National Forest Foundation

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Request for Proposals
Blue Pool Accessible Trail and Viewpoint Construction
Willamette National Forest, Oregon

Background and Statement of Work: The National Forest Foundation (NFF) in coordination with the U.S. Forest Service seeks proposals for the construction of a new accessible trail on the McKenzie River Ranger District of the Willamette National Forest. Contractor will be responsible for constructing 11,615 linear feet of hardened surface trail, with 4 viewpoints consisting of masonry stone walls, to connect a new parking lot and trailhead that will be constructed by the Forest Service to the Blue Pool / Tamolitch Falls area. The trail will be constructed to Trail Class 4 (Highly Developed) and Trail Class 5 (Fully Developed) standards to allow for greatest possible accessible use.

Information Requested

If interested in submitting a bid for this project, please provide a proposal for the above statement of work by providing:

- technical approach
- work experience
- cost
- capacity for this project
- experience in similar projects

Specific requirements are detailed below.

I. PROJECT OVERVIEW AND REQUIREMENTS

General Specifications

(a) Description of Work – This Request for Proposals is for restoration services related to construction of the new accessible trail to Blue Pool, including the following:

- Mobilization
- Clearing and grubbing for new trail construction (11,615 linear feet)
- Excavation for new trail construction (11,615 linear feet)
- Construction of 80 drain dips and related features
- Installation of 205 sleeper anchors
- Construction of 3 switchbacks
- Rock excavation work (415 linear feet)

- Road subsoiling (250 linear feet)
- Re-vegetation after road subsoiling (250 linear feet)
- Stump removal
- Construction of hardened surface trail without poles (4,145 linear feet)
- Construction of hardened surface trail with poles on one side (4,316 linear feet)
- Construction of hardened surface trail with poles on both sides (2,900 linear feet)
- Construction of stone retaining wall (70 linear feet)
- Construction of 4 masonry walls with concrete core and integrated steel railings (1050 square feet)*
- Installation of 4 steel interpretive sign bases*
- Construction of 3 accessible wooden benches*
- Aggregate surface hardening at viewpoints (28 cubic yards)*
- Removal of all garbage and construction debris along length of trail and at viewpoints

*Given the size and scope of the walls to be constructed at the viewpoints along the trail, NFF reserves the right to award multiple contracts in order to accomplish this project. Contractors may bid on trail construction, viewpoint wall construction, or both. If multiple contracts are awarded, the project will require a high degree of coordination between contractors, which will be facilitated by the NFF point of contact. See (c) Work Schedule below. Contractors may propose alternative or adjusted methods of stone wall construction so long as all dimensions and tolerances are met. Proposed alternatives must be approved by the Forest Service.

The Contractor shall identify what they can supply in terms of materials, labor, equipment, supplies, supervision, quality control, and incidentals required to complete the work described. The Contractor shall perform all work in a safe and conscientious manner and abide by all OSHA regulations.

(b) Project Location – This project is located on the McKenzie River Ranger District of the Willamette National Forest, in Linn County, Oregon. See Appendix G for map of the area and project. The project site is located off OR Highway 126, approximately 10 miles south of US Highway 20. Actual location and perimeter of staging area shall be defined by the contractors and the Forest Service representative.

(c) Work Schedule – Construction work may begin on June 1, 2024. Contractor(s) will be given leeway in regard to working weekdays, weekends, holidays, etc. within the project time frame. All construction will be complete by September 30, 2025. Certain aspects of the project must be completed before other tasks can begin. The delivery of rocks and other construction materials for the viewpoint walls must occur before the road subsoiling and road to trail conversion that is part of the main trail construction. After road to trail conversion has been done, it will no longer be possible to drive larger vehicles out to the viewpoints. If a single contract is awarded for this project, it will be the responsibility of the contractor to schedule all deliveries and tasks in the appropriate order. If multiple contracts are awarded, contractors must be willing and able to coordinate deliveries and tasks with other contractors and with Forest Service work ongoing in the area. All coordination will be through NFF's point of contract. Furthermore, the Forest Service is managing a separate contract for the installation of the Kink Creek Bridge located on this trail. Contractors will not be able to begin trail work on the sections immediately adjacent to the bridge until the bridge work has been

completed. See Appendix H – Project Coordination Outline for a full explanation of scheduling requirements.

Other Project Requirements and Specifications

I. Utilities – There is no running water, electrical or housing services available. The Contractor shall coordinate with the Forest Service on approved locations for camping and staging of work. The Contractor shall make its own arrangements for any other temporary facilities if needed.

(b) Specifications – Project work shall be accomplished in accordance with the following:

- Blue Pool Trail Construction Scope of Work (Appendix A)
- Blue Pool Trail Supplemental Drawings (Appendix B)
- Blue Pool Overlooks Construction Drawings (Appendix C)
- Forest Service Trail Accessibility Guidelines (Appendix D)
- Forest Service Outdoor Recreation Accessibility Guidelines (Appendix E)
- Standard Specifications for Construction of Trails and Trail Bridges on Forest Service Projects (Appendix F)
- Maps (Appendix G)
- Blue Pool Project Coordination Outline (Appendix H)

Insurance Requirements

Upon selection of the winning bid, the Contractor agrees that it has and shall maintain the following insurance coverage indicated below. The effective date of all coverage shall precede the start of any work.

a. State minimum workers' compensation insurance coverage for its employees, if any.

b. Broad form general liability, property damage, and automotive liability insurance in the minimum amount of $1,000,000 for bodily injury, death, or damage to property of any person and $2,000,000 for bodily injury, death, or damage to property of more than one person. The Contractor shall name NFF an Additional Named Insured and provide NFF with a certificate of insurance evidencing such coverages, prior to the initiation of the Scope of Services.

c. Contractor shall provide professional errors and omissions liability insurance if its Scope of Services includes professional services. Professional services for purposes of this section include, but are not limited to performing: architecture, engineering, landscape architecture, land surveying or planning, geological investigation, interior design/space planning, preparation and signing or stamping of drawings, maps, surveys or construction specifications, consulting, or design and development of computer software, programs or websites by the Contractor or by subcontractors on behalf of the Contractor. The minimum coverage limits required are $1,000,000 for each claim and $1,000,000 annual aggregate.

Prohibited Telecommunications Services and Equipment

The Contractor is responsible for compliance with the prohibition on certain telecommunications and video surveillance services or equipment identified in 2 CFR 200.216.

Payment/Performance Security

Contractor shall post cash, a letter of credit, bond, or other financial security that is easily convertible into cash in a form acceptable to the NFF, in its sole determination, to assure completion of the work required under any subsequent agreement and payment of all amounts lawfully due to all persons supplying or furnishing to the Contractor or Contractor's subcontractors with labor, laborers, materials, rental machinery, tools or equipment used or to perform the work. Contractor may incorporate required associated costs into mobilization costs or other approved expenses.

a. Work that is classified as construction in accordance with the Miller Act or Little Miller Act or if required per conditions of the funding source, payment and performance bonding will be required in the full amount of any Agreement. For the purposes of this Request for Proposal, construction is defined as "any contract greater than $100,000 for the construction, alteration, or repair of any public building or public work where the federal government is the owner", or

b. If Contractor is not self-performing at least 85% of the total contract value or if the cost of materials is in excess of the larger of $100,000 or 50% of the contract total, payment and performance bonding will be required in the full amount of the agreement, or

c. If the value of the agreement is in excess of $250,000, Contractor will be required to post financial security in a form acceptable to the NFF in the amount of 5% of the total agreement value up to $250,000 in total financial security.

American Made Products. The work associated with this RFP is subject to Build America, Buy America Act. P.L. 117-58, Secs 70911-70917, and as such, domestic content procurement preference requires all iron and steel, manufactured products and construction materials used within the scope of this Agreement, be produced in the United States.

Federal Exclusion Verification

The selected Contractor will be required to affirm that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

Federal Flowdown Provisions

Flowdown Requirements: Any Agreement associated with this RFP may be subject to flowdown requirements under associated federal or state funding agreements, which are included and made part of by this reference.

II. REQUIRED COMPONENTS

Technical Proposal

Please provide a detailed technical approach to the work, including your ability to sequence the various stages of the project or to coordinate with another contractor, if needed.

Contractor Qualifications

I. Past Experience – Please provide a brief explanation of previous work experience with land management agencies.

II. References – Please provide three professional references that can speak to past performance.

Pricing Schedule

Contractor shall price work according to the schedule below. Prevailing wages are required per conditions of funding sources.

	Task/Item	Unit	Units	Unit Cost	Extended Cost
	Section 1, Trail Construction				
(a)	Mobilization and performance bond	LS	1		
(b)	Clearing and grubbing for new trail construction	LF	11,615		
(c)	Excavation for new trail construction	LF	11,615		
(d)	Drain dip, lead-off ditch, and settling basins	EA	80		
(e)	Sleeper anchors	EA	205		
(f)	Switchback construction	EA	3		
(g)	Rock excavation work	LF	415		
(h)	Road subsoiling	LS	1		
(i)	Re-vegetation after road subsoiling	LS	1		
(j)	Stump removal	EA	10		
(k)	Trail construction, hardening without poles	LF	4,145		
(l)	Trail construction, hardening with poles on one side	LF	4,316		
(m)	Trail construction, hardening with poles on both sides	LF	2,900		
(n)	Stone retaining wall	LF	70		
(o)	Removal of garbage and construction debris	LS	1		
Total Bid – Section 1, Trail Construction					

	Section 2, Viewpoint Construction	Unit	Units	Unit Cost	Extended Cost
(p)	Mobilization and performance bond	LS	1		

(q)	Clearing and grubbing for viewpoint construction	SF	1520		
(r)	Stump removal	EA	2		
(s)	Excavation	CY	19		
(t)	Compacted aggregate fill	CY	28		
(u)	Construction of stone masonry walls with concrete core	SF	1050		
(v)	Installation of steel railings	LF	65		
(w)	Construction and installation of benches	EA	3		
(x)	Installation of steel interpretive sign base	EA	4		
(y)	Removal of garbage and construction debris	LS	1		
Total Bid – Section 2, Viewpoint Construction					
				Grand Total Bid	

III. SUBMISSION, EVALUATION, AND CONTACTS

Contractor Selection Process

This is a request for proposals only and bids furnished are not offers from the National Forest Foundation. This request does not commit the National Forest Foundation to pay any costs incurred in the preparation or submission of the proposal or to contract for supplies or services.

The NFF will use the Evaluation Factors below to review each submitted bid. Based on the outcomes of that selection process, the NFF will notify successful and unsuccessful bidders by May 3, 2024, and will prepare a separate contract document.

Evaluation Factors and Relative Importance

The following criteria will be used in the evaluation of submitted proposals, ordered from highest weighting (level 3) to lowest weighting (level 1).

Level 3 Criteria
- Price / cost
- Equipment and contractor capability
- Timing of when contractor can begin and/or finish the project
- Past performance, references, and USFS feedback

Level 2 Criteria
- Technical proposal / proposed approach to project
- Overall strategic benefits to meeting NFF goals and grant needs, requirements, and timelines

Level 1 Criteria
- Benefits to the local community
- Relationship to local community

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MISSOULA, MONTANA 59804
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Point of Contact

Please submit any questions about the project in writing to the Point of Contact.

Jeff Malik
National Forest Foundation, Oregon Recreation Projects Coordinator
jmalik@nationalforests.org

Responses will be shared with known interested parties by email or otherwise posted at https://www.nationalforests.org/rfp.

Pre-bid Meeting

The National Forest Foundation and the Forest Service will provide a virtual pre-bid meeting to answer any questions about the scope of work for the project. The meeting will be held via Microsoft Teams on **April 10, 2024, at 10am Pacific Time**. Click here to join the meeting

Attendance at the Pre-bid Meeting is not required to submit a bid.

Contact jmalik@nationalforests.org if you need a call-in number or for other meeting questions.

Bid Submission

Submit bids via email to jmalik@nationalforests.org by 5pm Pacific Time on April 19, 2024.

Equal Opportunity Provider

In accordance with Federal law and U.S. Department of Agriculture policy, the National Forest Foundation is prohibited from discriminating on the basis of race, color, national origin, sex, age, religion, political beliefs, or disability.

National Forest Foundation
Appendix A – Blue Pool Trail Construction Scope of Work

Construction of the new accessible trail at Blue Pool shall be done according to the following table. Station numbers are indicated on the project map (Appendix G) and written on wooden stakes in the ground on the project site. Additional construction specifications are included below the table.

Table 1: WORK SUMMARY
Blue Pool Trail Construction

Station (feet)	Work Item	Pay Item	Comments
Station 1 to 2 0-278’	Clearing and grubbing Excavation Hardening NOT retained with poles Drain dip, lead off ditch, sediment basin as needed or at least every 150 feet.	1, 2, 3, 10	Begins at parking area, ends at road/Station 2. Follow pin flags at centerline. Construct trail to 72” wide Scatter spoils, green side up.
Station 2 to 3 278’-1414’	Very minor clearing Excavation Hardening with poles on one side Running ditch on non-trail portion of road Drain dip, lead off ditch, every 150’ or as needed to drain running ditch to sediment basin Install sleeper at start of turnpike	1, 2, 3, 4, 11	Begin at Station 2, end at Station 3. Choose higher elevation side of road for trail. Use lower side for running ditch. See supplemental drawing “Compacted Aggregate Surface with Pole Retainer”
Viewpoint #1 Near Station 3	Clearing and grubbing Excavation Hardening retained with poles on both sides. Install sleeper at viewpoint end. Drain dip, lead off ditch, sediment basin as needed	1, 2, 3, 4, 12	River View: View point. Trail leading to view point is 150 feet long, continue with 6 feet wide turnpike to within 8 feet of the viewpoint stake.
Station 3 to 4 1414’-1625’	Clearing and grubbing Excavation Hardening retained with poles on one side along the road. Hardening NOT retained by poles in the forest section. Hardening with poles on both sides wherever there is no cut slope.	1, 2, 3, 4, 10, 11, 12	Begin at Station 3, end at 4 (Kink Cr). After the short patch of forest, return to excavating running ditch. Drain running ditch to a sediment basin prior to through-cut approaching Kink Creek.

	Drain dip, lead off ditch, sediment basin as needed		
Station 4 to 5 1625'-2594'	Clearing and grubbing as needed Excavation Hardening retained with poles on one side. Hardening NOT retained by poles in the forest section. Drain dip, lead off ditch and sediment basin as needed Continue all of the above on the north side of Kink Creek. Drain through-cut north of Kink Creek at first opportunity. Install sleeper at each end of turnpike approaching and departing from Kink Creek Bridge.	1, 2, 3, 4, 10, 11	Begin at 4, end at 5. North of Kink Cr is a short (<100') section into the forest to cut off unnecessary hairpin in road, then road to trail to Station 5.
ABA Spur near Station 6 2594' Viewpoint #2 along ABA Spur	Follow 72" wide hardened trail retained with poles on both sides for roughly 500' as marked on the ground to create a loop. Excavation Running ditch on non-trail portion of road (not necessary on the ABA loop) Drain dip, lead off ditch, every 150' or as needed to drain running ditch to sediment basin Hardening retained with poles Three large choke boulders need moved to the side or broken to ensure 72" passage. Clean up construction debris.	1, 2, 3, 4, 7, 12	"ABA Spur" leading to overlook loop. Loop trail circles the dispersed site and will be 72" wide, hardened and retained with poles on both sides.
Station 5 to 6 2594"-3120'	Clearing and grubbing Excavation Drain dip, lead off ditch, every 150' or as needed to drain running ditch to sediment basin Hardening retained with poles on one or both sides as needed	1, 2, 3, 4, 11, 12	End of ABA spur is also end of 72" wide segment. Reduce trail width to 40"
Station 6 to Station 7 3120'-3306'	Minor clearing and grubbing Excavation Outslope to 3% where possible. Where not possible, install	1, 2, 3, 4, 11, 12	Ensure boulder choke at bottom of road is >40" wide. Climbs a steep road briefly then enters the forest.

	shallow drain dip, lead off ditch and settling basing on cross slopes less than 5%. Hardening retained with poles where on road or similar flat surface.		Dig into the road and change direction as needed to create enough “run” to keep the grade <8%. Full bench construction, scatter spoils.
Station 7 to Station 8 3306’-3630’	Clearing and grubbing Excavation Hardening not retained with poles Out slope to 3%	1, 2, 3, 4, 10	Enters the forest following a contour on the east side through the woods and follows a side slope with grade reversals. Sidehill (roughly 80%) construction in the woods. Grade reversals are pin flagged into the layout. Full bench construction, scatter spoils. Ends at another road to trail segment.
Station 8 to Station 9 3630’-3945’	Road to trail conversion. Subsoiling Excavation Hardening retained with poles on both side or one side as needed. Install appropriate drainage as needed. Install one 72x72” wide section to be used as a passing zone in the middle of this section where the road slope allows a <5% grade. Revegetate* the non-trail segment of subsoiled road.	8, 2, 3, 4, 10, 11	This road is compacted and rocky. Use a suitable excavator to subsoil the road to from Station 8 to 9 (appx 250 feet long) at 16-18” depth to promote water infiltration and plant growth. Use the full width of road to create as gentle a grade as the road allows. Use the fill slope if needed, dig below grade and use Table 7.4.3.1. *Use straw and seed approved by the Project Manager.
Station 9 to Station 10 3945’-4855’	Clearing and grubbing Rock Excavation work Retaining wall for SWBs (3 of them, stone found on site within reach of trail. 15’ each) Switchback Fill space inside SWB legs with rubble for 15’ to prevent SWB cutting. Hardening not retained with poles.	1, 7, 4, 13, 5, 9, 10, 11	Rocky SWB segment. Three switchbacks to be built on a steep, rocky slope Tread shall be 40” wide with two additional passing zones installed near the middle of two longer tangents. (As determined on site by USFS field contact and contractor). Install 36”x36” resting/waiting zone at the end of each SWB.

	Retain with poles or rock (found on site) wherever there is no cut slope to retain the gravel. A slump area is staked to construct a 20' long, dry-stacked, stone retaining wall roughly 4 feet in height. Stone for this wall may be harvested from the trail corridor nearby.		See supplemental drawing and construction notes. Outslope to <3%
Station 10 to Station 11 4855'-6799'	Clearing and grubbing (medium) Excavation Hardening NOT retained with poles Out slope to 3% Drain dip, lead off ditch, sediment basin as needed	1, 2, 3, 10	Outslope to 3% where possible, install drainage where out sloping is not possible
Viewpoint #3 at Station 11	Trail passes a viewpoint looking north near Station 11.	1, 2, 3, 4, 10	Masonry contractor will construct the viewpoint elements. *Note. The soil is rocky and shallow near Station 11. If bedrock is exposed it may be used as a trail surface if protrusions can be kept to <0.5" above trail grade.
Station 11 to Station 12 6799'-9734'	Hardening without poles until the road Road section will have poles on one side Clearing and grubbing Light excavation Drain to fill slope using 3% outslope where possible. Drain dip, lead off ditch, sediment basin as needed	1, 2, 3, 4, 10,	Modify existing water bars on the road to be smooth rolling drain dips. Blend drain dip grades to <5%.
Viewpoint #4 between Stations 12 and 13	Construct 100' of spur trail, 40" wide. Buck large log blocking view, dismantle root wad. Poles on both sides. Construct trail to within 10 feet of viewpoint stake. Install sleeper at end.	1, 2, 3, 4,	Masonry contractor will construct the viewpoint elements.

Station 12 to Station 13 9734-9865’	Back to road to trail conversion (poles on one side) for some distance and then trail building in the forest. Clearing and grubbing Excavation Drain to fill slope using 3% outslope where possible. Drain dip, lead off ditch, sediment basin as needed	1, 2, 3, 4,	After the road to trail conversion segment, the trail route goes into the woods. The route parallels a road (740/743) that will stay open for emergency traffic to Blue Pool. *Avoid blocking this road with equipment or materials*.
Station 13 to Station 14 9865-10,557’	Hardening without poles Clearing and grubbing Light excavation Drain to fill slope using 3% outslope where possible. Drain dip, lead off ditch, sediment basin as needed	1, 2, 3, 10	

Numbers in the Pay Item column above correspond to the descriptions below to help clarify what type of trail construction is to be done within each section of the trail.

PAY ITEM	DESCRIPTION	UNIT	EST QUANTITY
1	**Clearing and Grubbing**	**LF**	**11615***
2	**Excavation**	**LF**	**11615***
3	**Drain dip, lead-off ditch, settling basin**	**EA**	**80**
4	**Sleeper Anchors**	**EA**	**205**
5	**Switchback**	**EA**	**3**
6	**Mobilization**	**LS**	**1**
7	**Rock Excavation Work**	**LF**	**415**
8	**Road Subsoiling**	**LS**	**1**
9	**Stump Removal**	**EA**	**10**
10	**Hardening without poles**	**LF**	**4145***
11	**Hardening with poles on one side**	**LF**	**4316***
12	**Hardening with poles on both sides**	**LF**	**2900***
13	**Stone Retaining wall**	**LF**	**70**
14	**Garbage and Construction Debris**	**LF**	**11615***

These notes describe the trail construction requirements in further detail. No deviation from these requirements is permitted without approval from the NFF and USFS.

1. **Roots** in the tread larger than 1" diameter must be buried completely or removed from the tread. Avoid cutting roots larger than 3 inches in diameter if possible.

2. **Trees** up to 11" DBH may be cut where necessary. Stumps under the tread must be dug out and removed. Stumps from trees cut by the contractor adjacent to the trail or within the trail prism must be flush cut.

3. All construction shall be **full bench**. Compacted, clean fill may be used to bring low areas up to grade but no partial bench trail shall be constructed. Do not bury any organics within the tread.

4. In general, the yellow or orange pin flags marking the route are to be followed precisely. The pin flags mark the centerline of the trail. In rocky areas, the pin flags may be marking the upper edge of the cut slope to help the contractor avoid unnecessary rock work. On corners, the pin flag line marks the outside radius of the turn. If necessary, the pin flag line can be moved by the contractor up to 50 feet from the original location if undiscovered issues arise during construction. If the line needs to be moved further than 50 feet, skip that area and contact the USFS Technical Point of Contact to discuss a solution. This must be arranged in advance before the ground is disturbed.

5. Stakes mark each station. The stakes have a station number and a footage (from the parking lot). Work needed between each pair of stations is described in the Work Summary.

6. **Turnpike** construction. Geocloth on the ground (see #7), poles along the sides anchored with two rebar stakes in each pole. Install sleepers if needed. Add 2.5-inch lift of 1.5 minus gravel, compact, then add 2.5 inches of ¼ minus, compact and crown. See supplemental drawing "Compacted Aggregate Pole Retainer with Ditch

7. **Geocloth** shall be used under the gravel for the majority of the trail. Geocloth must be laid on the ground under the gravel with edges folded upward inside the trail edge. No geocloth may be exposed. Geocloth should not be "burrito wrapped". The contractor may elect to *not* use geocloth wherever the subsurface is rocky and dense enough to keep gravel from sinking or dispersing into the soil.

8. In areas where poles are needed on both sides it may be necessary to install "**sleeper**" anchors under the poles perpendicular to the trail. The purpose of a sleeper anchor is to tie poles on either side to each other underneath the trail to prevent potential displacement of the side poles. Examples of sleeper locations include; curves, grade changes, slope edge, drain dips and wherever trail without poles transitions to trail with poles. See definition.

9. **Resting interval/Passing section** are used interchangeably in this document. The 72" wide segment is wide enough to allow passing for its entire length. On the 40" wide segment, resting intervals shall measure 60" long and 36" wide in addition to the 40" trail width. Special resting intervals for SWBs are shown on the "Switchback with Rectangular Landing" supplemental drawing.

10. Unless otherwise specified in the Work Summary, install a gently **rolling drain dip** roughly every 150 feet on the trail segments that do not call for a running ditch alongside the

turnpike. The contractor should select suitable low areas on the trail for appropriate drain locations. A break in the turnpike poles will be needed. Sleepers are needed under the trail on each side of the opening to anchor the free ends of the poles. Drain dips should be <5% grade in all directions. On side slopes less than 10%, connect the drain dip to a settling basin with a short lead-off ditch that is at least 24" wide. No settling basin should touch the trail edge.

11. Where **rolling dips** are installed in turnpike segments, 8" minus rock should be used to armor the full width of the exit from the edge of the trail for 24" into the lead-off ditch. The purpose is to delineate the end of the drain dip to keep traffic away from this potentially soft edge and to keep the ¼"- gravel on the trail. See supplemental drawing "Compacted Ag Rock Spillway".

12. **Garbage** and construction debris found within the trail corridor or generated by the construction of this trail, or found within the trail corridor, should be hauled to a waste facility by the contractor.

Specifications:

- Clear tread width shall be 72" or 40" as noted in the above Work Summary
- Corridor clearing width shall be 3 feet horizontally from each edge of the tread
- Corridor clearing height shall be 8 feet
- Surface shall be compacted gravel, smooth, firm and stable without holes, soft areas, protrusions or obstacles exceeding ½" in height.
- Tread out slope shall be 2-3% when the tread is constructed against a backslope.
- Crown with 2% outslope from centerline any segment on flat ground
- Grade of up to 5% is permitted for any distance
- The grade of any segment of the trail shall not be steeper than 12%
- Where the grade of a segment of a trail is steeper than 5%, the maximum length of the segment shall be in accordance with Table 7.4.3.1 below
- On the 72" wide segments there is no need for resting intervals because the tread will be wide enough to allow passing and resting
- On the 40" wide segment resting intervals shall be provided at the end of each switchback and a resting interval measuring 60" long and 36" wide shall be provided as marked on the ground or specified in the Work Summary.

Table 7.4.3.1 Trail Running Slope (Grade) and Resting Intervals

Running Slope of Trail Segment		Maximum Length of Segment Between Resting Intervals
Steeper Than	But Not Steeper Than	
1:20 (5 percent)	1:12 (8.33 percent)	200 feet (61 m)
1:12 (8.33 percent)	1:10 (10 percent)	30 feet (9 m)
1:10 (10 percent)	1:8 (12 percent)	10 feet (3050 mm)

Source: FSTAG https://www.fs.usda.gov/sites/default/files/FSTAG-2013-Update.pdf

See also Appendix B – Blue Pool Trail supplemental drawings:

- Switchback with Rectangular Landing
- Compacted Aggregate Knick Rock Spillway

- Compacted Aggregate Pole Retainer with Ditch

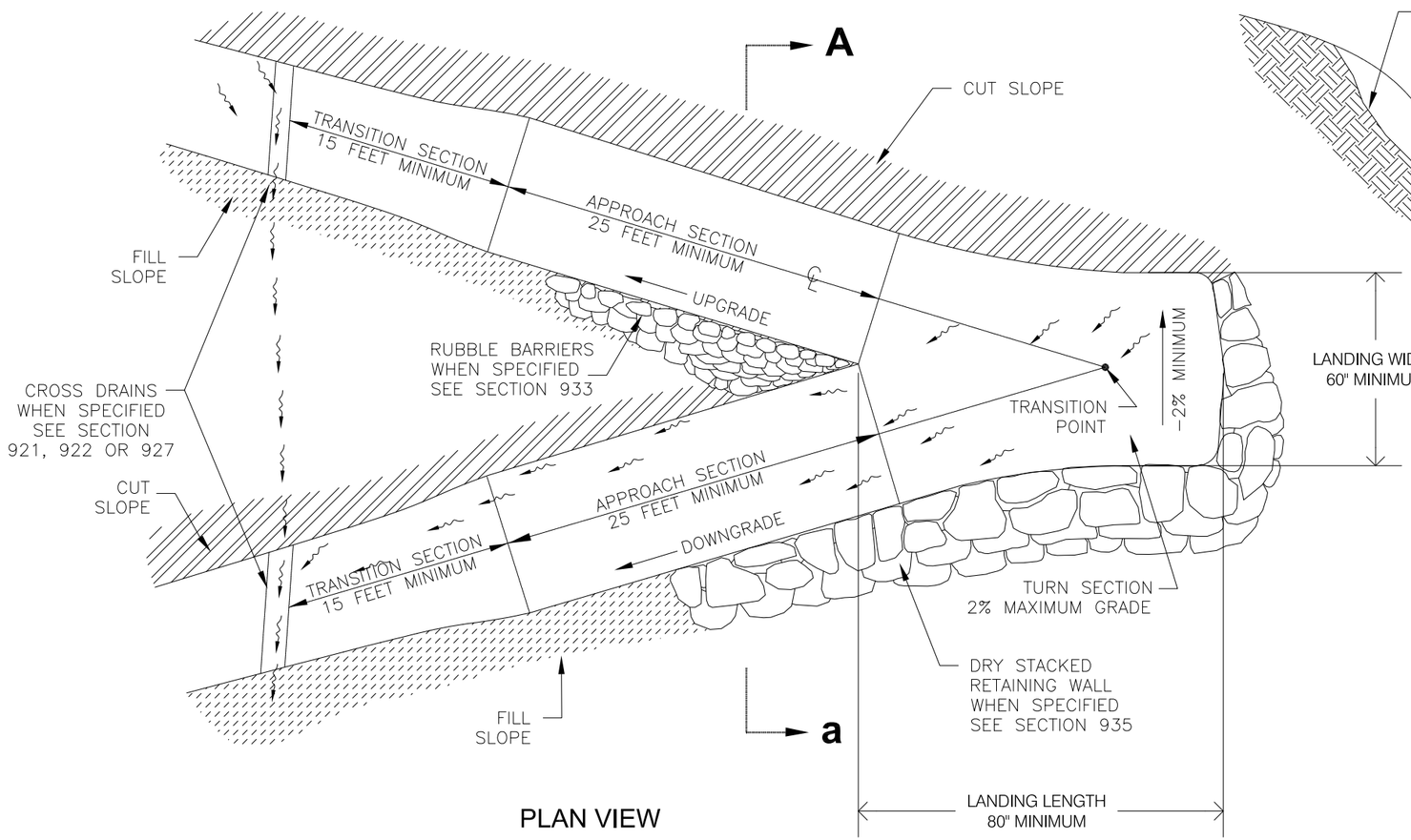
Materials Requirements:
The following materials specifications must be used. Deviations may be approved by the NFF Project Manager in consultation with USFS Technical Point of Contact.

Poles of any length may be used. They must be treated with a wood preservative by the manufacturer. Poles shall be “4/5” meaning, they taper from 4” to 5”. Larger diameter poles may be used if approved by the Project Manager. Smaller diameter poles may not be used.
Gravel shall be quarry rock. River rock may be used only if it is crushed to the point that no rounded faces remain.
1.5 minus quarry rock shall be used unless another size is approved by the Project Manager. The compacted depth shall be 2”.
3/8 or ¼ minus quarry rock with crusher fines included shall be used on the surface. The compacted depth may range from 1.5” to 3” to accommodate crowned or outsloped surfacing.
Geocloth used shall be 3.5 oz or thicker and at least 6 feet wide on the 6-foot-wide trail segment and at least 40” wide on the 40” wide segment.
Hardware used such as lags and spiral nails must be coated to resist rust.
Spillway rock shall be 6” minus to 8” minus quarry rock and certified “weed free”.
Rebar shall be “#5” or 5/8” diameter. Each rebar stake shall be 24” long or cut off when it refuses to drive any further.
Seed/Straw shall be weed free.
Subsoiling is to be done with an excavator bucket. No ripping. *Do not invert the soil column.*

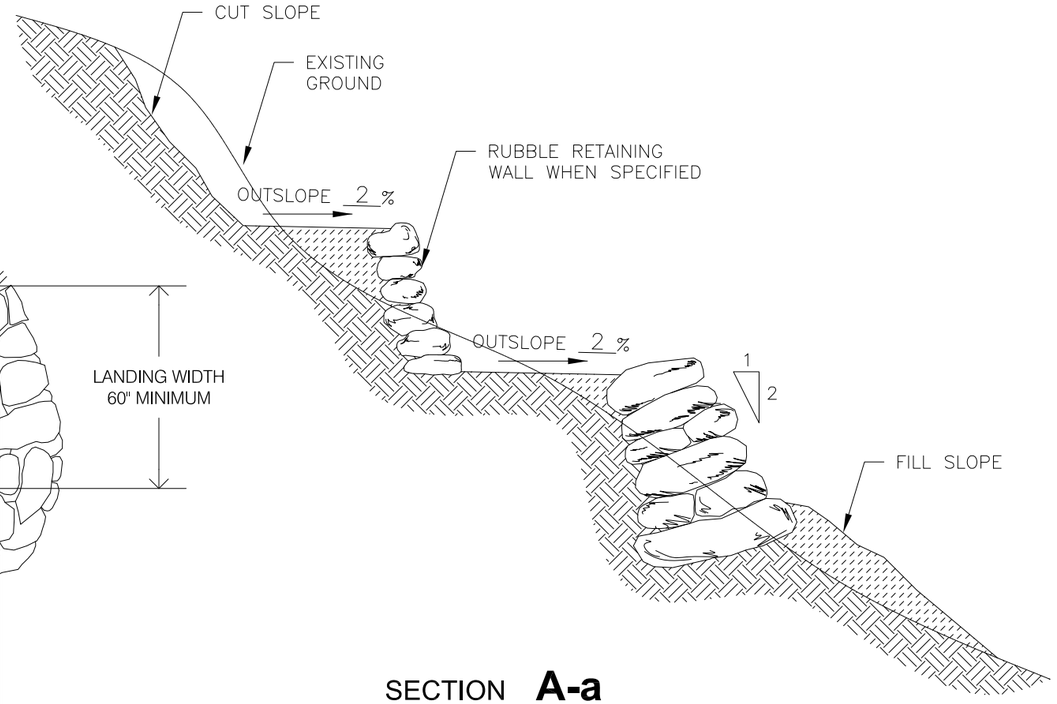
Terminology:

Settling basin- A shallow, rounded hole, approximately 60” diameter and 12” deep, connected to the trail with a lead-off ditch to allow water from the trail to soak into the ground away from the trail edge.
Scatter Spoils-Soil spoils may be used as fill where needed. Organics should be scattered with green side up within a long shovel reach of the trail edge.
Sleeper anchor-Used where poles on both sides of the trail need to be tied together under the trail to prevent displacement of side poles. Cut this pole to length with 4” of overhang. Treat the cut end of the pole with an oil-based wood preservative. Fasten to side poles just below the ground, under the geocloth and gravel, with a coated spiral nail or lag.
Lead off ditch-Connects a drain dip or knick to a settling basin. Should be 24” wide and armored as needed to prevent loss of trail surfacing.
Spur trail-An out-and-back trail not included, but attached to, the main trail.
ABA-Architectural Barriers Act
ADA-Americans with Disabilities Act
Hardening NOT retained with poles-For trail construction in the woods wherever a cut slope on both sides of the trail exists to adequately retain the gravel. Use geocloth under gravel wherever the ground is soft or permeable. Add gravel with fines included in short lifts (2” max.), compacting each lift to form a smooth sloped or crowned (as specified) surface elevated 4” above the excavated grade. This is called a “**turnpike**”. Drain dips should be shallow and have smooth grade changes. A gravel apron should enter the lead off ditch from the edge of the trail to avoid an abrupt trail edge that might collapse.
Hardening retained with poles on one side-Some of the “turnpike” will be retained with poles on *one side only* (the running ditch side). The other side can be retained against a cut slope. Wherever an adequate cut slope does not exist and cannot be made, poles should retain both sides as described below.

Hardening retained with poles on both sides-Poles must be used to retain the gravel wherever there is not an adequate cut slope to retain the gravel.
Drain dip-Shallow dip in trail tread to facilitate drainage off the trail.
Knick-The opening at the trail edge allowing water to spill into the lead-off ditch. Armored when installed in turnpike.

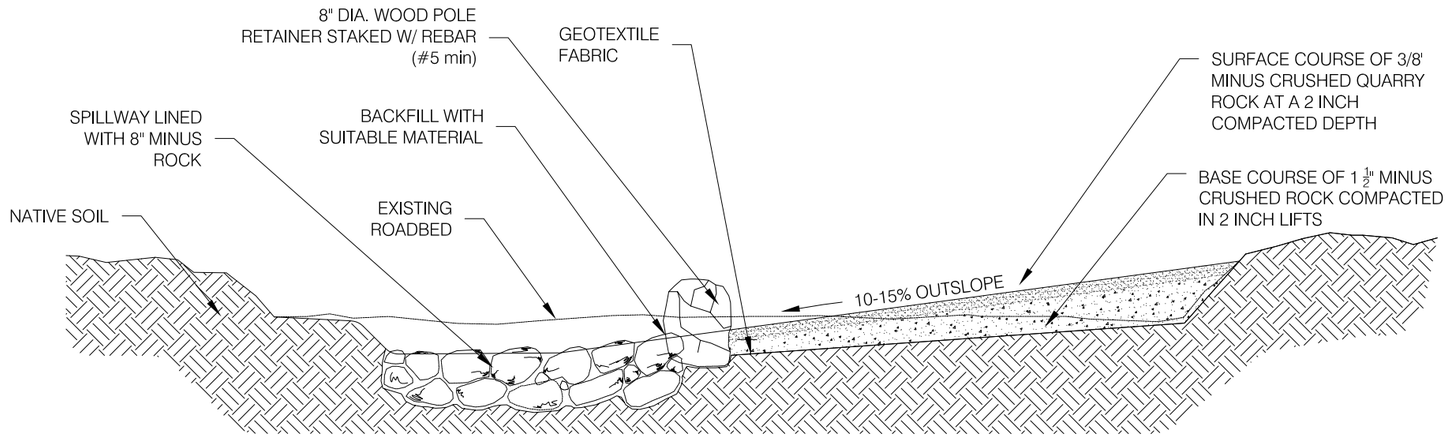


PLAN VIEW

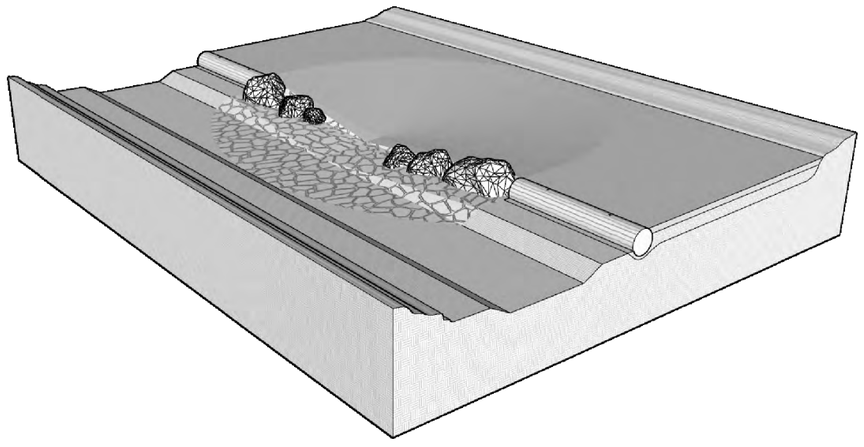


SECTION **A-a**

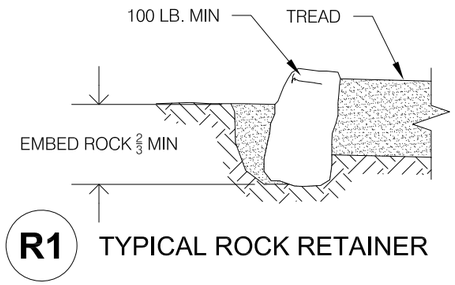
U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE **STANDARD TRAIL PLAN**	PROJECT NAME & LOCATION **BLUE POOL TRAIL** **WILLAMETTE NATIONAL FOREST** **MCKENZIE RANGER DISTRICT**	DRAWING NAME **TYPE 3 SWITCHBACK W/ PASSING SPACE @ LANDING** SECTION TYPICAL ID **SUPPLEMENTAL TRAIL DETAILS**	REVISION DATE **11/13/23** **NO SCALE**	DRAWING NO. SHEET **X** OF **X**



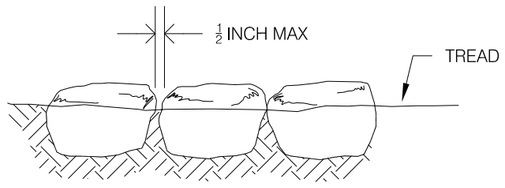
SECTION B-b



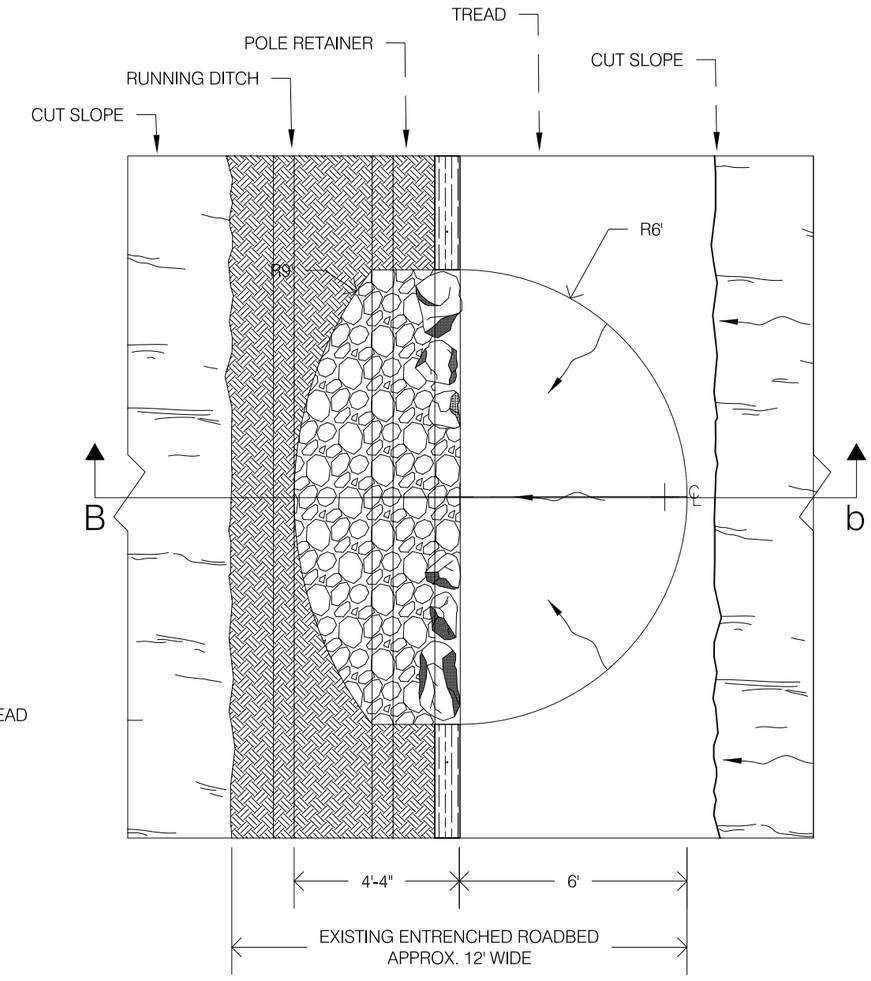
PERSPECTIVE VIEW



R1 TYPICAL ROCK RETAINER



TYPICAL ROCK SPACING



PLAN VIEW

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

BLUE POOL TRAIL
WILLAMETTE NATIONAL FOREST
MCKENZIE RANGER DISTRICT

DRAWING NAME

COMPACTED AGGREGATE W/ KNICK, ROCK CAPS & SPILLWAY

SECTION — TYPICAL ID

SUPPLEMENTAL TRAIL DETAILS

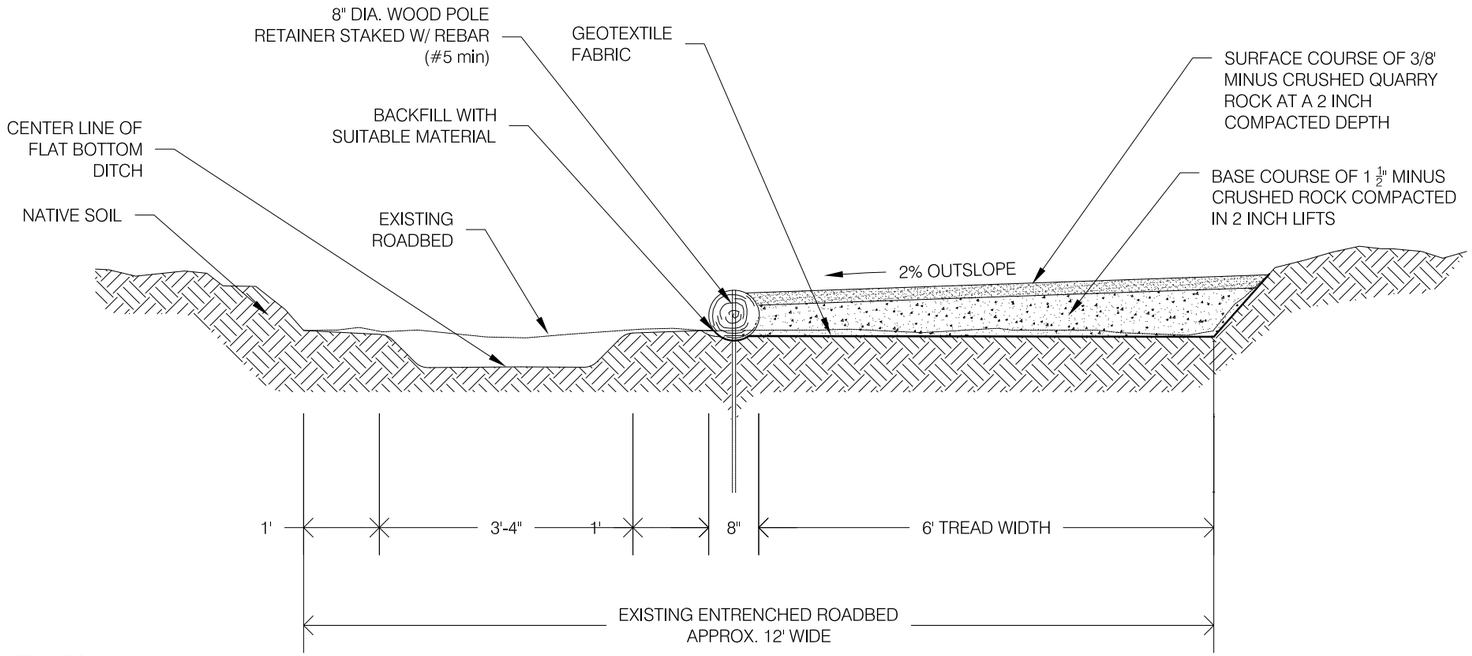
REVISION DATE

11/07/23

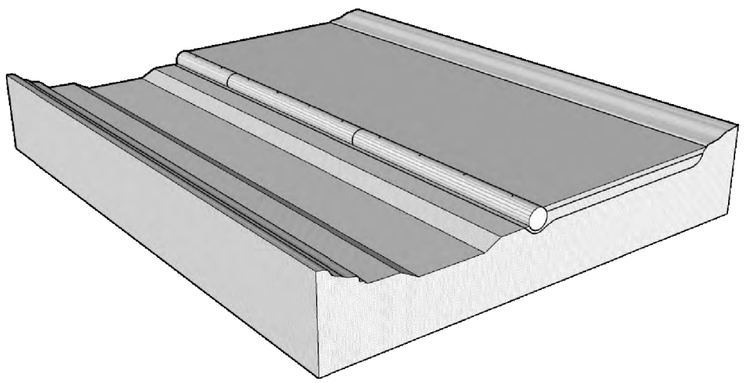
NO SCALE

DRAWING NO.

SHEET **X** OF **X**



SECTION A-a



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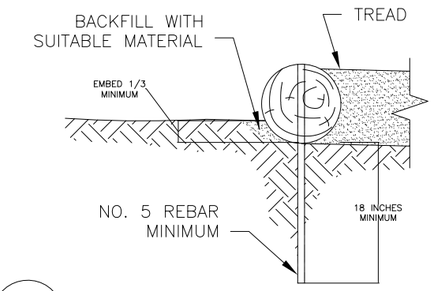
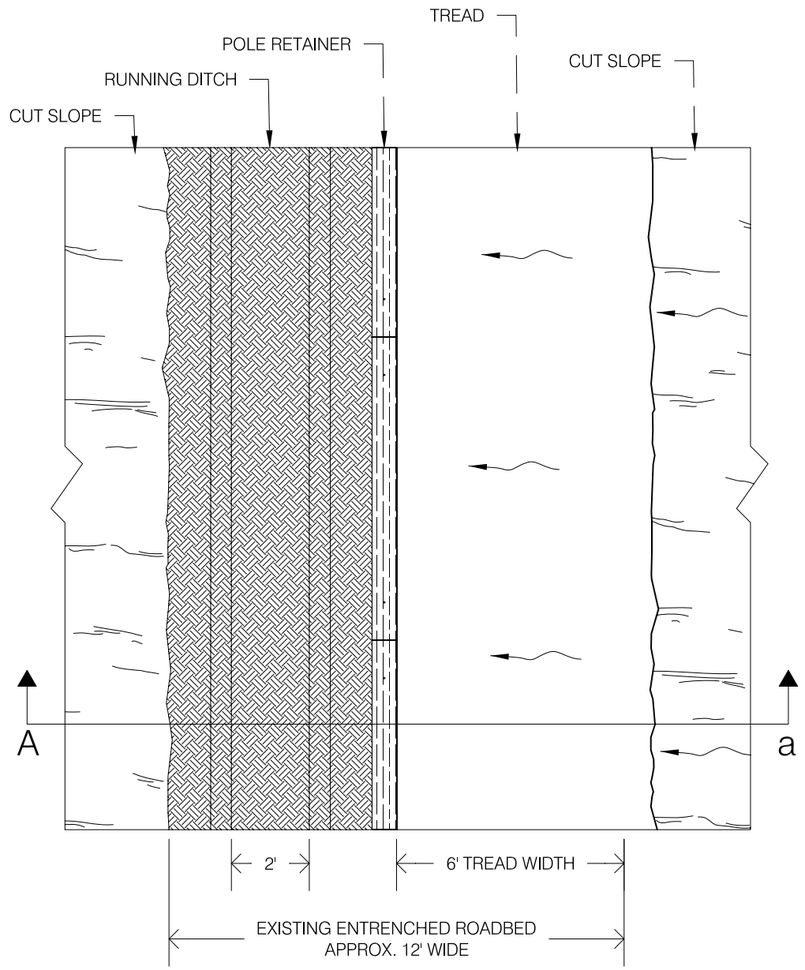


R2a TYPICAL LOG RETAINER



PLAN VIEW

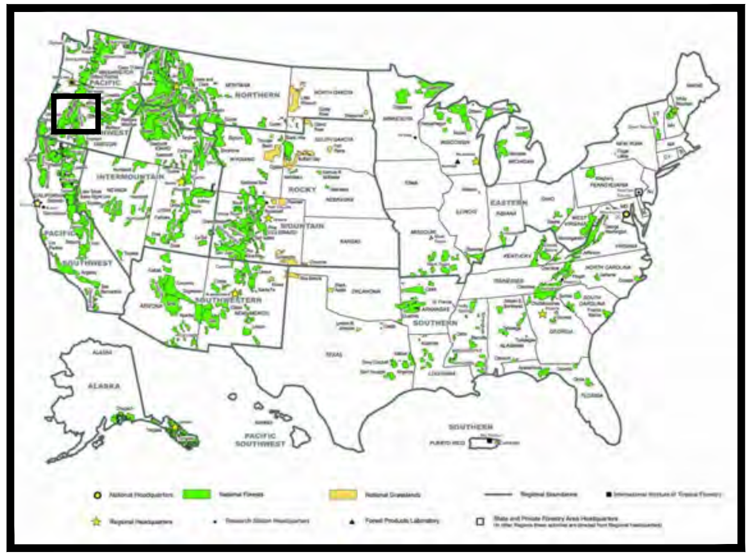
U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE **STANDARD TRAIL PLAN**	PROJECT NAME & LOCATION **BLUE POOL TRAIL** **WILLAMETTE NATIONAL FOREST** **MCKENZIE RANGER DISTRICT**	DRAWING NAME **COMPACTED AGGREGATE SURFACE WITH POLE RETAINER** SECTION: **SUPPLEMENTAL TRAIL DETAILS** — TYPICAL ID	REVISION DATE **11/07/23** **NO SCALE**	DRAWING NO. SHEET **X** OF **X**

APPENDIX C

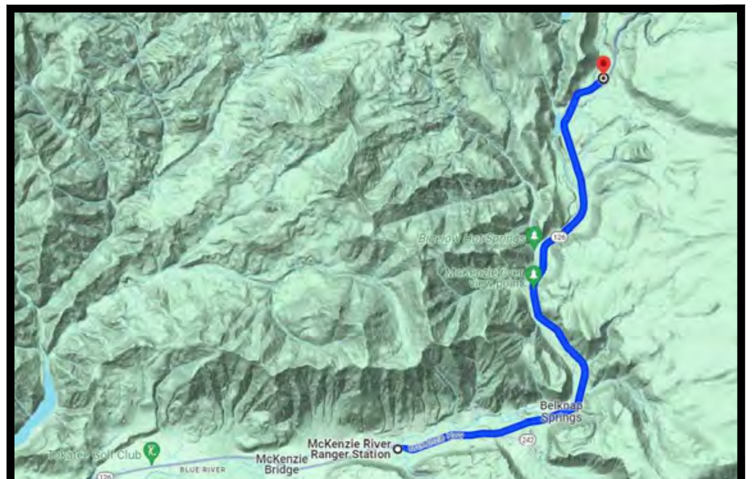
United States Department of Agriculture
Forest Service

OREGON
LINN COUNTY
R06 PACIFIC NORTHWEST REGION
WILLAMETTE NATIONAL FOREST
MCKENZIE RIVER RANGER DISTRICT

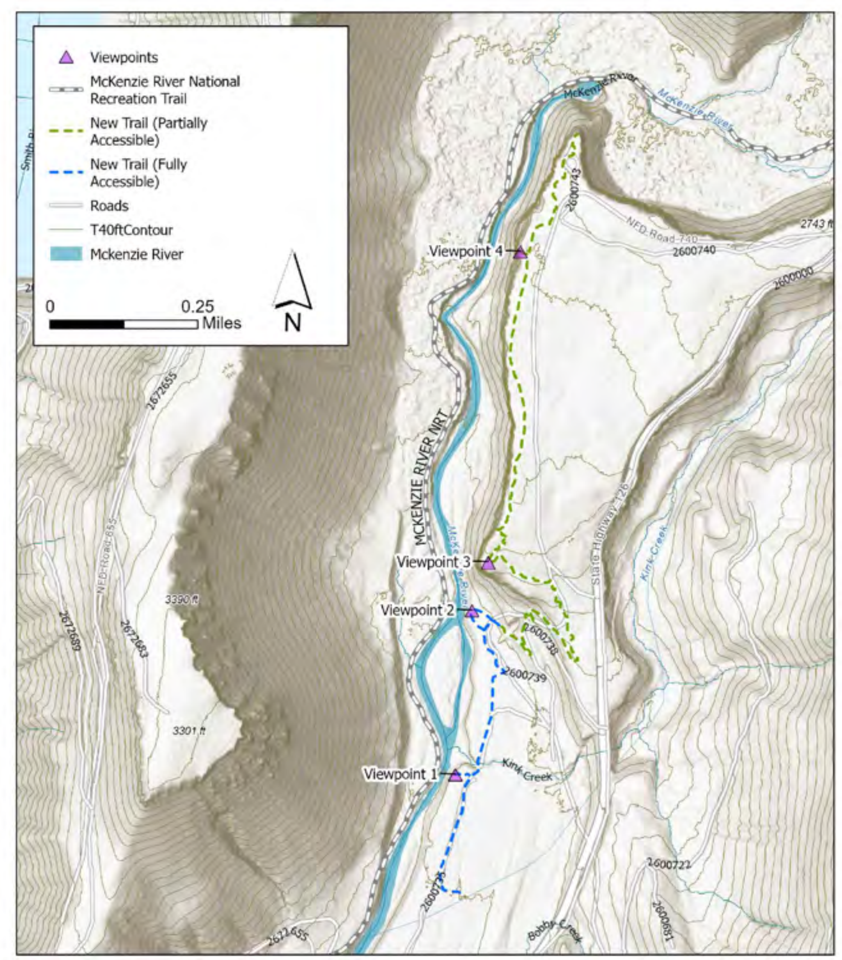
BLUE POOL TRAIL OVERLOOK PROJECT



FOREST LOCATION



PROJECT VICINITY MAP



Blue Pool Trail Construction Map
Viewpoint Locations
McKenzie River Ranger District | Willamette National Forest

PROJECT AREA MAP

INDEX OF SHEETS

SHEET	SHEET TITLE	DWG SHEET NO.
1	COVERSHEET	
2	OVERLOOK #1	L-01
3	OVERLOOK #2	L-02
4	OVERLOOK #3	L-03
5	OVERLOOK #4	L-04
6	DETAIL Q: WALL SECTIONS	L-05
7	DETAILS R-S: PILASTERS, FOOTINGS	L-06
8	DETAILS T: MASONRY	L-07
9	DETAILS U-W: STEEL RAILING, SIGNS, BENCH	L-08
10	DETAIL X: RUBBLE WALL/ROCK EDGING	L-09
11	NOTES	L-10
12	NOTES CONTINUED	L-11
13		
14		
15		
16		
17		
18		
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RECOMMENDED BY:

FOREST ENGINEER ______________ DATE ______

DISTRICT RANGER ______________ DATE ______

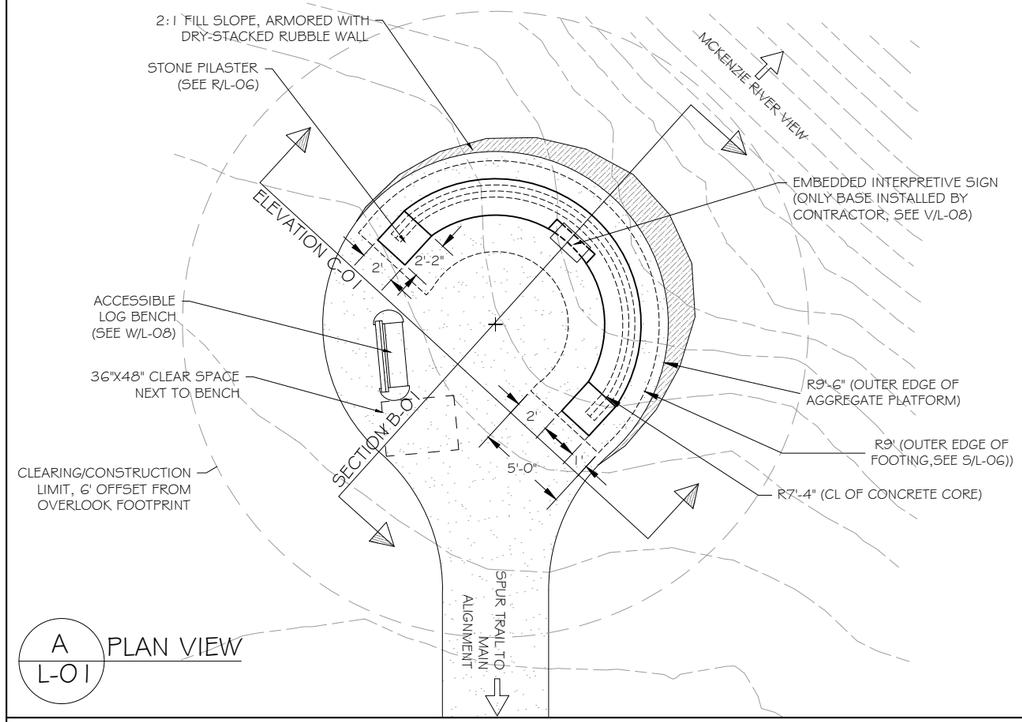
FOREST SUPERVISOR ______________ DATE ______

RO FACILITIES PROGRAM MANAGER ______________ DATE ______

APPROVED:

DIRECTOR OF ENGINEERING ______________ DATE ______

2/26/24 08:36 KAILEEBELL C:\USERS\KAILEEBELL\ONEDRIVE - USDA\DESKTOP\WILLAMETTE\PROJECTS\TAMOLITCH\CAD\OVERLOOK_SUITE_FEB5.DWG;



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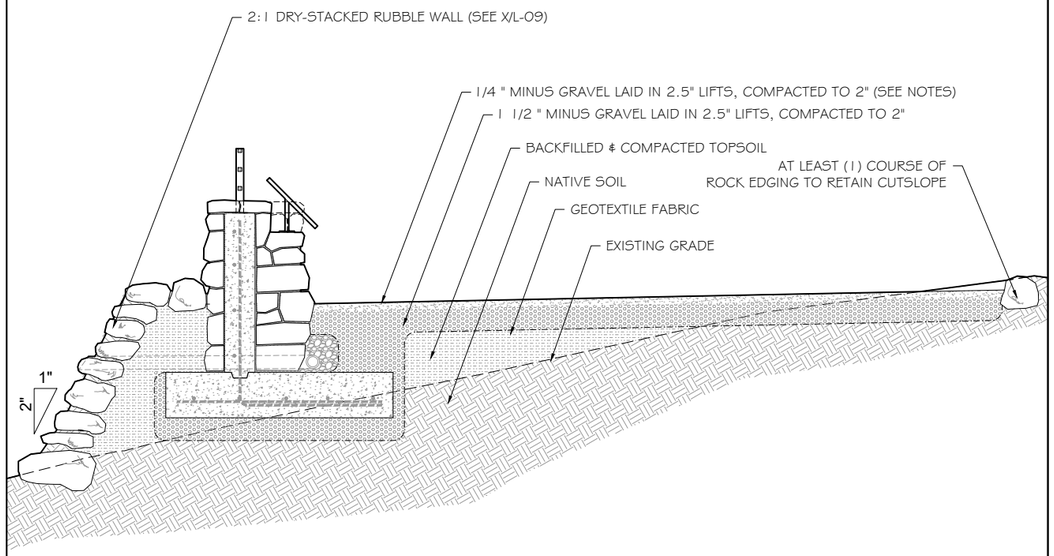

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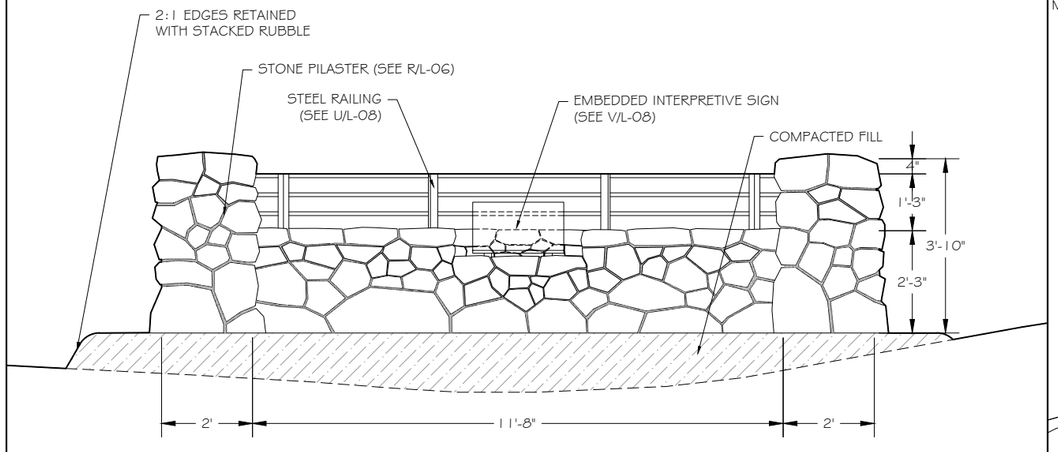
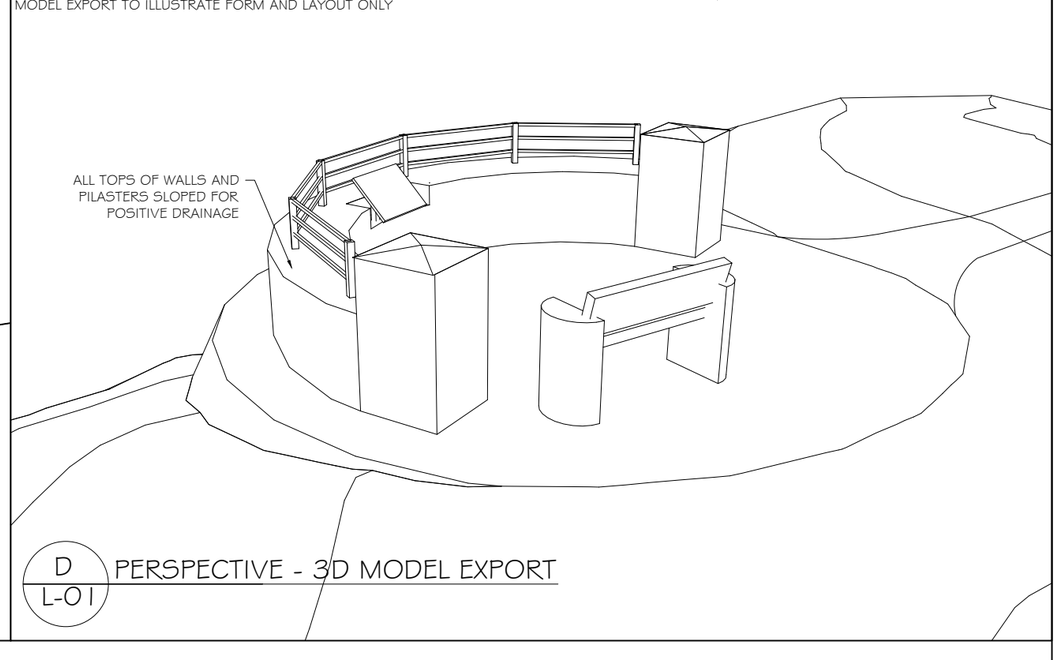


C L-01 ELEVATION

MODEL EXPORT TO ILLUSTRATE FORM AND LAYOUT ONLY



D L-01 PERSPECTIVE - 3D MODEL EXPORT

VIEWPOINT #1

United States Department of Agriculture
Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
3		
2		
1		

PROJECT NAME

BLUE POOL TRAIL OVERLOOKS

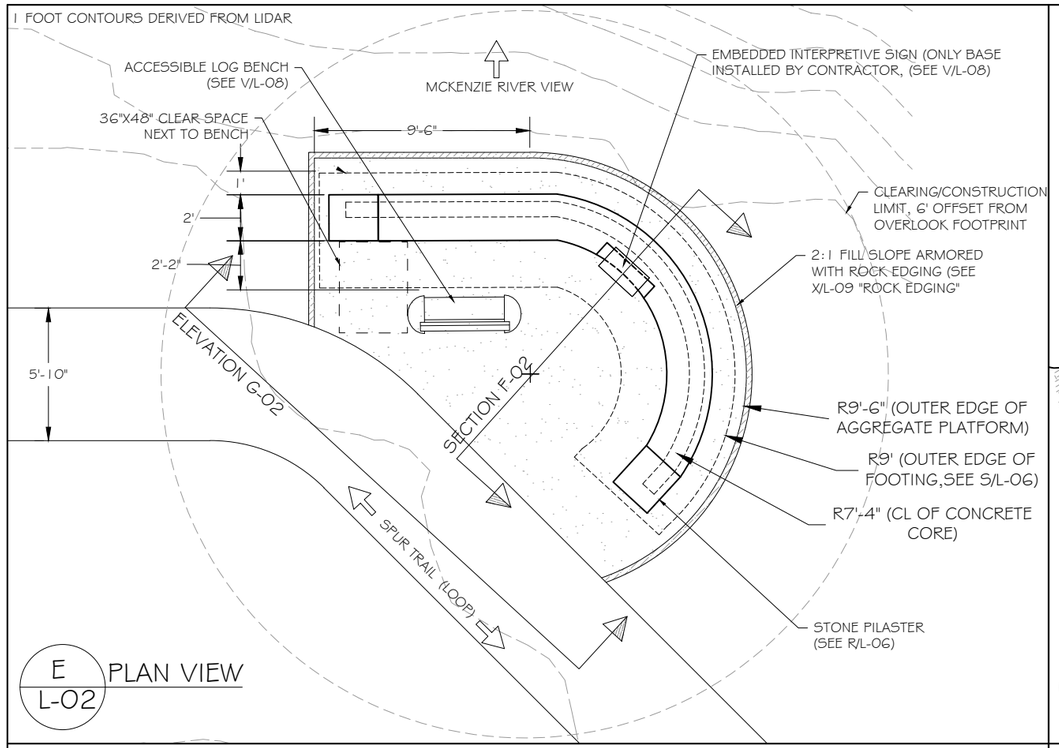
WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

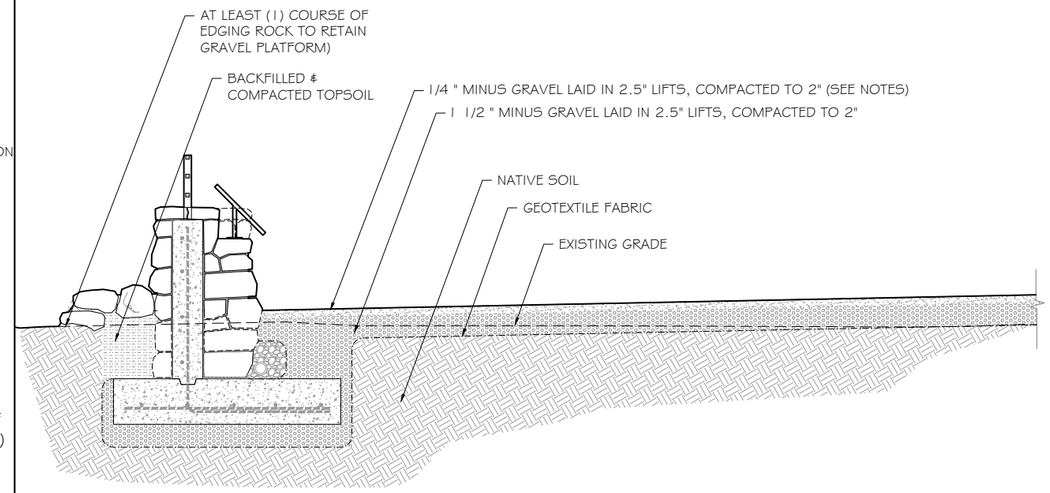
DRAWING TITLE

Viewpoint #1

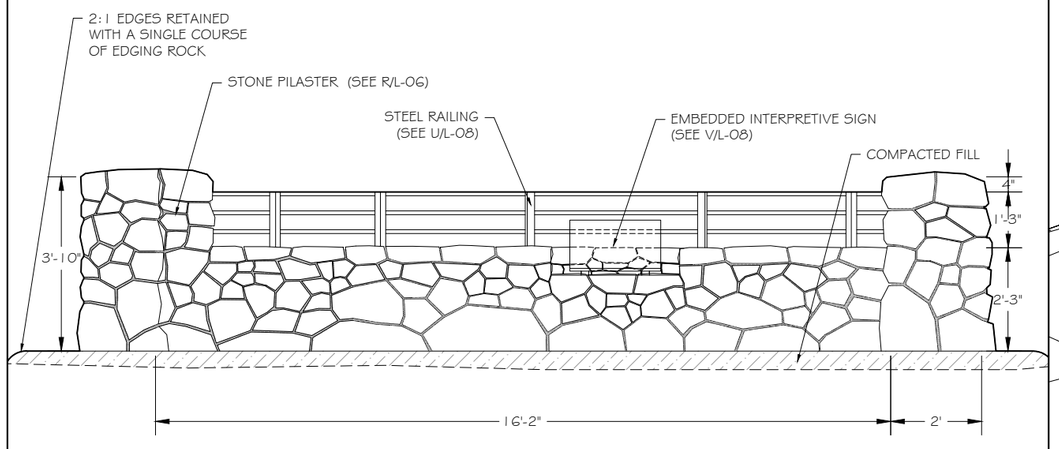
DATE	ARCHIVE NO.
DESIGNER: K.BELL	DRAWING SHEET NO. L-01
DRAWN: K.BELL	
CHECKED: X.XXX	
PROJECT NO.	SHEET OF



E L-02 PLAN VIEW



F L-02 SECTION



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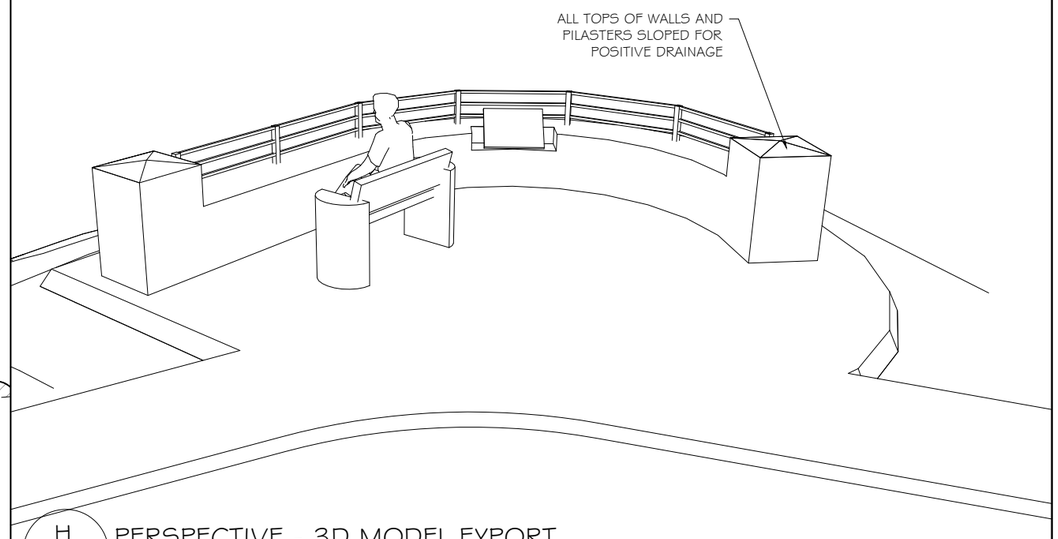

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United States Department of Agriculture
Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
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PROJECT NAME

BLUE POOL TRAIL OVERLOOKS

WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

DRAWING TITLE

Viewpoint #2

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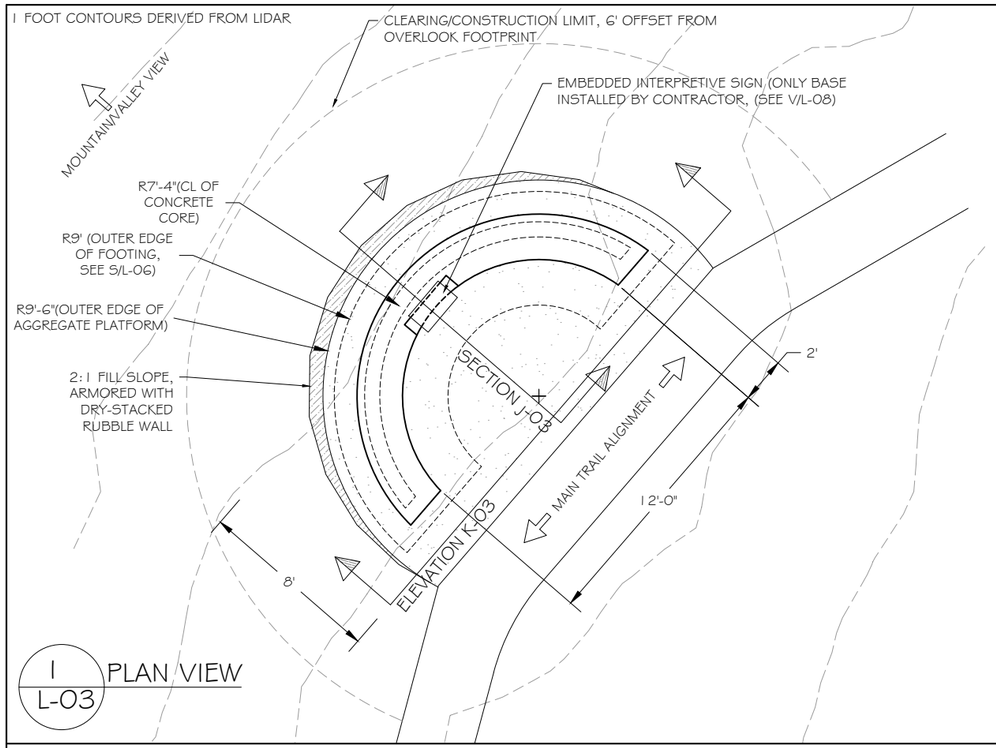
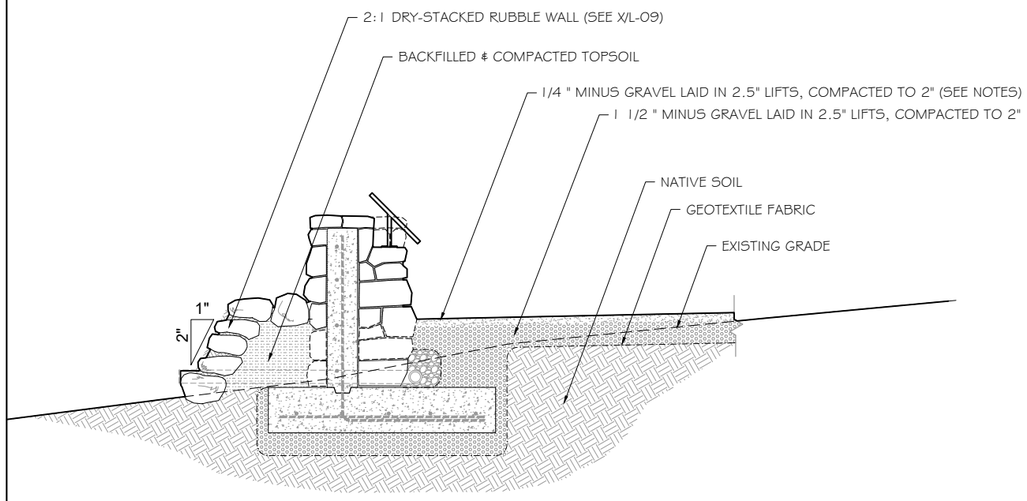


I / L-03 PLAN VIEW



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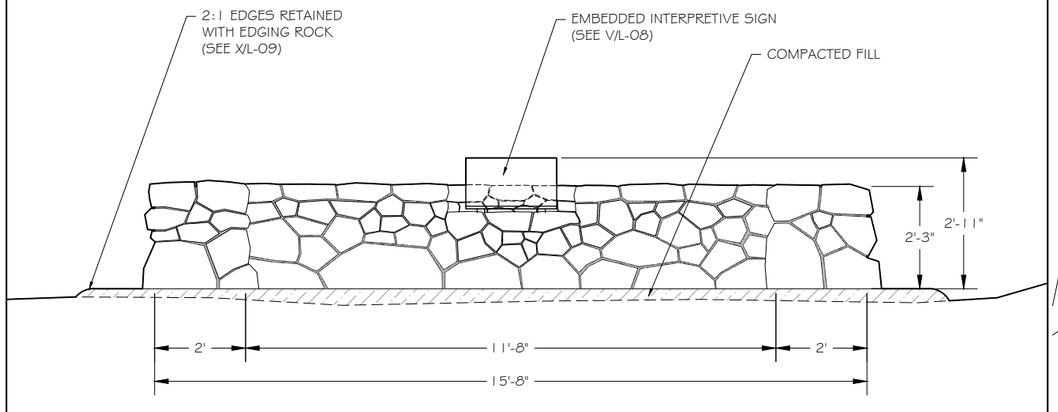

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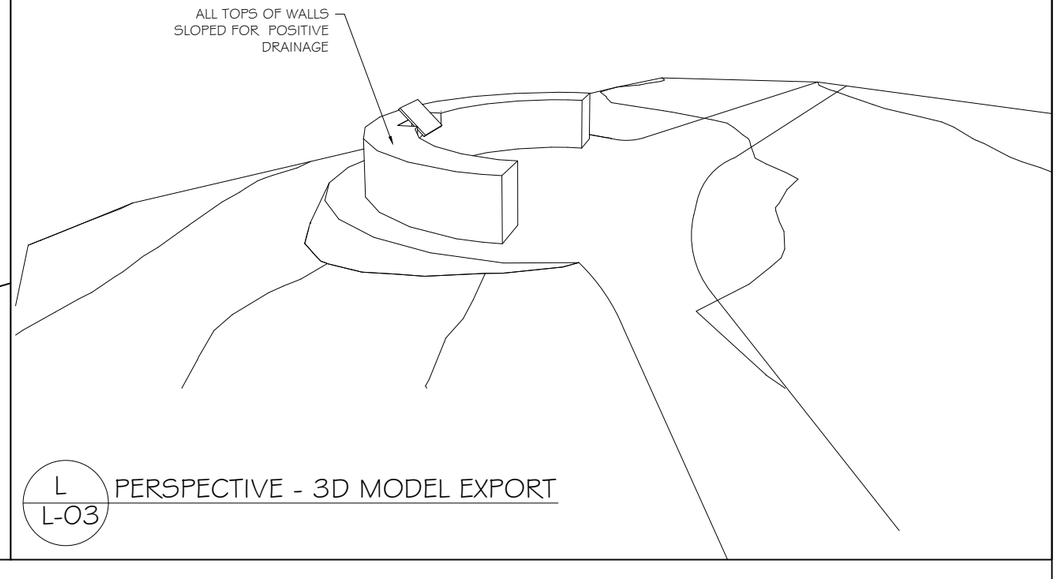

L / L-03 PERSPECTIVE - 3D MODEL EXPORT

VIEWPOINT #3

USDA FOREST SERVICE
United States Department of Agriculture
Forest Service
R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
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PROJECT NAME

BLUE POOL TRAIL OVERLOOKS

WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

DRAWING TITLE

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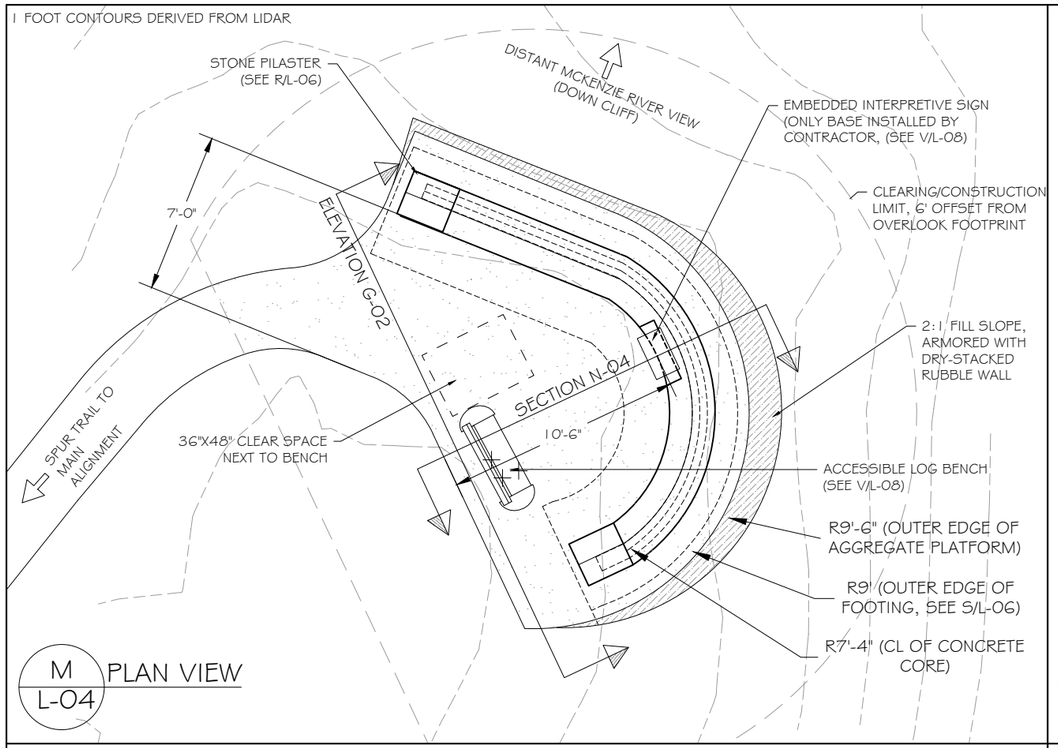
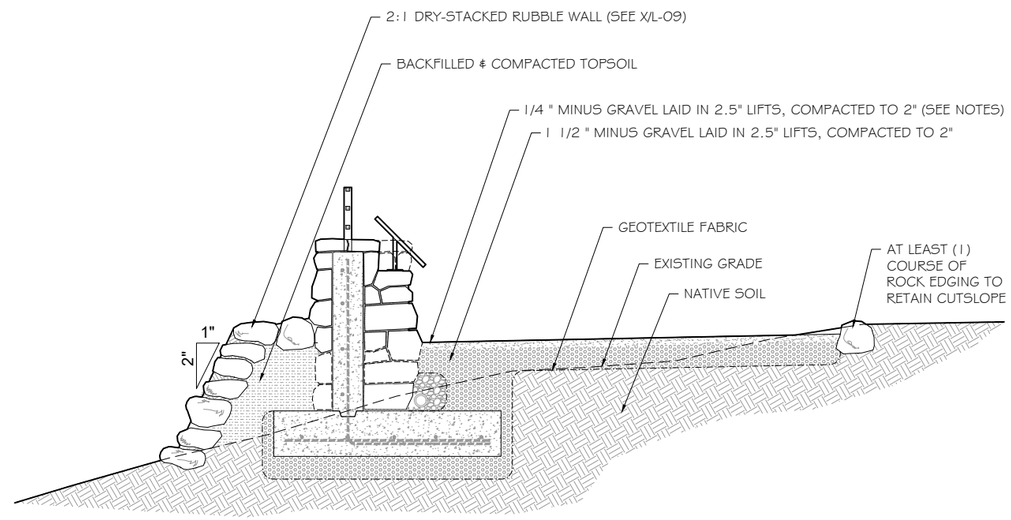
PROJECT NO.	SHEET OF



M L-04 PLAN VIEW



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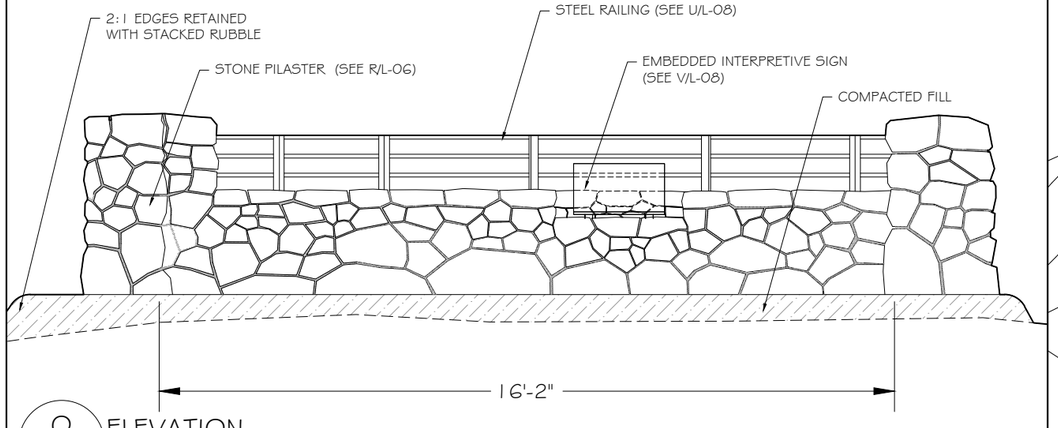

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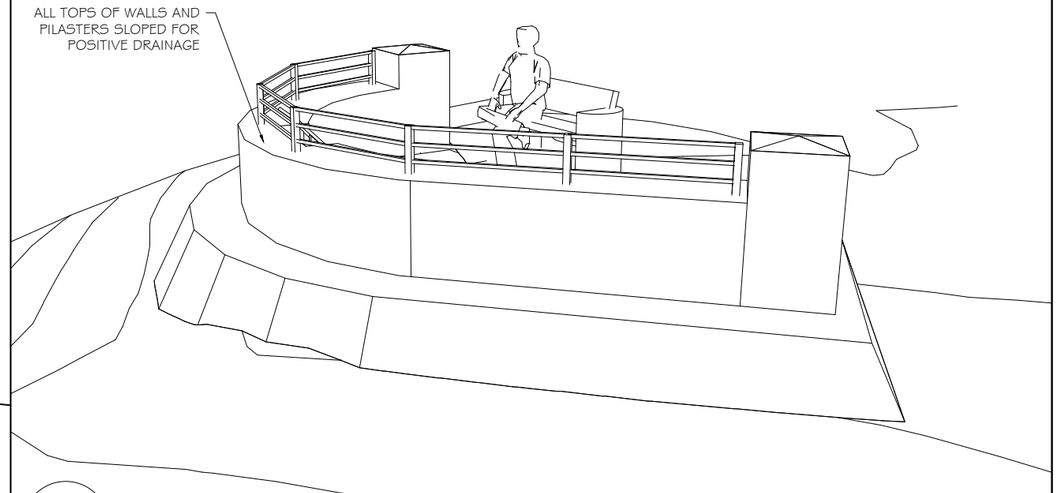

P L-04 PERSPECTIVE - 3D MODEL EXPORT

VIEWPOINT #4

United States Department of Agriculture
Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
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PROJECT NAME

BLUE POOL TRAIL OVERLOOKS

WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

DRAWING TITLE

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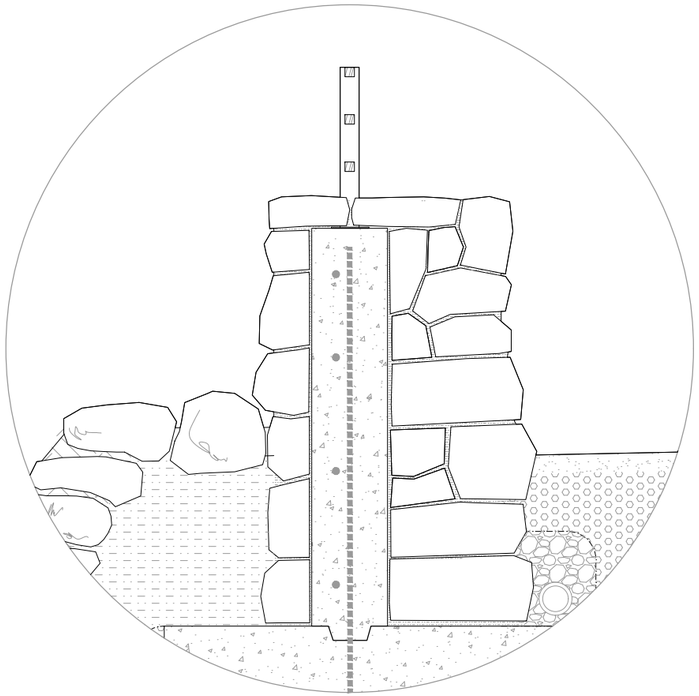
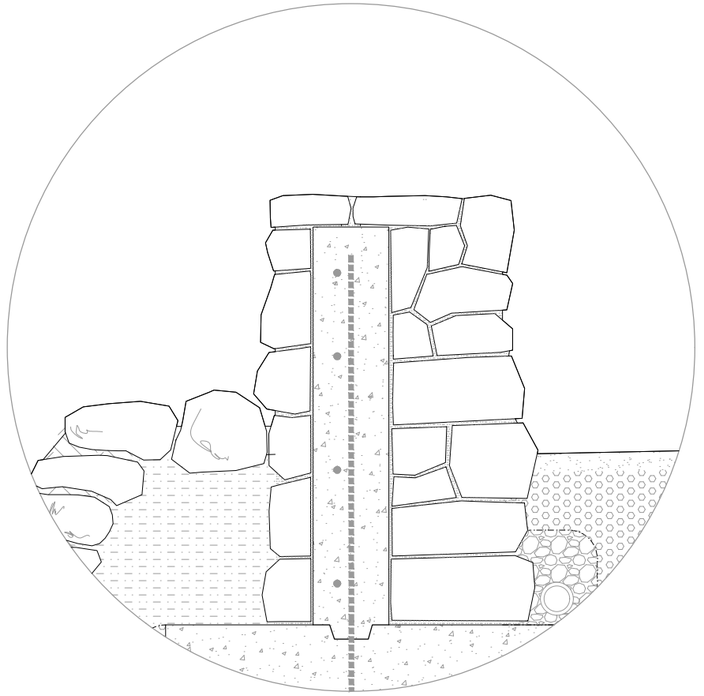


WALL WITH RAILING



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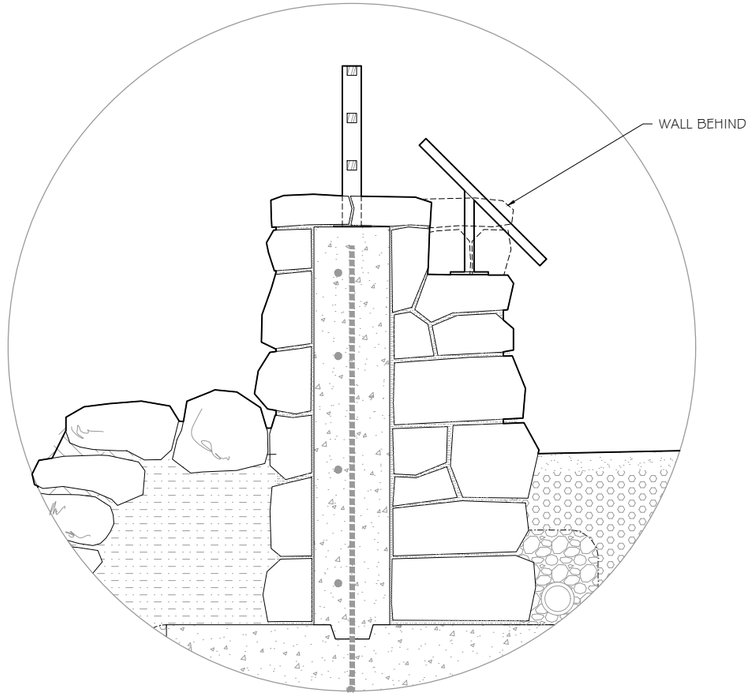

WALL AT SIGN

Q
L-05 TYPICAL WALL SECTIONS

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USDA FOREST SERVICE

United States Department of Agriculture
Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
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PROJECT NAME

BLUE POOL

WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

DRAWING TITLE

DETAILS

DATE	ARCHIVE NO.
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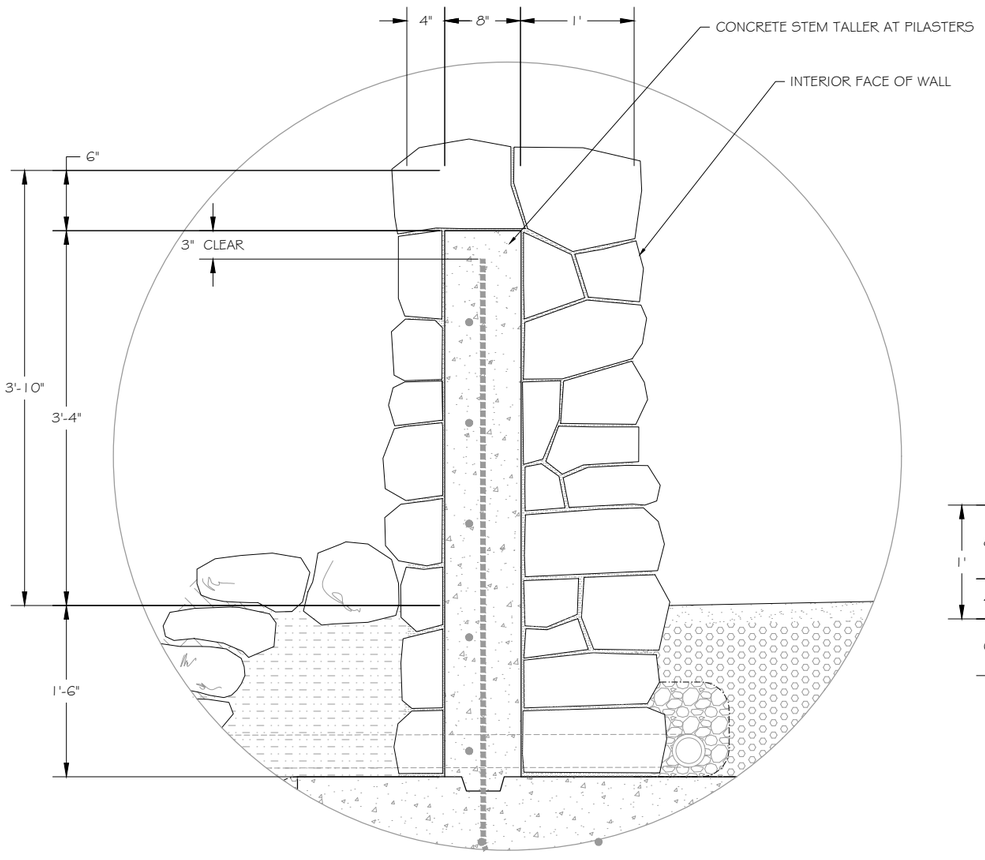
PROJECT NO.	SHEET OF



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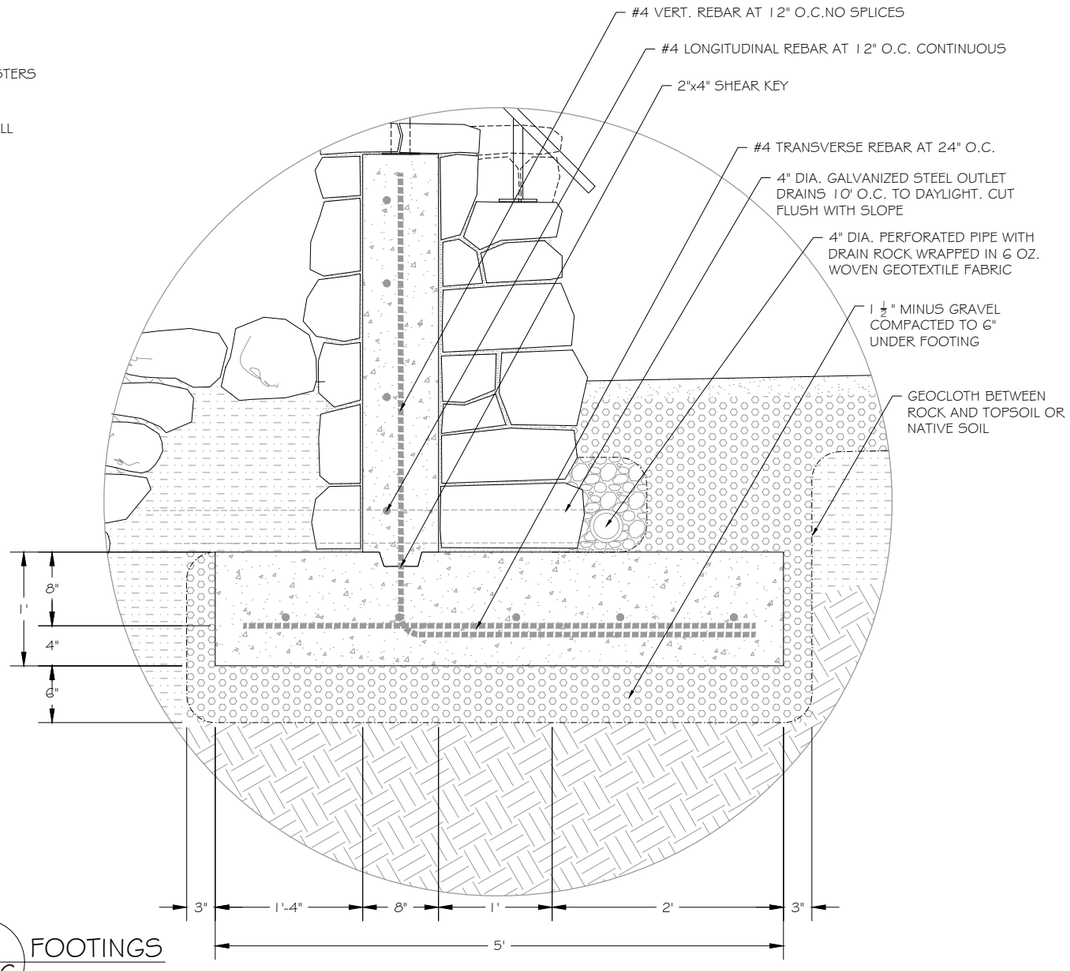

S L-06 FOOTINGS

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United States Department of Agriculture
Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
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PROJECT NAME

BLUE POOL

WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

DRAWING TITLE

DETAILS

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DRAWN K.BELL	
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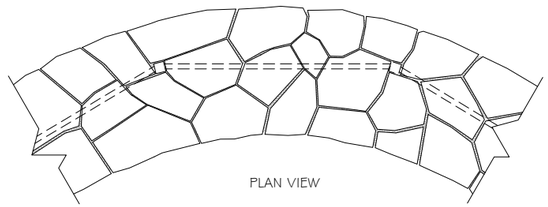
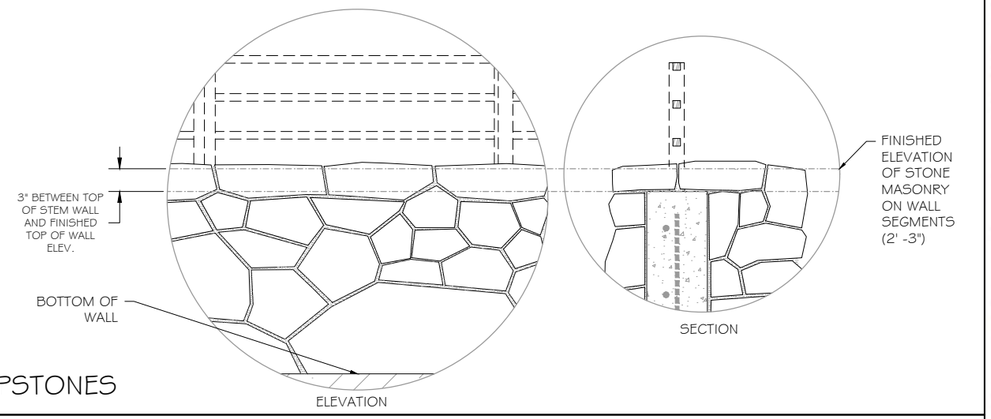
PROJECT NO.	SHEET OF





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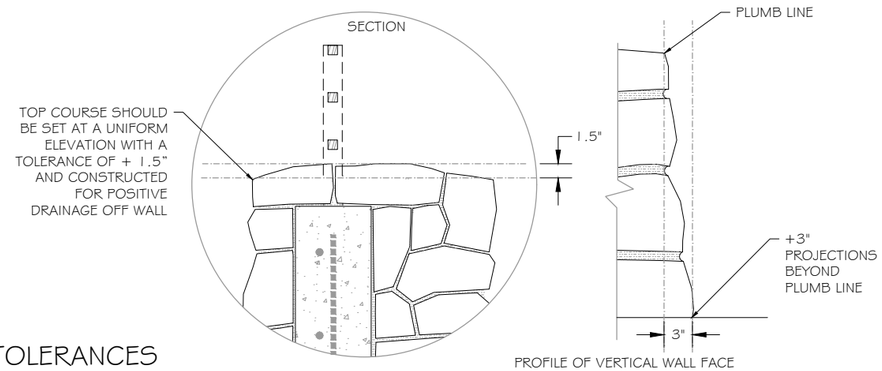

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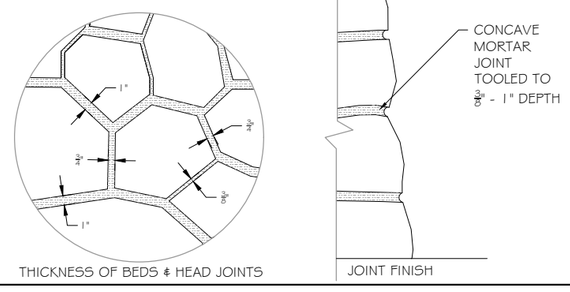

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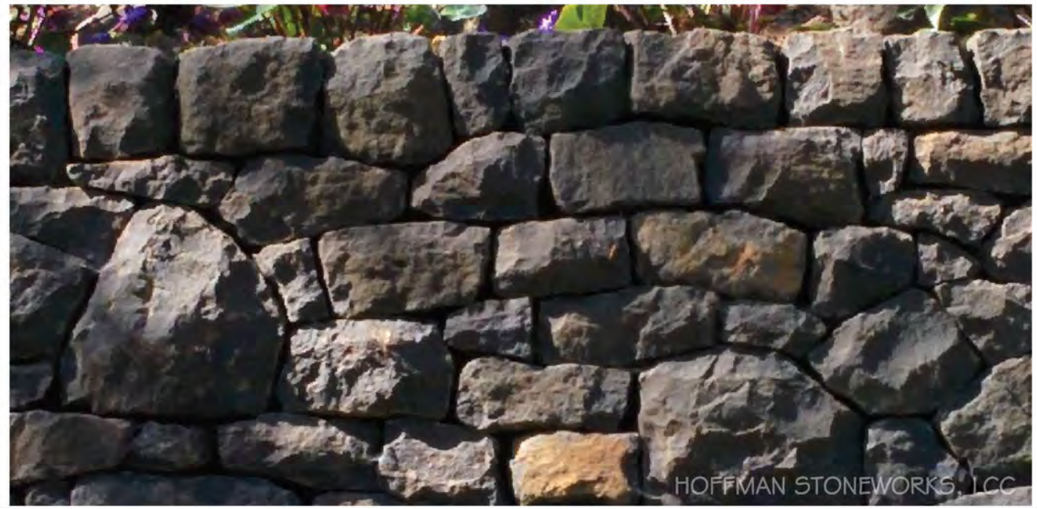

PRECEDENTS REPRESENTING DESIRED AESTHETIC OUTCOME

WHILE THE IMAGES SHOWN ABOVE ARE PRIMARILY DRY-STACKED RETAINING WALLS, THEY ACHIEVE MANY OF THE DESIRED AESTHETIC OUTCOMES FOR THE OVERLOOK WALLS. THE WALLS IN THIS PROJECT SHOULD SIMILARLY VARY UNIT SIZE THROUGHOUT (EMPHASIZING LARGER STONES ON LOWER PORTION), HAVE SIMILAR RANDOM ARRANGEMENT, AND HAVE NATURALLY TEXTURED FACES. ACTUAL STONE TYPE SHOULD BE SIMILAR IN COLOR, TEXTURE, AND GEOLOGICAL MAKEUP TO THE ROCK THAT EXISTS IN THE SURROUNDING LANDSCAPE. BROADLY, THE STONE WILL BE CHARACTERISTIC OF WEST CASCADES GEOLOGY.

T
L-07
MASONRY

United States Department of Agriculture
Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
3		
2		
1		

PROJECT NAME

BLUE POOL

WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

DRAWING TITLE

DETAILS

DATE	ARCHIVE NO.
DESIGNER K.BELL	DRAWING SHEET NO. L-07
DRAWN K.BELL	
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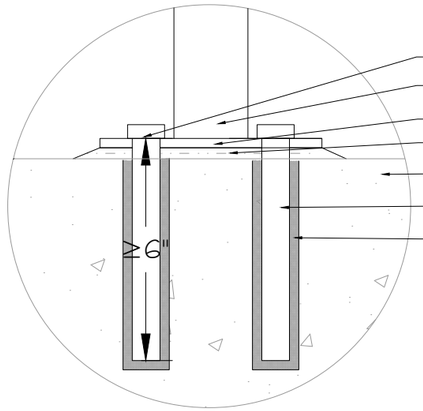
PROJECT NO.	SHEET OF



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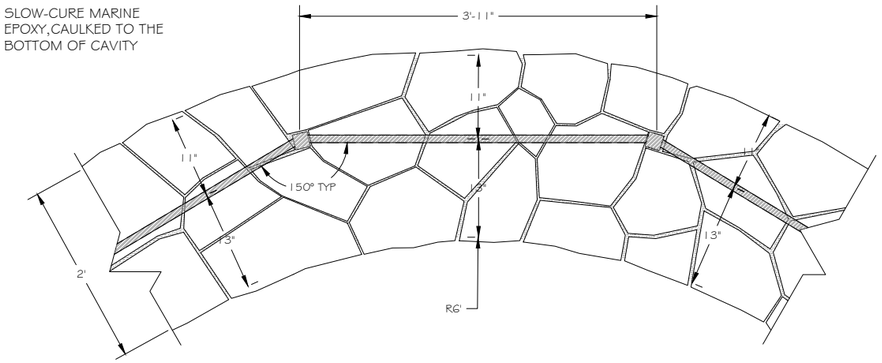

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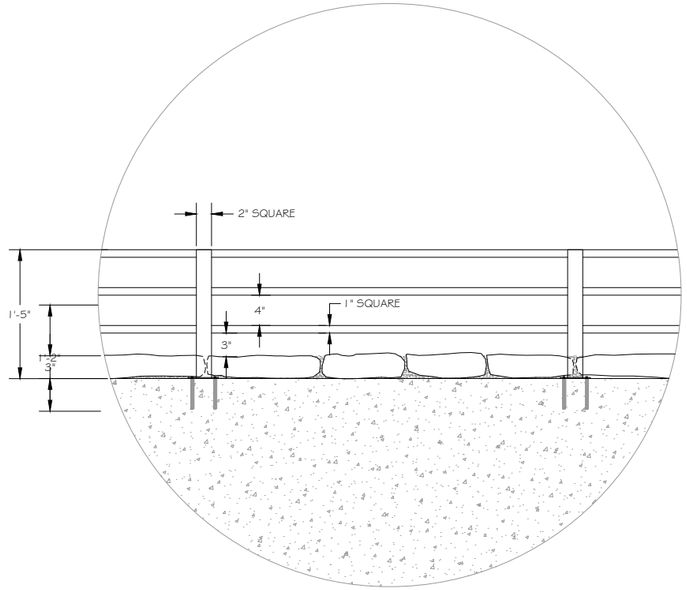
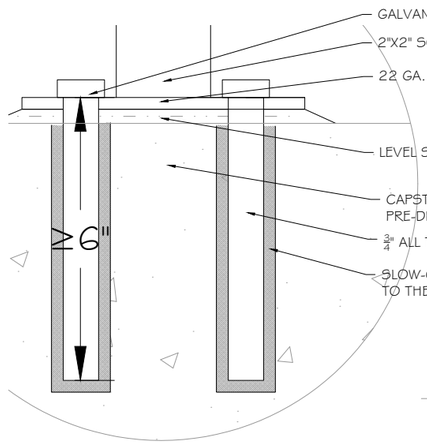


SECTION

U
L-08
STEEL RAILING



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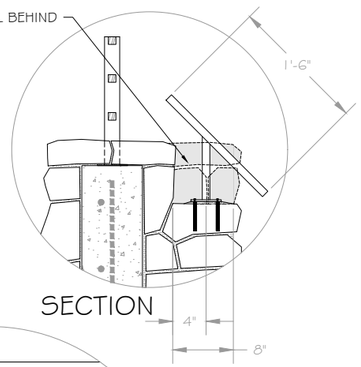

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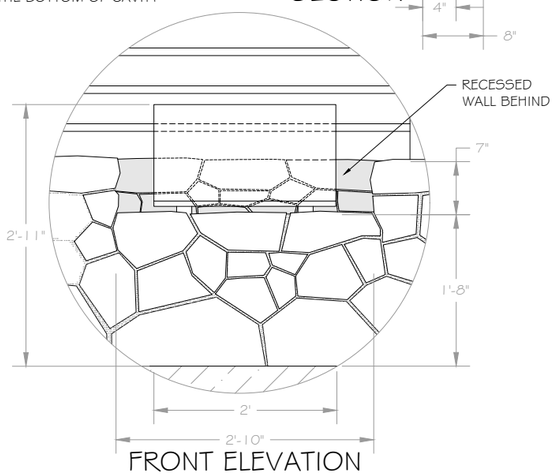
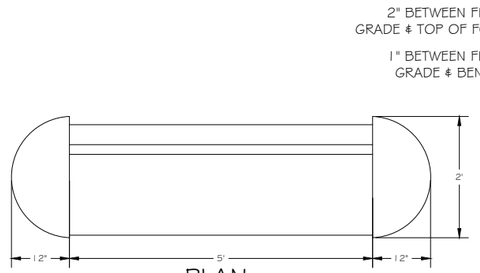


FRONT ELEVATION

V
L-08
SIGNS



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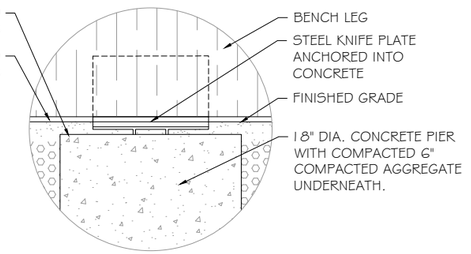

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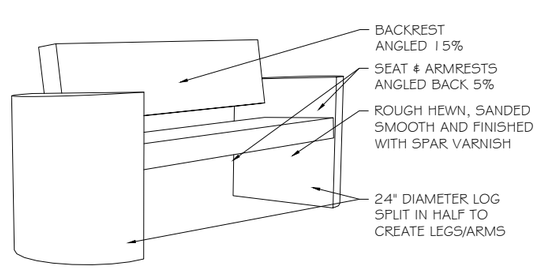
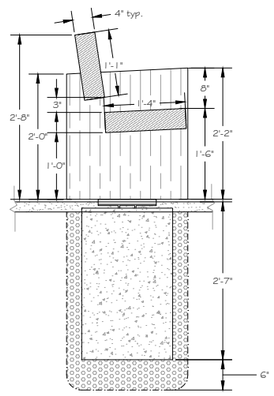


PERSPECTIVE



SECTION

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L-09
ACCESSIBLE BENCH

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Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
3		
2		
1		

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WILLAMETTE NATIONAL FOREST

MCKENZIE RIVER RANGER DISTRICT

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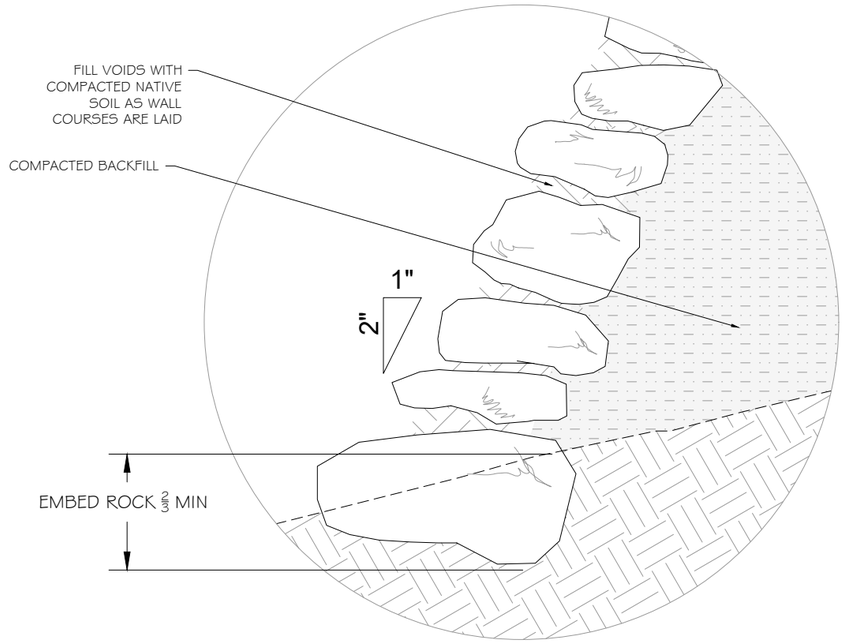
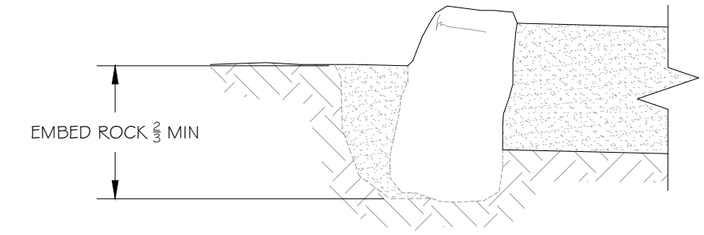
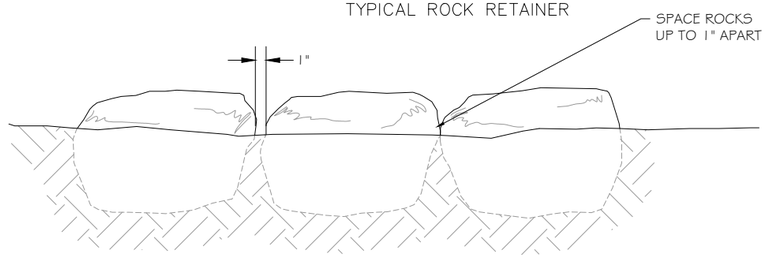
PROJECT NO.	SHEET OF



X / L-09 RUBBLE WALL & EDGING ROCK



TYPICAL ROCK RETAINER



TYPICAL ROCK SPACING

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R06
PACIFIC NORTHWEST REGION

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4		
3		
2		
1		

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DRAWN K.BELL	
CHECKED X.XXX	
PROJECT NO.	SHEET OF

CONSTRUCTION NOTES

SITE PREPARATION

1. Contractor will provide all materials and labor necessary to protect rivers and streams, wet or dry, during construction activities.
2. The contractor shall schedule and execute all work in a manner that does not contribute to soil erosion into nearby waterways.
3. Contractor shall preserve and protect all vegetation adjacent to the designated clearing limits (6-foot offset from footprint of the overlooks).
4. Sod, pine needles, and soil heavy in organic materials (topsoil) shall be stripped to mineral soil before any excavation or placement of fill material.
5. Stripped material shall be stockpiled on site and placed on disturbed areas upon completion of grading operations.

MASONRY

6. Walls should be constructed of native stone specific to the character of the surrounding landscape. Provide proposed sample prior to building mock-up. On-site quarrying will not be allowed.
7. Contractor shall provide a 28" x 48" mockup of exterior rock veneer illustrating proposed techniques and materials to achieve the desired aesthetic outcome. The mockup is to be approved by the Forest Service Landscape Architect before construction of walls commences.
8. Rock should be set in naturalistic patterns that vary between smaller and larger pieces throughout the element. Stones should be randomly coursed. (T/L-06-MASONRY, "Precedents Representing Desired Aesthetic Outcome").
9. Stones should be irregularly shaped, with between 5 and 12 sides (T/L-06 MASONRY).
10. No stone dimension should be smaller than 6" or larger than 24". Exception: stones larger than 24" may be used in the plinth.
11. Larger stones (at least 18-24") representing at least half the total quantity used should be set on the lowest course to create the plinth.
12. Walls will be approximately 2' thick, with a tolerance of +3" projections from plumb line to allow for a naturalistic appearance and reduced need to dress stone (T/L-06 MASONRY, "Tolerances").
13. Capstones should be used on tops of the walls but be informal and non-uniform and arranged to fit around steel railing. The top course should be set at a uniform elevation with a tolerance of + 1.5". (T/L-06 MASONRY, "Tolerances").
14. Construct all horizontal faces for positive drainage to avoid pooled water.
15. Use type S mortar. Tints should be used in mortars to match the selected rock colors and mortar should be non-staining. Deliver packaged mortar materials in unopened containers bearing the manufacturer's identification of contents. Store materials in a dry location.
16. Mortar beds should be approximately 1" thick. Include masonry ties as needed to support stones (T/L-06 MASONRY, "Mortar").
17. All mortared joints shall be a consistent width along the face of adjoining stones. Individual stones will be dressed to create uniform joints 3/8" - 1". Joints should be concave, tooled to a depth of 3/8" - 1". (T/L-06 MASONRY, "Mortar").
18. Clean exposed masonry with stiff brush and compressed air. After cleaning, apply 2 coats of silicone waterproofing according to manufacturer's instructions.
19. Leave work area and surrounding surfaces clean and free of mortar spots, droppings, and broken masonry.

United States Department of Agriculture
Forest Service

R06
PACIFIC NORTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
3		
2		
1		

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DRAWN: K.BELL	
CHECKED: X.XXX	
PROJECT NO.	SHEET OF

CONSTRUCTION NOTES CONTINUED

STEEL RAILING

20. Railing along the tops of the walls should consist of Corten steel (also referred to as A606 or "Weathering Steel"). Railing should be fabricated with base plates to affix to the concrete stem wall (U/L-08 - STEEL RAILING).

COMPACTED AGGREGATE

21. The grade shall have no more than 1:48 or 2% slope in any direction (see FSORAG, section 4.2). Drain water away from walls.
22. The surface course shall consist of ¼" minus crushed aggregate, laid in 2 ½" lifts and compacted to 2". Attention should be given to selecting surface course aggregate that blends into natural surroundings such as crushed basalt.
23. The base course shall consist of 1 ½ "minus gravel, laid in 2.5" lifts and compacted to 2". All footings to have a 6-inch compacted base of 1 ½ minus rock. Use 6' oz. woven geotextile fabric between compacted aggregate surfaces and native soil.
24. All compacted fill material shall not contain anything larger than 2" and be free of organics.
25. Use drain rock wrapped in 6 oz. woven geotextile fabric around perforated pipes at base of concrete stems.
26. Subbase used as fill for overlook platforms may consist of compacted topsoil, where compacted aggregate is not required.
27. Place geotextile fabric between base course of rock and any topsoil or native soil.
28. Imported material must be certified weed-free.
29. For dry stacked rubble stabilizing walls, voids must be filled with compacted native soil as wall courses are laid.
30. Retain gravel edges with at least (1) course of edging rock (X/L-09 - RUBBLE WALLS 7 EDGING ROCK).

BENCHES

31. Bench should be rustic in appearance, constructed of rough-hewn timber and treated with spar varnish. Acceptable wood types include Cedar, Redwood or Douglas fir.
32. Refer to FSORAG, section 4.4, for accessibility parameters for benches.
33. Bench should be placed on concrete piles with galvanized steel fasteners (W/L-08 - ACCESSIBLE BENCH).
34. Concrete footings should be buried 2" below finished grade, and bench suspended on fasteners 1" above grade. (W/L-08 - ACCESSIBLE BENCH)

SIGNS

35. Contractor shall install a sign base in wall (V/L-08 - SIGNS).
36. Stones holding the sign base shall be pre-drilled to accept brackets.
37. The Forest Service will be responsible for installing the panels later.
38. Galvanized steel or a dark powder-coated metal base to be used for this component.

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Forest Service
R06
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4		
3		
2		
1		

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DRAWN K.BELL	
CHECKED X.XXX	
PROJECT NO.	SHEET OF

2013 Update

Forest Service Trail Accessibility Guidelines (FSTAG)

2013

All Trails and Constructed Features Addressed in the FSTAG and FSORAG that are constructed or altered within the National Forest System shall comply with the FSTAG and FSORAG.

Contents

Forest Service Trail Accessibility Guidelines
Scoping Requirements, Technical Provisions, and Appendices

TABLE OF CONTENTS

FOREST SERVICE TRAIL ACCESSIBILITY GUIDELINES (FSTAG)

Technical Provisions

7.0 APPLICATION

The Forest Service Trail Accessibility Guidelines (FSTAG) provides guidance for maximizing accessibility of trails in the National Forest System, while protecting the unique characteristics of their natural setting. The FSTAG and the Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) are the legally enforceable standards for use in outdoor recreation areas on the National Forest System for the facilities, routes, and features addressed in these guidelines. Although not legally enforceable outside of the National Forest System, the Guidelines may be used by other entities to define best practices for trails.

These guidelines have been updated to incorporate the supplement to the Architectural Barriers Act Accessibility Standards, the Outdoor Developed Area Accessibility Guidelines (ODAAG), developed by the Architectural and Transportation Barriers Compliance Board (U.S. Access Board). While they incorporate the U.S. Access Board's ODAAG they also ensure the application of equivalent or higher guidelines, in order to comply with other existing Forest Service policies, including universal design, as well as agency terminology and processes.

All trails in the National Forest System that (1) are new or altered; (2) have a Federal Trail Data Standard (FTDS) designation Designed Use of Hiker/Pedestrian; and (3) connect directly to a trailhead or to a trail that currently substantially complies with the FSTAG, shall comply with the FSTAG**.** Where provided, associated constructed features (such as tent pads, fire rings and pit toilets) located along National Forest System trails shall comply with the Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG).

Side trails or other routes to associated constructed features off a trail are not outdoor recreation access routes. Therefore, they are subject only to section 7 of the FSTAG and do not have to comply with the technical provisions in section 2.0 of the FSORAG that apply to outdoor recreation access routes.

Trailheads and the constructed features at trailheads shall also comply with the applicable technical provisions of the FSORAG and ABAAS. Routes connecting those facilities are to comply with the FSORAG outdoor recreation access route specifications.

These guidelines do not apply to maintenance work (routine or periodic repair of existing trails, recreation sites, or facilities). Where existing individual site features are altered but the floor or ground surface under or around them is not altered, the clear floor or ground space shall not be required to comply with surface and slope

requirements.

The FSTAG and FSORAG became the National Forest System's legal standard for all applicable facilities on May 26, 2006 with the final Federal Register publication of Forest Service Manuals 2330 and 2350. As stated in the Federal Register, these guidelines would be updated periodically to ensure they remain equal to or a higher standard than other guidelines and standards applicable to Federal agencies under the Architectural Barriers Act.

Construction or alteration of all facilities within the National Forest System that are not addressed in the FSORAG or FSTAG shall comply with the applicable requirements of the Architectural Barriers Act Accessibility Standards (ABAAS). The FSTAG, FSORAG and ABAAS are all available at *http://www.fs.fed.us/recreation/accessibility/.*

Boating and fishing facilities, swimming pools, play areas, sports arenas, miniature golf courses, and amusement parks, which are referred to as "recreation facilities" are addressed in Chapter 10 of the ABAAS (*http://www.access-board.gov*).

7.1 Conditions for an Exception.

Where one or more of the following conditions exists on a trail, an "exception" provided in the guidelines for that specific technical requirement can be used where that condition exists. The exception shall not be used on the portion of the trail where the condition does not exist. If no exception is provided for the technical requirement, no exception is allowed. All other appropriate design options should be considered before applying the exception.

Condition for an Exception 1. Where compliance with the technical provision is not practicable due to terrain.

Condition for an Exception 2. Where compliance with the technical provision would fundamentally alter the function or purpose of the facility, trail, or the setting.

Condition for an Exception 3. Where compliance with the technical provision cannot be accomplished with the prevailing construction practices.

Condition for an Exception 4. Where compliance is precluded because the cultural, historic, or significant natural features are eligible for protection under Federal, State, or local law by:

- Endangered Species Act (16 U.S.C. §§ 1531 et seq.);
- National Environmental Policy Act (42 U.S.C. §§ 4321 et seq.);
- National Historic Preservation Act (16 U.S.C. §§ 470 et seq.);
- Wilderness Act (16 U.S.C. §§ 1131 et seq.); or

- Other Federal, State, or local law the purpose of which is to preserve threatened or endangered species; the environment; or archaeological, cultural, historical, or other significant natural features.

7.2 General Exceptions.

The basis for the determination that General Exception 1 or General Exception 2 apply shall be documented and maintained with the records of the construction or alteration project. Documentation shall include the rationale for that determination, which conditions for exception and which exceptions apply, the date of the determination, and the name of the individuals who made the determination. There is no standard format for this documentation; each unit may develop its own format to meet its specific needs.

7.2.1 General Exception 1.

Where a condition in 7.1 prohibits full compliance with a specific requirement in 7.4 on a trail segment, that trail segment shall comply with the specific requirement to the maximum extent practicable.

7.2.2 General Exception 2.

If after applying General Exception 1 it is determined that it is impracticable to provide a trail complying with 7.4, the trail shall not be required to comply with 7.4. Notification of this determination shall be sent to the Access Board. A form is available on the Access Board's Website <*http://.access-board.gov/outdoor*> for optional use. For long-distance trails, this exception applies to the trail segments that are planned for construction or alteration in a given planning period, rather than over the entire length of the trail.

7.2.2.1 Determining Impracticability. The use of General Exception 2 is reasonable where one or more conditions for an exemption in section 7.1 and at least one of the following limiting factors exist:

Limiting Factor 1. The combination of trail running slope (grade) and cross slope exceeds 1:2.5 (40 percent) for over a distance of 20 feet (6m).

Limiting Factor 2. The surface is not firm and stable for a distance of 45 feet or more (14 m).

Limiting Factor 3. The minimum trail width is 12 inches (305 millimeters) or less for a distance of at least 20 feet (6100 mm)**.**

Limiting Factor 4. A trail obstacle of at least 30 inches (770 mm) in height extends across the full width of the trail.

Limiting Factor 5. One or more conditions for an exception exist that result in significant deviations from the technical provisions of section 7.4.1 through 7.4.8 for over 15 percent of the length of the trail.

7.2.2.2 Extent of Impracticability. Where General Exception 2 permits exemption of an entire trail from the requirements of section 7.4.1 through 7.4.8, it may be beneficial to construct a portion of the trail to meet the trail accessibility guidelines. Consider doing so especially if a prominent feature (such as a scenic view, waterfall, or other feature that would be of interest to visitors) is located between the trail terminus and the first extreme environmental barrier and there are few or no significant conditions requiring exceptions on that portion of the trail.

7.3 Definitions

All trail-related definitions used in the FSTAG are from the Forest Service Manual or Handbook, the Forest Service Infra Trails Module, Trail Assessment and Condition Survey (TRACS) reference materials, or are mandated by the Access Board.

"Accessible Trail" is a term to avoid. The technical provisions in section 7.4 of the FSTAG allow for grades up to 12 percent. While such grades are understandable in challenging terrain as hiking paths selected by choice, the general public's expectation of an "accessible" pathway is that it have a gentle grade and other uniform factors. In addition, most trails constructed under the FSTAG use exceptions to some extent in order to maintain the nature of the setting.

Therefore, a trail that has been constructed in accordance with the FSTAG should be advertised as a "trail that complies with the trail accessibility guidelines", rather than as an "accessible trail". Information concerning grades, etc. is to be posted along with other trail information on websites, trailhead signs, and so forth. Each visitor can then select the trail that best meets their recreation experience and expectations.

Alteration. A change in the original purpose, intent, or function of a trail.

Camp Shelter. A partially enclosed structure that provides campers and hikers cover from weather and that does not contain plumbing fixtures or kitchen appliances. Camp shelters are not cabins, which are typically larger and are required to comply with ABAAS section 806 for transient lodging where short term accommodations are provided.

Constructed Features

- **Associated Constructed Feature.** A constructed element associated with a trail that provides support for trail users, but is not a part of the trail tread. Examples include overnight shelters, toilets, fire rings, picnic tables, and tent pads. Refer to the FSORAG for the technical provisions for associated constructed features.

- **Trail Constructed Feature.** A constructed feature that functions as part of the trail tread. Examples include puncheon, trail bridges, boardwalks, waterbars, and switchbacks. For a listing of trail constructed features, refer to the trail documentation available at *http://www.fs.fed.us/recreation/programs/trail-management/index.shtml* or available to Forest Service employees at *http://fsweb.wo.fs.fed.us/rhwr/ibsc/tr-cost.shtml*

Designed Use. The "Managed Use" of a trail that requires the most demanding design, construction, and maintenance parameters. In conjunction with the applicable "Trail Class," designed use determines which design parameters will apply to a trail. It is an FTDS term for the intended use that controls the geometric design of a trail and determines the level to which it should be maintained. There is only one "Designed Use" per trail or trail segment.

Federal Trail Data Standards (FTDS) Standardized terminology that enable national, regional, and State trail managers, and the public, to use mutually understood terminology for recording, retrieving, and applying spatial and tabular information. FTDS make it easier for trail information to be accessed, exchanged, and used by more than one individual, agency, or group. The data standards are available at *http://www.nps.gov/gis/trails/Doc2/Federal_Trail_Data_Standards_Final_20111108.pdf*

Hiker/Pedestrian Trail. A trail with a designed use of hiker/pedestrian that is designed, constructed, and maintained for hiker/pedestrian use.

Limiting Factor. An extreme, uncorrectable environmental barrier that makes the trail beyond the barrier unreachable for many people with mobility limitations.

Maintenance. Routine or periodic repair of trails or trail segments to restore them to the standards to which they were originally designed and built**.** Maintenance does not change the original purpose, intent, or design of a trail.

Managed Use. An FTDS term for the mode(s) of travel for which a trail is actively managed. Managed uses are the specific types of trail use that are allowed by management decision or intent on a specific trail or portion of a trail. Each trail or trail segment may have more than one "Managed Use." For example, a trail may be managed for both equestrian and hiker/pedestrian use in the summer and for cross-country skiing in the winter.

Outdoor Recreation Access Route (ORAR). A continuous, unobstructed path for pedestrian use that connects elements in an outdoor recreation area such as a picnic area, campground, or trailhead.

Pit Toilet. A primitive outhouse consisting of a toilet riser over a hole dug into the ground or receptacle to receive and naturally decompose human waste. Pit toilets are provided primarily for resource protection and are only constructed at recreation sites with a *Recreation Site Development Scale* level of 2 of less. A pit toilet riser may or may not be surrounded by walls and may or may not have a roof. A pit toilet may be permanently installed or may be moved from one location to another as the pit is filled or the area becomes severely impacted from use. Waste may be disposed of directly into the pit or may be composted.

Practicable. Practicable in this context means the work can be completed within the limits of the applicable *Conditions for an Exception* and results in a useful improvement for all.

Prominent Feature. A natural, cultural, or historic feature located along or adjacent to a trail that is determined by a trail designer or manager to have national, regional, or local

distinction or significance. A prominent feature may be the focal point, main attraction, or destination of a trail, or it may simply be an interesting secondary feature. Examples include but are not limited to boulder outcrops, waterfalls, groupings of old or unique trees or other vegetation, vistas that may or may not be part of a developed overlook, and cultural or historic structures.

Protruding Object. A constructed feature such as a sign that extends into the trail tread more than 4 inches (100 mm) between 27 inches (685 mm) and 80 inches (2030 mm) above the trail tread. Accessibility guidelines for protruding objects do not apply to naturally occurring objects, such as tree branches, or rock ledges. However, safety regulations or Forest Service construction and maintenance standards may define clear space and limit overhangs of natural protruding objects.

Provisions. The sections of accessibility guidelines and standards that explain what is required for specific situations and facilities (parking, picnic tables, trails, etc.)

Recreation Site. An area that is improved, developed, or otherwise identified for recreation and that has a development scale of 0, 1, 2, 3, 4, or 5 (See Forest Service Handbook 2309.13, Chapter10 – Exhibit 01).

Reconstruction. This term is not used in Federal accessibility guidelines or the FSTAG and FSORAG, even though it is used frequently by personnel who work in recreation and trails. For the purposes of the FSTAG and FSORAG, actions are categorized as construction, alteration, or maintenance.

Scoping Requirement. Specifications of where, when, and how much of a constructed features detailed in the accessibility guidelines technical requirements must be met in order to comply with the FSTAG.

Slope. The incline of a surface.

- **Cross Slope.** The percentage of rise to length, which is the difference in elevation, when measuring the trail tread from edge to edge perpendicular to the direction of travel This may be expressed as the percentage of change in elevation or as a ratio of vertical distance to horizontal distance. The percentage is shown in parentheses in these guidelines.
- **Running Slope (Grade).** The ascent or descent of a trail segment expressed as a percentage of its length, which is the difference in elevation of a section of a trail measured parallel to the predominant direction of travel. This may be expressed as a ratio of vertical distance to horizontal distance or as the percentage of change in elevation. The percentage is shown in parentheses in these guidelines.

Surface. The top layer of a trail.

- **Firm.** A firm surface resists deformation by indentations. During the planning process, firmness must be evaluated for noticeable distortion or compression during the seasons for which the surface is managed, under normally occurring weather conditions.

- **Stable**. A surface is not permanently affected by expected weather conditions and can sustain normal wear and tear from the expected use(s) of the area, between planned maintenance.

Technical Requirements. Are the specific numbers, conditions, and measurements that are required to be achieved (percent that must comply, dimensions, reach ranges, grades, trail width, etc.).

Trail. For purposes of the FSTAG and FSORAG, a trail is a pedestrian route developed primarily for outdoor recreational hiking purposes. A pedestrian route provided primarily to connect elements, spaces, or facilities within a site is not a trail; it is an outdoor recreation access route (ORAR).

Trail Class. The prescribed scale of development for a trail, representing its intended design and management standards.

Trail Grade. The ascent or descent of a trail segment expressed as a percentage of its length. When expressed as a ratio of rise to length to the term used is running slope.

Trailhead. For the purpose of the FSTAG a trailhead is an outdoor space that is designated by the entity responsible for administering or maintaining the trail to serve as a primary access point to the trail. The simple junction of two or more trails, or the undeveloped junction of a trail and a road, is not a trailhead.

Trail Segment. The portion of a trail being planned, evaluated, or constructed.

Trail Tread. The portion of a trail upon which traffic moves.

Trail Terminus. For the purpose of the FSTAG the trail terminus is the beginning or ending point of a trail or trail segment, where a trail assessment or trail work begins or ends.

Tread Width. The visible trail surface measured perpendicular to the direction of travel.

- **Clear Tread Width.** The width of the usable trail tread and adjacent usable surface.
- **Minimum Tread Width.** The width of the usable part of the tread width at the narrowest point on a trail.
- **Minimum Trail Width.** The width of the trail tread and the adjacent usable surface at the narrowest point on a trail.

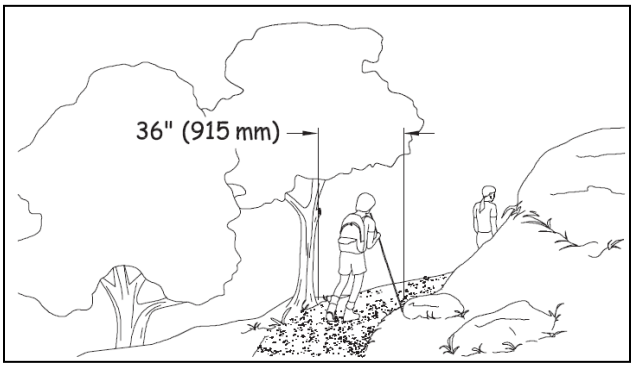
Wheelchair. A device, including one that is a battery-powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area. A person whose disability requires use of a wheelchair or mobility device may use a wheelchair or mobility device that meets both parts of this definition anywhere foot travel is permitted (per 36 CFR 212, FSM 2350, and in Federally designated wilderness under ADA Title V, section 508c).

7.4 Technical Provisions

General: Trails shall comply with 7.4.

7.4.1 Surface.
The trail tread surface, including resting intervals and passing spaces, shall be both firm and stable.

7.4.2 Clear Tread Width.
The clear tread width of the trail shall be at least 36 inches (915 mm).



EXCEPTION: Where a condition for an exception prevents achieving the required width, the clear tread width may be reduced to 32 inches (815 mm) minimum. If the condition for an exception prevents achieving the reduced width of 32 inches, comply to the extent practicable.

7.4.3 Slope.
Trail running slopes (grades) and cross slopes shall comply with sections 7.4.3.1 and 7.4.3.2.

7.4.3.1 Running Slope (Grade). The running slope (grade) of trail segments shall comply with this section and shall be consistent over the distances cited.

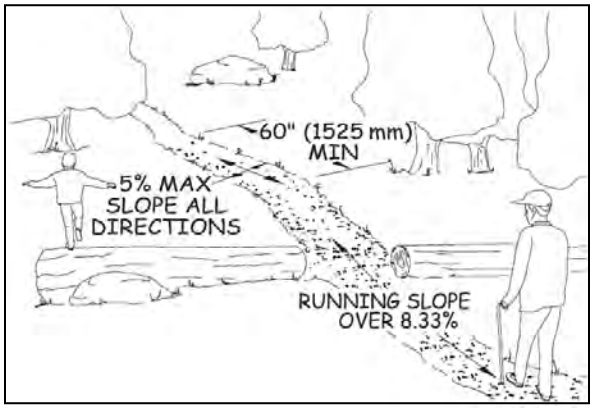
- Trail running slope (grade) of up to 1:20 (5 percent) is permitted for any distance.
- The running slope of any segment of a trail shall not be steeper than 1:8 (12 percent).
- No more than 30 percent of the total trail length may exceed a running slope (grade) of 1:12 (8.33 percent).
- Where the running slope (grade) of a segment of a trail is steeper than 1:20 (5 percent), the maximum length of the segment shall be in accordance with Table 7.4.3.1, and a resting interval complying with 7.4.4 shall be provided at each end of the segment.

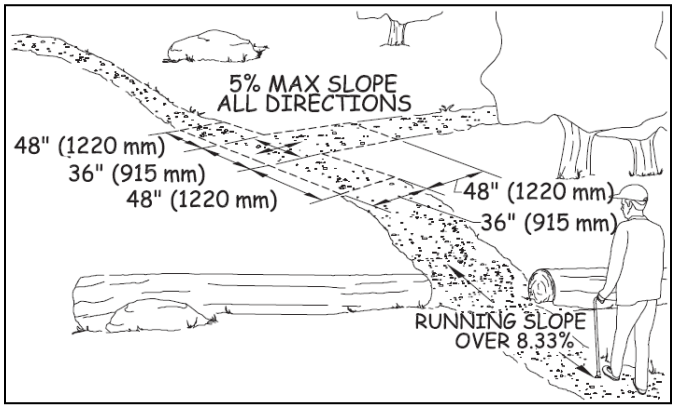
Table 7.4.3.1 Trail Running Slope (Grade) and Resting Intervals

Running Slope of Trail Segment		Maximum Length of Segment Between Resting Intervals
Steeper Than	But Not Steeper Than	
1:20 (5 percent)	1:12 (8.33 percent)	200 feet (61 m)
1:12 (8.33 percent)	1:10 (10 percent)	30 feet (9 m)
1:10 (10 percent)	1:8 (12 percent)	10 feet (3050 mm)

7.4.3.2 Cross Slope. The cross slope shall not exceed 1:20 (5 percent). Where the surface is paved or is elevated above the natural ground**,** the cross slope shall not be steeper than 1:48 (2 percent).

7.4.4 Resting Intervals.
Resting intervals shall comply with 7.4.4. Where the trail grade exceeds 1:20 (5 percent), resting intervals shall be provided as specified in Table 7.4.3.1.





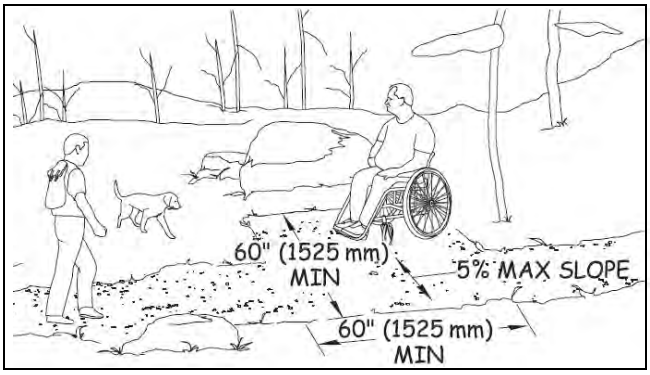
7.4.4.1 Length. The resting interval length shall be 60 inches (1525 mm) long minimum.

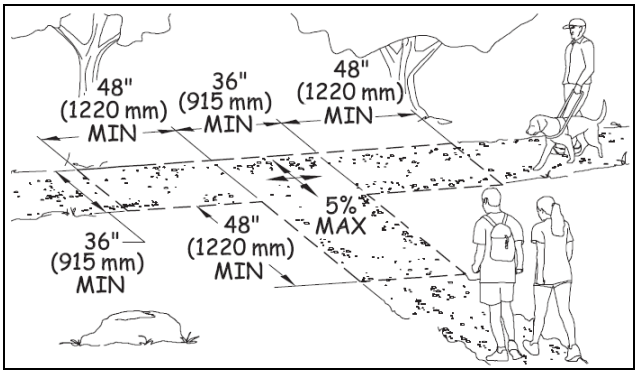
7.4.4.2 Width. Where resting intervals are provided within the trail tread, resting intervals shall be at least as wide as the widest segment of the trail tread leading to the resting interval. Where resting intervals are provided adjacent to the trail tread, the resting interval clear width shall be 36 inches (915 mm) minimum.

7.4.4.3 Slope. The slope of a resting interval shall not exceed 1:20 (5 percent) in any direction. Where the surface is paved or is elevated above the natural ground**,** the slope shall not be steeper than 1:48 (2 percent) in any direction.

7.4.4.4 Turning Space. Where resting intervals are provided adjacent to the trail tread, a turning space complying with ABAAS section 304.3.2 shall be provided. Vertical alignment between the trail tread, turning space, and resting interval shall be nominally level. The trail tread, turning space, and resting interval may overlap.

7.4.5 Passing Spaces.
Trails with a clear tread width less than 60 inches (1525 mm) shall provide passing spaces complying with 7.4.5 at intervals of 1000 feet (300 m) maximum. A passing space must also be provided at the end of any segment of trail that meets the requirements of 7.4, if the full length of the trail does not meet the requirements. Passing spaces and resting intervals may coincide or overlap.





7.4.5.1 Size. The passing space shall be either:

- A space 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum; or
- The intersection of two trails providing a T-shaped space complying with ABAAS section 304.3.2 where the base and the arms of the T-shaped space extend 48 inches (1220 mm) minimum beyond the intersection. Vertical alignment at the intersection of the trails that form the T-shaped space shall be nominally level.

7.4.5.2 Slope. The cross slope of a passing space shall not exceed 1:20 (5 percent) in any direction.

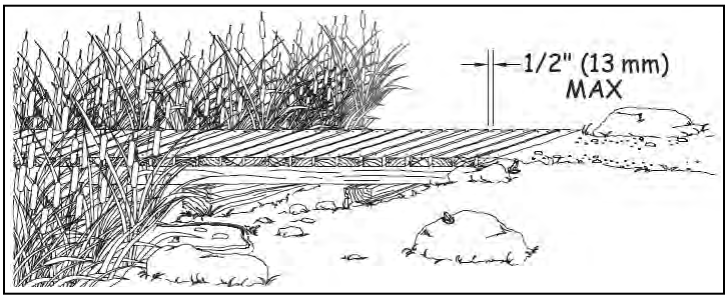
7.4.5.3 Non-complying Segment Ends. Where a segment of the trail does not comply with 7.4, a passing space shall be located at the end of each adjacent trail segment that does comply with 7.4.

7.4.6 Tread Obstacles.

Tread obstacles on trails shall not exceed 2 inches (50 mm) in height measured vertically to the highest point. Where the trail surface is paved or is elevated above the natural ground, tread obstacles shall not exceed ½ inch (13 mm) in height measured vertically to the highest point.

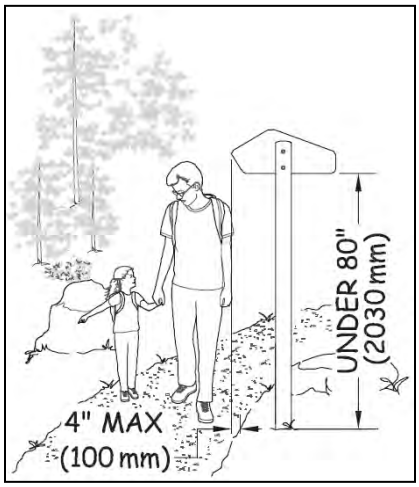
7.4.7 Openings.

Openings in trail tread surfaces, trail resting spaces, and trail passing spaces shall be small enough to prevent passage of a 1/2 inch- (13 mm-) diameter sphere. Where possible, elongated openings should be placed perpendicular, or as close to perpendicular as possible, to the dominant direction of travel.



Exception: Where openings that do not permit the passage of a ½ inch (6.4 mm) sphere cannot be provided due to a condition for an exception, openings that do not permit passage of a ¾ inch (19 mm) sphere shall be permitted.

7.4.8 Protruding Objects.
Constructed features, including signs, shall not extend into the trail tread more than 4 inches (100 mm) between 27 inches (685 mm) and 80 inches (2030 mm) above the surface of the trail.



7.4.9 Trail Facilities.
Where provided on trails, facilities shall comply with the applicable provisions of the FSORAG. ORARs are not required at or between facilities on trails.

> **Exception.** When the surface of the required clear ground space for trail facilities is not paved or is not elevated above the natural ground, slopes not steeper than 1:20 (5 percent) shall be permitted where necessary for drainage.

7.4.10 Trailheads.
Trailheads shall comply with 7.4.10.

> **7.4.10.1 Outdoor Constructed Features.** Where provided within trailheads each outdoor constructed features such as parking spaces, toilets, or camp sites shall comply with the applicable portions of the FSORAG and ABAAS.
>
> **7.4.10.2 Outdoor Recreation Access Routes (ORARs).**
> At least one outdoor recreation access route complying with FSORAG section 2.0 shall connect the following places at trailheads:
> - Accessible parking spaces or other arrival point;
> - Starting point of the trail; and
> - Accessible outdoor constructed features, elements, spaces, and facilities within the trailhead.
>
> **Exception 1.** In alterations to existing trailheads, where a condition for exception prohibits compliance with a technical provision, the ORAR shall comply with FSORAG 2.0 to maximum extent practicable.
>
> **Exception 2.** Where elements, spaces, or outdoor constructed features are altered at trailheads but the circulation path is not altered, an outdoor recreation access route shall not be required.

7.4.11 Trailhead Signs.
Where new trailhead information signs are provided at trailheads on newly constructed or altered trails, they shall comply with 7.4.11.

7.4.11.1 Clear Space. Trailhead signs shall be located centered at the back of a 30- by 48-inch (760- by 1,220-millimeter) minimum clear floor or ground space. The clear space shall not overlap the trail width but may overlap a resting space or passing space. The slope of the clear space shall not exceed 1:20 (5 percent) in any direction.

7.4.11.2 Sign Contents. Where new trail information signs are provided at trailheads on newly constructed or altered trails, regardless of whether the trail is accessible, the signs shall include at minimum the following information:

- Length of the trail or trail segment
- Surface type
- Typical and minimum tread width
- Typical and maximum running slope
- Typical and maximum cross slope
- A statement that the posted information reflects the condition of the trail when it was constructed or assessed, including the date of the construction or assessment

Where more extensive trail information is provided (*e.g.,* an aerial map of the trail and related facilities), the location of specific trail features and obstacles that do not comply with the technical provisions in 7.4 should be identified and a profile of the trail grade should be included.

7.4.11.3 Reach Ranges. If materials need to be obtained from or manipulated on a sign or kiosk, the sign or kiosk shall be designed to meet the reach ranges in section 308 of the ABAAS.

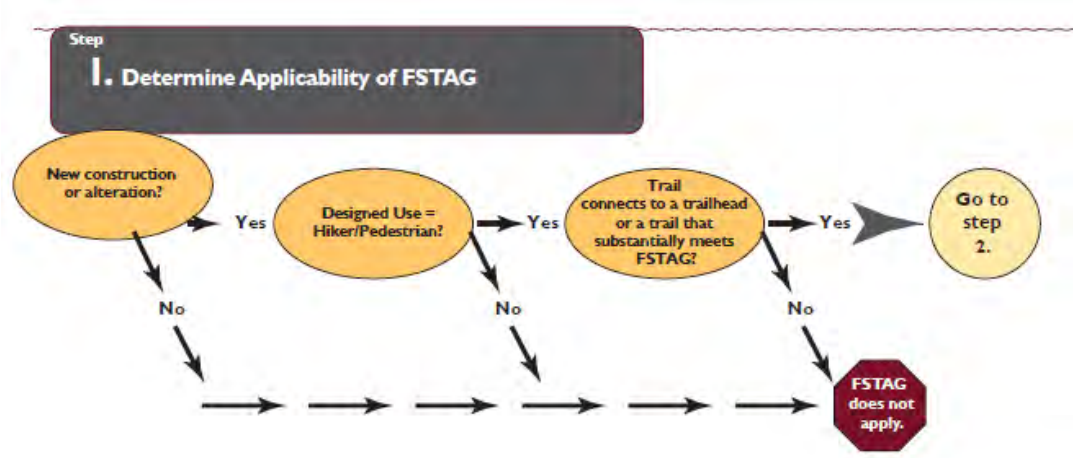
7.4.12 Gates and Barriers.
Where gates or barriers are constructed to control access to trails, gates and barriers shall comply with 7.4.12.

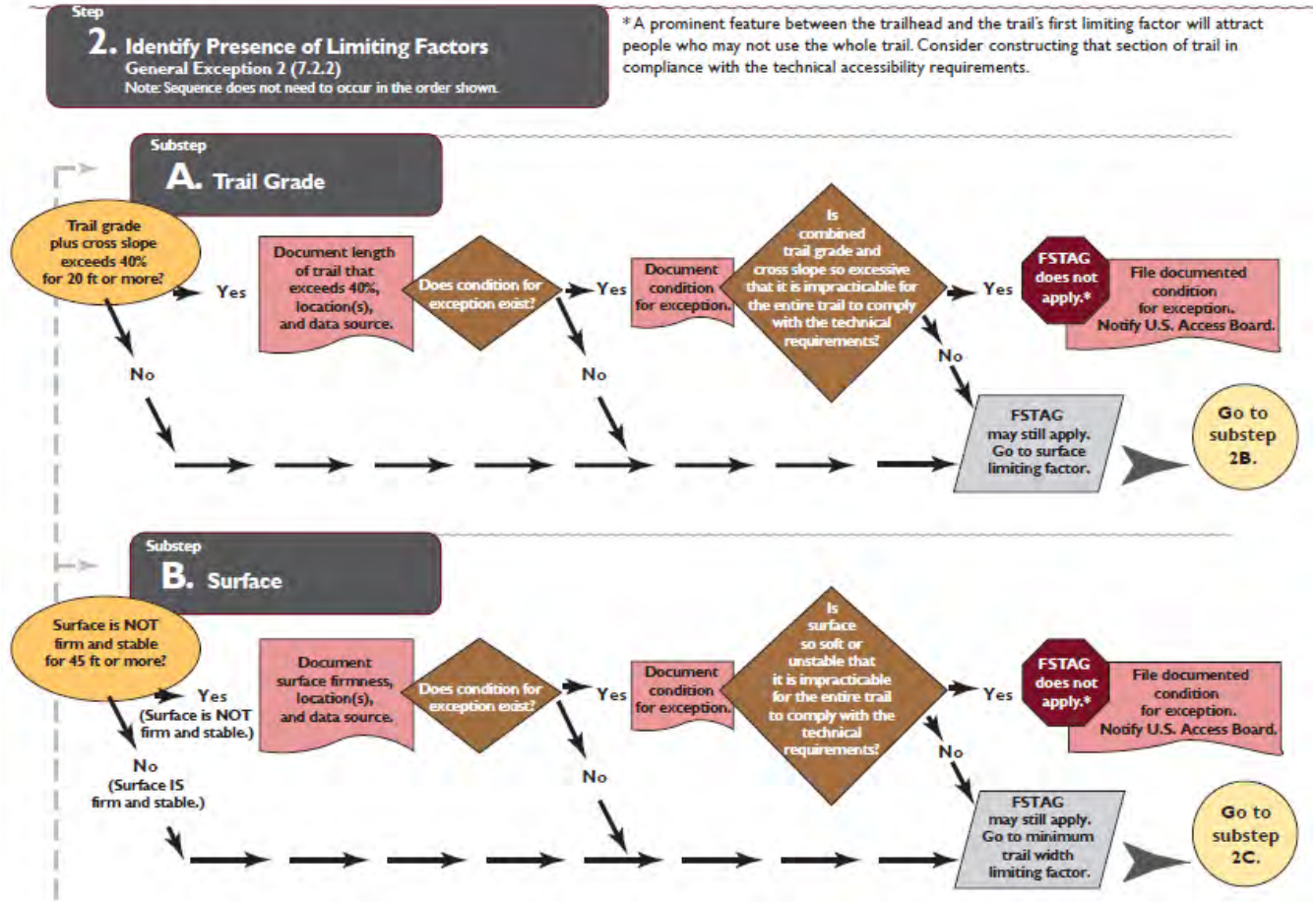
7.4.12.1 Clear Width. Gate openings and openings in barriers for hiker passage shall provide a clear width of 36 inches (915 mm), complying with ODAAG, section 1017.3 Clear Tread Width.

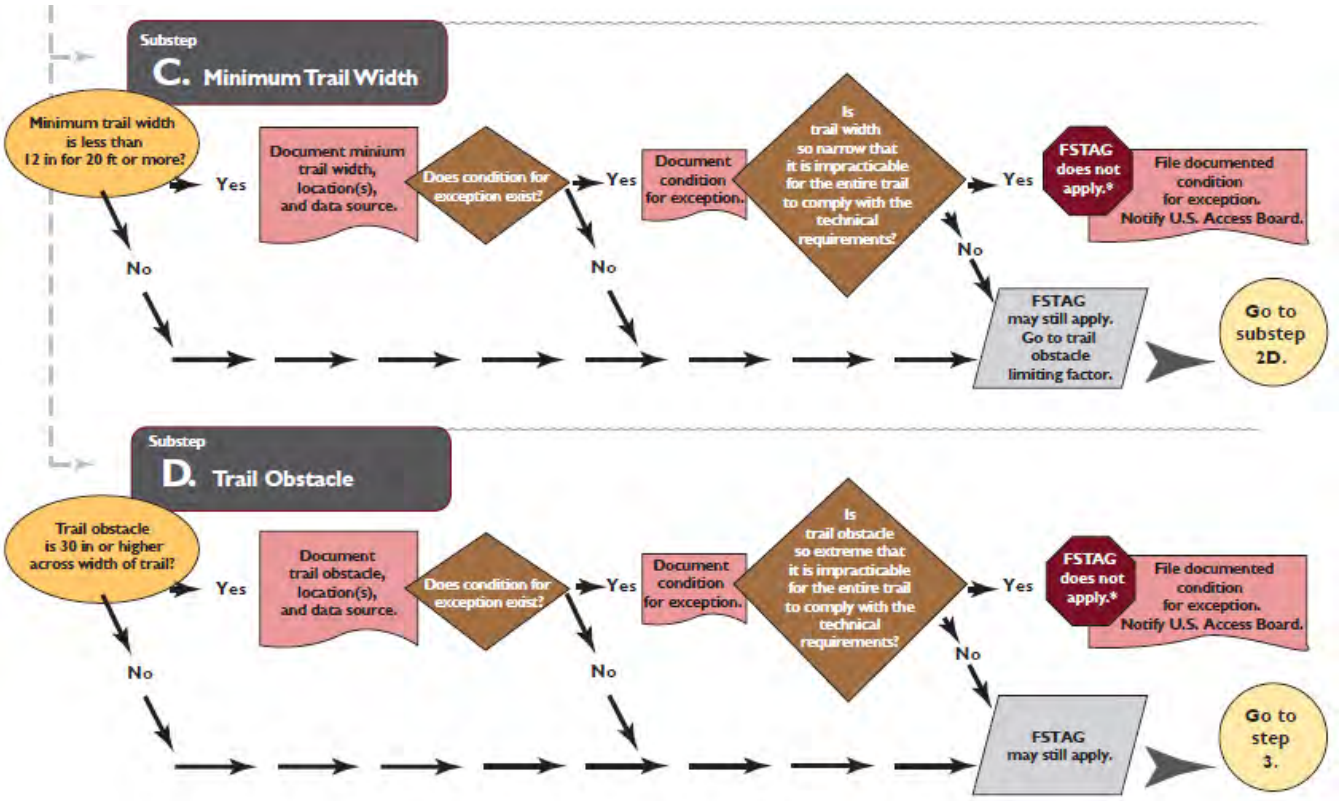
7.4.12.2 Gate Hardware. Gate hardware shall comply with operable controls requirements in ABAAS section 309.4 and 404.2.7.

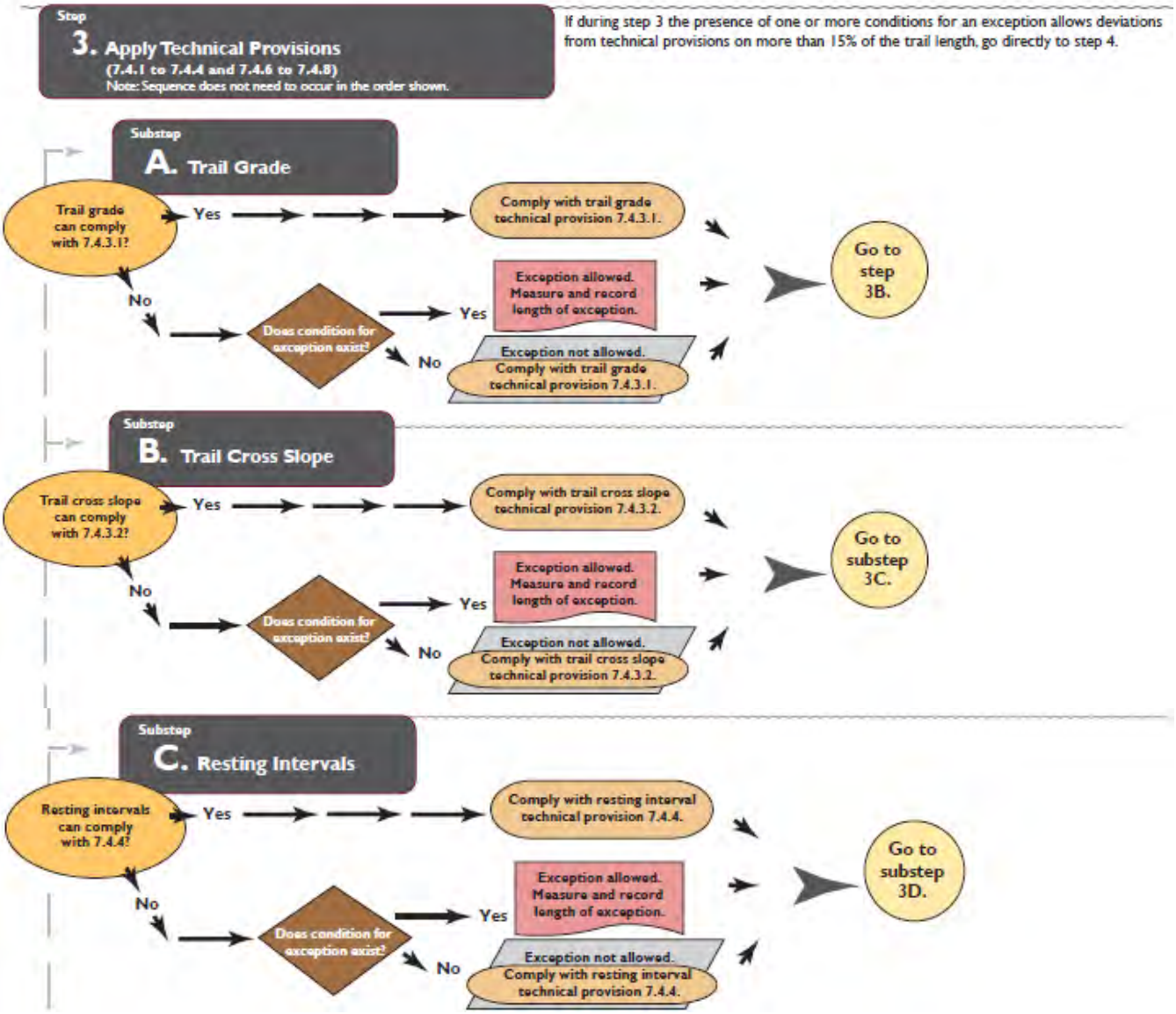
Overview of FSTAG Implementation Process:

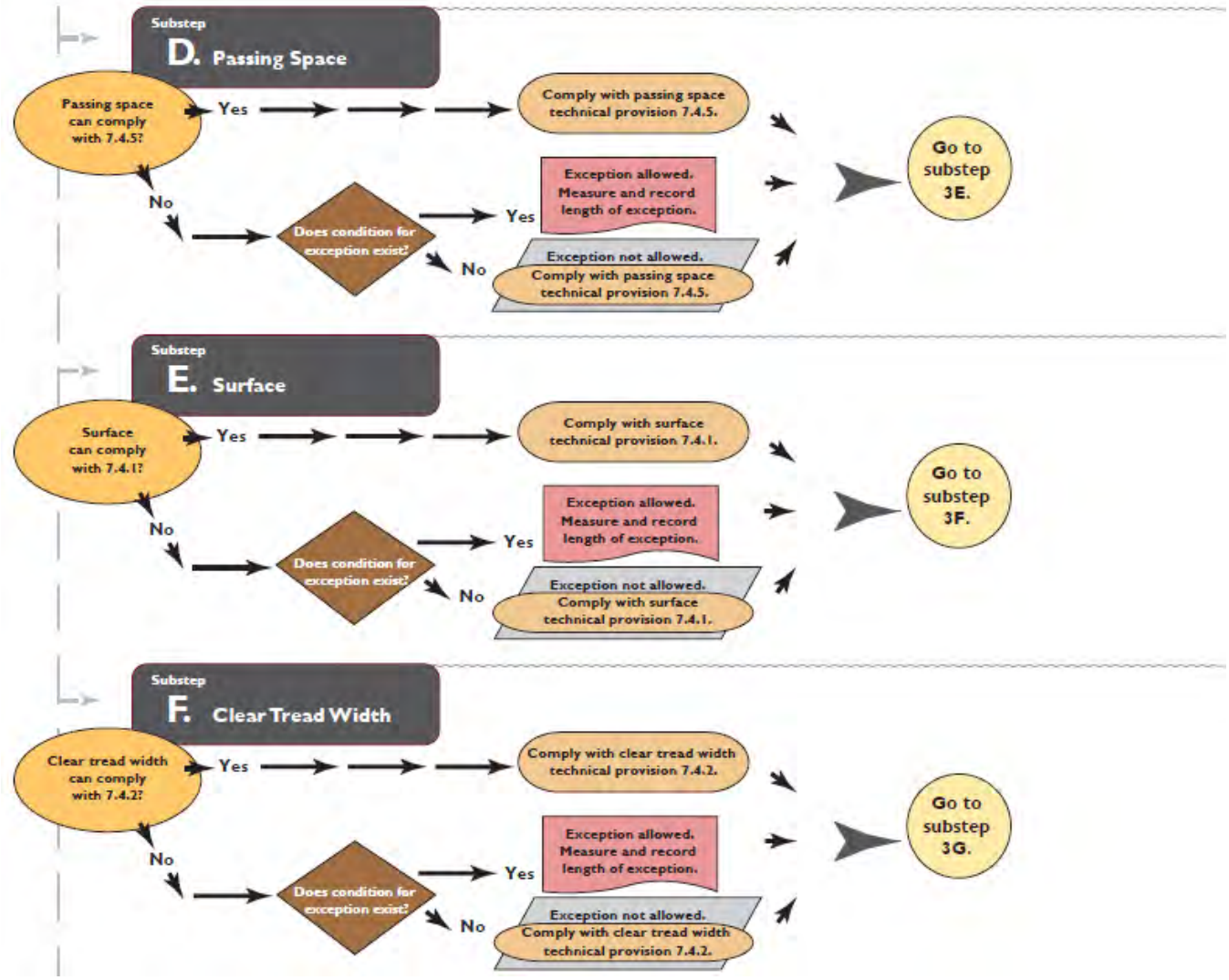
A flowchart on how to apply the FSTAG one step at a time. (Best if printed in color.)

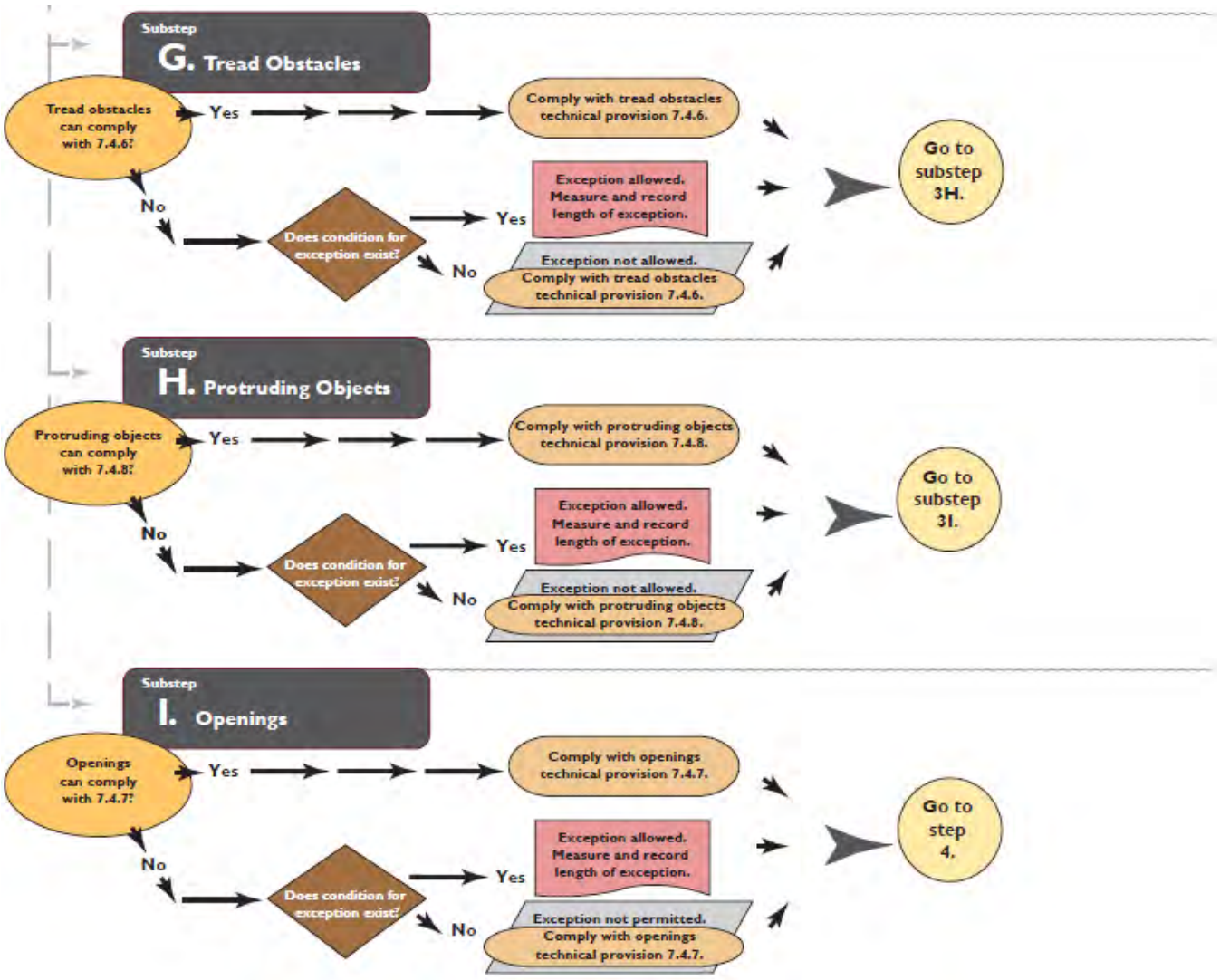


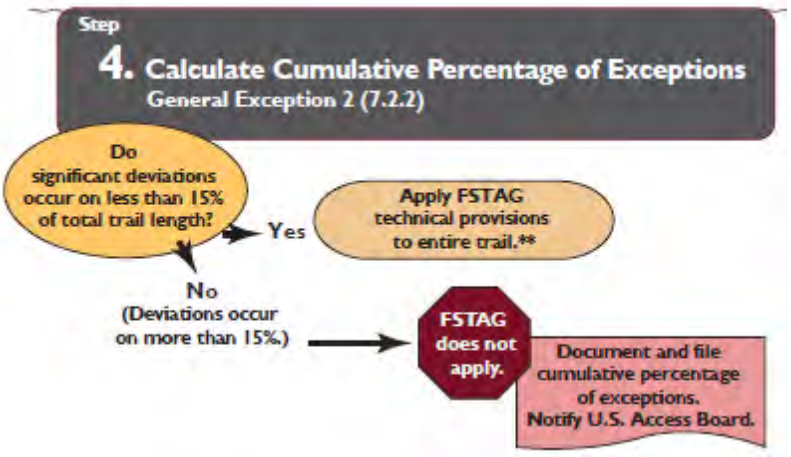



Substep
C. Minimum Trail Width
Minimum trail width is less than 12 in for 20 ft or more?
Yes
No
Document minium trail width, location(s), and data source.
Does condition for exception exist?
Yes
No
Document condition for exception.
Is trail width so narrow that it is impracticable for the entire trail to comply with the technical requirements?
Yes
No
FSTAG does not apply.*
File documented condition for exception. Notify U.S. Access Board.
FSTAG may still apply. Go to trail obstacle limiting factor.
Go to substep 2D.
Substep
D. Trail Obstacle
Trail obstacle is 30 in or higher across width of trail?
Yes
No
Document trail obstacle, location(s), and data source.
Does condition for exception exist?
Yes
No
Document condition for exception.
Is trail obstacle so extreme that it is impracticable for the entire trail to comply with the technical requirements?
Yes
No
FSTAG does not apply.*
File documented condition for exception. Notify U.S. Access Board.
FSTAG may still apply.
Go to step 3.


Step
3. Apply Technical Provisions
(7.4.1 to 7.4.4 and 7.4.6 to 7.4.8)
Note: Sequence does not need to occur in the order shown.
If during step 3 the presence of one or more conditions for an exception allows deviations from technical provisions on more than 15% of the trail length, go directly to step 4.
Substep
A. Trail Grade
Trail grade can comply with 7.4.3.1?
Yes
Comply with trail grade technical provision 7.4.3.1.
No
Does condition for exception exist?
Yes
Exception allowed. Measure and record length of exception.
No
Exception not allowed. Comply with trail grade technical provision 7.4.3.1.
Go to step 3B.
Substep
B. Trail Cross Slope
Trail cross slope can comply with 7.4.3.2?
Yes
Comply with trail cross slope technical provision 7.4.3.2.
No
Does condition for exception exist?
Yes
Exception allowed. Measure and record length of exception.
No
Exception not allowed. Comply with trail cross slope technical provision 7.4.3.2.
Go to substep 3C.
Substep
C. Resting Intervals
Resting intervals can comply with 7.4.4?
Yes
Comply with resting interval technical provision 7.4.4.
No
Does condition for exception exist?
Yes
Exception allowed. Measure and record length of exception.
No
Exception not allowed. Comply with resting interval technical provision 7.4.4.
Go to substep 3D.


Substep
D. Passing Space
Passing space can comply with 7.4.5?
Yes
Comply with passing space technical provision 7.4.5.
No
Does condition for exception exist?
Yes
Exception allowed. Measure and record length of exception.
No
Exception not allowed. Comply with passing space technical provision 7.4.5.
Go to substep 3E.
Substep
E. Surface
Surface can comply with 7.4.1?
Yes
Comply with surface technical provision 7.4.1.
No
Does condition for exception exist?
Yes
Exception allowed. Measure and record length of exception.
No
Exception not allowed. Comply with surface technical provision 7.4.1.
Go to substep 3F.
Substep
F. Clear Tread Width
Clear tread width can comply with 7.4.2?
Yes
Comply with clear tread width technical provision 7.4.2.
No
Does condition for exception exist?
Yes
Exception allowed. Measure and record length of exception.
No
Exception not allowed. Comply with clear tread width technical provision 7.4.2.
Go to substep 3G.





**Refer to FSTAG for detailed instructions, definitions, and technical provisions 7.0 through 7.3

APPENDIX A: Federal Trail Data Standards (FTDS) – Trail Fundamentals

11/08/2011

Trail Type ▪ Trail Class ▪ Managed Use ▪ Designed Use

The Federal Trail Fundamentals include four concepts that are the cornerstones of effective trail planning and management:

- Trail Type
- Trail Class
- Managed Use
- Designed Use

Identify the four Trail Fundamentals for each trail or trail segment based on applicable land management plan direction, travel management decisions, trail-specific decisions, and other related direction.

Trail Fundamentals provide an integrated means to consistently record and communicate the intended design and management guidelines for trail design, construction, maintenance and use.

Trail Type

A category that reflects the predominant trail surface and general mode of travel accommodated by a trail

There are three Trails Types:

Standard/Terra Trail: *A trail that has a surface consisting predominantly of the ground and that is designed and managed to accommodate use on that surface.*

Snow Trail: *A trail that has a surface consisting predominantly of snow or ice and that is designed and managed to accommodate use on that surface.*

Water Trail*: A trail that has a surface consisting predominantly of water (but may include land-based portages) and that is designed and managed to accommodate use on that surface.*

This management concept allows managers to identify trail-specific Design Parameters or technical specifications, management needs, and the cost of managing the trail for particular uses and/or seasons by trail or trail segment.

1. Inventory trails and identify the appropriate Design Parameters or technical specifications, management needs, and management costs for trail using the Trail Types.
2. Identify only one Trail Type per trail.
3. Identify the Trail Type for each trail based on applicable land management plan direction, travel management decisions, trail-specific decisions, and other related direction.
4. Inventory both trails and Trail Types when two trails overlap, for example, when a Snow Trail overlaps a Standard Terra Trail.

Trail Class

The prescribed scale of development for a trail, representing its intended design and management standards.

Trail Classes are general categories reflecting trail development scale, arranged along a continuum.

There are five Trail Classes, ranging from the least developed (Trail Class 1) to the most developed (Trail Class 5):

Trail Class 1: Minimally Developed

Trail Class 2: Moderately Developed

Trail Class 3: Developed

Trail Class 4: Highly Developed

Trail Class 5: Fully Developed

Use Trail Classes to inventory trails and to identify the applicable Design Parameters or technical specifications and the costs for meeting trail management standards.

1. Identify only one Trail Class per trail or trail segment.
2. Trail Class descriptors reflect typical attributes of trails in each class. Local deviations from any Trail Class descriptor may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.
3. There is a direct relationship between Trail Class and Managed Uses: generally, one cannot be determined without consideration of the other.
4. Identify the appropriate Trail Class for each trail or trail segment based on the management intent in the applicable land management plan, travel management decisions, trail-specific decisions, and other related direction. Apply the Trail Class that most closely reflects the management intent for the trail or trail segment, which may or may not reflect the current condition of the trail.

For specifics on each Trail Class, refer to the National Trail Management Class matrix.

Managed Use

A mode of travel that is <u>actively</u> managed and appropriate on a trail, based on its design and management.

1. Managed Use indicates management intent to accommodate a specific use.
2. There can be more than one Managed Use per trail or trail segment.
3. The Managed Uses for a trail are usually a small subset of all the allowed uses on the trail, that is, uses that are allowed unless specifically prohibited. For example, on a trail that is closed to all motorized use but open to all non-motorized use, the Managed Uses could be Hiker/Pedestrian and Pack and Saddle. The allowed uses, however, would also include bicycles and all other non-motorized uses.
4. Identify the Managed Uses for each trail or trail segment based on applicable land management plan direction, travel management decisions, trail-specific decisions, and other related direction.
5. There is a direct relationship between Managed Use and Trail Class: generally, one cannot be determined without consideration of the other. Not all Trail Classes are appropriate for all Managed Uses. For guidance on the potential appropriateness of each Trail Class to each Managed Use, refer to agency-specific guidelines and reference material.

Designed Use

The Managed Use of a trail that requires the most demanding design, construction, and maintenance parameters and that, in conjunction with the applicable Trail Class, determines which Design Parameters or technical specifications will apply to a trail.

1. There is only one Designed Use per trail or trail segment. Although a trail or trail segment may have more than one Managed Use and numerous uses may be allowed, only one Managed Use is identified as the design driver or Designed Use.
2. Determine the Designed Use for a trail or trail segment from the Managed Uses identified for that trail. When making this determination, consider all Managed Uses that occur during all seasons of use of the trail or trail segment. Assess any essential or limiting geometry for the Managed Uses of the trail or trail segment to determine whether any trail-specific adjustments are necessary to the applicable Design Parameters or technical specifications.
    a. In some situations, when there is more than one Managed Use identified for a trail, the Designed Use may be readily apparent. For example, on a trail with Managed Uses of all-terrain vehicle and Motorcycle, all-terrain vehicle use would be the Designed Use because this use requires wider tread widths and has lower tolerances for surface obstacles and maximum trail grades.
    b. In other situations involving more than one Managed Use, the Designed Use may not be readily apparent, as is often the case when there are fewer differences between the applicable sets of Design Parameters than in the example above. For example, on a trail that is actively managed for hiker and pedestrian, pack and saddle, and bicycle use, pack and saddle use would likely be the Designed Use because of the three Managed Uses, pack and saddle use generally has the most limiting design requirements. While the Bicycle Design Parameters are very similar to the Pack and Saddle Design Parameters, the Design Parameters or technical specifications for this trail may need to be adjusted to accommodate bicycles.

Designed Use / Managed Use Types*

Hiker / Pedestrian

Pack and Saddle

Bicycle

Motorcycle

All Terrain Vehicle

Four-Wheel Drive Vehicle > 50” in Width

Cross-Country Ski

Dog Sled

Snowshoe

Snowmobile

Motorized Watercraft

Non-Motorized Watercraft

* Refer to agency-specific guidance regarding which of the Designed Uses and Managed Uses listed above are being used by a particular agency.

APPENDIX B: Federal Trail Data Standards – Class Matrix

11/08/2011

Trail Classes are general categories reflecting trail development scale, arranged along a continuum. The Trail Class identified for a trail prescribes its development scale, representing its intended design and management standards.[1] Local deviations from any Trail Class descriptor may be established based on trail-specific conditions, topography, or other factors, provided that the deviations do not undermine the general intent of the applicable Trail Class.

Identify the appropriate Trail Class for each trail or trail segment based on the management intent in the applicable land management plan, travel management direction, trail-specific decisions, and other related direction. Apply the Trail Class that most closely matches the management intent for the trail or trail segment, which may or may not reflect the current condition of the trail.

Trail Attributes	**Trail Class 1** Minimally Developed	**Trail Class 2** Moderately Developed	**Trail Class 3** Developed	**Trail Class 4** Highly Developed	**Trail Class 5** Fully Developed
Tread & Traffic Flow	◆ Tread intermittent and often indistinct. ◆ May require route finding. ◆ Single lane, with no allowances constructed for passing. ◆ Predominantly native materials.	◆ Tread continuous and discernible, but narrow and rough. ◆ Single lane, with minor allowances constructed for passing. ◆ Typically native materials.	◆ Tread continuous and obvious. ◆ Single lane, with allowances constructed for passing where required by traffic volumes in places where there is no reasonable opportunity to pass. ◆ Native or imported materials.	◆ Tread wide and relatively smooth , with few irregularities. ◆ Single lane, with allowances constructed for passing where required by traffic volumes in places where there is no reasonable opportunity to pass. ◆ Double lane where traffic volumes are high and passing is frequent. ◆ Native or imported materials. ◆ May be hardened.	◆ Tread wide, firm, stable, and generally uniform ◆ Single lane, with frequent turnouts where traffic volume is low to moderate. ◆ Double lane where traffic volume is moderate to high. ◆ Commonly hardened with asphalt or other imported material.
Obstacles	◆ Obstacles common, naturally ocurring, often substantial , and intended to provide increased challenge. ◆ Narrow passages; brush, steep grades, rocks and logs present.	◆ Obstacles may be common, substantial, and intended to provide increased challenge. ◆ Blockages cleared to define route and protect resources. ◆ Vegetation may encroach into trailway.	◆ Obstacles may be common, but not substantial or intended to provide challenge. ◆ Vegetation cleared outside of trailway.	◆ Obstacles infrequent and insubstantial . ◆ Vegetation cleared outside of trailway.	◆ Obstacles not present ◆ Grades typically < 8%

Trail Attributes	**Trail Class 1** Minimally Developed	**Trail Class 2** Moderately Developed	**Trail Class 3** Developed	**Trail Class 4** Highly Developed	**Trail Class 5** Fully Developed
Constructed Features & Trail Elements	◆ Structures minimal to non-existent. ◆ Drainage typically provided without structures. ◆ Natural fords. ◆ Typically no bridges.	◆ Structures of limited size, scale, and quantity; typically constructed of native materials. ◆ Structures adequate to protect trail infrastructure and resources. ◆ Natural fords . ◆ Bridges as needed for resource protection and appropriate access.	◆ Structures may be common and substantial; constructed of imported or native materials. ◆ Natural or constructed fords. ◆ Bridges as needed for resource protection and appropriate access.	◆ Structures frequent and substantial; typically constructed of imported materials. ◆ Contructed or natural fords. ◆ Bridges as needed for resource protection and user convenience. ◆ Trailside amenities may be present.	◆ Structures frequent or continuous; typically constructed of imported materials. ◆ May include bridges, boardwalks, curbs, handrails, trailside amenities, and similar features.
Signs[2]	◆ Route identification signing limited to junctions. ◆ Route markers present when trail location is not evident. ◆ Regulatory and resource protection signing infrequent. ◆ Destination signing, unless required, generally not present . ◆ Information and interpretive signing generally not present.	◆ Route identification signing limited to junctions. ◆ Route markers present when trail location is not evident. ◆ Regulatory and resource protection signing infrequent . ◆ Destination signing typically infrequent outside of wilderness; generally not present in wilderness areas. ◆ Information and interpretive signing uncommon.	◆ Route identification signing at junctions and as needed for user reassurance. ◆ Route markers as needed for user reassurance . ◆ Regulatory and resource protection signing may be common. ◆ Destination signing likely outside of wilderness; generally not present in wilderness areas . ◆ Information and interpretive signs may be present outside of wilderness .	◆ Route identification signing at junctions and as needed for user reassurance. ◆ Route markers as needed for user reassurance. ◆ Regulatory and resource protection signing common. ◆ Destination signing common outside of wilderness; generally not present in wilderness areas. ◆ Information and interpretive signs may be common outside wilderness areas. ◆ Accessibility information likely displayed at trailhead.	◆ Route identification signing at junctions and for user reassurance. ◆ Route markers as needed for user reassurance. ◆ Regulatory and resource protection signing common. ◆ Destination signing common. ◆ Information and interpretive signs common. ◆ Accessibility information likely displayed at trailhead.

Trail Attributes	**Trail Class 1** Minimally Developed	**Trail Class 2** Moderately Developed	**Trail Class 3** Developed	**Trail Class 4** Highly Developed	**Trail Class 5** Fully Developed
Typical Recreation Environs & Experience[3]	◆ Natural and unmodified. ◆ ROS: Typically Primitive to Roaded Natural. ◆ WROS: Typically Primitive to Semi-Primitive .	◆ Natural and essentially unmodified. ◆ ROS: Typically Primitive to Roaded Natural. ◆ WROS: Typically Primitive to Semi-Primitive.	◆ Natural and primarily unmodified. ◆ ROS: Typically Primitive to Roaded Natural. ◆ WROS: Typically Semi-Primitive to Transition.	◆ May be modified. ◆ ROS: Typically Semi-Primitive to Rural. ◆ WROS: Typically Portal or Transition.	◆ May be highly modified. ◆ Commonly associated with visitor centers or high-use recreation sites. ◆ ROS: Typically Roaded Natural to Urban. ◆ Generally not present in wilderness areas.

[1] For management standards, potential appropriateness of Trail Classes for Managed Uses, technical specifications by Trail Class and Designed Use, and other related guidance, refer to agency-specific guidelines and reference material.

[2] For standards and guidelines for the use of signs and posters along trails, refer to agency-specific guidelines.

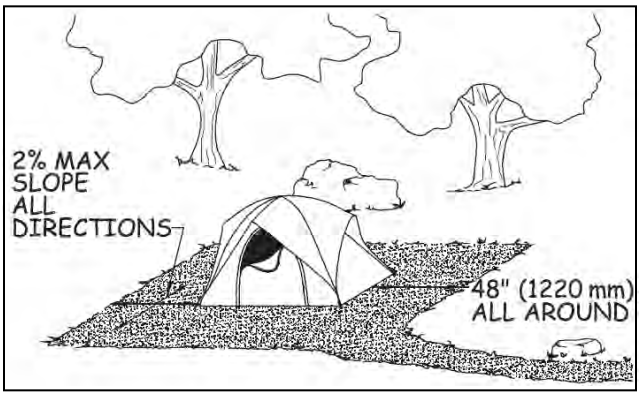
[3] The National Trail Management Class matrix shows the combinations of Trail Class and Recreation Opportunity Spectrum (ROS) or Wilderness Recreation Opportunity Spectrum (WROS) settings that commonly occur, although trails in all Trail Classes may and do occur in all settings. For guidance on the application of the ROS and WROS, refer to agency-specific guidelines.

APPENDIX C: FSORAG Technical Provisions

Referenced in the FSTAG's Technical Provisions

4.3 Tent Pads and Tent Platforms

4.3.1 General. Tent platforms are not required. Where provided, tent pads and tent platforms at single camping units shall comply with section 4.6 and shall be connected to an ORAR complying with section 2.0. Where camping units contain more than one tent pad or tent platform, at least 20 percent, but not less than two, of the tent pads or tent platforms shall comply with section 4.3.



4.3.2 Clear Floor or Ground Space. Tent pads and tent platforms shall have clear floor or ground space surrounding the tent that is at least 48 inches (1220 mm) wide. This space shall not overlap the ORAR.

> **Exception.** Where a condition for exception in section 1.1 prohibits full compliance, the clear floor or ground space shall comply with 4.3.2 to the extent practicable.

4.3.3 Slope. The slope of tent pads and tent platforms shall not exceed 1:48 (2 percent) in any direction.

> **Exception.** When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

4.3.4 Tent Pad or Platform Surface. Tent pads and platforms shall have a surface that is firm and stable and is designed to allow use of tent stakes and other tent securing devices.

> **Exception.** Where a condition for exception in section 1.1 prohibits full compliance, the surface shall comply with 4.3.4 to the extent practicable.

4.3.5 Transfer Height. Tent platform surfaces that are not the same elevation as the ORAR shall be between 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the floor or ground surface adjacent to the ORAR to facilitate transfer from a wheelchair to the tent platform.

5.1 Camp Shelters

5.1.1. General. Camp shelters at single camping units shall comply with 5.1. Where camping units contain more than one camp shelter, at least 20 percent, but not less than two, of the camp shelters shall comply with section 6.1. Camp shelters located on trails shall be connected to other constructed features in the unit by a trail complying with the FSTAG. Camp shelters located in a campground, not on a trail, shall be connected to other constructed features by an ORAR complying with section 2.0.

5.1.2 Level or Sloped Entry. Camp shelters providing roll-in access shall have a level or sloped entry that complies with the FSORAG Outdoor Recreation Access Route technical provisions if the camp shelter is in a campground with a development level of 3 or higher. If the camp shelter is located off a trail, the sloped entry is to comply with the FSTAG Trail provisions.

5.1.3 Slope. The slope of the surface of the clear floor or ground space inside the camp shelter shall not be steeper than 1:48 (2 percent) in all directions.

5.1.4 Turning Space. Where the camp shelter floor is not elevated above the trail or ORAR, as applicable, a turning space complying with ABAAS section 304.3 shall be provided.

5.1.5 Floor Height. Where the floor at the entrance to the camp shelter is elevated above the ground surface, the floor shall be 17 (430 mm) high minimum to19 inches (485 mm) high maximum measured from the clear ground space to the floor surface inside the camp shelter.

5.1.6 Clear Floor or Ground Space. A clear floor or ground space at least 36 inches (915 mm) by 48 inches (1220 mm) shall be provided parallel at the elevated entrance to the camp shelter. One full unobstructed side of the clear ground space shall adjoin or overlap the trail or ORAR, as applicable, or another clear ground space.

5.1.7 Surface. The surface of the clear ground space shall be firm and stable.

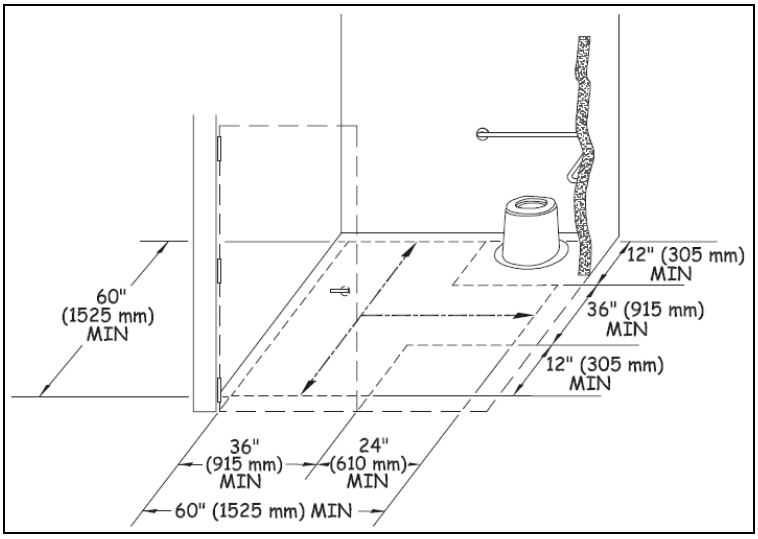
5.1.8 Slope. The slope of the surface of the clear ground space shall not be steeper than 1:48 in any direction.

> **Exception:** When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:20 (5 percent) shall be permitted where necessary for drainage.

5.1.9 Doors. Where provided, doors shall comply with ABAAS section 404. The door shall not swing into or otherwise obstruct the clear floor or ground space or the turning space required by 5.1.4

5.3 Pit Toilets

5.3.1 General. Pit toilets may only be provided in FS recreation sites with **a** *Recreation Site Development Scale* level of 2 or less or at remote cabin locations. All pit toilets shall comply with section 5.3 and be connected to an ORAR complying with section 2.0**.** Where pit toilets are constructed in sites that are not accessed by motor vehicles, the pit toilet and all constructed features in the site shall be connected by trail segments complying with the FSTAG.



5.3.2 Turning Space and Clear Floor or Ground Space. Turning space and clear floor or ground space complying with 5.3 shall be provided at pit toilets.

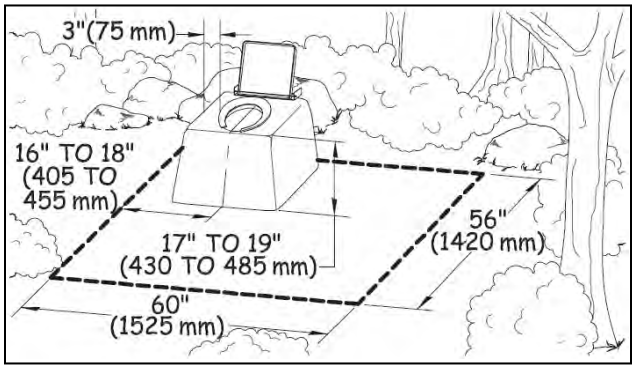
5.3.2.1 Size. The clear floor or ground space shall be 60 inches (1525 mm) wide minimum measured parallel with the back of the pit toilet, and 56 inches (1420 mm) deep minimum measured parallel to the sides of the pit toilet. The turning space shall be at least 60 inches (1,525 millimeters) in diameter or T-shaped with a minimum 60- by 36-inch (1,525 by 915 millimeter) arm and a minimum 36-inch (915 millimeter) -wide by 24-inch (610 millimeter) -long base. The turning space and clear floor or ground space may overlap.

5.3.2.2 Surface. The surface of the turning space and clear floor or ground space shall be firm and stable.

5.3.2.3 Slope. The slope of the turning space and clear floor or ground space surface shall not be steeper than 1:48 (2 percent) in all directions.

Exception: When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:20 (5 percent) shall be permitted where necessary for drainage

5.3.3 Seats. Pit toilet seats shall comply with 5.3.3



5.3.3.1 Height. The total height of the toilet seat on the riser for a pit toilet shall be between 17 inches (430 mm) and 19 inches (485 mm) above the floor or ground surface.

5.3.3.2 Location Where Walls Provided. Where walls or partitions are provided, the seat shall be positioned with a wall or partition to the rear and to one side of the seat for a left-hand or right-hand approach. The back of the riser shall be flush against the back wall. The centerline of the seat shall be 16 inches (405 mm) minimum to 18 inches (455 mm) maximum from the side wall or partition.

5.3.3.3 Location Where Walls Not Provided. Where walls or partitions are not provided, the seat shall be positioned in a corner of the clear floor or ground space required by 5.3.2 for a left-hand or right-hand approach. The back of the seat shall be flush against the perimeter of the clear floor or ground space

5.3.4 Grab Bars. Where walls or partitions are provided, grab bars complying with ABAAS section 604.5 shall be provided.

Exception: Where the walls or partitions cannot support the force specified in ABAAS section 609.8, grab bars shall not be installed. In such cases, the riser shall have vertical or nearly vertical sides and a flat area on each side of the seat that is about 3 inches (75 millimeters) wide.

5.3.5 Doors. Where provided, doors shall comply with ABAAS section 404. The door shall not swing into or otherwise obstruct the clear floor or ground space required by 5.3.2.1.

5.3.6 Entrance. The entrance to the toilet shall be level with the surrounding surface.

Exception: Where bedrock, perma-frost or other environmental conditions prohibit a level entry or the toilet design (such as a composting toilet) necessitates a raised toilet structure, a sloped entry complying with the FSTAG provisions for a trail may connect the toilet entrance with the trail or ORAR. A 60 inch by 60 inch (1,220 millimeters by 1,220 millimeters) level landing must be provided outside the door to the toilet. Sloped entries do not require handrails.

APPENDIX D: Provisions of the Architectural Barriers Act Accessibility Standards (ABAAS)

that are referenced in the FSORAG Technical Provisions

The ABAAS are available at *http://www.access-board.gov/ada-aba/aba-standards-gsa.cfm*

304 - Turning Space

304.1 General. Turning space shall comply with 304.

304.3 Size. Turning space shall comply with 304.3.1 or 304.3.2.

304.3.1 Circular Space. The turning space shall be a space of 60 inches (1525 mm) diameter minimum. The space shall be permitted to include knee and toe clearance complying with 306.

304.3.2 T-Shaped Space. The turning space shall be a T-shaped space within a 60 inch (1525 mm) square minimum with arms and base 36 inches (915 mm) wide minimum. Each arm of the T shall be clear of obstructions 12 inches (305 mm) minimum in each direction and the base shall be clear of obstructions 24 inches (610 mm) minimum. The space shall be permitted to include knee and toe clearance complying with 306 only at the end of either the base or one arm.

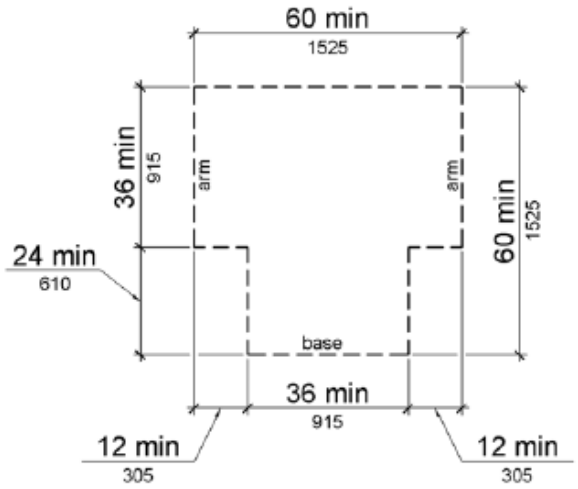


Figure 304.3.2 T-Shaped Turning Space

305 - Clear Floor or Ground Space for Wheelchairs.

305.1 General. Clear floor or ground space shall comply with 305.

305.2 Floor or Ground Surfaces. Floor or ground surfaces of a clear floor or ground space shall comply with 302. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

305.3 Size. The clear floor or ground space shall be 30 inches (760 mm) minimum by 48 inches (1220 mm) minimum.

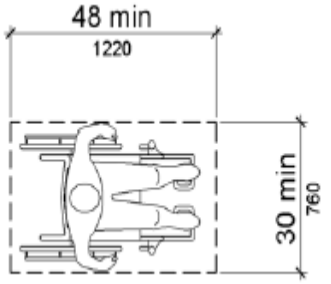


Figure 305.3 Clear Floor or Ground Space

305.4 Knee and Toe Clearance. Unless otherwise specified, clear floor or ground space shall be permitted to include knee and toe clearance complying with 306.

305.5 Position. Unless otherwise specified, clear floor or ground space shall be positioned for either forward or parallel approach to an element.

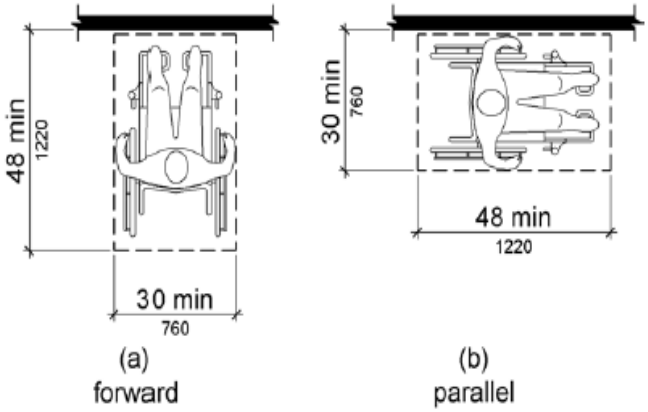


Figure 305.5 Position of Clear Floor or Ground Space

305.6 Approach. One full unobstructed side of the clear floor or ground space shall adjoin an accessible route or adjoin another clear floor or ground space.

305.7 Maneuvering Clearance. Where a clear floor or ground space is located in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearance shall be provided in accordance with 305.7.1 and 305.7.2.

305.7.1 Forward Approach. Alcoves shall be 36 inches (915 mm)wide minimum where the depth exceeds 24 inches (610 mm).

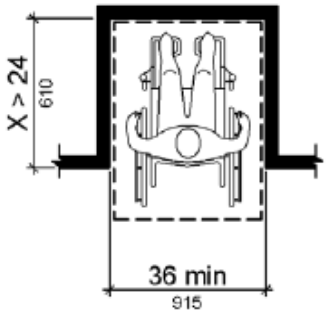


Figure 305.7.1 Maneuvering Clearance in an Alcove, Forward Approach

305.7.2 Parallel Approach. Alcoves shall be 60 inches (1525 mm) wide minimum where the depth exceeds 15 inches (380 mm).

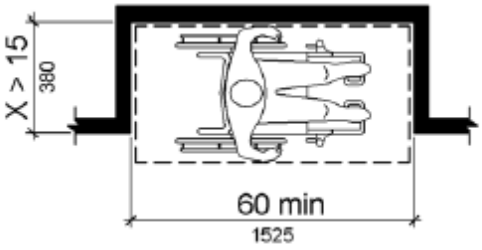


Figure 305.7.2 Maneuvering Clearance in an Alcove, Parallel Approach

306 Knee and Toe Clearance

306.1 General. Where space beneath an element is included as part of clear floor or ground space or turning space, the space shall comply with 306. Additional space shall not be prohibited beneath an element but shall not be considered as part of the clear floor or ground space or turning space.

Advisory 306.1 General. Clearances are measured in relation to the usable clear floor space, not necessarily to the vertical support for an element. When determining clearance under an object for required turning or maneuvering space, care should be taken to ensure the space is clear of any obstructions.

306.2 Toe Clearance.

306.2.1 General. Space under an element between the finish floor or ground and 9 inches (230 mm) above the finish floor or ground shall be considered toe clearance and shall comply with 306.2.

306.2.2 Maximum Depth. Toe clearance shall extend 25 inches (635 mm) maximum under an element.

306.2.3 Minimum Required Depth. Where toe clearance is required at an element as part of a clear floor space, the toe clearance shall extend 17 inches (430 mm) minimum under the element.

306.2.4 Additional Clearance. Space extending greater than 6 inches (150 mm) beyond the available knee clearance at 9 inches (230 mm) above the finish floor or ground shall not be considered toe clearance.

306.2.5 Width. Toe clearance shall be 30 inches (760 mm) wide minimum.

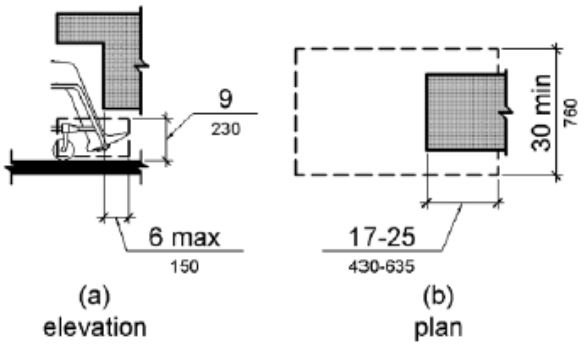


Figure 306.2 Toe Clearance

306.3 Knee Clearance.

306.3.1 General. Space under an element between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground shall be considered knee clearance and shall comply with 306.3.

306.3.2 Maximum Depth. Knee clearance shall extend 25 inches (635 mm) maximum under an element at 9 inches (230 mm) above the finish floor or ground.

306.3.3 Minimum Required Depth. Where knee clearance is required under an element as part of a clear floor space, the knee clearance shall be 11 inches (280 mm) deep minimum at 9 inches (230 mm) above the finish floor or ground, and 8 inches (205 mm) deep minimum at 27 inches (685 mm) above the finish floor or ground.

306.3.4 Clearance Reduction. Between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground, the knee clearance shall be permitted to reduce at a rate of 1 inch (25 mm) in depth for each 6 inches (150 mm) in height.

306.3.5 Width. Knee clearance shall be 30 inches (760 mm) wide minimum.

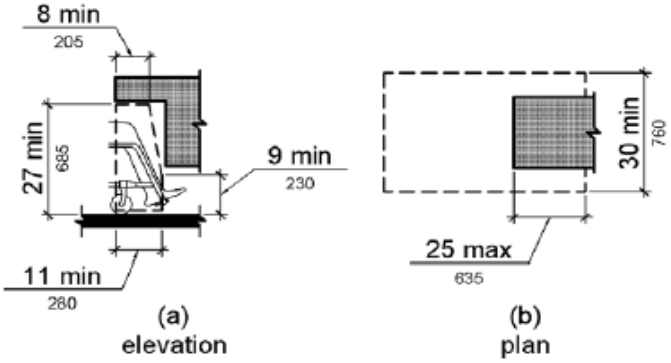


Figure 306.3 Knee Clearance

308 Reach Ranges

308.1 General. Reach ranges shall comply with 308.

308.2 Forward Reach.

308.2.1 Unobstructed. Where a forward reach is unobstructed, the high forward reach shall be 48 inches (1220 mm) maximum and the low forward reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

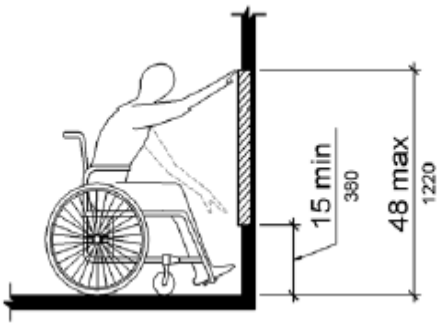


Figure 308.2.1 Unobstructed Forward Reach

308.2.2 Obstructed High Reach. Where a high forward reach is over an obstruction, the clear floor space shall extend beneath the element for a distance not less than the required reach depth over the obstruction. The high forward reach shall be 48 inches (1220 mm) maximum where the reach depth is 20 inches (510 mm) maximum. Where the reach depth exceeds 20 inches (510 mm), the high forward reach shall be 44 inches (1120 mm) maximum and the reach depth shall be 25 inches (635 mm) maximum.

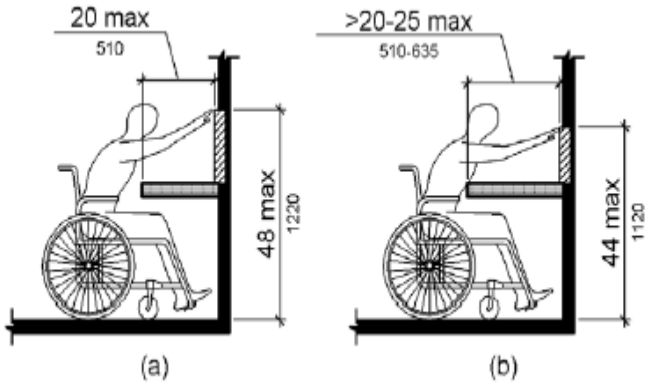


Figure 308.2.2 Obstructed High Forward Reach

308.3 Side Reach.

308.3.1 Unobstructed. Where a clear floor or ground space allows a parallel approach to an element and the side reach is unobstructed, the high side reach shall be 48 inches (1220 mm) maximum and the low side reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

EXCEPTIONS: 1. An obstruction shall be permitted between the clear floor or ground space and the element where the depth of the obstruction is 10 inches (255 mm) maximum.
2. Operable parts of fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.

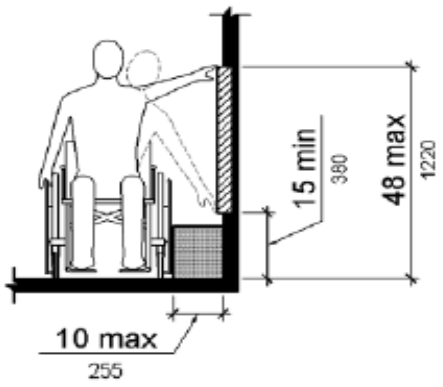


Figure 308.3.1 Unobstructed Side Reach

308.3.2 Obstructed High Reach. Where a clear floor or ground space allows a parallel approach to an element and the high side reach is over an obstruction, the height of the obstruction shall be 34 inches (865 mm) maximum and the depth of the obstruction shall be 24 inches (610 mm) maximum. The high side reach shall be 48 inches (1220 mm) maximum for a reach depth of 10 inches (255 mm) maximum. Where the reach depth exceeds 10 inches (255 mm), the high side reach shall be 46 inches (1170 mm) maximum for a reach depth of 24 inches (610 mm) maximum.

EXCEPTIONS: 1. The top of washing machines and clothes dryers shall be permitted to be 36 inches (915 mm) maximum above the finish floor.
2. Operable parts of fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.

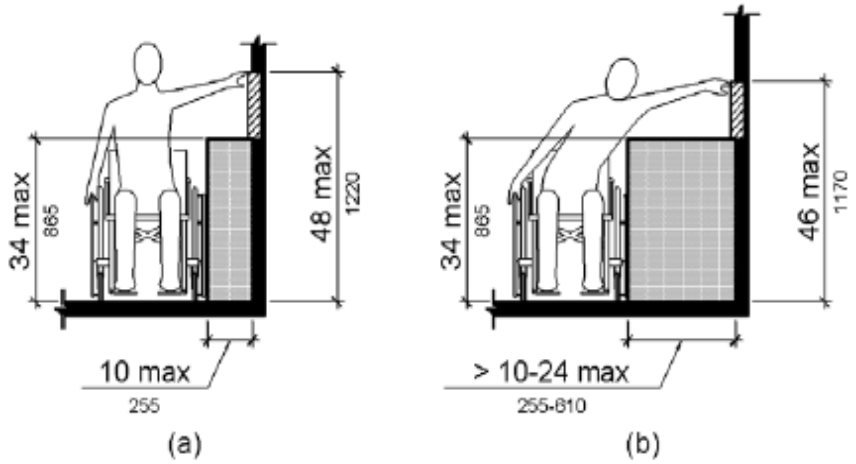


Figure 308.3.2 Obstructed High Side Reach

309 Operable Parts

309.1 General. Operable parts shall comply with 309.

309.2 Clear Floor Space. A clear floor or ground space complying with 305 shall be provided.

309.3 Height. Operable parts shall be placed within one or more of the reach ranges specified in 308.

309.4 Operation. Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum.

EXCEPTION: Gas pump nozzles shall not be required to provide operable parts that have an activating force of 5 pounds (22.2 N) maximum.

404 Doors, Doorways, and Gates

404.2.3 Doorways - Clear Width. Door openings shall provide a clear width of 32 inches (815 mm) minimum. Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees. Openings more than 24 inches (610 mm) deep shall provide a clear opening of 36 inches (915 mm) minimum. There shall be no projections into the required clear opening width lower than 34 inches (865 mm) above the finish floor or ground. Projections into the clear opening width between 34 inches (865 mm) and 80 inches (2030 mm) above the finish floor or ground shall not exceed 4 inches (100 mm).

EXCEPTIONS: 1. In alterations, a projection of 5/8 inch (16 mm) maximum into the required clear width shall be permitted for the latch side stop.
2. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the finish floor or ground.

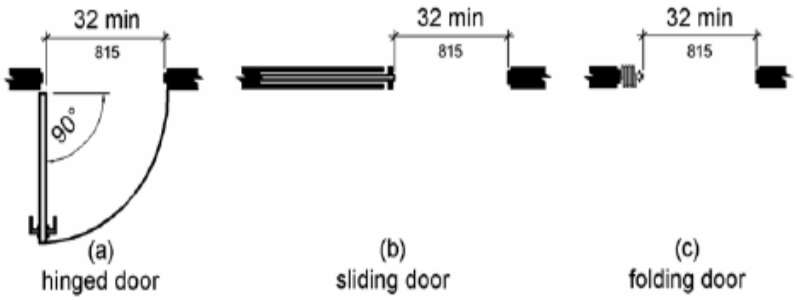


Figure 404.2.3 Clear Width of Doorways

404.2.7 Door and Gate Hardware. Handles, pulls, latches, locks, and other operable parts on doors and gates shall comply with 309.4. Operable parts of such hardware shall be 34 inches (865 mm) minimum and 48 inches (1220 mm) maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG)

2013

All Facilities and Features Addressed in the FSORAG that are Constructed or Altered Within the National Forest System shall comply with the FSORAG.

Contents

FSORAG - Technical Provisions:
Contains the definitions and technical requirement specifications.

Appendix:

Provisions of the Architectural Barriers Act Accessibility Guidelines that are referenced in the FSORAG Technical Provisions

Forest Service Outdoor Recreation Accessibility Guidelines

Scoping Requirements, Technical Provisions, and Appendix

Table of Contents

FOREST SERVICE OUTDOOR RECREATION ACCESSIBILITY GUIDELINES (FSORAG)

Technical Provisions

1.0 APPLICATION

The Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) and the Forest Service Trail Accessibility Guidelines (FSTAG) are the legally enforceable standards for use on the National Forest System for the facilities and features addressed in those guidelines. They have been updated to incorporate the supplement to the Architectural Barriers Act Accessibility Standards, the Outdoor Developed Area Accessibility Guidelines (ODAAG), developed by the Architectural and Transportation Barriers Compliance Board (U.S. Access Board).

While they incorporate the U.S. Access Board's ODAAG they also ensure the application of equivalent or higher guidelines, in order to comply with other existing Forest Service policies, including universal design, as well as agency terminology and processes.

The FSORAG and FSTAG became the National Forest System's legal standard for all applicable facilities on May 26, 2006 with the final Federal Register publication of Forest Service Manuals 2330 and 2350. As stated in the Federal Register, these guidelines will be updated periodically to ensure they remain equal to or a higher standard than other guidelines and standards applicable to Federal agencies under the Architectural Barriers Act.

The FSORAG provides guidance for maximizing the accessibility of outdoor recreation areas in the National Forest System, while protecting the unique characteristics of their natural setting.

All facilities and features addressed in the FSORAG that are constructed or altered within the National Forest System shall comply with the FSORAG. Such facilities include but are not limited to camping facilities, picnic areas, viewing areas at overlooks, beach access routes, outdoor recreation access routes, and other constructed features associated with outdoor recreation areas in the National Forest System.

Construction or alteration of all facilities within the National Forest System that are not addressed in the FSORAG or FSTAG shall comply with the applicable requirements of the Architectural Barriers Act Accessibility Standards (ABAAS).

The FSORAG does not apply to:

Trails within the National Forest System shall comply with the Forest Service Trail Accessibility Guidelines (FSTAG), which are available at *http://www.fs.fed.us/recreation/accessibility/*

Boating and fishing facilities, swimming pools, play areas, sports arenas, miniature golf courses, and amusement parks, which are referred to as “recreation facilities” are addressed in Chapter 10 of the ABAAS (*http://www.access-board.gov*).

These guidelines do not apply to maintenance work (routine or periodic repair of existing trails, recreation sites, or facilities).

Where existing individual site furnishings are altered or replaced, the floor or ground surface under or around them is not required to be altered solely because an accessible furnishing has been placed in that site. While the new or altered furnishing must be accessible the clear floor or ground space shall not be required to comply with surface and slope requirements until the surface and slope alteration is the focus of work in that site.

1.1 Conditions for an Exception.

Where one or more of the following conditions exists in an outdoor recreation area, an “exception” provided in the guidelines for that specific technical requirement can be used where that condition exists. The exception shall not be used on the portion of the feature where the condition does not exist. If no exception is provided for the technical requirement, no exception is allowed. All other appropriate design options should be considered before applying the exception.

Condition for an Exception 1. Where compliance with the technical provision is not practicable due to terrain.

Condition for an Exception 2. Where compliance with the technical provision cannot be accomplished with the prevailing construction practices.

Condition for an Exception 3. Where compliance with the technical provision would fundamentally alter the function or purpose of the facility or the setting.

Condition for an Exception 4. Where compliance is precluded by the:

- Endangered Species Act (16 U.S.C. §§ 1531 et seq.);
- National Environmental Policy Act (42 U.S.C. §§ 4321 et seq.);
- National Historic Preservation Act (16 U.S.C. §§ 470 et seq.);
- Wilderness Act (16 U.S.C. §§ 1131 et seq.); or
- Other Federal, State, or local law the purpose of which is to preserve threatened or endangered species; the environment; or archaeological, cultural, historical, or other significant natural features.

1.2 Definitions.

Alteration of a recreation site, building, or facility. A change to a portion of a recreation site, building, or facility that is addressed by the accessibility guidelines and that affects or could affect the usability of the site, building, or facility. Alterations include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, change in surface of circulation paths or vehicular ways, changes or rearrangement of the structural

parts or elements, and changes or rearrangement in the plan configuration of walls and full-height partitions. Normal maintenance, reroofing, painting or wallpapering, or changes to mechanical and electrical systems are not alterations unless they affect the usability of the building or facility

Beach Access Route. A continuous, unobstructed path designed for pedestrian use that crosses the surface of a beach or that leads from a pedestrian access point to the high tide level at tidal beaches; mean high water level at river beaches; or the normal recreation water level at lake, pond, and reservoir beaches.

Beach Nourishment. A process by which sediment (usually sand) is added to a beach. An entity is not required to expend more than 20% of the costs of a beach nourishment project to provide a beach access route.

Camp Shelter. A small structure typically enclosed on three or all four sides, with a roof or overhang. Camp shelters are often located on trails. Camp shelters are not cabins, which are typically larger and are required to comply with ABAAS section 806 for transient lodging where short term accommodations are provided.

Camping Facility. A site, or portion of a site, developed for outdoor recreational purposes that contains camping units.

Camping Unit. A discrete area within a campground with a persons at one time capacity (PAOT) of 5 that usually includes a camp living area, a parking spur, and one or more constructed features such as a picnic table and a cooking or campfire area.

- **Camp Living Area**. The area in a camping unit that contains constructed features, such as picnic tables, grills, fire rings, utilities, and other related elements, and may be located adjacent to or near a parking spur.
- **Parking Spur.** The space in a camping unit that is designed for vehicular access and parking and that includes a driveway and vehicle parking area.
    - **Driveway.** The section of a parking spur connecting the road accessing a campground and a vehicle parking area.
    - **Vehicle Parking Area.** The section of a parking spur where camping vehicles, such as cars, motorcycles, vans, recreational vehicles, and trailers, are parked.
- **Multiple Camping Unit**. A camping unit that can accommodate more than 5 PAOT. A double camping unit accommodates 10 PAOT. A triple camping unit accommodates 15 PAOT. A camping unit with a PAOT of 20 or more is a group camping unit.

Circulation Path. An exterior or interior way of passage provided for pedestrian travel.

Clear Floor or Ground Space. The minimum unobstructed floor or ground space required to accommodate a single, stationary wheelchair and occupant.

Developed Recreation Site. A recreation site that has a development scale level of 3, 4 or 5 on the *Recreation Site Development Scale* in Forest Service Handbook 2309.13,10– Exhibit 01.

Essential Container. A trash, recycling, food storage, or other animal-resistant container.

Outdoor Constructed Feature. A constructed element provided at an outdoor recreation site such as a picnic table; fire ring; pedestal grill; tent pad; bench; trash, recycling, or other essential container; fireplace, woodstove, water hydrant or pump, telescope or periscope; pit toilet; or outdoor rinsing shower.

Outdoor Recreation Access Route (ORAR). A continuous, unobstructed path designed for pedestrian use that connects constructed features in a campground, camping unit, picnic area, at a trailhead or other recreation site where modifications are provided for visitor convenience and comfort.

Pedestrian Access Points to a Beach. A location developed as an entry point to the beach for pedestrians. Access Points include parking facilities that serve beaches, dune crossings, and stairways or ramps leading from boardwalks, walkways, or parking spaces to the beach.

Picnic Facility. A site, or portion of a site, developed for outdoor recreational purposes that contains picnic units.

Picnic Unit. An outdoor space within a picnic area or facility that is designed and constructed for picnicking and that contains one or more constructed features such as picnic tables, grills, and other related elements.

Pit Toilet. A primitive outhouse consisting of a toilet riser over a hole dug into the ground or receptacle to receive and naturally decompose human waste. Pit toilets are provided primarily for resource protection and are only constructed at recreation sites with a *Recreation Site Development Scale* level of 2 of less. A pit toilet riser may or may not be surrounded by walls and may or may not have a roof. A pit toilet may be permanently installed or may be moved from one location to another as the pit is filled or the area becomes severely impacted from use. Waste may be disposed of directly into the pit or may be composted.

Practicable. Practicable in this context means the work can be completed within the limits of the applicable Conditions for an Exception and results in a useful improvement for all.

Protruding Object. A constructed feature such as a sign that overhangs an ORAR, beach access route, trail, resting interval, or passing space between 27 inches (685 mm) and 80 inches (2030 mm) above the travel surface. Accessibility guidelines for protruding objects do not apply to natural elements such as tree branches and rock formations. However, safety regulations or Forest Service construction and maintenance standards may define clear space and limit overhangs of natural protruding objects.

Provisions. The sections of accessibility guidelines and standards that explain what is required for specific situations and facilities (parking, picnic tables, trails, etc.)

Recreation Site. An area that is improved, developed, or otherwise identified for recreation and that has a development scale of 0, 1, 2, 3, 4, or 5 (See Forest Service Handbook 2309.13, Chapter10 – Exhibit 01.

Reconstruction. This term is not used in Federal accessibility guidelines or the FSORAG and FSTAG, even though it is used frequently by folks who work in recreation and trails. For the purposes of the FSORAG and FSTAG, actions are categorized as construction, alteration, or maintenance.

Scoping Requirement. Specifications of where, when, and how much of a constructed features detailed in the accessibility guidelines technical requirements must be met in order to be in compliance with the guidelines.

Slope. The incline of a surface.

- **Cross Slope.** The difference in elevation from edge to edge of an ORAR, trail, or beach access route measured perpendicular to the direction of travel. This may be expressed as the percentage of change in elevation or as a ratio of vertical distance to horizontal distance. The percentage is shown in parentheses in these guidelines.
- **Running Slope (Grade).** The difference in elevation of a section of an ORAR, trail, or beach access route measured parallel to the predominant direction of travel. This may be expressed as a ratio of vertical distance to horizontal distance or as the percentage of change in elevation. The percentage is shown in parentheses in these guidelines.

Surface. The top layer of ground on a recreation site, ORAR, trail, or beach access route.

- **Firm.** A firm surface resists deformation by indentations. During the planning process, firmness must be evaluated for noticeable distortion or compression during the seasons for which the surface is managed, under normally occurring weather conditions.
- **Stable**. A surface is not permanently affected by expected weather conditions and can sustain normal wear and tear from the expected use(s) of the area, between planned maintenance.

Technical Requirements. The specific numbers, conditions, and measurements that are required to be achieved (percent that must comply, dimensions, reach ranges, grades, trail width, etc.).

Tent Pad. An outdoor space designed and constructed for setting-up and securing tents.

Tent Platform. An outdoor space designed and constructed for setting-up and securing tents that is elevated above the ground surface.

Trail. For purposes of the FSTAG and FSORAG, a trail is a pedestrian route developed primarily for outdoor recreational purposes. A pedestrian route provided primarily to connect elements, spaces, or facilities within a site is not a trail; it is an outdoor recreation access route (ORAR).

Trailhead. For purposes of the FSORAG and FSTAG, a trailhead is an outdoor space that is designated by an entity responsible for maintaining or administering the trail to serve as an access point to the trail. The junction of two or more trails, or the undeveloped junction of a trail and a road, is not a trailhead.

Vehicle Parking Lot. An area specifically intended for parking of more than two motor vehicles, usually divided into multiple designated parking spaces.

Viewing Area. An outdoor space developed for viewing a landscape or point of interest such as a mountain range, a valley, or a waterfall.

Wheelchair. A device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area. A person whose disability requires use of a wheelchair or mobility device may use a wheelchair or mobility device that meets this definition anywhere foot travel is permitted (36 CFR 212 .1, Forest Service Manual 2353.05 and Title V, Section 508c, of the Americans with Disabilities Act).

2.0 OUTDOOR RECREATION ACCESS ROUTES (ORARS)

2.1 General.

ORARs shall be provided between units and constructed features in campgrounds, picnic areas, trailheads, viewing areas, and other outdoor recreation sites. ORARs shall connect the outdoor constructed features within each recreation site and shall connect to common use features such as toilets, showers, water spouts, trash or recycling receptacles, parking spaces, and beach access routes.

> **Exception 1.** ORARs shall not be required where camping facilities, picnic facilities, viewing areas, or outdoor constructed features are provided on trails. The routes connecting those facilities are to comply with the technical provisions for trails.
>
> **Exception 2**. When an existing camping facility or unit, picnic facility or unit, trailhead, is altered or reconstructed and a condition for an exception in section 1.1 prohibits full compliance with a specific requirement in section 2 on a portion of an ORAR, that portion of the ORAR shall comply with the specific requirement to the extent practicable.

Exception 3. When a new viewing area is constructed, or an existing viewing area is altered or reconstructed and a condition for an exception in section 1.1 prohibits full compliance with a specific requirement in section 2 on a portion of an ORAR, that portion of the ORAR shall comply with the specific requirement to the extent practicable.

Exception 4. Where an element, space, or outdoor constructed feature is altered in a camping facility, picnic facility, viewing area, or trailhead but the circulation path to the altered element, space, or outdoor constructed feature is not altered, an ORAR shall not be required.

Exception 5. Where outdoor recreation access routes are provided within vehicular way (recreation site roadway), outdoor recreation access routes shall not be required to comply with 2.4 Slope, 2.5 Resting Intervals, and 2.6 Passing Spaces.

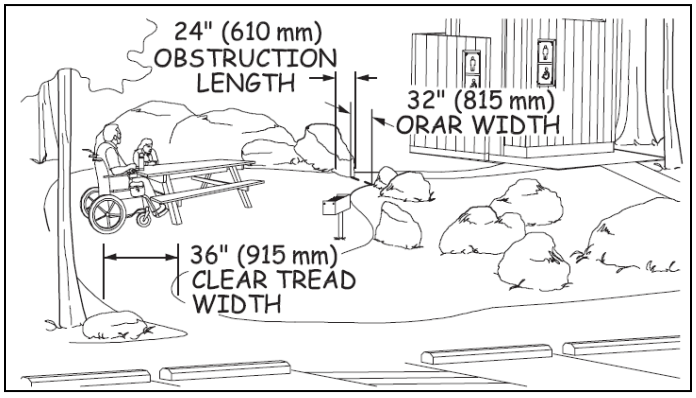
Exception 6. An ORAR is not required to connect accessible camping units to a recreational vehicle (RV) dump station if an accessible vehicle pull-up space is provided at the RV dump station.

2.2 Surface.

The surface of an ORAR shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

2.3 Clear Tread Width.

The clear tread width of an ORAR shall be at least 36 inches (915 mm).

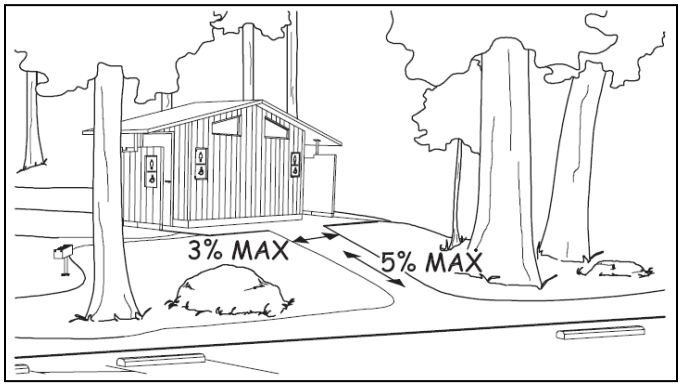


Exception 1. Where a condition for an exception in section 1.1 prevents achieving the required width, the clear tread width may be reduced to 32 inches (815 mm) minimum. If the condition for an exception prevents achieving the reduced width of 32 inches, comply to the extent practicable.

Exception 2. Where an ORAR is provided within a vehicular way, clear passage of 32” is required around or through speed restriction devices, gates, and other barriers on the roadway.

2.4 Slope.

The running slope (grade) and cross slope of ORARs shall comply with section 2.4.



Exception: Where an ORAR is permitted to be provided within a vehicular way, the integrated ORAR shall not be required to comply with 2.4.

2.4.1 Running Slope (Grade). The running slope (grade) of ORARs shall comply with all applicable provisions of this section.

2.4.1.1. The running slope (grade) of an ORAR shall be 1:20 (5 percent) or less for any distance.

2.4.1.2. A grade of up to 1:12 (8.33 percent) is permitted for up to 50 feet (15 m) of an ORAR. Resting intervals complying with section 2.3 shall be provided at distances of no more than 50 feet (15 m) apart.

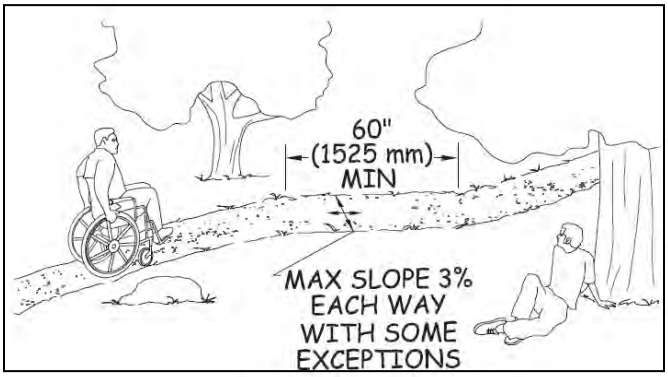
2.4.1.3. A grade of up to 1:10 (10 percent) is permitted for up to 30 feet (9 m) of an ORAR. Resting intervals complying with section 2.3 shall be provided at distances of no more than 30 feet (9 m) apart.

Table 2.4.1. Running Slope (Grade) and Resting Intervals

Running Slope (Grade) of Segment of Outdoor Recreation Access Route		Maximum Length of Segment Between Resting Intervals
Steeper than	**But not Steeper than**	
1:20 (5 percent)	1:12 (8.33 percent)	50 feet (15 m)
1:12 (8.33 percent)	1:10 (10 percent)	30 feet (9 m)

2.4.2 Cross Slope. The cross slope of an ORAR shall be no more than 1:33 (3 percent). Where the surface is paved or is elevated above the natural ground**,** the cross slope shall not be steeper than 1:48 (2 percent).

2.5 Resting Intervals.
Resting intervals shall comply with 2.5.



2.5.1 Location. A resting interval shall be provided between each ORAR segment, in compliance with section 2.4.1. Depending on the design and location, the intersection of two ORARs may act as a resting interval.

> **Exception.** Where a vehicular way serves as the ORAR, the integrated ORAR shall not be required to comply with 2.5.

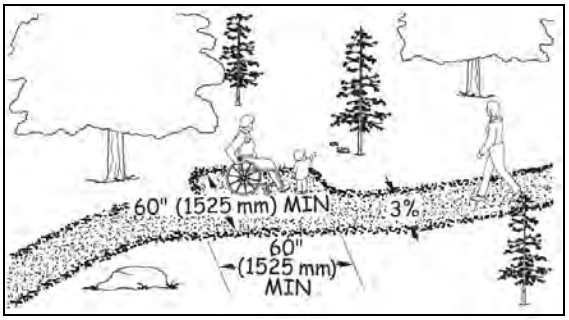
2.5.2 Length. The resting interval length shall be 60 inches (1525 mm) long minimum.

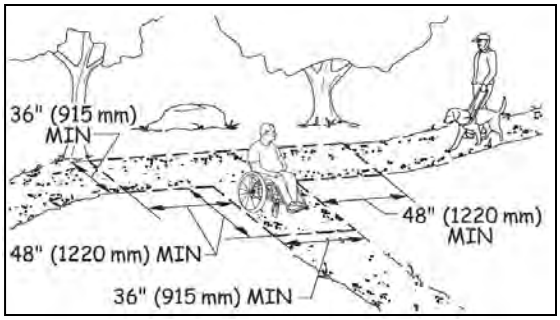
2.5.3 Width. Where resting intervals are provided within an outdoor recreation access route, resting intervals shall be at least as wide as the widest segment of the outdoor recreation access route leading to the resting interval. Where resting intervals are provided adjacent to an outdoor recreation access route, the resting interval clear width shall be 36 inches (915 mm) minimum.

2.5.4 Slope. Resting intervals shall not be steeper than 1:33 (3 percent) in any direction. Where the surface is paved or is elevated above the natural ground, the slope shall not be steeper than 1:48 (2 percent) in any direction.

2.5.5 Turning Space. Where resting intervals are provided adjacent to an outdoor recreation access route, a turning space complying with ABAAS section 304.3.2 shall be provided. Vertical alignment between the outdoor recreation access route, turning space, and resting interval shall be nominally level. The access route, turning space and resting interval may overlap.

2.6 Passing Spaces.
ORARs with a clear width less than 60 inches (1525 mm) shall provide passing spaces complying with 2.6 at intervals of 200 feet (61 m) maximum. Passing spaces and resting intervals shall be permitted to overlap.





Exception. Where a vehicular way serves as the ORAR, the integrated ORAR shall not be required to comply with 2.6.

2.6.1 Size. The passing space shall be either:

2.6.1.1. A space 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum; or

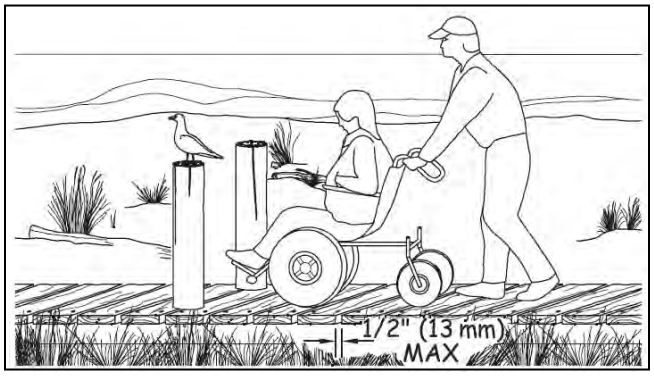
2.6.1.2. The intersection of two outdoor recreation access routes providing a T-shaped space complying with ABAAS section 304.3.2 where the base and the arms of the T-shaped space extend 48 inches (1220 mm) minimum beyond the intersection. Vertical alignment at the intersection of the outdoor recreation access routes that form the T-shaped space shall be nominally level.

2.7 Tread Obstacles.

Where tread obstacles exist on the surface of an ORAR, they shall not exceed 1 inch (25 mm) in height. Where the surface is paved or is elevated above the natural ground, obstacles shall not exceed 1/2 inch (13 mm) in height measured vertically to the highest point.

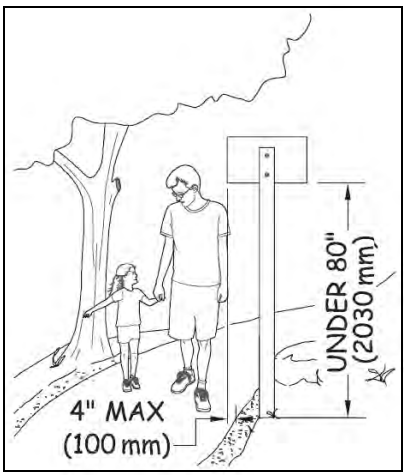
2.8 Openings.

Openings in the surface of ORARs shall be small enough to prevent passage of a 1/2 inch (13 mm) diameter sphere. Where possible, elongated openings should be placed perpendicular, or as close to perpendicular as possible, to the dominant direction of travel.



2.9 Protruding Objects.

Constructed features, including signs, water sources, and so forth shall not extend into the space above an ORAR more than 4 inches (100 mm) if they are between 27 inches (685 mm) and 80 inches (2030 mm) above the surface of the ORAR.



2.9.1 Natural Elements. Accessibility guidelines for protruding objects do not apply to natural elements such as tree branches and rock formations. However, safety regulations or Forest Service construction and maintenance standards may define clear space and limit the allowable extension of natural protruding objects over the ORAR surface.

2.10 Gates and Barriers.

Where gates or barriers are constructed to control access to an ORAR, gates and barriers shall comply with 2.10.

2.10.1 Clear Width. Gate openings and openings in barriers for pedestrian passage shall provide a clear width of 36 inches (915 mm), complying with ODAAG, section 1017.3 Clear Tread Width.

2.10.2 Gate Hardware. Gate hardware shall comply with operable controls requirements in ABAAS section 309.4 and 404.2.7.

3.0 RECREATION SITES

3.1 Vehicle Parking

3.1.1 Vehicle Parking. All vehicle parking facilities shall comply with the applicable provisions of section 3.1.

3.1.1.1 Vehicle Parking Lots. Vehicle parking lots with more than 2 parking spaces that are not associated with an individual camping or picnic unit shall comply with ABAAS sections 208 and 502.

3.1.1.2 Camping and Picnic Vehicle Parking Spurs. Where a parking spur is adjacent or attached to a picnic unit or a camping unit living area, it shall comply with section 3.3 as well as 3.1.

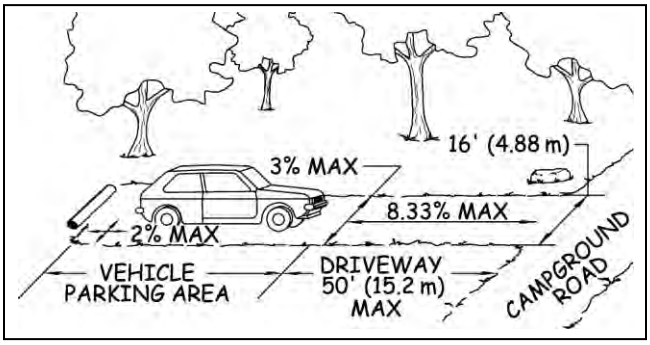
3.1.1.3 Recreational Vehicle Parking Areas. Where recreational vehicle (RV) parking areas are provided at a camping facility or dump station, parking areas shall be provided for accessible RVs and trailers in accordance with Table 3.1.1.

Table 3.1.1. Minimum Number of Accessible RV Parking Areas

Number of Camping Units	Minimum Number of Accessible RV Parking Areas in units designated for Recreational Vehicles and Trailers
1	1
2 to 25	2
26 to 50	3
51 to 75	4
76 to 100	5
101 to 150	7
151 to 200	8
201 and over	8, plus 2 percent of the number over 200

3.1.2 Surface of Vehicle Parking Spurs. The surface of vehicle parking spurs shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

3.1.3 Slope of Vehicle Parking Spurs. The slope of parking spurs shall comply with applicable provisions of section 3.1.3.



3.1.3.1 Slope of Vehicle Parking Areas. The slope of vehicle parking areas shall not exceed 1:48 (2 percent) in any direction.

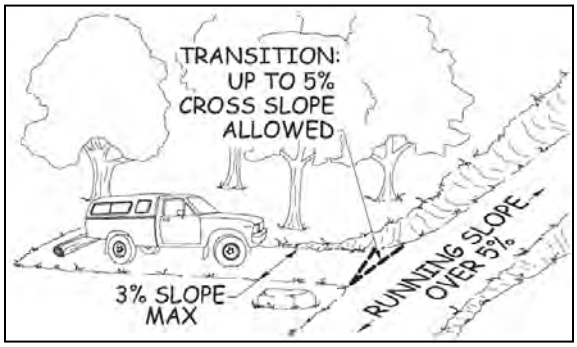
> **Exception.** When the surface is not paved, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

3.1.3.2 Running Slope (Grade) of Driveways. The running slope of driveways shall be no more than 1:12 (8.33 percent) for no more than 50 feet (15 m).

> **Exception 1.** A running slope of up to 1:10 (10 percent) for driveways is permitted for up to 30 feet (9 m).

Exception 2. For alteration only, not new construction, if exception 1 of section 3.1.3.2 cannot be met because one or more conditions for exception in section 1.1 exist, a running slope of no more than 1:10 (10 percent) is permitted for no more than 50 feet (15 m).

3.1.3.3 Cross Slope of Driveways. The cross slope of driveways shall not exceed 1:33 (3 percent).



Exception. The cross slope of driveways may be no more than 1:20 (5 percent) where needed to ensure proper drainage or to transition from the running slope of a campground road.

3.1.4 Width of Vehicle Parking Areas. The width of vehicle parking areas shall comply with applicable provisions of section 3.1.4

3.1.4.1 Width of Non-RV Campsite Vehicle Parking Areas. The width of vehicle parking areas shall be at least 16 feet (4880 mm).

Exception 1. Where the width of a vehicle parking area cannot be at least 16 feet (3960 mm) because one or more conditions for exception in section 1.1 exist, the width of the vehicle parking area may be reduced to no less than 13 feet 3960 mm) . Where only one or two vehicle parking areas are provided, no exception is permitted. Where three to ten vehicle parking areas are provided, no exception is permitted for two of the vehicle parking areas. Where over ten vehicle parking areas are provided, no exception is permitted for 20 percent of the vehicle parking areas.

Exception 2. Where a double camping unit is provided and two parking areas are provided to accommodate two vehicles side-by-side in an accessible parking spur, the total width of the vehicle parking area may be reduced from 32 feet (9760 mm) to 24 feet (7320 mm).

3.1.4.2 Width of RV Campsite and Dump Station Vehicle Parking Areas. Where RV camping units or dump stations are provided, vehicle parking areas for recreational vehicles and trailers that are required to be accessible in accordance with table 3.1.1 shall be at least 20 feet (6100 mm) wide. The 20-foot width requirement applies only to the RV parking area and does not apply to the driveway of a parking spur or dump station.

Exception. Where a double camping unit or dump station is provided to accommodate two RVs or trailers side-by-side in a vehicle parking, the total width of the vehicle parking area may be reduced from 40 feet (12 m) to 36 feet (11 m).

3.2 Camping Units

3.2.1 General. Where camping units are provided in a campground, section 4.0 and 5.0 shall apply to each camping unit. Camp living areas shall comply with sections 3.2. Vehicle parking spaces shall comply with section 3.1.

3.2.2 ORARs in Camping Units. Connections shall be provided between site furnishings and constructed features in camping units as well as between accessible camping units, parking areas, and accessible common use features in compliance with section 2.0

3.2.3 Surface. The ground surface in all camp living areas shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

3.2.4 Slope. The ground surface in all camp living areas shall have a slope of no more than 1:48 (2 percent) in any direction.

Exception. When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

3.2.5 Camp Living Areas. All constructed features provided in a camp living area shall comply with applicable provisions in sections 4.0 and 5.0.

3.2.5.1 Walk-In Camping. Where walk-in camping is provided, an ORAR connecting the camp living area to the parking area shall be provided in accordance with section 2.0.

3.2.6 Identification of Accessible Camping Units. Accessible camping units shall be identified at an entrance kiosk, on a bulletin board, or on a sign at the registration area of a campground. They shall not be identified using individual signs adjacent to the camp units.

Exception 1. Identification of accessible camping units is not required at campgrounds where all camping units are accessible.

Exception 2. Identification of accessible camping units is not required where camping units are assigned upon arrival or through a reservation system.

3.3 Picnic Units

3.3.1 General. Site furnishings and constructed features provided in picnic units shall comply with the applicable provisions of sections 4.0 and 5.0 of the FSORAG.

3.3.2 ORARs in Picnic Units. Connections shall be provided between site furnishings and constructed features in picnic units as well as between accessible picnic units, parking areas, and accessible common use features in compliance with section 2.0.

3.3.3 Identification of Accessible Picnic Units. Where not all picnic units are accessible, the picnic units that are accessible shall not be identified by signs at the individual units. Information on the location of accessible picnic units shall be provided on websites, in brochures, and at bulletin boards or information kiosks if available at the picnic facility.

3.4 Viewing Areas

3.4.1 General. Where viewing areas are provided, each shall comply with section 3.4.

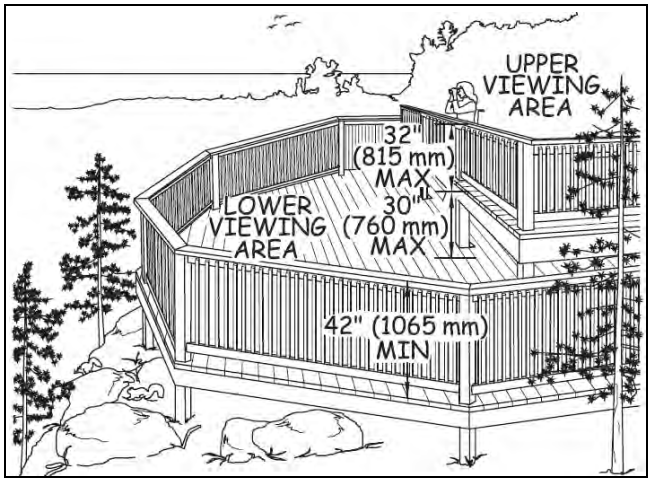
> **Exception 1.** Where multiple viewing areas at overlooks are provided, at least one of each viewing opportunity for distinct points of interest shall be accessible.
>
> **Exception 2.** When a new viewing area is constructed, or an existing viewing area is altered or reconstructed, if a condition for exception in section 1.1 prohibits full compliance with a specific requirement in 3.4, the viewing area shall comply with the specific requirement to the extent practicable.

3.4.2 ORARs in Viewing Areas. Connections shall be provided between site furnishings and constructed features in viewing areas as well as between accessible viewing areas, parking areas, and accessible common use features in compliance with section 2.0.

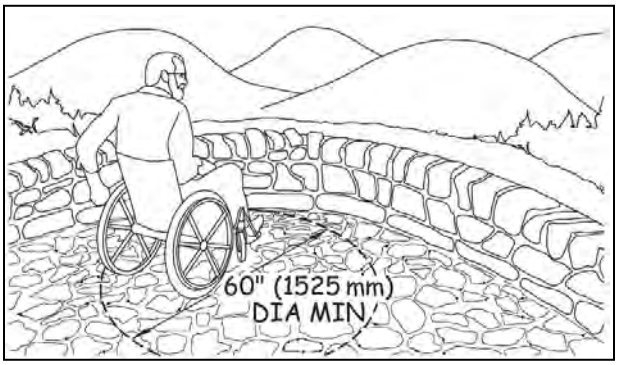
> **Exception.** Where a condition for an exception in section 1.1 prohibits full compliance with a specific technical requirement on a portion of an ORAR for a viewing area, that portion of the ORAR shall comply with the specific requirement to the extent practicable.

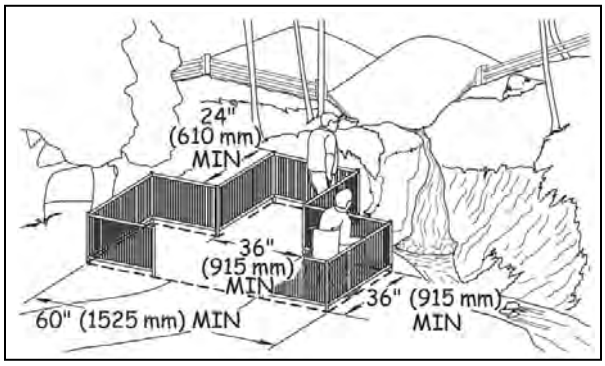
3.4.3 Unrestricted Viewing Opportunities. Each viewing area that is required to be accessible by section 3.4.1 shall provide at least one unrestricted viewing opportunity that accommodates eye levels between 32 inches (815 mm) minimum and 51 inches (1295 mm) maximum above the ground or floor.

Where there is a drop-off of more than 30 inches (762 mm) a guard railing or barrier that complies with the height and opening requirements of the International Building Code sections 1013.2 and 1013.3 (2006 edition) shall be provided.



3.4.4 Clear Ground Space and Turning Space. Each viewing area that is required to be accessible by section 3.4.1 shall have a clear ground or floor space 36 inches (915 mm) minimum by 48 inches (1220 mm) minimum positioned for either forward or parallel approach to the viewing location and at least one turning space that complies with section 304.3 of the ABAAS.





3.4.5 Grade. The clear ground space and turning space required by section 3.4.3 shall have a slope of no more than 1:48 (2 percent) in any direction.

> **Exception.** When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

3.4.6 Surface. The surface of each viewing area shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

3.4.7 Openings. Openings in the clear ground space and turning space surface shall not allow passage of a sphere more than 1/2 inch (13 mm) diameter. Where possible, elongated openings should be placed perpendicular, or as close to perpendicular as possible, to the dominant direction of travel.

3.4.8 Viewing Areas Accessed by Vehicular Ways. Where a viewing area is accessed by a vehicular way and parking spaces are provided adjacent to the viewing area, the accessible parking spaces shall be connected to the viewing areas by an outdoor recreation access route complying with 2.0. The outdoor recreation access route shall connect the distinct viewing locations, accessible outdoor constructed elements, and other accessible elements, accessible spaces, and accessible facilities in the viewing area.

3.5 Use of the International Symbol of Accessibility (ISA) and Other Signs

3.5.1 General. Per section F216 of the ABAAS, the ISA  shall be posted at the following six locations:

- Accessible parking spaces in parking lots where there are 5 or more designated parking spaces, including accessible parking spaces.
    - VAN accessible parking spaces in lots must be signed as such.
    - RV accessible parking spaces in lots must be signed as such.
- Accessible loading zones.
- Accessible restrooms and bathing facilities.
- If the main entrance to a building is not accessible, in the vicinity of the closest accessible entrance.
- Accessible means of egress out of a building.
- Accessible areas of refuge inside multi-story buildings.

In addition, the ISA may only be posted at the entrance to recreation areas with a *Recreation Site Development Scale* level of 3 or higher, but only where **ALL** constructed features within that recreation area comply with applicable provisions of the ABAAS and FSORAG.

Use of the ISA for identification of accessible camping units shall conform to 3.2.6. Use of the ISA for identification of accessible picnic units shall conform to 3.3.3.

3.5.2 Color of the ISA. Per section 703.7 of the ABAAS, the ISA shall be posted in high-contrast colors. The ISA is not required to be blue and white when posted on Federal lands.

3.5.2.1 Enforceable Accessible Parking Spaces. To be enforceable at accessible parking spaces, the ISA must comply with the Manual on Uniform Traffic Control Devices (MUTCD) section 2B.35, which requires the ISA to be displayed in blue and white.

3.5.2.2 Accessible Space Pavement Markings. Where parking spaces are paved, pavement markings designating accessible parking spaces must be blue, per the MUTCD section 3A.05.

3.5.3 Signs in General. If materials need to be obtained from or manipulated on a sign or kiosk, the sign or kiosk shall be designed to meet the reach ranges in section 308 of the ABAAS.

4.0 CONSTRUCTED FEATURES IN RECREATION SITES

4.1 Picnic Tables

4.1.1 General

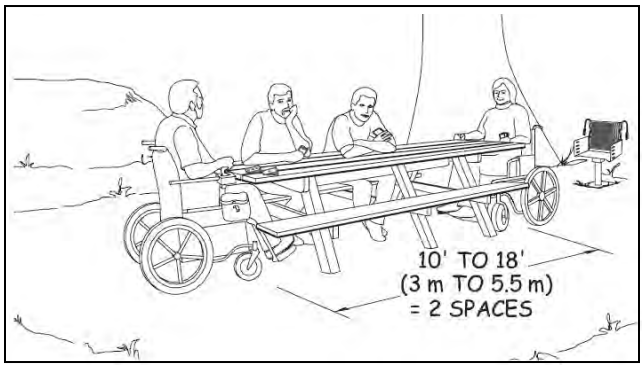
Where picnic tables are provided, each shall comply with section 4.1.

> **Exception.** In alterations, where a condition for exception in section 1.1 prohibits full compliance with a specific requirement for clear floor or ground space surface slope, size, or location, the clear floor or ground space shall comply with requirements to the extent practicable.

4.1.2 Number of Wheelchair Seating Spaces. Each picnic table shall have at least one wheelchair seating space. Picnic tables shall have at least one wheelchair seating space for each 24 linear feet (7 linear m) of usable table surface perimeter as shown in table 4.1.2. Each wheelchair seating space shall comply with section 4.1.3 through 4.1.6.

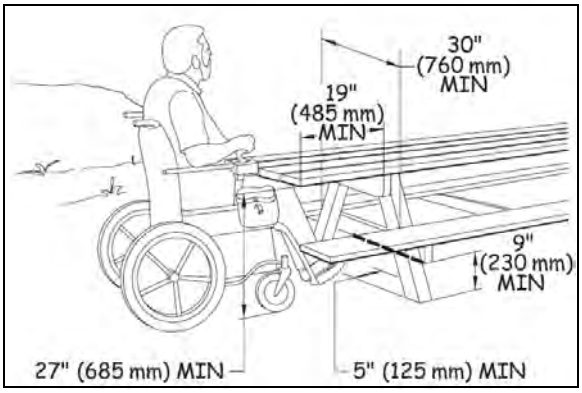
Table 4.1.2. Number of Wheelchair Seating Spaces

Table Top Perimeter	Typical Table Length (for 2 ft. 6 in. table width)	Number of Wheelchair Seating Spaces Required
Up to 24 linear ft. (7 linear meters)	Up to a 9-ft. table (3 meters)	1 spaces
24 to 48 linear ft. (7 to 15 meters)	10- to 20-ft. table (3.1 to 6 meters)	2 spaces
48 to 72 linear ft. (15 to 22 meters)	Typically custom-built table	3 spaces
72 to 96 linear ft. (22 to 29 meters)	Typically custom-built table	4 spaces
96 to 120 linear ft. (29 to 37 meters)	Typically custom-built table	5 spaces

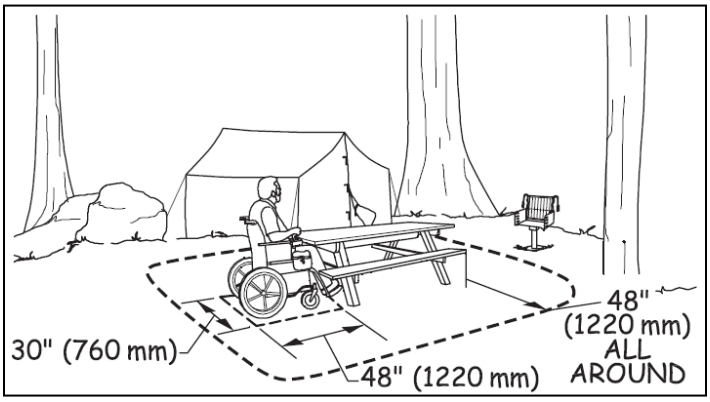


4.1.3 Wheelchair Seating Space. Knee space for wheelchair seating shall be at least 27 inches (685 mm) high, 30 inches (760 mm) wide, and 19 inches (485 mm) deep. Toe clearance of at least 9 inches (230 mm) in height shall extend at least an additional 5 inches (125 mm) from the knee clearance. Clear floor or ground space that is at least 30 inches by

48 inches shall be provided at each seating space that is required to be accessible and positioned for a forward approach to the table.



4.1.4 Clear Floor or Ground Space. At least 48 inches (1220 mm) of clear floor or ground space shall surround the usable sides of a picnic table, measured from the back edge of the benches. This space may overlap the ORAR.



Exception. The clear floor or ground space for a picnic table may be reduced to no less than 36 inches (915 mm) where one or more conditions for an exception in section 1.1 exist.

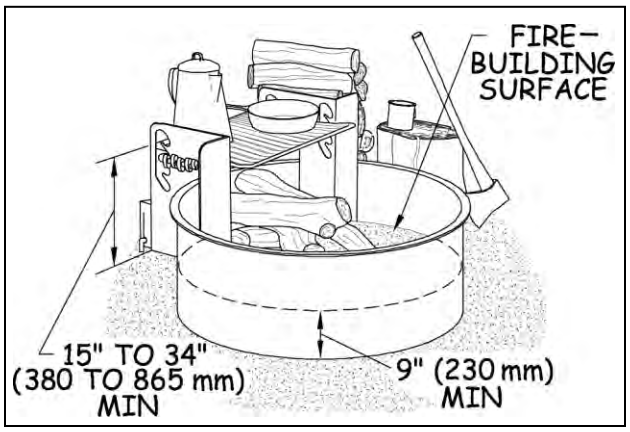
4.1.5 Slope. The slope of the surface of the clear floor or ground space around a picnic table shall not exceed 1:48 (2 percent) in any direction.

Exception. When the surface is not paved or is not elevated above the natural ground, grades not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

4.1.6 Surface. The surface of the clear floor or ground space shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

4.2 Fire Rings, Grills, Fireplaces, and Wood Stoves

4.2.1 General. Where fire rings, grills, fireplaces, or woodstoves are provided, each shall comply with section 4.2.



Exception. In alterations, where a condition for exception in section 1.1 prohibits full compliance with a specific requirement for clear floor or ground space surface, slope, size, or location, the clear floor or ground space shall comply with requirements to the extent practicable.

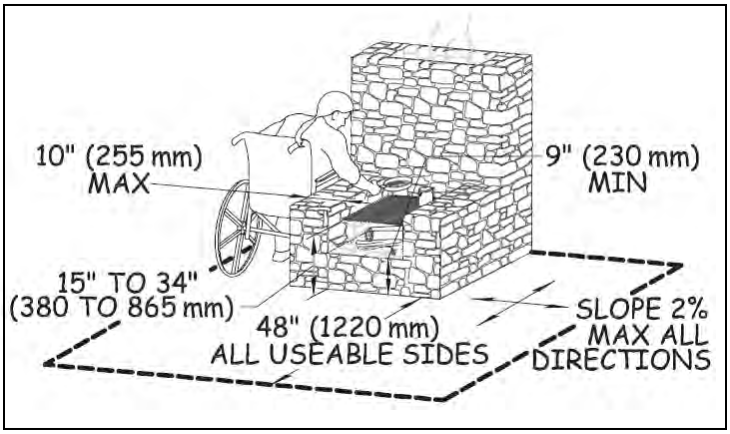
4.2.2 Cooking Surface Height. The cooking surface shall be at least 15 inches (380 mm) and no more than 34 inches (865 mm) above the floor or ground surface.

4.2.3 Operable Parts. Operable parts shall comply with the operable parts requirements in ABAAS sections 308 and 309.4.

Exception: Fire rings, grills, fireplaces, and wood stoves shall not be required to comply with ABAAS section 309.4 until models that comply are readily available from more than one source.

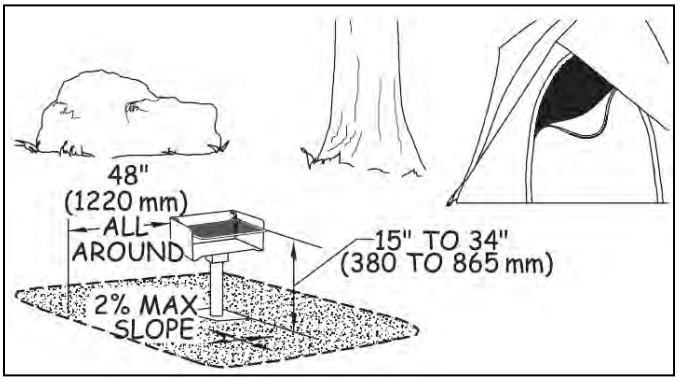
4.2.4 Height of Fire-Building Surface. The fire-building surface within a fire ring shall be at least 9 inches (230 mm) above the floor or ground.

4.2.5 Raised Edge. Where fire rings, grills, or fireplaces are constructed with raised edges or walls, the depth of the raised edge or wall shall be 10 inches (255 mm) maximum.



4.2.6 Clear Floor or Ground Space. At least 48 inches (1220 mm) by 48 inches (1220 mm) of clear floor or ground space shall be provided on all usable sides of fire rings, grills,

fireplaces or woodstoves. This space must be adjacent to the ORAR but may not overlap the ORAR, due to safety considerations.



Exception. The clear floor or ground space at fire rings, grills, fireplaces, or woodstoves may be reduced to no less than 36 inches (915 mm), where a condition for an exception in section 1.1 exists.

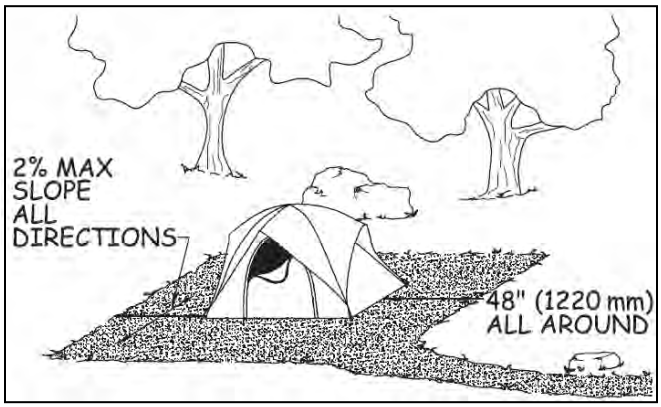
4.2.7 Surface. The surface of the clear floor or ground space shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

4.2.8 Slope. The slope of the clear floor or ground space required by section 4.2.6 shall not exceed 1:48 (2 percent) in any direction.

Exception. When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

4.3 Tent Pads and Tent Platforms

4.3.1 General. Tent platforms are not required. Where provided, tent pads and tent platforms at single camping units shall comply with section 4.3 and shall be connected to an ORAR complying with section 2.0. Where camping units contain more than one tent pad or tent platform, at least 20 percent, but not less than two, of the tent pads or tent platforms shall comply with section 4.3.



4.3.2 Clear Floor or Ground Space. Tent pads and tent platforms shall have clear floor or ground space surrounding the tent that is at least 48 inches (1220 mm) wide. This space shall not overlap the ORAR.

> **Exception.** Where a condition for exception in section 1.1 prohibits full compliance, the clear floor or ground space shall comply with 4.3.2 to the extent practicable.

4.3.3 Slope. The slope of tent pads and tent platforms shall not exceed 1:48 (2 percent) in any direction.

> **Exception.** When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

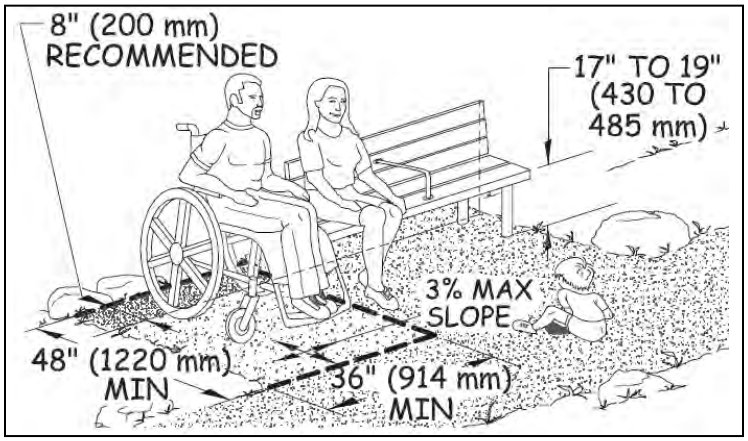
4.3.4 Tent Pad or Platform Surface. Tent pads and platforms shall have a surface that is firm and stable and is designed to allow use of tent stakes and other tent securing devices.

> **Exception.** Where a condition for exception in section 1.1 prohibits full compliance, the surface shall comply with 4.3.4 to the extent practicable.

4.3.5 Transfer Height. Tent platform surfaces that are not the same elevation as the ORAR shall be between 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the floor or ground surface adjacent to the ORAR to facilitate transfer from a wheelchair to the tent platform.

4.4 Benches

4.4.1 General. Where benches are provided, each shall comply with section 4.4. At least 20 percent of the benches provided at a recreation site shall be connected to an ORAR complying with section 2.0.



> **Exception 1.** Section 4.3.1 does not apply to built-in benches provided in assembly areas such as amphitheaters. These benches are covered by sections F221.2.1.1, F221.2.2, and 903 of the ABAAS.

Exception 2. In alterations, where a condition for exception in section 1.1 prohibits full compliance with a specific requirement for clear floor or ground space surface, slope, size, or location, the clear floor or ground space shall comply with requirements to the extent practicable.

4.4.2 Height. The front edge of the seat of a bench shall be at least 17 inches (430 mm) and no more than 19 inches (485 mm) above the floor or ground.

4.4.3 Backrest and Armrest. When more than one bench is provided in the same area, at least 50 percent of the benches shall have a backrest running the full length of the bench. In addition, one armrest shall be provided at one end or in the middle of at least 50 percent of the benches with backrests. The structural strength of backs, armrests, and mounting devices shall comply with section 903.6 of the ABAAS, which states: "Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the seat, fastener, mounting device or supporting structure."

4.4.4 Clear Floor or Ground Space.
A clear floor or ground space of 36 inches (915 mm) by 48 inches (1220 mm) shall be located at an end the bench with one side of the space adjoining an accessible route, outdoor recreation access route, trail, or beach access route. The long dimension of the clear space shall be roughly perpendicular to the length of the bench.

Locate the clear space to provide shoulder alignment between a person sitting on the bench and a person seated in a wheelchair occupying the clear space. Shoulder alignment generally can be achieved by positioning the back of the bench so it is 8 inches (200 millimeters) closer to the outdoor recreation access route, trail, or beach access route than the back of the required clear floor or ground space adjacent to the end of the bench.

The clear floor or ground space shall not overlap the outdoor recreation access route or trail.

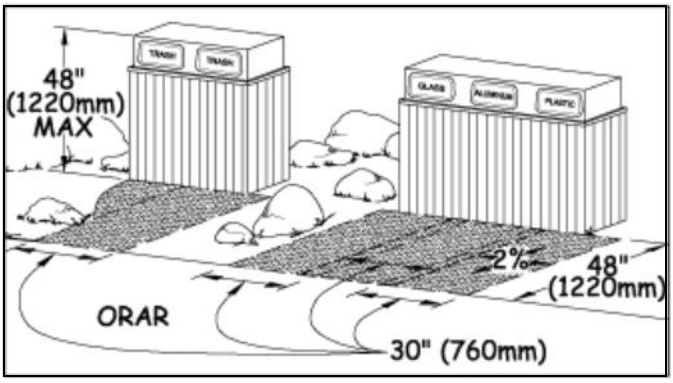
4.4.5 Slope. The slope of the clear floor or ground space for benches shall not exceed 1:48 (2 percent) in any direction.

Exception. When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

4.4.6 Surface. The surface of the clear floor or ground space for benches shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

4.5 Trash, Recycling, and Other Essential Containers

4.5.1 General. Where trash, recycling, and other essential containers are provided, each shall comply with section 4.5.



Exception 1. Fifty percent of the bins in multi-bin containers are exempt from section 4.5.1.

Exception 2. In alterations, where a condition for exception in section 1.1 prohibits full compliance with a specific requirement for clear floor or ground space surface, slope, size, or location, the clear floor or ground space shall comply with requirements to the extent practicable.

4.5.2 Clear Floor or Ground Space. A clear floor or ground space shall be provided for each trash, recycling, and other essential container. The space shall be positioned for either forward or side approach to the container opening and be adjacent to or overlap the ORAR.

4.5.2.1 Forward Approach. The clear floor or ground space for a forward approach shall be 36 inches (915 mm) by 48 inches (1220 mm).

4.5.2.2 Side Approach. The clear floor or ground space for a side approach shall be 30 inches (760 mm) by 60 inches (1525 mm).

4.5.3 Slope. The slope of the clear floor or ground space for trash, recycling, and other essential containers shall not exceed 1:48 (2 percent) in any direction.

Exception. When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

4.5.4 Surface. The surface of the clear floor or ground space for trash, recycling, and other essential containers shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

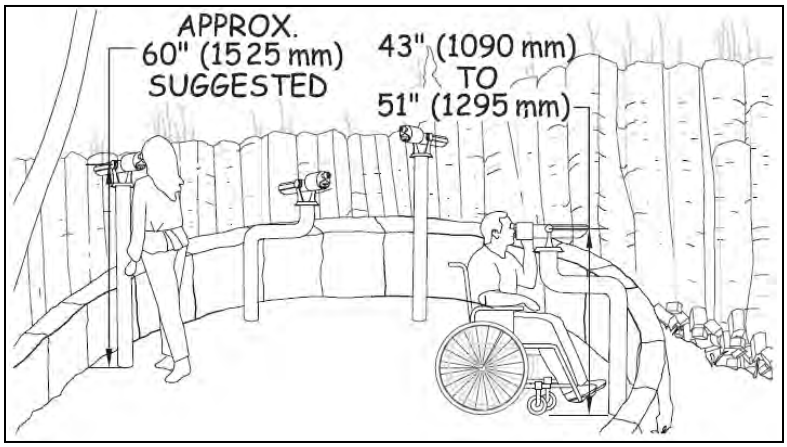
4.5.5 Controls and Operating Mechanisms. Controls and operating mechanisms shall comply with the operable parts requirements in sections 308 and 309.4 of the ABAAS.

Exception. Trash and recycling containers with hinged lids and controls designed to keep out large animals shall not be required to comply with the operable parts requirements in ABAAS section 309.4 until models that comply are readily available from more than one source.

4.5.6 Openings. Openings in the clear floor or ground space surface shall not allow passage of a sphere more than 1/2 inch (13 mm) diameter. Where possible, elongated openings should be placed perpendicular, or as close to perpendicular as possible, to the dominant direction of travel.

4.6 Telescopes and Periscopes

4.6.1 General. Where telescopes or periscopes are provided, no fewer than two telescopes or periscopes shall be provided at each distinct viewing location in a viewing area. At least one telescope or periscope for each viewing location shall comply with 4.6. The other telescopes shall be usable from a standing position. Telescopes or periscopes at different heights can be mounted separately or on a single pedestal.

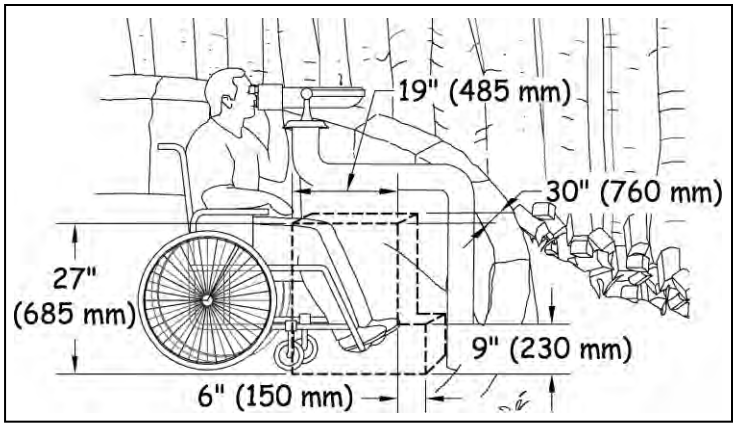


Exception. In alterations, where a condition for exception in section 1.1 prohibits full compliance with a specific requirement for clear floor or ground space surface, slope, size, or location, the clear floor or ground space shall comply with requirements to the extent practicable.

4.6.2 Operable Parts. Controls and operating mechanisms for telescopes and periscopes that are useable from a seated position shall comply with the operable parts requirements in sections 308 and 309.4 of the ABAAS.

4.6.3 Eyepiece. The eyepiece for the telescope or periscope that is usable from a seated position for viewing each point of interest shall be positioned 43 inches (1090 mm) minimum and 51 inches (1295 mm) maximum above the floor or ground surface.

4.6.4 Clear Floor or Ground Space. The clear floor or ground space for telescopes and periscopes shall be at least 36 inches (915 mm) by 48 inches (1220 mm) positioned for forward approach to the telescope or periscope, and be located adjacent to an ORAR. Knee and toe clearance complying with ABAAS section 306 shall be provided under the telescope or periscope. Clear floor or ground space shall be positioned so that the eyepiece of the telescope or periscope is centered on the space.



4.6.5 Slope. The slope of the clear floor or ground space required by section 4.6.4 shall not exceed 1:48 (2 percent) in any direction.

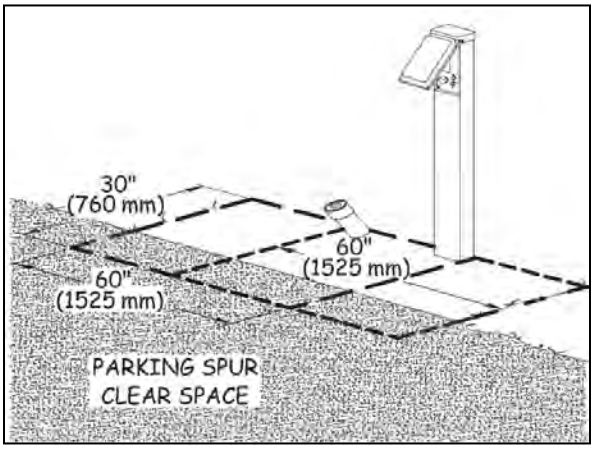
> **Exception.** When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

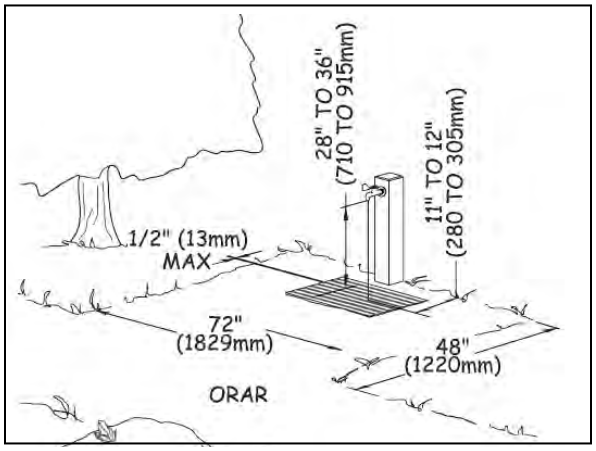
4.6.6 Surface. The surface of the clear floor or ground space required by section 4.6.4 shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

4.6.7 Openings. Openings in the clear floor or ground space surface shall not allow passage of a sphere more than 1/2 inch (13 mm) diameter. Where possible, elongated openings should be placed perpendicular, or as close to perpendicular as possible, to the dominant direction of travel.

4.7 Utilities including Water Hydrants at Recreation Sites

4.7.1 General. Electric, water, sewage, and other types of utilities shall comply with section 4.7. All utilities required to be accessible shall be connected to an ORAR complying with section 2.0.





Exception. In alterations, where a condition for exception in section 1.1 prohibits full compliance with a specific requirement for clear floor or ground space surface, slope, size, or location, the clear floor or ground space shall comply with requirements to the extent practicable.

4.7.2 Controls and Operating Mechanisms. Controls and operating mechanisms shall comply with the operable parts requirements in sections 308 and 309.4 of the ABAAS.

Exception 1. Water hydrants and water utility hookups shall not be required to comply with the operable parts requirements in ABAAS section 309.4 until models that comply are readily available from more than one source.

Exception 2. Sewage hatches shall not be required to comply with the operable parts requirements in ABAAS sections 308 and 309.4.

4.7.3 Slope. The slope of the clear floor or ground spaces required by section 4.0 shall not exceed 1:48 (2 percent) in any direction.

Exception. When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

4.7.4 Surface. The surface of the clear floor or ground spaces required by section 4.0 shall be firm and stable. The type of surface should be appropriate to the setting and level of development.

4.7.5 Openings. Openings in surface of the clear floor or ground spaces required by section 2.0 shall not allow passage of a sphere more than 1/2 inch (13 mm) in diameter. Where possible, elongated openings should be placed perpendicular, or as close to perpendicular as possible, to the dominant direction of travel.

4.7.6 Water Hydrant Clear Floor or Ground Space. Clear floor or ground space around a water hydrant shall be 48 inches (1220 mm) by 72 inches (1830 mm) with the long side of the space adjoining an outdoor recreation access route, trail, beach access route, or another clear ground space. The clear space at the water hydrant shall not overlap the outdoor recreation access route, trail or beach access route leading to or passing that water hydrant.

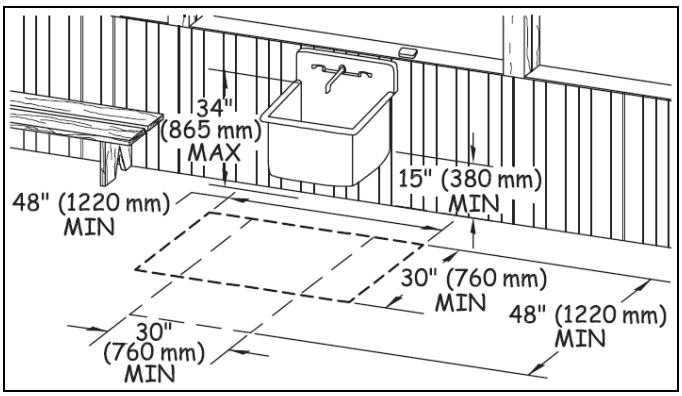
4.7.7 Water Spouts. Water spouts shall be located in the space so that the water spout is 11 inches (280 mm) minimum and 12 inches (305 mm) maximum from the rear center of the long side of the clear floor or ground space. Water spouts must be 28 inches (710 mm) minimum and 36 inches (915 mm) maximum above the ground or floor.

4.7.8 Utility and Dump Station Hookup Clear Floor or Ground Space. The clear floor or ground space around utility and dump station hookups shall be at least 30 inches (760 mm) by 60 inches (1525 mm). The clear space shall be located with the long side of the space adjoining or overlapping an accessible parking space or accessible pull-up space for recreational vehicles, or an ORAR connecting the accessible vehicle pull-up space to the hookups. Hookups shall be located at the rear center of the space. Clear spaces of adjacent

utility hookups may overlap. Bollards or other barriers shall not obstruct the clear floor or ground space in front of the hook-ups.

4.7.9 Utility Sinks.

4.7.9.1 General. Where utility sinks are provided in a recreation facility that also contains a cook top or conventional range, at least 5 percent, but not less than one in each accessible space, shall comply with section 4.7.9 and shall be connected to an ORAR complying with section 2.0.



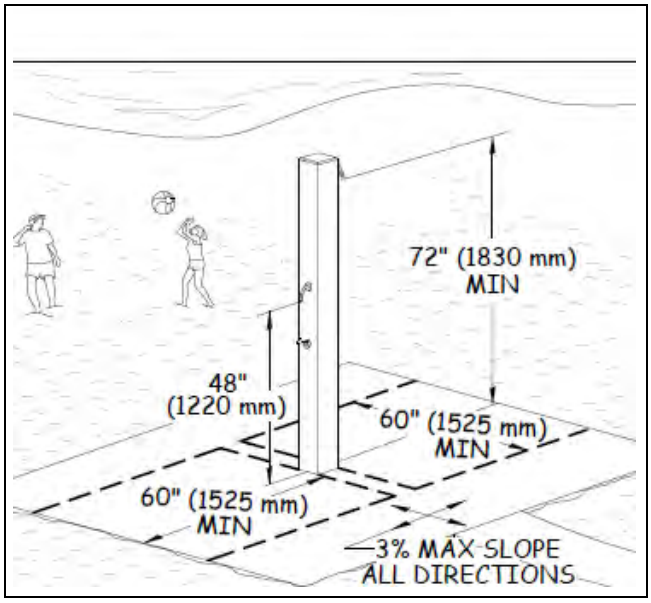
4.7.9.2 Clear Floor or Ground Space. Clear floor or ground space 48 inches (1220 mm) by 30 inches (760 mm) oriented for a forward or parallel approach shall be provided for utility sinks required to meet 4.7.9. This space shall not overlap the ORAR.

4.7.9.3 Height. The counter or rim of the sink shall be no more than 34 inches (865 mm) above the floor or ground. Water spouts must be 28 inches (710 mm) minimum and 36 inches (915 mm) maximum above the ground or floor.

4.7.9.4 Depth. The bottom of the bowl shall be at least 15 inches (380 mm) above the floor or ground.

4.8 Outdoor Rinsing Showers.

4.8.1 General. Outdoor rinsing showers shall provide a hand-held shower spray unit complying with ABAAS section 608.6.



Exception: In facilities where vandalism is a consideration, two fixed shower heads may be provided instead of the hand-held shower spray. One fixed showerhead shall be 48 inches (1220 mm) above the floor or ground surface, and one fixed shower head shall be 72 inches (1830 mm) minimum above the floor or ground surface.

4.8.2 Clear Floor or Ground Space. The clear floor or ground space around outdoor rinsing showers shall be 60 inches (1525 mm) by 60 inches (1525 mm). The space shall be centered on the showerhead and located so that the showerhead is at the rear of the space.

5.0 BUILDINGS IN RECREATION SITES

5.1 Camp Shelters

5.1.1. General. Camp shelters at single camping units shall comply with 5.1. Where camping units contain more than one camp shelter, at least 20 percent, but not less than two, of the camp shelters shall comply with section 5.1. Camp shelters located on trails shall be connected to other constructed features in the unit by a trail complying with the FSTAG. Camp shelters located in a campground, not on a trail, shall be connected to other constructed features by an ORAR complying with section 2.0.

5.1.2 Level or Sloped Entry. Camp shelters providing roll-in access shall have a level or sloped entry that complies with the FSORAG Outdoor Recreation Access Route technical provisions if the camp shelter is in a campground with a development level of 3 or higher. If the camp shelter is accessed from a trail, the sloped entry must comply with the FSTAG Trail provisions.

5.1.3 Slope. The slope of the surface of the clear floor or ground space inside the camp shelter shall not be steeper than 1:48 (2 percent) in all directions.

5.1.4 Turning Space. Where the camp shelter floor is not elevated above the trail or ORAR, a turning space complying with ABAAS section 304.3 shall be provided.

5.1.5 Floor Height. Where the floor at the entrance to the camp shelter is elevated above the ground surface, the floor shall be 17 (430 mm) high minimum to19 inches (485 mm) high maximum measured from the clear ground space to the floor surface inside the camp shelter.

5.1.6 Clear Floor or Ground Space. A clear floor or ground space at least 36 inches (915 mm) by 48 inches (1220 mm) shall be provided parallel to the entrance to the camp shelter. One full unobstructed side of the clear ground space shall adjoin or overlap the trail or ORAR, as applicable, or another clear ground space.

5.1.7 Surface. The surface of the clear ground space shall be firm and stable.

5.1.8 Slope. The slope of the surface of the clear ground space shall not be steeper than 1:48 (2 percent) in any direction.

> **Exception:** When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

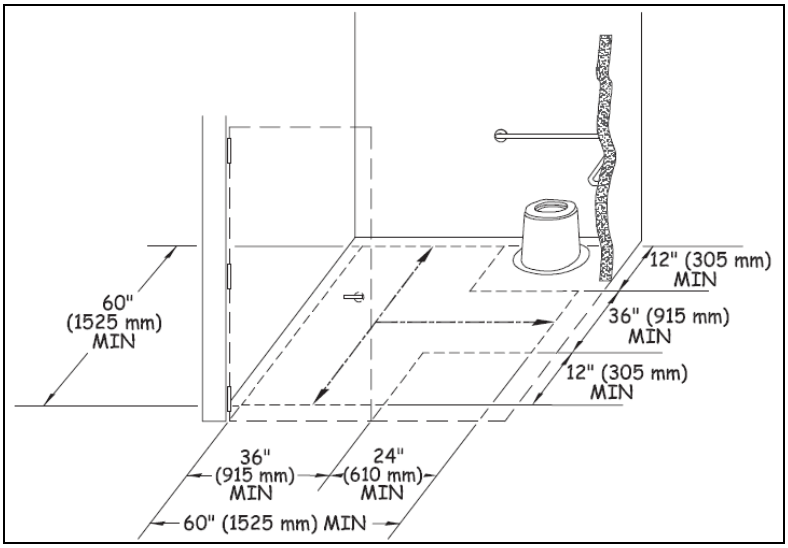
5.1.9 Doors. Where provided, doors shall comply with ABAAS section 404. The door shall not swing into or otherwise obstruct the clear floor or ground space or the turning space required by 5.1.4

5.2 Toilet Buildings

5.2.1 General. All toilet buildings with one riser at recreation sites with a FS *Recreation Site Development Scale* of 3 or higher shall comply with sections 603, 604.4, 604.5, 604.6, and 604.7 of the ABAAS. All toilet buildings at recreation sites with a FS *Recreation Site Development Scale* level of 3 or higher with multiple risers shall comply with section 604 of the ABAAS, and shall also comply with other applicable sections of the ABAAS if other amenities are provided within the building.

5.3 Pit Toilets

5.3.1 General. Pit toilets may only be provided in FS recreation sites with a *Recreation Site Development Scale* level of 2 or less or at remote cabin locations. All pit toilets shall comply with section 5.3 and be connected to an ORAR complying with section 2.0. Where pit toilets are constructed in sites that are not accessed by motor vehicles, the pit toilet and all constructed features in the site shall be connected by trail segments complying with the FSTAG.



5.3.2 Turning Space and Clear Floor or Ground Space. Turning space and clear floor or ground space complying with 5.3 shall be provided at pit toilets.

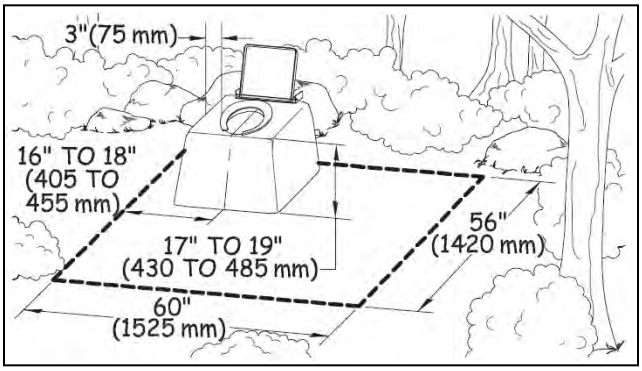
5.3.2.1 Size. The clear floor or ground space shall be 60 inches (1525 mm) wide minimum measured parallel with the back of the pit toilet, and 56 inches (1420 mm) deep minimum measured parallel to the sides of the pit toilet. The turning space shall be at least 60 inches (1,525 millimeters) in diameter or T-shaped with a minimum 60- by 36-inch (1,525 by 915 millimeter) arm and a minimum 36-inch (915 millimeter) -wide by 24-inch (610 millimeter) -long base. The turning space and clear floor or ground space may overlap.

5.3.2.2 Surface. The surface of the turning space and clear floor or ground space shall be firm and stable.

5.3.2.3 Slope. The slope of the turning space and clear floor or ground space surface shall not be steeper than 1:48 (2 percent) in all directions.

Exception: When the surface is not paved or is not elevated above the natural ground, slopes not steeper than 1:33 (3 percent) shall be permitted where necessary for drainage.

5.3.3 Seats. Pit toilet seats shall comply with 5.3.3



5.3.3.1 Height. The total height of the toilet seat on the riser for a pit toilet shall be between 17 inches (430 mm) and 19 inches (485 mm) above the floor or ground surface.

5.3.3.2 Location Where Walls Provided. Where walls or partitions are provided, the seat shall be positioned with a wall or partition to the rear and to one side of the seat for a left-hand or right-hand approach. The back of the riser shall be flush against the back wall. The centerline of the seat shall be 16 inches (405 mm) minimum to 18 inches (455 mm) maximum from the side wall or partition.

5.3.3.3 Location Where Walls Not Provided. Where walls or partitions are not provided, the seat shall be positioned in a corner of the clear floor or ground space required by 5.3.2 for a left-hand or right-hand approach. The back of the seat shall be flush against the perimeter of the clear floor or ground space.

5.3.4 Grab Bars. Where walls or partitions are provided, grab bars complying with ABAAS section 604.5 shall be provided.

Exception: Where the walls or partitions cannot support the force specified in ABAAS section 609.8, grab bars shall not be installed. In such cases, the riser shall have vertical or nearly vertical sides and a flat area on each side of the seat that is about 3 inches (75 millimeters) wide.

5.3.5 Doors. Where provided, doors shall comply with ABAAS section 404. The door shall not swing into or otherwise obstruct the clear floor or ground space required by 5.3.2.1.

5.3.6 Entrance. The entrance to the toilet shall be level with the surrounding surface.

Exception: Where bedrock, perma-frost or other environmental conditions prohibit a level entry or the toilet design (such as a composting toilet) necessitates a raised toilet structure, a sloped entry complying with the FSTAG provisions for a trail may connect the toilet entrance with the trail or ORAR. A 60 inch by 60 inch (1,220 millimeters by 1,220 millimeters) level landing must be provided outside the door to the toilet. Sloped entries do not require handrails.

6.0 BEACH ACCESS ROUTES

6.1 General.

Beach access routes complying with 6.0 shall be provided at developed beach sites as required by 6.0. Beach access routes shall be permanent or removable surfaces. Removable beach access routes can be moved to a protected storage area during storms and other periods when the routes are subject to damage.

Exception 1. Where a condition in 1.1 prohibits full compliance with a specific requirement in 6.0 on a portion of a beach access route, that portion of the beach access route shall comply with the specific requirement to the extent practicable. The

basis for the determination shall be documented and maintained with the records of the construction or alteration project.

Exception 2. If it is determined not to be practicable to provide a beach access route complying with 6.0 after applying Exception 1, a beach access route shall not be required. The basis for the determination of impracticability shall be documented, the documentation shall be maintained with the records of the construction or alteration project, and notification of this determination shall be sent to the Access Board. A form is available on the Access Board's Website *http://www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas* for optional use.

Exception 3. Removable beach access routes shall not be required to comply with the grade requirements in section 6.7 and the resting interval requirement in section 6.8.

Exception 4. Beach access routes shall not be required where pedestrian access to the beach is not permitted.

6.2 Where Required.

Beach access routes shall be provided in a number complying with 6.3 where any of the following facilities to serve the beach are constructed or altered:

6.2.1 Circulation Routes Constructed at Beaches. Beach access routes shall be provided where circulation routes such as boardwalks**,** walkways, or dune crossings are constructed along or across developed beach sites to provide pedestrian access to the beach or shoreline.

6.2.2 Parking Facilities Constructed at Beaches. Where parking facilities are constructed at developed beach sites and pedestrian access to the beach is provided near the parking facilities, beach access routes shall be provided.

6.2.3 Bathing and Toilet Facilities Constructed at Beaches. Where bathing and toilet facilities are constructed at developed beach sites and pedestrian access points to the beach are provided near the bathing and toilet facilities, beach access routes shall be provided.

6.2.4 Beach Nourishment. Beach access routes shall be provided where a beach nourishment project is undertaken.

Exception: No more than 20 percent of the costs of a facility construction or alteration project or beach nourishment project shall be required to be expended to provide beach access routes.

6.3 Minimum Number.

At least one beach access route shall be provided for each 1/2 mile of shoreline where required by 6.2

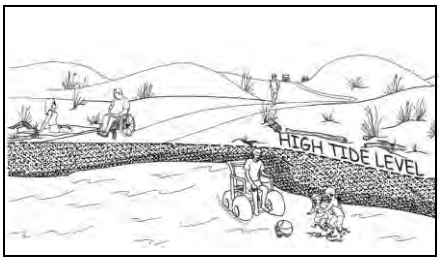
Exception: The number of beach access routes shall not be required to exceed the number of pedestrian access points that are provided to a beach.

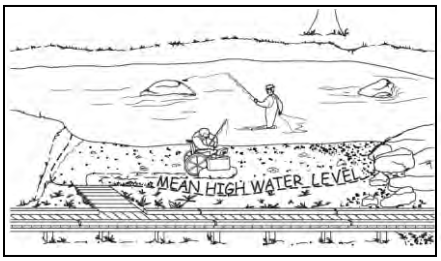
6.4 Connections.
Beach access routes shall coincide with or be located in the same general area as the pedestrian access points to the beach. Beach access routes shall extend to the:

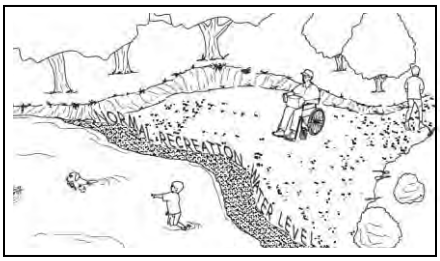
6.4.1 High tide level at tidal beaches;

6.4.2 Mean high water level at river beaches; and

6.4.3 Normal recreation water level at lake, pond, and reservoir beaches.







6.5 Surface.
The surface of beach access routes and their related resting intervals shall be firm and stable.

6.6 Clear Width.
The clear width of beach access routes shall be 60 inches (1525 mm) minimum.

> **Exception:** At dune crossings, the clear width of beach access routes that are not removable shall be permitted to be reduced to 48 inches (1220 mm) minimum.

6.7 Slope.
The slopes of beach access routes shall comply with 6.7.1 and 6.7.2.

6.7.1 Running Slope (Grade). The running slope (grade) of a Beach Access Route shall comply with all applicable provisions of this section.

> **6.7.1.1**. The grade of a Beach Access Route shall be 1:20 (5 percent) or less for any distance.
>
> **6.7.1.2.** A grade of up to 1:12 (8.33 percent) is permitted for up to 50 feet (15 m) of a beach access route. Resting intervals complying with section 2.3 shall be provided at distances of no more than 50 feet (15 m) apart.
>
> **6.7.1.3.** A grade of up to 1:10 (10 percent) is permitted for up to 30 feet (9 m) of a beach access route. Resting intervals complying with section 2.3 shall be provided at distances of no more than 30 feet (9 m) apart.

Table 6.7.1. Running Slope (Grade) and Resting Intervals

Running Slope (Grade) and Resting Intervals on Beach Access Routes		Maximum Length of Segment
Steeper than	But not Steeper than	
1:20 (5 percent)	1:12 (8.33 percent)	50 feet (15 m)
1:12 (8.33 percent)	1:10 (10 percent)	30 feet (9 m)

Exception. Elevated dune crossings shall not be required to comply with the resting interval requirements in 6.7.1.

6.7.2 Cross Slope. The cross slope of a beach access route shall be no more than 1:33 (3 percent). Where the surface is paved or is elevated above the natural ground, the cross slope shall not be steeper than 1:48 (2 percent).

6.8 Resting Intervals.
Resting intervals shall comply with 6.8

6.8.1 Size. The resting interval length shall be a minimum of 60 inches (1525 mm) long by 60 inches (1525 mm) wide.

6.8.2 Grade and cross slope. The slope of a resting interval shall not be steeper than 1:33 (3 percent) in any direction. Where the surface is paved or is elevated above the natural ground, the surface shall not be steeper than 1:48 (2 percent) in any direction.

6.9 Tread Obstacles.
Obstacles on beach access routes and their related resting intervals shall not exceed 1 inch (25 mm) in height measured vertically to the highest point. Where the surface is paved or is elevated above the natural ground, obstacles shall not exceed 1/2 inch (13 mm) in height measured vertically to the highest point. Where possible, obstacles should not be closer than 48 inches (1220 mm) apart.

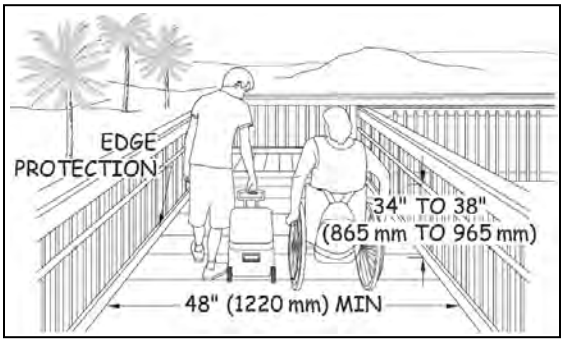
6.10 Openings.
Openings in the surface of beach access routes and their related resting intervals may be up to 1/2 inch (13 millimeters) wide. Where possible, elongated openings should be placed perpendicular, or as close to perpendicular as possible, to the dominant direction of travel.

6.11 Protruding Objects.
Constructed features, including signs, shall not extend into the space above a beach access route more than 4 inches (100 mm) if they are between 27 inches (685 mm) and 80 inches (2030 mm) above the surface of the beach access route.

6.11.1 Natural Elements. Accessibility guidelines for protruding objects do not apply to natural elements such as tree branches and rock formations. However, safety regulations or Forest Service construction and maintenance standards may define clear space and limit the allowable extension of natural protruding objects over the beach access route surface.

6.12 Handrails and Edge Protection.

Where elevated dune crossings or dune crossings steeper than 1:20 (5 percent) are part of beach access routes, handrails complying with ABAAS section 505 and edge protection complying with ABAAS section 405.9 shall be provided.



6.13 Outdoor Constructed Features.

Where provided on circulation paths or beach access routes at beaches, outdoor constructed features such as picnic tables, grills or water hydrants, shall comply with technical provisions for that constructed feature as detailed in these Forest Service Outdoor Recreation Accessibility Guidelines.

6.14 Gates and Barriers

Where gates or barriers are constructed to control access to beach access routes, gates and barriers shall comply with 6.14.

6.14.1 Clear Width. Gate openings and openings in barriers for pedestrian passage shall provide a clear width of 36 inches (915 mm), complying with ODAAG, section 1017.3 Clear Tread Width.

6.14.2 Gate Hardware. Gate hardware shall comply with operable controls requirements in ABAAS section 309.4 and 404.2.7.

APPENDIX A: Provisions of the Architectural Barriers Act Accessibility Standards (ABAAS)

That Are Referenced in the FSORAG Technical Provisions

The ABAAS are available at *http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/aba-standards*

F208 Parking Spaces

F208.1 General. Where parking spaces are provided, parking spaces shall be provided in accordance with F208.

> **EXCEPTION:** Parking spaces used exclusively for buses, trucks, other delivery vehicles, law enforcement vehicles, or vehicular impound shall not be required to comply with F208 provided that lots accessed by the public are provided with a passenger loading zone complying with 503.

F208.2 Minimum Number. Parking spaces complying with 502 shall be provided in accordance with Table F208.2 except as required by F208.2.1, F208.2.2, and F208.2.3. Where more than one parking facility is provided on a site, the number of accessible spaces provided on the site shall be calculated according to the number of spaces required for each parking facility.

F208.2 Parking Spaces

Total Number of Parking Spaces Provided in Parking Facility	Minimum Number of Required accessible Parking Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total
1001 and over	20, plus 1 for each 100, or fraction thereof, over 1000

F208.2.4 Van Parking Spaces. For every six or fraction of six parking spaces required by F208.2 to comply with 502, at least one shall be a van parking space complying with 502.

F208.3 Location. Parking facilities shall comply with F208.3

F208.3.1 General. Parking spaces complying with 502 that serve a particular building or facility shall be located on the shortest accessible route from parking to an entrance complying with F206.4. Where parking serves more than one accessible entrance, parking spaces complying with 502 shall be dispersed and located on the shortest accessible route to the accessible entrances. In parking facilities that do not serve a particular building or facility, parking spaces complying with 502 shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility.

304 - Turning Space

304.1 General. Turning space shall comply with 304.

304.3 Size. Turning space shall comply with 304.3.1 or 304.3.2.

304.3.1 Circular Space. The turning space shall be a space of 60 inches (1525 mm) diameter minimum. The space shall be permitted to include knee and toe clearance complying with 306.

304.3.2 T-Shaped Space. The turning space shall be a T-shaped space within a 60 inch (1525 mm) square minimum with arms and base 36 inches (915 mm) wide minimum. Each arm of the T shall be clear of obstructions 12 inches (305 mm) minimum in each direction and the base shall be clear of obstructions 24 inches (610 mm) minimum. The space shall be permitted to include knee and toe clearance complying with 306 only at the end of either the base or one arm.

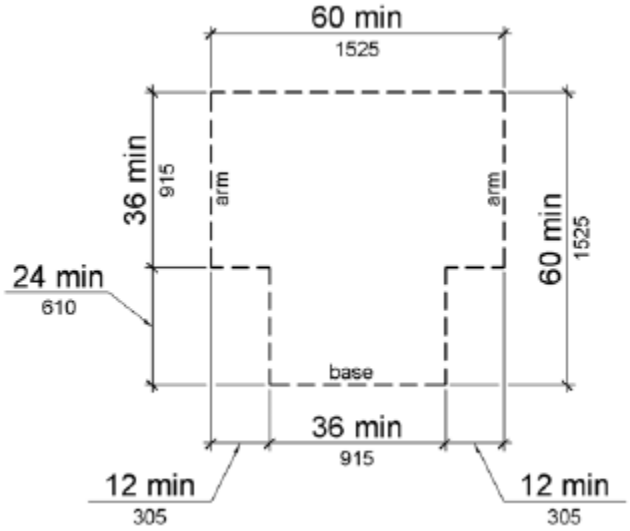


Figure 304.3.2 T-Shaped Turning Space

305 - Clear Floor or Ground Space for Wheelchairs.

305.1 General. Clear floor or ground space shall comply with 305.

305.2 Floor or Ground Surfaces. Floor or ground surfaces of a clear floor or ground space shall comply with 302. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

305.3 Size. The clear floor or ground space shall be 30 inches (760 mm) minimum by 48 inches (1220 mm) minimum.

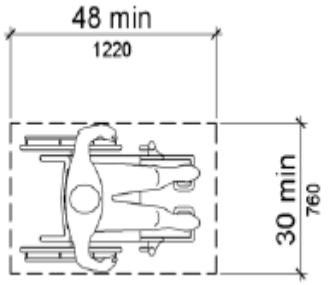


Figure 305.3 Clear Floor or Ground Space

305.4 Knee and Toe Clearance. Unless otherwise specified, clear floor or ground space shall be permitted to include knee and toe clearance complying with 306.

305.5 Position. Unless otherwise specified, clear floor or ground space shall be positioned for either forward or parallel approach to an element.

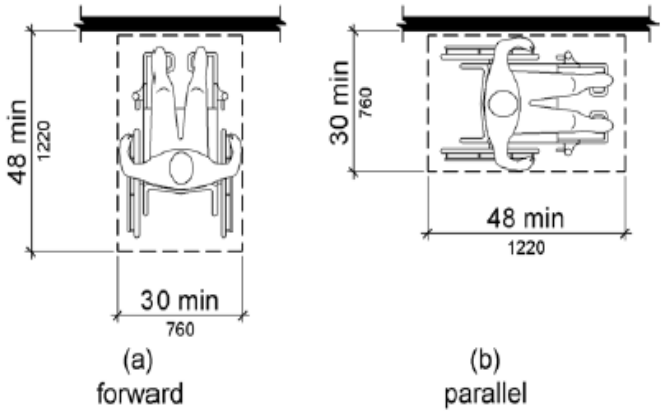


Figure 305.5 Position of Clear Floor or Ground Space

305.6 Approach. One full unobstructed side of the clear floor or ground space shall adjoin an accessible route or adjoin another clear floor or ground space.

305.7 Maneuvering Clearance. Where a clear floor or ground space is located in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearance shall be provided in accordance with 305.7.1 and 305.7.2.

305.7.1 Forward Approach. Alcoves shall be 36 inches (915 mm)wide minimum where the depth exceeds 24 inches (610 mm).

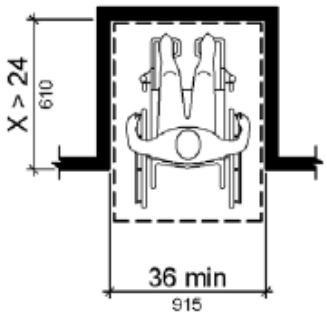


Figure 305.7.1 Maneuvering Clearance in an Alcove, Forward Approach

305.7.2 Parallel Approach. Alcoves shall be 60 inches (1525 mm) wide minimum where the depth exceeds 15 inches (380 mm).

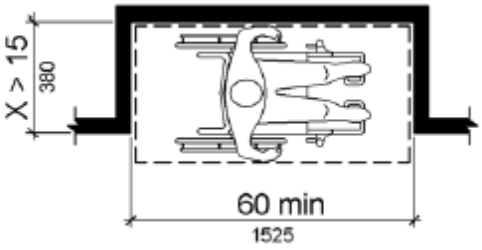


Figure 305.7.2 Maneuvering Clearance in an Alcove, Parallel Approach

306 Knee and Toe Clearance

306.1 General. Where space beneath an element is included as part of clear floor or ground space or turning space, the space shall comply with 306. Additional space shall not be prohibited beneath an element but shall not be considered as part of the clear floor or ground space or turning space.

Advisory 306.1 General. Clearances are measured in relation to the usable clear floor space, not necessarily to the vertical support for an element. When determining clearance under an object for required turning or maneuvering space, care should be taken to ensure the space is clear of any obstructions.

306.2 Toe Clearance.

306.2.1 General. Space under an element between the finish floor or ground and 9 inches (230 mm) above the finish floor or ground shall be considered toe clearance and shall comply with 306.2.

306.2.2 Maximum Depth. Toe clearance shall extend 25 inches (635 mm) maximum under an element.

306.2.3 Minimum Required Depth. Where toe clearance is required at an element as part of a clear floor space, the toe clearance shall extend 17 inches (430 mm) minimum under the element.

306.2.4 Additional Clearance. Space extending greater than 6 inches (150 mm) beyond the available knee clearance at 9 inches (230 mm) above the finish floor or ground shall not be considered toe clearance.

306.2.5 Width. Toe clearance shall be 30 inches (760 mm) wide minimum.

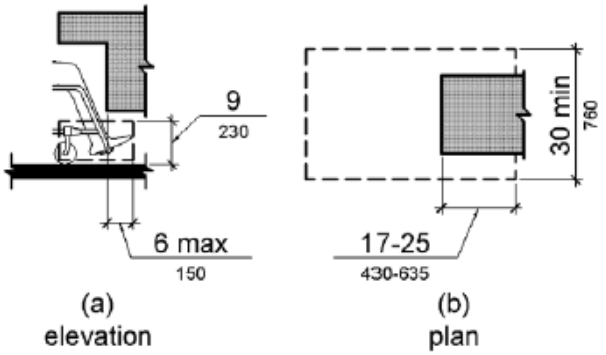


Figure 306.2 Toe Clearance

306.3 Knee Clearance.

306.3.1 General. Space under an element between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground shall be considered knee clearance and shall comply with 306.3.

306.3.2 Maximum Depth. Knee clearance shall extend 25 inches (635 mm) maximum under an element at 9 inches (230 mm) above the finish floor or ground.

306.3.3 Minimum Required Depth. Where knee clearance is required under an element as part of a clear floor space, the knee clearance shall be 11 inches (280 mm) deep minimum at 9 inches (230 mm) above the finish floor or ground, and 8 inches (205 mm) deep minimum at 27 inches (685 mm) above the finish floor or ground.

306.3.4 Clearance Reduction. Between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground, the knee clearance shall be permitted to reduce at a rate of 1 inch (25 mm) in depth for each 6 inches (150 mm) in height.

306.3.5 Width. Knee clearance shall be 30 inches (760 mm) wide minimum.

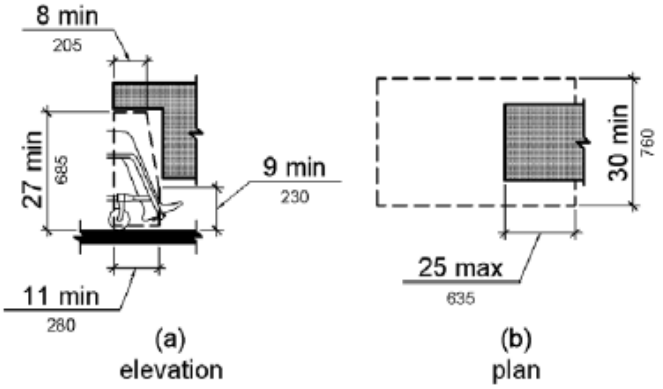


Figure 306.3 Knee Clearance

308 Reach Ranges

308.1 General. Reach ranges shall comply with 308.

308.2 Forward Reach.

308.2.1 Unobstructed. Where a forward reach is unobstructed, the high forward reach shall be 48 inches (1220 mm) maximum and the low forward reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

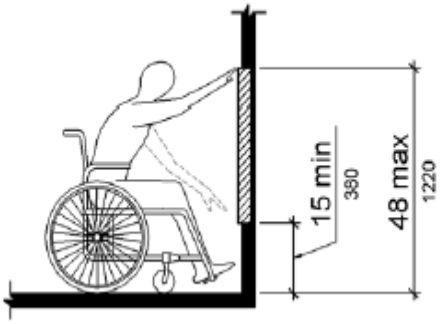


Figure 308.2.1 Unobstructed Forward Reach

308.2.2 Obstructed High Reach. Where a high forward reach is over an obstruction, the clear floor space shall extend beneath the element for a distance not less than the required reach depth over the obstruction. The high forward reach shall be 48 inches (1220 mm) maximum where the reach depth is 20 inches (510 mm) maximum. Where the reach depth exceeds 20 inches (510 mm), the high forward reach shall be 44 inches (1120 mm) maximum and the reach depth shall be 25 inches (635 mm) maximum.

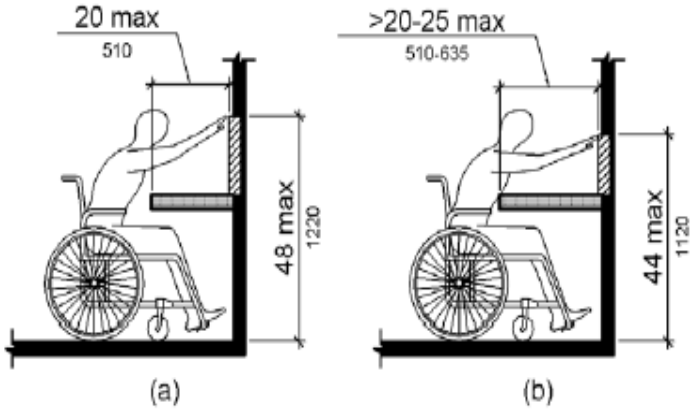


Figure 308.2.2 Obstructed High Forward Reach

308.3 Side Reach.

308.3.1 Unobstructed. Where a clear floor or ground space allows a parallel approach to an element and the side reach is unobstructed, the high side reach shall be 48 inches (1220 mm) maximum and the low side reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

EXCEPTIONS: 1. An obstruction shall be permitted between the clear floor or ground space and the element where the depth of the obstruction is 10 inches (255 mm) maximum.
2. Operable parts of fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.

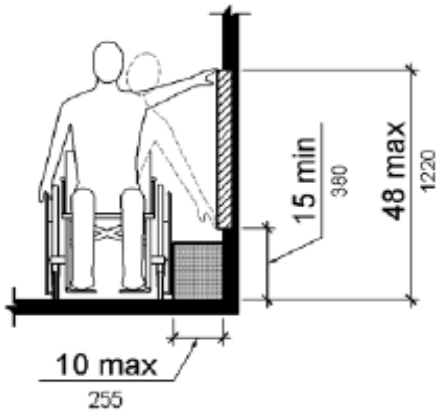


Figure 308.3.1 Unobstructed Side Reach

308.3.2 Obstructed High Reach. Where a clear floor or ground space allows a parallel approach to an element and the high side reach is over an obstruction, the height of the obstruction shall be 34 inches (865 mm) maximum and the depth of the obstruction shall be 24 inches (610 mm) maximum. The high side reach shall be 48 inches (1220 mm) maximum for a reach depth of 10 inches (255 mm) maximum. Where the reach depth exceeds 10 inches (255 mm), the high side reach shall be 46 inches (1170 mm) maximum for a reach depth of 24 inches (610 mm) maximum.

EXCEPTIONS: 1. The top of washing machines and clothes dryers shall be permitted to be 36 inches (915 mm) maximum above the finish floor.
2. Operable parts of fuel dispensers shall be permitted to be 54 inches (1370 mm) maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.

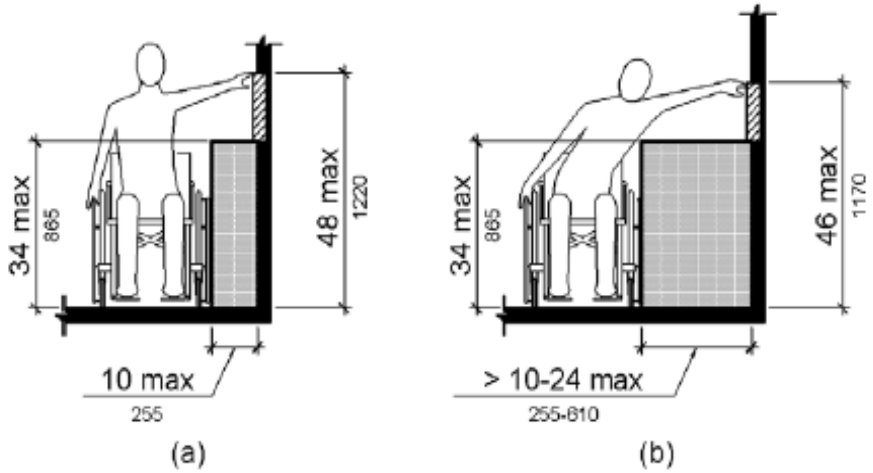


Figure 308.3.2 Obstructed High Side Reach

309 Operable Parts

309.1 General. Operable parts shall comply with 309.

309.2 Clear Floor Space. A clear floor or ground space complying with 305 shall be provided.

309.3 Height. Operable parts shall be placed within one or more of the reach ranges specified in 308.

309.4 Operation. Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum.

EXCEPTION: Gas pump nozzles shall not be required to provide operable parts that have an activating force of 5 pounds (22.2 N) maximum.

404 Doors, Doorways, and Gates

404.2.3 Doorways - Clear Width. Door openings shall provide a clear width of 32 inches (815 mm) minimum. Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees. Openings more than 24 inches (610 mm) deep shall provide a clear opening of 36 inches (915 mm) minimum. There shall be no projections into the required clear opening width lower than 34 inches (865 mm) above the finish floor or ground. Projections into the clear opening width between 34 inches (865 mm) and 80 inches (2030 mm) above the finish floor or ground shall not exceed 4 inches (100 mm).

EXCEPTIONS: 1. In alterations, a projection of 5/8 inch (16 mm) maximum into the required clear width shall be permitted for the latch side stop.
2. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the finish floor or ground.

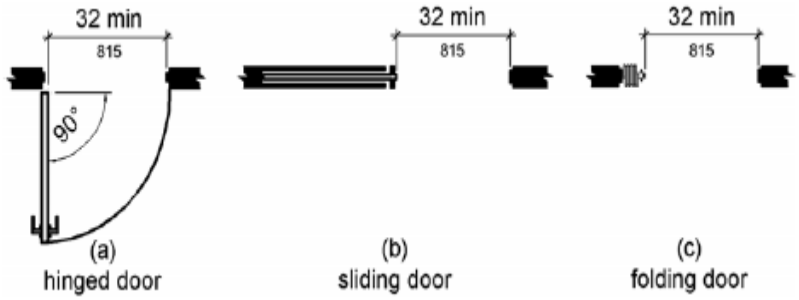


Figure 404.2.3 Clear Width of Doorways

404.2.7 Door and Gate Hardware. Handles, pulls, latches, locks, and other operable parts on doors and gates shall comply with 309.4. Operable parts of such hardware shall be 34 inches (865 mm) minimum and 48 inches (1220 mm) maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

405.9 Edge Protection. Edge protection complying with 405.9.1 or 405.9.2 shall be provided on each side of ramp runs and at each side of ramp landings.

EXCEPTIONS: 1. Edge protection shall not be required on ramps that are not required to have handrails and have sides complying with 406.3.
2. Edge protection shall not be required on the sides of ramp landings serving an adjoining ramp run or stairway.
3. Edge protection shall not be required on the sides of ramp landings having a vertical drop-off of 1/2 inch (13 mm) maximum within 10 inches (255 mm) horizontally of the minimum landing area specified in 405.7.

405.9.1 Extended Floor or Ground Surface. The floor or ground surface of the ramp run or landing shall extend 12 inches (305 mm) minimum beyond the inside face of a handrail complying with 505.

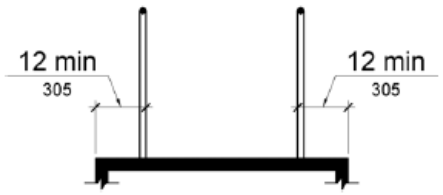


Figure 405.9.1 Extended Floor or Ground Surface Edge Protection

405.9.2 Curb or Barrier. A curb or barrier shall be provided that prevents the passage of a 4 inch (100 mm) diameter sphere, where any portion of the sphere is within 4 inches (100 mm) of the finish floor or ground surface.

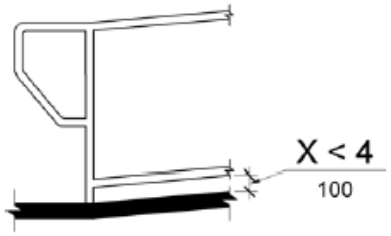


Figure 405.9.2 Curb or Barrier Edge Protection

405.10 Wet Conditions. Landings subject to wet conditions shall be designed to prevent the accumulation of water.

502 Parking Spaces

502.1 General. Car and van parking spaces shall comply with 502. Where parking spaces are marked with lines, width measurements of parking spaces and access aisles shall be made from the centerline of the markings.

EXCEPTION: Where parking spaces or access aisles are not adjacent to another parking space or access aisle, measurements shall be permitted to include the full width of the line defining the parking space or access aisle.

502.2 Vehicle Spaces. Car parking spaces shall be 96 inches (2440 mm) wide minimum and van parking spaces shall be 132 inches (3350 mm) wide minimum, shall be marked to define the width, and shall have an adjacent access aisle complying with 502.3.

EXCEPTION: Van parking spaces shall be permitted to be 96 inches (2440 mm) wide minimum where the access aisle is 96 inches (2440 mm) wide minimum.

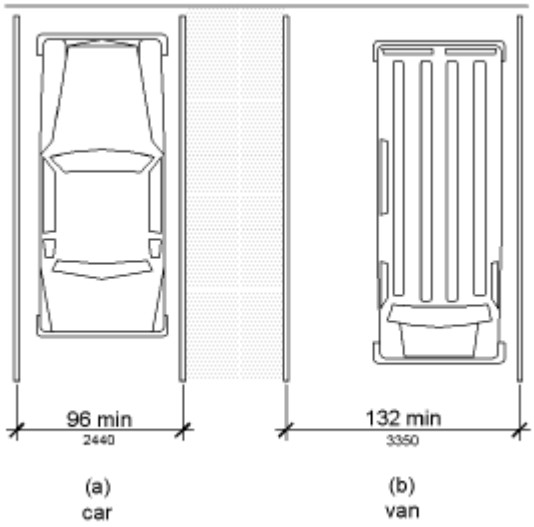


Figure 502.2 Vehicle Parking Spaces

502.3 Access Aisle. Access aisles serving parking spaces shall comply with 502.3. Access aisles shall adjoin an accessible route. Two parking spaces shall be permitted to share a common access aisle.

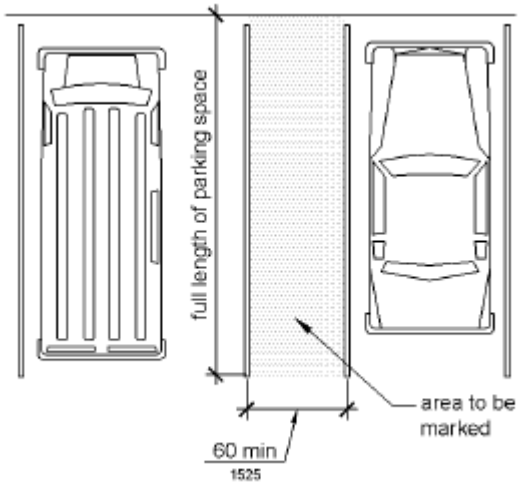


Figure 502.3 Parking Space Access Aisle

502.3.1 Width. Access aisles serving car and van parking spaces shall be 60 inches (1525 mm) wide minimum.

502.3.2 Length. Access aisles shall extend the full length of the parking spaces they serve.

502.3.3 Marking. Access aisles shall be marked so as to discourage parking in them.

502.3.4 Location. Access aisles shall not overlap the vehicular way. Access aisles shall be permitted to be placed on either side of the parking space except for angled van parking spaces which shall have access aisles located on the passenger side of the parking spaces.

502.4 Floor or Ground Surfaces. Parking spaces and access aisles serving them shall comply with 302. Access aisles shall be at the same level as the parking spaces they serve. Changes in level are not permitted.

EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

502.6 Identification. Parking space identification signs shall include the International Symbol of Accessibility complying with 703.7.2.1. Signs identifying van parking spaces shall contain the designation "van accessible." Signs shall be 60 inches (1525 mm) minimum above the finish floor or ground surface measured to the bottom of the sign.

502.7 Relationship to Accessible Routes. Parking spaces and access aisles shall be designed so that cars and vans, when parked, cannot obstruct the required clear width of adjacent accessible routes.

505 Handrails

505.1 General. Handrails provided along walking surfaces complying with 403, required at ramps complying with 405, and required at stairs complying with 504 shall comply with 505.

505.2 Where Required. Handrails shall be provided on both sides of stairs and ramps.

EXCEPTION: In assembly areas, handrails shall not be required on both sides of aisle ramps where a handrail is provided at either side or within the aisle width.

505.3 Continuity. Handrails shall be continuous within the full length of each stair flight or ramp run. Inside handrails on switchback or dogleg stairs and ramps shall be continuous between flights or runs.

EXCEPTION: In assembly areas, handrails on ramps shall not be required to be continuous in aisles serving seating.

505.4 Height. Top of gripping surfaces of handrails shall be 34 inches (865 mm) minimum and 38 inches (965 mm) maximum vertically above walking surfaces, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above walking surfaces, stair nosings, and ramp surfaces.

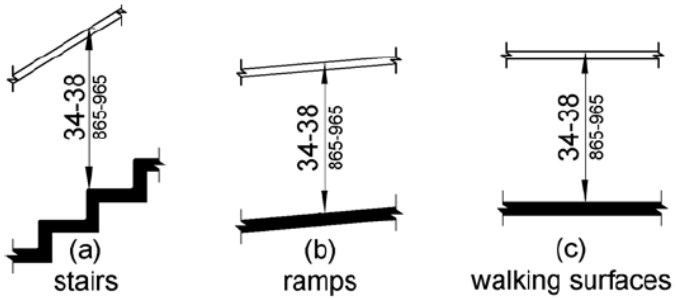


Figure 505.4 Handrail Height

505.5 Clearance. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1 1/2 inches (38 mm) minimum.

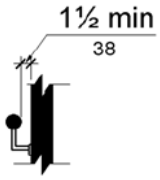


Figure 505.5 Handrail Clearance

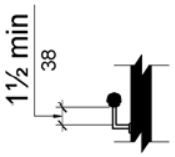


Figure 505.6 Horizontal Projections Below Gripping Surface

505.6 Gripping Surface. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20 percent of their length. Where provided, horizontal projections shall occur 1 1/2 inches (38 mm) minimum below the bottom of the handrail gripping surface.

EXCEPTIONS: 1. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.

2. The distance between horizontal projections and the bottom of the gripping surface shall be permitted to be reduced by 1/8 inch (3.2 mm) for each 1/2 inch (13 mm) of additional handrail perimeter dimension that exceeds 4 inches (100 mm).

505.7 Cross Section. Handrail gripping surfaces shall have a cross section complying with 505.7.1 or 505.7.2.

505.7.1 Circular Cross Section. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1 1/4 inches (32 mm) minimum and 2 inches (51 mm) maximum.

505.7.2 Non-Circular Cross Sections. Handrail gripping surfaces with a non-circular cross section shall have a perimeter dimension of 4 inches (100 mm) minimum and 6 1/4 inches (160 mm) maximum, and a cross-section dimension of 2 1/4 inches (57 mm) maximum.

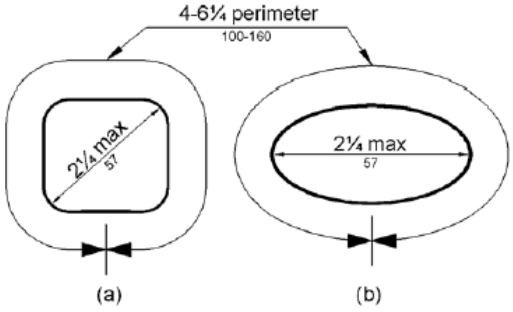


Figure 505.7.2 Handrail Non-Circular Cross Section

505.8 Surfaces. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.

505.9 Fittings. Handrails shall not rotate within their fittings.

505.10 Handrail Extensions. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with 505.10.

EXCEPTIONS: 1. Extensions shall not be required for continuous handrails at the inside turn of switchback or dogleg stairs and ramps.
2. In assembly areas, extensions shall not be required for ramp handrails in aisles serving seating where the handrails are discontinuous to provide access to seating and to permit crossovers within aisles.
3. In alterations, full extensions of handrails shall not be required where such extensions would be hazardous due to plan configuration.

505.10.1 Top and Bottom Extension at Ramps. Ramp handrails shall extend horizontally above the landing for 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent ramp run.

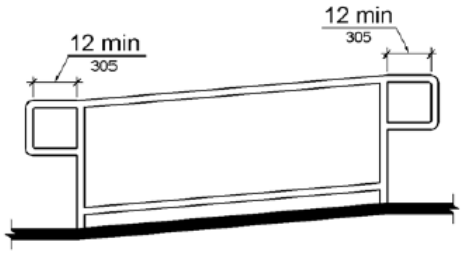


Figure 505.10.1 Top and Bottom Handrail Extension at Ramps

505.10.2 Top Extension at Stairs. At the top of a stair flight, handrails shall extend horizontally above the landing for 12 inches (305 mm) minimum beginning directly above the first riser nosing. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

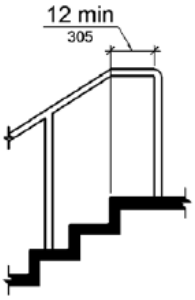


Figure 505.10.2 Top Handrail Extension at Stairs

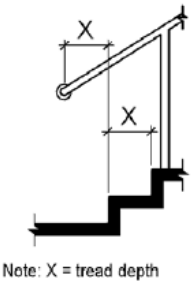


Figure 505.10.3 Bottom Handrail Extension at Stairs

505.10.3 Bottom Extension at Stairs. At the bottom of a stair flight, handrails shall extend at the slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last riser nosing. Extension shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

603 Toilet and Bathing Rooms

(This section is to be used for toilet buildings with a single riser such as SSTs, but not for pit toilets. See definition of pit toilet in Technical Provisions section of FSORAG.)

603.1 General. Toilet and bathing rooms shall comply with 603.

603.2 Clearances. Clearances shall comply with 603.2.

603.2.1 Turning Space. Turning space complying with 304 shall be provided within the room.

603.2.2 Overlap. Required clear floor spaces, clearance at fixtures, and turning space shall be permitted to overlap.

603.2.3 Door Swing. Doors shall not swing into the clear floor space or clearance required for any fixture. Doors shall be permitted to swing into the required turning space.

EXCEPTIONS: 1. Doors to a toilet room or bathing room for a single occupant accessed only through a private office and not for common use or public use shall be permitted to swing into the clear floor space or clearance provided the swing of the door can be reversed to comply with 603.2.3.

2. Where the toilet room or bathing room is for individual use and a clear floor space complying with 305.3 is provided within the room beyond the arc of the door swing, doors shall be permitted to swing into the clear floor space or clearance required for any fixture.

603.3 Mirrors. Mirrors located above lavatories or countertops shall be installed with the bottom edge of the reflecting surface 40 inches (1015 mm) maximum above the finish floor or ground. Mirrors not located above lavatories or countertops shall be installed with the bottom edge of the reflecting surface 35 inches (890 mm) maximum above the finish floor or ground.

Advisory 603.3 Mirrors. A single full-length mirror can accommodate a greater number of people, including children. In order for mirrors to be usable by people who are ambulatory and people and people who use wheelchairs, the top edge of mirrors should be 74 inches (1880 mm) minimum from the floor or ground.

603.4 Coat Hooks and Shelves. Coat hooks shall be located within one of the reach ranges specified in 308. Shelves shall be located 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the finish floor.

604 Water Closets and Toilet Compartments

(This section is to be used for toilet buildings with multiple risers provided at recreation sites with a FS Recreation Site Development Scale of 3 or higher, and for the Exception under Pit Toilets in General Forest Areas FSORAG 6.6)

604.1 General. Water closets and toilet compartments shall comply with 604.2 through 604.8.

EXCEPTION: Water closets and toilet compartments for children's use shall be permitted to comply with 604.9.

604.2 Location. The water closet shall be positioned with a wall or partition to the rear and to one side. The centerline of the water closet shall be 16 inches (405 mm) minimum to 18 inches (455 mm) maximum from the side wall or partition, except that the water closet shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum from the side wall or partition in the ambulatory accessible toilet compartment specified in 604.8.2. Water closets shall be arranged for a left-hand or right-hand approach.

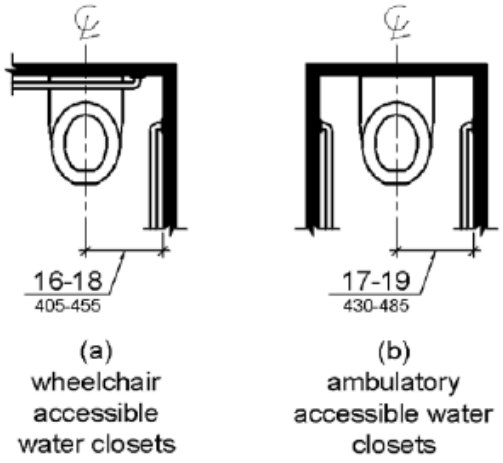


Figure 604.2 Water Closet Location

604.3 Clearance. Clearances around water closets and in toilet compartments shall comply with 604.3.

604.3.1 Size. Clearance around a water closet shall be 60 inches (1525 mm) minimum measured perpendicular from the side wall and 56 inches (1420 mm) minimum measured perpendicular from the rear wall.

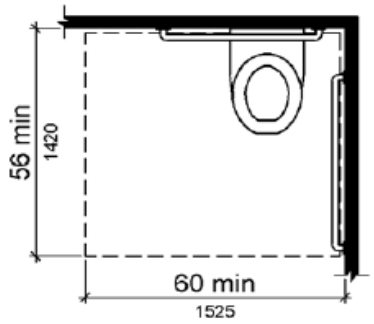


Figure 604.3.1 Size of Clearance at Water Closets

604.3.2 Overlap. The required clearance around the water closet shall be permitted to overlap the water closet, associated grab bars, dispensers, sanitary napkin disposal units, coat hooks, shelves, accessible routes, clear floor space and clearances required at other fixtures, and the turning space. No other fixtures or obstructions shall be located within the required water closet clearance.

EXCEPTION: In residential dwelling units, a lavatory complying with 606 shall be permitted on the rear wall 18 inches (455 mm) minimum from the water closet centerline where the clearance at the water closet is 66 inches (1675 mm) minimum measured perpendicular from the rear wall.

604.4 Seats. The seat height of a water closet above the finish floor shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum measured to the top of the seat. Seats shall not be sprung to return to a lifted position.

EXCEPTIONS: 1. A water closet in a toilet room for a single occupant accessed only through a private office and not for common use or public use shall not be required to comply with 604.4.
2. In residential dwelling units, the height of water closets shall be permitted to be 15 inches (380 mm) minimum and 19 inches (485 mm) maximum above the finish floor measured to the top of the seat.

604.5 Grab Bars. Grab bars for water closets shall comply with 609. Grab bars shall be provided on the side wall closest to the water closet and on the rear wall.

Advisory 604.5 Grab Bars Exception 2. Reinforcement must be sufficient to permit the installation of rear and side wall grab bars that fully meet all accessibility requirements including, but not limited to, required length, installation height, and structural strength.

604.5.1 Side Wall. The side wall grab bar shall be 42 inches (1065 mm) long minimum, located 12 inches (305 mm) maximum from the rear wall and extending 54 inches (1370 mm) minimum from the rear wall.

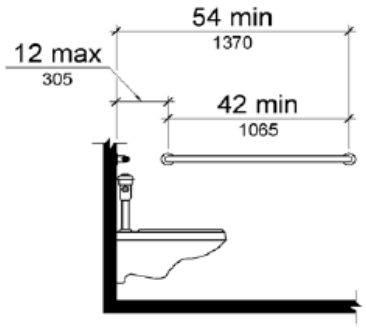


Figure 604.5.1 Side Wall Grab Bar at Water Closets

604.5.2 Rear Wall. The rear wall grab bar shall be 36 inches (915 mm) long minimum and extend from the centerline of the water closet 12 inches (305 mm) minimum on one side and 24 inches (610 mm) minimum on the other side.

EXCEPTIONS: 1. The rear grab bar shall be permitted to be 24 inches (610 mm) long minimum, centered on the water closet, where wall space does not permit a length of 36 inches (915 mm) minimum due to the location of a recessed fixture adjacent to the water closet.
2. Where an administrative authority requires flush controls for flush valves to be located in a position that conflicts with the location of the rear grab bar, then the rear grab bar shall be permitted to be split or shifted to the open side of the toilet area.

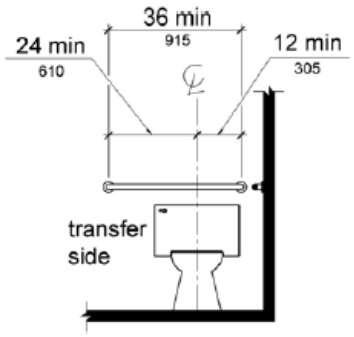


Figure 604.5.2 Rear Wall Grab Bar at Water Closets

604.6 Flush Controls. Flush controls shall be hand operated or automatic. Hand operated flush controls shall comply with 309. Flush controls shall be located on the open side of the water closet except in ambulatory accessible compartments complying with 604.8.2.

604.7 Dispensers. Toilet paper dispensers shall comply with 309.4 and shall be 7 inches (180 mm) minimum and 9 inches (230 mm) maximum in front of the water closet measured to the centerline of the dispenser. The outlet of the dispenser shall be 15 inches (380 mm) minimum and 48 inches (1220 mm) maximum above the finish floor and shall not be located behind grab bars. Dispensers shall not be of a type that controls delivery or that does not allow continuous paper flow.

Advisory 604.7 Dispensers. If toilet paper dispensers are installed above the side wall grab bar, the outlet of the toilet paper dispenser must be 48 inches (1220 mm) maximum above the finish floor and the top of the gripping surface of the grab bar must be 33 inches (840 mm) minimum and 36 inches (915 mm) maximum above the finish floor.

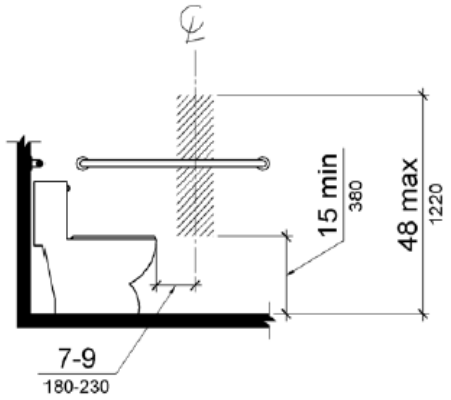


Figure 604.7 Dispenser Outlet Location

608 Shower Compartments

608.6 Shower Spray Unit and Water. A shower spray unit with a hose 59 inches (1500 mm) long minimum that can be used both as a fixed-position shower head and as a hand-held shower shall be provided. The shower spray unit shall have an on/off control with a non-positive shut-off. If an adjustable-height shower head on a vertical bar is used, the bar shall be installed so as not to obstruct the use of grab bars. Shower spray units shall deliver water that is 120°F (49°C) maximum.

EXCEPTION: A fixed shower head located at 48 inches (1220 mm) maximum above the shower finish floor shall be permitted instead of a hand-held spray unit in facilities that are not medical care facilities, long-term care facilities, transient lodging guest rooms, or residential dwelling units.

Advisory 608.6 Shower Spray Unit and Water. Ensure that hand-held shower spray units are capable of delivering water pressure substantially equivalent to fixed shower heads.

609 Grab Bars

609.1 General. Grab bars in toilet facilities and bathing facilities shall comply with 609.

609.2 Cross Section. Grab bars shall have a cross section complying with 609.2.1 or 609.2.2.

609.2.1 Circular Cross Section. Grab bars with circular cross sections shall have an outside diameter of 1 1/4 inches (32 mm) minimum and 2 inches (51 mm) maximum.
609.2.2 Non-Circular Cross Section. Grab bars with non-circular cross sections shall have a cross-section dimension of 2 inches (51 mm) maximum and a perimeter dimension of 4 inches (100 mm) minimum and 4.8 inches (120 mm) maximum.

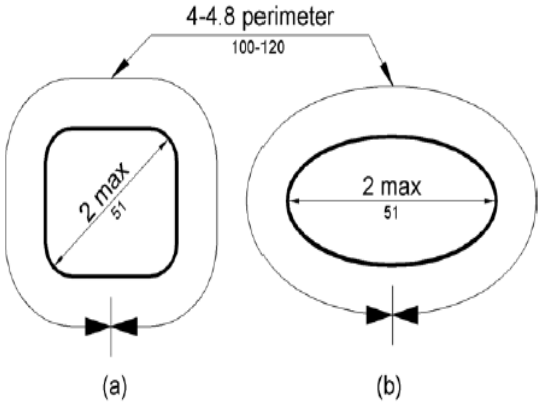


Figure 609.2.2 Grab Bar Non-Circular Cross Section

609.3 Spacing. The space between the wall and the grab bar shall be 1 1/2 inches (38 mm). The space between the grab bar and projecting objects below and at the ends shall be 1 1/2 inches (38 mm) minimum. The space between the grab bar and projecting objects above shall be 12 inches (305 mm) minimum.

EXCEPTION: The space between the grab bars and shower controls, shower fittings, and other grab bars above shall be permitted to be 1 1/2 inches (38 mm) minimum.

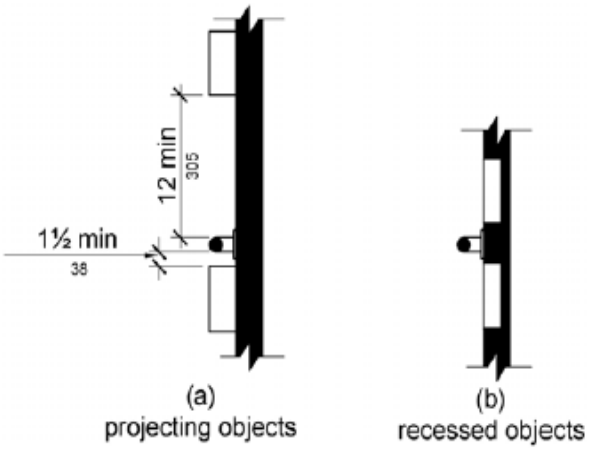


Figure 609.3 Spacing of Grab Bars

609.4 Position of Grab Bars. Grab bars shall be installed in a horizontal position, 33 inches (840 mm) minimum and 36 inches (915 mm) maximum above the finish floor measured to the top of the gripping surface, except that at water closets for children's use complying with 604.9, grab bars shall be installed in a horizontal position 18 inches (455 mm) minimum and 27 inches (685 mm) maximum above the finish floor measured to the top of the gripping surface. The height of the lower grab bar on the back wall of a bathtub shall comply with 607.4.1.1 or 607.4.2.1.

609.5 Surface Hazards. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall have rounded edges.

609.6 Fittings. Grab bars shall not rotate within their fittings.

609.7 Installation. Grab bars shall be installed in any manner that provides a gripping surface at the specified locations and that does not obstruct the required clear floor space.

609.8 Structural Strength. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the grab bar, fastener, mounting device, or supporting structure.

SIGNAGE

F216 Signs

F216.1 General. Signs shall be provided in accordance with F216 and shall comply with 703.

703 Signs

703.7 Symbols of Accessibility. Symbols of accessibility shall comply with 703.7.

703.7.1 Finish and Contrast. Symbols of accessibility and their background shall have a non-glare finish. Symbols of accessibility shall contrast with their background with either a light symbol on a dark background or

a dark symbol on a light background.

Advisory 703.7.1 Finish and Contrast. Signs are more legible for persons with low vision when characters contrast as much as possible with their background. Additional factors affecting the ease with which the text can be distinguished from its background include shadows cast by lighting sources, surface glare, and the uniformity of the text and background colors and textures.

703.7.2 Symbols.

703.7.2.1 International Symbol of Accessibility. The International Symbol of Accessibility shall comply with Figure 703.7.2.1.

Figure 703.7.2.1 International Symbol of Accessibility

This symbol is to be posted at the following locations:

- At designated accessible parking spaces (F216.5)
  - where a total of 5 or more parking spaces, including accessible parking spaces, are at a site (F216.5.1)
  - van parking space must be signed as "van accessible".(F216.5)
- If the main entrance to a building is not accessible, the ISA and an arrow to be posted to direct to closest accessible entrance. (F216.6)
- Accessible restrooms and bathing facilities.(F216.8)
- Accessible Area of Refuge inside multi story buildings (F216.4.2)
- Accessible means of egress out of a building (F216.4.3)
- If an entrance or elevator is not accessible, the ISA and an arrow are to be posted to direct to closest accessible (F216.7)

903 Benches

903.1 General. Benches shall comply with 903.

903.2 Clear Floor or Ground Space. Clear floor or ground space complying with 305 shall be provided and shall be positioned at the end of the bench seat and parallel to the short axis of the bench.

903.3 Size. Benches shall have seats that are 42 inches (1065 mm) long minimum and 20 inches (510 mm) deep minimum and 24 inches (610 mm) deep maximum.

903.4 Back Support. The bench shall provide for back support or shall be affixed to a wall. Back support shall be 42 inches (1065 mm) long minimum and shall extend from a point 2 inches (51 mm) maximum above the seat surface to a point 18 inches (455 mm) minimum above the seat surface. Back support shall be 2 1/2 inches (64 mm) maximum from the rear edge of the seat measured horizontally.

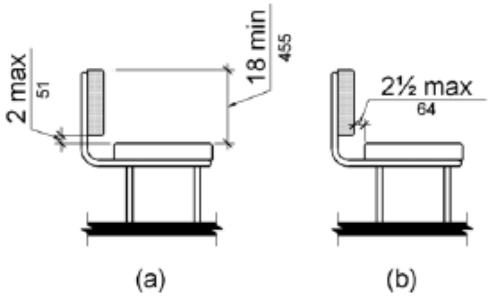


Figure 903.4 Bench Back Support

903.5 Height. The top of the bench seat surface shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the finish floor or ground.

903.6 Structural Strength. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the seat, fastener, mounting device, or supporting structure.

APPENDIX F

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FOREST SERVICE PROJECTS

U.S. Customary Units

National Technology and Development Program

10/30/2014

Supersedes the 1996 Standard Specification for Construction and Maintenance of Trails

Table of Contents

914.00. Climbing Turn
- 914.10. Climbing Turn
- 914.20. Climbing Turn Maintenance

915.00. Talus Section
- 915.10. Talus Section
- 915.20. Talus Section Maintenance

916.00. Turnout and Passing Section
- 916.10. Turnout and Passing Section
- 916.20. Turnout and Passing Section Maintenance

917.00. Fords
- 917.10. Natural Ford
- 917.20. Constructed Ford with Rock Structure
- 917.30. Constructed Ford with Log Structure
- 917.40. Stepping Stones
- 917.50. Ford Maintenance

918.00. Foundations
- 918.10. Rock Foundations
- 918.20. Gabion Basket Foundations
- 918.30. Crib Foundations
- 918.40. Geosynthetic Foundations
- 918.50. Corduroy Foundations
- 918.60. Foundation Maintenance

919. Reserved for Trailway Special Project Specifications

920. Drainage Structures

921.00. Culverts
- 921.10. Standard Culvert
- 921.20. Standard Culvert with Headwalls
- 921.30. Rock Culvert
- 921.40. Treated Timber Box Culvert
- 921.50. Open-Top Drain
- 921.60. Bottomless Arch Culvert
- 921.70. Log Culvert
- 921.80. Culvert Maintenance

922.00. Waterbars
- 922.10. Rock Waterbar
- 922.20. Log or Treated Timber Waterbar
- 922.30. Belted Waterbar
- 922.40. Waterbar Maintenance

923.00. Spillways
- 923.10. Rock Spillway
- 923.20. Rock Spillway Maintenance

924.00. Underdrains
- 924.10. Rock Underdrain
- 924.20. Sheet Underdrain
- 924.30 Underdrain Maintenance

925.00. Ditches
- 925.10. Side Ditch
- 925.20. Leadoff Ditch
- 925.30. Ditch Maintenance

926.00. Berms
- 926.10. Berm
- 926.20. Berm Maintenance

927.00. Drain Dips
- 927.10. Drain Dip
- 927.20. Drain Dip Maintenance

928.00. Check Dams
- 928.10. Check Dam
- 928.20. Check Dam Maintenance

929. Reserved for Drainage Structures Special Project Specifications

930. Trail Structures

931.00. Switchbacks
- 931.10. Type 1 – Radius Switchback
- 931.20. Type 2 – Circular Landing Switchback
- 931.30. Type 3 – Rectangular Landing Switchback
- 931.40. Switchback Maintenance

932.00. Turnpikes
- 932.10. Type 1 – Standard Turnpike
- 932.20. Type 2 – Standard Turnpike with Foundation
- 932.30. Turnpike Maintenance

933.00. Side Barriers
- 933.10. Stacked Rock Barrier
- 933.20. Masonry Rock Barrier
- 933.30. Barrier Rail on Grade
- 933.40. Barrier Rail on Post
- 933.50. Curbs
- 933.60. Guardrail
- 933.70. Side Barrier Maintenance

934.00. Puncheons
- 934.10. Standard Puncheon
- 934.20. Puncheon Without Decking
- 934.30. Puncheon Maintenance

935.00. Retaining Walls
- 935.10. Log Crib
- 935.20. Stacked Rock Retaining Wall
- 935.30. Wire Basket Retaining Wall
- 935.40. Masonry Rock Retaining Wall
- 935.50. Cast-in-place Concrete Retaining Wall
- 935.60. Retaining Wall Maintenance

936.00. Stairways
- 936.10. Individual Steps
- 936.20. Overlapping Steps
- 936.30. Crib Ladder
- 936.40. Staircase
- 936.50. Ladder
- 936.60. Stairway Maintenance

937.00. Railing System
- 937.10. Railing System
- 937.20. Railing System Maintenance

938.00. Boardwalks
- 938.10. Standard Boardwalk
- 938.20. Elevated Boardwalk
- 938.30. Step and Run
- 938.40. Boardwalk Maintenance

939. Reserved for Trail Structures Special Project Specifications

940. Restriction Devices

941.00. Fences
- 941.10. Post and Wire Fence
- 941.20. Post and Rail Fence
- 941.30. Woven Wire Fence
- 941.40. Jack Leg Fence
- 941.50. Stacked Rail (Worm) Fence
- 941.60. Remove and Reset Fence
- 941.70. Fence Maintenance

942.00. Gates
- 942.10. Wire Gate
- 942.20. Swing Gate
- 942.30. Loose Rail Gate
- 942.40. Accessible Gate – Kissing Gates
- 942.50. Accessible Gate – Chicanes
- 942.60. Gate Maintenance

943.00. Cattle Guards
- 943.10. Standard Cattle Guard
- 943.20. Above Ground Cattle Guard
- 943.30. Cattle Guard Maintenance

944.00. Stiles
- 944.10. Stiles
- 944.20. Stile Maintenance

945.00. Bollards
- 945.10. Bollards
- 945.20. Bollard Maintenance

949. Reserved for Restriction Devices Special Project Specifications

950. Signs and Markers

951.00. Signs
- 951.10. Signs
- 951.20. Sign Repair and Replacement Maintenance

952.00. Route Markers
- 952.10. Route Markers
- 952.20. Route Marker Maintenance

953.00. Reassurance Markers
- 953.10. Standard Forest Service Blaze
- 953.20. Manufactured Blazer
- 953.30. Reassurance Marker Maintenance

954.00. Mileage Markers
- 952.10. Mile Markers
- 952.20. Mileage Marker Maintenance

955.00. Cairns
- 955.10. Cairns
- 955.20. Cairn Maintenance

959. Reserved for Route Markers and Signs Special Project Specifications

960. Trail Bridges

961.00. Log Stringer Trail Bridge
- 961.10. Single Log Stringer Trail Bridge
- 961.20. Multiple Log Stringer Trail Bridge

962.00. Sawn Timber Trail Bridge
- 962.10. Sawn Timber Stringer Trail Bridge
- 962.20. Longitudinal Nail-Laminated Timber Trail Bridge

963.00 Glulam Trail Bridge
- 963.10. Glulam Stringer Trail Bridge
- 963.20. Longitudinal Glulam Deck Panel Trail Bridge

964.00. Prefabricated Steel Trail Bridge

965.00. Trail Bridge Substructures
- 965.10. Timber Sill on Geocell Pad
- 965.20. Timber Sill on Gabion Basket
- 965.30. Timber Sill on Timber Cribbing
- 965.40. Concrete Leveling Pad on Bedrock

966.00. Trail Bridge Maintenance

969. Reserved for Trail Bridge Special Project Specifications

970. Specialty Structures

971. Reserved for Snow Sheds

972. Reserved for Tunnels

979. Reserved for Specialty Structures Special Project Specifications

980. Incidentals

981.00. Seeding, Fertilizing and Mulching
982.00. Erosion Control Blankets
983.00. Removal of Structures and Obstructions
989.00. Reserved for Incidentals Special Project Specifications

990. Material

991.00. Rock, Grid Pavement Unit, Aggregate and Asphalt
- 991.01 Rock
- 991.02 Gabion and Revet Mattress Rock
- 991.03 Grid Pavement Unit
- 991.04 Pit-Run Aggregate
- 991.05 Screened Aggregate
- 991.06 Crushed Aggregate for Base or Surface Course
- 991.07 Asphalt
- 991.08 Cement

992.00. Pipe Material
993.00. Fence Material
994.00. Geosynthetic Material
- 994.01 Geotextile
- 994.02 Geonet
- 994.03 Geogrid
- 994.04 Geocell
- 994.05 Sheet Drains

995.00. Material for Timber Structures
996.00. Gabion and Revet Mattress Material

Section 900
General Specifications

Section 901—Terms, Format, Abbreviations and Definitions

901.01 Meaning of Terms. These specifications are generally written in the imperative mood. In sentences using the imperative mood, the subject "the Contractor," is implied. Also implied in this language is "shall," "shall be," or similar words or phrases. In material specifications, the subject may also be the supplier, fabricator, or manufacturer supplying material, products, or equipment for use on the project.

Wherever *"directed," "required," "prescribed,"* or similar words are used, the *"direction," "requirement,"* or *"order"* of the Contracting Officer is intended. Similarly, wherever *"approved," "acceptable," suitable," "satisfactory,"* or similar words are used, they mean *"approved by," "acceptable to,"* or *"satisfactory to"* the Contracting Officer.

The word *"will"* generally pertains to decisions or actions of the Contracting Officer.

Whenever in these specifications, or in other contract documents, the following terms (or pronouns in place of them) are used, the intent and meaning shall be interpreted as follows: reference to a specific standard, test, testing method, or specification shall mean the latest published edition or amendment that is in effect at the solicitation issue date for the public works contracts.

901.02 Specification Format These specifications are divided into Sections.

Sections 900 through 906, 908 and 909 consist of general contract requirements for which no direct payment is made. The requirements contained in Sections 900 through 906 are applicable to all contracts.

Sections 907, 908, 909 and 910 through 989 consist of construction contract requirements for specific items of work. Work under these Sections is paid for directly or indirectly according to Subsection 906.04 and the Section ordering the work. When there is no pay item in the bid schedule, no direct payment is made.

Sections 990 through 999 contain the material requirements for Sections 910 through 989. No direct payment is made in Sections 990 through 999. Payment for material is included as part of the work required in Sections 910 through 989.

The first three digits of the pay item number identify the Section under which the work is performed.

901.03 Abbreviations. Whenever these abbreviations are used in the specifications, they represent the following:

(a) Acronyms

AASHTO	American Association Of State Highway And Transportation Officials
ABS	Acrylonitrile-Butadiene-Styrene

AITC	American Institute of Timber Construction
ANSI	American National Standards Institute
AQ	Actual Quantities
APA	American Plywood Association
ASTM	American Society For Testing And Material
AWPA	American Wood Protection Association
CO	Contracting Officer
C.F.	Cubic Feet
C.Y.	Cubic Yard
DQ	Design Quantities
EA	Each
FAR	Federal Acquisition Regulation
g	Grams
HDPE	High-Density Polyethylene
hr	Hour
kg	Kilogram
kN	Kilonewtons
lb	Pound
L.F.	Linear Feet
LS	Lump Sum
LSQ	Lump Sum Quantities
m	Meter
m^2	Square Meter
m^3	Cubic Meter
mi	Mile
mm	Millimeter
MPa	Megapascals
MSE	Mechanically Stabilized Earth
N	Newton
NBS	National Bureau Of Standards
NCMA	National Concrete Masonry Association
OSHA	Occupational Safety & Health Administration
Pa	Pascal
PE	Polyethylene
PS	Product Standard Issued By The U.S. Department Of Commerce
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
S.F.	Square Feet
SQ	Staked Quantities
S.Y.	Square Yard
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association
WWPI	Western Wood Preservers Institute

Additional abbreviations may be found in Section 101.03 of the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03).

(b) Slope notation (vertical: horizontal). For slopes flatter than 1:1, express the slope as the ratio of one unit vertical to a number of units horizontal. For slopes steeper than 1:1, express the slope as the ratio of a number of units vertical to one unit horizontal.

901.04 Definitions The following terms, or pronouns in place of them, are used in these specifications or in other contract documents, the intent and meaning are as follows:

Barriers. A fence or other obstacle that prevents movement or access.

Base Course. The layer or layers of specified material of designed thickness placed on a trailbed to support surfacing.

Batter. A backward and upward slope of the face of a wall.

Berm. The ridge of material formed on the outer edge of the trail that projects higher than the tread.

Borrow. Suitable materials taken from approved sources designated on the plans or on the ground, to be used for embankments and backfilling.

Bridge. A trail structure, including supports, erected over a depression or obstruction such as a body of water, a road, a trail, or a railroad that provides a continuous pathway and that has a deck for carrying traffic or other loads.

Cap Rock. Rock placed in the top or uppermost layer in a constructed rock structure, such as a talus or rubble rock section or rock retaining wall.

Catch Point. The outer limits of a trailway where the excavation and/or embankment intersect with the ground line.

Clearing Limit. The area over and beside the trail that is cleared of trees, limbs, and other obstructions.

Climbing Turn. A reverse in direction of trail grade without a level landing used to change elevation on a steep slope.

Compacted. Consolidation that is obtained by tamping or rolling suitable material until no noticeable displacement of material is observed.

Contracting Officer (CO). An official of the Government with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the CO acting within the limits of their authority as delegated by the CO.

Culvert. Any structure with a bottom, regardless of the fill depth, the depth of invert, or the presence of a horizontal driving surface, or any bottomless (natural

channel) structure with footings that does not have wheel loads in direct contact with the top of the structure.

Curb. A border defining the edge of the trail or trail bridge.

Cushion Material. Native or imported material generally placed over rocky section of unsurfaced trail to provide a usable and maintained traveled way.

Designated on the Ground. The location of materials, work areas, and construction items, including lines and grades, marked on the ground with stakes, flagging, tags, or paint.

Drawings. Design sheets or fabrication, erection, or construction details submitted to the Government by the Contractor according to FAR Clause 52.236-21 Specifications and Drawings for Construction. Also refers to submissions and submittals.

Duff. Organic material overlying rock or mineral soil.

Embankment. A structure of suitable material placed on the prepared ground surface and constructed to the trailbed elevation.

Excess Excavation. Material in the trailway in excess of that needed for construction of designed trailways.

Falsework. Temporary construction work on which a main work is wholly or partly built and supported until the main work is strong enough to support itself.

Ford. A water-level stream crossing constructed to provide a level surface for safe traffic passage.

Full Bench. Trailbed constructed entirely on undisturbed material.

Gabion Basket. Rectangular wire baskets filled with rock used as pervious, semiflexible building blocks for slope and foundation stabilization.

Grade. The vertical distance of ascent or descent of the trail expressed as a percentage of the horizontal distance.

Hazard Tree. An unstable tree that is likely to fall across the trail.

Header Rock. Rock laid with the narrow end towards the face of the wall.

Inslope. Where the trails tread is sloped downward toward the backslope.

Leave Tree. Trees designated to be left or to remain undisturbed after trail construction.

Mineral Soil. Soil or aggregate that is free from organic substances and contains no particles larger than 2 inches at their greatest dimension.

Outslope. Where the trail tread is sloped downward toward the embankment or daylight side of the trailway.

Plans. The contract plans furnished by the Government showing the location, type, dimensions, and details of work.

Retainers. Embedded border of wood or rock used to retain fill and/or surface material.

Sideslope. The natural slope of the ground, usually expressed as a percentage.

Slough. That material from the backslope or the area of the backslope that has raveled onto the trailbed.

Slump. Where the trailbed material has moved downward, causing a dip in the trail grade.

Special Contract Requirements. Specifications that detail the conditions and requirements peculiar to an individual project, including additions and revisions to the standard specifications.

Standard Plans. Detailed plans approved for repetitive use and included as part of the plans.

Standard Specifications. The Standard Specifications for Construction of Trails on Federal Projects approved for general application and repetitive use.

Surfacing. Material placed on top of the trailbed or base course that provides the desired tread.

Suitable Material. Rock that can be accommodated in the trail structure, and soil free of duff with a recognizable granular texture.

Switchback. A reverse in direction of trail grade with a level landing used to change elevation on a steep slope, usually involving special treatment of the approaches, barriers, and drainages.

Trailbed. The finished surface on which base course or surfacing may be constructed. For trails without surfacing the trailbed is the tread.

Trailway. The portion of the trail within the limits of the excavation and embankment.

Tread. The surface portion of the trail upon which traffic moves.

Turnout. A short section of extra trail width to provide for passage of trail users.

Waterbar. A structure used for turning water off the trail, usually made of logs or stones.

Water Courses. Any natural or constructed channel where water naturally flows or will collect and flow during spring runoff, rainstorms, etc.

Additional definitions may be found in Section 101.03 of the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03).

Section 902—Intent of Contract

902.01 Intent of Contract. The intent of the contract is to provide for the construction and completion of the work described. The precise details of performing the work are not stipulated except as considered essential for the successful completion of the work. Furnish all labor, material, equipment, tools, transportation, and supplies necessary to complete the work according to the contract.

Section 903—Control of Work

903.01 Specifications and Drawings. Follow the requirements of FAR Clause 52.236-21 Specifications and Drawings for Construction.

(a) General. Prepare drawings as necessary to construct the work. Drawings include, but are not limited to, layouts that show the relative position (vertical and horizontal as appropriate) of work to be performed, fabrication details for manufactured items and assemblies, installation and erection procedures, details of post-tensioning and other systems, detailed trench and excavation procedures that conform to OSHA requirements, traffic control implementation drawings, and methods for performing work near existing structures or other areas to be protected. Show all the drawing dimensions in United States customary units.

Drawings shall be a minimum size of 11 by 17 inches and a maximum size of 24 by 36 inches. All text should have a minimum height of 1/8 inch for 24 by 36 inch drawings (D size sheets). Include on each drawing and calculation sheet, the project number, name, and other identification as shown in the contract.

Furnish 5 sets of drawings and supporting calculations for acceptance before performing work covered by the drawings. If drawings are returned for revision, correct and resubmit for acceptance. Allow 40 days per submission for railroad structures and 30 days per submission for all other structures. The review time as specified is applied separately to each drawing submitted. The CO may request additional specific drawings for unique situations in order to clarify layout, construction details, or methodology. If drawings must be resubmitted, the time for acceptance starts over. Obtain written approval before changing or deviating from the accepted drawings.

(b) Specific requirements for concrete and miscellaneous structures.

(1) Furnish drawings for the following:

(a) Site-specific layouts for all wall types and gabion installations;

(b) Gabion and revet mattress details and installation procedures;

(c) Forms and falsework for reinforced concrete box culverts less than or equal to 6 feet in height;

(d) Fabrication drawings for bridge railings and parapets;

(e) Fabrication drawings for prestressed members;

(f) Fabrication and installation drawings for expansion joint assemblies;

(g) Fabrication drawings for bearing assemblies;

(h) Construction joint location and concrete deck placement sequences not shown on the plans;

(i) Erection diagrams for Soil-Corrugated Metal Structure interaction systems (multi-plate structures);

(j) Structural steel fabrication drawings;

(k) Utility hangar details; and

(l) Fabrication and installation drawings for precast items.

(2) Furnish drawings that bear the seal and signature of a professional engineer proficient in the pertinent design field for the following:

(a) Erection plans;

(b) Reinforced soil slopes details;

(c) MSE wall and crib wall details;

(d) Details and installation procedures for proprietary wall systems;

(e) Temporary bridge structures for public use;

(f) All bridge forms except for railings, parapets, and components less than 6 feet in height;

(g) Shoring systems and cofferdams greater than 6 feet in height;

(h) All shoring systems that support traffic loadings;

(i) Forms and falsework for all structures greater than 6 feet in height;

(j) Post-tensioning systems;

(k) Ground anchors, soil nail, and rock bolt assembly details, layout, and installation and testing procedures;

(l) Tie back wall details; and

(m) Alternate retaining wall details.

(3) Furnish drawings that bear the seal and signature of a professional engineer who is proficient in forms and falsework

design and licensed in the state where the project will be constructed for the following:

(a) Falsework for any structure with a span exceeding 16 feet;

(b) Falsework for any structure with a height exceeding 14 feet; and

(c) Falsework for structures where traffic, other than workers involved in constructing the structure, will travel under the structure.

Section 904—Control of Materials

904.01 Handling Materials. Transport and handle all materials to preserve their quality and fitness for the work. Stockpile, load, and transport aggregates in a manner that will preserve specified gradation and avoid contamination.

Store materials to assure the preservation of their quality and fitness for the work. Locate stored materials to facilitate their prompt inspection. Sites on Government-administered land that are not already designated may be used for storage purposes and for placing of equipment only when approved in advance by the CO. Restore all storage sites in accordance with requirements SHOWN ON THE PLANS or as otherwise specified. Arrangements for storage on other than designated sites are the responsibility of the contractor.

904.02 Material Sources

(a) Designated Sources. Sources for materials such as, but not limited to, soil, rock, or logs that are not available from trailway excavation or clearing operations will be designated. Sources of local materials designated in the SPECIAL CONTRACT REQUIREMENTS or SHOWN ON THE PLANS are guaranteed by the Government for the quality and quantity of material in the source.

Use all needed suitable material from the source. The designation of a source includes the right to use areas SHOWN ON THE PLANS for the purposes designated (such as plant sites, stockpiles, and haul roads). Operations are restricted to the confines of the area(s) designated.

Comply with the requirements of 30 CFR 56, subparts B and H. When required, re-establish vegetation in disturbed areas according to section 981.

(b) Contractor-Furnished Sources. Furnish material that produces an end product equivalent in performance to that specified.

904.03 Restoration. Shape and grade borrow areas on Government-administered land to make them stable and to minimize future erosion. Dispose of debris resulting from development of material sources by scattering, unless otherwise specified. Do not scatter debris within the clearing limits of trails or within roadsides. Cut off stumps to less than 12 inches above the ground as measured on the uphill side of the stump.

Section 905—Quality Assurance and Quantity Measurement

Description

905.01 This work consists of providing certification that the quality and quantity of construction conform to the plans, specifications, and requirements of the contract.

Construction

905.02 Certification and Measurements

(a) Offsite-Produced Materials. Furnish signed certificates executed by the manufacturer, supplier, or vendor, stipulating that all offsite-produced materials incorporated in the work meet applicable requirements SHOWN ON THE PLANS or stated in the specifications. Furnish a certificate for each commodity or invoice.

(b) Quantity Measurements. Submit quantities to the CO for periodic progress payments, and the CO will compute payments. Quantities are subject to verification.

905.03 Records. Maintain a set of contract plans depicting as-built conditions resulting from approved changes. Maintain the plans in a current condition and indicate changes from the original contract plans in red. Give the plans to the CO upon the completion of the contract work.

Measurement

905.04 Method. There will be no separate measurement for this item.

Payment

905.05 Payment will be considered incidental to other pay items in this contract.

Section 906—Measurement and Payment

906.01 General. Measurement and payment for contract work will be made only for and under those pay items included in the SCHEDULE OF ITEMS. All other work and materials will be considered incidental and included in the payment of the PAY ITEMS in the SCHEDULE OF ITEMS.

When more than one class, size, or thickness is specified in the SCHEDULE OF ITEMS for any PAY ITEM, suffixes will be added to the item number to differentiate between the items.

906.02 Determination of Quantities. The following measurements and calculations are to be used to determine contract quantities for payment:

Make measurements for seeding, geotextiles, and erosion control blankets along slope lines.

For retaining walls, measure by the square foot of front wall face.

Measure structures according to neat lines SHOWN ON THE PLANS or as altered by the CO in writing to fit field conditions. Make measurements along the centerline and parallel to the specified grade or foundation or as SHOWN ON THE PLANS.

Deduct lengths for stairways, turnpike, puncheon, retaining walls, wire baskets, switchbacks, bridges, and bridge approaches from the measurement of excavation in Section 911 unless these items are specified as incidental to excavation in Section 911.

For standard manufactured items, such as fence, wire, plates, rolled shapes, and pipe conduits identified by gage, weight, section dimensions, and the like, such identification shall be considered the nominal weights or dimensions. Manufacturer's tolerances will be accepted unless controlled by tolerances in the cited specifications.

906.03 Units of Measurement. Payment will be made by units defined and determined according to U.S. Customary measure and by the following:

(a) Cubic Yard. A measurement computed by one of the following methods:

(1) Excavation, embankment, or borrow. The measurement computed by the average-end-area method from measurements made longitudinally along a centerline or other reference line.

(2) Material in place or stockpiled. The measurement computed with the dimensions of the in-place material using average-end-area method or prismodial formula.

(3) Material in the Delivery Vehicle. The measurement computed using measurements of material in the hauling vehicles at the point of delivery.

Vehicles shall be loaded to at least their water-level capacity. Leveling of the loads may be required when vehicles arrive at the delivery point.

(b) Each (EA). One complete unit, which may consist of one or more parts.

(c) Lump Sum (LS). The quantities that denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job.

906.04 Methods of Measurement. One of the following methods of measurement for determining final payment is DESIGNATED ON THE SCHEDULE OF ITEMS for each PAY ITEM:

(a) Designed Quantities. These quantities denote the final number of units to be paid for under the terms of the contract. They are based upon the original design data available prior to advertising the project. Original design data include the preliminary survey information, design assumptions, calculations, and plans. Changes in the number of units DESIGNATED IN THE SCHEDULE OF ITEMS may be authorized under the following conditions:

(1) As a result of changes in the work approved by the CO.

(2) As a result of the CO determining that errors exist in the original design that cause a PAY ITEM quantity to change by 15 percent or more.

(3) As a result of the contractor submitting to the CO a written request showing evidence of errors in the original design that cause a PAY ITEM quantity to change by 15 percent or more. The evidence must be verifiable and consist of calculations, plans, or other data that show how the designed quantity is believed to be in error.

(b) Staked Quantities (SQ). These quantities are determined from staked measurements prior to the construction.

(c) Actual Quantities (AQ). These quantities are determined from measurement of completed work.

(d) Vehicle Quantities. These quantities are measured or weighed in hauling vehicles.

(e) Lump Sum Quantities (LSQ). These quantities denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job.

906.05 Government-Furnished Materials. When materials are furnished by the Forest Service, the note “Government-Furnished Materials” will be added to the description of the PAY ITEM.

Section 907—Mobilization

Description

907.01 This work consists of moving personnel, equipment, material, and incidentals to the project and performing all work necessary before beginning work at the project site. Mobilization includes the costs associated with obtaining permits, insurance, and bonds. Mobilization is not intended to pay for the costs of materials before they are used on the project site.

Payment

907.02 The accepted quantity, measured as provided in Subsection 906.02, will be paid at the contract price per unit of measurement for the Section 907 pay item shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Progress payments for mobilization lump sum will be paid as follows:

(a) Bond premiums will be reimbursed according to FAR Clause 52.232-5, Payments Under Fixed-Price Construction Contracts, after receipt of the evidence of payment. Reimburse for bond premiums before issuing the Notice to Proceed if evidence of payment is received.

(b) When 5 percent of the original contract amount is earned from other bid items, 50 percent of the mobilization item, or 5 percent of the original contract amount, whichever is less, will be paid.

(c) When 10 percent of the original contract amount is earned from other bid items, 100 percent of the mobilization item, or 10 percent of the original contract amount, whichever is less, will be paid.

(d) Any portion of the mobilization item in excess of 10 percent of the original contract amount will be paid after final acceptance. Pay any unpaid amount for mobilization upon final acceptance of all work items.

Section 908—Construction Staking, Flagging, and Cleanup

Description

908.01 This work consists of establishing any control points needed in addition to existing staking, and removing and disposing of all construction stakes, tags, flagging, and plastic ribbon from the project area.

Construction

908.02 General. The Government will set initial construction stakes or flagging, and control points, and furnish the contractor with all necessary information relating to lines, slopes, and grades. These stakes and flagging constitute the field control.

Furnish and maintain additional stakes, flagging, templates, batter boards, and other materials and supplies necessary for marking and maintaining points and lines established. Do not perform work in the absence of control points. If any construction control points are destroyed, displaced, or erroneous, notify the CO. Uniformly contour alignment and construct grade from control point to control point.

Remove all construction stakes, tags, flagging, and plastic ribbon from the project area within 7 days after the final inspection of all other work on the project. Dispose of all stakes, tags, flagging, and plastic ribbon off Government-administered lands unless otherwise designated.

Measurement

908.03 There will be no separate measurement for this item.

Payment

908.04 Trail staking, flagging, and cleanup will be considered incidental to other pay items in this contract, and additional payment will not be made.

Section 909— Maintenance for Traffic and Temporary Construction Access

Description

909.00.01 This work consists of maintaining existing trails that are undergoing improvements open and maintained in such a condition as to safely accommodate traffic and providing temporary construction access to the site. Maintaining the trail for traffic and temporary access may be covered by subsection:

909.10	Maintenance for Traffic
909.20	Temporary Construction Access

Measurement

909.00.02 There will be no separate measurement for these items.

Payment

909.00.03 Maintaining the trail for public access and providing temporary construction access will be considered incidental to other pay items in this contract, and additional payment will not be made.

909.10 - Maintenance for Traffic

Description

909.10.01 Keep existing trails that are undergoing improvements open and maintained in such a condition as to safely accommodate traffic. Provide and maintain temporary detours, approaches, or crossings and intersections with trails, roads, businesses, parking lots, and campgrounds in a safe and passable condition. Perform no work that interferes or conflicts with traffic until a plan for handling traffic has been submitted and approved. Specific requirements for detours or closures are SHOWN ON THE PLANS or in the SPECIAL CONTRACT REQUIREMENTS.

Before any suspension of work, take precautions necessary to prevent damage to the project, such as temporary detours, approaches, crossings, or intersections, and make provisions for normal drainage and to minimize erosion. Leave all trailways in a condition suitable for traffic unless otherwise specified.

The Government may permit use of portions of the project during periods when operations are shut down. All maintenance attributable to permitted use during periods of work suspension will be provided by the Government. The contractor is responsible for any maintenance that is not attributable to use or that is necessary during suspensions resulting from fault or negligence of the contractor.

909.20 - Temporary Construction Access

Description

909.20.01 The government may provide temporary access for the contractor from another route or trail other than the trail being constructed. The contractor will be responsible for maintaining the temporary access, removing and rehabilitating the temporary access route and any damaged area after construction is completed.

Section 910—Trailways

Section 911 - Trail and Prism

Description

911.00.01 This work consists of constructing trails, restoration of existing trails or obliteration of abandoned trails. The earthwork and associated trail tread and prism work may be covered by one or more of the following subsections:

911.10.	Excavation and Embankment
911.20.	Borrow
911.30.	Existing Trail Restoration
911.40.	Slide Maintenance
911.50.	Slough and Berm Removal
911.60.	Obliteration of Abandoned Trails
911.70.	Retainers

Measurement

911.00.02 Measure the section 911 items listed in the bid schedule according to subsection 906.

Payment

911.00.03 The accepted quantities will be paid at the contract price per unit of measurement for the section 911 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

911.10 - Excavation and Embankment

Description

911.10.01 This work consists of the excavation and placement of excavated material, regardless of its nature, from within the trailway or from other sources, except for material included under other pay items SHOWN IN THE SCHEDULE OF ITEMS.

Includes excavation, embankment, and backfill construction required to shape and finish the trailbed, ditches, backslopes, fill slopes, drainage dips, trail passing sections, and turnouts. Also includes excavation and embankment work required to construct culverts, trail bridges, shallow stream fords and gully crossings, talus and rubble rock sections, and climbing turns.

Materials

911.10.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

911.10.03 Use and Disposal of Excavated Material. Conserve and use all suitable material for specified work. Conserve excess excavated rock suitable for specified project work and use in place of materials from designated sources.

Remove all duff and debris from within trailway limits and uniformly spread outside the clearing limits, not more than 4 inches in depth (unless otherwise SHOWN ON THE PLANS). Do not obstruct drainage or create piles, berms, or windrows of debris.

Place excess and unsuitable excavation beyond the downslope edge of the trailbed Do not obstruct drainage and spread to a depth not exceeding 4 inches. This includes any material removed in the grubbing operation and deposited in the same area.

Place rocks over 4 inches in greatest dimension not used in construction beyond the hinge point on the downslope side. Place rocks so that the tops are at least 6 inches lower than the trailbed surface. Ensure that no blockage of drainage or creation of a windrow effect occurs.

911.10.04 Trailway Excavation and Embankment. Minor deviations of ± 12 inches in vertical alignment and 36 inches in horizontal alignment with smooth transitions of at least 30 feet on each side of the deviation are acceptable unless otherwise SHOWN ON THE PLANS.

Construct embankments with suitable compacted material. Compact all disturbed soil within the trailbed area.

Remove any rock within or above the backslopes that is unstable. Use or dispose of rock in accordance with Subsection 912.03.

Leave the finished slope in a uniform and roughened condition.

Make necessary adjustments of horizontal or vertical alignment, within the tolerances specified in this subsection, to produce the designed trailway section and balance earthwork. Such adjustments shall not be considered as changes.

911.10.05 Trailbed Finish. Fill holes with suitable material, compact, and cut high points to provide a uniform trailbed finish.

911.10.07 Ditches. Construct ditches to be free of loose rocks, roots, sticks, and other obstructions.

911.10.08 Geosynthetics. Where SHOWN ON THE PLANS, place geosynthetics flat and parallel to centerline of the trail before placing embankment. Overlap geosynthetics a minimum of 24 inches. Install anchors or fasteners as recommended by the geosynthetic manufacturer.

911.20 - Borrow

Description

911.20.01 This work consists of placing select borrow material on the trailbed.

Materials

911.20.02 Requirements. Obtain borrow materials from locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Obtain CO's approval before using borrow from other locations. Suitable material from slough and berm removal may also be used as borrow material. Use suitable borrow material and aggregate under 2 inches in the greatest dimension.

Construction

911.20.03 General. On sideslopes where water can drain away from the trailbed, provide a sufficient depth of borrow material to obtain the outslope as SHOWN ON THE PLANS.

Across meadows and on turnpike sections, provide a sufficient depth of borrow material to produce a crowned trailbed as SHOWN ON THE PLANS.

Compact all material placed. Compact borrow material placed on the approaches of bridges and puncheon to provide a smooth surface and a smooth transition from the structure to the adjoining trail tread surface.

Cover any culvert surfaces that have become exposed with a minimum depth of 6 inches of suitable material over the full length of the exposed culvert and of sufficient length along the trail to present a uniform trail grade.

Provide free-draining borrow sites and backslopes no steeper than 1 1/3:1.

911.30-Existing Trail Restoration

Description

911.30.01 This work consists of restoring the original trail template, including clearing, removing slough and berm, borrow, filling ruts and troughs, reshaping backslopes, excavation, reshaping trail tread, restoring drainage and other trail structures, constructing check dams, and removing protruding rocks, roots, stumps, slough, and berms.

Construction

911.30.03 Clearing and Grubbing. Clear and grub in accordance with the requirements of section 912 and as SHOWN ON THE PLANS.

911.30.04 Excavation and Embankment. Excavate and place all excavated material in accordance with the requirements of section 911.10.04 and as SHOWN ON THE PLANS.

911.30.05 Rock and Root Removal. Uniformly scatter the removed rocks and roots below the trailway and distribute to ensure no blockage of watercourses or creation of a windrow. Fill holes with suitable material and compact.

911.30.06 Slough and Berm Removal and Excess Material. Use suitable slough and berm material within the trailway to restore the trailbed as SHOWN ON THE PLANS. Place all unsuitable and excess material beyond the downslope edge of the trailbed and uniformly spread to a depth not exceeding 4 inches and so as not to obstruct drainage or interfere with the drainage of outsloped tread.

Remove berm when daylight can be obtained within a distance of 5 feet from the outslope edge of finished tread unless otherwise DESIGNATED ON THE GROUND or SHOWN ON THE PLANS.

911.30.07 Fill Material and Borrow. Use suitable material to fill ruts, troughs, and potholes in the tread that cannot be leveled and outsloped through performance of work in Subsection 915.06. Compact and shape as SHOWN ON THE PLANS.

Obtain borrow from areas SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

911.30.08 Drainage. Restore drainage dips and ditches to reestablish drainage as SHOWN ON THE PLANS by removing obstructions such as rocks, roots, and sticks to make ditches and culverts free draining.

Restore rock spillways in accordance with section 923 and as SHOWN ON THE PLANS.

911.30.09 Stream Channel Cleaning. Clean channel of obstructions in areas SHOWN ON THE PLANS. Remove debris and rocks from the stream channel and scatter outside of the side slopes of the stream channel and beyond the clearing limits.

911.30.10 Check Dams. When constructing check dams for gullies, use dimensional lumber, sound peeled logs, or a row of stones placed across the gully in the subgrade with the ends securely embedded in the banks as SHOWN ON THE PLANS and at locations STAKED ON THE GROUND.

Use suitable material for backfill as SHOWN ON THE PLANS. Place and compact backfill to meet the density of the existing trailbed and to form a smooth tread.

911.30.11 Switchbacks. Restore switchbacks in accordance with section 914 and as SHOWN ON THE PLANS.

911.30.12 Waterbars. Restore waterbars in accordance with section 922 and as SHOWN ON THE PLANS. Reestablish drainage by removing accumulated material and replacing loose or missing rocks, unsuitable logs, and deteriorated rubber belting.

911.30.13 Turnpikes. Restore turnpikes in accordance with section 913 and as SHOWN ON THE PLANS by replacing missing, rotten, or loose retainer logs and stakes, or missing or loose retainer rocks. Backfill with suitable material.

911.30.14 Trail Structures. Restore all trail structures at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

911.30.15 Reshaping and Finishing Trailbed and Backslopes. Provide a firm and uniformly finished trailbed in accordance with cross-sections SHOWN ON THE PLANS.

Provide a uniform and roughened surface on disturbed backslopes in accordance with cross-sections SHOWN ON THE PLANS. Cut all roots flush.

911.40 - Slide Maintenance

Description

911.40.01 This work consists of the removal and disposal of slide material from the trailbed and the restoration of all sections of trail that have been damaged.

Maintenance

911.40.02 General. Conserve and use suitable material from the slide on the trailbed for tread surfacing. Spread this material at a maximum depth of 3 inches for a distance not exceeding 100 feet in each direction from the site of the slide unless otherwise SHOWN ON THE PLANS.

Place all excess and unsuitable material beyond the downslope edge of the trailbed. Uniformly spread unsuitable material to a depth not exceeding 4 inches and do not obstruct drainage.

Reshape the backslope that contributed to the slide to reduce future sloughing and to conform to adjacent undamaged sections unless otherwise SHOWN ON THE PLANS.

Re-grade sections of trailbed that have been damaged to a width and finish that conform to adjacent undamaged sections unless otherwise SHOWN ON THE PLANS.

911.50 - Slough and Berm Removal

Description

911.50.01 This work consists of the removal and disposal of slough and berm material that has accumulated on the trailway.

Construction

911.50.02 Slough and Berm Removal and Excess Material. Remove all slough material within the trailway. Remove all material from the trailbed when daylight can be obtained within a distance of 4 feet from the outsloped edge of the finished tread unless otherwise DESIGNATED ON THE GROUND or SHOWN ON THE PLANS. Conserve and use suitable material to restore the trail tread as SHOWN ON THE PLANS.

Place all excess and unsuitable material beyond the downslope edge of the trailbed. Uniformly spread to a depth not exceeding 4 inches and do not obstruct drainage or interfere with the drainage of outsloped tread.

911.60 - Obliteration of Abandoned Trails

Description

911.60.01 This work consists of removal and disposal of existing structures, including turnpikes, walkways, bridges, culverts, signs and posts, and other material within the trailway, above or below ground. Work also includes salvaging DESIGNATED materials and backfilling the resulting trenches, holes, and pits.

Construction

911.60.02 Removal of Culverts and Bridges. Remove existing culverts within embankment areas at locations SHOWN ON THE PLANS.

Remove existing structures down to the natural stream bottom, and remove parts outside the water course to at least 12 inches below natural ground surface or finish ground surface, whichever is lower. Where portions of an existing structure lie wholly, or in part, within the limits of a new structure, remove parts to accommodate the installation of the proposed structure.

Avoid damage to bridges being dismantled for salvage. Match mark steel and/or wood members and prepare drawings showing the structural location of each member.

911.60.03 Signs and Posts. Remove signs, posts, and associated hardware at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Backfill post hole, compact, and contour area to match existing ground.

911.60.04 Removal of Other Obstructions. Remove other obstructions at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

911.60.05 Disposal. Dispose of native log and rock material by scattering below the trailway and outside clearing limits. Do not place debris in water courses, snow ponds, lakes, meadows, or locations where it could impede the flow to, through, or from the drainage structures. Dispose of metal, treated timber, and other manufactured products by removing from Government-administered lands and placing in approved waste disposal sites.

911.70 - Retainers

Description

911.70.01 This work consists of furnishing and installing log, sawn timber and rock retainers, including excavation and backfill, wood stakes and/or metal anchors and selecting and hauling of retainer materials.

Materials

911.70.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Construction

911.70.03 General. Place log, sawn timber, or rock retainers in continuous rows. Bed retainers along their entire length and so they are stable. When retainers are constructed of logs or sawn timber use lengths greater than or equal to 10 feet.

Section 912 - Clearing Limits

Description

912.00.01 This work consists of clearing, grubbing, trimming, removing, and treating trees, logs, limbs, branches, brush, plants, and other vegetation along with removal of rocks, undermined roots and hazard trees within the clearing limits. Clearing and removal of trees, vegetation and rocks may be covered by one or more of the following subsections:

912.10.	Clearing and Grubbing
912.20.	Brush Cutting
912.30.	Logging Out
912.40.	Hazard Tree Removal
912.50.	Loose Rock Removal
912.60.	Rock and Root Removal

Measurement

912.00.02 Measure the section 912 items listed in the bid schedule according to subsection 906.

Payment

912.00.03 The accepted quantities will be paid at the contract price per unit of measurement for the section 911 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

912.10 - Clearing and Grubbing

Description

912.10.01 This work consists of clearing, grubbing, trimming, removing, and treating trees, logs, limbs, branches, brush, plants, and other vegetation within the clearing limits. Work includes the felling and treatment of designated trees outside the clearing limits. Also, included are the protection from injury or defacement of trees and other objects not designated for removal and treatment of damaged trees.

Construction

912.10.02 Clearing Limits. Clear to the dimensions SHOWN ON THE PLANS or 12 inches beyond the fill and backslope catch points, whichever is greater.

912.10.03 Material to Be Cleared. Remove and dispose of trees, logs, limbs, branches, brush, herbaceous plants, and other vegetation within the clearing limits, except for the following:

a) Live, sound, and firmly rooted trees of the size SHOWN ON THE PLANS.

b) Live brush, herbaceous plants, and trees between the trailway and the clearing limits that are less than 12 inches in height and less than ½ inch in diameter at ground line.

Except as provided above, cut all limbs and branches more than ½ inch in diameter that extend into the clearing limits. Cut limbs flush with the tree trunks or stems or cut at the ground surface as SHOWN ON THE PLANS.

Fall and limb designated trees.

912.10.04 Damaged Trees. When felling, cutting, or trimming, do not cause bark damage to standing timber. If damage does occur to standing trees, treat the injured trees as SHOWN ON THE PLANS. Remove and dispose of trees with major roots exposed by construction that are rendered unstable.

912.10.05 Removal of Stumps. Remove all stumps within the trailbed. Remove stumps located between the edge of the trailbed and the edge of the trailway that cannot be cut flush with the finished slope or that are not tightly rooted.

912.20 - Brush Cutting

Description

912.20.01 This work consists of removing brush, trees less than 4 inches in diameter, and shrubs within the clearing limits.

Construction

912.20.02 General. Remove all limbs of shrubs and trees that extend across or into the clearing limits as SHOWN ON THE PLANS. Saw or cut limbs flush with the tree trunk. Make cuts in a manner that will not tear or strip bark from the trees.

Cut and remove from the clearing limits all woody plants exceeding ½ inch in stem diameter or 12 inches in height. The maximum size material to be cut under this specification is 4 inches in diameter when measured at a height of 6 inches above the ground on the uphill side of the stump.

Cut all brush and small, woody plants as near flush to the ground surface as possible. When impractical to cut plants flush, the maximum stem length shall be 2 inches.

Remove all woody material for a minimum of 3 inches below the trail tread surface. Fill holes in the trail tread caused by removing woody material with suitable material.

Scatter the clearing debris removed from the clearing limits outside and below the clearing limits. Do not place materials in stream channels, drainage ways, ditches, culvert inlets, or other locations where they would prevent the free flow of water away from the trailbed.

912.30 - Logging Out

Description

912.30.01 This work consists of removing brush, logs, and down trees from the clearing limits.

Construction

912.30.02 Clearing Out. Cut and remove all logs that extend across or into the clearing limits. The portions of cut logs that remain on the upper side of the trail shall be either firmly anchored to prevent sliding or rolling onto the trailway or moved across the trail to the lower side and scattered outside the clearing limits.

Fell all trees over 4 inches in diameter that are leaning into the clearing limits and that are within 10 feet above the trailbed. Stump height of leaning trees that are cut outside the clearing limits shall not exceed 12 inches as measured on the uphill side of the stump. Disposal and payment for the leaning trees described above will be the same as for down logs and trees. Remove roots and stumps from trees within the trailway that have been uprooted.

Rerouting the trail around windfalls, uprooted trees, and other obstacles will not be permitted. Ramp or reroute sections of the trail tread that have been damaged by uprooted stumps as necessary to provide safe passage on the trail. Payment for such work will be incidental to the specified work item, and no extra payment will be made.

Remove sticks or wood chunks exceeding 2 inches in diameter and 12 inches in length that have fallen onto the trailbed.

Scatter the down trees on the lower side of the trailway outside the clearing limits. Do not place such materials in stream channels, drainage ways, ditches, culvert catch basins or other locations where they would prevent the free flow of water away from the trailbed.

912.40 - Hazard Tree Removal

Description

912.40.01 This work consists of felling, bucking, and limbing trees and scattering slash.

Construction

912.40.02 Hazard Trees. Remove trees and snags that are broken off or that are in a leaning, unstable position over the trailway to designated areas as SHOWN ON THE PLANS. Cut designated danger trees so that stump heights do not exceed 12 inches as measured on the uphill side of the stump. Maximum stump height of designated trees within 4 feet of the trail centerline is 4 inches. Do not leave felled trees parallel with the trail unless there are sufficient barriers to keep them from rolling or sliding onto the trail. Lop limbs to reduce slash concentration and scatter the clearing debris outside and below the clearing limits. If the trunk or a portion thereof, falls within the trailway, remove that portion within 4 feet of either side of the trail centerline and scatter a minimum distance of 4 feet beyond and below the trail centerline.

912.50 - Loose Rock Removal

Description

912.50.01 This work consists of removal and disposal of loose rock from the trail tread.

Construction

912.50.02 General. Remove loose rocks that are larger than 2 inches at their greatest dimension from the trailbed. Remove any loose rock in drainage dips or ditches that may impede water flow off the trail. Loose rocks are rocks that are not firmly embedded in the trail and can be removed by hand. Where the trailbed consists predominantly of rock with little or no soil present, remove all loose rock larger than 3 inches.

Fill any holes remaining from rock removal with suitable material and compact. If the rock removed is not needed for other items of maintenance work, scatter the rock by side-casting to the lower side of trailway beyond the clearing limits, and distribute rock to ensure that no blockage of drainage or creation of a windrow occurs. Do not dispose of waste materials in water courses.

912.60 - Rock and Root Removal

Description

912.60.01 This work consists of removal and disposal of rocks and roots from the tread.

Construction

912.60.02 Rock Removal. Remove surface rocks that are larger than 2 inches at their greatest dimension, and rocks that project more than 2 inches above the surface of the trail tread, when removal can be accomplished by hand or when rocks can be pried out with a pick mattock, shovel, pry bar, or similar tool. Where the trailbed consists predominantly of rock with little or no soil present, remove loose rock in excess of 3 inches.

Shatter any protruding rocks in trail tread that are too large to be pried out with a pick and bar by using either a rock sledge or explosives. Remove the protrusion down to the level of the tread surface. Fill any resulting depressions with suitable material and compact by tamping. If rock removed is not needed for other items of maintenance work, scatter the rock by side-casting to the lower side of the trailway and beyond the clearing limits and distribute rock to ensure that no blockage of drainage

or creation of windrow occurs. Do not dispose any waste material in water courses.

912.60.03 Root Removal. Remove exposed tree roots on or in the trail tread that are greater than 1 inch in diameter. Cut embedded roots that project more than 2 inches above the trail tread flush with the trail tread. Scatter removed roots on the lower side of the trailway beyond the clearing limits and outside of water courses.

Fill holes caused by rock and root removal with suitable material and compact to form a smooth trail tread.

Maintain trail tread to the width as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Section 913 – Surfacing

Description

913.00.01 This work consists of furnishing, hauling, watering, placing, and compacting surfacing and other associated work. Trail surfacing may be covered by one or more of the following subsections:

913.10.	Aggregate Surfacing and Base Course
913.20.	Hot Asphalt Plant Mix Trail Surfacing
913.30.	Cold Asphalt Mix Trail Surfacing
913.40.	Grid Unit Surfacing
913.50.	Riprap Surfacing
913.60.	Chunk Wood Surfacing
913.70.	Imported Clay Surfacing
913.80.	Geosynthetic Surfacing
913.90.	Surface Maintenance

Materials

913.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

913.00.02 Preparation of Subgrade. Prepare and finish trailbed as required under section 911. Obtain written approval of the CO before placing aggregate.

913.00.03 Retainers. Construct retainers in accordance with Section 911.70 and as SHOWN ON THE PLANS.

Measurement

913.00.04 Measure the section 913 items listed in the bid schedule according to subsection 906.

Payment

913.00.05 The accepted quantities will be paid at the contract price per unit of measurement for the section 913 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

913.10 - Aggregate Surfacing and Base Course

Description

913.10.01 This work consists of furnishing, hauling, watering, placing, and compacting aggregate surfacing or base course; furnishing and installing retainers; and geosynthetics.

Materials

913.10.02 Materials. Produce aggregate by pit run, screening, or crushing. Obtain materials from sources SHOWN ON THE PLANS or other sources approved by the CO in writing.

913.10.03 Handling Materials. Stockpile, remove, transport, and spread aggregates in a manner that will preserve specified gradation and avoid contamination. Do not intermingle stockpiles of aggregate having different gradations.

913.10.04 Sampling Aggregate. Submit test results and a Certificate of Compliance verifying that aggregate gradation meets contract requirements.

Sample the material before incorporation into the work as follows:

(a) for onsite-produced materials at crushing or screening plants, after additions of any necessary blending material.

(b) for commercially produced aggregates, at the producer's plant or stockpile.

The sampling will not be considered a final acceptance and will not preclude later sampling and testing after final processing of the material. Such sampling does not relieve the contractor of responsibility of providing quality control measures to ensure compliance with contract requirements.

Construction

913.10.05 Preparation of Subgrade. Prepare and finish trailbed as required under section 912. Obtain written approval of the CO before placing aggregate.

913.10.06 Spreading and Compacting. Use aggregate that is uniformly mixed at optimum moisture content and spread and compact in layers to the final thickness and width SHOWN ON THE PLANS. The maximum thickness of any one layer shall be 3 inches. Obtain compaction by one of the following methods as SHOWN IN THE SCHEDULE OF ITEMS:

(a) by hand, using non-mechanized compaction tools over the full area of each layer until visual displacement ceases;

(b) by mechanical vibratory compactors over the full area of each layer until visual displacement ceases, but not fewer than three complete passes;

(c) by using a roller or mechanical hand tamper until the density is at least 90 percent of the maximum density, as determined by AASHTO T 99, Method C or D.

Immediately following final spreading, smoothing, and compacting, correct any irregularities or depressions that develop by adding or removing material until the surface is smooth, uniform, and compacted.

913.10.07 Acceptance, Testing, Sampling, and Tolerances. Do not vary the total compacted thickness of the aggregate by more or less than ¾ inch from the specified thickness or place it consistently below or above the specified depth.

Do not vary the aggregate width by more than ± 3 inches from the specified width or place it consistently narrower or wider than the specified width.

913.20 - Hot Asphalt Plant Mix Trail Surfacing

Description

913.20.01 This work consists of constructing a single course of hot asphalt plant mix on a prepared base course or trailbed and furnishing or installing retainers and geosynthetics.

Materials

913.20.02 Materials. Use hot plant mix design that is currently in use by the local State department of transportation, the county, or city, and submit a certificate of compliance that the mix meets their requirements. Certify the locations of past projects for the CO's inspection prior to approval.

Construction

913.20.03 Weather Limitations. Do not place the asphalt mixture when weather conditions prevent the proper compaction of the mixture, the base course is frozen, or the average temperature of the underlying surface upon

which the asphalt mixture is to be placed is less than 55°F. Do not place when it is raining or snowing.

913.20.04 Mixing. Do not allow the temperature of the mix to exceed 320°F when discharging from the mixer.

913.20.05 Surface Preparation. Remove loose aggregate, soil, or other deleterious materials from the surface to be paved. Prepare base or trailbed by shaping, watering, and compacting before placing plant mix. Obtain the CO's approval before placing plant mix on prepared base.

913.20.06 Placement and Compaction. Place and compact plant mix to meet the lines, grades, and thicknesses SHOWN ON THE PLANS. Avoid segregation of the mix. Hand or small machine placement of mix is permitted, except where the use of asphalt paving machines is required for areas SHOWN ON THE PLANS. Use only self-contained, power-propelled paving machine units, provided with an adjustable activated screed or strike-off assembly, heated if necessary, and capable of spreading and finishing courses of asphalt plant mix to the required widths and thicknesses.

Start compaction when the mix is above 230°F. Compact the mix with at least three passes over the entire trail surface. Use a steel wheel power roller that is of a minimum weight of 1 ton. Use vibratory plate compactors in areas that are not accessible to rollers. Continue compaction over the full width of the layer until visible deformation of the layer ceases.

913.20.07 Thickness. Do not vary the thickness of the compacted hot mix by more or less than 15 percent from the thickness SHOWN ON THE PLANS and not consistently above or below the specified thickness.

913.30 - Cold Asphalt Mix Trail Surfacing

Description

913.30.01 This work consists of constructing a single course of cold bituminous mix on a prepared base course or trailbed and furnishing and installing retainers.

Materials

913.30.02 Requirements. Use cold bituminous mix design that is currently in use by the local State department of transportation, the county, or city, and submit a certificate of compliance that the mix meets their requirements. Certify the locations of past projects for the CO's inspection prior to approval.

Use either MC250 liquid asphalt that conforms to AASHTO M 82 or CMS-2 emulsion that conforms to AASHTO M 208.

For the cold bituminous mix, use aggregate with a maximum size of ¾ inch and no more than 10 percent by weight passing the No. 200 sieve.

Construction

913.30.03 Weather Limitations. Place cold asphalt concrete on an unfrozen, reasonably dry surface. Place when the air temperature in the shade is above 50°F, the temperature of the road surface is above 40°F, and it is not raining or snowing or predicted to rain or snow within 24 hours after placement.

913.30.04 Surface Preparation. Clean the surface to be paved of all loose aggregate, soil, or other deleterious materials. Shape, water, and compact the base course or trailbed with a compactor to prepare the base and subgrade just before placing cold mix. Obtain the CO's approval before placing mix on prepared bases.

913.30.05 Mixing. If liquid asphalt is used, use aggregate that contains no more than 3 percent moisture and is at a temperature between 60 and 220°F during mixing. If emulsified asphalt is used, use aggregate that is at a temperature between 60 and 175°F during mixing.

Mix the aggregate and bituminous material until the aggregates are thoroughly coated and the mass is a uniform color.

913.30.06 Placement and Compaction. Place and compact the mix to meet the lines, grades, and cross-section SHOWN ON THE PLANS. Avoid segregation of the mix. Hand or small machine placement of mix is permitted, except where the use of bituminous paving machines is required for areas SHOWN ON THE PLANS. Use self-contained, power-propelled paving machine units, provided with an adjustable activated screed or strike off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix to the required widths and thicknesses.

Compact the mix with at least three passes over the entire trail surface. Use a steel wheel power roller that is of a minimum weight of 1 ton. Use vibratory plate compactors in areas that are not accessible to rollers. Continue compaction over the full width of the layer until visible deformation of the layer ceases.

913.30.07 Thickness. Do not vary the thickness of the compacted hot mix by more or less than 15 percent from the thickness SHOWN ON THE PLANS and not consistently above or below the specified thickness.

913.40 - Grid Unit Surfacing

Description

913.40.01 This work consists of furnishing and installing grid pavement units, including excavation, backfilling, and geosynthetics.

Construction

913.40.02 Excavation and Embankment. Perform excavation and embankment in accordance with section 911 and as SHOWN ON THE PLANS.

Excavate to the depth of the grid pavement units to be installed after first removing all duff and debris.

Stockpile all excavated suitable material adjacent to the trail for later use as backfill.

Obtain approval before placing grid pavement units.

913.40.03 Laying Grid Block. Place and bed blocks so they rest firmly against adjacent blocks, are stable, and form a smooth and uniform tread surface. Blocks designed to be interlocked must be interconnected. Fill void areas to full depth with fractured or cut pieces of block on curves or where needed to establish the grid pavement units in which native surface areas are no larger than 6 inches in greatest dimension. Bury beginning and ending blocks at a 30° angle to the tread.

Dispose of unused block material by removing from Government-administered lands to an appropriate site or by burying it at a location DESIGNATED ON THE GROUND.

913.40.04 Backfilling. After approval of the grid block installation by the CO, place and compact suitable material into holes between and around grid pavement units. For block surfacing used in shallow stream fords and gully crossings, substitute native gravels for suitable materials.

913.50 - Riprap Surfacing

Description

913.50.01 This work consists of construction of riprap surfacing, including excavation, furnishing, hauling, and placing rock and aggregate, compacting surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

913.50.02 Construct riprap surfacing as required under the construction section of 914.00. and/or as SHOWN ON THE PLANS.

913.60 - Chunk Wood Surfacing

Description

913.60.01 This work consists of construction of chunk wood surfacing, including excavation, furnishing, hauling, and placing chuck wood, compacting surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

913.60.02 Construct chunk wood surfacing as required under the construction section of 914.00. and/or as SHOWN ON THE PLANS.

913.70 - Imported Clay Surfacing

Description

913.70.01 This work consists of construction of imported clay surfacing, including excavation, furnishing, hauling, and placing clay, compacting surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

913.70.02 Construct imported clay surfacing as required under the construction section of 914.00. and/or as SHOWN ON THE PLANS.

913.80 - Geosynthetic Surfacing

Description

913.80.01 This work consists of construction of geosynthetic surfacing, including excavation, furnishing, hauling, and placing geosynthetics and aggregate, compacting surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

913.80.02 Construct geosynthetic surfacing as required under the construction section of 914.00. and/or as SHOWN ON THE PLANS.

913.90 – Surface Maintenance

Description

913.90.01 This work consists of maintenance of surfacing, including excavation, furnishing, hauling, and placing rock, aggregate and other surfacing, compacting surfacing, and associated barriers, ditches, and retaining walls to bring surface up to good condition.

Maintenance

913.90.02 Perform maintenance of surfacing as required under the construction section of 914.00. and/or as SHOWN ON THE PLANS.

914 - Climbing Turn

Description

914.00.01 This work consists of construction or maintenance of climbing turns, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections. Construction or maintenance of the climbing turn may be covered by one or more of the following subsections:

914.10.	Climbing Turn
914.20.	Climbing Turn Maintenance

Materials

914.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

914.00.03 Preparation of Subgrade. Prepare and finish trailbed as required under section 911 and/or as SHOWN ON THE PLANS. Obtain written approval of the CO before placing aggregate.

914.00.04 Retaining Walls. When SHOWN ON THE PLANS, construct retaining walls in accordance with section 935.

914.00.05 Barriers. When SHOWN ON THE PLANS, construct barriers at each climbing turn in accordance with section 933.

914.00.06 Ditches. When SHOWN ON THE PLANS, construct ditches in accordance with section 925.

Measurement

914.00.07 Measure the section 914 items listed in the bid schedule according to subsection 906.

Payment

914.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the section 914 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

914.10 - Climbing Turn

Description

914.10.01 This work consists of construction of climbing turns, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

914.10.02 Construct climbing turn as required under the construction section of 914.00. and/or as SHOWN ON THE PLANS.

914.20 - Climbing Turn Maintenance

Description

914.20.01 This work consists of maintenance of climbing turns, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections to bring the climbing turn up to good condition.

Maintenance

914.20.02 Perform maintenance of climbing turn as required under the construction section of 914.00. and/or as SHOWN ON THE PLANS.

915 - Talus Section

Description

915.00.01 This work consists of furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail. Construction or maintenance of the talus section may be covered by one or more of the following subsections:

915.10.	Talus Section
915.20.	Talus Section Maintenance

Materials

915.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

915.00.03 Preparation of Subgrade. Prepare and finish trailbed as required under section 911. Obtain written approval of the CO before placing aggregate

915.00.04 Talus or Rubble Rock Sections. Through talus or rubble rock slide areas, fill all voids with suitable material to the depth SHOWN ON THE PLANS. Use cap rocks that weigh a minimum of 130 lbs and have a length of at least twice their width. At least 50 percent of all hand-placed outer rocks should weigh a minimum of 130 lbs. Construct tread by building out rather than by removing material from the inner bank.

Measurement

915.00.05 Measure the section 915 items listed in the bid schedule according to subsection 906.

Payment

915.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the section 915 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

915.10 - Talus Section

Description

915.10.01 This work consists of construction of talus section, including furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail.

Construction

915.10.02 Construct talus section as required under the construction section 915.00., and and/or as SHOWN ON THE PLANS.

915.20 - Talus Section Maintenance

Description

915.10.01 This work consists of maintenance of talus section, including furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail.

Maintenance

915.10.02 Perform maintenance of talus section as required under the construction section 915.00., and/or as SHOWN ON THE PLANS.

916 - Turnout and Passing Section

Description

916.00.01 This work consists of construction or maintenance of turnout and passing sections, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections. Construction or maintenance of the turnout and passing section may be covered by one or more of the following subsections:

916.10.	Turnout and Passing Section
916.20.	Turnout and Passing Section Maintenance

Materials

916.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

916.00.03 Preparation of Subgrade. Prepare and finish trailbed as required under section 911 and/or as SHOWN ON THE PLANS. Obtain written approval of the CO before placing aggregate.

916.00.04 Retaining Walls. When SHOWN ON THE PLANS, construct retaining walls in accordance with section 935.

916.00.05 Barriers. When SHOWN ON THE PLANS, construct barriers at each switchback in accordance with section 933.

916.00.06 Ditches. When SHOWN ON THE PLANS, construct ditches in accordance with section 925.

Measurement

916.00.07 Measure the section 916 items listed in the bid schedule according to subsection 906.

Payment

916.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the section 916 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

916.10 - Turnout and Passing Area

Description

916.10.01 This work consists of construction of turnout and passing sections, including furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail.

Construction

916.10.02 Construct turnout and passing sections as required under the construction section 916.00., and/or as SHOWN ON THE PLANS.

916.20 - Turnout and Passing Area Maintenance

Description

916.10.01 This work consists of maintenance of turnout and passing sections, including furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail.

Maintenance

916.10.02 Perform maintenance of turnout and passing sections as required under the construction section 916.00., and /or as SHOWN ON THE PLANS.

917 – Fords

Description

917.00.01 This work consists of construction or maintenance of fords or stepping stones, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections. Construction or maintenance of the ford or stepping stones may be covered by one or more of the following subsections:

917.10.	Natural Ford
917.20.	Constructed Ford
917.30.	Stepping Stones
917.40.	Ford Maintenance

Materials

917.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

917.00.03 Preparation of Subgrade. Prepare and finish trailbed as required under section 911 and 912 and/or as SHOWN ON THE PLANS. Obtain written approval of the CO before placing aggregate.

917.00.04 Retaining Walls. When SHOWN ON THE PLANS, construct retaining walls in accordance with section 935.

917.00.05 Barriers. When SHOWN ON THE PLANS, construct barriers at each ford in accordance with section 933.

917.00.06 Ditches. When SHOWN ON THE PLANS, construct ditches in accordance with section 925.

Measurement

917.00.07 Measure the section 917 items listed in the bid schedule according to subsection 906.

Payment

917.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 917 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

917.10 - Natural Ford

Description

917.10.01 This work consists of construction of natural ford, approaches and surfacing, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

917.10.02 Construct natural ford, approaches and surfacing as required under the construction section 917.00., and/or as SHOWN ON THE PLANS.

917.20 - Constructed Ford

Description

917.20.01 This work consists of construction of ford, approaches and surfacing, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

917.20.02 Construct ford, approaches and surfacing as required under the construction section 917.00., and/or as SHOWN ON THE PLANS.

917.30 - Stepping Stones

Description

917.30.01 This work consists of construction of stepping stones and approaches, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

917.30.02 Construct stepping stones and approaches as required under the construction section 917.00., and/or as SHOWN ON THE PLANS.

917.40 – Ford Maintenance

Description

917.40.01 This work consists of maintenance of fords and approaches, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, retaining walls, and approach sections to bring the ford up to good condition.

Maintenance

917.40.02 Maintain stream fords and gully crossings as SHOWN ON THE PLANS. Remove debris and loose rocks over 3 inches from existing stream crossings to provide the tread width. Maintain and replace missing or rotted log or rock barriers that form the dam at fords and gully crossings. Level and smooth the stream bottom with gravel or rock less than 3 inches in greatest dimension to provide a crossing.

Re-grade or fill the approaches to the stream fords and gully crossings to provide for safe use. Replace missing stepping stones.

918.00. – Foundations

Description

918.00.01 This work consists of construction or maintenance of foundations for trailways, including excavation, furnishing, hauling, placing and compacting rock, aggregate, geosynthetics, wire baskets and timber materials, and associated barriers, ditches, retaining walls, and approach sections. Construction or maintenance of the foundations may be covered by one or more of the following subsections:

918.10.	Rock
918.20.	Geosynthetics
918.30.	Gabion Basket
918.40.	Crib Foundation
918.50.	Corduroy Foundation
918.60.	Foundation Maintenance

Materials

918.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995
Wire Basket Materials	996

Construction

918.00.03 Preparation of Subgrade. Prepare and finish subgrade as required under section 911 and/or as SHOWN ON THE PLANS. Obtain written approval of the CO before placing rock, geosynthetics, gabion baskets or crib foundations.

918.00.03 Foundation Construction. Construction foundation as SHOWN ON THE PLANS, construct with approved backfill material in accordance with section 911 and 912.

918.00.04 Retaining Walls. When SHOWN ON THE PLANS, construct retaining walls in accordance with section 935.

918.00.05 Barriers. When SHOWN ON THE PLANS, construct barriers at each switchback in accordance with section 933.

918.00.06 Ditches. When SHOWN ON THE PLANS, construct ditches in accordance with section 925.

Measurement

918.00.07 Measure the section 918 items listed in the bid schedule according to subsection 906.

Payment

918.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 918 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

918.10. – Rock

Description

918.10.01 This work consists of construction of rock foundation for trailways, including excavation, furnishing, hauling, and placing rock, aggregate, and geosynthetics.

Construction

918.10.02 Construct foundation as required under the construction section 918.00. and/or as SHOWN ON THE PLANS.

918.20. – Geosynthetics

Description

918.20.01 This work consists of utilizing geosynthetics for foundation construction for trailways, including excavation, furnishing, hauling, and placing rock, aggregate, and geosynthetics.

Construction

918.20.02 Construct foundation as required under the construction section 918.00. and/or as SHOWN ON THE PLANS.

918.30. - Gabion Basket

Description

918.30.01 This work consists of utilizing wire baskets for foundation construction for trailways, including excavation, furnishing, hauling, and placing rock, aggregate and wire baskets.

Construction

918.30.02 Construct foundation as required under the construction section 918.00. and/or as SHOWN ON THE PLANS.

918.40. - Crib Foundation

Description

918.40.01 This work consists of utilizing timber cribs for foundation construction for trailways, including excavation, furnishing, hauling, and placing rock, aggregate and timber cribs.

Construction

918.40.02 Construct foundation as required under the construction section 918.00. and/or as SHOWN ON THE PLANS.

918.50. – Corduroy Foundation

Description

918.50.01 This work consists of utilizing corduroy for foundation construction for trailways, including excavation, furnishing, hauling, and placing logs, aggregate and geosynthetics.

Construction

918.50.02 Construct foundation as required under the construction section 918.00. and/or as SHOWN ON THE PLANS.

918.60. - Foundation Maintenance

Description

918.60.01 This work consists of maintenance of foundation for trailways, including excavation, furnishing, hauling, placing and compacting rock, aggregate, geosynthetics, wire baskets and timber materials, and associated barriers, ditches, retaining walls, and approach sections.

Maintenance

918.60.02 Perform maintenance on foundation as required under the construction section 918.00. and/or as SHOWN ON THE PLANS.

Section 920—Drainage Structures

921 – Culverts

Description

921.00.01. This work consists of furnishing and installing culverts, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls. Construction of culverts may be covered by one or more of the following subsections:

921.10.	Standard Culvert
921.20.	Standard Culvert with Headwall
921.30.	Rock Culvert
921.40.	Treated Timber Box Culvert
921.50.	Open-Top Drain
921.60.	Bottomless Arch Culvert
921.70.	Culvert Maintenance

Materials

921.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Drainage Pipe	992
Geosynthetics	994
Material for Timber Structures	995

Construction

921.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

921.00.04 Placement. Place culverts to provide for unobstructed inlet and outlet flow. Remove logs, debris, soil, rock, and other obstructions above and below the culvert that would impede flow into the culvert or away from the trailway. Minimize disturbance to streambeds.

Construct a catch basin to facilitate flow from trail ditches into the culvert.

921.00.05 Installation. Install culverts of the types and at the locations SHOWN ON THE PLANS or as DESIGNATED ON THE GROUND.

(a) Placing. Skew ditch relief culverts as staked to provide a downgrade equal to or greater than the uphill ditch. Place culverts at stream crossings in the natural streambed on stream grade.

Attach end sections to the pipe by connecting bands or other means as recommended by the manufacturer.

(b) Bedding. Excavate and remove all unsuitable material and rocks over 3 inches to a minimum depth of 6 inches below the pipe invert and to a minimum width of 1.5 pipe diameters. Bed pipe with compacted suitable material free of

rocks larger than 3 inches and in a stable foundation of undisturbed or compacted soil. Make the bed shaped to fit the lower quadrant of the pipe exterior and provide uniform continuous support along the entire length of the pipe.

921.00.06 Backfilling. Backfill and compact around culverts with suitable material that is free of rocks over 3 inches. Provide for the cover height as SHOWN ON THE PLANS.

Measurement

921.00.07 Measure the section 921 items listed in the bid schedule according to section 906.

Payment

921.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 921 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

921.10 - Standard Culvert

Description

921.10.01 This work consists of furnishing and installing culverts without headwalls, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins.

Construction

921.10.02 Install culverts as required under construction section 921.00 and/or as SHOWN ON THE PLANS.

921.20 - Standard Culvert with Headwalls

Description

921.20.01 This work consists of furnishing and installing culverts with headwalls, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins.

Construction

921.20.02 Install culverts and headwalls as required under construction section 921.00 and/or as SHOWN ON THE PLANS.

921.20.03 Headwalls. Install headwalls at the locations SHOWN ON THE PLANS or as DESIGNATED ON THE GROUND.

Provide a compacted bench as a foundation for the wall.

Select rocks that have a general rectangular shape with flat top and bottom faces. Place the largest rocks on the bottom. Lay each rock stable on the course that supports it, interlocking with surrounding rocks. Do not break, jar, or displace rocks already set. Place the exposed face of each rock parallel to the face of the wall. Stagger vertical joints a minimum of 4 inches horizontally from vertical joints in adjoining courses.

921.30 - Rock Culvert

Description

921.30.01 This work consists of furnishing and installing rock culverts, including excavation and backfill, selecting and hauling of rock material, and constructing catch basins.

Construction

921.30.02 Install culverts as required under construction section 921.00 and/or as SHOWN ON THE PLANS.

921.30.03 Rock Culverts. Install rock culverts at the locations SHOWN ON THE PLANS or as DESIGNATED ON THE GROUND.

Firmly embed selected sidewall rocks below the natural ground or streambed as SHOWN ON THE PLANS. Use flat cover rocks long enough to bridge between outside faces of the sidewalls. Select and place rocks so as to fit snugly with firm bearing on underlying rocks. Fill voids with small rock to prevent entry of soil into the culvert.

921.40 – Treated Timber Box Culvert

Description

921.40.01 This work consists of furnishing and installing treated timber box culverts, including excavation and backfill, and constructing catch basins.

Construction

921.40.02 Install culverts as required under construction section 921.00 and/or as SHOWN ON THE PLANS.

921.40.03 Treated Timber Box Culverts. Install treated timber box culverts at the locations SHOWN IN THE PLANS or as DESIGNATED ON THE GROUND.

Place the box culvert walls on a firm foundation of undisturbed or compacted suitable material shaped to fit the bottom of the culvert walls and free of rocks larger than 3 inches in size.

921.50 - Open-Top Drain

Description

921.50.01 This work consists of furnishing and installing open-top drains, including excavation and backfill, and constructing catch basins.

Construction

921.50.02 Install open-top drains as required under construction section 921.00 and/or as SHOWN ON THE PLANS.

921.60 - Bottomless Arch Culvert

Description

921.50.01 This work consists of furnishing and installing bottomless arch culverts, including excavation and backfill, selecting and hauling of log and rock materials for headwalls, and constructing catch basins.

Construction

921.50.02 Install culverts as required under construction section 921.00 and as SHOWN ON THE PLANS.

921.70. - Culvert Maintenance

Description

921.50.01 This work consists of maintenance of culverts, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls.

Maintenance

921.50.02 General. Where trail drainage facilities have been plugged and the water has been diverted from the intended channel, remove the debris causing the diversion and return the drainage to the channel. Divert water off and away from the trailbed. If washing or ponding of water has been or is occurring, dig a shallow ditch sloped 2 percent to 5 percent to the downstream side of the trail and 3 inches minimum deep and 12 inches minimum wide across the trail at the point where water enters the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

921.50.03 Remove debris and soil from catch basins and inlet and outlet ditches and inside culverts to permit the unobstructed flow of water into, through and away from the culvert. Replace any missing or loose rocks or logs in culvert headwalls. Fit replacement rocks for rock culverts so that they have a firm bearing on adjacent and underlying rocks. Place rocks snugly and fill voids with small rocks to prevent material from sifting into the drain. Fill and compact with suitable material all disturbed areas in the trail tread over or adjacent to rock culverts.

922 - Waterbars

Description

922.00.01 This work consists of installing and maintaining waterbars, including excavation and backfill; selecting and hauling of log and rock materials; and furnishing treated timber, belting, and other materials. Construction and maintenance of waterbars may be covered by one or more of the following subsections:

922.10.	Rock Waterbar
922.20.	Log or Treated Timber Waterbars
922.30.	Belted Waterbar
922.40.	Waterbar Maintenance

Materials

922.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Drainage Pipe	992
Geosynthetics	994
Material for Timber Structures	995

Use rubber belting that is single-ply, non-reinforced material 3/8 inch to 1/2 inch thick.

Construction

922.00.03 General. Install waterbars of the types and at the locations SHOWN ON THE PLANS or as DESIGNATED ON THE GROUND.

922.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911. Around waterbars, backfill and compact suitable material that is free of rocks larger than 3 inches in size. Compact material on the downgrade side of rock, log, and treated timber waterbars, flush with the top of waterbars.

Outslope the trailbed on the upgrade side of the waterbar with a slope equal to or greater than the trail grade leading into the waterbar. Provide a uniform outsloped plane that forms a gutter against the waterbar.

Measurement

922.00.05 Measure the Section 922 items listed in the bid schedule according to section 906.

Payment

922.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 922 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

922.10 - Rock Waterbar

Description

922.10.01 This work consists of installing rock waterbars, including excavation and backfill; selecting and hauling of rock materials; and other materials.

Construction

922.10.02 Install rock waterbars as required under construction section 922.00 and/or as SHOWN ON THE PLANS.

922.10.03 Rock Waterbar. Tightly embed selected rocks into the trailbed. Place waterbar rocks with tops relatively even, with no sharp points. Use rocks with lengths greater than or equal to 1.5 times the width.

922.20 - Log or Treated Timber Waterbars

Description

922.20.01 This work consists of installing log or treated timber waterbars, including excavation and backfill; selecting and hauling of log materials or furnishing treated timbers and other materials.

Construction

922.20.02 Install waterbars per as required under construction section 922.00 and/or as SHOWN ON THE PLANS.

922.20.03 Log or Treated Timber Waterbars. Embed peeled native logs or treated timbers into the trailbed to form a waterbar across the trail. Use anchor methods as SHOWN ON THE PLANS at log or treated timber ends outside the trail tread. Pre-drill pilot holes (for steel pins) through timbers prior to treatment. Anchor stakes firmly in the ground, and tightly nail to the log without splitting. In the absence of a backslope, anchor the upgrade end of the log or timber waterbar in the same manner as the downgrade end.

922.30 - Belted Waterbar

Description

922.30.01 This work consists of installing belted waterbars, including excavation and backfill; furnishing treated timbers and other materials.

Construction

922.30.02 Install waterbars as required under construction section 922.00 and/or as SHOWN ON THE PLANS.

922.30.03 Rubber Belting Waterbars. Tightly secure one continuous piece of rubber belting between treated timbers as SHOWN ON THE PLANS.

922.40. - Waterbar Maintenance

Description

922.40.01 This work consists of maintenance of waterbars, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls.

Maintenance

922.40.02 General. Where trail drainage facilities have been plugged and the water has been diverted from the intended channel, remove the debris causing the diversion and return the drainage to the channel. Divert water off and away from the trailbed. If washing or ponding of water has been or is occurring, dig a shallow ditch sloped 2 percent to 5 percent to the downstream side of the trail and 3 inches minimum deep and 12 inches minimum wide across the trail at the point where water enters the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

922.40.03. Clean the upgrade side of all existing waterbars and maintain them as SHOWN ON THE PLANS. Remove material accumulated against rubber belting waterbars. Use and compact suitable material removed from the upgrade side of all waterbars to bring the trail tread flush with the top of those waterbars on the downgrade side. Remove all debris from the lead-off area of all waterbars that restricts the free flow of water away from the trail. Firmly embed replacement rocks for rock waterbars into the trailbed and fit the rocks together. Make the tops of the rocks even, with no sharp points. Peel native replacement logs before using them. Anchor stakes tightly in the ground without splits and nail tightly to the log.

923 – Rock Spillways

Description

923.01 This work consists of constructing or maintenance of spillways, including selecting, excavating, and placing geotextile and rock material. Construction and maintenance of spillways may be covered by one or more of the following subsections:

923.10.	Rock Spillway
923.20.	Rock Spillway Maintenance

Materials

923.02 Requirements. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Drainage Pipe	992
Geosynthetics	994
Material for Timber Structures	995

Construction

923.03 General. Construct rock spillways at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Construct spillways so the flow of water from the facility being drained is centered on and flows down the full length of the spillway.

923.04 Excavation. Excavate for the spillway in accordance with Section 911. Construct a horizontal bench into undisturbed material and compact it as a foundation for the toe of the rock spillway.

923.05 Geotextile Placement. Place geotextile under the rock as required or as SHOWN ON THE PLANS.

923.06 Rock Placement. Construct the spillway by hand-placing rock, with the larger rock in the bottom layers. Place each rock to provide a stable course. Interlock each rock with adjacent rocks, and minimize voids. Use small rocks to fill voids. Do not break, jar, or displace rocks already set.

Measurement

923.06 Measure the Section 923 items listed in the bid schedule according to section 906.

Payment

923.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 923 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

923.10. – Rock Spillway

Description

923.10.01 This work consists of constructing or maintenance of spillways, including selecting, excavating, and placing rock material.

Construction

923.10.02 Install rock spillway as required under construction section 923.00 and/or as SHOWN ON THE PLANS.

923.20. – Rock Spillway Maintenance

Description

923.20.01 This work consists of maintenance of spillways, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls.

Maintenance

923.20.02 General. Where trail drainage facilities have been plugged and the water has been diverted from the intended channel, remove the debris causing the diversion and return the drainage to the channel. Divert water off and away from the trailbed. If washing or ponding of water has been or is occurring, dig a shallow ditch sloped 2 percent to 5 percent to the downstream side of the trail and 3 inches minimum deep and 12 inches minimum wide across the trail at the point where water enters the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

923.20.03. Maintain rock spillways to conform as SHOWN ON THE PLANS. Replace missing rocks, interlocking each rock with adjacent rocks. Place the rocks to ensure that the water flows down the spillway and away from the facility being drained. Use small rocks to fill voids. Clean all material from the spillway that restricts the flow of water away from the trail.

924 – Underdrains

Description

924.00.01 This work consists of constructing or maintaining underdrains, including excavation and backfill and obtaining and installing filter rock, geosynthetics, and drainpipe with necessary fittings. Construction and maintenance of underdrains may be covered by one or more of the following subsections:

924.10.	Rock Underdrain
924.20.	Sheet Underdrain
924.30.	Underdrain Maintenance

Materials

924.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Drainage Pipe	992
Geosynthetics	994
Material for Timber Structures	995

Construction

924.00.03 General. Construct underdrains at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

924.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

924.00.05 Trench Construction. Grade underdrain trenches to provide complete drainage of the underdrain system. Obtain CO approval of the trench system prior to placement of underdrain materials.

924.00.06 Pipe Installation. Ensure positive drainage from the underdrain pipes and drainage system. Place pipe in the trench with the perforations down.

Measurement

924.00.07 Measure the Section 924 items listed in the bid schedule according to section 906.

Payment

924.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 924 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

924.10 - Rock Underdrain

Description

924.10.01 This work consists of constructing rock underdrains and associated drainage ditches, including excavation and backfill and obtaining and installing filter rock, geosynthetics, and drainpipe with necessary fittings.

Construction

924.10.02 Install underdrain as required under construction section 924.00 and/or as SHOWN ON THE PLANS.

924.20 - Sheet Underdrain

Description

924.20.01 This work consists of constructing sheet underdrains or sheet drains, including excavation and backfill and obtaining and installing filter rock, geosynthetics, and drain pipe with necessary fittings.

Construction

924.20.02 Install underdrain as required under construction section 924.00 and/or as SHOWN ON THE PLANS.

924.30. - Underdrain Maintenance

Description

924.30.01 This work consists of maintenance of rock and sheet underdrains and associated drainage ditches, including excavation and backfill and obtaining and installing filter rock, geosynthetics, and drainpipe with necessary fittings.

Maintenance

924.30.02 Perform maintenance on underdrains and associated ditches as required under construction section 924.00 and/or as SHOWN ON THE PLANS.

Where ditches have been plugged and the water has been diverted from the intended underdrain, remove the debris causing the diversion and return the drainage to the ditch.

925 – Ditches

Description

925.00.01 This work consists of construction and maintenance of ditches, including excavation and backfill. Construction and maintenance of ditches may be covered by one or more of the following subsections:

925.10. Side Ditch
925.20. Leadoff Ditch
925.30. Ditch Maintenance

Construction

925.00.02 General. Construct ditches at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

925.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

Measurement

925.00.04 Measure the Section 925 items listed in the bid schedule according to section 906.

Payment

925.00.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 925 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

925.10. - Side Ditch

Description

925.10.01 This work consists of construction of side ditches, including excavation and backfill.

Construction

925.10.02 Construct side ditches as required under construction section 925.00 and/or as SHOWN ON THE PLANS.

925.20. - Leadoff Ditch

Description

925.20.01 This work consists of construction of leadoff ditches, including excavation and backfill.

Construction

925.20.02 Construct leadoff ditches as required under construction section 925.00 and/or as SHOWN ON THE PLANS.

925.30. - Ditch Maintenance

Description

925.30.01 This work consists of maintenance of leadoff ditches, including excavation and backfill.

Maintenance

925.30.02 General. Where ditches have been plugged and the water has been diverted from the intended ditch, remove the debris causing the diversion and return the drainage to the ditch. Clean deposited material and restore ditches as SHOWN ON THE PLANS. Remove all debris from the lead-off ditches that restricts the free flow of water away from the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

926 – Berms

Description

926.00.01 This work consists of construction and maintenance of berms and associated drainage ditches, including excavation and backfill. Construction of berms may be covered by one or more of the following subsections:

926.10. Berms
926.20. Berm Maintenance

Construction

926.00.02 General. Construct berms at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

926.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

Measurement

926.00.04 Measure the Section 926 items listed in the bid schedule according to section 906.

Payment

926.00.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 926 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

926.10. – Berms

Description

926.10.01 This work consists of constructing berms and associated drainage ditches, including excavation and backfill.

Construction

926.10.02 Construct berms as required under construction section 926.00 and/or as SHOWN ON THE PLANS.

926.20. - Berm Maintenance

Description

926.10.01 This work consists of maintaining berms, including excavation and backfill.

Maintenance

926.10.02 Perform maintenance of berms as required under construction section 926.00 and/or as SHOWN ON THE PLANS.

927 - Drain Dips

Description

927.00.01 This work consists of construction and maintenance of drainage dips, including excavation and backfill. Construction and maintenance of drainage dips may be covered by one or more of the following subsections:

924.10.	Drain Dip
924.20.	Drain Dip Maintenance

Materials

927.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

927.00.03 General. Construct drainage dips at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

927.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

Measurement

927.00.05 Measure the Section 924 items listed in the bid schedule according to section 906.

Payment

927.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 924 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

927.10. - Drain Dip

Description

926.10.01 This work consists of constructing drain dips and associated drainage ditches, including excavation and backfill.

Construction

926.10.02 Construct drain dips as required under construction section 927.00 and/or as SHOWN ON THE PLANS.

927.20. - Drain Dip Maintenance

Description

927.20.01 This work consists of maintenance of drain dips, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls.

Maintenance

927.20.02 General. Where trail drainage facilities have been plugged and the water has been diverted from the intended channel, remove the debris causing the diversion and return the drainage to the channel. Divert water off and away from the trailbed. If washing or ponding of water has been or is occurring, dig a shallow ditch sloped 2 percent to 5 percent to the downstream side of the trail and 3 inches minimum deep and 12 inches minimum wide across the trail at the point where water enters the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

927.20.03 Clean deposited material and restore drainage dips as SHOWN ON THE PLANS. Remove all debris from the lead-off area of dips that restricts the free flow of water away from the trail. Use suitable material obtained by cleaning dips for fill on the downgrade side, removing rock more than 3 inches at its greatest dimension. Compact all material placed in the trail tread.

928 - Check Dams

Description

928.00.01 This work consists of construction and maintenance of check dams, including excavation and backfill, and obtaining and installing of log and rock materials. Construction and maintenance of check dam may be covered by one or more of the following subsections:

928.10. Check Dam
928.20. Check Dam Maintenance

Materials

928.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

928.00.03 General. Construct check dams at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

928.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

Measurement

928.00.05 Measure the Section 928 items listed in the bid schedule according to section 906.

Payment

928.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 928 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

928.10. - Check Dams

Description

928.00.01 This work consists of construction of check dams, including excavation and backfill and obtaining and installing rocks.

Construction

928.10.02 Construct check dams as required under construction section 928.00 and/or as SHOWN ON THE PLANS.

928.20. - Check Dam Maintenance

Description

928.20.01 This work consists of maintenance of check dams, including excavation and backfill and obtaining and installing rocks.

Maintenance

928.20.02 General. Where check dams have been plugged and the water has been diverted from the intended channel, remove the debris causing the diversion and return the drainage to the channel. Divert water off and away from the trailbed. If washing or ponding of water has been or is occurring, dig a shallow ditch sloped 2 percent to 5 percent to the downstream side of the trail and 3 inches minimum deep and 12 inches minimum wide across the trail at the point where water enters the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

928.20.03 Clean deposited material and restore check dams as SHOWN ON THE PLANS. Remove all debris from the lead-off area of dips that restricts the free flow of water away from the trail. Use suitable material obtained by cleaning dips for fill on the downgrade side, removing rock more than 3 inches at its greatest dimension. Compact all material placed in the trail tread.

Section 930 – Trail Structures

Section 931 – Switchbacks

Description

931.00.01 This work consists of construction and maintenance of switchbacks, including excavation, associated barriers, ditches, retaining walls, and approach sections. Construction and maintenance of switchbacks may be covered by one or more of the following subsections:

931.10.	Type 1 – Radius Switchback
931.20.	Type 2 – Circular Landing Switchback
931.30.	Type 3 – Rectangular Landing Switchback
931.40.	Switchback Maintenance

Materials

931.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Construction

931.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

931.00.04 Retaining Walls. When SHOWN ON THE PLANS, construct retaining walls in accordance with Section 935.

931.00.05 Barriers. When SHOWN ON THE PLANS, construct barriers at each switchback in accordance with Section 933.

931.00.06 Ditches. When SHOWN ON THE PLANS, construct ditches in accordance with Section 925.

931.00.07 Limits of Switchback. Beginning and ending of switchback will be as SHOWN ON THE PLAN or as DESIGNATED ON THE GROUND.

Measurement

931.00.08 Measure the Section 931 items listed in the bid schedule according to section 906.

Payment

931.00.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 931 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

931.10 - Type 1 – Radius Switchbacks

Description

931.10.01 This work consists of construction of radius switchbacks, including excavation, associated barriers, ditches, retaining walls, and approach sections.

Construction

931.10.02 Construct radius switchback as required under construction section 931.00 and/or as SHOWN ON THE PLANS.

931.20 - Type 2 – Circular Landing Switchbacks

Description

931.20.01 This work consists of construction of circular landing switchbacks, including excavation, associated barriers, ditches, retaining walls, and approach sections.

Construction

931.20.02 Construct circular landing switchback as required under construction section 931.00 and/or as SHOWN ON THE PLANS.

931.30 - Type 3 – Rectangular Landing Switchbacks

Description

931.30.01 This work consists of construction of rectangular landing switchbacks, including excavation, associated barriers, ditches, retaining walls, and approach sections.

Construction

931.30.02 Construct rectangular landing switchback as required under construction section 931.00 and/or as SHOWN ON THE PLANS.

931.40 - Switchback Maintenance

Description

931.40.01 This work consists of replacing or maintaining retaining walls, trail tread, barriers, and drain ditches on existing switchbacks.

Maintenance

931.40.02 General. Perform maintenance on switchbacks as required under construction section 931.00 and/or as SHOWN ON THE PLANS.

931.40.03 Retaining Walls. When needed in rock retaining wall maintenance, use replacement rock that is sound, durable, and free from rifts, seams, laminations, and minerals that could cause deterioration through weathering.

931.40.04 Barriers. Perform barrier maintenance where needed. Use the same type of materials as in the original construction.

931.40.05 Ditches. Clear switchback ditches to permit the free flow of water. Construct ditches as SHOWN ON THE PLANS.

931.40.06 Tread. Maintain trail tread to the original designed tread width.

Section 932 – Turnpikes

Description

932.00.01 This work consists of construction and maintenance of turnpike sections, including excavation, embankment, retainers, geosynthetics, backfill, and drainage features. Construction and maintenance of turnpike sections may be covered by one or more of the following subsections:

932.10.	Type 1 – Standard Turnpike
932.20.	Type 2 – Standard Turnpike with Foundation
932.30.	Turnpike Maintenance

Materials

932.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics materials	994
Material for Timber Structures	995

Construction

932.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

932.00.04 Retainers. Construct retainers in accordance with Section 911.70 and as SHOWN ON THE PLANS. Place retainers in a continuous row along each shoulder of the turnpike section as SHOWN ON THE PLANS. Bed the parallel retainers so they are stable and at approximately the same top elevation.

932.00.05 Geosynthetics. Where SHOWN ON THE PLANS, place geosynthetics flat and parallel to centerline of the trail before placing embankment. Overlap geosynthetics a minimum of 2 feet. Install anchors or fasteners as recommended by the geosynthetic manufacturer.

932.00.06 Backfill. Backfill and compact with suitable material.

932.00.07 Drainage. Construct side ditches, cross-drainage, and culverts at locations SHOWN ON THE PLANS and/or DESIGNATED ON THE GROUND. Provide leadoff ditches from side ditches on the lower side of trail at points DESIGNATED ON THE GROUND or SHOWN ON THE PLANS.

Measurement

932.00.08 Measure the Section 932 items listed in the bid schedule according to section 906.

Payment

932.00.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 932 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

932.10 - Type 1 – Standard Turnpikes

Description

932.10.01 This work consists of construction of standard turnpike sections, including excavation, embankment, retainers, geosynthetics, backfill, and drainage features.

Construction

932.10.02 Construct standard turnpike sections as required under construction section 932.00. and/or as SHOWN ON THE PLANS.

932.20 - Type 2 – Standard Turnpikes with Foundation

Description

932.20.01 This work consists of construction of standard turnpike sections with foundation, including excavation, embankment, retainers, geosynthetics, rocks, backfill, and drainage features.

Construction

932.20.02 Standard turnpike sections with foundation as required under construction section 932.00. and/or as SHOWN ON THE PLANS.

932.30 - Turnpike Maintenance

Description

932.30.01 This work consists of maintaining turnpike sections.

Maintenance

932.30.02 General. Perform maintenance on turnpikes as required under construction section 932.00. and/or as SHOWN ON THE PLANS.

932.30.03 Obtain logs, staking material, and suitable material for backfill from locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

932.30.04 Replace missing rocks, or missing or decayed retaining logs or lumber, with rocks, logs, or dimensional lumber as SHOWN ON THE

PLANS. Secure loose or dislocated retainers. Drive stakes 2-3 inches in diameter and 18-24 inches in length along the outside edge of each log or lumber retainer to hold them in place at a maximum of 3 feet.

932.30.05 Clear all drainage structures of obstructions, silt, and debris so as to permit the free flow of water away from the trail.

932.30.06 If necessary, use suitable material removed from the drainage structures to build up the crown. Shape the tread with suitable material to provide a 2 inch crown measured from the top of the crown at the centerline to the top of the retainers.

Section 933 – Side Barriers

Description

933.00.01 This work consists of construction and maintenance of side barriers, including excavation, embankment, widening, debris disposal and backfill. Construction and maintenance of side barriers may be covered by one or more of the following subsections:

933.10.	Stacked Rock Barrier
933.20.	Masonry Rock Barrier
933.30.	Barrier Rail on Grade
933.40.	Barrier Rail on Posts
933.50.	Curb
933.60.	Guardrail

Materials

933.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Construction

933.00.03 General. Construct barriers of the type and at the locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Use logs in which the true centerline deviates no more than 2 inches from the line between the centers of the ends of the log.

933.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

933.00.05 Backfill. Backfill and compact with suitable material.

Measurement

933.00.06 Measure the Section 933 items listed in the bid schedule according to section 906.

Payment

933.00.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 933 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

933.10. – Stacked Rock Barrier

Description

933.10.01 This work consists of construction of stacked rock barrier, including excavation, embankment, widening, debris disposal and backfill.

Construction

933.10.02 Construct stacked rock barrier as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.20. – Masonry Rock Barrier

Description

933.20.01 This work consists of construction of masonry rock barrier, including excavation, embankment, widening, debris disposal and backfill.

Construction

933.20.02 Construct masonry rock barrier as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.30. – Barrier Rail on Grade

Description

933.30.01 This work consists of construction of barrier rail on grade, including excavation, embankment, widening, debris disposal and backfill.

Construction

933.30.02 Construct barrier rail on grade as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.40. – Barrier Rail on Posts

Description

933.40.01 This work consists of construction of barrier rail on posts, including excavation, embankment, widening, debris disposal and backfill.

Construction

933.40.02 Construct barrier rail on posts as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.50. – Curb

Description

933.50.01 This work consists of construction of curbing, including excavation, embankment, debris disposal and backfill.

Construction

933.50.02 Construct curbing as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.60. – Guardrail

Description

933.60.01 This work consists of construction of guardrail, including excavation, embankment, widening, debris disposal and backfill.

Construction

933.60.02 Construct guard as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.70 – Side Barrier Maintenance

Description

933.70.01 Work consists of maintaining rock, log, and timber barriers.

Maintenance

933.70.02 General. Perform maintenance on barriers as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.70.03 Restore rock, log, and timber barriers to their original lines and grades unless otherwise SHOWN ON THE PLANS.

933.70.04 Rock Barriers. Replace missing rocks, using rocks of general rectangular shape between 45 lbs and 120 lbs, with the larger rocks placed on the bottom. Use rock chips to wedge larger rocks in place to form a stable wall. Stagger all vertical joints.

Stabilize and reset loose rocks.

Form a continuous grade with the top of the restored barrier consistent with adjacent segments of the barrier.

933.70.05 Log or Timber Barriers. Replace missing, damaged, and unsound logs or timbers using material similar to that used in the original barrier unless otherwise SHOWN ON THE PLANS. The location of trees for native timber materials will be DESIGNATED ON THE GROUND.

Stabilize and re-attach loose logs or timbers that are in sound condition.

Section 934 – Puncheons

Description

934.00.01 This work consists of construction and maintenance of puncheon, including excavation, embankment, backfill, and drainage features. Construction and maintenance of puncheon may be covered by one or more of the following subsections:

934.10.	Standard Puncheon
934.20.	No Deck Puncheon
934.30.	Puncheon Maintenance

Materials

934.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

The location of trees for native timber materials will be SHOWN ON THE PLANS and DESIGNATED ON THE GROUND.

Construction

934.00.03 General. Construct puncheon at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Pre-drill holes for fasteners when necessary to prevent splitting and drive spikes flush.

934.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with the requirements of Section 911 and as SHOWN ON THE PLANS.

934.00.05 Mud Sills. Bury mud sills to a depth that provides a finished walking surface that is less than or equal to 3 feet above the surrounding ground. Hew sill logs to provide a bearing surface for the log stringers and to provide the log stringers with a level top surface. Do not hew sill logs more than one-third their diameter. Do not level the top surfaces of the log stringers by shimming or notching their ends.

934.00.06 Log Stringers. Use logs greater than or equal to 10 feet in length. Use logs greater than or equal to 8 inches in diameter before the top is flattened. Fasten each stringer to each mud sill with drift pins that penetrate a minimum of 4 inches into the mud sill unless otherwise SHOWN ON THE PLANS.

When plank decking is used, hew the top surfaces of log stringers up to 2 inches deep, as necessary, to provide bearing surfaces for deck planks.

934.00.07 Sawn Timber Stringers. Use sawn timber greater than or equal to 10 feet in length. Fasten each stringer to each mud sill with drift pins that penetrate a minimum of 4 inches into the mud sill unless otherwise SHOWN ON THE PLANS.

934.00.08 Finished Walkway. Construct abutting ends of sections of log or plank puncheon flush with each other. Do not slope the surface of the completed walkway to either side. Construct the puncheon with a grade that does not exceed 5 percent and where no change in grade exceeds 6 percent unless otherwise SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Construct the finished walking surface of the puncheon flush with the trail grade at each end of the structure.

934.00.09 Decking. Spike decking evenly at right angles to each stringer.

Lay split log decking alternately flat side down first, then round side down, ending with a flat side down. When round side is down, notch round log decking to provide 2 inches wide bearing surface.

Lay split and sawn deck planks on the stringer to provide bearing for the full width of the plank.

Trim protruding ends of the decking to give a straight-line appearance to the edges of the structure or as SHOWN ON THE PLANS.

934.00.10 Curbs. Construct curbs with logs or sawn timber as SHOWN ON THE PLANS. Use lengths greater than or equal to 10 feet and splice with a 6 inches half-lap joint at a spacer location. Match diameters of logs at lap joints and trim excess to provide a smooth transition between logs.

Counter bore lag screws in curbs so that heads are flush with the surface.

Finish curbs smooth and free from splinters and sharp projections.

934.00.11 Approach Fills. Construct the approach fills with compacted suitable material.

Measurement

934.00.12 Measure the Section 934 items listed in the bid schedule according to section 906.

Payment

934.00.13 The accepted quantities will be paid at the contract price per unit of measurement for the Section 934 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

934.10. – Standard Puncheon

Description

934.10.01 This work consists of construction of standard puncheon, including excavation, embankment, backfill, and drainage features.

Construction

934.10.02 Construct standard puncheon as required under construction section 934.00. and/or as SHOWN ON THE PLANS.

934.20. – No Deck Puncheon

Description

934.20.01 This work consists of construction of no deck puncheon, including excavation, embankment, backfill, and drainage features.

Construction

934.20.02 Construct no deck puncheon as required under construction section 934.00. and/or as SHOWN ON THE PLANS.

934.30. – Puncheon Maintenance

Description

934.30.01 This work consists of maintaining puncheon sections.

Maintenance

934.30.02 General. Perform maintenance on puncheon as required under construction section 934.00. and/or as SHOWN ON THE PLANS.

934.30.03 Obtain logs, staking material, and suitable material for backfill from locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

934.30.04 Replace missing rocks, or missing or decayed retaining logs or lumber, with rocks, logs, or dimensional lumber as SHOWN ON THE PLANS. Secure loose or dislocated retainers. Drive stakes 2-3 inches in diameter and 18-24 inches in length along the outside edge of each log or lumber retainer to hold them in place at a maximum of 3 feet.

934.30.05 Clear all drainage structures of obstructions, silt, and debris so as to permit the free flow of water away from the trail.

934.30.06 If necessary, use suitable material removed from the drainage structures to build up the crown. Shape the tread with suitable material to provide a 2 inch crown measured from the top of the crown at the centerline to the top of the retainers.

935 - Retaining Walls

Description

935.00.01 Work consists of construction or maintenance of retaining walls, including excavating, placing borrow, backfilling, geosynthetics, trailbed construction and slope finishing. Construction and maintenance of retaining walls may be covered by one or more of the following subsections:

935.10.	Log Crib
935.20.	Stacked Rock Retaining Wall
935.30.	Wire Basket Retaining Wall
935.40.	Masonry Rock Retaining Wall
935.50.	Cast-in-place Concrete Retaining Wall
935.60.	Post and Plank Retaining Wall (Soldier Pile)
935.70.	Retaining Wall Maintenance

Materials

935.00.02 Requirements. Use materials meeting the requirements of the following section:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics Materials	994
Material for Timber Structures	995
Wire Basket Material	996

The location of trees for native timber materials is SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Construction

935.00.03 Installation. Install retaining walls of the types and at the locations SHOWN ON THE PLANS or as DESIGNATED ON THE GROUND.

935.00.04 Excavation. Excavate in accordance with Section 911 to provide a full bench foundation of stable undisturbed soil or compacted suitable material. Construct the finished foundation grade parallel with the trail profile grade.

935.00.05 Backfill. Place geosynthetics before backfilling and compaction. Backfill and compact with suitable material.

Measurement

935.00.06 Measure the Section 935 items listed in the bid schedule according to section 906.

Payment

935.00.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 935 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

935.10 - Log Crib

Description

935.10.01 This work consists of constructing log or split timber retaining walls. Work includes excavation, notching, pre-drilling, pinning, borrow, backfilling, tread and slope finishing.

Construction

935.10.02 Install retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.10.03 Log Notching. Notch logs only on bottom side.

Do not notch sill and filler logs. Individually notch all face, rear, and header logs to fit as the wall construction proceeds vertically. Do not pre-notch.

Provide a notch depth between one-fourth and one-third the log diameter. Vary notching depth and width as required to obtain a snug fit between interlocking logs of varying diameter. Do not exceed 1/2 inch of space between filler and face logs.

935.20 - Stacked Rock Retaining Wall

Description

935.20.01 This work consists of constructing stacked rock retaining walls, including excavating, placing borrow, backfilling, tread and slope finishing.

Construction

935.20.02 Install retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.20.03 Wall Construction. Construct rock retaining walls at locations SHOWN ON THE PLANS and DESIGNATED ON THE GROUND. Stagger vertical joints a minimum of 4 inches horizontally from vertical joints in adjoining courses.

Use uniformly distributed header rocks for at least 25 percent of the rocks in the front and rear faces of the wall each having a length at least 2.5 times its width. Place all header rocks with the greatest dimension extending into the wall (at right angle to trail centerline), except at corners. At corners, lay alternating courses containing headers with greatest dimension parallel with wall.

Place the exposed face of each rock parallel to the face of the wall in which it is set.

Stabilize each rock on the course that supports it. Do not break, loosen, or displace rocks already set.

Use rocks of a general rectangular shape. Fill voids with small rock fragments or fine aggregate.

935.30 - Wire Basket Retaining Wall

Description

935.30.01 Work consists of furnishing and constructing wire basket structures, including excavating, placing borrow, backfilling, tread and slope finishing.

Construction

935.30.02 Install retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.30.03 Basket Assembly. Do not damage wire coatings during basket assembly, structure erection, cell filling, or backfilling. Rotate the basket panels into position and join the vertical edges with fasteners. Where lacing wire is used, wrap the wire with alternating single and double loops every other mesh opening. Where spiral binders are used, crimp the ends to secure the binders in place. Where alternate fasteners are used, space the fasteners in every other mesh opening.

Rotate the diaphragms into position and join the vertical edges with fasteners, lacing wire, or spiral binders as specified above.

935.30.04 Structure Erection. Place the empty baskets on the foundation and interconnect the adjacent baskets along the top and vertical edges using fasteners.

Where lacing wire is used, wrap the wire with alternating single and double loops every other mesh opening. Install the other fasteners according to Subsection 935.30.03, but space alternate fasteners in every other mesh opening.

In the same manner, interconnect each horizontal layer of baskets to the underlying layer of baskets along the front, back, and sides. Stagger the vertical joints between the baskets of adjacent rows and layers by at least one cell length.

935.30.05 Cell Filling. Remove all kinks and folds in the wire mesh and properly align all the baskets. Place rock carefully in the basket cells to prevent the baskets from bulging and to minimize voids in the rock fill.

Maintain the basket alignment and shape by placing the basket in tension during the filling operation.

Place internal connecting wires in each unrestrained exterior basket cell greater than 12 inches in height. This includes interior basket cells left temporarily unrestrained. Place internal connecting wires concurrently with rock placement.

Fill the cells in any row or layer so that no cell is filled more than 12 inches above an adjacent cell. Repeat this process until the basket is full and the lid bears on the final rock layer.

Secure the lid to the sides, ends, and diaphragms according to Subsection 935.00.04. Make all exposed basket surfaces smooth and neat, with no sharp rock edges projecting through the wire mesh.

935.30.06 Geotextile Installation. Place the geotextile as SHOWN ON THE PLANS. Ensure that the surfaces upon which geotextile is to be placed have a uniform slope and are reasonably smooth and free of obstructions, depressions, and debris that could damage the geotextile. Have the surface approved by the CO before placing geotextile.

Loosely lay the geotextile without wrinkles or creases. Sew or overlap adjacent strips a minimum of 12 inches at joints.

Insert securing pins through both strips of overlapped geotextile at maximum intervals of 36 inches, but no closer than 2 inches to each edge, to prevent the geotextile from being displaced.

935.30.07 Basket Mattresses. Construct wire baskets for mattresses less than 12 inches thick according to Subsections 935.30.03 through 935.30.05. Note that alternate fasteners for basket assembly may be used for structure erection. Anchor the mattress in place as SHOWN ON THE PLANS. Place geotextile against the vertical edges of the mattress and backfill against the geotextile, using structural backfill material or other approved material.

935.40. – Masonry Rock Retaining Wall

Description

935.40.01 This work consists of constructing masonry rock retaining walls. Work includes excavation, borrow, backfilling, tread and slope finishing.

Construction

935.40.02 Install masonry rock retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.50. – Cast-in-place Concrete Retaining Wall

Description

935.50.01 This work consists of constructing cast-in-place concrete retaining walls. Work includes excavation, borrow, backfilling, tread and slope finishing.

Construction

935.50.02 Construct cast-in-place concrete retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.60. – Post and Plank Retaining Wall (Soldier Pile)

Description

935.60.01 This work consists of constructing post and plank retaining walls. Work includes excavation, borrow, backfilling, tread and slope finishing.

Construction

935.60.02 Install post and plank retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.70 - Retaining Wall Maintenance

Description

935.70.01 This work consists of maintenance and repair of retaining wall sections.

Maintenance

935.70.02 General. Perform maintenance on retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.70.03 Obtain logs, rocks, and suitable material for backfill from locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

935.70.04 Replace missing rocks, or missing or decayed logs or lumber, with rocks, logs, or dimensional lumber as SHOWN ON THE PLANS. Secure loose or dislocated rocks and logs.

935.70.05 Repair walls back to a height that will provide a uniform grade consistent with segments of trail adjacent to each side of the damaged wall.

Section 936 – Trail Stairways

Description

936.00.01 This work consists of construction and maintenance of stairways, including excavation and placing embankment and constructing rock, log and treated timber riser, crib-ladder, stairways and railing systems. Construction and maintenance of stairways may be covered by one or more of the following subsections:

936.10.	Individual Steps
936.20.	Overlapping Steps
936.30.	Crib Ladder
936.40.	Staircase
936.50.	Ladder
936.60.	Stairway Maintenance

Materials

936.00.02 Requirements. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics Materials	994
Material for Timber Structures	995

Construction

936.00.03 General. Construct stairways of the type and at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

936.00.04 Excavation and Embankment. Excavate and place embankment in accordance with Section 911. Backfill with suitable compacted material after stairs are constructed.

Measurement

936.00.05 Measure the Section 936 items listed in the bid schedule according to section 906.

Payment

936.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 936 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

936.10. – Individual Steps

Description

936.10.01 This work consists of construction of individual steps, including excavation and placing embankment and constructing rock, log and treated timber steps.

Construction

936.10.02 Install steps as required under construction section 936.00. and/or as SHOWN ON THE PLANS.

936.10.03 Log or Treated Timber Steps. Use single logs or timbers for the entire riser.

936.10.04 Rock Steps. Lay rock with the greatest dimension horizontally and embed a minimum of one-third the height of the rock. Use single rocks to form the entire riser, unless otherwise DESIGNATED ON THE GROUND.

936.10.05 Pinned Steps. Provide a rock base clean of loose materials, roots, soil, and other obstructions.

Drill two 3/4 inch holes into the treads from the bottom side to match the positions of the holes in the rock and provide for the correct position of the step. Do not allow holes to penetrate the top of the tread. Hew the bottom of the tread to provide a firm, solid contact with the rock base. This contact does not need to be continuous but must provide a firm solid bearing.

Place the timber tread on the reinforcing bars and drive the tread down to its solid position.

936.20. – Overlapping Steps

Description

936.20.01 This work consists of construction of overlapping steps, including excavation and placing embankment and constructing rock steps.

Construction

936.20.02 Install overlapping steps as required under construction section 936.00. and/or as SHOWN ON THE PLANS.

936.20.03 Overlapping Rock Stairways. Construct steps starting with the bottom rock. Form the entire tread and riser with single rocks and provide two or more contact points for stability.

936.30. – Crib Ladder

Description

936.30.01 This work consists of construction of crib ladders, including excavation and placing embankment and constructing log and treated timber risers.

Construction

936.30.02 Install crib ladder as required under construction section 936.00. and/or as SHOWN ON THE PLANS.

936.30.03 Crib Ladder Stairway. Construct by laying two carriages parallel to each other. Construct sills and risers between carriages. Excavate location for crib ladder so that the ladder is firmly supported for their entire length. Backfill around carriages and behind the risers with suitable compacted material.

936.40. – Staircase

Description

936.40.01 This work consists of construction of staircases, including excavation and placing embankment and constructing log and treated timber riser.

Construction

936.40.02 Install staircase as required under construction section 936.00. and/or as SHOWN ON THE PLANS.

936.40.03 Plank Staircase. Construct plank staircase by laying two continuous and parallel carriages. Firmly embed the bottom of each carriage in the ground. Support each carriage by a sill at each end. Construct carriages and steps as SHOWN ON THE PLANS.

936.50. – Ladder

Description

936.50.01 This work consists of construction of ladders, including excavation and placing embankment and constructing log and treated timber riser.

Construction

936.50.02 Install ladders as required under construction section 936.00. and/or as SHOWN ON THE PLANS.

936.60. – Stairway Maintenance

Description

936.60.01 This work consists of maintaining stairways and ladders.

Maintenance

936.60.02 Perform maintenance on stairways and ladders as required under construction section 936.00. and/or as SHOWN ON THE PLANS.

Replace missing, broken or decayed logs or lumber with logs or dimensional lumber as SHOWN ON THE PLANS. Secure loose or dislocated stairs and steps.

Section 937— Railing System

Description

937.00.01 This work consists of construction and maintenance of railing system, including fasteners, posts and railing. Construction and maintenance of railing systems may be covered by one or more of the following subsections:

937.10.	Site-built Railing System
937.20.	Modular Railing System
937.30.	Railing System Maintenance

Materials

937.00.02 Materials. Conform to the following Sections and Subsections:

Material for Timber Structures	995
Steel	FP-03, Section 555

Construction

937.00.03 General. Construct Railing Systems at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

937.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with the requirements of Section 911 and as SHOWN ON THE PLANS.

937.00.05 Log Rails and Posts. Use logs greater than or equal to 10 feet in length. Use logs greater than or equal to 4 inches in diameter for rails and posts. Fasten each rail to posts with spikes that penetrate a minimum of 4 inches into the posts unless otherwise SHOWN ON THE PLANS.

937.00.06 Sawn Timber Rails and Posts. Use sawn timber rails greater than or equal to 10 feet in length. Use posts greater than or equal to 4 inches x 4 inches and rails greater than 2 inches by 4 inches. Fasten each rail to posts with spikes or fasteners as SHOWN ON THE PLANS that penetrate a minimum of 3 inches into the posts unless otherwise SHOWN ON THE PLANS. Pre-drill holes for fasteners to prevent splitting and drive spikes flush.

937.00.07 Metal Rails and Posts. Construct metal railing systems as SHOWN ON THE PLANS.

937.00.08 Finish railing systems smooth and free from splinters and sharp projections.

Measurement

937.00.09 Measure the Section 937 items listed in the bid schedule according to section 906.

Payment

937.00.10 The accepted quantities will be paid at the contract price per unit of measurement for the Section 937 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

937.10. — Site-Built Railing System

Description

937.10.01 This work consists of construction of site–built railing system, including fasteners, posts and rails.

Construction

937.10.02 Construct site-built railing system as required under construction section 937.00 and/or as SHOWN ON THE PLANS.

937.20. — Modular Railing System

Description

937.20.01 This work consists of installation of modular railing systems, including fasteners, and modular railing systems.

Construction

937.20.02 Install modular railing systems as required under construction section 937.00 and/or as SHOWN ON THE PLANS.

937.30. — Railing System Maintenance

Description

937.30.01 This work consists of maintaining railing systems.

Maintenance

937.30.02 General. Perform maintenance on railing systems as required under construction section 937.00 and/or as SHOWN ON THE PLANS.

Replace missing, broken or decayed logs or lumber with logs or dimensional lumber as SHOWN ON THE PLANS. Secure loose or dislocated curbing and railing systems.

Section 938—Boardwalks

Description

938.00.01 This work consists of construction and maintenance of boardwalks, including excavation, embankment, backfill, curbs and railing systems. Construction and maintenance of boardwalks may be covered by one or more of the following subsections:

938.10.	Standard Boardwalk
938.20.	Elevated Boardwalk
938.30.	Step and Run
938.40.	Boardwalk Maintenance

Materials

938.00.02 Materials. Conform to the following Sections and Subsections:

Material for Timber Structures	995

Construction

938.00.03 General. Construct boardwalks of the type and at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

938.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with the requirements of Section 911 and as SHOWN ON THE PLANS.

938.00.05 Mud Sills. Bury mud sills to a depth that provides a uniform walking surface as SHOWN ON THE PLANS.

938.00.06 Piers. Construct piers as SHOWN ON THE PLANS.

938.00.06 Approach Fills. Construct the approach fills with compacted suitable material.

Measurement

938.00.07 Measure the Section 938 items listed in the bid schedule according to section 906.

Payment

938.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 938 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

938.10.—Standard Boardwalk

Description

938.10.01 This work consists of construction of standard boardwalks, including excavation, embankment, backfill, curbs and/or railing system.

Construction

938.10.02 Construct standard boardwalks as required under construction section 938.00 and/or as SHOWN ON THE PLANS.

938.10.03 Sawn Timber Stringers. Use sawn timbers that are continuous over 2 or more spans. Fasten each stringer to each mud sill with fasteners as SHOWN ON THE PLANS that penetrate a minimum of 4 inches into the mud sill unless otherwise SHOWN ON THE PLANS. Pre-drill holes for fasteners to prevent splitting and drive spikes flush.

938.10.04 Finished Walkway. Construct abutting ends of sections of boardwalk flush with each other. Do not slope the surface of the completed walkway to either side. Construct the boardwalk with a grade that does not exceed 5 percent and where no change in grade exceeds 5 percent unless otherwise SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Construct the finished walking surface of the boardwalk flush with the trail grade at each end of the structure.

938.10.05 Decking. Lay sawn deck planks on the stringer to provide bearing for the full width of the plank. Fasten decking evenly at right angles to each stringer. Trim protruding ends of the decking to give a straight-line appearance to the edges of the structure or as SHOWN ON THE PLANS.

938.10.06 Curbs and Railing Systems. Construct curbs and railing systems with sawn timber as SHOWN ON THE PLANS. Use lengths greater than or equal to 10 feet and splice with a 6 inch half-lap joint at a spacer location. Finish curbs and railing systems smooth and free from splinters and sharp projections.

938.20.—Elevated Boardwalk

Description

938.20.01 This work consists of construction of elevated boardwalks, including excavation, embankment, backfill, curbs and/or railing system.

Construction

938.20.02 Construct elevated boardwalks as required under construction section 938.00 and/or as SHOWN ON THE PLANS.

938.20.03 Sawn Timber Stringers. Use sawn timbers that are continuous over 2 or more spans. Fasten each stringer to each mud sill with fasteners as SHOWN ON THE PLANS that penetrate a minimum of 4 inches into the

mud sill unless otherwise SHOWN ON THE PLANS. Pre-drill holes for fasteners to prevent splitting and drive spikes flush.

938.20.04 Finished Walkway. Construct abutting ends of sections of boardwalk flush with each other. Do not slope the surface of the completed walkway to either side. Construct the boardwalk with a grade that does not exceed 5 percent and where no change in grade exceeds 5 percent unless otherwise SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Construct the finished walking surface of the boardwalk flush with the trail grade at each end of the structure.

938.20.05 Decking. Lay sawn deck planks on the stringer to provide bearing for the full width of the plank. Fasten decking evenly at right angles to each stringer. Trim protruding ends of the decking to give a straight-line appearance to the edges of the structure or as SHOWN ON THE PLANS.

938.20.06 Curbs and Railing Systems. Construct curbs and railing systems with sawn timber as SHOWN ON THE PLANS. Use lengths greater than or equal to 10 feet and splice with a 6 inch half-lap joint at a spacer location. Finish curbs and railing systems smooth and free from splinters and sharp projections.

938.30.—Step and Run

Description

938.30.01 This work consists of construction of step and runs, including excavation, embankment, and backfill.

Construction

938.30.02 Construct standard step and runs as required under construction section 938.00 and/or as SHOWN ON THE PLANS.

938.40.—Boardwalk Maintenance

Description

938.40.01 This work consists of maintaining boardwalks.

Maintenance

938.40.02 General. Perform maintenance on boardwalks as required under construction section 938.00 and/or as SHOWN ON THE PLANS.

Replace missing, broken or decayed lumber with dimensional lumber as SHOWN ON THE PLANS. Secure loose or dislocated decking, curbing and railing systems.

Clear boardwalk of obstructions, silt, and debris so as to permit the free flow of water away under the boardwalk. Clean decking of all dirt and debris.

940 – Restriction Devices

Section 941 – Fences

Description

941.00.01 This work consists of construction and maintenance of fences, including excavation, backfill, and associated hardware. Construction and maintenance of fences may be covered by one or more of the following subsections:

941.10.	Post and Wire Fence
941.20.	Post and Rail Fence
941.30.	Woven Wire Fence
941.40.	Jackleg Fence
941.50.	Stacked Rail (Worm) Fence
941.60.	Remove and Reset Fence
941.70.	Fence Maintenance

Material

941.00.02 Conform to the following Sections and Subsections:

Concrete	FP-03, Section 601
Fence Material	993

Construction Requirements

941.00.03 General. Clear along the fence line. Remove and dispose of trees, brush, logs, upturned stumps, roots of downed trees, rubbish, and debris according to section 912. Clear a 3 feet width for wire fence.

Grubbing is not required except where short and abrupt changes in the ground contour require removal of stumps to properly grade the fence line. Remove or close cut stumps within the clearing limits.

Perform clearing and leveling with minimum disturbance to the terrain outside the fence line.

Schedule the fence installation, provide temporary fence, or other adequate means to prevent livestock from entering the project right-of-way, easements, or adjoining properties.

At bridges, cattle underpasses, and culverts, connect new fence to structure to permit free passage of livestock under or through the structure.

941.00.04 Posts. Excavate holes for posts, footings, and anchors as SHOWN ON THE PLANS. Space posts at intervals SHOWN ON THE PLANS for the type of fence being installed. Measure post spacing interval parallel to the existing ground slope. Set posts in a vertical position. Backfill post holes in 6 inch lifts. Tamp and compact each lift.

Wood posts may be driven in place if the method of driving does not damage the

post. Metal posts may be driven. Set metal corner, gate, end, and pull posts in concrete.

Where solid rock is encountered without overburden, drill line post holes at least 14 inches deep, and end, corner, gate, and pull posts at least 20 inches deep in the solid rock. Make the hole width or diameter at least 1 inch greater than the post width or diameter. Cut the post to the required length before installation or drill the hole deep enough to set the post at the required height. Set and plumb the post and fill the hole with grout. Thoroughly work the grout into the hole to eliminate voids. Crown the grout to drain water away from the post. Metal posts set in this manner do not require anchor plates and concrete footings.

Where solid rock is covered with soil or loose rock overburden, set posts to the plan depth or to the minimum depth into the solid rock as specified above, whichever is less. When the depth of overburden is greater than 12 inches, use an anchor plate on steel line posts and backfill steel end, corner, gate, and pull posts with concrete from the solid rock to top of the ground. When the depth of overburden is 12 inches or less, anchor plates and concrete backfill are not required. Grout the portion of the post in solid rock.

Install corner posts at changes in alignment of 30 degrees or more. Where new fence joins an existing fence, set end or corner posts, as necessary, and attach in a manner satisfactory to the CO.

941.00.05 Braces. Limit fence runs to no more than 650 feet between adjacent corner braces, gate braces, end braces, or line braces. Install line braces at uniform intervals so the distance between any two braces is 650 feet or less. Construct braces before placing the fence fabric and wires on posts.

(a) Metal braces. Provide corner posts and pull posts with two braces, one each direction from the post in the main fence line. Provide end posts and gate posts with one brace in the line of the fence. Attach metal braces to the metal end, corner, pull, and gate posts and set in concrete as SHOWN ON THE PLANS.

(b) Wood braces. Tap the posts to receive the braces. Anchor the brace to the post with three 16d nails or a 3/8 inch by 4 inches dowel. Install brace wires as SHOWN ON THE PLANS and twist together until the entire assembly is taut and firm. Lightly notch the posts to position the brace wire. Drive three staples at each notch to secure wire.

Measurement

941.00.06 Measure the Section 941 items listed in the bid schedule according to section 906.

Payment

941.00.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 941 pay items listed in the bid schedule. Payment will

be full compensation for the work prescribed in this Section. See Subsection 906.04.

941.10. - Post and Wire Fence

Description

941.10.01 This work consists of furnishing and installing post and wire fence, including excavation, backfill, and any associated materials.

Construction

941.10.02 General. Construct post and wire fence as required under construction section 911 and 941.00 and/or as SHOWN ON THE PLANS.

941.10.03 Placement. Place barbed wire on the side of the post face away from the trail. On curved alignment, place the barbed wire on the post face on the outside of the curve. Tightly stretch and fasten barbed wire to the posts.

Apply tension according to the manufacturer's recommendations using a mechanical stretcher or other device designed for such use. Do not use a motor vehicle to stretch the wire.

Splicing of barbed wire between posts is permitted provided not more than two splices, spaced a minimum of 50 feet apart, occur in any one run of fence. Use wrap or telephone type splices for barbed wire with each end wrapped around the other wire for not less than six complete turns.

941.10.04 Fastening. Terminate the barbed wire at each end, corner, gate, and pull post. Wrap each line of barbed around the post and then itself with at least four turns. Where wood posts are used, staple the wires tightly to the posts.

Fasten each strand of barbed wire to each line post. Use wire ties or clamps to fasten the wires to metal posts. Securely splice tie wires to the fence on both sides of the post so there are two loops behind the post and one loop in front. On wood line posts, drive U-shaped staples diagonally across the wood grain so that both points do not enter between the same grain. In depressions where wire uplift occurs, drive staples with points slightly upward. On level ground and over knolls, slope the points slightly downward. Drive the staples just short of actual contact with the wires to permit free longitudinal movement of those lines and to prevent damage to the protective coating.

At grade depressions, alignment angles, and other locations where stresses tending to pull posts from the ground or out of alignment are created, snub or guy the wire fence. Attach the guy wire to each strand of barbed wire in a manner to maintain the entire fence in its normal shape. Attach the guy wire to a deadman anchor buried not less than 24 inches in the ground or to an approved anchor at a point that best serves to resist the pull of the wire

fence. If necessary to guy the fence in solid rock, grout the guy wire in a hole 2 inches in diameter and 10 inches deep. Deadman may also be fastened to posts. Place the deadman anchors at locations as directed.

Where required, install vertical cinch stays as SHOWN ON THE PLANS. Twist the wire to permit weaving into the horizontal fence wires to provide rigid spacing. Weave barbed wires and the top, middle, and bottom wire of the woven wire, as applicable, into the cinch stay.

Where existing fence intersects the new fence, cut the existing fence materials or, splice in kind, new material as necessary, and fasten each strand of the barbed wire to a new end post in line with or immediately adjacent to the new fence line.

941.20. – Post and Rail Fence

Description

941. 20.01 This work consists of furnishing and installing post and rail fence, including any associated materials.

Construction

941. 20.02 General. Construct post and rail fence as required under construction section 911 and 941.00 and/or as SHOWN ON THE PLANS.

941.30. – Woven Wire Fence

Description

941.30.01 This work consists of furnishing and installing woven wire fence including any associated materials.

Construction

941.30.02 General. Construct woven wire fence as required under construction section 911 and 941.00 and/or as SHOWN ON THE PLANS.

941.40. – Jackleg Fence

Description

941.40.01 This work consists of furnishing and installing jackleg fence including any associated materials.

Construction

941.40.02 General. Construct jackleg fence as required under construction section 911 and 941.00 and/or as SHOWN ON THE PLANS.

941.50. – Stacked Rail (Worm) Fence

Description

941.50.01 This work consists of furnishing and installing stacked rail (worm) fence including any associated materials.

Construction

941.50.02 General. Construct stacked rail (worm) fence as required under construction section 911 and 941.00 and/or as SHOWN ON THE PLANS.

941.60. – Remove and Reset Fences

Description

941.60.01 This work consists of removing and resetting of fencing, including excavation and backfill, including any associated materials.

Construction

941.60.02 General. Remove and reset fencing at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

941.60.03 Remove and Reset Fence. Remove existing fence and reset to approximately the same condition as the original fence. Salvage material in the existing fence and incorporate the material into the reset fence. When posts are set in concrete, remove concrete from old post and reset in concrete. Replace fence material damaged beyond reuse. Firmly reset posts on new alignment. Space posts and attach the horizontal members or wires to posts the same as the original fence. Furnish and use new material to fasten members or wires to posts.

941.70. – Fence Maintenance

Description

941.70.01 This work consists of maintenance of fences including any associated materials.

Maintenance

941.70.02 General. Perform maintenance on fences as required under construction section 911 and 941.00 and/or as SHOWN ON THE PLANS.

Section 942 – Gates

Description

942.00.01 This work consists of construction and maintenance of gates, including excavation, embankment, backfill and rails. Construction and maintenance of gates may be covered by one or more of the following subsections:

942.10.	Wire Gate
942.20.	Swing Gate
942.30.	Loose Rail Gate
942.40.	Accessible Gate – Kissing Gate
942.50.	Accessible Gate - Chicane
942.60.	Gate Maintenance

Material

942.00.02 Conform to the following Sections and Subsections:

Concrete	FP-03, Section 601
Fence Material	993

Construction Requirements

942.00.03 General. Construct gates at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Provide minimum 10 feet clear width along the fence line for gate construction and operation.

Remove and dispose of trees, brush, logs, roots of downed trees, rubbish, and debris according to section 912. All stumps and roots shall be removed to allow for unhindered operation of the gate.

Schedule the gate installation, provide temporary fence, or other adequate means to prevent livestock from entering the project right-of-way, easements, or adjoining properties.

942.00.04 Posts. Excavate holes for posts and install posts at locations as SHOWN ON PLANS. Set posts in a vertical position. Backfill post holes in 6 inch lifts. Tamp and compact each lift.

Wood posts may be driven in place if the method of driving does not damage the post. Metal posts may be driven.

Where solid rock is encountered without overburden, drill gate post holes at least 20 inches deep in the solid rock. Make the hole width or diameter at least 1 inch greater than the post width or diameter. Cut the post to the required length before installation or drill the hole deep enough to set the post at the required height. Set and plumb the post and fill the hole with grout. Thoroughly work the grout into the hole to eliminate voids. Crown the grout to drain water away from the post. Metal posts set in this manner do not require anchor plates and concrete footings.

Where solid rock is covered with soil or loose rock overburden, set posts to the

plan depth or to the minimum depth into the solid rock as specified above, whichever is less. When the depth of overburden is greater than 12 inches, use an anchor plate on steel line posts and backfill steel end, corner, gate, and pull posts with concrete from the solid rock to top of the ground. When the depth of overburden is 12 inches or less, anchor plates and concrete backfill are not required. Grout the portion of the post in solid rock.

Measurement

942.00.06 Measure the Section 942 items listed in the bid schedule according to section 906.

Payment

942.00.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 942 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

942.10 – Wire Gates

Description

942.10.01 This work consists of furnishing and installing gates, including any associated hardware and materials.

Material

942.10.02 Wire gates to be constructed of the same material as the fence.

Construction

942.10.03 Construct gates as required under construction section 911 and 942.00 and/or as SHOWN ON THE PLANS.

Provide a taut and well-aligned closure of the opening, capable of being readily opened and closed by hand.

942.20 – Swing Gates

Description

942.20.01 This work consists of furnishing and installing gates, including any associated hardware and materials.

Material

942.20.02 Swing gates to be constructed from the material SHOWN ON THE PLANS.

Construction

942.20.03 Construct gates as required under construction section 911 and 942.00 and/or as SHOWN ON THE PLANS.

Install metal gates and fittings to gate posts previously set as SHOWN ON THE PLANS. Firmly attach the fittings to the posts and gates. Hinge each single gate to prevent removal of the gate without tools. Set the gate in an approximately horizontal plane. Set the gate so it swings freely inward and outward and fastens securely in its latch holder, or in the case of double gates, in its latch holder and gate stops. Set gates to swing open at least 90 degrees in each direction.

Install wood gates similar to metal gates and as SHOWN ON THE PLANS.

942.30 – Loose Rail Gates

Description

942.30.01 This work consists of furnishing and installing gates, including any associated hardware and materials.

Material

942.30.02 Loose rail gates to be constructed of the same material as the fence.

Construction

942.30.03 Construct gates as required under construction section 911 and 942.00 and/or as SHOWN ON THE PLANS.

942.40 – Accessible Gate – Kissing Gate

Description

942.40.01 This work consists of furnishing and installing gates, including any associated hardware and materials.

Material

942.40.02 Gates to be constructed from the material SHOWN ON THE PLANS.

Construction

942.40.03 Construct kissing gates as required under construction section 911 and 942.00 and/or as SHOWN ON THE PLANS.

942.50 – Accessible Gate – Chicanes

Description

942.50.01 This work consists of furnishing and installing gates, including any associated hardware and materials.

Material

942.50.02 Gates to be constructed from the material SHOWN ON THE PLANS.

Construction

942.50.03 Construct chicanes as required under construction section 911 and 942.00 and/or as SHOWN ON THE PLANS.

942.60 – Gate Maintenance

Description

942.60.01 This work consists of maintenance of gates and latches including any associated materials.

Maintenance

942.60.02 Perform maintenance on gates and latches as required under construction section 911 and 942.00 and/or as SHOWN ON THE PLANS.

Replace missing, broken or decayed logs or lumber as SHOWN ON THE PLANS. Adjust gate hinges to allow gate to open and close and gate latches to function properly.

Section 943 - Cattle Guard

Description

943.00.01 This work consists of construction and maintenance of cattle guards, including excavation, embankment, and backfill. Construction and maintenance of cattle guards may be covered by one or more of the following subsections:

943.10. Standard Cattle Guard
943.20. Above Ground Cattle Guard
943.30. Cattle Guard Maintenance

Materials

943.00.02 Materials. Conform to the following Sections and Subsections:

Steel	FP-03, Section 555
Material for Timber Structures	995

Construction

943.00.03 General. Construct cattle guards at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

943.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with the requirements of Section 911 and as SHOWN ON THE PLANS. Excavate foundation to depth with sufficient space for proper installation of formwork.

When the cattle guard is to be installed on new embankment, complete and compact the embankment according to Section 911 before excavating for footing.

943.00.05 Concrete foundation. Construct concrete foundations according to FP-03, Section 601. Concrete units may be cast-in-place or precast.

Finish stringer bearings to allow full bearing under each stringer. The cattle guard shall rest on the concrete without rocking.

943.00.06 Cattle guard. Fabricate cattle guard as SHOWN ON THE PLANS. Assemble and place guards as shown on the plans. Securely fasten the cattle guard to the foundation. Fasten the metal wings to the cattle guard as shown on the plans. Connect fences and gates according to the plans. Weld according to ANSI/AASHTO/AWS D1.5.

Standard manufactured cattle guards may be used if approved. Designs shall provide for AASHTO loading H-10. Provide suitable cleanouts. Prepare and submit drawings according to Subsection 903.01. Acceptance of the drawings covers the requirements for strength and detail only. No responsibility is assumed for errors in dimensions.

943.00.07 Painting. All metal parts shall receive one shop coat. Two additional coats are required and may be applied in the shop or in the field. Paint according to FP-03, Section 563.

943.00.08 Approach Fills. Construct the approach fills with compacted suitable material.

Measurement

943.00.09 Measure the Section 943 items listed in the bid schedule according to section 906.

Payment

943.00.10 The accepted quantities will be paid at the contract price per unit of measurement for the Section 943 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

943.10. - Standard Cattle Guard

Description

943.10.01 This work consists of furnishing and installing cattle guards, including excavation, embankment, backfill, and any associated materials.

Construction

943.10.02 Construct standard cattle guards as required under construction section 943.00 and/or as SHOWN ON THE PLANS.

943.20. – Above Ground Cattle Guard

Description

943.20.01 This work consists of furnishing and installing cattle guards, including excavation, embankment, backfill, and any associated materials.

Construction

943.20.02 Construct standard cattle guards as required under construction section 943.00 and/or as SHOWN ON THE PLANS.

943.30.—Cattle Guard Maintenance

Description

943.30.01 This work consists of maintaining cattle guards.

Maintenance

943.30.02 Perform maintenance on cattle guards as required under construction section 943.00 and/or as SHOWN ON THE PLANS.

Replace missing, broken or decayed rails as SHOWN ON THE PLANS. Secure loose or dislocated rails.

944.00. – Stiles

Description

944.00.01 This work consists of construction and maintenance of stiles, including excavation, embankment, backfill and rails. Construction and maintenance of stiles may be covered by one or more of the following subsections:

944.10. Stile
944.20. Stile Maintenance

Materials

944.00.02 Materials. Conform to the following Sections and Subsections:

Material for Timber Structures	995

Construction

944.00.03 General. Construct stiles at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

944.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with the requirements of Section 911 and as SHOWN ON THE PLANS.

Measurement

944.00.05 Measure the Section 944 items listed in the bid schedule according to section 906.

Payment

944.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 944 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

944.10. – Stiles

Description

944.10.01 This work consists of furnishing and installing stile, including excavation, embankment, backfill, timbers and any associated hardware materials.

Construction

944.10.02 Construct stile as required under construction section 944.00. and/or as SHOWN ON THE PLANS.

944.20. – Stiles Maintenance

Description

944.20.01 This work consists of maintaining stiles.

Maintenance

944.20.02 General. Perform maintenance on stiles as required under construction section 944.00. and/or as SHOWN ON THE PLANS.

Replace missing or broken steps and rails as SHOWN ON THE PLANS. Secure loose or dislocated steps and rails.

Section 945 – Bollards

Description

945.00.01 This work consists of construction and maintenance of bollards, including excavation, embankment, and backfill. Construction and maintenance of bollards may be covered by one or more of the following subsections:

945.10.	Bollards
945.20.	Bollard Maintenance

Materials

945.00.02 Materials. Conform to the following Sections and Subsections:

Material for Timber Structures	995
Steel	555

Construction

945.00.03 General. Construct bollards of the type and at locations as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

945.00.04 Bollards. Drill holes for bollards. Set posts plumb, backfill with approved material, and compact or as SHOWN ON THE PLANS.

Measurement

945.00.05 Measure the Section 945 items listed in the bid schedule according to section 906.

Payment

945.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 945 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

945.10. – Bollards

Description

945.10.01 This work consists of furnishing and installing bollards, including excavation, embankment, backfill, and any associated hardware materials.

Construction

945.10.02 Construct bollards as required under construction section 945.00 and/or as SHOWN ON THE PLANS.

945.20. – Bollard Maintenance

Description

945.20.01 This work consists of maintaining bollards.

Maintenance

945.20.02 General. Perform maintenance on bollards as required under construction section 945.00 and/or as SHOWN ON THE PLANS.

Replace missing, broken or decayed bollards as SHOWN ON THE PLANS. Secure loose or dislocated bollards as SHOWN ON THE PLANS.

Section 949 – Reserved for Restriction Devices Special Project Specifications

950. Signs and Markers

Section 951 - Signs

Description

951.00.01 This work consists of furnishing and installing or maintaining signs and posts, including excavation, backfill, and associated materials and hardware. Construction and maintenance of signs and posts may be covered by one or more of the following subsections:

951.10.	Signs
951.20.	Sign Repair and Replacement Maintenance

Material

951.00.02 All materials shall conform to Forest Service EM-7100-15, *Sign and Poster Guidelines for the Forest Service* or as SHOWN ON THE PLANS.

Construction

951.00.03 General. Erect signs and posts of the type and at the locations as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

951.00.04 Post Installation. Excavate post hole to the depth as SHOWN ON THE PLANS. The hole width should not be more than three times the width of the post. If necessary because of obstacles, the post hole may be moved within the tolerances as SHOWN ON THE PLANS.

Set posts in a plumb position. Backfill the post holes with suitable material in 6 inch layers and compact material to produce a solid installation. Stabilize the post with concrete or rock mounds built in accordance with rock cairn specifications when approved by the CO.

951.00.05 Sign Installation. Pre-drill signs before mounting. Tighten hardware snug, but do not damage the sign panel surface.

For signs mounted on trees, remove obstructing limbs and notch the outer bark to provide a flat surface at the sign mounting position as necessary. Avoid removing the inner bark or cutting the cambium. Use 50-penny galvanized nails or spikes to fasten signs to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the sign.

Measurement

951.00.06 Measure the Section 951 items listed in the bid schedule according to section 906.

Rock cairns built to support posts will be considered incidental to the PAY ITEM for signs, and separate payment will not be made.

Payment

951.00.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 951 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

951.10 – Signs

Description

951.10.01 This work consists of furnishing and installing signs and posts, including excavation, backfill, and associated materials and hardware.

Construction

951.10.02 Install signs and posts as required under construction section 911 and 951.00 and/or as SHOWN ON THE PLANS.

951.20 – Sign Repair and Replacement Maintenance

Description

951.20.01 This work consists of repairing existing damaged signs, refastening existing signs to existing sign posts and resetting existing sign posts and furnishing and installing new replacement signs and new sign posts.

Maintenance

951.20.02 General. Repair signs at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Reattach designated signs that are out of their original position so that the lines of the sign legend are horizontal. Reset sign support posts to a plumb position and firmly tamp in place. Set sign posts designated for replacement in the ground to a depth as SHOWN ON THE PLANS at the approximate location of the original post.

Reset existing posts that are out of plumb and firmly tamp in place. Set posts that need to be reset and new replacement posts in a plumb position and to a depth of as SHOWN ON THE PLANS. Backfill and tamp holes from which posts are removed.

Pre-drill replacement signs before mounting. Tighten sign mounting bolts or lag screws to hold the sign snugly in place. Do not damage sign surface.

For signs mounted on trees, remove obstructing limbs and notch the outer bark to provide a flat surface at the sign mounting position as necessary. Avoid removing the inner bark or cutting the cambium. Use 50-penny galvanized nails or spikes to refasten signs to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the sign.

Section 952 – Route Markers

Description

952.00.01 This work consists of furnishing and installing or maintaining route markers or route markers on supports, including excavation, backfill, and associated materials and hardware. Construction and maintenance of route markers may be covered by one or more of the following subsections:

952.10.	Route Markers
952.20.	Route Marker Maintenance

Material

952.00.02 All materials shall conform to Forest Service EM 7100-15, *Sign and Poster Guidelines for the Forest Service* or as SHOWN ON THE PLANS.

Construction

952.00.03 General. Erect route markers of the type and at the locations as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Measurement

952.00.04 Measure the Section 952 items listed in the bid schedule according to section 906.

Rock cairns built to support route marker posts will be considered incidental to the PAY ITEM for route markers, and separate payment will not be made.

Payment

952.00.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 952 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

952.10 – Route Markers

Description

952.10.01 This work consists of furnishing and installing route markers or route markers on supports, including associated materials and hardware.

Construction

952.10.02 Construct route markers as required under construction section 952.00 and/or as SHOWN ON THE PLANS.

952.10.03 Post Installation. Excavate post hole to the depth as SHOWN ON THE PLANS. The hole width should not be more than three times the width of the post. If necessary because of obstacles, the post hole may be moved within the tolerances as SHOWN ON THE PLANS.

Set posts in a plumb position. Backfill the post holes with suitable material in 6 inch layers and compact material to produce a solid installation. Stabilize the post with concrete or rock mounds built in accordance with rock cairn specifications when approved by the CO.

952.10.04 Tree Installation. Remove obstructing limbs and notch the outer bark to provide a flat surface at the manufactured blaze mounting position as necessary. Avoid removing the inner bark or cutting the cambium.

952.10.05 Route Marker Installation. Pre-drill route markers before mounting. Tighten hardware snug, but do not damage the route marker surface. Use 50-penny galvanized nails or spikes to fasten route markers to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the markers.

952.20 – Route Marker Maintenance

Description

952.20.01 This work consists of refastening existing route markers to existing marker supports, resetting existing marker support posts, and furnishing and installing new replacement route markers and new route marker supports.

Maintenance

952.20.02 General. Repair route markers at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Reattach designated route markers that are out of their original position so that the lines of the marker legend are vertical. Reset route marker support posts to a plumb position and firmly tamp in place. Set route marker posts designated for replacement in the ground to a depth as SHOWN ON THE PLANS at the approximate location of the original post.

Reset existing supports that are out of plumb and firmly tamp in place. Set supports that need to be reset and new replacement supports in a plumb position and to a depth as SHOWN ON THE PLANS. Backfill and tamp holes from which posts are removed.

Tighten route marker mounting bolts or lag screws to hold the marker snugly in place. Do not damage route marker surface.

For route markers mounted on trees, remove obstructing limbs and notch the outer bark to provide a flat surface at the marker mounting position as necessary. Avoid removing the inner bark or cutting the cambium. Use 50-penny galvanized nails or spikes to refasten markers to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the marker.

Section 953 – Reassurance Markers

Description

953.00.01 This work consists of blazing trees, furnishing and installing manufactured blazers on supports, or maintaining blazed trees, manufactured blazers and/or supports, including excavation, backfill, and associated materials and hardware. Construction and maintenance of reassurance markers may be covered by one or more of the following subsections:

953.10. Standard Forest Service Blaze
953.20. Manufactured Blazer
953.30. Reassurance Marker Maintenance

Material

953.00.02 All materials shall conform to Forest Service EM-7100-15, *Sign and Poster Guidelines for the Forest Service* or AS SHOWN ON THE PLANS.

Construction

953.00.03 General. Construct a reassurance marker of the type and at the locations as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Measurement

953.00.04 Measure the Section 953 items listed in the bid schedule according to section 906.

Rock cairns built to reassurance marker posts will be considered incidental to the PAY ITEM for markers, and separate payment will not be made.

Payment

953.00.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 953 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

953.10 – Standard Forest Service Blaze

Description

953.10.01 This work consists of cutting, painting, branding or routing and/or scorching blazes on trees or rocks.

Construction

953.10.02 Cut, paint, brand or router and/or scorch blazes on trees or rocks as required under construction section 953.00 and/or as SHOWN ON THE PLANS.

953.20 – Manufactured Blazer

Description

953.20.01 This work consists of furnishing and installing manufactured blazers on supports.

Construction

953.20.02 Install the manufactured blazer on supports as required under construction section 953.00 and/or as SHOWN ON THE PLANS.

953.20.03 Tree Installation. Remove obstructing limbs and notch the outer bark to provide a flat surface at the manufactured blazer mounting position as necessary. Avoid removing the inner bark or cutting the cambium.

953.20.04 Post Installation. Excavate post hole to the depth as SHOWN ON THE PLANS. The hole width should not be more than three times the width of the post. If necessary because of obstacles, the post hole may be moved within the tolerances as SHOWN ON THE PLANS.

Backfill the post holes with suitable material in 6 inch layers and compact material to produce a solid and plumb installation. Stabilize the post with concrete or rock mounds built in accordance with rock cairn specifications when approved by the CO.

953.20.05 Blazer Installation. Pre-drill blazers before mounting manufactured blazers on supports. Use 50-penny galvanized nails or spikes to fasten manufactured blazers to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the manufactured blazers. Tighten hardware snug for posts, but do not damage the manufactured blazer surface.

953.30 – Reassurance Marker Maintenance

Description

953.30.01 This work consists of maintaining manufactured blazers or blazed trees, including resetting supports, refastening or replacing manufactured blazers or re-blazing trees with an axe or paint.

Maintenance

953.30.02 General. Repair reassurance markers at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND and as required under construction section 953.

Reattach designated reassurance markers that are out of their original position so that the marker is vertical. Reset reassurance markers support posts to a plumb position and firmly tamp in place. Set reassurance marker supports designated for replacement in the ground to a depth as SHOWN ON THE PLANS at the approximate location of the original post.

Reset existing supports that are out of plumb and firmly tamp in place. Set supports that need to be reset and new replacement supports in a plumb position and to a depth as SHOWN ON THE PLANS. Backfill and tamp holes from which posts are removed.

Tighten route marker mounting bolts or lag screws to hold the marker snugly in place. Do not damage route marker surface.

For reassurance markers mounted on trees, remove obstructing limbs and notch the outer bark to provide a flat surface at the marker mounting position as necessary. Avoid removing the inner bark or cutting the cambium. Use 50-penny galvanized nails or spikes to refasten markers to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the marker.

Section 954 – Mileage Markers

Description

954.00.01 This work consists of furnishing and installing or maintaining mileage markers or mileage markers on supports, including excavation, backfill, and associated materials and hardware. Construction and maintenance of mileage markers may be covered by one or more of the following subsections:

954.10	Mileage Markers
954.20	Mileage Marker Maintenance

Material

954.00.02 All materials shall conform to Forest Service EM 7100-15, *Sign and Poster Guidelines for the Forest Service* or as SHOWN ON THE PLANS.

Construction

954.00.03 General. Erect mileage markers of the type and at the locations as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Measurement

954.00.04 Method. Measure the Section 954 items listed in the bid schedule according to section 906.

Rock cairns built to support mileage marker posts will be considered incidental to the PAY ITEM for markers, and separate payment will not be made.

Payment

954.00.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 954 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

954.10 – Mileage Markers

Description

954.10.01 This work consists of furnishing and installing mileage markers or mileage markers on supports, including associated materials and hardware.

Construction

954.10.02 Construct mileage markers as required under construction section 954.00 and/or as SHOWN ON THE PLANS.

954.10.03 Post Installation. Excavate post hole to the depth as SHOWN ON THE PLANS. The hole width should not be more than three times the width of the post. If necessary because of obstacles, the post hole may be moved within the tolerances as SHOWN ON THE PLANS.

Set posts in a plumb position. Backfill the post holes with suitable material in 6 inch layers and compact material to produce a solid installation. Stabilize the post with concrete or rock mounds built in accordance with rock cairn specifications when approved by the CO.

954.10.04 Tree Installation. Remove obstructing limbs and notch the outer bark to provide a flat surface at the mileage marker mounting position as necessary. Avoid removing the inner bark or cutting the cambium.

954.10.05 Mileage Marker Installation. Pre-drill mileage markers before mounting. Tighten hardware snug, but do not damage the route marker surface. Use 50-penny galvanized nails or spikes to fasten mileage markers to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the markers.

954.20 – Mileage Marker Maintenance

Description

954.20.01 This work consists of refastening existing mileage markers to existing marker supports, resetting existing marker supports, and furnishing and installing new replacement mileage markers and new mileage marker supports.

Maintenance

954.20.02 General. Repair mileage markers at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Reattach designated mileage markers that are out of their original position so that the lines of the marker legend are vertical. Reset route marker support posts to a plumb position and firmly tamp in place. Set route marker posts designated for replacement in the ground to a depth as SHOWN ON THE PLANS at the approximate location of the original post.

Reset existing supports that are out of plumb and firmly tamp in place. Set supports that need to be reset and new replacement supports in a plumb position and to a depth as SHOWN ON THE PLANS. Backfill and tamp holes from which posts are removed.

Tighten route marker mounting bolts or lag screws to hold the marker snugly in place. Do not damage marker surface.

For mileage markers mounted on trees, remove obstructing limbs and notch the outer bark to provide a flat surface at the marker mounting position as necessary. Avoid removing the inner bark or cutting the cambium. Use 50-penny galvanized nails or spikes to refasten markers to trees and leave 1 inch of nail exposed to allow for tree to grow without impacting the marker.

Section 955 – Cairns

Description

955.00.01 This work consists of furnishing and installing or maintaining cairns. Construction and maintenance of cairns may be covered by one or more of the following subsections:

955.10.	Cairns
955.20.	Cairn Maintenance

Material

955.00.02 Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991

Construction

955.00.03 General. Erect cairns of the type and at the locations as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

955.00.04 Rock Cairn Construction. Slope each rock layer toward the center. Place each rock with at least three points of contact. Do not wedge small rocks into cracks between large rocks to stabilize the large rocks.

Measurement

955.00.05 Measure the Section 955 items listed in the bid schedule according to section 906.

Payment

955.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 955 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

955.10 – Cairns

Description

955.10.01 This work consists of furnishing and installing cairns.

Construction

955.10.02 Construct cairns as required under construction section 955.00 and/or as SHOWN ON THE PLANS.

955.20 – Cairn Maintenance

Description

955.20.01 This work consists of maintenance of cairns.

Maintenance

955.20.02 Perform maintenance on cairns as required under construction section 955.00 and/or as SHOWN ON THE PLANS.

Section 959 – Reserved for Route Markers and Signs Special Project Specifications

960. Trail Bridges

Section 961- Native Log Stringer Trail Bridge

Description

961.00.01 This work consists of constructing native log stringer bridges, including mud sills, bulkheads, rail systems, curbs, decking, excavation, backfill, and approach fills as SHOWN ON THE PLANS. Construction of native log stringer trail bridges may be covered by one or more of the following subsections:

961.10.	Single Log Stringer Trail Bridge
961.20.	Multiple Log Stringer Trail Bridge

Materials

961.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

The location of trees for native timber materials will be SHOWN ON THE PLANS and DESIGNATED ON THE GROUND.

Construction

961.00.03 General. Construct native log stringer trail bridges at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Pre-drill holes for fasteners when necessary to prevent splitting and drive spikes flush. Use washers with lag screws and bolts.

961.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

961.00.05 Hardware. Furnish and install hardware as SHOWN ON THE PLANS.

961.00.06 Mud Sills. Construct mud sills at each end of the span in the location staked on the ground. Construct mud sills to be level, bedded evenly, and buried to the depth necessary for the bottom of the log stringers to clear the ground surface by a minimum of 6 inches.

Hew sill logs to provide a bearing surface for the log stringers and to provide the log stringers with a level top surface. Do not hew sill logs more than one-third their diameter. Do not level the top surfaces of the log stringers by shimming or notching their ends.

961.00.07 Stringers. Fasten log stringer to each mud sill with a drift pin that penetrates a minimum of 8 inches into the mud sill.

When plank decking is used, hew the top surfaces of log stringers up to 2 inches deep, as necessary, to provide bearing surfaces for deck planks.

961.00.08 Decking. Spike decking evenly at right angles to each stringer, unless otherwise SHOWN ON THE PLANS.

Lay split log decking alternately flat side down first, then round side down, ending with a flat side down. When the round side is down, provide a bearing surface that is between 1½ inches and 2 inches wide.

Lay split and sawn deck planks on the stringer to provide bearing for the full width of the plank.

Trim protruding ends of the decking to give a straight-line appearance to the edges of the structure, except for decking that extends out to provide handrail support.

961.00.09 Curbs. Construct curbs with logs or sawn timber as SHOWN ON THE PLANS. Use lengths greater than or equal to 10 feet and splice with a 24 inch half-lap joint at a curb block location. Match diameters of logs at lap joints and trim excess to provide a smooth transition between logs.

Finish curbs smooth and free from splinters and sharp projections.

961.00.10 Rail Systems. Construct rail systems with logs or sawn timber as SHOWN ON THE PLANS and use lengths greater than or equal to 10 feet.

When rail systems are constructed of logs, splice them with a 6 inch half-lap joint at a post location. Notch surfaces of posts and rails 5/8 inch at connections. Match diameters of rails at lap joints and trim excess to provide a smooth transition between rails. Use timber bolts for fastening rails to posts as SHOWN ON THE PLANS.

When rail systems are constructed of sawn timber, splice them with a diagonal butt joint at a post location. Use S4S sawn timber, for all rails, posts, and top caps. Fasten each rail and top rail to each post with wood screws as SHOWN ON THE PLANS. Finish handrails and posts smooth and free from splinters and sharp projections.

961.00.11 Approach Fills. Construct the approach fills with compacted suitable material.

Measurement

961.00.12 Measure the Section 961 items listed in the bid schedule according to section 906.

Payment

961.00.13 The accepted quantities will be paid at the contract price per unit of measurement for the Section 961 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

961.10 – Single Log Stringer Trail Bridge

Description

961.10.01 This work consists of construction of a single log stringer bridge, including excavation, embankment, backfill, curbs and/or railing system.

Construction

961.10.02 Construct single log stringer bridge as required under construction section 961.00 and as SHOWN ON THE PLANS.

961.20 – Multiple Log Stringer Trail Bridge

Description

961.20.01 This work consists of construction of a multiple log stringer bridge, including excavation, embankment, backfill, curbs and/or railing system.

Construction

961.20.02 Construct multiple log stringer bridge as required under construction section 961.00 and as SHOWN ON THE PLANS.

Section 962 - Sawn Timber Trail Bridge

Description

962.00.01 This work consists of furnishing, fabricating, constructing sawn timber trail bridges, including all required lumber, hardware, sills, backwalls, rail systems, curbs, decking, excavation, backfill, and approach fills as SHOWN ON THE PLANS. Construction of sawn timber trail bridges may be covered by one or more of the following subsections:

962.10.	Sawn Timber Stringer Trail Bridge
962.20.	Longitudinal Nail-Laminated Trail Bridge

Materials

962.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Furnish the following compliance certificates to the CO upon delivery of the materials to the jobsite:

(a) Verification of compliance with grading rules and species of timber and lumber. Provide certification by an agency accepted as competent by the American Lumber Standards Committee (ALSC).

(b) Lot certification of each charge for preservative, penetration in inches, and retention in pounds per cubic foot (assay method) by a qualified independent inspection and testing agency. In addition, have the producer of the treated products provide written certification that Best Management Practices (BMP's) in accordance with "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservers Institute (WWPI) and Canadian Institute of Treated Wood, were followed, including a description and appropriate documentation of the applicable BMP's used.

(c) Such other certifications as SHOWN ON THE PLANS or called for in the SPECIAL PROJECT SPECIFICATIONS.

Provide shop drawings in accordance with section 903 for all timber bridges 30 days in advance of fabrication when SHOWN ON THE PLANS or in the SPECIAL PROJECT SPECIFICATIONS. Show all dimensions and fabrication details for all cut, framed, or bored timbers.

Construction

962.00.03 General. Construct sawn timber trail bridges at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Furnish structural lumber and timber of the required stress grade as SHOWN ON THE PLANS.

Clear stacks of weeds, rubbish, or other objectionable material from the ground under and in the vicinity of all stored material. Place the bottom layer of material at least 8 inches above the ground level. Provide sufficient support to prevent sagging.

Open-stack untreated material to shed water. Stack material in layers on spacers (stickers) that extend across the full width of the stack to allow for free air circulation. Align all stickers vertically and space them at regular intervals.

Close-stack treated material to shed water.

Protect material from the weather. If covered, used sheet material such as water-resistant paper or opaque polyethylene film. Do not cover with impervious membranes, such as polyethylene film, during dry weather. Slit individual wrappings full length or puncture on the lower side to permit drainage of water.

Use slings or other devices to protect corners of heavy construction timbers and banded packages of heavy construction timber

962.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

962.00.05 Hardware. Furnish and install hardware as SHOWN ON THE PLANS

962.00.06 Workmanship. Cut and form all lumber and construction timbers so all joints will have even bearing over the entire contact surface. Do not use shims in making joints. Construct all joints to be closed. Drive nails and spikes to set the heads flush with the wood surface. Use the same end, face, and edge of the timber member for all layout dimensions. Bore all holes from mating faces.

962.00.06 Mud Sills. Construct mud sills at each end of the span in the location staked on the ground. Construct mud sills to be level, bedded evenly, and buried to the depth necessary for the bottom of the log stringers to clear the ground surface by a minimum of 6 inches.

962.00.07 Stringers. Stringers shall be size matched at bearings and shall be positioned so that knots near the edge will be in the top portion of the stringers. Bridging between stringers shall be neatly and accurately framed and securely fastened.

962.00.08 Curbs. Construct curbs with logs or sawn timber as SHOWN ON THE PLANS. Use lengths greater than or equal to 10 feet and splice with a 24 inch half-lap joint at a curb block location. Match diameters of logs at lap joints and trim excess to provide a smooth transition between logs.

Finish curbs smooth and free from splinters and sharp projections.

962.00.09 Rail Systems. Construct rail systems with logs or sawn timber as SHOWN ON THE PLANS and use lengths greater than or equal to 10 feet.

When rail systems are constructed of logs, splice them with a 6 inch half-lap joint at a post location. Notch surfaces of posts and rails 5/8 inch at connections. Match

diameters of rails at lap joints and trim excess to provide a smooth transition between rails. Use timber bolts for fastening rails to posts as SHOWN ON THE PLANS.

When rail systems are constructed of sawn timber, splice them with a diagonal butt joint at a post location. Use S4S sawn timber, for all rails, posts, and top caps. Fasten each rail and top rail to each post with wood screws as SHOWN ON THE PLANS. Finish handrails and posts smooth and free from splinters and sharp projections.

962.00.10 Approach Fills. Construct the approach fills with compacted suitable material.

Measurement

962.00.11 Measure the Section 962 items listed in the bid schedule according to section 906.

Payment

962.00.12 The accepted quantities will be paid at the contract price per unit of measurement for the Section 962 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

962.10 – Sawn Timber Stringer Trail Bridge

Description

962.10.01 This work consists of construction of a sawn timber stringer trail bridge, including excavation, embankment, backfill, curbs and/or railing system.

Construction

962.10.02 Construct a sawn timber stringer trail bridge as required under construction section 962.00 and as SHOWN ON THE PLANS.

962.20 – Longitudinal Nail-Laminated Trail Bridge

Description

962.20.01 This work consists of construction of a longitudinal nail-laminated trail bridge, including excavation, embankment, backfill, curbs and/or railing system.

Construction

962.20.02 Construct a longitudinal nail-laminated trail bridge as required under construction section 962.00 and as SHOWN ON THE PLANS.

Section 963 - Glulam Trail Bridge

Description

963.00.01 Work. This work consists of furnishing, fabricating, constructing glulam trail bridges, including all required lumber, hardware, sills, backwalls, rail systems, curbs, decking, excavation, backfill, and approach fills as SHOWN ON THE PLANS. Construction of glulam trail bridges may be covered by one or more of the following subsections:

963.10.	Glulam Stringer Trail Bridge
963.20.	Longitudinal Glulam Deck Panel Trail Bridge

Materials

963.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Furnish the following compliance certificates to the CO upon delivery of the materials to the jobsite:

(a) Verification of compliance with grading rules and species of timber and lumber. Provide certification by an agency accepted as competent by the American Lumber Standards Committee (ALSC).

(b) Lot certification of each charge for preservative, penetration in inches, and retention in pounds per cubic foot (assay method) by a qualified independent inspection and testing agency. In addition, have the producer of the treated products provide written certification that Best Management Practices (BMP's) in accordance with "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservers Institute (WWPI) and Canadian Institute of Treated Wood, were followed, including a description and appropriate documentation of the applicable BMP's used.

(c) Certification from a qualified inspection and testing agency indicating that all glued laminated members are in accordance with the requirements of American National Standard, "Standard for Wood Products - Structural Glued Laminated Timber" (ANSI A190.1) modified as SHOWN ON THE PLANS.

(d) Such other certifications as SHOWN ON THE PLANS or called for in the SPECIAL PROJECT SPECIFICATIONS.

Provide shop drawings in accordance with section 903 for all timber bridges 30 days in advance of fabrication when SHOWN ON THE PLANS or in the SPECIAL PROJECT SPECIFICATIONS. Show all dimensions and fabrication details for all cut, framed, or bored timbers.

Construction

963.00.03 General. Construct glulam trail bridges at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Furnish glulams and lumber of the required stress grade.

Clear stacks of weeds, rubbish, or other objectionable material from the ground under and in the vicinity of all stored material. Place the bottom layer of material at least 8 inches above the ground level. Provide sufficient support to prevent sagging.

Store and protect glued laminated timber in accordance with the recommendations for Loading and Handling, Job Site Storage, and Erection in "Recommended Practice for Protection of Structural Glued Laminated Timber During Transit, Storage, and Erection," published by the American Institute of Timber Construction, AITC 111.

Open-stack untreated material to shed water. Stack material in layers on spacers (stickers) that extend across the full width of the stack to allow for free air circulation. Align all stickers vertically and space them at regular intervals.

Close-stack treated material to shed water.

Protect material from the weather. If covered, used sheet material such as water-resistant paper or opaque polyethylene film. Do not cover with impervious membranes, such as polyethylene film, during dry weather. Slit individual wrappings full length or puncture on the lower side to permit drainage of water.

Use slings or other devices to protect corners of heavy construction timbers and banded packages of heavy construction timber.

963.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

963.00.05 Hardware. Furnish and install hardware as SHOWN ON THE PLANS.

963.00.06 Workmanship. Cut and form all lumber and construction timbers so all joints will have even bearing over the entire contact surface. Do not use shims in making joints. Construct all joints to be closed. Drive nails and spikes to set the heads flush with the wood surface. Use the same end, face, and edge of the timber member for all layout dimensions. Bore all holes from mating faces.

963.00.07 Mud Sills. Construct mud sills at each end of the span in the location staked on the ground. Construct mud sills to be level, bedded evenly, and buried to the depth necessary for the bottom of the log stringers to clear the ground surface by a minimum of 6 inches.

963.00.08 Glulam Stringers. Do not drag or skid stringers. Stringers shall be size matched at bearings and shall be positioned so that the camber is up. Bridging between stringers shall be neatly and accurately framed and securely fastened.

963.00.09 Glued Laminated Panel Decks. Do not drag or skid panels. When lifted, support panels in the weak-moment plane at a sufficient number of points to avoid overstressing, and protect the edges from damage.

When dowels are SHOWN ON THE PLANS between deck panels, use a template or drilling jig to ensure that dowel holes are accurately spaced and drilled parallel to one another and to the horizontal surfaces of the panel. Drill holes to a depth 1/4 inch greater than one-half the dowel length, and a diameter that is 3/32 greater than the dowel, unless otherwise SHOWN ON THE PLANS. Use a temporary dowel as a check for snug fit prior to production drilling. Use dowels of the size SHOWN ON THE PLANS, with the tips slightly tapered or rounded. Use an approved lubricant to facilitate the connection process.

Start the tips of all dowels partially and equally into the holes of the two panels being joined. Draw the panels together keeping the edges parallel, until the panels abut tightly. Securely fasten each panel to each stringer as SHOWN ON THE PLANS.

Assemble and match-mark panels prior to delivery to the construction site when SHOWN ON THE PLANS or called for in the SPECIAL PROJECT SPECIFICATIONS. Follow erection procedures given in FPL-263, Forest Service, Forest Products Laboratory (FPL), Madison, Wisconsin.

963.00.010 Curbs. Construct curbs with sawn timber as SHOWN ON THE PLANS. Use lengths greater than or equal to 10 feet and splice with a 24 inches half-lap joint at a curb block location. Match diameters of logs at lap joints and trim excess to provide a smooth transition between logs.

Finish curbs smooth and free from splinters and sharp projections.

963.00.11 Rail Systems. Construct rail systems with sawn timber as SHOWN ON THE PLANS and use lengths greater than or equal to 10 feet.

When rail systems are constructed of sawn timber, splice them with a diagonal butt joint at a post location. Use S4S sawn timber, for all rails, posts, and top caps. Fasten each rail and top rail to each post with wood screws as SHOWN ON THE PLANS. Finish handrails and posts smooth and free from splinters and sharp projections.

963.00.12 Approach Fills. Construct the approach fills with compacted suitable material.

Measurement

963.00.13 Measure the Section 963 items listed in the bid schedule according to section 906.

Payment

963.00.14 The accepted quantities will be paid at the contract price per unit of measurement for the Section 963 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

963.10 – Glulam Stringer Trail Bridge

Description

963.10.01 This work consists of construction of a glulam stringer trail bridge, including excavation, embankment, backfill, curbs and/or railing system.

Construction

963.10.02 Construct a glulam stringer trail bridge as required under construction section 963.00 and as SHOWN ON THE PLANS.

963.20 – Longitudinal Glulam Deck Panel Trail Bridge

Description

963.20.01 This work consists of construction of a longitudinal glulam deck panel trail bridge, including excavation, embankment, backfill, curbs and/or railing system.

Construction

963.20.02 Construct a longitudinal glulam deck panel trail bridge as required under construction section 963.00 and as SHOWN ON THE PLANS.

Section 964 - Prefabricated Steel Trail Bridges

964.00.01 This work consists of designing, furnishing, fabricating, and constructing prefabricated steel trail bridges, including all required materials, hardware, sills, backwalls, rail systems, curbs, decking, excavation, backfill, and approach fills as SHOWN ON THE PLANS. Work includes all other incidental work necessary to complete the bridge installation. These specifications are for a fully engineered clear span bridge and shall be regarded as minimum standards for design and construction.

Design

964.00.02 Engineering Requirements. Structural design of the bridge structure(s) shall be performed by or under the direct supervision of a licensed professional engineer and done in accordance with recognized engineering practices and principles. The engineer shall be licensed to practice in the State in which the bridge is fabricated. The design shall be in accordance with AASHTO LRFD Bridge Design Specifications, Current Edition and as recommended in AASHTO's LRFD Guide Specifications for Design of Pedestrian Bridges, Current Edition.The design shall meet the following requirements unless otherwise SHOWN ON THE PLANS:

1. Pedestrian Load – Main supporting members shall be designed for a pedestrian live load of 90 psf.

2. Vehicle Load – When the clear deck width between railings is greater than 7 ft and less than 10 ft the bridge shall be designed for an occasional single maintenance vehicle of 10,000 lbs (H5 Design Vehicle). When clear deck width is greater than 10 feet, the bridge shall be designed for an occasional single maintenance vehicle of 20,000 lbs (H10 Design Vehicle). The vehicle load shall not be placed in combination with the pedestrian live load or snow load. A vehicle impact allowance is not required.

3. Other Loads– Other loads such as snow, equestrian, wind and fatigue loads and load combinations shall be designed for as specified in AASHTO LRFD and as SHOWN ON THE PLANS. When a snow load greater than the 90 psf pedestrian load is SHOWN ON THE PLANS the bridge shall be analyzed and designed for the controlling load.

4. Deflection – Pedestrian live load deflection shall not exceed L/360 for steel or as SHOWN ON THE PLANS.

5. Vibration – The fundamental frequency of the pedestrian bridge without live load shall be greater than 3.0 hertz in the vertical direction and 1.3 hertz in the lateral direction for steel bridges. The minimum fundamental frequency for loads other than pedestrian loads, such as equestrian and mule trains shall be determined by the design engineer.

6. Camber - The bridge shall have a vertical camber dimension at midspan equal to 100% of the full dead load deflection plus 1% of the full length of the bridge or as SHOWN ON THE PLANS.

964.00.03 General Features of Design. The following are the required minimum design features unless otherwise SHOWN ON THE PLANS.

1. Span -The required bridge span shall be as SHOWN ON THE PLANS.

2. Deck Width -The required bridge width between railing elements as SHOWN ON THE PLANS.

3. Truss Type - Bridge(s) shall be designed as a through (or box) "Pratt" truss with one (1) diagonal per panel and square end vertical members.

4. Through truss bridges will be designed utilizing underhung floor beams.

5. The top of the top chord shall not be less than 42 inches above the deck (measured from the high point of the riding surface) unless otherwise SHOWN ON THE PLANS.

6. Safety Rails - Horizontal safety rails shall be placed on the structure so as to prevent a 4 inch sphere from passing through the truss or as SHOWN ON THE PLANS. The safety rail system shall be designed for 50 pounds per linear foot transversely and vertically, acting simultaneously on each rail.

964.00.04 Design Drawings and Calculations. Provide design drawings and calculations for the prefabricated bridge including wind, seismic and bearing forces. The Contractor is responsible for preparing all shop drawings necessary for erection of the bridge. All design drawings and calculations shall have the signature and seal of a registered professional engineer.

The Contractor shall submit all design drawings and calculations in accordance with section 903 at least 30 days in advance of the start of fabrication to allow time for review by the CO and correction of any changes. Include plan, elevation, and section views of the pedestrian bridge superstructure, dimensions of all components, connection details, and general and specific notes regarding design and construction.

The Contractor and COR shall be provided with detailed installation instructions.

Materials

964.00.05 Materials. Conform to the following Sections:

Steel Structures	FP-03, Section 555
Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Furnish materials that meet the following requirements:

1. Unpainted Steel - Bridges which are not to be painted shall be fabricated from high strength, low alloy, atmospheric corrosion resistant ASTM A847 cold-formed welded square and rectangular tubing and/or ASTM A588, or ASTM A242, ASTM A606 plate and structural steel shapes (F_y = 50,000 psi). The minimum corrosion index of atmospheric corrosion resistant steel, as determined in accordance with ASTM G101, shall be 5.8.

2. Minimum Metal Thickness – The minimum nominal metal thickness of closed structural tubular metal members shall 0.25 inches.

3. 3/8 inch weep holes are required at all low points for bottom and top chords, verticals, and diagonals for closed structural tubular metal members.

4. Hardware – All fasteners and hardware shall be in compliance with FP-03, Section 717 and as SHOWN ON THE PLANS.

5. Wood Decking - Wood decking shall be West Coast Regional Douglas Fir or Southern Pine as SHOWN ON THE PLANS. Treated wood shall meet the requirements as SHOWN ON THE PLANS.

964.00.06 Welding

1. Welding Process - Welding and weld qualification tests shall conform to the provisions of the ANSI/AWS D1.5 Structural Welding Code.

2. Welders - Welders shall be properly accredited experienced operators, each of whom shall submit certification of satisfactorily passing AWS standard qualification tests for all positions, satisfactory evidence of experience and skill in welding structural steel with the kind of welding to be used in the work, and who has demonstrated the ability to make uniform, sound welds of the type required.

964.00.07 Submittals

1. Welder certifications showing compliance with Section 964.00.06(2)

2. Welding procedures in compliance with Section 964.00.06(1)

3. Steel Certification - All certified mill test reports shall be furnished upon request. Mill test reports shall show the chemical analysis and physical test results for each heat of steel used in the work. All steel shall be produced in the United States of America and be AISC certified.

4. Bolt Certification - All certified mill test reports shall be furnished upon request. Mill test reports shall show the chemical analysis and physical test results for each heat of steel used in the work. All bolts shall be produced in the United States of America.

5. Wood Certifications - Furnish the following compliance certificates to the CO upon delivery of the wood materials to the jobsite:

(a) Verification of compliance with grading rules and species of timber and lumber. Provide certification by an agency accepted as competent by the American Lumber Standards Committee (ALSC).

(b) Lot certification of each charge for preservative, penetration in inches, and retention in pounds per cubic foot (assay method) by a qualified independent inspection and testing agency. In addition, have the producer of the treated products provide written certification that Best Management Practices (BMP's) in accordance with "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservers Institute (WWPI) and Canadian Institute of Treated Wood, were followed, including a description and appropriate documentation of the applicable BMP's used.

(c) Such other certifications as SHOWN ON THE PLANS or called for in the SPECIAL PROJECT SPECIFICATIONS.

Provide shop drawings in accordance with section 903 for all bridges 30 days in advance of fabrication when SHOWN ON THE PLANS or in the SPECIAL PROJECT SPECIFICATIONS. Show all dimensions and fabrication details for all cut, framed, or bored timbers.

Construction

964.00.08 General Construct a prefabricated steel trail bridge as required under construction section 964.00. and as SHOWN ON THE PLANS.

964.00.09 Excavation and Embankment. Perform all excavation and embankment work in accordance with Section 911.

964.00.10 Installation. All construction and installation shall be performed in conformance with manufacturer's recommendations and the approved shop drawings. Unprotected steel chains shall not be used as a sling for installation.

964.00.11 Performance. Provide 14 day notice prior to delivery and/or installation of prefabricated bridge.

If the prefabricated superstructure is not installed immediately upon delivery to the project site, provide appropriate equipment and labor to unload and stack, support, and store all material at the delivery point designated by the COR. Support and stack all components to prevent damage. Furnish and install blocking such that all components are supported at least 8 inches above the ground.

Measurement

964.00.12 Measure the section 964 items listed in the bid schedule according to section 906.

Payment

964.00.13 The accepted quantities will be paid at the contract price per unit of measurement for the Section 964 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

Section 965 – Trail Bridge Substructures

Description

965.00.01 This work consists of furnishing, fabricating, constructing trail bridge substructures, including all required geosynthetics, gabion baskets, concrete, lumber, hardware, excavation, and backfill as SHOWN ON THE PLANS. Construction of trail bridge substructure may be covered by one or more of the following subsections:

965.10.	Timber Sill on Geocell Pad
965.20.	Timber Sill on Gabion Baskets
965.30.	Timber Sill on Timber Cribbing
965.40.	Concrete Leveling Pad on Bedrock

Materials

965.00.02 Materials. Conform to the following Sections:

Concrete	FP-03, Section 552
Reinforcing Steel	FP-03, Section 554
Rock, Grid Pavement Units, and Aggregate	991
Geosynthetic Materials	994
Material for Timber Structures	995
Wire Basket Materials (Gabion Baskets)	996

Furnish the following compliance certificates to the CO upon delivery of the materials to the jobsite:

(a) Verification of compliance with grading rules and species of timber and lumber. Provide certification by an agency accepted as competent by the American Lumber Standards Committee (ALSC).

(b) Lot certification of each charge for preservative, penetration in inches, and retention in pounds per cubic foot (assay method) by a qualified independent inspection and testing agency. In addition, have the producer of the treated products provide written certification that Best Management Practices (BMP's) in accordance with "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservers Institute (WWPI) and Canadian Institute of Treated Wood, were followed, including a description and appropriate documentation of the applicable BMP's used.

(c) Such other certifications as SHOWN ON THE PLANS or called for in the SPECIAL PROJECT SPECIFICATIONS.

Provide shop drawings in accordance with section 903 for all timber bridge substructures 30 days in advance of fabrication when SHOWN ON THE PLANS or in the SPECIAL PROJECT SPECIFICATIONS. Show all dimensions and fabrication details for all cut, framed, or bored timbers.

Construction

965.00.03 General. Construct trail bridge substructure at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Furnish structural lumber and timber of the required stress grade as SHOWN ON THE PLANS.

Clear stacks of weeds, rubbish, or other objectionable material from the ground under and in the vicinity of all stored material. Place the bottom layer of material at least 8 inches above the ground level. Provide sufficient support to prevent sagging.

Open-stack untreated material to shed water. Stack material in layers on spacers (stickers) that extend across the full width of the stack to allow for free air circulation. Align all stickers vertically and space them at regular intervals.

Close-stack treated material to shed water.

Protect material from the weather. If covered, used sheet material such as water-resistant paper or opaque polyethylene film. Do not cover with impervious membranes, such as polyethylene film, during dry weather. Slit individual wrappings full length or puncture on the lower side to permit drainage of water.

Use slings or other devices to protect corners of heavy construction timbers and banded packages of heavy construction timber

965.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

965.00.05 Hardware. Furnish and install hardware as SHOWN ON THE PLANS.

965.00.06 Workmanship. Cut and form all lumber and construction timbers so all joints will have even bearing over the entire contact surface. Do not use shims in making joints. Construct all joints to be closed. Drive nails and spikes to set the heads flush with the wood surface. Use the same end, face, and edge of the timber member for all layout dimensions. Bore all holes from mating faces.

Measurement

965.00.07 Measure the Section 965 items listed in the bid schedule according to section 906.

Payment

965.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 965 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

965.10 – Timber Sill on Geocell Pad

Description

965.10.01 This work consists of construction of a timber sill on geocell pad including excavation, embankment, backfill, curbs and/or railing system.

Construction

965.10.02 Construct a timber sill on geocell pad as required under construction section 965.00 and as SHOWN ON THE PLANS.

965.20 – Timber Sill on Gabion Baskets

Description

965.20.01 This work consists of construction of a timber sill on gabion baskets including excavation, embankment, backfilling.

Construction

965.20.02 Construct a timber sill on gabion baskets as required under construction section 965.00 and as SHOWN ON THE PLANS.

965.30 – Timber Sill on Timber Cribbing

Description

965.30.01 This work consists of construction of a timber sill on timber cribbing including excavation, embankment, and backfilling.

Construction

965.30.02 Construct a timber sill on timber cribbing as required under construction section 965.00 and as SHOWN ON THE PLANS.

965.40 – Concrete Leveling Pad on Bedrock

Description

965.40.01 This work consists of construction of a concrete leveling pad on bedrock including rock excavation, embankment and backfilling.

Construction

965.40.02 Construct a concrete leveling pad on bedrock as required under construction section 965.00 and as SHOWN ON THE PLANS.

Section 966 - Trail Bridge Maintenance

Description

966.01 This work consists of maintenance of trail bridges, including replacing or reconstructing rail systems, curbs, decking, sills, stringers and approach fills as SHOWN ON THE PLANS.

Materials

966.02 Materials. Conform to the following Sections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Furnish the following compliance certificates to the CO upon delivery of the materials to the jobsite:

(a) Verification of compliance with grading rules and species of timber and lumber. Provide certification by an agency accepted as competent by the American Lumber Standards Committee (ALSC).

(b) Lot certification of each charge for preservative, penetration in inches, and retention in pounds per cubic foot (assay method) by a qualified independent inspection and testing agency. In addition, have the producer of the treated products provide written certification that Best Management Practices (BMP's) in accordance with "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservers Institute (WWPI) and Canadian Institute of Treated Wood, were followed, including a description and appropriate documentation of the applicable BMP's used.

(c) Certification from a qualified inspection and testing agency indicating that all glued laminated members are in accordance with the requirements of American National Standard, "Standard for Wood Products - Structural Glued Laminated Timber" (ANSI A190.1) modified as SHOWN ON THE PLANS.

(d) Such other certifications as SHOWN ON THE PLANS or called for in the SPECIAL PROJECT SPECIFICATIONS.

Maintenance

966.03 General. Maintenance of trail bridges at locations SHOWN ON THE PLANS.

Furnish structural lumber and timber of the required stress grade as SHOWN ON THE PLANS.

Clear stacks of weeds, rubbish, or other objectionable material from the ground under and in the vicinity of all stored material. Place the bottom layer of material at least 8 inches above the ground level. Provide sufficient support to prevent sagging.

Open-stack untreated material to shed water. Stack material in layers on spacers (stickers) that extend across the full width of the stack to allow for free air circulation. Align all stickers vertically and space them at regular intervals.

Close-stack treated material to shed water.

Protect material from the weather. If covered, used sheet material such as water-resistant paper or opaque polyethylene film. Do not cover with impervious membranes, such as polyethylene film, during dry weather. Slit individual wrappings full length or puncture on the lower side to permit drainage of water.

Use slings or other devices to protect corners of heavy construction timbers and banded packages of heavy construction timber

966.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

963.05 Hardware. Furnish and install hardware as SHOWN ON THE PLANS.

966.06 Workmanship. Cut and form all lumber and construction timbers so all joints will have even bearing over the entire contact surface. Do not use shims in making joints. Construct all joints to be closed. Drive nails and spikes to set the heads flush with the wood surface. Use the same end, face, and edge of the timber member for all layout dimensions. Bore all holes from mating faces.

966.07 Stringers. Stringers shall be size matched at bearings and shall be positioned so that the camber is up and if possible, so that knots near the edge will be in the top portion of the stringers. Bridging between stringers shall be neatly and accurately framed and securely fastened.

Measurement

966.08 Measure the Section 966 items listed in the bid schedule according to section 906.

Payment

966.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 966 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

970. Specialty Specifications

Section 971 – Reserved for Snow Shed

Section 972 – Reserved for Tunnels

Section 979 – Reserved for Specialty Structures Special Project Specifications

980. Incidentals

Section 981 – Seeding, Fertilizing and Mulching

Description

981.01 This work consists of preparing seedbeds and furnishing and placing required seed, fertilizer, and mulch.

Materials

981.02 Seed. Conform to the Federal Seed Act, the Federal Noxious Weed Act, and applicable State and local seed and noxious weed laws. Do not use wet, moldy, or otherwise contaminated or damaged seed. Furnish each seed type in separate sealed container. Clearly label each container with the following:

(a) Name and type of seed

(b) Lot number

(c) Net mass

(d) Percent of purity, germination, and hard seed

(e) Percent of maximum weed seed content

(f) Seed Origin

(g) Noxious weeds present

(h) Other crop seed

(i) Inert matter

(j) Name and address of seed distributor

(k) Mixture percent of each component

Inoculate legume seed with approved cultures according to the manufacturer's instructions.

Certify that seed meets the type as SHOWN ON THE PLANS. Furnish the CO with duplicate copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of the date of delivery.

Include in the certificate:

(1) Name and address of the laboratory

(2) Date of test

(3) Lot number for each kind of seed

(4) Percent of purity and germination for each kind of seed

(5) Percent of weed seed content for each kind of seed

(6) Mixture percent of each component

981.03 Fertilizer. Furnish standard commercial grade dry formulated fertilizer conforming to the standards of the Association of Official Analytical Chemists International, applicable State and Federal regulations, and required minimum percentages of available nutrients. Supply fertilizer in new, clean, sealed, and properly labeled containers with name, mass, and guaranteed analysis of contents clearly marked. Use fertilizer with the minimum percentage of available nutrients as SHOWN ON THE PLANS.

981.04 Mulch. Use commercially produced mulch as SHOWN ON THE PLANS.

(a) Straw. Furnish certified weed free straw from oats, wheat, rye, or other grain crops that is free from mold or other objectionable material. Furnish straw in an air-dry condition suitable for placing with mulch blower equipment.

(b) Wood fiber. Furnish processed wood fiber from wood chips conforming to the following:

(1) Colored with a green dye noninjurious to plant growth

(2) Readily dispersible in water

(3) Nontoxic to seed or other plant material

(4) Free of growth or germination inhibiting substances

(5) Free of weed seed

(6) Air dried to an equilibrium moisture content of 12±3 percent

(7) Packaged in new labeled containers

(8) Packaged in a condition appropriate for mixing in a homogeneous slurry suitable for application with power spray equipment

(c) Grass straw cellulose fiber. Furnish processed grass straw fiber conforming to the following:

(1) Colored with a green dye noninjurious to plant growth

(2) Readily dispersible in water

(3) Nontoxic to seed or other plant material

(4) Free of growth or germination inhibiting substances

(5) Free of weed seed

(6) Air dried to a moisture content of 10±0.2 percent

(7) Air dried to a uniform mass of ±5 percent

(8) Packaged in new containers labeled with the manufacturer's name and air-dry mass

(9) Packaged in a condition appropriate for mixing in a homogeneous slurry suitable for application with power spray equipment

Construction

981.05 Seeding Seasons. Seed during the seeding dates as SHOWN ON THE PLANS. Do not apply seeding materials during windy weather or when the ground is excessively wet or frozen.

981.06 Soil Preparation. Shape and finish cut slopes, fill slopes, embankments, or other areas to be seeded as required by other applicable sections or as SHOWN ON THE PLANS. Prepare soil as specified in other sections.

981.07 Mulch. Spread mulch immediately after seeding, or after seeding and fertilizing, to a loose depth of 1 1/2 inches to 3 inches at locations SHOWN ON THE PLANS.

Measurement

981.08 Measure the section 981 items listed in the bid schedule according to subsection 906.

Payment

981.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 981 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

Section 982 – Erosion Control Blankets

Description

982.01 This work consists of furnishing and installing erosion control blankets.

Material

982.02 Erosion Control Blanket. Use erosion control materials of the type and in the locations SHOWN ON THE PLANS.

(a) Burlap. Use burlap of standard weave with a weight of 4, ±1/2 oz/SY.

(b) Excelsior Blanket. Use excelsior blanket consisting of a machine-produced mat or curled wood excelsior of 80-percent, 8 inches or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the blanket. Use blanket with mesh dimensions of 1 inch by 2 inches ±25 percent. Provide blanket with average weight of 8 oz/SY ±10 percent at time of manufacture.

Construction

982.03 General. Install erosion control blankets in accordance with manufacturer's recommendations at locations SHOWN ON THE PLANS.

Make the soil surface stable, firm, and free of rocks and other obstructions. Install erosion control blankets to the following minimum guidelines.

(a) Slope Installations. At the top of slope, anchor the erosion control blankets by one of the following methods:

(1) Staples. Install the erosion control blankets 3 feet over the shoulder of the slope onto flat final grade. Secure with a single row of staples on 1 foot centers.

(2) Anchor trench. Construct a 6 inch by 6 inch trench. Extend the upslope terminal end of the erosion control blankets 10 feet past the trench. Use staples on 1 foot centers to fasten the erosion control blankets into the trench. Backfill the trench and compact the soil. Secure the terminal end with a single row of staples on 1 foot centers and cover the end with soil. Apply turf establishment.

(3) Check slot. Install two rows of staples 4 inch apart on 4 inch centers across the top edge of the erosion control blankets. Drive all staple heads flush with soil surface.

Securely fasten all erosion control blankets to the soil by installing staples at a minimum rate of 1.5 per square yard.

(b) Channel Installations. At the beginning of the channel, construct a full width anchor trench according to paragraph (a)(2) above. Construct additional anchor trenches or check slots at intervals along the channel reach and at the channel end according to paragraph (a)(2) or (a)(3) and the manufacturer's installation guidelines.

Securely fasten all erosion control blankets to the soil by installing staples at a minimum rate of 2.0 per square yard. Significantly higher anchor rates may be necessary in sandy, loose, or wet soils and in severe applications.

Repair all damaged areas immediately by restoring soil to finished grade, re-applying turf establishment, and replacing the erosion control blankets.

Measurement

982.04 Measure the section 982 items listed in the bid schedule according to subsection 906.

Payment

982.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 982 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

Section 983 – Removal of Structures and Obstructions

Description

983.01 Work. Work consists of removal and disposal of existing structures, including turnpikes, walkways, bridges, culverts, signs and posts, and other material within the trailway, above or below ground. Work also includes salvaging DESIGNATED materials and backfilling the resulting trenches, holes, and pits.

Construction

983.02 Removal of Culverts and Bridges. Remove existing culverts within embankment areas at locations SHOWN ON THE PLANS.

Remove existing structures down to the natural stream bottom, and remove parts outside the water course to at least 1inch below natural ground surface or finish ground surface, whichever is lower. Where portions of an existing structure lie wholly, or in part, within the limits of a new structure, remove parts to accommodate the installation of the proposed structure.

Avoid damage to bridges being dismantled for salvage. Match mark steel and/or wood members and prepare drawings showing the structural location of each member.

983.03 Removal of Signs and Posts. Remove signs, posts, and associated hardware at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Backfill post hole, compact, and contour area to match existing ground.

983.04 Removal of Other Obstructions. Remove other obstructions at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

983.05 Disposal. Dispose of native log and rock material by scattering below the trailway and outside clearing limits. Do not place debris in water courses, snow ponds, lakes, meadows, or locations where it could impede the flow to, through, or from the drainage structures. Dispose of metal, treated timber, and other manufactured products by removing from Government-administered lands and placing in approved waste disposal sites.

Measurement

983.06 Measure the section 983 items listed in the bid schedule according to subsection 906.

Payment

983.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 983 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

Section 989 – Reserved for Incidentals Special Project Specifications

990. Materials

Section 990 - Materials

990.01 General. Materials specification not found in this section will be covered by the most current version of *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*, U.S. Department of Transportation, Federal Highway Administration.

Section 991 - Rock, Grid Pavement Units, Aggregate and Asphalt

991.01 Rock. Use sound, durable rock free of rifts, seams, laminations, and minerals that could deteriorate as a result of weathering. Dress rock to remove thin or weak portions before use.

Furnish rock of the size, shape, weight, and face area necessary to produce the general characteristics and appearance SHOWN ON THE PLANS.

991.02 Gabion and Revet Mattress Rock. Ensure that rock conforms to the requirements of Section 991.01 and the following specifications.

(a) Coarse durability index, AASHTO T 210 52 min.

(b) Unit weight of a filled basket 100 pounds per cubic foot min.

(c) Gradation:

(1) Baskets 12 inches or greater in the vertical dimension:

Maximum dimension of rock .....…. 8 inch

Minimum dimension of rock ..... 4 inch

(d) (2) Baskets less than 12 inches in the vertical dimension:

Maximum dimension of rock ..... 6 inch

Minimum dimension of rock ..... 3 inch

991.03 Grid Pavement Units. Use concrete grid pavement units with a minimum compressive strength of 4495 lbs/in^2 that meet the National Concrete Masonry Association (NCMA) Designation: A-15-82: Specifications for Grid Pavers.

991.04 Pit-Run Aggregate. Use pit-run aggregates consisting of native materials that can be placed on the trail without crushing or screening. No gradation, other than a maximum size, will be required. Provide pit-run aggregate with a maximum size as SHOWN IN THE SCHEDULE OF ITEMS.

991.05 Screened Aggregate. Use screened material consisting of gravel, talus, rock, sand, shale, or other suitable material that is reasonably hard, durable, and free of organic material, mica, clay lumps, or other deleterious material. Use screened aggregate meeting the gradation requirements shown in table 961-1 and of the grading SHOWN IN THE SCHEDULE OF ITEMS.

991.06 Crushed Aggregate for Base or Surface Course. Use crushed aggregate meeting the requirements of tables 991-1 and 991-2 and SHOWN IN THE SCHEDULE OF ITEMS.

At least 50 percent, by weight, of the aggregate retained on the No.4 sieve is to have one fractured face. Naturally fractured faces may be included in the 50-percent requirement.

The CO may approve other gradations if they are similar to those specified Grade aggregate from coarse to fine within the gradation band.

Table 991-1-Crushed and screened aggregate grading requirements for base or surface courses.

	Percent Passing (AASHTO T 11 and T 27)			
Sieve	Grading A	Grading B	Grading C	Grading D
1"				
¾"	100	100		
½"	50-90	70-100		
3/8"			100	100
No.4	30-65	45-75	60-85	70-90
No.8	25-55	30-60	35-70	45-70
No.30		15-40		20-40
No.200	6-12	6-20	5-20	5-20

Table 991-2.-Crushed Aggregate Quality Requirements

Description	AASHTO Test Method	Requirement
Percent Wear	T 96	40 Max.
Durability Index, Coarse and Fine	T 211	35 Min.
Liquid Limit	T 89	35 Max.
Plasticity Index	T 91	2-11

991.07 – Asphalt. Asphalt material for trail construction shall conform to requirements of the U.S. Department of Transportation, Federal Highway Administration, Standard Specifications for Construction or Roads and Bridges on Federal Highway Projects, most current edition, Section 702 – Asphalt Material.

991.08 – Cement. Cement material for trail construction shall conform to requirements of the U.S. Department of Transportation, Federal Highway Administration, Standard Specifications for Construction or Roads and Bridges on Federal Highway Projects, most current edition, Section 701 – Cement.

Section 992 – Pipe Material

992.01 General. Use pipe, coupling bands, and special sections such as elbows, tees, and wyes made of the same material and of the same thickness as the conduit to which they are joined, unless otherwise specified.

992.02 Corrugated Steel Pipe, Pipe Arches and Underdrains

(a) Riveted Pipe and Pipe Arches. Use pipes meeting the requirements of AASHTO M 36.

(b) Welded Pipe and Pipe Arches. Use corrugated metal pipe and pipe arches fabricated by resistance spot welding meeting the applicable requirements of AASHTO M 36.

(c) Helical Pipe. Use un-perforated helically corrugated pipe with continuous lock or welded seams meeting the applicable requirements of AASHTO M 36.

(d) Coupling Bands. Use coupling bands meeting the requirements of AASHTO M 36.

(e) Special Sections. Use special sections such as elbows, tees, and wyes meeting the same thickness as the conduit to which they are joined and meeting the applicable requirements of AASHTO M 36.

(f) Flared-End Sections. Use flared-end sections for inlet and outlet ends of pipe and pipe arch culverts meeting the applicable requirements of AASHTO M 36.

(g) Corrugated Steel Pipe for Underdrains. Use perforated galvanized pipe meeting the requirements of AASHTO M 36. Use polymer-precoated perforated underdrains meeting the requirements of AASHTO M 245

992.03 Corrugated Aluminum Alloy Culvert Pipe, Pipe Arches, and Underdrains. Use pipe meeting the requirements of AASHTO M 196.

992.05 Aluminum-Coated (Aluminized Type 2). Use pipe and coupling bands meeting the requirements of AASHTO M 36 except that they must be made from material meeting the requirements of AASHTO M 274.

992.06 Concrete Pipe and Pipe Arches

(a) Non-Reinforced Concrete Pipe. Conform to AASHTO M 86M for the diameters and strength classes specified.

(b) Reinforced Concrete Pipe. Conform to AASHTO M 170M for the diameters and strength classes specified. For precast reinforced concrete end sections, conform to cited specifications to the extent they apply.

(c) Perforated Concrete Pipe. Conform to AASHTO M 175M type 1 or 2 and AASHTO M 86M for the diameters and strength classes specified.

(d) Reinforced Arch-Shaped Concrete Pipe. Conform to AASHTO M 206M for the diameters and strength classes specified.

(e) Reinforced Elliptically-Shaped Concrete Pipe. Conform to AASHTO M 207M for the diameters, placement design (horizontal or vertical), and strength classes specified.

992.07 Precast Reinforced Concrete Box Sections. Conform to AASHTO M 259M or M 273M, as applicable, for dimensions and loading conditions specified.

992.08 Plastic Pipe. Furnish perforated and non-perforated plastic pipe conforming to the following for the sizes and types specified. For watertight joints, conform to ASTM D 3212.

(a) Smooth wall polyethylene pipe. Furnish 12 to 42-inch diameter pipe conforming to ASTM F 714 and minimum cell class, ASTM D 3350, 335434C.

(b) Corrugated polyethylene pipe. Furnish 12 to 42-inch diameter pipe conforming to AASHTO M 294M. For sanitary sewer applications, furnish AASHTO M 294M type S pipe with watertight joints.

(c) Profile wall (ribbed) polyethylene pipe. Furnish 18 to 48-inch diameter pipe conforming to ASTM F 894 and minimum cell class, ASTM D 3350, 334433C or 335434C.

(d) Corrugated polyethylene drainage tubing. Furnish 3 to 10-inch diameter tubing conforming to AASHTO M 252M.

(e) Smooth wall polyvinyl chloride pipe. Furnish 4 to 15-inch diameter pipe conforming to AASHTO M 278 and minimum cell class, ASTM D 1784, 12454B or 12364C. For sanitary sewer applications, conform to ASTM D 3034.

(f) Profile wall (ribbed) polyvinyl chloride pipe. Furnish 4 to 48-inch diameter pipe conforming to AASHTO M 304M and minimum cell class, ASTM D 1784, 12454C or 12364C. For sanitary sewer applications, conform to ASTM F 794 or F 949.

(g) Acrylonitrile-butadiene-styrene (ABS) pipe. Conform to AASHTO M 264. For perforations, conform to AASHTO M 278.

Section 993 - Fence Material

993.01 Barbed Wire. Furnish galvanized wire conforming to AASHTO M 280 or aluminum coated wire conforming to AASHTO M 305 type I.

993.02 Woven Wire. Furnish galvanized fabric conforming to AASHTO M 279 or aluminum coated fabric conforming to ASTM A 584.

993.04 Fence Posts.

(a) Wood. Conform to AASHTO M 168 and as SHOWN ON THE PLANS.

Peel all bark, except for red cedar posts and bracing which do not require peeling. Trim all knots flush with the surface and season the wood.

For dimension lumber for fences or gates, use timber that is sound, straight, and reasonably free from knots, splits, and shakes. Provide S4S finish.

(b) Concrete. Conform to FP-03, Section 601.

(c) Steel. For line fence posts, conform to AASHTO M 281.

993.05 Fence Gates. Furnish wood gates conforming to conforming to AASHTO M 168 and as SHOWN ON THE PLANS. For dimension lumber for gates, use timber that is sound, straight, and reasonably free from knots, splits, and shakes. Provide S4S finish.

993.06 Metal Beam Rail. Conform to AASHTO-AGC-ARTBA *A Guide to Standardized Highway Barrier Hardware*.

(a) Galvanized steel rail. Furnish W-beam or thrie beam rail elements fabricated from corrugated sheet steel conforming to AASHTO M 180 for the designated shape, class, type, and mass of coating specified.

(b) Corrosion resistant steel rail. Furnish W-beam or thrie beam rail elements and associated weathering steel hardware conforming to the following:

(1) Shapes and plates	ASTM A 242
(2) Rail elements	AASHTO M 180
(3) Fasteners	AASHTO M 180

993.07 Guardrail Posts. Conform to AASHTO-AGC-ARTBA "A Guide to Standardized Highway Barrier Hardware."

Do not use a wood guardrail post that has a thorough check, shake, or end slit in the same plane as, or a plane parallel to the bolt hole and extending from the top of the post to within 3 inches or the bolt hole.

For steel-backed timber rail posts, furnish 10 by 12-inch posts conforming to Subsection 710.08.

993.08 Guardrail Hardware. Conform to the AASHTO-AGC-ARTBA *A Guide to Standardized Highway Barrier Hardware*.

For angles, channels, wide flanges, and plates not contained in the above standard, conform to ASTM A 36M. For structural tubing for short steel posts, conform to ASTM A 500 or ASTM A 513 grade 1008. Galvanize soil plates and structural tubing according to AASHTO M 111. Do not punch, drill, cut, or weld the metal after galvanizing.

993.09 Temporary Plastic Fence. Furnish plastic noncorrosive fence fabricated from polyethylene (HDPE) and UV stabilized for outdoor weathering. Conform to the following:

(a) Height	48 inch min.
(b) Mesh openings	3 to 3.5 inches
(c) Color	International orange
(d) Mass	0.168 lb/ft min.

Section 994 - Geosynthetics

994.01 Geotextiles

(a) Use geotextiles, alone or in combination with other geosynthetics that meet the following Class B requirements for subsurface drainage as specified in AASHTO M288.

(1) Grab Strength at 50 percent elongation
ASTM D4632-91 .....…….. 355 N min.

(2) Seam Strength,
ASTM D 4632 .....…….... 310 N min.

(3) Puncture Strength,
ASTM D4833-88 .....…….. 110 N min.

(4) Mullen Burst,
ASTM D 3786-87 ..... 900 kPa min.

(5) Trap Tear Strength,
ASTM D4533-91 .....…….. 110 N min.

(b) Use geotextile meeting the following critical physical properties, unless otherwise SHOWN ON THE PLANS.

(1) Material Structure .....…….. Nonwoven (all purposes) or Slit Film (for reinforcement or separation)

(2) Polymer Composition .....……. Polypropylene

(3) Apparent Opening,
ASTM D 4751-87 .....……. .30 mm max.

(4) Permittivity, ASTM
D4491-92 .....…….. 4060 liters/minute/m^2 min.

(5) Ultraviolet Degradation .....…….. 70 at150 hours

994.02 Geonet. Use geonet meeting the following critical physical proper-ties unless otherwise SHOWN ON THE PLANS.

(a) Polymer Composition of Core
(Net or Mesh).....…….. Medium PE or HDPE

(b) Permeability……..... 0.001cm/second min.

(c) Geotextile .....……..……..…. Must meet all Section 994.01 requirements

(d) Compressive Strength
of Core, ASTM D1621.....……. 500 kPa min.

(e) Transmissivity with Gradient
at 0.1, Pressure at 10 kPa.....……..... 0.0009 m^2/second min.

994.03 Geogrids. Use geogrids made from polypropylene or coated polyester that meets the following critical physical properties.

(a) Polymer Type .....……	HDPE, Polypropylene, or Polyester with Acrylic or PVC coating
(b) Mass per Unit Area, ASTM D5261-92...	175 g/m^2 min.
(c) Maximum Aperture Size	
(1) Direction (MD) ....……	100 mm
(2) Cross-Direction (XD) .....……	75 mm
(d) Wide-Width Strip Tensile Strength at 5 percent Strain, ASTM D4595-86	
(1) Machine Direction (MD) ....……	8 kN/m min.
(2) Cross-Direction (XD) .....……	6 kN/m max.

994.04 Geocells. Use geocells meeting the following physical properties.

(a) Composition .....…….	PE or HDPE
(b) Geocell Weight expanded: .....…..	1.70 kg/m^2 min.
(c) Minimum Cell Seam Peel Strength, U.S. Army Corps of Engineers Technical Report G:-86-19, Appendix A .....……	800 N min.
(d) Expanded Dimensional Properties…...	AS SHOWN ON PLANS

994.05 Sheet Drains. Use sheet drains meeting the following critical physical properties.

(a) Core Polymer Composition ....……	Polystyrene, HDPE, or polypropylene attached
(b) Geotextile .....……	Nonwoven on one side if core solid; on both sides if core perforated. Must meet all Section 994.01 requirements
(c) Core Thickness, ASTM D5199 .……	10 mm min.
(d) Core Compressive Strength at Yield, ASTM D1621 .....……	650 kPa max.

994.06 Fasteners. Use anchors or fasteners of the design recommended by the manufacturer, and install per manufacturer's specifications.

994.07 Certification. Furnish a certificate or affidavit signed by an official from the company manufacturing the geosynthetic, verifying that the geosynthetic meets specifications.

994.08 Delivery, Storage, and Handling. During shipment and storage, wrap all geosynthetics to protect them from sunlight. When storing geosynthetics, protect them from mud, soil, dust, and debris. If materials are not installed immediately after delivery to site, do not store them in direct sunlight.

Section 995 - Material for Timber Structures

995.01 Untreated Structural Timber and Lumber. Conform to AASHTO M 168. Furnish an inspection certification from an agency accredited by the American Lumber Standards Committee for the species and grade. Mark all pieces with the inspection service, grade designation, species, and inspector identity.

Season and dry all structural timber and lumber before fabrication. Do not use material that is twisted, curved, or otherwise distorted.

Do not use boxed-heart pieces of Douglas fir or redwood in outside stringers, floor beams, caps, posts, sills, or rail posts. Boxed-heart pieces are defined as timber so sawed that at any point in the length of a sawed piece the pith lies entirely inside the four faces.

Select native log stringers from designated sites on Government-administered land. Select the species and sizes of materials as SHOWN ON THE PLANS. Select native log stringers that are straight, sound, and free of defects. Obtain CO approval of logs and trees before felling or moving them to the site. Fell trees to prevent damage to standing timber and to minimize breakage of trees to be used. Buck logs from felled trees in such a way to minimize waste and to obtain the required length and diameter.

Peel logs, square the ends, and trim the knots and limbs flush unless otherwise SHOWN ON THE PLANS. Scatter the debris from the processing of timber away from the trail and so it will not block the trail or plug water courses.

Field treat the following untreated timber surfaces in accordance with AWPA standard M4.

(a) All ends and tops, and all contact surfaces of posts, sills, and caps.

(b) All ends, joints, and contact surfaces of bracing and truss members.

(c) All surfaces of timber bumpers and the back faces of bulkheads.

(d) All other timber that will be in contact with earth.

(e) All ends of log stringers.

995.02 Holes for Bolts, Dowels, Rods & Lag Screws. Bore all holes before preservative treating the wood.

Bore holes for round drift bolts and dowels 1/16 inch smaller in diameter than that of the bolt or dowel to be used. Ensure that the diameter of holes for square drift bolts or dowels is equal to the side dimension of the bolt or dowel.

Bore holes for machine bolts 1/16 inch larger than the diameter, except when galvanized bolts are specified. In this case, drill all holes 1/8 inch greater than the bolt size.

Bore holes for lag screws 1/16 inch larger for the shank portion of the lag screw and drill the remainder of the hole approximately 75 percent of the shank diameter to a depth of 1 inch less than the length of the screw.

995.03 Hardware. Use nails of standard form (ASTM F 1667), wood screws (ANSI/ASME B 18.6.1), hex headed bolts and nuts (ASTM A307), lag screws (ASTM A307 and ANSI/ASME B18.2.1), carriage bolts (ASTM A307), and drift pins and dowels (ASTM A307) as SHOWN ON THE PLANS.

Fabricate washers from gray iron or malleable iron castings unless structural washers are specified. Use malleable iron washers with a diameter approximately four times the bolt diameter under all bolt heads or nuts in contact with wood, unless otherwise SHOWN ON THE PLANS.

Galvanize all hardware according to AASHTO M 232 or cadmium plate all hardware according to ASTM B 766 class 12, type III, unless otherwise SHOWN ON THE PLANS, except for the glued laminated deck panel dowels. Ensure that all fasteners, including nails, spikes, bolts, washers, and timber connectors, other than malleable iron, are galvanized.

Final tighten all nuts to provide proper bearing and snug tight condition. Snug tight is defined as sufficient tightness to bring faces of members into firm contact with each other. Cut off excess bolt lengths of more than 1 inch. After final tightening, check or burr all bolts effectively with a pointing tool to prevent loosening of the nuts.

995.04 Treated Structural Timber and Lumber. Furnish wood according to Subsection 995.01. Incise all wood and make all dimensional cuts and holes in the wood before pressure treatment. Use wood preservative treatment methods meeting the requirements of AASHTO M 133 as SHOWN ON THE PLANS. Treat dimensional lumber, sawn timber and glued laminated timber members according to AWPA Standards as SHOWN ON THE PLANS.

All treated stringers, decking, running planks, and handrails shall be treated after fabrication in accordance with AWPA U1, *Use Category System,* using Pentachlorophenol or Copper Naphthenate (CuN) in Light Oil, (Type C Solvent) for Use Category UC3B.

All treated substructures (sills, backing planks, cribs, timber walls, etc.) shall be treated after fabrication in accordance with AWPA U1 *Use Category System,* using Pentachlorophenol or Copper Naphthenate (CuN) in Heavy Oil (Type A Solvent) for Use Category UC4B.

Treat timber members shall comply with the requirements of the current edition of WWPI's *Best Management Practices for the Use of Treated Wood in Aquatic Environments.*

Except for pine, incise before treatment all surfaces greater than 2 inches in width and all Douglas fir and western larch surfaces. Field treat all cuts, abrasions, drilled

holes, and recesses that occur after initial preservative treatment in accordance with the requirements specified in AWPA standard M4, *Standard for the Care of Pressure-Treated Wood Products*. Plug all unused holes with preservative-treated plugs. Perform all field-applied preservation treatment with necessary precautions so as to prevent soil and/or water contamination.

All treated timber members must have an approved American Lumber Standards Committee quality mark, individually or sealed pallets, assuring that treatment conforms to the appropriate AWPA standards.

Submit a certified copy of the lot certification, by a qualified independent inspection and testing agency, to the CO for each charge of preservative, stating penetration in inches and retention in pounds per cubic foot (assay method). In addition, provide a written certification from the producer of the treated products that "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservers Institute and Canadian Institute of Treated Wood, were utilized. Include a description and appropriate documentation of the Best Management Practices used.

Handle treated timber according to the Consumer Information Sheet published by AWPA. Do not cut, frame, or bore treated timber after treatment unless approved by the CO. Handle treated timbers carefully and do not drop, damage outer fibers, or penetrate the surface with tools. Do not use cant dogs, hooks or pike poles. In coastal waters, do not cut or bore timber below the highwater mark.

995.05 Structural Glued Laminated Timber. Furnish structural glued laminated timber according to American National Standard, "Standard Specifications for Structural Glued Laminated Timber of Softwood Species" (ANSI 117). Fabricate according to the combination and grade as indicated in the contract. Fabricate structural glued laminated members according to American National Standard, "Standard for Wood Products - Structural Glued Laminated Timber" (ANSI A190.1).

Manufacture members as industrial appearance grade for wet use conditions, using a phenol-resorcinol resin type of adhesive throughout. Use only single- or multiple-piece laminations with bonded edge joints.

Section 996 - Gabion and Revet Mattress Material.

996.01 Basket Mesh. Twist or weld the mesh from galvanized steel wire conforming to ASTM A 641, class 3 or aluminized steel wire conforming to ASTM A 809. Use wire with a minimum tensile strength of 60,000 pounds per square inch when tested according to AASHTO T 244. The galvanized or aluminized coating may be applied after mesh fabrication. Make the mesh openings with a maximum dimension less than 4½ inches, an area less than 10 square inches, and a size less than the gabion or revet mattress rock to be used with the mesh.

(a) Gabion baskets (1 foot or greater in the vertical dimension). Fabricate the mesh for galvanized or aluminized coated baskets from nominal-sized 0.12-inch or greater diameter wire and fabricate the mesh for polyvinyl chloride coated baskets from nominal-sized 0.11-inch or greater diameter wire.

(1) Twisted wire mesh. Form the mesh in a uniform hexagonal pattern with non-raveling double twists. For galvanized or aluminized coated baskets, tie the perimeter edges of the mesh for each panel to a 0.15-inch or greater diameter selvedge wire. For polyvinyl chloride coated baskets, tie the perimeter edges of the mesh for each panel to a 0.13-inch or greater diameter selvedge wire. Make the selvedge at least the same strength as the body of the mesh. Furnish selvedge wire from the same type of material used for the wire mesh.

(2) Welded wire mesh. For galvanized or aluminized coated baskets, weld each connection to obtain minimum average weld shear strength of 585 pounds with no value less than 450 pounds. For polyvinyl chloride coated baskets, weld each connection to obtain minimum average weld shear strength of 472 pounds with no value less than 360 pounds.

Fabricate gabion baskets in the dimensions required with a dimension tolerance of ±5 percent. Where the length of the basket exceeds 1.5 times its width, equally divide the basket into cells less than or equal to the basket width using diaphragms of the same type and size mesh as the basket panels. Prefabricate each basket with the necessary panels and diaphragms secured so they rotate into place.

(b) Revet mattresses (less than 1 foot in the vertical dimension). Fabricate the mesh from nominal-sized 0.086-inch or greater diameter wire.

(1) Twisted wire mesh. Form the mesh in a uniform hexagonal pattern with non-raveling double twists. Tie the perimeter edges of the mesh for each panel to a 0.11-inch or greater diameter selvedge wire. Make the selvedge at least the same strength as the body of the mesh. Furnish selvedge wire from the same type of material used for the wire mesh.

(2) Welded wire mesh. Weld each connection to obtain minimum average weld shear strength of 292 pounds with no value less than 225 pounds.

Fabricate revet baskets in the dimensions required with a dimension tolerance of ±5 percent in length and width and ±10 percent in height. Where the length of the basket exceeds 0.5 times its width, equally divide the basket into cells less than or equal to 0.5 times the basket width using diaphragms of the same type and size mesh as the mattress panels. Prefabricate each basket with the necessary panels and diaphragms secured so they rotate into place.

(c) Epoxy or Polyvinyl chloride coated baskets. Use either a fusion bonded or extruded coating to coat the galvanized or aluminized mesh.

Make the coating at least 0.0625 inches in thickness for epoxy and 0.125 inch thickness for PVC. Make the color black or gray and conform to the following:

(1) For epoxy coating meet:

- Abrasion resistance, ASTM D 1242, maximum weight loss 0.19 g.
- Salt crock, ASTM G 8, maximum disbondment diameter 1.75 inch, and at 90 days, 1.5 volts, and 3 percent solution.
- Chemical resistance, ASTM G 20, with 45 days at 70°F, 3 molar CaCl, 3 molar NaOH, saturate $Ca(OH)^2$, and no coating loss.
- Weatherometer, ASTM G 23, with a surface chalk and 2,000 hours.

(2) For polyvinyl coating meet:

▪ Specific gravity, ASTM D 792	1.20 to 1.40
▪ Tensile strength, ASTM D 638 per square inch	2,300 pounds min.
▪ Modulus of elasticity, ASTM D 638 per square inch	2,000 pounds min. at 100 strain
▪ Hardness — shore "A", ASTM D 2240	75 min.
▪ Brittleness temperature, ASTM D 746	16 ºF max.
▪ Abrasion resistance, ASTM D 1242, method B at 200 cycles, CSI-A abrader tape, 80 grit	12% max. mass loss
▪ Salt spray (ASTM B 117) and ultraviolet light exposure (ASTM D 1499 and G 23 using apparatus type E and 145 ºF)	No visual effect *(c)* Δ< 6% *(d)* Δ< 25% *(e)* Δ< 25%

for 3000 hours	*(h)* Δ< 10%
▪ Mandrel bend, 360º bend at 0 ºF around a mandrel 10 times the wire diameter	No breaks or cracks in coating

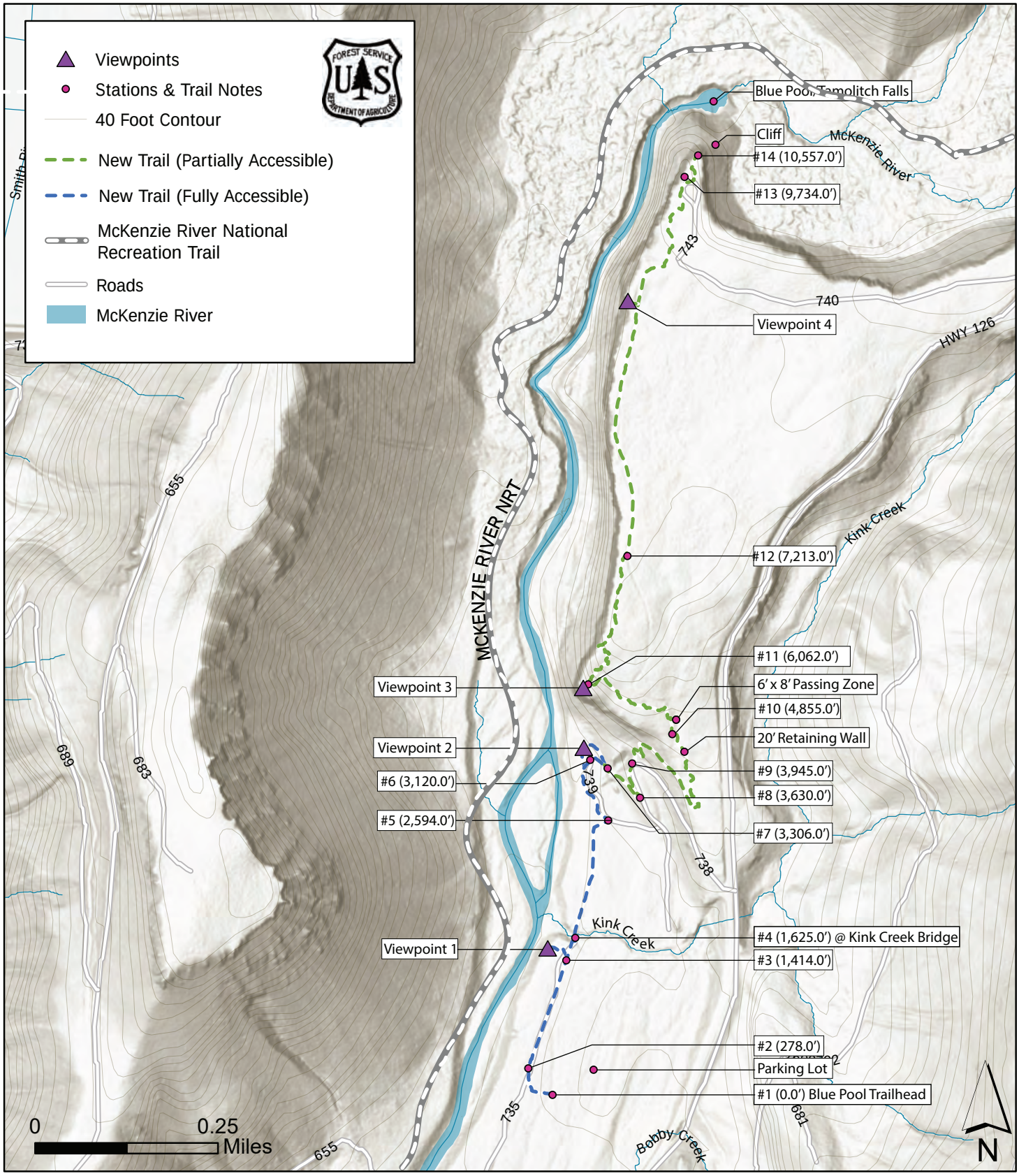
996.02 Permanent fasteners.

(1) Lacing wire. Furnish nominal-sized 0.086-inch diameter wire of the same type, strength, and coating as the basket mesh.

(2) Spiral binders. Form with wire having at least the same diameter, type, strength, and coating as the basket mesh.

(3) Alternate fasteners. Furnish fasteners according to the basket manufacturer's specification that remain closed when subjected to a 585-pound tensile force while confining the maximum number of wires to be confined in the gabion structure or revet mattress. Submit installation procedures and fastener test results.

996.03 Internal connecting wire. Furnish lacing wire as described in (b)(1) above or alternate stiffeners according to the basket manufacturer's specification.



Blue Pool Trail Construction Map
Station & Viewpoint Locations

McKenzie River Ranger District | Willamette National Forest

National Forest Foundation
Blue Pool Accessible Trail and Viewpoint Construction
Willamette National Forest, Oregon

Appendix H – Blue Pool Project Coordination Outline

Construction of the new accessible trail and viewpoints at Blue Pool will require the coordination of several important stages of the project. Please refer to Appendix A – Blue Pool Trail Scope of Work, Appendix B – Blue Pool Viewpoint Construction Work Summary, and Appendix C – Blue Pool Overlook Construction Drawings, in regard to station numbers and associated tasks. See Also Appendix G – Blue Pool project area map.

The Willamette National Forest is also managing the construction and installation of the Kink Creek Bridge, located along this new trail to Blue Pool. Trail and Viewpoint Contractor(s) cannot begin work in the vicinity of the Kink Creek Bridge until July 1, 2024.
Contractor(s) may begin work between stations 1 and 3, but no further than station 3 prior to July 1. Contractor(s) may also begin work everywhere from station 5 onward, but contractor(s) cannot begin any work between stations 3 and 5 until after July 1, 2024.

If different contractors are selected for Trail Construction and for Viewpoint Construction, certain activities related to each contract must be coordinated with one another. All coordination of work schedules and material deliveries will be done through the NFF point of contact.

Viewpoint Construction – deliveries of stone and construction materials must be staged at the viewpoint work sites prior to road to trail conversion work that will be occurring as part of Trail Construction. Contractor(s) may use any Forest Roads within the project area for initial staging and delivery of materials. However, once road to trail conversion work begins, it will no longer be possible to access certain work locations with anything larger than a small ATV.

- Viewpoint 1 – Contractor(s) may use Forest Road 735 to stage materials at Viewpoint 1. Large stones and construction materials should be delivered prior to any Trail Construction occurring between stations 2 and 3.
- Viewpoint 2 – Contractor(s) may use Forest Roads 738 and 739 to stage materials at Viewpoint 2. Large stones and construction materials should be delivered prior to any Trail Construction occurring between stations 5 and 6; and between stations 8 and 9.
- Viewpoints 3 and 4 – Contractor(s) may use Forest Service Roads 740 and 743 for delivery of materials for Viewpoints 3 and 4. Roads 740 and 743 must be kept clear and open for emergency access at all times. Any staging of construction materials must be outside of the road prism. Large stones and construction materials should be delivered prior to any Trail Construction occurring between stations 11 and 13.

Trail Construction – Trail Contractor, if different from Viewpoint Contractor, should be prepared to coordinate with the Viewpoint Contractor and cannot begin work on certain sections of Trail until after materials for the Viewpoints have been staged at the appropriate areas.
In addition, Trail Contractor should plan their own deliveries of aggregate and other construction materials so that those materials can be in place prior to road to trail conversion and new trail construction.

Any delays of material orders, shipments, and deliveries must be communicated to the NFF point of contact immediately. NFF point of contact will coordinate with the Forest Service and other contractor(s) and will advise on the appropriate course of action and any necessary scheduling changes.