National Park Service
U.S. Department of the Interior

NPS *Uni***Guide** Standards

*Uni*Guide

Identification, Wayfinding and Visitor Information for National Parks

Final Draft: *June 1, 2002*

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National Park Service UniGuide Standards Manual

The National Park Service UniGuide Program Manual is divided into six primary sections. An overview of this new system is included in Chapter 1. Chapters 2 and 3 describe the graphic standards, and the process for developing a sign plan. Fabrication, assembly, and material standards are provided for each sign type in Chapter 4. Chapter 5 is a field manual that includes instruction for both installation and maintenance of signs. Chapter 6 includes various reference materials for use when developing and maintaining park sign plans. The following Table of Contents lists the primary sections included in each chapter.

This PDF file was generated as a print document. Blank pages are included when necessary to allow this file to print as a front and back document.

Letter of Introduction

Table of Contents

Chapter 1

UniGuide Program

Section 1.1

Introduction to the UniGuide Program

Final Draft: *June 1, 2002*

The elements of wayfinding are a series of visual, editorial, and environmental cues to help visitors navigate and experience a National Park without confusion and conflict; the cues must enhance their enjoyment and understanding of the park without damaging the park's rich natural and cultural resources.

This definition of wayfinding, that describes the goals of this project, was developed with NPS Staff and the Project Design Team in the process of planning and designing the prototype for Yosemite National Park

National Park Service UniGuide Program

The way the National Park Service presents itself to those who visit parks says much about the agency's mission and its work. In fact, communicating effectively with the public is essential to the mission, and is one of the National Park Service's proudest traditions.

Signs are perhaps the most frequently used means of communicating with park visitors. Entrance signs offer greetings, welcoming visitors and reminding them that the place they are entering is part of a system of parks cared for by the National Park Service. Other signs guide visitors as they travel to or within parks, informing them of potential dangers, helping them to understand and appreciate what they encounter, reminding them of their role in caring for parks, directing them to various events and facilities, and helping them have a pleasant stay.

Despite their value, the National Park Service has not had comprehensive standards to direct the planning, design, and acquisition of signs. Current NPS sign standards, which are based on guidelines first developed in 1978, were designed primarily for road guide signs. The UniGuide Sign Standards illustrated on the following pages provide, for the first time, standards that address the full range of signs that parks typically need.

These standards offer a variety of benefits to those who manage and to those who visit parks. The UniGuide standards will help coordinate signs with other parts of a park's communication program. With consistent applications signs will reinforce the agency's identity. As a result, communications will be more certain, more rapid, and more effective, and visitor safety, convenience, and enjoyment will be more assured.

The new standards will also offer other, more practical, benefits. Costs associated with repetitive sign design can be reduced, or even eliminated. Likewise, fabrication costs can be lowered by taking advantage of mass production and purchasing. Maintenance costs are also reduced by limiting material choices to only those with the greatest durability. Sign planning and acquisition can be simplified by the use of standardized procedures that are supported by specialized software and internet applications. These same technologies can also be used to digitally archive and access park sign plans and specific sign production data, thus reducing the costs of inventory, maintenance, and replacement efforts.

For additional information about the UniGuide Program, contact Harpers Ferry Center Associate Manager Phil Musselwhite at 304 535 6049 or at phil_musselwhite @nps.gov.

Why are new sign standards needed?

New standards are necessary to respond to significant changes that have occurred in the quarter century since existing standards were developed:

Changing Audiences - Current NPS sign standards (NPS-SSS) were adopted in 1978, a year in which 294 parks were visited by 282 million people. Today, there are 385 parks which are visited by 429 million people each year. More important than growing in numbers, the character of park visitors is changing as well. Today's visitors are older and more international in origin. They also come to parks expecting facilities that are asthetically and functionally equal to those they enjoy elsewhere. The new standards address these requirements by providing signs that reflect the latest in human factors engineering and a systematic approach to environmental graphic design.

New Technologies - Sign technology has changed significantly since 1978. Rather than relying on pencil and paper, the new standards rely on the electronic technologies made possible by the computer. Sign planning, design, fabrication, delivery, inventory, and maintenance are all easier and better integrated with standards developed for the digital world. Many new sign materials and fabrication procedures have also been developed since 1978. They include advanced retroreflective surfaces, digitally imaged sign panels, and computerized sign-making equipment. By taking full advantage of these materials and methods, the new standards offer a much wider range of possibilities for park signs than the old guidelines.

Expanded Needs - The 1978 standards focused primarily on vehicular traffic signs within or leading to parks and provided limited guidance on metal entrance signs. The 1978 standards, however, did not begin to fully address the complex range of signs that are typically needed in a park. The new comprehensive standards offer complete design and fabrication specifications for a full range of sign types from interstate highway guide signs to campsite number designations and everything in between. The new standards also are consistent with the NPS graphic design standards that were recently introduced in response to the agency's effort to strengthen its public identity.

Why is an NPS sign program needed?

The National Park Service, one of the primary federal land management agencies,is currently responsible for over 83 million acres that are visited annually by nearly 430 million people. This responsibility includes directing the movement of those visitors along 8,000 miles of roads and 14,000 miles of trails in a manner that ensures their convenience and their safety while protecting each park's natural and historic features. Signs are the principal tools parks use to address this responsibility.

The National Park Service currently has more than 72,000 signs that represent an investment of over $100 million. Despite the importance of signs and the magnitude of their monetary worth, the agency lacks a clear designation of who is responsible Servicewide for signage. In fact, no one at the national or regional level has the singular and full-time responsibility. Signs are currently the purview of a loosely organized coalition of part-time regional sign coordinators, park sign shop managers, and park facilities managers. Consequently, signs are acquired from a mix of sources: local commercial vendors, park sign shops (in the 19 parks that still have them), and Federal Prison Industries (UNICOR).

The UniGuide Standards will be implemented in the context of a new NPS Sign Program. As outlined in Director's Order No. 52C, the program defines the various offices and individuals responsible for the planning, design, purchase, installation, maintenance, and replacement of signs. For the first time, the agency will have comprehensive sign standards, and, perhaps more important, a clearly defined organizational infrastructure dedicated to their successful use.

What are the roles of those involved in implementing the UniGuide Program?

The general responsibilities of most of the participants, from the Director to Park UniGuide Managers, are defined in Director' Order #52C. Additional details are provided below:

National UniGuide Program Advisory Board

Provides ongoing oversight to ensure effective management of the program

National UniGuide Manager

Manages overall implementation of the program

- Prepares and updates standards and related sign planning tools
- Prepares training curriculum, trains Regional UniGuide Managers, and oversees their training of Park UniGuide Managers
- Secures and coordinates private sector sign planning services for use by parks
- Coordinates and responds to advice from the National Uniguide Program Advisory Board
- Coordinates activities of the Regional UniGuide Managers
- Issues contracts to and manages performance of Private Sector Sign Supplier
- Coordinates UniGuide Program with Denver Service Center Construction and Park Roads and Parkways Programs

Harpers Ferry Center

Manages and supports activities of the National UniGuide Manager

- Lets and administers contracts with Private Sector Sign Supplier
- Lets and administers contracts for sign planning services
- Provides graphic design, editorial, and cartographic services as required
- Provides quality control over production and delivery of sign hardware and sign panel imaging
- Reports progress and problems in implementing the program to Associate Director for Park Operations and Education

Regional UniGuide Manager(s)

Manages implementation of the program at the Regional level

- Trains Park UniGuide Managers and other NPS personnel in creating sign plans
- Coordinates NPS and private sector sign planning services to assist parks in creating and maintaining sign plans
- Assists ordering and installation of signs; troubleshoots problems in sign ordering process
- Reports progress and problems in implementing the program to Regional Director
- Coordinates design and fabrication of nonstandard signs through National UniGuide Manager
- Advises parks on funding resources and procedures

Park UniGuide Manager(s)

Manages implementation of the program at the park level

- Prepares and maintains park sign plan with assistance from Regional UniGuide Manager and National UniGuide Manager
- Orders Signs from Private Sector Sign Supplier
- Oversees installation of signs by park or Sign Supplier
- Inspects installed signs, maintains and replaces signs as required
- Maintains local inventory of sign hardware for rapid replacement
- Reports progress and problems in implementing sign program to Superintendent
- Coordinates with park staff to help create common voice for all communications

Private Sector Sign Supplier

Provides signs to parks consistent with NPS design and fabrication standards

- Prepares final production files for sign panel imaging
- Produces and delivers sign hardware and panels to parks
- Maintains supply of standard sign panels and hardware for rapid delivery
- Provides sign installation services
- Constructs and maintains transactional website for online sign ordering
- Maintains database of park sign plans and production files with online NPS accessibility

What is the schedule for implementing the UniGuide Program?

Although considerable effort has gone into developing the UniGuide Standards and preparing the standards manual, much work remains to be done before the standards can begin to be implemented. Two primary tasks must be completed: secure the required approval of the standards, and establish a vehicle for the planning and fabrication of signs.

Formal NPS review of the standards began last fall with the issuance of Director's Order No. 52C: Park Signs for a 60-day period of field review. The Director's Order was revised in response to comments and reissued along with an extensive technical manual for its current period of review, which is scheduled to conclude in September, 2002. Alterations will be made to the DO and the technical manual based on comments received, and both will be forwarded to the Director in November for consideration. Upon signing of the DO, the UniGuide Standards would be officially adopted as NPS policy.

In order to implement the standards, however, contracts must be established with sign suppliers and fabricators, and with environmental graphic design firms who can assist parks in preparing sign plans. Although preliminary efforts to select both types of vendors are already underway, contracts will not be in place until November 2002 for design firms, and February 2003 for sign suppliers. Additional time will also be required for the fabrication vendor to tool-up and establish procedures for receiving orders. Initial deliveries are not expected to begin until the spring of 2003.

What do I do until implementation of the standards takes place?

As indicated above, delivery of signs that reflect the new standards may not begin until the spring of 2003. Until then replacement of existing signs or the purchase of urgently needed new signs should proceed using current standards (NPS-SSS/January 1988). Large sign purchases should be delayed until the advent of the UniGuide Standards.

Do the standards apply to everyone?

All parks are expected to follow the standards. Director's Order No. 52C: Park Signs states: "Superintendents are expected to expeditiously convert park signage to the new standards to the extent permitted by available funding. However, in accordance with Director's Order No. 52A, existing stocks will be used until exhausted. Also, nothing in this policy will affect the continued use of entrance and other signs that have historic significance. Determination of which signs are historic will be a function of the National UniGuide Program Advisory Board. Use of the standards in cultural landscapes, historic districts, and backcountry and wilderness areas will be moderated by the special nature of these areas and in accordance with established policies and practices. These standards are not generally intended to be

applied to signs installed in parks by other government agencies, concessioners, and lessees of historic properties; exceptions may be granted by park Superintendents.

Who determines if an existing sign has "historic significance" and is therefore exempted from the new standards?

To ensure that the UniGuide Standards continue to serve the communication needs of various park programs, a National UniGuide Program Advisory Board will be created. The board will include representatives from various park functions: management, interpretation, maintenance, law enforcement, etc. In order to determine which park signs (either entrance or facility identification) are historically significant, the board will periodically convene a subgroup including board members and others with specialized knowledge on the subject of signs and history, including historic architects and landscape architects, park historians, sign makers, environmental graphic designers, etc. This subcommittee will determine a sign's historic significance in concert with a park's superintendent based on information supplied by the park.

Will the new signs all look alike?

To maximize their authority, all park signs must be recognized as official National Park Service messages. Just as the credibility of park rangers is enhanced by the consistency of their uniforms, signs gain authority by repetition of style. They also gain clarity. As visitors travel from park to park, they are greeted by a graphic language that they come to know and understand. Communication is more assured, more rapid, and more effective. Redundancy of appearance also helps strengthen the agency's identity by ensuring that the public is fully aware of the NPS and the breath of its mission.

The goal of the standards is to find the appropriate point between the extremes of absolute uniformity on the one hand and exhaustive custom design on the other. Too much of the former results in signs that are overly "corporate" in appearance; too much of the latter increases costs and fails to adequately reflect a park's connection to the agency. The new standards attempt to achieve a reasonable balance by prescribing some features while offering enough flexibility to ensure that signs reflect the visual character of individual parks. This is especially true of entry signs. Consistency is achieved by the conformity of the sign panel; appropriateness is insured by providing variety in the form and the material of the sign's structure.

Will the new signs be more expensive?

Because of large-volume purchasing and delivery, the initial cost of many signs will actually be less expensive than it was previously. Some signs may be more expensive initially, but because the UniGuide Standards specify the use of higher-quality, durable, and reusable materials, total life-cycle cost will be less than the current costs.

For example, wayside exhibit hardware is currently made from aluminum tubing and extrusions are cut, welded together, sandblasted, and coated with two layers of paint. Although the resulting wayside base has a standardized appearance, its manufacture is so labor intensive it is essentially a custom product. The price of the existing design is about $600 per unit. The cost of a wayside base specified under the new standards will be about $400. This difference results primarily from the fact that the new hardware is a mass-produced kit of parts that is assembled rather than built.

Not only are the new wayside bases less expensive to purchase, because of the materials they employ, they are also less expensive to maintain. Current wayside hardware uses painted metal, which after several years requires repainting; the new hardware is made from uncoated weathering steel (or galvanized steel in coastal environments) that essentially require no maintenance. This is true of most all signs in the new system. Because they are stout in form and use rugged materials, the signs will last longer and require much less upkeep.

Of course, the price of a sign is not simply the sum of its purchase and maintenance costs. The total price also includes the cost of planning and design and any expenses associated with sign acquisition. Because the new standards provide simplified planning methods, standardized design, and automated acquisition procedures, costs associated with these activities are greatly reduced or eliminated.

Finally, sign designs developed for one park can be used by other parks that have the same need through a shared digital library of signs, thus reducing the cost of repetitive sign planning and design.

Will the signs take longer to make?

The new system includes three sign categories: 1. Road Guide and Traffic Regulatory Signs; 2. Entrance and Facility Identification Signs; and 3. an extensive set of small panel signs for orientation, interpretation, safety, resource protection, and pedestrian wayfinding. Manufacture or construction of the first and second types of signs will require about the same time it currently does. Planning these types of signs should take considerably less time however. Manufacture of the third category of signs (the Visitor Information System) should take dramatically less time, because the hardware is mass-produced and shipped to

parks for assembly. Wayside exhibit bases, for example, which currently take months to produce in quantity, could be delivered in a matter of days. Other small sign hardware could also be shipped very quickly, or parks could keep a small inventory of the hardware on hand for immediate use.

Have the new standards been tested?

Yes, the standards have been the subject of considerable laboratory analysis and field observations.

Human Factors Studies: In March, 2001, a study of prototypical sign panels developed for Yosemite National Park was conducted by the Virginia Polytechnic Institute and State University. The Virginia Tech study was conducted jointly by the school's Department of Resource Recreation and Tourism and the Department of Industrial and Systems Engineering. Preliminary lab studies conducted at the university were followed by field evaluations in the North Pines Campground and Yosemite Falls trailhead at Yosemite. The results of both studies were helpful in understanding the importance of sign placement, the proper amount of narrative and illustrative content, and the value of maps. The findings of this study have been incorporated into these standards.

Analysis of Sign Typography: In 2001, tests were conducted to determine the relative effectiveness of the new NPS standard Rawlinson Roadway typeface. The tests were conducted by the Pennsylvania Transportation Institute (PTI) at The Pennsylvania State University. Researchers evaluated NPS Roadway against the current NPS standard typeface (Clarendon) and against two federal highway alphabets. The Penn State tests were conducted on a track using human subjects to determine the readability of these fonts against retroreflective sign sheeting during the day and at night. The tests concluded that NPS Roadway "results in 10.5% greater legibility distances and equal recognition distances compared with NPS Clarendon." The study also found that words created with Roadway "are 11.5% shorter than the same words created with NPS Clarendon" thus enabling signs that are considerably smaller in overall size.

Evaluation of Prototypes: Several sign prototypes have been constructed, and some have been installed in parks. Various types of signs were placed in Yosemite Valley in 1998 and on the South Rim of the Grand Canyon in 2000. Important lessons were gained from each installation that prompted revisions to the standards. For example, difficulties at Yosemite in installing and replacing certain signs led to the redesign of a primary component of the sign's structure. The installation at Grand Canyon prompted the design of several new sign types and highlighted the need to maintain quality control of hardware manufacturing. Additional prototypes are planned for Mount Rushmore, C&O Canal, George Washington Birthplace, Palo Alto Battlefield, Death Valley, and Adams National Historical Park.

How will signs be planned?

Having standards for the design and fabrication of signs is pointless unless their application is based on solid sign planning. At its most basic, planning a sign is simply determining its purpose, placement, and content. Signs are often planned in the context of larger undertakings: the construction of a visitor center, for example, or the development of a campground or roadway. Sometimes, as in the case of Yosemite, Grand Canyon, and Zion, signs are an integral and essential part of a transportation system.

Director's Order No. 52C requires each park to develop a sign plan to guide the acquisition, installation, and maintenance of their signs. The Director's Order also requires the appointment of Regional UniGuide Managers to provide assistance to parks, including help in developing sign plans. Besides establishing contracts for the manufacture and delivery of signs, various tools (forms, templates, samples, software programs, etc.) will be developed to assist parks in creating comprehensive sign plans and in applying the standards to individual signs. Training will also be offered as funding allows. In the short run, and for those parks that might always need or prefer outside assistance, contracts will be established with a number of private-sector sign planning firms that are versed in the new NPS standards.

What exactly is a sign plan?

A sign plan is a list of all signs in or relating to a specific park that are installed and maintained under the authority of that park's management. The plan is an inventory of all existing signs and a proposal for any additional signs. A sign plan documents all attributes of a sign including location, type, purpose, content, physical characteristics (of structure, sign panel, and mounting assembly), and physical condition. A comprehensive sign plan will include a sign location map (in AutoCad or other software) of an entire park indicating the location of each sign by unique reference code number and a database of digital files containing the production artwork for each sign panel in the system.

The purpose of a sign plan is to ensure that all signs work in concert and in support of approved park communication goals and that they are compliant with NPS design standards. A sign plan will also help ensure that signs are routinely maintained and promptly replaced as required.

The development of a park sign plan is the responsibility of the Park UniGuide Manager with assistance from the Regional UniGuide Manager The actual planning may be done by agency personnel or by environmental graphic design firms working through contracts established by the National UniGuide Manager.

How will signs be purchased?

One of the biggest advantages of having common design and production specifications is that they allow volume purchasing. Buying in quantity enables lower unit prices and helps to ensure quality control. The goal of the new UniGuide Program is to offer reasonable prices and good quality and to do so in the most efficient and convenient way.

Signs will be supplied through a master private-sector contractor who will be responsible for production schedules and overall quality control. Because of the specialized nature of sign hardware and panel fabrication, much of the actual manufacturing will be subcontracted to other suppliers. This master contractor will also provide installation services to those parks that prefer not to undertake this work. Most orders for signs and other transactions between parks and the primary vendor will be handled over the internet. This will enable transactions to be swift and all records (both individual and cumulative) to be readily available to all parties involved.

Is UNICOR still the required sign supplier?

UNICOR (also known as Federal Prison Industries) is a "mandatory source" for federal agencies that wish to purchase signs and other items. This means that the NPS is required to purchase signs from UNICOR unless UNICOR expressly allows the agency to go elsewhere. As indicated above, UNICOR has traditionally provided retroreflective aluminum signs to the NPS. Discussions are underway to determine whether UNICOR will continue this practice. In either case, signs fabricated by UNICOR will likely be purchased through the general NPS sign supply contractor, rather than directly from UNICOR.

May signs be produced locally?

There are two possible sources for the local fabrication of signs: park sign shops and private-sector vendors.

Currently 19 parks maintain active sign shops. Although the UniGuide standards were not developed to specifically accommodate the capabilities of these shops, most of them can produce many of the signs specified in the standards. Shops with the ability to route wood can produce Park Entrance and Facility Identification Signs; those with the ability to work in metal and to cut retroreflective materials can produce Motorist Guidance Signs. Because the Visitor Information System hardware includes extruded metal components, parks must purchase these materials from the general NPS sign supply contractor. VIS hardware is intended to hold a variety of flat sign panel materials, including screen prints or cut vinyl, that many park sign shops can produce. Park shops cannot produce porcelain enamel or the new digitally imaged panels.

Federal regulations require that all NPS signs be produced internally or be purchased from Federal Prison Industries (UNICOR). Traditionally, UNICOR has supplied retroreflective aluminum signs to parks. If, as expected, UNICOR continues to provide this type of sign, parks may not obtain them from private-sector vendors. There are no federal prohibitions that restrict the purchase, from local sources, of sign types that are not supplied by UNICOR. However, parks that buy from these sources will give up the advantage of established supply contracts, lower unit prices associated with volume purchasing, centralized quality control, access to computerized planning and design programs, and to online archiving of sign production files and park sign plans. They may also fail to capitalize on signs already created for other parks that suit their current need.

How will signs be funded?

Funding to complete the development of the UniGuide Standards, to support the process of their approval, and to oversee their continued use has been provided by the National Leadership Council. However, new funding to support the purchase of signs by parks was not provided. For now, parks that wish to purchase signs must do so from sources they have traditionally used for this purpose. Once the new standards are implemented, funding to help parks pay for signs may become available as part of the agency's effort to address its maintenance and repair backlog. The existence of detailed and comprehensive standards will assist in securing such funds by demonstrating that they would be used in a consistent and controlled way, and in keeping with the NPS pledge to employ standardized designs more frequently.

Why are the new standards called UniGuide?

The term UniGuide is derived from the name of the graphic standards that have directed the design of NPS brochures and handbooks since the late 1970s. The Unigrid Program, as it is called, is considered one of the most significant and recognizable examples of public-sector graphic design in recent years. The guidelines, which are now the foundation of all NPS graphic standards, have provided interpretive media that are consistent, highly functional, attractive, reasonably priced, and easy to maintain. The UniGuide Program is intended to offer these same attributes to NPS signs.

Why are new sign typefaces needed?

The 1978 sign standards prescribe the use of Modified Clarendon. Another typeface, Modified Gothic, is not referenced in the '78 standards but is used on hand-routed wooden signs that still appear in some parks. New NPS sign standards specify the use of two typefaces: NPS Rawlinson (and a variation called NPS Rawlinson Roadway) and Frutiger. Rawlinson and Frutiger were selected in the process of developing new graphic design guidelines for the NPS. These new general standards, created as part of the NPS Message Project, are intended to strengthen the agency's identity and to make the public more aware of the breadth of its mission with a single family of typefaces for all NPS graphics. The developers of new NPS graphic standards followed identity design tradition by selecting a sans serif face (Frutiger) and a complementary serif face (Rawlinson). Frutiger (designed by Adrian Frutiger) was chosen because of its clarity at very small sizes (as on printed materials, like maps), and at a distance (as on signs). Frutiger is, in fact, one of the few sans serif typefaces originally designed for use on signs. NPS Rawlinson was custom designed for the NPS (by James Montalbano of Terminal Design, Inc.) for a range of applications, especially signs. Because Rawlinson sets in a (11.5%) shorter word length than Modified Clarendon of the same letter height, signs in Rawlinson are correspondingly smaller. Research conducted by the Pennsylvania Traffic Institute shows that NPS Rawlinson Roadway (a custom weight and setting of Rawlinson) is more legible at significantly greater distances than Modified Clarendon.

What changes were made to the NPS Arrowhead logo and why were they necessary?

In response to recommendations from the NPS Message Project, the National Leadership Council directed that "exact standards should be developed for the appearance and use of the Arrowhead." The decision was made in the belief that wider use of the Arrowhead, and greater consistency in its appearance, would contribute to the public's recognition of what the National Park Service does, both within parks and beyond park boundaries. Because the National Park Service is highly regarded as a public agency, the NPS Arrowhead has gained some equity as a symbol. Dramatic changes to the logo were therefore not necessary, but a few have been made in order to visually simplify the logo and to ensure its successful reproduction. Five versions of the logo were created for use in a range of media. For information about these versions, visit <www.graphics.nps.gov>. Two of the Arrowhead logos have been selected for use on NPS signs. For information about these, refer to page 2.3-3 of this manual.

Are the new standards compliant with the MUTCD?

In most respects, the UniGuide Standards conform to the Manual on Uniform Traffic Control Devices published by the Federal Highway Administration. Those few areas where the standards do not conform are being identified in conversations with FHWA. Further discussions will determine whether the UniGuide Standards will be revised to comply with the MUTCD or whether the FHWA will permit the National Park Service certain exceptions, as it has in the past.

Will UniGuide signs help meet NPS sustainability goals?

Yes. The Uniguide Program recognizes the opportunity that the National Park Service has to be a model for environmentally responsible behavior. Development of the standards was guided by a number of principles:

Durability: The UniGuide Standards specify materials that are rugged and are used in stout dimensions and forms. This means that fewer materials are used over time because the signs resist damage and last longer.

Limited Energy Consumption: Signs that last longer also mean less energy is consumed, because they do not need to be inspected, repaired, or replaced as often. This saves fuel and money. Signs that are well planned and communicate effectively also mean that visitors' vehicles consume less fuel by traveling to their destinations directly and quickly.

Recyclability: Most materials specified by the UniGuide Standards -- including wood, steel, and aluminum -- are recyclable.

Reusability: Much of the UniGuide hardware is designed as a kit of parts that can be assembled, taken apart, and then reassembled for a different use rather than being discarded.

Efficient Manufacturing: Because most of the UniGuide hardware components and sign panels are produced in volume, efficient fabrication procedures can be employed saving both energy and materials.

Flexibility: Because they are based on a modular system, UniGuide sign panels can be made of a variety of materials. Over time, as newer, more environmentally friendly materials are developed, they can be incorporated into the system.

How do the UniGuide Standards address issues of accessibility?

The signage component of the Americans with Disabilities Act sets accessibility standards primarily for building interiors, with exterior sign requirements limited to parking and passenger loading zones. In the spirit of the Act, the UniGuide mounting heights for all outdoor signs are designed for ease of reading from both sitting and standing positions. Futhermore, signs that communicate effectively with those who have visual impairments (and those who do not) must adhere to certain graphic design principles, especially those relating to typography. The UniGuide Standards carefully considered each of the following criteria in the *Accessible Text Guidelines* developed by the Society for Environmental Graphic Design (SEGD) for the U.S. Access Board *(February 2001)* in response to the Americans with Disabilities Act:

Typestyle: In selecting typefaces for the UniGuide Standards, considerable attention was given to those that are highly legible. In accordance with SEGD recommendations, two classic faces were chosen: the sans-serif face Frutiger which was initially designed for ease of reading on road guide signs, and Rawlinson which was developed specifically for the National Park Service. Tests on Rawlinson demonstrate that it is a very readable font. Although decorative fonts appeal to some because of their historic reference, they were avoided. Variations of Rawlinson and Frutiger (e.g., light, extra bold, condensed, expanded, italic, etc.) were generally also avoided. Finally, in keeping with SEGD guidelines, words of all uppercase letters were used very sparingly because they are difficult to read.

Type size: 16 point type is considered by most sources as the smallest acceptable size for "large-print" communications. (12 point is considered an effective size for conventional communications where no large-print versions are planned.) Type sizes used in the UniGuide Standards range from 20 point on signs in the Visitor Information System all the way to 12 inches on Motorist Guidance and Park Identification Signs.

Letter, word, and line spacing: Regardless of type size, all text must have sufficient space between characters, words, and lines if it is to be easily read. The default settings for both Rawlinson and Frutiger in the UniGuide Standards provide ample letter and word spacing; line spacing may be adjusted according to the type of sign and the length of the text.

Line length: The Uniguide Standards provide layout grids that help avoid text lines that are too long or too short. Rather than indenting, paragraphs are distinguished by an open line space between them. Text is set in a flush-left alignment and hyphens are used infrequently, again in compliance with SEGD recommendations.

Color and Contrast: Generally, the higher the contrast between type and its background, the more readable the type is. According to the SEGD, contrast may be achieved by black text on a light background or white text on a dark background. The UniGuide Standards pre-

scribe the use of both black or white type; other colors are used sparingly for emphasis or to designate specific subjects. Backgrounds are typically dark or mid tones; white is rarely used to avoid glare outdoors.

Content and layout: SEGD guidelines state that "information (layouts) should follow clear hierarchical patterns, and the elements ... should be sensibly located and follow logical progressions." Informational signs in the UniGuide Standards present information in an easily understandable sequence, beginning with a headline, continuing with a text deck that briefly presents the subject or purpose of the sign, and concluding with additional details supplemented by illustrations and symbols when appropriate. Purely decorative elements are avoided so that text can be presented in clearly defined blocks, again consistent with SEGD guidelines.

Introduction: Overview of UniGuide Program

The following section illustrates the four major types of sign in the UniGuide Program. These include Park Identification, Visitor Information System (VIS), and Motorist Guidance and Traffic Regulatory signs. The chapters that follow, 2 through 6 provide detailed specifications, and instruction on each aspect of the sign and the way they are incorporated into the overall program.

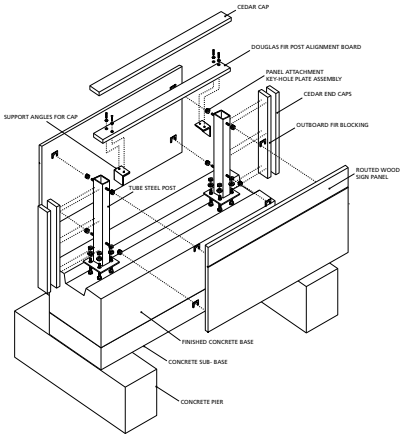
Park Identification

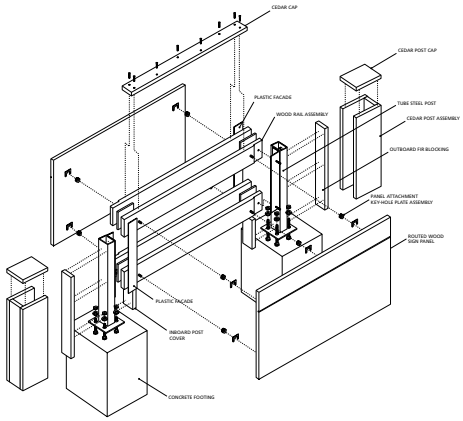
his category includes both Park Entrance and Park Facility Identification Signs. Facilities to be signed may include visitor centers and other buildings, campgrounds, geographic areas including subunits of larger parks, significant physical features, and other places of interest or activity. Park Entrance signs are perhaps the most important of all park signs. They welcome visitors as they arrive, providing a gateway that marks the beginning of their park experience. Above all other signs used in a national park, entrance signs represent an architectural statement that should reflect the importance and quality of the park and the agency. To this end, the UniGuide Standards offer considerable latitude in the design of these signs. The various styles are based on historic examples that still exist in many parks. Monolithic, double-post, and hanging sign types may be constructed in a variety of materials to ensure that they are appropriate to their setting. Materials may include wood, cut or random stone, brick, stucco, cast concrete, and porcelain enamel or other metals. To ensure that visitors understand that an individual park is one of many managed by the National Park Service, sign panels are of a consistent appearance, using the NPS Arrowhead, standard typefaces, and other elements from the recently developed graphic identity standards. Repetition of these components will help to create a strong public identity and reinforce the fact that parks are managed by a single organization.

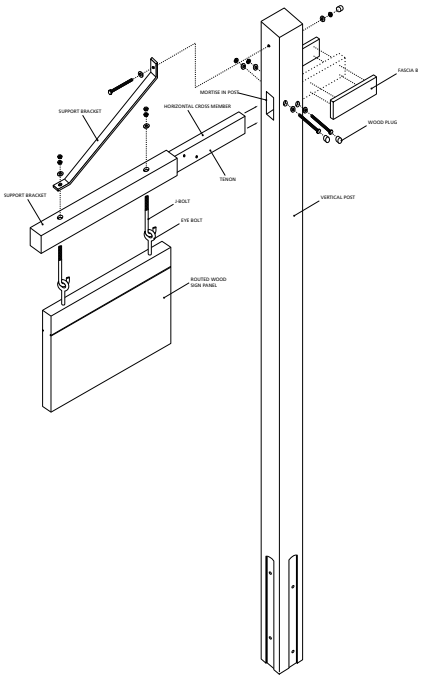
In addition to complete material specifications and assembly drawings for three standard identification sign types, the UniGuide Standards provide suggestions for a number of other styles. Parks may use these guidelines to construct Park and Facility Identifications Signs on their own, or they may rely on the design and engineering assistance -- and standard sign panels-- available through the National UniGuide Manager at Harpers Ferry Center.

Park Identification

Designed to provide distinctive and consistent identification of park entrances and significant destinations, these signs incorporate agency and department names and the NPS Arrowhead symbol. Although designs for standard signs are provided, variations in structure and materials may be used to reflect the character of the park and the sign's setting.


CEDAR CAP
DOUGLAS FIR POST ALIGNMENT BOARD
PANEL ATTACHMENT KEY-HOLE PLATE ASSEMBLY
CEDAR END CAPS
SUPPORT ANGLES FOR CAP
OUTBOARD FIR BLOCKING
TUBE STEEL POST
ROUTED WOOD SIGN PANEL
FINISHED CONCRETE BASE
CONCRETE SUB- BASE
CONCRETE PIER

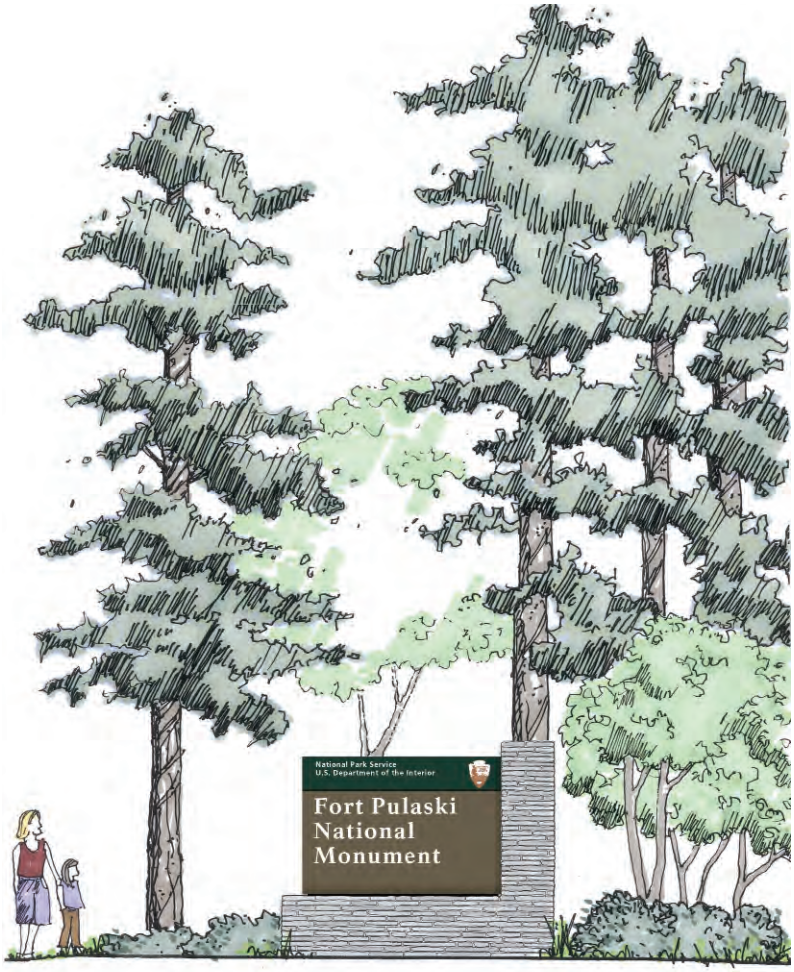

CEDAR CAP
CEDAR POST CAP
PLASTIC FACADE
WOOD RAIL ASSEMBLY
TUBE STEEL POST
CEDAR POST ASSEMBLY
OUTBOARD FIR BLOCKING
PANEL ATTACHMENT KEY-HOLE PLATE ASSEMBLY
ROUTED WOOD SIGN PANEL
PLASTIC FACADE
INBOARD POST COVER
CONCRETE FOOTING


FASCIA B
MORTISE IN POST
SUPPORT BRACKET
HORIZONTAL CROSS MEMBER
WOOD PLUG
TENON
SUPPORT BRACKET
VERTICAL POST
I-BOLT
EYE BOLT
ROUTED WOOD SIGN PANEL


National Park Service
U.S. Department of the Interior
Assateague Island
National Seashore

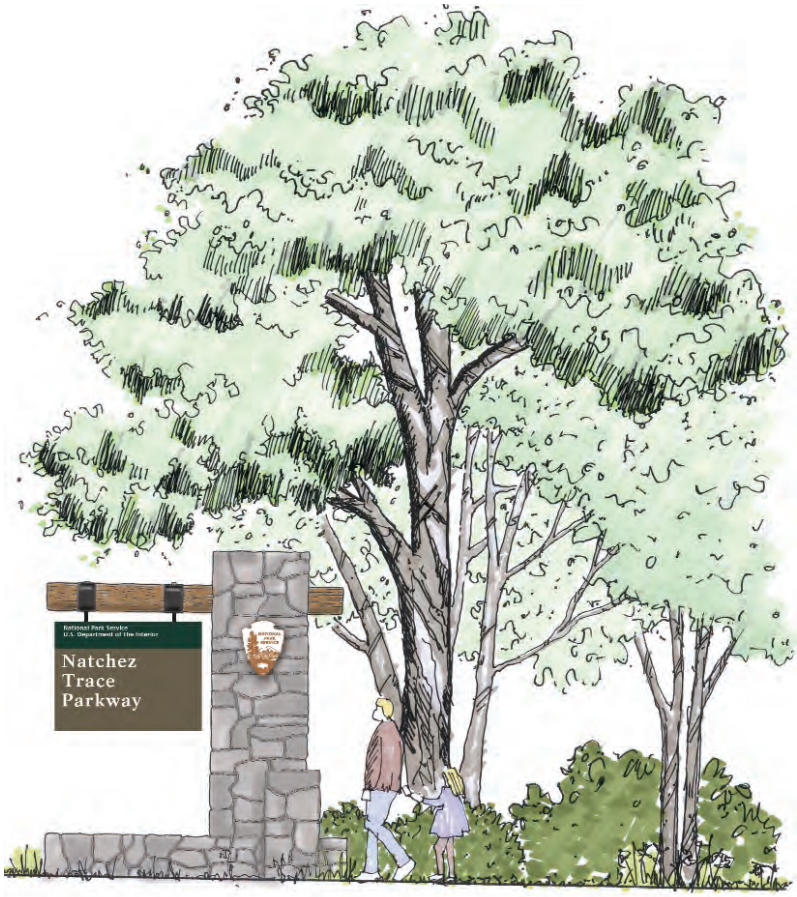

National Park Service
U.S. Department of the Interior
Big Cypress
National Preserve


National Park Service
U.S. Department of the Interior
Colonial National
Historical Park
NATIONAL PARK SERVICE

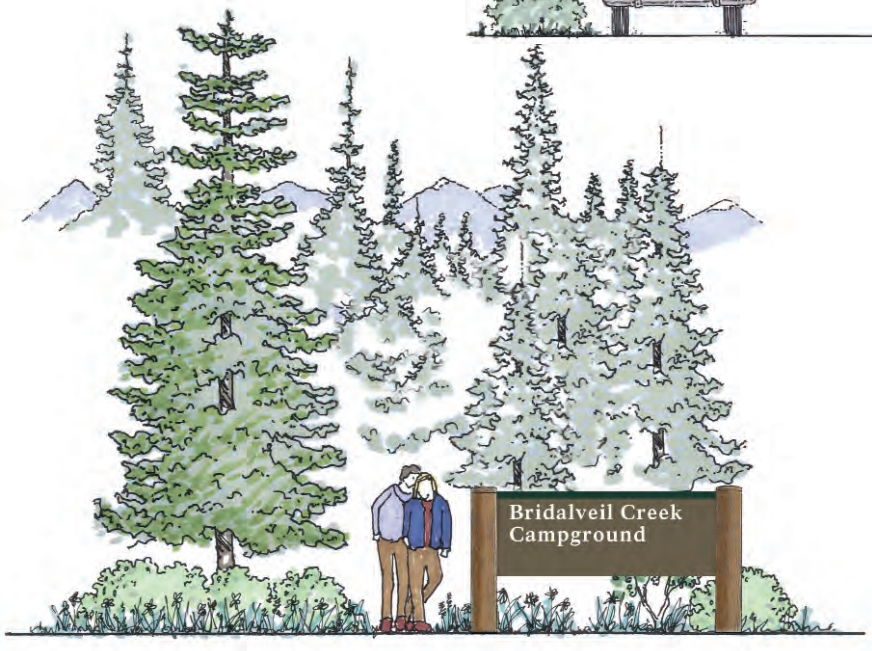

National Park Service
U.S. Department of the Interior
Fort Pulaski
National
Monument


Yosemite
Creeek
Campground

UniGuide Program Overview


Natchez
Trace
Parkway


Lassen
Volcanic
National
Park


Bridalveil Creek
Campground

Visitor Information System

Nearly 90% of all park signs fall into this category. VIS Signs are designed to present information in a consistent, attractive, convenient, and flexible format. Such information may involve pedestrian or bicycle and (low-speed) motorist guidance, regulations, resource protection, instructions and general information, safety warnings, maps, and interpretation. VIS Signs may also be used to identify parks (or park areas, features, or facilities) when more monumental identification signs are not required.

The Visitor Information System is based on a set of hardware components that may be configured in a variety of ways to hold modular sign panels and other accessories. VIS hardware is available in a range of materials to suit local requirements, all selected for vandal resistance, general durability, and low maintenance. Although each sign form is stout, each is designed to be visually unobtrusive and to "go lightly on the land." Each sign structure can hold a variety of individual information panels, made from an extensive list of materials including porcelain enamel, fiberglass, cut vinyl on metal, or digitally imaged resin laminates. A mix of materials can be used in the same assembly, each chosen to suit the information it carries.

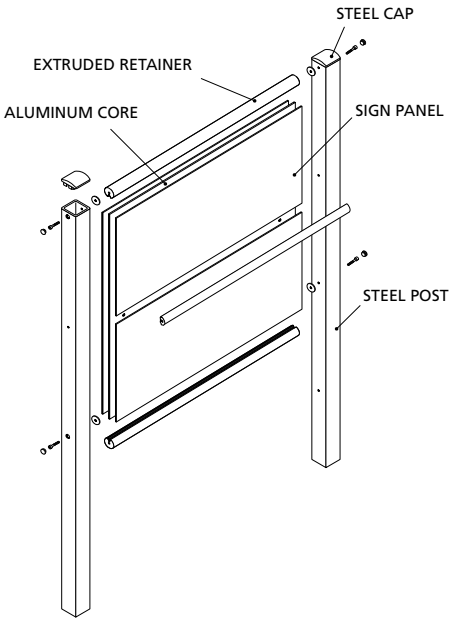
The modular nature of VIS signs also allows content to be presented in discrete, easily comprehended "eyefuls" consistent with how park visitors are most willing to receive information according to research. This approach is also consistent with the way that those with visual difficulties prefer to view text and visual materials. Additionally, this modular approach enables information panels (and sign hardware) to be used and then easily taken apart and reassembled for service at other times or locations.

The UniGuide Standards include an extensive set of templates, instructions, and examples to enable park staffs to develop most of the VIS signs they need. Easy-to-use computer-based planning and design programs are being developed to make this process, and the ordering of signs, even easier. Assistance with more complex content (maps, illustrations, etc.) or with the development of a large number of signs will be available through the National UniGuide Manager. An array of standard signs in the VIS series will also be available. Chapter 6 of this manual shows those currently produced. These signs may be purchased "off the shelf" or used as models for similar signs. Signage consistency will help ensure that communication with visitors will be more certain, more rapid, and more effective than previously, and that visitor safety, convenience, and enjoyment will be enhanced.

Besides supporting sign panels, VIS hardware is designed to accommodate a number of accessories: bulletin cases, campsite numbering bollards with fee receipt holders, brochure distribution boxes, campground and backcountry registration cabinets, and trash bag distribution boxes for parks that have eliminated the use of trash cans. Additional accessories will be added as the standards continue to develop.

Visitor Information System

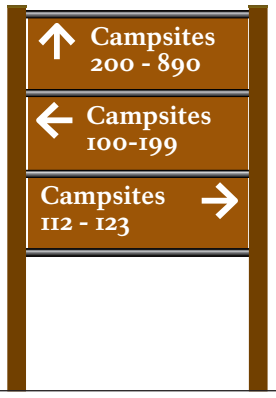
VIS signs are designed to provide an attractive and consistent way to present a broad range of messages. The modular system allows posting of regulations, safety warnings, information, interpretation, pedestrian guidance, and other wayfinding information including maps. The hardware is vandal resistant and reusable. Hardware and panels are available in a variety of materials to accommodate local conditions.



Vertical Assembly
Page 4.2-61-65

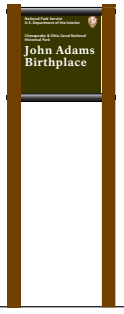
Shuttle Stop & Area Regulations

Low-Speed Motorist Guide

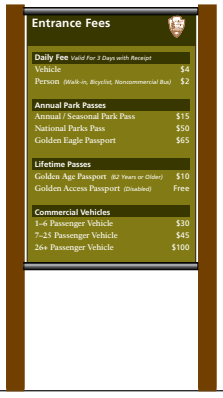


Area Entry

Facility Identification



Entrance Fee



Campsites
112 - 123

Pets on Leash Only

National Park Service
U.S. Department of the Interior

Wrangell-St. Elias National Park & Preserve

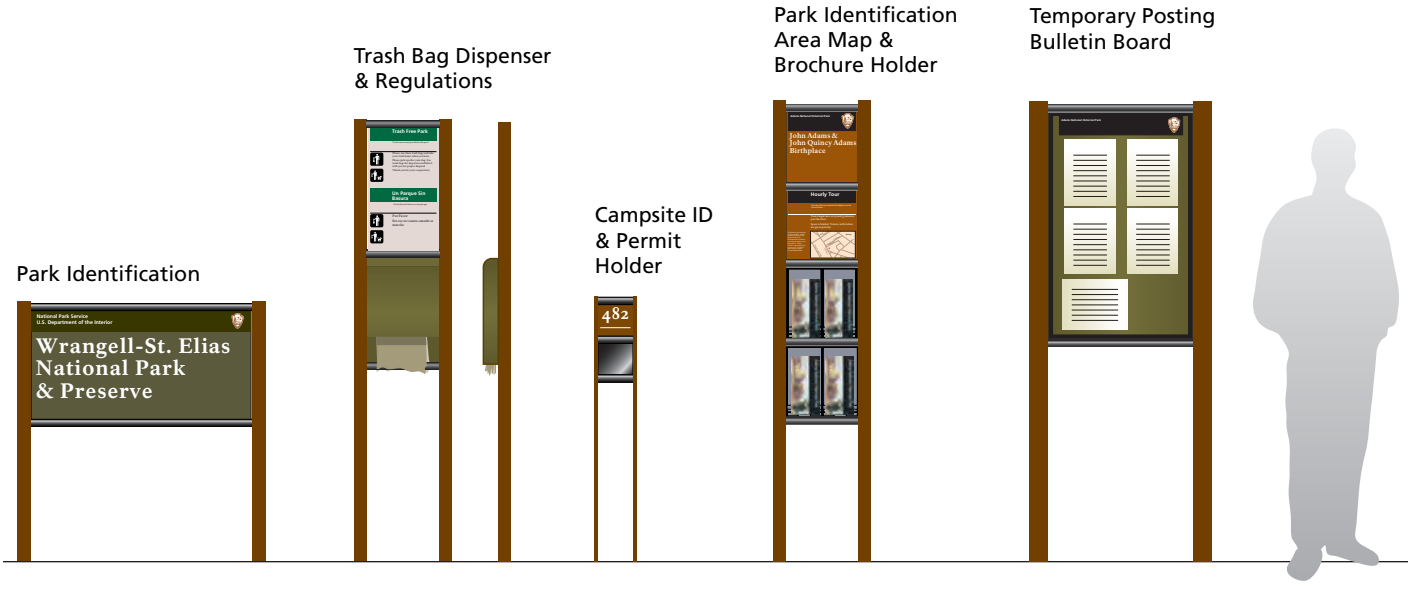
Entrance Fees

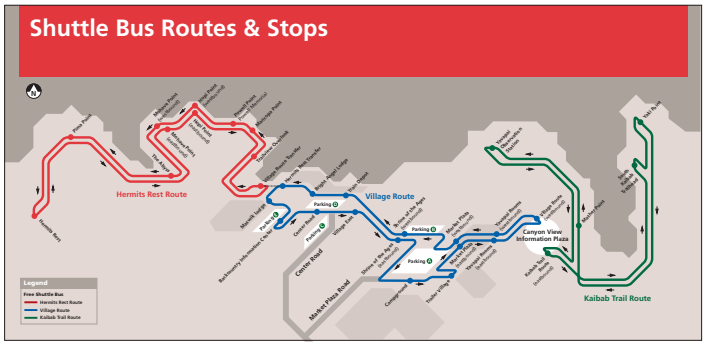
Daily Fee *Valid For 3 Days with Receipt*	
Vehicle	$4
Person *(Walk-in, Bicyclist, Noncommercial Bus)*	$2
Annual Park Passes	
Annual / Seasonal Park Pass	$15
National Parks Pass	$50
Golden Eagle Passport	$65
Lifetime Passes	
Golden Age Passport *(62 Years or Older)*	$10
Golden Access Passport *(Disabled)*	Free
Commercial Vehicles	
1–6 Passenger Vehicle	$30
7–25 Passenger Vehicle	$45
26+ Passenger Vehicle	$100

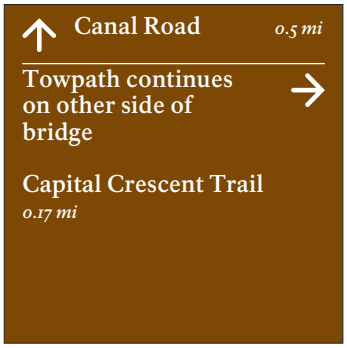
National Park Service
U.S. Department of the Interior

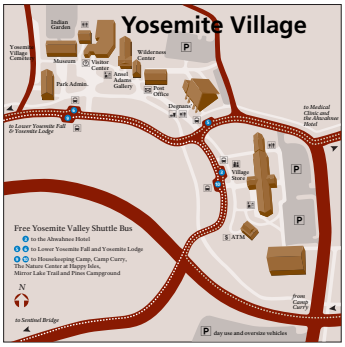
Adams National Historical Park

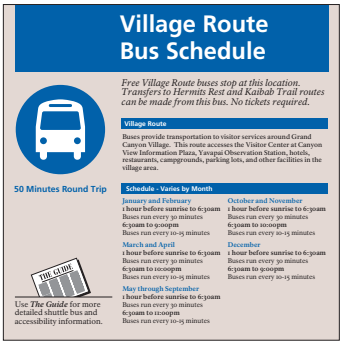
John Adams Birthplace









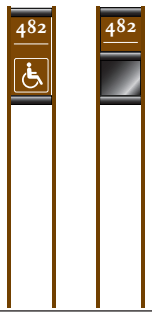


Warning & Regulations

Warning & Regulations

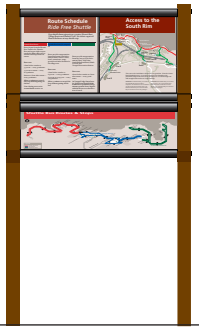
Pedestrian Guide

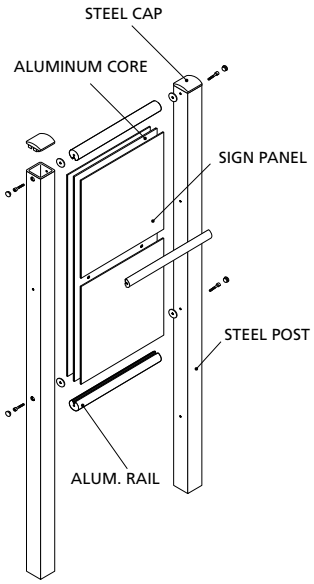
Campsite Identification



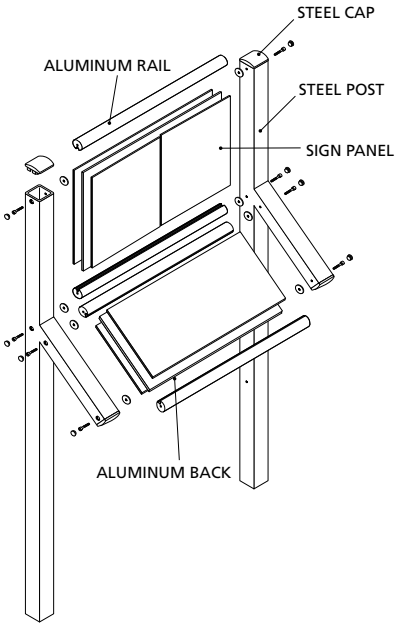
Warning & Pedestrian Guide

Shuttle Bus Information

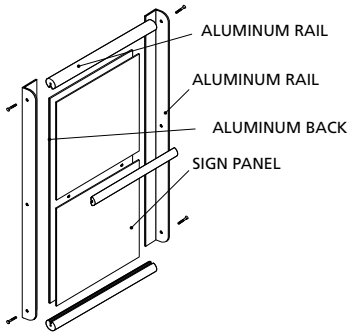




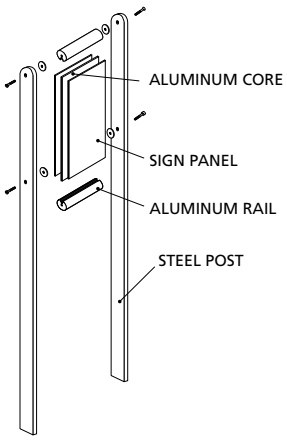
Vertical Assembly
Page 4.2-61-65



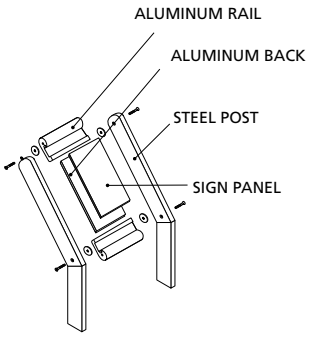
Forward Angle Assembly
Page 4.2-81-86



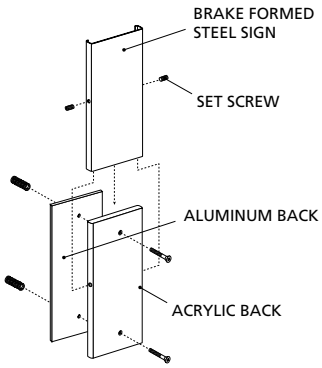
Wall Mount Assembly
Page 4.2-109-111



Narrow Profile Assembly
Page 4.2-98-99

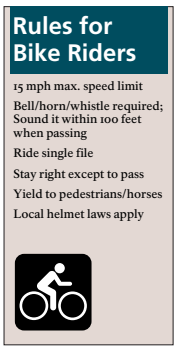


Reverse Angle Assembly (low to ground)
Page 4.2-95-97



Wall Mount Assembly Narrow Profile
Page 4.2-102-103

Narrow Profile Panels



Motorist Guidance:

This category includes four kinds of signs: 1. Highway Guide Signs; 2. Trailblazers and Park Boundary Signs; 3. Road Guide Signs; and 4. Traffic Regulatory and Warning Signs.

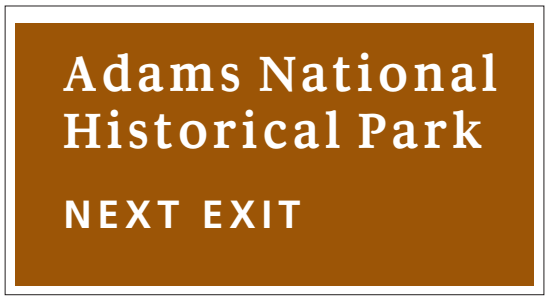
Highway Guide Signs are placed on state roads outside of a park entrance and are intended to direct visitors to a park. Trailblazers serve as an additional assist in guiding visitors to specific park sites and features in urban and highly developed suburban environments. By displaying the NPS Arrowhead and other graphic elements, Trailblazers also help to reinforce park and agency identity. Boundary Signs designate the beginning of park land. These signs are useful in areas of multiple land ownership, or where it is better to place an entrance sign at a location other than the official park boundary. Road Guide Signs are placed on park roads to direct the first-time or infrequent visitor to facilities and areas within a park. Traffic Regulatory and Warning Signs are used within a park to govern the operation of motor vehicles.

As required, Traffic Regulatory and Warning Signs in the UniGuide System comply in content and appearance with Federal Highway Administration guidelines as expressed in the Manual for Uniform Traffic Control Devices (MUTCD). The other three categories of UniGuide Motorist Guidance Signs meet or exceed MUTCD performance requirements, but they have a distinctive appearance from most road and highway guide signs. NPS signs will continue to have a brown background. However, the UniGuide Standards specify the use of the Rawlinson Roadway typeface rather than the Clarendon font currently used on NPS signs. The change was made because: 1. Tests proved Rawlinson to be more legible than Clarendon; 2. Signs made with Rawlinson can be (11.4%) smaller than with Clarendon; 3. Use of Rawlinson, one of the two official NPS house typefaces, helps reinforce NPS identity.

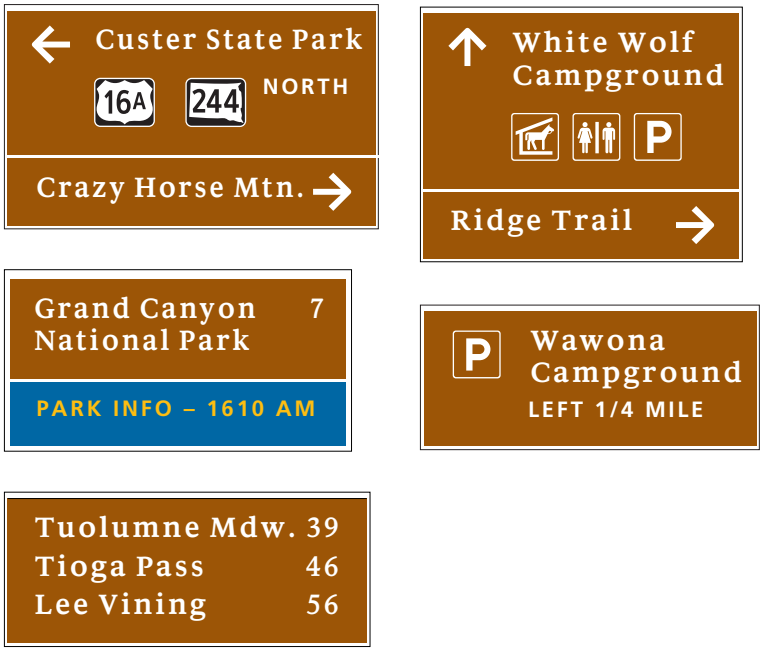
Motorist Guidance and Traffic Regulatory

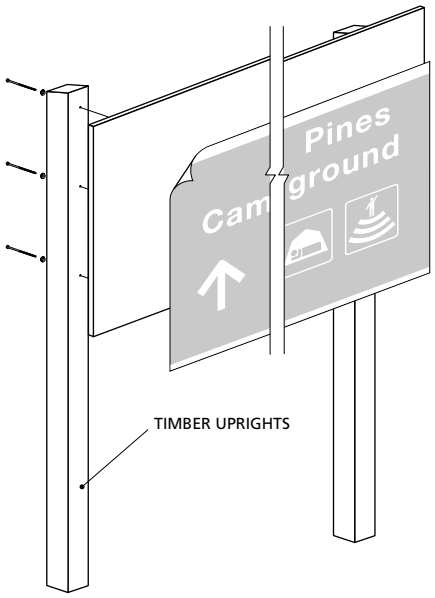
A distinctive system to guide motorists to park entrances and along park roadways, these signs use new lower-cost, brighter, and longer-lasting materials which --along with the recently developed NPS Rawlinson Road type face — will enhance message legibility and visitor safety.

Highway Guide



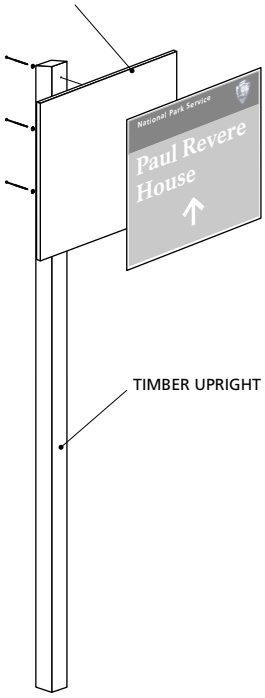
Road Guide



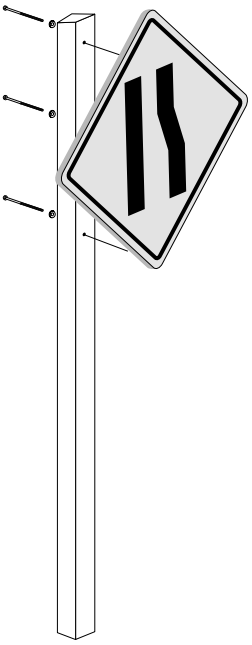


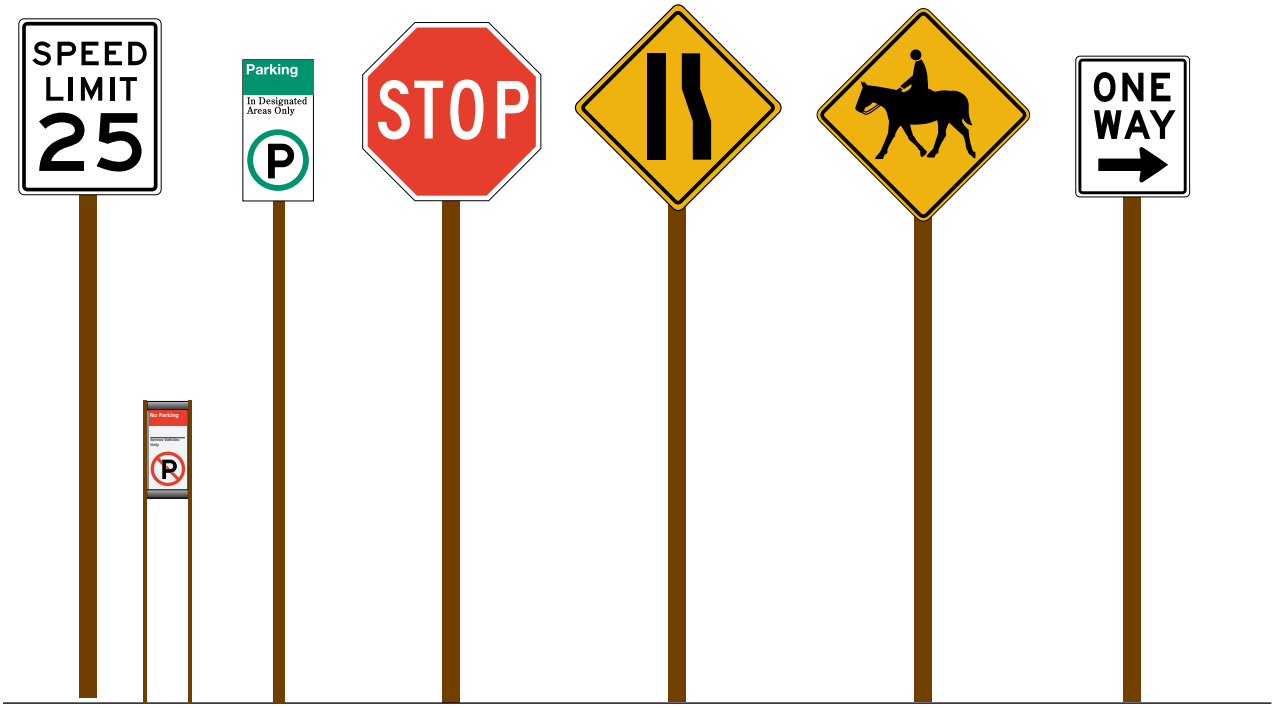
Trailblazers 1-3 Lines

ALUMELITE PANEL WITH
RETRO-REFLECTIVE BACKGROUND WITH
TRANSPARENT OVERLAYGRAPHIC



Boundry Signs 1-4 Lines




SPEED
LIMIT
25
Parking
In Designated
Areas Only
P
STOP
ONE
WAY

Chapter 2

UniGuide Graphic Standards

Sections 2.1-2.10

Final Draft: *June 1, 2002*

Chapter 2: UniGuide Graphic Standards

Contents

Contents

The building blocks for the UniGuide Program consist of six graphic components: typography, color, Arrowhead symbol, directional arrow graphic, recreation symbols, and grid formats. These components are used in specific ways to visually enhance particular types of communications consistently throughout the National Park System.

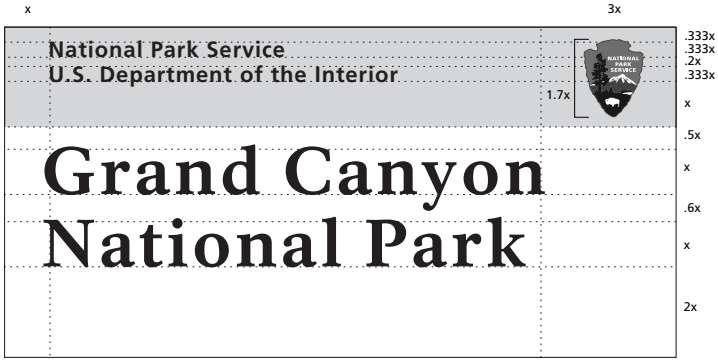
The UniGuide Program has been designed to accommodate a wide range of park communications needs such as formal identification signs, wayfinding signs on highways and park roads, and safety signs. This chapter is divided into sections that describe each component of the sign program with specific instructions on its use.

National Park Service

National Park Service

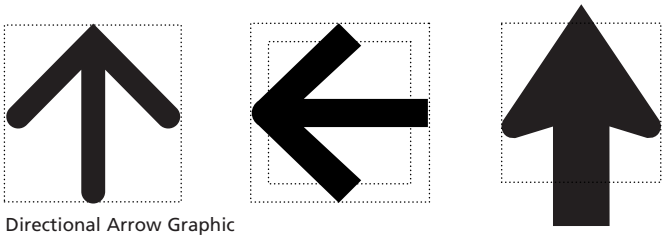
Typography

NPS Arrowhead Symbol



Grid Formats

Recreation Symbols



Directional Arrow Graphic

Color

Applicability and Production: These guidelines are provided to park planners for information purposes only. The actual production of graphic panels is coordinated through Harpers Ferry Center based on the park's UniGuide Plan. Designers and graphic production contractors using these guidelines may obtain digital templates and copies of the materials in this chapter from the UniGuide Program Manager at Harpers Ferry Center and from Detailed material specifications for sign production are included in Chapter 4: UniGuide Material Specifications and Fabrication Drawings and from www.graphics.nps.gov.

Graphic Storage: Each sign graphic is referenced by a standard catalog number or by a specific sign location number assigned in each park's UniGuide Plan. The version of the production file used to prepare a finished graphic is to be dated, numbered, and filed with the park's UniGuide Plan in the designated NPS digital storage bank. This digital record, accessible over the Internet, will speed the process when a sign needs to be replaced. For information on the method for numbering signs, refer to the sign specification code, Chapter 3, section 3.3, Sign Planning & Documentation.

Software Applications for Sign Layout & Production: Most of the signs are produced using graphical software programs. Preferred programs include Adobe Illustrator and QuarkXpress for use with the Apple Macintosh operating system. Although programs are available for the MS Windows operating system, graphic production houses prefer Macintosh for consistency and overall product quality. Selection of graphical software will depend on the method of production. Artwork developed with these programs will accommodate such methods of production as single-color printing on a panel, cutting vector art from adhesive vinyl film, and creating complex multi-layer map artwork for screen printing. Guidance on which software to use is available from the NPS UniGuide Program Manager at Harpers Ferry Center.

Adobe Illustrator is used for production that requires:

- Cutting or routing from a typographic outline for all road guide signs and routed identification signs, plus Visitor Information System panels using cut adhesive vinyl
- Direct digital printing on paper for high-pressure laminate or fiberglass embedment
- Creation of color separation films for screen printing with flat color artwork

Quark Xpress is used for production that requires:

- Direct digital printing, and screen printing with color separations that includes the incorporation of graphic images such as TIFF, JPEG, EPS, BMP or Adobe Illustrator files and typography
- Typographic layouts that use fixed templates or formats (masterpages)
- Creation of separation films for screen printing with duotone or four-color artwork

Questions and Compliance: These graphic components and respective formats are to be used as specified. Questions on the use of these standards or special applications should be referred to the Regional UniGuide Coordinator or to the UniGuide Program Manager at Harpers Ferry Center.

Typefaces for NPS UniGuide Program: The National Park Service UniGuide Program uses two families of typefaces for legends on signs: NPS Rawlinson, a roman or serif font, and Frutiger, a sans serif font.

Each type family offers different weights from light to bold as shown in this manual. Both type families include italic. The correct use of each typeface has been specified for each application.

NPS Rawlinson, designed by James Montalbano (under license from Terminal Design, Inc.) specifically for the National Park Service, is the primary typeface used on all UniGuide signs. It is also the primary typeface used for NPS publications and wayside exhibits. This typeface is available in Book, Medium, Bold and Heavy weights. The specified size and weight are noted in the formats in the back of this chapter.

NPS Rawlinson Roadway (under license from Terminal Design Inc.) is a special weight of the NPS Rawlinson typeface used for primary legends on Highway Guide, Road Guide, and Trailblazer Signs. This typeface was custom designed for road signs and has been tested for legibility and recognition with both old and young drivers in day and night viewing conditions. It replaces NPS Clarendon modified for all road guide sign applications.

Frutiger from Adobe Systems Incorporated (under license from Linotype AG), replaces the Helvetica formerly used in NPS media. Frutiger's open character forms enhance legibility. It is used for headlines on small panel signs and secondary legends on road guide and park identification signs.

NPS Rawlinson

NPS Rawlinson Book

NPS Rawlinson Book Italic

NPS Rawlinson Medium

NPS Rawlinson Medium Italic

NPS Rawlinson Bold

NPS Rawlinson Bold Italic

NPS Rawlinson Heavy

NPS Rawlinson Heavy Italic

NPS Rawlinson Roadway

Frutiger

Frutiger Roman 55

Frutiger Italic 56

Frutiger Bold 65

Frutiger Bold Italic 66

Software License for Typefaces: All NPS Rawlinson and NPS Rawlinson Roadway typefaces and Frutiger typefaces are licensed to the National Park Service for its unrestricted and unlimited use and its use by National Park Service contractors for NPS business only. These typefaces may not be used or distributed for other purposes. These fonts may not be resold or repackaged in any way. The granting of this license does not constitute a transfer of ownership, which remains that of the company granting the license to the NPS and its suppliers.

Availability from NPS: These fonts may be downloaded from the NPS website (www.graphics.nps.gov.uniguide). A computer disk with these fonts is available only through Harpers Ferry Center and will be provided to sign fabricators as required.

Specifications and Compliance: Only these two fonts are to be used. Alternates— such as Helvetica, Century, Times Roman, or Clarendon—are not acceptable.

Specified software programs and typefaces are to be used in the production of all graphic panels. Conversions that change the typographic style, letterspacing, alignment, stroke-width, or size will be rejected.

Computer Systems: All typographic legends will be prepared on a computer using PostScript language. The recommended method for setting type on panels and laying out signs is to use a Macintosh computer with the latest version of Adobe Illustrator (8.0, 9.0 or later) drawing program, or Quark XPress (4.1 or later) publication and printing layout program. These programs are also available on IBM compatible systems and can be developed cross platform, but the Macintosh system is preferred.

Case: Method of Typographic Display: All legends are displayed in upper and lowercase (U/lc) with initial capital letters only unless otherwise noted. Exceptions are legends on traffic regulatory signs (STOP, YIELD) and secondary directional legends on road guide signs (TURN LEFT 1/4 MILE). These are shown only in Frutiger Bold. NPS Rawlinson or NPS Rawlinson Roadway legends are never displayed on sign panels in all uppercase.

Letterspace Adjustment for Legibility: Signs viewed from a distance require more space between letters (additional kerning) than those viewed by pedestrians from a standing position. Computer software programs provide precise adjustments for such kerning needs. Within the UniGuide program, custom kerning of legends is limited.

- All Visitor Information System (VIS) lettering is displayed without kerning.

- NPS Rawlinson Roadway has the correct proportional letterspacing built into the font for road guide sign applications, but secondary legends for motorist guide signs in Frutiger Bold require letterspace modifications to improve legibility. The numerical value of the specified kerning is identified with the individual grid specifications.

- NPS Rawlinson Heavy legends for Park Identification signs and Facility Identification signs are modified within the layout software to increase their letterspacing. The kerning specifications are based on a typographic measurement of an Em space. This fraction varies depending on the program used. Adobe Illustrator spacing is based on a 1/1000 of an Em space, and Quark spacing is based on units of 1/200 of an Em space. For example, the letterspacing for identification signs using NPS Rawlinson Heavy in Adobe Illustrator is +50 (or 50/1000 of and Em). The same space to be specified on a computer using Quark XPress is +7.5 (or 7.5/200 of an Em).

Measurement Method for Text and Display Type: Visitor Information System displays are to be set using conventional references of point size with line space (leading) noted in points (60/66 means 60 pt. type with 66 pt. leading from baseline to baseline). Note that this method of measurement reflects traditional typographic measurements based on setting type on a lead punch or carrier. These lead letters were assembled as lines of type and then as pages. The measurement of 60 points included the letter and the area of the punch that is above and below the letter, which together measured 60 points. The addition of interline space is called leading, which in this case is 6 points. Although the physical quality of typesetting has been transformed by the digital age, the method of measurement remains the same. For reference, there are 72 points in an inch.

Proportionally Based Standards: The size of type for use in the Visitor Information System have been specified in a uniform progression of sizes with leading. These specifications are noted on pages 2.1-6 through 2.1-9 for the standard size panels as shown in the grid formats (30cm x 30cm, 15cm x 30cm, 30cm x 90cm, etc). If a sign is to be fabricated at a proportionally larger size such as a 45cm tall panel (150% enlargement), or a 60cm tall panel (200% enlargement), the type size will be enlarged at the same percent.

The UniGuide Program allows designers to conveniently select type sizes that can be proportionally used in larger panels.

Large Signs: Type used in larger scale sign panels will be specified in inches according to the height of the initial capital letter of the legend. The measurement is based on the flat bottom and flat top of the serif of a capital letter like an "H". The lowercase letters are always proportional to the capital letters. Letterspacing and word spacing will follow Adobe Illustrator (8.0 or later) software and Quark Express (3.3 or later) software calibrations as specified. Interline space will be specified as proportional to legend size and measured from the base of one line and the top of the next. For example: the line space for a 6 inch legend is 3.6 inches if the line space is specified as **0.6x**, and if "**x**" is the capital letter height. These increments are clearly shown on the respective panel format grids.

The legends for Motorist Guidance and Park Identification Signs are specified in an even progression of sizes: 3", 4", 6", 9" and 12". Note that custom applications or larger Park Identification or Highway Guide Signs may be proportionally enlarged based on the grid formats included in this chapter.

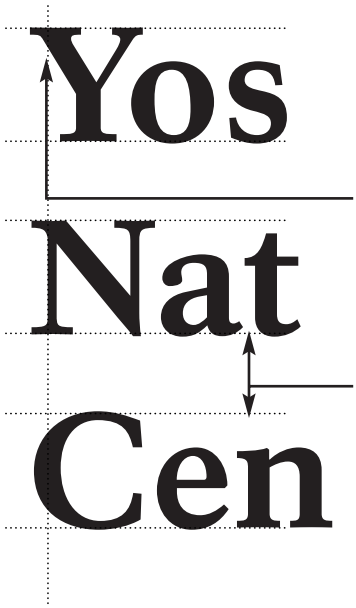
Production Conversion: The production method will vary depending on sign type:

A. ***Visitor Information System*** signs will be designed, and reproduction films, digital print files, or outline files will be generated directly from the Adobe Illustrator (8.0 or later) and/or Quark Express (3.3 or later) files, including: printing film for screen prints or for firing porcelain enamel, printing on paper for embedment into fiberglass, or printing on paper for embedment into high-pressure laminate. Artwork for cutting adhesive vinyl or retroreflective sheeting will use the same files in outline (vector) format.

B. ***Motorist Guidance*** Signs will be formatted in Adobe Illustrator (8.0 or later) using templates provided and will be exported to a compatible digital plotting table for reverse cutting the brown transparent overlay sheeting for the sign panel that is applied to the white retroreflective background. Users are advised to confirm that size and spacing attributes of the panel design are precisely translated and interpreted by the cutting equipment software, because some types of equipment do not read measurements at the same scale. A test can be a simple comparison of the output compared to a same size paper print made from the original file.

C. ***Park Identification*** signs should follow the same methods as noted for Road Guide Signs if they are being prepared for a computer-driven router. Hand-routed sign faces will follow full-size paper templates, that are printed from a computer file.

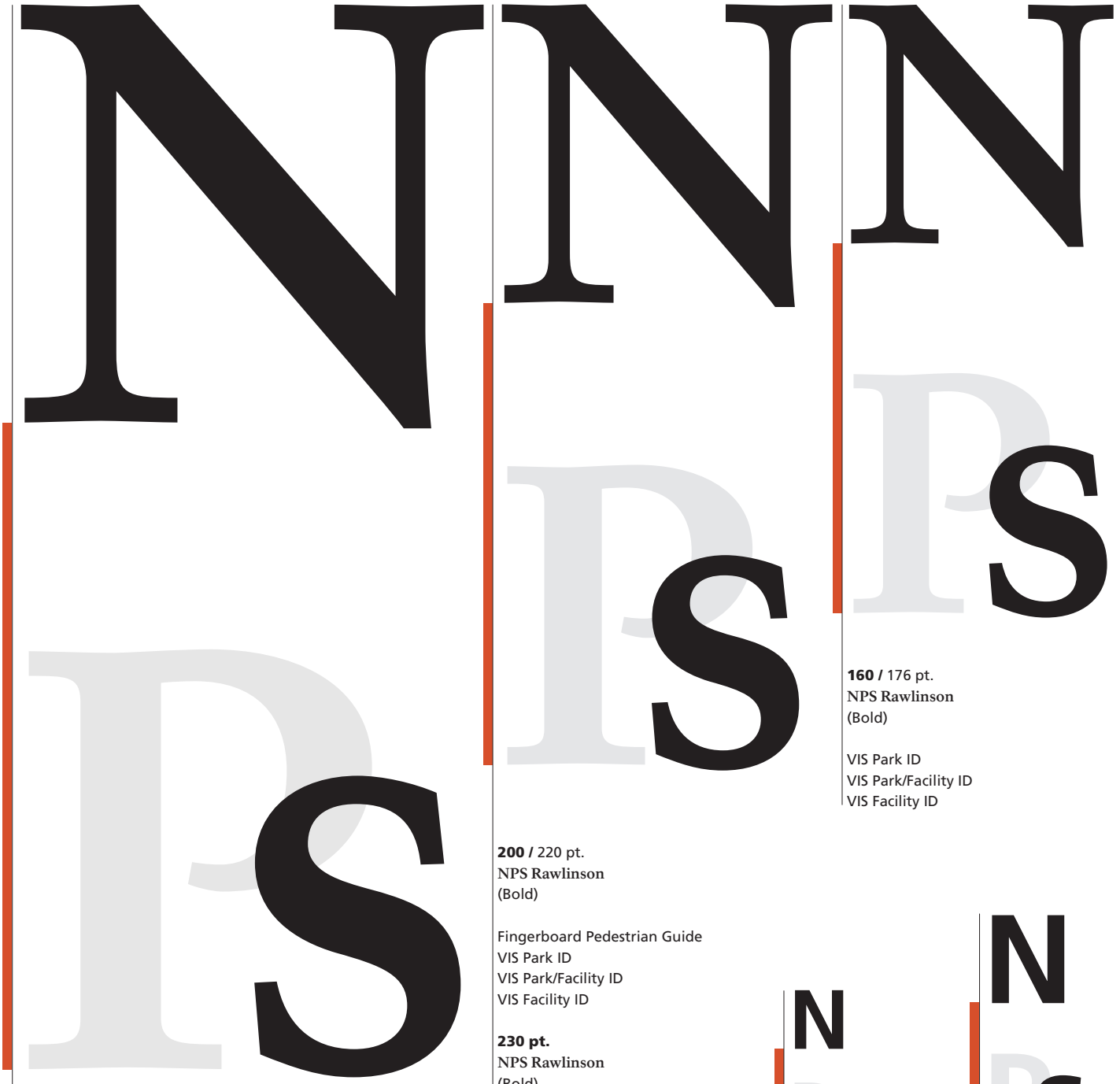
Typographic Alignment for Identification and Motorist Guidance: Destination legends are placed flush left (left justified) on the grid with initial letter aligned to the left side of a vertical stroke.



Alignment: Initial capital letters align on the leading edge of the vertical stroke. Round and angular letters are placed slightly to the left as shown so as to appear aligned flush left on the grid.

Vertical alignment: The serif is allowed to extend beyond the edge of the grid. Letters including Y, W, A, etc. are aligned inside the serif at the location where the body of the actual letter begins as shown in the diagram on the left.

Horizontal alignment: The distance between the baseline of a line of type and the imaginary line across the top of capital letters becomes the dimension on which interline spacing is based.



280 / 308 pt.
NPS Rawlinson
(Bold)

Small Guide Signs
Area Entry
Street Name Sign

575 pt.
NPS Rawlinson
(Bold)

Small Guide Signs

200 / 220 pt.
NPS Rawlinson
(Bold)

Fingerboard Pedestrian Guide
VIS Park ID
VIS Park/Facility ID
VIS Facility ID

230 pt.
NPS Rawlinson
(Bold)

Campsite ID

160 / 176 pt.
NPS Rawlinson
(Bold)

VIS Park ID
VIS Park/Facility ID
VIS Facility ID

40 / 44 pt.
Frutiger (Bold)

NPS Overbar ID
for Trail Guide
VIS Park ID
VIS Park/Facility ID
VIS Facility ID
Entrance Fees
Recreation Fees

60 / 66 pt.
Frutiger (Bold)

Standard Panel
Narrow Profile
Entrance Fees
Recreation Fees

120 / 132 pt.
NPS Rawlinson
(Med., Bld.)

Miscellaneous Posting
VIS Park ID
VIS Park/Facility ID
VIS Facility ID

80 / 88 pt.
NPS Rawlinson
(Med., Bld., Ital.)

Miscellaneous Posting
Bus Stop ID
Parking Area ID
Bus Stop ID
Parking Area ID
Trail Guide
VIS Park ID
VIS Park/Facility ID
VIS Facility ID

60 / 66 pt.
NPS Rawlinson
(Med., Bld., Ital.)

Standard Panel
Trail Guide

40 / 44 pt.
NPS Rawlinson
(Med., Bld., Ital.)

Standard Panel
Narrow Profile Trail Guide
Narrow Profile with symbol
Parking Control
Entrance Fees
Recreation Fees

30 / 33 pt.
NPS Rawlinson
(Med., Bld., Ital.)

Standard Panel
Narrow Profile

24 / 27 pt.
NPS Rawlinson
(Med. wth Ital.)

Standard Panel
Narrow Profile

20 / 22 pt.
NPS Rawlinson
(Med. wth Ital.)

Standard Panel
Narrow Profile

80 / 88 pt.
Frutiger (Bold)

Miscellaneous Posting
Fingerboard Ped. Guide

100 / 110 pt.
Frutiger (Bold)

Miscellaneous Posting

120 / 132 pt.
Frutiger (Bold)

Miscellaneous Posting
Bus Stop ID
Parking Area ID

160 / 176 pt.
Frutiger (Bold)

Small Guide Sign, Secondary Legend

Highway Guide

Rawlinson Road
12" Primary Legend

Frutiger Bold
9.6" Secondary Legend

Frutiger Black
12" Advance Guidance Numbers

Road Guide & Highway Guide

Rawlinson Road
9" Primary Legend

Frutiger Bold
7.2" Secondary Legend

Frutiger Black
9" Advance Guidance Numbers

Park Identification Typefaces

Ground Mounted Format

12" Primary Legend
Rawlinson Heavy

3.6" Secondary Legend
Frutiger Bold

Ground Mounted Format

9" Primary Legend
Rawlinson Heavy

2.43" Secondary Legend
Frutiger Bold

Hy Elev.

Road Guide

Rawlinson Road
6" Primary Legend

Frutiger Bold
4.8" Secondary Legend

Hy Elev.

Road Guide Signs
Trailblazer & Park Boundary

Rawlinson Road
4" Primary Legend

Frutiger Bold
3.2" Secondary Legend
1.5" NPS Identity

Hy Elev.

Road Guide Signs
Trailblazer & Park Boundary

Rawlinson Road
3" Primary Legend

Frutiger Bold
2.4" Secondary Legend
1.125" NPS Identity

Hy Elev.

Trailblazer &
Park Boundary

Rawlinson Road
2" Primary Legend

Frutiger Bold
1.6" Secondary Legend
.75" NPS Identity

Yos National

Hanging and Ground Mounted Format

6" Primary Legend
Rawlinson Heavy

1.8" Secondary Legend
Frutiger Bold

Yos National

Hanging and Ground Mounted Format

4" Primary Legend
Rawlinson Heavy

1.2" Secondary Legend
Frutiger Bold

Yos National

Hanging Format

3" Primary Legend
Rawlinson Heavy

.9" Secondary Legend
Frutiger Bold

Introduction: Since its introduction in 1952, the NPS Arrowhead logo has become a well recognized symbol of the agency. Changes to the logo adopted in 2001 helped to ensure that the Arrowhead appears more often, more consistently, and more legibly on all NPS communication materials, including signs. The UniGuide Sign Standards prescribe the use of the NPS Arrowhead on selected park entrance and facility identification signs, and on trail and highway guide signs, including trailblazers. The Arrowhead is also prescribed on wayside exhibits and certain other signs within the Visitor Information System. Each of these applications is illustrated in the appropriate subject areas and layout grids in this manual.

Recent revisions to the NPS Arrowhead included the creation of five variations of the logo that are consistent in general appearance but tailored to the specialized requirements of various media. Information about the full set of Arrowheads is available online at <www.graphics.nps.gov>. The two Arrowheads recommended for use on signs (illustrated on page 2.1-12) have been optimized for a variety of imaging technologies and for distant viewing. Both a three-color (TC) and a one-color (OC) version are available. Guidance on when to use each is provided below.

The decision of when and how to use the NPS Arrowhead logo on signs should be made with care. Although the Arrowhead is an integral part of the agency's public identity, it should not be overused. The Arrowhead should also not be used in ways that compromise a signs primary purpose. For example, the Arrowhead should certainly be used on park entrance signs. However, if a sign is obviously within a park, greater liberty may be taken in the use, size, or placement of the Arrowhead (e.g. most wayside exhibits).

Arrowhead Applications: The Arrowhead generally should be applied on Park Identification Signs in the upper overbar section of the sign panel, with the Arrowhead graphic being 1.7x of the primary legend size. An alternative is to place the Arrowhead graphic on the overall sign structure. In that application, the Arrowhead size is based on the size of the primary legend and the type of structure. See chart on page 2.I-13.

Highway Guide Signs display the Arrowhead on the left side of the legend at a size specified on the layout grid. Highway Guide Signs are used outside the park to direct visitors to its entrance(s). The width of the Arrowhead is displayed at 3x of the primary legend size. Most states allow the use of the NPS Arrowhead on Highway Guide Signs but its use is subject to discretion of the state highway engineer, and will vary from state to state and within the individual highway districts in a state. Arrowheads are not placed on Road Guide Signs (RG) inside a national park.

Trailblazer Signs display the Arrowhead along with the name of the agency (National Park Service) in an overbar that contrasts in color with the lower portion of the sign panel. Trailblazers are primarily used in urban, suburban, and populated rural areas along streets and roads with posted speeds of less than 45 mph. The NPS Arrowhead and typographic designations provide a consistent nationwide identifier that helps guide visitors through congested environments to a park's entrance(s). The Arrowhead in this application is 1.7x the primary legend size.

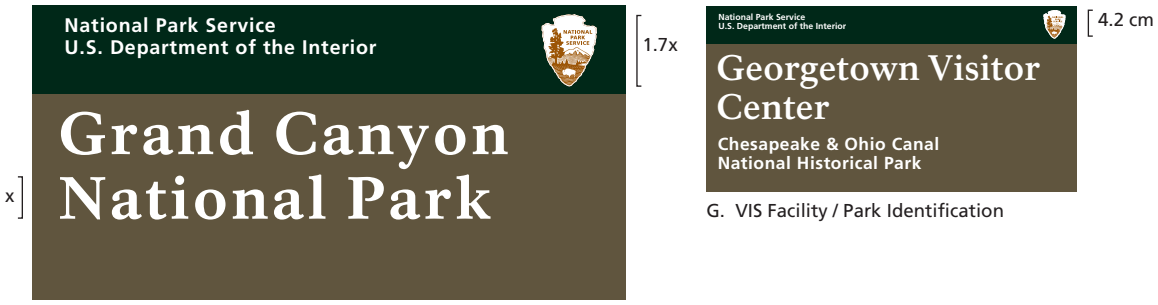
Visitor Information System signs display the Arrowhead in the overbar along with the agency and department titles as on a wayside exhibit, or with the full park name in lieu of the NPS/DOI identifier. This latter approach is intended for areas where multiple park jurisdictions are commingled, where a trail passes through a park, or where pedestrians are being guided to a park in an urban area. The size of the Arrowhead in these applications is based on the size of the overbar in which it is placed.

Arrowhead Materials and Color: Arrowheads may be manufactured in a variety of materials, methods, and colors, either as an integral part of the sign panel, or separately and affixed to the panel or to a masonry upright that is part of an overall sign structure.

Park Entrance and Facility Identification Signs: The preferred material for park and facility ID signs is porcelain enamel which is colorfast, very difficult to scratch, and may therefore look new the entire life of the sign. Porcelain enamel Arrowheads can be attached to identification sign panels or

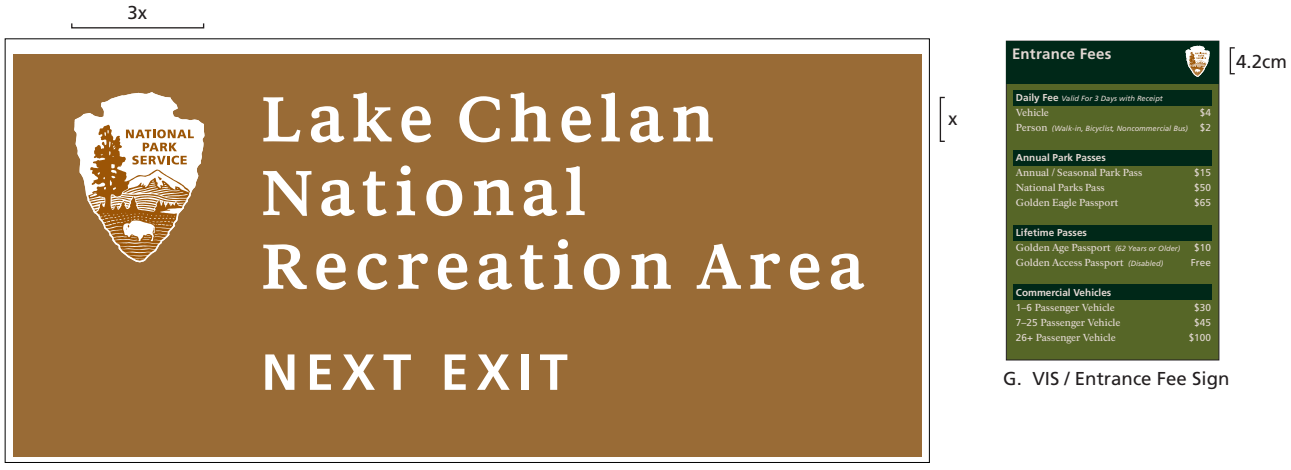
The seven standard sign types in which the signage version of the NPS Arrowhead graphic is displayed are illustrated here. These examples are not shown in relative scale to each other. Grid formats for each application are provided in this chapter. Descriptions of the applications are provided in Chapter 1, and guidelines for the use of each type of sign are included in Chapter 3.

F. Hanging Park Identification with Arrowhead on Masonry Column Ratio for Ground Mounted Park Identification (D) is 3.5x



C & E. Hanging and Ground Mounted Park Identification with Arrowhead On Panel

G. VIS Facility / Park Identification



A. Highway Guide

G. VIS / Entrance Fee Sign

B. Boundary Guide

B. Trailblazer

G. VIS / Trail Guide

2.3-NPS Arrowhead for UniGuide Applications

to masonry structures with mounting pins welded to the back. Such Arrowheads may also be digitally imaged and embedded in fiberglass or screen-printed on adhesive vinyl. When displaying any of these materials on a masonry structure they should be mounted on an a back panel (of aluminum or other suitable material) to aid in attachment and to provide suitable thickness relative to size. Arrowheads that are cast or routed to create a three-dimensional surface may also be used providing that they conform to NPS guidelines for shape, color, and material published in the technical manual associated with Director's Order #52B.

Arrowheads on park entrance and facility identification signs may be either three-color or one-color (over a second color background). Although NPS entrance signs have traditionally used multi-color versions of the logo, their use over a dark background or a multicolored stone surface may make them more difficult to see than the simpler one-color version. See illustration on page 2.1-12 and discussion of standard colors on page 2.1-14.

Visitor Information System Signs: The Arrowhead on VIS signs, which is rendered as an integral part of the fabrication process, may appear in either one or three colors. Cost considerations suggest that it most often appear as one color over a white or off-white background.

Highway Guide Signs: The Arrowhead on highway signs is to be cut from brown transparent overlay film with the rest of the panel graphics and applied to a white retroreflective background. Three-color vinyl Arrowheads affixed to the face of the sign are not recommended because of limited adhesion and colorfastness.

Trailblazer and Boundary Signs: Arrowheads in the overbar of these signs are screen-printed NPS Brown on white reflective sheeting along with the dark green overbar. This screen-printed material is then applied to the sign panel.

Production Methods: Artwork for the UniGuide version of the Arrowhead, which is available from the UniGuide Program Manager, has been presized in digital form for each method of production. These methods include digital PostScript printing of the graphic, as a one-color panel for screen -printing artwork, or as vector art for cutting from adhesive materials. Vector cutting is not recommended for use at any size smaller than specified in the chart on the right.

The size of the Arrowhead is listed at right for each sign type and only those sizes should be used. For questions about the appropriate use of the Arrowhead, consult the UniGuide Program Manager.

A Highway Guide *(1)*

Legend size	*Width relative to "x"*	*Arrowhead size (W x H)*
9"	3x width	27" x 33.75"
12"	3x width	36" x 45"
16"	3x width	60" x 75"

B Trailblazer/and Boundary Guide *(1)*

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
2"	1.6x height	2.5" x 3.2"
3"	1.6x height	3.8" x 4.8"
4"	1.6x height	5" x 6.4"

C Ground Mount Park Identification w/ Arrowhead on panel *(1)*

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
4"	1.7x height	5.4" x 6.8"
6"	1.7x height	8.2" x 10.2"
9"	1.7x height	12.2" x 15.3"
12"	1.7x height	16.3" x 20.4"

D Ground Mount Park Identification w/ Arrowhead on masonry column *(1)*

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
4"	3.5x height	11.2" x 14"
6"	3.5x height	16.8" x 21"
9"	3.5x height	25.2" x 31.5"
12"	3.5x height	33.6" x 42"

E Hanging Park Identification w/ Arrowhead on panel *(1)*

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
3"	1.7x height	4.1" x 5.1"
4"	1.7x height	5.4" x 6.8"
6"	1.7x height	8.2" x 10.2"

F Hanging Park Identification w/ Arrowhead on masonry column *(1)*

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
4"	4.5x height	16" x 20"
6"	4.5x height	24" x 30"

G Visitor Information System *(2)* **(0.7x of overbar height)**

Panel width	*Overbar height (cm)*	*Arrowhead size (W x H)*
30 cm	6 cm	3.2 cm x 4.2 cm
45 cm	9 cm	4.8 cm x 6.3 cm
60 cm	12 cm	6.4 cm x 8.4 cm
90 cm	18 cm	9.6 cm x 12.6 cm
120 cm	24 cm	12.8 cm x 16.8 cm

(1) Size based on legend size primary legend height ("x")
(2) Size based on panel height

Introduction: Three basic color palettes are specified for the UniGuide Program. The differences are dictated by sign function, manufacturing method, types of graphic materials, and appropriateness of the color with the graphics.

Visitor Information System: The palette for the Visitor Information System signs consists of colors compatible with the landscape except for standard colors for traffic regulatory and safety signs, and brighter colors for identifying different shuttle bus routes and parking areas. Park and Facility Identification signs have Gray- Brown main panel with NPS Dark Green overbar. The legend color is Light Warm Gray, with NPS Brown Arrowhead. Standard information panels are a Light Warm Gray with overbars being Dark Blue for regulation, NPS Brown for general information, or Olive Green for instruction, all with Light Warm Gray headline type. Text is typically Black, but may be one of the overbar colors. Illustrations can be Gold, Light Brown or one of the above listed overbar colors. Pedestrian guide signs are to be NPS Brown with Light Warm Gray legend, and with Red circle and slash for prohibition symbols. Safety panels are Red-Black and Light Warm Gray for danger, and Yellow and Black for warning. Small Guide Signs, Campsite Identification, Fingerboards and Streetname signs are retroreflective FHWA Recreation Brown with White legend. Area Entry and Miscellaneous Postings signs are retroreflective Gold with Black legend and symbol, and Red circle and slash for prohibition symbols.

Colors are specified according to the Pantone Matching System (PMS) or to standard Federal Highway Administration (FHWA) highway sign colors. These colors will be matched and formulated for the respective type of manufacturing material. For other options in the use of color, contact the NPS UniGuide Program Manager.

Park Identification: For Park Identification Signs, the panels are Gray-Brown with an NPS Dark Green overbar. Timber posts are a Dark Brown similar to the color of mature weathering steel, and the sign legend is Off-White. The one-color NPS Arrowhead logo is NPS Brown on an Off-White background. Paint color specifications are based on Benjamin Moore products, because of the firm's common color system for all types of materials and wide availability.

Motorist Guidance: Highway Guide (HG) and Road Guide (RG) Sign panels are FHWA Recreation Brown with White legend. For Trailblazers (TB), the overbar is Dark Green with one-color NPS Brown Arrowhead logo on a White background and the main sign panel being FHWA Recreation Brown with a White legend.

Both FHWA Recreation Brown and FHWA white are retro

Colors for Park Identification

NPS Brown: NPS Arrowhead (PMS-1615)

Gray-Brown: Panel (BM-5/E-1000)

Dark Green: Overbar (BM-W-4B-2139-10)

Dark Brown: Uprights (BM-C-4B-2130-10)

Off-White: Legend & Background for NPS Logo (BM-1B-W-2143-50)

Colors for Motorist Guidance

NPS Brown: NPS Arrowhead (PMS-1615)

FHWA Recreation Brown: Sign Panel

Dark Green: Trialblazer Overbar (PMS-5605)

FHWA Blue: Information & Concessions Panel

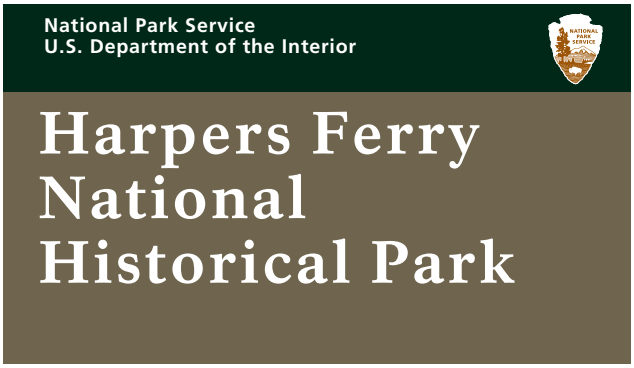
FHWA White: Legend

FHWA Yellow: Secondary Legend

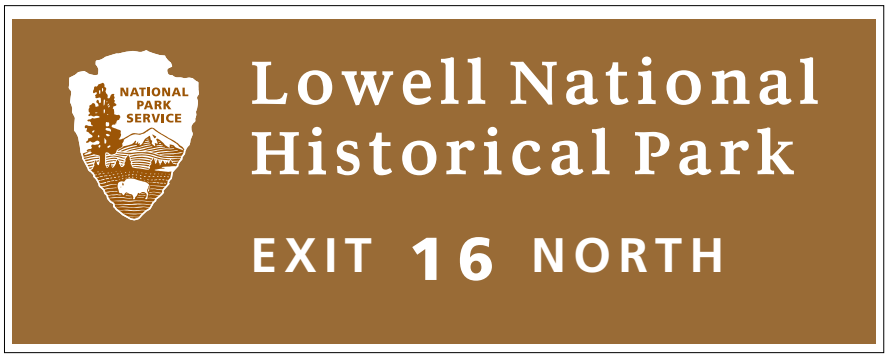
reflective colors based on Federal Highway Administration standards (See specification in Chapter 4, Section 4). The Dark green Trailblazer overbar and NPS Brown Arrowhead logo are screen-printed with transparent inks on reflective sheeting.

The charts below and on the following page show the specified color palettes based on application or sign type. For each application, the NPS Arrowhead Logo is NPS Brown on a White or Light Warm Gray background depending on material used.

Colors for Motorist Guidance Signs use retroreflective FHWA Recreation Brown with the addition of the dark green NPS identity for trailblazers and use of FHWA Blue and Yellow to improve communications. Other FHWA colors apply for regulatory signs.



Color for Park Identification signs utilize traditional green, brown, and gray tones used by the NPS for signs and uniforms.



Colors for Visitor Information System

Light Warm Gray: Panel, primary & overbar legends (PMS-Warm Gray 2)

NPS Brown: Arrowhead, overbars, illustrations & trail guide panel (PMS-1615)

Black: Text, prohibition symbol figure, warning overbar (PMS-Black)

Red: Safety danger overbar, prohibition circle / slash (PMS-485)

Bright Blue: Disabled symbol, shuttle bus route and map color (PMS-301)

Dark Green: Sign overbar NPS identification (PMS-5605)

Dark Blue: Regulation overbar, illustrations (PMS-303)

Gold: Miscellaneous posting and Area Entry, accent Illustration (PMS-125)

Yellow: Safety warning panel (PMS-131)

Bright Green: Parking symbol, shuttle bus route and map color (PMS-341)

Gray-Brown: Sign panel NPS identification (PMS-405)

Olive Green: Information and instruction overbar & illustrations (PMS-5753)

Light Brown: Illustration and accent (PMS-154)

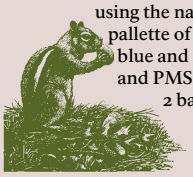
White: Parking Sign back ground & Small Guide Sign legends (PMS-White)

Bright Red: shuttle bus route and map color (PMS-187)

Color Use Guide for Visitor Information System

Olive Green: PMS 5753

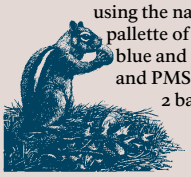
Type color may be black or any of the overbar colors, with illustrations using the natural tone pallette of olive, dark blue and dark brown, and PMS Warm Gray 2 background



Information / Instruction

Dark Blue: PMS 303

Type color may be black or any of the overbar colors, with illustrations using the natural tone pallette of olive, dark blue and dark brown, and PMS Warm Gray 2 background



Regulations

NPS Brown: PMS 1615

Type color may be black or any of the overbar colors, with illustrations using the natural tone pallette of olive, dark blue and dark brown, and PMS Warm Gray 2 background

General Information

PMS Black

Type color is Black with Warm Gray 2 overbar text

Safety Red PMS-485 for prohibition symbols is the only other color that may be used on this sign type

Safety Yellow: PMS 131

Warning

Safety Red: PMS 485

Type color is Black with Warm Gray 2 overbar text

Overbar and prohibition symbols are Safety Red PMS-485. No other colors are used on danger signs

PMS Warm Gray 2

Danger

Type color is Black only

Safety Red PMS-485 for prohibition symbols is the only other color that may be used on this sign type

Gold color also available in retroreflective sheeting

Gold: PMS 125

Area Entry
Miscellaneous Posting

Type color is White retroreflective material

Symbols may be reversed out from dark back-ground

FHWA Recreation Brown or NPS Brown: PMS 1615

Campsite Identification
Fingerboard, Pedestrian Guide

Dark Green: PMS-5605

Legend

Type color is PMS Warm Gray 2 for main panel and overbar

NPS Brown Arrowhead Logo is PMS-1615

Gray Brown: PMS-405

Park Identification

Gray Brown: PMS 405

Back Panel Blanks

Bright Red: PMS 187

Type color is Black or Bright Red only

Bright Red for overbar, prohibition symbols or bus route symbol

Bright Blue for disabled access symbol

PMS Warm Gray 2

Bus Stop Identification
Parking Area Identification

Bright Blue: PMS 301

Type color is Black or Bright Blue text only

Bright Blue for overbar, bus route symbol, and disabled access symbol

Bright Red for prohibi-tion symbol

PMS Warm Gray 2

Bus Stop Identification
Parking Area Identification

Bright Green: PMS 341

Type color is Black or Bright Green text only

Bright Green for overbar, bus route or parking symbol, Bright Blue for disabled access symbol

Bright Red for prohibi-tion symbol.

PMS Warm Gray 2

Bus Stop Identification
Parking Area Identification

Introduction: Symbols provide a common, nonverbal language to transmit information to park visitors regardless of their native language. In a project supported by the National Endowment for the Arts, the National Recreation Symbols were designed for the U.S. Army Corps of Engineers, and refined and augmented by the Society for Environmental Graphic Design, with endorsements from the NPS. The project was undertaken to build upon and upgrade an existing NPS system of symbols. The present cohesive, highly legible system contains more than 20 symbols not included in the original NPS inventory.

This system includes 112 symbols in the positive format, 56 prohibitions with a red circle and slash graphic over a white figure, and 20 warnings in a yellow diamond.

The NPS has modified some of the symbols in this series (referred to as the NPS Recreation Symbols) to maintain pictographic content of the original program.

Use of Symbols: Although symbols are considered an international pictographic language, many park visitors may not be familiar with specific symbols, so legends occasionally must be added to affirm the messages, especially where activities are prohibited. In these instances the symbol is combined with words in a regulations panel (see RS-1 on next page) or on a site specific narrow profile sign (NP-Y), or on an area entry panel (AE-Y). In some cases the worded legend is dominant. In others, the symbol is larger than the text.

Symbol Formats

Positive: *The positive format is generally displayed as a dark figure and border with light background and is used to indicate the availability of a service, accommodation or activity.*

Positive (reverse): *Applications on Motorist Guidance Signs are displayed in reverse with a brown background with white border and figure.*

Prohibition: *A red circle and slash behind a black figure is used to indicate the prohibition of an activity. The symbol is placed on a light background to maintain proper contrast for the figure and red circle. The slash is placed behind the figure, so the figure will be visible.*

Warning: *A few symbols are used in the warning format in which a black symbol is placed in a yellow diamond. Although this type of warning sign is derived from U.S. highway standards and is not an international warning convention, this format is readily recognized by most park visitors.*

Area Entry (AE-Y)

Recreation Symbol (RS-1)

Narrow Profile (NP-Y)

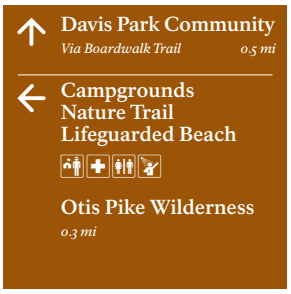
To determine whether or not a symbol sign would be appropriate for a specific use, the following criteria should be used.

- Does the symbol represent an accommodation, service or activity?
- Is the accommodation, service or activity obvious? The obvious should not be symbolized.
- Will the symbol be a substitute or reinforce a message? Symbols may be displayed alone, augment a worded legend, or dominate a legend.
- Will multiple symbols clutter a sign? Road and Highway Guide Signs with three or more word legends should not include symbols, but some of the Visitor Information System signs may have several symbols.

Symbol Colors: Refer to the examples provided in this manual for general guidance on the use of color. All positive symbols must be displayed with adequate contrast for legibility. Specific color applications are illustrated in the preceding section.

General Symbol Color Guide

Standard Panels	Dark figure and border on light field or light figure and border on dark field
	Red circle and slash in prohibition symbols to be placed on light field. Black symbol is placed in front of slash.
Motorist Guidance	Light figure and border on FHWA Recreation Brown field



Trail Guide (TG-1)

Information Instruction (SP-3)

Road Guide (RG-7)

UniGuide Applications with Recreation Symbols:
Applications that incorporate symbols as an option include the following:

Visitor Information System

SP-1, 2, 3, 4	Standard panel with optional use of symbols
SP-5	Regulations symbols panel
RS-1	Recreation symbols panel
TG-1 & 2	Trail guide signs with symbols
SS-1	Shuttle stop Identification
PA-1	Parking area identification
NP-Y	Narrow profile for identification with symbol
NP-N	Narrow profile for prohibition with symbol
PK-Y	Narrow profile for parking allowance with symbol
PK-N	Narrow profile for parking prohibition with symbol
NT-1	Narrow profile trail guide with symbols
SG-3 & 4	Small guide with symbol
AE-Y	Area Entry with positive symbol
AE-N	Area Entry with prohibition symbol
FB-1, 2, 3	Fingerboard pedestrian guide signs with symbols

Motorist Guidance

RG-2	Horizontal module: legend and symbols
RG-5	Horizontal module: legend and multiple symbols
RG-7	Vertical format: single destination and 1 or 2 symbols
RG-8	Symbols (1 to 4) with directional arrow

2.5-SEGD National Recreation Symbols

General


PS-001
Firearms


PS-100
Alcoholic Bev.


RS-002
Smoking


RS-003
Automobiles


RS-004
Trucks


RS-005
Tunnel


RS-006
Lookout Tower


RS-007
Lighthouse


RS-008
Falling Rocks


RS-009
Dam


RS-011
Deer Viewing


RS-012
Bear Viewing


RS-016
Ped. Crossing


RS-017
Pets on Leash


RS-031
Bus Stop


RS-036
Viewing Area


RS-042
Campfires


RS-080
Point of Interest


RS-090
Fire Extinguisher


RS-099
Rattlesnakes


RS-101
Cans or Bottles


RS-102
Snack Bar


RS-103
Radios


RS-111
Strollers


RS-200
Recycling

Accomodations


RS-018
Lodging


RS-019
Restaurant/Food


RS-021
Men's Room


RS-022
Restrooms


RS-023
Women' s Room


RS-028
Symbol of Access


RS-034
Parking


RS-037
Sleeping Shelter


RS-038
Campground


RS-040
Trailer Site


RS-104
Rec. Vehicle Site

Services


RS-013
Drinking Water


RS-014
Information


RS-015
Ranger Station


RS-020
Grocery Store


RS-024
First Aid


RS-025
Telephone


RS-026
Post Office


RS-027
Mechanic


RS-029
Airport


RS-030
Lockers/Storage


RS-032
Gas Station


RS-033
Vehicle Ferry


RS-035
Showers


RS-037
Sleeping Shelter


RS-039
Picnic Shelter


RS-041
Sanitary Station


RS-043
Trail Shelter


RS-044
Picnic Site


RS-045
Kennel


RS-071
Tramway


RS-073
Stable


RS-074
Interpretive Trail


RS-085
Laundromat


RS-086
Litter Receptacle


RS-091
Trash Dumpster


RS-109
Theater


RS-110
Library


RS-112
Firewood Cutting


RS-114
Radiator Water


RS-201
Hospital

Water Recreation


RS-010
Fish Hatchery


RS-053
Marina


RS-054
Boat Ramp


RS-055
Motorboating


RS-056
Sailing


RS-057
Rowboating


RS-058
Waterskiing


RS-059
Surfing


RS-061
Swimming


RS-060
Scuba Diving


RS-062
Diving


RS-063
Fishing Area


RS-079
Canoeing


RS-087
Tour Boat


RS-088
Wading


RS-089
Fish Ladder


RS-093
Fish Cleaning


RS-094
Lifejackets


RS-106
Seal Viewing


RS-107
Whale Viewing


RS-108
Wind Surfing

Land Recreation


RS-064
Horse Trail


RS-065
Motor Bike Trail


RS-066
Bicycle Trail


RS-067
Off-Road Vehicle


RS-068
Hiking Trail


RS-069
Playground


RS-070
Amphitheater


PS-072
Hunting


RS-076
Wildlife Viewing


RS-081
Tech. Rock Climb


RS-082
Climbing


RS-083
Rock Collecting


RS-084
Spelunking/Caves


RS-095
All-Terrain Trail


RS-096
Baseball


RS-097
Exercise/Fitness


RS-098
Skateboarding


RS-113
Golfing

Winter Recreation


RS-046
C.C. Skiing


RS-047
Downhill Skiing


RS-048
Ski Jumping


RS-049
Sledding


RS-050
Ice Skating


RS-052
Snowmobiling


RS-077
Winter Rec. Area


RS-078
Snow-shoeing


RS-092
Ice Fishing


RS-105
Chair Lift/Ski Lift

Symbol Artwork: There are two methods for placing symbols into the artwork for production of a sign panel.

1) EPS Vector Art: Individual symbols provided in Adobe Illustrator as an EPS file, a vector art file to be placed as a freestanding graphic into the artwork. In this form the graphic must be used with care to maintain its proper relationship with other graphic elements when it is enlarged or reduced, or moved in a layout.

2) Placed in Typographic Format: Individual symbols embedded into custom versions of the NPS Rawlinson and NPS Rawlinson Roadway type fonts which are accessed as a typographic element by keystroke. Versions of these fonts with embedded symbols are tailored to specific sign types to allow the creation of artwork as a word processing procedure. In each case, the size of the symbol has been tailored to correspond to the symbol size specified by a specific sign type. The specific versions of NPS Rawlinson with embedded fonts are listed at right. Note that only the primary symbols used for

Symbol name and number are listed below in alphabetical order. If a symbol is also available in the prohibition format, a number is listed after the symbol name (PS-ooo). Where one symbol could be described by different names, options are listed; for instance, "caving" is also listed as "spelunking". Symbols noted with an asterisk (*) can be used in a warning format using digital artwork provided.

Accessibility	(RS-028)	
Airport	(RS-029)	
Alcoholic Beverages	(PS-100)	
All-Terrain Veh. Trail	(RS-095)	(PS-095)*
Amphitheater	(RS-070)	
Automobiles	(RS-003)	(PS-003)
Baseball	(RS-096)	(PS-096)
Bear Viewing	(RS-012)*	
Bicycle Trail	(RS-066)	(PS-066)*
Boat Tour	(RS-087)	
Bus Stop	(RS-031)	
Campfires	(RS-042)	(PS-042)
Campground	(RS-038)	(PS-038)
Canoeing	(RS-079)	
Cans or Bottles	(RS-101)	(PS-101)
Chair Lift/Ski Lift	(RS-105)	(PS-105)
Cleaning, Fish	(RS-093)	
Climbing	(RS-082)	(PS-082)
Cross Country Skiing	(RS-046)	
Dam	(RS-009)*	
Deer Viewing	(RS-011)*	
Diving	(RS-062)	(PS-062)
Diving, Scuba	(RS-060)	(PS-060)
Downhill Skiing	(RS-047)	(PS-047)
Drinking Water	(RS-013)	(PS-013)
Dumpster, Trash	(RS-091)	
Exercise Fitness Area	(RS-097)	
Falling Rocks	(RS-008)*	
Ferry, Vehicle	(RS-033)	
Fire Extinguisher	(RS-090)	
Firearms	(PS-001)	
Firewood Cutting	(RS-112)	(PS-112)
First Aid	(RS-024)	
Fish Cleaning	(RS-093)	
Fish Hatchery	(RS-010)	
Fish Ladder	(RS-089)	
Fishing Area	(RS-063)	(PS-063)
Fishing, Ice	(RS-092)	(PS-092)
Fitness Area, Exercise	(RS-097)	
Food Serv./ Restaurant	(RS-019)	
Gasoline Station	(RS-032)	
Golfing	(RS-113)	
Grocery Store	(RS-020)	
Handicapped	(RS-028)	
Hatchery, Fish	(RS-010)	
Hiking Trail	(RS-068)	
Horse Trail	(RS-064)	(PS-064)*
Hospital	(RS-201)	
Hunting	(PS-072)*	
Ice Fishing	(RS-092)	(PS-092)
Ice Skating	(RS-050)	(PS-050)
Information	(RS-014)	
Interpretive Trail	(RS-074)	
Kennel	(RS-045)	
Ladder, Fish	(RS-089)	
Launching Ramp	(RS-054)	(PS-054)*
Laundry	(RS-085)	
Library	(RS-110)	
Lifejackets	(RS-094)	
Lighthouse	(RS-007)	
Litter Receptacle	(RS-086)	(PS-086)
Lockers/ Storage	(RS-030)	
Lodging	(RS-018)	
Lookout Tower	(RS-006)	
Marina	(RS-053)	
Mechanic	(RS-027)	
Men's Restroom	(RS-021)	
Motorbike Trail	(RS-065)	(PS-065)*
Motorboating	(RS-055)	(PS-055)*

these applications are included in the custom fonts. Symbols needed that are not embedded in a custom type font will require placement in the artwork as separate EPS file, as described above.

Note that in reproducing symbols in artwork, all symbols and borders must proportionally match one-to-one the sample artwork included in these specifications. When enlarging a symbol as an EPS file, check Maintain Uniform Scale in the software when assigning a proportion for enlargement or reduction.

Custom versions of NPS Rawlinson type fonts with embedded symbols for specific applications are listed below.

Typeface Name	Grid Application
NPS Rawlinson S-1	Grid TG-1
NPS Rawlinson S-2	Grid TG-2
NPS Rawlinson S-3	Grid NT-1
NPS Rawlinson Roadway S-4	Grid RG-1
NPS Rawlinson Roadway S-5	Grid RG-2
NPS Rawlinson Roadway S-6	Grid RG-2
NPS Rawlinson Roadway S-7	Grid RG-2

No Alcoholic Beverages		(PS-100)
No Firearms		(PS-001)
No Hunting		(PS-072)
No Radios		(PS-103)
No Smoking		(PS-002)
Off-Road Veh. Trail	(RS-067)	
Parking	(RS-034)	(PS-034)
Pedestrian Crossing	(RS-016)	(PS-016)
Pet on leash	(RS-017)	(PS-017)
Picnic Shelter	(RS-039)	
Picnic Site	(RS-044)	
Playground	(RS-069)	
Point of Interest	(RS-080)	
Post Office	(RS-026)	
Radiator Water	(RS-114)	
Radios	(RS-103)	(PS-103)
Ramp, Launching	(RS-054)	(PS-054)*
Ranger Station	(RS-015)	
Rattlesnake	(RS-099)*	
Receptacle, Litter	(RS-086)	(PS-086)
Recreation Veh. Site	(RS-104)	(PS-104)
Recreation, Winter	(RS-077)	
Recycling	(RS-200)	
Restaurant/Food Serv.	(RS-019)	
Restroom, Men's	(RS-021)	
Restroom, Women	(RS-023)	
Restrooms	(RS-022)	
Rock Collecting	(RS-083)	(PS-083)
Rocks Falling	(RS-008)*	
Rowboating	(RS-057)	
Sailing	(RS-056)	
Sanitary Stn., Trailer	(RS-041)	
Scuba Diving	(RS-060)	(PS-060)
Seal Viewing	(RS-106)	
Shelter, Picnic	(RS-039)	
Shelter, Sleeping	(RS-037)	
Shelter, Trail	(RS-043)	
Showers	(RS-035)	
Site, Picnic	(RS-044)	
Site, Trailer	(RS-040)	(PS-040)
Skateboard	(RS-098)	(PS-098)
Skating, Ice	(RS-050)	(PS-050)
Ski Jumping	(RS-048)	(PS-048)
Skiing, Crosscountry	(RS-046)	
Sledding	(RS-049)	(PS-049)
Sleeping Shelter	(RS-037)	
Smoking	(RS-002)	(PS-002)
Snack Bar	(RS-102)	(PS-102)
Snowshoeing	(RS-078)	
Snowmobiling	(RS-052)	(PS-052)*
Spelunking/ Caves	(RS-084)	
Stable	(RS-073)	
Store, Grocery	(RS-020)	
Strollers	(RS-111)	(PS-111)
Surfing	(RS-059)	(PS-059)
Swimming	(RS-061)	(PS-061)
Tech. Rock Climbing	(RS-081)	(PS-081)
Telephone	(RS-025)	
Theater	(RS-109)	
Tour Boat	(RS-087)	
Tower, Lookout	(RS-006)	
Trail Shelter	(RS-043)	
Trail, All-Terrain Veh.	(RS-095)	(PS-095)*
Trail, Bicycle	(RS-066)	(PS-066)*
Trail, Hiking	(RS-068)	
Trail, Horse	(RS-064)	(PS-064)*
Trail, Motorbike	(RS-065)	(PS-065)*
Trail, Off-Road Veh.	(RS-067)	
Trailer Sanitary Stn.	(RS-041)	
Trailer Sites	(RS-040)	(PS-040)
Tramway	(RS-071)	
Trash Dumpster	(RS-091)	
Trucks	(RS-004)	(PS-004)
Tunnel	(RS-005)	
Vehicle Ferry	(RS-033)	
Viewing Area	(RS-036)	
Viewing, Deer	(RS-011)*	
Wading	(RS-088)	(PS-088)
Water, Drinking	(RS-013)	(PS-013)
Waterskiing	(RS-058)	(PS-058)*
Whale Viewing	(RS-107)	
Wind Surfing	(RS-108)	
Winter Recreation	(RS-077)	
Wildlife Viewing	(RS-076)	
Women Restroom	(RS-023)	

2.6-Directional Arrow Graphic for Guide Signs

Introduction: Three styles of directional arrow graphics are used on signs in the UniGuide Program. Which style is used depends on the application.

- Arrow Type A is used on Trail Guide Signs in the Visitor Information System.

- Arrow Type B is used on Road Guide Signs and Trailblazers.

- Arrow Type C, the standard arrow specified in the FHWA Manual on Uniform Traffic Control Devices (MUTCD) is used on Highway Guide Signs.

Arrow Artwork: The arrows are sized as a proportion of the primary legend size based on a transparent alignment box placed around the arrow as shown at right. Arrows are placed on the sign grid by aligning the transparent box to the baselines as shown in the grid formats.

There are two formats for placing arrows into the artwork for production of a sign panel.

1) EPS Vector Art: Individual arrows are provided in Adobe Illustrator as an EPS file, a vector art file to be placed as a free-standing graphic into the artwork. In this form the graphic must be used with care to maintain its proper relationship with other graphics when it is enlarged or reduced, or moved in a layout.

When enlarging an arrow as an EPS file, check “Maintain Uniform Scale" in the software when assigning a proportion for enlargement or reduction.

2) Embedded in Type Font: Individual arrows are also embedded into custom versions of the NPS Rawlinson and NPS Rawlinson Roadway type fonts which are accessed as a typographic element by keystroke. Versions of these fonts with embedded arrows are tailored to specific sign types to allow the creation of artwork as a word processing procedure. In each case, the size of the arrow has been tailored to correspond to the legend size. The specific versions of NPS Rawlinson with embedded arrows are listed below.

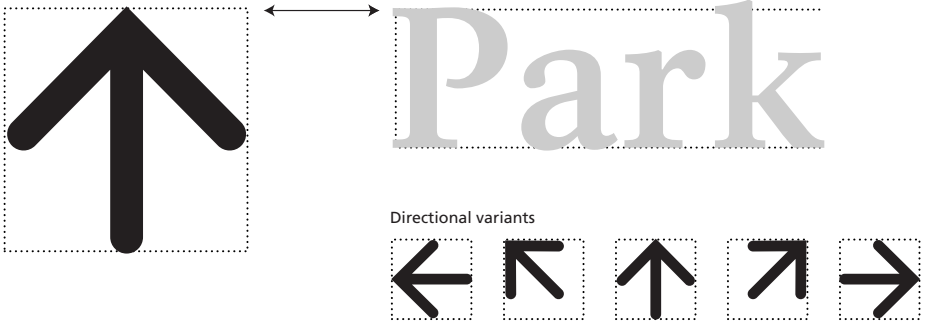
Arrow Applications Guide: The chart below lists the types of signs that use directional arrows along with the respective grid, arrow style, and size. The three standard styles of arrow are displayed on the facing page.

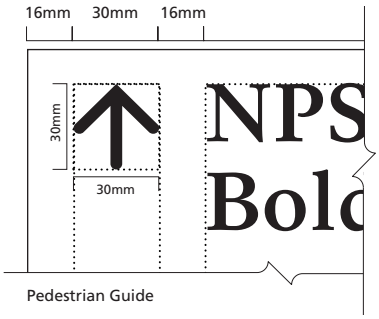
Grid	Sign Type	Arrow Style	Arrow Size as Proportion of Primary Legend
TG-1, 3	Trail Guide Sign	A	30 mm *
TG-2, 4	Trail Guide Sign	A	30 mm *
NT-1	Narrow Profile Trail Guide	A	20 mm **
SG-1-8	Small Guide	A	10 cm ***
RG-1-5, 9, 11	Road Guide	B	2x
RG-7	Road Guide	B	2.5x
RG-8	Road Guide	B	2x
HG- 3	Highway Guide	C	2.5x
TB-1, 2, 3	Trailblazer	B	1.6x

* Based on a 30 cm x 30 cm panel
** Based on a 15 cm x 30 cm panel
*** Based on a 90/120 cm x 30cm panel

Arrow Type A (Pedestrian Arrow) for Trail Guide, Double Column Guide, and Narrow Profile Trail Guide Signs

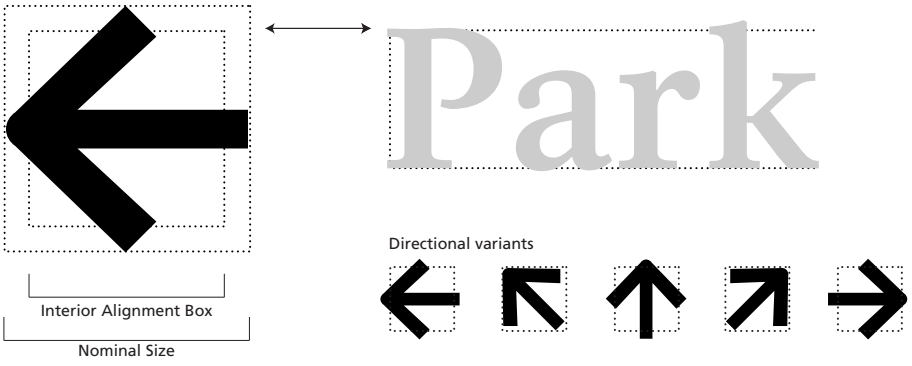
Top edge of arrow's alignment box lines up with top edge of text box

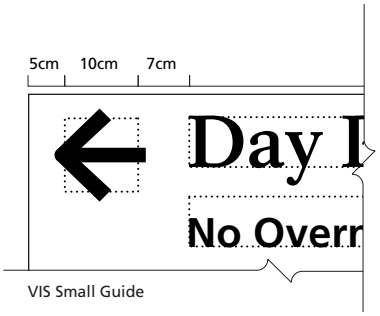




Arrow Type B (Traffic Arrow) for Small Guide Signs

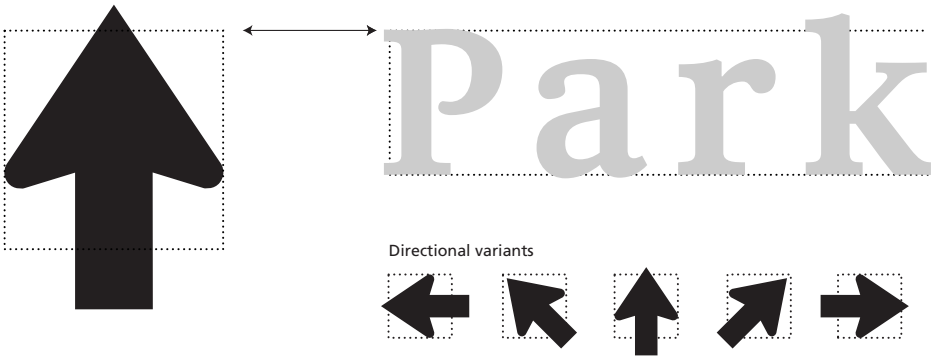
Top edge of arrow's interior alignment box lines up with top edge of text box

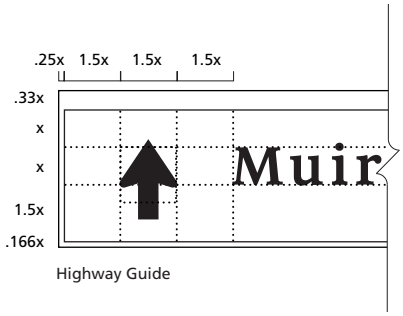




Arrow Type C (Highway Guide Arrow) for Highway Guide Signs Viewed from an Automobile

Top edge of arrow's alignment box lines up with top edge of text box





2.7-Panel Layout Grid Formats

Introduction: Each sign type follows a standard layout grid format that includes margins, borders, text fields, and legend size for a specific typeface. Grid formats, included in this section of the manual, provide the skeletal structure for organizing the sign legend, symbols and illustrations on a sign. The grids have been designed to provide optimum legibility and a consistency in presenting legends and information.

Although there are a large number of grids in this section, there are generally only one or two options for a specific signage application. All sign panels should follow the graphic layout grid formats provided here.

Layouts for panels in the Visitor Information System allow for a combination of illustration and text to create visual interest and

Visitor Information System Grid Formats

Layout: 55 different grid formats are included in the Visitor Information System. Each is tailored to a specific function.

Legend: Text is separated into small paragraphs or telegraphic chunks for ease of reading. Panels are illustrated or include symbols to aid communications.

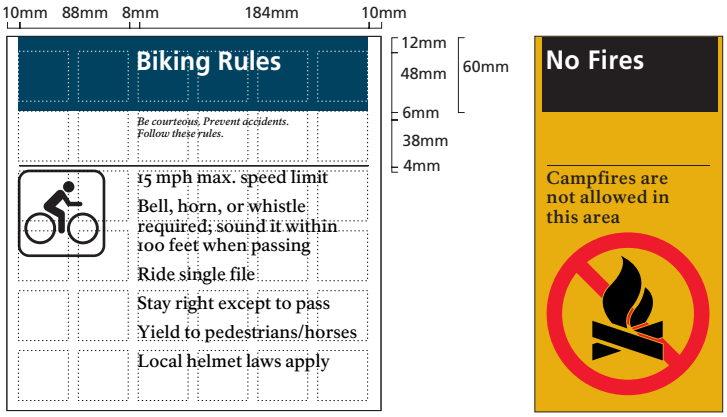
Grid Format: Legend is placed flush to the left on the appropriate layout grid format.

Proportional Sizing: Standard panel sizes may be enlarged 150% and 200% from 30 cm to 45 cm and 60 cm for larger applications.

Overbar: The headline overbar identifies the panel subject in a consistent size and format. Headline aligns to legend below.

Color: General information is displayed in earth tones. Safety information is color-coded according to national standards.

Typeface: NPS Rawlinson with upper and lower case legends, initial capital letters only. Secondary legends and headlines are in the Frutiger typeface. Type weights (Bold, Regular, Book) vary depending on application. Type sizes are in graduated proportions for consistency.



Park Identity Sign Grid Formats

Ground Mounted format: Panel height is constant for each grid with panel width based on length of longest legend line. Panel length is based on the length of the longest legend line plus **4x**, and then rounded up or down to closest whole number.

Hanging Format: Panel formats for suspended flag mounts are a constant width based on 3", 4" and 6" primary legend size. Panel height is constant for each grid

Typeface: NPS Rawlinson Heavy, with upper and lower case display, initial capital letters only. Agency and department identifiers and secondary legend for Facility Identifier with park name below are Frutiger Bold.

Grid Format: Legend is placed flush to the left on the legend lines shown on the grid. All proportions and alignments should follow the grid formats precisely.

Panel Color: Overbar is NPS Dark Green. Overbar contains titles of Agency and department and NPS Arrowhead only. Background of main field is NPS Gray-Brown and all legends are off-white.

NPS Arrowhead: A one-color signage version with NPS Brown and off white background. Size on panel to remain as shown (**1.7x**). Alternative bases allow removal from overbar and placement of larger Arrowhead on structure.

Layout: All proportions are based on the size of the primary legend (**x**). Legend includes full name of park regardless of length.

to distinguish different subjects while maintaining a typographic consistency.

Complex messages on Road Guide Signs may require modification of these guidelines. Ask the UniGuide Program Manager at Harpers Ferry Center for specific examples.

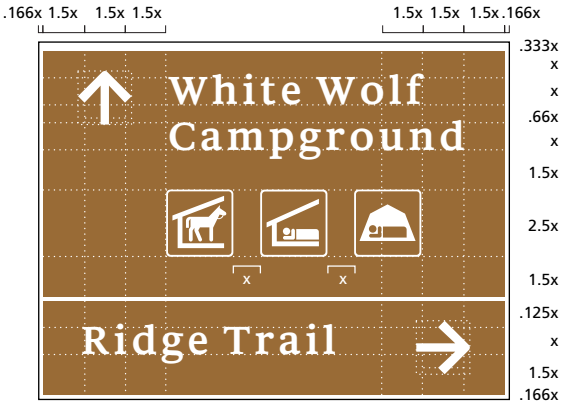
Road Guide Sign Grid Formats

Typeface: NPS Rawlinson Roadway, with mixed case display, initial capital letters only in white. Secondary legends are Frutiger Bold, a sans-serif typeface with letterspace adjustment, and are displayed in FHWA Yellow for advance guidance and motorist information.

Grid Formats: Layouts feature one to three directional modules and consistent space around legend and between lines to aid readability.

Symbols: Use only SEGD National Recreation Symbols. Size is proportional to specified capital letter height.

Borders: A white border is placed around entire panel assembly. The white border between two modules separates direction modules.



Vertical alignment: Destination legends are placed flush left (left justified) on the grid with initial letter aligned to the left side of a vertical stroke.

Options: See RG.9-11 for guide on secondary legends, advanced guidance and road condition displays. Route Shields are accommodated in formats (see RG.3 & 4). Grid system also accommodates use of highway route shields.

Arrow Size: Arrows are measured by overall size and aligned on an interior grid (alignment box) to correctly balance the wings of the arrow with the legend.

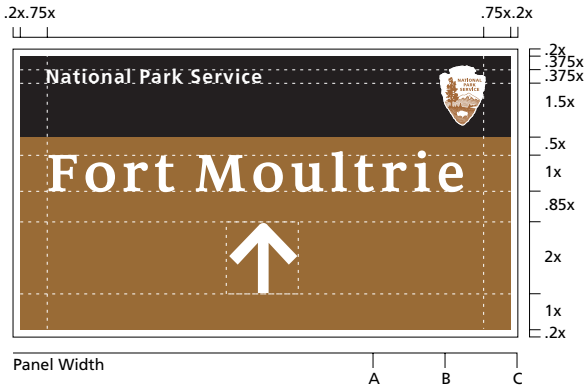
Trailblazer/Boundary Sign Grid Formats

Overbar: Dark green, with NPS name and Arrowhead. Arrowhead graphic is displayed in FHWA Recreation Brown, one color signage version on retroreflective background.

Layout: All proportions are based on the size of the primary legend (**X**) with three possible sizes: 2", 3", and 4". For each size, there are standard panels for one-, two-, and three-line legends, and three different panel widths for each legend size.The same size panels and format are used for park boundary identification signs.

Color: Background of main field is FHWA Brown, fabricated from transparent overlay film and placed on a retroreflective background.

Typeface: NPS Rawlinson Roadway, with mixed case display, initial capital letters only. Secondary legends displayed in lieu of directional arrow are Frutiger Bold in all capital letters.



Arrow Size: Arrows are measured by overall size and aligned on an interior grid. Straight arrows are centered. Right directional arrows aligned flush to the right and left directional arrows are flush to the left.

Legend: Display full park or place name. Avoid acronyms or abbreviations.

Proportional Sizing: Type specifications are shown at below right for the most common sign sizes, such as a 30cm x 30cm panel or a 15cm x 30cm narrow profile panel. Type sizes for larger panels (45cm x 45cm, 60cm x 60cm) will be enlarged proportionally. For example, the 30/33 body text on a 30cm x 30cm sq. panel will be 45/49.5 for a 45cm x 45cm panel. Road Guide, Highway Guide, and Park Identification Sign grids are also proportionally sized based on the capital letter height of the primary legend, which is specified in inches.

Selection of the Appropriately Sized Sign: It is often difficult to determine the correct sign size. What may appear appropriate on paper may seem small when placed in the environment. The UniGuide Program Manager can provide full size mock-ups to aid in identifying the correct panel size for Visitor Information System signs and identification signs. The sizing of signs will become routine, when a planner becomes familiar with the system.

Use of Grid Formats: To create sign layouts and prepare artwork for panel production, a designer or production person must have a good working knowledge of Adobe Illustrator and Quark Xpress and possibly Adobe Photoshop for the inclusion of some graphic images.

Planners may also create rough layouts using the UniGuide Manager software program (estimated release schedule, Spring 2002).

The grids included in this section are available from the UniGuide Program Manager and online (**www.graphics.nps.gov.uniguide**) as digital files in the most appropriate program for a particular type of sign.

Visitor Information System: These files are provided as a 30cm x 30cm square that can be proportionally enlarged to 45cm or 60cm high panels as required. Note that the panels are specified in nominal sizes. Actual sizes for final panel production are slightly larger vertically to accommodate placement into the rail frame and wider than 30 cm or 45cm to accommodate panel gaps that are built into the system if multiple panels are used side by side. The NPS contracted graphics fabricator will make this accommodation when the panels are prepared for production. For panels wider than those noted above, extend the panel grid to the width specified below.

This table specifies the final panel heights and widths for inclusion into assemblies of the Visual Information System. Typical panel heights are nominally 30 cm, 45 cm, and 60 cm. Street name signs, Fingerboards, Area entry signs and Small Guide signs are 20 cm high. Placing panels taller than 60 cm into the Visual Information System assembly is not recommended. For applications taller than 60 cm, consult the Regional UniGuide Coordinator or the UniGuide Program Manager.

Height and Width (30cm): for Visual Information System Panels based on 30cm x 30cm module

Panel Height (cm)		
Nominal	30	60
Actual	30	62.15

Panel Width (cm)							
Nominal	30	45	60	90	105	120	150
Actual	30	45	60.1	90.2	105.3	120.3	150.4

Height and Width (20cm): for Visual Information System Panels based on 20 cm high panels

Panel Height (cm)	
Nominal	20
Actual	20

Panel Width (cm)				
Nominal	60	75	80	90
Actual	60.1	75	80	90

Height and Width (15cm): for Visual Information System Panels based on 15cm x 30 cm narrow profile module.

Panel Height (cm)		
Nominal	30	60
Actual	30	62.15

Panel Width (cm)					
Nominal	15	30	45	60	90
Actual	15	30	45	60.1	90.2

Motorist Guidance: Road Guide, Trailblazer and Highway Guide Sign grids are provided with a one inch primary legend height. This height dimension is referenced as "**x**", with all other dimensions of the panel being a percentage of "**x**". The recommended sizes for legends are different for each type of sign. The NPS Rawlinson Roadway typeface is used exclusively for legends, as specified on page 2.1-86.

Sign Layout and artwork production will vary based on sign type.

• Highway Guide Signs layouts are based on a single one-to-three line grid (HG-1 through HG-3) with right margin adjusted for the length of the longest line of legend.

• Trailbazers and Boundary Signs are based on a single one-to-four line grid (TB-1a through TB-4b and PB-1a through PB-4b) that are to be layed out to fit into one of three standard panel widths.

• Road Guide Signs incorporate one to three separate modules, with one module for each direction used for the particular guide sign. Once each module is prepared, they are digitally assembled to complete the sign panel layout. When each direction module is assembled, a **.125x** interline space is placed between them to provide visual separation to improve readability. A white border is placed around the entire assembly. The top of the white border is **.333x**, and the sides and bottom are **.166x**.

After a sign layout is complete using the grid format provided, the entire digital file will be enlarged by a factor of 100 to the specified size for for production. Thus, a sign with 6" legend will be enlarged 600%.

Park Identification: Identification sign grids are provided with the primary legend being one inch high. This dimension is referenced as "**x**", with all other dimensions of the panel being a percentage of "**x**". These proportional relationships are to be maintained for all signs of this type. The recommended sizes for sign legend are 4", 6", 9", and 12". The entire digital file will be enlarged by the fabrication vendor for production after the layout is completed using the grid format provided.

Building a Sign Panel: A copy of each grid should be made before preparing a sign panel. Using a copy, the underlying grid should be "locked" so that all measurements and proportions are maintained. Sign legends and graphics can be placed on a second layer using text boxes with the correct typographic attributes. Once the panel is finalized, the legend and graphics may be merged into the master template and color assigned to each element. For most panels, this work will generally be done using Adobe Illustrator software. If a panel includes an illustration or a variety of nontypographic graphics, it may be appropriate to export the graphics to Quark Xpress layout software, or to build the panel in Quark Xpress with the grid format on an underlying layer as a guide. Panels that are manufactured using computer-driven cutting or routing equipment should be prepared for production using Adobe Illustrator software. After the legend is finalized, the file will be transmitted with a sign order for manufacturing. The completed artwork should be identified using the NPS UniGuide numbering convention (see file name guidelines, Chapter 3, Section 3.3) and sized and saved as a production file. Signs for machine cutting or routing will be "saved as outlines." Note that once a file is saved as outline, the legend is no longer type that can be manipulated on a keyboard; it has been converted to vector art and can be manipulated only as a graphic shape.

Standard UniGuide grid formats appear on the following pages. They are grouped by sign type: Visitor Information System, Park Identification, and Motorist Guidance with Boundary Identification. An overview of the options is placed at the beginning of each section. A full list of all grids is provided in the table of contents.

Introduction: The Visitor Information System (VIS) panel formats included in this section will accommodate the majority of postings for information, identification, instruction, regulations and guidance. The system is designed for each panel to present a separate subject or function; with single panels or multiple panel displays.

Reference: An introduction to the system is in Chapter 1, guidelines for use are in Chapter 3, material specifications for panels and structures are provided in Chapter 4, and a materials selection guide is provided in Chapter 6.

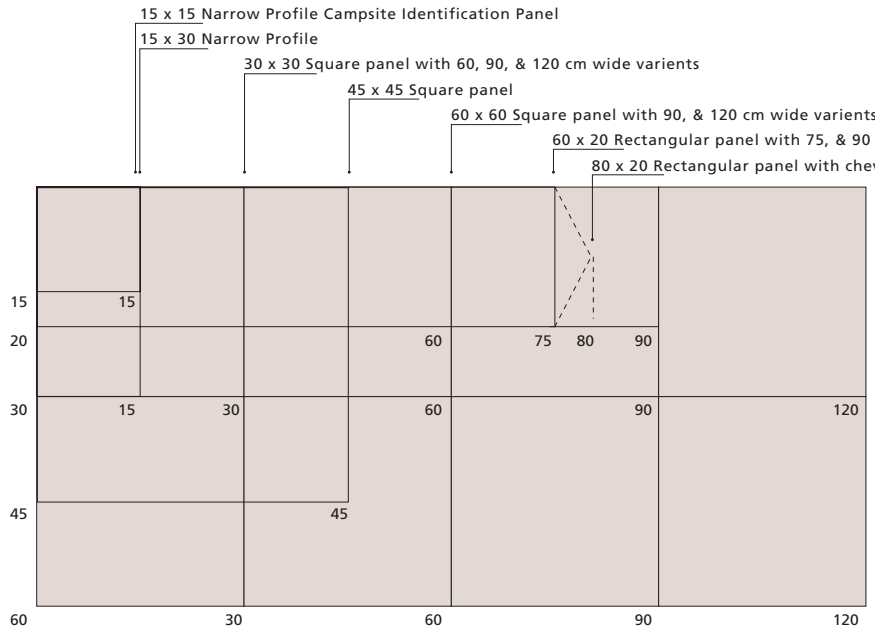
Size: There are four basic configuration of signs. These include the 30 cm square and variants, the 15 cm x 30 cm Narrow Profile format, and the Fingerboard and Streetname Signs which are both based on a 20 cm tall panel. The majority of the system is based on a 30 cm square panel. This is an adequate size for most information postings when viewed as a pedestrian, while not making the posting overly large. If a larger panel is required for longer distance viewing, or increased size for ease of recognition, 30 cm panels can be enlarged to 45 cm, or 60 cm square. Panel heights are limited to 60 cm tall, however, the horizontal dimension can be extended in 30 cm increments up to 120 cm for maps and Identification Signs, Small Guide, and Area Entry Signs. The Narrow Profile format is 15 cm x 30 cm and is used for site specific identification, information, instruction, regulations and guidance, and duplicate panels in foreign language postings. The campsite identification number is 15 cm x 15 cm and fits into the narrow profile structure.

Type: The type system displayed on pages 6 to 9 and shown on each format in this section allows for type to be sized around the amount of legend material. Type is sized on standard point sizes or based on the height of the initial capital letter.

Gird Formats: Although many of the grids shown in this section are similar, there are variations in the interior dimensions and type location specifications for each format based on how the type and graphics should be displayed. These formats should be consistently maintained to the specifications. For questions concerning specific panel design, contact the UniGuide Program Manager at Harpers Ferry Center.

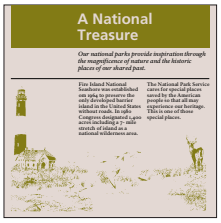
Materials and Production: Panels may be produced in: porcelain enamel, high pressure laminate, fiberglass embedment, digitally printed adhesive vinyl, or computer cut retroreflective sheeting. Selection of material is based on life-cycle cost, budget, exposure to wear, and need for retroreflective legends if viewed from an automobile. Production methods include digital printing, screen printing, and adhesive computer cut and applied legends.

Panel Sizing Chart



Nominal Size	Actual Size
15 x 15	15 x 14
15 x 30	15 x 30
20 x 60	20 x 60
20 x 75	20 x 75
20 x 90	20 x 90
20 x 80	20.1 x 80.1
30 x 30	30 x 30
60 x 30	60.1 x 30
90 x 30	90.2 x 30
120 x 30	120.3 x 30
45 x 45	45 x 45
30 x 60	30 x 62.157
60 x 60	60.1 x 62.157
90 x 60	90.2 x 62.157
120 x 60	120.3 x 62.157

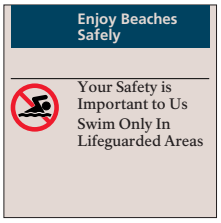
(WxH) Dimensions in centimeters (cm)



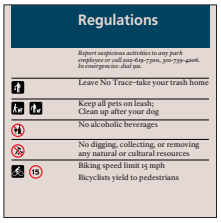
SP-1
Page 2.8-5

SP-2
Page 2.8-6

SP-3
Page 2.8-7

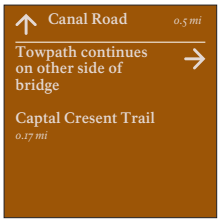


SP-4
Page 2.8-8



SP-5
Page 2.8-9

RS-1
Page 2.8-10



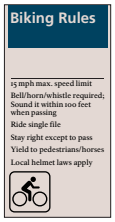
TG-1 to TG-2
Page 2.8-13–14

TG-3 to TG-4
Page 2.8-15–16

MP-1
Page 2.8-17

MP-2
Page 2.8-18

NP-1
Page 2.8-21



NP-2
Page 2.8-21

NP-Y
Page 2.8-22

NP-N
Page 2.8-22

PK-Y
Page 2.8-23

PK-N
Page 2.8-23

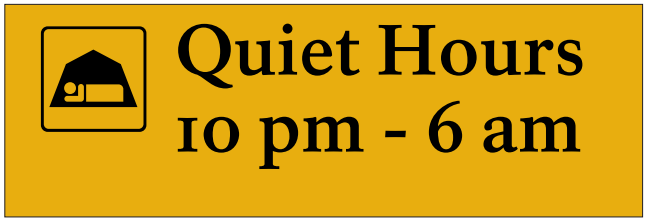
NP-T
Page 2.8-24

NP-C
Page 2.8-24

SS-1
Page 2.8-19

PA-1
Page 2.8-20

SG-1 to SG-9
Page 2.8-25



AE-Y
Page 2.8-28

AI-1
Page 2.8-28

TR-1
Page 2.8-27

AE-N
Page 2.8-28

FB-2
Page 2.8-29

SN-1
Page 2.8-30

EF-1
Page 2.8-11

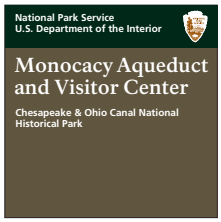
RF-1
Page 2.8-12

VPI-1
Page 2.8-31

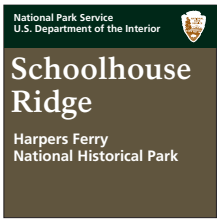
VPI-2
Page 2.8-32

VPI-3
Page 2.8-33

VPI-4
Page 2.8-34



VFI-1
Page 2.8-35



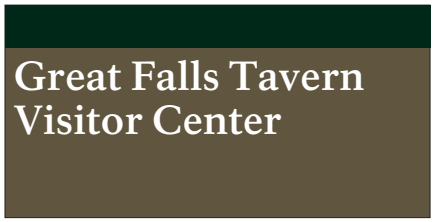
VFI-2
Page 2.8-36

VFI-3
Page 2.8-37

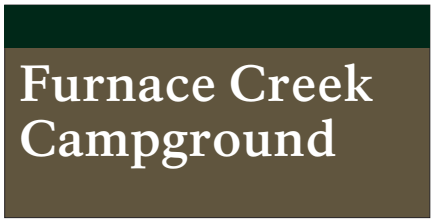
VFI-4
Page 2.8-38

VFI-5
Page 2.8-39

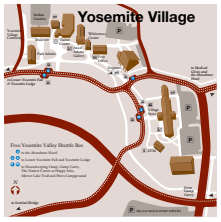
VFI-6
Page 2.8-40

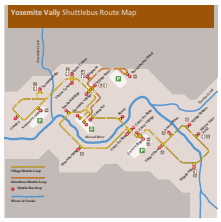


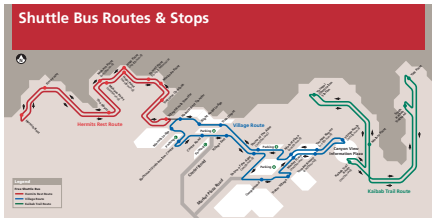
VFI-7
Page 2.8-41



VFI-8
Page 2.8-42



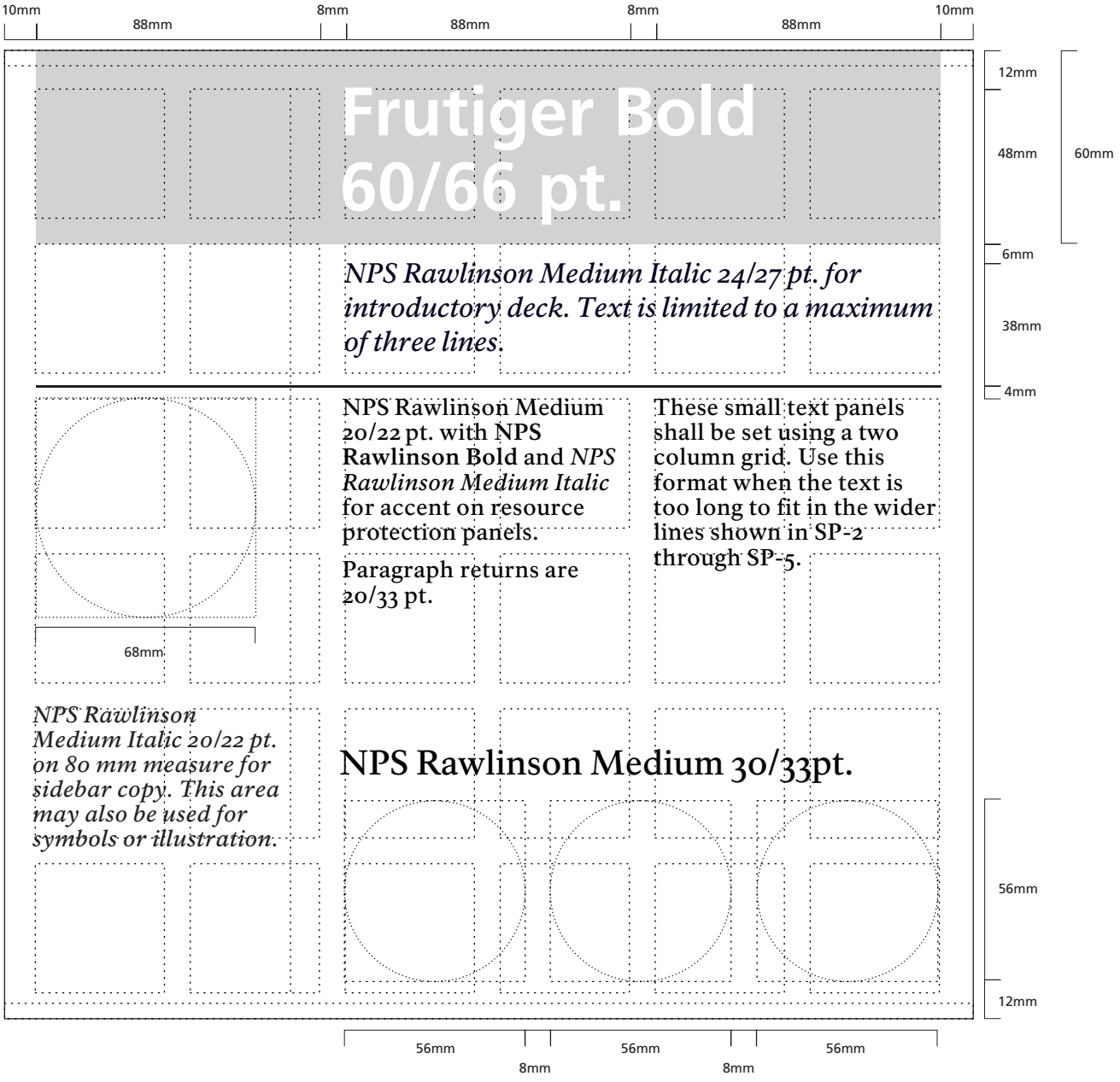




SP-1: Standard Panel with 20/22 Text (2-Column)

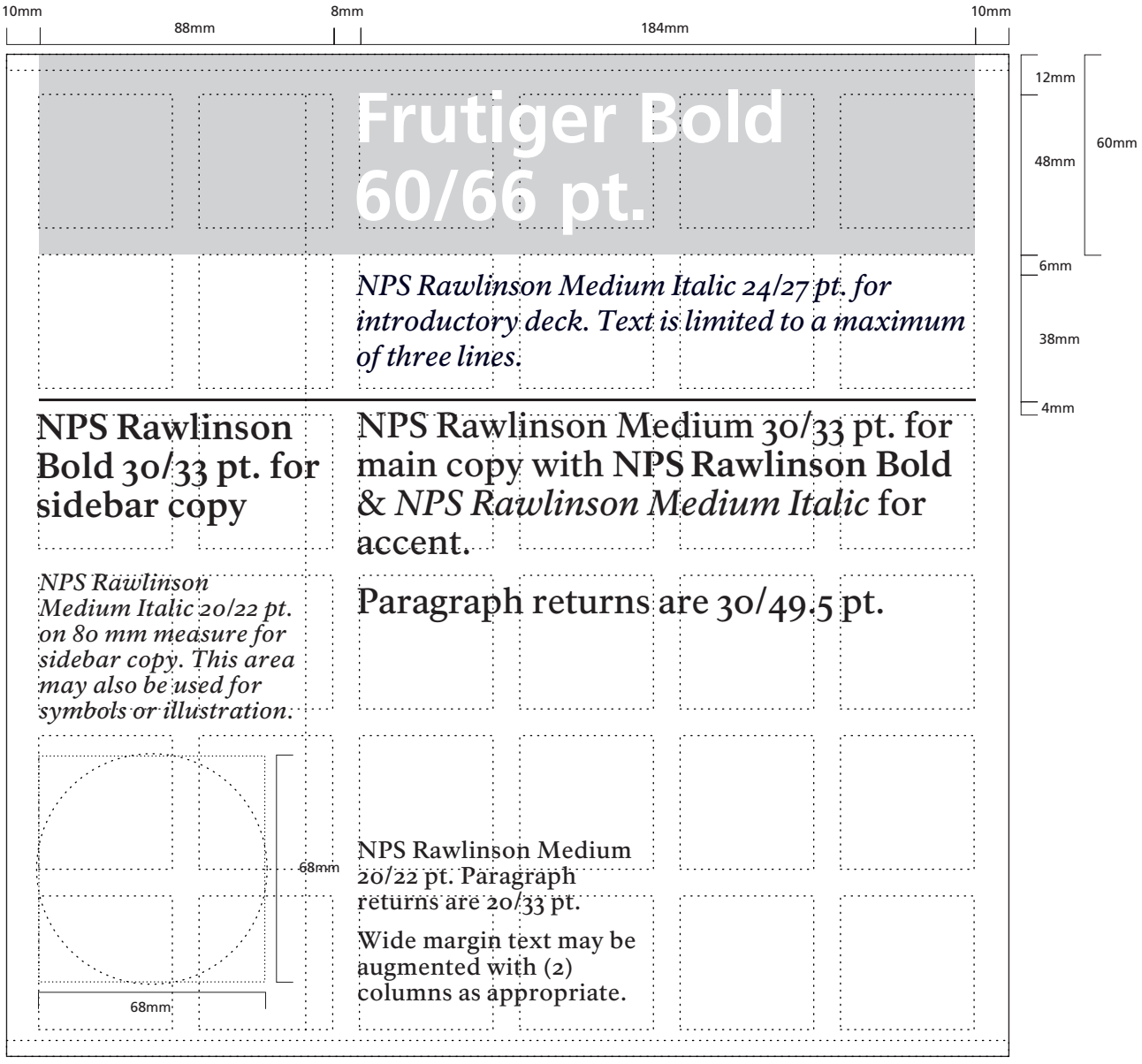
Heading:	60/66 pt. Frutiger Bold
Deck:	24/27 pt. NPS Rawlinson Medium Italic
Main Body Text:	20/22 pt. NPS Rawlinson Medium with Bold or Italic accents, 33 pt. paragraph space
Second Text:	30/33 pt. NPS Rawlinson Medium with Bold or Italic accents
Sidebar Text:	20/22 pt. NPS Rawlinson Medium Italic
Recreation Symbols:	56 mm main body and 68 mm sidebar

Maps are placed on standard panels with specified overbar size and overbar legend. Taller panels (60 cm) may maintain 60 mm overbar to maximize usable area for map.



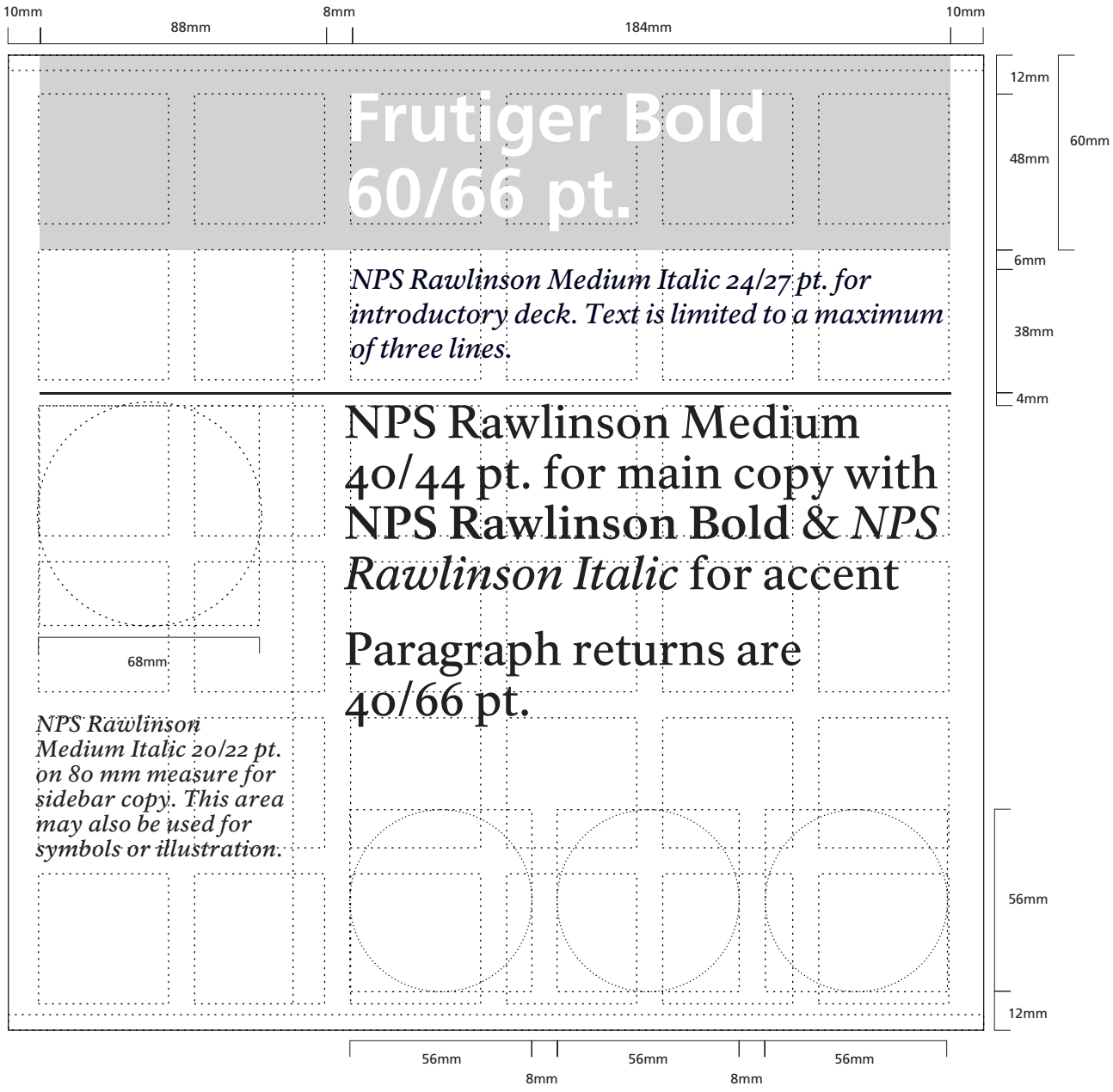
SP-2: Standard Panel with 30/33 Text

Heading:	60/66 pt. Frutiger Bold
Deck:	24/27 pt. NPS Rawlinson Medium Italic
Main Body Text:	30/33 pt. NPS Rawlinson Medium with Bold or Italic accents, 49.5 pt. paragraph space
Second Text:	20/22 pt. NPS Rawlinson Medium with Bold or Italic accents, 33 pt. paragraph space
Sidebar Heading:	30/33 pt. NPS Rawlinson Bold
Sidebar Text:	20/22 pt. NPS Rawlinson Medium Italic
Recreation Symbols:	68 mm for sidebar (56 mm if in main body of panel, see SP-1)



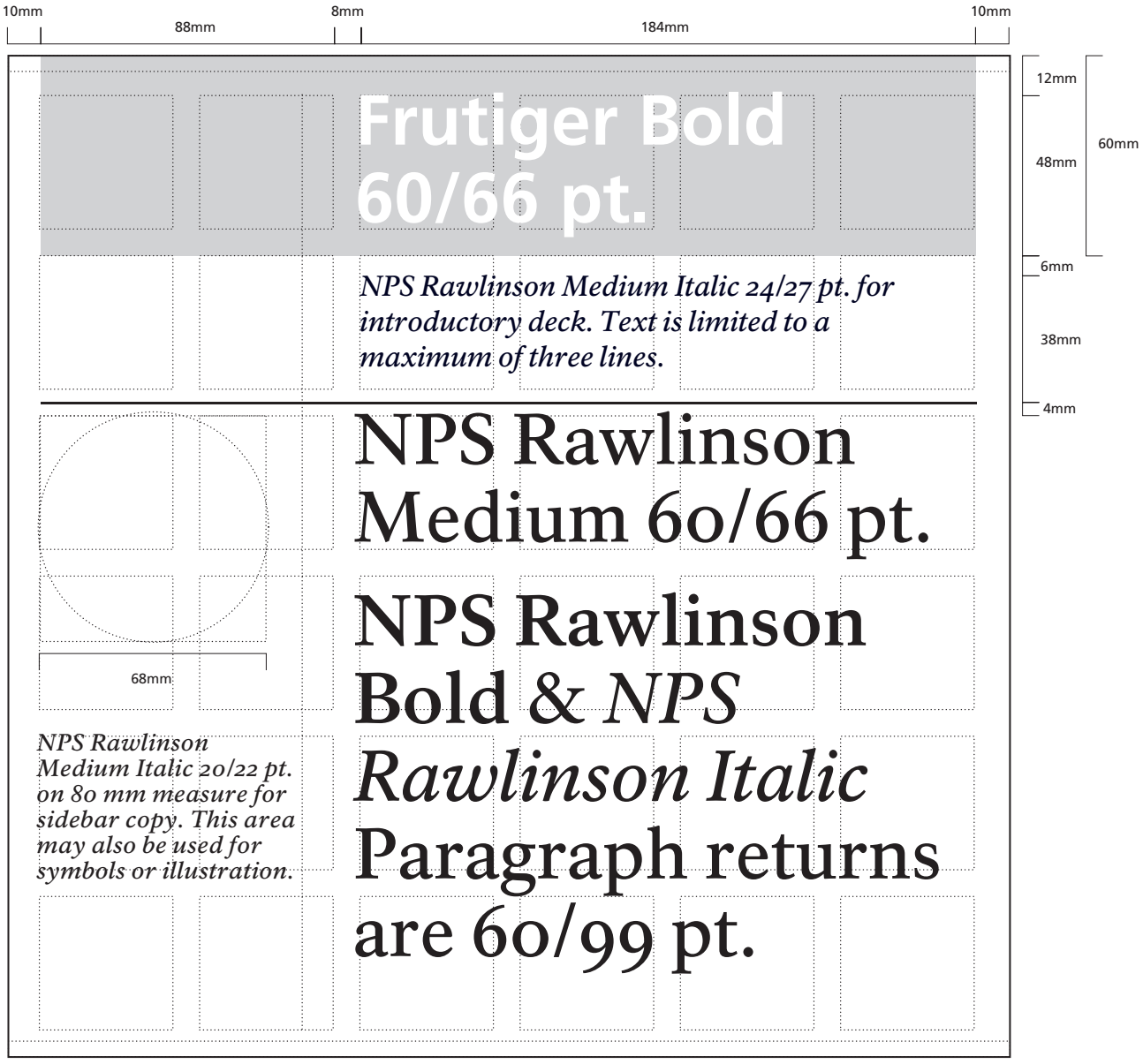
SP-3: Standard Panel with 40/44 Text

Heading:	60/66 pt. Frutiger Bold
Deck:	24/27 pt. NPS Rawlinson Medium Italic
Main Body Text:	40/44 pt. NPS Rawlinson Medium with Bold or Italic accents, 66 pt. paragraph space
Sidebar Text:	20/22 pt. NPS Rawlinson Medium
Recreation Symbols:	56 mm main body and 68 mm sidebar



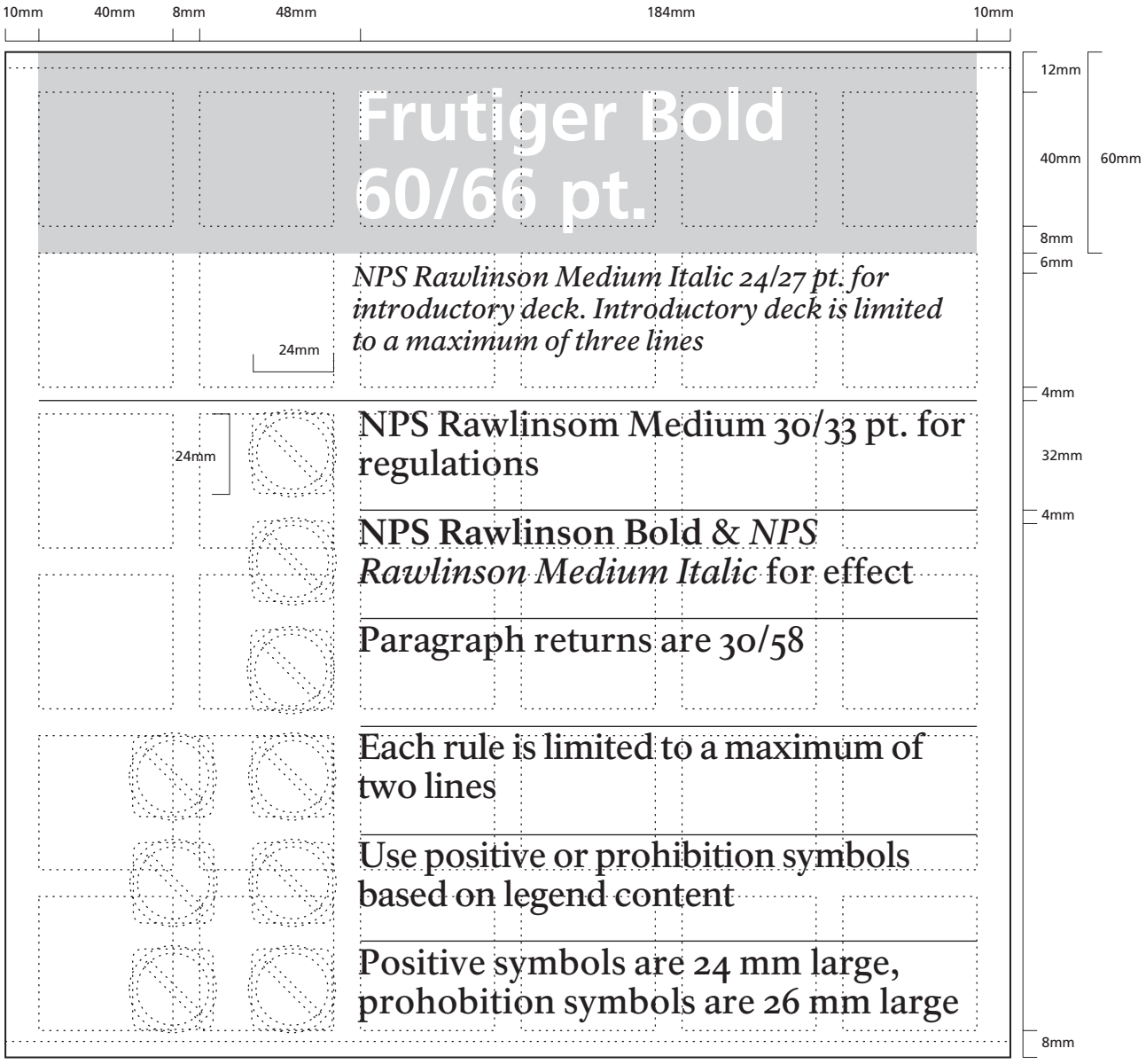
SP-4: Standard Panel with 60/66 Text

Heading:	60/66 pt. Frutiger Bold
Deck:	24/27 pt. NPS Rawlinson Medium Italic
Main Body Text:	60/66 pt. NPS Rawlinson Medium with Bold and Italic accents, 99 pt. paragraph space
Sidebar Copy:	20/22 pt. NPS Rawlinson Medium
Recreation Symbols:	68 mm (56 mm if in main body of panel, see SP-1)



SP-5: Standard Panel with 40/44 Text–Regulations Display with Symbols

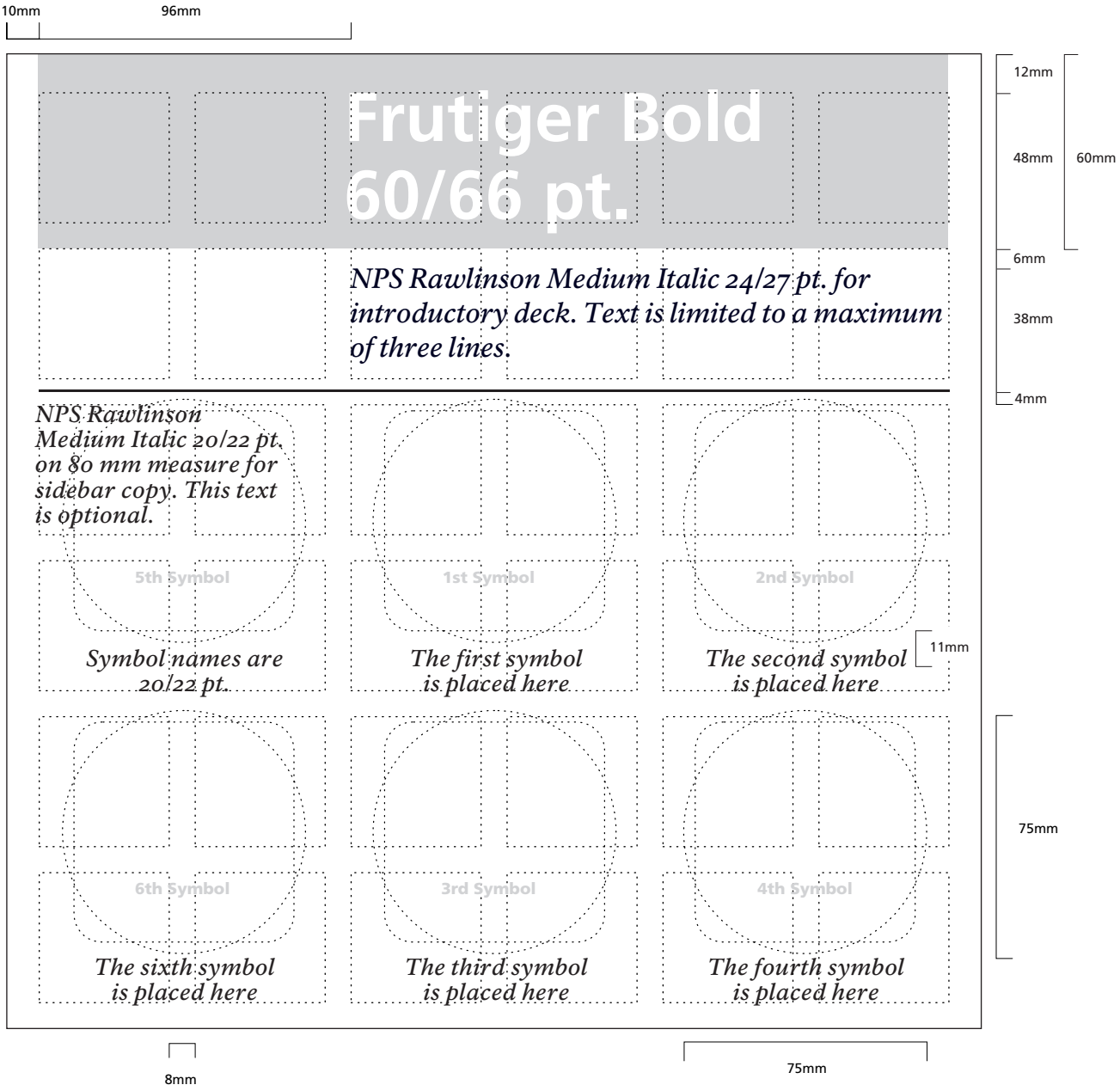
Heading:	60/66 pt. Frutiger Bold
Deck:	24/27 pt. NPS Rawlinson Medium Italic
Regulations Text:	30/33 pt. NPS Rawlinson Medium with Bold or Italic accents, 49.5 pt. paragraph space
Recreation Symbols:	Positive symbols are 24 mm, prohibition symbols are 26 mm large



RS-1: Recreation Symbols Panel

Heading:	60/66 pt. Frutiger Bold
Deck:	24/27 pt. NPS Rawlinson Medium Italic
Sidebar Text:	20/22pt. NPS Rawlinson Medium with Bold or Italic accents
Recreation Symbols:	75 mm

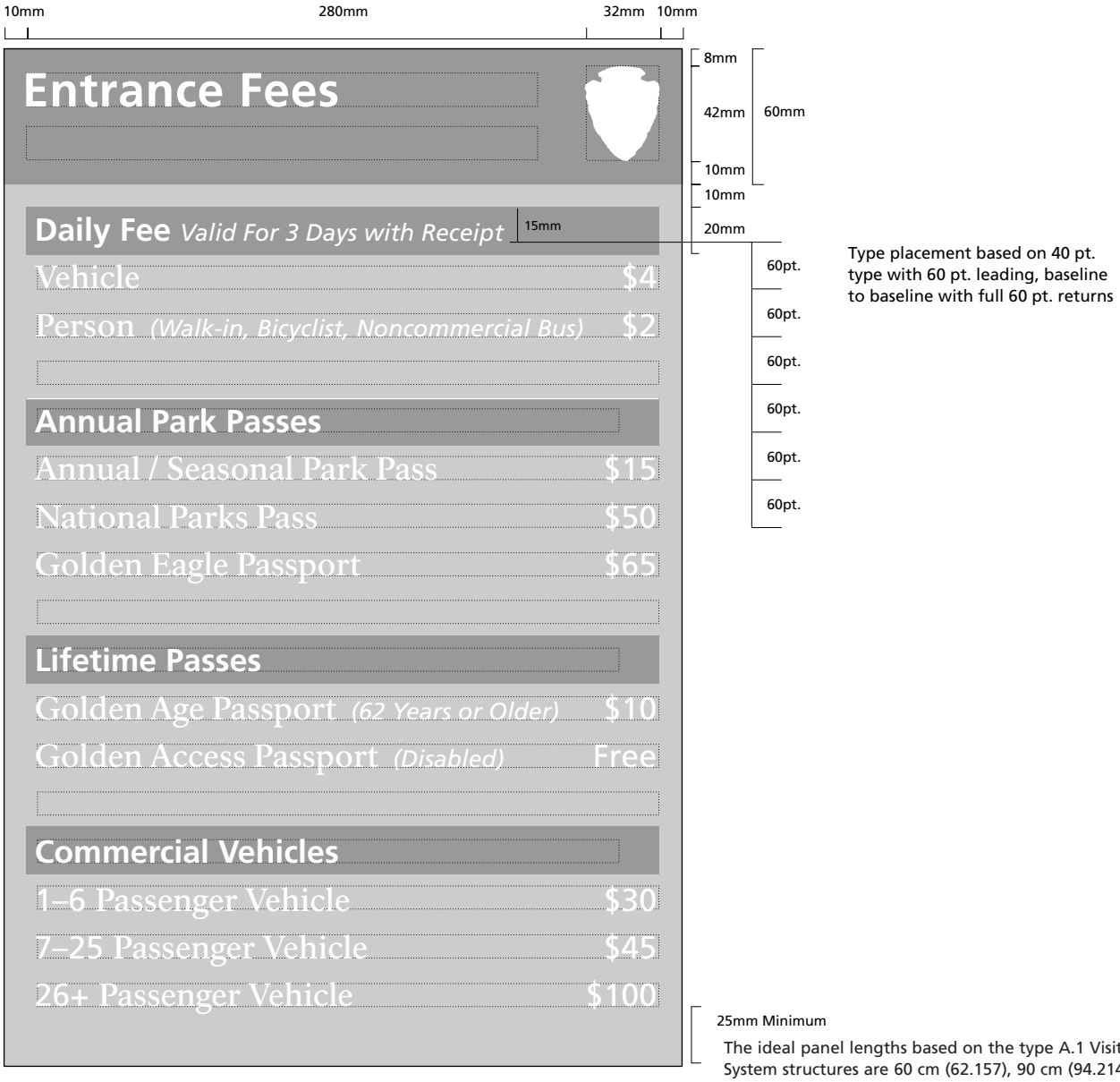
Panel will accommodate up to 6 symbols with location order noted below. Symbol legend or name (picnic area, no cans or bottles, etc.) is placed below each symbol to affirm message.



SF-1: Standard Entrance Fees Panel with 40/60 Text

Overbar Text:	60/66 pt. Frutiger Bold
Heading:	40/60 pt. Frutiger Bold with Italic accents
Secondary Text:	40/60 pt. NPS Rawlinson Medium with Bold or Italic accents, 49.5 pt. paragraph space
Arrowhead Logo:	32mm x 42mm

All signs based on 30 cm wide panel. Signs may be enlarged proportionally to 45 cm, 60 cm, 90 cm, and 120 cm wide. Panel length will vary with each park and panels taller than 60 cm (62.157) will require custom adaptation of Visitor Information System assembly to accommodate panel.

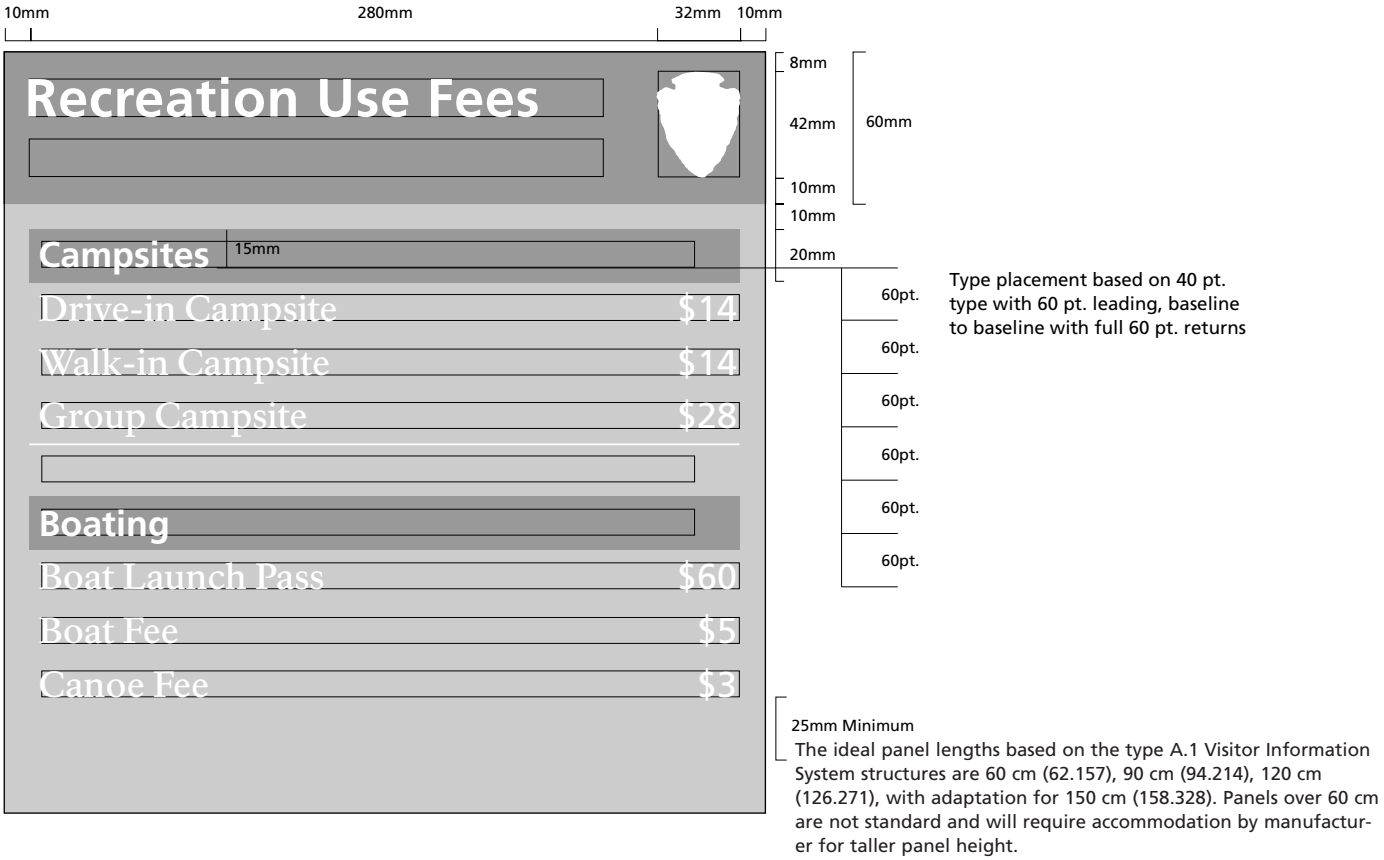


The ideal panel lengths based on the type A.1 Visitor Information System structures are 60 cm (62.157), 90 cm (94.214), 120 cm (126.271), with adaptation for 150 cm (158.328). Panels over 60 cm are not standard and will require accommodation by manufacturer for taller panel height.

SF-2: Standard Recreation Fees Panel with 40/60 Text

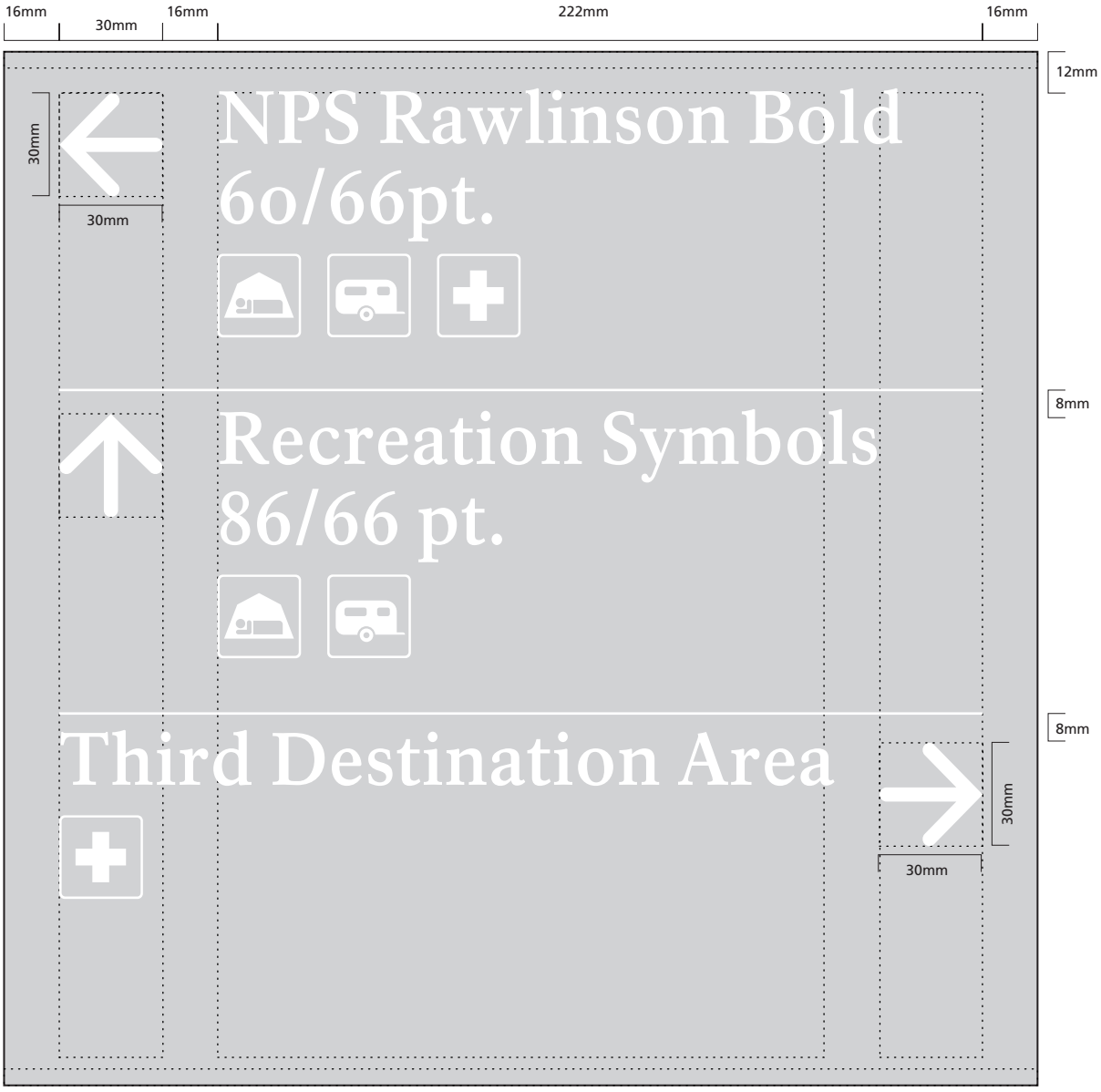
Overbar Text:	60/66 pt. Frutiger Bold
Heading:	40/60 pt. Frutiger Bold with Italic accents
Secondary Text:	40/60 pt. NPS Rawlinson Medium with Bold or Italic accents, 49.5 pt. paragraph space
Arrowhead Logo:	32mm x 42mm

All signs based on 30 cm wide panel. Signs may be enlarged proportionally to 45 cm, 60 cm, 90 cm, and 120 cm wide. Panel length will vary with each park and panels taller than 60 cm (62.157) will require custom adaptation of Visitor Information System assembly to accommodate panel.



Trail Guide Sign with 60/66 Text and Symbols

Destinations:	60/66 pt. NPS Rawlinson Bold
Recreation Symbols:	86/66 pt.
Arrow size:	30 mm

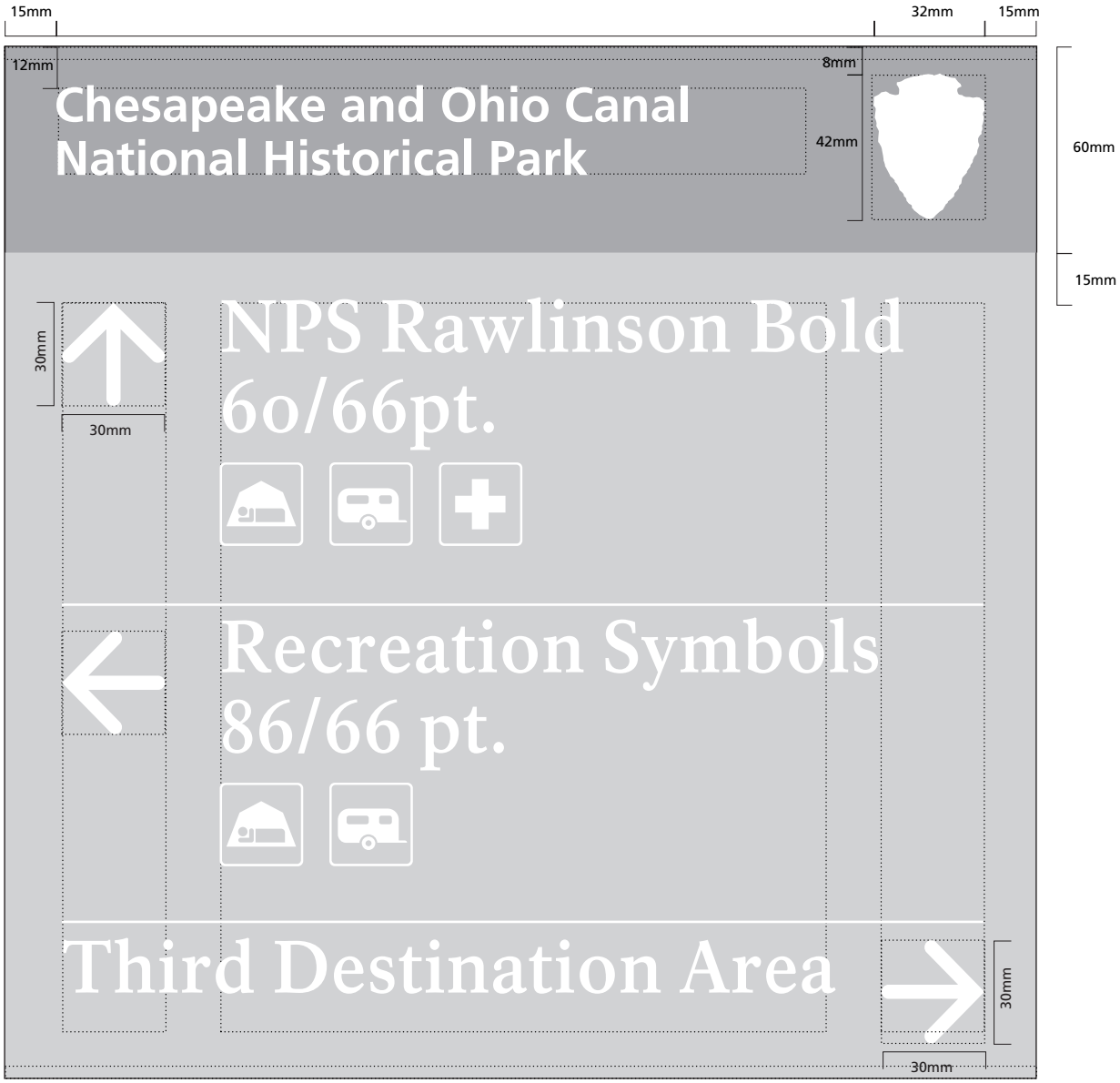


TG-2: Trail Guide Sign with 80/88 Text and Symbols

Destinations:	80/88 pt NPS Rawlinson Bold
Recreation Symbols:	86/88 pt.
Arrow size:	30 mm alignment box

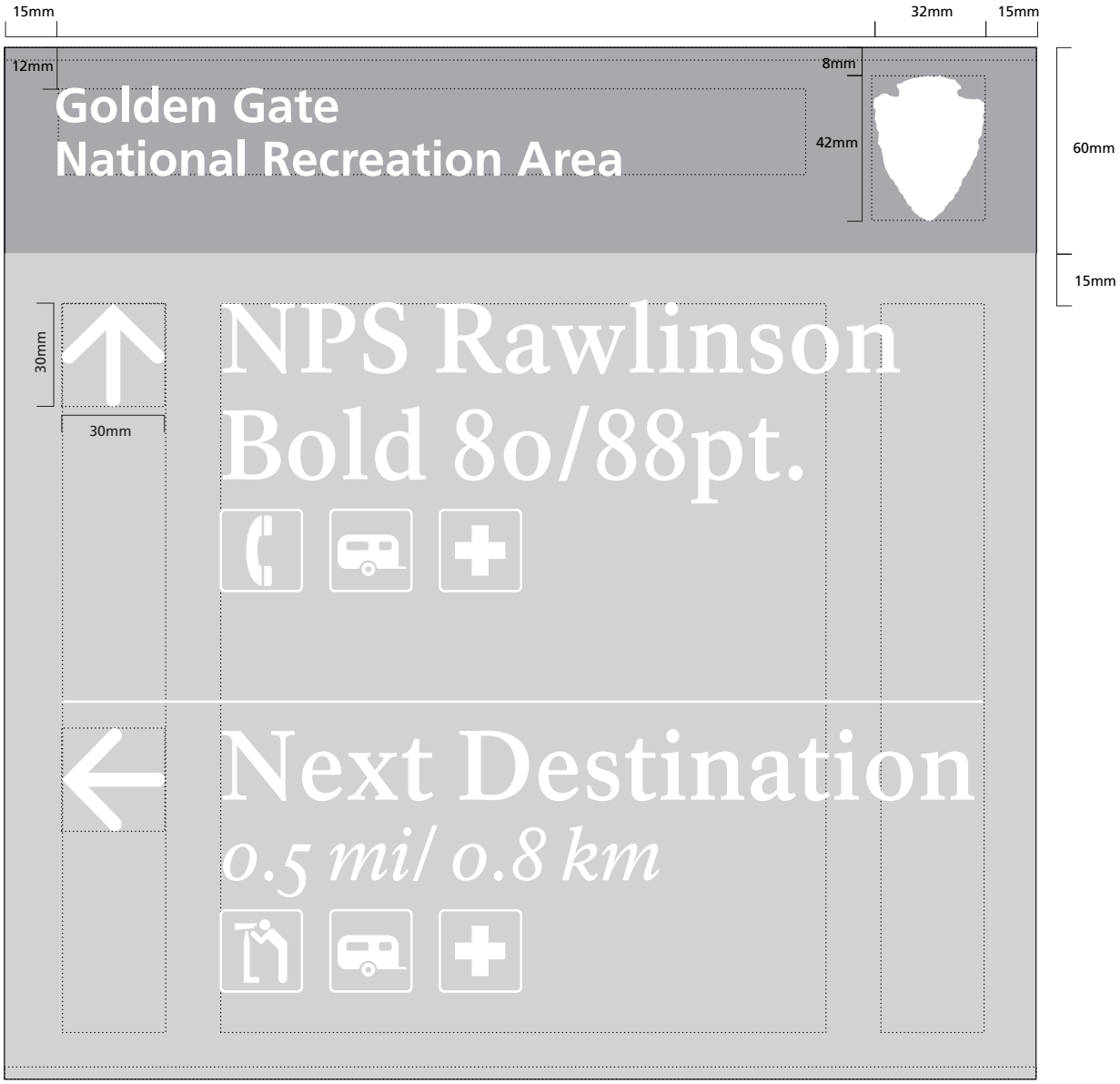
TG-3: Trail Guide Sign with 60/66 Text, Symbols, and Park Identification

Destinations:	60/66 pt. NPS Rawlinson Bold
Overbar Text:	40/44 Frutiger Bold
Recreation Symbols:	86/66 pt.
Arrow size:	30 mm
Arrowhead Logo:	32 mm x 42 mm



TG-4: Trail Guide Sign with 80/88 Text, Symbols, and Park Identification

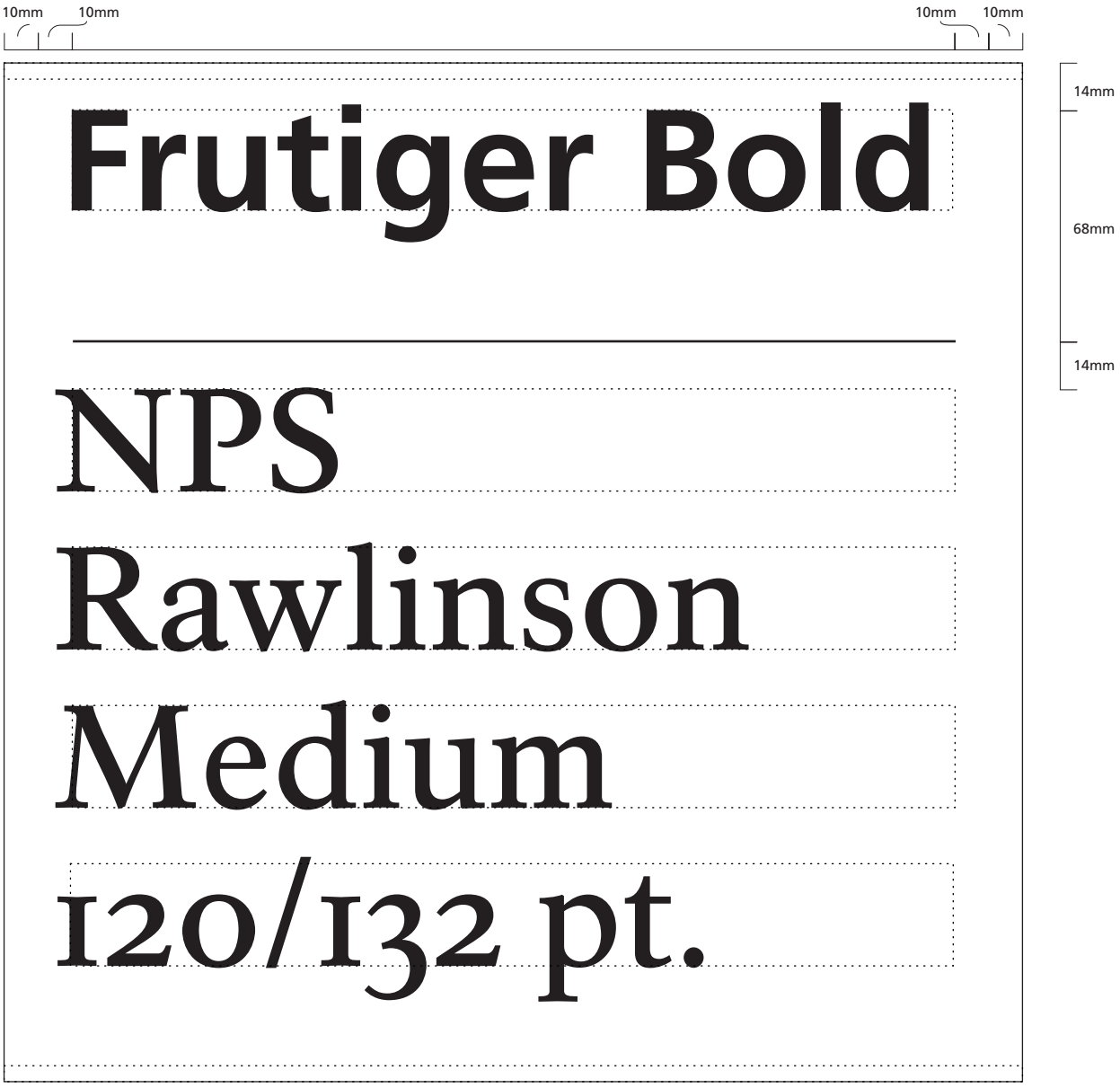
Destinations:	80/88 pt. NPS Rawlinson Bold
Overbar Text:	40/44 Frutiger Bold
Distance:	60/66 pt. NPS Rawlinson Medium Italic
Recreation Symbols:	86/88 pt.
Arrow size:	30 mm
Arrowhead Logo:	32 mm x 42 mm



MP-1: Miscellaneous Posting Sign with 120/132 Text

Heading: 120/132 pt. Frutiger Bold
Body: 120/132 pt. NPS Rawlinson Medium

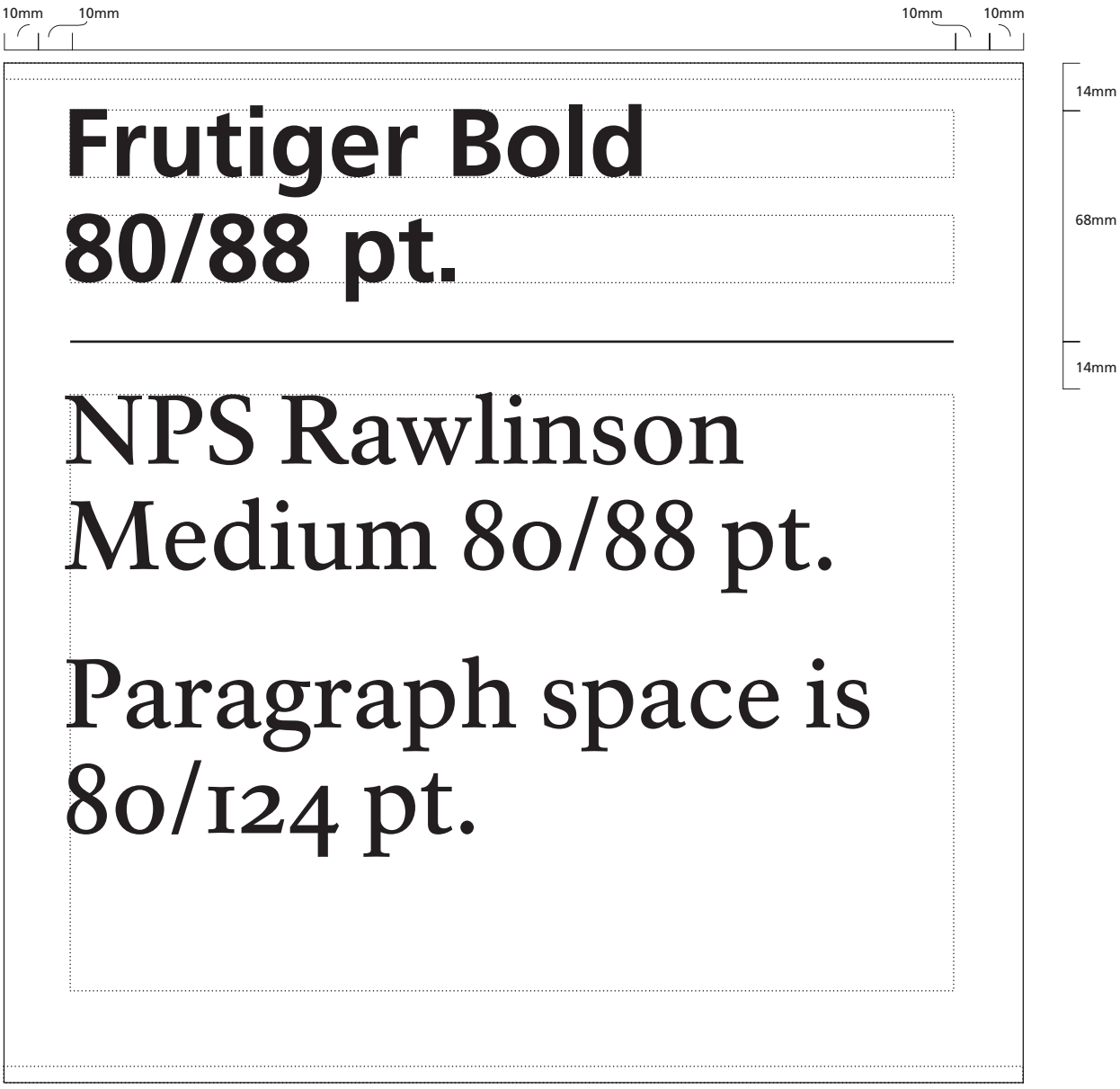
All panel dimensions are based on a 30 cm tall panel. This panel accommodates both a 45 cm and 60 cm tall panel with both type size and dimensions revised proportionally. The width of the panel for both the 30 cm and 60 cm tall panels can be widened in 30 cm increments up to 120 cm based on length of the legend. Use of smaller text type (80/88 pt) is optional based on sign content.



MP-2: Miscellaneous Posting Sign with 80/88 Text

Heading: 80/88 pt. Frutiger Bold
Body: 80/88 pt. NPS Rawlinson Medium, 124 pt. paragraph space

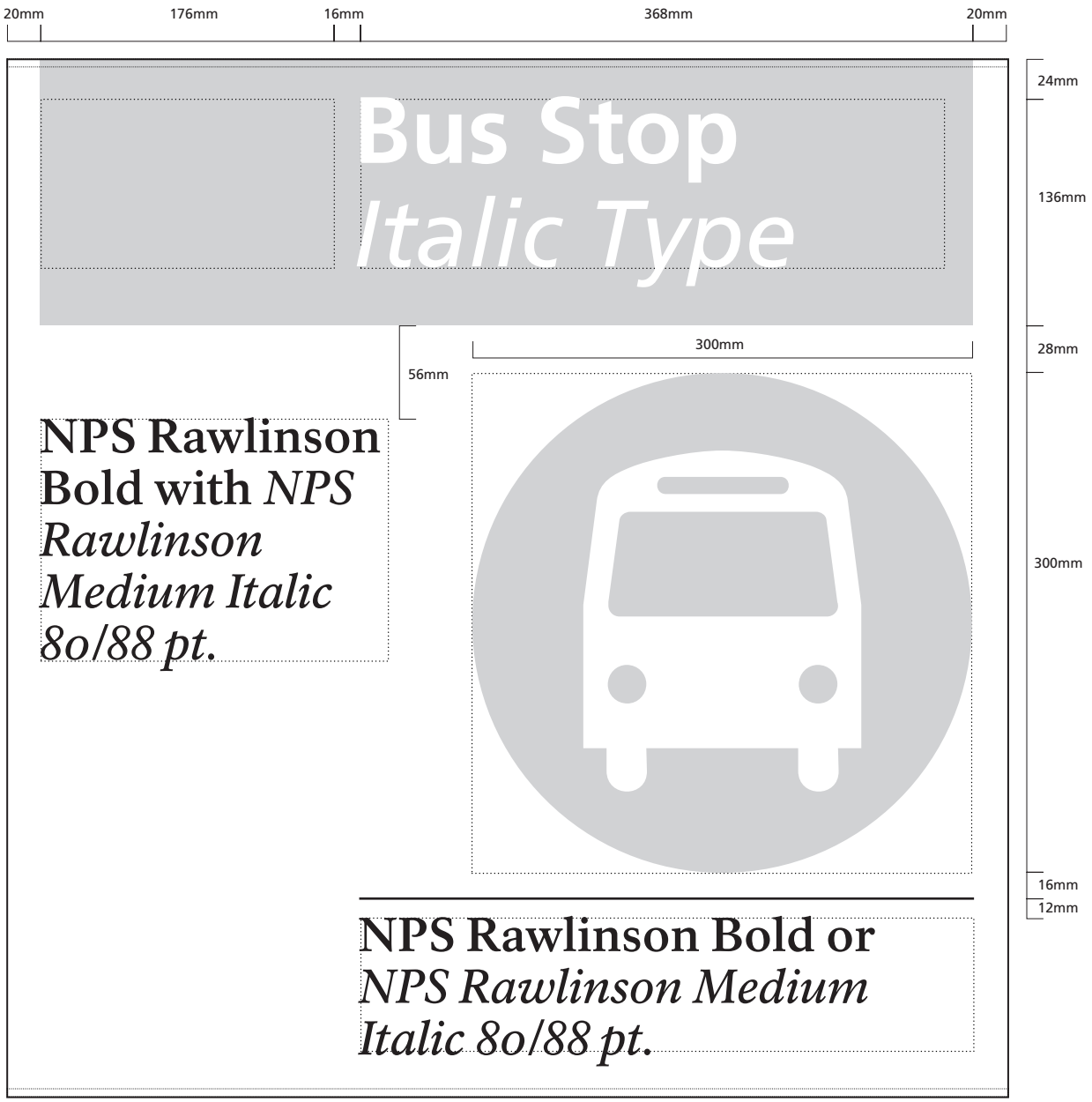
All panel dimensions are based on a 30 cm tall panel. This panel accommodates both a 45 cm and 60 cm tall panel with both type size and dimensions revised proportionally. The width of the panel for both the 30 cm and 60 cm tall panels can be widened in 30 cm increments up to 120 cm based on length of the legend. Use of larger heading (120/132 pt) is optional based on sign content.



SS-1: Shuttle Stop Identification Sign

Heading:	160/176 pt. Frutiger Bold and Frutiger Italic
Body:	80/88 pt. NPS Rawlinson Bold and NPS Rawlinson Medium Italic
Symbol:	300 mm

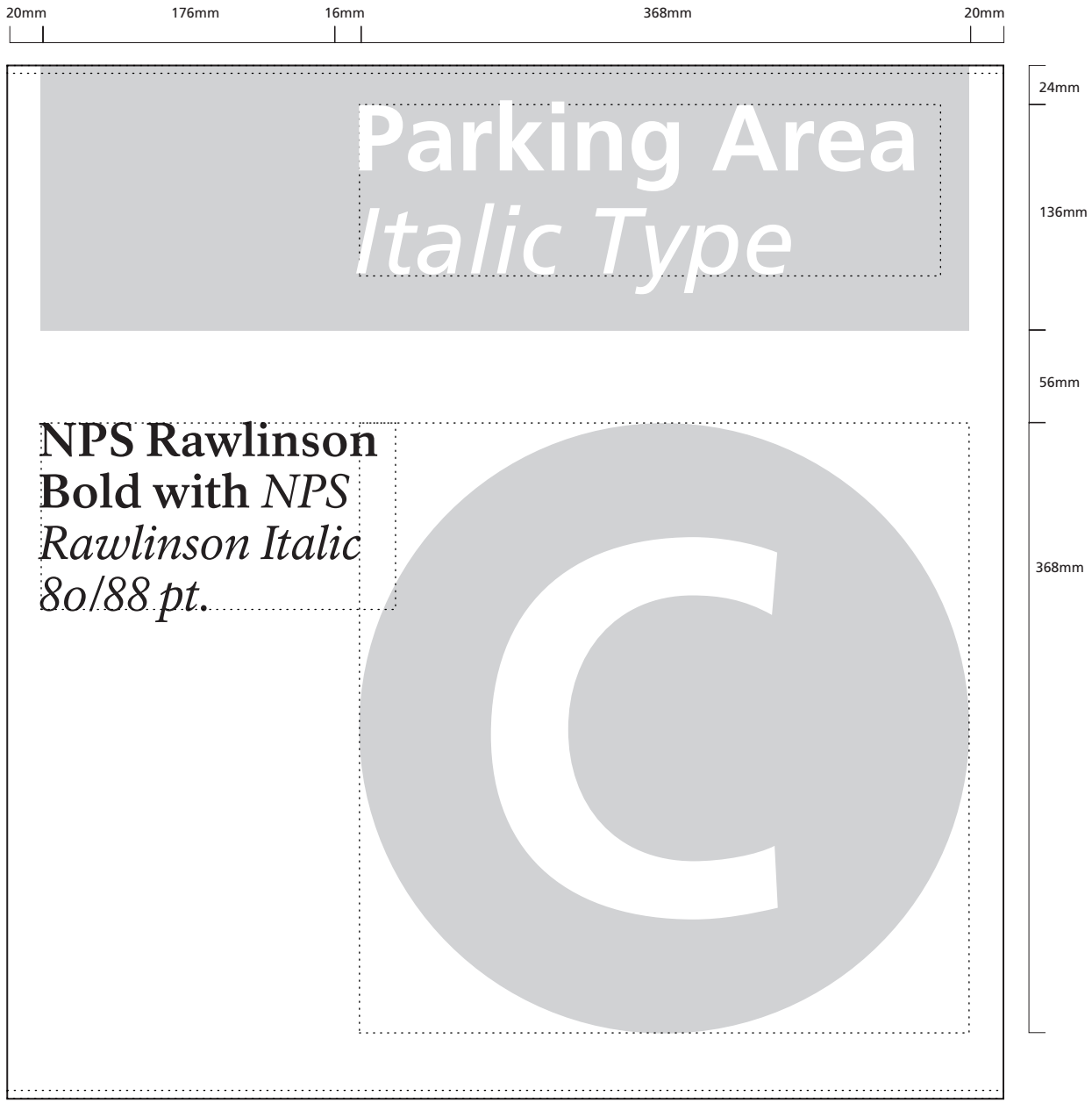
This grid specification is based on a nominal 60 cm square panel.



PA-1: Parking Area Identification Sign

Heading:	160/176 pt. Frutiger Bold and Frutiger Italic
Body:	80/88 pt. NPS Rawlinson Bold and NPS Rawlinson Medium Italic
Symbol size:	368 mm

This grid specification is based on a nominal 60 cm square panel.

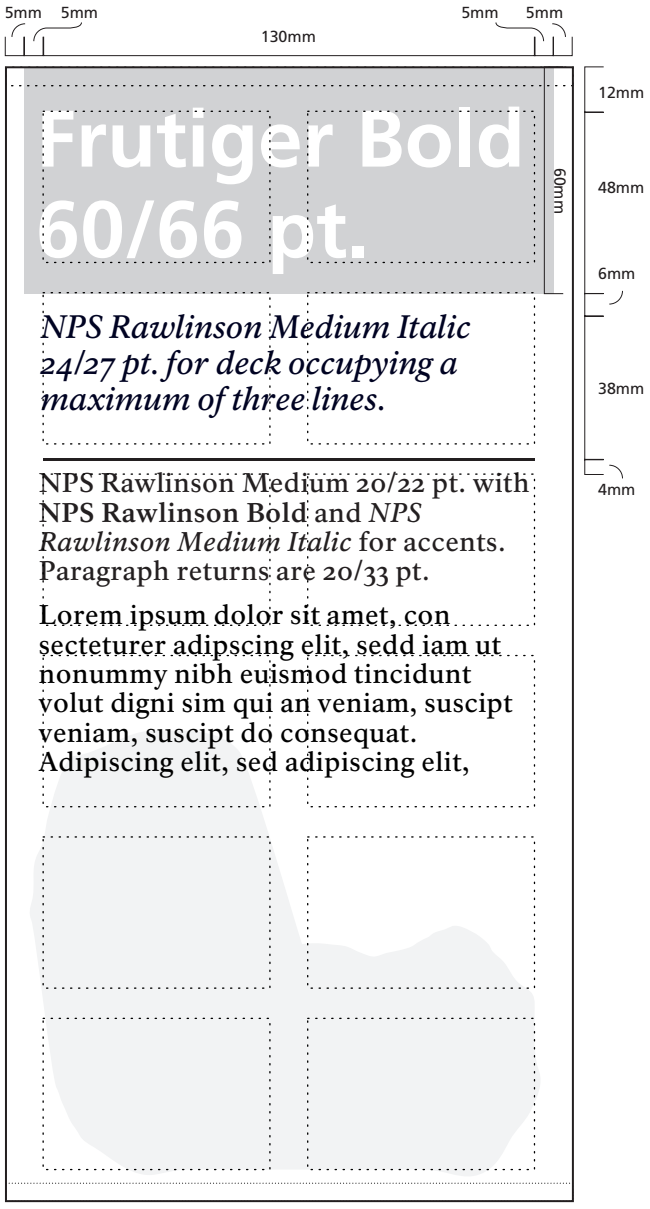


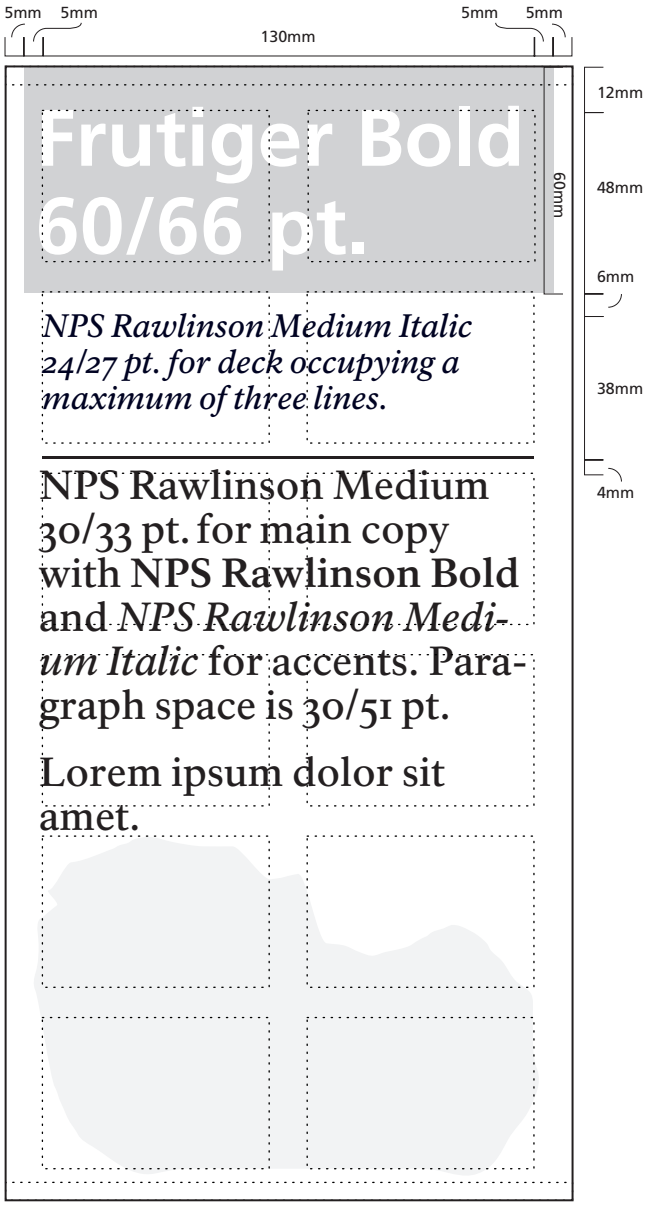
NP-1: Narrow Profile Information, 20/22 Text

Heading: 60/66 pt. Frutiger Bold
Deck: 24/27 pt. NPS Rawlinson Medium Italic
Body: 20/22 pt. NPS Rawlinson Medium with corresponding Bold and Italic, 33 pt. paragraph space

NP-2: Narrow Profile Information, 30/33 Text

Heading: 60/66 pt. Frutiger Bold
Deck: 24/27 pt. NPS Rawlinson Medium Italic
Body: 30/33 pt. NPS Rawlinson Medium with corresponding Bold and Italic, 51 pt. paragraph space



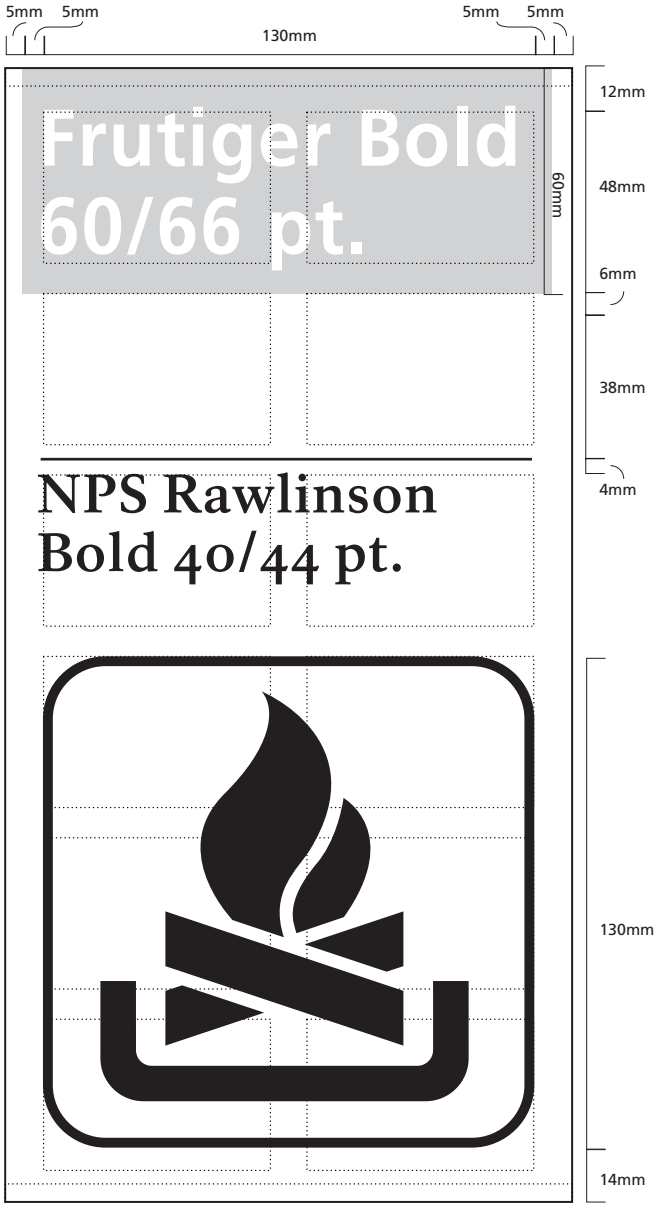


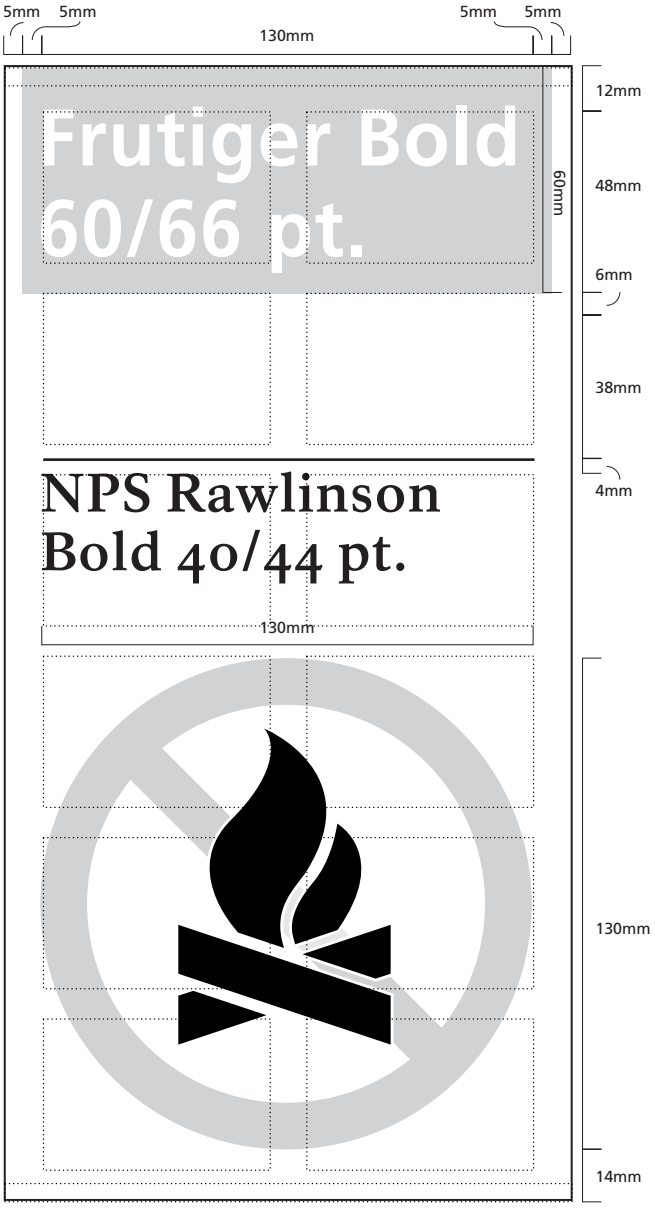
NP-Y: Narrow Profile Identification with Symbol

Heading: 60/66 pt. Frutiger Bold
Text: 40/44 pt. NPS Rawlinson Bold
Symbol size: 130 mm

NP-N: Narrow Profile Prohibition with Symbol

Heading: 60/66 pt. Frutiger Bold
Text: 40/44 pt. NPS Rawlinson Bold
Symbol size: 130 mm



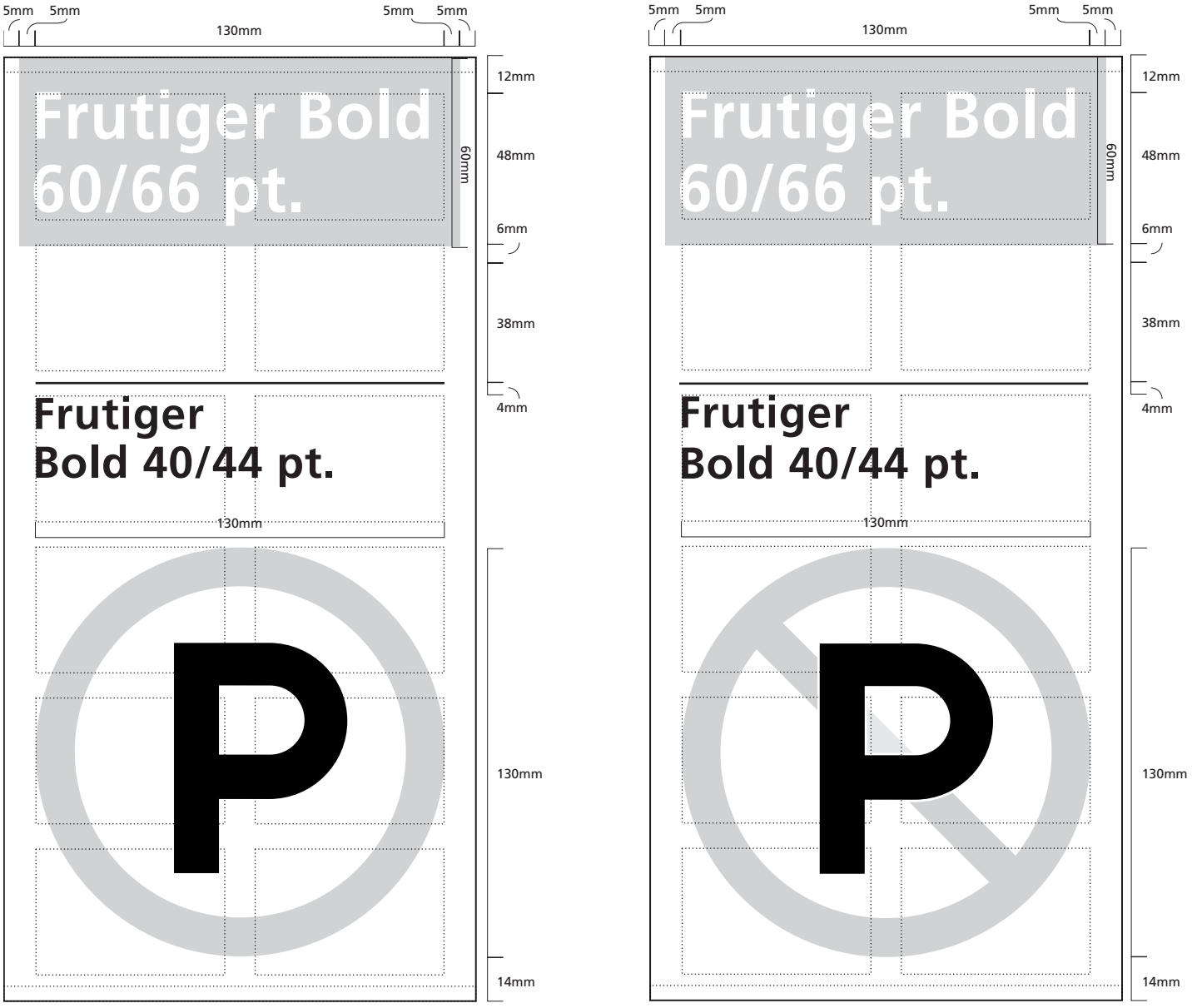


PK-Y: Narrow Profile Parking with Symbol

Heading: 60/66 pt. Frutiger Bold
Text: 40/44 pt. Frutiger Bold
Symbol size: 130 mm

PK-N: Narrow Profile Parking Prohibition with Symbol

Heading: 60/66 pt. Frutiger Bold
Text: 40/44 pt. Frutiger Bold
Symbol size: 130 mm

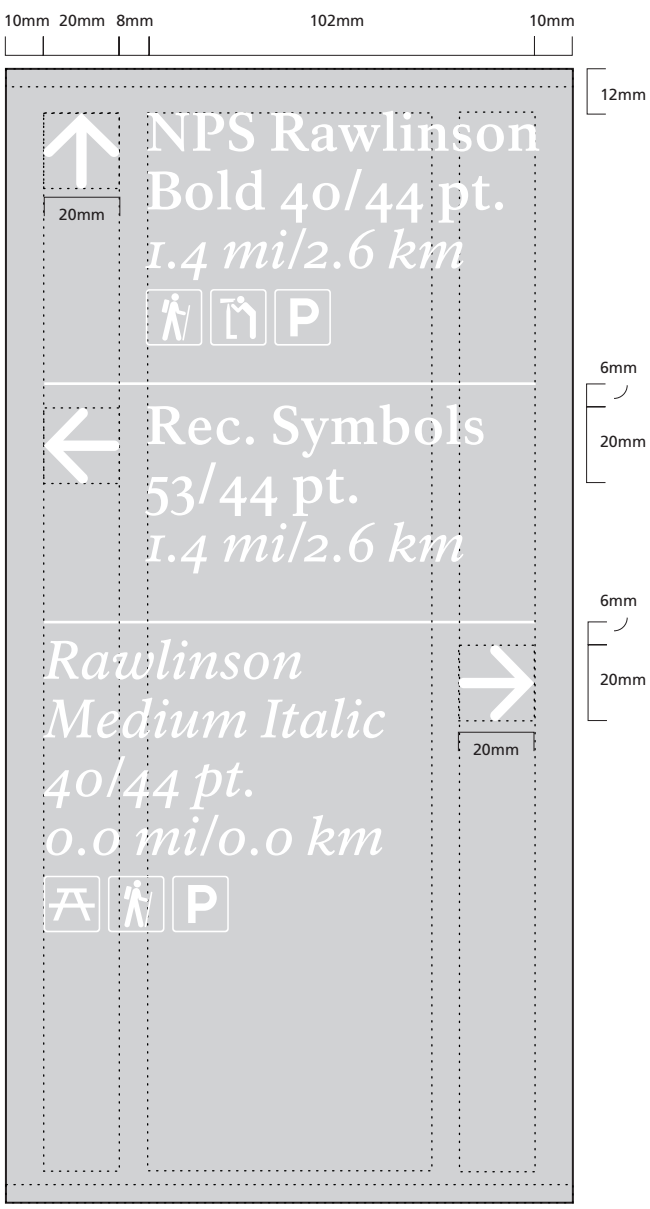


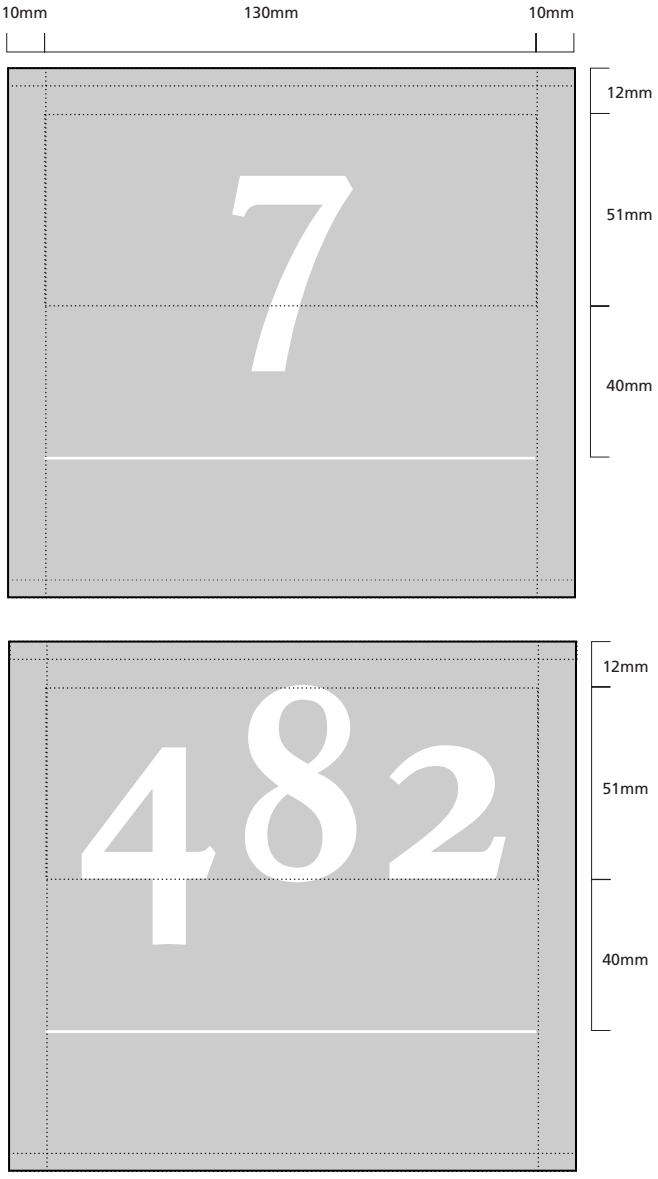
NP-T: Narrow Profile Trail Guide with Symbols

Destinations: 40/44 pt. NPS Rawlinson Bold
Distance Text: 40/44 pt. NPS Rawlinson Medium Italic
Symbols: 53/44 pt.
Arrow: 20 mm alignment box

NP-C: Narrow Profile Campsite Identification

Legend: 200 pt. NPS Rawlinson Heavy

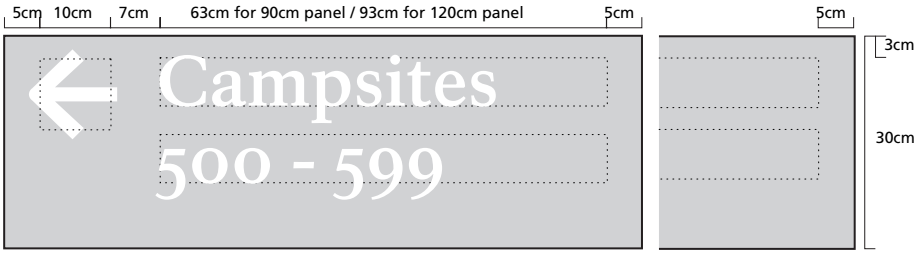




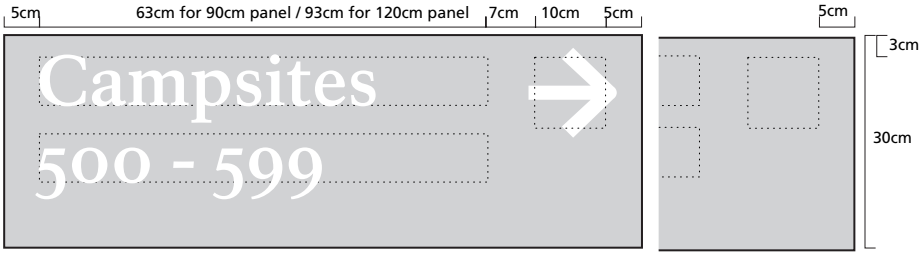
SG-1 to SG-4: Small Guide Signs

Legend:	280/308 pt. NPS Rawlinson Bold
Secondary Legend:	160/ 308 pt Frutiger Bold
Arrow size:	10 cm interior alignment box
Symbol:	15 cm

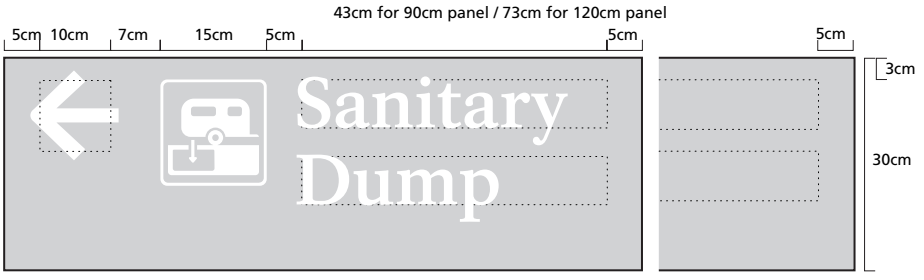
All dimensions are reduced by .666 for panels based on a 20 cm height.



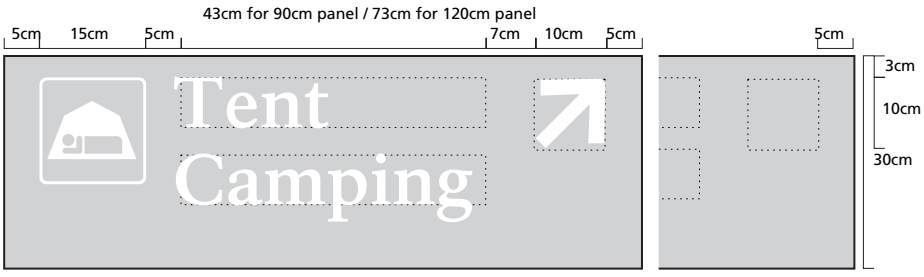
SG-1: Small Guide with 2-Line Legend and Left Arrow



SG-2: Small Guide with 2-Line Legend and Right Arrow



SG-3: Small Guide with 2-Line Legend, Symbol and Left Arrow

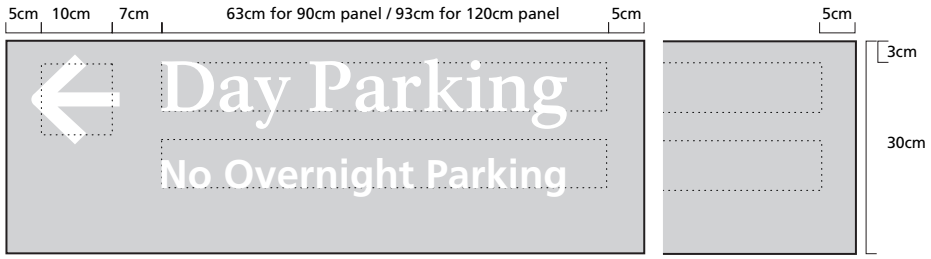


SG-4: Small Guide with 2-Line Legend, Symbol and Right Arrow

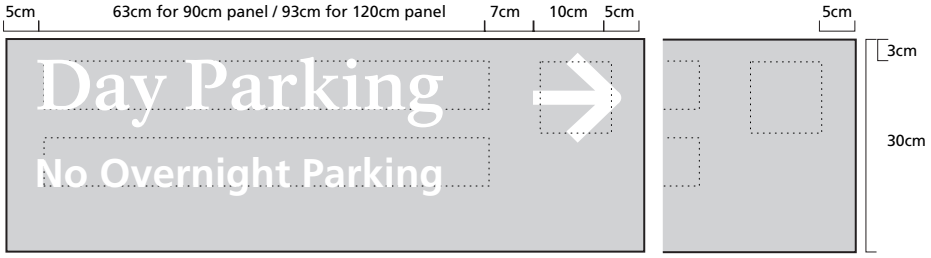
SG-5 to SG-8: Small Guide Signs

Legend:	280/308 pt. NPS Rawlinson Bold
Secondary Legend:	160/308 pt. Frutiger Bold
Arrow size:	10 cm interior alignment box
Symbol:	15 cm

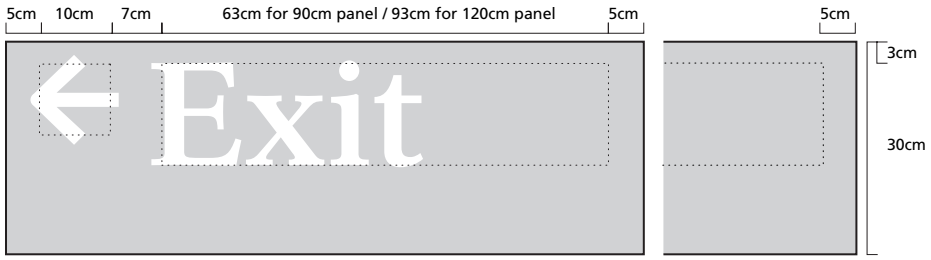
All dimensions are reduced by .666 for panels based on a 20 cm height.



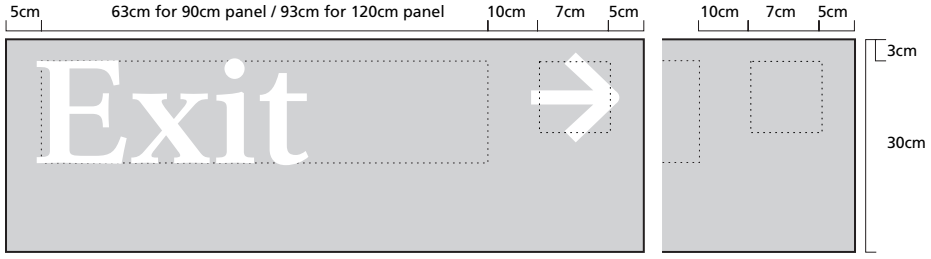
SG-5: Small Guide with Primary/Secondary Legend and Left Arrow



SG-6: Small Guide with Primary/Secondary Legend and Right Arrow



SG-7: Small Guide with One-Line Legend (Exit) and Left Arrow

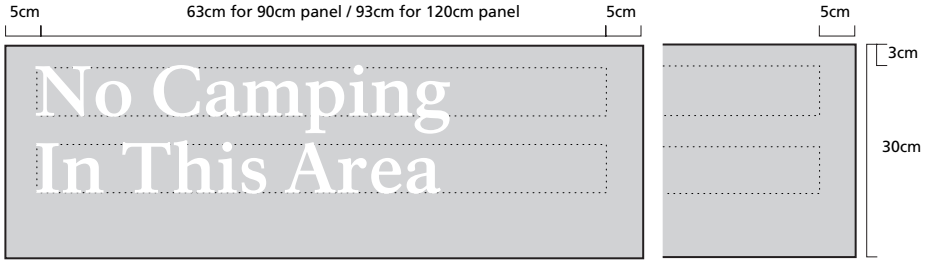


SG-8: Small Guide with One-Line Legend (Exit) and Right Arrow

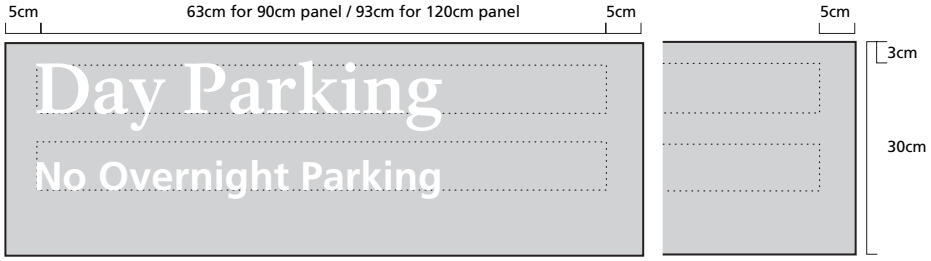
SG-7 to SG-9, and TR-1: Small Guide & Traffic Regulatory Signs

Legend:	280/308 pt. NPS Rawlinson Bold
Secondary Legend:	160/ 308 pt Frutiger Bold
Symbol:	15 cm

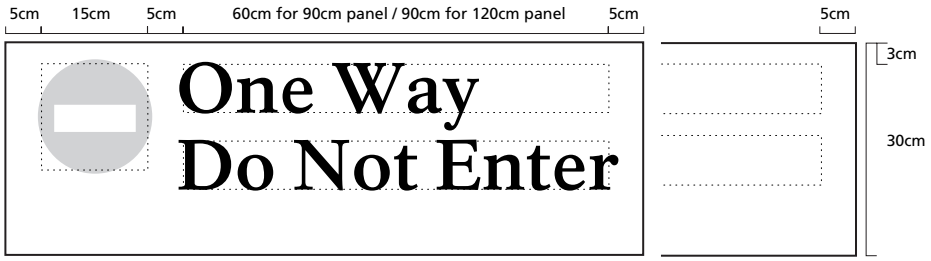
All dimensions are reduced by .666 for panels based on a 20 cm height.



SG-9: Small Guide with 2-Line Legend and No Arrow



SG-10: Small Guide with 2-Line Legend (Primary/Secondary) and No Arrow



TR-1: Traffic Regulatory with 2-Line Legend and No Entry Symbol

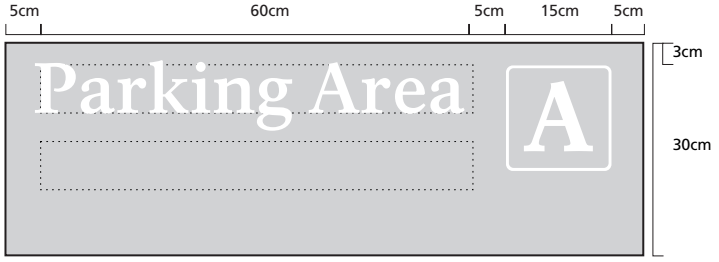
AE-Y, AE-N, and AI-1: Area Entry & Area Identification Signs

Legend: 280/308 pt. NPS Rawlinson Bold
Symbol: 15 cm

All dimensions are reduced by .666 for panels based on a 20 cm height.

AE-Y: Area Entry with 2-Line Legend and Symbol

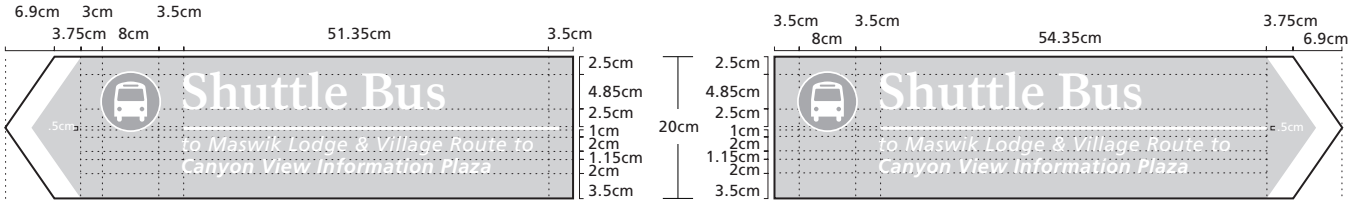
AE-N: Area Entry with 2-Line Legend and Prohibition Symbol



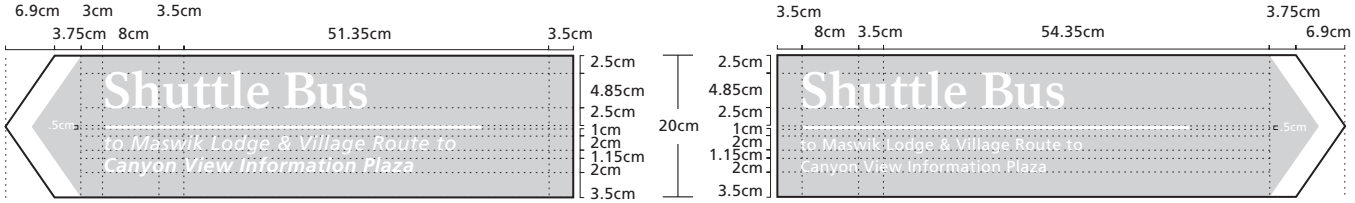
AI-1: Area Identification with 2-Line Legend and Symbol

FB-1 to FB-4: Fingerboard Pedestrian Guide Signs

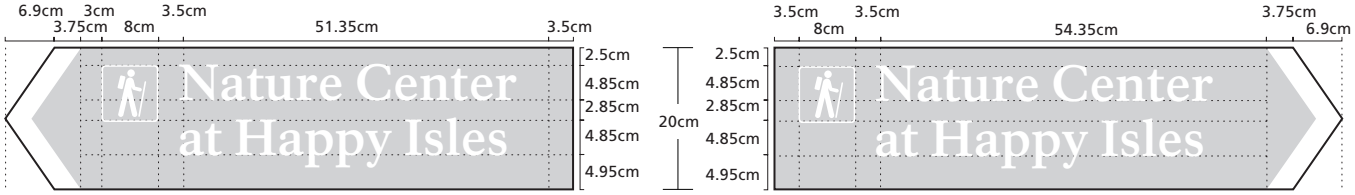
Large Body Copy: 4.85 cm NPS Rawlinson Roadway
Small Body Copy: 2 cm Frutiger Bold and Italic
Symbol: 8 cm



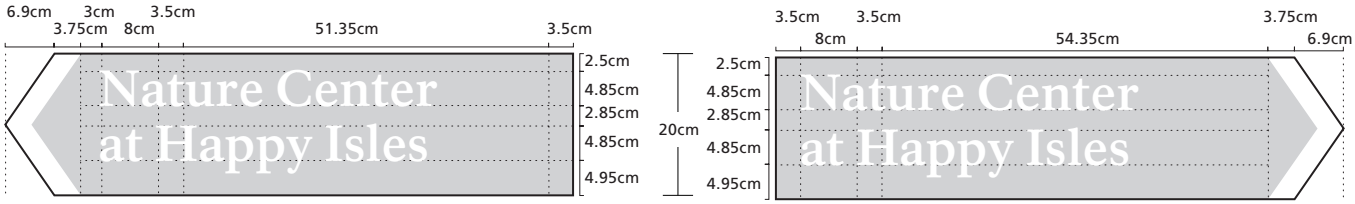
FB-1: Fingerboard Pedestrian Guide Sign with 1-Line Primary and 2-Line Secondary Legend and Symbol



FB-2: Fingerboard Pedestrian Guide Sign with 1-Line Primary and 2-Line Secondary Legend and No Symbol



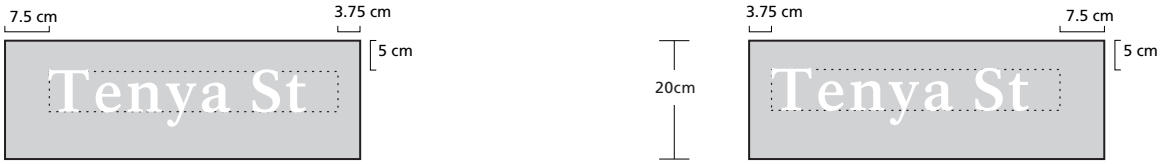
FB-3: Fingerboard Pedestrian Guide Sign with 2-Line Primary Legend and Symbol



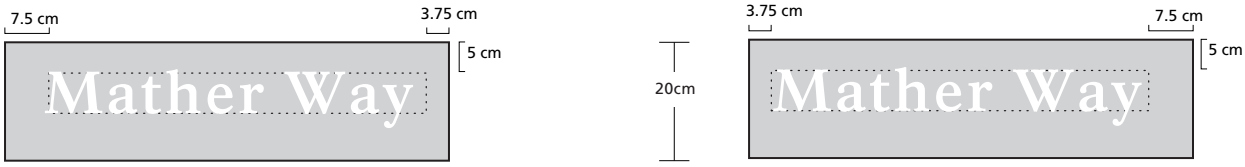
FB-4: Fingerboard Pedestrian Guide Sign with 2-Line Primary Legend and No Symbol

SN-1 to SN-3: Street Name Signs

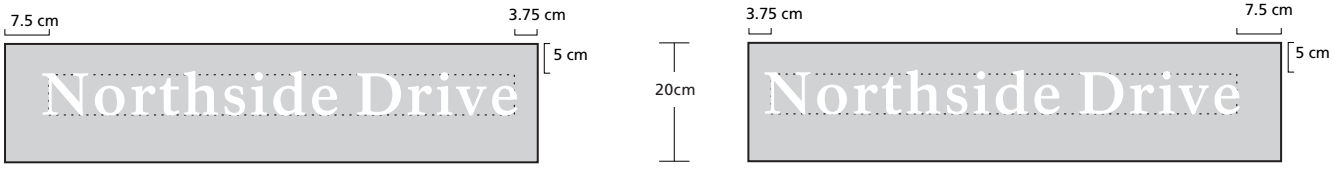
Text: 280/308 pt. NPS Rawlinson Bold + 50 kerning



SN-1: Street Name Sign (60 cm blade)



SN-2: Street Name Sign (75 cm blade)



SN-3: Street Name Sign (90 cm blade)

VPI-1: VIS–Park Identification Sign with 80/88 Text

Primary Legend:	80/88pt. NPS Rawlinson Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.

VPI-2: VIS–Park Identification Sign with 120/132 Text

Primary Legend:	120/132pt. NPS Rawlinson Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.

VPI-3: VIS–Park Identification Sign with 160/176 Text

Primary Legend:	160/176pt. NPS Rawlinson Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.

VPI-4: VIS–Park Identification Sign with 200/220 Text

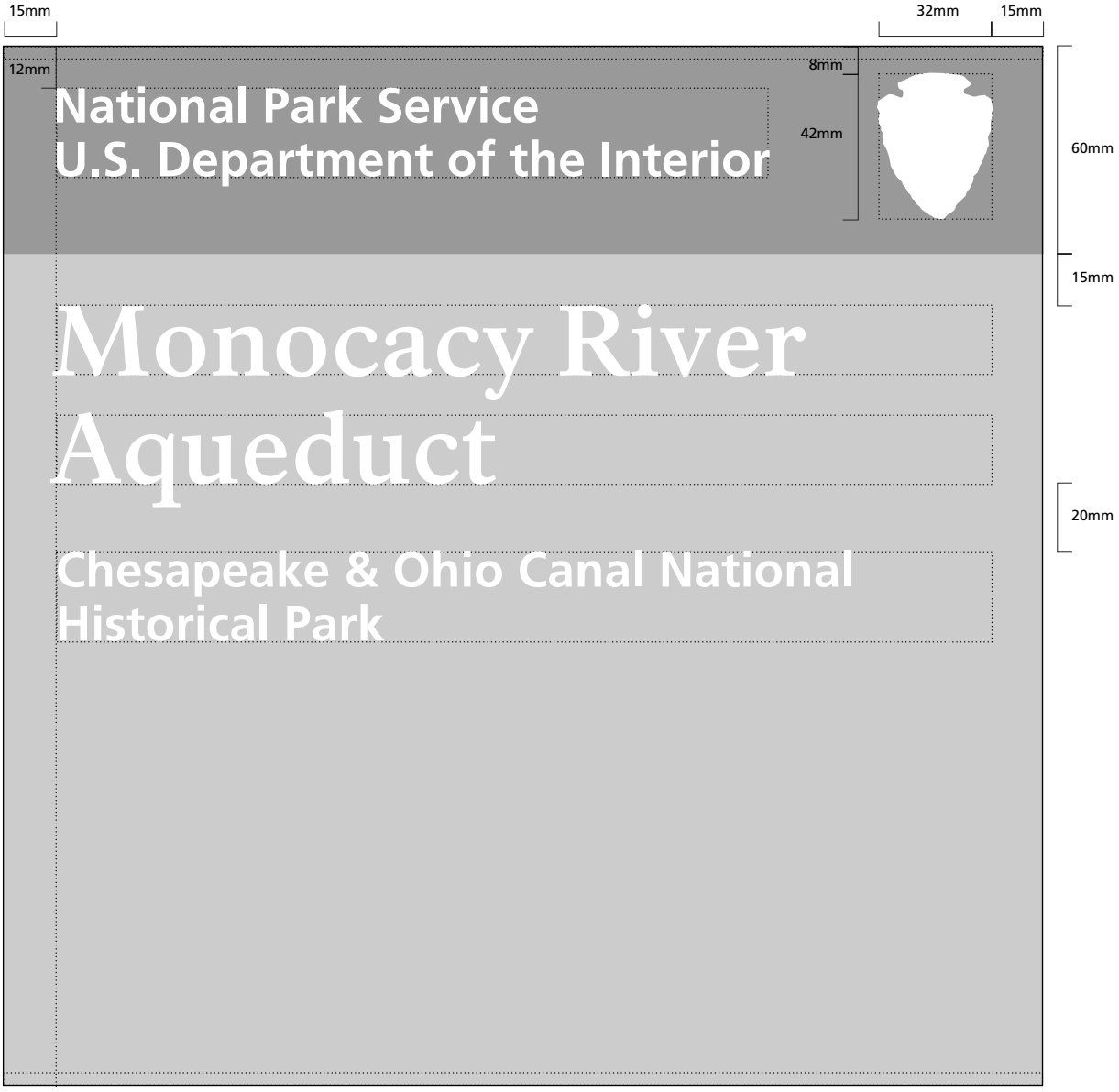
Primary Legend:	200/220pt. NPS Rawlinson Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.

VFI-1: VIS–Facility/Park Identification Sign with 80/88 Text

Primary Legend:	80/88pt. NPS Rawlinson Bold
Secondary Legend:	40/44pt. Frutiger Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

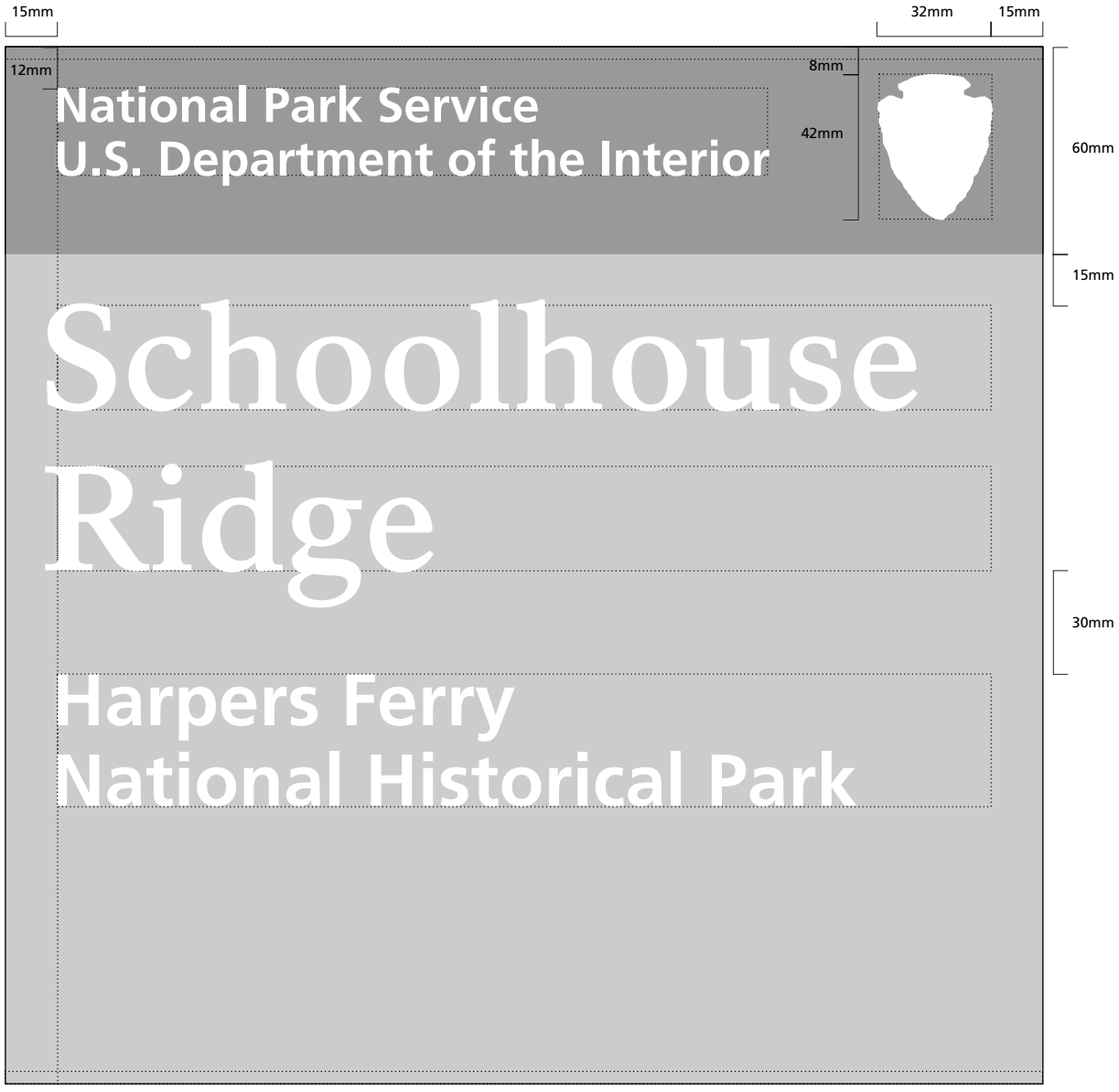
All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.



VFI-2: VIS–Facility/Park Identification Sign with 120/132 Text

Primary Legend:	120/132pt. NPS Rawlinson Bold
Secondary Legend:	40/44pt. Frutiger Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.



VFI-3: VIS–Facility/Park Identification Sign with 160/176 Text

Primary Legend:	160/176pt. NPS Rawlinson Bold
Secondary Legend:	40/44pt. Frutiger Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.

VFI-4: VIS–Facility/Park Identification Sign 200/220 Text

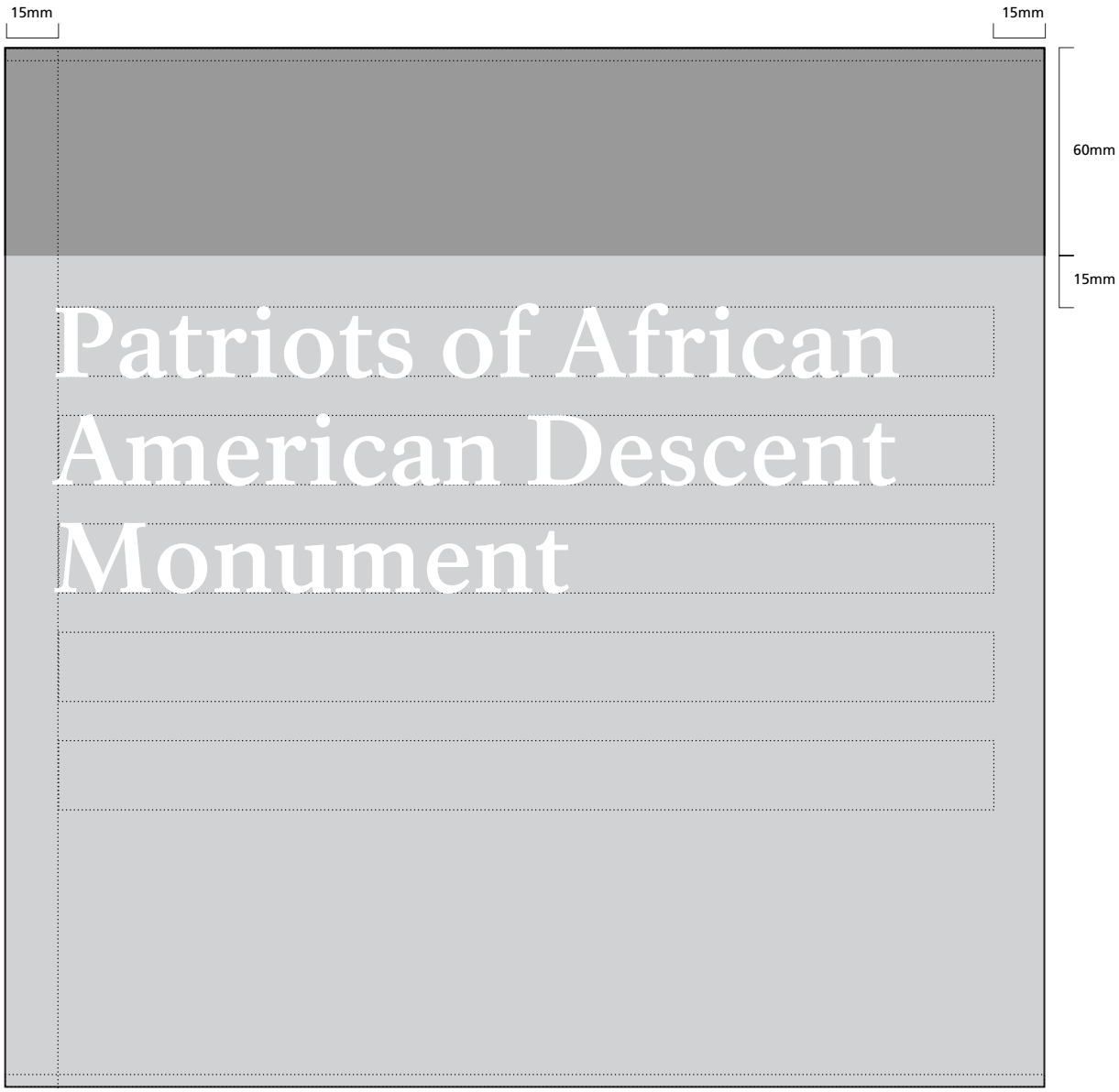
Primary Legend:	200/220pt. NPS Rawlinson Bold
Secondary Legend:	40/44pt. Frutiger Bold
Overbar Text:	40/44pt. Frutiger Bold
Arrowhead Logo:	32mm x 42mm

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.

VFI-5: VIS–Facility Identification Sign with 80/88 Text

Primary Legend: 80/88pt. NPS Rawlinson Bold

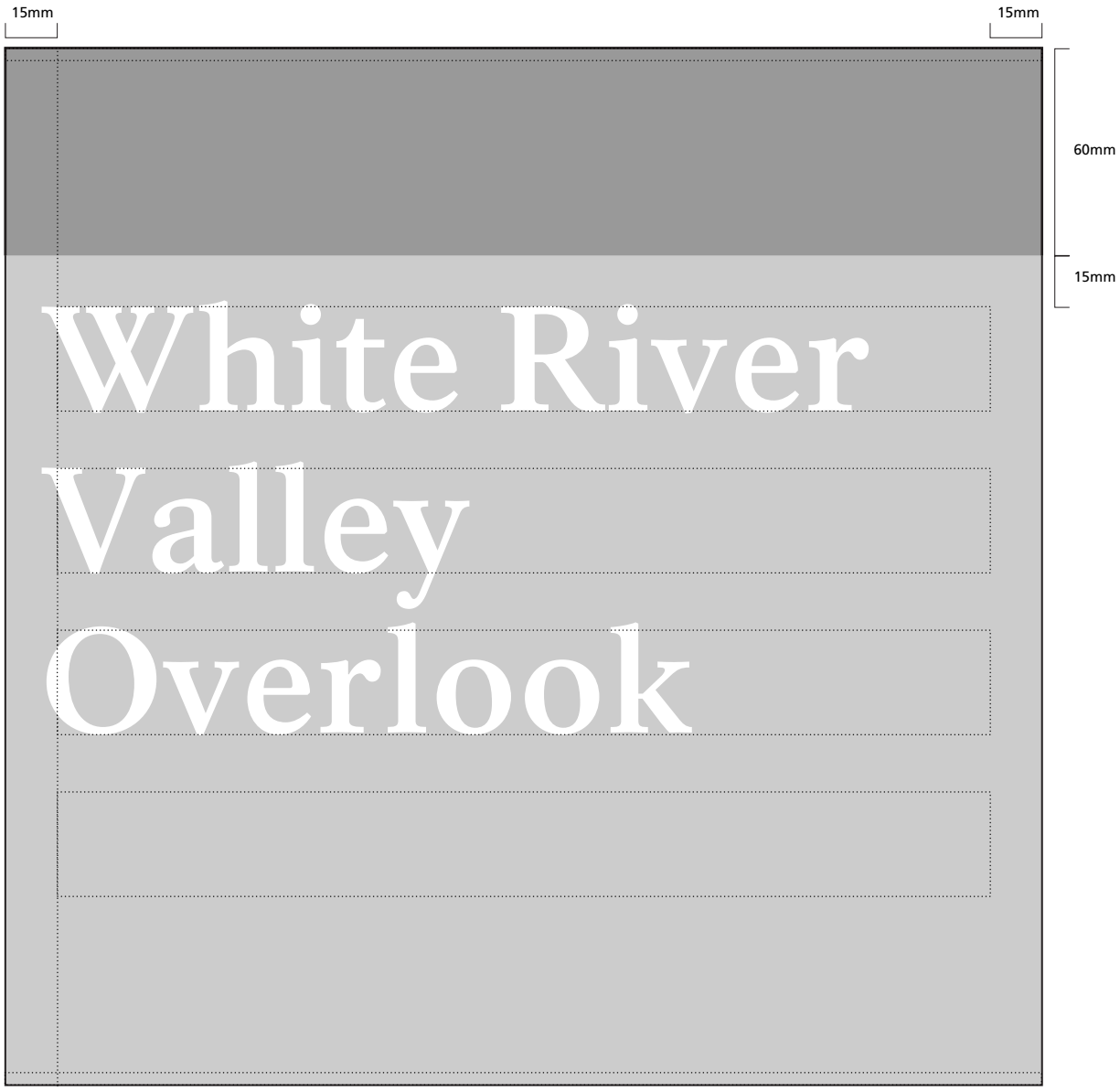
All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.



VFI-6: VIS–Facility Identification Sign with 120/132 Text

Primary Legend: 120/132pt. NPS Rawlinson Bold

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.



VFI-7: VIS–Facility Identification Sign with 160/176 Text

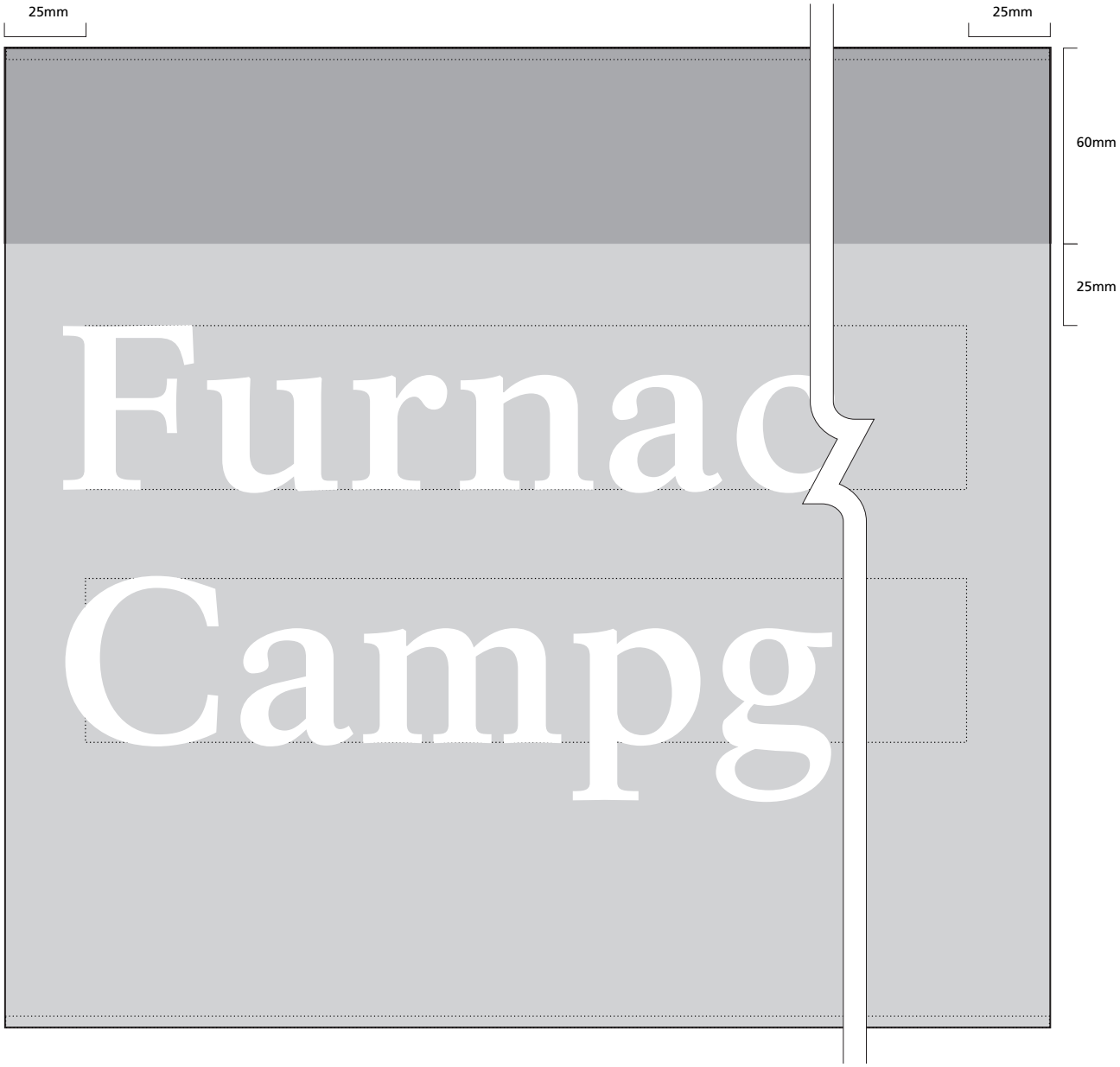
Primary Legend: 160/176pt. NPS Rawlinson Bold

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.

VFI-8: VIS–Facility Identification Sign with 200/220 Text

Primary Legend: 200/220pt. NPS Rawlinson Bold

All panel dimensions are based on a 30 cm tall panel. This panel accommodates a 60 cm tall panel with both type size and dimensions revised proportionally. The width is based on the length of the legend and is sized in 30 cm increments up to 120 cm.



Introduction: The UniGuide Program offers a variety of sign formats to identify a park and the facilities within a park. The formats include various ways to mount the signs and to display the NPS Arrowhead. The sign at the park entrance will include the full name of the park, plus the identity of the National Park Service and U.S. Department of the Interior and the Arrowhead in the overbar (pages 73 -79). The legend to identify a facility will vary depending on whether a sign is within or outside the park boundary. Facilities inside a park do not require the full park and agency names because visitors usually are aware that they are already within the park (pages 81-82). Sometimes however, facilities are so well known that visitors do not realize they are in a park, or the park is decentralized and has many units that are more clearly identified by the name of the facility or unit. In these instances, the park name will appear on the sign secondary to the facility name (pages 83 -85).

Mounting and Panel Formats for Ground Mounted Signs: Most sign structures will display the panel in a horizontal ground mounted format with a legend of one to three lines. These are mounted in a double post structure or on a monolithic masonry base.

Hanging Formats: Alternative formats are provided for hanging identity signs from traditionally styled "flagmount" structures. The width of these panels is not variable and can be either 36", 48" or 72" with primary legend of 3, 4, or 6 inches respectively.

Both ground and hanging formats allow for placement of the Arrowhead on a masonry structure.

Proportional Size of Panels: The grids shown are proportional with all relationships based on the height of the primary legend, known as "**x**". All other dimensions are a percentage of "**x**". After the sign is formatted on one of the grids in this section, it can be proportionally enlarged to the desired size. Standard legend sizes for ground identification signs are 4", 6", 9", and 12". Sizes for hanging identification signs are 3", 4", and 6".

The size of the sign and the size of the legend depend on the limitations of the site, the viewing distance. The format of the legend will depend on the way the name logically breaks into lines of type. A guide showing appropriate legend displays is provided in Chapter 6: Park Identification Sign Formats.

For hanging sign assemblies, the width of the panel is a fixed dimension as noted with a **10.5x** legend length for the longest line and with the overall panel being **12x**.

Ground mounted sign panels will be sized in the horizontal dimension to the nearest whole number. For instance a panel that measures **16.2x** with the longest legend line being **12.2x**– right and left margins being **4x** – will be adjusted to **16x**.

Color: Sign colors are specified on page 14 of this chapter. Standard colors include a dark green overbar, a gray brown panel, with off white legend and dark brown legs.

Typeface: The typeface for NPS identity panels is NPS Rawlinson Heavy +50 kerning for the primary legend and Frutiger Bold +50 kerning for NPS/DOI and secondary park name.

Alternate Grids: For small identity sign applications, use Visitor Information System formats shown on pages 60-71.

Display and Alignment of Legend: Legends are aligned flush left on the grids with initial capital letters only. Flush right or centered displays are discouraged. Placement of the NPS Arrowhead in any location other than what is shown in this manual is strongly discouraged.

Use of Arrowhead: The two-color signage version of the NPS Arrowhead identity graphic (see page 12 in this chapter) is to be fabricated from porcelain enamel, or fiberglass embedment, and affixed in a dadoed inset shape on the sign overbar or placed on the masonry column if that alternative structure is used. The size of the Arrowhead is specified for each grid.

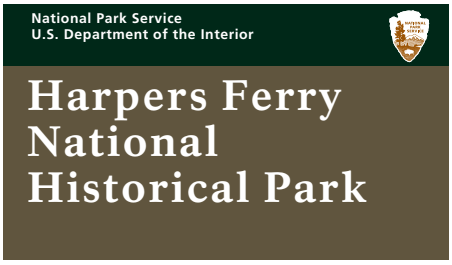
Layout and Production Artwork: The digital sign layout file is the same file used for sign production. Once the layout is complete, the digital file can be enlarged to the size of the actual sign for production. The production file will be converted into the correct digital format for the selected production method.

Routed Dado: Place 1/4" deep shadow-line dado on wood signs, directly below overbar in primary legend field. Width of dado is 0.0833 of primary legend and painted to match overbar.

Park Identification (Ground Mounted)

PI-1GA
1-Line Ground Mounted Format
with Arrowhead

PI-2GA
2-Line Ground Mounted Format
with Arrowhead



PI-3GA
3-Line Ground Mounted Format
with Arrowhead

PI-1GX
1-Line Ground Mounted Format
without Arrowhead

PI-2GX
2-Line Ground Mounted Format
without Arrowhead

PI-3GX
3-Line Ground Mounted Format
without Arrowhead

Park Identification (Hanging)

PI-2HA
2-Line Hanging Format
with Arrowhead

PI-3HA
3-Line Hanging Format
with Arrowhead

PI-4HA
4-Line Hanging Format
with Arrowhead

PI-2HX
2-Line Hanging Format
without Arrowhead

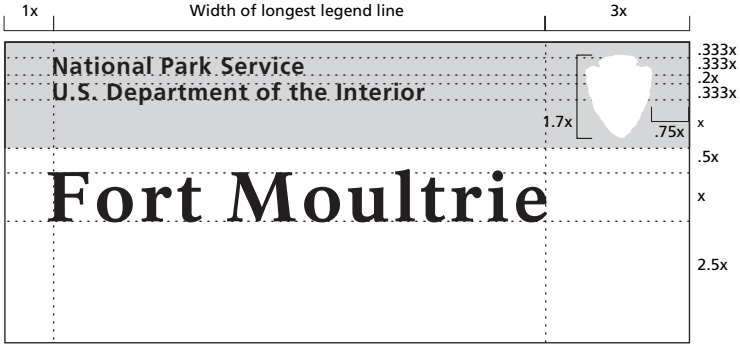
PI-3HX
3-Line Hanging Format
without Arrowhead

PI-4HX
4-Line Hanging Format
without Arrowhead

PI-1GA & PI-1GX: Park Identification, 1-Line Ground Mounted Format

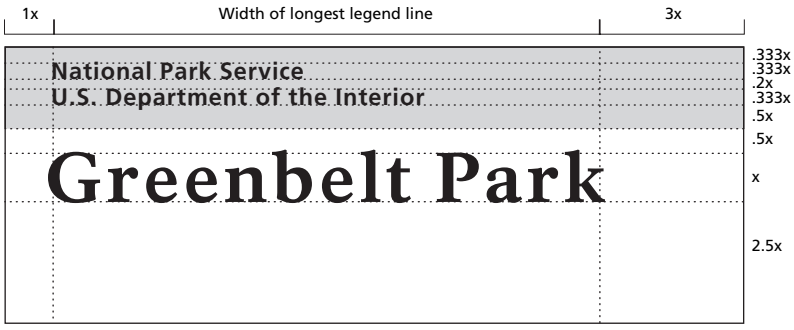
	Legend and Arrowhead Size Based on Primary Legend Size			
Primary Legend: NPS Rawlinson Heavy +50 kerning	4"	6"	9"	12"
Overbar Legend: Frutiger Bold +50 kerning	1.33"	2"	3"	4"
Arrowhead Size (Panel)	6.8"	10.2"	15.3"	20.4"
Arrowhead Size (Structure)	14"	21"	31.5"	42"
Routed Dado	0.333"	0.5"	0.75"	1"

Note: Total panel width rounded to the nearest whole number, see note on page 72 (Proportional Size of Panels).



PI-1GA: 1-Line Ground Mounted Format with Arrowhead on Panel

Structure options for this grid format



PI-1GX: 1-Line Ground Mounted Format with Arrowhead on Structure

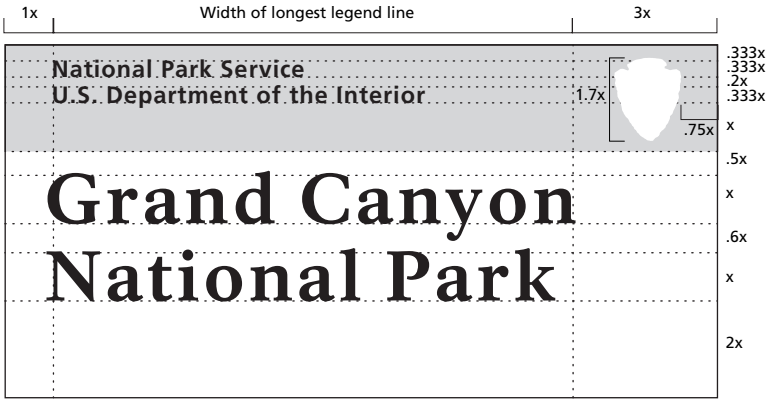
3.5x

Structure for this grid format

PI-2GA & PI-2GX: Park Identification, 2-Line Ground Mounted Format

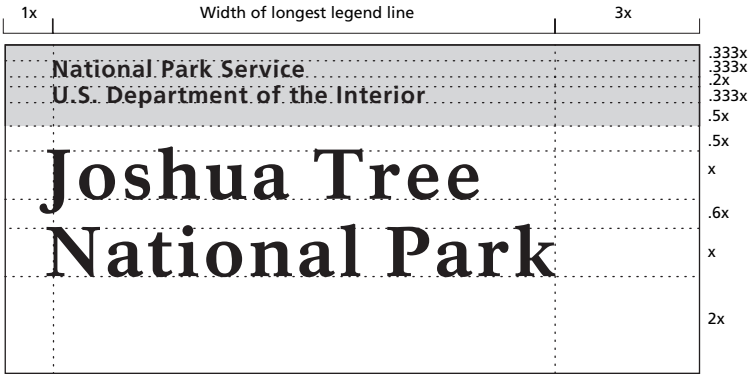
	Legend and Arrowhead Size Based on Primary Legend Size			
Primary Legend: NPS Rawlinson Heavy +50 kerning	4"	6"	9"	12"
Overbar Legend: Frutiger Bold +50 kerning	1.33"	2"	3"	4"
Arrowhead Size (Panel)	6.8"	10.2"	15.3"	20.4"
Arrowhead Size (Structure)	14"	21"	31.5"	42"
Routed Dado	0.333"	0.5"	0.75"	1"

Note: Total panel width rounded to the nearest whole number, see note on page 72 (Proportional Size of Panels).

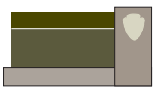


Structure options for this grid format

PI-2GA: 2-Line Ground Mounted Format with Arrowhead on Panel



Structure for this grid format

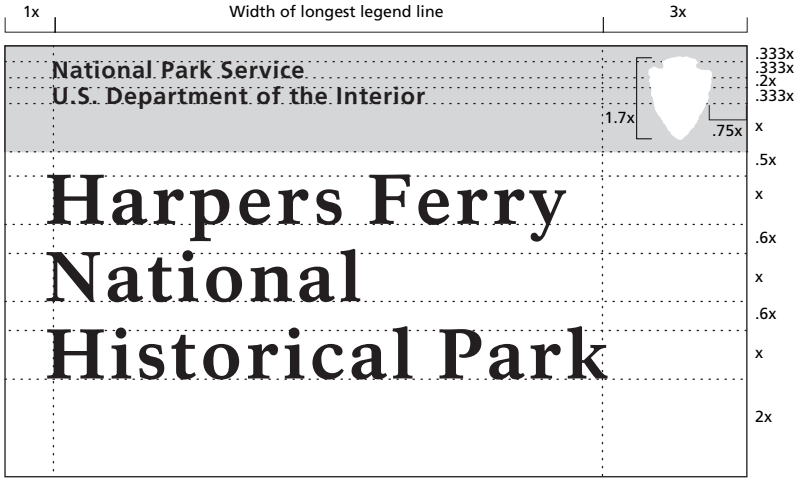


PI-2GX: 2-Line Ground Mounted Format with Arrowhead on Structure

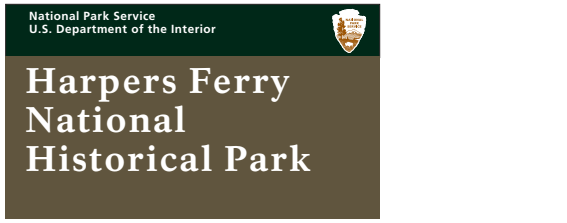
PI-3GA & PI-3GX: Park Identification, 3-Line Ground Mounted Format

	Legend and Arrowhead Size Based on Primary Legend Size			
Primary Legend: NPS Rawlinson Heavy +50 kerning	4"	6"	9"	12"
Overbar Legend: Frutiger Bold +50 kerning	1.33"	2"	3"	4"
Arrowhead Size (Panel)	6.8"	10.2"	15.3"	20.4"
Arrowhead Size (Structure)	14"	21"	31.5"	42"
Routed Dado	0.333"	0.5"	0.75"	1"

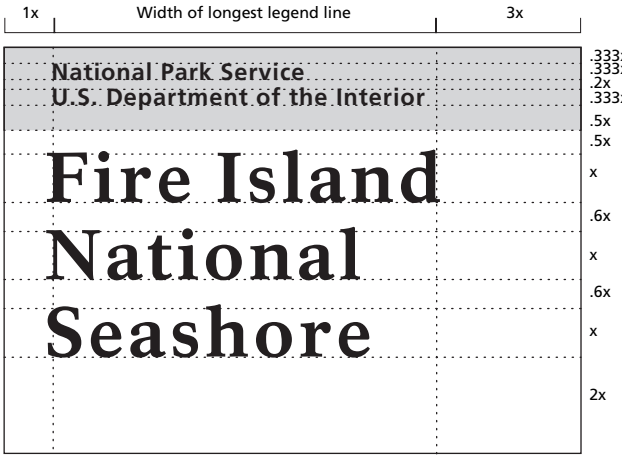
Note: Total panel width rounded to the nearest whole number, see note on page 72 (Proportional Size of Panels).



PI-3GA: 3-Line Ground Mounted Format with Arrowhead on Panel



Structure options for this grid format



PI-3GX: 3-Line Ground Mounted Format with Arrowhead on Structure

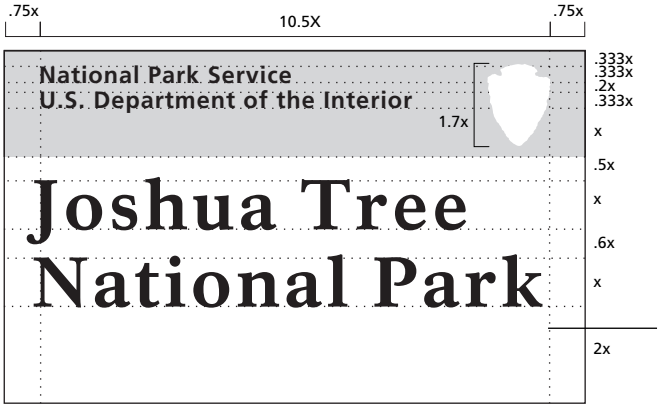
Structure for this grid format

PI-2HA & PI-2HX: Park Identification, 2-Line Hanging Format

	Legend and Arrowhead Size Based on Primary Legend Size		
Primary Legend: NPS Rawlinson Heavy +50 kerning	3"	4"	6"
Overbar Legend: Frutiger Bold +50 kerning	1"	1.33"	2"
Arrowhead Size (Panel)	5.1"	6.8"	10.2"
Arrowhead Size (Structure)		18"	27"
Routed Dado	0.25"	0.333"	0.5"

Note: Panels mounted in hanging format use standard width (12x) format.

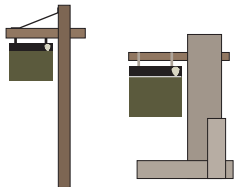
Specified wood structures use 3" (36" wide) and 4" (48" wide) panels. Custom masonry structures use 4" and 6" (72" wide) panels.

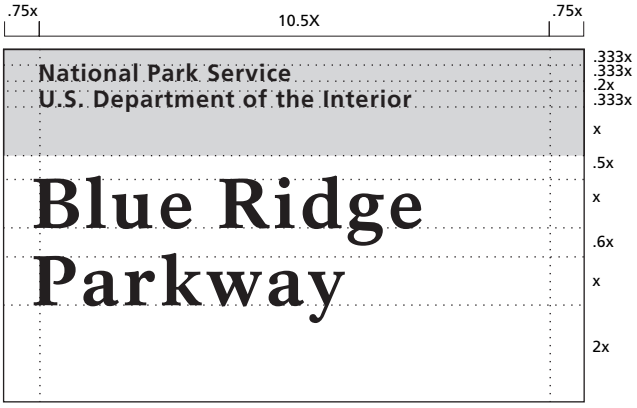


PI-2HA: 2-Line Hanging Format with Arrowhead on Panel

Maximum legend length not to intrude .75x margin on right edge of panel

Structure options for this grid format

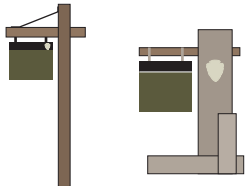




PI-2HX: 2-Line Hanging Format with Arrowhead on Structure

4.5x

Structure options for this grid format

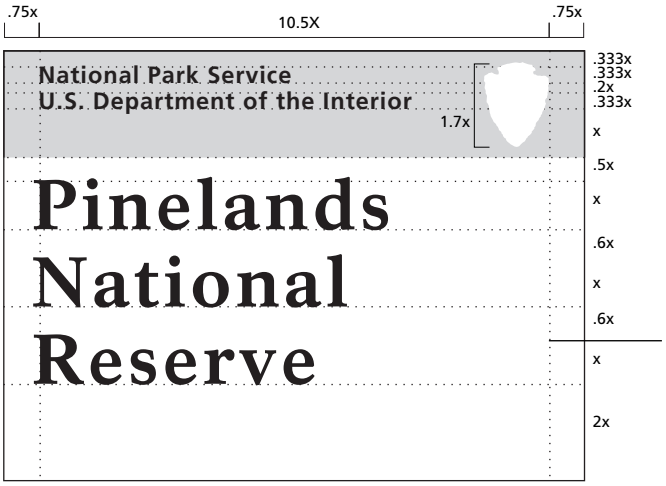


PI-3HA & PI-3HX: Park Identification, 3-Line Hanging Format

	Legend and Arrowhead Size Based on Primary Legend Size		
Primary Legend: NPS Rawlinson Heavy +50 kerning	3"	4"	6"
Overbar Legend: Frutiger Bold +50 kerning	1"	1.33"	2"
Arrowhead Size (Panel)	5.1"	6.8"	10.2"
Arrowhead Size (Structure)		18"	27"
Routed Dado	0.25"	0.333"	0.5"

Note: Panels mounted in hanging format use standard width (12x) format.

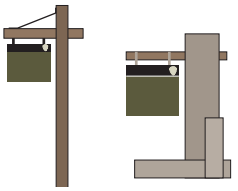
Specified wood structures use 3" (36" wide) and 4" (48" wide) panels. Custom masonry structures use 4" and 6" (72" wide) panels.

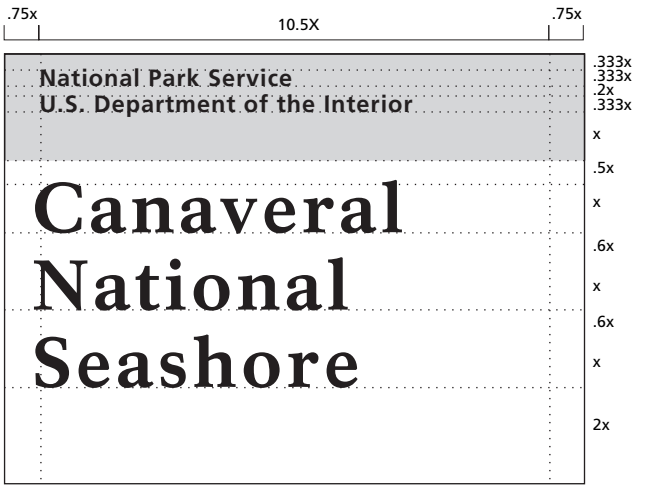


PI-3HA: 3-Line Hanging Format with Arrowhead on Panel

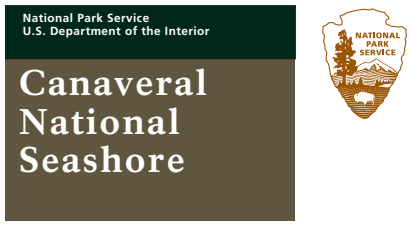
Maximum legend length not to intrude .75x margin on right edge of panel

Structure options for this grid format

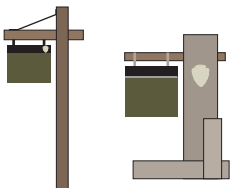




PI-3HX: 3-Line Hanging Format with Arrowhead on Structure



Structure options for this grid format

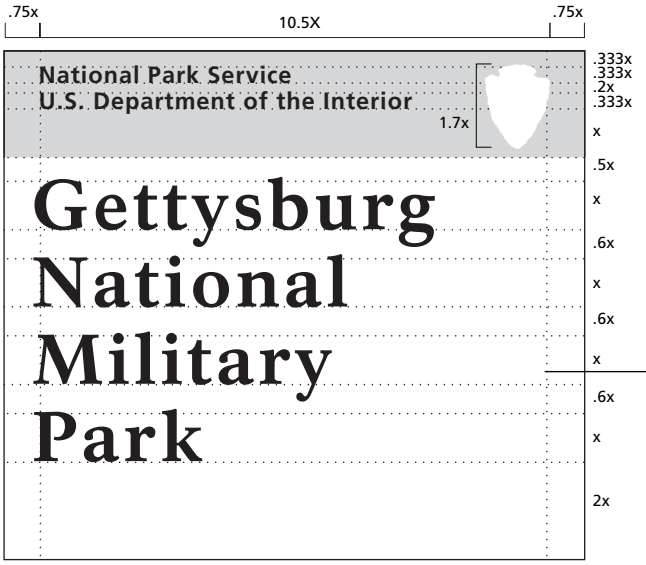


PI-4HA & PI-4HX: Park Identification, 4-Line Hanging Format

	Legend and Arrowhead Size Based on Primary Legend Size		
Primary Legend: NPS Rawlinson Heavy +50 kerning	3"	4"	6"
Overbar Legend: Frutiger Bold +50 kerning	1"	1.33"	2"
Arrowhead Size (Panel)	5.1"	6.8"	10.2"
Arrowhead Size (Structure)	13.5"	18"	27"
Routed Dado	0.25"	0.333"	0.5"

Note: Panels mounted in hanging format use standard width (12x) format.

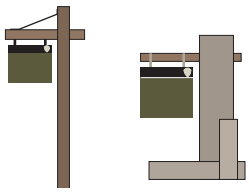
Specified wood structures use 3" (36" wide) and 4" (48" wide) panels. Custom masonry structures use 4" and 6" (72" wide) panels.

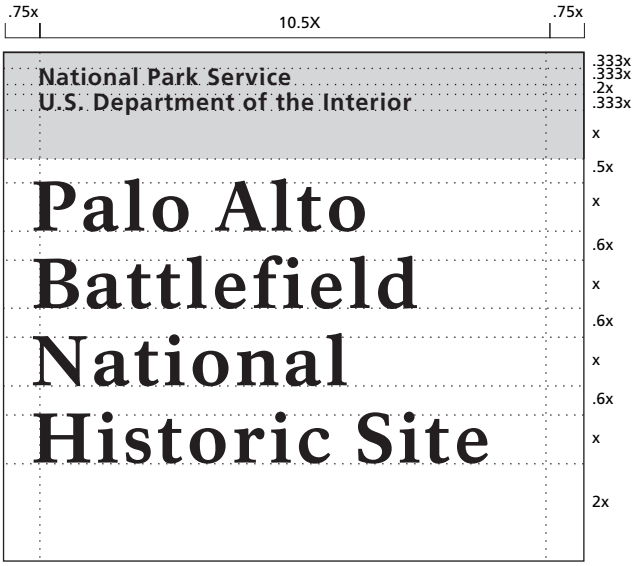


PI-4HA: 4-Line Hanging Format with Arrowhead on Panel

Maximum legend length not to intrude .75x margin on right edge of panel

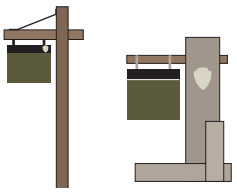
Structure options for this grid format





PI-4HX: 4-Line Hanging Format with Arrowhead on Structure

Structure options for this grid format



Facility Identification

FI-1G
1-Line Ground Mounted Format

FI-2G
2-Line Ground Mounted Format

FI-3G
3-Line Ground Mounted Format

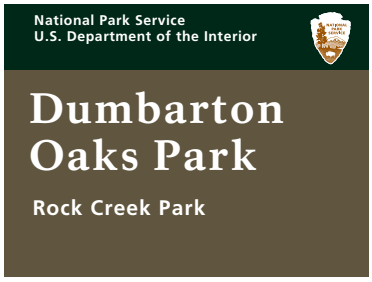
FI-1H
1-Line Hanging Format

FI-2H
2-Line Hanging Format

FI-3H
3-Line Hanging Format

Facility Identification with Park Identification, NPS Identification, and Arrowhead

F/PI-1G
1-Line Ground Mounted Format
with Park Identification



F/PI-2G
2-Line Ground Mounted Format
with Park Identification

F/PI-3G
3-Line Ground Mounted Format
with Park Identification

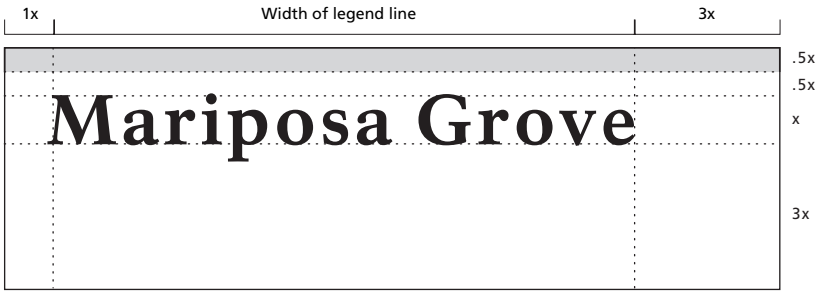
F/PI-1H
1-Line Hanging Format
with Park Identification

F/PI-2H
2-Line Hanging Format
with Park Identification

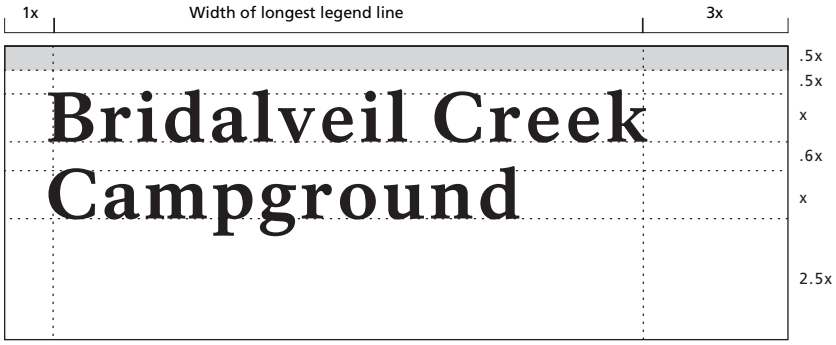
F/PI-3H
3-Line Hanging Format
with Park Identification

FI-1G to FI-3G: Facility Identification, 1–3 Line Ground Mounted Formats

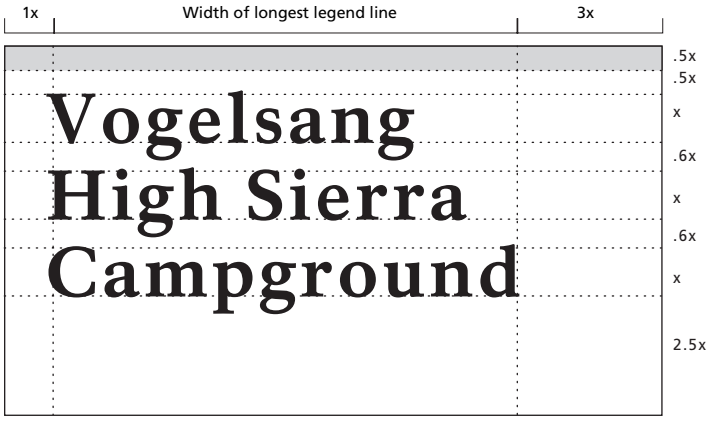
	Legend Size			
Legend: NPS Rawlinson Heavy +50 kerning	4"	6"	9"	12"
Routed Dado	0.333"	0.5"	0.75"	1"



FI-1G: 1-Line Ground Format



FI-2G: 2-Line Ground Format



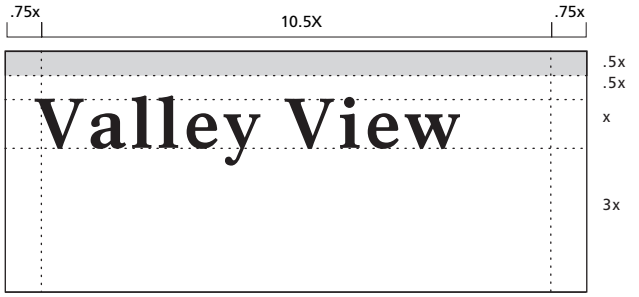
FI-3G: 3-Line Ground Format

Structure options for these formats

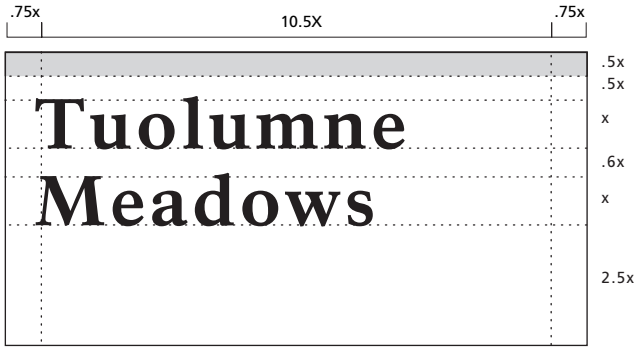
FI-1H to FI-3H: Facility Identification, 1–3 Line Hanging Format

	Legend Size		
Legend: NPS Rawlinson Heavy +50 kerning	3"	4"	6"
Routed Dado	0.25"	0.333"	0.5"

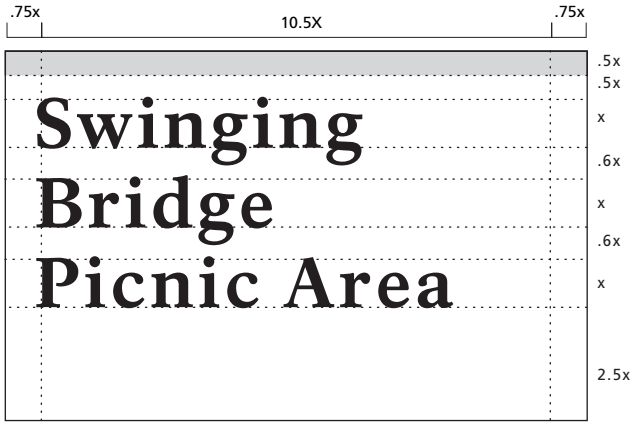
Note: Panels mounted in hanging format use standard width (12x) format.
Specified wood structures use 3" (36" wide) and 4" (48" wide) panels. Custom masonry structures use 4" and 6" (72" wide) panels.



FI-1H: 1-Line Hanging Format

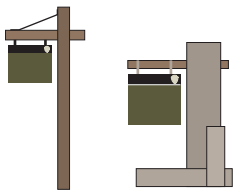


FI-2H: 2-Line Hanging Format



FI-3H: 3-Line Hanging Format

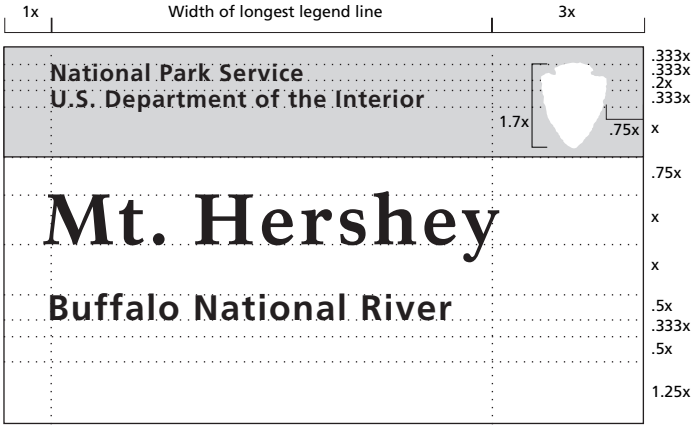
Structure options for this grid format



F/PI-1G and F/PI-1H: Facility/Park identification, 1-Line (Ground Mounted and Hanging Formats)

	Legend and Arrowhead Size Based on Primary Legend Size				
Primary Legend: NPS Rawlinson Heavy +50 kerning	3" *	4"	6"	9"	12"
Overbar Legend	1"	1.33"	2"	3"	4"
Secondary Legend: Frutiger Bold +50 kerning	1.5"	2"	3"	4.5"	6"
Arrowhead Size	5.1"	6.8"	10.2"	15.3"	20.4"
Routed Dado	0.25"	0.333"	0.5"	0.75"	1"

Note: Panels mounted in hanging format use standard width (12x) format.
Specified wood structures use 3" (36" wide) and 4" (48" wide) panels. Custom masonry structures use 4" and 6" (72" wide) panels.



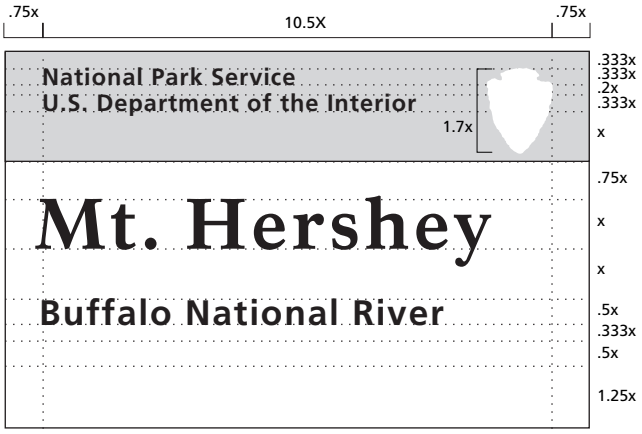
F/PI-1G: 1-Line Ground Mounted Format with Park Identification

For ground mounted signs, total panel width will be rounded to nearest whole number, see note on page 72.

1-Line Park ID

2-Line Park ID

Structure options for this format

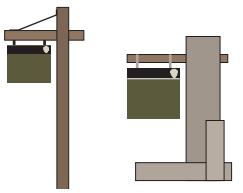


F/PI-1H: 1-Line Hanging Format with Park Identification

1-Line Park ID

2-Line Park ID

Structure options for this grid format



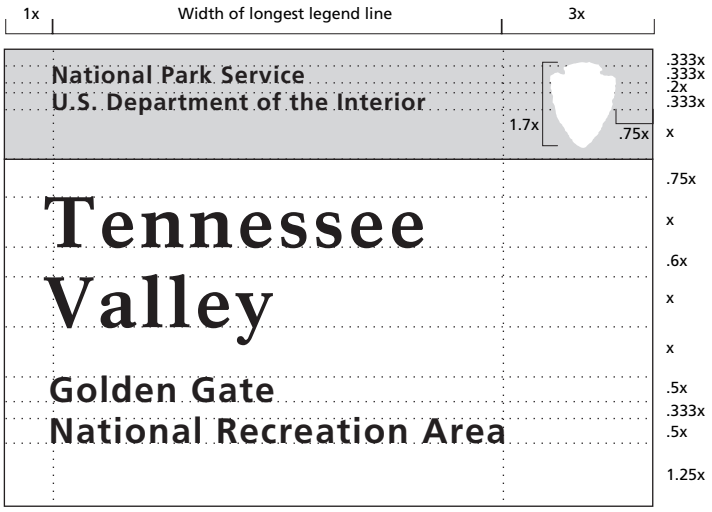
**3" Legend for timber post hanging format only.*

F/PI-2G & F/PI-2H: Facility/Park identification, 2-Line (Ground Mounted and Hanging Formats)

	Legend and Arrowhead Size Based on Primary Legend Size				
Primary Legend: NPS Rawlinson Heavy +50 kerning	3" *	4"	6"	9"	12"
Overbar Legend /	1"	1.33"	2"	3"	4"
Secondary Legend: Frutiger Bold +50 kerning	1.5"	2"	3"	4.5"	6"
Arrowhead Size	5.1"	6.8"	10.2"	15.3"	20.4"
Routed Dado	0.25"	0.333"	0.5"	0.75"	1"

Note: Panels mounted in hanging format use standard width (12x) format.

Specified wood structures use 3" (36" wide) and 4" (48" wide) panels. Custom masonry structures use 4" and 6" (72" wide) panels.

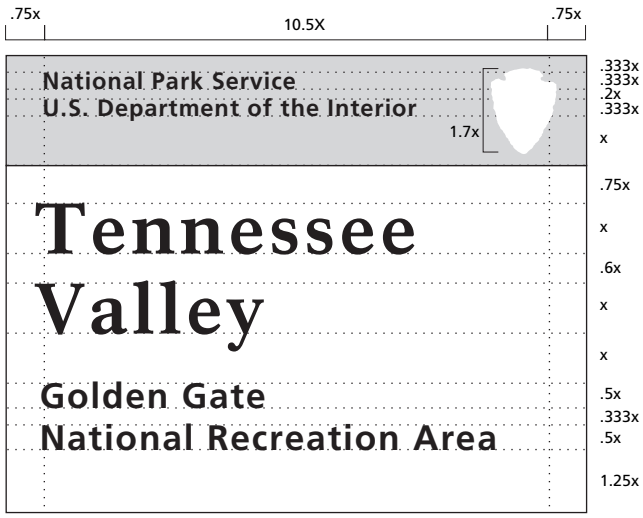


1-Line Park ID

2-Line Park ID

Structure options for this format

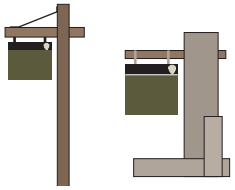
F/PI-2G: 2-Line Ground Mounted Format with Park Identification



1-Line Park ID

2-Line Park ID

Structure options for this grid format



F/PI-2H: 2-Line Hanging Format with Park Identification

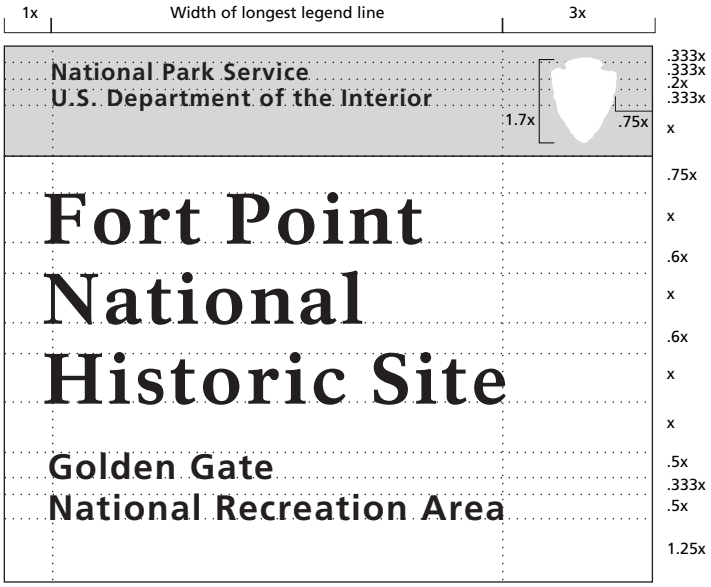
**3" Legend for timber post hanging format only.*

F/PI-3G & F/PI-3H: Facility/Park identification, 3-Line Ground Mounted and Hanging Formats

	Legend and Arrowhead Size Based on Primary Legend Size				
Primary Legend: NPS Rawlinson Heavy +50 kerning	3" *	4"	6"	9"	12"
Overbar Legend /	1"	1.33"	2"	3"	4"
Secondary Legend: Frutiger Bold +50 kerning	1.5"	2"	3"	4.5"	6"
Arrowhead Size	5.1"	6.8"	10.2"	15.3"	20.4"
Routed Dado	0.25"	0.333"	0.5"	0.75"	1"

Note: Panels mounted in hanging format use standard width (12x) format.

Specified wood structures use 3" (36" wide) and 4" (48" wide) panels. Custom masonry structures use 4" and 6" (72" wide) panels.

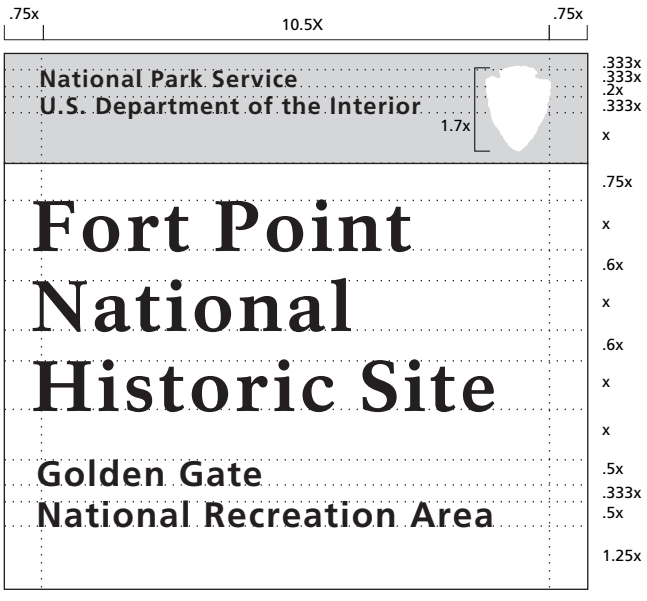


F/PI-3G: 3-Line Ground Mounted Format with Park Identification

1-Line Park ID

2-Line Park ID

Structure options for this format

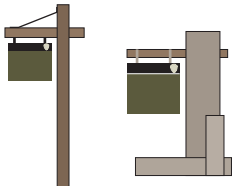


F/PI-3H: 3-Line Hanging Format with Park Identification

1-Line Park ID

2-Line Park ID

Structure options for this grid format



**3" Legend for timber post hanging format only.*

Introduction:

Motorist Guidance Signs are provided in three formats:

- Road Guide Signs used to guide visitors to destinations within a park
- Highway Guide Signs used on public highways and expressways to guide visitors to a park.
- Trailblazers Guide Signs used to guide visitors to a NPS destination and Boundary Signs used to alert visitors that they are entering or leaving a national park.

All Motorist Guide Signs use the NPS Rawlinson Roadway typeface. This new typeface, designed specifically for road sign applications, was tested extensively by the Pennsylvania Transportation Institute and found to be more legible than standard highway typefaces, including Clarendon.

Reference: For instructions on sign legend content, sign size and placement, refer to Chapter 3, Sign Planning and Documentation, Section 3.4 Sign Use by Sign Type Guide. Each grid includes a narrative description of the module and panel assembly.

For a description of the assembly of Road Guide Signs using individual directional modules, refer to Panel Layout Grid Formats, pages 88-111.

Road Guide Signs: This sign type is formatted using standardized layout grids displayed in this section (RG-1 to RG-11). The signs are graphically based on the message size, not the panel size. This ensures that the relationship between the legend and the background on all signs is consistent. The formats are designed to present information so it can be read quickly from a moving vehicle.

The legend size referred to as "**x**", is based on the capital letter height. Interline spaces accommodate the descender of lowercase letters. This proportional relationship is maintained regardless of sign size, so a common grid or template can be used. That means that the same file that has been used to develop the initial layout can be digitally enlarged to the actual sign size for production.

Sign sizes may vary because of legend content, but all of them are based on a similar set of proportions designed to maintain alignments and consistent space between legend elements. For example, the margins are always the same proportion to the legend size, including (**1.5x**) left and right, (**x**) on top, and (**1.5x**) bottom.

The panels may be a combination of legend, a directional arrow, and perhaps symbols. A secondary legend may share the same directional arrow. Signs that include two different directions will be separated by an interline space that has a value of **.125x**.

There are two types of Road Guide Sign grid. The first set consists of modules that can be assembled interchangeably for installations with multiple directions posted on the same panel (RG-1, RG-2, RG-3, RG-4, RG-5, RG-9, RG-10, and RG-11). The

second set consists of stand-alone, single-message, or single-destination modules that are not assembled into larger signs (RG-6, RG-7 , and RG-8).

Highway Guide Signs: These signs are placed outside a park to direct motorists into the park. They are formatted using standardized layout grids displayed in this section (HG-1 to HG-3) using the same basic principles as those noted for Road Guide Signs except for the possible use of the NPS Arrowhead, FHWA directional arrow, and only one legend per sign assembly.

Trailblazer Guide Signs and Boundary Signs: Trailblazers, available in four legend heights and three panel widths, are used for single destinations only and include the NPS identification and Arrowhead at the top of the panel. A variation on this format is used for boundary signs. See the layout grids displayed in this section (TB-1 to TB-4 and BG-1 to BG-4).

Typography, Directional Arrow and Symbol Sizes: The chart below identifies the possible sizes of legend type, directional arrow, and symbols for each size panel and grid format. Guidelines for the recommended type sizes, which are based on prevailing road speeds are provided in the type size section of Chapter 3.

Alternate Formats: Although most legends can be accommodated within the standard grids, unique situations might require modifications to create effective panels. In such instances planners should consult with their Regional UniGuide Coordinator or National Uniguide Program Manager.

Traffic Engineering: All Motorist Guidance Signs are placed for the first-time user and are intended to complement a well-designed road system and orderly traffic management plan. Some older park roads may not be ideal, but signs alone cannot correct problems. Sign planners are encouraged to seek professional help from traffic engineers or landscape architects experienced in solving basic circulation and road capacity problems.

Small Guide Signs on Secondary Roads: Guide signs placed on roads within campgrounds, picnic areas, and other "off road" facilities are part of the Visitor Information System; see the grids in the front of this chapter.

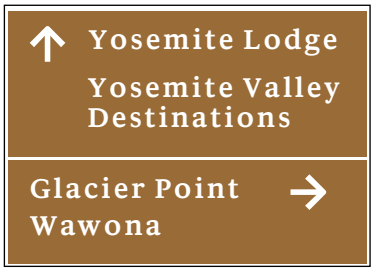
RG-1 to RG-11 Road Guide	**Grid**	**Size of Legend, Symbols and Arrowhead**			
Legend: NPS Rawlinson Roadway	RG-1–11	**3"**	**4"**	**6"**	**9"**
Secondary Legend: Frutiger Bold, 100 Tracking	RG-4, 9, 10, 11	2.4"	3.2"	4.8"	7.2
Arrow size: Overall size: Sq.	RG-1–5, 7–9, 11	6"	8"	12"	18"
Recreation Symbol: Overall size: Sq	RG-2, 5, 7*, 8*, 9, 10	7.5/9"*	10/12"*	15/18"*	22.5/27"*

**Symbol size will vary depending on the sign content. See specific grid specification.*

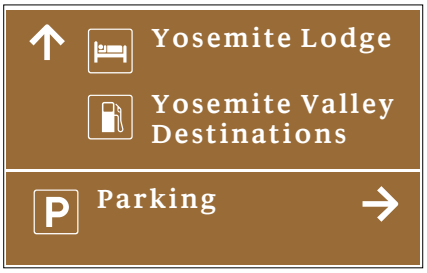
HG-1 to HG-3 Highway Guide			
Legend: NPS Rawlinson Roadway	HG-1–3	**9"**	**12"**
Secondary Legend: Frutiger Bold, 100 Tracking	HG-2–3	7.2"	9.6"
Route Numbers: Frutiger. Black, 100 Tracking	HG-2–3	9"	12"
Arrow size: Overall size: Sq.	HG-1	13.5"	18"
NPS Arrowhead: Width	HG-2	22.5"	30"

Trailblazer Guide and Boundary Sign				
Legend: NPS Rawlinson Roadway	TB-1–4/ BG-1–4	**2"**	**3"**	**4"**
Secondary Legend: Frutiger Bold, 100 Tracking	TB-1–4/ BG-1–4	1.6"	2.4"	3.2"
Arrow size: Overall size: Sq.	TB-1–4	4"	6"	8"
NPS Arrowhead: Height	TB-1–4/ BG-1–4	3.2"	4.8"	6.4"

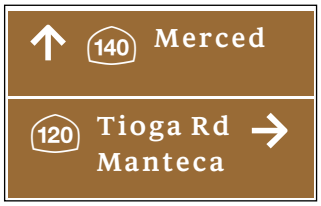
Road Guide



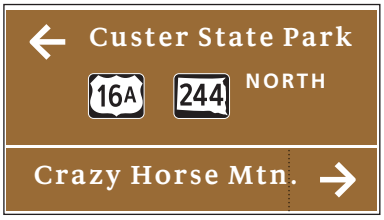
RG-1
Road Guide Single and Multiple Destinations Without Symbols



RG-2
Road Guide Single and Multiple Destinations with Symbols

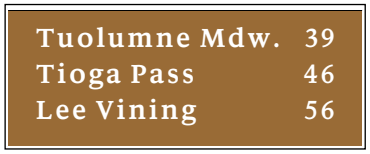


RG-3
Road Guide Single and Multiple Destinations with Route Shield



RG-4
Road Guide Single and Multiple Destinations with Route Shields

RG-5
Road Guide Single and Multiple Destinations with Multiple Symbols



RG-6
Road Guide Single and Multiple Destinations with Distances

RG-7
Road Guide Single Destination with 1 or 2 Symbols

RG-8
Road Guide 1 to 4 Symbols Without Legend
With Directional Arrow

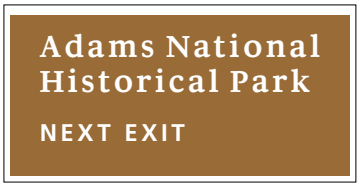
RG-9
Road Guide Single Destination with Secondary Legend

RG-10
Road Guide for Single Destination with Advance Guidance

RG-11
Road Guide for Advisory Panels

Highway Guide

HG-1
3-Line Primary Legend with
Directional Arrow



HG-3
2-Line Primary Legend with Advance
Guide Legend without Arrowhead

Trailblazer

TB-3
3-Line Primary Legend
with Directional Arrow

TB-1
1-Line Primary Legend
with Directional Arrow

Boundary Guide

BG-3
3-Line Primary Legend
with Boundary Guide

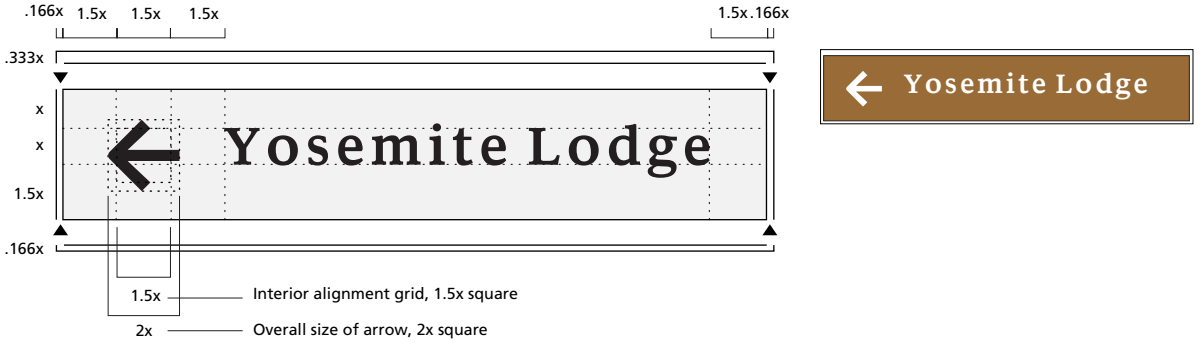
BG-2
2-Line Primary Legend
with Boundary Guide

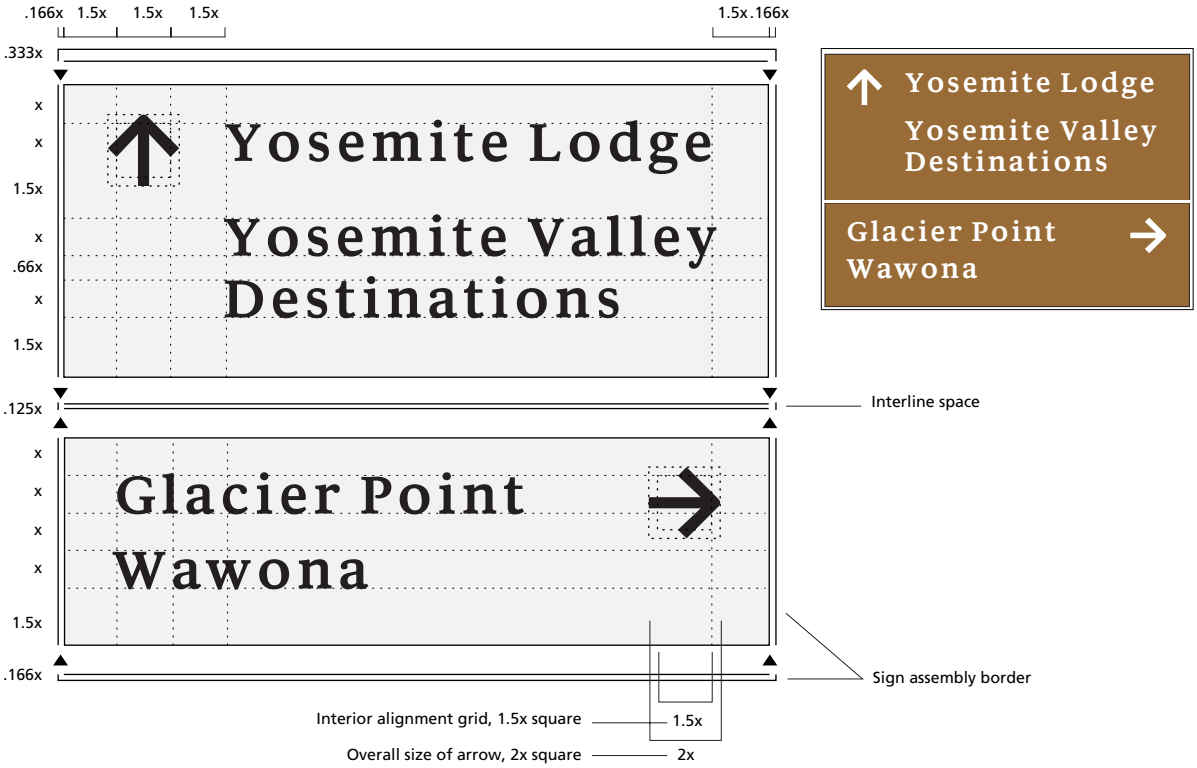
RG-1: Road Guide for Single and Multiple Destinations Without Symbols

This Road Guide format accommodates one-or two-line destination legends for any direction. An RG-1 sign panel assembly can display up to 3 different destinations (4 if each is on a single line, but 3 are preferred), with up to 3 directional modules.

The first legend is always an **x** below the top edge of the brown legend field. Each new destination legend is separated by an **x** vertical space unless the panel includes a two–line destination. If a panel includes a two–line destination, all destinations in the module are separated by **1.5x**. Two line destinations have a **.66x** space between the first and second line. All legends are left justified.

The legends on straight and left directional modules are placed **4.5x** from the left edge of the brown legend field. The arrow is then horizontally centered in this **4.5x** space. The distance between the end of the longest destination legend and and the right edge of the brown legend field is **1.5x**.





Legends on right directional modules are placed **1.5x** from the left edge of the brown legend field. The arrow is then placed to the right of the destination legend, with the right edge of its interior alignment box **1.5x** to the left of the right edge of the legend field. The distance between the end of the longest destination legend and the left edge of the arrows interior alignment box is **1.5x**.

On each RG-1 panel the arrows interior alignment box is always top aligned with the first destination legend.

All RG-1 sign panel assemblies are surrounded by a white border. The top of the white border is **.333x** and the sides and bottom are **.166x**. If more than one panel is used in a sign panel assembly, there is a **.125x** white interline space placed to visually separate the panels.

1-Line, 1-Destination

Arrow straight or left

Arrow right

2-Lines, 1-Destination

Arrow straight or left

Arrow right

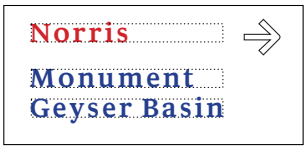
2-Lines, 2-Destinations

Arrow straight or left

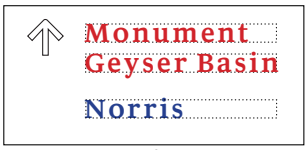
Arrow right

3-Lines, 2-Destinations

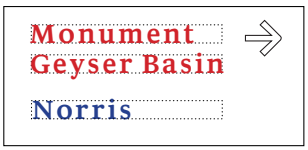
Arrow straight or left



Arrow right



Arrow straight or left



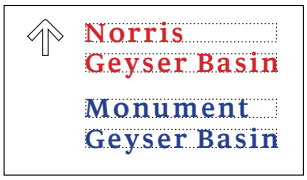
Arrow right

3-Lines, 3-Destinations

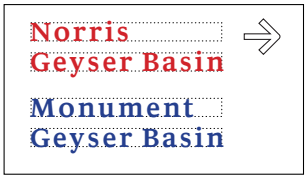
Arrow straight or left

Arrow right

4-Lines, 2-Destinations

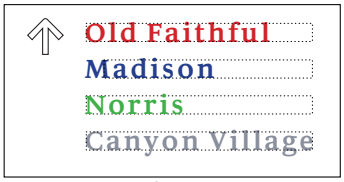


Arrow straight or left

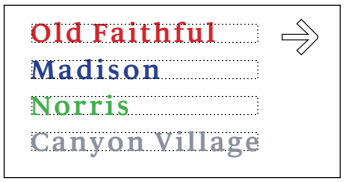


Arrow right

4-Lines, 4-Destinations

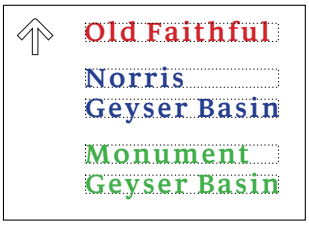


Arrow straight or left

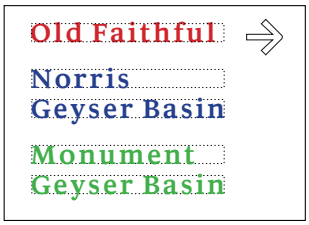


Arrow right

5-Lines, 3-Destinations

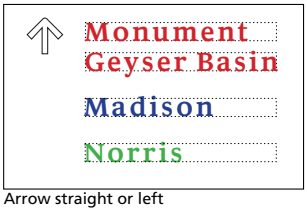


Arrow straight or left

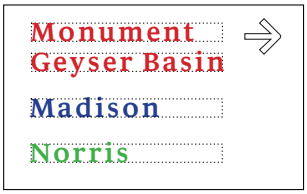


Arrow right

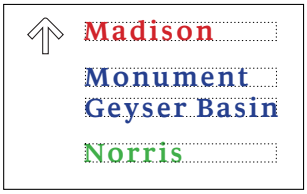
4-Lines, 3-Destinations



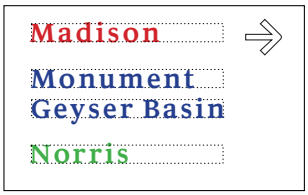
Arrow straight or left



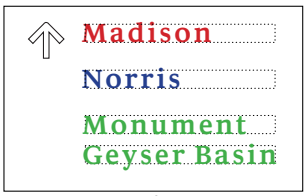
Arrow right



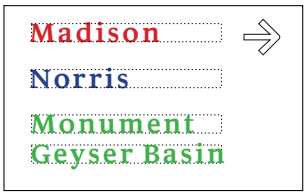
Arrow straight or left



Arrow right



Arrow straight or left



Arrow right

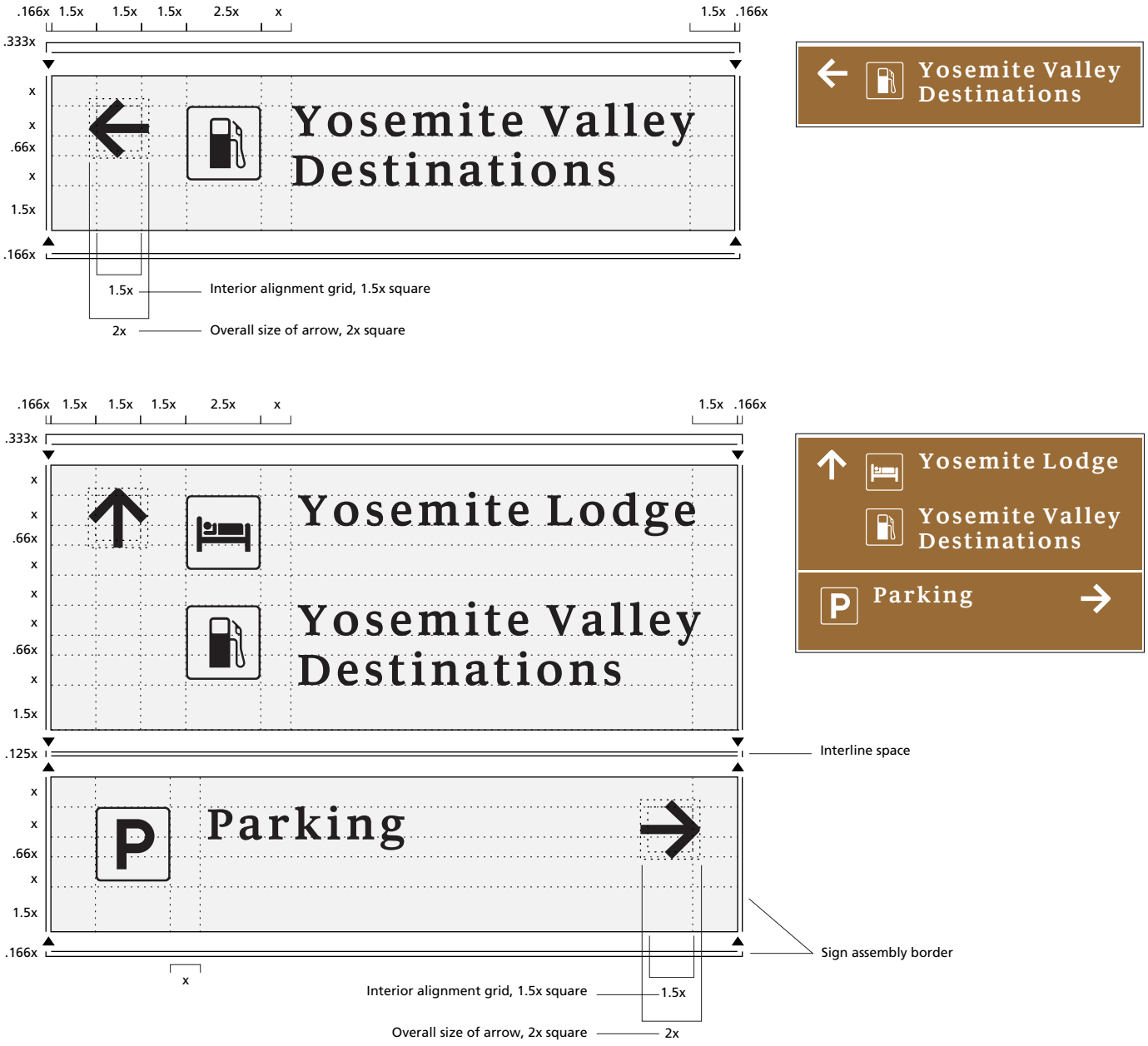
RG-2: Road Guide for Single and Multiple Destinations with Symbols

This format combines recreation symbols with one-or two-line destination legends for any direction. An RG-2 sign panel assembly can display up to three different destinations and can contain up to three panels.

The size of the recreation symbol is **2.5x**. The first recreation symbol is placed an **x** below the top of the brown legend field. Each additional symbol is separated by an **x** vertical space. All symbols are an **x** to the left of the destination legend.

Destination legends are top aligned with their corresponding recreation symbols. Two-line destinations have a **.66x** space between the first and second line. All legends are left justified.

The recreation symbols on straight and left directional modules are placed **4.5x** to the right of the left edge of the brown legend field. The arrow is then horizontally centered in this **4.5x** space.



The recreation symbols on right directional modules are placed **1.5x** to the right of the left edge of the brown legend field. The arrow is then placed to the right of the destination legend, with the right edge of its interior alignment box **1.5x** to the left of the right edge of the brown legend field. The distance between the end of the longest destination legend and the left edge of the interior arrow box should be **1.5x**.

On each RG-2 panel the arrow's interior alignment box is always top aligned with the first destination legend.

All sign panel assemblies are surrounded by a white border. The top of the white border is **.333x** and the sides and bottom are **.166x**. If more than one panel is used in a sign panel assembly, a **.125x** white interline space separates the modular panels.

2-Lines, 1-Destination, 1-Symbol

Arrow straight or left

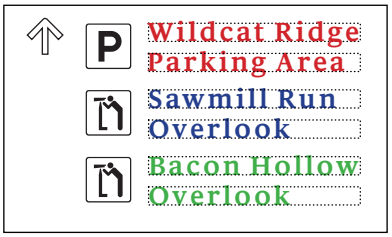
Arrow right

4-Lines, 2-Destinations, 2-Symbols

Arrow straight or left

Arrow right

4-Lines, 3-Destinations, 3-Symbols



Arrow straight or left

Arrow right

RG-3: Road Guide for Single and Multiple Destinations with Route Shield

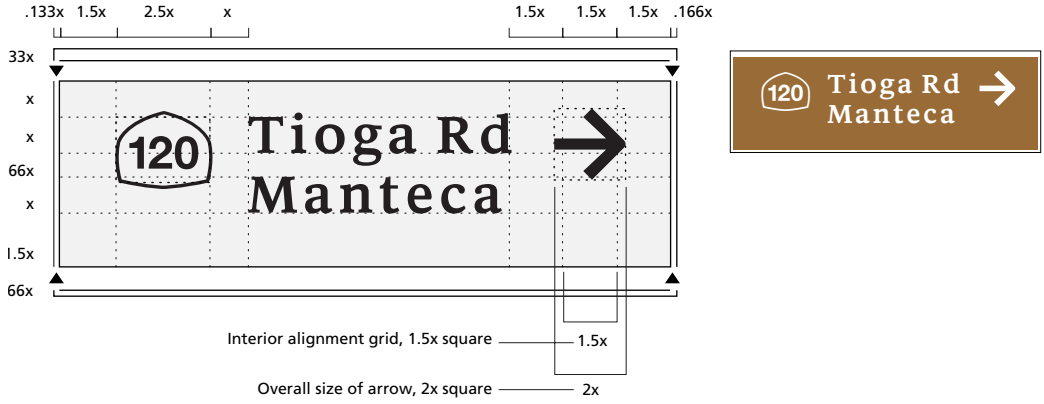
This format combines a route shield with one-or two-line destination legends for any direction. An RG-3 sign panel assembly can display up to three different destinations and can contain up to three panels.

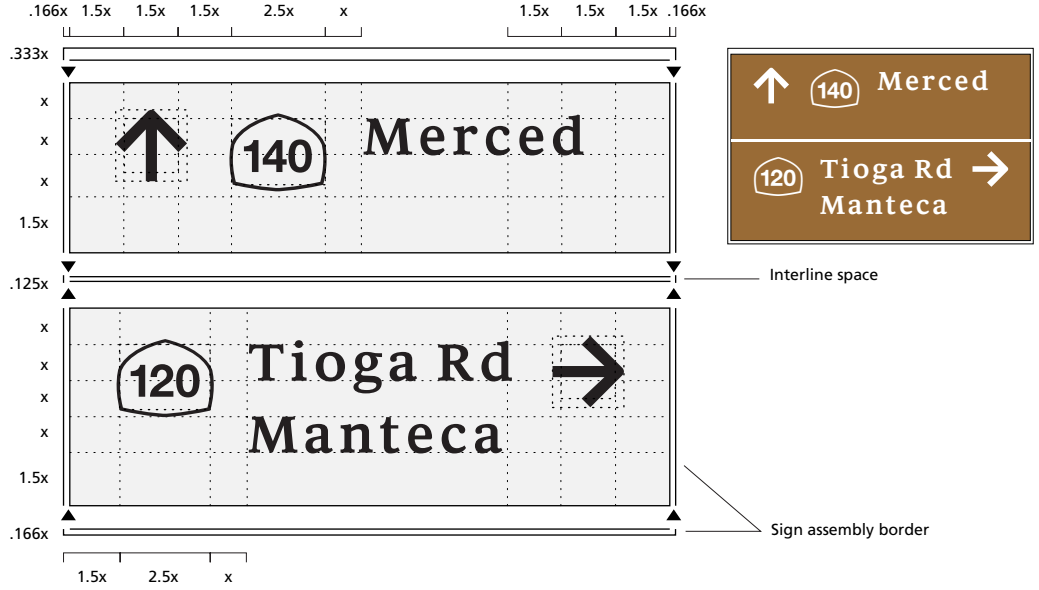
The route shield is **2.5x** wide and is placed an **x** below the top of the brown legend field and on the left side of the legend.

There is to be only one route shield per module.

The first legend is an **x** below the top of the brown legend field. Each new destination legend is separated by an **x** vertical space, unless the panel includes a two-line destination. If a panel includes a two-line destination, all destinations in the panel are separated by a **1.5x** space. Two-line destinations have a **.66x** interline space between the first and second line. All legends are left justified and placed an **x** to the right of route shield.

On straight and left directional modules the route shield is placed **4.5x** to the right of the left edge of the brown legend field.





The arrow is then horizontally centered in this **4.5x** space.

On right directional modules the route shield is placed **1.5x** to the right of the left edge of the brown legend field. The arrow is then placed to the right of the legend, with the right edge of its interior alignment box **1.5x** left of the right edge of the brown legend field. The distance between the end of the longest destination legend and the left edge of the arrow's interior alignment box should be **1.5x**.

The arrow's interior alignment box is always top aligned with the first destination legend.

All RG sign panel assemblies are surrounded by a white border. The top of the white border is **.333x**, and the sides and bottom are **.166x.** If more than one panel is used in the assembly, there is a **.125x** white interline space placed to visually separate each panel.

1-Line, 1-Message, 1-Icon

Arrow straight or left

Arrow right

2-Lines, 1-Message, 1-Icon

Arrow straight or left

Arrow right

2-Lines, 2-Messages, 1-Icon

Arrow straight or left

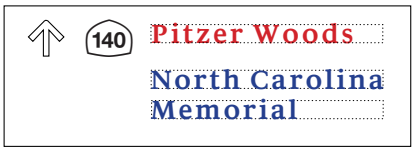
Arrow right

3-Lines, 3-Messages, 1-Icon

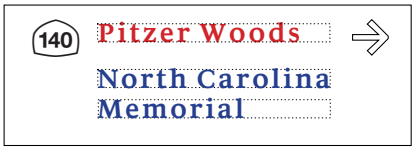
Arrow straight or left

Arrow right

3-Lines, 2-Messages, 1-Icon



Arrow straight or left



Arrow right

4-Lines, 3-Messages, 1-Icon

Arrow straight or left

Arrow right

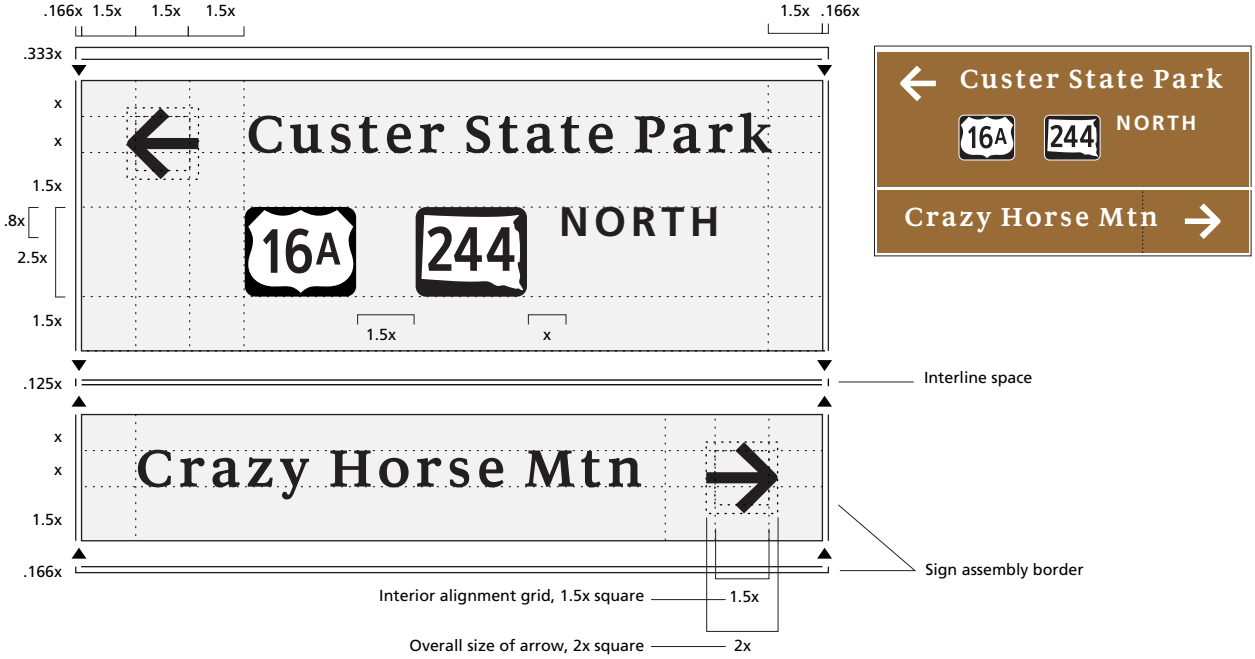
RG-4: Road Guide for Single and Multiple Destinations with 2 to 3 Route Shields

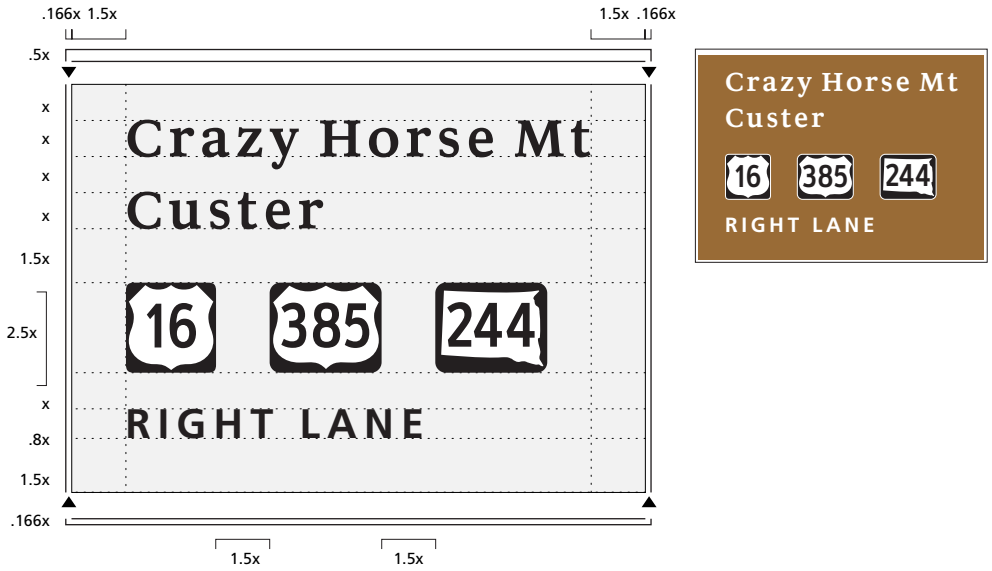
This format includes two options: 1) panel with directional arrow, and 2) panel with advance guidance legend. It accommodates one-single-or double-line destination legend or two single-line destination legends.

The first destination legend is an **x** below the top of the brown legend field. Two-line destinations have a **.66x** line space between the first and second line. Two individual destination legends are separated by an **x** line space.

The route shields are **2.5x** high (double digit displays are **2.5x** wide, triple digit displays are **3x** wide) and are placed **1.5x** below the destination legend. The leftmost route number shield is left aligned with the legend, and each additional shield is separated by a **1.5x** horizontal space.

An optional compass direction legend is placed as needed. It is top aligned with, and an **x** to the right of the right most route medallion. The compass direction legend is **.8x** and is displayed in all uppercase Frutiger Bold, +100 kerning.





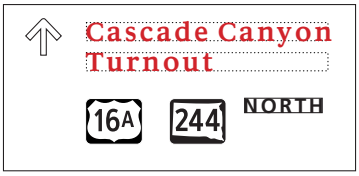
All RG sign panel assemblies are surrounded by a white border. The top of the white border is **.333x** and the sides and bottom are **.166x**. If more than one panel is used in an assembly, a **.125x** white interline space separates the panels.

1-Line, 1-Message

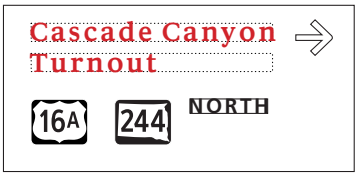
Arrow straight or left

Arrow right

2-Lines, 1-Message



Arrow straight or left

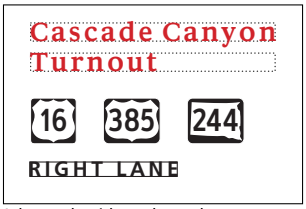


Arrow right

1-Line, 1-Message

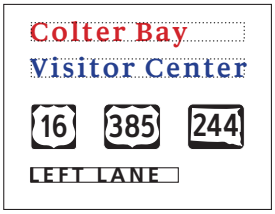
Advanced guidance legend

2-Lines, 1-Message



Advanced guidance legend

2-Lines, 2-Messages



Advanced guidance legend

Panel with directional arrow: If sign panel assembly includes a second directional module, the combined assembly should not have more than 4 destination displays in the sign panel assembly. The destination legends and route shields each count as a destination display. As a horizontal modular assembly, this grid will accommodate a second direction module. The second module would be added only if the first panel contains no more than three destinations displays, and the second module contains only one destination display as shown in the top example on page 95.

Legends on panels with directional arrows directing motorists to the right are aligned to the left of the panel with **1.5x** margin, see Arrow right in the examples to the left. On these panels, the distance between the end of destination legend and the right directed arrow should not be less than **1.5x**, but is determined by the longest legend in the overall assembly of modules, and with the arrow placed flush to the right with **1.5x** between tip of arrow and edge of brown legend field.

Panel with advance guidance legend: Advance guide legend is used in lieu of directional arrow and is placed an **x** below the route medallions, flush to the left with **1.5x** left margin, see advance guide legend in second column on the left. The distance between the end of destination legend and the right edge of the module should not be less than **1.5x**, but is determined by the longest legend in the overall assembly of modules. The **.8x** legend is displayed in all uppercase sans serif type.

RG-5: Road Guide for Single Destination With 2 to 4 Symbols

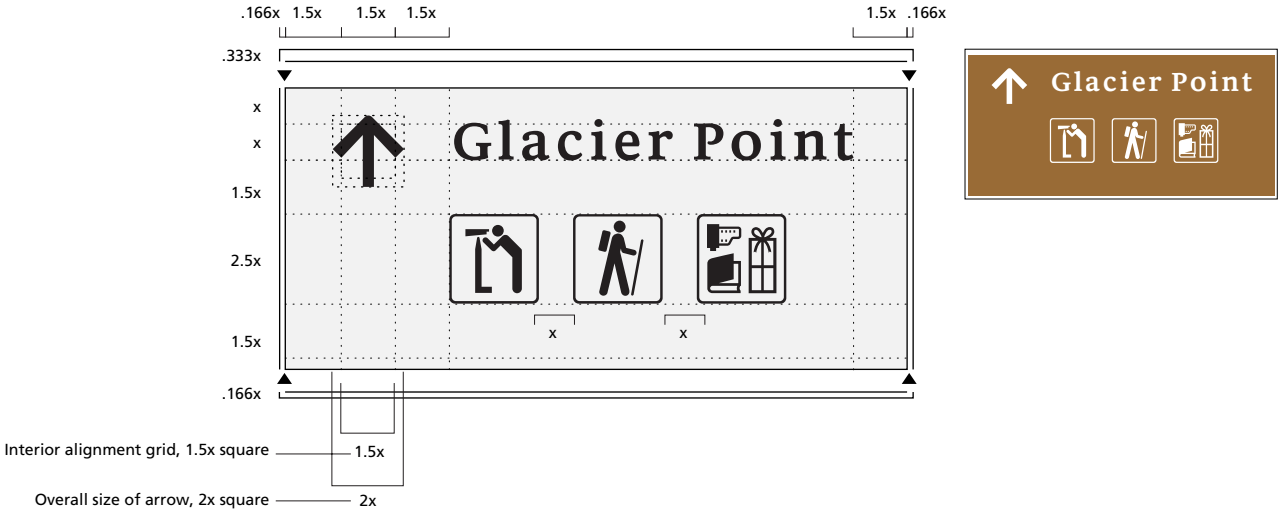
This format accommodates a one-or two-line destination legend with two to three recreation symbols. It also can accommodate a second directional module.

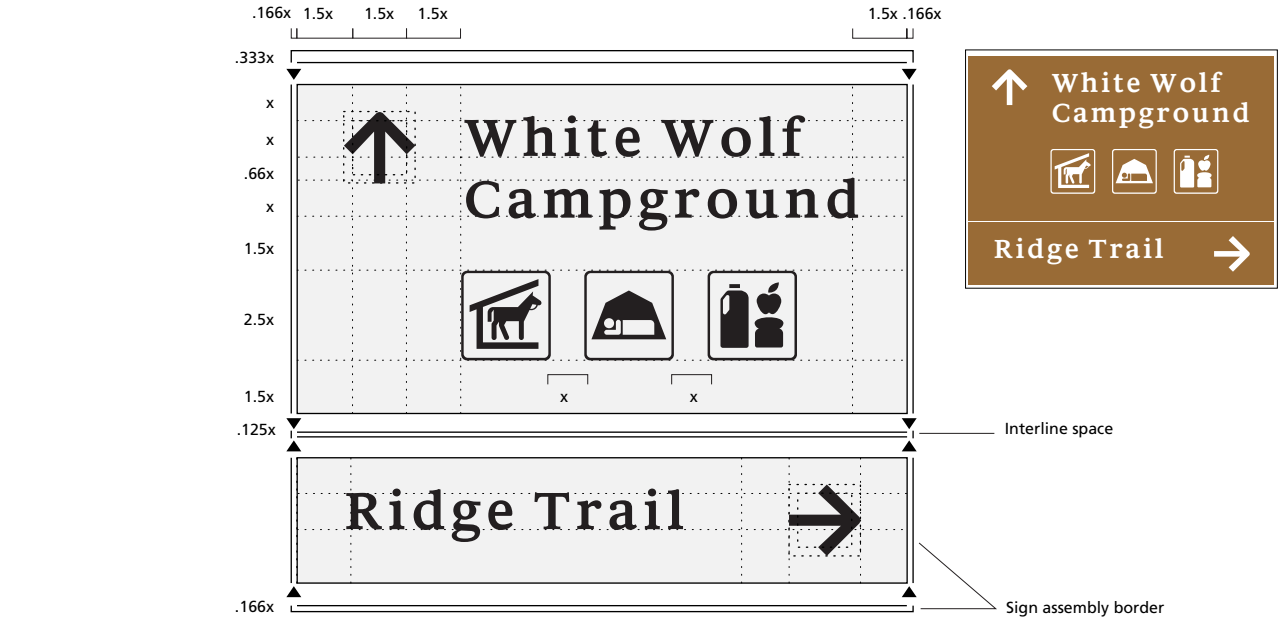
An RG-5 sign panel assembly can display up to two destinations and contain up to two panels. If an assembly contains a second directional module, that module should not include symbols or route shields.

All recreation symbols are **2.5x** square and are placed **1.5x** below the destination legend. The leftmost recreational symbol is left aligned with the legend, and each additional symbol is separated by an **x** horizontal space.

The destination legend is always an **x** below the top of the brown legend field. Two-line destinations have a **.66x** interline space between the first and second line.

On straight and left directional modules the legend is placed **4.5x** to the right of the left edge of the brown legend field.





The arrow is then horizontally centered in this **4.5x** space.

On right directional modules the legend is placed **1.5x** to the right of the left edge of the brown legend field. The arrow is then placed to the right of the destination legend, with the right edge of its interior alignment box **1.5x** to the left of the right edge of the brown legend field. The distance between the end of the destination legend and the left edge of the interior alignment box is **1.5x**. The arrow's interior alignment box is to be top aligned with the first destination legend.

All sign panel assemblies are surrounded by a white border. The top of the white border is **.333x** and the sides and bottom are **.166x**. If more than one panel is used in a sign panel assembly, a **.125x** white interline space separates the panels.

1-Line, 1-Message

Arrow straight or left

Arrow right

2-Lines, 1-Message

Arrow straight or left

Arrow right

RG-6: Road Guide for Single and Multiple Destinations with Distance

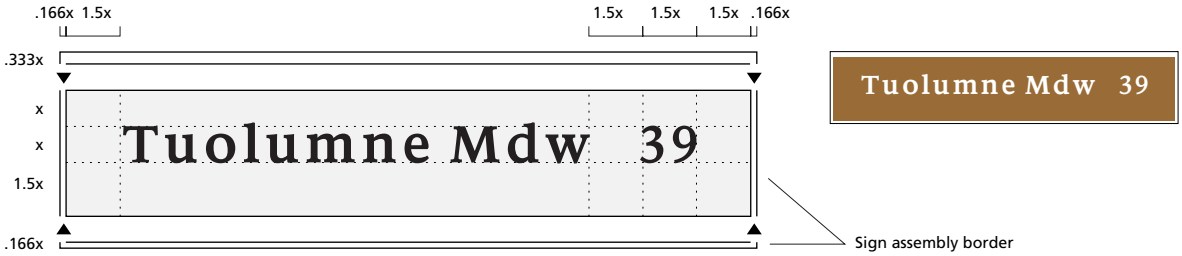
This grid accommodates up to four one-line destination legends with mileage numbers. This is a stand-alone panel.

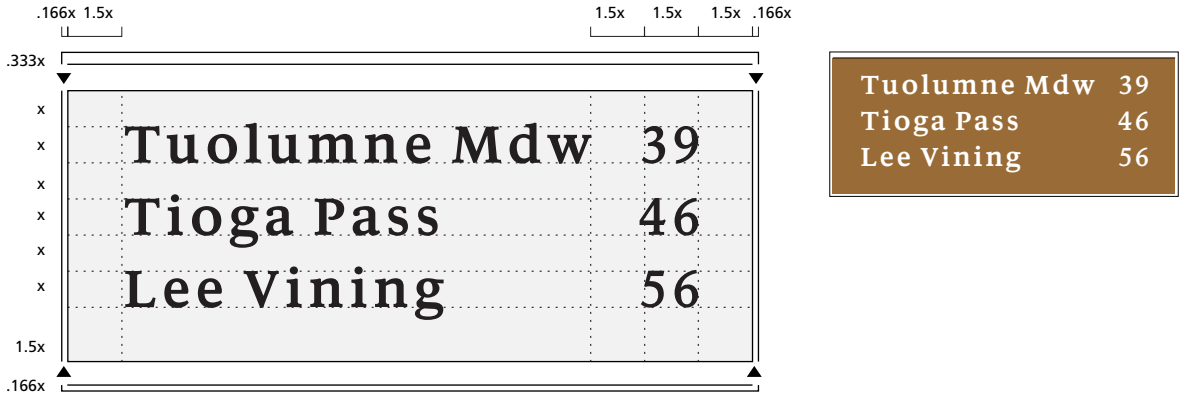
The destination legends are placed **1.5x** to the right of the left edge of the brown legend field. The mileage numbers are right aligned with each other and are placed **1.5x** to the left of the right edge of the brown legend field. The horizontal distance between the end of the longest destination legend and the widest mileage number is **1.5x**.

The first legend is an **x** below the top of the brown legend field. Each new destination legend is separated by an **x** vertical space.

There is always a **1.5x** left, right, and bottom border.

This one to four-line module is surrounded by a white border. The top of the white border is **.333x**, and the sides and bottom are **.166x**.





1-Line, 1-Message

2-Lines, 2-Messages

3-Lines, 3-Messages

4-Lines, 4-Messages

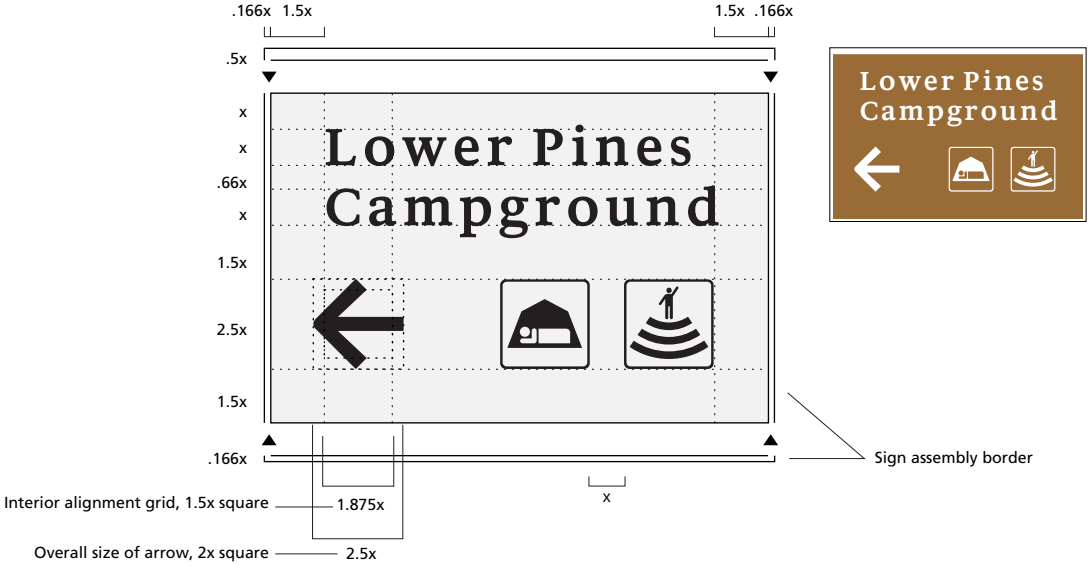
RG-7: Road Guide for Single Destination with 1 or 2 Symbols

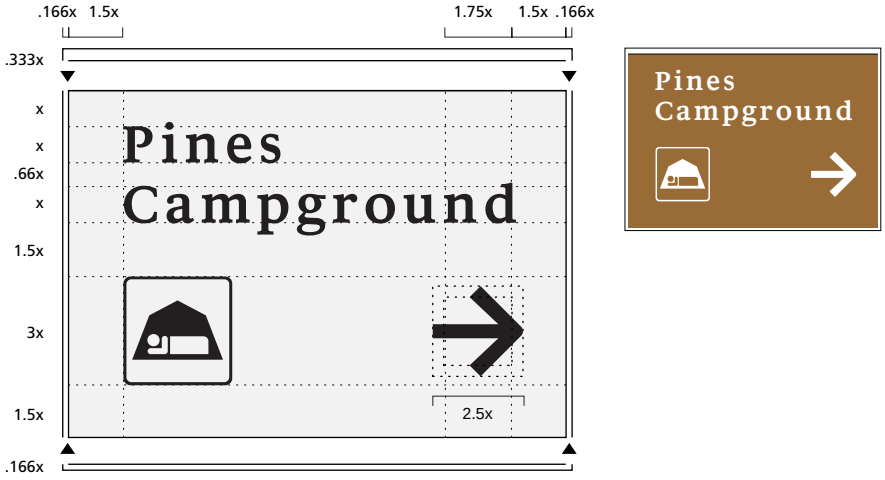
This format accommodates a single one-or two-line destination legend, with one or two recreation symbols.

This is a stand-alone panel. The width of the panel is determined by the width of the destination legend. The right edge of the brown legend field is to be **1.5x** to the right of the legend, and the left edge is to be **1.5x** to the left of the legend. Two-line destination legends are left justified and have a **.66x** line space between the first and second line.

All symbols are placed **1.5x** below the legend. On panels with one recreation symbol, the symbol is **3x** square. On panels with two recreation symbols, both symbols are **2.5x** square and are separated by an **x** horizontal space. The bottom edge of the brown legend field is **1.5x** below the recreation symbols.

The arrow is **2.5x** square and is vertically centered with the recreational symbols. On straight or left directed panels, the interior arrow box is left aligned with the destina-



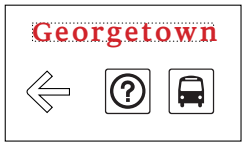


tion legend, and the recreation symbols are right aligned with the legend, unless the space between the arrow and the left edge of the left symbol in less than **1.5x**.

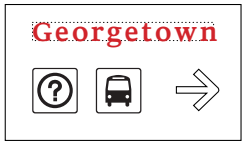
On right directed panels, the interior arrow box is right aligned with the destination legend and the recreation symbols are left aligned with the legend above.

The panel layout is surrounded by a white border. The top of the white border is **.333x**, and the sides and bottom are **.166x**.

1-Line, 1-Message, 2-Symbols

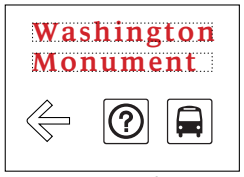


Arrow straight or left

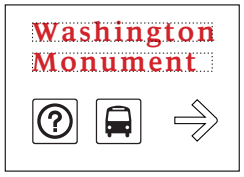


Arrow right

2-Lines, 1-Message, 2-Symbols



Arrow straight or left



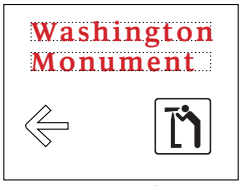
Arrow right

1-Line, 1-Message, 1-Symbol

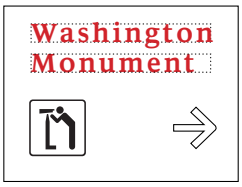
Arrow straight or left

Arrow right

2-Lines, 1-Message, 1-Symbol

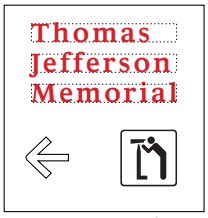


Arrow straight or left

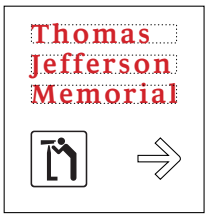


Arrow right

3-Line, 1-Message, 1-Symbol



Arrow straight or left



Arrow right

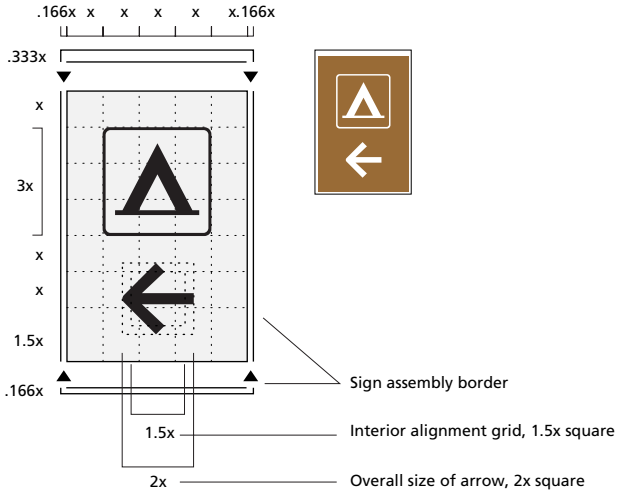
RG-8: Road Guide with 1 to 4 Symbols and Directional Arrow

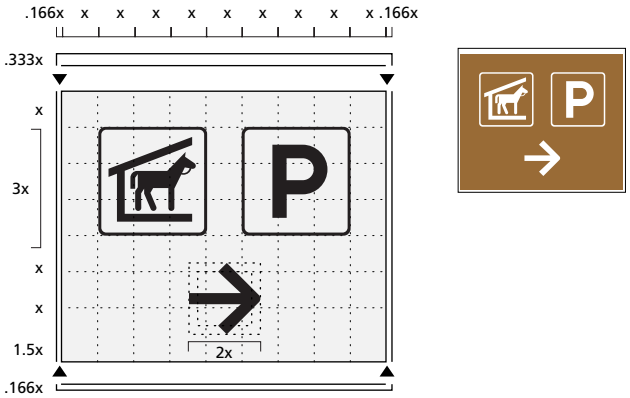
These Road Guide Sign formats accommodate one to four recreation symbols.

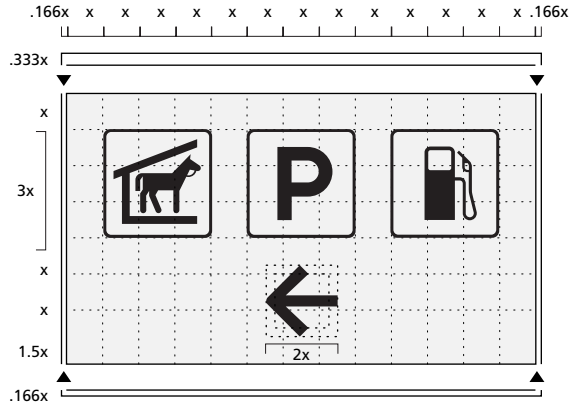
All recreation symbols on an RG-8 panel are **3x** square. On panels that contain one to three recreation symbols, all symbols are placed an **x** below the top, with an **x** horizontal separation between them. On a panel containing four recreation symbols, the symbols are stacked, with two placed an **x** below the top of the brown legend field and two placed an **x** below the top two symbols. Recreation symbols sharing the same horizontal alignment have an **x** space between them.

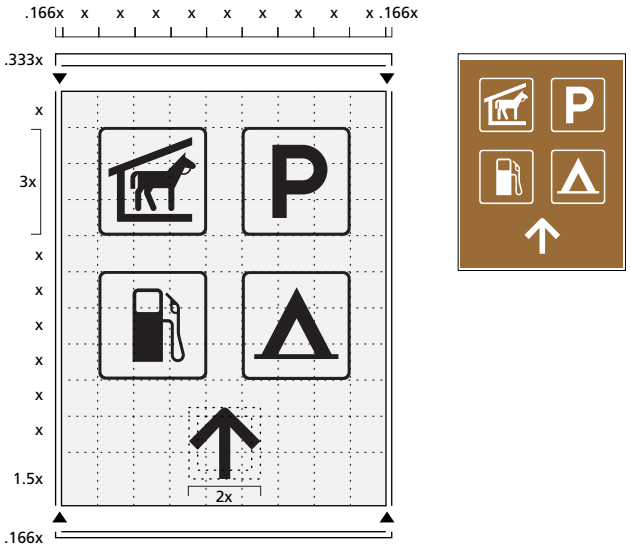
The space between the bottommost recreation symbol and the bottom edge of the brown legend field is **3x**. This space accommodates a **1.5x** arrow centered horizontally and vertically.

Two different panels may be displayed horizontally in the same assembly if the combined assembly has no more than four symbols.









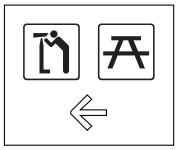
The sign panel is surrounded by a white border. The top of the white border is **.333x**, and the sides and bottom are **.166x**. If more than one module is used in an overall panel assembly, there is a **.125x** white interline space placed vertically between the modules to visually separate them.

1-Symbol

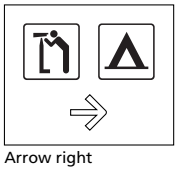
Arrow straight or left

Arrow right

2-Symbols

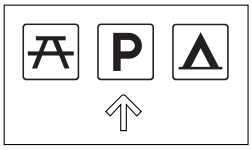


Arrow straight or left

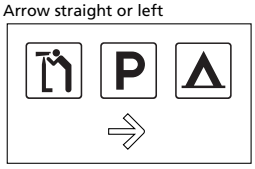


Arrow right

3-Symbols



Arrow straight or left



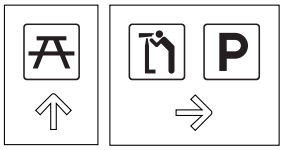
Arrow right

4-Symbols

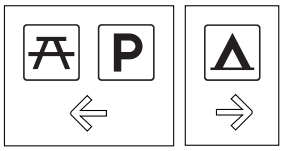
Arrow straight or left

Arrow right

3-Symbols, 2-Destinations

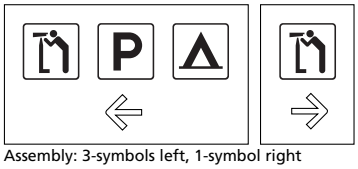


Assembly: 1-symbol straight, 2-symbols right

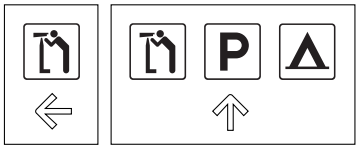


Assembly: 2-symbols left, 1-symbol right

4-Symbols, 2-Destinations



Assembly: 3-symbols left, 1-symbol right



Assembly: 1-symbol left, 3-symbols straight

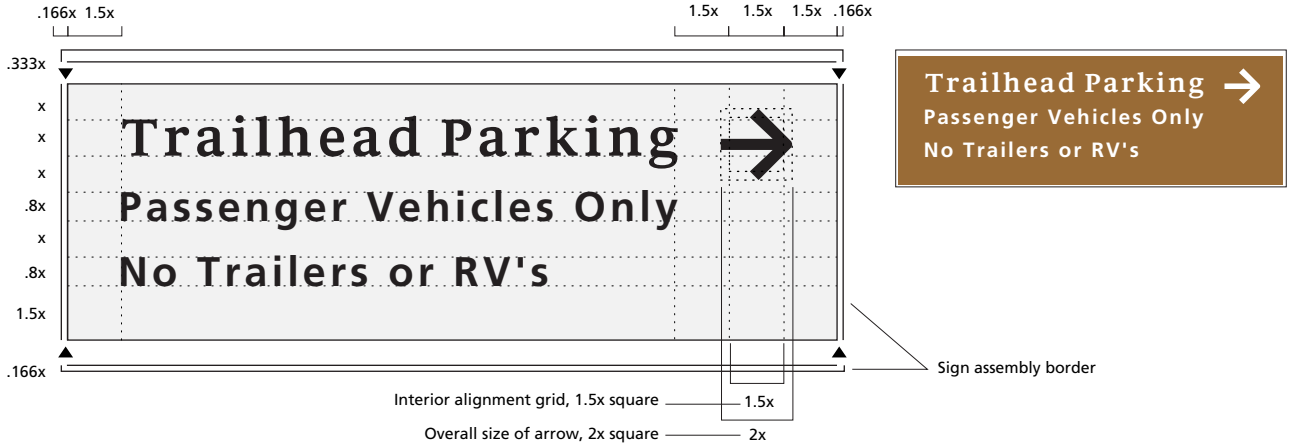
RG-9: Road Guide Information for Single Destination with Secondary Legend

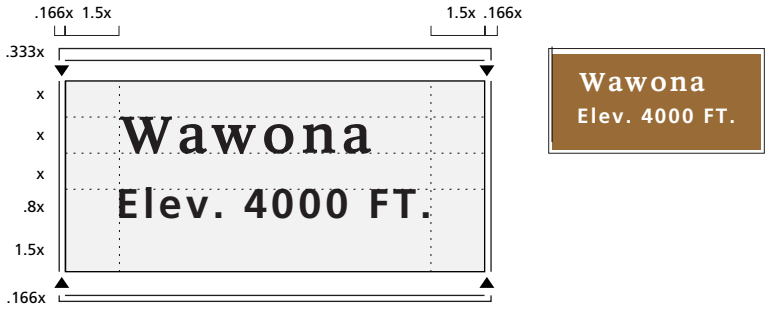
This format is a variation of RG-1 and RG-2 and accommodates one single-or double-line destination legend with one or two single-line secondary informational legends.

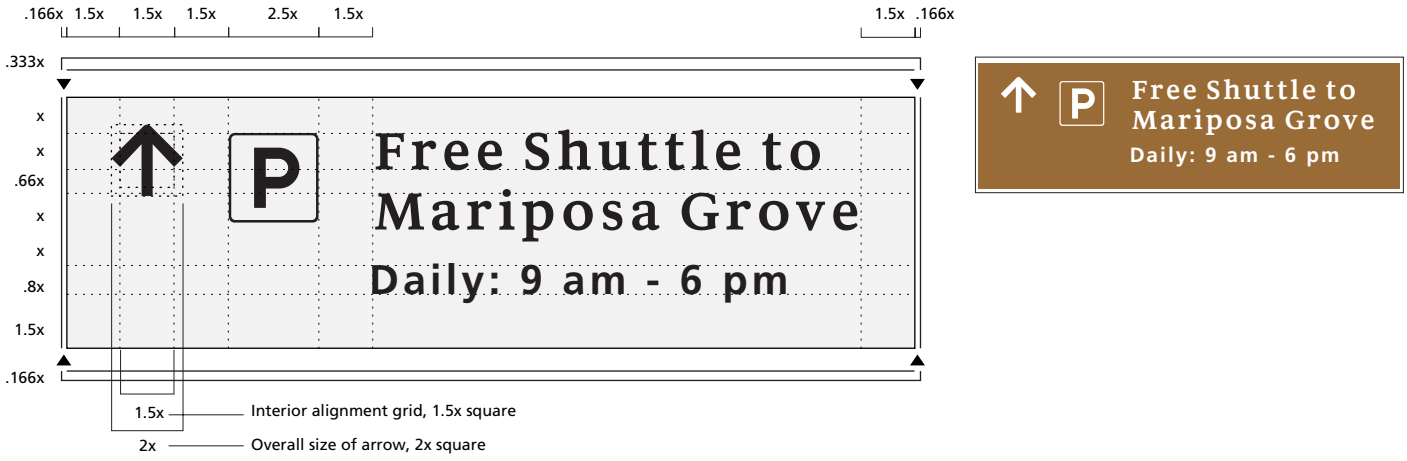
Refer to the referenced grids along with the following notes to prepare a panel with secondary information legend.

A secondary legend is used to qualify a primary legend with restrictions, allowances, access information, hours of operation, etc.

The secondary legend is Frutiger Bold and is displayed in mixed case, with initial capital letters and +50 kerning. The color of the secondary legend is yellow. The secondary legend size is **.8x** and is always placed on a flush left alignment to the primary legend. It is placed an **x** below the primary legend. Two single-line secondary legends are separated by an **x** vertical space. The space between the secondary legend and the bottom edge of the brown legend field is **1.5x**.







All panels are surrounded by a white border. The top of the white border is **.333x**, and the sides and bottom are **.166x.**

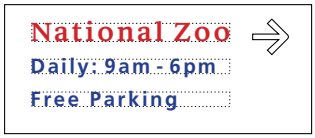
2-Lines, 1-Destination

Arrow straight or left

Arrow right

3-Lines, 1-Destination

Arrow straight or left



Arrow right

3-Lines, 1-Destination

Arrow straight or left

Arrow right

4-Lines, 1-Destination

Arrow straight or left

Arrow right

2-Lines, 1-Destination

Information / Advisory

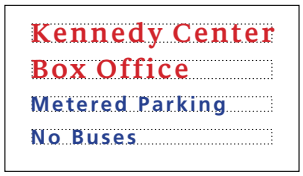
3-Lines, 1-Destination

Information / Advisory

3-Lines, 1-Destination

Information / Advisory

4-Lines, 1-Destination

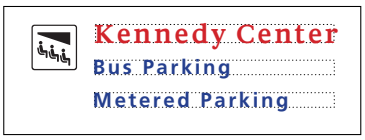


Information / Advisory

2-Lines, 1-Destination

3-Lines, 1-Destination

3-Lines, 1-Destination



4-Lines, 1-Destination

2-Lines, 1-Destination

Arrow straight or left

Arrow right

3-Lines, 1-Destination

Arrow straight or left

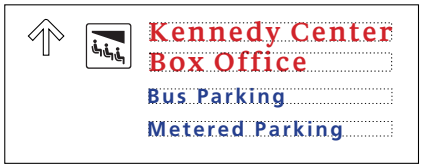
Arrow right

3-Lines, 1-Destination

Arrow straight or left

Arrow right

4-Lines, 1-Destination



Arrow straight or left

Arrow right

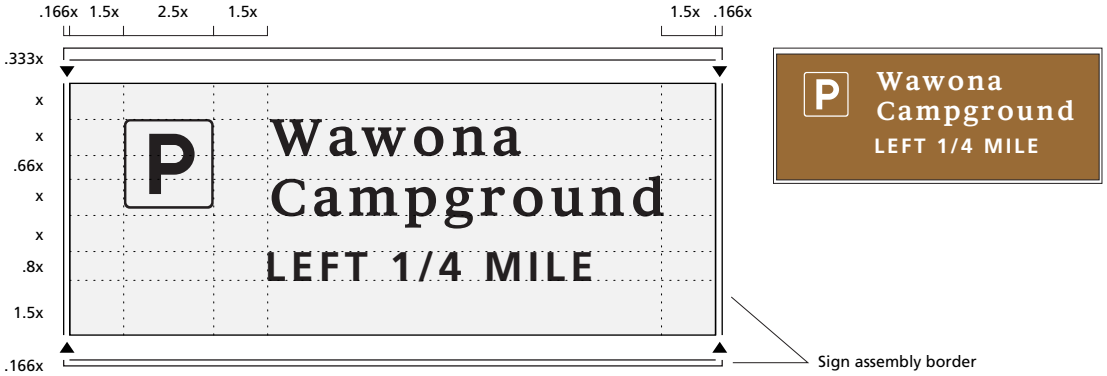
RG-10: Road Guide for Single Destination with Advance Guidance

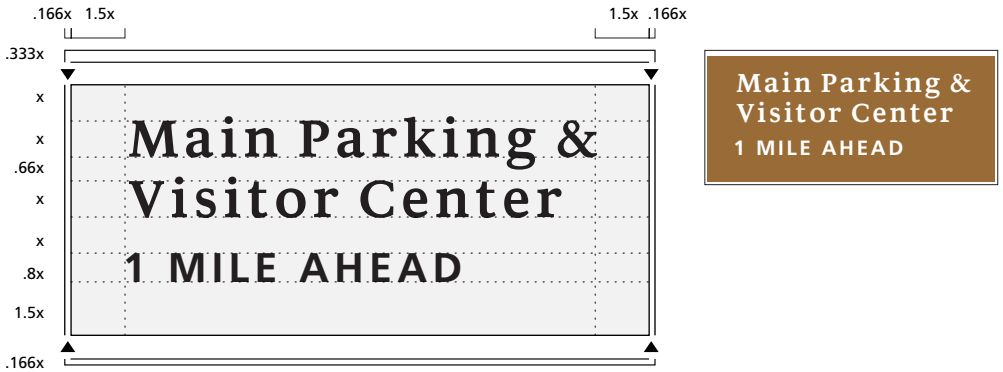
This format is a variation on RG-1 to RG-4 and uses words in lieu of an arrow to direct motorists to a destination. If advance guidance is placed on a panel, it should be displayed as a stand alone panel and not be combined with other modules.

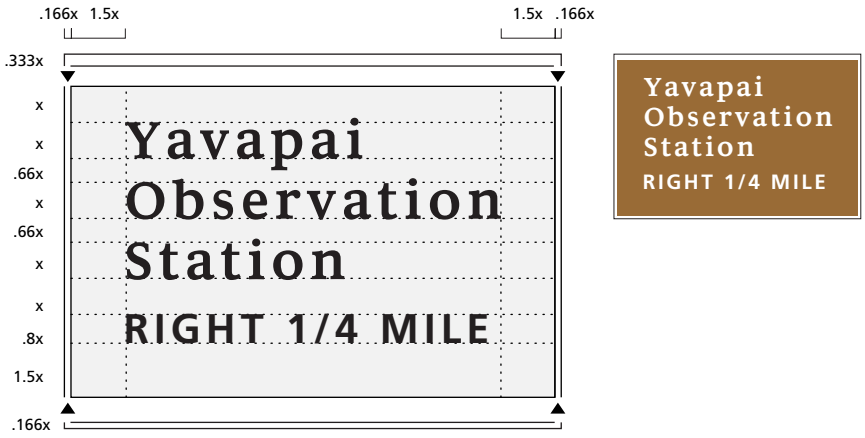
Refer to the RG-1 to RG-4 formats and the following notes to prepare a panel with advanced guidance. Advance guidance legends include familiar directions (LEFT, RIGHT) and distance (1/4 MILE, 1000 FT., or NEXT).

These legends are **.8x** in all uppercase Frutiger Bold, +100 kerning. They are placed an **x** below the primary legend on a flush left alignment. The color of the advance guidance legend is yellow on a recreation brown field (or a blue field if it is on a concession related sign). The space below the secondary legend and the bottom edge of the brown legend field is **1.5x**.

All panels are surrounded by a white border. The top of the white border is **.333x**, and the sides and bottom are **.166x**.



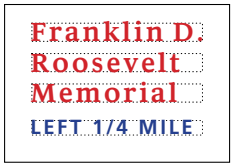




2-Lines, 1-Destination

3-Lines, 1-Destination

4-Lines, 1-Destination



2-Lines, 1-Destination

3-Lines, 1-Destination

RG-11: Road Guide with Advisory Legend Panels

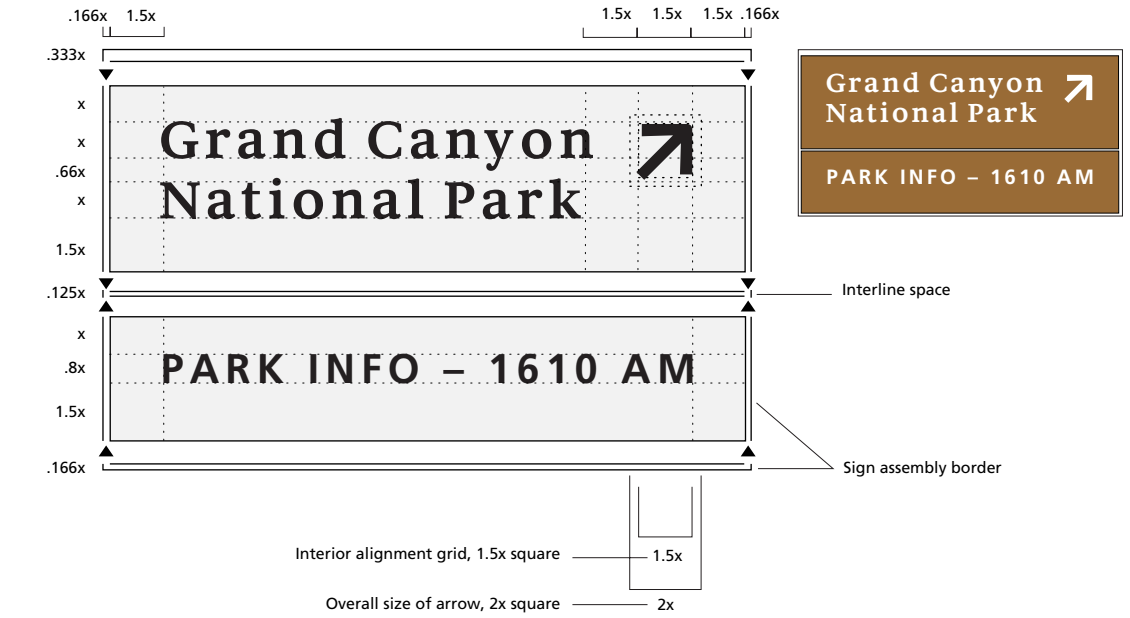
Advisory panels may be freestanding or be placed below a conventional road guide panel, as show with the RG-1 panel below. They may be temporary or permanent parts of panel assemblies.

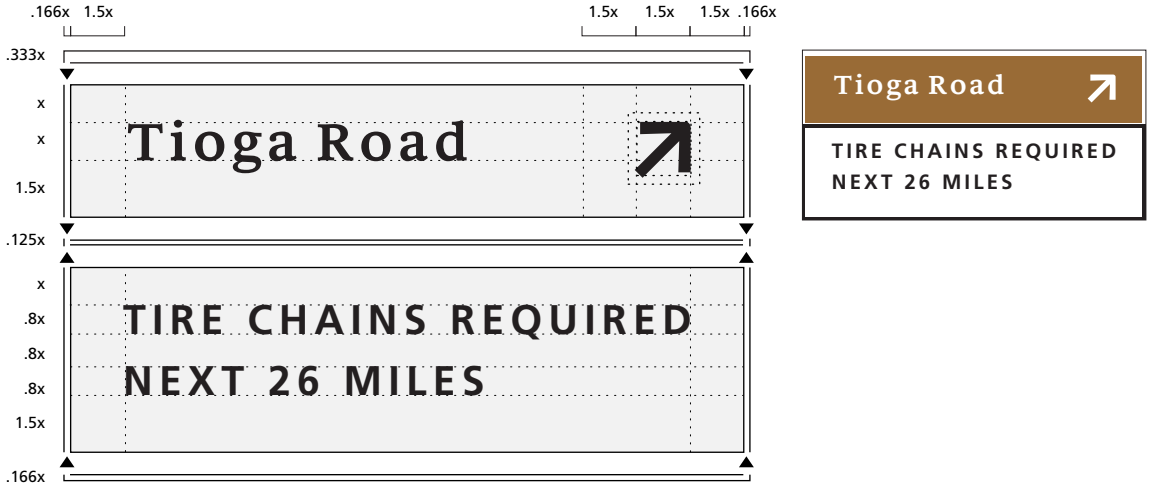
Advisories include:

- Regulatory warnings noting road closures, or tire chain restrictions. They are white panels with a black legend, and a black border.
- General information such as the lack of motor fuel within a section of a park, or the availability of local park information on a AM radio band. Information panels are blue with white legend, and a white border.

This format accommodates a one-to two-line to two-line advisory legend. The legend is sans serif and is displayed in all capital letters with +125 nonstandard word spacing setting. The legend size is **.8x** with a **.8x** interline space for a two-line legend.

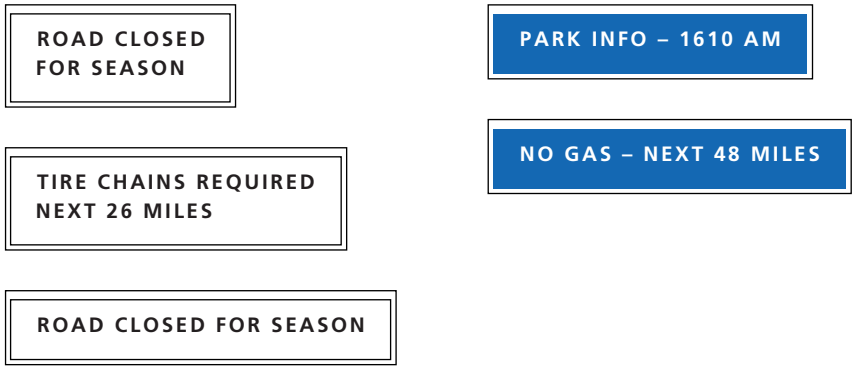
Advisory legends are left justified, **1.5x** to the right of the left legend field edge.





Common proportions for all modules are: **1x** between top of legend field and first destination legend, **1.5x** margin on left and right side of panel, **1.5x** between bottom of the legend and bottom of legend field.

This panel is surrounded by a **.333x** top border and a **.166x** side and bottom border. The color of the border on the top and sides of the upper panel will be white. The color border of the advisory legend: black for regulatory signs and white for blue general information signs. General information panels are separated from a guide sign panel by a white **.125x** line.



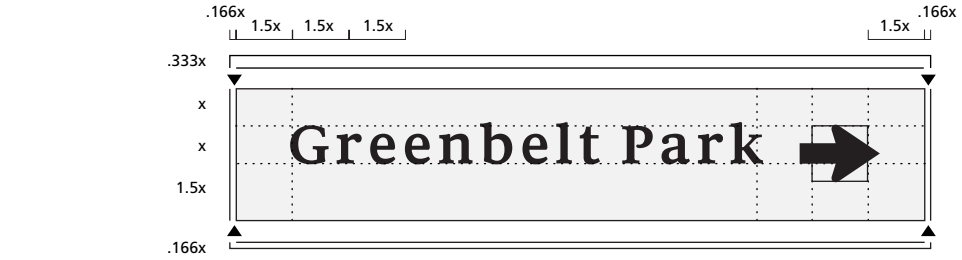
HG-1: Highway Guide with 1-to 3-Line Legend and Directional Arrow

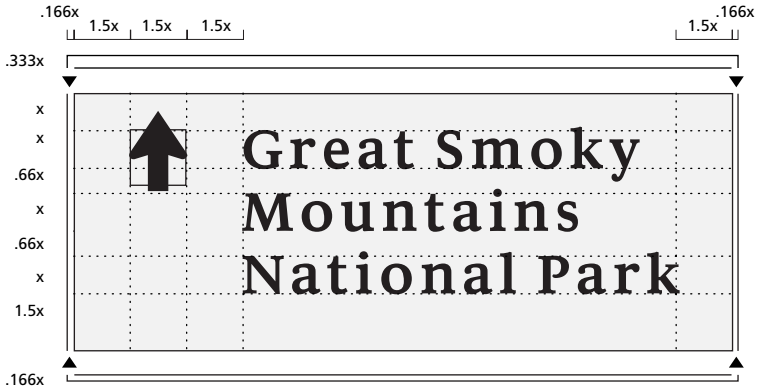
This format accommodates a single one-to three-line destination legend. The legend is an **x** below the top edge of the brown legend field, and aligned flush left. Multiple line legends have **.66x** interline space.

The legends on straight and left directional modules are placed **4.5x** from the left edge of the brown legend field. The arrow is horizontally centered in the **4.5x** space. The distance between the end of the longest destination legend and the right edge of the brown legend field is **1.5x**.

Legends on right directional modules are placed **1.5x** from the left edge of the brown legend field. The arrow is **1.5x** beyond the end of the destination legend and the interior alignment box with **1.5x** between the right edge of the legend and the interior alignment box of the arrow and the right side of the brown legend field.

Sign panels are surrounded by a white border. The top of the white border is **.333x**, and the sides and bottom are **.166x**.

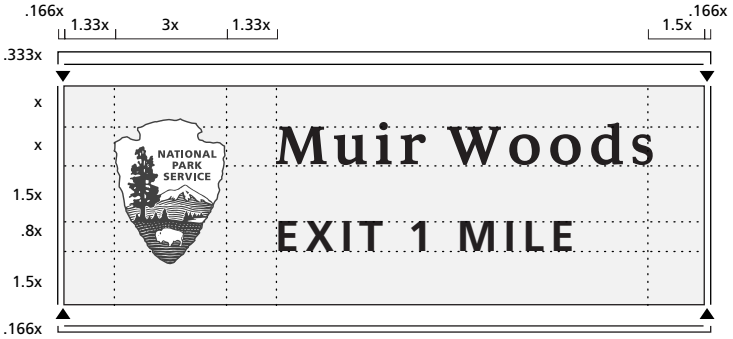


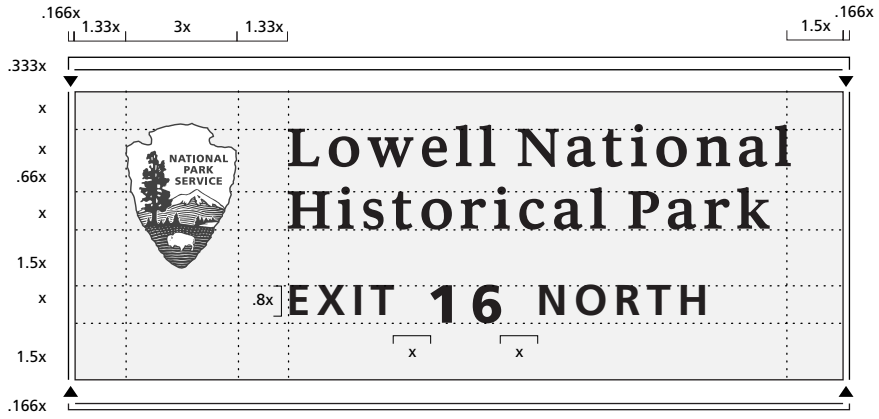


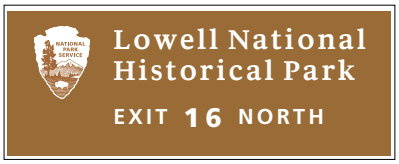
HG-2: Highway Guide with 1- to 3- line legend, Advance Guidance and NPS Arrowhead

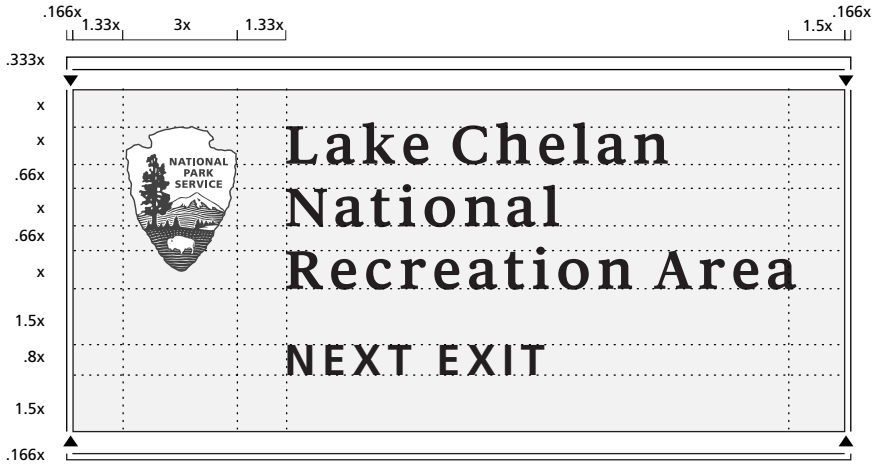
This format accommodates a single one-to three-line destination legend, advance guidance legend, and an NPS Arrowhead.

The legend is placed an **x** below the top edge of the brown legend field and is left justified **5.66x** from the left edge of the brown legend field. Multiple line legends have **.66x** interline space. The right side margin is **1.5x** beyond the longest legend line to the right side of the brown legend field. The advance guidance legend is **.8x**, Frutiger Bold typeface, displayed in all uppercase, is placed **1.5x** below the destination legend and aligned flush left. If route numbers are displayed, they are an **x** high Frutiger Black, and are aligned to the top of the advance guidance legend. A **1.5x** space is placed below the advance guide legend. The **3x** wide arrowhead is centered between left edge of the panel and left alignment of sign legend, and aligned to the top of the first legend line. Sign panels are surrounded by a white border. The top of the white border is **.333x** and the sides and bottom are **.166x**.









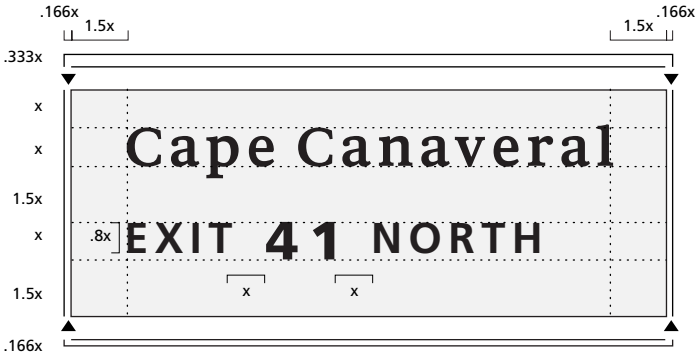
HG-3: Highway Guide with 1- to 3-Line Legend and Advance Guidance

This format accommodates a single one-to three-line destination legend, advance guide legend, with NPS Arrowhead. The legend is placed an **x** below the top edge of the brown legend field and is left justified **5.66x** from the left edge of the brown legend field. Multiple line legends have **.66x** interline space. The right side margin is **1.5x** beyond the longest legend line to the right side of the brown legend field.

The advance guidance legend is **.8x**, Frutiger Bold typeface, displayed in all uppercase, is placed **1.5x** below the destination legend and aligned flush left. If route numbers are displayed, they are an **x** high Frutiger Black, and are aligned to the top of the advance guide legend.

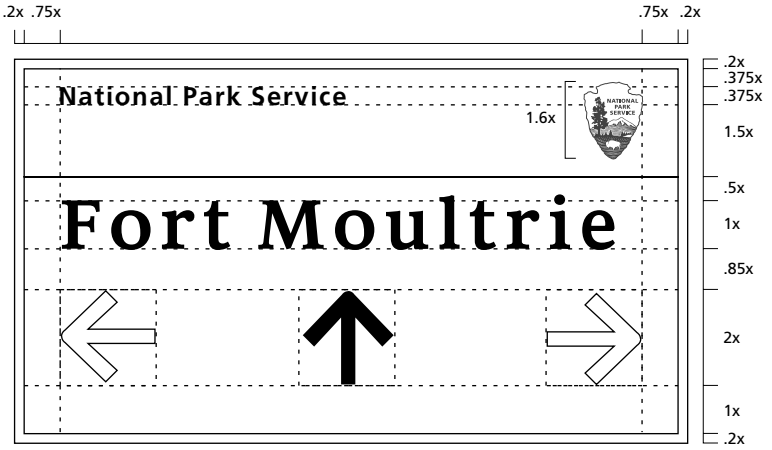
A **1.5x** space is placed below the advance guide legend.

Sign panels are surrounded by a white border. The top of the white border is **.333x** and the sides and bottom are **.166x**.

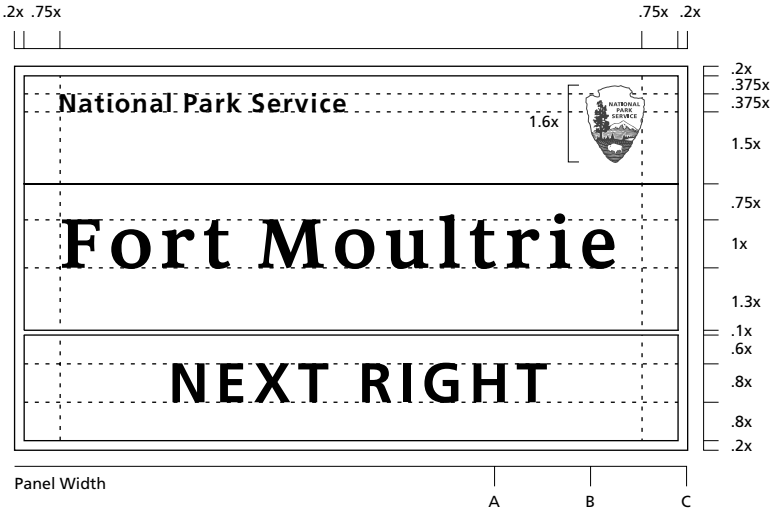


TB-1a & TB-1b: Trailblazer with 1-Line Primary Legend, Directional Arrow or Secondary Legend

Primary Legend:	NPS Rawlinson Roadway
Secondary guide legend:	Frutiger Bold, all capital, +100 Tracking
Overbar legend:	Frutiger Bold, +50 Tracking



TB-1a



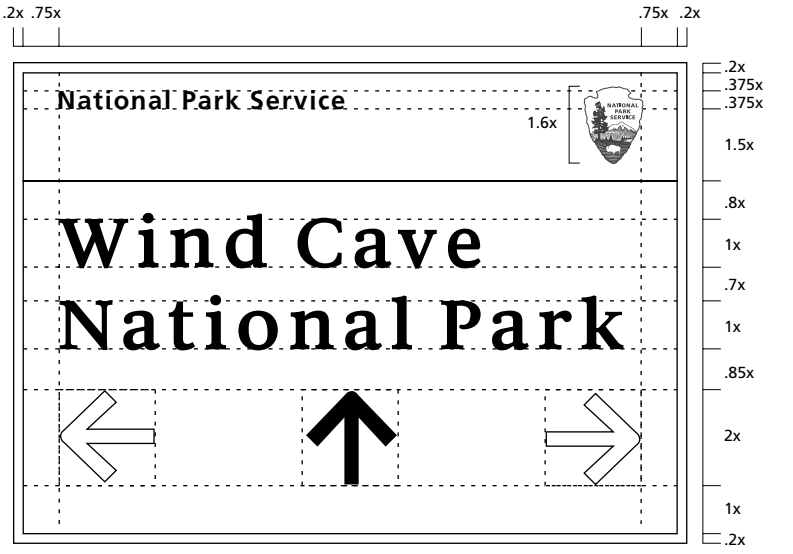
TB-1b

One Line Legend

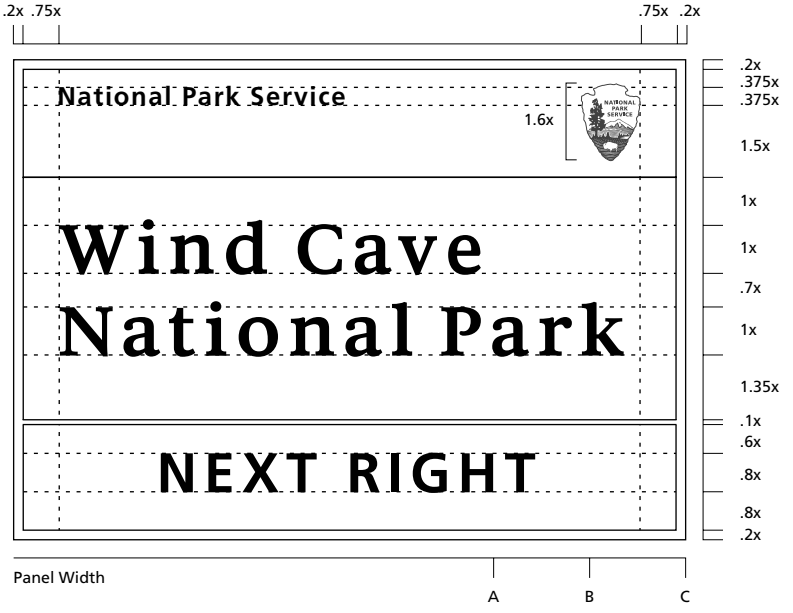
Legend Size	Panel Height	Panel Width A	B	C
2"	16"	20"	24"	28"
3"	24"	30"	36"	42"
4"	32"	40"	48"	56"

TB-2a & TB-2b: Trailblazer with 2-Line Primary Legend, Directional Arrow or Secondary Legend

Primary Legend: NPS Rawlinson Roadway
Secondary guide legend: Frutiger Bold, all capital, +100 Tracking
Overbar legend: Frutiger Bold, +50 Tracking



TB-2a



TB-2b

Two Line Legend

Legend Size	Panel Height	Panel Width A	B	C
2"	20"	20"	24"	28"
3"	30"	30"	36"	42"
4"	40"	40"	48"	56"

TB-3a & TB-3b: Trailblazer with 3-Line Primary Legend, Directional Arrow or Secondary Legend

Primary Legend:	NPS Rawlinson Roadway
Secondary guide legend:	Frutiger Bold, all capital, +100 Tracking
Overbar legend:	Frutiger Bold, +50 Tracking

TB-3a

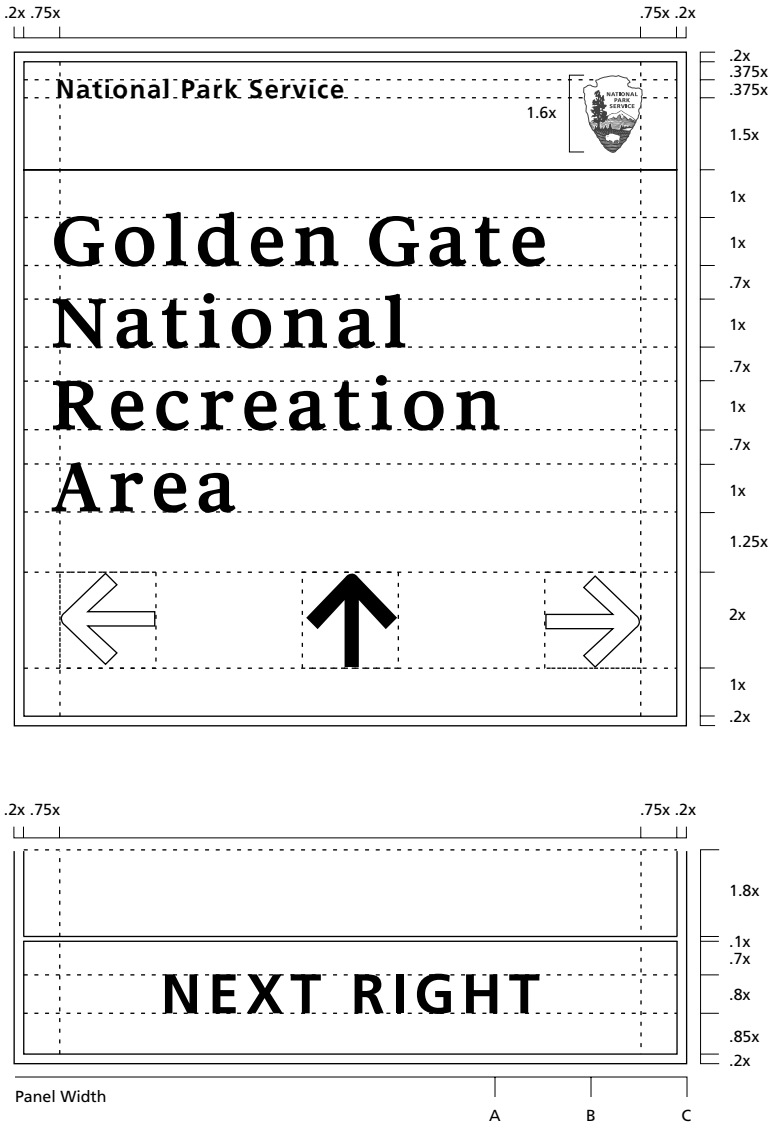
TB-3b

Three Line Legend

Legend Size	Panel Height	Panel Width A	B	C
2"	24"	20"	24"	28"
3"	36"	30"	36"	42"
4"	48"	40"	48"	56"

TB-4a & TB-4b: Trailblazer with 4-Line Primary Legend, Directional Arrow or Secondary Legend

Primary Legend: NPS Rawlinson Roadway
Secondary guide legend: Frutiger Bold, all capital, +100 Tracking
Overbar legend: Frutiger Bold, +50 Tracking



TB-4a

TB-4b

Four Line Legend

Legend Size	Panel Height	Panel Width A	B	C
2"	28"	20"	24"	28"
3"	42"	30"	36"	42"
4"	56"	40"	48"	56"

When arrows are not used, the optional secondary legend module gets inserted below the last line of the primary legend

PB-1a & PB-1b: Park Boundary Sign with 1-Line Primary Legend, Secondary Legend

Primary Legend: NPS Rawlinson Roadway
Secondary guide legend: Frutiger Bold, all capital, +100 Tracking
Overbar legend: Frutiger Bold, +50 Tracking

PB-1a

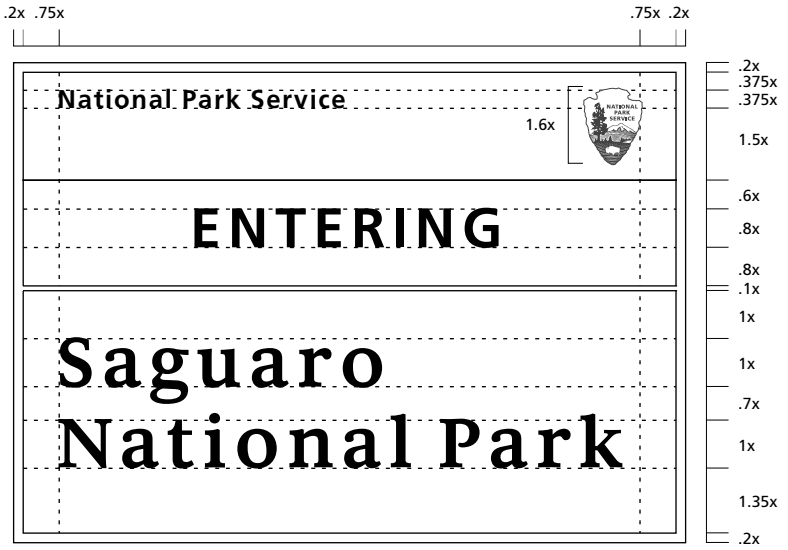
PB-1b

One Line Legend

Legend Size	Panel Height	Panel Width A	B	C
2"	16"	20"	24"	28"
3"	24"	30"	36"	42"
4"	32"	40"	48"	56"

PB-2a & PB-2b: Park Boundary Sign with 2-Line Primary Legend, Secondary Legend

Primary Legend: NPS Rawlinson Roadway
Secondary guide legend: Frutiger Bold, all capital, +100 Tracking
Overbar legend: Frutiger Bold, +50 Tracking



PB-2a

PB-2b

Two Line Legend

Legend Size	Panel Height	Panel Width A	B	C
2"	20"	20"	24"	28"
3"	30"	30"	36"	42"
4"	40"	40"	48"	56"

PB-3a & PB-3b: Park Boundary Sign with 3-Line Primary Legend, Secondary Legend

Primary Legend: NPS Rawlinson Roadway
Secondary guide legend: Frutiger Bold, all capital, +100 Tracking
Overbar legend: Frutiger Bold, +50 Tracking

PB-3a

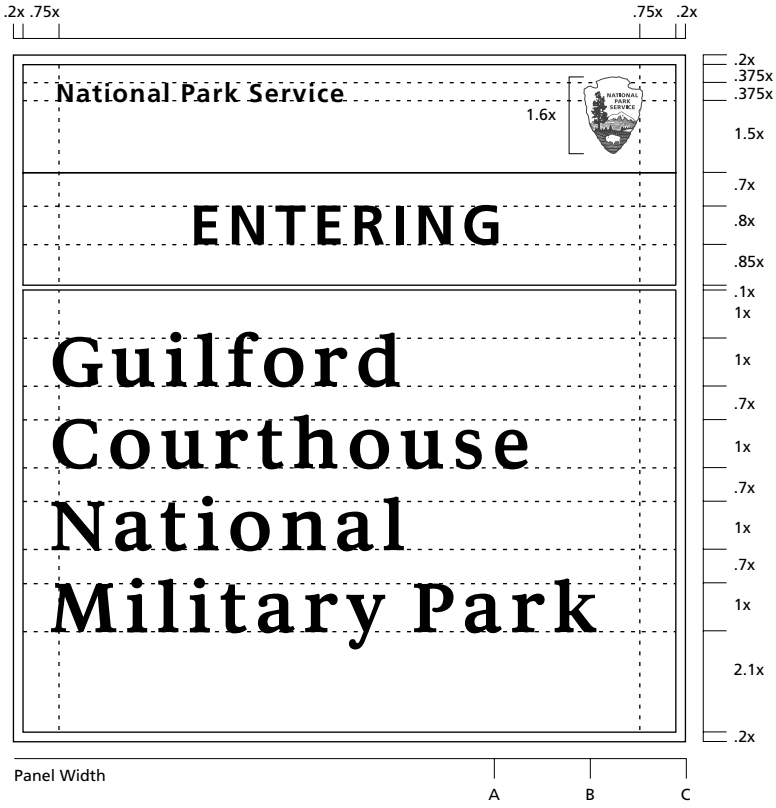
PB-3b

Three Line Legend

Legend Size	Panel Height	Panel Width A	B	C
2"	24"	20"	24"	28"
3"	36"	30"	36"	42"
4"	48"	40"	48"	56"

PB-4a & PB-4b: Park Boundary Sign with 4-Line Primary Legend, Secondary Legend

Primary Legend: NPS Rawlinson Roadway
Secondary guide legend: Frutiger Bold, all capital, +100 Tracking
Overbar legend: Frutiger Bold, +50 Tracking



PB-4a

PB-4b

Four Line Legend

Legend Size	Panel Height	Panel Width A	B	C
2"	28"	20"	24"	28"
3"	42"	30"	36"	42"
4"	56"	40"	48"	56"

Chapter 3

UniGuide Planning, Design & Documentation

Section 3.1

Final Draft: *June 1, 2002*

3.1 Table of Contents

Introduction

A primary goal of the UniGuide standards has been to develop a systems approach to signing throughout the National Park system. The basic design concept attempts to combine the functional and esthetic requirements of visual communications and wayfinding in parks to improve visitor experiences and park management of visual communications.

These guidelines describe the process for planning a sign installation for a park. This process includes a field survey and inventory of existing conditions, design, and documentation using a database management system.

Within the UniGuide system, each type of sign or component part has been developed to accommodate a specific type of communication function or functions to be used consistently in the park and, in many cases, in other parks.

With this systems approach, all planning, procurement, implementation, maintenance, and functional changes can be accomplished efficiently, because each repair, replacement, upgrade, addition, or new installation will not require a site specific design and ideally will be ordered from a single source that is familiar with the UniGuide design standards and specifications.

System Components

This UniGuide Program consists of three basic categories of signs:

1) Identification—signs to identify parks and facilities. Identification signs are formal, architectural installations used to frame and celebrate the entry to a national park or facility within a park. Several options for sign structure are available. Ideally, they should be implemented with site improvements to create an image equal in stature to the resource.

2) Motorist Guidance—signs used to direct motorists to specific areas or locations. Regulatory and warning traffic signs augment these functional wayfinding tools and follow standard MUTCD guidelines.

3) Visitor Information System (VIS)—small signs with general information for park visitors. This posting system includes information about rules, regulations, instructions, maps, trail guidance, safety precautions, and resource management issues. Also included are guide and information signs for viewing from a car on low speed routes such as those in a campground or parking facility. Most of these signs will serve as communication tools used to guide, warn, and inform visitors on how to use the park in ways to enhance their experience while maintaining the integrity of the resource. The Visitor Information System includes common formats, sizes, and structures that accommodate various needs

of different management groups in the park. Messages can be placed individually or grouped in a small multi-panel assembly. The editorial approach is to provide visitors with essential details in an engaging and easy-to-understand manner. Guidelines on developing texts are provided in this chapter.

VIS signs are placed at sites, such as viewpoints or entrances, where visitors can use the information immediately. They also can be grouped at sites, such as campground comfort stations and shuttle stops, where visitors frequent and customarily have time to read and digest information. These postings might include such general issues related to resource management, personal protection, food storage around bears, dehydration in desert environments, fragile landscapes, and feeding of wild animals.

Plan–Based System

All sign implementations should be based on a comprehensive plan for a finite area like a campground, a series of trailheads, or for an entire park. A park sign plan can be built incrementally, but it should be developed for consistency of communications.

A sign plan will allow a program manager to phase implementations as needed based on priorities. This could include ordering signs of a common type at the same time to reduce costs. Without a plan, there is less of a chance that installation will be visually or editorially consistent or comprehensive and less of a chance that signs will be checked periodically and replaced if needed.

Although many UniGuide plans will include direct replacements of existing signs, the plan should be thought of as a comprehensive information program for park visitors.

To that end it is recommended that the sign plan be developed with two complementary approaches:

- The first is to specify the signs for a park or an area based on function. This includes all Identification Signs, all Motorist Guidance Signs, all trail guide signs, etc. They should be developed on a site plan as layers based on the hierarchy of signs provided in the UniGuide system.
- The second is to identify the primary issues to be communicated, such as safety, protection, resource management, instructions, regulations, and orientation maps.

These issues can be planned as individual panels for specific locations. For example, orientation assemblies may be placed near comfort stations in campgrounds, at trailheads, in picnic areas, and other locations where visitors congregate. Safety signs may be placed adjacent to a riverbank, resource management panels placed on a trail adjacent to a fragile area, and registration instructions placed at the entrance to a campground. In many instances, more than one panel may be used in a single installation.

Aesthetically, primary Identification Signs must meld with the land and affirm the traditional image of the National Park Service with well-crafted, well-maintained installations. Secondary Visitor Information System and Motorist Guidance Signs should be functional and consistent. They must be large enough for ease of recognition and readability but lay lightly on the land without calling undue attention. These functional tools help create a visual language throughout the National Park Service and reflects the agency's commitment to communicate clearly and consistently with the public.

When combined, these two approaches will be integrated into a comprehensive plan.

UniGuide Planning: Resources and Process

This section makes reference to various planning documents that are identified below and referenced throughout this chapter:

- *Sign Inventory Worksheet:* A form used to record location, size and attributes of existing signs in field survey.
- *Site Plan:* A map or survey drawing showing location of roads, trails, structures to which sign locations are documented in both the initial survey process and subsequently plotted in the final sign plan. The sign locations for the final plan may be digitally linked to each respective *Sign Plan Record* by unique sign number.
- *Sign Plan Record:* A computer generated sheet prepared for each individual sign with complete description of the installation including: assembly overview, panel description for single or multiple panel installations, mounting and installation specifications, and assembly parts list. Production artwork for panel or panels is digitally attached to the *Sign Plan Record*. This digital package is the basis for each sign order and becomes part of the overall park *Sign Plan*.
- *Sign Schedule:* This is a "spread sheet" type report that lists all signs in a plan by park, park area, sign type, or installation status for ease of reference and for maintenance surveys.
- *Sign Plan:* This includes the overall plan and is made up of the *Sign Plan Record,* production artwork, *Sign Schedule, and Site Plan.*

To implement the sign system on an existing site requires a working familiarity with the, UniGuide Program, the site to be signed, and the way facilities are used by the public.

Although the system is expansive, it is not as difficult to use as it appears because most of the solutions focus on common signing requirements. For specific communications problems, examples from other parks can be adapted for local use.

This section includes information on:

- Sign Specification Code for identifying all attributes in sign documentation
- UniGuide Program planning and management software
- Guidance on acquiring and using maps, site plans, GIS data

- A uniform method for preparation of artwork for sign production
- Guidelines for Sign Use by Sign Type
- Various options for Identification Sign structures
- Sign Size (viewing distance tables) for Motorist Guidance Signs
- Text Writing Guidelines for Visitor Information System
- Guidelines for Use of Illustration
- Guidelines on use of Mapping for Wayfinding and Orientation
- Schematic Concepts for Site Improvements

The stages, tasks, and reference tools involved in this process are summarized in the UniGuide Planning Flowchart and Checklist.

Sign Planning with Field Work and Software Tools

The process described in this section assumes that the all possible operations will be completed using UniGuide Manager software program. Executing these functions manually will increase the time required for design and documentation by as much as 80 percent.

The sign plan is a record identifying each sign by type and legend, a graphic layout of the sign, along with a site plan showing its location. Based on reports generated by the UniGuide Manager software program, the sign plan also provides the framework for budget preparation and sign procurement as well as the documentation to be used for new installations, replacements, removals, and maintenance.

Manual tasks: The initial part of a the sign planning process is based on fieldwork. This includes:

- Field review and recording of existing conditions
- Discussions with fellow park staff on specific communication requirements
- Writing of legends for information panels based on existing case examples or site specific content developed by the park
- Writing the content for each road and pedestrian guide signs
- Hand-plotting or sketching the general location of each installation by sign type on site plan drawings and assigning a number to each

Computer-based operations: Once the plan has been sketched–out based on field review and analysis, the final design and documentation will be prepared as these of computerized tasks.

- Prepare a Sign Plan Sheet for each proposed sign installation using the prompts and pull-down menus
- Prepare artwork for standard signs using digital templates and inserting them into the Sign Plan Sheet

(continued, next page)

	Stage	Task	Reference Tools	Check
1	**Existing Condition Survey**	Inventory of existing conditions	Sign Inventory Worksheet	☐
		Plot location of signs	Site plan	
2	**Evaluation & Analysis**	Review overall requirements by sign type with park staff	Evaluation questions in planning guide	☐
		Record special requirements by sign type and location	Sign Inventory Worksheet	
3a.	**Planning for Identification and Wayfinding**	Prepare sign plan • *Identification* • *Trailblazer* • *Trail Guide* • *Area Entry* • *Traffic Regulatory* • *Parking Control* • *Road Guide* • *Boundary* • *Campsite ID* • *Small Guide* • *Entrance Fees*	Sign code Sign Schedule worksheet Site Plan drawings Sign use by sign type	☐
		Prepare panel layout and site location detail	Grid templates	
3b.	**Planning for Visitor Information**	List small panel postings by type and placement location • *Information* • *Resource* • *Messaging* • *Protection* • *Instruction* • *Mgmt. Maps* • *Regulations* • *Safety*	Catalog of existing panels Text writing guide Illustration / diagram use guide Artwork guide Map use guide	
		Identify requierments of nonstandard panels		
		Consult writer, designer cartographer, illustrator to complete		
4	**Site Improvements**	Identify site related issues for wayfinding	Park design standards for roads, paths, edges, campsites, etc.	☐
5	**Cost Estimate and Implementation Plan**	Estimate sign cost to implement	UniGuide Manager data base UniGuide Manager Sign Schedule	☐
		Estimate related constuction costs		
6	**Construction Package**	Sign Schedule Sign Plan Sign Plan Record Digital image files	UniGuide Manager software	☐
7	**Purchase**	Order signs & coordinate delivery	Procurment contracts UniGuide Manager software	☐
		Inspect delivery		
8	**Installation**	Stake site	Sign site plan Guidelines: assembly/installation	☐
		Assemble and install signs		

- Work with graphic designer, illustrator, cartographer, and writer to refine and complete Visitor Information System panels
- Plot and number each installation
- Print out Sign Schedule report from Sign Plan Sheet data
- Generate cost plan from cost data base
- Develop implementation plans based on available funding
- Package reflective artwork and digital files for production

Project Coordination: Sign planning and project management should be coordinated by the designated Park UniGuide Manager. Panels may be designed in-house or prepared in conjunction with the National UniGuide Manager in Harpers Ferry.

Compliance with the System: The format and design standards for each type of sign must be maintained. Although every effort has been made to standardize sign legends, individual sign conditions vary. Questions concerning compliance or unique conditions should be referred to the Regional UniGuide Manager or the National UniGuide Manager in Harpers Ferry.

The following sections describe the procedures for:

- Inventory of Existing Conditions
- Survey Process
- Evaluation of Existing Conditions
- Plan Development
- Preparation of Project Sign Plan
- Plan Documentation
- Plotting Sign Location Plan
- Preparation of Implementation Plan

These procedures are followed by samples of the Sign Inventory Worksheet, Sign Plan Record, and the sign location plan at three stages of the process as described in the following part of this chapter.

Inventory of Existing Conditions

The development of a park sign plan begins with a survey of existing conditions and evaluation of requirements. The following guidelines provide a step-by-step review of that process.

In the development of a UniGuide Plan, it is recommended that two people work together to prepare a full inventory of existing park signs. This is not as daunting a task as it may first appear, and the materials produced will make the development of the new sign plan significantly easier. Although this process could be done electronically, filling in survey forms on a laptop computer and recording the signs with a digital camera, it is generally more efficient to work manually. And, the resulting Sign Inventory Worksheets with photos attached are easily manipulated in this format. Note that this survey is an interim planning vehicle, whereas the final UniGuide Plan will be in digital format.

The materials used for this field work are:

1) *Sign Inventory Worksheets*
2) *Site Plan Drawings:* Collect site plans and maps of the areas to be surveyed prior to conducting fieldwork.

- In a developed area of the park, ideally a site plan will be available at 1"=100' scale to 1"=200' scale. Many parks do not have good base data, and it will require some creativity to gather appropriate maps and site plans for recording the location of existing and proposed signs. An alternate source is the planning department of the county or state which may have digital map data that includes the park. These should be acquired from the local jurisdiction in digital form so they can be used in plotting the final sign plan. The formats may vary, but most data can be translated into a DXF file (AutoCad) for creation of a park UniGuide plan.
- If maps are not available, it is recommended that surveyors prepare simple diagrams or scaled maps of individual areas for the inventory. Although crude, these site drawings can be effectively used to plot existing conditions and the resulting UniGuide Plan. These drawings can be prepared by roughly measuring an area with a pedometer to plot the shape of the primary area and parking areas, comfort stations, trailheads, viewing areas, and other park features. Once drawn, these simple maps can be scanned, scaled and plotted for use in the development of the UniGuide Plan. Note that these plans are used to indicate general location only. Final location will be staked prior to installation.
- For road data outside developed areas of a park, one option is to use USGS quadrangle maps. These are provided at (1"=24,000" or 1"=2,000'). They can be used for the initial survey to identify guide sign locations along park highways and isolated trailheads along roads. In locations where positioning landmarks are not easily identified, use a global positioning device (GPS) to help locate a sign.

3) *35 mm Camera with Color Print Film:* An automatic type point-and-shoot camera with zoom lens is ideal. It is more efficient to use snapshots than digital photography when

compiling the inventory.

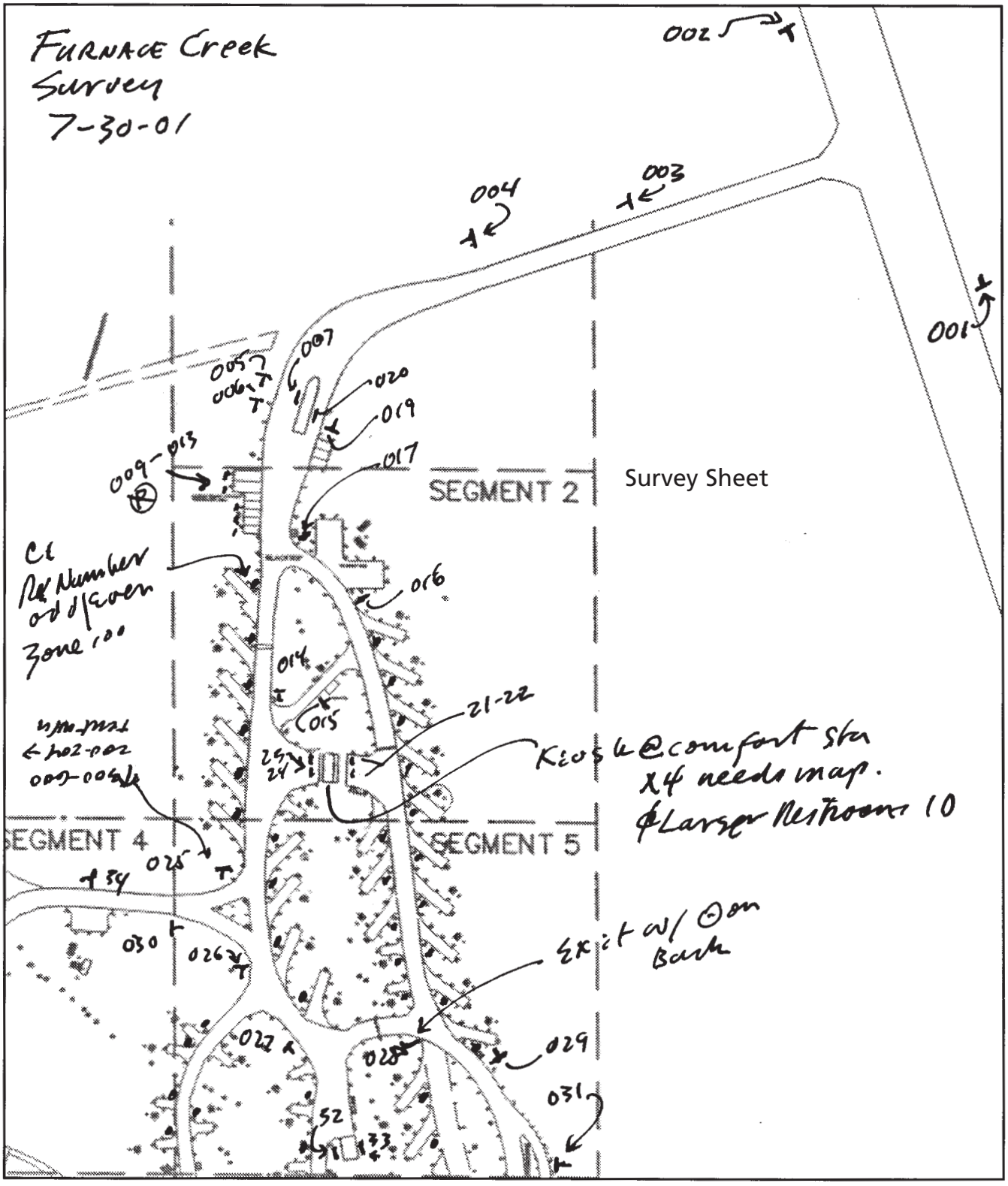
4) *Measuring:* 12' heavy duty tape measure, 50' cloth tape measure, and field pedometer:
5) *Masking Tape:* (1")
6) *Marking Pen:* Broad tipped black
7) *Bond Paper:* Divided into sixths, approximate sheet size: 4-1/4" x 3-1/2" for hand prepared number to be taped to sign for survey reference number
8) *Clipboard:* A plastic clipboard with a base that also serves as a storage box is very handy to hold all of the above materials
9) *Backpack and Belly Bag:* For tape measure, maps and film
10) *Identification Sign Banners:* Cloth banners available from Harpers Ferry Center to determine sizes of Park Identification Signs (optional)

Survey Process

The inventory is most efficient as a two-person process. One person numbers the signs and takes measurements, and the second person photographs the sign and writes down the information on the *Sign Inventory Worksheet*. In the process, both team members will make comments for the record.

a) *Label Film:* Label each roll of film with a consecutive number
b) *Identify Survey Areas:* Plan the survey process in a systematic way so that there will be continuity in ordering of the survey files. Survey in defined areas, or "neighborhoods" and label the area on the *Sign Inventory Worksheets*, on the location map and on a slip of paper that is taped to the face of the sign and photographed. Number the sign to include the number of the roll of film and the consecutive number for the sign in that area (7-21, 7-22, 7-23, etc.). Also place the roll and frame number on the survey sheet.
c) *Plot Sign Location:* Identify the location of the sign on the site plan or map using a symbol "T" for a single face sign and "H" for double face sign, with top of "T" or side of the "H" to represent the face of the sign. Number each location on the map.
d) *Sign Inventory Worksheet:* On this form, enter the survey number, film roll number and frame(s) for each sign surveyed. Enter all relevant data including legend, legend size, and sign size. Note any mounting constraints such as erosion, bedrock, or tree root systems that may affect a new installation. Describe or sketch the general site location issues noting setback from edge of road, grade changes, or distance from a orientation point. Where possible, describe any recommendations that will improve the legend, change the location, or suggest removal of the sign. Based on familiarity with the UniGuide Program, note options or recommendations that may be helpful while completing the existing conditions survey.
e) *Photo Record:* Photograph the sign with the numerical identifier taped to the sign for reference. If the sign is text heavy, make one photo of the sign in context and one of the sign panel with camera close enough to read the message. Also record all information in bulletin cases that address specific resource management issues because these may be incorporated into permanent signing in the plan. A photo record should be made of

Sign Location Survey: Example of sign location survey developed in conjunction with individual *Sign Inventory Worksheets*



Sign Inventory Worksheet

Sign Location Number 001-FC

Legend 6"

Asmbly Size 6'x2'

No. Panels 1

HAGL 7'

Assembly Type
- ○ A ○ E ○ H
- ○ B ○ F ○ I
- ○ C ○ G ○ J
- ○ D

Mounting Type
- ○ Direct Embedment
- ○ Base Plate
- ○ Wall Mount
- ○ Flag Mount
- ○ Monolith
- ○ Narrow Profile
- ○ Small Panel

Sign Type
- ○ Park Identification
- ○ Facility Identification
- ✕ Road Guide
- ○ Traffic Regulatory
- ○ Parking Control (Y) (N)
- ○ Area Entry
- ○ Small Guide
- ○ Trail Guide
- ○ Miscellaneous Posting
- ○ Street Name
- ○ Information Display
- ○ Fingerboard
- ○ Street Name
- ○ Map

Sign Type
- ○ Resource Management
- ○ Information
- ○ Instruction
- ○ NPS Messageing
- ○ Rules & Regulations
- ○ Symbol Based Regulation
- ○ Protection
- ○ Safety Warning
- ○ Safety Danger
- ○ Schedules

Sign Panel
- ○ TD-Trashbag Dispenser
- ○ FD-Folder Dispenser
- ○ BC-Bulletin Case
- ○ O-Other _____

Film Roll 7

Pictures 18 to 19

Front

Back

Notes: Replace with double post
Include Full Name of facility

Sign Inventory Worksheet

Sign Location Number 003-FC

Legend 5"

Asmbly Size 8'x2'

No. Panels

HAGL 6'

Assembly Type
- ○ A ○ E ○ H
- ○ B ○ F ○ I
- ○ C ○ G ○ J
- ○ D

Mounting Type
- ○ Direct Embedment
- ○ Base Plate
- ○ Wall Mount
- ○ Flag Mount
- ○ Monolith
- ○ Narrow Profile
- ○ Small Panel

Sign Type
- ○ Park Identification
- ○ Facility Identification
- ○ Road Guide
- ○ Traffic Regulatory
- ○ Parking Control (Y) (N)
- ○ Area Entry
- ○ Small Guide
- ○ Trail Guide
- ○ Miscellaneous Posting
- ○ Street Name
- ○ Information Display
- ○ Fingerboard
- ○ Street Name
- ○ Map

Sign Type
- ○ Resource Management
- ○ Information
- ○ Instruction
- ○ NPS Messageing
- ○ Rules & Regulations
- ○ Symbol Based Regulation
- ○ Protection
- ○ Safety Warning
- ○ Safety Danger
- ○ Schedules

Sign Panel
- ○ TD-Trashbag Dispenser
- ○ FD-Folder Dispenser
- ○ BC-Bulletin Case
- ○ O-Other

Film Roll 7

Pictures 21 to

Front

Back

Notes: Primary Campground Identification

Replace w/ formal monolith 6" legend

Place Symbols on Entering Road Guide Sign

Sign Inventory Worksheet

Sign Location Number 004-FC

Legend AE type

Asmbly Size 8' x 2'

No. Panels 1

HAGL 6'1/2'

Assembly Type
- ○ A ○ E ○ H
- ○ B ○ F ○ I
- ○ C ○ G ○ J
- ○ D

Mounting Type
- ○ Direct Embedment
- ○ Base Plate
- ○ Wall Mount
- ○ Flag Mount
- ○ Monolith
- ○ Narrow Profile
- ○ Small Panel

Sign Type
- ○ Park Identification
- ○ Facility Identification
- ○ Road Guide
- ○ Traffic Regulatory
- ○ Parking Control (Y) (N)
- ⊗ Area Entry
- ○ Small Guide
- ○ Trail Guide
- ○ Miscellaneous Posting
- ○ Street Name
- ○ Information Display
- ○ Fingerboard
- ○ Street Name
- ○ Map

Sign Type
- ○ Resource Management
- ○ Information
- ○ Instruction
- ○ NPS Messageing
- ○ Rules & Regulations
- ○ Symbol Based Regulation
- ○ Protection
- ○ Safety Warning
- ○ Safety Danger
- ○ Schedules

Sign Panel
- ○ TD-Trashbag Dispenser
- ○ FD-Folder Dispenser
- ○ BC-Bulletin Case
- ○ O-Other _____

Film Roll 7

Pictures 22 to _____

Front

Back

Notes: Replace with 30R30 Area Entry w/4 panels

1 ⊗ wood gathering — Place Closer
2 Generator Hours — to Fee Station
3 ☐ Pets on Leash — w/ 20 cm Hagl
4 30 Day Max

Sign Inventory Worksheet

Sign Location Number 024-FC

Legend 1 1/4"

Asmbly Size 15" sq

No. Panels 1

HAGL 54"

Assembly Type
- ○ A
- ○ B
- ○ C
- ○ D
- ○ E
- ○ F
- ○ G
- ○ H
- ○ I
- ○ J

Mounting Type
- ○ Direct Embedment
- ○ Base Plate
- ○ Wall Mount
- ○ Flag Mount
- ○ Monolith
- ○ Narrow Profile
- ○ Small Panel

Sign Type
- ○ Park Identification
- ○ Facility Identification
- ○ Road Guide
- ○ Traffic Regulatory
- ○ Parking Control (Y) (N)
- ○ Area Entry
- ○ Small Guide
- ○ Trail Guide
- ○ Miscellaneous Posting
- ○ Street Name
- ○ Information Display
- ○ Fingerboard
- ○ Street Name
- ○ Map

Sign Type
- ○ Resource Management
- ○ Information
- ○ Instruction
- ○ NPS Messageing
- ○ Rules & Regulations
- ○ Symbol Based Regulation
- ○ Protection
- ○ Safety Warning
- ○ Safety Danger
- ○ Schedules

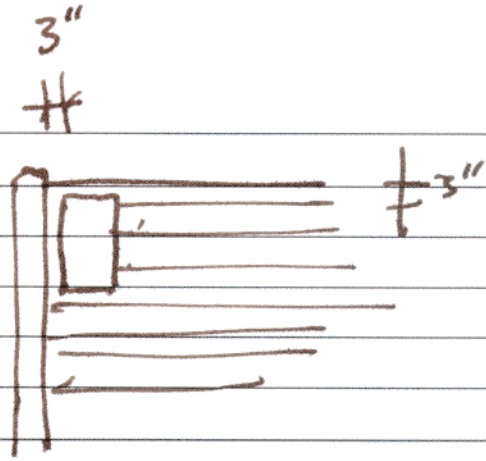
Sign Panel
- ○ TD-Trashbag Dispenser
- ○ FD-Folder Dispenser
- ○ BC-Bulletin Case
- ○ O-Other _____

Film Roll 8

Pictures 23 to _____

Front

Back



Notes: Place 30 cm x 60 Sign to Frame Women w/ &

Sign Inventory Worksheet

Sign Location Number 031-FC

Legend Varies

Asmbly Size 18'x36

No. Panels 1

HAGL 90 cm

Assembly Type
- ○ A ○ E ○ H
- ○ B ○ F ○ I
- ○ C ○ G ○ J
- ○ D

Mounting Type
- ○ Direct Embedment
- ○ Base Plate
- ○ Wall Mount
- ○ Flag Mount
- ○ Monolith
- ○ Narrow Profile
- ○ Small Panel

Sign Type
- ○ Park Identification
- ○ Facility Identification
- ○ Road Guide
- ○ Traffic Regulatory
- ○ Parking Control (Y) (N)
- ○ Area Entry
- ○ Small Guide
- ○ Trail Guide
- ○ Miscellaneous Posting
- ○ Street Name
- ○ Information Display
- ○ Fingerboard
- ○ Street Name
- ○ Map

Sign Type
- ○ Resource Management
- ○ Information
- ○ Instruction
- ○ NPS Messageing
- ○ Rules & Regulations
- ○ Symbol Based Regulation
- ○ Protection
- ○ Safety Warning
- ○ Safety Danger
- ○ Schedules

Sign Panel
- ○ TD-Trashbag Dispenser
- ○ FD-Folder Dispenser
- ○ BC-Bulletin Case
- ○ O-Other _____

Film Roll 8

Pictures 31 to 32

Front

Back

Notes:

Replace with Standard panel Double Post.

Align to Entering Motorhomes.

Use 60 cm x 60 cm Version w/ 90 cm HAGL

Sign Inventory Worksheet

Sign Location Number 032FC

Film Roll 8

Pictures 33 to _____

Legend _____

Asmbly Size Cabinet

No. Panels _____

HAGL _____

Assembly Type
- ○ A ○ E ○ H
- ○ B ○ F ○ I
- ○ C ○ G ○ J
- ○ D

Mounting Type
- ○ Direct Embedment
- ○ Base Plate
- ○ Wall Mount
- ○ Flag Mount
- ○ Monolith
- ○ Narrow Profile
- ○ Small Panel

Sign Type
- ○ Park Identification
- ○ Facility Identification
- ○ Road Guide
- ○ Traffic Regulatory
- ○ Parking Control (Y) (N)
- ○ Area Entry
- ○ Small Guide
- ○ Trail Guide
- ○ Miscellaneous Posting
- ○ Street Name
- ○ Information Display
- ○ Fingerboard
- ○ Street Name
- ○ Map

8½ x 11 Sheet

Sign Type
- ☒ Resource Management
- ○ Information
- ○ Instruction
- ○ NPS Messageing
- ○ Rules & Regulations
- ○ Symbol Based Regulation
- ☒ Protection
- ○ Safety Warning
- ○ Safety Danger
- ○ Schedules

Sign Panel
- ○ TD-Trashbag Dispenser
- ○ FD-Folder Dispenser
- ○ BC-Bulletin Case
- ○ O-Other _____

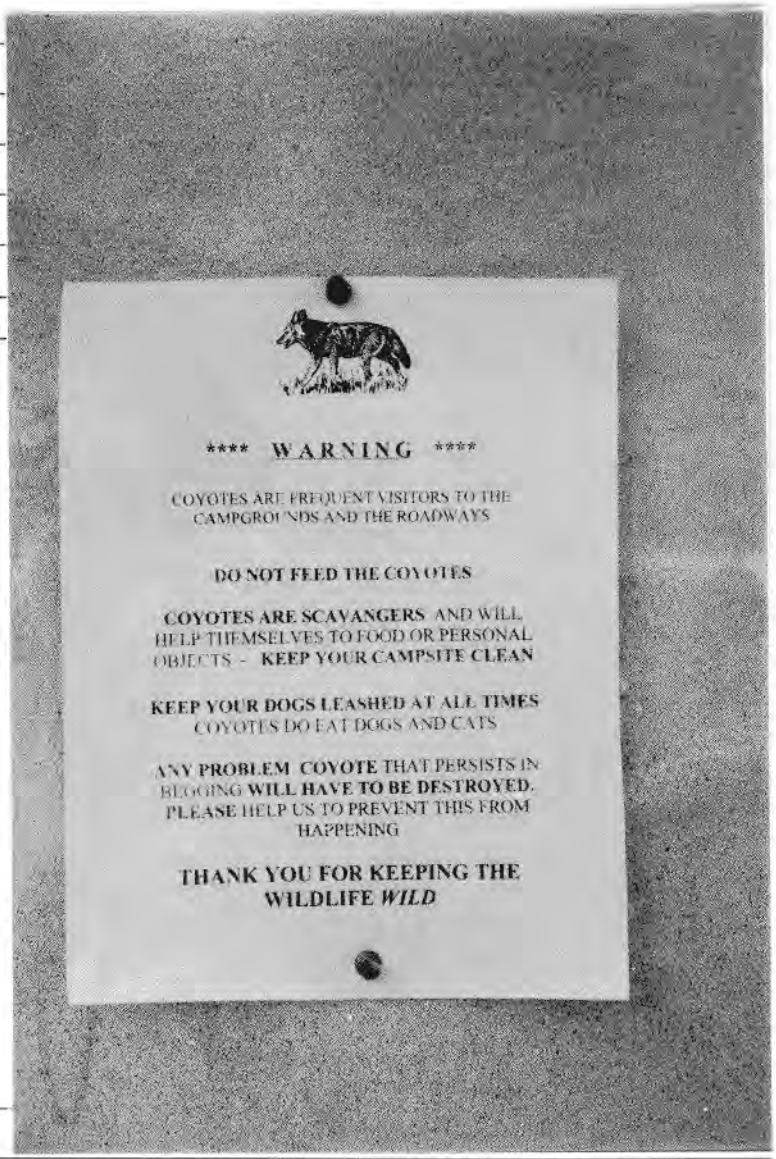
Front

Back

Notes: Coyotes Warning in Bulletin Case,

Hold for panel Review.

Review w/ Rangers and Campground manager



each sign except truly repetitive installations such as campsite identification number signs or parking control signs which need not be photographed individually; one visual reference is adequate. Each sign location, however, should be noted on the site plan and in the *Sign Inventory Worksheet*.

f) *Documentation:* Record all sign legends (text) for instructions, rules, and procedures even though the size, placement location, and format may be different in the new plan.

g) *Organize Survey Data:* Process film and tape each photo to the appropriate *Sign Inventory Worksheet* and file the worksheets for each area in clearly marked folders.

Evaluation of Existing Condition Survey

Once the existing conditions survey is complete, analyze the Sign Inventory Worksheets to determine what signs are needed to improve wayfinding while minimizing visual intrusions on the naturalness of the park. Be familiar with the Design Standards (Chapter 2) and the guides included in this chapter as you analyze sign requirements. It is helpful to review each sheet and identify how that particular solution can be improved and where the solution can be applied parkwide.

The following is a list of planning questions that may be helpful when analyzing sign requirements for a location:

a) Are there any signs that are no longer necessary or appropriate?
b) Are all signs properly scaled and sited?
c) What new information needs to be communicated?
d) What could be noted more effectively (smaller, reworded, fewer words, illustrated, etc.)?
e) What physical site-related changes would enhance the subsequent effectiveness of a new sign installation and wayfinding in general?
f) How would a change in a policy or procedure make the proposed signs more effective?
g) How can various types of postings be effectively integrated to enhance the collective quality of information posting and create a less cluttered and more ordered environment?

Also, use the following definition of wayfinding as a guide in making recommendations for sign and site improvements.

The elements of wayfinding are a series of visual, editorial, and environmental cues to help visitors navigate and experience this national park without confusion and conflict; the cues must enhance their enjoyment and understanding of the place without damaging the park's rich natural and cultural resources.

Based on this evaluation, identify new signs required, replacement signs needed, and signs that can be removed. In the process, identify site improvements that would make signing

more effective. Note that an existing sign function may be treated in a different location or way, a replacement sign may not have the same legend as the existing sign, or several current signs may be consolidated into a single assembly. Sketch the layout or draft text of the sign based on the grid formats provided in Chapter 2. The overall goal is to develop the plan with fewer signs, signs of smaller scale, and information presented at the location where it will be of the greatest benefit to the visitor. Equally, the overall program is most effective if there is systemwide consistency and a common NPS voice regardless of the type or source of the communications. A well-planned program will accommodate the posting requirements for safety, resource management, regulations and protection.

Once the evaluation is complete, prepare a general list of proposed program requirements and then set the plan aside for reference.

Plan Development

It is strongly recommended that the new sign plan be developed immediately after the survey is completed when you have a fresh understanding of the areas involved.

As you begin the plan, put yourself in position of your first visit to the park. Nothing is familiar and you do not know what is around the next corner. Every decision point on the road, every trail intersection, every detail about the fragile landscape or instruction in a campground must be anticipated and given to first-time visitors at locations linked to their immediate experiences. It is like teaching a child how to do something new. With proper signage, visitors will have a more fulfilling experience, resources will be subjected to less impact, and the park staff will spend less time policing and directing visitors.

Set the Survey Aside: Begin the plan with a clean slate even if the park is not planning a wholesale replacement of existing signs. The development of a comprehensive plan will help set priorities for information planning. A new plan should not attempt to replicate the existing signs with new signs, but should clearly provide properly scaled identification, guidance, and visitor information at locations where it will be most effective. To that end, use of the existing condition survey should only be for general reference. Many of the signs in a park were placed to solve a specific problem but were not planned relative to the whole park. Many of the others will be different if planned in a comprehensive manner.

Besides being a reference in the planning process, the existing condition survey has two additional functions. The first is to identify what signs will need to be removed as the new system is implemented. The second is to be a check-and-balance. When the new plan is complete, the existing condition survey should be reviewed to determine if anything has been forgotten.

Before beginning a plan, become familiar with the UniGuide Standards and the hierarchy of

signing. If you have questions, meet with your Regional UniGuide Coordinator for she can advise on effective ways to use the system.

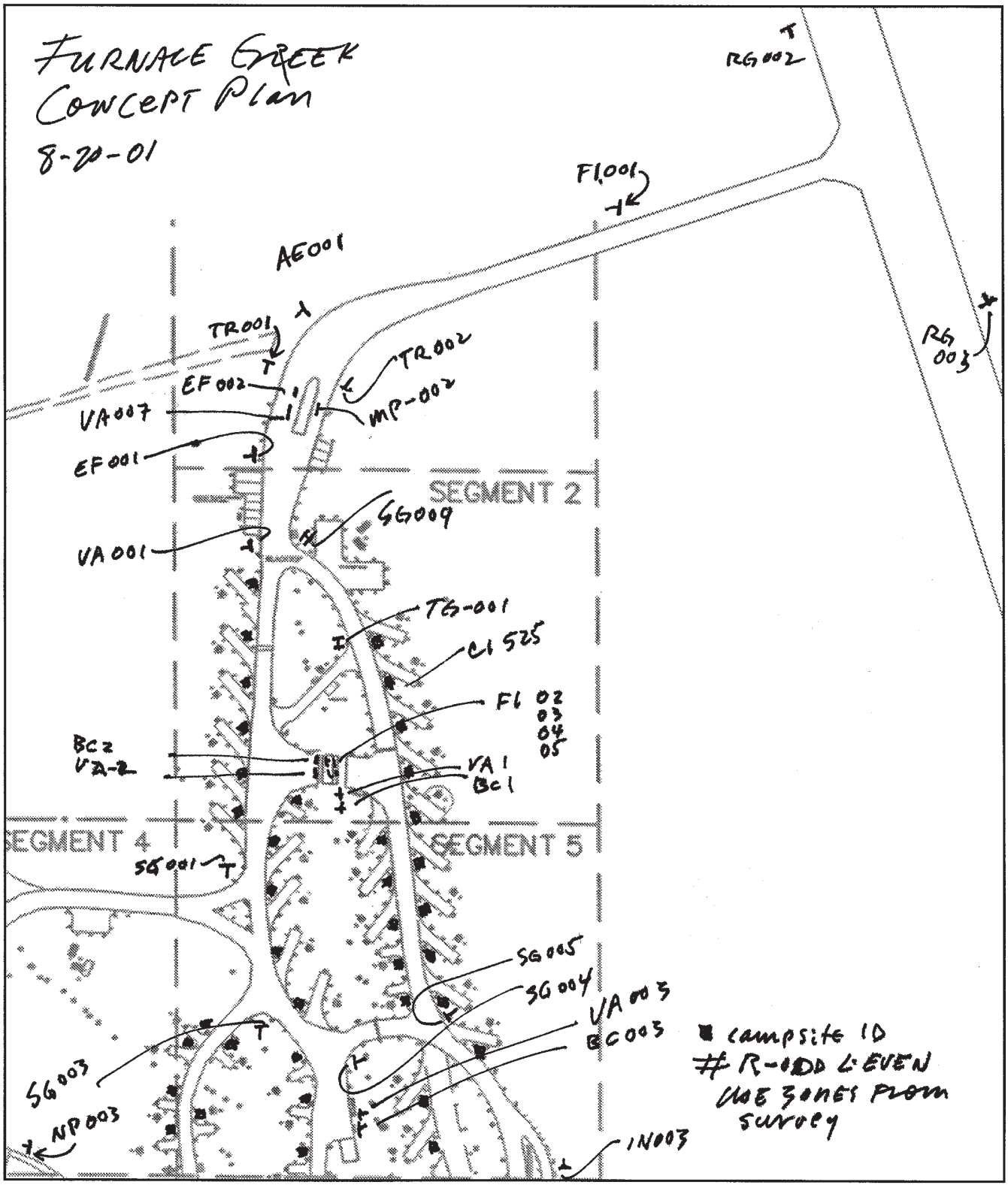
When beginning a plan, focus only on content. Do not be concerned with layout, because the content will drive the layout. Do not be concerned about size, because the entire system is proportional and can be sized appropriate to the site. Do not be concerned about materials, because materials can be selected based on the overall plan.

Two-Part Process: As noted in the introduction, there are two parts to developing a plan. The first involves basic wayfinding and traffic management. The second include communication issues unique to the park or area. These include the rules, instructions, protection information, safety warnings, maps, and other types of communications. All these help a visitor navigate and experience the park without confusion and conflict; while giving them the information needed to enhance their enjoyment and understanding of the place without damaging the park's rich natural and cultural resources.

Identify Neighborhoods: Begin to develop the plan on sheets of tracing paper taped over the site plans and maps of the park. Draw each of the various plan areas or "neighborhoods" as finite areas and assign a two letter identifier (suffix) to all signs in that area. Areas should be divided logically to create manageable planning areas.

Preliminary Sign Location Sketch: Using the hierarchy of signs listed below, begin identifying the appropriate locations for each type of sign for identification, guidance, information, and safety. It is most effective if signs are placed in layers by type (identification, road guide, trail guide, parking control, etc.). Mark these on the tissue using the same "H" and "T" marks used in the field survey along with the general sign type code. Refer to illustrations and guidance in Chapter 2, including the instructions laying out Road Guide Signs, and Identification Signs, and the various guides included in this chapter including Sign Use by Sign Type. All parks, of course, do not need all the same types of signs.

Sign Location Plan: A preliminary sketch of the proposed sign plan with numbering each sign by type.



Using the sign type code (below), note each sign location with the consecutive number for that area or "neighborhood" of the park. For example SG.001.FC, SG.002.FC, and SG.003.FC, on the preceding page signify three consecutive Small Guide sign locations within the Furnace Creek Campground.

UniGuide Hierarchy

Identification	FI	Facility Identification
	FPI	Facility/Park Identification
	PI	Park Identification
Motorist Guidance	HG	Highway Guide
	RG	Road Guide
	TB	Trailblazer Sign
	PB	Park Boundary
Visitor Information	VFI	VIS Facility Identification
System Panels	VPI	VIS Park Identification
	VFPI	VIS Facility/ Park Identification
	AE	Area Entry
	SG	Small Guide (VIS)
	TR	Traffic Regulatory
	EF	Entrance Fees
	RF	Recreation Fees
	PN	No Parking
	PY	Parking
	PH	Handicapped Parking
	FB	Fingerboard
	TG	Trail Guide
	CI	Individual Campsite Identification
	PA	Parking Lot Identification
	SS	Shuttle Stop Identification
	AI	Area Identification
	SN	Street Name

While plotting the proposed location of each sign on the site plan drawing, open the *UniGuide Manager* software program and create a folder for the park and the area or "neighborhood" being signed. With each plot on the map, open an individual *Sign Plan Record* and enter the number of the sign in the upper right corner and a description of content or the actual proposed legend in the Notes section of the screen. Also, include other pertinent field notes that will affect mounting and sign location.

For example, in preparing the plan for the Furnace Creek Campground in Death Valley, each new *Sign Plan Record* would be numbered as noted below and contain the general content or description in the notes section.

RG.001.FC	Stovepipe Wells/Scottys Castle (straight), Furnace Creek Campground (left) (110' x 10 fog line, Level
RG.002.FC	Furnace Creek Campground (right), Badwater (straight) (85" x 10 fog line. 12" over 10')
FI.001.FC	Furnace Creek Campground (6" H, 28' from edge, 120 back on 70 degree orientation)
AE.001.FC	Pets on Leash, Generator Hours 7/7, No Wood Gathering, 30 Day Limit
RF.001.FC	Campground fees with summer registration instructions
VA.001.FC	Campground map on building (M), with regulations panel (RG), and heat warning (MP) (masonry)
SG.001.FC	Straight 300-622, Right 201-248, Right Walk in camping
VA.001.FC	Orientation with map, rules, camper services, and campfire rules

Do not bother with any other details of the *Sign Plan Record* at this time. The details can be entered after the plan is outlined. This process will make actual data entry into the *UniGuide Manager* software program more efficient because it will reflect the train of thought that is important while creating the initial sketch.

Once the general sketch of the sign plan is placed on the Site Plan and numbered files are created in the *UniGuide Manager* software program, the second part of the plan is to determine what general information or rules panels will need to be developed. At Death Valley, for example, it is important to give visitors information on the effects of heat on the body, campground rules, and information on fires and wood gathering. For each type information listed below, work with the respective interests in the park to prepare a coordinated message plan for each type of area within the park. Use the examples provided in Section 6.2 and the panel text writing guide in this chapter for guidance. Once the content has been developed, work with a team that may include a graphic designer, writer, and illustrator to prepare the final panels for production. Artwork for these panels will be prepared following the guidelines contained in this chapter.

Specific Visitor Information	IN	Information/ Instruction
	RM	Resource Management
	NPS	Messaging
	RE	Regulations
	RS	Symbol Based Regulation
	PR	Protection
	SW	Safety Warning
	SD	Safety Danger
	MP	Miscellaneous Postings
	MA	Map (area orientation)
	VA	Multiple panel assembly consisting of more than one of the various panels types included in the Visitor Information System

Preparation of Project Sign Plan

The *Sign Plan* specifies and identifies the locations for all signs. This record can be revised and updated on an ongoing basis as signs are replaced, added, or removed. The sign plan will be recorded on a *Site Plan* map and in a *Sign Plan Record* using the following materials and methods of documentation:

a) *Site Plans* with sketch (previous step) that identifies the location of each proposed sign and identifying code number
c) A copy of the *UniGuide Manager* software program
d) A digital copy of the UniGuide grid formats for creation of sign artwork (Chapter 2)
e) A clean *Site Plan* (1"=100' to 1"=200') for manually recording the each sign with unique sign code number from (a) above, or on an AutoCad terminal
f) A copy of the *Sign Inventory Worksheet* with photograph attached to identify which installations will be removed and the sign location on the original survey *Site Plan*

The *Sign Plan* location drawings will identify and show the location of those signs that are planned for implementation. The existing condition *Site Plan* is used to identify signs to be replaced.

Plan Documentation

a) Following the *Site Plan* sketch, open the *Sign Plan Record* for each sign using the *UniGuide Manager* software program
b) Determine which grid as displayed in Chapter 2 will be most appropriate
c) Leave the *UniGuide Manager* software program and open Adobe Illustrator. Copy the selected grid from the file and place this grid in a separate document and save to the area folder. Name the grid to match the installation name unless part of a multi-panel assembly. In that case the panel is named based on the type of panel. See the Sign Code Section in this chapter.
d) Enter the new legend in the panel following the guideline for artwork preparation and save the artwork file into the correct "area" folder
e) Import a copy of the panel into the *Sign Plan Record*
f) Enter appropriate data into the *Sign Plan Record* by following the series of prompts

In the Assembly Overview section enter the following:

Assembly Overview						
Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly		Legend Size MG/ID
				Width	Height	
RG-002-FC	K..1	TDF	A/X	108"	33"	6"

Number: Enter (verify) the sign assembly number
Assembly Type: Identify the assembly type (using the pull-down options)
Post: Identify the post material (using the pull-down options)
Assembly Configuration: Identify the assembly configuration (using the pull-down menu)
Panel/Assembly Size: Enter the overall assembly size (sign panel size if single panel assembly, assembly size if multi-panel VIS assembly)
Legend Size: Enter the legend size (using the pull-down options for Identification and Road Guide Signs only)

In the Mounting/Installation section enter the following:

Mounting / Installation					
Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
M.DE.C	18" x 18"	6'	none	42"	P-03/27/02

Mounting Type: Identify the mounting type (using the pull-down options)
Footing Size: The footing size will be filled in from the data base (footing size

should fill in itself)

Mounting Height: The mounting height will be filled in from the data base (HAGL is a default)

Grade Change: From field notes, fill in the grade change (oo") over distance (o'-o") between the two posts

Setback: Note proposed setback from road or trail if critical (all signs will be staked prior to installation, so this may not be critical)

Date: Enter the date that the sheet is prepared.

In the Panel Description section enter the following:

Panel Description					
Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
RG-002-FC	Road Guide	—	108"x33"	RRIII	—

Panel Number: Enter the number of the panel. There are three methods to numbering a sign panel. The preface for all panel numbers is based on the sign type (SG for Small Guide). The unique number is the same as the installation number unless this is a parkwide "catalog" sign or a national "NPS catalog" sign (see Sign Code Number section in this chapter). The suffix will be the neighborhood number unless the sign is from a master catalog. If there are multiple panels of the same type in an assembly (like a Small Guide Sign) each panel will be numbered with an consecutive alpha after the number. For example: SG.117a.FC, SG.117b.FC, and SG.117c.FC. are to be placed in one assembly.

Reference Word: Under panel reference, enter a word that generally describes the panel "Coyotes Warn" or "Pets Leash" to make review of *Sign Schedule Reports* that subscribe to this same database easier to read without supporting *Sign Plan Record* sheets.

Overview: On multiple panel assemblies, enter the panel location (a, b, or c)and place the same alpha-numeric on the overview window.

Panel Size: Enter panel size

Panel Material: Enter panel material (using the pull-down options)

For all double–face assemblies, including Identification Signs and VIS assemblies, repeat the listing. If the back of the panel is blank, enter blank in the reference box.

Plotting Sign Location Plan

a) Plot the sign location on a digital map of the park or area. This map may be a scanned version of a sketch, an actual site plan of an area, a map based on a GIS survey, or a USGS map. Ideally the scale of these maps is 1"= 100' to 1"= 200' for settled areas. The smallest scale acceptable is a USGS Quadrangle map with scale of 1"=2000' for use in locating road guide signs or other installations where more accurate location detail is not required and sign frequency allows plotting at such a small scale.

b) Format the plan in 8" x 14" segments with match lines and overlap for inclusion into plan documents.

c) Identify each placement location as accurately as possible with a "T" or "H" indicator and draw a leader to an identification box. Place the sign assembly identification in the box. Activate the link for the sign location to the Sign Plan Record. This will allow a viewer to click on the location number and see a full information display on the particular sign.

Actual placement locations will be staked prior to installation. This is a plan location identifier only and is not to scale.

Reports from UniGuide Manager

The *UniGuide Manager* software program is capable of generating a variety of reports from the data in the Sign Plan Record. This includes:

- Sign Schedule (list of all selected installation by area, by type, by material, by plan date, order date, and installation date
- Cost based on contract data
- Maintenance review sheets

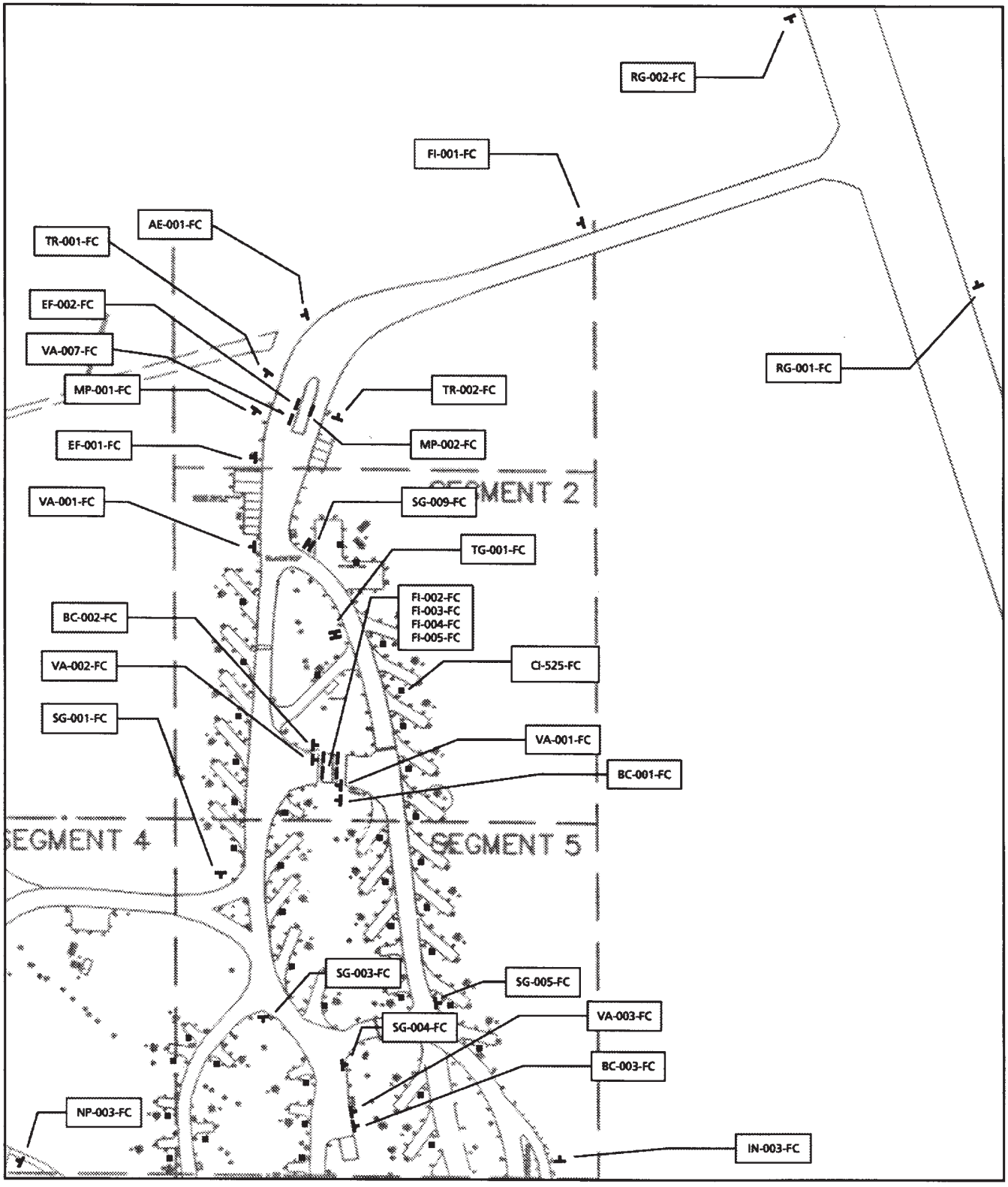
Preparation of Implementation Plan

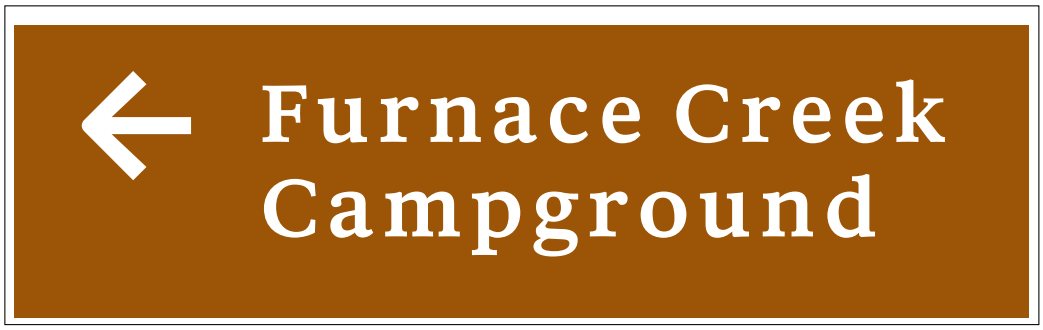
Based on the priorities identified, prepare an implementation plan to install new UniGuide signs. Depending on budget and park priorities, this can be based on one of the following scenarios:

a) Replacement by Attrition: Since the average life of most exterior signs is 7 to 10 years, approximately 10 to 15 percent of the signs will need to be replaced each year. Identify signs in the new plan that will replace existing signs.

b) Replacement by Site: This involves changing all the signs in a specific area. If there are 10 areas at a park, schedule replacement of all signs in two of the areas annually. In five years, the entire project will be in full compliance to the program without a major expenditure in any one year. This comprehensive implementation method increases the visual impact of the sign program.

Sign Location Plan: Computer plotting of each installation in the sign plan with numbering each sign by type.





Assembly Overview

Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly Width	Panel / Panel Assembly Height	Legend Size MG/ID
RG-002-FC	K..1	TDF	A/X	108"	33"	6"

Mounting / Installation

Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
M.DE.C	18" x 18"	6'	none	42"	P-03/27/02

Panel Description

Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
RG-002-FC	Road Guide	—	108"x33"	RRIII	—

Furnace Creek Campground

Assembly Overview						
Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly		Legend Size MG/ID
				Width	Height	
FI-001-FC	P.1	WRC	A/X	86"	37"	6"

Mounting / Installation					
Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
I.AB.DP	15x15x39"	30"	none	15'	P-03/27/02

Panel Description					
Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
FI-001-FC	Facility ID	—	86"x37"	WRC	—

Assembly Overview

Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly Width	Panel / Panel Assembly Height	Legend Size MG/ID
AE-001-FC	A.1	TWS	A/X	90cm	120cm	—

Mounting / Installation

Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
V.DE.TS	—	60cm	none	3'	P-03/27/02

Panel Description

Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
AE-001-FC	Generator Hrs	A.1	90 x 30	PE	1
AE-002-FC	30 Day Stay	A.2	90 x 30	PE	2
AE-001	No Wood Gather	A.3	90 x 30	PE	3
AE-016	Pets Leashed	A.4	90 x 30	PE	4
BLNK	BLNK	B.1	90 x 30	PE	1
BLNK	BLNK	B.2	90 x 30	PE	2
BLNK	BLNK	B.3	90 x 30	PE	3
BLNK	BLNK	B.4	90 x 30	PE	4

Assembly Overview

Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly Width	Panel / Panel Assembly Height	Legend Size MG/ID
IN-003-FC	A.1	TWS	A/X	60cm	60cm	—

Mounting / Installation

Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
V.DE.TS	—	90cm	none	2.5'	P-03/27/02

Panel Description

Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
IN-186	Tank Disposal	A.1	60 x 60	PE	1
BLNK	BLNK	B.1	60 x 60	PE	1

Assembly Overview

Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly		Legend Size MG/ID
				Width	Height	
CI-525-FC	A.1	BS	A/X	15cm	15cm	—

Mounting / Installation

Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
V.DE.BS	—	90cm	none	2'	P-03/27/02

Panel Description

Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
CI-525-FC	Campsite ID	A.1	15 x 15	PE	1
BLNK	BLNK	B.1	15 x 15	PE	1

Assembly Overview

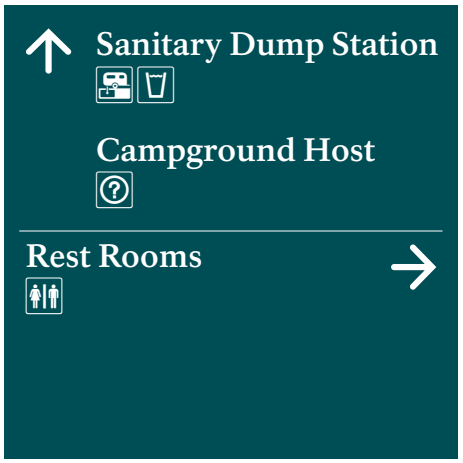
Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly Width	Panel / Panel Assembly Height	Legend Size MG/ID
SG-001-FC	A.1	TWS	A/X	90cm	90cm	—

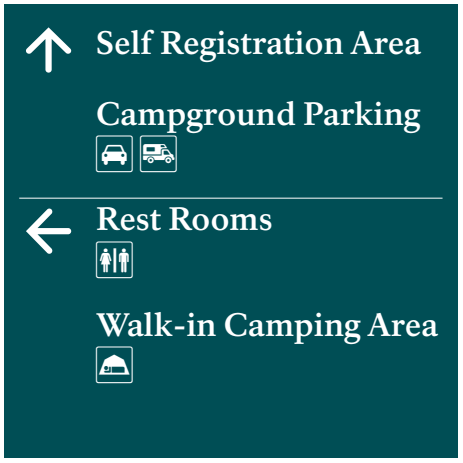
Mounting / Installation

Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
V.DE.TS	—	90cm	none	3'	P-03/27/02

Panel Description

Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
SG-001a-FC	Small Guide	A.1	90 x 30	PE	1
SG-001b-FC	Small Guide	A.2	90 x 30	PE	2
SG-001c-FC	Small Guide	A.3	90 x 30	PE	3
BLNK	BLNK	B.1	90 x 30	PE	1
BLNK	BLNK	B.2	90 x 30	PE	2
BLNK	BLNK	B.3	90 x 30	PE	3

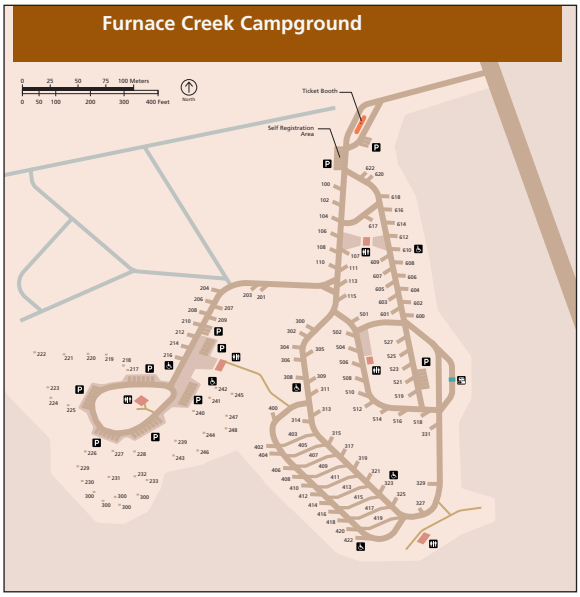


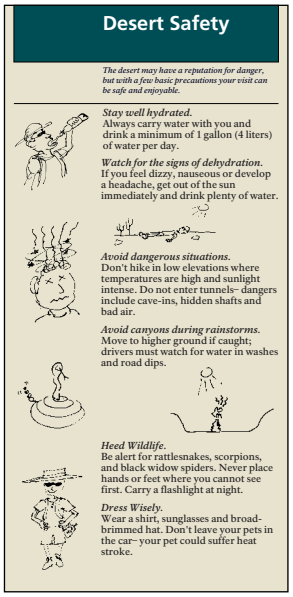


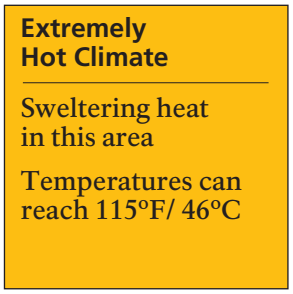
Assembly Overview						
Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly Width	Panel / Panel Assembly Height	Legend Size MG/ID
TG-001-FC	A.1	TWS	A/B	30cm	30cm	—

Mounting / Installation					
Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
V.DE.TS	—	90cm	none	2'	P-03/27/02

Panel Description					
Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	Overview
TG-001a-FC	Trail Guide	A.1	30 x 30	PE	1
TG-001b-FC	Trail Guide	B.1	30 x 30	PE	1







Assembly Overview

Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly Width	Panel / Panel Assembly Height	Legend Size MG/ID
VA-001-FC	A.1	TWS	A/X	90cm	90cm	—

Mounting / Installation

Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date
V.DE.TS	—	90cm	none	4'	P-03/27/02

Panel Description

Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material
M-001-FC	Map	A.1	60 x 60	FG
P-001-FC	Desert Safety	A.2	30 x 60	PE
R-001-FC	Regulations	A.3	30 x 30	PE
R-002-FC	Campfire Rules	A.4	30 x 30	PE
SW-001-FC	Hot Climate	A.5	30 x 30	PE
BLNK	BLNK	B.1	90 x 60	PE
BLNK	BLNK	B.2	90 x 30	PE

Overview

		2
1		
3	4	5

1
2

c) *Replacement by Category:* This involves changing all signs of the same type throughout the park, such as all the Road Guide Signs or all the Trailhead signs. Because multiples in each category may be ordered, there could be a cost savings in both procurement and installation with this method. Also, since all signs of one type are installed at the same time, they will all be on the same maintenance schedule.

d) *Replacement Parkwide:* This involves changing all of the signs throughout the park. This is the most comprehensive approach and in smaller parks may be a cost efficient approach as a Fee Demonstration or capital plan project. This approach will create the greatest visual impact and will reduce long-term management costs because all signs are based on the same unified system. The communications value of a comprehensive approach to signing would be significant.

Once an implementation schedule has been developed, it should be incorporated into the sign inspection and maintenance program. In this way, the sign plan also serves as a management tool for preparing budget requests and for reviewing sign requisitions while coordinating replacements and maintenance.

UniGuide Manager Software Program

The *UniGuide Manager* software program is a comprehensive planning tool designed to allow Park UniGuide Managers and Regional UniGuide Coordinators efficiently develop comprehensive sign plans based on the NPS UniGuide Program standards.

The system incorporates a hierarchical system that is driven by data bases for each sign type. Planners will enter attributes for each installation using a series of prompts with subsets for graphic panels, assembly package, and mounting.

The program is designed to allow UniGuide planners to inventory existing conditions, develop and document a plan, link the plan to sign location plans, and prepare various schedules and reports including sign procurement orders with all associated costing by panel and by assembly.

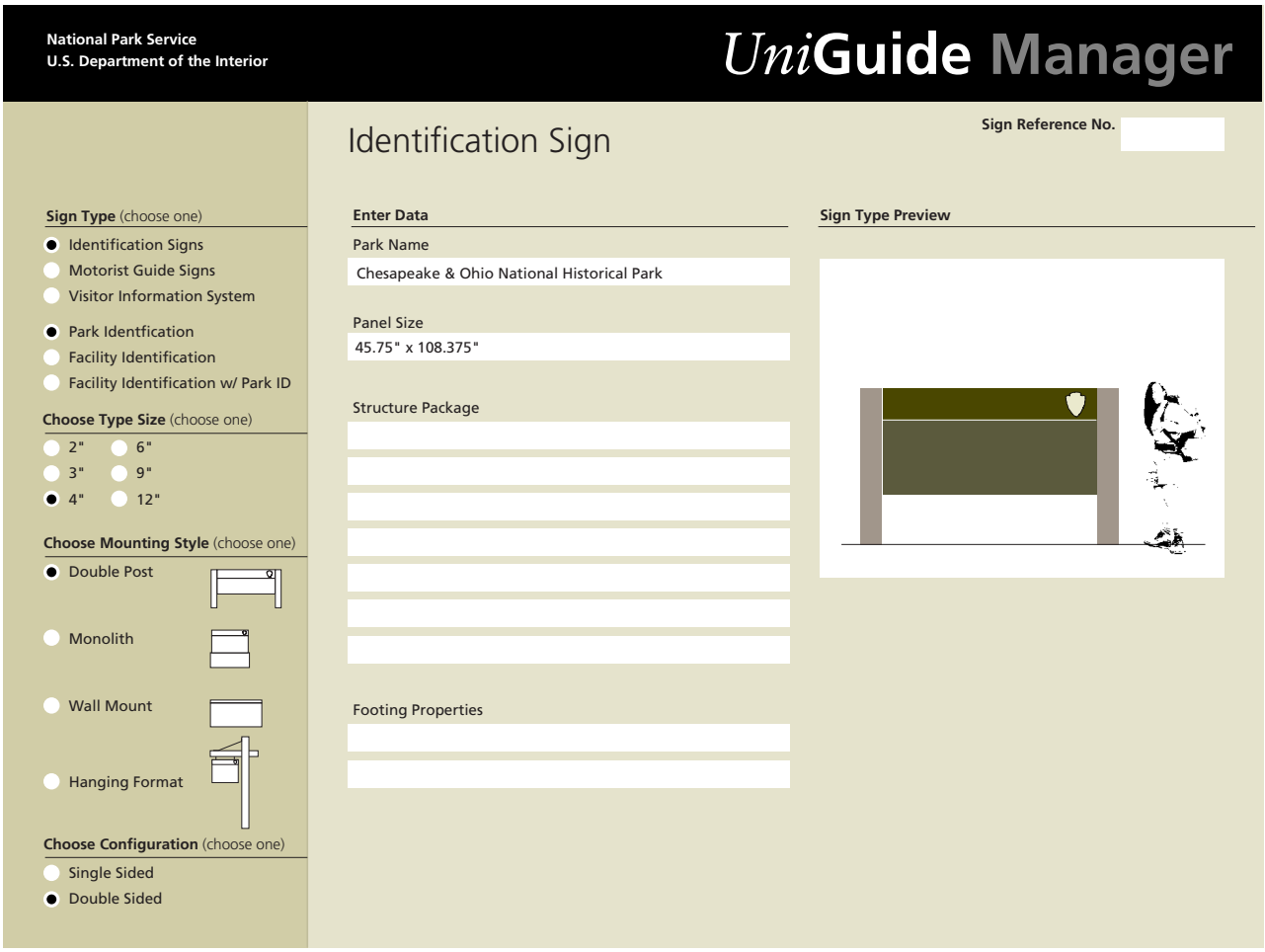
Based on this data base, a park manager can augment and update the program, use the sign schedule for seasonal maintenance inspections, and plan phased implementation programs.

To order signs, the UniGuide planners can select signs from the plan for procurement in a “shopping cart” format. Based on this selection, an order report will be generated that sorts signs by common type, by similar graphic panel or panel material. For each assembly, a complete list of parts required can be generated and included in a manufacturer's delivery package to insure all deliveries are complete.

The plans for each park will be banked on a single Internet-based server that is made part of

the UniGuide Program Web site. This banked plan will be accessible by the Regional Coordinators and the Park UniGuide Managers. From this plan, annual reports can be generated to document compliance activity, annual expenditures, maintenance and management costs, maintenance requirements, etc.

A screen capture of the conceptual *UniGuide Manager* software program and sample *Sign Schedule* are illustrated on the following pages.



Sign Specification Code

Each sign installation will be designated in a series of codes that will identify all attributes of that particular installation.

The Sign Location Code is the primary designator. The additional codes augment the installation description with the attributes of the specific installation. These attributes are designed to accommodate data base sorting by sign type, by panel type, by location or by other attributes.

Assembly Overview						
Code-No.-Loc.	Assembly Type	Post Material	Assembly Config.	Panel / Panel Assembly		Legend Size MG/ID
				Width	Height	
TA-001-GF	A.1	TWS	A/A	120	90	
PI-001-EE	P.1	WRC	A/X	138	54	6"
PI-001-EE	P.1	TDF	A/X	138	54	6"
TB-004-GF	L.1	TDF	A/X	40"	40"	4"

Panel Description					
Panel ID Number	Panel Reference	Panel Location	Panel Size	Panel Material	
TG.003.GT	Trail Guide	A.1	30x30	PE	
		A.2			
		A			
		A			
		A			
		A			
		B			
		B			
		B			
		B			
		B			
PI.001a-EE	DEVA	A	138 x 54	WRC	
PI.001b-EE	Blank	X	138 x 54	WRC	
RG-002-FC	na	na	108x33	ACM	
TB-004-GF	na	na	40x40	ACM	

Overview	Mounting / Installation						Assembly			
	Footing Type	Footing Size	Mounting HAGL	Grade Change	Setback	Status / Date	Sign Assembly Components	Part Number Code	Qty.	Component Size
1 3 5 7 2 4 6 8	V.DE.TS	12x12x36	7'-0"	0/0	28'	P-03/27/02	Post Length	A.1-238-E	2	3" x 2"
							Core Panel 1		1	90x30
							Core Panel 2		1	90x60
							Back Panel 1		1	90x30
							Back Panel 2		1	90x60
							Double Groove Rail		1	90
							Single Groove Rail		2	90
							Retainer Rail		0	0
							Rail Conn. Bolts		6	1/4-20x1
							Post Caps		2	2x3
							Stab. Blade & Bolts		2	10x24
							Folder 30x30		1	30x30
	I.AB.DP	18x18x39	90 cm	12/36"	12"	P-03/27/02	Steel Upright		2	3.5x3.5
							Sgn Rail		2	124.5
							Sign Panel		2	138x54
							Blocking Package		2	31"
							Column Package		2	72"
							Mounting Bolts		6	3/8"x5.5"
							Key Hole Hardware		6	2x4
							Assembly Hardware		1	pkg.
	M.DE.C	18x18x48	7'-0"	0/0	8'-0"	P-03/27/02	ACM Panel	RRIII	1	
							Alum. Panel		2 sets	104
							Timber Post		4x8	165"
							Assembly Hardware		1	pkg.
	M.DE.E	14x14x48	7'-0"	0/0	6'-0"	P-03/27/02	ACM Panel	RRII	1	40x40
							Alum. Brackets		1	set
							Timber Post		4x6	172
							Stab. Blade & Bolts		1	10x42
							Assembly Hardware		1	pkg.

The primary groups of data included in the code are listed below: A list of the codes for each attribute are provided after the introduction along with a sample Sign Schedule and Sign Plan Sheet.

- *Sign Location Code:* Unique reference for each sign based on type, number, and the neighborhood in which the sign is located
- *Assembly Type:* Fabrication reference to each different type of structure
- *Post Material:* Selection will be based on options within a specific assembly type
- *Assembly Configuration:* Double face, single face, different message on each side, wall mount
- *Assembly Size:* Based on overall panel or panel assembly size (width x height)
- *Legend Size:* For Motorist Guidance and Identification Signs only
- *Panel Description(s):* Unique reference for each sign based on type, number, and catalog reference. This data field will also include panel sizes, location of individual panels if it is a multiple panel assembly, and panel material.
- *Mounting Configuration:* Type of mounting, with site placement information
- *Assembly Components:* A data base of the component parts specific to this installation
- *Status:* Date of latest transaction (Planned, Ordered, Installed)

This code system will be incorporated into the *Sign Plan Record*, *Sign Location Site Plan,* and *Sign Schedule*. The Sign Location Code will be used in conjunction with all reports, orders, and tracking documents.

Sign Location Code

Each sign assembly will be identified by a unique reference code. This code includes a dual alpha to indicate sign type, a three-digit number that consecutively identifies each sign of a particular type in the area (neighborhood) of the plan, and a second alpha to identify finite areas within a park.

Example: TG-017-GF ***(Trail Guide + consecutive number of that sign type in the specific area + code designation for the area)***

For purposes of planning and management, it is recommended that the neighborhoods be finite areas within a park. Although content will overlap from one area to another, the neighborhood designation keeps plans divided into manageable packages.

Within a neighborhood, there may be installations of different types with the same numerical designation and neighborhood designation, such as TG-004-GF, SW-004-GF, and PY-004-GF. In each case the sign type designation will be different and there will not be any duplication in computer sorting based on this sign code.

The function of the Sign Location Code is to allow a reviewer who is familiar with the sign type codes to visually scan a *Sign Schedule* or sign location *Site Plan* of an area and separate out the sign types and the number of that sign type in that area.

In the case of the Visitor Information System, in which there are more than one type of sign in an assembly, the sign type code designation will be VA (shorthand for VIS Assembly) and each panel within that assembly will be identified in the panel description section of the sign code. An example is a trailhead installation with a series of panels that may include: map of trail route, wilderness rules, resource management display on maintaining switchbacks, and a seasonal panel on ice or other hazards.

If a plan is manually prepared, refer to the following code descriptions. If a plan is prepared using the *UniGuide Manager* software, each of these attributes will be accessible in pull-down menus. Once selected, the codes will be entered into the *Sign Plan Record* and *Sign Schedule* with certain entries automatically entering the corresponding data fields. Once the Sign Location Code is placed on an AutoCad site plan, it can be linked to the *Sign Plan Record* and *Sign Schedule* so that any update to one document will automatically be updated in the others.

Panel Identification Sign Type Code

The three digit number range noted to the right of the sign type name references catalogue numbers used for standard signs used system wide. For example: AE.001.N always refers to the "No Wood Gathering" Area Entry panel with prohibition symbol.

VIS Panels/NPS Catalog Panels

AE	Area Entry	001-049
SG	Small Guide	050-064
TR	Traffic Regulatory	065-164
EF	Entrance Fees	165-174
RF	Recreation Fees	175-184
IN	Information/Instruction	185-284
RM	Resource Management	285-334
NPS	Messaging	335-384
RE	Regulations	385-434
PR	Protection	435-484
SW	Safety Warning	485-584
SD	Safety Danger	585-684
MP	Miscellaneous Postings	685-784
PN	No Parking	785-834
PY	Parking	835-874
PH	Handicapped Parking	875-884

VIS Panels

AI	Area Identification
CI	Campsite Identification
FB	Fingerboard
PA	Parking Lot Identification
SS	Shuttle Stop Identification
RS	Symbol Based Regulation
M	Map
SN	Street Name
TG	Trail Guide
VFI	VIS Facility Identification
VPI	VIS Park Identification
VFPI	VIS Facility/Park Identification
NP	Narrow Profile
VA	VIS Multi–Panel Assembly

VIS Accessories

BC	Bulletin Cabinet
FD	Folder Dispenser
PD	Page Display
RC	Registration Cabinet
TB	Trashbag Dispenser

Non VIS Identification

FI	Facility Identification
FPI	Facility/Park Identification
PI	Park Identification

Motorist Guidance

RG	Road Guide
HG	Highway Guide
TB	Trailblazer Sign
PB	Park Boundary

Assembly Code

Visitor Information System

A.1	Vertical, Double Post Assembly (Tubular Steel)
A.2	In-line, Multiple Post Assembly (Tubular Steel)
A.3	Cluster Base, Multiple Post Assembly (Tubular Steel)
A.4	Tri-Side, Multiple Post Assembly (Tubular Steel)
A.5	Vertical, Double Post, Small Assembly (Wood)
B.1	Forward Angle, Double Post Assembly (Tubular Steel)
B.2	Forward Angle, Double Post Assembly (4x4 Wood)
C.1	Reverse Angle, Double Post Assembly (Tubular Steel)
C.2	Reverse Angle, Wall Cap Mount Double Post Assembly (Tubular Steel)
C.3	Reverse Angle, Sled Base Double Post Assembly (Tubular Steel)
C.4	Reverse Angle, Deck Mount with Straight Post Assembly (Tubular Steel)
C.5	Reverse Angle, Double Post Wood Assembly (4x4 Wood)
D.1	Low Profile Reverse Angle, Double Post Assembly (Flat Bar Steel)
E.1	Double Post Bar Stock Assembly (Flat Bar Steel)
F.1	Single Post Assembly (Tubular Steel)
G.1	Narrow Profile Flush Wall Mount Assembly
H.1	Street Name, Single Post Assembly (6x6 Wood)
H.2	Fingerboard, Single Post Assembly (6x6 Wood)
J.1	Wall Mount Assembly (Aluminum Angle)

Motorist Guidance

K.1	Double Post Timber with Reflective Sheeting Face
L.1	Single Post Trailblazer/Boundary with Reflective Sheeting on Aluminum Composite Panel
L.2	Double Post Trailblazer/Boundary with Reflective Sheeting on Aluminum Composite Panel

Identification Signs

P.1	Double Post Identification Sign with Baseplate
Q.1	Cast Concrete Monolithic Base
Q.2	Cast Concrete Monolithic Base with Stone or Brick Veneer Facing
R.1	Cast Concrete Monolithic Base with Narrow Side Column
R.2	Cast Concrete Monolithic Base with Narrow Side Column with Stone or Brick Veneer Facing
S.1	Cast Concrete Monolithic Base with Wide Side Column
S.2	Cast Concrete Monolithic Base with Wide Side Column with Stone or Brick Veneer Facing
T.1	Flag Mount, Wide Column Cast Concrete Structure
T.2	Flag Mount, Wide Column Cast Concrete Structure with Stone or Brick Veneer
U.1	Flag Mount, Narrow Column Cast Concrete Structure
U.2	Flag Mount, Narrow Column Cast Concrete Structure with Stone or Brick Veneer
V.1	Flag Mount, Timber Upright with Baseplate
W.1	Wall Mount Wood Panel

Panel Configuration Codes

A/A	Same Message Front and Back
A/B	Different Message Front and Back
A/X	Blank Back Panel
A/-	No Back Panel (Wall Mount)

Panel Size Codes

W x H	Panel is always measured width first and height second

Legend Size Codes

Trailblazer & Boundary Signs	Road Guide Signs	Identification Signs
2″	4″	3″
3″	6″	4″
4″	8″`	6″
		9″
		12″

Panel Material Codes

PE	Porcelain Enamel
EF	Embedment Fiberglass
ES	Electrostatic Vinyl/Aluminum
IJ	Ink-jet Vinyl/Aluminum
RRI	Retro-reflective Sheeting Type I/Aluminum Composite Matl.
RRII	Retro-reflective Sheeting Type I/Aluminum Composite Matl.
RRIII	Retro-reflective Sheeting Type III/Aluminum Composite Matl.
ACM	Aluminum Composite Material
OV	Cut Opaque Vinyl / Aluminum
HPL	High Pressure Laminate
RRW	Routed Redwood
WRC	Western Red Cedar

Status/Date

P–00/00	Planned
O–00/00	Ordered
I–00/00	Installed

Grid Format Codes

(VIS) Standard Panel Grid Formats: Visitor Information System Codes

SP-1	Standard Panel with 20/22 Text (2-Column)
SP-2	Standard Panel with 30/33 Text
SP-3	Standard Panel with 40/44 Text
SP-4	Standard Panel with 60/66 Text
SP-5	Standard Panel with 40/44 Text–Regulations Display with Symbols
RS-1	Recreation Symbols Panel
SF-1	Standard Entrance Fees Panel with 40/60 Text
SF-2	Standard Recreation Fees Panel with 40/60 Text
TG-1	Trail Guide Sign with 60/66 Text and Symbols
TG-2	Trail Guide Sign with 80/88 Text and Symbols
TG-3	Trail Guide Sign with 60/66 Text, Symbols, and Park Identification
TG-4	Trail Guide Sign with 80/88 Text, Symbols, and Park Identification
MP-1	Miscellaneous Posting Sign with 120/132 Text
MP-2	Miscellaneous Posting Sign with 80/88 Text
SS-1	Shuttle Stop Identification Sign
PA-1	Parking Area Identification Sign

Narrow Profile Panel Grid Formats: (VIS)

NP-1	Narrow Profile Information Sign with 20/22
NP-2	Narrow Profile Information Sign with 30/33 Text
NP-Y	Narrow Profile Identification Sign with Symbol
NP-N	Narrow Profile Prohibition Sign with Symbol
PK-Y	Narrow Profile Parking Sign with Symbol
PK-N	Narrow Profile Parking Prohibition Sign with Symbol
NP-T	Narrow Profile Trail Guide Sign with Symbols
NP-C	Narrow Profile Campsite Identification Sign

Small Guide Panel Grid Formats: (VIS)

SG-1	Small Guide Sign with 2-Line Legend and Left Arrow
SG-2	Small Guide Sign with 2-Line Legend and Right Arrow
SG-3	Small Guide Sign with 2-Line Legend, Symbol and Left Arrow
SG-4	Small Guide Sign with 2-Line Legend, Symbol and Right Arrow
SG-5	Small Guide Sign with Primary/Secondary Legend and Left Arrow
SG-6	Small Guide Sign with Primary/Secondary Legend and Right Arrow
SG-7	Small Guide Sign with 1-Line Legend (Exit) and Left Arrow
SG-8	Small Guide Sign with 1-Line Legend (Exit) and Right Arrow
SG-9	Small Guide Sign with 2-Line Legend and No Arrow
SG-10	Small Guide Sign with 2-Line Legend (Primary/Secondary) and No Arrow
TR-1	Traffic Regulatory Sign with 2-Line Legend and No Entry Symbol
AE-Y	Area Entry Sign with 2-Line Legend and Symbol
AE-N	Area Entry Sign with 2-Line Legend and Prohibition Symbol
AI-1	Area Identification Sign with 2-Line Legend and Symbol

Fingerboard & Street Name Panel Grid Formats: (VIS)

FB-1	Fingerboard Pedestrian Guide Sign with 1-Line Primary and 2-Line Secondary Legend and Symbol
FB-2	Fingerboard Pedestrian Guide Sign with 1-Line Primary and 2-Line Secondary Legend
FB-3	Fingerboard Pedestrian Guide Sign with 2-Line Primary Legend and Symbol

FB-4	Fingerboard Pedestrian Guide Sign with 2-Line Primary Legend
SN-1	Street Name Sign (60 cm blade)
SN-2	Street Name Sign (75 cm blade)
SN-3	Street Name Sign (90 cm blade)

Park & Facility Identification Panel Grid Formats: (VIS)

VPI-1	VIS–Park Identification Sign with 80/88 text
VPI-2	VIS–Park Identification Sign with 120/132 text
VPI-3	VIS–Park Identification Sign with 160/176 text
VPI-4	VIS–Park Identification Sign with 200/220 text
VFI-1	VIS–Facility/Park Identification Sign with 80/88 text
VFI-2	VIS–Facility/Park Identification with 120/132 text
VFI-3	VIS–Facility/Park Identification with 160/176 text
VFI-4	VIS–Facility/Park Identification with 200/220 text
VFI-5	VIS–Facility Identification Sign with 80/88 text
VFI-6	VIS–Facility Identification Sign with 120/132 text
VFI-7	VIS–Facility Identification Sign with 160/176 text
VFI-8	VIS–Facility Identification Sign with 200/220 text

Park Identification and Facility Identification Sign Codes

Park Identification Sign Grid Formats

PI-1GA	Park Identification Sign, 1 Line Ground Mounted with Arrowhead on panel
PI-1GX	Park Identification Sign, 1 Line Ground Mounted with Arrowhead on structure
PI-2GA	Park Identification Sign, 2 Line Ground Mounted with Arrowhead on panel
PI-2GX	Park Identification Sign, 2 Line Ground Mounted with Arrowhead on structure
PI-3GA	Park Identification Sign, 3 Line Ground Mounted with Arrowhead on panel
PI-3GX	Park Identification Sign, 3 Line Ground Mounted with Arrowhead on structure
PI-2HA	Park Identification Sign, 2 Line Hanging Format with Arrowhead on panel
PI-2HX	Park Identification Sign, 2 Line Hanging Format with Arrowhead on structure
PI-3HA	Park Identification Sign, 3 Line Hanging Format with Arrowhead on panel
PI-3HX	Park Identification Sign, 3 Line Hanging Format with Arrowhead on structure
PI-4HA	Park Identification Sign, 4 Line Hanging Format with Arrowhead on panel
PI-4HX	Park Identification Sign, 4 Line Hanging Format with Arrowhead on structure

Facility Identification Sign Grid Formats

FI-1G	Facility Identification Sign, 1 Line Ground Mounted Sign Format
FI-2G	Facility Identification Sign, 2 Line Ground Mounted Sign Format
FI-3G	Facility Identification Sign, 3 Line Ground Mounted Sign Format
FI-1H	Facility Identification Sign, 1 Line Hanging Sign Format
FI-2H	Facility Identification Sign, 2 Line Hanging Sign Format
FI-3H	Facility Identification Sign, 3 Line Hanging Sign Format
F/PI-1G	Facility/Park Identification Sign, 1 Line Ground Mounted Sign Format
F/PI-1H	Facility/Park Identification Sign, 1 Line Hanging Sign Format
F/PI-2G	Facility/Park Identification Sign, 2 Line Ground Mounted Sign Format
F/PI-2H	Facility/Park Identification Sign, 2 Line Hanging Sign Format
F/PI-3G	Facility/Park Identification Sign, 3 Line Ground Mounted Sign Format
F/PI-3H	Facility/Park Identification Sign, 3 Line Hanging Sign Format

Road Guide Sign Grid Formats

RG-1	Road Guide Sign for Single and Multiple Destinations without Symbols
RG-2	Road Guide Sign for Single and Multiple Destinations with Symbols
RG-3	Road Guide Sign for Single and Multiple Destinations with route shield
RG-4	Road Guide Sign for Single and Multiple Destinations with 2 to 3 Route Shields
RG-5	Road Guide Sign for Single Destination with 2 to 4 Symbols
RG-6	Road Guide Sign for Single and Multiple Destinations with Distance
RG-7	Road Guide Sign for Single Destination with 1 or 2 Symbols
RG-8	Road Guide Sign with 1 to 4 Symbols and Directional Arrow
RG-9	Road Guide Information Sign for Single Destination with Secondary Legend
RG-10	Road Guide Sign for Single Destination with Advance Guidance
RG-11	Road Guide Sign with Advisory Legend Panels Highway Guide Sign Grid Formats
HG-1	Highway Guide Sign with 1-3 Line Legend with Directional Arrow
HG-2	Highway Guide Sign with 1-3 Line Legend, Advance Guidance and NPS Arrowhead
HG-3	Highway Guide Sign with 1-3 Line Legend and Advance Guidance

Trailblazer Sign Grid Formats

TB-1a	Trailblazer Sign with 1-Line Primary Legend and Directional Arrow
TB-1b	Trailblazer Sign with 1-Line Primary Legend and Secondary Guide Legend
TB-2a	Trailblazer Sign with 2-Line Primary Legend and Directional Arrow
TB-2b	Trailblazer Sign with 2-Line Primary Legend and Secondary Guide Legend
TB-3a	Trailblazer Sign with 3-Line Primary Legend and Directional Arrow
TB-3b	Trailblazer Sign with 3-Line Primary Legend and Secondary Guide Legend
TB-4a	Trailblazer Sign with 4-Line Primary Legend and Directional Arrow
TB-4b	Trailblazer Sign with 4-Line Primary Legend and Secondary Guide Legend

Park Boundary Sign Grid Formats

PB-1a&b	Park Boundary Sign with 1-Line Primary Legend
PB-2a&b	Park Boundary Sign with 2-Line Primary Legend
PB-3a&b	Park Boundary Sign with 3-Line Primary Legend
PB-4a&b	Park Boundary Sign with 4-Line Primary Legend

Mounting Method Codes

Visitor Information System

V.DE.TS	Direct embedment for assemblies with tubular posts
V.DE.BS	Direct embedment for assemblies with flat bar stock posts
V.CO.T/B	Direct embedment into concrete footing for shallow footing conditions
V.RO.RS	Direct embedment of round tubular post in core–drilled rock (F.1)
V.AB.BP	Baseplate mount with anchor bolts in concrete footing (tubular steel post)
V.AB.BP	Baseplate mount with a standard footing (wood post with steel baseplate
V.TR.BP	Baseplate mount to threaded rod anchored into rock or concrete
V.TR.BP	Baseplate mount to threaded rod anchored into bedrock
V.RO.SF	Baseplate attachment to corresponding stem footing in core drilled bedrock
V.CO.SF	Baseplate attachment to corresponding stem footing in concrete footing
V.TB.BP	Baseplate attachment to wood deck
V.TB.TS	Bolt attachment to deck joist
V.LB.WM	Wall mount on wood or masonry surfaces (J.1)

Identification Signs

I.AB.DP	Baseplate mount double post with concrete footing and anchor bolts
I.AB.SC	Baseplate mount with monolithic concrete base and anchor bolts
I.AB.VC	Baseplate mount with monolithic concrete base and anchor bolts
I.TR.WM	Wall mount on wood or masonry surfaces
I.AB.SP	Baseplate mount single post with concrete footing and anchor bolts

Motorist Guidance: Road Guide and Trailblazer/Boundary Signs

M.DE.C	Direct Embedment with backfilled concrete footing
M.DE.E	Direct Embedment with backfilled and compacted earth

Traffic Regulatory

T.DE.TS	Direct embedment for assemblies with tubular posts
T.DE.WO	Direct embedment for assemblies with wood posts

Components of Mounting Code

TS	*Tubular Steel*
RS	*Round Tubular Steel (Pipe)*
BS	*Flat Bar Stock*
AA	*Aluminum Angle*
BP	*Baseplate*
SF	*Stem Footing*
CO	*Concrete*
RO	*Bedrock*
SC	*Solid Concrete Monolithic Base*
VC	*Veneer Covered Concrete Monolithic Base*
WM	*Wall Mount*
WO	*Wood Deck with through bolts*
DE	*Direct Embedment*
AB	*Anchor Bolts (J-Bolts)*
TR	*Threaded Rod (adhesive mount)*
TB	*Through Bolts (hex bolts*
LB	*Lag Bolts*

Post Material Codes

TDF	Treated Douglas Fir Post
TSYP	Treated Southern Yellow Pine Post
SGC	Structural Grade Western Red Cedar Post
CRW	Construction Heart Redwood Post
TWS	Tubular Weathering Steel
TGS	Tubular Galvanized Steel
TPS	Painted Tubular Steel
SBS	Steel Bar Stock
GBS	Galvanized Bar Stock
PBS	Painted Steel Bar Stock
WRC	Western Red Cedar with Steel Interior Post
RWS	Clear Heart Redwood with Steel Interior Post

Park Name Codes

ABLI	Abraham Lincoln Birthplace NHS
ACAD	Acadia National Park
ADAM	Adams NHP
AGFO	Agate Fossil Beds NM
AKRO	Alaska Region
AKSO	Alaska Support Office
ALAG	Alagnak Wild River
ALFL	Alibates Flint Quarries NM
ALPO	Allegheny Portage Railroad NHS
AMIS	Amistad Natl Rec Area
AMME	American Memorial Park
ANCH	Alaska Public Lands Info Ctr-Anchorage
ANDE	Andersonville NHS
ANIA	Aniakchak NM & Preserve
ANJO	Andrew Johnson NHS
ANTC	Antietam Natl Cemetery
ANTI	Antietam Natl Battlefield
APCO	Appomattox Court House NHP
APIS	Apostle Islands Natl Lakeshore
APPA	Appalachian Natl Scenic Trail
ARCH	Arches National Park
ARHO	Arlington House, The Robert E Lee Memorial
ARPO	Arkansas Post Natl Memorial
ASIS	Assateague Island Natl Seashore
AZRU	Aztec Ruins NM
BADL	Badlands National Park
BAND	Bandelier NM
BAWA	Baltimore-Washington Parkway
BEFR	Benjamin Franklin Natl Memorial
BELA	Bering Land Bridge Natl Preserve
BEOL	Bent's Old Fort NHS
BIBE	Big Bend National Park
BICA	Bighorn Canyon Natl Rec Area
BICY	Big Cypress Natl Preserve
BIHO	Big Hole Natl Battlefield
BISC	Biscayne National Park
BISO	Big South Fork Natl River & Rec Area
BITH	Big Thicket Natl Preserve
BLAC	Blackstone River Valley Natl Heritage Corridor
BLCA	Black Canyon of the Gunnison National Park
BLRI	Blue Ridge Parkway
BLUE	Bluestone Natl Scenic River
BOAF	Boston African-American NHS
BOHA	Boston Harbor Islands Natl Rec Area
BOSO	Boston Support Office
BOST	Boston NHP
BOWA	Booker T Washington NM
BRCA	Bryce Canyon National Park
BRCR	Brices Cross Roads Natl Battlefield Site
BRVB	Brown v Board of Education NHS
BUFF	Buffalo National River
BUIS	Buck Island Reef NM
CABR	Cabrillo NM
CACH	Canyon de Chelly NM
CACL	Castle Clinton NM
CACO	Cape Cod Natl Seashore
CAGR	Casa Grande Ruins NM
CAHA	Cape Hatteras Natl Seashore
CAKR	Cape Krusenstern NM
CALI	California Natl Historic Trail
CALO	Cape Lookout Natl Seashore
CANA	Canaveral Natl Seashore
CANY	Canyonlands National Park
CARE	Capitol Reef National Park
CARI	Cane River Creole NHP
CARL	Carl Sandburg Home NHS
CASA	Castillo de San Marcos NM
CATO	Catoctin Mountain Park
CAVE	Carlsbad Caverns National Park
CAVO	Capulin Volcano NM
CCSO	Columbia Cascades Support Office
CEBR	Cedar Breaks NM
CHAM	Chamizal Natl Memorial
CHAT	Chattahoochee River Natl Rec Area
CHCH	Chickamauga & Chattanooga Natl Military Park
CHCU	Chaco Culture NHP
CHIC	Chickasaw Natl Rec Area
CHIR	Chiricahua NM
CHIS	Channel Islands National Park
CHOH	Chesapeake & Ohio Canal NHP
CHPI	Charles Pinckney NHS
CHPO	Chicago Portage NHS
CHRI	Christiansted NHS
CHRO	Chimney Rock NHS
CIRO	City of Rocks Natl Reserve
CLBA	Clara Barton NHS
CMCO	Claude Moore Colonial Farm
COGA	Constitution Gardens
COLM	Colorado NM
COLO	Colonial NHP
CORO	Coronado Natl Memorial
COSW	Congaree Swamp NM
COWP	Cowpens Natl Battlefield
CRLA	Crater Lake National Park
CRMO	Craters of the Moon NM
CUGA	Cumberland Gap NHP
CUIS	Cumberland Island Natl Seashore
CURE	Curecanti Natl Rec Area
CUVA	Cuyahoga Valley National Park
DAAV	Dayton Aviation Heritage NHP
DABE	David Berger Natl Memorial
DELA	Delaware Natl Scenic Riverway
DELE	Delaware & Lehigh Natl Heritage Corridor
DENA	Denali National Park & Preserve
DEPO	Devils Postpile NM
DESO	De Soto Natl Memorial
DETO	Devils Tower NM
DEVA	Death Valley National Park
DEWA	Delaware Water Gap Natl Rec Area
DINO	Dinosaur NM
DRTO	Dry Tortugas National Park
DSC	Denver Service Center
EBLA	Ebey's Landing Natl Historical Reserve
EDAL	Edgar Allan Poe NHS
EDIS	Edison NHS
EFMO	Effigy Mounds NM
EISE	Eisenhower NHS
ELIS	Ellis Island
ELMA	El Malpais NM
ELMO	El Morro NM

ELRO	Eleanor Roosevelt NHS
EUON	Eugene O'Neill NHS
EVER	Everglades National Park
FAIR	Alaska Public Lands Info Ctr-Fairbanks
FAMA	Father Marquette NM
FARM	Farmington Wild & Scenic River
FDRM	Franklin Delano Roosevelt Memorial
FEHA	Federal Hall Natl Memorial
FIIS	Fire Island Natl Seashore
FILA	First Ladies NHS
FLFO	Florissant Fossil Beds NM
FOBO	Fort Bowie NHS
FOBU	Fossil Butte NM
FOCA	Fort Caroline Natl Memorial
FOCL	Fort Clatsop Natl Memorial
FODA	Fort Davis NHS
FODC	Fort Donelson Natl Cemetery
FODO	Fort Donelson Natl Battlefield
FOFR	Fort Frederica NM
FOLA	Fort Laramie NHS
FOLS	Fort Larned NHS
FOMA	Fort Matanzas NM
FOMC	Fort McHenry NM & Historic Shrine
FOMO	Fort Moultrie NM
FONE	Fort Necessity Natl Battlefield
FOPO	Fort Point NHS
FOPU	Fort Pulaski NM
FORA	Fort Raleigh NHS
FOSC	Fort Scott NHS
FOSM	Fort Smith NHS
FOST	Fort Stanwix NM
FOSU	Fort Sumter NM
FOTH	Ford's Theatre NHS
FOUN	Fort Union NM
FOUS	Fort Union Trading Post NHS
FOVA	Fort Vancouver NHS
FOWA	Fort Washington Park
FRDO	Frederick Douglass NHS
FRED	Fredericksburg Natl Cemetery
FRHI	Friendship Hill NHS
FRLA	Frederick Law Olmsted NHS
FRSP	Fredericksburg & Spotsylvania Natl Military Park
GAAR	Gates of the Arctic National Park & Preserve
GARI	Gauley River Natl Rec Area
GATE	Gateway Natl Rec Area
GEGR	General Grant Natl Memorial
GERO	George Rogers Clark NHP
GETC	Gettysburg Natl Cemetery
GETT	Gettysburg Natl Military Park
GEWA	George Washington Birthplace NM
GICL	Gila Cliff Dwellings NM
GLAC	Glacier National Park
GLBA	Glacier Bay National Park & Preserve
GLCA	Glen Canyon Natl Rec Area
GLDE	Gloria Dei (Old Swedes) Church NHS
GLEC	Glen Echo Park
GLOR	Glorieta Battlefield
GOGA	Golden Gate Natl Rec Area
GOSP	Golden Spike NHS
GRBA	Great Basin National Park
GRCA	Grand Canyon National Park
GREE	Greenbelt Park
GREG	Great Egg Harbor Scenic & Rec River
GRFA	Great Falls Park
GRKO	Grant-Kohrs Ranch NHS
GRPO	Grand Portage NM
GRSA	Great Sand Dunes National Park
GRSM	Great Smoky Mountains National Park
GRSP	Green Springs Historic District
GRTE	Grand Teton National Park
GUCO	Guilford Courthouse Natl Military Park
GUIS	Gulf Islands Natl Seashore
GUMO	Guadalupe Mountains National Park
GWCA	George Washington Carver NM
GWMP	George Washington Memorial Parkway
HAFE	Harpers Ferry NHP
HAFO	Hagerman Fossil Beds NM
HAGR	Hamilton Grange Natl Memorial
HALE	Haleakala National Park
HAMP	Hampton NHS
HAVO	Hawaii Volcanoes National Park
HEHO	Herbert Hoover NHS
HFC	Harpers Ferry Center
HOAL	Horace M Albright Training Center
HOBE	Horseshoe Bend Natl Military Park
HOCU	Hopewell Culture NHP
HOFR	Home of Franklin D Roosevelt NHS
HOFU	Hopewell Furnace NHS
HOME	Homestead NM of America
HOSP	Hot Springs National Park
HOVE	Hovenweep NM
HPTC	Historic Preservation Training Center
HSTR	Harry S Truman NHS
HUTR	Hubbell Trading Post NHS
IATR	Ice Age Natl Scenic Trail
ICAG	Ice Age Natl Scientific Reserve
ICRC	Intermountain Cultural Resource Center
ILMI	Illinois & Michigan Canal Natl Heritage Corridor
IMDE	Denver Support Office
IMRO	Intermountain Region
IMSF	Santa Fe Support Office
INDE	Independence NHP
INDU	Indiana Dunes Natl Lakeshore
ISRO	Isle Royale National Park
JAGA	James A Garfield NHS
JAME	Jamestown NHS
JAZZ	New Orleans Jazz NHP
JECA	Jewel Cave NM
JEFF	Jefferson Natl Expansion Memorial
JELA	Jean Lafitte NHP & Preserve
JICA	Jimmy Carter NHS
JODA	John Day Fossil Beds NM
JODR	John D Rockefeller Jr Memorial Parkway
JOFI	John Fitzgerald Kennedy NHS
JOFL	Johnstown Flood Natl Memorial
JOMU	John Muir NHS
JOTR	Joshua Tree National Park
KAHO	Kaloko-Honokohau NHP
KALA	Kalaupapa NHP
KATM	Katmai National Park & Preserve
KEFJ	Kenai Fjords National Park
KEMO	Kennesaw Mountain Natl Battlefield Park

KEWE	Keweenaw NHP
KIMO	Kings Mountain Natl Military Park
KLGO	Klondike Gold Rush NHP
KLSE	Klondike Gold Rush NHP-Seattle Unit
KNRI	Knife River Indian Villages NHS
KOVA	Kobuk Valley National Park
KOWA	Korean War Veterans Memorial
LABE	Lava Beds NM
LACH	Lake Chelan Natl Rec Area
LACL	Lake Clark National Park & Preserve
LAME	Lake Mead Natl Rec Area
LAMR	Lake Meredith Natl Rec Area
LARO	Lake Roosevelt Natl Rec Area
LAVO	Lassen Volcanic National Park
LBME	LBJ Memorial Grove on the Potomac
LECL	Lewis & Clark Natl Historic Trail
LIBI	Little Bighorn Battlefield NM
LIBO	Lincoln Boyhood Natl Memorial
LIHO	Lincoln Home NHS
LINC	Lincoln Memorial
LIRI	Little River Canyon Natl Preserve
LIRO	Little Rock Central High School NHS
LODI	Long Distance Trails Group-Santa Fe
LODT	Long Distance Trails Group-Salt Lake City
LONG	Longfellow NHS
LOWE	Lowell NHP
LYJO	Lyndon B Johnson NHP
MAAC	Maine Acadian Culture Project
MABI	Marsh-Billings-Rockefeller NHP
MACA	Mammoth Cave National Park
MALU	Martin Luther King Jr NHS
MANA	Manassas Natl Battlefield Park
MANZ	Manzanar NHS
MASI	Manhattan Sites
MAVA	Martin Van Buren NHS
MAWA	Maggie L Walker NHS
MCHO	McLoughlin House NHS
MEAF	US/Mexico Affairs Office
MEVE	Mesa Verde National Park
MIMA	Minute Man NHP
MIMI	Minuteman Missle NHS
MISS	Mississippi Natl Reserve & Rec Area
MMBC	Mary McLeod Bethune Council House NHS
MNRR	Missouri Natl Rec River
MOCA	Montezuma Castle NM
MOCR	Moores Creek Natl Battlefield
MOJA	Mojave Natl Preserve
MONO	Monocacy Natl Battlefield
MOPI	Mormon Pioneer Natl Historic Trail
MORA	Mount Rainier National Park
MORR	Morristown NHP
MORU	Mount Rushmore Natl Memorial
MUWO	Muir Woods NM
MWAC	Midwest Archeological Center
MWRO	Midwest Region
MWSO	Midwest Support Office
NABR	Natural Bridges NM
NACC	National Capital Parks-Central
NACE	National Capital Parks-East
NAMA	National Mall
NATC	Natchez NHP
NATR	Natchez Trace Parkway
NATT	Natchez Trace Natl Scenic Trail
NAVA	Navajo NM
NCRO	National Capital Region
NCSO	National Capital Support Office
NEBE	New Bedford Whaling NHP
NEJE	New Jersey Coastal Heritage Trail Route
NEPE	Nez Perce NHP
NERI	New River Gorge Natl River
NERO	Northeast Region
NICO	Nicodemus NHS
NIOB	Niobrara Natl Scenic River
NISI	Ninety Six NHS
NOAT	Noatak Natl Preserve
NOCA	North Cascades National Park
NOCO	North Country Natl Scenic Trail
NPS	National Park Service
NPSA	National Park of American Samoa
NWAK	Northwest Alaska Areas
OBRI	Obed Wild & Scenic River
OCMU	Ocmulgee NM
OKCI	Oklahoma City Natl Memorial
OLYM	Olympic National Park
OPOT	Old Post Office Tower
ORCA	Oregon Caves NM
OREG	Oregon Natl Historic Trail
ORPI	Organ Pipe Cactus NM
OVVI	Overmountain Victory Natl Historic Trail
OZAR	Ozark Natl Scenic Riverways
PAAL	Palo Alto Battlefield NHS
PAAV	Pennsylvania Avenue NHS
PAIS	Padre Island Natl Seashore
PECO	Pecos NHP
PEFO	Petrified Forest National Park
PERI	Pea Ridge Natl Military Park
PETE	Petersburg Natl Battlefield
PETR	Petroglyph NM
PEVI	Perry's Victory & Internatl Peace Memorial
PGSO	Pacific Great Basin Support Office
PHSO	Philadelphia Support Office
PIMA	Hohokam Pima NM
PINN	Pinnacles NM
PIPE	Pipestone NM
PIRO	Pictured Rocks Natl Lakeshore
PISC	Piscataway Park
PISO	Pacific Islands Support Office
PISP	Pipe Spring NM
POEX	Pony Express Natl Historic Trail
POGR	Poplar Grove Natl Cemetery
POHE	Potomac Heritage Natl Scenic Trail
POPO	Poverty Point NM
PORE	Point Reyes Natl Seashore
PRES	Presidio of San Francisco
PRPA	President's Park
PRWI	Prince William Forest Park
PUHE	Puukohola Heiau NHS
PUHO	Pu'uhonua o Honaunau NHP
PWRO	Pacific West Region
RABR	Rainbow Bridge NM
REDW	Redwood National & State Parks
RICH	Richmond Natl Battlefield Park

RIGR	Rio Grande Wild & Scenic River
ROCA	Roosevelt Campobello Internatl Park
ROCR	Rock Creek Park
ROLA	Ross Lake Natl Rec Area
ROMO	Rocky Mountain National Park
RORI	Rosie the Riveter/World War II Home Front NHP
ROVA	Roosevelt-Vanderbilt Headquarters
ROWI	Roger Williams Natl Memorial
RUCA	Russell Cave NM
SAAN	San Antonio Missions NHP
SACN	Saint Croix Natl Scenic Riverway
SACR	Saint Croix Island Internatl Historic Site
SAFE	Santa Fe Natl Historic Trail
SAFR	San Francisco Maritime NHP
SAGA	Saint-Gaudens NHS
SAGU	Saguaro National Park
SAHI	Sagamore Hill NHS
SAIR	Saugus Iron Works NHS
SAJH	San Juan Island NHP
SAJU	San Juan NHS
SAMA	Salem Maritime NHS
SAMO	Santa Monica Mountains Natl Rec Area
SAPA	Saint Paul's Church NHS
SAPU	Salinas Pueblo Missions NM
SARA	Saratoga NHP
SARI	Salt River Bay NHP & Ecological Preserve
SCBL	Scotts Bluff NM
SEBE	Sewall-Belmont House NHS
SEKI	Sequoia & Kings Canyon National Parks
SERO	Southeast Region
SESO	Southeast Support Office
SHEN	Shenandoah National Park
SHIC	Shiloh Natl Cemetery
SHIL	Shiloh Natl Military Park
SITK	Sitka NHP
SLBE	Sleeping Bear Dunes Natl Lakeshore
SOAR	Southern Arizona Group
SPAR	Springfield Armory NHS
STEA	Steamtown NHS
STLI	Statue of Liberty NM
STMA	Stephen T Mather Training Center
STRC	Stones River Natl Cemetery
STRI	Stones River Natl Battlefield
SUCR	Sunset Crater Volcano NM
TAPR	Tallgrass Prairie Natl Preserve
THIS	Theodore Roosevelt Island
THJE	Thomas Jefferson Memorial
THKO	Thaddeus Kosciuszko Natl Memorial
THRB	Theodore Roosevelt Birthplace NHS
THRI	Theodore Roosevelt Inaugural NHS
THRO	Theodore Roosevelt National Park
THST	Thomas Stone NHS
TICA	Timpanogos Cave NM
TIMU	Timucuan Ecological & Historic Preserve
TONT	Tonto NM
TOSY	Touro Synagogue NHS
TRTE	Trail of Tears Natl Historic Trail
TUAI	Tuskegee Airmen NHS
TUIN	Tuskegee Institute NHS
TUMA	Tumacacori NHP
TUPE	Tupelo Natl Battlefield
TUZI	Tuzigoot NM
ULSG	Ulysses S Grant NHS
UNST	United States Park Police
UPDE	Upper Delaware Scenic & Rec River
USAR	USS Arizona Memorial
VAFO	Valley Forge NHP
VAMA	Vanderbilt Mansion NHS
VICC	Vicksburg Natl Cemetery
VICK	Vicksburg Natl Military Park
VIIS	Virgin Islands National Park
VIVE	Vietnam Veterans Memorial
VOYA	Voyageurs National Park
WABA	Washita Battlefield NHS
WACA	Walnut Canyon NM
WAMO	Washington Monument
WAPA	War in the Pacific NHP
WASO	Washington Support Office
WEFA	Weir Farm NHS
WHHO	White House
WHIS	Whiskeytown-Shasta-Trinity Natl Rec Area
WHMI	Whitman Mission NHS
WHSA	White Sands NM
WICA	Wind Cave National Park
WICR	Wilson's Creek Natl Battlefield
WIHO	William Howard Taft NHS
WORI	Women's Rights NHP
WOTR	Wolf Trap Farm Park
WRBR	Wright Brothers Natl Memorial
WRST	Wrangell-St Elias National Park & Preserve
WUPA	Wupatki NM
YELL	Yellowstone National Park
YOHO	Yucca House NM
YORK	Yorktown Natl Cemetery
YOSE	Yosemite National Park
YUCH	Yukon-Charley Rivers Natl Preserve
ZION	Zion National Park

Chapter 3

UniGuide Planning, Design & Documentation

Section 3.2

Guidelines for Sign Use & Placement by Sign Type

Final Draft: *June 1, 2002*

Introduction

These guidelines provides general instruction for sign planners and installers on the application and placement of signs by sign type within the UniGuide Program. Sign types are listed below:

Identification

- Park Identification
- Facility Identification

Motorist Guidance

- Road Guide Signs within parks
- Highway Guide Signs leading to parks
- Trailblazers
- Boundary signs
- Traffic Regulatory and Warning Signs

Visitor Information System

VIS Facility Identification

- VIS Park Identification
- VIS Facility/Park Identification

Vehicular Entry and Guide

- Area Entry
- Small Guide
- Traffic Regulatory

Secondary Identification

- Area Identification
- Campsite Identification
- Parking Lot Identification
- Shuttle Stop Identification

Fee Displays

- Entrance Fees
- Recreation Fees

Pedestrian Guidance

- Trail Guide
- Fingerboard
- Street Name

Specific Visitor Information

- Information/Instruction
- Resource Management
- Messaging
- Regulations
- Protection
- Safety Warning Danger
- Symbol Based Regulation
- Miscellaneous Postings
- Maps

The UniGuide Program is based on a systems approach to park signing. The intent of a systems approach is to use the most appropriate sign type for a specific purpose and to use a consistent approach to all signing of a similar type throughout a park. Uniform installations will reduce sign clutter and make the signs more inviting and accessible for visitors.

This section provides general guidance to park staff on the method to locate signs and develop legends in a consistent way throughout a park and all parks.

Because of inherent differences in site conditions, there will be variation from one facility to another. It is, however, important to maintain consistency wherever possible by placing signs at a common mounting height, scaling sign sizes to the viewing distance, presenting messages in a uniform way, and locating signs for ease of view by the approaching visitor.

Prior to installation, each placement must be carefully identified and staked by a person familiar with the park, the UniGuide Standards, and the way each site is used by visitors.

Guidelines Common to Most Sign Placements

- Use Identification Signs to affirm the NPS identity and character of the park.
- Place Motorist Guidance Signs in advance of destination at a distance based on speed of approach, complexity of intersection, and quality of sight lines.
- Place signs on the approaching viewer's right side.
- Place signs perpendicular to the viewer's approach.
- Scale signs appropriate to site and/or sight lines.
- Size sign panels based on viewing distance and legend size, and enlarge them for locations where greater numbers of people view an installation at the same time.
- Place signs of the same type at a common height above grade.

General Guidance on Sign Placement and Installation

For complete specifications on sign mounting, installation, and footings refer to Section 5.1 in the Field Manual.

- Stake all sign mounting locations in accordance with the park's UniGuide Plan and the plan identification number on the stake.
- Stakes for double post signs adjacent to roads or trails identify the inboard post. Stake location of both posts of Visitor Information System assemblies to assure proper orientation of installation.
- Preassemble Visitor Information System assemblies prior to installation.
- Embed standard mounting for double post VIS and Narrow Profile campsite identifiers directly in 10" x 10" x 36" holes and backfill with existing material in 6" lifts to 95% compaction. Alternate mountings are provided for baseplate (anchor bolts and shield mount), stem mount, mounting on wood boardwalks, and wall mounting.
- Install Road Guide Signs using timber uprights with concrete reinforced footing as specified in Section 4.4 and 5.1.
- Install Identification Signs with steel frame in either a monolithic or double post assembly, or as a single post timber hanging sign with concrete reinforced footing specified in Sections 4.3 and 5.1.

Sign Removal and Demolition

- Remove all existing signs being replaced unless otherwise noted and dispose of properly and/or recycle as appropriate. Backfill area around removed sign and restore to original grade.
- Fill holes in masonry surfaces with tinted grout to match existing surface.
- Fill holes in wood surfaces with exterior grade wood filler and patch–paint to match existing color.

Placement Guidelines to Reduce Impacts

Signs should be placed so they have as little impact as possible on the sites.

- Objects of archeological significance may affect sign placement. Installers should consult the Park UniGuide Manager prior to installing signs to learn if signs are intended for areas with known archeological findings. If archeological resources are discovered in the process of digging footings for signs, stop the installation and notify the person responsible for checking such findings.

- Trees and tree root systems may affect sign placement. When placing signs that may impact tree root systems, follow guidelines on tree and plant protection in Section 5.1, Field Manual, and General Contract Requirements in Section 4.1. If there is a potential for tree root damage when placing a sign, adjust the location accordingly. If a sign placement location must be changed, verify sight lines to affirm that the sign is still visible from the designated approach.
- Subsurface obstructions may limit the depth of a standard footing. Alternative footings are specified for the Visitor Information System in Section 5.1. For nonstandard footings for Identification Signs and Motorist Guidance Signs, consult with your Regional UniGuide Coordinator or the National UniGuide Manager in Harpers Ferry concerning ways to address unusual mounting configurations. Generally this will require site–specific engineering based on established criteria.
- Surface obstructions like rock tables and tree stumps may affect sign placement. If a conflict exists, adjust the sign location accordingly. If a location must be changed, verify sight lines to affirm that sign is still visible from the designated approach.
- If the proposed sign location will adversely affect adjacent land use or become a safety hazard, identify an alternate location or change the land use plan.Specific guidelines on placement are provided on the following pages for each type of sign.

References in this Manual: References to typography, use of the Arrowhead logo, sign layout grid formats, color and mounting systems are described in this section. Also see graphic standards in Chapter 2, sign structures in Chapter 4 and guidance on custom bases for Identification Signs in Section 3.3 of this chapter.

Park Identification Signs

The Park Identification Sign is important because it provides a gateway into the park and welcomes a visitor. Above all other signs used in a national park, the Identification Sign is an architectural statement that should reflect the importance and quality of the park and the institution.

Graphic Standards: A standard panel format has been developed for all national park Identification Signs. Grid formats specified on pages 2.1-72 to 2.1-79, include the full name of the park in uppercase and lowercase NPS Rawlinson Heavy typeface. The National Park Service/US Department of the Interior identification, displayed in Frutiger Bold, typeface, is placed with the NPS Arrowhead logo in the dark green overbar with an option for putting the Arrowhead on custom, traditional sign structures. Placement of other logos or graphics on the panels is strongly discouraged. For guidance on the identification of NPS facilities managed jointly with another agency, consult the UniGuide Program Manager in Harpers Ferry.

Panel Format: Format of the legend will vary depending on the orientation of the sign and the length of the park name. The ground-mounted format accommodates a one to three line legend, with two-to-four-line legend in the hanging format. Because of great differences in the length of park names, what looks balanced in the layout for one park may look odd for another. Layout options are provided in Section 6.4.

Because some parks are decentralized with unconnected units or many access points, the entrance may be named after the unit. In that case, the legend accommodates the name of the park as a secondary legend under the name of the unit.

This format should be used only when the unit name is more commonly used than the park name.

Mounting format: Four standard mounting formats are specified: double post, monolithic base of concrete or concrete and stone veneer, wall-mounted panels and a single timber post hanging sign. Alternate designs based on traditional park identification sign forms are shown in Chapter 3.

Material: All structures incorporate a interior structural steel post and baseplate mounting configuration, with double post and monolithic structures having a cedar exterior. Panels are specified with routed Western Red Cedar panel or with redwood, but alternative materials may include laser cut steel mounted to steel, sand blasted stone, and synthetic granite and synthetic sandstone panels with routed graphics. For alternative applications, consult the National UniGuide Manager.

Size: Identification Signs are proportionally sized based on the size of the primary legend. These include 4", 6", 9", and 12" in the ground-mounted format used for signs with double post, monolithic bases, and wall mount. The width of the ground-mounted panel is dictated by the longest line of the legend. The single post hanging sign format is specified with a 3" legend or 4" legend placed on a 36" or 48" wide panel respectively.

Concepts of larger custom-designed hanging signs are shown in Section 3.3. The advantage of the hanging sign is that it places the sign higher than same size ground mount and provides more conspicuity with a smaller sign.

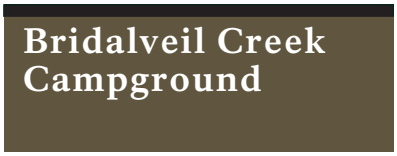
Although the panels are proportional based on the primary legend size (x), the height above grade level is based on the specific proportions of the panel size. For example, the height above grade to the base of a panel with 4" primary legend is 33", but the same dimension for panels with 6", 9", and 12" primary legends are 36, 24", and 30" respectively.

Placement: Identification Signs are architectural installations. They are sized and sited in a way that will frame the entrance or placed in a way to dignify the entrance and the sign. To that end, the sign is sized to the location. Legibility is secondary. Because these are large signs, the only realistic way to determine the appropriate size is to mockup the mass of the sign with plywood or use banners available from Harpers Ferry Center.

It is very important that the entry at a park be designed by a landscape architect familiar with the requirements of the entry experience. Ideally, especially at large parks, the entry is not just a sign but a stopping point for photos and a location where comfort stations are provided and where orientation and accommodation information is displayed. With these requirements, the area must have adequate circulation without cluttering the view of the sign and the portal to the park. In many cases, the entrance should be located not at the boundary but at the place of greatest impact.

Place Identification Signs

Application: Use the Place Identification Sign as a welcome portal to each primary facility such as a campground, scenic vista, trailhead, and visitor center. When installed at an appropriate scale and siting with related site improvements, the sign will create a clear and positive identity of the area for visitors.



Legend: Include the full name of the facility and the distinctive NPS dark green overbar. Because the Facility Identification Sign is generally placed within the park boundary, the NPS/DOI name and NPS Arrowhead logo do not appear on the sign.

Mounting Format: The ground-mounted panel is used for double post and monolithic structures. Monoliths may be

concrete or concrete with stone or brick veneer. If the base is veneered, use indigenous material without a heavily domesticated appearance. The doublepost, horizontal format is used for signs placed at eye level with site conditions allowing for an appropriately long view of the sign on the land. The horizontal format is also used for wall-mounted signs. The alternate is the traditional hanging mount. This mount enhances viewing by placing a smaller panel above the ground plane.

Size: Ground-mounted signs are specified based on the size of the primary legends of 4", 6", 9", and 12" with the width of panel based on length of legend. The mounting heights have been specified for each size but may be adjusted because of site conditions. Hanging panels have 3" and 4" legends with 36" and 48" standard panel widths respectively.

Identification signs are sized relative to viewing distance and sight lines. For facility signs on higher speed roads, determine the size by whatever scale feels appropriate to that particular location. For most locations, a 4" and 6" legend sign will be the most effective without making the sign overly large. To help identify the correct size and location, use cardboard the same size as the proposed sign panel and mock up the installation, or use banners that can be borrowed from Harpers Ferry Center.

Typeface and grid format: The legend is displayed in uppercase and lowercase NPS Rawlinson Heavy with initial capital letters only and aligned flush left. Placement of other graphics or information legends on the sign panel is strongly discouraged.

Panel format: The panel format allows two options with a one-to-three-line grid format for ground-mounted monoliths and double post signs and hanging signs. The overall panel widths and lengths are based on a standard proportion for all signs of this type. The format includes a dark green horizontal overbar similar to the black overbar which has become the signature of Harpers Ferry NPS publications and wayside exhibits. The panel is gray brown with white legend.

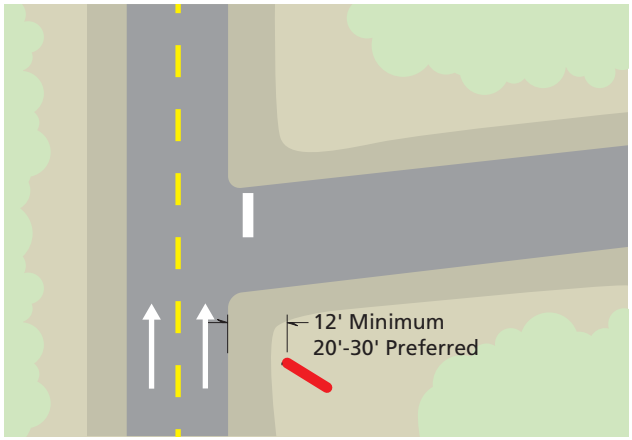
The assistance of a graphic designer may be required to select the most visually balanced configuration of the name on the panel. One example: Lower Pines Campground, with the words Lower Pines being equal in length to the word Campground, is most pleasing if displayed in a two-line format instead of three lines. In general, a long first line with shorter second line is preferable to the opposite configuration.

An alternative Facility Identification Sign includes the park name and NPS identifier if the facility is also a primary park entrance. See examples on page 2.1-80 in Chapter 2, Graphic Standards.

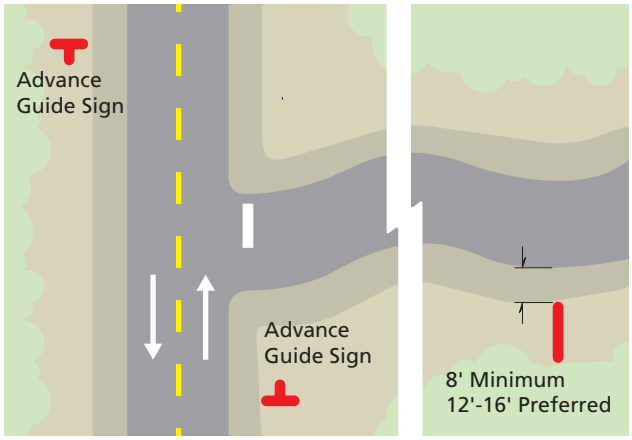
Placement: For most sites the sign is placed perpendicular to the approaching viewers' sight lines with a double-faced assembly. Even when most traffic approaches from one direction, the assembly is may be more effective if lettered on both sides. At some locations, the sign is placed on the actual entry road and need not have a legend on the back face.

Hanging-mounted panels are optimal in locations with a narrow frontage and locations with tall trees and vegetation close to the road.

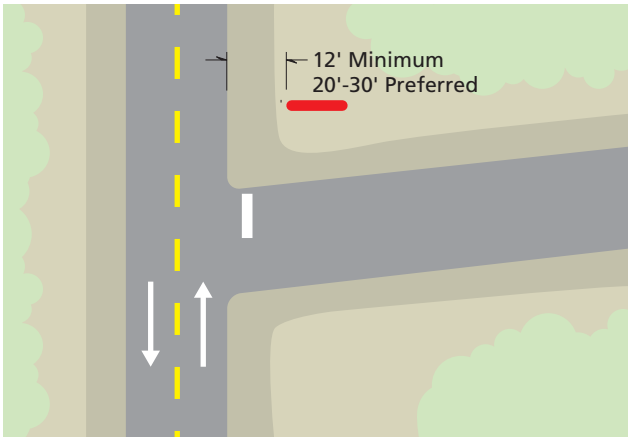
As an architectural element, the sign and should be placed integral to the site with an adequate setback to create a framed setting. There are no set rules for exact location of Identification Signs. Appropriate setbacks vary depending on site conditions. Formal entrances leading to heavily traveled destinations should incorporate the sign as a design element with minimal site domestication. Examples of various site configurations are shown on the following pages.



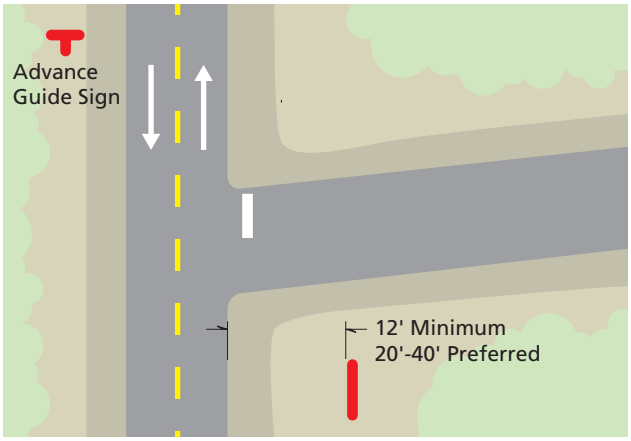
- Single face Identification Sign placed in advance of entrance. For clear view by entering visitors, augment Identification Sign with appropriate advance Road Guide Signs.



- Single face Identification Sign placed along facility access road if destination is not close to main road. Advance Road Guide Signs are used to identify destination from primary highway.



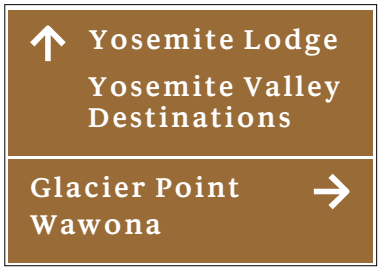
- Double-faced Identification Sign placed near corner for clear view from primary direction of approach.



- To frame entry to large or important locations, a single face Identification Sign is placed perpendicular to approach. Use where sight lines are not critical or at locations augmented with advance Road Guide Signs.

Road Guide Signs

Application: Road Guide Signs are used on park roads to direct the first-time or infrequent visitor to facilities and areas of a park. For vehicular areas that are not on primary park roads, such as those within campgrounds, picnic areas, and large parking facilities, use Small Guide Signs specified in the Visitor Information System.



Road Guide Signs are placed at or in advance of a destination point to direct visitors to a location. The legend should assume a lack of prior knowledge. This lack of familiarity and typical narrow, winding roads require that sign size, placement, and legend content be carefully planned, so drivers can read and safely respond to the information.

These Road Guide Sign placement guidelines provide general instructions on guide sign planning but do not preclude the need for a site analysis, legend formulation, and placement location plan by a qualified traffic engineer.

Grid Format: Road Guide Signs must be not only orderly and consistent but–adaptable to the many different roadside conditions. The 11 standard NPS Road Guide Signs formats shown on Page 2.1-88 in Chapter 2 allow for consistent use of destination name, recreation symbol or route shield, distance, directional arrow and/or turn instructions. Based on the size of the legend (X), the order, alignment, layout, and size relationship of all elements are common on a proportional grid.

The grid format has been designed to give a consistent figure/field relationship of legend to panel regardless of overall length or borders and interline space by using adjustable panel widths and standard depths for legend modules. A sign panel is assembled using modules for legends (single, double, or triple lines) and modules for top border, bottom border, and line breaks: a white lines used to separate a two different direction modules. Ideally, each panel should have the shortest possible horizontal dimension for proper mounting on the narrow-shoulder roads in most national parks. Detailed instructions on the assembly of Road Guide Signs with all possible options are displayed in the Motorist Guidance Section of Chapter 2, page 2.1-86 to 2.1-111. These options can be laid out using the UniGuide Manager software program.

Legend Formulation: Guide sign legends include only enough information to direct motorists to the next decision point. The initial legend may direct motorists to a general area of a park. Once in the general area, the motorist is then directed to specific locations within that area.

Ideally a sign should include no more than three destinations. A driver's ability to read, comprehend, and react to a complex array of options is limited. If there are more destinations, list only the three most important ones.

For legibility, Road Guide Signs must be properly laid out. Flush left alignments should be carefully maintained. Interline space and the space around legends, route shields, symbols, and directional arrows have been carefully calculated on the grids provided to make all signs as easy to read as possible. Road Guide Signs are constructed from the inside out; the dimensions of the sign are based on the content and the space around the legend. Do not attempt to fit a legend on a smaller panel.

Because the system is proportionally based, signs have common proportions regardless of legend size or the amount of content on the sign. With use of the specified proportions, the panel will always be consistently tailored to the area of the legend.

Legend content must be succinct without ambiguity and be consistent, using the same wording for a specific destination on each sign. Where possible, avoid using similar words for different destinations, such as Yosemite Village and Curry Village. In

this instance, Yosemite Village and Camp Curry are preferred. Instead of a sign guiding visitors to Yosemite Lodge and Yosemite Village, use Yosemite Lodge and Visitor Center & Village as an alternative.

Guide Signs:

- A single destination will include place name with optional recreation symbol.
- Two or three destination signs will include place name with optional recreation symbols.
- Four destinations signs will include only the place name (no symbols). Signs with four destinations should be located at the far corner of an intersection, not in advance of the STOP sign to give a viewer time to read and interpret the complex message.

Refer to guidelines on the use of directional modules in Chapter 2.

The ordering of messages on Road Guide Signs with appropriate arrow alignment is:

- First position—Straight
- Second position—Left
- Third position—Right

On mileage signs (Grid RG-6), list the locations in order of approach with closest in the first position.

Typeface: The typeface is NPS Rawlinson Road, uppercase and lowercase (initial capital letters), aligned flush left on the module grid. Secondary legends and advance guidance and advisory panels are Frutiger Bold with advance guide legends (NEXT LEFT, 1/4 MILE, etc.) displayed in all capital letters with .8X capital letter height. All panel are sizes are based on the capital letter size (X) with all other panel proportions being a function of "X".

Symbols: NPS/SEGD National Recreation Symbols are used on Road Guide Signs in "reverse" format with white figure and border on a brown field. The size of the symbol is generally 2.5X cap height for standard grid and 3X when used on vertical format single destination signs (Grid RG-7).

Legend Size and Reaction Time: Signs placed along a roadway must be sized to allow for clear comprehension from a vehicle traveling at the posted speed. Placed the signs in advance of the decision point so that the driver can read, interpret, and react to the information if there is a change in direction. To determine sign size and placement relative to viewing distance and reaction time, use the chart provided in Section 3.4 of this chapter.

Legend sizes should be standardized where possible. These guidelines specify uppercase and lowercase legends with 4" and 6" letters for general park roads and 8" letters for higher-speed park roads. Guide signs placed in campgrounds and off-highway roads will use the Small Guide Sign format with 280 pt legend (2.75") as specified in the Visitor Information System guideline

Mounting: All assemblies are mounted with timber posts embedded in concrete footings. The post and sign panel are attached with two or three aluminum angles that extend the full width of the panel, match-plate composite section design for ease of alignment in mounting. The sign panel has an aluminum skin on front and back with rigid poly core. Each panel size has been engineered for wind loading. The specific configuration of each assembly is specified in Section 4.4, with mounting and assembly instructions in Section 5.1.

The sign upright can be modified to incorporate a breakaway baseplate or frangible coupling as per the FHWA Traffic Control Devices Handbook (Part II), the AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaire and Traffic Signals (Chapter 4), the AASHTO Roadside Design Guide (and as incorporated into the NPS Sign Manual 1988), and the NCHRP Recommended Procedures for the Safety Performance Evaluation of Highway Features (Report 350). Use of breakaway bases is discouraged by the AASHTO standards when signs are mounted on an uneven grade where calculation of impact point is not possible, or in pedestrian zones where an impacted sign may dislodge and hit a bystander.

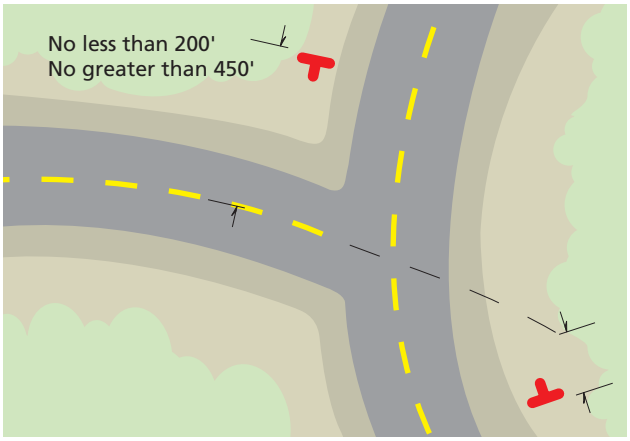
Sign Placement: Standardize sign locations whenever possible. The general rule is to locate signs on the right hand side of the roadway where drivers customarily look for them. Signs in other locations, except for those mounted overhead on mastarms (not included in this standard), should be considered supplementary to signs on the right. Road Guide Signs on one-way road systems to direct motorists to the left at an intersection are mounted on the left.

Placements should follow a uniform plan so that motorists, once accustomed to the plan, will be able to use the system with greatest comfort. A Forest Service reference handbook, *Placement Guide for Traffic Control Devices* (FS 8171 2603, out of print), supplements the MUTCD.

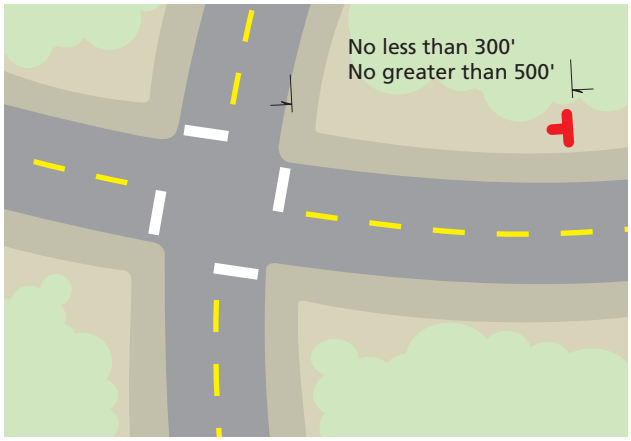
Signs should be located so that they do not obscure each other or are hidden from view by other roadside objects. Placement should allow drivers at least 250 feet to read the sign and an equal distance to react in advance of a turn. Actual distance will vary depending on speed of approach, clarity of sight lines, and available locations for sign placement. The lateral clearance for smaller guide signs should be from 6 to 12 feet from the edge of the pavement (the fog line). For larger guide signs, the lateral clearance from the edge of the pavement may be greater because of site conditions. To make certain that signs are not obscured by parked or standing vehicles and to ensure uniformity in placement, the recommended minimum mounting height of 6 feet should always be followed. For greater legibility at high-speed locations, or in more congested areas, the height of the sign from the ground to the base of the panel can be 7 feet.

Placement for specific conditions:

- Guide signs with up to three destination legends are to be located not less than 300 feet and not more than 500 feet in advance of the intersection to allow viewers the needed time to see the sign, read the legend, and respond.

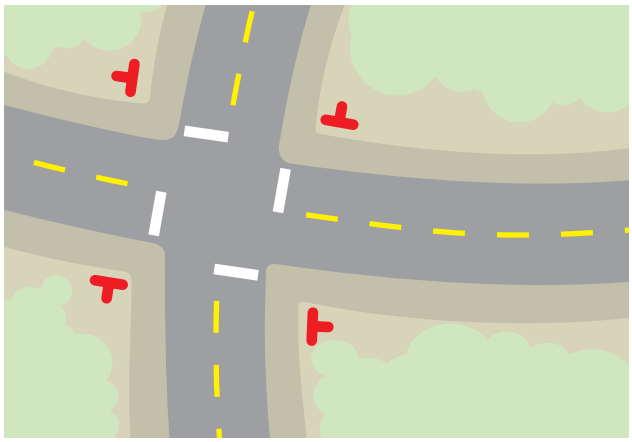


- Guide signs with one destination legend are to be located not less than 200 feet and not more than 450 feet in advance of the intersection to allow viewers to see, read, and react.



- Junction signs and advance turn arrows should be placed no less than 300 feet in advance of the intersections.

- Symbol signs and (route shield) cardinal direction guide signs are posted in advance of intersections. If the intersection includes a STOP sign, place the Road Guide Signs on the far side of the intersection.



- At primary intersections with three directions on the sign and two or more possible directions of travel and all converging drivers required to STOP, place guide signs beyond the intersection to keep the view open at the stop line.

Highway Guide

Application: Highway Guide Signs are designed for placement on state and federal roads outside of the park entrance.

Panel Grid Format: The standard grid has three formats. One includes the name of park with directional arrow, and the other two include the park name and advance guide legend (EXIT 16 NORTH, or EXIT 1 MILE). The second and third formats may be displayed with the NPS Arrowhead logo on the left, though placement of the Arrowhead on a panel may require approval from a state highway official where placement is requested. The full park name is placed on a one-to-three-line legend displayed in NPS Rawlinson Roadway, upper and lowercase with initial capital letters. The advance guide legend is Frutiger Bold in all capital letters with Frutiger Black numbers.

Size: The panel layout is proportional, and the size is based on the prevailing speed of the highway. Refer to legend size guidelines in Section 3.4 of this chapter.

Sign Placement: Locate signs based on state guidelines for advance Road Guide Signs. In some cases there will be two signs, one placed in advance of an exit (EXIT I MILE) and the second placed directly before the exit or deceleration lane with an arrow showing the direction of travel.

Sign Structure: Follow state designs for structure. Maintain all graphic formats shown by providing a layout and digital production file to the state or company making the sign panel. In some cases the NPS will provide the sign panel, manufactured by Unicor and sent to the state or county for installation.

Trailblazer and Park Boundary Signs

Application: Trailblazer Guide Sign are intended for use in urban and suburban locations to guide visitors to NPS parks and sites from local roads. Park Boundary Signs are used to identify the boundary at locations where the formal entrance is beyond the boundary, in a different location, or in locations in and around private lands. These signs are intended to provide guidance, identification, and in the spirit of messaging, the NPS identity. In metropolitan areas with many NPS locations, this visual identity can be significant.

Legend and Typeface: The legend of both sign types includes

the full park name using the NPS Rawlinson Roadway typeface with initial capital letter and flush left alignment. Above the name is an overbar with National Park Service set in Frutiger Bold and the NPS Arrowhead logo. The secondary guide legend of "LEFT 1/2 MILE" on guide signs, or

"ENTERING" and "LEAVING" on Boundary Signs is Frutiger Bold.

Panel Size and Grid Format: The panel grid formats are displayed on pages 2.1-105 to 2.1-122 and include one- to four-line versions in three standard widths dictated by the layout of the sign. Three legend sizes are specified: 2", 3", and 4". The panel size is based on the size of the legend. In most urban locations, signs with 3" and 4" legends are preferred. Use 2" legend only for neighborhood streets.

Sign Placement: All Boundary and Trailblazer signs are placed on the driver's right side unless the road is one-way and the sign is directing a motorist to make a left turn. Place Trailblazers in advance of the decision point. In urban locations, this will be between 50' to 200'. Advance guide legends are set ahead of a panel with directional arrow. Local conditions will dictate sign location, but try to place Trailblazers at each decision point leading to a park site from the main circulation route. Place sign a minimum of 7' to the base of the panel.
Boundary Signs are sized and placed for ease of reading at or close to the boundary. A second sign may be placed on the opposite side of the road if it is important to identify the boundary for traffic leaving the park area.

Traffic Regulatory and Warning Signs

The content and form of traffic Regulatory and Warning signs are mandated by the Federal Highway Administration in the Manual on Uniform Traffic Control Devices. This standard includes guidelines for mounting these signs. Parking Control Signs follow a NPS UniGuide standard format, and are described separately in the following section.

Placement: The exact placement of Regulatory and Warning signs will differ depending on the type of sign and road condition. In general, Regulatory signs are to be installed where the mandate or prohibition applies or begins. Warning signs are to be placed in advance of the conditions.

STOP and YIELD signs should be placed at the point at which compliance is expected. Even in open areas, STOP signs should not be placed more than 25 feet from the intersecting roadway. At village or high-density intersections, the STOP line should be augmented with corresponding pavement markings in compliance with the federal Manual on Uniform Traffic Control Devices.

Where speeds are relatively low, Warning signs should be posted no more than 250 feet in advance of the hazardous condition. On higher-speed roadways, Warning signs should be posted well in advance of the hazard, with distance and sign size based on FHWA specifications. Placement of all Warning and Regulatory signs shall be done with a complete site review. Complaints or observations that a condition is not effectively marked must be addressed immediately.

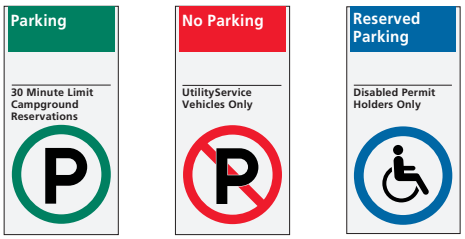
Regulatory and Warning signs are placed 6 to 12 feet from the edge (fog line) of the roadway pavement. Whenever possible, each traffic sign should be mounted on a single post.

Within a campground, regulatory signs are used to maintain lane control, direction, and speed limits. At an entry kiosk, use signs sparingly and place at the driver's right. Affirm lane control with well-maintained curbs and pavement markings. Where possible, use VIS Regulatory Signs to minimize the presence of signing while providing needed guidance and control.

Posts and Mountings: The standard mounting for all Regulatory and Warning signs that are less than 36" square uses 3" x 2" tubular steel posts or 4" x 4" wood posts mounted in earth with direct embedment. Signs larger than 36" x 36" will use two posts. These posts must break or bend easily when struck by vehicles. For specific guidelines, see the standard FHWA Traffic Control Devices Handbook or local state DOT specifications.

Parking Control Signs

Application: Parking Control Signs are used to prohibit or regulate parking along park roads, within congested areas, and in parking lots. To reduce clutter and maintain sight-line quality, use the small Narrow Profile format if this understated solution can effectively control the posted zone. The NPS standard design for Parking Control Signs is designed to for consistency and clarity for all postings of this type.



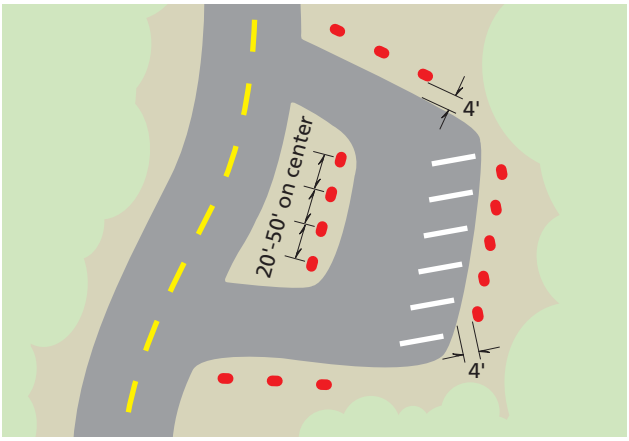
Typeface and Grid Format: The system incorporates bold color-coded panels with a bright red, green, or blue headline overbar with white legend, a large symbol in the white lower panel denoting prohibited parking or the type of parking. The headline is Frutiger Bold with smaller black qualifying legends in the main panel of the same typeface. Arrows are incorporated into the format when Parking Control Signs are used at the end of a parking zone to define the direction of control.

Legend: The legend includes signal panel overbar with Parking or No Parking legend. The zone is qualified with smaller secondary legend "Loading Zone" and large color-coded circle or circle and slash with "P".

Size and Placement: Parking Control Signs are sized and placed for legibility. Attempt to minimize the visual clutter they can create if not placed with some sensitivity. The recommended signs are 15 cm x 30 cm retroreflective panels using the post mounting instead of the clutter-producing conventional FHWA (12" x 18") signs. The small size is readable from 30 to 60 feet, so it should be adequate for most applications. Two larger panel sizes are specified for longer viewing distances and when there is a possibility that another vehicle might block a person's view of the sign.

The chart below identifies the type of post and mounting height for each different size of Parking Control Sign.

Size	*Post/Mounting*	*Height to Bottom of Panel (HAGL)*
15 cm x 30 cm	2" x 2" Steel	48"
	4" x 4" Wood	48"
22.5 cm x 45 cm	4" x 4" Wood	72"
30 cm x 60 cm	4" x 4" Wood	48" or 72"



- Place small Narrow parking control posts 20 to 50 feet on-center to create defining the parking or prohibited zone. Place at eye level (48" high) along curb lines (offset 2 to 3 feet) or at the edge of the road shoulder (offset 3 to 4 feet). Frequency will be determined by local conditions. Parking Control Signs placed at the front of a parking stall shall be centered and placed 4 feet beyond the wheel stop.

- Where site conditions require more conspicuity, where signs need to be seen from a greater distance, or where sight lines may be blocked, large Parking Control Signs (22.5 cm x 45 cm) are used. These aluminum panels are attached to a 4" x 4" wood post and mounted 7' from grade to the base of the panel. All handicapped parking site identifiers are mounted in this manner.

- Large 30 cm x 60 cm panels are used to identify the end of diagonal bus stalls where the smaller panels are not adequate.

Reference: Commonly used Parking Control Signs are displayed in Section 6.4, and digital artwork is available from Harpers Ferry Center.

Material Specifications: Fabrication Specifications and Assembly Drawings in Section 4.5 include a drilling diagram for Parking Control Signs that keep the bold head from lapping over the sign graphics. For assembly and installation instructions, see Section 5.1.

Visitor Information System (VIS)

Application: The Visitor Information System is designed to present information in a consistent, inviting, and easy-to-read format. Topics for these small signs include pedestrian guidance, identification, vehicular guidance, resource management, instructions, regulations, maps, and safety warnings. This system is based on a common mounting method that accommodates numerous assembly sizes. All postings from various park interests can be coordinated in a comprehensive, manageable, and cost-efficient system.

System Design: The Visitor Information System is the outgrowth a prototype developed for Yosemite National Park that has since been validated in several other parks, large and small. The graphic system is comprehensive and anticipates nearly every type of message requirement used in a national park, with graphic material options tailored to each application. The structures can hold a variety of individual panels. The overall assembly is modular, and all parts can be used and reused. The materials are strong, durable, require little maintenance, and are vandal resistant.

Reference: The Visitor Information System will be used for about 90 percent of all park signing. Extensive guidelines and specifications are provided in this manual on every aspect of layout and structure, legend writing and installation. The following are the primary references that augment the instructions in this section:

- Graphic standards for typography, NPS Arrowhead logo, directional arrow graphic, color, and recreation symbols, see Chapter 2, pages 2.1-2.25
- Grid Format overview, see Chapter 2, pages 2.26-2.29
- Visitor Information System grid formats, see Chapter 2, pages 2.30-2.71
- Material Specifications and Assembly Drawings, see Section 4.2
- Guidelines for sign planning, design and documentation, see Section 3. 1
- Guidelines for text writing for VIS, see Section 3.6
- Guidelines for use of illustration, see Section 3.8
- Guidelines on use of mapping for wayfinding and orientation, see Section 3.7
- Catalog of Standard Signs, see section 6.2
- Sign Materials Reference Selection Guide, see section 6.3

Content: Most of the VIS signage can be implemented by the park staff using guidelines for legend preparation and the grid formats. Panels and structures are fabricated by NPS contractors using the standards contained in this manual. Detailed graphic panels may be planned by the park staff and refined with the assistance of a design team that may include an editor, graphic designer, illustrator, and cartographer. It is recommended that planners review the text writing guide as panels are being developed.

Materials: Panels are fabricated in a variety of materials under existing NPS contracts: porcelain enamel, high-pressure laminate, embedment fiberglass, ink jet and electrostatically printed vinyl applied to aluminum, and computer cut retroreflective graphics applied to aluminum.

Panels are mounted between aluminum rails in a custom NPS assembly with either weathering steel or galvanized steel uprights, or wood uprights.

Panels Type and Applications:

The system is grouped by function. These include:

Identification
- VIS Facility Identification
- VIS Park Identification
- VIS Facility/Park Identification

Vehicular Entry and Guide
- Area Entry
- Small Guide
- Traffic Regulatory

Secondary Identification
- Area Identification
- Campsite Identification
- Parking Lot Identification
- Shuttle Stop Identification

Fee Displays
- Entrance Fees
- Recreation Fees

Pedestrian Guidance
- Trail Guide
- Fingerboard
- Street Name

Specific Visitor Information
- Information/ Instruction
- Resource Management
- Messaging
- Regulations
- Protection
- Safety Warning Danger
- Symbol Based Regulation
- Miscellaneous Postings
- Maps

Size: The VIS formats are based on a 30 cm x 30 cm module with a maximum width of 120 cm (150 cm for wayside exhibits) and a maximum height of 60 cm for panels. Panel assemblies are designed for individual and multi- panel assemblies. All general postings use the standard panel size of 30 cm x 30 cm. When more space is needed for text and graphics, a longer double-length display (30 cm x 60 cm) can be used. Signs viewed from other than standing distance, such as Small Guide, Area Entry Signs are 30 cm high, but wider to contain the larger legend size. Park Fees are proportionally larger (60 cm, 90 cm, and 120 wide) as needed for proper viewing with modifications to structures to accommodate.

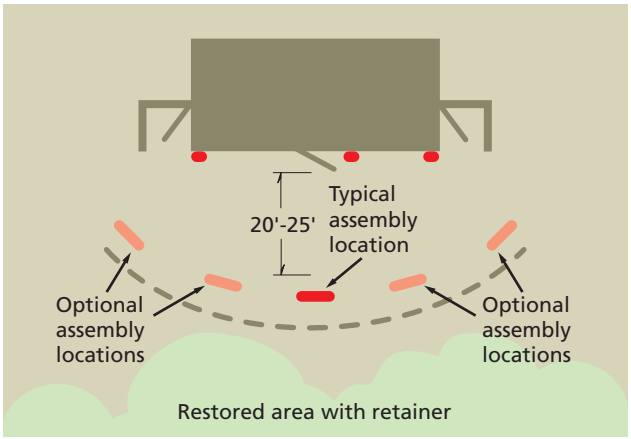
Panel Grid and Typeface: The 30 cm x 30 cm panels are based on a standard three column grid format. Panels include a Frutiger Bold headline in the upper level with an optional introductory deck using NPS Rawlinson Italic. The main text, in NPS Rawlinson, is placed in the lower part of the panel in either large (two-column wide) or small (one-column wide) displays. Rules are used as a graphic device to separate groups of text for clarity and visual organization. Wherever possible, panels should be illustrated with line drawings or other woodcut-style artwork to aid communications and to spark interest in the viewer. Most illustrations are one color.

Bilingual Signs: If a foreign language is to be used, it is recommended that the entire panel be prepared in each language unless the text is very short.

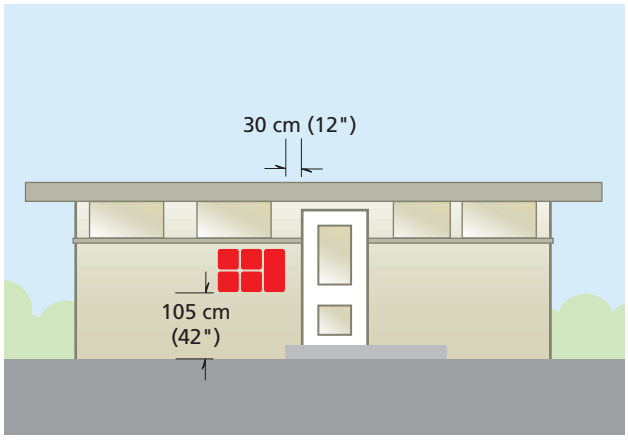
Placement of Individual Panel Assemblies: A general rule is to place panels perpendicular to a viewer's approach on the right side. Double-faced signs on a dual direction route should be placed for optimal viewing from both directions. Information displays for trails and walkways are often best placed parallel to a route; they should include pavers or some surface treatment to define the area and limit impact on the surroundings.

Placement of Multi-Panel Assemblies: Signs are to be placed where the location has a direct association with the message, or at central points of congregation, such as the comfort sta-

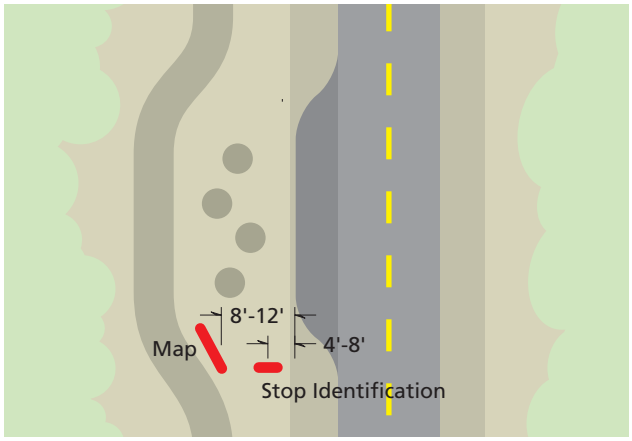
tions in campgrounds, at shuttle stops, trailheads, or entrances.



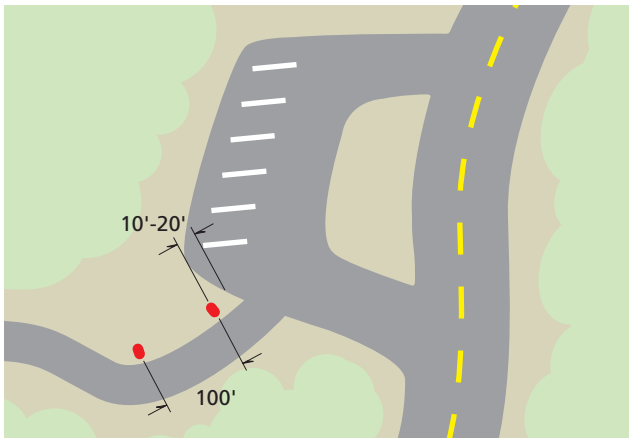
- *Comfort Stations:* Freestanding information kiosks are located at campground comfort stations for viewing by campers passing the building. Placement generally will be at a position on an arc line that is between 20 to 25 feet from the front of the building. Panels may include: map of campground, campground rules, food storage procedures, camper services, and resource management issues.



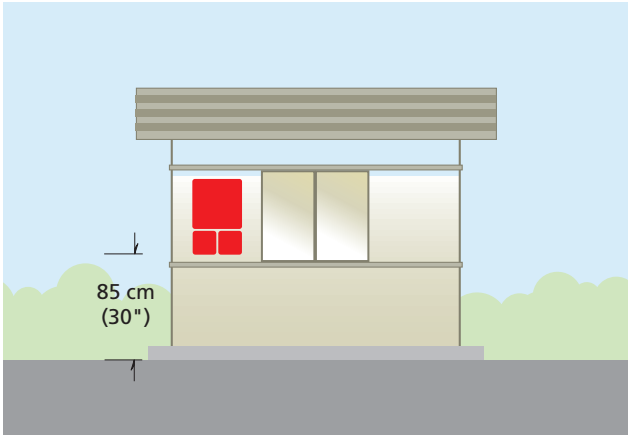
- *Comfort Stations:* Wall-mounted information panels are placed at a similar height above grade as the post-mounted assemblies. Place double height assemblies 105 cm from grade to the base and single panels at 150 cm. Align mounting to building lines to create an orderly appearance to the installation.

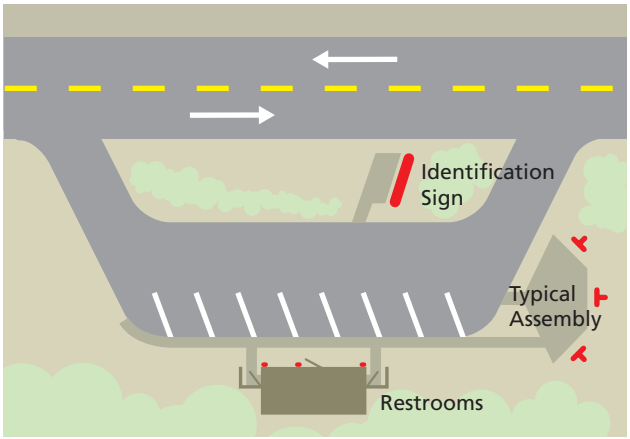


- *Shuttle Stops:* Frame shuttle stop maps and information kiosks for ease of view. Place installation 8 to 12 feet back from boarding area to reduce congestion. Orient map graphics to be consistent to location so readers are not required to mentally invert the map for correct interpretation. Panels may include: map of shuttle route, diagram of shuttle route, route schedule, list of shuttle stops and what is available at each.



- *Trailheads:* Information assemblies are placed to draw the viewer's eye to the beginning of the trail to help reduce trampling of broad areas in these locations. To reduce the amount of information at a single installation, consider placing a second installation 100 feet down the trail. Panels may include: map of trail route, wilderness camping rules, safety tips for hikers, and resource management information on water or other topics.

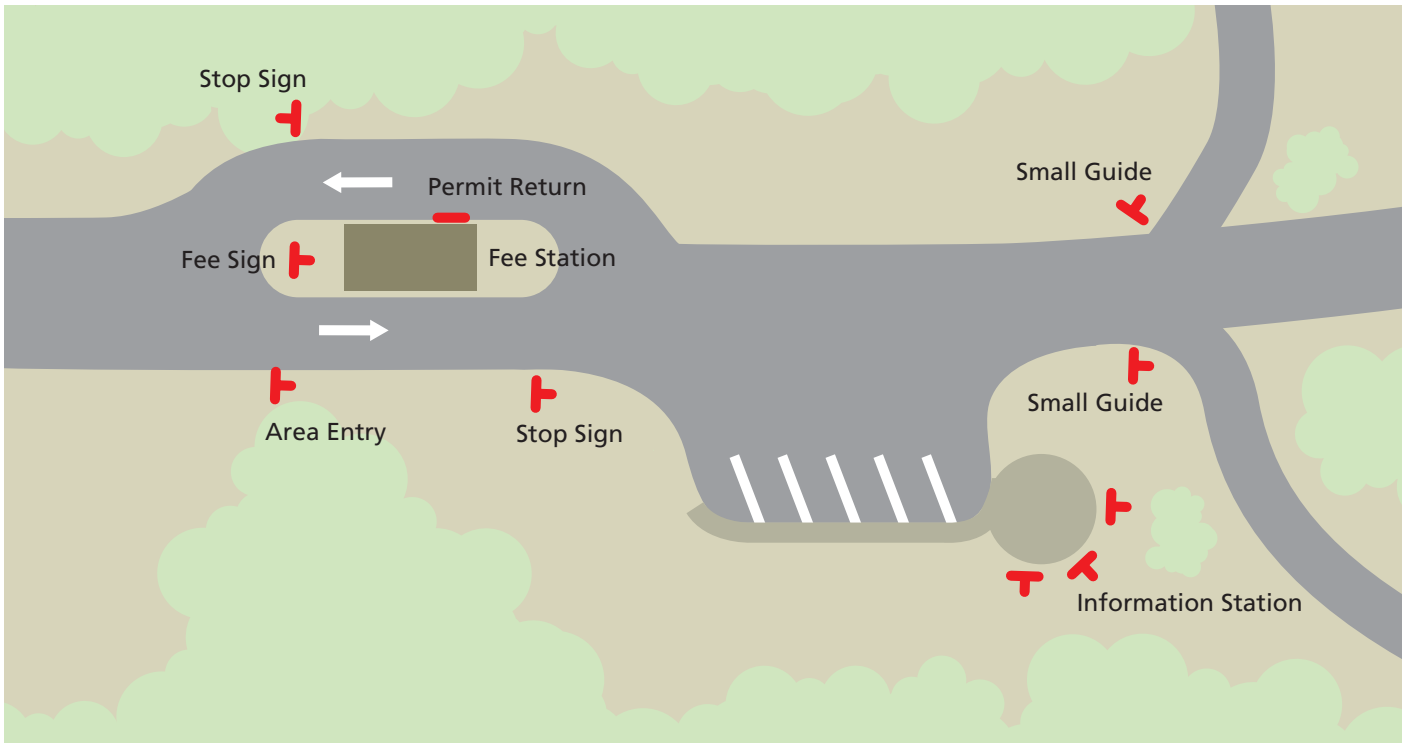




- Larger assemblies mounted on the wall of fee structures should be placed for ease of view by the entering motorist.

- *Campground Entrance:* As parks reduce staffing at campground entrances, more information needs to be displayed. Panels (below) may include: map of campground with campsites numbered, registration procedures, campground fees, and any critical resource management issues related to campgrounds.

- *Park Entrance:* The park entrance is an ideal place to dispense information to visitors who have stopped to get their photo taken with the Park Identification Sign or at the entrance fee station. Panel displays may include: map of region where visitor is entering or of the entire park, information on overnight accommodations, activities (though that may also be in a folder), and any critical resource management issues.



VIS Narrow Profile: Ground and Wall Signs

Application: Narrow Profile Signs are single panel 15 cm x 30 cm installations designed to guide, identify, or inform in a consistent format. These small, discrete site specific postings are for pedestrians. Applications include: campsite identification, small trail guide signs, safety warnings, and prohibitions. Sign panels are primarily mounted to double post steel bar stock assemblies in vertical and reverse angle structures using the same rail capture system used for the larger VIS assemblies. Alternate single post mounting is an option for Parking Control Signs and locations that will not accept a double post assembly such as single core bored installation on a rocky tail. Wall-mounted applications include identification signs for restrooms and doors to other facilities.

Legend: The legend and color will vary depending on application.

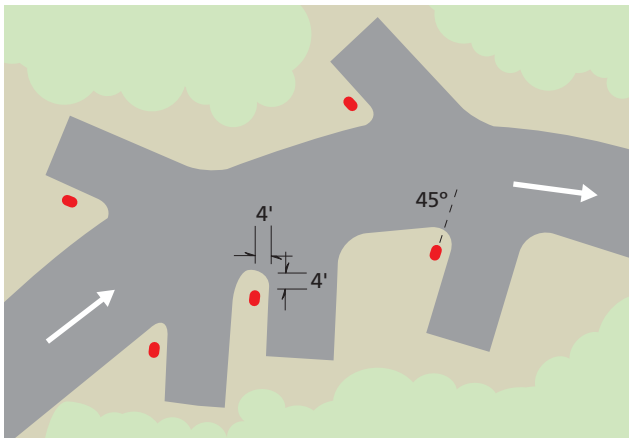
- Campsite identifications include the campsite number in large bold numbers with even numbers on the right and odd on the left. It is recommended to number each loop with a new 100 number, omitting numbers that break odd-even flow similar to a street address. This system of logical segments makes it easier to direct visitors and emergency vehicles when compared to traditional consecutive numbering systems. For more information on changing the numbering in a campground and linking the change to reservation services, contact your Regional UniGuide Coordinator.
- Information specific to a campsite, including accessibility for disabled campers, can be included on the panel below the number.
- Safety/Protection panels can include short and site-specific safety signs used to advise visitors of a danger or warning relative to the land, wildlife, or other personal safety factor or hazardous condition. Place safety panels adjacent to the hazard being posted and include a signal word and qualifying text. Use appropriate referential colors and a symbol or illustration for improved communications.
- Identification signs identify the facility with associated recreation symbol in the lower section of the panel.
- Prohibition and instruction signs include short headlines to describe rules or procedures with associated recreation symbol (positive or prohibition) in the lower section of the panel.
- Trail guide signs include directional arrow, destination identification, and appropriate recreation symbols.

Colors: Colors for the Narrow Profile panels are the same as for all VIS panels. For specific color information refer to pages 2.1-14 to 2.1-16.

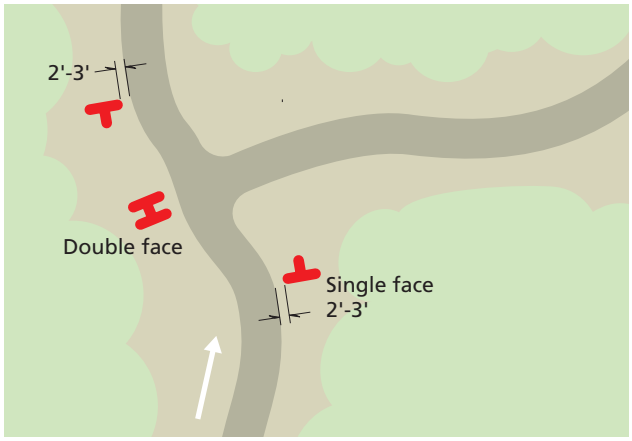
Panel Grid and Typeface: The 15 cm x 30 cm post panel is based on one of four 2 x 4 unit grids (see pages 2.1-50 to 2.1-53). Panels include a Frutiger Bold headline in the upper part of the panel. The panel text, in NPS Rawlinson, is placed full width in the lower part of the panel. Symbols are placed in the bottom half of the panel. Rules are used as a graphic device to separate groups of text for clarity and visual organization.

Bilingual Signs: Narrow Profile panels can be used for bilingual displays with up to six information or safety panels, one in each foreign language placed in one small reverse angle assembly.

Placement: These small discrete signs are to be placed where they will be easily viewed by the intended audience. Narrow Profile Signs are not to be used in congested areas where they can be easily blocked from view by another person. See the following illustrations for general guidelines on placement locations.

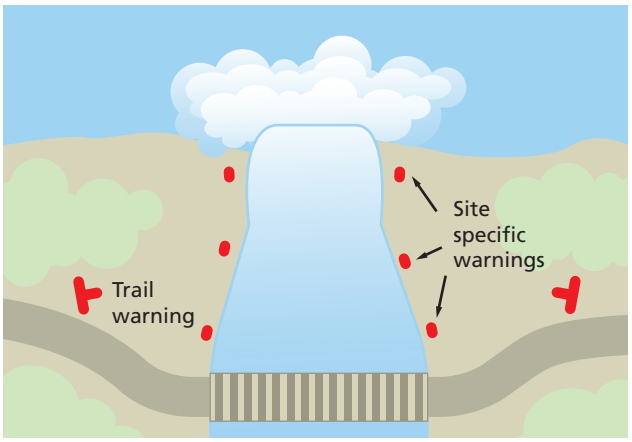


- *Campsite Identification:* Place signs behind the concrete wheel stop at the near front corner of a parking pad, 4 to 6 feet back from the edge of the road and perpendicular to the approaching driver. These installations are generally double face, with retroreflective number on both sides to accommodate both motorists and pedestrians. The assembly can also include a permit display panel (clip or sleeve type). Adjust placement to make sure vehicles backing into adjacent spaces will not drive into the sign.

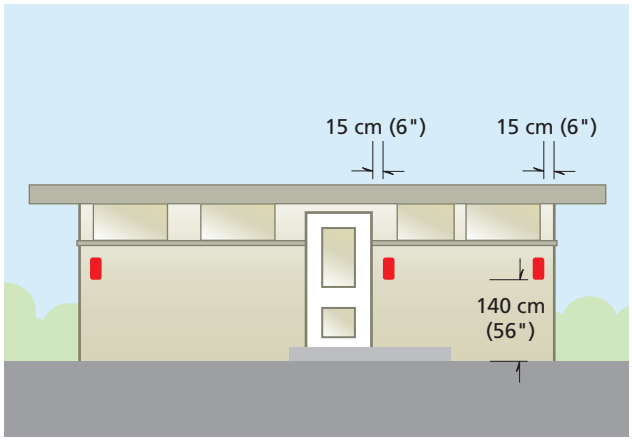


- *Trail Guide Panel:* Signs are placed approximately 2 feet off the edge of a pathway. If the installation is double faced, locate the sign for clearest view from both directions.

- *Site Specific Postings:* Instruction, prohibitions and safety signs are placed clearly between the hazard or prohibition and the viewer's approach. If the hazard is approachable along a continuous zone such as the top of a waterfall, multiple signs should be placed along the edge zone to be sure that viewer will see at least one of the warnings. When physical barriers are not provided, place the sign at a safe distance back from the hazardous condition.



- *Wall Mount:* Surface-mounted signs are placed at eye level. Small identification signs are placed on the opening side of the door, 140 cm to the base of the panel and 15 cm from the edge of the doorframe, and on the end of the building to identify which side is for men and which side is for women.



VIS Park and Facility Identification Signs

Application: The VIS version of NPS Identification Signs provides appropriately sized signs for small applications, such as historic buildings in urban areas, buildings in parks, parking lots, picnic shelters, boathouses, stables, and other facilities.

Content & Color: This design, with applications for Facility Identification, Park Identification, and combined Facility/Park Identification, includes the dark green overbar and grey-brown lower panel with National Park Service/U.S. Department of the Interior names and NPS Arrowhead logo in NPS Brown. The lower panel accommodates the full park name or name of the facility. Facilities within a park that need to be identified with the park can include the park title at approximately half-letter size under the facility name with actual proportions based on grid format selected. Use the full park name; do not abbreviate.

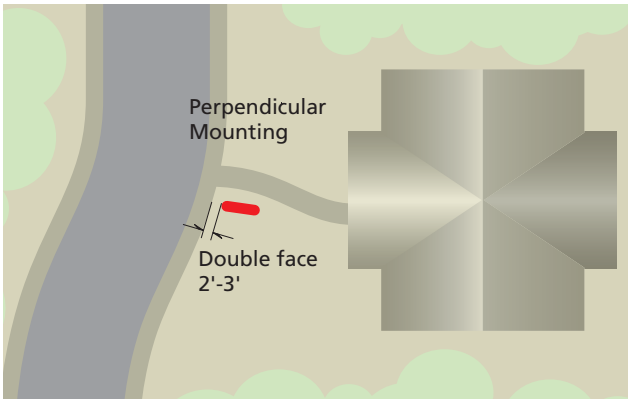
The agency identifier and NPS Arrowhead logo are not placed on VIS Facility Identification Signs.

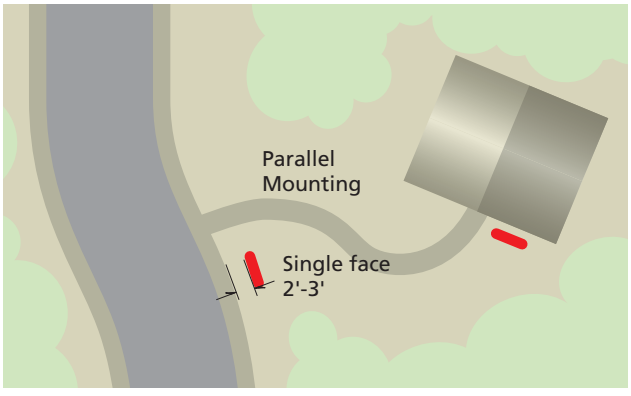
Panel and Legend Size: The base panel is a 30 cm x 30 cm square with four different legend sizes. Actual size of legend type will be based on how the legend fits into one of the standard grids. Panels may be made wider in 30 cm increments up to 120 cm (150 in special cases as a custom sign) and up to 60 cm tall for double size panels. Most applications can be sized to the location. The legend sizes are specified in points. Enlarge specified type sizes proportionally by 150% for panel heights of 45 cm, and 200% for 60 cm tall panels.

Typeface and Grid Format: On Park Identification Signs the agency identifier in the overbar and park name as secondary legend is Frutiger Bold typeface with NPS Rawlinson Bold typeface for primary park name legend. All type is displayed in uppercase and lowercase, flush left, initial capitals only. Refer to grid formats on pages 2.1-60 to 2.1-71.

Material: The structure follows standard VIS specifications with options for tubular weathering steel, galvanized steel or Western Red Cedar uprights. The panel is primarily specified in porcelain enamel but can be produced in embedment fiberglass or high-pressure laminate. Wall-mounted applications follow standard J.1 specifications within the VIS system.

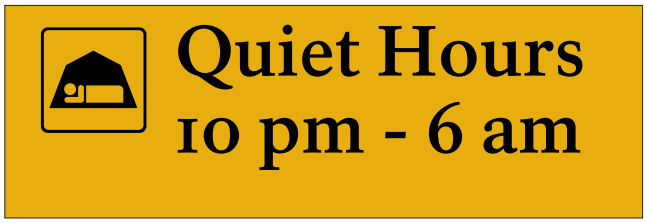
Placement: The size and placement of the sign will be dictated by the nature of the site. If the site is approached from a fronting walkway, the panel may be double faced and placed perpendicular to the front of the facility. Other locations may be signed with sign parallel to front of facility for entering visitors. Determine appropriate location and size in a field review. Use a cardboard mock-up or banners available from Harpers Ferry Center to validate size before ordering sign.





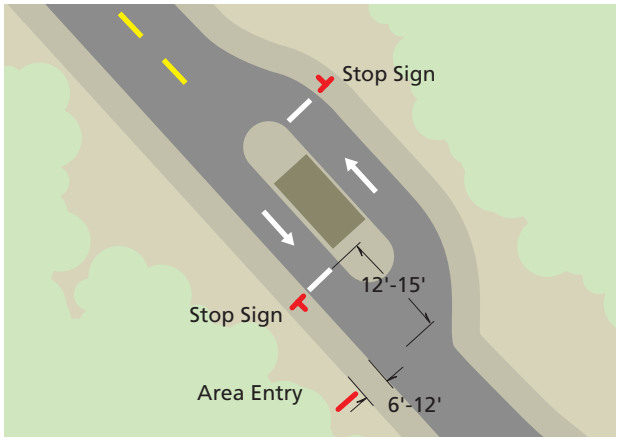
VIS Area Entry Signs

Application: Area Entry Signs are designed for placement at the entrance to an area such as campground, picnic area or trailhead parking area. These small, discrete signs provide a consistent way to post primary rules and prohibitions with symbols and legend. Assemblies accommodate one to a maximum of four panels to identify the most important pieces of information for a visitor entering an area. Although primarily intended for viewing from a vehicle, Area Entry assemblies can also be used on pedestrian routes and paved, urban trailways.



Legend: All panels include a symbol, when available, on a one-or two-line legend on the right. Common legends are displayed in Section 6.4.

Placement: Signs are to be placed at the location where they can be easily viewed by the intended audience.



- *Area Entry Sign Assemblies:* Place these assemblies to the driver's right along the entry road into a campground or recreation area between 6 and 12 feet off the edge of the pavement. At campsites with entry stations, place signs 30 to 50 feet beyond the station stop line and angle slightly toward driver to afford a clear view of the sign when stopped at the kiosk for registration information.

Panel Size: Panels are available in two sizes: 30 cm x 90 cm for motorists and 20 cm x 60 cm for pedestrians.

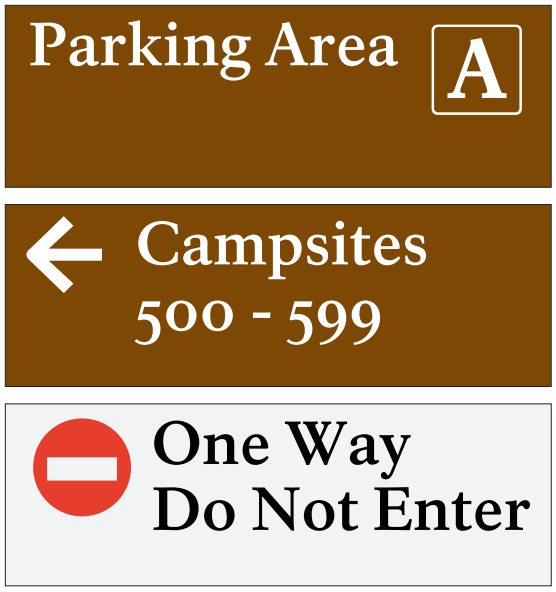
Typeface and Grid Format: Area Entry Signs are formatted on a standard layout grid and use NPS Rawlinson Bold (uppercase and lowercase, flush left, initial capitals only) with NPS/SEGD National Recreation Symbols in positive or prohibition format.

Color: The background color of is ochre (gold, not yellow) retroreflective sheeting with black legend and symbol; prohibition symbols use the red circle and slash. An optional changeable, recreation brown panel with campground symbol has been recommended to identify campground availability (Campground Available or Campground Full) and to help control entry traffic of visitors looking for campsites. For this application, the two graphics are placed on the front and back sides of the same panel. Using rail type R/5, the panel can be easily reversed as needed.

VIS Small Guide Signs, with Companion Traffic Regulatory and Area Identification

Application: The VIS Small Guide Signs provide a systematic way to guide visitors to destinations in and around recreation facilities such as campgrounds and viewpoints. They may be used on all vehicular routes that are outside primary park circulation roads, which use standard Road Guide Signs.

Small Guide assemblies also accommodate a select group of traffic regulatory signs (Do Not Enter, One Way, No Left/Right Turn, MPH) for placement on the back of the double faced structures. This eliminates the need to place a standard traffic regulatory at the end of a campground loop in where a Small Guide is placed.



Area Identification differs from Facility Identification in that it can be made part of an Area Entry or Small Guide installation and is primarily intended for the identification of individual parking areas along a interior park road.

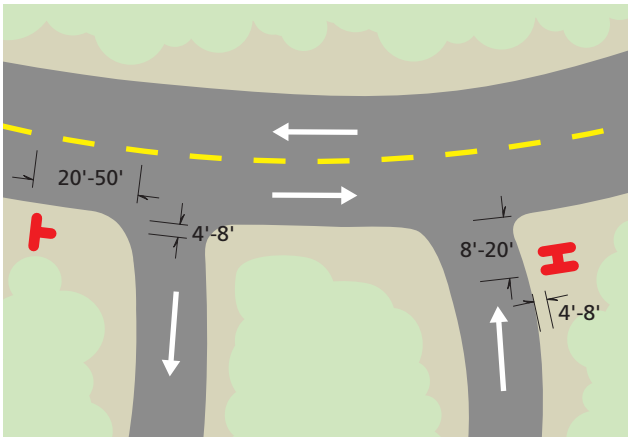
Legend Formulation: Guide sign legends are to include only enough information to direct the motorist to the specific location. If there are more destinations for a particular intersection, use a second panel for the second destination. Examples include:

Panel 1:	(Arrow Straight)	Campsites 300-621
Panel 2:	(Arrow Left)	Sanitary Dump Station
Panel 3:	Campsites 200-264	(Arrow Right)

Panel Size: Panels are 30 cm x 90 cm or 30 cm x 120 cm with standard legend that is appropriately sized for reading from an automobile on secondary park roads.

Typeface and Grid Format: Small Guide Signs are formatted on a standard layout grid with 280 pt. (approximately 2.75") NPS Rawlinson Bold legend (uppercase and lowercase, flush left, initial capitals only), and large arrow graphic aligned left (destinations straight, left, or right) on the standard grid. Square 15 cm symbols may be used selectively per typographic and grid format specifications (see 2.1-54 to 2.1-56).

Color: The background is recreation brown with white legend retroreflective sheeting. Regulatory signs are white with black legend and red symbols.

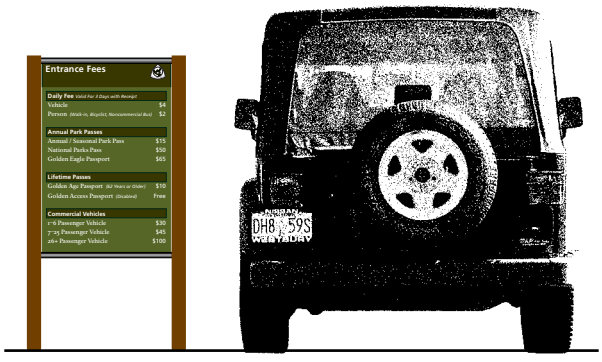


Placement: Small Guide Sign assemblies are placed perpendicular to a motorist's approach along campground and picnic area roads and in parking areas.

Place these signs on the driver's right, 20 to 50 feet in advance of the intersection and between 4 and 8 feet off the edge of the pavement or road shoulder. Place exit signs 8-12 feet in advance of road access with "Do Not Enter" panel on the back face where appropriate.

VIS Fee Signs

Application: Because of the variety of fees and passes, the UniGuide fee sign was designed in conjunction with the NPS Fee Office. In essence, the various types of fees are grouped to make the displays easy to read.



Legend: All displays include an NPS Arrowhead logo instead of a US Fee Area graphic and clear title “Entrance Fees” or “Recreation Use Fees” depending on the application. Fees are listed below the overbar with group headings.

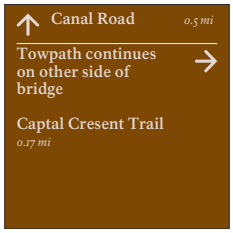
Panel Size: The panel is designed for placement at park fee stations as a double post ground-mounted sign, or as a wall mounted assembly. The basic size of the Entrance Fee panel is based on a 1:2 vertical rectangle. Because the panel is text heavy, this may be enlarged to 60 cm x 120 cm, or even larger for use in the A.1 double post structure. Modifications will be made to structure to accommodate up to a 150 cm tall vertically oversized panel (exception to the 60 cm limitation on panel height).

Typeface and Grid Format: Fee signs are formatted on a modified layout grid (see page 2.1-40 and 2.1-41) and use NPS Rawlinson Bold uppercase and lowercase, flush left, initial capitals only for pass descriptions, and Frutiger Bold headlines and fee amounts.

Color: The background color is NPS Grey-Brown with dark green overbar in bar for group identification. The NPS Arrowhead logo is NPS Brown. All type is white.

VIS Pedestrian/Bicycle Guide Signs

Application: Trail Guide Signs are used to direct pedestrians and bicyclists along park paths and bikeways. The primary form is the standard double-faced, double post VIS assembly. An alternative approach is the Fingerboard Sign assembly mounted to a timber upright.



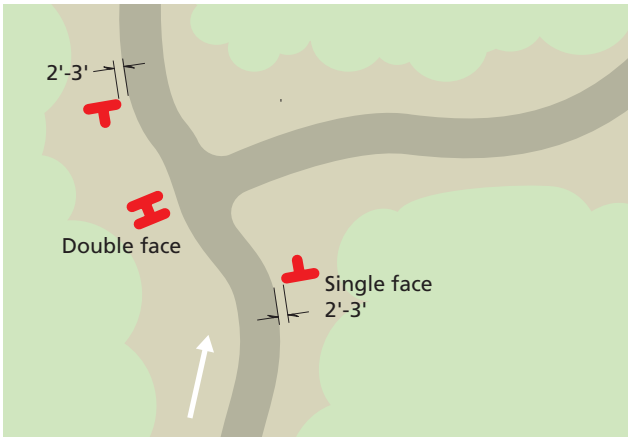
Legend: The standard square panel includes a directional arrow, name of destination(s), and symbols related to service, activity, or accommodation at that site. An alternate version (see pages 2.1-44 to 2.1-45) includes the park identification and NPS Arrowhead logo in the overbar. This application is for park trails that extend out into an urban area or that cross into and through another park. Another application includes historic walking tours between various NPS sites in an urban area where affirming the NPS identity is important.

Format: The format is a special three-column square grid format with arrow alignments on left and right sides. Each panel accommodates as many as three or four destinations with each being in the same or different directions (see pages 2.1-42 to 2.1-43), and can incorporate recreation symbols as part of the legend. The directional arrow is aligned left (straight and left) or aligned right (right direction). White rules are used as a graphic device to separate destinations on the panel. Intersections with more than three destinations in a single direction may use an extended vertical (30 cm x 60 cm) panel, or in locations with many destinations, a more appropriate solution is to use a small area "You Are Here" map.

Placement: The small sign assembly will accommodate two-sided panels allowing one sign structure to incorporate panels for opposite directions of approach. Panels are placed at intersections of trails or bikeways and should be in clear sight lines of approaching walkers and bike riders. Guidance for

most common placement locations are described below:

- Single-and double-face trail guide signs are placed 2 to 3 feet off the traveled way for optimal viewing (left or right) based on local conditions.
- Place guide signs that cross a park roadway in advance of crossing 6 to 10 feet back from gravel edge for paths and bikeways with a 2 to 3 foot offset. A second small stop sign may also be placed at the edge of the road to notify bike riders of cross traffic as required.



Size: Standard size sign is 30 cm x 30 cm square. Wide paths or heavily congested areas may use 45 cm x 45 cm and 60 cm x 60 cm panels enlarged proportionally from the master grid.

Typeface and Grid Format: Two formats have been included in the system for front-country pedestrian path and bikeway guide signs using the VIS grid formats, panel sizes (30 cm x 30 cm, 15 cm x 30 cm), mountings, and materials.

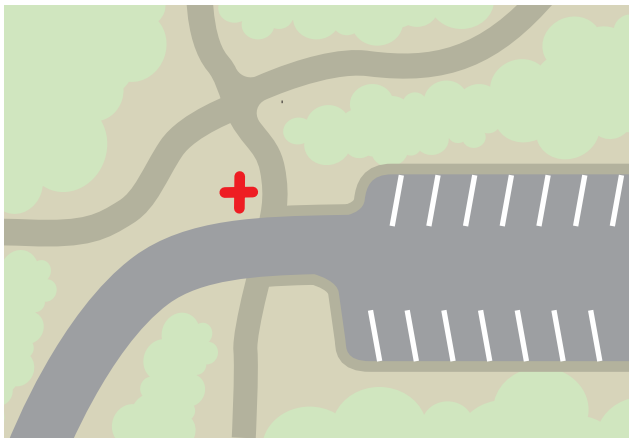
Typeface and Color: Pedestrian path and bikeway guide signs use NPS Rawlinson Bold (uppercase and lowercase, flush left, initial capitals only). The recommended color for the pedestrian path and bikeway guide signs is NPS Brown with warm gray legend.

VIS Fingerboard Pedestrian Guide Sign

Application: The Fingerboard Sign is specified for congested areas of a park in which a taller guide or beacon will help orient pedestrian traffic.

Legend and Format: There are four variations on the standard chevron shaped panel depending on application (see page 2.1-58). These include primary destination name and can incorporate a symbol and secondary legend as shown in the grid formats. Note that the legend is placed flush left on the panel with alignments shifted for reverse side layout as shown on the page referenced above.

Placement: All panels are double-faced with the fingerboard being directed toward the specific destination, with option of four directions, and up to two panels for each direction. Structure is placed at intersections with panels placed nearly 11 feet above grade. For consistency, use Fingerboard Signs in areas at which there will be at least 3 to 5 or more installations. A single assembly may not be understood by the first-time visitor. When they are used in a series, however, the visitor will find the system handy.



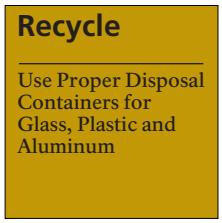
Size: Each panel base is a 80 cm x 20 cm blank with chevron formed into one end.

Typeface and Color: The primary legend is NPS Rawlinson Bold, uppercase and lowercase, flush left, initial capitals only. The secondary legend is Frutiger Bold with Frutiger Regular. The recommended color for trailblazers is NPS Brown with white legend.

Structure: The assembly is a clear Western Red Cedar timber with rail mounts at the top. The structure will carry as many as eight double-face panels (two in each of four directions)

Miscellaneous Postings

Application: There will always be miscellaneous postings of general information regardless of how well coordinated and planned a sign program may be. These temporary or permanent panels are posted to address particular, site-specific needs not covered by the other types of signs. They can be used to notify visitors of important issues that may not be easily conveyed through brochures or other media.



Content: Examples of miscellaneous postings include:

- *Meadow Restoration:* Remain on Maintained Trails
- *Temporarily Closed:* Use Trash Containers at Entrance Station
- *No Camping or Sleeping in Vehicles:* Violators Will Be Cited and Towed

Placement: Miscellaneous postings are to be sized for ease of reading from the anticipated viewing distance of the approaching viewer (see chart below). They of course, should be placed at the site on sites mentioned in the message.

Typeface and Grid Format: Two grid formats are noted in the chart. The amount of text and viewing distance determine which grid to use. Miscellaneous postings use a Frutiger Bold headline or signal word with NPS Rawlinson Medium typeface for information text. All type is displayed in upper-case and lowercase, flush left, initial capitals only.

Color: The recommended color for miscellaneous postings is ochre (gold, not yellow) retroreflective sheeting with black legend.

Panel and Legend Size: These signs are proportionally grided square panels. Using the formats provided, the panels should be sized for conspicuity and ease of reading in the intended location. The basic panel size is 30 cm square but is proportionally adaptable to 45 cm and 60 cm. Keep the panel as small as possible while maintaining effectiveness.

Panel size	*Type size/legibility distance*	
	Large Text	*Small Text*
30cm x 30cm	1.2” / 70 ft	.75” / 44 ft
45cm x 45cm	1.8” / 105 ft	1.125” / 66 ft
60cm x 60cm	2.4” / 140 ft	1.5” / 88 ft

Chapter 3

UniGuide Planning, Design & Documentation

Section 3.3

Identification Sign Structures

Final Draft: *June 1, 2002*

At its inception, the National Park Service made a concerted effort to construct all facilities within park boundaries so they would harmonize with the landscape. Individually architects Herbert Maier, Mary Colter, Robert Reamer, Thomas Chalmers Vint, and Andrew Jackson Downing stressed the importance of relating of a built structures to the environment. There were no set theories, but early developments in Yellowstone, Glacier, and Grand Canyon would influence what happened in other parks. Vint and other landscape architects made developments look as if they belonged in fragile park settings. They used native materials and sited all structures to be at one with the surrounding landscape. In a documentation of park buildings and structures edited by Albert Good he stated that "by avoiding clean, straight lines, by using properly scaled native materials, and by giving the appearance of pioneer handcrafting, designers of rustic buildings could bond their structures with their settings and the past."

That philosophy is reflected in the UniGuide designs that have been developed for park identification and facility identification signs. The structures are based on signs built in the 1920's and 1930's.

These designs are in an addition to the four standard mounting formats that include:

- Double post mount
- Monolith
- Wall mount
- Single post, hanging signs

Custom Identification Signs are recommended for use with locations that can be greatly enhance with a special identifier. With each design, the proportions are shown for each size based on the size of the primary legend. These include:

- Monolith with side column and NPS Arrowhead logo
- Monolith with side column with NPS Arrowhead logo on sign panel
- Masonry column with timber cross member and hanging sign.

Sign Panel and Structure

All Park Identification Sign panels are routed Western Red Cedar with opaque stain finish. Panels are attached to a vertical steel frame with keyhole attachment. The structures of the monolithic forms are steel with wood cross rail and cedar end and top cap (See section 4.3).

Legend, panel, and grid formats and graphic standard

A standard panel has been developed for all Park Identification Signs. (Grid formats are specified in the Graphic Standards, pages 2.1-72 to 2.1-79.) Each sign includes the full name of the park in uppercase and lowercase NPS Rawlinson Heavy typeface. The National Park Service / US Department of the Interior identification, displayed in Frutiger Bold typeface, is placed with the NPS Arrowhead logo in the dark green overbar. Optional formats allow

placement of the Arrowhead logo the column of custom traditional sign structures as shown in the attached examples.

Panel Format

The format of the legend will vary depending on the orientation of the sign and the length of the park name. The ground-mounted format accommodates a one-to three-line legend, and the hanging format allows a two-to four-line legend. Because of the great differences in the length of park names, what looks balanced in the layout for one park may look odd for another. Extensive layout options are provided in Section 6.4.

Because some parks are decentralized with unconnected park units or many access points, the entrance may be named after the unit. In that case, the legend accommodates the name of the park as a secondary legend under the name of the unit. This format should only be used only when the unit name is more commonly used than the park name.

Custom bases also can be used to identify primary facilities within a park following the grid formats in Section 2.1-80 and 2.1-82.

Size of Panel

Identification Signs are proportionally sized based on the size of the primary legend. These include 4", 6", 9", and 12" in the ground-mounted format used for signs with double post, monolithic bases, and wall mount. The width of the ground-mounted panel is dictated by the longest line of the legend. The single post hanging sign format is specified with 3" legend and 4" legend placed on a 36" and 48" wide panel respectively. Large hanging sign structures with 4" and 6" legend with 48" and 72" wide panel respectively are shown in this specification for custom structures.

The height above grade level is based on the specific panel size.

Color

The color of the signs are gray brown with dark green overbar and dark brown uprights. The legend color is white with the NPS Brown Arrowhead logo.

Arrowhead

The NPS Arrowhead is manufactured in porcelain enamel on steel. Use the two-color or four flat color versions shown in this manual. Sizes are specified in Section 2.1-10 to 2.1-13 for each mounting configuration. Arrowheads mounted on stone or concrete surfaces are to be pin mounted with two-part epoxy adhesive with a intermediate level polymer sheet as specified in Section 4.3. Arrowheads mounted on the sign panel are placed in a dado receiving area and attached with threaded mounting pins on the back of the panel.

Engineering

The custom structure designs shown in this section have not been engineered. However, the monoliths can be adapted from those structures included in Section 4.3, including the internal structure that holds the sign. The column on the side will require a footing design, and be sized to match the panel intended for this installation. At this writing, designs do not exist for the flag sign with stone column. A detail for mounting the panel is available from the National UniGuide Manager at Harpers Ferry Center. Other details will be added to this specification as they are developed.

Concrete and Stone Work

Instructions are provided in Sections 4.3 and 5.1 that describe the forming and pouring of concrete footings. The footings and monoliths are to be poured in two separate procedures with the form below grade poured first, and a second pour for the monolith with anchor bolts set for mounting sign uprights.

Masonry Materials

Cast-in-place concrete footings to receive sack finish with structure articulated with bevel detail in form that is scaled to overall structure and with corner bevels on all sides. The patterning is to be designed by the project landscape architect.

Stone or Brick Veneer

All stone or brick veneer structures should follow the proportions shown in the attached drawings. Veneered structures can use a variety of materials, but it is recommended that they be indigenous to the area. Options include uncoursed mosaic and random coursed ashlar, both with 1/2" visible grout joints. Stone veneer cap to be flat, following specification in Section 4.3

Brick veneer should be horizontal with precast concrete coping. Thickness of the coping to be 5-1/2 minimum and larger for signs based on a 9" and 12" legend.

For all veneered bases, place 1' weep holes along the bottom 24" on center to prevent moisture buildup in the space between the concrete core and stone veneer.

All concrete work to comply with NPS standard specifications as available for construction contracts from Denver Service Center for:

- Cast in Place Concrete, NPS Standard Specification, Section 03300
- Concrete reinforcement, NPS Standard Specification, Section 03200
- Mortar and Masonry Grout, NPS Standard Specification, Section 04100
- Unit Masonry, NPS Standard Specification, Section 04200
- Masonry Reinforcement, NPS Standard Specification, Section 04150
- Stone Veneer Masonry, NPS Standard Specification, Section 04400
- Graffiti-Resistant Coatings, NPS Standard Specification, Section 09860

The Portal Experience

The Identification Sign is the front door of a park. It identifies both the park and the National Park Service.

The graphic sign panel should be developed according to the standards contained in this manual unless the existing sign is of historic significance. By using these specifications, each park helps mold a clear and consistent identity for the NPS across the country.

The legend on the sign panel includes the park name without abbreviation or secondary information. The size of the panel is based on the initial capital letter height of the primary legend. Selection of the legend size is determined by two factors:

1 The legend must be easy to read by entering motorists.
2 As an architectural statement, the park identification sign must be appropriately scaled to the site. As a formal portal, this sign may be larger than the size needed for readability, but it should relate to the scale of the entrance.

Site Considerations

The entry portal initially provides a grand sense of arrival. The Park Identification Sign, depending on the size of the park should provide a frame for that experience - - a “photo opportunity” for visitors to celebrate their arrival. To that end, it is recommended that each entrance be designed so vehicles may stop without creating a cluttered environment or traffic problems. A drive can be placed behind the sign so visitors are not in traffic as they walk to the sign to enjoy the photo opportunity, and parking areas should be located so they are not seen by the next visitor entering the portal.

If possible, a comfort station should be located at the entrance to parks that are a great distance from other public facilities.

The portal is also a place to give visitors information about where they are going and what to expect when they get there. Information should be available on accommodations inside and outside the park, and include maps of the region and the park. Kiosks can provide informa-

tion on seasonal activities and critical resource management issues.
All plantings at the entrance should be native to the site. Labels on plants and other wayside exhibit interpretive materials can make a short stop there more meaningful.

Paths or walkways should be designed to protect the quality of the landscape surrounding the Park Identification Sign, while allowing access for photographs.

Standard Structures

1 Wood Panel-Double Post Mount for Park Identification
2 Wood Panel-Monolithic Structure for Park Identification
3 Wood Panel-Monolithic Structure for Facility Identification
4 Wood Panel-Double Post Mount for Facility Identification
5 Wood Panel-Hanging Timber Mount
6 Wood Panel-Wall Mount

Custom Monoliths

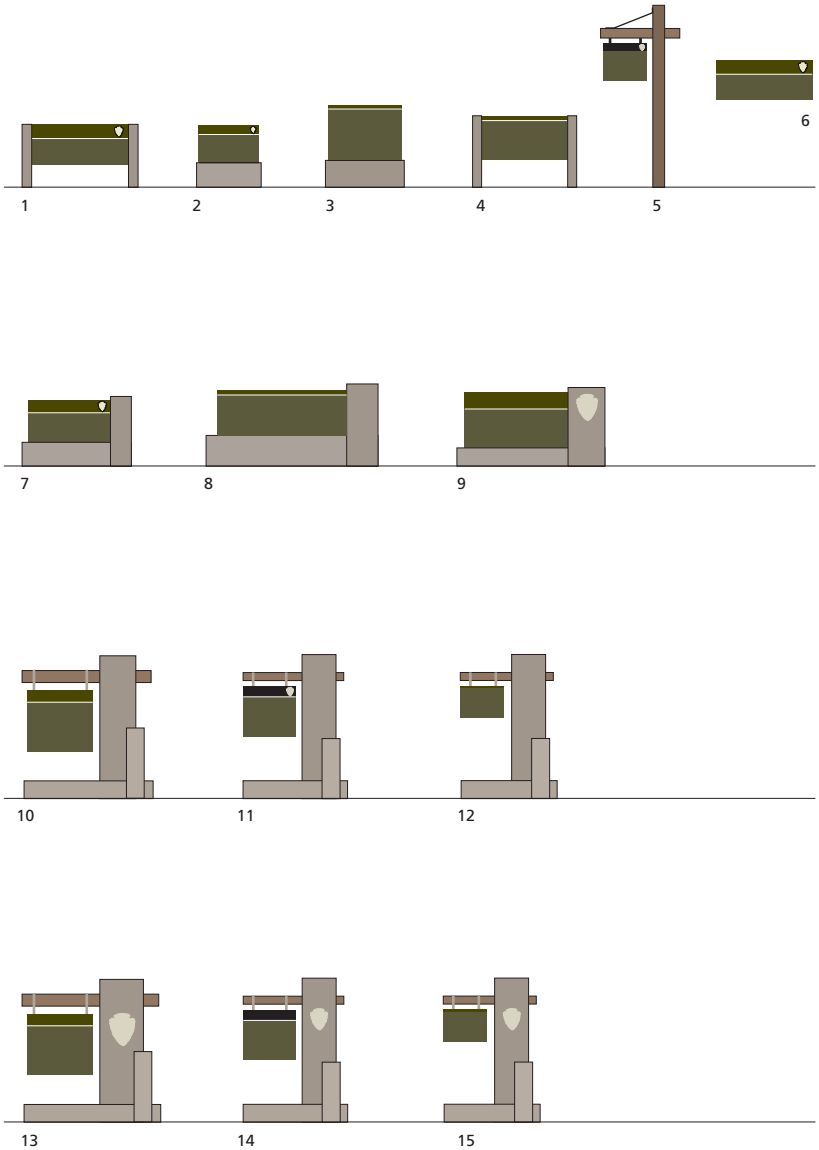
7 Wood Panel-Monolith with Side Column with NPS Arrowhead Logo on Sign Panel
8 Wood Panel-Monolith with Side Column
9 Wood Panel-Monolith with Side Column with NPS Arrowhead Logo on Structure

Custom Hanging Structures

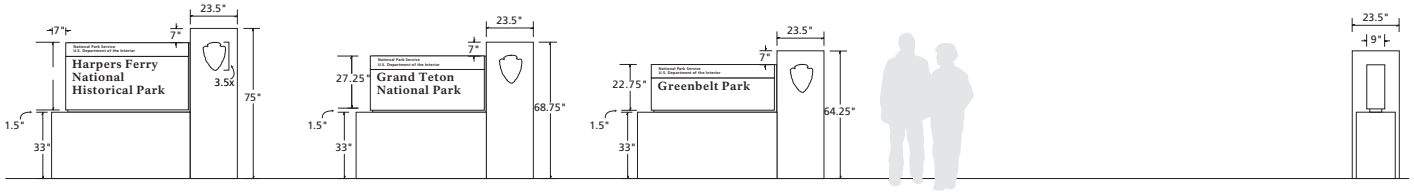
10-12 Masonry Column with Wood Cross Member and Hanging Sign

Custom Hanging Structures

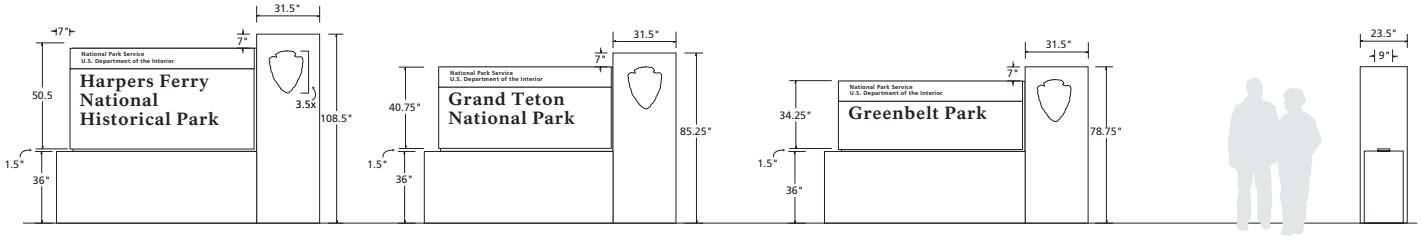
13-15 Masonry Column with Wood Cross Member and Hanging Sign with NPS Arrowhead Logo on Structure



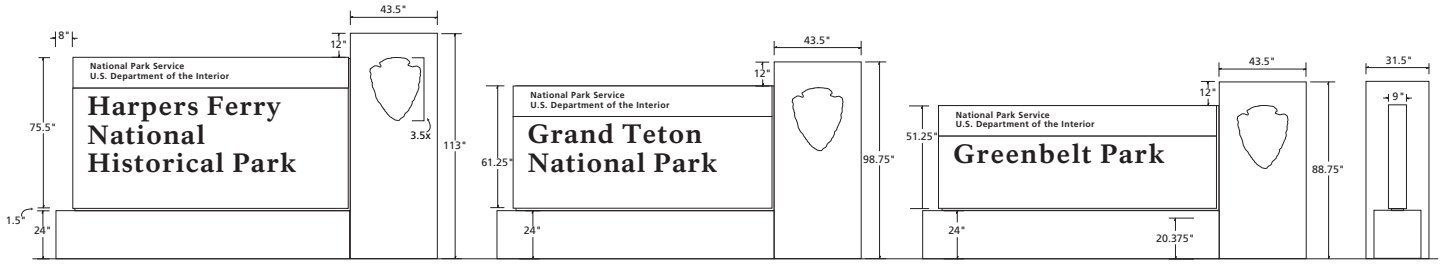
Side Column Structure with Arrowhead



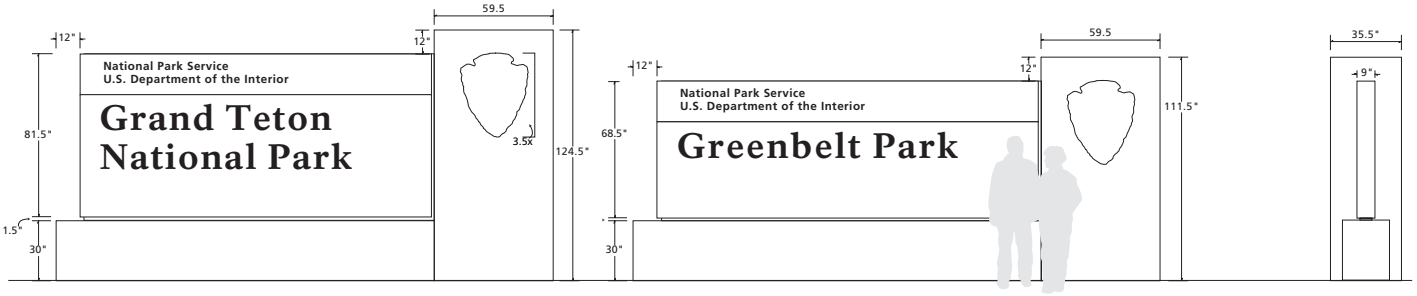
4" Legend Row



6" Legend Row



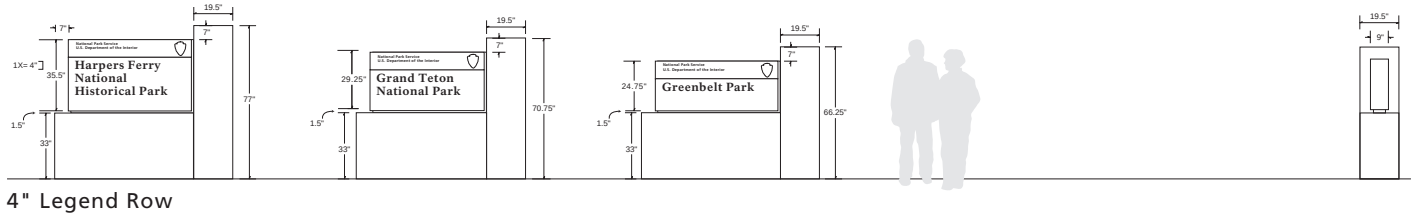
9" Legend Row



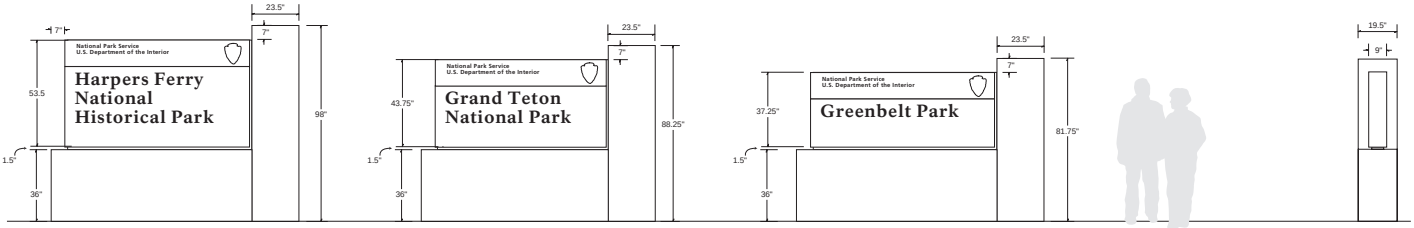
12" Legend Row


National Park Service
U.S. Department of the Interior
Fort Pulaski
National
Monument

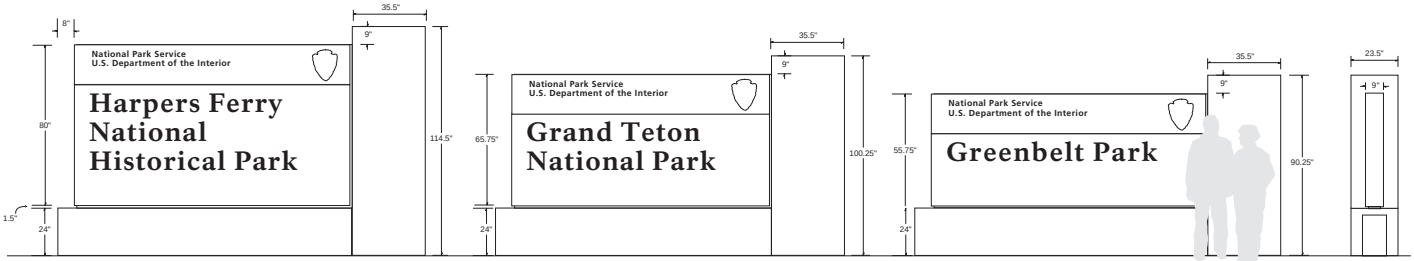

National Park Service
U.S. Department of the Interior
Big Cypress
National Preserve



4" Legend Row



6" Legend Row



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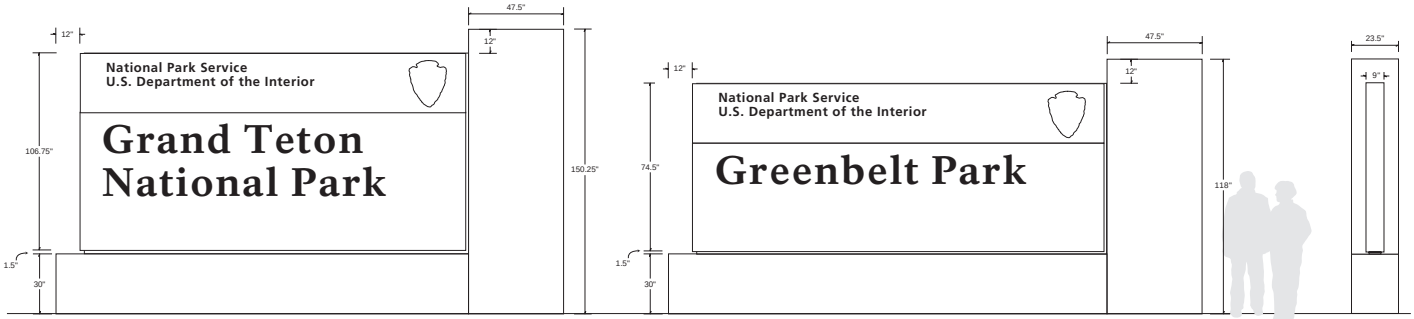

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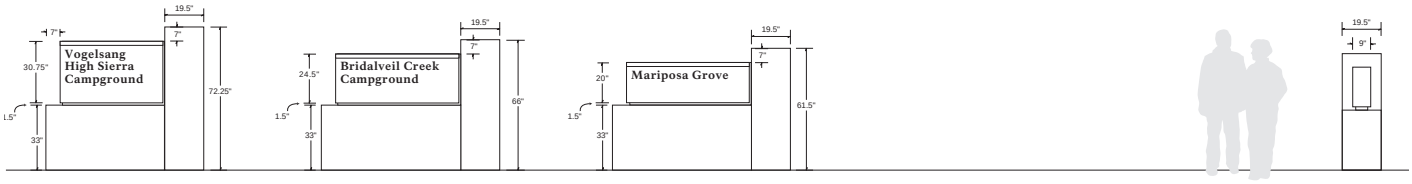
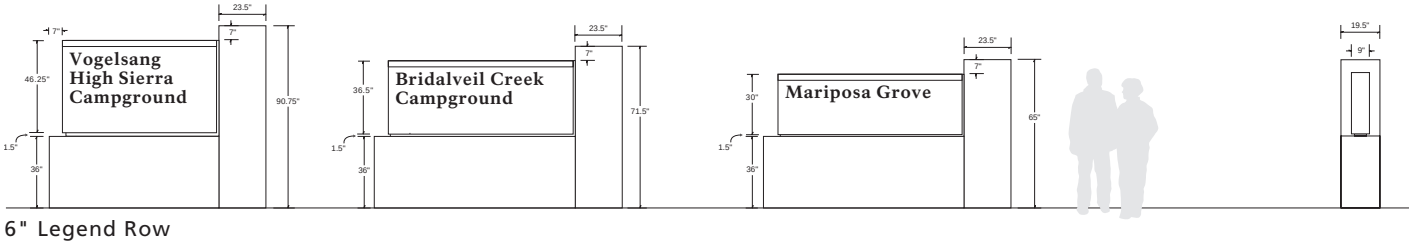
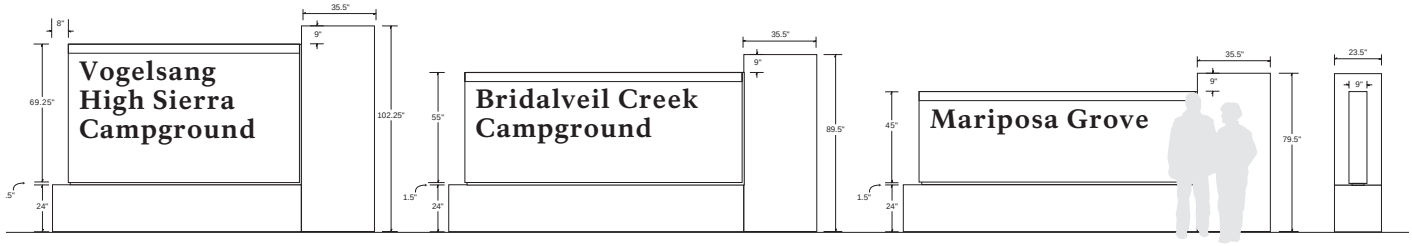


4" Legend Row



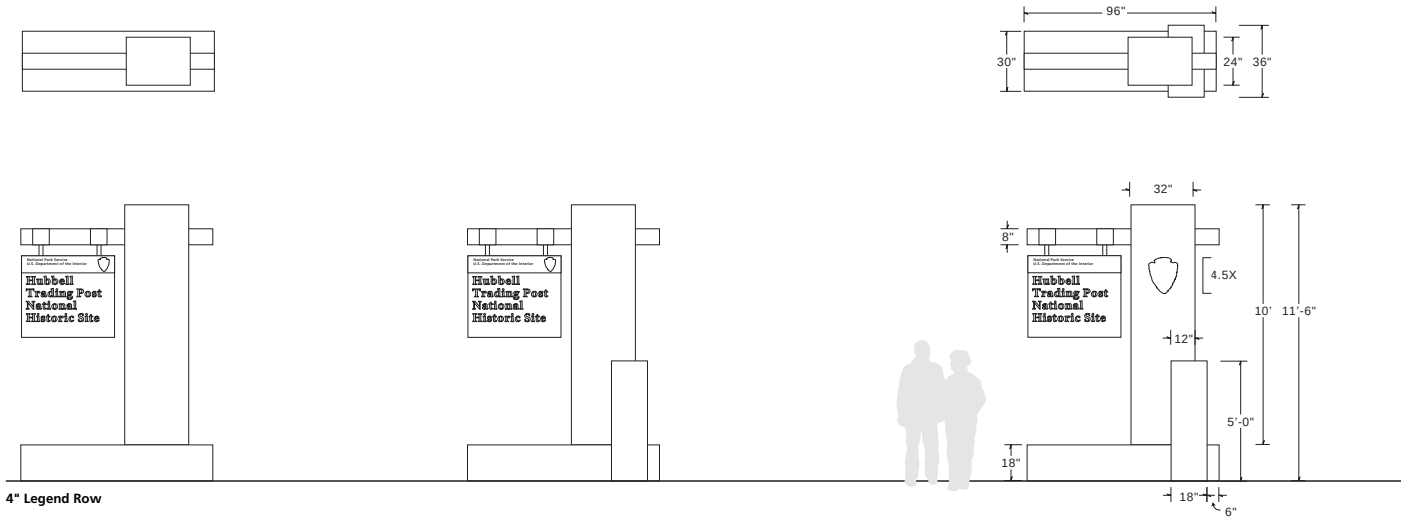
6" Legend Row



9" Legend Row


Saquaro
National
Park


National Park Service
U.S. Department of the Interior
Natchez
Trace
Parkway



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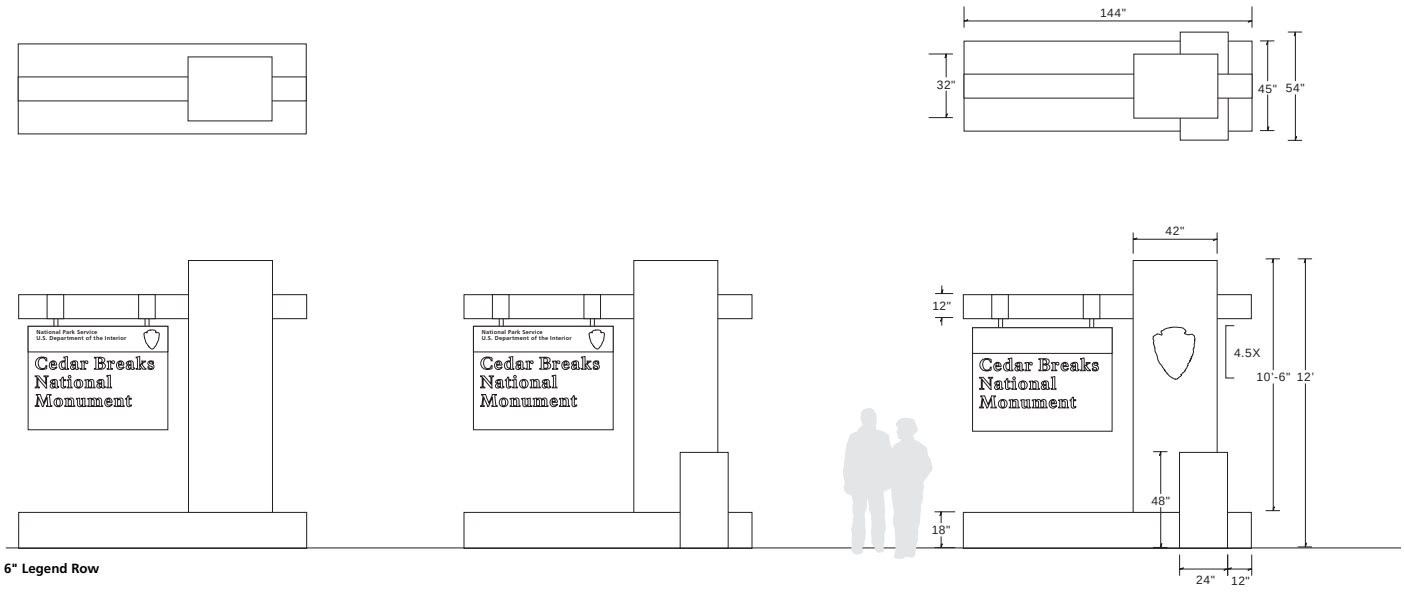
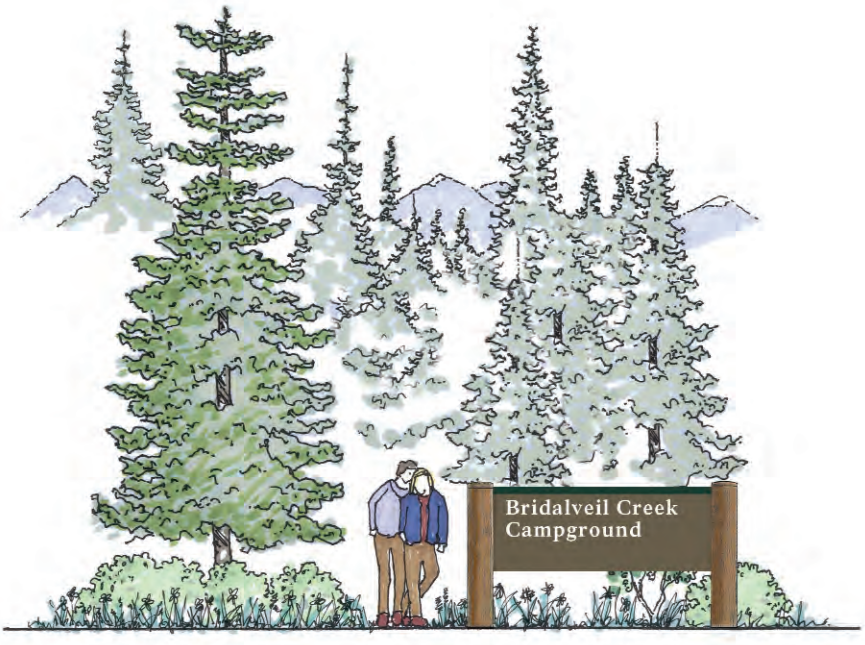
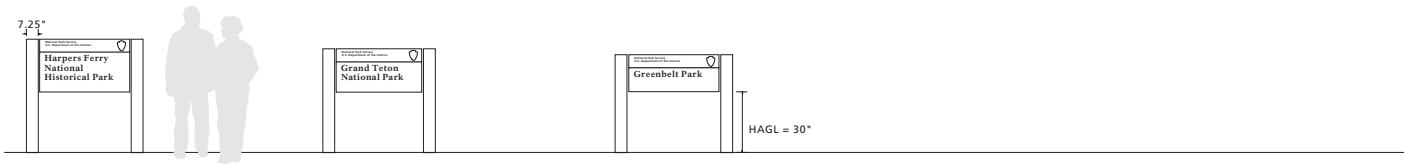


6" Legend Row

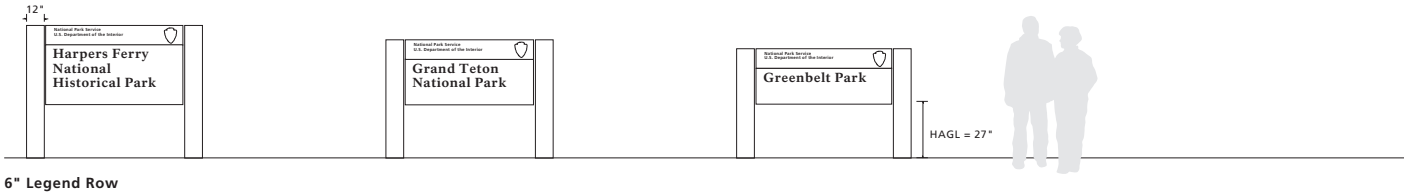

National Park Service
U.S. Department of the Interior
Assateague Island
National Seashore


Bridalveil Creek
Campground

Double Post (Park ID)



4" Legend Row



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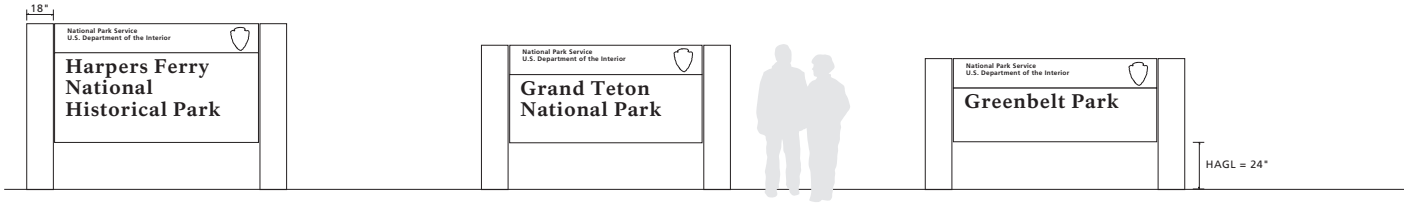

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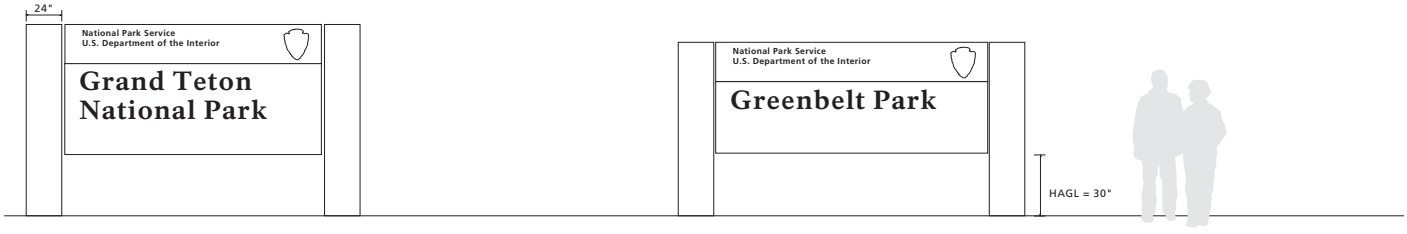
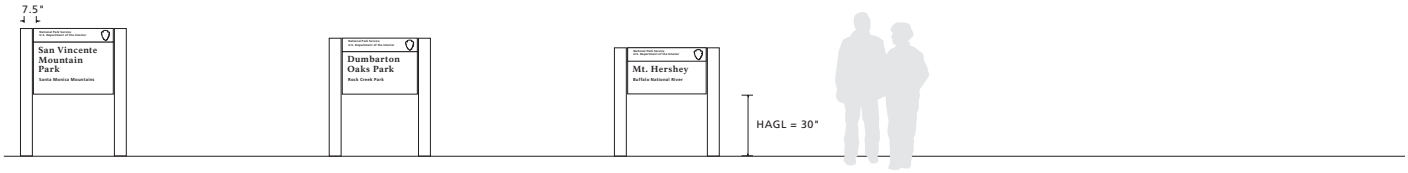
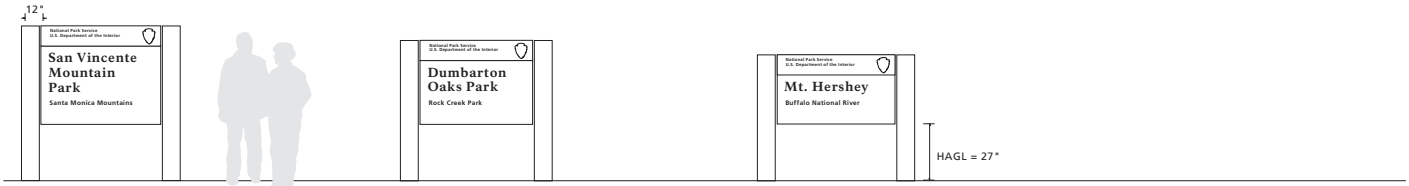


12" Legend Row



4" Legend Row



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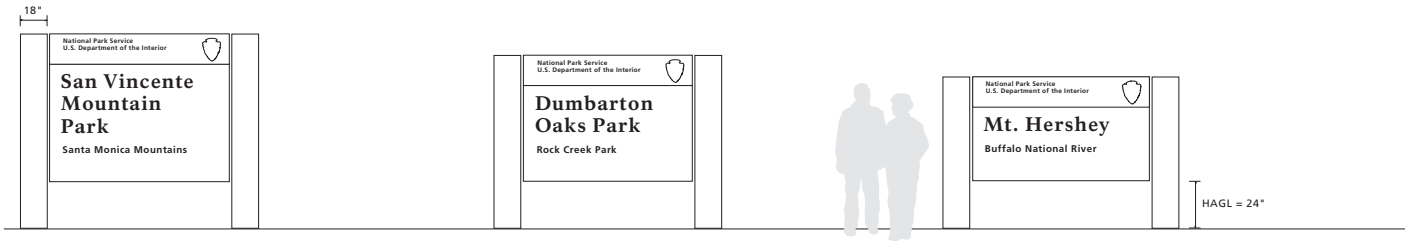
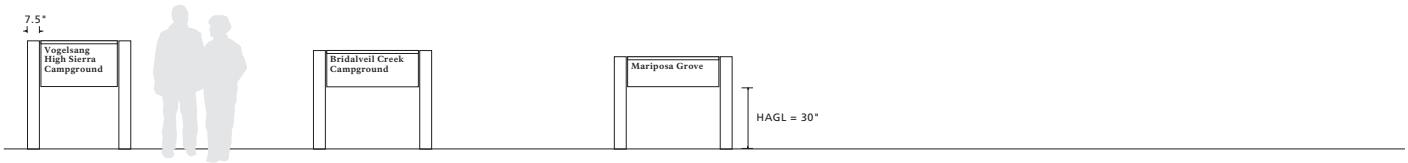
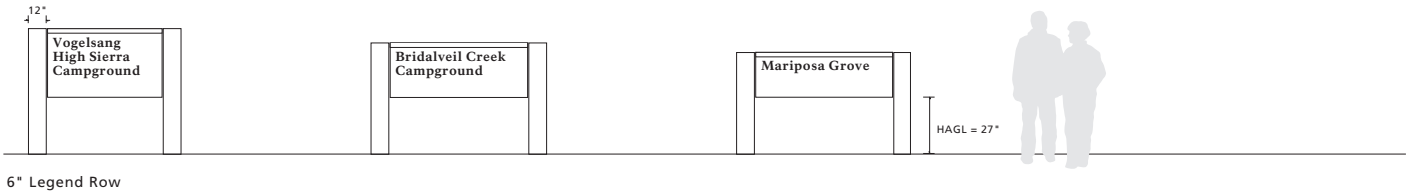


9" Legend Row

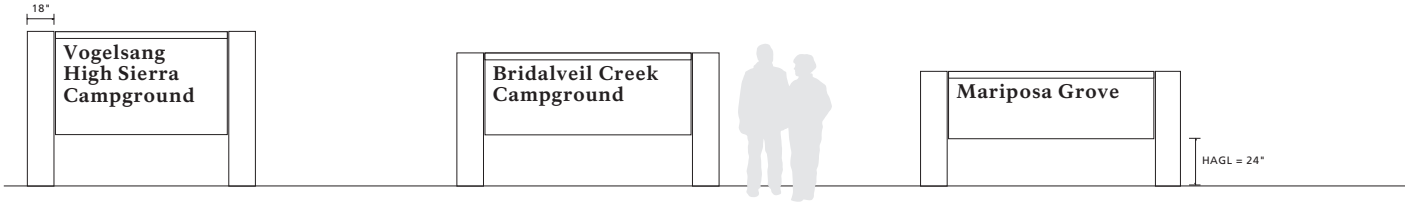
Double Post (Facility ID)



4" Legend Row



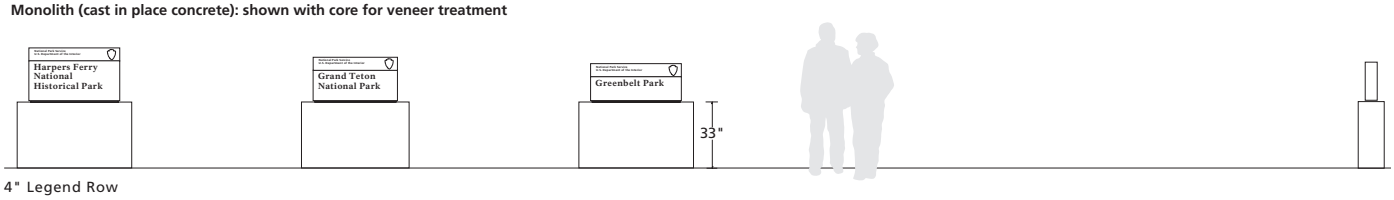
6" Legend Row



9" Legend Row

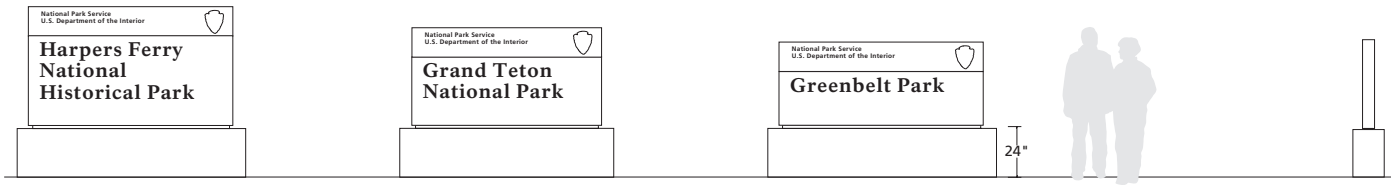

National Park Service
U.S. Department of the Interior
Cumberland Island
National Seashore

Monolith (cast in place concrete): shown with core for veneer treatment

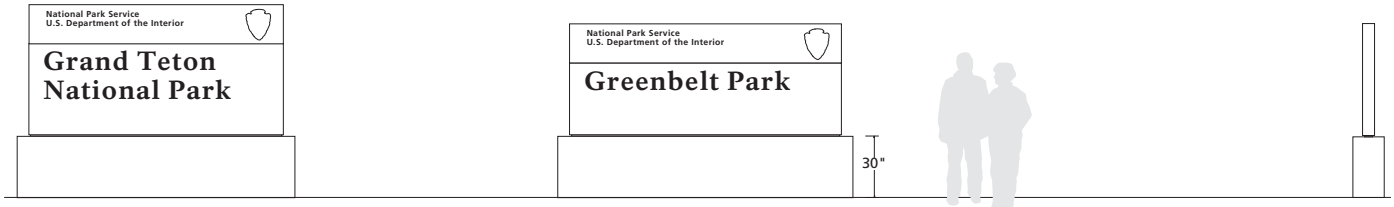


4" Legend Row

6" Legend Row

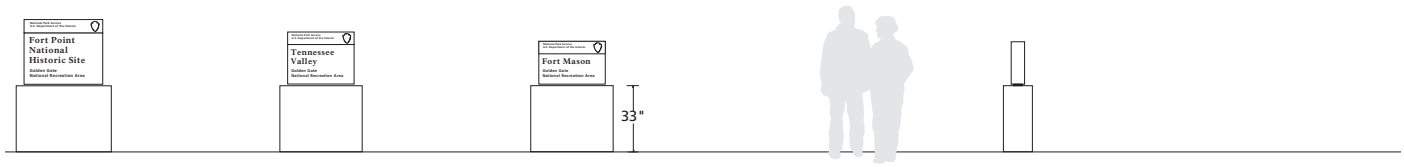


9" Legend Row

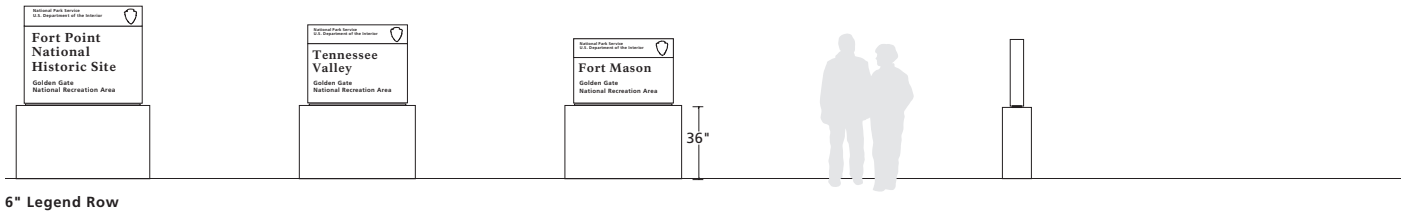


12" Legend Row

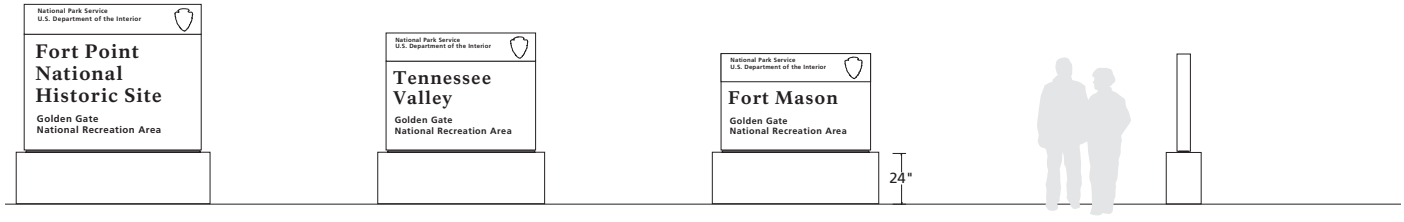
Monolith (Facility ID with Park Identification) cast in place concrete: shown with core for veneer treatment



4" Legend Row

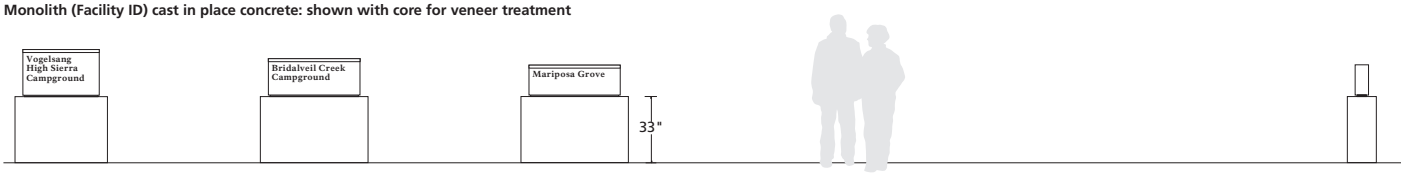


6" Legend Row

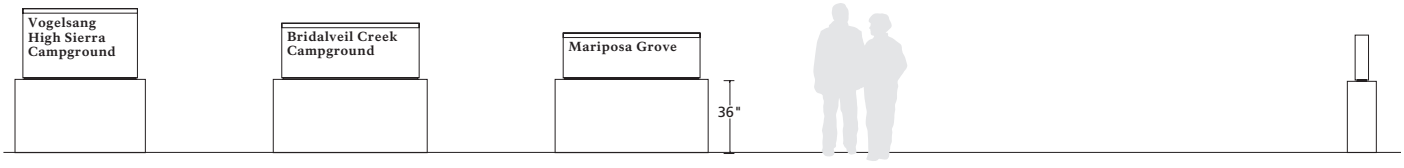


9" Legend Row

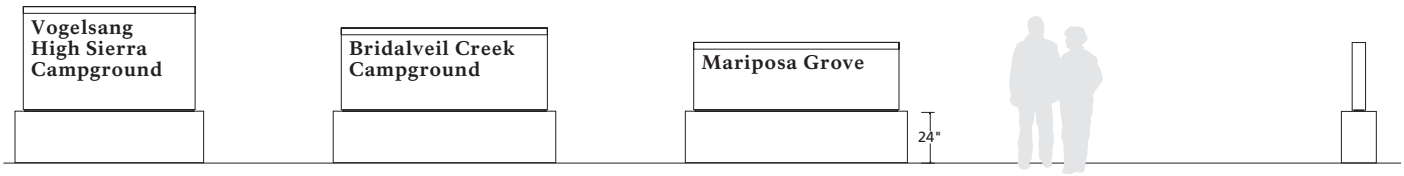
Monolith (Facility ID) cast in place concrete: shown with core for veneer treatment



4" Legend Row



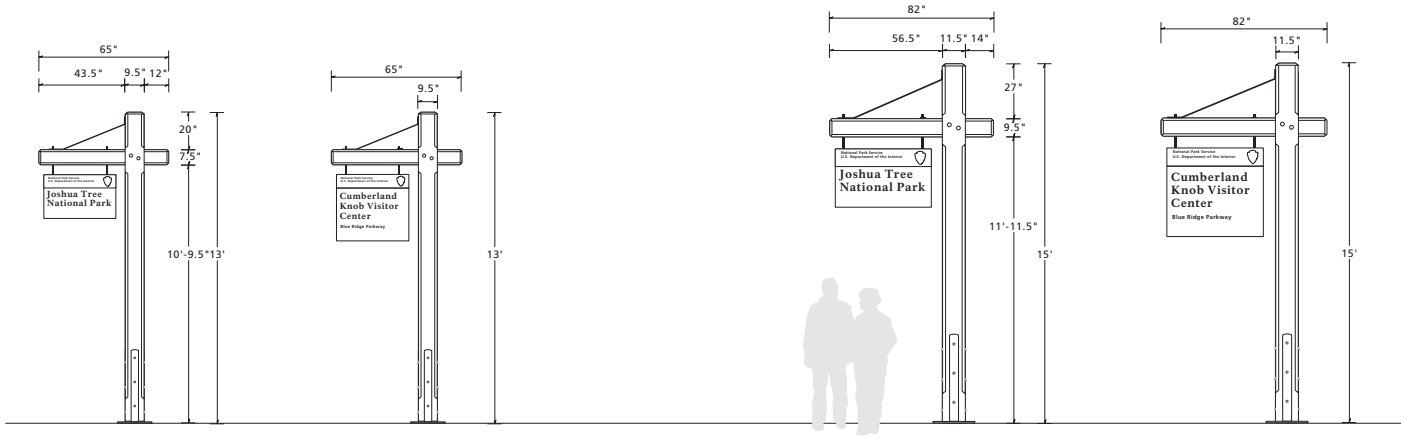
6" Legend Row



9" Legend Row


Yosemite
Creeek
Campground


Lassen
Volcanic
National
Park



National Park Service
U.S. Department of the Interior

Great Falls Park

National Park Service
U.S. Department of the Interior

Pinelands National Reserve

National Park Service
U.S. Department of the Interior

Gettysburg National Military Park

Valley View

Tuolumne Meadows

Swinging Bridge Picnic Area

National Park Service
U.S. Department of the Interior

Blue Ridge Parkway

National Park Service
U.S. Department of the Interior

Oregon Caves National Monument

National Park Service
U.S. Department of the Interior

Palo Alto Battlefield National Historic Site

National Park Service
U.S. Department of the Interior

Joshua Tree National Park

National Park Service
U.S. Department of the Interior

Cumberland Knob Visitor Center

Blue Ridge Parkway

Chapter 3

UniGuide Planning, Design & Documentation

Section 3.4

Type Size Viewing Distance Tables

Final Draft: *June 1, 2002*

Letter Size and Sign Placement

Foreword

This report provides a guide on letter size and the placement of directional signs on roadways leading to or in national parks.

Principles

Careful selection of letter size and sign location will enable the motorist to detect and understand the sign message before passing the sign. There should be ample time after passing the sign to comfortably react to it. The typical reaction of the motorist would be to slow from the operating speed and then to turn either right or left at the appropriate crossroad or access road. On multi-lane roadways, the motorist may have to change lanes before slowing to the crossroad or access road.

Detection and Recognition Time

"The total time needed to perceive and complete a reaction to a sign is the sum of the times necessary for Perception, Identification (understanding), Emotion (decision making), and Volition (execution of decision), and is called the PIEV time. The PIEV time can vary from several seconds for general warning signs to 6 seconds or more for warning signs requiring high road user judgment." (MUTCD, 2000)

As stated above, advance guide sign placement should allow sufficient time to comfortably react to the sign message after passing the sign. What occurs before the driver passes the sign is therefore limited to sign detection and reading for comprehension.

Sign Reading and Comprehension Time

Proffitt, Wade, and Lynn (1998) reported that the average normal reading speed for adults is about 250 words per minute (wpm), or 4.2 words per second. Research evaluating "optimum acuity reserve" (the ratio between threshold acuity and optimal print size) has demonstrated that optimal reading speeds result from print size that may be as much as four times size threshold (Bowers and Reid, 1997; Yager, Aquilante, and Plass, 1998; Lovie-Kitchin, Bowers, and Woods, 2000). In fact, Yager et al. (1998) reported 0.0 words per minute (wpm) reading speed at size threshold. This explains some of the disparity between "normal" reading speed of above size threshold text and the time it takes to read a sign, which begins at acuity threshold.

Research on highway sign reading provides evidence that it takes drivers approximately 0.5 to 2.0 seconds to read and process each word. Dudek (1991) recommended a minimum exposure time of "one second per short word…or two seconds per unit of information" for unfamiliar drivers to read changeable message signs. In a study conducted by Mast and Balias (1976), average advance guide sign reading was 3.12 seconds and average exit direction

sign reading was 2.28 seconds. Smiley, MacGregor, Dewar, and Blamey (1998) found that 2.5 seconds was sufficient for 94% of their subjects to accurately read signs that contained three destination names, however this dropped to 87.5% when the signs displayed four or five names.

McNees and Messer (1982) reported two equations to determine reading time: t=(N/3)+1 and t=.31N+1.94 (where t is time in seconds and N in the number of familiar words). In their own work, these researchers found that the time it takes to read a sign depends, among other things, on how much time the driver has to read it (i.e., signs are read faster when it is necessary to do so). They also found that as reading speed increases so do errors. McNees and Messer (1982) concluded that, "a cut-off of approximately 4.0 s to read any sign was critical for safe handling of a vehicle along urban freeways." If the 4.0 s is plugged back into the equations cited by these researchers, the number of familiar words on the sign ranges from about seven to nine, or approximately two words per second.

While it is impractical to specify a single minimum reading time that will allow all drivers to read and understand all signs, the research on sign reading speed seems to indicate that signs displaying four to eight words could be comfortably read and comprehended in approximately 4.0 sec. Signs with one to three words could be read in 2.5 sec.

In addition to sign reading, the driver must also watch the road and perform other driving tasks. Considering overhead guide signs, McNees and Messer (1982) estimated that a 4.5 sec sign reading time would actually entail an 11.0 sec sign legibility distance. This results from adding 2.0 sec for sign clearance time and dividing the remaining 9.0 sec equally between sign reading and other driving tasks. In looking at shoulder mounted signs, Smiley, et al. (1998) provide more practical estimates. These researchers allowed for .5 sec clearance time and a .5 sec glance back at the road for every 2.5 sec of sign reading (based on eye movement research by Bhise and Rockwell, 1973). This would require a 5.0 sec legibility distance for 4.0 sec of sign reading and 3.0 sec legibility distance for 2.5 sec of sign reading. This is assuming that the driver begins to read the sign as soon as it becomes legible. Allowing an additional 1.0 sec for sign acquisition after it becomes legible, appropriate legibility distance for signs displaying four to eight words would be 6.0 sec and for signs with one to three words would be 4.0 sec.

Letter Height

To determine letter height requirement for a sign, several variables must be quantified: the minimum required legibility distance (MRLD); the actual sign legibility distance; the vehicle speed; and the target population.

- Based on the analysis above, the **MRLD** expressed in time is 6.0 sec for signs with four to eight words and 4.0 sec for signs displaying one to three words.

- The **legibility distance** for signs using NPS Rawlinson Roadway letters was established in research conducted by Garvey, Zineddin, Pietrucha, Meeker, and Montalbano (2001). The combined median day/night legibility index (ft/in of letter height) for the NPS Rawlinson Roadway font for younger subjects with normal (20/20) visual acuity was 57.8. Based on this number, median legibility distances were calculated for individuals of varying acuities and for letter heights ranging from 2 to 14 in (*Table 1*).
- The calculated legibility distances were then converted to time for four **driving speeds** *(Tables 2-5)*. *Tables 2-5* show the amount of time between threshold sign legibility distance and the point where the vehicle passes the sign, or the total available legibility distance expressed in time.
- Smiley et al. (1998) reported that 90% of drivers have 20/30 vision or better. If the 20/30 driver is selected as the **design driver**, then the gray bars in *Tables 2-5* represent the required legibility distance.
- The heavy solid line cells in *Tables 2-5* depict the **recommended letter heights** for signs with one to three words and the heavy dotted line cells contain the letter heights and reading time for signs with four to eight words.
- These recommendations are in accord with MUTCD requirements (MUTCD, 2000).

Sign Placement

The placement of directional signs is to be far enough in advance of the location of the site so that the motorist can react and slow the vehicle or change lanes, if necessary, after passing the sign and prior to reaching the appropriate crossroad or access road. The MUTCD (2000) states, "When used in high-speed areas, Destination signs [i.e., conventional road guide signs] should be located 200 ft or more in advance of the intersection…In urban areas, shorter advance distances may be used." The distance of 200 ft at 65 MPH translates to approximately 2.0 sec.

This minimum distance should be increased on multi-lane roadway approaches to allow the motorist time to change lanes. The MUTCD (2000) states, "where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation" 4.5 sec should be allotted for vehicle maneuvers.

The MUTCD recommendations can best be thought of as absolute minimums. To establish more conservative recommended distances for longitudinal sign placement for the National Park Service, a formula developed by Woods and Rowan (1970) was combined with deceleration rates from AASHTO. Table 6 contains the results of that formula for single lane approaches. Adding 4.0 sec to the single lane approaches results in the multilane recommendations.

In some cases, such as high-speed highways, two signs may be necessary. In fact, the MUTCD (2000) recommends, "For major and intermediate interchanges, two and prefer-

ably three Advance Guide signs should be used. Placement should be 0.5 mi, 1 mi, and 2 mi in advance of the exit. At minor interchanges, only one Advance Guide sign should be used. It should be located 0.5 to 1 mi from the exit gore." (MUTCD, 2000)

Recommendations

Table 6 contains the recommended viewing distances, letter sizes, and sign placement for operating speeds up to 70 miles per hour.

The decision to use a particular size sign at a specific location should be made on the basis of a thorough study of the area. *Table 6* provides the fundamental criteria for directional sign letter sizing and placement.

Ambiguous and/or complicated situations may require a more in depth analysis performed by a qualified engineer. This assessment is needed to exercise the judgment inherent in the selection of traffic signs just as it is needed to locate and design the roads and streets which the signs complement.

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Smiley, A., MacGregor, C., Dewar, R.E., and Blamey C. (1998). Evaluation of prototype tourist signs for Ontario. Transportation Research Record 1628, TRB, National Research Council, Washington, D.C. pp. 34-40.

Woods, D. L. and Rowan, N.J. (1970). Street Name Signs for Arterial Streets, Highway Research Record 325, p. 54.

Yager, D., Aquilante, K., and Plass, R. (1998). High and low luminance letters, acuity reserve, and font effects on reading speed. Vision Research, 38, p2527-2531.

Visual Acuity	Letter Height (in)							
	2	3	4	6	8	10	12	14
20/20	115	172	229	344	458	573	688	802
20/30	76	115	153	229	306	382	458	535
20/40	57	86	115	172	229	287	344	401
20/60	38	57	76	115	153	191	229	267

Table 1. Calculated median legibility distance in feet for NPS Rawlinson Roadway at various letter heights and visual acuities.

Visual Acuity	Letter Height (in)							
	2	3	4	6	8	10	12	14
20/20	2.23	3.35	4.47	6.70	8.93	11.16	13.40	15.63
20/30	1.49	2.23	2.98	4.47	5.95	7.44	8.93	10.42
20/40	1.12	1.67	2.23	3.35	4.47	5.58	6.70	7.81
20/60	0.74	1.12	1.49	2.23	2.98	3.72	4.47	5.21

Table 2. Calculated legibility distance in seconds for NPS Rawlinson Roadway at various letter heights and visual acuities at 35 mph.

Visual Acuity	Letter Height (in)							
	2	3	4	6	8	10	12	14
20/20	1.74	2.60	3.47	5.21	6.95	8.68	10.42	12.15
20/30	1.16	1.74	2.32	3.47	4.63	5.79	6.95	8.10
20/40	0.87	1.30	1.74	2.60	3.47	4.34	5.21	6.08
20/60	0.58	0.87	1.16	1.74	2.32	2.89	3.47	4.05

Table 3. Calculated legibility distance in seconds for NPS Rawlinson Roadway at various letter heights and visual acuities at 45 mph.

Visual Acuity	Letter Height (in)							
	2	3	4	6	8	10	12	14
20/20	1.42	2.13	2.84	4.26	5.68	7.10	8.52	9.95
20/30	0.95	1.42	1.89	2.84	3.79	4.74	5.68	6.63
20/40	0.71	1.07	1.42	2.13	2.84	3.55	4.26	4.97
20/60	0.47	0.71	0.95	1.42	1.89	2.37	2.84	3.32

Table 4. Calculated legibility distance in seconds for NPS-4 at various letter heights and visual acuities at 55 mph.

Visual Acuity	Letter Height (in)							
	2	3	4	6	8	10	12	14
20/20	1.20	1.80	2.40	3.61	4.81	6.01	7.21	8.41
20/30	0.80	1.20	1.60	2.40	3.21	4.01	4.81	5.61
20/40	0.60	0.90	1.20	1.80	2.40	3.01	3.61	4.21
20/60	0.40	0.60	0.80	1.20	1.60	2.00	2.40	2.80

Table 5. Calculated legibility distance in seconds for NPS Rawlinson Roadway at various letter heights and visual acuities at 65 mph.

Operating Speed (MPH)	Number of Word	Reading Time (sec)	Letter Height (in)	Longitudinal Sign Placement Distance (ft/sec)	
				Single Lane approach	Multi-lane approach
25 – 40	1-3	3.0 – 4.5	4 – 6	375/6.4	600/10.4
	4-8	6.0	8		
41 – 50	1-3	3.5 - 4.5	6 – 8	500/6.8	800/10.8
	4-8	5.5 - 7.0	10 - 12		
51 – 60	1-3	4.0 – 5.0	8 - 10	650/7.4	1000/11.4
	4-8	5.5 – 7.0	12 - 14		
61 – 70	1-3	4.0	10	725/7.1	1100/11.1
	4-8	5.5	14		

Table 6. Recommended reading time, letter height, and longitudinal sign placement for various operating speeds and number of words on a sign.

Chapter 3

UniGuide Planning, Design & Documentation

Section 3.5

Preparation of Artwork for Sign Production

Final Draft: *June 1, 2002*

Introduction

This section provides general guidelines and a series of case examples illustrating the process of preparing artwork for signs. For most of the panels in the UniGuide Program, the preparation of artwork is not a difficult task if the planner uses the tools provided. Nonetheless, all artwork should be reviewed prior to production by the National UniGuide Manager.

The preparation of panel artwork for production is based on standard grid formats specified in Chapter 2, Design Standards. The specifications include: NPS Rawlinson and Frutiger typefaces, NPS Arrowhead logo, NPS/SEGD recreation symbols, directional arrows for guide signs, and color.

All 30 cm x 30 cm and 15 cm x 30 cm panels are provided at full size with specified typography included in each text field for ease of use. These grids can be proportionally scaled to 45 cm and 60 cm tall panels if needed.

Motorist Guidance and Park Identification Sign grid formats are provided with the primary legend as 1" in capital letter height to make scaling to specified sizes convenient.

Software Applications for Sign Layout & Production

Most of the signs are produced using graphical software programs. Preferred programs include Adobe Illustrator and QuarkXpress for use with the Apple Macintosh operating system. Although programs are available for the MS Windows operating system, graphic production houses prefer Macintosh for consistency and overall product quality. Selection of graphical software will depend on the method of production. Artwork developed with these programs will accommodate such methods of production as single-color printing on a panel, cutting vector art from adhesive vinyl film, and creating complex multi-layer map artwork for screen printing. Guidance on which software to use is available from the National UniGuide Manager at Harpers Ferry Center.

Adobe Illustrator is used for production that requires:

- Cutting or routing from a typographic outline for all Motorist Guidance Signs and routed Identification Signs, plus Visitor Information System panels using cut adhesive vinyl
- Direct digital printing on paper for high-pressure laminate or fiberglass embedment
- Creation of color separation films for screen printing with flat color artwork

Quark Xpress is used for production that requires:

- Direct digital printing and screen printing with color separations incorporating graphic images such as TIFF, JPEG, EPS, BMP or Adobe Illustrator files and typography
- Typographic layouts that use fixed templates or formats (master pages)
- Creation of separation films for screen printing with duotone or four-color artwork

General Guidelines for Preparing Artwork

It is not the intent of this overview to teach someone how to become a graphic designer. Many of the maps and more complex panels in the system will require skilled professionals to prepare them for production. Complex graphic panels will be prepared directly or under supervision of the National UniGuide Manager. It is possible with minimal training, however, to prepare panels with basic type and symbols using the templates provided. Most UniGuide panels can be built from the following standard grid formats or templates:

VIS Panels (Catalog & Site Specific Panels)

AE	Area Entry
SG	Small Guide
TR	Traffic Regulatory
EF	Entrance Fees
RF	Recreation Fees
IN	Information / Instruction
RM	Resource Management
NPS	Messaging
RE	Regulations
PR	Protection
SW	Safety Warning
SD	Safety Danger
MP	Miscellaneous Postings
PN	No Parking
PY	Parking
PH	Handicapped Parking
AI	Area Identification
CI	Campsite Identification
FB	Fingerboard
PA	Parking Lot Identification
SS	Shuttle Stop Identification
RS	Symbol Based Regulation
MA	Map
SN	Street Name
TG	Trail Guide
VFI	VIS Facility Identification
VPI	VIS Park Identification
VFPI	VIS Facility / Park Identification

Park and Facility Identification

FI	Facility Identification
FPI	Facility / Park Identification
PI	Park Identification

Motorist Guidance

RG	Road Guide
HG	Highway Guide
TB	Trailblazer Sign
PB	Park Boundary

Follow these basic guidelines when creating a new sign:

Step 1: Install all required weights of the NPS Rawlinson, NPS Rawlinson Road and Frutiger typefaces, and the NPS/SEGD Recreation Symbols onto your computer.

Step 2: Based on the sign type and legend size, choose the appropriate grid (digital template) from the graphic standards and make a copy of the file.

Step 3: Rename the file using the Sign Specification Code (e.g. TG-01-FC). Note that this number can be changed as the plan evolves.

Step 4: Type new legend into template. If legend does not fit, select an alternate grid or edit text accordingly.

Step 5: Save file.

Step 6: Create a folder for each area "neighborhood" and place each panel for that area in the folder.

Printing Templates: All VIS panel templates are provided at 100% scale. If printouts are desired, use the page setup dialog box in the program to reduce the print size to 25% for 30 cm square panels. All Identification Sign and Motorist Guidance signs are provided at 1" scale and should print on a 8-1/2" x 11" sheet without reduction.

Use the following guidelines to maintain an overall visual consistency in the signage:

Alignment: Lay out text flush left, rag right (unjustified). Do not indent paragraphs.

Typography: All type should be displayed in mixed case (upper and lower case) as shown in the examples and in the templates. Do not use all capital letter displays for any application except advance guide and advisory panels on Road Guide Signs, and advance guide legends and entry legends for Trailblazer and Boundary Signs as specified in Chapter 2.

Widows and Copy Fitting: All panels within the Visitor Information System are constrained relative to space. All legends should be prepared following the text writing guidelines in this chapter. If the text on a panel is displayed with typographic widows, or paragraphs that end with one word on the last line, the text should be edited to shorten the paragraph or place a hard return before the last line in the preceding line to balance the look of the paragraph. The width of panels for Road Guide Signs and Identification Signs are based on the longest legend line as shown in the examples.

Letterspacing: Letterspacing (tracking values) are built into each grid format. Changing these values will diminish overall legibility and visual consistency of the panels.

Chunking: When displaying lists or text on panels, use small paragraphs. This chunking and is intended to make panels easier to read than single large paragraphs. When preparing a panel with line breaks, use the paragraph space between the two blocks of type instead of a full return.

Color: The system includes a basic pallets of colors for sign background, overbar type and legend. Guidelines on the use of color are provided in Chapter 2. When using Adobe Illustrator software, the panel can be colored by highlighting the area or item and, using the eyedroper tool, clicking on the color pallets provided with each grid.

Step by Step Examples of Artwork Preparation

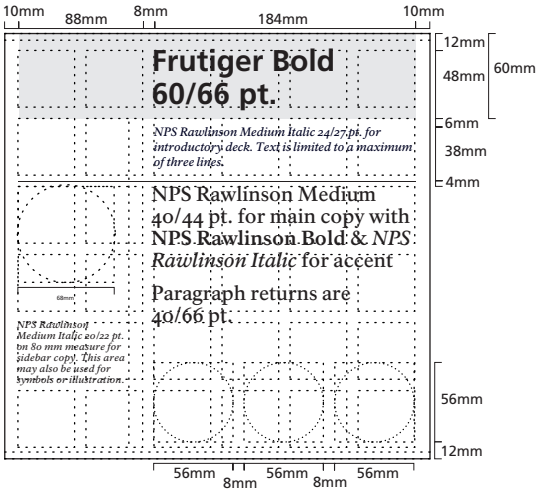
The following pages contain samples of how various types of signs in the UniGuide Program are prepared with the recommended software programs.

Step 1

Select the appropriate grid from the grid option pages in Chapter 2. The grids are provided at full size in Adobe Illustrator software.

Step 2

Type the text into the grid template, overriding the existing text. Maintain the type size and typeface as provided in each text box.



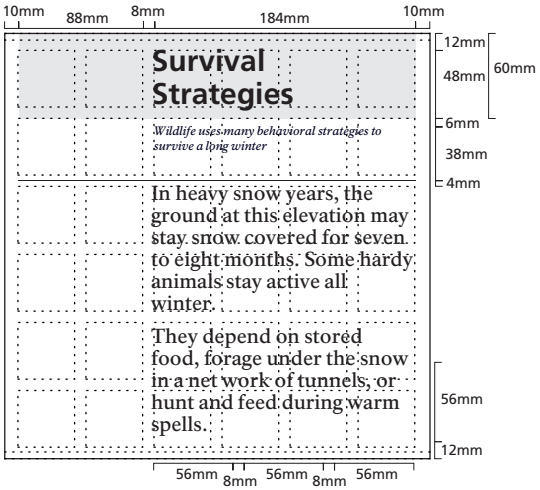
Step 3

If the panel will include an illustration, create a sketch and insert a low resolution digital scan for position only and adjust the type alignment as necessary.

Panels with an illustration may be prepared using QuarkXpress. This program allows precise manipulations of type and artwork.

Color the panel, text, illustrations, and graphics using the color pallet provided.

Note in the space provided if the panel requires additional cleanup by the National or Regional UniGuide Manager prior to final production.



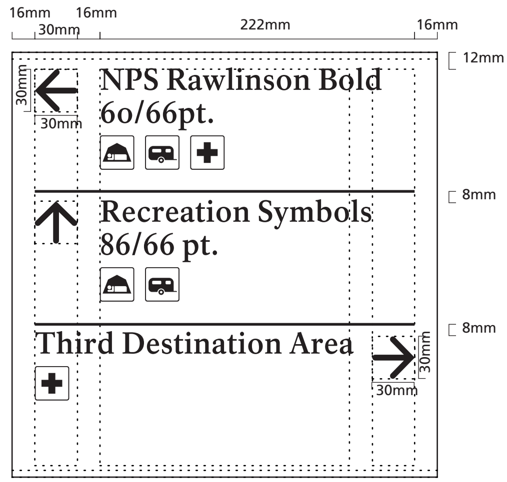
Note in the space provided if the panel requires additional cleanup by the National or Regional UniGuide Manager prior to final production.

Step 4

Save the completed panel in the "neighborhood" folder for which it is intended and place a copy into the Sign Plan Sheet. If the sign will be a "catalog" panel for use in many places, save the panel to a master panel folder.

Step 1

Select the appropriate grid from the grid option pages in Chapter 2, pages 2.1-41 to 45 and 2.-53. Use the grids provided in Adobe Illustrator software



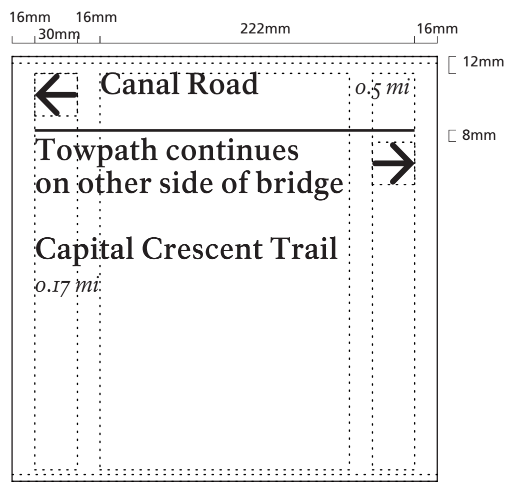
Step 2

Type the text into the grid template. Place arrows as typographic characters included in the type system. Tab location of type and returns. Position rules above legend with selection arrow tool.

Step 3

Color the panel, text, illustrations, and graphics using the color pallet provided.

Note in the space provided if the panel will require additional cleanup by the National or Regional UniGuide Manager prior to final production.



Step 4

Save the completed panel in the "neigh-borhood" folder for which it is intended and place a copy into the Sign Plan Sheet.

Step 1

Select the appropriate grid from the grid option pages in the UniGuide manual. Use the grids provided in Adobe Illustrator software.

Step 2

Type the text into the grid template. Note that no regulation may exceed more than two lines of text.

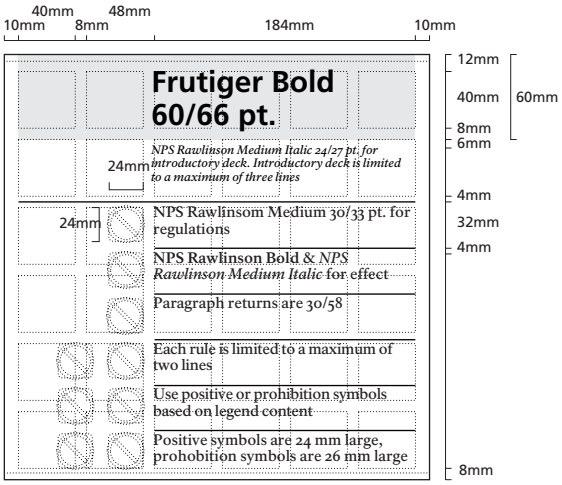
Place symbols in proper location using template as a guide.

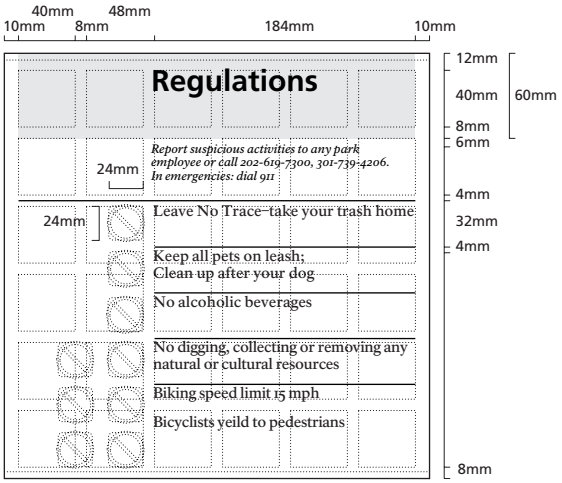
Step 3

From the provided catalog of symbols, choose the symbol for each regulation and align with the appropriate legend.

Step 4

Save the completed panel in the "neighborhood" folder for which it is intended and place a copy into the Sign Plan Sheet. If the sign will be a "catalog" panel for use in many places, save the panel to a master panel folder.





Step 1
Select the appropriate grid from the grid option pages 2.-60 to 2.-7 in Chapter 2.

(Note: Each grid is designed to accommodate a particular legend size. Do not mix and match panel size and type size without reviewing all of the size options. Choose type size based on view distance.

Step 2
Using the grids provided in Adobe Illustrator software, type the text into the grid template. Adjust to correct width based on 30 cm increments up to 120 cm.

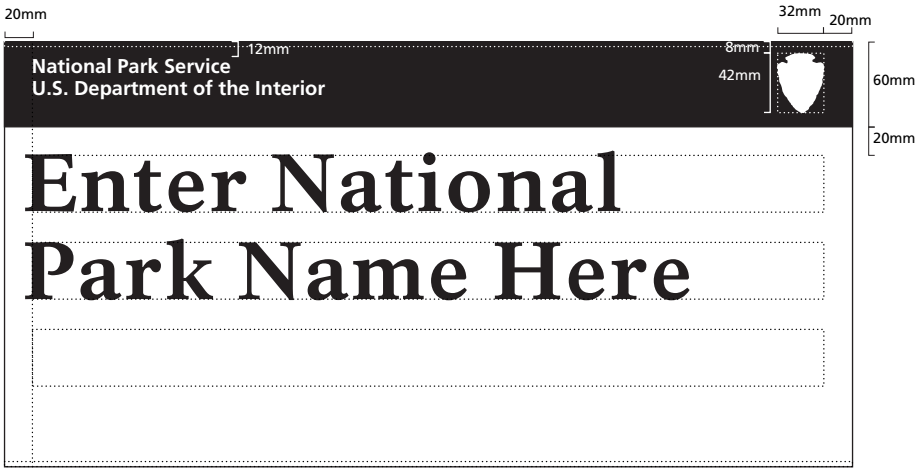
This panel may be enlarged :45cm x 90cm or 120cm x 60cm.

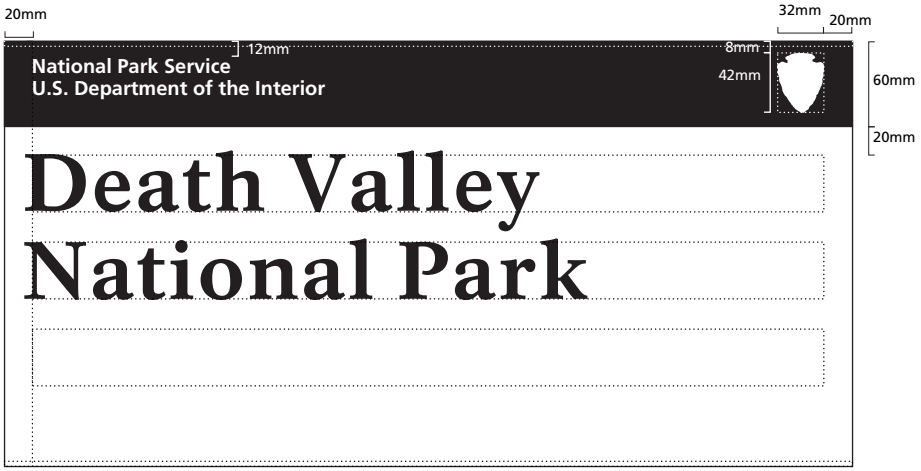
Step 3
Once the correct grid has been chosen and the text has been entered into the appropriate location, the panel may be colored according to specification guidelines. The underlying grid will be hidden.

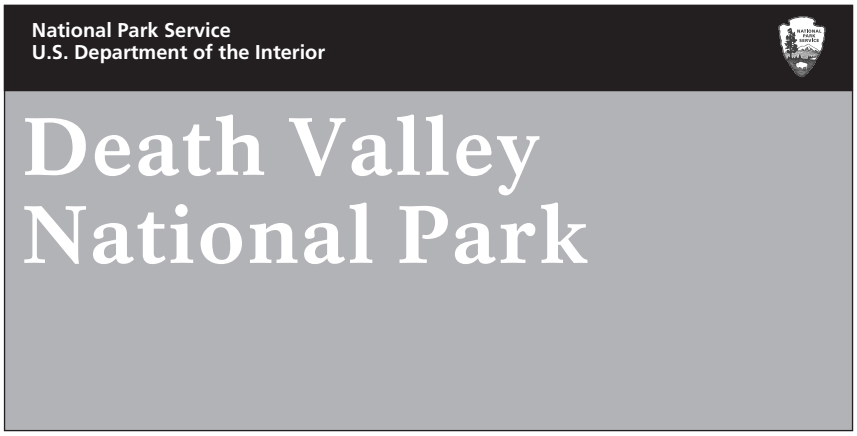
The manufacturer will verify all measurements and delete the unnecessary grid for final production.

Note: the NPS Arrowhead logo will be added to the final panel by the manufacturer.

Step 4
Save the completed panel in the "neighborhood" folder for which it is intended and place a copy into the Sign Plan Sheet. If the sign will be a "catalog" panel for use in many places, save the panel to a master panel folder.







Step 1

Select the appropriate grid from the grid option pages in the UniGuide manual. Use the grids provided in Adobe Illustrator software

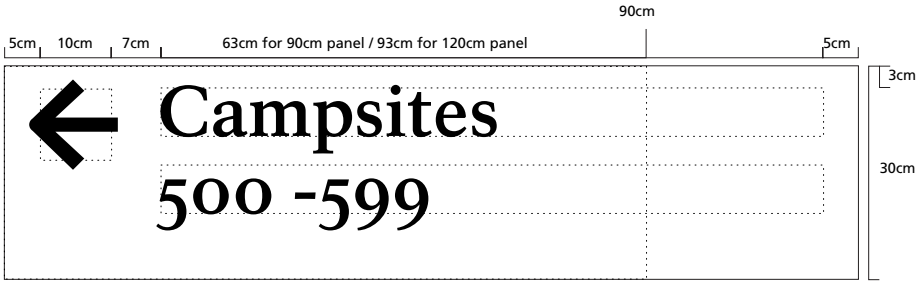
Step 2

Type the destination into the grid layout.

Step 3

Select the outside border and the maximum legend length mark and slide to the left until guideline border aligns to the 90 cm mark.

Note: There are grids for two size, 90 cm x 30 cm and 120 cm x 30. Use the 90 cm wide grid when legend lengths are shorter than the maximum legend length mark and the 120 cm wide grid when the legend length exceeds the mark.



All panels on a common assembly must be the same length. The 90 cm width is preferred.

This grid may be proportionately reduced 66% to 20 cm x 60 cm or 20 cm x 80 cm.

Step 4

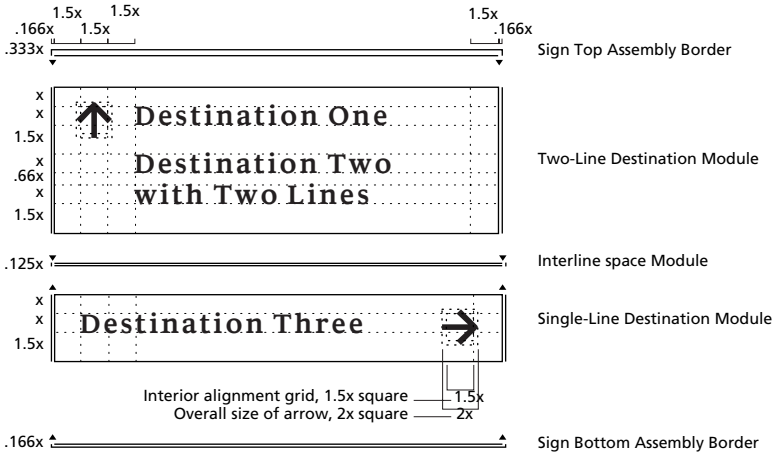
Save the completed panel in the "neighborhood" folder for which it is intended and place a copy into the Sign Plan Sheet.

Step 1

Select the appropriate grid from the grid option page 2.1-88 in this manual.

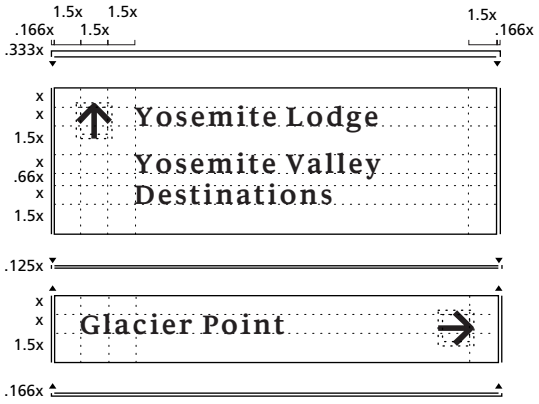
Note: A single sign panel is often constructed using more than one grid. This example illustrates the production of a single sign panel using (1) two-line destination and (1) one-line destination modules.

Extensive guidelines on preparation of legends are provided in the Chapter 2 for each Road Guide Sign grid format.



Step 2

Using the grids provided in Adobe Illustrator software, type the desired legend into the grid templates.

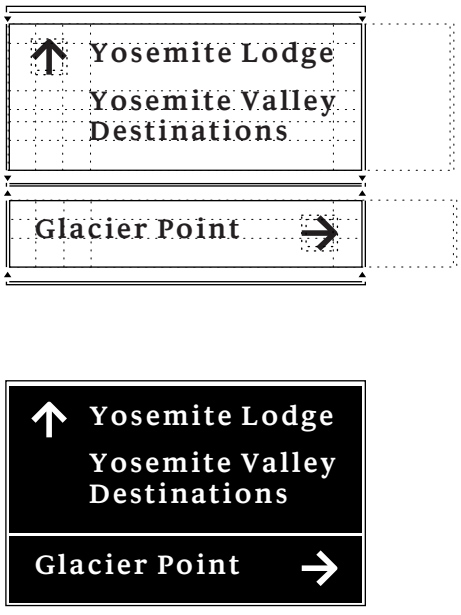


Step 3

Once the type has been entered into the appropriate grid, adjust the width of the sign by selecting the right outside edge of the sign including the border, any right directional arrows, and the guideline for longest legend line. Move the selection to the right or left depending on whether the sign needs to be larger or smaller than the original grid.

Step 4

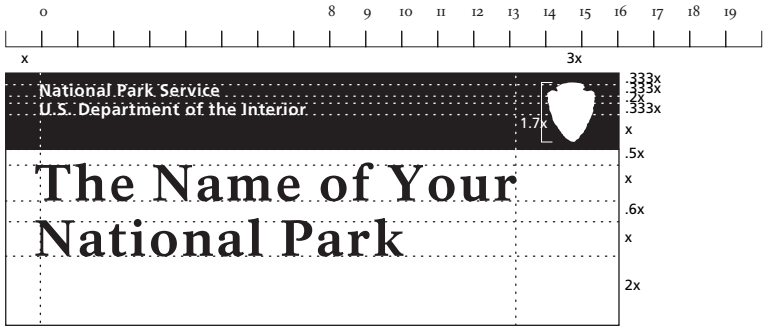
Once the sign panel width has been adjusted, the modules should be brought together to form a continuous sign panel. The manufacturer will use this file to finalize the sign panel graphic and create a final proof and production file.



Step 1

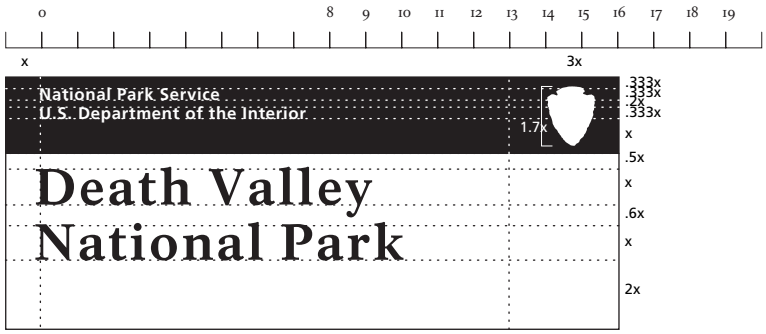
Select the appropriate grid from the grid option pages in Chapter 2 based on the number of lines (1-3 for Ground Mounted and 2-4 for Hanging Format).

See layout options in Section 6.4 for individual park names. Most parks have 2-3 options for panel layout. Choose the appropriate layout that corresponds to the site conditions or type of sign structure selected.



Step 2

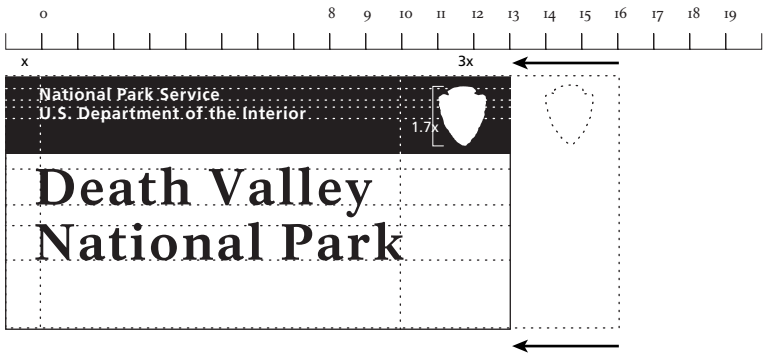
Using the grids provided in Adobe Illustrator software, type the park name into the appropriate grid layout.



Step 3

Select the outside border (right side), the 3x guideline, and the Arrowhead placement graphic and slide to the left until guideline touches the right side of the last letter of the longest word.

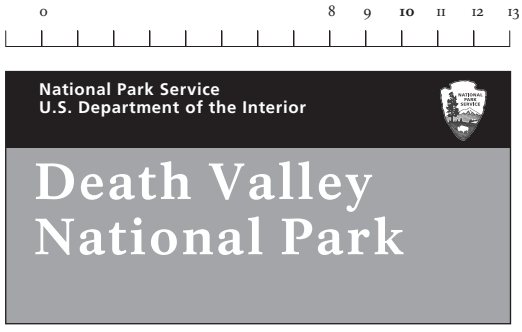
In the case of a very short park name, do not slide the guideline beyond the final letter "r" in the word "Interior" used in the overbar.



Step 4

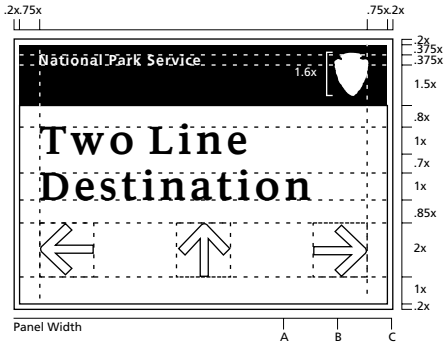
Final width of Park Identification Sign to be sized to the nearest "x" unit, which represents the legend size.

e.g. x=4"
legend length =40"
left side = 4"
right side= 12"
panel=56 (40+4+12)=56



Step 1

Select the appropriate grid 2", 3" or 4" from the grid option pages in the UniGuide manual. Use the grids provided in Adobe Illustrator software.

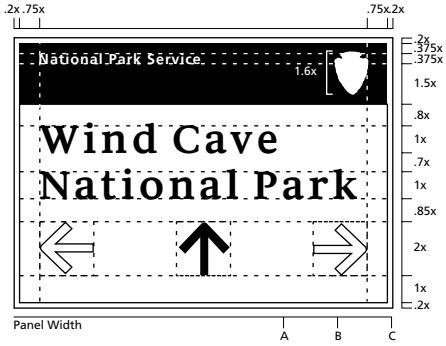


Step 2

Type the desired legend into the grid template.

Choose the appropriate directional arrow.

Select the right outside border, the Arrowhead graphic, and the maximum line length guideline and move it to the left (aligning with position A, B, or C, depending on legend length, with a minimum of .75x between end of longest line and white border).



Step 3

Trailblazer signs are proportional. Size options are 2", 3", and 4" legends. Scale the sign panel according to view distance and traveling speed and site lines of location.

Step 4

Save the completed panel in the "neighborhood" folder for which it is intended and place a copy into the Sign Plan Sheet.

Step 1
Select the fee sign grid from pages 2.-40 to 2.-4 in Chapter 2.

Step 2
Using the grids provided in Adobe Illustrator software, type the fee amounts for each category.

Step 3
Sign panel width is based on 30 cm panel. Sign widths may be enlarged proportionally to 45 cm, 60, cm and 90 cm.

Sign panel lengths based on the type A.1 Visitor Information System structures are 60 cm, 90 cm, 120 cm, and 150 cm.

Panels over 60 cm are not standard and will require accommodation by manufacturer.

Step 4
If commercial vehicles are not permitted in the park, remove that wording.

Panel depth will remain inside standard length increments.

Step 5
Save the completed panel in the "neighborhood" folder for which it is intended and place a copy into the Sign Plan Sheet.

Chapter 3

UniGuide Planning, Design & Documentation

Section 3.6

Text Writing for Visitor Information System

Final Draft: *June 1, 2002*

Table of Contents

Introduction

The Visitor Information System (VIS) offers park personnel a uniform and efficient way to communicate with the public through a series of small signs.

This sign system was created primarily to replace the array of homemade signs, posters, handbills, old brown signs, and other notices that customarily appear in a variety of shapes and sizes at campgrounds, trailheads, boat launch sites, ranger stations, shuttle stops, and other locations in parks.

Using standardized VIS formats and structures, the park staff now can systematically inform visitors about entrance fees, park regulations, safety concerns, resource management issues, and other matters in a clear, consistent voice.

Depending on the message, VIS signs can be written for use in a single park, a few parks, or all parks. With each new installation of this informational system, the National Park Service increases its inventory of signs from which other parks can draw. And each new installation helps to reinforce the objectives of the NPS Message Project to enhance the public's awareness of the agency's identity and stewardship mission.

These small signs should not be confused with interpretive wayside exhibits. They are informational tools. They concisely complement important messages in park brochures, site bulletins, newspapers, books, and other media. They provide critical information at locations that are not staffed at certain times or never staffed.

VIS signs can be used alone or in groups of two, three, or four signs—or even five or six if a map is included. Larger groupings are possible, but park staffs should be careful not to overwhelm visitors with too much information at a single location. That was one of the recommendations made by the Virginia Polytechnic Institute after testing prototypes at trailheads and campgrounds in Yosemite National Park, where this sign system was first introduced.

Other recommendations that came out of the Yosemite study include reducing the amount of text on each panel, enlarging the type size of the main text, limiting the number of possible background colors, and displaying maps to a greater extent. These recommendations have been incorporated in these guidelines.

Because the information for these signs usually comes from various offices within a park and because of the need for consistency and clarity, it is strongly recommended that one person be responsible for coordinating the contents and layout of VIS panels. If that person does not have any editorial experience, he or she should work with a writer-editor in preparing texts that are clear, concise, and consistent. To paraphrase Mark Twain, it is much easier to write a long text than a short one.

Three Formats

The Visual Information System utilizes three formats that are designed to work together:

Standard Panel: This 30 x 30 cm square panel can be posted as a single sign or appear in a group of panels. Each panel should focus on a particular subject, such as park regulations, visitor services, instructions, resource management, trail guidance, and safety warnings and hazards. They can include area maps, shuttle maps, "you are here maps," and trail maps. Where appropriate, panel depth or width can be doubled to 60 cm or the whole panel can be enlarged to 45 x 45 or 60 x 60 cm. Maps depicting large areas or extensive shuttle routes can be as wide as 120 cm.

Narrow Profile: The companion small, narrow profile panels are intended for site-specific postings such as campsite identifications, trail guidance, and safety concerns. Symbols for No Parking, Bus Stop, Truck/Loading, Handicapped Zone, and other facilities, activities, or prohibitions can be adapted for use in this format.

Area Entry Sign: Slat signs using the same structural system may be installed at the entrance to an area to alert the public about major regulations pertaining to that location. These installations may include four brief messages, but they probably are more effective when they contain one to three key messages, such as Area Closed at Dark, No Alcoholic Beverages, No Camping. There is a limit to how much information a visitor can absorb when entering an area in a vehicle or on foot. Details about these and other regulations can be displayed on other signage or in bulletin cases at a more appropriate location away from the entrance.

Initial Planning

To be most effective and efficient, a Visual Information System should be developed on a parkwide basis even if the final plan is eventually implemented in stages. The goal is to develop a cohesive informational plan in which the small signs work well with other signage, media presentations, and personal services.

To begin the planning process, the individuals involved in the task should:

- Identify subjects to be communicated
- Determine the locations where the information will be displayed most effectively
- Select the most appropriate format—Standard Panel, Narrow Profile, Area Entry—for each location
- Identify the type of Standard Panel—regulatory, safety, instruction, information, resource management, protection—and the proper editorial approach
- Decide which signs, if any, have to be bilingual
- Determine how signs should be grouped

The team should examine VIS signs developed by other parks for ideas on subjects and to see which ones could be adopted outright or adapted for use in its park.

Writing of Texts

Visitors want to enjoy parks, not spend their time reading signs. Because of space limitations, it is almost impossible to overload Narrow Profile and Area Entry Signs. Be especially careful, however, not to overload Standard Panels. Give visitors the essential information and let them go on their way.

Remember the 3-30-3 rule that applies to informational signs and interpretive wayside exhibits. Some people will spend three seconds reading a sign. Some will spend thirty seconds, and others three minutes. Where it is necessary to provide a long list of information, put it in the park newspaper, create a special publication, put it on the back of a permit or ticket, or devise some other way to convey the information.

A Standard Panel usually consists of a heading, an introductory deck, a main text, an illustration, and sometimes a caption or sidebar. The format, however, is quite flexible: some panels may not contain a deck, an illustration, a caption, or a sidebar.

Each Standard Panel should focus on one subject.

First, catch the visitor's attention with a clear, concise heading and, wherever possible, a strong graphic element.

Second, write an introduction that will appear as an italic deck under the heading. The introduction should contain one or two sentences totaling no more than three lines. Try to set a positive tone in the introduction; state why regulations are being enforced, why an area is being restored. Engage the visitor's attention by posing a problem. You might pique their curiosity by saying: "An exotic fungus is killing this native shrub" or "The fish population is declining 10 percent each year." They are bound to read on as you explain the why behind those statements, what is being done to resolve problems, and, if possible, what they can do to help.

The sign tests conducted at Yosemite by Virginia Polytechnic Institute indicated that people tended to spend more time reading Standard Panels when the decks contained hard-hitting statistics instead of gentle, positive invitations. The decks on some regulatory panels might state how many people drown in the river or are killed in falls off cliffs every year, but care should be given that the overall tone of all the Standard Panels within a park is not negative or alarmist.

Third, write the main text that will appear in the bottom two thirds of the panel. Be as brief

and direct as possible. Be telegraphic:

- Avoid most forms of the verb "to be;" say "Swimming not allowed" or "No swimming" instead of "Swimming is not allowed"; say "Campfires permitted" instead of "Campfires are permitted"
- Eliminate articles (a, an, the)
  Avoid most adjectives, adverbs
- Use commas or semicolons instead of "and" wherever possible
- Do not put periods at ends of lines listing various points of information
- Do not use contractions (don't, doesn't, aren't) to avoid confusion, especially with those with little command of English
- Avoid abbreviations, acronyms, bureaucratic terms, and jargon
- Use complete sentences and proper punctuation in main texts about resource management issues, historic preservation projects, archeological digs, and other subjects that require explanations

Once the contents have been drafted, the coordinator and writer should work with a graphic designer and illustrator to prepare the layout for each panel.

Designing VIS Signs

To maintain the integrity and effectiveness of the Visual Information System, the designer should carefully follow the grid and typographic guidelines delineated in Chapter 2: UniGuide Graphic Standards. That chapter also includes important information about the range of sign colors, use of symbols, and contains several examples of Standard Panel, Narrow Profile, and Area Entry Signs.

The designer also should follow the guidelines on illustrations, and maps in the next two sections of this chapter and be well acquainted with the VIS specifications in Chapters 4 and 5.

Examples

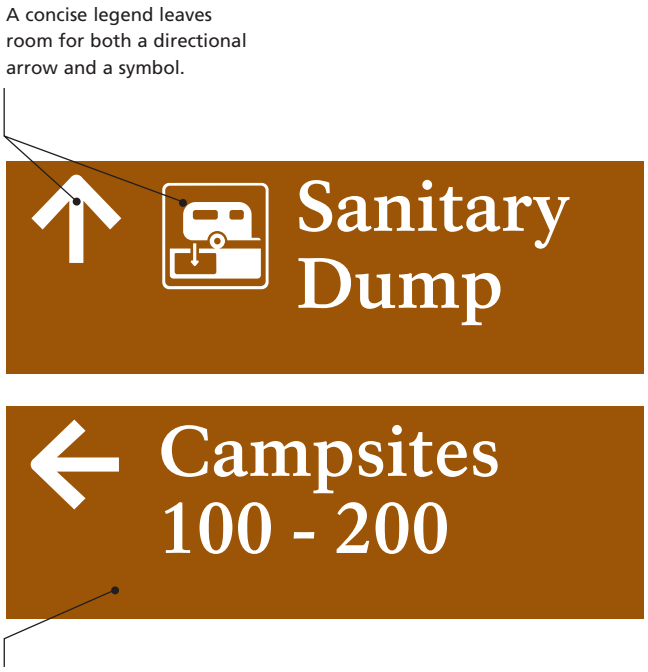
A variety of Standard Panels, Narrow Profiles, and Area Entry Signs are shown on the following pages with notes on how to prepare various kinds of headings, introductions, main texts, sidebars, and captions.

Area Entry (AE)

Using the Narrow Profile format, Area Entry Signs provide a simple way to alert visitors about one to four primary rules as they enter a park or an area within a park. All lettering is the same size. Use a positive symbol for what is allowed and a symbol with a circle and a slash for whatever is prohibited.

Small Guide (SG)

The Narrow Profile format also can be used as a Small Guide to one destination with a simple legend and an arrow.



Traffic Regulatory (TR)

A few traffic regulatory legends can be incorporated into the back of Small Guide signs inside a campground or parking lot to eliminate the need for larger highway regulatory signs and to reduce clutter. Legends must be brief and easy to understand.

Use initial capital letters on each word.

Even with two messages, no punctuation is necessary.

The symbol reinforces the message and informs those who do not know English.

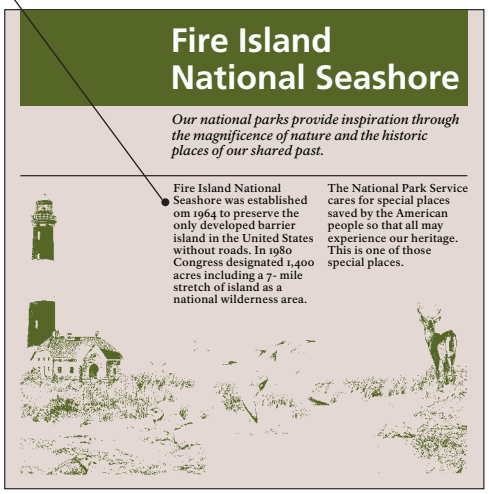
Messaging (NPS)

The Standard Panel format allows each park to briefly inform the public about its national significance, its relationship to the National Park Service, the agency's stewardship mission, and partnership programs.

The main text focuses on the park's uniqueness and the agency's mission.

Message panels can be duplicated and used in several locations near the boundary.

Messaging signs provide a medium to acknowledge partnership programs unobtrusively.



Entrance Fees (EF)

With so many options, fee signs usually are difficult to read and understand at a glance. This UniGuide VIS format puts fees in categories and replaces the US Fee Area symbol with the NPS Arrowhead logo for clear identity. Wherever possible, use this format to help create a consistent presentation of fees nationwide.

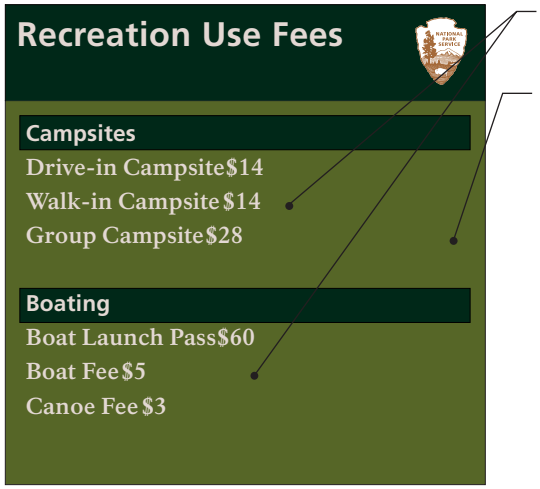
Fee signs may be enlarged proportionally to 45 or 60 cm square.

The width can be extended to 90 or 120 cm. Panels taller than 60 cm require custom assembly adaptations.

For campground registration signs, list the fees first, then the procedures, and a few key rules.

Recreation Fees (RF)

For consistency in presenting fee information, display recreation fees on signs similar to those about entrance fees. Duplicate the signs for use at several locations. Use the same format for concession signs, but do not include the NPS Arrowhead.



Put the fee information in categories.

Signs can be enlarged proportionally from 30 x 30 to 45 x 45 or 60 x 60 cm. If necessary, larger sizes can be customized.

Information/Instruction (IN)

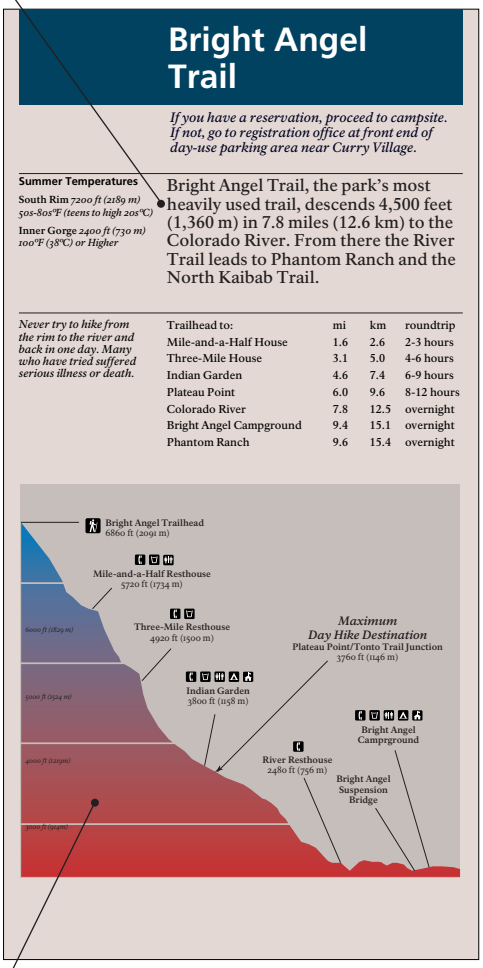
Park staffs often have to provide basic information or instructions at specific sites, such as a trailhead, or about parkwide policies, such as not providing trash cans. Other possibilities include procedures for storing food in campgrounds, hiking in arid conditions, using waste disposal stations, or registering for a campsite.

The heading calls attention to the park policy.

In one line, the deck states the policy.

The main text explains what to do in both English and Spanish.

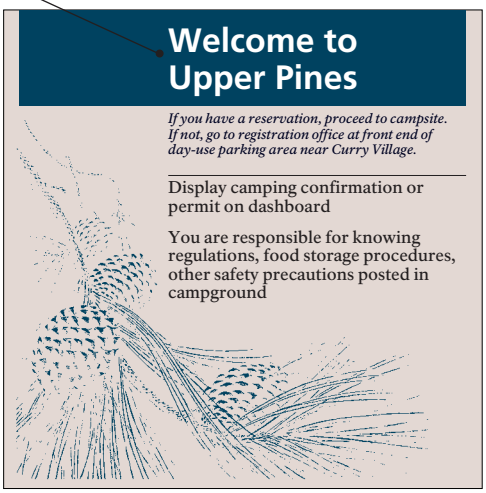
State the essential trail information in the main text.



Trailhead signs can be enlarged to accommodate a map or, in this case, a trail profile highlighting the descent into the canyon.

Information/Instruction (IN)

The title provides a greeting and identification of the facility.



This panel is designed for a campground entrance station when it is not staffed, but it also reinforces the attendant's message when the station is staffed.

Information/Instruction (IN)

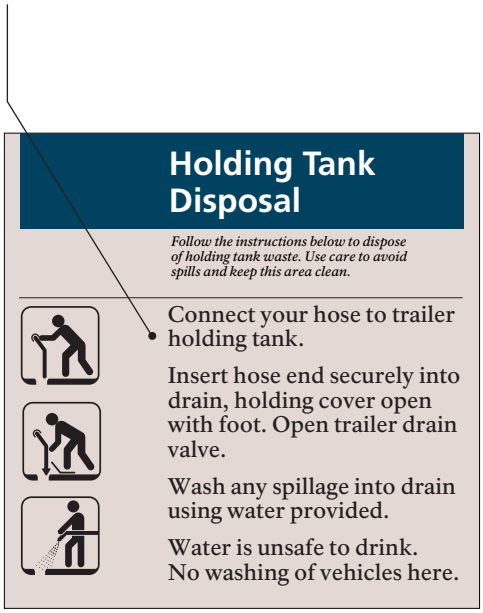
Deck briefly explains why the park has adopted this policy.

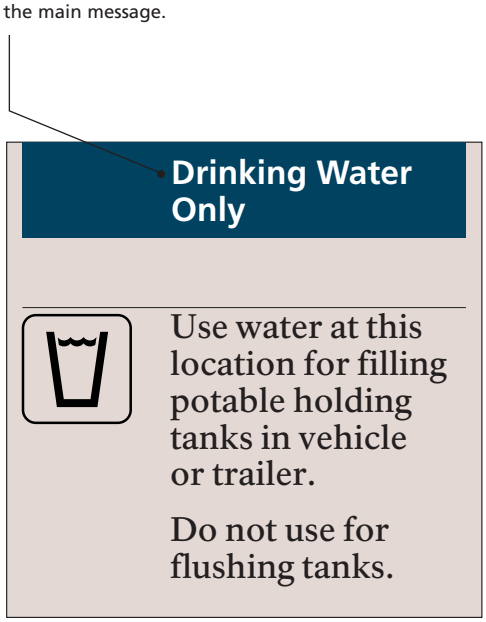
Keep the main message brief. Do not use articles (a, an, the).

Information/Instruction (IN)

List procedures step by step.

The title alone conveys the main message.



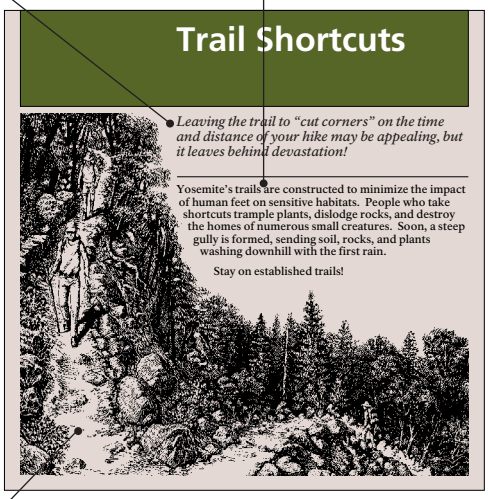


Resource Management (RE)

The Visitor Information System is designed to work with interpretive wayside exhibits but does not serve the same purposes. Resource Management panels can be used at sites within a park where resource protection or restoration projects are located. They also can inform visitors how they can help protect natural and cultural resources.

Capture the viewer's attention with a snappy opening that poses a resource management problem.

Note that the mini-essay is written in sentence form but concisely describes what happens.



Augment message with a carefully planned and executed illustration.

Opening briefly states the problem.

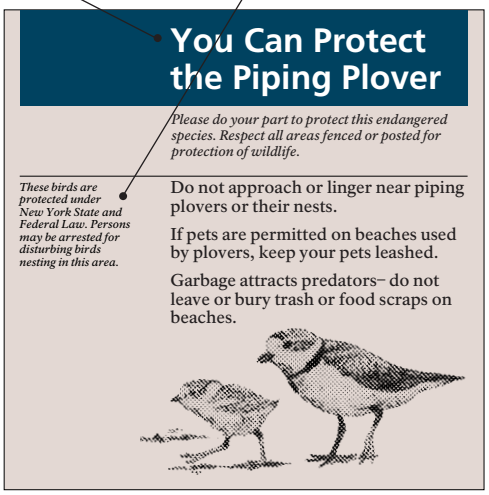
Main text explains why the area is roped off, purpose of the plastic tubes and screens, and what will happen in the area.

With an understanding of the "why," visitors tend to honor protective measures.

Resource Management (RE)

Heading immediately engages the reader.

Sidebar cites the legal background without being heavy-handed.



The Narrow Profile format can be used for brief resource management messages.

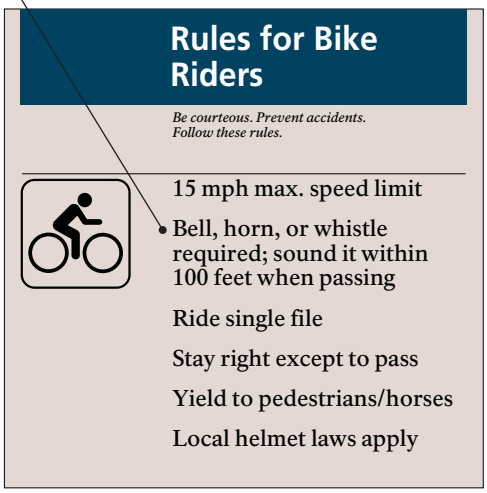
A version in the Standard Panel format could explain the reasons for the policy.

Regulations (R)

Regulations come in many forms. Postings include a listing of parkwide regulations or rules for specific areas, such as campgrounds. Others may be for such activities as bicycle riding or camping in the wilderness. The headline should clearly focus on the subject.

Be telegraphic; give only the essential information.

On parkwide regulation signs, list only the most important items.



Use pertinent symbols to amplify the messages and to communicate with non-English-speaking visitors.

Regulations (R)

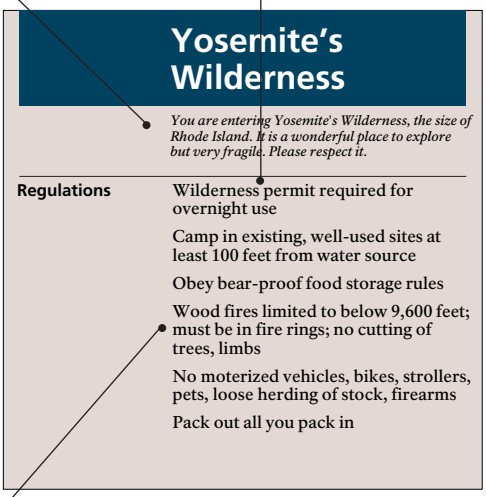
Standard Panels can be used to post restricted areas and places that have been closed temporarily.

Keep all italic introductions to one, two, or three lines written as complete sentences.

Regulations (R)

Despite its brevity, the opening expresses three ideas—size, fragility, and respect.

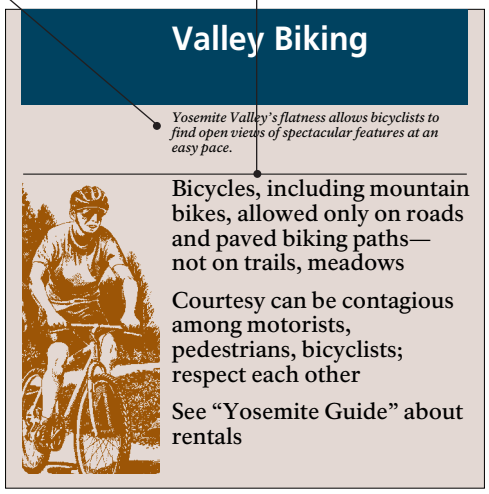
On regulation signs, list only the most important rules.



Text conveys a sense of authority without a bureaucratic reference to the Code of Federal Regulations.

Low-key introduction suggests alternative without criticizing motorists.

Main text provides gentle reminders.



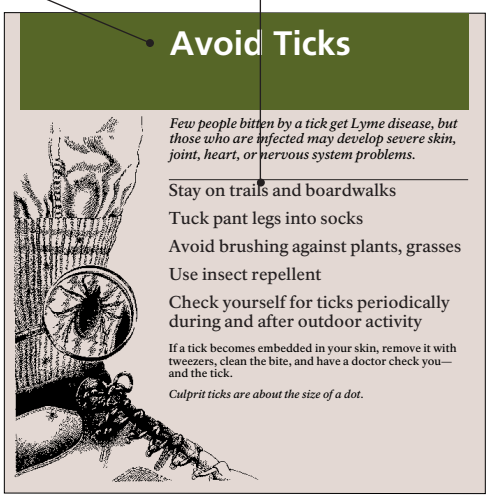
Refer to other sources for information that might change periodically.

Protection (PE)

Park environments are quite different than home environments for most visitors. This category of VIS signs primarily provides information and instructions that visitors can use to protect themselves. Occasionally they also provide advice to assist in protecting plants, animals, or historic resources.

Succinct title alerts the public.

Be direct with instructions and advice.



Mini-essay deals with protecting wildlife and protecting visitors.

Even complete sentences should be written concisely. More complete messages can appear in publications.

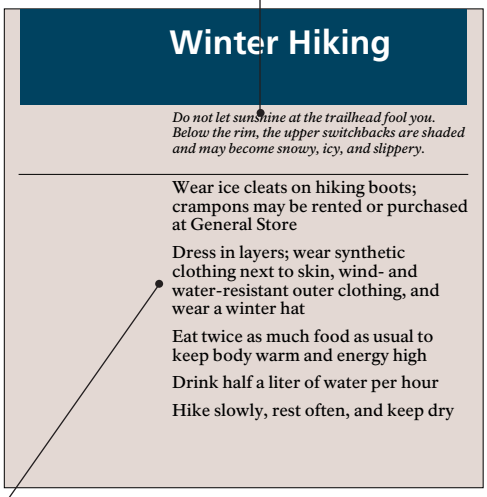
Protection (PE)

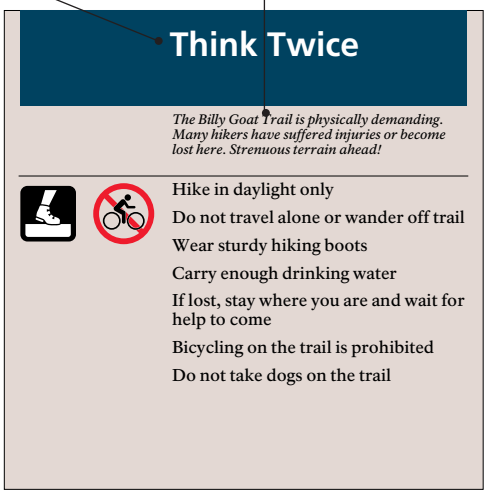
Protection panels can be produced for certain seasons or unusual conditions.

Deck alerts visitors to the seasonal conditions.

Title subtly challenges visitor to walk by without reading the panel.

Italic introduction states the problem.



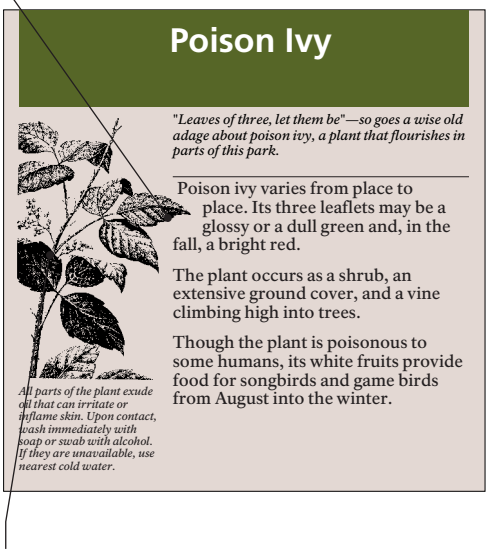


Main text lists five key points.

Protection (PE)

Main text provides basic information about the plant.

The Narrow Profile format can convey brief protective messages in two or more languages, depending on the symbol size.



Sidebar gives advice to visitors.

Safety Warning (SW)

VIS Safety signs identify potential personal hazards that are more severe than those covered in the Protection panels. The titles and the referential colors telegraph the degree of hazard: Warning (yellow), Danger (red).

The panel's yellow background, the heading in a black overbar, and the symbol alert the visitor to the hazardous condition.

In one line, the introduction states what has happened at this location and what the visitor should do and not do.

The symbols denote three prohibitions without, in this instance, accompanying words.

Safety Warning (SW)

The word "Warning" is reinforced by the panel's yellow color.

The text gives instructions in brief, direct statements.

Warning signs can alert visitors to unusual, unforeseen conditions.

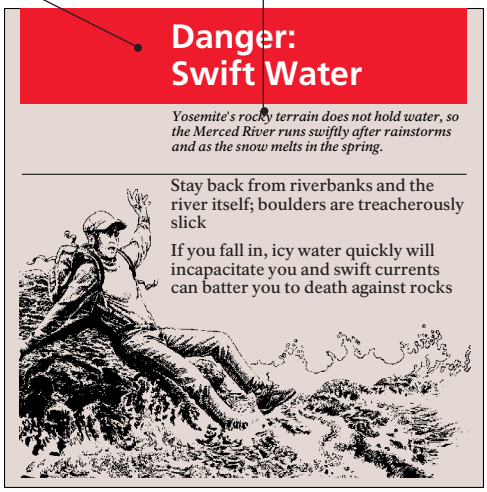
In this case, the illustration probably makes the strongest impact.

Safety Danger (SD)

This category of Safety panels highlights the signal word "Danger" in a red overbar indicating the extreme severity of the hazard. Danger panels should be used only where truly dangerous situations exist. Otherwise, safety postings lose their impact.

The standard referential color, red, reinforces the heading.

The opening contains information that provides a clue to the "why" behind the hazard.



The heading, the red overbar, and the deck set the stage for the legend.

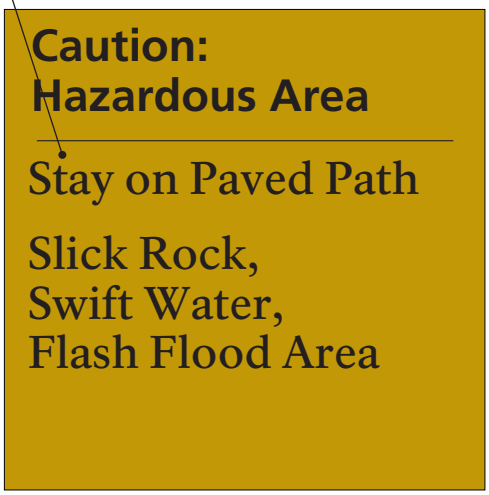
In a few words, the legend describes the hazard and clearly states the action required.

Miscellaneous Postings (MP)

Every park has special needs for signs that do not fit into one of the other categories of VIS signs. Miscellaneous Postings generally are temporary or seasonal and are used to direct and inform visitors about particular situations or actions. They are similar to Standard Panels in size but are treated differently graphically.

Heading and legend are flush left.

Note that all words except prepositions have initial caps in this posting.



Chapter 3

UniGuide Planning, Design & Documentation

Section 3.7

Guidelines on Use of Mapping for Wayfinding and Orientation

Final Draft: *June 1, 2002*

Introduction to Mapping for the Visitor Information System

Maps are important tools in the Visitor Information System (VIS) to orient park visitors where they might be confused or have questions. Research conducted at Yosemite National Park by a team from Virginia Tech determined that a map in a trailhead display becomes a magnet drawing visitors to the multi-panel installation. Subsequent discussions with visitors indicated that a map is essential to their understanding of where they are and where they want to go. For those who are familiar with a park, it is difficult to put yourself in the position of the first-time or infrequent visitor. For the most part, parks are complex. Most parks are not lineal. Verbal descriptions and photographs cannot provide the kind of information that an effective map can provide for a visitor trying to get from one area to another, planning a hike, or deciding what to see and what to do in an afternoon. By locating a destination on a map, visitors can begin to develop the visual relationship of where they are to where they are going.

Whereas maps in the NPS folder program generally provide visitors a view of the whole park, maps used in the VIS provide information on specific areas like campgrounds or trails, or on services such as a shuttle bus route. The differences between a folder map and one placed in the environment include scale of area, size of map, size of legend, and overall emphasis. A map placed in the environment is viewed first from a greater distance. Even when it is only a few inches from a reader's eye, it cannot be held for study and it cannot be taken away. In essence, the VIS map needs to create a strong mental impression, and must be rendered to make understanding as easy as possible. This is not an easy task and generally will require the crafting of a professional cartographer.

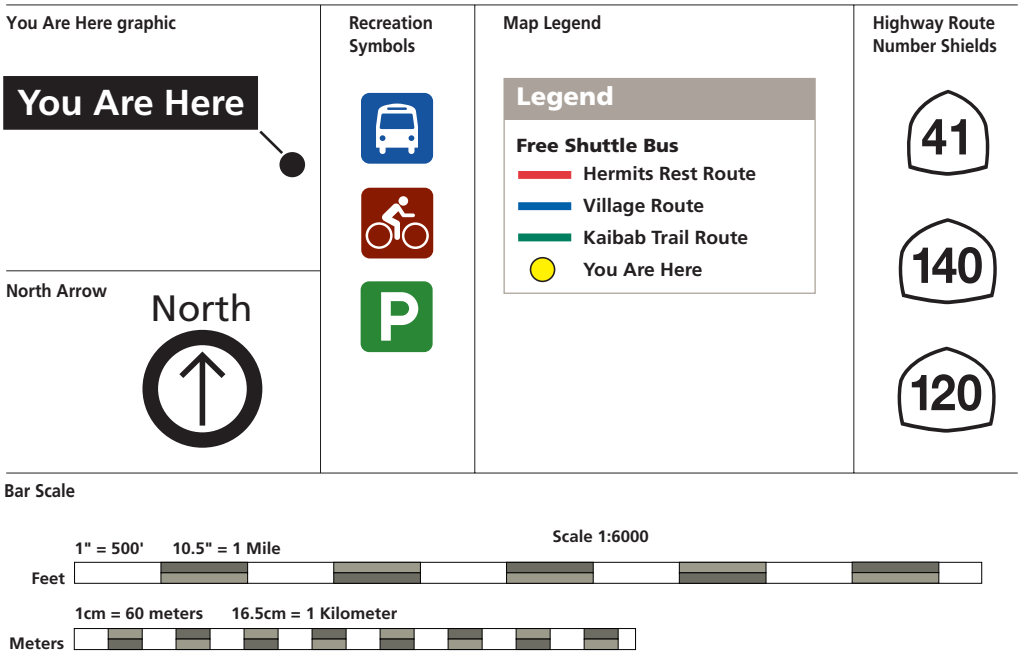
To aid viewing, all labels should be large enough for easy reading and small features may need to be visually manipulated or enlarged to give them greater presence. It also may be helpful to increase the color contrast between the primary features being displayed and the background. Features, especially areas that are the focus of the map, should be emphasized in either weight of line or color.

Use the following NPS mapping resources and guidelines in developing maps for the Visitor Information System, but make a professional cartographer part of the design team. Consult the National UniGuide Manager at Harpers Ferry Center for guidance.

Reference: The *Wayside Exhibit Map Standards*, prepared by the Wayside Exhibits Department at Harpers Ferry Center, provides a comprehensive guide on the use of type and color for large scale maps, and guidance on map planning. This guide identifies standard colors, provides an approach to the use of typography and graphic designations for natural and constructed features. These standards are similar to those used by the Publications Department.

Color: For overall consistency in NPS mapping, refer to the specific color standards in the *Wayside Exhibit Map Standards*. Because the emphasis of VIS maps may be different, the colors used may vary from the wayside and publications standards, but these standards provide a basis from which to start.

Graphic Labels: For consistency and simplicity, it is recommended that the graphic devices and sizes specified in the *Wayside Exhibit Map Standards* be adopted for all VIS maps. They include:



As noted above, the specific requirements of UniGuide maps may be different from the general area maps used on wayside exhibits and in publications. There is no single solution or style, but a map must be designed to visually emphasize or make understandable the idea for

which it is being displayed. To illustrate this, examples of maps developed as prototypes for the UniGuide Program are discussed below and shown on the following pages.

Size: Base the size of a particular map on the area to be covered and the detail shown. Maps used in the Visitor Information System are generally 30 cm tall or 60 cm tall for incorporation into the structures. The width is variable and is based on the standard panel widths.

Production Material: Produce most maps as high resolution digital ink jet prints that are made part of a high-pressure laminate panel, or a fiberglass embedment panel. Although maps produced in porcelain enamel are beautiful, they can be cost prohibitive because of the number of colors and unless they are produced in very high quantities, they cannot compete with maps on other materials. Maps of services or facility areas change frequently. They rarely last more than five years, so alternatives to porcelain are suggested.

Legend: Identify a VIS map in the overbar with a mixed case Frutiger Bold legend, following the standard panel grids provided in Chapter 2, page 2.1-34, but with the title aligned flush to the left of the panel. If a panel is taller than 30 cm, the size of the overbar can be maintained at the 30 cm scale as shown in the example for the South Rim Orientation Map for Grand Canyon. If the overbar consumes too much space on the map, the title of the map may be printed within the same format, but without the overbar shape as show in the Yosemite Village orientation maps.

Maps must contain a north arrow, a scale based on a number that can be easily converted by the viewer, and a legend that explains meaning of primary lines or tones as appropriate. Examples of these graphic elements are shown below. Digital copies of these are available from the National UniGuide Manager at Harpers Ferry Center

Labels and Use of Type: All maps should be labeled at the specific destination or feature being identified. Do not number features and key them to a list, as this is extremely confusing. The UniGuide method for labeling map recommends using NPS Rawlinson Roman and NPS Rawlinson Italic (Book and Bold) for labeling natural features, and Frutiger Roman and Frutiger Italic (Book and Bold) to identify park sites, roads, trails, and political areas. Both are used primarily with upper and lowercase, initial capital letters only. Typographic legends are printed in black unless the contrast ratio to the background is too close, and then they should be dropped out in white.

You Are Here: This label is the most important graphic on a VIS map and should be placed for ease of reading. If the location is part of an area with great detail, place the "You Are Here" away from the detail and identify with a line drawn to the specific location.

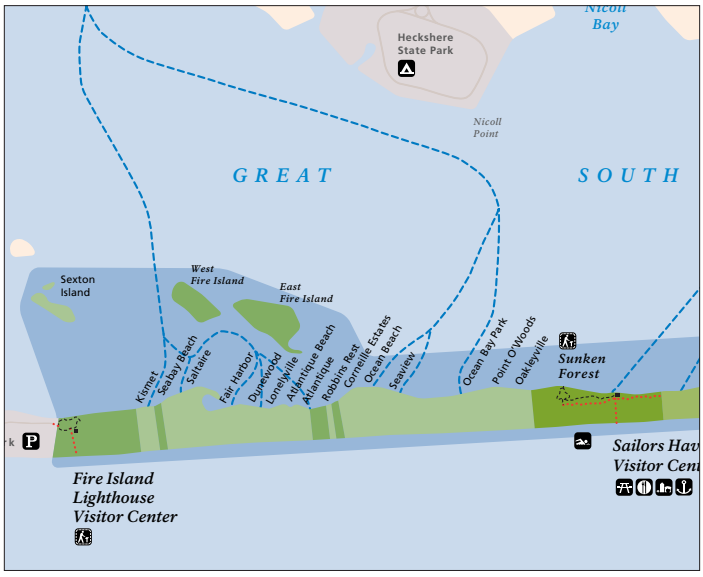
Frequently the same map will be displayed at a variety of locations around a park. Digital printing allows the "You Are Here" legend and arrow form to be placed on an individual layer in the graphic program. This layer may also include the map title if the title changes based on where it is placed. When the map is produced, this individuality can be made integral to each respective copy of the map, eliminating the need to place a sticker or have nothing on the map to identify a particular location.

Type Size: Maps in VIS assemblies are generally viewed from a distance of 15" to 30". The type must be large enough for convenient reading. The minimum size for a VIS map is 14 points, with options for 18 point, 24 point, 30 point and 36 point for labels of increasing importance. All labels of similar features should be of the same size for consistency.

Case Studies

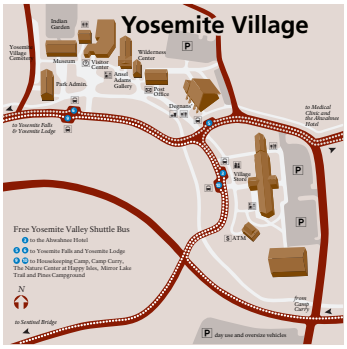
The area map for Fire Island National Seashore shown at the right is based on the folder map. The overall map has been enlarged and the legend sizes increased for ease of reading. The actual footprint of this narrow, quarter-mile-wide barrier island has been made slightly wider on the ocean side to give the park more mass. The emphasis has been changed from a regional map to one that graphically makes the park area the focal point by use of more saturated color to identify Fire Island and the legal boundary of the park, while using muted color and less detail in the surrounding region.

Folder Map



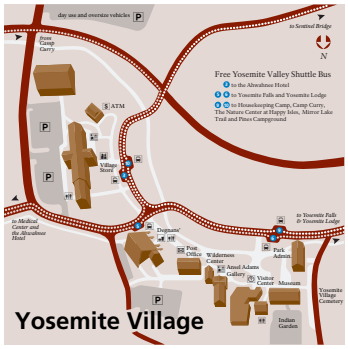
UniGuide Orientation Panel

Orientation: Each map must contain a north arrow, a scale based on a number that can be easily converted by the viewer, and a legend. Maps should be drawn with north at the top unless the map is being used as an immediate wayfinding device and is drawn to match the orientation of the viewer. The Yosemite Village map is depicted in four versions that are placed around the village where visitors typically approach the area.



Facing North

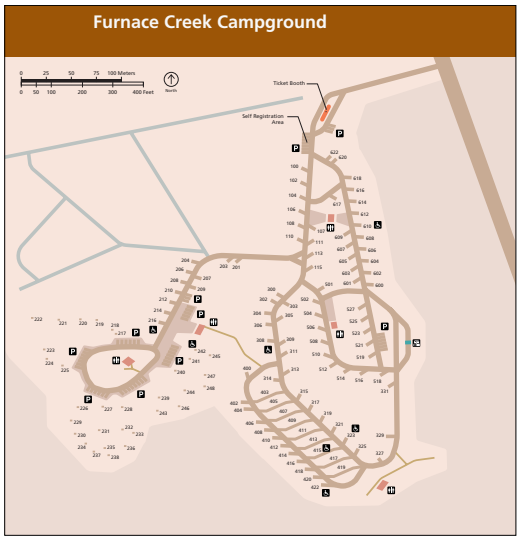
Facing West

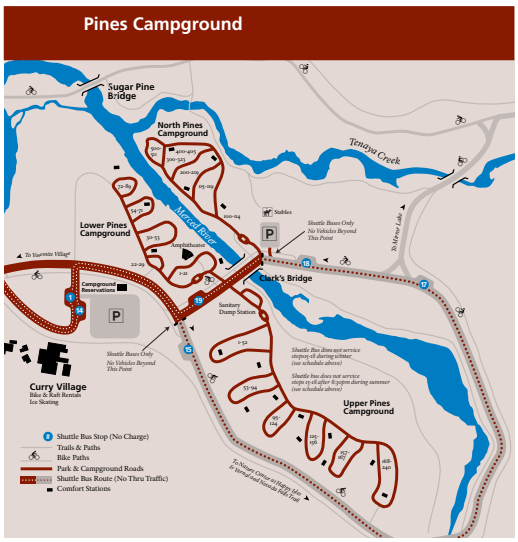


Facing South

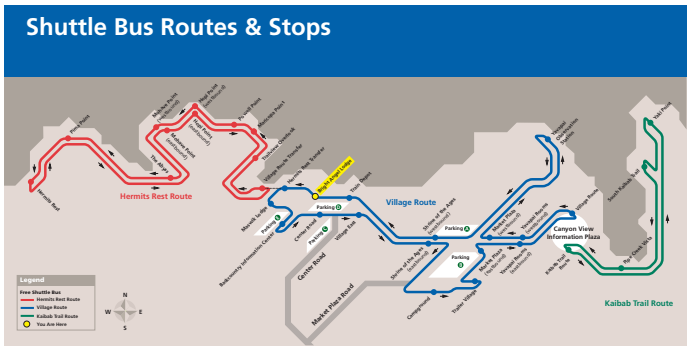
Facing East

Small Area Maps: Orientation maps of small area maps can easily be displayed as flat maps. The campground maps for Death Valley and Yosemite are all flat maps.

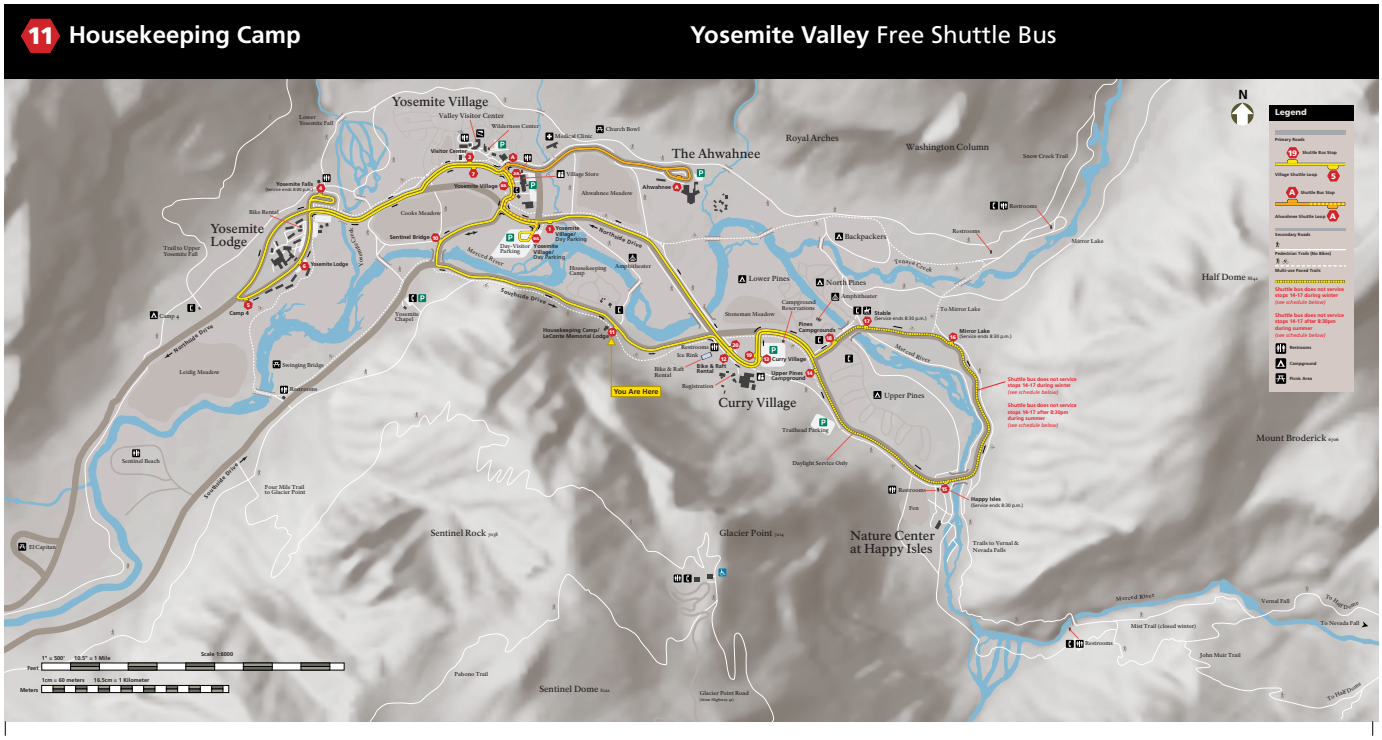


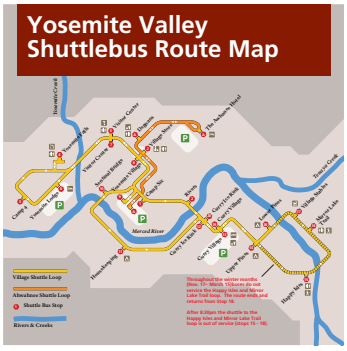


Large Area Maps: The large regional map, such as those for the South Rim of the Grand Canyon and Yosemite Valley, must incorporate the same natural features that surround a visitor to help them become oriented to the very dramatic environment in which they stand. The Grand Canyon map (created by the project designers and the cartography unit at Harpers Ferry Center is an oblique and slightly distorted projection that was created with satellite data and digital data from USGS quadrangle maps. The image was then manipulated on a 3-D modeling program to create a view into the canyon while maintaining a flat plain on which to set the roads, trails, buildings, and shuttle bus routes.



Shuttle Bus Routes: Transit maps can be depicted in two forms: a diagrammatic map with the route abstracted to incorporate 90° degree and 45° degree lines showing shuttle stops and direction of flow, a literal map showing the route in relation to the environment. In general it is important to show both and to include a list of each stop on a third panel. This level of redundancy is based on the fact that Grand Canyon and Yosemite are so complex that a visitor needs to become familiar with the shuttle route relative to primary locations and direction of the buses.

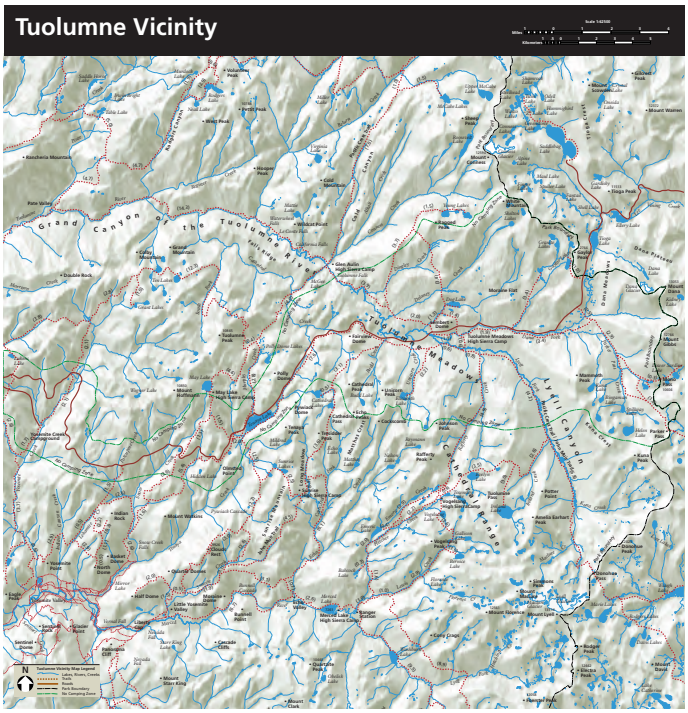




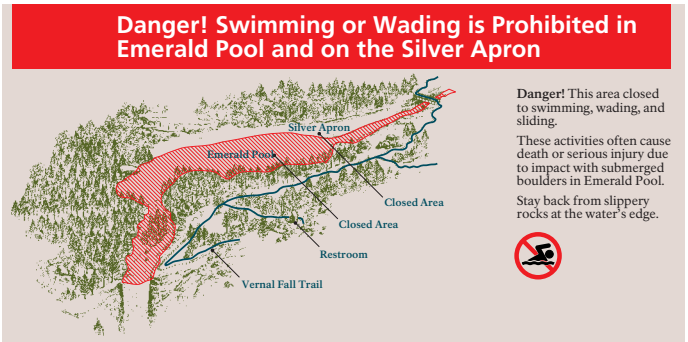
The diagrammatic shuttle maps, with all lines on 90° or 45° degree angles, are modeled after the 1933 map of the London Underground designed by Henry C. Beck. The goal is to condense a complex route into a simple, easy-to-understand diagram. In this type of map, the designer takes the liberty to condense and expand distances to create a cohesive diagram. The literal map shows the same route with all surrounding roads, buildings, trails and natural features.

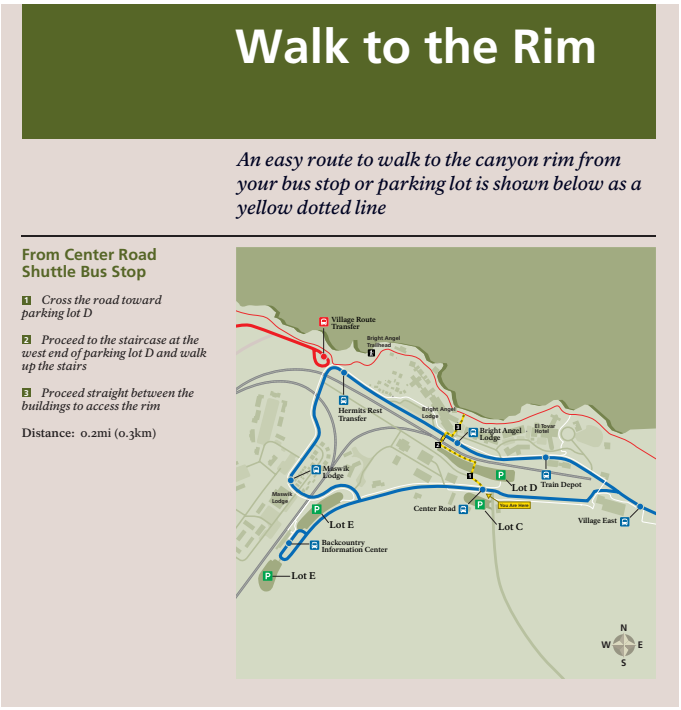
The Yosemite Valley map is a direct aerial view with shaded relief. Once the base was developed, an undistorted flat diagram map was laid upon the background. The diagram features the shuttle bus system and incorporates roads, trails, and bike routes.

The Yosemite wilderness map is one of two created at 1:62500 (60 cm square, actual size) for display at the wilderness permit office and selected trailheads to help visitors understand the relationship of various trail systems in this expansive area. The base data is from USGS quadrangles with the trails placed in heavy red line for accent and ease of reading.

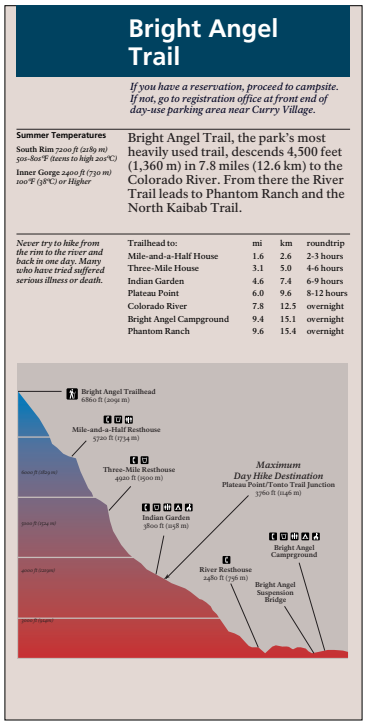


The Nevada and Vernal Falls schematic illustration was developed to show the location of the trail in a small area while providing a clear diagram of the dangerous areas around the around the apron of the waterfall. A visitor can easily relate the diagram to the environment.





At Grand Canyon, visitors are directed to parking lots to reduce unnecessary driving and encourage shuttle bus ridership. Although the South Rim is within walking distance from many of the parking areas, it is not immediately visible. The "Walk to the Rim" map is a flat diagram that is displayed at each parking area with numbered instructions on how to walk to the rim, and/or the closest shuttle bus stop. The overall area of the map is limited to reduce confusion.



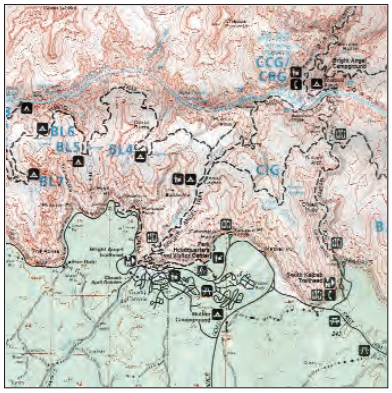
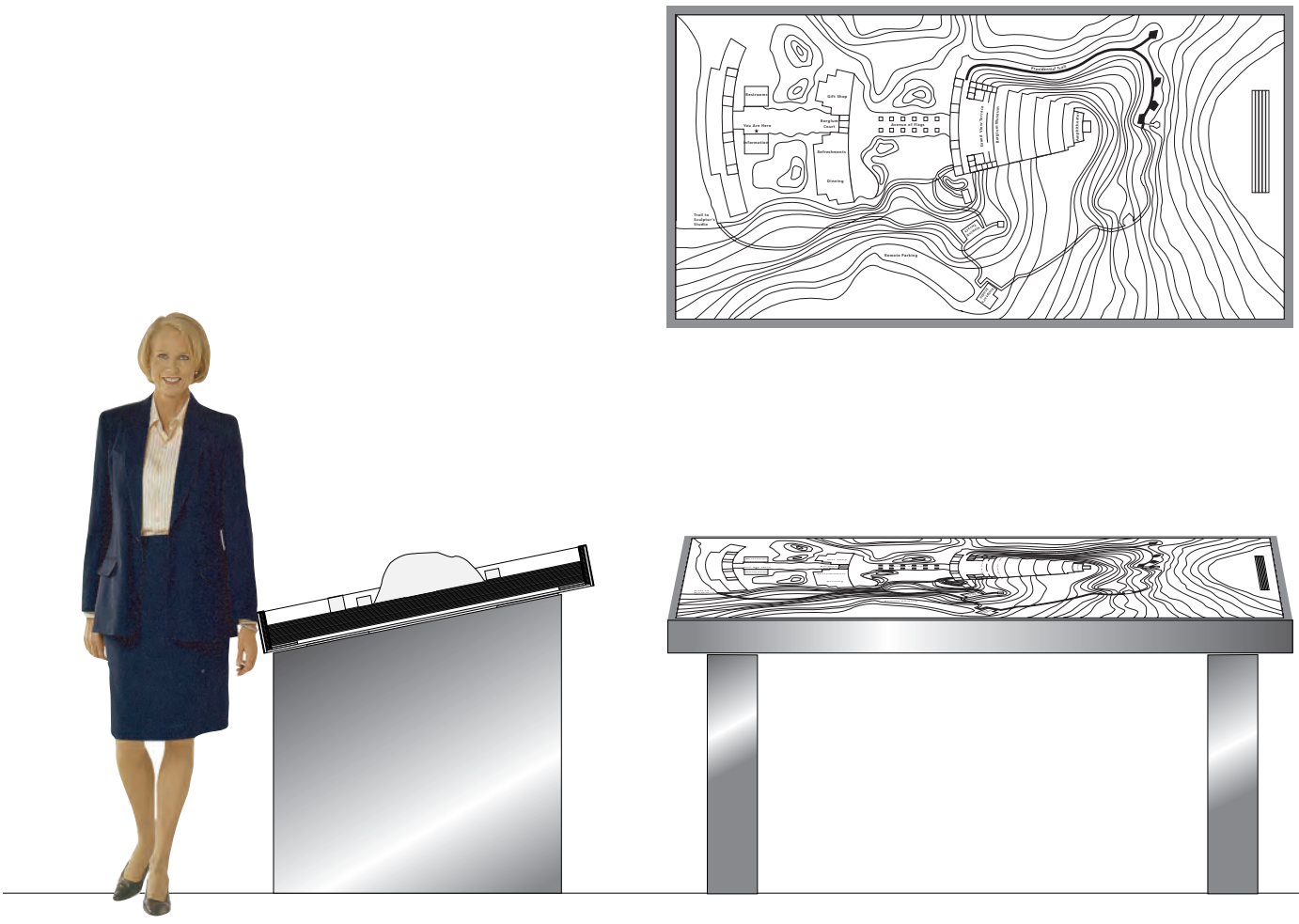


Illustration to come

Once a visitor attempts to go beyond the rim and hike down into the canyon, the type of map required is significantly different. A topographic map is helpful but it cannot easily show the complexity of a landscape that is unfamiliar to 99% of the visitors that attempt to hike into the canyon. Furthermore, any map or diagram needs to incorporate temperature and information on how the body will be taxed in this environment. To create a picture of this world, three different approaches may need to be used together. These include a topographic map that shows the basic trail route and the associated switchbacks, a cross section that shows elevation and temperatures, and a computer-generated topographic oblique that shows the severity of the land.

The orientation map planned for Mount Rushmore takes cartography into the third dimension. This map is designed as a tabletop map displayed in stainless steel layered relief to show disabled visitors how much of the park is fully accessible without steps and how to access other areas. Proportions have been altered for ease of understanding.

The map consists of 21 layers of stainless steel that show the area from the entrance through the Presidential Trail clearly identifying accessibility, all trails, and facilities.



Chapter 3

UniGuide Planning, Design & Documentation

Section 3.8

Guidelines on Use of Illustration for the Visitor Information System

Final Draft: *June 1, 2002*

Use of Illustration on Visitor Information System Panels

The small panels that are incorporated in the Visitor Information System are designed to present various types of information in an organized format without overloading any panel with too much type or too many messages. When an assembly contains more than one panel, the "chunking" of information allows the reader to focus his or her attention on whatever is important to that individual at that moment.

Where possible, each panel on a specific subject should also be illustrated in a way that engages the reader and enhances understanding of the subject.

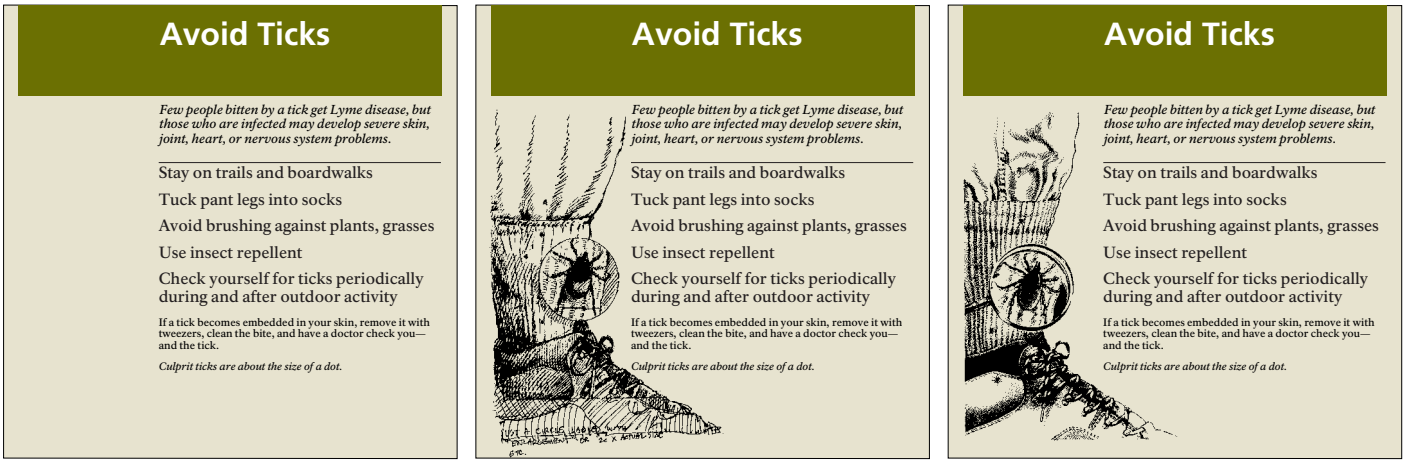
Content: These illustrations should complement the text. They might illustrate an action or process, a condition or environment, or a plant or animal. It is generally recommended that these illustrations be true representations of the subject. The artwork should answer questions, communicate ideas, resolve concepts, and otherwise reinforce the text. The artwork should be historically, scientifically and culturally accurate. Wherever possible, the artwork should incorporate universal design concepts to make content accessible to as many park visitors as possible and to allow use of the illustration at other parks.

Emphasis: Visitor Information System panels are significantly different from interpretive media in which an illustration or group of illustrations typically dominates a panel and is in full color. VIS illustrations support or augment texts using a single color. Line art such as pen-and-ink drawings, scratchboard illustrations, fine line woodcuts, or pencil drawings are the most appropriate forms for VIS panels. Each of these methods can be scanned or photographed for reproduction in digital or screen-printed media while maintaining the clarity and crispness of the original artwork.

Format: Because the panels are small and texts are presented in standard ways, the illustrations need to be carefully planned. Generally the illustration is placed in the left column but may cross over into the left margin of the type requiring a sensitively designed run-around of the main text or it may wrap under the text along the bottom of the panel. If the illustration intrudes into the text, the break in the column of type should minimal to maintain the readability of the paragraph, but have enough shape to define the run-around in contrast to the rest of the paragraphs left edge.

Design Process: Because of space constraints, the designer, writer, and illustrator should work together in the development of each panel. The recommended process is for the text to be drafted by the writer and placed on a panel by the designer. The designer then makes a rough sketch in the area identified for the illustration. Using this layout, the illustrator prepares tight sketches that can be scanned into the layout for review by all members of the creative team. Once the content, size and shape of the illustration have been finalized, the illustrator prepares the final artwork.

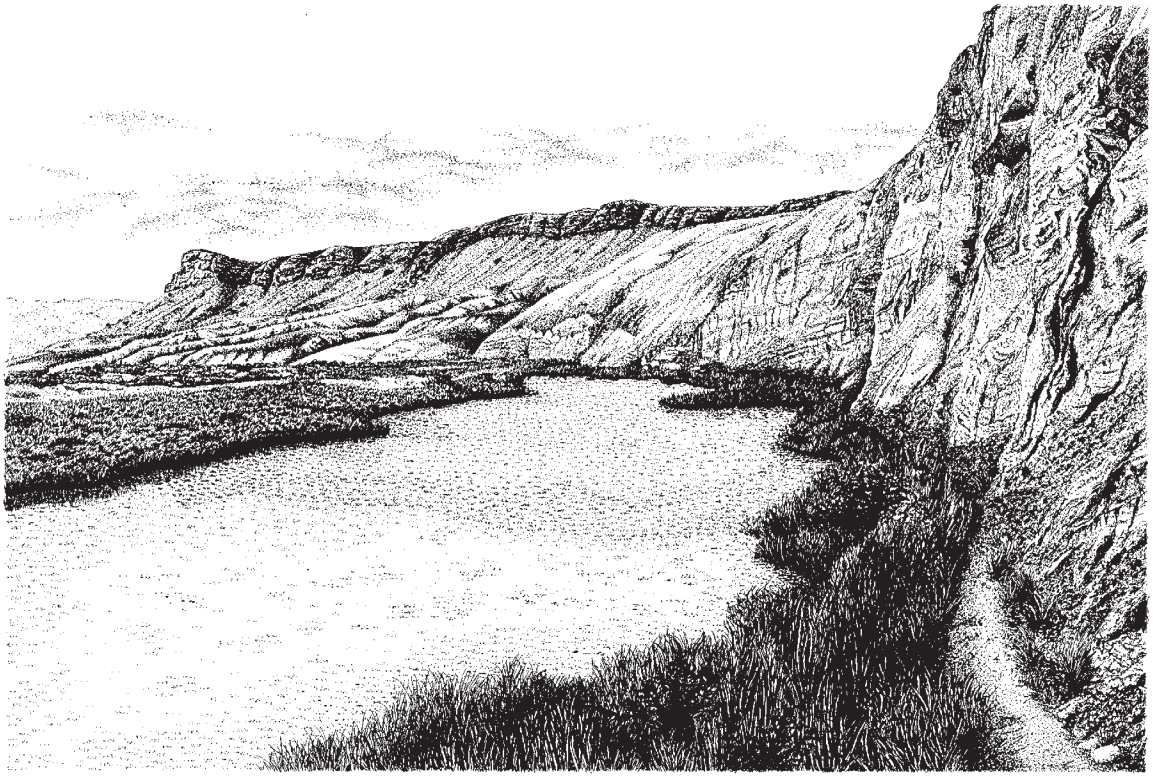
A sample of this evolution is shown below.



Selection and Quality of Illustration: The selection of the illustrator for the project should be based on experience in creating images that clearly communicate the intended messages. The illustrator's samples should exhibit first-rate artistic techniques. What to look for:

- Rendering techniques show a consistency of stroke, source of light, and amount of detail in the focal area.
- Artwork is composed with an accurate and believable perspective.
- Human figures, flora, and fauna are anatomically and biologically accurate.
- The professional quality and technical skill exhibited in the artwork is similar to that of illustrations published in NPS folders, handbooks, and wayside exhibits.

The examples shown on the following pages by three different artists illustrate the quality recommended and a diversity in appropriate styles.

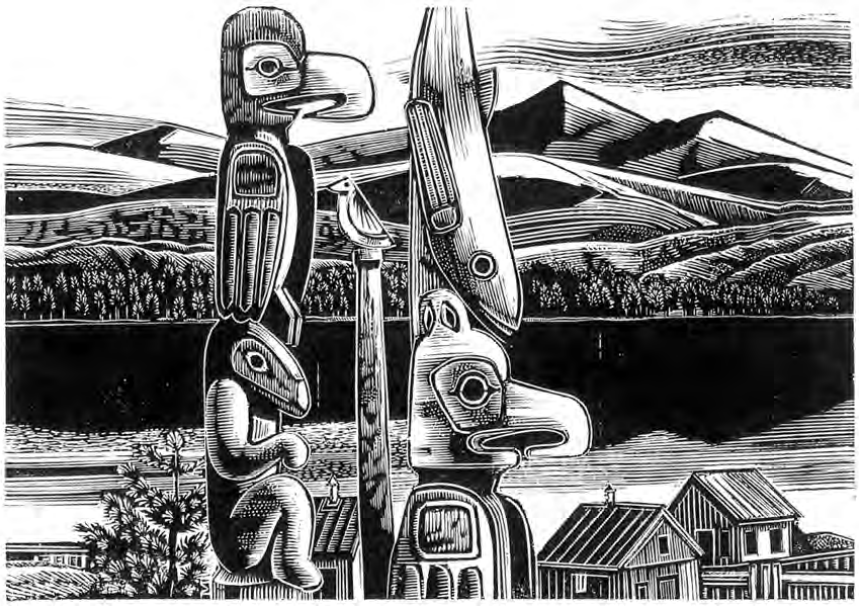


Tau Madsen, Illustrator–Salt Creek, Death Valley National Park, Pen & Ink Drawing

Tau Madsen, Illustrator–Grizzly Bears, Yellowstone National Park, Pen & Ink Drawing

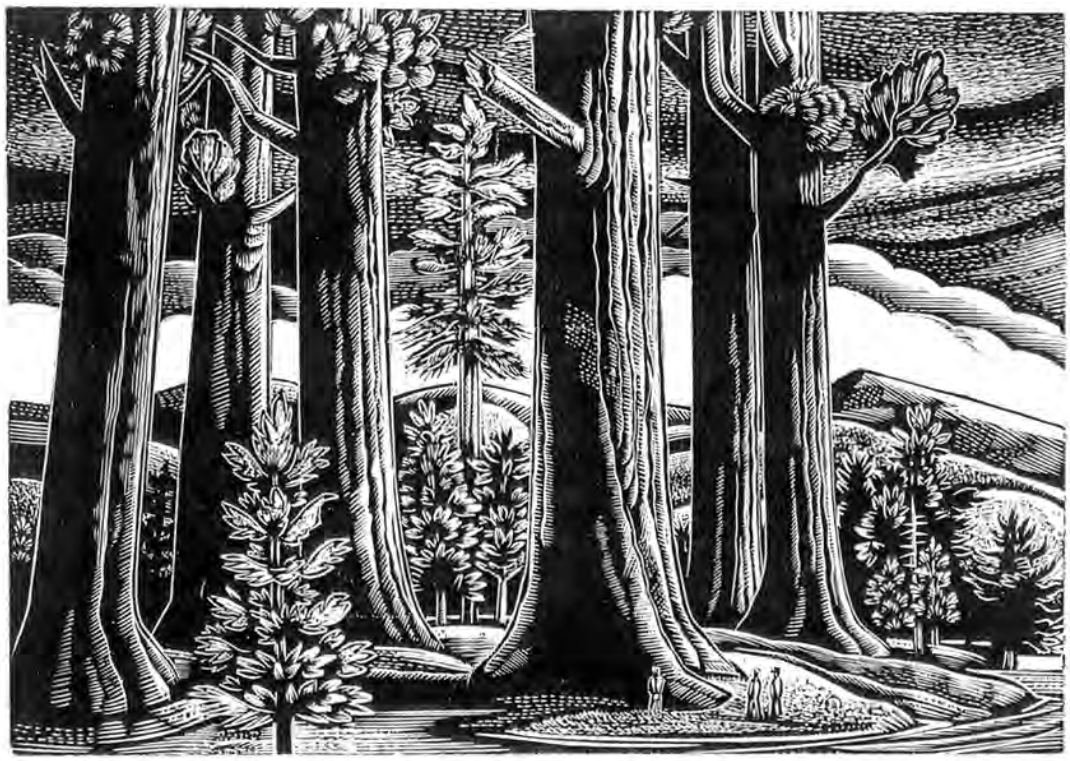
Tau Madsen, Illustrator–Road Runner, Death Valley National Park
Pen & Ink Drawing

Tau Madsen, Illustrator–Horse & Rider, Death Valley National Park, Pen & Ink Drawing



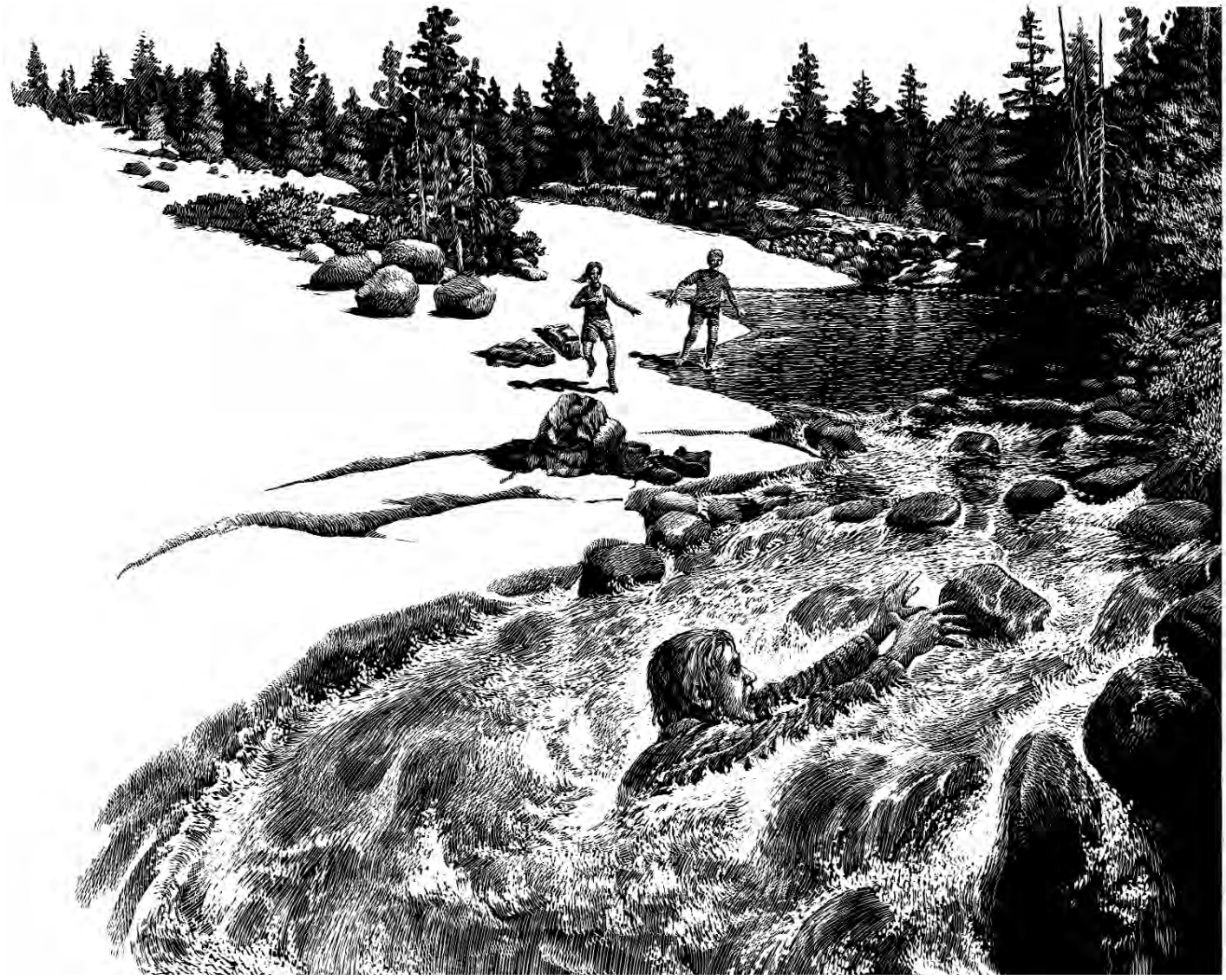
Michael McCurdy, Illustrator–John Muir Series "Our National Parks", Wood Cut

Michael McCurdy, Illustrator–Industrial, Wood Cut
(michaelmccurdy.com)



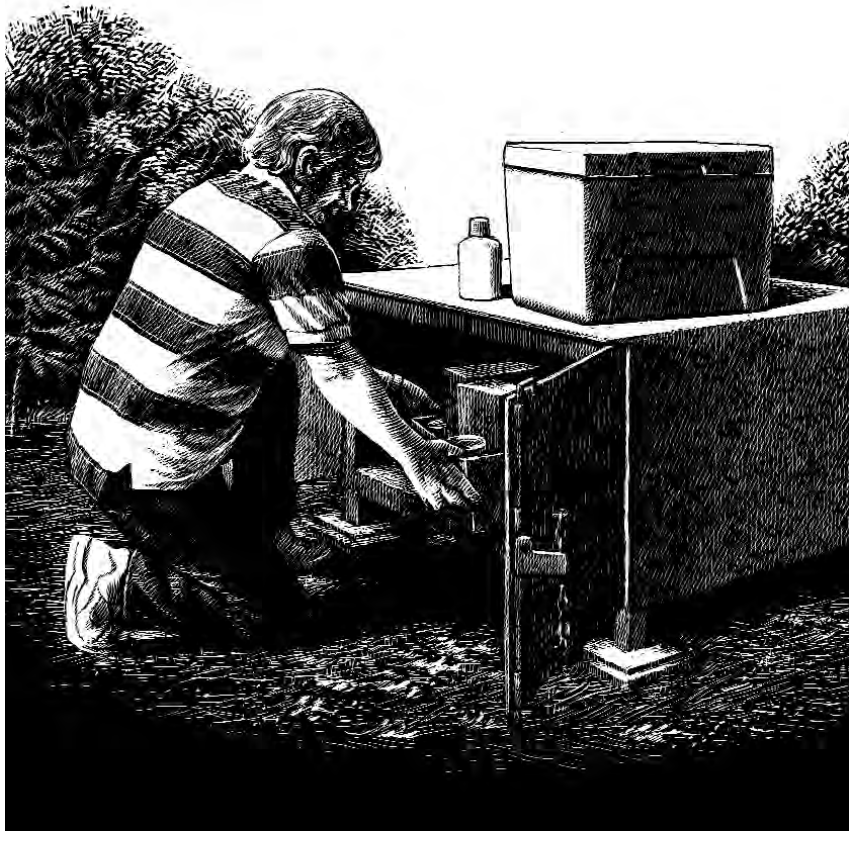
Michael McCurdy, Illustrator–John Muir Series "Our National Parks", Wood Cut

Lawrence Duke, Illustrator–Chipmunk, Yosemite National Park, Scratchboard



Lawrence Duke, Illustrator–Dangerous Currents, Yosemite National Park, Scratchboard

Lawrence Duke, Illustrator–Bicycle & Rider, Yosemite National Park, Scratchboard



Lawrence Duke, Illustrator–Food Storage Regulations,Yosemite National Park, Scratchboard

Lawrence Duke, Illustrator–Bear Scare,Yosemite N.P. Scratchboard

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Chapter 4

Material Specifications & Assembly Drawings

Final Draft: *June 1, 2002*

Introduction

These performance-based specifications have been developed to document the materials and fabrication methods for the NPS UniGuide Program.

In the overall planning and development process, great care was given to developing a system that will be durable and, where possible, follow the NPS principles of sustainable design, while being compatible to various park environments.

These specifications are organized in five sections:

These sections include specifications and drawings for each specific sign type.

Sign sizes have been standardized where possible based on common applications and usage. All materials specified and assemblies are designed to minimize maintenance in the field and to provide low life-cycle costs.

Chapter 4

Material Specifications & Assembly Drawings

Section 4.1

General Requirements

Final Draft: *June 1, 2002*

Chapter 4: UniGuide Material Specifications and Assembly Drawings

Section 4.1: General Requirements

		Survey and Layout Data
		Field Engineering
4.1-7	B.7	Obstructions
		Subsurface Obstructions
		Existing Utilities
4.1-8	B.8	Site Protection
		Natural Features
		Tree and Root Protection
4.1-8	B.9	Tree/Plant Protection
4.1-9	B.10	Mitigation of Damage
4.1-9	B.11	Archeological Findings
		Monitoring
		Observation
		Finding
		Suspension of Work
4.1-10	B.12	Demolition
		Removal and Disposal
		Waste and Recycling Plan
4.1-10	B.13	Installation Quality
		Cleanup of Site
		General Compliance

SECTION 4.1: GENERAL REQUIREMENTS

1. INTRODUCTION

1.1 Function

These specifications are provided as a guideline for the fabrication, assembly, and installation of signs for the UniGuide Program of the National Park Service. Material and fabrication specifications are provided for each structure and related graphic panels.

All signs are to be built to the specifications described in this chapter. Additional instructions and requirements are to be provided within contracts that describe the performance of specific sign fabricators and suppliers.

1.2 Graphic Production: Depending on the specific nature of the project, production os sign graphics may be required from graphic files submitted, or may be required to generate artwork for sign production based on sign schedule and specified graphic formats using specified graphic programs. If artwork is to be generated, the artwork will follow standard text formats for Motorist Guidance (RG-1 to 11, TB-1 to 3, BG-1 to 3), Identification (PI, FI, F/PI in all series), and selected panels within the Visitor Information System (TG-1 to 4, PK-Y and N, NP-T, NP-C, SG-1 to 9, AE-Y and N, TR-1, VPI-1 to 4, VFI-1 to 8, EF-1, RF-1, and SN).

1.3 Glossary of Sign Types

Visitor Information System: Signs that are adaptable to a variety of applications: identification, general instructions, safety information, regulatory information, resource education, trail route guidance, small road guides, campsite identification, parking control, and area entry panels. Panel widths and lengths are based on nominal 15 cm, 30 cm and 45 cm wide unit modules with widths up to 150 cm and panel height of 30 cm-45 cm and 60 cm.

Sign panels (porcelain enamel on steel, retroreflective graphics on aluminum, digitally printed graphics on adhesive vinyl, embedment fiberglass with digital images, and high-pressure laminate with digital images) are retained within extruded aluminum rails. Ground-mounted signs are supported with two steel tubular, flat bar stock steel, or wood posts. Wall-mounted signs are supported by aluminum vertical attachment angles.

Motorist Guidance Signs– Roadguide, Trailblazer, Boundary Signs: Panels to provide guidance to motorists. Signs incorporate a common system of dimensional timber uprights and ultra stiff, light weight 10mm Alumalite aluminum composite material (ACM) panel. Adhesive retroreflective graphics are applied directly to ACM.

Identification Signs: A system of standard format routed wood (cedar or redwood) sign panels mounted in double post or monolithic format. Interior structures are galvanized fabricated steel. Signs may be double or single face.

Traffic Regulatory: A standard mounting for traffic regulatory and parking control signs as specified in the Manual on Uniform Traffic Control Devices.

1.4 Identification Systems

Planning Code: Each sign type, format, size, assembly, and material is identified by a code referenced by attribute in the sign schedule. A copy of this code is included in Chapter 3: Sign Planning and Documentation.

1.5 Installation Sticker

All finished sign panels shall be provided with a 1-1/4" x 2-1/2" weather resistant identification placed on the back of the sign indicating sign plan ID number, manufacturer, date of fabrication, and installation date.

1.6 Reference Standards

A. Visitor Information System (Section 4.2)

- Specification for Architectural Porcelain Enamel on Steel for Exterior Use (PEI:S-100(86) as issued by the Porcelain Enamel Institute, Washington, D.C.
- American Society for Testing and Materials standard specification for Aluminum and Aluminum Alloy Sheet and Plate (ASTM- 6061-T5 extruded shapes with Type 2: Black anodized finish, and 3003-H16, 3003-H14, 2024-T3, 6061-T6, and 5052-H34 aluminum plate)
- American Society for Testing and Materials standard specification for Stainless Steel tube and structural shapes (ASTM- 316L and 18-8)
- American Society for Testing and Materials standards for Weathering Steel ASTM-588 (A-847 as a tube product)
- American Society for Testing and Materials, and American Institute for Hollow Structural Sections standards (HSS) for ASTM-500; Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- American Society for Testing and Materials standard specification D-523 for paint gloss and D-4587 for accelerated weathering cycles for paint
- American Society for Testing and Materials: Standards for threaded steel rod and "J" bolts
- Dimensional Lumber: Laminated clear heart, kiln–dried vertical grain redwood or Western Red Cedar with maximum moisture content of 12% for panels, fabricated posts, and monolith edge. Redwood to be selected per grading rules of the California Redwood Association or better for panels, frames, and posts. Cedar to be selected per grading rules of the Western Red Cedar Lumber Association

- California Redwood Association grading rules for Dimensional Redwood lumber including Clear Heart, kiln–dried vertical grain redwood, and Construction Heart redwood
- Western Red Cedar Lumber Association Number 1, Select, and No. 1 Structural Select Lumber using the grading rules of the National Lumber Grading Authority as approved by the American Lumber Standards Board of Review

B. Wood Identification Signs (Section 4.3)

- California Redwood Association grading rules for Dimensional Redwood lumber including Clear Heart, kiln–dried vertical grain redwood, and Construction Heart redwood
- Western Red Cedar Lumber Association Number 1, Select, and No. 1 Structural Select Lumber using the grading rules of the National Lumber Grading Authority as approved by the American Lumber Standards Board of Review
- American Society for Testing and Materials, and American Institute for Hollow Structural Sections standards (HSS) for ASTM-A500B; Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- American Society for Testing and Materials, and American Institute for steel plate, bar stock, and rolled sections; Standard Specification for A-36 material
- Western Wood Products Association Design Pressure Treated Lumber
- American Society for Testing and Materials standard specification for aluminum alloy plate and aluminum extruded sections (ASTM- 6061-T6)

C. Motorist Guidance (Section 4.4)

- Manual on Uniform Traffic Control Devices (MUTCD), Millennium Edition, by the U.S. Department of Transportation, December 2000
- Traffic Control Devices Handbook, by the U.S. Department of Transportation, FHWA, 1983.
- U.S. Department of Transportation, Federal Highway Administration, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, current edition FP-85 Sections 633.06 and 718.01
- General Services Administration., Federal Supply Service specification L-S-300-C
- American Society for Testing and Materials standard specification for Aluminum and Aluminum Alloy Sheet and Plate (ASTM- 6061-T5 extruded shape, and 2024-T3, 3003-H16, 3003-H14, 6061-T6, and 5052-H34 aluminum plate)
- American Society for Testing and Materials standard specification for Retroreflective Sheeting for Traffic Control, ASTM D-4956-93a
- Western Wood Products Association Design Stress for Graded Lumber (Douglas Fir Select Grade)

D. Traffic Regulatory Sign Mounting (Section 4.5)

- Manual on Uniform Traffic Control Devices (MUTCD), Millennium Edition, by the U.S. Department of Transportation, 2000
- Traffic Control Devices Handbook, by the U.S. Department of Transportation, FHWA, 1983
- American Society for Testing and Materials standards for Weathering Steel ASTM-588 (A-847 as a tube product)

1.7 PreProduction Sign Graphics

Graphic Standards: All graphic formats, use of typography, color, directional arrow graphics, pictograms and NPS Arrowhead logo shall comply without deviation from Chapter 2, NPS UniGuide Graphic Standards. Any exceptions must be approved in writing by the NPS National UniGuide Manager based on a graphic submission submitted for review.

1.8 Dimensions

Visitor Information System: Metric dimensions are used for the size of panels and component parts with hard conversions in feet/inches noted in specifications. Legend size and all related dimensions including layout grids for Visitor Information System are in both points and picas for typographic reference and in centimeters and millimeters for alignment and panel layout.

Motorist Guidance and Identification Signs: Legend size and all related dimensions including layout grids, panel sizes, post lengths, mounting height, post drilling for connection of panel to post, and all hardware, machine parts (cast caps, mechanical fasteners, connection details), materials (tube, dimensional lumber) are specified in inches.

1.9 Structural Engineering

All structures have been engineered to meet typical conditions for all national parks. This criteria is provided in Appendix A: Engineering Criteria For Sign Design of this specification. Special conditions that are outside these parameters are to be engineered on a site specific basis.

1.10 Quality of Materials

All materials shall be new and of first quality. Materials shall meet or exceed the standards and specifications herein or by reference. Factory seconds shall not be accepted. All materials shall comply with this specification or approved equal.

APPENDIX A: ENGINEERING CRITERIA FOR SIGN DESIGN

A.1 Engineering Criteria

The following criteria have been used as the standards governing material specifications, assemblies and footings for all recreation project signs unless otherwise specified.

Wind Pressure	20 PSF ***
Soil	1-TSF (2 KSF)-Minimum * **
Frost Depth	36" Maximum unless otherwise noted
Concrete:	3000 PSI. / 28 days

* For all direct embedment footings, backfill in 6" lifts tamped to 95% compaction.

** Subgrade materials are assumed to be organic free sand/gravel/silt, or mixture of same, with bearing capacity of 1-TSF (2 KSF) min, subject to inspection.

*** Exceptions include sign placements along the Gulf of Mexico and in the region of Cape Hattaras, with installations engineered site specific to the location.

If these criteria are not adequate for a specific sign location, modifications shall be made to conform to the basic assembly specifications of specified sign type. Modifications may include, but are not limited to, thicker panels, larger dimension sign posts or larger footing configuration.

The design of the structural requirements of special one-of-a-kind signs shall conform to the basic assembly specifications for similar sign types. The modified assembly shall fulfill the requirements of local criteria for wind pressure, soil, and frost depth.

APPENDIX B: INSTALLATION

B.1 General Scope

Installation contracts may include assembly and installation only, or assembly, installation and removal and disposal of existing signs. Specific scope of each installation or removal contract is itemized in the Sign Schedule.

B.2 Project Meeting

Before start of construction, the COTR may arrange an on-site meeting with Contractor.

Progress Meetings: The COTR will schedule meetings as needed with the Contractor and subcontractors. The meeting agenda (minimum) will include the following: review of work in progress, field observations (problems and decisions), identification of items which impede planned progress, review of submittals schedule and status of submittals, review of off-site fabrication and delivery schedules, maintenance of progress schedule, corrective measures to retain projected schedules, planned progress during succeeding work period, coordination of projected progress, maintenance of quality and work standards, effect of proposed changes on progress schedule and coordination, and other business relating to work.

Meeting minutes: The Contractor shall compile minutes of each project and progress meeting and will distribute copies to the COTR. The Contractor shall make and distribute such other copies as is required to expedite the work.

B.3 Workscope

Contractor shall furnish all labor, materials, tools, equipment, loading/unloading and transportation services required to perform and complete the work according to the specifications and contract documents. All work shall be done with no damage to mounting site or sign.

B.4 Staging Area

If requested, the NPS will provide a lay-down and staging location for sign assembly and sign component storage during the installation process. Location will be in close proximity to the construction site but outside of areas that are actively used by park visitors. Contractor shall stay within designated area and not damage surrounding vegetation. Upon completion of installation project, Contractor shall remove all materials and restore area to preexisting condition. Securing the area will be the responsibility of the Contractor.

B.5 Footings Reference

For complete specifications on foundations and assembly, refer to the respective *Material Specifications and Assembly Drawings* in this chapter.

B.6 Sign Location

All signs are to be mounted at locations as marked with a stake by direction of the COTR. Stake will be identified with sign type code, unique number, and location code, and correspond to the sign location plan drawings.

- Double post signs will be staked at the location of the left leg when facing the sign. Double-faced signs and angled installations will be staked with both leg locations noted.
- Double-post assembly stations will be identified using two stakes for the two posts of the primary installation with orientation of the assembly to follow location drawing.
- Campsite identification assemblies will be placed in the same location as existing identifiers unless noted otherwise.

Field Verification: The Contractor shall check and verify all dimensions and conditions at the job site prior to installation. Discrepancies are to be brought to the attention of the COTR for adjudication and resolution.

Survey and Layout Data: No surveys are required. All survey and land data will be provided by the NPS and are not the responsibility of the contractor unless otherwise specified.

Field Engineering: All sign engineering will be the responsibility of the National Park Service unless otherwise noted in contract documents.

B.7 Obstructions

Subsurface Obstructions: Unforeseen obstructions may limit the depth of a standard footing or require special mitigation to prevent damage to existing tree roots. Where possible, move the sign as needed to allow unconstrained subsurface installation. If a sign placement location must be moved because of subsurface obstructions, the Contractor shall follow all instructions for sign location provided in Chapter 3, Section 3.4: Guidelines for Sign Use by Sign Type, and shall notify the COTR if such installation will not fit in this location. If the sign can be logically moved, verify sight-lines of adjusted locations to affirm that sign is still visible from the designated approach.

- If plant and tree obstructions are identified, and the sign location cannot be moved, follow the instructions below for Tree/Plant Protection, and Mitigation of Damage.
- If the sign location cannot be moved and nonplant (rock) obstructions prohibit the footing from being as deep as specified, see respective "Shallow Footing" specification in the Installation section of the sign type being mounted (Sections 5 for Small Panel, Post/Bollard, and Road Guide, and Section 6 for Identification) for adjusting footing configuration.

Existing Utilities: The COTR will provide known existing condition data on utility line locations in conjunction with park engineering and maintenance operations and utility company

surveys. Prior to beginning excavation, the Contractor shall notify Contract Officer and utility companies of proposed sign locations and times for excavation.

The Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, the Contractor shall repair the utility at no additional expense to the Government.

B.8 Site Protection

The Contractor shall provide all necessary protection for his work until turned over to the COTR. The Contractor shall protect all adjacent structures, surfaces, vegetation and plant materials from damage during installation. The Contractor will notify the COTR of any damage within eight hours of occurrence. Any damage to the items described above must be restored to original condition and appearance, or replaced within thirty days.

Natural Features: Confine all operations to work limits of the project. Prevent damage to natural surroundings. Restore damaged areas, repairing or replacing damaged trees and plants at no additional cost to the Government.

- Do not remove, injure, or destroy trees or other plants. Consult with COTR to remove agreed-on roots and branches, or whole branches or trees that interfere with sign installation.
- Do not fasten ropes, cables, or guys to existing trees.
- Carefully supervise excavating, grading, filling, and other construction operations near trees to prevent damage.

Tree and Root Protection: Minimize disturbance to tree trunks and root zones to prevent damage to trees.

- Do not drive over root zones unless work cannot otherwise reasonably be done. Driving over roots will compact the soil and can harm or destroy the tree.
- Do not pile excavated soil against tree trunks.
- Do not compact soil around roots to a greater degree than surrounding unexcavated soil except to meet compaction requirements for backfilling signpost installations.

B.9 Tree/Plant Protection

Do not remove, injure, or destroy trees, tree roots, or other plants without prior approval. Use accepted horticultural practices for all work. Adjust sign installation locations to keep them beyond the drip line wherever possible. Notify the COTR of any proposed sign locations within the drip line of the trees. The drip line shall be defined as the area below the farthest-spreading branches of a tree. Where such adjustments are not practical, maintain the following minimum clearances between the face of trees to be saved and the closest edge of sign footing:

- for trees more than 30’ in diameter . . . . . .10 feet
- for trees between 15’ and 30’ in diameter . . . . . .8 feet
- for trees less than 15’ in diameter . . . . . .5 feet

B.10 Mitigation of Damage

Take steps to mitigate damage to roots wherever excavation must take place within the drip line of trees and wherever excavation must take place within the drip line of other trees 12 inches or larger in diameter:

- Excavate carefully where tree roots might be encountered. Where roots 2" and larger are encountered, hand excavate as required to prevent damage to roots. Tunnel under roots to be saved, hand excavating as necessary
- Do not cut roots over 2" in diameter.
- Cleanly saw cut roots between 1" and 2 " in diameter where they interface with work; do not cut roots except as necessary. Roots between 1" and 2" in diameter which must be cut shall be cleanly saw cut near the edge of sign foundation closest to the tree to prevent roots from being dislodged from soil by equipment.
- Within four hours of excavating wrap burlap around the ends of cut roots larger than 1’ in diameter and wet the burlap. Keep the burlap moist until the sign is backfilled. During backfilling operations, bring the burlap to within a few inches of the ground surface.
- Thoroughly wet roots and burlap in the excavated area before backfilling. Backfill shall contain as much water as is compatible with compaction.

B.11 Archeological Findings

Petroglyphs, artifacts, burial grounds or remains, structural features, ceremonial, domestic, and archeological objects of any nature, historic or prehistoric, found within the construction area are the property of and will be removed only by the Government.

Monitoring: At least one week before on-site work begins, Contractor shall meet with the COTR and Archeological Monitor to discuss Daily Work Schedule and equipment and special methods to be used in archeologically sensitive areas.

Observation: As appropriate, an Archeological Monitor will observe all ground-disturbing site work at all archeologically sensitive areas, from a safe location mutually agreed on by Contractor and Monitor. As new ground is broken, Monitor will examine excavated materials using construction layout centerline and perimeter staking as a reference point to record locations of findings.

Finding: Should Contractor’s operations uncover or find any archeological remains, Contractor shall suspend operations at the site of the discovery, notify COTR immediately of the findings, and continue operations in other areas. Included with the notification shall

be a brief statement of the location and details of the findings.

B.12 Demolition

Sign to be replaced shall be removed completely by the Contractor following or in conjunction with installation of the new signs unless otherwise specified.

Removal and Disposal: All designated existing signage and related structures shall be removed from the project area and disposed of properly in accordance with state and local regulations unless otherwise indicated.

B.13 Installation Quality

The Contractor shall install all signs level and plumb at the specified heights and alignments with all specified footings, backfill, or attachment hardware.

Cleanup of site: The Contractor shall remove all packing, sign boxes, and construction materials from the project upon completion of installation.

Ground cover restoration: The Contractor shall replace damaged ground cover with same species as damaged in the installation process unless instructed otherwise in the installation specifications provided by the park.

Chapter 4

Material Specifications & Assembly Drawings

Section 4.2

Visitor Information System (VIS)

Final Draft: *June 1, 2002*

4.2 Visitor Information System (VIS) Specifications

Assembly Drawings

4.2-65	A.1-A	Vertical, Double Post Assembly Axonometric (Tubular Steel)
4.2-66	A.1-D	Vertical, Double Post Assembly Detail (Tubular Steel)
4.2-67	A.1-S1	Vertical, Double Post Assembly System Options (Tubular Steel)
4.2-68	A.1-S2	Vertical, Double Post Assembly System Options (Tubular Steel)
4.2-69	A.1-S3	Vertical, Double Post Assembly System Options (Tubular Steel)
4.2-70	A.2-A	In-line, Multiple Post Assembly Axonometric (Tubular Steel)
4.2-71	A.2-D	In-line, Multiple Post Assembly Detail (Tubular Steel)8
4.2-72	A.3-A	Cluster Base, Multiple Post Assembly Axonometric (Tubular Steel)
4.2-73	A.3-D	Cluster Base, Multiple Post Assembly Detail (Tubular Steel)
4.2-74	A.4-A	Tri-Side, Multiple Post Assembly Axonometric (Tubular Steel)
4.2-75	A.4-D	Tri-Side, Multiple Post Assembly Detail (Tubular Steel)
4.2-76	A.2-4-S	Multiple Post Assembly System Options (Tubular Steel)
4.2-77	A.5-A	Vertical, Double Post, Small Assembly Axonometric (4x4 Wood)
4.2-78	A.5-A	Vertical, Double Post, Large Assembly Axonometric (6x6 Wood)
4.2-79	A.5-D	Vertical, Double Post Assembly Detail (6x6 Wood)
4.2-80	A.5-D	Vertical, Double Post Assembly Detail (4x4 Wood)
4.2-81	A.5-S1	Vertical, Double Post Assembly System Options 2: Small Multi Panel Assemblies (4x4 Wood)
4.2-82	A.5-S2	Vertical, Double Post Assembly System Options 2: Large Multi Panel & Bus Stop/Parking Area ID (6x6 Wood)
4.2-83	A.5-S3	Vertical, Double Post Assembly System Options 3: 20 cm Based Area Entry/Small Guide (4x4 Wood)
4.2-84	A.5-S4	Vertical, Double Post Assembly System Options 1: 30 cm Based Area Entry/Small Guide (6x6 Wood)
4.2-85	B.1-A	Forward Angle, Double Post Assembly Axonometric (Tubular Steel)
4.2-86	B.1-D	Forward Angle, Double Post Assembly Detail (Tubular Steel)
4.2-87	B.1-S	Forward Angle, Double Post Assembly System Options (Tubular Steel)
4.2-88	B.2-A	Forward Angle, Double Post Assembly Axonometric (4x4 Wood)
4.2-89	B.2-D	Forward Angle, Double Post Assembly Detail (4x4 Wood)
4.2-90	B.2-S	Forward Angle, Double Post Assembly System Options (4x4 Wood)
4.2-91	C.1-A	Reverse Angle, Double Post Assembly Axonometric (Tubular Steel)
4.2-92	C.2-A	Reverse Angle, Wall Cap Mount Double Post Assembly Axonometric (Tubular Steel)
4.2-93	C.3-A	Reverse Angle, Sled Base Double Post Assembly Axonometric (Tubular Steel)
4.2-94	C.4-A	Reverse Angle, Deck Mount with Straight Post Assembly (Tubular Steel)
4.2-95	C.1-D	Reverse Angle, Double Post Assembly Detail (Tubular Steel)
4.2-96	C.1-4-S	Reverse Angle, Assembly System Options (Tubular Steel)
4.2-97	C.5-A	Reverse Angle, Double Post Wood Assembly Axonometric (4x4 Wood)
4.2-98	C.5-D	Reverse Angle, Double Post Wood Assembly Detail (4x4 Wood)
4.2-99	C.5-S	Reverse Angle, Double Post Wood Assembly System Options (4x4 Wood)
4.2-100	D.1-A/S	Low Profile Reverse Angle, Double Post Assembly Axonometric and Options (Flat Bar Steel)
4.2-101	D.1-D	Low Profile Reverse Angle, Double Post Plate Steel Assembly Detail (Flat Bar Steel)
4.2-102	E.1-A/S	Double Post Bar Stock Assembly Axonometric and Options (Flat Bar Steel)
4.2-103	E.1-D	Double Post Bar Stock Plate Steel Assembly Detail (Flat Bar Steel)

4.2-104	F.1-A/S	Single Post Assembly Axonometric and Options (Tubular Steel)
4.2-105	F.1-D	Single Post Assembly Detail (Tubular Steel)
4.2-106	G.1-A	Flush Wall Mount Assembly Axonometric
4.2-107	G.1-D	Flush Wall Mount Assembly Detail
4.2-108	H.1-A	Street Name, Single Post Assembly Axonometric (6x6 Wood)
4.2-109	H.1-D	Street Name, Single Post Assembly Detail (6x6 Wood)
4.2-110	H.2-A	Finger Board, Single Post Assembly Axonometric (6x6 Wood)
4.2-111	H.2-D	Finger Board, Single Post Assembly Detail (6x6 Wood)
4.2-112	H.1-2-S	Street Name/Finger Board, Single Post Assembly System Options (6x6 Wood)
4.2-113	J.1-A	Wall Mount Assembly Axonometric (Aluminum Angle)
4.2-114	J.1-D	Wall Mount Assembly Detail (Aluminum Angle)
4.2-115	J.1-S	Wall Mount Assembly System Options (Aluminum Angle)
4.2-116	C.AC.A-B	Aluminum Core Panel Size / Drilling Detail for Assemblies A.1–5, B.1-2 (vertical only), J.1
4.2-117	C.AC.C	Aluminum Core Panel Size / Drilling Detail for Assemblies C.1–5 (30 cm tall panels)
4.2-118	C.AC.C	Aluminum Core Panel Size / Drilling Detail for Assemblies C.1–5 (45 cm tall panels)
4.2-119	C.AC.C	Aluminum Core Panel Size / Drilling Detail for Assemblies C.1–5 (60 cm tall panels)
4.2-120	C.AC.D-F	Aluminum Core Panel Size / Drilling Detail for Assemblies D.1, E.1, F.1
4.2-121	C.AC.H	Aluminum Core Panel Size / Drilling Detail for Assemblies H.1, H.2
4.2-122	C.ER.1-3	Extruded Aluminum Rails: 1) Single Slot, 2) Double Slot, & 3) Retainer
4.2-123	C.ER.4	Extruded Aluminum Rail: Reverse Angle
4.2-124	C.ER.5	Extruded Aluminum Rail: Bulletin Case
4.2-125	C.ER.6	Extruded Aluminum Rail: Removable Face
4.2-126	C.SP-A.1	Tubular Steel for Vertical Assembly with Direct Embedment
4.2-127	C.SP-A.1	Tubular Steel for Vertical Assembly with Baseplate Mount
4.2-128	C.SP-B.1	Tubular Steel for Forward Angle Assembly with Direct Embedment and Baseplate Mount
4.2-129	C.SP-A.2-4	Tubular Steel for Inline, Cluster, and Tri-Side Assemblies with Baseplate Mount
4.2-130	C.SP-C.1-4	Tubular Steel for Reverse Angle Assemblies with Direct Embedment and Baseplate Mount
4.2-131	C.SP-D.1	Bar Stock for Low Profile Reverse Angle Assemblies with Direct Embedment & Baseplate Mount
4.2-132	C.SP-E.1	Bar Stock for Double Post Assemblies with Direct Embedment & Baseplate Mount
4.2-133	C.SP-F.1	Tubular Steel for Single Post Assembly with Direct Embedment and Baseplate Mount
4.2-134	C.BP.1	Baseplates for Assemblies A.1, B.1, C.1, F.1
4.2-135	C.BP.1	Baseplates for Assemblies C.2, D.1, E.1
4.2-136	C.BP.1	Baseplates for Assemblies A.2, A.3, A.4
4.2-137	CPC.A.1, B.1, C.1	Solid Post Caps for Assemblies A.1, B.1, C.1–4, F.1
4.2-138	C.PC.A.3–4	Solid Post Caps for Assemblies A.3–4
4.2-139	CPC.A.1, B.1, C.1	Polyethylene Caps for Assemblies A.1, B.1, C.1–4, F.1
4.2-140	C.SF	Stainless Steel Stem Footing for Assemblies A.1, B.1, C.1, D.1, E.1, F.1
4.2-141	C.AA.J.1	Aluminum Angle for Wall Mounted Assembly J.1
4.2-142	C.SB,SA,DP	Stabilizer blade: Tube Uprights (C.SB), Bar Stock (C.SA), Plate for Deck Mounted Baseplates (C-DP)
4.2-143	C.WP-A.5–H.1/2	Cedar Post for Vertical Assembly with Baseplate Mount
4.2-144	C.WP-B.2–C.5	Cedar Post for Forward and Reverse Angle Assembly with Baseplate Mount

4.2-145	C.BP.2	5” Baseplates for Assemblies A.5, C.5
4.2-146	C.BP.2	7” Baseplates for Assemblies A.5, B.2, H.1, H.2
4.2-147	C.RS	Retainer Straps for Wood Posts for Assemblies A.5 (30), H.1, H.2
4.2-148	C.RS	Retainer Straps for Wood Posts for Assemblies A.5 (20), H.1, H.2
4.2-149	C.RS	Retainer Straps for Wood Posts for Assemblies C.5
4.2-150	C.RS	Retainer Straps for Wood Posts for Assemblies B.2
4.2-151	C.CC	Copper Cap for Wood Posts
4.2-152	CBC	Bulletin Case Assembly
4.2-153	CFD	Folder Dispenser Assembly (30cm wide)
4.2-154	CFD	Folder Dispenser Assembly (15cm wide)
4.2-155	CTB	Trash Bag Dispenser
4.2-156	CPD	Campsite Permit Display
4.2-157	CRL	Campsite Registration List Display
4.2-158	CRC	Campsite/Trailhead Registration Cabinet
4.2-159	CRC	Campsite Trailhead Registration Cabinet Component Details
4.2-160	V.DE.TS	Direct Embedment for Tubular Steel Post Assemblies A.1, B.1, C.1, F.1
4.2-161	V.DE.BS	Direct Embedment for Bar Stock Post Assemblies D.1, E.1
4.2-162	V.AB.BP	J-Bolt Mount with Concrete Footing and Anchor Bolts for Assemblies A.1-4, B.1, C.1-2, D.1, E.1, F.1
4.2-163	V.TR.BP	Threaded Rod Mount for Bedrock Anchor for Assemblies A.1, B.1, C.1-2, D.1, E.1, F.1
4.2-164	I.SF	Stem Footing and Baseplate for Assemblies A.1, B.1, C.1, D.1, E.1, F.1
4.2-165	V.RO.RS	Core boar for assembly F.1
4.2-166	V.CO.T/B	Direct Embedment into Concrete Footing for Shallow Footing Conditions A.1, B.1, C.1, D.1, E.1, F.1
4.2-167	I.BP-D	Reverse Angle, Deck / Baseplate Mount with Double Post Assembly C.1
4.2-168	I.BP-D	Reverse Angle, Deck / Baseplate Mount Detail C.1
4.2-169	V.TB.TS	Reverse Angle, Deck Mount with Straight Post Assembly C.4
4.2-170	V.AB.BP	J-Bolt Mount with Concrete Footing for Wood Assemblies A.5, B.2, C.5, H.1-2
4.2-171	V.TR.BP	Threaded Rod Mount for Bedrock Anchor for Wood Assemblies A.5, B.2, C.5, H.1-2
4.2-172	Bolt Alignment Jig (5” Baseplate)	
4.2-173	Bolt Alignment Jig (7” Baseplate)	
4.2-174	Baseplate Mounting Jig for Signs with 4x4 Wood Posts	
4.2-175	Baseplate Mounting Jig for Signs with 6x6 Wood Posts	

0.0 Introduction

Description

The Visitor Information System (VIS) consists of a standard group of component parts that are mechanically assembled and include:

- Extruded aluminum panel rail (top and bottom) into which a sheet aluminum core is inserted for rigidity.
- Steel or wood uprights with finished top or companion cap. Upright material includes tubular weathering steel and tubular stainless steel, hot rolled flat bar stock and stainless steel flat bar stock, all with sandblasted finish; or Western Red Cedar timbers with bronze straps to which the rails are connected.
- Sign panels which are inserted into the rails in the front and back of the aluminum core. The sign panels accommodate a variety of graphic media including: porcelain enamel graphics on steel; computer cut adhesive vinyl graphics (retroreflective vinyl and/or non-reflective) on retroreflective background (with aluminum backing panel), digitally printed graphics on adhesive vinyl, digitally printed graphics integrated into high pressure laminate, and digitally printed graphics embedded in fiberglass.

These specifications are organized as a series of individual sections on specific components of the system:

1. Material overview
2. Material fabrication by type of material or component
3. Graphic layout and production
4. Sign assembly
5. Installation

General Requirements

Signs and sign assemblies are to be manufactured using materials and fabrication processes as described in these specifications and in companion drawings and should match the quality of initial submissions.

Engineering Criteria

The following criteria have been used as the standards governing material specifications, assembly and footings for all recreation project signs, unless otherwise specified.

Wind Pressure	20 PSF
Soil	1-TSF (2 KSF)-Minimum **
Frost Depth	36" Maximum unless otherwise noted
Concrete:	3000 psi / 28 days

When these criteria are not adequate for a specific sign location, modifications will be necessary. Contact the contract officer or park UniGuide Program Manager. Modifications may

include, but are not limited to, thicker panels, larger dimension sign posts or larger footing configuration.

The design of the structural requirements of special one-of-a-kind signs should conform to the basic assembly specifications for similar sign types. The modified assembly should fulfill the requirements of local criteria for wind pressure, soil, and frost depth.

* For all direct embedment and cast concrete footings, backfill in 6" lifts tamped to 95 percent compaction.

** Subgrade materials are assumed to be inorganic mixed sand/gravel/silt, with bearing capacity of 1-TSF (2 KSF) min., subject to inspection.

Dimensions

Metric dimensions are used for legend size and all related dimensions including layout grids, panel sizes, post lengths, mounting height, and post drilling for connection of panel to post. All hardware, machine parts (cast caps, mechanical fasteners, connection details), and materials (tube, dimensional lumber) are specified in inches.

NPS License for Use of Visitor Information System (VIS)

The design of the Visitor Information System (VIS) is proprietary to, and is owned by, Meeker & Associates, Inc. A patent application is pending. The system is licensed to the National Park Service for use only in national parks and affiliated areas. Vendors manufacturing this product for the NPS are prohibited from using this system for any other purpose, product, or customer.

Material Options and Substitutions

All materials are to be new and of first quality. Materials shall meet or exceed the standards and specifications herein or by reference. All materials shall comply with this specification or be an "approved equal". Procedures for substitution of materials are described in Section D.6, General Requirements of the Material Specifications and Fabrication Drawings.

A limited number of materials have been specified by manufacturer's trade name. These include: 3M™, and Avery Dennison adhesive graphic films and retroreflective sheeting materials, Penofin wood treatment, Matthews Acrylic Polyurethane paint systems, 3M ScotchPrint™ brand electrostatic printing on adhesive vinyl, Pannier digitally printed graphics embedded in fiberglass panels, and Hilti masonry anchor systems. These products are specified as examples and not to limit use of alternative products and suppliers that are of equal or superior quality.

McMaster Carr has been specified as the industrial hardware supplier because they provide the most comprehensive line of products and offer next day delivery to all parks within the system.

1. MATERIAL OVERVIEW

Aluminum

Rails

- 1.25"ø Extruded aluminum (6063-T6 or 6063-T6/T651), single channel rail section, with Type 2: black anodized finish
- 1.25"ø extruded aluminum (6063-T6 or 6063-T6/T651), double channel rail section, with Type 2: black anodized finish
- 1.25" extruded aluminum (6063-T6 or 6063-T6/T651), face mount double channel retainer section with, Type 2: black anodized finish
- 1.25" extruded aluminum (6063-T6 or 6063-T6/T651), double channel rail section with offset slot on one side for accessories, with Type 2: black anodized finish
- 1.25" extruded aluminum (6063-T6 or 6063-T6/T651), double channel section with removable face, with Type 2: black anodized finish
- 1.25" extruded aluminum (6063-T6 or 6063-T6/T651), single face section with extended support plate for reverse and forward angle display, with Type 2: black anodized finish

Core panels

- 0.125" sheet aluminum (2024-T3 or 7075-T3) for panel core for vertical panel display
- 0.25" sheet aluminum (2024-T3 or 7075-T3) for panel core of angled wayside exhibit structures and specific small panel system assemblies and accessories

Sign blanks

- 0.080" sheet aluminum (2024-T3 or 7075-T3) backing panel for adhesive graphics

Wall mount

- 1.75" x 1.75" x 0.25" extruded aluminum angle (6061-T6) for wall sign mount frame with Type 2: black anodized finish

Accessories

- 0.875" x 0.4375" bar stock aluminum (6061-T6), milled and tapped, with Type 2: black anodized finish for outside frame of bulletin cabinet
- 0.75" x 0.6875" bar stock aluminum (6061-T6), milled to receive cabinet face and corner clips, with Type 2: black anodized finish for bulletin cabinet door frame
- 0.060" (2024-T3 or 7075-T3) alloy sheet for trash bag dispenser cabinet and frame

Mounting templates

- 0.5" (x 5", 6" and 7") plate aluminum (2024-T3, 7075-T3) for machined drilling templates for mounting “J” bolts and wood sign baseplates
- 0.5" head press fit drill bushings for master templates for mounting bolts

	Steel
Uprights and baseplates	• 2" x 2" x 1/8" and 3" x 2" x 1/8" wall tubular weathering steel (A-847) for sign uprights • 2" x 6" x 1/8" wall tubular weathering steel (A-847) for fabricated angle uprights of cluster and tri-side assemblies • 3/8" weathering steel plate (A-847) for welded baseplates for assemblies with tubular uprights and narrow profile bar stock uprights • 1/2" weathering steel plate (A-847) sheared or waterjet plate cut to 2" widths for narrow profile bar stock uprights • 2" x 2" x 1/8" and 3" x 2" x 1/8" wall tubular steel section (A500B) for sign uprights of galvanized and painted assemblies. • 2" x 6" x 1/8" wall tubular steel section (A500B) for fabricated angle uprights of galvanized and painted inline and tri-side assemblies • 3/8" steel plate (A-36) for welded baseplates for assemblies with tubular steel uprights or with bar stock uprights (galvanized or painted) • 1/2" x 2" flat bar stock steel (A-36) for narrow profile assemblies (galvanized or painted) • 3/8" steel plate (A-36) for welded baseplates used with wood upright assemblies • 1/4" x 2" steel plate (A-36) welded baseplate straps for wood upright assemblies
Stabilizers	• 6" x 6" x 11-gauge steel plate (A-36) for bottom of embedment hole to mitigate settling of tubular steel uprights (as required) • 3" x 3" x 3/16" x 24" steel angle (A-36) to stabilize embedment of narrow profile signs with 0.5" x 2" steel (A-36) bar stock uprights • 3-1/2" x 3-1/2"x 1/4" x 24" steel angle (A36) back plate to anchor through bolted baseplates of deck–mounted reverse angle assemblies • 0.25" x 10" x 24" steel plate (A-36) to stabilize embedment of tubular steel uprights
Post caps (weathering steel)	• Weathering steel (A-847) machined post caps (2" x 2" and 3" x 2") • Weathering steel (A-847) machined post caps with sandblasted finish for 2" x 6" fabricated weathering steel uprights for cluster and tri-side assemblies with 135 degree and 120 degree configurations
Post caps (galvanized/painted)	• Weathering steel (A-36) machined post caps (2" x 2" and 3" x 2") • Weathering steel (A-36) machined post caps with sandblasted finish for 2" x 6" fabricated weathering steel uprights for cluster and tri-side assemblies with 135 degree and 120 degree configurations
Sign panels	• 16 gauge sheet vitreous or enameling steel, (ASTM A424) Type 1
Stem Footing	• 1.25" x 18" schedule 80 stainless steel (302, 304, 316) pipe for stem baseplate • 3/8" x 5" x 5" stainless steel (ASTM-316L) for stem baseplate

Inline and cluster assemblies

- 10 gauge steel (A-36) for faceplate clips (See drawing page 4.2-67)

Brass

- 0.25" x 2" brass flat stock (UNS No. C360) for inserted straps on wood assemblies
- 0.25" brass plate (UNS No. C360) for angled straps on wood assemblies
- 0.25" x 15 cm x 30 cm brass plate (UNS No. C360) for backing panel of single post, narrow profile assembly

Copper

- 20 ounce (c10200) sheet copper for fabricated cap on wood posts
- 1" – 2d copper nail (McMaster Carr 97952A100) for attaching copper cap to wood posts

Wood

- 13'-6" x 6" x 6" structural Select Grade Western Red Cedar for post for large double post assemblies, fingerboard assembly and street name sign
- 4" x 4" and 6" x 6" structural Select Grade Western Red Cedar for sign uprights

Hardware

Rail Attachment

- 1/4-20 x 1" stainless steel socket head cap screws (with stainless steel washer; see below) for rail attachment to upright (McMaster Carr 92196A542)
- Stainless steel spring lock washer for socket head cap screw (1/4" screw size), 0.26" ID, 0.363 OD, 0.078" min. thickness (McMaster Carr 98437A110)
- 1/4-20 x 1" stainless steel flat spanner head screw for rail attachment for upright in wall mount assemblies and for rail attachment for bar stock upright for narrow profile assemblies (McMaster Carr 94063A247)
- 8-32 x 3/8" slotted flathead stainless steel screws for rear attachment of retainer bar to vertical assemblies with 0.125" core panel (McMaster Carr 91781A192)
- 10-24 x 3/8" low head steel, socket head cap screws to attach core panel to wayside extrusion (McMaster Carr 92220A240)
- 10-24 x 3/8" stainless steel button head cap screw, style No. 3 hex with center pin (McMaster Carr 9563A240) for attaching removable rail face
- 0.3125" x 9.6875" stainless steel rod for street name sign and fingerboard tension bar
- 10-32 x 3/8" stainless steel socket head cap screws (McMaster Carr 92196A240) with stainless steel hi-collar helical spring lock washer to attach backing panel to narrow profile single post upright
- Stainless steel round base weld nut for 10-24 screw size, with 3/4" base dia., and 9/32" barrel height (McMaster Carr 90860A105) for attachment of backing panel to narrow profile single post upright
- Stainless steel, heavy duty spring lock washer, #10 screw size, 0.200" Id, 0.350" OD, 0.0586" min. thickness (McMaster Carr 91007A628) for attachment of backing panel to narrow profile single post upright

	• 3/8-16 Stainless steel self-locking acorn nut (McMaster Carr 90507A250) to cover hex nut on wall mount reverse angle assemblies.
Inline	• 10-24 x 1.5" button head, socket head stainless steel bolts to hold cover panel on fabricated upright for inline (McMaster Carr 92949A251) with No.12 stainless steel flat washer (McMaster Carr 92141A013) • 10-24 x 3/4" coupling nut for attachment of fabricated leg cover to fabricated upright (McMaster Carr 90268A011). • 3/16" dia. x 0.630" long, stainless steel (316) body and (18-8) stainless steel mandrel (McMaster Carr 97525A032) pop-rivet to attach clip angle to interior of tri-side, multiple post assembly
Wall mounted assemblies	• 1/4"-20 x 1" stainless steel round head screw (McMaster Carr 91783A533) with stainless steel flat washer (McMaster Carr 92141A029) and wall anchor for attaching assembly • Stainless steel knurled press insert with(18-8)stainless steel 8-32 x 0.3125" cup point socket head set screw (McMaster Carr 92311A191) for narrow profile wall–mounted sign • 1/4" zinc alloy lag bolt expansion shield for narrow profile wall mount (McMaster Carr 97040A029) • 1/4"-20 x 1" stainless steel slotted flathead screw to attach backing panel of narrow profile wall mount (McMaster Carr 91858A542).
Stabilizer blade	• 3/8" x 3" zinc plated hex head machine bolt (McMaster Carr 91236A636), with galvanized washer and offset washers for mounting stabilizer blade • 3/8" x 2" zinc plated hex head machine bolt (McMaster Carr 91236A632), with galvanized washer and offset washers for mounting steel angle stabilizer blade on narrow profile assembly • 3/8" x 8" zinc plated hex head machine bolt (McMaster Carr 91236A652), with galvanized washer and offset washers for mounting steel angle stabilizer blade on double post low profile assembly and for through bolt assembly on stem footing • 0.5"dia. x 0.035" x 15 cm long stainless steel tube (McMaster Carr 8989K78) to be used as a spanner between narrow profile leg assemblies
Anchor bolts and baseplate attachment	• 3/8"-16 x 14" stainless steel (18-8) "J" bolts (McMaster Carr-91615A140), with stainless steel hex nut (McMaster Carr-91849A031) for leveling and heavy duty stainless steel 1" dia. washer (McMaster Carr-98019A200) for mounting with concrete footing • 3/8"–16 threaded stainless steel rod (18-8) (McMaster Carr-98920A031) cut for 3.5" positive embedment, or standard 3/8" x 5-1/8" HILTI-HVA rod with chisel point and embedment mark • HILTI–HVA adhesive anchor system (or equal) for 3/8" x 3-1/2" embedment • 3/8" flat washers (McMaster Carr 92141A031) and hex nuts (McMaster Carr 91845A031), thin nuts (McMaster Carr 91847A031), and stainless steel (304) finishing acorn nut

	(McMaster Carr-92994A031) for baseplate attachment • 3/8"–16 x 2" stainless steel button head socket cap screw (McMaster Carr-92949A632) with companion washer (McMaster Carr-98019A200) for attachment of baseplate to mounting stem • 3/8-16 stainless steel (18-8) heavy hex nut welded to bottom of stem footing baseplate for mounting bolt attachment (McMaster Carr-91849A031)
Bolts for mounting to deck	• 3/8" x 4" zinc plated hex head lag screw (McMaster Carr-91478A640) to attach baseplates to wood decks • 3/8" x 3" zinc plated hex head machine bolt (McMaster Carr 91236A636), washers and hex nuts to through bolt baseplates to wood decks • 3/8" x 4" zinc plated carriage bolt (McMaster Carr-93548A636), washers and hex nuts to through bolt supporting "L" brackets to wood decks • 3/8" x 8" zinc plated carriage bolt (McMaster Carr-93545A652), washers and hex nuts to through bolt C.1 upright to face of deck joist
Bolts for wood sign mount	• No. 10 x 1.5" brass flat head Phillips wood screw (McMaster Carr-92114A251) to attach brass retainer straps to post • 1/4-20 x 4.25" 18-8 stainless steel threaded rod (McMaster Carr-98804A029) with stainless steel acorn nut (McMaster Carr 92994A029) brazed on end for attachment of rail through 4" x 4" wood post • 1/4-20 x 6.25" 18-8 stainless steel threaded rod (McMaster Carr-98804A029) with stainless steel acorn nut (McMaster Carr 92994A029) brazed on end for attachment of rail through 6" x 6" wood post • 1/4-20 x 3.75" 18-8 stainless steel threaded rod (McMaster Carr-98804A029) with stainless steel acorn nut (McMaster Carr 92994A029) brazed on each end for attachment of retainer straps through 4" x 4" wood post • 1/4-20 x 3-1/2" stainless steel socket head cap bolts (McMaster Carr 92196A558), with 1" x 0.067" stainless steel washer (McMaster Carr 98019A155) for rail attachment on street name sign and fingerboard assemblies • 0.3125"ø x 9.6875" stainless steel rod for street name sign assembly as stop. • 16 gauge stainless steel for custom fabricated retainer strap for street name sign assembly • 3/8"–16 x 6.25" threaded stainless steel rod (18-8) (McMaster Carr-98920A031) with (316) stainless steel acorn nut (McMaster Carr-92994A031) and companion washer (McMaster Carr-98019A200) for attachment of wood post to upright baseplate straps

Bulletin cabinet

- 0.5" x 1.375" aluminum “L” shape frame assembly (2-screws, backing plate, tapped front plate) hardware (Nielsen 2400)
- (304) stainless steel continuous hinge with drilled holes. plain finish, 0.040 thick, 1-1/16" open wide (McMaster Carr 1658A417) for bulletin cabinet
- #4-40 x 3/16" long (18-8) stainless steel flat head Phillips machine screw, with undercut head (McMaster Carr 91771A111)
- 3/16" – (18-8) stainless steel flat, socket head machine screw, 8-32 thread (McMaster Carr 92210A192)*Accessories* • 1-1/16" x 0.040" thick aluminum continuous hinge (McMaster Carr 1581A66) for trash bag dispenser
- 8-32 x 1/4" stainless steel low head socket cap screw (McMaster Carr 93615A317) for keyhole attachment of folder holders and campsite permit display
- 10-32 x 2" alloy steel, flat socket head screw (McMaster Carr 91253A018) with 1/2" plate washer and nut to secure for trash bag dispenser

Plastic / Nylon

- F & R Series, black cast polyethylene cap 0.625" dia. with 0.125" self capture shaft, Polymer Molding Inc.
- 0.5" black acrylic sheet for core panel of wall–mounted narrow profile signs
- 1.0" (OD) x 0.275" (ID) x 0.63" thick black nylon washer, Products Components Corp (M01176)

Bulletin cabinet

- 0.1875" clear polycarbonate sheet material for bulletin cabinet face
- 0.1875" CRL vinyl glazing gasket for clear 3/16" polycarbonate sheet of bulletin display cabinet (0752C)
- Vinyl weather stripping for bulletin cabinet door (specification to be determined)
- 0.1875" and 0.1" acrylic sheet (clear and black) for brochure dispenser, campsite permit display, and camp registration display

Graphics

- Porcelain enamel with high resolution graphics (up to 8 colors on 16 gauge steel, flat panel with sealed bead edge)
- 0.93" thick, high pressure laminate with high resolution printed graphics integrally impregnated in melamine with phenolic resin and kraft core (I-Zone brand or equal).
- 4 mil 3M Controltac™ electrostatic marking film (8640C) with 3M Scotchcal™ Protective Over-laminate (8945) applied to 0.080" aluminum backing panel
- 0.93" fiberglass sheet with digitally printed graphics embedded within top and bottom fiberglass layer
- 2 mil adhesive electro-cut vinyl sheeting for nonreflective cut graphics
- Type I–A medium-intensity retroreflective sheeting referred to as “engineering grade” with Class 1 adhesive backing that is pressure sensitive per ASTM 4956-01 and FHWA standard specification FP-96

- Type II–A medium high-intensity retroreflective sheeting referred to as "super engineering grade" with Class I adhesive backing that is pressure sensitive per ASTM D 4956-01 and FHWA standard specification FP-96
- Type III–A high-intensity retroreflective sheeting, with prismatic retroreflective material with Class 1 adhesive backing that is pressure sensitive, per ASTM 4956-01 and FHWA - FP-96
- Transparent overlay film should be warrantied by the reflective sheeting manufacturer for the life of the retroreflective sheeting
- Translucent and opaque screen printing inks compatible with substrate

Paint

- Penofin Penetrating Oil Finish: Cedar color (Brazilian Rosewood oil, 99% UV) for all wood posts
- Matthews Pre-treatment: Acid Activated PT Filler (74760/74766) metal prep
- Matthews Rust Inhibiting White Epoxy Primer (274908) with Matthews Activator (274909) for painted weathering steel posts in wet, high saline, or very dry environments, and painting stainless steel baseplates
- Matthews Acrylic Polyurethane enamel (number 26A-1A) with appropriate activator and catalysts (see manufacturers specifications); alternate: Matthews low volatile organic compound formula available where environmental regulations require
- Alkyd based, premium grade metal primer (Pittsburgh Paints, or equal) for protective coating on stabilizer blades

Adhesive

- Clear silicone adhesive for attachment of acrylic panel to aluminum panel of wall–mounted narrow profile signs
- 1/2" – 0.120" thick flexible magnetic stripping with adhesive backing (McMaster Carr 5759K23)
- Epoxy bond to attach round base weld nut to backing panel of single post narrow profile sign
- Two-part epoxy catalytic adhesive for attaching stem footing to bedrock

Masonry Materials

- Concrete for sign footings
- Gravel or crushed stone for placement at base of direct embedment
- Nonshrink exterior grade grout for backfilling stem footing and single post tube mounted in bedrock

2. Fabrication

2A. FABRICATION: INTERIOR ALUMINUM CORE PANEL FOR VERTICAL AND ANGLED ASSEMBLIES

Aluminum Core

Vertical Assemblies: Interior core panels should be made of 0.125" material: 2024-T3 or 7075-T3 alloy aluminum plate.

Reverse and Forward Angle Assemblies: Interior core panels should be made of 0.25" material: 2024-T3 or 7075-T3, alloy aluminum plate.

Accessory Assemblies: Integrated core panel and back panel for selected accessories should be made of 0.25" material: (2024-T3 or 7075-T3), alloy aluminum plate with top and bottom section milled to fit into core panel channel and sign panel channel of rail, with drilled and tapped holes to accept 8-32 screws at locations noted on drawing. Double milled section step to be smooth and milling dimensions to be consistent (+/–) 5/1000, along entire edge, with inside corner of steps to be a sharp 90 degree corner. Hole location to be within (+/–) 5/1000 of specified location in both directions. Assemblies include:

- Brochure Dispensers: 15 cm x 31 cm and 30 cm x 31 cm, with 4 holes
- Campsite Permit Display: 15 cm x 15 cm, with 2 holes
- Campground Registration Display: 60.1 cm x 31 cm, with 4 holes

Quality and Finish: Panels should be flat, clean, and free of any surface corrosion, oil, dirt, or other imperfections or contaminates. All edges are to be square and without edge burr or rounding from sheer cutting that will prevent snug insertion into retainer frame.

Tolerances: Overall size of core panels should be cut to (+/–) 10/1000 of specified size. Note: panels exceeding specified size will not fit into assembly.

Metal Fabrication–Vertical Assemblies: Drill and countersink holes in 60 cm (63.157 cm) high core panels to receive (8-32) flathead stainless steel screws for retainer rail, with screw being flush to back of panel. Do not over counterbore hole. Holes are placed 15 cm OC, with first hole being 7.5 cm from left edge. Panel size, number of holes, and hole location are shown in specification drawing.

Metal Fabrication–Reverse and Forward Angle Assemblies: Drill and counterbore holes (1.805" from top and bottom edges) along top and bottom of back panels. Flat bottom counter–bored holes to be 7.5 cm from side of the edge and 15 cm on-center to receive 10-24 x 3/8" low head steel socket head cap screws. Panel size, number of holes, and hole location are shown in specification drawing.

Core Panel Dimensions: Panel sizes include a 1 mm vertical adjustment gap for each vertical unit from top to bottom. Specified core panel width incorporates 1 mm gap between each 30 cm panel (example: core panel for 60 cm wide assembly is 60.1 cm). Vertical dimension of 60 cm core panels includes interior width of intermediate rail.

Standard core panel sizes accommodate all possible configurations using single panels or a combination of panels. Horizontally, the core is specified for the full width of the assembly. Vertically, assemblies may incorporate contiguous back panels or are made from individual panels (up to two units, or 60 cm in height), or a combination of single and double core panels to create the desired assembly configuration (up to 4 units high for 20 cm and 30 cm assembly modules). Assemblies that are taller than two 30 cm panels in height are assembled with intermediate double slot rail.

All reverse and forward angle assemblies are continuous panels and do not accommodate intermediate rails.

Vertical Sign Assemblies (0.125"): 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 31 cm	60.1 cm x 31 cm	90.2 cm x 31 cm	120.3 cm x 31 cm
2 panels (60 nominal)	30 cm x 63.157 cm	60.1 cm x 63.157 cm	90.2 cm x 63.157 cm	120.3 cm x 63.157 cm

Vertical Sign Assemblies (0.125"): 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel	45 cm x 46 cm

Vertical Sign Assemblies (0.125"): 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel	60.1 cm x 21 cm	80 cm x 21 cm

Street Name Sign Assemblies (0.125"): 20 cm Panels: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20)	60 cm x 21 cm	75 cm x 21 cm	90 cm x 21 cm

Fingerboard Sign Assemblies (0.125"): 20 cm Panels: H.2

Width x Height (cm)	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20)	80.1 cm x 21.1 cm

Reverse Angle Sign Assemblies (0.25"): 30 cm Panels for C.1-5

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 31 cm	60.1 cm x 31 cm	75.2 cm x 31 cm	90.2 cm x 31 cm
	105 cm wide	*120 cm wide*	*150 cm wide*	
	105.3 cm x 31 cm	120.3 cm x 31 cm	150.4 cm x 31 cm	

Reverse Angle Sign Assemblies (0.25"): 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 46 cm	60.1 cm x 46 cm	75.2 cm x 46 cm	90.2 cm x 46 cm
	105 cm wide	*120 cm wide*	*150 cm wide*	
	105.3 cm x 46 cm	120.3 cm x 46 cm	150.4 cm x 46 cm	

Reverse Angle Sign Assemblies (0.25"): 60 cm Panels for C.1-5

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	60.1 cm x 63.157 cm	75.2 cm x 63.157 cm	90.2 cm x 63.157 cm
	105 cm wide	*120 cm wide*	*150 cm wide*
	105.3 cm x 63.157	120.3 cm x 63.157 cm	150.4 cm x 63.157 cm

Narrow Profile Sign Assemblies (0.125"): 15 cm Panels for Reverse Angle D.1, Vertical E.1

Width x Height (cm)	*15 cm wide*	*30 cm wide*	*45 cm wide*
1 panel (30 nominal)	15 cm x 31 cm	30 cm x 31 cm	45 cm x 31 cm
	60 cm wide	*75 cm wide*	*90 cm wide*
	60.1 cm x 31cm	75.2 cm x 31 cm	90.3 cm x 31 cm

Narrow Profile Sign Assemblies (0.125"): 15 cm Panels for Campsite Identification Number Sign: Vertical E.1

Width x Height (cm)	*15 cm wide*
1 panel / Half high	15 cm x 15 cm

Accessory Panels (0.25") with machined dado along top and bottom of panel)

Width x Height (cm)	*15 cm wide*	*30 cm wide*	*60 cm wide*
Folder Holder	15 cm x 31 cm	30 cm x 31 cm	—
Campsite Permit Display	15 cm x 15 cm	—	—
Registration Display	—	30 cm x 31 cm	60.1 cm x 31 cm
Registration Cabinet	—	—	60.1 cm x 31 cm

Accessory Panels (0.125")

Width x Height (cm)	*15 cm wide*	*30 cm wide*	*60 cm wide*
Bulletin Cabinet (60 x 60)	—	—	60.1 cm x 63.157 cm
Bulletin Cabinet (60 x 90)	—	—	60.1 cm x 95.314 cm
Trash bag Dispenser (30 x 60)	—	30 cm x 63.157 cm	—

2.B FABRICATION: ALUMINUM RAIL AND RETAINER EXTRUSION

Rail Extrusion

Dual Channel (R/1): 1.25" dia. round extruded aluminum shape with top and bottom channel for core panel and sign panel engagement. Rail to be a perfectly symmetrical section with straight and parallel sidewalls in slots.

Single Channel (R/2): 1.25" dia. round extruded aluminum shape with single channel for core panel and sign panel engagement. Rail to be a perfectly symmetrical section with straight and parallel sidewalls in slots.

Retainer Bar Extrusion (R/3): 1.25" extruded aluminum half round shape. Retainer bar to be a perfectly symmetrical section with straight and parallel sidewalls in slots and continuous grooves in back to receive a number 8-32 x 0.375" flathead screw.

Wayside Exhibit Extrusion (R/4): 1.25" asymmetrical single face extruded aluminum section with extended section on back of extrusion for 1/4" plate core panel and continuous grooves in back to receive a number 10-24 x 0.375" low head screw.

Removable Face Extrusion (R/5): 1.25" dia. round extruded aluminum shape assembly with top and bottom channel, with removable front face for panel removal. Both assembly pieces to be a perfectly symmetrical section with continuous grooves in primary section to receive a number 10-24 x 0.375" screw through drilled and milled hole in front extrusion.

Accessory Extrusion (R/6): 1.25" wide, semicircular extruded aluminum shape with centered channel in top half and offset channel in bottom for accessory attachment.

Fabrication

Extrusion Tolerance: Extruded cross section to be within (+/−) 5/1000 of dimensions indicated on drawings.

Cutting Tolerance: Overall length of cut panel to be (+/−) 5/1000" of specified length.

Submissions: Contractor to submit samples of each extrusion with measurements of extrusion noted in red on a copy of the specification drawing prior to hardening die.

Rail Length: Extruded sections to be cut to the following lengths. Ends shall be milled smooth and be free of sawtooth or cutting burrs.

Vertical Sign Assemblies: A.1, A.5, J.1, and vertical section only for B.1, & B.2

Rail Lengths (30 cm widths)	*30 cm*	*45 cm*	*60 cm*	*80 cm**	*90 cm*	*120 cm*
Dual Channel (R/1)	30.4 cm	45.4 cm	60.5 cm	80.4 cm	90.6 cm	120.7 cm
Single Channel (R/2)	30.4 cm	45.4 cm	60.5 cm	80.4 cm	90.6 cm	120.7 cm
Retainer Bar: Dual Channel (R/3)	30 cm	45 cm	60.1 cm	80 cm	90.2 cm	120.3 cm
Removable Face: Dual Channel (R/5)	30.4 cm	45.4 cm	60.5 cm	80.4 cm	90.6 cm	120.7 cm
Accessory: Dual Channel (R/6)	30.4 cm	45.4 cm	60.5 cm	80.4 cm	90.6 cm	120.7 cm

* 80 cm width is used only in conjunction with small guide signs with 20 cm high panels

Narrow Profile Sign Assembly: Reverse angle D.1, Vertical E.1

Lengths (30 cm widths)	*15 cm*	*30 cm*	*45 cm*	*60 cm*	*75 cm*	*90 cm*
Dual Channel (R/1)	15.4 cm	—	—	—	—	—
Single Channel (R/2)	15.4 cm	—	—	—	—	—
Retainer Bar: Dual Channel (R/3)	15 cm	—	—	—	—	—
Reverse Angle: Single Channel (R/4)	15.4 cm	30.4 cm	45.4 cm	60.6 cm	75.2 cm	90.6 cm
Removable Face: Dual Channel (R/5)	15.4 cm	—	—	—	—	—
Accessory: Dual Channel (R/6)	15.4 cm	—	—	—	—	—

Forward Angle Sign Assemblies: lower section for B.1, & B.2

Lengths (30 cm widths)	*30 cm*	*45 cm*	*60 cm*	*90 cm*	*120 cm*
Reverse Angle: Single Channel (R/4)	30.4 cm	45.4 cm	60.5 cm	90.6 cm	120.7 cm

Reverse Angle Sign Assemblies: C.1-5

Lengths (30 cm widths)	*30 cm*	*60 cm*	*75 cm*	*90 cm*	*105 cm*	*120 cm*	*150 cm*
Reverse Angle: Single Channel (R/4)	30 cm	60.5 cm	75.6 cm	90.6 cm	105.7 cm	120.7 cm	150.8

Street Name Signs: H.1

Lengths	*60 cm*	*75 cm*	*90 cm*
Single Channel (R/2)	67 cm	82 cm	97 cm

Fingerboard Signs: H.2 (with custom 45 degree bevel on outside end)

Lengths	*80 cm*
Single Channel (R/2)	83 cm

Inline, Cluster & Tri-side Sign Assemblies: A.2, A.3, A.4

Lengths (30 cm widths)	*30 cm*	*45 cm*	*60 cm*	*90 cm*
Dual Channel (R/1)	30.4 cm	45.4 cm	60.5 cm	90.6 cm
Single Channel (R/2)	30.4 cm	45.4 cm	60.5 cm	90.6 cm
Retainer Bar: Dual Channel (R/3)	30 cm	45 cm	60.1 cm	90.2 cm
Removable Face: Dual Channel (R/5)	30.4 cm	45.4 cm	60.5 cm	90.6 cm

Machining: Drill and tap both ends of rail section a minimum of 1.125" depth to accommodate a full 1" embedment of a 1/4-20 stainless steel socket head cap bolt. Holes and 1/4-20 tap to be precisely centered in end of extrusion. Location of holes and 1/4-20 tap in accessory extrusion and reverse angle extrusion to be as shown in drawings. Tapped thread in each end of extrusion to receive 60 degree countersink with 5/32" diameter maximum for positive engagement of cap bolt. Remove any metal chips created in tapping process.

Surface: Material surface to be smooth and free of scratches or other imperfections from extrusion or machining.

Finish: Extruded and machined shape to be anodized and finished with Type 2: black anodized finish.

Packaging for Shipping: Extruded shapes to be packaged to protect the finish of the pieces in transit.

Nonstandard Configurations Fingerboard Assembly: Single channel extrusion machined for fingerboard assembly to receive 235 degree mitered end with slot facing up for bottom rail and slot facing down for top rail. Measure overall length (83 cm) from outboard end after miter.

Hole for Tension Rod in Rail–Fingerboard and Street Name Assembly: Place 0.3125" dia. x 0.3125" deep hole in rail for tension rod. Orient hole for vertical placement of tension rod through assembly, with hole located precisely 19/32" from inboard end of rail.

2.C FABRICATION: TUBULAR STEEL POSTS FOR DIRECT EMBEDMENT & BASEPLATE MOUNT (A.1-4, C.1-4)

Materials: Two types of steel tubing are specified. These include:

Weathering Steel (TS-W): Tubular section weathering steel (A-847) with 1/8" wall, in section sizes: 2" x 2", and 3" x 2". Note: at the election of the contractor, A-847 material can be galvanized in-lieu of A-500-B material.

Tubular Steel (TS-GS: Tubular section steel (A-500-B) with 1/8" wall, in section sizes: 2" x 2", and 3" x 2" for galvanized structures

Metal Finishing: All posts to be cut square. Finish to be free of edge burrs or sawtooth on cut edge. Fabricated posts to be degreased and sandblasted with copper slag abrasive to create an even finish throughout.

Galvanized (TS-GS): Tubular steel to be hot dipped galvanized after fabrication

Drilling Frame Assembly Holes for Rail Attachment: Drill 0.28125" holes through both sides of tube (2" face) at each attachment location noted on drawings. Expand 0.28125" holes on one side to 0.625" diameter for cap screw access and to accept outside hole plug. If uprights are fabricated forward angle or reverse angle format, expanded holes are to be placed on outside face with one left version and one right version. Post length to be as specified. Measure drill locations for attaching rails from the top of the tube, and drill all holes based on the dimensions from top. These holes begin 1.9 cm from the top of the tubular section; drilling tolerance between holes is (+/–) 5/1000 with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole.

Weld Specifications for Joining Tubular Sections for Forward Angle, Reverse Angle and Sled Base Assemblies: Reverse and forward angle assemblies to be fabricated with full penetration weld using welding rod compatible with the (A-847 or A-500-B) alloy tube (depending on tube used for assembly). Finished weld to be ground smooth. All finished sections to have matching angle with no more than (+/–) 3 mm variation at top of panel when vertical sections are aligned.

2.C-A Tubular Steel Posts for Direct Embedment Assemblies

Steel Stabilizer Plate: From the base of the post section, drill three 7/16" holes through both walls, front to back of the 3" face, for attachment of 1/4" x 24" x 10" steel plate to stabilize embedded post for 3/8" bolt. Stabilizer to be attached on 3" face with corresponding holes drilled in the stabilizer blade.

Paint Finish: The sandblasted and degreased surface to receive two coats of premium alkyd metal primer covering the bottom 95 cm of the post. Protect section of post above the 95 cm line to prevent paint splatter on the surfaces to remain uncoated.

Length of Tubular Steel Post for Direct Embedment: Length is determined by the number of panels, the standard height to the base, and standard 90 cm embedment. Width of post is determined by assembly width and mounting configuration. The code for the type of material is: TS–WS for weathering steel and TS–GS for galvanized steel Each post is specified by mounting assembly type (A.1, Vertical Assembly), the length, and type of mounting (E, embedment) type of post (2/3-2) and number of panels.

A.1 Vertical Assembly, Direct Embedment

Sign Post	*Tube Size*	*Code based on length, tube dimensions and number of panels*			
Height (no. of panels)		*1 high*	*2 high*	*3 high*	*4 high*
A.1 (30 cm basis)	2" x 2" x 1/8"	A.1-214-E (2/2-1)	A.1-246-E (2/2-2)	A.1-279-E (2/2-3)	A.1-279-E (2/2-4)
A.1 (30 cm basis)	2" x 3" x 1/8"	A.1-214-E (2/3-1)	A.1-246-E (2/3-2)	A.1-279-E (2/3-3)	A.1-279-E (2/3-4)
A.1 (45 cm basis)	2" x 3" x 1/8"	A.1-229-E (2/3-1b)	A.1-276-E (2/3-2b)	—	—
A.1 (20 cm basis)	2" x 2" x 1/8"	A.1-189-E (2/2-1)	A.1-211-E (2/2-2)	A.1-234-E (2/2-3)	A.1-256-E (2/2-4)

B.1 Forward Angle Assembly, Direct Embedment

Sign Post	*Tube Size*	*Code based on length, tube dimensions and number of panels*	
Height (no. of panels)		*1 high*	*2 high*
B.1 (30 cm basis)	2" x 3" x 1/8"	B.1-234-E (2/3-1/SF)	B.1-266-E (2/3-2/SF)
B.1 (30 cm basis)	2" x 3" x 1/8"	B.1-234-E (2/3-1/DF)	B.1-266-E (2/3-2/DF)

C.1 Reverse Angle Assembly, Direct Embedment

Sign Post	*Tube Size*	*Code based on length of reverse angle*
Height (no. of panels)		
C.1 (30 cm basis)	2" x 3" x 1/8"	C.1-204-E (2/3-30)
C.1 (45 cm basis)	2" x 3" x 1/8"	C.1-219-E (2/3-45)
C.1 (60 cm basis)	2" x 3" x 1/8"	C.1-236-E (2/3-60)

C.4 Reverse Angle Assembly, Deck Mount

Sign Post	*Tube Size*	*Code based on length of reverse angle*
Height (no. of panels)		
C.4 (30 cm basis)	2" x 3" x 1/8"	C.4-204-E (2/3-30)
C.4 (45 cm basis)	2" x 3" x 1/8"	C.4-219-E (2/3-45)
C.4 (60 cm basis)	2" x 3" x 1/8"	C.4-236-F (2/3-60)

F.1 Single Post Assembly, Narrow Profile, Direct Embedment

Sign Post	*Tube Size*	*Code based on height (number of panels)*	
Height (no. of panels)		*1 high*	*2 high*
F.1 (30 cm basis)	2" x 2" x 1/8"	F.1-190-E (2/2)	F.1-196-E (2/2)

C-B Tubular Steel Posts with Baseplates for Bolt Mounted Assemblies

General: Baseplate mounting designed for surface mounting baseplate on paved surfaces, on subsurface bedrock, or bolting to cast in place footing with "J" bolt or anchored threaded rod.

Material for Weathering Steel: Tubular section weathering steel (A-847) in section sizes: 2" x 2" x 1/8", and 3" x 2" x 1/8", with 5" x 5" x 3/8" A-847 weathering steel baseplate welded to bottom of tubular section

Material for Galvanized or Painted Steel: Tubular section steel (A-500 B) in section sizes: 2" x 2" x 1/8", and 3" x 2" x 1/8", with 5" x 5" x 3/8" A-36 steel baseplate welded to bottom of

tubular section. Note that A-847 material can also be used for galvanized and painted assemblies.

Baseplate Fabrication: Place (4) 7/16" dia. holes, one in each corner of plate, 0.75" from edges, 0.75" center drain hole as per fabrication drawing as noted in baseplate drawings. Note: Most applications use a 5" x 5" baseplate. Wall–mounted assemblies as well as in-line, cluster, and tri-side assemblies have unique baseplate dimensions.

Baseplate (5" x 5" x 3/8", or unique sizes for A.2-4, and C.2,) and base of tubular steel upright to be fabricated with full penetration weld on all four (4) sides using welding rod compatible with tube alloy. Sled base assembly to be fabricated with full tubular return. (see drawing 4.2-89) Welded location of upright to baseplate to be within (+/–) 10/1,000 of specified location on drawings. Welded uprights to be set exactly 90 degrees perpendicular to surface of the baseplate.

Mounting Configuration: The standard post length dimensions shown allow for the bottom of the baseplate to be placed at grade, or up to 5 cm (approximately 2") below grade. Once mounting height is determined, the top of the footing to be 2.5 cm below the bottom of the baseplate. For mounts below grade, this will allow for full coverage of bolt assembly when area restored to existing grade.

Fabricated Steel Posts for Inline, Cluster, and Tri-side Assemblies: Center sections of fabricated posts to allow access to interior section of post for attaching rails, with fabricated faceplate to cover interior section.

Inline Assemblies, A.2 Place 0.28125" holes through both sides of tube (2" face) at each rail attachment location noted on drawings. Measure drill locations for attaching rails from the top of the tube and drill all holes, center-to-center based on the dimensions from top for consistency. These holes begin 1.9 cm from the top of the tubular section; drilling tolerance between holes is (+/–) 5/1000 with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole.
Mechanically cut full length center section, 2.125" wide from one side of post on 3" dimension, with outside dimension of section not to exceed 2.25" wide once post is adjusted for expansion. Removed section of tube to be used as fabricated post cover, or replaced with section of 0.125" plate of the same alloy. Cut tube to be straight and the outside (2" wide face) ends to be made parallel and aligned 90 degrees to the front and back of post. Following cutting, edges and face of tube to be smooth and free of burrs and cutting marks from top to bottom. Tack weld 10-24 x 0.75" coupling nut to inside of post. Place coupling nuts 18" on center over full length of post beginning with first attachment placed 3" from top of post. Drill corresponding 0.28125" holes through 2.125" wide faceplate for attachment of panel to post assembly.

To properly seat faceplate, fabricate brake formed 0.5" x 1.25" clip angle with corresponding 0.28125" holes in long leg to rail attachment points on post. Angle to extend the full length (less 1 cm top and bottom: 186 cm) of the post. Reveal between post and cover to be no less than 0.625" on each side with total gap to not exceed 0.1875" for finished assembly.

Fabricate and weld 5" x 5" x 0.375" baseplate to base of post (2" x 3" x 3/8") with full penetration weld on all four (4) sides using welding rod compatible with tube alloy.

Cluster Base Assemblies, A.3 Place 0.28125" holes through both sides of tube (2" face) at each rail attachment location noted on drawings. Measure drill locations for attaching rails from the top of the tube and drill all holes, center-to-center based on the dimensions from top for consistency. These holes begin 1.9 cm from the top of the tubular section; drilling tolerance between holes is (+/–) .5/1000 with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole.

Mechanically cut full length center section 4.5" wide from one side of post on 6" dimension. Removed 4.5" section of tube to be used as fabricated post cover (or replaced with section of 0.125" plate of the same alloy). Brake form post to 135 degree angle on the center line of the 6" back face. Brake formed section to be straight and the outside (2" wide face) ends be made parallel and aligned 90 degrees to the front and back of post. Following cutting, edges and face of tube to be smooth and free of burrs and cutting marks from top to bottom. Tack weld 10-24 x 0.75" coupling nut to inside of post at locations 1.5" from 2" end on each side of brake formed section. Vertically align coupling nuts 18" on center over full length of post beginning with first attachment placed 3" from top of post.

Fabricate 2.5625" x 0.125" faceplate from section removed from 2" x 6" tube. Brake form the full length of the plate to match 135° degree angle of post section. Drill matching 0.28125" holes (each side) through brake formed faceplate for attachment of panel to post assembly.

To properly seat face plate, fabricate brake formed 1" x 1.25" clip angle with corresponding 0.28125" holes in long leg to rail attachment points on post. Clip angle to extend for the full length (less 1 cm top and bottom: 186 cm) of the post. Attach clip angle with rail attachment. Reveal between post and faceplate to be no less than 0.625" on each side and with total gap from both sides to not exceed 0.1875" for finished assembly.
Fabricate and weld 0.375" baseplate to base of post with full penetration weld on all four (4) sides using welding rod compatible with tube and baseplate alloy.

Tri-side Assemblies, A.4 Place 0.28125" holes in back of tube (6" face) at each rail attachment location noted on drawings (10 holes). Holes are to placed 1.5" from 2" end and placed on both sides of back face of tube. Measure drill locations for attaching rails from the top of the tube and drill all holes, center-to-center based on the dimensions from top for consis-

tency. These holes begin 1.9 cm from the top of the tubular section; drilling tolerance between holes is (+/–) 5/1000 with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole.

Place 0.1875" holes on sides of each 2" face for rivet attachment of interior clip angle. Holes to be placed 18" on center with first hole placed 3" from top of post. Mechanically cut full length center section 4.5" wide from one side of post on 6" dimension. Removed 4.5" section of tube to be used as fabricated post cover (or replaced with section of 0.125" plate of the same alloy). Brake form post to 120 degree angle on the center line of the 6" back face. Brake formed section to be straight and the outside (2" wide face) ends be made parallel and aligned 90 degrees to the front and back of post. Following cutting, edges and face of tube to be smooth and free of burrs and cutting marks from top to bottom. Tack weld 10-24 x 0.75" coupling nut to inside of post at locations 1.5" from 2" end on each side of brake formed section. Vertically align coupling nuts 18" on center over full length of post beginning with first attachment placed 3" from top of post.

Fabricate 2.140" x 0.125" faceplate from section removed from 2" x 6" tube and brake form the full length of the plate to match 120 degree angle of post section. Drill matching 0.185" holes (each side) through brake formed faceplate for attachment of panel to post assembly.

To properly seat face plate, fabricate brake formed 1" x 1.25" clip angle with corresponding 0.1875" holes in long leg to rivet clip angle to inside of post. Clip angle to extend for the full length (less 1 cm top and bottom: 186 cm) of the post. Reveal between post and faceplate to be no less than 0.625" on each side and with total gap from both sides not to exceed 0.1875" for finished assembly.

Fabricate and weld 0.375" baseplate to base of post with full penetration weld on all four (4) sides using welding rod compatible with tube and baseplate alloy.

Length of Tubular Steel Post with Baseplate for Bolt–Mounted Assemblies: Length is determined by the number of panels, the standard height to the base. Width of post is determined by assembly width and mounting configuration. The code for the type of material is:

A.1 Vertical Assembly, Baseplate Mount

Sign Post	*Tube Size*	*Code based on length, tube dimensions, and number of panels*			
Height (no. of panels)		*1 high*	*2 high*	*3 high*	*4 high*
A.1 (30 cm basis)	2" x 2" x 1/8"	A.1-125-B (2/2-1)	A.1-157-B (2/2-2)	A.1-159-B (2/2-3)	A.1-159-B (2/2-4)
A.1 (30 cm basis)	2" x 3" x 1/8"	A.1-125-B (2/3-1)	A.1-157-B (2/3-2)	A.1-189-B (2/3-3)	A.1-189-B (2/3-4)
A.1 (45 cm basis)	2" x 3" x 1/8"	A.1-139-B (2/3-1b)	A.1-186-B (2/3-2b)	—	—
A.1 (20 cm basis)	2" x 2" x 1/8"	A.1-100-B (2/2-1)	A.1-122-B (2/2-2)	A.1-144-B (2/2-3)	A.1-166-B (2/2-4)

B.1 Forward Angle Assembly, Baseplate Mount

Sign Post	*Tube Size*	*Code based on height (number of panels)*	
Height (no. of panels)		*1 high*	*2 high*
B.1-(30 cm basis)	2" x 3" x 1/8"	B.1-144-B (2/3-1/SF)	B.1-176-B (2/3-2/SF)
B.1-(30 cm basis)	2" x 3" x 1/8"	B.1-144-B (2/3-1/DF)	B.1-176-B (2/3-2/DF)

A.3–5 In-line, Cluster, Tri-side, Baseplate Mount

Sign Post	*Tube Size*	*Code based on the length of the reverse angle*
Height (no. of panels)		*4 high*
A.2 (30 cm basis)	2" x 3" x 1/8"	A.2-188-B (2/3-CNT)
A.2 (30 cm basis)	2" x 3" x 1/8"	A.2-188-B (2/3-END)
A.3(30 cm basis)	2" x 6" x 1/8"	A.3-188-B (2/6-MID)
A.4 (30 cm basis)	2" x 6" x 1/8"	A.4-188-B (2/6-TRI)

C.1 Reverse Angle Assembly, Baseplate Mount (also used for C.4, Deck–Mounted assemblies)

Sign Post	*Tube Size*	*Code based on height (number of panels)*
Height (no. of panels)		
C.1 (30 cm basis)	2" x 3" x 1/8"	C.1-114-B (2/3-30)
C.1 (45 cm basis)	2" x 3" x 1/8"	C.1-129-B (2/3-45)
C.1 (60 cm basis)	2" x 3" x 1/8"	C.1-146-B (2/3-60)

C.2 Reverse Angle Assembly, Wall Cap Mount

Sign Post	*Tube Size*	*Code based on height (number of panels)*
Height (no. of panels)		
C.2 (30 cm basis)	2" x 3"x 1/8"	C.2-49-W (2/3-30)
C.2 (45 cm basis)	2" x 3"x 1/8"	C.2-64-W (2/3-45)
C.2 (60 cm basis)	2" x 3"x 1/8"	C.2-79-W (2/3-60)

F.1 Single Post Assembly, Narrow Profile, Baseplate Mount

Sign Post	*Tube Size*	*Code based on height (number of panels)*	
Height (no. of panels)		*1 high*	*2 high*
F.1 (30 cm basis)	2" x 2" x 1/8"	F.1-100-B (2/2)	F.1-106-B (2/2)

C.3 Reverse Angle Assembly, Sled Mount

Sign Post	*Tube Size*	*Code based on height (number of panels)*
Height (no. of panels)		
C.3 (45 cm basis)	2" x 3" x 1/8"	C.3-178-S (2/3-45)

TS–WS for Weathering steel and TS–GS forA500B steel to be hot dipped galvanized. Each post is specified by mounting assembly type (A.1, Vertical Assembly), the length, and type of mounting (B, baseplate), type of post and number of panel modules (2/3-2).

2.D FABRICATED STEEL, FLAT BAR STOCK UPRIGHTS FOR NARROW PROFILE ASSEMBLIES (D.1, E.1)

Materials: One type of steel flat bar stock is specified for uncoated, painted or galvanized finishing.

Flat Bar Stock (FB-WS): 0.5" x 2" flat bar stock steel for upright reverse angle assemblies, (A-36) alloy.

An alternative to flat bar stock for reverse angle assemblies is the use 0.5" plate material, with reverse angle upright water-jet cut into single piece in lieu of miter and weld fabrication.

Machine Top of Post: Top of flat bar section to be machined with semicircular shape. Edge of semi-circle shaped machined top to have 0.625" radius on edge of machined work to smooth overall top of post. Edge shall be free of any sharp burrs. (see drawing page 4.2-97)

Drill and Countersink holes for Bar Stock Post for Rail Attachment: Place 0.28125" holes through 2" face of bar stock at each specified rail attachment location noted on drawings. Countersink all holes placed for rail attachment to accept 1/4-20 x 1" flathead spanner screws. Measure drill locations from the top of the bar stock post and drill all holes, measured from top down for consistency, with first hole placed 1.9 cm from the top of the flat bar section. Note: E.1 assembly may include an intermediate rail within 30 cm basis for placement of two (2) 15 cm x 14 cm panels. Drilling and hole location tolerance between holes are (+/−) 5/1000, with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole.

Drill Holes for Bar Stock Post for Stabilizer Blade: If the post is to be mounted by direct embedment, place three (3) 0.4375" holes at the specified location in lower section of leg for attachment of 3" x 3" angle stabilizer.

Welded Reverse Angle Post: Reverse angle assemblies to be fabricated bar stock mitered and welded with full penetration weld using welding rod compatible with the (A-36 or 316L) alloy tube as appropriate. Finished weld to be ground smooth. All finished sections to have matching angle with no more than (+/−) 3 mm variation at top of panel when vertical sections are aligned.

Welded Baseplate: Baseplate and bottom of post (5" x 5" x 3/8", or 5" x 9" x 3/8") to be fabricated with full penetration weld on all four (4) sides using welding rod compatible with alloy of flat bar and baseplate assembly. Welded location of upright to baseplate to be within (+/−) 10/1000 of specified location on drawings. Welded uprights to be set exactly 90 degrees perpendicular to surface of the base-plate.

Length for Flat Bar Stock Posts Mounted by Direct Embedment: Length is determined by the number of panels, the standard height to the base, and standard 90 cm embedment. The code for the type of material is: FB–HR for (A-36) hot rolled steel and FB–GS for galvanized steel assemblies Each post is specified by mounting assembly type (D.1, Narrow Profile Reverse Angle Assembly, and E.1, Narrow Profile Vertical Assembly), the length, and type of mounting (E, embedment).

D.1, E.1: Flat Bar Post, Narrow Profile, Direct Embedment

Sign Post	*Bar Size*	*Code based on height (number of panels)*	
Height (no. of panels)		*1 high*	*2 high*
D.1 (30 cm basis)	0.5" x 2"	D.1-156-E	
E.1	–	E.1-200-E*	E.1-217-E

Length of Flat Bar Stock Posts with Baseplate for Bolt–Mounted Assemblies: Length is determined by the number of panels and the standard height to the base. The code for the type of material is: FB–HR for (A-36) hot rolled steel and FB–GS for galvanized steel assemblies. Each post is specified by mounting assembly type (D.1, Narrow Profile Reverse Angle Assembly, and E.1, Narrow Profile Vertical Assembly), the length, and type of mounting (B, baseplate).

D.1, E.1: Flat Bar Post, Narrow Profile, Baseplate Mount

Sign Post	*Bar Size*	*Code based on height (number of panels)*	
Height (no. of panels)		*1 high*	*2 high*
D.1 (30 cm basis)	0.5" x 2"	D.1-65-B	
E.1	–	E.1-110-B*	E.1-127-B

* May include one 15 cm x 30 cm panel or two 15 cm x 14 cm panels with intermediate rail.

Metal Finishing: All posts to be cut to precise length specified. Finish to be free of edge burrs or sawtooth on cut edge. Fabricated bar stock posts to be degreased and sandblasted using copper slag abrasive to create even finish over entire part.

Galvanized Finish: If specified in order as with code (GS), steel assemblies to be hot dipped galvanized after fabrication.

Paint Bottom for Embedment: The sandblasted and degreased surface to receive two coats of premium alkyd metal primer covering the bottom 95 cm of the post that will be embedded. Protect section of uncoated surfaces above the 95 cm line to prevent paint splatter.

2.E FABRICATION: MACHINED POST CAP (MC)

Material: Cap for tubular steel posts to be machined from solid metal block. Caps for weathering steel posts to be machined from steel, (A-847) steel. Caps for steel assemblies to be galvanized or painted shall be machined from (A-36) alloy material.

Size and Shape: Cap to be machined to match attached drawings. Finished caps to have a very snug interior fit into the specified post when inserted with a hard rubber mallet. Radius of machined cap to be flush to edge of corner radius based on average of the radius of the four corners. Mill 1.5 mm deep slot with 1 cm fronting edge of cap for tool access to allow removal if necessary.

Fabricated Steel Machined Post Cap

Sign Post	*Code*			*Application*
	Weathering Stl.	Galvanized Stl	Painted Stl	
2" x 2"	C.MC-W2/2	C.MC-G2/2	C.MC-P2/2	A.1
2" x 3"	C.MC-W2/3	C.MC-G2/3	C.MC-P2/3	A.1, A.2, B.1, C.1
2" x 6" with 45^{o} angle	C.MC-W45	C.MC-G45	C.MC-P45	A.3
2" x 6" with 60^{o} angle	C.MC-W60	C.MC-G60	C.MC-P60	A.4

Finishing: All exterior surfaces to be machined to 200 micro inches with exterior edge flush to side walls of tubular uprights.

Following fabrication, lightly sandblast to match post surface into which it is being placed.

Assembly: Machined caps are to be inserted into posts prior to shipment.

2.F POLYETHYLENE, SELF CAPTURE HOLE PLUG

Material: Cast black polyethylene self capture hole plug (Polymer Molding Inc.)

Size and Shape: Cast cap to be inserted flush to face of steel tube with 0.625" diameter self-capture shaft, with satin finish from mold.

Fabricated Steel Machined Post Cap

Diameter	*Code*
0.625"	C.PC

Finishing: Exterior molding seams to be free of flash at parting line.

2.G FABRICATED STEM FOR BASE PLATE MOUNT WITHOUT "J"–BOLT FOOTING

Material:

- 1.25" x 18", schedule 80 316L stainless steel pipe for stem baseplate.
- 3/8" x 5" x 5" stainless steel (ASTM-316L) for stem baseplate
- 3/8"-16 x 2" stainless steel threaded rod (18-8) with 316 stainless steel acorn nut and companion washer for attachment of baseplate to mounting stem
- 3/8"-16 stainless steel (18-8) heavy hex nut welded to bottom of stem footing baseplate for mounting bolt attachment
- 3/8"-16 x 8" zinc plated hex head machine bolt with galvanized washer and offset washers for through bolt assembly on stem footing for anchorage in concrete

Fabrication: Drill 0.4375" hole through stem at location noted on drawing. Machine 5" x 5" x 0.375" stainless steel baseplate with radius corners. Place four (4) 0.5" dia. holes as specified in drawing. Weld 18" stem with full penetration weld (all around) in center of baseplate. Stem to be perpendicular to baseplate. Tack weld 0.375" nuts over drill holes on same side as stem mount. Nuts to be welded flush to baseplate surface.

Fabricated Stainless Steel Stem Footing (two per assembly)	
Diameter	*Code*
5" x 5" with 1.25" dia. stem	C.SF

Finish: Remove all sharp edges and burrs from cutting and drilling of parts.

2.H FABRICATION: ALUMINUM ANGLE SIDE RAILS FOR WALL MOUNT APPLICATIONS (J.1)

Material: 6061-T6 Extruded Aluminum Angle, 1.75" x 1.75" x 0.25"

Wall Mount Sign Sizes:	**Angle lengths to be cut to the following sizes (two per assembly)**
1 – 30 cm panel high	36 cm
1 – 45 cm panel high	51 cm
2 – 30 cm panels high	68.1 cm
3 – 30 cm panels high	100.3 cm
4 – 30 cm panels high	132.4 cm

Wall Mount Sign Fabrication: Machine 0.75" radius, top and bottom on out-side face of angle. Drill two (2) 0.3125" holes in back face for wall attachment. Drill and countersink 0.25" holes for 1/4–20 flathead spanner screws in outside face for rail attachment. Holes for rail attachment are to be 32.157 cm center-to-center as shown in the fabrication drawing.

Tolerances: Angle frame and placement of holes to be fabricated to within 5/1000" of specified size and location.

Surface: Material surface to be smooth and free of scratches or other imperfections from extrusion or machining and finishing.

Finish: Machined angle section to be anodized with Type 2: black anodized finish.

Assembly: Mechanically attach angle to rail section with stainless steel 1/4-20 x 1" flathead spanner screw.

Packaging for Shipping: Angle frames to be packaged to protect the finish of the pieces in transit.

2.I STABILIZER BLADES FOR TUBULAR STEEL SIGN POSTS MOUNTED BY DIRECT EMBEDMENT (A.1, B.1, C.1)

A flat steel panel is mounted to embedded section of tubular steel uprights to restrict removal and reduce lateral movement or loosening of sign in its mount.

Material: 0.25" x 10" x 24" steel plate (A-36) to stabilize embedment of tubular steel uprights

Fabricated Steel Stabilizer Blades (two per assembly)

Size	*Code*
0.25" x 10" x 24"	C.SB

Fabrication: Place three (3) 0.4375" vertically centered holes in plate at locations specified in drawing.

Finish: Remove all sharp edges and burrs from cutting and drilling of parts. Clean metal and paint with two heavy coats of alkyd based metal primer.

Assembly: Attach one stabilizer blade to each post of two post assemblies, or one blade to the narrow profile sign using a single post.

2.J STABILIZER BLADES FOR FLAT BAR STOCK STEEL SIGN POSTS MOUNTED BY DIRECT EMBEDMENT (D.1, E.1)

A steel angle section is mounted to flat bar stock uprights to restrict removal and to reduce lateral movement or loosening of sign in its mount.

Material: 3" x 3" x 3/16" x 24" steel angle (A-36) to stabilize embedment of narrow profile signs with 0.5" x 2" bar stock uprights

Fabricated Steel Angle Stabilizer Blades (two per assembly)

Size	*Code*
3" x 3" x 3/16" x 24"	C.SA

Fabrication: Place three (3) 0.4375" vertically centered holes in one of the angle faces at locations specified in drawing.

Finish: Remove all sharp edges and burrs from cutting and drilling of parts. Clean metal and paint with two heavy coats of alkyd based metal primer.

Assembly: Attach one stabilizer blade to each post of narrow profile two post assemblies that are 15 cm wide, or two (2) to each post in opposite facing direction of any assembly wider than 15 cm.

2.K METAL PREPARATION AND PAINT COATING FOR NONSTANDARD ENVIRONMENTAL CONDITIONS

Painting: Steel posts are to be primed and painted when sign posts are specified for environmental conditions not recommended for unprotected weathering steel. These include very dry climates that will not provide sufficient moisture to allow the steel to develop a fully oxidized surface, heavily salinated coastal environments, or locations that are always wet and do not allow the steel to dry.

Reference: Matthews Paint Co. (1800-323-6593) 8201 100th Street, Pleasant Prairie, WI 53158

VOC Alternate: Matthews MAP-VOC (low volatile organic compound acrylic polyurethane) is available for use where VOC compliance is required.

Metal Preparation: Metal to be fully sandblasted with copper slag abrasive to remove all mill slag, surface rust, and dirt. All surfaces to be coated should be free of oil, grease, soil, weld slag, weld splatter, or other contaminants. Surfaces to be dry before application of primer.

Tack wipe or remove sandblast residue or dust prior to applying pretreatment and priming.

Metal Pretreatment: Apply Matthews Acid Activated PT Filler (74760/74766) to provide superior bonding of primer and finish coat to clean bare metal. Mix with specified activator and per manufacturer's specification to 0.5 to 0.75 mils dry film thickness. Primer can be applied after 30 minutes, or when tack free.

Primer: Matthews Rust Inhibiting White Epoxy Primer (274908) with Matthews Activator (274909) and Reducer (285900) to be mixed with specified hardener and applied per manufacturer's specification to 1.5 to 3 mils dry film thickness (3 to 6 mils wet film thickness).

Finish Coat: Spray two (2) coats Matthews Acrylic Polyurethane (MAP) enamel, satin gloss finish (No. 26A-1A) mixed with MAP Catalyst and appropriate reducers depending on temperature and humidity per Matthews specification. Finish coat to be 1.5 to 2 mils dry film thickness (3 to 4 mils wet film thickness). Finish coat can be applied over Rust Inhibiting White Epoxy Primer within 30-60 min., or when dry to the touch. If finish coat is applied over 48 hrs. after primer application, surface to be lightly broken with 400 grit sandpaper.

Field Touch-up: Matthews Acrylic Polyurethane can be brush or roller applied. For good workability and finished surface quality use Matthews Brushing/Rolling Additive (no. 47-444SP). Color tolerance for match shall be 1 unit or less CMC.

Packaging for shipping: Painted posts must be fully protected prior to shipping to eliminate scratches or other surface abrasion in transit.

2.L FABRICATION: DOUBLE AND SINGLE POST SIGNS WITH WOOD POSTS (A.5, B.2, C.5, H.1, H.2)

Material: Fabricated solid (one piece) post using No. 1 Select Structural Grade Western Red Cedar. Material shall be well seasoned, free of any surface defects. Wood must be dry, with maximum moisture content not to exceed 12% during fabrication of assembly to maintain tolerances between component parts.

Upright Lumber Dimensions: Finished dimension is 3.5" x 3.5" from nominal 4" x 4" material and 5.5" x 5.5" for 6" x 6" material

Milling Post Crown: Top of cedar post and ends of reverse angle and forward angle assemblies to be milled with an arc shape as shown in drawing on page 4.2-140.

Length of Post: Cedar post and extension pieces for reverse and forward angle assemblies

to be precisely cut to length specified. Sections of the attached forward angle and reverse angle parts to be mitered and sized precisely as specified.

Drilling, Double Post Assembly and for All Baseplates: Place holes through post for rail attachment as specified on drawings. Measure drill locations for attaching rails from the top of the post (crown of radius) and drill all holes based on the dimensions from top. Drilling tolerance between holes is (+/–) 5/1000 with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole. All holes drilled through the timber sections to have common location on both sides of finished post and to be straight and true. Interior wood sign frame to be shop drilled for:

- 0.3125" dia. holes in side of post for through bolt attachment of rail, and bottom connection point on upright of forward angle
- 0.09375"x 1.5" pilot holes in post to receive wood screws to secure retainer straps to post
- 0.4375" dia. holes (2–front-to-back, and 2–side-to-side) for through bolt connection to baseplate tang at bottom of post. Note that lower hole on front face is 2" on-center from the bottom of the upright, and the lower side hole is 4.5" from the bottom of the upright with second hole placed 5" on center above the first hole.

Drilling, Street Name Signs (H.1): Place 0.3125" dia. holes in side of post for through bolt attachment of rail. Maintain stagger of holes from adjacent sides as specified with top hole placed on side of milled crown. Counterbore 1.25" dia. hole with flat bottom drill that is 2.75" deep for inserting end of single channel rail.

Drilling, Fingerboard Signs (H.2): Although each assembly will accommodate up to eight (8) sign panels, with two on each side, attachment holes are to be placed in holes on a site specific basis for the configuration of each individual assembly. Mounting holes are to be vertically staggered from adjacent sides and placed laterally off-center to allow attachment of panels on opposing sides. Place 0.3125" dia. holes in side of post for through bolt attachment of rail. Maintain stagger of holes from adjacent directions as specified with top hole placed on side of milled crown. Counterbore 1.25" diameter hole with flat bottom drill that is 2.75" deep for inserting end of single channel rail.

Machine Dado for Rail Attachment Straps: Machine 0.25" x 2.0625" wide dado for inset of 2" retainer strap on inside and outside of posts (small hole side only for street name signs and fingerboard signs). Top of dado to incorporate 4" radius of retainer strap. Bottom of dado to be flat with straight sidewalls and 90 degree corners at bottom of dado. Abutting connection point of dado for forward angle or reverse angle to align precisely for uniform attachment of retainer strap. Location and dimensions of dado to match fabrication drawings precisely.

Machine Dado for Baseplate Mounting Straps: Machine 0.25" x 2.0625" wide dado at bottom of post on sides, front, and back face. Top of dado to extend 2" beyond top 12" of base-

plate strap and feather out to front face of post to create smooth inset sleeve for inserting shims should they be required due to future post shrinkage.

Machine Dado for Tension Bar for Fingerboard and Street Name Signs: Place 0.3125" wide by 0.3125" deep dado between counterbored holes for tension rod used to secure rail attachment bolt.

Post length: The length of the post is based on the height of the panel assembly inserted into the assembly. Based on these format dimensions, there is a standard mounting height and post length for each assembly configuration. Post lengths are specified in the fabrication drawings.

A.1 Vertical Assembly, Baseplate Mount

Sign Post	*Post Size*	*Post length based mounting height and height of panel assembly (CM)*			
Height (no. of panels)		*1 high*	*2 high*	*3 high*	*4 high*
A.5 (20 cm basis)	4" x 4" (3.5" x 3.5")	A.5-100-B (4/4-1)	A.5-122-B (4/4-2)	A.5-146-B (4/4-3)	A.5-168-B (4/4-4)
A.5 (30 cm basis)	4" x 4" (3.5" x 3.5")	A.5-124-B (4/4-1)	A.5-156-B (4/4-2)	A.5-190-B (4/4-3)	A.5-190-B (4/4-4)
A.5 (45 cm basis)	4" x 4" (3.5" x 3.5")	A.5-141-B (4/4-1b)	A.5-188-B (4/4-2b)	—	—
A.5 (30 cm basis)	6" x 6" (5.5" x 5.5")	A.5-124-B (6/6-1)	A.5-156-B (6/6-2)	A.5-190-B (6/6-3)	A.5-190-B (6/6-4)
A.5 (30 cm basis)	6" x 6" (5.5" x 5.5")	A.5-335-B (6/6-1)	—	—	—

B.2 Forward Angle Assembly, Baseplate Mount

Sign Post	*Post Size*	*Post length based mounting height and height of panel assembly (CM)*	
Height (no. of panels)		*1 high*	*2 high*
B.2 (30 cm basis)	4" x 4" (3.5" x 3.5")	B.2-147-B (4/4-1)	B.2 -180-B (4/4-2)
B.2 (45 cm basis)	4" x 4" (3.5" x 3.5")	B.2 -162-B (4/4-1)	—

C.5 Reverse Angle Assembly, Baseplate Mount

Sign Post	*Post Size*	*Post length based mounting height and length of panel assembly (CM)*
Height (no. of panels)		
C.5 (30 cm basis)	4" x 4" (3.5" x 3.5")	C.5-117-B (4/4-30)
C.5 (45 cm basis)	4" x 4" (3.5" x 3.5")	C.5-132-B (4/4-45)
C.5 (60 cm basis)	4" x 4" (3.5" x 3.5")	C.5-150-B (4/4-60)

H.1 Street Name Sign

Sign Post	*Post Size*	*Post length based mounting height and height of panel assembly (CM)*
Height (no. of panels)		
H.1	6" x 6" (5.5" x 5.5")	H.1-335-B (6/6)

H.2 Fingerboard Guide Sign

Sign Post	*Post Size*	*Post length based mounting height and height of panel assembly (CM)*
Height (no. of panels)		*1 high*
H.2	6" x 6" (5.5" x 5.5")	H.2-335-B (6/6)

Oil Finish Post: Apply two generous coats of Penofin Penetrating Oil Finish: Cedar color. Wood must be clean and dry. Apply second coat after first coat has been absorbed; approximately 3 hours but no more than 6 hours. Remove excess material with a rag 2 hours after applying second coat. Do not allow first coat to dry because it will limit the penetration of the second coat and leave gloss patches on the surface of the post.

2.M BRASS RETAINER STRAPS

Straps provide a positive connection of rails to wood uprights regardless of expansion or contraction of timber post.

Material

- 0.25" x 2" brass flat stock (UNS No. C360) for straight straps
- 0.25" brass plate (UNS No. C360) for angled straps

Fabricated Brass Retainer Straps (four per assembly)

Size	*Code*
14.638" X 2	1/30-RS
21.815" X 2	1/45-RS
27.320" X 2	2/30-RS
39.130" X 2	2/45-RS
39.914" X 2	3/30-RS
52.552" X 2	4/30-RS
10.779" X 2	1/20-RS
19.558" X 2	2/20-RS
28.337" X 2	3/20-RS
37.116" X 2	4/20-RS
27.276"/14.638" X 2"	60/30-RS *
20.565"/14.638" X 2"	45/30-RS *
14.638"/14.638" X 2"	30/30-RS *

* For both forward angle and reverse angle applications

Fabrication–Straight Strap: Cut brass straps to precise length as specified with machined top with 4" radius. Place 0.3125"dia. holes for attachment of rails at location and interval noted. Place 0.09"dia. holes and countersink for No. 10 flathead wood screw in strap for attaching to wood upright. Drilling tolerance between holes is (+/–) 5/1000 with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole.

Fabrication–Angled Strap: Water-jet cut angled brass straps from 0.25" flat plate material to shape and length specified, including ends with 4" radius. Place 0.3125" dia. holes for attachment of rails at location and interval noted. Place 0.09" dia. holes and countersink

from both sides of strap for No. 10 flathead wood screw in strap for attaching to wood upright. Drilling tolerance between holes is (+/–) 5/1000 with overall tolerance of 10/1000 measured from center of the top hole to the center of the bottom hole.

Finishing: Remove any sharp edges from cutting and milling strap. Sand brass with fine (220 or finer) emery cloth with orbital, nondirectional finish. Do not apply any protective coating. Straps are to be allowed to oxidize. Attach after Penofin Penetrating Oil Finish has dried to minimize oil staining the exposed brass material.

2.N BRASS BACK PANEL FOR SINGLE POST NARROW PROFILE ASSEMBLY

Material

- 15 cm x 30 cm x 0.25" thick brass plate (UNS No. C360) for backing panel of single post, narrow profile assembly

Brass Back Panel Straps

Size	*Code*
15 cm x 30 cm x 0.25"	15/30-BB

Fabrication–Straight Strap: Cut brass panel to precise dimensions as specified. Place two (2) 0.3125" diameter holes with 0.875" counter bore (0.078" deep) to receive stainless steel round base weld nut for attachment of panel to post with 10-24 x 0.375" stainless steel cap bolt.

Finishing: Remove any sharp edges from cutting and milling panel. Sand brass with fine (220 or finer) emery cloth with orbital, nondirectional finish. Allow panels to oxidize. Do not apply any protective coating.

2.O STAINLESS STEEL BASE PLATES WITH PAINTED FINISH

One size baseplate for each of the nominal posts sizes is specified, including the 5" x 5" for nominal 4" x 4" cedar upright and 7" x 7" for nominal 6" x 6" cedar upright. (see drawings pages 4.2-141-142

Material

- 0.375" stainless steel plate (316L) for welded baseplates.
- 0.25" x 2" stainless steel flat stock (316L) for welded straps for baseplates

Stainless Steel Baseplates for Wood Post Assemblies (two per assembly)

Size	*Code*
5' x 5"	5/5-BP
7" x 7"	7/7-BP

Fabrication

Side Straps: Cut 0.25" x 2" stainless steel flat stock to 12" length. Place two (2) 0.375" dia. holes in each piece at locations noted on drawing. Note that lower hole on front face is 2.25" on-center from the bottom of the upright, and the lower side hole is 4.75" from the bottom of the upright with second hole placed 5" on-center above the first hole.

Baseplate: Machine baseplates (5" x 5" and 7" x 7") with 0.625" radius corner and four (4) 0.5" dia. holes at locations specified on each respective drawing.

Welding: Weld side straps to baseplate with full penetration weld on both sides. Straps to be attached precisely as noted in drawing (+/– 10/1000). Finished straps to be aligned 90 degrees to the baseplate surface.

Finishing: Remove all sharp edges and burrs. Remove weld slag and machine oil. Sandblast baseplate assembly with copper slag abrasive to create even finish over all surfaces.

Metal Preparation and Paint Coating for Stainless Steel Baseplates

Painting: Stainless steel baseplates are to be primed and painted.

Reference: Matthews Paint Company (1800-323-6593) 8201 100th Street, Pleasant Prairie, WI 53158

VOC Alternate: Matthews MAP-VOC (low volatile organic compound acrylic polyurethane) is available for use where VOC compliance is required.

Metal Preparation: Metal to be fully sandblasted with copper slag abrasive to remove all mill slag, surface rust, and dirt. All surfaces to be coated should be free of oil, grease, soil, weld slag, weld splatter, or other contaminants. Surfaces to be dry before application of primer. Tack wipe or remove sandblast residue or dust prior to applying pretreatment and priming.

Metal Pretreatment: Apply Matthews Acid Activated PT Filler (74760/74766) to provide superior bonding of primer and finish coat to clean bare metal. Mix with specified activator and apply per manufacturer's specifications to 0.5 to 0.75 mils dry film thickness. Primer can be applied after 30 minutes, or when tack free.

Primer: Matthews Rust Inhibiting White Epoxy Primer (274908) with Matthews Activator (274909) and Reducer (285900) to be mixed with specified hardener and applied per manufacturer's specifications to 1.5 to 3 mils dry film thickness (3 to 6 mils wet film thickness).

Finish Coat: Spray apply two coats Matthews Acrylic Polyurethane (MAP) enamel, satin gloss finish (number 26A-1A) mixed with MAP Catalyst and appropriate reducers depending on temperature and humidity per manufacturer's specifications. Finish coat to be 1.5 to 2 mils dry film thickness (3 to 4 mils wet film thickness). Finish coat can be applied over Rust Inhibiting White Epoxy Primer within 30 to 60 minutes, or when dry to the touch. If finish coat is applied over 48 hours after primer application, surface should be lightly broken with 400 grit sandpaper for proper adhesion.

Field Touch-up: Matthews Acrylic Polyurethane can be brush or roller applied. For good workability and finished surface quality use Matthews Brushing/Rolling Additive (number 47-444SP). Color tolerance for match shall be 1 unit or less CMC.

Packaging for shipping: Painted baseplates must be fully protected prior to shipping to eliminate scratches or other surface abrasion in transit.

2.P COPPER CAP FOR WOOD POSTS

- 20 ounce sheet copper for fabricated cap on wood posts
- 1" – 2d Copper nail (McMaster Carr 97952A100) for attaching copper cap to wood posts

Fabricated Copper Cap for Wood Posts (two per assembly)

Size	*Code*
3.25". x 6.572"	4/4 CC
5.250" X 10.326"	6/6 CC

Fabrication: Cut copper 3.250" x 6.572" and 5.250" x 10.326" caps for 4" x 4" (3.5" x 3.5") and 6" x 6" (5.5" x 5.5") cedar uprights respectively. Include 3.625" radius and 2.25" radius for each respectively as specified. Machine drill seven (7) 0.9375" dia. holes evenly spaced on top and bottom edge for attaching with nails.

Finish: Remove all sharp edges from fabrication. Mark the fold locations with metal scribe on each part.

2.Q FABRICATION: BULLETIN CASE ASSEMBLY

Materials:

- 0.125" sheet aluminum (2024-T3, 7075-T3) for panel core
- 0.1875" clear poly carbonate sheet material for bulletin cabinet face
- 0.1875" CRL vinyl glazing gasket for clear 3/16" poly carbonate sheet of bulletin display cabinet (0752C)

- Vinyl weather stripping for bulletin cabinet door of (specification to be determined)
- 1/2"–0.120" thick flexible magnetic strip with adhesive back (McMaster Carr 5759K23)
- Porcelain back panel in standard sign panel size for nominal dimensions of bulletin case assembly. Color: Weathering Steel Brown
- Interior backing panel: 0.0625" flat steel sheet with black baked enamel finish on front and back. Panel to fit flush inside outer frame of case assembly. Attach to aluminum core panel with 2 mil 3M-VHB tape.
- 0.875" x 0.4375" bar stock aluminum (6061-T6), milled and tapped, with Type 2: black anodized finish for outside frame
- 0.75" x 0.6875" bar stock aluminum (6061-T6), milled to receive cabinet face and corner clips, with Type 2: black anodized finish for door frame
- 0.5" x 1.375" aluminum "L" shape frame assembly (2-screws, backing plate, tapped front plate) hardware (Nielsen 2400)
- 304 stainless steel continuous hinge with drilled holes, plain finish, 0.040 thick, 1-1/16" open wide (McMaster Carr 1658A417) for bulletin cabinet
- 4-40 x 3/16" (18-8) stainless steel flathead Phillips machine screw with undercut head (McMaster Carr 91771A111)
- 8-32 x 3/16" (18-8) stainless steel flat, socket head machine screw (MC# 92210A192).

Bulletin Case Assembly

Size	*Code*
60 cm x 60 cm	60/60BC
60 cm x 90 cm	60/90BC

Fabrication: Place countersunk holes in core panel to receive 8-32 x 3/8" flat head screws for attachment of bulletin cabinet frame from back of core panel. Size and miter and mill 0.875" x 0.4375" outside frame with holes in back to receive 8-32 flathead screws to attach frame to core panel, and vinyl weather stripping gasket material. Drill and tap for 4-40 x 3/16" screw on side wall of frame for attachment of continuous hinge. Machine 0.75" x 0.6875" aluminum bar stock to receive 3/16" clear poly carbonate sheet (with gasket) and corner clips. Drill and tap for 4-40 x 3/16" screw on side wall of frame for attachment of continuous hinge.

Assembly: Attach outside frame to core panel with gasket and hinge attached. Assemble door frame with clear sheet window and attach adhesive magnetic strip to back of frame. Insert enameled steel panel to back of the cabinet interior, placing the panel flush to the outside frame on each edge. Bond enameled steel panel to core panel.

Finish: All edges and machined surfaces to be smooth and free of sharp edges. All sizing of component parts to be (+/–) 5/1000".
All aluminum components to be anodized with Type 2, black finish.

2.R FABRICATION: CAMPSITE PERMIT DISPLAY

Materials:

- 0.25" sheet aluminum (2024-T3, 7075-T3) with milled stair-step for insertion into rail
- 0.1875" clear acrylic sheet
- 0.1" black acrylic sheet
- 8-32 x 1/4" stainless steel low head socket cap screw (McMaster Carr 93615A317) for keyhole attachment of folder holders and campsite permit display.

Campsite Permit Display: Fabricated Acrylic

Size	*Code*
15 cm x 15 cm	CPD

Fabrication: Mill double 0.197" stair step in core panel for insertion into rail. Drill and tap two (2) holes in core panel to receive No. 8-32 screws for panel attachment. Laser cut four (4) layers to sizes as noted in specification drawings with three (3) back layers being black and with clear front layer. All finished sizing of component parts shall be within (+/–) 5/1000" of specifications.

Assembly: Glue assemble with acrylic cement and machine edges to be flush. Satin finish.

2.S FABRICATION: TRASH BAG DISPENSER

Materials:

- 0.125" sheet aluminum (2024-T3, 7075-T3) for panel core
- 1-1/16" x 0.040" thick aluminum continuous hinge (McMaster Carr 1581A66) for trash bag dispenser
- 10-32 x 2" alloy steel, flat socket head screw (McMaster Carr 91253A018) with 1/2" plate washer and nut to secure for trash bag dispenser
- 0.060", (2024-T3 or 7075-T3) alloy sheet for trash bag dispenser cabinet and frame

Trashbag Dispenser: Fabricated Metal

Size	*Code*
30 cm x 60 cm	CTB

Fabrication: Place counter sunk holes in core panel to receive 10-32 x 2" flathead screws for attachment of trash bag handles. Cut sections of 0.60" aluminum sheet and fabricate with roll formed top, clip return, and side walls, and separate hinge strap. Adhesive weld top section of side walls where they join rolled front face. Spot weld hinge strap to core panel. Spot weld hinge to hinge strap and to front panel of cabinet. (see drawing page 4.1-151

Assembly: Attach 10-32 x 2" flathead screws through back of core panel with with companion lock washer and hex nut. Attach to rail using removable face rail at top of assembly.

Finish: Finished assembly to be sanded and be free of sharp edges or surface imperfections. Entire assembly to be painted (Matthews Acrylic Polyurethane, Color: 39B-4D). See application specification in section 2K for procedure. Surfaces will not be sandblasted.

2.T FABRICATION: REGISTRATION DISPLAY

Materials:

- 0.25" sheet aluminum (2024-T3, 7075-T3) with milled stair-step for insertion into rail
- 0.1875" clear acrylic sheet
- 0.1" black acrylic sheet
- 8-32 x 1/4 stainless steel low head socket cap screw (McMaster Carr 93615A317) for keyhole attachment of folder holders and campsite permit display

Registration Display

Size	*Code*
30 cm x 30 cm	CRL

Fabrication: Mill double 0.197" stair step in core panel for insertion into rail. Drill and tap two (2) holes in core panel to receive 8-32 screws for panel attachment. Laser cut four (4) layers to sizes as noted in specification drawings with three (3) back layers being black and with clear front layer. All finished sizing of component parts to be (+/–) 5/1000".

Assembly: Glue assemble with acrylic cement and machine edges to be flush. Satin finish.

2.U FOLDER DISPENSER ASSEMBLY

Materials:

- 0.25" sheet aluminum (2024-T3, 7075-T3) with milled stair-step for insertion into rail
- 0.1875" clear acrylic sheet for front face
- 0.1875" black acrylic sheet for break formed back section
- 0.125" black acrylic sheet for side walls
- 8-32 x 1/4 stainless steel low head socket cap screw (McMaster Carr 93615A317) for keyhole attachment of folder holders and campsite permit display

Fabrication: Mill double 0.197" stair step in core panel for insertion into rail. Drill and tap four (4) holes in core panel to receive No. 8-32 screws for panel attachment. Laser cut back

panel, side panels and front panel to sizes as noted in specification drawings. Mill keyhole in black back panel to receive low head cap bolt attached to core panel. Brake form back panel with 113° and 90° degree angles. Brake form front clear sheet and bond to back panel. Bond sides to complete assembly. Nominal 30 cm wide assemblies to receive additional side panel in center to separate sides. All finished sizing of component parts to be (+/–) 5/1000".

Folder Dispenser Assembly

Size	*Code*
15 cm x 30 cm	15/30FD
30 cm x 30 cm	30/30FD

Assembly: Glue assemble with acrylic cement and machine edges to be flush. Satin finish.

2.V CAMPGROUND-TRAILHEAD RESERVATION CABINET

Materials:

- 0.25" sheet aluminum (2024-T3, 7075-T3) for panel core with Type 2: black anodized finish both sides.
- 0.50" wide x 1/32" thick polyurethane foam tape-adhesive on both sides. (McMaster Carr 75845A669)
- 304 stainless steel continuous hinge with drilled holes. plain finish, 0.040” thick, 1-1/16" open wide (McMaster Carr 1582A132) for bulletin cabinet.
- 4-40 x 1/4" (18-8) stainless steel flat head phillips machine screw, with undercut head (McMaster Carr 91771A106).
- 8-32 x 3/16" (18-8) stainless steel flat, socket head machine screw (McMaster Carr 92210A192).
- 0.080” thick aluminum plate
- Matthews acrylic polyurethane, with corresponding pre-treatment and primer.
- 3"wide x 1-5/16" high x 5/16" thick extruded aluminum with clear anodized finish round handle pull (mcmaster carr 1568a11)
- 8-32 x 1/2" stainless steel screw and 0.50" dia. x 0.0625 thick plate washer.

Campground-Trailhead Reservation Cabinet

Size	*Code*
60 cm x 30 cm	CRC

Fabrication: Drill and tap four (4) holes in core panel to receive 8-32 x 3/8" flat head screws for attachment of reservation cabinet assembly to core panel. Drill holes for 4-40 x 1/4" screws on top return of base pan frame for attachment of continuous hinge. Drill holes for 4-40 x 1/4" screws on front face of cover pan for attachment of continuous hinge. Apply

0.50" wide x 1/32" thick, double-sided adhesive, polyurethane foam tape to steel hinge then apply hinge to base pan and insert all screws and nuts. Use same technique for corresponding top cover pan.

Fabricate back panel: Brake form sides and top with corners welded and ground smooth. Drill two (2) holes tin top panel for attachment of handle. Bottom of pan to receive double return. Drill and countersink four (4) holes in back panel to receive 8-32 x 3/8" flathead screws for attachment of back panel to core panel. Alignment must be ± 5/1000". Assemble handle with 8-32 x 1/2" screws into drill holes in top pan.

Finish: Paint aluminum components with acrylic polyurethane. Follow instructions for panel prep and finish painting on page 4.2-27 of this specification.

Assembly: Attach assembly to core panel with four screws. Insert core panel and cabinet assembly into upper and lower retainer extrusions and connect posts with 1/4-20 x 3/4" socket head cap screws.

2.W FABRICATION: ALUMINUM PANELS FOR ADHESIVE VINYL GRAPHICS

Aluminum: Sign panels to be 0.080", (2024-T3 or 7075-T3) sheet aluminum

Panel Sizes: The sizes for aluminum panels are specified below. Variations from these sizes shall not be more than (+/-) 10/1000. Blank back panels may be NPS brown reflective sheeting on aluminum or a porcelain enamel panel that is NPS weathering steel brown or olive green. Back panels are the same size as the sign faces.

Vertical Sign Assemblies: 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 30 cm	60.1 cm x 30 cm	90.2 cm x 30 cm	120.3 cm x 30 cm
2 panels (60 nominal)	30 cm x 62.157 cm	60.1 cm x 62.157 cm	90.2 cm x 62.157 cm	120.3 cm x 62.157 cm

Vertical Sign Assemblies: 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel	45 cm x 45 cm

Vertical Sign Assemblies: 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel	60.1 cm x 20 cm	80 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Street Name Signs: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20)	60 cm x 20 cm	75 cm x 20 cm	90 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Fingerboard Signs: H.2

Width x Height (cm)	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20)	80.1 cm x 20.1 cm

Reverse Angle Sign Assemblies: 30 cm Panels for C.1-5

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 30 cm	60.1 cm x 30 cm	75.2 cm x 30 cm	90.2 cm x 30 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 30 cm	120.3 cm x 30 cm	150.4 cm x 30 cm

Reverse Angle Sign Assemblies: 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 45 cm	60.1 cm x 45 cm	70.2 cm x 45 cm	90.2 cm x 45 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 45 cm	120.3 cm x 45 cm	150.4 cm x 45 cm

Reverse Angle Sign Assemblies: 60 cm Panels for C.1-5

Width x Height	*60 cm wide*	*75 cm wide*	*90 cm wide*	
1 panel (30 nominal)	60.1 cm x 62.157 cm	75.2 cm x 62.157 cm	90.2 cm x 62.157 cm	
		105 cm wide	120 cm wide	150 cm wide
		105.3 cm x 62.157cm	120.3 cm x 62.157 cm	150.4 cm x 62.157 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Reverse Angle D.1, Vertical E.1

Width x Height	*15 cm wide*	*30 cm wide*	*45 cm wide*	
1 panel (30 nominal)	15 cm x 30 cm	30 cm x 30 cm	45 cm x 30 cm	
		60 cm wide	*75 cm wide*	*90 cm wide*
		60.1 cm x 30cm	75.2 cm x 30 cm	90.3 cm x 30 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Campsite Identification Number Sign Assembly: Vertical E.1

Width x Height	*15 cm wide*
1 panel / Half high	15 cm x 14 cm

Quality and Finish: Panels to be flat, clean, and free of any surface corrosion, oil, dirt, or other imperfections or contaminates that will inhibit adhesion of sign background material. All edges are to be square and without edge burrs or rounding from sheer cutting that will prevent snug insertion into rail frame.

2.X FABRICATION: STEEL PANELS FOR ENAMELING

Sign Panels Enameling Steel: For purposes of this specification, 16 gauge sheet steel is special purpose “vitreous or enameling iron or steel" as defined by ASTM A424 Type 1, tensioned leveled and especially manufactured for the purpose of porcelain enameling with total additions of copper and aluminum no greater than 0.002%.

Metal Cutting: Porcelain panels are to be cut to within 1 mm of specified size. Panels to be flat, clean, and free of an any surface corrosion, oil, dirt, or other imperfections or contaminates. All edges are to be square and without edge burrs or deflection from cutting.

Flatness: Panels of one meter or greater shall be flat within 5 mm over all directions across the convex surface. Panels shall be flat within-1 mm over the concave surface in all directions. Panels shall not be more than 1 mm out of square when measured over the diagonal in total surface area of over 1 square meter and within 1 mm of the diagonal in panel under 1 meter surface area. Deviations shall be measured with the aid of an accurate steel tape and straight edge.

Printing side: Print porcelain enamel images on the concave side of the rolled steel sheet to help insure the proper fit after the panel is inserted into a finished assembly.

Graphic Panel Dimensions: Panel sizes include a 1 mm vertical adjustment top to bottom. Graphic panel width accommodates 1 mm gap between each 30 cm panel (example: core panel for 60 cm wide assembly is 60.1 cm). Vertical dimension of 60 cm graphic panels includes interior width of intermediate rail (example: a nominal 60 cm panel is 62.157 cm).

Panel Size Tolerance: Steel panels shall be cut to the sizes listed below. Size variation from these sizes should not vary more than (+/-) 10/1000.

Vertical Sign Assemblies: 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 30 cm	60.1 cm x 30 cm	90.2 cm x 30 cm	120.3 cm x 30 cm
2 panels (60 nominal)	30 cm x 62.157 cm	60.1 cm x 62.157 cm	90.2 cm x 62.157 cm	120.3 cm x 62.157 cm

Vertical Sign Assemblies: 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel	45 cm x 45 cm

Vertical Sign Assemblies: 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel	60.1 cm x 20 cm	80 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Street Name Signs: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20)	60 cm x 20 cm	75 cm x 20 cm	90 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Fingerboard Signs: H.2

Width x Height (cm)	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20)	80.1 cm x 20.1 cm

Reverse Angle Sign Assemblies: 30 cm Panels for C.1-5

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 30 cm	60.1 cm x 30 cm	75.2 cm x 30 cm	90.2 cm x 30 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 30 cm	120.3 cm x 30 cm	150.4 cm x 30 cm

Reverse Angle Sign Assemblies: 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 45 cm	60.1 cm x 45 cm	75.2 cm x 45 cm	90.2 cm x 45 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 45 cm	120.3 cm x 45 cm	150.4 cm x 45 cm

Reverse Angle Sign Assemblies: 60 cm Panels for C.1-5

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*	
1 panel (30 nominal)	60.1 cm x 62.157 cm	75.2 cm x 62.157 cm	90.2 cm x 62.157 cm	
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 62.157cm	120.3 cm x 62.157 cm	150.4 cm x 62.157 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Reverse Angle D.1, Vertical E.1

Width x Height (cm)	*15 cm wide*	*30 cm wide*	*45 cm wide*
1 panel (30 nominal)	15 cm x 30 cm	30 cm x 30 cm	45 cm x 30 cm
		60 cm wide	*75 cm wide*	*90 cm wide*
		60.1 cm x 30cm	75.2 cm x 30 cm	90.3 cm x 30 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Campsite Identification Number Sign Assembly: Vertical E.1

Width x Height	*15 cm wide*
1 panel / Half high	15 cm x 14 cm

3. GRAPHIC LAYOUT & PRODUCTION

General

The following specifications are divided into five sections reflective of the five possible types of graphic production:

3A. Porcelain enamel on steel
3B Computer cut, retroreflective and nonreflective graphics on aluminum
3C. Digitally printed graphics encapsulated in high pressure laminate
3D. Electrostatically printed digital graphics printed on adhesive vinyl
3E Digitally printed graphics embedded in fiberglass (fiberglass embedment)

Artwork & Imaging

Artwork: All images for panels shown in this specification will be prepared in specified digital processes with all layouts in conformance with respective grid formats.

Artwork will be provided to a fabricator in one of three ways:

1. The government will provide fabricator with digital artwork in a finished "production ready" form that directly accommodates the production method specified for the sign or panel.
2. The government will provide fabricator with completed digital artwork with typography in place and a low resolution illustration placed "for-position-only" (FPO) at the precise scale, with the actual illustration or photograph provided as a chrome or reflective art for the fabricator to digitally or mechanically incorporate the attached original artwork for final production.
3. The government will provide fabricator with the sign panel formats (grids only) in digital form and the text (and / or sign schedule) and artwork (photos or illustration) for the fabricator to prepare panel layouts as part of the production contract.

Each order schedule will stipulate the form in which the artwork will be supplied.

Art Preparation

Computer Programs: All artwork for panels will be prepared in electronic format using industry standard programs including QuarkXPress™ or Adobe Pagemaker™ for layout and Adobe Illustrator™, Macromedia Freehand™, Corel Draw™ for diagrams and files containing vector art used to cut adhesive materials for application to sign panels, and Adobe Photoshop™ for illustration and scanned photographic files. The version of the program will generally be the latest version or the version which has been just preceded unless specified.

Artwork submitted to fabricator shall be in a commonly available file format and stored on a commonly available removable media, such as Zip™, Jaz™, Syquest™, CD ROM, MO Drive™, or 3.5" floppy disk.

Porcelain enamel contractor shall produce film positives and negatives as required from the electronic art files as supplied for fine line screen–printed sign production. Electrostatic production and ink-jet printing for embedment fiberglass will produce panels as direct output in their respective process. Computer cut vinyl and retroreflective graphics will be prepared as vector art for direct transfer to production equipment.

Government Submittals

A scaled output copy of the panels to be produced will accompany each order.

Art Approvals: To insure that the files have been correctly output on a fabricator's equipment, the fabricator will provide a paper copy of all panels to be reproduced. This copy shall be submitted to the Contract Officer for approval before it is produced in the specified medium. Options for proof include: same size diazo print from reproduction films, die-sublimation prints, laser print (full size or scaled 66% or 50%), or color ink–jet prints of final prepared from same file used to produce film work, or fine line plots of vector art files. All submissions must include crop marks and be at a definable scale (25%, 50%, 75%, etc.) and provide an accurate reflection of the panel to be produced.

Grid Format: All graphics to be formatted using the grid formats for the respective sign type specified *(see Chapter 2: UniGuide Graphic Standards, Section 2.7a)*. This includes type size, kerning, margins (left and right), top alignment, and overall panel proportions.

Typography and Symbols: All sign legends are to be prepared using the typographic specifications provided in this document. Typography to be Frutiger, NPS Rawlinson, and NPS Roadway. Symbols to be the SEGD National Recreation Symbols *(See Chapter 2: UniGuide Graphic Standards, Section2.4)*.

Artwork Storage: All panel artwork files (digital) will be coded by number. Contractor shall retain all films (negative or positive) for each project for preparation of replacements or additional panels using the same graphics. Files will remain property of the NPS and be returned at their request at the end of a contract period.

Artwork: Original artwork shall not be harmed in any way (writing, cutting, etc.) and will be returned to the government upon successful completion and acceptance of the project.

Color Matching: Supplier shall be able to match nearly the entire range of colors as represented by the Pantone Matching System (PMS) and Toyo Inks, etc. Color samples are to be provided at no extra charge on any project.

3A. GRAPHIC IMAGING & PRODUCTION: PORCELAIN ENAMEL SIGNS

Porcelain Enamel Signs

Porcelain enamel on steel is a substantially vitreous, or glassy, inorganic coating bonded to metal by fusion at temperatures above 1400 degrees Fahrenheit. Porcelain enamel is not to be confused with baked paints or organic enamels.

Metal Prep & Production

Degreasing: All panels shall be degreased by immersion in an approved degreasing fluid. The panels shall then be rinsed in a heated water bath.

Etching: After the first rinse, panels shall be immersed in a caustic solution sufficient to provide an “etched" surface capable of good porcelain adherence. The panels shall then be rinsed.

Neutralizing: After the third rinse, the chemical action shall be neutralized in a soda ash solution and then dried rapidly.

Porcelain Enameling: A porcelain enamel ground coat shall be applied to all areas of each unit, including backside and flanges, by spraying methods approved by the Porcelain Enamel Institute. At least one additional separately fired cover-coating shall be applied to the face side and flanges of each unit. For corrosion protection and flatness, one additional coating shall be applied to the backside of each panel.

Finish

Continuity of Coating: Visual inspection of each unit shall reveal no visible breaks, gas bubbles, scumming, hairlines, stress lines or surface defects in the cover coat.

Printing Side: Print porcelain enamel images on the concave side of the rolled steel sheets to help insure the proper fit after the panel is inserted into a finished assembly.

Finish and Background Color Control: The color and finish shall match a color sample previously submitted by supplier and approved by Contract Officer within 1 NBS unit (1-2 NBS unit variation is barely perceptible to the human eye).

Ground and Covercoat Thickness: Ground and covercoat thickness shall be applied in accordance with PEI recommendations to a thickness range of 0.004" to 0.020" as required by the manufacturer to suit the intended use. Edges of steel panel to be fully sealed, with no steel visible through porcelain coating.

Firing: Panels shall be fired in a furnace custom designed for the purpose, at temperatures

above 1400 degrees Fahrenheit. After firing, every panel must be visually inspected for color consistency against the control panel as approved by the Contract Officer.

Imaging: Line art/script shall be screened one color at a time with intermediate firing of each color before subsequent color is screened. The quality of the screen image shall be of high resolution with no ragged edges. Line art shall be screened over background colors, so that characters are not obscured by the application of color. Line art resolution shall be accurately printed at a standard which accepts as a minimum 1/2 point line thickness and type in sizes as small as 4 (lpi) lines per inch. Black and white & color photographic / lithographic imaging shall be available at a resolution of up to 200 (lpi) lines per inch.

Multiple color work shall maintain (+/-) 1/500 registration of all layers, one to another. Color layers shall be fully opaque, with no bleed-through, or change in hue, value or intensity as a result of the layering of color in the imaging process. Color to match the specified color as converted from PMS reference to porcelain enamel and approved by the client as a match sample prior to imaging the job. Colors shall match CMYK with color shift base on inherent qualities of base frits.

Screen Glazes: Glazes used in the screening process shall be acid resistant and opaque. The glazes shall be corrosion proof, UV proof, wind proof, and vandal resistant. All screen glass must be milled to a 400 mesh particle size or smaller.

Use only specially formulated porcelain enamel frits, glazes, and oxides as supplied by Ferro, Chivit, APEC or Cerdek. These materials when combined and processed in final form shall be acid resistant to achieve an A or AA acid resistance rating.

Technical Proficiency: Supplier shall be proficient in the reproduction of photographs by halftone and continuous tone methods, including process color and duotones.

Color Matching: Supplier shall be able to match all colors specified. Color samples are to be provided at no extra charge.

Colors: Colors referenced are based on the Pantone Matching System (PMS) printing inks because similar standards do not exist for porcelain enamel. (Exception: The color of back panel, Weathering Steel Brown, is specified as an actual porcelain frit. Colors references are:

- Warm Grey No. 2 — PMS WG2
- Dark Green — PMS-5605
- Grey Brown — PMS-405
- NPS Brown — PMS-1615C
- Dark Blue — PMS-303C *(continued on next page)*

• Olive Green	PMS-5753C
• Black	PMS-Black-7C
• Gold	PMS-131C
• Light Brown	PMS-154C
• Safety Yellow	PMS-130C
• Safety Red	PMS-485C
• White	PMS-White
• Bright Blue	PMS-301
• Bright Green	PMS-341
• Bright Red	PMS-187

Sign Panel Size: The sizes of sign panels are the same as Section 2.X, Steel Panels for Enameling.

3B. GRAPHIC LAYOUT & PRODUCTION: COMPUTER CUT ADHESIVE GRAPHIC SIGNS

Computer Cut Graphics

Adhesive, computer cut graphics adhered to aluminum with retroreflective background and retroreflective and nonreflective graphics for small guide signs, miscellaneous postings, and applicable small panels.

General Requirements: Adhesive vinyl graphics to be computer cut from vector art files are created in a vector based program: Adobe Illustrator (or compatible programs such as Corel Draw, or Macromedia Freehand). Contractor shall produce computer cut graphic sign panels from the electronic art files as supplied. Finished artwork must match original precisely on basic measurements of typeface replication including: stroke width, letter space, and symbol and arrow size and proportion. Letter stroke to be a continuous line with no ragged edges or ragged interior corners.

Art Preparation: All artwork for panels will be provided as electronic files in Adobe Illustrator, EPS or other vector based programs such as Corel Draw or Macromedia Freehand, with all type and illustrations in-position following the established typographic specifications and grid formats.

Graphic Material

- Type I–A medium-intensity retroreflective sheeting referred to as “engineering grade" with Class 1 adhesive backing that is pressure sensitive per ASTM 4956-01 and FHWA standard specification FP-96
- Type II–A medium high-intensity retroreflective sheeting referred to as “super engineering grade" with class I adhesive backing that is pressure sensitive per ASTM D4956-01 and FHWA standard specification FP-96
- Type III–A high-intensity retroreflective sheeting, referred to as prismatic retroreflective material with Class 1 adhesive backing that is pressure sensitive, per ASTM 4956-01 and FHWA -FP-96.
- Transparent overlay film shall be warrantied by the reflective sheeting manufacturer for the life of the retroreflective sheeting
- Adhesive vinyl film shall be a 2 mil cast PVC film. Warrantee will be based on manufacturer and color. Manufactures include; Avery Dennison (XL-1000 nonreflective opaque films), and 3M (7700 series, 180 series, and 3600 series).

Products manufactured by 3M

	Retroreflective materials					Opaque materials
Colors:	*Type I*	*Type II*	*Transparent*	*Type III*	*Transparent*	*Cast Adhesive*
	Engineer Gr.	*S. Engineer Gr.*	*Overlay film*	*Prismatic*	*Overlay film*	*Vinyl Films*
White	3M-3290	na	na	na	na	3M-7725-10
Brown	3M-3279	na	na	na	3M-1179	3M-7725-19
Red	3M-3272	na	na	na	3M-1172	3M-7725-53
Green	3M-3277	na	na	na	3M-1177	3M-7725-186
Blue	3M-3275	na	na	na	3M-1175	3M-7725-17
Black	3M-580-85	na	na	na	3M-1178	3M-7725-12
Gold	3M-580-64	na	na	na	na	

Products manufactured by Avery Dennison

	Retroreflective materials					Opaque materials
Colors:	*Type I*	*Type II*	*Transparent*	*Type III*	*Transparent*	*Cast Adhesive*
	Engineer Gr.	*S. Engineer Gr.*	*Overlay film*	*Prismatic*	*Overlay film*	*Vinyl Films*
White	T-1500	T-2500	na	T-6500	na	XL-1001
Brown	T-1509	T-2509	XL 6009	T-6509	4809	XL-1036
Red	T-1508	T-2508	XL 6002	T-6508	4808	XL-1012
Green	T-1507	T-2507	XL 6007	T-6507	4807	XL-1032
Blue	T-1505	T-2505	XL 6005	T-6505	4805	XL-1018
Black	R-106	na	XL 6003	na	4803	XL-1003
Gold	R-103	na	NA	na	na	XL-1009

Nonreflective Adhesive Vinyl: Premium quality, cast, opaque pressure sensitive material designed for electro-cutting. Material shall be 2 mil thick with an outdoor life of 3-5 years.

Screen Printing Inks

Products manufactured by 3M

Color:	Black	3M-3985 (opaque)

Products manufactured by Avery Dennison

Color:	Black	Sericol TMII (opaque)

Compatibility of Graphic Sheeting: Background and legend shall use sheeting from the same manufacturer. Mixing of sheeting from different manufacturers is not be permitted and will void warranties.

Age of Material: The Contractor shall indelibly mark each carton of retroreflective materials showing the date received. No more than 12 months shall have elapsed from the date of purchase from the manufacturer to the date of application on the substrate.

Graphic Application

Quality: Application of pressure-sensitive sheeting shall follow manufacturer's specifications.

Surface Preparation: Before application of the sheeting, the face shall be free of all foreign matter such as paint or dust. The aluminum shall be thoroughly cleaned and degreased with solvent and alkaline emulsion cleaner by immersion, spray, or vapor degreasing and dried prior to application of the sheeting coat.

Background Material: Panels shall be covered with one unspliced sheet. Background shall be adhered to front of sign panel prior to application of sign graphics. Background material to be applied as per manufacturer's specifications. Finished background application to be trimmed flush to the edge and be free of bubbles, edge lift, and or other surface imperfections.

Application of Adhesive Computer cut Graphics: All graphics for Small Guide, Area Entry, and Miscellaneous Posting signs will be retroreflective except for legends and symbols on Miscellaneous Postings and the Area Entry signs which are black nonreflective adhesive vinyl.

Graphics Application: Cut graphics to be applied using 3M—TPM5 ECF Transfer Tape to maintain alignment and relationship of all elements.

Legend Application: Legend shall be adhered to background after application of background sheeting to sign panel.

Application Alignment: Graphics placed on panels must align to specified grid format (see Artwork and Imaging).

Horizontal Alignment: Using formats supplied, letters shall be horizontally aligned to a tolerance of (+/–) 0.125" from side of panel to left edge of legend with standard adjustments for round or overhanging letters. Inter-letter spacing shall be horizontally aligned to a tolerance of (+/–) 0.0625" from letter to letter and (+/–) 0.5" overall based on the typographic specifications in this document.

Vertical Alignment: Using formats supplied, letters shall be horizontally aligned to a tolerance of (+/–) 0.125" from top of panel to baseline of legend, or from baseline to baseline of multi-line legends. Optical adjustment for overhang of round letters will be maintained as set on the computer.

Sign Panel Size: The sizes of sign panel graphics are the same as the aluminum panels to which they are affixed, and the graphic is trimmed flush to the edge of the aluminum panel to which it is applied. These sizes are as specified below.

Vertical Sign Assemblies: 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 30 cm	60.1 cm x 30 cm	90.2 cm x 30 cm	120.3 cm x 30 cm
2 panels (60 nominal)	30 cm x 62.157 cm	60.1 cm x 62.157 cm	90.2 cm x 62.157 cm	120.3 cm x 62.157 cm

Vertical Sign Assemblies: 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel (45 nominal)	45 cm x 45 cm

Vertical Sign Assemblies: 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel (20 nominal)	60.1 cm x 20 cm	80 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Street Name Signs: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20 nominal)	60 cm x 20 cm	75 cm x 20 cm	90 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Fingerboard Signs: H.2

Width x Height (cm)	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20 nominal)	80.1 cm x 20.1 cm

Reverse Angle Sign Assemblies: 30 cm Panels for C.1-5

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 30 cm	60.1 cm x 30 cm	75.2 cm x 30 cm	90.2 cm x 30 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 30 cm	120.3 cm x 30 cm	150.4 cm x 30 cm

Reverse Angle Sign Assemblies: 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 45 cm	60.1 cm x 45 cm	75.2 cm x 45 cm	90.2 cm x 45 cm
		105cm wide	*120cm wide*	*150cm wide*
		105.3 cm x 45 cm	120.3 cm x 45 cm	150.4 cm x 45 cm

Reverse Angle Sign Assemblies: 60 cm Panels for C.1-5

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	60.1 cm x 62.157 cm	75.2 cm x 62.157 cm	90.2 cm x 62.157 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 62.157cm	120.3 cm x 62.157 cm	150.4 cm x 62.157 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Reverse Angle D.1, Vertical E.1

Width x Height (cm)	*15 cm wide*	*30 cm wide*	*45 cm wide*	
1 panel (30 nominal)	15 cm x 30 cm	30 cm x 30 cm	45 cm x 30 cm	
		60 cm wide	*75 cm wide*	*90 cm wide*
		60.1 cm x 30cm	75.2 cm x 30 cm	90.3 cm x 30 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Campsite Identification Number Sign Assembly: Vertical E.1

Width x Height	*15 cm wide*
1 panel / Half high	15 cm x 14 cm

3C. GRAPHIC IMAGING & PRODUCTION: ELECTROSTATICALLY PRINTED DIGITAL GRAPHICS PRINTED ON ADHESIVE VINYL

Product: This specification is based on a 3M Scotchprint™ finished graphic. 3M Scotchprint™ has been selected because of the availability nationwide through 3M authorized graphic manufacturers, and a four-year exterior warranty as described below. Scotchprint™ is a matched component finished graphic produced by an authorized manufacturer using 3M Scotchcal™ or Controltac™ electrostatic films, UV resistant toners, durable over-laminates and a controlled production process that assures the durability and reliability of the finished graphic. The materials described below are specified based on overall requirements of the project including durability and life-cycle cost.

Description: Full color, digital graphics shall be electrostatically printed on 4 mil 3M Controltac™ Electrostatic Marking Film 8640C (ES) adhesive vinyl film with 3M Scotchcal™ Protective Over-laminate 8945, and 3M Scotchcal™ Electrostatic Toners 8700/8800 (ES). The specified Scotchprint graphic is a durable, dimensionally stable (within 1/64" between -65 degrees F to +225 degrees F), four (4) year (2.5 year in southwestern U.S. environments) warranted product. When applied to a blank aluminum back panel, it can be easily replaced or updated on a seasonal basis.

Material Description: Durable, matte vinyl, scuff resistant overlaminate intended for production of full color, large format graphics which will withstand severe weather and surface abrasion. The graphic marking films shall be precoated with positionable, pressure sensitive adhesive which shall provide excellent adhesion to aluminum and porcelain enamel surfaces. The material, with comply feature, shall be capable of being applied with no air bubbles using basic application techniques. All components of the finished graphic --, i.e., marking film, toners, over-laminates-- shall be certified as compatible and supplied by one manufacturer as a warranted imaging system.

Graphic Reproduction: The recommended use of this material is for both single image and multiple copies of the same graphic. Material is selected for an intended display life of up to 4 years without noticeable degradation of graphics using electrostatic imaging direct from digital files. Imaging and graphic resolution: Scotchprint™ is produced directly from specified 3M graphics software and 3M printing hardware with 400 DPI (dots per inch) image fidelity.

Color Stability: Fading of color shift in the finished graphic shall not exceed visual acceptability as determined by the NPS Sign Program Manager in agreement with 3M Technical Service. Toners shall have a light fastness rating of 7-8 on the DIN 16525 (Wool Scale) or equivalent industry standard and must be able to withstand 2750 without noticeable change in pigmentation.

The 3M Scotchcal™ or Controltac™ Marking Film shall be compatible with the 3M Scotchcal™ Electrostatic toners.

Over-laminate: 3M protective over-laminate 8945 (ES) shall be certified by the manufacturer as a matched component of the finished graphic and be supplied by the same manufacturer as the marking film and toner used to produce the graphic.

Sign Panel Size: The sizes of sign panel graphics are the same as the aluminum panels to which they are affixed. The graphic is trimmed flush to the edge of the aluminum panel to which it is applied. These sizes are as specified below. No edge sealing is required to maintain warranty requirements.

Vertical Sign Assemblies: 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 30 cm	60.1 cm x 30 cm	90.2 cm x 30 cm	120.3 cm x 30 cm
2 panels (60 nominal)	30 cm x 62.157 cm	60.1 cm x 62.157 cm	90.2 cm x 62.157 cm	120.3 cm x 62.157 cm

Vertical Sign Assemblies: 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel	45 cm x 45 cm

Vertical Sign Assemblies: 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel	60.1 cm x 20 cm	80 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Street Name Signs: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20 nominal)	60 cm x 20 cm	75 cm x 20 cm	90 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Fingerboard Signs: H.2

Width x Height (cm)	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20 nominal)	80.1 cm x 20.1 cm

Reverse Angle Sign Assemblies: 30 cm Panels for C.1-5

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 30 cm	60.1 cm x 30 cm	75.2 cm x 30 cm	90.2 cm x 30 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 30 cm	120.3 cm x 30 cm	150.4 cm x 30 cm

Reverse Angle Sign Assemblies: 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 45 cm	60.1 cm x 45 cm	75.2 cm x 45 cm	90.2 cm x 45 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 45 cm	120.3 cm x 45 cm	150.4 cm x 45 cm

Reverse Angle Sign Assemblies: 60 cm Panels for C.1-5				
Width x Height	*60 cm wide*	*75 cm wide*	*90 cm wide*	
1 panel (30 nominal)	60.1 cm x 62.157 cm	75.2 cm x 62.157 cm	90.2 cm x 62.157 cm	
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 62.157cm	120.3 cm x 62.157 cm	150.4 cm x 62.157 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Reverse Angle D.1, Vertical E.1				
Width x Height	*15 cm wide*	*30 cm wide*	*45 cm wide*	
1 panel (30 nominal)	15 cm x 30 cm	30 cm x 30 cm	45 cm x 30 cm	
		60 cm wide	*75 cm wide*	*90 cm wide*
		60.1 cm x 30cm	75.2 cm x 30 cm	90.3 cm x 30 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Campsite Identification Number Sign Assembly: Vertical E.1	
Width x Height	15 cm wide
1 panel / Half high	15 cm x 14 cm

Application to Aluminum Substrate: Aluminum panel to be thoroughly cleaned and free of any oils. Lightly sand surface with orbital sander with fine sandpaper to aid adhesion of adhesive graphics. Clean sanded surface to remove sanding residue.

Cut graphic to same size as backing panel (above). Align top of graphic with top of panel and tape across top to secure. Lift graphic and remove backing paper. Holding the two bottom corners, gently lay the adhesive graphic panel on the aluminum substrate. Squeegee the graphic to the aluminum in broad overlapping strokes beginning at the upper taped edge and proceeding to the bottom of the graphic. Follow manufacturer's directions for application, including minimum temperature of backing panel for proper adhesion.

Warranty: The specified Scotchprint™ graphics have a life expectancy of 4 years (2.5 in southwestern United States). The manufacturer's warranty shall cover manufacturer defects, out of specification materials (e.g. visual or hidden defects), premature graphics failure due to excessive fading, discoloration, crazing, peeling and blistering, or excessive dimensional change or loss of adhesion that makes the graphic visually unacceptable (as determined by customary standards of the industry) when viewed from the intended viewing distance. For any 3M product intended for the graphics market which does not meet the specified warranty, upon timely notification, 3M's sole responsibility, and purchaser's and user's remedy shall be, at 3M's option, that 3M will (A) refund the full purchase price of all 3M materials used to produce the graphic, or (B) replace all 3M materials consumed in the manufacture of graphics. See the Worldwide 3M™ MCS™ Warranty for further details.

3D. GRAPHIC IMAGING & PRODUCTION: HIGH RESOLUTION INK JET PRINTED DIGITAL GRAPHICS PRINTED ON ADHESIVE VINYL

Product: Full color digital graphics printed at high resolution (1200 DPI). The finished product is a highly durable, richly colored and dimensionally stable, 3 year warranted product.

Description: Hewlett Packard 5000 inkjet finished graphic printed on 4 mil Hewlett Packard Adhesive vinyl Q1909A. Material printed with C7962A exterior grade pigment based uv-resistant toners. Finished graphic completed with 3M Scotchcal™ protective over-laminate 8945 to provide increased weatherability and durability. Pigment toner has exterior warranty of three years.

Material Description: Durable luster vinyl, abrasion resistant overlaminate intended to enhance and protect full color, graphics to withstand severe weather and surface abrasion. The back of the graphic marking films are pre-coated with positionable, pressure sensitive adhesive which shall provide excellent adhesion to aluminum and porcelain enamel surfaces. When graphic is applied to a blank aluminum back panel, the adhesive vinyl can be removed and the panel reused or updated on a seasonal basis, for on-site replacement. The material, with 3M™ Comply feature, can be applied with no air bubbles using basic application techniques. All components of the finished graphic including, marking film, toners, overlaminates, shall be certified as compatible and supplied by one manufacturer as a warranted imaging system.

Graphic Reproduction: Imaging and graphic resolution: Inkjet is produced directly from specified Hewlett Packard graphics software and Hewlett Packard printing hardware at 1200 DPI (dots per inch) image resolution. This is the highest resolution graphic imaging process in the UniGuide system. The recommended use of this material is for both single image and multiple copies of the same graphic. The material is selected for an intended display life of up to 3 years without noticeable degradation of graphics using inkjet imaging direct from digital files. This material is ideal for applications requiring order response of two days in response to quick-ship project requirements, those applications like fee signs, or signs with dates that may be changed annually, and where highest graphic resolution is desired in an affordable product.

Sign Panel Size: The sizes of sign panel graphics are the same as the aluminum panels to which they are affixed. The graphic is trimmed flush to the edge of the aluminum panel to which it is applied. These sizes are as specified on the following page. No edge sealing is required to maintain warranty requirements.

Vertical Sign Assemblies: 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 30 cm	60.1 cm x 30 cm	90.2 cm x 30 cm	120.3 cm x 30 cm
2 panels (60 nominal)	30 cm x 62.157 cm	60.1 cm x 62.157 cm	90.2 cm x 62.157 cm	120.3 cm x 62.157 cm

Vertical Sign Assemblies: 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel	45 cm x 45 cm

Vertical Sign Assemblies: 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel	60.1 cm x 20 cm	80 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Street Name Signs: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20 nominal)	60 cm x 20 cm	75 cm x 20 cm	90 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Fingerboard Signs: H.2

Width x Height (cm)	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20 nominal)	80.1 cm x 20.1 cm

Reverse Angle Sign Assemblies: 30 cm Panels for C.1-5

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 30 cm	60.1 cm x 30 cm	75.2 cm x 30 cm	90.2 cm x 30 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 30 cm	120.3 cm x 30 cm	150.4 cm x 30 cm

Reverse Angle Sign Assemblies: 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 45 cm	60.1 cm x 45 cm	75.2 cm x 45 cm	90.2 cm x 45 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 45 cm	120.3 cm x 45 cm	150.4 cm x 45 cm

Reverse Angle Sign Assemblies: 60 cm Panels for C.1-5

Width x Height	*60 cm wide*	*75 cm wide*	*90 cm wide*	
1 panel (30 nominal)	60.1 cm x 62.157 cm	75.2 cm x 62.157 cm	90.2 cm x 62.157 cm	
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 62.157cm	120.3 cm x 62.157 cm	150.4 cm x 62.157 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Reverse Angle D.1, Vertical E.1

Width x Height	*15 cm wide*	*30 cm wide*	*45 cm wide*	
1 panel (30 nominal)	15 cm x 30 cm	30 cm x 30 cm	45 cm x 30 cm	
		60 cm wide	*75 cm wide*	*90 cm wide*
		60.1 cm x 30cm	75.2 cm x 30 cm	90.3 cm x 30 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Campsite Identification Number Sign Assembly: Vertical E.1

Width x Height	15 cm wide
1 panel / Half high	15 cm x 14 cm

Application to Aluminum Substrate: Aluminum panel to be thoroughly cleaned and free of any oils. Lightly sand surface with orbital sander with fine sandpaper to aid adhesion of adhesive graphics. Clean sanded surface to remove sanding residue.

Cut graphic to same size as backing panel (above). Align top of graphic with top of panel and tape across top to secure. Lift graphic and remove backing paper. Holding the two bottom corners, gently lay the adhesive graphic panel on the aluminum substrate. Squeegee the graphic to the aluminum in broad overlapping strokes beginning at the upper taped edge and proceeding to the bottom of the graphic. Follow manufacturer's directions for application, including minimum temperature of backing panel for proper adhesion.

3E. GRAPHIC IMAGING & PRODUCTION: DIGITALLY PRINTED GRAPHICS INCORPORATED IN HIGH PRESSURE LAMINATE PANELS

Product: This specification is based on iZone brand product. iZone is a durable high-pressure laminate that consolidates high resolution, full color graphics in the laminate assembly. The following are specifications for iZone (iZone - Imaging by Wilsonart International, 2400 Wilson Place, Temple, Texas 76503) brand, (or equal) outdoor grade high-pressure laminate sign material.

Outdoor Grade: iZone™XT - High pressure laminate graphic sign material is composed of several layers of phenolic (opaque) resin impregnated kraft filler paper collated to a thickness from 0.093" and, surfaced by a layer of coated inkjet graphic image substrate, digitally imaged with UV resistant, pigment based process color inks, two UV resistant melamine (clear) overlay sheets, with a modified acrylic overlay for further UV resistance and hardness, which has been pre-consolidated with an industrial optical coating. The optical topcoating assures UV resistance of over 97% of all harmful UV rays and further tempers the surface to resist vandalism and provides a surface that accommodates easy cleaning of graffiti without degrading the graphic surface. Layers of material are to be assembled and heat/pressure consolidated in laminate presses at approximately 1300 PSF at temperatures exceeding 295 degrees Fahrenheit. Once cooled, the paper must be completely absorbed by the melamine to assure a solid thermoset plastic.

Surface: The surface shall be: a satin-matte that resists marks, and diffracts sunlight.

Imaging/Artwork

Low volume: Imaging is to be executed on a coated inkjet, melamine compatible base paper, which is printed on piezo-based ink–jet imaging equipment as manufactured by Encad, Xerox Colorgraphix, or equal.

Digital imaging will be of even consistency throughout the image. Resolution, while dependent upon final imaging output size, should attain a maximum of 600 dpi at final output sizes under 24 x 36 inches. This will decrease as the final output size increases, but the manufacturer must insure the at maximum resolution is attained given the parameters of the imaging hardware.

High Volume: High-resolution digital print imaging must be used for imaging applications that require high volume runs of a single panel while affording very good fidelity for typography and fine line images.

Imaging Inks: Inks used in the printing process shall be UV resistant and opaque. The ink shall be pigment based to insure maximum durability.

Sign Panel Size: The size of high pressure laminate sign panels are as specified below. High pressure laminate panels are to be cut to within 10/1000 of specified size. Panels are to be flat, clean, and free of any surface imperfections. All edges are to be square and without edge burrs or deflection from cutting.

Vertical Sign Assemblies: 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 30 cm	60.1 cm x 30 cm	90.2 cm x 30 cm	120.3 cm x 30 cm
2 panels (60 nominal)	30 cm x 62.157 cm	60.1 cm x 62.157 cm	90.2 cm x 62.157 cm	120.3 cm x 62.157 cm

Vertical Sign Assemblies: 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel	45 cm x 45 cm

Vertical Sign Assemblies: 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel	60.1 cm x 20 cm	80 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Street Name Signs: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20 nominal)	60 cm x 20 cm	75 cm x 20 cm	90 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Fingerboard Signs: H.2

Width x Height	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20 nominal)	80.1 cm x 20.1 cm

Reverse Angle Sign Assemblies: 30 cm Panels for C.1-5

Width x Height	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 30 cm	60.1 cm x 30 cm	75.2 cm x 30 cm	90.2 cm x 30 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 30 cm	120.3 cm x 30 cm	150.4 cm x 30 cm

Reverse Angle Sign Assemblies: 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 45 cm	60.1 cm x 45 cm	75.2 cm x 45 cm	90.2 cm x 45 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 45 cm	120.3 cm x 45 cm	150.4 cm x 45 cm

Reverse Angle Sign Assemblies: 60 cm Panels for C.1-5

Width x Height	*60 cm wide*	*75 cm wide*	*90 cm wide*	
1 panel (30 nominal)	60.1 cm x 62.157 cm	75.2 cm x 62.157 cm	90.2 cm x 62.157 cm	
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 62.157cm	120.3 cm x 62.157 cm	150.4 cm x 62.157 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Reverse Angle D.1, Vertical E.1

Width x Height (cm)	*15 cm wide*	*30 cm wide*	*45 cm wide*	
1 panel (30 nominal)	15 cm x 30 cm	30 cm x 30 cm	45 cm x 30 cm	
		60 cm wide	*75 cm wide*	*90 cm wide*
		60.1 cm x 30cm	75.2 cm x 30 cm	90.2 cm x 30 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Campsite Identification Number Sign Assembly: Vertical E.1

Width x Height (cm)	*15 cm wide*
1 panel / Half high	15 cm x 14 cm

Cutting: All fabrication tools used in shaping and cutting of high pressure laminates must be sharp as new and carbide-tipped. Saw blades must be no less that 10" diameter, hollow ground, 60 - 80 tooth, carbide tipped, running at a minimum of 4500 rpm to insure smooth edges with no chipping or sharp protrusions.

Maintenance

Cleaning: Clean completed sign unit surface with a soft cloth and any good quality glass cleaner or laminate cleaner. Abrasive cleaners should be avoided for long–term usage. A coat of polymer based automotive wax is recommended prior to installation to facilitate future surface cleaning.

Graffiti: Material can be wiped of paint graffiti with a common organic solvents, including mineral spirits and Simple Green™, but should be rinsed afterward with a damp cloth to prevent subtle surface damage to the UV resistant over-laminate. Do not use plastic eroding chemical solvents such as acetone or lacquer thinner.

Guarantee

This product must have a guaranteed life of five (5) years, with full replacement, against fading, delaminating, discoloration, blistering, staining, or cracking or any other manufacturing degradation from date of substantial performance. It is mutually understood that in most environmental settings the product will provide usable service beyond this guaranteed time period.

3F. GRAPHIC IMAGING & PRODUCTION: DIGITALLY PRINTED GRAPHICS EMBEDDED IN FIBERGLASS PANELS

Product

This specification is based on engineered fiberglass signs and digitally printed graphic panels manufactured by Pannier Graphics in rigid form known as Modulite® (or approved equal) which combines exceptional strength and durability with full color, high resolution graphics capability. The materials specified below are based on overall requirements of the project including durability and life-cycle cost.

Application: Embedment fiberglass is ideal for multiple panel editions, ink-jet print technology is a viable alternative for low quantity editions.

I. MATERIAL

Material: Sign must be manufactured of non-yellowing, R-70 clear resin (or UV stabilized, acrylic-modified polyester resin) reinforced with high solubility, chopped strand fiberglass mat so that the index of refraction ensures clarity of all color, copy, and graphics. Glass fibers should not be readily discernible on the sign face. In addition, sign must have a glass content of no less than 28% of the total sign weight.

Fabrication: All copy and graphics must be permanently embedded in the fiberglass panel. The resulting sign must be a solid, one-piece panel with all graphics inseparable from the fiberglass in which they are embedded. Artwork must become a permanent part of the fiberglass sign so it will not delaminate. Laminated or encapsulated products are unacceptable.

Material Performance Requirements: Sign must have an ambient temperature range of -65 degrees F to +350 degrees F. Sign must have a minimum Barcol hardness of 50, tensile strength of 12,000 psi, compressive strength of 20,000 psi, and flexural strength of 18,000 psi. Minimum impact strength of sign must be 6 ft. lbs./in. notch with a fire resistance of 500°F. Sign face must not be permanently defaced by steam, mild acids, aromatics, scratching, inks, or paints and should be readily wiped clean with paint remover and solvents without affecting the appearance or legibility of the sign finish or graphics.

Sign face should retain legibility and finished appearance when sprayed with a 10% solution of hydrochloric, nitric, or sulfuric acid for one-half hour or when scrubbed by a brush of medium hardness using common commercial cleaning compounds such as ammonia, laundry soaps, detergents, carbon tetrachloride, or petroleum based solvents.

Sign must be opaque or translucent with a clear or matte finish, as indicated, with a minimum embedment of all graphic elements of 0.03125 inches (1/32").

Thickness: Panels to be 0.093" thick.

Surface Finish: Panel to have matte finish

Graphic Resolution: Full color, digital graphics, printed by 600 dpi ink–jet or high resolution screen printing. Screen printed graphics to be made using 85 (lpi) lines per inch , and to be free of any modeling or varying density of line and color.

Color Stability: Digitally imaged graphics to retain color values for up to five (5) years without fading.

Panel Sizes: Embedded fiberglass signs to be cut to the following sizes. Size variation from these sizes shall not vary more than (+/–) 1/10,000.

Vertical Sign Assemblies: 30 cm Panels for A.1, A.5, J.1, and vertical section only for B.1, & B.2

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*90 cm wide*	*120 cm wide*
1 panel	30 cm x 30 cm	60.1 cm x 30 cm	90.2 cm x 30 cm	120.3 cm x 30 cm
2 panels (60 nominal)	30 cm x 62.157 cm	60.1 cm x 62.157 cm	90.2 cm x 62.157 cm	120.3 cm x 62.157 cm

Vertical Sign Assemblies: 45 cm Panels for A.1, A.5, and J.1

Width x Height (cm)	*45 cm wide*
1 panel	45 cm x 45 cm

Vertical Sign Assemblies: 20 cm Panels for Small Area Entry Signs & Small Road Guide Signs: A.1, A.5

Width x Height (cm)	*60 cm wide*	*80 cm wide*
1 panel	60.1 cm x 20 cm	80 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Street Name Signs: H.1

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (20 nominal)	60 cm x 20 cm	75 cm x 20 cm	90 cm x 20 cm

Flag–Mounted Sign Assemblies: 20 cm Panels for Fingerboard Signs: H.2

Width x Height (cm)	*80 cm wide (with double 125 degree miter on leading edge)*
1 panel (20 nominal)	80.1 cm x 20.1 cm

Reverse Angle Sign Assemblies: 30 cm Panels for C.1-5

Width x Height (cm)	*30 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	30 cm x 30 cm	60.1 cm x 30 cm	75.2 cm x 30 cm	90.2 cm x 30 cm
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 30 cm	120.3 cm x 30 cm	150.4 cm x 30 cm

Reverse Angle Sign Assemblies: 45 cm Panels for C.1-5

Width x Height (cm)	*45 cm wide*	*60 cm wide*	*75 cm wide*	*90 cm wide*
1 panel (30 nominal)	45 cm x 45 cm	60.1 cm x 45 cm	75.2 cm x 45 cm	90.2 cm x 45 cm
		105cm wide	*120cm wide*	*150cm wide*
		105.3 cm x 45 cm	120.3 cm x 45 cm	150.4 cm x 45 cm

Reverse Angle Sign Assemblies: 60 cm Panels for C.1-5

Width x Height (cm)	*60 cm wide*	*75 cm wide*	*90 cm wide*	
1 panel (30 nominal)	60.1 cm x 62.157 cm	75.2 cm x 62.157 cm	90.2 cm x 62.157 cm	
		105 cm wide	*120 cm wide*	*150 cm wide*
		105.3 cm x 62.157cm	120.3 cm x 62.157 cm	150.4 cm x 62.157 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Reverse Angle D.1, Vertical E.1

Width x Height (cm)	*15 cm wide*	*30 cm wide*	*45 cm wide*	
1 panel (30 nominal)	15 cm x 30 cm	30 cm x 30 cm	45 cm x 30 cm	
		60 cm wide	*75 cm wide*	*90 cm wide*
		60.1 cm x 30cm	75.2 cm x 30 cm	90.2 cm x 30 cm

Narrow Profile Sign Assemblies: 15 cm Panels for Campsite Identification Number Sign Assembly: Vertical E.1

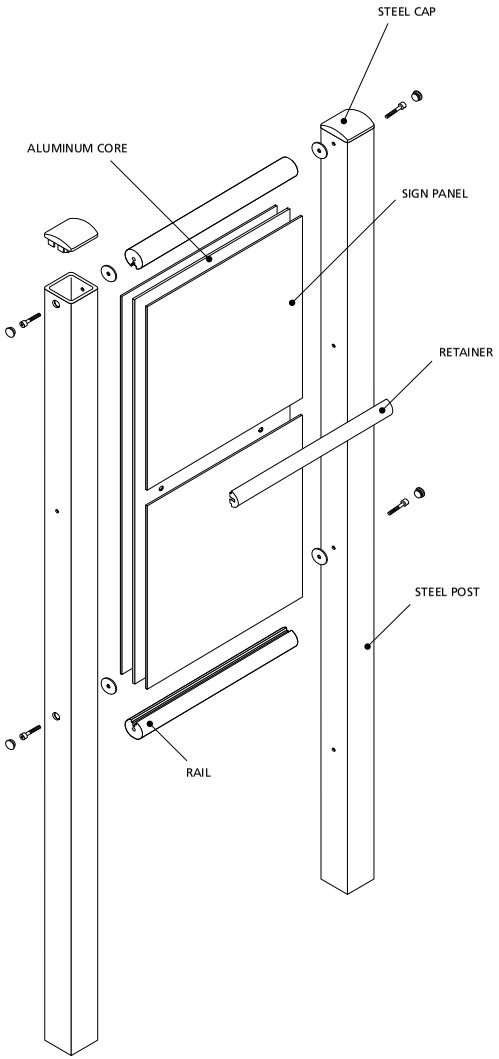
Width x Height (cm)	*15 cm wide*
1 panel / Half high	15 cm x 14 cm

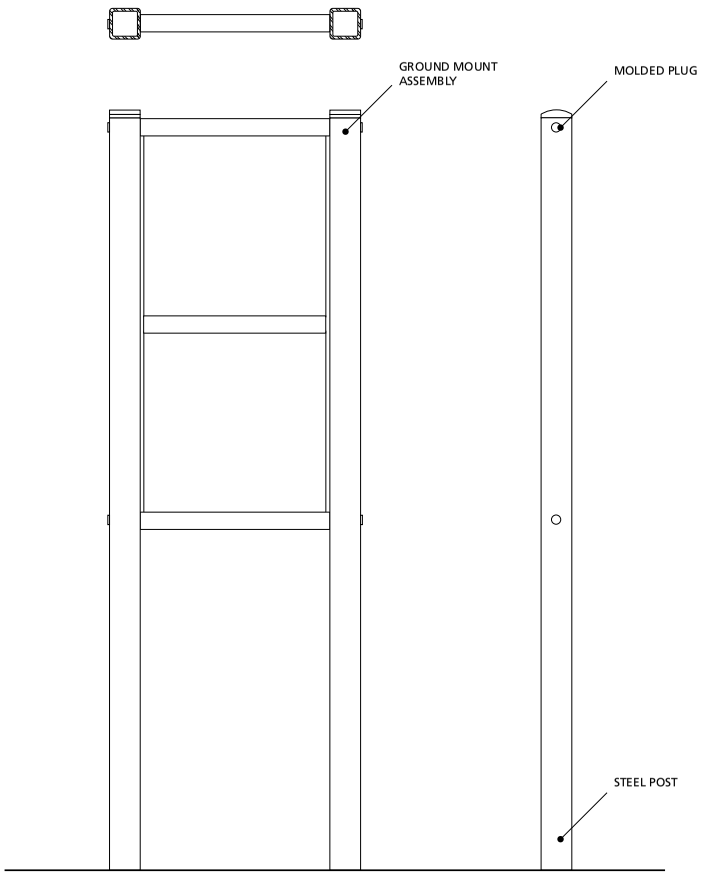
Cutting and Finishing: Signs must be router cut (no saws), the sign edges must not be crazed or cracked, and the edge finish must be smooth, clean, and neat. Embedded fiberglass panels are to be cut to within 1 mm of specified size. Panels to be flat, clean, and free of an any surface imperfections. All edges are to be square and without edge burrs or deflection from cutting.

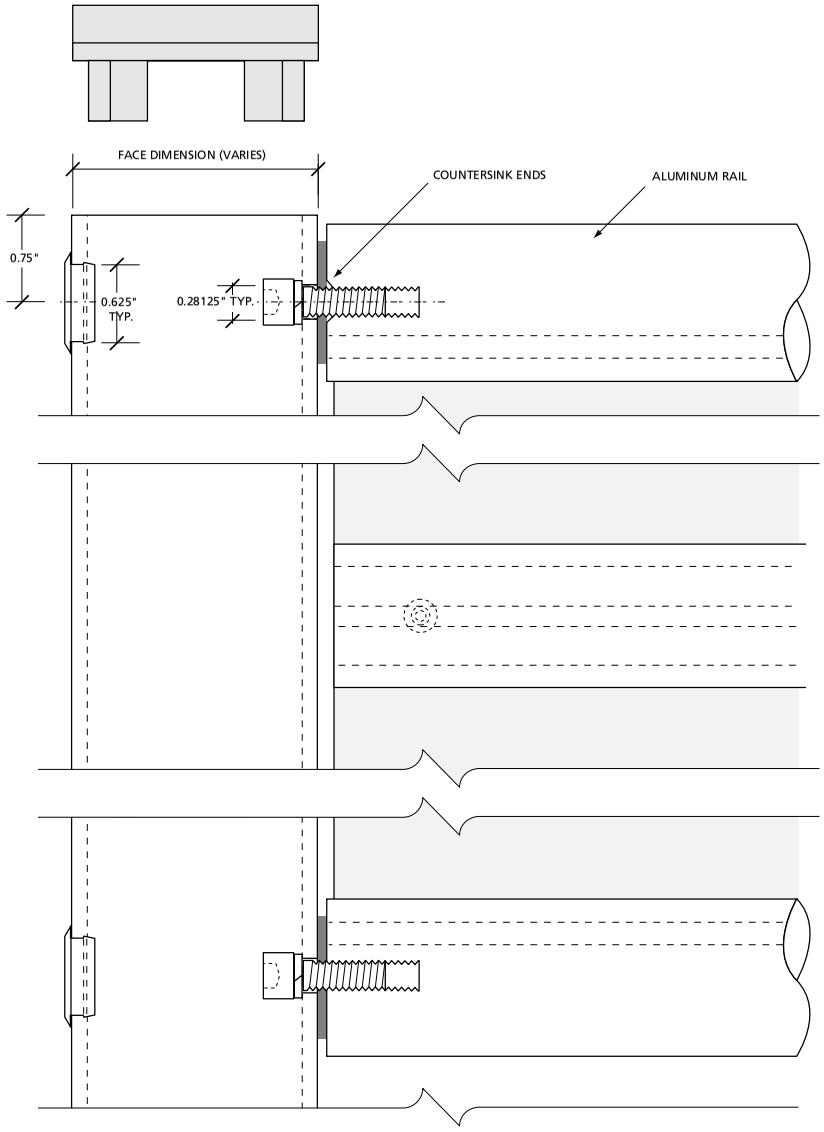
Maintenance: Clean with any solvent based cleaner and polish with auto or boat wax.

Warranty: Screen–printed signs must be warranted for a period of 10 years against chipping, delaminating, and fading.

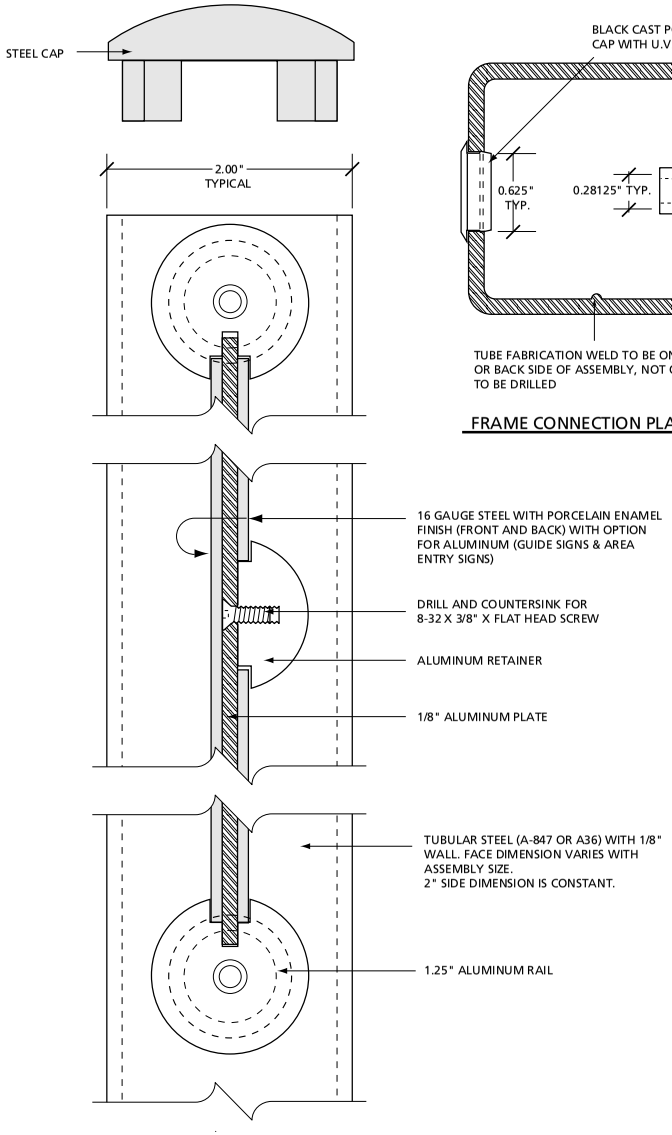
Digitally printed signs must be warrantied for a period of ten (10) years against chipping and delaminating and a period of five (5) years against fading.


STEEL CAP
ALUMINUM CORE
SIGN PANEL
RETAINER
STEEL POST
RAIL

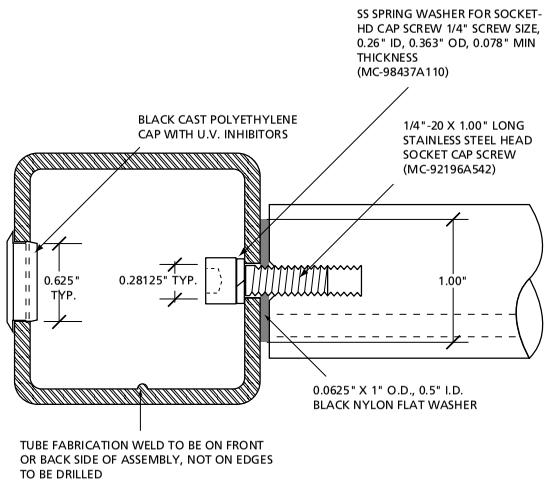

GROUND MOUNT ASSEMBLY
MOLDED PLUG
STEEL POST



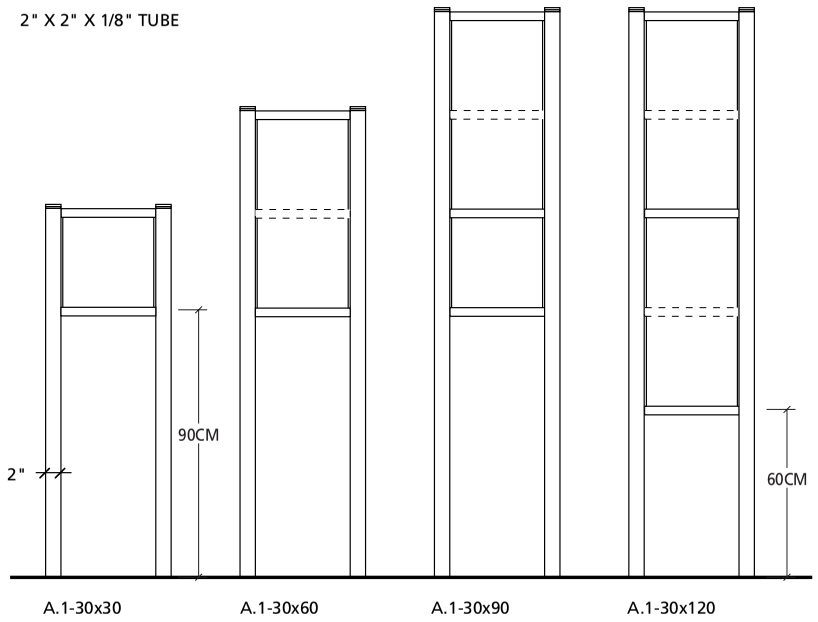
FRAME CONNECTION ELEVATION DETAIL

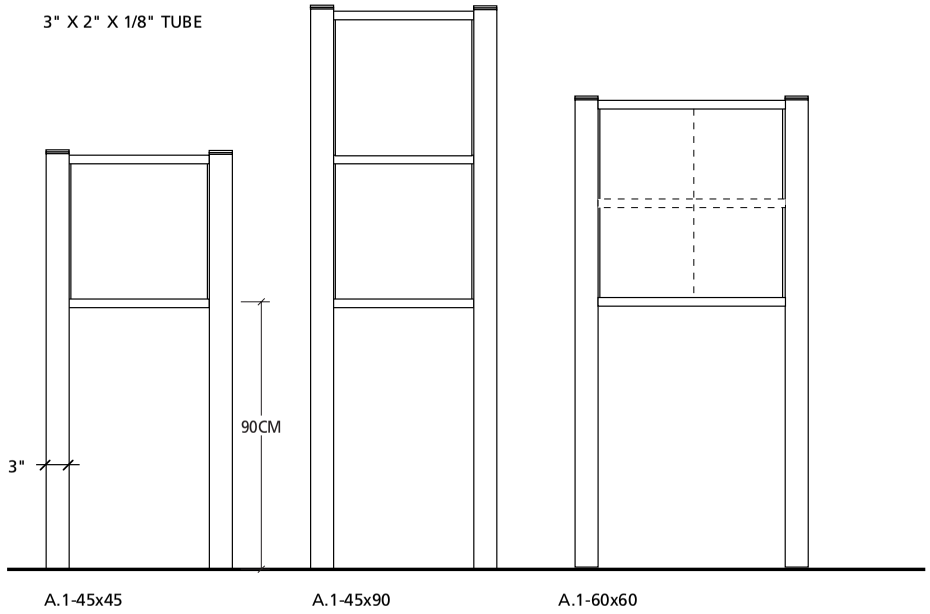


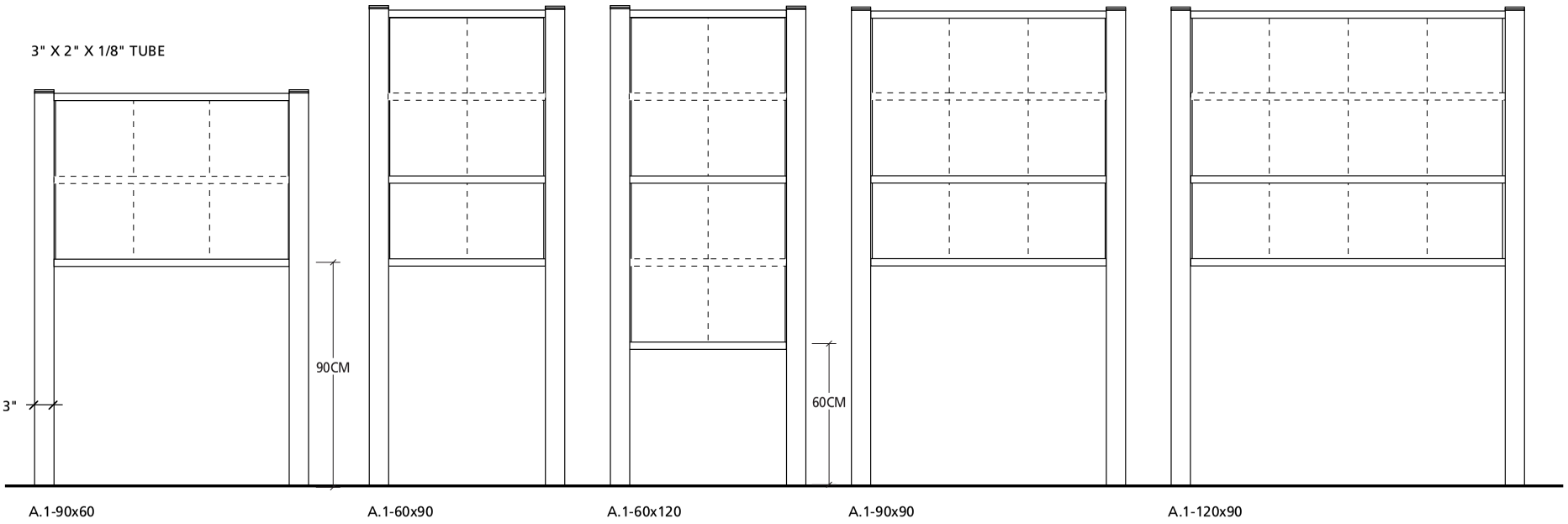
FRAME CONNECTION SECTION DETAIL

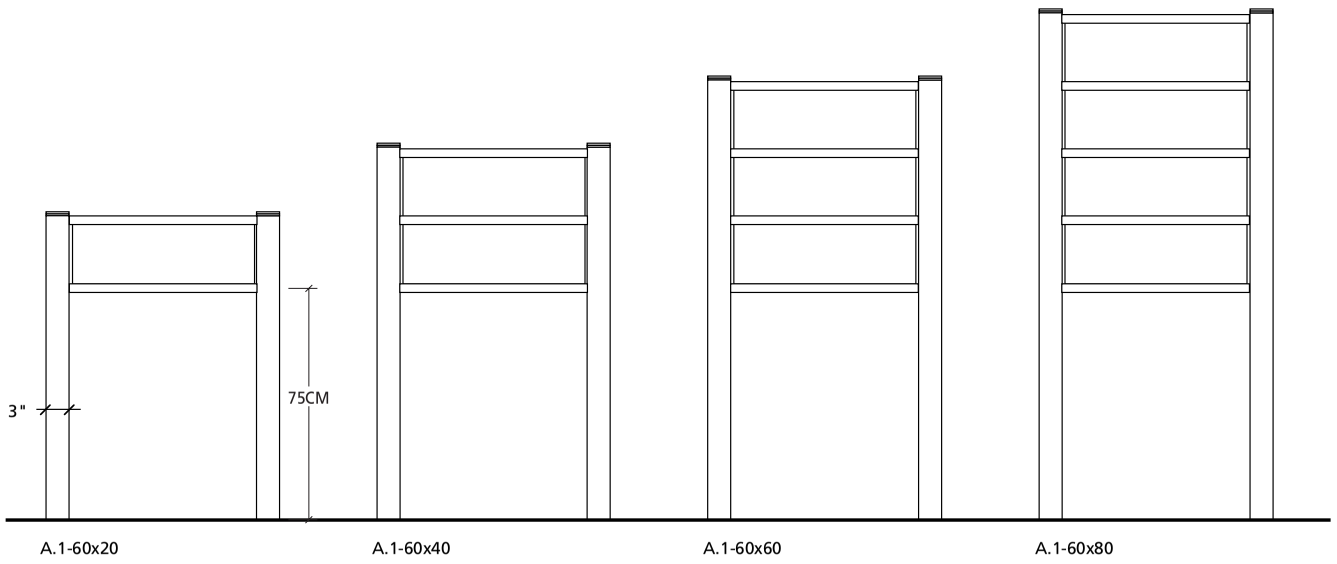


FRAME CONNECTION PLAN DETAIL

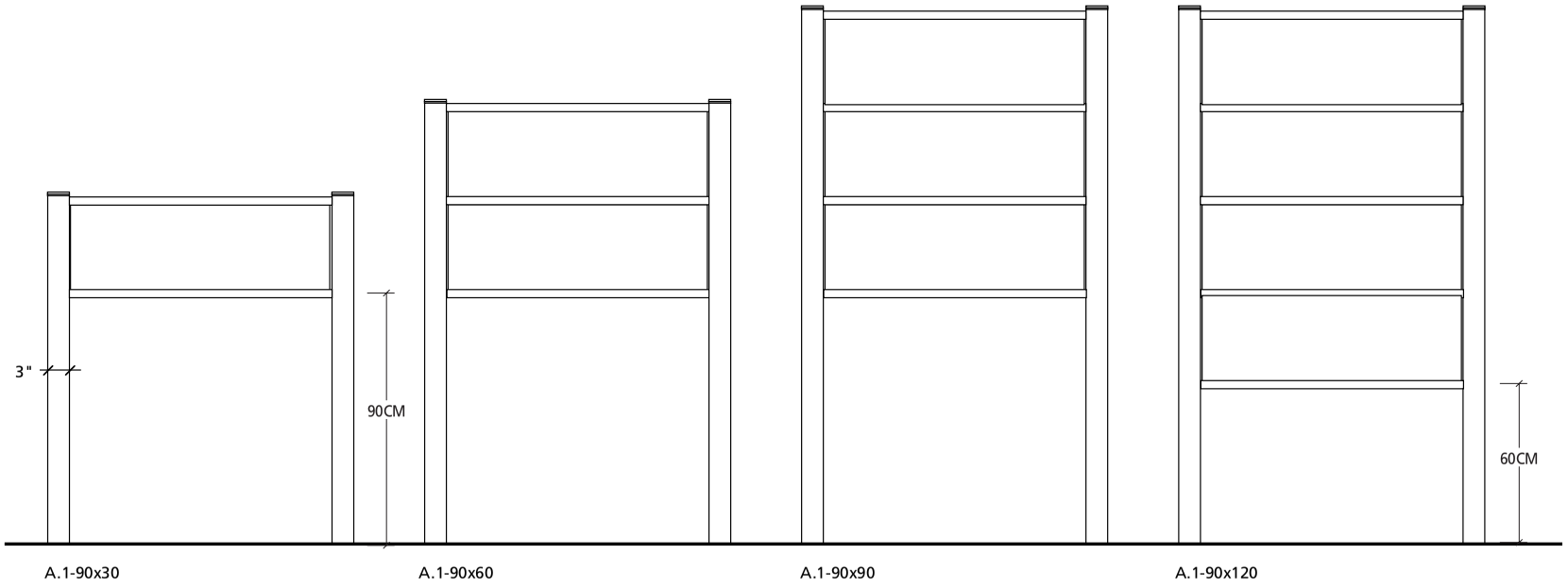

2" X 2" X 1/8" TUBE
90CM
2"
60CM
A.1-30x30
A.1-30x60
A.1-30x90
A.1-30x120


3" X 2" X 1/8" TUBE
90CM
3"
A.1-45x45
A.1-45x90
A.1-60x60

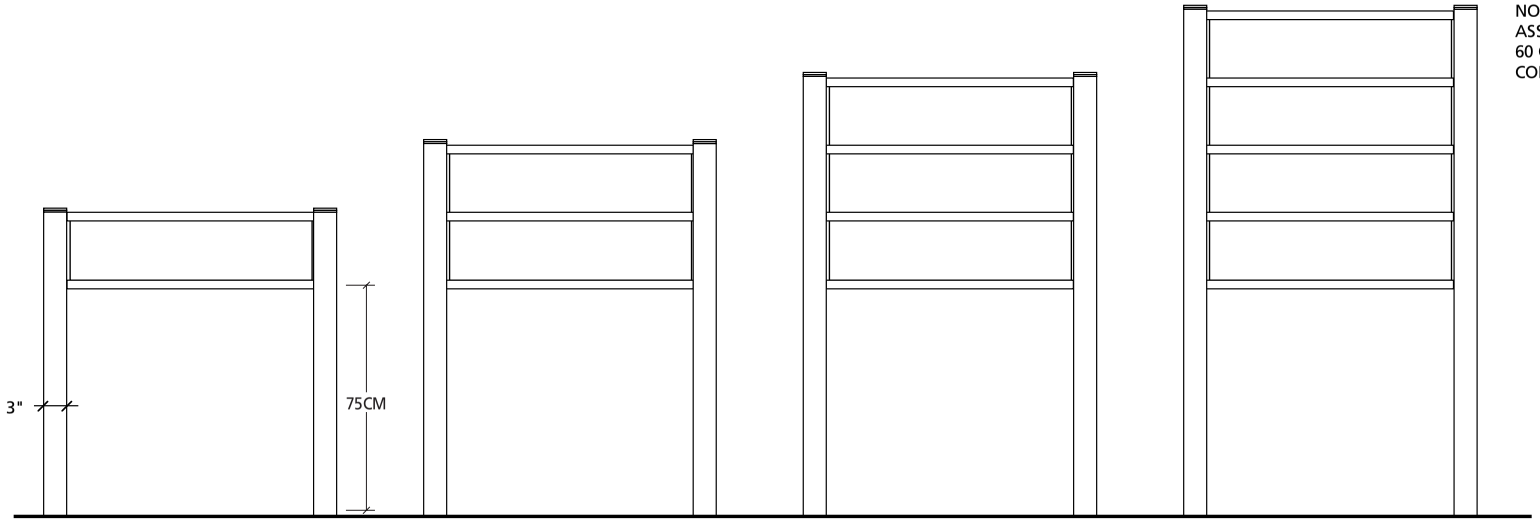

3" X 2" X 1/8" TUBE
90CM
3"
60CM
A.1-90x60
A.1-60x90
A.1-60x120
A.1-90x90
A.1-120x90



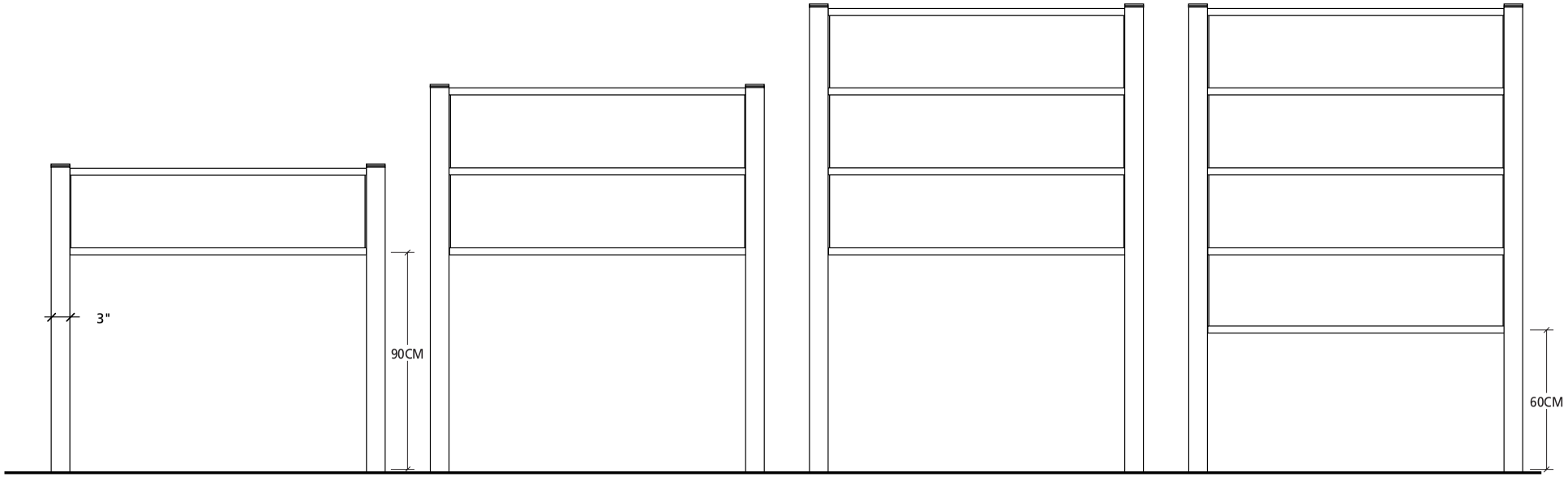
NO SINGLE PANEL IS DEEPER THAN 60 CM. ASSEMBLIES CAN BE ASSEMBLED FROM 30 AND 60 CM UNITS TO CREATE THE DESIRED CONFIGURATION



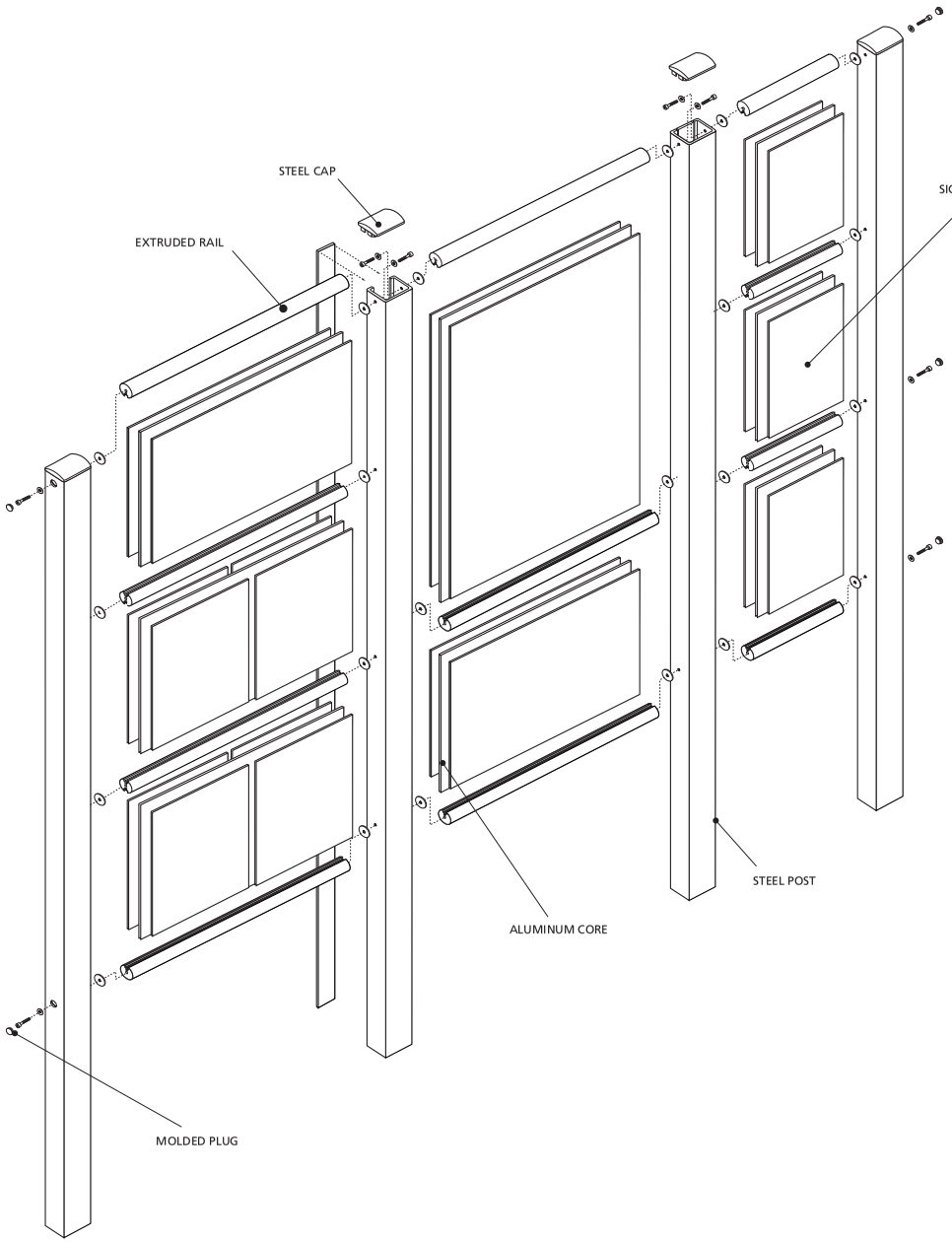
NO SINGLE PANEL IS DEEPER THAN 60 CM. ASSEMBLIES CAN BE ASSEMBLED FROM 30 AND 60 CM UNITS TO CREATE THE DESIRED CONFIGURATION

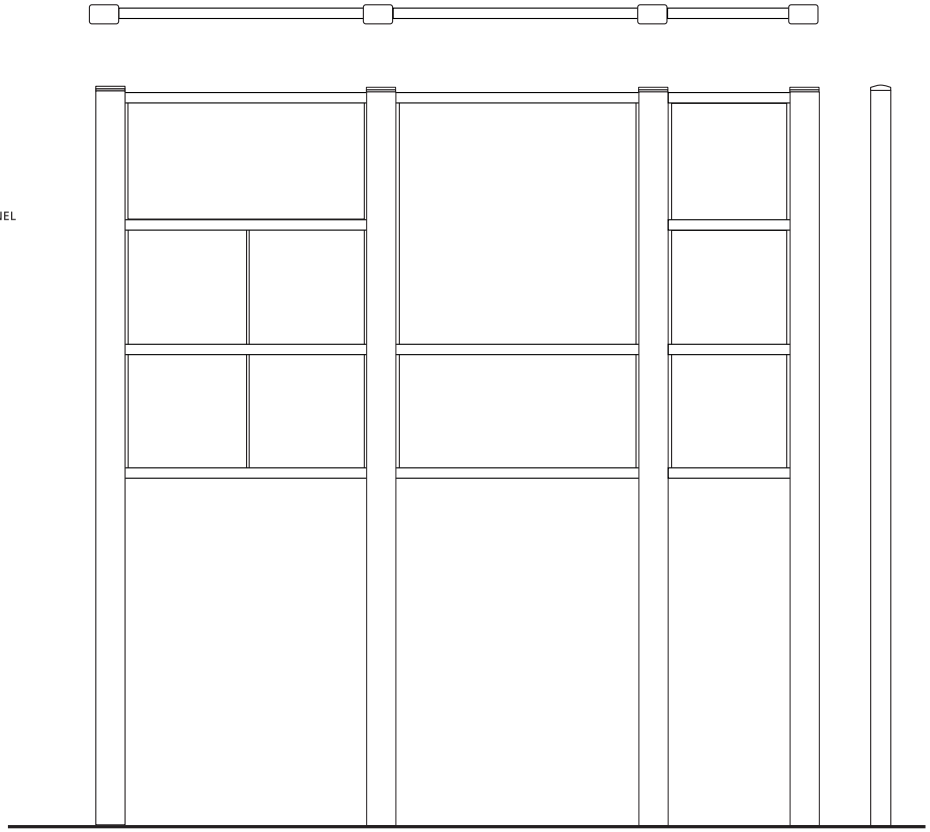


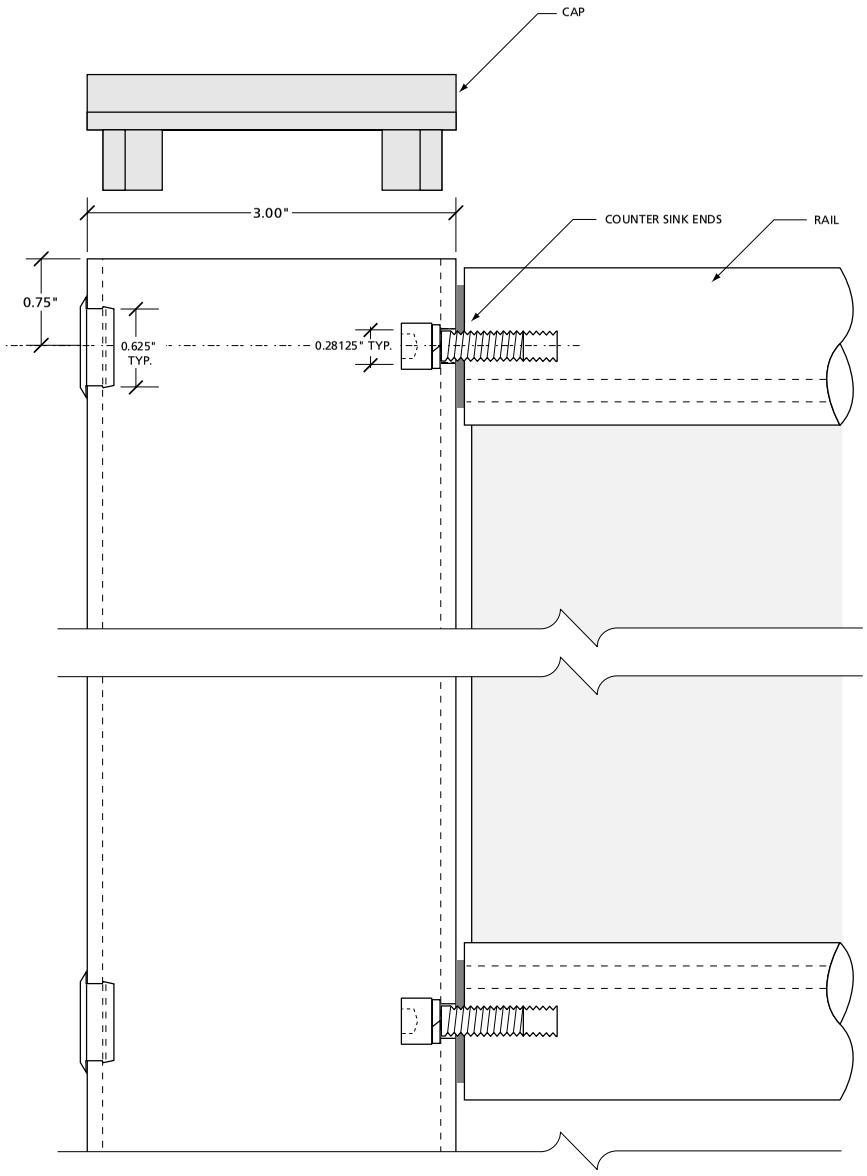
A.1-80x20 A.1-80x40 A.1-80x60 A.1-80x80



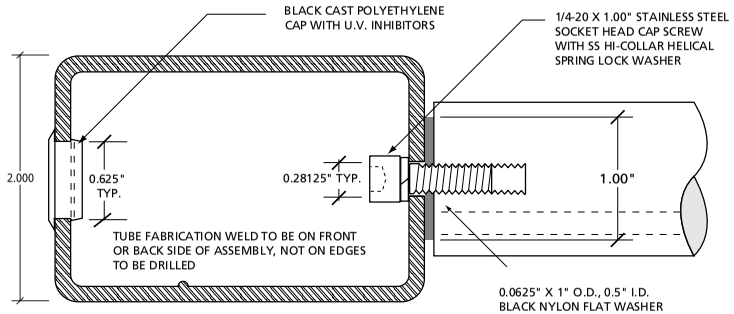
A.1-120x30 A.1-120x60 A.1-120x90 A.1-120x120


STEEL CAP
EXTRUDED RAIL
SIGN PANEL
STEEL POST
ALUMINUM CORE
MOLDED PLUG

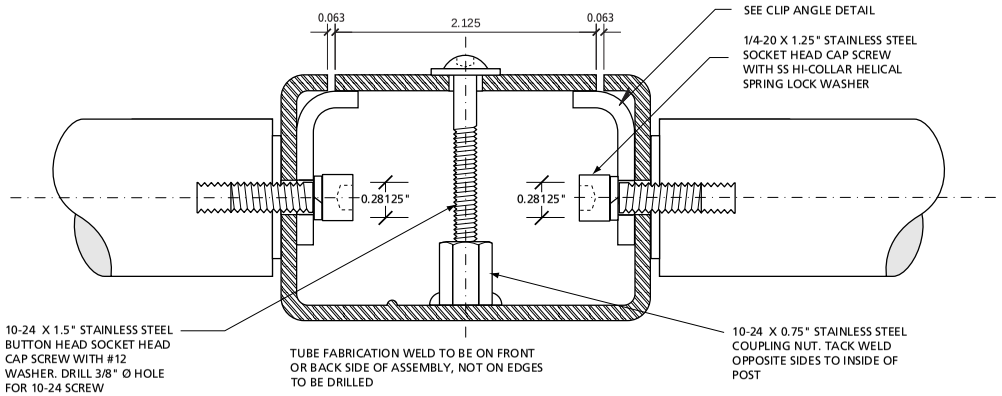




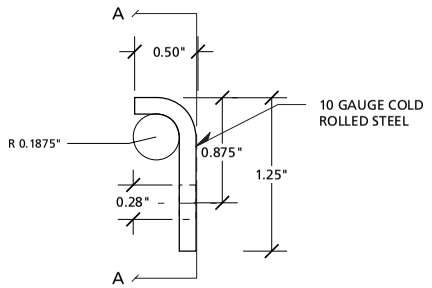
END POST CONNECTION ELEVATION DETAIL



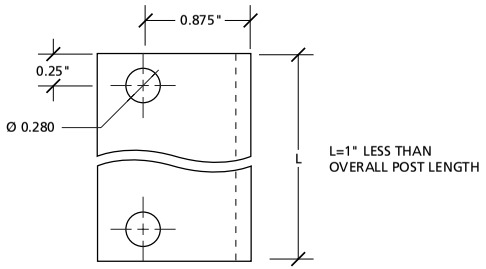
FRAME CONNECTION OUTSIDE POST PLAN DETAIL



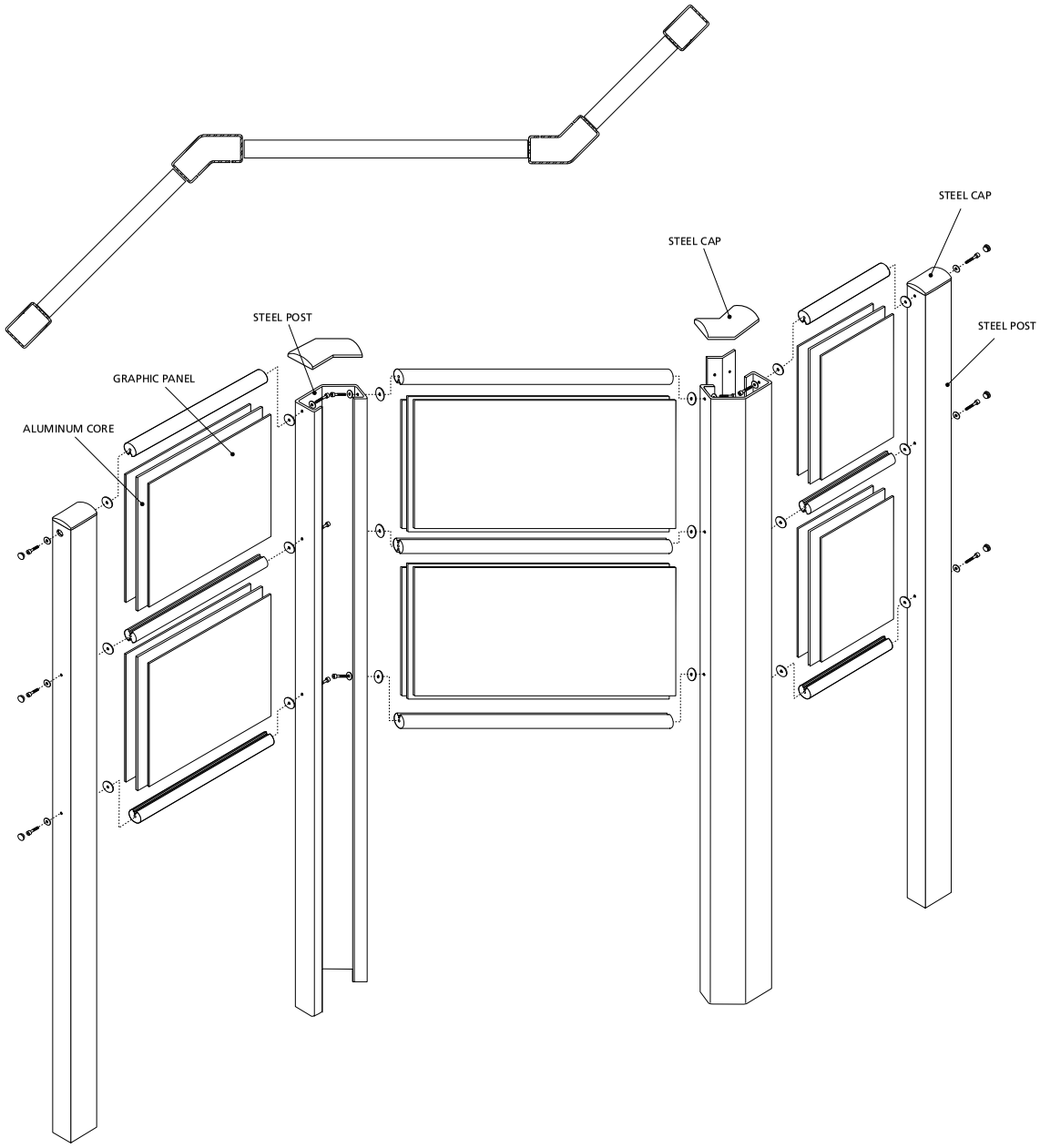
FRAME CONNECTION INNER POST PLAN DETAIL

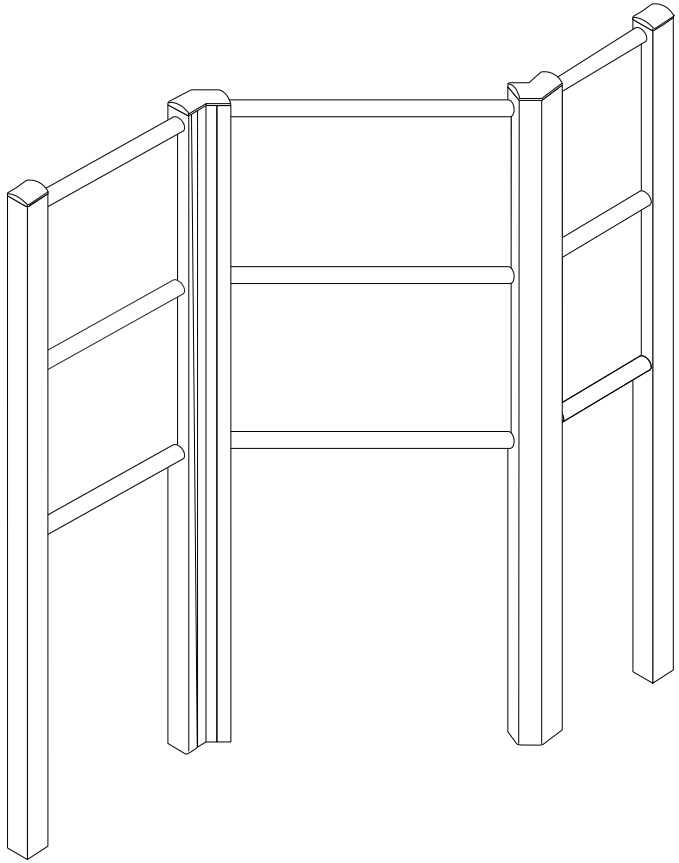


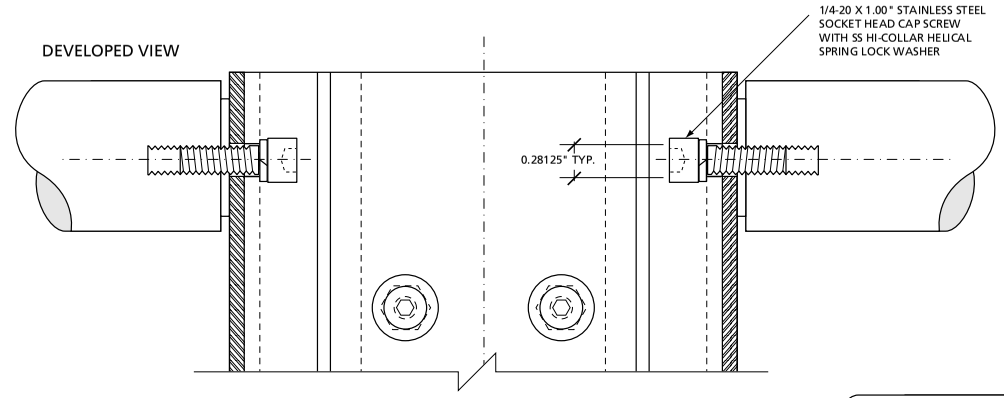
CLIP ANGLE DETAIL



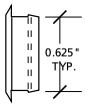
CLIP ANGLE DETAIL
A-A


STEEL CAP
STEEL CAP
STEEL POST
STEEL POST
GRAPHIC PANEL
ALUMINUM CORE

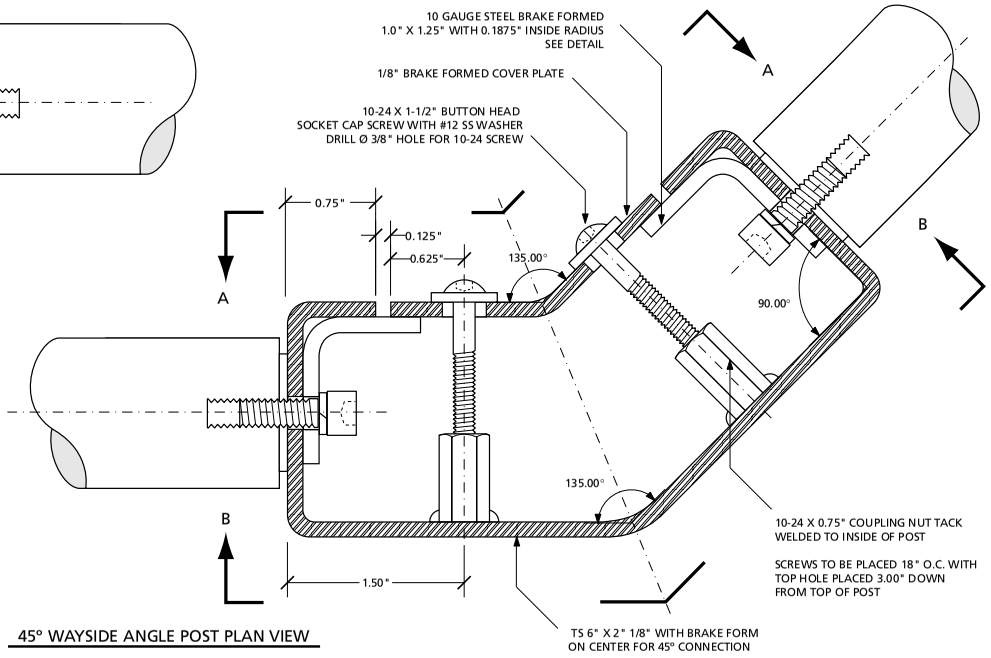




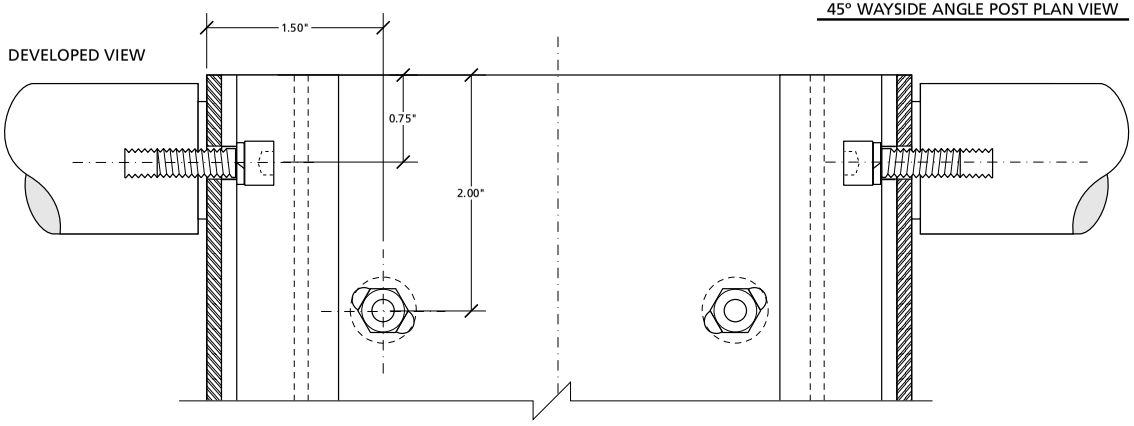
45° ANGLE CLUSTER BASE POST BACK VIEW
A-A



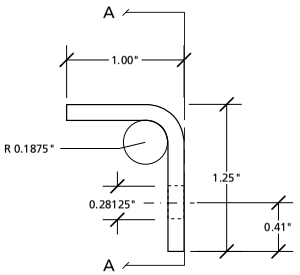
POLYETHYLENE PLUGS FOR END POSTS



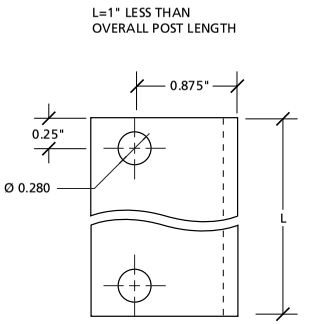
45° WAYSIDE ANGLE POST PLAN VIEW



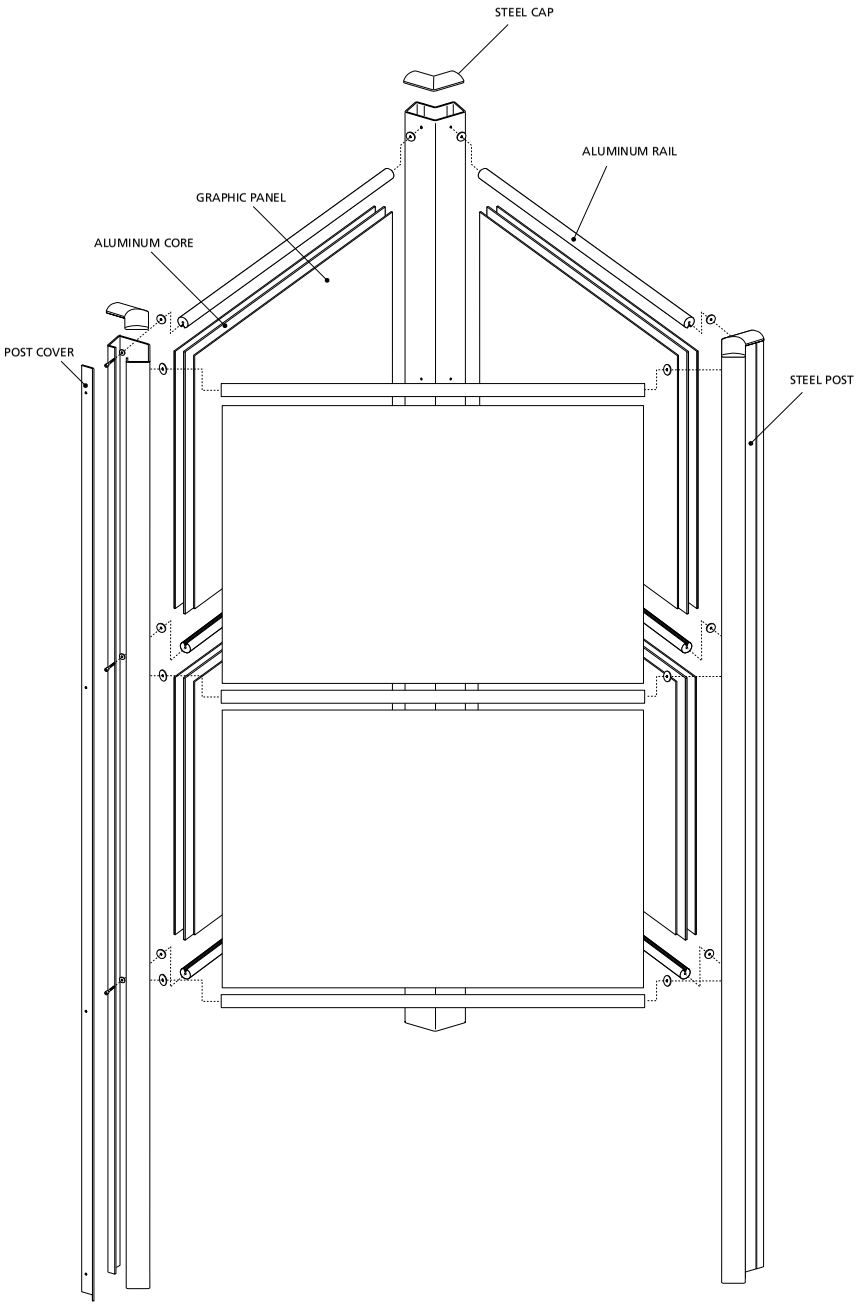
45° ANGLE CLUSTER BASE POST FRONT VIEW
B-B

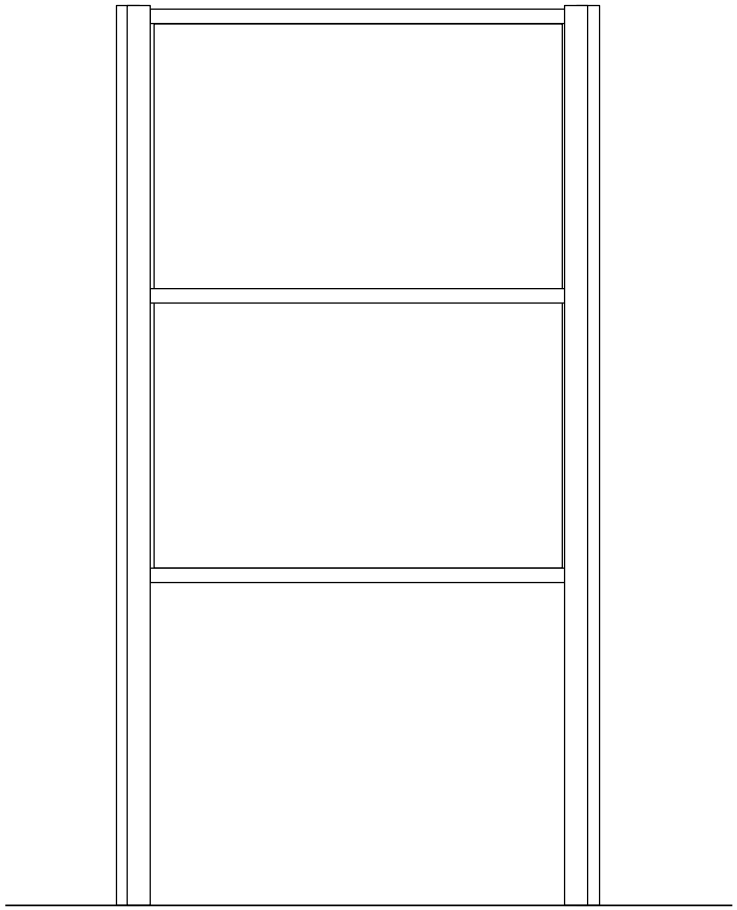


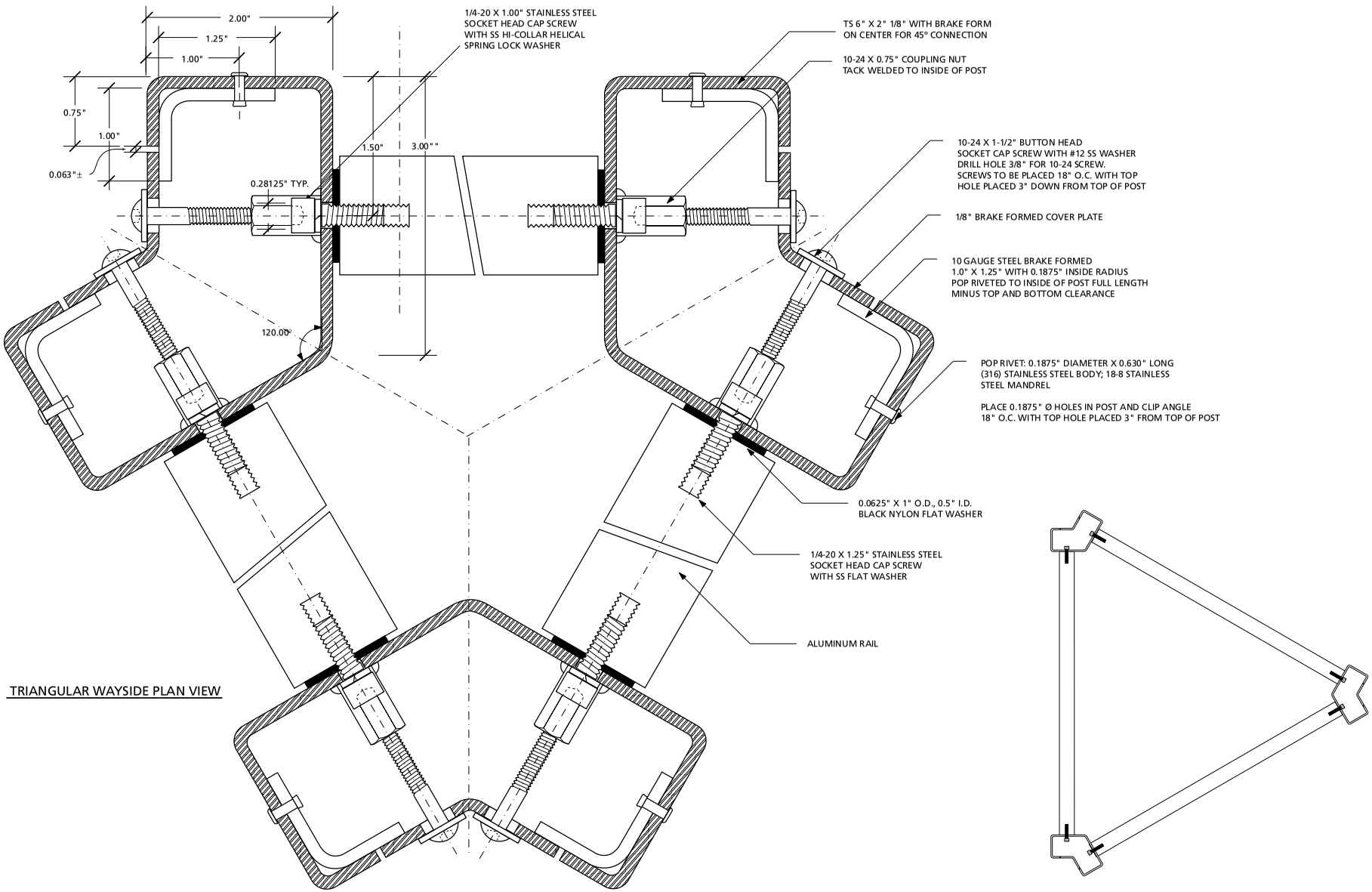
CLIP ANGLE DETAIL



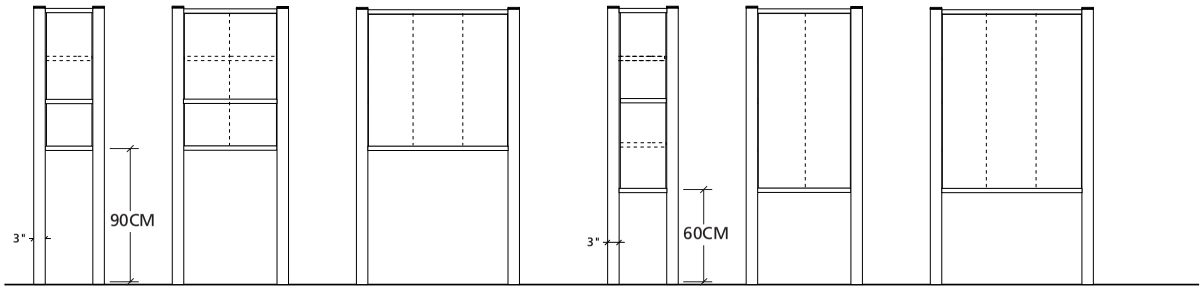
CLIP ANGLE DETAIL
A-A

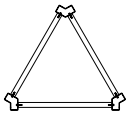

STEEL CAP
ALUMINUM RAIL
GRAPHIC PANEL
ALUMINUM CORE
POST COVER
STEEL POST



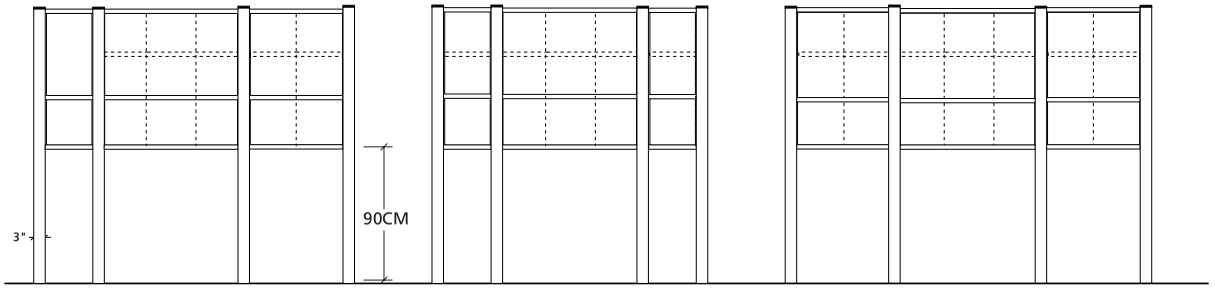


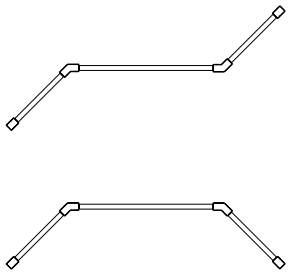
TRIANGULAR WAYSIDE PLAN VIEW



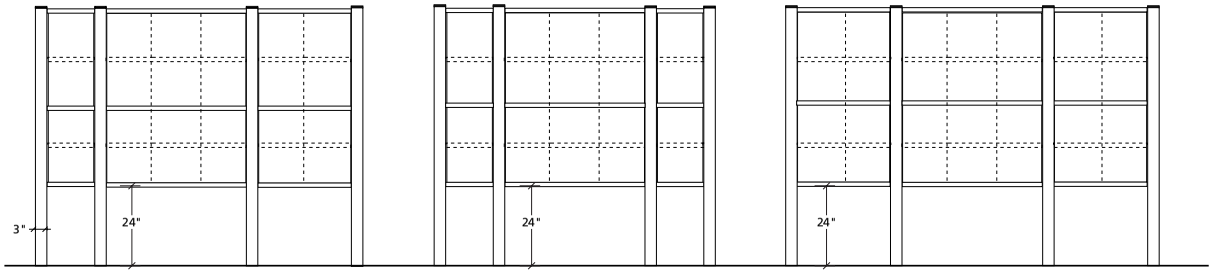


Tri-Side, Multiple Post Assembly



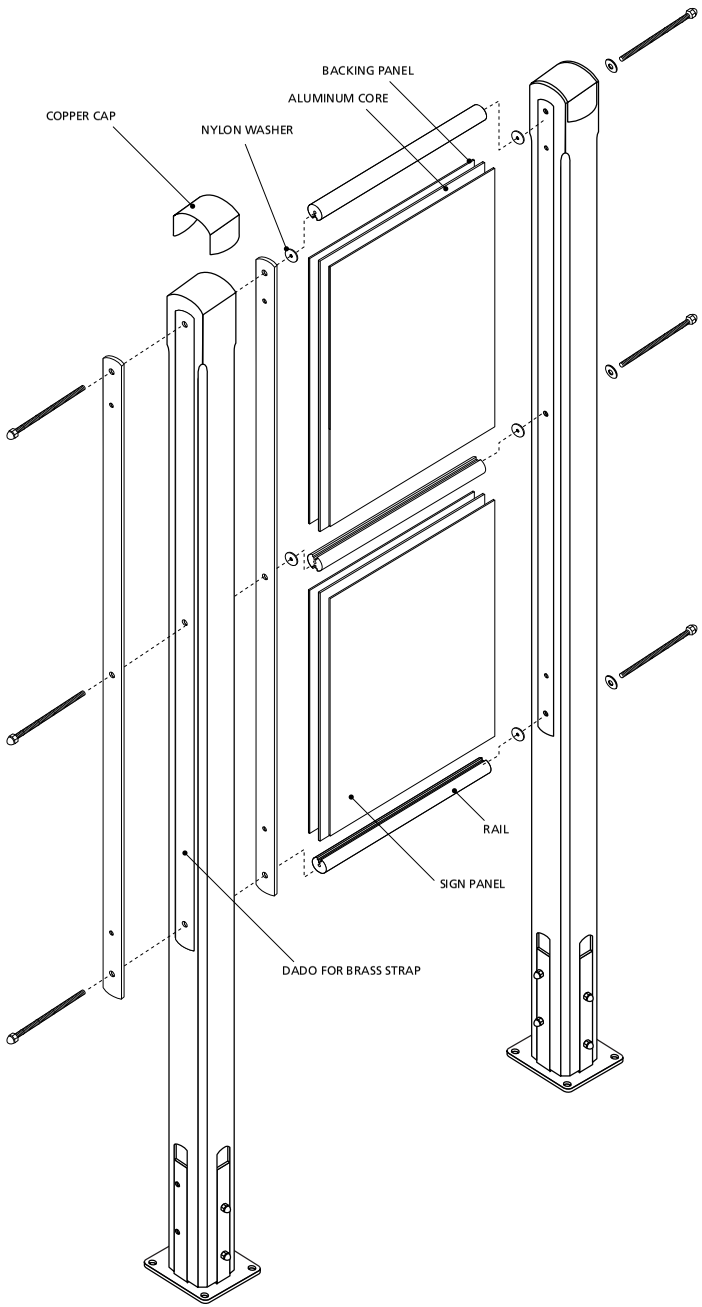


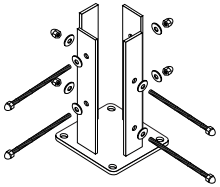
Cluster, Multiple Post Assembly

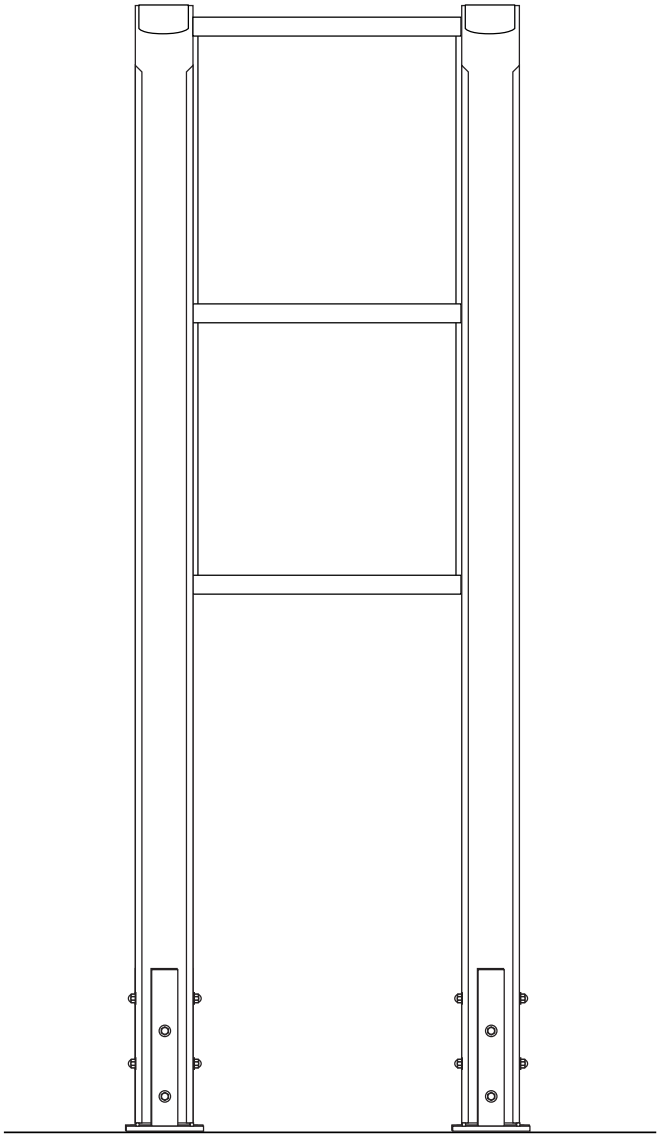


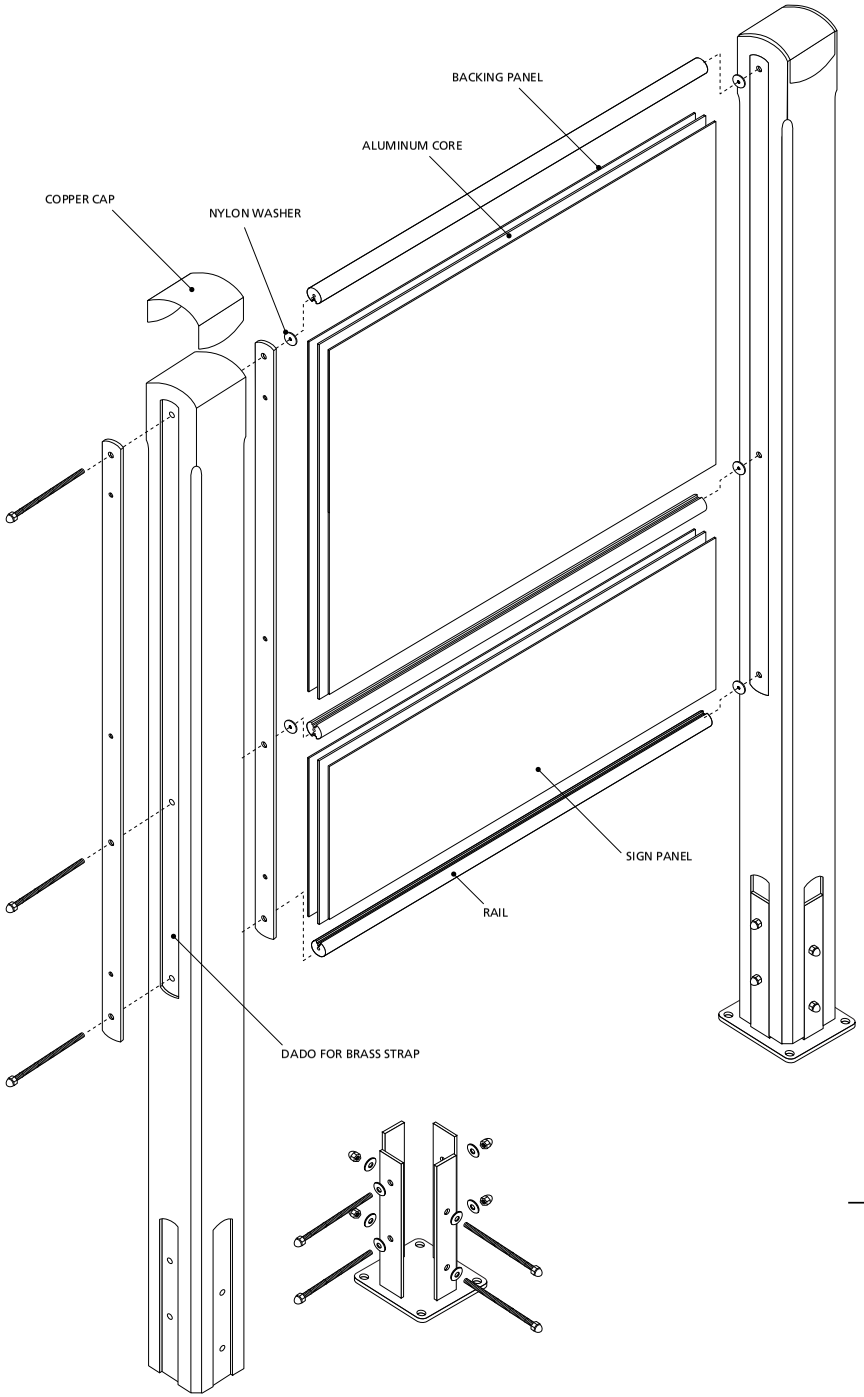
In-Line, Multiple Post Assembly

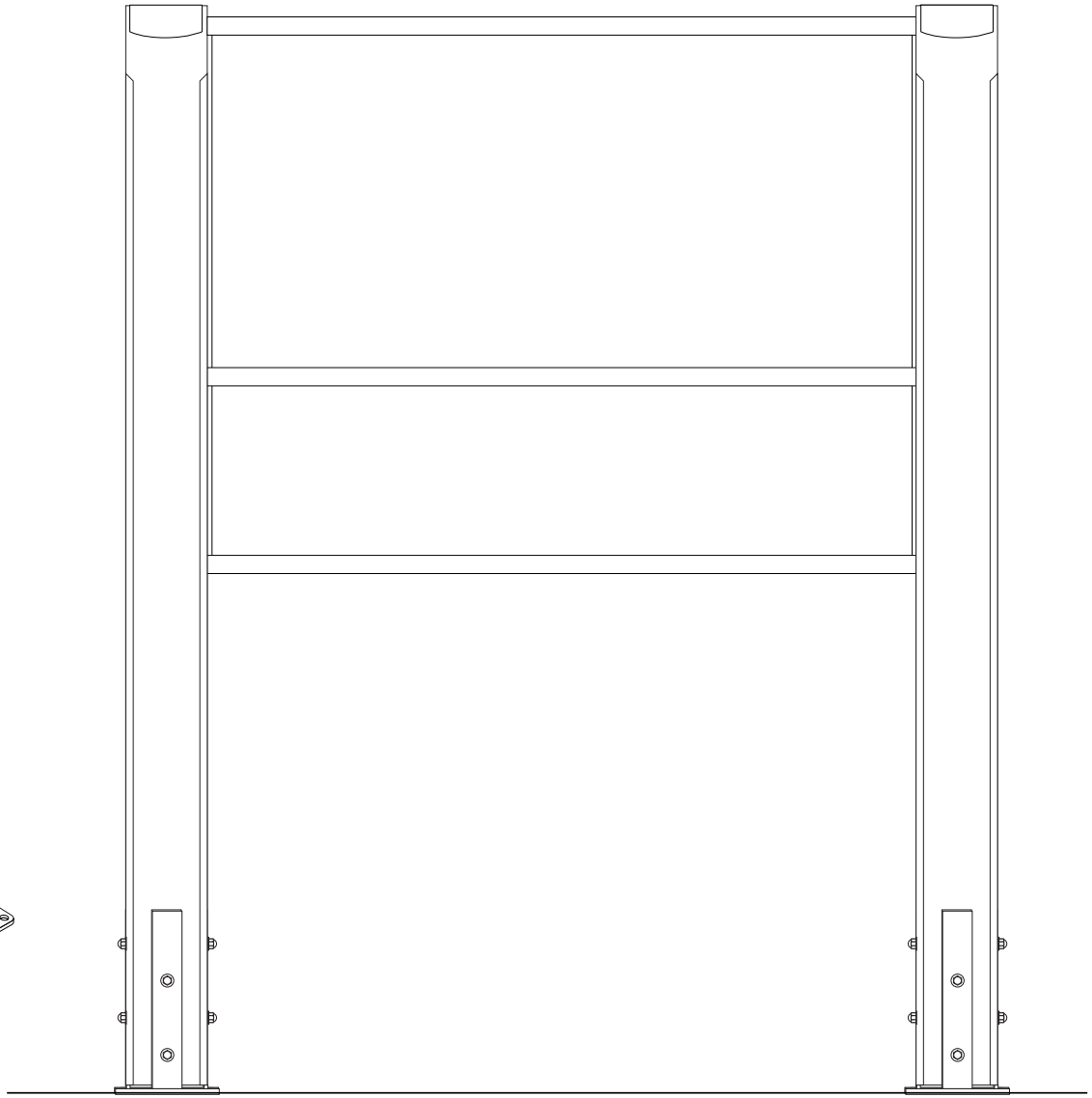
TYPICAL ASSEMBLIES.
ACTUAL ASSEMBLY CONFIGURATIONS WILL VARY BASED ON OVERALL DESIGN OF GRAPHICS INCLUDED. ALL ASSEMBLIES ARE 180 CM TALL

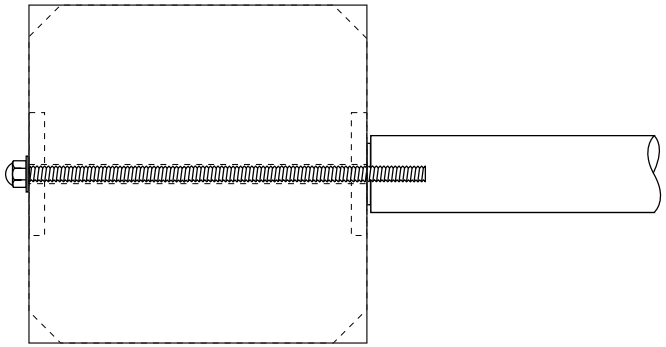

BACKING PANEL
ALUMINUM CORE
COPPER CAP
NYLON WASHER
RAIL
SIGN PANEL
DADO FOR BRASS STRAP





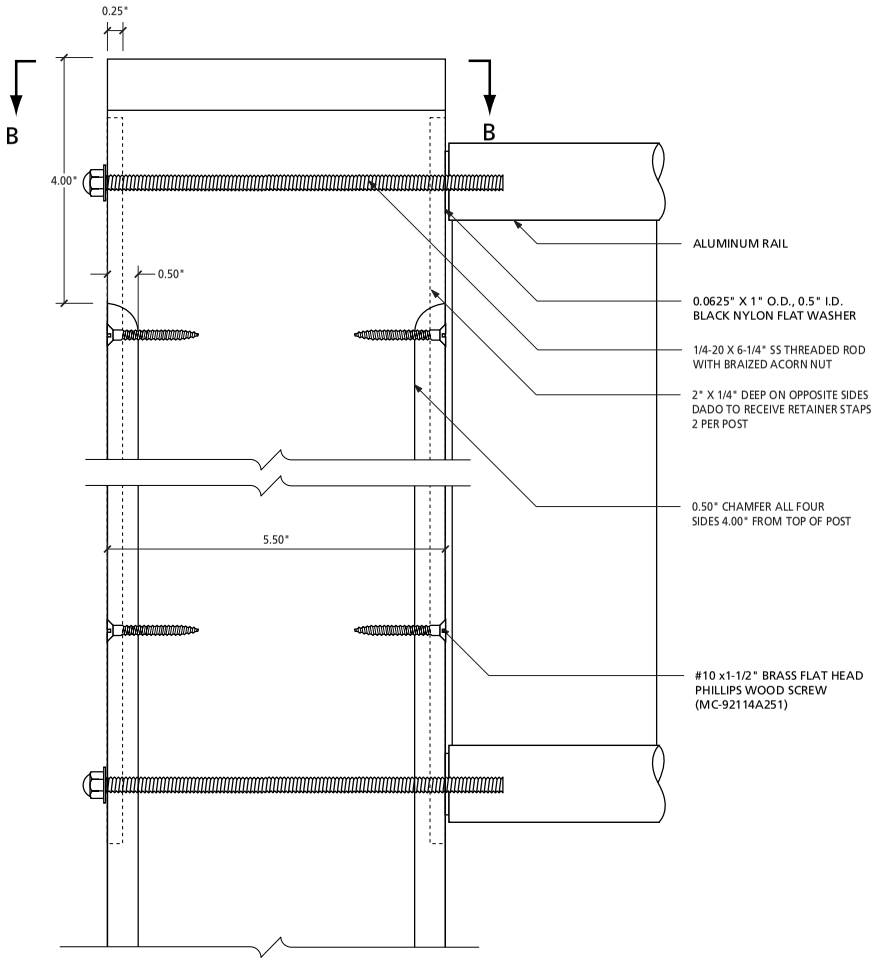

BACKING PANEL
ALUMINUM CORE
COPPER CAP
NYLON WASHER
SIGN PANEL
RAIL
DADO FOR BRASS STRAP

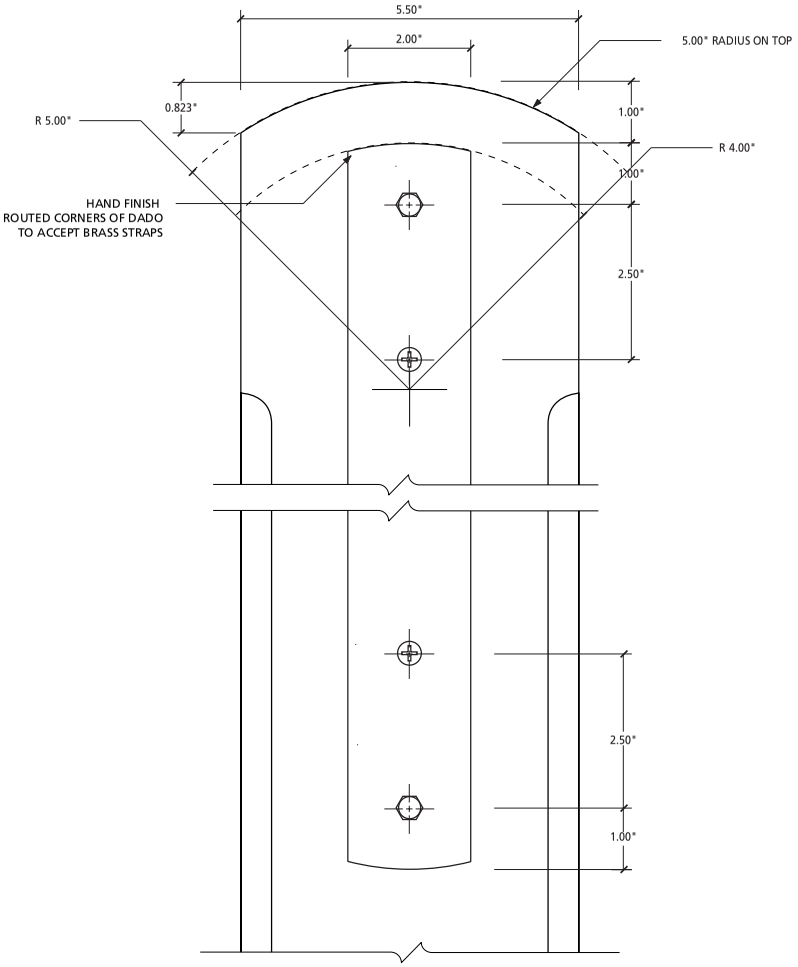


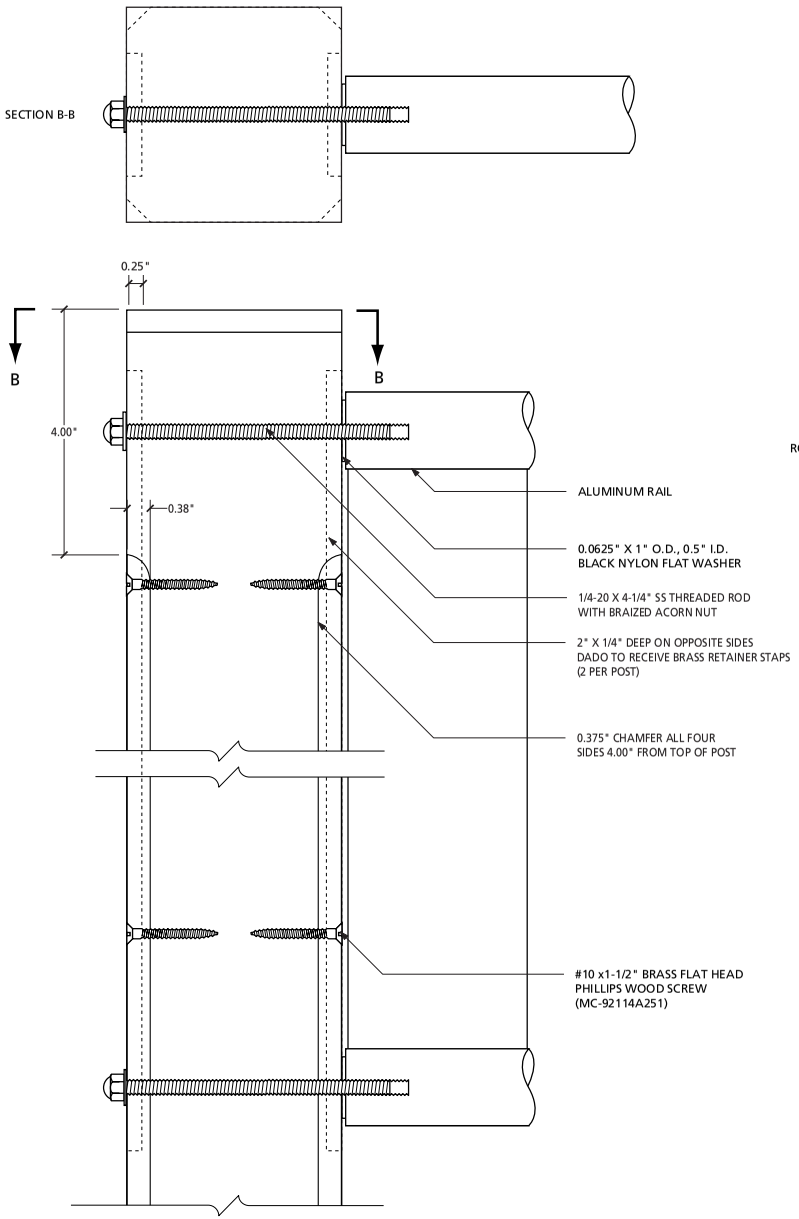


SECTION B-B

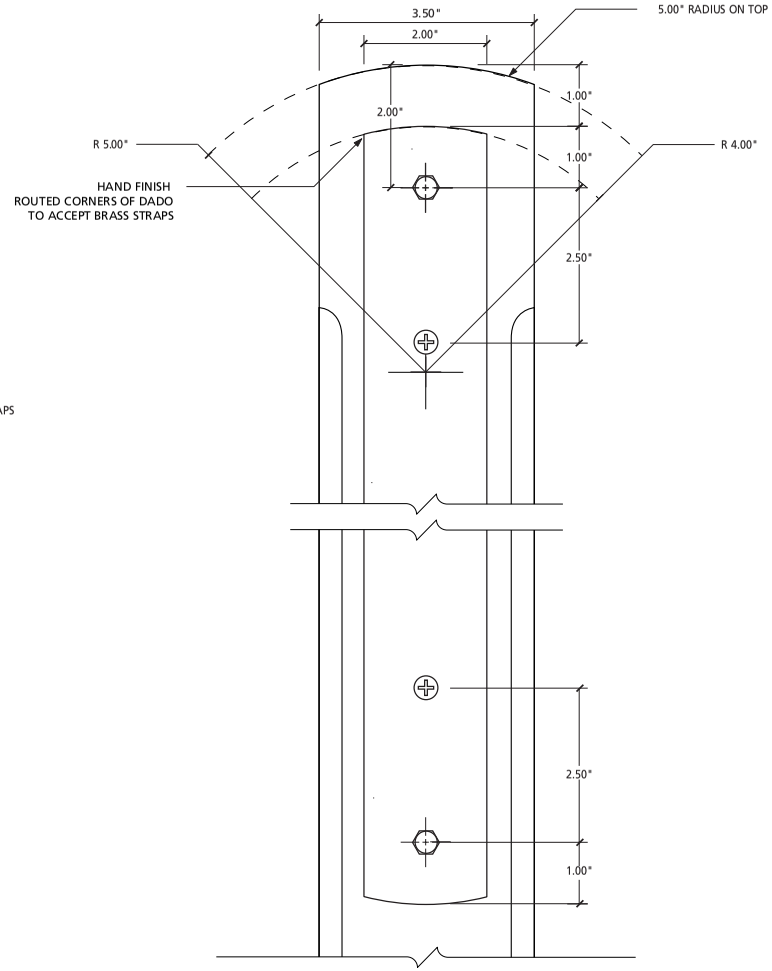
NOTE: SEE SYSTEM OPTIONS FOR POST SIZE AND DRILLING DIAGRAM FOR ALL ASSEMBLY CONFIGURATIONS



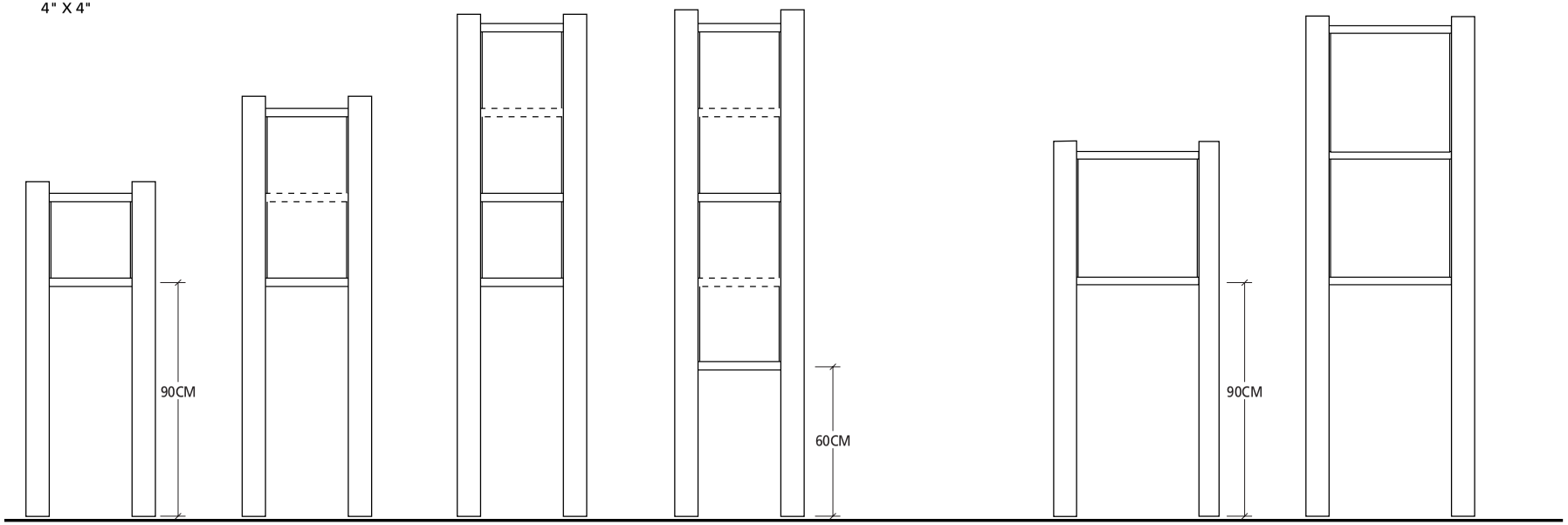




NOTE: SEE SYSTEM OPTIONS FOR POST SIZE AND DRILLING DIAGRAM FOR ALL ASSEMBLY CONFIGURATIONS



4" X 4"



A.5-30x30
(49.446")

A.5-30x60
(62.084")

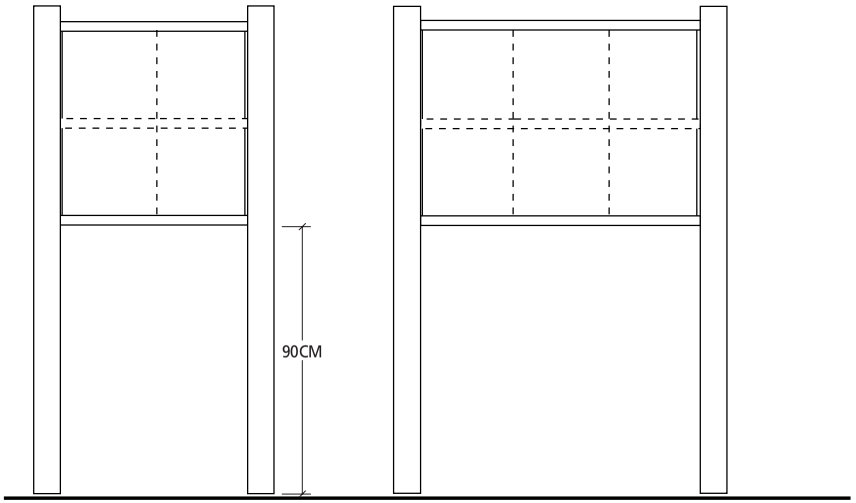
A.5-30x90
(74.722")

A.5-30x120
(74.722")

A.5-45x45
(55.373")

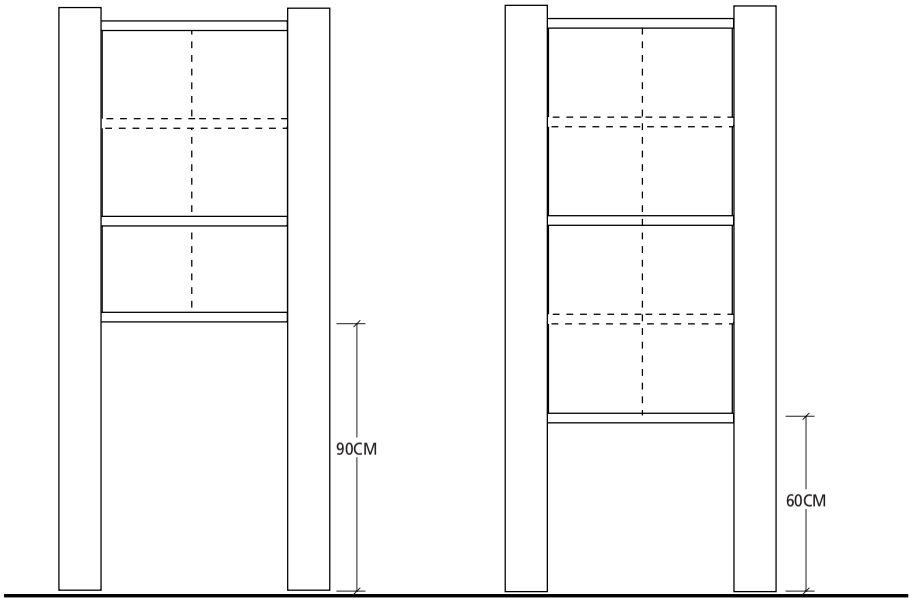
A.5-45x90
(73.938")

4" x 4"



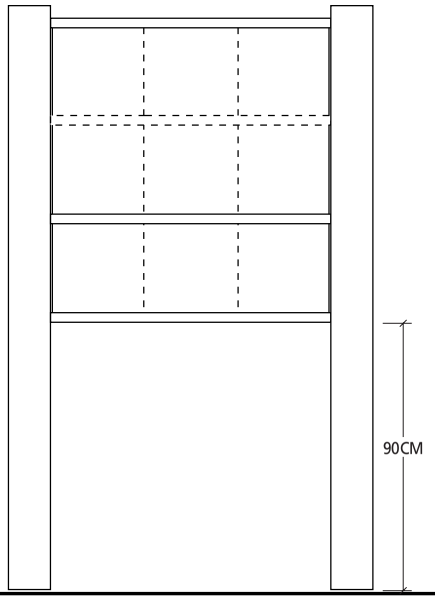
A.5-60x60
(62.084")

A.5-90x60
(62.084")

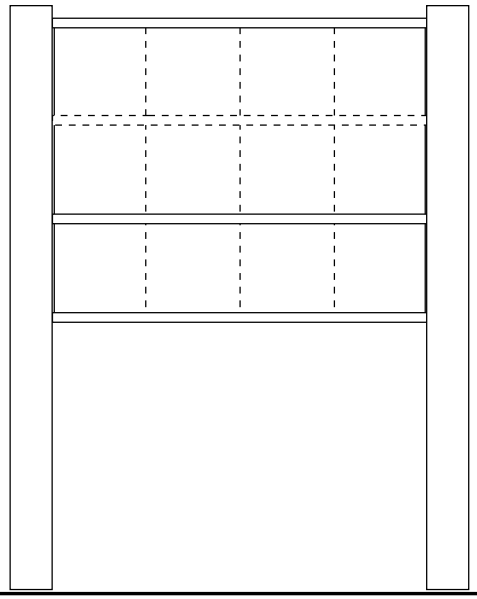


A.5-60X90-B6

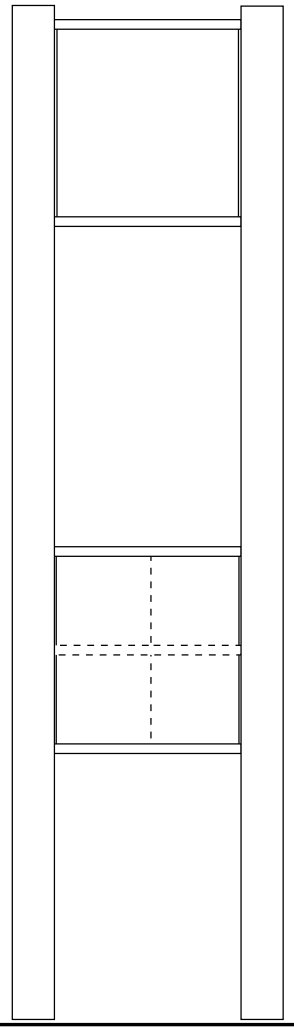
A.5-60X120-B6



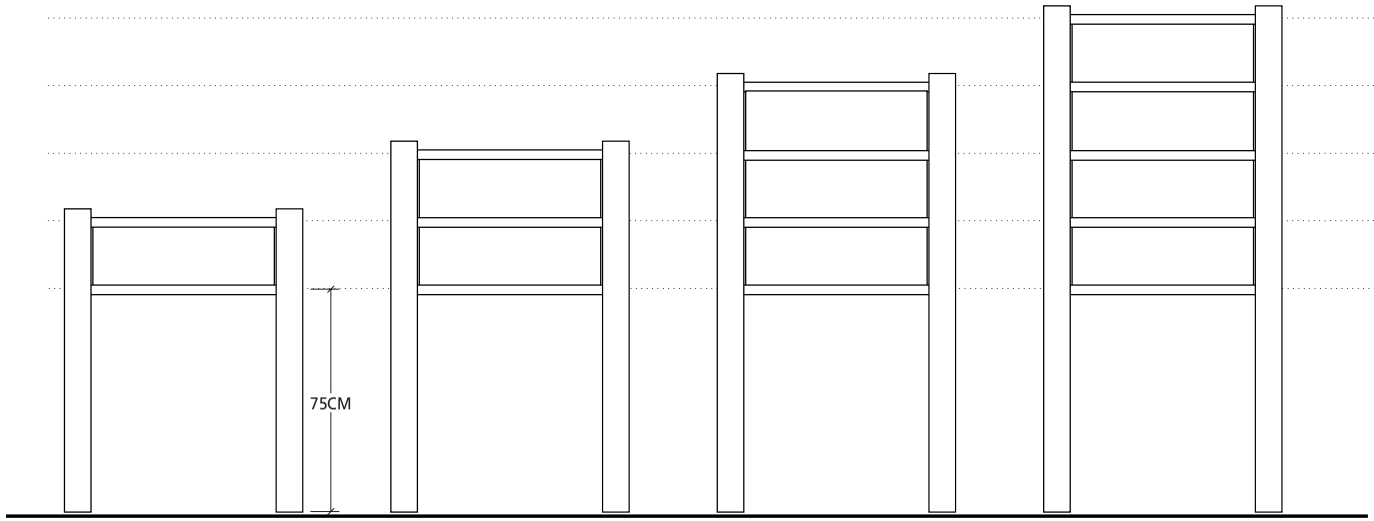
A.5-120X90-B6



A.5-120X90-B6



A.5-60x60/60x60-B6

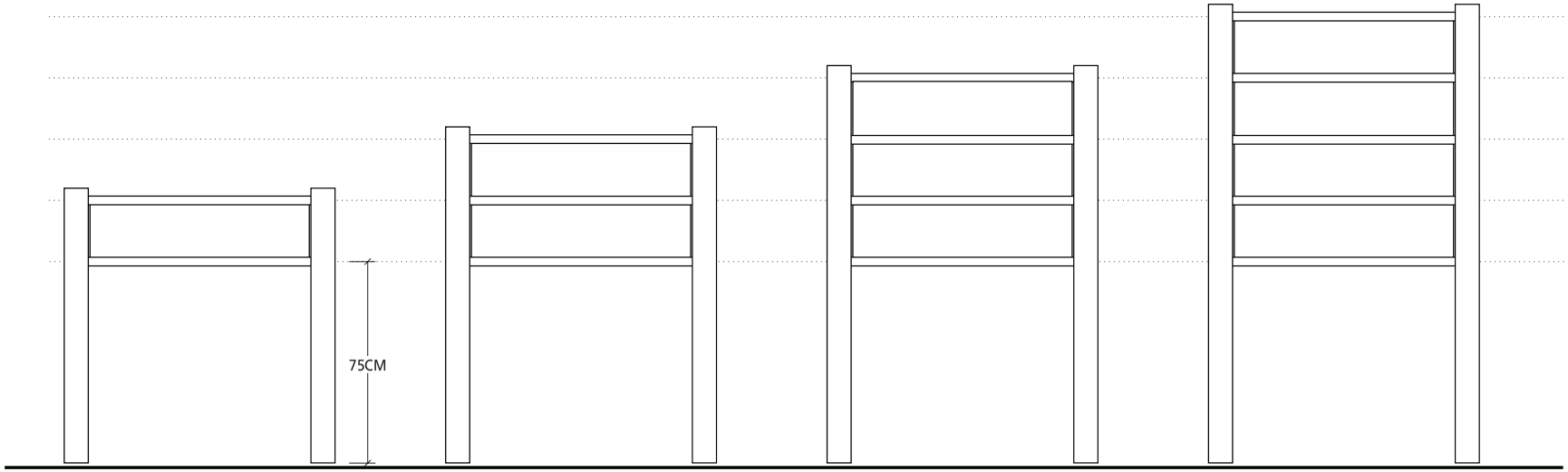


A.5-60x20
(39.681")

A.5-60x40
(48.460")

A.5-60x60
(57.239")

A.5-60x80
(66.00")

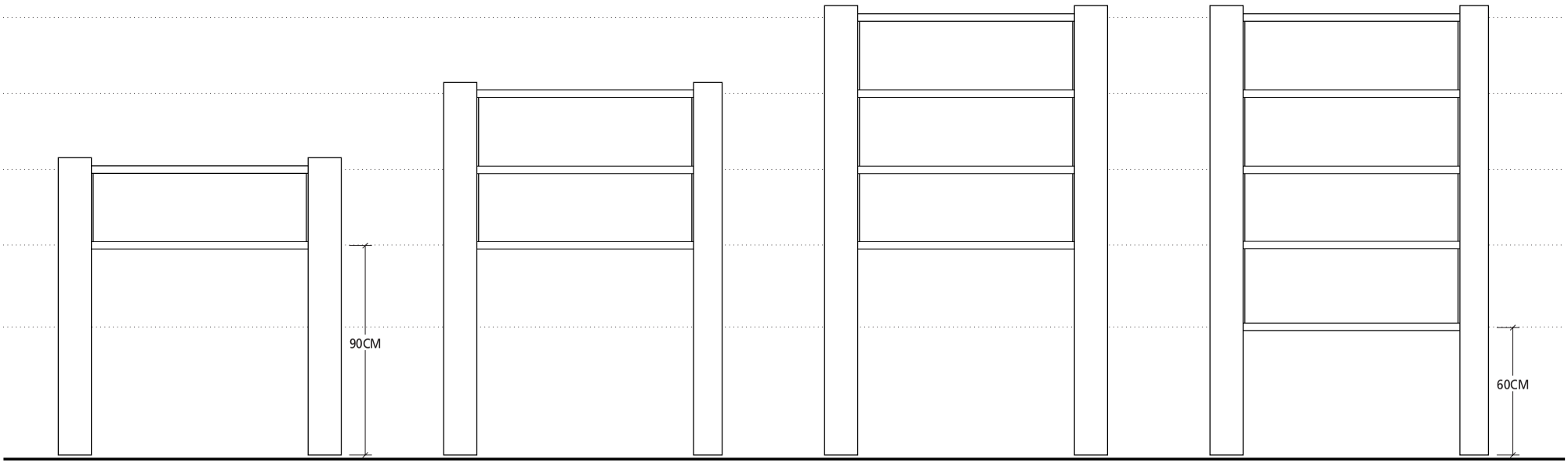


A.5-80x20
(39.681)

A.5-80x40
(48.460")

A.5-80x60
(57.239")

A.5-80x80
(66.00")

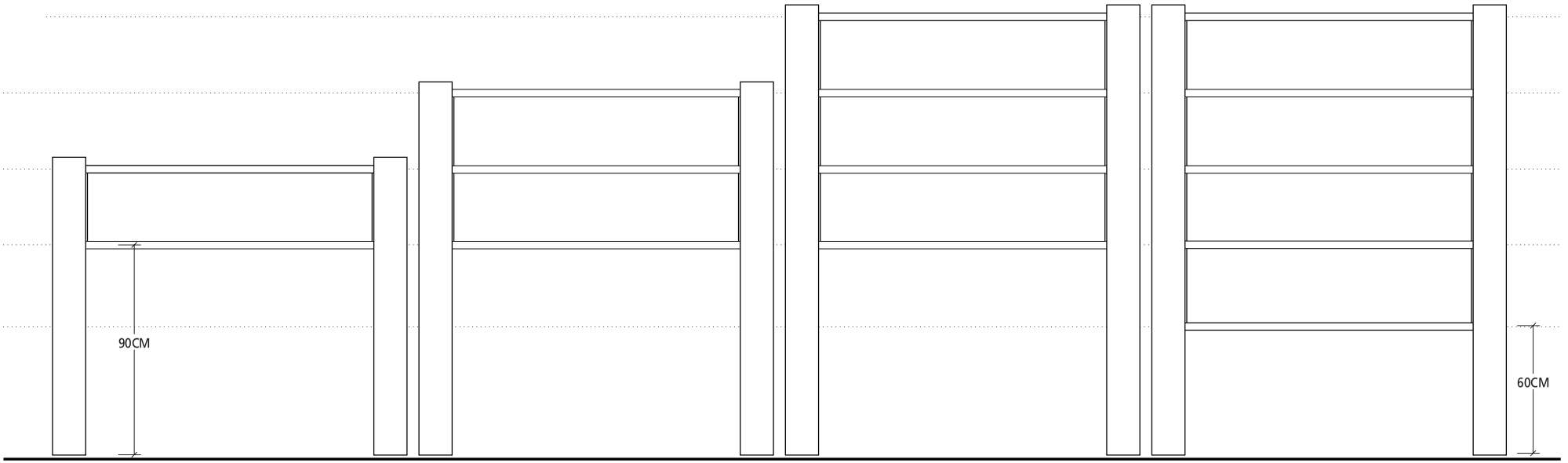


A.5–90x30
(49.446")

A.5–90x60
(62.084")

A.5-90x90
(74.722")

A.5-90x120
(74.722")

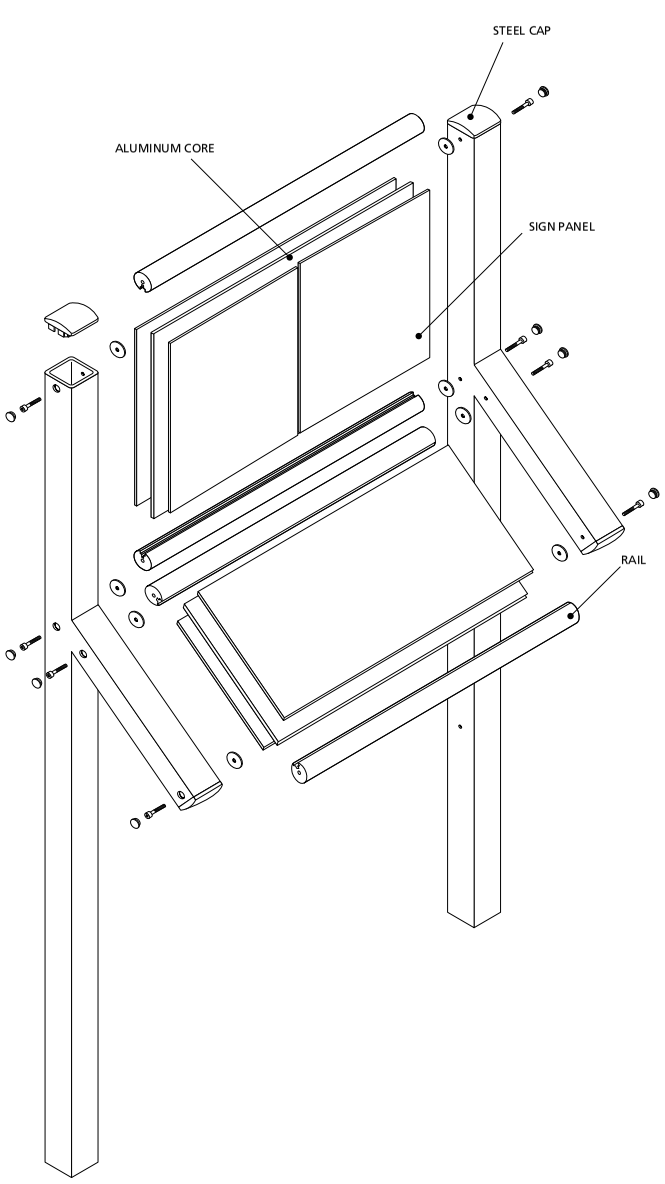


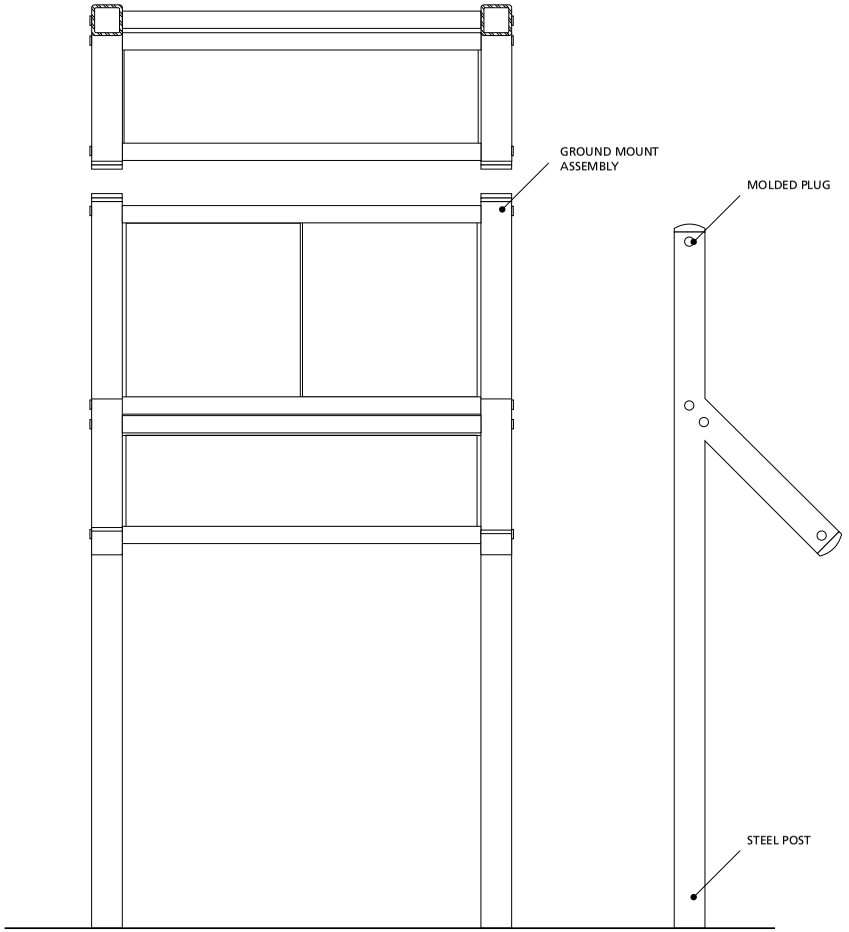
A.5-120x30
(49.446")

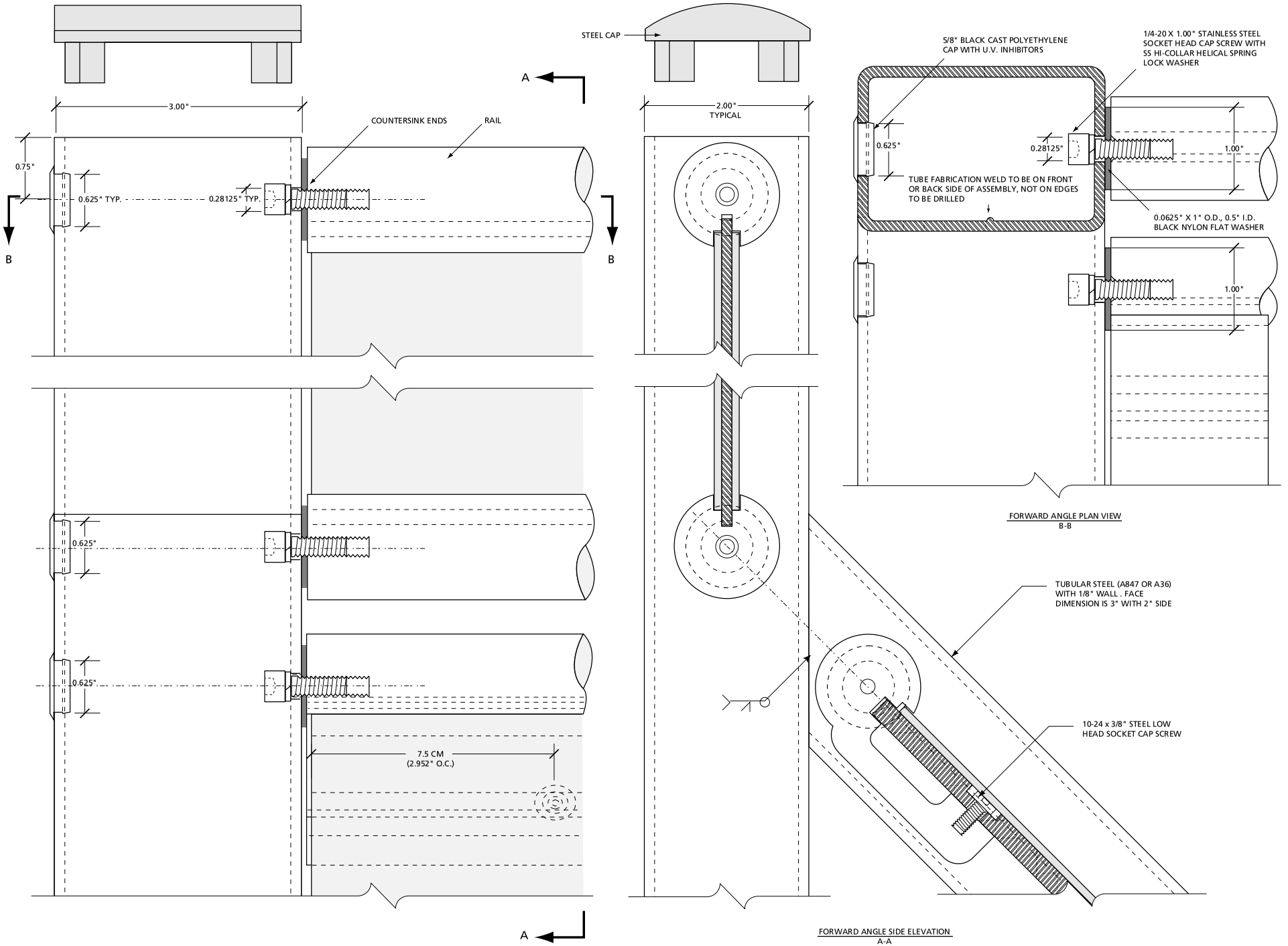
A.5-120x60
(62.084")

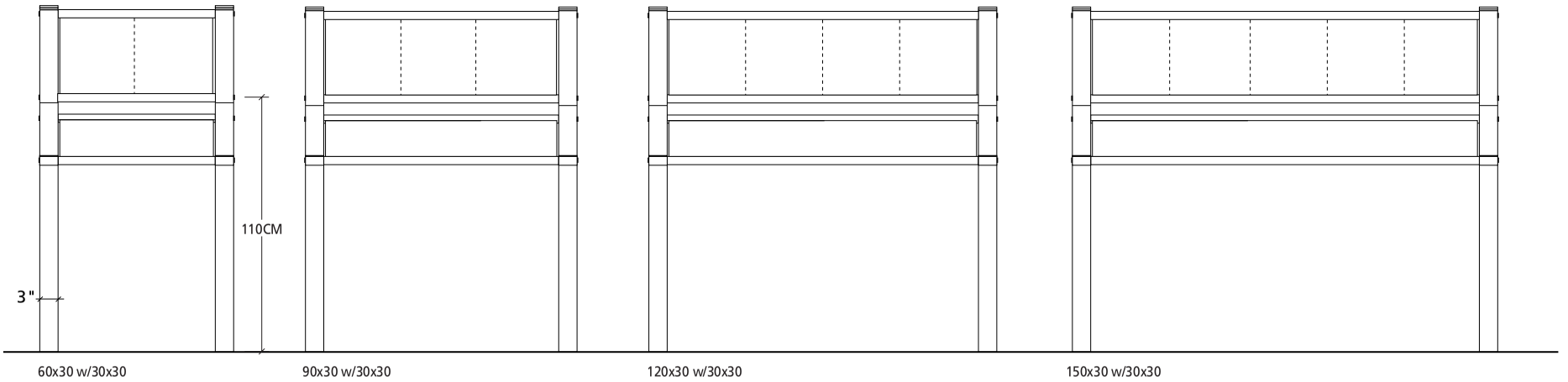
A.5-120x90
(74.722")

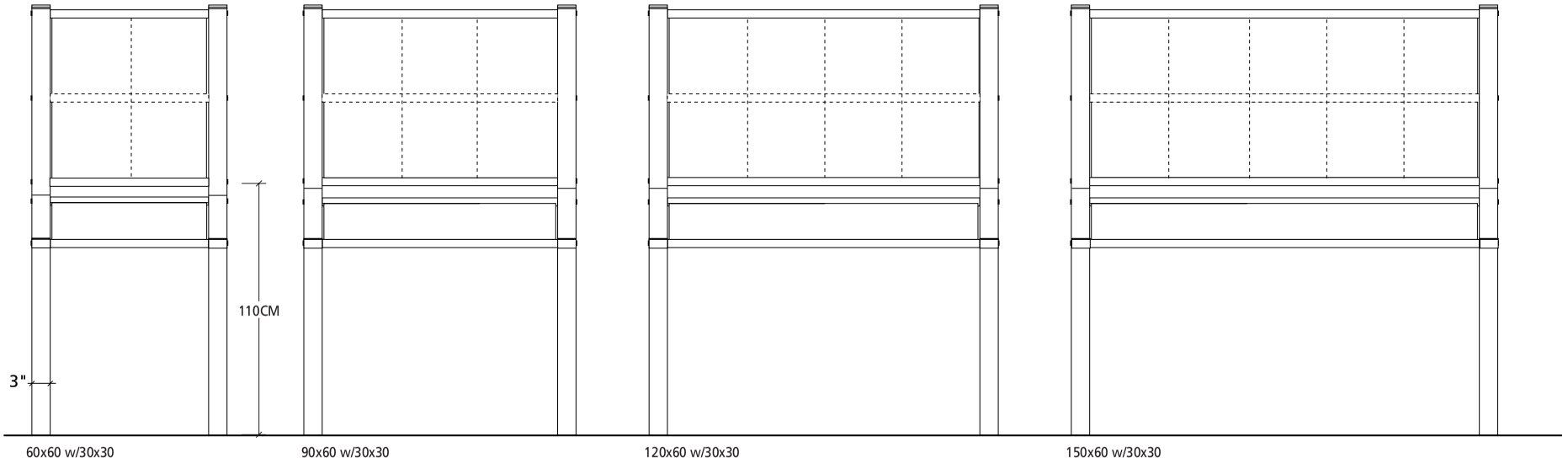
A.5-120x120
(74.722")

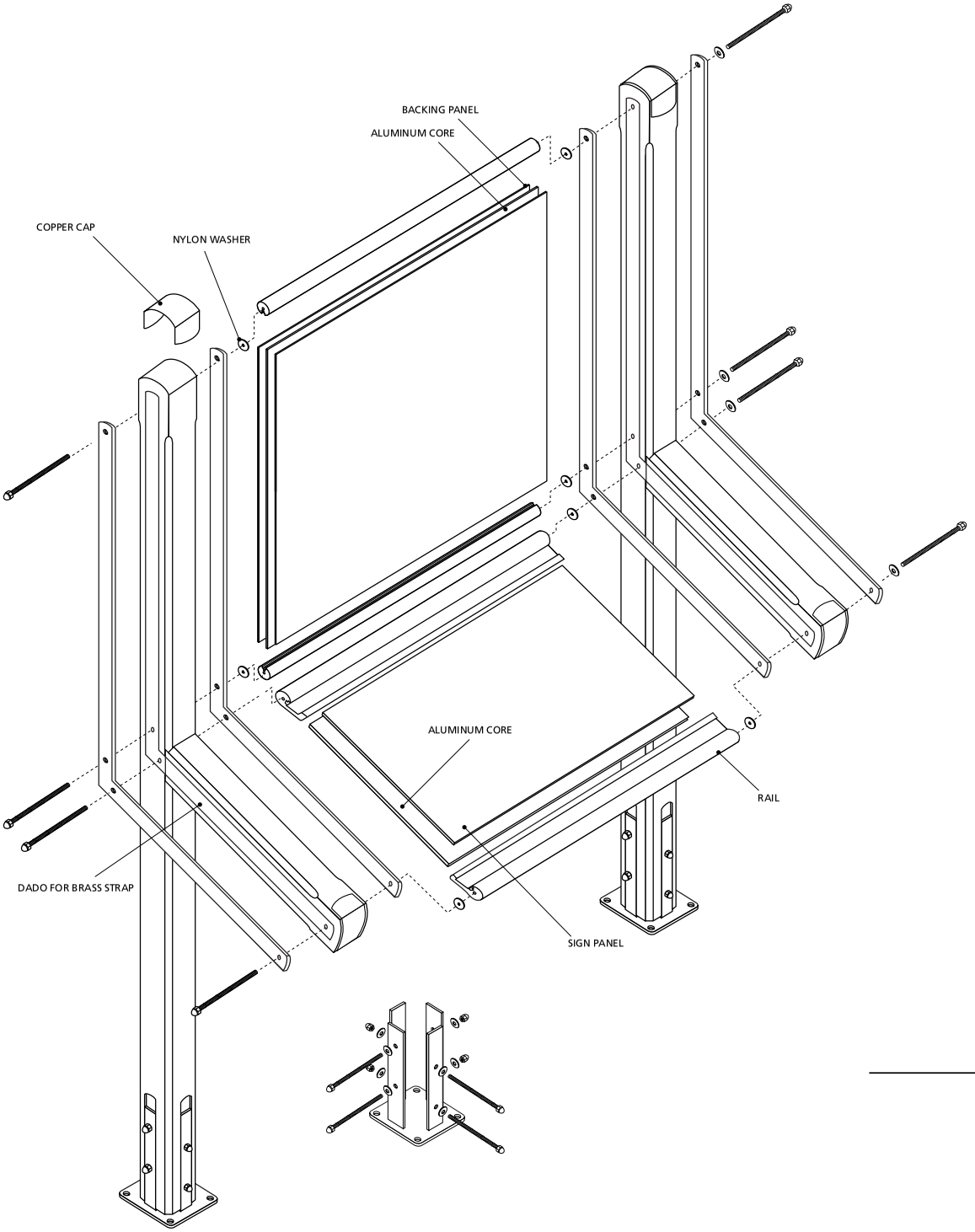

STEEL CAP
ALUMINUM CORE
SIGN PANEL
RAIL

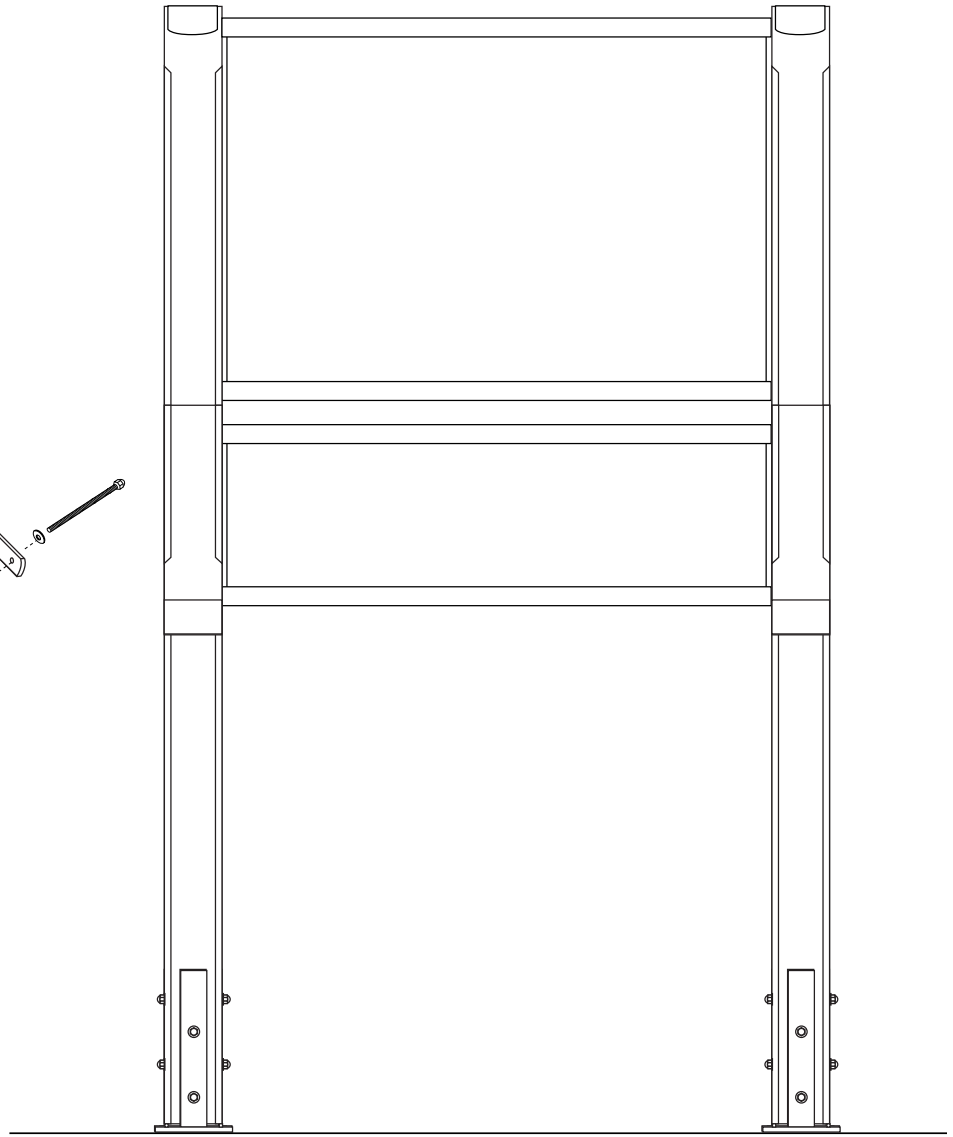

GROUND MOUNT ASSEMBLY
MOLDED PLUG
STEEL POST

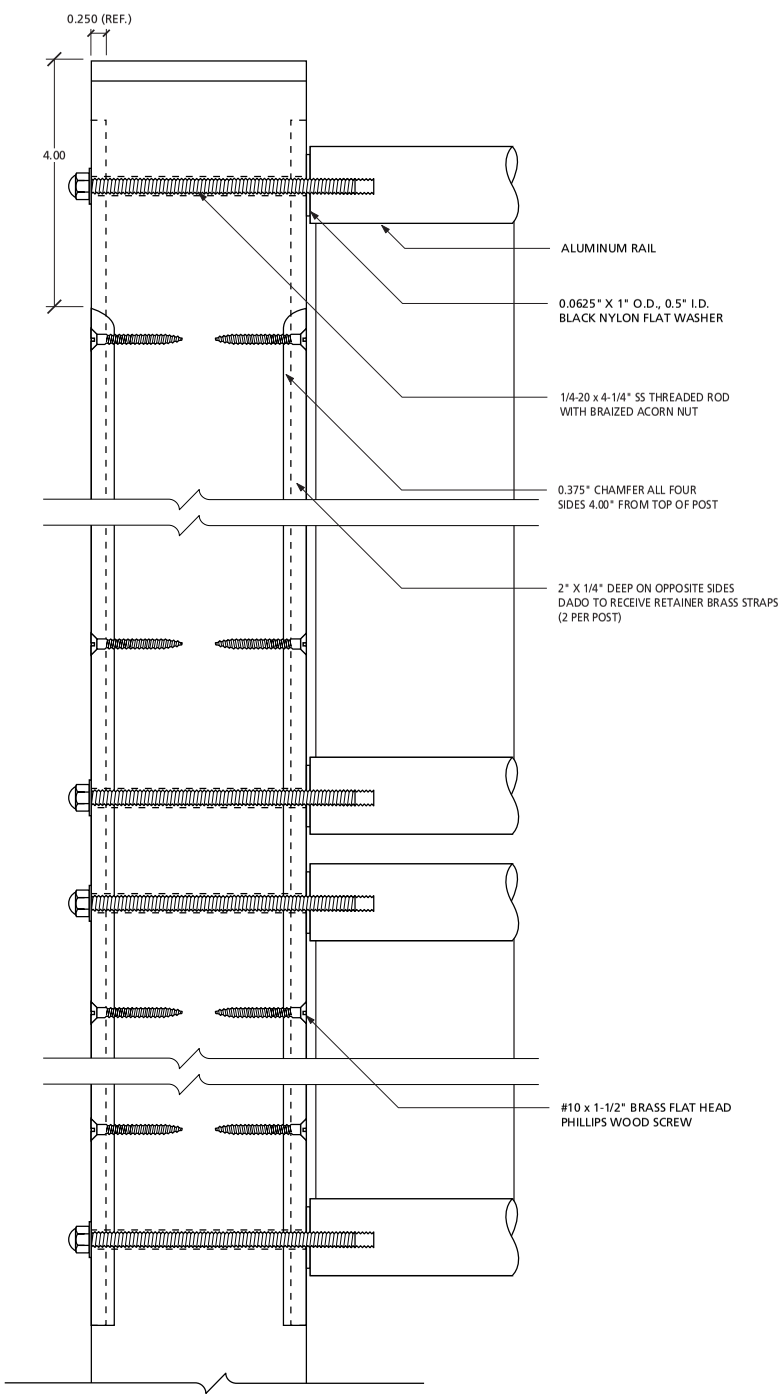

STEEL CAP
A
3.00"
COUNTERSINK ENDS
RAIL
0.75"
0.625" TYP.
0.28125" TYP.
B
B
2.00"
TYPICAL
0.625"
0.625"
7.5 CM
(2.952" O.C.)
A
5/8" BLACK CAST POLYETHYLENE
CAP WITH U.V. INHIBITORS
1/4-20 X 1.00" STAINLESS STEEL
SOCKET HEAD CAP SCREW WITH
SS HI-COLLAR HELICAL SPRING
LOCK WASHER
0.625"
0.28125"
1.00"
TUBE FABRICATION WELD TO BE ON FRONT
OR BACK SIDE OF ASSEMBLY, NOT ON EDGES
TO BE DRILLED
0.0625" X 1" O.D., 0.5" I.D.
BLACK NYLON FLAT WASHER
1.00"
FORWARD ANGLE PLAN VIEW
B-B
TUBULAR STEEL (A847 OR A36)
WITH 1/8" WALL . FACE
DIMENSION IS 3" WITH 2" SIDE
10-24 x 3/8" STEEL LOW
HEAD SOCKET CAP SCREW
FORWARD ANGLE SIDE ELEVATION
A-A

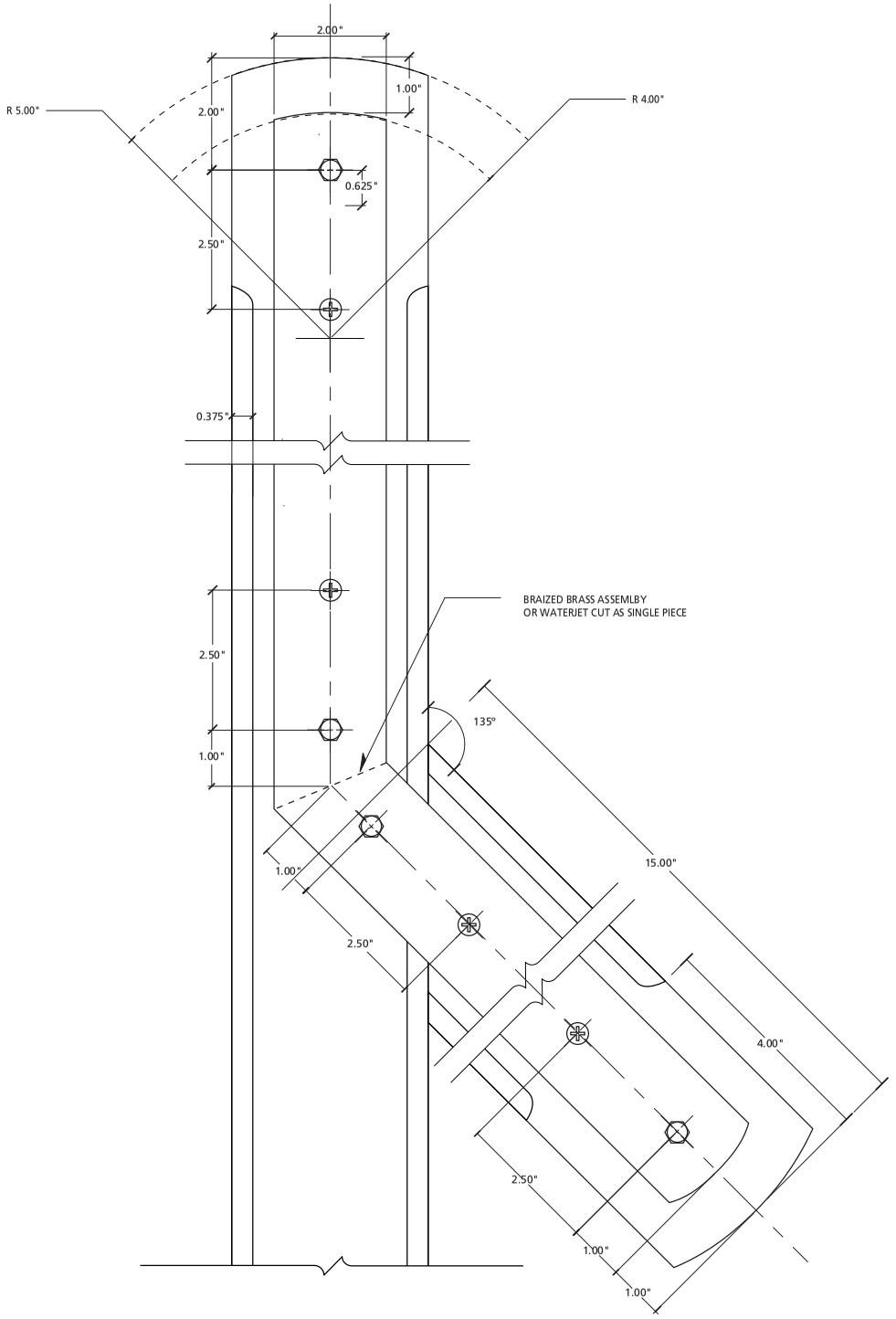

110CM
3"
60x30 w/30x30
90x30 w/30x30
120x30 w/30x30
150x30 w/30x30

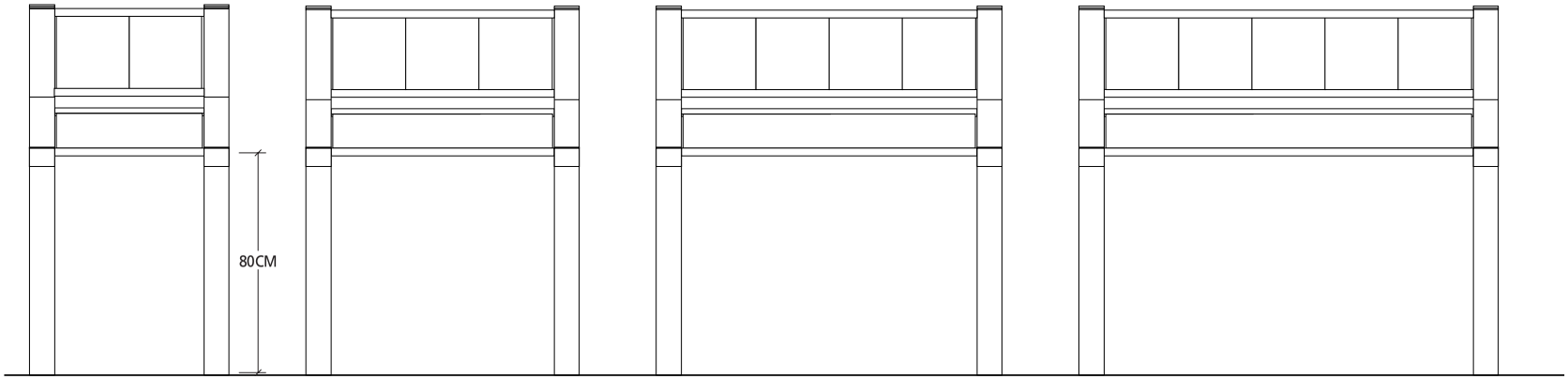

110CM
3"
60x60 w/30x30
90x60 w/30x30
120x60 w/30x30
150x60 w/30x30

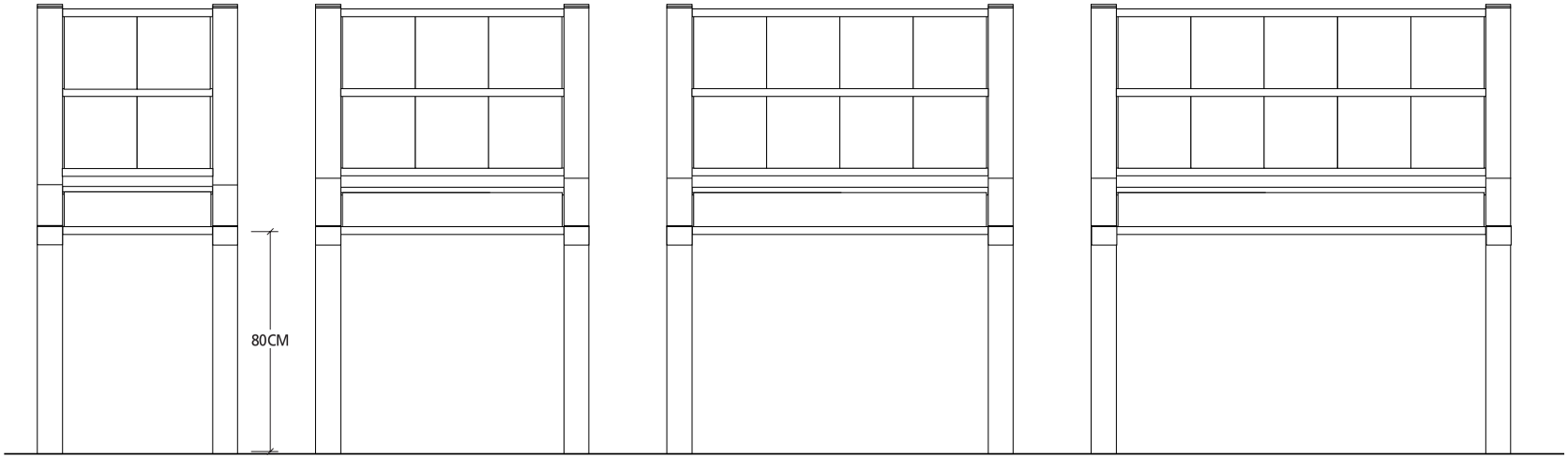

BACKING PANEL
ALUMINUM CORE
COPPER CAP
NYLON WASHER
ALUMINUM CORE
RAIL
DADO FOR BRASS STRAP
SIGN PANEL




0.250 (REF.)
4.00
ALUMINUM RAIL
0.0625" X 1" O.D., 0.5" I.D.
BLACK NYLON FLAT WASHER
1/4-20 x 4-1/4" SS THREADED ROD
WITH BRAIZED ACORN NUT
0.375" CHAMFER ALL FOUR
SIDES 4.00" FROM TOP OF POST
2" X 1/4" DEEP ON OPPOSITE SIDES
DADO TO RECEIVE RETAINER BRASS STRAPS
(2 PER POST)
#10 x 1-1/2" BRASS FLAT HEAD
PHILLIPS WOOD SCREW


2.00"
1.00"
R 5.00"
2.00"
R 4.00"
0.625"
2.50"
0.375"
2.50"
BRAIZED BRASS ASSEMLBY
OR WATERJET CUT AS SINGLE PIECE
135°
1.00"
1.00"
15.00"
2.50"
4.00"
2.50"
1.00"
1.00"


80CM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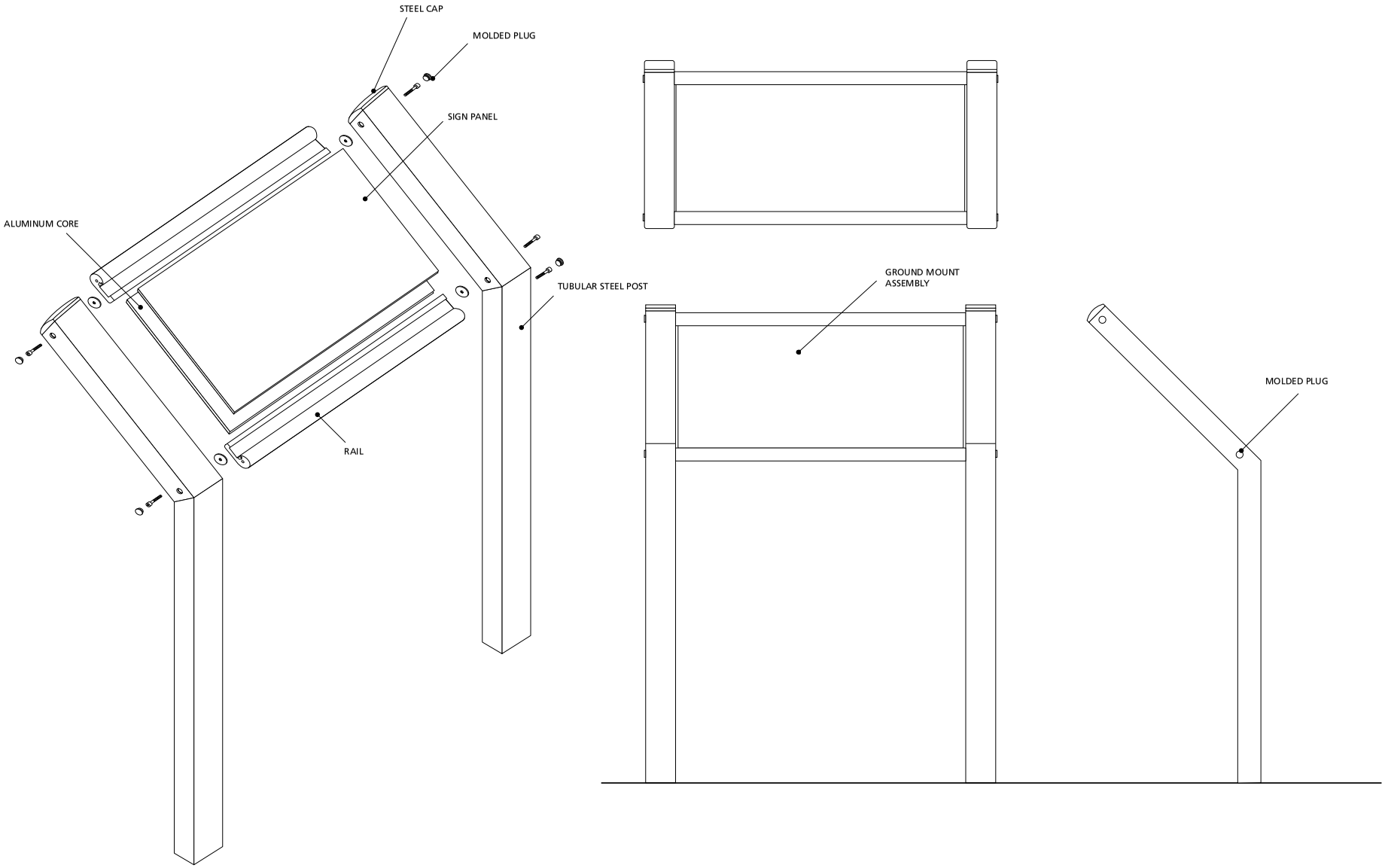
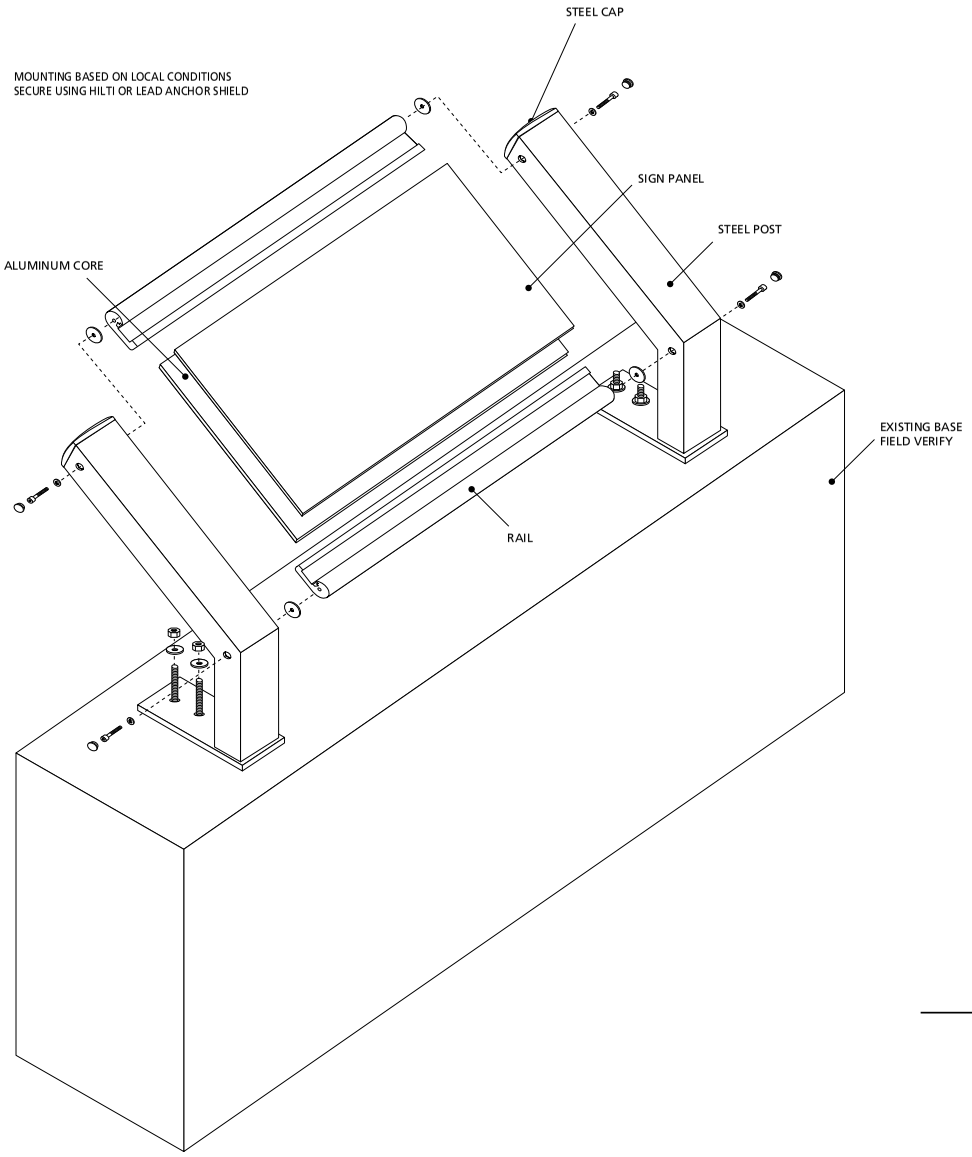
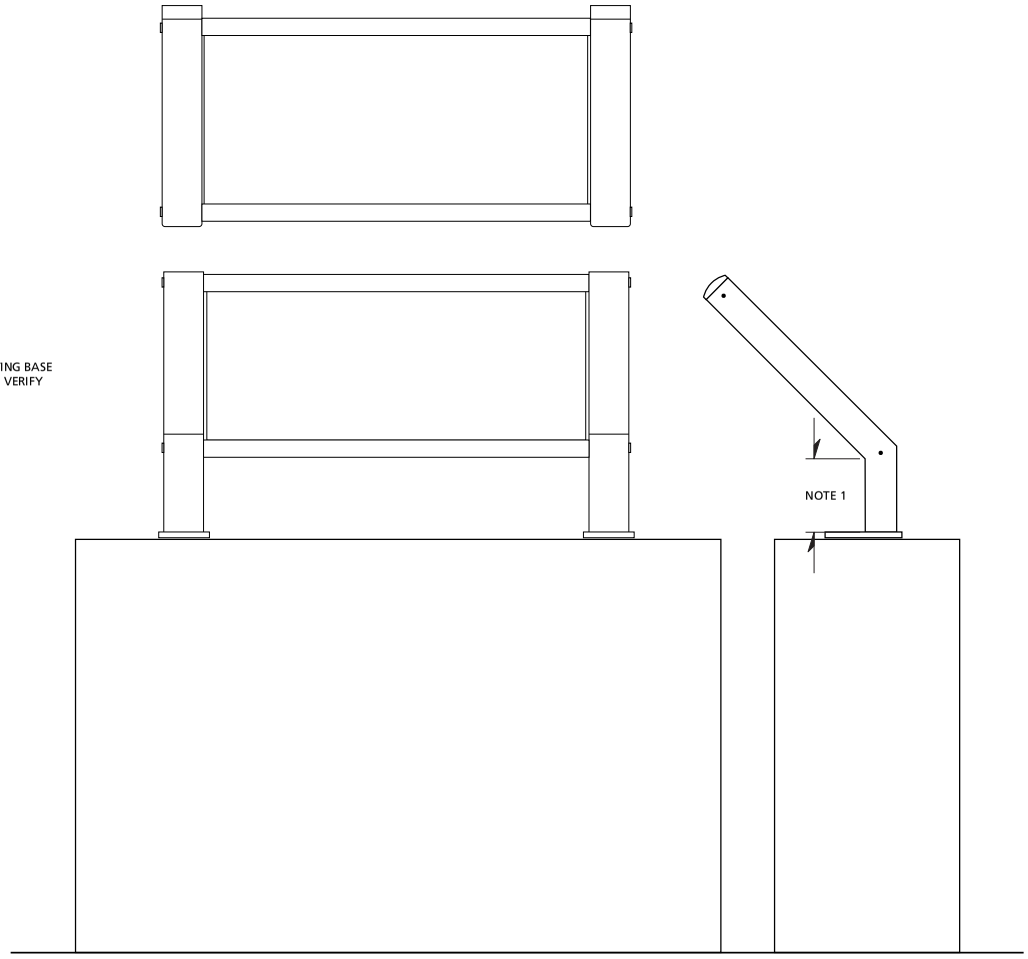
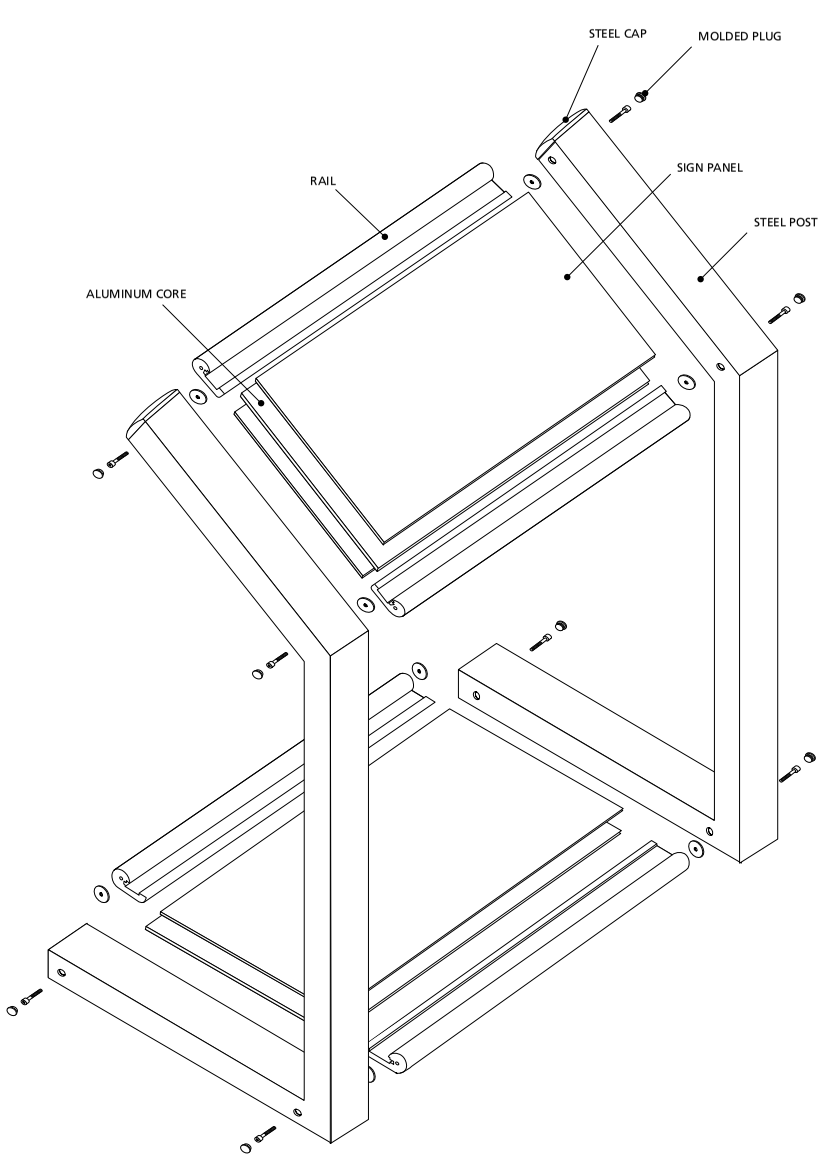
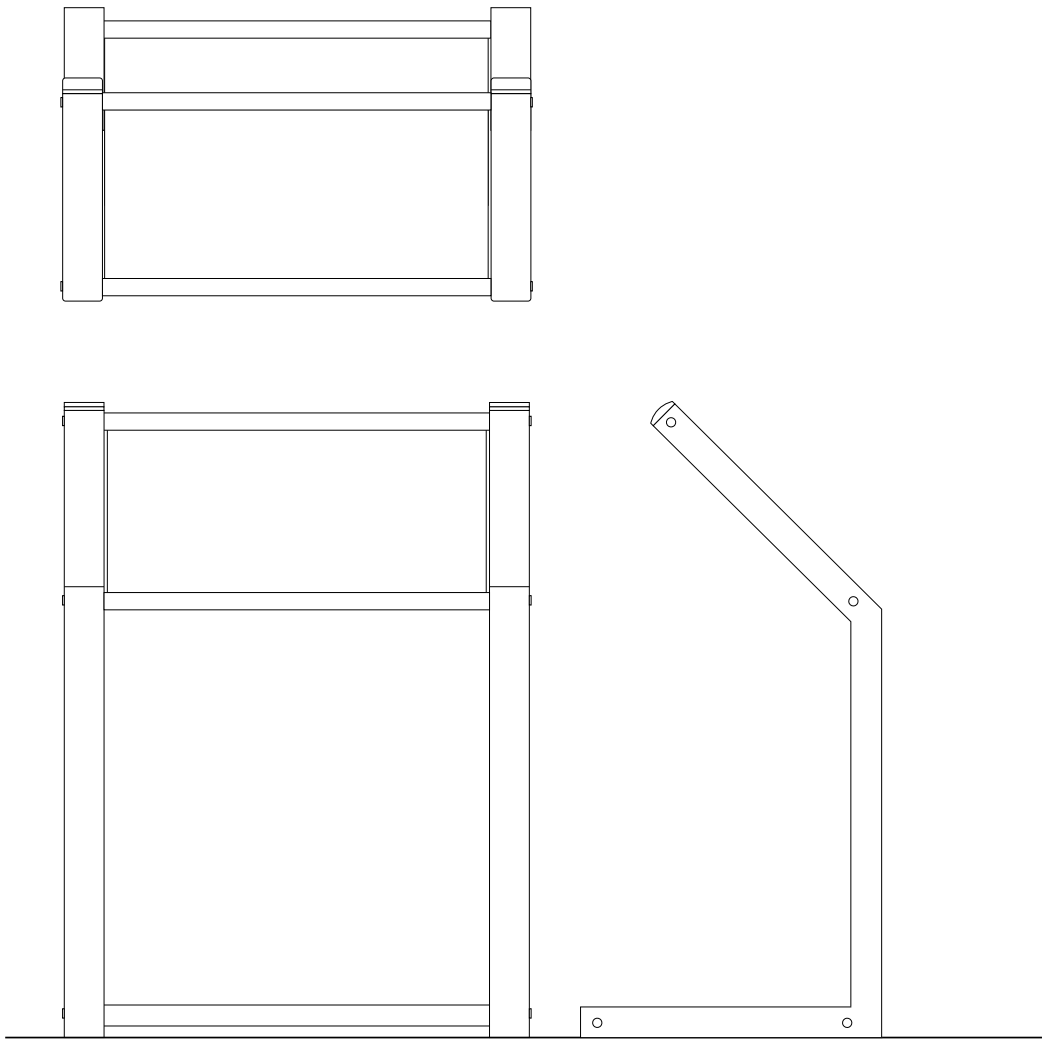


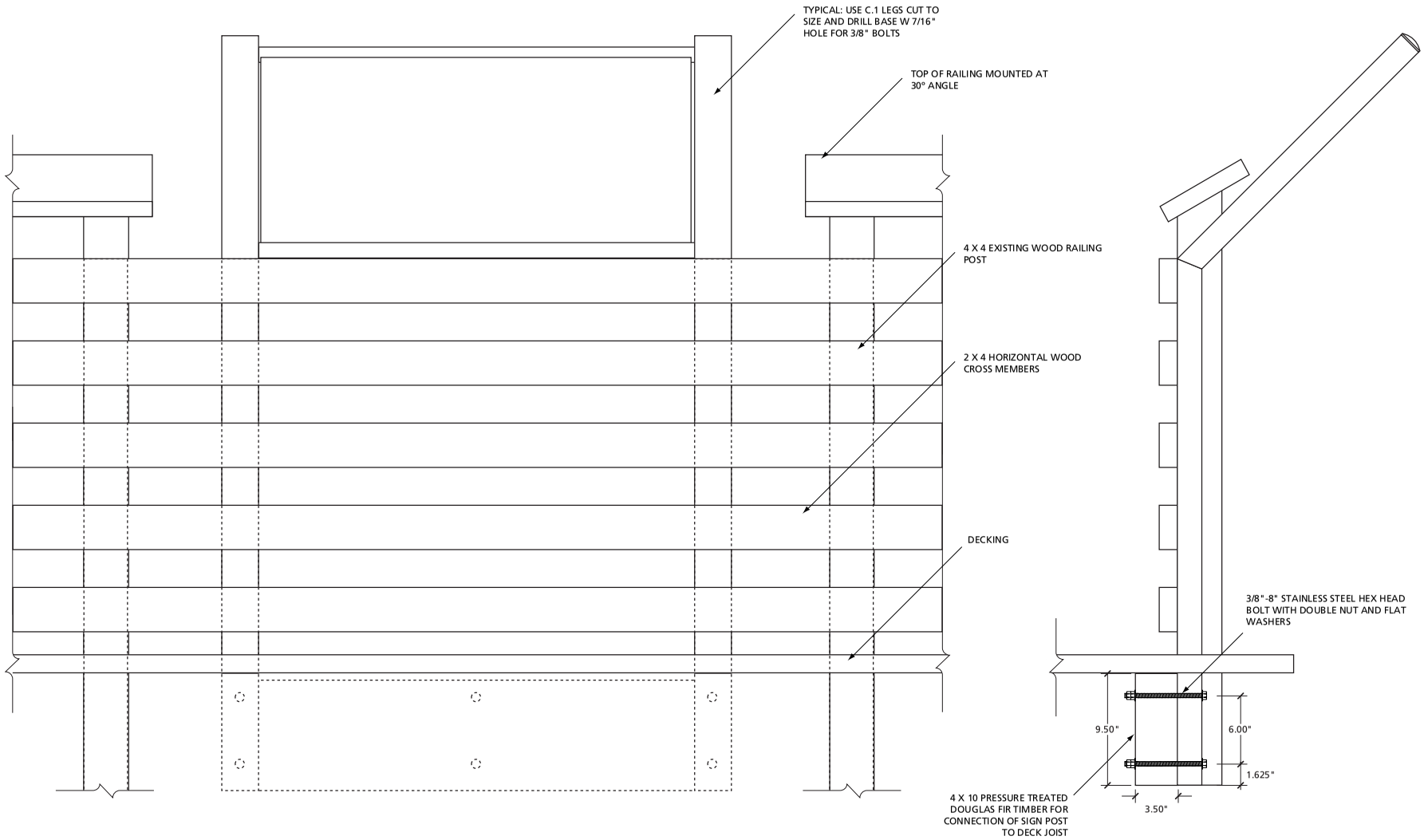
REVERSE ANGLE LARGE ASSEMBLY

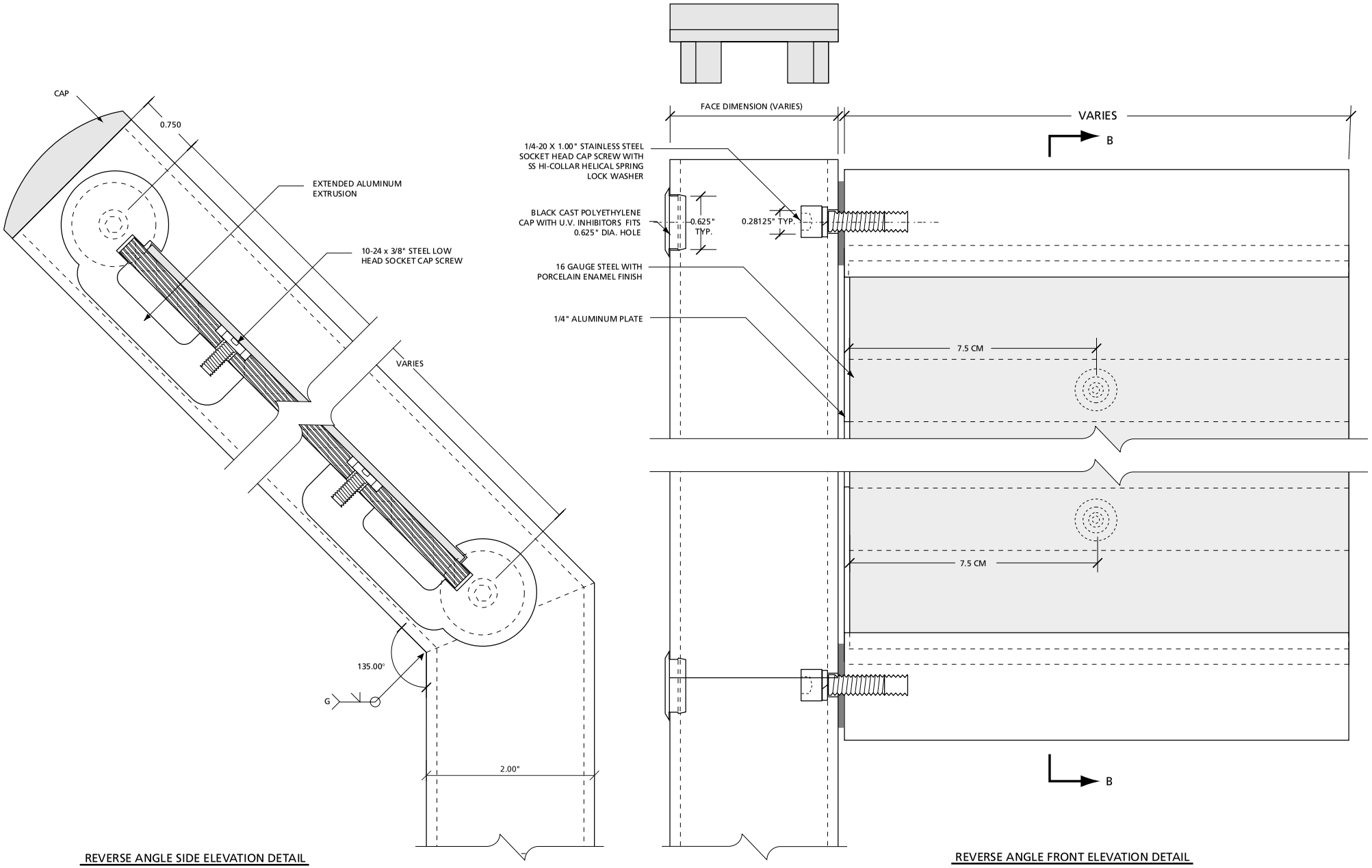

STEEL CAP
MOUNTING BASED ON LOCAL CONDITIONS
SECURE USING HILTI OR LEAD ANCHOR SHIELD
SIGN PANEL
STEEL POST
ALUMINUM CORE
EXISTING BASE
FIELD VERIFY
RAIL


NOTE 1
NOTE 1: MINUMUM LENGTH 6"


STEEL CAP
MOLDED PLUG
SIGN PANEL
RAIL
STEEL POST
ALUMINUM CORE

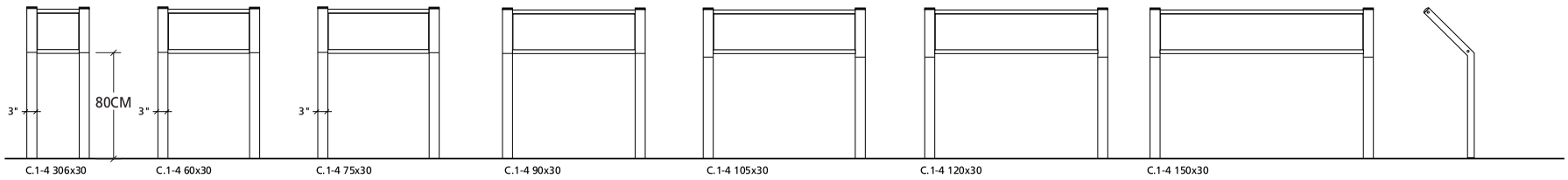



TYPICAL: USE C.1 LEGS CUT TO SIZE AND DRILL BASE W 7/16" HOLE FOR 3/8" BOLTS
TOP OF RAILING MOUNTED AT 30° ANGLE
4 X 4 EXISTING WOOD RAILING POST
2 X 4 HORIZONTAL WOOD CROSS MEMBERS
DECKING
3/8"-8" STAINLESS STEEL HEX HEAD BOLT WITH DOUBLE NUT AND FLAT WASHERS
9.50"
6.00"
1.625"
3.50"
4 X 10 PRESSURE TREATED DOUGLAS FIR TIMBER FOR CONNECTION OF SIGN POST TO DECK JOIST

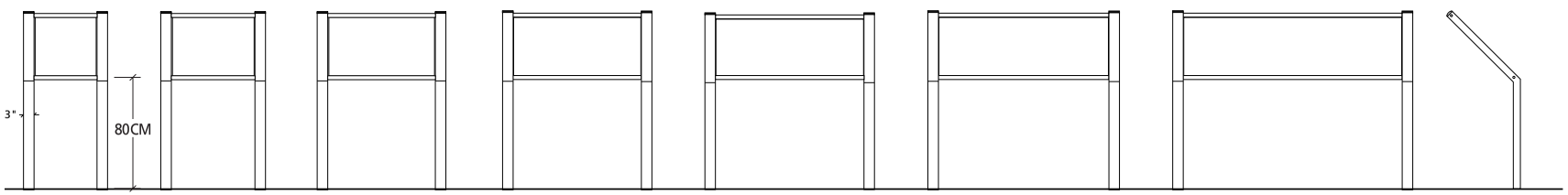


REVERSE ANGLE SIDE ELEVATION DETAIL
B-B

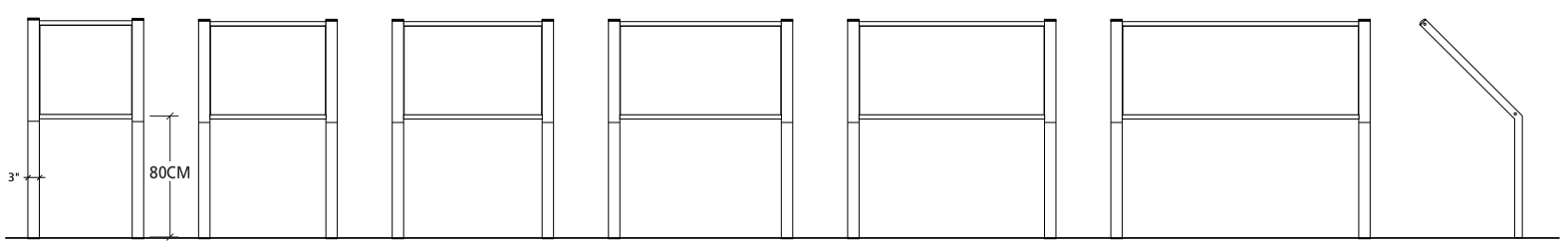
REVERSE ANGLE FRONT ELEVATION DETAIL



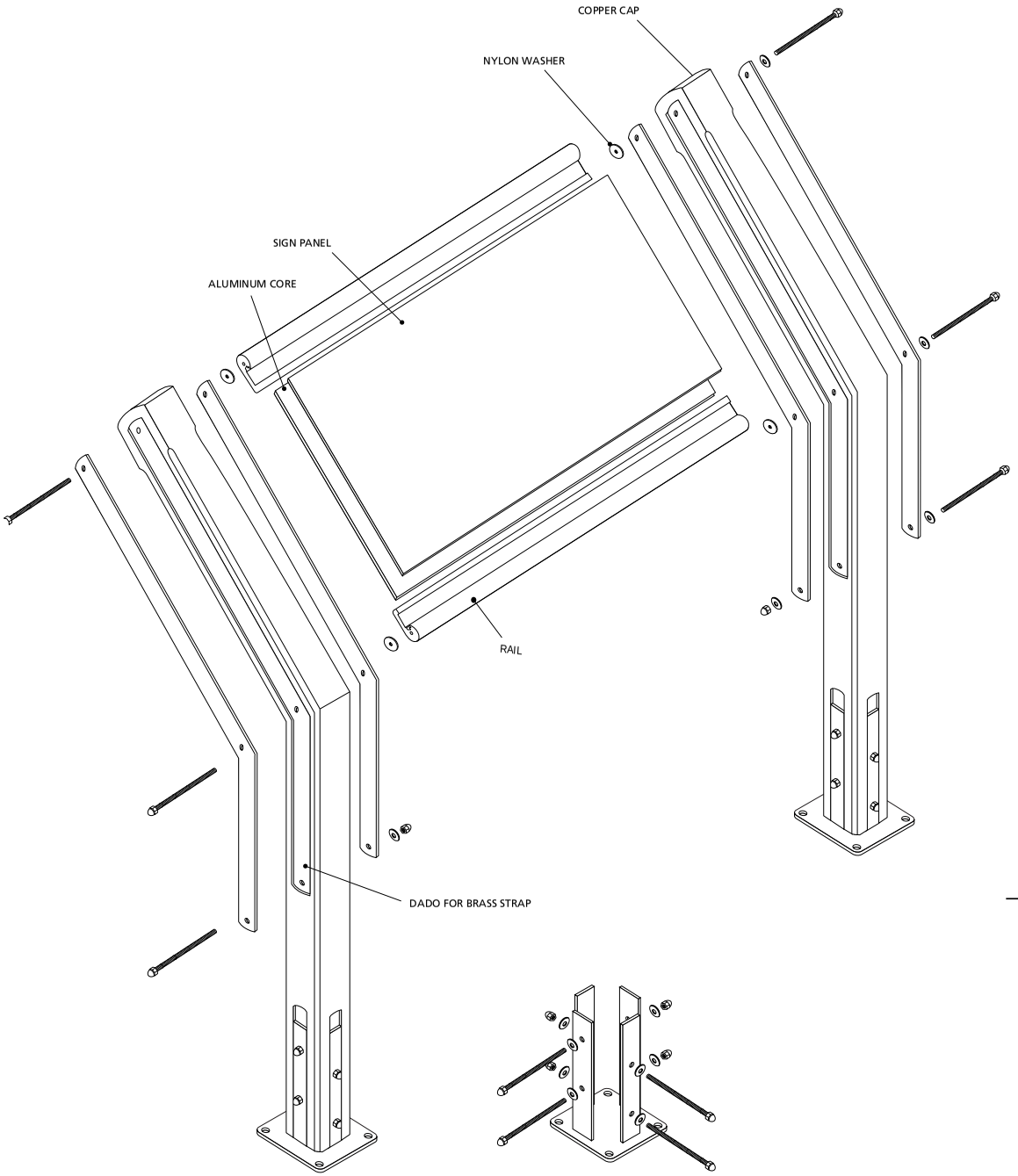
C.1-4 306x30 C.1-4 60x30 C.1-4 75x30 C.1-4 90x30 C.1-4 105x30 C.1-4 120x30 C.1-4 150x30

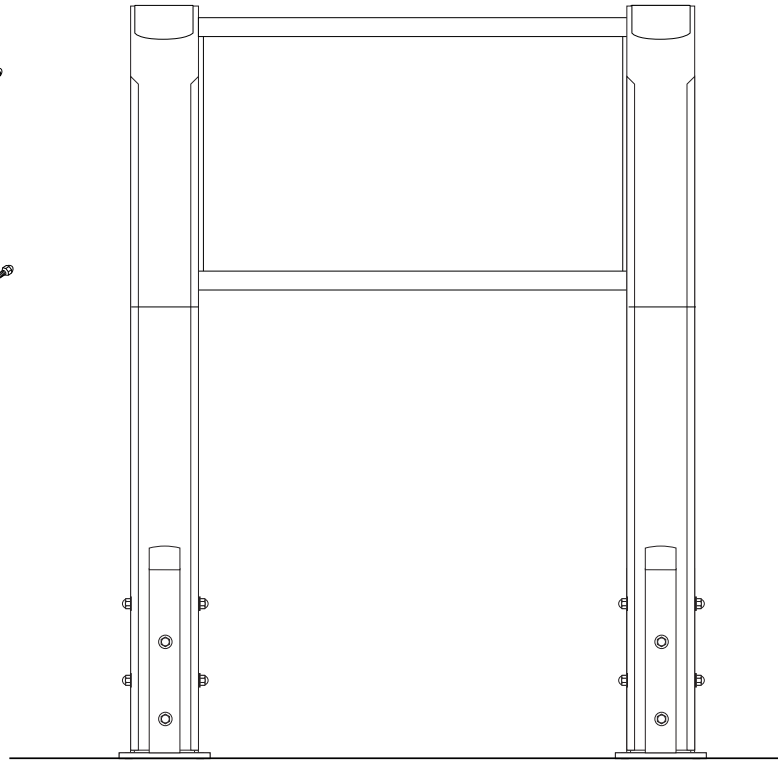


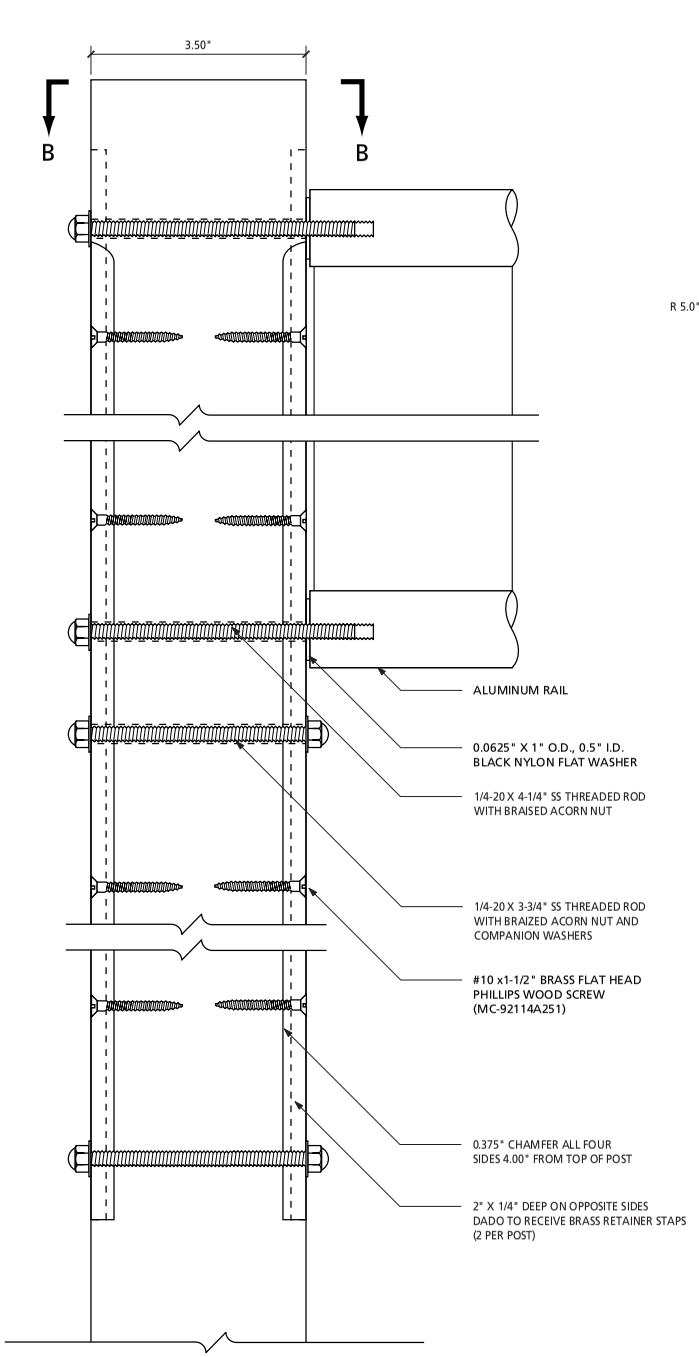
C.1-4 45x45 C.1-4 60x45 C.1-4 75x45 C.1-4 90x45 C.1-4 105x45 C.1-4 120x45 C.1-4 150x45

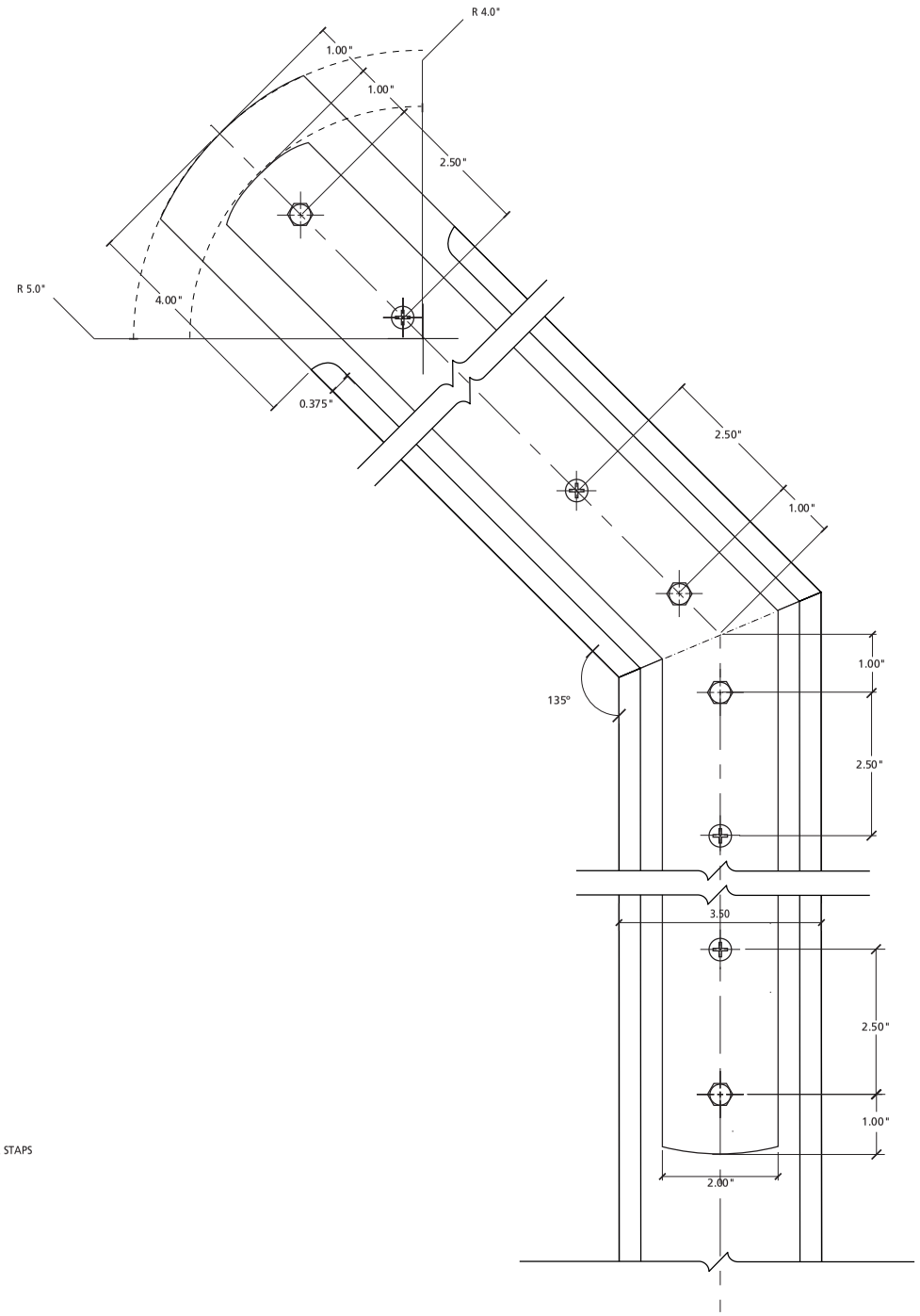


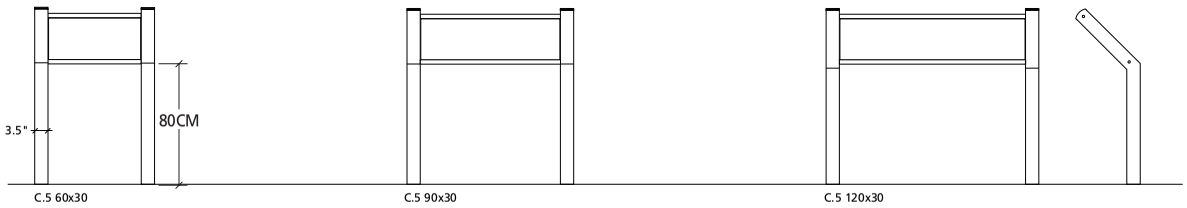
C.1-4 60x60 C.1-4 75x60 C.1-4 90cmx60 C.1-4 105x60 C.1-4 120x60 C.1-4 150x60

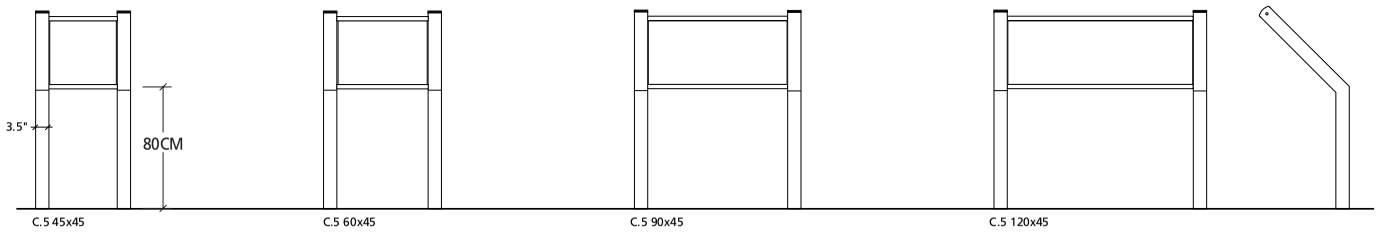

COPPER CAP
NYLON WASHER
SIGN PANEL
ALUMINUM CORE
RAIL
DADO FOR BRASS STRAP

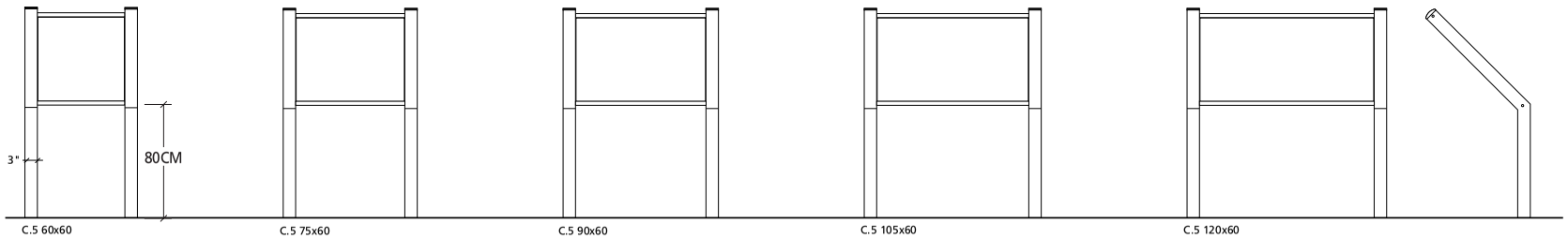


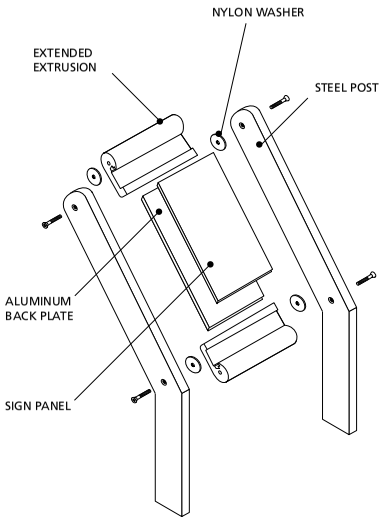

3.50"
B
B
ALUMINUM RAIL
0.0625" X 1" O.D., 0.5" I.D.
BLACK NYLON FLAT WASHER
1/4-20 X 4-1/4" SS THREADED ROD
WITH BRAISED ACORN NUT
1/4-20 X 3-3/4" SS THREADED ROD
WITH BRAIZED ACORN NUT AND
COMPANION WASHERS
#10 x1-1/2" BRASS FLAT HEAD
PHILLIPS WOOD SCREW
(MC-92114A251)
0.375" CHAMFER ALL FOUR
SIDES 4.00" FROM TOP OF POST
2" X 1/4" DEEP ON OPPOSITE SIDES
DADO TO RECEIVE BRASS RETAINER STAPS
(2 PER POST)


R 4.0"
1.00"
1.00"
2.50"
R 5.0"
4.00"
0.375"
2.50"
1.00"
135°
1.00"
2.50"
3.50
2.50"
1.00"
2.00"

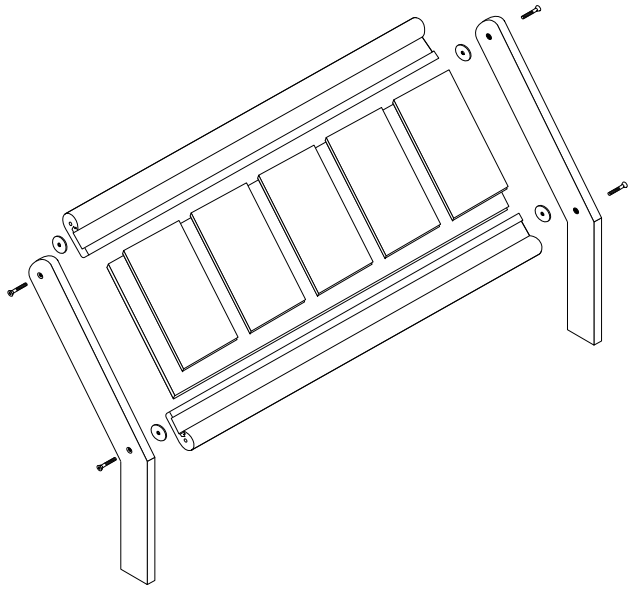

3.5"
80CM
C.5 60x30
C.5 90x30
C.5 120x30


3.5"
80CM
C.5 45x45
C.5 60x45
C.5 90x45
C.5 120x45

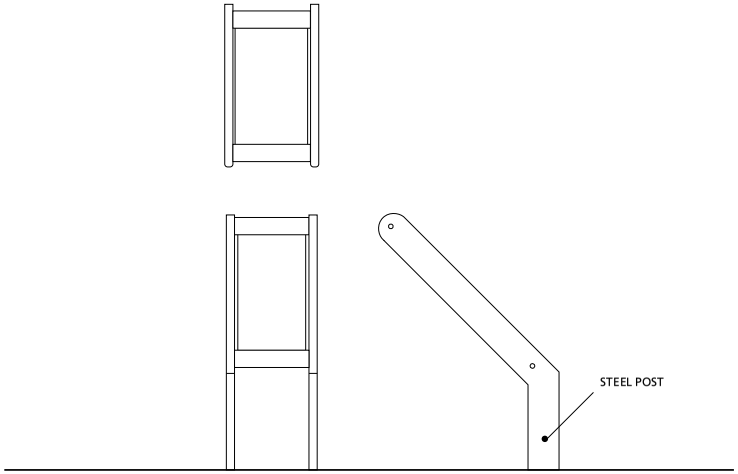

3"
80CM
C.5 60x60
C.5 75x60
C.5 90x60
C.5 105x60
C.5 120x60



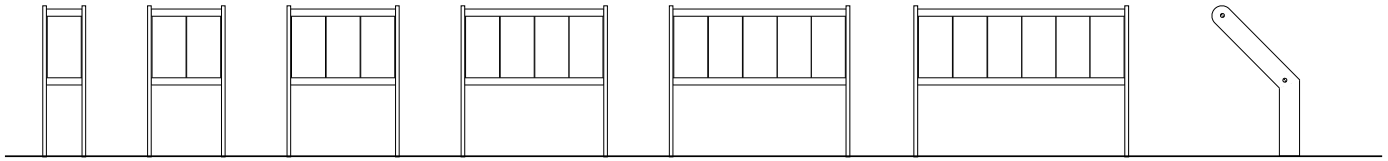
REVERSE ANGLE SINGLE ASSEMBLY

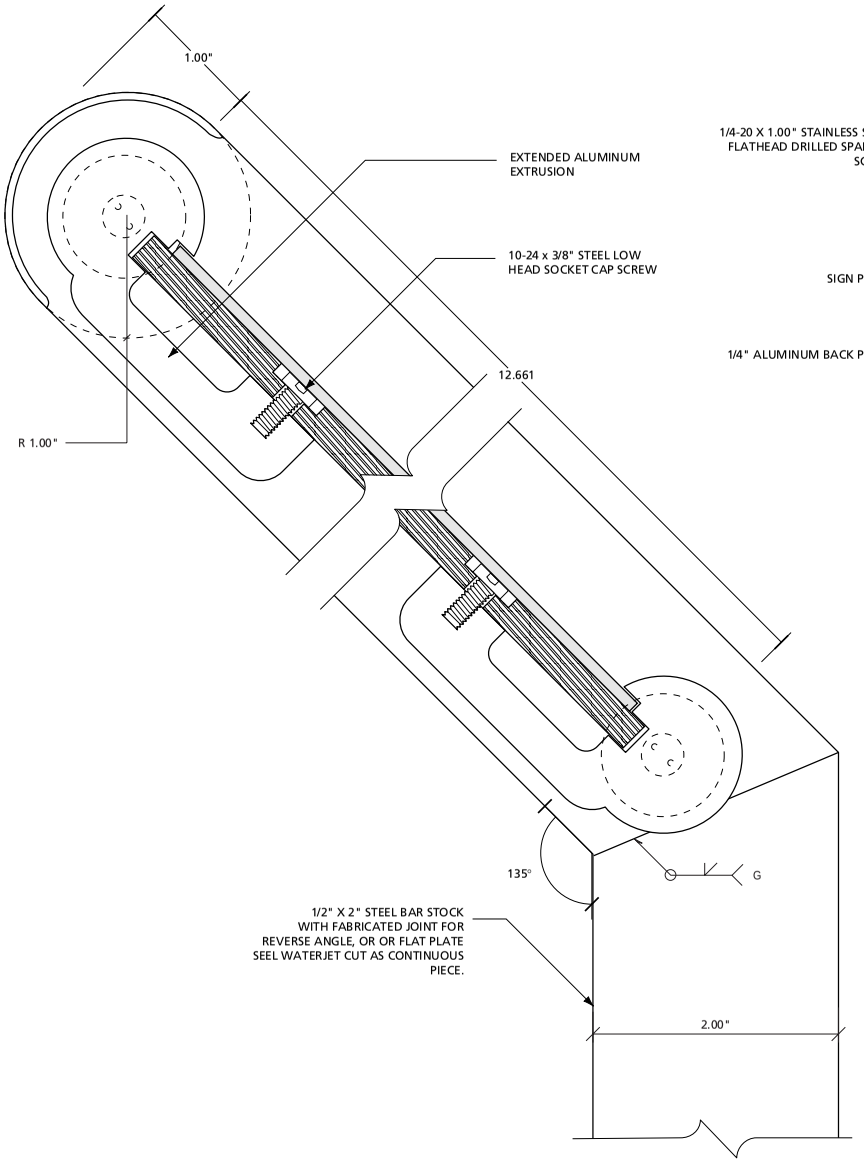


REVERSE ANGLE MULTI-PANEL ASSEMBLY

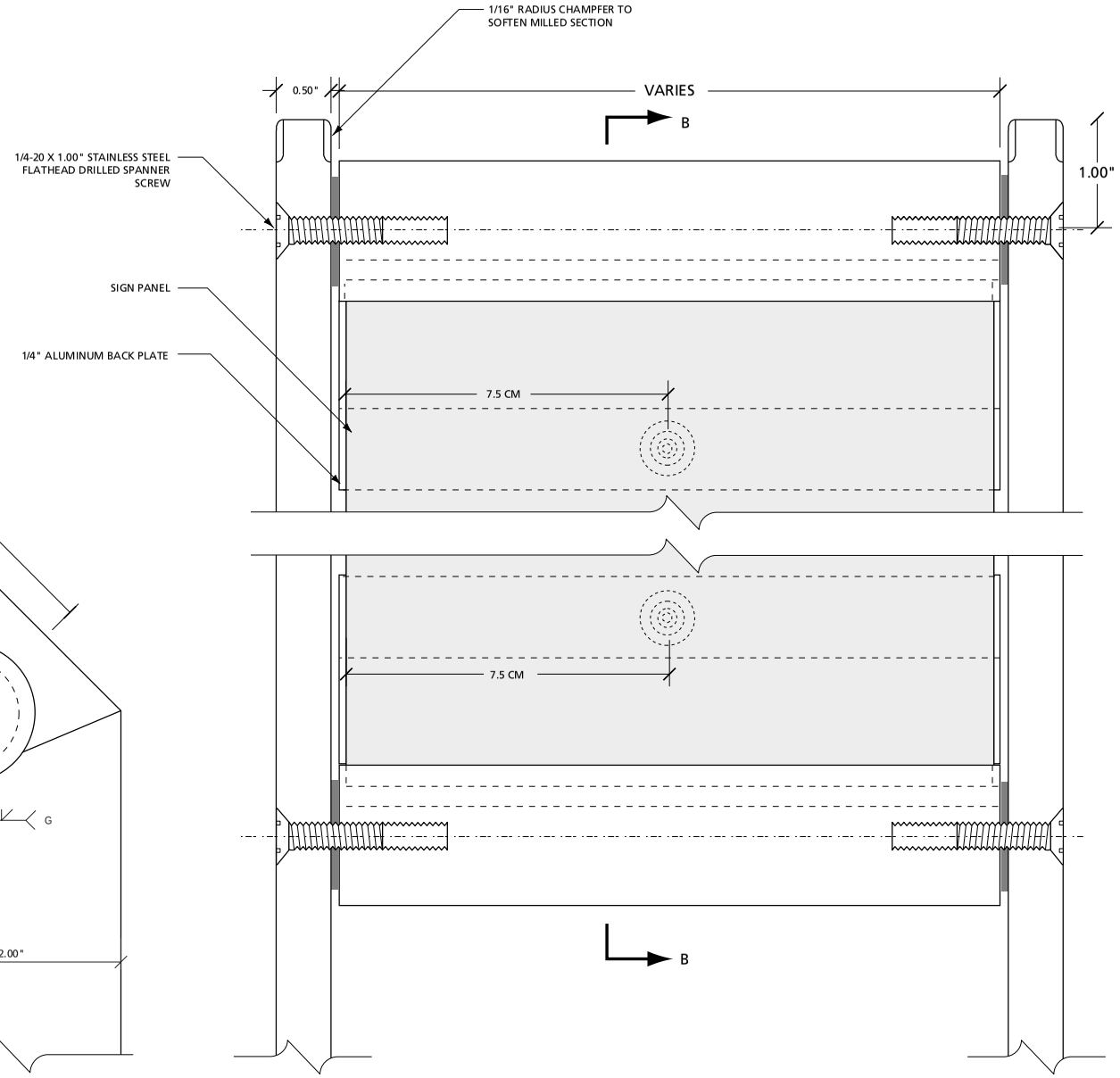


Low Profile, Reverse Angle Double Post Assembly System Options

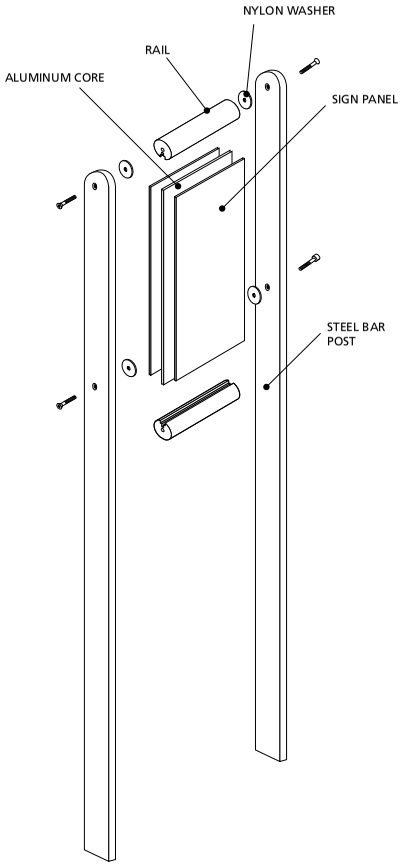


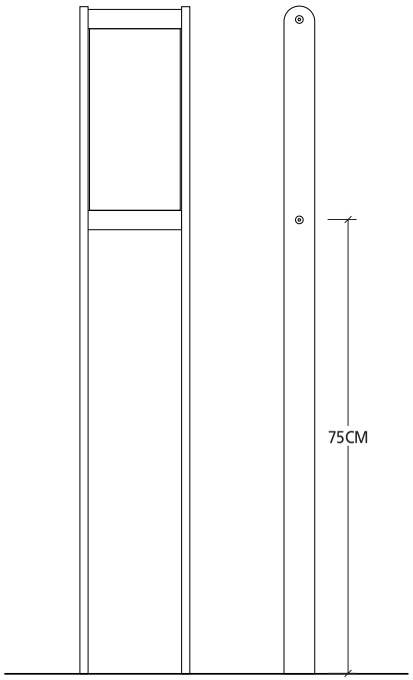


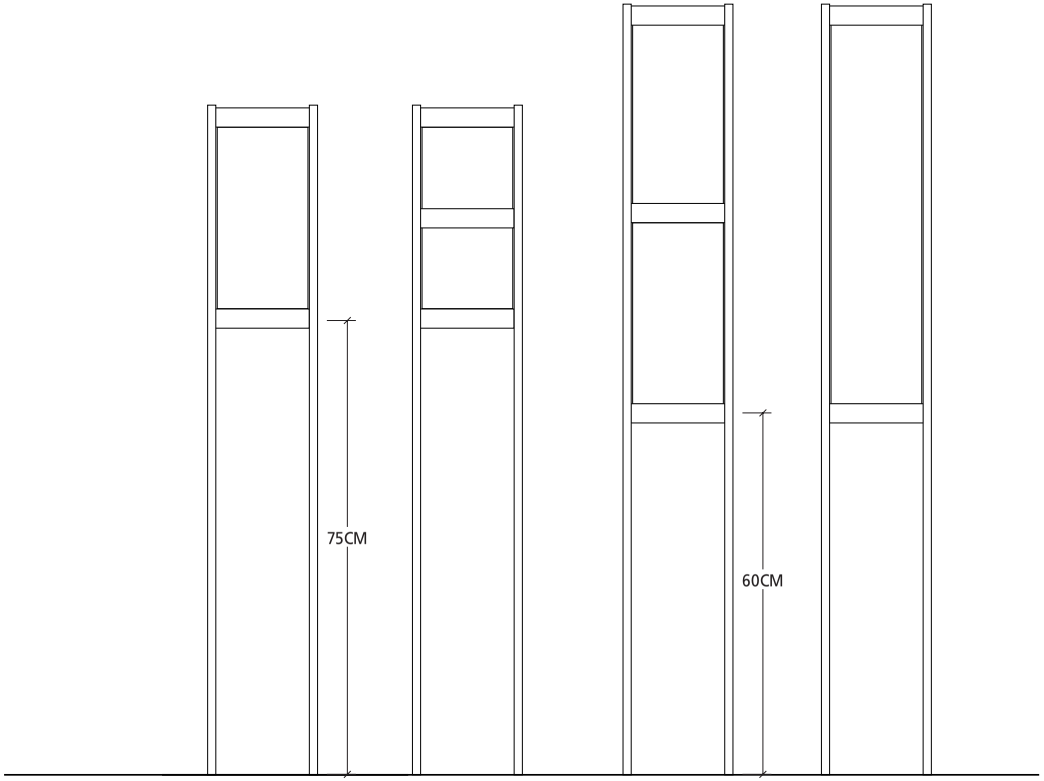
SMALL GROUND MOUNT SIDE ELEVATION DETAIL
B-B

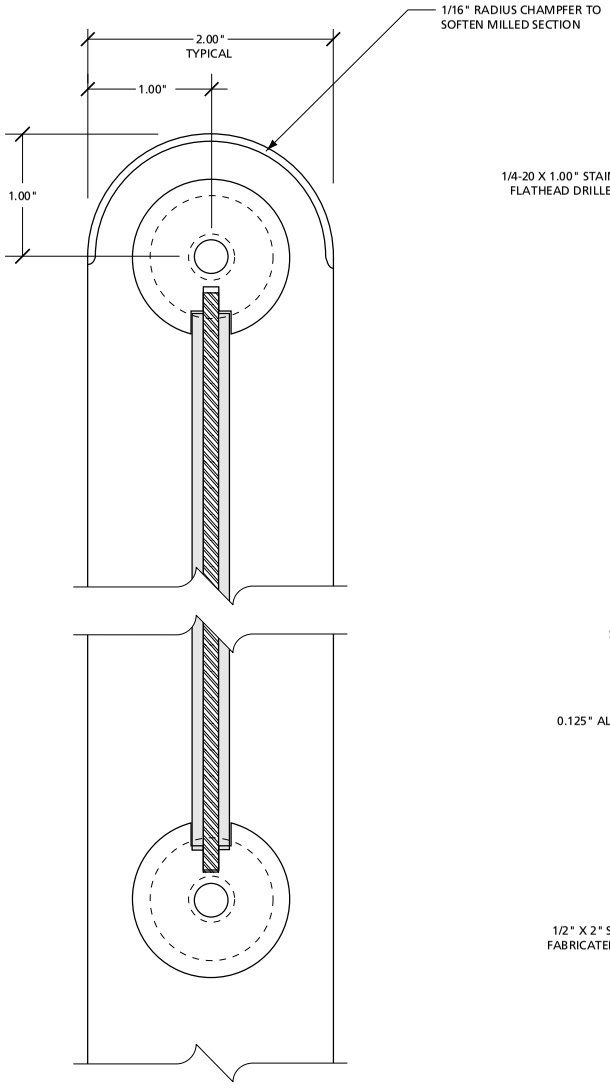


SMALL GROUND MOUNT FRONT ELEVATION DETAIL

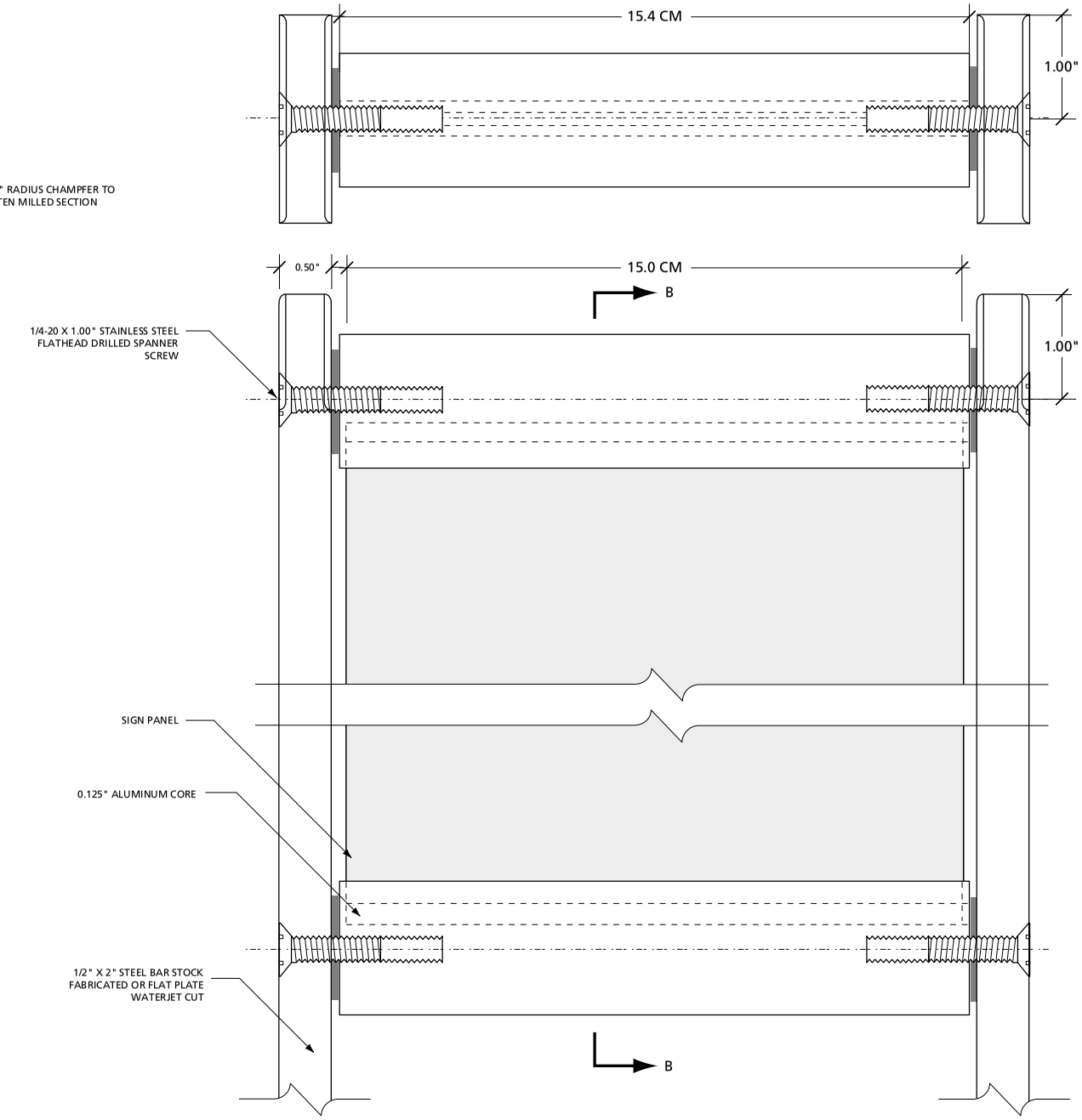

NYLON WASHER
RAIL
ALUMINUM CORE
SIGN PANEL
STEEL BAR POST


75CM

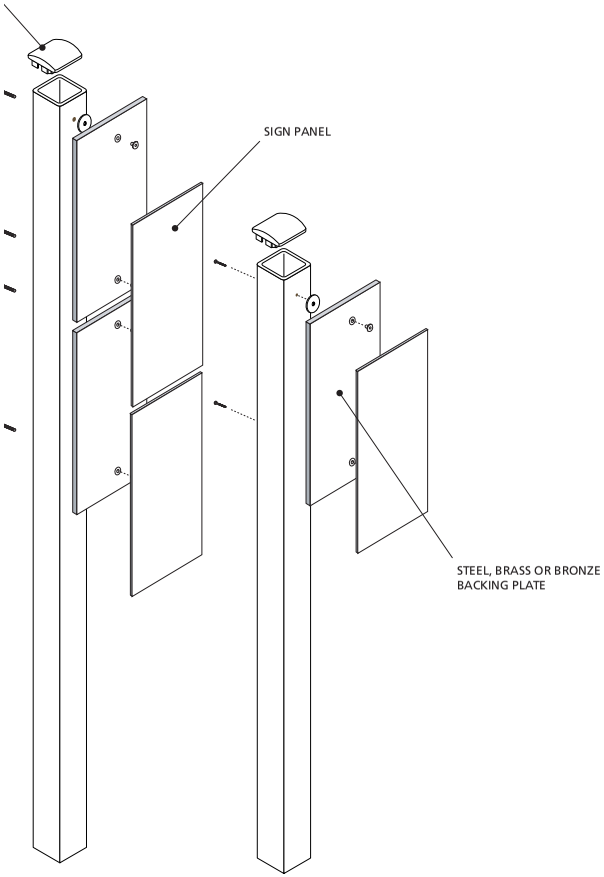

75CM
60CM

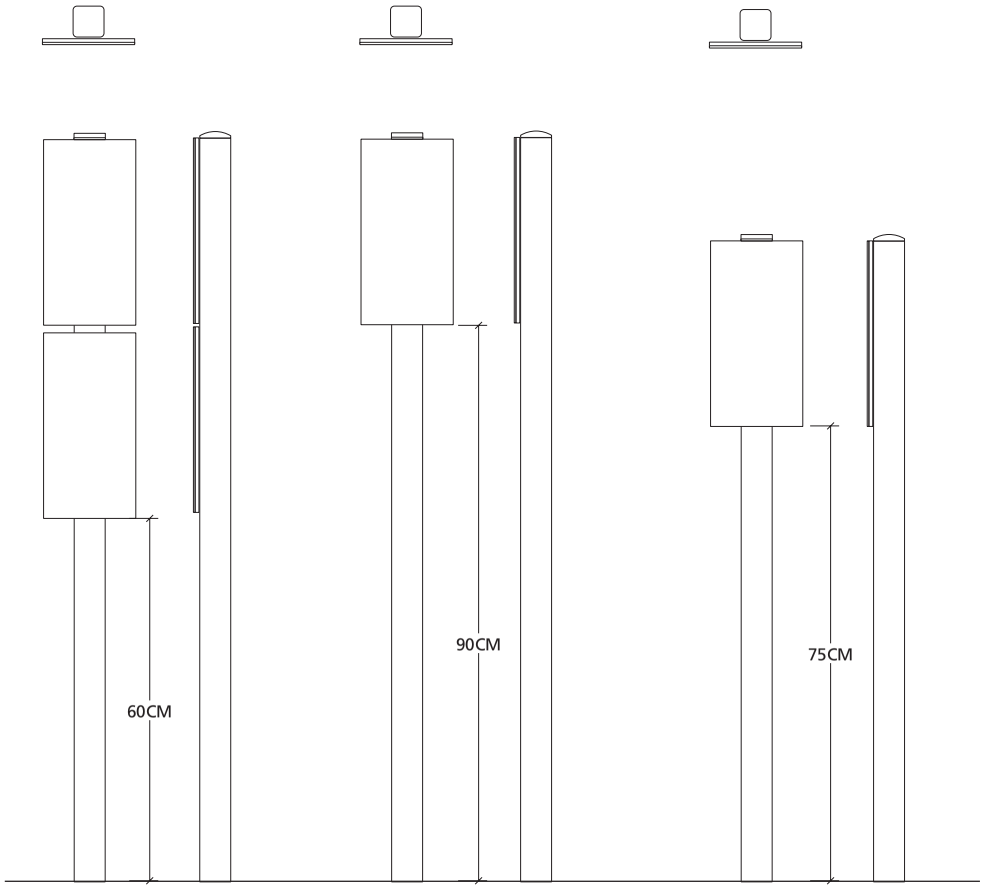


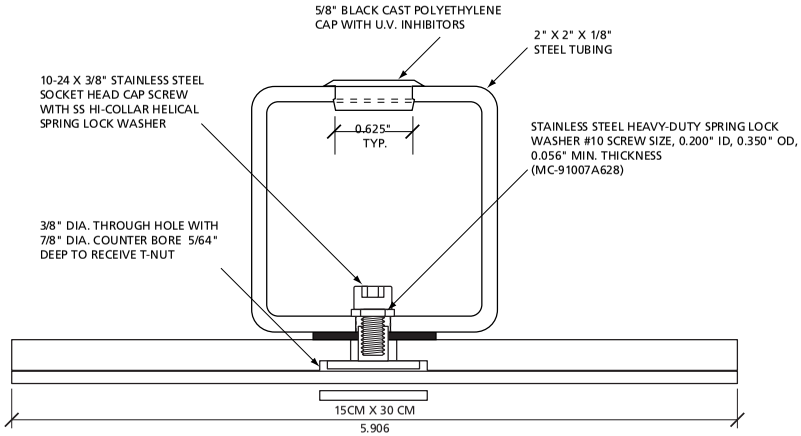
NARROW PROFILE BAR STOCK SIDE ELEVATION DETAIL
B-B

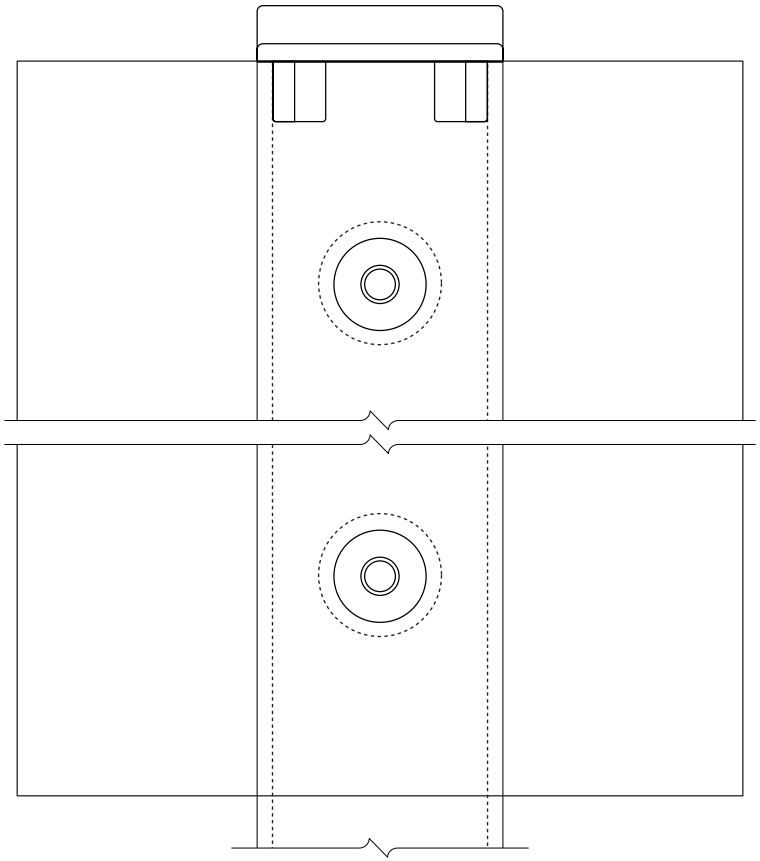


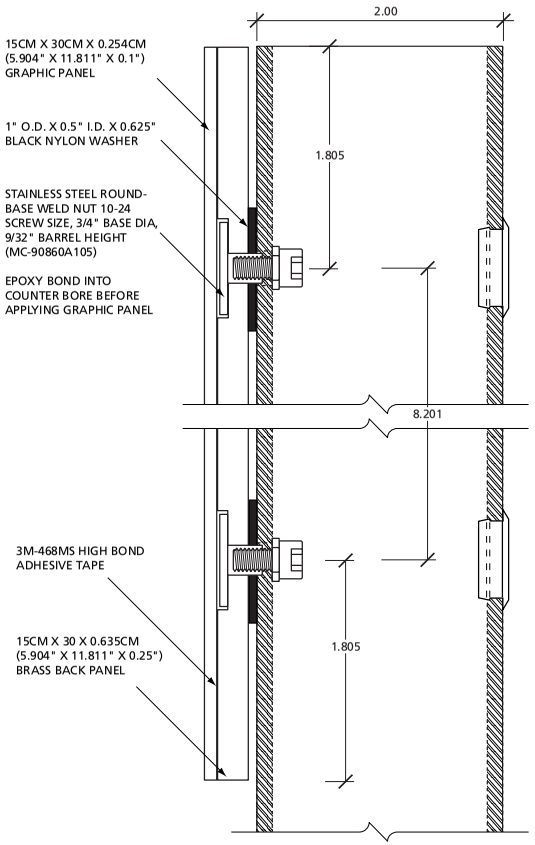
NARROW PROFILE BAR STOCK FRONT ELEVATION DETAIL

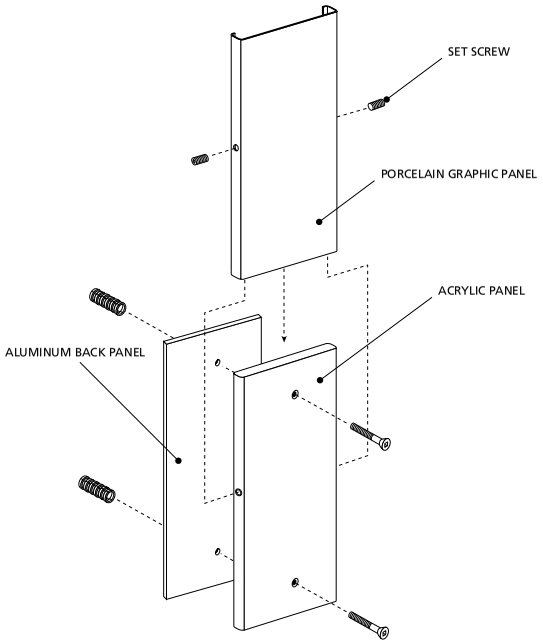

SIGN PANEL
STEEL, BRASS OR BRONZE
BACKING PLATE

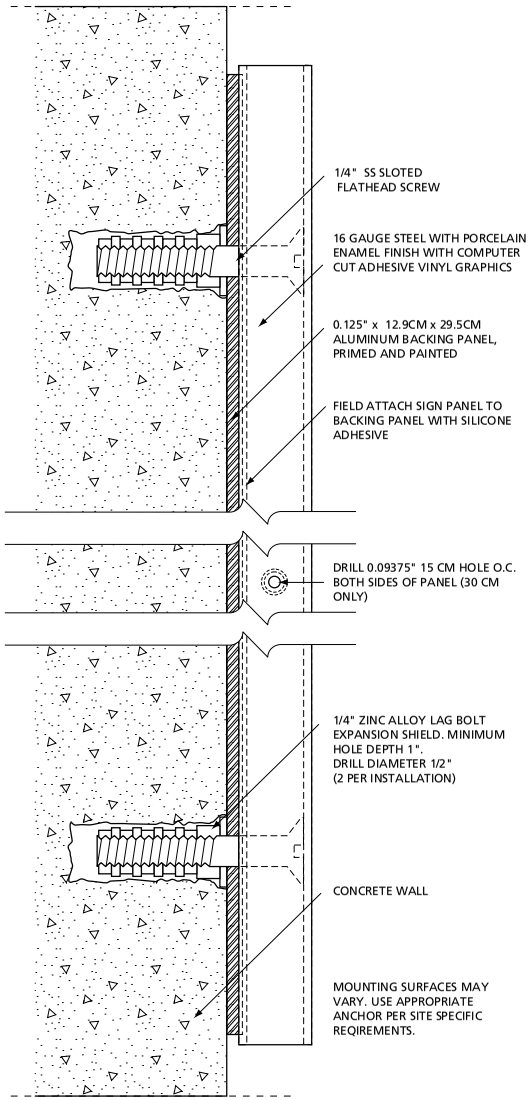

60CM
90CM
75CM


5/8" BLACK CAST POLYETHYLENE
CAP WITH U.V. INHIBITORS
2" X 2" X 1/8"
STEEL TUBING
10-24 X 3/8" STAINLESS STEEL
SOCKET HEAD CAP SCREW
WITH SS HI-COLLAR HELICAL
SPRING LOCK WASHER
0.625"
TYP.
STAINLESS STEEL HEAVY-DUTY SPRING LOCK
WASHER #10 SCREW SIZE, 0.200" ID, 0.350" OD,
0.056" MIN. THICKNESS
(MC-91007A628)
3/8" DIA. THROUGH HOLE WITH
7/8" DIA. COUNTER BORE 5/64"
DEEP TO RECEIVE T-NUT
15CM X 30 CM
5.906

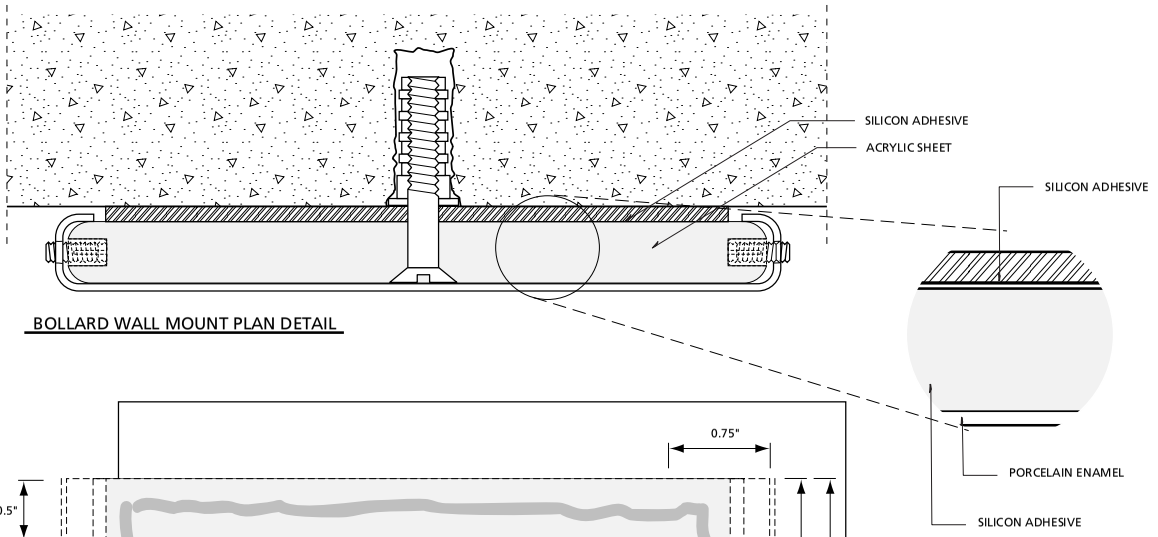



2.00
15CM X 30CM X 0.254CM
(5.904" X 11.811" X 0.1")
GRAPHIC PANEL
1" O.D. X 0.5" I.D. X 0.625"
BLACK NYLON WASHER
1.805
STAINLESS STEEL ROUND-
BASE WELD NUT 10-24
SCREW SIZE, 3/4" BASE DIA,
9/32" BARREL HEIGHT
(MC-90860A105)
EPOXY BOND INTO
COUNTER BORE BEFORE
APPLYING GRAPHIC PANEL
8.201
3M-468MS HIGH BOND
ADHESIVE TAPE
15CM X 30 X 0.635CM
(5.904" X 11.811" X 0.25")
BRASS BACK PANEL
1.805

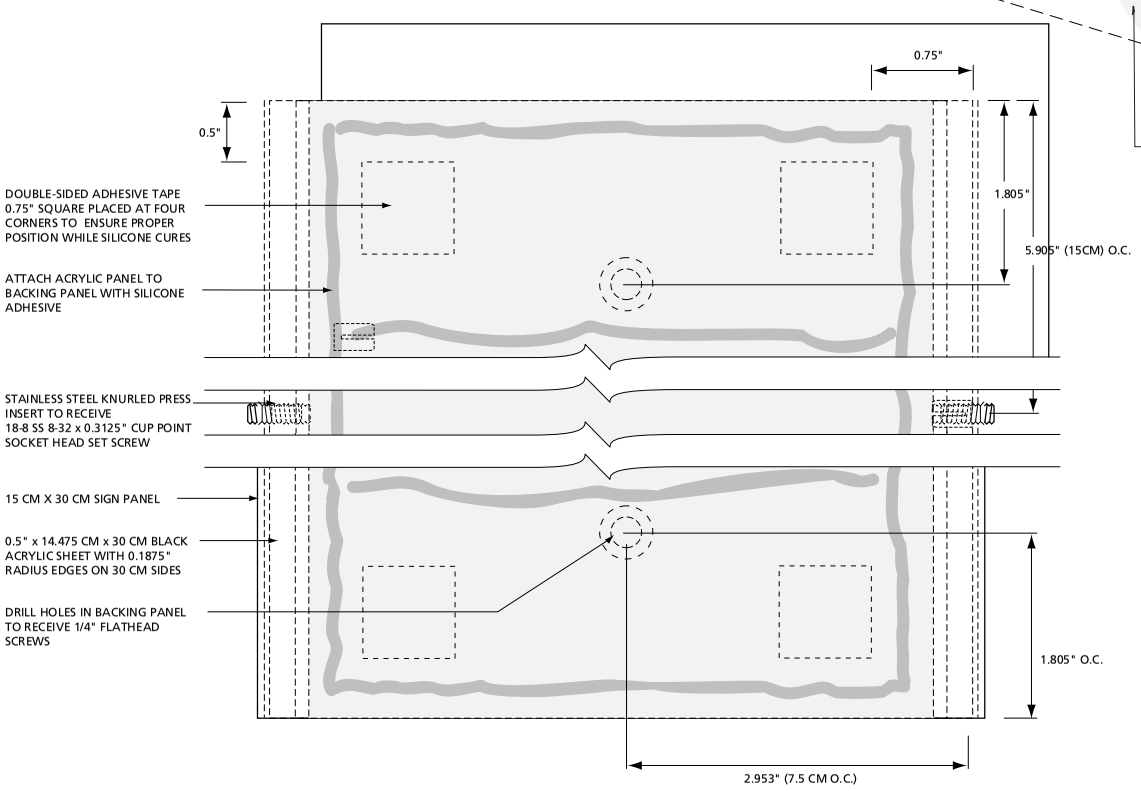

SET SCREW
PORCELAIN GRAPHIC PANEL
ACRYLIC PANEL
ALUMINUM BACK PANEL



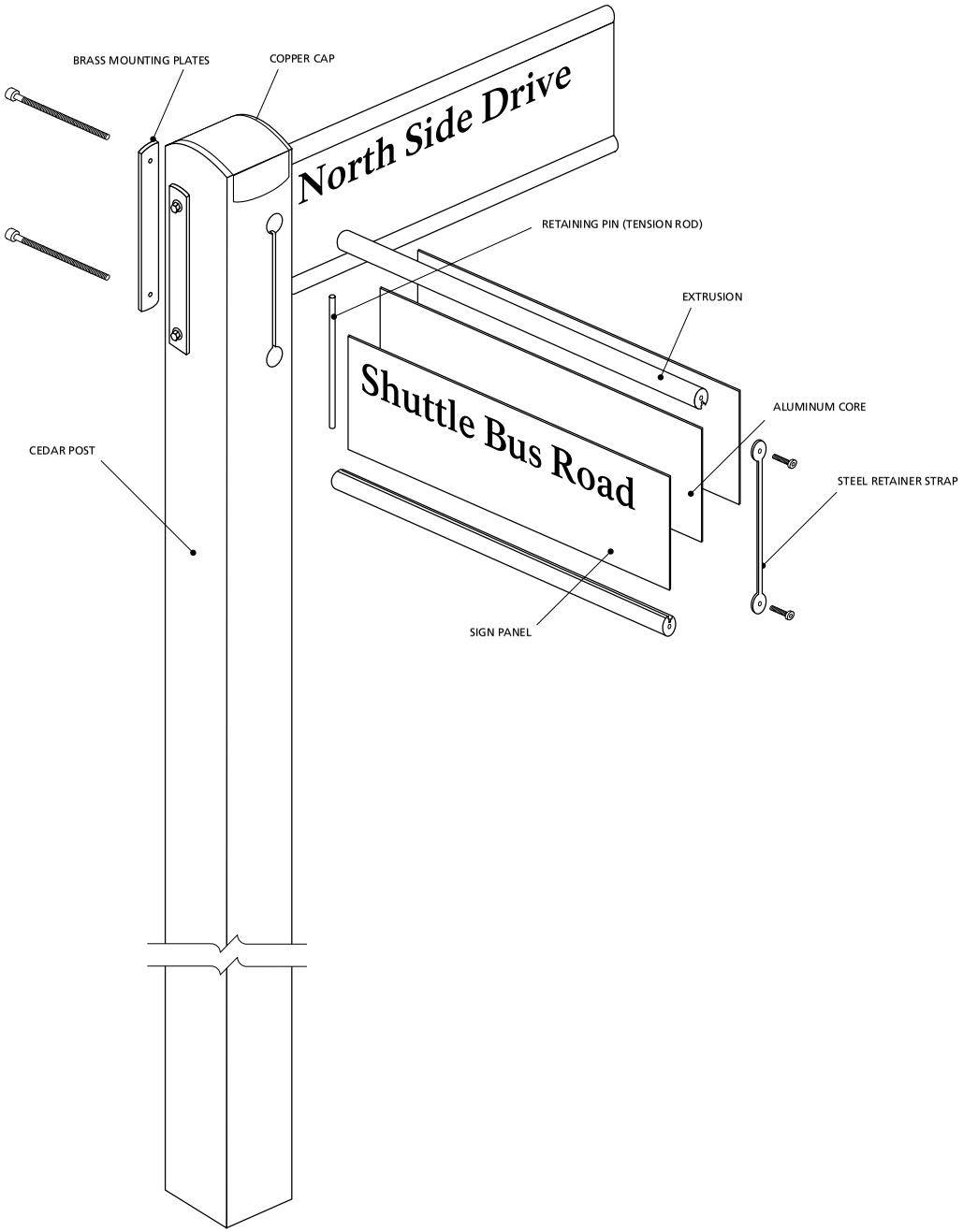
BOLLARD WALL MOUNT SECTION DETAIL

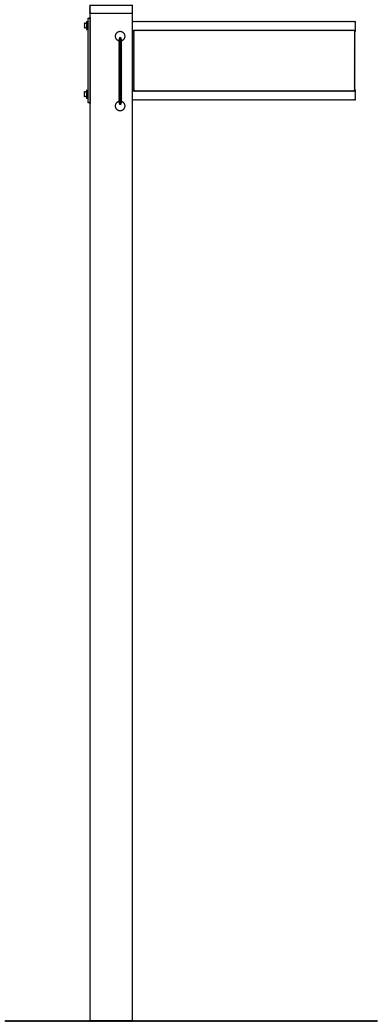


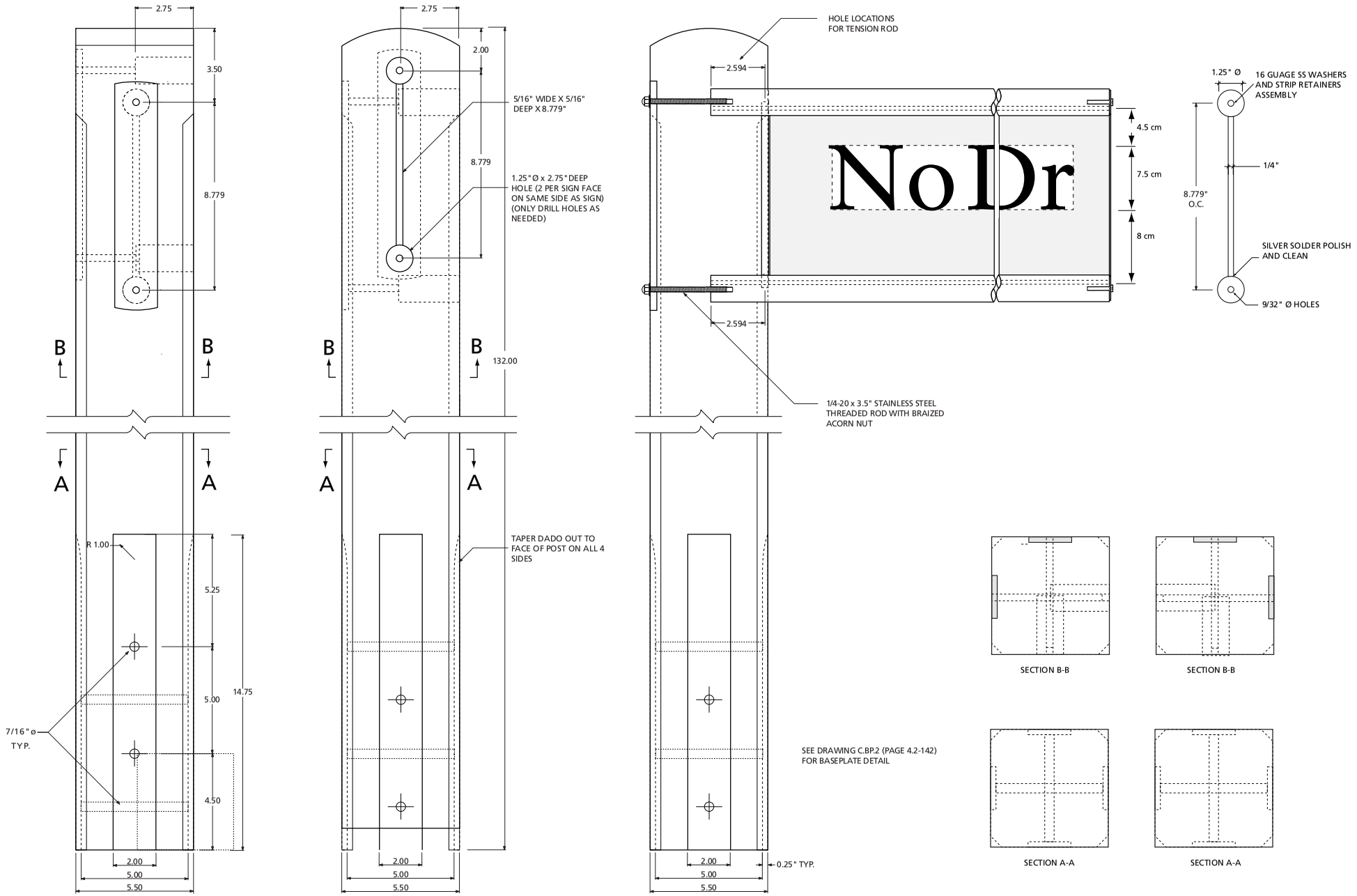
BOLLARD WALL MOUNT PLAN DETAIL

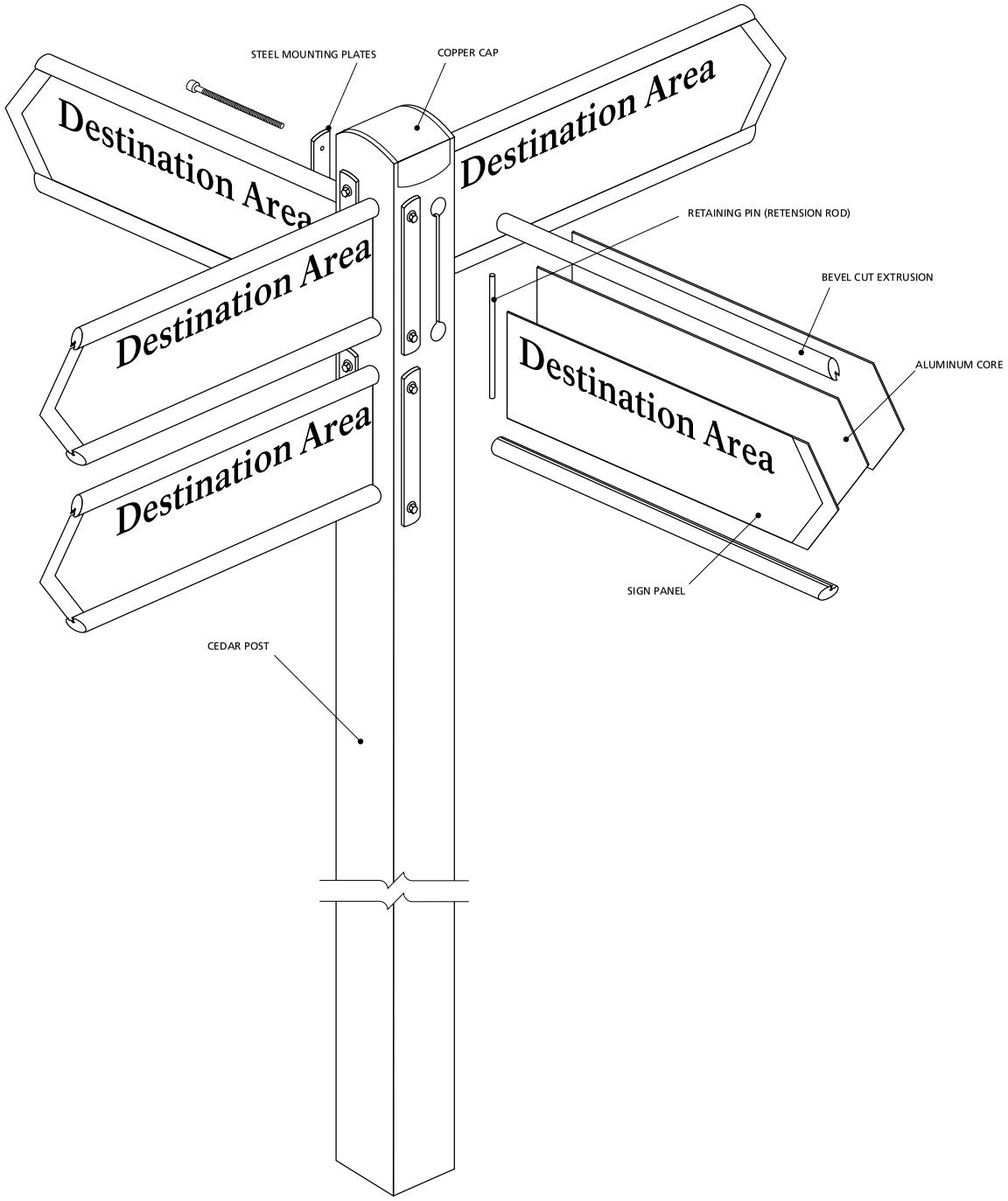


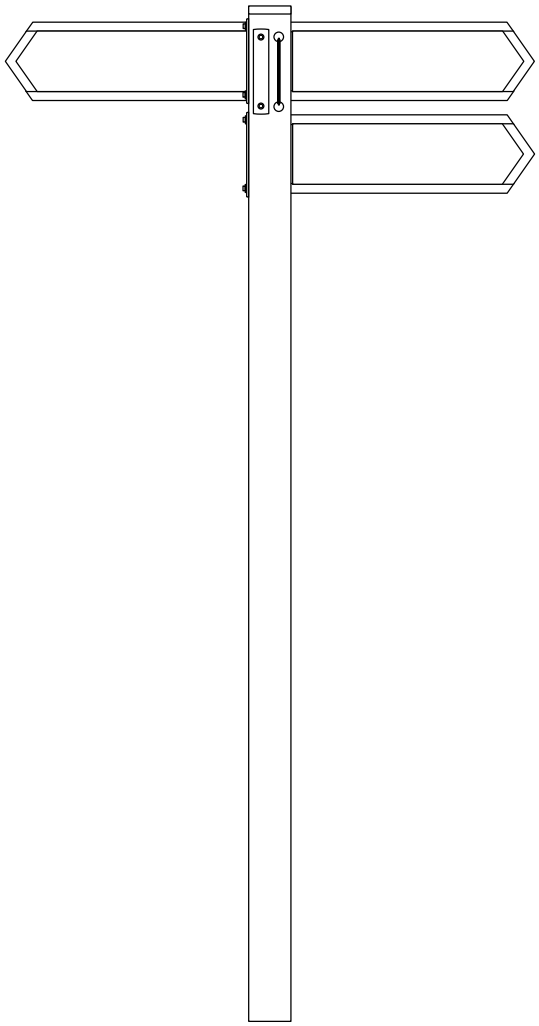
BOLLARD WALL MOUNT ELEVATION DETAIL

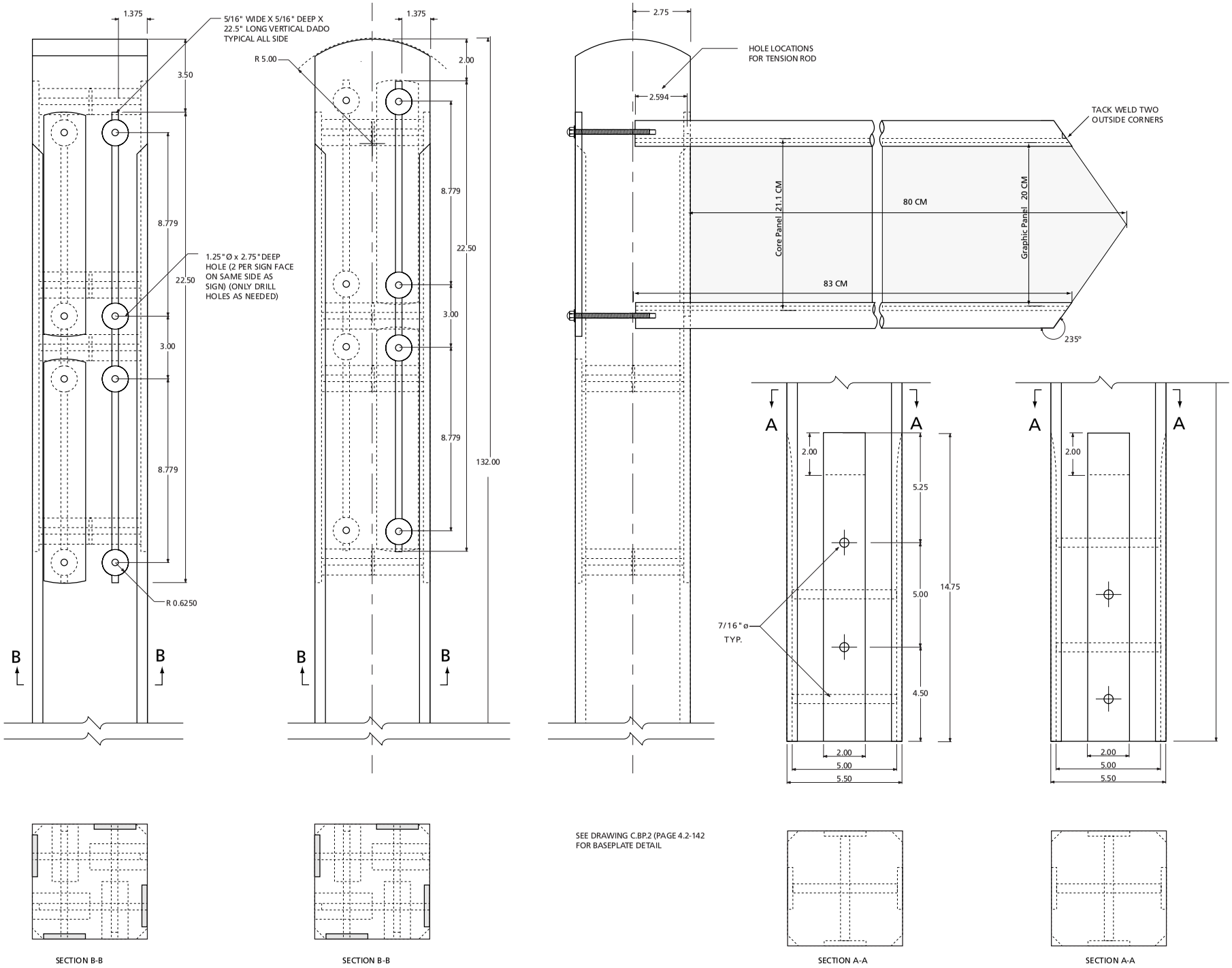

BRASS MOUNTING PLATES
COPPER CAP
North Side Drive
RETAINING PIN (TENSION ROD)
EXTRUSION
Shuttle Bus Road
ALUMINUM CORE
CEDAR POST
STEEL RETAINER STRAP
SIGN PANEL




2.75
3.50
8.779
B
B
A
A
R 1.00
5.25
5.00
4.50
14.75
7/16" ø
TYP.
2.00
5.00
5.50
2.75
2.00
5/16" WIDE X 5/16"
DEEP X 8.779"
8.779
1.25" Ø x 2.75" DEEP
HOLE (2 PER SIGN FACE
ON SAME SIDE AS SIGN)
(ONLY DRILL HOLES AS
NEEDED)
132.00
TAPER DADO OUT TO
FACE OF POST ON ALL 4
SIDES
2.00
5.00
5.50
HOLE LOCATIONS
FOR TENSION ROD
2.594
NoIDr
4.5 cm
7.5 cm
8 cm
2.594
1/4-20 x 3.5" STAINLESS STEEL
THREADED ROD WITH BRAIZED
ACORN NUT
SEE DRAWING C.BP.2 (PAGE 4.2-142)
FOR BASEPLATE DETAIL
2.00
5.00
5.50
0.25" TYP.
1.25" Ø
16 GUAGE SS WASHERS
AND STRIP RETAINERS
ASSEMBLY
1/4"
8.779"
O.C.
SILVER SOLDER POLISH
AND CLEAN
9/32" Ø HOLES
SECTION B-B
SECTION B-B
SECTION A-A
SECTION A-A


STEEL MOUNTING PLATES
COPPER CAP
Destination Area
Destination Area
Destination Area
Destination Area
RETAINING PIN (RETENSION ROD)
BEVEL CUT EXTRUSION
ALUMINUM CORE
SIGN PANEL
CEDAR POST





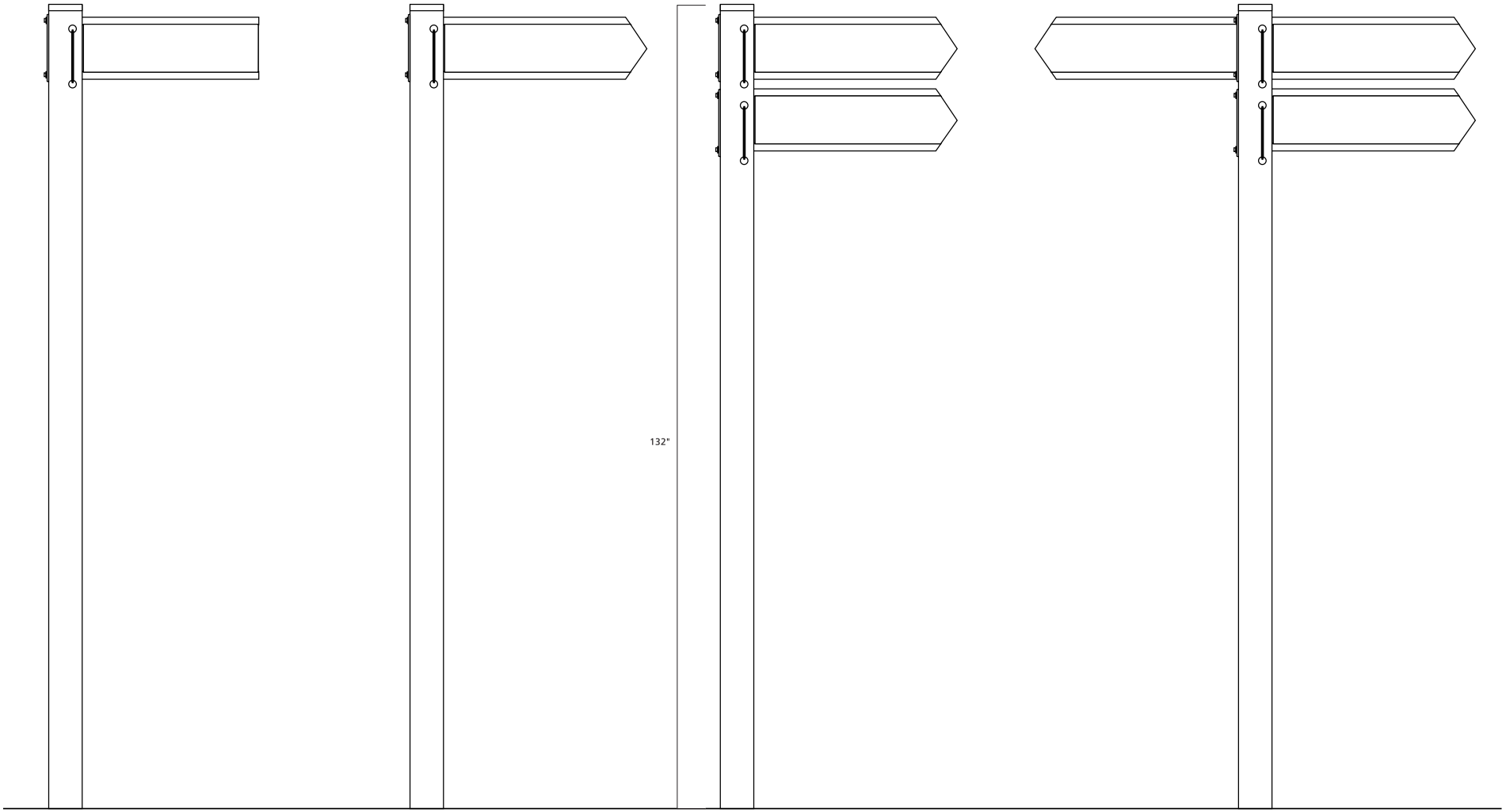
SECTION B-B

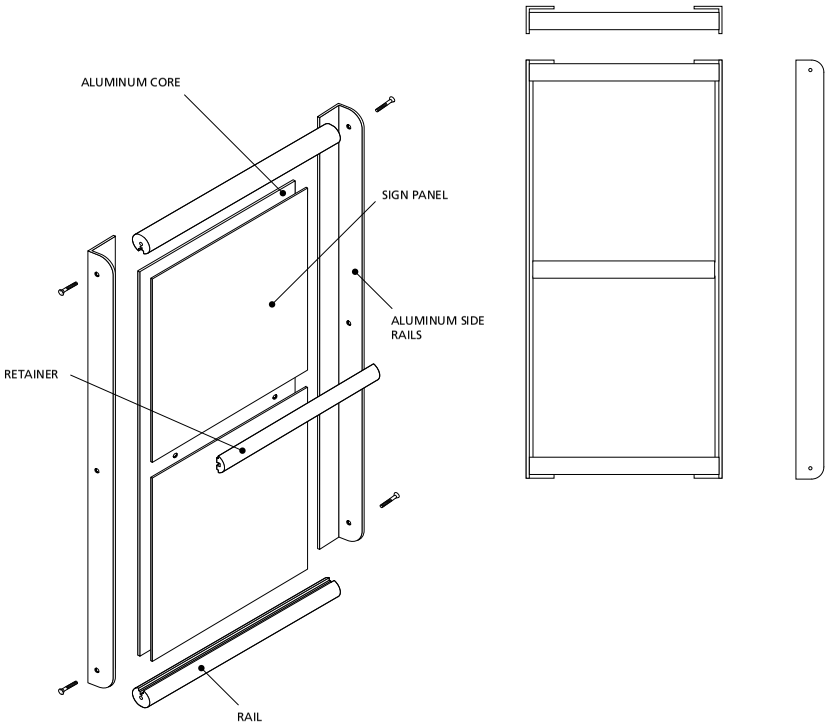
SECTION B-B

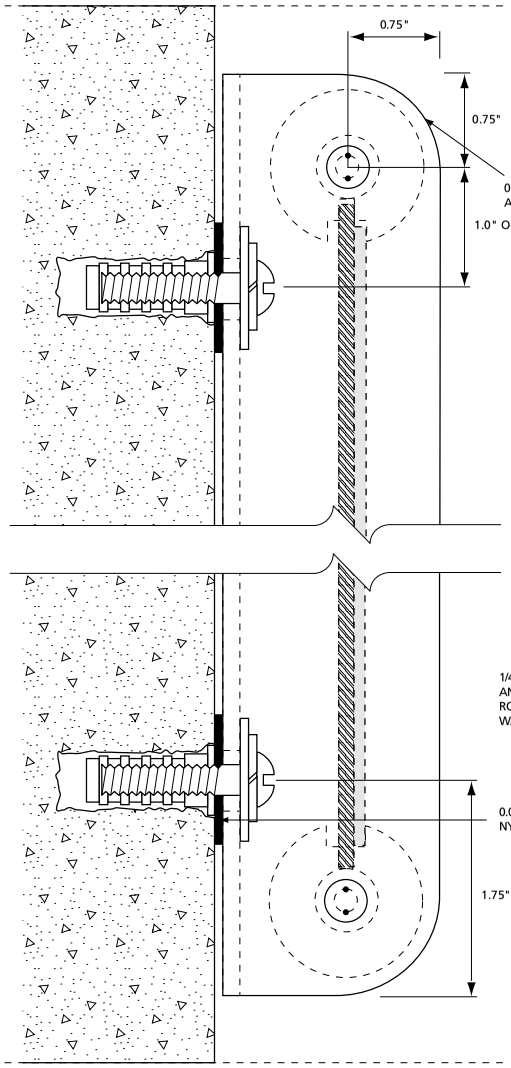
SEE DRAWING C.BP.2 (PAGE 4.2-142 FOR BASEPLATE DETAIL

SECTION A-A

SECTION A-A

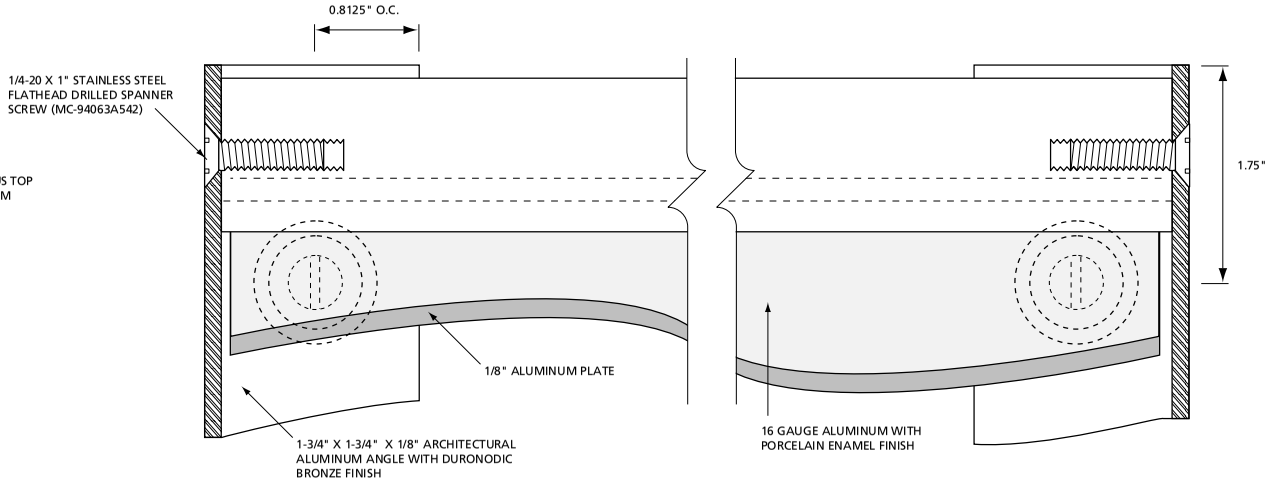

132"


ALUMINUM CORE
SIGN PANEL
ALUMINUM SIDE RAILS
RETAINER
RAIL

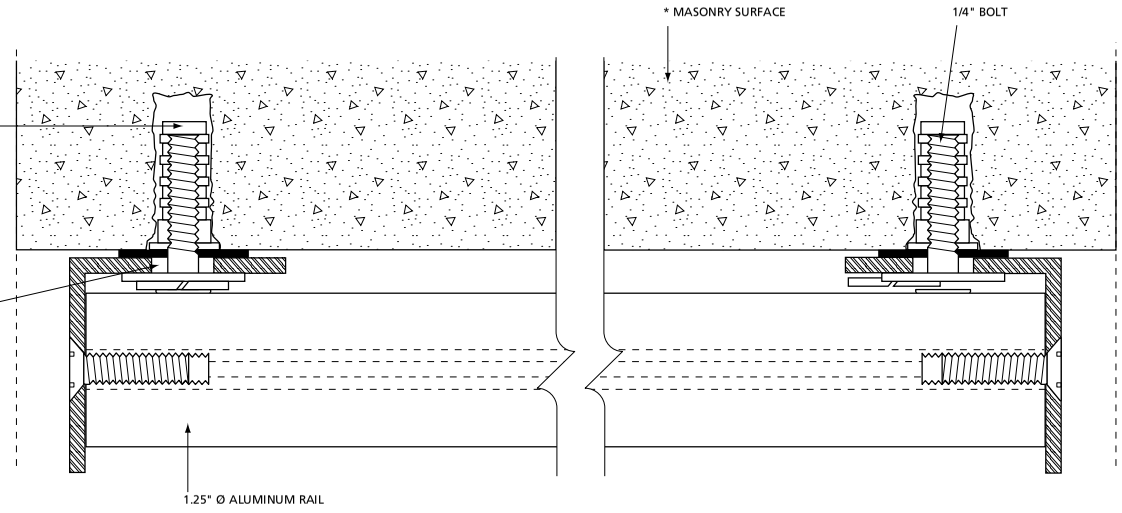


* MOUNTING SURFACES MAY VARY. USE 1/4" WOOD SCREWS WHEN MOUNTING ON WOOD SURFACES.

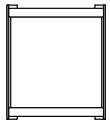
WALL MOUNT ASSEMBLY SECTION DETAIL



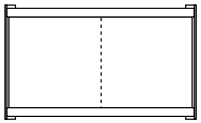
WALL MOUNT ASSEMBLY ELEVATION DETAIL



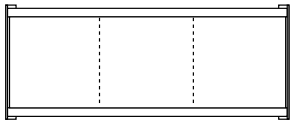
WALL MOUNT ASSEMBLY PLAN DETAIL



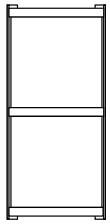
W-1 30x30



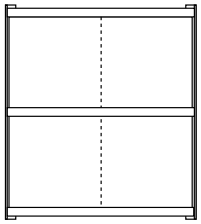
W-4 60x30



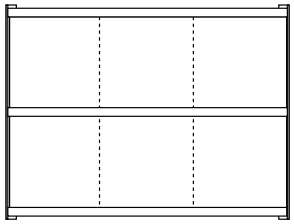
W-7 90x30



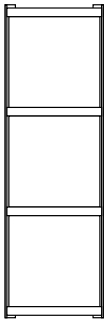
W-2 30x60



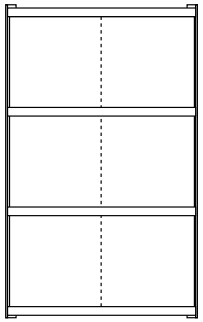
W-5 60x60



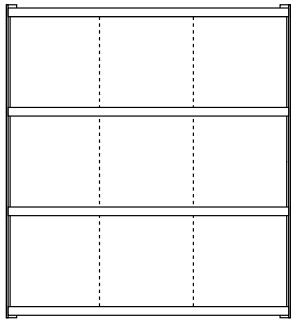
W-8 90x60



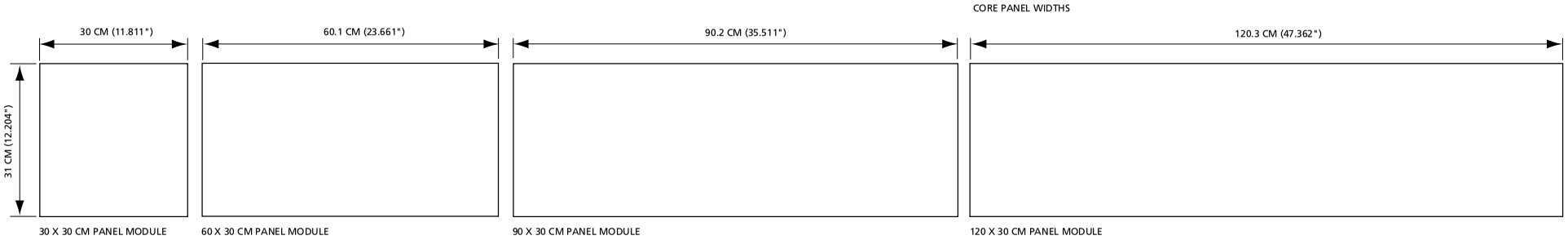
W-3 30x90

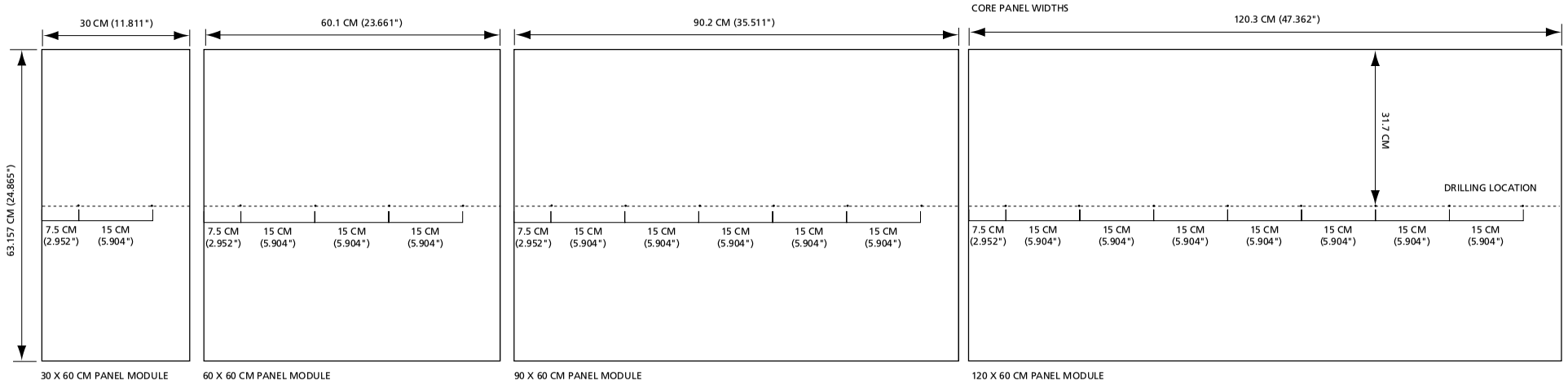


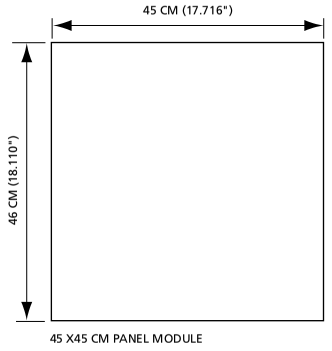
W-6 60x90

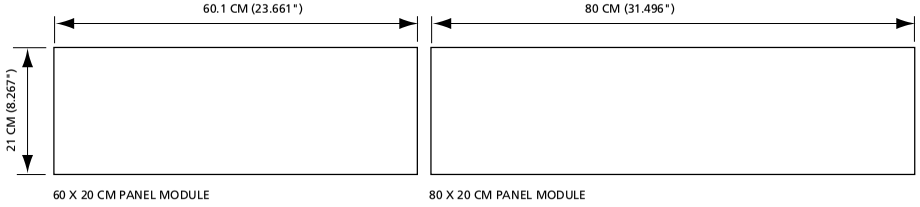


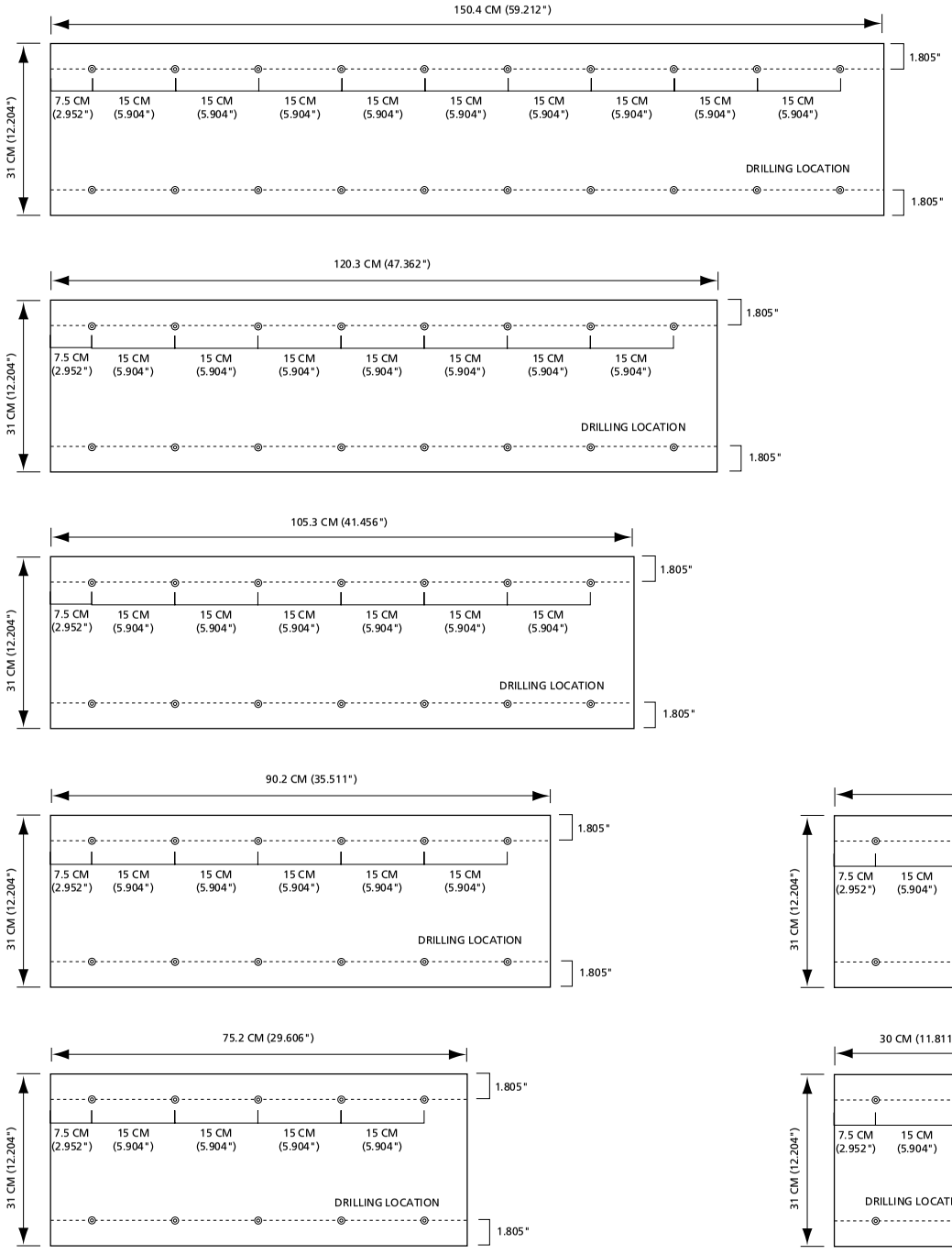
W-9 90x90

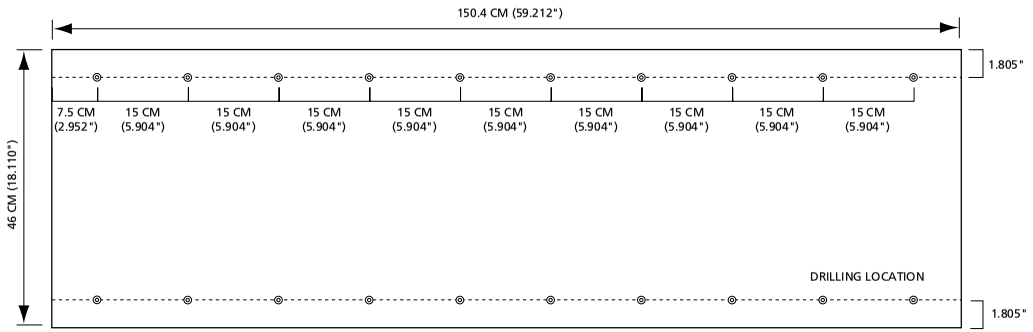

CORE PANEL WIDTHS
30 CM (11.811")
60.1 CM (23.661")
90.2 CM (35.511")
120.3 CM (47.362")
31 CM (12.204")
30 X 30 CM PANEL MODULE
60 X 30 CM PANEL MODULE
90 X 30 CM PANEL MODULE
120 X 30 CM PANEL MODULE

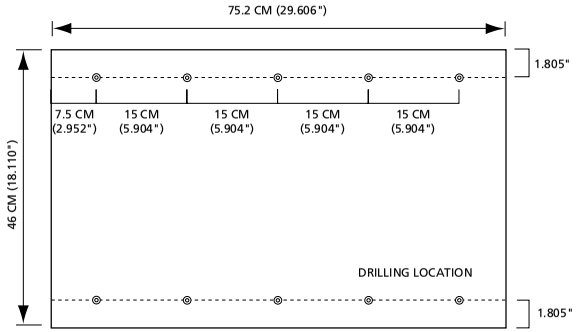

CORE PANEL WIDTHS
30 CM (11.811")
60.1 CM (23.661")
90.2 CM (35.511")
120.3 CM (47.362")
63.157 CM (24.865")
31.7 CM
DRILLING LOCATION
7.5 CM (2.952")
15 CM (5.904")
30 X 60 CM PANEL MODULE
60 X 60 CM PANEL MODULE
90 X 60 CM PANEL MODULE
120 X 60 CM PANEL MODULE

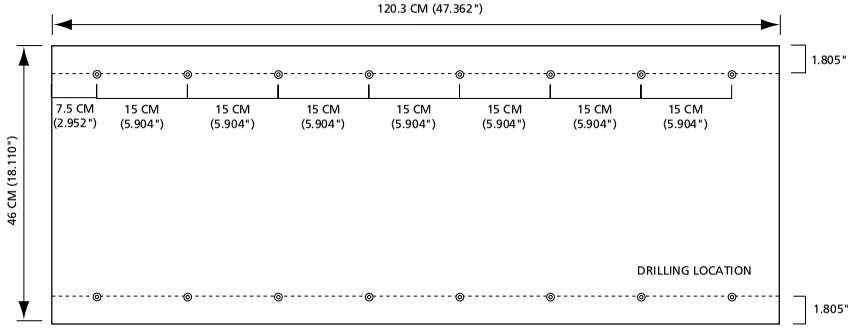

45 CM (17.716")
46 CM (18.110")
45 X45 CM PANEL MODULE

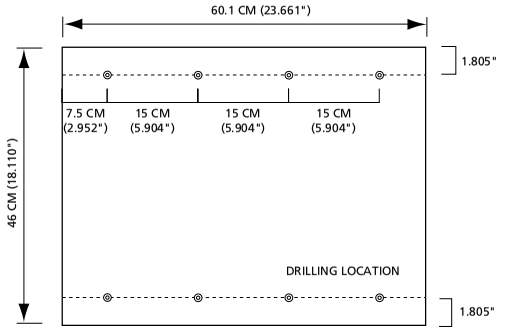

60.1 CM (23.661")
80 CM (31.496")
21 CM (8.267")
60 X 20 CM PANEL MODULE
80 X 20 CM PANEL MODULE

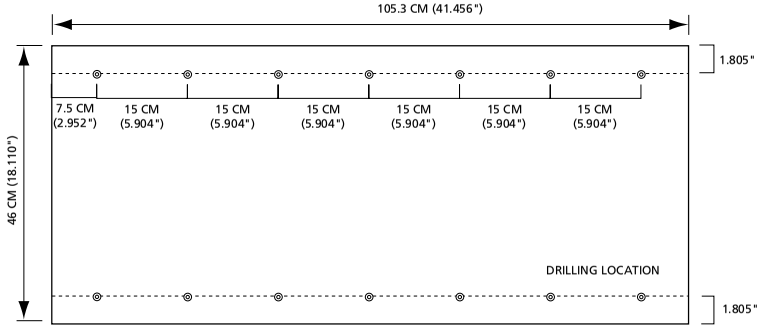

150.4 CM (59.212")
1.805"
31 CM (12.204")
7.5 CM (2.952")
15 CM (5.904")
DRILLING LOCATION
120.3 CM (47.362")
105.3 CM (41.456")
90.2 CM (35.511")
60.1 CM (23.661")
75.2 CM (29.606")
30 CM (11.811")
DRILL AND COUNTERBORE HOLES TO RECEIVE
(10-24) STEEL LOW HEAD SOCKET CAP SCREWS

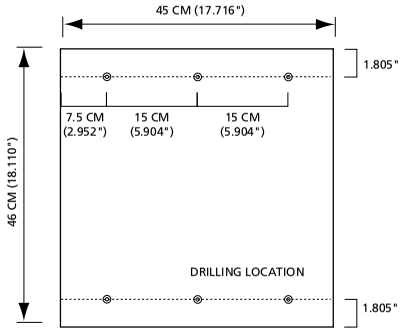


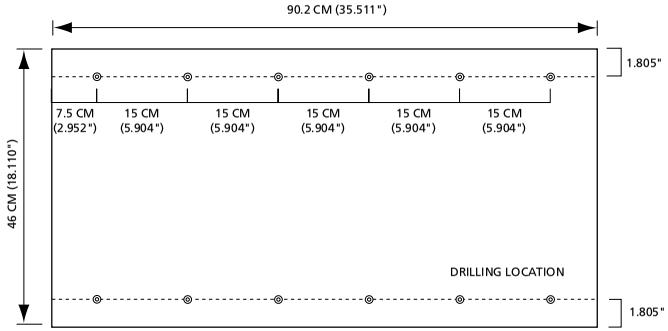




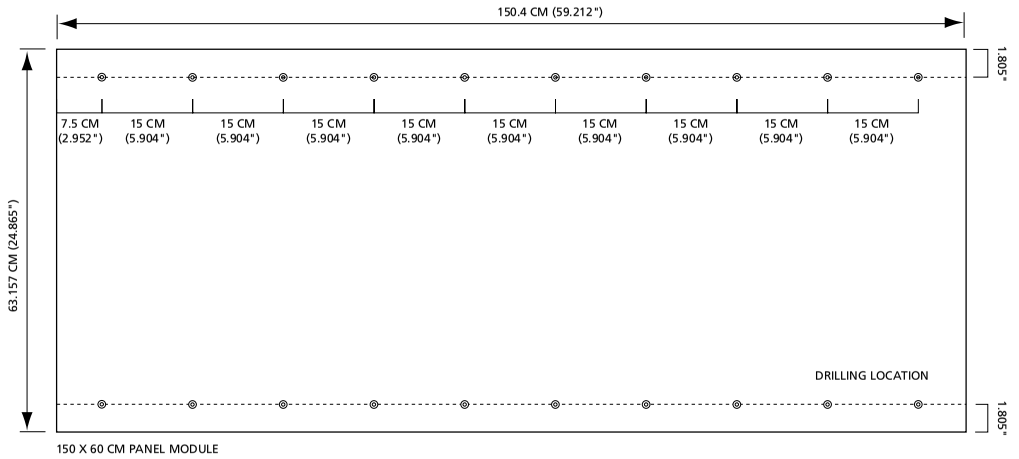




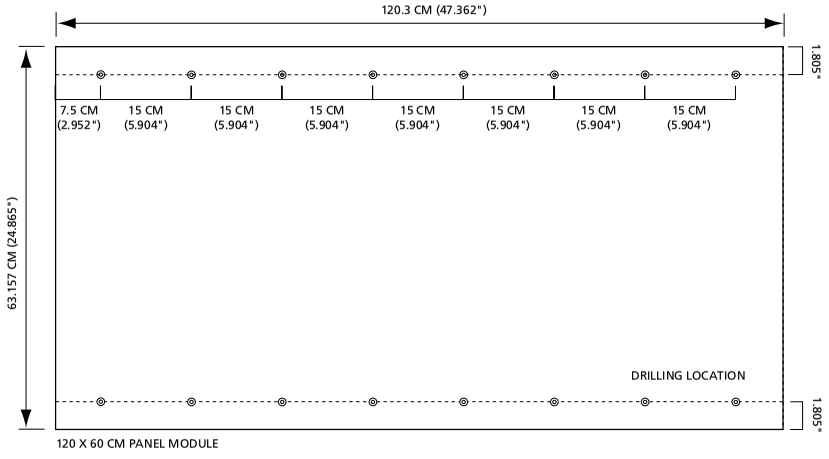




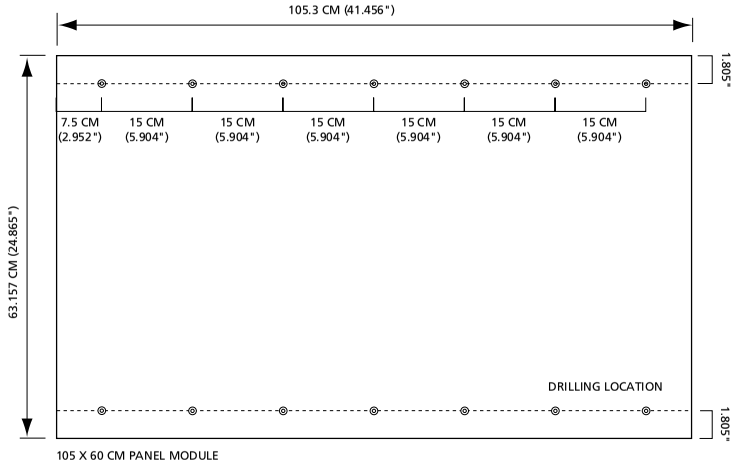
DRILL AND COUNTERBORE HOLES TO RECEIVE
(10-24) STEEL LOW HEAD SOCKET CAP SCREWS



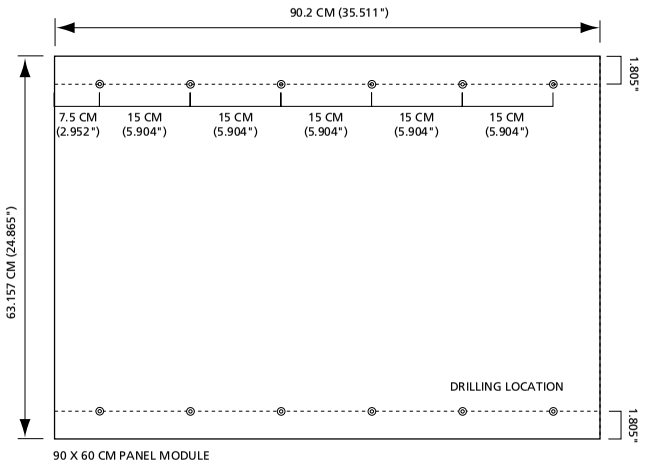
150 X 60 CM PANEL MODULE



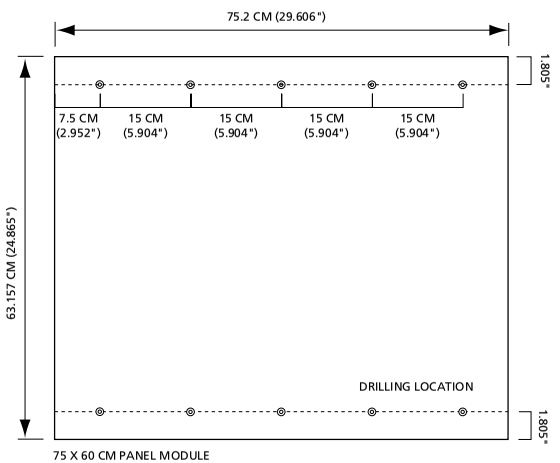
120 X 60 CM PANEL MODULE



105 X 60 CM PANEL MODULE

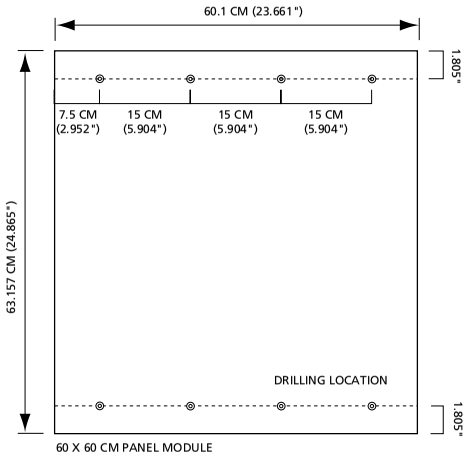


90 X 60 CM PANEL MODULE

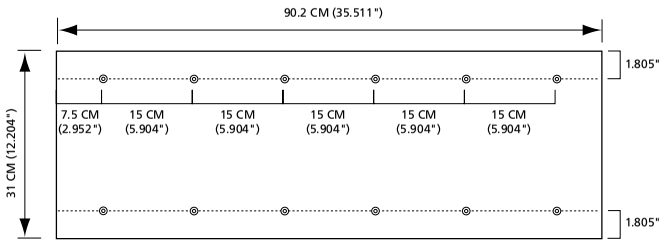


75 X 60 CM PANEL MODULE

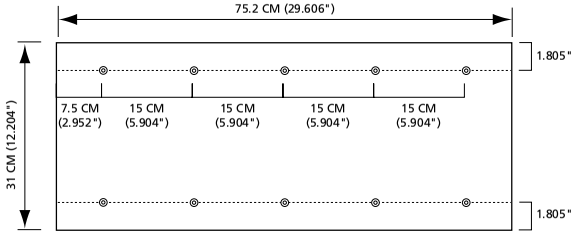
DRILL AND COUNTERBORE HOLES TO RECEIVE
(10-24) STEEL LOW HEAD SOCKET CAP SCREWS



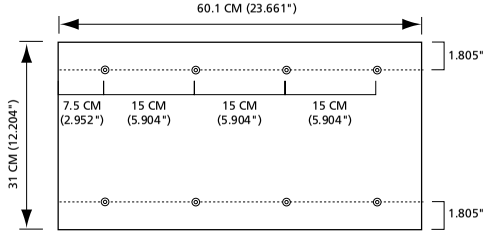
60 X 60 CM PANEL MODULE



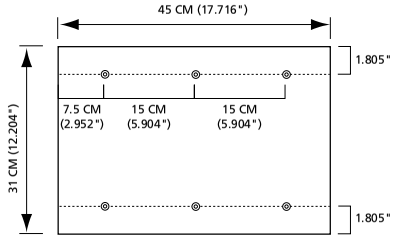
6-PANEL DOUBLE POST
ASSEMBLY D



5-PANEL DOUBLE POST
ASSEMBLY D

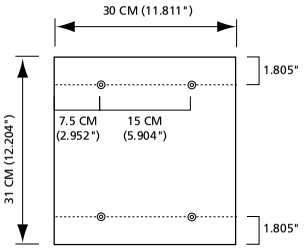


4-PANEL DOUBLE POST
ASSEMBLY D

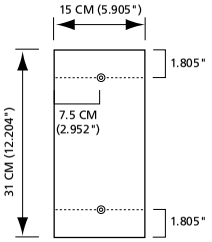


3-PANEL DOUBLE POST
ASSEMBLY D

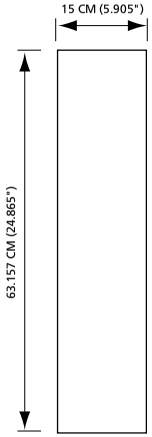
DRILL AND COUNTERBORE HOLES TO RECEIVE
(10-24) STEEL LOW HEAD SOCKET CAP SCREWS



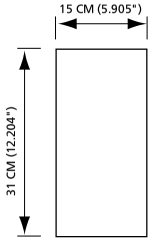
2-PANEL DOUBLE POST
ASSEMBLY D



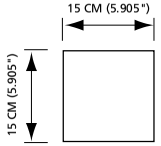
1-PANEL DOUBLE POST
ASSEMBLY D



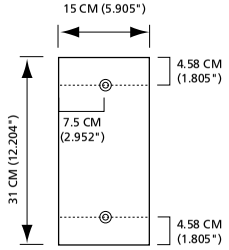
CAMPSITE ID
EXTENDED-PANEL
DOUBLE POST
ASSEMBLY E



CAMPSITE ID
FULL-PANEL
DOUBLE POST
ASSEMBLY E

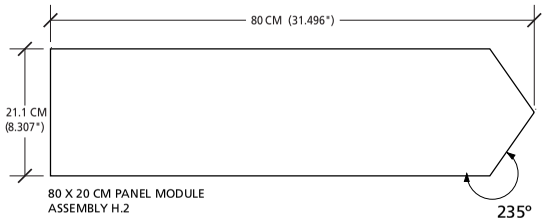


CAMPSITE ID
HALF-PANEL
DOUBLE POST
ASSEMBLY E

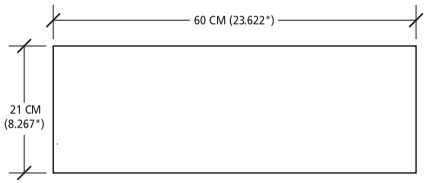


SINGLE POST
ASSEMBLY F

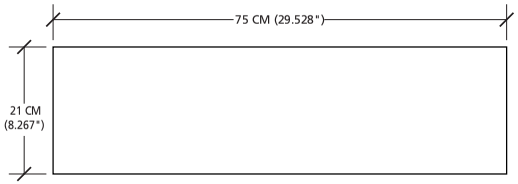
DRILL 3/8" Ø THROUGH HOLE WITH
7/8" Ø COUNTERBORE 5/64" DEEP
TO RECEIVE T-NUT



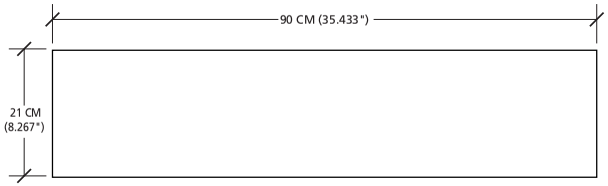
80 X 20 CM PANEL MODULE
ASSEMBLY H.2



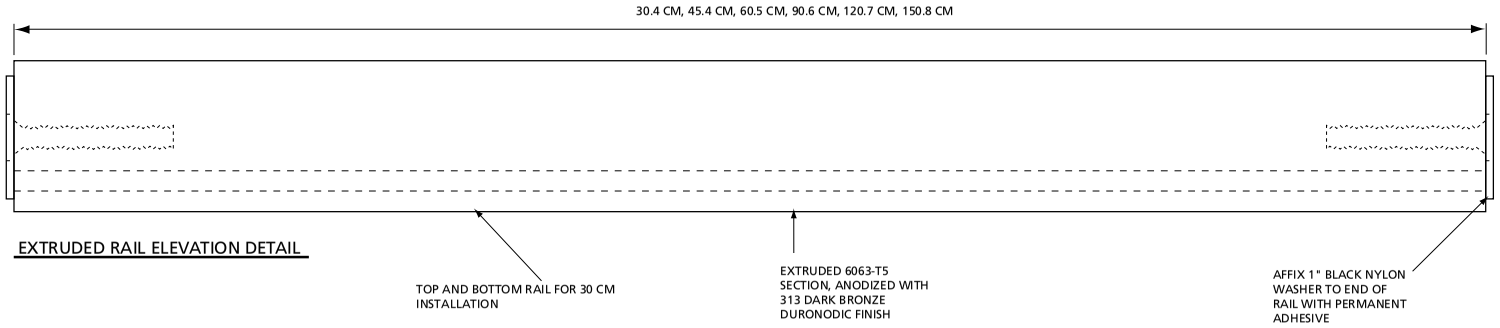
60 X 20 CM PANEL MODULE
ASSEMBLY H.1



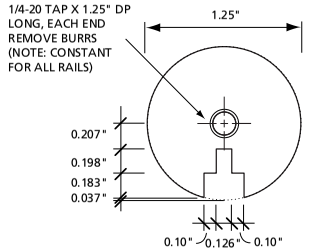
75 X 20 CM PANEL MODULE
ASSEMBLY H.1



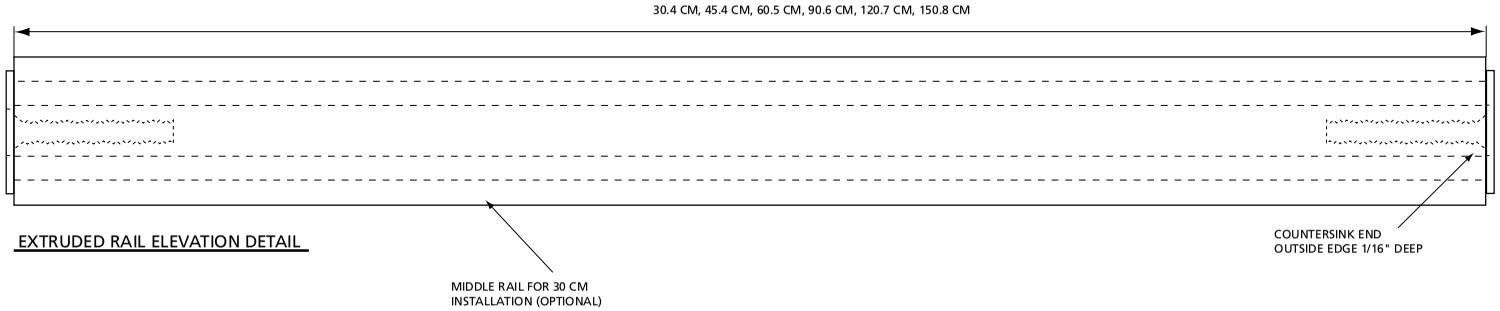
90 X 20 CM PANEL MODULE
ASSEMBLY H.1



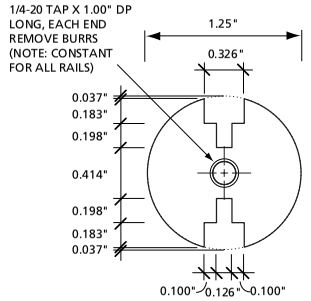
EXTRUDED RAIL ELEVATION DETAIL



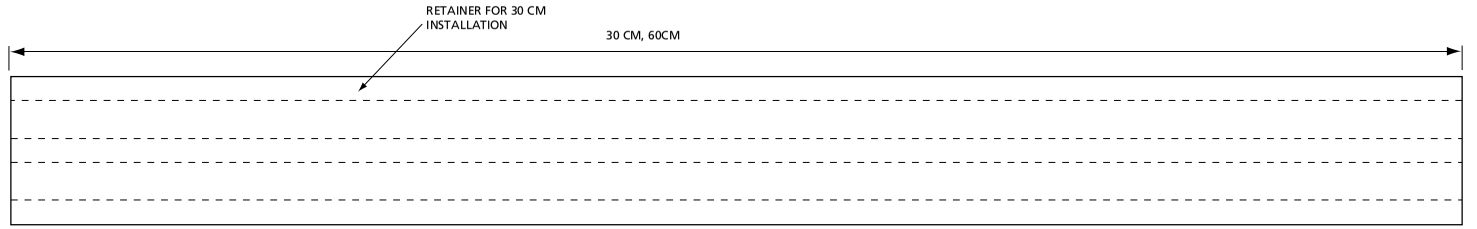
SINGLE SLOT EXTRUDED RAIL SECTION DETAIL



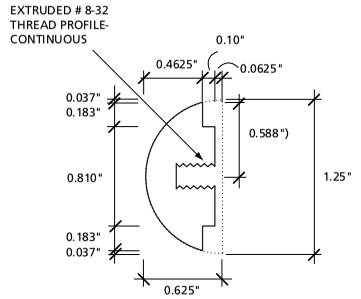
EXTRUDED RAIL ELEVATION DETAIL



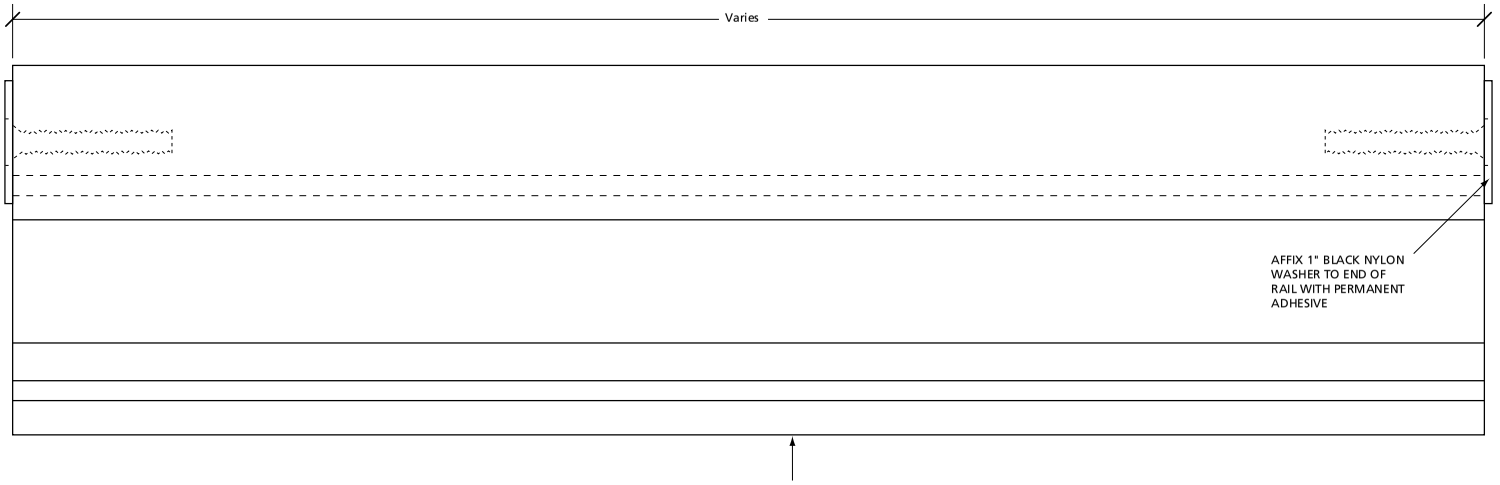
DOUBLE SLOT EXTRUDED RAIL SECTION DETAIL



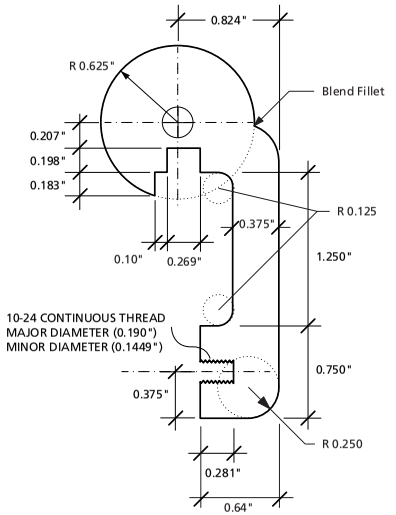
EXTRUDED RETAINER BAR ELEVATION DETAIL



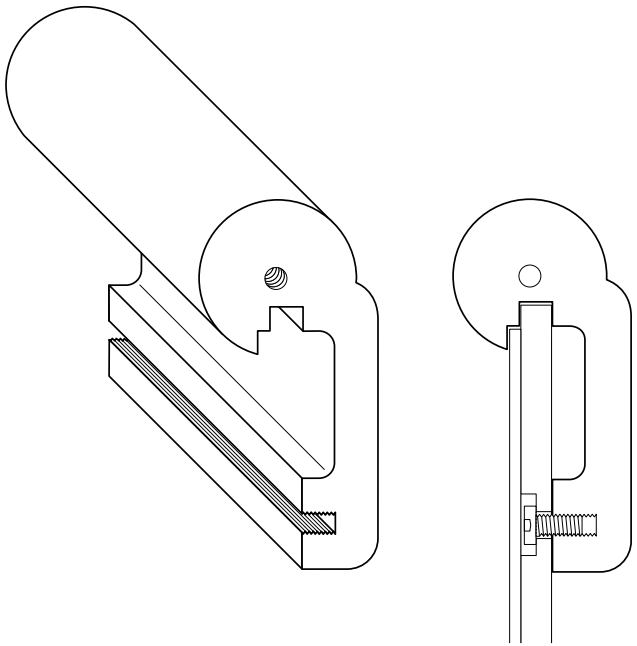
EXTRUDED RETAINER SECTION DETAIL

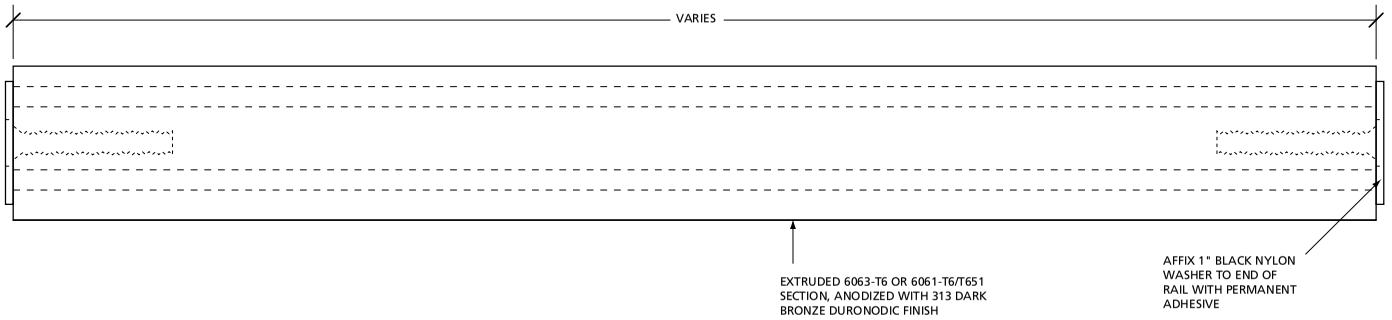


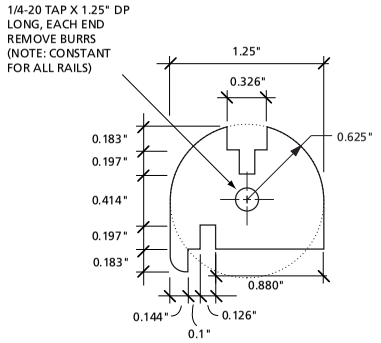
EXTRUDED EXTENSION RAIL ELEVATION DETAIL



EXTRUDED EXTENSION RAIL PROFILE DETAIL

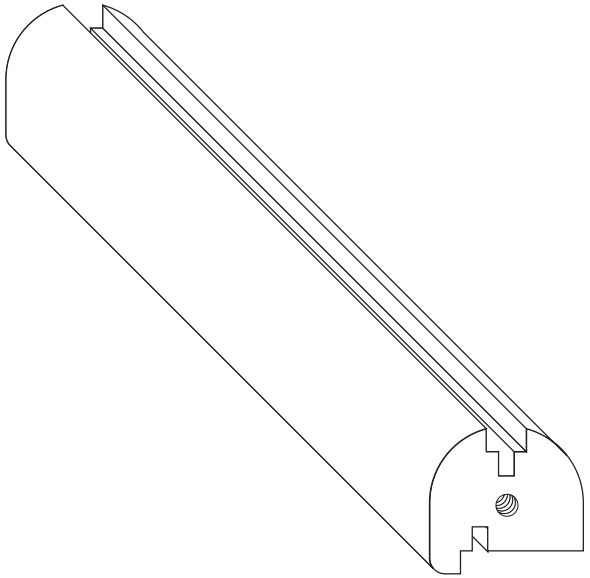


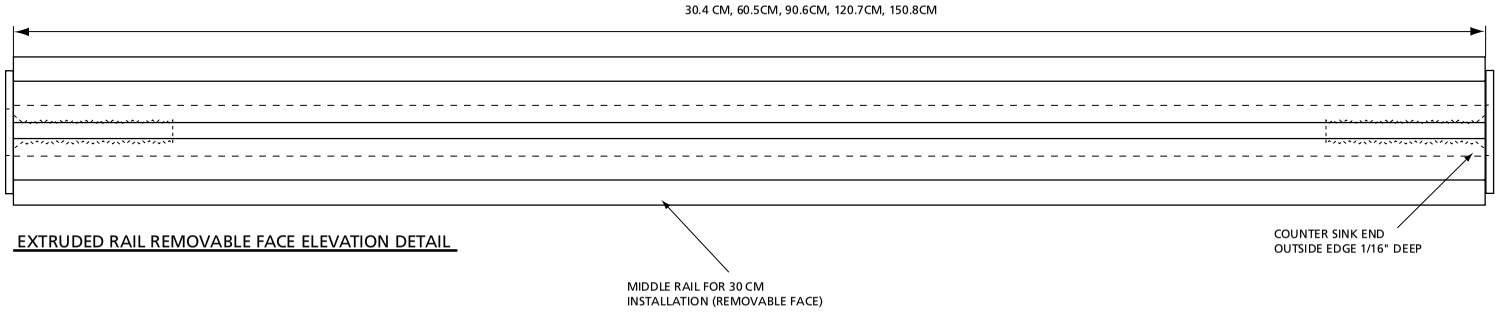




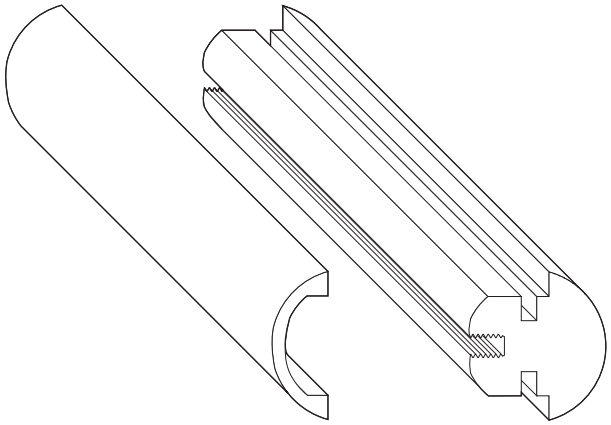
EXTRUDED CABINET RAIL PROFILE DETAIL

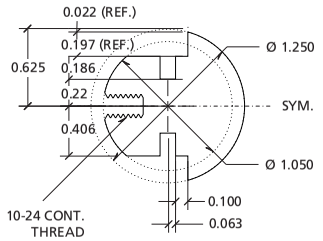
EXTRUDED EXTENSION RAIL ELEVATION DETAIL



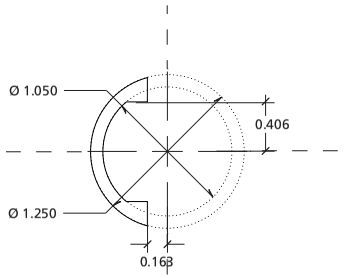


EXTRUDED RAIL REMOVABLE FACE ELEVATION DETAIL

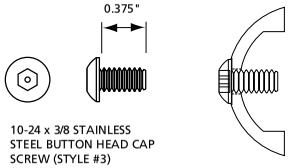




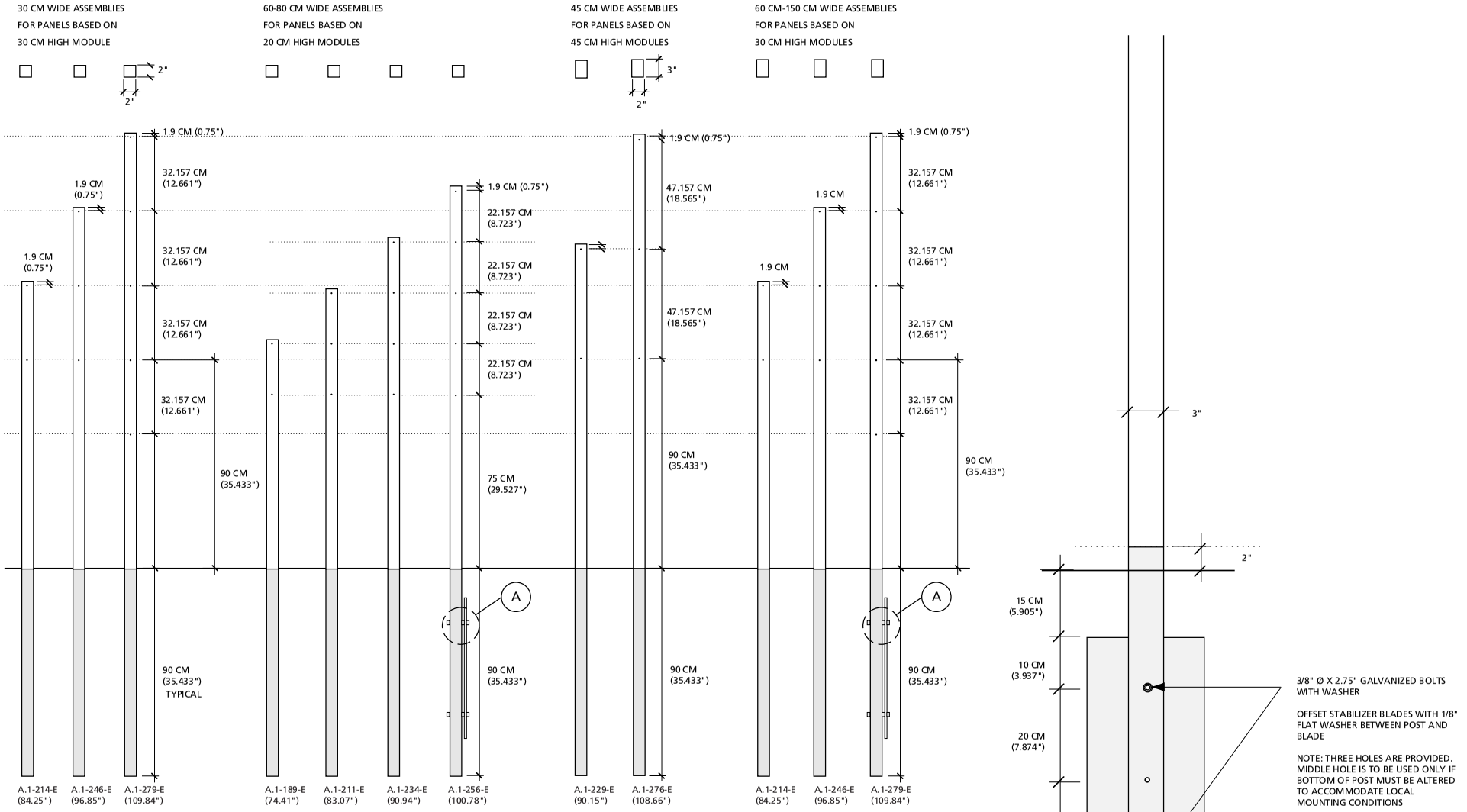
EXTRUDED BASE RAIL PROFILE DETAIL

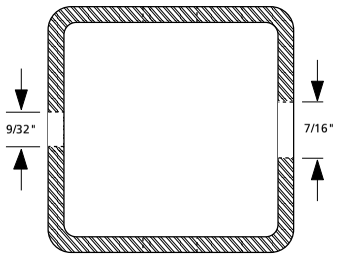


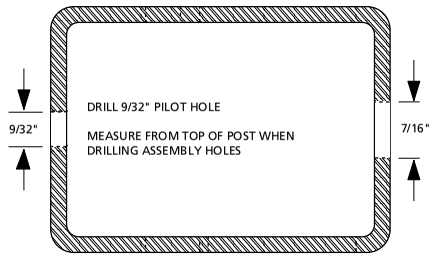
EXTRUDED FACE RAIL PROFILE DETAIL

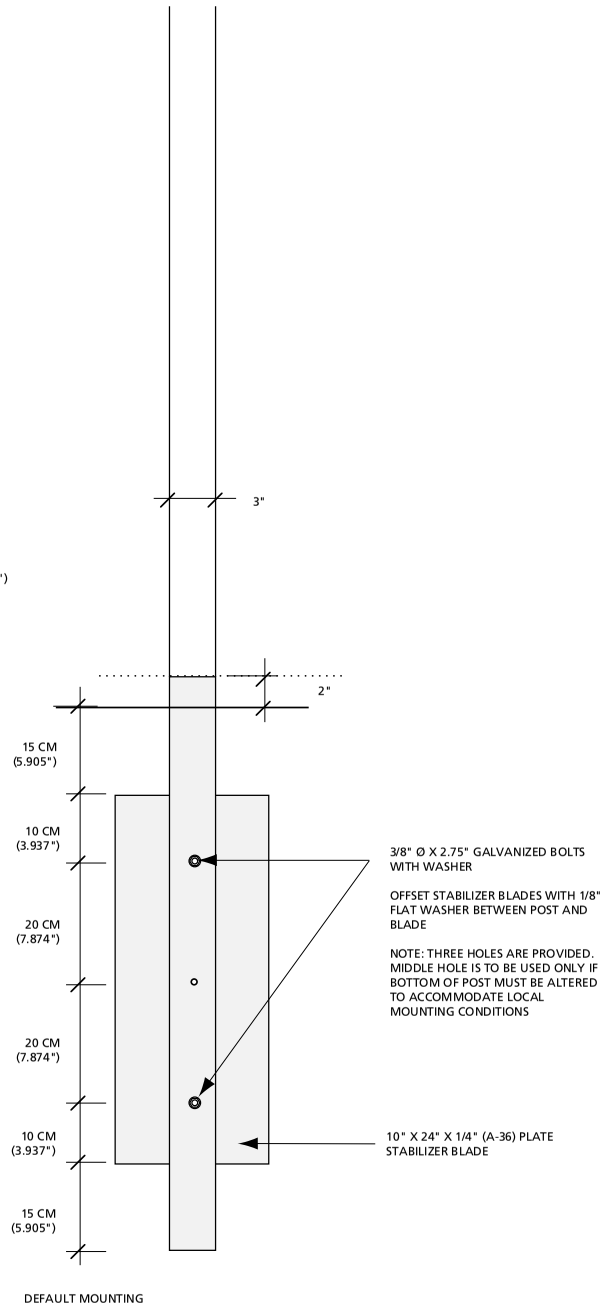


10-24 x 3/8 STAINLESS
STEEL BUTTON HEAD CAP
SCREW (STYLE #3)
(MC-9563A240)









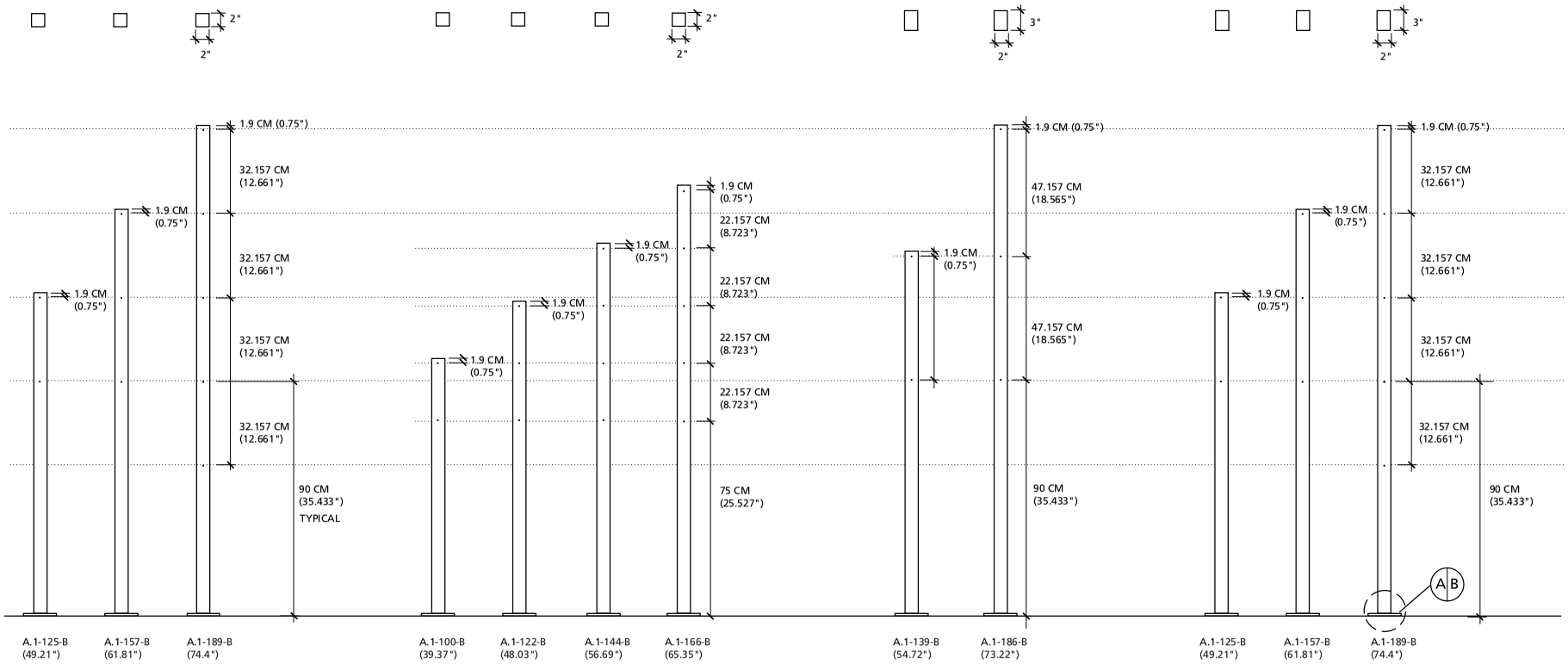
DEFAULT MOUNTING

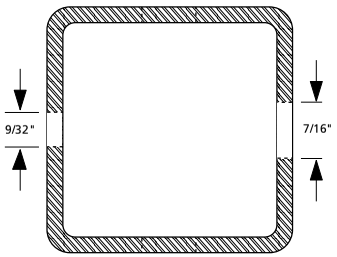
30 CM WIDE ASSEMBLIES
FOR PANELS BASED ON
30 CM HIGH MODULE

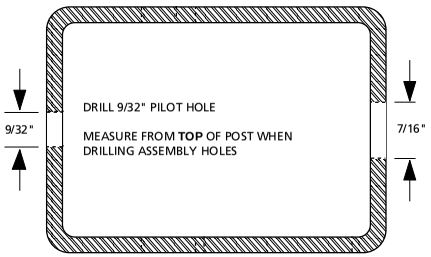
60-80 CM WIDE ASSEMBLIES
FOR PANELS BASED ON
20 CM HIGH MODULES

45 CM WIDE ASSEMBLIES
FOR PANELS BASED ON
45 CM HIGH MODULES

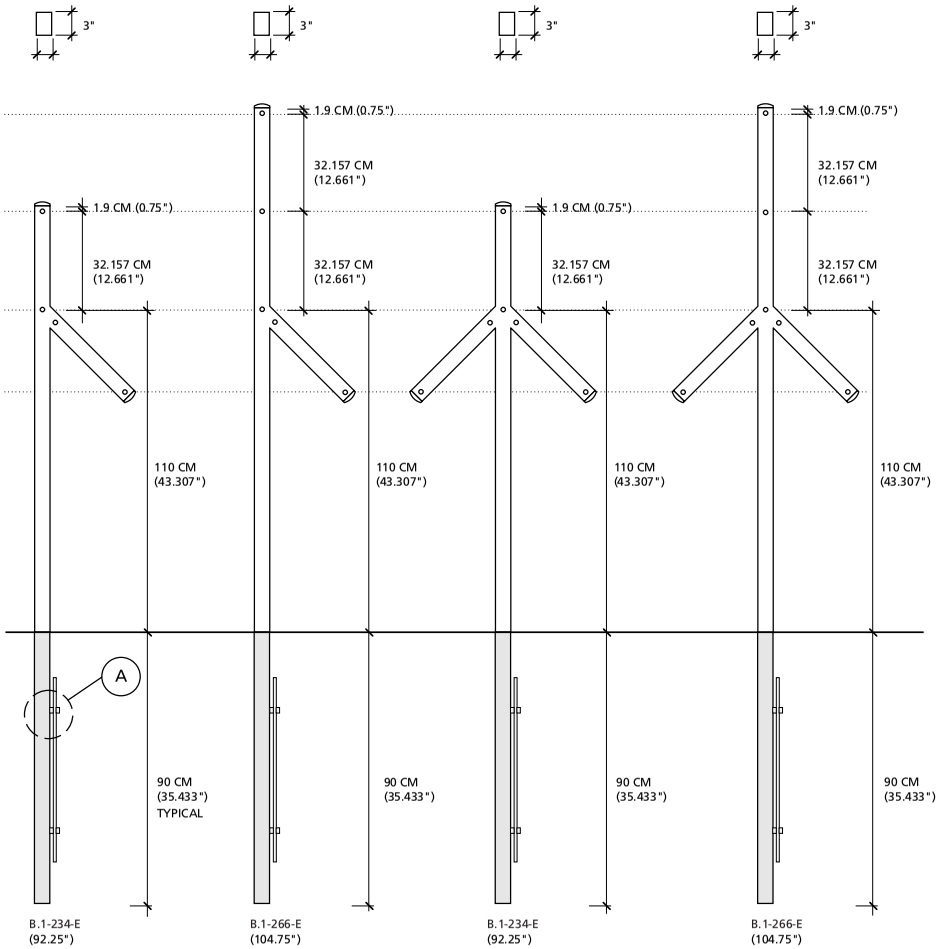
60 CM-150 CM WIDE ASSEMBLIES
FOR PANELS BASED ON
30 CM HIGH MODULES



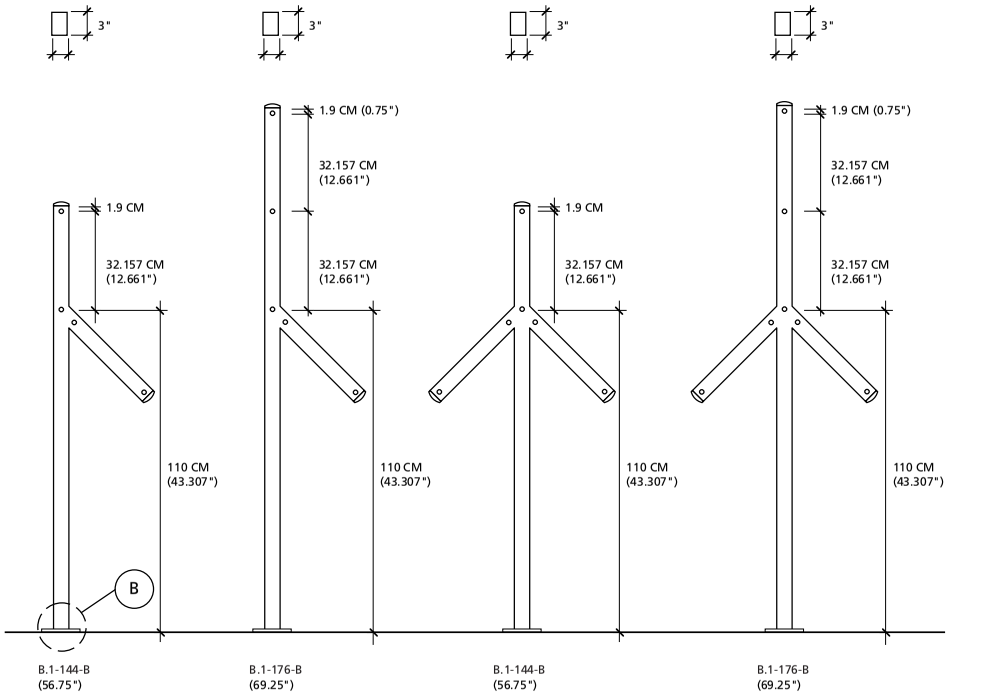


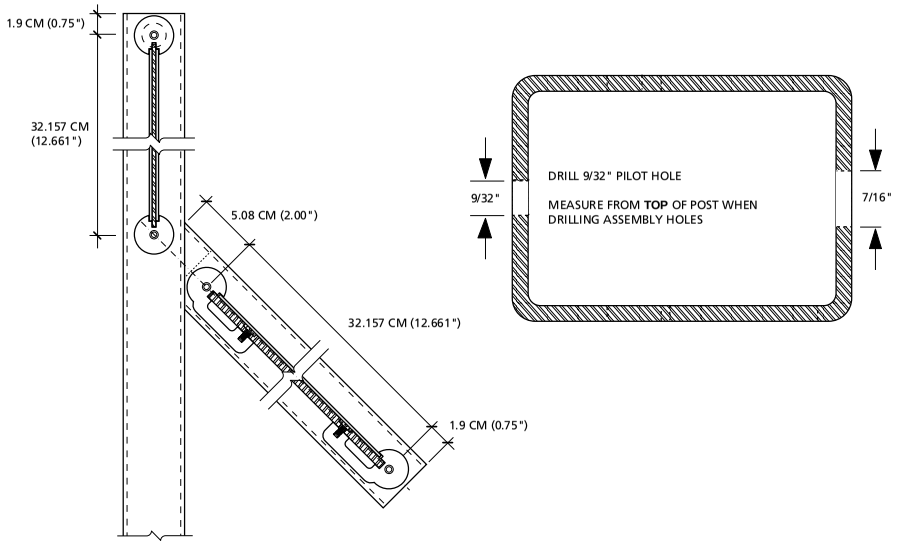


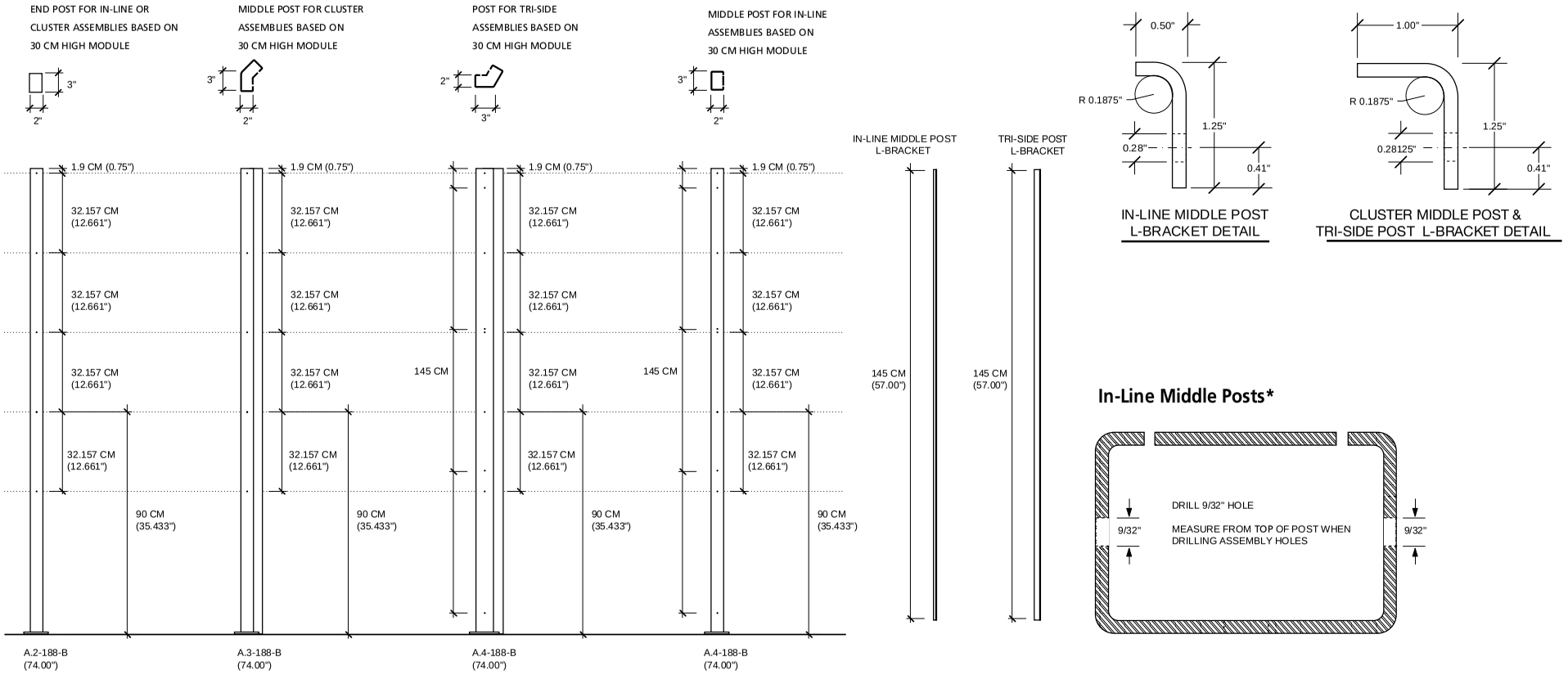
Forward Angle Assembly with Direct Embedment



Forward Angle Assembly with Baseplate Mount

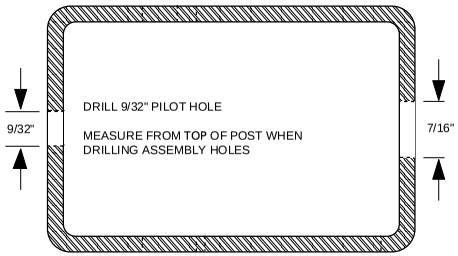




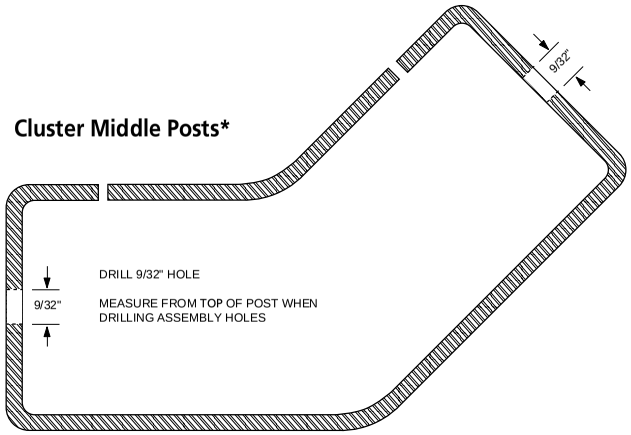


In-Line Middle Posts*

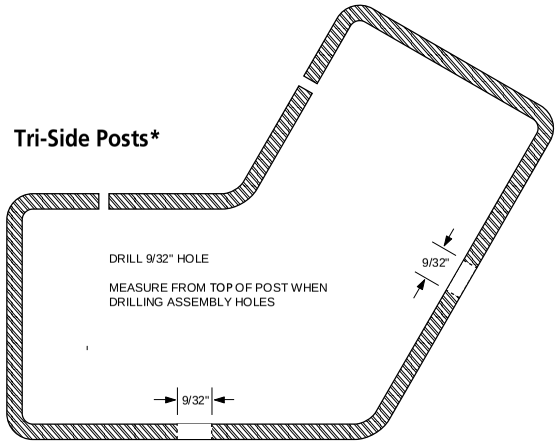
In-Line & Cluster End Posts*



Cluster Middle Posts*



Tri-Side Posts*

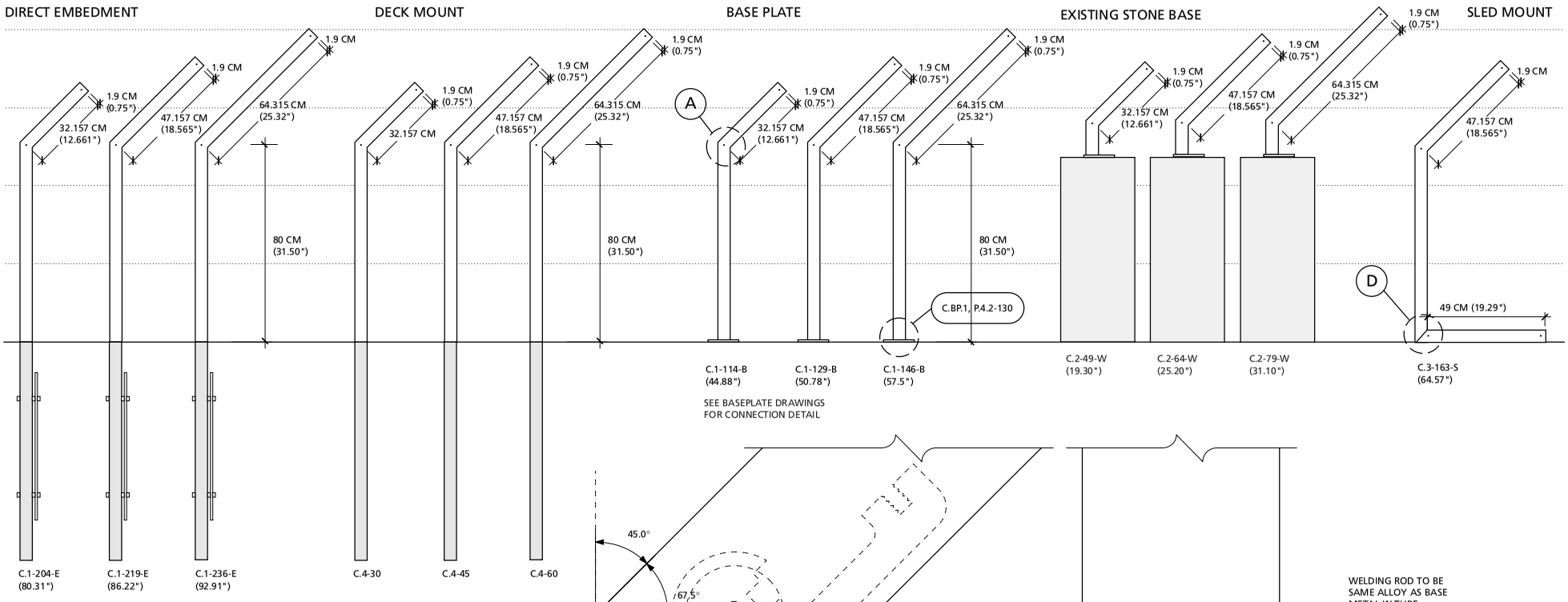


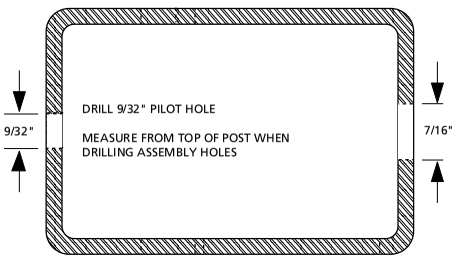
*NOTE: SEE BASEPLATE DRAWINGS FOR DETAILS

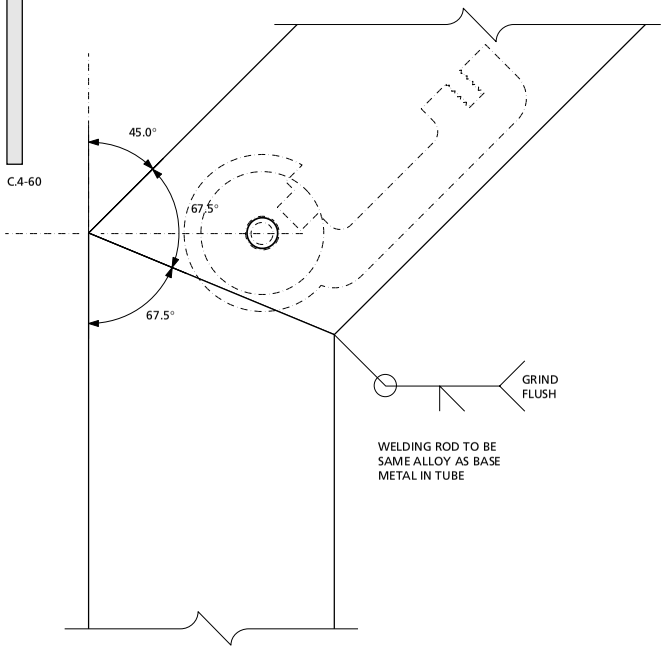
POST FOR REVERSE ANGLE
ASSEMBLIES BASED ON
30, 45 AND 60 CM HIGH MODULES

LENGTH AND LOCATION OF MOUNTING
HOLES TO BE DETERMINED BY FIELD
CONDITIONS

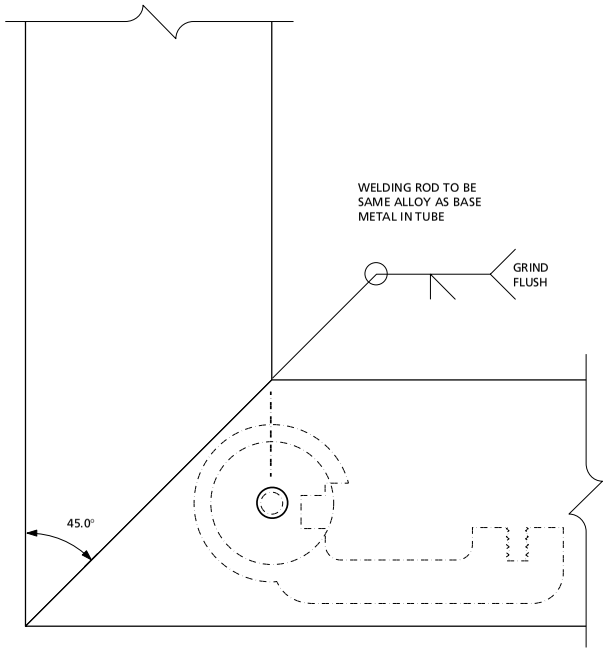
POST LENGTH FOR STONE BASE MOUNT IS BASED ON A 30"
HIGH WALL. LOCAL SITE CONDITIONS MAY DICTATE
MODIFICATIONS (+/-) STRUCTURE. NOTE LOCAL
REQUIRMENTS IN SIGN PLAN AND STRUCTURE ORDER.



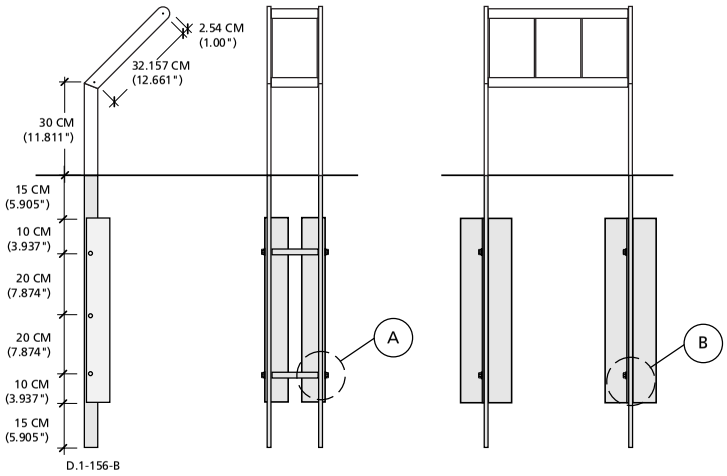


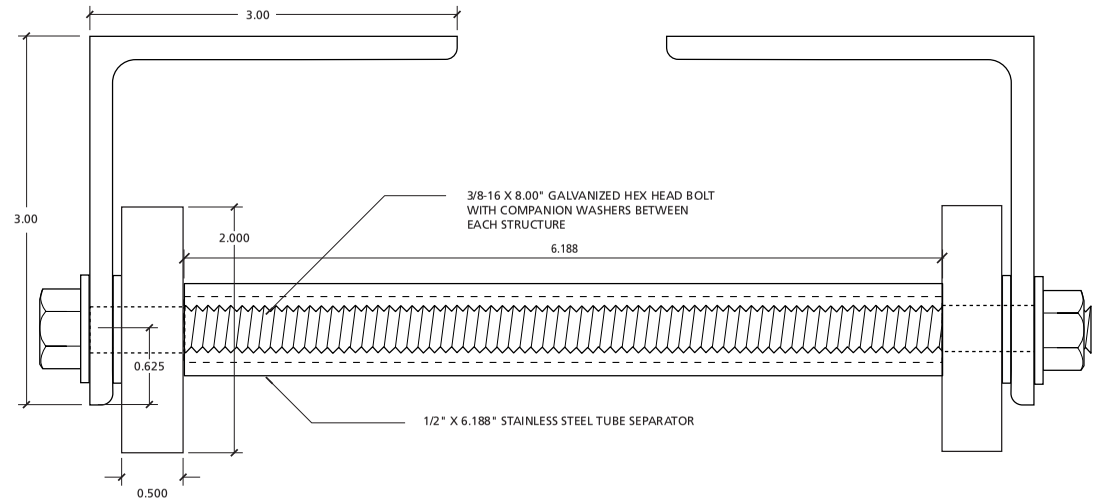


(A) 45° ANGLE WELD DETAIL

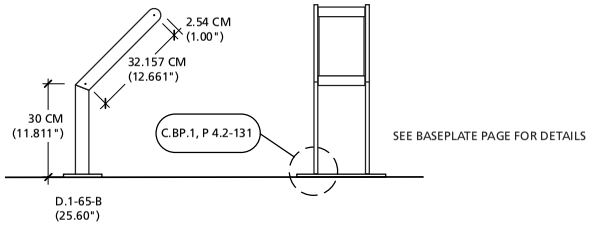


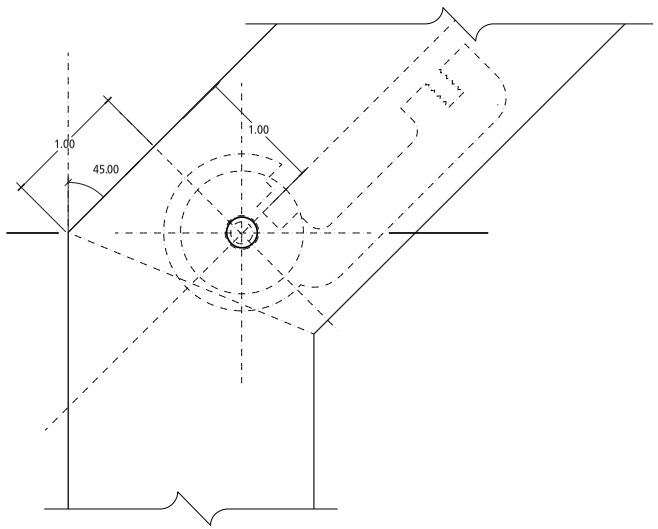
(D) 90° ANGLE WELD DETAIL



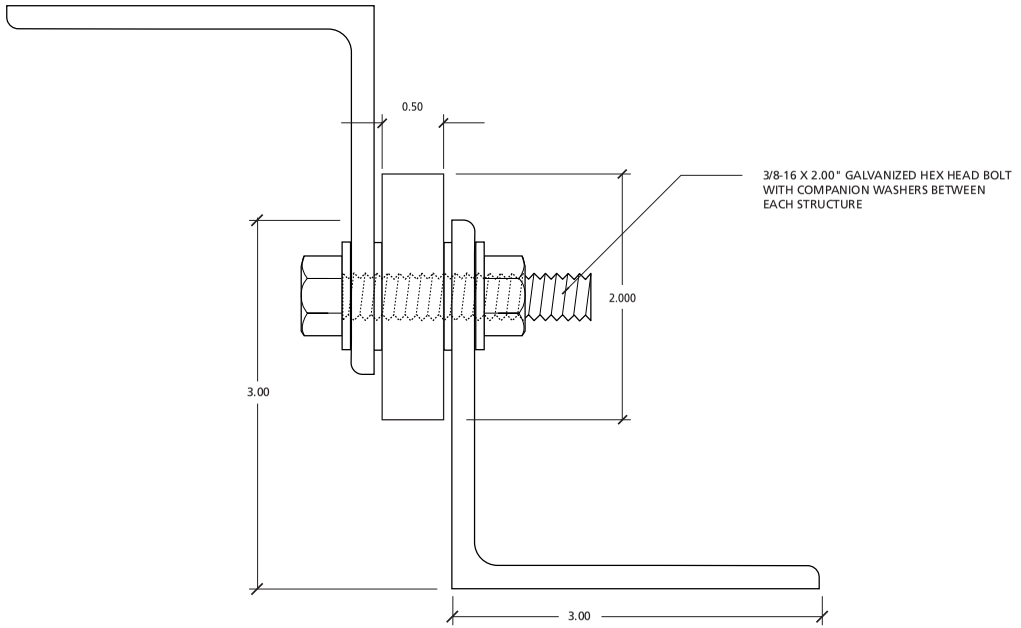


A 2.00" x 0.5" POST-NARROW PROFILE REVERSE ANGLE WITH
1 OR 2 PANEL ASSEMBLY-DIRECT EMBEDMENT CONNECTION DETAIL

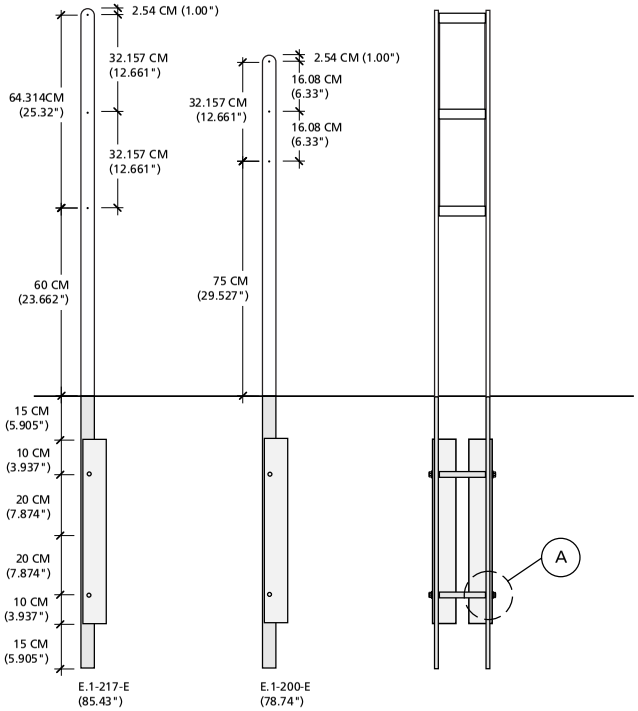


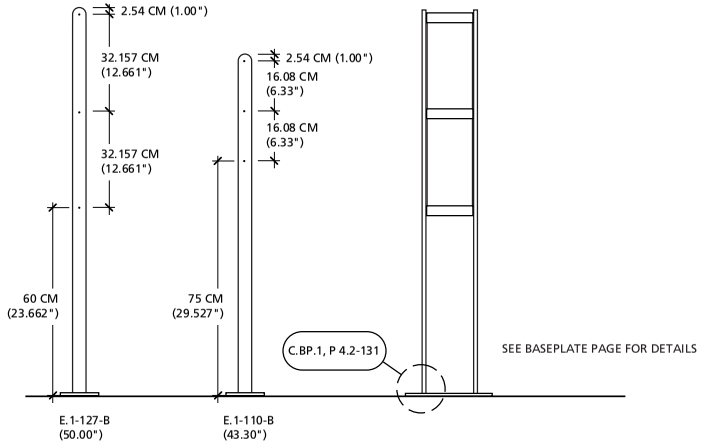


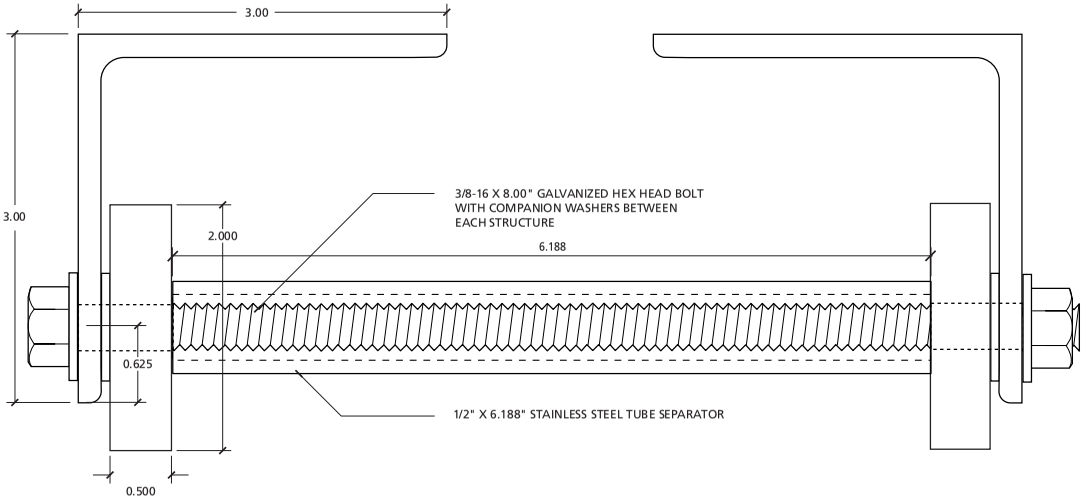
45° ANGLE HOLE DETAIL



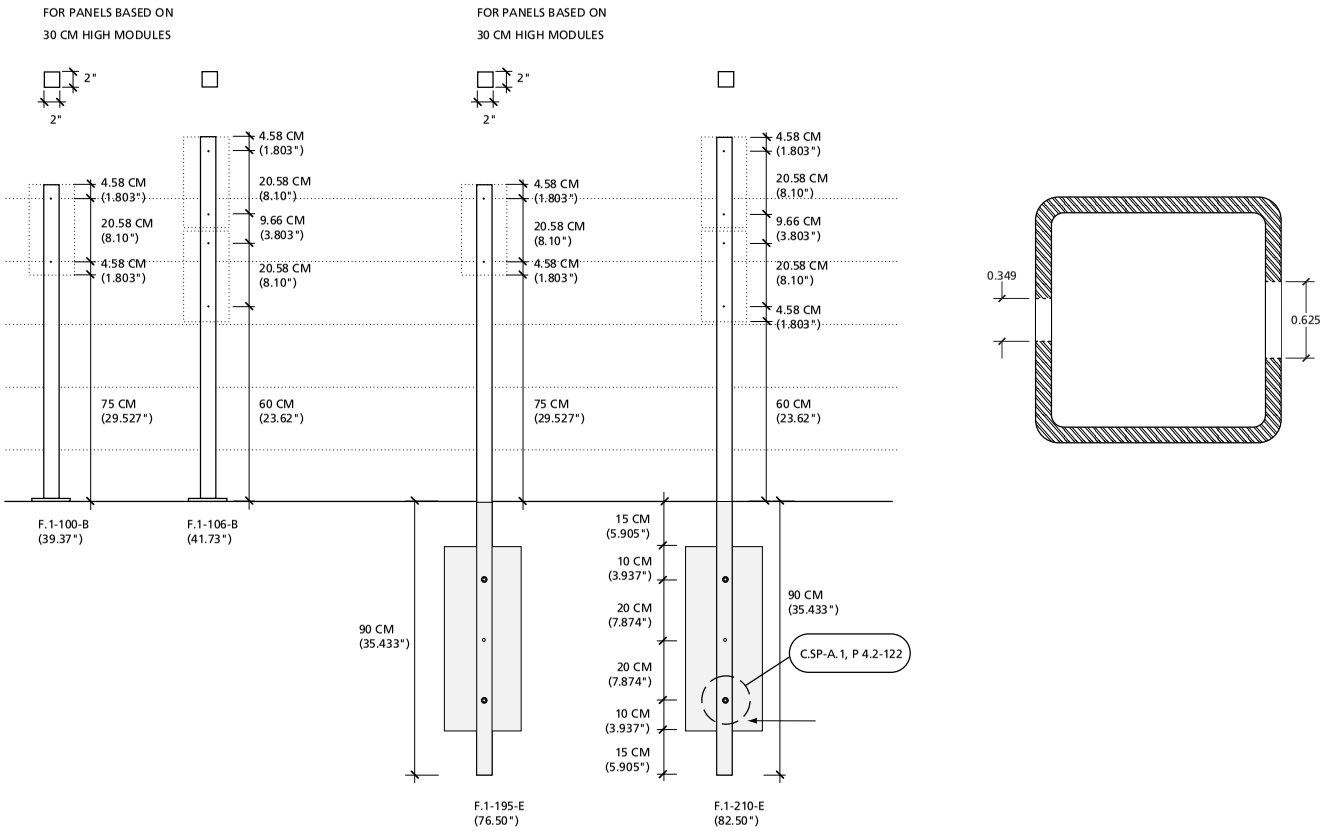
B 2.00" x 0.5" POST-NARROW PROFILE REVERSE ANGLE WITH
3 TO 5 PANEL ASSEMBLY-DIRECT EMBEDMENT CONNECTION DETAIL



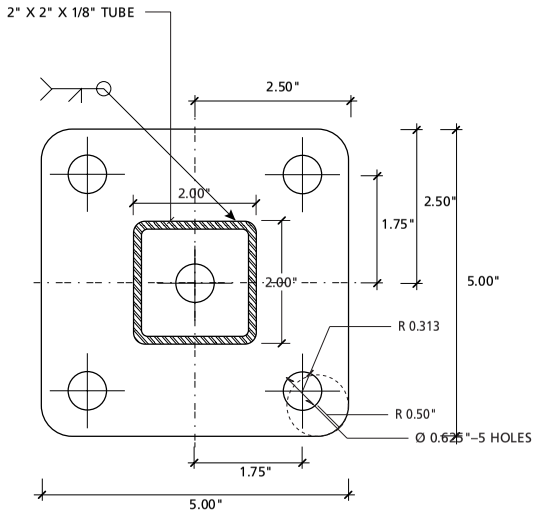




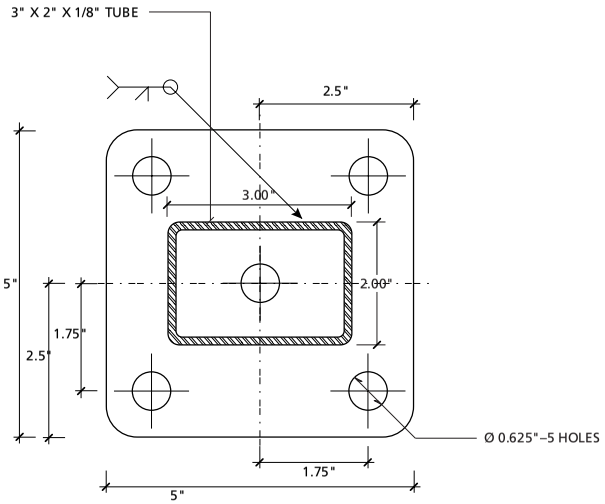
A 2.00" x 0.5" POST-NARROW PROFILE REVERSE ANGLE WITH 1 OR 2 PANEL ASSEMBLY-DIRECT EMBEDMENT CONNECTION DETAIL


FOR PANELS BASED ON
30 CM HIGH MODULES
2"
2"
4.58 CM
(1.803")
20.58 CM
(8.10")
4.58 CM
(1.803")
75 CM
(29.527")
F.1-100-B
(39.37")
9.66 CM
(3.803")
60 CM
(23.62")
F.1-106-B
(41.73")
90 CM
(35.433")
F.1-195-E
(76.50")
15 CM
(5.905")
10 CM
(3.937")
20 CM
(7.874")
C.SP-A.1, P 4.2-122
F.1-210-E
(82.50")

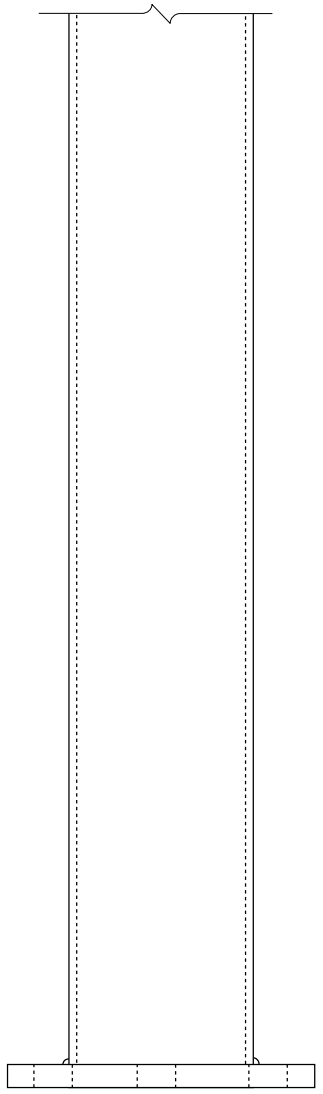
0.349
0.625



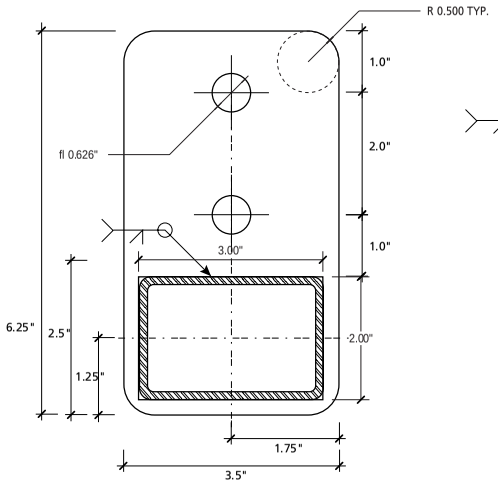
2" x 2" POST BASE PLATE



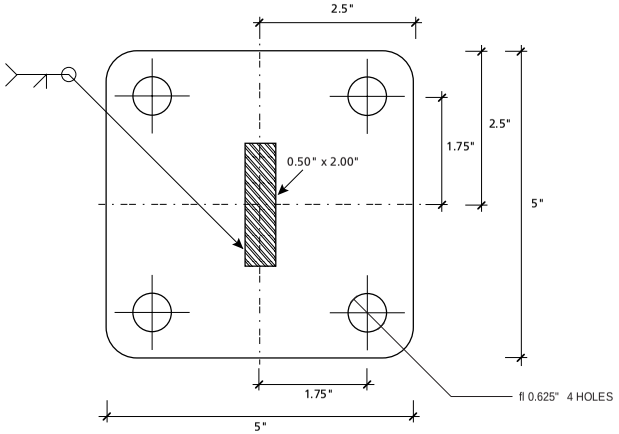
3" x 2" POST BASE PLATE



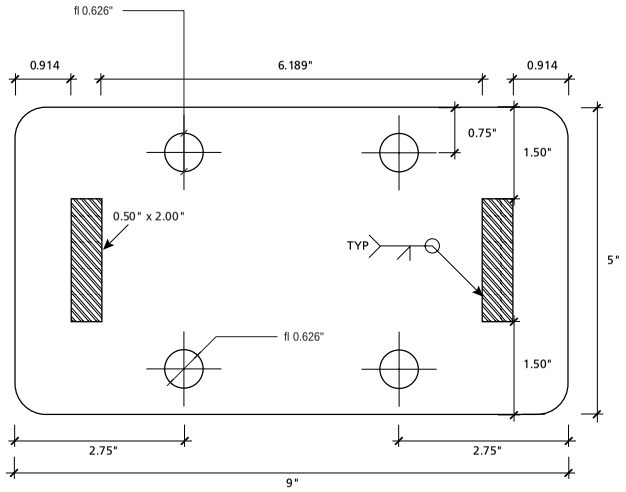
TYPICAL ELEVATION



3" x 2" REVERSE ANGLE POST BASE PLATE

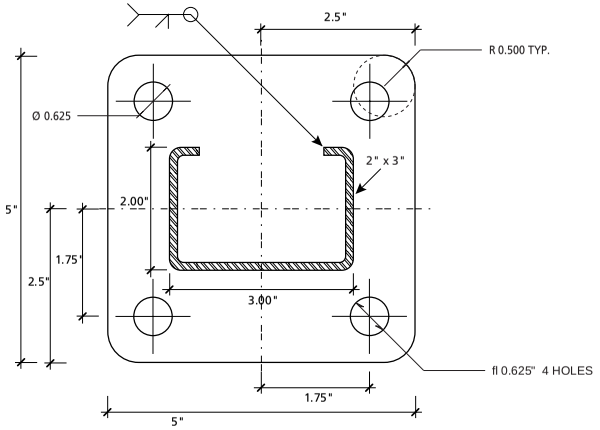


2.00" X 0.5" BAR STOCK POST BASE PLATE

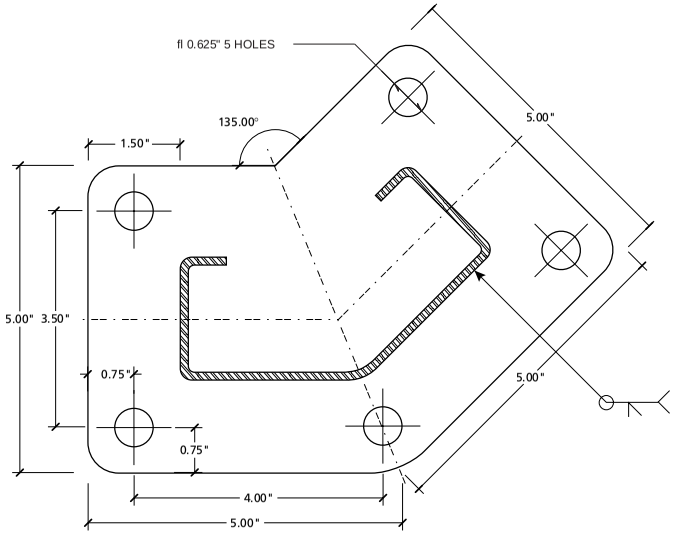


2.00 X 0.5" NARROW PROFILE BAR STOCK POST BASE PLATE

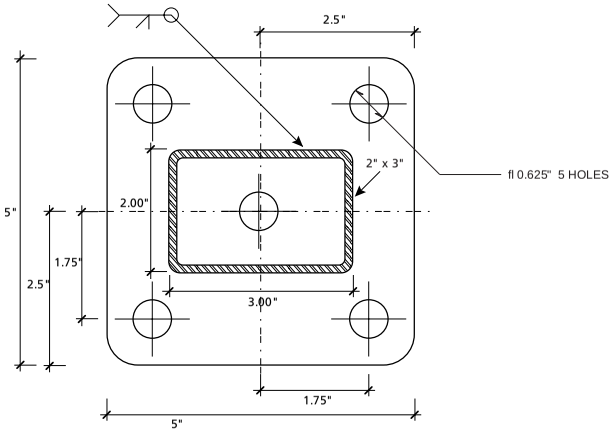
TYPICAL ELEVATION



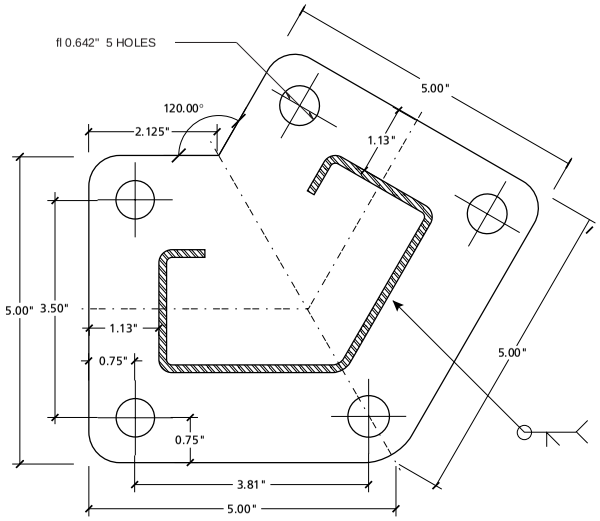
3" x 2" POST INLINE BASE PLATE



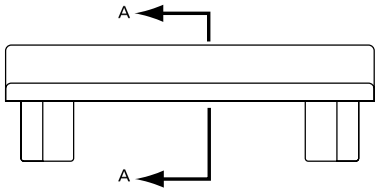
ANGLE POST BASE PLATE



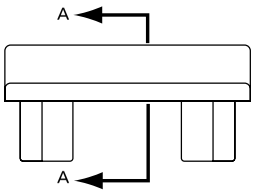
3" x 2" POST BASE PLATE



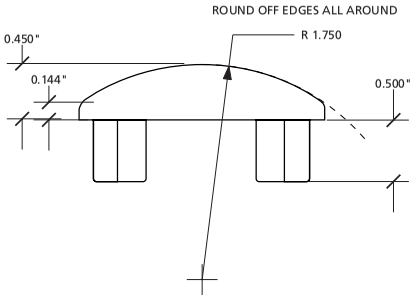
TRIANGULAR ASSEMBLY BASE PLATE



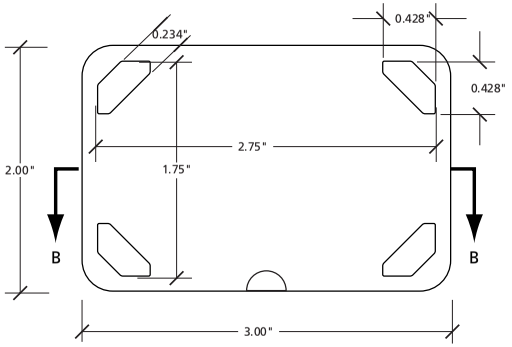
3" X 2" METAL CAP ELEVATION DETAIL



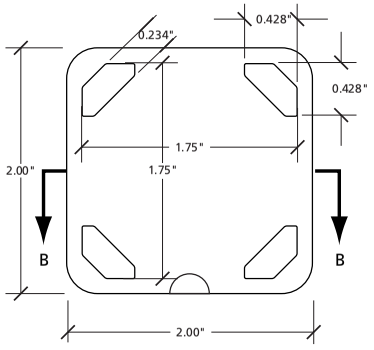
2" X 2" METAL CAP SIDE ELEVATION DETAIL



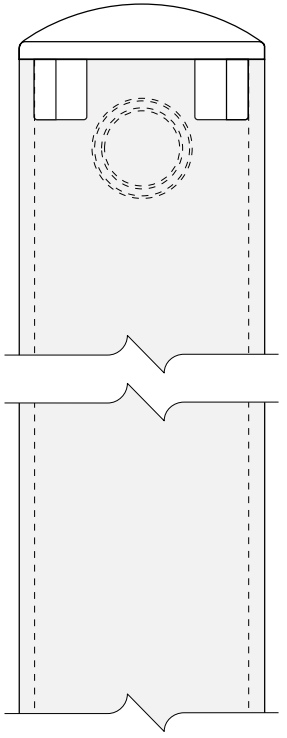
METAL CAP SECTION DETAIL
A-A TYPICAL



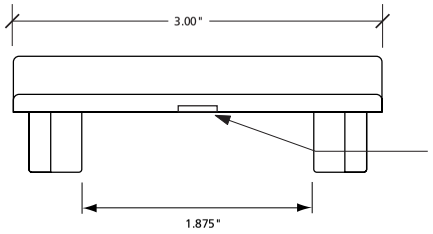
3" X 2" METAL CAP PLAN DETAIL



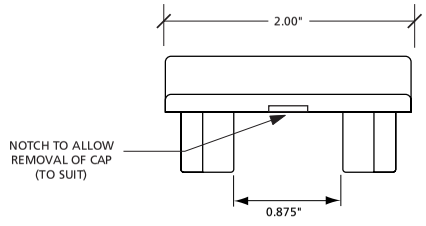
2" X 2" METAL CAP PLAN DETAIL



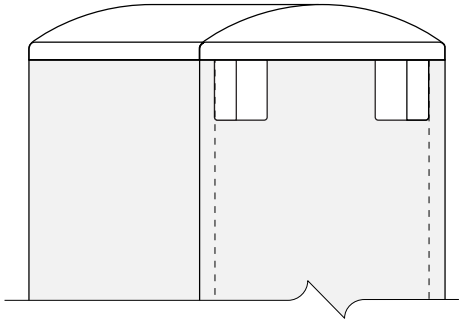
METAL CAP FITTING DETAIL



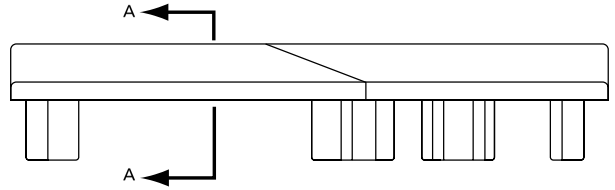
3" X 2" METAL CAP SECTION DETAIL
B-B



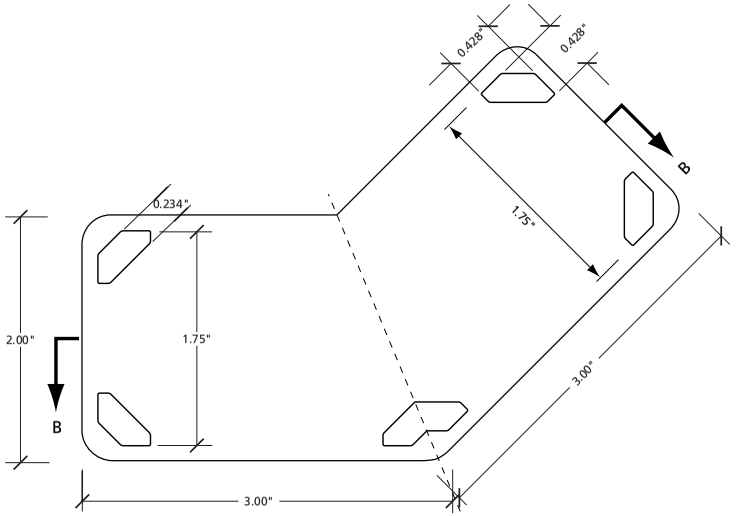
2" X 2" METAL CAP SECTION DETAIL
B-B



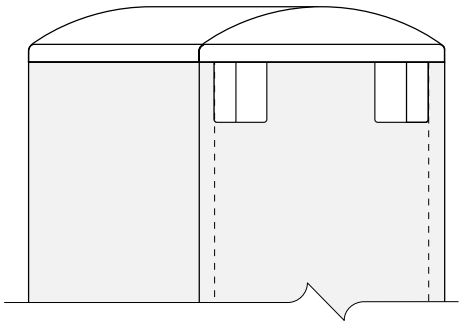
MACHINED METAL CAP 45° FITTING DETAIL



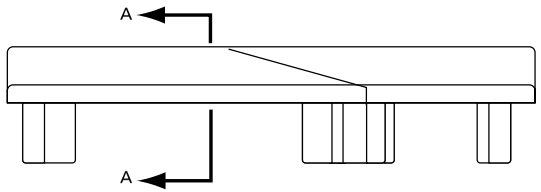
MACHINED METAL CAP ELEVATION DETAIL



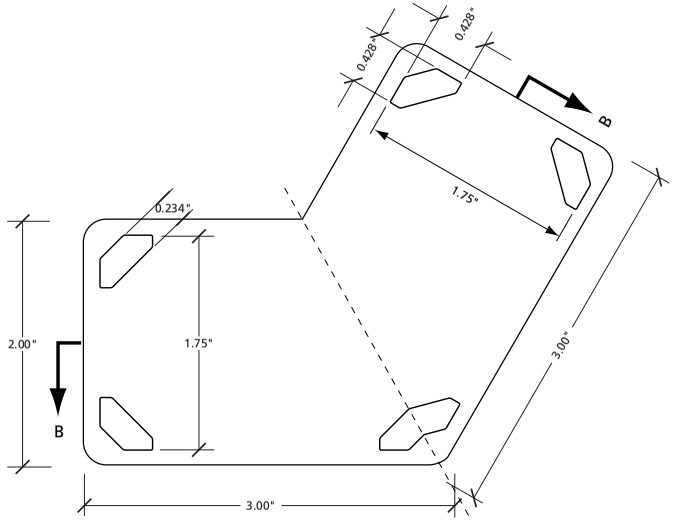
MACHINED METAL 45° ANGLE CAP PLAN DETAIL



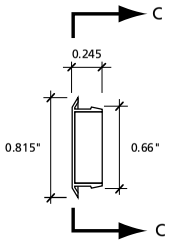
MACHINED METAL CAP 60° FITTING DETAIL



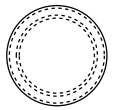
MACHINED METAL CAP 60° ELEVATION DETAIL



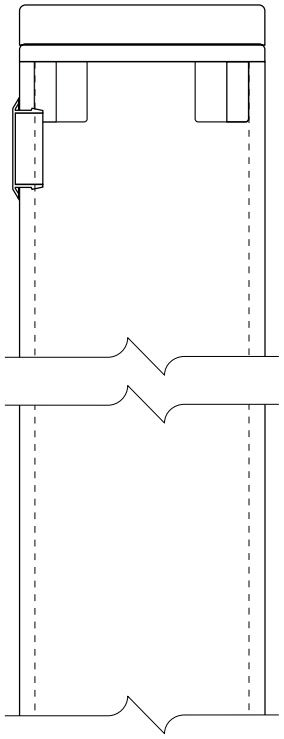
MACHINED METAL 60° ANGLE CAP PLAN DETAIL



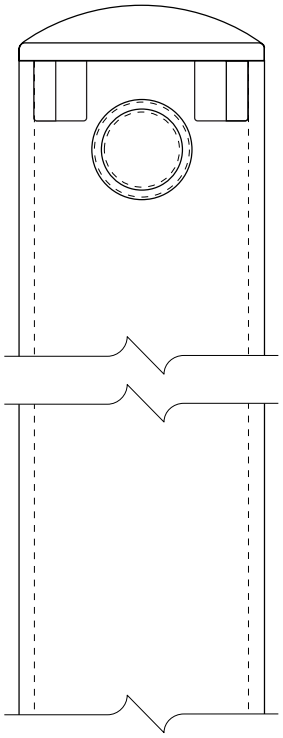
PLASTIC HOLE COVER SECTION DETAIL



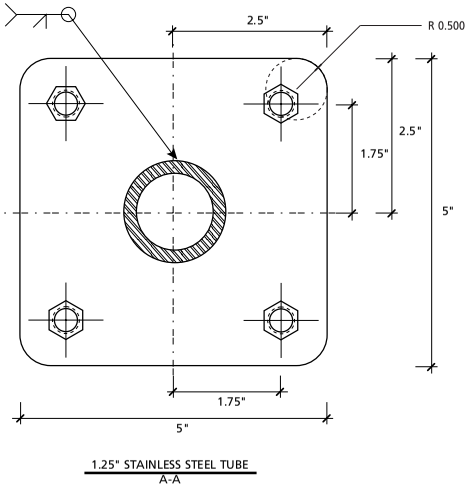
PLASTIC HOLE COVER PLAN DETAIL
C-C



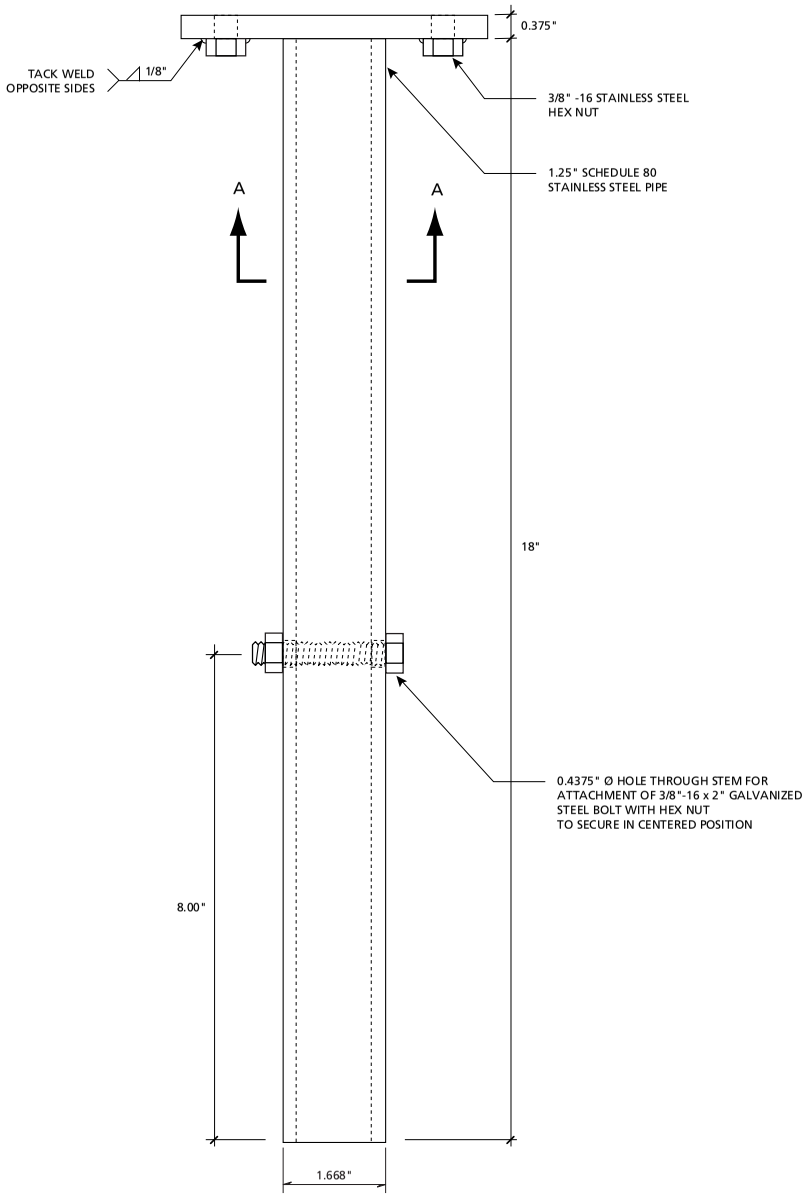
PLASTIC CAP FITTING FRONT ELEVATION DETAIL

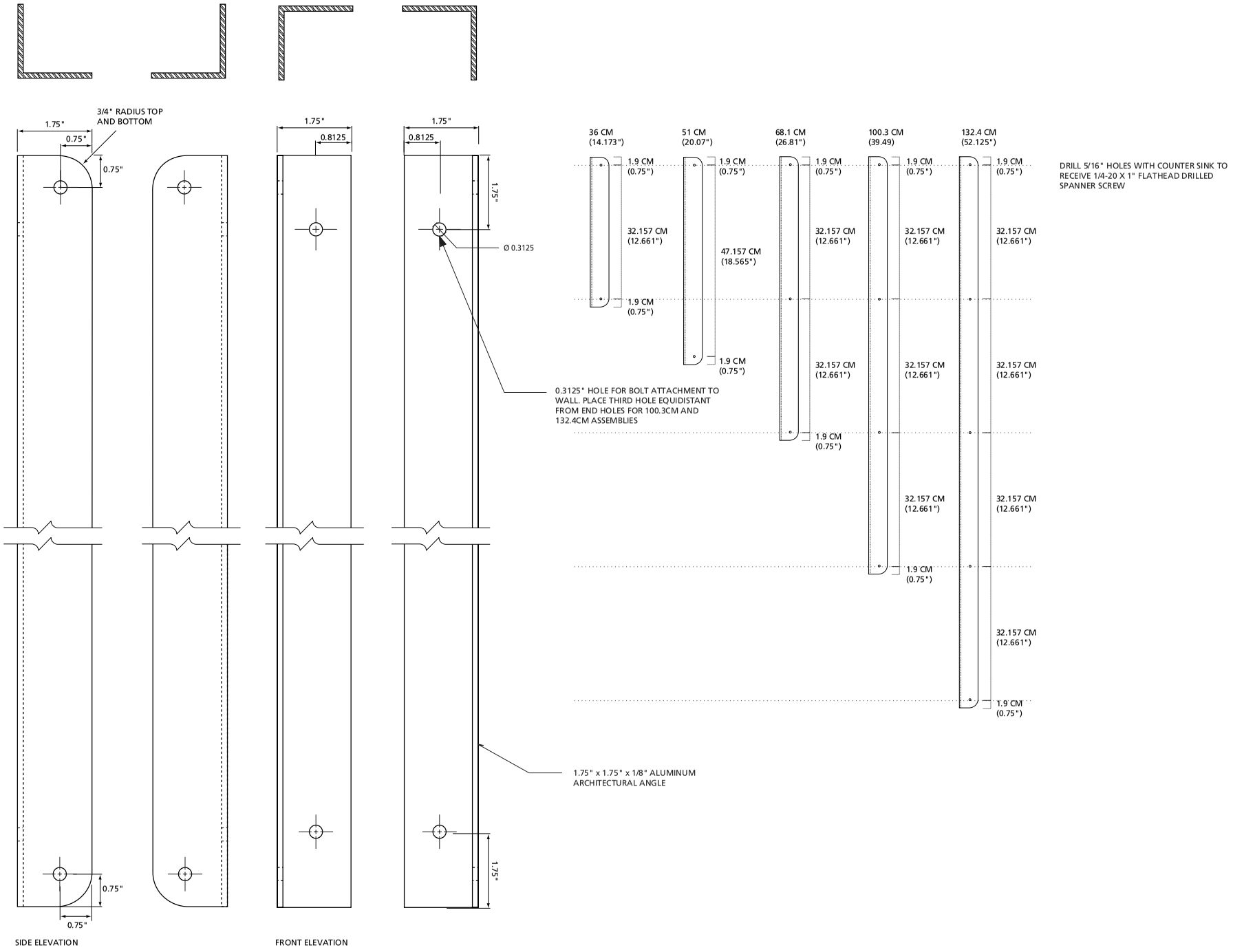


PLASTIC CAP FITTING SIDE ELEVATION DETAIL

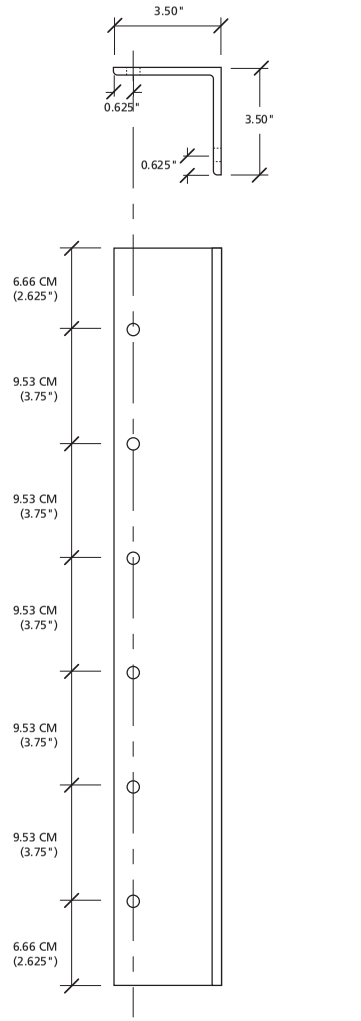


1.25" STAINLESS STEEL TUBE
A-A



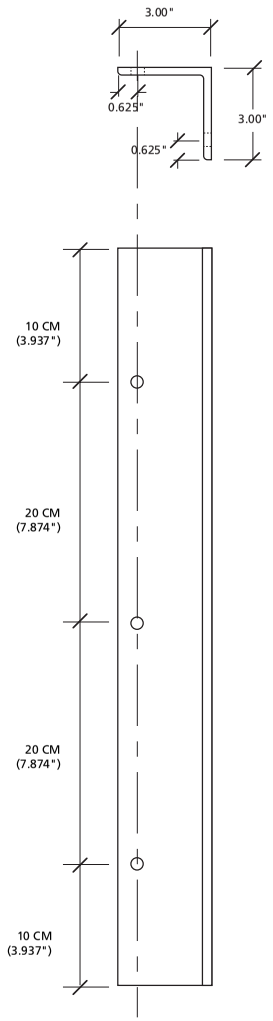

3/4" RADIUS TOP AND BOTTOM
1.75"
0.75"
0.75"
0.75"
0.75"
SIDE ELEVATION
1.75"
0.8125
1.75"
0.8125
1.75"
1.75"
Ø 0.3125
1.75"
FRONT ELEVATION
0.3125" HOLE FOR BOLT ATTACHMENT TO WALL. PLACE THIRD HOLE EQUIDISTANT FROM END HOLES FOR 100.3CM AND 132.4CM ASSEMBLIES
1.75" x 1.75" x 1/8" ALUMINUM ARCHITECTURAL ANGLE
36 CM (14.173")
51 CM (20.07")
68.1 CM (26.81")
100.3 CM (39.49)
132.4 CM (52.125")
1.9 CM (0.75")
32.157 CM (12.661")
47.157 CM (18.565")
DRILL 5/16" HOLES WITH COUNTER SINK TO RECEIVE 1/4-20 X 1" FLATHEAD DRILLED SPANNER SCREW

C.DP



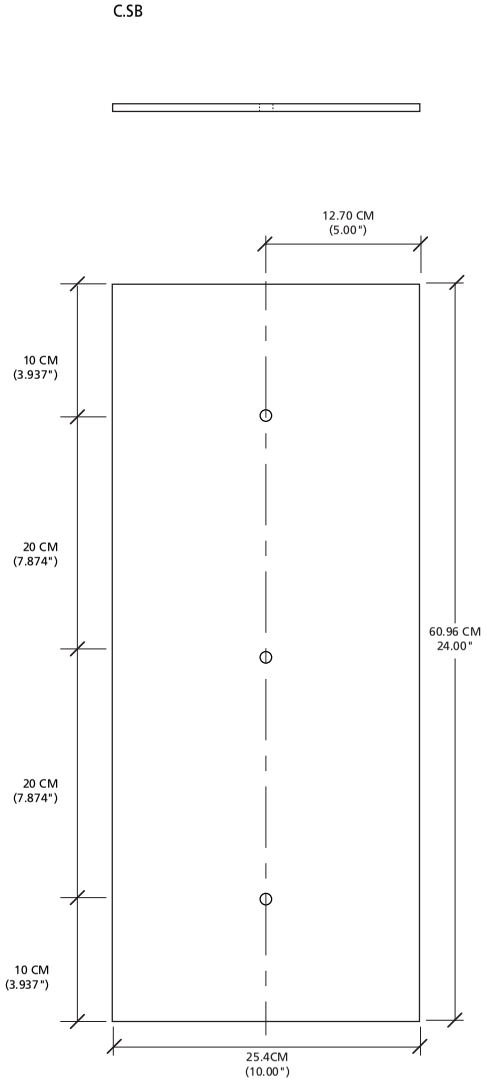
STEEL ANGLE FOR DECK MOUNTING BASE PLATES

C.SA

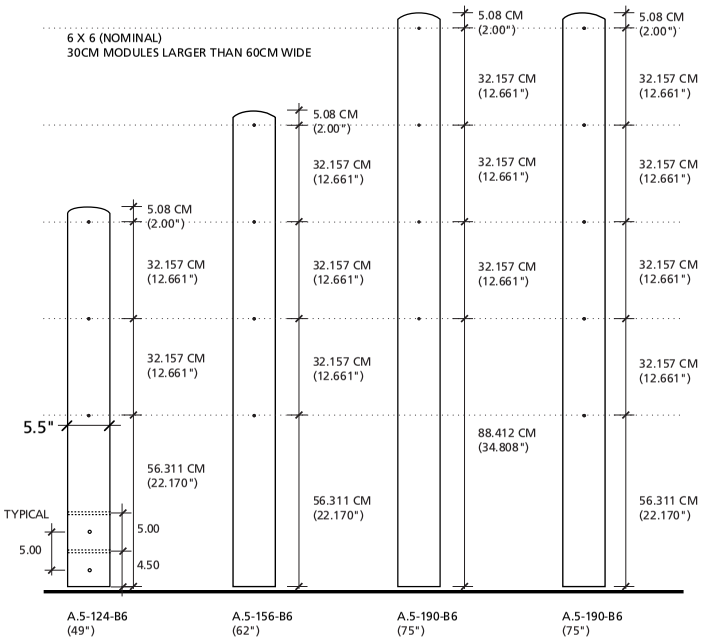


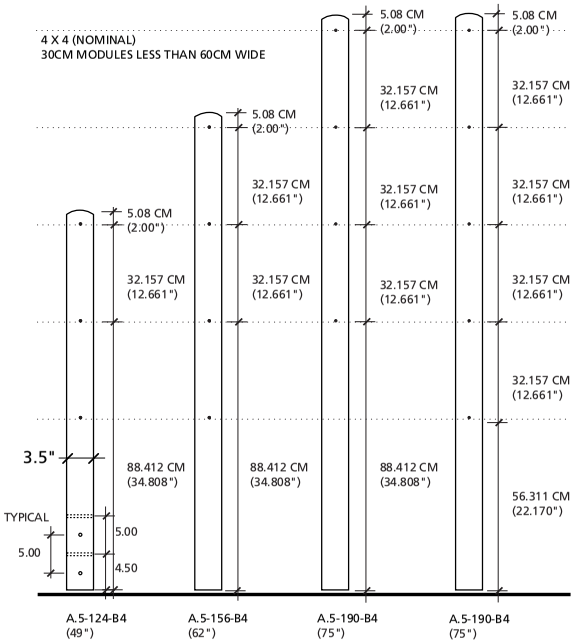
STEEL ANGLE FOR BAR STOCK ASSEMBLIES

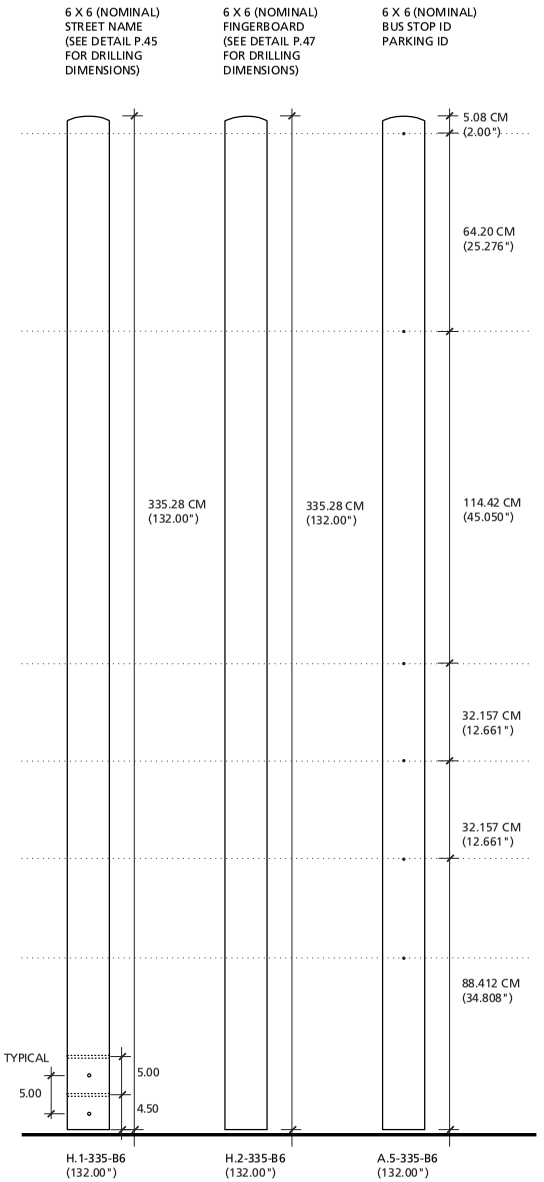
C.SB

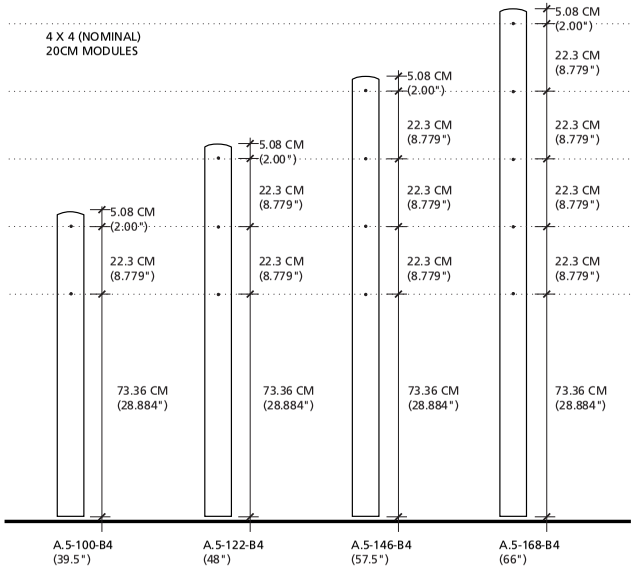


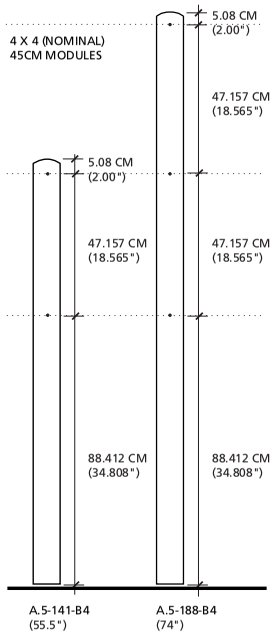
STEEL PLATE FOR TUBE ASSEMBLIES

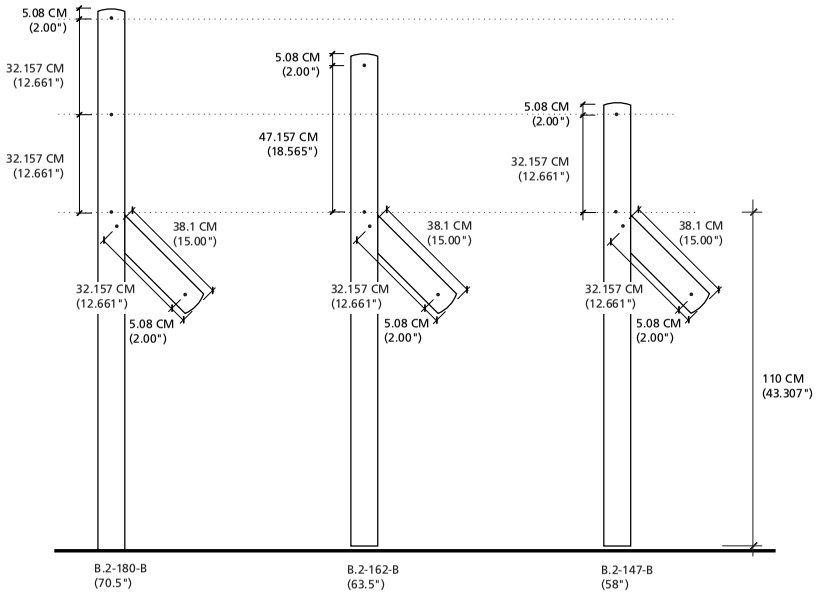

6 X 6 (NOMINAL)
30CM MODULES LARGER THAN 60CM WIDE
5.08 CM (2.00")
32.157 CM (12.661")
5.5"
88.412 CM (34.808")
56.311 CM (22.170")
TYPICAL
5.00
4.50
A.5-124-B6 (49")
A.5-156-B6 (62")
A.5-190-B6 (75")
A.5-190-B6 (75")

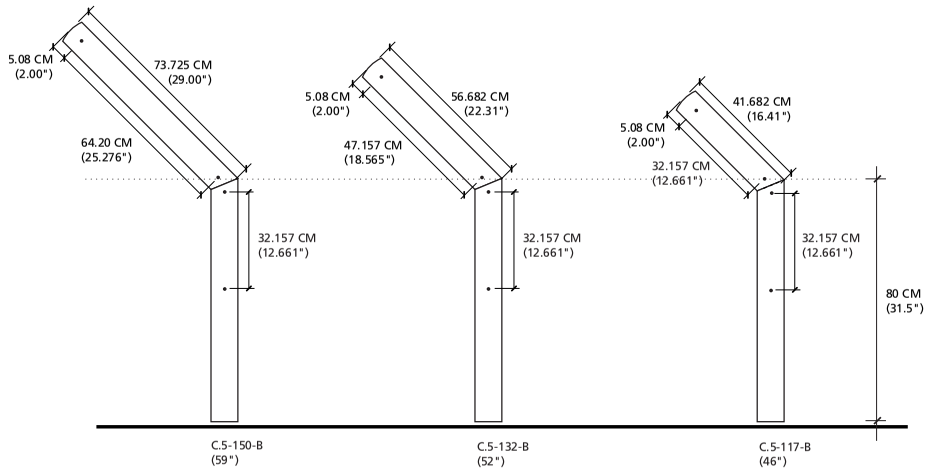

4 X 4 (NOMINAL)
30CM MODULES LESS THAN 60CM WIDE
5.08 CM (2.00")
32.157 CM (12.661")
3.5"
88.412 CM (34.808")
56.311 CM (22.170")
TYPICAL
5.00
4.50
A.5-124-B4 (49")
A.5-156-B4 (62")
A.5-190-B4 (75")
A.5-190-B4 (75")

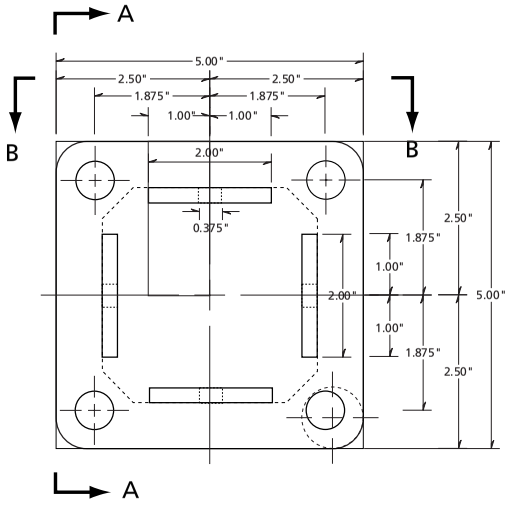

6 X 6 (NOMINAL)
STREET NAME
(SEE DETAIL P.45
FOR DRILLING
DIMENSIONS)
6 X 6 (NOMINAL)
FINGERBOARD
(SEE DETAIL P.47
FOR DRILLING
DIMENSIONS)
6 X 6 (NOMINAL)
BUS STOP ID
PARKING ID
5.08 CM (2.00")
335.28 CM (132.00")
64.20 CM (25.276")
114.42 CM (45.050")
32.157 CM (12.661")
88.412 CM (34.808")
TYPICAL
5.00
4.50
H.1-335-B6 (132.00")
H.2-335-B6 (132.00")
A.5-335-B6 (132.00")


4 X 4 (NOMINAL)
20CM MODULES
5.08 CM (2.00")
22.3 CM (8.779")
73.36 CM (28.884")
A.5-100-B4 (39.5")
A.5-122-B4 (48")
A.5-146-B4 (57.5")
A.5-168-B4 (66")

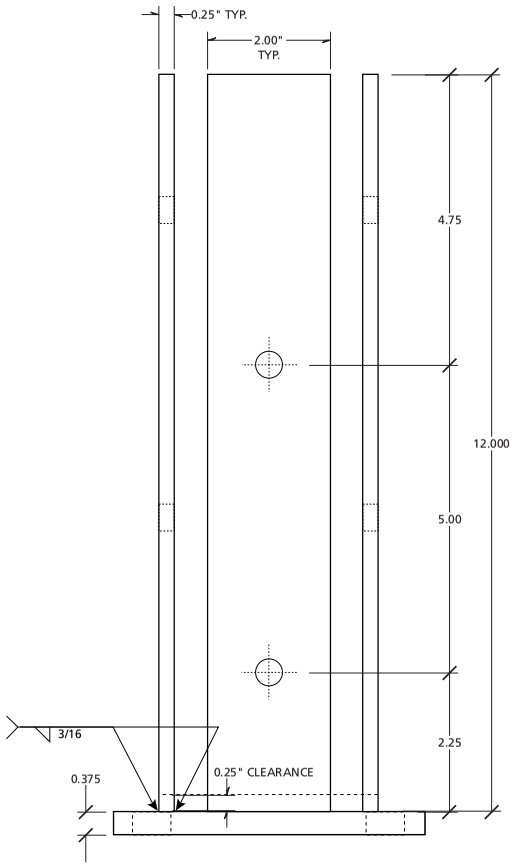

4 X 4 (NOMINAL)
45CM MODULES
5.08 CM (2.00")
47.157 CM (18.565")
88.412 CM (34.808")
A.5-141-B4 (55.5")
A.5-188-B4 (74")


5.08 CM
(2.00")
32.157 CM
(12.661")
32.157 CM
(12.661")
38.1 CM
(15.00")
32.157 CM
(12.661")
5.08 CM
(2.00")
5.08 CM
(2.00")
47.157 CM
(18.565")
38.1 CM
(15.00")
32.157 CM
(12.661")
5.08 CM
(2.00")
5.08 CM
(2.00")
32.157 CM
(12.661")
38.1 CM
(15.00")
32.157 CM
(12.661")
5.08 CM
(2.00")
110 CM
(43.307")
B.2-180-B
(70.5")
B.2-162-B
(63.5")
B.2-147-B
(58")

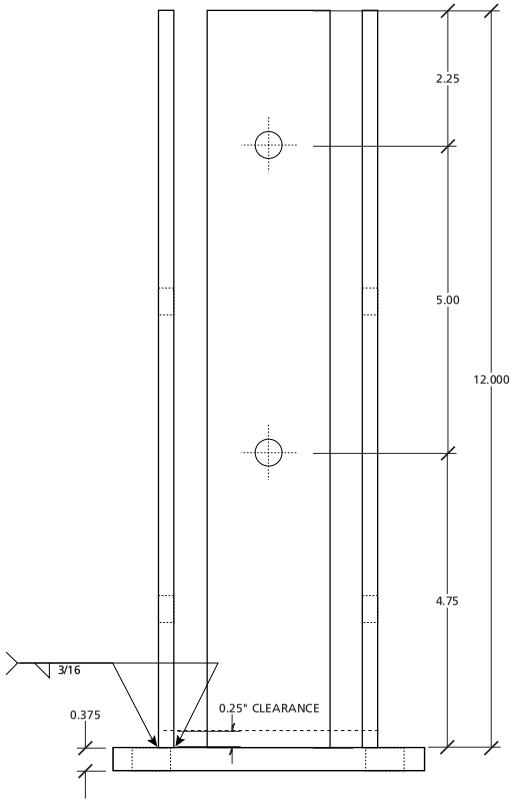

5.08 CM
(2.00")
73.725 CM
(29.00")
64.20 CM
(25.276")
32.157 CM
(12.661")
5.08 CM
(2.00")
56.682 CM
(22.31")
47.157 CM
(18.565")
32.157 CM
(12.661")
5.08 CM
(2.00")
41.682 CM
(16.41")
32.157 CM
(12.661")
32.157 CM
(12.661")
80 CM
(31.5")
C.5-150-B
(59")
C.5-132-B
(52")
C.5-117-B
(46")



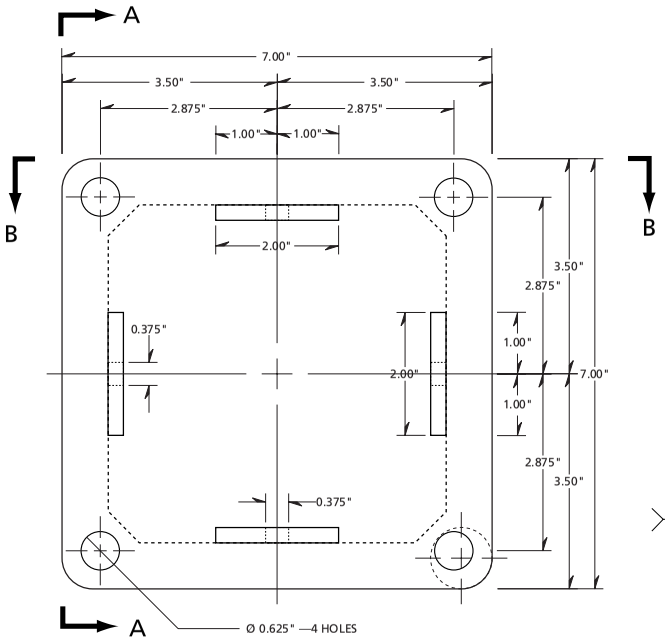
4" X 4" WOOD POST BASEPLATE PLAN VIEW



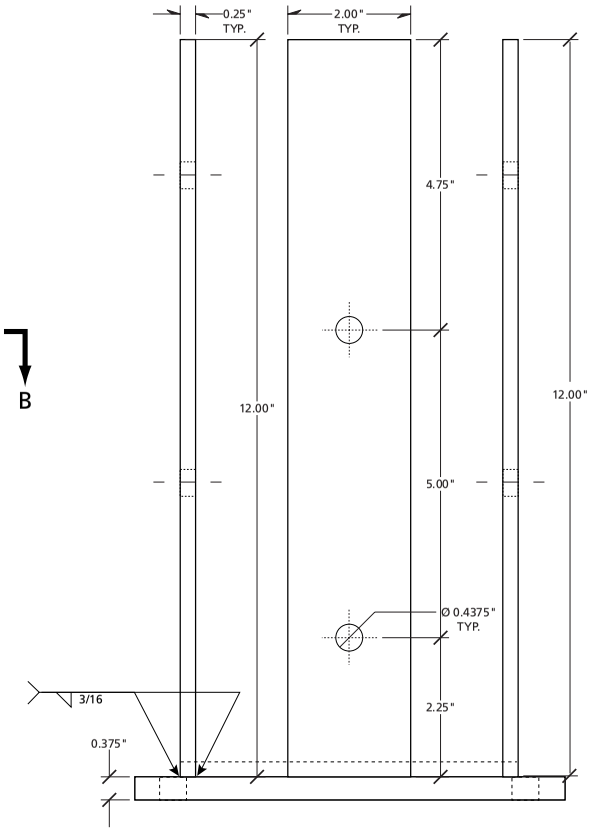
4" X 4" WOOD POST BASEPLATE ELEVATION VIEW
A-A



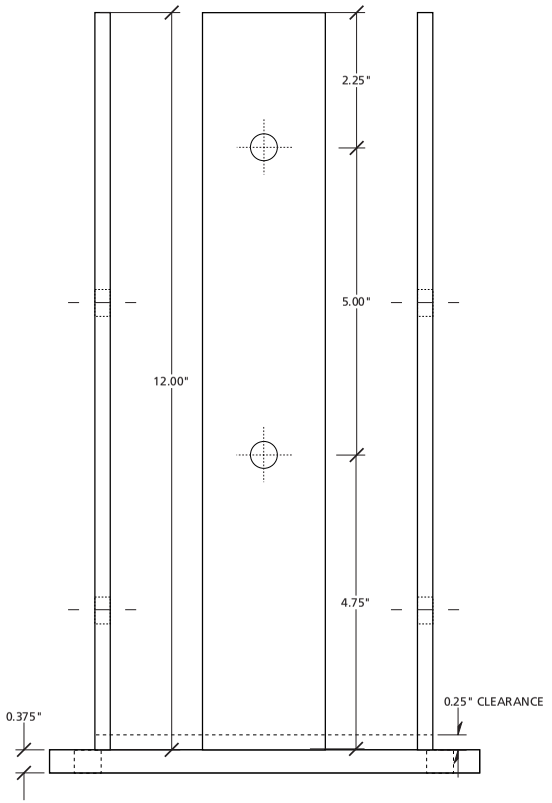
4" X 4" WOOD POST BASEPLATE ELEVATION VIEW
B-B



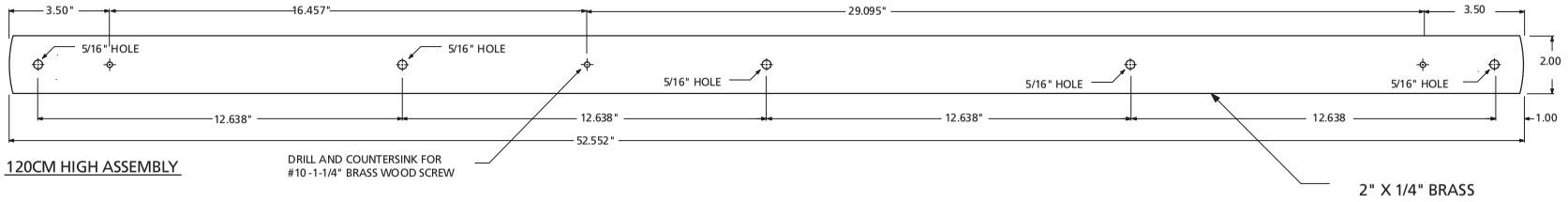
6" X 6" WOOD POST BASEPLATE PLAN VIEW



6" X 6" WOOD POST BASEPLATE ELEVATION VIEW
A-A

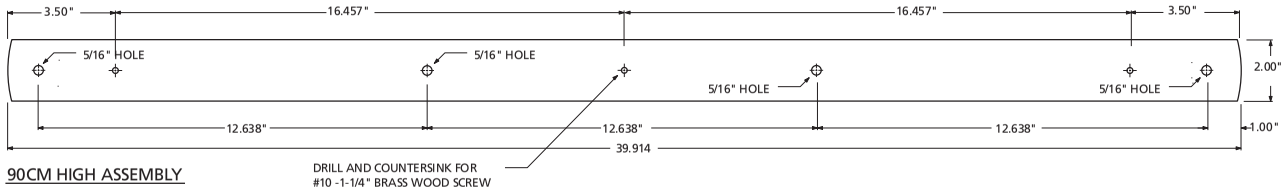


6" X 6" WOOD POST BASEPLATE ELEVATION VIEW
B-B



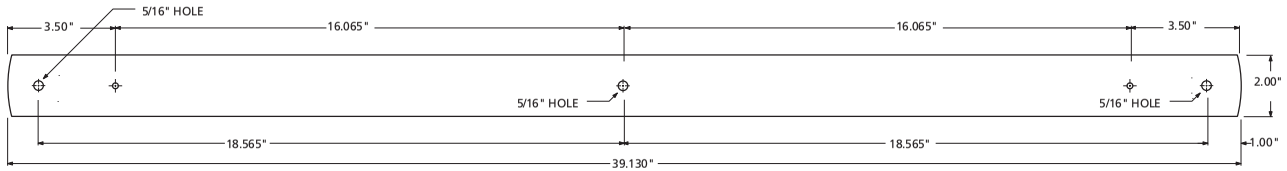
A.5-4/30 S

120CM HIGH ASSEMBLY



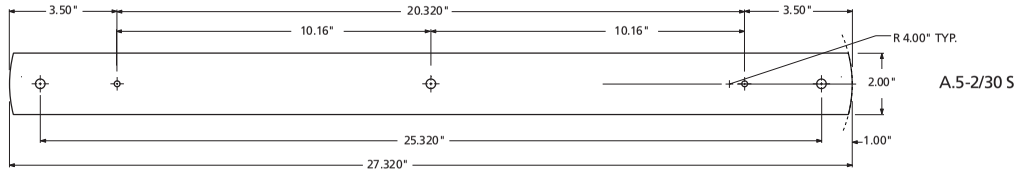
A.5-3/30 S

90CM HIGH ASSEMBLY



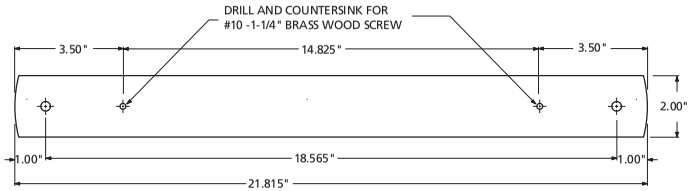
A.5-2/45 S

90CM HIGH (2) 45CM PANELS



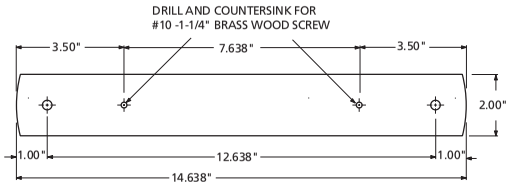
A.5-2/30 S

60CM HIGH ASSEMBLY



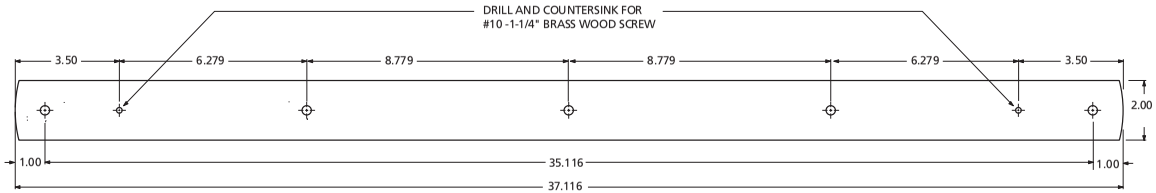
A.5-1/45 S

45CM HIGH ASSEMBLY



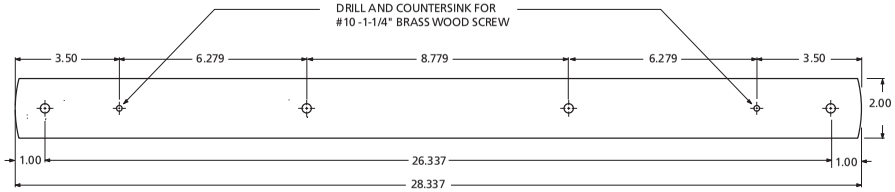
A.5-1/30 S

30CM HIGH ASSEMBLY



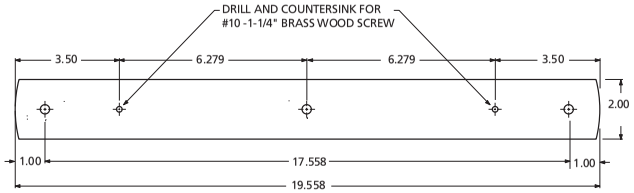
A.5-4/20 S

80CM HIGH ASSEMBLY



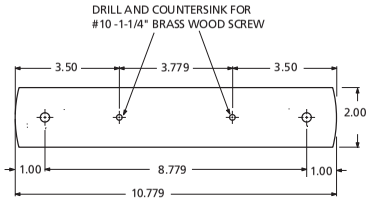
A.5-3/20 S

60CM HIGH ASSEMBLY



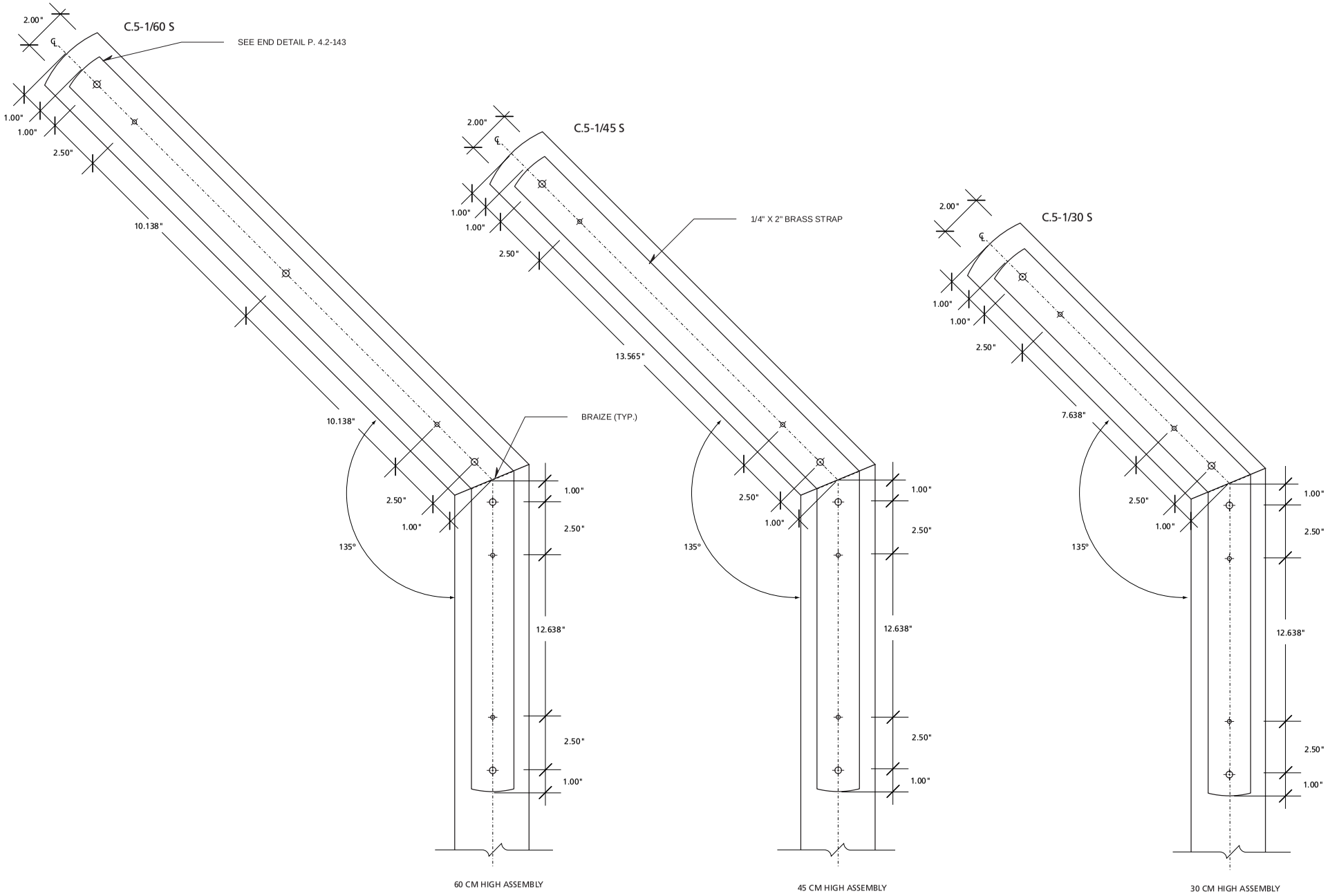
A.5-2/20 S

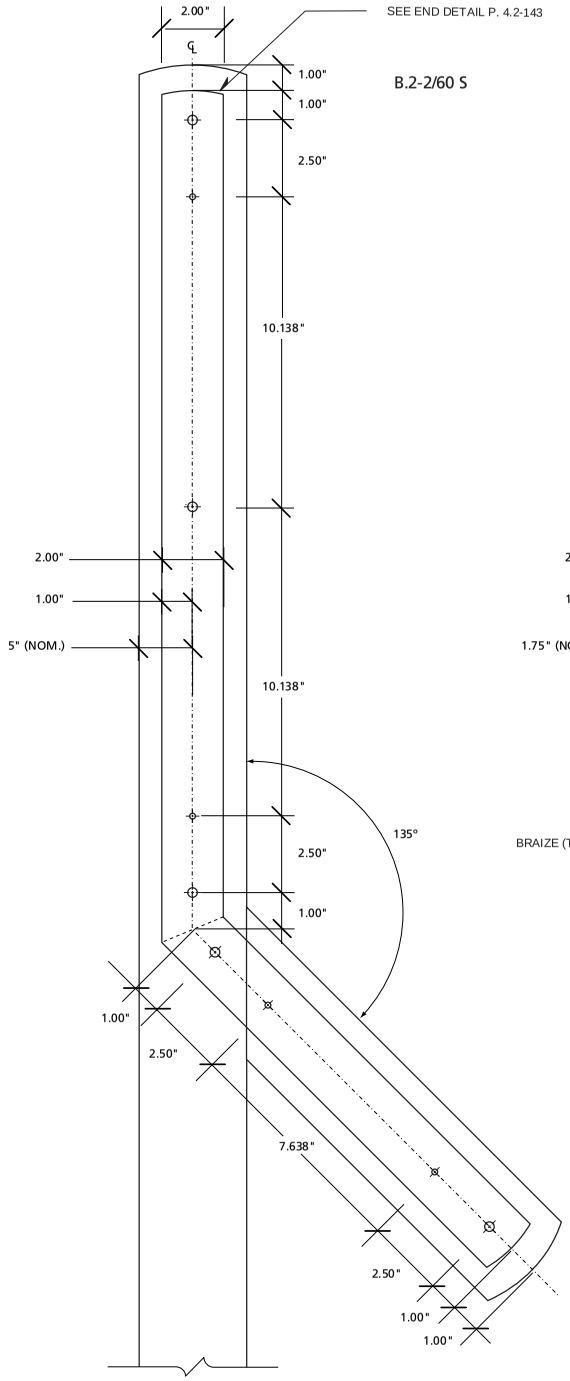
40CM HIGH ASSEMBLY



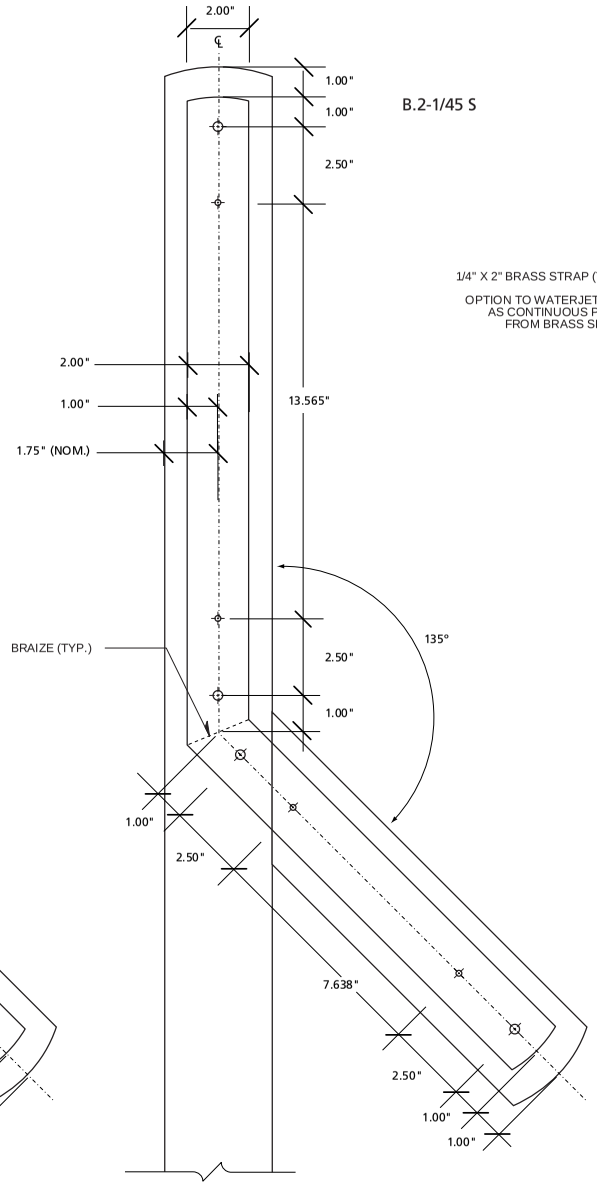
A.5-1/20 S

20CM HIGH ASSEMBLY

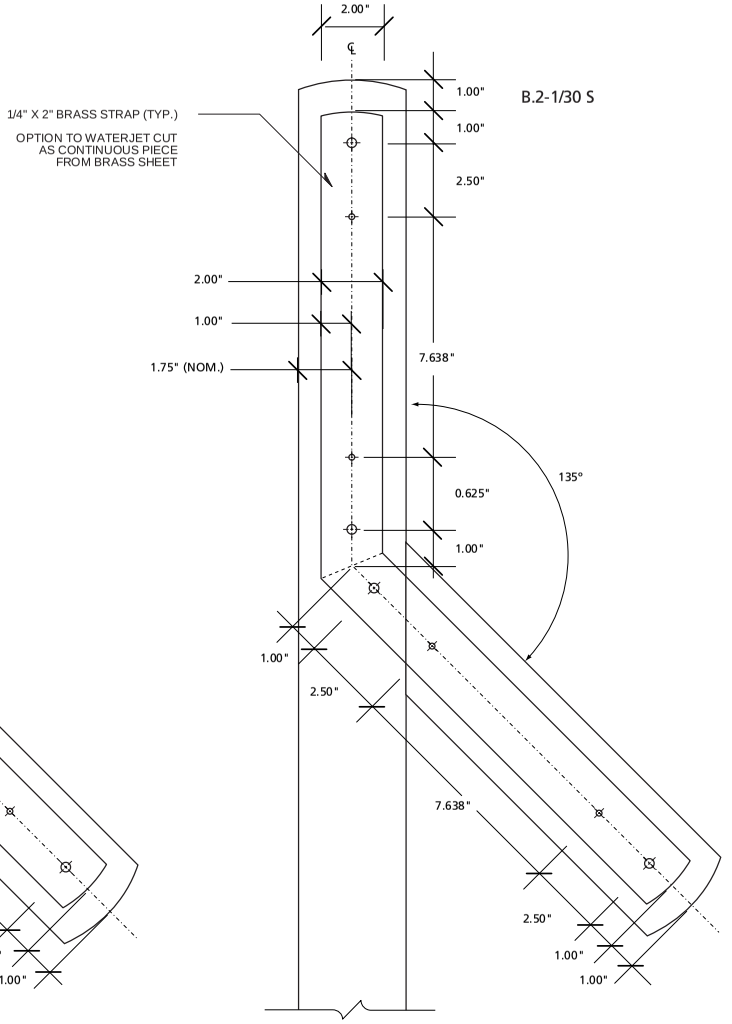

C.5-1/60 S
SEE END DETAIL P. 4.2-143
2.00"
1.00"
1.00"
2.50"
10.138"
10.138"
BRAIZE (TYP.)
2.50"
1.00"
135°
1.00"
2.50"
12.638"
2.50"
1.00"
60 CM HIGH ASSEMBLY
C.5-1/45 S
2.00"
1.00"
1.00"
2.50"
1/4" X 2" BRASS STRAP
13.565"
2.50"
1.00"
135°
1.00"
2.50"
12.638"
2.50"
1.00"
45 CM HIGH ASSEMBLY
C.5-1/30 S
2.00"
1.00"
1.00"
2.50"
7.638"
2.50"
1.00"
135°
1.00"
2.50"
12.638"
2.50"
1.00"
30 CM HIGH ASSEMBLY



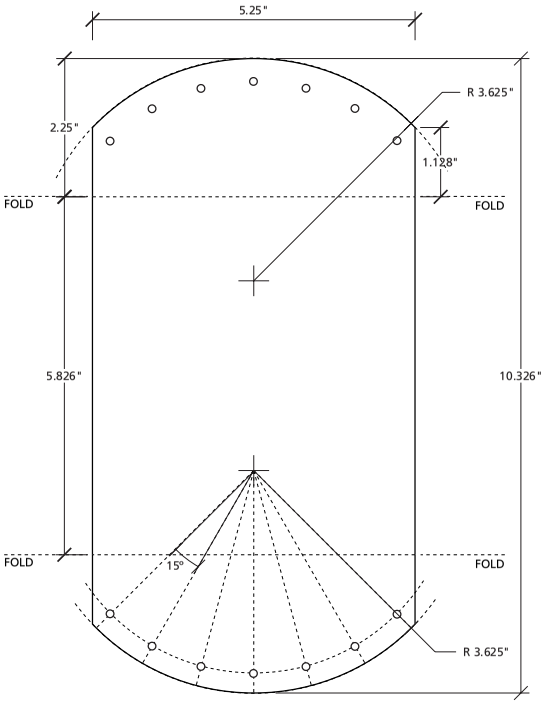
60 CM HIGH ASSEMBLY



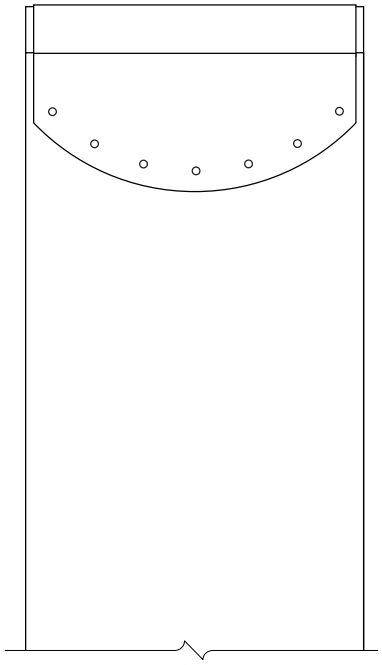
45 CM HIGH ASSEMBLY



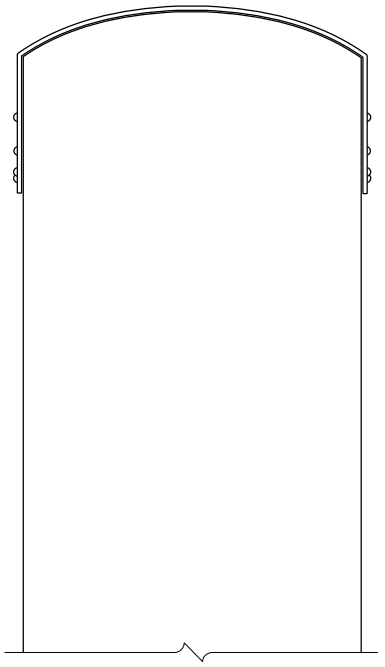
30 CM HIGH ASSEMBLY



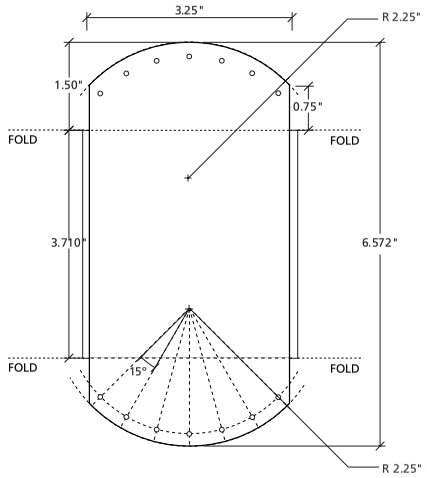
6 x 6 COPPER CAP DEVELOPED VIEW DETAIL



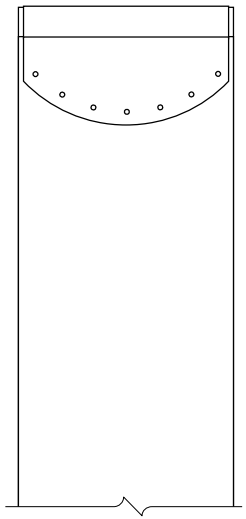
6 x 6 COPPER CAP FRONT ELEVATION



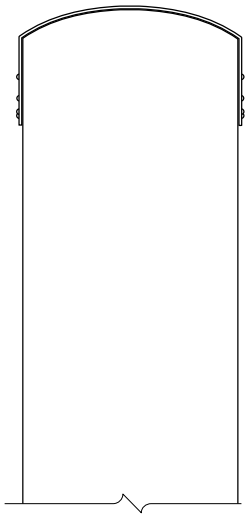
6 x 6 COPPER CAP SIDE ELEVATION



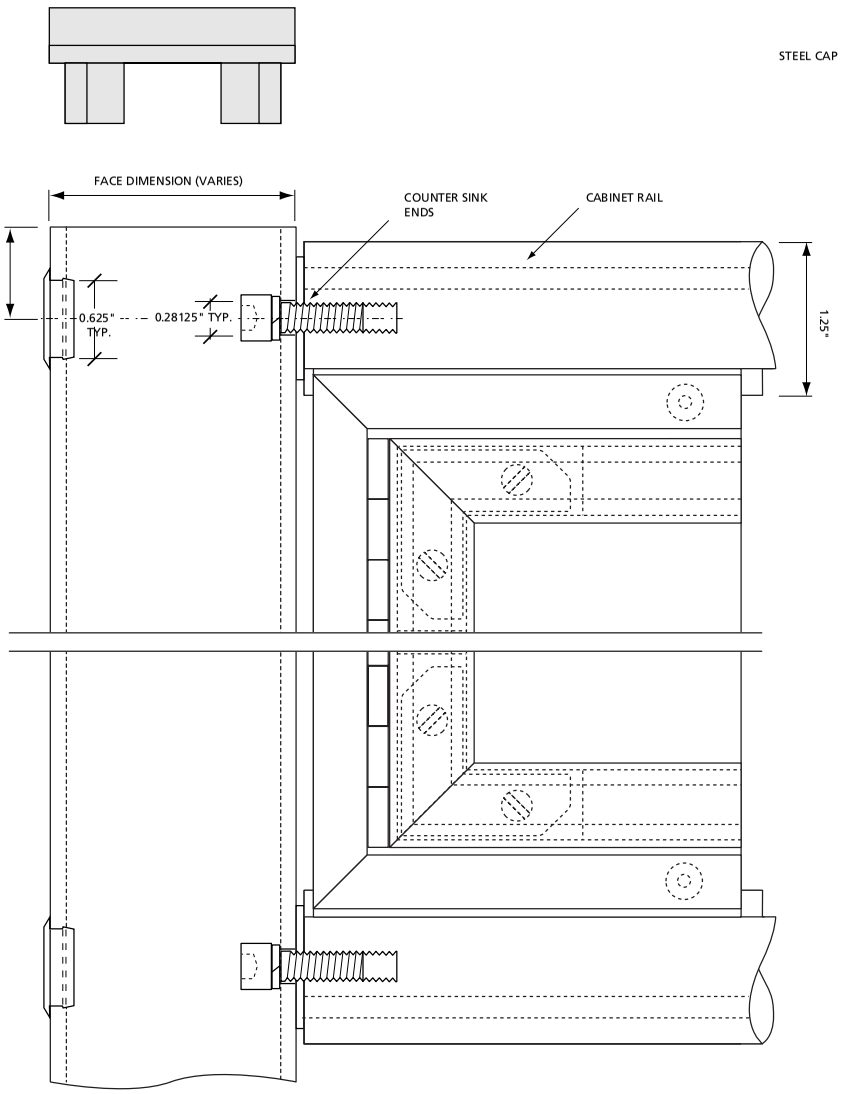
4 x 4 COPPER CAP DEVELOPED VIEW DETAIL



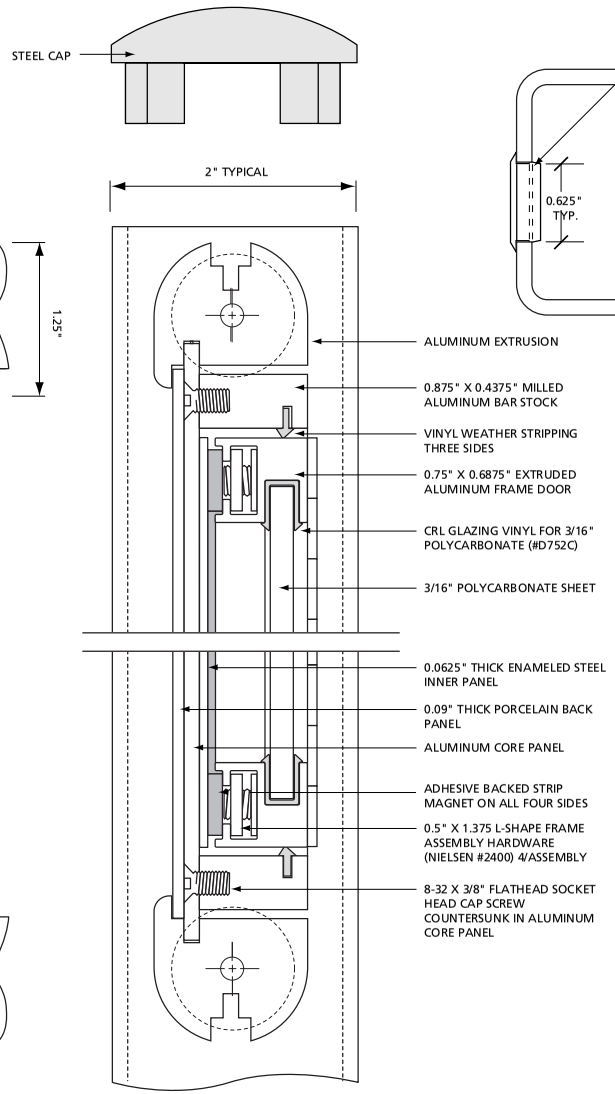
4 x 4 COPPER CAP FRONT ELEVATION



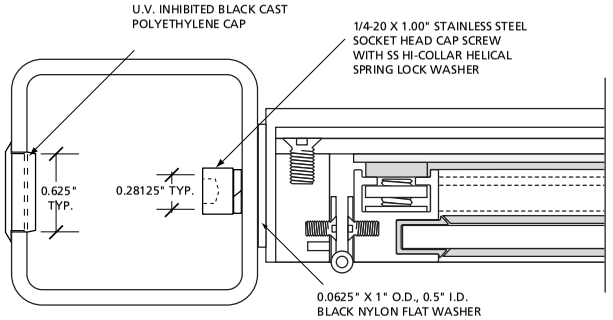
4 x 4 COPPER CAP SIDE ELEVATION



FRAME CONNECTION ELEVATION DETAIL

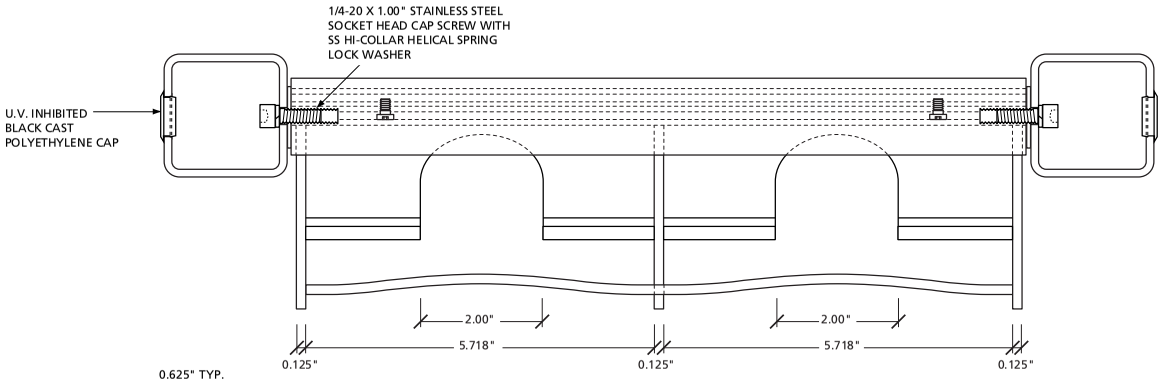


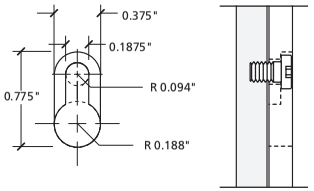
FRAME CONNECTION SECTION DETAIL



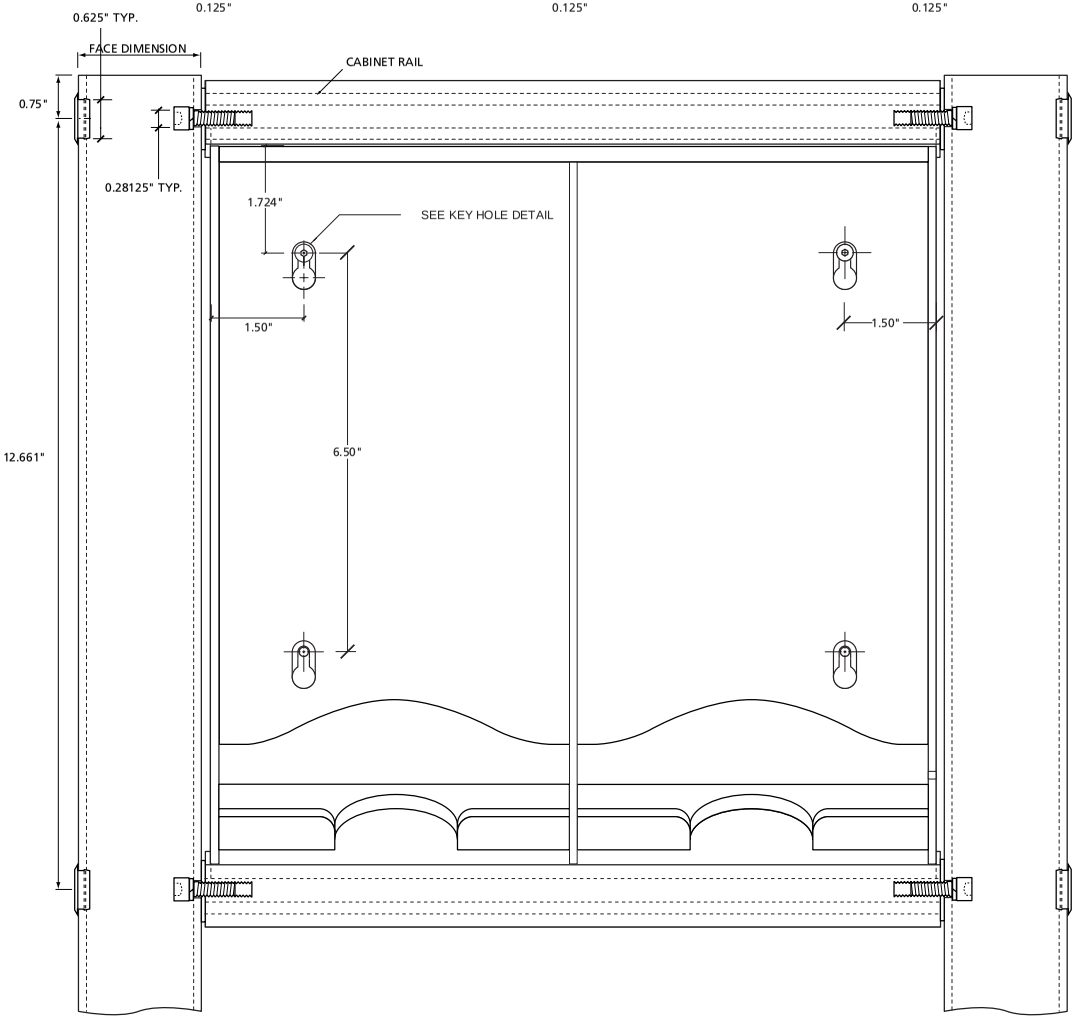
TUBE FABRICATION WELD TO BE ON FRONT OR BACK SIDE OF ASSEMBLY, NOT ON EDGES TO BE DRILLED

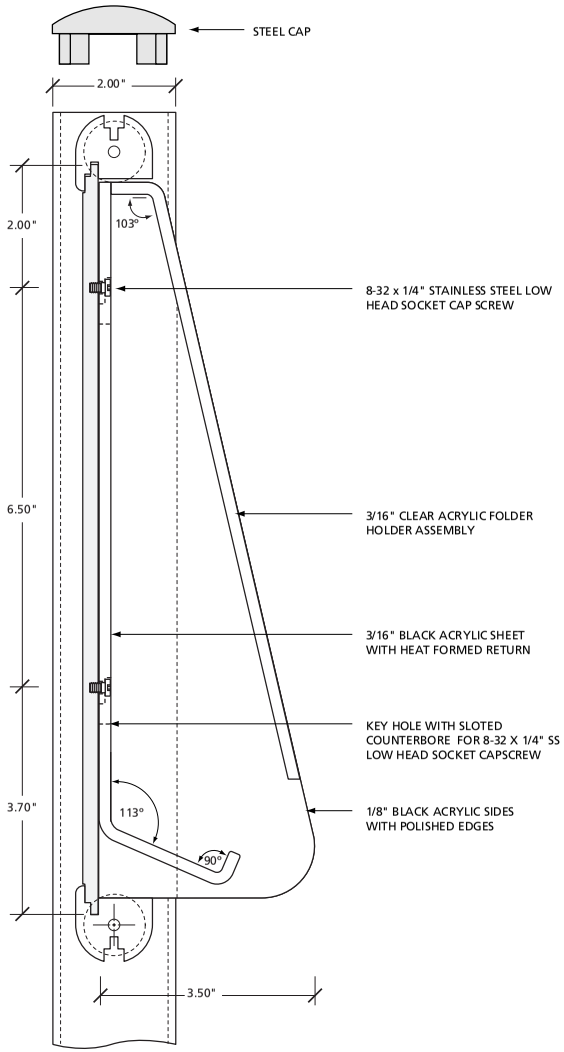
FRAME CONNECTION PLAN DETAIL

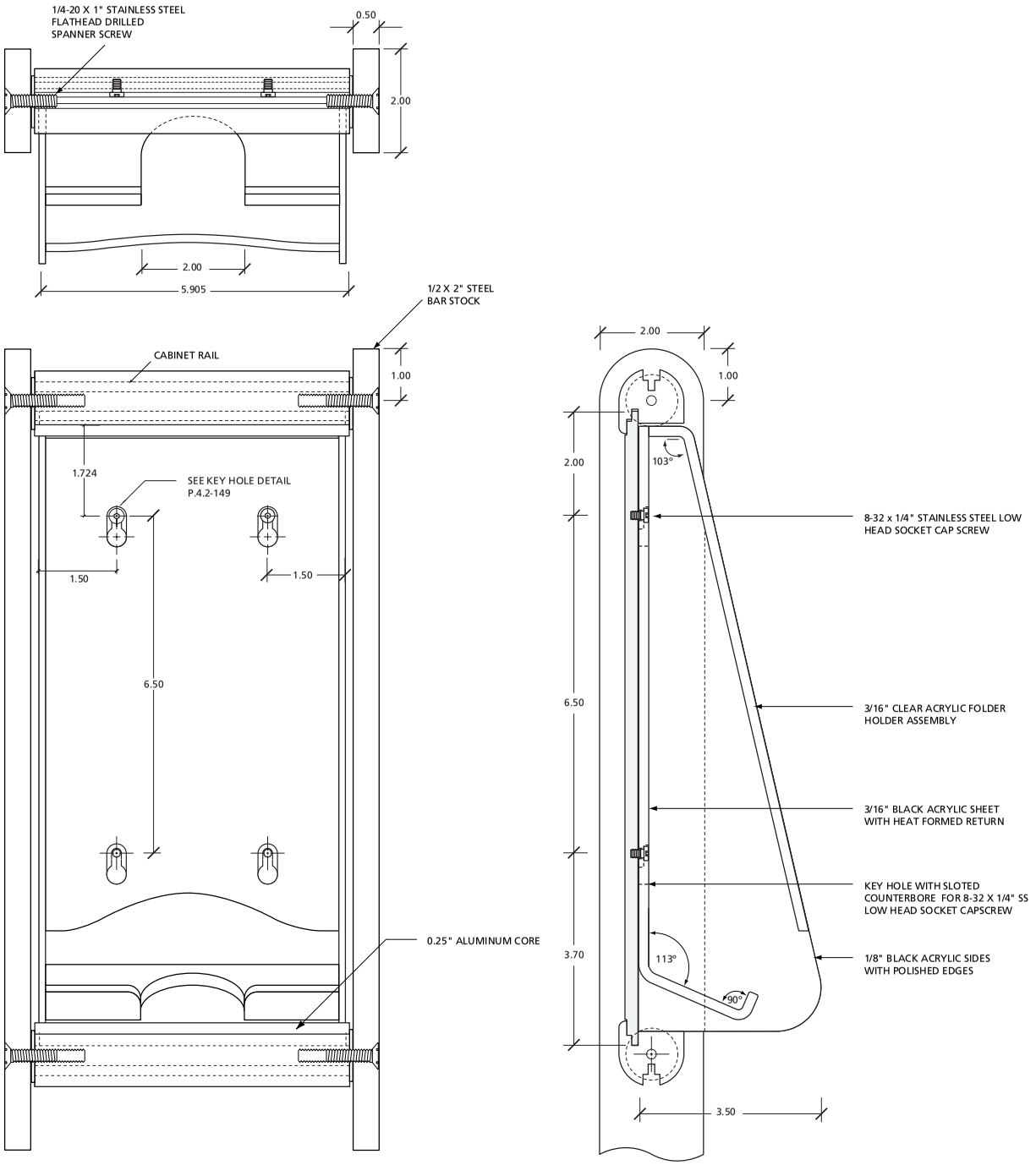


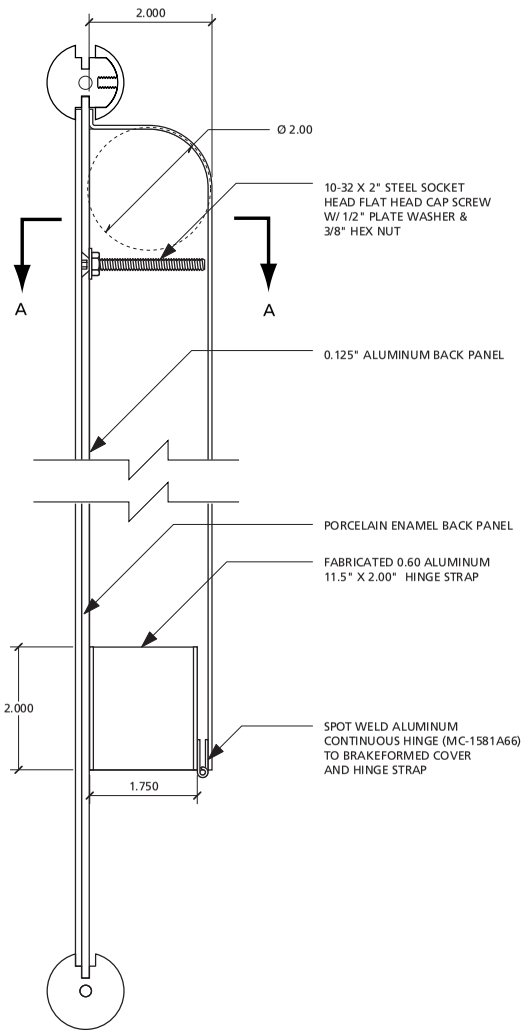


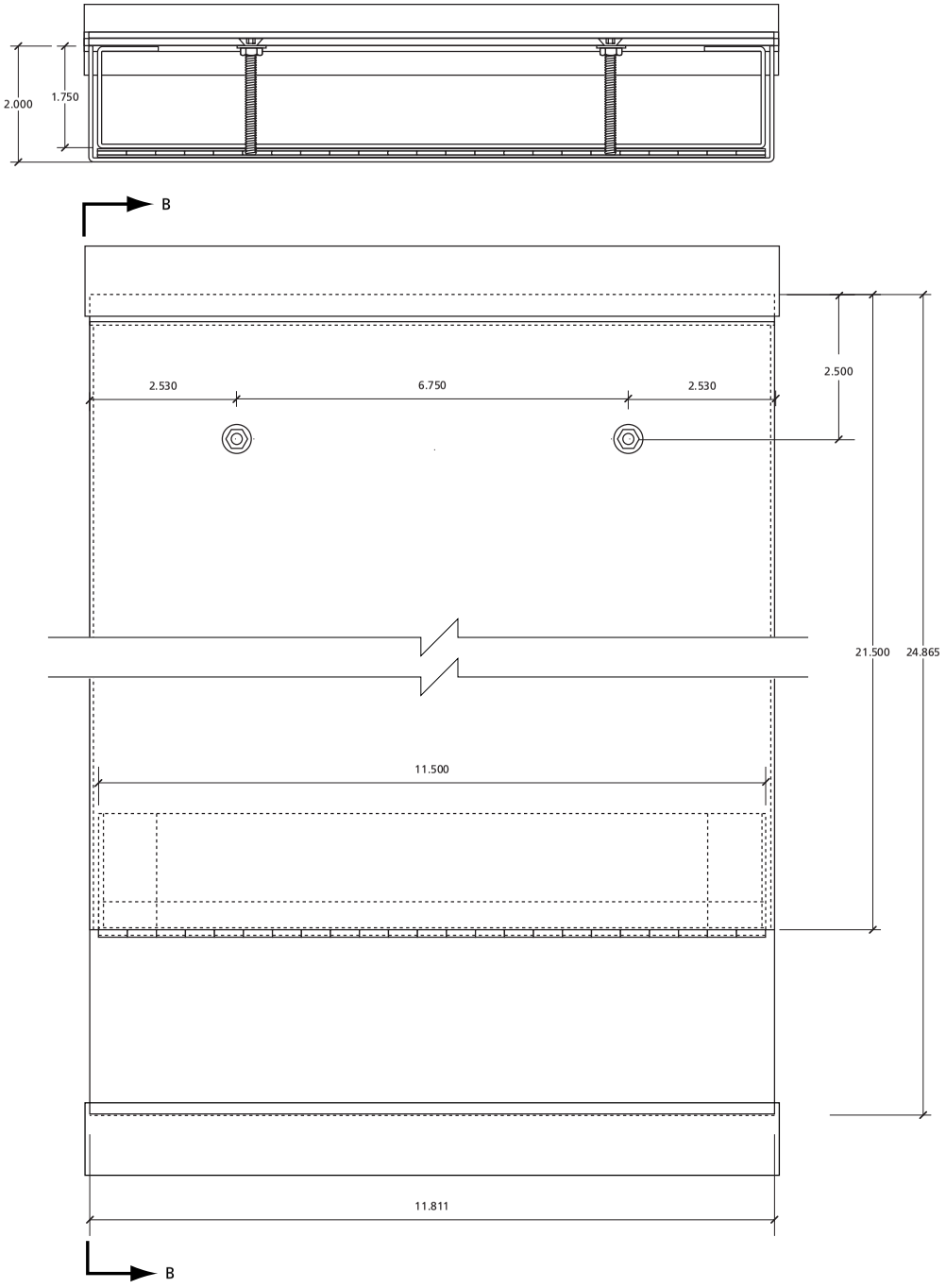
KEY HOLE DETAIL FOR FOLDER DISPENSERS
AND REGISTRATION DISPLAY

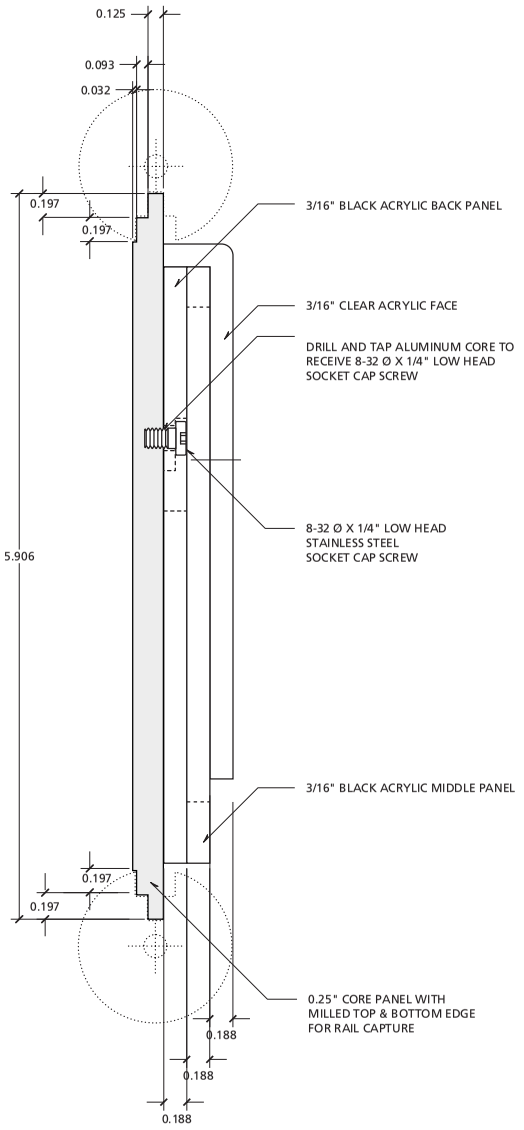


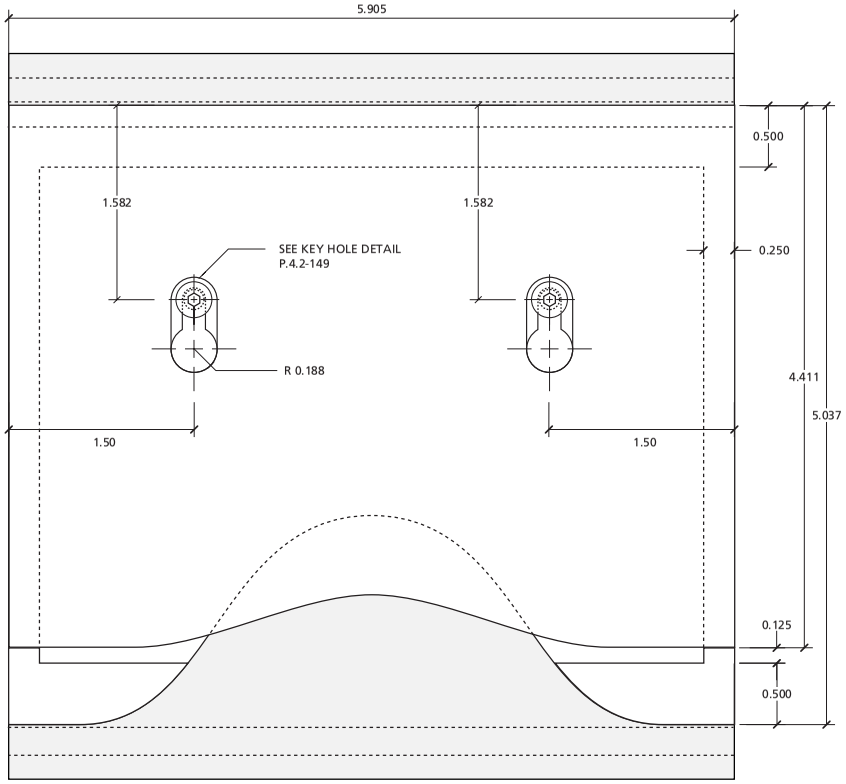


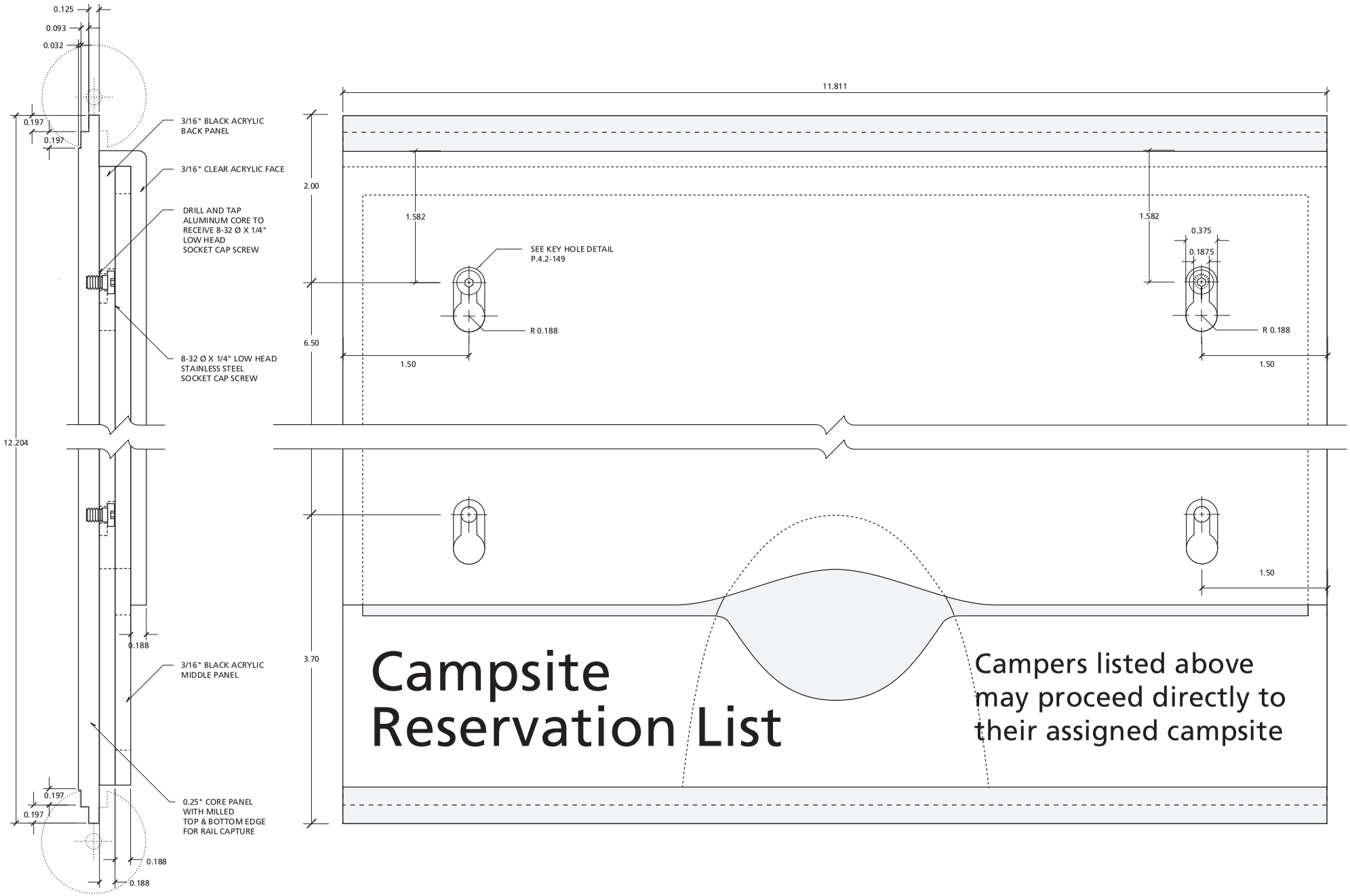

1/4-20 X 1" STAINLESS STEEL
FLATHEAD DRILLED
SPANNER SCREW
0.50
2.00
2.00
5.905
1/2 X 2" STEEL
BAR STOCK
CABINET RAIL
1.00
1.724
SEE KEY HOLE DETAIL
P.4.2-149
1.50
1.50
6.50
0.25" ALUMINUM CORE
2.00
1.00
2.00
103°
8-32 x 1/4" STAINLESS STEEL LOW
HEAD SOCKET CAP SCREW
6.50
3/16" CLEAR ACRYLIC FOLDER
HOLDER ASSEMBLY
3/16" BLACK ACRYLIC SHEET
WITH HEAT FORMED RETURN
KEY HOLE WITH SLOTED
COUNTERBORE FOR 8-32 X 1/4" SS
LOW HEAD SOCKET CAPSCREW
3.70
113°
90°
1/8" BLACK ACRYLIC SIDES
WITH POLISHED EDGES
3.50

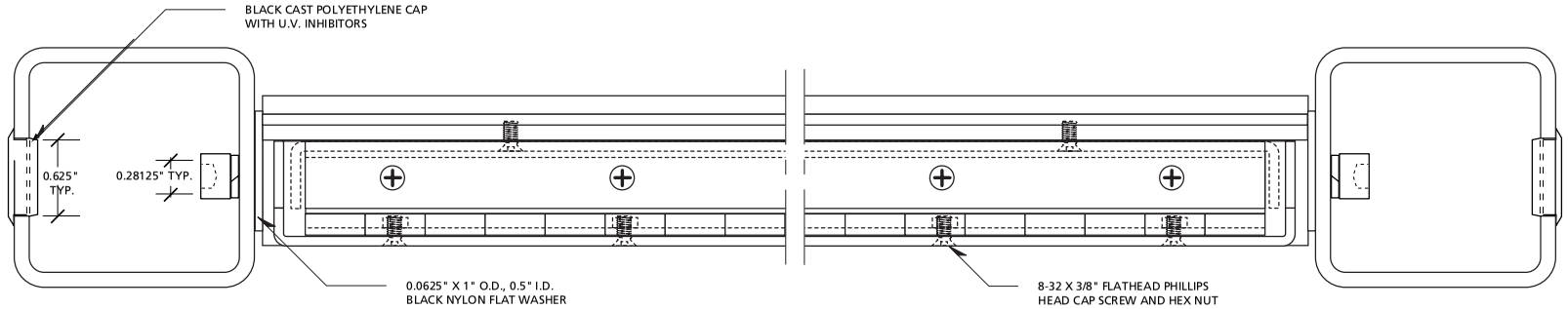

2.000
Ø 2.00
10-32 X 2" STEEL SOCKET
HEAD FLAT HEAD CAP SCREW
W/ 1/2" PLATE WASHER &
3/8" HEX NUT
A
A
0.125" ALUMINUM BACK PANEL
PORCELAIN ENAMEL BACK PANEL
FABRICATED 0.60 ALUMINUM
11.5" X 2.00" HINGE STRAP
2.000
SPOT WELD ALUMINUM
CONTINUOUS HINGE (MC-1581A66)
TO BRAKEFORMED COVER
AND HINGE STRAP
1.750


2.000
1.750
B
2.530
6.750
2.530
2.500
21.500
24.865
11.500
11.811
B

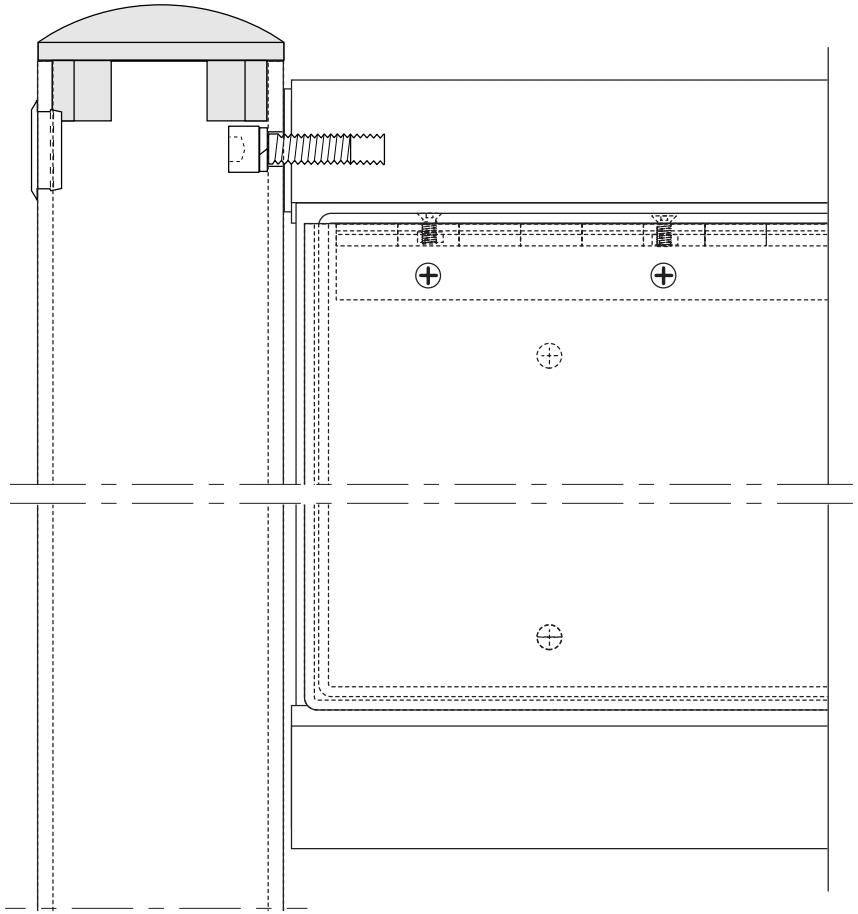

0.125
0.093
0.032
0.197
0.197
3/16" BLACK ACRYLIC BACK PANEL
3/16" CLEAR ACRYLIC FACE
DRILL AND TAP ALUMINUM CORE TO
RECEIVE 8-32 Ø X 1/4" LOW HEAD
SOCKET CAP SCREW
8-32 Ø X 1/4" LOW HEAD
STAINLESS STEEL
SOCKET CAP SCREW
5.906
3/16" BLACK ACRYLIC MIDDLE PANEL
0.197
0.197
0.25" CORE PANEL WITH
MILLED TOP & BOTTOM EDGE
FOR RAIL CAPTURE
0.188
0.188
0.188


5.905
0.500
1.582
1.582
SEE KEY HOLE DETAIL
P.4.2-149
0.250
R 0.188
4.411
5.037
1.50
1.50
0.125
0.500

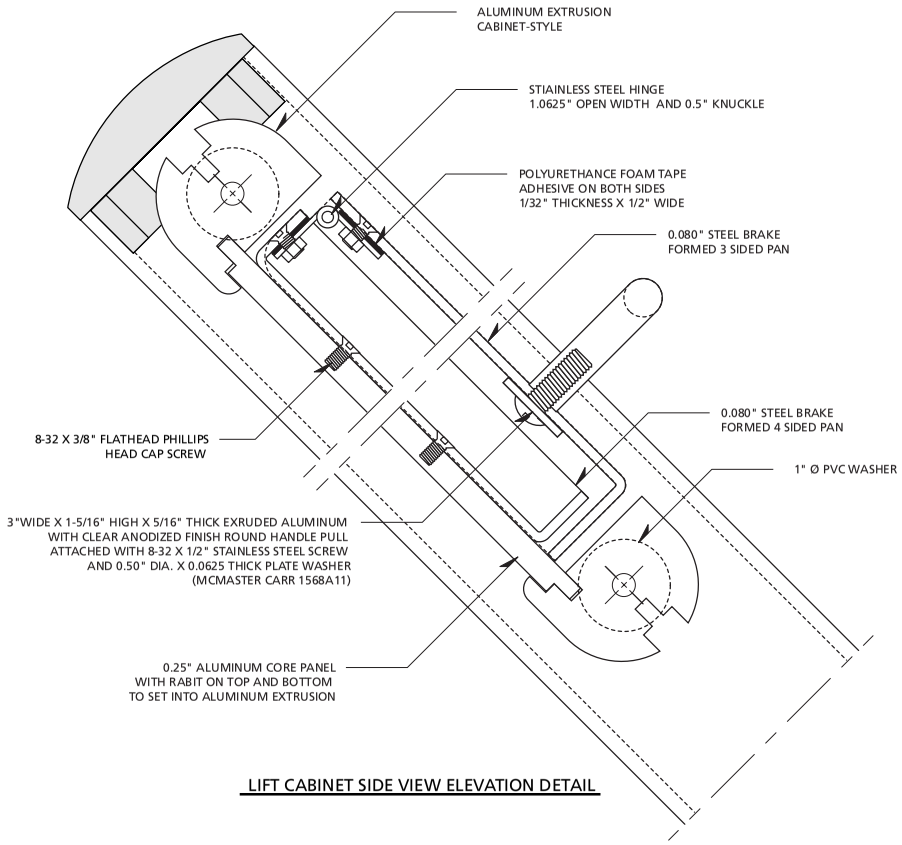

0.125
0.093
0.032
0.197
0.197
3/16" BLACK ACRYLIC
BACK PANEL
3/16" CLEAR ACRYLIC FACE
DRILL AND TAP
ALUMINUM CORE TO
RECEIVE 8-32 Ø X 1/4"
LOW HEAD
SOCKET CAP SCREW
8-32 Ø X 1/4" LOW HEAD
STAINLESS STEEL
SOCKET CAP SCREW
12.204
0.188
3/16" BLACK ACRYLIC
MIDDLE PANEL
0.197
0.197
0.25" CORE PANEL
WITH MILLED
TOP & BOTTOM EDGE
FOR RAIL CAPTURE
0.188
0.188
11.811
2.00
6.50
3.70
1.582
1.582
SEE KEY HOLE DETAIL
P.4.2-149
R 0.188
1.50
0.375
0.1875
R 0.188
1.50
1.50
Campsite
Reservation List
Campers listed above
may proceed directly to
their assigned campsite



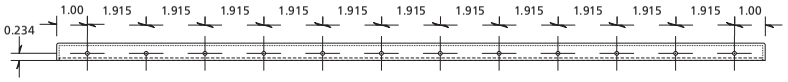
LIFT CABINET CONNECTION PLAN VIEW DETAIL



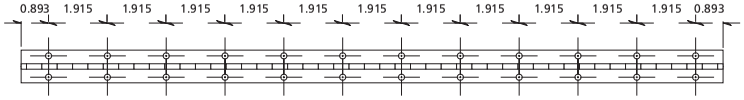
LIFT CABINET FRONT VIEW ELEVATION DETAIL



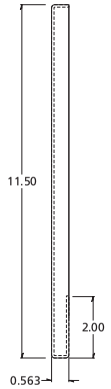
LIFT CABINET SIDE VIEW ELEVATION DETAIL



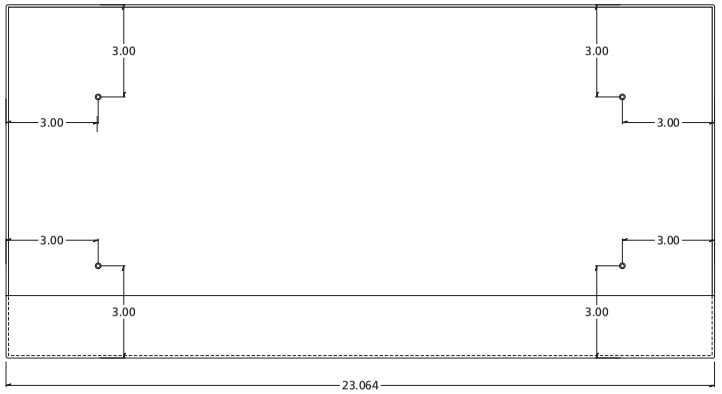
LIFT CABINET BOTTOM PAN PLAN VIEW DETAIL



LIFT CABINET HINGE DETAIL

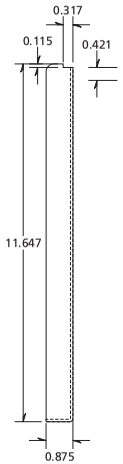


LIFT CABINET BOTTOM PAN SIDE ELEVATION DETAIL

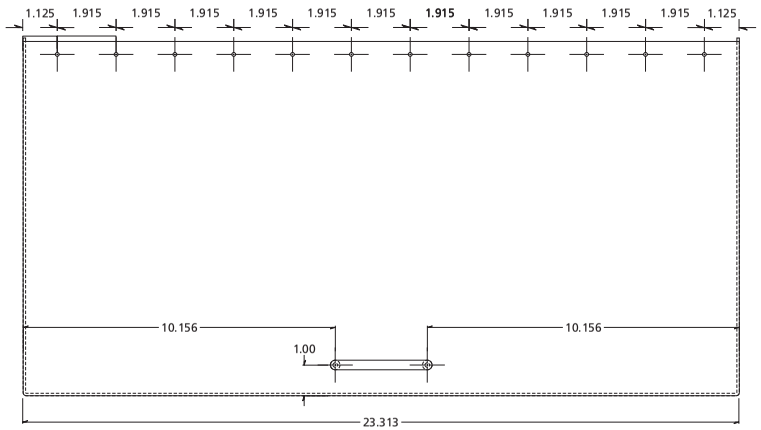


LIFT CABINET BOTTOM PAN FRONT VIEW ELEVATION DETAIL

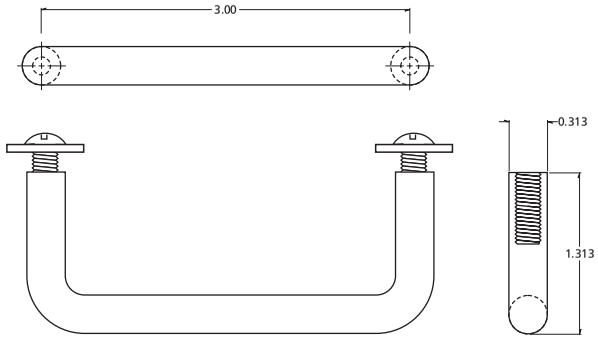
LIFT CABINET TOP PAN PLAN VIEW DETAIL



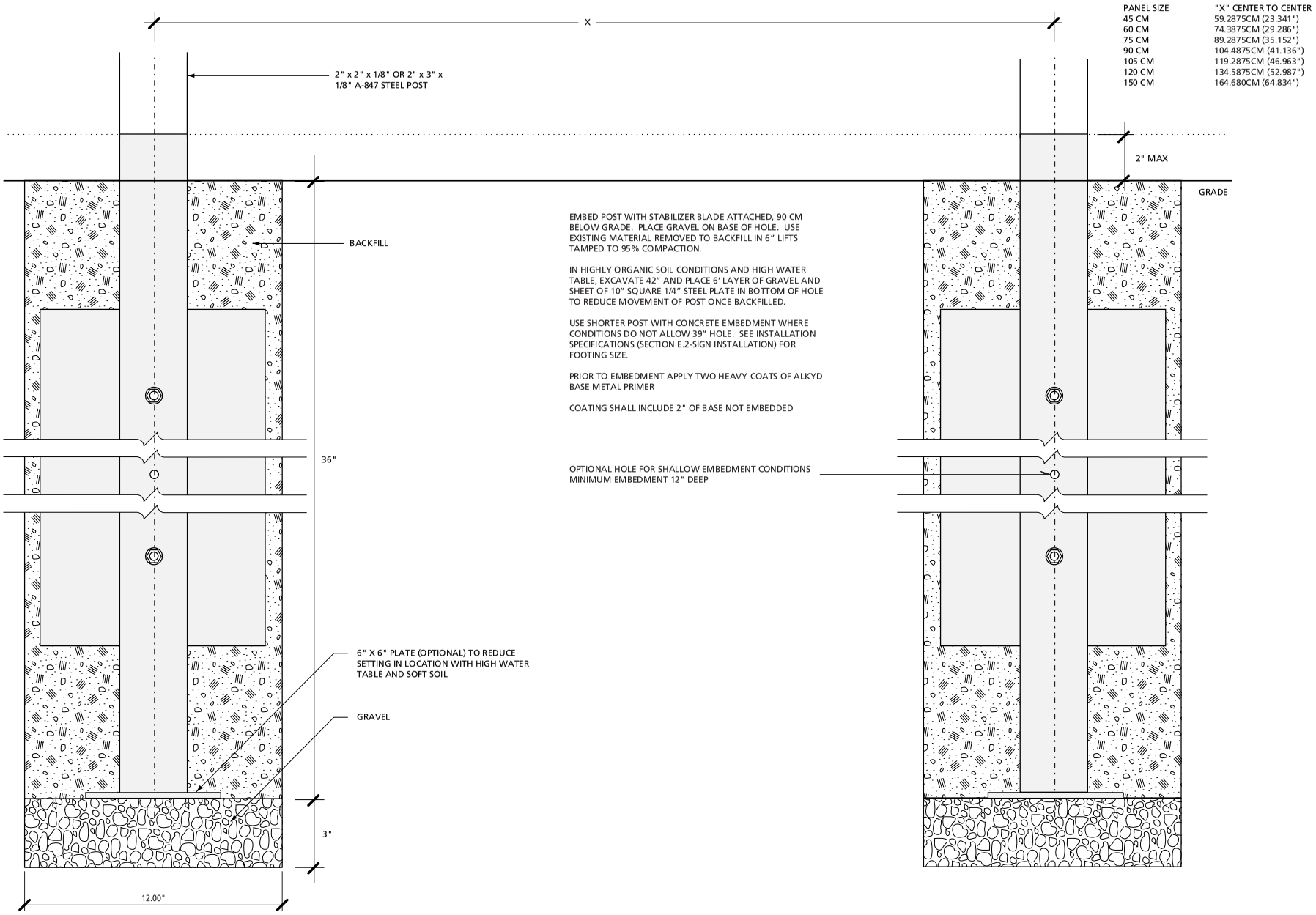
LIFT CABINET TOP PAN SIDE ELEVATION DETAIL



LIFT CABINET TOP PAN FRONT VIEW ELEVATION DETAIL

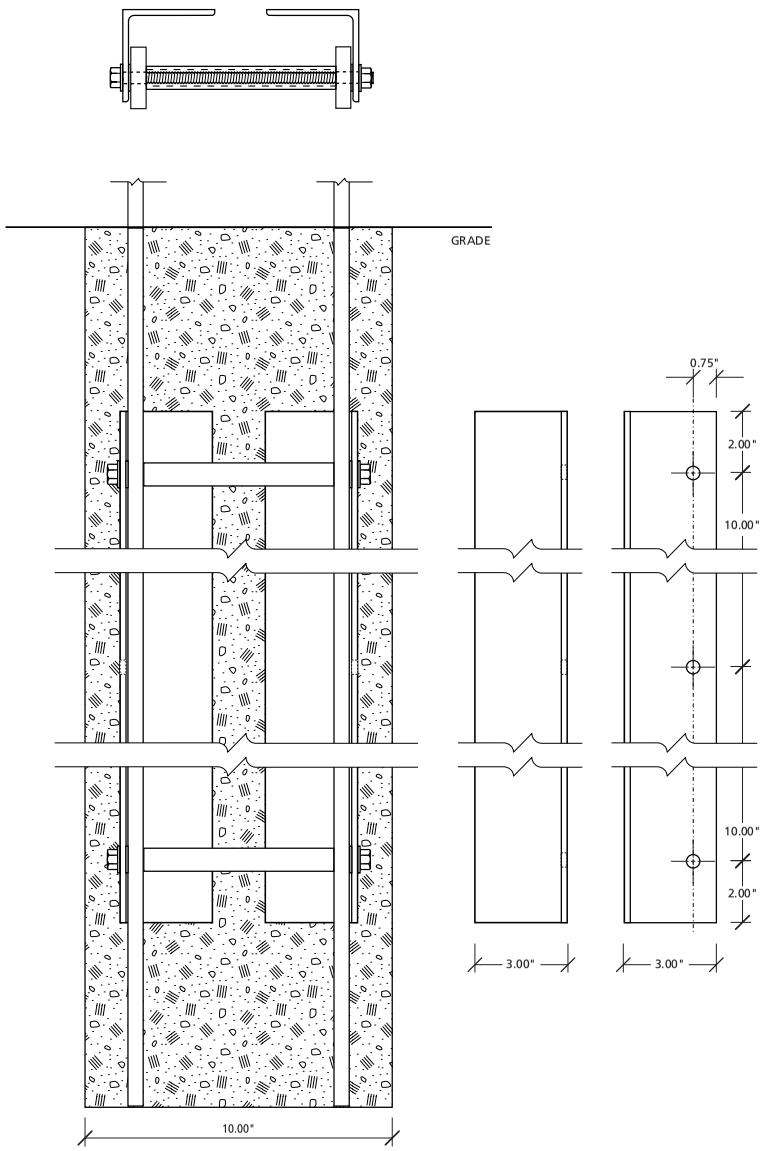


ANODIZED ALUMINUM 3" ROUND HANDLE DRAWER PULL
MC# 1568A11



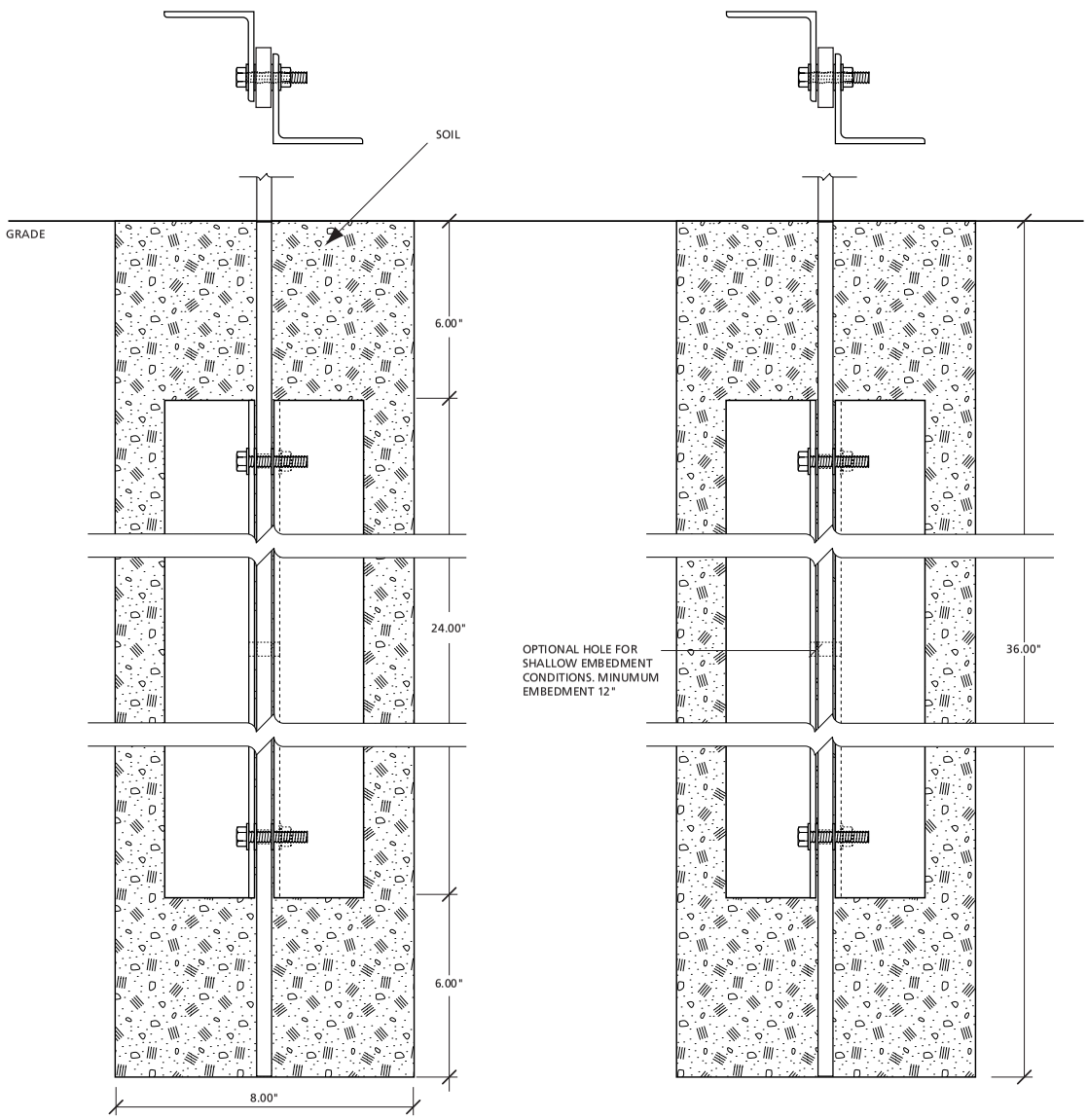
PANEL SIZE	"X" CENTER TO CENTER
45 CM	59.2875CM (23.341")
60 CM	74.3875CM (29.286")
75 CM	89.2875CM (35.152")
90 CM	104.4875CM (41.136")
105 CM	119.2875CM (46.963")
120 CM	134.5875CM (52.987")
150 CM	164.680CM (64.834")

NARROW PROFILE WITH CONNECTED DOUBLE POST ASSEMBLY

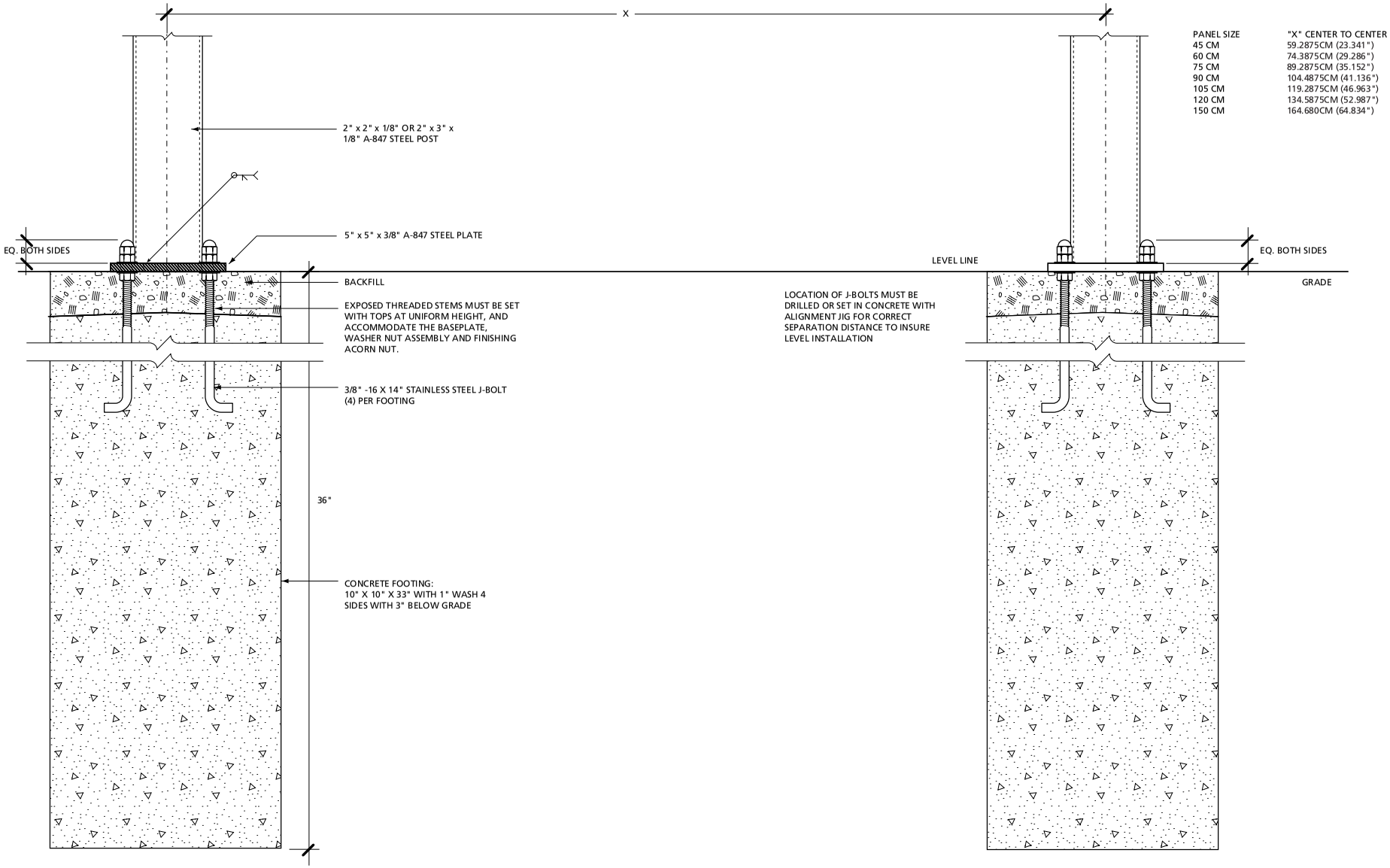


NARROW PROFILE, 15 CM WIDE

NARROW PROFILE WITH 30CM TO 75CM ASSEMBLY WIDTH



NARROW PROFILE, GREATER THAN 15 CM WIDE



PANEL SIZE	"X" CENTER TO CENTER
45 CM	59.2875CM (23.341")
60 CM	74.3875CM (29.286")
75 CM	89.2875CM (35.152")
90 CM	104.4875CM (41.136")
105 CM	119.2875CM (46.963")
120 CM	134.5875CM (52.987")
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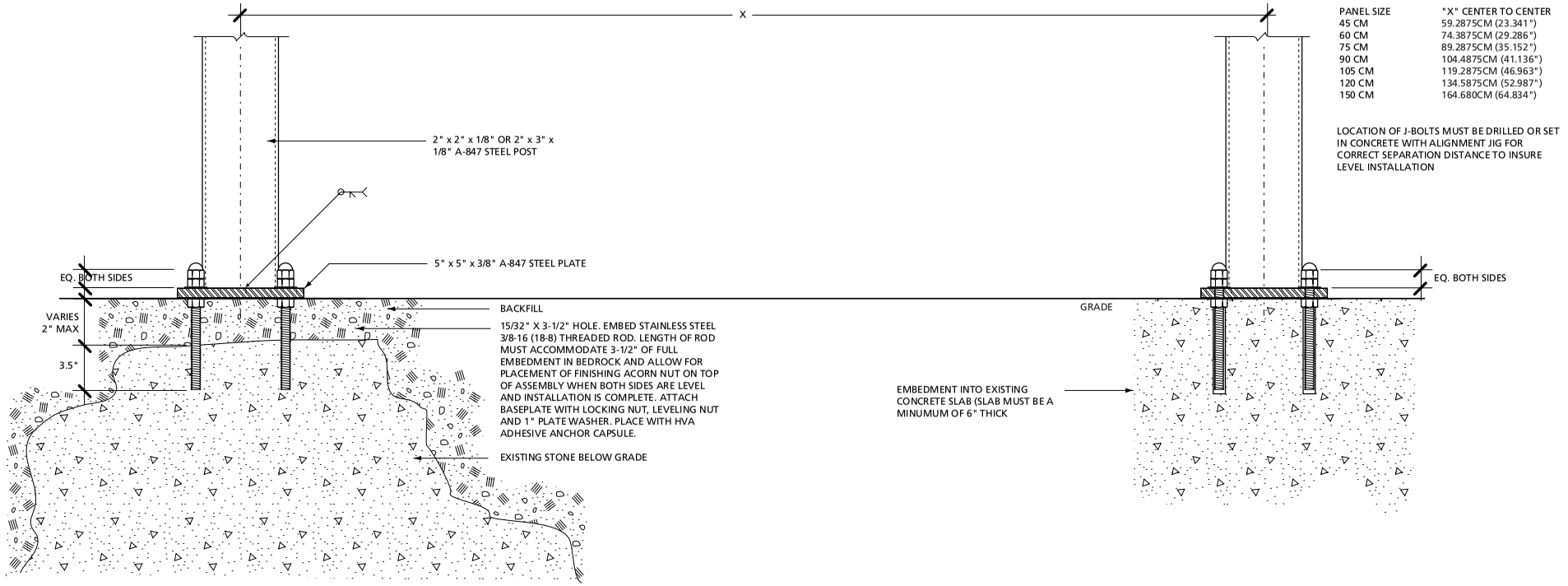
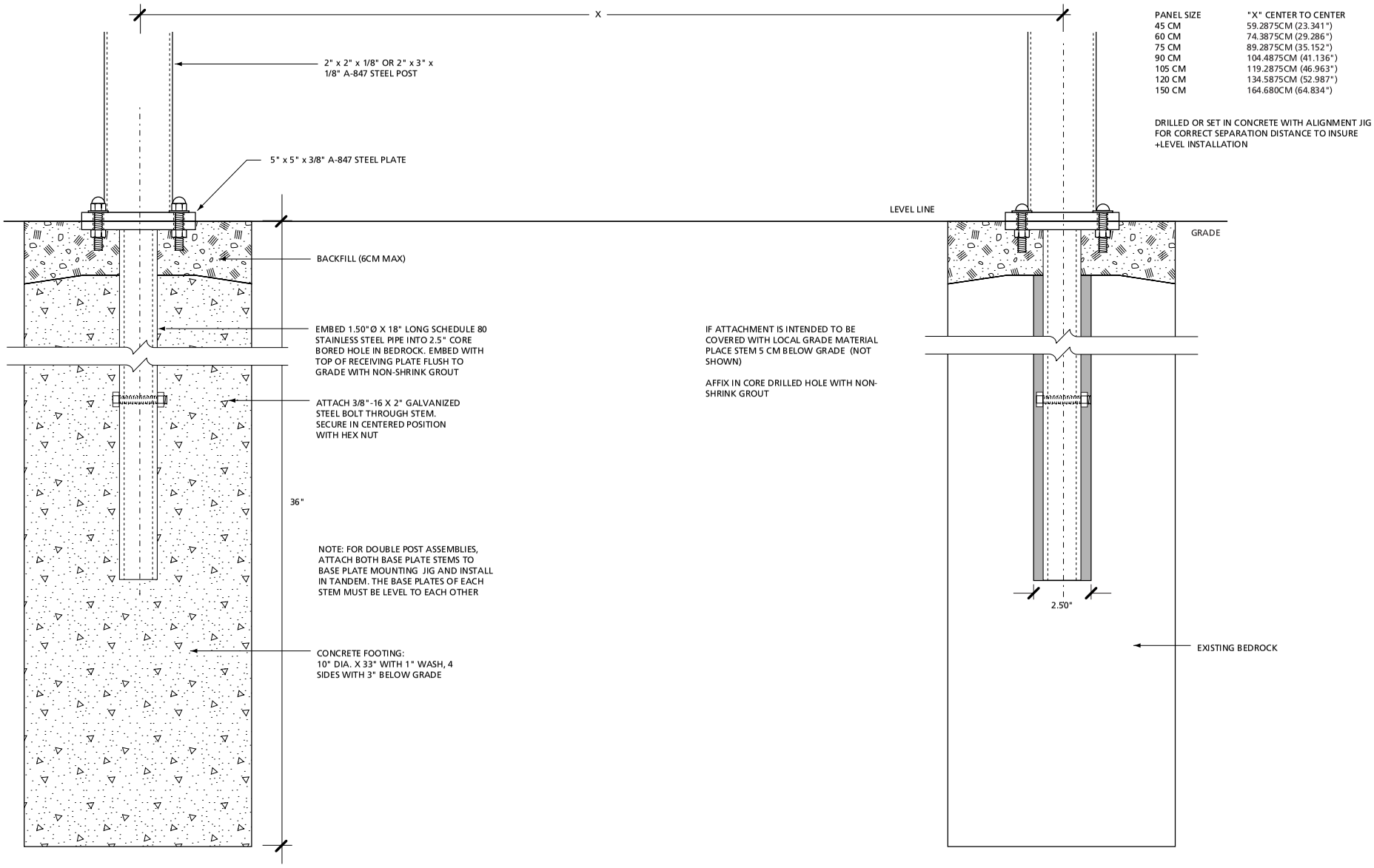

X
2" x 2" x 1/8" OR 2" x 3" x 1/8" A-847 STEEL POST
5" x 5" x 3/8" A-847 STEEL PLATE
EQ. BOTH SIDES
VARIES 2" MAX
3.5"
BACKFILL
15/32" X 3-1/2" HOLE. EMBED STAINLESS STEEL 3/8-16 (18-8) THREADED ROD. LENGTH OF ROD MUST ACCOMMODATE 3-1/2" OF FULL EMBEDMENT IN BEDROCK AND ALLOW FOR PLACEMENT OF FINISHING ACORN NUT ON TOP OF ASSEMBLY WHEN BOTH SIDES ARE LEVEL AND INSTALLATION IS COMPLETE. ATTACH BASEPLATE WITH LOCKING NUT, LEVELING NUT AND 1" PLATE WASHER. PLACE WITH HVA ADHESIVE ANCHOR CAPSULE.
EXISTING STONE BELOW GRADE
GRADE
EMBEDMENT INTO EXISTING CONCRETE SLAB (SLAB MUST BE A MINUMUM OF 6" THICK
EQ. BOTH SIDES
PANEL SIZE "X" CENTER TO CENTER
45 CM 59.2875CM (23.341")
60 CM 74.3875CM (29.286")
75 CM 89.2875CM (35.152")
90 CM 104.4875CM (41.136")
105 CM 119.2875CM (46.963")
120 CM 134.5875CM (52.987")
150 CM 164.680CM (64.834")
LOCATION OF J-BOLTS MUST BE DRILLED OR SET IN CONCRETE WITH ALIGNMENT JIG FOR CORRECT SEPARATION DISTANCE TO INSURE LEVEL INSTALLATION

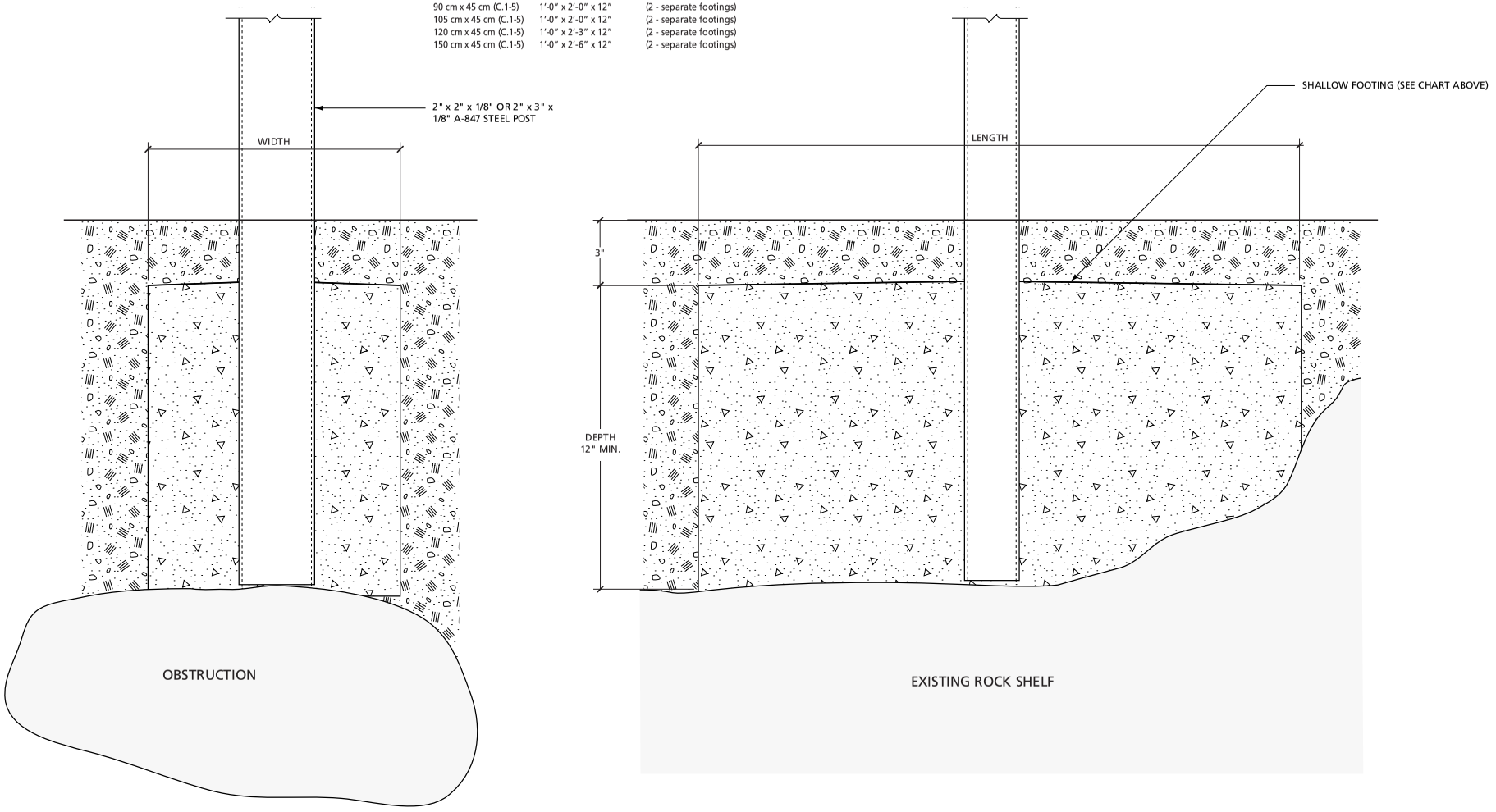


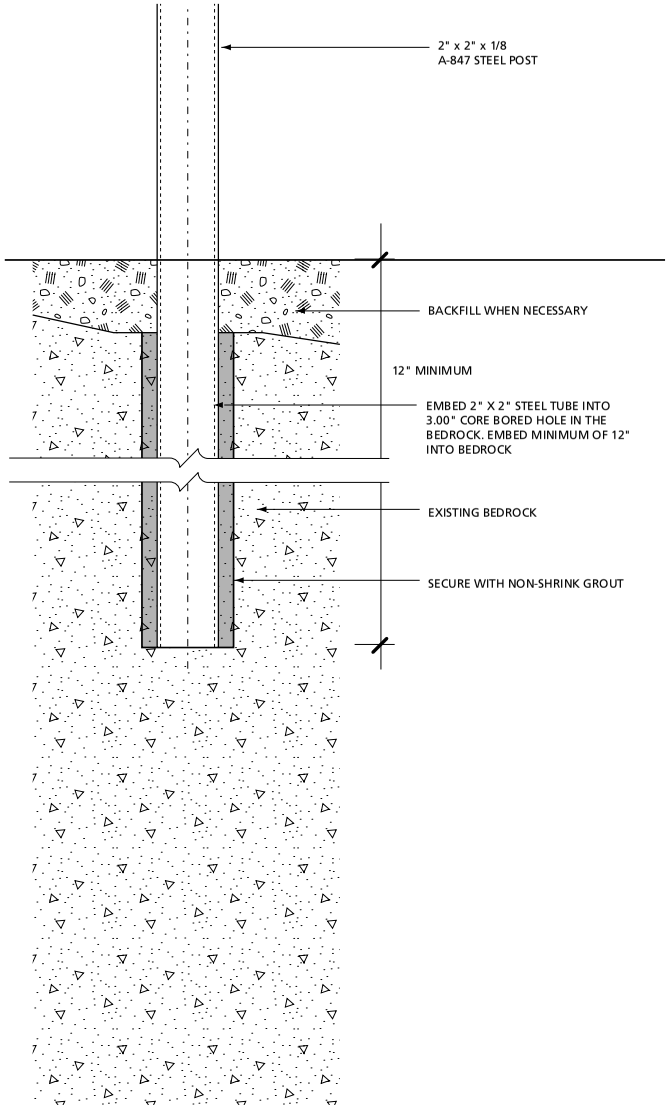
PLACEMENT OF STEM FOOTING INTO CONCRETE

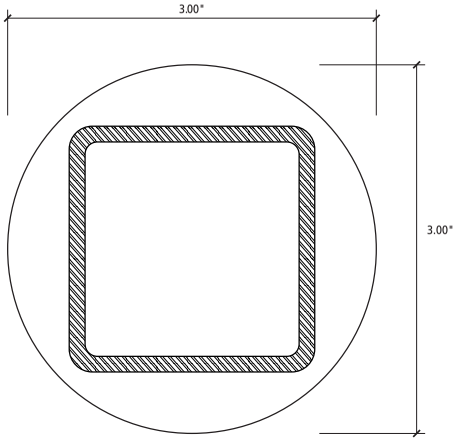
PLACEMENT OF STEM FOOTING INTO BEDROCK

Assembly size (W x H)	Footing Size (L x W x D)	No. of Footings
30 cm x 30 cm	2'-0" x 1'-3" x 12"	(1 - single footing)
30 cm x 60 cm	2'-0" x 1'-9" x 12"	(1 - single footing)
30 cm x 90 cm	2'-0" x 2'-3" x 12"	(1 - single footing)
30 cm x 120 cm	2'-0" x 2'-6" x 12"	(1 - single footing)
45 cm x 45 cm	1'-0" x 1'-9" x 12"	(2 - separate footings)
45 cm x 90 cm	1'-0" x 3'-0" x 12"	(2 - separate footings)
60 cm x 20 cm	1'-0" x 1'-3" x 12"	(2 - separate footings)
60 cm x 40 cm	1'-0" x 1'-6" x 12"	(2 - separate footings)
60 cm x 60 cm	1'-0" x 2'-0" x 12"	(2 - separate footings)
60 cm x 80 cm	1'-0" x 2'-6" x 12"	(2 - separate footings)
60 cm x 60 cm	1'-0" x 2'-0" x 12"	(2 - separate footings)
90 cm x 60 cm	1'-0" x 2'-6" x 12"	(2 - separate footings)
60 cm x 90 cm	1'-0" x 2'-9" x 12"	(2 - separate footings)
60 cm x 120 cm	1'-0" x 3'-0" x 12"	(2 - separate footings)

Assembly size (W x H)	Footing Size (L x W x D)	No. of Footings
90 cm x 30 cm	1'-0" x 1'-9" x 12"	(2 - separate footings)
90 cm x 60 cm	1'-0" x 2'-6" x 12"	(2 - separate footings)
90 cm x 90 cm	1'-3" x 3'-0" x 12"	(2 - separate footings)
90 cm x 120 cm	1'-3" x 3'-6" x 12"	(2 - separate footings)
120 cm x 90 cm	1'-3" x 3'-6" x 12"	(2 - separate footings)
30 cm x 30 cm (C.1-5)	2'-0" x 1'-3" x 12"	(1 - single footing)
30 cm x 60 cm (C.1-5)	2'-0" x 1'-9" x 12"	(1 - single footing)
30 cm x 90 cm (C.1-5)	2'-0" x 2'-3" x 12"	(1 - single footing)
60 cm x 30 cm (C.1-5)	1'-0" x 1'-3" x 12"	(2 - separate footings)
75 cm x 30 cm (C.1-5)	1'-0" x 1'-6" x 12"	(2 - separate footings)
90 cm x 30 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footings)
105 cm x 30 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footings)
120 cm x 30 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footings)
150 cm x 30 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footings)
45 cm x 45 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footings)
60 cm x 45 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footings)
75 cm x 45 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footings)
90 cm x 45 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footings)
105 cm x 45 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footings)
120 cm x 45 cm (C.1-5)	1'-0" x 2'-3" x 12"	(2 - separate footings)
150 cm x 45 cm (C.1-5)	1'-0" x 2'-6" x 12"	(2 - separate footings)




2" x 2" x 1/8
A-847 STEEL POST
BACKFILL WHEN NECESSARY
12" MINIMUM
EMBED 2" X 2" STEEL TUBE INTO
3.00" CORE BORED HOLE IN THE
BEDROCK. EMBED MINIMUM OF 12"
INTO BEDROCK
EXISTING BEDROCK
SECURE WITH NON-SHRINK GROUT

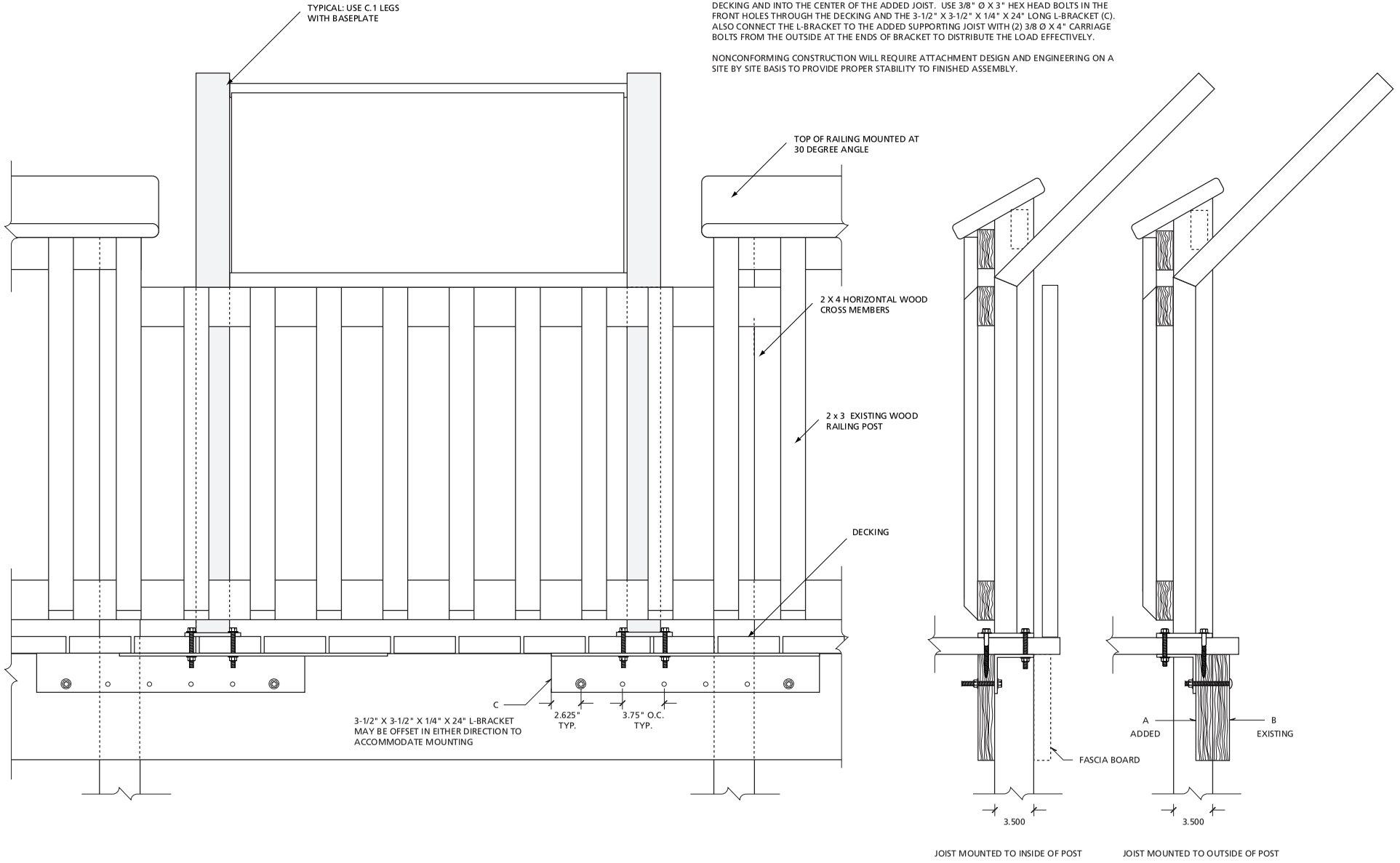

3.00"
3.00"

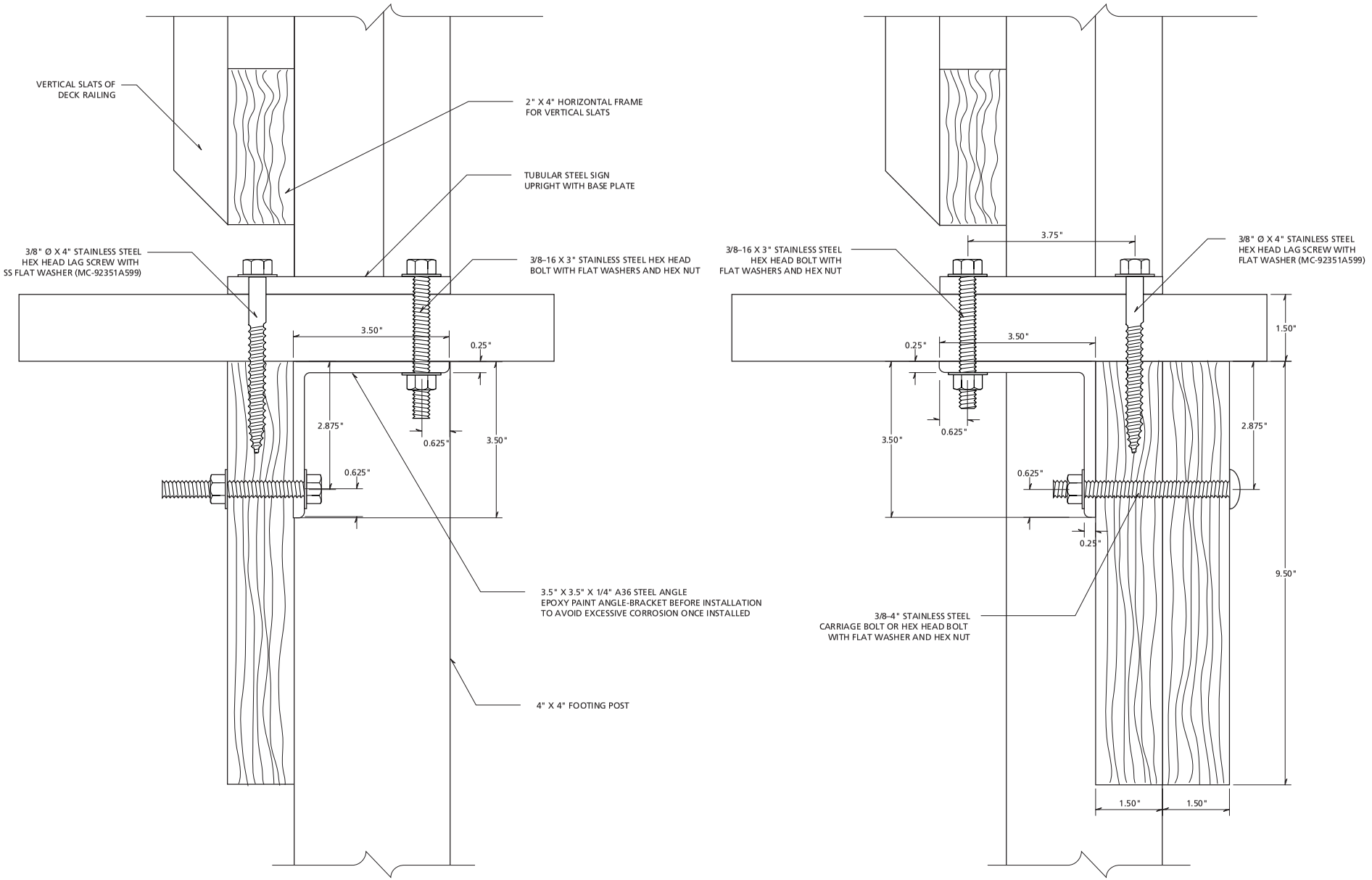
THE FRONT FACING PLANE OF THE SIGN POST MUST BE ALIGNED WITH THE FRONT PLANE OF THE 4" X 4" POST WITH VERTICAL SLATS AND RAIL ON DECK MODIFIED TO ACCOMMODATE INSERTION OF REVERSE ANGLE ASSEMBLY.

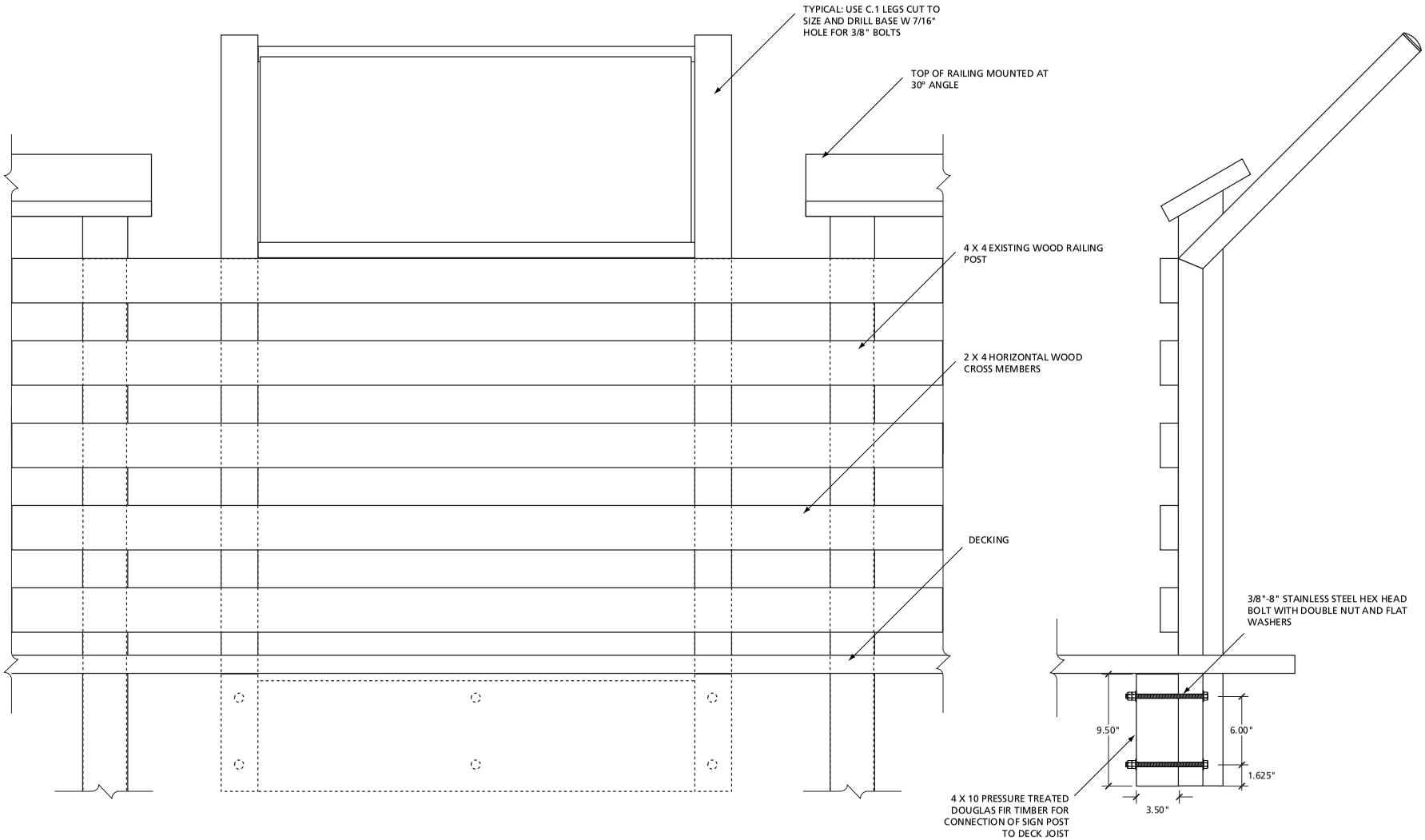
IF THE FURTHEST SUPPORTING JOIST IS ATTACHED TO THE INSIDE OF THE POST, USE (2) 3/8" Ø X 4" LAG SCREWS IN THE FRONT TWO HOLES OF THE BASEPLATE TO CONNECT THROUGH THE DECKING AND INTO THE CENTER OF THE SUPPORTING JOIST, AND (2) 3/8 Ø X 3" HEX HEAD BOLTS IN THE BACK TWO HOLES THROUGH THE DECKING AND THE 3-1/2" X 3-1/2" X 1/4" X 24" LONG L-BRACKET. ALSO CONNECT THE L-BRACKET TO THE SUPPORTING JOIST WITH (2) 3/8 Ø X 3" HEX HEAD BOLTS AT THE ENDS OF L-BRACKET TO DISTRIBUTE THE LOAD EFFECTIVELY.

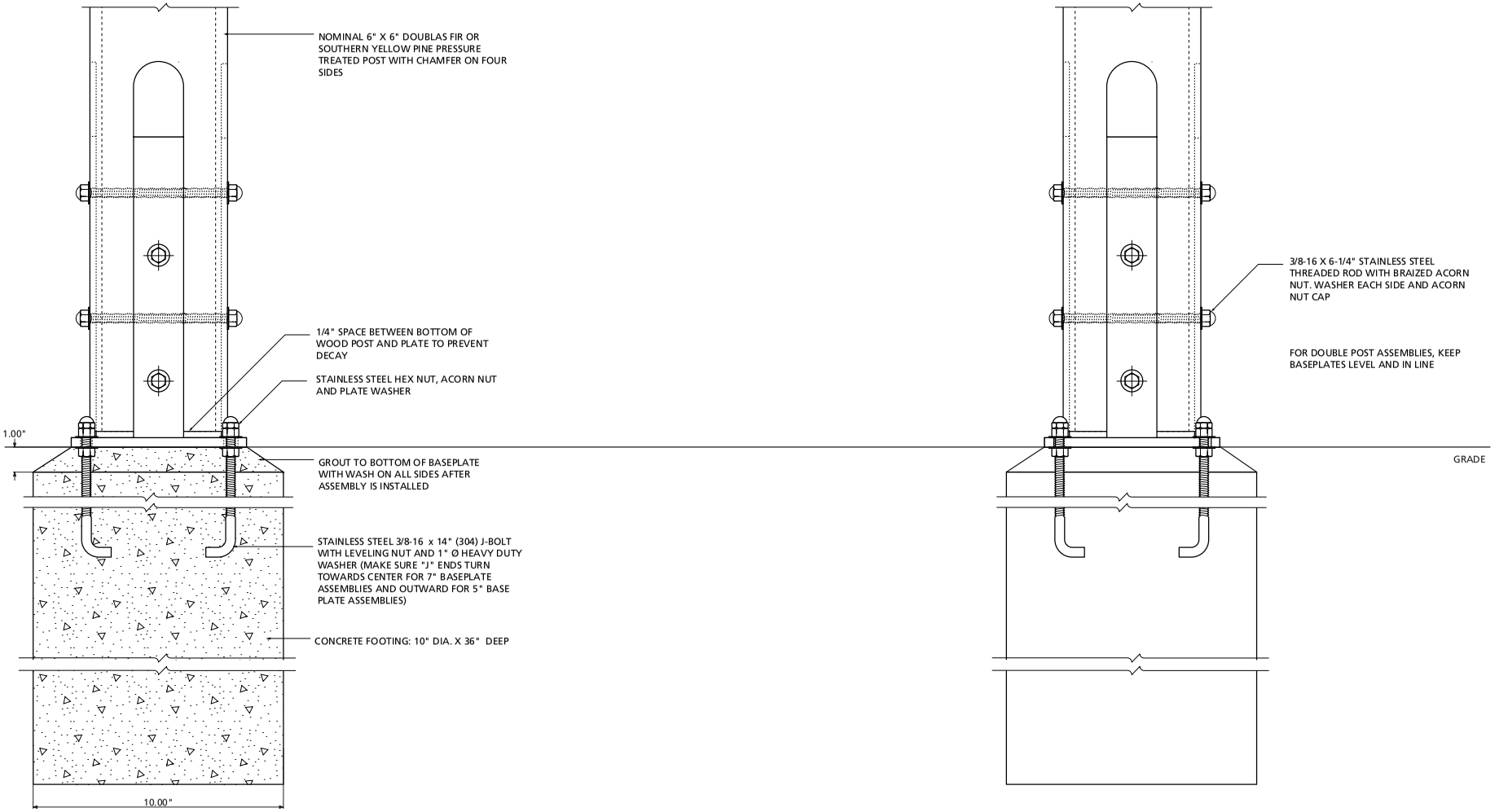
IF THE FURTHEST SUPPORTING JOIST IS ATTACHED TO THE OUTSIDE OF THE POST, ATTACH AN ADDITIONAL 2" X 10 (OR SAME SIZE LUMBER) (A) TO THE INSIDE OF THE JOIST (B). USE (2) 3/8" Ø x 4" LAG SCREWS IN THE BACK TWO HOLES OF THE BASEPLATE TO CONNECT THROUGH THE DECKING AND INTO THE CENTER OF THE ADDED JOIST. USE 3/8" Ø X 3" HEX HEAD BOLTS IN THE FRONT HOLES THROUGH THE DECKING AND THE 3-1/2" X 3-1/2" X 1/4" X 24" LONG L-BRACKET (C). ALSO CONNECT THE L-BRACKET TO THE ADDED SUPPORTING JOIST WITH (2) 3/8 Ø X 4" CARRIAGE BOLTS FROM THE OUTSIDE AT THE ENDS OF BRACKET TO DISTRIBUTE THE LOAD EFFECTIVELY.

NONCONFORMING CONSTRUCTION WILL REQUIRE ATTACHMENT DESIGN AND ENGINEERING ON A SITE BY SITE BASIS TO PROVIDE PROPER STABILITY TO FINISHED ASSEMBLY.

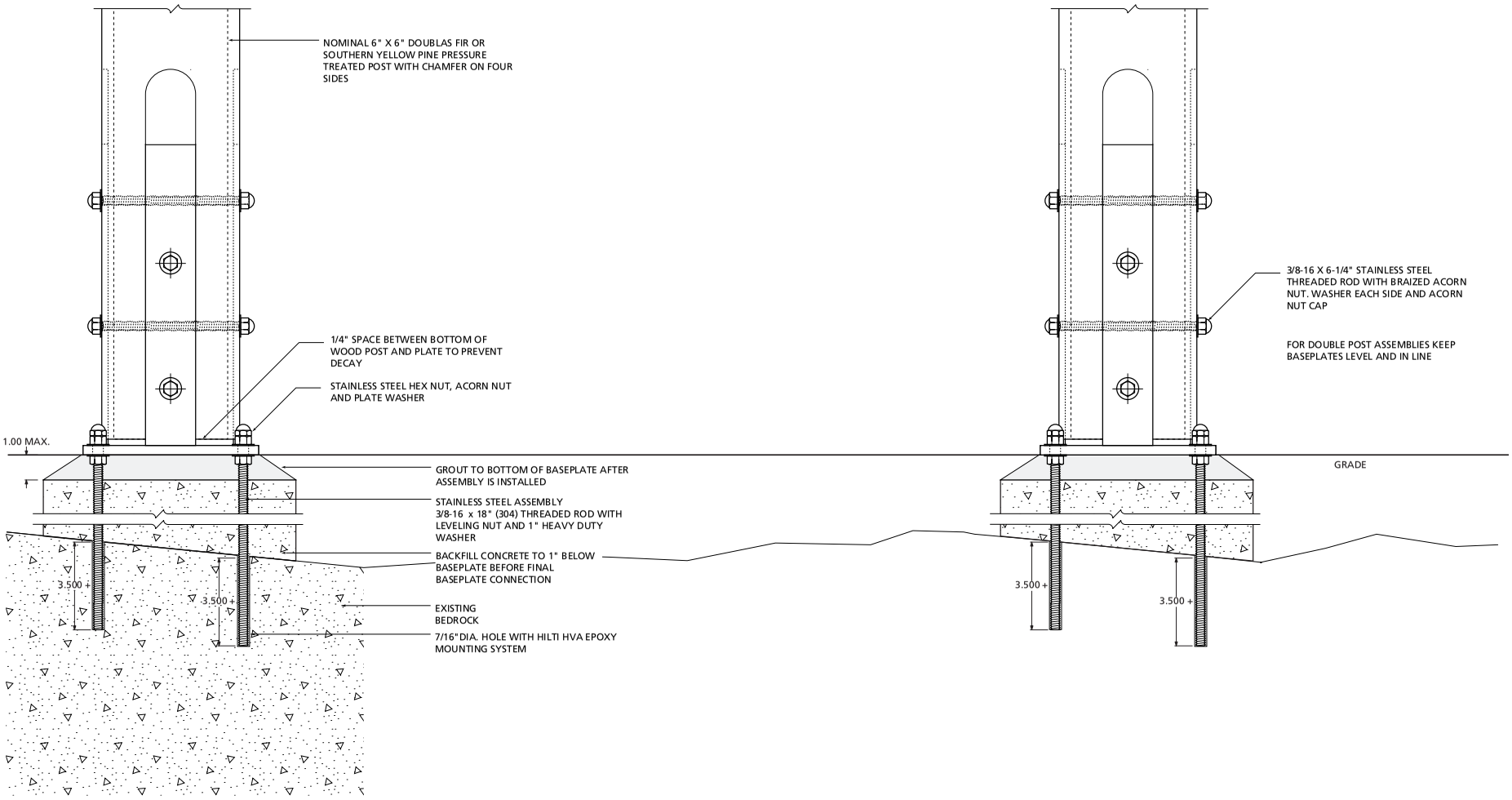



VERTICAL SLATS OF DECK RAILING
2" X 4" HORIZONTAL FRAME FOR VERTICAL SLATS
TUBULAR STEEL SIGN UPRIGHT WITH BASE PLATE
3/8" Ø X 4" STAINLESS STEEL HEX HEAD LAG SCREW WITH SS FLAT WASHER (MC-92351A599)
3/8–16 X 3" STAINLESS STEEL HEX HEAD BOLT WITH FLAT WASHERS AND HEX NUT
3.50"
0.25"
2.875"
0.625"
3.50"
0.625"
3.5" X 3.5" X 1/4" A36 STEEL ANGLE EPOXY PAINT ANGLE-BRACKET BEFORE INSTALLATION TO AVOID EXCESSIVE CORROSION ONCE INSTALLED
4" X 4" FOOTING POST
3/8–16 X 3" STAINLESS STEEL HEX HEAD BOLT WITH FLAT WASHERS AND HEX NUT
3.75"
3/8" Ø X 4" STAINLESS STEEL HEX HEAD LAG SCREW WITH FLAT WASHER (MC-92351A599)
1.50"
0.25"
3.50"
3.50"
0.625"
2.875"
0.625"
0.25"
9.50"
3/8–4" STAINLESS STEEL CARRIAGE BOLT OR HEX HEAD BOLT WITH FLAT WASHER AND HEX NUT
1.50"
1.50"

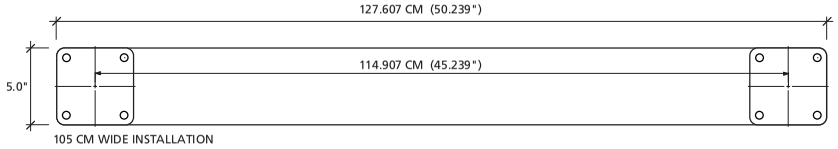

TYPICAL: USE C.1 LEGS CUT TO SIZE AND DRILL BASE W 7/16" HOLE FOR 3/8" BOLTS
TOP OF RAILING MOUNTED AT 30° ANGLE
4 X 4 EXISTING WOOD RAILING POST
2 X 4 HORIZONTAL WOOD CROSS MEMBERS
DECKING
3/8"-8" STAINLESS STEEL HEX HEAD BOLT WITH DOUBLE NUT AND FLAT WASHERS
9.50"
6.00"
1.625"
3.50"
4 X 10 PRESSURE TREATED DOUGLAS FIR TIMBER FOR CONNECTION OF SIGN POST TO DECK JOIST



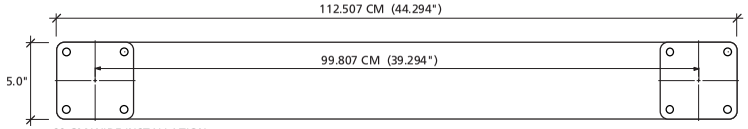
BASEPLATE & FOOTING DETAIL FOR 10" HOLE



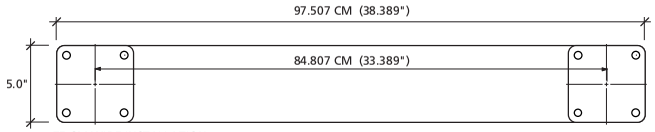
BASEPLATE & FOOTING DETAIL FOR SUBSURFACE LIMESTONE EMBEDMENT



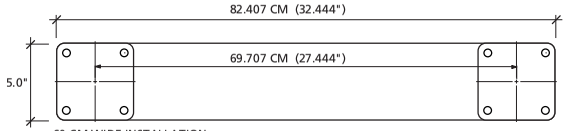
105 CM WIDE INSTALLATION



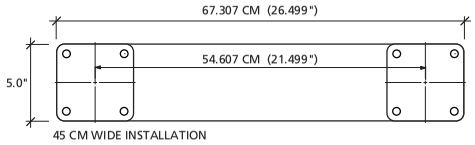
90 CM WIDE INSTALLATION



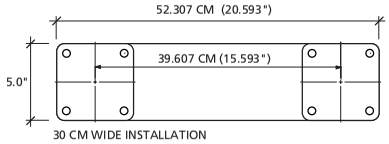
75 CM WIDE INSTALLATION



60 CM WIDE INSTALLATION

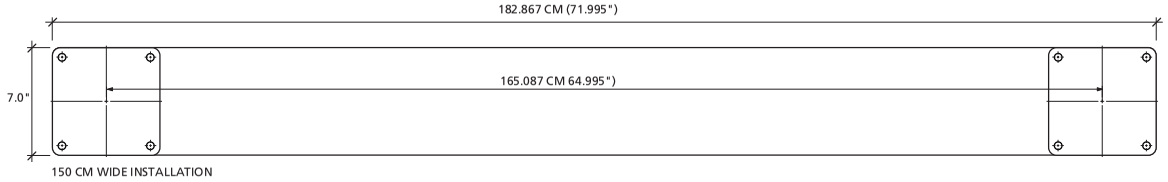


45 CM WIDE INSTALLATION

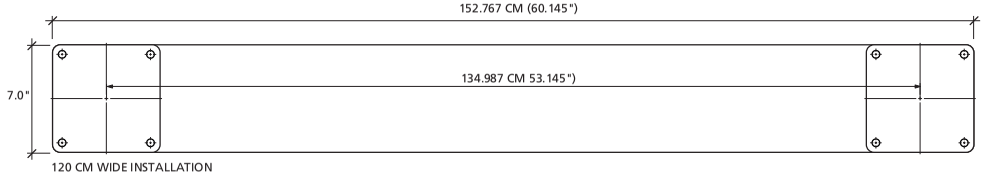


30 CM WIDE INSTALLATION

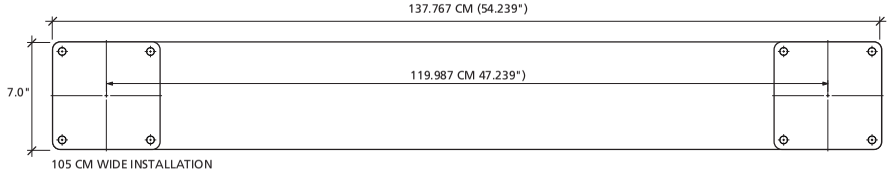
NOTE: HOLE ALIGNMENT AND CENTER TO CENTER DIMENSIONS TO MATCH BASEPLATES AS SHOWN ON DRAWING



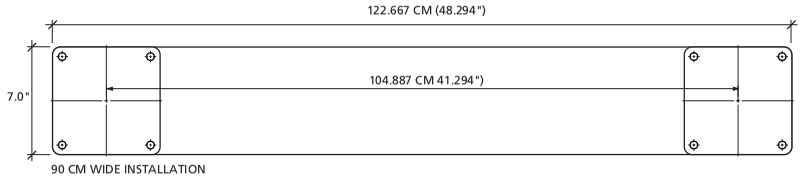
150 CM WIDE INSTALLATION



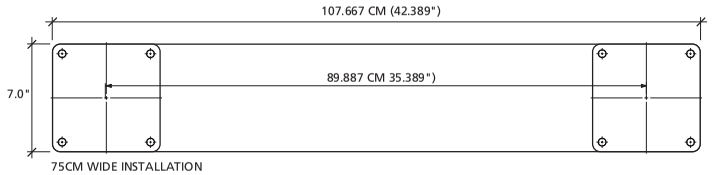
120 CM WIDE INSTALLATION



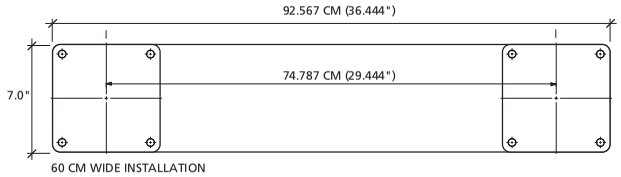
105 CM WIDE INSTALLATION



90 CM WIDE INSTALLATION



75CM WIDE INSTALLATION



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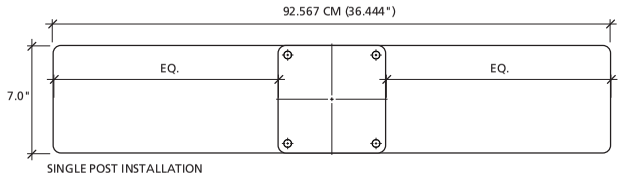
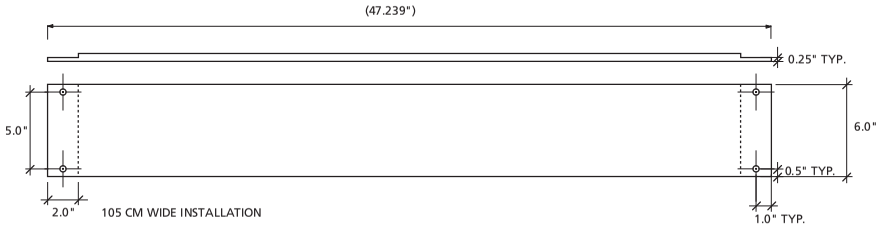


SINGLE POST INSTALLATION

NOTE: HOLE ALIGNMENT AND CENTER TO CENTER DIMENSIONS TO MATCH BASEPLATES AS SHOWN ON DRAWING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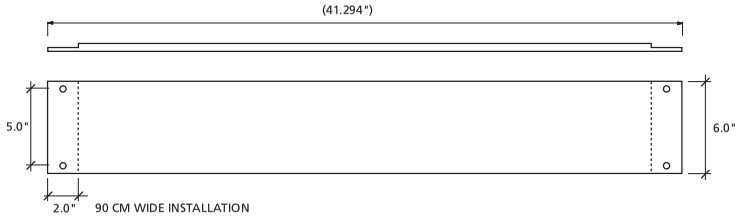
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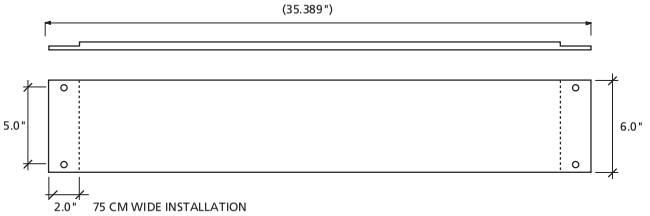
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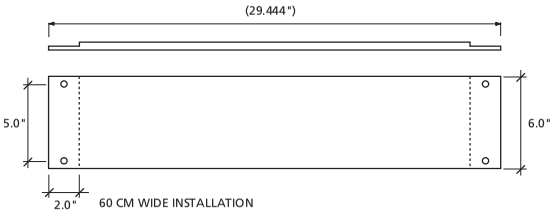
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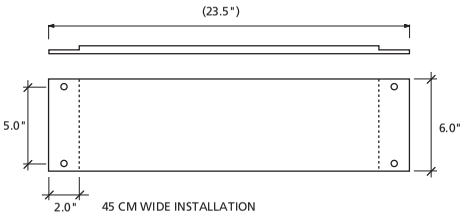
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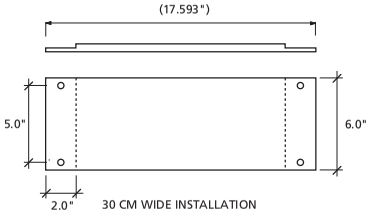
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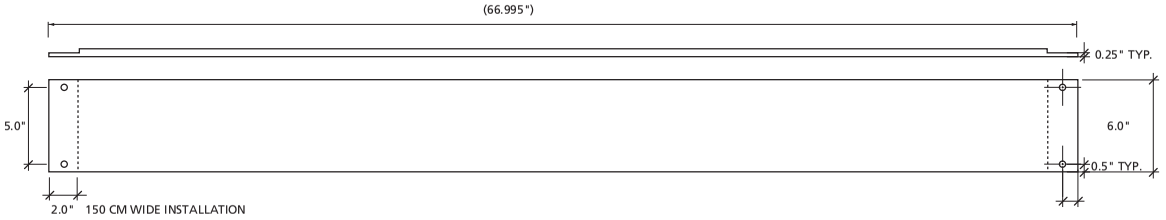
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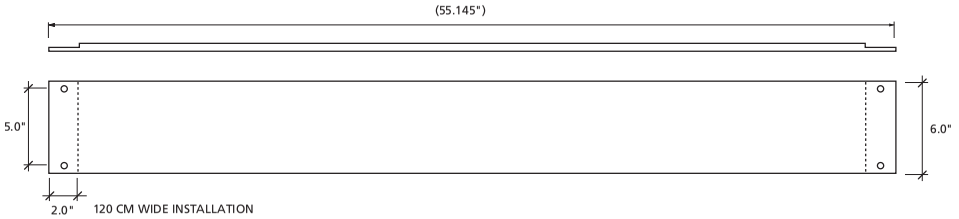
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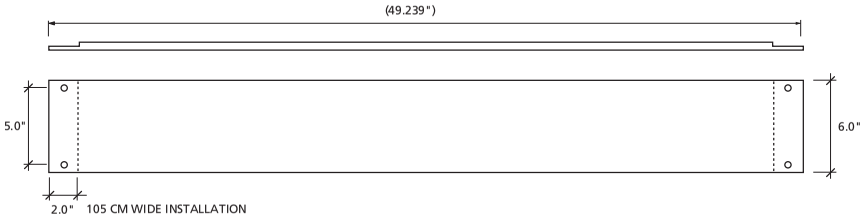
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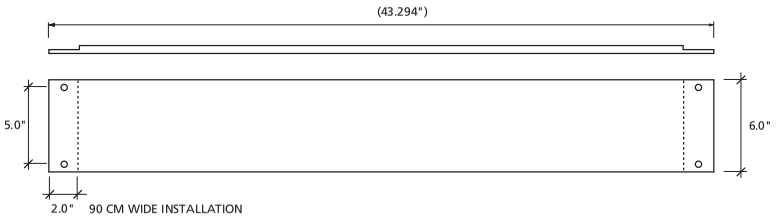
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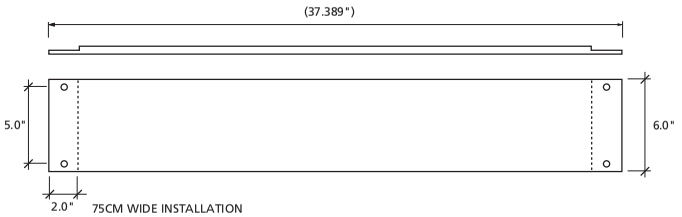
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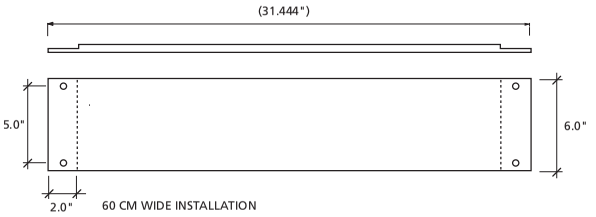
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60 CM WIDE INSTALLATION

Chapter 4
Material Specifications & Assembly Drawings

Section 4.3
Identification Signs

Final Draft: *June 1, 2002*

TABLE OF CONTENTS

4.3 Identification Signs: Material Specifications & Assembly Drawings

Material Specifications

SECTION 4.3: IDENTIFICATION SIGNS: MATERIAL SPECIFICATIONS AND FABRICATION DRAWINGS

0.0 INTRODUCTION

Overview

These specifications apply to the furnishing of park and place Identification Signs with routed wood faces. Mounting formats include:

- Double post sign with interior steel upright and wood frame, with wood panel and leg cover
- Double post sign with interior steel upright and frame, with wood panel and leg cover
- Monolith sign with formed concrete base, interior steel uprights and wood panel and frame cover
- Monolith sign with formed concrete base with stone or brick face, interior steel uprights and wood panel and frame cover
- Wall mounted sign cleat mounted to masonry or wood building facade
- Single post timber upright with flag mounted sign

Work shall include the furnishing of all materials, labor, equipment, and supplies to construct sign panels or full assemblies, and all related packaging and shipment to the designated assembly location.

These specifications are organized as a series of individual specifications, on components of the Uniguide Sign Program. Assembly and installation instructions are included in Chapter 5: Field Manual, with general site-related issues in Section 5.1 and installation and assembly in Section 5.2b. Specifications for contracted installations are included in Section 4.6, General Requirements, of this chapter.

General Requirements

Signs and sign assemblies are to be manufactured using materials and fabrication processes as described in this specification and in companion drawings, and match quality of initial submissions.

Dimensions

Dimensions specified in inches include: legend size and all related dimensions for layout grids, panel sizes, post lengths, mounting height, post drilling for connection of panel to post, and all hardware, machine parts (brackets, mechanical fasteners, frames), materials (tube, dimensional lumber).

Structural Engineering

All structures have been engineered to meet typical conditions throughout the National Park

System. This criteria is provided *Section 4.6, Engineering Criteria for Sign Design*, of the *General Requirements Specification*. Special conditions outside these parameters are to be engineered on a site-specific basis.

1.0 MATERIAL OVERVIEW

Wood

This specification allows use of redwood or Western Red Cedar. The National Park Service prefers use of cedar based on overall cost and principles of sustainability. If one material is used, it must be used consistently throughout a type of sign. Components of a frame, panel, or leg shall use only one material of the same grade throughout.

Western Red Cedar and Redwood Dimensional Lumber: Laminated clear heart, kiln–dried vertical grain redwood or Western Red Cedar with maximum moisture content of 12%, for panels, fabricated posts and monolith edge. Redwood to be selected per grading rules of the California Redwood Association or better for panels, frames, and posts. Cedar to be selected per grading rules of the Western Red Cedar Lumber Association using the grading rules of the National Lumber Grading Authority as approved by the American Lumber Standards Board of Review.
Applications include:

- 1-1/2" thick sign panels
- 2" lumber (nominal, 1-1/2" finished) lumber with varying widths for: finished top cap of monolith and double post assembly, side cover on monolith, leg cover and cap assembly for double post sign, inboard post blocking double post sign, and fascia boards on single post flag mounted assembly.
- 2" lumber fascia for cross member of flag mounted single post assembly.

Western Red Cedar and Redwood Timber: Full dimension construction heart redwood to be selected per grading rules of the California Redwood Association or better for redwood lumber frames and solid posts. Number 1, select structural per grading rules of the Western Red Cedar Lumber Association using the grading rules of the National Lumber Grading Authority as approved by the American Lumber Standards Board of Review.
Applications include:

- 8" x 8", 10" x 10", 12" x 12", timbers for upright timber and cross member of flag mounted single post assembly.

Cedar: Milled plugs for counter sunk

- 1-1/2 diameter x 1" Wood Plug for to cover countersunk tenon joint of hanging panel
- 2" diameter x 1" Wood Plug for to cover countersunk bolt supporting steel bracket of hanging panel

Douglas Fir: Dimensional lumber, kiln-dried, to be selected using the grading rules of the Western Wood Products Association.

Douglas Fir (Pressure Treated): Structural Grade, Number 2 Standard and Better pressure-treated with ACQ (Ammoniacal Copper Quat.). Do not use CCA treated material.
Applications include:

- 2" (width varies) blocking on inside and outside of wood posts, and rails for double post assembly and alignment cross member on monolithic structures.

Douglas Fir Timbers: Select Structural Grade, Number 1 and Better.
Applications include (alternate, not a substitute to Cedar)

- 8" x 8", 10" x 10", 12" x 12", timbers for upright timber and cross member of flag mounted single post assembly.

Plywood: 5/8" and 3/4"thick Marine Grade A-C or better plywood material per the grading rules of the American Plywood Association. Plywood used for mounting bolt templates.

Plywood: 1/2" thick pressure-treated material per the grading rules of the American Plywood Association. Plywood used for center blocking in wood rails.

Steel

Double Post Assemblies

- Tubular sections: A-36 tubular steel hot-dipped galvanized after fabrication.
  - 3-1/2" x 3-1/2" x 3/16", 6" x 4" x 1/4", 8" x 6" x 1/4", 8" x 6" x 5/16" for interior posts of double post assemblies
  - 6" x 6" x 1/4" and 6" x 8" x 3/16" for tubular steel rails
- Structural angle: A-36 steel, 3-1/2" x 5" x 5/16" for attachment of wood rails to steel posts
- A-36 steel plate for baseplates: 7"x 7" x 1/2", 9"x 11" x 5/8", and 12" x 14" x 3/4"
- 1/2" A-36 steel plate for threaded end plug of steel rail
- 1" x 6.5" x 1/16" stainless steel strap with 3–3/16" holes to secure panels on double post assemblies.
- 1" x 1/16" stainless steel panel retention strap (length varies by thickness of assembly)

Monolithic Assemblies

- 6" x 4" x 1/4" tubular sections: A-36 tubular steel with hot-dipped galvanized coating after fabrication for interior posts of monolithic assemblies
- 2" x 2" x 1/4" x 6" long structural angle: A-36 steel, for attachment of wood cap blocking to top of monolith steel posts
- Plate: A-36 steel for baseplates: 8-1/2" x 9" x 5/8"
- A-615 grade 60, reinforcing bar with epoxy coating
  - Straight, varying length A-615 grade 60, #4, reinforcing bar for bottom of pier, subbase and monolith
  - 18" long, A-615 grade 60, #4, bent reinforcing bar: with 6" returns each end

– 24' long, A-615 grade 60, #4, bent reinforcing bar: with 8" returns each end
- 5/8" dia. A-36 galvanized anchor bolts, 22" long with 6" returns

Single Post Hanging Assembly

- 1/2" x 4" A-36 grade steel bar for cross member bracket, hot-dipped galvanized
- 14" x 14" x 5/8", and 16" x 16" x 5/8" A36 steel plate for baseplates
- 1/2" x 3-1/2" x 36" and 1/2" x 4" x 42 " A36 steel straps for baseplates
- 5/8" dia. A-36 galvanized anchor bolts, 18" long with 6" returns

Hardware

Panel Attachment

- 4" x 2" x 3/16" (6061-T6) aluminum plate for machined keyhole bracket
- No.12 Phillips x 1" stainless steel screws to attach keyhole panel to back of sign panel (MC90294A296)
- 1-1/8" x 11/16" custom aluminum (6061-T6) machined hex head capture nut
- 3/8"-16 stainless steel threaded rod with machined hex head capture nut with locktite on one end (4-5/8" for wood rail, 7-1/4" for 6" x 6" steel rail,9-1/4" for 6" x 8" rail)
- 3/8"-16 x 3/4" flathead stainless steel machine screw for attachment of custom-machined hex head capture nut to aluminum plate for wall-mounted signs (MC91500A622)
- 2-1/2", No.12 stainless steel, flat Phillips head screws for attachment of panel edge strips on laminated sign panel (MC-90294A296)

Double Post Assemblies (wood rail)

- 3/8"-16 X 5-1/4" custom stainless steel threaded rod with welded nut on end with stainless steel flat washers and stainless steel hex nut to secure outboard blocking to steel leg
- 3/8"-16 X 6-1/8" custom stainless steel threaded rod welded nut on one end with flat washers and hex nut to secure inboard and inboard blocking to steel leg
- No.8 x 2-1/2" galvanized deck screws to attach top cap, and post cover to frame (MC90031A207)
- 3/8"-16 X 3-1/2" flathead, stainless steel machine screw to attach wood rail to steel angle on upright (MC90275A638)
- 1/2" dia. stainless steel anchor bolts, 14" long with 4" returns (MC91603A165), with stainless steel hex nut, jam nut, washer and leveling nuts

Double Post Assemblies (steel rail)

- 3/8"-16 x 10" & 12" stainless steel threaded rod (custom bolt) to attach upper wood blocking to steel leg
- 3/8"-16 x 8" & 10" stainless steel threaded rod (custom bolt) to attach lower wood blocking to steel leg
- 1/2"-13 x 1-1/2" stainless steel hex head cap screw to attach steel rail to steel upright (MC92240A715)
- Stainless steel spring (lock) washer to attach steel rail to steel upright (MC91104A033)
- Stainless steel flat washer O.D.=1-1/16" I.D.= 17/32" to attach steel rail to steel upright

(MC98019A509)

- #12 x 3" galvanized wood screws to attach wood leg and cap to wood interior blocking (MC#90095A133)
- Stainless steel flat washer O.D.=1" I.D.=9/32" to mount top cedar cap (MC90313A107)
- 1/4" stainless steel countersunk washer to hold top cedar cap (MC98466A029)
- 1/4"-20 x 2" stainless steel flat head machine screw to mount top cedar cap (MC# 91500A550)
- Bulletin AEK Spintite™ Rib-Wall Minimized-Profile Head Rivet inserted in top rail to receive 1/4"-20 top cap screw

- 5/8"-11 dia. A-36 galvanized anchor bolts, 17-1/4" long with 6" returns (MC91603A265), with hex nut, jam nut, washers top and bottom and leveling nut
- 3/4"-10 dia. A-36 galvanized anchor bolts, 23-1/4" long with 8" returns (MC91603A325), with hex nut, jam nut, washers top and bottom and leveling nut

Monolithic Assemblies

- 1", No.12 stainless steel flathead wood screws for attachment of keyhole plate to panel back (MC 90294A296)
- 1/4"-20 Bulletin AEK Spintite™ Rib-wall minimized-profile head rivet to attach alignment blocking and outboard blocking on to steel angle and post sides
- 1/4"-20 x 2" stainless steel, flathead machine screw (MC 91500A550)
- 1/4" countersunk washer to seat screw (MC98466A029)
- Flat washer, I.D.= 9/32", O.D.=1.00" , 0.047" thick (91090A108)
- 5/8" stainless steel hex nut to level and secure baseplate and post assembly to J-bolts (MC94895A035)
- 5/8" Stainless steel acorn nut to keep secure and finish baseplate connection (MC91855A035)
- 3/8"-16 x 7-1/4" threaded stainless steel rod with custom hex nut (spanner nut).
- 2-1/4" zinc-plated steel deck screws for attachment of cedar panel cap and end caps (MC90031A254)
- 3", No.12 Phillips zinc-plated steel, flathead screws for attachment of panel edge strips (MC90031A305)
- 0.375" x 6" Zinc-plated lag screws to attach wood frame to sign posts
- 5/8"-11 dia. A-36 galvanized anchor bolts, 17-1/4" long with 6" returns (MC91603A265), with hex nut, jam nut, washers top and bottom and leveling nut

Wall-Mounted Assemblies

- 3/8"-16 threaded rod (6" sections) for wall-mounted anchorage
- 3/8" 16 hex heavy 18-8 stainless steel Thin (Jam) Nuts for wall mount anchorage (MC 91851A630)
- 13/32" x 1-1/4"od, 18-8 stainless steel large OD flat washers for wall mount anchorage (MC 90313A114)

Single Post Hanging Assembly

- 5/8"-11 X 7" eye bolt fabricated internal to sign panel for hanging (MC9489A148)
- 5/8"-11 X 10" J-bolt for capture of eye bolt to suspend sign (MC91604A320), (12"–MC91604A330)
- 5/8" flat washers to secure J-bolt on cross member (MC98970A135)
- 5/8"-11 X 9" hex head cap screw to secure bracket to 9-1/2" upright (MC91247A461)
- 5/8"-11 X 11" hex head cap screw to secure bracket to 11-1/2" upright (MC91236A827)
- 5/8"-11 hex nut to secure bracket on upright timber (MC94895A035)
- 1-1/2" X 2" X 1/2" with 5/8-11 thread inset into panel assembly (custom oversize washer)
- No. 8-3" galvanized deck screw to attach fascia panel (MC95616A209)
- 1/2"-13 X 8" hex head cap screw to secure tenon (MC91247A742)
- 1/2"-13 X 10" hex head cap screw to secure tenon (MC91247A746)
- 1/2"-13 hex nut to secure tenon (MC94895A823)
- 1/2" flatwashers to secure tenon (MC98970A133)
- 5/8"-11 X 10" 18-8 stainless steel hex head bolt to attach baseplate to upright post for 9-1/2" x 9-1/2" post (92198A826)
- 5/8"-11 X 12" 18-8 stainless steel hex head bolt to attach baseplate to upright post for 11-1/2" x 11-1/2" post (92198A830)
- 5/8"-11 dia. A-36 galvanized anchor bolts, 17-1/4" long with 6" returns (MC91603A265), with hex nut, jam nut, washers top and bottom and leveling nut

Aluminum

- 1/4" x 3" x variable length 6061-T6 Aluminum plate for wall mount attachment plate

Stone

- Random coursed ashlar stone
- Uncoursed field stone
- Granite block sections of standard grade Sierra White Granite, free of cracks, seams, or starts which may impair structural integrity or function

Adhesive

- Phenolic resorcinol moisture resistant adhesive for fabrication of panels and posts
- HILTI-HVA catalytic anchor system for attaching anchor bolts to stone or concrete surfaces
- HILTI-HIT HY20 System Adhesive Anchors for attaching anchor bolts to brick surfaces

Paints/Finishes

- *Primer:* Wood Primer: Benjamin Moore, Exterior Fast Drying Exterior alkyd primer, No. 09400 or equal
- *Finish enamel for letter fill:* Benjamin Moore, Impervex latex exterior enamel No. 309-2B, or equal, Color: Off-white (2B-2143-50 Old Prairie) with double coat of primer
- *Solid color stain for sign panel overbar:* Solid color stain: Benjamin Moore Acrylic

Latex Solid Stain (No. 089-4B), Color: River Rock-2139-10)

- *Solid color stain for sign panel, cap and ends of monolith:* Benjamin Moore Acrylic Latex Solid Stain (No. 089-4B), Color: Grey-Brown-5/E 1000
- *Solid color stain for sign uprights, and sign post for single post assembly:* Solid color stain: Benjamin Moore Acrylic Latex Solid Stain (No. 089-4B), Color: Dark Brown-2130-10)
- *Enamel (alternate) for sign panel overbar*: Benjamin Moore Acrylic Moorglo Enamel (No. 096-4B), Color: River Rock-2139-10)
- *Enamel (alternate) for sign panel, cap and ends of monolith*: Benjamin Moore Acrylic Moorglo Enamel (No.096-4B), Color: Grey-Brown-5/E 1000
- *Enamel (alternate) for sign uprights, and sign post for single post assembly:* Solid color stain: Benjamin Moore Acrylic Moorglo Enamel (No.096-4B), Color: Dark Brown-2130-10

Porcelain Enamel

- 16 gauge enameling steel panel(ASTM-424) Type I with sealed bead edge porcelain enamel with 2-color, laser cut NPS Arrowhead Logo with 1/8"ø x 1-1/4" mounting studs on back of panel

Coatings Hardware

- Standard bituminous roofing cement for embedded posts

Concrete

- 3000 lbs./28 days
- All cast-in-place concrete work shall follow National Park Service specifications for material and construction procedures, Section 03300
- All mortar and masonry grout work shall follow National Park Service specifications for material and construction procedures, Section 04100

Polyethylene

- 8 mil sheet for base of footings

Marine Grade Polymer Sheet

- 1" thick, King StarBoard marine grade polymer sheet, color: seafoam, for backing of porcelain enamel arrowheads mounted to masonry structures

2.0 INTRODUCTION: SIGN SIZE, BASE AND FOOTING REFERENCE CHARTS

Each assembly size has been custom-engineered based on the size of the sign, the format of the legend, the length of the longest legend line, the height of the panel based on the specified grid format, and the height of the structure above grade. Many variables including the length of the steel posts, size and thickness of the baseplate, the section size of the rail, and diameter, length of the anchor bolts, and size of the footing are unique to each configuration.

Dimension charts are provided for double post signs and signs with monolithic bases. These spreadsheets are displayed based on the size of the primary legend, and include 4", 6", 9", and 12". The larger 9" assemblies limit some layouts including three-line primary legends, and signs with 12" primary legends are limited to two lines for Park Identification (PI-1G and PI-2G only. The fabrication of all primary sign components and footings and bases shall be based on the sizes specified in these charts.

The charts are provided at the end of each respective part of the fabrication drawings.

2.1 FABRICATION: TUBULAR STEEL UPRIGHTS AND RAILS

Uprights and Rails for Double Post and Monolithic Structures

Double Post : All signs have internal steel upright posts with welded baseplates. Post and rail size is different depending on size of sign. Assemblies with wood rails include a steel angle welded to the inboard face of a 3-1/2" x 3-1/2" x 3/16" tubular A500B steel post for rail attachment. Assemblies with steel rails are are drilled for bolt attachment of rail and are fabricated from 6" x 4" x 1/4", 8" x 6" x 1/4", 8" x 6" x 5/16"tubular A500B steel posts with size of post based on height and size of sign panel. Both types of uprights are drilled to accommodate the bolt attachment of blocking and face panels to steel post. All baseplates and rolled sections (angles and plate) to be A-36 steel.

Steel rails are tubular sections with inserted welded steel plates that are drilled and tapped for attachment to steel uprights.

Monoliths: All monoliths utilize 6" x 4" x 1/4"tubular sections for uprights with welded baseplate. A clip angle is welded at the top of the post for attachment of post alignment board. The length of the upright is based on height of sign panel. Larger assemblies will require as many as six uprights.

General Requirements

Tolerances: The length and dimension of parts, size of end plates, and drilling tolerance for hole location on both axis to be no more than +/− 1/16". Parts are measured from center of

the holes to the edge of the plate.
Weld Specifications: Baseplate and angle attachment, and rail attachment plate assemblies to be fabricated with full penetration weld using welding rod compatible with the baseplate and tube assembly. Finished weld to be cleaned to remove all welding slag and weld splatter.

Metal Finishing: All posts to be cut square. Finish to be free of edge burrs. Fabricated posts to be degreased and sandblasted with copper slag abrasive to create an even finish throughout.

Galvanized Finish: All fabricated steel upright posts and fabricated steel rails shall be hot-dip galvanized after fabrication.

Steel Post Fabrication for Double Post Signs with Wood Rail
Length: Length of interior tubular steel upright is determined by the height of the sign panel based on the size of the primary legend, 4", and 6". Refer to “Steel Post Height" in the Double Post Assembly Dimension Chart.

Fabrication: All assemblies with wood rail are fabricated with 3-1/2" x 3-1/2" x 3/16" tubular steel uprights.

Rail Attachment Angle: Fabricate 3-1/2" x 5" x 5/16"steel angle with four (4) 7/16" holes placed 1" from the edge of the 5" leg and 1-1/2" and 4-1/4" from the top and bottom of angle for attachment of wood rail (top and bottom). Countersink the hole on the outside face to receive 3/8" flathead bolt. For length of angle based on height of sign, refer to “Steel Angle Bracket" in the Double Post Assembly Dimension Chart. Weld angle to inboard side of post with top of angle flush to top of steel post, with angle mounted in same orientation on both uprights as shown in drawings. When assembled, each angle will face inboard but on opposite sides.

Blocking Attachment Holes: Four (4) 7/16" holes through both sides of fabricated post with angle attached as shown for attachment of outboard treated Douglas Fir blocking and inboard Western Red Cedar post cover.

Baseplate: 5/8" holes in each corner of 7" x 7" x 1/2" baseplate as shown in the fabrication drawing, and 5/8" weep hole placed in the center of the baseplate. Baseplate welded to tubular steel post as specified. See drawing 4.3-51-53

Steel Post Fabrication for Double Post Signs with Steel Rail
Length: Length of interior tubular steel upright is determined by the height of the sign panel based on the size of the primary legend, 6", 9" and 12". Refer to “Steel Post Height" in the Double Post Assembly Dimension Chart.

Fabrication: Assemblies with steel rail are fabricated with 6" x 4" x 1/4", 8" x 6" x 1/4", and 8" x 6" x 5/16" tubular steel uprights. Size of post is based on size of sign panel and is specified under legend length reference in Double Post Assembly Dimension Chart.

Blocking Attachment Holes: Four (4) 7/16" holes through both sides of upright as shown for attachment of outboard treated Douglas Fir blocking, inboard treated Douglas Fir blocking (two part assembly), and inboard Western Red Cedar post cover.

Rail Attachment Holes: 2 sets of 2 (4 total) 1" dia. holes on outboard side of upright, with 1/2" corresponding holes on inboard side of post as shown for attachment of rail from inside post. Staggered hole location must match orientation and alignment of receiving plate in end of steel rail precisely.

Baseplate: Specified anchor bolt holes in each corner as specified below and shown on drawings, with added weep hole in the center of the baseplate. Baseplate welded to tubular steel post as specified in drawings.

Post	Baseplate	Anchor Bolts	Baseplate Hole Size
6" x 4" x 1/4"	9" x 11" x 5/8"	5/8"	3/4"
8" x 6" x 1/4"	14" x 12" x 3/4"	3/4"	7/8"
8" x 6" x 5/16"	14" x 12" x 3/4"	3/4"	7/8"

Steel Rail Fabrication

Length: Length of interior tubular steel rail is determined by the width of sign. Based on the size of the primary legend, 4", 6", 9" and 12", refer to “Rail Length Steel" in the Double Post Assembly Dimension Chart.

Threaded Plug End Plate: Machined 1/2" x 5" x 5-5/8" end plates size is common for both 6’ x 6" and 6’ x 8" rails. Drill and tap two holes for 3/8"-16 bolts as dimensioned on the drawings. Alignment holes must match corresponding holes on upright precisely. Size of end plate and drilling tolerance for hole location on both axis is (+/–) 5/1000 measured from center of the holes to the edge of the plate. Place 45 degree x 3/16" bevel (top and bottom) on 5" wide dimension for weld fill. Center end plate in tube and weld end plate into end of tubular rail section with faced of end plate flush to end of tube. Weld top and bottom and grind smooth.

Hex Bolt Attachment Holes: 7/16" holes through face of rail for attachment of stainless 3/16"-16 threaded rod (7.25" for 6" and 9.25" for 8" deep rails) for custom machined hex head capture nut for panel attachment. Outboard holes are placed 7-1/2" from ends of rail. An additional hole is centered between the two outboard mounting holes if the sign panel is greater than 78", but not longer than 144". Holes are placed 4-1/2" from top of rail. Rails to carry panels longer than 144" to 240" will have two equally spaced (center to center) mounting holes between the outboard holes.

Interior Blocking Attachment Holes: 25/64" holes in top of rail (top rail only) to receive Atlas Engineering, Bulletin AEK Spintite Rib-Wall Minimized-Profile Rivit. Location of holes to correspond precisely to factory drilled treated Douglas Fir interior blocking cap on rail. Cap alignment bolt assembly to be spaced staggered with maximum 36" (+/– 3" on center) with two attachment points on each end. End holes are located 6" from end of rail. All holes are placed 1-1/4" inboard from side of rail.

Steel Post Fabrication for Monolithic Sign

Length: All monolithic assemblies use same size 4" x 6" x 1/4" tubular steel section. Length of interior upright is determined by the height of the sign panel, based on the size of the primary legend, 4", 6", 9" and 12". Refer to "Steel Post Height" in the Monolith Assembly Dimension Chart.

Post Alignment Bracket Holes: 6" long, 2" x 2" x 1/4" steel angle bracket with two (2) 5/16" holes placed 1" from the edge, and 1" from end of one face for attachment of 2" x 6" wood alignment cap blocking board. Weld angle to 6" face of tubular steel upright with drilled face placed flush to top. When assembled, each angle will face inboard, but on opposite sides. Center post to be oriented to receive factory-drilled alignment cap.

Outside Blocking Attachment Holes: 25/64" dia. holes in outboard wall of steel upright to receive Atlas Engineering, Bulletin AEK Spintite Rib-Wall Minimized-Profile Rivit. Holes are placed in pairs, 1-1/2" from each side of tubular steel upright, and 3" from top and bottom of post. Intermediate holes are place d in pairs at a maximum 24" on center. Location of holes to correspond precisely to factory-drilled, pressure-treated 1-1/2" x 5" Douglas Fir outside blocking.

Hex Bolt Attachment Holes: 7/16" holes through face of tubular steel upright for attachment of stainless 3/16"-16 x 7.25" threaded rod and custom machined hex head capture nut. Upper attachment hole is placed 3" from top of upright, centered in 4" wide face. Lower attachment point is placed precisely 12" less than the specified height of the sign panel.

Baseplate: 3/4" hole in each corner of 8-1/2" x 9" x 3/16" baseplate as shown in the fabrication drawing, and3/4" weep hole placed in the center of the baseplate. Weld baseplate as specified in drawing.

2.2 FABRICATION: WOOD SIGN PANELS

*Wood Sign Panel Scope***:** This includes 1-1/2" panels for double post signs, monolithic signs, and wall mounted signs. Hanging signs are 3" thick and are fabricated from two 1-1/2" panels.

Size of Panel: Size of each Identification Sign panel is based on sign format as determined using Park Identification and Facility Identification sign grids specified in Chapter 2: Graphic Standards, page 2.1-72 to 2.1-85.

Adhesive for Panels and Posts: Application of phenolic resorcinol moisture resistant adhesive must be performed within 15 minutes between the first glue application and the final setting of the clamps. The surface of each joint face shall be completely covered with adhesive. Glued panels to cure for a minimum of 24 hours with clamps in place.

Air Temperature for Laminating Wood: Temperature shall be between 70–90 degrees Fahrenheit during drying of boards, glue application, and curing process. Boards to be stacked on drying racks and dried not less than 24 hours prior to gluing.

Panels: Construct using clear heart, kiln–dried vertical grain wood throughout, one board thick (1.5" finished) using 2" dimensional lumber (2" x 6", 2" x 8", and 2" x 10"). Panel size will be based on sign layout per specified grid formats.

Panel Assembly: Surfaces shall be edge-glued and planed smooth to 1-1/2" thick finish dimension. The end grain of laminated panel ends shall be face-glued with a 2" x 1-1/2" end strip, reinforced with 3", No.12 stainless steel Phillips flathead screws placed 8" center to center. Recess head 3/8" and fill with glued–in wood plugs. Following cutting and edging, all face and back edges shall be rounded to a radius of 1/8".

Graphics: For graphic application and finishing of sign panels see Graphic Layout and Production section of this specification.

Double Post, Monolithic and Wall-Mounted Signs

Panel Attachment for Double Post, Monolith and Wall-Mounted Panel: Hardware shall be a machined 2" x 4" x 3/16" stainless steel keyhole receiving plate, to be attached to panel with four (4) No.10 x 1-1/4" stainless steel, flathead wood screws. Keyholes are precisely aligned to a corresponding oversize stainless steel hex bolt assembly mounted on the sign rail that is bolted through the frame or to an attachment plate on wall-mounted signs.

Each keyhole assembly is dadoed 3/16" deep into the back of the sign panel to be flush to the back of the sign. The keyhole plate is centered top and bottom, left and right to the center of the keyhole mounting bolt for each location.

To insert the head of the machined hex head mounting bolt behind the keyhole mounting plate, route 1-3/4" x 2-1/2" by 5/8" deep pocket behind the mounting plate. Top of dado to be 3/8" above center of bolt holding oversize hex bolt assembly.

Keyhole Plate Location: The number of keyhole plates for connection to the sign structure is based on the width of the panel. Exception includes F/PI-G monolithic panels with 12" legends; refer to the table below for number of keyhole plates required by width of panel.

Panel Length	*Quantity of Keyhole Attachments*
48" to 78"	2 top and 2 bottom (4 total)
78" to 144"	3 top and 3 bottom (6 total)
144" to 240"	4 top and 4 bottom (8 total)
144" to 180"	5 top and 5 bottom (10 total)
180" to 240"	6 top and 6 bottom (12 total)

The quantity of keyholes per assembly is not consistent for 6", 9" and 12" legend panels of the same length. Refer to respective charts on pages 4.3-75 to 4.3-78 for specifications. Note that the 5 and 6 post assemblies are use only with the 12" legends.

Each keyhole receiving plate is to be positioned vertically and horizontally off of the center point of the machined hex capture nut that is mounted on the sign rail, monolith upright or attachment plate. The upper bolt locations are six inches below the top of the sign panel (+/– 1/16") on a horizontal, and five inches inboard from right and left sides. Additional keyhole plates as specified above will be centered equally between the center point of the two outside keyhole plates as measured from the center of the attachment bolt. The placement location of the lower row of keyhole plates is based on the height of the sign panel, and are placed precisely 12" less that the overall height of the panel as measured from the upper mounting location. For example, if the sign panel is 55.6", the bottom row of keyhole places will be placed 43.6" below the upper row.

Hanging Signs

Hanging Panels: Hanging panels to be fabricated from two 1-1/2" panels glue attached back-to-back with phenolic resorcinol moisture resistant adhesive. Panels to be fabricated as described above. Prior to assembly, place two matching vertical 3/8"(d) x 3/4"(w) dadoed slots, one on each side of the panel for receipt of the 5/8" diameter eyebolt. Cut additional slot on both sides in location noted on drawing for insertion of oversized rectangular washer, but prepared so washer will fit tightly and not rotate when eye bolt is tightened. Oversized washers to be laminated into panel assembly on left and right side.

2.3 FABRICATION: WOOD COMPONENTS

Double Post Sign with Wood Rail

Wood Rail

Fabricate with No.1 select construction grade pressure-treated Douglas Fir, nominal 2" x 8" material for rail and 1/2" pressure-treated plywood for interior blocking. Length of rail assemblies to be 4-1/2" longer than finished panel width. Rails to be assembled from two continuous boards that are straight and without lateral twisting. Assemble joists with 7-1/4" x 12" x 1/2" thick plywood blocking on each end and 7-1/4" x 6" x 1/2" plywood blocking at each keyhole location. Place aluminum shim material at each blocking location as needed to create a 3-1/2" thick ±1/32" rail assembly.

Drilling and Milling: Wood rail assemblies to be shop-drilled and milled for mounting holes, attachment to steel angle, and attachment of panel mounting hardware:

- Holes for rail attachment to steel angle: Drill two 7/16"dia. holes (top and bottom) through each end of rails, blocking and shim material. Holes to be 3-11/16" from end, and 1-1/2" from top and bottom of board. Counterbore, on opposing sides, 1-1/8"dia. x 1/2" deep holes on side without dado. Align holes and dado to corresponding location on welded angle post assembly (top of angle and joist assembly to be flush).
- Dado for rail attachment to steel angle: Place 5" wide x 5/16" deep dado for full height of the 2" x 8" (2 per rail assembly). Make 3/4" x 45° x full height of the (2" x 8") on same side as dado to clear inside corner of steel angle when attaching rail.
- Holes for keyhole hardware: 7/16"dia. through hole with 1-1/2"dia. x 3/16" deep counterbore on each end. Locate hole 7-1/8" from end of rail and 4-1/2" below top of rail for top assembly and 2-3/4" below top of rail for bottom rail. Place middle hole equally centered between outboard holes for all assemblies with panels over 78".
- Drill 3/32" pilot holes in top of rail to match hole location of finished 1-1/2" finished cedar cap
- Factory assemble rail with 3/8" dia. bolt and hex head mounting hardware with intermediate 1/2" plywood blocking installed.

Drilling tolerance is (+/–) 1/16" with lengths measured top to bottom being within 1/16" overall.

Wood Blocking and Finished Post Covers and Caps

Wood Cap for Wood Rail: 1-1/2" x 3-1/2" cap with length equal to width of sign panel. Material to be Western Red Cedar (or clear heart redwood). Pre-drill 3/16" attachment holes that are aligned with wood rail and placed 3/4" inboard from side and 5" from end with one screw placed on each side at approximately 24" on center. Use 3" galvanized deck screws, sand smooth and stain prior to attachment.

Finished Inboard Cedar Post Cover: Fabricate 1-1/2" x 3-1/2" panel with two 7/16" holes with 1" x 1/2" counterbore to accept washer and nut assembly. Material to be Western Red Cedar (or clear heart redwood). Holes must be in alignment with the companion holes in the steel upright used to secure the outboard blocking and this piece. Height of the inboard post cover is based on the height of the base of the sign panel above grade level. Refer to "Lower Inboard Block" in the Double Post Assembly Dimension Chart by size of legend (4", and 6" assemblies with wood rail).

Outboard Blocking for Steel Post Cover: Fabricate 1-1/2" x 3-1/2" blocking with four (4) 7/16" holes with 1" x 1/2" counterbore to accept washer and nut assembly. Material to be pressure-treated Douglas Fir. Holes must be in alignment with the companion holes in the steel upright used to secure the inboard cedar post cover and interior rail blocking. Height of the outboard blocking for steel post cover is based on the height of the overall sign. Refer to

"Outboard Post Block" in the Double Post Assembly Dimension Chart by size of legend (4" and 6" assemblies with wood rail).

Double Post Sign with Steel Rail

Finished Wood Cap for Steel Rail: 1-1/2" cap with length equal to width of sign panel. Width will be either 6" or 8" depending on size of tubular steel rail. Material to be Western Red Cedar (or clear heart redwood). Drill 1/2"diameter through holes with 1–1/8"diameter x 1/2" deep counterbore, two at each end and staggered every 16" on center (1–1/2" from edge of cap). Match holes in steel rail to connect with threaded inserts using 1" stainless steel (oversized OD) flat washer, beveled washer and 1/4"–20 machine screw. Sand smooth and stain prior to attachment.

Inboard Post Blocking for Steel Rail Assembly (2 Part Assembly) Two 1-1/2" thick blocks with two 7/16" holes to create 3" thick assembly. Width of block abutting steel tube will be either 6-1/2" or 8-1/2" depending on size of tubular steel rail. Width of second block will be either 6" or 8" depending on size of tubular steel rail and is drilled with 1" x 1/2" counterbore to accept washer and nut assembly. Material to be pressure-treated Douglas Fir. Holes must align with the companion holes in the steel upright used to secure the outboard post blocking. Height of the inboard blocking is based on the height of the sign panel. Refer to "Upper Inboard Block" in the Double Post Assembly Dimension Chart by size of legend (6", 9" and 12").

Outboard Blocking for Steel Post Cover: 1-1/2" blocking with four (4) 7/16" holes with 1" x 1/2" counterbore to accept washer and nut assembly. Material to be pressure-treated Douglas Fir. Width will be either 6-1/2" or 8-1/2" depending on size of tubular steel rail. Holes must align with the companion holes in the steel upright used to secure the inboard cedar post cover and interior rail blocking. Height of the outboard blocking for steel post cover is based on the height of the overall sign. Refer to "Outboard Post Block" in the Double Post Assembly Dimension Chart by size of legend (6", 9" and 12").

Finished Inboard Cedar Post Cover: 1-1/2" panel with two (2) 7/16" holes with 1" x 1/2" counterbore to accept washer and nut assembly. Use 6-1/2" wide material on structures with 4" x 6" posts and 8-1/2" wide board for 6" x 8" steel posts. Material to be Western Red Cedar (or clear heart redwood). Holes must be in alignment with the companion holes in the steel upright used to secure the outboard blocking and this cover. Height of the inboard post cover is based on the height of the base of the sign panel above grade level. Refer to "Lower Inboard Block" in the Double Post Assembly Dimension Chart by size of legend (4", 6", 9" and 12").

All Double Post Assemblies

Fabricated Wood Post Cover and Cap: Finished glue-laminated post cover and cap is fabricated from Western Red Cedar (or clear heart redwood), 1-1/2" thick boards. Finished post face width and end width dimensions are based on legend size and structure size as specified in the chart below.

Predrill 3/16" attachment holes in cover boards. Prefinish all surfaces except edges and backs to be glued in final assembly. Do not stain top end grain of post or underside of cap for gluing.

To assemble, screw wood post cover to interior blocking mounted to steel upright. Box section corners and cap to be glue-attached in the field with phenolic resorcinol adhesive and screws to create a closed box as shown in fabrication drawings. Embed screw head a minimum 1/4" below face of lumber when assembling. Butt lap joints to be flush (+/– 1/16") top to bottom. Fill screw head locations smooth to face with two-part epoxy filler (Minwax or equal). Touch up stain after assembly in the field.

Legend Size	Post Size	Rail Width	Finished Face Width	Finished End Width	Top Cap Dimensions
4"	3-1/2" x 3-1/2"	3-1/2"	8"	6-3/4"	8" x 6-3/4"
6"	3-1/2" x 3-1/2"	3-1/2"	12"	6-3/4"	12" x 6-3/4"
6"	4" x 6"	6" (6" x 6")	11.25"	9-1/2"	11.25" x 9-1/2"
9"	4" x 6"	6" (6" x 6")	18"	9-1/2"	18" x 9-1/2"
9"	6" x 8"	8" (6" x 6")	18"	11-1/2"	18" x 11-1/2"
12"	4" x 6"	6" (6" x 6")	24"	9-1/2"	24" x 9-1/2"
12"	6" x 8"	8" (6" x 6")	24"	11-1/2"	24" x 11-1/2"

Monolithic Assemblies

Steel Post Alignment Board: 1-1/2" x 6" pressure-treated Douglas Fir board. Length is 3" less than overall width of sign panel. Factory place one pair of 5/16" holes in each end with holes 6" from end and 1" inboard from side of board. Place additional holes in board for structures with one or more center posts. Note: location of center post holes will be 3" off center to center point because angle bracket is offset on side of post.

Outboard Blocking for Steel Post Cover: 1-1/2" x 5-1/2" blocking with four (4) 7/16" holes with 1" x 1/2" counterbore to accept washer and nut assembly. Material to be pressure-treated Douglas Fir. Holes must align with the companion holes in the steel upright. Height of the outboard blocking for steel post cover is 3" less than height of the overall sign. Refer to "Outboard Frame Blocking" in the Monolithic Assembly Dimension Chart by size of legend (4", 6", 9" and 12").

Finished Cedar Top Cap: 1-1/2" x 6" cap with length equal to width of sign panel. Material to be Western Red Cedar (or clear heart redwood). Attach with 2-1/4" galvanized deck screws. Predrill 3/16" pilot holes with two holes placed 4" from end and 1" inboard from side. Additional attachments are placed in pairs, 24" on center (+/– 4") along top of cap. Embed head of deck screw 1/4" and fill with two-part epoxy wood filler, and touch up stain to finish.

Outboard Cedar Finished End Panels: 1-1/2" x 6" panels. Material to be Western Red Cedar

(or clear heart redwood). Height of the outboard blocking for steel post cover is 1-1/2" less than height of the overall sign. Refer to “Outboard Post Cover" in the Monolithic Assembly Dimension Chart by size of legend (4", 6", 9" and 12"). Attach with 2-1/4" galvanized deck screws. Predrill 3/16" pilot holes with two holes placed 4" from top and bottom and 1" inboard from side. Additional attachments are placed in pairs, 24" on center (+/– 4") along side of monolith. Embed head of deck screw 1/4" and fill with two-part epoxy wood filler, and touch up stain to finish.

Attachment of Hex Bolt in Rail

Affirm that keyhole plates correspond to bolts in frame. Panel keyholes capture an oversize stainless steel hex bolt assembly mounted on the sign rail or attachment plate for wall-mounted signs.

Bolt assembly to include two 1-1/8" diameter x 11/16" machined receiving nuts, one of which is welded to threaded rod. Drill specified number of 7/16" holes to receive panel mounting bolts. Bolt length will vary for double post signs: 4-1/2" for signs with wood rails (joists), 7-3/8" for signs with 6" x 6" steel rails, and 9-3/8" for signs with 8" x 6" steel rails.

2.4 SINGLE WOOD POST WITH HANGING SIGN PANEL

Hanging Signs

Overview: Two sizes of the single post assemblies with hanging sign panel are specified based on size of primary identification legend and width of panel. These include a 36" wide panel with 3" primary legend, and a larger structure with a 48" wide panel and 4" primary legend. Each structure, assembly, baseplate, and foot have been engineered based on the engineering criteria established for the UniGuide program. Nonstandard site conditions shall be engineered on a site-by-site basis.

Material: Fabricate solid (one piece) post using No. 1 Select Structural Grade Western Red Cedar. Material shall be well seasoned, free of any surface defects. Wood must be dry, with maximum moisture content not to exceed 12% during fabrication of assembly to maintain tolerances between component parts.

Alternate Material: If specified by ordering park, single wood post assembly can be fabricated from Douglas Fir No. 1, Select Structural Grade material. This structure would be painted in lieu of stain with paint of the same color as the sign leg specification. The sign panel will follow the standard specifications for Western Red Cedar or clear heart redwood.

Upright Lumber Dimensions: Finished dimension of upright post and cross member are provided in the chart below.

Legend Size	*Panel Width*	*Post Size*	*Cross Member*
3"	36"	9-1/2 x 9-1/2" x 13'-0"	7-1/2" x 7-1/2" x 5'-5"
4"	48"	11-1/2 x 11-1/2" x 15'-0"	9-1/2" x 9-1/2" x 6'-10"

Chamfer Post and Cross Member: Place 45 degree x 3/4" chamfer on post edges, top of post, edge and end of cross brace, and matching fascia boards. Taper ends at top of post, and on cross member and fascia boards, leaving 1-3/4" without chamfer as shown on drawings.

Finish: Sand finish upright and cross member assembly and factory finish as specified in this section. Insert cedar end plugs into counterbored attachment holes once assembly is complete and paint to match assembly.

- Western Red Cedar assemblies to be stained as specified.
- Douglas Fir assemblies to be painted with enamels of the same specified colors.

Post Fabrication

Length of Post: Cedar post to be precisely cut to length specified.

Drilling for Baseplate Attachment, Cross Member, Support Bracket, and Panel Bolts: Place holes through post for cross member attachment as specified on drawings. Measure drill locations from the bottom of the post. Drilling tolerance between holes is (+/−) 1/16". All holes drilled through the timber sections to have common location on both sides of finished post.

- *Attachment of Baseplate Straps:* 11/16" dia. holes in side of post for 5/8"-11 through bolts (3 each side). Measure from bottom of post for location of mounting holes. Subtract 1/4" from measurement location on baseplate to yield 1/4" space under post in mounted finished assembly (3" on face for baseplate straps will be 2-3/4" from base of post for first mounting hole on post, and opposing side will be 8-3/4" from bottom of post for first mounting hole on post).
- *Tenon Attachment:* 9/16" holes with 1-1/2" x1-1/4" counterbore for 1/2"-13 through bolt. Note: Drill 9/16" hole with finished, fabricated tenon inserted to assure correct bolt alignment in final assembly.
- *Support Bracket Attachment:* 11/16" holes for 5/8"-11 bolt to retain steel bracket at top of post, with 2" dia. x 2" deep counterhole on back face for washer and nut
- *Panel Attachment:* 11/16" holes for 5/8"-11 J-bolt to suspend sign panel and retain steel bracket on cross member.

Machine Dado for Baseplate Mounting Straps: Machine 1/2" deep dado at bottom of post on all four sides for inserting mounting straps. Top of dado to extend 2" beyond top of baseplate strap and be feathered out to front face of post to create smooth inset sleeve for inserting shims should they be required with shrinkage to post in the future. Size of dado for 9-1/2" post to be 1/2" x 3-1/2" x 36", and 1/2" x 4" x 42" for 11-1/2" post.

Cut Mortise: Machine mortise into upright post. Sidewalls and top of mortise to be true and straight. Corners to be sharp with radius no greater than 1/16". Mortise to be vertically centered on post at location specified in fabrication drawing.

- Mortise for 9-1/2" post to be 7-1/2" tall by 4-1/2" wide.
- Mortise for 11-1/2" post to be 9-1/2" tall by 6-1/2" wide.

Cross Brace Fabrication

Fabricate Tenon: Machine tenon for inserting in upright post. Size of tenon to match fabrication drawings precisely. Tenon to be 21-1/2" x long x 4-1/2" wide for 7-1/2" square cross brace and 25-1/2" long x 6-1/2" wide for 9-1/2" square cross brace.

Fascia Boards: Cut and chamfer as specified. Drill four (pilot holes in fascia board for attachment to tenon.

Steel Bracket

Form 1/2" x 4" steel bracket with 11/16" mounting holes as shown in drawings. Precise length to be determined in fabrication process. Finished bracket to be hot-dipped galvanized and painted black with one coat of metal primer and two of coats finished alkyd enamel.

Assembly Hardware

All assembly hardware are standard products and are listed with product numbers for ordering from McMaster-Carr Supply Company should they not be available locally. McMaster-Carr provides any type of delivery required for production, including next day service.

Assembly

Assembly instructions are provided in section Chapter 5, Section 5.1

2.5 STEEL BASEPLATES FOR SINGLE POST HANGING SIGN (GALVANIZED & PAINTED)

Baseplates are specified based on size of timber and mounting height of sign. These include:

- 36" wide panel for 3" primary legend for 9-1/2" x 9-1/2" x 13'-0" post, with 14" x 14" x 5/8" baseplate and 3-1/2" x 1/2" x 36" mounting straps
- 48" wide panel for 4" primary legend for 11-1/2" x 11-1/2" x 15'-0" post, with 16" x 16" x 5/8" baseplate and 4" x 1/2" x 42" mounting straps

Material 0.625" steel plate (A-36) for welded baseplates, and 0.5" x 3-1/2" and 0.5" x 4" steel flat stock (A-36) for welded straps for baseplates

Fabrication

Side Straps: Fabricate steel flat stock to specified length. Place two 11/16" dia. holes in each

piece at locations noted on drawing. Note that hole on front face is lower than the side strap to stagger the six mounting bolts on the post

Baseplate: Machine baseplates with four 3/4" dia. holes at locations specified on each respective drawing.

Welding: Weld side straps to baseplate with full penetration weld on both sides. Straps to be attached precisely as noted in drawing (+/– 10/1000). Finished straps to be aligned 90 degrees to the baseplate surface.

Finishing: Remove all sharp edges or machine burrs. Remove weld slag and machine oil. Sandblast baseplate assembly with copper slag abrasive to create even finish over all surfaces.

Galvanized Finish: All fabricated steel baseplate assemblies for hanging signs shall be hot-dip galvanized after fabrication.

Metal Preparation and Paint Coating for Steel Baseplates

Painting: Galvanized steel baseplates are to be primed and painted.

Reference: Matthews Paint Company (1800-323-6593) 8201 100th Street, Pleasant Prairie, WI 53158

VOC Alternate: Matthews MAP-VOC (low volatile organic compound acrylic polyurethane) is available for use where VOC compliance is required.

Metal Preparation: All surfaces to be coated should be free of oil, grease, soil, weld slag, weld splatter, or other contaminant. Surfaces to be dry before application of primer. Tack wipe or remove sandblast residue or dust prior to applying pretreatment and priming.

Metal Pretreatment: Apply Matthews Acid Activated PT Filler (74760/74766) to provide superior bonding of primer and finish coat to clean bare metal. Mix with specified activator and apply per manufacturer's specifications to 0.5 to 0.75 mils dry film thickness. Primer can be applied after 30 minutes, or when tack free.

Primer: Matthews Rust Inhibiting White Epoxy Primer (274908) with Matthews Activator (274909) and Reducer (285900) to be mixed with specified hardener and applied per manufacturer's specifications to 1.5 to 3 mils dry film thickness (3 to 6 mils wet film thickness).
Finish Coat: Spray apply two coats Matthews Acrylic Polyurethane (MAP) enamel, satin gloss finish (number 26A-1A) mixed with MAP Catalyst and appropriate reducers depending on temperature and humidity per manufacturer's specifications. Finish coat to be 1.5 to 2 mils dry film thickness (3 to 4 mils wet film thickness). Finish coat can be applied over Rust

Inhibiting White Epoxy Primer within 30 to 60 minutes, or when dry to the touch. If finish coat is applied over 48 hours after primer application, surface should be lightly broken with 400 grit sandpaper for proper adhesion.

Field Touch-up: Matthews Acrylic Polyurethane can be brush or roller applied. For good workability and finished surface quality use Matthews Brushing/Rolling Additive (number 47-444SP). Color tolerance for match shall be 1 unit or less CMC.

Packaging for shipping: Painted baseplates must be fully protected prior to shipping to eliminate scratches or other surface abrasion in transit.

2.6 ALUMINUM PLATE FOR WALL-MOUNTED SIGN

Quantity: Two assemblies per sign installation

Material: 1/4" x 3" Aluminum. 6061-T6 flat plate material that is free of sharp edges of or other surface imperfections

Length of Plate: Aluminum to be 2 inches shorter than overall panel width.

Fabrication: Two types of hole are to be placed in plate. These include holes for wall mounting bolts and holes for attachment of machined hex head mounting bolt.

- *Wall Mounting Bolts:* Place 7/16" holes 1-1/2" from each end of plate and place additional holes approximately 12" on center between the two outside mounting holes. Local conditions may require moving mounting bolt holes to align with appropriate attachment media.
- *Hex Bolt Mount:* Place 7/16" holes 4" from each end of plate. If panel is longer than 78", place a third panel equal distant from the two outside hex bolt mounting locations. Countersink hole on back side to receive 3/8"-16 hex head bolt. Location of mounting bolts shall correspond precisely to keyhole receiving plates in sign panel.

Assembly: Attach custom Machined Hex Head Mounting Nuts with intermediate flat washer. Factory package 3/8-16 threaded rod with jam nuts and flat washers. Do not assemble until the selected mounting holes are identified. Mount aluminum plate with at least 3 connection points, top and bottom. Hole selection will be dictated by local conditions.

2.7 PORCELAIN ENAMEL NPS ARROWHEAD LOGO

Introduction: This section contains only size and production specifications for laser cut and fabricated porcelain enamel NPS Arrowhead logos for application to routed cedar and redwood sign panels. For complete specification for porcelain enamel imaging, refer to section 3A *Graphic Imaging & Porcelain Production: Porcelain Enamel Signs* in Section 4.2 of this chapter.

Specific requirements of this application are for 16 gauge panel, plasma cut NPS Arrowhead logo shape with threaded steel mounting studs on back of panel, and with 2-color porcelain enamel finish.

Production: 16 gauge enameling steel to be cut using dry cutting from outline artwork as provided. Cut edges to be sanded and files to eliminate any burrs or sharp edges. Stud weld threaded rod to back of panel based on layout drawings provided. Base coat and base PMS-Warm Grey No. 2 color to cover face, edges, and back completely (back is not a finished side). Screen-print NPS Arrowhead graphic on panel (no bleed).

Mounting Studs: Weld threaded mounting studs (1 to 6 depending on size of Arrowhead) to back of panel based on specific location shown on layered artwork files. Studs for Arrowheads mounted to sign panels to be 1/4"-20 x 1-3/8" unless otherwise specified. Studs for Arrowheads mounted to masonry structures to be 1/4-20 x 1" unless otherwise specified.

Relief Mounting on Masonry Structures: Large-scale NPS Arrowhead logos placed on masonry structures will be mounted to 1" thick, King StarBoard marine grade polymer sheet. Color: seafoam. Polymer sheet to be cut to match silhouette of porcelain enamel Arrowhead logo. Drill attachment holes for mounting studs into polymer sheet with 1/2" dia. x 3/8" deep counterbore in back of panel to receive mounting washer and nut. Place additional 3/8" x 4" mounting bolts from front of polymer sheet for embedment into masonry surface. Refer to stud anchorage specifications for wall-mounted signs for installation of 3/8" bolts in surface.

Artwork & Size: NPS Arrowhead logo will be provided as an Adobe Illustrator file in each of the sizes noted below. Files will be identified by Arrowhead size (W x H). Each file will be digitally layered to include outline of Arrowhead logo for cutting, location of studs for mounting and artwork for screen-printed image. The finished size of each Arrowhead logo is identified in the table below by application.

C Ground-Mounted Park Identification with Arrowhead on Panel (1)

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
4"	1.7x height	5.4" x 6.8"
6"	1.7x height	8.2" x 10.2"
9"	1.7x height	12.2" x 15.3"
12"	1.7x height	16.3" x 20.4"

D Ground-Mounted Park Identification with Arrowhead on Masonry Column (1)

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
4"	3.5x height	11.2" x 14"
6"	3.5x height	16.8" x 21"
9"	3.5x height	25.2" x 31.5"
12"	3.5x height	33.6" x 42"

E Hanging Park Identification with Arrowhead on Panel (1)

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
3"	1.7x height	4.1" x 5.1"
4"	1.7x height	5.4" x 6.8"
6"	1.7x height	8.2" x 10.2"

F Hanging Park Identification with Arrowhead on Masonry Column (1)

Legend size	*Height relative to "x"*	*Arrowhead size (W x H)*
4"	4.5x height	16" x 20"
6"	4.5x height	24" x 30"

(1) Size based on legend size primary legend height ("x")

2.8 GRAPHIC LAYOUT & PRODUCTION

General Requirements

Graphic Layout: Graphic layout shall be as shown on attached drawings. Graphics to be accurately reproduced from plotted outline template or directly from computer to router based on full size digital vector art provided. Allowable reproduction tolerance is (+/–) 0.0625" for typographic reproduction of all letters less than 10 cm and (+/–) 0.125" for typographic reproduction of all letters greater than 10 cm. An accurate grid shall be used to insure layout is properly aligned vertically and horizontally on panel.

Horizontal Alignment: Letters shall be horizontally aligned to a tolerance of (+/–) 0.125" from side of panel to left edge of legend with standard adjustments for round or overhanging letters. Inter-letter spacing shall be horizontally aligned to a tolerance of (+/–) 0.0625" from letter to letter and (+/–) 0.5" overall based on the typographic specifications in this document.

Vertical Alignment: Letters shall be horizontally aligned to a tolerance of (+/–) 0.125" from top of panel to baseline of legend, or from baseline to baseline of multi-line legends. Optical adjustment for overhang of round letters will be maintained as provided in the digital files.

Grid Format: All graphics to be formatted using UniGuide Graphic Standards as specified in Chapter 2 of this manual. This includes type size, typefaces, use of NPS Arrowhead logo, kerning, margins (left and right), top alignment, and overall panel proportions.

Typography: Legends to be NPS Rawlinson Heavy with +50 kerning in Adobe Illustrator for primary park identification legend and Frutiger Bold with +50 kerning for National Park Service /U.S. Department of the Interior identifier and for secondary identification name. All legends are displayed with mixed case with initial capital letters only and lowercase for remainder of word. All sign legends are to be prepared using the typographic specifications provided in Chapter 2: UniGuide Graphic Standards.

NPS Arrowhead Logo: For panels receiving NPS Arrowhead logo, machine route 1/8" deep area into overbar section of panel. Silhouette of panel to be oversized by 1/8" for even attachment. Oversized artwork for computer-driven router will be incorporated into vector art files for sign production.

Place 3/16" dia. attachment holes for threaded studs mounted in the back of the porcelain enamel Arrowhead logo. Hole location is different for each size Arrowhead graphic size.

Rout Overbar Dado: Rout 1/4" deep dado line between the overbar and main sign panel. Width of dado to be 0.0833 of primary legend height (.25" for 3", 0.333" for 4", .5" for 6", .75" for 9", and 1" for 12" capital letter. Dado to be placed within the field of the primary legend panel, with the NPS overbar being the full height as noted in the layout grid format. Overbar dado to be finished same color as overbar.

Routing Quality: NPS Rawlinson Bold park identification is Machine-routed unless otherwise specified using a 30 degree “V" route bit with 1/8" flat sidewall inset. Routed graphics must conform exactly to the same size artwork. Routing depth to be a uniform except where such depth would distort very small forms. Corners of typography less than 3" cap height shall have a radius no greater than 0.0625". Typography of 3" and larger shall have radii no greater than 0.125". All burrs on edges will be removed by sanding with the grain of the wood.

Frutiger Bold Legends: Machine-routed unless otherwise specified using a vertical–sided flat–bottom bit. Routed graphics must conform exactly to the same size artwork. Routing depth to be a uniform 0.375", except where such depth would distort very small forms. Corners of typography less than 3" cap height shall have a radius no greater than 0.0625". Typography of 3" and larger shall have radii no greater than 0.125". All burrs on edges will be removed by sanding with the grain of the wood.

2.9 STAIN, PAINT AND FINISHING WOOD

General Requirements

Paint Room Facilities: Well-ventilated, dust-free and enclosed. Air temperature shall not be less than 65 degrees Fahrenheit during application of stain and paint.

Letter Fill: After panels are routed, apply two coats of alkyd primer to routed letters. Once thoroughly dry and clean, apply finish coat of exterior latex enamel to routed letterforms and shapes, and stain or paint panels and structures.

Panel and Structure Finishing: All surfaces to be painted must be clean and thoroughly dry. All Douglas Fir structures must be dry and free of pitch to assure full adhesion of paint.

Finished Sanding: After finish coats of letter–fill enamel have been applied and thoroughly dried, panel to be machine drum sanded, removing up to 0.0625" of the sign surface. No planing, use of hand–held belt, orbital or vibrating sander shall be permitted, and all sawdust and sanding residue shall be removed from the sign.

Finish Materials

Routed Letters Primer: Primer shall be specified ready–mixed exterior grade alkyd (oil base), Benjamin Moore or approved equal. Any substitutions shall be submitted to the National UniGuide Program Manager with color samples and a written justification for the change of material following procedures described in section 5.1 of this chapter.

Routed Letters Paint: Paint shall be Off White (2B-2143-50 Old Prairie), custom–mixed exterior grade gloss Benjamin Moore Impervex enamel (No. 309-2B), or approved equal. To prevent bleeding on the face of the panel, DO NOT use thinner to remove residual paint, but wipe with dry cloth. Remaining surface liquid shall be removed with the final sanding of the sign face.

Stain: Sign Panel, Overbar, and Post: Apply three coats with brush or roller to all exposed surfaces of sign panel and posts. DO NOT stain areas to receive paint or areas already painted. Remove excess stain by wiping with dry cloth. Stain shall be thoroughly mixed prior to and during application to ensure even pigmentation. Panels will be rack-dried a minimum of 24 hours and completely dry to the touch prior to shipping.

Stain: For exterior surfaces of sign panels and posts, use Benjamin Moore brand solid color and semi-transparent stains, or approved equal.

- *Primer:* Wood Primer: Benjamin Moore, Exterior Fast Drying Exterior alkyd primer, No. 09400 or equal.

- *Finish Enamel for Letter Fill:* Benjamin Moore, Impervex latex exterior enamel No. 309-2B, or equal, Color: Off-white (2B-2143-50 Old Prairie) with double coat of primer.
- *Sign Panel Overbar:* Solid color stain: Benjamin Moore Acrylic Latex Solid Stain (No. 089-4B), Color: River Rock-2139-10)
- *Sign Panel, Cap and Ends of Monolith:* Solid color stain: Benjamin Moore Acrylic Latex Solid Stain (No. 089-4B), Color: Grey-Brown-5/E 1000
- *Sign Uprights, and Sign Post for Single Post Assembly:* Solid color stain: Benjamin Moore Acrylic Latex Solid Stain (No. 089-4B), Color: Dark Brown-2130-10)

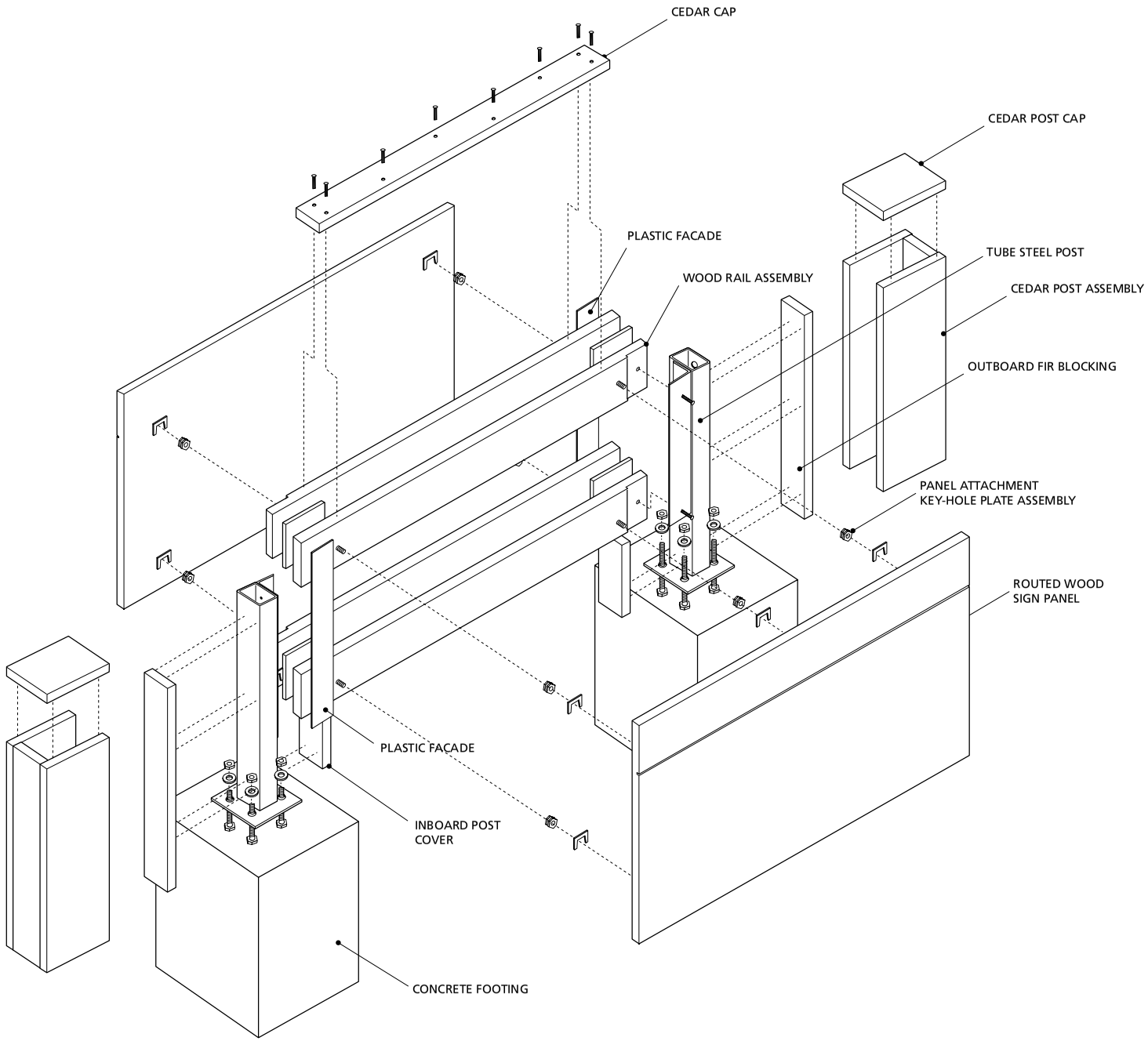
Enamel: Douglas Fir uprights and panels may be finished with exterior grade Benjamin Moore brand enamel in lieu of solid color stain. All surfaces to be primed with alkyd primer specified above and finished with the enamel paints specified below.

- *Primer:* Wood Primer: Benjamin Moore, Exterior Fast Drying Exterior alkyd primer, No. 09400 or equal.
- *Finish Enamel for Letter Fill:* Benjamin Moore, Impervex latex exterior enamel No. 309-2B, or equal, Color: Off-white (2B-2143-50 Old Prairie) with double coat of primer.
- *Sign Panel Overbar*: Benjamin Moore Acrylic Moorglo Enamel (No. 096-4B), Color: River Rock-2139-10)
- *Sign Panel, Cap and Ends of Monolith*: Benjamin Moore Acrylic Moorglo Enamel (No.096-4B), Color: Grey-Brown-5/E 1000
- *Sign Uprights and Sign Post for Single Post Assembly:* Solid color stain: Benjamin Moore Acrylic Moorglo Enamel (No.096-4B), Color: Dark Brown-2130-10

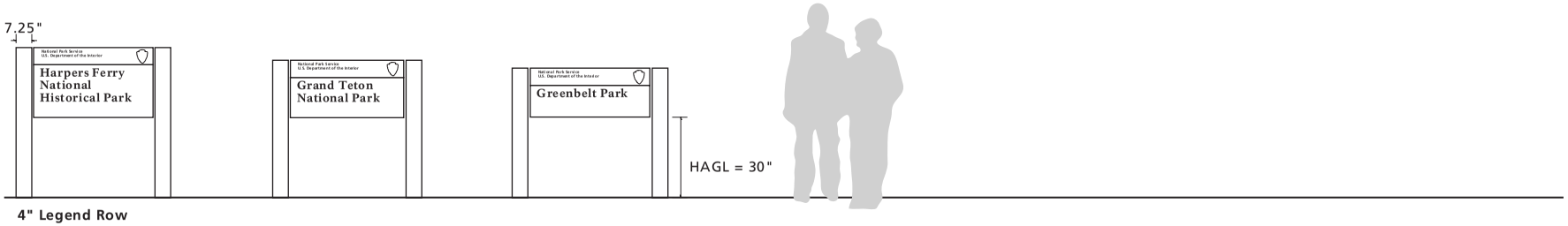
2.10 ASSEMBLY

Preassembly

All complete sign panel and post assemblies must be predrilled and assembled in the factory prior to shipment to check alignment of all parts and attachment holes and to insure proper fit once installed, if level. Panels manufactured as separate units shall be predrilled with hardware inserted in place. For field assembly and installation instructions, refer to NPS UniGuide Field Manual, Chapter 5.1, UniGuide Assembly and Installation.


CEDAR CAP
CEDAR POST CAP
PLASTIC FACADE
WOOD RAIL ASSEMBLY
TUBE STEEL POST
CEDAR POST ASSEMBLY
OUTBOARD FIR BLOCKING
PANEL ATTACHMENT
KEY-HOLE PLATE ASSEMBLY
ROUTED WOOD
SIGN PANEL
PLASTIC FACADE
INBOARD POST
COVER
CONCRETE FOOTING

Double Post (Park ID)



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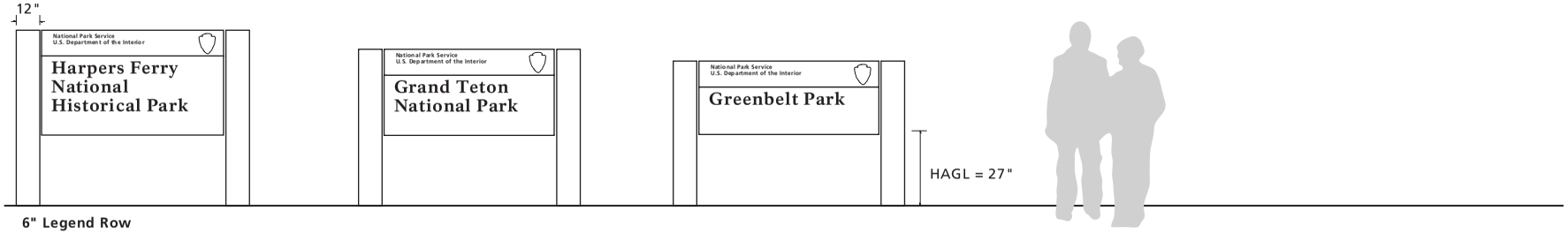

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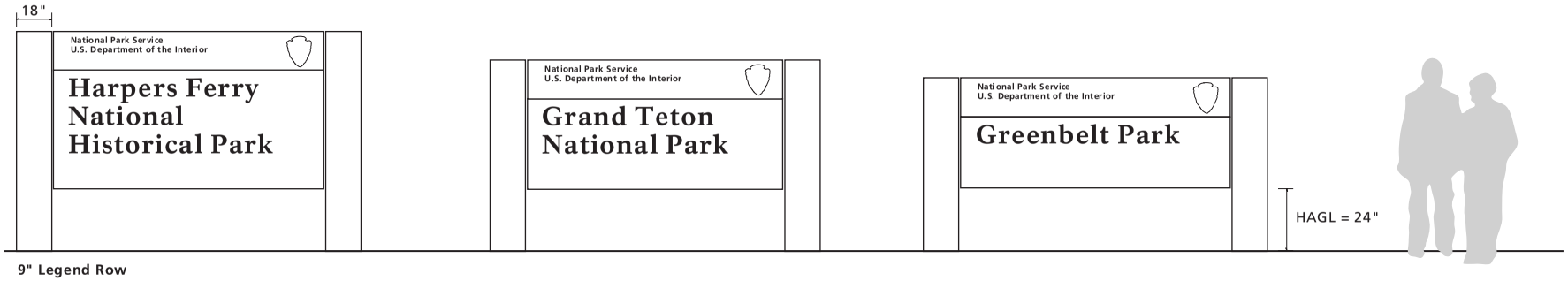

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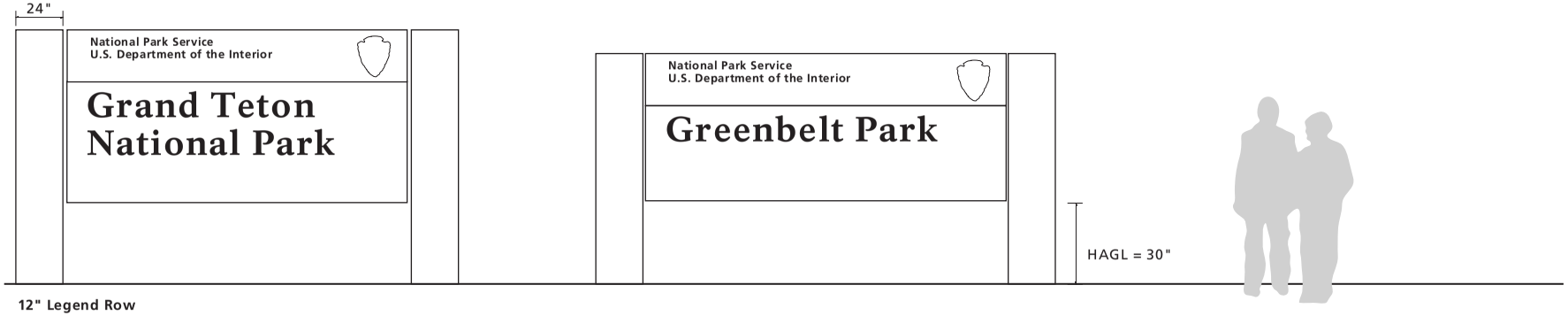
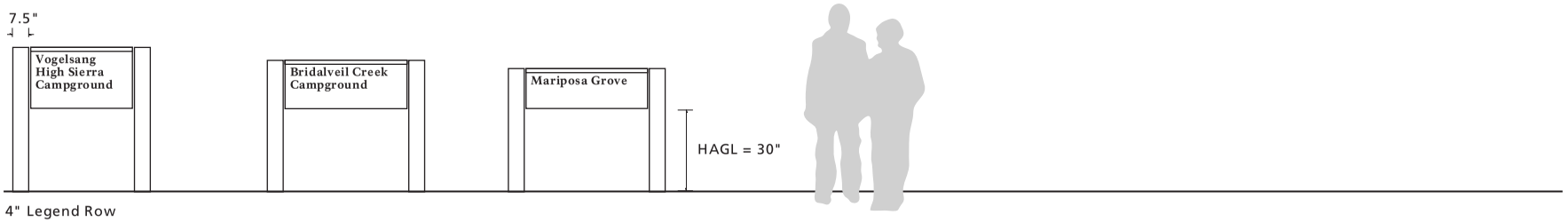
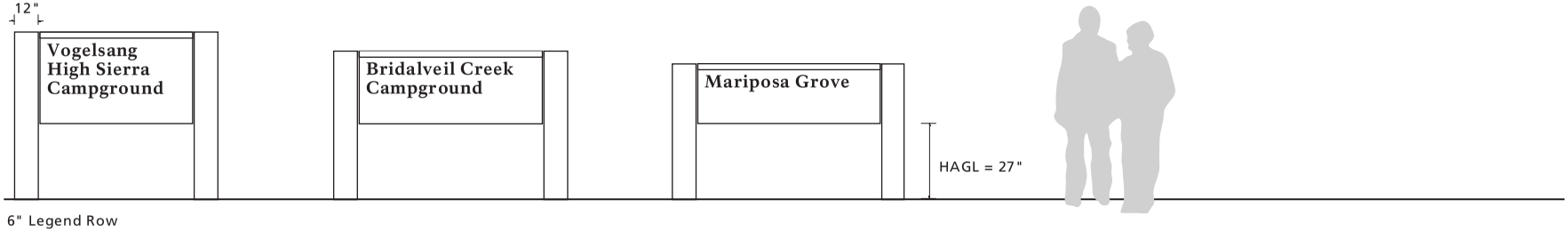


12" Legend Row

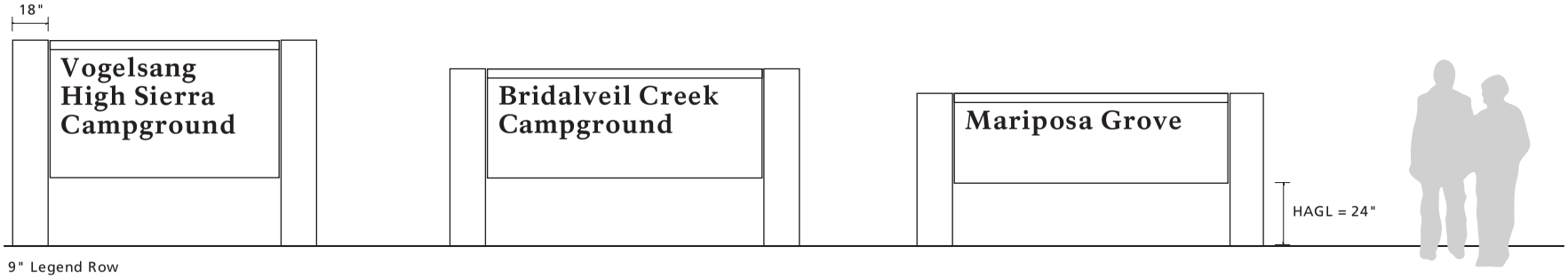
Double Post (Facility ID)



4" Legend Row

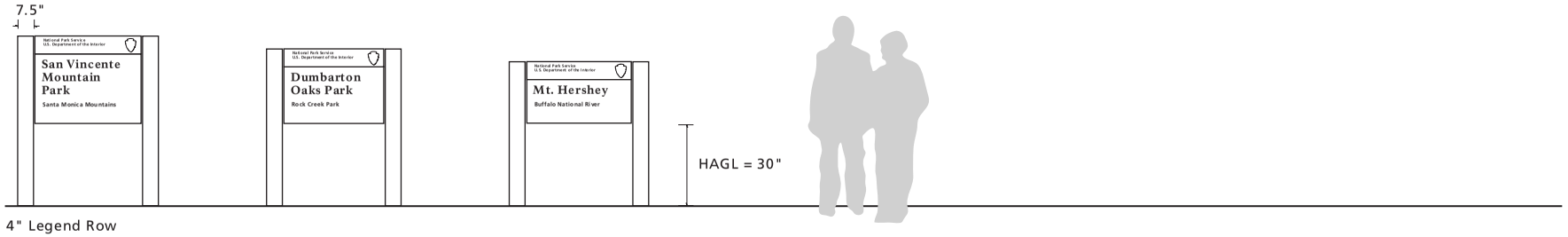


6" Legend Row

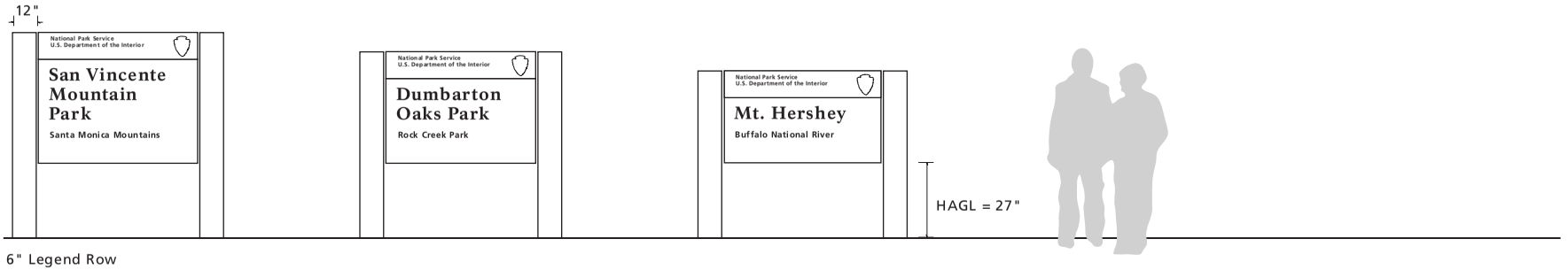


9" Legend Row

Double Post (Facility with Park Identification)



4" Legend Row



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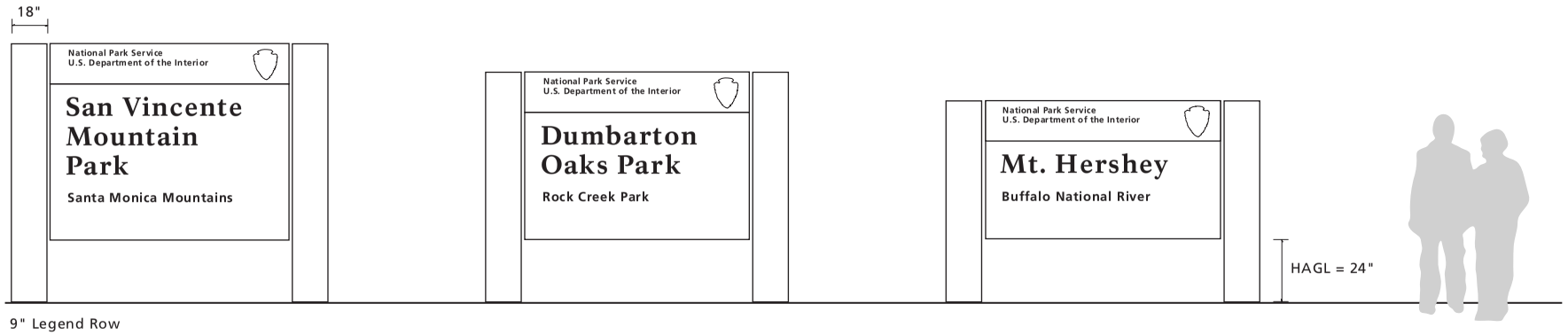
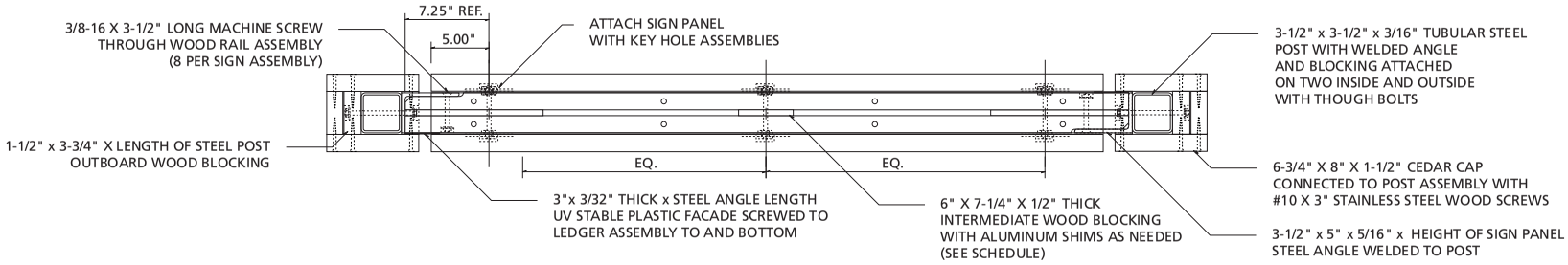
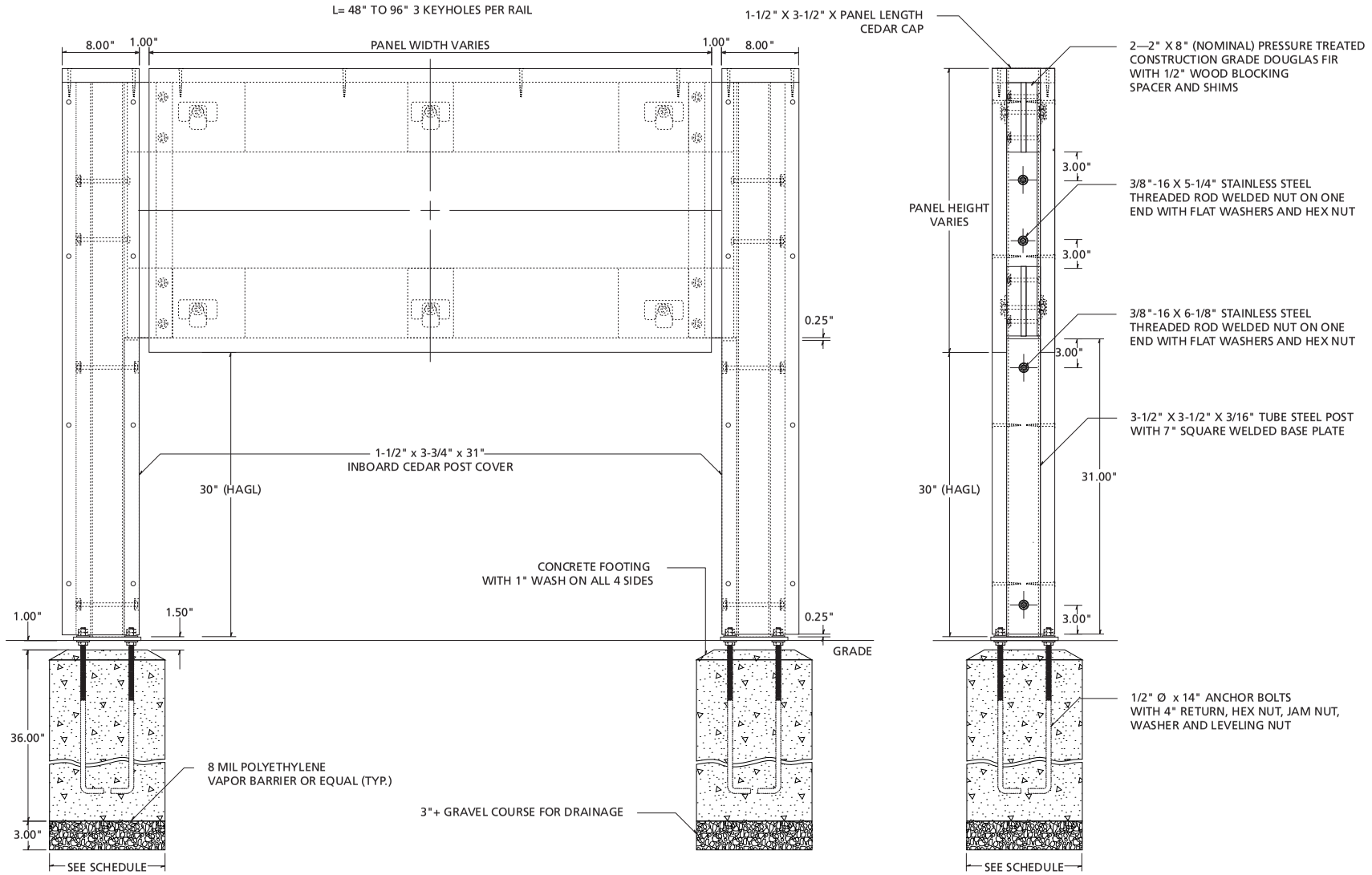
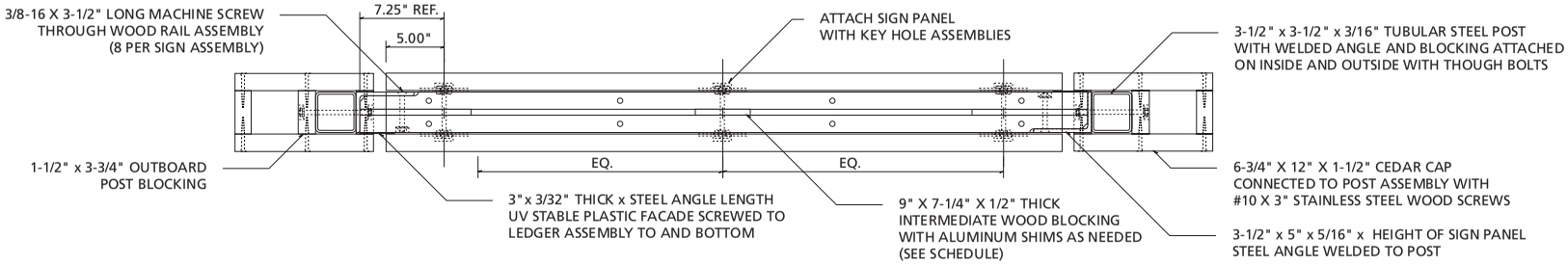


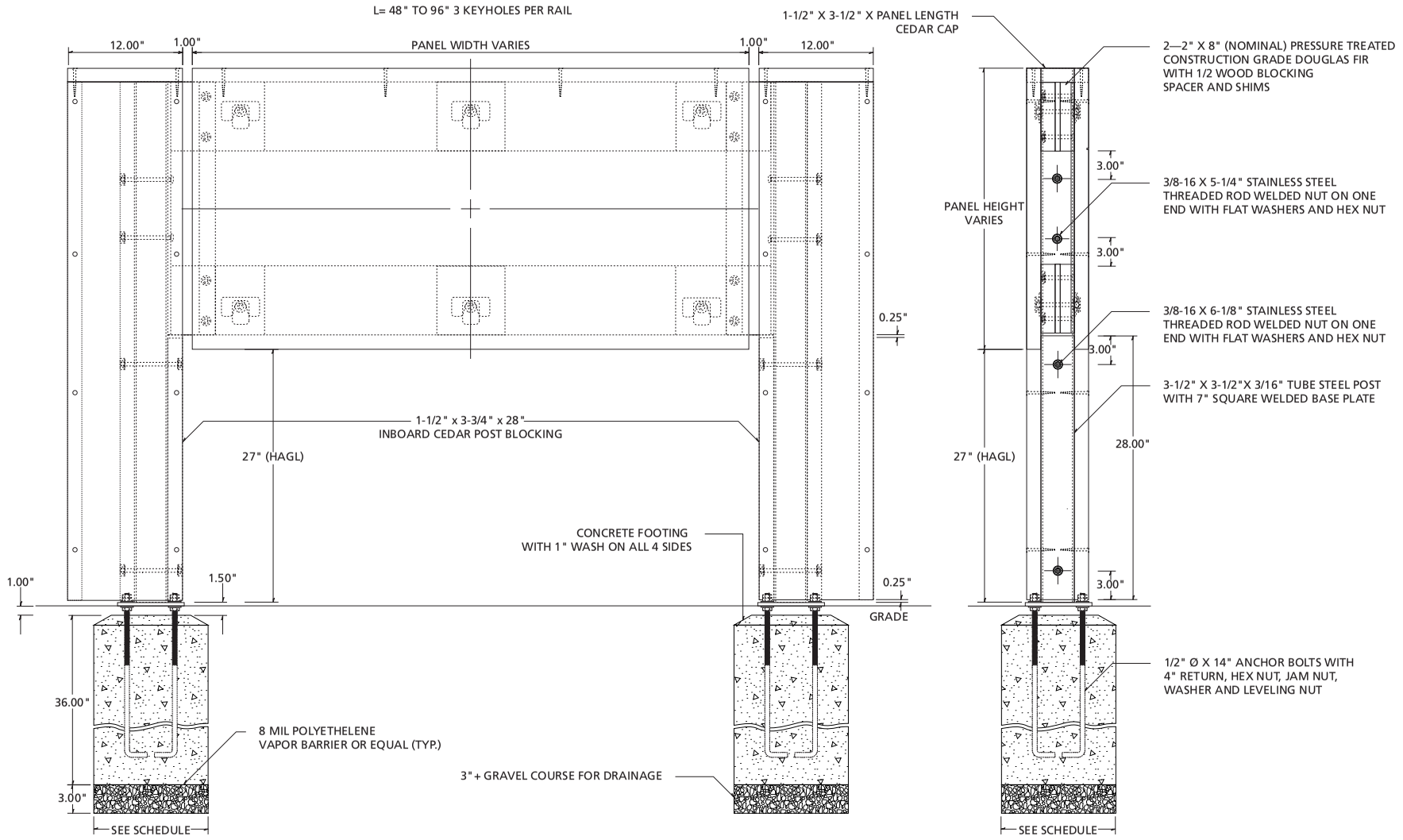
9" Legend Row

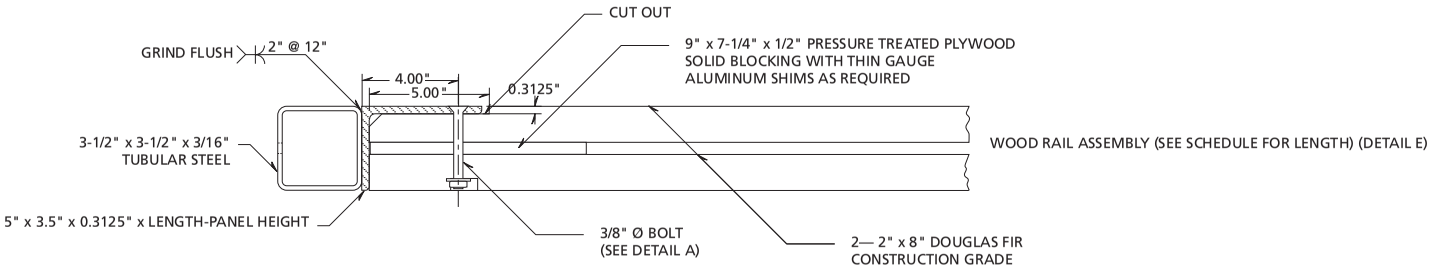




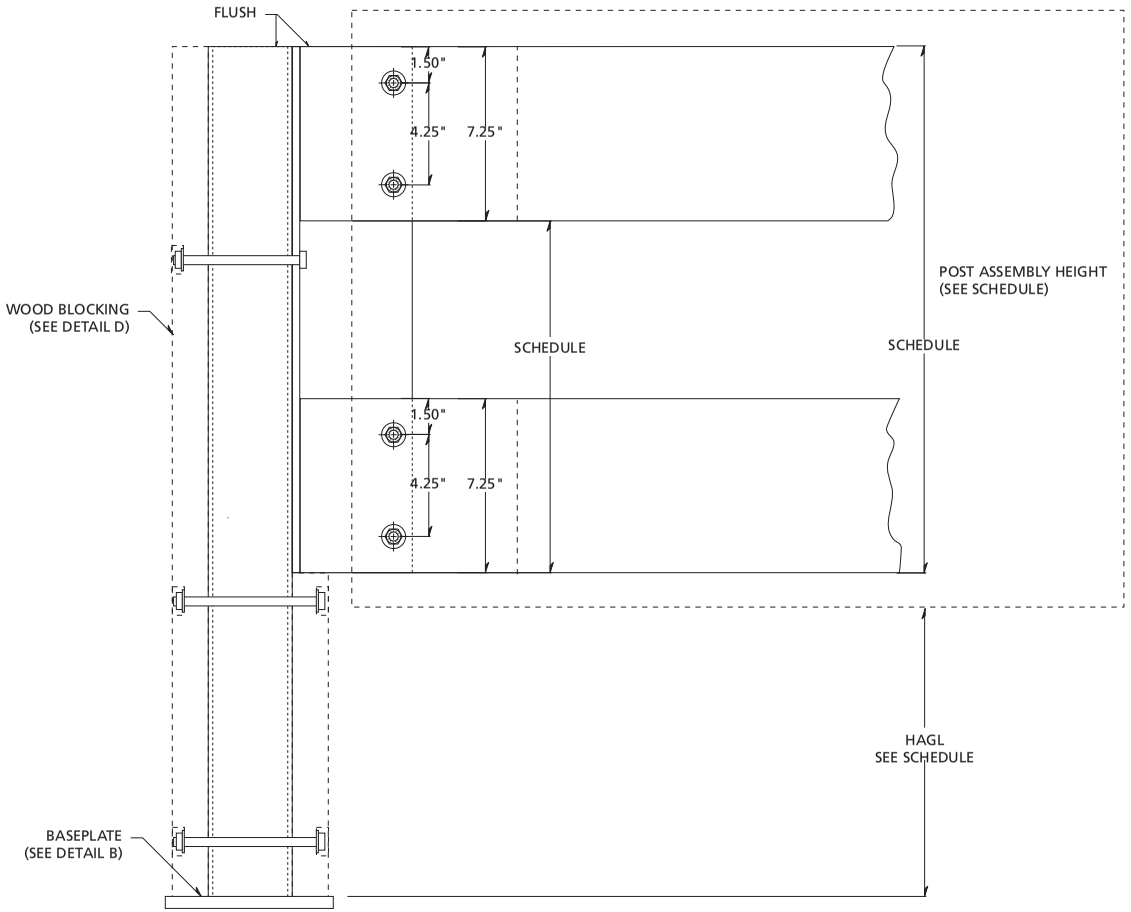
Assembly Elevation for Identification Signs with 4" Legends (3.5 x 3.5 Post, Wood Rail)


3/8-16 X 3-1/2" LONG MACHINE SCREW
THROUGH WOOD RAIL ASSEMBLY
(8 PER SIGN ASSEMBLY)
7.25" REF.
5.00"
ATTACH SIGN PANEL
WITH KEY HOLE ASSEMBLIES
3-1/2" x 3-1/2" x 3/16" TUBULAR STEEL POST
WITH WELDED ANGLE AND BLOCKING ATTACHED
ON INSIDE AND OUTSIDE WITH THOUGH BOLTS
1-1/2" x 3-3/4" OUTBOARD
POST BLOCKING
EQ.
EQ.
6-3/4" X 12" X 1-1/2" CEDAR CAP
CONNECTED TO POST ASSEMBLY WITH
#10 X 3" STAINLESS STEEL WOOD SCREWS
3"x 3/32" THICK x STEEL ANGLE LENGTH
UV STABLE PLASTIC FACADE SCREWED TO
LEDGER ASSEMBLY TO AND BOTTOM
9" X 7-1/4" X 1/2" THICK
INTERMEDIATE WOOD BLOCKING
WITH ALUMINUM SHIMS AS NEEDED
(SEE SCHEDULE)
3-1/2" x 5" x 5/16" x HEIGHT OF SIGN PANEL
STEEL ANGLE WELDED TO POST

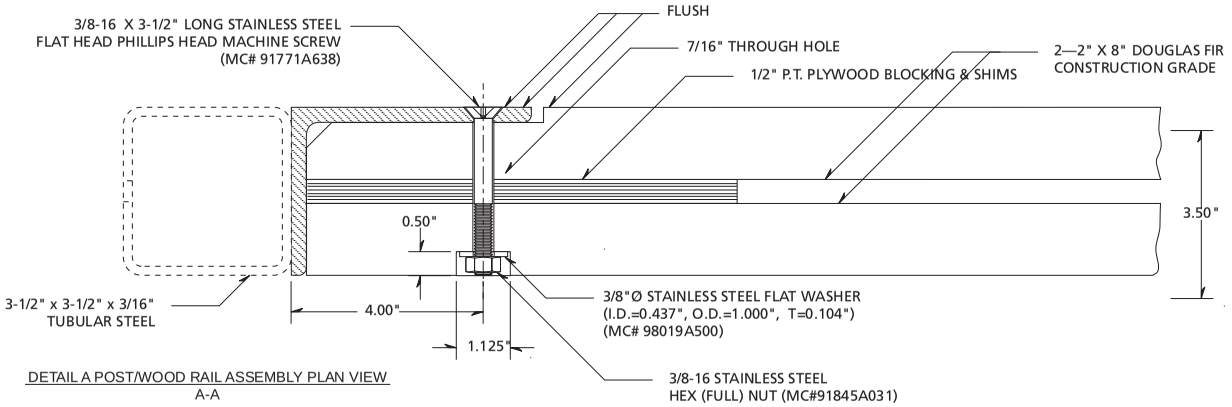

L= 48" TO 96" 3 KEYHOLES PER RAIL
1-1/2" X 3-1/2" X PANEL LENGTH
CEDAR CAP
12.00"
1.00"
PANEL WIDTH VARIES
1.00"
12.00"
2—2" X 8" (NOMINAL) PRESSURE TREATED
CONSTRUCTION GRADE DOUGLAS FIR
WITH 1/2 WOOD BLOCKING
SPACER AND SHIMS
3.00"
3/8-16 X 5-1/4" STAINLESS STEEL
THREADED ROD WELDED NUT ON ONE
END WITH FLAT WASHERS AND HEX NUT
PANEL HEIGHT
VARIES
3.00"
0.25"
3/8-16 X 6-1/8" STAINLESS STEEL
THREADED ROD WELDED NUT ON ONE
END WITH FLAT WASHERS AND HEX NUT
3.00"
3-1/2" X 3-1/2"X 3/16" TUBE STEEL POST
WITH 7" SQUARE WELDED BASE PLATE
1-1/2" x 3-3/4" x 28"
INBOARD CEDAR POST BLOCKING
27" (HAGL)
28.00"
27" (HAGL)
CONCRETE FOOTING
WITH 1" WASH ON ALL 4 SIDES
1.00"
1.50"
0.25"
GRADE
3.00"
1/2" Ø X 14" ANCHOR BOLTS WITH
4" RETURN, HEX NUT, JAM NUT,
WASHER AND LEVELING NUT
36.00"
8 MIL POLYETHELENE
VAPOR BARRIER OR EQUAL (TYP.)
3"+ GRAVEL COURSE FOR DRAINAGE
3.00"
SEE SCHEDULE
SEE SCHEDULE



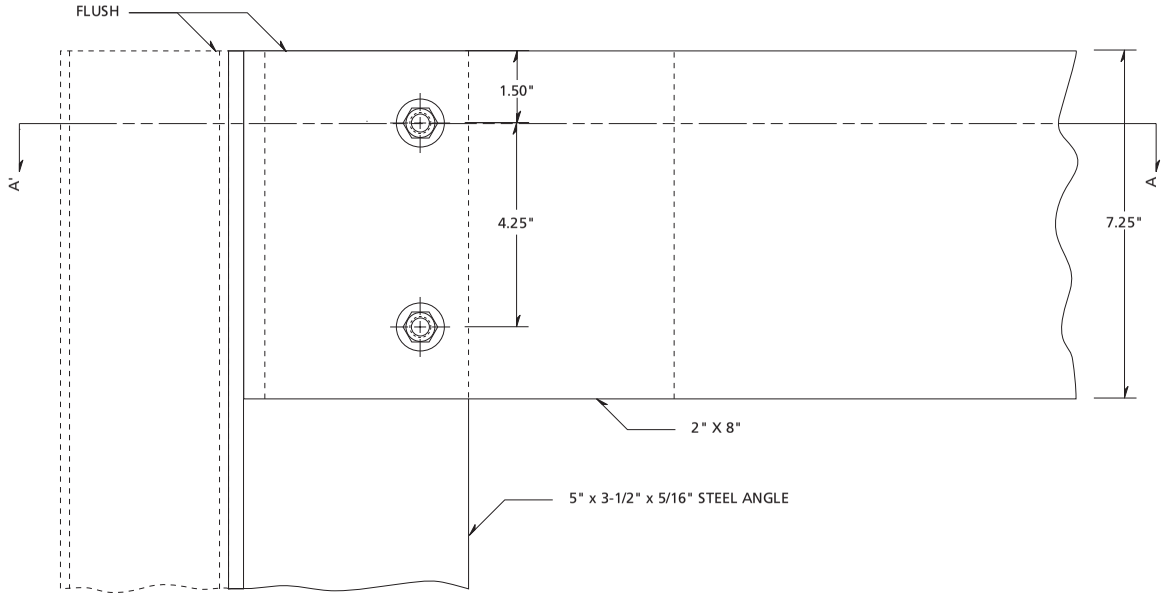
DETAIL POST ASSEMBLY 3-1/2" x 3-1/2" x 3/16" PLAN VIEW



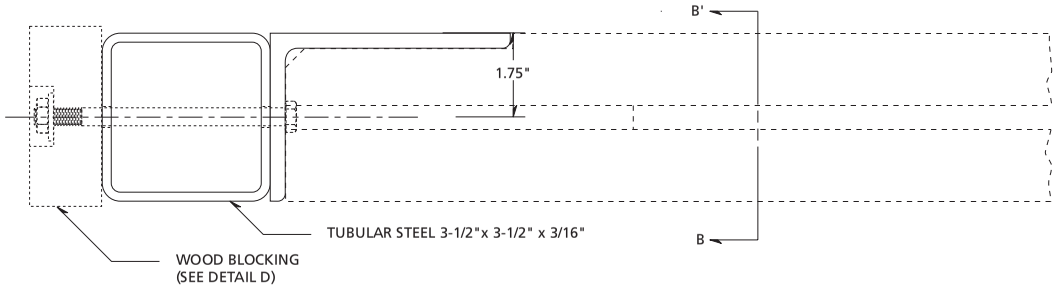
DETAIL POST ASSEMBLY 3-1/2" x 3-1/2" x 3/16" FRONT ELEVATION



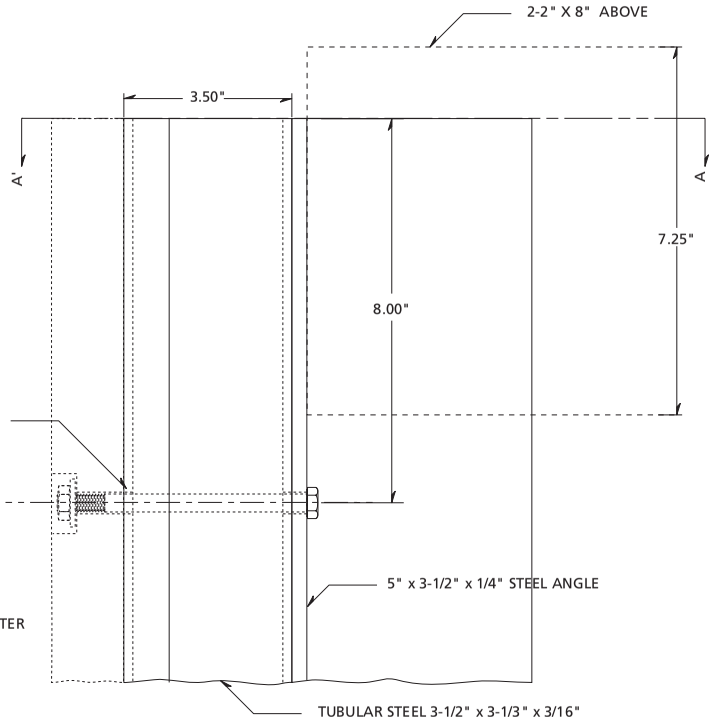
DETAIL A POST/WOOD RAIL ASSEMBLY PLAN VIEW
A-A



DETAIL A POST/WOOD RAIL ASSEMBLY FRONT VIEW



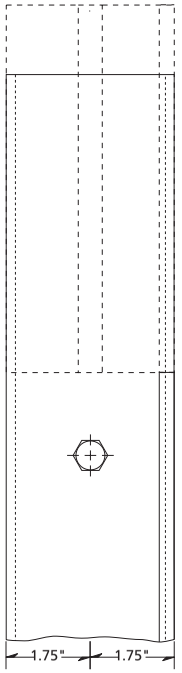
DETAIL C 3-1/2 x 3-1/2" x 3/16" POST ASSEMBLY PLAN VIEW
A'-A



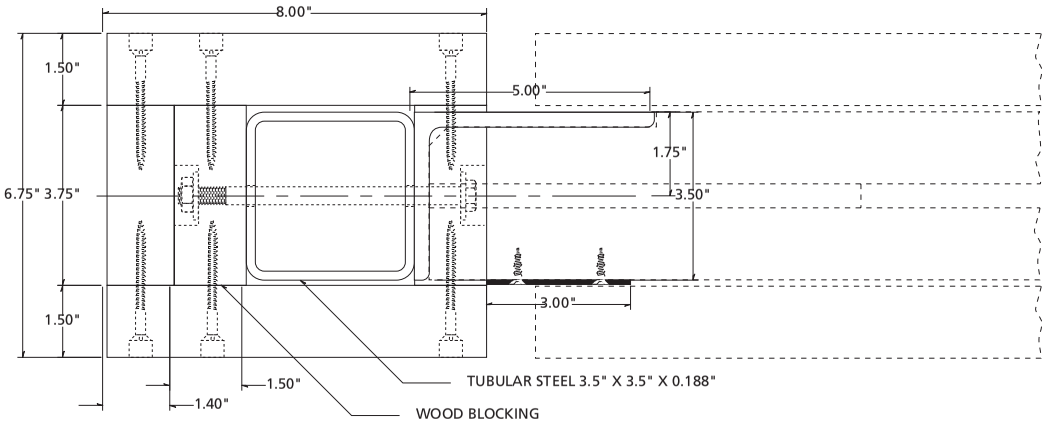
NOTE 1:

FOR SIGN PANEL HEIGHTS GREATER THAN 48", CENTER ONE INTERMEDIATE TROUGH BOLT

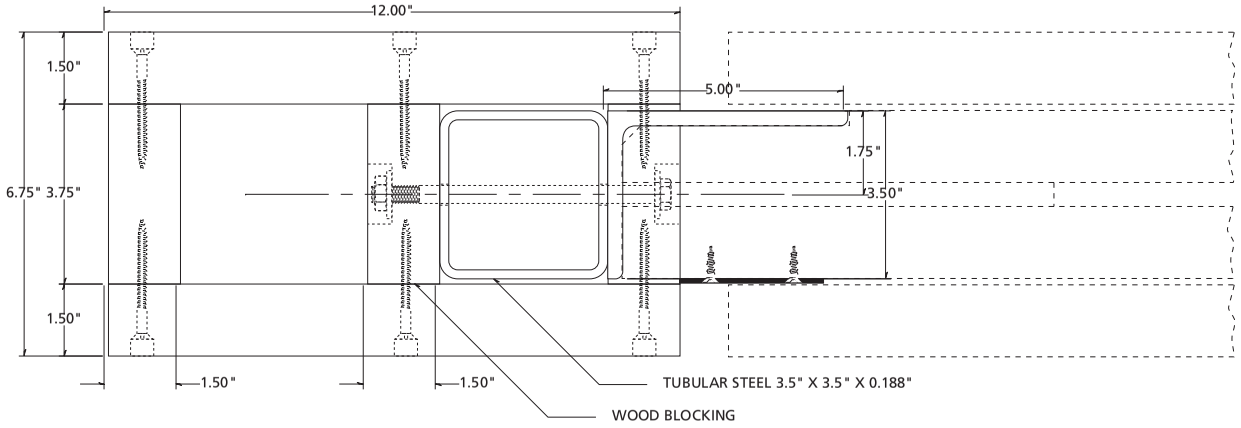
DETAIL C 3-1/2 x 3-1/2" x 3/16" POST ASSEMBLY FRONT ELEVATION



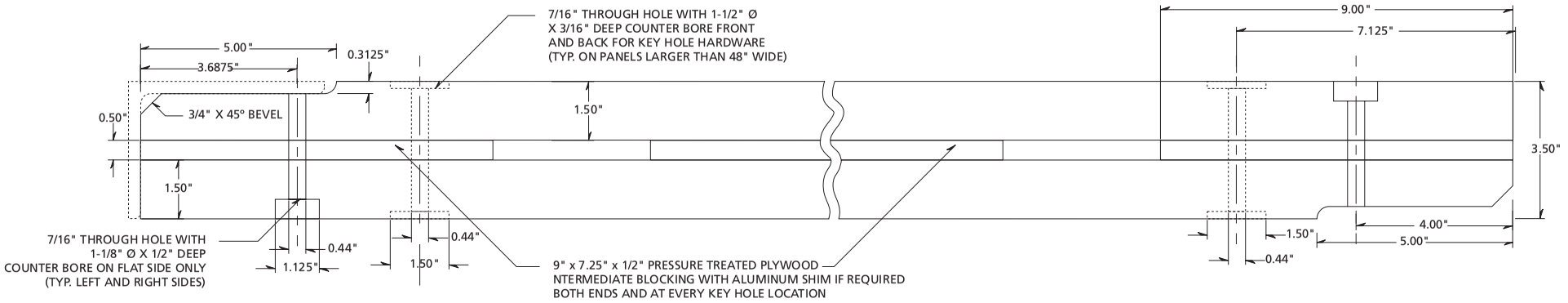
DETAIL C 3-1/2 x 3-1/2" x 3/16" POST ASSEMBLY SIDE ELEVATION
B'-B



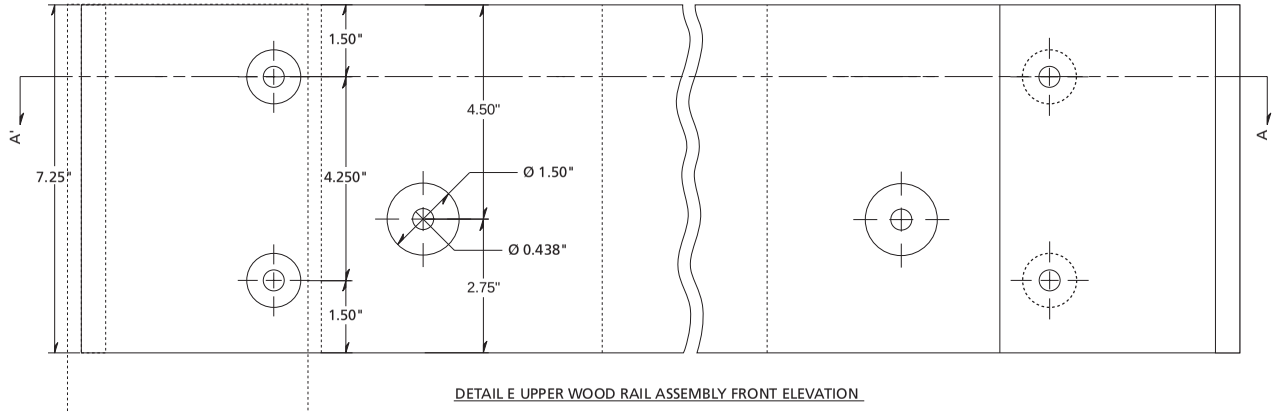
DETAIL D-3-1/2" x 3-1/2" x 3/16" TUBULAR POST WITH WOOD CLADDING FOR 4" LEGEND SIGN PANELS



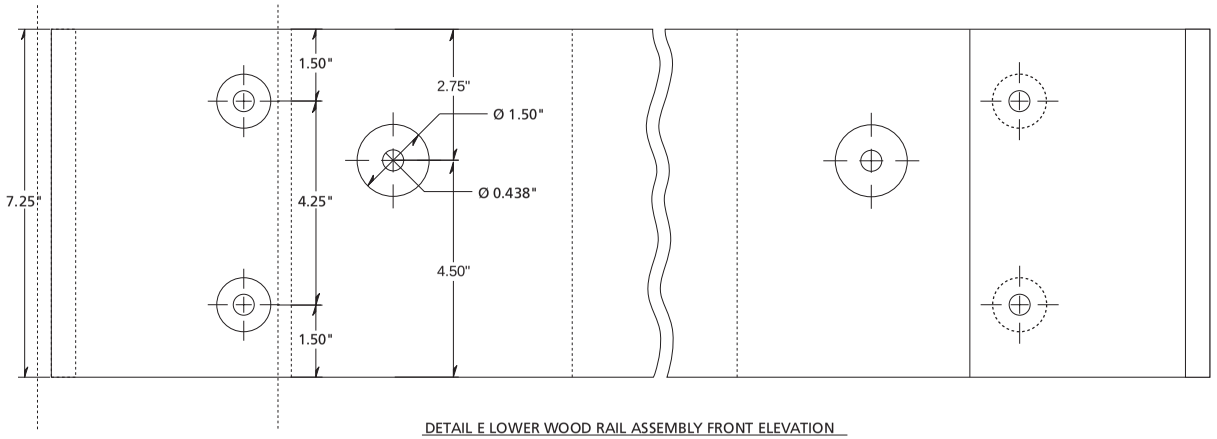
DETAIL D-3-1/2" x 3-1/2" x 3/16" TUBULAR POST WITH WOOD CLADDING FOR 6" LEGEND SIGN PANELS



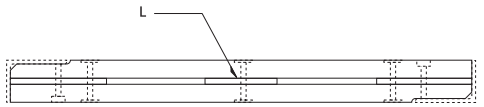
DETAIL E WOOD RAIL ASSEMBLY PLAN VIEW
A'-A



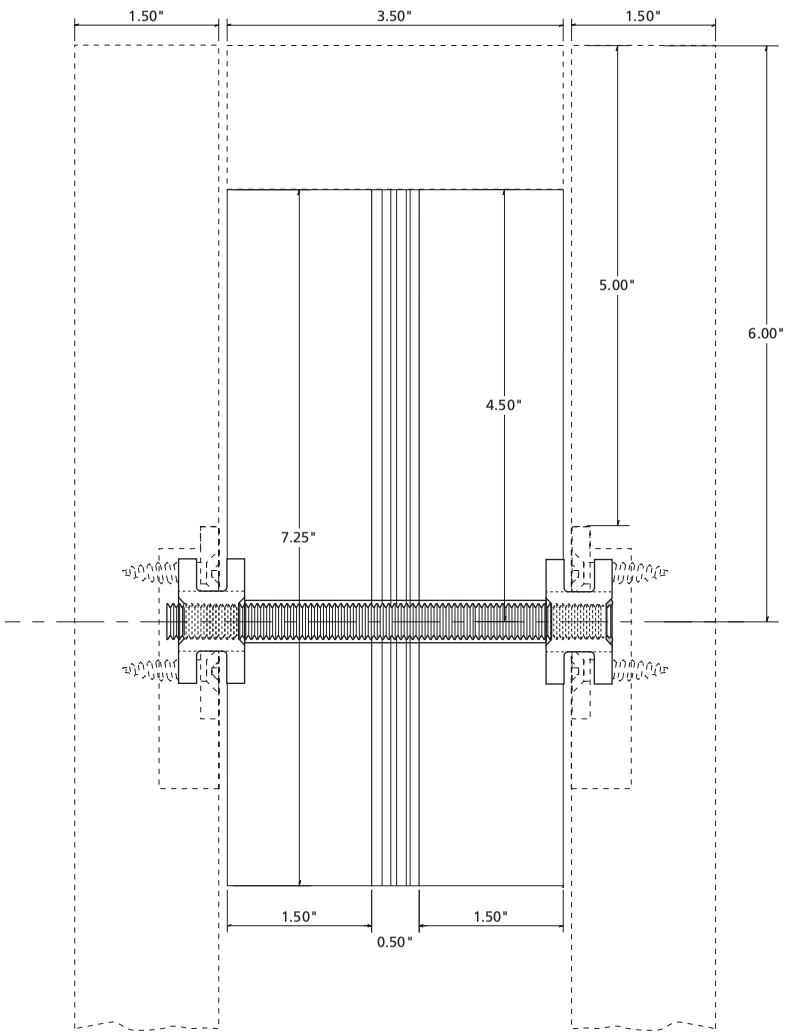
DETAIL E UPPER WOOD RAIL ASSEMBLY FRONT ELEVATION

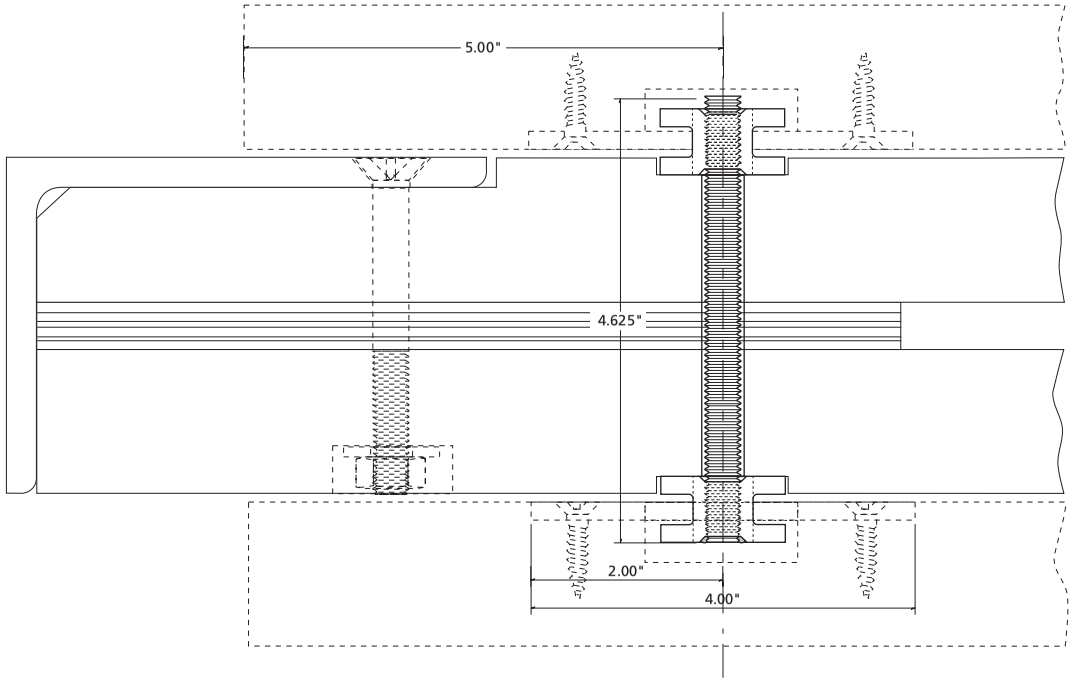


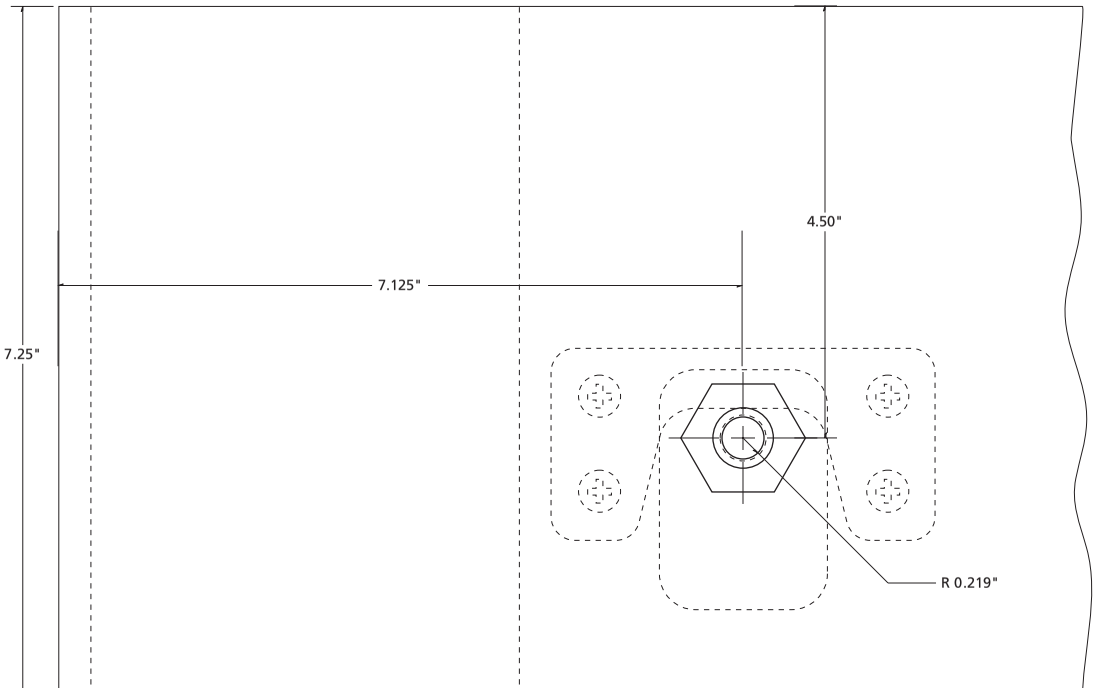
DETAIL E LOWER WOOD RAIL ASSEMBLY FRONT ELEVATION

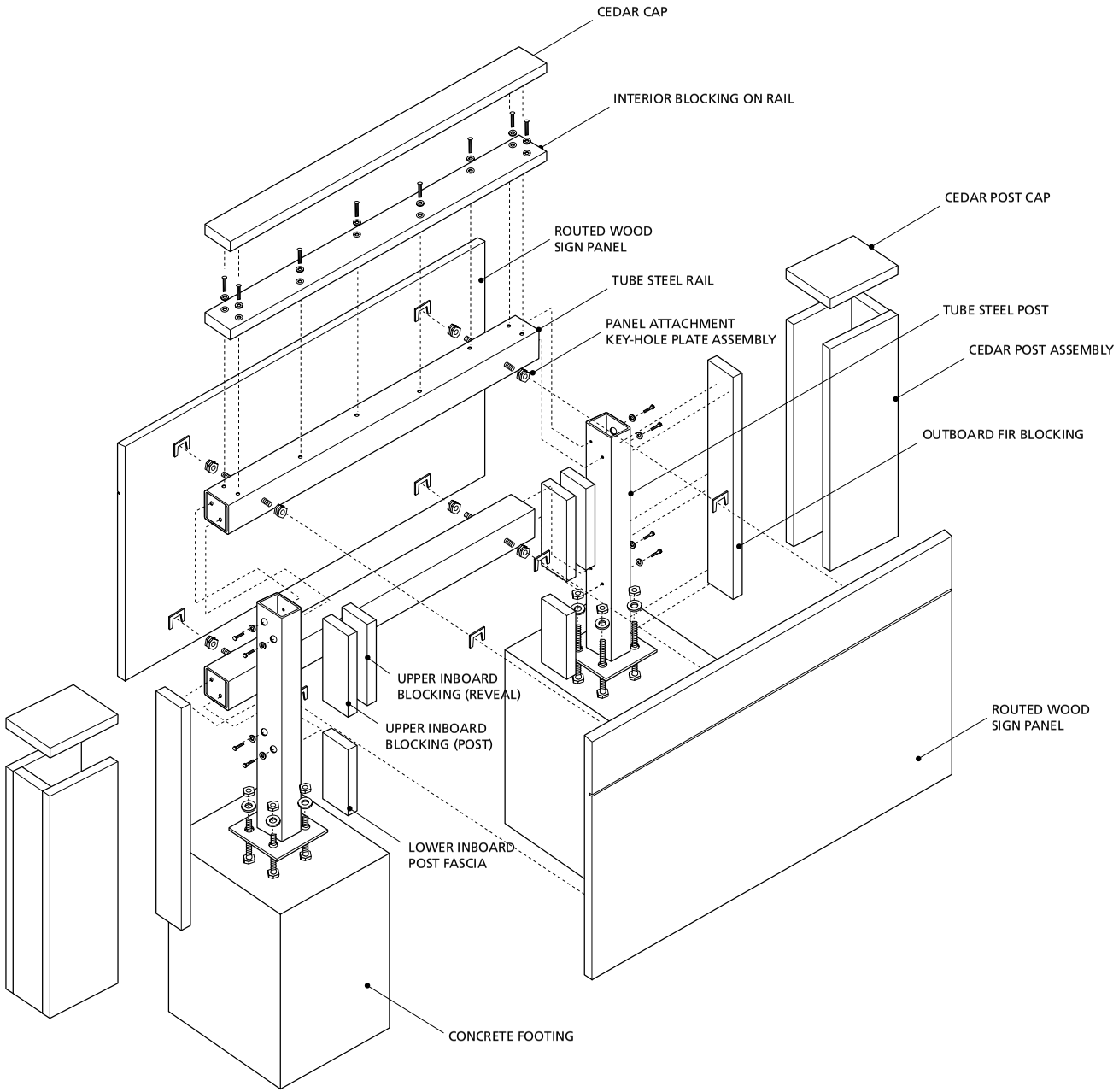


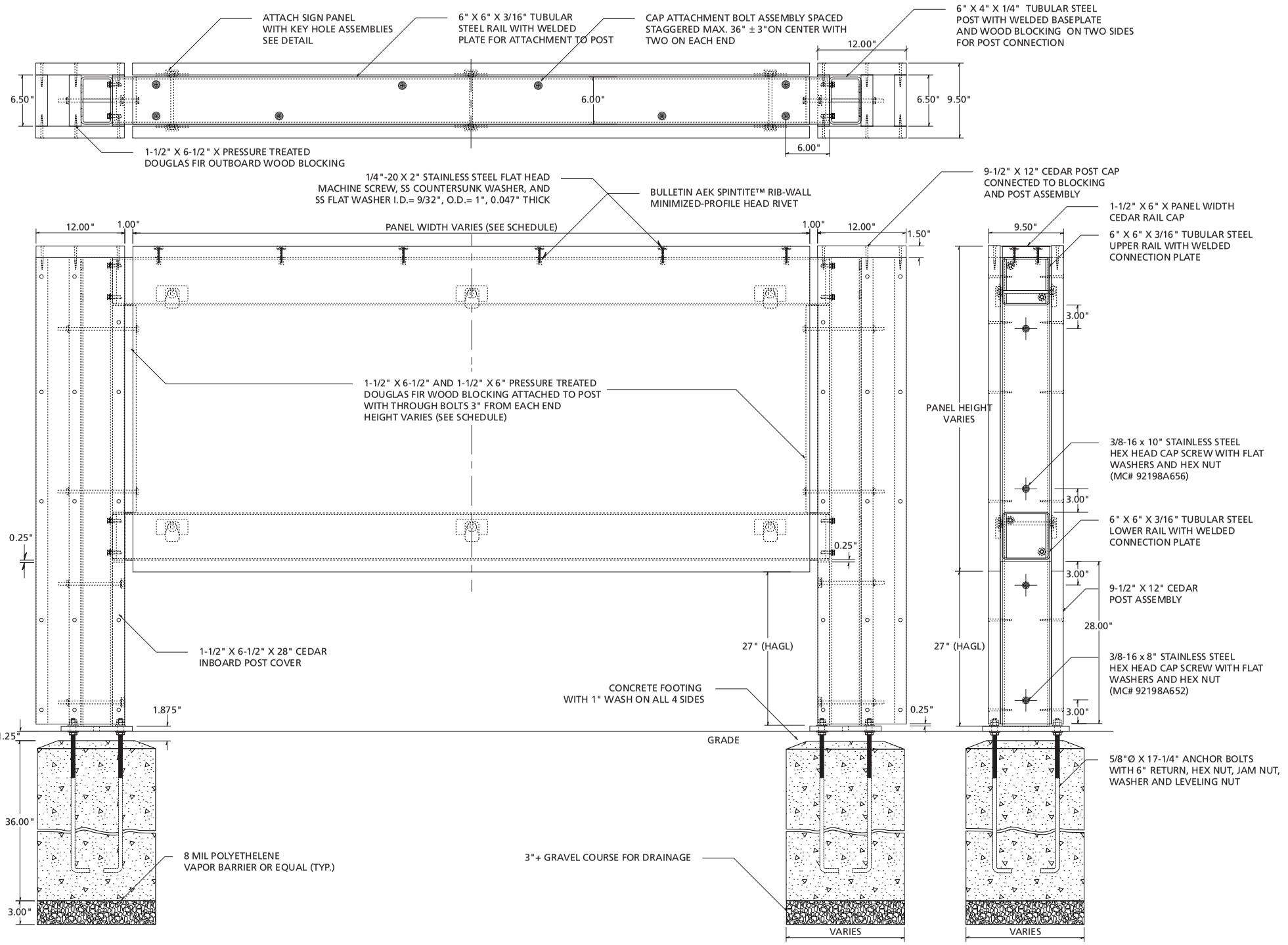
L	# OF INTERMEDIATE KEY HOLE ASSY. EQUALLY SPACED	
≤ 48"	NONE	
> 48"	≤ 96"	1 AT CENTERLINE
> 96"	≤120"	2 EQUALLY SPACED BETWEEN ENDS
>120"	≤ 144"	3 EQUALLY SPACED BETWEEN ENDS

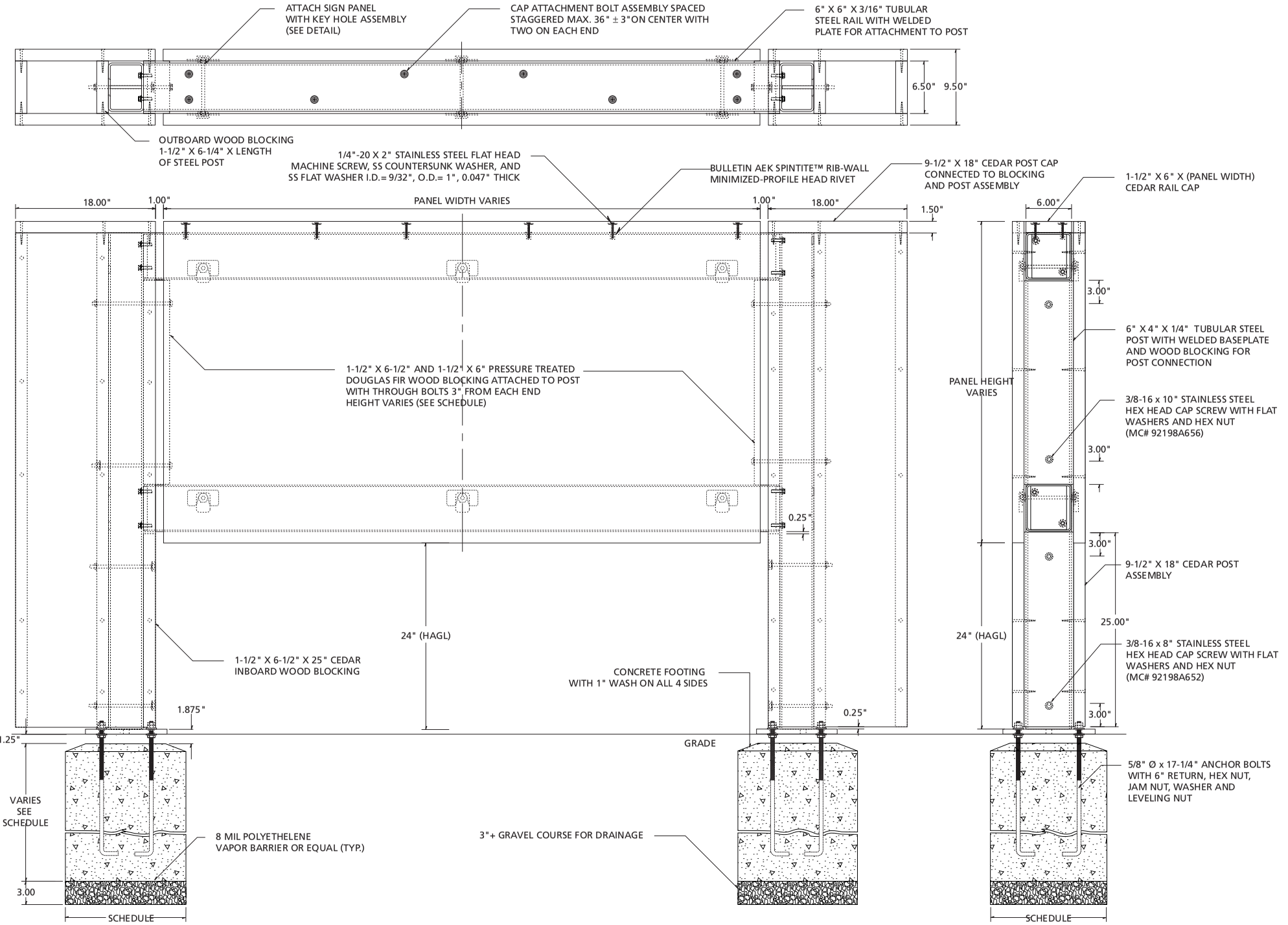

1.50"
3.50"
1.50"
5.00"
6.00"
4.50"
7.25"
1.50"
0.50"
1.50"


5.00"
4.625"
2.00"
4.00"

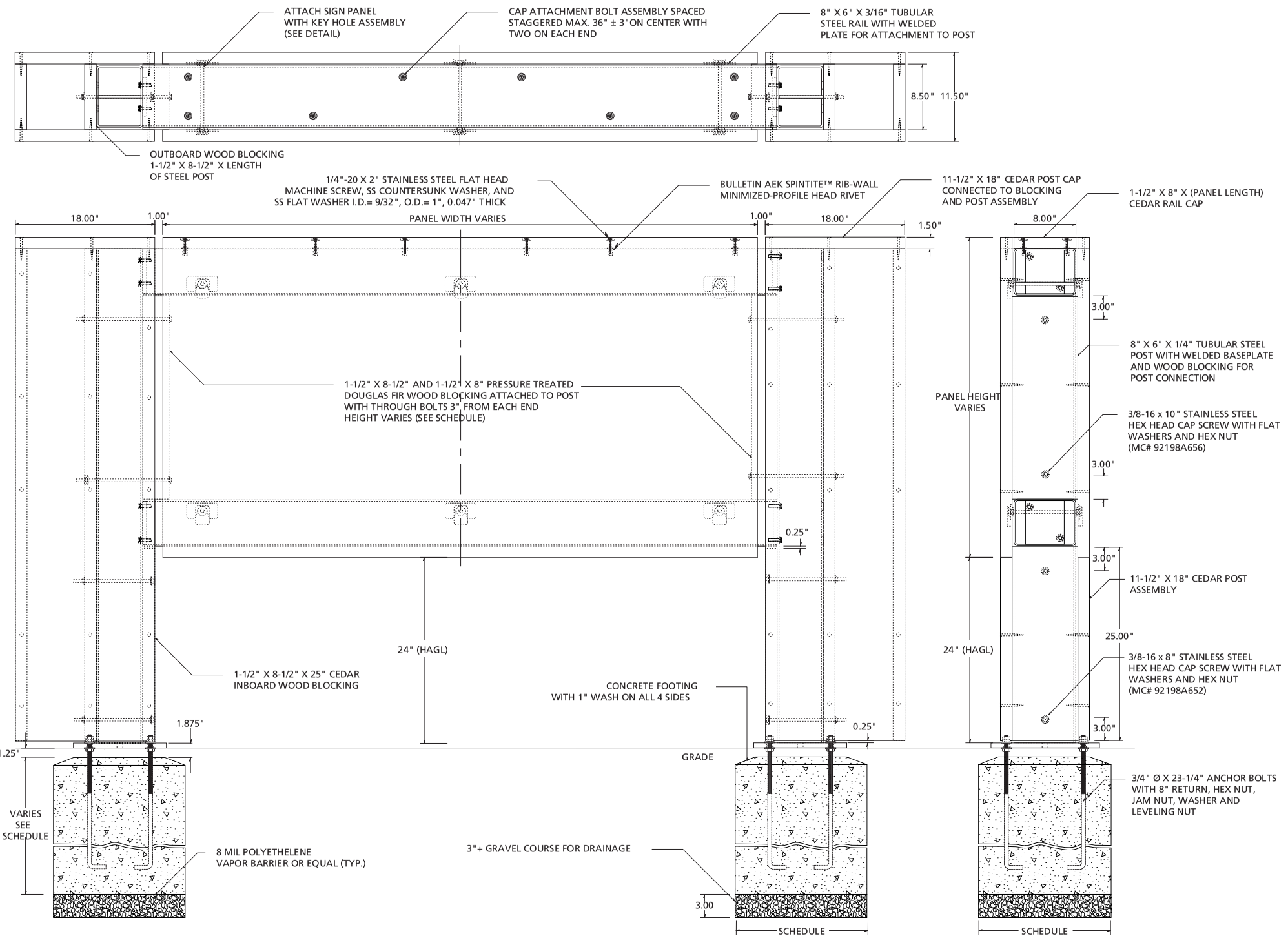

4.50"
7.125"
7.25"
R 0.219"

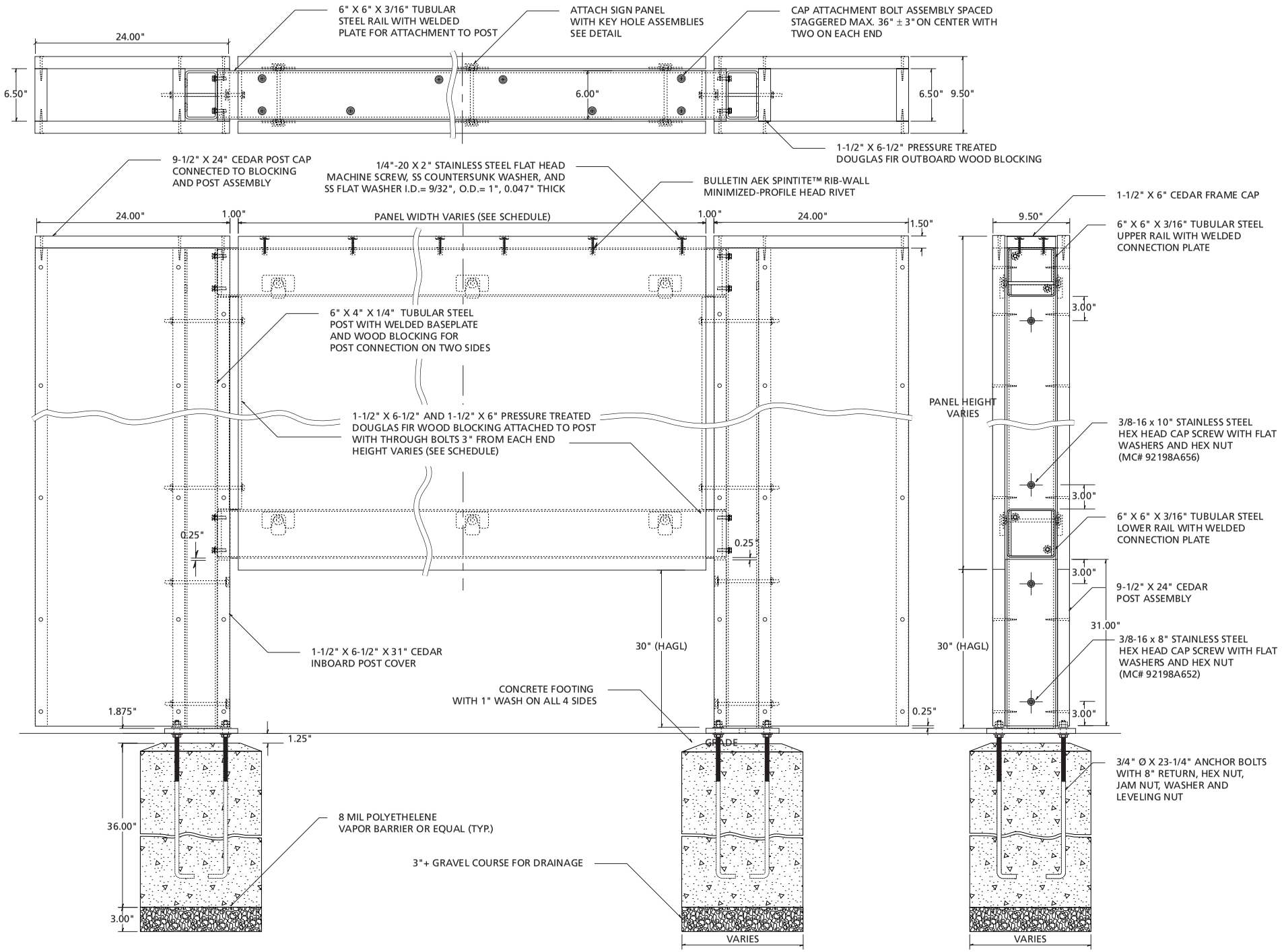

CEDAR CAP
INTERIOR BLOCKING ON RAIL
CEDAR POST CAP
ROUTED WOOD
SIGN PANEL
TUBE STEEL RAIL
TUBE STEEL POST
PANEL ATTACHMENT
KEY-HOLE PLATE ASSEMBLY
CEDAR POST ASSEMBLY
OUTBOARD FIR BLOCKING
UPPER INBOARD
BLOCKING (REVEAL)
UPPER INBOARD
BLOCKING (POST)
ROUTED WOOD
SIGN PANEL
LOWER INBOARD
POST FASCIA
CONCRETE FOOTING


ATTACH SIGN PANEL WITH KEY HOLE ASSEMBLIES SEE DETAIL
6" X 6" X 3/16" TUBULAR STEEL RAIL WITH WELDED PLATE FOR ATTACHMENT TO POST
CAP ATTACHMENT BOLT ASSEMBLY SPACED STAGGERED MAX. 36" ±3"ON CENTER WITH TWO ON EACH END
6" X 4" X 1/4" TUBULAR STEEL POST WITH WELDED BASEPLATE AND WOOD BLOCKING ON TWO SIDES FOR POST CONNECTION
12.00"
6.50"
6.00"
6.50"
9.50"
6.00"
1-1/2" X 6-1/2" X PRESSURE TREATED DOUGLAS FIR OUTBOARD WOOD BLOCKING
1/4"-20 X 2" STAINLESS STEEL FLAT HEAD MACHINE SCREW, SS COUNTERSUNK WASHER, AND SS FLAT WASHER I.D.= 9/32", O.D.= 1", 0.047" THICK
BULLETIN AEK SPINTITE™ RIB-WALL MINIMIZED-PROFILE HEAD RIVET
9-1/2" X 12" CEDAR POST CAP CONNECTED TO BLOCKING AND POST ASSEMBLY
1-1/2" X 6" X PANEL WIDTH CEDAR RAIL CAP
12.00"
1.00"
PANEL WIDTH VARIES (SEE SCHEDULE)
1.00"
12.00"
1.50"
9.50"
6" X 6" X 3/16" TUBULAR STEEL UPPER RAIL WITH WELDED CONNECTION PLATE
3.00"
1-1/2" X 6-1/2" AND 1-1/2" X 6" PRESSURE TREATED DOUGLAS FIR WOOD BLOCKING ATTACHED TO POST WITH THROUGH BOLTS 3" FROM EACH END HEIGHT VARIES (SEE SCHEDULE)
PANEL HEIGHT VARIES
3/8-16 x 10" STAINLESS STEEL HEX HEAD CAP SCREW WITH FLAT WASHERS AND HEX NUT (MC# 92198A656)
3.00"
0.25"
0.25"
6" X 6" X 3/16" TUBULAR STEEL LOWER RAIL WITH WELDED CONNECTION PLATE
3.00"
9-1/2" X 12" CEDAR POST ASSEMBLY
28.00"
27" (HAGL)
27" (HAGL)
1-1/2" X 6-1/2" X 28" CEDAR INBOARD POST COVER
3/8-16 x 8" STAINLESS STEEL HEX HEAD CAP SCREW WITH FLAT WASHERS AND HEX NUT (MC# 92198A652)
CONCRETE FOOTING WITH 1" WASH ON ALL 4 SIDES
1.875"
0.25"
3.00"
1.25"
GRADE
5/8"Ø X 17-1/4" ANCHOR BOLTS WITH 6" RETURN, HEX NUT, JAM NUT, WASHER AND LEVELING NUT
36.00"
8 MIL POLYETHELENE VAPOR BARRIER OR EQUAL (TYP.)
3"+ GRAVEL COURSE FOR DRAINAGE
3.00"
VARIES
VARIES

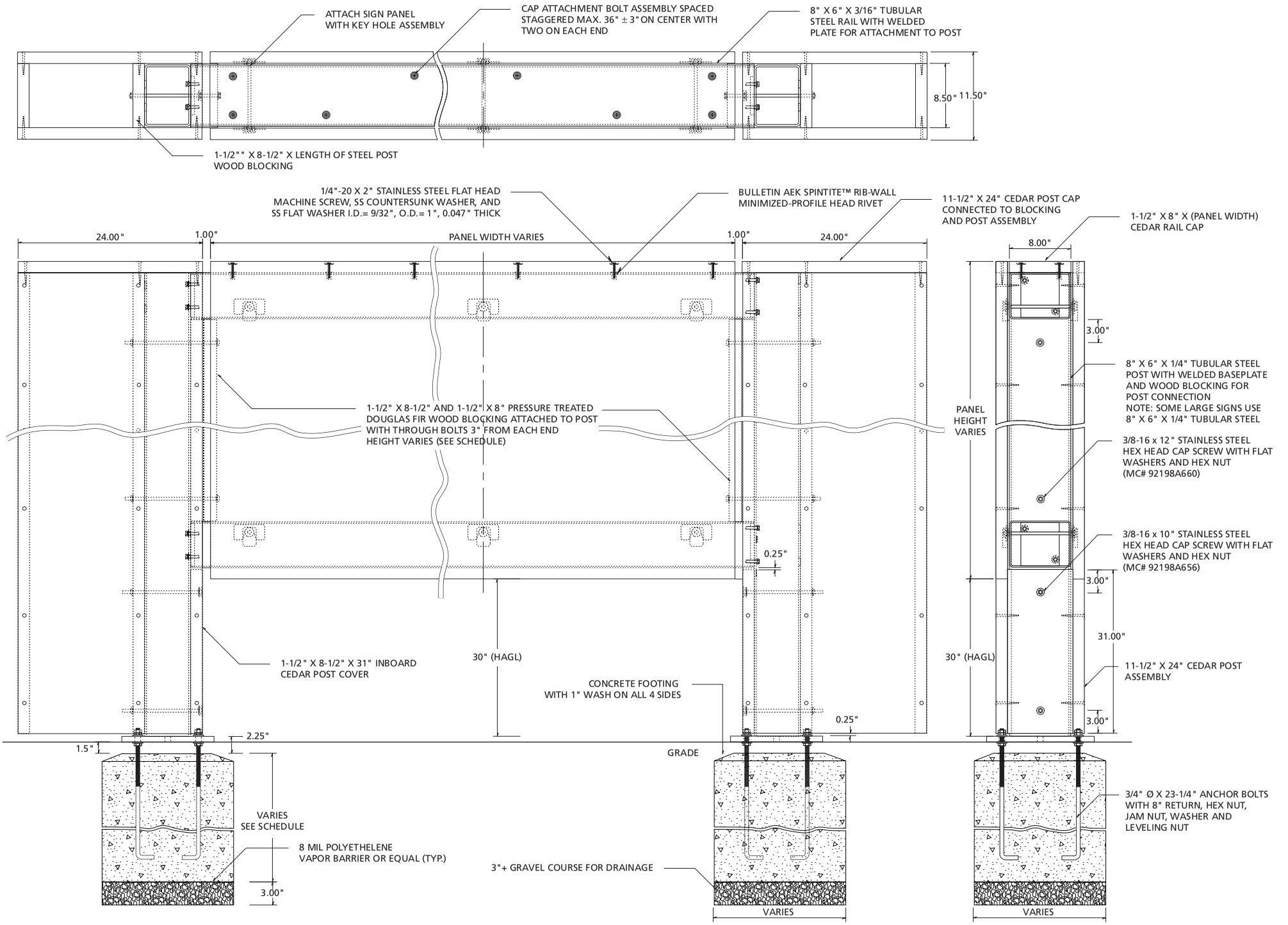


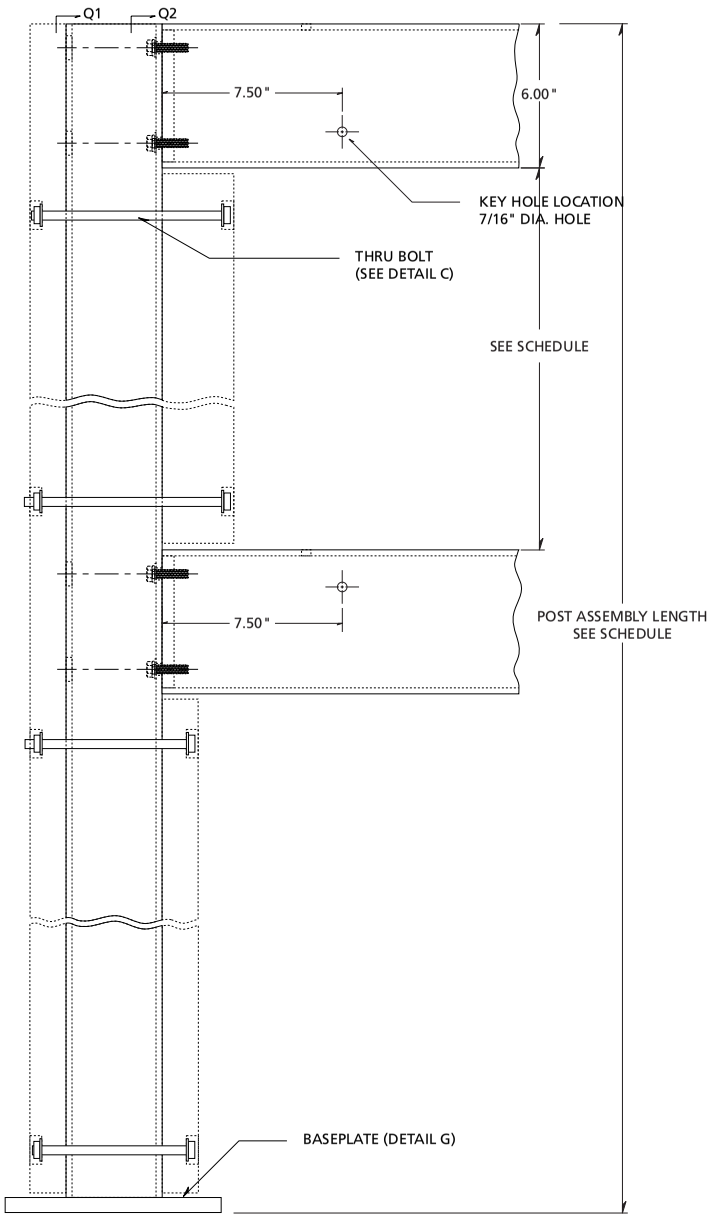
Assembly Overview for Identification Signs with 9" Legends (6 x 4 Post, 6 x 6 Steel Rail)


ATTACH SIGN PANEL WITH KEY HOLE ASSEMBLY (SEE DETAIL)
CAP ATTACHMENT BOLT ASSEMBLY SPACED STAGGERED MAX. 36" ± 3"ON CENTER WITH TWO ON EACH END
8" X 6" X 3/16" TUBULAR STEEL RAIL WITH WELDED PLATE FOR ATTACHMENT TO POST
8.50"
11.50"
OUTBOARD WOOD BLOCKING 1-1/2" X 8-1/2" X LENGTH OF STEEL POST
1/4"-20 X 2" STAINLESS STEEL FLAT HEAD MACHINE SCREW, SS COUNTERSUNK WASHER, AND SS FLAT WASHER I.D.= 9/32", O.D.= 1", 0.047" THICK
BULLETIN AEK SPINTITE™ RIB-WALL MINIMIZED-PROFILE HEAD RIVET
11-1/2" X 18" CEDAR POST CAP CONNECTED TO BLOCKING AND POST ASSEMBLY
1-1/2" X 8" X (PANEL LENGTH) CEDAR RAIL CAP
18.00"
1.00"
PANEL WIDTH VARIES
1.00"
18.00"
1.50"
8.00"
3.00"
8" X 6" X 1/4" TUBULAR STEEL POST WITH WELDED BASEPLATE AND WOOD BLOCKING FOR POST CONNECTION
1-1/2" X 8-1/2" AND 1-1/2" X 8" PRESSURE TREATED DOUGLAS FIR WOOD BLOCKING ATTACHED TO POST WITH THROUGH BOLTS 3" FROM EACH END HEIGHT VARIES (SEE SCHEDULE)
PANEL HEIGHT VARIES
3/8-16 x 10" STAINLESS STEEL HEX HEAD CAP SCREW WITH FLAT WASHERS AND HEX NUT (MC# 92198A656)
3.00"
0.25"
3.00"
11-1/2" X 18" CEDAR POST ASSEMBLY
25.00"
24" (HAGL)
24" (HAGL)
3/8-16 x 8" STAINLESS STEEL HEX HEAD CAP SCREW WITH FLAT WASHERS AND HEX NUT (MC# 92198A652)
1-1/2" X 8-1/2" X 25" CEDAR INBOARD WOOD BLOCKING
CONCRETE FOOTING WITH 1" WASH ON ALL 4 SIDES
1.875"
0.25"
3.00"
1.25"
GRADE
3/4" Ø X 23-1/4" ANCHOR BOLTS WITH 8" RETURN, HEX NUT, JAM NUT, WASHER AND LEVELING NUT
VARIES SEE SCHEDULE
8 MIL POLYETHELENE VAPOR BARRIER OR EQUAL (TYP.)
3"+ GRAVEL COURSE FOR DRAINAGE
3.00
SCHEDULE
SCHEDULE

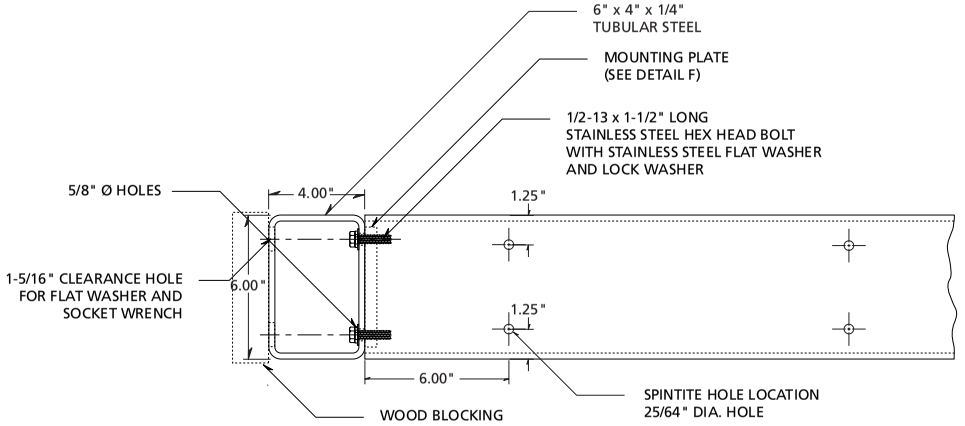


Assembly Overview for Identification Signs with 12" Legends (6 x 4 Post, 6 x 6 Steel Rail)

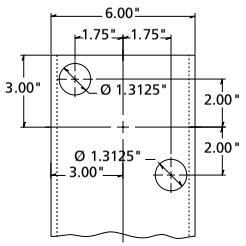

ATTACH SIGN PANEL WITH KEY HOLE ASSEMBLY
CAP ATTACHMENT BOLT ASSEMBLY SPACED STAGGERED MAX. 36" ± 3" ON CENTER WITH TWO ON EACH END
8" X 6" X 3/16" TUBULAR STEEL RAIL WITH WELDED PLATE FOR ATTACHMENT TO POST
8.50"
11.50"
1-1/2"" X 8-1/2" X LENGTH OF STEEL POST WOOD BLOCKING
1/4"-20 X 2" STAINLESS STEEL FLAT HEAD MACHINE SCREW, SS COUNTERSUNK WASHER, AND SS FLAT WASHER I.D.= 9/32", O.D.= 1", 0.047" THICK
BULLETIN AEK SPINTITE™ RIB-WALL MINIMIZED-PROFILE HEAD RIVET
11-1/2" X 24" CEDAR POST CAP CONNECTED TO BLOCKING AND POST ASSEMBLY
1-1/2" X 8" X (PANEL WIDTH) CEDAR RAIL CAP
24.00"
1.00"
PANEL WIDTH VARIES
1.00"
24.00"
8.00"
3.00"
8" X 6" X 1/4" TUBULAR STEEL POST WITH WELDED BASEPLATE AND WOOD BLOCKING FOR POST CONNECTION
NOTE: SOME LARGE SIGNS USE 8" X 6" X 1/4" TUBULAR STEEL
1-1/2" X 8-1/2" AND 1-1/2" X 8" PRESSURE TREATED DOUGLAS FIR WOOD BLOCKING ATTACHED TO POST WITH THROUGH BOLTS 3" FROM EACH END
HEIGHT VARIES (SEE SCHEDULE)
PANEL HEIGHT VARIES
3/8-16 x 12" STAINLESS STEEL HEX HEAD CAP SCREW WITH FLAT WASHERS AND HEX NUT (MC# 92198A660)
0.25"
3/8-16 x 10" STAINLESS STEEL HEX HEAD CAP SCREW WITH FLAT WASHERS AND HEX NUT (MC# 92198A656)
3.00"
31.00"
30" (HAGL)
30" (HAGL)
1-1/2" X 8-1/2" X 31" INBOARD CEDAR POST COVER
CONCRETE FOOTING WITH 1" WASH ON ALL 4 SIDES
11-1/2" X 24" CEDAR POST ASSEMBLY
0.25"
3.00"
1.5"
2.25"
GRADE
VARIES SEE SCHEDULE
8 MIL POLYETHELENE VAPOR BARRIER OR EQUAL (TYP.)
3/4" Ø X 23-1/4" ANCHOR BOLTS WITH 8" RETURN, HEX NUT, JAM NUT, WASHER AND LEVELING NUT
3"+ GRAVEL COURSE FOR DRAINAGE
3.00"
VARIES
VARIES



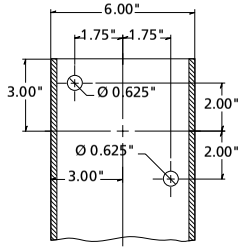
DETAIL POST ASSEMBLY 6 x 4 FRONT ELEVATION



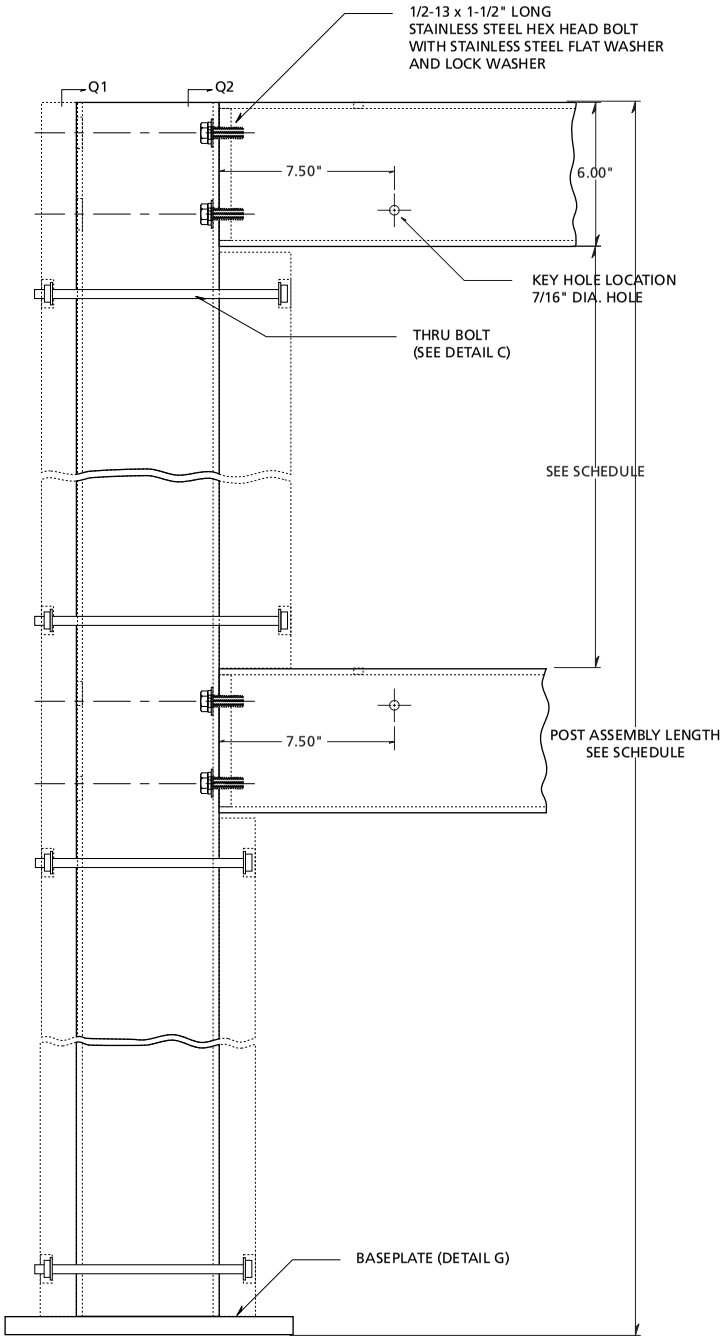
DETAIL POST ASSEMBLY 6 x 4 PLAN VIEW



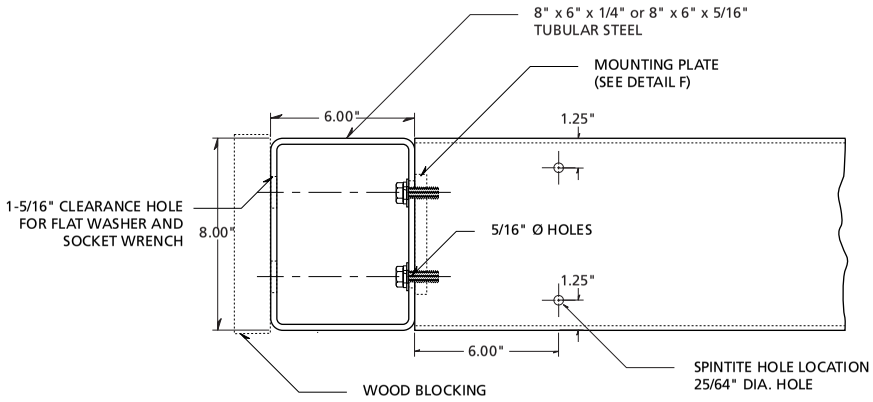
DETAIL POST ASSEMBLY 6 x 4 SIDE ELEVATION
Q1



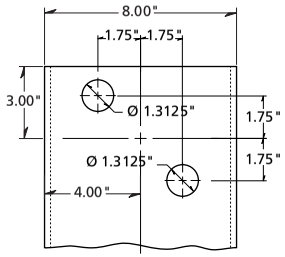
DETAIL POST ASSEMBLY 6 x 4 SIDE ELEVATION
Q2



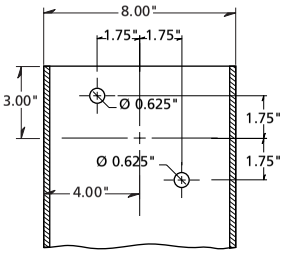
DETAIL POST ASSEMBLY 8 x 6 FRONT ELEVATION



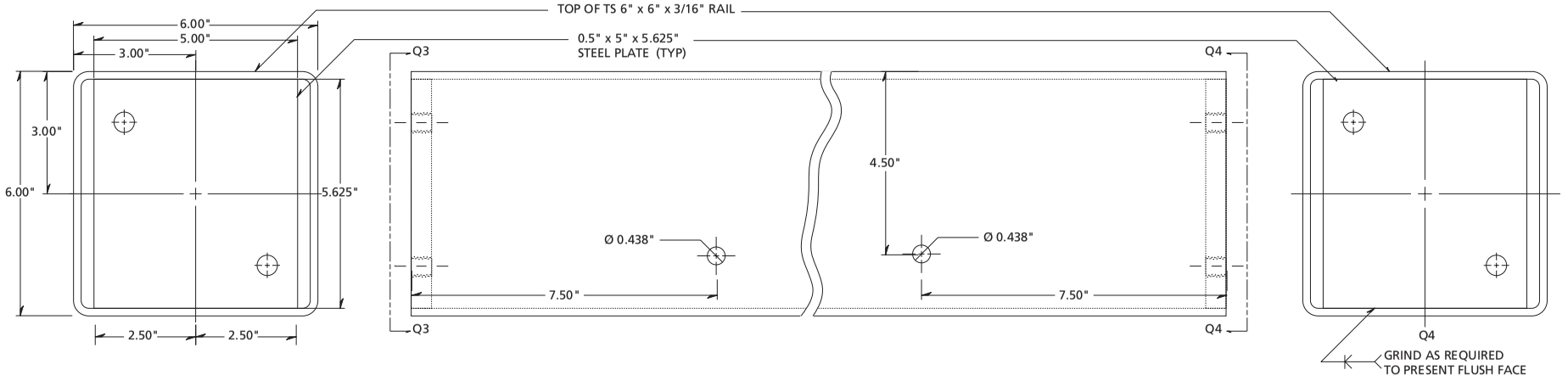
DETAIL POST ASSEMBLY 8 x 6 PLAN VIEW



DETAIL POST ASSEMBLY 8 x 6 SIDE ELEVATION
Q1



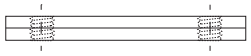
DETAIL POST ASSEMBLY 8 x 6 SIDE ELEVATION
Q2



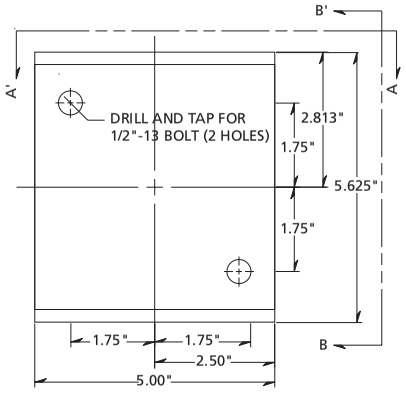
DETAIL F 6" x 6" STEEL RAIL PLUG SIDE ELEVATION
Q3

DETAIL F 6" x 6" STEEL RAIL PLUG FRONT ELEVATION
Q3

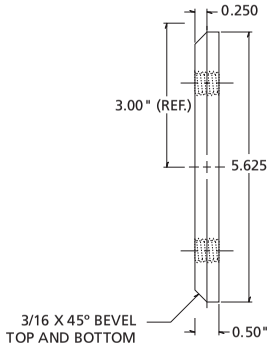
DETAIL F 6" x 6" STEEL RAIL PLUG SIDE ELEVATION
Q4



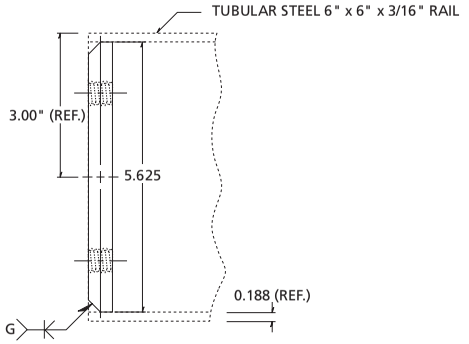
DETAIL F 6" x 6" STEEL RAIL PLUG PLAN VIEW
A'-A



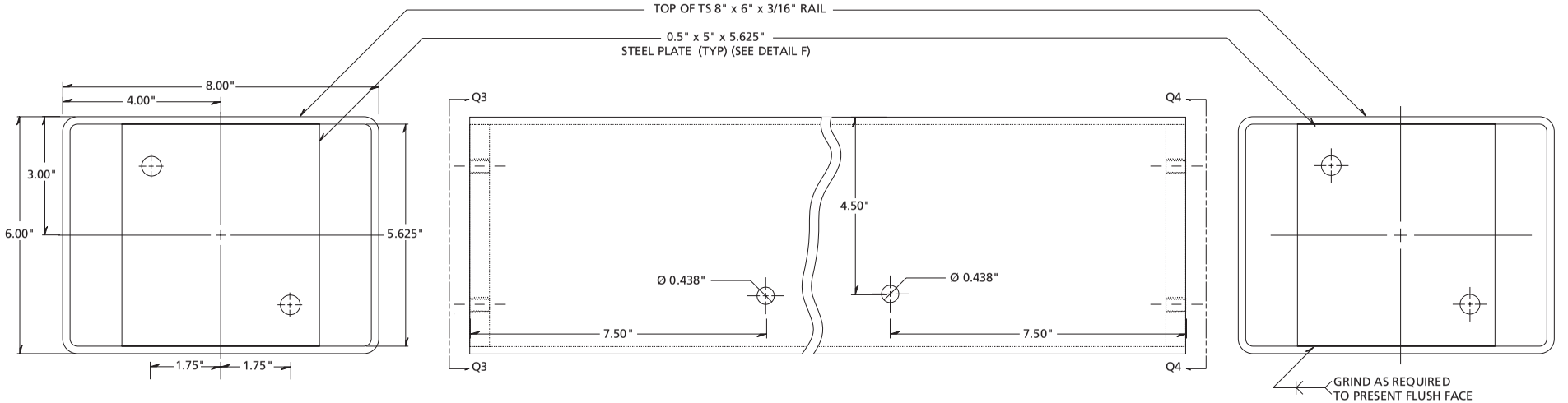
DETAIL F 6" x 6" STEEL RAIL PLUG SIDE ELEVATION



DETAIL F 6" x 6" STEEL RAIL PLUG FRONT ELEVATION
B'-B



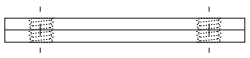
DETAIL F 6" x 6" STEEL RAIL PLUG SCHEMATIC ASSEMBLY



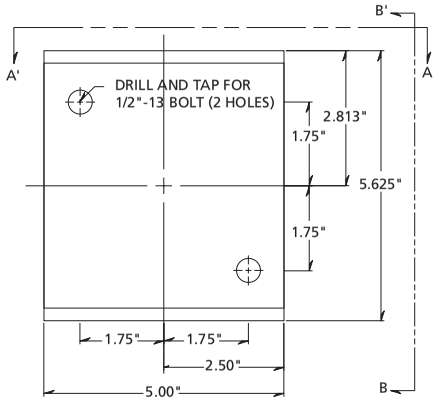
DETAIL F 8" x 6" RAIL WITH WELDED PLUG SIDE ELEVATION
Q3

DETAIL F 8" x 6" RAIL WITH WELDED PLUG FRONT ELEVATION

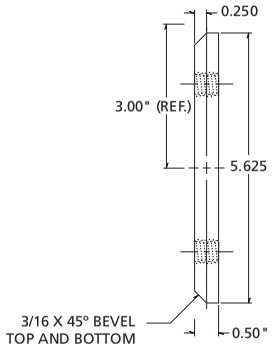
DETAIL F 8" x 6" RAIL WITH WELDED PLUG SIDE ELEVATION
Q4



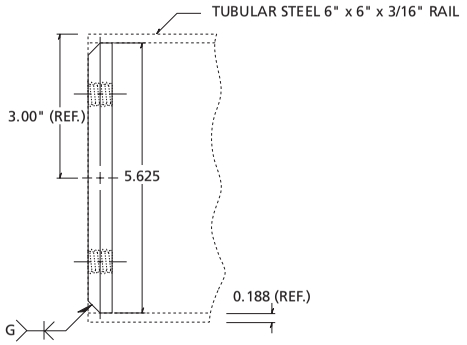
DETAIL F 8" x 6" STEEL RAIL PLUG PLAN VIEW
A'-A



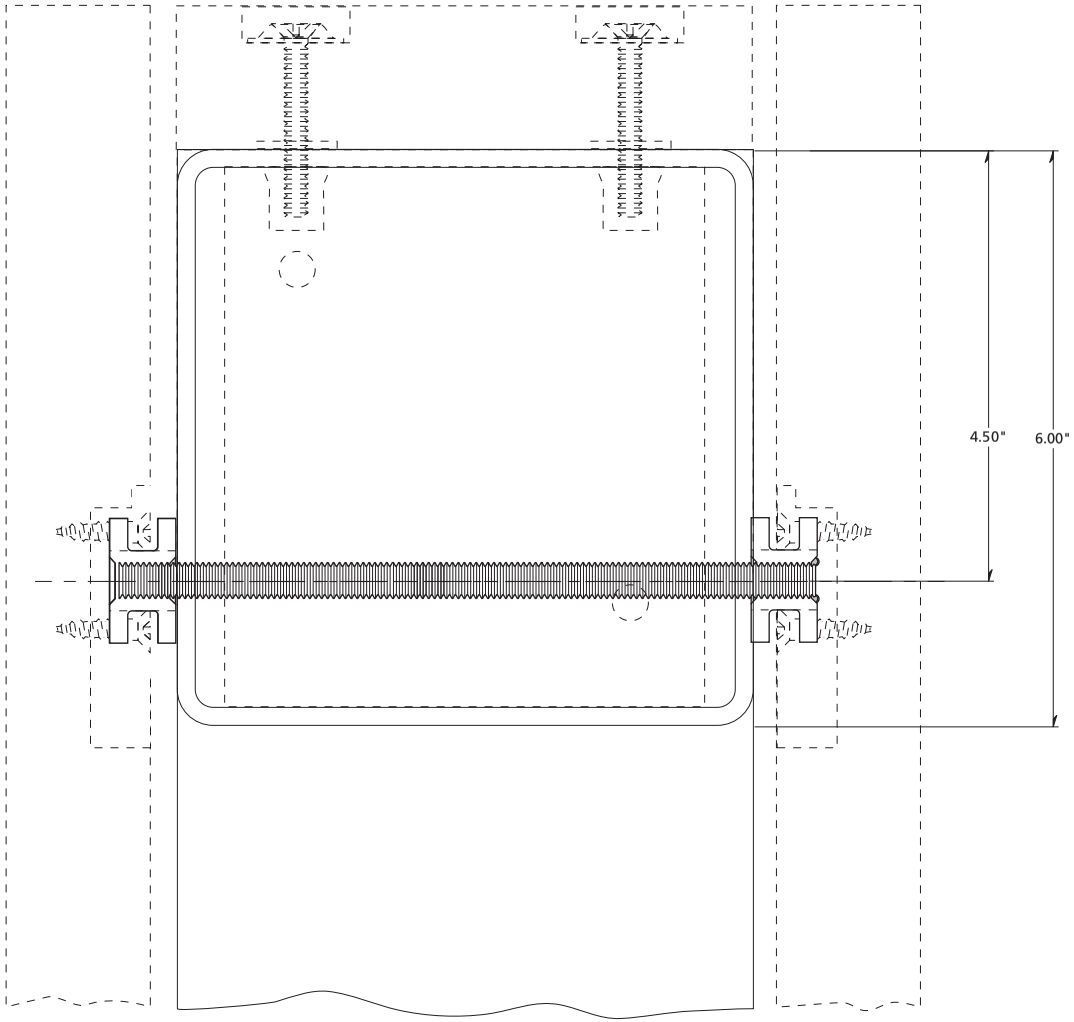
DETAIL F 8" x 6" RAIL PLUG FRONT ELEVATION



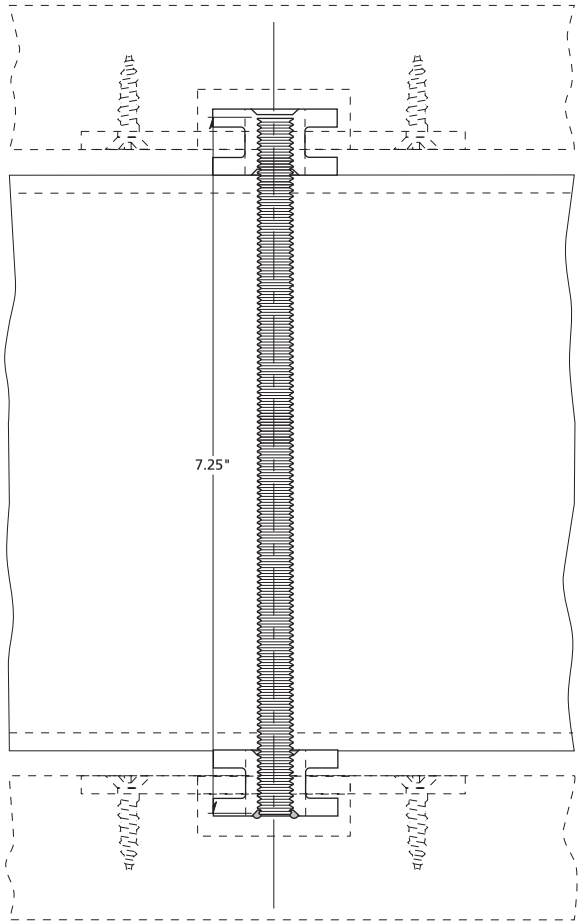
DETAIL F 8" x 6" RAIL PLUG SIDE ELEVATION
B'-B



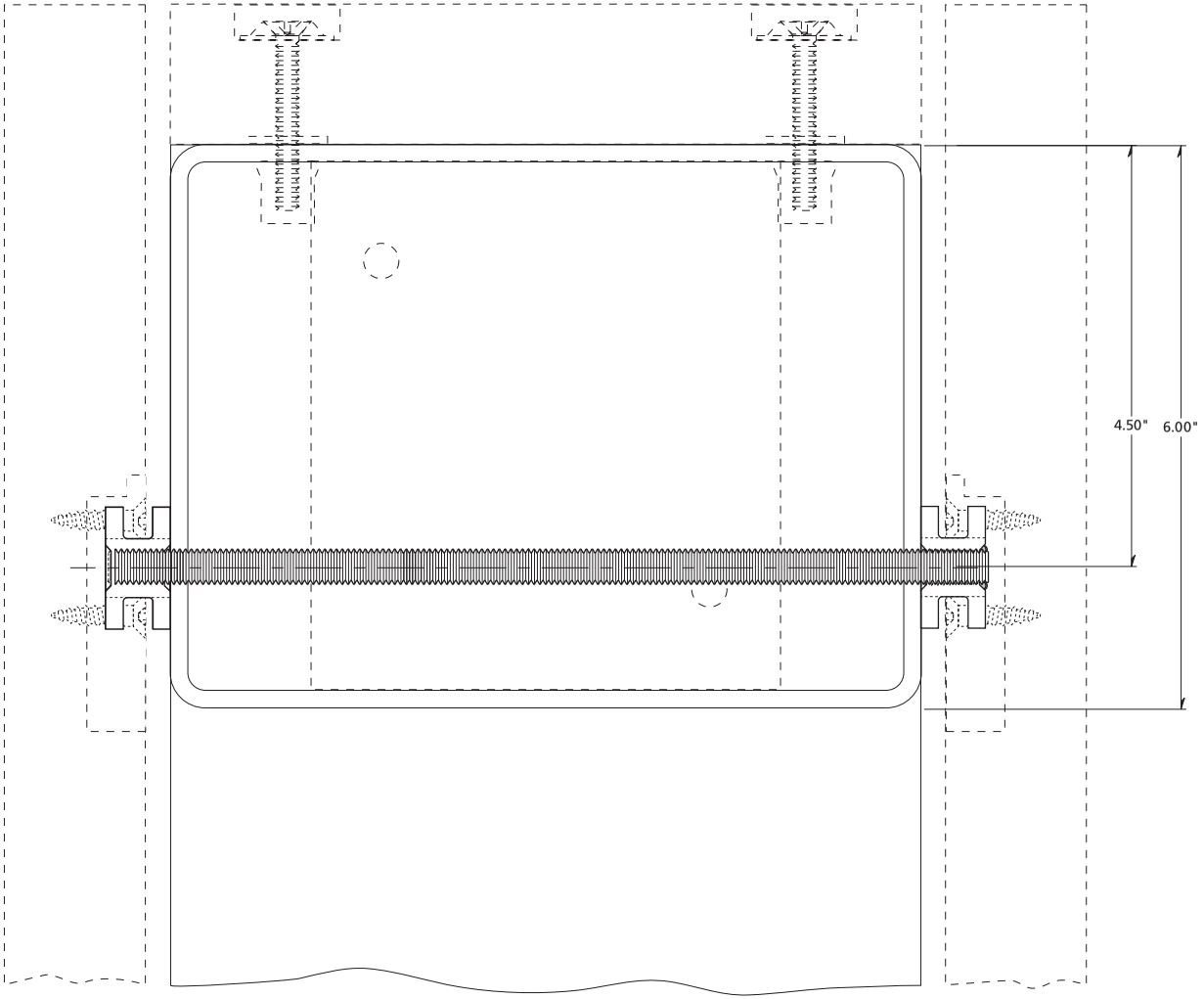
DETAIL F 8" x 6" STEEL RAIL PLUG SCHEMATIC ASSEMBLY



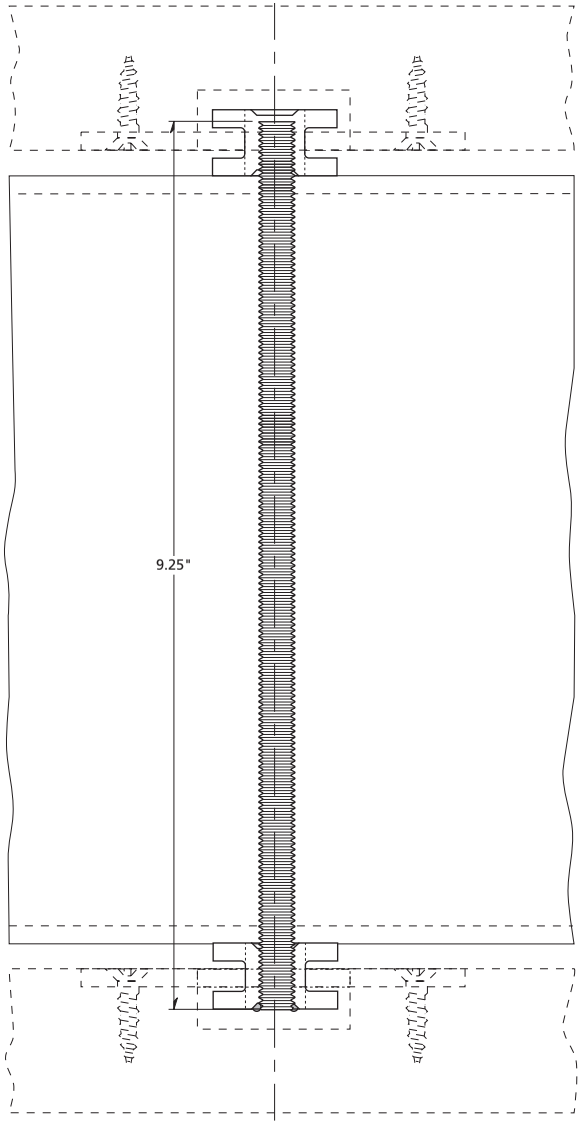
KEYHOLE CONNECTION TO 6" X 6" STEEL RAIL SIDE ELEVATION



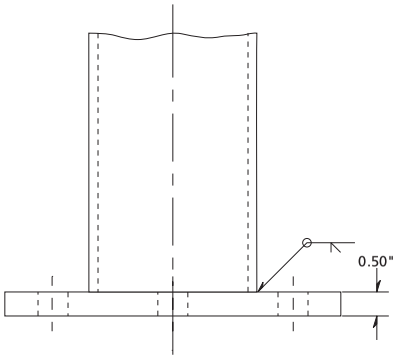
KEYHOLE CONNECTION TO 6" X 6" STEEL RAIL PLAN VIEW



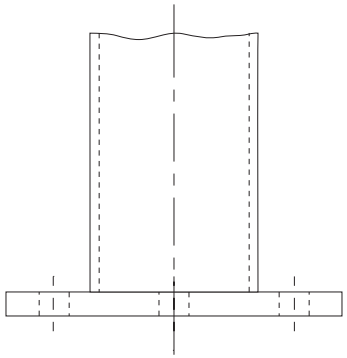
KEYHOLE CONNECTION TO 8" X 6" STEEL RAIL SIDE ELEVATION



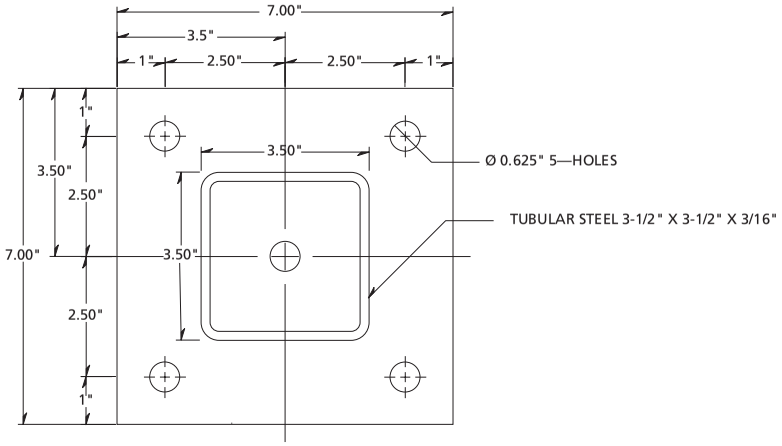
KEYHOLE CONNECTION TO 8" X 6" STEEL RAIL PLAN VIEW



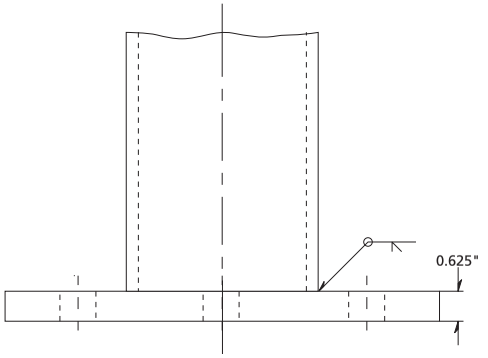
DETAIL B TS 3-1/2" x 3-1/2" x 3/16" BASEPLATE ASSEMBLY FRONT ELEVATION



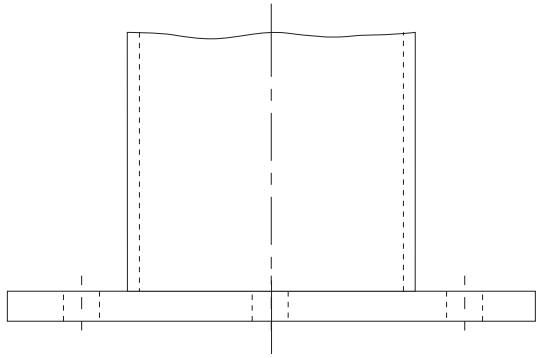
DETAIL B TS 3-1/2" x 3-1/2" x 3/16" BASEPLATE ASSEMBLY SIDE ELEVATION



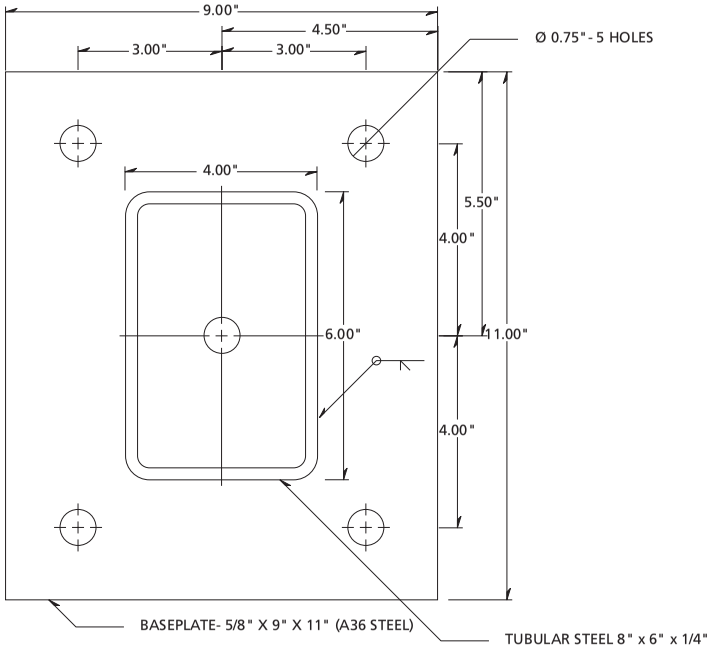
DETAIL B TS 3-1/2" x 3-1/2" x 3/16" BASEPLATE ASSEMBLY PLAN VIEW



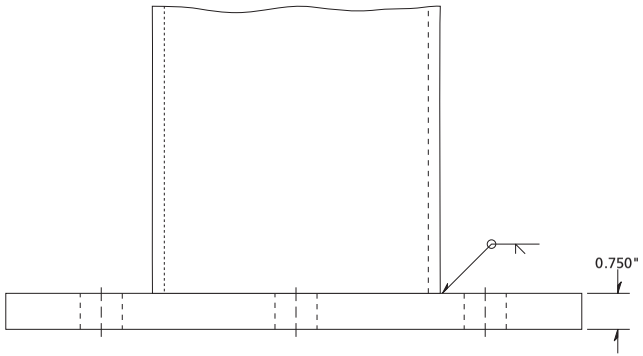
DETAIL G TUBULAR STEEL 6" x 4" x 1/4" BASEPLATE ASSEMBLY FRONT ELEVATION



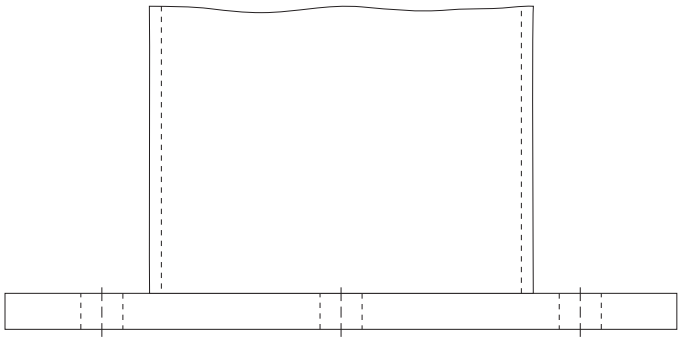
DETAIL G TUBULAR STEEL 6" x 4" x 1/4" BASEPLATE ASSEMBLY SIDE ELEVATION



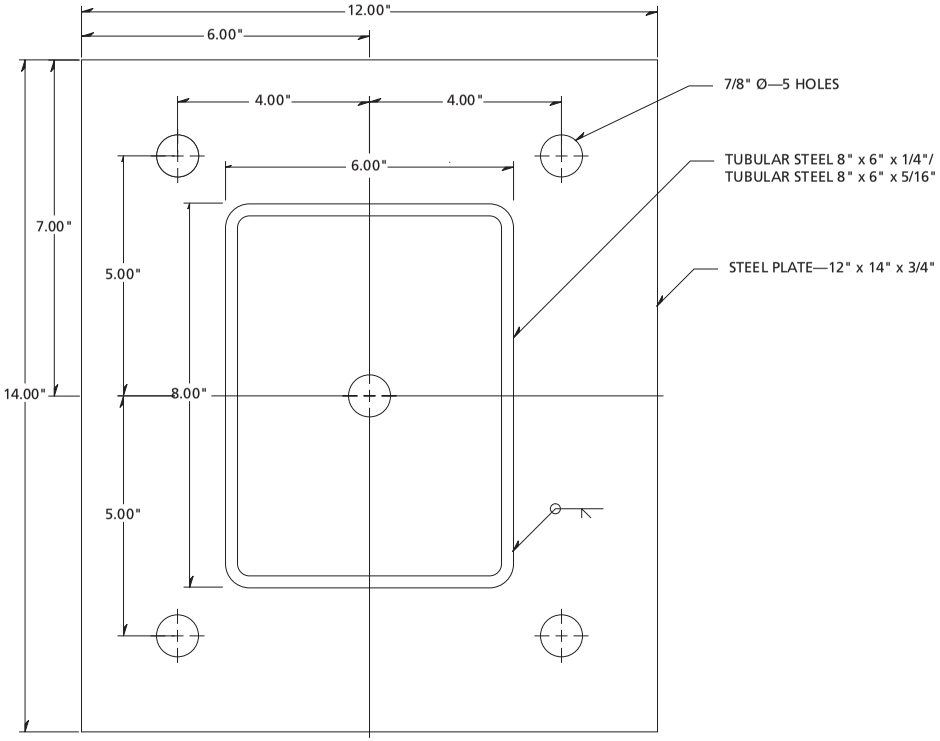
DETAIL G TUBULAR STEEL 6" x 4" x 1/4" BASEPLATE ASSEMBLY PLAN VIEW



DETAIL H 8 X 6 x 1/4" / 8" x 6" x 5/16" AND BASEPLATE ASSEMBLY FRONT ELEVATION

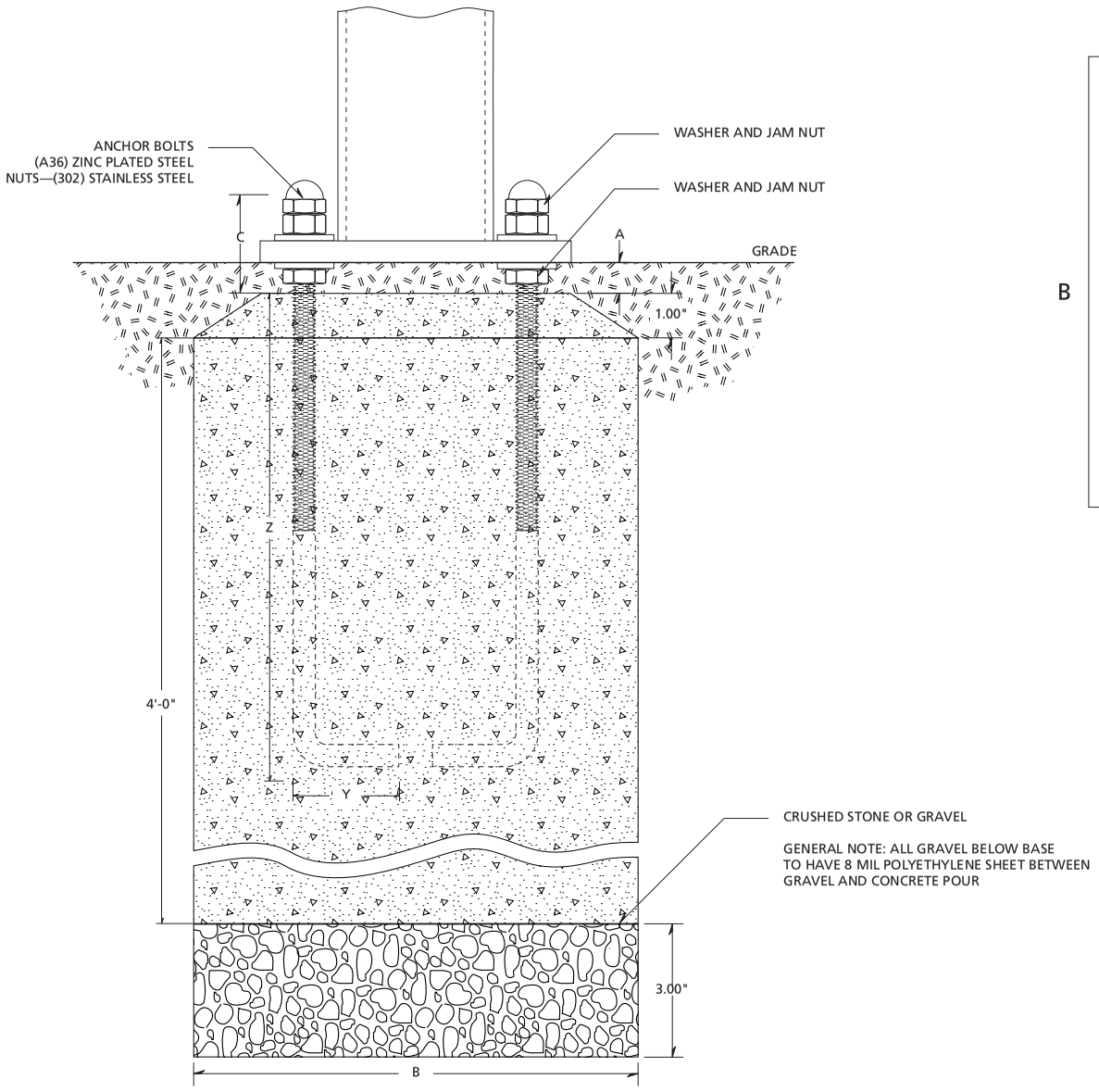


DETAIL H 8 X 6 x 1/4" / 8" x 6" x 5/16" AND BASEPLATE ASSEMBLY SIDE ELEVATION



DETAIL H 8 x 6 x 1/4" / 8" x 6" x 5/16" AND BASEPLATE ASSEMBLY PLAN VIEW

Anchor bolt diameter	Distance from top of footing to bottom of base plate (A)	Anchor bolt exposed from top of footing (C)	Anchor bolt emedment (Z)	Overall anchor bolt length	Anchor bolt return (Y)
1/2"	1"	2-3/4"	11-1/4"	14"	4"
5/8"	1-1/4"	3"	15"	18"	4"
3/4"	1-1/2"	3-1/2"	18-1/2"	22"	4"



FOOTING DETAIL FOR ALL SIZE SIGNS

ALL FOOTINGS ARE SQUARE
(SEE SCHEDULE FOR SIZE)

4" Legend Ground Mount Double Post Assembly

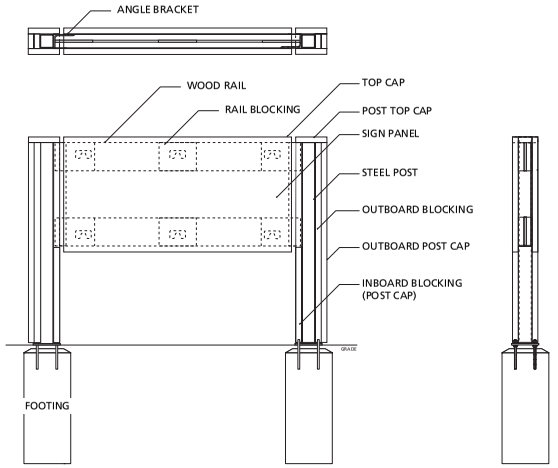
Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Lower Inboard Block (in)	Steel Angle Bracket (in)	Outboard Post Block (in)	Outboard Post Cover (in)	Anchor Bolt (Dia.)
		8		9		10		11		12		13		14		15		16		17		18		19		20							
		Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post						
PI-1GA	24.75	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	53.25	31.00	21.75	53.00	53.00	1/2"
PI-2GA	29.25	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	57.75	31.00	26.25	57.50	57.50	1/2"
PI-3GA	35.50	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	64.00	31.00	32.50	63.75	63.75	1/2"
PI-1GX	22.75	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	51.25	31.00	19.75	51.00	51.00	1/2"
PI-2GX	27.25	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	55.75	31.00	24.25	55.50	55.50	1/2"
PI-3GX	33.50	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	62.00	31.00	30.50	61.75	61.75	1/2"
FI-1G	20.00	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	48.50	31.00	17.00	48.25	48.25	1/2"
FI-2G	24.50	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	53.00	31.00	21.50	52.75	52.75	1/2"
FI-3G	30.00	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	58.50	31.00	27.00	58.25	58.25	1/2"
F/PI-1G	30.25	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	58.75	31.00	27.25	58.50	58.50	1/2"
F/PI-2G	36.50	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	65.00	31.00	33.50	64.75	64.75	1/2"
F/PI-3G	43.00	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	71.50	31.00	40.00	71.25	71.25	1/2"

Panel & Top Cap Lgth (in)	48	52	56	60	64	68	72	76	80	84	88	92	96
Wood Rail Length (2x8)	52.375	56.375	60.375	64.375	68.375	72.375	76.375	80.375	84.375	88.375	92.375	96.375	100.375
HAGL (Height Above Grade)	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00

Footing Dimension Key
A = 1'-0" x 1'-0" x 3'-3"
B = 1'-3" x 1'-3" x 3'-3"
C = 1'-6" x 1'-6" x 3'-3"
D = 1'-9" x 1'-9" x 3'-3"
E = 2'-0" x 2'-0" x 3'-3"
F = 2'-3" x 2'-3" x 4'-3"
G = 2'-6" x 2'-6" x 4'-3"
H = 2'-9" x 2'-9" x 4'-3"
I = 3'-0" x 3'-0" x 4'-3"
J = 3'-6" x 3'-6" x 4'-3"
K= 4'-0" x 4'-0" x 4'-3"

Post Dimension Key

3.5	= Use 3.5" x 3.5" x 3/16" Steel Post
6 X 4	= Use 6" x 4" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 3/16" Steel Post
8 X 6	= Use 8" x 6" x 5/16" Steel Post



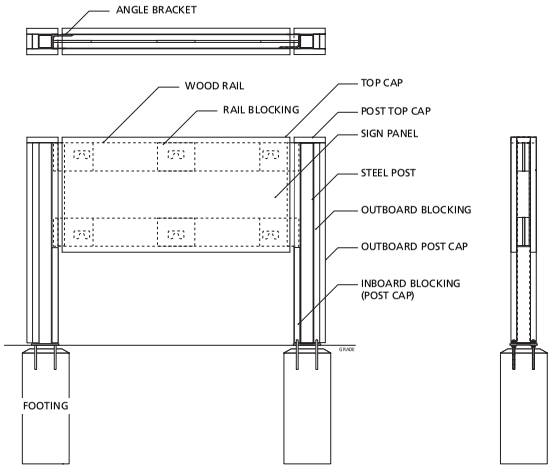
6" Legend Ground Mount Double Post Assembly with Wood Rails

Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Lower Inboard Block (in)	Steel Angle Bracket (in)	Outboard Post Block (in)	Outboard Post Cover (in)	Anchor Bolt (Dia.)
		8		9		10		11		12		13		14		15		16		17		18		19		20						
		Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post						
PI-1GA	37.25	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	65.75	31.00	21.75	65.50	65.50	1/2"
PI-2GA	43.75	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	72.25	31.00	28.25	72.00	72.00	1/2"
PI-3GA	53.50	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	D	3.5	D	3.5	D	3.5	D	3.5	D	3.5	D	3.5	82.00	31.00	38.00	81.75	81.75	1/2"
PI-1GX	34.25	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	62.75	31.00	18.75	62.50	62.50	1/2"
PI-2GX	40.75	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	69.25	31.00	25.25	69.00	69.00	1/2"
PI-3GX	50.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	79.00	31.00	35.00	78.75	78.75	1/2"
FI-1G	30.00	A	3.5	A	3.5	A	3.5	A	3.5	A	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	58.50	31.00	14.50	58.25	58.25	1/2"
FI-2G	36.50	A	3.5	A	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	C	3.5	C	3.5	C	3.5	65.00	31.00	21.00	64.75	64.75	1/2"
FI-3G	46.25	B	3.5	B	3.5	B	3.5	B	3.5	B	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	74.75	31.00	30.75	74.50	74.50	1/2"
F/PI-1G	45.25	B	3.5	B	3.5	B	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	73.75	31.00	29.75	73.50	73.50	1/2"
F/PI-2G	54.75	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5	C	3.5															83.25	31.00	39.25	83.00	83.00	1/2"

Panel Length (in)	72	78	84	90	96	102	108	114	120	126	132	138	144
Rail Length Wood (2x8)	76.5	82.5	88.5	94.5	100.5	106.5	112.5	118.5	124.5	130.5	136.5	142.5	148.5
HAGL (Height Above Grade)	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00

Footing Dimension Key
A = 1'-0" x 1'-0" x 3'-3"
B = 1'-3" x 1'-3" x 3'-3"
C = 1'-6" x 1'-6" x 3'-3"
D = 1'-9" x 1'-9" x 3'-3"
E = 2'-0" x 2'-0" x 3'-3"
F = 2'-3" x 2'-3" x 4'-3"
G = 2'-6" x 2'-6" x 4'-3"
H = 2'-9" x 2'-9" x 4'-3"
I = 3'-0" x 3'-0" x 4'-3"
J = 3'-6" x 3'-6" x 4'-3"
K= 4'-0" x 4'-0" x 4'-3"

Post Dimension Key	
3.5	= Use 3.5" x 3.5" x 3/16" Steel Post
6 X 4	= Use 6" x 4" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 1/4" Steel Post



6" Legend Ground Mount Double Post Assembly with Steel Rails

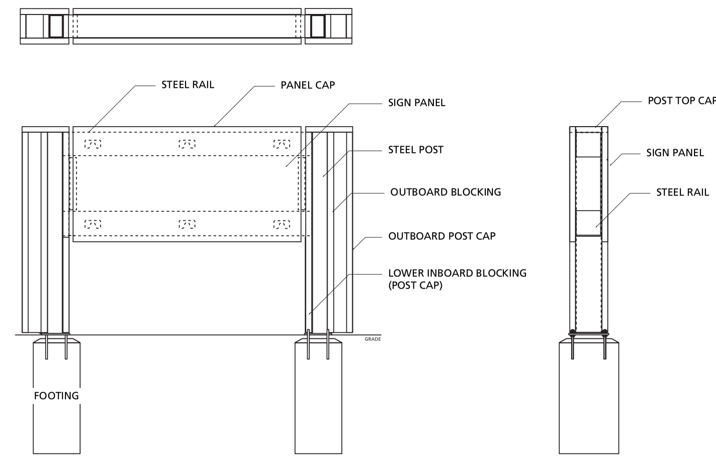
Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Lower Inboard Block (in)	Upper Inboard Block (in)*	Outboard Post Block (in)	Outboard Post Cover (in)	Anchor Bolt (Dia.)
		8		9		10		11		12		13		14		15		16		17		18		19		20							
		Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post						
														C	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	83.25	31.00	39.25	83.00	83.00	5/8"
F/PI-3G	64.50	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	D	6 x 4	93.00	31.00	49.00	92.75	92.75	5/8"

Panel & Top Cap Lgth (in)	72	78	84	90	96	102	108	114	120	126	132	138	144
Rail Length Steel (6x6)	77	83	89	95	101	107	113	119	125	131	137	143	149
HAGL (Height Above Grade)	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00

* Upper inboard blocking consists of 2 pieces, 3" thick overall (1-1/2" x 6" and 1-1/2" x 6-1/2")

Footing Dimension Key
A = 1'-0" x 1'-0" x 3'-3"
B = 1'-3" x 1'-3" x 3'-3"
C = 1'-6" x 1'-6" x 3'-3"
D = 1'-9" x 1'-9" x 3'-3"
E = 2'-0" x 2'-0" x 3'-3"
F = 2'-3" x 2'-3" x 4'-3"
G = 2'-6" x 2'-6" x 4'-3"
H = 2'-9" x 2'-9" x 4'-3"
I = 3'-0" x 3'-0" x 4'-3"
J = 3'-6" x 3'-6" x 4'-3"
K= 4'-0" x 4'-0" x 4'-3"

Post Dimension Key	
3.5	= Use 3.5" x 3.5" x 3/16" Steel Post
6 X 4	= Use 6" x 4" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 5/16" Steel Post



9" Legend Ground Mount Double Post Assembly

Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																														
		8		9		10		11		12		13		14		15		16		17		[18]		[19]		[20]							
		Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing													
PI-1GA	55.75	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6												
PI-2GA	65.75	D	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6												
PI-3GA	80	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	G	6 X 4	G	6 X 4	G	6												
PI-1GX	51.25	C	6 X 4	C	6 X 4	D	6 X 4	D	6 X4	D	6 X 4	D	6 X 4	D	6	D	6 X 4	E	6 X 4	E	6												
PI-2GX	61.25	D	6 X 4	D	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	F	6												
PI-3GX	75.5	E	6 X 4	E	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	G	6 X 4	G	6 X 4	G	6 x 4	G	6 X 4	G	6 X 4	98.00	25.00	60.00	97.75	97.75	5/8"
FI-1G	45	B	6 X 4	C	6 X 4	C	6 X 4	C	6 X 4	C	6 X 4	C	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	67.50	25.00	29.50	67.25	67.25	5/8"
FI-2G	55	C	6 X 4	C	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	D	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	77.50	25.00	39.50	77.25	77.25	5/8"
FI-3G	69.25	D	6 X 4	D	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	91.75	25.00	53.75	91.50	91.50	5/8"
F/PI-1G	67.75	E	6 X 4	E	6 X 4	E	6 X 4	E	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	90.25	25.00	52.25	90.00	90.00	5/8"
F/PI-2G	82.25	E	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	F	6 X 4	G	6 X 4	G	6 X 4	G	6 X 4	G	6 X 4	G	6 X 4	H	6 X 4	H	6 X 4	H	6 X 4	104.75	25.00	66.75	104.50	104.50	5/8"
F/PI-3G	96.5	G	6 X 4	G	6 X 4	G	6 X 4	G	6 X 4	H	6 X 4	H	8 X 6	H	8 X 6	H	8 X 6	H	8 X 6	H	8 x 6	H	8 X 6	H	8 X 6	H	8 X 6	119.00	25.00	81.00	118.75	118.75	3/4"

Panel & Top Cap Lgth (in)	108	117	126	135	144	153	162	171	180	189	198	207	216
Rail Length (6x6)	113	122	131	140	149	158	167	176	185	194	203	212	221
HAGL (Height Above Grade)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00

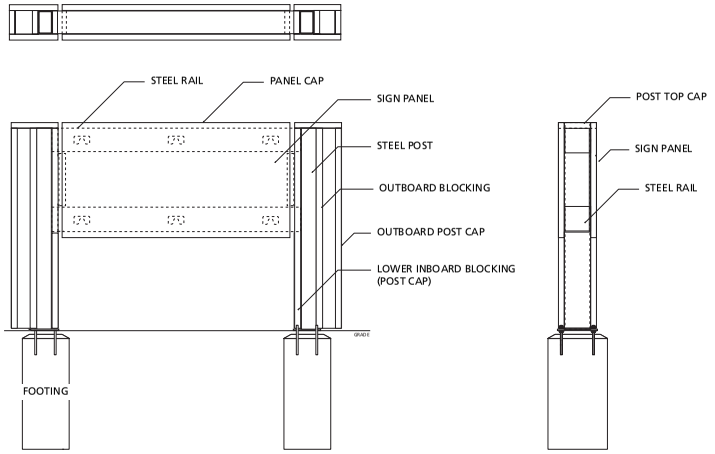
* Upper inboard blocking consists of 2 pieces, 3" thick overall (1-1/2" x 6" and 1-1/2" x 6-1/2")

Footing Dimension Key
A = 1'-0" x 1'-0" x 3'-3"
B = 1'-3" x 1'-3" x 3'-3"
C = 1'-6" x 1'-6" x 3'-3"
D = 1'-9" x 1'-9" x 3'-3"
E = 2'-0" x 2'-0" x 3'-3"
F = 2'-3" x 2'-3" x 4'-3"
G = 2'-6" x 2'-6" x 4'-3"
H = 2'-9" x 2'-9" x 4'-3"
I = 3'-0" x 3'-0" x 4'-3"
J = 3'-6" x 3'-6" x 4'-3"
K= 4'-0" x 4'-0" x 4'-3"

Post Dimension Key	
3.5	= Use 3.5" x 3.5" x 3/16" Steel Post
6 X 4	= Use 6" x 4" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 5/16" Steel Post

12" Legend Ground Mount Double Post Assembly

Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																					
		8		9		10		11		12		13		14		15		16		17		18	
		Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post
PI-1GA	74.50	I	6 X 4	I	6 X 4	I	6 X 4	J	6 x 4	J	6 x 4	J	6 x 4	J	6 x 4	J	6 X 4	J	6 X 4				
PI-2GA	87.50	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 X 6	J	8 X 6				
PI-3GA	106.75																						
PI-1GX	68.50	I	6 x 4	I	6 x 4	I	6 x 4	I	6 X 4	I	6 X 4	J	6 X 4	J	6 X 4	J	6 X 4	J	6 X 4				
PI-2GX	81.50	J	6 x 4	J	6 x 4	J	6 x 4																
PI-3GX	81.50							J	8 X 6	J	8 X 6	J	8 X 6	J	8 X 6	J	8 X 6	J	8 X 6				
FI-1G	60.00	H	8 x 6	H	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 X 6				
FI-2G	73.25	I	8 x 6	I	8 x 6	I	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 X 6				
FI-3G	92.50																						
F/PI-1G	90.50	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	K	8 x 6	K	8 x 6	K	8 X 6	K	8 X 6				
F/PI-2G	109.58	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 X 6	K	8 X 6				
F/PI-3G	128.75																						
Panel & Top Cap Lgth (in)		144		156		168		180		192		204		216		228		240					
Rail Length (8x6)		149		161		173		185		197		209		221		233		245					
HAGL (Height Above Grade)		30.00		30.00		30.00		30.00		30.00		30.00		30.00		30.00		30.00					



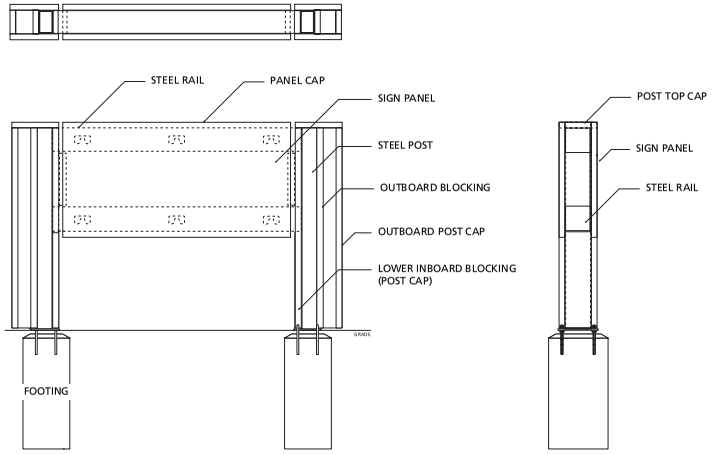
12" Legend Ground Mount Double Post Assembly

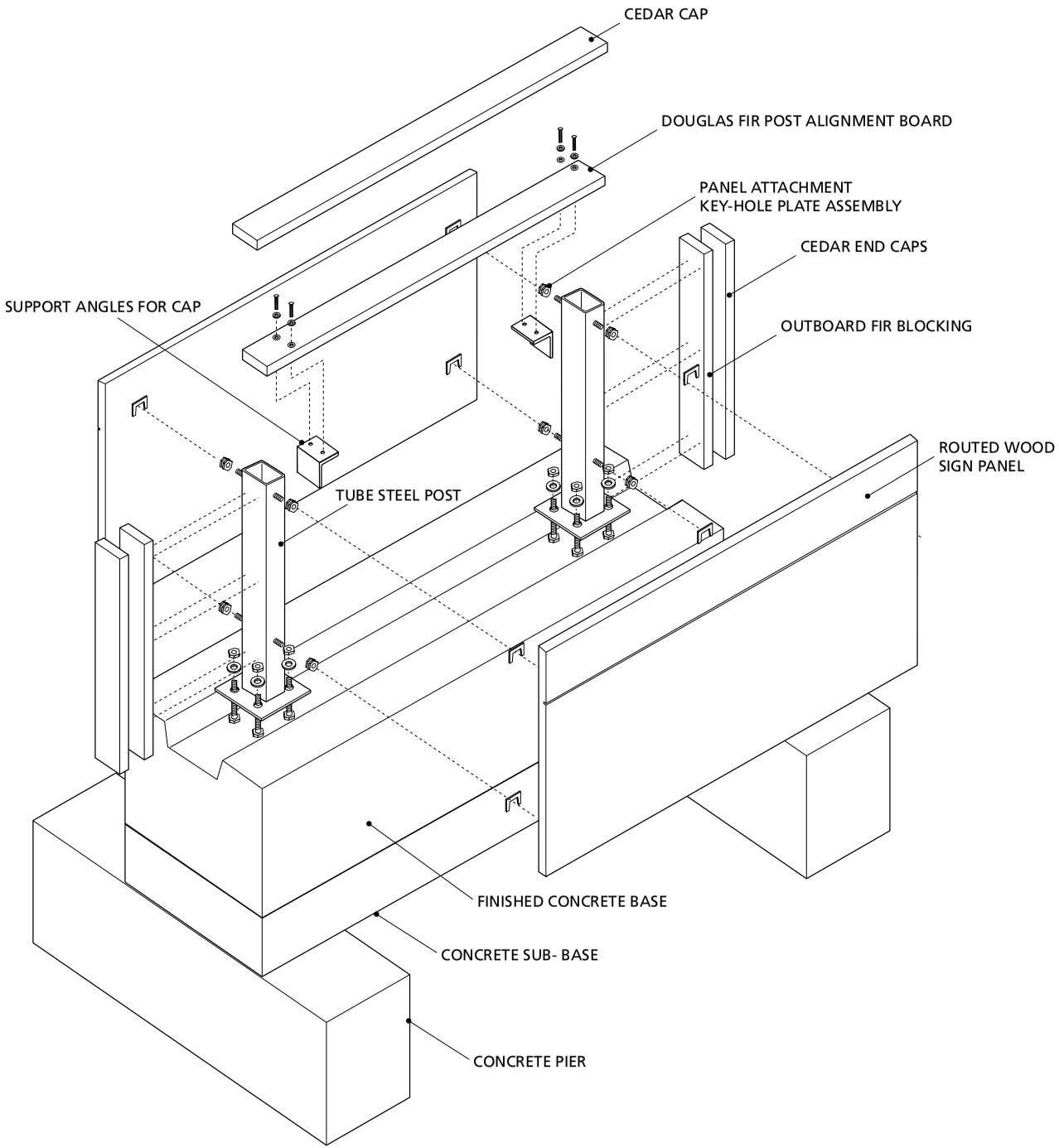
Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Lower Inboard Cover (in)	Upper Inboard Block (in)*	Outboard Post Block (in)	Outboard Post Cover (in)	Anchor Bolt (Dia.)
		8		9		10		11		12		13		14		15		16		17		18		19		20							
		Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post	Footing	Post						
PI-1GA	74.50	I	6 X 4	I	6 X 4	I	6 X 4	J	6 x 4	J	6 x 4	J	6 x 4	J	6 x 4	J	6 X 4	J	6 X 4									103.00	29.50	59.00	102.75	102.75	5/8"
PI-2GA	87.50	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 X 6	J	8 X 6									116.00	29.50	72.25	115.75	115.75	3/4"
PI-3GA	106.75																																
PI-1GX	68.50	I	6 x 4	I	6 x 4	I	6 x 4	I	6 X 4	I	6 X 4	J	6 x 4	J	6 X 4	J	6 X 4	J	6 X 4									97.00	29.50	53.25	96.75	96.75	5/8"
PI-2GX	81.50	J	6 x 4	J	6 x 4	J	6 x 4																					110.00	29.50	66.25	109.75	109.75	5/8"
PI-3GX	81.50							J	8 X 6	J	8 X 6	J	8 X 6	J	8 X 6	J	8 X 6	J	8 X 6									110.00	29.50	66.25	109.75	109.75	3/4"
FI-1G	60.00	H	8 x 6	H	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 x 6	I	8 X 6									88.50	29.50	44.75	88.25	88.25	5/8"
FI-2G	73.25	I	8 x 6	I	8 x 6	I	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 X 6									101.75	29.50	58.00	101.50	101.50	5/8"
FI-3G	92.50																																
F/PI-1G	90.50	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	J	8 x 6	K	8 x 6	K	8 x 6	K	8 X 6	K	8 X 6									119.00	29.50	75.25	118.75	118.75	3/4"
F/PI-2G	109.58	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 x 6	K	8 X 6	K	8 X 6									138.08	29.50	94.33	137.83	137.83	3/4"
F/PI-3G	128.75																																
Panel & Top Cap Lgth (in)		144		156		168		180		192		204		216		228		240															
Rail Length (8x6)		149		161		173		185		197		209		221		233		245															
HAGL (Height Above Grade)		30.00		30.00		30.00		30.00		30.00		30.00		30.00		30.00		30.00															

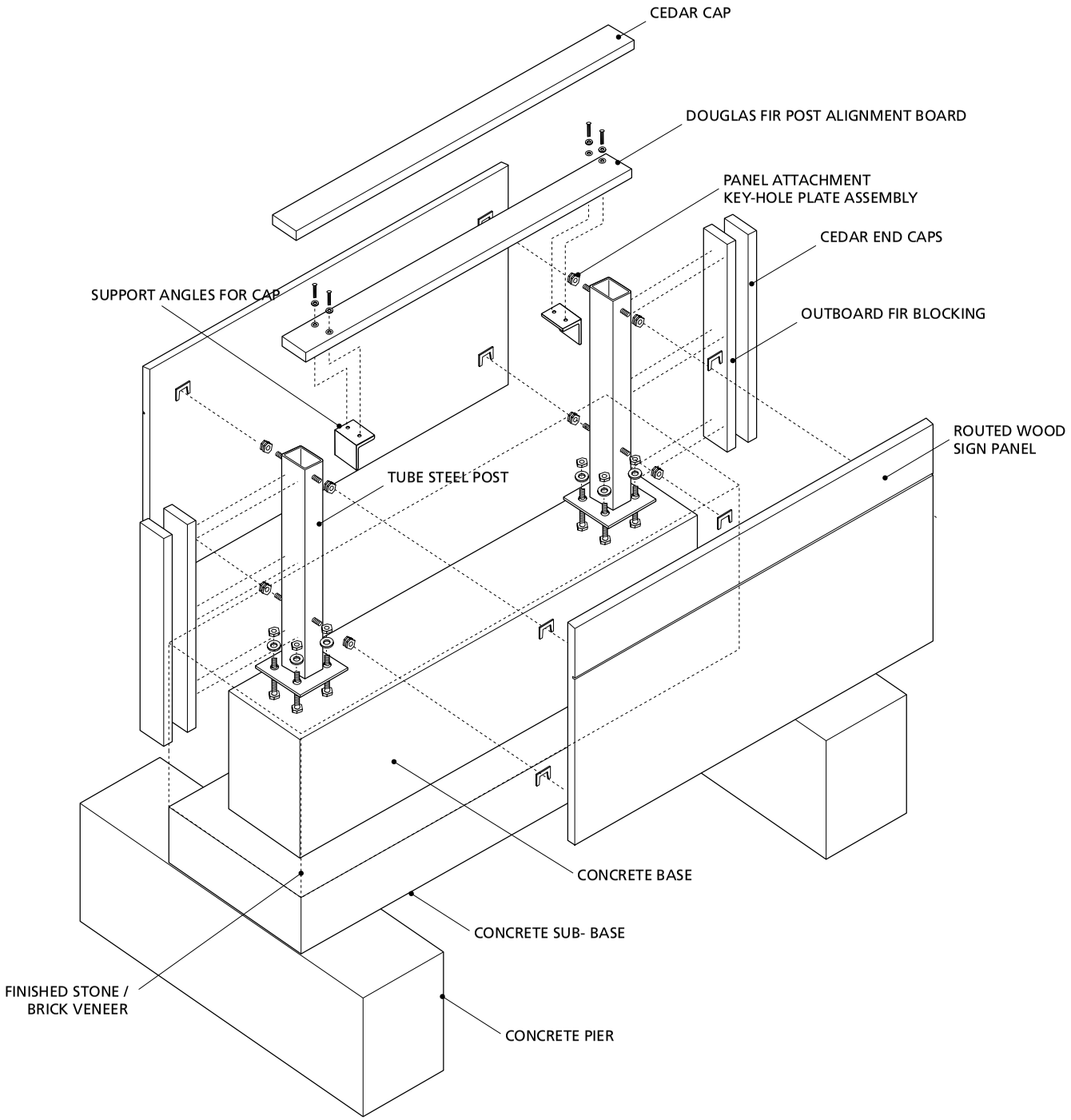
Footing Dimension Key
A = 1'-0" x 1'-0" x 3'-3"
B = 1'-3" x 1'-3" x 3'-3"
C = 1'-6" x 1'-6" x 3'-3"
D = 1'-9" x 1'-9" x 3'-3"
E = 2'-0" x 2'-0" x 3'-3"
F = 2'-3" x 2'-3" x 4'-3"
G = 2'-6" x 2'-6" x 4'-3"
H = 2'-9" x 2'-9" x 4'-3"
I = 3'-0" x 3'-0" x 4'-3"
J = 3'-6" x 3'-6" x 4'-3"
K= 4'-0" x 4'-0" x 4'-3"

Post Dimension Key

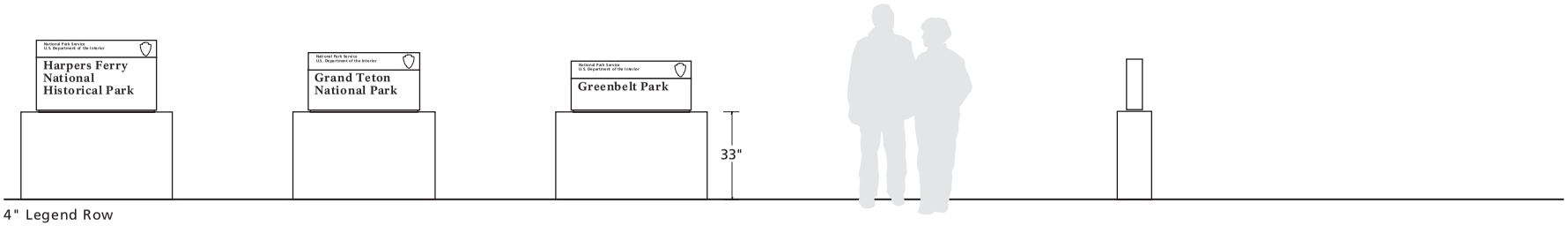
3.5	= Use 3.5" x 3.5" x 3/16" Steel Post
6 X 4	= Use 6" x 4" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 1/4" Steel Post
8 X 6	= Use 8" x 6" x 5/16" Steel Post



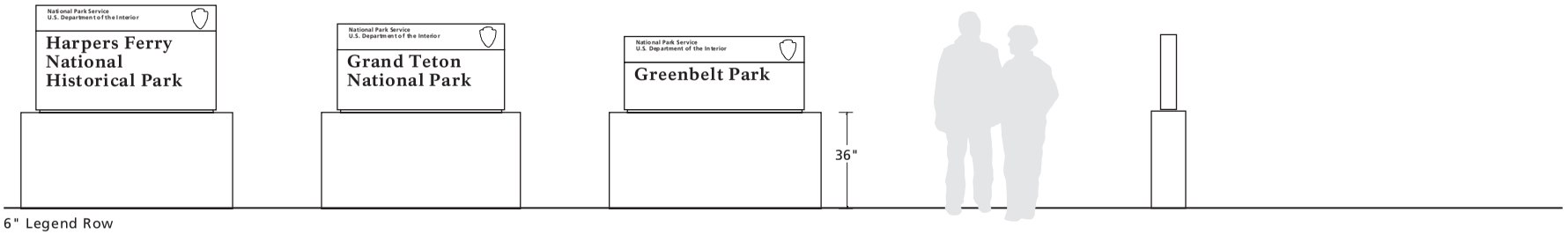

CEDAR CAP
DOUGLAS FIR POST ALIGNMENT BOARD
PANEL ATTACHMENT
KEY-HOLE PLATE ASSEMBLY
CEDAR END CAPS
SUPPORT ANGLES FOR CAP
OUTBOARD FIR BLOCKING
ROUTED WOOD
SIGN PANEL
TUBE STEEL POST
FINISHED CONCRETE BASE
CONCRETE SUB- BASE
CONCRETE PIER


CEDAR CAP
DOUGLAS FIR POST ALIGNMENT BOARD
PANEL ATTACHMENT
KEY-HOLE PLATE ASSEMBLY
CEDAR END CAPS
SUPPORT ANGLES FOR CAP
OUTBOARD FIR BLOCKING
ROUTED WOOD
SIGN PANEL
TUBE STEEL POST
CONCRETE BASE
CONCRETE SUB- BASE
FINISHED STONE /
BRICK VENEER
CONCRETE PIER

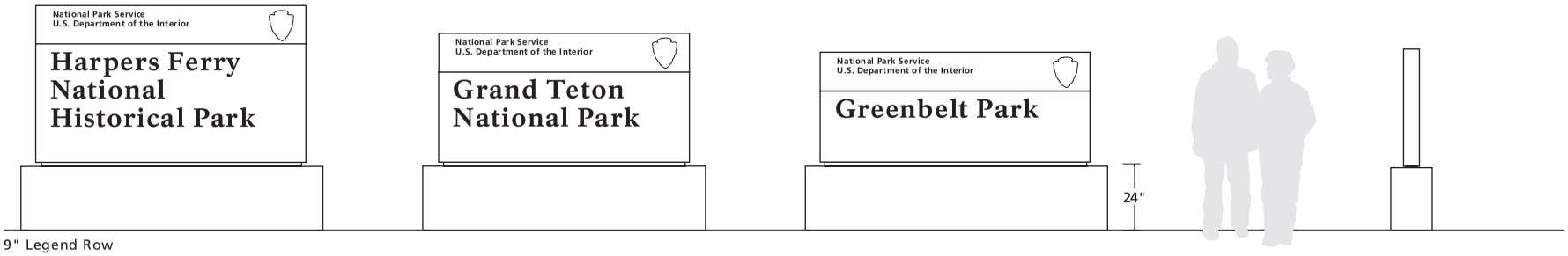
Monolith (cast in place concrete): shown with core for veneer treatment



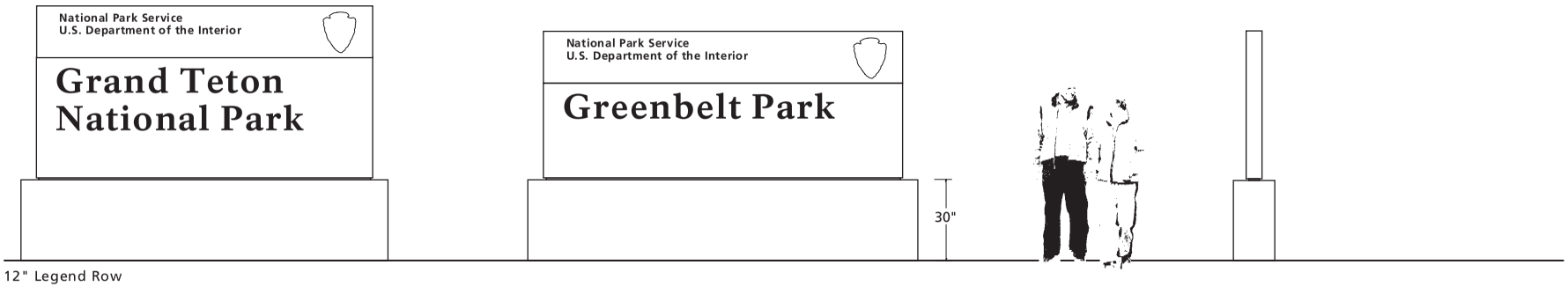
4" Legend Row



6" Legend Row

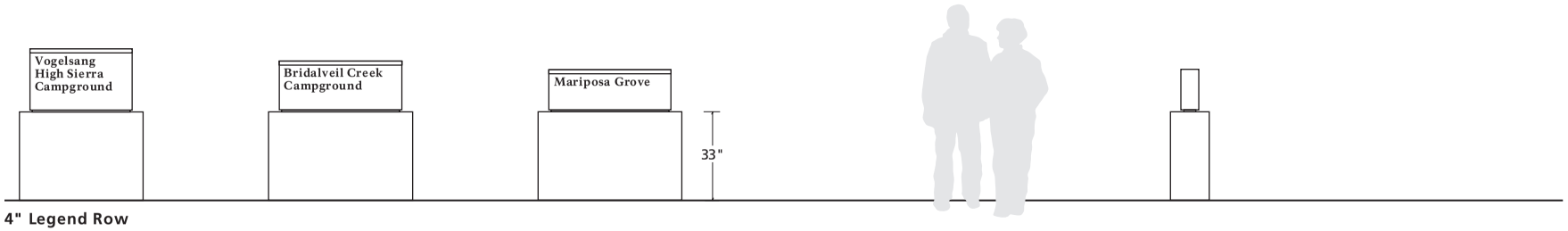


9" Legend Row

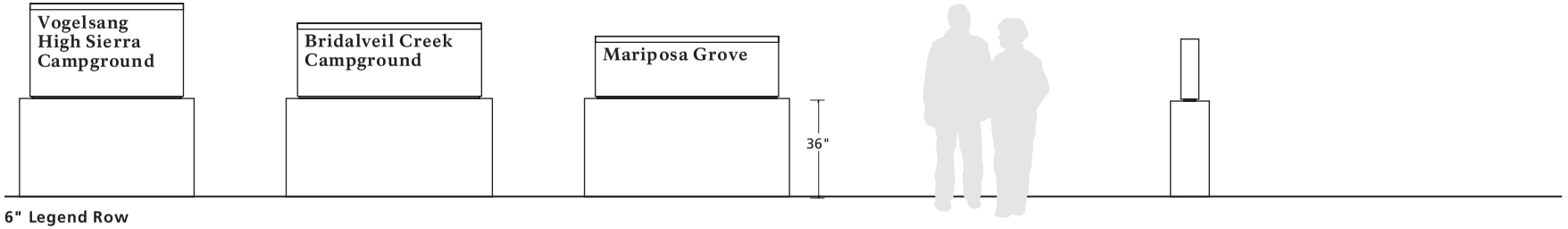


12" Legend Row

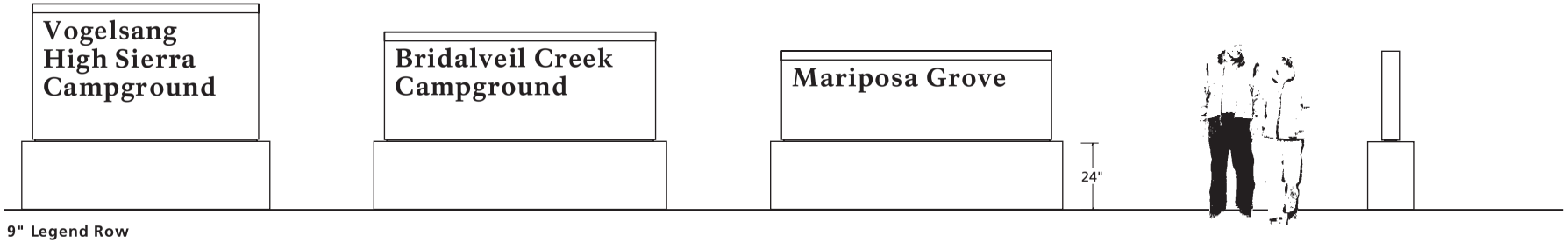
Monolith (Facility ID) cast in place concrete: shown with core for veneer treatment



4" Legend Row

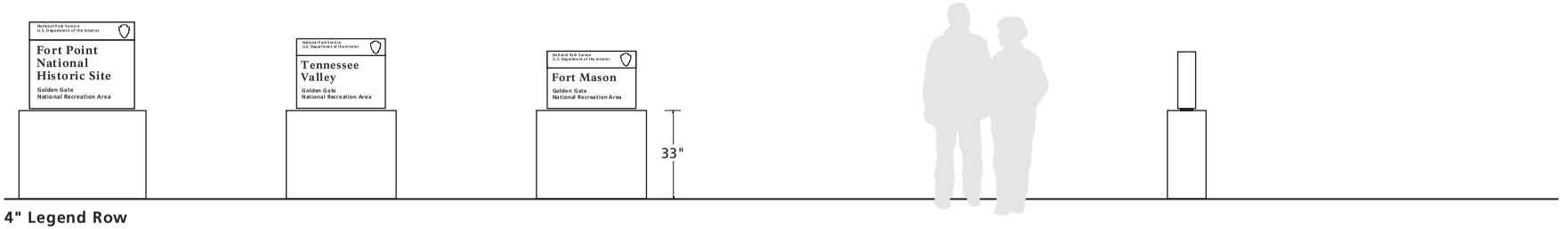


6" Legend Row

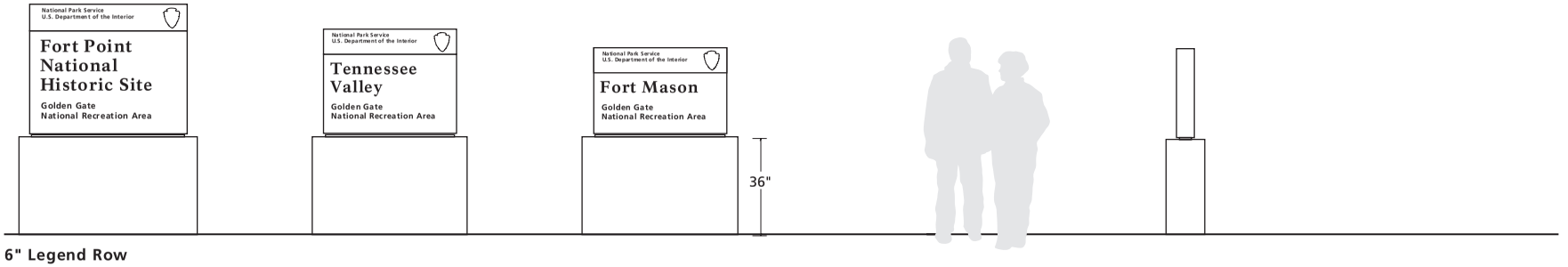


9" Legend Row

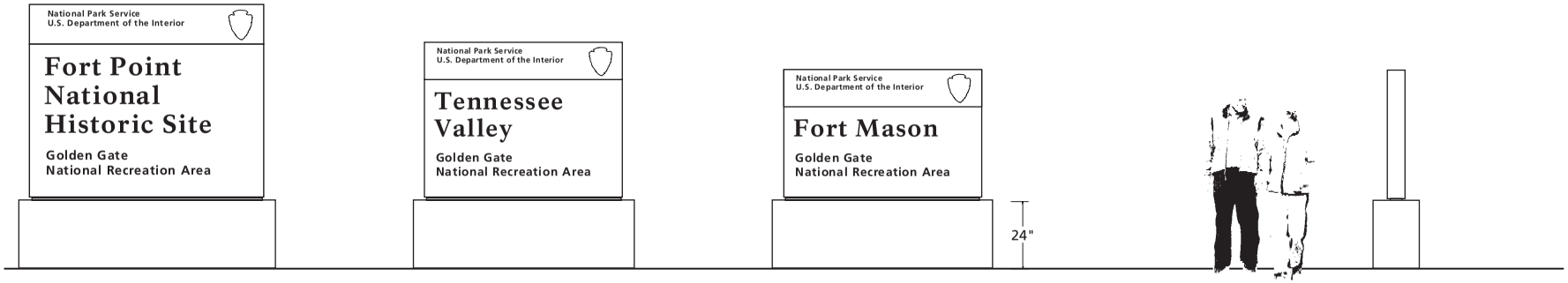
Monolith (Facility ID with Park Identification) cast in place concrete: shown with core for veneer treatment



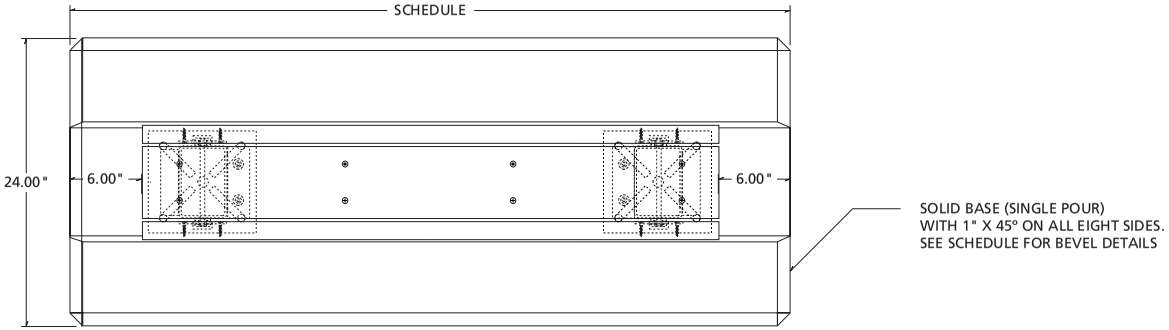
4" Legend Row



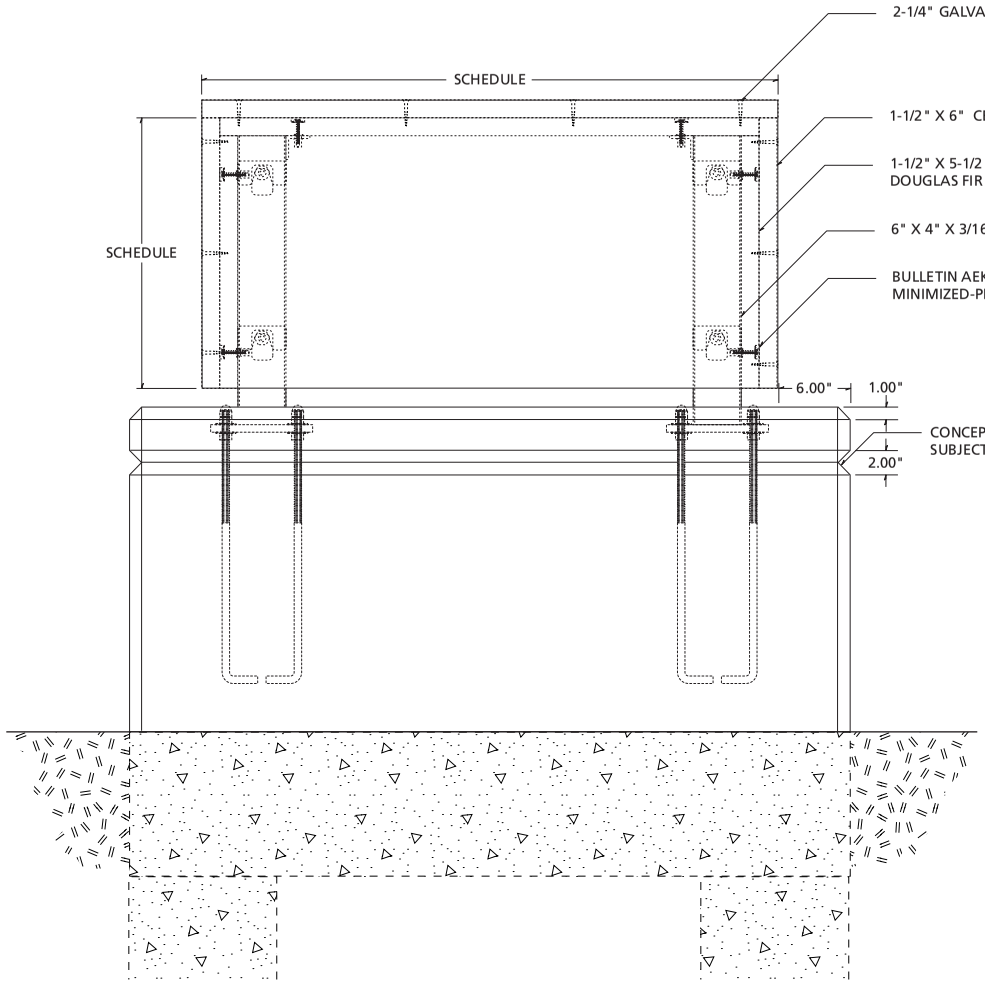
6" Legend Row



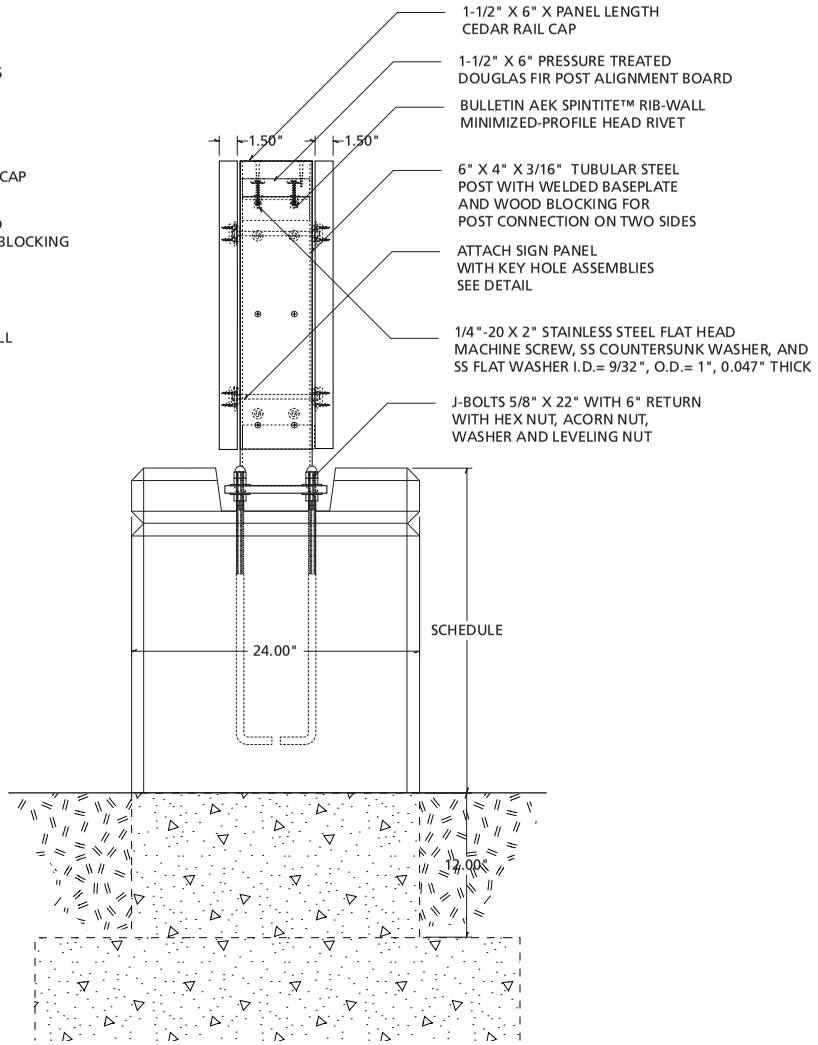
9" Legend Row



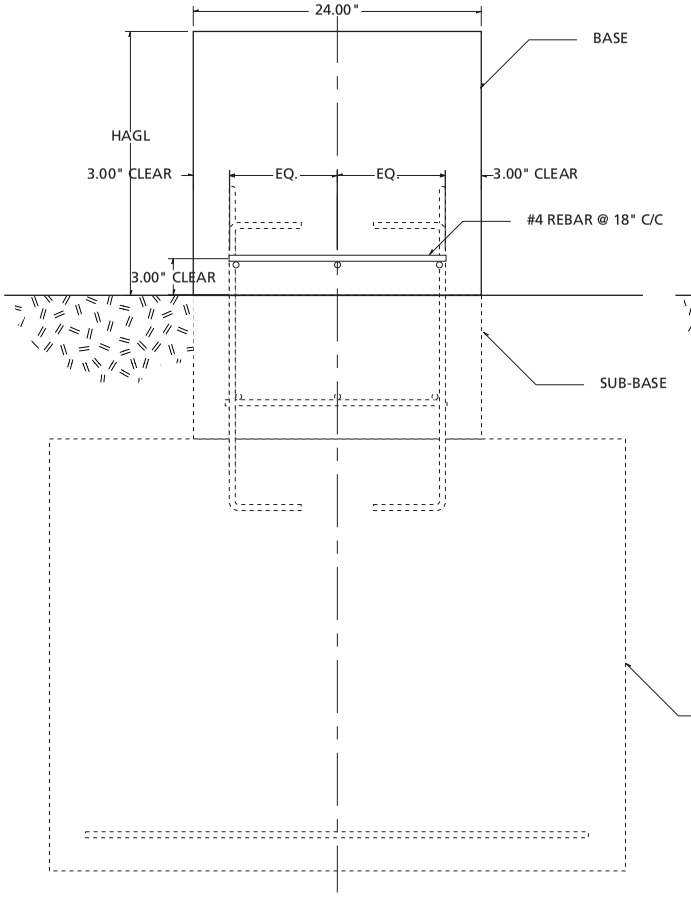
CONNECTION DETAIL FOR SOLID BASE MONOLITH PLAN VIEW



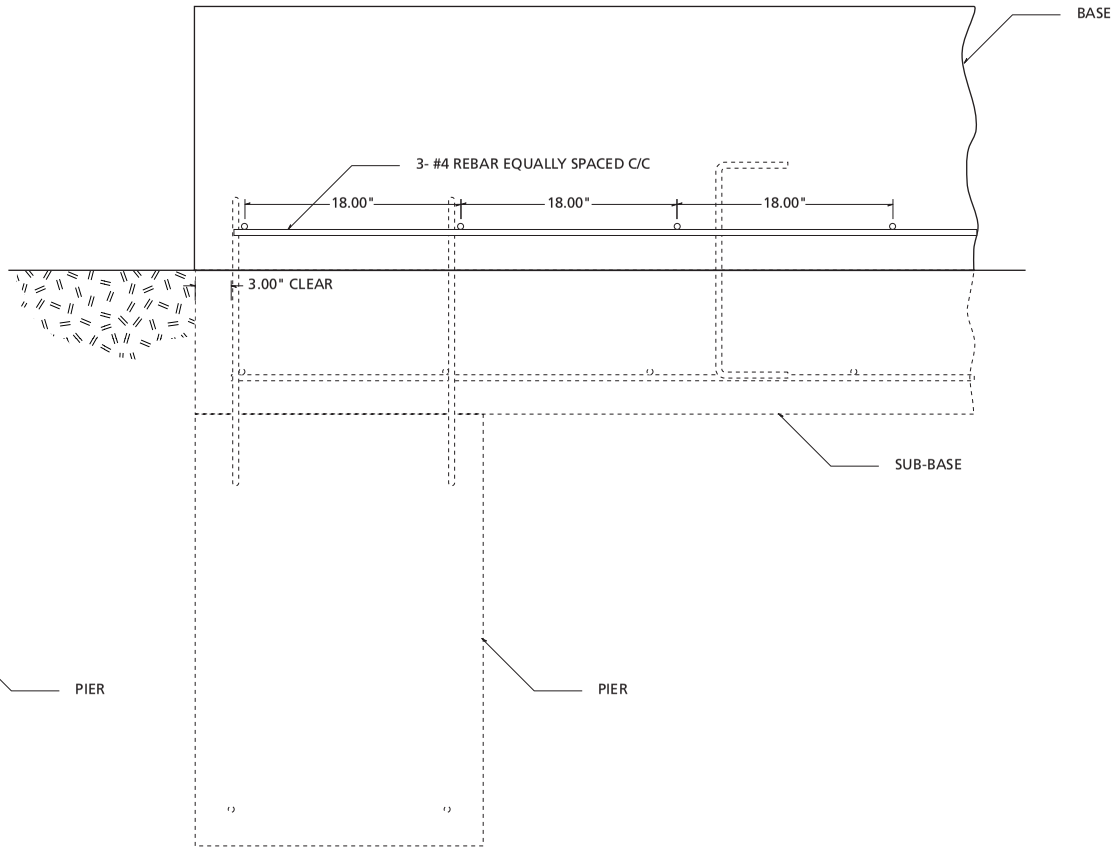
CONNECTION DETAIL FOR SOLID BASE MONOLITH FRONT ELEVATION



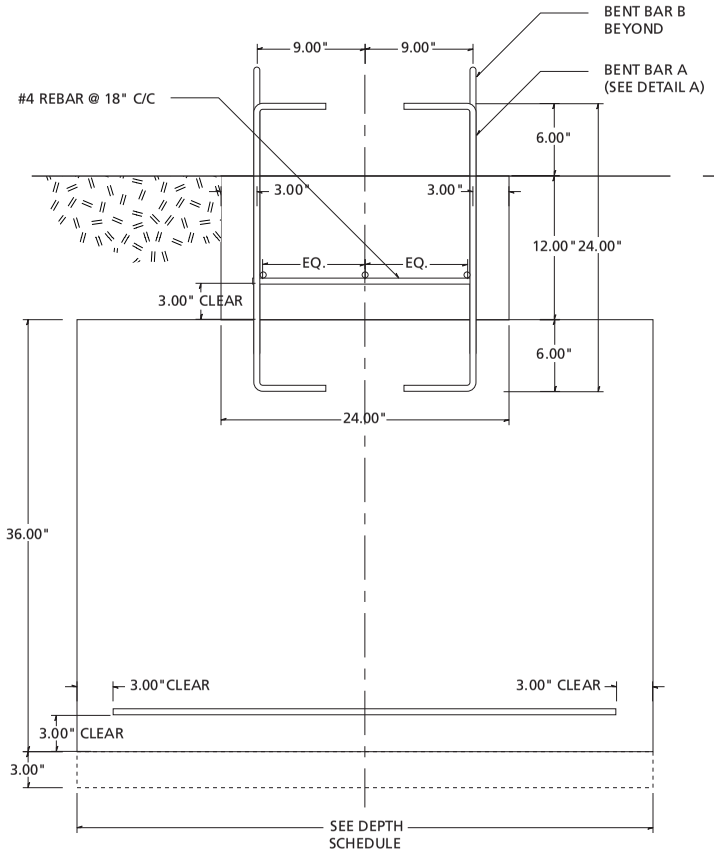
CONNECTION DETAIL FOR SOLID BASE MONOLITH SIDE ELEVATION



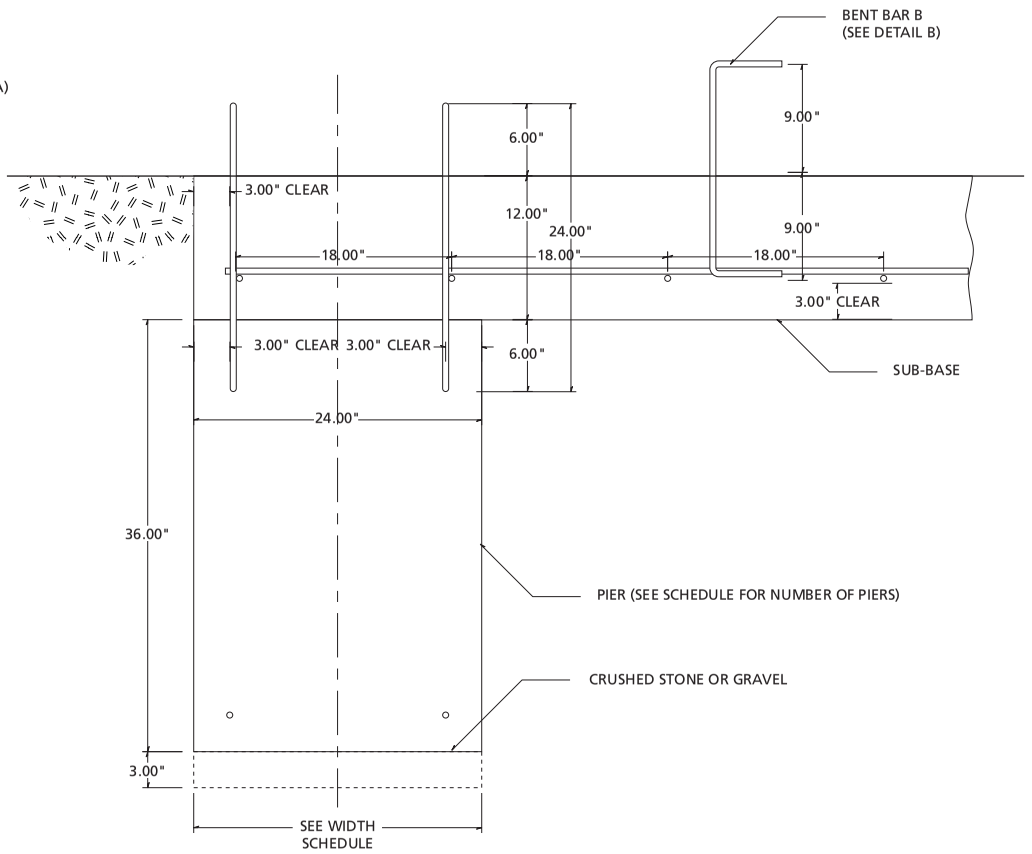
BASE REBAR DIAGRAM SIDE ELEVATION



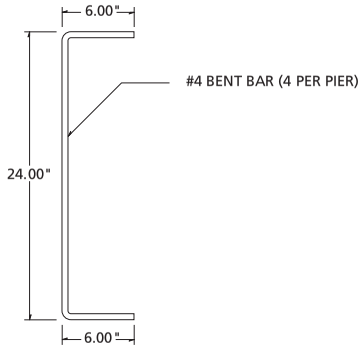
BASE REBAR DIAGRAM FRONT ELEVATION



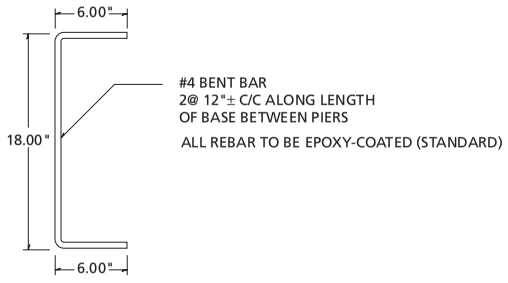
PIER/SUB-BASE REBAR DIAGRAM SIDE ELEVATION



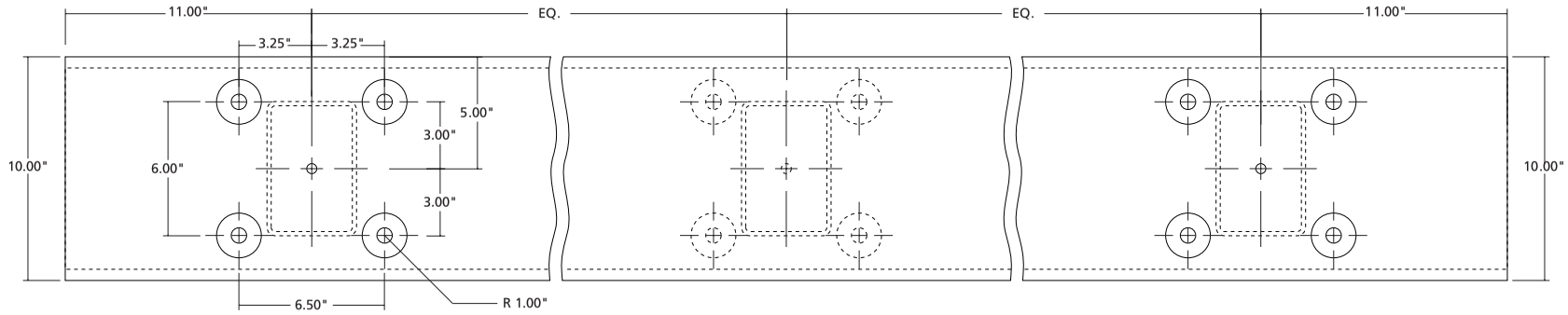
PIER/SUB-BASE REBAR DIAGRAM FRONT ELEVATION



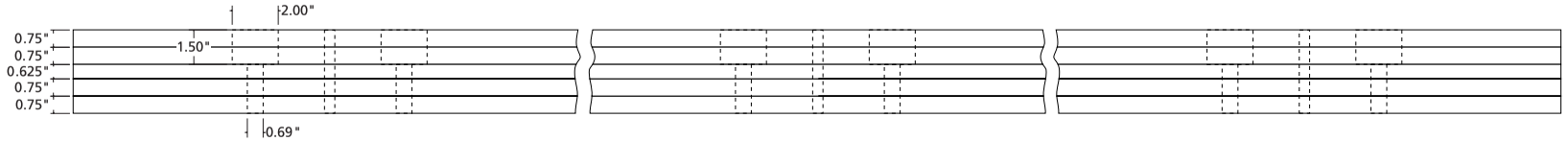
DETAIL A



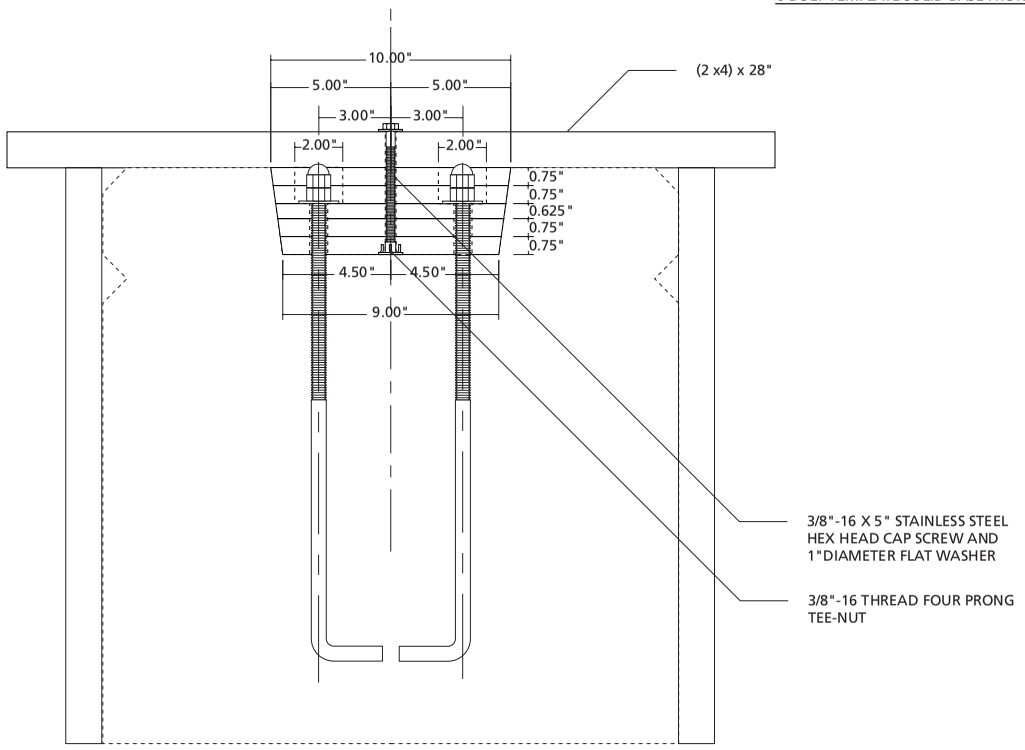
DETAIL B



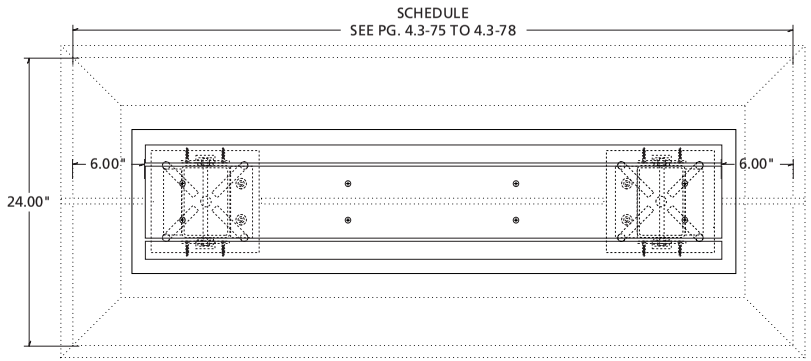
J-BOLT TEMPLATE SOLID BASE PLAN VIEW



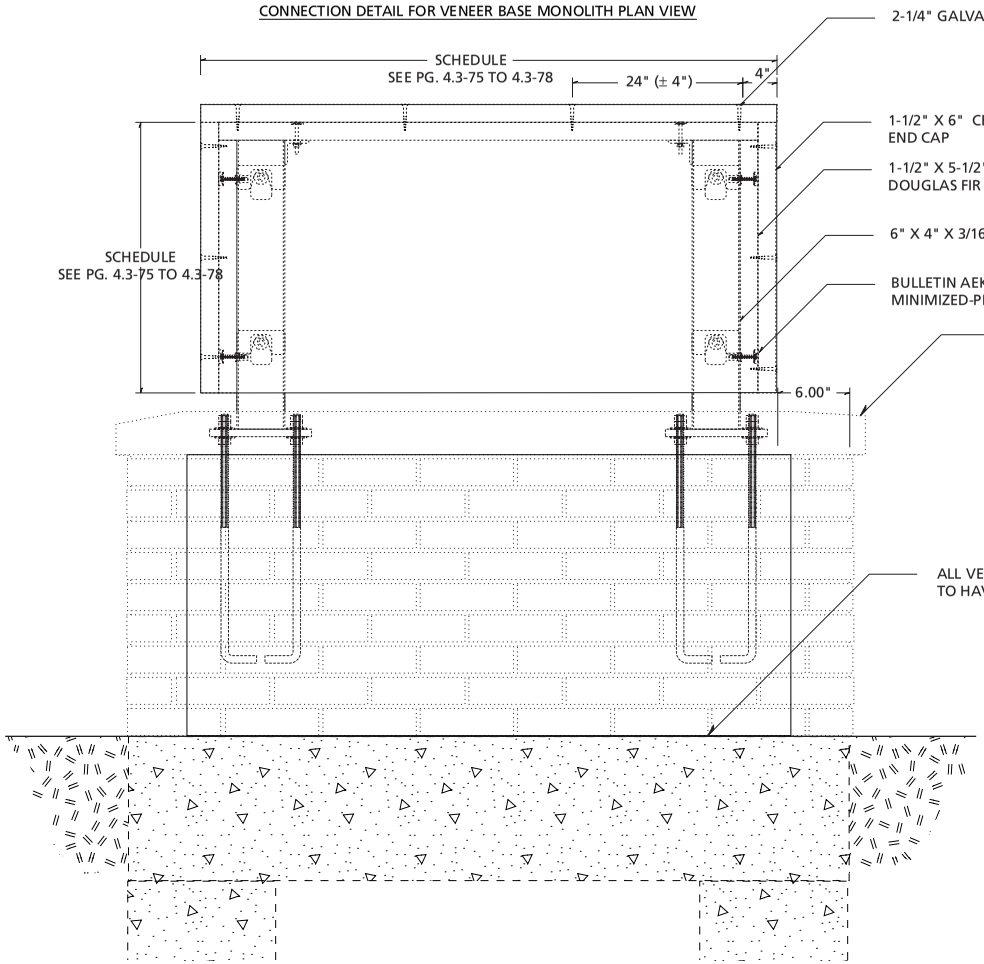
J-BOLT TEMPLATE SOLID BASE FRONT ELEVATION



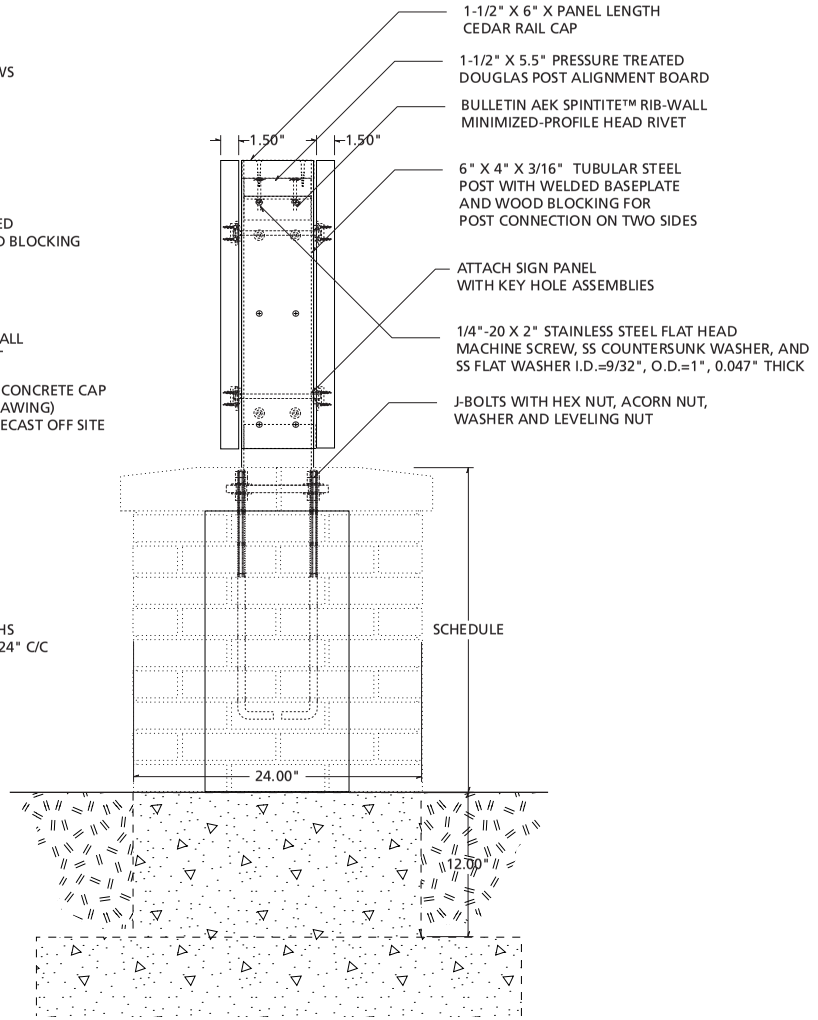
J-BOLT TEMPLATE SOLID BASE SIDE ELEVATION



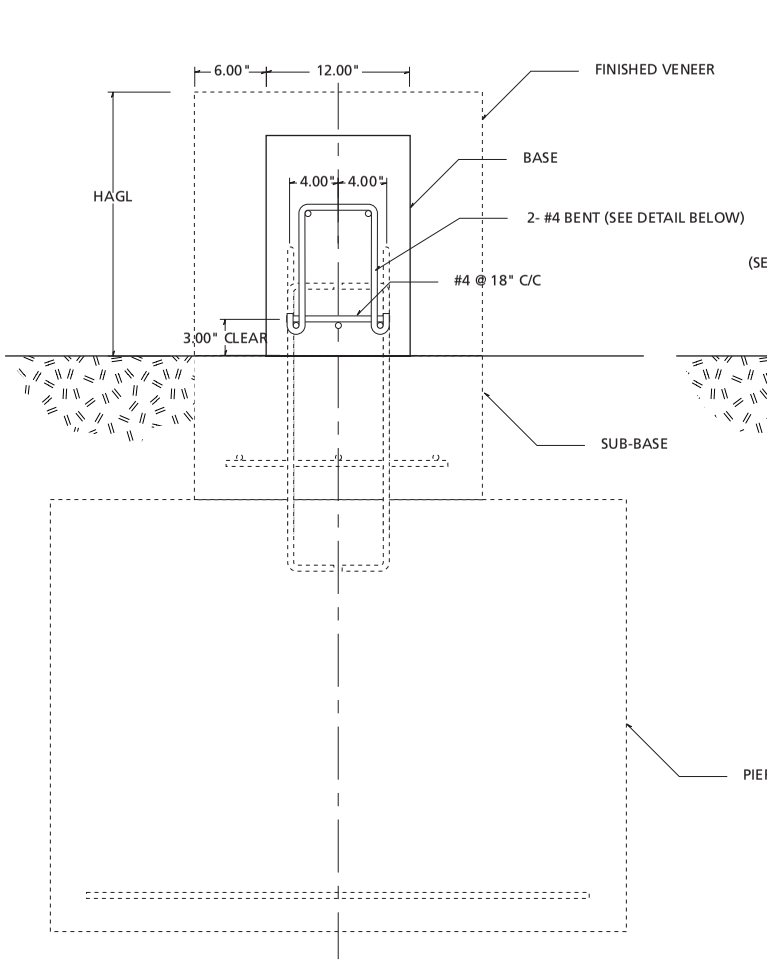
CONNECTION DETAIL FOR VENEER BASE MONOLITH PLAN VIEW



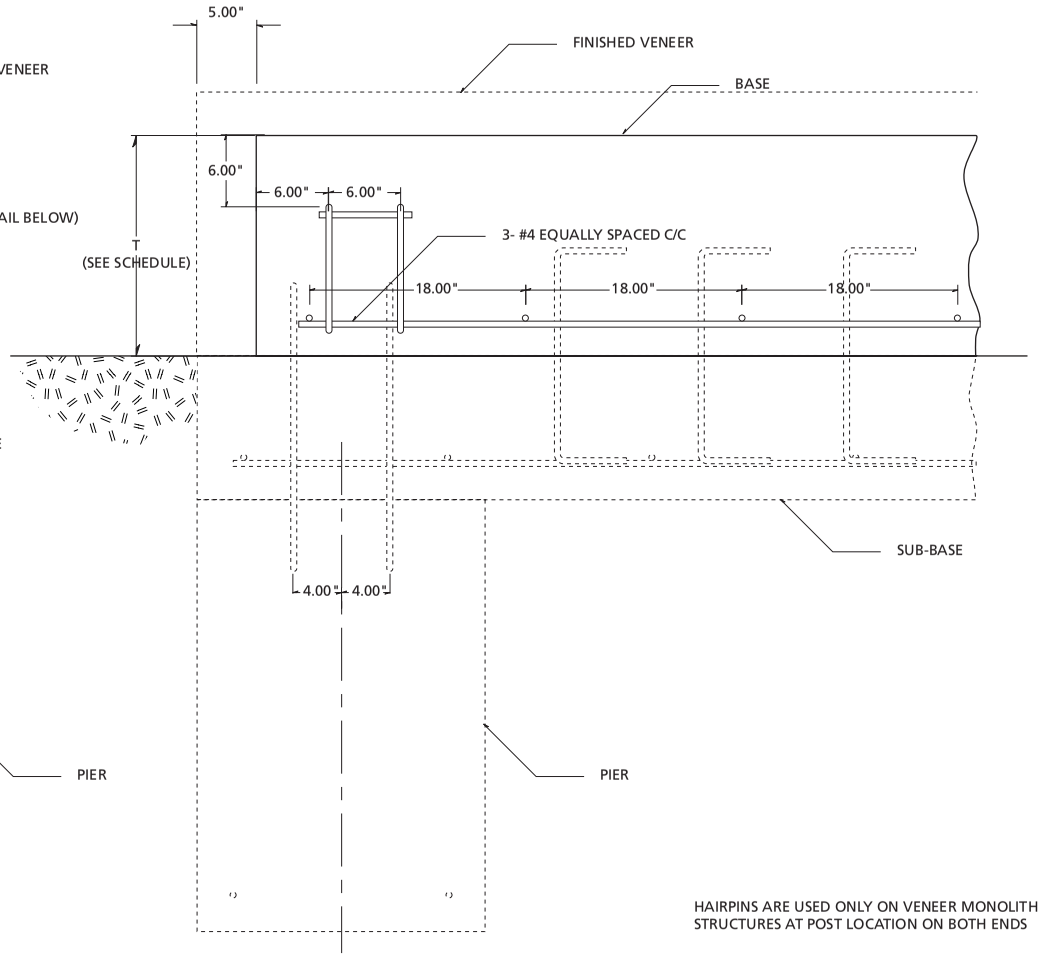
CONNECTION DETAIL FOR VENEER BASE MONOLITH FRONT ELEVATION



CONNECTION DETAIL FOR VENEER BASE MONOLITH SIDE ELEVATION



REBAR BASE WITH VENEER DIAGRAM SIDE ELEVATION

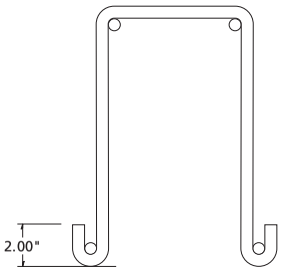


BASE REBAR DIAGRAM FRONT ELEVATION

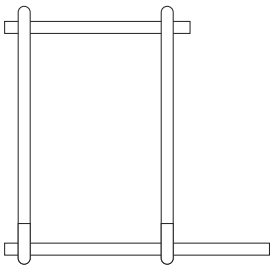
HAIRPINS ARE USED ONLY ON VENEER MONOLITH STRUCTURES AT POST LOCATION ON BOTH ENDS

BASE POUR HEIGHT SCHEDULE FOR MONOLITHS WITH VENEER

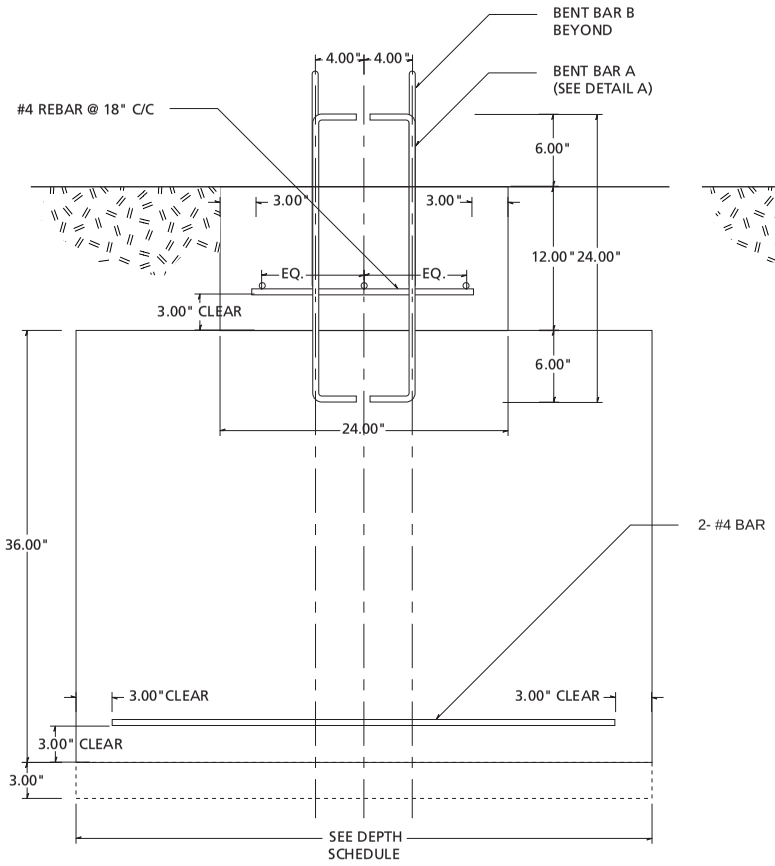
HAGL	T
33"	29.375"
36"	32.375"
24"	20.375"
30	26.375"



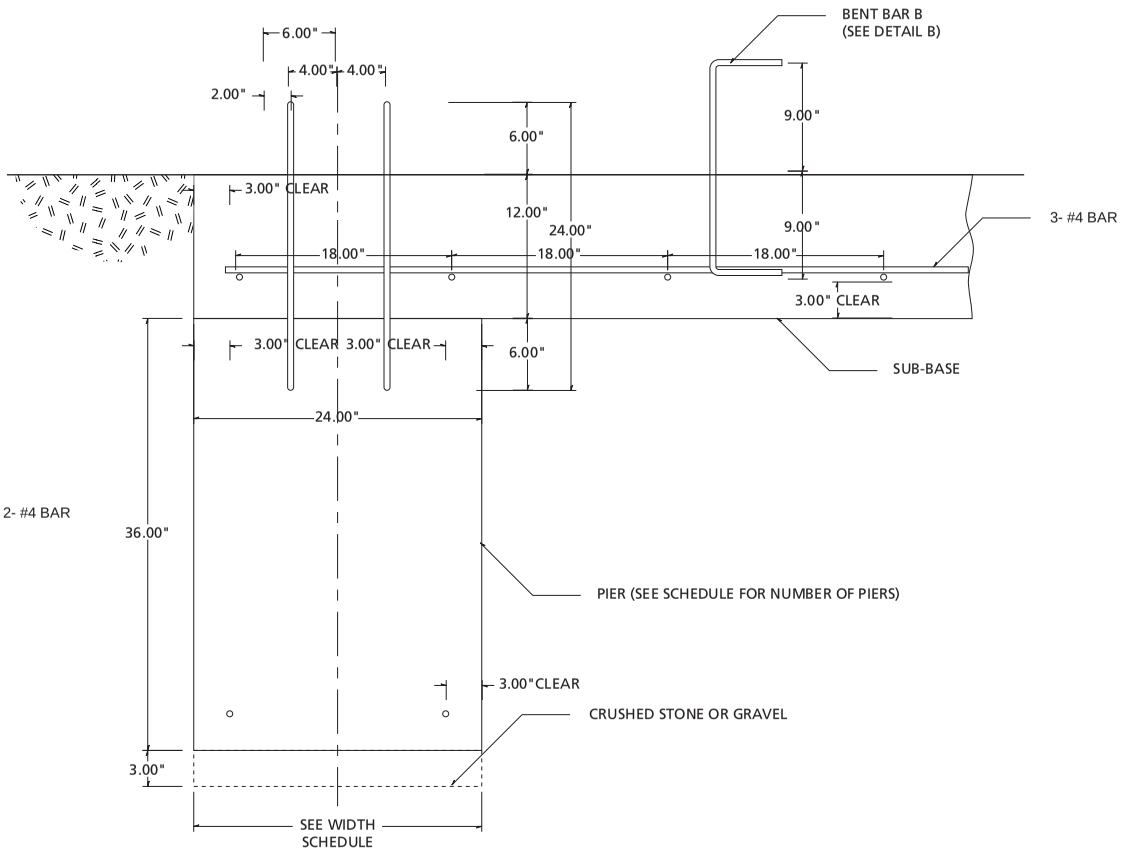
HAIRPINS SIDE ELEVATION



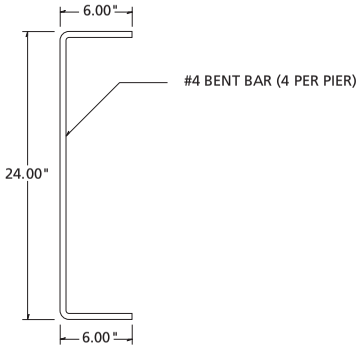
HAIRPINS FRONT ELEVATION



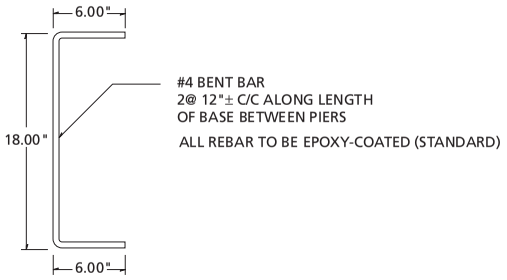
PIER/SUB-BASE REBAR DIAGRAM WITH VENEER SIDE ELEVATION



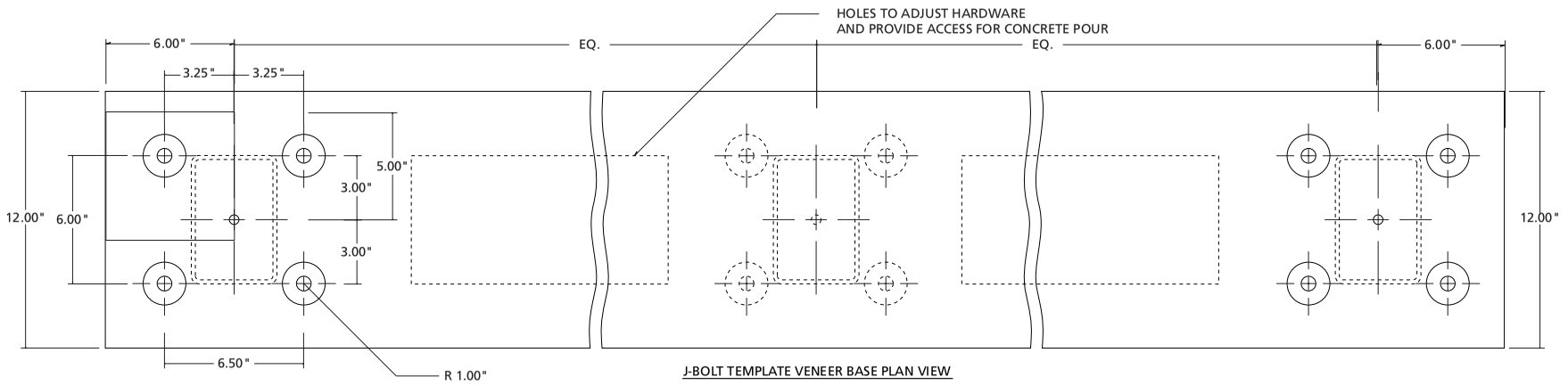
PIER/SUB-BASE REBAR DIAGRAM WITH VENEER FRONT ELEVATION



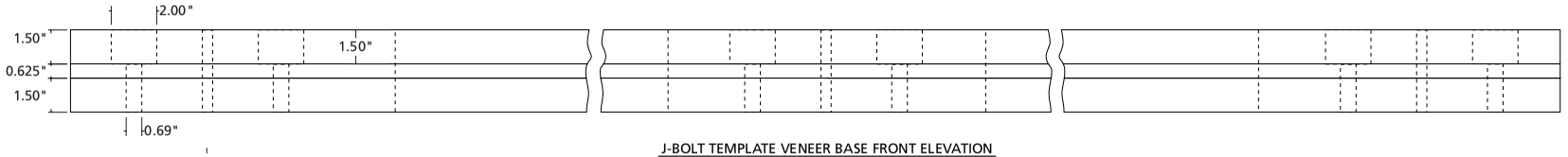
DETAIL A



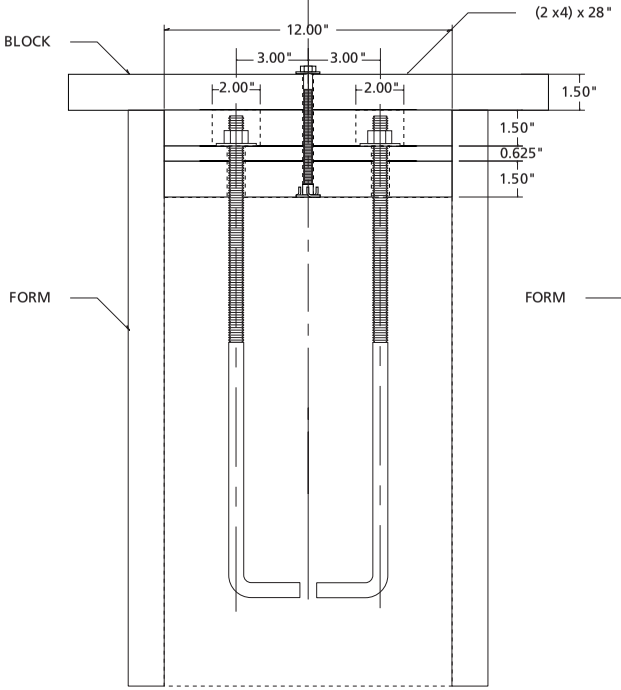
DETAIL B



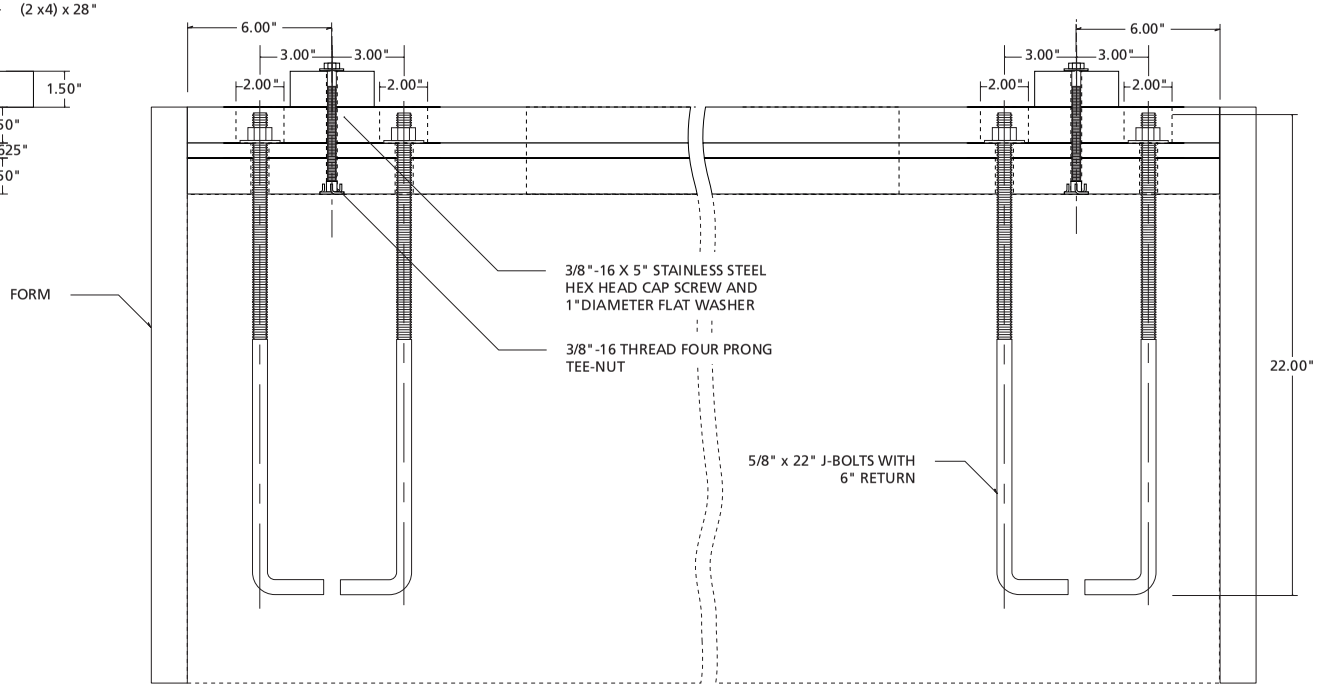
J-BOLT TEMPLATE VENEER BASE PLAN VIEW



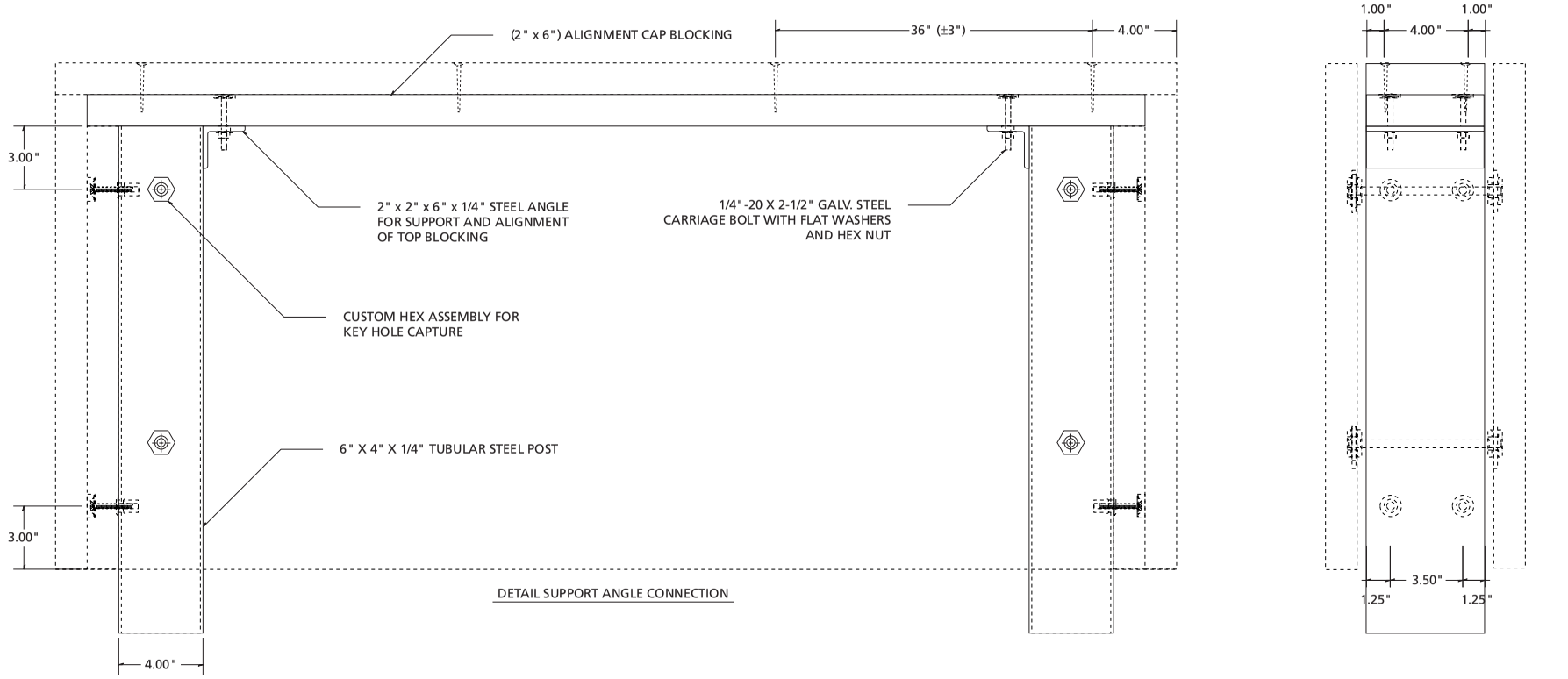
J-BOLT TEMPLATE VENEER BASE FRONT ELEVATION



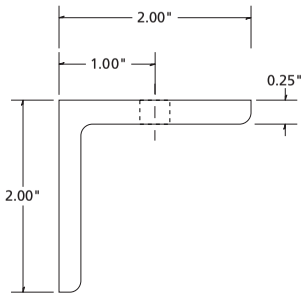
J-BOLT TEMPLATE VENEER BASE SIDE ELEVATION



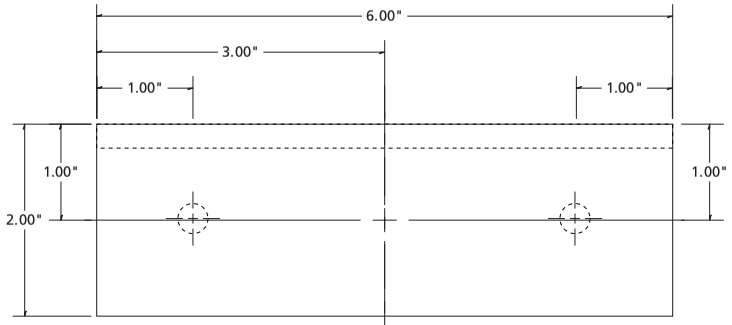
J-BOLT TEMPLATE VENEER BASE FRONT ELEVATION



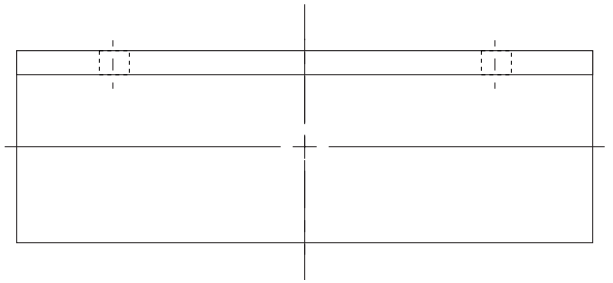
DETAIL SUPPORT ANGLE CONNECTION



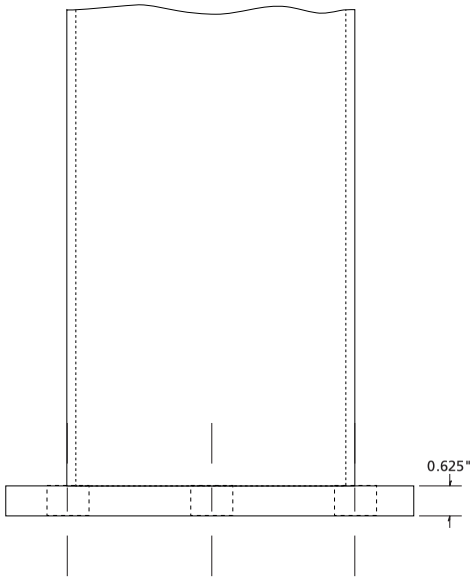
SUPPORT ANGLE FRONT ELEVATION



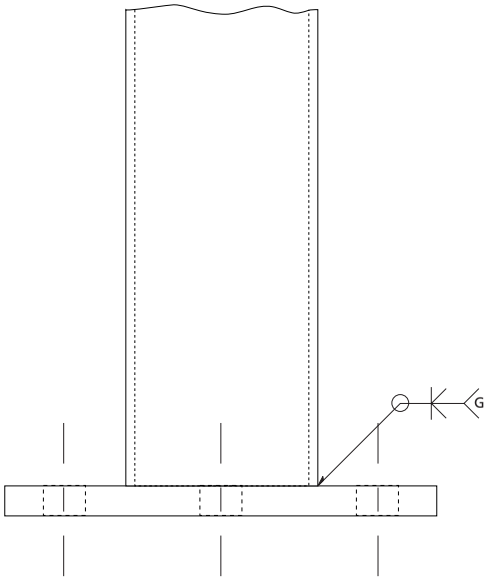
SUPPORT ANGLE PLAN VIEW



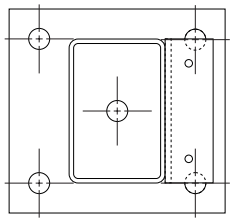
SUPPORT ANGLE SIDE ELEVATION



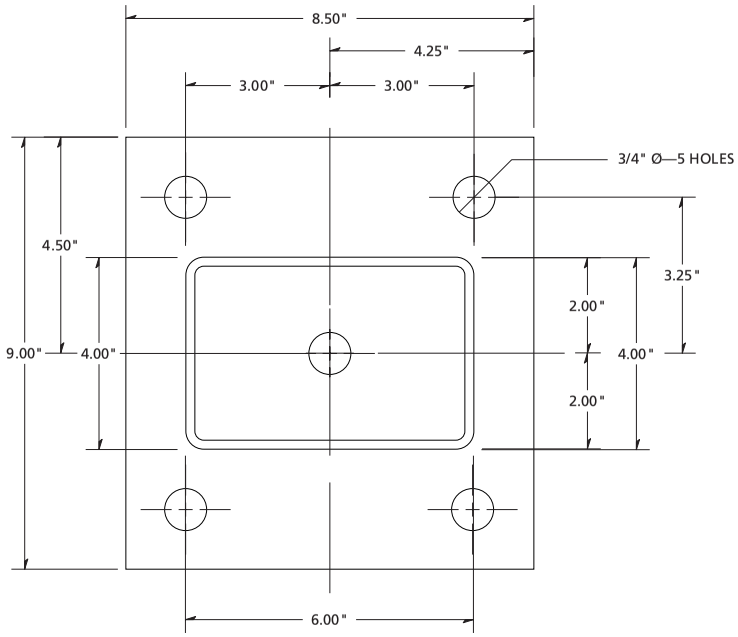
6" x 4" x 1/4" BASEPLATE MONOLITH ASSEMBLY SIDE ELEVATION



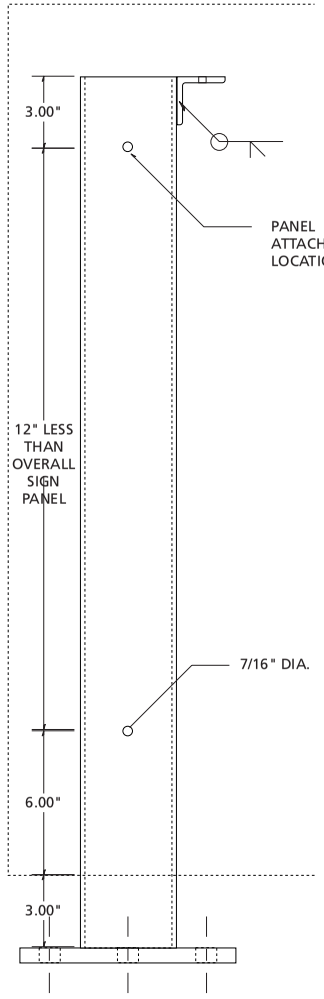
6" x 4" x 1/4" BASEPLATE MONOLITH ASSEMBLY SIDE ELEVATION



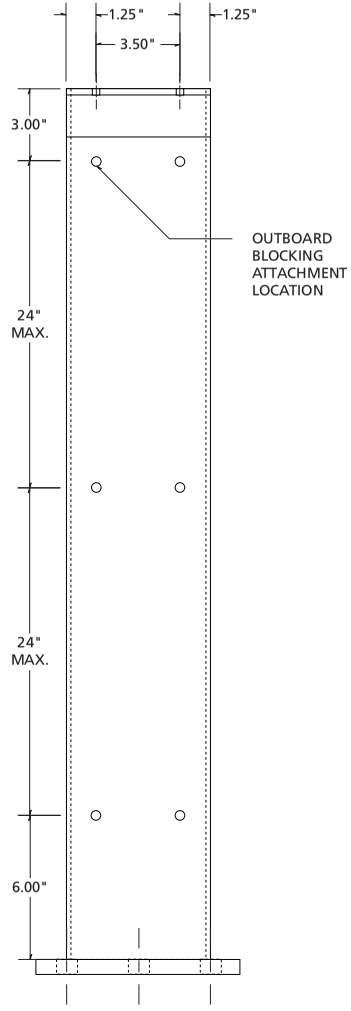
PLAN VIEW WITH WELDED SUPPORT ANGLE



6" x 4" x 1/4" BASEPLATE MONOLITH ASSEMBLY PLAN VIEW



FRONT ELEVATION WITH WELDED SUPPORT ANGLE



SIDE ELEVATION WITH WELDED SUPPORT ANGLE

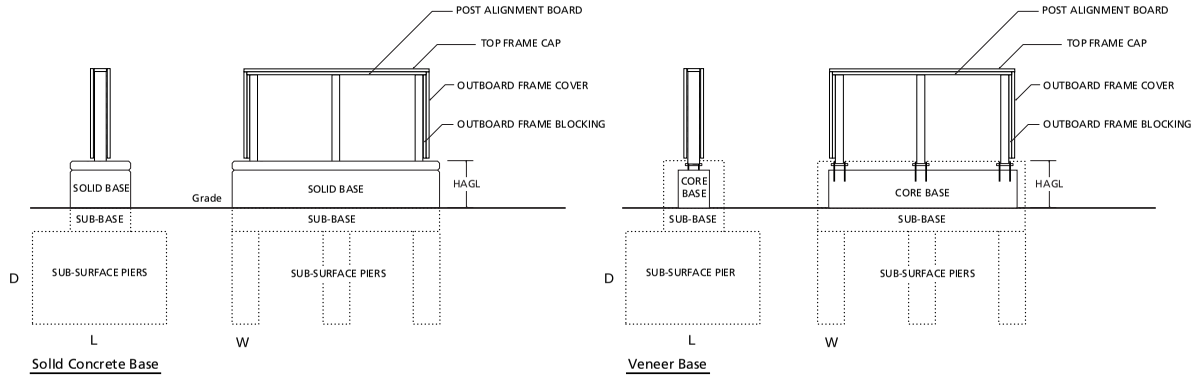
4" Legend Ground Mount Monolith Assembly

Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Outboard Frame Blocking (in)	Outboard Post Cover (in)	Solid Base Height (in)	Veneer Base Height (in)
		8		9		10		11		12		13		14		15		16		17		18		19		20						
		Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers					
PI-1GA	24.75	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	24.75	21.75	23.25	33.00	29.375
PI-2GA	29.25	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	3	3	2	29.25	26.25	27.75	33.00	29.375
PI-3GA	35.50	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	35.50	32.50	34.00	33.00	29.375
PI-1GX	22.75	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	22.75	19.75	21.25	33.00	29.375
PI-2GX	27.25	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	27.25	24.25	25.75	33.00	29.375
PI-3GX	33.50	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	33.50	30.50	32.00	33.00	29.375
FI-1G	20.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	20.00	17.00	18.50	33.00	29.375
FI-2G	24.50	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	24.50	21.50	23.00	33.00	29.375
FI-3G	30.75	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	30.75	27.75	29.25	33.00	29.375
F/PI-1G	30.25	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	30.25	27.25	28.75	33.00	29.375
F/PI-2G	36.50	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	36.50	33.50	35.00	33.00	29.375
F/PI-3G	43.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	3	2	43.00	40.00	41.50	33.00	29.375

Sign Panel Width (in)	48	52	56	60	64	68	72	76	80	84	88	92	96		
Post Alignment Board (in)	45	49	53	57	61	65	69	73	77	81	85	89	93		
Top Frame Cap (in)	48	52	56	60	64	68	72	76	80	84	88	92	96		
Sub-base Length (in)	60	64	68	72	76	80	84	88	92	96	100	104	108		
Sub-base Depth x Width (in)	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24		
Solid Pour Base Length (in)	60	64	68	72	76	80	84	88	92	96	100	104	108		
Veener Core Base Length (In)	50	54	58	62	66	70	74	78	82	86	90	94	98		

Note: All posts are 6" x 4" x 1/4" with 8.5" x 9" x 5/8" base plate and 5/8" Ø J-bolts

PIER SIZE
1'-0" x 3'-0" x 4'-0"
W x D x L



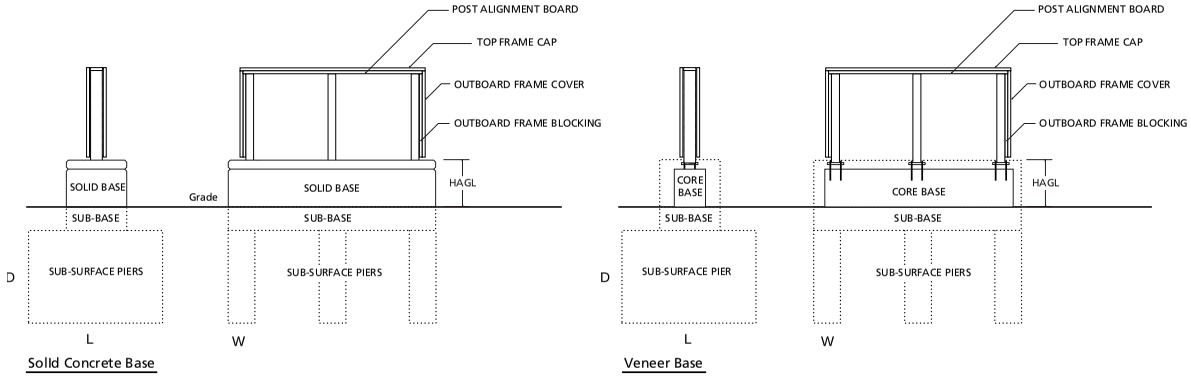
6" Legend Ground Mount Monolith Assembly

Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Outboard Frame Blocking (in)	Outboard Post Cover (in)	Solid Base Height (in)	Veneer Base Height (in)
		8		9		10		11		12		13		14		15		16		17		18		19		20						
		Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers					
PI-1GA	37.25	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	37.25	34.25	35.75	36.00	32.375
PI-2GA	43.75	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	43.75	40.75	42.25	36.00	32.375
PI-3GA	53.50	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	53.50	50.50	52.00	36.00	32.375
PI-1GX	34.25	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	34.25	31.25	32.75	36.00	32.375
PI-2GX	40.75	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	40.75	37.75	39.25	36.00	32.375
PI-3GX	50.5	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	50.50	47.50	49.00	36.00	32.375
FI-1G	30.00	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	30.00	27.00	28.50	36.00	32.375
FI-2G	36.500	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	36.50	33.50	35.00	36.00	32.375
FI-3G	46.250	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	46.25	43.25	44.75	36.00	32.375
F/PI-1G	45.25	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	45.25	42.25	43.75	36.00	32.375
F/PI-2G	54.75	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	54.75	51.75	53.25	36.00	32.375
F/PI-3G	64.50	2	2	2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	64.50	61.50	63.00	36.00	32.375

Sign Panel Width (in)	72	78	84	90	96	102	108	114	120	126	132	138	144	
Post Alignment Board (in)	69	75	81	87	93	99	105	111	117	123	129	135	141	
Top Frame Cap (in)	72	78	84	90	96	102	108	114	120	126	132	138	144	
Sub-base Length (in)	84	90	96	102	108	114	120	126	132	138	144	150	156	
Sub-base Depth x Width (in)	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	
Solid Pour Base Length (in)	84	90	96	102	108	114	120	126	132	138	144	150	156	
Veener Core Base Length (In)	74	80	86	92	98	104	110	116	122	128	134	140	146	

Note: All posts are 6" x 4" x 1/4" with 8.5" x 9" x 5/8" base plate and 5/8" Ø J-bolts

PIER SIZE
1'-0" x 3'-0" x 5'-0"
W x D x L



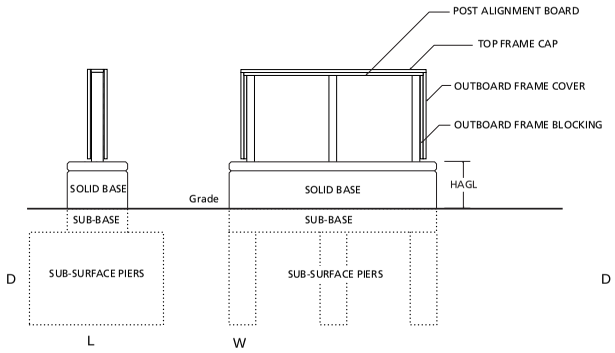
9" Legend Ground Mount Monolith Assembly

Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Outboard Frame Blocking (in)	Outboard Post Cover (in)	Solid Base Height (in)	Veneer Base Height (in)
		8		9		10		11		12		13		14		15		16		17		18		19		20						
		Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers					
PI-1GA	55.75	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	55.75	52.75	54.25	24.00	20.375
PI-2GA	65.75	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	65.75	62.75	64.25	24.00	20.375
PI-3GA	80	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	80.00	77.00	78.50	24.00	20.375
PI-1GX	51.25	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	51.25	48.25	49.75	24.00	20.375
PI-2GX	61.25	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	61.25	58.25	59.75	24.00	20.375
PI-3GX	75.5	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	75.50	72.50	74.00	24.00	20.375
FI-1G	45	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	45.00	42.00	43.50	24.00	20.375
FI-2G	55	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	55.00	52.00	53.50	24.00	20.375
FI-3G	69.25	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	69.25	66.25	67.75	24.00	20.375
F/PI-1G	67.75	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	67.75	64.75	66.25	24.00	20.375
F/PI-2G	82.25	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	82.25	79.25	80.75	24.00	20.375
F/PI-3G	96.5	3	2	3	2	3	2	3	3	3	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	96.50	93.50	95.00	24.00	20.375

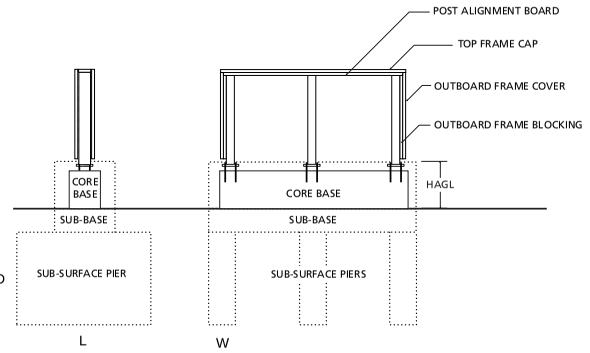
Sign Panel Width (in)	108	117	126	135	144	153	162	171	180	189	198	207	216
Post Alignment Board (in)	105	114	123	132	141	150	159	168	177	186	195	204	213
Top Frame Cap (in)	108	117	126	135	144	153	162	171	180	189	198	207	216
Sub-base Length (in)	120	129	138	147	156	165	174	183	192	201	210	219	228
Sub-base Depth x Width (in)	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24
Solid Base Length (in)	120	129	138	147	156	165	174	183	192	201	210	219	228
Veener Core Base Length (In)	110	119	128	137	146	155	164	173	182	191	200	209	218

Note: All posts are 6" x 4" x 1/4" with 8.5" x 9" x 5/8" base plate and 5/8" Ø J-bolts

PIER SIZE
1'-0" x 3'-0" x 5'-0"
W x D x L



Solid Concrete Base



Veneer Base

12" Legend Ground Mount Monolith Assembly

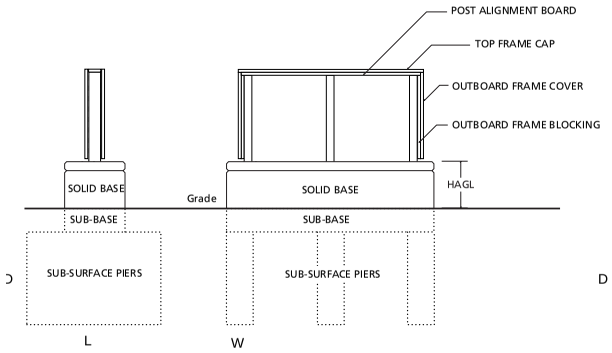
Sign Code	Panel Height (in)	Legend Length (Units of "X") X= Legend Size																								Steel Post Height (in)	Outboard Frame Blocking (in)	Outboard Post Cover (in)	Solid Base Height (in)	Veneer Base Height (in)
		8		9		10		11		12		13		14		15		16		17		18		19		20						
		Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers	Posts	Piers					
PI-1GA	74.5	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3									74.50	71.50	73.00	30.00	26.375
PI-2GA	87.5	4	3	4	3	4	4	4	3	4	3	4	3	4	3	4	3	4	3									87.50	84.50	86.00	30.00	26.375
PI-3GA																																
PI-1GX	68.5	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3									68.50	65.50	67.00	30.00	26.375
PI-2GX	81.5	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3									81.50	78.50	80.00	30.00	26.375
PI-3GX																																
FI-1G	60	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3									60.00	57.00	58.50	30.00	26.375
FI-2G	73.25	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3									73.25	70.25	71.75	30.00	26.375
FI-3G																																
F/PI-1G	90.5	5	3	5	3	5	3	5	3	6	3	6	3	6	3	6	3	6	3									90.50	87.50	89.00	30.00	26.375
F/PI-2G	109.5	5	3	5	3	5	3	5	3	6	3	6	3	6	3	6	3	6	3									109.50	106.50	108.00	30.00	26.375
F/PI-3G																																

Sign Panel Width (in)	144	156	168	180	192	204	216	228	240					
Post Alignment Board (in)	141	153	165	177	189	201	213	225	237					
Top Frame Cap (in)	144	156	168	180	192	204	216	228	240					
Sub-base Length (in)	156	165	177	189	201	213	225	237	249					
Sub-base Depth x Width (in)	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24	12 x 24					
Solid Pour Base Length (in)	156	168	180	192	204	216	228	240	252					
Veener Core Base Length (In)	146	158	170	182	194	206	218	230	242					

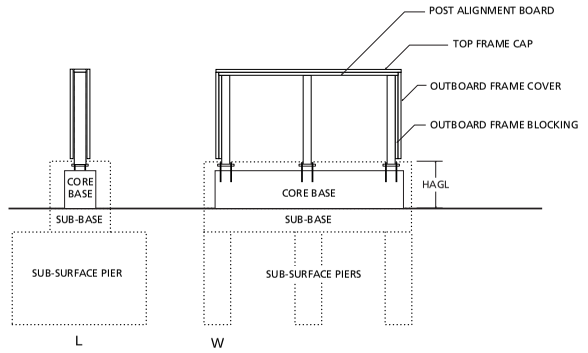
Note: All posts are 6" x 4" x 1/4" with 8.5" x 9" x 5/8" base plate and 5/8" Ø J-bolts

PIER SIZE
1'-0" x 3'-0" x 5'-0"
W x D x L

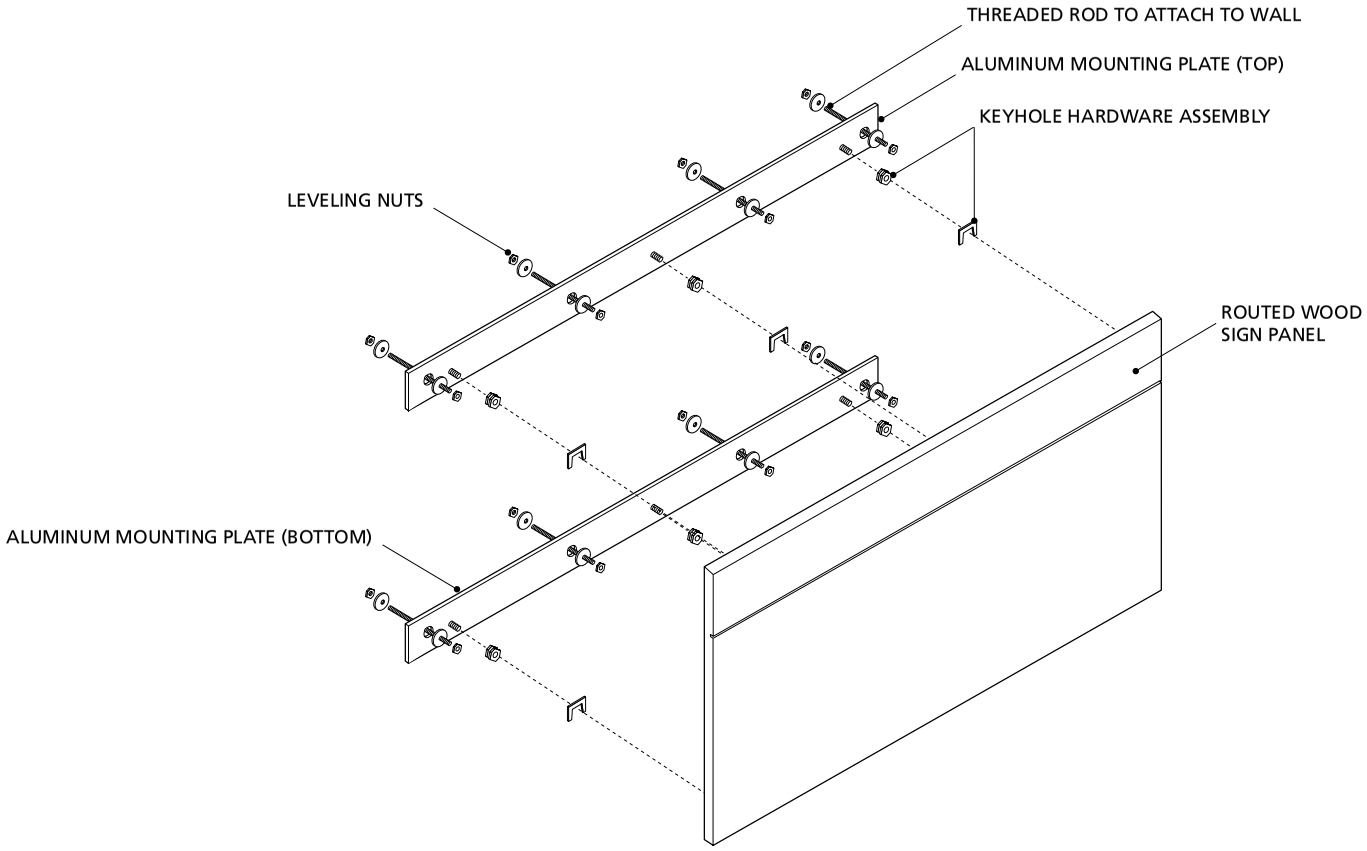
PIER SIZE
1'-6" x 3'-0" x 6'-0"
W x D x L



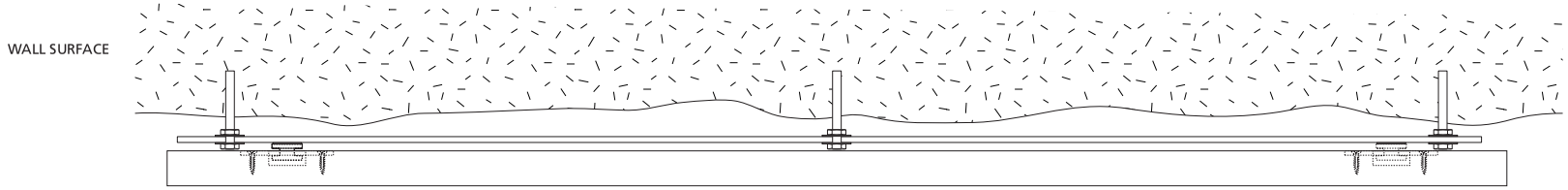
Solid Concrete Base



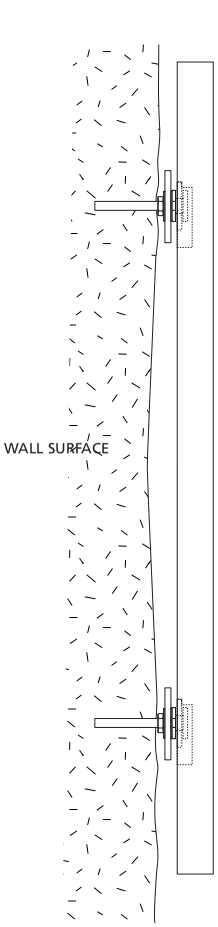
Veneer Base



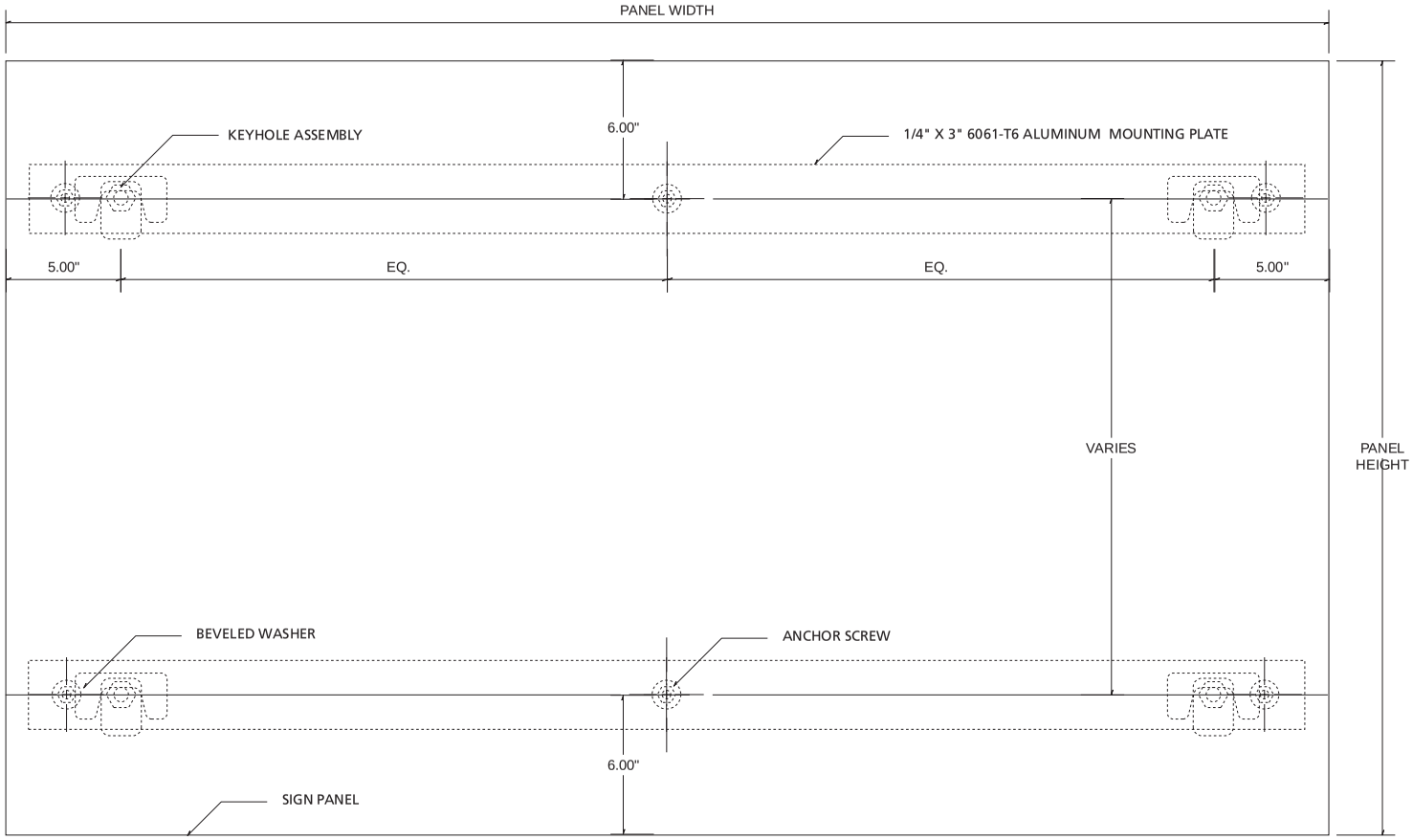
Axis Drawing for Wall Mount Identification Signs



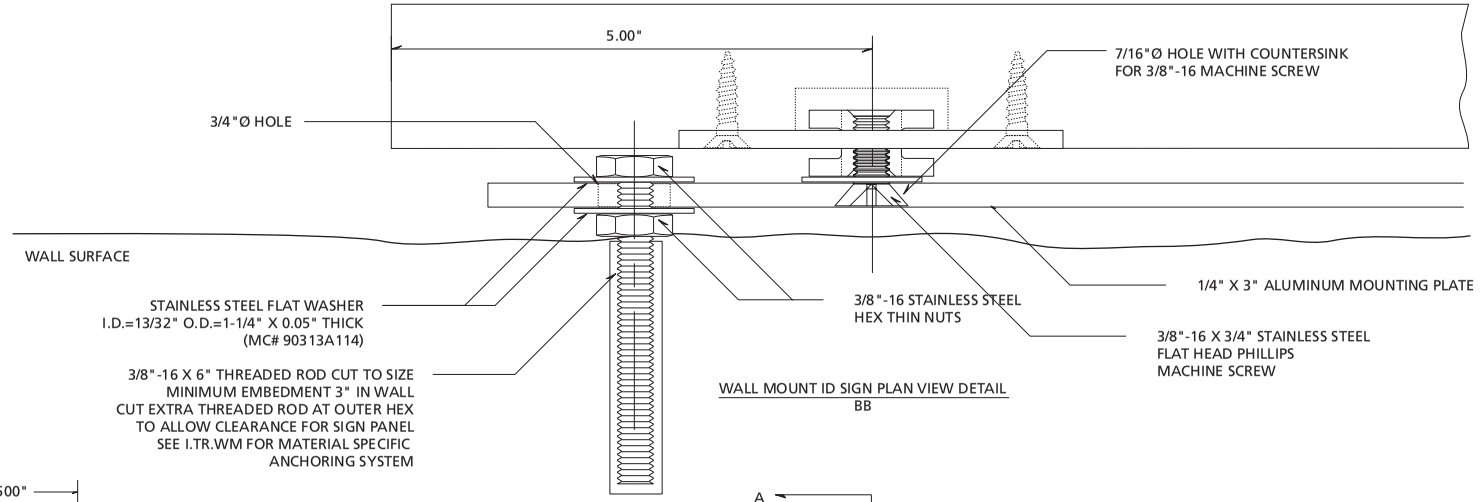
WALL MOUNT IDENTIFICATON SIGN PLAN VIEW



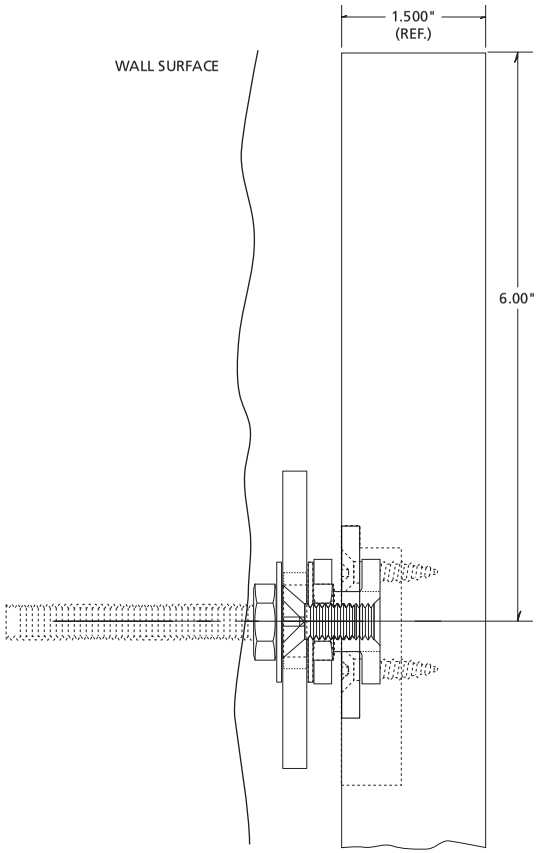
WALL MOUNT IDENTIFICATON SIGN SIDE ELEVATION



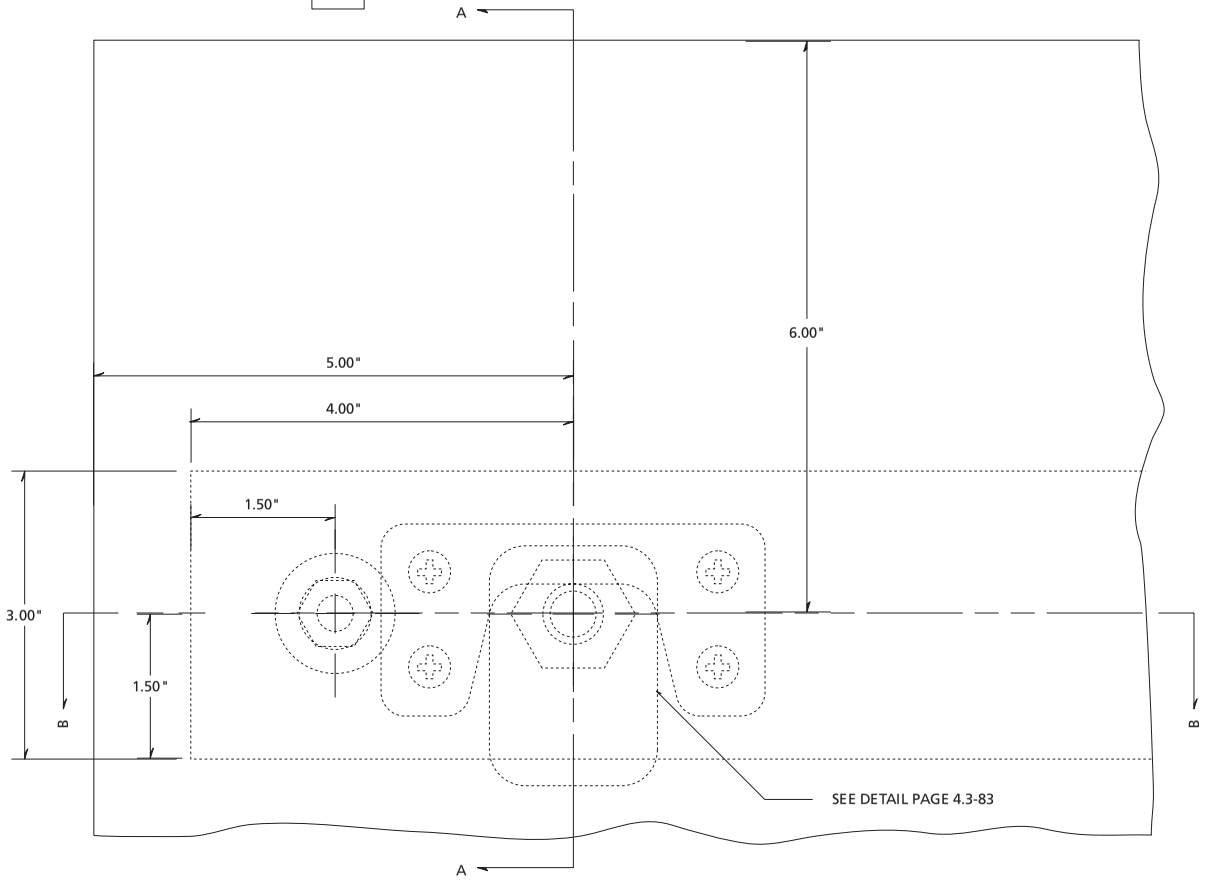
WALL MOUNT IDENTIFICATON SIGN FRONT ELEVATION



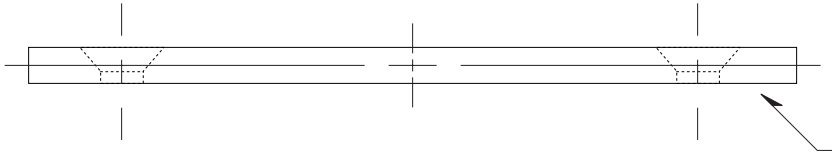
WALL MOUNT ID SIGN PLAN VIEW DETAIL
BB



WALL MOUNT ID SIGN SIDE ELEVATION DETAIL
AA

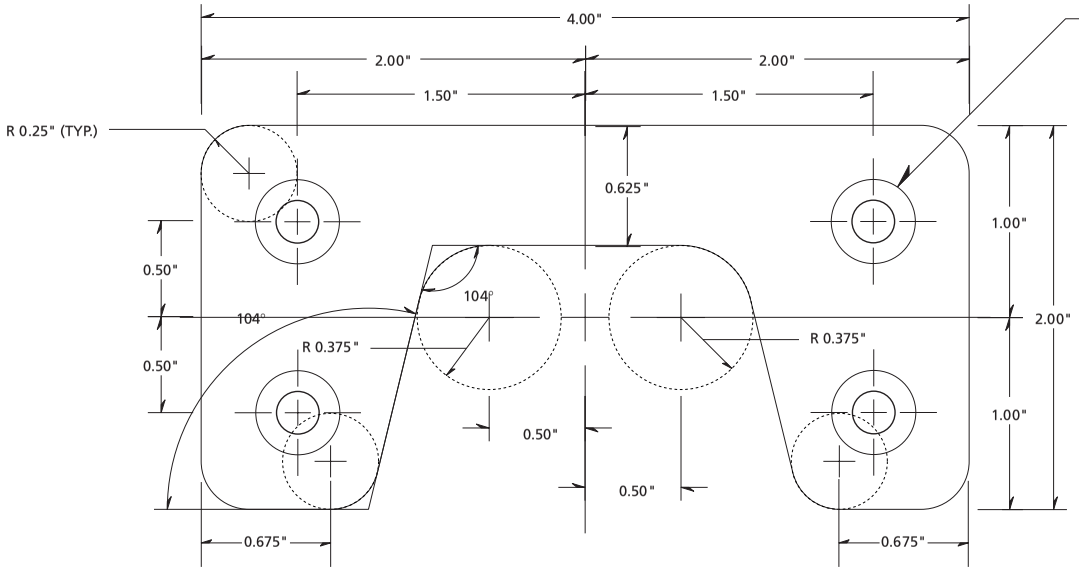


WALL MOUNT ID SIGN FRONT ELEVATION DETAIL

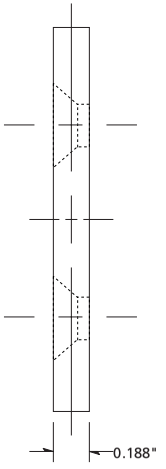


2" X 4" X 3/16" MILLED
ALUMINUM KEYHOLE PLATE

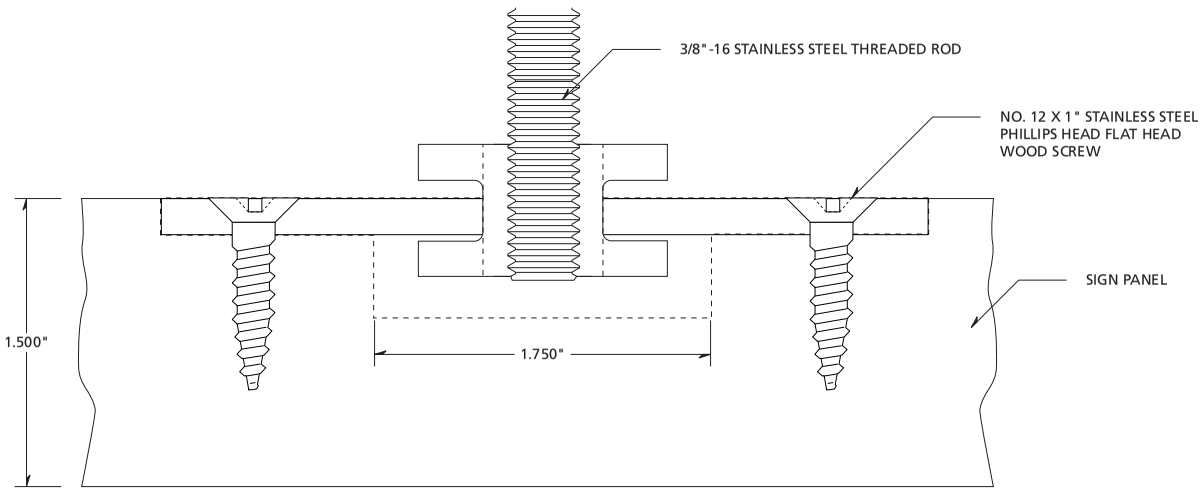
2" X 4" X 3/16" KEY HOLE PLATE FOR CENTER OF PANEL CAPTURE PLAN VIEW



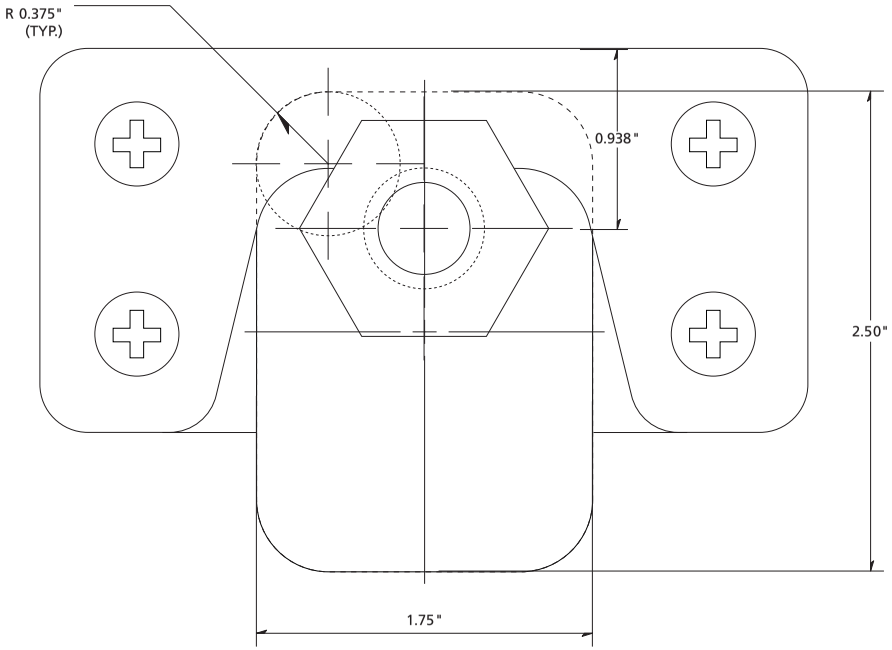
2" X 4" X 3/16" KEY HOLE PLATE FOR LEFT AND RIGHT SIDES OF PANEL CAPTURE FRONT ELEVATION



SIDE ELEVATION



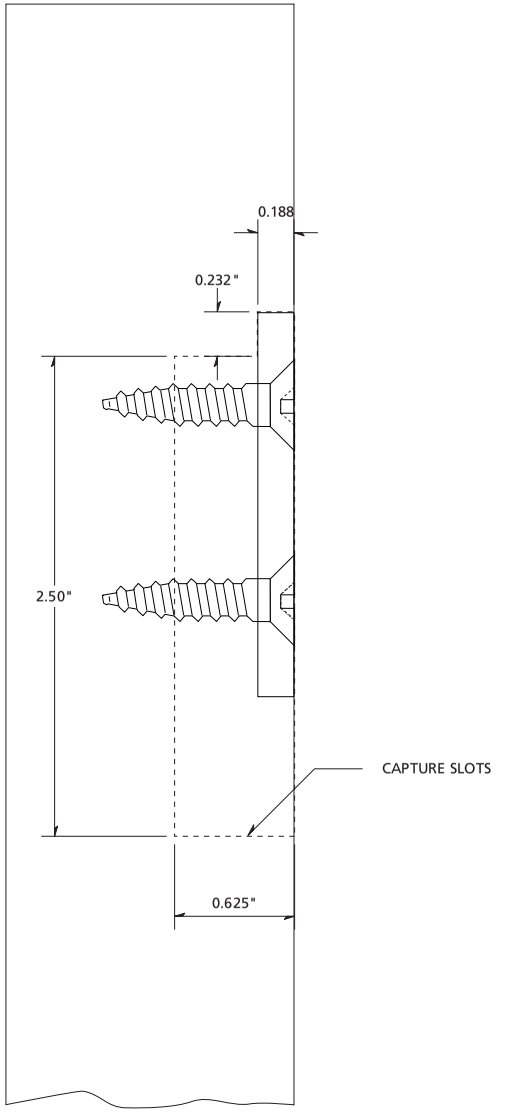
KEY HOLE SLOT DIMENSIONS PLAN VIEW



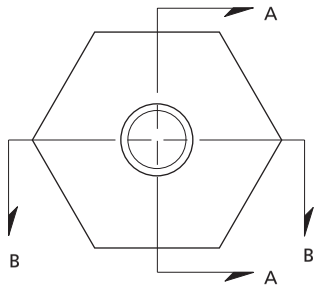
KEY HOLE SLOT DIMENSIONS FRONT ELEVATION

THREADED ROD

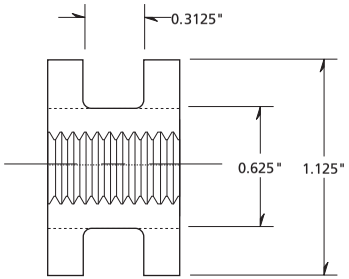
3-1/2" WOOD RAIL FOR DOUBLE POST SIGNS	4.625"
6" STEEL RAIL FOR DOUBLE POST SIGNS	7.25"
8" STEEL RAIL FOR DOUBLE POST SIGNS	9.25"
6" STEEL UPRIGHT FOR MONOLITHS	7.25"



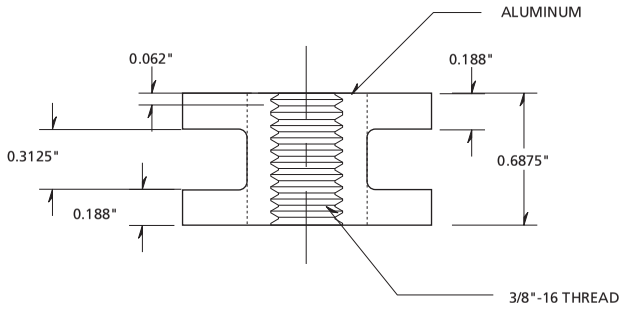
KEY HOLE SLOT DIMENSIONS SIDE ELEVATION



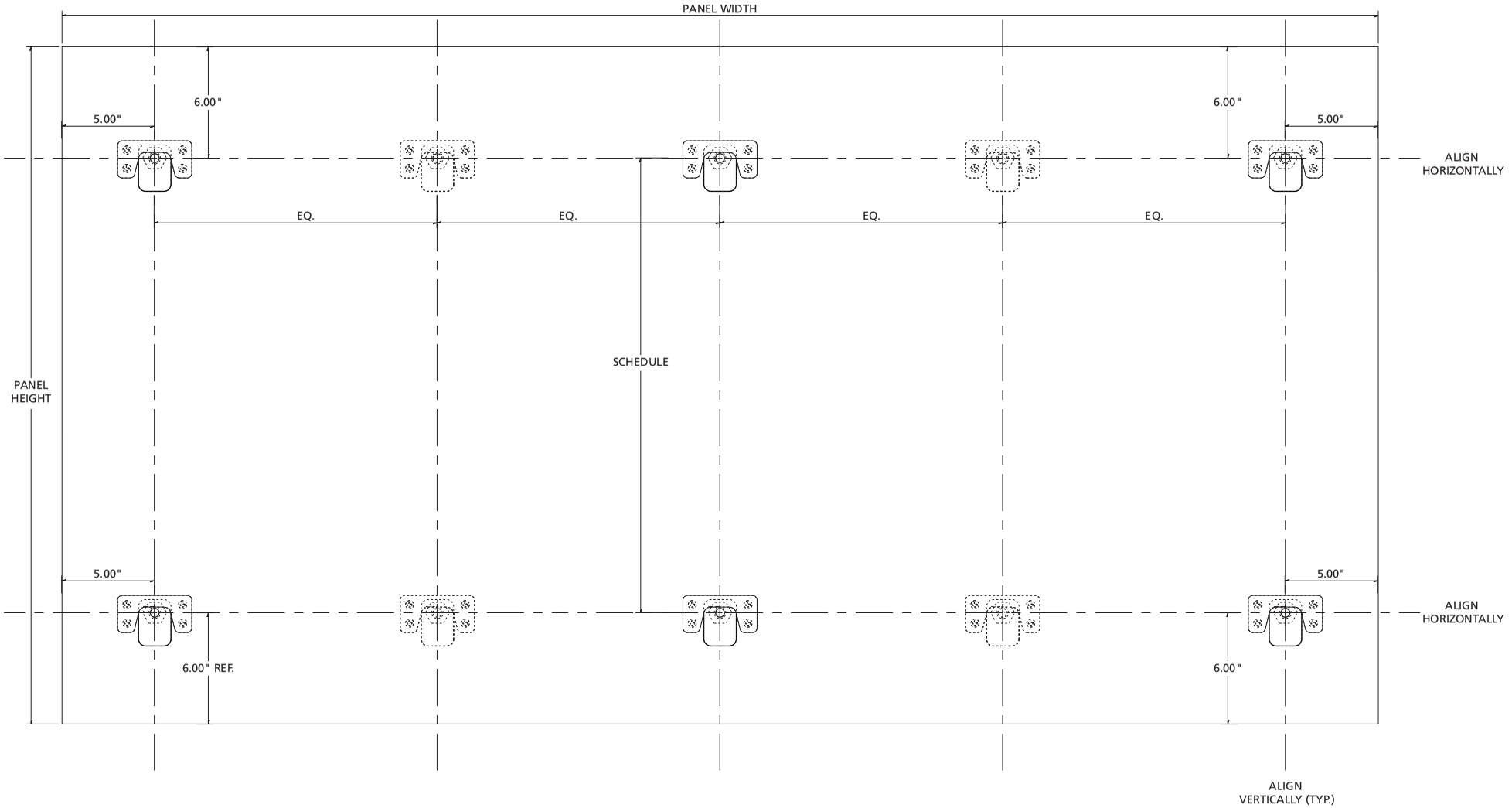
MACHINED HEX NUT PLAN VIEW
A-A



MACHINED HEX NUT SIDE VIEW SECTION
A-A

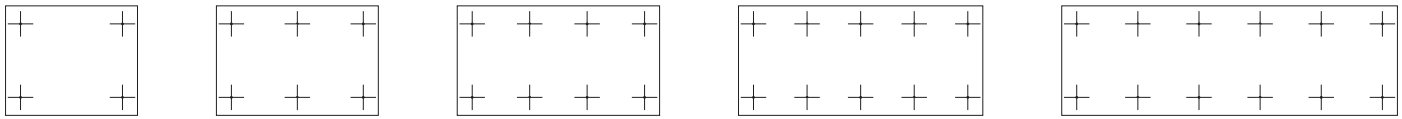


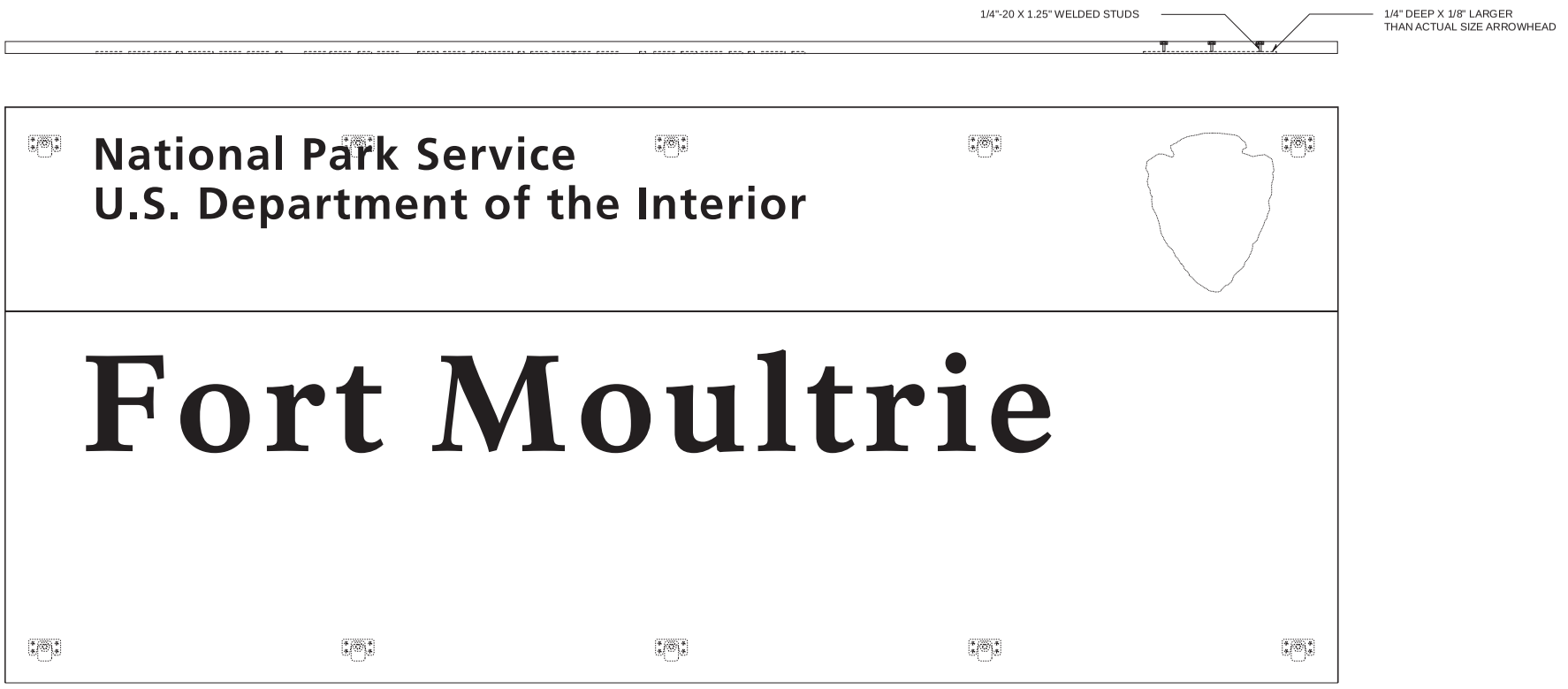
MACHINED HEX NUT VIEW TOP SECTION
B-B

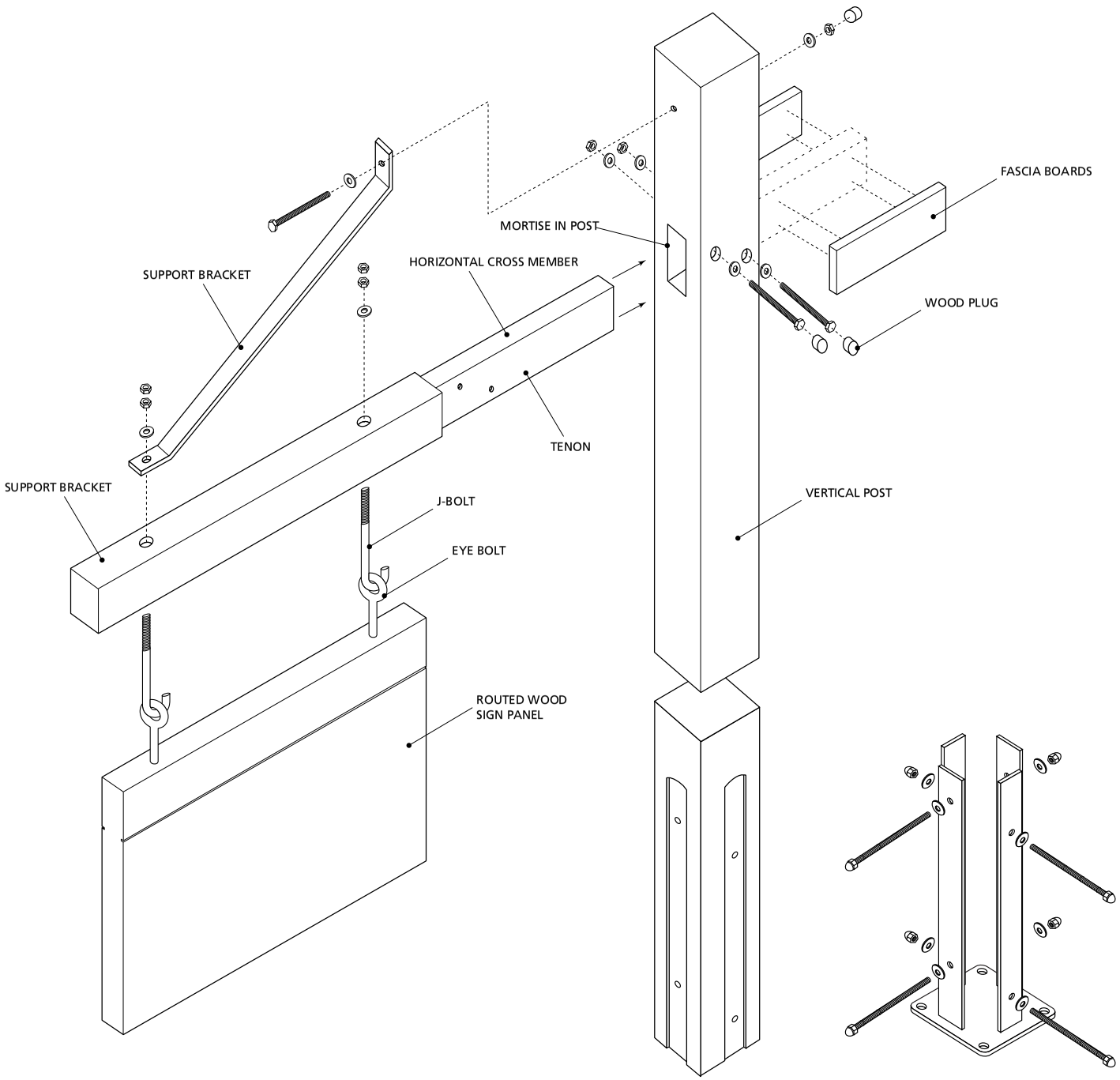


THE QUANTITYOF ATTACHMENT LOCATIONS ARE SPECIFIED IN THE TABLE BELOW. NOTE: EXCEPTIONS INCLUDE F/PI-G MONOLITHIC PANELS WITH 12" LEGEND WHICH REQUIRE 5-6 CONNECTIONS ON BOTH TOP AND BOTTOM OF PANEL BASED ON SIZE.

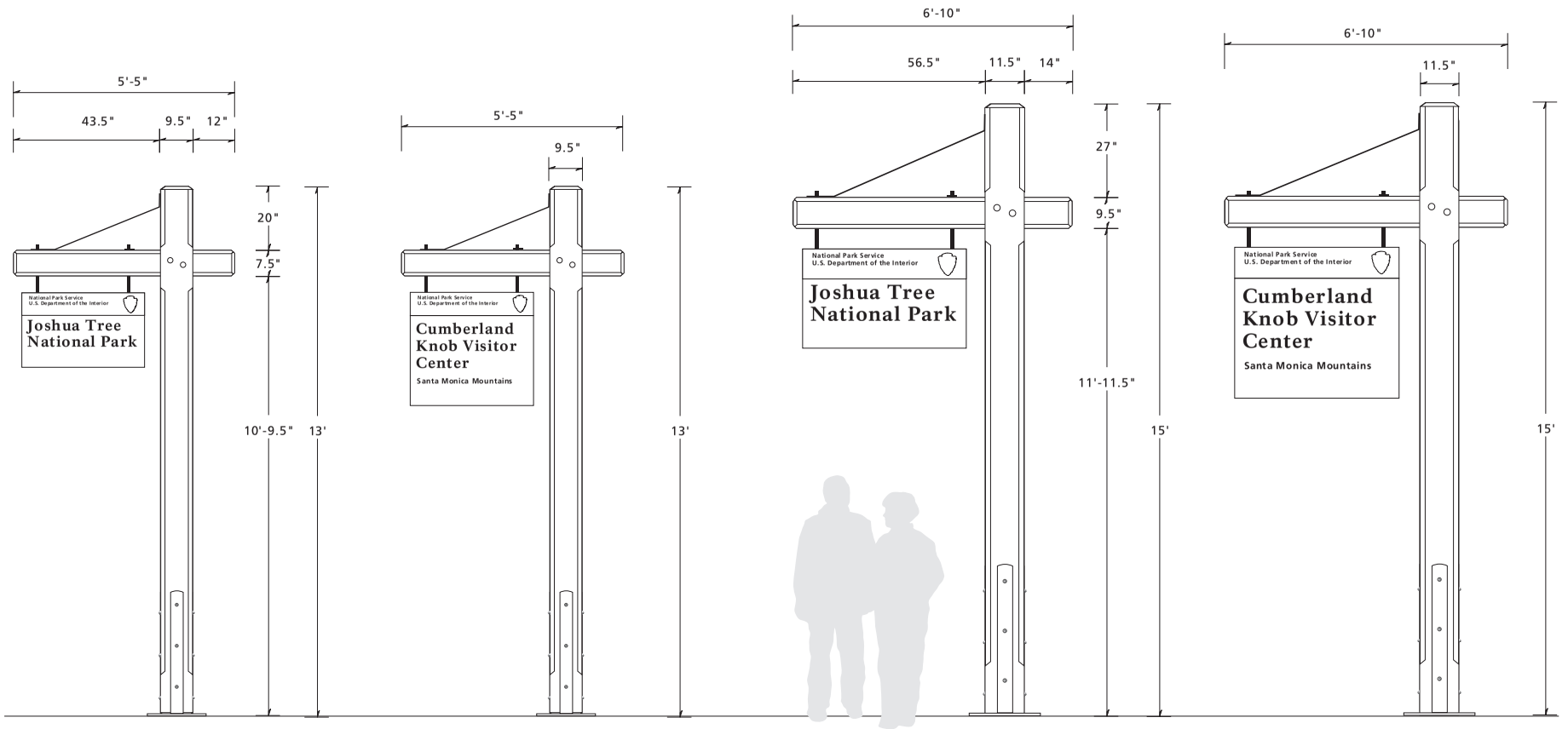
PANEL LENGTH	NUMBER OF KEYHOLE ATTACHMENTS
48" TO 78"	2 TOP AND 2 BOTTOM (4 TOTAL)
78" TO 144"	3 TOP AND 3 BOTTOM (6 TOTAL)
144" TO 240"	4 TOP AND 4 BOTTOM (8 TOTAL)
144" TO 180"	5 TOP AND 5 BOTTOM (10 TOTAL)
180" TO 240"	6 TOP AND 6 BOTTOM (12 TOTAL)

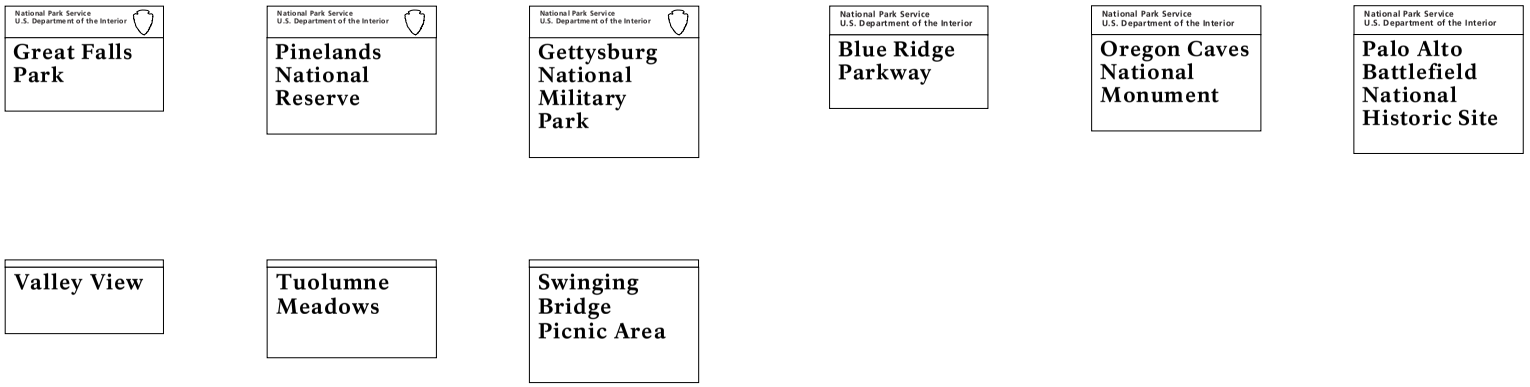


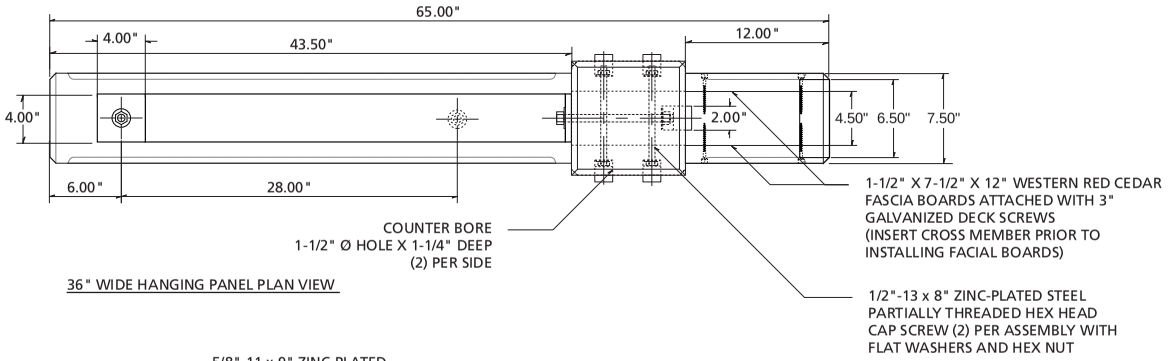

1/4"-20 X 1.25" WELDED STUDS
1/4" DEEP X 1/8" LARGER
THAN ACTUAL SIZE ARROWHEAD
National Park Service
U.S. Department of the Interior
Fort Moultrie
12" LEGEND
National Park Service
U.S. Department of the Interior
Fort Moultrie
9" LEGEND
6" LEGEND
4" LEGEND



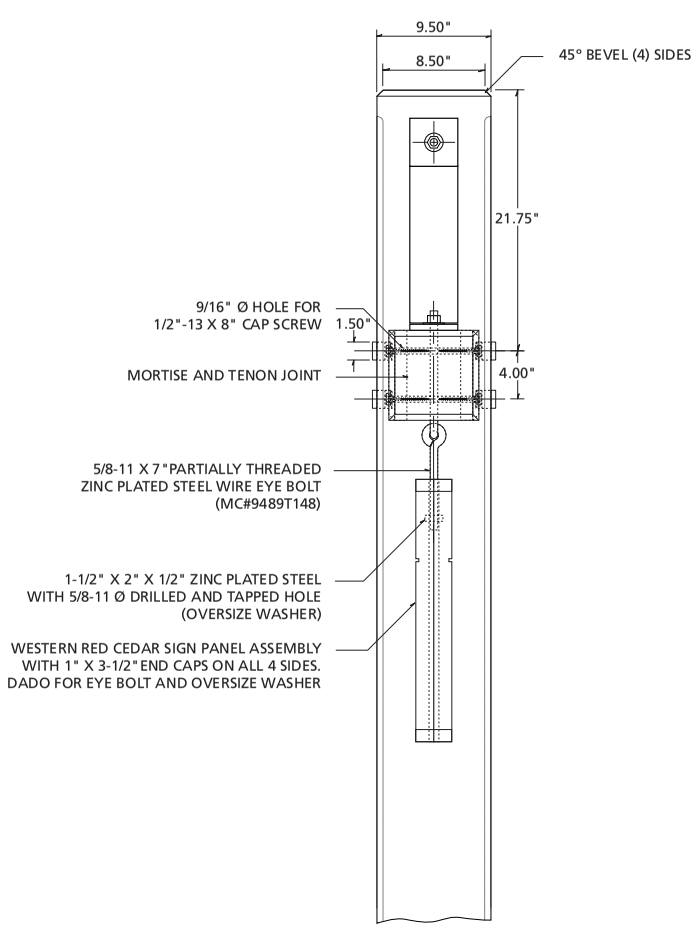
Axis Drawing for Single Post Hanging Identification Signs


5'-5"
43.5"
9.5"
12"
20"
7.5"
10'-9.5"
13'
National Park Service
U.S. Department of the Interior
Joshua Tree
National Park
5'-5"
9.5"
13'
National Park Service
U.S. Department of the Interior
Cumberland
Knob Visitor
Center
Santa Monica Mountains
6'-10"
56.5"
11.5"
14"
27"
9.5"
11'-11.5"
15'
National Park Service
U.S. Department of the Interior
Joshua Tree
National Park
6'-10"
11.5"
15'
National Park Service
U.S. Department of the Interior
Cumberland
Knob Visitor
Center
Santa Monica Mountains

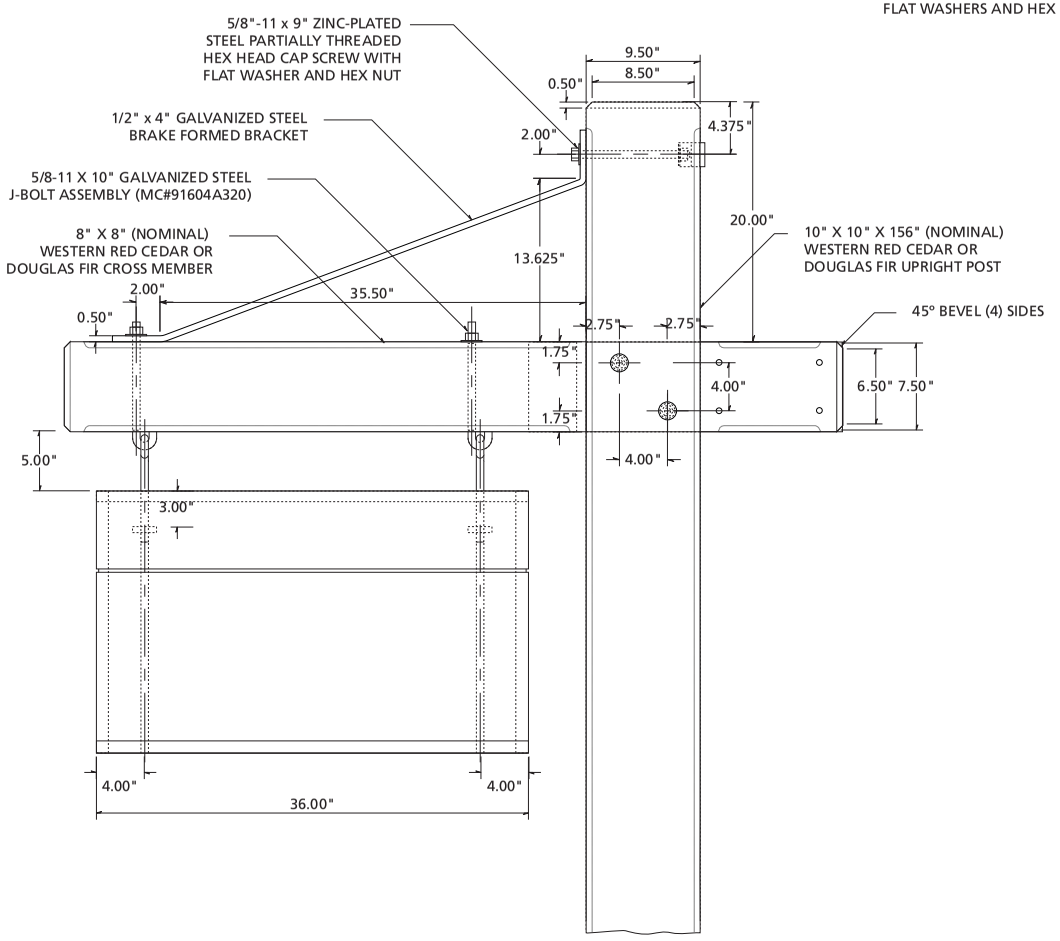

National Park Service
U.S. Department of the Interior
Great Falls
Park
National Park Service
U.S. Department of the Interior
Pinelands
National
Reserve
National Park Service
U.S. Department of the Interior
Gettysburg
National
Military
Park
National Park Service
U.S. Department of the Interior
Blue Ridge
Parkway
National Park Service
U.S. Department of the Interior
Oregon Caves
National
Monument
National Park Service
U.S. Department of the Interior
Palo Alto
Battlefield
National
Historic Site
Valley View
Tuolumne
Meadows
Swinging
Bridge
Picnic Area



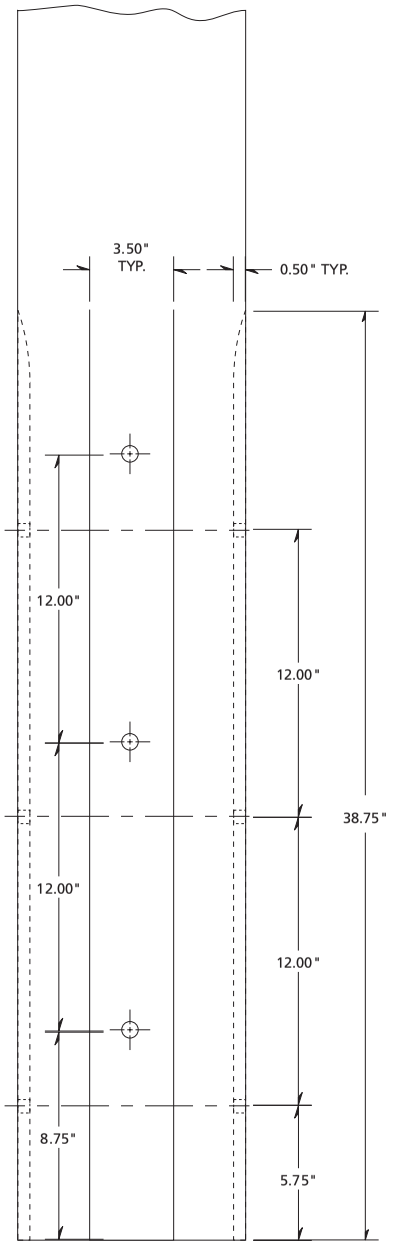
36" WIDE HANGING PANEL PLAN VIEW



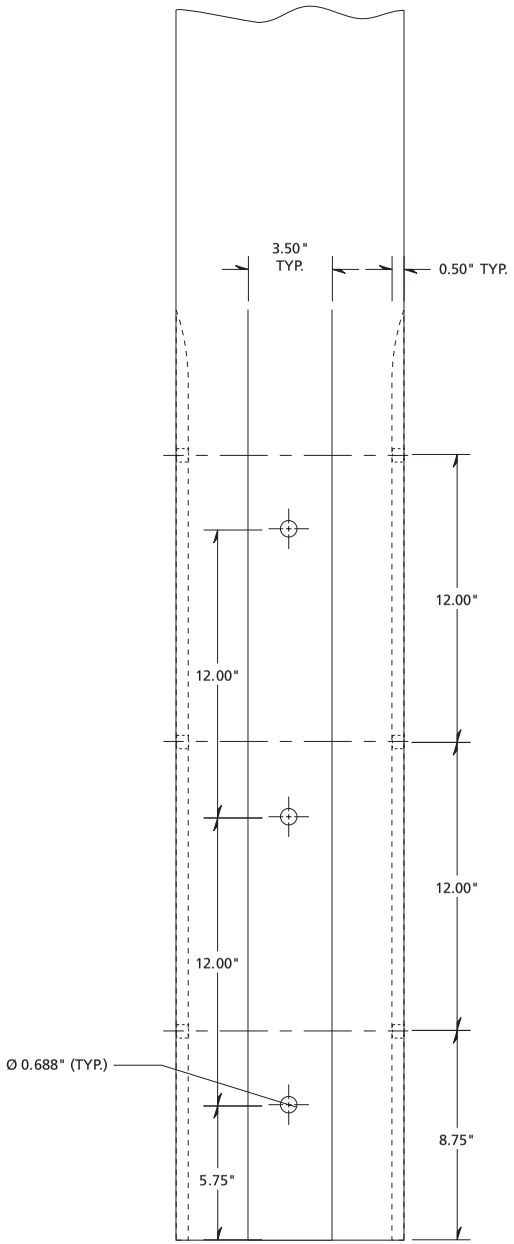
36" WIDE HANGING PANEL SIDE ELEVATION



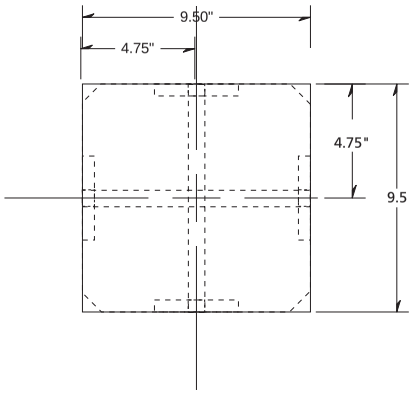
36" WIDE HANGING PANEL FRONT ELEVATION



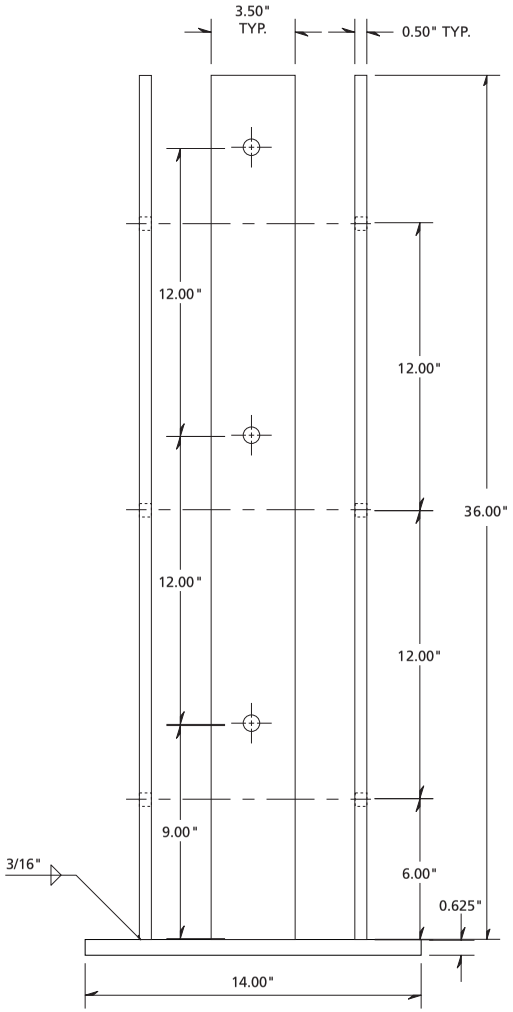
36" WIDE HANGING PANEL POST DRILL DIAGRAM FRONT ELEVATION



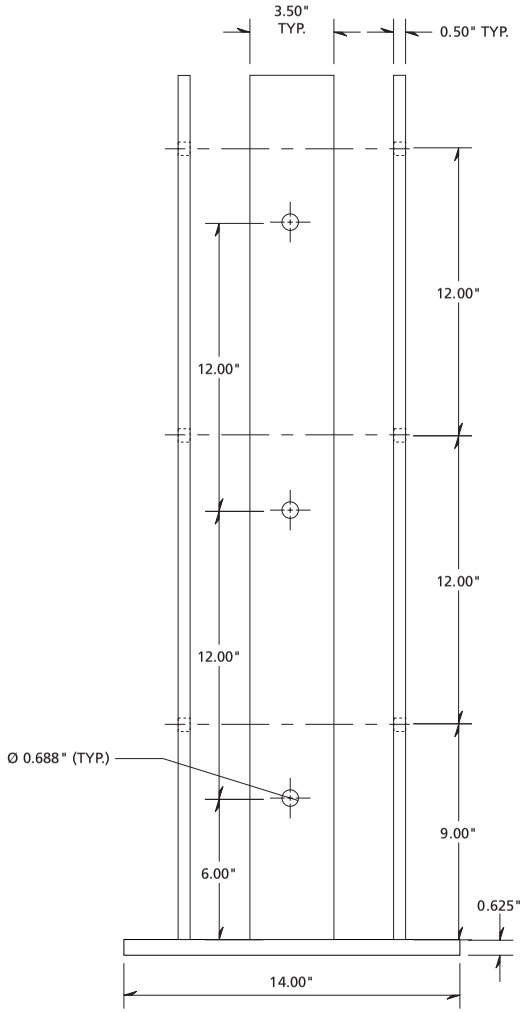
36" WIDE HANGING PANEL POST DRILL DIAGRAM SIDE ELEVATION



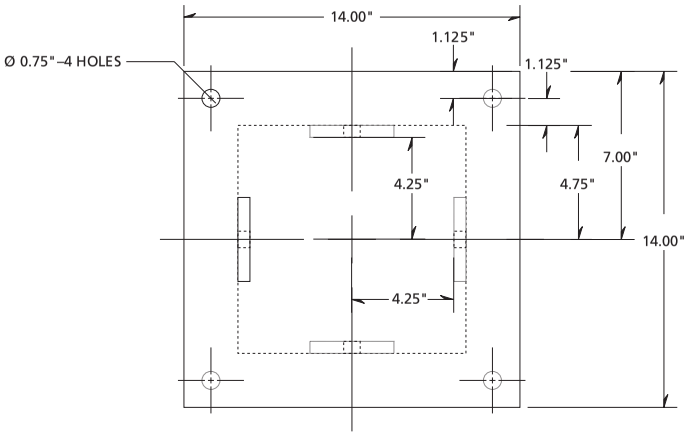
36" WIDE HANGING PANEL POST DRILL DIAGRAM PLAN VIEW



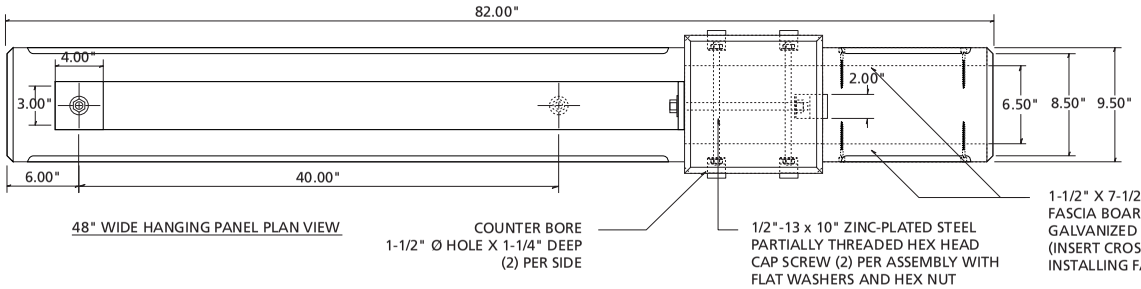
36" WIDE HANGING PANEL BASE PLATE FRONT ELEVATION

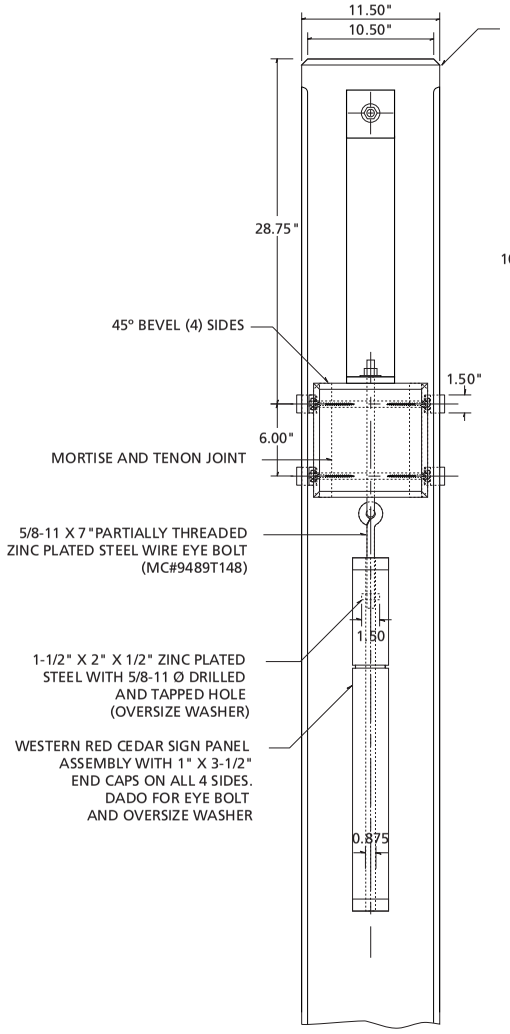


36" WIDE HANGING PANEL BASE PLATE SIDE ELEVATION

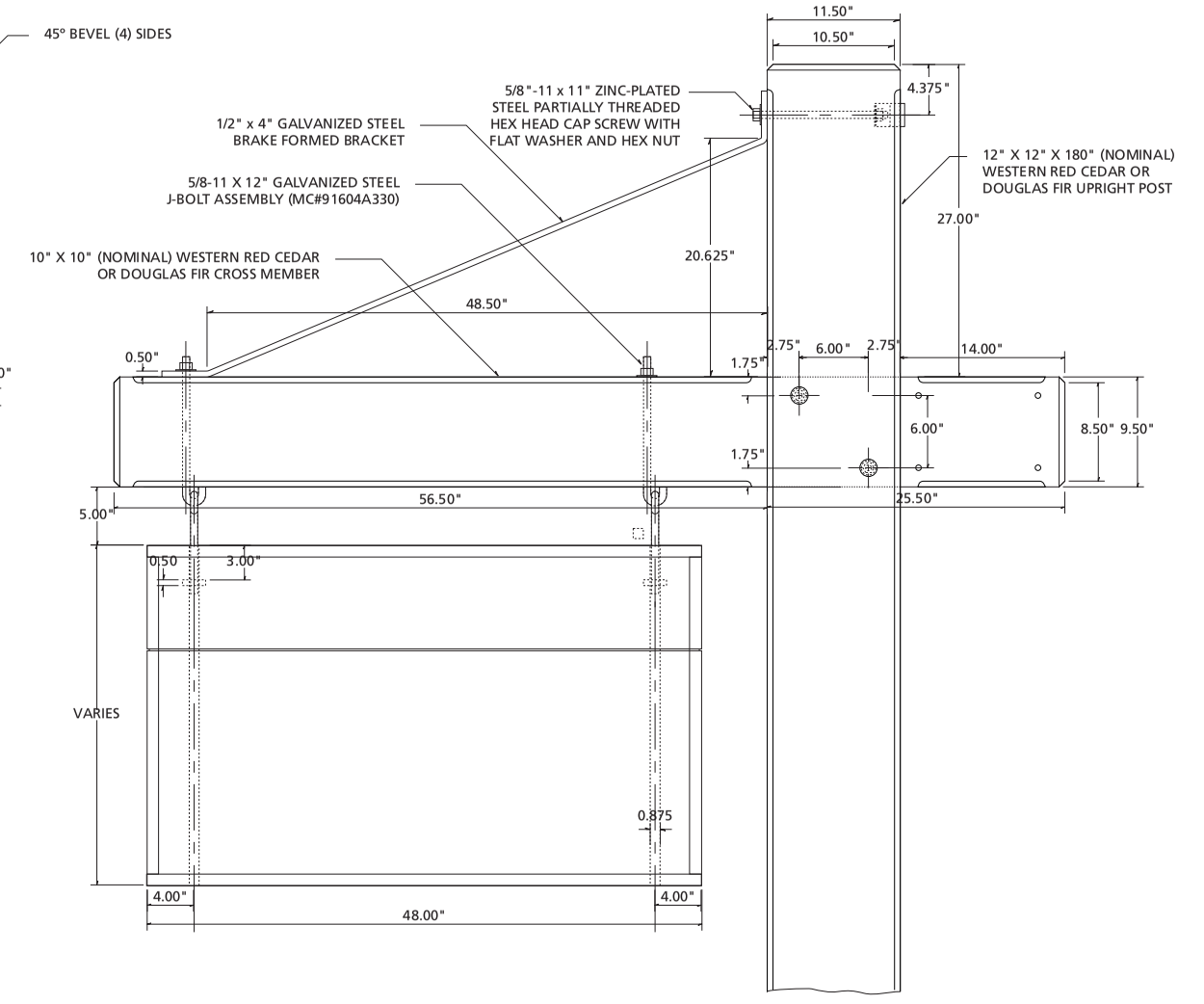


36" WIDE HANGING PANEL BASE PLATE PLAN VIEW

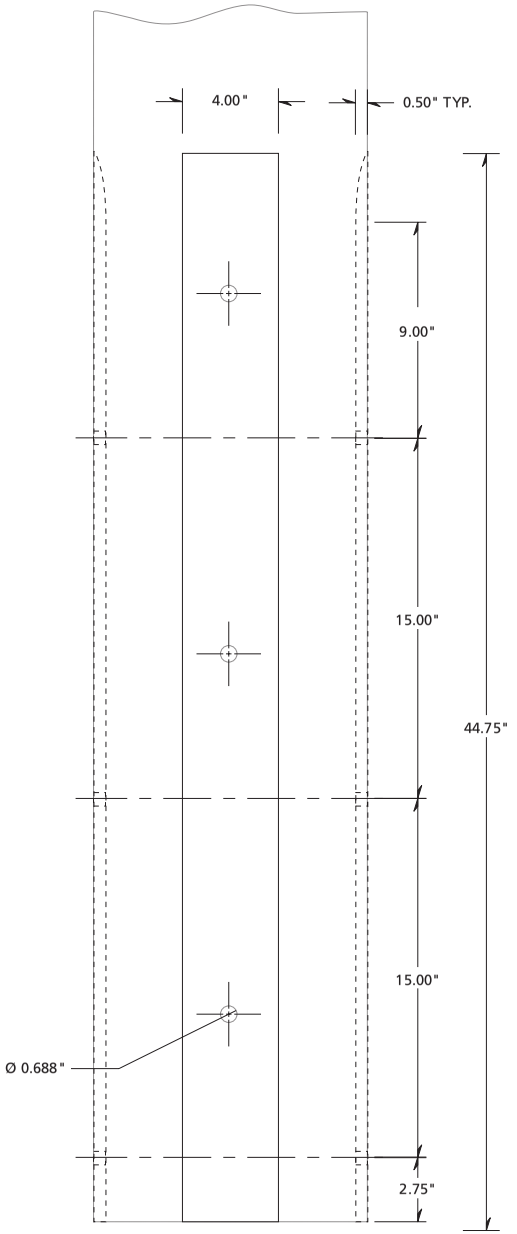




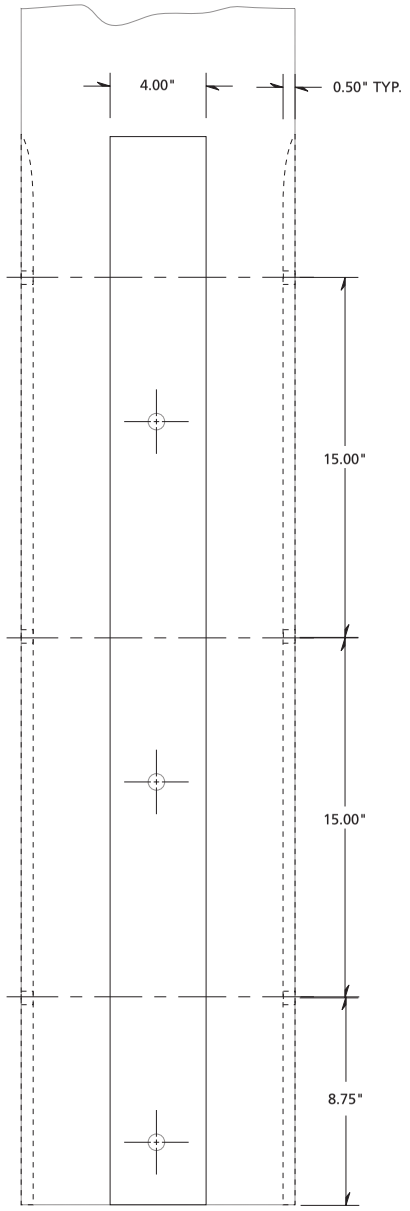
48" WIDE HANGING PANEL SIDE ELEVATION



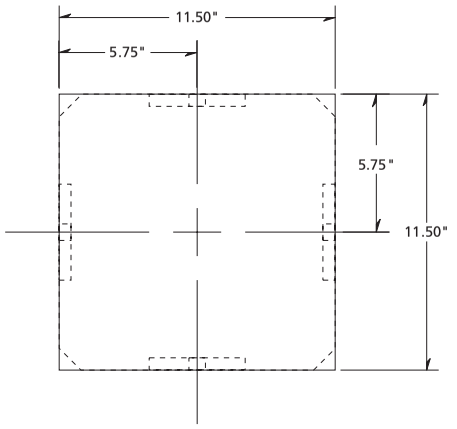
48" WIDE HANGING PANEL FRONT ELEVATION



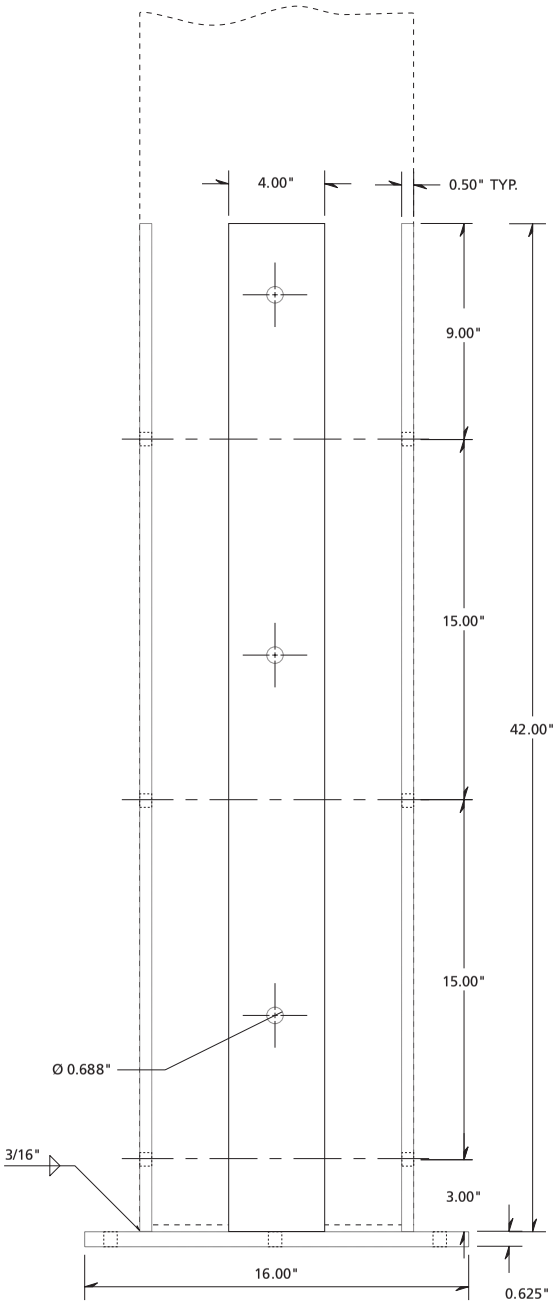
48" WIDE HANGING PANEL POST DRILL DIAGRAM FRONT ELEVATION



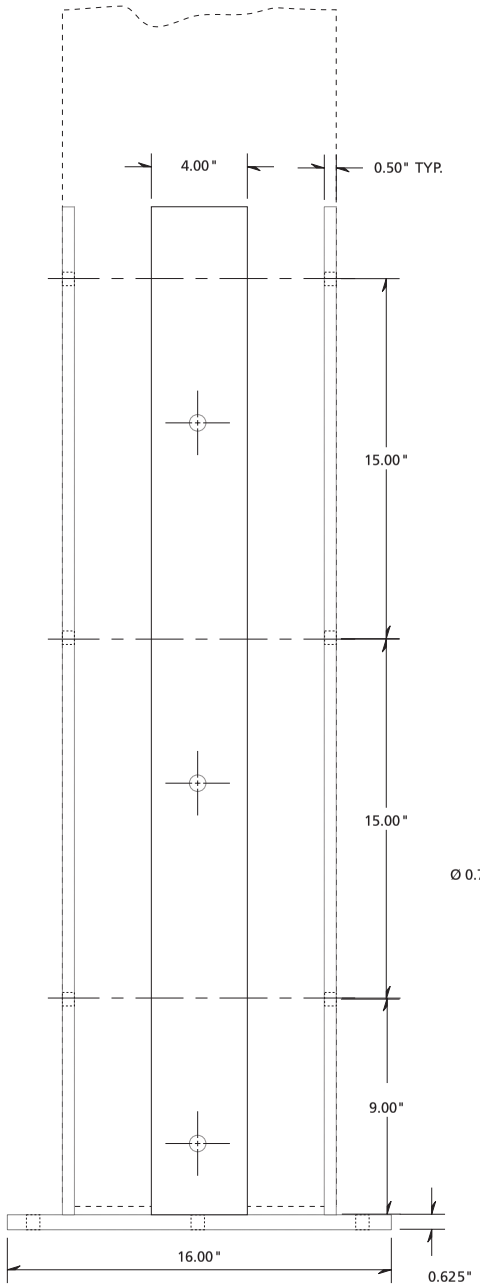
48" WIDE HANGING PANEL POST DRILL DIAGRAM SIDE ELEVATION



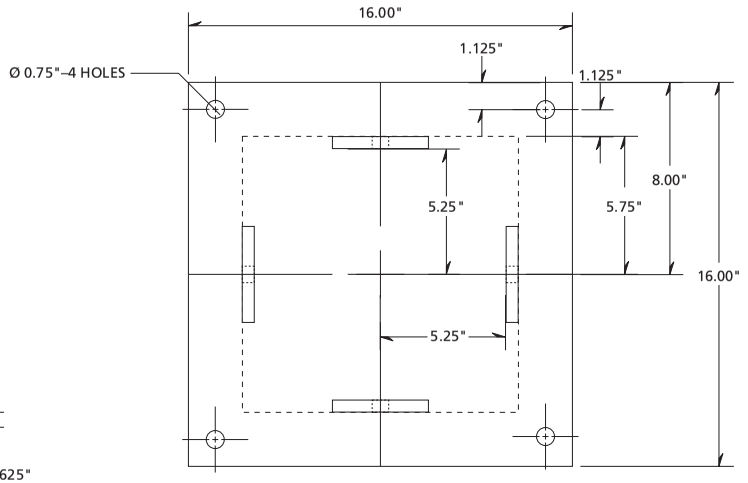
48" WIDE HANGING PANEL POST DRILL DIAGRAM PLAN VIEW



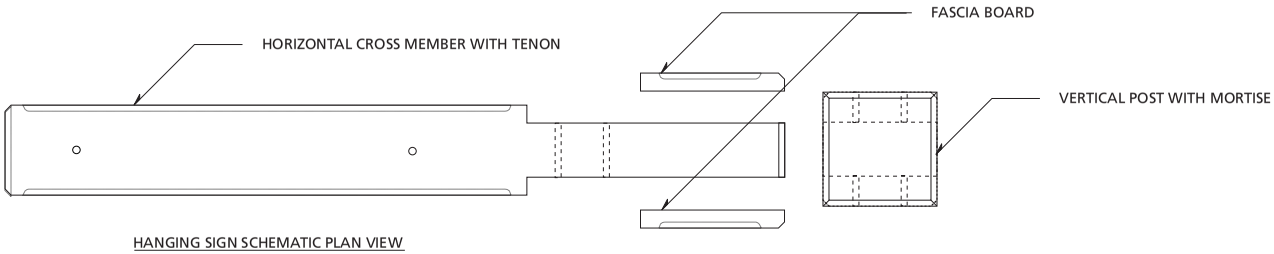
48" WIDE HANGING PANEL BASE PLATE FRONT ELEVATION



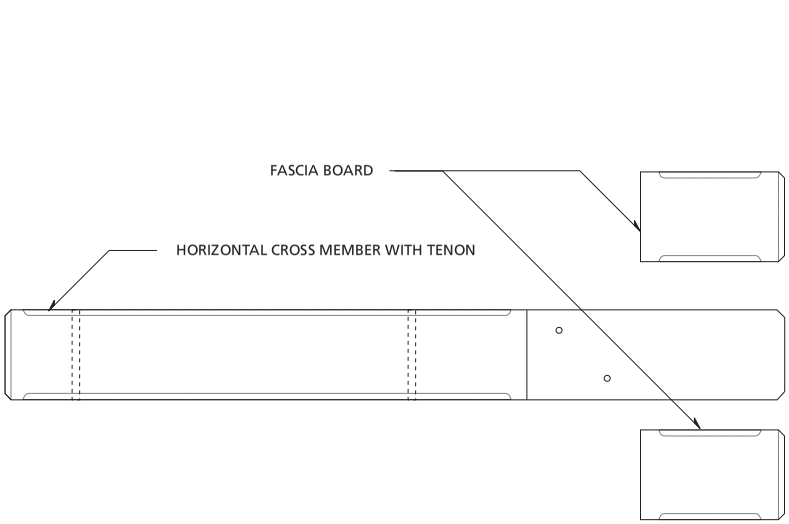
48" WIDE HANGING PANEL BASE PLATE SIDE ELEVATION

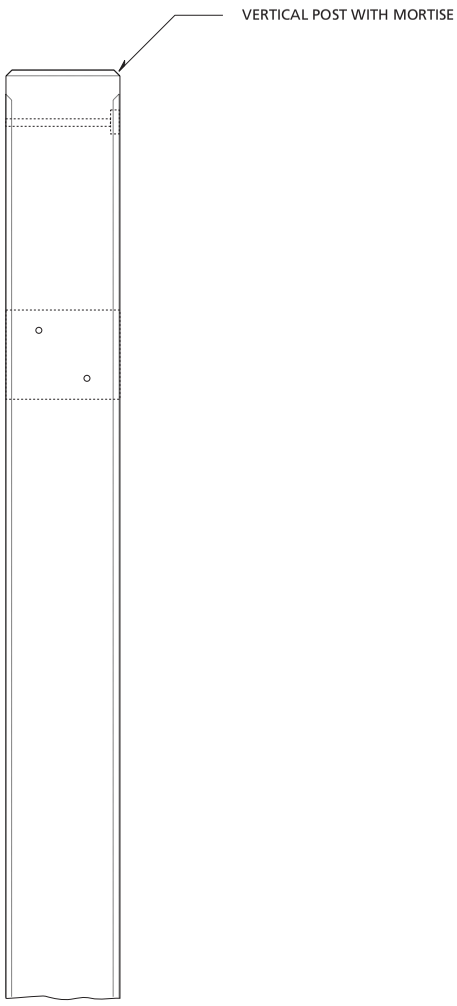


48" WIDE HANGING PANEL BASE PLATE PLAN VIEW

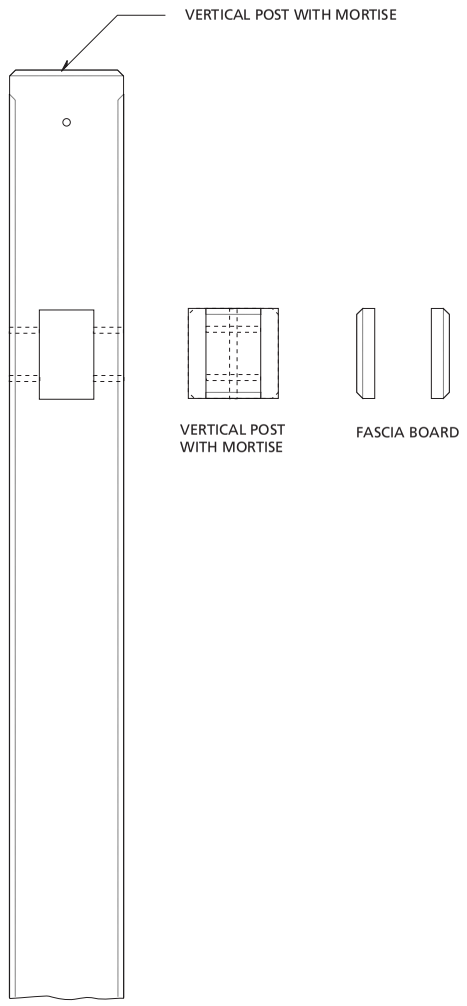


HANGING SIGN SCHEMATIC PLAN VIEW



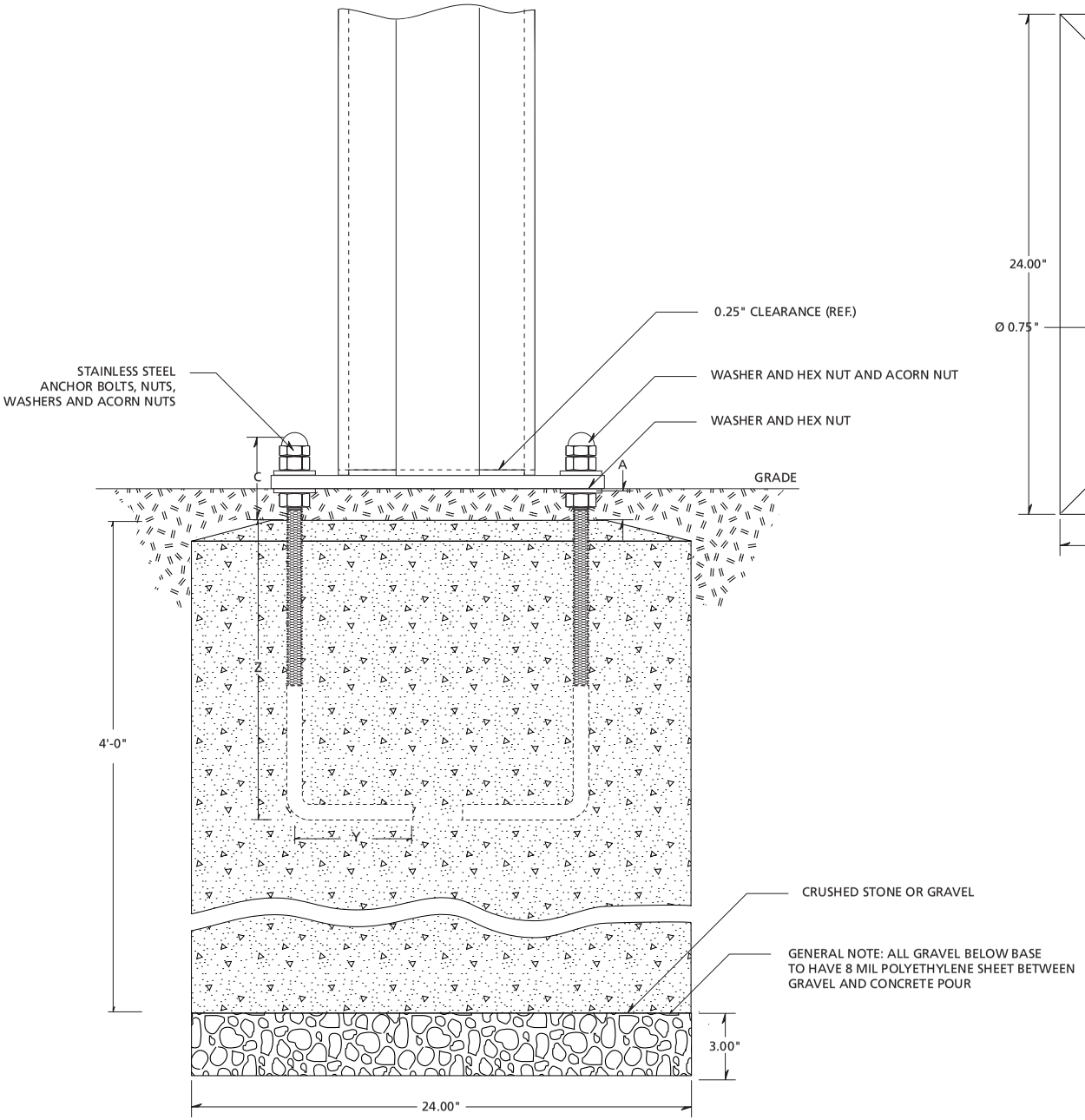


HANGING SIGN SCHEMATIC FRONT ELEVATION

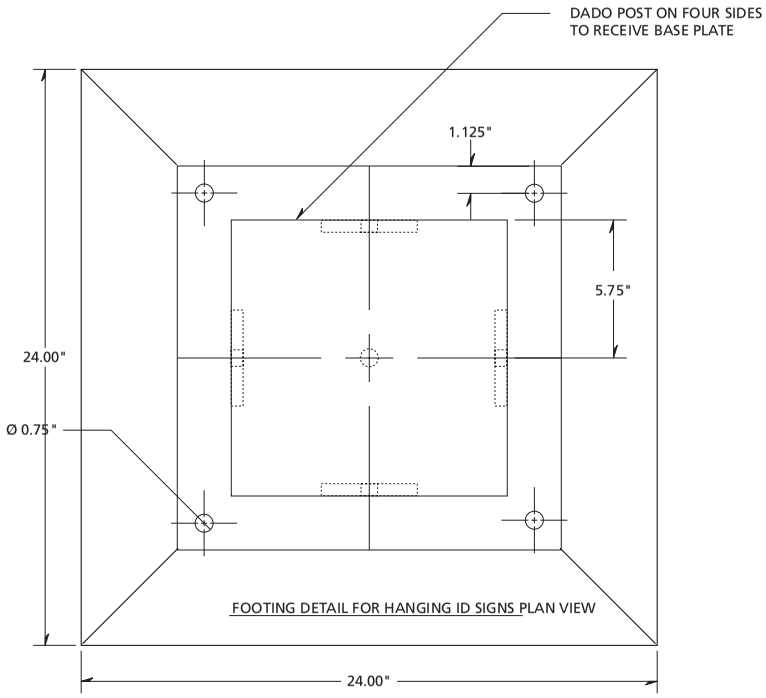


HANGING SIGN SCHEMATIC SIDE ELEVATION

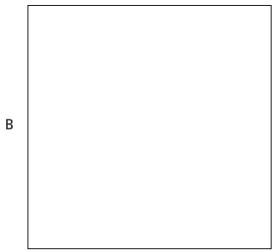
Anchor bolt diameter	Distance from top of footing to bottom of base plate (A)	Anchor bolt exposed from top of footing (C)	Anchor bolt embedment (Z)	Overall anchor bolt length	Anchor bolt return (Y)
5/8"	1-1/2"	4"	14"	18"	6"



FOOTING DETAIL FOR HANGING ID SIGNS



FOOTING DETAIL FOR HANGING ID SIGNS PLAN VIEW



ALL FOOTINGS ARE SQUARE

Chapter 4

Material Specifications & Assembly Drawings

Section 4.4

Road Guide, Trailblazer, & Boundary Signs

Final Draft: *June 1, 2002*

TABLE OF CONTENTS

4.4 Road Guide Signs: Material Specifications & Assembly Drawings

Material Specifications

Fabrication Drawings and Reference Charts

INTRODUCTION

These specifications apply to the furnishing of Road Guide, Trailblazer, and Boundary Signs.

Signs assemblies are fabricated to the dimensions specified in the sign orders and these specifications. They are ordered from the sign schedule and mounted with Douglas Fir Select Grade dimensional timber uprights. Work shall include the furnishing of all materials, labor, equipment, and supplies to construct sign panels or full sign assemblies, packaging, and shipment to the designated assembly location.

This section concerns material and fabrication procedures. Assembly and installations instructions are included in Chapter 5, Section 5.1. Installation, demolition, and overall site management procedures for construction are included in the General Requirements Section of Section 4.1: of this chapter.

Scope

Signs and sign assemblies are to be manufactured using materials and fabrication processes as described in these specifications and companion drawings, and match quality of initial submissions.

Dimensions

Dimensions for legend size and all related dimensions for sign layout, panel sizes, post lengths, mounting height, and post drilling for connection of panel to post, hardware, machine parts (connection details), and materials (dimensional lumber and panel thickness) are specified in inches.

Structural Engineering

All structures have been engineered to meet typical conditions throughout the National Park Service. This criteria is provided in Section 4.1 of the General Requirements Section, Appendix A, Engineering Criteria for Sign Design. Special conditions that are outside these parameters are to be engineered on a site-specific basis. This primarily includes signs placed on a steep grade where one post is longer than the 7' height above grade level (HAGL) or where soil density is less than the parameters specified.

Mounting Regulations for Frangible Bases

Sign assemblies will be embedded in concrete footings. The sign upright can be modified to incorporate a breakaway base as per the FHWA Traffic Control Devices Handbook (Part II), the AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaire and Traffic Signals (Chapter 4), the AASHTO Roadside Design Guide (and as incorporated into the NPS Sign Manual 1988), and the NCHRP Recommended Procedures for the Safety Performance Evaluation of Highway Features (Report 350). Those guidelines are not includ-

ed in this manual. Other references include local highway sign specifications which may identify drilling procedures for timber posts. Use of breakaway bases are discouraged by the AASHTO standards when signs are mounted on an uneven grade in which calculation of impact point is not possible, or in pedestrian zones where an impacted sign may dislodge and hit a bystander.

1.0 MATERIAL OVERVIEW

Aluminum Composite Panel Material

- 10 mm Omega Alumalite ACM (aluminum composite material) as manufactured by Laminators Inc., Hatfield, Pa., for Road Guide, Trailblazer and Boundary Sign panels

Dimensional Lumber

- Douglas Fir (Pressure Treated): Structural Grade, Number 2 Standard and Better timbers pressure- treated with ACQ (Ammoniacal Copper Quat.). Do not use CCA treated material. Sizes include: 4" x 4", 4" x 6", 4" x 8", 4" x 10" ,6" X 8" and 8" X 10" with lengths specified in sign schedule for Road Guide, Trailblazer, and Boundary Signs.

Steel

- 1/4" thick (10" x 42", 12" x 42", 14" x 42") A-36 plate stabilizer blades with epoxy coating for direct embedment Trailblazer and Boundary Signs

Aluminum

Road Guide Signs

- 3" x 2-1/2" x 1/4", 6061-T6 aluminum structural angle for matching "L" brackets attached to both panel and upright to create "Z" match plate

Trailblazer/Boundary Signs

- 3" x 3" x 3/16", 6061-T6 aluminum structural angle for "L" brackets used to attach sign panel to upright

Hardware

- 4" x 1/2" zinc plated steel dowel pins, (Laminators, Inc. No. 50292) for edge joining panels for sheets over 5'-0" x 10'-0"
- 1/2", No.8 stainless steel pan head sheet metal screw (MC92465A194) for attachment of angle to Alumalite panel to secure during adhesive set.

Road Guide Signs

- 1/2"-13 dia. – 18-8 stainless steel hex bolts for attachment of aluminum angle to timber upright in lengths based on post size; 5"(MC 92198A732), 7"(MC 92198A738), 9"(MC 92198A742), 12"(MC 92198A748)
- 9/16"– 18-8 stainless steel washer for attachment of aluminum angle to timber upright (MC 98019A510)
- 1/2"-13 stainless steel hex nut for attachment of aluminum angle to timber upright (MC 91845A310)

- 3/8"– 16 x 1-1/4"– 18-8 stainless steel hex head for attaching companion aluminum angles (McMaster Carr 92240A626)
- 3/8"– 18-8 stainless steel flat washer for attaching companion aluminum angles (McMaster Carr 98019A500)

- 3/8"– 18-8 stainless steel flat spring lock washer for attaching companion aluminum angles (McMaster Carr 91475A031)
- 3/8"– 18-8 stainless steel hex nut for attaching companion aluminum angles (McMaster Carr 91845A031)

Trailblazer and Boundary Signs

- 1/4"– 20 x 4.5" stainless steel hex head 18-8 bolts for panel attachment with 4" post (McMaster Carr 92198A560)
- 1/4" stainless steel flat washer for attachment of angle bracket to post (McMaster Carr 98019A360)
- 1/4"– 18-8 stainless steel, hex head lock nut with Nylon insert (MC 91831A029)

- 1/2"– 13 zinc- plated steel hex bolts for attachment of stabilizer blade to timber upright. Sizes include: 5" (MC 91236A732), 7" (MC 91236A738), 9" (MC 91236A742) with companion galvanized washer.
- 7/16" galvanized washers for attachment of sign brackets to timber upright (MC 98970A132)

Graphics

- Type I – A medium-intensity retroreflective sheeting referred to as "engineering grade" with Class 1 adhesive backing that is pressure sensitive per ASTM 4956-01 and FHWA standard specification FP-96
- Type II - A medium high-intensity retroreflective sheeting referred to as "super engineering grade" with Class I adhesive backing that is pressure sensitive per ASTM D4956-01 and FHWA standard specification FP-96
- Type III – A high-intensity retroreflective with prismatic retroreflective material with Class 1 adhesive backing that is pressure sensitive, per ASTM 4956-01 and FHWA-FP-96

Transparent overlay film reverse cut and applied to Type II and Type III sheeting shall be warranted by the reflective sheeting manufacturer for the life of the retroreflective sheeting.

Translucent and opaque screen-printing inks applied to Type I and Type II sheeting shall be compatible with specified sheeting.

Paint and Coatings

- Acrylic Gloss Enamel, Benjamin Moore M28, color 5/E-1000 for field painting of posts

- Matthews Pretreatment Acid Activated PT Filler (74760/74766) metal prep
- Matthews Acrylic Polyurethane enamel (number 39A-1A) with appropriate activator and catalysts (see manufacturer's specifications); alternate: Matthews low volatile organic compound formula, available where environmental regulations require, for aluminum angles

- Bituminous roofing cement for coating directly embedded Road Guide, Trailblazer, and Boundary Sign upright timbers

Adhesive

- Heavy duty exterior grade construction adhesive (Laminators, Inc. No. 12751), 11 oz. tube, for adhering aluminum angle to back of Alumalite panels of Road Guide Signs and Trailblazer and Boundary Signs.

Concrete

- 3000 lbs./28 days

2.0 PANEL FABRICATION REFERENCE CHARTS

Road Guide Signs

Each Road Guide Sign is unique in that the size is based on the legend size (4", 6", 8"), the length of the longest legend line on a sign panel and overall height of the sign layout based on the standard grid formats (RG1 to RG-11) as provided in Chapter 2.

All Road Guide Signs are fabricated using a common method of assembly with the thickness of the Alumalite aluminum composite panel material, diameter of bolts, and weight of composite section rails (aluminum angle) being the same. Based on size of panel, variations include the dimensions and number of upright timbers, the number and frequency of aluminum angle rails, and size of footing.

Refer to the two diagrams for legend sizes:

- *Road Guide Sign Assembly Reference Diagram: 4.4-27, 29, 31*
- *Road Guide Sign Rail and Post Location Diagram: 4.4-28, 30, 32*

Select the correct specification based on height and width of panel, not to exceed the value shown in the chart. For example:

- If the sign has a 6" primary legend, and the panel is 140' wide and 43" tall, the correct assembly reference is 144" wide by 48" tall. Based on this size, the components of this sign assembly will be:
- Alumalite panel with one vertically aligned pin joint to create 140" continuous sheet with optional aluminum panel of same size attached depending on type of sheeting used
- Two aluminum angle rails horizontally located 6" from top and bottom of panel
- Three 4" x 8" posts with the outboard posts set 24" from the left and right sides of the panel, and one in the middle, with aluminum angles attached to match plate angles on back of Alumalite panel
- 18" x 18" by 4'-0" footing

Sign Assembly Process: Summary

The recommended order for assembly of Road Guide and Trailblazer/Boundary Signs is as follows:

- Cut Alumalite panel to size and join a required for panels larger than 5'-0" x 10'-0".
- Clean front face of Alumalite panel and apply retroreflective graphics per manufactures specifications.
- Prepare aluminum angles, including drilling for sheet metal screws and match plate assembly for Road Guide Signs and holes for connection to timber uprights for both Road Guide Signs, and Trailblazer and Boundary Signs. Clean rails and remove any surface imperfections. Paint aluminum angles, except for surfaces to be adhesive applied to back of Alumalite panel.
- Clean back of Alumalite panels and attach aluminum angles as specified.

2.1 FABRICATION: ALUMALITE SIGN PANELS

Panel shall be fabricated from Alumalite aluminum composite panel material (ACM) as manufactured by Laminators, Inc., Hatfield. Pa. Panels are premium grade polyolifin core with double layer of fluting and with 0.012" skin of aluminum laminated to front and back sides. Surface of panel shall be flat and free of buckles, warps, dents, burrs, and any fabrication defects.

Use a continuous, un-spliced panel wherever possible. Panel splices are to be made on the vertical alignment with the interior fluting oriented in the horizontal direction. Standard panel sizes include: 4'-0" x 8'-0", 4'-0" x 10'-0",4'-0" x 12'-0", and 5'-0" x 10'-0". Recommended method for joining panels are provided on pages 4.4-23, 4.4-25, and 4.4-27.

Finish: Panels to be finished with factory applied polyester paint finish on front and back. Back panel to be Regal Bronze (HA), and front to be factory finished white. Panel shall be 10mm thick. Panel finished dimensions shall have a tolerance of ± .125". No cleats or joints shall be permitted for panels with a dimension smaller than or equal to 10'-0" (304 cm) in overall width and less than 5'-0" (152 cm) tall, or less than 10'-0" (304 cm) in overall height and with width not less than 5'-0" (152 cm).

Corners: Panels shall have 0.375" safety corner radius unless otherwise specified.

Cutting: All cuts shall be made with high-speed saws. Rotary saw blades to be carbide tipped. Power saws shall have little or no set and as much lead as possible. Blades on table saws shall not extend more than 1" and not less than 0.5" through panel. Panels will be fed through slowly to avoid damage to edges.

Storage: Panels to be stored shall be stacked flat and raised from the floor with supporting 4" x 4" blocking placed 24" on center in an enclosed and well-ventilated area; do not store on concrete surfaces.

Edge Joining Large Panels

All pin joints are to be placed in the vertical orientation. Panels that are wider than 10'-0" and taller than 5'-0" will be vertically pin jointed with Omega Alumalite dowel pins. Joining diagrams are provided in the fabrication drawings showing how each panel is to be joined based on overall size.

Pins to be embedded to an equal depth in each receiving side with outboard pin being 1" from edge of panel and intermediate pins placed one every 12" over the length of the joint.

Refer to Road Guide Sign Fabrication drawings for dowel pin joint fabrication detail.

2.2 FABRICATION: ALUMINUM ANGLES

Road Guide Signs

Each assembly requires two to three pairs of 2-1/2" x 3" x 1/4" structural aluminum (6061-T6) angles placed horizontally on sign panel.

Aluminum angles to be painted prior to attachment to back of Alumalite sign panel, see paragraph 2.3 below.

Finishing: Remove all sharp edges or machine burrs on end prior to painting. Remove any surface imperfections that will prevent a positive adhesive bond to back of Alumalite sign panel. Remove machine oil and dirt on angle prior to painting.

Length: Angles are to be 4" less than overall width of finished panel and placed 2" inboard on both right and left sides of panel.

Assembly and Mounting Holes: The pairs of angles are bolt-attached on the 3" face to create a composite structural section after sign is fully assembled.

- *Composite Structural Section:* Each angle will be fabricated to receive 7/16" mounting holes placed 24" (+/- 4") on center over the length of the 3" face for match plate attachment, with outboard hole on each end placed 4" from end of angle. To insure alignment of common holes, each set of angles shall be fabricated as a pair.
- *Panel Attachment:* The leg of the angle to be attached to the sign panel back to fabricated to receive 1/4"" mounting holes for sheet metal screws placed 24" (+/- 4") on center over the length of the 3" face for match plate attachment, with outboard hole on each end placed 4" from end of angle.
- Clean the unpainted 2-1/2" face intended for attachment to Alumalite panel with *Bar Keepers Friend* brand cleaner (includes oxalic acid to remove surface corrosion), rinse with clean water and wipe dry with a clean cloth. Mark angle attachment location on back of panel. Place bottom of upper angle 6.25" from top of panel and, and place bottom of lower angle 3.75" from bottom of panel. Third angle, if required to be placed equal distant between the upper and lower angle.
- Clean back of Alumalite panel with *Fantastic* brand (no bleach) cleaner and wipe dry with a clean cloth prior to adhesive attachment of angle. Apply 2 continuous 3/16" dia. beads of specified adhesive to 2.5" unpainted face of angle. Beads of adhesive to be 3/4" from edge of angle on each side. Attach angle to back of sign panel. For precise alignment, it is recommended that blocking be affixed to back of panel on the base lines. Firmly press the angle to the panel to compress the adhesive evenly. Carefully secure angle with sheet metal screws (do not over tighten). Allow attached angles to cure for 24 hours before placing any stress on the connection point.
- *Post Attachment:* Angle attached to post shall receive two to three 5/8" diameter holes to receive 1/2" hex bolt from timber post. Location and number of mounting holes to be

based on width of sign panel and number of posts. *Refer to Road Guide Sign Rail and*

- *Post Location Diagram* to determine distance in from end of angle (note that this is 2" less on each end than overall width of sign) and if a center hole is required.

Trailblazer/Boundary Signs

Each assembly requires one or two pairs of 3" x 3" x 3/16" structural aluminum (6061-T6) angles for attachment of Alumalite panel to upright timber.

Aluminum angles to be painted prior to attachment to back of Alumalite sign panel, see paragraph 2.3 below.

Finishing: Remove all sharp edges or machine burrs on end prior to painting. Remove any surface imperfections that will prevent a positive adhesive bond to back of Alumalite sign panel. Remove machine oil and dirt on angle prior to painting.

Length: Angles are to be 2" less than overall height of finished panel, and placed 1" inboard of top and 1" inboard from bottom. For size of panel, refer to *Trailblazer Sign Assembly Reference Diagram* by size of legend.

Assembly and Mounting Holes:

- *Panel Attachment:* The 3" leg of the angle to be attached to the sign panel back to fabricated to receive 1/4" mounting holes for sheet metal screws placed 12" on-center with outboard hole on each end placed 2" from end of angle.
- Clean the unpainted 3" face intended for attachment to Alumalite panel with *Bar Keepers Friend* brand cleaner (includes oxalic acid to remove surface corrosion), rinse with clean water and wipe dry with a clean cloth.
- Mark angle attachment location on back of panel. Identify vertical center of panel and mark angle attachment location on back of panel. For single post assemblies, place each angle 1.75" from left and right side of center line. For double post assemblies, refer to post location drawings included in this specification. Note, 4" post widths are nominal with finished width of 3.5".
- Clean back of Alumalite panel with *Fantastic* brand (no bleach) cleaner and wipe dry with a clean cloth prior to adhesive attachment of angle. Apply 2 continuous 3/16" dia. beads of specified adhesive to 3" unpainted face of angle. Beads of adhesive to be 3/4" from edge of angle on each side. Attach angle to back of sign panel. For precise alignment, it is recommended that blocking be affixed to back of panel on the base lines. Firmly press the angle to the panel to compress the adhesive evenly. Carefully secure angle with sheet metal screws (do not over tighten). Allow attached angles to cure for 24 hours before placing any stress on the connection point.
- *Post Attachment:* Place three 5/16" holes on opposing side angle. Location to be centered on 3" face and 1" from top and bottom of angle, with third hole placed equal distant

between top and bottom. Hole location to match mounting holes on companion angle.

Finishing: Remove all sharp edges or machine burrs. Remove machine oil and dirt on angle prior to painting.

2.3 PAINTING ALUMINUM ANGLES

Road Guide & Trailblazer Signs

Painting: All aluminum angles, ***except surfaces to be adhesive applied to back of sign panel*** are to be primed and painted with acrylic polyurethane from Matthews Paint Company (1800-323-6593) 8201 100th Street, Pleasant Prairie, WI 53158.

VOC Alternate: Matthews MAP-VOC (low volatile organic compound acrylic polyurethane) is available for use where VOC compliance is required.

Metal Preparation: All surfaces to be coated should be free of oil, grease, soil, or other contaminant. Surfaces to be dry before application of primer. Tack wipe or remove dust prior to applying pretreatment and priming.

Metal Pretreatment: Apply Matthews Acid Activated PT Filler (74760/74766) to provide superior bonding of primer and finish coat to clean bare metal. Mix with specified activator and apply per manufacturer's specifications to 0.5 to 0.75 mils dry film thickness. Primer can be applied after 30 minutes, or when tack free.

Finish Coat: Spray apply two coats Matthews Acrylic Polyurethane (MAP) enamel, satin gloss finish (number 39A-1A) mixed with MAP Catalyst and appropriate reducers depending on temperature and humidity per manufacturer's specifications. Finish coat to be 1.5 to 2 mils dry film thickness (3 to 4 mils wet film thickness). Finish coat can be applied over Rust Inhibiting White Epoxy Primer within 30 to 60 minutes, or when dry to the touch. If finish coat is applied over 48 hours after primer application, surface should be lightly broken with 400 grit sandpaper for proper adhesion.

Field Touch-up: Matthews Acrylic Polyurethane can be brush or roller applied. For good workability and finished surface quality use Matthews Brushing/Rolling Additive (number 47-444SP). Color tolerance for match shall be 1 unit or less CMC.

Packaging for Shipping: Aluminum angles must be fully protected prior to shipping to eliminate scratches or other surface abrasion in transit.

2.4 FABRICATION: DOUGLAS FIR POSTS

Material: Solid posts shall be fabricated from single piece Douglas Fir (pressure treated) Structural Grade, Number 2 Standard and Better timbers pressure- treated with ACQ (Ammoniacal Copper Quat.). Follow Douglas Fir grade lumber grading rules of the Western Wood Products Association. In jurisdictions where Douglas Fir is not available, pressure treated southern yellow pine No.1 or better may be used. Material shall be well-seasoned and free of any defects.

All post sizes may be no more than 1/2" less than nominal dimensions and sanded prior to finishing.

Road Guide Signs

Post Size: Post dimensions and quantity are based on legend size and overall panel size. Refer to ***Road Guide Sign Assembly Reference Diagram***, and ***Road Guide Sign Rail and Post Location Diagram,*** based on legend size for post size and quantity.

Post length: Post length will be determined by the height of the sign panel, added to the height above grade level to base of panel (HAGL may vary between 5' and 7' based on sight lines and local conditions noted in the sign schedule), plus embedment depth. Variations in grade or slope of actual sign installation location will be incorporated into the calculation on a site- by- site basis. The basic formula to determine post length is as follows:

- ***Panel height less one inch (-1") + height to base above grade level + 48" embedment depth of post = post length (+/-) for grade adjustment.***

All completed sign panel and post assemblies must be predrilled and assembled in the shop prior to shipment to check alignment and ensure proper fit once installed.

Post Fabrication: Chamfer top of post 1" on 4" from front edge to back edge to create a slope to reduce moisture retention in end grain of post.

Drilling Posts: 9/16" bolt holes to be placed in timber posts for attachment of aluminum angle on front face of post. Angle to be attached with 1/2" carriage bolt embedded from back of panel.

Location of Mounting Holes: Top hole to be placed 5" from top of post (front to back). Location of bottom mounting hole is determined by subtracting 10" from overall panel height and placing the bottom hole that distance from the center of the top mounting hole. Intermediate angles are to be placed midpoint between the upper and lower holes.

Shop Verification of Angles: Prior to installation, preassemble sign on shop floor to verify that matching angles align.

Bolts: Angle attached with 1/2"-13 dia. galvanized carriage bolts inserted from back of post in field installation. Length of bolt will vary depending on dimension of post. Attach in field with stainless steel flat washer and stainless steel hex nut.

Trailblazers Signs

Post Size: Post dimensions and quantity are a based on panel height and width. Based on primary legend height, ***Refer to Trailblazer Sign Assembly Reference Diagram***. Note that the large wide panels will require two posts.

Post Length: Post length will be determined by the height of the sign panel (between 16" and 56"), the height above grade level to base of panel (7'-0"), plus embedment depth (4'-0").

All completed sign panel and post assemblies must be predrilled and assembled in the shop prior to shipment to check alignment and ensure proper fit once installed.

Post Fabrication: Chamfer top of post 1" on 4"from front edge to back edge to create a slope to reduce moisture retention in end grain of post.

Mounting Location for Panel Attachment: Three 3/8" bolt holes to be placed in side of timber posts for attachment of aluminum angle to post. Angle to be attached with 1/4"-20 x 4-1/2" hex bolts. Top hole to be placed 4" from top of post (side to side). Use drilled mounting angle as a reference template for each different assembly.

Mounting Location for Stabilizer Blade Attachment: Three 9/16" holes placed front to back measured from bottom of post. See fabrication drawing for location.

Shop Verification of Angles: Prior to installation, preassemble sign on shop floor to verify that matching angles align.

Bolts: Angle attached with 1/4"-20 x 4-1/4" stainless steel hex bolts inserted from side of post in field installation with stainless steel flat washer on each side and stainless steel hex lock nut.

2.5 STABILIZER BLADES: POSTS MOUNTED BY DIRECT EMBEDMENT

Trailblazer & Boundary Signs

Material: 0.25", A-36 steel plate mounted to timber uprights that are directly embedded without cement to reduce lateral movement or loosening of sign in its mount.

Size: All stabilizer blades are 42" long. Width corresponds to size of post:

Post Size	***Blade Width***	***Screw Length***	***Footing Width***
4" x 4"	10" x 42"	5"	12"
4" x 6"	12" x 42"	7"	14"
4" x 8"	14" x 42"	9"	16"
6" x 8"	18" x 42"	9"	20"

Fabrication: 3 holes, 9/16" vertically centered holes in plate at locations shown in drawing.

Finish: Remove all sharp edges and burrs from cutting and drilling of parts. Clean metal and paint with two heavy coats of alkyd based metal primer, or finish by- hot dipped galvanizing.

Assembly: Refer to assembly and installation instructions in Section 5.1.

2.6 GRAPHIC LAYOUT & PRODUCTION

Requirements

Road Guide & Trailblazer Signs

Computer Cut Graphics: Signs to be computer cut from vector art files created in Adobe Illustrator (or compatible programs). Finished cut graphics must precisely match digital copy and scaled print relative to measurements of typeface replication, stroke width, letterspace, and symbol and arrow size. Letter stroke to be a continuous line with no ragged edges or ragged interior corners.

Trailblazer Signs

Screen- Printed Graphics: Overbar graphics for Trailblazer and Boundary Signs to be screen- printed on white Type II retroreflective sheeting. Files with National Park Service name and NPS Arrowhead logo to be provided in rasterized or vector art, TIFF, EPS PostScript file. Finished cut graphics must precisely match digital copy and scaled print relative to measurements of typeface replication, stroke width, letterspace, and symbol and arrow size and proportion. Letter stroke to be a continuous line with no ragged edges or ragged interior corners.

Graphic Layout

Road Guide & Trailblazer Signs

Grid Format: All graphics to be formatted using National Park Service Road Guide Sign grid formats (RG.1-11, HG.1-3, TB.1-4, PB.1-4) as specified in this manual. This includes type size, kerning, margins (left and right), top alignment, and overall panel proportions.

Typography: Legends to be NPS Rawlinson Roadway with Frutiger Bold for secondary legends. All sign legends are to be prepared using the typographic specifications provided in Chapter 2, Graphic Standards.

Production Layouts: Graphics for each sign will be provided with all text and graphic elements in position. Graphics to be accurately reproduced from these files.

Artwork & Imaging

Art Preparation: All artwork for panels will be provided as a vector art computer file in electronic format with Adobe Illustrator files with all type, arrows, and symbols in-position following the established typographic specifications and grid formats. Allowable reproduction tolerance is (+/−) 0.0312" for typographic reproduction of all letters.

Art Approvals: To insure proper conversion from digital files supplied, all art to be reproduced shall be submitted to the COTR (or whomever is designated in the review process) for approval before sign is fabricated. Submissions are to be outline plots from cutting files (10% scale or 20% scale).

Graphic Material/Production Methods

Road Guide Signs

Production Method A – Retroreflective Sheeting with Transparent Overlay: All Road Guide Signs to be produced with retroreflective background with computer (reverse) cut brown (or blue for specific concession related signs) transparent adhesive overlay film applied to the white sheeting, with all graphics (including secondary legends) and borders cut in-position from the approved sign layout graphic file.

Secondary legends are to be cut in positive from yellow retroreflective sheeting that is compatible with the grade of white base sheeting, and are to be cut and applied over the secondary legend (reverse cut white) after the transparent overlay films are applied. All graphics to be computer cut as a continuous graphic that is weeded and applied using compatible application film with all graphics in-position.

Road Guide Signs (alternate)

Production Method B – Retroreflective Sheeting placed on Retroreflective Sheeting: An alternate method for preparing Road Guide Signs is to place computer cut retroreflective graphics on a retroreflective base material using application tape to maintain alignment and spacing of word groups. This method requires careful positioning of each graphic onto the panel based on the layout grid formats and the specific sign panel layout drawing (see *Graphic Application)*.

Trailblazer Signs

Production Method C – Screen- Printed Graphics and Retroreflective Sheeting with Transparent Overlay: Screen-printing is specified for the dark green opaque overbar portion of Trailblazer and Boundary Signs with white "National Park Service" name and the NPS Arrowhead logo as a separate (Brown, PMS-1615) screen- printed graphic cut to the specified outline shape. These two graphics will be applied to a white retroreflective background. Graphics for the site- specific message will be prepared as a reverse cut brown transparent overlay that is applied over the white sheeting.

Road Guide Signs

Material Selection: Selection of applicable grade of retroreflective sheeting will be determined by the NPS based on desired life cycle and brightness requirements. Retroreflective materials shall comply with Standard Specifications for Construction of Roads and Bridges on Federal Highway Project, FP-96 and ASTM D4956-01. The following three standard sheeting types are used. Refer to Section 6.2: *Sign Materials Reference Selection Guide.*

- Type I – A medium-intensity retroreflective sheeting referred to as "engineer grade" with Class 1 adhesive backing that is pressure sensitive per ASTM 4956-01 and FHWA standard specification FP-96.
- Type II – A medium high-intensity retroreflective sheeting referred to as "super engineering" FHWA standard specification FP-96.
- Type III – A high- intensity retroreflective prismatic sheeting material with Class 1 adhesive backing that is pressure sensitive, per ASTM 4956-01 and FHWA-FP-96.

Transparent overlay film shall be warranted by the reflective sheeting manufacturer for the life of the retroreflective sheeting.

Colors

Road Guide Signs

Colors shall be used as specified in Standard Highway Sign Colors (FHWA, HTO-21). These colors are specified using 3M and Avery Dennison product numbers. If an alternate manufacturer is used, notify Contract Officer with verification that grade and adhesive system are equal to the specified materials below.

Standard Road Guide Signs are to be brown with white legend and yellow secondary legend. Signs guiding visitors to fee areas managed by a concession are to have a blue background and white legend with yellow secondary legend. For questions on the appropriate use of color, contact the National UniGuide Manager.

Method A: Computer Cut Transparent Overlay Film Applied on to White Retroreflective Sheeting

	Manufacturer	*White Background*	*Brown Transparent Overlay*	*Yellow Secondary Legend*	*Blue Transparent Overlay*
Type I Material (Engineer Grade)	Avery Dennison 3M	T-1500 White 3290	XL-6009 1179	T-1501 3271	XL-6005 1175
Type II Material (Super Engineer Grade)	Avery Dennison 3M	T-2500 White na	XL-6009 or 4809 na	T-2501 na	XL-6005 / 4805 na
Type III Material (Prismatic)	Avery Dennison 3M	T-6500 White na	4809 na	T-6501 na	4805 na

Method B: Computer Cut White Retro-reflective Sheeting Applied over Retroreflective Base Sheeting

	Manufacturer	*White Legend*	*Brown Background*	*Yellow Secondary Legend*	*Blue Background*
Type I Material (Engineer Grade)	Avery Dennison 3M	T-1500 White 3290	T-1509 Brown 3279	T-1501 3271	T-1505 3275
Type II Material (Super Engineer Grade)	Avery Dennison 3M	T-2500 White na	T-2509 Brown na	T-2501 na	T-2505 na
Type III Material (Prismatic)	Avery Dennison 3M	T-6500 White na	T-6509 Brown na	T-6501 na	T-6505 na

Note 1: Sheeting material lines identified with (na) are not available from the manufacturer noted.

Note 2: Type I, II, and III are designations of ASTM and the Federal Highway Administration and define materials based on performance specifications.

Compatibility of Graphic Sheeting: Background and legend shall use sheeting from the same supplier. Supplier shall guarantee its products as a composite sign.

Age of Material: The Contractor shall indelibly mark each carton of retroreflective materials showing the date received. No more than 12 months shall have elapsed from the date of purchase from the manufacturer to the date of application on the substrate.

Screen- Printing on Retroreflective Sheeting

Trailblazer Signs

Artwork & Imaging: Screen- printing contractor shall produce film positives and negatives as required from the electronic art files as supplied for 175 line (or finer) screen production in the format for intended reproduction.

Printing Production: All screen work shall be of high quality, with clean, crisp, and clear graphic definition. All line work to be have even resolution from 1/2 point line width or heavier.

Colors: Colors shall be:

- Dark Green, PMS-5605 for Overbar place on Trailblazer and Boundary Signs
- NPS Brown, PMS-1615 for NPS Arrowhead logo graphic line art

Ink type shall be specified as compatible by the manufacturer of the retroreflective substrate. Inks shall be formulated using a computer calorimetry system and shall be matched with a tolerance of + 0.1 grammes.

Formulation Cards: Actual samples of selected colors shall be filed for each individual ink color to ensure consistency of the product. Filed information shall include, but is not limited to, ink formula with designated color code, thinner and retarder adjustments in grammes, batch numbers of inks, thinner and retarder, mesh tension, emulsion coating and exposure units/time. When semi- or fully- automatic equipment is used, additional information shall be filed for: off contact, peel, speed, squeegee, flood speed, curing temperature, and belt speed.

Thinner and retarder used in the adjustment of the inks shall be specified by the ink manufacturer. Additions shall be made by weight with a tolerance of (+/–) 0.1 gram and filed on the formulation card.

Screens shall be 254 polyester monofilament, mesh tensioned to no less than 18 newtons. Mesh tension, emulsion coating and exposure units/time are to be established and filed on the formulation card.

Printing shall be performed on semi- or fully- automatic equipment with a repeatability tolerance of (+/–) 0.004" in conjunction with a forced air conveyor drier. Off contact, peel, speed, squeegee, flood speed, curing temperature, and belt speed are to be established and filed on the

formulation card. A fiberglass laminated urethane squeegee set at a 75° angle is to be used.

Graphic Application

Road Guide & Trailblazer Signs

Quality: Application of pressure-sensitive sheeting shall follow manufacturer's specification. No loose or curled or lifting edges, bubbles, or blisters shall be permitted.

Surface Preparation: Before application of the sheeting, the face shall be free of all foreign matter such as paint, dust, or chemical residue. Alumalite panel shall be dry and free of any dirt or surface imperfection. The aluminum shall be thoroughly cleaned and degreased with solvent and alkaline emulsion cleaner by immersion, spray, or vapor degreasing and dried prior to application of the sheeting coat.

Road Guide Signs

Background Material: Panels shall be covered with one unspliced sheet unless the dimension is larger than 48" in vertical direction. Horizontal splices shall be positioned so as not to fall within legends. Top piece shall overlap bottom piece by a minimum of 0.5", but not more than 0.75". Spliced sheets shall be color matched.

Background shall be adhered to front of sign panel prior to application of sign graphics.

Production Method A: Apply transparent overlay graphics as one continuous sheet, or multiple sheets with overlay splice to white retroreflective sheeting background. Use application film with border dimensions as specified in the layout grid format for the specific size of sign. Overlay splice to be incorporated into cutting files to eliminate any distortion of finished graphic.

Production Method B: Apply computer cut retroreflective graphics to brown or blue retroreflective background with application film.

Legend, Border Application: Legend shall be adhered to background after application of background sheeting to sign panel. Graphics to be applied as contiguous sections with all type and graphics in- position using sheeting manufacturer's recommended transfer tape.

Horizontal Alignment: Using formats supplied, letters shall be horizontally aligned to a tolerance of (+/–) 0.125" from side of panel to left edge of legend with standard adjustments for round or overhanging letters. Inter-letter spacing shall be horizontally aligned to a tolerance of (+/–) 0.0625" from letter to letter and (+/–) 0.5" overall based on the typographic specifications in this manual.

Vertical Alignment: Using formats supplied, letters shall be horizontally aligned to a tolerance of (+/–) 0.125" from top of panel to baseline of legend, or from baseline to baseline of multi-line legends. Optical adjustment for overhang of round letters will be maintained as set on the computer.

Production Method C: Place white retroreflective sheeting on full panel. Apply screen-printed dark green overbar panel in upper section with white border as specified and NPS identifier in specified flush left position. Apply correctly sized die cut, screen-printed NPS Arrowhead logo in overbar as specified. Based on Production Method A, apply transparent overlay graphics as one continuous sheet to primary area of panel with white border and rule as specified. Following graphic application, attach edge cap as specified below.

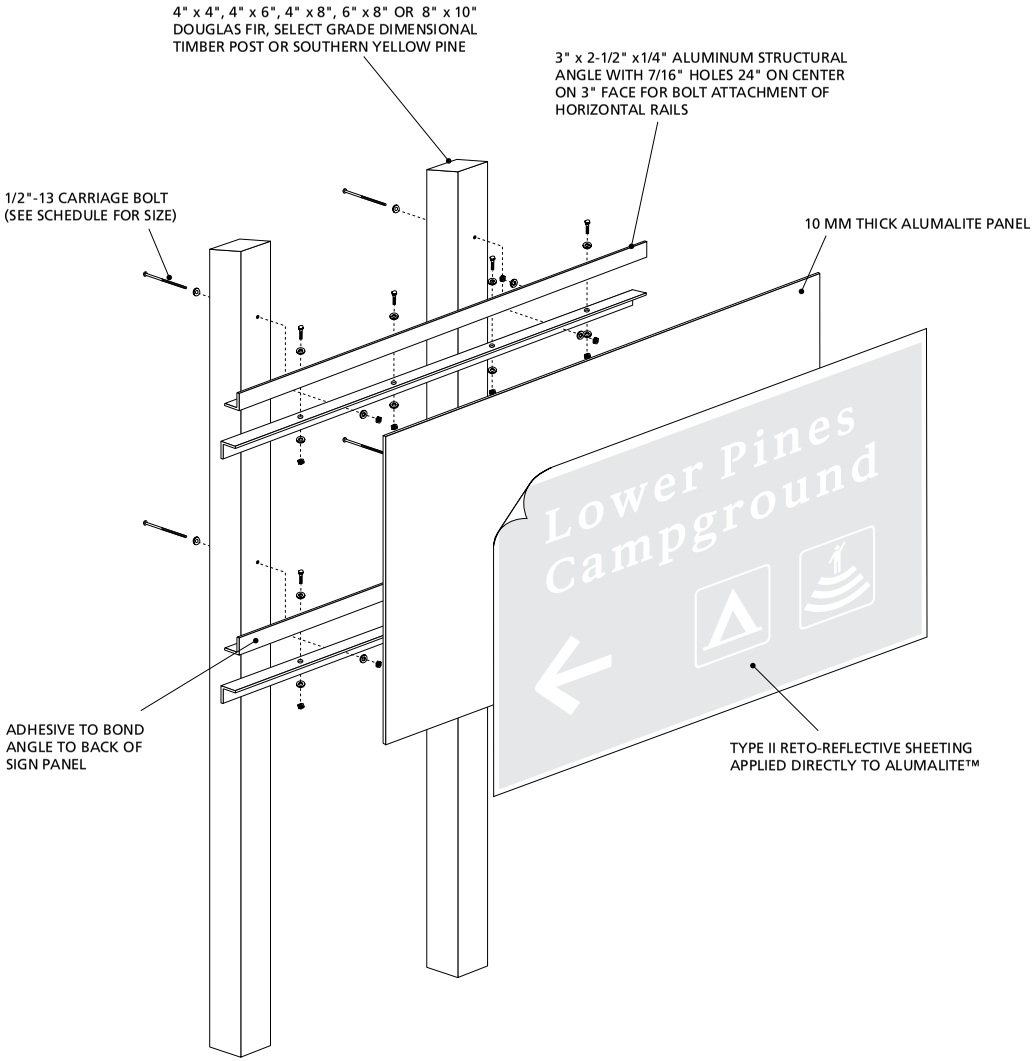
3.0 ASSEMBLY

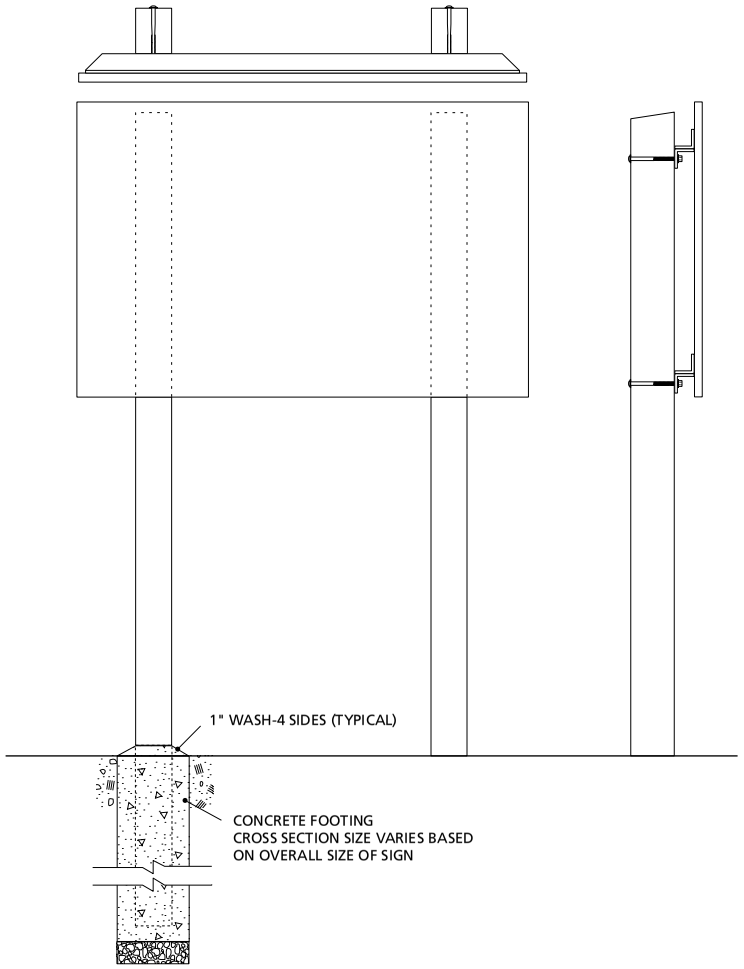
Pre-Assemblies

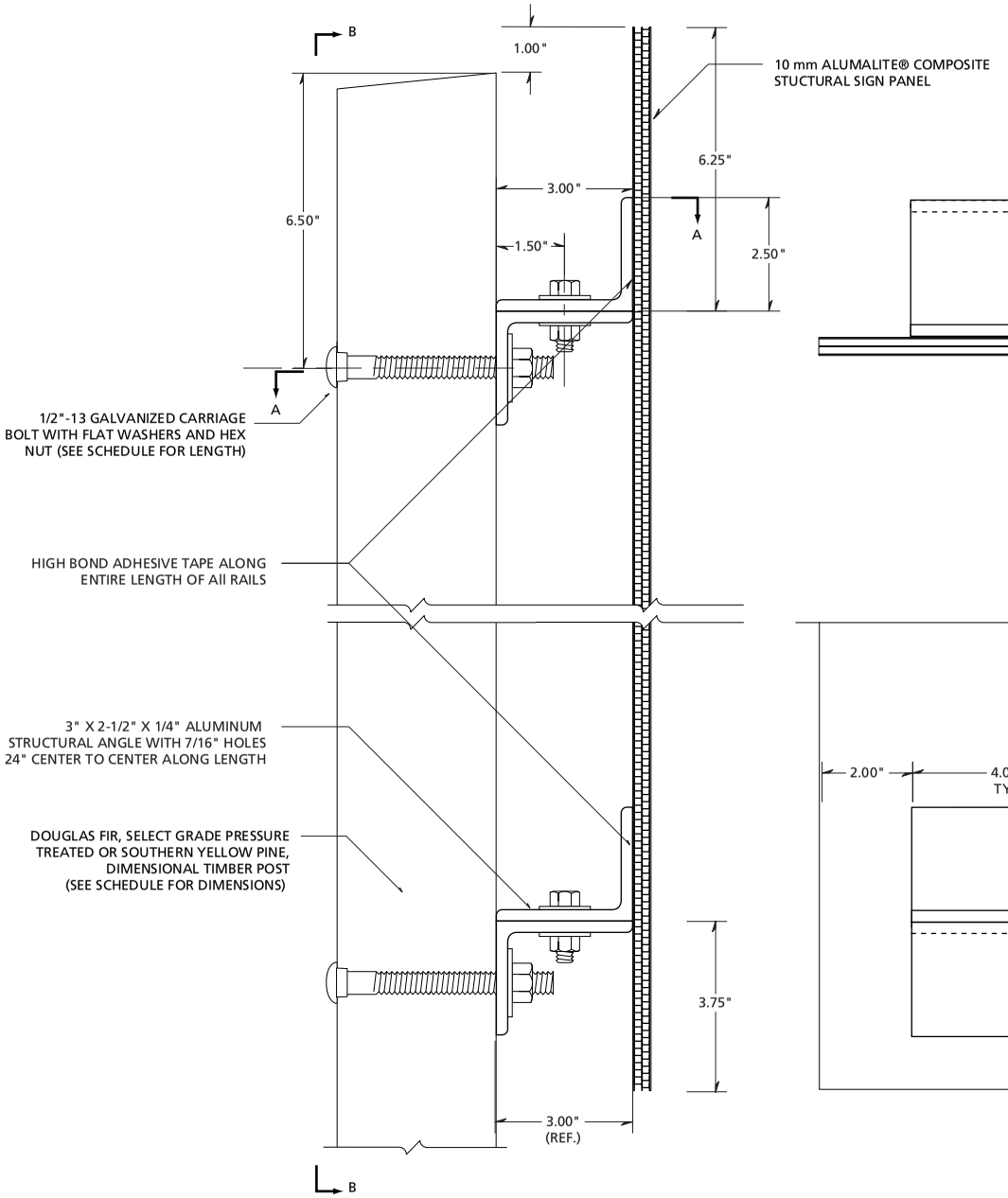
All completed sign panel and post assemblies must be predrilled and assembled in the shop prior to shipment to check alignment and ensure proper fit once installed.

If post and panels are assembled separately, aluminum angles shall be manufactured with the 10 mm Alumalite sign panels to ensure correct alignment of 3/8" bolts to attach angle to panel and the matching holes in the angle

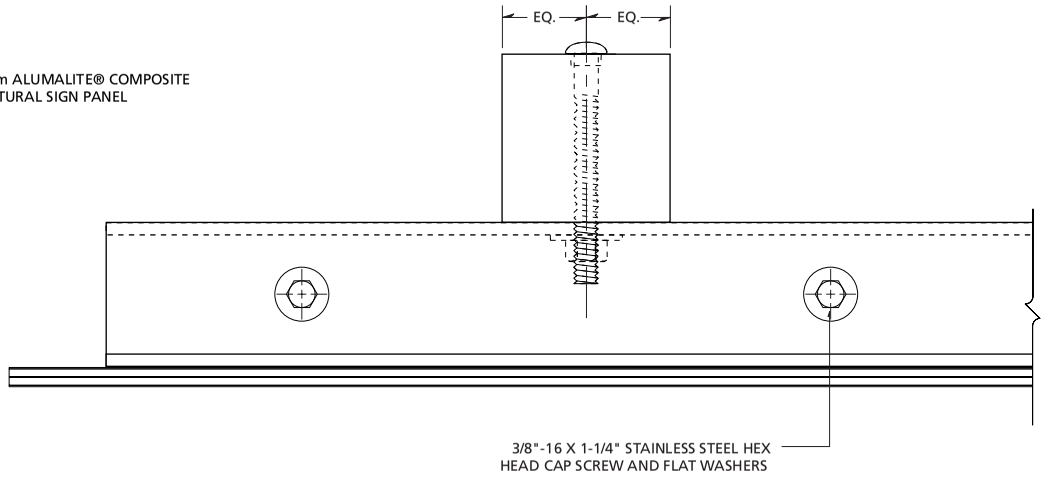
Assembly and Installation: For complete specifications on assembly and installation, refer to Chapter 5, Section 5.1.


4" x 4", 4" x 6", 4" x 8", 6" x 8" OR 8" x 10"
DOUGLAS FIR, SELECT GRADE DIMENSIONAL
TIMBER POST OR SOUTHERN YELLOW PINE
3" x 2-1/2" x1/4" ALUMINUM STRUCTURAL
ANGLE WITH 7/16" HOLES 24" ON CENTER
ON 3" FACE FOR BOLT ATTACHMENT OF
HORIZONTAL RAILS
1/2"-13 CARRIAGE BOLT
(SEE SCHEDULE FOR SIZE)
10 MM THICK ALUMALITE PANEL
Lower Pines
Campground
ADHESIVE TO BOND
ANGLE TO BACK OF
SIGN PANEL
TYPE II RETO-REFLECTIVE SHEETING
APPLIED DIRECTLY TO ALUMALITE™

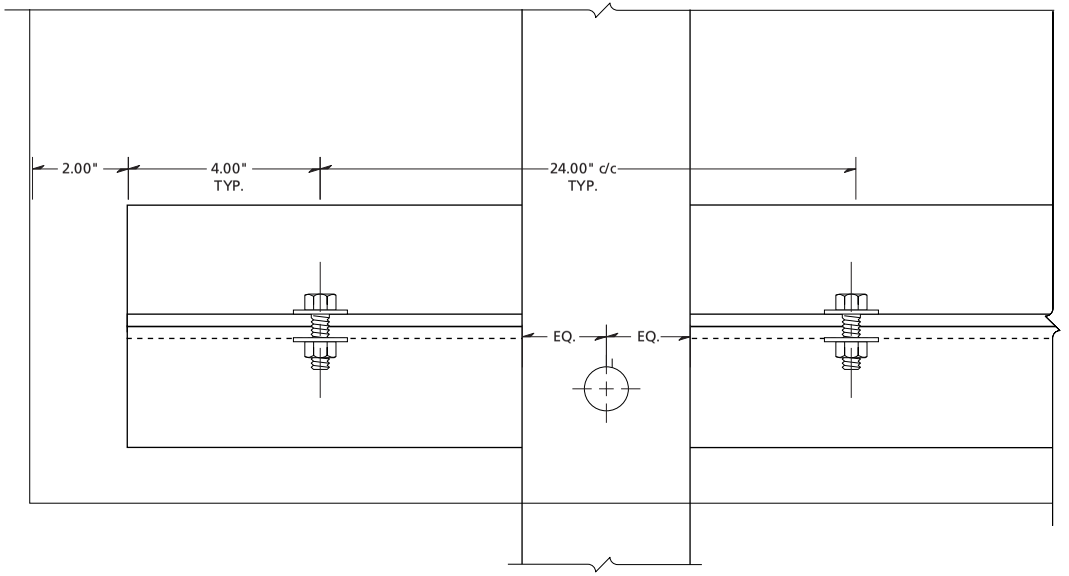

1" WASH-4 SIDES (TYPICAL)
CONCRETE FOOTING
CROSS SECTION SIZE VARIES BASED
ON OVERALL SIZE OF SIGN



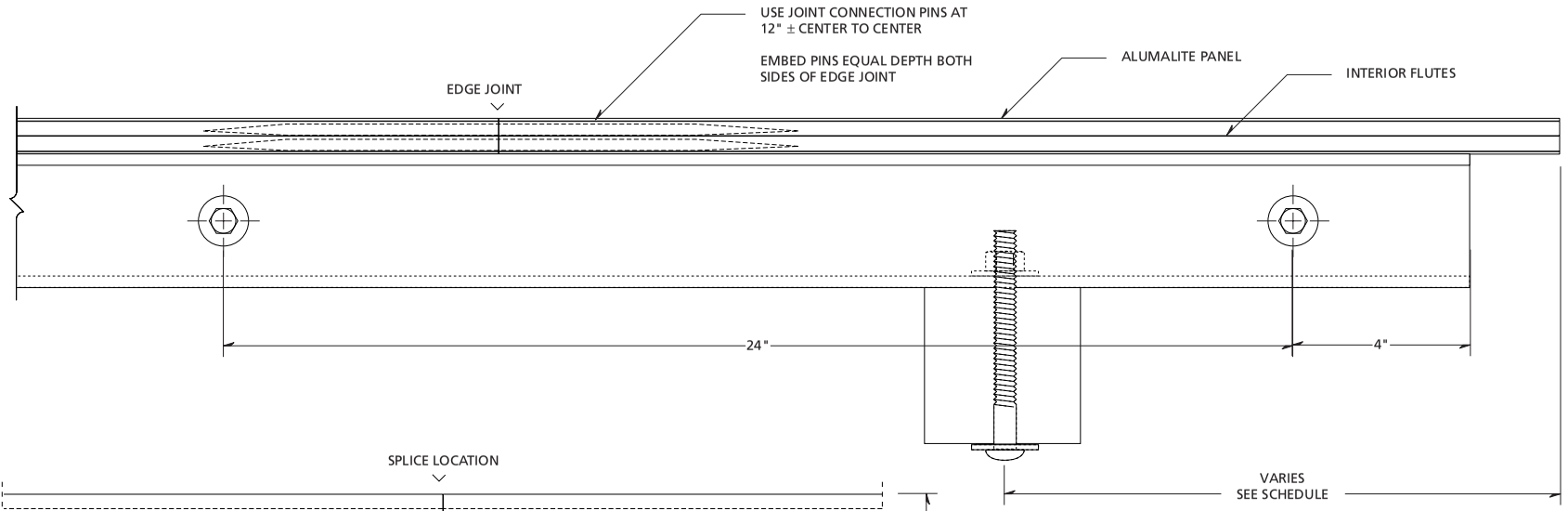
MOTORIST GUIDE SIGN CONNECTION ELEVATION DETAIL

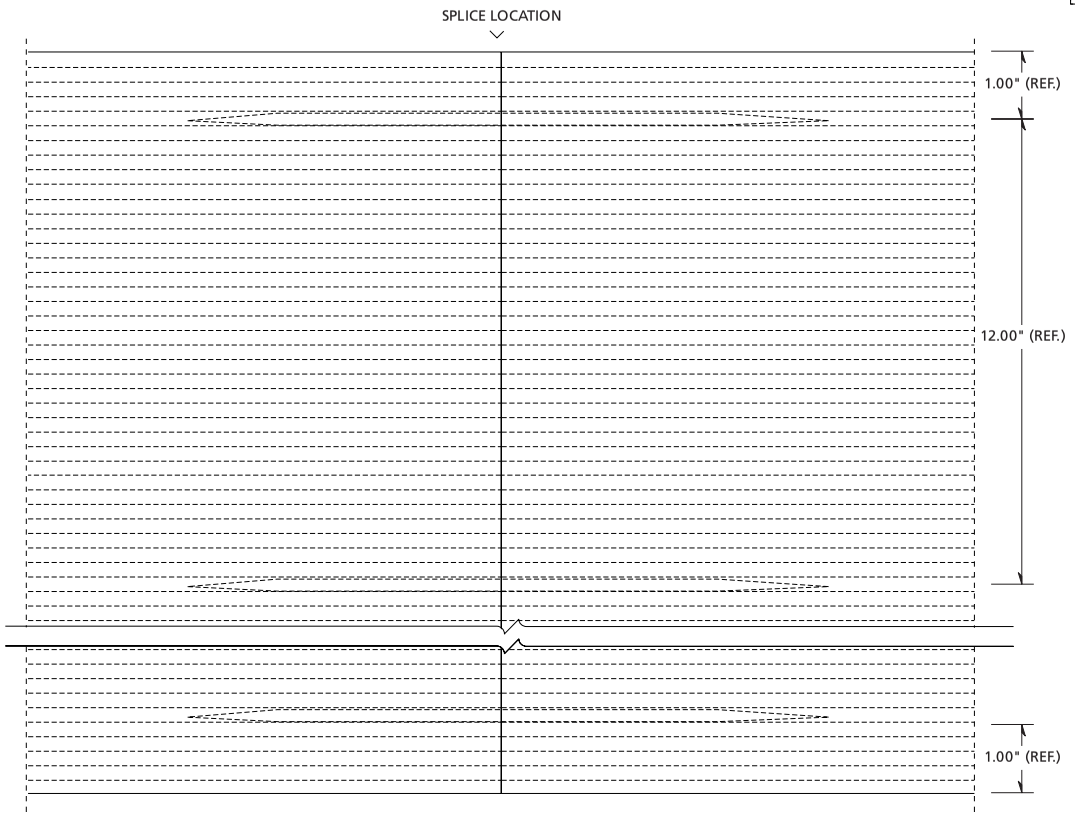


MOTORIST GUIDE SIGN CONNECTION PLAN DETAIL
A-A

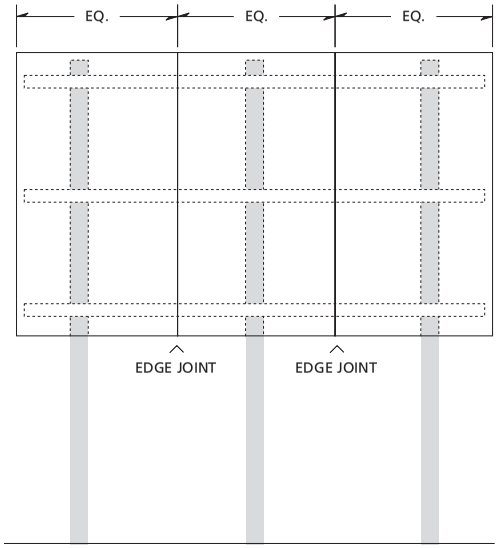


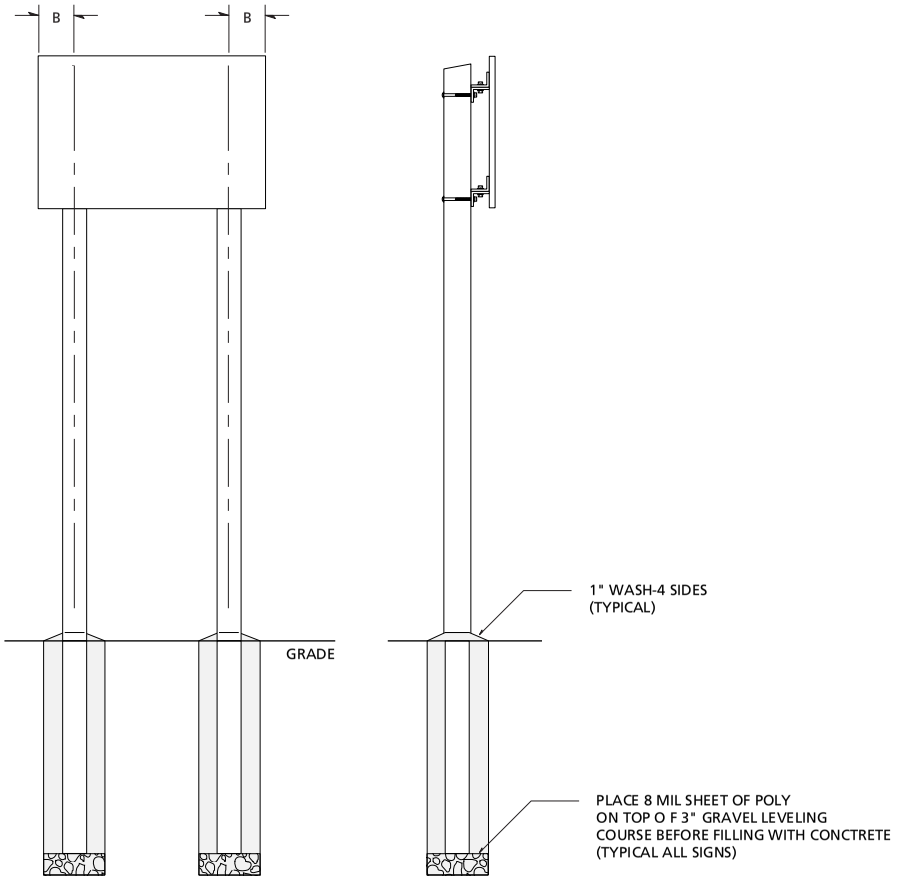
MOTORIST GUIDE SIGN CONNECTION SECTION DETAIL
B-B





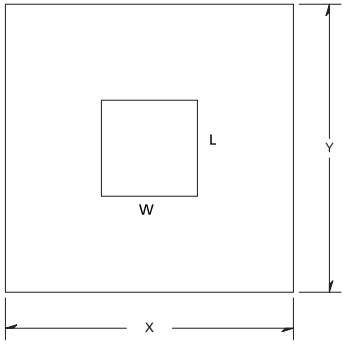
NOTE: ALL SPLICES ARE TO BE EQUALLY SPACED



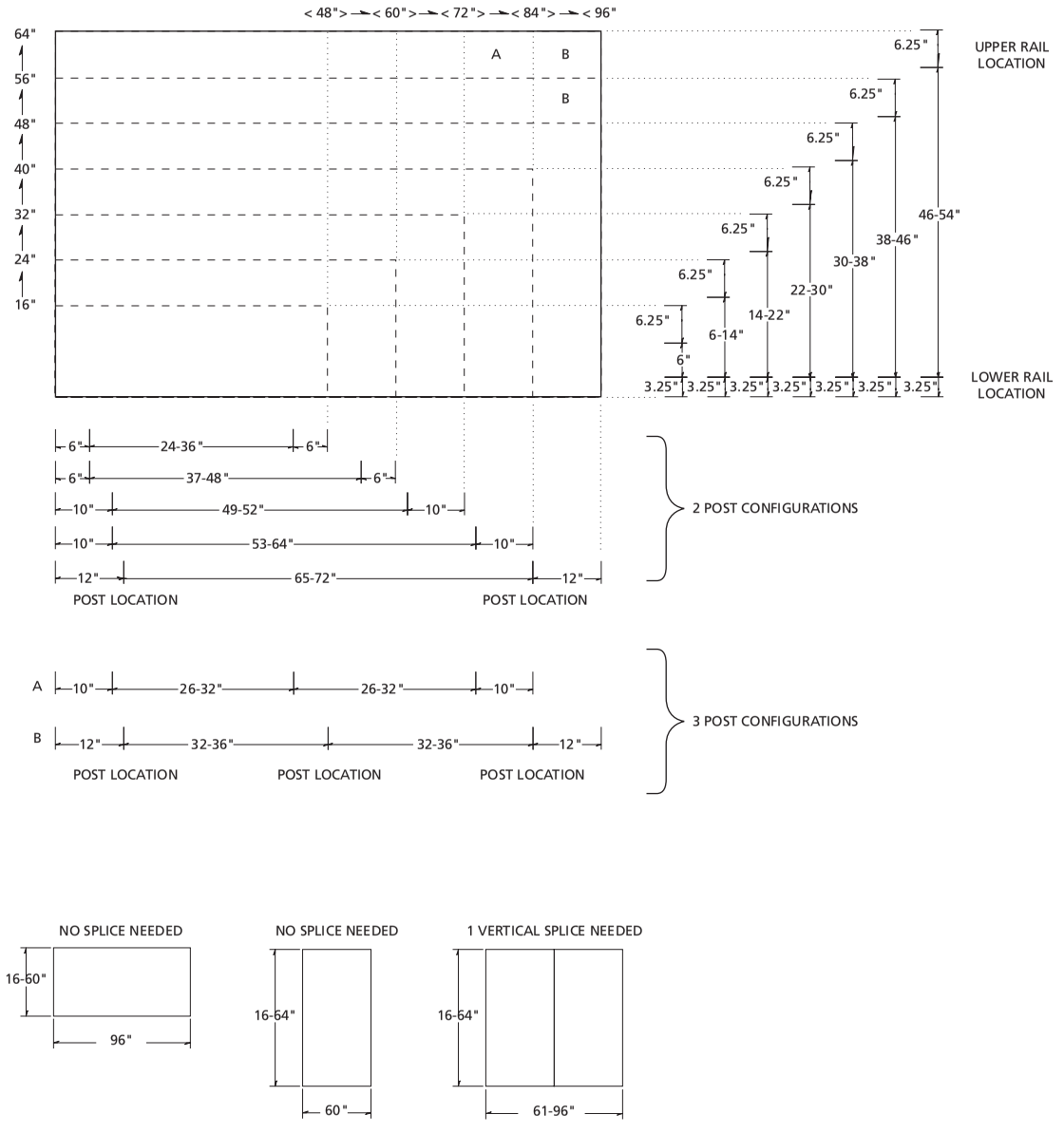


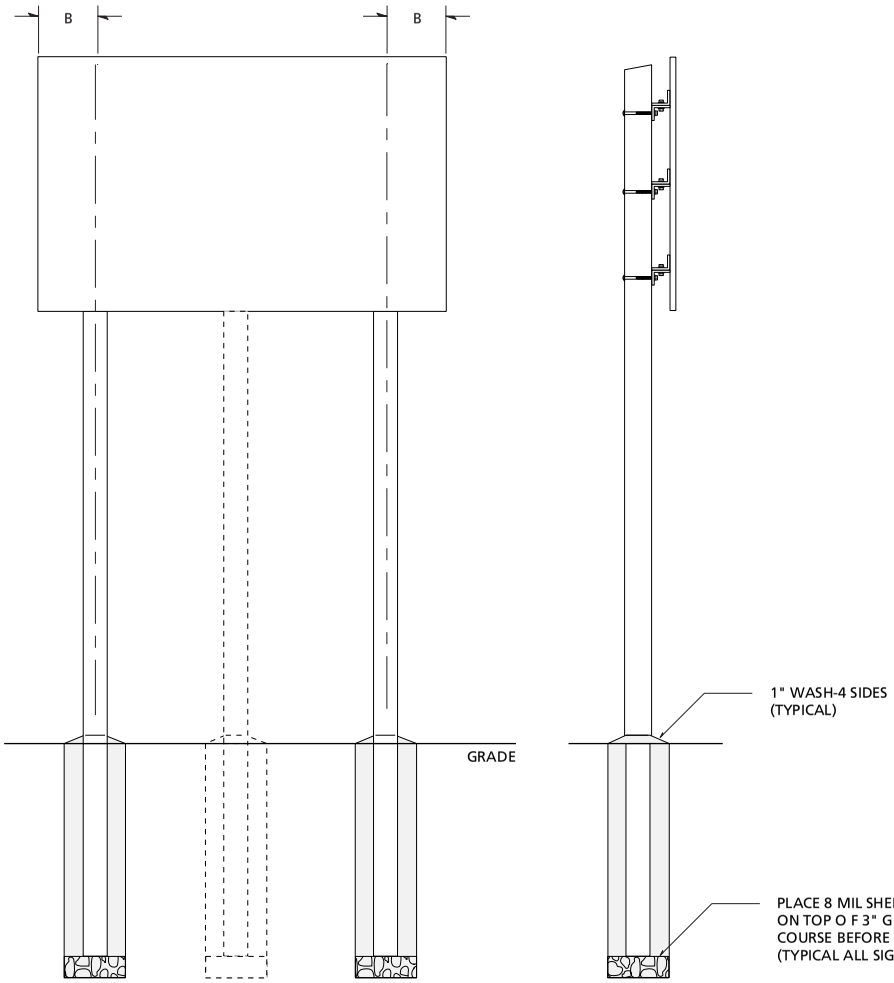
Road Guide Signs With 4" Legend

Maximum Panel Width	Maximum Panel Height	Panel Area Square Ft	Post Inset to Outboard Face (B)	Post Size W X L	Number of Posts	Composite Section Angle Frame	Footing Section X x Y	Footing Depth
48	16	5.333	6"	4" x 4"	2	2	12" x 12"	4'-0"
60	16	6.667	6"	4" x 4"	2		12" x 12"	
72	16	8.000	10"	4" x 4"	2		12" x 12"	
84	16	9.333	10"	4" x 6"	2		12" x 12"	
96	16	10.667	12"	4" x 6"	2		12" x 12"	
48	24	8.000	6"	4" x 4"	2		12" x 12"	
60	24	10.000	6"	4" x 4"	2		12" x 12"	
72	24	12.000	10"	4" x 6"	2		12" x 12"	
84	24	14.000	10"	4" x 6"	2		12" x 12"	
96	24	16.000	12"	4" x 6"	2		12" x 12"	
48	32	10.667	6"	4" x 6"	2		12" x 12"	
60	32	13.333	6"	4" x 6"	2		12" x 12"	
72	32	16.000	10"	4" x 6"	2		12" x 12"	
84	32	18.667	10"	4" x 6"	2		15" x 15"	
96	32	21.333	12"	4" x 6"	2		15" x 15"	
48	40	13.333	6"	4" x 6"	2		12" x 12"	
60	40	16.667	6"	4" x 6"	2		12" x 12"	
72	40	20.000	10"	4" x 6"	2		15" x 15"	
84	40	23.333	10"	4" x 8"	2		18" x 18"	
96	40	26.667	12"	4" x 8"	2		18" x 18"	
48	48	16.000	6"	4" x 6"	2		12" x 12"	
60	48	20.000	6"	4" x 6"	2		15" x 15"	
72	48	24.000	10"	4" x 8"	2		18" x 18"	
84	48	28.000	10"	4" x 8"	2		18" x 18"	
96	48	32.000	12"	4" x 8"	2		18" x 18"	
48	56	18.667	6"	4" x 6"	2		15" x 15"	
60	56	23.333	6"	4" x 8"	2		18" x 18"	
72	56	28.000	10"	4" x 8"	2		18" x 18"	
84	56	32.667	10"	4" x 8"	2		18" x 18"	
96	56	37.333	12"	4" x 8"	3		18" x 18"	
48	64	21.333	6"	4" x 8"	2		18" x 18"	
60	64	26.667	6"	4" x 8"	2		18" x 18"	
72	64	32.000	10"	4" x 8"	2		18" x 18"	
84	64	37.333	10"	4" x 8"	3		21" x 21"	
96	64	42.667	12"	4" x 8"	3		21" x 21"	



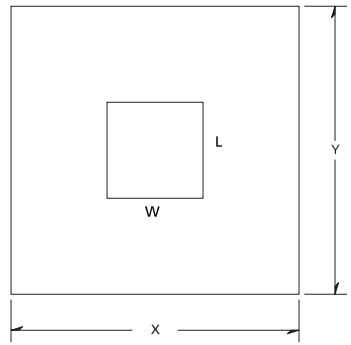
Road Guide Sign Assembly Reference Diagram for 4" Legend


< 48"> < 60"> < 72"> < 84"> < 96"
64"
56"
48"
40"
32"
24"
16"
A
B
B
6.25"
UPPER RAIL LOCATION
46-54"
38-46"
30-38"
22-30"
14-22"
6-14"
6"
LOWER RAIL LOCATION
3.25"
6"
24-36"
37-48"
49-52"
53-64"
65-72"
10"
12"
2 POST CONFIGURATIONS
POST LOCATION
A
B
26-32"
32-36"
3 POST CONFIGURATIONS
NO SPLICE NEEDED
16-60"
96"
16-64"
60"
1 VERTICAL SPLICE NEEDED
61-96"

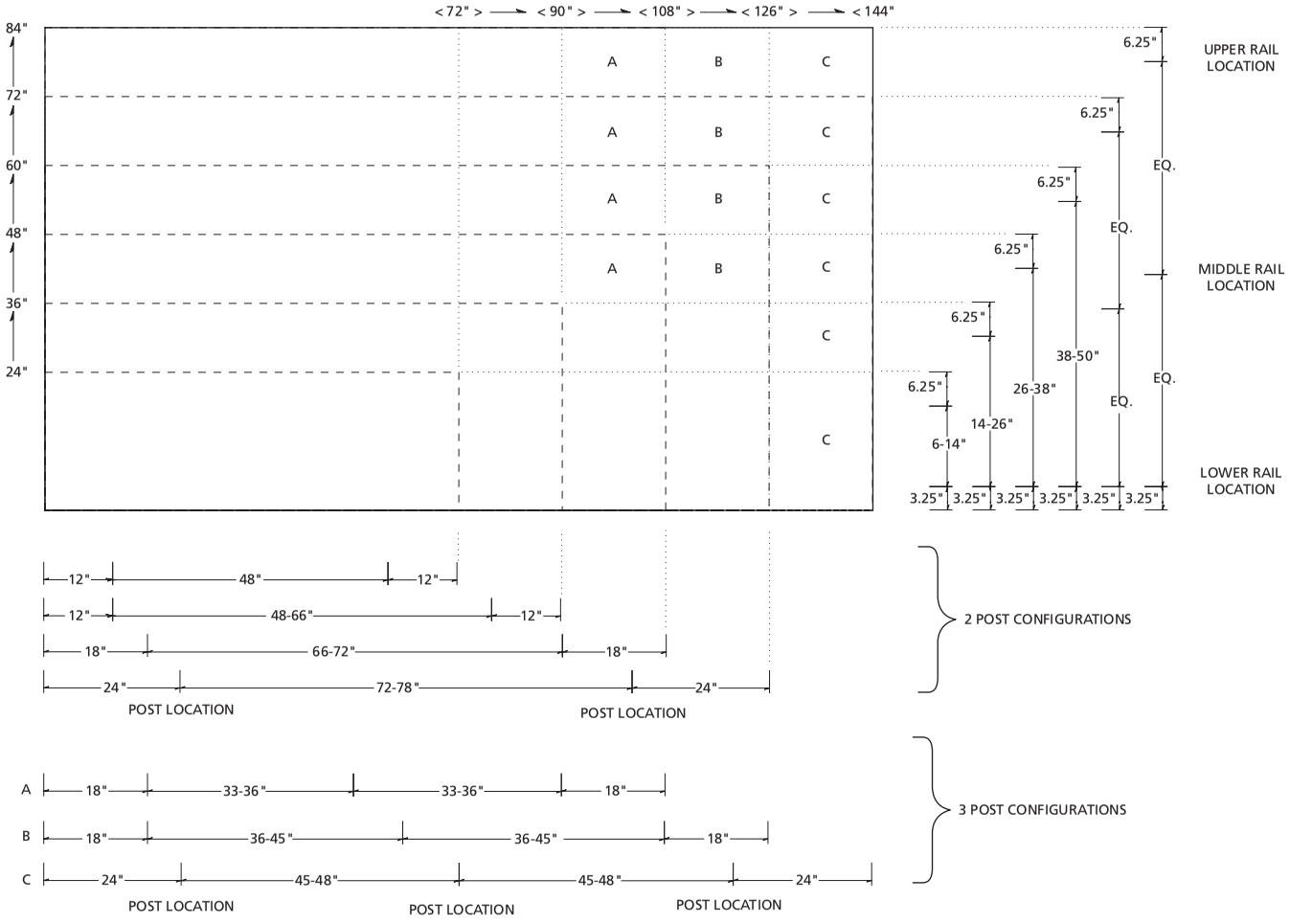


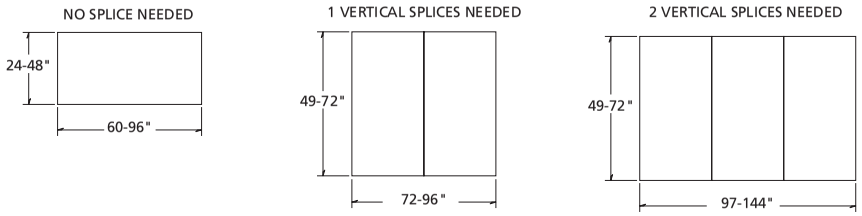
Road Guide Signs With 6" Legend

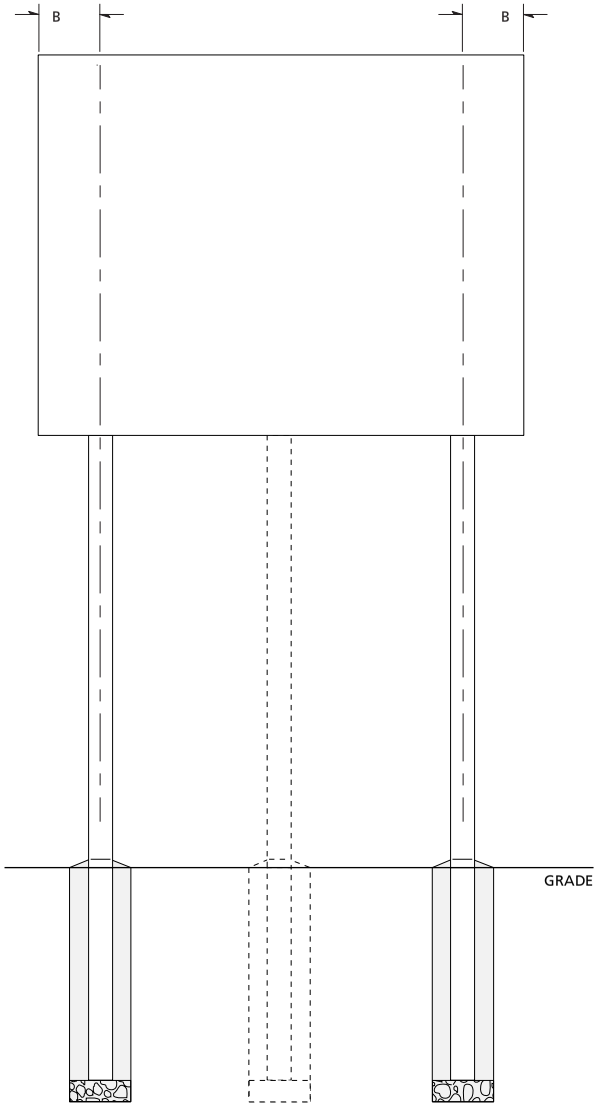
Maximum Panel Width	Maximum Panel Height	Panel Area Square Ft	Post Inset to Outboard Face (B)	Post Size	Number of Posts	Composite Section Angle Frame	Footing Cross Section	Footing Depth
72	24	12.000	12"	4" x 6"	2	2	12" x 12"	4'-0"
90	24	15.000	12"	4" x 6"	2		12" x 12"	
108	24	118.000	18"	4" x 6"	2		12" x 12"	
126	24	21.000	24"	4" x 6"	2		15" x 15"	
144	24	24.000	24"	4" x 6"	3		12" x 12"	
72	36	18.000	12"	4" x 6"	2		12" x 12"	
90	36	22.500	12"	4" x 6"	2		15" x 15"	
108	36	27.000	18"	4" x 8"	2		18" x 18"	
126	36	31.500	24"	4" x 8"	2		18" x 18"	
144	36	36.000	24"	4" x 8"	3		15" x 15"	
72	48	24.000	12"	4" x 8"	2		15" x 15"	
90	48	30.000	12"	4" x 8"	2		21" x 21"	
108	48	36.000	18"	4" x 8"	3		21" x 21"	
126	48	42.000	24"	4" x 8"	3		21" x 21"	
144	48	48.000	24"	4" x 8"	3		18" x 18"	
72	60	30.000	12"	4" x 8"	2		18" x 18"	
90	60	37.500	12"	6" x 8"	2		21" x 21"	
108	60	45.000	18"	6" x 8"	3		24" x 24"	
126	60	52.500	24"	6" x 8"	3		24" x 24"	
144	60	60.000	24"	6" x 8"	3		21" x 21"	
72	72	36.000	12"	6" x 8"	2		21" x 21"	
90	72	45.000	12"	6" x 8"	2		24" x 24"	
108	72	54.000	18"	6" x 8"	3		18" x 36"	
126	72	63.000	24"	6" x 8"	3		18" x 36"	
144	72	72.000	24"	6" x 8"	3		18" x 36"	
72	84	42.000	12"	6" x 8"	2	3	24" x 24"	
90	84	52.500	12"	6" x 8"	2	3	18" x 36"	
108	84	63.000	18"	6" x 8"	3	3	18" x 36"	
126	84	73.500	24"	6" x 8"	3	3	18" x 36"	
144	84	84.000	24"	6" x 10"	3	3	21" x 36"	

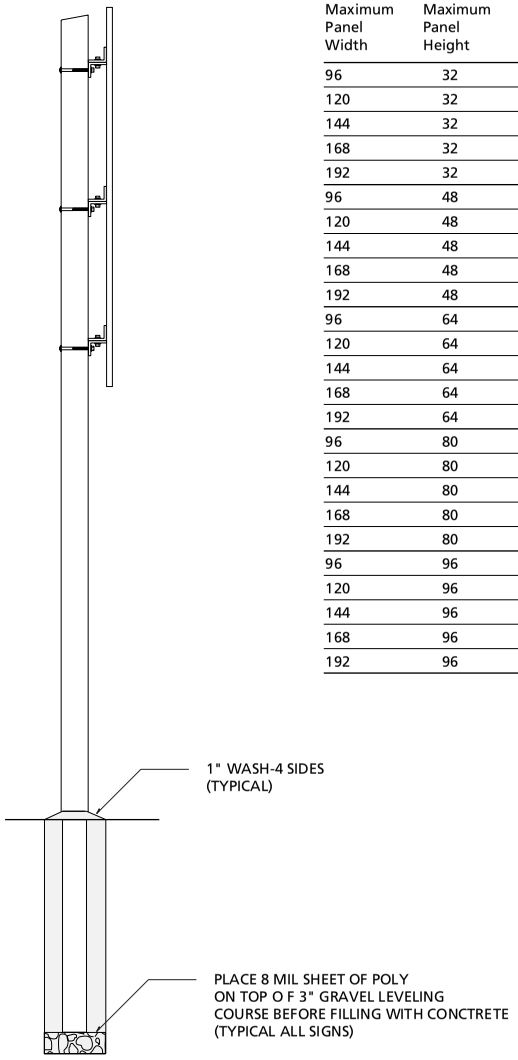


Road Guide Sign Assembly Reference Diagram for 6" Legend


< 72" >
< 90" >
< 108" >
< 126" >
< 144"
84"
72"
60"
48"
36"
24"
A
B
C
6.25"
EQ.
38-50"
26-38"
14-26"
6-14"
3.25"
UPPER RAIL LOCATION
MIDDLE RAIL LOCATION
LOWER RAIL LOCATION
12"
48"
48-66"
18"
66-72"
24"
72-78"
2 POST CONFIGURATIONS
POST LOCATION
18"
33-36"
36-45"
45-48"
3 POST CONFIGURATIONS

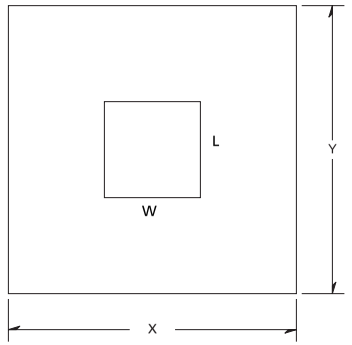

NO SPLICE NEEDED
24-48"
60-96"
1 VERTICAL SPLICES NEEDED
49-72"
72-96"
2 VERTICAL SPLICES NEEDED
49-72"
97-144"



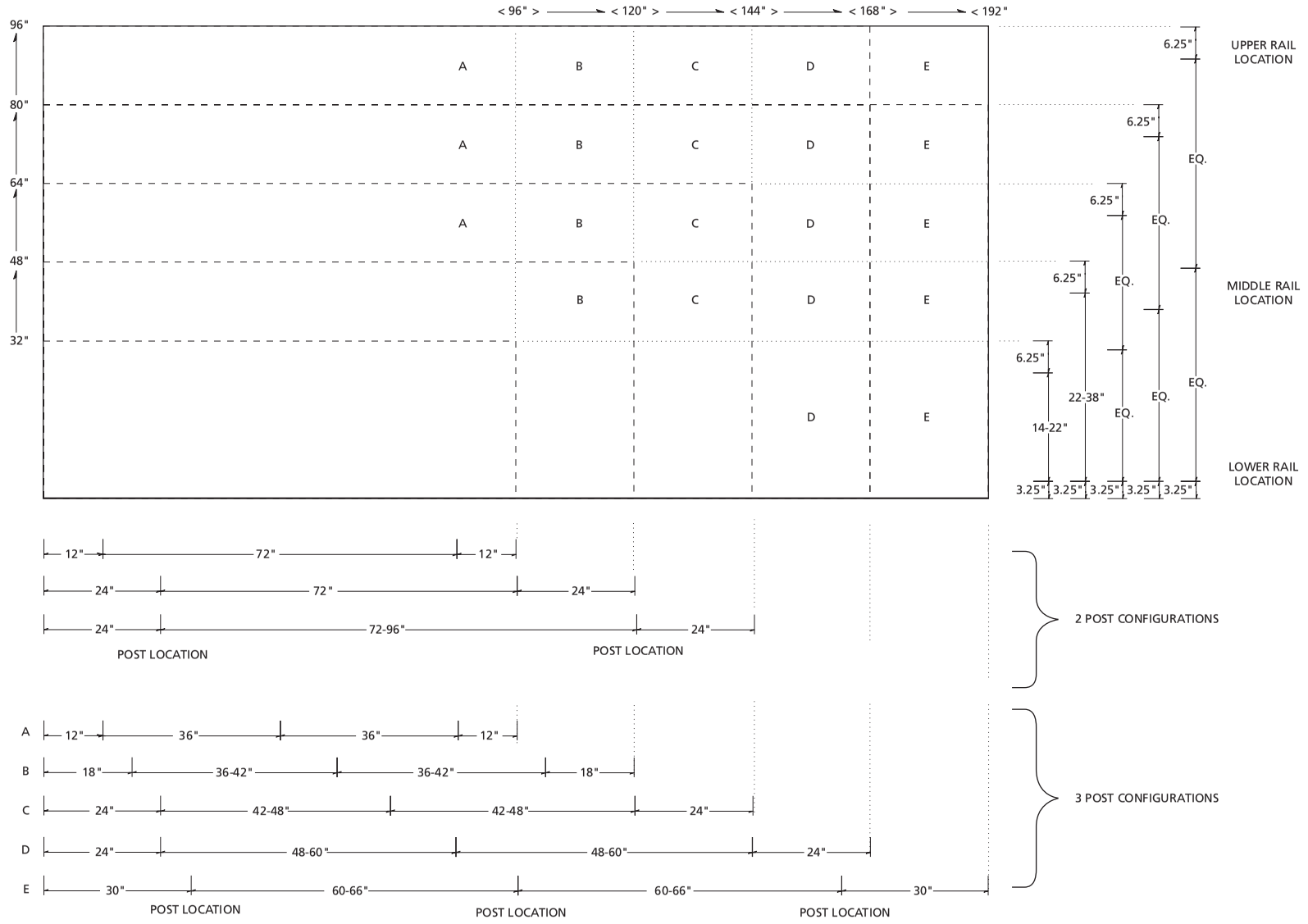


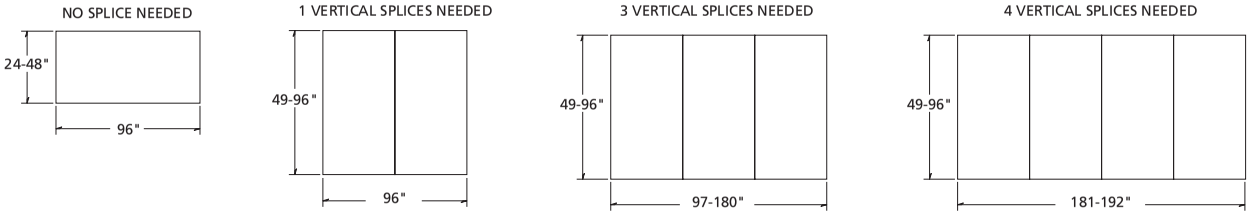
Road Guide Signs With 8" Legend

Maximum Panel Width	Maximum Panel Height	Panel Area Square Ft	Post Inset to Outboard Face (B)	Post Size	Number of Posts	Composite Section Angle Frame	Footing Cross Section	Footing Depth
96	32	21.333	12"	4" x 6"	2	2	15" x 15"	4'-0"
120	32	26.667	24"	4" x 8"	2		18" x 18"	
144	32	32.000	24"	4" x 8"	2		18" x 18"	
168	32	37.333	24"	4" x 8"	2		21" x 21"	
192	32	42.666	30"	6" x 8"	2		21" x 21"	
96	48	32.000	12"	4" x 8"	2		18" x 18"	
120	48	40.000	18"	4" x 8"	3		18" x 18"	
144	48	48.000	24"	4" x 8"	3		18" x 18"	
168	48	56.000	24"	4" x 8"	3		21" x 21"	
192	48	64.000	30"	6" x 8"	3		21" x 21"	
96	64	42.667	12"	4" x 8"	3		21" x 21"	
120	64	53.333	18"	6" x 8"	3		24" x 24"	
144	64	64.000	24"	6" x 8"	3		24" x 24"	
168	64	74.667	24"	6" x 8"	3		18" x 36"	
192	64	85.333	30"	6" x 8"	3		18" x 36"	
96	80	53.333	12"	6" x 8"	3		24" x 24"	
120	80	66.667	18"	6" x 8"	3		18" x 36"	
144	80	80.000	24"	6" x 8"	3		18" x 36"	
168	80	93.333	24"	6" x 10"	3		21" x 36"	
192	80	106.666	30"	6" x 10"	3		24" x 36"	
96	96	64.000	12"	6" x 8"	3	3	18" x 36"	
120	96	80.000	18"	6" x 10"	3	3	21" x 36"	
144	96	96.000	24"	6" x 10"	3	3	21" x 36"	
168	96	112.000	24"	6" x 10"	3	3	24" x 36"	
192	96	128.000	30"	8" x 10"	3	3	24" x 42"	

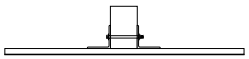


Road Guide Sign Assembly Reference Diagram for 8" Legend

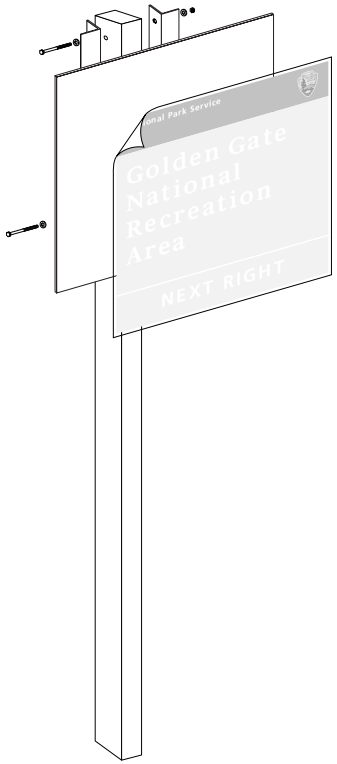

< 96" >
< 120" >
< 144" >
< 168" >
< 192"
96"
80"
64"
48"
32"
A
B
C
D
E
6.25"
UPPER RAIL LOCATION
EQ.
MIDDLE RAIL LOCATION
22-38"
14-22"
LOWER RAIL LOCATION
3.25"
12"
72"
24"
72-96"
POST LOCATION
2 POST CONFIGURATIONS
18"
36"
36-42"
42-48"
48-60"
30"
60-66"
3 POST CONFIGURATIONS

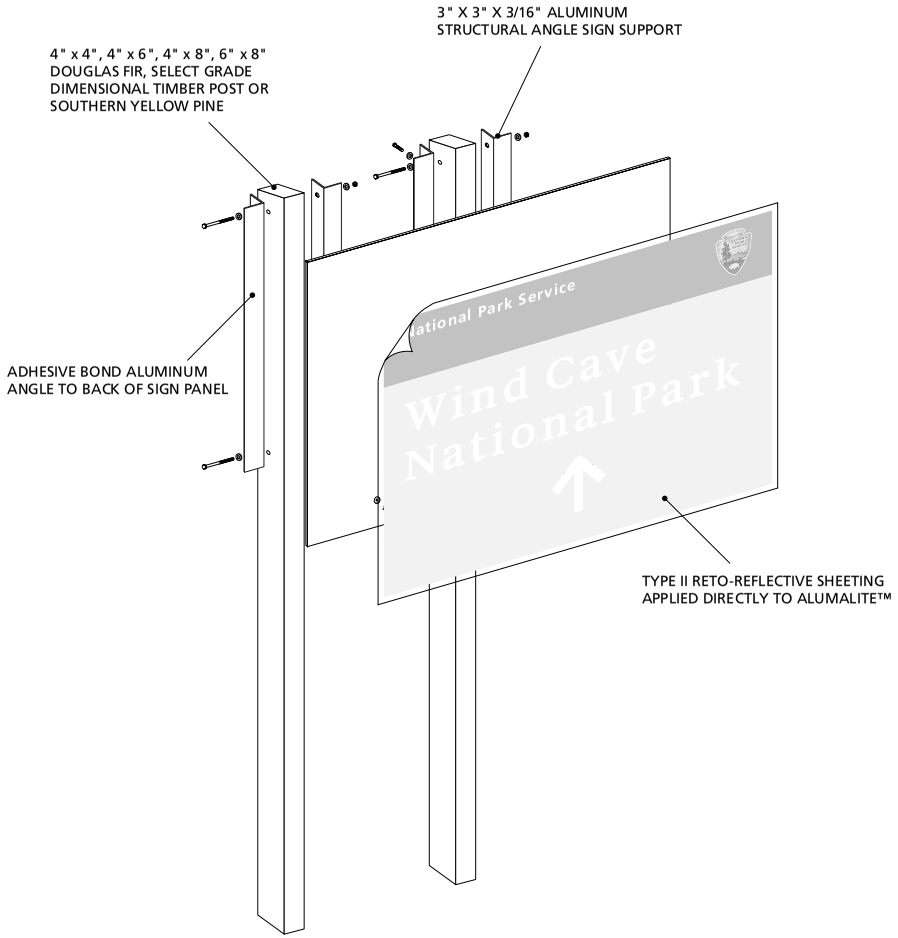

NO SPLICE NEEDED
24-48"
96"
1 VERTICAL SPLICES NEEDED
49-96"
3 VERTICAL SPLICES NEEDED
97-180"
4 VERTICAL SPLICES NEEDED
181-192"

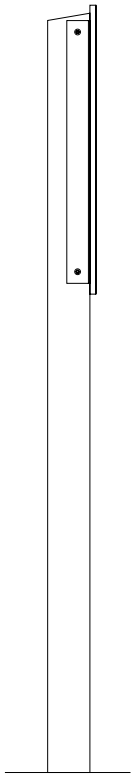
SINGLE POST



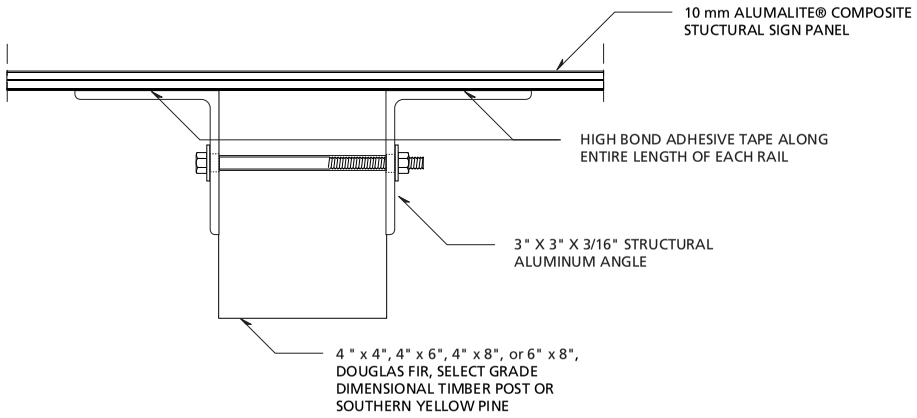
DOUBLE POST



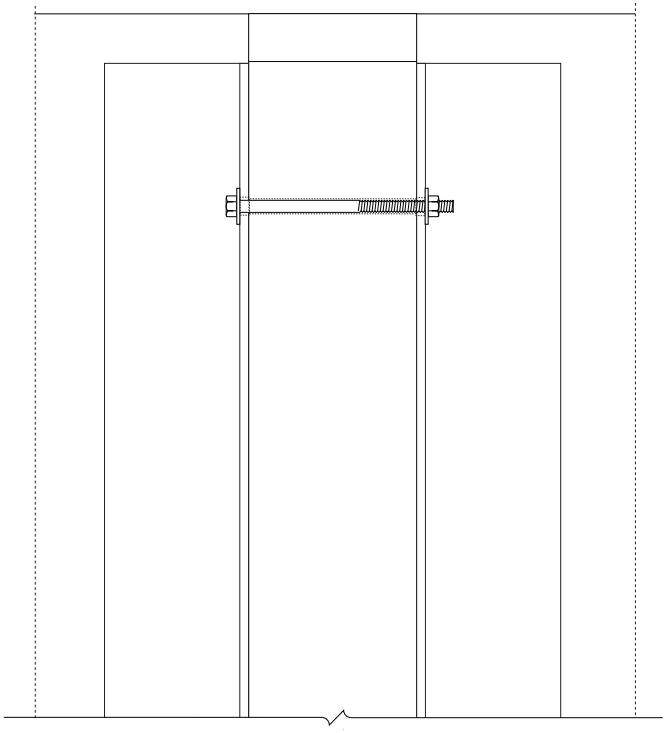




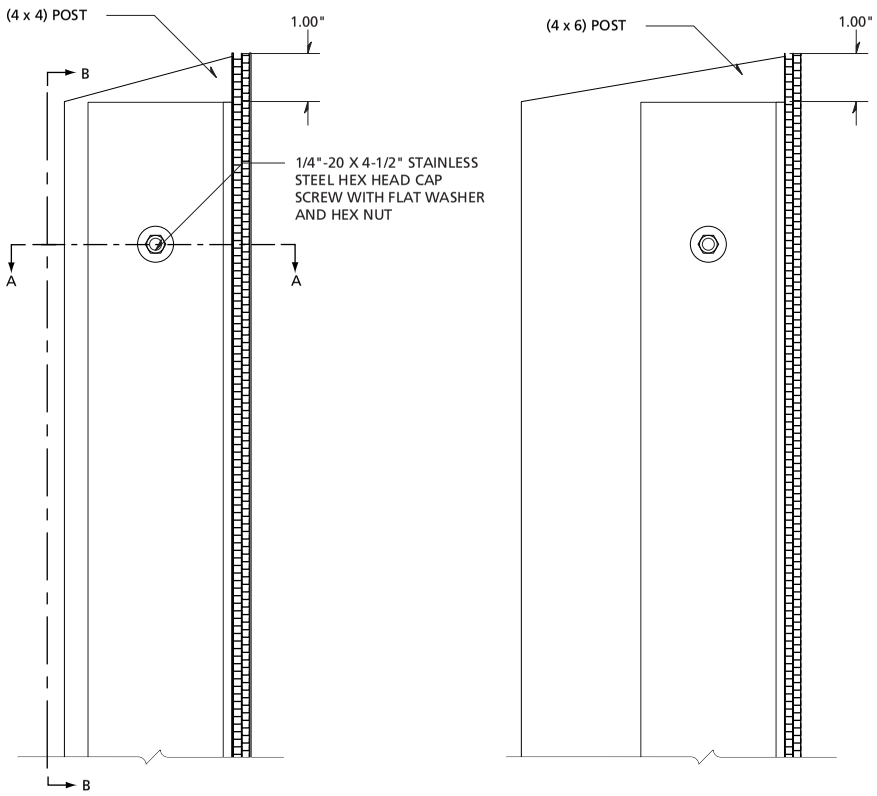
Axis Assembly Drawing for Single and Double Post Trailblazer Signs



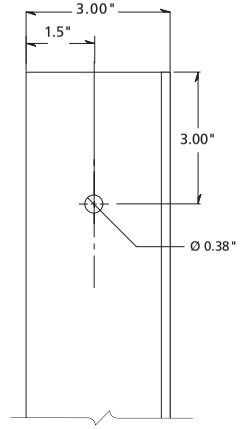
TRAIL BLAZER CONNECTION PLAN VIEW
A-A



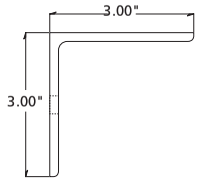
TRAIL BLAZER CONNECTION BACK ELEVATION DETAIL
B-B



TRAIL BLAZER CONNECTION SIDE ELEVATION DETAIL



3" X 3" X 3/16" ANGLE SIDE ELEVATION DETAIL

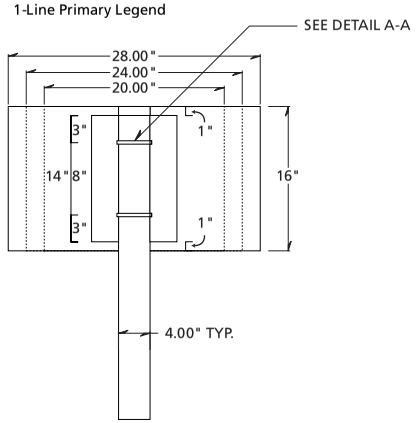


3" X 3" X 3/16" ANGLE PLAN VIEW DETAIL

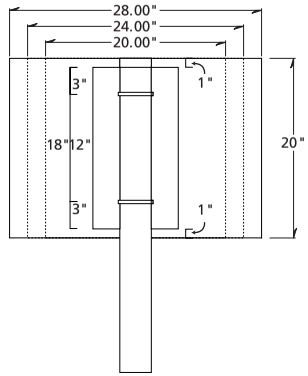
TRAILBLAZER & BOUNDARY SIGNS WITH 2" LEGENDS

Legend	Panel Size Width x Height	Post Size W x L	Post (Qty)	HAGL (max.)	Post Length (max.)	Bracket Length
1-Line	20" x 16"	4" x 4"	1	7'-0"	11'4"	14"
	24" x 16"	4" x 4"	1	7'-0"	11'4"	14"
	28" x 16"	4" x 4"	1	7'-0"	11'4"	14"
2-Line	20" x 20"	4" x 4"	1	7'-0"	11'8"	18"
	24" x 20"	4" x 4"	1	7'-0"	11'8"	18"
	28" x 20"	4" x 4"	1	7'-0"	11'8"	18"
3-Line	20" x 24"	4" x 4"	1	7'-0"	12'	22"
	24" x 24"	4" x 4"	1	7'-0"	12'	22"
	28" x 24"	4" x 4"	1	7'-0"	12'	22"
4-Line	20" x 28"	4" x 4"	1	7'-0"	12'4"	26"
	24" x 28"	4" x 6"	1	7'-0"	12'4"	26"
	28" x 28"	4" x 6"	1	7'-0"	12'4"	26"

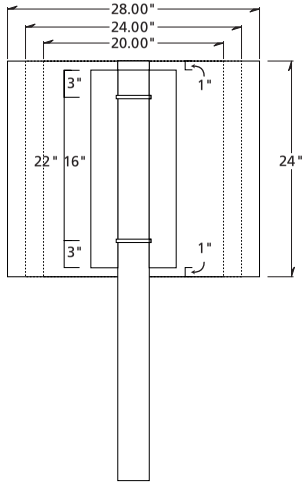
1-Line Primary Legend



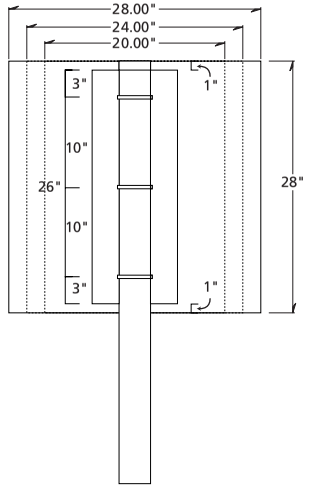
2-Line Primary Legend



3-Line Primary Legend



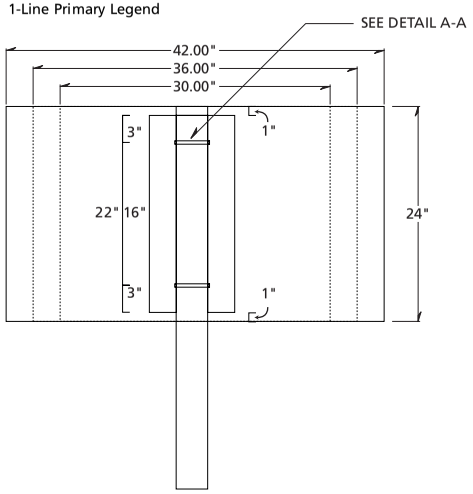
4-Line Primary Legend



TRAILBLAZER & BOUNDARY SIGNS WITH 3" LEGENDS

Legend	Panel Size Width x Height	Post Size W x L	Post (Qty.)	HAGL (max.)	Post Length (max.)	Bracket Height
1-Line	30" x 24"	4" x 6"	1	7'-0"	12'	22"
	36" x 24"	4" x 6"	1	7'-0"	12'	22"
	42" x 24"	4" x 6"	1	7'-0"	12'	22"
2-Line	30" x 30"	4" x 6"	1	7'-0"	12'6"	28"
	36" x 30"	4" x 6"	1	7'-0"	12'6"	28"
	42" x 30"	4" x 6"	1	7'-0"	12'6"	28"
3-Line	30" x 36"	4" x 6"	1	7'-0"	13'	34"
	36" x 36"	4" x 6"	1	7'-0"	13'	34"
	42" x 36"	4" x 6"	1	7'-0"	13'	34"
4-Line	30" x 42"	4" x 6"	1	7'-0"	13'6"	40"
	36" x 42"	4" x 6"	1	7'-0"	13'6"	40"
	42" x 42"	4" x 8"	1	7'-0"	13'6"	40"

1-Line Primary Legend



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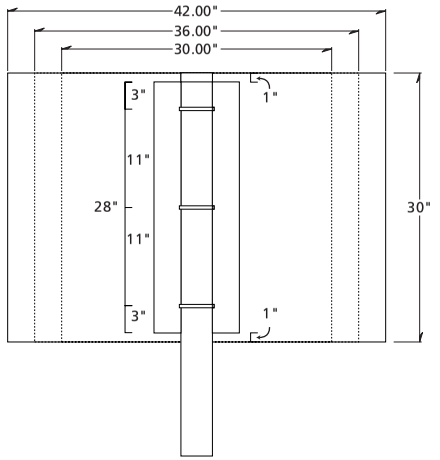
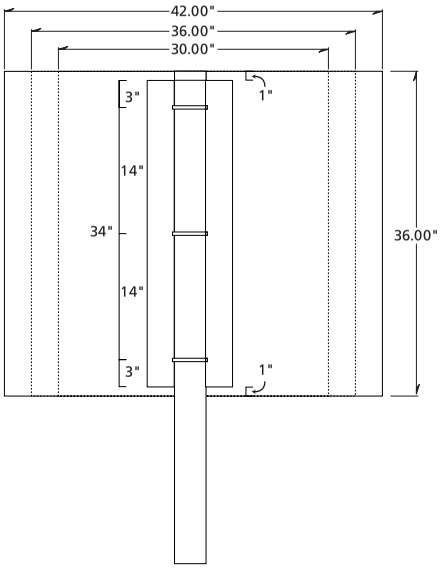
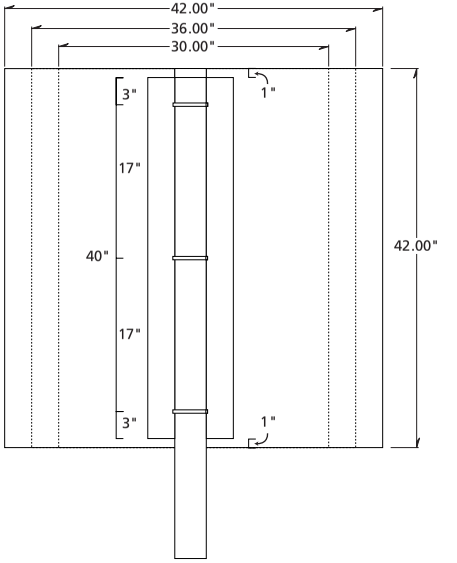


3-Line Primary Legend



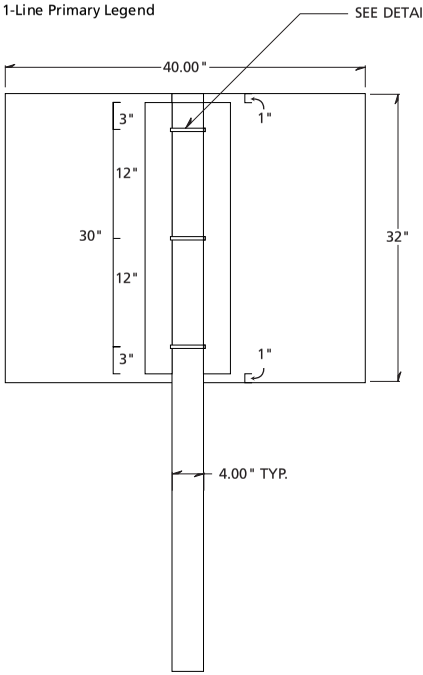
4-Line Primary Legend



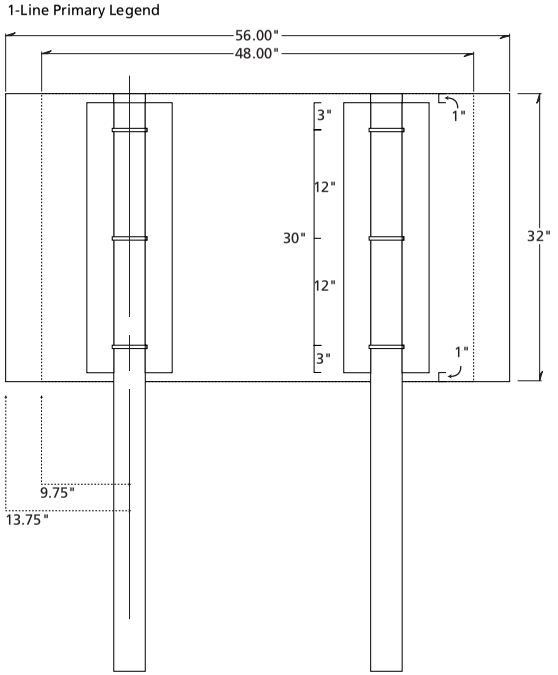
TRAILBLAZER & BOUNDARY SIGNS WITH 4" LEGENDS

Legend	Panel Size Width x Height	Post Size W x L	Post (Qty)	HAGL (max.)	Post Length	Bracket Length
1-Line	40" x 32"	4" x 6"	1	7'-0"	12'8"	30"
	48" x 32"	4" x 6"	2	7'-0"	12'8"	30"
	56" x 32"	4" x 6"	2	7'-0"	12'8"	30"
2-Line	40" x 40"	4" x 6"	1	7'-0"	13'4"	38"
	48" x 40"	4" x 6"	2	7'-0"	13'4"	38"
	56" x 40"	4" x 6"	2	7'-0"	13'4"	38"

1-Line Primary Legend



1-Line Primary Legend



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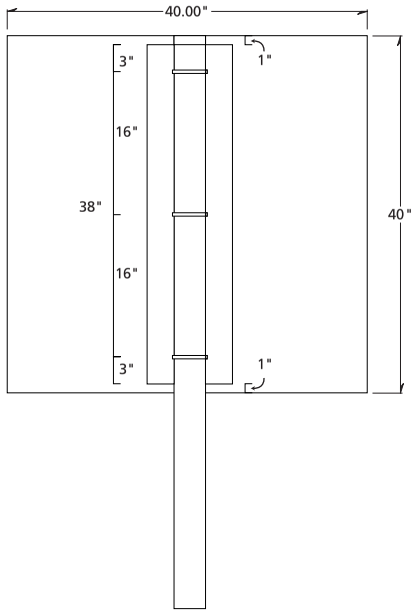

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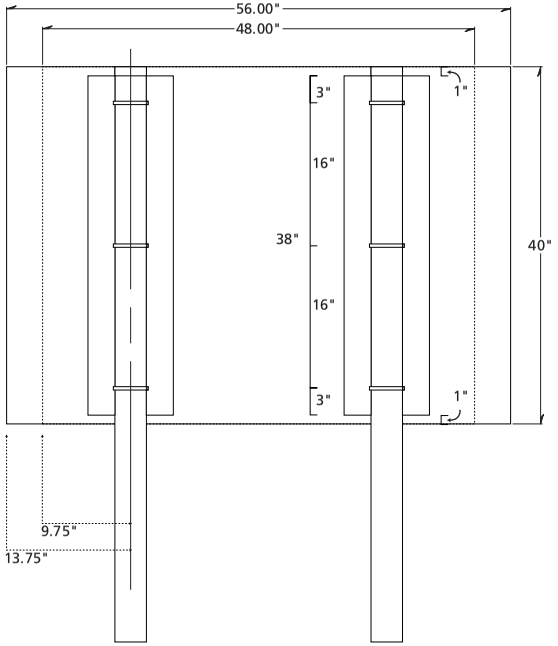
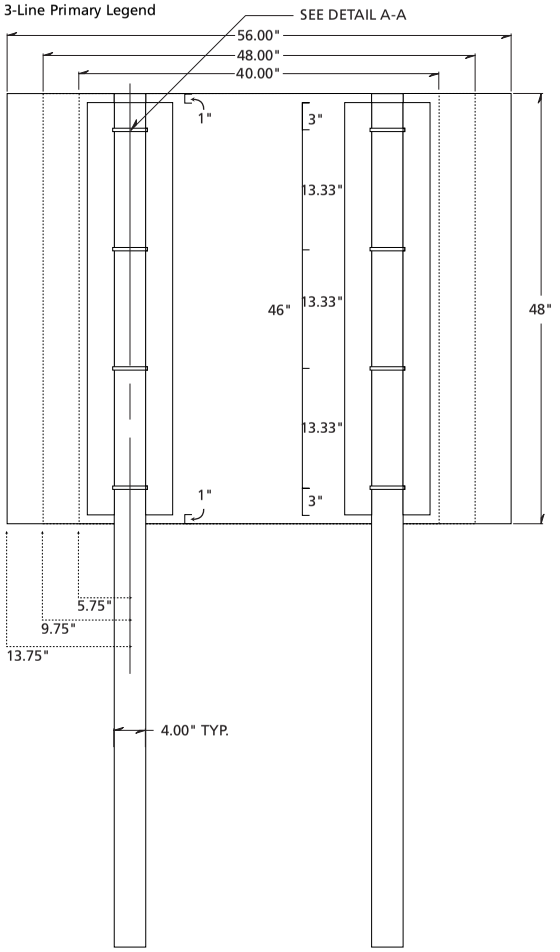


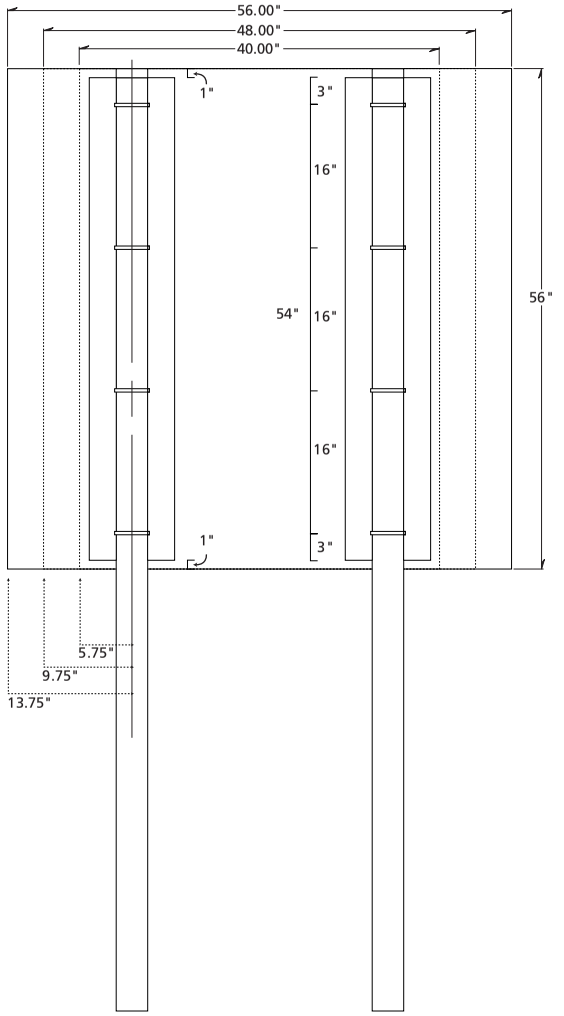
TRAILBLAZER & BOUNDARY SIGNS WITH 4" LEGENDS

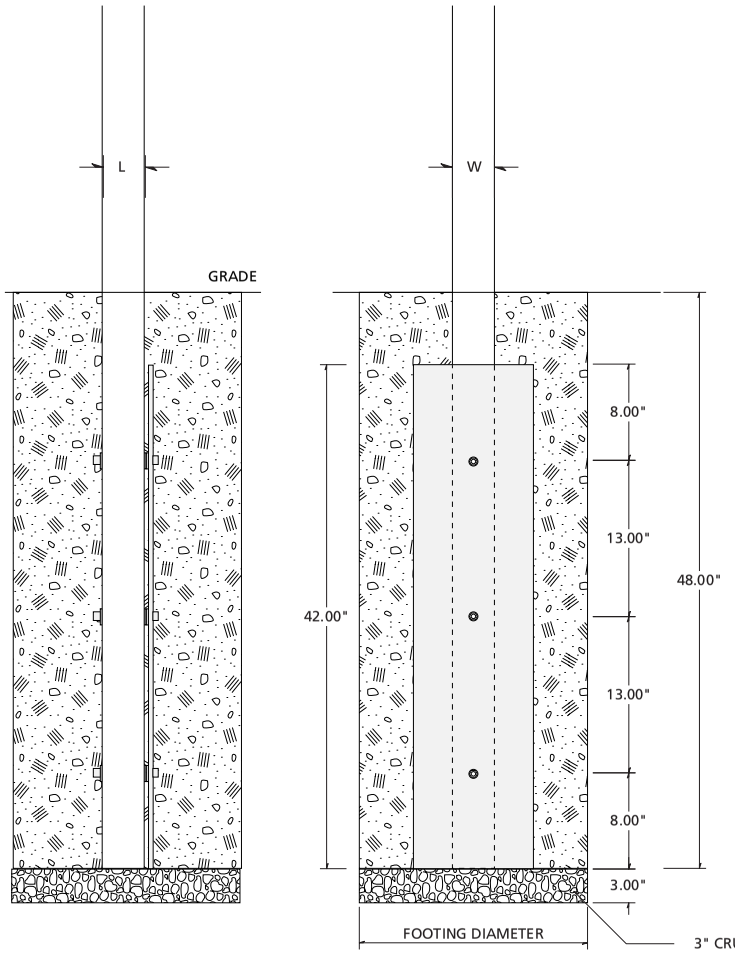
Legend	Panel Size Width x Height	Post Size W x L	Posts (Qty.)	HAGL (max.)	Post Length	Bracket Length
3-Line	40" x 48"	4" x 6"	2	7'-0"	14'	46"
	48" x 48"	4" x 6"	2	7'-0"	14'	46"
	56" x 48"	4" x 6"	2	7'-0"	14'	46"
4-Line	40" x 56"	4" x 6"	2	7'-0"	14'8"	54"
	48" x 56"	4" x 6"	2	7'-0"	14'8"	54"
	56" x 56"	4" x 8"	2	7'-0"	14'8"	54"

3-Line Primary Legend

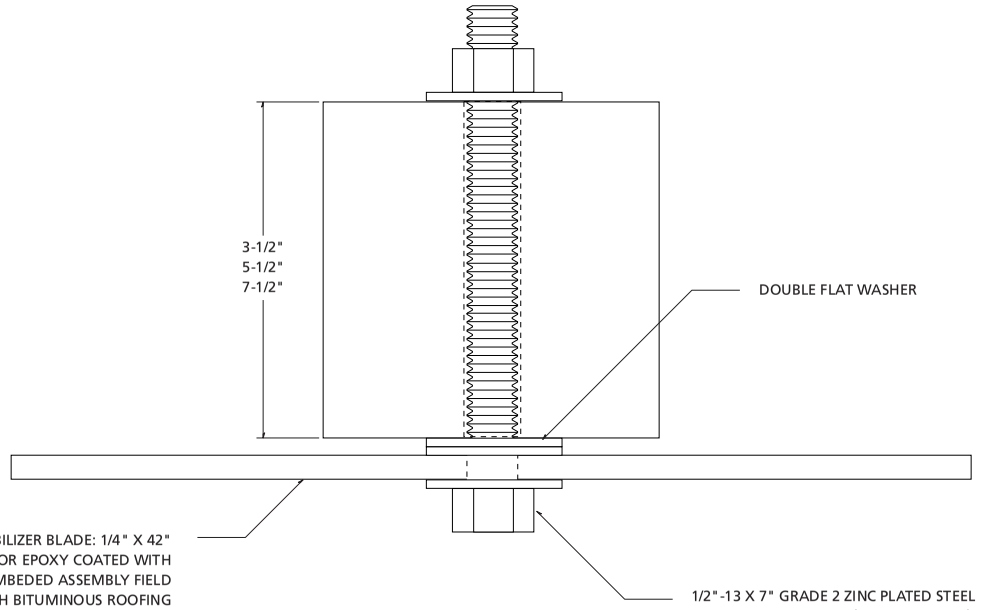


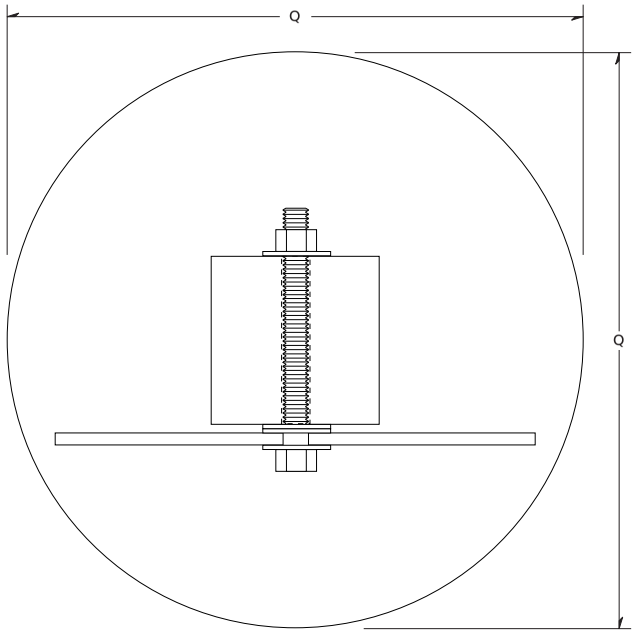
4-Line Primary Legend





GENERAL NOTE: ALL GRAVEL BELOW BASE TO HAVE 8 MIL POLYETHYLENE SHEET BETWEEN GRAVEL AND CONCRETE POUR





STABILIZER BLADE FOR TRAILBLAZER SIGNS

Post Size (W) x(L)	Width of Blade (W)	Screw Size Length	Footing Size Diameter (Q)
4" x 4"	10"	5"	12"
4" x 6"	12"	7"	14"
4" x 8"	14"	9"	16"
6" x 8"	18"	9"	20"

Detail, Embedment and Stabilizer Blade for Trailblazer Signs

Chapter 4

Material Specifications & Assembly Drawings

Section 4.5

Traffic Regulatory Signs

Final Draft: *June 1, 2002*

Table of Contents

4.5 Traffic Regulatory Signs: Material Specifications and Assembly Drawings

Material Specifications

Fabrication and Assembly Drawings

TRAFFIC REGULATORY SIGNS: MATERIAL AND FABRICATION SPECIFICATION

0. INTRODUCTION

Description: These specifications apply to the assembly and mounting of traffic regulatory and parking control signs mounted on steel posts with aluminum panels.

Mounting: Sign assemblies will be embedded in concrete footings. The sign upright can be modified to incorporate a breakaway baseplate or frangible coupling as per the FHWA Traffic Control Devices Handbook (Part II), the AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaire and Traffic Signals (Chapter 4), the AASHTO Roadside Design Guide (and as incorporated into the NPS Sign Manual 1988), and the NCHRP Recommended Procedures for the Safety Performance Evaluation of Highway Features (Report 350). they are not included in this manual. Use of breakaway bases is discouraged by the AASHTO standards when signs are mounted on an uneven grade where calculation of impact point is not possible, or in pedestrian zones where an impacted sign may dislodge and hit a bystander.

1. MATERIAL OVERVIEW

Aluminum

- 0.125"–6061-T6 aluminum sheet

Steel

- Post: Square (2" x 2" x 1/8") or rectangular (2" x 3" x 1/8") A–847 tubular sections weathering steel

Wood

- 4" x 4" Pressure treated-Douglas Fir No. 2 or better, or pressure-treated southern yellow pine

Hardware

- Panel and rail assembly bolts: 1/4–20 x 2-1/2" stainless steel truss head bolt
- Tamper resistant nuts: 1" X 1" x 1/4" Tuff Nut brand nut assembly
- Acorn nuts: 1/4–20 thread, stainless steel
- 1/4–20 x 2-1/2" aluminum stud welded to parking sign panel

Paint and Coatings

- Zinc chromate primer (Matthews Paint Company 74-734 with 74-735 activator, or equal)
- Acrylic polyurethane enamel: Rich Brown (Matthews Paint Company 42-224 with 43-270 catalyst or compatible Matthews VOC material, or equal)
- Rust inhibiting metal primer

Timber posts may be used as an alternate. For standard traffic signs, use posts no smaller than nominal 4" x 4" with use of 5-1/2" assembly bolt if the assembly includes an HDO plywood panel, and 4-1/2" long assembly bolt if sign is an aluminum instead of the 2-1/2" specified for steel tube mountings. Use of timber for any Traffic Regulatory and warning sign larger than 30" x 30" will require engineering based on species of wood, size of sign, and mounting height. Refer to engineering criteria in Section 4.1, Appendix B of the General Requirements specification.

2. FABRICATION

Parking Sign Panels

- 15cm x 30 cm x 0.125" Aluminum 6061-T6 alloy for Parking Control Signs
- 22..5 cm x 45 cm x 0.125" Aluminum 6061-T6 alloy for Parking Control Signs
- 30 cm x 60 cm x 0.125" Aluminum 6061-T6 alloy for Parking Control Signs

Dimensional Tolerances: Dimensions for panels shall have a tolerance of ± 0.125", with two 1/4–20 x 2-1/2" threaded aluminum studs welded to back of panel. Location shown in specification drawing.

Painting Panel Back: Back panel of all regulatory and parking control signs to be painted NPS Brown. Prime and paint back and edges of aluminum panel NPS Brown using Matthews Zinc Chromate Primer and Matthews Acrylic Polyurethane Enamel.

Aluminum panel to be cut to specified size and attachment holes drilled before paint application. Do not apply paint to panel face. Complete all paint application before application of sign graphics.

Mounting Holes: 5/16" holes place in Parking Control Signs are based on attached panel drawings.

Panel Cleaning: The aluminum shall be thoroughly cleaned and degreased with solvent and dried prior to application of the paint.

Application: Apply primer, and two coats of finish enamel as per manufacturer's specifications. Prime plus paint thickness shall provide a minimum of 2 mils (+/–) 1/2 mil thickness of dry paint film.

Paint Room Facilities. Primer and enamel shall be applied and dried at an air temperature of not less than 65 degrees Fahrenheit in a well-ventilated, dust-free, enclosed paint room.

Steel Post

Square tubular sections weathering steel A 847, in the following section sizes:

- 15 cm x 30 cm, Parking Control Signs with 4'-0" height above grade, 8'-0" total
- 22.5 cm x 45 cm with 6'-0" height above grade, 10'-0" total
- 30 cm x 60 cm, Parking Control Signs 2" x 2" x 1.8" x 11'-0" (for 7'-0" HAGL)
- Traffic Regulatory signs 3" x 2" x 1.8" (length varies)

Post Length: Determine post length on a site-by-site basis. Variables include actual height of sign above grade. Height may vary between 5' and 7' depending on location and type of sign, height of panel based on panel size, and variations in grade or slope of actual sign installation location (panel height + height to base above grade level + embedment depth of post = post length (+/–) for grade adjustment). Embedment depth to be 36".

Drill Post: Drill two (2) 5/16" holes in post for panel attachment. Locate holes to correspond to holes in Traffic Regulatory Sign panel. For Parking Control Signs, refer to panel layout drawing in this section with holes located away from legend.

Metal Finishing: All posts to be cut square. Finish of cut to be free of edge burrs or saw tooth on cut edge.

Wood Post

Pressure-Treated 4" x 4" Douglas Fir or southern yellow pine, No. 2 or better

- 15 cm x 30 cm, Parking Control Signs with 4'-0" height above grade, 8'-0" total
- 22.5 cm x 45 cm with 6'-0" height above grade, 10'-0" total
- 30 cm x 60 cm Parking Control Signs with for 7'-0" HAGL, 12'-0" total
- Traffic Regulatory Signs, standard height is 7'-0" to base

Post length: See Steel Post above

Drill Post: Drill two 5/16" holes in post for panel attachment. Locate holes to correspond to holes in regulatory sign panel. For Parking Control Signs, refer to panel layout drawing in this section with holes located away from legend.

Post Finishing: Chamfer top of post away from face to allow runoff of rain water.

3. GRAPHIC LAYOUT & PRODUCTION

The following specifications are divided into two sections for the two possible types of graphic production:
3A. Computer cut, retroreflective graphics on aluminum
3B Screen-printed, retroreflective graphics on aluminum

Artwork & Imaging: All artwork for panels will be provided in electronic format Adobe Illustrator files with all type and illustrations in-position following the established typographic specifications and grid formats.

Grid Format: All graphics to be formatted using NPS UniGuide formats as specified in Chapter 2, Graphic Standards for the parking control signs size as specified in this package. This includes type size, kerning, margins (left and right), top alignment, and overall panel proportions.

Typography and Symbols: See specifications in Chapter 2, Graphic Standards

Artwork Storage: All panel artwork files (digital) will be coded by number. Contractor shall retain all films (negative or positive) for each project.for preparation of replacements or additional panels using the same graphics. Negatives will remain property of the NPS and be returned at its request at the end of a contract period.

3B. GRAPHIC LAYOUT & PRODUCTION: COMPUTER CUT ADHESIVE GRAPHIC SIGNS

Computer Cut Graphics: Adhesive, computer cut adhesive graphics on aluminum with retroreflective background and with retroreflective and non reflective graphics.

General Requirements: Signs to be computer cut from vector art files created in Adobe Illustrator (or compatible programs such as Corel Draw). Contractor shall produce computer cut graphic sign panels from the electronic art files as supplied. Finished artwork must match original precisely on basic measurements of typeface replication including: stroke width, letterspace, and symbol and arrow size and proportion. Letter stroke to be a continuous line with no ragged edges or ragged interior corners.

Graphic Material: All adhesive graphics for this type of sign will have Type 11 retroreflective background and legend except for black legend and graphics which will be nonreflective as specified below.

Background for Parking Control Signs shall be Type 11, Super engineering grade, premium quality, wide angularity enclosed lens retroreflective material to meet or exceed the standards of: GSA L-S-300-C, Reflectivity 1, or FHWA Standard Specifications FP-85 Sections 633.06 and 718.01. These colors are specified using Avery Dennison product numbers. If an alternate manufacturer is used, notify Contract Officer with verification that grade and adhesive system are equal.

Colors:	**Type 11 for aluminum**	**Type 11 for wood**
White	T-2500	T-2200
Red	T-25022	
Green	T-2507	
Blue	T-2505	

Translucent inks to be compatible with specified sheeting following manufacturer's specifications.

Nonreflective Adhesive Vinyl: Premium quality, opaque pressure sensitive material designed for electro-cutting. Material shall be 2 mil thick with an outdoor life of 5-7 years.

Colors:	**2-mil vinyl**
Black	XL-1003

Compatibility of Graphic Sheeting: Background and legend shall use sheeting from the same manufacturer. Mixing of sheeting from different manufacturers shall not be permitted.

Age of Material: The Contractor shall indelibly mark each carton of retroreflective materials showing the date received. No more than 12 months shall have elapsed from the date of purchase from the manufacturer to the date of application on the substrate.

Graphic Application Quality: Application of pressure-sensitive sheeting shall follow manufacturer's specifications.

Background Application Surface Preparation: Before application of the sheeting, the face shall be free of all foreign matter such as paint or dust. The aluminum shall be thoroughly cleaned and degreased with solvent and dried prior to application of the sheeting coat.

Background Material: Panels shall be covered with one unspliced sheet. Background shall be adhered to front of sign panel prior to application of sign graphics.

Application of Retroreflective Background: Finished background application to be trimmed flush to the edge and be free of bubbles, edge lift or other surface imperfections.

Graphics application: Cut graphics to be applied using Avery Dennison Transfer Tape to maintain alignment and relationship of all elements.

Legend Application: Legend shall be adhered to background after application of background sheeting to sign panel.

Application: Graphics placed on panels must align to specified grid format (see Artwork and Imaging).

3B. GRAPHIC LAYOUT & PRODUCTION: SCREEN-PRINTING ON RETROREFLECTIVE SHEETING WITH ALUMINUM SIGN PANEL

Application

Screen-printing may be used to make Parking Control Signs that are reproduced in multiples. The decision to use screen-printing versus computer cut and applied legends should be based on which method is most cost effective for the number of signs required.

Artwork & Imaging

Art Preparation: Screen-printing contractor shall produce film positives and negatives as required from the electronic art files as supplied for fine line screen production with illustrative material digitally incorporated in format for intended reproduction, or attached with precisely scaled position (FPO) images included in the Adobe Illustrator document.

Printing Production

Quality: All screen work shall be of high quality, with clean, crisp, and clear graphic definition.

Formulation cards shall be filed for each individual ink color to ensure consistency of the product. Filed information shall include, but is not limited to, ink formula with designated color code, thinner and retarder adjustments in grammes, batch numbers of inks, thinner and retarder, mesh tension, emulsion coating and exposure units/time. When semi-or fully-automatic equipment is used, additional information shall be filed for: off contact, peel, speed, squeegee, flood speed, curing temperature, and belt speed.

Inks shall have a light fastness rating of 7-8 on the DIN 16525 (Wool Scale) or equivalent industry standard and must be able to withstand 375 degrees Fahrenheit (190 degrees Celsius) without noticeable change of pigmentation.

Ink type shall be specified as compatible by the manufacturer with the retroreflective substrate.

Inks shall be formulated using a computer calorimetry system and shall be matched with a tolerance of + 0.1 grammes.

Colors: Colors shall be as specified in specifications for Standard Highway Sign Colors (FHWA, HTO-21). These transparent process colors are specified using Avery Dennison products to be compatible with sheeting. If an alternate manufacturer is used, notify Contract Officer with verification that grade and adhesive system are equal.

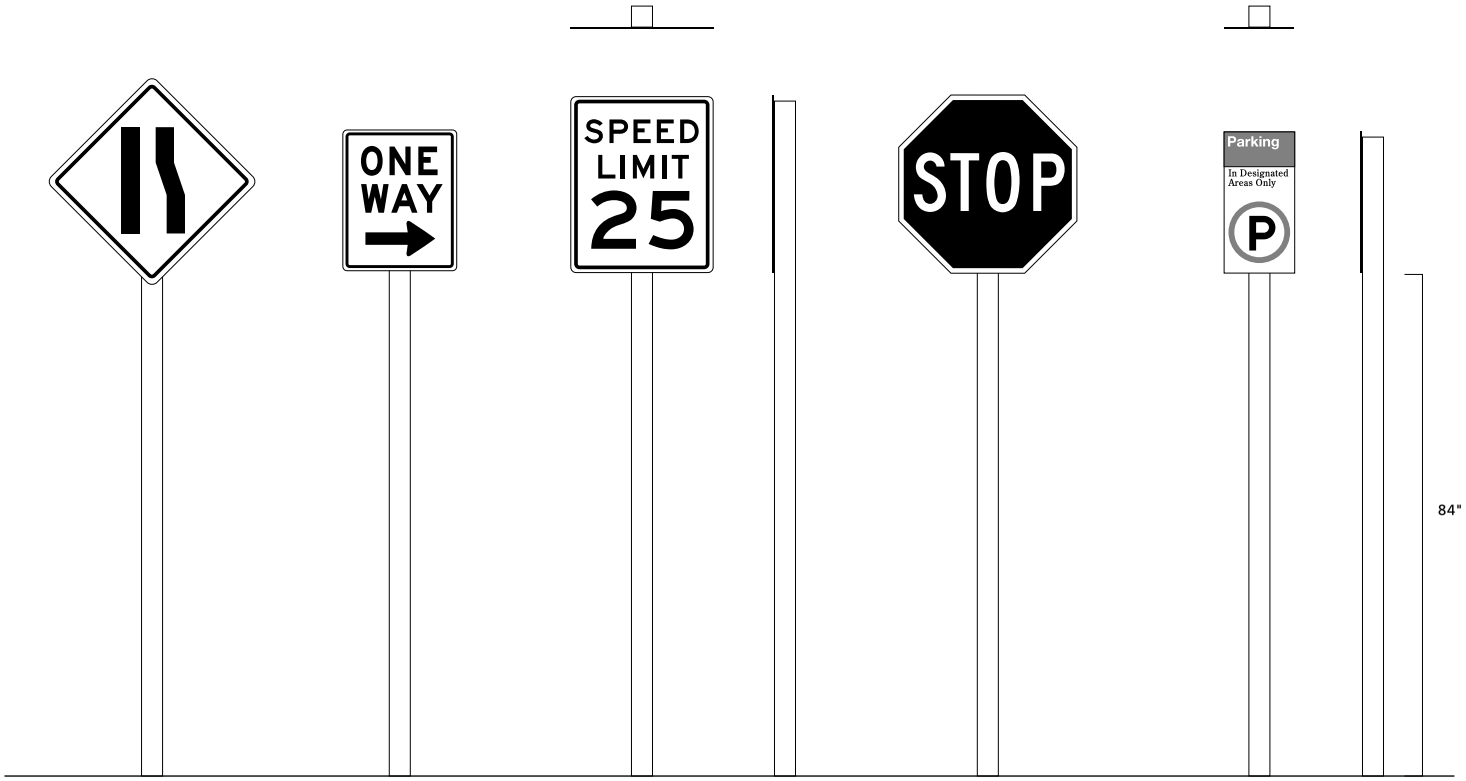
Thinner and retarder used in the adjustment of the inks shall be specified by the ink manufacturer. Additions shall be made by weight with a tolerance of (+/−) 0.1 grammes and filed on the formulation card.

Screens shall be 254 polyester monofilament, mesh tensioned to no less than 18 newtons. Mesh tension, emulsion coating, and exposure units/time are to be established and filed on the formulation card.

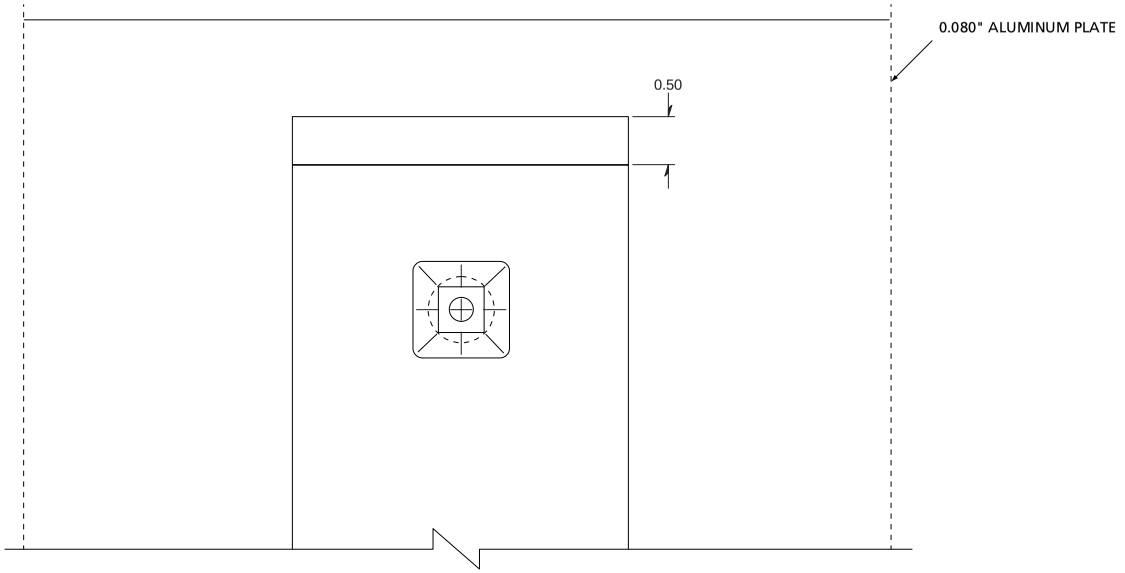
Printing shall be performed on semi- or fully-automatic equipment with a repeatability tolerance of (+/−) 0.004" in conjunction with a forced air conveyor drier. Off contact, peel, speed, squeegee, flood speed, curing temperature, and belt speed are to be established and filed on the formulation card. A fiberglass laminated urethane squeegee set at a 75 degree angle is to be used.

4. ASSEMBLY

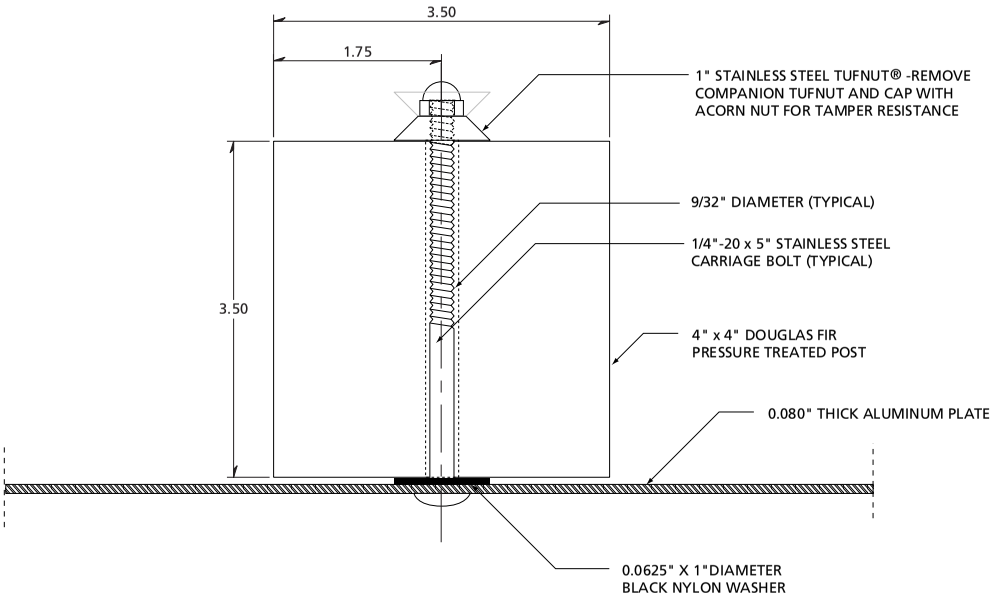
Refer to Chapter 5, Section 5.1 for Traffic Regulatory Sign Assembly and Installation instructions



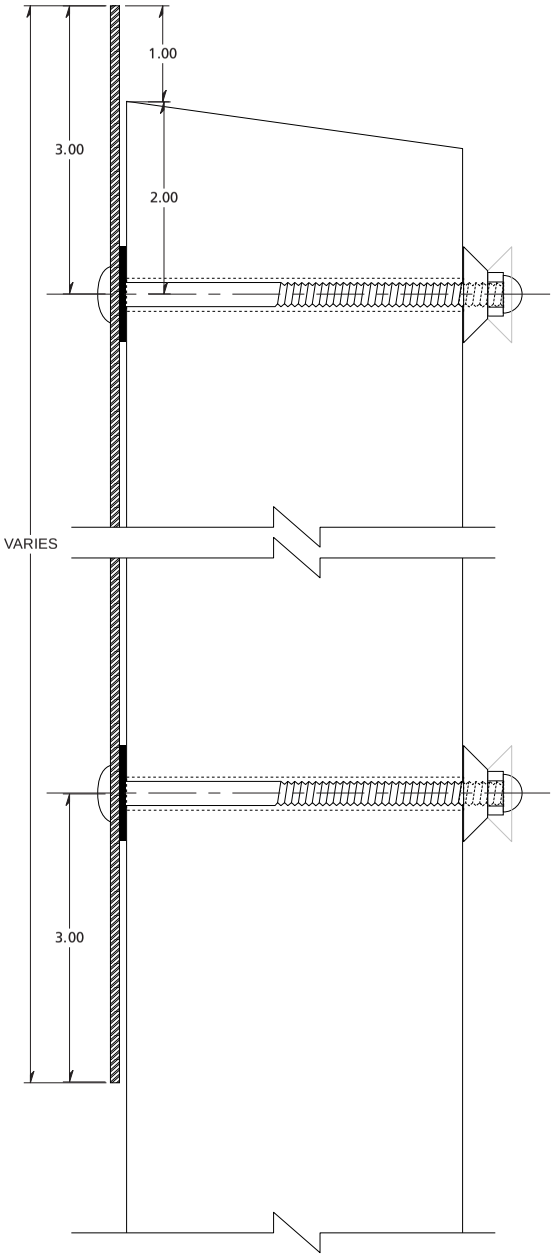
Elevation of Typical Traffic Regulatory Signs



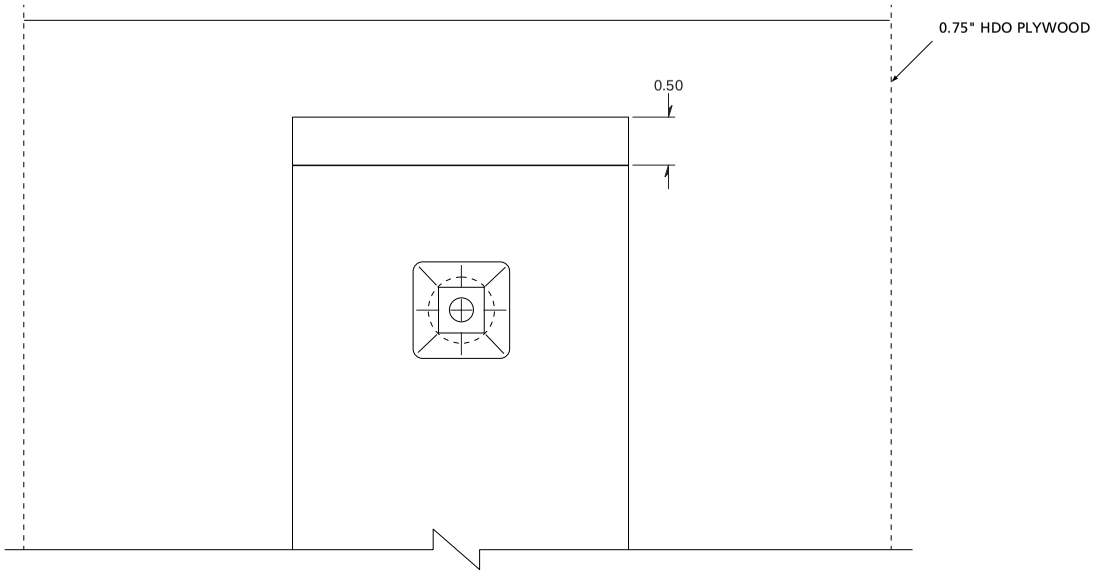
TRAFFIC SIGN BACK ELEVATION DETAIL



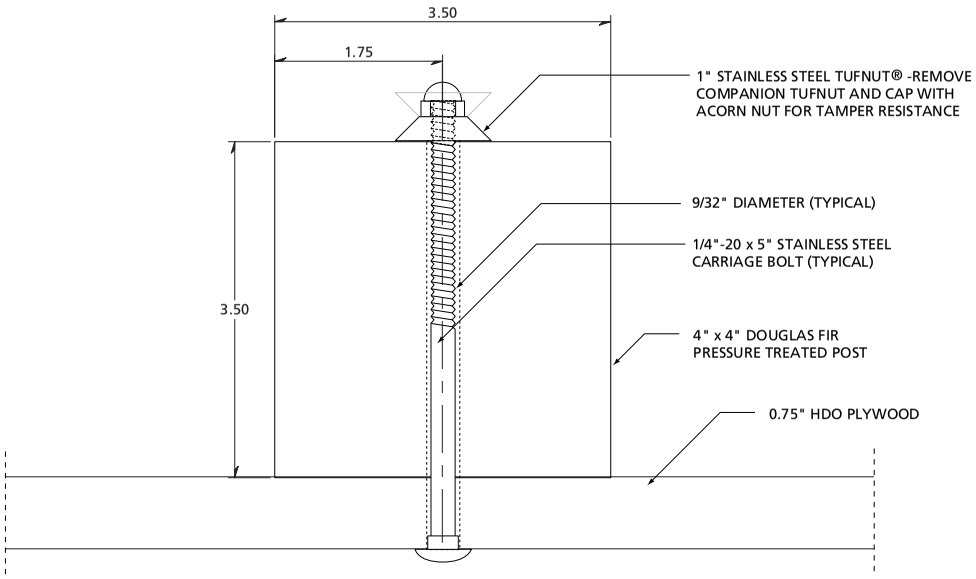
TRAFFIC SIGN PLAN DETAIL



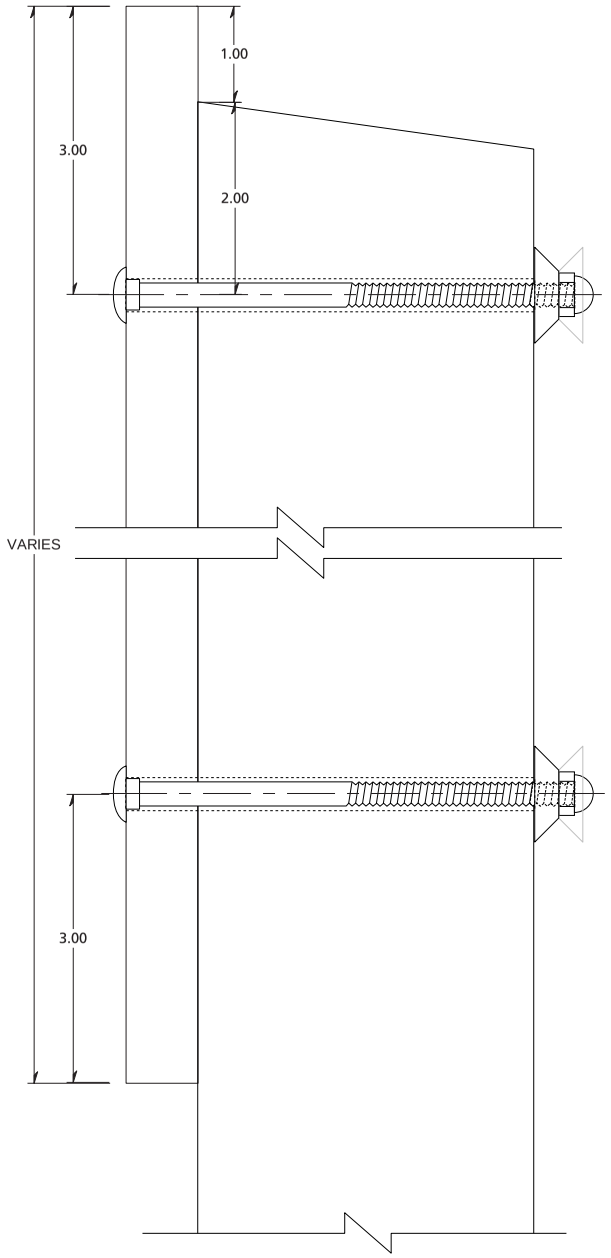
TRAFFIC SIGN SIDE ELEVATION DETAIL



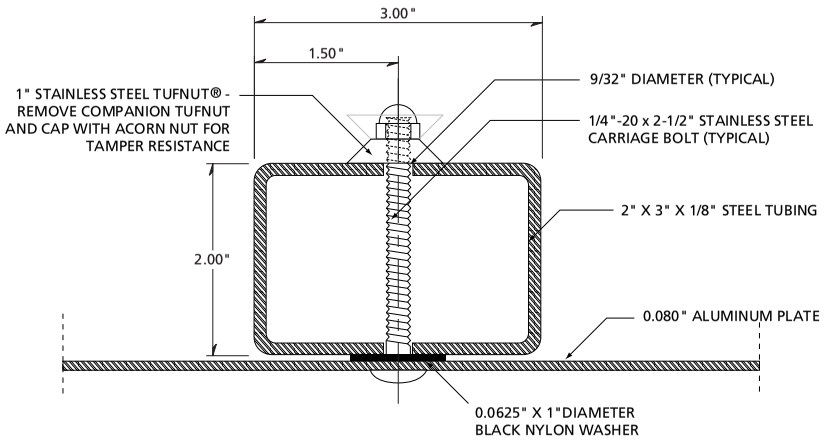
TRAFFIC SIGN BACK ELEVATION DETAIL



TRAFFIC SIGN PLAN DETAIL



TRAFFIC SIGN SIDE ELEVATION DETAIL



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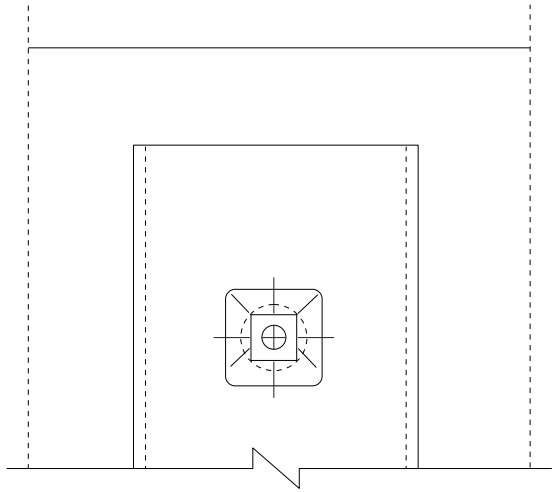
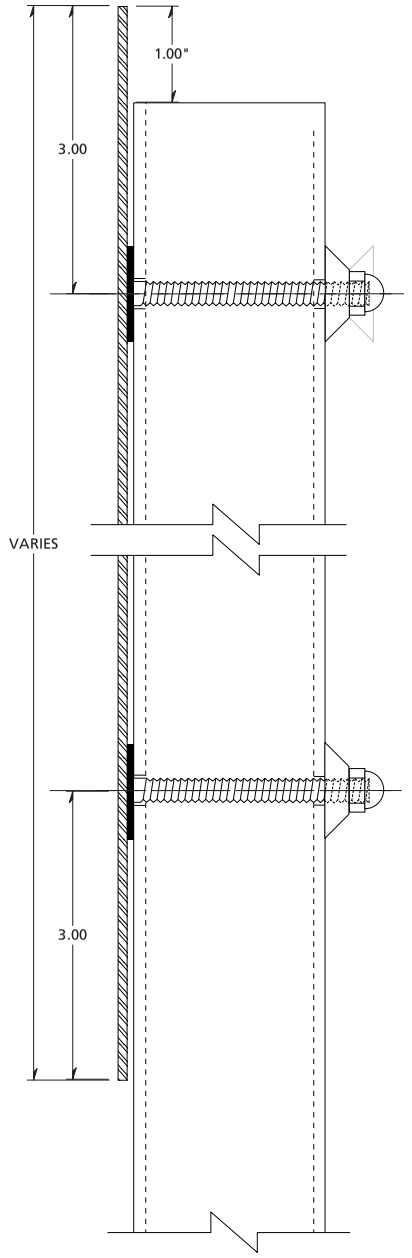
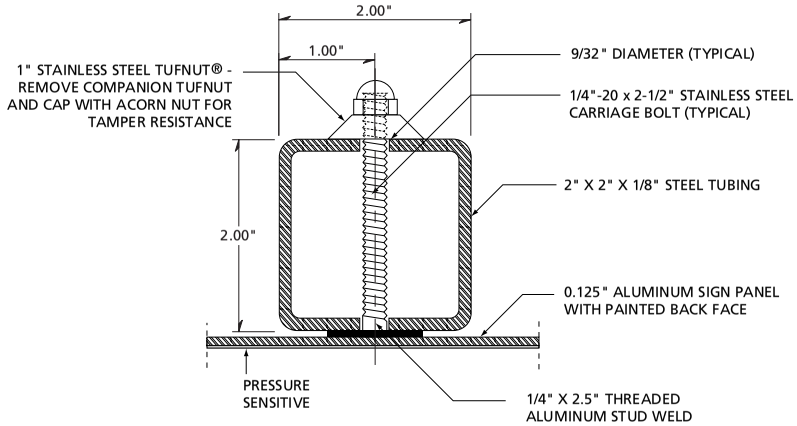


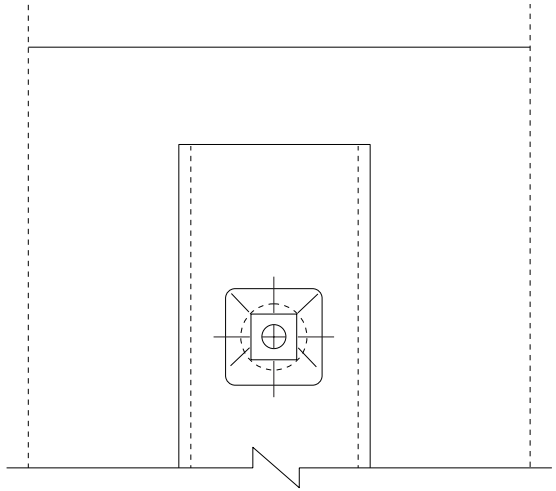
TRAFFIC SIGN ELEVATION DETAIL



TRAFFIC/TRAFFIC SIGN SECTION DETAIL

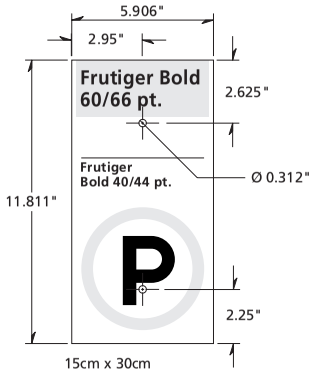


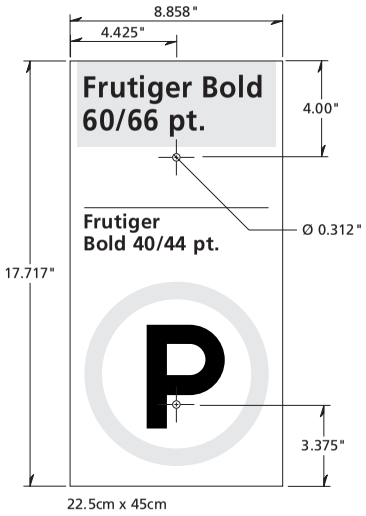
PARKING SIGN PLAN DETAIL

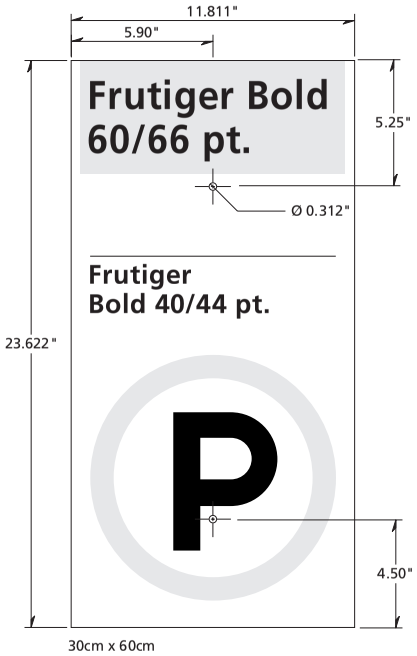


PARKING SIGN ELEVATION DETAIL

DRILL HOLE LOCATION FOR PARKING SIGNS







Chapter 5
Field Manual

Final Draft: *June 1, 2002*

Introduction

This chapter of the NPS UniGuide Standards Manual includes instructions on how to install new signs and how to maintain installed signs.

These instructions are divided into three parts:

- General procedures for placing signs without damaging the surrounding area
- Specific guidance on the installation of each different sign type and mounting configuration
- Instructions on general maintenance including twice yearly inspection and specific methods for repair of damaged signs

These instructions are intended for sign installation by park maintenance or other facilities management personnel. They are written , however, so that they might also serve as part of instructions to private-sector installers working under contract to an individual park. Such services are also available through the National UniGuide Program Manager at Harpers Ferry Center.

Table of Contents

Chapter 5

Field Manual

Section 5.1

UniGuide Sign Assembly and Installation

Final Draft: *June 1, 2002*

Chapter 5-Section 5.1

Sign Location and Site Preservation

Visitor Information System: Assembly and Installation

Visitor Information System Assembly and Installation Guidelines

INTRODUCTION

General Instructions for Sign Location and Site Preservation

The general guidelines included in this introduction apply to the installation of all UniGuide assemblies including: Visitor Information System, Identification Signs, Motorist Guidance Signs, and Traffic Regulatory Signs. Specific guidelines for installation by sign type and mounting method are included in each section.

Inventory Parts Prior to Installation

Before installing a sign or group of signs, inventory all shipments to verify that all parts have been received from the suppliers. Each supplier will send a shipping summary of parts in a standard format. Note that various parts may come from various suppliers, but all orders will be coordinated to assure complete delivery. Contact the designated supplier immediately if orders are not complete or parts have been damaged in shipment.

Personal Safety Procedures

It is critical to complete all UniGuide installations following NPS safe-workplace practices Specifically:

- Use care when lifting rock from excavated holes and use good judgment to prevent injuries when moving dry concrete to mixing locations,
- Wear eye protection when using power tools, or implements to break rock
- Make sure that an appropriate number of people assist in lifting large components into place and that the parts can be fully secured until positive bolt connections are made. Sign assemblies and primary components including: steel rails for large Identification Signs, large VIS assemblies, and upright timbers and panels for Road Guide Signs are heavy.

Installation Quality

All signs must be installed level and plumb at the specified heights and alignments with all specified footing, backfill or attachment hardware. It is not possible to effectively correct a misaligned footing, or directly embedded post because assemblies are predrilled in the factory and designed for level mounts in the field. Precise alignment is required for panel capture and bolt alignment in each of the various sign types included in the UniGuide Program.

No field drilling is required for assembly of any UniGuide assemblies other than the panel cap blocking board placed on top of the steel post used for monolithic assemblies of Identification Signs.

Sign Location

All signs are to be mounted at locations marked with a stake located by the Park UniGuide Manager. Stakes will be identified with sign type code, unique number, and location code; and correspond to the sign location plan drawings.

Stakes for double post signs will be staked with the maker at the location of the left leg when facing sign. Double-faced signs and angled installations are staked with both leg locations noted.

Information stations are identified using two stakes for the two posts of the primary installation with orientation of the assembly to follow location drawing.

Campsite identification assemblies will be placed in the same location as existing identifiers unless a new odd/even numbering system makes other locations more appropriate for entering motorists.

Base plate Mounting Templates

Mounting templates must be used for placement of J-bolts into concrete footing. The mounting template, a plywood copy of the base plate, is used to suspend the anchor bolts into a concrete footing. The template aligns the bolts to match the baseplate and insures that the height of the baseplate and bolts will be placed as specified.

For double posts assemblies, use a template that is either fabricated in the park or supplied by the sign fabricator. Templates place the bolt circles for each post on one continuous board. In the case of Identification Signs with more than two uprights, the template will incorporate all bolt circles with the correct distance between each post. This type of template is much more accurate than measuring center-to-center with separate templates and insures that the height of each footing is the same.

For Visitor Information System signs, the bolt circles are specified on pages 4.2-130 and 132 for steel posts, and 4.2-141, and 142 for wood signs, and with template drawings provided on pages 4.2-168 and 169.

Identification Sign templates are fabricated following baseplate specifications on pages 4.3-94 for single post flag-mounted assemblies; pages 4.3-51, 52, and 53 for double post signs; and page 4.3-74 for monolithic structures. Contract specifications require the sign fabricator provide the template with new Identification Signs. The guidelines for double post Identification Signs describe an method to determine the distance between two sign posts for fabrication of a new mounting template.

Do Not mount double post signs without the use of a common J-bolt mounting template.

Concrete Curing Time

Allow footing to cure for at least seven days before removing top nut and washer and alignment jig assembly and/or mounting sign uprights. Leave the bottom nut and washer in the preleveled position on anchor bolts.

Field Engineering

All sign structures have been engineered for normal conditions based on engineering criteria provided in Chapter 4: Material Specifications and Fabrication Drawings, Section 4.1. Unusual conditions, such as soft soil, rocky terrain, high winds or signs mounted higher than the specified height above grade level to the base of the sign, should be engineered on a site-by-site basis using general principles established in this manual. For advice, consult with the Regional UniGuide Manager or the National UniGuide Manager.

Sign Mounting in Sensitive Natural or Archeological Areas

Site-related installation instructions including site preservation, plant and tree protection, archeological finds, and demolition and removal are provided for installation contractors in Chapter 4: Material Specifications and Fabrication Drawings, Section 4.1. NPS installation personnel should follow guidelines contained in this section. The *Field Manual* section includes: specifications for mounting signs adjacent to trees or fragile natural features, specifications for mounting signs in archeologically sensitive areas, and NPS conditions on demolition and removal of existing signs.

Subsurface Obstructions: Unforeseen obstructions may limit the depth of a standard footing or require special mitigation to prevent damage to existing tree roots. Where possible, move the sign as needed to allow unconstrained subsurface installation. If a sign placement location must be moved because of subsurface obstructions, follow all instructions for sign location provided in Chapter 3, Section 3.4: Guidelines for Sign Use by Sign Type. If the sign can be logically moved, verify sight-lines of adjusted locations to affirm that sign is still visible from the designated approach.

If plant and tree obstructions are identified, and the sign location cannot be moved, follow the instructions below for Tree/Plant Protection and Mitigation of Damage.

If a Visitor Information System (VIS) sign location cannot be moved and nonplant (rock) obstructions prohibit the footing from being as deep as specified, see the Shallow Footing specification V.DE-C in this section for adjusting the footing configuration.

If site conditions make placement of standard footing impossible for identification signs, consult with the National UniGuide Program Manager for specifications on spread footing, or direct anchor bolts for rocky conditions.

Existing Utilities

The Park UniGuide Manager should identify known existing condition data on utility line locations. Prior to beginning excavation, the manager should notify utility companies of proposed locations and times for excavation. If there is a possibility of hitting underground utilities such as water and sewer lines, excavation should be done with care to prevent damage.

Site, Tree, and Root Protection

The installation crew should make all possible efforts to protect all adjacent structures, surfaces, vegetation, and plant materials from damage during installation.

Natural Features: Confine all operations to work limits of the project. To prevent damage to natural surroundings, restore damaged areas, repairing or replacing trees and plants that may have been damaged in the installation process.

- Do not remove, injure, or destroy trees or other plants without prior approval. The installers should consult with the Park UniGuide Manager and remove agreed on roots and branches that interfere with the sign installation.
- Do not fasten ropes, cables, or guys to existing trees.
- Carefully supervise excavating, grading, filling, and other construction operations near trees to prevent damage. Where possible, place excavated earth on heavy tarps to mitigate grade damage during installation and site restoration.

Tree and Root Protection: Minimize disturbance to tree trunks and root zones to prevent damage to trees.

- Do not drive over root zones unless work cannot otherwise be reasonably done. Driving over roots will compact the soil and can harm or destroy the tree.
- Do not pile excavated soil against tree trunks.
- Do not compact soil around roots to a greater degree than surrounding unexcavated soil, except to meet compaction requirements for backfilling signpost installations.

Tree/Plant Protection Do not remove, injure, or destroy trees, tree roots, or other plants without approval of the person in the park responsible for this type of resource management. Use accepted horticultural practices for all work. Adjust sign installation locations to keep them beyond the drip line wherever possible. Notify the Natural Resource Manager of any proposed sign locations within the drip line of the trees. The drip line shall be defined as the area below the furthest spreading branches of a tree. Where such adjustments are not practical, maintain the following minimum clearances between the face of trees to be saved and the closest edge of sign footing:

- for trees more than 30’ in diameter ----------10 feet
- for trees between 15’ and 30’ in diameter ---------- 8 feet
- for trees less than 15’ in diameter ---------- 5 feet

Mitigation of Damage: Wherever an excavation must take place within the drip line for all trees 12 inches or larger in diameter, take the following steps to mitigate root damage:

- Excavate carefully where tree roots might be encountered. Where roots 2" and larger are encountered, hand excavate as required to prevent damage to roots. Tunnel under roots to be saved, hand excavating as necessary.
- Do not cut roots over 2" in diameter.
- Cleanly saw cut roots between 1" and 2 " in diameter where they interfere with work; do not cut roots except as necessary. Roots between 1" and 2" in diameter which must be cut shall be cleanly saw cut near the edge of the sign foundation closest to the tree to prevent roots from being dislodged from soil by equipment.
- Within four hours of excavating, wrap burlap around the ends of cut roots larger than 1' in diameter and wet the burlap. Keep the burlap moist until the sign is backfilled. During backfilling operations, bring the burlap to within a few inches of the ground surface.
- Thoroughly wet roots and burlap in the excavated area before backfilling. Backfill shall contain as much water as is compatible with compaction.

Archeological Findings

Petroglyphs, artifacts, burial grounds or remains, structural features, and ceremonial, domestic, and archeological objects of any nature, historic or prehistoric, found within the installation area are the property of the Government and must be preserved to NPS standards.

Monitoring: At least one week before on-site work begins, meet with the person in the park responsible for archeological monitoring to discuss installation plan and equipment and special methods to be used in archeologically sensitive areas.

Observation: As appropriate, an archeological monitor should observe all ground-disturbing site work at all archeologically sensitive areas. As new ground is broken, the monitor will examine excavated materials using construction layout centerline and perimeter staking as a reference point to record locations of findings.

Finding: Should operations uncover or find any archeological remains, the installer shall suspend operations at the site of the discovery; notify the archeological monitor immediately of the findings; and continue operations in other areas.

Demolition and Project Cleanup

All Designated temporary or permanent existing (replaced) signage at the location of any new sign shall be removed completely following, or in conjunction with installation of the new signs unless otherwise specified by the Park UniGuide Manager. These materials shall be removed from the project and disposed of properly in accordance with state and local

regulations unless otherwise indicated.

Remove all packing, sign boxes, and construction materials from the project upon completion of installation.

VISITOR INFORMATION SYSTEM

Assembly and Installation

Mounting Options for Sign Installation

The sign assembly process will vary depending on the mounting type: direct embedment, assemblies mounted with baseplates (to anchor bolts, stem footing, to wood decks), and wall- mounted assemblies. To accommodate varying local conditions for mounting signs in national parks, this specification provides a variety of ways signs can be installed into the ground or onto vertical surfaces. For all tubular steel and bar stock assemblies, this includes:

V.DE.TS	Direct embedment for assemblies with tubular posts
V.DE.BS	Direct embedment for assemblies with flat bar stock posts
V.CO.T/B	Direct embedment into concrete footing for shallow footing conditions
V.RO.RS	Direct embedment of tubular post in core-drilled rock (F.1)
V.AB.BP	Baseplate mount with concrete footing and anchor bolts
V.AB.BP	Baseplate mount with a standard footing
V.TR.BP	Baseplate mount to threaded rod (anchor bolts) set in rock or concrete
V.TR.BP	Baseplate mount to threaded rod (anchor bolts) that has been set in bedrock
V.RO.SF	Baseplate attachment to corresponding stem footing in core-drilled bedrock
V.CO.SF	Baseplate attachment to corresponding stem footing in concrete footing
V.TB.BP	Baseplate attachment to wood deck
V.TB.TS	Bolt attachment to deck joist
V.LB.WM	Wall mount on wood or masonry surfaces (J.1)

Field Assembly Procedures:

Staging Area

Prior to assembly, all parts shall be organized and inventoried in a common work area. An orderly assembly procedures should be followed to expedite the installation process and to reduce loss of components and hardware. Parts being transported to an installation location should be organized in a manner that will minimize loss or damage. For mounting hardware, it is suggested that the correct bolts, nuts, and washers for each assembly be packaged in clear plastic bags to help expedite installation in the field, especially at locations where many signs are being installed by more than one crew.

In the field, a portable assembly table (two sawhorses and a sheet of plywood) is recommended with uprights, rails, core and sign panels organized in the bed of a pickup truck. If signs are assembled on the ground, all work shall be done on a furniture-moving protective blanket. Remaining parts should be returned to a common work area at the end of each workday.

The Assembly location should be in close proximity to the installation site but outside of areas that are actively used by park visitors. Use care to stay within the designated area and not damage surrounding vegetation. Upon completion of the installation project, remove all materials and restore area to its original condition.

Footing Reference

For complete specification drawings of foundations and mounting assemblies, refer to the drawings provided in each respective section of Chapter 4: Material Specifications and Fabrication Drawings.

General Guidelines for Sign Mounting:

Alignment and Mounting Height

All double post assemblies must be level when installed to maintain panel capture within the top and bottom rails. If the sign is to be mounted in a location with a difference in grade or slope from one upright to the other, the standard mounting height is measured from the end of the sign at the lowest grade.

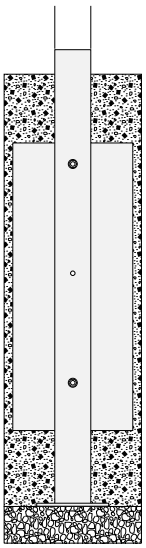
Embedment Coating

All weathering steel or hot-rolled steel posts and stabilizer blades that are embedded directly in the ground are to be painted with two coats of alkyd metal primer as specified in Chapter 4, Section 2.2. If the parts were not properly coated prior to shipment to a park, they are to be coated locally prior to embedment. Paint bottom 95 cm of post, allowing paint to cover 90 cm embedment depth and 5 cm section above grade.

Because factory-painted steel uprights and stabilizer blades will be shipped in banded and palletized form, they may be scratched in transit. Prior to installation, touchup exposed metal with alkyd-based metal primer for added protection of embedded material.

Vandal-Resistant Mounting of Porcelain Enamel Panels

If porcelain enamel signs are placed where signs may be defaced by sharp impacts to the face, they should be attached to the core panel using silicone adhesive or double-faced tape. If subsequent removal is needed, use piano wire (or similar high strength wire) to saw through the contact.



V.DE.TS Direct Embedment for Assemblies w/ Tubular Posts (A.1, B.1, C.1, & F.1)

Sign assembly instructions for F.1 are included in V.CB (Direct embedment of tubular post in core-drilled rock) below.

Application: Direct embedment is the preferable method of mounting signs because it does not require concrete and allows removal of the sign with the least intrusion on the land. Alternative methods, however, are provided because some locations will not accommodate drilling a 90cm hole(s) for posts, or local conditions dictate an alternate installation method.

Note: When ordering sign posts, direct embedment is the standard. If a baseplate is used, this must be specified in the order using the alternate part number.

Assembly: To assemble signs with tubular steel posts, mechanically attach post to rail section with stainless steel (1/4-20) x 1.25" socket head cap bolt. To separate aluminum rail from weathering steel upright, adhesive affix 0.0625" x 1" black nylon washer with 0.5" ID to each end of extrusion. Mechanically attach retainer bar to core panel with 8-32 x 3/8" flathead screws.

Mechanically attach 0.25" x 10" x 24" stabilizer blade to posts with 3/8"-16 x 3" bolts and flat washers. Place flat washers at bolt head between the stabilizer blade and the post, and before the attachment with nut.

For reverse angle assemblies, mechanically attach the 0.25" core panel to the wayside exhibit extrusion (R/4) with 8-32 x 0.375" stainless steel flathead socket head screws.

Preassembly: Assemblies that are mounted by direct embedment are to be preassembled in the field with rails and core panels and a stabilizer blade as a contiguous unit. Do not insert sign panels until the full assembly is mounted, leveled, and the uprights are secure.

Prepare Mounting Holes: Auger drill two holes 12" dia. x 39" deep. Fill holes with 3" of gravel. Place each upright of a double post assembly in the center of each respective hole. Note: If drilling is impeded by bedrock and it is impossible to move the installation, follow the instructions for shallow footing conditions (V-DE-C) in the following specification.

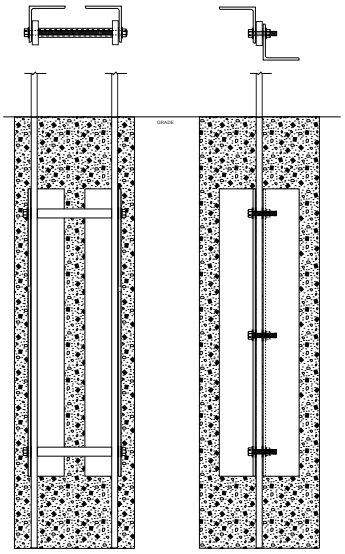
Level Assembly in Hole: Lower the preassembled sign into the mounting holes. Two people should lift the sign to minimize twisting of the assembly before it is made secure by the back-filling. Carefully tamp the assembly in the bottom of the hole and check to make sure that the top rail is level when the uprights are held in vertical position. To adjust, back-fill each hole with gravel until the bottom of each upright is seated at the same level, the bottom rail is at the specified height above grade, and the entire assembly is level.

If the soil is soft, muddy, highly organic, or there is a seasonally high water table, drill the hole to a depth of 42", backfill with gravel and place a ten gauge 6" x 6" steel plate at base of hole to spread the weight of the sign assembly to reduce settling. Tamp the plate firmly and reset the double post assembly to confirm that the assembly is level before back-filling the hole.

Backfill Installation: To backfill the installation, secure the assembly with both uprights vertical. Carefully place the soil removed in the excavation process in the holes in 6" lifts with each tamped to 95% compaction. Repeat process in six cycles to insure proper mounting.

Sign Panel Installation: Once the assembly is installed, remove the top rail, or all rails except the bottom rail. Insert front and back sign panels into bottom rail in front and behind the core panel. Place next upper rail on assembly and secure rail to upright. Repeat until installation is complete. If retainer rail is used, attach to core panel with 8-32 x 0.375" flat-head screws with sign panel in place or inserted into assembly from the side once the retainer is secured to the core panel.

Hole Covers: Insert 0.625" black poly cover caps into outboard access holes to finish installation.



V.DE.BS Direct Embedment for Assemblies with Flat Bar Stock Posts (D.1, E.1)

Application: For narrow profile sign assemblies with flat bar stock uprights (D.1, E.1) and multiple narrow profile panels (D.1).

Reference: Follow instructions for direct embedment of tubular post assemblies (V.DE-T), with the following exceptions.

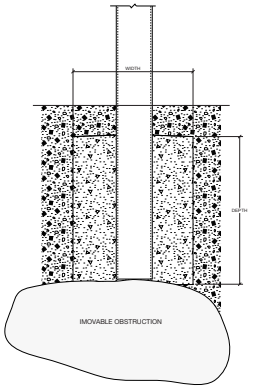
Assembly: To assemble signs with flat bar stock uprights, mechanically attach post to rail section with stainless steel 1/4"-20 x 1" flathead spanner head screw. To separate aluminum rail from steel upright, adhesive affix 0.0625" x 1" black nylon washer with 0.5" ID to each end of extrusion. Mechanically attach retainer bar to core panel with 8-32 x 3/8" flathead screws.

Mechanically attach 0.25" x 3" x 3" x 24" stabilizer angle to posts with 3/8"-16 bolts and flat washers placed on outside of bolt between the stabilizer angle and upright.

- If the assembly is a nominal 15 cm wide, bolt stabilizer angle to outside of uprights and connect both uprights with 3/8"-16 x 8" zinc-plated hex head machine bolt and use a 0.5" x 15 cm thin-wall stainless steel tube as a spanner between narrow profile leg assemblies.
- If the assembly is 30 cm wide or wider, bolt stabilizer angle to outside and inside of uprights (two per upright) and connect both uprights with 3/8"-16 x 2" zinc-plated hex head machine bolt.

Prepare Mounting Holes: If the assembly is a nominal 15 cm wide double post assembly, the two posts are to be attached with bolt and tube assembly using steel angle stabilizer blades. The augered assembly hole is to be 10" in diameter.

Assemblies that are wider than 15 cm require a 8" augered hole for embedment. Note that the excavated holes for 30 cm and 45 cm wide installations may be a continuous oval that is 20" or 26" wide respectively.



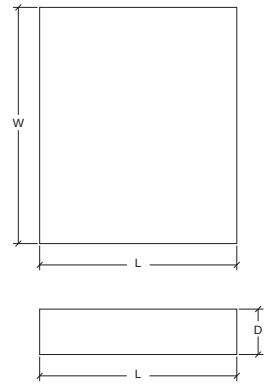
V.CO.T/B Direct Embedment into Concrete Footing for Shallow Footing Conditions (A.1, B.1, C.1, D.1, E.1, F.1)

Application: For rocky subgrade conditions which limit depth of excavation for direct embedment.

Reference: Follow instructions for direct embedment of tubular post assemblies (V.DE-T), with the exception of placing post in mounting hole as specified below.

Adaptation of Post for Concrete Embedment: The post length may be shortened and the area surrounding the post backfilled with concrete to make a shallow footing. At no time can the footing excavation be less than 15" deep. This will allow 12" of concrete with a 3" cover of existing earth to backfill over the concrete base. The width and length of the footing will depend on the size of the assembly and depth of hole. When the sign upright is embedded in concrete, the stabilizer blade is not needed.

The following table specifies the appropriate footing size based on size of sign and depth of hole. When calculating adjusted post length, the height above grade level to base of bottom rail is 90 cm unless specified otherwise (see drawing 1.8), and the post is to be fully embedded in concrete.

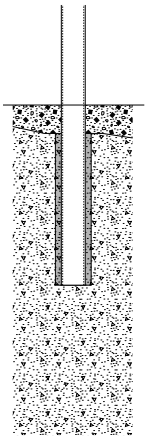


Assembly size (W x H)	Footing Size (L x W x D)	No. of Footing/Assembly
30 cm x 30 cm	2'-0" x 1'-3" x 12"	(1 - single combined footing)
30 cm x 60 cm	2'-0" x 1'-9" x 12"	(1 - single combined footing)
30 cm x 90 cm	2'-0" x 2'-3" x 12"	(1 - single combined footing)
30 cm x 120 cm	2'-0" x 2'-6" x 12"	(1 - single combined footing)
45 cm x 45 cm	1'-0" x 1'-9" x 12"	(2 - separate footing)
45 cm x 90 cm	1'-0" x 3'-0" x 12"	(2 - separate footing)
60 cm x 20 cm	1'-0" x 1'-3" x 12"	(2 - separate footing)
60 cm x 40 cm	1'-0" x 1'-6" x 12"	(2 - separate footing)
60 cm x 60 cm	1'-0" x 2'-0" x 12"	(2 - separate footing)
60 cm x 80 cm	1'-0" x 2'-6" x 12"	(2 - separate footing)
60 cm x 60 cm	1'-0" x 2'-0" x 12"	(2 - separate footing)
90 cm x 60 cm	1'-0" x 2'-6" x 12"	(2 - separate footing)
60 cm x 90 cm	1'-0" x 2'-9" x 12"	(2 - separate footing)
60 cm x 120 cm	1'-0" x 3'-0" x 12"	(2 - separate footing)

90 cm x 30 cm	1'-0" x 1'-9" x 12"	(2 - separate footing)
90 cm x 60 cm	1'-0" x 2'-6" x 12"	(2 - separate footing)
90 cm x 90 cm	1'-3" x 3'-0" x 12"	(2 - separate footing)
90 cm x 120 cm	1'-3" x 3'-6" x 12"	(2 - separate footing)
120 cm x 90 cm	1'-3" x 3'-6" x 12"	(2 - separate footing)

Assembly size (W x H)	**Footing Size (L x W x D)**	**No. of Footing/Assembly**
30 cm x 30 cm (C.1-5)	2'-0" x 1'-3" x 12"	(1 - single combined footing)
30 cm x 60 cm (C.1-5)	2'-0" x 1'-9" x 12"	(1 - single combined footing)
30 cm x 90 cm (C.1-5)	2'-0" x 2'-3" x 12"	(1 - single combined footing)
60 cm x 30 cm (C.1-5)	1'-0" x 1'-3" x 12"	(2 - separate footing)
75 cm x 30 cm (C.1-5)	1'-0" x 1'-6" x 12"	(2 - separate footing)
90 cm x 30 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footing)
105 cm x 30 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footing)
120 cm x 30 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footing)
150 cm x 30 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footing)
45 cm x 45 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footing)
60 cm x 45 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footing)
75 cm x 45 cm (C.1-5)	1'-0" x 1'-9" x 12"	(2 - separate footing)
90 cm x 45 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footing)
105 cm x 45 cm (C.1-5)	1'-0" x 2'-0" x 12"	(2 - separate footing)
120 cm x 45 cm (C.1-5)	1'-0" x 2'-3" x 12"	(2 - separate footing)
150 cm x 45 cm (C.1-5)	1'-0" x 2'-6" x 12"	(2 - separate footing)

Mounting: Brace sign assembly in vertical position and temporarily secure. Backfill concrete footing into excavated hole. Protect exposed mounting posts from concrete splatter.



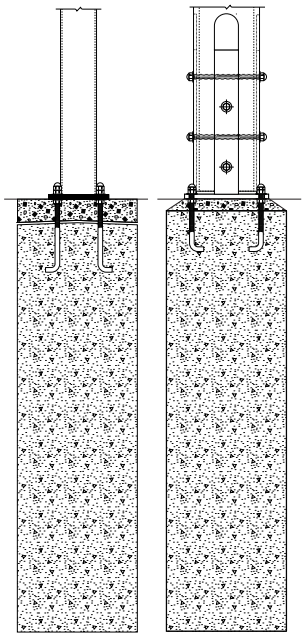
V.RO.RS Direct Embedment of Tubular Post in Core-Drilled Rock (F.1)

Application: The primary application for this combination of sign and mounting is for a narrow trail mounting that will not accommodate a double post sign.

Hole Preparation and Upright Installation: Single post, narrow profile 2" x 2" tubular steel uprights may be directly inserted into a 3" core-drilled hole. Brace core drill to insure that the hole is vertical, drill to 12" depth minimum, and remove all waste material from hole before inserting post. Cut lower portion of standard tubular post to appropriate length to accommodate specified mounting height for the particular assembly of sign from grade to base of panel. Insert tubular steel post and secure in vertical position. Grout surrounding void with nonshrink, high-strength grout. Restore site and replace existing grade at base of post.

Sign Assembly: Epoxy bond stainless steel round base weld nut into counterbored brass backing panel to prevent weld nut from turning when attached to post. Glue sign panel to brass backing panel with 3M-468MS panel bond adhesive. All edges to be flush and even. Attach panel to post through the back of the post with 10-32 x 3/8" stainless steel socket head cap screws with stainless steel hi-collar helical spring lock washer.

Hole Covers: Insert 0.625" black poly cover caps into outboard access holes to finish installation.



V.AB.BP Baseplate Mount with Concrete Footing and Anchor Bolts (A.1-5, B.1-2, C.1 & 5, D.1, E.1, F.1, H.1-2)

Application: For conditions that require a removable assembly or anchor bolt assembly with baseplate attachment.

Field Tolerances: All double post assemblies must be level to maintain panel capture within the top and bottom rails. The correct installation of this sign type is contingent on both footing being at the same elevation and the mounting bolts placed at the precise location noted in the specification. The tolerances for field adjustment of assembly width are (+/–) 10/10000. The tolerances for field adjustment of assembly height are (+/–) 30/10,000.

Top of Footing: If the baseplate is mounted even with the existing grade, the top of the footing is to be 1" below the grade. If the baseplate is concealed with earth, the top of the footing is to be 3" below the grade.

If the sign is to be mounted in a location with a difference in grade or slope from one upright to the other, the standard mounting height is measured from the end of the sign at the lowest grade.

Bolt Alignment Jig (5" or 7" baseplate): Bolt alignment jig plates are provided for each possible assembly configuration. These are precision aluminum templates with drill bushings. Use these as templates to prepare same size alignment jigs for field installation using 3/4" plywood (Marine exterior grade (Type 1-A/C or better) or Medium Density Overlaid plywood (MDO). Bolt locations in bolt alignment jigs to match template precisely.

Prepare Mounting Holes: Auger drill two 10"dia. x 39" deep holes and clean out to the specified depth. Fill base of hole with 3" layer of gravel. Cover gravel with sheet of 8 mil. polyethylene before pouring concrete.

Prepare Bolt Alignment Jig Assembly: Attach 0.375" x 14" "J" bolts to plywood bolt alignment jig using a washer and bolt on top and bottom of plywood to secure. Leave 0.5" of exposed thread for each of the eight (8) bolts, and align with "J" bolt ends facing away from center when used with 5" baseplates; align with "J" bolt ends directed inward when used with 7" baseplates. Suspend the bolt and template assembly over the mounting holes with the bottom of the plywood being at the proposed level of the underside of the baseplate. Place boards or mounting shims under the bolt alignment jig assembly until level.

Pour Concrete: Remove bolt alignment jig assembly (leaving boards and shims in place) and pour concrete into holes to the level specified for the finished top of footing (3" below grade if concealed, 1" below grade if surface mounted). Reinsert alignment jig assembly into fresh

concrete secure in a level position side-to-side and front-to-back.

Finishing Concrete: Tamp wet concrete from the side of the alignment jig assembly to insure complete capture of "J" bolts. Finish top of footing with 1" wash (slope concrete away from post), 4 sides for drainage.

Cure Time: Allow footing to cure for at least seven days before removing top nut and washer and alignment jig assembly and/or mounting sign uprights. Leave the bottom nut and washer in position.

Assembly of Signs with Tubular Steel Posts

Mechanically attach post to rail section with stainless steel 1/4-20 x 1.25" socket head cap bolts. To separate aluminum rail from weathering steel upright, affix 0.0625" x 1" black nylon washer with 0.5"ID to each end of extrusion with adhesive before assembly. Mechanically attach retainer bar to core panel with 8-32 x 3/8" flathead screws. For reverse angle assemblies, mechanically attach the 0.25" core panel to the wayside exhibit extrusion (R/4) with 8-32 x 0.375 low head, socket head screws.

Sign Installation (60 x 120 or smaller): Preassemble in the field with rails and core panels as a contiguous unit. Set assembly on leveling nuts (bottom washer and nut assembly removed when alignment jig assembly was removed). Place top washer and nut on anchor bolt stem but do not tighten until assembly is vertically aligned and the rail is leveled. Do not insert sign panels until the full assembly is mounted, leveled, and the uprights are secure. Align assembly by adjusting height of each leveling nut. Check assembly for movement that indicates one or more of the leveling nuts is not touching the bottom of the baseplate, and tighten accordingly. Once assembly is level and vertically aligned, secure top washer and nut assembly. Cut top of anchor bolt, leaving six threads exposed. Attach acorn to protect exposed threads and finish assembly.

Once the assembly is embedded and secure, remove all but the bottom rail and core panel. Insert the lower sign panel and back panel into the bottom rail. While holding the panel assembly together, insert the top rail and secure with screw on each end of rail. On assemblies with more than one rail, repeat process until assembly is complete.

Sign Installation (larger than 60 x 120): Large installations can be preassembled as noted above. If the overall assembly is too large or heavy for mounting as a fully assembled unit, the alternative method is to place each upright post individually on the anchor bolts and secure. Once the uprights are vertically aligned and secured (thumb tighten bolts), attach the bottom rail. To adjust, loosen the upper nut and adjust the leveling nuts until the rail is level and both uprights are vertically aligned front-to-back and side-to-side. Once assembly is

level and vertically aligned, tighten the top washer and nut assembly. Cut top of anchor bolt, leaving six threads exposed. Attach acorn to protect exposed threads and finish assembly. To assemble the remaining parts of the assembly, tighten the bottom rail attachment, and insert the core panel and front and back sign panels into the rail channel. While holding the panel assembly together, insert the top rail and secure with screw on each end of rail. On assemblies with more than one rail, repeat process until assembly is complete.

Site Restoration Subsurface Baseplates: Once installation is complete, place high bond, nonshrinking structural grout between baseplate and footing and trowel sides with wash base to stop moisture penetration under baseplate. Restore grade around base of footing.

Hole Covers: Insert 0.625" black poly cover caps into outboard access holes to finish installation.

Assembly of Signs with Wood Posts (A.5, B.2, C.5)

Brass Mounting Straps: Mounting straps are generally installed by the post manufacturer. Place straps in dadoed sections of posts and attach with No. 10 x 1.5" brass flathead Phillips wood screws.

Baseplate Attachment: Insert fabricated steel baseplate onto base of wood post. Orient baseplate to align with bolt holes in post and corresponding baseplate tang. Bolt attach the posts to baseplate tangs with 3/8"–16 x 6.25" threaded rod (four per post to baseplate assembly) and acorn nut assembly (both ends). Place flat washer on each end of threaded rod and affix acorn nuts. Take care that the threads on the rods are not damaged when inserted through the post. Tighten nuts simultaneously from both sides.

Double Post Wood Sign Assembly: Mechanically attach post to rail section with stainless steel 1/4-20 threaded rod with stainless steel acorn nut brazed to one end. The length of these custom bolt assemblies is 4.25" for 3.5" x 3.5" post and 6.25" for 5.5" x 5.5" post. To separate aluminum rail from brass mounting strap, affix 0.0625" x 1" black nylon washer with 0.5"(interior diameter) at each end of extruded rail with adhesive before assembly. Mechanically attach retainer bar to core panel with 8-32 x 3/8" flathead screws if part of an assembly.

For reverse angle assemblies, mechanically attach the 0.25" core panel to the wayside exhibit extrusion (R/4) with 8-32 x 0.375" steel low head socket head screws. On reverse angle assemblies, the straight section of the retainer strap is affixed to the sign upright with a custom 1/4–20 x 3–3/4" stainless steel threaded rod with stainless acorn nut brazed to one end and screw attached acorn nut. Place companion washer on each side of .3-3/4" stainless rod.

Mounting Double Post Wood Sign Assemblies with 4" Uprights: Assemble sign in the field with rails and core panels as a contiguous unit. Place sign assembly on leveling nuts (leveling nut and washer to remain after removal of alignment jig). Place top washer and nut on anchor bolt stem but do not tighten until assembly is vertically aligned and the rail is leveled. Do not insert sign panels until the full assembly is mounted, leveled, and the uprights are secure. Align assembly by adjusting height of each leveling nut. Make sure assembly is seated properly and has no play when moved from side to side. Movement indicates one or more of the leveling nuts is not touching the bottom of the baseplate and must be tightened accordingly. Once level and vertically aligned, secure top washer and nut assembly. Cut top of anchor bolt, leaving six threads exposed. Attach acorn to protect exposed threads and finish installation.

Once the assembly is embedded and secure, remove all but the bottom rail and core panel. Insert the lower sign panel and back panel into the bottom rail. While holding the panel assembly together, insert the top rail and secure with screw on each end of rail. On assemblies with more than one rail, repeat process until assembly is complete.

Mounting Double Post Wood Sign Assemblies with 6" Uprights: Large installations can be preassembled as noted above. If the overall assembly is too large or too heavy for mounting as a fully assembled unit, the alternative method is to place each upright post individually on the anchor bolts and secure. Once the uprights are vertically aligned and secured (thumb tighten bolts), attach the bottom rail. To adjust, loosen the upper nut and adjust the leveling nuts until the rail is level and both uprights are vertically aligned front-to-back and side-to-side. After assembly is level and vertically aligned, tighten the top washer and nut assembly. Cut top of anchor bolt, leaving six threads exposed. Attach acorn to protect exposed threads and finish assembly.

To assemble the remaining parts of the assembly, tighten the bottom rail attachment, and insert the core panel, and front and back sign panels into the rail channel. While holding the panel assembly together, insert the top rail and secure with screw on each end of rail. On assemblies with more than one rail, repeat process until assembly is complete.

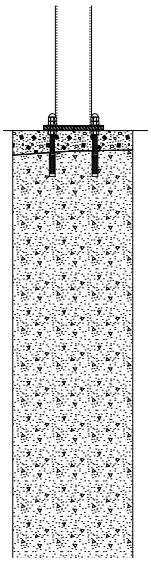
Assembly and Mounting of Street Name Signs

Assemble core panel, rails, and tension rod and insert into upright prior to mounting on baseplate. Insert top and bottom rail into counterbored hole in sign upright and push inward until the rails are fully engaged. Insert core panel and sign panels into top and bottom channel of extrusion and connect with stainless steel connector. Complete installation by inserting 1/4"–20 x 3.5" threaded stainless rod with brazed acorn nut head and companion washer through post and into end of extrusion. Tighten both bolts. Repeat for second street name sign blade.

Assembly and Mounting of Fingerboard Signs

Each fingerboard upright should be drilled to accommodate the planned number and orientation of panels.

Fingerboard rail and core panel sign assemblies will be factory assembled, with core panel welded on the outboard end to each rail and stainless steel tension rod in place. Insert all fingerboard assemblies prior to erecting sign. Insert top and bottom rail into counterbored hole in sign upright. Push the assembly inward until the rails are fully engaged in the counterbored hole in the upright and the tension rod is firmly seated in position. Insert sign panels into top and bottom channel of extrusion. Complete installation by inserting 1/4–20 x 3.5" threaded stainless rod with brazed acorn nut head and companion washer through post and into end of extrusion. Tighten both bolts. Repeat for second street name sign blade.



V.TR.BP Baseplate Mount to Threaded Rod (Anchor Bolts) Set in Rock or Concrete (A.1&5, B.1-2, C.1&5, D.1, E.1, F.1)

Application: For anchor bolt to base plate installations with bedrock or for attachment to a concrete surface.

Reference: Follow all instructions on leveling sign assembly in the section V.JB.BP (Baseplate Mount with Concrete Footing and Anchor Bolts) for sign assembly and installation.

Anchor Material: Note that this specification is predicated upon rock being basaltic (igneous) in nature to afford a sound structure and positive engagement. In the event the rock base is of poorer quality (schist or similar), attachment shall be engineered for this site-specific application after consulting the Contract Officer.

All concrete slabs must be at least 5" thick and free of cracks, surface deterioration or indication of settling.

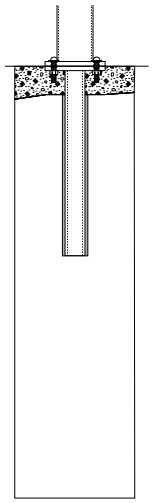
Site Accommodation: For sign placement with exposed uneven bedrock, manually level stone surfaces (equal for both baseplates) to receive base plates with masonry tools. Drill four 15/32" dia. (0.46875") x 3-1/2" deep holes in bedrock that align to baseplate configuration. Insert and affix 3/8"–16 x 6" threaded stainless steel rod (302 or 304) in drilled holes on top of base using HILTI-HVA catalytic anchor system (or equal) for securing mounting bolts into top of bedrock slabs. Follow manufacturer's instructions for proper attachment.

Drilling Rock or Concrete: Identify drilling location for placement of anchor bolts using the bolt alignment jig as a template.

Place 15/32" dia. hole in rock or masonry surface. Depth of hole must accommodate full 3-1/2" of embedment of anchor bolts. Bolt length must accommodate placement of baseplate at specified level with thread to accommodate securing flat washer, nut, and acorn nut.

Inserting Anchor Bolt: Clean all drilling powder from hole and place HILTI-HVA catalytic adhesive in hole. Insert 3/8"-16 threaded rod while breaking two-part adhesive canister as per manufacturers specifications.

Once bolts are set as specified by the manufacturer, place nut and washer on each anchor bolt. Place plywood bolt alignment jig over anchor bolts and adjust until level front-to-back and side-to-side. Remove alignment jig and place sign uprights or complete sign assembly on bolts as specified in the above section (V.JB-S Baseplate mount with a standard footing).



V.RO.SF Baseplate Attachment to Corresponding Stem Footing in Core-Drilled Rock or Concrete (A.1, B.1, C.1, D.1, E.1, F.1) for 5"x 5" Baseplates Only

Application: For assemblies mounted in subsurface bedrock with stem inserted in a core-drilled hole, and secured with epoxy adhesive. The sign post is mounted to the baseplate.

Reference: Follow all applicable instructions for setting and leveling two stem assemblies in-tandem in the section V.JB-S (Baseplate Mount with Concrete Footing and Anchor Bolts) for sign assembly and installation with the following exceptions for use of stem in lieu of anchor bolts.

Stem Assembly: For double post assemblies, attach 3/8"-26 x 8" galvanized steel bolt through stem and secure with equal length of bolt protruding on each side with double nut assembly.

Baseplate Alignment Jig: Bolt stem footing to bottom of alignment jig. Place alignment jig assembly over mounting location and mark precise drilling location for core attachment.

Core-Drilled Hole: Drill or core bore 1-3/4" dia. hole in rock surface. Drill must be vertically aligned for proper placement of stem footing. Remove all waste material from core hole. Note: If 1-3/4" dia. core is not available, a 2" dia. core can be used.

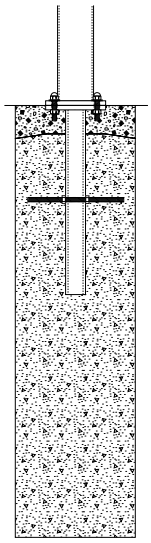
Setting Stem Footing: Cover the bottom of the stem footing pipe with tape to prevent epoxy adhesive from entering stem when setting the stem footing in epoxy adhesive.

Place baseplate alignment jig with stem footing attached into position. Verify that the tops of baseplates are at the intended mounting height for either surface mount or subsurface mount as planned. Level top of baseplate alignment jig from side-to-side and front-to-back and secure with blocking prior to setting with adhesive.

Once set in place, mix two-part epoxy adhesive and pour into side of core-drilled hole with pipe stem in position. Because of short setting times, do not attempt to place stems in hole after mixed epoxy is placed in hole.

Follow manufacturer's directions for curing time.

Sign Attachment: Attach companion baseplate to top of stem footing with 3/8"–16 x 2" stainless steel button head socket cap screw and companion washer. Refer to sign assembly guidelines for baseplate-mounted signs V.JB-S and V.JB-W for instructions on sign assembly.



V.CO.SF Baseplate Attachment to Corresponding Stem Footing in Concrete Footing (A.1, B.1-2, C.1, D.1, E.1, F.1) for 5"x 5" Baseplates Only

Application: For baseplate-mounted signs that are removed on a seasonal basis, with the stem mounted in a concrete footing, and sign assembly mounted to the stem baseplate.

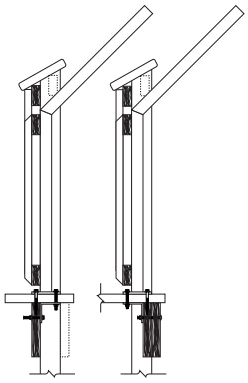
Reference: Follow all applicable instructions for setting and leveling two stem assemblies in-tandem in the section V.JB-S (Baseplate Mount with Concrete Footing and Anchor Bolts) for sign assembly and installation with the following exceptions for use of stem in lieu of anchor bolts.

Stem Assembly: For double post assemblies, attach 3/8"–16 x 8" galvanized steel bolt through stem and secure with equal length of bolt protruding on each side with double nut assembly.

Baseplate Alignment Jig: Bolt stem footing to bottom of alignment jig and insert into concrete as specified in the section I.JB-S above for attachment at grade or below grade. Prior to placing concrete in hole for footing, set the baseplate alignment jig and align with stem footing attached to verify final mounting height of baseplate to grade.

Cure Time: Allow footing to cure for at least seven days before removing alignment jig assembly and/or mounting sign uprights.

Sign Attachment: Attach companion baseplate to top of stem footing with 3/8"–16 x 2" stainless steel button head socket cap screw and companion washer. Refer to sign assembly guidelines for baseplate-mounted signs I.JB-S and I.JB-W for instructions on sign assembly.



V.TB.BP Baseplate Attachment to Wood Deck (A.1, B.1, C.1)

Application: For assembly placement on wood decks and wood walkways

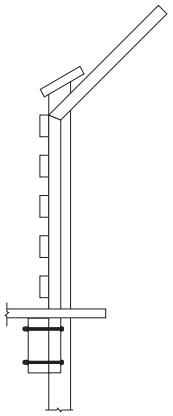
Reference: Follow all applicable instructions for setting and leveling two stem assemblies in-tandem in the section V.JB-S (Baseplate Mount with Concrete Footing and Anchor Bolts) for sign assembly and installation with the following exceptions for mounting with through bolts and bracket.

Installation: The front-facing plane of the sign post must be aligned with the front plane of the 4" x 4" post with vertical slats and rail on deck modified to accommodate insertion of reverse angle assembly.

If the furthest supporting joist is attached to the inside of the post, use two 3/8" dia. x 4" long lag screws in the front two holes of the baseplate to connect through the decking and into the center of the supporting joist, and two 3/8" dia. x 3" long hex head bolts in the back two holes through the decking and the 3-1/2" x 3-1/2" x 1/4" x 24" long “L” bracket. Also connect the “L” bracket to the supporting joist with (2) 3/8" dia. x 3" long hex head bolts at the ends of “L” bracket to distribute the load effectively.

If the furthest supporting joist is attached to the outside of the post, attach an additional 2" x 10" (or same size lumber) to the inside of the joist. Use two 3/8"dia. x 4" long lag screws in the back two holes of the baseplate to connect through the decking and into the center of the added joist. Use 3/8" dia. x 3" long hex head bolts in the front holes through the decking and the 3-1/2" x 3-1/2" x 1/4" x 24" long “L” bracket (c). Also connect the “L” bracket to the added supporting joist with (2) 3/8" dia. x 4" long carriage bolts from the outside at the ends of bracket to distribute the load effectively.

Adaptation to Local Conditions: Non conforming construction will require attachment design and engineering on a site-by-site basis to provide proper stability to finished assembly.



V.TB.TS Bolt Attachment to Deck Joist (A.1, B.1, C.4)

Application: For assembly placement on wood decks and wood walkways with outside subgrade joist for anchorage.

Reference: Follow all applicable instructions for setting and leveling two stem assemblies in-tandem in the section V.DE-T (Direct Embedment for Assemblies with Tubular Posts) for sign assembly and installation with the following exceptions for mounting into joist with through bolts.

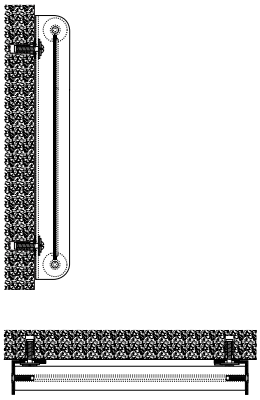
Installation: The front-facing plane of the sign post must be aligned with the front plane of the 4" x 4" upright post used to support the railing, with vertical slats and rail on deck modified to accommodate insertion of reverse angle assembly.

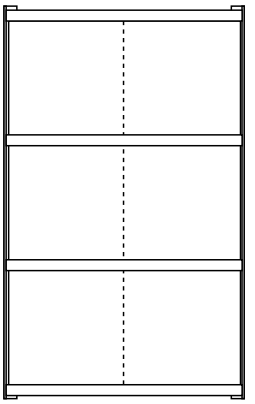
Mount tubular steel upright post to side face of deck joist with two 3/8" dia. x 8" long bolts, flat washers, and double nut. Bolts to be placed at 6" apart with bottom bolt no less than 1.5" from base of joist.

Upright to be a modified version of a C.1 type reverse angle tubular steel post that has been shortened by 24.75" based on a 2" x 10" joist (23.25" with 2" x 12" joist). Place two 7/16" dia. holes through face of post for bolt connection to joist. Drill corresponding holes in joist to receive through bolts.

If joist is less than a nominal 4" wide member, the underside of the deck should be reinforced to insure that the reverse angle display will be secure with outward pressure or weight placed on the installed assembly.

Adaptation to Local Conditions: Nonconforming construction will require attachment design and engineering on a site-by-site basis to insure that the final assembly is secure. Note that this type of mounting will require periodic inspection and adjustment of bolts because of possible shrinkage of wood to which the assembly is attached.





V.LB.WM Wall Mount on Wood or Masonry Surfaces (J.1)

Application: For small panel system assemblies that are affixed to vertical walls or buildings.

Wall Mounting Installation: Assemble the outside structure including angle frame, rail and nylon washer (without sign or core panel) to create a template for marking anchor holes on mounting surface (Alternate: Prepare separate cardboard template with wall attachment holes located). Mark and drill receiving wall and insert appropriate anchor media. Disassemble assembly and mount angles to wall surface. Reassemble sign onto attached angle brackets using hardware as specified. Fabrication drawings shown using 1/4" dia. bolts with lead anchors. Local conditions will dictate appropriate anchor material.

Sign Assembly: After side angles are securely affixed to vertical surface, mechanically attach bottom rail to 1.75" x 1.75" aluminum angle with stainless steel 1/4"-20 x 1" flathead socket head screws. Insert aluminum core panel and sign panel. Attach top rail. If assembly includes more than one rail, assemble from the bottom to the top. If assembly includes a retainer bar in lieu of full rail, mechanically attach retainer bar to core panel with 8-32 x 3/8" flathead screws.

IDENTIFICATION SIGNS

Assembly and Installation

This section includes general instructions for assembly and installation of Park and Facility Identification Signs. These include:

I.JB-D Double Post Identification Sign with Concrete Footing and Baseplate Mount
I.AB.DP Double Post with Steel Rails
I.AB.DP Double Post with Wood Rails
I.JB-M Monolithic Identification Sign with Concrete Footing and Baseplate Mount
I.AB.SC Cast Concrete Monolith
I.AB.VC Cast Concrete Monolith with Brick or Stone Veneer Exterior
I.TR.WM Wall-Mounted Identification Sign on Stone, Masonry, or Wood Surfaces
I.AB.SP Single Post Identification Sign with Hanging Panel, Concrete Footing, and Baseplate Mount

These guidelines are specific to each assembly type. Refer to the Introduction (pages 5.1-1 to 5.1-6 for general guidance on the assembly process, personal safety, installation quality, sign location, base plate mounting templates, concrete curing time, field engineering, sign mounting in sensitive natural areas or archeologically sensitive areas, existing utilities, site protection: tree and root protection and protection of archeological findings, and demolition and site cleanup.

I.AB.DP Double Post Identification Sign with Concrete Footing and Baseplate Mount

Application: Assembly and installation of double post Identification Signs with concrete footing and anchor bolts. This specification includes both assemblies with fabricated tubular steel rails (page 29) and those with fabricated wooden rails (page 30).

Reference: Fabrication drawings of this assembly are in Section 4.3, Identification Signs.

Footing Field Adjustments: If full embedment depth of footing is not possible because of subsurface obstruction or other limiting field conditions, depth of embedment may be reduced with an increase in the diameter of footing. Adjusted footing to be 4x dimension of face X 6x dimension of the return, with reduced footing being no less than 15" deep.

Baseplate Template and Bolt Location Drawing: All placement of sign post anchor J-bolts for double post sign assemblies requires the use of a plywood baseplate template for correct alignment and elevation of mounting bolts. Ideally, double post assemblies will use a single template that is one continuous board that includes both (or more as required) sets of bolt locations on a common panel to insure center-to-center distance between each post, and to insure that all of the bolts are placed at the same elevation as specified. An alternate to a single template is to use individual templates for each upright and place a wooden jig to hold each individual template over the concrete form work and set the center-to-center distance between the baseplates with tape measure and a string level. Refer to base plate mounting template overview on page 5.1-2 and the respective Sections 4.3, Identification Signs for drawings of the baseplate and mounting bolt templates.

Center-to-Center Location of Steel Uprights: Three different tubular steel uprights are specified depending on the size of the sign. These include: 3-1/2" x 3-1/2", 4" x 6", and 6" x 8" tubular section, with each having a different base plate configuration. Refer to the fabrication schedule for double post assemblies in Section 4.3 to identify the post size for the specific sign being installed and the dimensions and location of the bolt holes for each different sized baseplate. Use the following table to determine the center-to-center distance between the posts for each different size upright.

Post Size	*Formula to Determine Post Location*
3-1/2" x 3-1/2"	Width of panel + 8.5"
4" x 6"	Width of panel + 9"
6" x 8"	Width of panel + 11"

For example, if the panel is 108" wide, the post on each side will be an additional 4.5" outboard, to measure 118" center-to-center.

Footing: Using the center-to-center measurement calculated from the prior instruction, stake the location of the sign and prepare both of the footing holes with specified depth, width, and height for each. The size of each footing is specified in the Sign Size, Base and Footing Reference Charts provided in Section 4.3. Make sure to account for grade changes when necessary. If the grade is not even, the baseplate height is to be based on the lower of the two points. Use same size wood baseplate templates provided to hold "J" bolt assembly for each post. Secure with leveling nut and washer on bottom and nut and washer top. In locations with unstable soil conditions, prepare concrete forms with plywood. Backfill hole with 3" of gravel or crushed stone and cover base of footing with 8 mil polyethylene. Pour concrete to specified dimensions (see schedule, Chapter 4.3). Top of footing should be 1" above grade with 1" wash on four sides. *Double-check measurements of sign assembly to ensure correct distance between footing (center-to-center of baseplate) and that anchor bolt templates are square, level, and plumb before concrete begins to set.*

DO NOT attach posts to mounting bolts until footing has fully cured for seven days.

Double Post Identification Signs with Steel Rails

Frame Assembly: Posts are fully fabricated in the shop and arrive on site with predrilled access holes, welded baseplate, and upper and lower inboard and outboard wood blocking bolted to tubular steel.

Setting Steel Posts: Individually place each post on its respective footing and mounting "J" bolts. Baseplate sets on leveling nuts and washers that are 1" above the top of the concrete footing. Using a string level-line, verify the level between the two posts and adjust leveling nuts as required. Once the posts have been carefully lowered onto the "J" bolts and leveled, place washers and nuts on top and tighten bolts enough to allow for adjustment.

Steel Rail Attachment: Lift top rail and place on upper inboard wood blocking. Shim as necessary under rail for precise bolt connection hole alignment and attach to post with 1-1/2" stainless steel screws, lock washers, and flat washers (two each side per rail).

Secure Steel Post and Bottom Rail: Once upper rail is secured, verify that the assembly is square, plumb, and level. Then fully tighten all four hex nuts on each baseplate. Lift bottom rail and rest on lower inboard blocking and shim as necessary to align with attachment holes in steel posts. Attach to post with 1-1/2" stainless steel screws, lock washers, and flat washers. Reverify that the assembly is square, plumb, and level and all bolts tightened.

Wood Post Cover Assembly

Fabricated Post Cover Attachment: Attach front face, back face, and outside face wood members to assembly using 3" galvanized deck screws. Attach post cap to assembled post using 3" galvanized deck screws as per fabrication drawings.

Use bar clamps over full length of wood post assembly to secure alignment of edges before final assembly with deck screws. Use wood pads on clamps to keep from making indentation in soft wood post. Place deck screws 16" to 18" on center for length of each panel.

Panel Cap Attachment: Place 6" or 8" wide (width determined by size of steel post) x 1-1/2" thick cedar panel cap along top rail and align through holes with threaded grommets in steel rail. Insert stainless steel flat washer, stainless steel countersunk washer, and stainless steel flathead Phillips screw and secure (see schedule in section 4.3 for quantity and placement).

Once all bolts and screws have been sufficiently tightened, fill holes of exposed screwheads with a Minwax™ High Performance Wood Filler (or equivalent) and appropriately stain to match surfaces of panel and posts.

Panel Attachment: Place machined capture bolt assemblies (see schedule for quantity) onto upper and lower horizontal rails and tighten. Lift sign panel upward and forward and carefully align machined capture bolt assembly into keyhole slots and lower to engage on keyhole mounting plates. Once mounted, verify that the machined capture bolts have fully engaged onto the keyhole plates.

Site Restoration: Once concrete has set, backfill existing soil to grade and restore site to original condition.

Double Post Identification Signs with Wood Rails

General Instruction: Follow all instructions for Double Post Signs with Wood Rails including: *Application, Reference, Footing Field Adjustment, Baseplate Template Reference, Preassembly, Footing, Setting Steel Posts, Final Assembly Touch-up, Site Restoration.*

Differences in assembly specific to the wood rail assembly are described in the following instructions.

Frame Assembly: Steel posts are fully fabricated in the shop and arrive on site with welded steel mounting angle, welded baseplate, and upper and lower inboard and outboard wood blocking bolted to tubular steel.

Individually place each post on its respective footing and mounting "J" bolts after concrete has cured. Baseplate sets on leveling nuts and washers that are 1" above the top of the concrete footing. Using a string level-line, verify the level between the two posts and adjust leveling nuts as required. Once the posts have been carefully lowered onto the "J" bolts and leveled, place washers and nuts on top and tighten bolts enough to allow for adjustment. Lift top joist assembly (rail) and attach to mounting angle with 3-1/2" stainless steel machine screws, flat washers, and hex nuts (two each side per rail). Verify that the assembly is square,

plumb, and level and fully tighten all four hex nuts on each base plate. Lift bottom joist assembly and rest on lower inboard wood blocking, shim as necessary, and attach to mounting angle with 3-1/2" stainless steel machine screws, flat washers, and hex nuts. A final verification of the assembly being square, plumb, and level should be made and all bolts should be tightened.

Wood Post Cover Assembly

Fabricated Post Cover Attachment: Attach front face, back face and outside face wood members, to assembly using 3" galvanized deck screws. Attach post cap to assembled post using 3" galvanized deck screws as per fabrication drawings. Use bar clamps over full length of wood post assembly to secure alignment of edges before final assembly with deck screws. Use wood pads on clamps to keep from making indentation in soft wood post. Place deck screws 16" to 18" on center for length of each panel.

Plastic Reveal Cover (for assemblies with wood rails only): The interior surface of the reveal between sign panel and post is created on one side of the assembly by the steel angle used to secure the wooden joist (rail). A polyethylene panel is attached to the face of the joist on the opposite side to close visual access to the interior of the sign assembly. Attach, 3" x 3/32" x (length of steel angle) UV stable black polyethylene to joist assemblies using 1" galvanized deck screws on top and bottom (see fabrication drawing).

Panel Cap Attachment: Place 3-1/2" x 1-1/2" thick cedar panel cap along top rail. The rail cap to be the same length as the sign panel, allowing a 1" gap between the end of the panel cap and the inside of each post. Once aligned, use 2-1/2" galvanized deck screws to secure cap to upper joist assembly (see section 4.3, page 14 and drawing drawings, pages 4.3-33-38).

Once all bolts and screws have been sufficiently tightened, fill holes of exposed screwheads with a Minwax™ High Performance Wood Filler (or equivalent) and appropriately stain to match surfaces of panel and posts.

Panel Attachment: Place machined capture bolt assemblies (see reference above) on to upper and lower horizontal joist assemblies and tighten. Lift sign panel upward and forward and carefully align machined capture bolt assemblies into keyhole slots and lower to engage on keyhole mounting plates. Once mounted, verify that ALL keyhole mounting plates are fully engaged onto machined capture bolts.

I.AB.SC & I.AB.VC Monolithic Identification Sign with Concrete Footing & Baseplate Mount

Application: Assembly and installation of Identification Signs with monolithic base, concrete footing and anchor bolts, and steel interior supports. Two options for base include full cast in place monolith, or cast in place core with brick veneer and cast concrete cap, or stone veneer that is a random coursed ashlar or uncoursed mosaic.

Reference:

- Specification and fabrication drawings of this assembly are specified in Chapter 4, Section 4.3
- All cast-in-place concrete work shall follow National Park Service specifications for material and construction procedures, Section 03300
- All mortar and masonry grout work shall follow National Park Service specifications for material and construction procedures, Section 04100

Baseplate Template and Bolt Location Drawing: All placement of sign post anchor "J" bolts in the monolithic concrete base requires the use of a plywood baseplate template for correct alignment and elevation of mounting bolts. All monolith post assemblies will use a single template that includes the bolt location for each baseplate. This template is used to insure correct center-to-center distance between each post and that all of the bolts are placed at the same elevation as specified.

For full width finished cast monoliths, the anchor bolt template for sign post footing is a custom assembly of five plywood templates (9" to 10" wide, by the length of the sign panel plus 12") that has beveled sides to allow for removal from formed concrete. The five-template assembly is bolted together in sandwich format to keep it together while footing is formed.

Refer to Sections 4.3, drawings 4.3-60 to 4.3-78 , Identification Sign, for specification on the baseplate and mounting bolt templates.

Center-to-Center Location of Steel Uprights: The fabricated tubular steel uprights that are mounted on top of the cast concrete monolithic base are the same size for all monolithic assemblies. Smaller area monoliths will require two steel uprights. Large assemblies will require three and as many as six for the largest panels (140 square feet and more) as specified on page 4.3-78. The center of the baseplate for both outboard posts is placed 5" inboard of the sign panel width (10" total). For example, if the sign panel is 108" wide, the center of the baseplates of the two outboard posts will be 98" apart. If there is an additional upright, the distance to the center of the center upright from each outboard post will be half the distance or 49". If there are two interior uprights, the center-to-center distance between each of the four posts will be 32.667", or split evenly between the two outside posts.

Location of Sign: Based on the overall size of the sign base, stake the location of the sign and prepare both of the footing holes with specified depth, width, and height for each. Make sure to account for grade changes when necessary. If the grade is not even, the top of the sub-base is to be based on the lowest grade. Note that the sub-base should not be exposed.

Footing Field Adjustments: If full embedment depth of footing is not possible because of subsurface obstruction or other limiting field conditions, depth of embedment may be reduced with an increase in the area of the footing based on site specific engineering or by placing anchor pins into existing bedrock and casting sub-base around this condition.

Monolithic Base: The monolithic base consists of a sub-base, footing, and the monolithic base placed upon the sub-base as a second concrete pour. The overall base will be constructed in two steps. The first is the pouring of the sub-base and footing, with the monolithic base formed and poured one day after the first pour. The full cast in place monolithic base will have the same footprint as the sub-base. If the monolithic base is to receive a brick or stone veneer face, the overall dimensions will be 6" narrower (12" overall) and 5" shorter (10" overall).

The height of the monolithic base is based on the legend size. Refer to the sign schedule in Section 4.3, drawings 4.3-60 to 4.3-78. A summary of the height of the base is noted below:

Legend Size	*Height of Full Cast Monolithic Base*	*Height of Cast Monolithic Base for Veneer Exterior*
4"	33"	29.375"
6"	36"	32.375"
9"	24"	20.375"
12"	30"	26.375"

Sub-base and Footing: The sub-base width and depth is common to all installations (24" wide, 15" deep including 3" gravel base). The sub-base length is 12" longer than the overall length of the sign panel. Each footing will include two or three separate piers. Refer to the referenced schedule above for the size of the footing for each specific structure.

- Prepare the sub-base and footing holes. Footing holes may require forming if surrounding ground is unstable. If surrounding grade is stable, concrete can be poured against the grade.
- Form the sub-base with 2" x 12" lumber with the top of the form at the proposed sub-base grade.
- Bottom of piers and sub-base to be excavated 3" deeper than the final of concrete. Backfill sub-base and bottom of footing with "3" of course gravel or crushed stone. Cover gravel with 8 mil polyethylene sheet to create barrier between gravel and bottom of concrete and position rebar (below) in footing.

Once all forming materials are in place and gravel has been placed in the bottom of the footing and sub-base, place rebar and bent bars according to schedules. All rebar and bent bar to be No. 4 epoxy coated standard bar.

- Place two lateral lengths in the bottom of each footing 3" above gravel and 3" from each side. Length to be 6" shorter than overall length of pier footing.
- Place three bars for full length of sub-base (less 6", or 3" each end), with outside bar placed 3" from side of sub-base and third bar centered between outside bars. Place cross bars 18" on-center for full length of sub-base. Wire tie straight rebar to bent bar to complete rebar assembly.

Bent bar for full width cast in place footing

- Place four 24" x 6" x 6" bent bars in square pattern with returns all oriented to the center (3" from exterior of form) at each footing with top of bar projecting 6" above top of sub-base.
- Place two 18" x 6" x 6" bent bars 12" +/- center-to-center along the length of the sub-base with returns all oriented perpendicular to the length of the monolith (3" from exterior of form) between each footing with top of bar projecting 9" above top of sub-base.

Bent bar for narrow width cast in place footing

- Place four (4) 24" x 6" x 6" bent bars in square pattern with returns all oriented to the center (3" from exterior of form) at each footing with top of bar projecting 6" above top of sub-base.
- Place two (2) 18" x 6" x 6" bent bars 12" +/- center-to-center along the length of the sub-base with returns all oriented perpendicular to the length of the monolith (3" from exterior of form) between each footing with top of bar projecting 9" above top of sub-base.

Pour concrete into pier footing and sub-base to grade level.

Allow concrete to cure for at least 24 hours before forming and pouring finished monolithic base.

Cast Concrete for Solid Monolithic Base

After the pier and sub-base pour has cured for at least 24 hours, prepare wood form for the finished base with appropriate tiebacks to keep formwork structural once concrete is poured. The finished cast concrete base shall have the identical footprint of the sub-base, with 24" width and overall length being 12 longer than the sign panel. Determine the proper height of the base from the schedule (see Monolithic Base above and Section 4.3, pages 4.3-60 to 4.3-78).

Using traditional forming methods, form for the monolithic base over the sub-base. Form to have a smooth finish. Place 1" x 45° chamfer on all four exposed sides and around top edge.

Place additional and intermediate “v” groove with center of the groove placed a minimum of 4.25" from top of base as per drawings. Placement of “v” groove to simulate cap detail should be proportioned based on overall size of monolith.

Suspend sign post mounting bolt template assembly into formwork (see Baseplate Template and Bolt Location Drawing above and refer to Section 4.3, drawing 4.3-68) with cross braces across top of formwork to maintain level. This template will create a trough that extends the full length of the monolithic base and will insure that the mounting bolts are set at the correct height and amount of thread exposed. Note that the template includes four (4) 0.75" thick and one 0.625" thick pieces, with thinner template placed in the center of the sandwich.

Once monolithic base formwork is complete, place rebar into base of formwork. All rebar and bent bar to be No. 4 epoxy coated standard bar.

- Place three bars for full length of monolith (less 6", or 3" each end), with outside bar 3" from side of sub-base and third bar centered between outside bars. Place 18" cross bars 18" on-center for full length of sub-base. Wire tie new rebar to bent bar cast into sub-base.

Pour Concrete for Cast Monolith: Once all forms are secure, rebar assembly complete, and anchor bolts suspended from template with “J”-bolt hooks directed to center of bolt circle as shown in specification drawings, pour concrete. Make sure final pour is level and free of any defects. Tool joints as needed. Allow concrete to cure for 24 hours before formwork is removed. Remove anchor bolt template one layer at a time to prevent tearing edge of concrete.

Base plate Template: After formwork is removed, remove the continuous base plate template and cut into individual 9" square base plate templates. Place hex nuts and flat washers on each bolt. Top of flat washer to be 1.5" above concrete. Place 1.5" blocking between the four anchor bolts and place the base plate template on the anchors. Level each anchor bolt assembly and secure until post installation.

Cast Concrete Monolith for Brick or Stone Veneer Exterior

Once the pier and sub-base pour has cured for at least 24 hours, prepare wood form for the monolithic base for veneer exterior. Form base with appropriate tiebacks to keep formwork structural once concrete is poured. Place vertical dovetail anchor strips inside of formwork, with one centered on each end and a minimum of two on the sides, with one placed every 24" on-center to allow for one tie per four square foot of exterior surface (devices may vary depending on availability). The finished cast concrete base shall be 12" wide and 5" shorter than the sub-base on each end. The height of the base is 3.625" shorter than the full cast monolith to allow for placement of a stone or cast concrete cap

Determine the proper height of the base from the schedule (see Monolithic Base above and Section 4.3, page 4.3-75 to 4.3-78).

Place the sign post mounting bolt template assembly above the formwork (see Baseplate Template and Bolt Location Drawing above and refer to Section 4.3, drawing 4.3-72) with cross braces across top of formwork to maintain level. The template will insure that the mounting bolts are set at the correct height and amount of thread exposed.

Once monolithic base formwork is complete, place rebar into base of formwork. All rebar and bent bar to be No. 4 epoxy coated standard bar.

- Place three bars for full length of monolith (less 6", 3" each end), with outside bar 3" from side of sub-base and third bar centered between outside bars. Place 8" cross bars 18" on-center for full length of sub-base. Wire tie new rebar to bent bar cast into sub-base.
- Place two formed bar hoops (see drawing, page 4.3-70) inside each end of monolith form. First bar is placed 6" from end of monolith and directly under center of base plate. Second hoop to be placed 6" inboard of first hoop section. Hook hoop section under straight sections of bar at base of form. Hoop height to be 9" less than finish size of monolith.

Pour Concrete for Cast Monolith: Once all forms are secure, rebar assembly complete, and anchor bolts suspended from template as shown in specification drawings, pour concrete. Make sure that final pour is level and free of any defects. Tool joints as needed. Allow concrete to cure for 24 hours before formwork is removed.

Base plate Template: After formwork is removed, remove the continuous base plate template and cut into individual 9" square base plate templates for each bolt circle. Place hex nuts and flat washers on each bolt. Top of flat washer to be 1.5" above concrete. Place 1.5" blocking between the four anchor bolts and place the base plate template on the anchors. Level each anchor bolt assembly individually and using a string level, adjust so each template is at the same elevation and secure until post installation.

Veneer: Once concrete has cured, place galvanized or stainless steel masonry ties—1 tie per 4 square feet of veneer, staggered in alternate courses. Place selected veneer on sub-base, overhanging veneer approximately 1/4" to allow water drainage away from sub-base, and tie courses into base with masonry ties. Place weep holes 24" on center around base of veneer (above sub-base). Rear space between veneer and base concrete to be filled solid with rubble and mortar. Leave area around base plate template clear for attachment of post. Top of monolith to be 3-3/4" above top of cast concrete base with top of section being a continuation of the stone veneer that is a random coursed ashlar or uncoursed mosaic, or a cast concrete cap placed on top of brick veneer. Brick soldier course tops are not recommended because of maintenance required. Tool all top joints to allow free drainage for rainwater.

Fabricated Steel Post Assembly

Fabricated Posts: Do not install fabricated steel posts until monolith concrete has cured for seven days. Galvanized posts are fabricated with welded baseplate, mounting brackets for cross member support and Douglas Fir 2" x 6" blocking boards attached to outboard side. Orient each post in its proper location (attach 2" x 6" faces outward on each post). Center post will have mounting bracket on only one side.

Place posts on leveling nut and washer of each anchor-bolt assembly with each baseplate being 1-1/2" inches above the top of the concrete monolithic base. Place flat washer and hex nut on each bolt and finger tighten to allow for leveling adjustment as needed. Repeat this step for each post and check each for level. Once all posts have been placed and loosely secured, place predrilled 2" x 6" wood cross member across top of each post (post ends and welded support brackets) and secure into clip angles on top of posts with bolts provided.

Once cross member has been secured, preform a final level check and tighten all nuts on each of the post anchor bolts. Place acorn nut on top of each nut to secure and finish.

Wood Assembly

Panel Attachment: Place machined hex head capture bolt assemblies (see schedule for quantity) on to steel posts and tighten. Lift sign panel upward and forward and carefully align machined capture bolt assembly into keyhole slots and lower to engage on keyhole brackets. Verify that all keyhole mounting plates have fully engaged onto machined capture bolts.

Panel Cap Attachment: Place 1-1/2" thick cedar panel cap along top rail. Once aligned, use 3" galvanized deck screws to secure cap to upper cross member (see schedule for quantity and placement).

Side Cap Attachment: Place 1-1/2" thick cedar panel cap along left and right sides. Once aligned, use 3" galvanized deck screws to secure cap to 2" x 6" on each post.

Final Assembly: Once all bolts and screws have been sufficiently tightened, fill holes with a Minwax™ High Performance Wood Filler (or equivalent) and appropriately stain to match surfaces of panel and posts.

Site Restoration: Once concrete has set, backfill existing soil to grade and restore site to original condition.

I.TR.WM Wall-Mounted Identification Sign on Stone, Masonry, or Wood Surfaces

Application: Assembly and installation of routed wood identification sign panel with keyhole attachment to wall-mounted attachment plate. For drawings refer to sections 4.3-79 to 4.3-81.

Sign Fabrication and Assembly: The sign is attached to the wall surface using two .25" x 3" flat aluminum attachment plates. Each attachment plate assembly includes the machined capture bolts and 0.5" diameter holes for connection to wall-mounted anchor bolts. The sign and attachment plates will be fabricated as a complete assembly with machined capture bolts attached. Each sign panel includes keyhole mounting plates in the back of the sign that corresponds directly with the machined capture bolts on the attachment plate.

Sign Location: When determining the location of the sign, it is recommended that the sign or a cardboard panel of the same size be placed at the location to affirm that the mounting height is appropriate when viewed from the predominant approach. When placing signs on buildings, it may be possible to align sign to dominant details of the facade architecture to augment the visual relationship of the sign to the building.

Attachment Plate Assembly: If not assembled, attach machined capture bolts with 3/8" flathead screws from back of attachment plate. To secure, place Lock-tight or similar product on bolt prior to assembly to prevent assembly from becoming loose.

Mounting in Masonry or Stone Work (Solid Base Material): Identify precise mounting location of panel on wall. Place top horizontal attachment plate with the top of the plate placed 4-1/2" below the proposed top of the sign panel. Using the mounting holes provided in the attachment plate, mark hole location. Drill 15/32" holes with minimum embedment depth of 2-1/2", with 3-1/2" being preferred. Holes to be placed 24" on center. If drilling conditions are not possible in one location, use one of the alternate mounting holes placed 6" on center on the attachment bar. Overall number of attachment points must equal a minimum of one for every 24" of sign width.

Mounting on Stone Surfaces (Solid Base Materials): Insert 3/8"-16 x 6" stainless threaded rod into each hole and permanently affix with HILTI HVU Adhesive Capsule. Once the catalytic adhesive is set, place specified thin hex nuts and washers on each threaded rod. Set attachment plate on rods and adjust leveling nuts until the bar is flat across the mounting surface. The hex nuts are designed to evenly secure the attachment plate on uneven stone surfaces.

Mounting on Wood Structures (Alternate): Local conditions may dictate another method to secure attachment bars. Where possible, anchor attachment bars into structural lumber

(studs) with 3/8" lag bolt with length of bolt to allow for 2" embedment into solid material. Pre-drill 5/16" hole to reduce splitting when attaching lag bolts. Other methods for attachment are appropriate if attachment to solid material is not possible.

Mounting on Brick Surfaces (Alternate): Anchor systems will vary depending on mounting surface. For clay brick and brick with voids, use HILTI, HIT HY20 System with screen tube insert. Actual screen tube, adhesive cartridge size and recommended embedment depth will depend on actual base material. Refer to HILTI HIT HY20 System Adhesive Anchors on the HILTI web site or in Sweets Catalog (Section 03150).

Mount Second Attachment Plate: On the back of the sign panel, measure the distance from the bottom of the upper row of keyhole plates to the bottom of the lower row of keyhole plates. Based on that measurement, measure from the top of the upper bar to the top of the lower bar and mark holes for attachment. Repeat mounting instructions (above) for lower attachment bar.

Align Attachment Plate: For walls that are not even, hang a plumb bob or carpenter's level to check and adjust alignment using hex nuts behind the alignment plates as leveling nuts. Place the attachment plates as close as possible to the surface of the wall. Once vertically aligned to each other, attach front washer and thin hex nut to each threaded rod, tighten, and cut off the excess rod flush to the top of the hex nut.

Mount Sign Panel: Lift sign panel upward and forward, carefully align panel onto machined capture bolts, and lower to engage panel onto attachment bars. Verify that all keyhole brackets have fully engaged into machined capture bolts.

I.AB.SP Single Post Identification Sign with Hanging Panel, Concrete Footing and Baseplate Mount

Application: Mounting of single post, flag-mounted panel with timber upright and cross bar, routed wood panel, concrete footing, and steel base plate.

PreAssembly: All component parts of the flag-mounted panel have been milled and contain the specified bolt connection holes to install assembly. Prior to shipping, the sign has been preassembled and disassembled at manufacturer to ensure proper fit. Environment may cause the materials to swell and make for a more difficult field assembly. A simple preassembly of the two timbers (main upright and cross member) is recommend to ensure ease of installation once the upright has been placed. The proper procedure is to place blocking on each end under the main upright on level grade with mortise parallel to the ground. Carefully guide the tenon end of the cross member into the mortise of the main upright. It should not be forced but inserted with a snug fit. If the fit is too tight, use a hand plane to remove appropriate material to allow for a smooth fit. This step is very important because it will ease engaging the cross member once the vertical upright has been installed onto the baseplate. After the mortise and tenon joint has been tuned, remove the cross member and place aside until vertical upright has been installed. The upper connection point of the steel bracket should be attached at the top of the vertical upright using the 3/8" bolt and secured with flat washer and hex nut.

Footing: Footing location to be determined based on good sight lines and existing site conditions. Once installation location has been determined, stake the site and prepare 51" deep x 24" x 24" footing hole as specified. Place a minimum of three inches of gravel or crushed stone at base of footing hole and cover gravel with 8 mil polyethylene sheet prior to filling with concrete.

Anchor Bolts and Mounting Template: Place hex nut and flat washer on each anchor bolt with thread exposed 3-1/2". Using plywood “J”-bolt template provided, secure bolts to template with flat washer and hex bolt. Anchor bolt return to be directed to the center of the footing. Brace the template 1-1/2" above the top of footing finished grade. Pour concrete. Top of footing to have 1" wash on four sides with 1.5" finished gap between the bottom of the baseplate template and the top of the footing.

Concrete to cure seven days before mounting welded steel base plate and vertical post.

Vertical Upright: Remove top nut and washer from mounting template (bottom washer and nut to remain) and place steel base plate on “J” bolts. Using nuts to level, adjust to insure that the baseplate is absolutely level from left to right and front to back. Once level, remove the baseplate and bolt to the bottom of the vertical upright. Verify that the through hole

alignment (the holes are offset) and the mortise are oriented correctly to insure the proper position of the sign once installed. Lift vertical upright with base and steel bracket attached. Carefully lower onto the "J" bolts. Secure base plate with flat washers and nut (finger tight) and affirm post is level. Adjust using nuts on the bottom of the baseplate as required. Once straight, tighten all four hex nuts. Use acorn nuts on each bolt to lock into place.

Horizontal Cross Member: Once the vertical upright has been seated, leveled, and secured, the horizontal cross member shall be installed. Carefully lift the cross member and guide the tenon into the mortise. Once the tenon is fully engaged and the through holes are aligned properly, insert the 1/2" through bolts with flat washers and secure with flat washers and hex nuts on opposite side. (Note: Do not attach top steel bracket at this time. It is secured using the "J" bolt hardware from the sign panel)

Face Boards: Once the cross member has been secured, place 1-1/2" thick chamfered face boards on front and back sides of the tenon and secure with 3" galvanized deck screws. Pre-drill face boards using 3/16" drill. Countersink screws and fill will exterior grade wood filler.

Sign Panel: Align through holes on outboard end of cross member and steel bracket. Clamp (bar or large "C" type clamp) the bracket to the cross member to allow for easier installation of the "J" bolt. The sign panel is fully fabricated in the shop and arrives on site with 5/8" eye bolt installed. Insert "J" bolt through hole closest to mortise. The "J" should be parallel with the cross member and facing the mortise. Attach flat washer and hex nut on top of cross member and tighten to allow the eye bolt in the sign panel to be hooked onto the "J" bolt. Tighten the assembly leaving it loose enough to allow for adjustment of the sign. With the interior "J" bolt attached, now lift the opposite side of the sign, hook the "J" bolt to the eye bolt with the same orientation as the interior. Slide the "J" bolt into the through hole and through the steel bracket. Place flat washer and hex nut on "J" bolt. Make sure that both of the "J" bolts are oriented parallel to the cross member and tighten. Place acorn nuts on each of the bolts to finish the assembly and secure.

Site Restoration: Backfill existing soil to grade and restore site to original condition.

MOTORIST GUIDANCE: ROAD GUIDE, TRAILBLAZER/BOUNDARY SIGNS

Assembly and Installation

This section includes general instructions for assembly and installation of Road Guide and Trailblazer and Boundary Signs. These include:

- M.DE-C Road Guide Signs with Direct Embedment with Concrete
- M.DE-E Trailblazer/Boundary Signs with Direct Embedment with Earth

These guidelines are specific to each assembly type. Refer to the Introduction (pages 5.1-1 to 5.1-6 for general guidance on the assembly process, personal safety, installation quality, sign location, field engineering, sign mounting in sensitive natural areas or archeologically sensitive areas, existing utilities, site protection: tree and root protection, protection of archeological findings, and demolition and site clean-up.

ROAD GUIDE SIGNS

M.DE-C Road Guide Signs with Direct Embedment with Concrete Footing

Applications: This section includes installation instructions for Road Guide Signs. There are two different assembly configurations. All Road Guide Signs have timber uprights with aluminum angle rails. The aluminum angle rail attaches to an aluminum angle that is adhered to an Alumalite®structural panel.

PreAssembly: All Alumalite® panels will be supplied with aluminum angles adhered on panel back. DO NOT bolt through the sign panel or break the surface of the reflective sheeting graphics.

All completed sign post assemblies must be predrilled in the shop prior to shipment to check alignment and ensure proper fit once installed. Of critical importance is that the holes in the matching 3" face of the aluminum angle align precisely.

Panel, Post, and Footing Size Reference Charts

Each Road Guide Sign is unique in that the size is based on the legend size (4", 6", 8"), the length of the longest legend line on a sign panel and overall height of the sign layout based on the standard grid formats (RG1 to RG-11). For post location, post size, and footing size refer to the two diagrams displayed for each legend size based on the legend size, and the size of the sign panel in Chapter 4, Section 4.4: Road Guide Sign Assembly Reference Diagram and Road Guide Sign Rail and Post Location Diagram.

Select the correct specification based on height and width of panel not to exceed the value shown in the chart. For example, if the sign has a 6" primary legend, and the panel is 140’ wide and 43" tall, the correct assembly reference is 144" wide by 48" tall. Based on this size, the components of this sign assembly will be:

- Alumalite® panel with one vertically aligned butt joint to create 140" continuous sheet
- two aluminum angles are factory installed with high bond adhesive along a horizontal line placed 3.75" inboard from top and bottom of panel.
- three 4" x 8" posts with the outboard posts set 24" from the left and right sides of the panel, and one in the middle, with aluminum angles attached to match-plate angles on back of Alumalite panel
- a footing of 18" x 18" by 4'-0"

If post and panels are assembled separately, holes are to be placed in uprights and in aluminum angle attached to upright based on dimensions show in the above charts. However, all drilling and alignments must be verified in the shop prior to assembly to eliminate any requirement for field fitting an assembly that will not align.

Installation

Footing: Prepare hole for post embedment to size specified in the above charts for sign footing.

Assembly: If it is possible for a crew to lift an entirely assembled Road Guide Sign, the assembly may be fully assembled with panel attached to legs when installed.

Larger Road Guide Signs shall be assembled in pieces with timber uprights inserted in footing hole and braced in a upright position and assembled.

Subgrade Coating: Prior to embedment, apply heavy coat of roofing cement to all embedded timber surfaces from bottom of post to 2" above concrete wash (above grade level).

Installation: Place gravel in bottom 3" of 48" deep hole for initial leveling. Refer to the size charts for footing cross section dimensions. Wider installations will require more than two uprights as noted in the specifications.

Place sign assembly in hole and level sign with gravel. Temporarily brace uprights into position level and plumb. Bolt attach aluminum angles to uprights with 1/2" carriage bolts inserted from the back of the upright and secured with washer and hex nut on2" inch face of aluminum angle. The 3" face of the aluminum angle to project above the bolt acts as a shelf to receive the matching angle factory mounted to to the back of the Alumalite panel. Level posts and cross members and temporarily secure assembly with cross braces. Cover post to protect from concrete splatter before backfilling. Backfill hole with poured-in-place concrete footing. Finish top of concrete at grade with 1" wash on four sides. Once concrete has cured for seven days, sign panel can be attached.

Sign Panel Assembly: Attach aluminum angle to back of sign panel with specified high bond adhesive and secure with sheet metal screws until adhesive has cured. Attach with the 3" face in the factory as specified in Section 4.4 for correct attachment to matching angle mounted to post. Before mounting, verify that the angle matches the holes in the companion angle placed on the sign uprights. Do not over-tighten hardware to prevent damage to sign panel.

Most assemblies have two sets of angles, one top and bottom. Larger assemblies will include a middle angle. The number of angles is based on wind load and width of panel.

Final Installation: To erect sign face, place aluminum angles attached to sign panel onto aluminum angles attached to timber uprights. Secure panel until at least four 3/8" bolts have been placed in connecting matching holes. Once aligned, bolt the matching plates together with additional bolts, washers and lock washers placed every 24" on center over length of angle assembly.

Whenever possible, the panel should be erected using a bridle attached to the boom of a front-

end loader to make the attachment easier to manage and more secure.

Field Adjustments: If full embedment is not possible because of subsurface obstruction or other limiting field conditions, depth of embedment may be reduced (and post shortened) and with an increase in the diameter of footing. Adjusted footing to be 4x dimension of face by 6x dimension of the return, with reduced footing being no less than 24" deep.

Nonstandard Conditions: All conditions which exceed the panel size, height above grade level for one or both posts, frost depth, or soil compaction are to be engineered on a site specific basis.

Site Restoration: Once concrete has set, remove any bracing and restore site to original condition.

Old Sign Removal: Remove ground-mounted sign that is being replaced from the job site and dispose or recycle it as directed by the Contract Officer. Fill any existing holes to grade with minimal disturbance to surrounding plant materials and site.

TRAIL BLAZER/BOUNDARY SIGNS

M.DE-E Trailblazer/Boundary Signs with Direct Embedment with Earth

Assembly and Installation

Applications: This section includes installation instructions for Trailblazer and Boundary Signs that are directly embedded into the ground. The assembly includes both single and double post configurations, with double post used for panel widths of 40" to 56". For specifications on size of posts for each size panel, refer to the *Trailblazer Sign Assembly Reference Diagram* in Section 4.4 based on size of primary sign legend.

Assembly Overview: Sign panel is fabricated from a lightweight polyallomer and aluminum composite panel material with aluminum angle mounting brackets bonded to the back face of the panel. The mounting brackets are mounted to treated timber posts. The timber posts are directly embedded in the ground. Sign panel and aluminum angle mounting brackets are provided from the manufacturer fully fabricated with all mounting holes predrilled for assembly. Treated post is procured locally and drilled for connection to aluminum angle mounting brackets using holes provided in the mounting brackets. Refer to Section 4.4, page 4.4-13 for specifications on length of Treated Douglas Fir posts.

Sign location: Refer to Section 3.4, *Sign Use By Sign Type* guidelines on general placement or motorist viewing for Trailblazer and Boundary Signs. Sign to be mounted with at least 12' setback from the road fog line. In urban placements, sign should be placed at least 16" outside of the curb line to prevent damage from passing trucks and buses.

Assembly:
Panel & Bracket Attachment: Attach angle brackets to back of sign panel using high bond adhesive.

Chamfer and Drill Post: Cut top of post on an 1" over 4" angle. Chamfer to slope away from the back of sign panel in final assembly.

Mounting Holes: Place 7/16" holes through post from side to side for attachment of sign bracket to post. Use predrilled sign bracket as a drilling template. Top of bracket to be placed 1" from the top of the front of the post.

Bracket & Post: Slip panel over 3-1/2" wide post and bolt with 1/4"-20 bolts, placing washer on both sides. Secure with lock nut. Assembly is common for double post signs.

Stabilizer Blade Attachment: Place three 5/8" holes in bottom of post for attachment of 1/4" galvanized steel plate stabilizer blade using 42" stabilizer blade as a drilling template. The bottom of the post and bottom of the stabilizer blade will be flush. The size of the stabilizer blade for each respective installation is noted in the charts referenced above. Bolt stabilizer blade with 1/2" galvanized hex bolts, placing a flat washer on the bolt head, two washers between blade and treated post, and one on the nut.

Installation

Footing: Prepare 48" hole for post embedment. Place 3" of gravel in base of hole to reduce moisture at end of treated post.

Subgrade Coating: Prior to embedment, apply heavy coat of bituminous roofing cement to all embedded timber surfaces from bottom of post to 2" above concrete wash.

Installation: Place gravel in bottom 3" of 48"-deep hole for initial leveling. Place sign assembly in hole and level. Double post assemblies may need adjustment to insure that assembly is level and upright before backfilling holes. Backfill with existing earth. Fill in 6" lifts and backfill each lift to 95% compaction. Repeat until process is complete.

Old Sign Removal and Site Restoration: If the NPS Trailblazer is replacing an existing guide sign placed by the NPS or another jurisdiction, remove the existing sign to minimize sign clutter.

TRAFFIC REGULATORY SIGNS

Assembly and Installation

This section includes assembly and installation instructions for Traffic Regulatory Signs that are directly embedded into the ground. The assembly includes the option for either tubular steel or wood post configurations. The panel's aluminum plate is fabricated with retroreflective legends or finished HDO plywood with retroreflective legends. Use of same size HDO plywood backing placed between aluminum sign panel and post is optional. Instructions include:

T.DE-E Traffic Regulatory Signs with Direct Embedment with Earth (steel or wood)

Reference: Location and mounting height of Traffic Regulatory Signs to be mounted in compliance with the *FHWA Manual on Uniform Traffic Control Devices*.

These guidelines are specific for each assembly type. Refer to the Introduction (pages 5.1-1 to 5.1-6 for general guidance on the assembly process, personal safety, installation quality, sign location, field engineering, sign mounting in sensitive natural areas or archeologically sensitive areas, existing utilities, site protection: tree and root protection, protection of archeological findings, and demolition and site clean-up.

TRAFFIC REGULATORY

T.DE.TS or T.DE.WO Traffic Regulatory Signs (steel or wood) with Direct Embedment in Earth

Assembly and Installation

Preassemblies: All completed sign panel and post assemblies must be predrilled and assembled in the shop to eliminate the need for field fitting and to insure proper fit once installed. Panels manufactured as separate units shall be predrilled with the corresponding holes placed in posts prior to installation.

Wood Backing Panel: Use of a painted HDO plywood backing panel placed between the Traffic Regulatory Sign and the aluminum sign panel is optional. Backing panel to be flush with sign panel. This panel will stiffen the assembly and reduce a potential safety hazard that sharp aluminum panels may present in congested locations. The back of the plywood panel can be painted to create a more finished installation.

Panel and post assembly: Fasten sign panel to post with 1/4" stainless steel truss head bolts. Secure connection with Tuff-nut brand vandal resistant nut or its equivalent. Cut exposed thread to reveal 4-5 threads and cover exposed thread with 1/4–20 acorn nut to finish.

Wood Post: Cut top of post on an 1":3.5" angle. Chamfer to slope away from back of sign panel in final assembly. Drill post for connection of sign panel using existing holes in sign panel as a template. Top of chamfered post to be 1" below top of sign panel.

Steel Post: Drill post for connection of sign panel using existing holes in sign panel as a template. Top of post to be 1" below top of sign panel.

Protective Coating: Apply a heavy coat of bituminous roofing cement to all surfaces of wood and steel posts placed below grade and extending 2" above grade level to minimize surface deterioration.

Footing Size: Insert sign legs in 10" x 10" x 36" hole.

Embedment: Mount sign level and plumb. Use existing material removed to backfill hole in 6" lifts tamped to 95% compaction (Sign assembly may be installed with concrete as required by local conditions).

Site Restoration & Panel Attachment: Backfill existing soil to grade and restore site to original condition. Attach panels (front and back) to assembly.

Shallow Footing: If subgrade site conditions (rocks) limit depth of footing, post length may be reduced, and the hole backfilled with cement mix. Depth of hole to be no less than four times largest dimension of post, and six times the width, with a minimum depth of 15" regardless. Protect steel frame to prevent concrete splatter from staining post.

Old Sign Removal and Site Restoration: Remove all existing traffic signs that are being replaced. Remove the signs from the site and dispose or recycle them as directed by the UniGuide Manager. Backfill the location to existing grade with minimal disturbance to surrounding plant materials and site.

Chapter 5

Field Manual

Section 5.2

Sign Inspection, Maintenance & Repair

Final Draft: *June 1, 2002*

Table of Contents Section 5.2

SIGN MAINTENANCE AND REPAIR

Introduction:

This guideline describes the basic procedures required for proper maintenance of the signs included in the NPS UniGuide Program.

The principal goals of good maintenance is making sure that an existing sign is well maintained and that the content is accurate and up- to- date. This means that:

- Missing, broken, or degraded signs are identified in a timely manner
- Repairs are made without delay
- Unnecessary, or out- of- date signs are updated or removed
- New signs are added as needed in a coordinated effort to provide needed information while controlling an unnecessary proliferation of signs

Diligent, planned sign maintenance is a necessary component for the NPS UniGuide Program implementation and management. If maintained correctly, signs will last longer and overall program costs will be reduced, thus protecting the overall investment in the system. Furthermore, each sign is placed for a specific purpose. When a traffic or safety sign is missing or damaged, there is an increased potential for an accident and liability. Broken and noticeably weathered signs dilute the effect of the other signs in the system. Where vandalism is prevalent, the presence of one vandalized sign acts as an inducement for other incidents of vandalism to occur. Equally important, the effect of the collective system of signs will help visitors wayfind and use the park more effectively with less impact on the land. With dedicated management of the park UniGuide Plan, indiscriminate postings will be eliminated, content of all signs will be kept accurate and up to date, and damaged and worn signs will be replaced in a timely fashion. A well- maintained system will reflect positively on the overall image of park staff and the National Park Service.

The NPS UniGuide Program Standards have been designed and organized as a comprehensive system that is efficient to maintain and repair. Specific attributes of the system design that will reduce maintenance and life-cycle costs include: component parts are strong, durable, and easy to replace. Sign panel materials have been specified based on durability and overall visual quality. Production of all replacement sign faces can be manufactured directly from existing computer files maintained with the park's UniGuide Plan, eliminating the need for field measurement or preparation of new artwork. Once all signs have been documented in plans, scheduled maintenance inspection becomes a very efficient process. With the overall Visitor Information System based on sound principles of wayfinding and information design, all postings for visitors will become more timely, comprehensive, and consistent.

How To Use This Section

This is a guide to good sign maintenance practices. It includes guidelines for inspection, record keeping, repairing, refurbishing, cleaning, and replacing signs. The front part of the section describes maintenance procedures, including preparation of the UniGuide Inspection Field Report. The back part of the section outlines specific maintenance tasks and, where appropriate, some of the maintenance methods described in step-by-step procedures. A list of recommended tools, supplies, and suggested documentation for inspection and maintenance records are included.

Using this section as a guideline, the Park UniGuide Manager, working in conjunction with the park maintenance staff, can establish procedures for inspection and maintenance of signs. Working with the managers of campgrounds, trails, interpretive programs, and resource managers, the Park UniGuide Manager can make sure that the content of all signing is accurate, inclusive of information from various program interests, and updated as seasons and procedures for visitor management evolve.

By institutionalizing procedures for sign maintenance that take advantage of the UniGuide procurement and service contracts, the park will increase the effectiveness of all posted information for wayfinding and visitor information, and project management will become more cost efficient.

Sign Condition and Information Content Survey

Spring and Fall Inspection: The Park UniGuide Manager should conduct a comprehensive, inspection of all signs twice a year. Good maintenance practice suggests that, at minimum, all signs in the park (other than wilderness trail signs) should be inspected both before and after the primary visitor season. Locations such as campgrounds that are exposed to heavy use or frequent incidences of vandalism and locations where weather conditions are extreme may require inspections on a more frequent basis. Critical safety signs, trail condition warnings, and public health warnings should be inspected more frequently if subject to vandalism.

Daily Inspection: Because rangers and maintenance personnel are in the campgrounds, picnic areas, and other heavily used areas on a daily basis, they should be trained to report damaged signs when first noticed to allow prompt repair or replacement. All repairs, upgrades, replacements and additions should be documented on the UniGuide Inspection Field Report and submitted to the Park UniGuide Manager, who will coordinate whatever action is required to rectify the problems.

Scheduled Inspection Survey, Work Orders, and Record Keeping: In the twice-a-year inspection, it is recommended that the Park UniGuide Manager survey all park signs using the park's UniGuide Sign Schedule (a list of all signs by type, area, and age of installation),

and Sign Location Plan for reference. This inspection will include a careful review of the sign content (see sections in Chapter 3 on evaluation, and text writing and legend development), as well as the physical condition of all signs. If a sign is missing or damaged, the problem should be reported for immediate replacement or repair.

Until the Park's UniGuide Plan is implemented parkwide, the plan will include noncompliant signs until they are gradually phased out. The time required for a parkwide survey will vary depending on the size of the park. Based on experience, the time required to survey a large western park like Yosemite is between 48 and 60 hours. An inspection of signs at Grand Canyon would take between 30 and 36 hours, and a small park like Wind Cave could be surveyed in less than 8 hours. Surveys are generally more effective when one person takes full responsibility for all record keeping. If a survey team includes two people, the assignment of labor should be delegated to ensure that all maintenance or content problems are fully recorded at the time the inspection is made.

Document Inspection on Sign Plan: It is recommended that the field review be done manually on a printed copy of the park's UniGuide Sign Schedule and transferred to the digital fill once the survey is complete. Because the field survey may not be lineal as the signs are listed in the sign schedule, it is generally easier to work from the paper copy than entering the data directly in the field.

Each inspection should be noted in the space provided on the UniGuide Sign Schedule of the parkwide UniGuide Plan. These notations provide ways to:

- track problem installations and upgrade accordingly
- know the life of all installations and track the overall maintenance costs for the system
- schedule repairs by area
- provide documentation of a diligent and well-planned management plan should a sign placement be questioned as part of an accident or claim against the park

A significant advantage of the UniGuide Program is that it is tied by e-mail to a master contractor that can provide parts and panels on a quick-ship basis, making upgrades, repairs and replacements convenient for all parks. It also helps ensure that no critical safety sign is missing for an extended period.

All changes that result from the maintenance survey should be incorporated into the Park's Uniguide plan documents.

UniGuide Inspection Field Report

A UniGuide Inspection Field Report is to be used by the Park UniGuide Manager and maintenance personnel to identify signs needing repairs or revisions. This Field Report is to be used for both scheduled maintenance surveys and as part of daily inspections. From this

review, maintenance work will be scheduled, and or existing conditions evaluated based on changes in operations. Repair work should be scheduled with the highest priority given to requirements of critical safety signs. Replacement signs, posts, and hardware will be ordered as needed from the UniGuide fabrication contract unless these materials are stocked by the park maintenance shop.

It is imperative that damaged signs be reported as soon as possible so the maintenance work can be scheduled and completed in a timely manner.

A suggested version of the proposed UniGuide Inspection Field Report is attached. As the program is institutionalized and linked to sign planning software, the design of this form will evolve. This form is designed to help track the incidence and location of various types of repairs. It also serves as a primary defense in negligence claims, because it provides sound documentation for a well-managed wayfinding, visitor information, and safety sign program. Finally, this form can be used to track costs of labor and materials.

Instructions: The following information should be included in the report.

1) Plan ID Number: Identify if known. If not known, describe sign type and placement location so that information can be filled in by the Park Sign Manager when the sheet is returned.
2) Location: Identify location of sign by area or road name.
3) Date: Enter the date of report.
4) Description of problem: As shown, provide a brief but thorough description of the problem so that an accurate repair or replacement order can be prepared. Where appropriate, take a photo of the problem area for reference. Photos should include a reference number to eliminate confusion between problems.
5) Recommended action: Provide a general description of the work needed to repair or replace the sign, and check the appropriate boxes.
6) Special or nonstandard conditions: Describe any condition that will affect the repair.

The bottom half of this report becomes the work order that will be used to plan and track the repair from start to completion. This includes a description of the work to be done as interpreted from the field report, as well as the actual labor, materials, and equipment required to complete the job. Note that the sign number will become the requisition number.

Instructions: The following information will be entered by the Park Sign Manager or sign shop personnel in the process of planning and scheduling a sign repair or upgrade.

1) Planning/Design: Identify all appropriate information. If a sign is repaired or added, attach the sign layout sheet and all related documentation.
2) Materials: Prior to scheduling a repair order, identify all materials required for the repair. If items are ordered, note expected availability to aid scheduling of field work.
3) Repair location: Enter schedule for repair and location as needed.
4) Labor and Equipment: Note personnel and equipment requests for the same repair.
5) Plan Update: To complete the project, incorporate all changes in the park's UniGuide Plan documents.

Sign Program Record Keeping

Record keeping is an important aspect of sign maintenance and program management. The sign maintenance records can be used to measure the frequency of various types of repairs and the location of problems so that planning and management functions can be balanced accordingly. Dates of installation should be noted on the Sign Schedule to allow the tracking of sign life and replacement schedules.

*Uni***Guide** Inspection Field Report

Survey by:

Sign No. Location Date

Description of problem

Photo record

Recommended action:

__ Wash Sign
__ Remove Graffiti
__ Repair Sign Face
__ Repair Sign Panel
__ Repair Sign Mount
__ Repair Sign Frame
__ Remove Sign
__ Replace Sign Panel (new legend)
__ Replace Sign Panel (same legend)
__ Upgrade Site

Special or non-standard conditions

*Uni***Guide**
Program Manager Review

Date

Planning / Design

New Panel / Plan	Text / Legend	Illustration	Repro Artwork
Revise Existing / Plan	Text / Legend	Illustration	Repro Artwork
Other / Impact			

Materials

Post(s)	Order / Stock (circle)	Availability (date)	Cost
Rail(s)	Order / Stock (circle)	Availability (date)	Cost
Hardware	Order / Stock (circle)	Availability (date)	Cost
Panel	Order / Stock (circle)	Availability (date)	Cost
Other (describe)	Order / Stock (circle)	Availability (date)	Cost

Repair Location
___ Field Repair
___ Sign Shop Repair

Removal (date)	Repair (date)	Re-Install (date)	Cost

Notes:

Labor & Equipment

Personnel		Date	Cost
Special Equipment		Date	Cost

*Uni***Guide Plan Update**

Inspection of work (date)	Sign Location Plan (date)	Sign Schedule (date)	Sign Layout Sheet (date)

Notes:

Materials Required for Surveys

For inspections, use dated copies of these Uniguide Sign Plan documents:

- UniGuide Sign Schedule (sorted by location code)
- UniGuide Plan Location Drawings (Use copies that can be marked up with field notes. Reduced size prints are generally easier to use than large size prints)
- UniGuide Inspection Field Report (copies in tablet form)
- Catalog of standard Visitor Information System panels for numerical reference

The logistics of sign inspections in the field can be cumbersome. In the process of inspecting each sign and evaluating the physical condition as well as the content, the surveyor must juggle the site plan and Sign Schedule while filling out the UniGuide Inspection Field Report. The most convenient procedure is to sort the Sign Schedule by location code to allow complete review of an area or road corridor in a lineal fashion. This minimizes the need to cross-reference various documents. If the sign is in good order, check it off on the Sign Schedule by placing the date of the inspection adjacent to the sign number.

Inspection Criteria

The Park UniGuide Manager should inspect the condition of each sign. Glance inspections from a vehicle are not adequate. If a sign is damaged or deteriorated, missing connection hardware, or defaced or broken in any way, the surveyor should photograph the sign and document what is required to rectify the problem on the UniGuide Inspection Field Report. Where possible, note all required parts and tools needed to aid the maintenance staff in planning their work.

In the process of preparing a maintenance inspection, the Park UniGuide Manager should evaluate whether each respective sign is still needed, if the legend is correct, and if the sign is appropriate for the location. Any questions should be noted on the UniGuide Inspection Field Report for review with the appropriate program manager in the park, and possible upgrade.

The following is a list of review items for use during sign inspections.

Plan Validation:

- Cross-check location drawing with Sign Schedule and affirm with notations on both documents.

Mounting:

- Uprights are straight and plumb
- Posts are not loose or rotated
- Posts are not damaged
- Wall mountings are secure
- Wood Identification Sign posts are stained and sealed
- Wood Motorist Guidance Sign posts are not rotten at base or splitting along bolt lines

Hardware and Joints:

- Bolts, top caps, plugs, and attachments are secure

Sign Panel: Substrate

- Wood sign panels are stained and weather sealed
- Aluminum guide sign panels are flat and undamaged
- Backs of aluminum guide sign panels are painted

Sign Faces:

- Edges of reflective sheeting are tight to panel
- Applied letters are not missing or broken
- Routed letters on wood signs are paint- sealed
- Painted wood sign faces are clean, devoid of chalking or mildew, paint is in good condition.
- Visitor Information System panel legends are readable and look fresh
- Visitor Information System panel color is bright and unfaded
- Visitor Information System panel is clean and free of stains or markings
- Visitor Information System panel surface is not scratched, crazed, delaminating or chalking

General :

- Note any other damage from vandalism or normal deterioration
- Adjacent vegetation is not adversely affecting view or material
- Surrounding site conditions are in good order
- Soil and grade around sign base are in good order

As the system is fully implemented throughout a park, there will be a need to insure compliance and discourage placement of nonstandard signs. Signs that do not comply should be recorded and reviewed for possible replacement with compliant sign, or should be identified for removal.

Compliance:

- Verify that the sign complies with UniGuide Program Standards.

Vandalism

The problem of vandalism cannot be overlooked in a sign maintenance program. Defacement and destruction of signs will occur throughout a park. Vandalism ranges from defacement of panels and forcible damage to structures to theft. To combat vandalism, repair or replace damaged signs immediately. Vandal damage is infectious and can be thwarted by diligent attention to problem areas.

Materials and assembly methods specified in this system were selected because they are generally vandal-resistant. For example, most attachments are concealed and materials are stiff and durable. It is however possible to damage sign faces regardless of the material. Depending on the amount of damage, wood sign faces can be restained, porcelain panels can be touche up with enamel until they are replaced, and retroreflective faces can be patched or reskinned. If a sign is beyond repair, patch the sign as best possible and order a new replacement panel based on the computer plan on file.

Park maintenance personnel should be advised to report any damaged signs as they are identified so that they can be repaired in a timely manner. Make repairs in a professional manner. Make sure that all finishes are properly masked and applied. Improper or sloppy maintenance can destroy a sign just as easily as vandalism or no maintenance at all.

General Maintenance Procedures

The following are general maintenance procedures for each of the various materials, coatings, and graphic applications used within the NPS UniGuide Program. These include: aluminum signs with retroreflective or adhesive vinyl sign faces, porcelain enamel panels, fiberglass embedment panels, high- pressure laminate panels, and routed wood signs. Most tasks can be completed with common hand tools. To make these procedures easier, maintenance personnel should prepare a simple sign maintenance kit of tools and repair materials that can be easily transported to the site to help expedite routine maintenance operations.

Repair or Replace: First, determine if the sign is in satisfactory condition or should be repaired or replaced. This is usually a field judgment. More often than not, it is cheaper to replace a badly damaged sign than to make extensive repairs. Compare the repair and labor-hour costs with a new sign cost and service life when deciding whether to repair or replace a sign. If the problem is too severe, and the sign cannot be repaired in a cost -efficient manner, then it should be replaced. Replacement in-kind can be conveniently ordered using the sign location number. The graphic production files of the layout and material specifications for that particular sign will be on file with the NPS UniGuide Contractor.

You may need to consult with the manufacturers of the signs or sign materials to learn of the most efficient way to perform a specific repair or solve a maintenance problem not described in this section.

Grounds Maintenance

Tree branches, shrubs, weeds, and brush around the mounting should be removed to insure that there are unobstructed sight lines to the sign and that it is clearly legible to the approaching viewer. Maintenance crews should be careful not to damage the sign posts during mowing or trimming. If weed wackers are used, instruct grounds personnel to not repeatedly scar the base of the posts when trimming grass under the posts.

Safety Practices in Field and Shop

Personal safety is a prime concern in performing sign maintenance. Crew supervisors and members must be familiar with standard health and safety procedures to insure that field tasks are accomplished safely and efficiently.

Do not set out to maintain roadside signs without all the appropriate advance warning signs and devices needed to protect motorists and workers at each site. To protect sign crews and road users alike, follow these rules regarding clothing, vehicles, and barricades.

- Maintenance personnel must wear clothing as specified by the Maintenance Division's Safety Officer for conspicuity and protection.
- Equip maintenance vehicles with appropriate signals and flashing lights, and have a slow moving vehicle (inverted triangle SMV) sign properly displayed.
- Erect barricades, flashers, cones, and "Work Zone" signs in work areas where roads are open to vehicle travel. Follow guidelines in Part VI; Work Zone Traffic Control, in the U.S Department of Transportation, Federal Highway Administration, Traffic Control Devices Handbook.

Mounting and Hardware

All signs are mechanically assembled, and bolts and mountings are subject to becoming loose. Using the following guidelines, periodically check all assemblies to insure that the mountings are upright and bolt connections secure.

Sign Mounting

Sign Posts: All mountings should be straight and plumb. If a Visitor Information System post in a double post assembly has been bent, it should be replaced because a damaged pole will not allow the proper attachment of the rails and panel assembly.

When posts that are directly embedded become loose, or crooked, they should be re-embedded. To repair, excavate existing mounting and resecure sign in an upright position. Once upright, refill the hole in 6" lifts that are evenly tampered on all sides. Because many post assemblies include a stabilizer blade on the embedded portion, do not attempt to forcibly straighten the post.

Timber Motorist Guidance Posts: Although these are treated posts, they may deteriorate,

especially in wet climates. If there is any rotting or softening of the wood at the base, or if there are stress cracks that may compromise the carrying capacity of the structure, the uprights should be replaced. If the existing uprights are mounted in concrete, cut the old posts at the base and move the installation in front of, or beyond the placement location and reinstall following the installation instructions in Section 5.1 of this chapter.

Loose Wall Mountings: Clips and anchor cleats on wall-mounted signs may become loose over time. For signs mounted on masonry surfaces, replace a loose anchor with a larger anchor and remount with anchor shields that incorporate epoxy based adhesives with the embedded bolt. If this is not possible, fill the existing hole with compatible media and remount using a new hole and anchor in a nearby location.

Vibrations can be destructive to mountings on masonry surfaces. If the final mounting is not flush to the wall, shim wall-mounted signs with wooden blocks or rubber pads to alleviate possible play or movement.

Sign Hardware

Mechanical fasteners may become loose over time through normal vibration. The expansion and contraction of the wood structures will compromise screwed and bolted attachments.

Tighten Bolts on Motorist Guidance Signs: As part of the routine maintenance cycle, all sign bolts should be tightened to be snug, but not too tight. Tightening bolts on Motorist Guidance signs too tightly may rupture the reflective sheeting, causing premature sign face failure.

Screws and Clips on Identification Signs: On wood signs, insure that bolts and screws that hold hardware are secure. Screws used to hold keyhole plates in wood signs will loosen after a few years. As required, tighten; if this is not adequate, fill holes with epoxy (two-part catalytic) adhesive and reattach screws and panel. Allow adhesive to dry completely before reattaching sign to the frame.

Assembly of Visitor Information System: The cap bolts that hold the rails to the posts of the Visitor Information System should be tightened periodically as needed. The rail must be tight enough so it cannot rotate. Field check by attempting to twist top and bottom manually. Tighten as required. If a few signs in an area are loose, check to see if all assemblies in that area need to be tightened.

The bolts that secure the baseplate of Visitor Information System structures with wood uprights should be tightened annually. This is recommended specifically for very dry climates in which the cedar post will contract significantly in the first few years of the installation.

IDENTIFICATION SIGNS WITH ROUTED WOOD PANELS

Sign Cleaning for Routed Wood Panels and Structures

With proper care, routed wood signs can last for decades. Periodic cleaning can prolong the life of the finish, but eventually dirt and weathering will necessitate some heavier cleaning and/or refinishing of the surface.

The discoloring associated with cedar and redwood as it ages is a combination of surface dirt and mildew. Surface dirt is the accumulation of airborne particles which cling to rough surfaces and open pores in the wood, especially when the wood has been dampened by rain or dew. This dirt builds up through time and attracts another unsightly companion: mildew.

Mildew has the appearance of being a blackish surface dirt, but in reality is microscopic organisms living off the accumulated impurities on the wood. Sunlight is the biggest enemy of mildew. Mildew will grow on signs located in damp, shady environments where the sign does not have direct exposure to sunlight.

There are a number of commercially available products (Easy-Off, Tilex, and x-14 mildew removers) that will wash away surface dirt and kill existing mildew, restoring the wood to a reddish -brown color. Do not use oven cleaners, only mildew removers. Rubber gloves and safety glasses should be worn when using any of these products."

Step 1 Spray the product on the weathered wood in generous quantities and scrub with a soft scrub brush or stiff paint brush. The surface must stay wet for at least ten minutes with continuous reapplication of the mildewcide cleaner as it soaks in and tries to evaporate. Best results are obtained if the sign is dry to begin with, so there is no dilution of the cleaner by water on the surface.

Step 2 After ten or fifteen minutes, with occasional scrubbing, the sign should be thoroughly flooded (hosed, if possible) with clean water. Scrubbing while rinsing will get the chemical residue out of the wood grain, which may cause uneven streaking if left on the wood.

Step 3 Allow the sign to dry completely before continuing the refinishing process. This may require waiting several days to insure that the panel and uprights are completely dry. When the surface feels dry, commence refinishing.

Other Markings on Routed Wood

Because of the porous nature of cedar and redwood, damage by paint and other markings on the wood sign panels could be increased by washing with a solvent. In such cases, it is recommended to sand away the marked or stained area using a fine grade (150 grit) sandpaper. When most of the problem has been removed, restain the entire sign panel.

Refinishing Wood Signs: Staining Wood Panels

Every three to five years, the cedar or redwood sign panels with routed legends will require refinishing to maintain a well-maintained, inviting look for entering visitors.

The following sections describes how to restain panel surface using solid color wood stain as specified. Use Benjamin Moore brand Acrylic Latex Solid Color Stain on sign panel overbar (2139-10, River Rock); sign panel, top cap and end of monolith (5/E 1000, Grey-Brown); sign uprights and sign post assembly for single post flag (2130.10, Dark Brown), as specified in Section 4.3, Identification Sign Material Specifications and Fabrication Drawings. Use only the specified material to insure compatibility with the existing materials. The material provides added protection to the exposed surfaces of the sign. If the sign is exposed to harsh weather or environmental conditions or subject to the sandblast effect of wind, refinishing may be required on a more frequent schedule. Refer to the procedures listed below when restaining signs:

Step 1 Remove the sign faces. It is recommended that you refinish the sign faces in the shop instead of in the field.

Step 2 The sign panel must be clean, dry, and free of any chemical or cleaning solvents. Lightly sand (150 grit) the sign surfaces to smooth any raised grain and to help clean surface for refinishing.

Step 3 Dust off sanded panel and wipe clean with air hose or tack rag. Apply stain with a very short-napped roller. Avoid putting on a coat which is so heavy that the stain creeps into routed areas. It takes several coats, built up over a few hours, to sufficiently enhance the wood grain and protect the wood. The roller must first be rolled out, almost dry, into a scrap board, so only a little stain is carried onto the sign surface. Overlapping strokes of the roller will show to some extent, so roll in the direction of the grain if possible. The first coat should be allowed to penetrate, but not harden, and then the second coat should be applied. This may mean as little as one-half hour between coats on a hot, dry day or as much as four to five hours in shady, humid conditions. Excessive drying between coats (overnight, for instance) will mean poor penetration of the second coat, and a somewhat shiny surface until it weathers a few months. Because the color pigment in the can of stain and in the roller pan will settle quickly, the stain should be stirred frequently (every five minutes) to maintain color consistency. If stain runs down into routed letters it can be wiped out while still wet and not affect the lettering in most cases.

Step 4 If the routed letters need repainting, use the specified Benjamin Moore, MooreGlo Latex exterior enamel (color 2B-2143-50, Old Prairie). Brush in carefully with a small brush, being careful not to get paint onto the front surface of the sign panel.

Step 5 Check tightness of all keyhole screws before remounting panel (See Sign Hardware, page 5.2-11).

Step 6 Allow the stain to dry before the sign is reassembled.

Repairing Routed Wood Sign Faces

Many abrasions or damage due to firearms can be difficult to see from a normal viewing distance. Routine closeup inspection may be necessary to determine if damage warrants extensive repairs. Follow the procedures listed below to repair any problems.

Step 1 Remove all splintered wood and dress all bullet holes and damaged wood with a knife or wood chisel.

Step 2 Fill all cracks, holes, and imperfections with 2-part catalytic wood filler (Minwax High Performance Wood Filler).

Step 3 Sand the repaired sections, sign edges, back, and face. Dust off sign with air hose or tack rag; thoroughly clean repaired section.

Step 4 Apply two consecutive coats of Acrylic Latex Solid Stain to repaired area as described above for staining wood panels.

Refinishing Sign Posts and Frames

All wood sign posts and frames will require periodic refinishing to properly seal the wood and maintain good color and finish. Because the sign frames are large and unwieldy, they are best refinished in the field unless it proves more efficient to refinish them in a park maintenance facility. Refer to the procedures listed below when restaining signs:

Step 1 The post and frame assembly must be clean, dry, and free of any chemical or cleaning solvents. See Sign Cleaning and Sign Panel Refinishing on page 5.2-12

Step 2 Remove the sign faces to expose the sign frame and provide access to overall assembly. Lightly sand (150 grit) the exterior wood surfaces to smooth any raised grain and help clean surface for refinishing.

Step 3 Dust sanded legs and frame and wipe clean. The stain should be applied with a very short-napped roller. Apply two coats. The first coat should be allowed to penetrate, but not harden, and then the second coat should be applied. This may mean as little as one-half hour between coats on a hot, dry day or as much as four to five hours in shady, humid conditions. Excessive drying between coats (overnight, for instance) will mean poor penetration of the second coat, and a somewhat shiny surface until it weathers a few months. Roll in the direction of the grain if possible. Because the color pigment in the can of stain and in the roller pan will settle quickly, the stain should be stirred frequently (every five minutes) to maintain color consistency.

Step 4 Stain or apply Woodlife sealer to the wood interior sections of the sign assembly. Allow the stain and sealer to dry before the sign is reassembled.

Repainting Sign Legends on Routed Redwood Sign Panels

All refinishing of sign faces and repainting of letters shall be done in a park maintenance facility. To refinish the paint on routed sign legends, follow the procedure described below (refer to material specifications for product references).

Step 1 Thoroughly clean out all loose or cracked paint from interior of letters

Step 2 Brush apply a minimum of two coats of the specified Benjamin Moore, MooreGlo Latex exterior enamel (color 2B-2143-50, Old Prairie). Paint in routed areas to ensure a uniform finish. Follow manufacturer's specifications for application and drying time. To prevent bleeding on the face of the panel, DO NOT use thinner to remove residual liquid, but wipe clean with dry cloth. Remaining surface liquid shall be removed with the final sanding of the sign face.

ROAD GUIDE SIGNS AND SMALL PANEL SIGNS WITH RETROREFLECTIVE LEGENDS

General sign maintenance of Road Guide and Visitor Information System (VIS) signs with retroreflective faces will include cleaning the face as needed and patching damaged sections of the sign background and legend. The following sections describe the basic procedures for preventive maintenance. Note, however, if a sign requires extensive repair, it will be more economical to replace the panel than to perform labor extensive repairs.

The manufacturers of retroreflective sign face materials will guarantee sheeting products for varying periods depending on the grade of the product (see Chapter 6: Sign Materials Selection Guide). Degradation from age will include reduction of retroreflective intensity, surface oxidation, and fading. Retroreflective and adhesive vinyl sheetings are also susceptible to accelerated aging and deterioration from extreme weather or other environmental conditions. The freeze- and -thaw cycle and extended burial of signs in snowpacks can cause panel edges and adhesive graphics to delaminate. The abrasive effect of wind in combination with sand can also destroy the outer coating on the sheeting material surface of the sign face. As a part of the field inspection of all signs, the Park UniGuide Manager should identify signs that are getting to the end of their useful life so that they can be included in a scheduled replacement program.

Although not visible during daylight viewing, the retroreflective qualities of reflective sheeting will also begin to deteriorate as the material ages. For wayfinding and safety-related Traffic Regulatory signs, the testing procedure described in this section should be utilized if there is any question about a sign's legibility when viewed at night under reflected light conditions.

If a sign is removed for maintenance, it should be replaced with a temporary traffic control device while maintenance is performed.

Sign Cleaning of Retroreflective Panels

Retroreflective signs are to be clean and free of stains to insure good legibility and maximum reflectivity. The following cleaning instructions are applicable for aluminum signs with retroreflective sheeting sign faces.

Step 1 Flush sign surface with clean water to remove loose dirt.

Step 2 Wash sign with soft brush, rag, or sponge. Use a mild, nonabrasive biodegradable detergent that will not damage adjacent vegetation and is chemically neutral and free of strong aromatic solvents or alcohols. A list of appropriate cleaners tested for engineering-grade sheeting, painted surfaces, and stained posts and panels is available from the material manufacturer. Wash from top down. Avoid abrading the surface with unnecessary scrubbing. Once the detergent has been applied, keep a steady stream of water flowing on the sign face to wash away dirt.

Step 3 Rinse entire sign face with clean water and allow to dry.

Removing Difficult Materials on Retroreflective Sign Faces

Specific procedures for cleaning signs with stains or markings that are commonly difficult to remove are provided below.

- *Tar, Oil, Diesel Smut, Bituminous Material:* Use a mild solvent such as mineral spirits. Then wash the surface with mild detergent and water. Rinse with clean water to remove any solvent residue.
- *Pollen and Fungus:* Wash the surface with a 3 to 5 percent sodium hypochloride solution such as a commercial brand of bleach, followed by a mild detergent and water. Rinse with clean water.
- *Lipstick and Crayon:* For reflective sheeting with factory impregnated color, use a mild solvent such as mineral spirits to remove the material. Follow with detergent and water and clean water rinse. Because the solvent may also dissolve the legend on screen-printed sign faces, test clean a small area before solvent washing the entire sign face.
- *Paint on Reflective Sheeting:* It may be possible to remove paint sprayed onto a reflective sheeting sign face using a commercial paint remover designed for this purpose. The type of paint, length of exposure, and type of remover used may affect the life of the sheeting. Spot test the specific remover on an old sign panel that has the same sheeting to make sure that the remover will not destroy the sign face. After the cleaning procedure, the sign face may require an application of clear urethane coating available from sheeting manufacturers to restore the top surface and extend the life of the sign. Note that this method may not work for signs with screen- printed signs because the legend will also be removed in the cleaning process.

- *Other Markings on Reflective Sheeting:* It may be more appropriate to patch the damaged area of the sign or replace it, if markings cannot be removed by the methods described above.

Spot Patching RetroReflective Sheeting Backgrounds

Spot patching is recommended only for relatively new signs because color change and retroreflective deterioration will make it difficult to effectively match the adjacent surfaces. Spot patching is not recommended for signs fabricated with transparent overlay film legend unless the transparent overlay film has been factory applied with pressure rollers. When patching a sign, make sure that all replacement sheeting shall be of the same brand as the material to which it is being applied. Once existing sheeting is removed, clean any oil, grease, or dirt from the application surface by wiping with paint thinner or naphtha. After cleaning, wipe surface dry using a clean rag.

Step 1 Securely tape the replacement sheeting to the sign along one edge of the patch. The tape should create a hinge. The patch should overlap surrounding sheeting by at least 1/2 inch.

Step 2 Fold back, placing the sheeting face down against a clean, dust-free surface and carefully remove the backing paper.

Step 3 Gently lift and position the hinged self-adhesive sheeting on the application surface. When the temperature is below 50 degrees F, activate adhesive with activator solution available from the material manufacturer.

Step 4 When sheeting is positioned, press it firmly to the surface with a squeegee, using overlapping strokes, starting at center and working out to edges. Initial squeegee pressure must be very firm to avoid forming air pockets.

Step 5 Remove the tape hinge and resqueegee the edges using very firm pressure. Any remaining bubbles can be released with a pin and resqueegeed.

Repair of Sign Panels: Replacing Damaged Legends, Borders, and Symbols

Applied sign legend graphics that have been scratched, broken, or delaminated can be replaced. Request the replacement graphics from the UniGuide Contractor with reference to the sign number and legend area being replaced. The replacement graphics will be opaque pressure sensitive materials, and must match the size, stroke width, and spacing of the existing graphics exactly. These will be computer cut markings supplied on a self-adhesive carrier film with backing paper protecting the adhesive. To apply, follow the instructions below. This procedure is recommended only for single letters or small areas of a sign.

Step 1 Clean the mounting surface. It must be free of dust or any solvent residue.

Step 2 Draw vertical and horizontal alignment lines on the carrier film. Draw or mark the vertical and horizontal lines on the right and left edge of the mounting surface to register alignment.

Step 3 Securely tape the graphic in place along the top. The tape should act as a hinge, allowing the graphic to be lifted back over itself without shifting.

Step 4 Carefully remove the backing paper covering the adhesive and hinge the graphic back in place onto the panel surface.

Step 5 Squeegee the surface of the carrier film with firm strokes left-to-right using the squeegee tool provided by the manufacturer.

Step 6 Once the new markings are thoroughly squeegeed, gently remove the carrier film by lifting a corner and pulling the material back on itself. If the new graphic begins to lift off with the film, resqueegee the section and resume the removal.

Step 7 Resqueegee entire legend. Remaining air bubbles may be punctured with a pin and re-burnished.

Repair of Sign Panels: Bullet Holes or Punctures on Alumalite Sign Panels

It is generally not cost efficient to repair sign faces of Road Guide Signs on Alumalite panels damaged from bullet holes. It is recommended that these signs be replaced as soon as conditions are identified in order to discourage similar problems with other signs. A bullet-damaged sign can be repaired in the shop and reused following the procedures below.

Step 1 Remove all damaged background sheeting and legend with a sharp knife.

Step 2 Draw (scribe) an square around the damaged area.

Step 3 Using a jig saw with fine blade, carefully cut and remove the area in the square.

Step 4 Clean the entire area with Xylol; then naphtha. Note: screen-printed sign surfaces will be dissolved using these cleaning agents.

Step 5 Cut a matching insert from 10 mm Alumalite material. Apply poly adhesive to all edges of insert and place in hole. Tape flush on front of panel and apply additional glue from back side on edge line and tape flush until glue sets. Fill cut line with epoxy filler to create flush joint using putty knife on both sides.

Step 6 Apply reflective background sheeting, extending it at least 1 inch beyond the edge of the insert. Paint the back of the panel to match.

Step 7 Preferably resurface a panel with a new sign face, or if the damaged area is quite small, replace damaged legend with die-cut, pressure-sensitive, prespaced letters, borders, or symbols and firmly squeegee in place.

Repairing Damaged Aluminum Signs

A bent aluminum traffic sign can often be restored simply by straightening. If the reflective background or legend has not been scraped or severely damaged a replacement face may be applied over the old sign face. Generally, it is easier to repair a sign that is bent or has a damaged face in the shop instead of at a field location. The bent panel may be hammered out using hardwood backing blocks or straightened on sheet metal rollers. Once repaired, follow above instructions for the repair of backgrounds and legend area.

Reflective Sheeting Color and Reflectivity

The manufacturer of each grade of reflective sheeting provides a recommended life expectancy for each grade of sheeting (see Chapter 6: Sign Materials Selection Guide). This life is generally based on the quality of retroreflective brightness of the material but can also be a function of surface quality and the intensity of color. Common sense will dictate the replacement cycle for daytime color and general visual quality. To test the functional life of the material when used at night, follow the steps below. Careful attention should be given to a sign during inspection when it is nearing the end of the anticipated useful life. For this information, refer to the date of installation on the UniGuide Sign Schedule.

Color Fading on Reflective Sheeting: If the color of the background has faded and the type has become yellowed to the point where there is not sufficient contrast to read the sign from its intended viewing distance, the sign panel should be replaced. This problem will be most acute on panels where bright sun and abnormally strong concentrations of ultraviolet light occurs. If this problem arises prematurely according to manufacturer's specifications, the Park UniGuide Manager should consult the manufacturer of the reflective sheeting to determine if the material is faulty.

Inspection of Nighttime Reflectivity

Reflective signs must be inspected at night as well as during the day to insure nighttime legibility. The problem of night safety on roads is acute. Statistics show that, while only one–third of drivers travel after dark, over half of the fatalities (53 percent) occur at night. Underscoring the importance of sign reflectivity is the fact that 90 percent of a driver's actions result from decisions made based on what is seen. To this end, signs must be optimally legible during this viewing period.

Step 1 With masking tape, affix an 8" x 10" sign inspection guide test panel to a clean section of the sign. The UniGuide Manager can obtain sign inspection kits from the reflective sheeting manufacturer.

Step 2 Step back about 30 feet. Hold the flashlight approximately two inches from your eyes and shine it at the panel. Do not use the vehicle headlights.

Step 3 If the inspection guide is brighter than the sign, then the sign should be replaced within a year.

Step 4 If the sign is brighter than the inspection guide, then the sign will not have to be replaced for a number of years.

Step 5 If the sign and the inspection guide appear of equal brightness, then the sign has from one to five years of useful life left, depending on the grade of sheeting.

With experience using this test procedure, it will become easier to evaluate reflective brilliance without using the inspection guide on each sign. With enough experience, the inspection guide is only needed for questionable cases.

VISITOR INFORMATION SYSTEM PANEL MAINTENANCE

It is important that all Visitor Information Panels be well maintained and clean.

- All panels and installations should be washed periodically to insure that the information is presented in a fresh and positive way.
- If a panel is out of date, it should be replaced quickly. If a correction or update is affixed to a panel, the panel should be replaced within 30 days.
- A damaged panel may be repaired in a way described below. In most cases, however, it will be more cost effective to replace the panel. Use the sign code identification number from the park's UniGuide Plan.

Guidelines are given below for maintaining and repairing three of the most commonly used panel materials:

- Embedment fiberglass
- High pressure laminate
- Porcelain enamel

For panels finished with cut and applied retroreflective sheeting, see the preceding sections on panel cleaning and repair.

Embedment Fiberglass Panel Maintenance

Embedment fiberglass panels are durable and generally maintenance- free for the intended five- to ten -year life cycle. Because they are digitally printed images, the graphics may fade or lose some of their color intensity over the life of the panel. Panels placed south facing with direct sunlight will be more vulnerable to early failure than panels oriented away from the sun, or in shady environments.

Basic Handling: Handle fiberglass products with care during installation. As with any sign product, the edges and corners can be chipped and the surface can be scratched.

Panel Repair

Surface Crazing: Some embedment fiberglass panels may display fiberbloom, or a crystal-like appearance on the surface as the top surface begins to age. This condition can be refreshed by refinishing the surface as described below.

The following are procedures to repair minor abrasions and damaged edges on embedment fiberglass sign panels.

Step 1 Rub the abraded area with 320 grit wet/dry sandpaper until the scratches are no longer visible.

Step 2 Wipe the surface clean with rubbing alcohol and a soft cloth.

Step 3 Mask sign frame and apply clear Krylon™ Spray coating over the repaired area. Use matte finish No.1311 for matte panels and allow to dry before placing in park for viewing

Panel Maintenance

Surface Dirt: To clean panel, wash with mild soap and water, wipe the surface clean with rubbing alcohol and a soft cloth, then apply marine wax or, mask sign frame and apply a matte lacquer spray. If repair is made in the field, do not apply spray on a windy day or when visitors are in close proximity to the assembly.

Spray Paint or Permanent Markers: Apply Graff-off™ or equivalent citrus-based cleaner (follow instructions on cleaner). Wipe the surface clean with rubbing alcohol and a soft cloth, then apply marine wax or, mask sign frame and apply a matte lacquer spray.

High- Pressure Laminate Panel Maintenance

High-pressure laminate panels are durable and generally maintenance free for the intended five to ten- year life cycle. Because they are digitally printed images, the graphics may fade or lose some of their color intensity over the life of the panel. Panels placed south facing with direct sunlight will be more vulnerable to early failure than panels oriented away from the sun, or in shady environments.

Basic Handling: Handle high pressure laminate panels with care during installation. As with any sign product, the edges and corners can be chipped and the surface can be scratched.

Panel Cleaning

Surface markings are easily removed with conventional cleaners and solvents.

- For simple cleaning, mild soap and water is best. Rinse with clean water after washing. Avoid the use of abrasive cleaners or acids.

- Graffiti (paint, crayon, felt tip markers, etc.) can be removed using an organic solvent, such as Simple Green, or similar nonabrasive citrus-based cleaners.
- Stubborn graffiti may require something stronger, such as mineral spirits. Do not use lacquer thinner or acetone, for they may damage the surface of the graphics. Always rinse with clean water.
- Minor blemishes, nicks, rub marks or burnishes, and very light scratches can be concealed using a polymer based car wax, or a polymer based surface treatment, such as Freeman's Furniture Cream.
- Persistent stains may be removed with a two minute exposure to household bleach. Always rinse with clean water after this procedure.

Panel Maintenance

- When using graphics outdoors, an occasional coating of liquid wax or furniture polish will keep the edges shiny and black as well as help the panel resist moisture.
- An occasional wiping of the cleaned graphic face with a polymer-based car wax will assist in easing removal of graffiti and dirt.

Porcelain Enamel Panel Maintenance

Porcelain enamel panels are durable and generally maintenance free. Panel surfaces will not fade or oxidize, and surface markings are easily removed with conventional cleaners and solvents.

- *Dirt, Grime, Fingerprints:* For periodic cleaning, use a solution of water and a simple household liquid detergent. Apply with a sponge or rag and rinse with clean water. For stubborn areas, use a mild nonabrasive cleaner such as "Soft-Scrub" and rinse with clean water. To eliminate water spots, wipe the panel with a common household glass cleaner or a solution of vinegar and water.

- *Graffiti:* This is possibly the most common form of vandalism but is easily removed without damage to the panel. Because porcelain enamel has a nonporous, baked glass finish, virtually nothing will stick permanently to the surface. To remove spray paint, grease markers, permanent ink, etc., use paint thinner or lacquer thinner (Use proper personal protection when using lacquer thinner including protection of skin and eyes). After removing markings on panel, rinse with clean water and clean panel with glass cleaner to remove any grease or film residue from the solvent.

- *Chipped Enamel:* Porcelain enamel panels, though extremely durable, can be damaged by direct impact to the face by a rock or sharp implement. This type of problem is most often attributed to vandalism. If the graphics are destroyed, the panel should be replaced. Minor surface damage can be repaired by spot painting the exposed area with a two-step process that includes the application of metal primer to exposed steel, fol-

lowed by painting the effected area with a quality (automotive type) enamel to the affected area. Patch kits are available from the sign manufacturer. Use a small, good quality spotting brush to apply the paint. Two finish coats are recommended for durability in the park environment. Do not paint beyond the damaged area.

- *Rust:* If you notice rust forming, you should first try to locate the source of the problem. Most rust forms as a result of a chipped corner or an unprotected point of impact. The smallest imaginable spot that is not encapsulated with porcelain enamel may begin to rust and, over time, become noticeable. To repair, determine the source of the rust. This may involve removing the panel to inspect concealed edges. To repair, clean all rust from the panel using detergents, nonabrasive cleansers, and vinegar. Lightly sand the area with a fine grit sandpaper (400 grade) to remove the rust completely. Thoroughly clean, rinse, and dry the panel. Once the area is dry, apply a good quality primer and finish with two finish coats as described above for chipped panels.

If you should require further assistance in the maintenance of signs, call the manufacturer for assistance.

Chapter 6

UniGuide Reference

Final Draft: *June 1, 2002*

Introduction

This chapter has been included as an expandable reference section that includes materials used in the planning and maintenance of a parks UniGuide Plan. The initial entries include a catalog of standard signs, a sign materials reference selection guide, and a sign legend format guide for park identification. Planned additions include an overview of the accessible trail identification system developed by Beneficial Designs in conjunction with the National Park Service, and a section including schematic concepts for site improvements that augment identification and wayfinding programs for parks. Other references that may include case studies, and copies of applicable regulations from the NPS or other agencies can be included to aid the planning of park programs.

Chapter 6

UniGuide Reference

Section 6.2

Catalog of Standard Signs

Final Draft: *June 1, 2002*

This section of the NPS UniGuide Standards Manual is a catalogue of commonly used panels, and examples of panels used on various park projects that can be used as a template for a similar sign at another park.

This section is organized by type of sign as listed below, with number assigned from the ranges shown on the right.

These signs are available from the National UniGuide Program Manager in Harpers Ferry as vector art that can be scaled and placed into sign plans for any park.

As this program is implemented at more parks, the catalogue will be expanded with the goal that the catalogue be a searchable data base for reference in the near future.

VIS Panels / NPS Catalogue Panels

AE	Area Entry	001-049
SG	Small Guide	050-064
TR	Traffic Regulatory	065-164
EF	Entrance Fees	165-174
RF	Recreation Fees	175-184
IN	Information/ Instruction	185-284
RM	Resource Management	285-334
NPS	Messaging	335-384
RE	Regulations	385-434
PR	Protection	435-484
SW	Safety Warning	485-584
SD	Safety Danger	585-684
MP	Miscellaneous Postings	685-784
PN	No Parking	785-834
PY	Parking	835-874
PH	Handicapped Parking	875-884
ID	Identification	885-924

AE-001

AE-002

AE-003

AE-004

AE-005

AE-006

AE-007

AE-008

AE-009

AE-010

AE-011

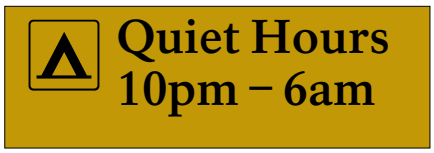
AE-012

AE-013

AE-014

AE-015

AE-016



AE-017

AE-018

AE-019

AE-020

AE-021

AE-022

AE-023

AE-024

SG-050

SG-051

SG-052

SG-053

SG-054

SG-055

SG-056

SG-057

SG-058

SG-059

SG-060

SG-061

SG-062

SG-063

SG-064

SG-065

SG-066

TR(R1-1)

TR(R5-1)

TR(R5-9)

TR(R1-2)

TR(R9-3A)

TR(R5-2)

TR(R1-2B)

TR(R1-3)

TR(R6-2L)

TR(R6-2R)

TR(R11-2)

TR(R4-7A)

TR(R4-7)

TR(R2-10)

TR(R2-45)

TR(R4-1)

TR(R2-5C)

TR(R2-5A)

TR(R3-7R)

TR(R3-7L)

TR(W1-7)

TR(W1-6)

TR(W8-2)

TR(W9-1L)

TR(W9-1R)

TR(W8-9)

TR(W8-4)

TR(W8-8)

TR(W5-1)

TR(W14-2)

TR(W14-1)

TR(W3-1)

TR(W3-3)

TR(W10-1)

TR(W14-3)

TR(W1-8)

TR(W5-2A)

TR(W8-3A)

TR(W11A-2A)

TR(W11A-2)

TR(W11-9)

TR(W11-5)

TR(W15-1)

TR(W11-1)

TR(W11-7)

TR(W11-6)

TR(W11-4)

TR(W11-3)

TR(W1-3L)

TR(W1-3R)

TR(W1-4L)

TR(W1-4R)

TR(W1-1L)

TR(W1-1R)

TR(W1-2L)

TR(W1-2R)

TR(W2-2)

TR(W2-5)

TR(W2-4)

TR(W2-1)

TR(W1-5L)

TR(W1-5R)

TR(W2-3)

TR(W8-1)

TR(W4-2)

TR(W5-3)

TR(W6-1)

TR(W12-2)

TR(W4-1)

TR(W7-1)

TR(W8-5)

TR-065

TR-066

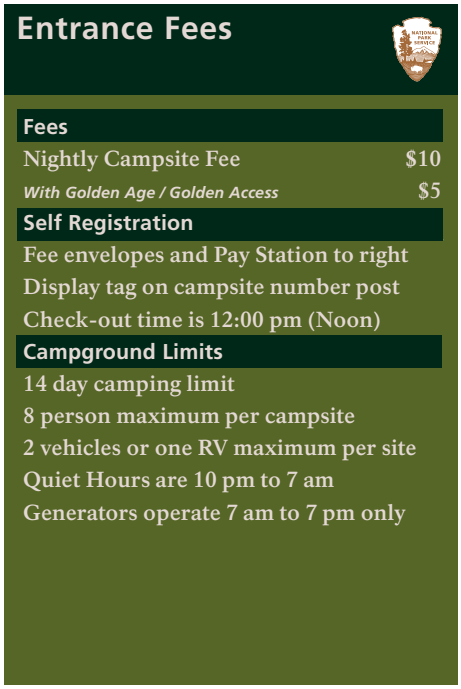
TR-067

TR-068

TR-069


Entrance Fees
Daily Fee Valid For 3 Days with Receipt
Vehicle $4
Person (Walk-in, Bicyclist, Noncommercial Bus) $2
Annual Park Passes
Annual / Seasonal Park Pass $15
National Parks Pass $50
Golden Eagle Passport $65
Lifetime Passes
Golden Age Passport (62 or Older) $10
Golden Access Passport (Disabled) Free
Commercial Vehicles
1–6 Passenger Vehicle $30
7–25 Passenger Vehicle $45
26+ Passenger Vehicle $100

EF-165



RF-175

RF-176

RF-177

Drinking Water Only

Use water at this location for filling potable holding tanks in vehicle or trailer.

Do not use for flushing tanks.

IN-185

Holding Tank Disposal

Follow the instructions below to dispose of holding tank waste. Use care to avoid spills and keep this area clean.

Connect your hose to trailer holding tank.

Insert hose end securely into drain, holding cover open with foot. Open trailer drain valve.

Wash any spillage into drain using water provided.

Water is unsafe to drink. No washing of vehicles here.

IN-186

Enjoy Campfires Safely

With a few basic precautions your visit can be safe and enjoyable.

Campfires are permitted only in the grates provided on developed campgrounds

Do not leave fires smoldering or unattended

Fires are not recommended when windy

Collecting firewood is prohibited

IN-187

Drinking Water, Waste Water

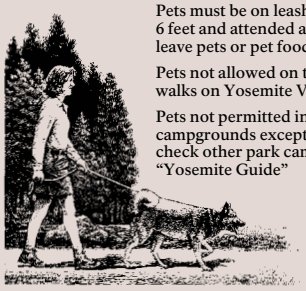
For your safety and convenience, use the special freshwater tap and utility disposal sink.

Odors from water used in cooking or washing attract bears and other animals; dispose of waste water in utility sink

IN-188

Pets

Restrictions on pets are enforced parkwide to protect the park's natural features and to avoid conflicts with wild animals.



Pets must be on leash no longer than 6 feet and attended at all times; do not leave pets or pet food outside at night

Pets not allowed on trails except paved walks on Yosemite Valley floor

Pets not permitted in Yosemite Valley campgrounds except Upper Pines; check other park campgrounds in "Yosemite Guide"

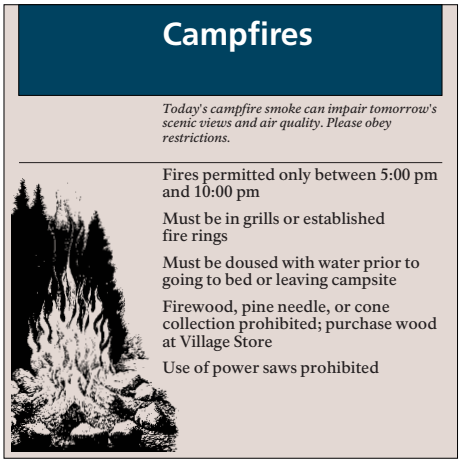
IN-189

Cleaning Water Only

Use water at this location for flushing tanks and cleaning purposes only.

This water is unsafe to drink.

IN-190



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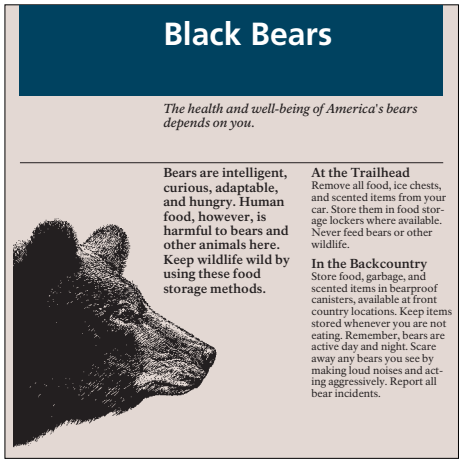

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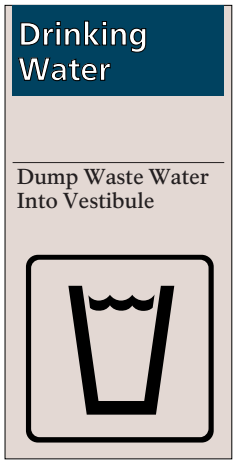
IN-193



IN-194

Survival Strategies

Wildlife uses many behavioral strategies to survive a long winter.

In heavy snow years, the ground at this elevation may stay snow covered for seven to eight months. Some animals, like the mule deer, migrate to lower elevations. Others, like the marmot, store energy in the form of fat and sleep away the winter in deep hibernation. Some hardy animals stay active all winter. They depend on stored food, forage under the snow in a network of tunnels, or hunt and feed during warm spells.

RM-285

Oak Woodlands Restoration

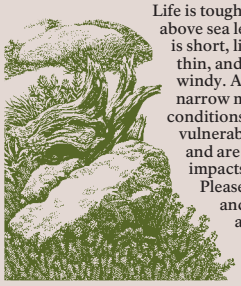
Years of trampling has compacted soils in these California black oak stands, and seedling oaks could not become established.

To restore the woodlands, black oak (Quercus kelloggii) seedlings have been planted in the fenced area. Plastic tubes and wire screens protect them from browsing by animals. You can help the gradual restoration process by staying outside the enclosed area. In a few years the oaks will provide shelter and acorns for birds, deer, rodents, and bears.

RM-286

Mountain Ecosystems

In the Alpine Zone, just a few people acting thoughtlessly can destroy a hundred years of growth.



Life is tough more than 9,000 feet above sea level. The growing season is short, little rain falls, soils are thin, and it is often cold and windy. Alpine plants have a narrow margin of survival in these conditions; they are more vulnerable to human disturbance, and are slower to recover from impacts than at lower elevations. Please do not build campfires and take special care to avoid trampling.

RM-287

Fire

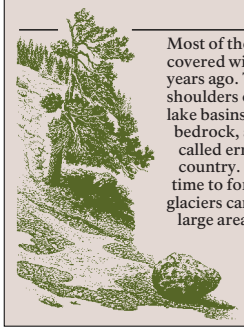
Natural processes like fire are essential to the health of the forest.

You may see areas of burned trees as you wander though this wilderness. Natural, recurrent, lightning-caused fires create diverse habitats for wildlife, enrich the soil, and provide seedbeds for sun-loving plants. They also remove woody debris from the forest floor, reducing the danger of hotter, catastrophic fires. All members of the natural community–trees, shrubs, fungi, insects, birds, and mammals–benefit when the forest is touched by flames.

RM-288

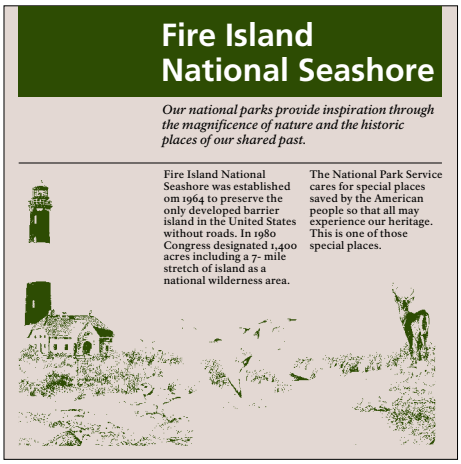
Glaciers

You are following the tracks of glaciers.



Most of the land around you was covered with ice as recently as 10,000 years ago. The ice rounded the shoulders of the peaks, carved today's lake basins, polished the remaining bedrock, and left rounded rocks called erratics across the high country. Soils have not had much time to form, so the work of the glaciers can be clearly seen in large areas of bare granite.

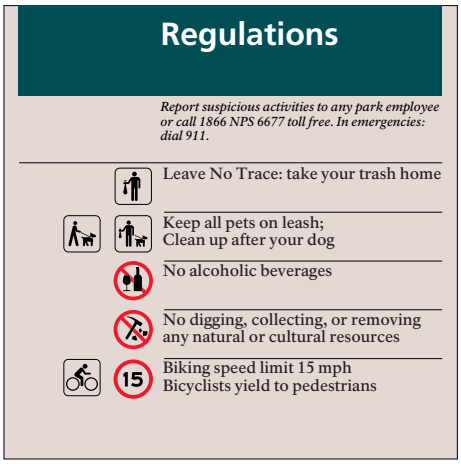
RM-289



NPS-335

NPS-336

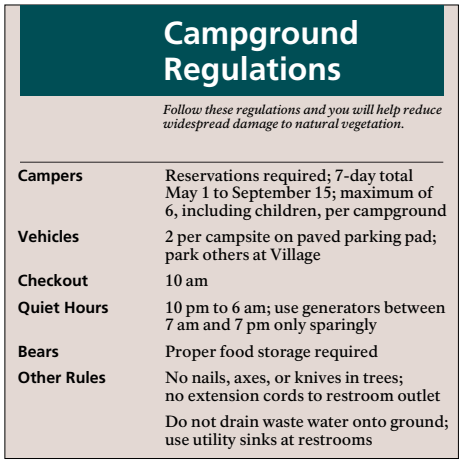
R-385



R-386

R-387

R-388



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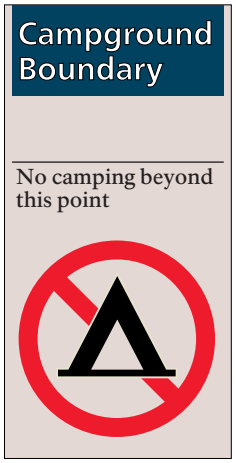
R-394



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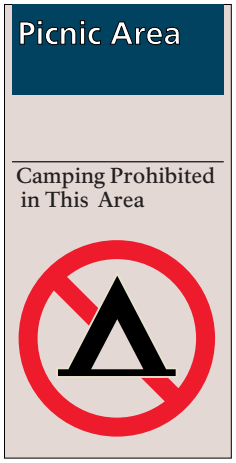

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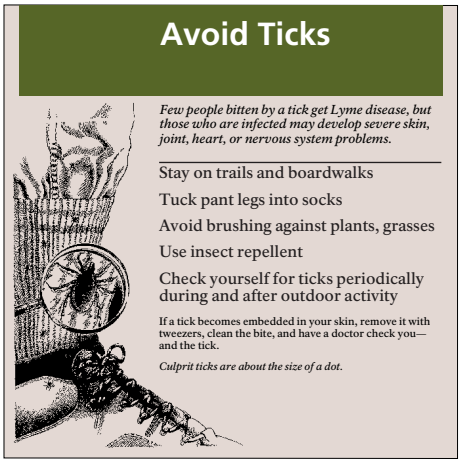
R-400



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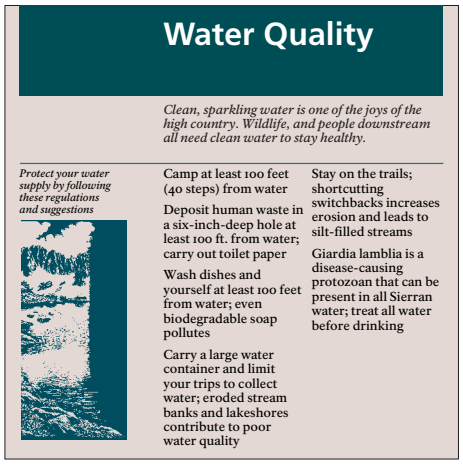
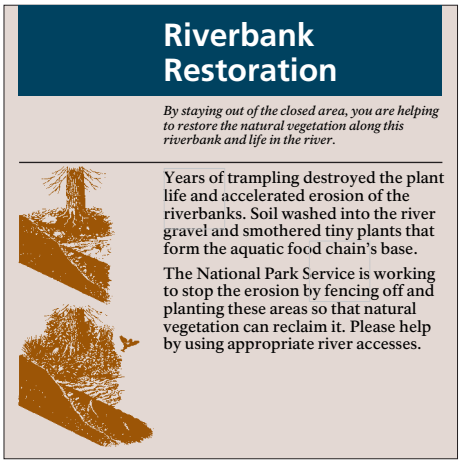


PR-436

Illustrations for these panels are currently being prepared and will be inserted in the final version of this manual



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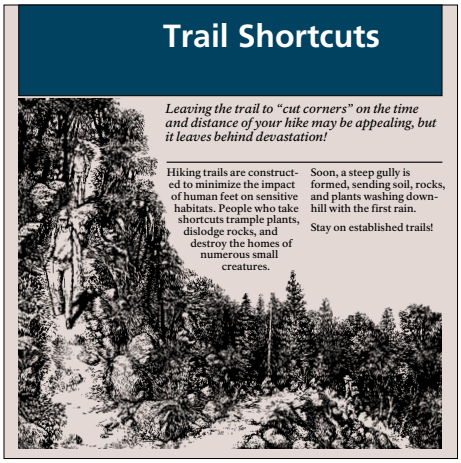
PR-438



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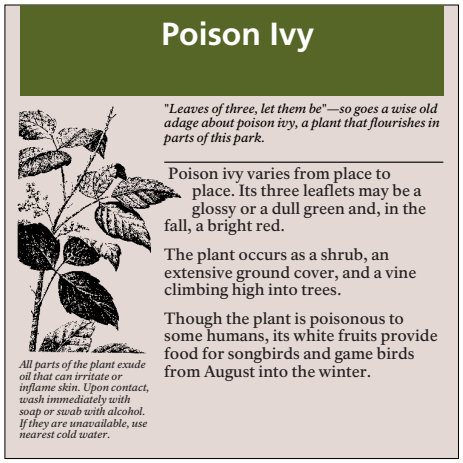
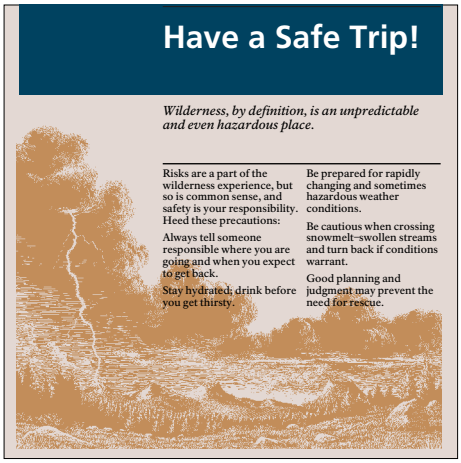


PR-440

PR-441 Illustrations for these panels are currently being prepared and will be inserted in the final version of this manual

PR-442

PR-443 Illustrations for these panels are currently being prepared and will be inserted in the final version of this manual



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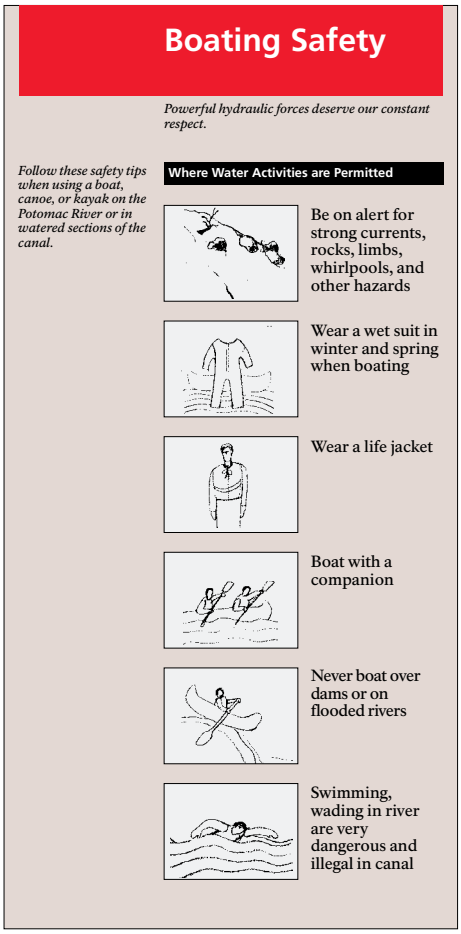
PR-445

PR-446



PR-447

Illustrations for these panels are currently being prepared and will be inserted in the final version of this manual

Illustrations for these panels are currently being prepared and will be inserted in the final version of this manual

Surviving Fast Water

Don't be fooled. The river may appear tranquil, but it is perilous.

Emergencies: dial 911

How to Survive

Roll over on your back until you can see your toes.

Point your toes downstream and float through rapids.

When you get to calm water swim sidestroke to shore.

If you fall out of a boat hang on and stay on upstream side.

Hydraulic Killer

Life jackets may not help despite added buoyancy.

White water can still hold you 6 to 18 inches under the surface because of air mixed in the water.

Falling in the River

Beware: Raising an arm out of the water to signal for help causes feet to go down.

Fast-Water Drowning

When feet are pushed downward they become snagged on rocks.

Current rushes over feet making escape impossible.

PR-448

Avoid Dehydration

Heat and dehydration can kill. Plan ahead and stay hydrated.

Frequently drink plenty of water

PR-449

Poison Sumac

Clear sap from a broken stem turns black and quickly causes severe itching and blistering. Wash immediately with soap or swab with alcohol. If they are unavailable, use nearest cold water.

Beware of poison sumac, one of North America's most dangerous plants. Its sap can cause an irritating rash—or worse.

This smooth, gray-stemmed shrub grows in bogs, swamps, and other flooded areas. Treelike, it may be 5, 25, or more feet high.

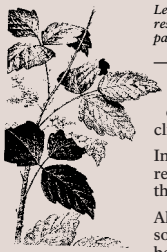
Each leaf has 7 to 13 shiny, dark green leaflets that turn a brilliant orange or red in the fall.

Clusters of whitish-yellowish berries hang from between the leaf and the branch. On nonpoisonous sumacs, they grow at the ends of branches.

Quail, grouse, and rabbits feed on the berries, especially in winter.

PR-450

Poison Oak



All parts of the plant exude oil that can irritate or inflame skin. Upon contact, wash immediately with soap or swab with alcohol. If they are unavailable, use nearest cold water.

Learn to identify this hairy plant. Its leaflets resemble oak leaves, but they—and all other parts of the plant—are poisonous.

Poison oak, like poison ivy, has three leaflets and grows as a ground cover, a dense shrub, and a vine climbing high into trees.

In the spring, new leaves are glossy red before turning dark green and, in the fall, brilliant red.

Although the plant is poisonous to some humans, its whitish flowers and berries attract pollinating bees and birds respectively.

PR-451

Warning: Mountain Lions

Sightings of mountain lions have increased in recent years. Attacks on humans are rare but possible. Follow these precautions.

- Obey food storage regulations
- Do not leave pets or pet food outside and unattended
- Avoid hiking alone; watch children closely
- If you encounter a mountain lion, do not run; hold your ground or back away slowly; maintain eye contact; raise your arms or open coat to appear larger; throw sticks or small rocks at mountain lion
- If a lion attacks, fight back!

SW-485

Warning: Bears

You are in the habitat of black bears. Bears find the odor of your food attractive. Read and carefully follow food storage regulations.

Bears tear apart backpacks, ice chests, vehicles to get at food

SW-486

No Lifeguard On Duty In This Area

For Your Safety, Swimming is Recommended Only in Lifeguarded Areas

SW-487

Enjoy the Beaches Safely

For Your Safety, Swimming is Recommended Only in Lifeguarded Areas

SW-488

Warning

People drown here each year. Be careful!

Extremely strong current/undertow

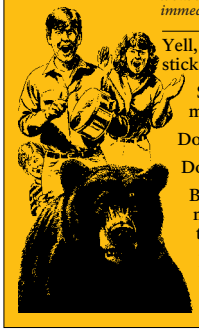
Stay off rocks at river's edge

Swimming or wading is strictly prohibited

SW-489

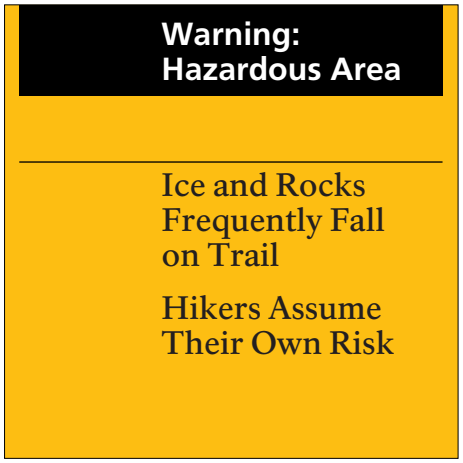
Warning: Black Bears

If you encounter a black bear, do not approach it but aggressively try to scare the bear away immediately. Follow these instructions.



- Yell, clap hands, bang pots, throw sticks or small rocks toward bear
- Stand together to present a more intimidating mass
- Do not surround the bear
- Do not try to retrieve objects
- Be cautious if you see cubs; their mother may aggressively defend them
- Report all sightings to a ranger

SW-490



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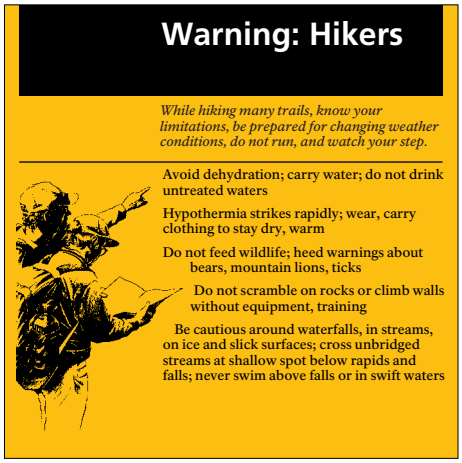

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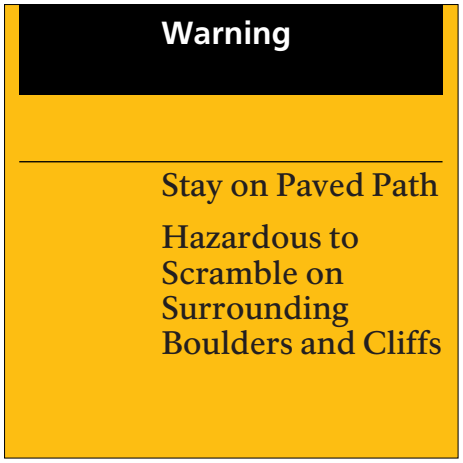

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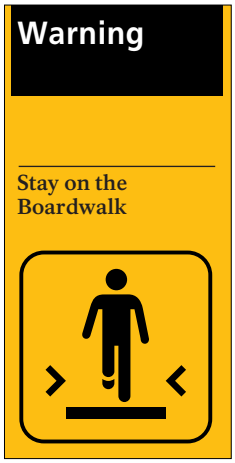

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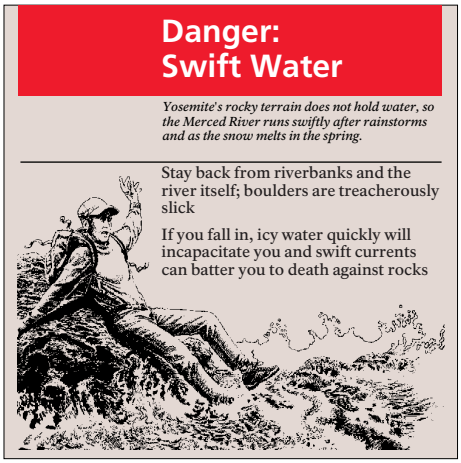
SW-495

SW-496

SW-497



SD-585

SD-586

SD-587

Piping Plover Nesting Area

Protected Species

Do Not Disturb

MP-685

Don't Tread on Me

No Walking on the Dunes

MP-686

Drivers

Stay on Roads

Park Only in Picnic Area

MP-687

Recycle

Use Proper Disposal Containers for Glass, Plastic and Aluminum

MP-688

Bicyclists

Rented Bicycles are Not Permitted Beyond This Point

Park Bikes Here & Walk to Viewpoint

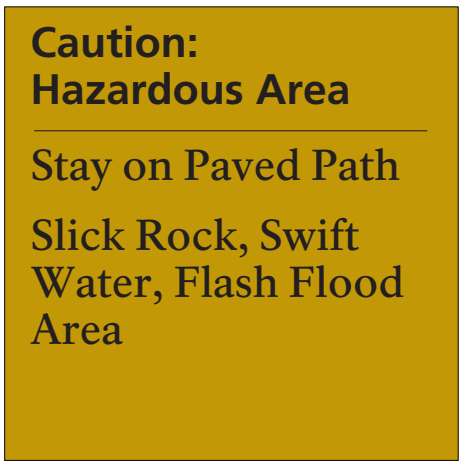
MP-689

Two-Way Road

Keep Road Clear

Yield to Oncoming Traffic

MP-690

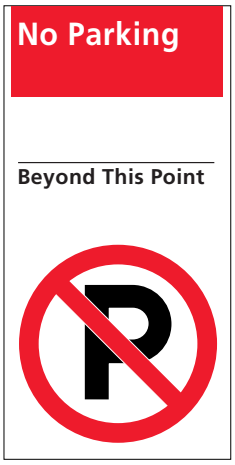

Caution:
Hazardous Area
Stay on Paved Path
Slick Rock, Swift Water, Flash Flood Area

MP-691

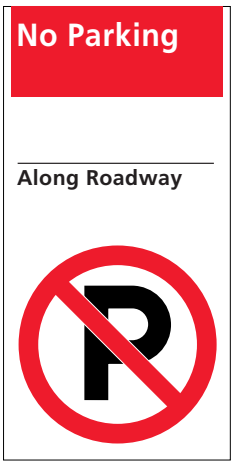
PN-785

PN-786

PN-787



PN-788



PN-789

PN-790

PN-791

PN-792

PN-793

PN-794

PN-795

PN-796

PN-797

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PN-799

PY-835

PY-836

PY-837

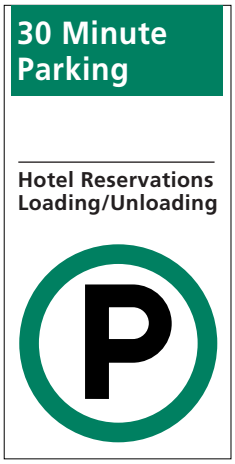
PY-838

PY-839

PY-840

PY-841

PY-842



PY-843

PY-844

PY-845

PY-846

PY-847

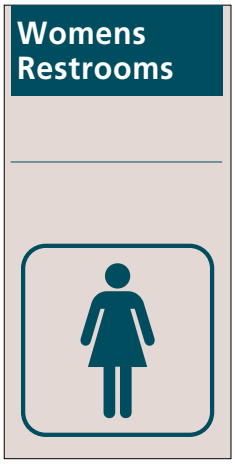
PY-848

PY-849

PY-850

PY-851

PH-875



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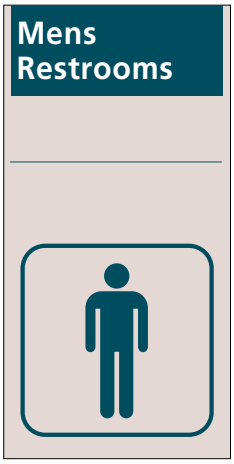

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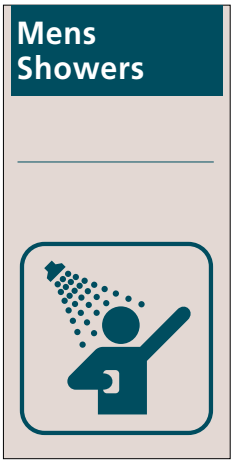
ID-887



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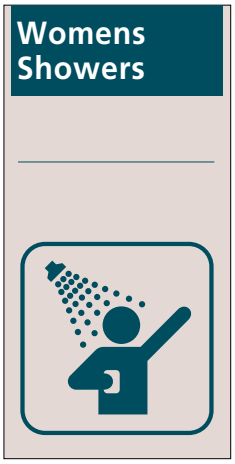

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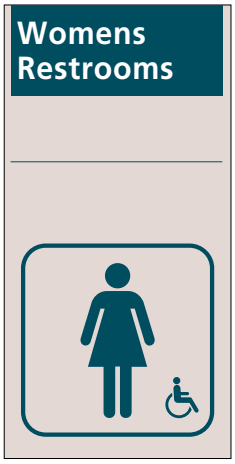

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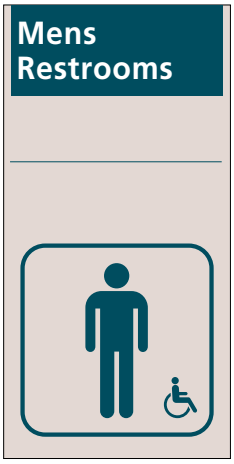

ID-891

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Chapter 6

UniGuide Reference

Section 6.3

Overview of Materials and Methods

Final Draft: *June 1, 2002*

Overview of Materials and Methods

Each of the four groups of signs within the UniGuide Program uses different materials for the structures and panels based on the application requirements. In each application, choices are based on cost, durability, expected life cycle, quality, and performance.

Generally, a material is selected because it is the most durable.. It will perform the best over the entire life cycle of the installation without appearing tired, worn, oxidized, or faded. Equally important, the materials selected and the method of assembly should be vandal resistant and require minimal maintenance. This is especially important at 95% of the national parks, the parks that do not have sign shops. With the exception of a few panel materials, cost is not a major issue because the cost of sign panels is a fraction of the cost of an overall installation. Porcelain enamel for instance is often the material of choice for panels within the Visitor Information System because of its durability and superior graphic quality.

Park Identification

Sign Structure

In the spirit of traditional materials, the standard exterior structures for double post signs, panel frames for monoliths, and posts for hanging signs are Western Red Cedar to match the sign panel. To eliminate all contact of natural materials with the ground, the core of all ground-mounted assemblies is galvanized steel mounted on baseplates. The steel interior allows a common, structurally sound, and corrosion-resistant method for mounting regardless of local conditions.

Monolithic signs also have steel interior posts. The monolithic base is cast-in-place concrete that may be cast to the full specified dimension of the base or cast to a narrower dimension and covered with a brick or stone veneer. It is recommended that the stone veneer be of a material and form indigenous to the surrounding area, or is historically compatible.

Alternative structural forms use the standard graphic panels and are conceptually built to mount the panels in the same way with added masonry work as recommended in Section 3.3. Since these are permanent "architectural" installations, the interior structure must be maintenance free and structurally built to withstand the harsh conditions common to national parks.

Sign Panel

The principal material for Identification Sign panels is Western Red Cedar with computer routed legend and stained surface. Second growth clear heart redwood may be used as an alternate, but because this is a less sustainable resource, its use is discouraged. Wood is specified because it is a traditional material for this application. Cedar and redwood are specified because they are both closed cell woods that will not rot or check and will last indefinitely without deterioration if properly maintained.

Alternate materials for custom applications include:

- Etched granite or other types of stone panels built into a monolithic structure
- Synthetic stone panels with cast or routed legend in panels built into a monolithic structure
- Porcelain enamel panels, if the size can be accommodated by the fabricator's kiln and if vandalism is not a factor
- Weathering steel plate, plasma cut in negative shape, or plasma cut letters plug welded to a plate of the same alloy and built into a monolithic structure or wall mounted
- Stainless steel plate with etched letters that is built into a monolithic structure or wall mounted
- Individual cast, cut, or channel letterforms fabricated from metal and pin mounted on a wall surface

Each of these alternate materials will require a custom base or custom method of mounting. In all cases, the grid format of the legend, use of typography, and display of the NPS Arrowhead logo must comply with the UniGuide Standards as specified in Chapter 2. For advice, contact the National UniGuide Manager in Harpers Ferry.

Visitor Information System

Sign Structure

All of the structures specified for the Visitor Information System were selected for general appearance, durability, adaptability to various park environments, and cost. Each component can be reused, and all are made from sustainable materials that can be recycled. The structures are stout and vandal resistant, and yet they occupy a diminutive presence in a park environment.

VIS structures include steel and wood. The primary steel type is weathering steel, an alloy that will rust to a fine dark deep brown and maintain that surface indefinitely. Weathering steel is not impervious to conditions like a rain forest in which the sign is constantly wet, or coastal environments. In these applications, use steel posts with a hot dip galvanized finish (a dull satin gray) or painted finish. Narrow Profile signs use solid bar stock steel in unpainted galvanized and painted configurations to match tubular steel uprights of larger assemblies.

An alternate to steel is Western Red Cedar. Although these posts may be more visually appropriate in some park environments, they are more expensive, have more visual mass because the size of the timber is larger than the steel tube, and the assembly is more complex, with steel baseplate and footing and metal hardware on the upright for stability of panel connection hardware. For cedar assemblies, should be coated annually with an environmentally friendly penetrating oil as specified in Section 4.2. Treated Douglas Fir or

Southern Yellow Pine are not recommended for these applications, because they are not as stable and will not last as long as closed cell materials.

Sign Panel
A feature of the Visitor Information System is the variety of panel materials that may be used because of cost, graphic quality, expected life cycle, and surface durability.

There are three basic material groups.
1) Porcelain Enamel: This is a process in which the graphic is screen-printed on steel with oxides and fired in a kiln. This is the most durable, highest quality material with no fading of color and full retention of surface integrity for an indefinite period. Porcelain enamel is permanent solution. Porcelain enamel is expensive because in the manufacturing process each color must be individually screen-printed so each additional color increases the cost of the panel. If duplicate panels are produced however, the individual panel cost can be reduced. Porcelain enamel is ideal for parks with significant exposure to southern sun, or locations abused by extreme weather conditions. It is also the recommended for VIS Identification Signs, safety critical signs placed in harsh environmental conditions, and other signs that might not be actively maintained.

2) Digitally Printed Graphics: Panels made using digital prints are generated from graphic files and printed using ink jet technology. Although this technology is significantly less expensive than porcelain enamel, the graphic is not permanent and will fade over a three-to-ten-year period (manufacturer's warranty period) depending on material used to to encapsulate the graphic and increase the resistance to ultraviolet rays. If a graphic will be updated frequently because of seasonal or program changes, information, these materials are ideal. It also may be less expensive to replace all panels every five or more years than it is to install porcelain initially. Following through on this maintenance work is important because visitors will ignore messages on tired-looking installations, and such signs reflect poorly on the National Park Service image. It should also be noted that digital printing technology is evolving rapidly and each process listed below will last longer as improvements are incorporated into the manufacturing process.

- *High-Pressure Laminate* – This is a high resolution, 600 dpi color digital process in which graphics are embedded in phenolic and melamine resins with a hardened satin matte finish. This is essentially an exterior grade version of laminate as used on counter-tops, but with sign graphics instead of faux wood grain appearance. Manufacturers of high-pressure laminate will warrant the product for five years against fading, delaminating, discoloration, or cracking. With each panel printed individually, there is no cost reduction for duplicates.
- *Embedment Fiberglass* – Panels incorporate high resolution 600 dpi digitally printed graphics fused into a panel of fiberglass and resins. This is a very durable material that

is warranted for 10 years against chipping, delaminating, and fading. An alternative version of this material is to incorporate graphics screen-printed with solvent based inks for greater durability, but the cost is not generally justified unless the same graphic is being manufactured in large quantities.

- *Ink Jet on Vinyl* – Full color digital graphics are printed at high resolution (1200 dpi) onto adhesive vinyl with an abrasion resistant overlaminate. This is the highest resolution graphic imaging process in the UniGuide system. The material is selected for an intended display life of up to three years without noticeable degradation of graphics. Ink jet on vinyl is ideal for applications requiring a quick response, such as fee signs or special events, and instances where the highest graphic resolution is desired at a relatively inexpensive cost. The back of the graphic marking films are precoated with a positionable, pressure sensitive adhesive that provides excellent adhesion to aluminum and porcelain enamel surfaces. When the graphic is applied to a blank aluminum back panel, the adhesive vinyl can be removed and the panel reused or updated on-site on a seasonal basis.
- *Electrostatic Printing on Vinyl* – Adhesive vinyl with electrostatically printed digital imaging is top coated with an abrasion resistant overlaminate. This material is similar to ink-jet vinyl, but it may be slightly less expensive and has a four year warranty. Electrostatic prints can be ordered for quick-ship delivery and have the same removable and replacement features as ink-jet. The image resolution is 400 dpi, making it less appropriate for text that is less than 30 point. Electrostatic prints, however can be imaged onto engineering grade retroreflective sheeting for Small Guide Signs, Area Entry Signs, and campsite identification numbers that must be viewed at night by motorists.

3) Computer Cut Graphics: This is a highly durable, low cost method for making panels with typographic legends using vector art files for fabrication. In this method, the outline of the word is computer cut and adhesive-applied to the sign background material using an application film to hold all graphic pieces in-position until they are permanently affixed to the aluminum back panel. The background and legend may be retroreflective or opaque vinyl. Retroreflective materials are preferred because they are more resistant to vandalism or letter removal. Retroreflective materials may also be produced with reverse cut transparent overlay film as specified for Road Guide Signs. The legend should be no less than 1" (120 point or larger) in capital letter height with preferred size of 1-1/2" (160 pt) type. Panels with computer cut graphics can be supplied within two days if required.

Reference: The Department of Wayside Exhibits at Harpers Ferry Center has current information on additional materials and imaging processes.

Motorist Guidance

Sign Structure

The basic structure for Road Guide Signs and Trailblazer/Boundary Signs includes timber uprights and an Alumalite panel. The Alumalite panel is attached to the timber posts with intermediate aluminum angles. On Road Guide Signs the aluminum angles become an integral part of the structure, using two companion angles (one attached to the post and one attached to the panel) to become a composite section when bolted together. This method provides a convenient way to mount panels without bolting through the sign panel. One of the sides of the angle is bonded to the back of the sign panel with very high bond adhesive.

The Alumalite panel has a thin 0.012" skin of aluminum on both sides of a extruded polyolifin core with a double layer of fluting to create a very rigid, though lightweight structure. This material was selected because it has the longest life, with manufacturers' guarantees of ten years but significantly longer anticipated life cycle. The life cycle of the material is consistent with the two longer life reflective materials specified below. Alumalite is the most environmentally friendly material specified for this purpose because the amount of aluminum used is 80% less than conventional aluminum panels, it requires fewer backing reinforcements, and the raw materials can be recycled. Although the base panel material is more expensive, the manufacturing costs are lower because the material is prefinished by the manufacturer. Shipping costs also are a fraction of conventional aluminum or HDO signs that weigh four to six times more than the finished Alumalite sign panel.

Sign Graphics

All Motorist Guidance Signs are fabricated from digital vector files supplied to the sign fabricator with full sign layout prepared. The file is sized and placed into a computer plotter/cutter that cuts the outline of the letters and other graphics in either positive or reverse contrast. Once cut, the portions of the graphic that are not used are hand-weeded from the backing paper that protects the adhesive, and an adhesive mask is be placed over the graphic to keep all materials in perfect alignment until the application to the sign background is complete.

All Signs for Motorist Guidance have retroreflective sign faces to make sign legends and backgrounds visible to motorists when viewed at night with headlight illumination. Two retroreflective material groups are specified. These groups are designated by the Federal Highway Administration by performance type. The two groups include glass bead technology as manifested in Type I and Type II material , and Type III, which is a brighter and longer life product that uses prismatic lens technology for retroreflectivity properties.

Selection of the appropriate type of material is based life-cycle cost, retroreflective brightness, visual quality of the material, and quality of the material. The selection of a retroreflective material should be based on the performance of the material over the entire life

cycle. While the brightness of retroreflective materials will diminish over the life of the product, the minimum warranted brightness at the end of the anticipated life of the product is just as important as the brightness of the material when it is new. Life cycle cost data based on manufacturer's specification for minimum reflectivity is available from the National UniGuide Manager at Harpers Ferry Center. A sign with limited effectiveness at night has no real value and can result in safety problems.

Two methods of graphic production are specified for Road Guide Signs. The preferred method is to use adhesive transparent brown overlay film that has been cut in reverse from the digital (vector art) sign layout and cutting file on a computer plotter and applied to a white retroreflective substrate. The alternative method is to apply the various pieces of white computer cut retroreflective legend that include border, prespaced words, arrows, symbols, etc., onto a retroreflective Brown background. The method of production using transparent overlay film is significantly less expensive for both material and production labor and insures greater consistency because it is a precise copy of the design layout file.

In all assemblies, the Alumalite with sign graphic applied directly to the front face with aluminum angles bonded horizontally to the back face. The angles are in turn bolted to a matching angle attached to the face of the dimensional timber uprights.

Material 1a: Type I (Engineering Grade) retroreflective sheeting is applied to the Alumalite. Type I is a seven year product with a base 70 candle power brightness. This method is recommended only for locations where the sign will be replaced well before its estimated useful life because it will carry only 50% of brightness at the end of the specified life cycle.

Material 1b: Type II (Super Engineering Grade) retro reflective sheeting is applied to the Alumalite panel. This is a 10-year product with a base 140 candle power brightness. Type II is the recommended option that has a lower life-cycle cost than the Type I material. It maintains 50% of brightness at the end of a 10-year life cycle, and carries a superior replacement warranty from the sheeting manufacturer.

Method 2: Type III (Prismatic High Intensity) is a white retroreflective sheeting with transparent overlay film cut in reverse and applied to a white retroreflective substrate. The composite sign face is applied to the Alumalite panel. This is a 10+ year product with a base 300 candle power brightness. This is the recommended option for long-life installations and for narrow, nonilluminated park roads. It is warranted to maintain 80% of original brightness over a ten-year life cycle.

An optional material would be a Type III material based on glass bead technology that is commonly known as high intensity. The high intensity product has a silver or light gray color background. The advantage of prismatic material, in addition to the manufacturer's

warranty is that it is retroreflectively brighter under most conditions actually seen by the motorist and has better daytime whiteness, with transparent applied colors being brighter because of the white background color.

Because the cost of sheeting material is only a fraction of the overall cost of a sign, its selection should be based on performance requirements, not just cost.

Traffic Regulatory

The materials used for Traffic Regulatory Sign structures and panels are simple and conventional. The sign graphics are retroreflective. The signs assemblies should be finished and well maintained. Refer to Section 4.5 for specifications and options based on the type of sign used.

Chapter 6

UniGuide Reference

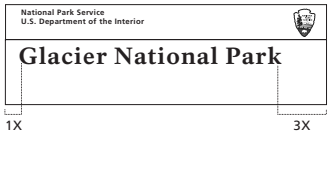
Section 6.4

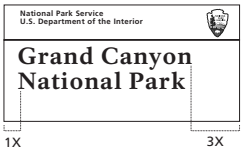
NPS/Park Identification Panel Legend Format Guide

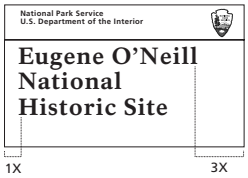
Final Draft: *June 1, 2002*

Introduction: This section displays legend format options for the graphic layout of NPS/Park Identification Signs. From this section, a UniGuide planner can select the appropriate format for a specific sign based on both the panel width and the most appropriate look or this particular display. The ruler at the base of each display identifies the length of the legend in relation to the capital letter height (x); to this length are added left and right margin values to create the full width of the panel. To determine if a legend will fit into a specific sign panel, use the guide below. The full park name must be listed on each sign. In no case can the park classification "National Historic Site" or "National Seashore" be made a different type size or typeface. For guidance on sign formatting, contact the Regional UniGuide Manager or the National UniGuide Program Manager at Harpers Ferry Center.

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Glacier National Park	Grand Canyon National Park	Eugene O'Neill National Historic Site	



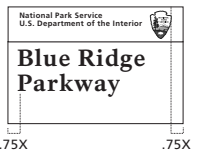




Ground Mounted Format Panels: For NPS / Park Identification signs with 4", 6", 9" and 12" legends in the horizontal format, add 4x to the length of the example legends shown above (1x added on the left of legend and 3x on the right).

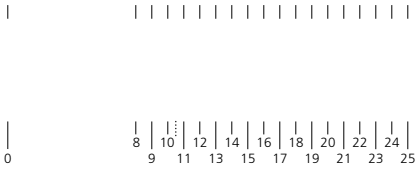
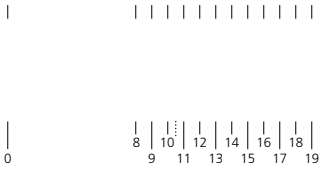
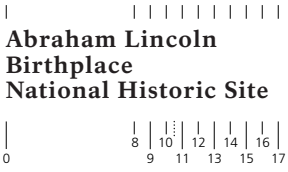
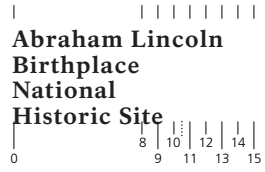
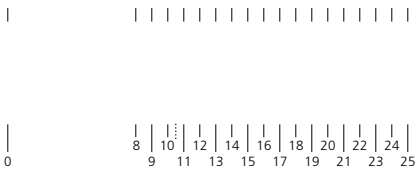
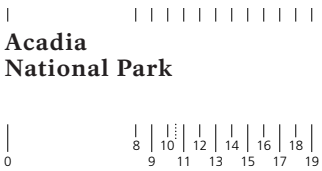
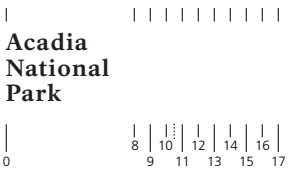
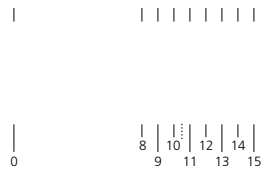
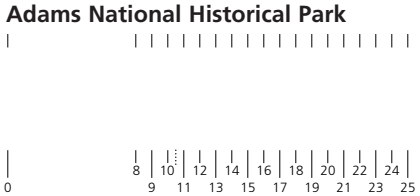
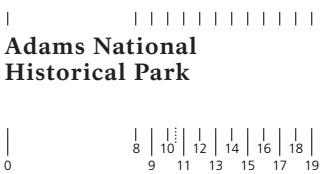
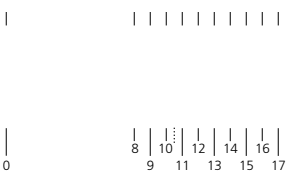
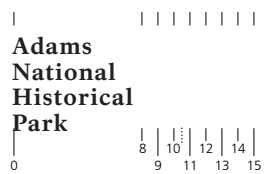
1-Line Format	2-Line Format	3-Line Format	4-Line Format
	Blue Ridge Parkway	Colorado National Monument	Apostle Islands National Seashore

Maximum Legend Length for Hanging Panel Format



Hanging Format Panels: For NPS/Park Identification Signs in the hanging format, add 1.5 x to the length of the example legends shown below (.75x added on the left of legend and .75x added on the right). The panel has a fixed width of 12x, limiting the longest legend length to 10.5x.

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Abraham Lincoln Birthplace National Historic Site			
			
Acadia National Park			
			
Adams National Historical Park			
			
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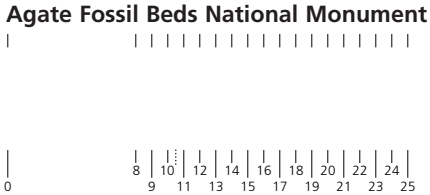		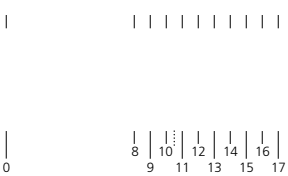	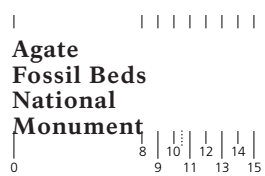
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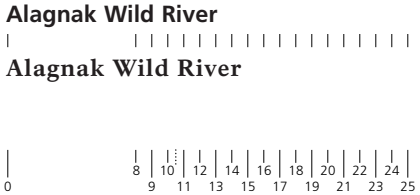	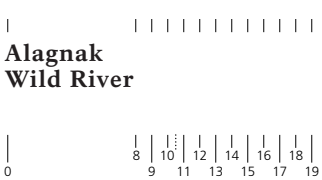	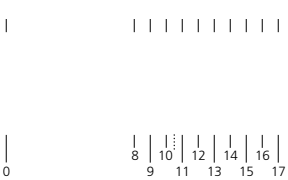	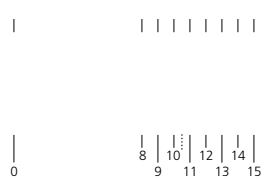
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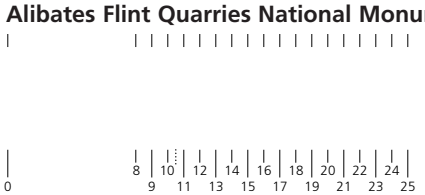	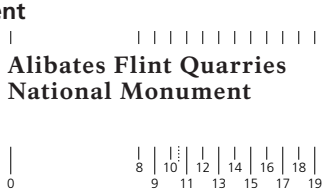	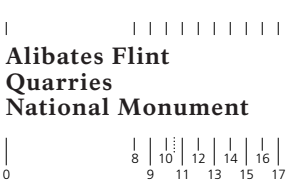	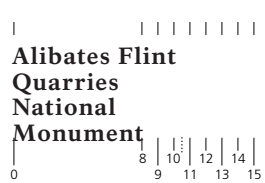
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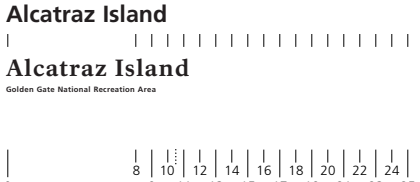		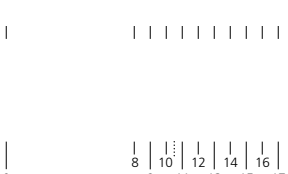	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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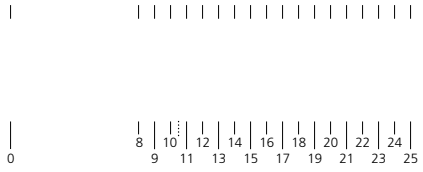	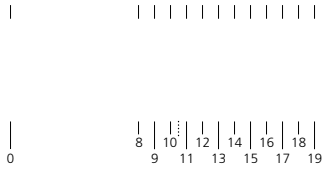	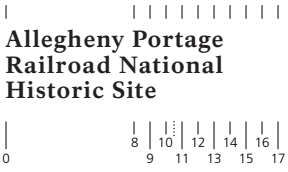	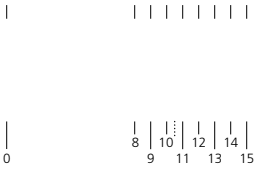
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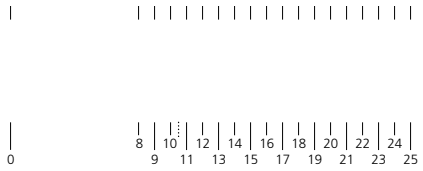	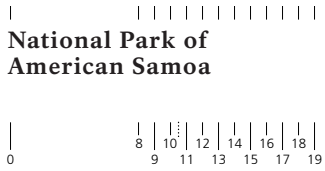	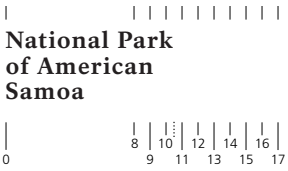	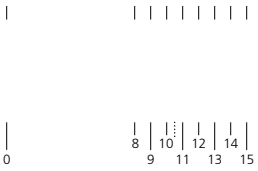
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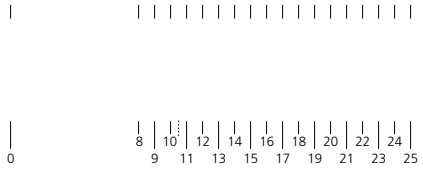	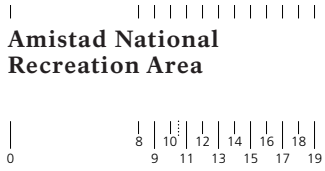	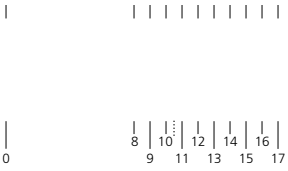	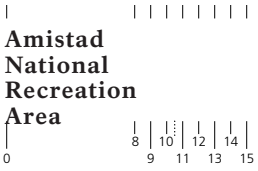
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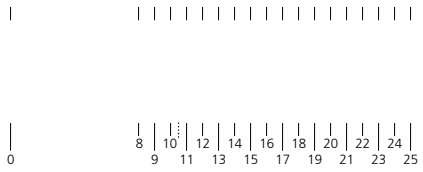	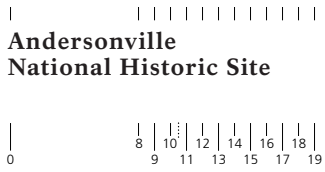	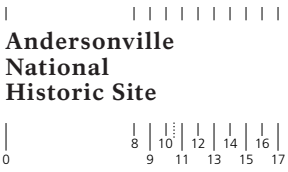	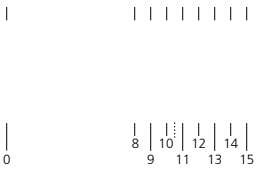
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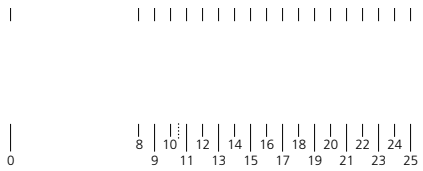	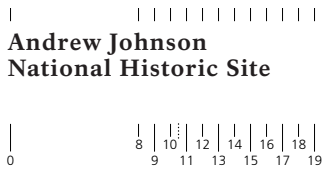	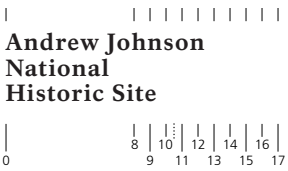	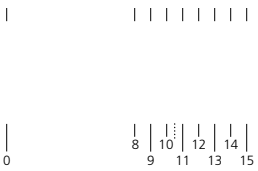
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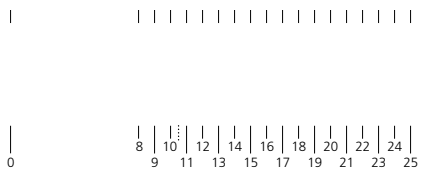	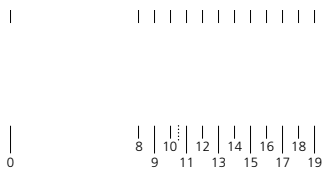	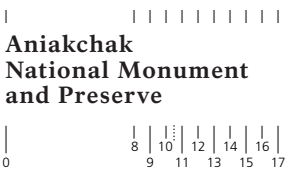	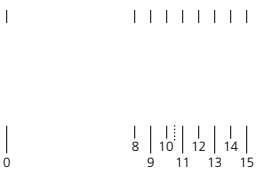
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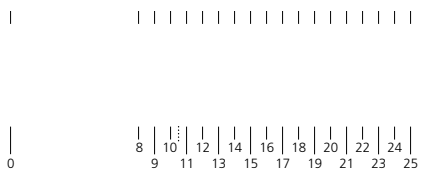
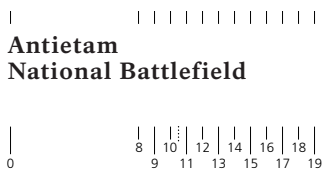
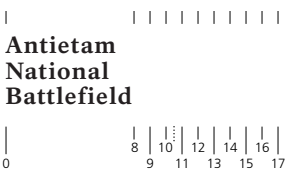
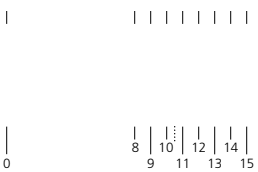
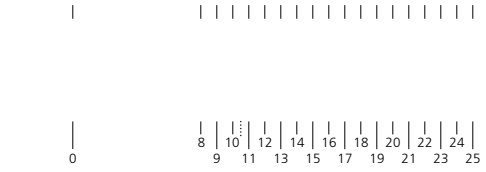
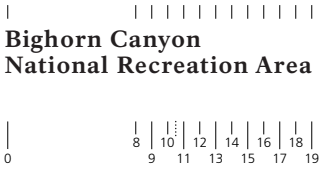
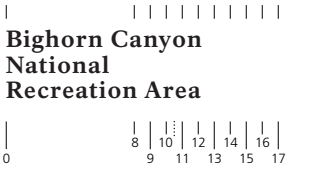
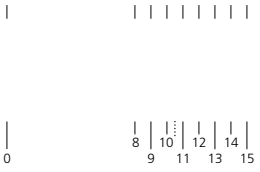
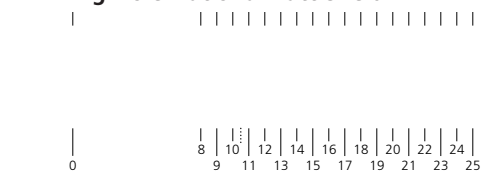
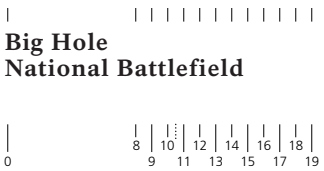
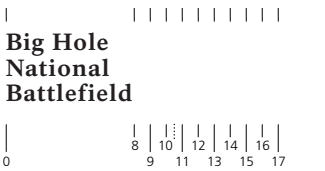
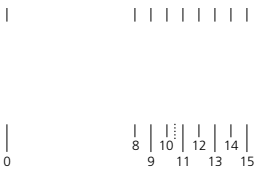
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Apostle Islands National Lakeshore	Apostle Islands National Lakeshore	Apostle Islands National Lakeshore	Apostle Islands National Lakeshore
Appalachian National Scenic Trail	Appalachian National Scenic Trail	Appalachian National Scenic Trail	
Appomattox Court House National Historical Park	Appomattox Court House National Historical Park		Appomattox Court House National Historical Park
Arches National Park	Arches National Park	Arches National Park	
Arkansas Post National Memorial	Arkansas Post National Memorial	Arkansas Post National Memorial	
Arlington House, The Robert E. Lee Memorial		Arlington House The Robert E. Lee Memorial	
Assateague Island National Seashore	Assateague Island National Seashore		Assateague Island National Seashore

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Aztec Ruins National Monument	Aztec Ruins National Monument	Aztec Ruins National Monument	
Badlands National Park	Badlands National Park	Badlands National Park	
Bandelier National Monument	Bandelier National Monument	Bandelier National Monument	
Bent's Old Fort National Historic Site	Bent's Old Fort National Historic Site	Bent's Old Fort National Historic Site	
Bering Land Bridge National Preserve	Bering Land Bridge National Preserve		Bering Land Bridge National Preserve
Big Bend National Park	Big Bend National Park	Big Bend National Park	
Big Cypress National Preserve	Big Cypress National Preserve	Big Cypress National Preserve	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Bighorn Canyon National Recreation Area			
			
Big Hole National Battlefield			
			
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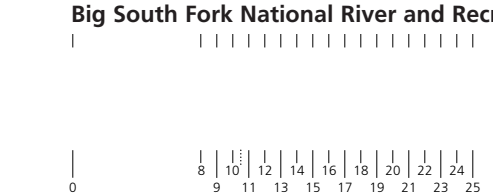	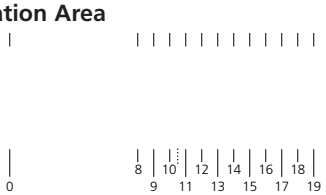	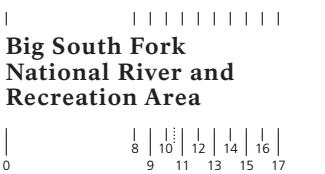	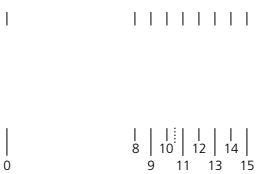
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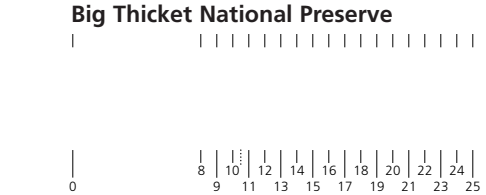	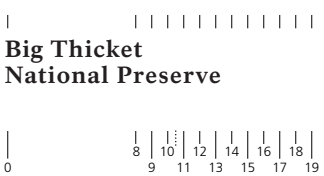	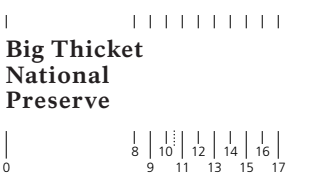	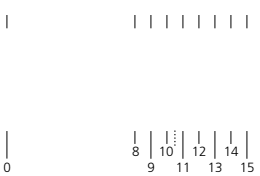
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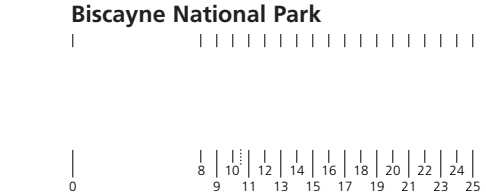	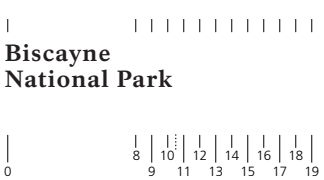	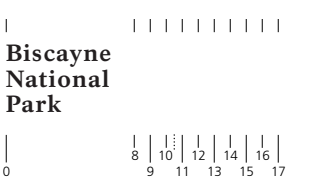	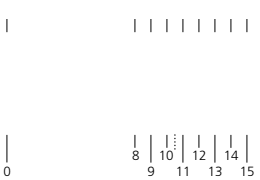
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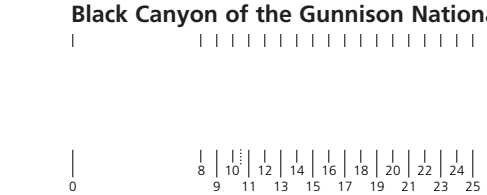
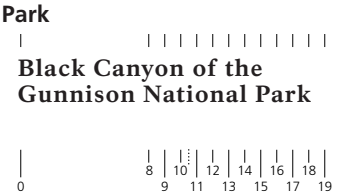
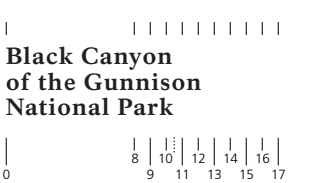
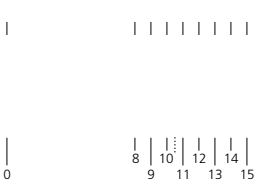
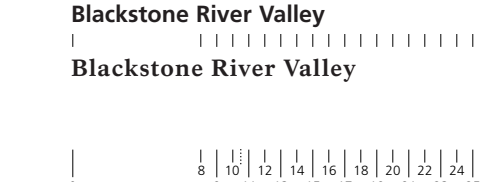
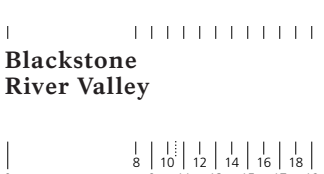
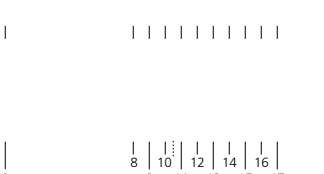
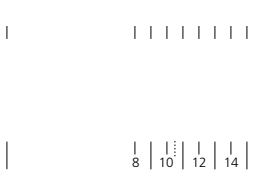
			
Blackstone River Valley			
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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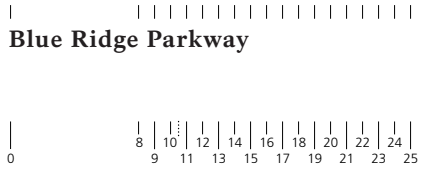
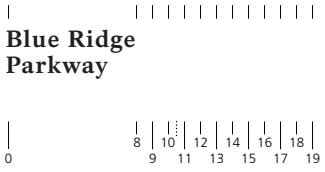
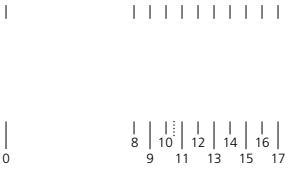
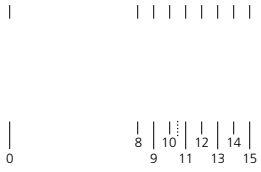
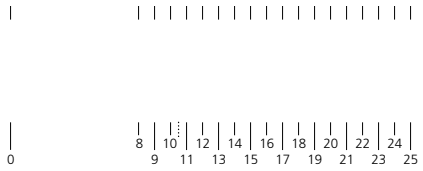
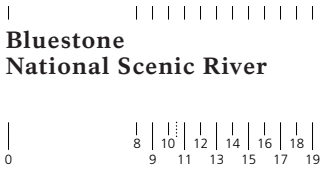
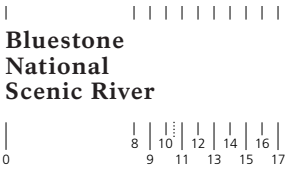
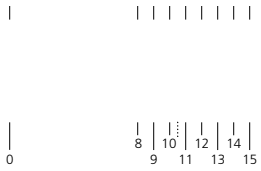
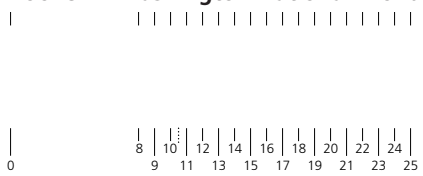
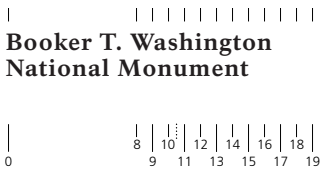
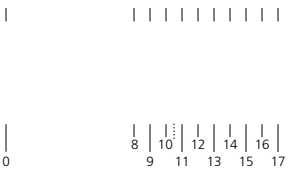
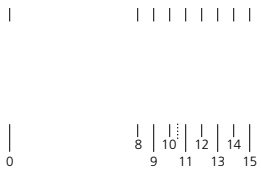
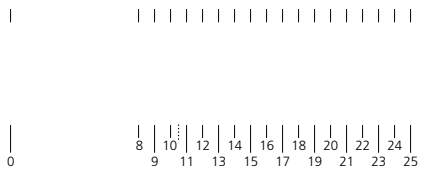
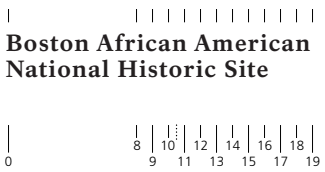
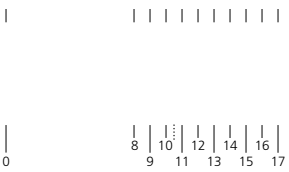
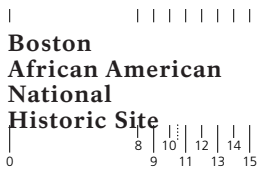
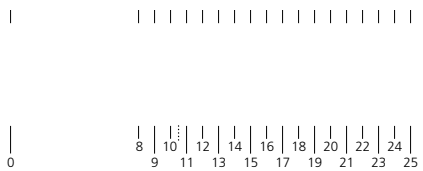
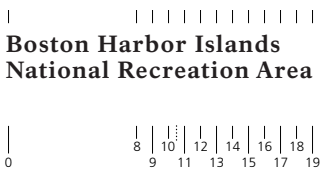
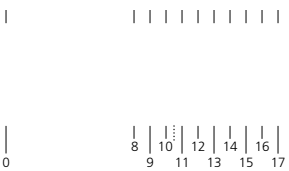
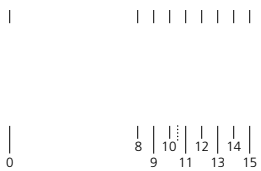
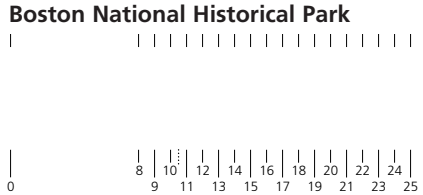
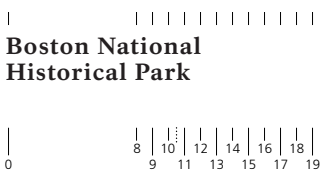
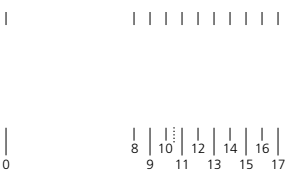
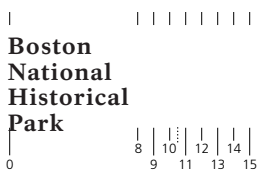
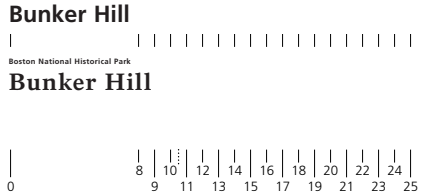
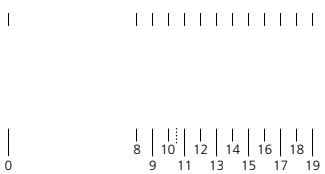
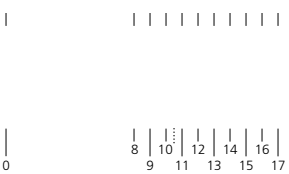
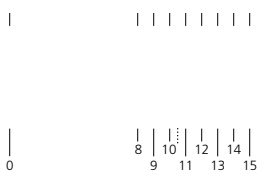
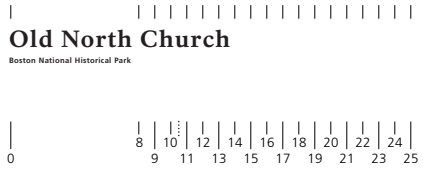
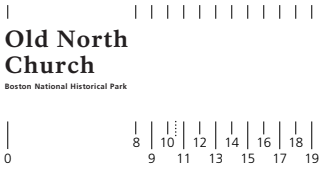
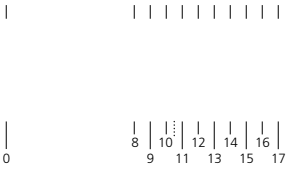
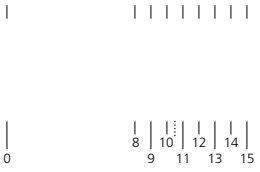
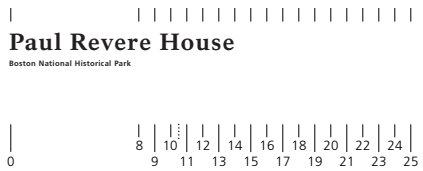
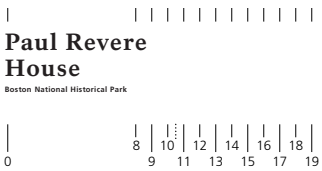
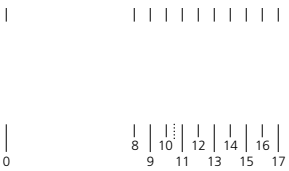
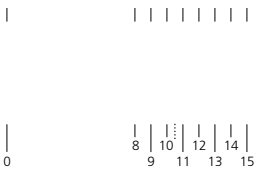
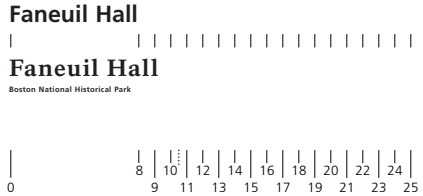
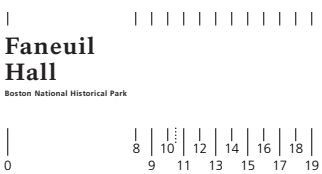
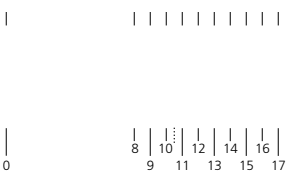
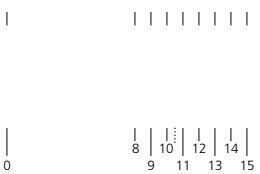
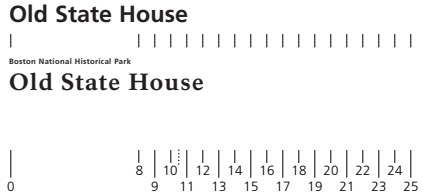
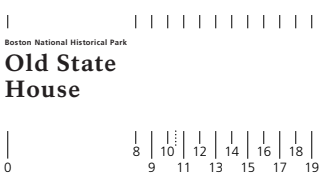
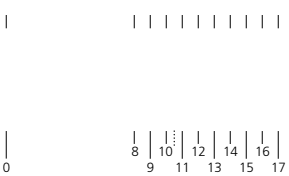
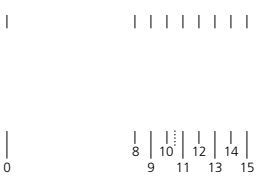
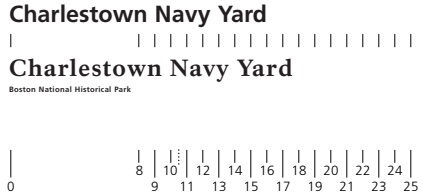
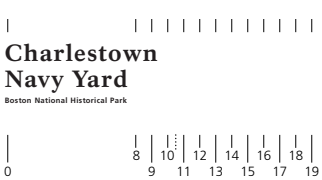
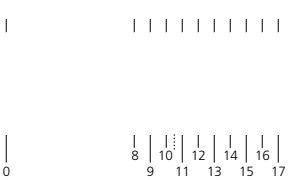
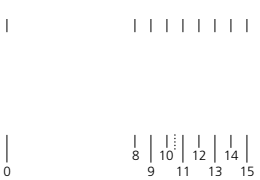
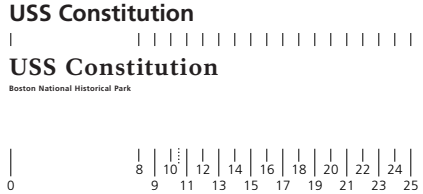
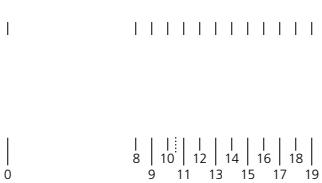
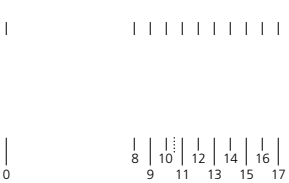
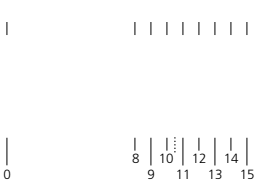
			
Bluestone National Scenic River			
			
Booker T. Washington National Monument			
			
Boston African American National Historic Site			
			
Boston Harbor Islands National Recreation Area			
			
Boston National Historical Park			
			
Bunker Hill			
			

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Old North Church			
			
Paul Revere House			
			
Faneuil Hall			
			
Old State House			
			
Charlestown Navy Yard			
			
USS Constitution			
			
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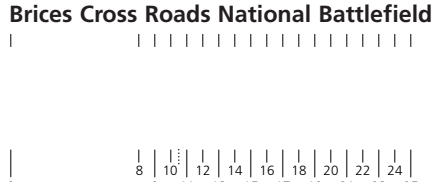
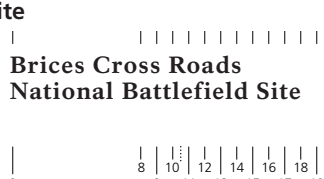
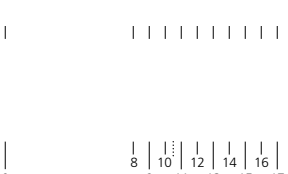
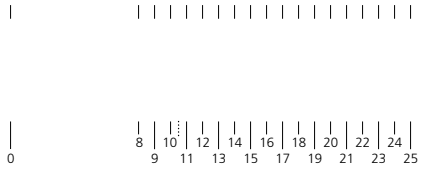
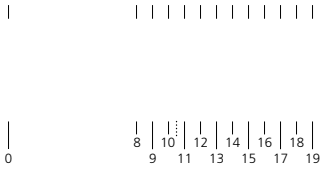
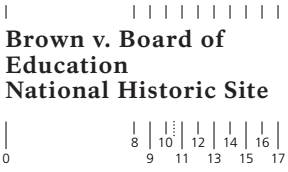
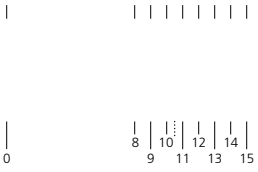
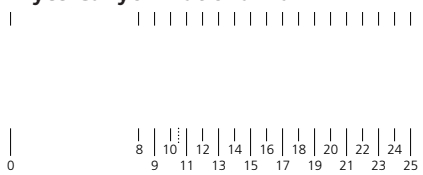
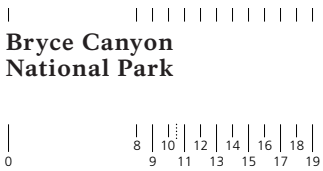
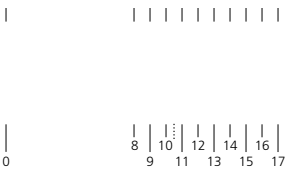
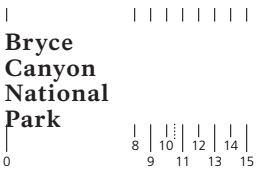
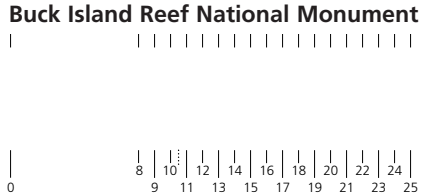
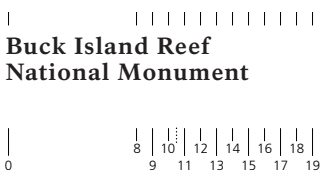
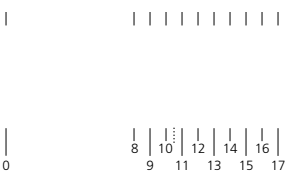
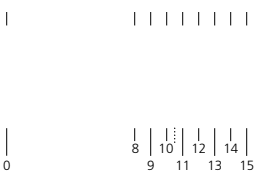
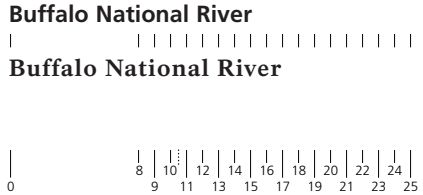
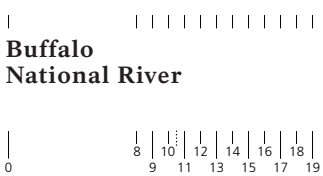
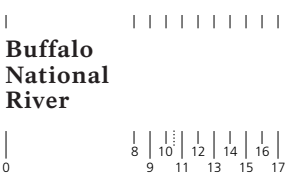
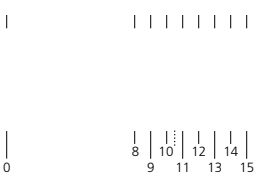
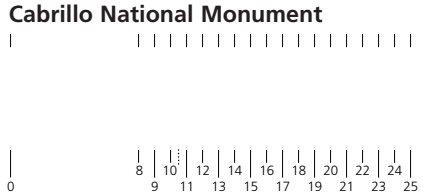
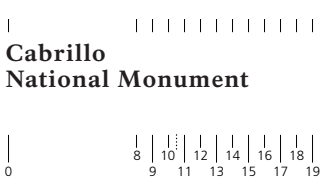
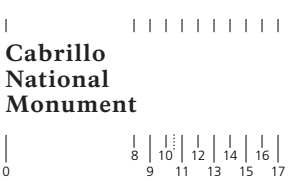
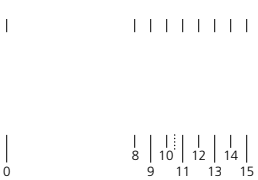
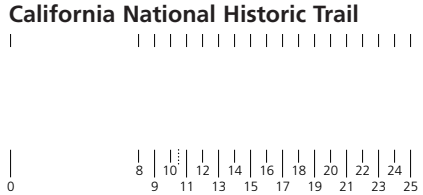
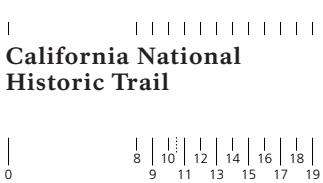
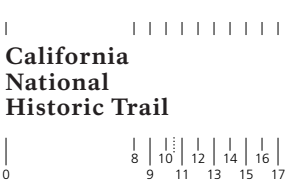
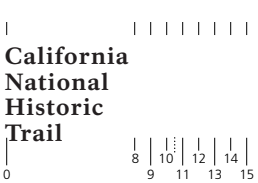
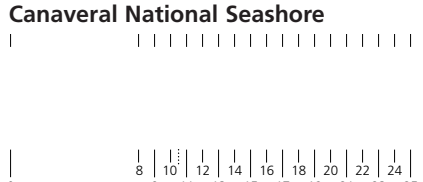
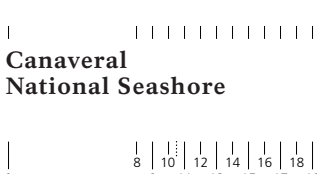
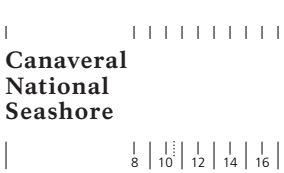
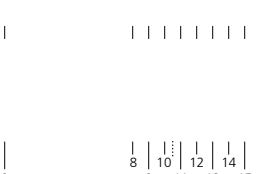
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Brown v. Board of Education National Historic Site			
			
Bryce Canyon National Park			
			
Buck Island Reef National Monument			
			
Buffalo National River			
			
Cabrillo National Monument			
			
California National Historic Trail			
			
Canaveral National Seashore			
			

6.4-NPS Park Identification Panel Legend Format Guide

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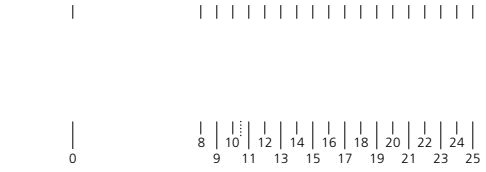
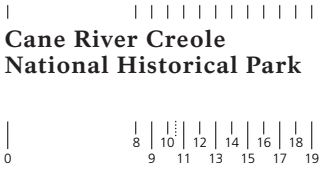
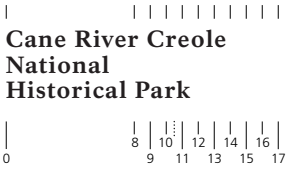
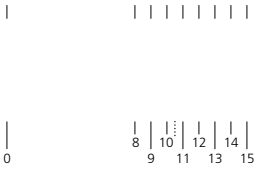
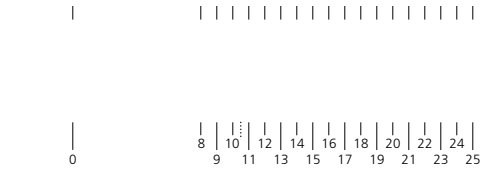
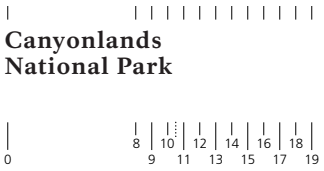
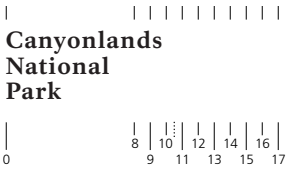
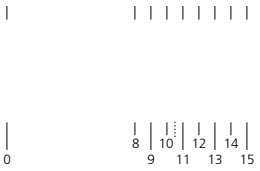
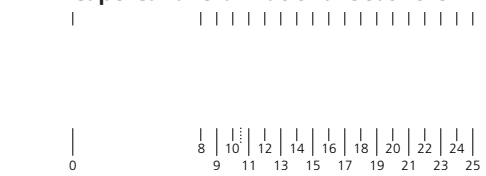
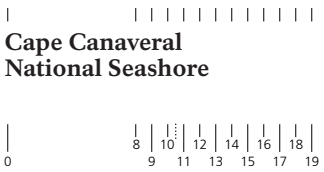
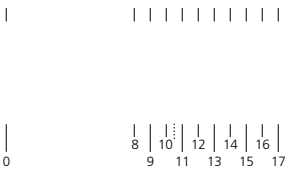
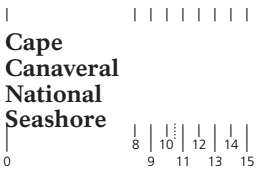
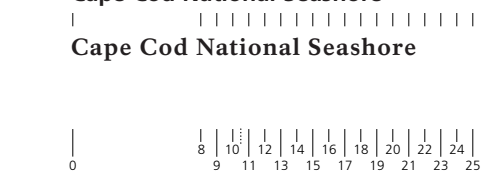
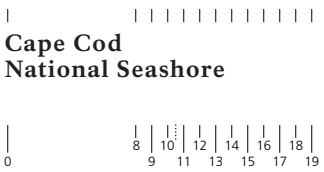
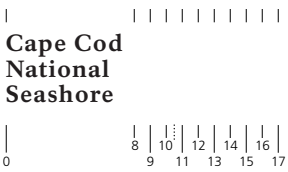
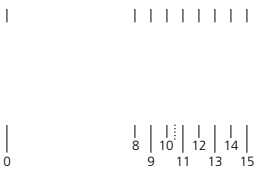
			
Canyon De Chelly National Monument			
			
Cape Canaveral National Seashore			
			
Cape Cod National Seashore			
			
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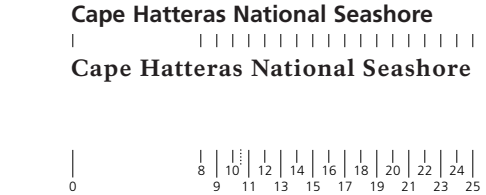	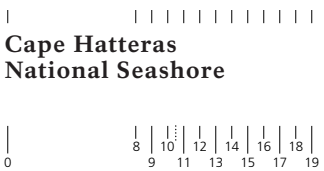	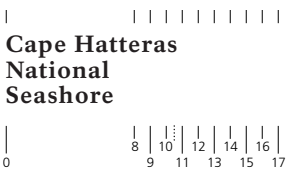	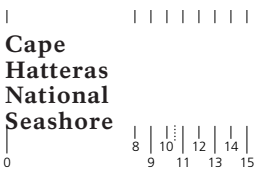
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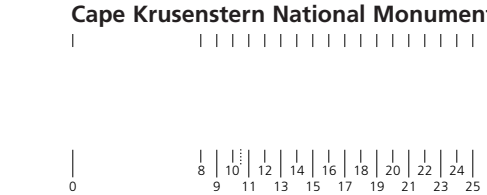
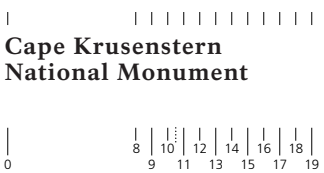
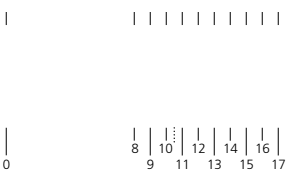
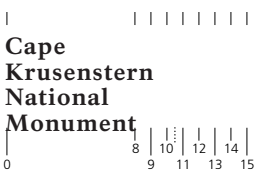
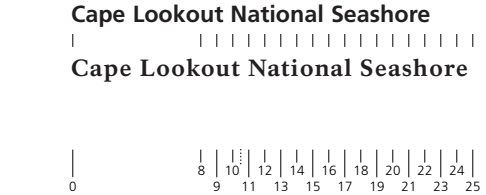
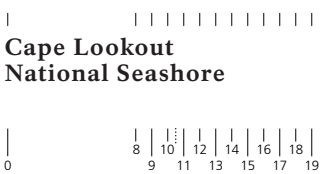
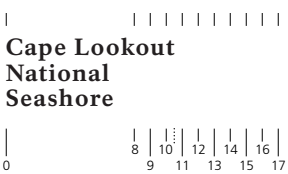
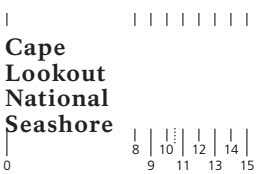
			
Cape Lookout National Seashore			
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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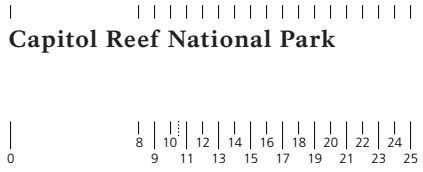
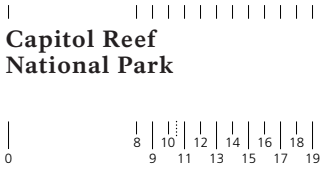
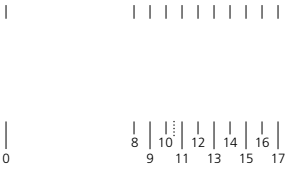
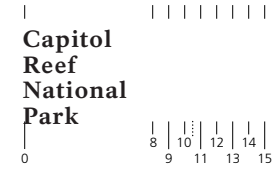
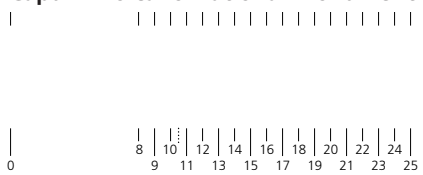
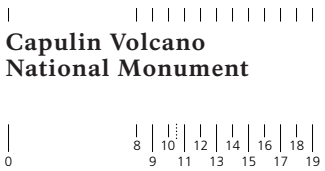
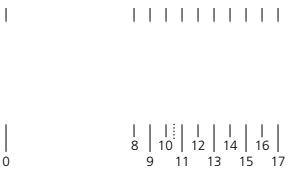
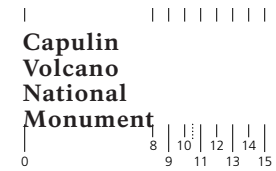
			
Capulin Volcano National Monument			
			
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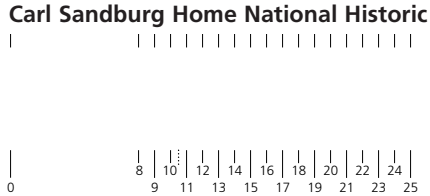	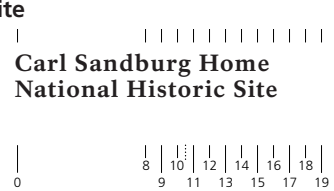	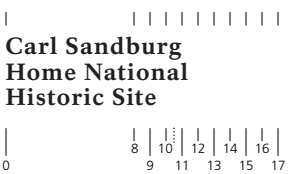	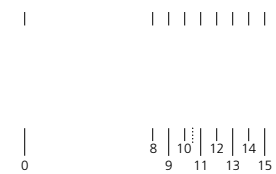
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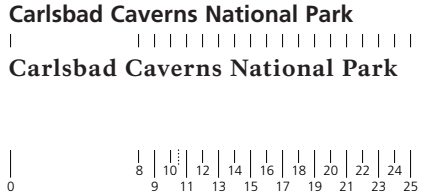
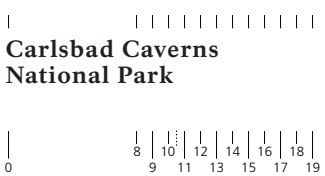
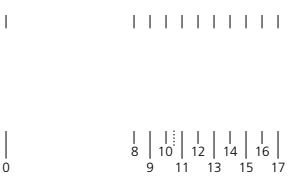
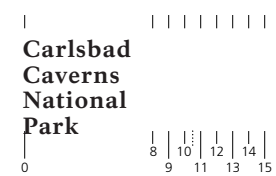
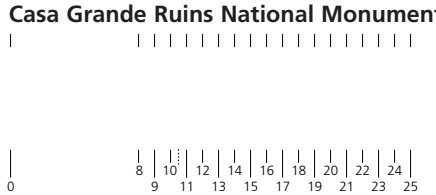
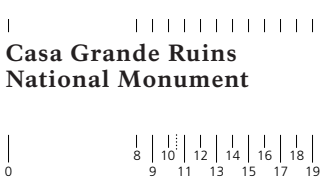
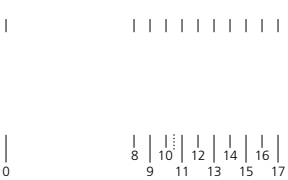
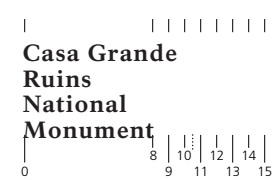
			
Casa Grande Ruins National Monument			
			
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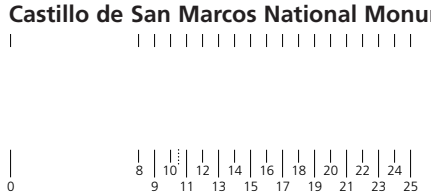		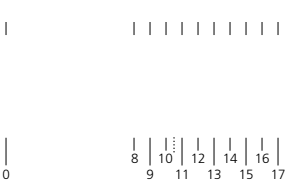	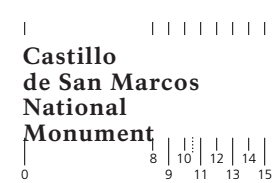
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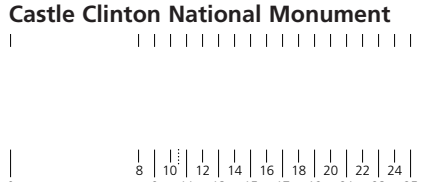	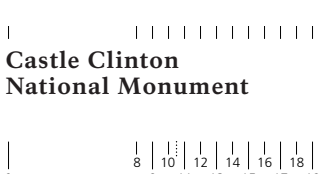	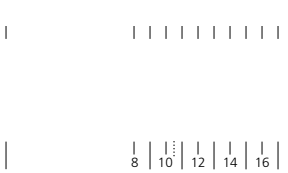	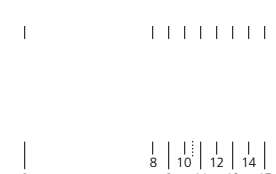

6.4-NPS Park Identification Panel Legend Format Guide

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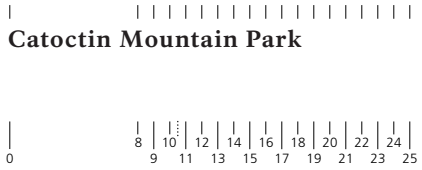
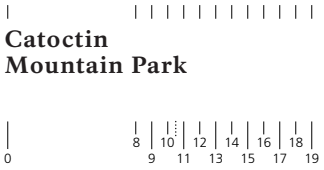
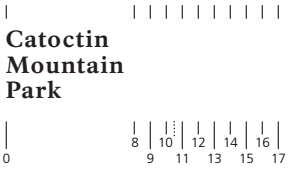
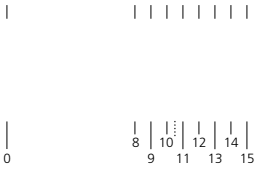
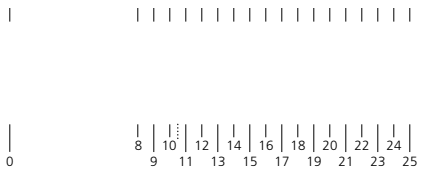
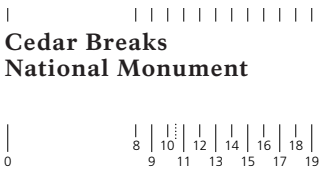
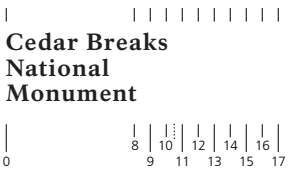
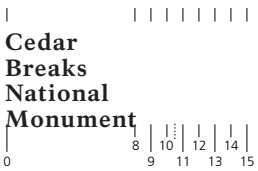
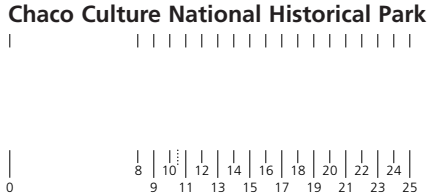
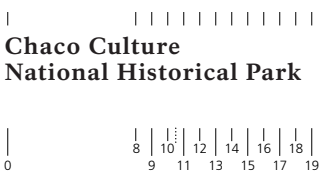
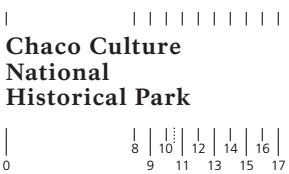
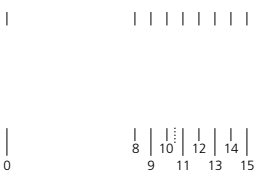
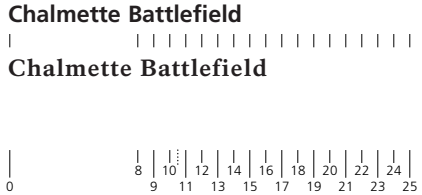
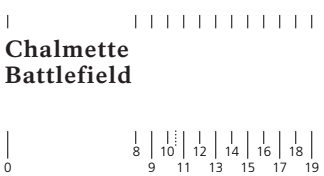
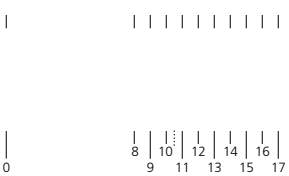
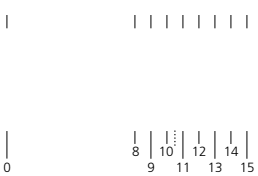
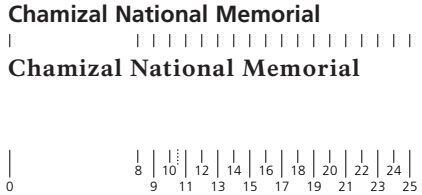
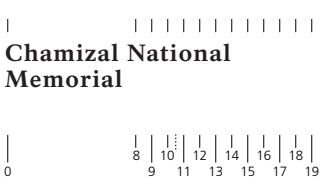
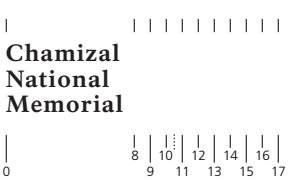
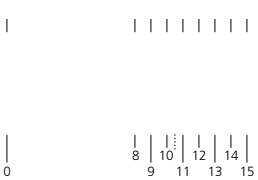
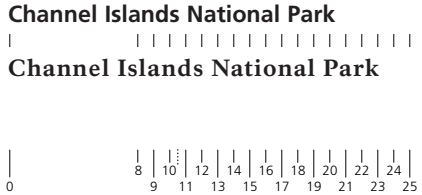
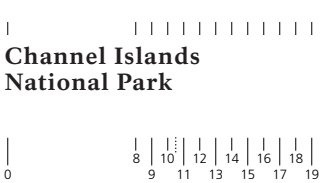
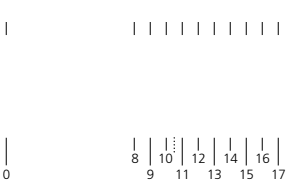
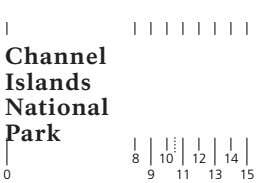
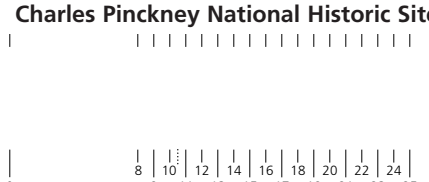
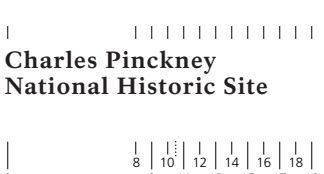
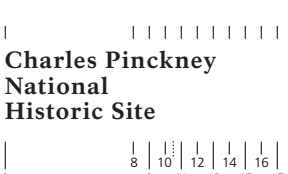
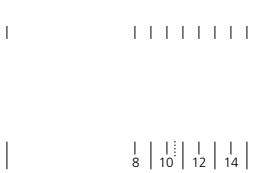
Catoctin Mountain Park  	 	 	
Cedar Breaks National Monument  	 	 	
Chaco Culture National Historical Park  	 	 	
Chalmette Battlefield  	 	 	
Chamizal National Memorial  	 	 	
Channel Islands National Park  	 	 	
Charles Pinckney National Historic Site  	 	 	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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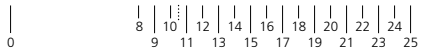
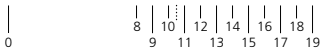
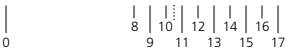
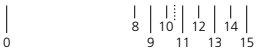
Charlestown Navy Yard	Charlestown Navy Yard		
			
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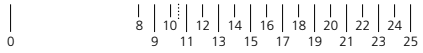
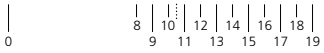
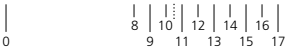
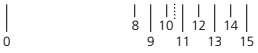
	Chattahoochee River National Recreation Area	Chattahoochee River National Recreation Area	
			
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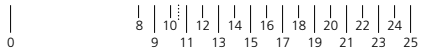
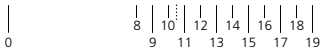
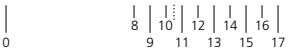
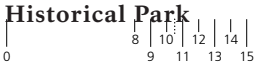
Chesapeake and Ohio Canal National Historical Park	See 1-Line Format	Chesapeake and Ohio Canal National Historical Park	Chesapeake and Ohio Canal National Historical Park
			
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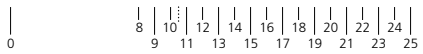
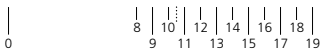
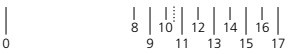
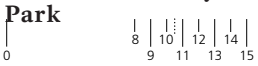
Chickamauga and Chattanooga National Military Park	See 1-Line Format	Chickamauga and Chattanooga National Military Park	Chickamauga and Chattanooga National Military Park
			
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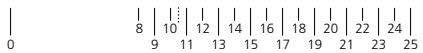
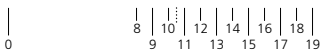
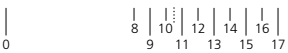
	Chickasaw National Recreation Area	Chickasaw National Recreation Area	Chickasaw National Recreation Area
			
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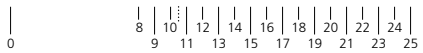	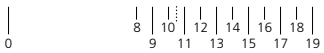	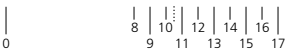	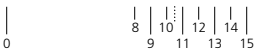
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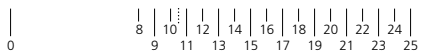
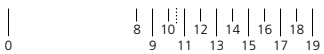
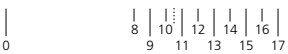
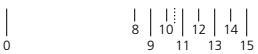
	Chiricahua National Monument	Chiricahua National Monument	
			

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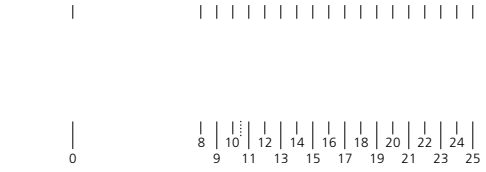	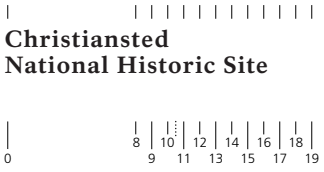	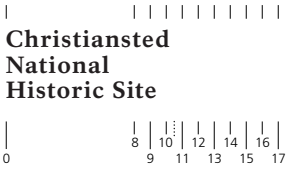	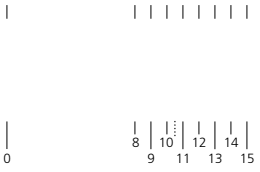
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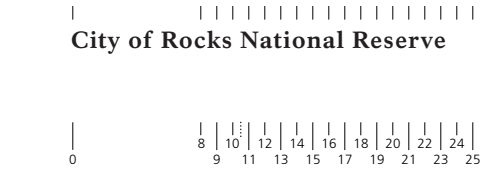	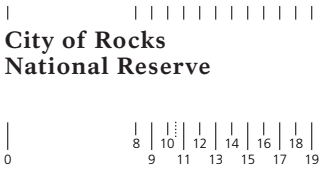		
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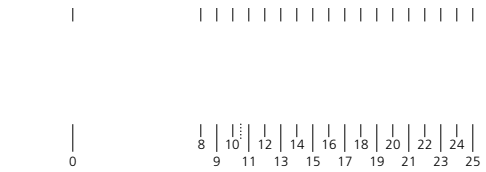	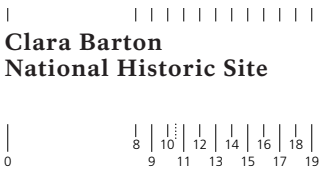	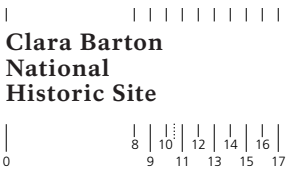	
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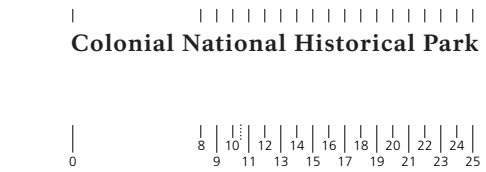	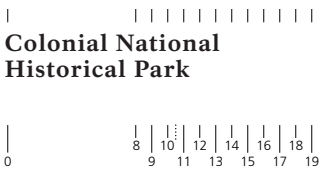		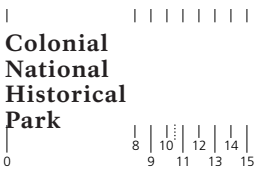
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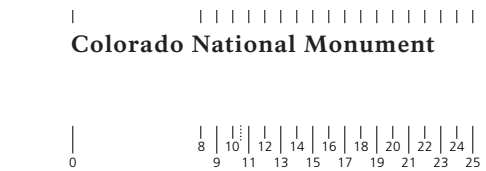	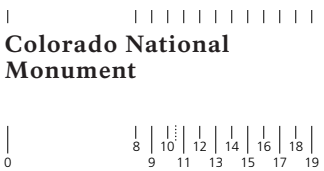	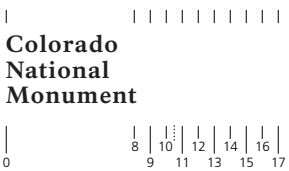	
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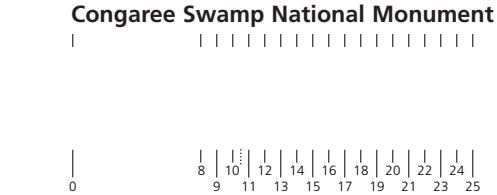	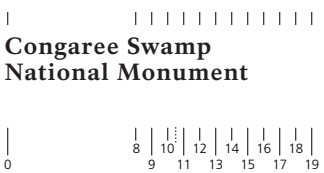		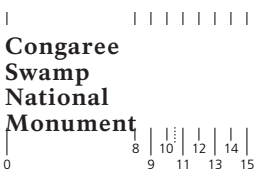
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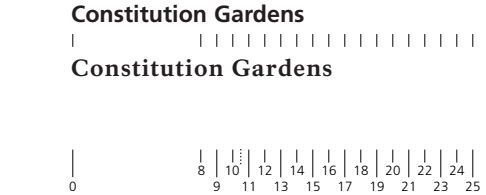	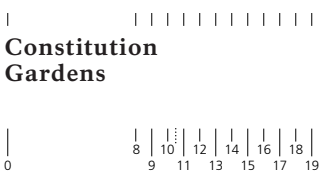		

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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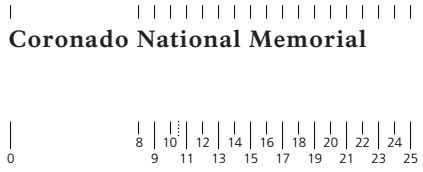	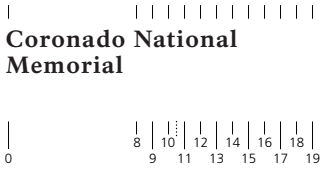	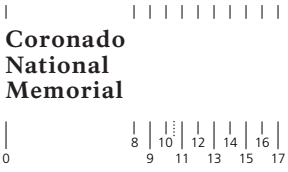	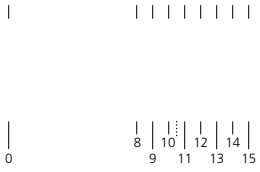
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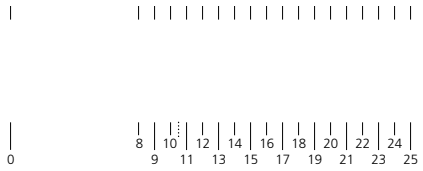	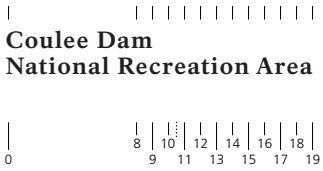	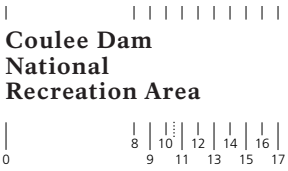	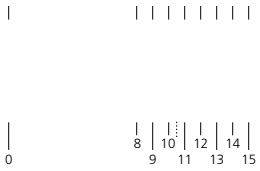
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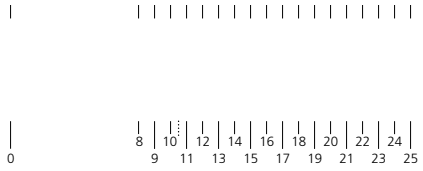	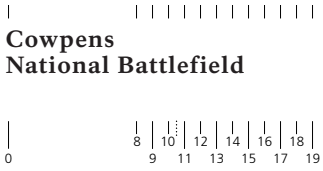	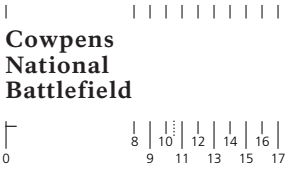	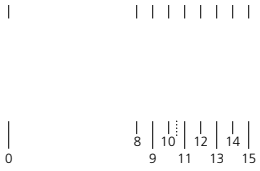
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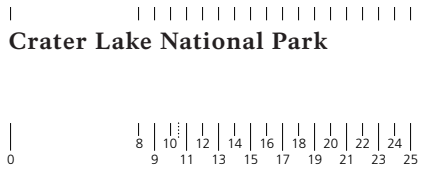	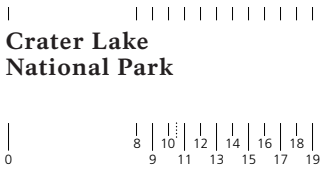	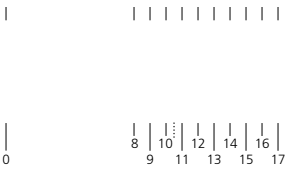	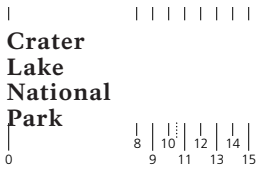
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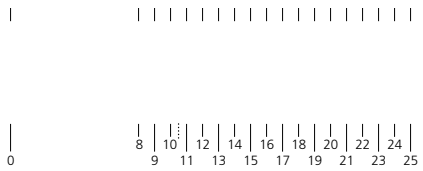	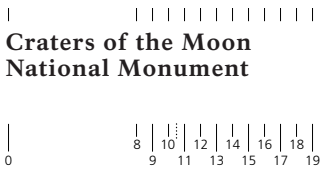	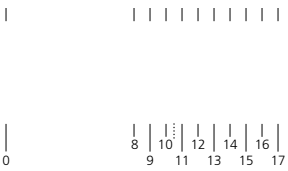	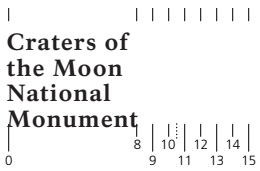
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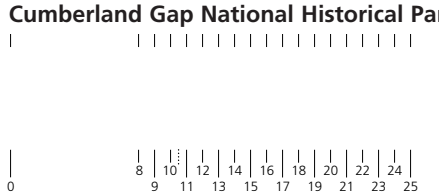	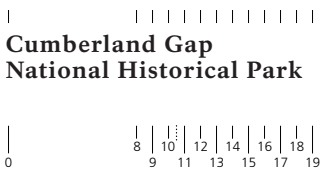	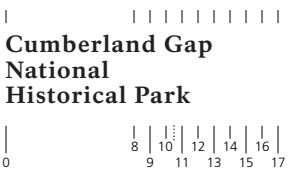	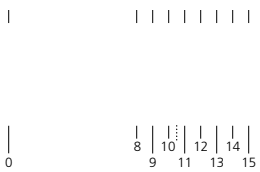
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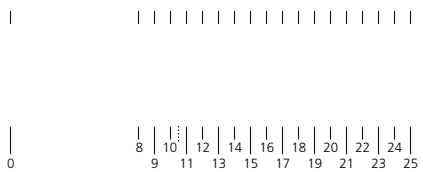		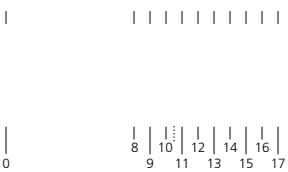	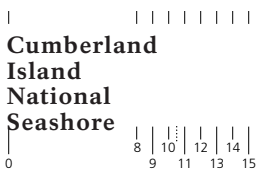

6.4-NPS Park Identification Panel Legend Format Guide

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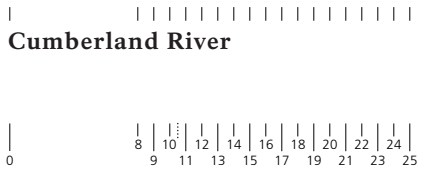
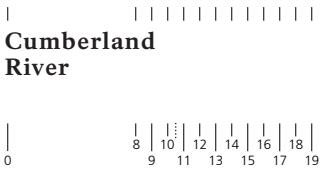
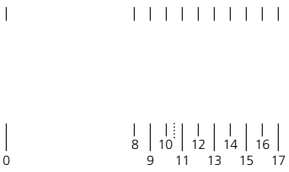
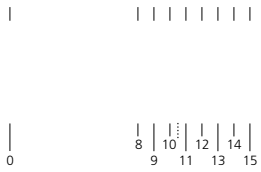
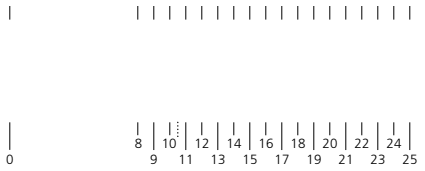
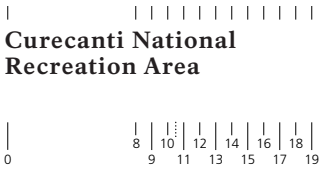
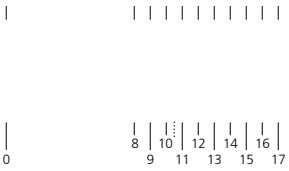
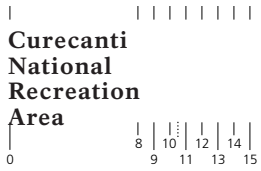
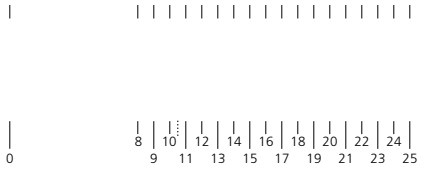
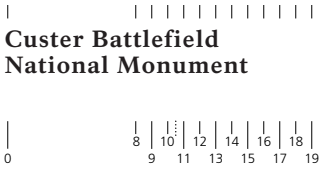
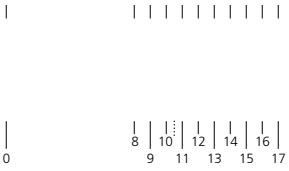
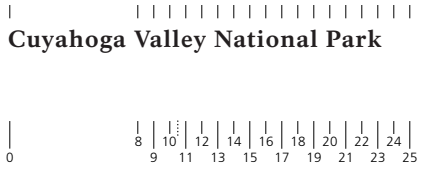
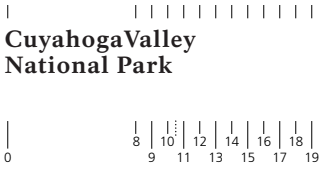
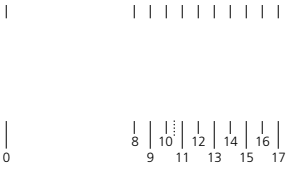
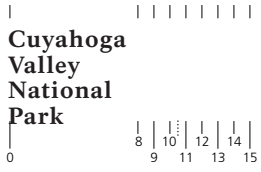
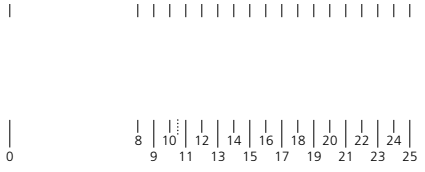
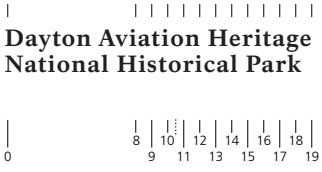
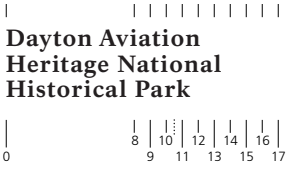
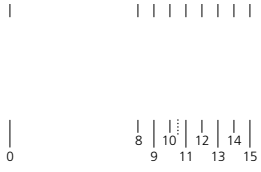
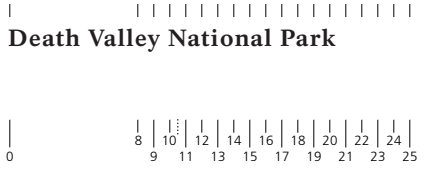
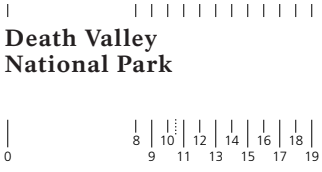
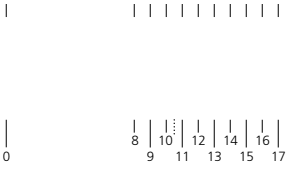
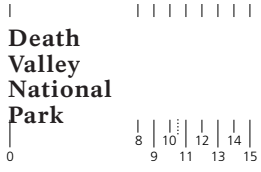
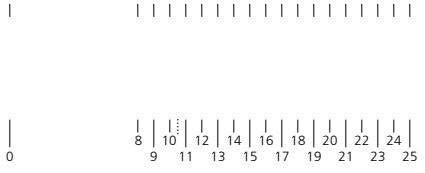
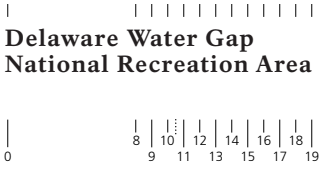
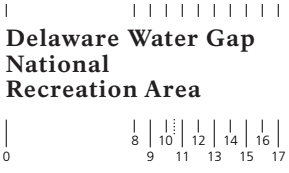
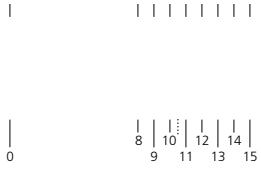
Cumberland River  Cumberland River	 Cumberland River		
Curecanti National Recreation Area  Curecanti National Recreation Area			 Curecanti National Recreation Area
Custer Battlefield National Monument  Custer Battlefield National Monument			 Custer Battlefield National Monument
Cuyahoga Valley National Park  Cuyahoga Valley National Park	 CuyahogaValley National Park		 Cuyahoga Valley National Park
Dayton Aviation Heritage National Historical Park 	 Dayton Aviation Heritage National Historical Park	 Dayton Aviation Heritage National Historical Park	
Death Valley National Park  Death Valley National Park	 Death Valley National Park		 Death Valley National Park
Delaware Water Gap National Recreation Area 	 Delaware Water Gap National Recreation Area	 Delaware Water Gap National Recreation Area	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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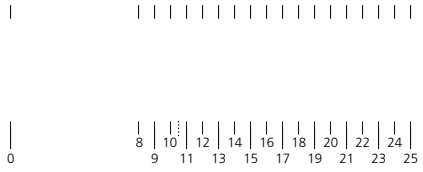
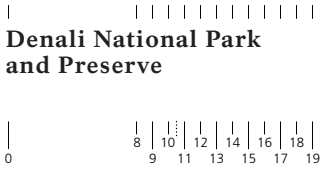
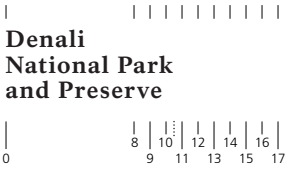
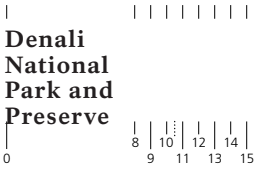
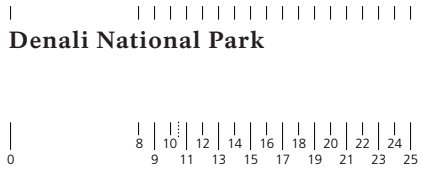
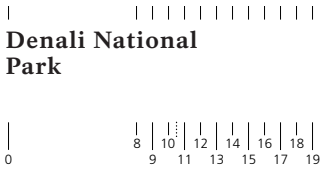
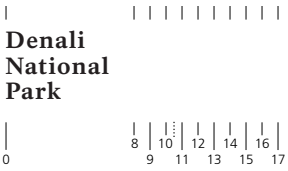
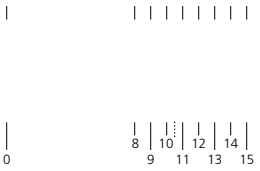
			
Denali National Park			
			
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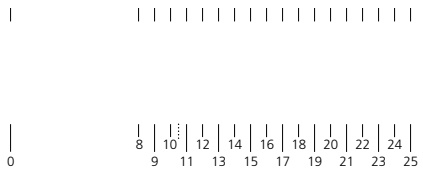
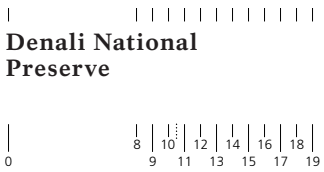
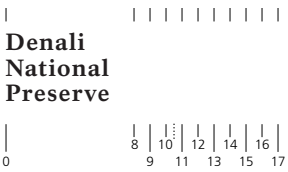
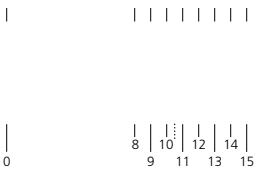
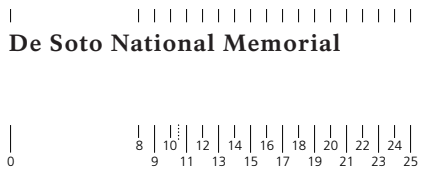
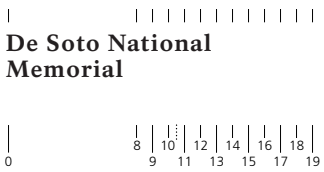
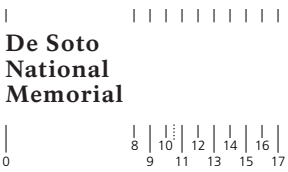
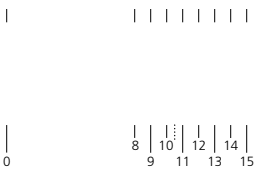
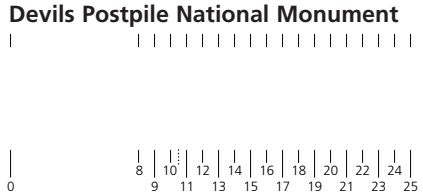
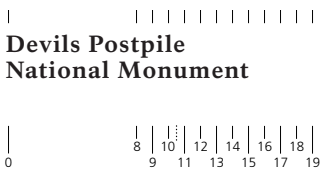
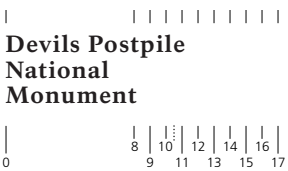
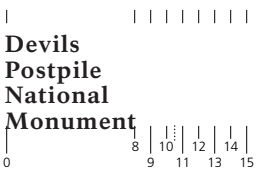
			
De Soto National Memorial			
			
Devils Postpile National Monument			
			
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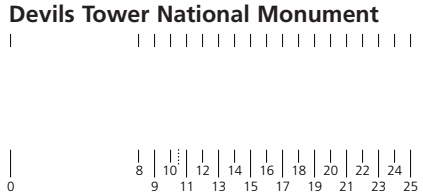
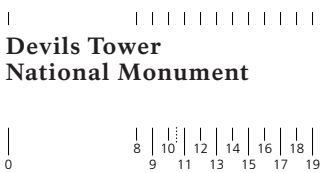
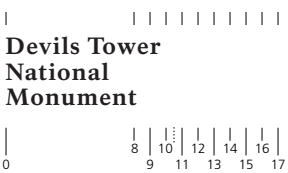
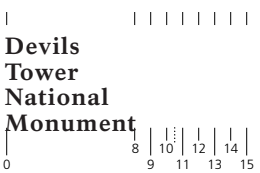
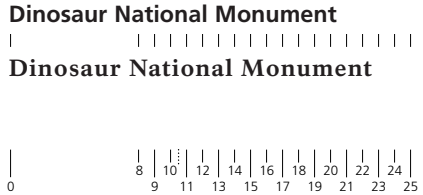
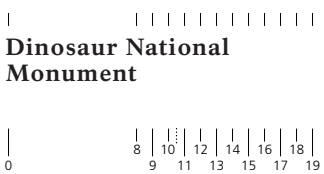
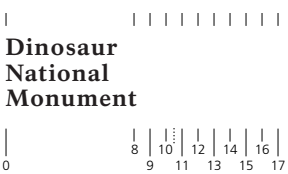
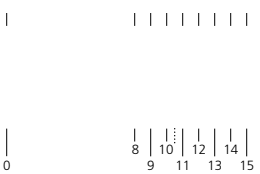
			
Dinosaur National Monument			
			

6.4-NPS Park Identification Panel Legend Format Guide

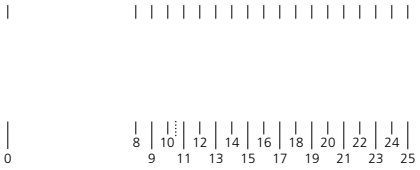
1-Line Format	2-Line Format	3-Line Format	4-Line Format
Dorchester Heights			
Dorchester Heights	Dorchester Heights		
Dry Tortugas National Park			
Dry Tortugas National Park	Dry Tortugas National Park		
Ebey's Landing National Historical Reserve			
		Ebey's Landing National Historical Reserve	Ebey's Landing National Historical Reserve
Edgar Allan Poe National Historic Site			
	Edgar Allan Poe National Historic Site	Edgar Allan Poe National Historic Site	
Edison National Historic Site			
Edison National Historic Site	Edison National Historic Site		Edison National Historic Site
Effigy Mounds National Monument			
	Effigy Mounds National Monument	Effigy Mounds National Monument	Effigy Mounds National Monument
Eisenhower National Historic Site			
Eisenhower National Historic Site	Eisenhower National Historic Site	Eisenhower National Historic Site	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Eleanor Roosevelt National Historic Site		Eleanor Roosevelt National Historic Site	Eleanor Roosevelt National Historic Site
Ellis Island Immigration Museum	Ellis Island Immigration Museum	Ellis Island Immigration Museum	
El Malpais National Monument	El Malpais National Monument	El Malpais National Monument	
El Morro National Monument	El Morro National Monument	El Morro National Monument	
Eugene O'Neill National Historic Site	Eugene O'Neill National Historic Site	Eugene O'Neill National Historic Site	
Everglades National Park	Everglades National Park	Everglades National Park	
Federal Hall National Memorial	Federal Hall National Memorial	Federal Hall National Memorial	

6.4-NPS Park Identification Panel Legend Format Guide

Fire Island National Seashore

1-Line Format



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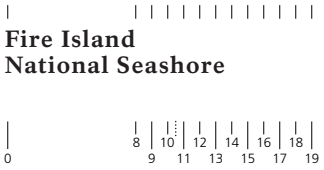

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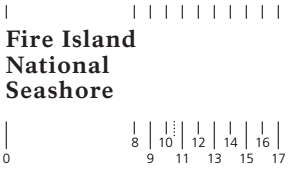
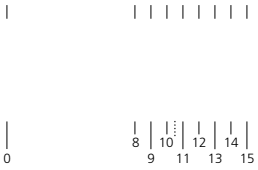
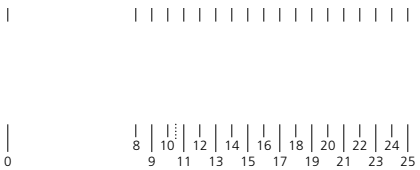


4-Line Format

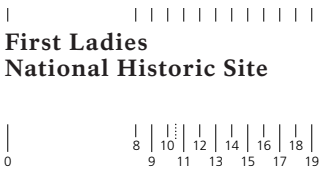


First Ladies National Historic Site

1-Line Format



2-Line Format



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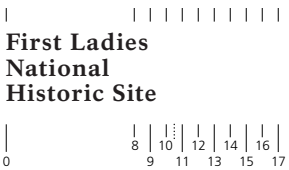
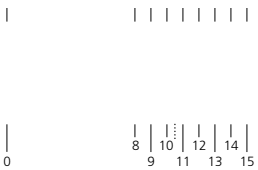
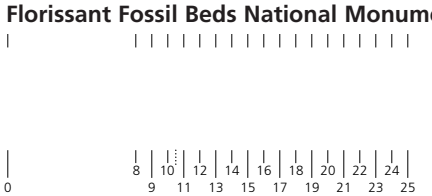


4-Line Format



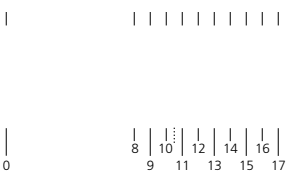
Florissant Fossil Beds National Monument

1-Line Format

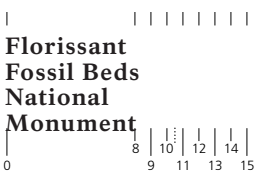


2-Line Format

3-Line Format

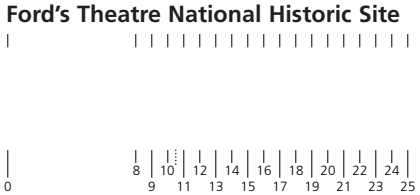


4-Line Format



Ford's Theatre National Historic Site

1-Line Format



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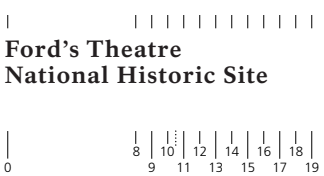

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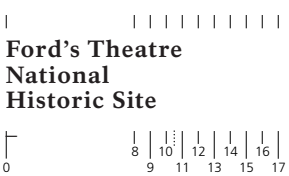

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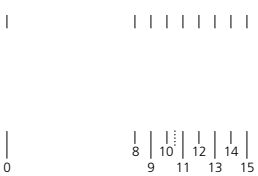
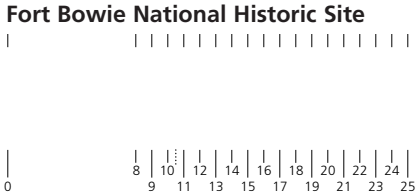


Fort Bowie National Historic Site

1-Line Format



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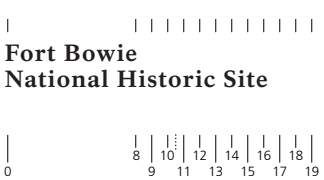

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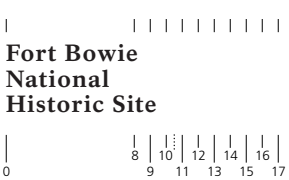

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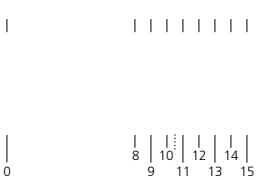
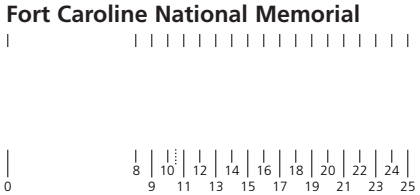


Fort Caroline National Memorial

1-Line Format



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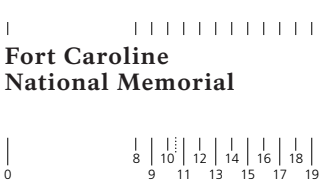

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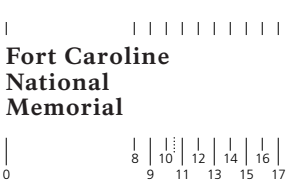

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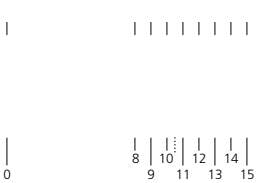

Fort Clatsop National Memorial

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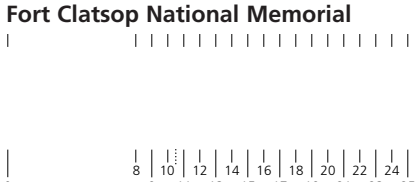

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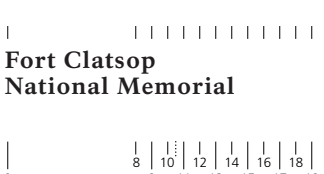

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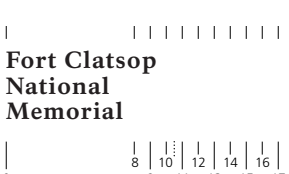

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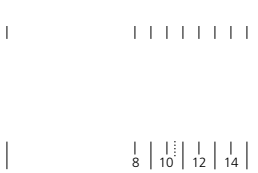
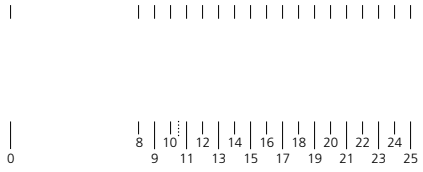
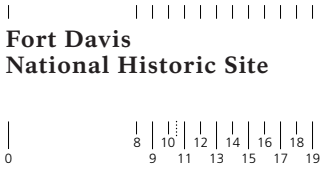
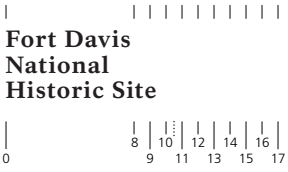
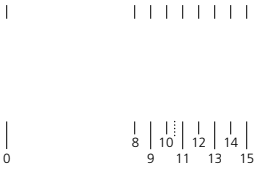
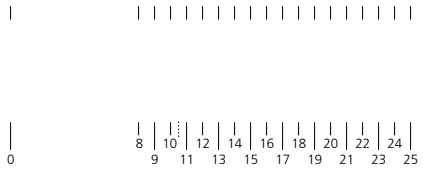
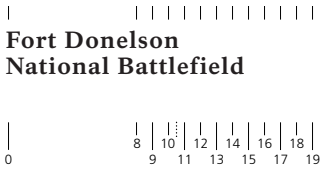
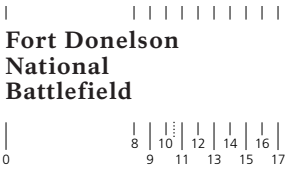
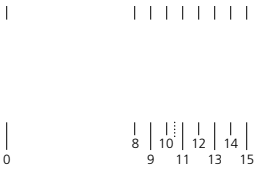
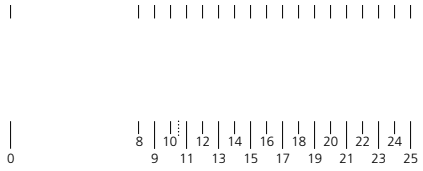
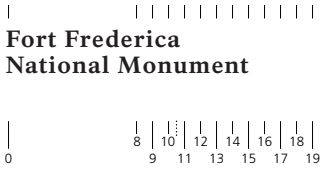
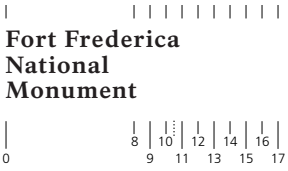
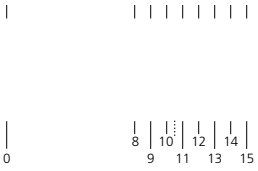
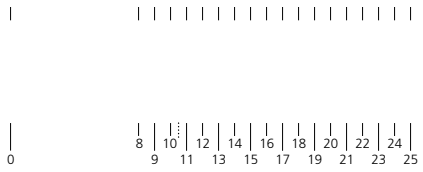
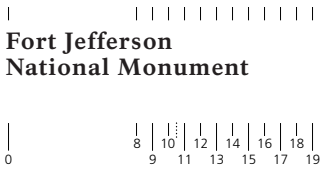
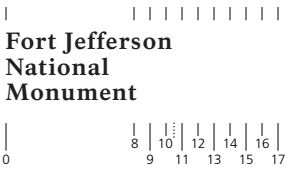
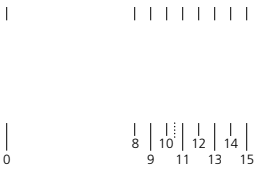


1-Line Format	2-Line Format	3-Line Format	4-Line Format
Fort Davis National Historic Site			
	**Fort Davis** **National Historic Site** 	**Fort Davis** **National** **Historic Site** 	
Fort Donelson National Battlefield			
	**Fort Donelson** **National Battlefield** 	**Fort Donelson** **National** **Battlefield** 	
Fort Frederica National Monument			
	**Fort Frederica** **National Monument** 	**Fort Frederica** **National** **Monument** 	
Fort Jefferson National Monument			
	**Fort Jefferson** **National Monument** 	**Fort Jefferson** **National** **Monument** 	
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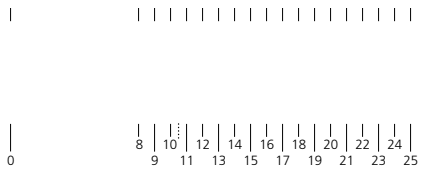
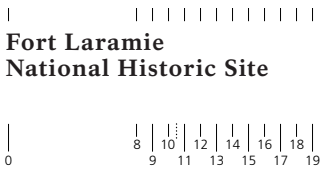
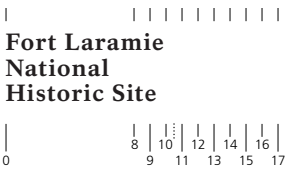
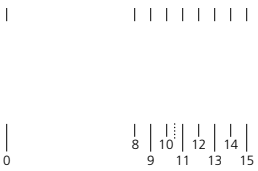
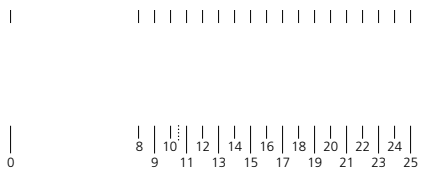
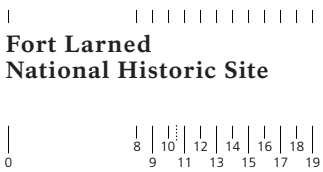
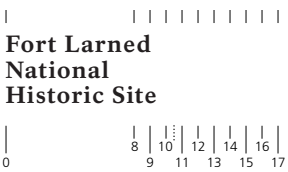
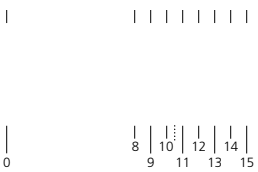
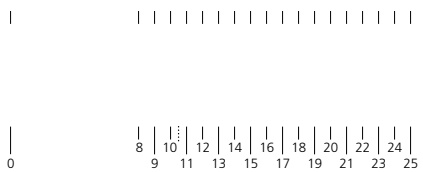
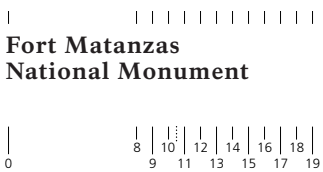
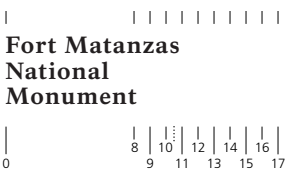
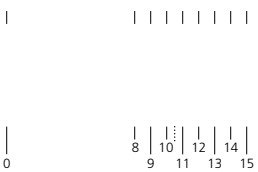
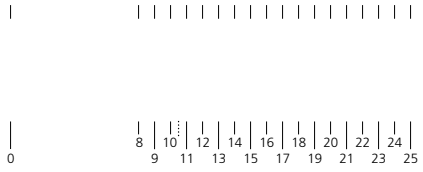
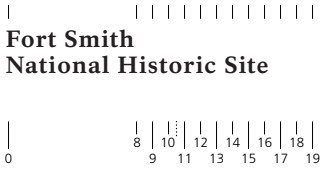
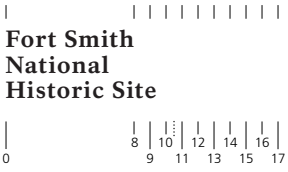
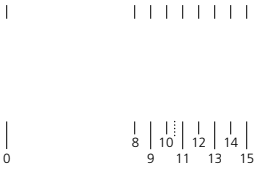
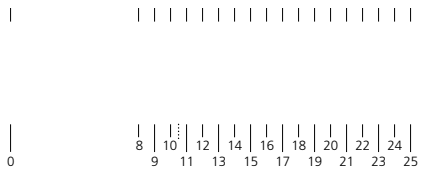
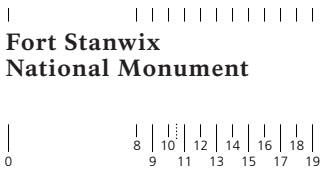
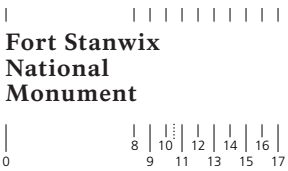
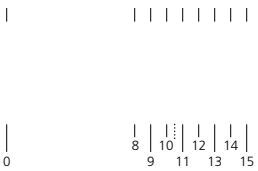
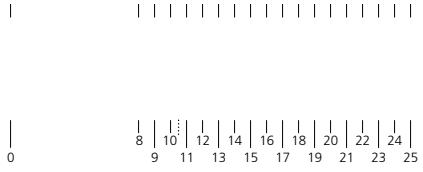
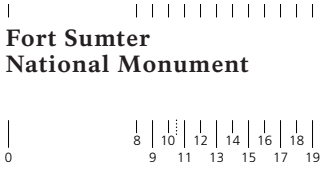
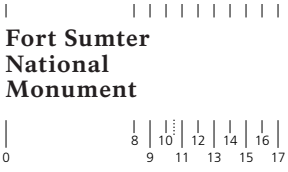
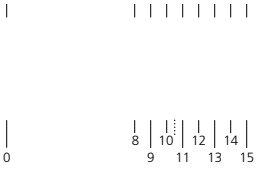
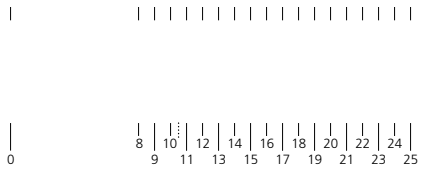
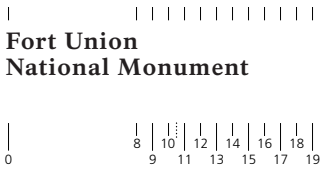
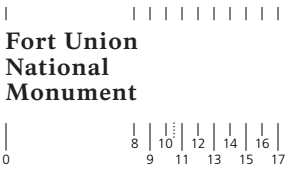
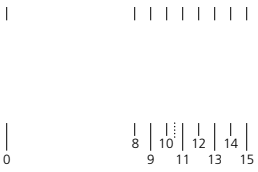
	**Fort Laramie** **National Historic Site** 	**Fort Laramie** **National** **Historic Site** 	
Fort Larned National Historic Site			
	**Fort Larned** **National Historic Site** 	**Fort Larned** **National** **Historic Site** 	
Fort Matanzas National Monument			
	**Fort Matanzas** **National Monument** 	**Fort Matanzas** **National** **Monument** 	

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Fort McHenry National Monument and Historic Shrine			
		Fort McHenry National Monument and Historic Shrine	
Fort Moultrie			
Fort Moultrie	**Fort Moultrie**		
Fort Necessity National Battlefield			
	Fort Necessity National Battlefield	**Fort Necessity National Battlefield**	
Fort Point National Historic Site			
	Fort Point National Historic Site	**Fort Point National Historic Site**	
Fort Pulaski National Monument			
	Fort Pulaski National Monument	**Fort Pulaski National Monument**	
Fort Raleigh National Historic Site			
	Fort Raleigh National Historic Site	**Fort Raleigh National Historic Site**	
Fort Scott National Historic Site			
	Fort Scott National Historic Site	**Fort Scott National Historic Site**	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Fort Smith National Historic Site			
			
Fort Stanwix National Monument			
			
Fort Sumter National Monument			
			
Fort Union National Monument			
			
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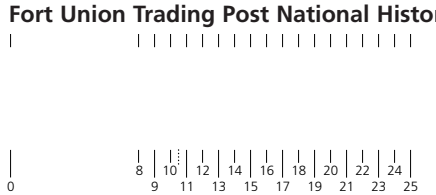	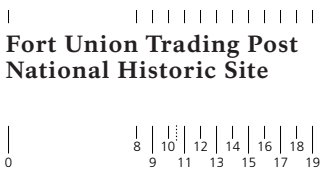	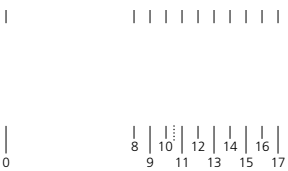	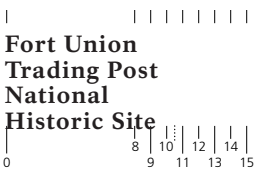
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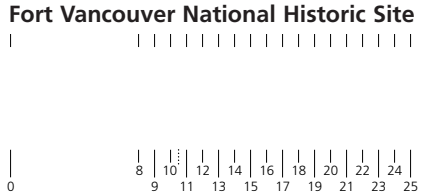		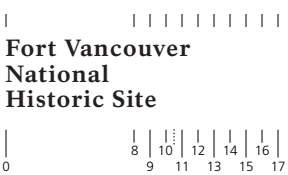	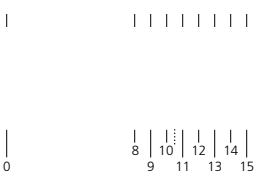
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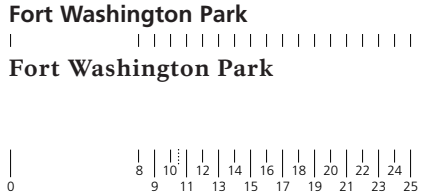
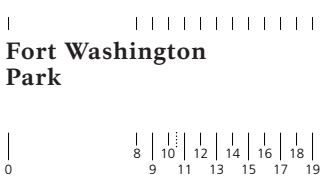
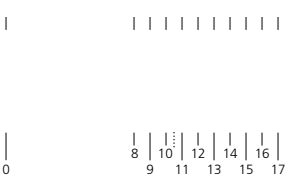
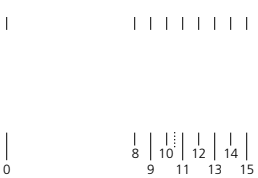
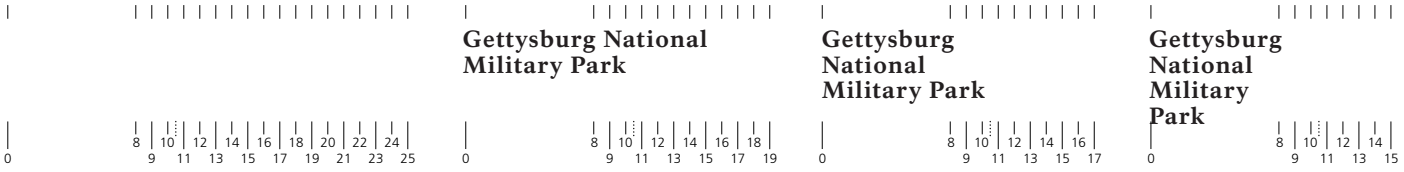
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Fossil Butte National Monument	Fossil Butte National Monument	Fossil Butte National Monument	
Franklin Delano Roosevelt Memorial	Franklin Delano Roosevelt Memorial	Franklin D. Roosevelt Memorial	Franklin Delano Roosevelt Memorial
Frederick Douglass National Historic Site	Frederick Douglass National Historic Site		Frederick Douglass National Historic Site
Frederick Law Olmsted National Historic Site	Frederick Law Olmsted National Historic Site	Frederick Law Olmsted National Historic Site	Frederick Law Olmsted National Historic Site
Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park		Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park	
Friendship Hill National Historic Site	Friendship Hill National Historic Site	Friendship Hill National Historic Site	
Gates of the Arctic National Park and Preserve		Gates of the Arctic National Park and Preserve	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Gateway National Recreation Area	Gateway National Recreation Area	Gateway National Recreation Area	Gateway National Recreation Area
Gauley River National Recreation Area	Gauley River National Recreation Area	Gauley River National Recreation Area	Gauley River National Recreation Area
General Grant National Memorial	General Grant National Memorial	General Grant National Memorial	
George Rogers Clark National Historical Park	George Rogers Clark National Historical Park	George Rogers Clark National Historical Park	
George Washington Birthplace National Monument		George Washington Birthplace National Monument	
George Washington Carver National Monument		George Washington Carver National Monument	
George Washington Memorial Parkway	George Washington Memorial Parkway		George Washington Memorial Parkway

6.4-NPS Park Identification Panel Legend Format Guide

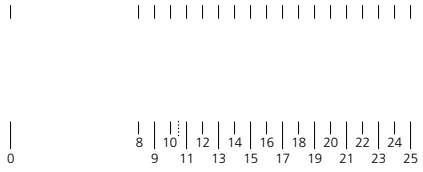
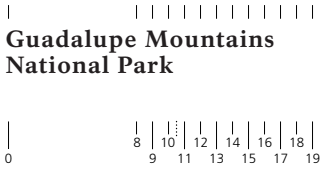
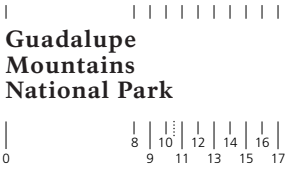
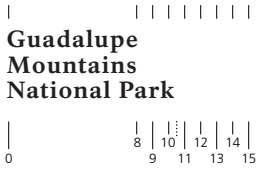
1-Line Format	2-Line Format	3-Line Format	4-Line Format
Gettysburg National Military Park	Gettysburg National Military Park	Gettysburg National Military Park	Gettysburg National Military Park
Gila Cliff Dwellings National Monument	Gila Cliff Dwellings National Monument		Gila Cliff Dwellings National Monument
Glacier Bay National Park and Preserve	Glacier Bay National Park and Preserve	Glacier Bay National Park and Preserve	
Glacier National Park	Glacier National Park	Glacier National Park	
Glen Canyon National Recreation Area	Glen Canyon National Recreation Area	Glen Canyon National Recreation Area	Glen Canyon National Recreation Area
Glen Echo Park	Glen Echo Park		
Gloria Dei (Old Swedes) Church National Historic Site		Gloria Dei (Old Swedes) Church National Historic Site	Gloria Dei (Old Swedes) Church National Historic Site



1-Line Format	2-Line Format	3-Line Format	4-Line Format
Golden Gate National Recreation Area	Golden Gate National Recreation Area	Golden Gate National Recreation Area	Golden Gate National Recreation Area
Golden Spike National Historic Site	Golden Spike National Historic Site	Golden Spike National Historic Site	
Governors Island National Monument	Governors Island National Monument		Governors Island National Monument
Gran Quivira National Monument	Gran Quivira National Monument	Gran Quivira National Monument	
Grand Canyon National Park	Grand Canyon National Park		Grand Canyon National Park
Grand Portage National Monument	Grand Portage National Monument	Grand Portage National Monument	
Grand Teton National Park	Grand Teton National Park	Grand Teton National Park	

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Grant-Kohrs Ranch National Historic Site			
	Grant-Kohrs Ranch National Historic Site	**Grant-Kohrs Ranch National Historic Site**	
Great Basin National Park			
	Great Basin National Park	**Great Basin National Park**	
Great Egg Harbor Scenic and Recreational River			
	Great Egg Harbor Scenic and Recreational River	**Great Egg Harbor Scenic and Recreational River**	
Great Falls Park			
Great Falls Park	**Great Falls Park**		
Great Sand Dunes National Monument and Preserve			
		Great Sand Dunes National Monument and Preserve	
Great Smoky Mountains National Park			
	Great Smoky Mountains National Park	**Great Smoky Mountains National Park**	
Greenbelt Park			
Greenbelt Park	**Greenbelt Park**		

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Guadalupe Mountains National Park			
			
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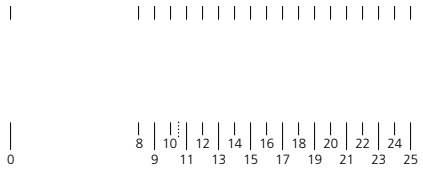
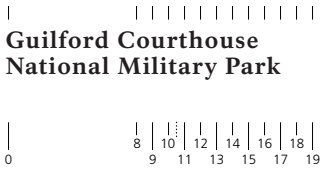
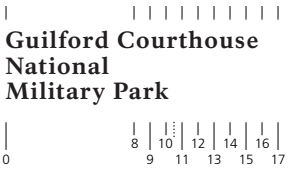
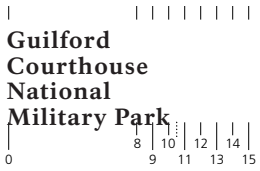
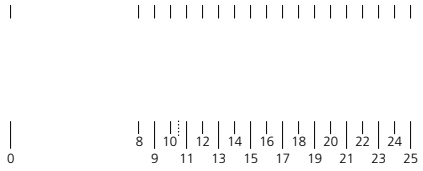
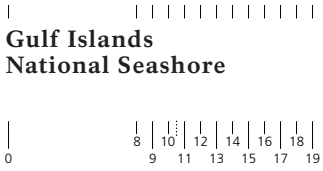
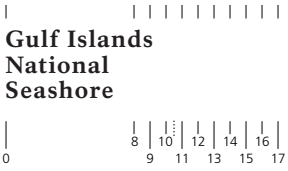
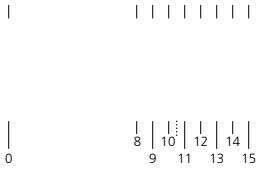
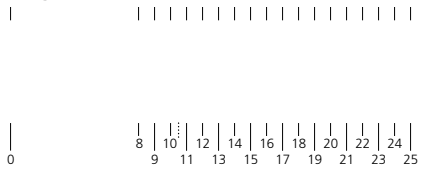
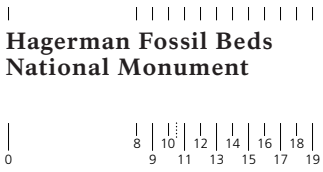
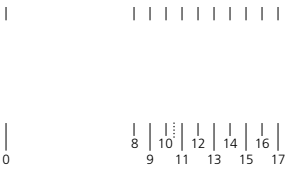
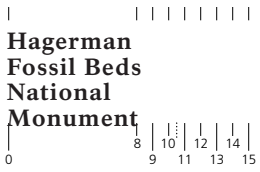
			
Gulf Islands National Seashore			
			
Hagerman Fossil Beds National Monument			
			
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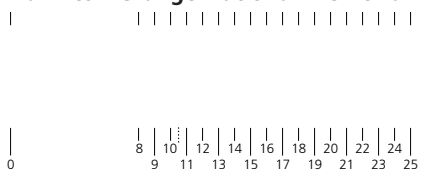
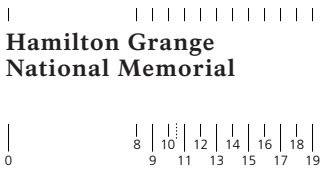
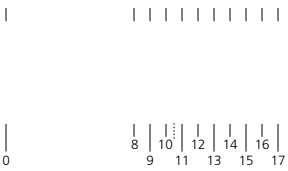
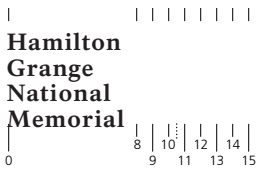
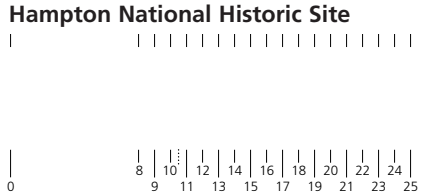
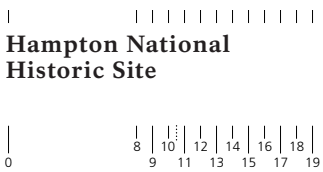
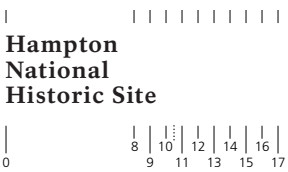
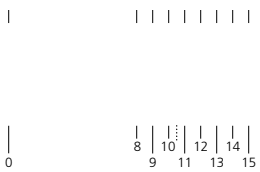
			
Hampton National Historic Site			
			
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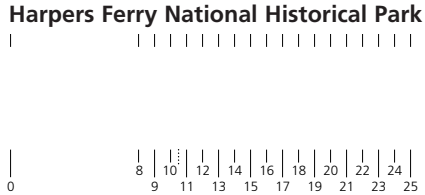
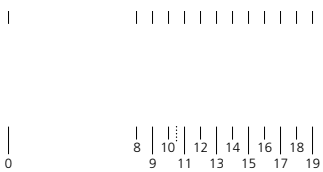
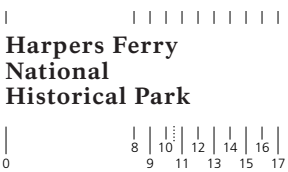
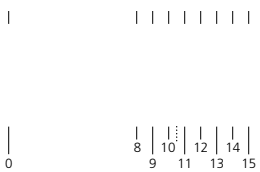
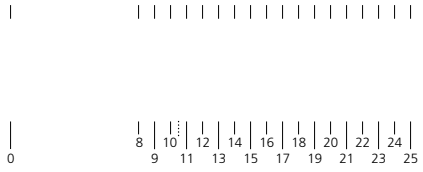
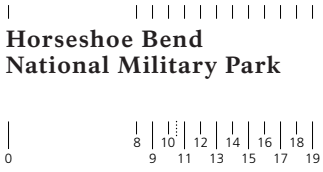
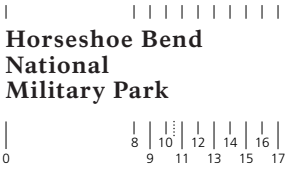
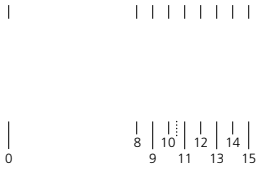
			

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Harry S Truman National Historic Site	Harry S Truman National Historic Site	Harry S Truman National Historic Site	
Hawaii Volcanoes National Park	Hawaii Volcanoes National Park	Hawaii Volcanoes National Park	
Herbert Hoover National Historic Site	Herbert Hoover National Historic Site	Herbert Hoover National Historic Site	
Hohokam Pima National Monument	Hohokam Pima National Monument		Hohokam Pima National Monument
Homestead National Monument of America	Homestead National Monument of America		Homestead National Monument of America
Hopewell Culture National Historical Park	Hopewell Culture National Historical Park	Hopewell Culture National Historical Park	
Hopewell Furnace National Historic Site	Hopewell Furnace National Historic Site	Hopewell Furnace National Historic Site	Hopewell Furnace National Historic Site

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Horseshoe Bend National Military Park			
			
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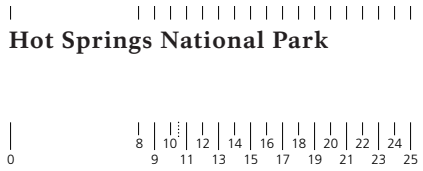	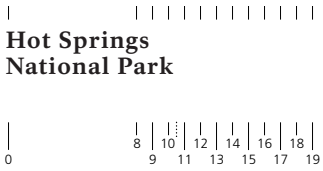	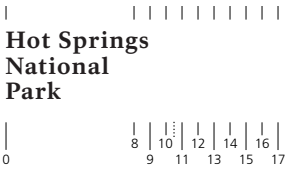	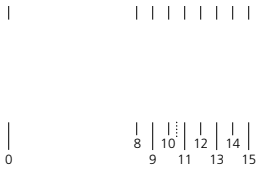
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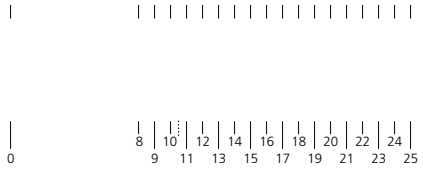	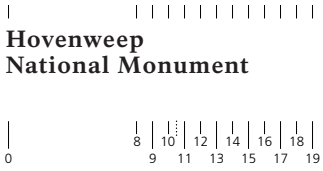	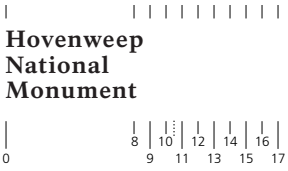	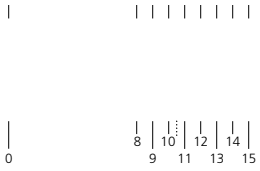
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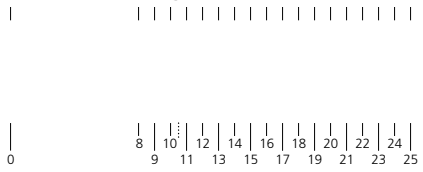
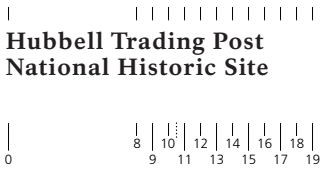
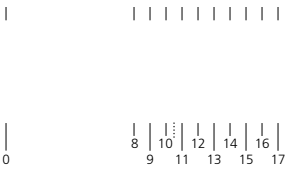
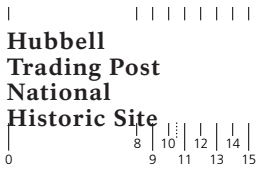
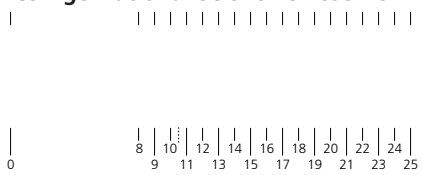
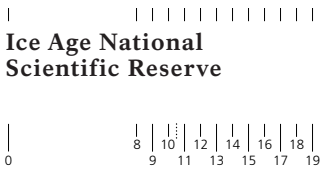
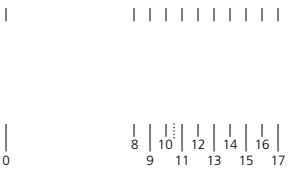
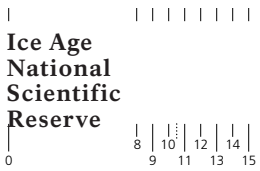
			
Ice Age National Scientific Reserve			
			
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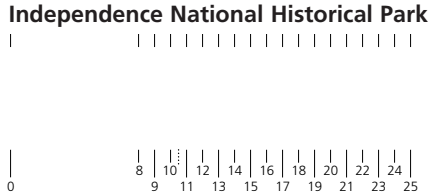
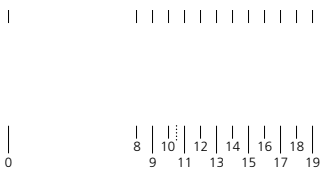
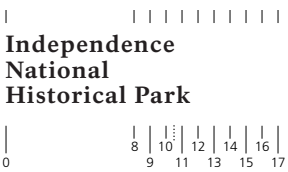
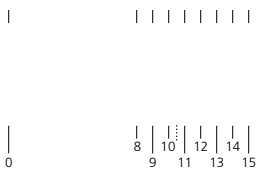
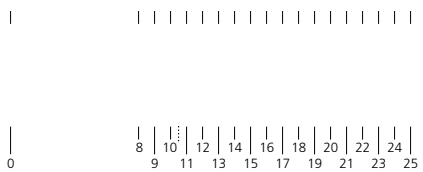
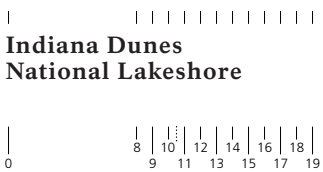
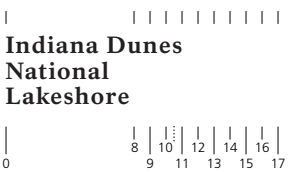
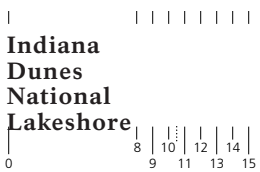
			
Indiana Dunes National Lakeshore			
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Isle Royale National Park	Isle Royale National Park	Isle Royale National Park	
James A. Garfield National Historic Site	James A. Garfield National Historic Site	James A. Garfield National Historic Site	
Jamestown National Historic Site	Jamestown National Historic Site	Jamestown National Historic Site	
Jean Lafitte National Historical Park and Preserve		Jean Lafitte National Historical Park and Preserve	
Jefferson National Expansion Memorial	Jefferson National Expansion Memorial		Jefferson National Expansion Memorial
Jewel Cave National Monument	Jewel Cave National Monument	Jewel Cave National Monument	
Jimmy Carter National Historic Site	Jimmy Carter National Historic Site	Jimmy Carter National Historic Site	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
John D. Rockefeller, Jr., Memorial Parkway	John D. Rockefeller, Jr. Memorial Parkway		
John Day Fossil Beds National Monument	John Day Fossil Beds National Monument		John Day Fossil Beds National Monument
John Fitzgerald Kennedy National Historic Site	John Fitzgerald Kennedy National Historic Site		
John Muir National Historic Site		John Muir National Historic Site	
Johnstown Flood National Memorial	Johnstown Flood National Memorial		Johnstown Flood National Memorial
Joshua Tree National Park	Joshua Tree National Park		Joshua Tree National Park
Kalaupapa National Historical Park		Kalaupapa National Historical Park	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Kaloko-Honokohau National Historical Park			
	Kaloko-Honokohau National Historical Park	Kaloko-Honokohau National Historical Park	
Katmai National Park and Preserve			
	Katmai National Park and Preserve	Katmai National Park and Preserve	
Kenai Fjords National Park			
	Kenai Fjords National Park	Kenai Fjords National Park	
Kennesaw Mountain National Battlefield Park			
	Kennesaw Mountain National Battlefield Park	Kennesaw Mountain National Battlefield Park	
Keweenaw National Historical Park			
	Keweenaw National Historical Park	Keweenaw National Historical Park	Keweenaw National Historical Park
Kings Canyon National Park			
	Kings Canyon National Park		Kings Canyon National Park
Kings Mountain National Military Park			
	Kings Mountain National Military Park	Kings Mountain National Military Park	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Klondike Gold Rush National Historical Park	Klondike Gold Rush National Historical Park	Klondike Gold Rush National Historical Park	
Knife River Indian Villages National Historic Site		Knife River Indian Villages National Historic Site	Knife River Indian Villages National Historic Site
Kobuk Valley National Park	Kobuk Valley National Park		Kobuk Valley National Park
Korean War Veterans Memorial	Korean War Veterans Memorial	Korean War Veterans Memorial	
Lake Chelan National Recreation Area		Lake Chelan National Recreation Area	Lake Chelan National Recreation Area
Lake Clark National Park and Preserve		Lake Clark National Park and Preserve	
Lake Mead National Recreation Area		Lake Mead National Recreation Area	Lake Mead National Recreation Area

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Lake Meredith National Recreation Area		Lake Meredith National Recreation Area	Lake Meredith National Recreation Area
Lake Roosevelt National Recreation Area		Lake Roosevelt National Recreation Area	Lake Roosevelt National Recreation Area
Lassen Volcanic National Park	Lassen Volcanic National Park		Lassen Volcanic National Park
Lava Beds National Monument	Lava Beds National Monument	Lava Beds National Monument	
Lincoln Boyhood National Memorial	Lincoln Boyhood National Memorial		Lincoln Boyhood National Memorial
Lincoln Home National Historic Site		Lincoln Home National Historic Site	
Lincoln Memorial	Lincoln Memorial		

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Little Bighorn Battlefield National Monument	Little Bighorn Battlefield National Monument	Little Bighorn Battlefield National Monument	Little Bighorn Battlefield National Monument
Little River Canyon National Preserve	Little River Canyon National Preserve	Little River Canyon National Preserve	Little River Canyon National Preserve
Little Rock Central High School National Historic Site		Little Rock Central High School National Historic Site	Little Rock Central High School National Historic Site
Longfellow National Historic Site		Longfellow National Historic Site	Longfellow National Historic Site
Lowell National Historical Park	Lowell National Historical Park	Lowell National Historical Park	Lowell National Historical Park
The Lower Mississippi River Valley		The Lower Mississippi River Valley	The Lower Mississippi River Valley
Lyndon B. Johnson National Historical Park	Lyndon B. Johnson National Historical Park	Lyndon B. Johnson National Historical Park	Lyndon B. Johnson National Historical Park

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Lyndon Baines Johnson Memorial Grove on the Potomac			
			Lyndon Baines Johnson Memorial Grove on the Potomac
Maggie L. Walker National Historic Site			
	Maggie L. Walker National Historic Site	Maggie L. Walker National Historic Site	
Mammoth Cave National Park			
	Mammoth Cave National Park		Mammoth Cave National Park
Manassas National Battlefield Park			
	Manassas National Battlefield Park		Manassas National Battlefield Park
Manzanar National Historic Site			
		Manzanar National Historic Site	Manzanar National Historic Site
Marsh-Billings-Rockefeller National Historical Park			
		Marsh-Billings-Rockefeller National Historical Park	
Martin Luther, Jr., National Historical Site			
	Martin Luther, Jr. National Historical Site	Martin Luther, Jr. National Historical Site	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Martin Van Buren National Historic Site			
	Martin Van Buren National Historic Site	Martin Van Buren National Historic Site	
Mary McLeod Bethune Council House National Historic Site			
		Mary McLeod Bethune Council House National Historic Site	
McLoughlin House National Historic Site			
	McLoughlin House National Historic Site	McLoughlin House National Historic Site	
Mesa Verde National Park			
	Mesa Verde National Park		
Middle Delaware National Scenic River			
	Middle Delaware National Scenic River	Middle Delaware National Scenic River	
Minute Man National Historical Park			
		Minute Man National Historical Park	Minute Man National Historical Park
Mississippi National River and Recreation Area			
		Mississippi National River and Recreation Area	Mississippi National River and Recreation Area

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Missouri National Recreational River	Missouri National Recreational River	Missouri National Recreational River	Missouri National Recreational River
Mojave National Preserve	Mojave National Preserve	Mojave National Preserve	
Monocacy National Battlefield	Monocacy National Battlefield	Monocacy National Battlefield	
Montezuma Castle National Monument	Montezuma Castle National Monument	Montezuma Castle National Monument	Montezuma Castle National Monument
Moores Creek National Battlefield	Moores Creek National Battlefield	Moores Creek National Battlefield	Moores Creek National Battlefield
Mormon Pioneer National Historic Trail	Mormon Pioneer National Historic Trail	Mormon Pioneer National Historic Trail	
Morristown National Historical Park	Morristown National Historical Park	Morristown National Historical Park	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Mound City National Monument		Mound City National Monument	
Mount Rainier National Park	Mount Rainier National Park		Mount Rainier National Park
Mount Rushmore National Memorial	Mount Rushmore National Memorial		Mount Rushmore National Memorial
Muir Woods National Monument		Muir Woods National Monument	
Natchez National Historical Park	Natchez National Historical Park		Natchez National Historical Park
Natchez Trace National Scenic Trail		Natchez Trace National Scenic Trail	
Natchez Trace Parkway	Natchez Trace Parkway	Natchez Trace Parkway	

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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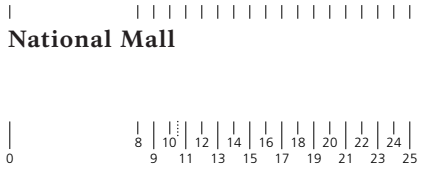
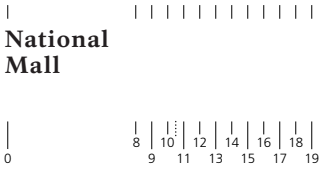
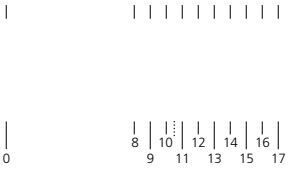
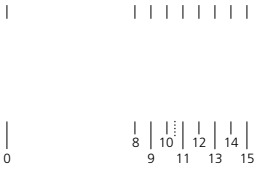
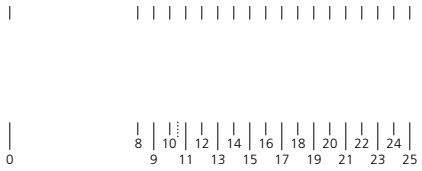
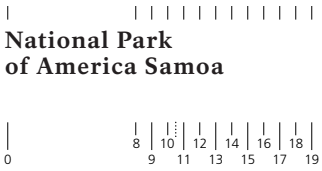
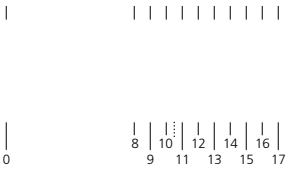
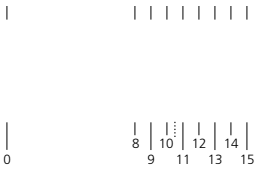
			
National Park of America Samoa			
			
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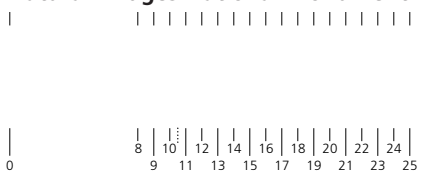	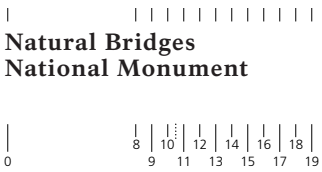	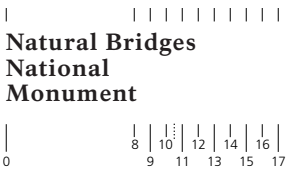	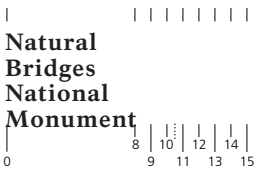
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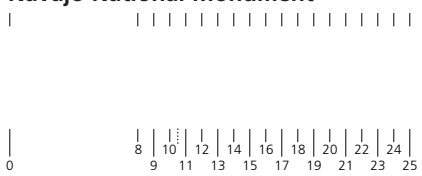	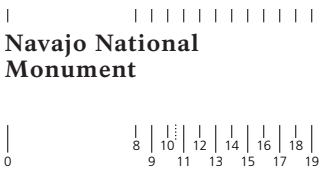	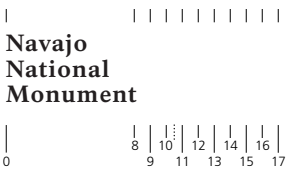	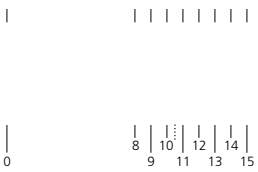
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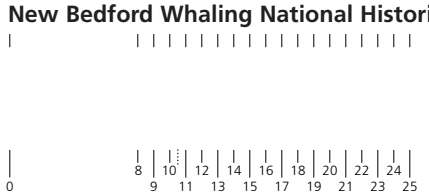	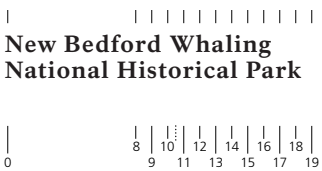	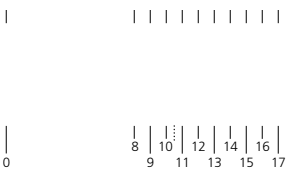	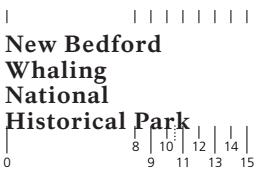
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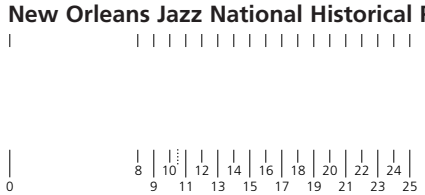
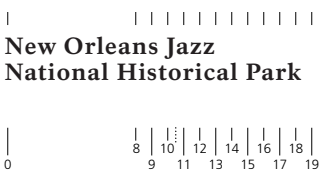
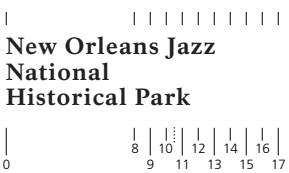
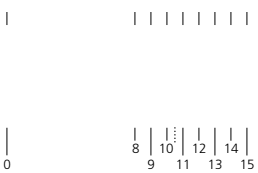
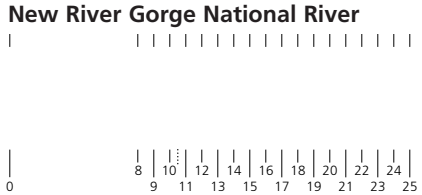
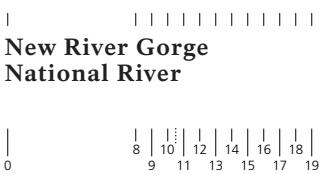
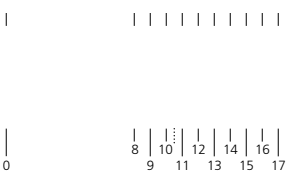
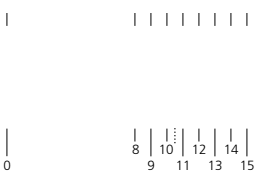
			
New River Gorge National River			
			

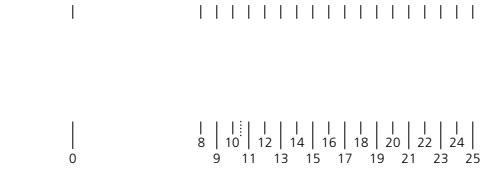
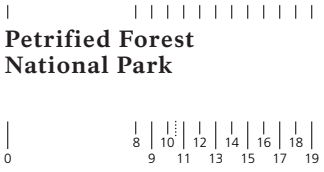
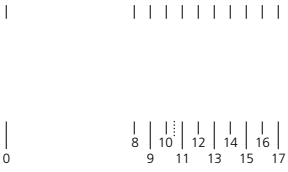
1-Line Format	2-Line Format	3-Line Format	4-Line Format
Nez Perce National Historical Park	Nez Perce National Historical Park	Nez Perce National Historical Park	Nez Perce National Historical Park
Nicodemus National Historic Site	Nicodemus National Historic Site	Nicodemus National Historic Site	
Ninety Six National Historic Site		Ninety Six National Historic Site	
Niobrara National Scenic Riverway	Niobrara National Scenic Riverway		Niobrara National Scenic Riverway
Noatak National Preserve		Noatak National Preserve	
North Cascades National Park	North Cascades National Park		North Cascades National Park
Obed Wild and Scenic River	Obed Wild and Scenic River		

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Ocmulgee National Monument	Ocmulgee National Monument	Ocmulgee National Monument	
Oklahoma City National Memorial	Oklahoma City National Memorial	Oklahoma City National Memorial	
Olympic National Park	Olympic National Park	Olympic National Park	
Oregon Caves National Monument	Oregon Caves National Monument	Oregon Caves National Monument	
Oregon National Historic Trail	Oregon National Historic Trail	Oregon National Historic Trail	
Organ Pipe Cactus National Monument	Organ Pipe Cactus National Monument		Organ Pipe Cactus National Monument
Ozark National Scenic Riverways	Ozark National Scenic Riverways		Ozark National Scenic Riverways

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Padre Island National Seashore	Padre Island National Seashore	Padre Island National Seashore	
Palo Alto Battlefield National Historic Site	Palo Alto Battlefield National Historic Site		Palo Alto Battlefield National Historic Site
Pea Ridge National Military Park	Pea Ridge National Military Park	Pea Ridge National Military Park	Pea Ridge National Military Park
Pecos National Historical Park	Pecos National Historical Park		Pecos National Historical Park
Pennsylvania Avenue National Historic Site	Pennsylvania Avenue National Historic Site		
Perry's Victory and International Peace Memorial		Perry's Victory and International Peace Memorial	
Petersburg National Battlefield		Petersburg National Battlefield	

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Petrified Forest National Park			
			
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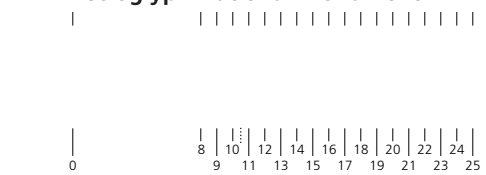
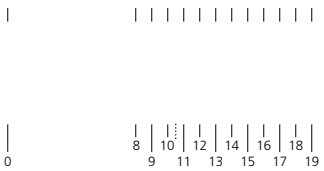
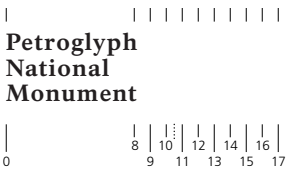
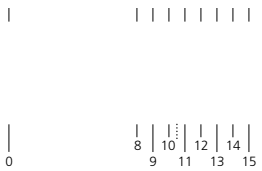
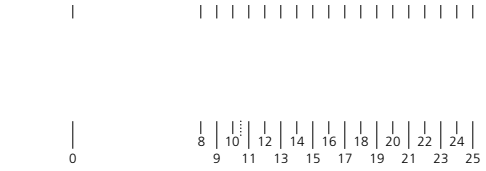
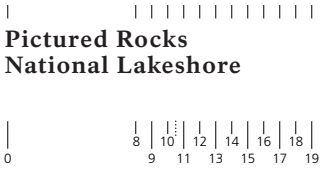
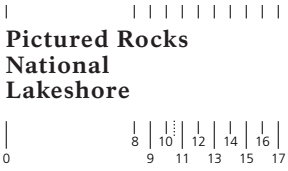
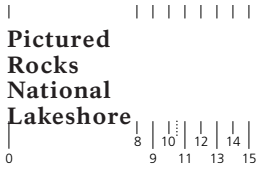
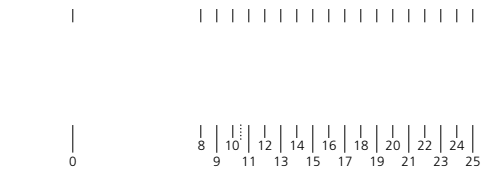
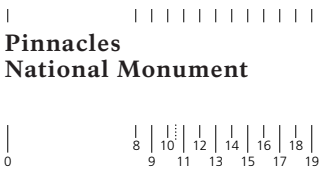
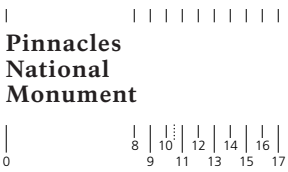
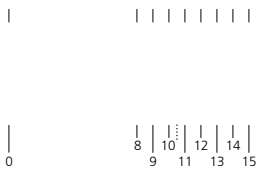
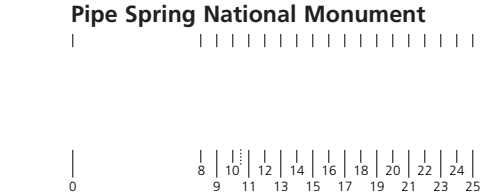
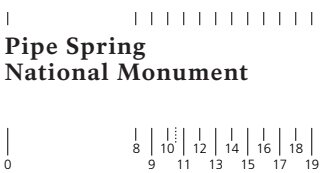
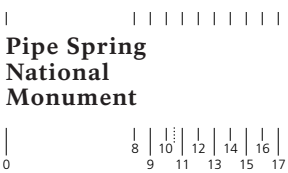
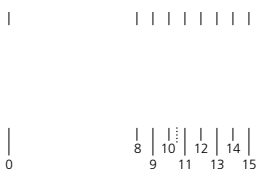
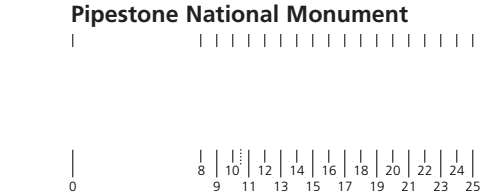
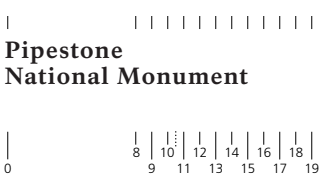
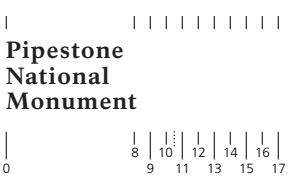
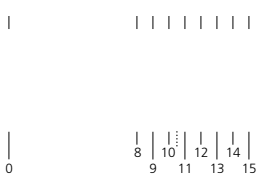
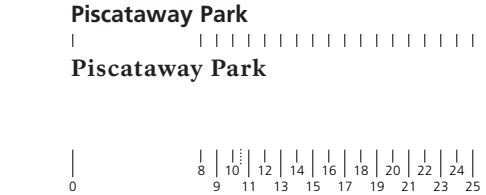
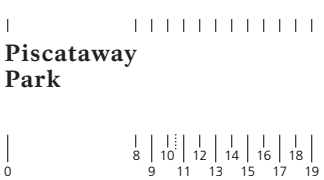
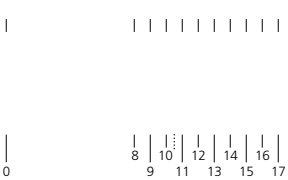
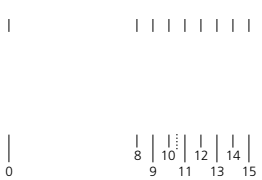
			
Pictured Rocks National Lakeshore			
			
Pinnacles National Monument			
			
Pipe Spring National Monument			
			
Pipestone National Monument			
			
Piscataway Park			
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
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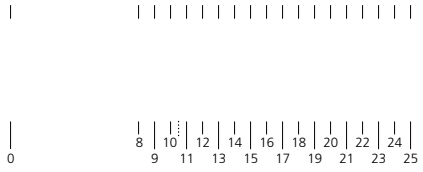
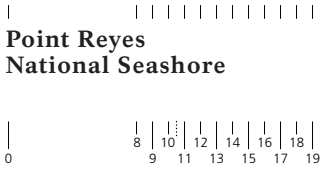
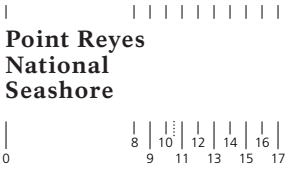
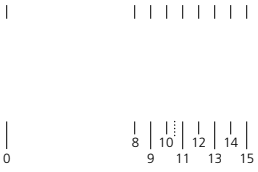
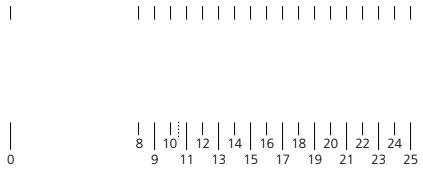
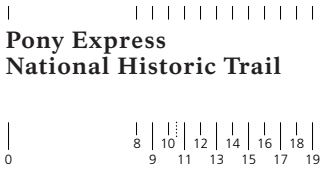
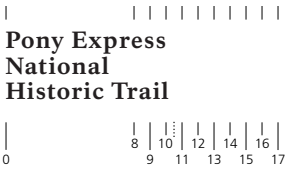
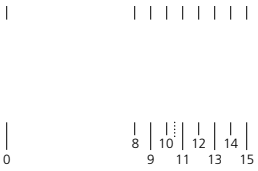
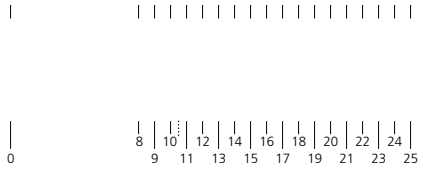
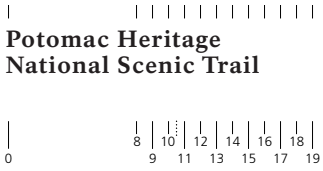
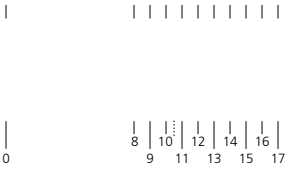
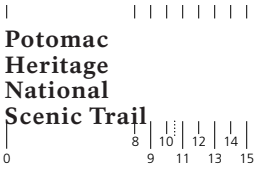
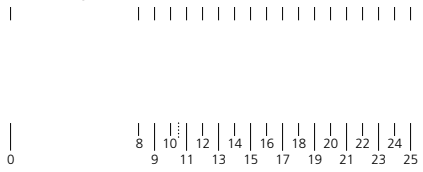
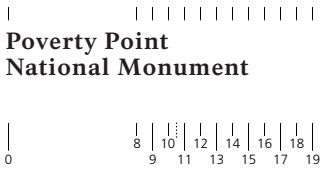
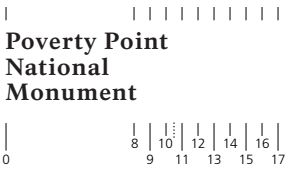
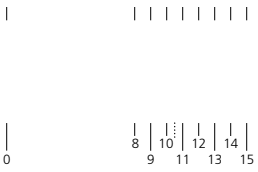
			
Pony Express National Historic Trail			
			
Potomac Heritage National Scenic Trail			
			
Poverty Point National Monument			
			
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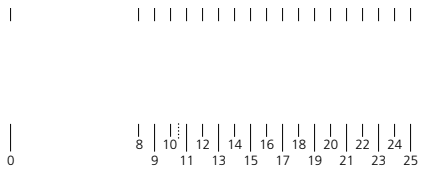
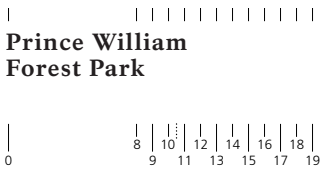
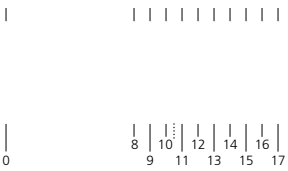
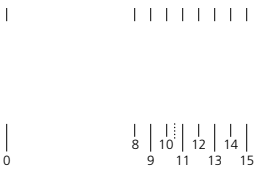
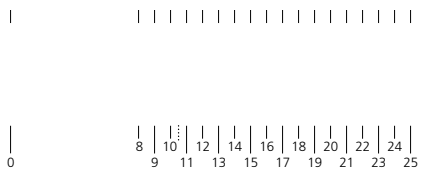
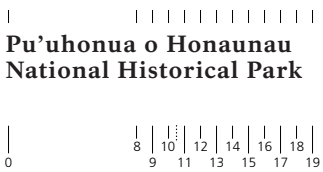
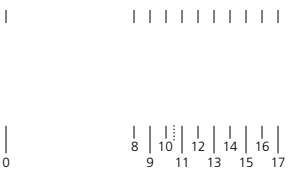
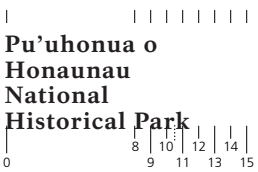
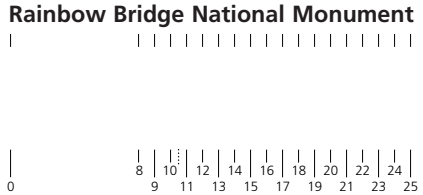
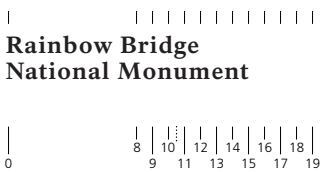
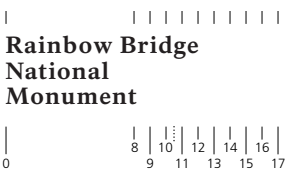
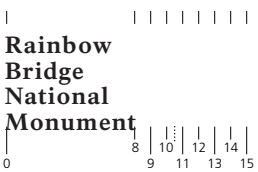
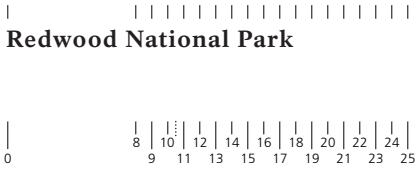
			
Pu'uhonua o Honaunau National Historical Park			
			
Rainbow Bridge National Monument			
			

6.4-NPS Park Identification Panel Legend Format Guide

Redwood National Park

1-Line Format



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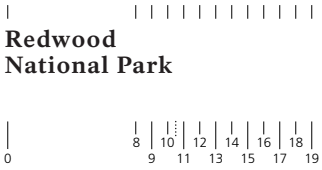

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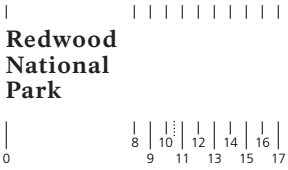
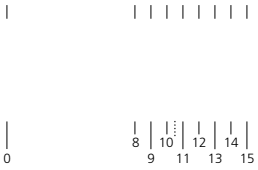
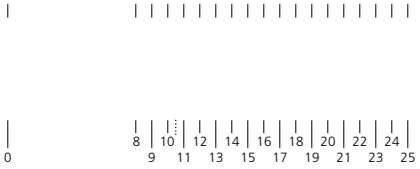


4-Line Format



Richmond National Battlefield Park

1-Line Format



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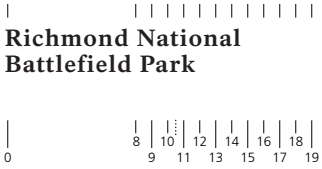

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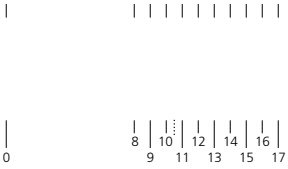

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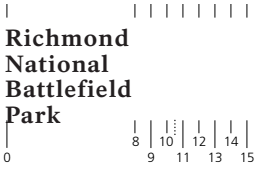
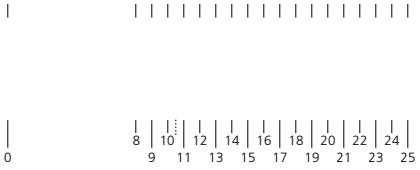


Rio Grande Wild and Scenic River

1-Line Format



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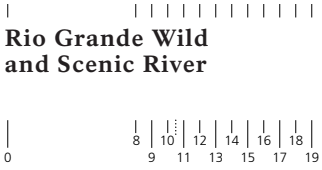

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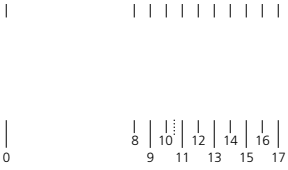

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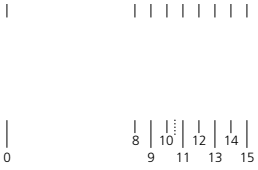
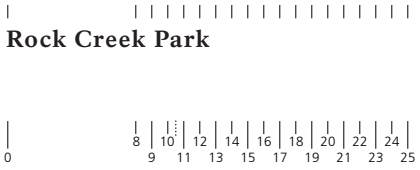


Rock Creek Park

1-Line Format



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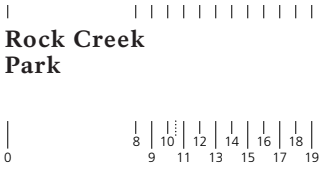

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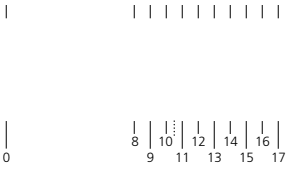

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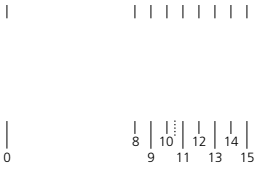
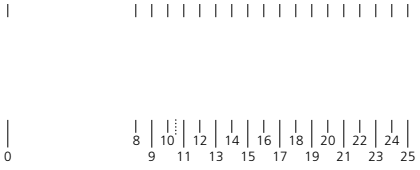


Rocky Mountain National Park

1-Line Format



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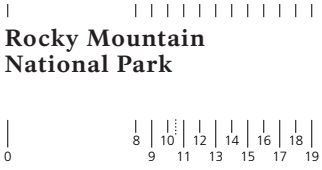

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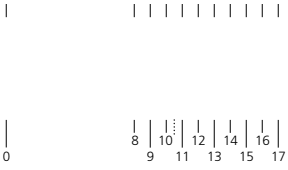

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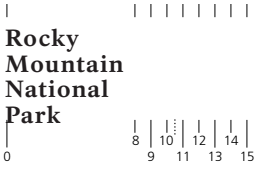
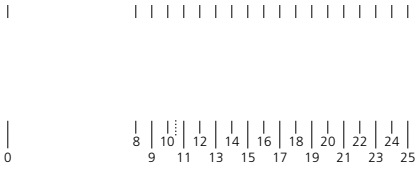


Roger Williams National Memorial

1-Line Format



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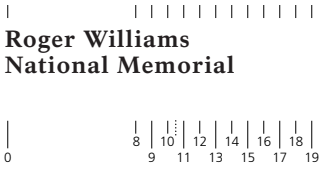

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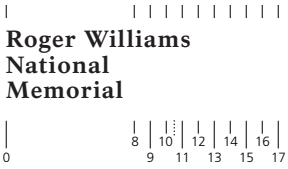

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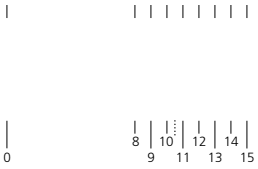
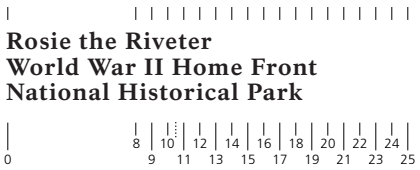


Rosie the Riveter/World War II Home Front National Historical Park

1-Line Format



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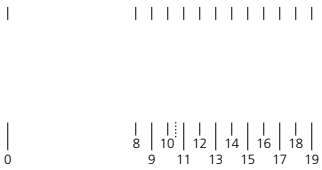

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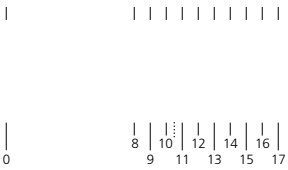

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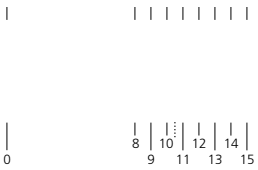
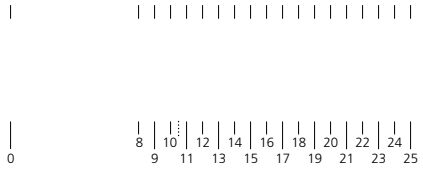
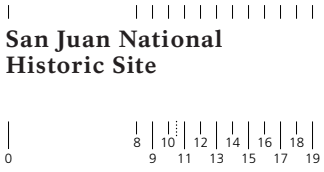
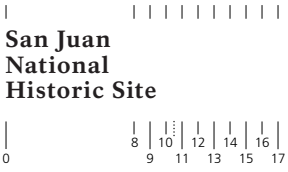
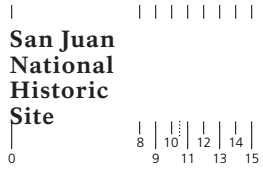
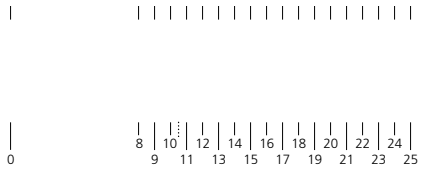
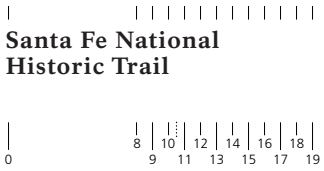
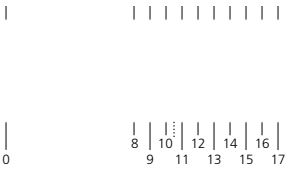
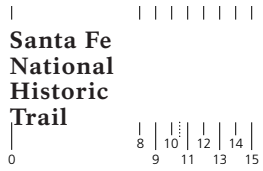
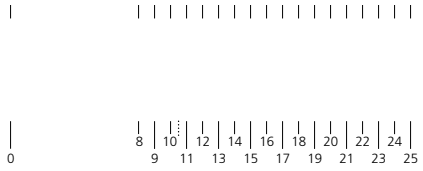
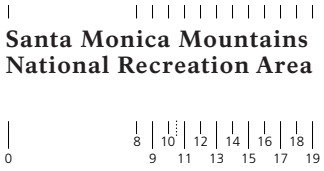
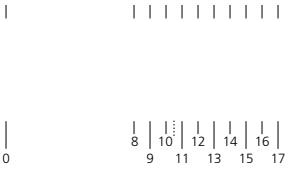
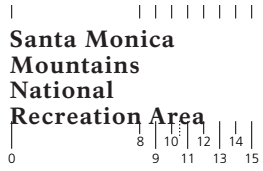


1-Line Format	2-Line Format	3-Line Format	4-Line Format
Ross Lake National Recreation Area	Ross Lake National Recreation Area	Ross Lake National Recreation Area	Ross Lake National Recreation Area
Russell Cave National Monument	Russell Cave National Monument	Russell Cave National Monument	
Sagamore Hill National Historic Site		Sagamore Hill National Historic Site	
Saguaro National Park	Saguaro National Park	Saguaro National Park	
Saint Croix Island International Historic Site		Saint Croix Island International Historic Site	Saint Croix Island International Historic Site
Saint Croix National Scenic Riverway	Saint Croix National Scenic Riverway		Saint Croix National Scenic Riverway
Saint-Gaudens National Historic Site	Saint-Gaudens National Historic Site	Saint-Gaudens National Historic Site	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Saint Paul's Church National Historic Site	Saint Paul's Church National Historic Site	Saint Paul's Church National Historic Site	Saint Paul's Church National Historic Site
Salem Maritime National Historic Site	Salem Maritime National Historic Site	Salem Maritime National Historic Site	
Salinas Pueblo Missions National Monument	Salinas Pueblo Missions National Monument		Salinas Pueblo Missions National Monument
Salt River Bay National Historical Park and Ecological Preserve			Salt River Bay National Historical Park and Ecological Preserve
San Antonio Missions National Historical Park	San Antonio Missions National Historical Park	San Antonio Missions National Historical Park	
San Francisco Maritime National Historical Park	San Francisco Maritime National Historical Park	San Francisco Maritime National Historical Park	San Francisco Maritime National Historical Park
San Juan Island National Historical Park	San Juan Island National Historical Park	San Juan Island National Historical Park	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
San Juan National Historic Site			
			
Santa Fe National Historic Trail			
			
Santa Monica Mountains National Recreation Area			
			
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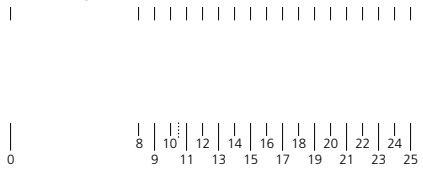	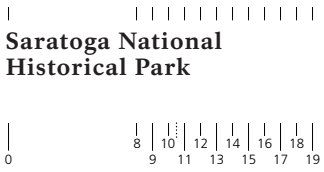	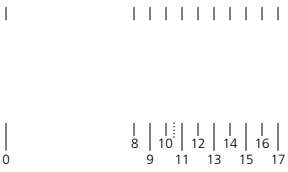	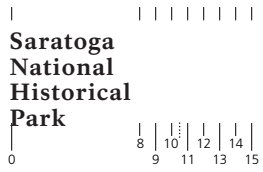
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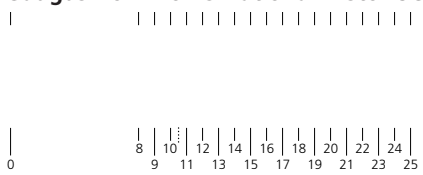	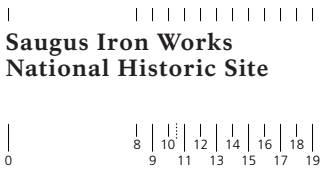	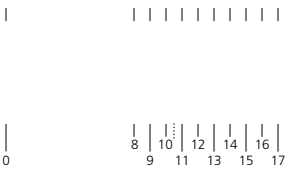	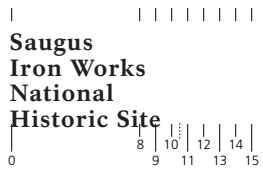
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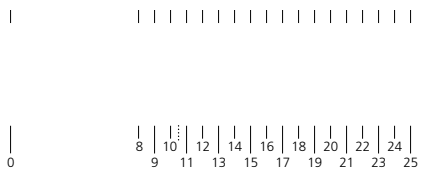
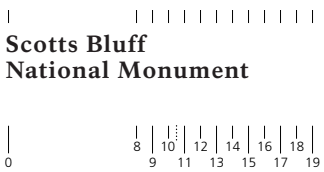
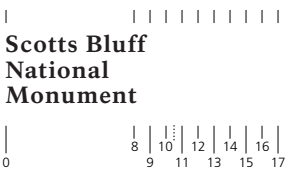
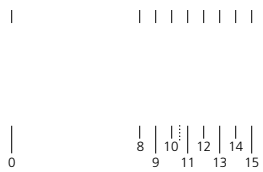
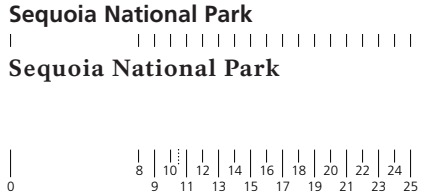
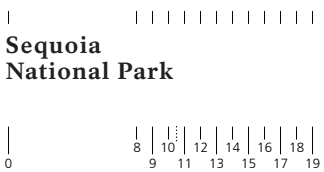
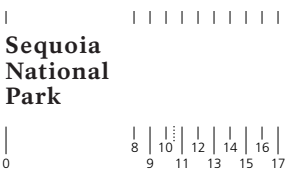
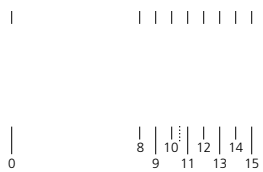
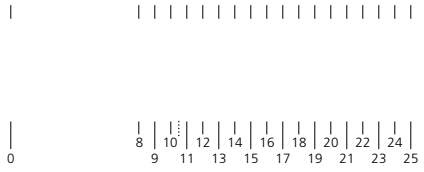
			
Sequoia National Park			
			

6.4-NPS Park Identification Panel Legend Format Guide

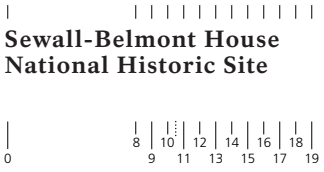
Sewall-Belmont House National Historic Site

1-Line Format

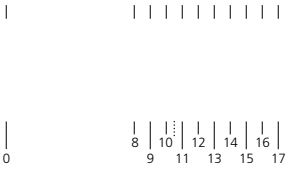


2-Line Format

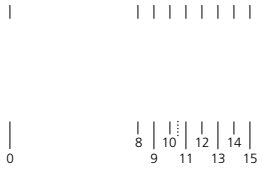
Sewall-Belmont House
National Historic Site



3-Line Format

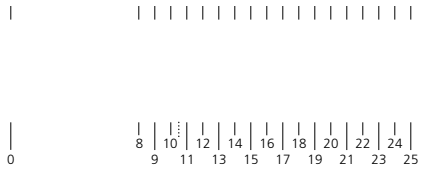


4-Line Format



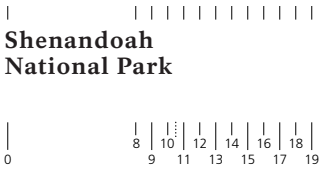
Shenandoah National Park

1-Line Format



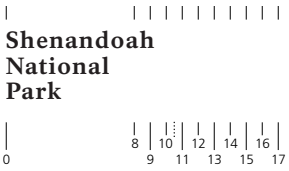
2-Line Format

Shenandoah
National Park

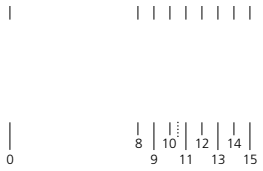


3-Line Format

Shenandoah
National
Park

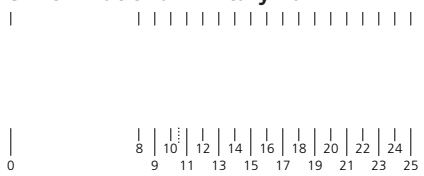


4-Line Format



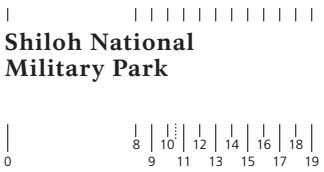
Shiloh National Military Park

1-Line Format

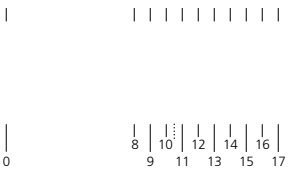


2-Line Format

Shiloh National
Military Park

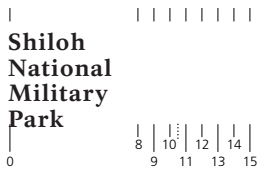


3-Line Format



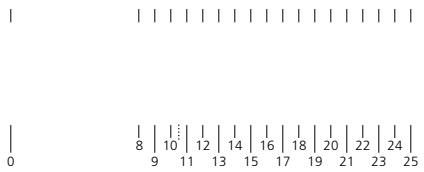
4-Line Format

Shiloh
National
Military
Park



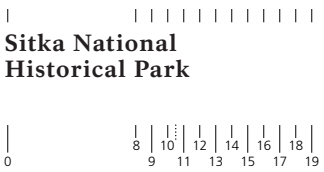
Sitka National Historical Park

1-Line Format



2-Line Format

Sitka National
Historical Park



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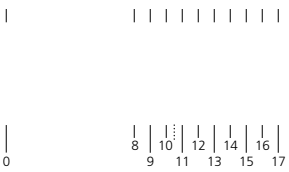
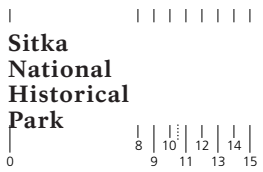


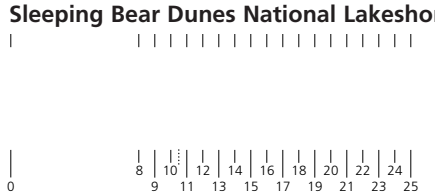
4-Line Format

Sitka
National
Historical
Park



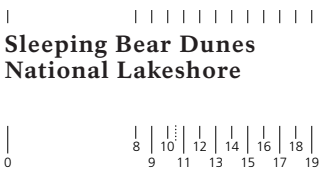
Sleeping Bear Dunes National Lakeshore

1-Line Format

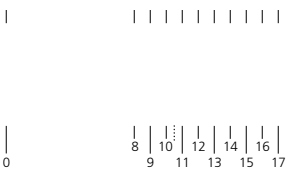


2-Line Format

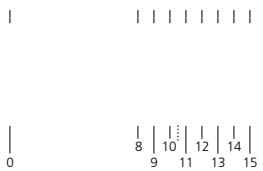
Sleeping Bear Dunes
National Lakeshore



3-Line Format

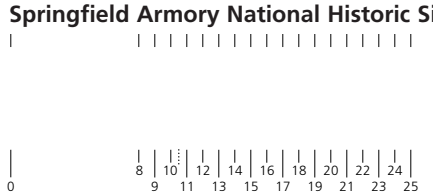


4-Line Format



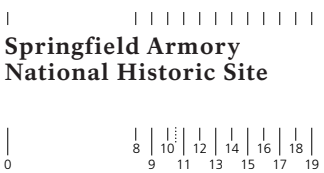
Springfield Armory National Historic Site

1-Line Format

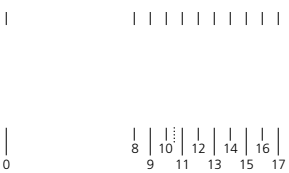


2-Line Format

Springfield Armory
National Historic Site



3-Line Format

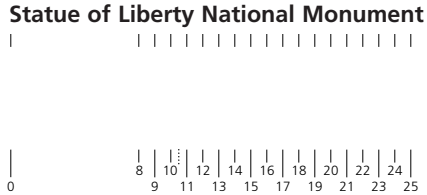


4-Line Format

Springfield
Armory
National
Historic Site

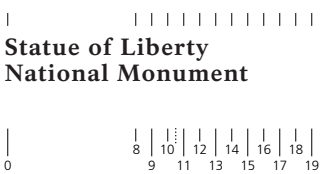
Statue of Liberty National Monument

1-Line Format



2-Line Format

Statue of Liberty
National Monument



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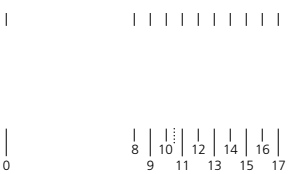
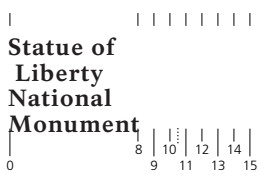


4-Line Format

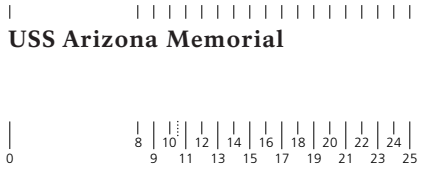
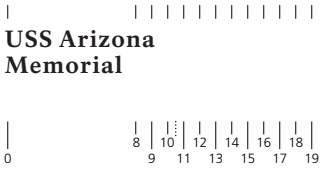
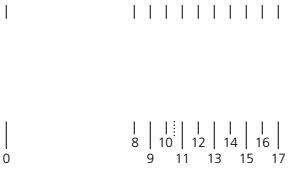
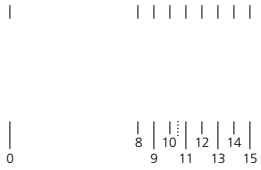
Statue of
Liberty
National
Monument



1-Line Format	2-Line Format	3-Line Format	4-Line Format
Steamtown National Historic Site	Steamtown National Historic Site	Steamtown National Historic Site	Steamtown National Historic Site
Stones River National Battlefield	Stones River National Battlefield	Stones River National Battlefield	
Sunset Crater Volcano National Monument	Sunset Crater Volcano National Monument		Sunset Crater Volcano National Monument
Tallgrass Prairie National Preserve	Tallgrass Prairie National Preserve		Tallgrass Prairie National Preserve
Thaddeus Kosciuszko National Memorial	Thaddeus Kosciuszko National Memorial		Thaddeus Kosciuszko National Memorial
Theodore Roosevelt Birthplace National Historic Site		Theodore Roosevelt Birthplace National Historic Site	Theodore Roosevelt Birthplace National Historic Site
Theodore Roosevelt Inaugural National Historic Site		Theodore Roosevelt Inaugural National Historic Site	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Theodore Roosevelt Island	Theodore Roosevelt Island	Theodore Roosevelt Island	
Theodore Roosevelt National Park	Theodore Roosevelt National Park	Theodore Roosevelt National Park	Theodore Roosevelt National Park
Thomas Jefferson Memorial	Thomas Jefferson Memorial	Thomas Jefferson Memorial	
Thomas Stone National Historic Site	Thomas Stone National Historic Site	Thomas Stone National Historic Site	
Timpanogos Cave National Monument	Timpanogos Cave National Monument		Timpanogos Cave National Monument
Timucuan Ecological and Historic Preserve	Timucuan Ecological and Historic Preserve		Timucuan Ecological and Historic Preserve
Tonto National Monument	Tonto National Monument	Tonto National Monument	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Tumacacori National Historical Park	Tumacacori National Historical Park	Tumacacori National Historical Park	Tumacacori National Historical Park
Tupelo National Battlefield	Tupelo National Battlefield	Tupelo National Battlefield	
Tuskegee Airmen National Historic Site	Tuskegee Airmen National Historic Site	Tuskegee Airmen National Historic Site	
Tuskegee Institute National Historic Site	Tuskegee Institute National Historic Site	Tuskegee Institute National Historic Site	Tuskegee Institute National Historic Site
Tuzigoot National Monument	Tuzigoot National Monument	Tuzigoot National Monument	
Ulysses S. Grant National Historic Site	Ulysses S. Grant National Historic Site	Ulysses S. Grant National Historic Site	
Upper Delaware Scenic and Recreational River	Upper Delaware Scenic and Recreational River	Upper Delaware Scenic and Recreational River	

1-Line Format	2-Line Format	3-Line Format	4-Line Format
USS Arizona Memorial			
			
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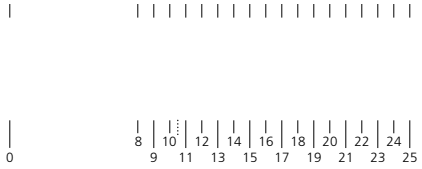	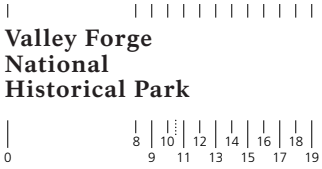	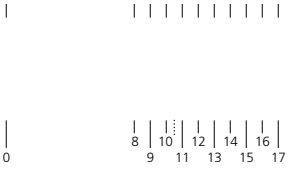	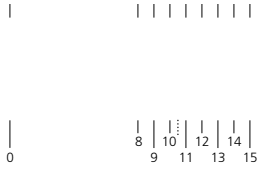
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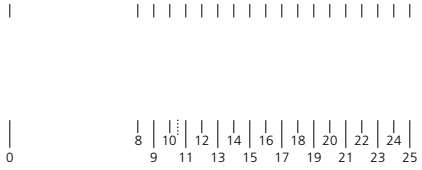	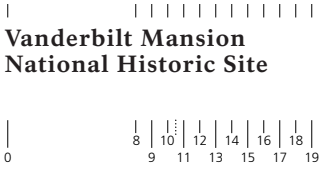	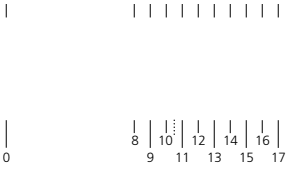	
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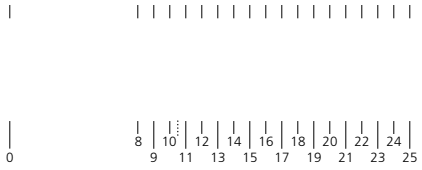
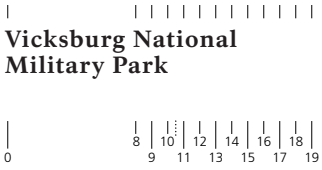
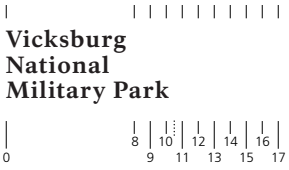
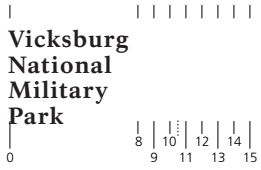
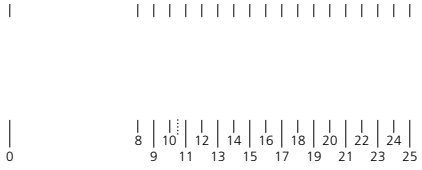
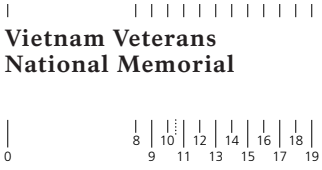
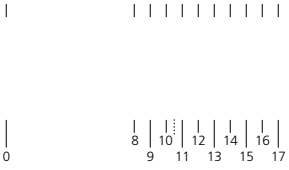
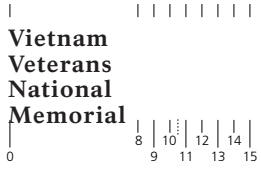
			
Vietnam Veterans National Memorial			
			
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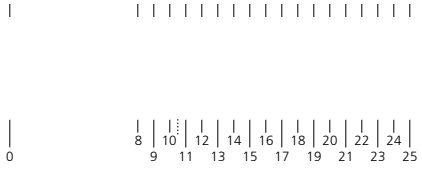
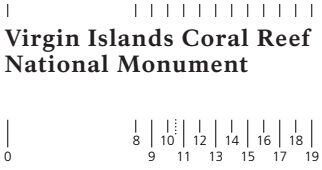
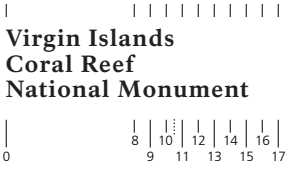
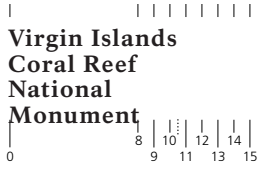
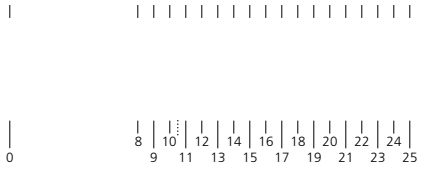
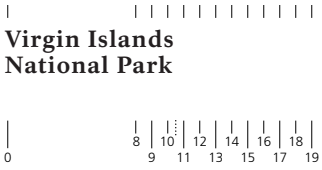
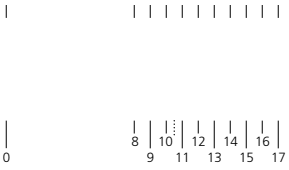
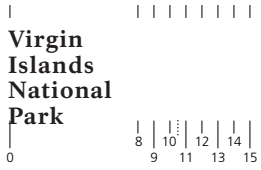
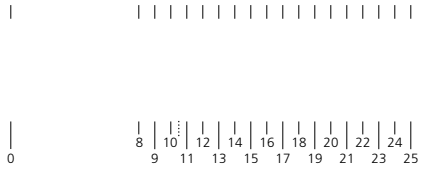
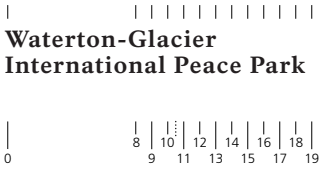
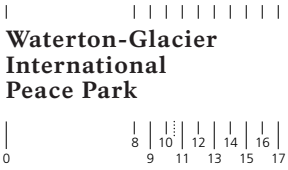
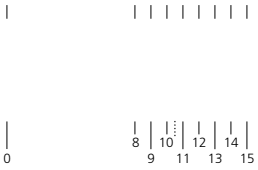
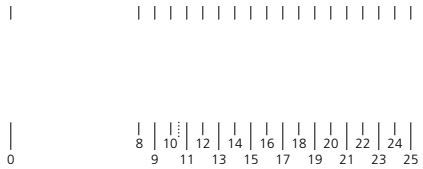
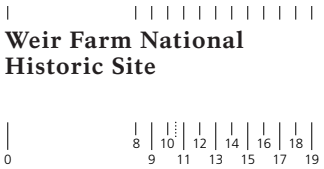
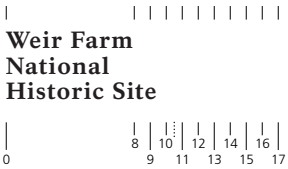
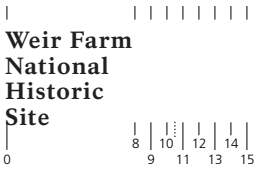
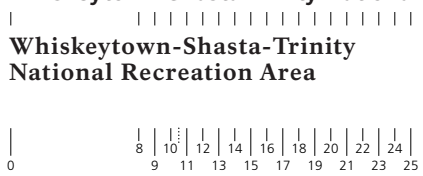
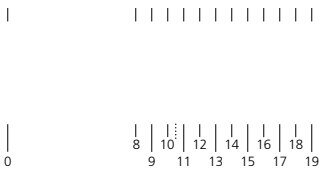
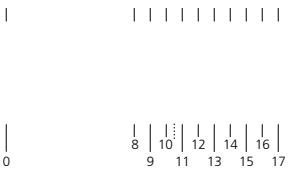
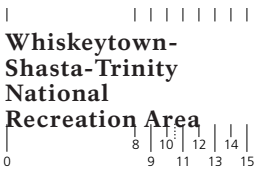
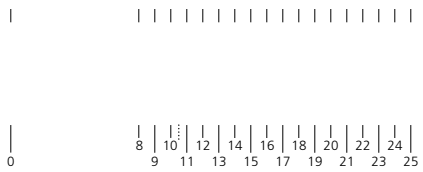
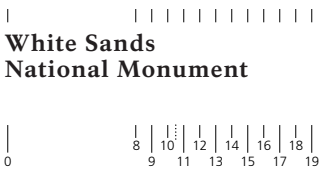
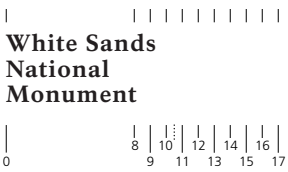
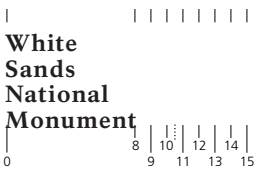
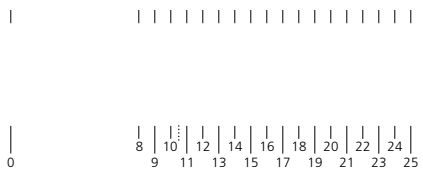
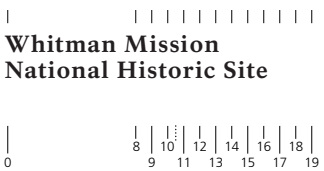
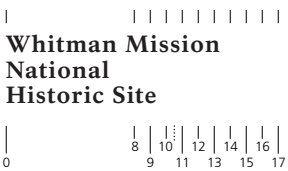
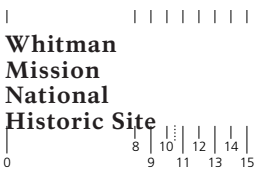
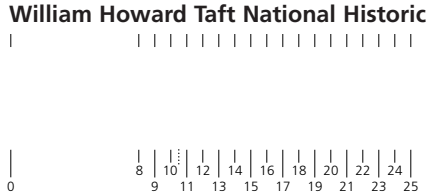
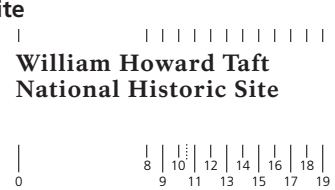
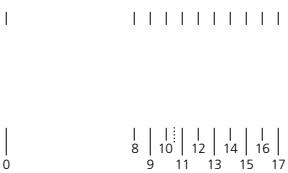
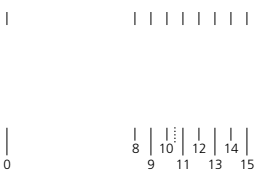
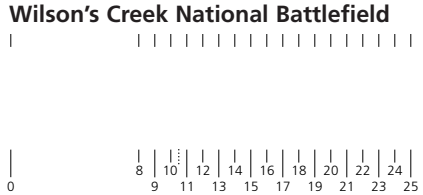
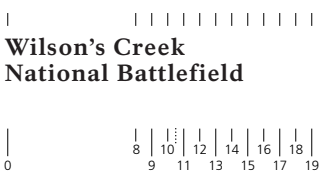
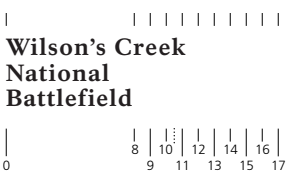
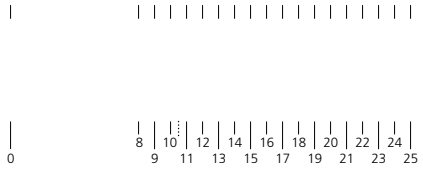
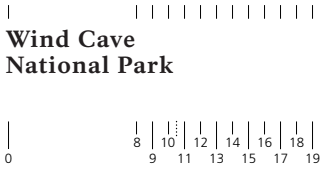
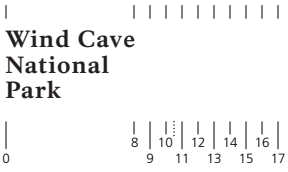
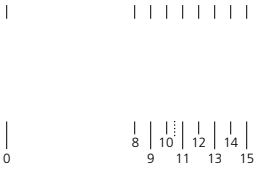
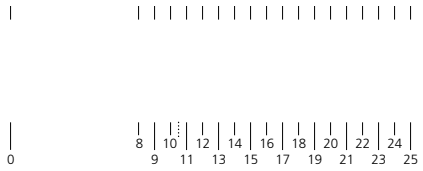
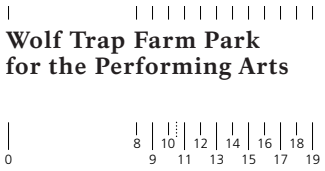
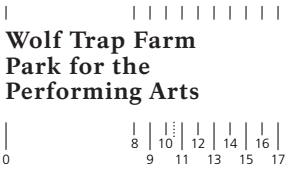
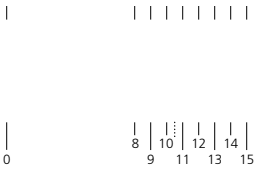
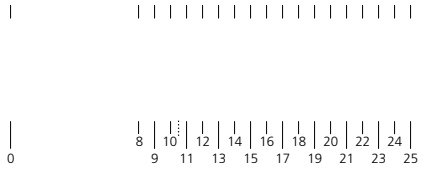
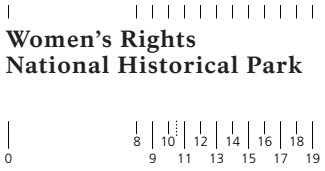
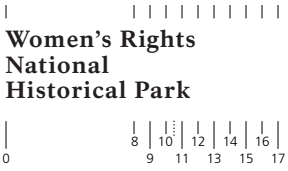
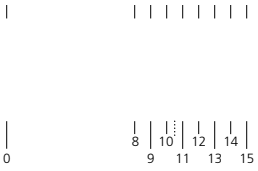
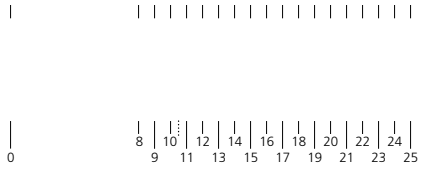
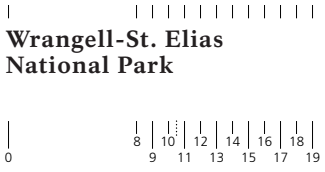
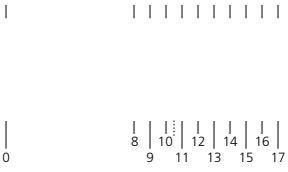
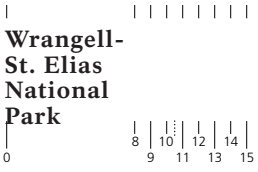
			
Virgin Islands National Park			
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Voyageurs National Park	Voyageurs National Park	Voyageurs National Park	
Walnut Canyon National Monument	Walnut Canyon National Monument	Walnut Canyon National Monument	Walnut Canyon National Monument
War in the Pacific National Historical Park	War in the Pacific National Historical Park	War in the Pacific National Historical Park	
Washington Monument	Washington Monument		
Vietnam Veterans National Memorial	Vietnam Veterans National Memoria		Vietnam Veterans National Memorial
White House			
Washita Battlefield National Historic Site	Washita Battlefield National Historic Site	Washita Battlefield National Historic Site	Washita Battlefield National Historic Site

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Waterton-Glacier International Peace Park			
			
Weir Farm National Historic Site			
			
Whiskeytown-Shasta-Trinity National Recreation Area			
			
White Sands National Monument			
			
Whitman Mission National Historic Site			
			
William Howard Taft National Historic Site			
			
Wilson's Creek National Battlefield			
			

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Wind Cave National Park			
			
Wolf Trap Farm Park for the Performing Arts			
			
Women's Rights National Historical Park			
			
Wrangell-St. Elias National Park			
			
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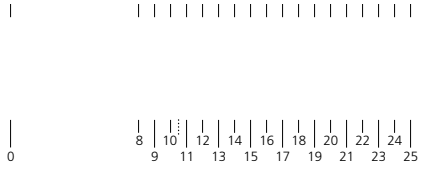
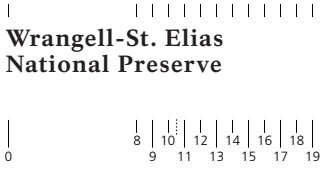
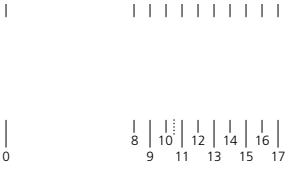
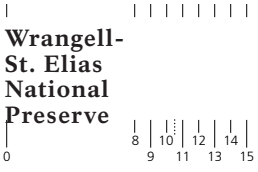
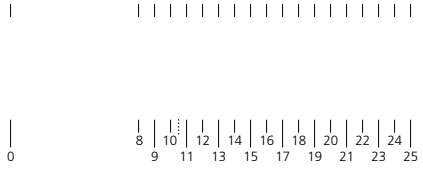
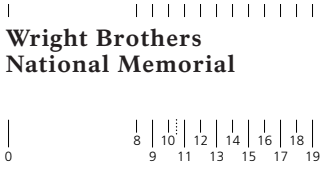
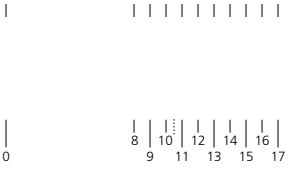
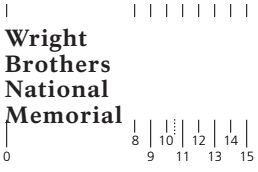
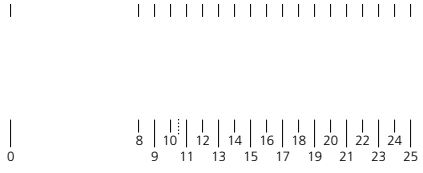
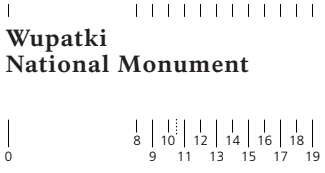
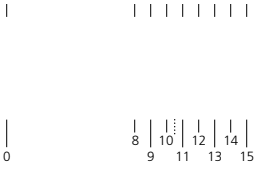
			
Wright Brothers National Memorial			
			
Wupatki National Monument			
			

6.4-NPS Park Identification Panel Legend Format Guide

1-Line Format	2-Line Format	3-Line Format	4-Line Format
Yellowstone National Park			
	Yellowstone National Park	Yellowstone National Park	
Yorktown Battlefield			
Yorktown Battlefield	Yorktown Battlefield		
Yosemite National Park			
	Yosemite National Park	Yosemite National Park	
Yucca House National Monument			
	Yucca House National Monument	Yucca House National Monument	
Yukon-Charley Rivers National Preserve			
	Yukon-Charley Rivers National Preserve		
Zion National Park			
	Zion National Park	Zion National Park	