

Biological Assessment
Marlette Lake Dam Resilient
Infrastructure Project

Nevada State Public Works Division

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Acronyms and Abbreviations

AA	action area
AMSL	above mean sea level
BA	Biological Assessment
BMP	Best Management Practice
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
LCT	Lahontan cutthroat trout
NDOW	Nevada Department of Wildlife
NMFS	National Marine Fisheries Service
PDM	Pre-disaster Mitigation
SR	State Route
USFWS	United States Fish and Wildlife Service

EXECUTIVE SUMMARY

The Nevada State Public Works Division has applied to the Federal Emergency Management Agency (FEMA) through the Nevada Division of Emergency Management for a grant through FEMA's Pre-disaster Mitigation (PDM) Grant Program. Nevada Division of Emergency Management is the Applicant for the grant and the Nevada State Public Works Division is the Subapplicant. The PDM Grant Program is authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. FEMA's PDM Grant Program provides funds to eligible state and local governments, federally recognized tribal governments, and nonprofit organizations to help implement long-term hazard mitigation measures before a disaster occurs.

The Marlette Lake Dam is an earthen-filled dam approximately 1 mile east of Lake Tahoe within Lake Tahoe Nevada State Park and the Lake Tahoe Basin. The dam is part of the Marlette Lake Water System, which provides drinking water to Carson City, Storey County, and Lyon County, Nevada. The elevation of the dam crest is approximately 7,846 feet above mean sea level (AMSL), with a height of approximately 52 feet, a length of approximately 250 feet, and a width of approximately 13 feet. The dam-created reservoir has a water storage capacity of approximately 11,780 acre-feet, and the full water elevation is 7,842 feet AMSL. There is one concrete-lined spillway on the north side of the dam and two outlet pipes with manual controls on the crest of the dam. The spillway discharges to Marlette Creek, which flows under State Route (SR) 28 via an existing box culvert to Lake Tahoe.

The dam is in an area of high seismic hazard and is classified as a "High Hazard Dam" in the National Inventory of Dams maintained by the U.S. Army Corps of Engineers. Annual inspections of the dam indicate a high probability of a dam breach in the event of an earthquake of 6.5 magnitude or larger, and seepage at the downstream toe of the dam along the primary outlets also increases the risk of dam failure. A dam breach would cause substantial damage to the dam, water system, existing structures, highways, and infrastructure downstream, including SR 28 and a sewage effluent pipeline that runs beneath the road. A dam breach could jeopardize the health and safety of people downstream, while also negatively impacting the ecology and water quality of Lake Tahoe and damaging infrastructure, such as SR 28. The State Public Works Division proposes to stabilize the Marlette Lake Dam to reduce hazards from seismic events by enlarging the downstream embankment with fill, replacing the existing outlet works, and rebuilding the spillway to address potential freeboard deficiencies.

FEMA prepared this Biological Assessment (BA) to evaluate the potential effects of the Proposed Action on species that are either listed or proposed for listing under the Endangered Species Act of 1973 (ESA), including species that are regulated by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) that may occur within the action area (AA). The potential effects on federally listed species were evaluated in accordance with Section 7 of the ESA. Measures to avoid and/or minimize effects on federally listed species are included in this BA.

Summary of Proposed Project

The Proposed Action would entail enlarging the downstream embankment of Marlette Lake Dam with imported materials for lateral support and adding a two-stage toe drain to mitigate seepage. Buttress fill would be placed and compacted in lifts and would extend the downstream toe of the dam an additional 48 feet. The dam crest height would be increased to address freeboard deficiencies. The existing riprap protection on the upstream slope would be removed and replaced. The existing concrete spillway would be removed and replaced with a new concrete box culvert. The culvert would convey the probable maximum flood (i.e., the flood that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the drainage basin) and maintain the required freeboard below the dam crest.

Existing outlet pipes within the dam, which are currently corroding, would be replaced with new outlet pipe via open-cut excavation. The intake for the outlets would be designed to prevent siltation. The primary outlet control system would be replaced with an automated control and supervisory control and data acquisition system housed in a new building on the dam crest. A new secondary outlet would also be constructed 2 feet below the spillway crest, for additional operational control. This secondary outlet would be manually controlled using a slide gate and hand wheel.

Construction of the new intake structure and replacement of the primary outlets would require lowering Marlette Lake to approximately 22 feet below the spillway crest, to an elevation of approximately 7,820 feet AMSL. The lake would be lowered via the existing primary outlet over a period of up to several months. A water level of 7,820 feet AMSL would expose an existing sediment bar approximately 230 feet northeast of the existing dam crest. This sediment bar would be the site for installing a cofferdam that would isolate the dam structure and forebay from the rest of the lake. The cofferdam would remain in place from approximately May through October 2025, after which point the cofferdam would be removed and the lake would be allowed to refill naturally. Assuming a required lake recovery of approximately 19 feet, and no changes to pumping operations, the lake would take approximately 6 years to fully recover after construction is completed.

An approximately 250-foot-long section of the existing access road northeast of the dam site, the Tahoe Flume Trail, would be regraded and raised using native fill material to accommodate a temporary truck turnaround. Access to the project site would be provided by North Canyon Road, which runs south to north from Spooner Lake to Marlette Lake. North Canyon Road connects to SR 28 near its intersection with U.S. Highway 50 (Lincoln Highway). Lake Spooner Trail, which connects to SR 28, would also be used for access. Use of North Canyon Road for access would require some trimming of vegetation and temporary stabilization using aggregate base. Several pullouts along the road would be cleared and improved with minor grading. Following project construction, the road would be restored to pre-project conditions, including the repair of any damaged culvert crossings.

Staging areas would be used for the storage of materials, equipment, and fuel. These areas would be limited to existing disturbed areas. The dewatered forebay work area may also be used for temporary staging.

Major project construction would extend from May 2025 through October 2025. The site would be stabilized during the winter to minimize potential erosion and sedimentation and would remain inactive until May 2026. In May 2026, final construction, including construction of the mechanical control building and minor appurtenances in addition to capping, would be completed and the site would be restored by summer 2026.

Federally Listed Species Potentially Affected

Based on a desktop review informed by federal databases, field survey findings, and early coordination with USFWS, one federally listed species has potential to occur within the AA and be affected by the Proposed Action, the threatened Lahontan cutthroat trout (LCT, *Oncorhynchus clarkii henshawi*).

The proposed AA is defined as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action” (50 Code of Federal Regulations §402.02). Therefore, the proposed AA consists of the proposed project area (comprising the limits of construction within the lake and on the existing dam face, the proposed staging areas, and access routes), a buffer of 100 feet around upland portions of the project area that border Marlette Lake where there could be effects on water quality from project-related erosion and sedimentation, and all of Marlette Lake, because the entirety of the lake would be affected by reservoir drawdown. Thus, the AA encompasses approximately 452 acres, as depicted in Figure 1 and Figure 2 in Appendix A.

Summary of Effects on Federally Listed Species

LCT occur within the AA in Marlette Lake and would be affected by the Proposed Action. Direct effects of the Proposed Action would consist of harm or mortality that may occur during fish capture and relocation. Indirect effects would consist of diminished water quality due to erosion of disturbed soils, accidental chemical spills or leaks, and/or reservoir drawdown. Although these effects would be minimized to the maximum extent practicable with the implementation of the proposed best management practices (BMPs) and LCT-specific measures, it is reasonably certain that some LCT would be stressed, injured, or killed as a result of the Proposed Action. Therefore, FEMA has determined that the Proposed Action may **affect and is likely to adversely affect** LCT and may result in take of the species.

SECTION 1. INTRODUCTION

1.1 Purpose and Need

The Nevada State Public Works Division has applied for Federal Emergency Management Agency (FEMA) funding assistance through the Nevada Division of Emergency Management to reduce seismic hazards that could affect the critical drinking water infrastructure of the Marlette Lake Dam and downstream property and infrastructure. The State of Nevada is the third most seismically active state in the United States, and Washoe County is located in one the most seismically active areas in Nevada. The Washoe County Regional Hazard Mitigation Plan considers earthquake hazards a high priority and considers the overall magnitude and potential severity of impacts from earthquakes to be high. During a seismic event, sections of the dam could be damaged, leading to dam failure. The Proposed Action is needed to stabilize the dam and reduce risks from earthquakes to people and infrastructure downstream of the dam and the ecology of Lake Tahoe.

1.2 Federal Nexus

FEMA's financial assistance would be provided through the Pre-disaster Mitigation (PDM) Grant Program, which provides funds to eligible state and local governments, federally recognized tribal governments, and nonprofit organizations to help implement long-term hazard mitigation measures before a disaster occurs.

Under Section 7 of the Endangered Species Act of 1973 (ESA), federal agencies are required to ensure that their actions do not jeopardize federally listed species or their habitats. The purpose of this Biological Assessment (BA) is to review the Proposed Action in sufficient detail to determine if it may affect any federally listed threatened or endangered fish, plant, or wildlife species, species proposed for listing, or designated critical habitat.

All federal agencies are required to consult with the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) in accordance with Section 7(a)(2) of the ESA regarding potential effects on federally listed or proposed species. The federal agency that is initiating or funding the "action" in question must ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of a federally listed threatened or endangered species, or a species proposed to be listed, or result in the destruction or adverse modification of designated or proposed critical habitat.

1.3 Project Location

The proposed project area is east of Lake Tahoe and spans three counties: Washoe, Carson City, and Douglas (Appendix A, Figure 1). The dam and associated reservoir are within Lake Tahoe Nevada State Park and the Lake Tahoe Basin. The existing road providing access to the proposed project area, North Canyon Road, is also within Lake Tahoe Nevada State Park and runs from the intersection of U.S. Highway 50 and State Route (SR) 28 near Spooner Lake to the southern shore of Marlette Lake (Appendix A, Figure 1). The proposed project area is mapped on the Marlette Lake U.S. Geological Survey 7.5-minute quadrangle in Section 12, Township 15N and Range 28E.

1.4 Consultation History

Consultation activities conducted to date to facilitate development of this BA include:

- FEMA hosted a teleconference on April 13, 2022, attended by representatives from the State of Nevada Public Works Division staff and their design consultant, Lumos and Associates, representatives from USFWS, Nevada Department of Wildlife (NDOW), Nevada Division of Emergency Management, Resource Concepts Inc. (RCI), Granite and CDM Smith (FEMA contractor). The purpose of the teleconference was to introduce the Proposed Action and to discuss potential impacts on resources protected under the ESA.
- FEMA hosted a subsequent teleconference on July 7, 2022, attended by representatives of the same entities indicated above. The purpose of the teleconference was to clarify the proposed scope of work, establish which federally listed species are likely to be affected by the Proposed Action and discuss the expected process for ESA compliance.
- FEMA hosted an additional teleconference on December 13, 2022, attended by attended by representatives from the State of Nevada Public Works Division, USFWS, NDOW, and CDM Smith (FEMA contractor). The purpose of the teleconference was to improve FEMA's understanding of what NDOW's remaining concerns are related to implementation of the Proposed Action, what additional information is needed by FEMA to complete ESA consultation and to clarify the duration and nature of the expected impacts of the Proposed Action.

SECTION 2. PROPOSED ACTION

2.1 Project Description

2.1.1 Proposed Work

Embankment and Spillway Improvements

The Nevada State Public Works Division proposes to stabilize the Marlette Lake Dam to reduce potential impacts from seismic events. The proposed project area includes work areas, staging areas and access roads (Appendix A, Figure 2). The proposed project area would encompass approximately 47 acres and would comprise (1) Marlette Lake, (2) Marlette Dam, and (3) a series of staging, stockpiling, and parking areas along North Canyon Road between the lake's southern shore to the intersection of U.S. Highway 50 and SR 28 near Spooner Lake (Appendix A, Figure 2). Appendix B provides the 60 percent design development plans detailing the project components described below.

The Proposed Action would entail enlarging the downstream embankment of Marlette Lake Dam with imported materials for lateral support and adding a two-stage toe drain to mitigate seepage. Before placing the buttress fill and toe drain material to enlarge the embankment, vegetation would be removed along the dam face, including up to eleven trees ranging from approximately 12 to 14 inches in diameter at breast height. Soil and loose, weathered, oversized rock material would be excavated to expose dense bedrock material underneath. This includes removal of an existing boulder wall halfway down the dam face that would be salvaged for other purposes at the site. Approximately 2,860 cubic yards of buttress fill would then be placed and compacted in lifts on the downstream face of the dam to achieve a grade of 3:1. The fill would extend the downstream toe of the dam approximately 48 feet, covering part of the existing Marlette Creek channel. The dam crest height would be increased to address freeboard deficiencies. The existing riprap protection on the upstream slope would be removed and replaced.

Operational Outlet Improvements

The existing concrete spillway would be removed and replaced with a new concrete box culvert that would be 11 feet wide, 6 feet tall, and 78 feet long. The base area beneath the spillway would be excavated an additional 12 inches to accommodate a compacted aggregate base for the new box culvert. The culvert would convey excess flows during the probable maximum flood (i.e., the flood that might be expected from the most severe combination of critical meteorologic and hydrologic conditions reasonably possible in the region) and maintain the required freeboard of 4 feet below the dam crest. The invert of the new concrete box culvert would be at the same elevation as the existing spillway crest, and the reservoir capacity would remain the same as the existing capacity.

Existing outlet pipes within the dam, which are currently corroding, would be replaced with new outlet pipes via open-cut excavation and extended through the new buttress fill to daylight at Marlette Creek. The creek would be re-graded at the outlet to facilitate construction of a riprap stilling basin consisting of a channel lined with large rocks or chunks of concrete that would serve to dissipate erosive flows. The intake for the outlets would be replaced with an elevated trash rack to prevent siltation. The primary outlet control system would be replaced with an

automated control and supervisory control and data acquisition system, housed in a new 10-foot by 10-foot masonry mechanical control building on the dam crest.

2.1.2 Implementation Methods

Marlette Lake Dewatering

Construction of the new intake structure and replacement of the primary outlets would require dewatering Marlette Lake to approximately 22 feet below the spillway crest, to an elevation of approximately 7,820 feet above mean sea level (AMSL). The lake would be lowered via the existing primary outlet, with a proposed maximum discharge rate of 25 cubic feet per second. This is the threshold at which water can erode sediments in Marlette Creek. By keeping the discharge below this level, water quality in the creek would be protected. This limitation would require dewatering to occur over a period of several months. A water level of 7,820 feet AMSL would expose an existing sediment bar approximately 230 feet northeast of the existing dam crest. This sediment bar would be the basis for installing a water-filled cofferdam that would isolate the dam structure and forebay from the rest of the lake. Once the cofferdam has been installed, the forebay would continue to be dewatered using a combination of the existing primary outlet works and pumps up- and down-gradient of the cofferdam to approximately 7,805 feet AMSL, at which point the forebay work area would be dry. Pumps would be used to continue dewatering any seepage coming through the cofferdam that may enter the forebay work area during construction.

Cofferdam Installation and Removal

As a part of the cofferdam installation, unstable substrate at the proposed cofferdam location may need to be excavated, and an underwater concrete pad may need to be installed to facilitate an appropriate sealing surface for the cofferdam. Both the excavation of unstable material and installation of the concrete pad would occur before installation of the cofferdam. Installation would be accomplished either by diver-assisted construction methods (e.g., rock-drilling and splitting, air lift bags, barge mounted excavator/crane) or by shallow-water entry with heavy equipment containing plant-based hydraulic fluid.

Before any in-water work, turbidity curtains would be installed up-gradient of the cofferdam location to minimize any resultant impacts on lake water quality. Installation of the cofferdam itself would involve using a crane to hoist the barrier across the water, while crews unroll the barrier to full length and get it into position. Next, crews would fill the barrier with lake water using two 4-inch trash pumps and settle the barrier into its final position as a temporary cofferdam.

The cofferdam would remain in place from approximately May through October 2025, when outlet pipe replacement and installation of the new slide gates is expected to be complete. The forebay area of the dam would then be rewatered by methodically pumping impounded lake water to the dewatered work zone. This would be performed in a manner to avoid abrupt flows and turbidity. The water elevation needs to be level on both sides of the cofferdam to equalize the pressures before its removal. Once the cofferdam is removed, the lake would be allowed to refill naturally. The refill rate would depend on precipitation amounts in the Marlette Lake basin and whether pumping operations of the Marlette Lake Water System are reduced during refill. If

pumping continues as normal, the average annual refill rate is expected to be approximately 3 feet of elevation per year. If pumping is reduced, refill would be faster; however, the exact rate is unknown. Assuming a lake recovery of approximately 3 feet, and no changes to pumping operations, the lake would take up to approximately 6 years to return to pre-project levels after construction is completed.

Access Roads

Access roads extend through Washoe County, Carson City (independent city), and Douglas County. An approximately 250-foot-long section of the existing access road northeast of the dam site, the Tahoe Flume Trail, would be regraded and raised approximately 5 feet using fill material to accommodate a temporary truck turnaround. Vegetation would be removed for the improvement of the access road, including the removal of four trees. The existing road providing access to the project site, North Canyon Road, runs south to north from Spooner Lake to Marlette Lake. The North Canyon Road connects to SR 28 near its intersection with U.S. Highway 50 (Lincoln Highway). Lake Spooner Trail, which connects to SR 28, also would be used for access. Use of North Canyon Road for access would require some trimming of vegetation and temporary stabilization using aggregate base. Several pullouts along the road would be cleared and improved with minor grading. Following project construction, the road would be restored to pre-project conditions, including the repair of any damaged culvert crossings. Figure 2 in Appendix A depicts the project site access route.

Construction Staging Areas

Staging areas would be used for the storage of the materials, equipment, and fuel. The State of Nevada Public Works Division anticipates that materials and equipment staging would be limited to existing disturbed areas. Up to 10,000 cubic yards of existing material would be temporarily removed and replaced as part of the replacement of the primary outlets. This material would be placed adjacent to the existing dam, both on the lakeward and landward sides of the existing dam. The dewatered lakebed may also be used for temporary staging. Figure 2 in Appendix A depicts the proposed staging areas. Construction water may be drafted from Spooner Lake at an access point along the western shore for dust control (Appendix A, Figure 2).

Material Disposal and Fill Sources

All material from the demolition of any existing structures would be removed and disposed of at an appropriate off-site location in accordance with federal and state laws. Fill used for the project would be certified clean fill from a commercial source or regularly maintained stockpile. It may be possible that excess soil material could be incorporated into the final design. Any excess material generated by the project (including soil, the existing spillway wall, outlet pipes, and inlet structure) would be hauled off-site and disposed of in accordance with state and federal laws.

Maintenance Activities

Follow-up maintenance is not part of the Proposed Action; however, it is a requirement of the grant award and may be considered a component of the Proposed Action. The Public Works Division would be responsible for project maintenance once the work is complete. Project

maintenance would include road maintenance, vegetation control/brush and tree removal, dam and spillway maintenance, and lake monitoring.

2.2 Project Duration

The lake drawdown process is expected to begin on October 1, 2024, and end in March 2025 at the latest. Once drawdown is complete, the cofferdam would be installed. Major project construction would extend from approximately May 2025 through October 2025, after which the cofferdam would be removed to allow the lake to begin to refill, and the site would be stabilized and remain inactive during the following winter. In May 2026, final construction of the mechanical control building and minor appurtenances in addition to capping would be completed and the site would be restored by summer 2026.

2.3 Equipment

Table 1 shows the anticipated vehicles and equipment that would be required to implement the Proposed Action, arranged by the construction activity.

Table 1. Construction Equipment List

Construction Activity	Equipment Description	Quantity
Clearing and Grubbing	CAT 966 - Loader	1
	CAT 14H - Motor Grader	1
	CAT D6 - Dozer	1
	CAT 330 - Excavator	3
	Water Truck	1
Installation of Temporary Cofferdam	CAT 345 - Excavator	1
	CAT 966 - Loader	1
	Rough Terrain Crane	1
	Concrete Pump Truck	1
	Ready Mix Trucks	6
Access Road Grading	CAT 14H - Motor Grader	1
	Vibratory Compactor	1
	Bobtail Dump Trucks	6
	Water Truck	1

Construction Activity	Equipment Description	Quantity
Placement of Buttress Fill	CAT 14H - Motor Grader	1
	Vibratory Compactor (7-9 ton)	1
	CAT 966 - Loader	1
	CAT D6 - Dozer	1
	CAT 330 - Excavator	1
	10 - Wheeler Dump Trucks	6
	Water Truck	1
Removal of Existing Spillway	CAT 330 - Excavator	1
	10-Wheeler Dump Trucks	2
Construction of New Emergency Outlet	Rough Terrain Crane	1
	Concrete Pump Truck	1
	Ready Mix Trucks	4
Placement of Riprap	CAT 345 – Excavator	1
	CAT 330 – Excavator	1
	CAT D6 – Dozer	1
	CAT 966 - Loader	1
	Bobtail dump trucks	6

2.4 Best Management Practices

To minimize soil erosion and protect water quality, best management practices (BMPs) would be implemented in accordance with the *Tahoe Regional Planning Agency Handbook of Best Management Practices* (Tahoe Regional Planning Agency 2014). A Stormwater Pollution Prevention Plan also would be prepared by a qualified professional, which would include BMPs and monitoring of BMP efficacy throughout construction. BMPs for the protection of soil and water resources would include:

- **BMP 1.** Boundary fencing (i.e., orange construction fencing or highly visible rope fencing) will be placed and maintained to clearly identify the limits of site grading, equipment staging and material stockpiling areas, and identified pullouts to protect adjacent vegetation.
- **BMP 2.** Excavated soils will be stockpiled temporarily within previously disturbed, upland staging areas or immediately off loaded into a haul truck. Sediment barriers will be placed around the downslope perimeter of temporary soil stockpiles.
- **BMP 3.** Sediment barriers will be placed around the downslope side of loose/erodible cut/fill slopes along the base of the dam embankment and at temporary road pullouts/staging areas to prevent sediment from washing into Marlette Creek.

- **BMP 4.** Sediment barriers will be inspected weekly for damage and appropriate placement to reduce potential erosion. Any damaged barriers will be repaired, or new barriers installed, within 24 hours upon identification of damage. Accumulated sediment will be removed when it reaches a maximum of one-third the height of the silt fence or one-half the height of the fiber roll.
- **BMP 5.** Work within regulated waters will be completed under low flow or no flow conditions. Water levels within the lake will be lowered via the existing outlet works prior to construction. A temporary hydraulic cofferdam will then be installed within Marlette Lake and water will be pumped around the cofferdam such that the replacement of the intake structures and work on the dam can occur in a dry environment.
- **BMP 6.** A turbidity curtain will be deployed up-gradient of the cofferdam to contain any turbidity caused by cofferdam installation.
- **BMP 7.** All upland areas temporarily disturbed by construction activities will be revegetated in accordance with the *Tahoe Regional Planning Agency Best Management Practices Handbook*.
- **BMP 8.** Staging and storage of equipment, materials, fuels, lubricant, and solvents will be located more than 100 feet from aquatic resources, including wetlands and lakes. Equipment will be fueled and maintained within the designated staging areas. Adequate supplies will be available at all times to handle spills, leaks, and disposal of used liquids.
- **BMP 9.** Loose construction materials, packaging, and litter will be cleaned up daily and disposed of or stored appropriately.
- **BMP 10.** All ground-disturbing activities will be effectively controlled of fugitive dust emissions using various methods.

Additionally, the following BMPs will be implemented to protect biological resources:

- **BMP 11.** If vegetation removal is scheduled during the nesting season (March 1 to August 31), a focused survey for nests will be completed by a qualified wildlife biologist at a minimum radius of 500 feet for migratory birds and 0.5 mile for raptors around the project area. If active nests are found, the nest will be avoided and a disturbance buffer established by the project biologist in coordination with NDOW. The extent of the buffer will be dependent on the species, noise levels or construction disturbance, and other topographical or artificial barriers. The buffer will be kept in place until the nesting season ends or the project biologist confirms the young have fledged.
- **BMP 12.** A screen-covered drafting box will be used while drafting or dewatering to minimize removal of aquatic species, including juvenile fish, from aquatic habitats. The pump intake screens will be sized according to the pump intake capacity and approved by an NDOW fisheries biologist.
- **BMP 13.** NDOW will perform any fish salvage procedures necessary before and/or during the dewatering of the waterward side of the dam (i.e., the forebay work area).

- **BMP 14.** Tightly woven fiber netting, plastic monofilament netting or similar material will not be used for erosion control or other purposes adjacent to aquatic resources, including wetlands.
- **BMP 15.** Vegetation removal will be minimized to the extent practicable. Where necessary within the construction access corridor and at designated passing areas, existing vegetation will be trimmed to a height necessary for construction equipment while keeping the existing plants alive. Vegetation within equipment access areas that could pose a fire danger if left in place will be removed.
- **BMP 16.** All construction equipment and vehicles will be washed and inspected for weed seeds and plant parts prior to bringing them onto the property. Vehicles or other traffic that may transport weed seed or plant materials will be restricted from entering the site.
- **BMP 17.** Certified weed-free mulch will be used for all site restoration areas.
- **BMP 18.** Infestations of invasive plants that are discovered during project implementation will be documented and locations mapped.
- **BMP 19.** To the maximum extent practicable, project-related vehicles will observe a 15-mile-per-hour speed limit within construction areas and on access roads.
- **BMP 20.** All food and food-related trash items will be enclosed in sealed trash containers and properly disposed of off-site.
- **BMP 21.** No pets will be allowed anywhere within the action area (AA) during project implementation.
- **BMP 22.** To the maximum extent practicable, construction and ground disturbance will occur only during daytime hours, and will cease no less than 30 minutes before sunset and will not begin again earlier than 30 minutes after sunrise.

2.5 Specific Measures for Lahontan Cutthroat Trout

In addition to the BMPs indicated above, the following species-specific measures would be incorporated into the Proposed Action to minimize potential impacts on Lahontan cutthroat trout (LCT, *Oncorhynchus clarkii henshawi*):

- **LCT 1.** In coordination with USFWS and NDOW, the Subapplicant will facilitate the collection and relocation of LCT from Marlette Lake prior to reservoir drawdown. This will reduce the number of fish that would be subject to stressors associated with post-drawdown conditions. Capture and relocation activities will only be conducted by USFWS-approved biologists and support staff with knowledge and experience in handling, collecting and relocating LCT. No collection and relocation of LCT will occur following reservoir drawdown because resultant access limitations would preclude such activities.

- **LCT 2.** During dewatering and rewatering of the forebay work area, the following measures will be implemented to minimize the contribution of turbidity to Marlette Lake:
 - Suspended sediment in water pumped or removed from the dewatered forebay work area will be filtered or allowed to settle before its release, or allowed to filter through vegetated upland areas prior to being returned to the lake.
 - When construction is complete, the forebay area will be rewatered slowly by methodically pumping water from the lake to the dewatered work zone. This will be performed in a manner that will avoid abrupt flows and turbidity. Once the water elevation is level on both sides of the cofferdam, the cofferdam will be removed.

2.6 Action Area

A project AA is identified for the analysis of potential effects of the proposed project on listed species. The AA includes areas where project activities could result in effects on federally listed species. The ESA defines effects of the action as all consequences to listed species or critical habitat that the Proposed Action caused, including the consequences of other activities that are caused by the Proposed Action. The Proposed Action causes a consequence if it would not occur but for the Proposed Action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 Code of Federal Regulations 402.02). Thus, consequences may include direct harm to species within work areas, staging areas, and access routes as well as disturbance from project-related noise and human presence. The AA is defined as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action” (50 Code of Federal Regulations 402.02). Therefore, observable or measurable effects of the project are not expected beyond the boundaries of the AA.

The proposed AA consists of the proposed project area (comprising the limits of construction within the lake and on the existing dam face, the proposed staging areas, and access routes), a buffer of 100 feet around upland portions of the project area along Marlette Lake where there could be effects on water quality from project-related erosion and sedimentation, and all of Marlette Lake, because the entirety of the lake would be affected by reservoir drawdown. Thus, the AA encompasses approximately 452 acres, as depicted in Figure 1 and Figure 2 in Appendix A.

SECTION 3. ENVIRONMENTAL SETTING

3.1 Environmental Setting

The AA is located in the northern Sierra Nevada physiographic province within the Lake Tahoe Basin. The AA largely consists of Marlette Lake and surrounding portions of undeveloped areas of dense conifer forest and woodland interspersed with open meadows and large, steep areas of granitic outcroppings. Aquatic habitats within the AA include Marlette Lake and several intermittent and perennial streams that cross through the AA within two major watersheds: 1) North Canyon Creek watershed and 2) Marlette Lake watershed. Both of these watersheds drain to Lake Tahoe. Additionally, there are several emergent and scrub-shrub wetlands that have formed along the AA adjacent to streams and isolated mountain-slope seeps.

Elevation within the AA ranges from a high of approximately 8,120 feet AMSL near Snow Valley Peak to a low of approximately 6,920 feet AMSL at the Spooner Lake parking area. From Snow Valley Peak to the north, the AA slopes downward toward Marlette Lake, which sits at an average elevation of approximately 7,823 feet AMSL.

Site geology is mapped as Quaternary alluvium, consisting of unconsolidated, moderately to poorly sorted sand, silt, and gravel (Jennings 1977). According to the findings of a special-status plant survey conducted in 2021, as described in Section 3.5, soils throughout the AA are moderately to excessively well-drained and range in composition from fine sand to cobble and gravel (RCI 2021a).

3.2 Land Use Type / Vegetation Communities

3.2.1 Land Use

Most of the AA is undeveloped, with the exception of Spooner Lake State Park, which provides parking, restrooms, camping, and boat access to Spooner Lake. There are several multiuse trails throughout and surrounding the AA for hikers, bikers, and equestrian riders. Access to the dam is via North Canyon Road, a dirt road that runs from Spooner Lake, north to Marlette Lake. Spooner Lake State Park personnel use it for lake access and dam maintenance.

3.2.2 Vegetation Communities

Within the lower elevations of the AA (i.e., within the North Canyon Creek watershed), the predominant vegetation consists of a Jeffrey pine (*Pinus jeffreyi*) and white fir (*Abies concolor*) forest community. There is a diverse shrub understory consisting of pinemat manzanita (*Arctostaphylos nevadensis*), antelope bitterbrush (*Purshia tridentata*), mountain sagebrush (*Artemisia tridentata*), tobacco brush (*Ceanothus velutinus*), mountain whitethorn (*Ceanothus cordulatus*), snowberry (*Symphoricarpos alba*) and several species of currants (*Ribes* spp.). The understory herbaceous layer is sparse, but often characterized by common forbs including sticky cinquefoil (*Potentilla glandulosa*), mountain monardella (*Monardella odoratissima*), mule's ear (*Wyethia mollis* sp.), low phacelia (*Phacelia humilis*) and sulfur flower buckwheat (*Eriogonum umbellatum*). Common grasses include mountain brome (*Bromus marginatus*) and bottlebrush squirreltail (*Elymus elymoides*).

The AA is crossed multiple times by North Canyon Creek, often forming emergent wetlands adjacent to the access road. Dense sedges (*Carex* spp.), rushes (*Juncus* spp.) and other wetland grasses including tufted hairgrass (*Deschampsia cespitosa*) and fowl mana grasses (*Glyceria striata*) characterize these wetlands. Dense sedges (*Carex* spp.), rushes (*Juncus* spp.), and other wetland grasses including tufted hairgrass (*Deschampsia cespitosa*) and fowl mana grasses (*Glyceria striata*). Common forbs include American cow parsnip (*Heracleum maximum*), arrowhead butterweed (*Senecio triangularis*) and seep monkeyflower (*Eryanthe guttata*).

As the access road ascends in elevation, wetland seeps are frequent along the steep cut slopes adjacent to the access road. Dense mountain alder (*Alnus incana*) and herbaceous species including false hellebore (*Veratrum californicum*), American cow parsnip, western columbine (*Aquilegia formosa*), Parish's yampah (*Perideridia parishii*) and blue-pod lupine (*Lupinus polyphyllus*) often dominate these wetlands.

At higher elevations and on the north-facing slopes above Marlette Lake, quaking aspen (*Populus deltoides*) become more prevalent and occur in dense stands along the access road interspersed with wetland seeps. The area surrounding the dam consists of steep granitic boulders with scattered antelope bitterbrush and an overstory of white fir.

3.3 Aquatic Habitat

The AA is in the Marlette Watershed (Hydrologic Unit Code 12 – 160501010201). The watershed can be divided into two smaller watersheds that drain to either the North Canyon Creek drainage or to Marlette Lake. Streams located along the lower two-thirds (approximately 4 miles) of North Canyon Creek Road flow to North Canyon Creek, which flows to the south and west, eventually discharging to Lake Tahoe. Streams along the northern third of the access road drain to Marlette Lake. An aquatic resources delineation was prepared by RCI for the AA in December 2021 (RCI 2021b). The delineation identified:

- Two lakes, Marlette Lake and Spooner Lake
- Four perennial streams including North Canyon Creek and Marlette Creek
- Four intermittent streams

Marlette Lake was constructed in 1873 when a small earthen dam was erected at the outlet of a broad glaciated basin that naturally drained into Lake Tahoe. In 1959, the dam was raised to its present height. Marlette Lake covers approximately 381 acres and has a maximum depth of approximately 45 feet (NDOW 2022a). The bottom of Marlette Lake can be generally characterized as a very gently sloping plane that dips toward the northwest (Rush et al. 1972), as shown in Figure 3 in Appendix A. The upper part of the shoreline is lined with boulders that quickly transition to an unconsolidated bottom below. Water within the lake is derived from snowmelt and several small unnamed streams. Based on water quality monitoring that was conducted by NDOW in 2022, dissolved oxygen levels in the upper 20 feet of the water column remain suitable for LCT throughout the winter when the lake is covered in ice (Hawks 2022). The outflow of Marlette Lake is controlled by the earthen dam located along the western shore and discharges to Marlette Creek, which flows west and terminates at Lake Tahoe. An outlet

pipe in the dam controls flow within Marlette Creek, and water levels are maintained for the benefit of downstream fisheries.

The AA partially overlaps the western edge of Spooner Lake, which may be used to draft water for dust control during construction (Appendix A, Figure 2). Spooner Lake is a small impoundment constructed in 1927 to store irrigation water. The reservoir covers about 78 surface acres and has a depth of nearly 20 feet at maximum capacity (NDOW 2022b). Water within the lake is charged by snow melt runoff and an unnamed tributary that enters at the eastern end. There is an earthen dam at the western end of the lake. Water outlets from the dam and flows west into North Canyon Creek, which drains to Lake Tahoe.

As previously noted, four perennial streams intersect portions of the AA, primarily along North Canyon Creek Road. North Canyon Creek is a perennial stream that originates from snow melt in the upper elevations of the Carson Range near Valley Peak. The channel meanders southwest paralleling North Canyon Creek Road, the main access road for the Proposed Action, before turning to the west and flowing to Lake Tahoe. North Canyon Creek crosses through the AA at four locations (Appendix A, Figure 2). The width of the channel ranges from approximately 3 feet in the upper reaches to 4 feet at lower elevations.

An unnamed perennial stream flows directly into the southernmost part of Marlette Lake. The NDOW LCT spawning station is approximately 50 feet upstream of where the stream meets Marlette Lake, just south of the existing access road. An approximately 225-foot section of the stream falls within the AA. Based on the findings of the 2021 survey, this section of stream has an average width of approximately 3.5 feet (RCI 2021b).

Marlette Creek is a perennial stream formed by the outflow of Marlette Lake. Water is released from Marlette Lake into Marlette Creek to maintain downstream flow to support existing fisheries. An approximately 300-foot section of the creek falls within the AA. Portions of the channel within the AA are confined by steep boulder-covered slopes. At the time of the survey conducted in 2021, there was approximately 2 inches of flowing water in the channel (RCI 2021b). The steep channel flows downslope for approximately 1.9 miles to its outlet at Lake Tahoe.

The southernmost perennial stream within the AA is an unnamed stream formed by the outflow of Spooner Lake. Upstream of North Canyon Creek Road, the channel splits and is conveyed under the road via culverts. Water from the split channels flows back together on the west side of the road and continues northwest through Spooner Meadow to North Canyon Creek. The channel is partially vegetated with hydrophytic species.

3.4 Federally Listed Species with Potential to Occur in the Action Area

FEMA conducted a desktop review to collect information on federally listed species under NMFS or USFWS jurisdiction with potential to occur within or near the AA. The scope of the desktop review included the area within a 10-mile radius of the AA. The review consulted the following sources:

- USFWS Information for Planning and Consultation (IPaC) (USFWS 2023a)
- USFWS Critical Habitat Mapper (USFWS 2023b)
- Essential Fish Habitat Mapper (NMFS 2023a)
- NMFS Protected Resources Application (NMFS 2023b)

FEMA reviewed recovery plans and other published literature for further details concerning species occurrences and status in the region, habitat preferences, documented historical and current ranges, and life histories. No species or habitats under NMFS jurisdiction occur within or near the AA. No designated critical habitat occurs within 10 miles of the AA. Appendix C provides the USFWS IPaC Official Species List.

RCI conducted multiple field surveys in 2021 to characterize existing biological resources within the AA. These surveys include:

- Special-status plant surveys conducted between June and July 2021, consisting of pedestrian surveys of the AA (RCI 2021a).
- A delineation of aquatic resources conducted in accordance with the 1987 *U.S. Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) as amended by the *Western Mountains, Valleys, and Coast Regional Supplement* (U.S. Army Corps of Engineers 2010), and *A Guide to Ordinary High Water Mark Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (Mersel and Lichvar 2014) (RCI 2021b).
- Wildlife surveys conducted between May and June 2021 focused primarily on identifying bald eagle (*Haliaeetus leucocephalus*) nesting pairs that could be disturbed by the Proposed Action (RCI 2021c).

Additionally, biologists from NDOW and USFWS conducted a survey in spring 2022 to determine whether Sierra Nevada yellow-legged frog (*Rana sierrae*) occur within the AA (Mellison 2022).

3.4.1 Plant Species

Based on the desktop review, a single threatened plant species, whitebark pine (*Pinus albicaulis*), has potential to occur within the AA. However, according to the findings of special-status plant surveys conducted in 2021, no suitable habitat for whitebark pine occurs within the AA (RCI 2021a). Therefore, this species is not considered further in this BA.

3.4.2 Wildlife Species

The desktop review identified three listed wildlife species and two wildlife species proposed for listing as having potential to occur within the AA. Based on field survey findings and input from USFWS provided during early coordination, one listed species (LCT) has potential to occur within the AA and be affected by the Proposed Action. FEMA dismissed all other species from further consideration in this BA because (1) the AA is not within the species known range,

(2) suitable habitat for the species does not exist within the AA and/or (3) focused surveys for the species resulted in a negative finding, as described in Appendix D.

The following sections provide LCT life history information and a discussion of the species' status within the AA.

3.4.2.1 Lahontan Cutthroat Trout

3.4.2.1.1 Status

The LCT was listed as endangered in 1970 (USFWS 1970) and subsequently reclassified as threatened in 1975 (USFWS 1975) to facilitate management by the States and allow State-permitted sport harvest. No critical habitat has been designated for the species.

3.4.2.1.2 Range

LCT historically occupied large freshwater and alkaline lakes, small mountain streams and lakes, small tributary streams, and major rivers of the Lahontan Basin of northern Nevada, eastern California and southern Oregon, including the Truckee, Carson, Walker, Susan, Humboldt, Quinn, Summit Lake/Black Rock Desert and Coyote Lake watersheds (USFWS 2009). LCT currently occupy approximately 588 miles, or 8.6 percent, of streams in 16 different hydrologic units within their historical range (USFWS 2009). LCT occupy an additional approximately 53 miles of habitat in 11 hydrologic units outside their historical range for a total of approximately 640 miles of occupied stream habitat (USFWS 2009).

3.4.2.1.3 Life History

LCT inhabit both lakes and streams. Lacustrine LCT populations have adapted to a wide variety of lake habitats from oligotrophic (with low nutrient levels and primary productivity) alpine lakes to large, productive desert terminal lakes (e.g., Pyramid Lake). Unlike most freshwater fish species, LCT have been reported to tolerate alkalinity and total dissolved solid levels as high as 3,000 and 10,000 parts per million, respectively (Dickerson and Vinyard 1999).

Although LCT inhabit lakes, they are obligate stream spawners. Spawning generally occurs from April through July, depending upon streamflow, elevation and water temperature (Lea 1968; Moyle 2002; Rissler et al. 2006). LCT in streams generally become sexually mature around year three (Ray et al. 2007), while LCT in lakes become sexually mature between 3 and 4 years of age (Rissler et al. 2006).

In lakes, small cutthroat trout largely feed on insects or zooplankton. However, if neither is available, they will feed on bottom-dwelling insect larvae, crustaceans, and snails (Moyle 2002). Large lake-dwelling cutthroat trout (i.e., those measuring more than approximately 1 foot fork length) feed mainly on other fish (Moyle 2002).

3.4.2.1.4 Status Within the Action Area

LCT only occur within the AA in Marlette Lake. NDOW introduced LCT to Marlette Lake in 1964. NDOW currently manages the Marlette Lake LCT population as brood stock for their hatchery program. Each spring, NDOW operates a spawning station on a tributary along the southern end of the lake where fish are captured, spawned and released. Because LCT are unable

to naturally reproduce in the lake, NDOW stocks the lake annually to maintain the population. According to information provided by NDOW, LCT in Marlette Lake generally live for approximately 5 years (Hawks 2023). Therefore, based on NDOW stocking records for the past 5 years (**Table 2**) and the expected stocking of an additional 2,000 individuals in 2023 (Hawks 2023), the Marlette Lake LCT population is conservatively anticipated to comprise approximately 21,000 individuals at the time that the Proposed Action would be initiated.

Table 2. Marlette Lake Lahontan Cutthroat Trout Stocking History

Date	Number of Lahontan Cutthroat Trout Stocked
8/30/2022	8,192
6/26/2020	6,095
10/11/2019	5,020
7/11/2018	375

SECTION 4. EFFECTS ANALYSIS

4.1 Potential Effects on Lahontan Cutthroat Trout

As described in Section 2.1, the Proposed Action would involve improvements to existing access roads and the Marlette Lake Dam, which would require the drawdown of Marlette Lake to an elevation of approximately 7,820 feet AMSL. Additionally, in-water work may be required to facilitate installation of the cofferdam that would be used to isolate the forebay work area.

Ground disturbance associated with the Proposed Action would be limited predominately to an approximately 1.25-acre area around the dam site. This area would encompass the limits of work associated with following project components, as further described in Section 2.1:

(1) stabilization of the dam face, (2) improvements to the section of Tahoe Flume Trail immediately adjacent to the dam site and temporary truck turnaround improvements along the existing Tahoe Flume Trail, (3) the riprap and grading work at Marlette Creek and (4) various improvements to the previously disturbed Marlette Dam (i.e., control building and outlet pipe replacement). Ground disturbance near Marlette Lake could result in disturbed soil originating from within construction areas being introduced to nearby portions of the lake via increased erosion during storm runoff. This erosion and runoff could lead to localized short-term decreases in water quality in Marlette Lake by temporarily increasing levels of suspended sediments resulting in increased turbidity and sedimentation. However, construction work would occur after reservoir drawdown, which would increase the distance between areas of soil disturbance and the water's edge. Additionally, construction work would be limited to the dry season and would be conducted in accordance with BMPs designed to further reduce the potential for increases in erosion caused by construction activities, as described in Section 2.4. Therefore, any elevated suspended sediment concentrations in Marlette Lake resulting from erosion associated with ground disturbance would be minimal and likely far below levels that would elicit a behavioral or physical response in LCT.

In-water work that may occur before installation of the cofferdam (i.e., installation of an underwater concrete pad and excavation of unstable material), during installation of the cofferdam and during removal of the cofferdam could also cause temporary localized decreases in water quality in the form of increased turbidity. However, the implementation of applicable BMPs described in Section 2.4, including the use of a turbidity curtain, would reduce the severity and duration of suspended sediment generated during in-water work, and any remaining suspended sediment would resettle shortly after in-water work is complete. Therefore, effects of increased suspended sediment resulting from in-water work on LCT are expected to be minimal and limited to short-term behavioral effects, such as avoidance.

Proposed construction activities could result in the accidental introduction of chemicals associated with construction equipment to Marlette Lake through spills or leaks. In the short-term, impacts of these substances on aquatic habitats could include harm to or mortality of LCT through poisoning or suffocation where concentrations of introduced contaminants are high. Similar long-term effects could occur where contamination persists and continues to leach out into Marlette Lake. However, because construction activities would be conducted in accordance with applicable BMPs described in Section 2.4, including storing fuels, lubricant and solvents

more than 100 feet from aquatic resources and maintaining adequate materials for spill cleanup and disposal on-site, the potential for chemical contamination of Marlette Lake to result from the Proposed Action would be extremely low.

As described in Section 2.1, the forebay work area would be isolated to allow for construction to occur under dry conditions. Isolation of the forebay work area would require the use of pumps to dewater the area and the capture and relocation of LCT that do not volitionally leave the forebay area before installing the cofferdam. Effects from dewatering and fish relocation would be minimized by following the applicable BMPs presented in Section 2.4. In accordance with BMP 12 and BMP 13, respectively, a screen-covered drafting box would be used while dewatering the forebay work area to prevent fish entrainment, and fish capture and relocation would be conducted by qualified NDOW personnel with knowledge and experience in handling, collecting and relocating LCT. Although effects on LCT from dewatering and fish relocation associated with work area isolation would be minimized to the maximum extent practicable, injury or mortality of some individuals may still occur.

In accordance with species-specific measure LCT 1, as described in Section 2.5, it is anticipated that additional fish capture and relocation activities would be conducted by NDOW before reservoir drawdown to limit the number of LCT that would be exposed to environmental stressors associated with post-drawdown habitat conditions. Such activities would involve risks to LCT similar to those described above. However, it is expected that potential sublethal and lethal effects of fish capture and relocation would be less than those presented by habitat loss and disturbance that would result from reservoir drawdown.

All LCT that avoid capture and remain in Marlette Lake following drawdown would be subject to effects from decreased habitat availability and changes in habitat conditions (i.e., water quality) for a period of up to approximately 6 years while the lake refills. The reduction in lake volume that would result from drawdown would depend on the water level of the lake at the time drawdown commences. When the water level is at the elevation of the spillway (i.e., “full pool”), the volume of Marlette Lake is approximately 11,500 acre-feet (Rush et al. 1972). However, drawdown is expected to begin when the water level is at a seasonal low of approximately 7,837 feet AMSL, at which point the volume of Marlette Lake would be approximately 10,000 acre-feet (Rush et al. 1972). Therefore, drawdown is expected to reduce lake volume by approximately 5,570 acre-feet because the reservoir volume at the target drawdown level (i.e., 7,820 feet AMSL) is approximately 4,250 acre-feet.

Based on lake bathymetry, it is expected that most habitat that would be temporarily lost as a result of drawdown would consist of shallow littoral areas—predominately occurring along the north, south and eastern shores of the lake—which generally provide richer food resources and more physically complex habitats that typically serve to mediate competition and predation. Habitat loss from reservoir drawdown would concentrate LCT in remaining waters, which would lead to an increased likelihood of avian predation, increased intra- and interspecific competition for resources and increased potential for the spread of disease. These stressors are reasonably certain to result in injury or mortality of some LCT.

Decreased water levels from reservoir drawdown would have the potential to cause a suite of water quality issues, including increased temperatures during the summer months, lowered dissolved oxygen, and increased turbidity. Warmer summer water temperatures could cause physiological stress, which may lead to diminished growth rates and could make fish more susceptible to disease. Decreased dissolved oxygen levels could impair LCT food conversion and swimming performance, which also could lead to decreased growth rates. Further, in extreme cases, such as during times when seasonally low dissolved oxygen concentrations are further reduced because of drawdown, widespread LCT mortality could occur. To reduce the potential for harm or mortality from decreased dissolved oxygen, NDOW may use temporary aeration. However, the use of temporary aeration may be impracticable because of access constraints due to lower water levels. Behavioral effects of increased turbidity on LCT could include avoidance of turbid waters resulting in increased energy expenditure and reduced foraging efficiency. Physiological effects may include increased plasma cortisol levels indicating stress and, in extreme cases, gill trauma (Berg and Northcote 1985; Redding et al. 1987). The exact number of LCT that would be harmed or killed as a result of decreased water quality resulting from reservoir drawdown cannot be determined because of the myriad variables involved. However, in a worst-case scenario, it is possible that all LCT that avoid capture and remain in Marlette Lake following drawdown could be killed.

4.2 Cumulative Effects

ESA Section 7 regulations require the federal action agency provide an analysis of cumulative effects, along with other information, when requesting initiation of formal consultation. Cumulative effects, as defined by the ESA, are those effects of future state or private activities that are reasonably certain to occur in the AA (50 CFR § 402.02). Future federal actions that are unrelated to the completed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA (16 United States Code § 1536).

Neither FEMA nor the Subapplicant are aware of any nonfederal projects proposed within the AA that could contribute to cumulative effects on the listed species considered in this BA. However, if any projects were to be implemented within the AA in the future, such projects would be subject to state environmental compliance and permits and would be required to implement Avoidance and Minimization Measures similar to those included in this BA to avoid or minimize impacts on sensitive biological resources. Therefore, the Proposed Action would have no significant cumulative effects on listed species when other potential future projects are considered.

SECTION 5. EFFECTS DETERMINATION

LCT occur within the AA and would be affected by the Proposed Action. Direct effects from the Proposed Action would consist of harm or mortality that may occur during fish capture and relocation. Indirect effects of the Proposed Action would include decreased habitat availability because of reservoir drawdown and diminished water quality due to erosion of disturbed soils, accidental chemical spills or leaks, and decreased water levels. Although these effects would be minimized to the maximum extent practicable with the implementation of the proposed BMPs and LCT-specific measures, it is reasonably certain that some LCT would be stressed, injured, or killed. In a worst-case scenario, it is possible that all LCT that avoid capture and remain in Marlette Lake following drawdown could be killed as a result of degraded water quality. Therefore, FEMA has determined that the Proposed Action **may affect and is likely to adversely affect** LCT and would result in take of the species.

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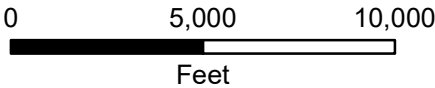
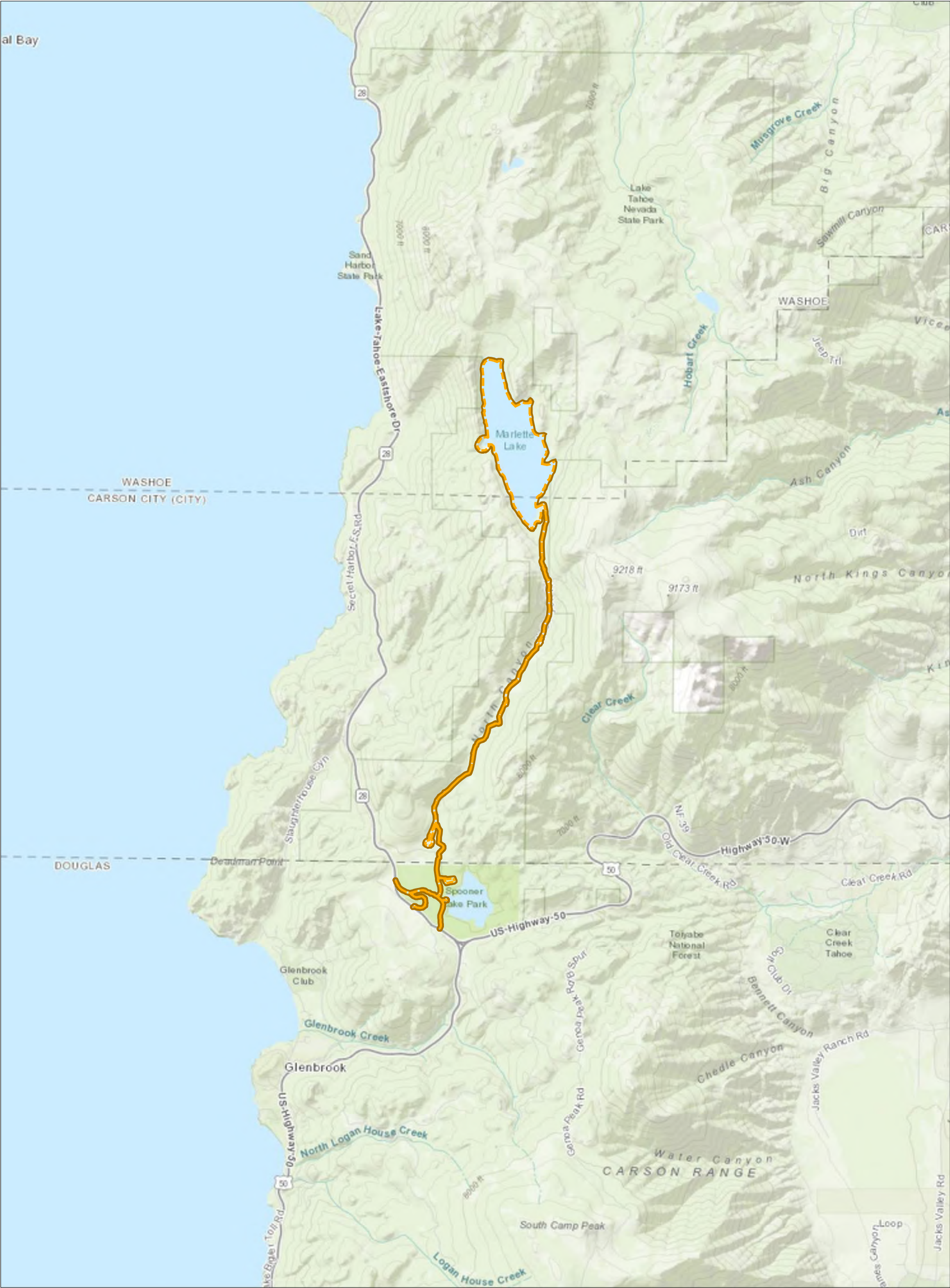
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SECTION 7. List of Preparers

Name, Organization	Education	Experience
Sam Bankston, CDM Smith	B.S., Aquatic Biology	Ten years of experience in wildlife and fisheries science, threatened and endangered species surveys, biological assessment, regulatory compliance and permitting

Appendix A: Figures



1 inch = 5,000 feet

Coordinate System: NAD 1983 HARN StatePlane Nevada West FIPS 2703 Feet
Projection: Transverse Mercator
Datum: North American 1983 HARN

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Legend
 Action Area

FIGURE 1
ACTION AREA
Proposed Action Vicinity
Marlette Lake Dam Resilient Infrastructure Project
PDPMC-PJ-09-NV-2018-001
Nevada State Public Works Division

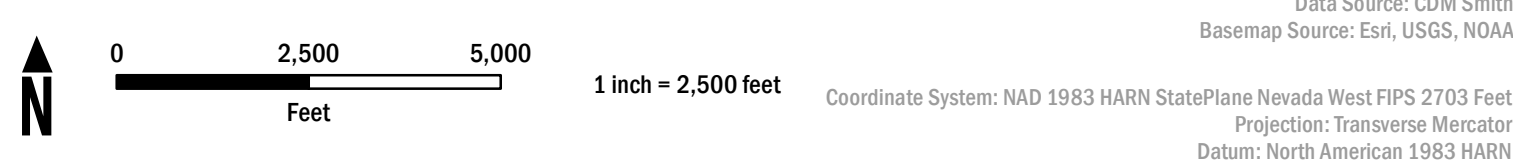
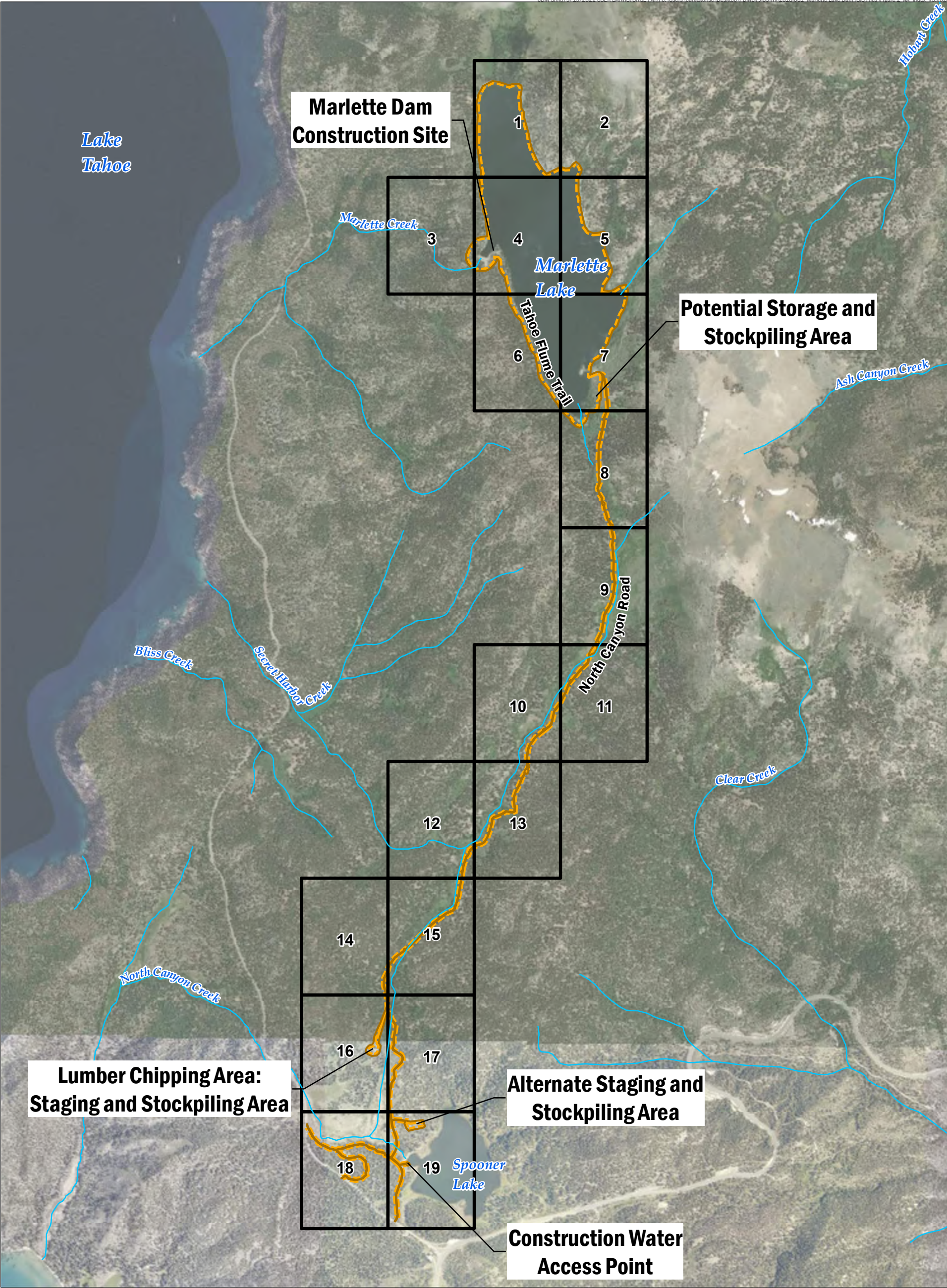
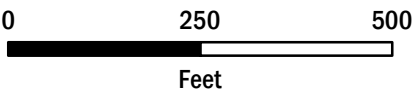
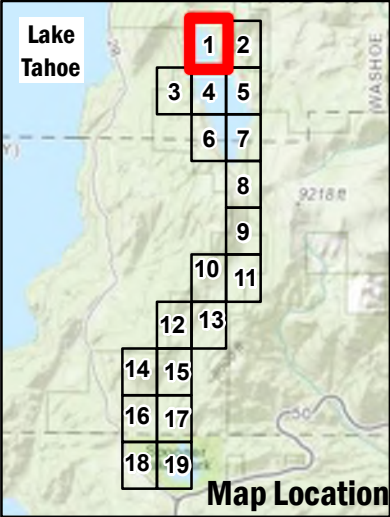


FIGURE 2
ACTION AREA

Index Sheet

Marlette Lake Dam Resilient Infrastructure Project
PDMP-PJ-09-NV-2018-001
Nevada State Public Works Division



1 inch = 250 feet

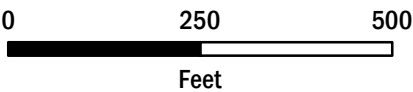
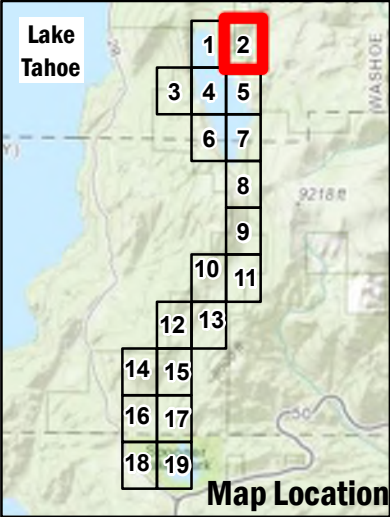
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-  Action Area
-  Stream

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Basemap Source: Esri, USGS, NOAA
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2
ACTION AREA

Sheet 1 of 19
Marlette Lake Dam Resilient Infrastructure Project
PDMC-PJ-09-NV-2018-001
Nevada State Public Works Division



1 inch = 250 feet

Legend

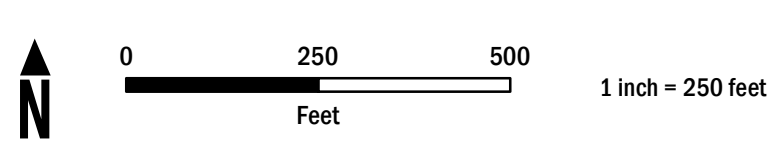
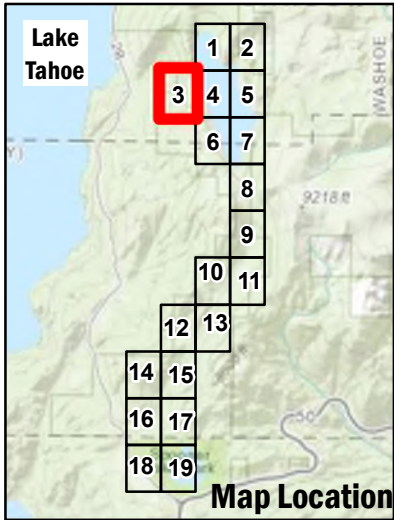
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Projection: Transverse Mercator
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FIGURE 2
ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
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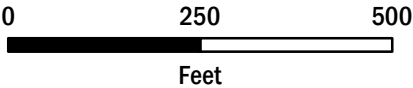
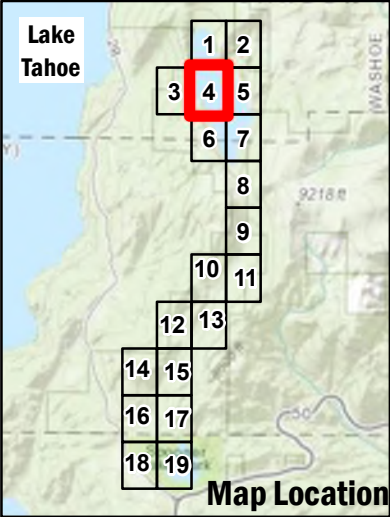
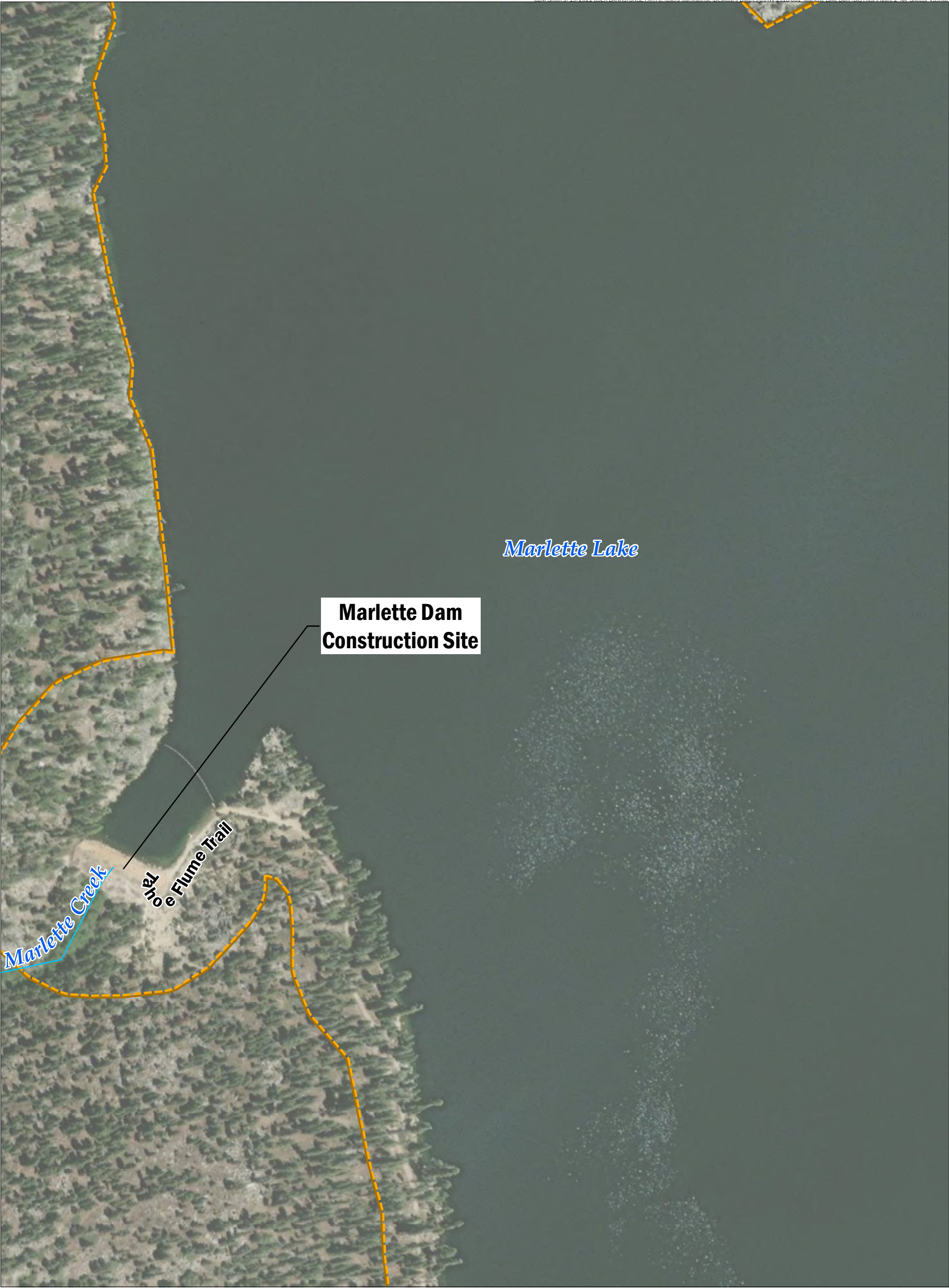


- Legend**
- Action Area
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2
ACTION AREA

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1 inch = 250 feet

Coordinate System: NAD 1983 HARN StatePlane Nevada West FIPS 2703 Feet
Projection: Transverse Mercator
Datum: North American 1983 HARN

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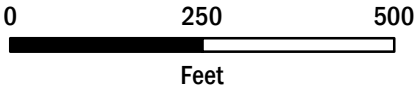
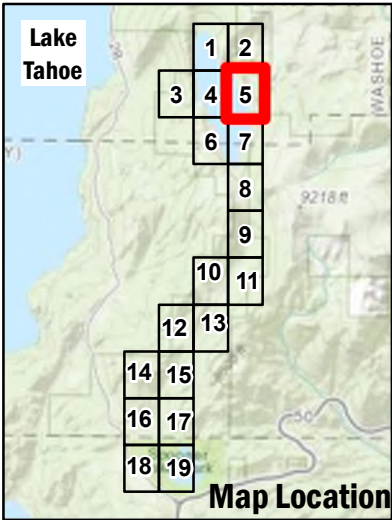
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- Action Area
- Stream

FIGURE 2
ACTION AREA

Sheet 4 of 19

Marlette Lake Dam Resilient Infrastructure Project
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1 inch = 250 feet

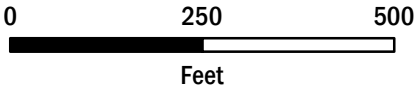
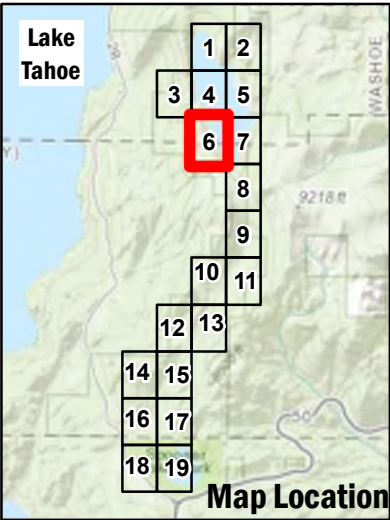
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-  Stream

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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2
ACTION AREA

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1 inch = 250 feet

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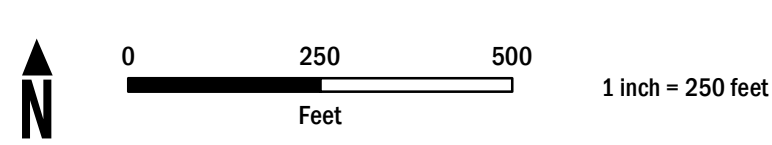
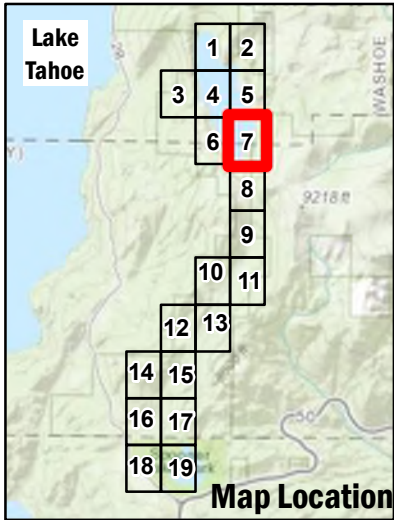
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-  Action Area
-  Stream

FIGURE 2
ACTION AREA

Sheet 6 of 19

Marlette Lake Dam Resilient Infrastructure Project
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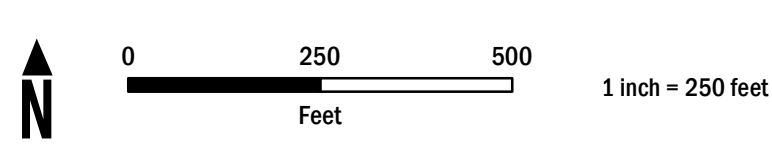
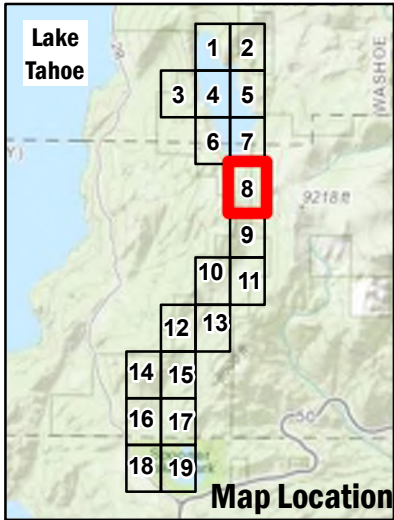
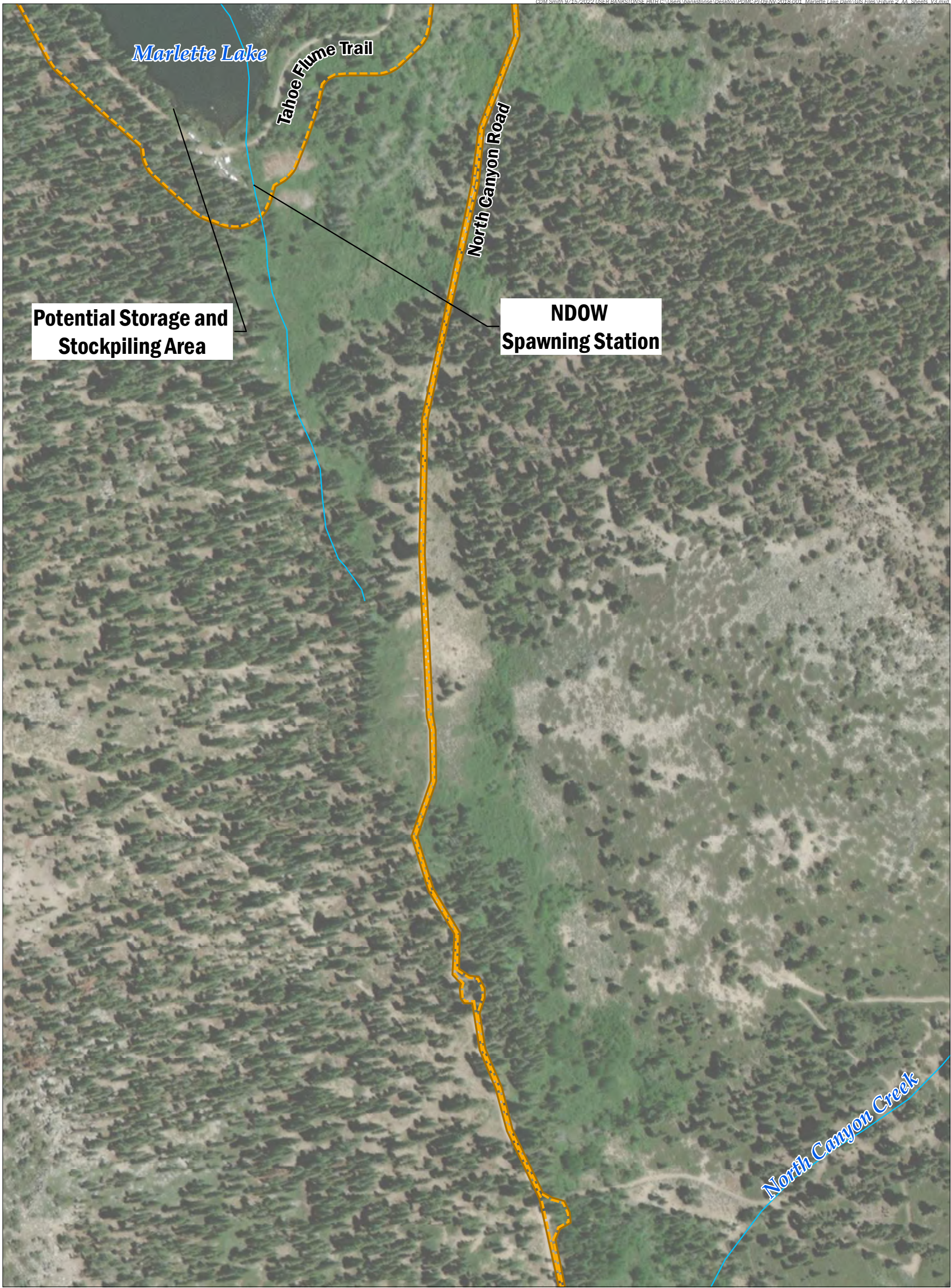


- Legend**
- Action Area
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2
ACTION AREA

Sheet 7 of 19
Marlette Lake Dam Resilient Infrastructure Project
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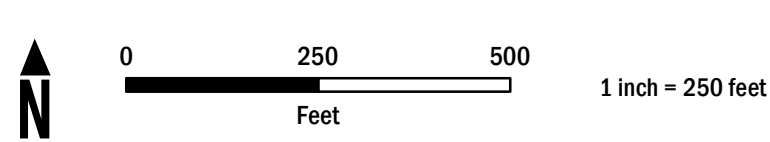
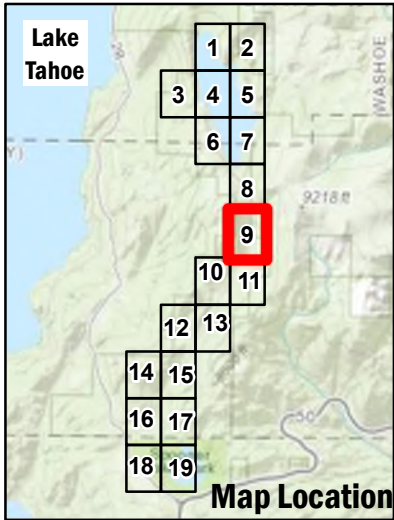
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- Action Area
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2 ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
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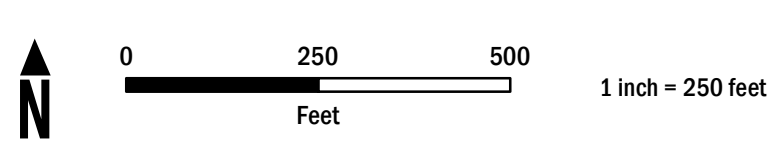
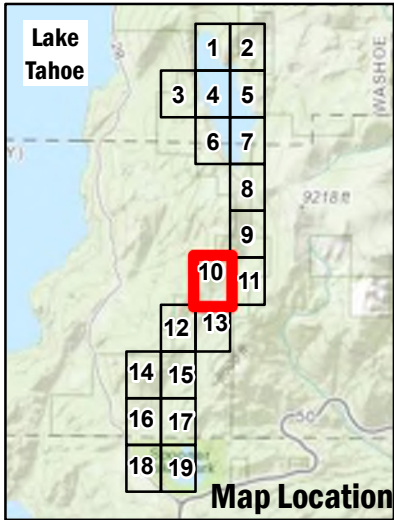
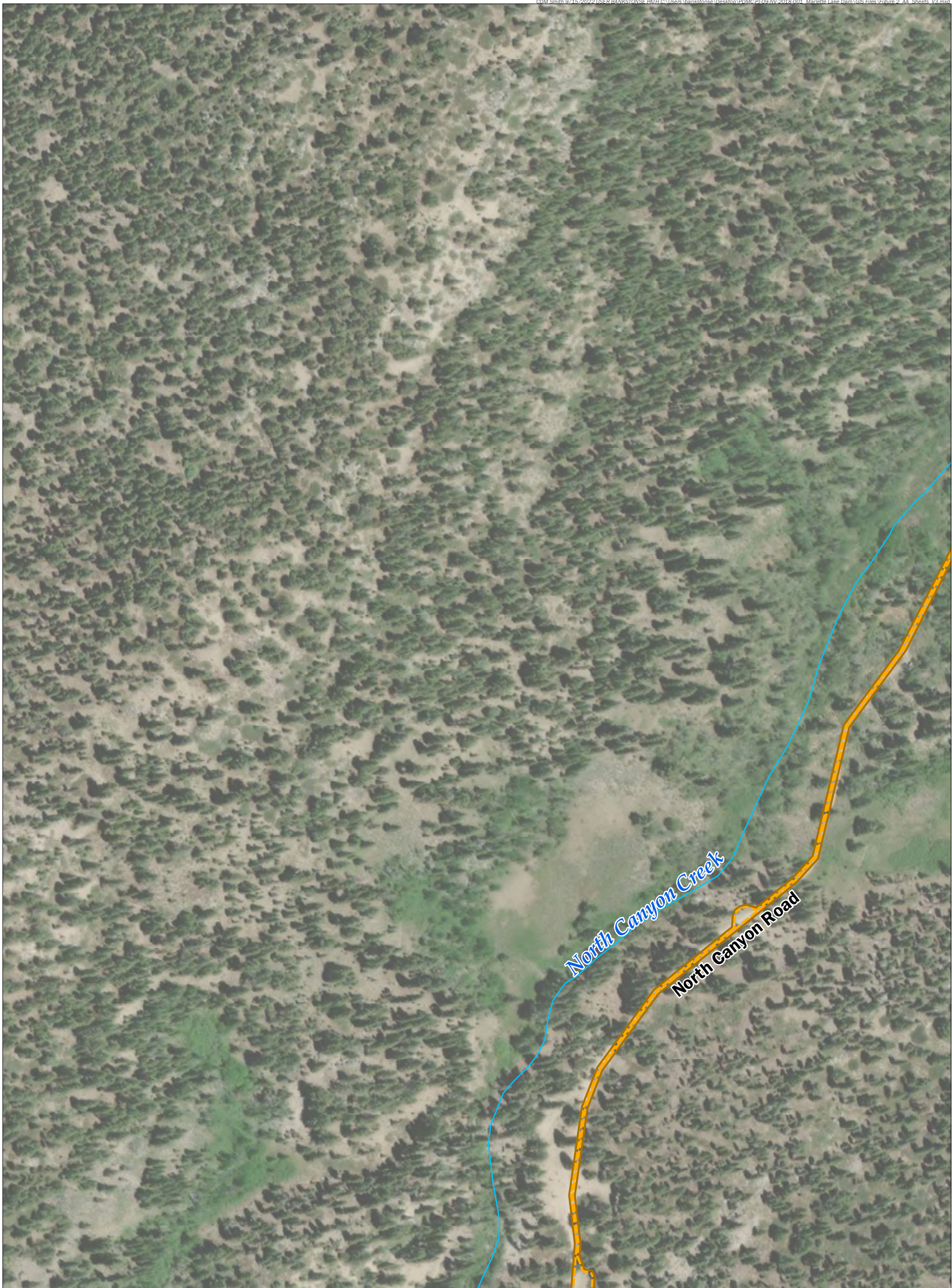


- Legend**
-  Action Area
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Coordinate System: NAD 1983 HARN StatePlane Nevada West FIPS 2703 Feet
Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2
ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
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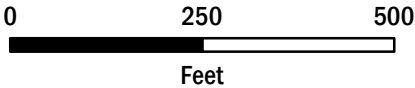
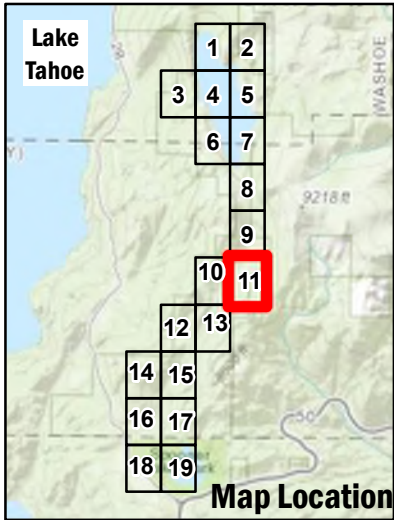
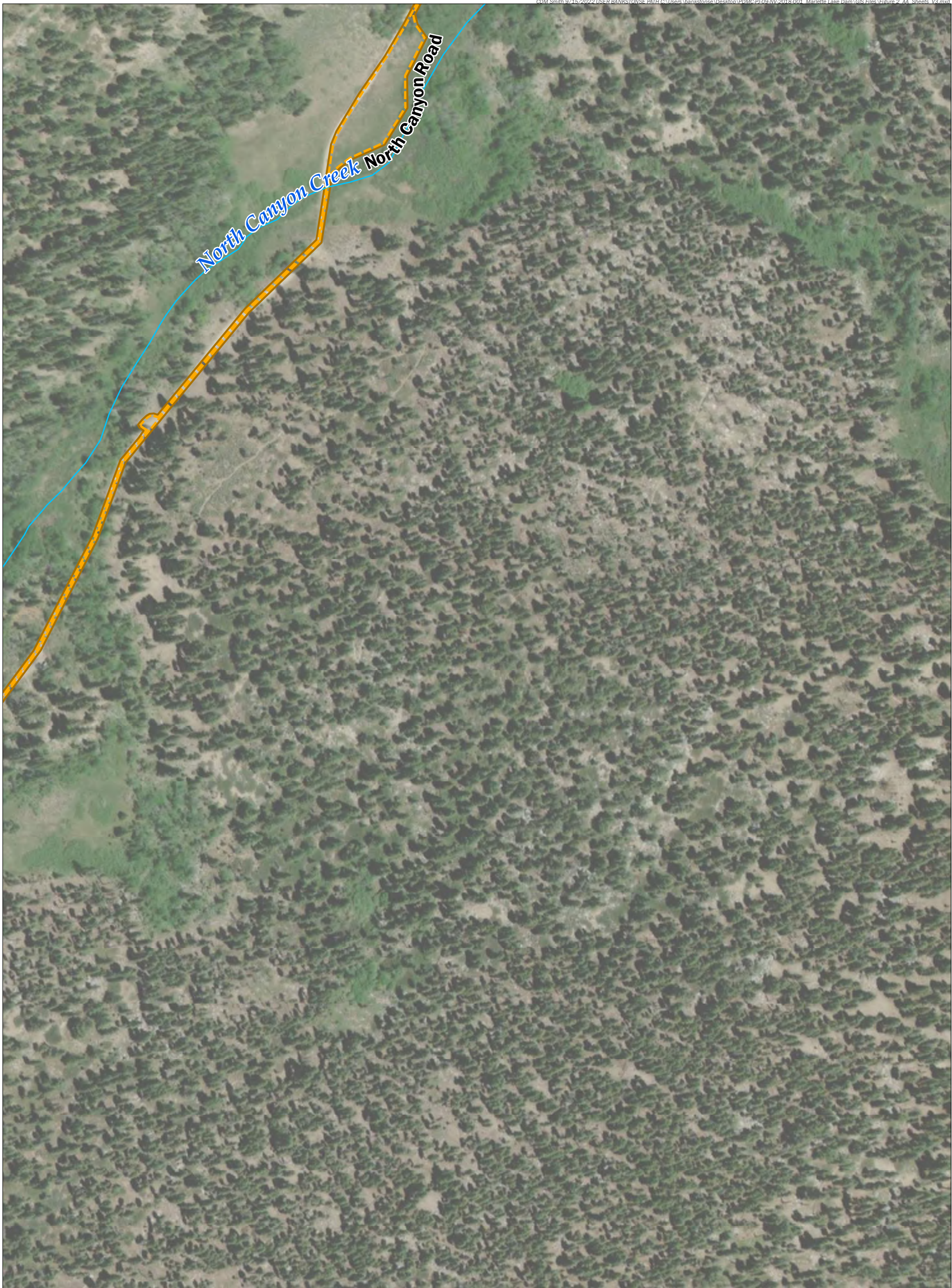
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2 ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
PDMC-PJ-09-NV-2018-001
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1 inch = 250 feet

Coordinate System: NAD 1983 HARN StatePlane Nevada West FIPS 2703 Feet
Projection: Transverse Mercator
Datum: North American 1983 HARN

Legend

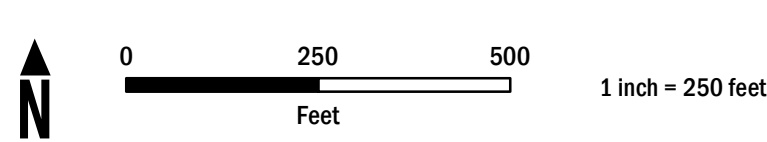
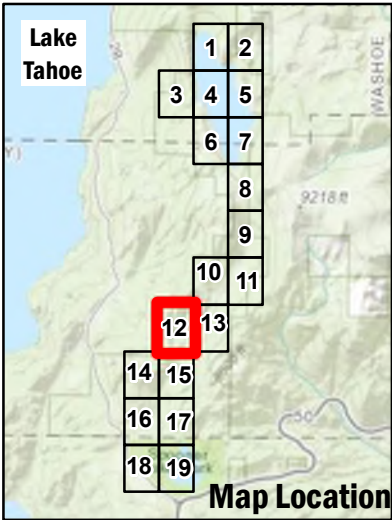
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-  Stream

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

FIGURE 2
ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
PDMC-PJ-09-NV-2018-001
Nevada State Public Works Division

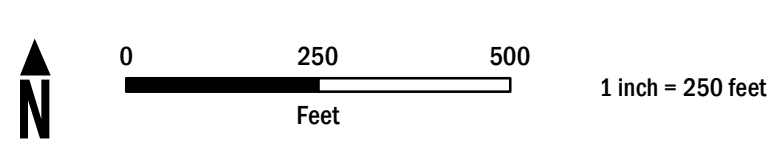
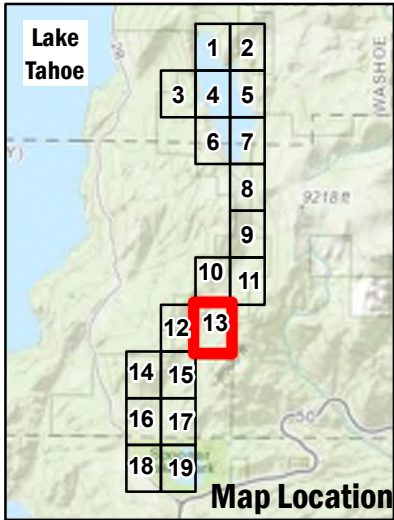
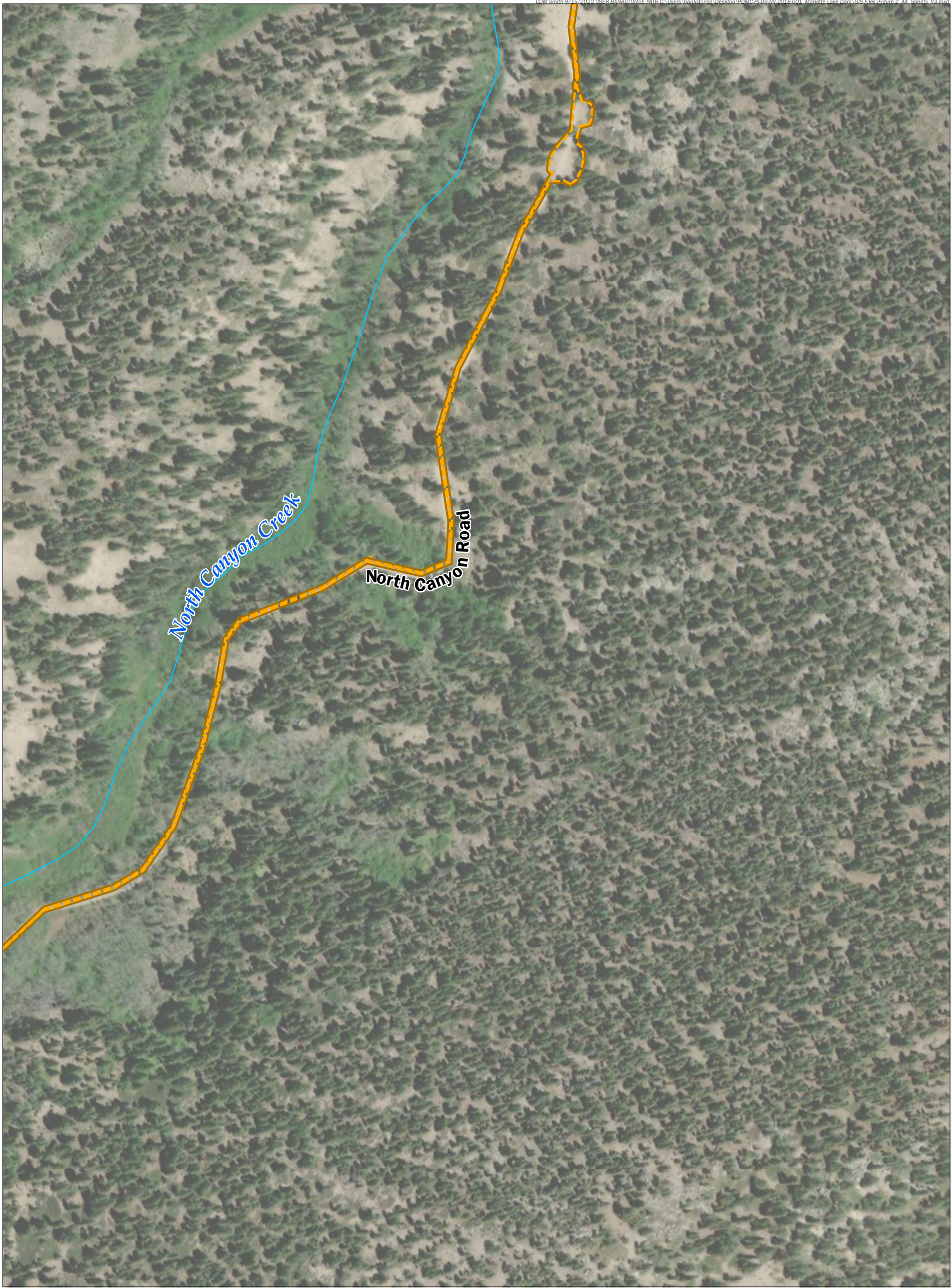


- Legend**
- Action Area
 - Stream

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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2
ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
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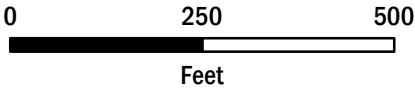
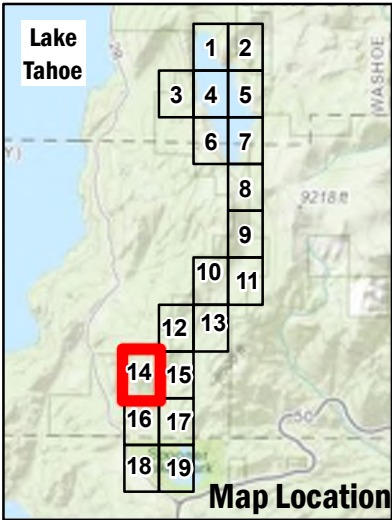
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2 ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
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1 inch = 250 feet

Coordinate System: NAD 1983 HARN StatePlane Nevada West FIPS 2703 Feet
Projection: Transverse Mercator
Datum: North American 1983 HARN

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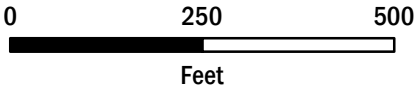
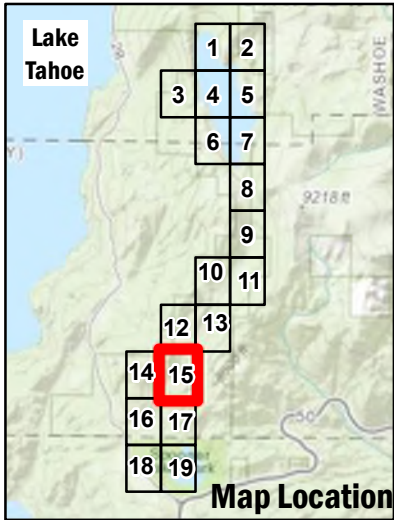
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-  Action Area
-  Stream

FIGURE 2
ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
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1 inch = 250 feet

Coordinate System: NAD 1983 HARN StatePlane Nevada West FIPS 2703 Feet
Projection: Transverse Mercator
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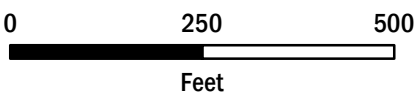
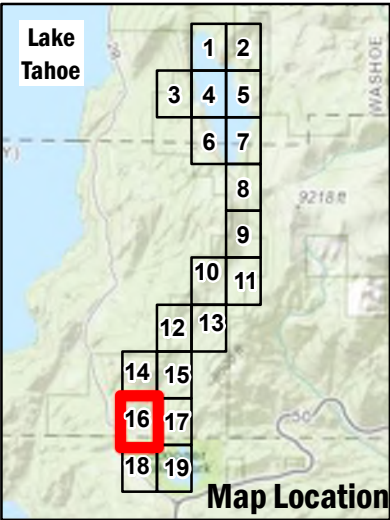
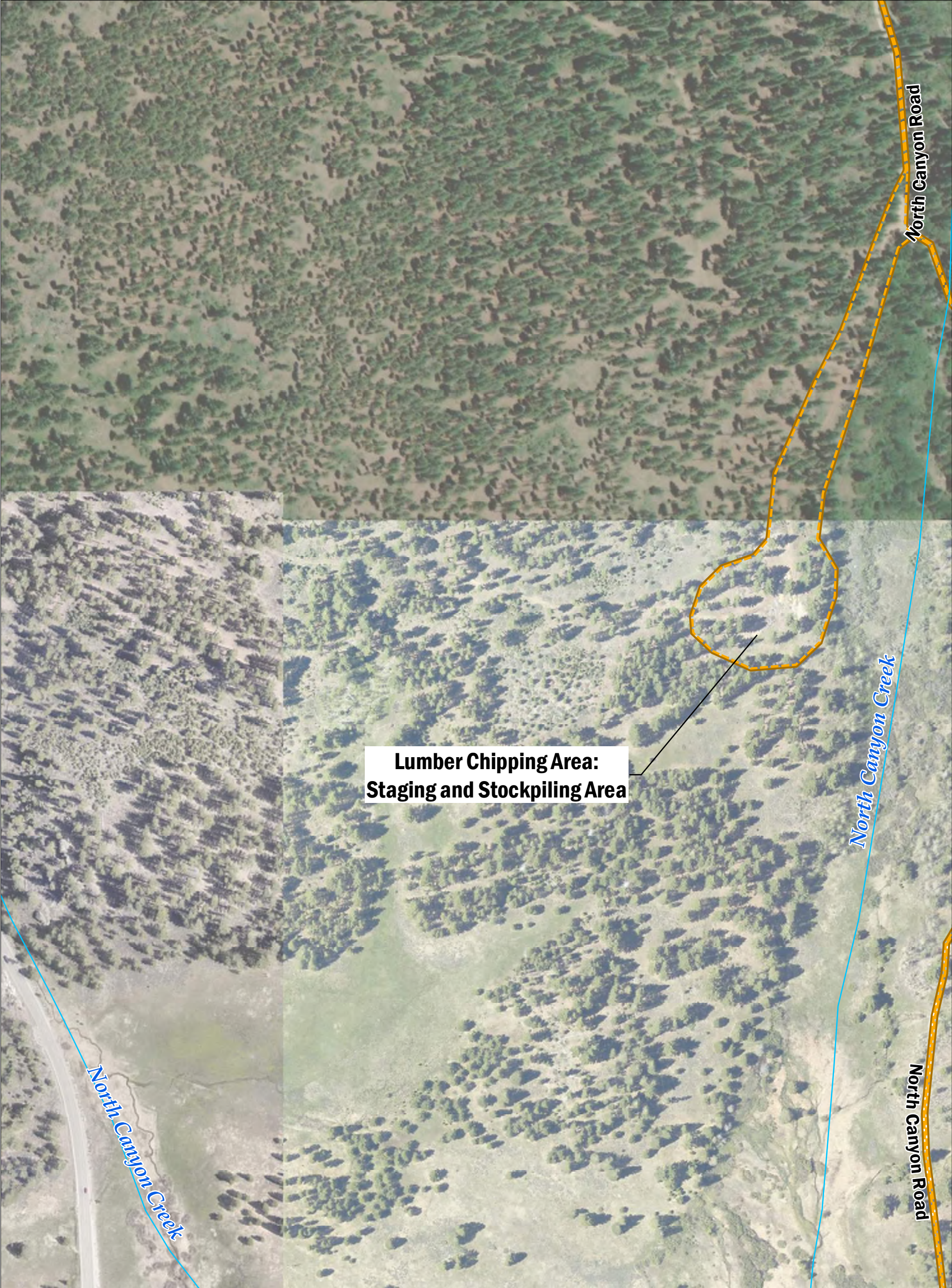
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-  Action Area
-  Stream

FIGURE 2
ACTION AREA

Sheet 15 of 19

Marlette Lake Dam Resilient Infrastructure Project
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1 inch = 250 feet

Legend

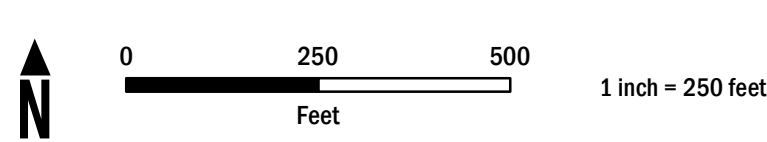
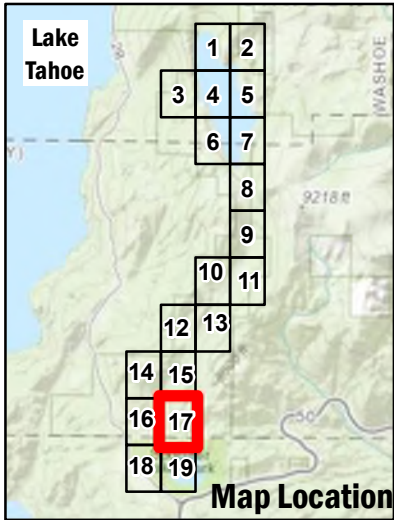
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Datum: North American 1983 HARN

**FIGURE 2
ACTION AREA**

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Marlette Lake Dam Resilient Infrastructure Project
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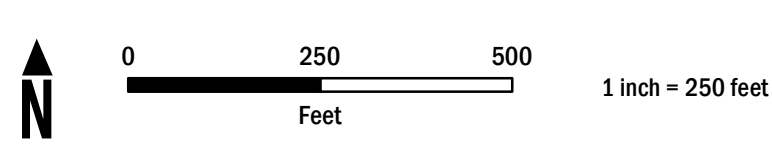
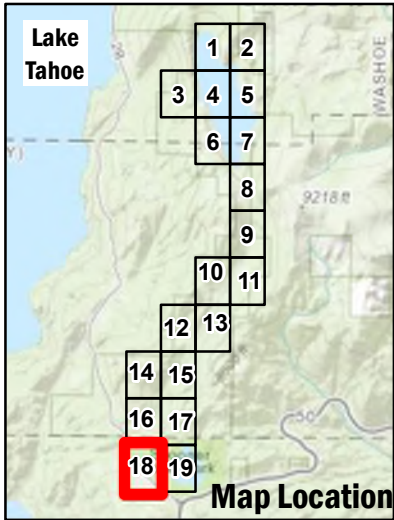
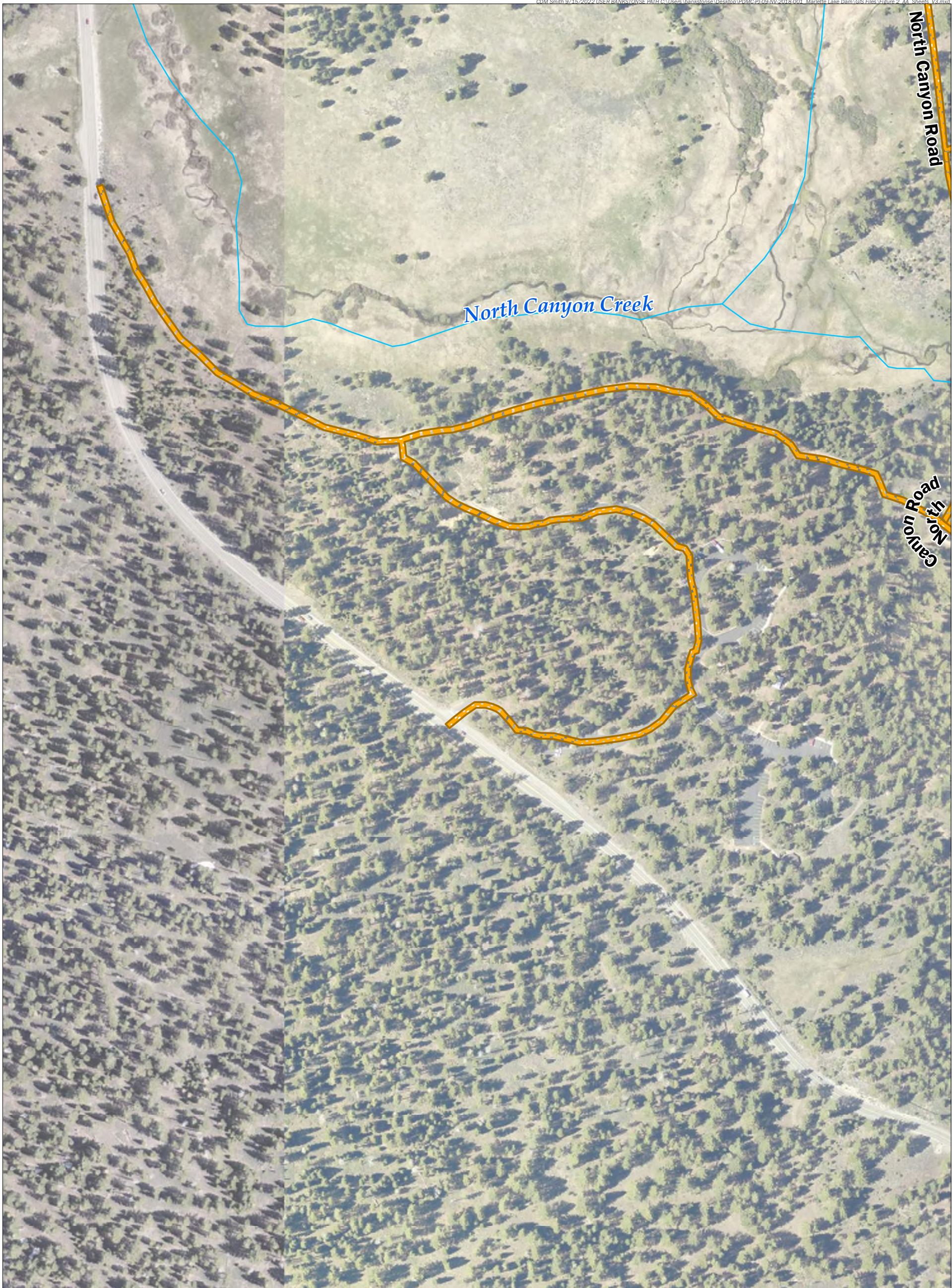
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Projection: Transverse Mercator
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FIGURE 2 ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
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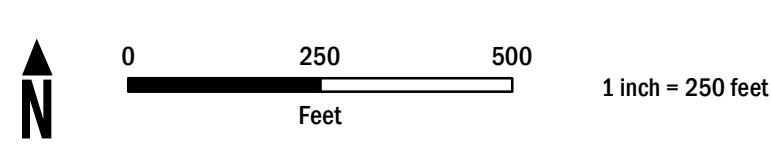
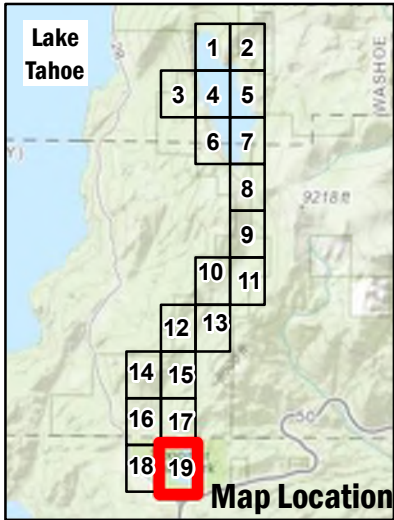
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2 ACTION AREA

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Marlette Lake Dam Resilient Infrastructure Project
PDMC-PJ-09-NV-2018-001
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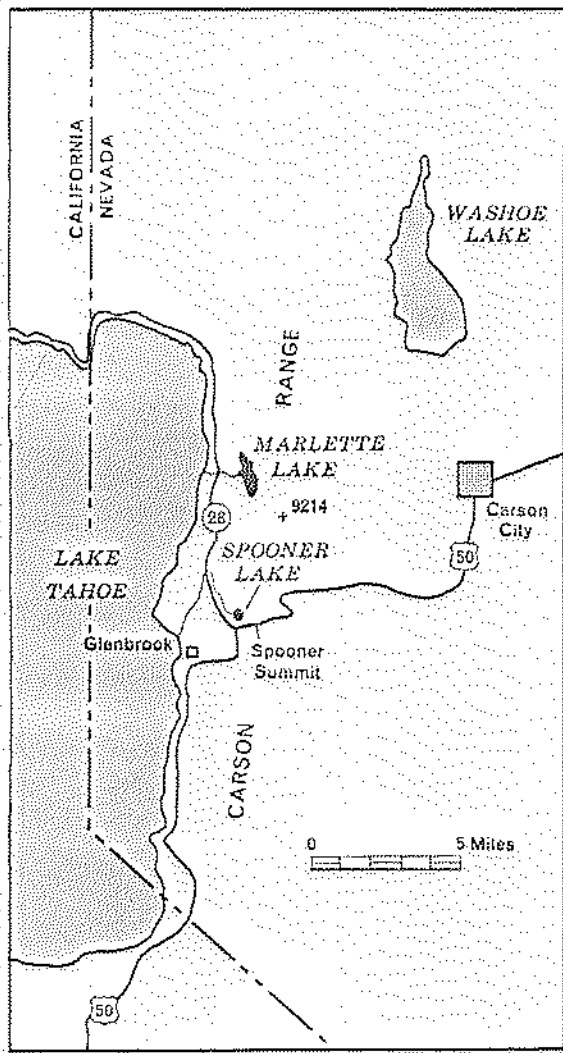
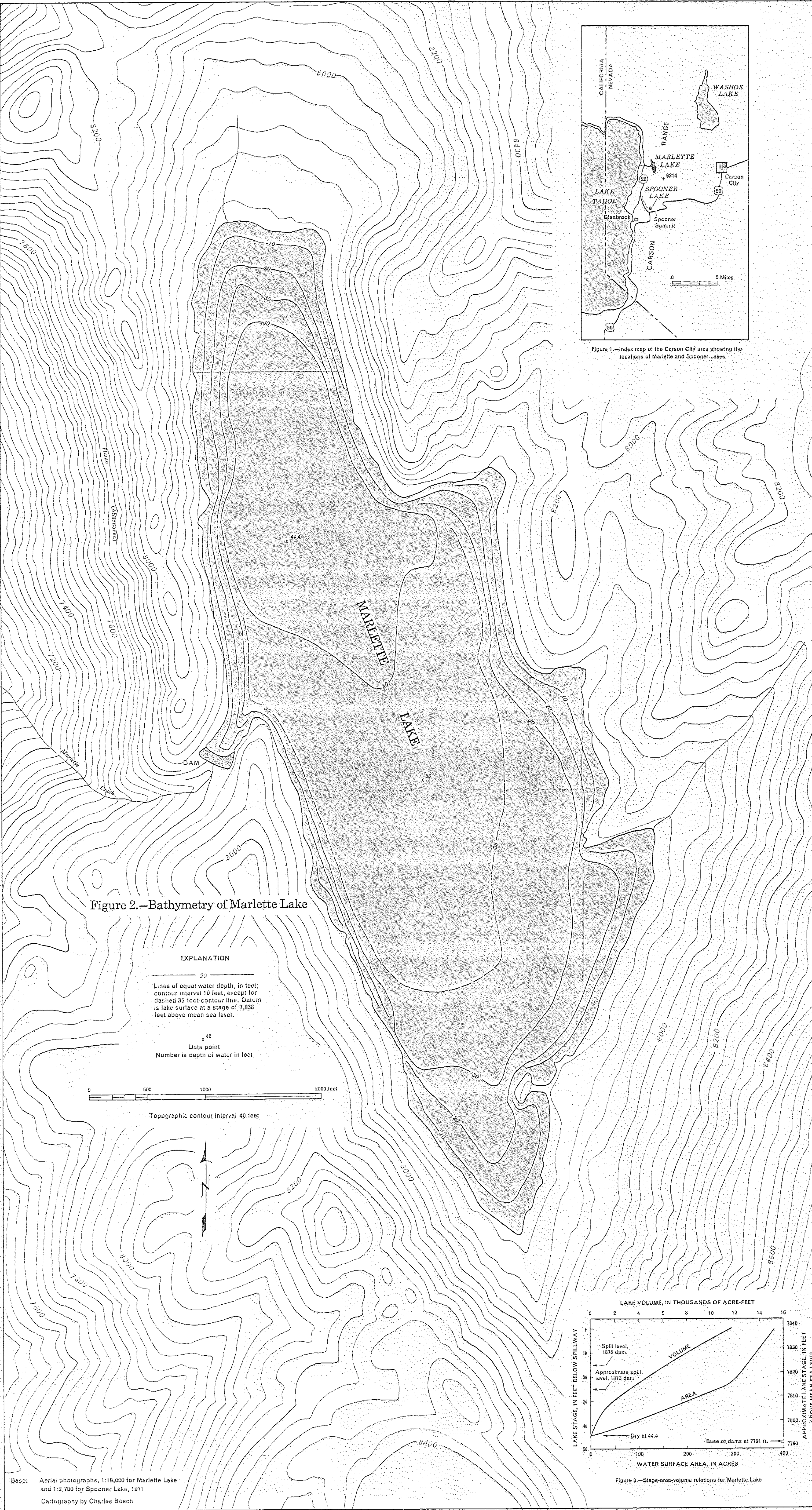


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- Action Area
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Projection: Transverse Mercator
Datum: North American 1983 HARN

FIGURE 2 ACTION AREA

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INTRODUCTION

Marlette and Spooner Lakes are between Carson City and Lake Tahoe (fig. 1) in the Carson Range of the Sierra Nevada. Marlette Lake is at an altitude of 7,838 feet and Spooner Lake, at about 6,980 feet. Marlette Lake is about 1,600 feet higher than Lake Tahoe and about 3,200 feet higher than Carson City. Both lakes drain to Lake Tahoe; Marlette Lake by way of Marlette Creek and Spooner Lake by way of North Canyon and Slaughterhouse Creeks. Marlette Lake is in a consolidated-rock depression (graben), probably containing little sediment. Spooner Lake is in an alpine meadow area, probably underlain by a veneer of alluvium. Both lakes are surrounded by pine-covered mountain ridges and peaks extending as high as 9,000 feet at Marlette Lake and 7,800 feet at Spooner Lake.

The principal source of water for the lakes is snowmelt in their small basins; the Marlette Lake basin has an area of 3.0 square miles and Spooner Lake basin, about 1.2 square miles. Precipitation at Marlette and Spooner Lakes averages about 27 inches per year, or an average annual total of each basin of about 4,500 acre-feet and 1,700 acre-feet, respectively. Of these amounts, an estimated 60 percent runs off to the lakes. The principal use of Marlette Lake in 1971 was as a source of cutthroat trout spawn for the Nevada Department of Fish and Game and is administered by that department. Most of the land adjoining Marlette and Spooner Lakes is within the Lake Tahoe Nevada State Park.

In 1873, according to Galloway (1947) and the Nevada Legislative Commission (1969), Duane L. Bliss and H. M. Yerington (Carson and Tahoe Lumber and Fluming Company) placed a 26-foot high dirt-fill and rock dam (Scott, 1957, p. 301) across the natural outlet from a small lake, then called Goodwin Lake but later named Marlette Lake. Water from the reservoir was conveyed southward to Spooner Summit (fig. 1), by a 6-mile-long V-flume, where it was used to flume lumber 12 miles to a lumber yard a mile south of Carson City. Most of the lumber was transported to the summit by a short railroad (Lake Tahoe Railroad) extending past what is now Spooner Lake to sawmills at Glenbrook on the nearby shore of Lake Tahoe.

In 1876, the Virginia and Gold Hill Water Co. received consent from Bliss and Yerington to draw water from Marlette Lake to be conveyed to the Virginia City area, 17 miles to the northeast. The dam was raised to a reported height of 37 feet, with a length of 213 feet. The top of this dam was at an altitude of 7,828 feet, according to Walter G. Reid, Virginia City (written commun., 1971). With a maximum lake stage of 7,823 feet above sea level, the estimated storage volume was 6,100 acre-feet, according to Galloway (1947) and 5,000 acre-feet according to Reid. The Virginia and Gold Hill Water Co. built a 14-inch by 30-inch flume northward along the west side of the crest of the Carson Range, a distance of 4.38 miles, to the west portal of a tunnel extending eastward through the crest of the Carson Range. The tunnel, 3,994 feet long, connected to another flume which conveyed the water eastward to an inverted siphon and again by flume to Virginia City.

In 1959, the dam at Marlette Lake was raised 15 feet to an altitude of 7,843 feet, bringing the high-water line to 7,838 feet and the storage volume to an estimated 10,400 acre-feet (Reid, written commun., 1971). The tunnel that conveyed water for Virginia City collapsed prior to 1963, preventing the usual movement of water from Marlette Lake to Virginia City and Carson City. In 1966, a diesel-operated pump was installed to pump water from Marlette Lake through a pipeline over the crest of the Carson Range to Red House diversion dam, near Hobart Reservoir, 2 miles northeast of Marlette Lake. Pumping has been infrequent.

Spooner Lake was created prior to 1927 by the construction of a small earthen dam across a narrow part of Spooner Meadow, situated near and due north of the intersection of U.S. Highway 50 and State Route 28, as shown in figure 4. The lake was built by Charles L. Fulstone to store irrigation water. In the past, the lake was called Fulstone Reservoir and Spooner Meadow Reservoir.

Altitudes of the dam and lake are based on the approximate altitude of a nearby feature, a large rock at the north end of the dam. The top of this rock has an altitude of about 6,990.7 ± 1.0 feet.

BATHYMETRY

A continuously recording, electronic fathometer was used to measure the depths of Marlette and Spooner Lakes, making a total of 19 traverses on Marlette Lake and 17 on Spooner Lake. The results of the survey are summarized in figures 2, 3, 4, and 5. The dimensions of Marlette Lake at high-water lines with 1873, 1876, and the 1959 dams are summarized in the following tabulation:

Spillway level, 1873 dam

Stage, approximate (feet)	7,813 ± 1
Area (acres)	270 ± 13
Volume (acre-feet)	3,400 ± 300
Maximum depth (feet)	19.4 ± 1

Spillway level, 1876 dam

Stage (feet)	7,823
Area (acres)	325
Volume (acre-feet)	6,400
Maximum depth (feet)	29.4

Spillway level, 1959 dam

Stage (feet)	7,838
Area (acres)	381
Volume (acre-feet)	11,800
Maximum depth (feet)	44.4

It can be seen from the data presented in this report that previous estimates of lake volume for the old and present dams were low with reference to the data resulting from this bathymetric survey.

The bottom of Marlette Lake, or that area below a depth of 35 feet, generally can be characterized as a very gently sloping plane. The plane, dipping to the northwest, may have been formed as a horizontal playalike surface that has been tilted by faulting along the western margin of the lake. The short time since faulting has limited the modification of the surface by sedimentation or erosion.

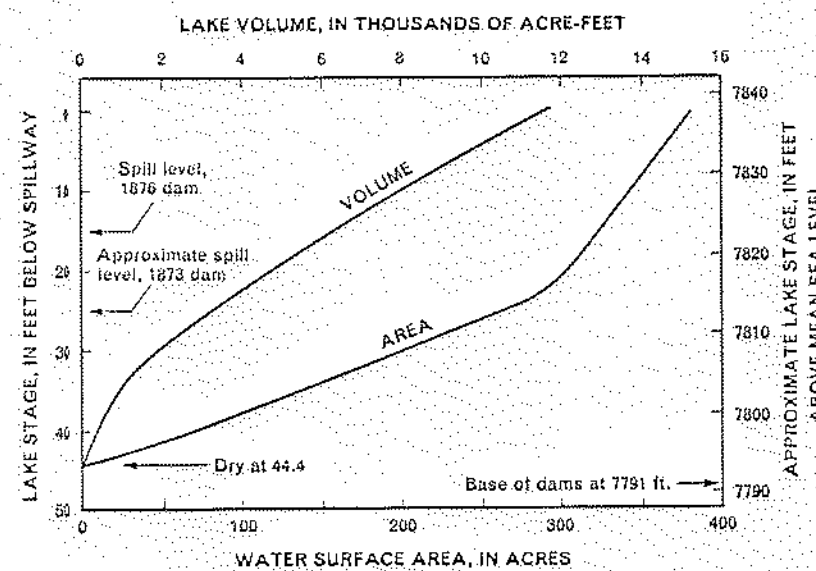


Figure 3.—Stage-area-volume relations for Marlette Lake

BATHYMETRIC RECONNAISSANCE OF MARLETTE AND SPOONER LAKES, WASHOE COUNTY AND CARSON CITY, NEVADA

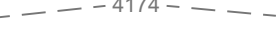
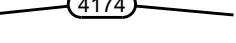
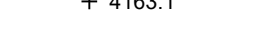
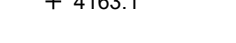
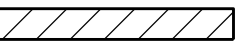
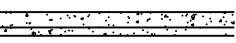
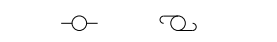
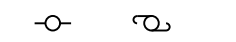
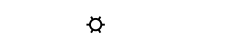
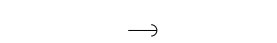
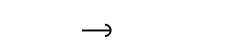
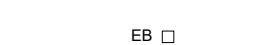
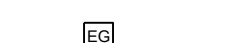
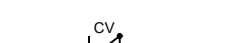
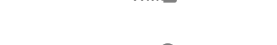
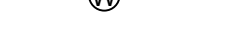
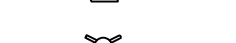
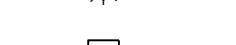
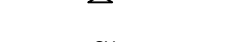
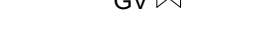
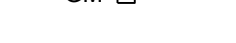
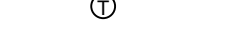
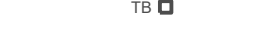
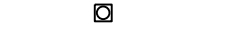
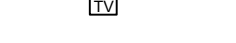
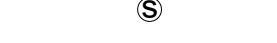
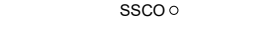
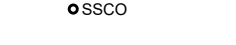
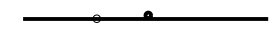
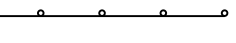
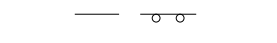
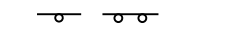
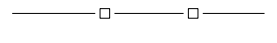
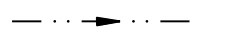
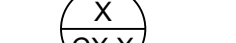
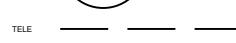
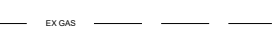
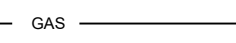
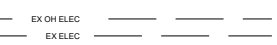
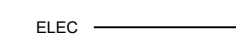
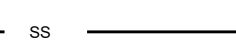
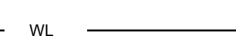
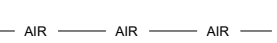
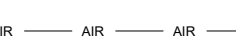
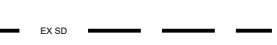
By
F. Eugene Rush, Bruce R. Scott,
Patrick A. Glancy, Terrance L. Katzer
and Edwin P. Ament
1972

FIGURE 3
MARLETTE LAKE BATHOMETRY
Marlette Lake Dam Resilient Infrastructure Project
PDMC-PJ-09-NV-2018-001
Nevada State Public Works Division

Appendix B:

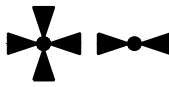
60% Design Drawings

L:\LAP\10217.000 - Marlette Lake Dam Rehabilitation\DWG\Sheets\10217000\MARLETTE LAKE DAM.dwg, NOTES, 12/07/2021 04:58 pm cstage

LEGEND	
EXISTING	PROPOSED
	
CONTOUR LINE	
	
GROUND ELEVATION	
	
TREE	
	
ROCK	
	
EDGE OF PAVEMENT	
	
AC PAVING TO BE REMOVED	
	
CURB & GUTTER	
	
CONCRETE	
	
UTILITY POLE	
	
LIGHT	
	
GUY WIRE	
	
ELECTRIC TRANSFORMER	
	
ELECTRIC VAULT	
	
ELECTRIC PANEL	
	
ELECTRIC CABINET	
	
ELECTRIC BOX	
	
ELECTRIC METER	
	
ELECTRIC GENERATOR	
	
ELECTRIC MANHOLE	
	
AIR CONDITIONER	
	
ELECTRIC OUTLET	
	
BOLLARD	
	
STORM DRAIN MANHOLE / DROP INLET	
	
CATCH BASIN	
	
WATER VALVE	
	
CHECK VALVE	
	
IRRIGATION CONTROL VALVE WATER	
	
METER	
	
WATER SPIGOT / HOSE BIB WATER	
	
MANHOLE	
	
WATER VAULT	
	
FIRE HYDRANT	
	
PUMP SYMBOL	
	
GAS VALVE	
	
GAS METER	
	
TELEPHONE MANHOLE	
	
TELEPHONE BOX	
	
TELEPHONE VAULT	
	
SEWER MANHOLE	
	
SEWER CLEANOUT	
	
SURVEY MONUMENT	
	
CONTROL POINT	
	
BARRICADE	
	
SIGN	
	
RETAINING WALL	
	
FENCE	
	
GRADE BREAK	
	
FLOW LINE	
	
SOIL TEST PIT	
	
DETAIL CALLOUT	
	
COMM LINE	
	
GAS LINE	
	
ELECTRIC LINE	
	
SEWER LINE	
	
WATER LINE	
	
AIR LINE	
	
STORM DRAIN	
	
RECLAIMED WATER LINE	



Know what's below.
Call before you dig.



FOUND SECTION CORNER AS NOTED

FOUND 5/8" REBAR AND CAP "PLS 14413" - UNLESS OTHERWISE NOTED SET 5/8" REBAR AND CAP "PLS 17616" - UNLESS OTHERWISE NOTED

ABBREVIATIONS

AC	ASPHALT CONCRETE
ACP	ASBESTOS CEMENT PIPE
AGG	AGGREGATE
BC	BEGIN CURVE (HORIZONTAL)
BOW	BOTTOM OF WALL
BF, BOF	BOTTOM OF FOOTING
BV	BUTTERFLY VALVE
BVC	BEGIN VERTICAL CURVE
BW	BACK OF WALK
CB	CATCH BASIN
cfs	CUBIC FEET PER SECOND
CF	CUBIC FEET
C&G	CURB AND GUTTER
℄	CENTER LINE
CL	CLASS / CENTER LINE
CMP	CORRUGATED METAL PIPE
COMP	COMPACTION
CONC	CONCRETE
CONTR	CONTRACTOR
CP	CONCRETE PAD
CTV	CABLE TELEVISION
DI	DROP INLET
DIA	DIAMETER
DWY	DRIVEWAY
E	EAST
EC	EACH
ELL	END CURVE (HORIZONTAL)
ELEC	ELBOW
ELEV	ELECTRICAL
EVC	ELEVATION
EX, (E)	END VERTICAL CURVE
EXT	EXISTING
EX	EXTERIOR
FE	FLANGE COUPLING ADAPTER
FA	FINISH ELEVATION
FES	FLARED END SECTION
FF	FINISH FLOOR
FFC	FRONT FACE OF CURB
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FLG	FLANGE
fps	FEET PER SECOND
FTG	FOOTING
G	GAS
GALV	GALVANIZED
GB	GRADE BREAK
GDW	GRAVEL DRIVEWAY
GD	GROUND
GV	GATE VALVE
H	HANDICAPPED
HGL	HYDRAULIC GRADE LINE
HORIZ	HORIZONTAL
HP	HIGH POINT
ID	INSIDE DIAMETER
INT	INVERT ELEVATION
INT	INTERSECTION
IRR	IRRIGATION
LAT	LATERAL
LF	LINEAR FEET
LP	LOW POINT
LT	LEFT
MAX	MAXIMUM
MDD	MAXIMUM DRY DENSITY
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
MMD	MAXIMUM MARSHALL DENSITY
MUTCD	MANUAL FOR TRAFFIC CONTROL DEVICES

N	NORTH
NAP	NOT A PART
NIP	NOT IN PROJECT
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD
(P)	PROPOSED
PCC	PORTLAND CEMENT CONCRETE
PG	PAD GRADE
PI	POINT OF INTERSECTION
PIVC	POINT OF INTERSECTION VERTICAL CURVE
PL	PROPERTY LINE
POCC	POINT OF COMPOUND CURVATURE
POT	POINT OF TANGENCY
PP	POWER POLE
PRC	POINT OF REVERSE CURVE
PRVC	POINT OF REVERSE VERTICAL CURVE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
Q 5	5 YEAR PEAK FLOW
Q 100	100 YEAR PEAK FLOW
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
REF	REFERENCE
RET	CURB RETURN
RP	RADIUS POINT
RT	RIGHT
R/W, ROW	RIGHT-OF-WAY
S=	SLOPE
S	SOUTH
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SL	STREET LIGHT
SS	SANITARY SEWER
SSCO	SANITARY SEWER CLEAN OUT
SSMH	SANITARY SEWER MANHOLE
SSPWC	STANDARD SPEC. FOR PUBLIC WORKS CONSTRUCTION
STA	STATION
SW	SIDEWALK
TELE	TELEPHONE
TBO	TEMPORARY BLOW OFF VALVE
TC	TOP OF CURB, TOP OF CONC
TG	TO GRADE
TGB	TOP OF BERM
TF, TOF	TOP OF FOOTING
TOW	TOP OF WALL
TS	TRAFFIC SIGNAL
TSCB	TRAFFIC CONTROL SIGNAL BOX
TR	TOP OF RAIL
TRANS	TRANSITION
TYP	TYPICAL
UG/P	UNDER GROUND POWER
UNO	UNLESS NOTED OTHERWISE
Vs	VELOCITY AT 5 YEAR PEAK
VC	VERTICAL CURVE
VEL	VELOCITY
VERT	VERTICAL
VG	VALLEY GUTTER
W	WEST
W/G	WATER AND GAS
WL	WATER LINE
WM	WATER METER
WS	WATER SURFACE
WV	WATER VALVE
WWF	WELDED WIRE FABRIC
YR	YEAR

GENERAL

- ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION.
- THE CONTRACTOR SHALL REFER TO THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, AS ADOPTED BY THE PERMITTING ENTITY, FOR ALL DETAILING NOT SHOWN ON THESE PLANS.
- CONSTRUCTION SHALL COMPLY WITH THESE PLANS AND CURRENT NDOT or CALTRANS STANDARD PLANS/SPECIFICATIONS (STANDARD SPECIFICATIONS) AND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ARRANGING A PRE-CONSTRUCTION JOB SITE CONFERENCE WITH GOVERNING AGENCIES, ALL UTILITY COMPANIES, OWNER'S REPRESENTATIVES, AND THE PROJECT ENGINEER PRIOR TO COMMENCING WORK. THIS MEETING SHALL BE HELD AT LEAST FORTY-EIGHT (48) HOURS, OR TWO (2) BUSINESS DAYS, PRIOR TO THE START OF CONSTRUCTION AND SHALL COMMUNICATE SCHEDULES, CONTRACTORS MEAN AND METHODS, MATERIALS TO BE USED, AND OTHER RELEVANT MATTERS ASSOCIATED WITH THE CONSTRUCTION OF THE PROJECT.
- ALL WORK EITHER DIRECTLY OR INDIRECTLY RELATED TO THE PROJECT SHALL BE COORDINATED WITH THE APPROPRIATE UTILITY SYSTEM MANAGER.
- THE CONTRACTOR SHALL MAINTAIN AN ONSITE RECORD COPY OF ALL DRAWINGS, SPECIFICATIONS, ADDENDA, CHANGE ORDERS, WORK CHANGE DIRECTIVES, FIELD ORDERS, FIELD CHANGES, AND WRITTEN INTERPRETATIONS AND CLARIFICATIONS. RECORDS SHALL BE IN GOOD ORDER AND ANNOTATED TO SHOW CHANGES MADE DURING CONSTRUCTION.
- CONTRACTOR SHALL PROVIDE MATERIALS AND EQUIPMENT SUBMITTALS AND/OR SHOP DRAWINGS TO THE PROJECT ENGINEER FOR REVIEW PRIOR TO ORDERING OR INSTALLATION. A SIGNED SET OF REVIEWED SUBMITTALS MUST ALWAYS BE AVAILABLE ONSITE DURING CONSTRUCTION.
- THE CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT AT 1-800-642-2444 TO PROVIDE FIELD LOCATIONS OF UNDERGROUND UTILITIES PRIOR TO THE START OF CONSTRUCTION.
- THE LOCATION OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE BASED ON THE BEST INFORMATION AVAILABLE TO THE ENGINEER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY PROPOSED POINTS OF CONNECTION AND IN AREAS OF POSSIBLE CONFLICT WITH NEW UTILITY INSTALLATION PRIOR TO BEGINNING CONSTRUCTION. SHOULD THE CONTRACTOR FIND ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT AND MAINTAIN ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THE PLAN.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO PROCURE ALL NECESSARY PERMITS, LICENSES, INSURANCE POLICIES, ETC. AS MAY BE NECESSARY TO COMPLY WITH LOCAL, COUNTY, STATE, AND FEDERAL LAWS ASSOCIATED WITH THE PERFORMANCE OF THE WORK; UNLESS OTHERWISE OBTAINED BY THE OWNER.
- THE CONTRACTOR SHALL PREPARE A TRAFFIC CONTROL PLAN AND PROVIDE, PLACE, AND MAINTAIN ALL LIGHTS, SIGNS, BARRICADES, FLAG PERSONS, PILOT CAR, OR OTHER DEVICES NECESSARY TO CONTROL TRAFFIC THROUGH THE CONSTRUCTION AREA AND FOR PUBLIC SAFETY. ALL TRAFFIC CONTROL OPERATIONS SHALL COMPLY WITH THE LATEST MUTCD. AT NO TIME WILL OBSTRUCTIONS BE LEFT IN THE ROADWAY DURING NIGHT HOURS. ALL TRAFFIC CONTROL PLANS SHALL BE PREPARED BY A REGISTERED CIVIL ENGINEER OR ATTS A CERTIFIED PERSONNEL.
- THE CONTRACTOR AGREES TO ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, AND FURTHER AGREES THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS IN ACCORDANCE WITH THE PROVISIONS OUTLINED BY THE PROJECT CONTROL AND THE STANDARD SPECIFICATIONS.
- THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA AND NRS CHAPTER 618.
- THE CONTRACTOR SHALL MAINTAIN THE WORK IN A CONTINUOUS AND DILIGENT MANNER, CONFORMING TO ALL THE PERTINENT SAFETY REGULATIONS TO ENSURE A TIMELY COMPLETION OF THE PROJECT.
- THE CONTRACTOR SHALL MAINTAIN A CLEAN PROJECT SITE, REMOVING CONSTRUCTION DEBRIS AT THE END OF EACH ACTIVITY DAY. THE CONTRACTOR SHALL MAINTAIN DEBRIS FREE CONSTRUCTION ROUTES, ADJACENT STREETS AND STORM DRAIN SYSTEMS.
- TEMPORARY CONSTRUCTION FENCING SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR THROUGHOUT THE DURATION OF THE PROJECT IN AREAS AS DELINEATED ON THE PLANS OR AS DIRECTED BY THE PROJECT ENGINEER. THE TEMPORARY FENCING SHALL PREVENT CHILDREN AND PETS FROM ENTERING THE CONSTRUCTION AREA, CREATE A VISUAL BARRIER OF THE CONSTRUCTION ACTIVITIES FROM THE ADJACENT RESIDENCE AND YARDS, AND PROTECT VEGETATION FROM CONSTRUCTION EQUIPMENT.
- THE CONTRACTOR SHALL USE ONLY AUTHORIZED SITES FOR STORAGE OF EQUIPMENT AND MATERIALS AND OBTAIN PROPER APPROVALS FROM THE LAND OWNER AND LOCAL GOVERNING AUTHORITY TO DO SO. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY OF ALL EQUIPMENT AND MATERIALS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SURVEY MONUMENTS AND OTHER SURVEY MARKERS DURING CONSTRUCTION. IN THE EVENT A MONUMENT IS DISTURBED, THE CONTRACTOR SHALL HAVE THE MONUMENT REPLACED, AT HIS OWN EXPENSE, BY A LICENSED SURVEYOR IN THE STATE OF THE PROJECT SITE.
- CONSTRUCTION HOURS SHALL BE WEEKDAYS BETWEEN 7:00 AM AND 6:00 PM UNLESS OTHERWISE DICTATED BY LOCAL ORDINANCE. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE PROJECT ENGINEER TO MODIFY WORK HOURS.
- ALL FIELD CHANGES MUST BE PRE-APPROVED BY THE PROJECT ENGINEER.
- SHOULD IT APPEAR THAT THE WORK TO BE DONE, OR ANY MATTER RELATIVE THERETO, IS NOT SUFFICIENTLY DETAILED OR EXPLAINED ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER FOR SUCH FURTHER EXPLANATIONS AS MAY BE NECESSARY.
- ALL SALVAGED MATERIALS ARE THE PROPERTY OF THE OWNER AND SHALL BE PALLETIZED ONSITE UNLESS OTHERWISE ARRANGED WITH THE OWNER AND/OR PROJECT ENGINEER.
- THE OWNER IS RESPONSIBLE FOR FURNISHING QUALIFIED SITE INSPECTIONS AS REQUIRED TO COMPLY WITH LOCAL ORDINANCES.
- A GEOTECHNICAL INVESTIGATION WAS PERFORMED ON THIS PROJECT. ALL RECOMMENDATIONS INCLUDED IN THE REPORT ARE HEREBY MADE A PART OF THE CONSTRUCTION DOCUMENTS UNLESS MODIFIED WITHIN THESE PLANS. INSPECTION AND TESTING DURING CONSTRUCTION SHALL BE REQUIRED IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED WITHIN THE REPORT.

TITLE: GEOTECHNICAL INVESTIGATION REPORT - MARLETTE LAKE REHAB
DATE: AUGUST 2021

UNDERGROUND UTILITIES

- THE CONTRACTOR SHALL FIELD VERIFY UTILITY LOCATIONS NEAR OR WITHIN THE CONSTRUCTION LIMITS WITH THE RESPECTIVE UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ARRANGE FOR THE NECESSARY RELOCATION OF ANY UTILITY. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES INVOLVED AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO BEGINNING WORK.
- NO OTHER UTILITIES MAY BE PLACED IN A WATER OR SEWER TRENCH.
- ALL VALVE BOXES, MANHOLE STRUCTURES, AND CLEAN OUTS SHALL BE MARKED AND ACCESSIBLE AT ALL TIMES.
- CONTRACTOR SHALL SUPPORT TRENCH SIDEWALLS IN ACCORDANCE WITH ALL

NOTES:

- APPLICABLE LAWS AND GOVERNING SAFETY REGULATIONS. SHEETING OR SHORING SHALL CONFORM TO LOCAL REGULATIONS AND OSHA STANDARDS.
- ENDS OF UNFINISHED PIPE SHALL BE SEALED AT THE END OF EACH DAY.
 - PIPE SHALL BE LAID IN THE UPHILL DIRECTION, WITH BELL ENDS UPHILL.
 - THE CONTRACTOR SHALL COORDINATE ALL WATER MAIN SHUT DOWNS AND TIE-INS WITH THE WATER UTILITY A MINIMUM OF FORTY-EIGHT (48) HOURS OR TWO (2) BUSINESS DAYS IN ADVANCE.
 - ALL UNDERGROUND VALVES, TEES, FITTINGS, ETC. LARGER THAN 2" SHALL BE COATED TO PROTECT AGAINST CORROSION.
 - ALL WATER PROJECT MATERIAL (PIPES, VALVES, LATERALS AND APPURTENANCES) SHALL BE LEAD FREE AND MEET THE MINIMUM REQUIREMENTS OF THE NEVADA ADMINISTRATIVE CODE AND NSF/ANSI 61.
 - ALL THRUST BLOCKS SHALL BE INSPECTED PRIOR TO BACK-FILL.
 - ALL BOLTS AT THRUST BLOCKS AND VALVE SADDLES SHALL BE COVERED WITH VISQUEEN AND TAPED PRIOR TO CONCRETE PLACEMENT.

GRADING, EXCAVATION & SURFACE IMPROVEMENTS

- THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING THEIR OWN QUANTITY TAKE-OFF AND SHALL BUDGET THE PROJECT AT AN APPROVED LOCATION. ALL EXCESS GRADING MATERIALS SHALL BE DISPOSED OF OFFSITE.
- ALL EARTHWORK ACTIVITIES SHALL BE IN ACCORDANCE WITH THE PROJECT'S GEOTECHNICAL REPORT.
- THE SOILS ENGINEER SHALL APPROVE ALL EARTHWORK AND GRADING TO CONFIRM COMPACTION REQUIREMENTS ARE MET.
- CONTRACTOR SHALL PROTECT EXISTING PAVING, CONCRETE, LANDSCAPING, FENCING, MAILBOXES, SIGNS AND ANY OTHER IMPROVEMENTS NOT SPECIFICALLY CALLED OUT FOR REPLACEMENT. CONTRACTOR SHALL REPAIR/REPLACE ANYTHING DAMAGED BY FORCES UNDER THEIR EMPLOY OR CONTRACT.

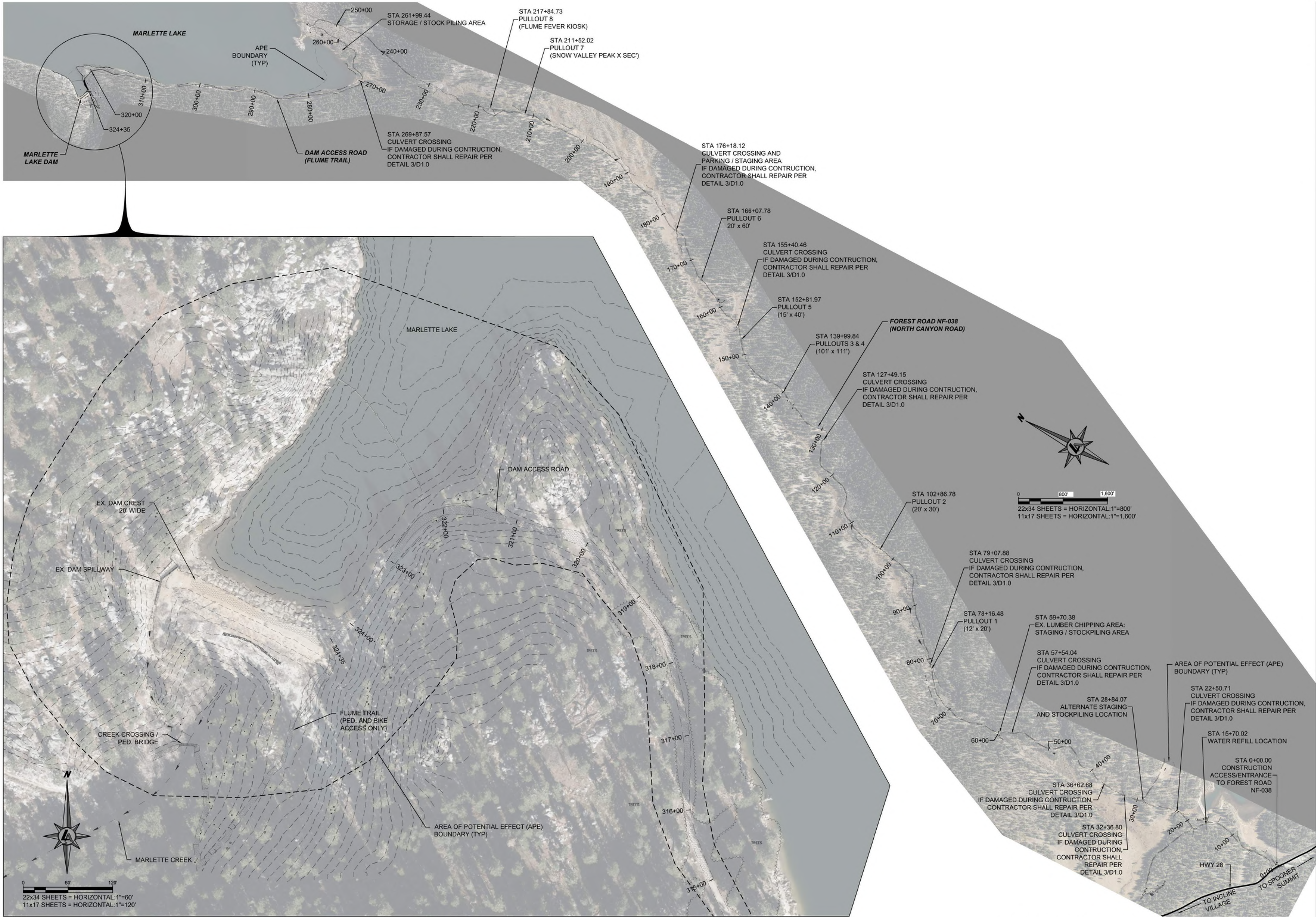
ENVIRONMENTAL

- ALL CONSTRUCTION SHALL BE PERFORMED IN COMPLIANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). CONTRACTOR IS RESPONSIBLE FOR ACQUIRING AND MAINTAINING A SWPPP.
- INSTALLATION AND MAINTENANCE OF EROSION CONTROL MEASURES ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREVENTION OF EROSION AND SILTATION FROM ENTERING THE STORM DRAIN SYSTEM, NATURAL DRAINAGE COURSES, AND/OR INTRUDING UPON ADJACENT ROADWAYS AND PROPERTIES. EROSION CONTROL MEASURES SHOWN ON THESE PLANS ARE INTENDED AS A GUIDE. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS DETERMINED IN THE FIELD. THIS RESPONSIBILITY SHALL APPLY THROUGHOUT THE COURSE OF CONSTRUCTION AND UNTIL ALL DISTURBED AREAS HAVE BECOME STABILIZED AND SHALL NOT BE LIMITED TO WET WEATHER PERIODS. THE CONTRACTOR IS RESPONSIBLE FOR SWPPP UPDATES.
- THE CONTRACTOR SHALL MAINTAIN AN ON-GOING DUST CONTROL PROGRAM INCLUDING WATERING OF OPEN AREAS, TO CONFORM WITH THE LATEST FEDERAL, STATE, AND COUNTY AIR POLLUTION REGULATIONS. CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND UPDATING DUST CONTROL PERMITS FOR THE PROJECT.
- ALL AREAS DISTURBED AND LEFT UNDEVELOPED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE STABILIZED BY THE APPLICATION OF AN APPROVED DUST PALLIATIVE OR HYDROMULCH.
- THE CONTRACTOR SHALL IDENTIFY A STANDBY CREW FOR EMERGENCY WORK AND THEY SHALL BE AVAILABLE AT ALL TIMES. MATERIAL NECESSARY TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES OR TO REPAIR DAMAGED EROSION CONTROL MEASURES SHALL BE AVAILABLE ON-SITE AND STOCKPILED AT APPROVED LOCATIONS.
- PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS SHALL BE USED TO PROTECT ADJOINING PROPERTIES DURING CONSTRUCTION OF IMPROVEMENTS.
- AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM CHECK BERMS AND DESILTING FACILITIES. GRADED SLOPE SURFACE PROTECTION MEASURES DAMAGED DURING THE RAINSTORM SHALL ALSO BE REPAIRED.
- FILL SLOPES AT THE PROJECT PERIMETER MUST DRAIN AWAY FROM THE TOP OF THE SLOPE AT THE END OF EACH WORKING DAY.
- ALL DISTURBED AREAS ARE REQUIRED TO HAVE A PALLIATIVE APPLIED FOR DUST CONTROL. ALL GRADING SHALL COMPLY WITH STATE AND COUNTY REGULATIONS.
- ALL AREAS DISTURBED BECAUSE OF THE WORK SHALL BE REVEGETATED IN ACCORDANCE WITH INDUSTRY BEST MANAGEMENT PRACTICES AND TRPA APPROVED NATIVE SEED MIX.
- NO CONSTRUCTION MATERIALS SHALL BE STORED IN A STREAM ENVIRONMENT ZONES (SEZ) AT ANY TIME.
- IF GROUNDWATER IS ENCOUNTERED, THE CONTRACTOR SHALL STOP WORK IMMEDIATELY, PREPARE A DEWATERING PLAN, AND OBTAIN APPROVAL FROM THE PROJECT ENGINEER BEFORE PROCEEDING WITH WORK. DEWATERING ACTIVITIES MAY REQUIRE THE CONTRACTOR TO OBTAIN A DISCHARGE/PUMPING PERMIT FROM THE STATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN SUCH PERMITS.



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MARLETTE LAKE DAM CONSTRUCTION SITE

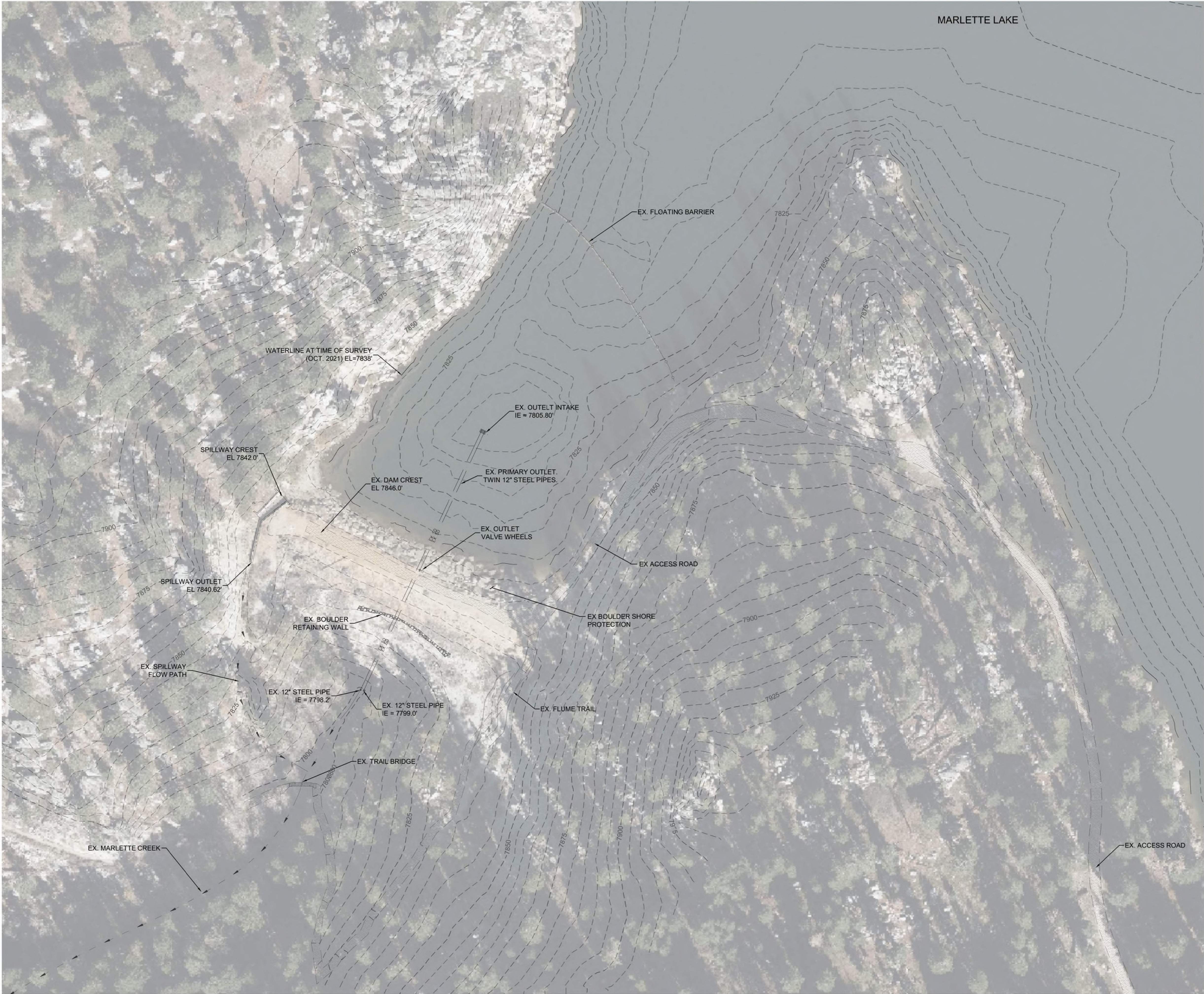
CONSTRUCTION ACCESS PLAN

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22x34 SHEETS = HORIZONTAL:1"=40'
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NEVADA STATE PUBLIC WORKS
MARLETTE LAKE DAM
REHABILITATION
EXISTING CONDITIONS SITE PLAN
NV
COUNTY
WASHOE

REV	DATE	DESCRIPTION	BY

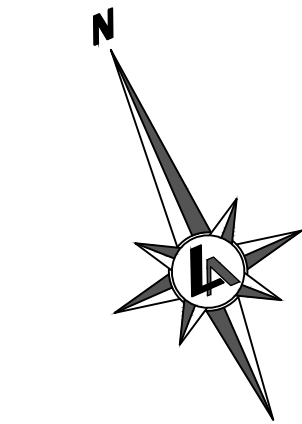
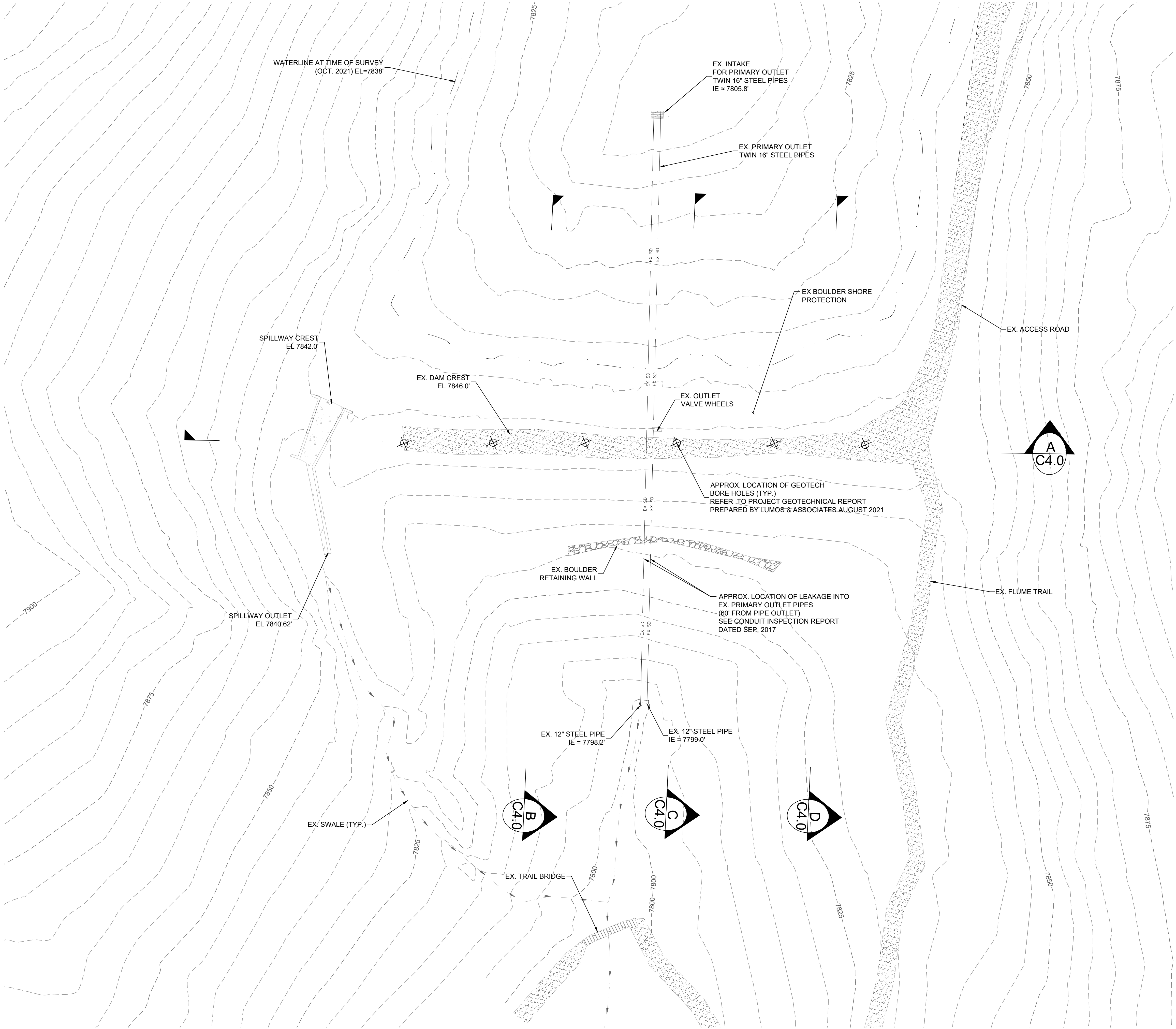
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0 20' 40'
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NEVADA STATE PUBLIC WORKS

MARIETTE LAKE DAM
REHABILITATION
EXISTING CONDITIONS DAM SITE PLAN

NV

COUNTY

WASHOE

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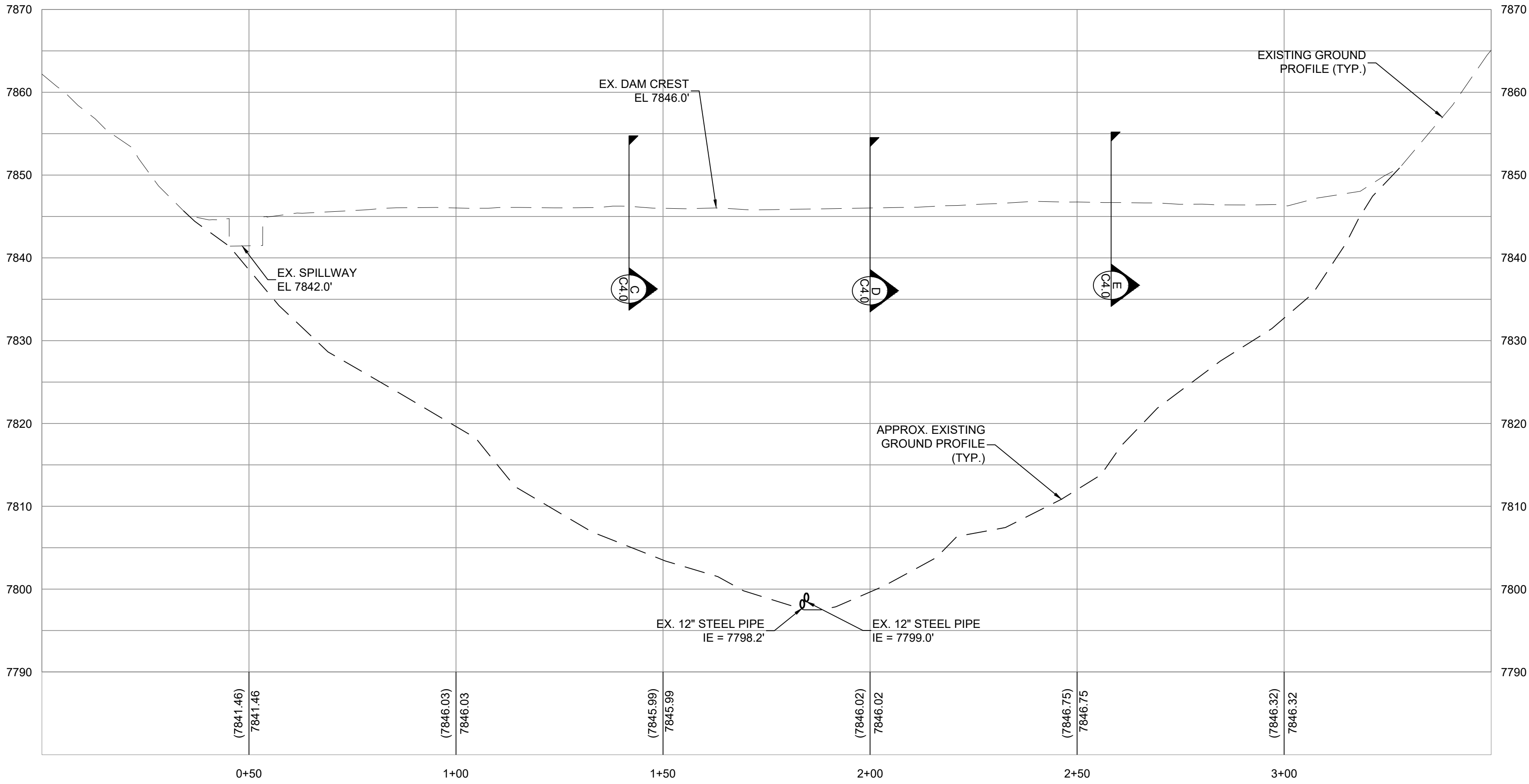
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Section A - C4.0

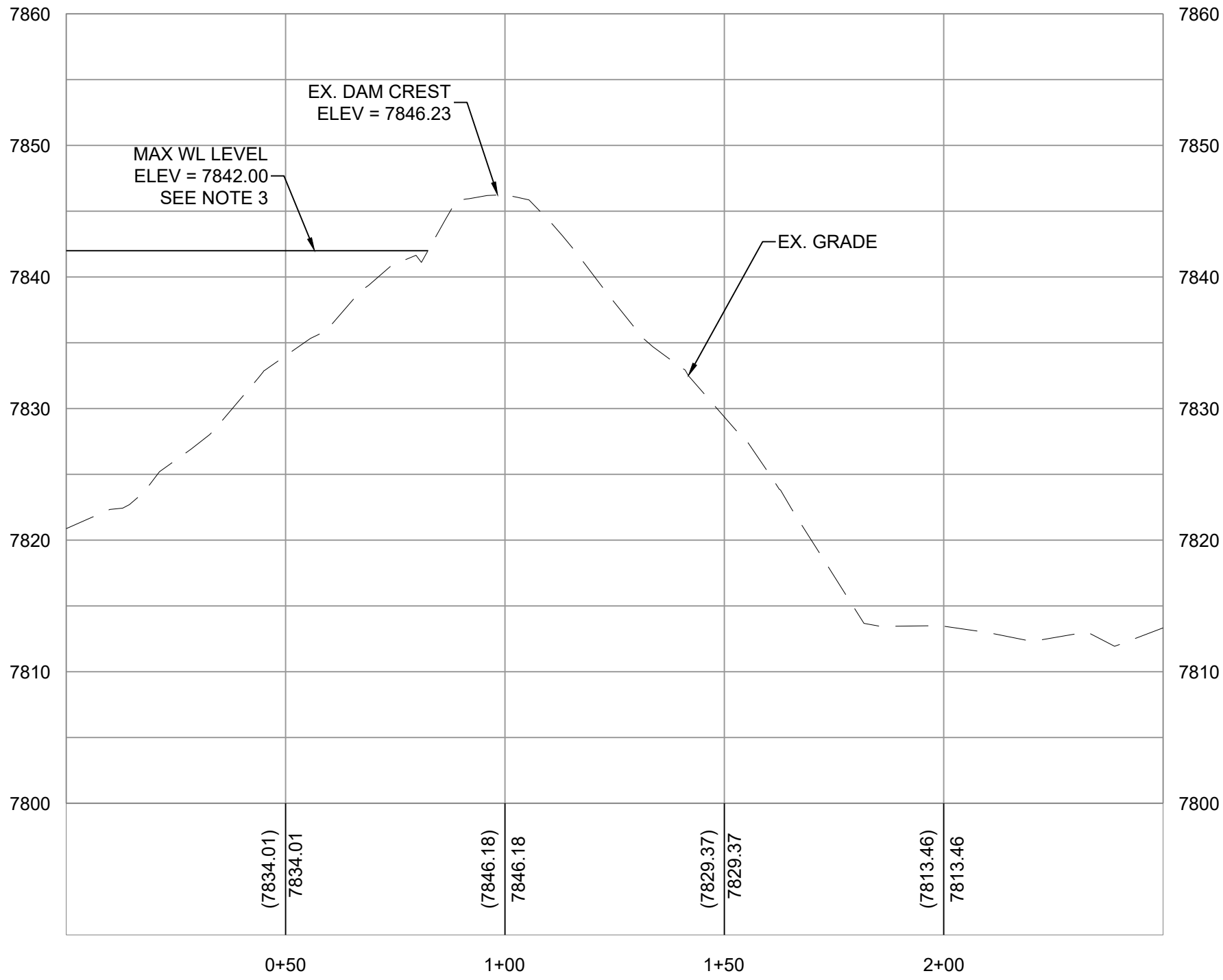


PROFILE SHEET NOTES:

1. ELEVATION OF LAKE BOTTOM = 7798.00'.
2. MINIMUM WATER LEVEL = 7820.00' (20' ABOVE ELEVATION OF LAKE BOTTOM WITH 2' SAFETY FACTOR).
3. MAXIMUM WATER LEVEL = SPILLWAY CREST ELEVATION = 7842.00'
4. NORMAL LOW WATER LEVEL 3 FEET BELOW SPILLWAY ELEVATION.

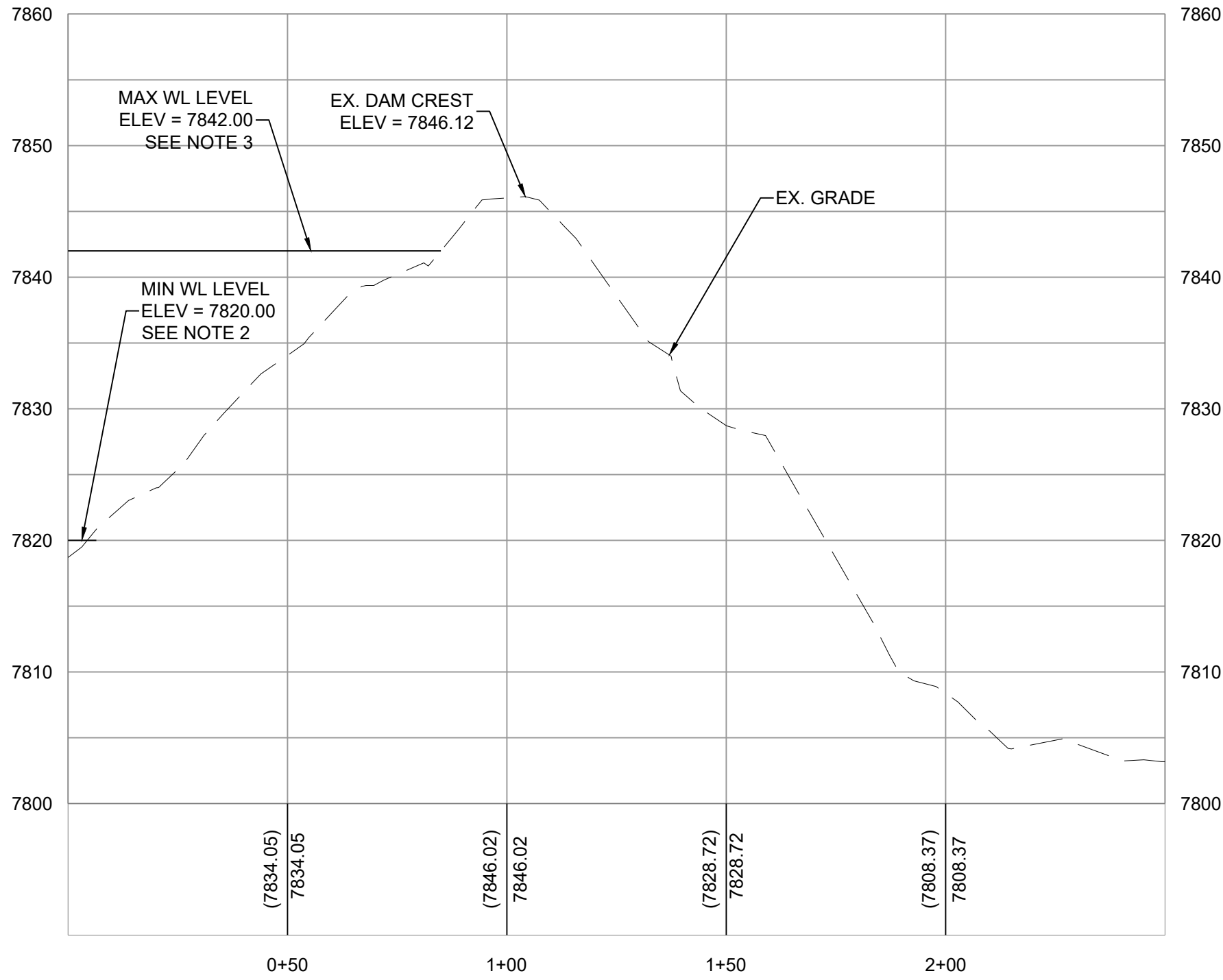
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Section B - C4.0



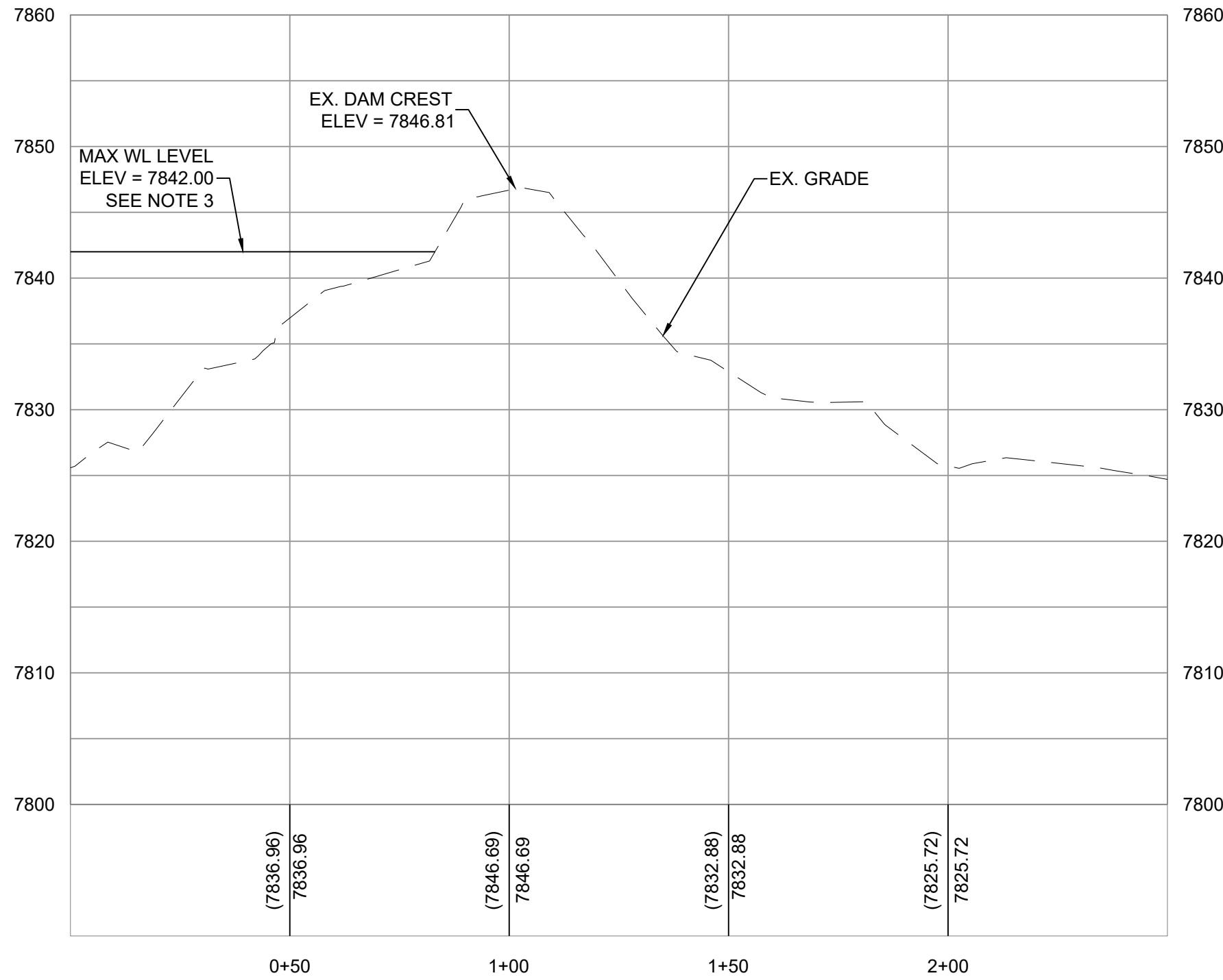
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Section C - C4.0



0 30' 60'
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22x34 SHEETS = VERTICAL:1"=10'
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Section D - C4.0



0 30' 60'
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11x17 SHEETS = VERTICAL:1"=20'



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NEVADA STATE PUBLIC WORKS

MARLETTE LAKE DAM
REHABILITATION
EXISTING CONDITIONS DAM SECTIONS

NV

COUNTY

WASHOE

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NEVADA STATE PUBLIC WORKS

MARLETTE LAKE DAM
REHABILITATION
EXISTING BATHYMETRIC CONDITIONS

NV

COUNTY

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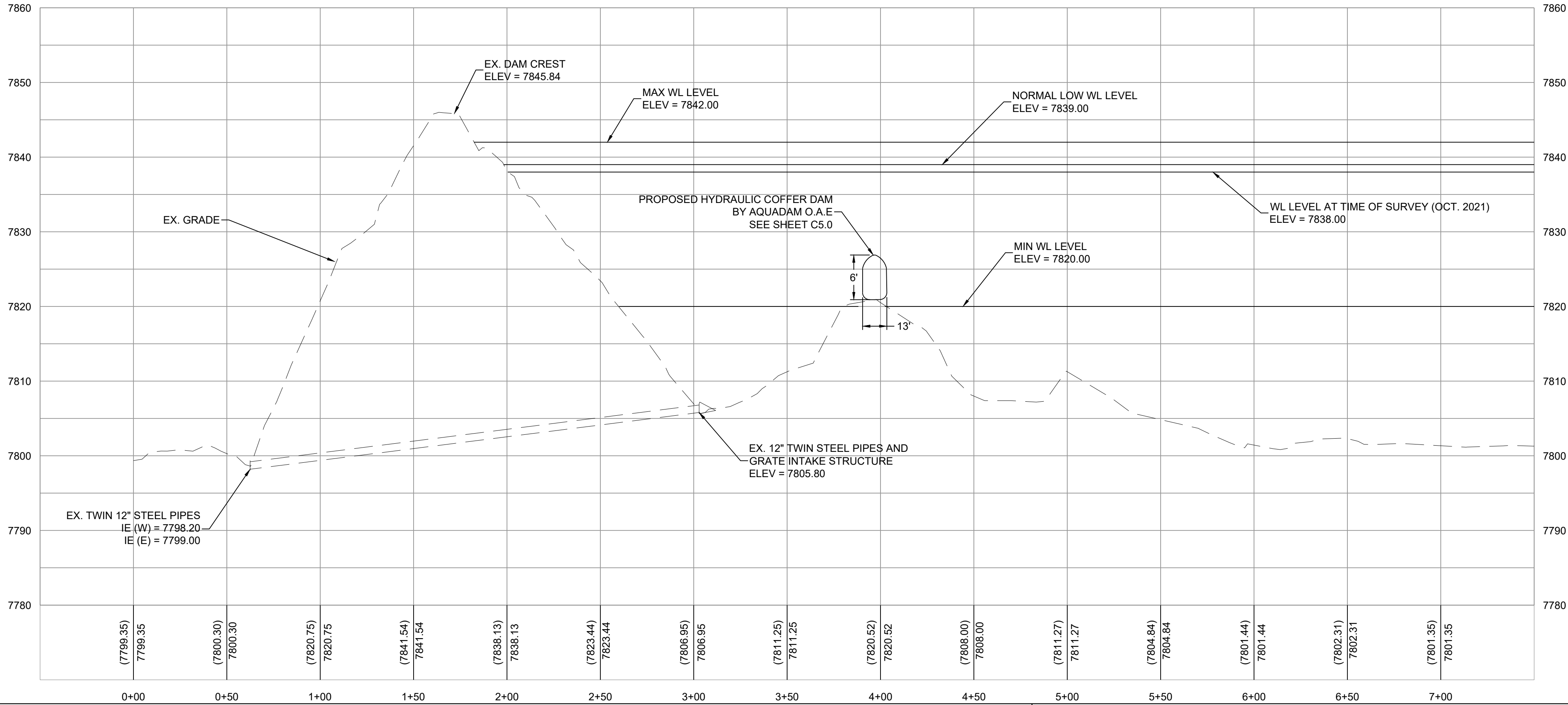
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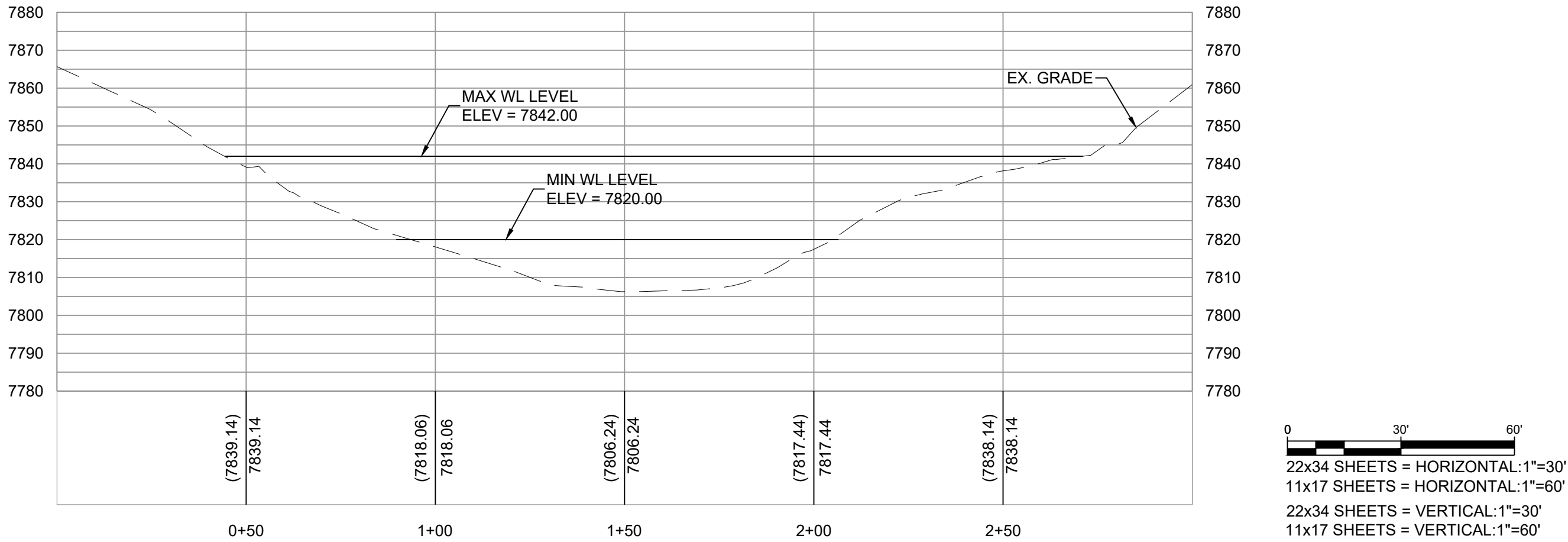


PROFILE SHEET NOTES:

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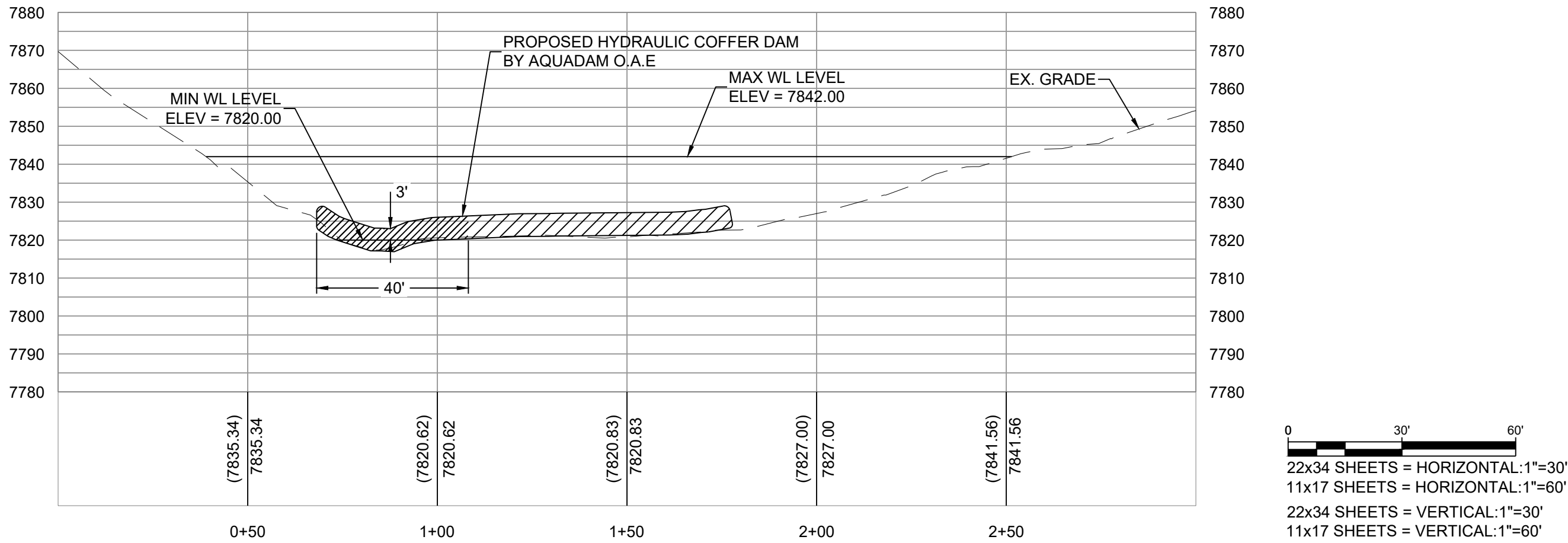
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Section B - C5.0 - STA:0+00 TO STA:3+00



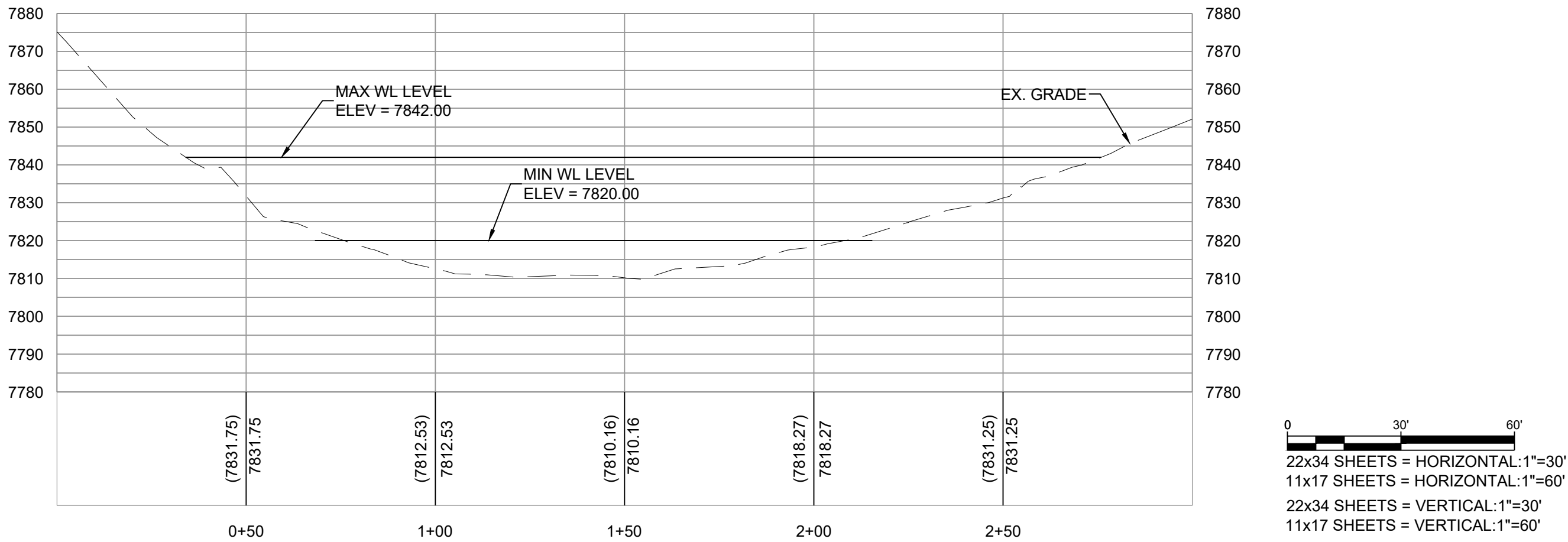
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Section C - C5.0 - STA:0+00 TO STA:3+00



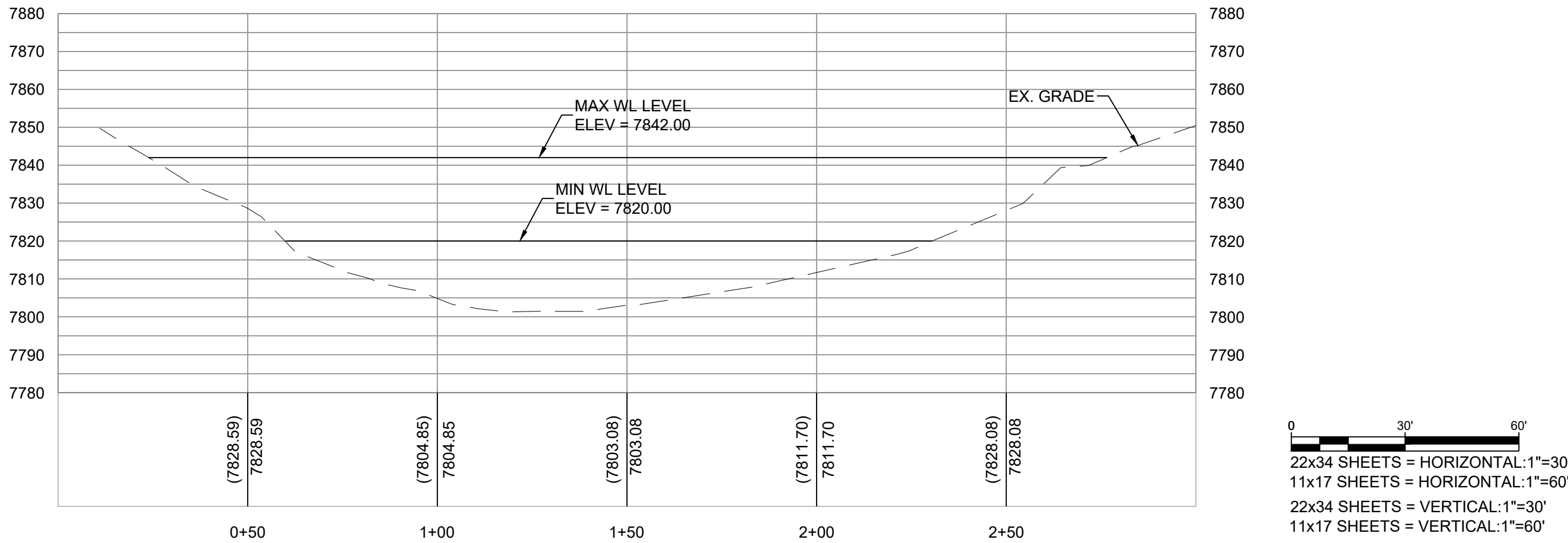
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Section D - C5.0 - STA:0+00 TO STA:3+00



0 30' 60'
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Section E - C5.0 - STA:0+00 TO STA:3+00



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22x34 SHEETS = VERTICAL:1"=30'
11x17 SHEETS = VERTICAL:1"=60'



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NEVADA STATE PUBLIC WORKS

MARLETTE LAKE DAM
REHABILITATION
EXISTING BATHYMETRIC SECTIONS

NV

COUNTY

WASHOE

REV	DATE	DESCRIPTION	BY

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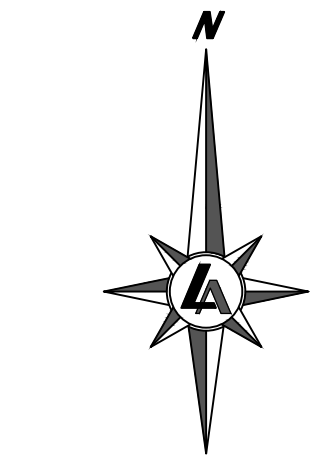
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11x17 SHEETS = HORIZONTAL:1"=60'

DEWATERING NOTES:

1. CONTRACTOR SHALL COORDINATE WITH NEVADA DEPARTMENT OF WILDLIFE (NDOW) FOR FISH RELOCATION DURING THE DEWATERING PROCESS.



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MARIETTE LAKE DAM
REHABILITATION
DEWATERING & BMP PLAN

NV

COUNTY

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- DEMOLITION NOTES:
1. CONTRACTOR SHALL NOT EXCAVATE INTO EX. DAM WHILE PERFORMING DEMOLITION OF EX. FACILITIES.



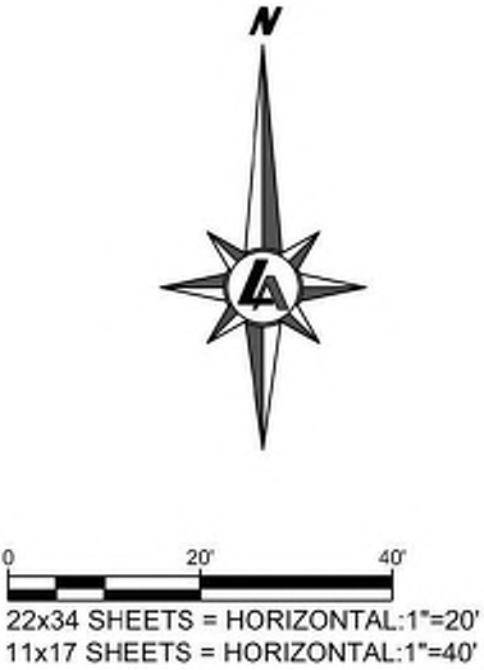
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MARLETTE LAKE DAM
REHABILITATION
DEMOLITION PLAN
NV
COUNTY
WASHOE

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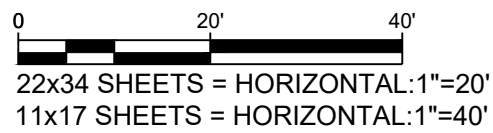
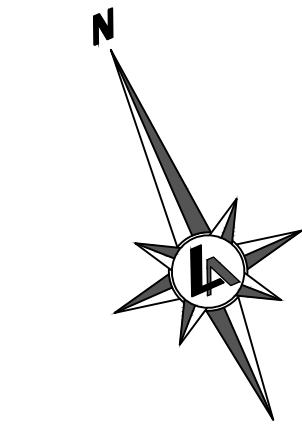
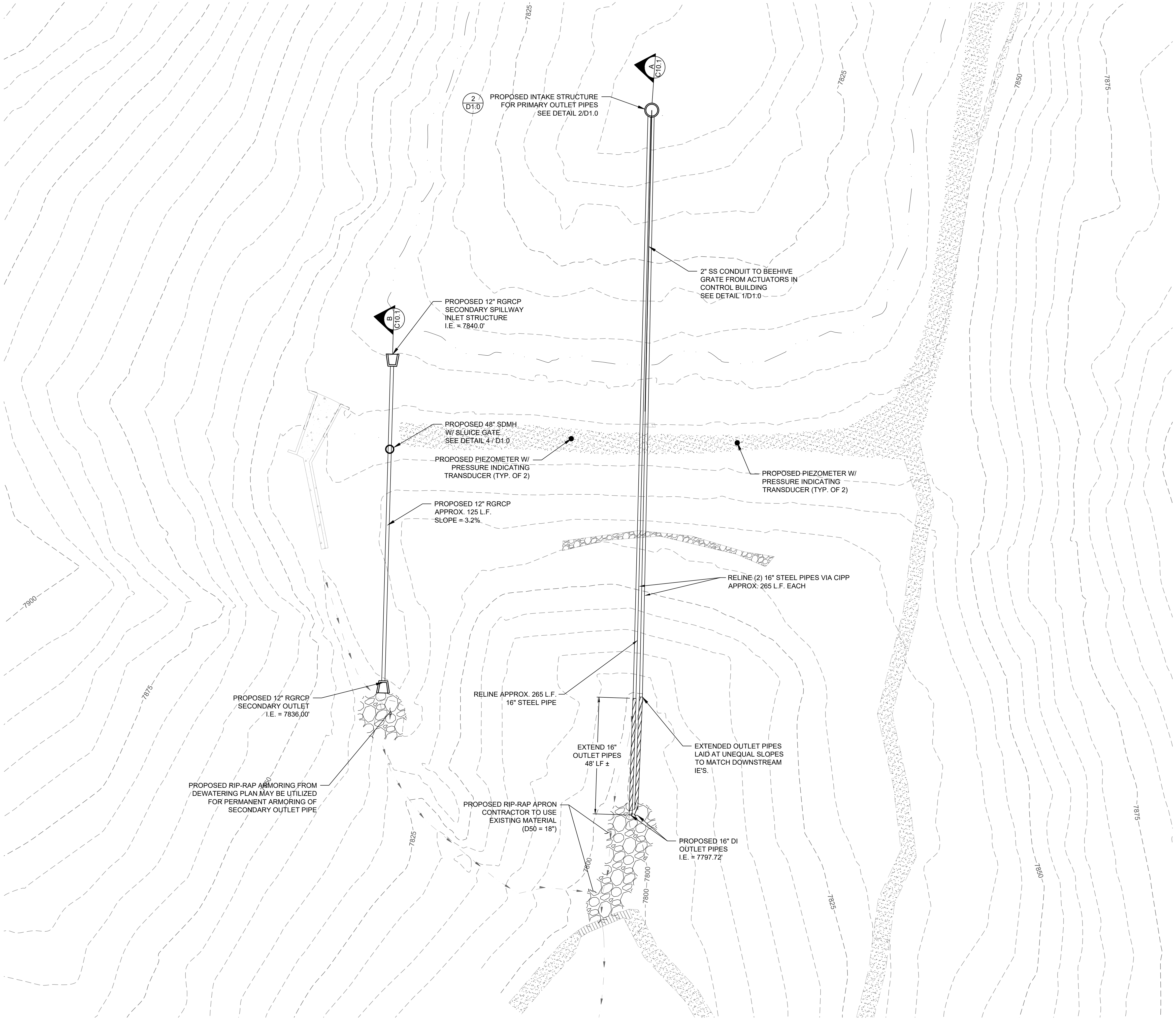


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NEVADA STATE PUBLIC WORKS

MARLETTE LAKE DAM REHABILITATION UTILITY REHABILITATION PLAN

NV

COUNTY

WASHOE

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DEC 2021

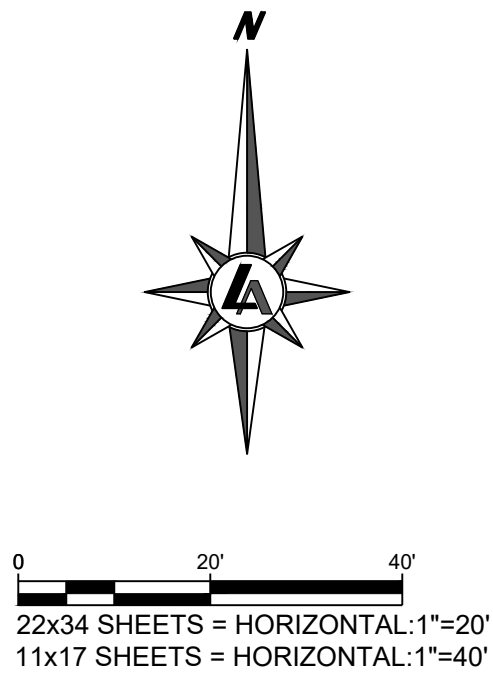
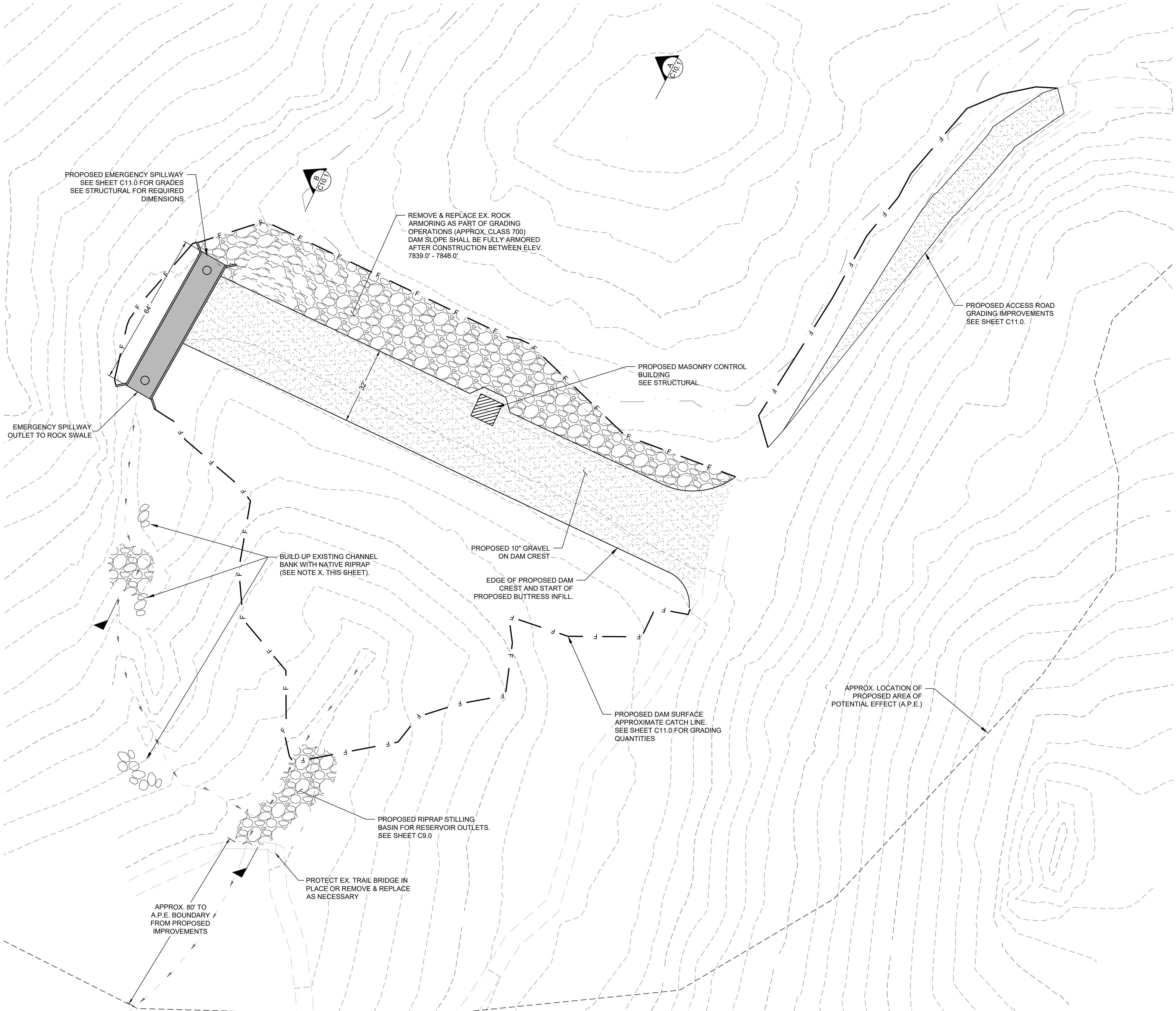
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MARIETTE LAKE DAM
REHABILITATION
PROPOSED DAM SITE PLAN

NV
COUNTY
WASHOE

REV	DATE	DESCRIPTION	BY

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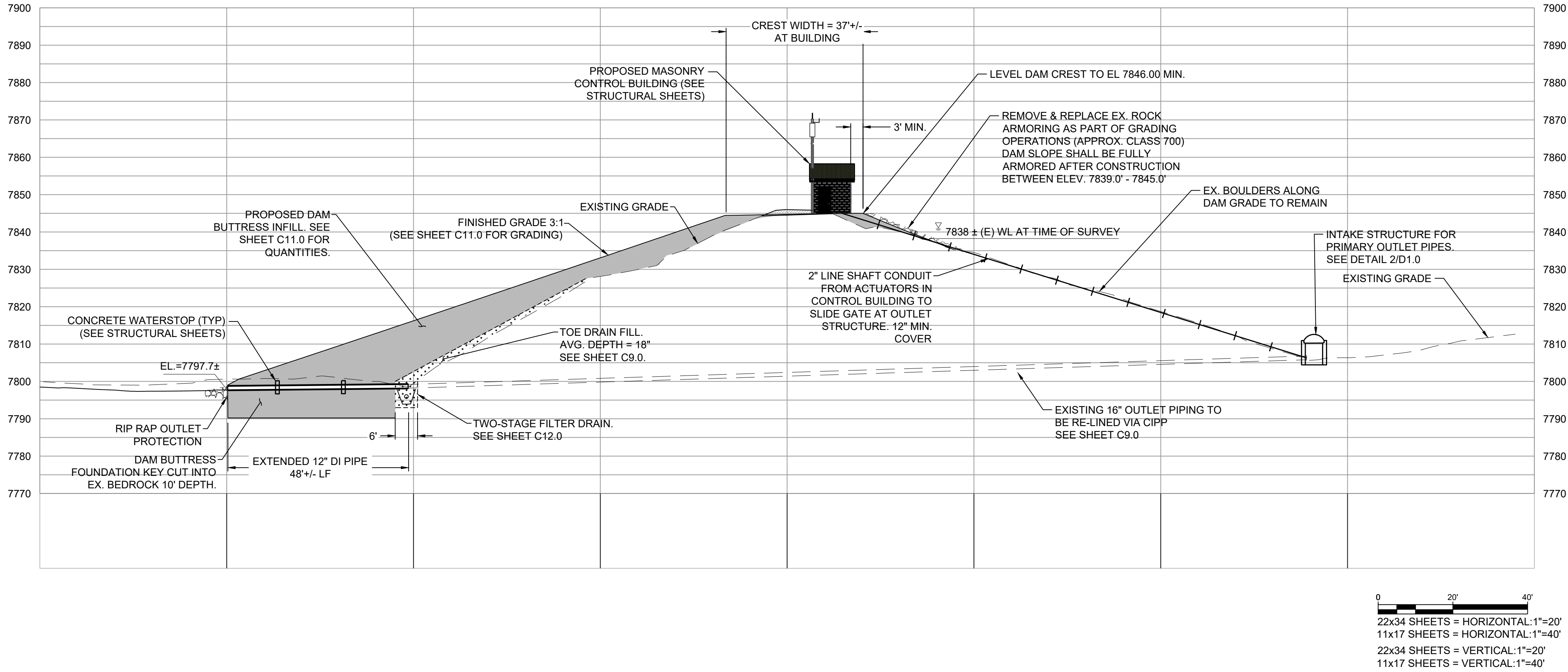
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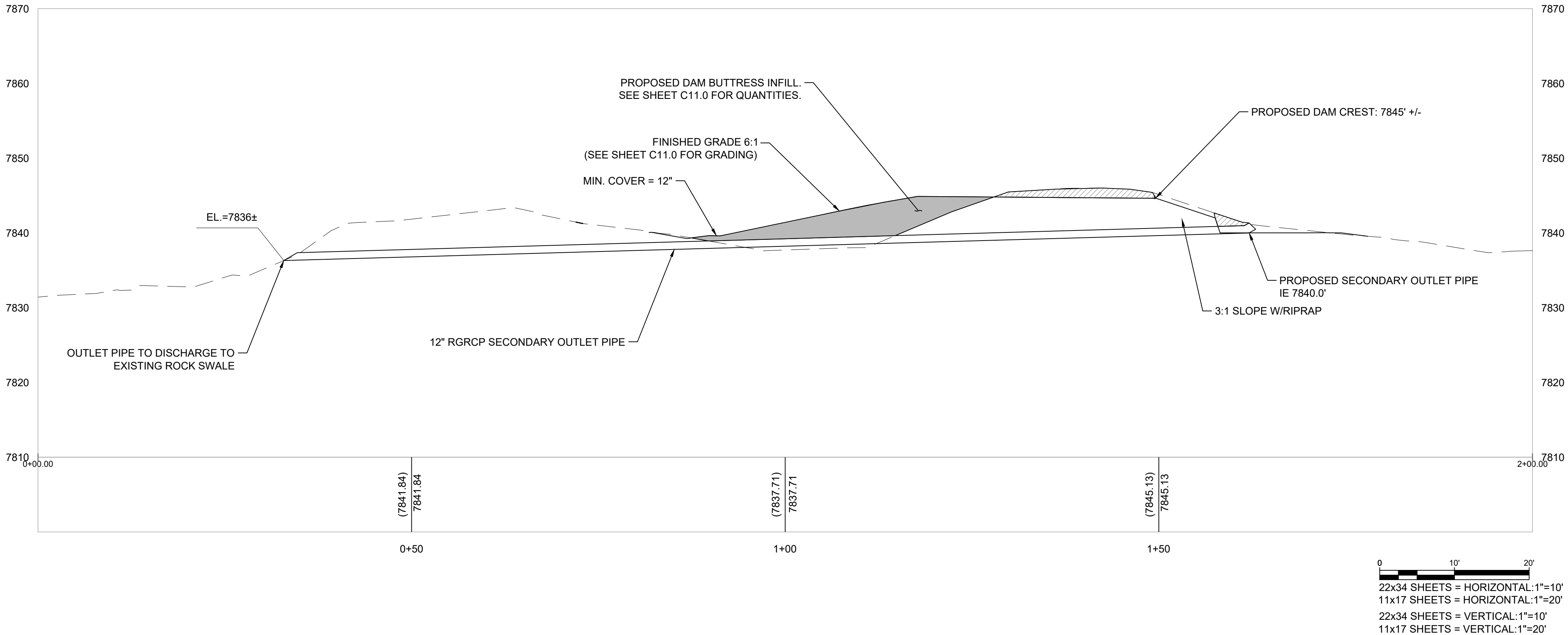
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CHECKED BY: JEL
JOB NO.: 10217.000

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12/07/2021 05:00 pm csturge

Section A - C10.0 - STA:0+00 TO STA:4+00



Section B - C10.0 - STA:0+00 TO STA:2+00



PROFILE SHEET NOTES:

- ELEVATION OF LAKE BOTTOM = 7798.00'.
- MINIMUM WATER LEVEL = 7820.00' (20' ABOVE ELEVATION OF LAKE BOTTOM WITH 2' SAFETY FACTOR).
- MAXIMUM WATER LEVEL = SPILLWAY CREST ELEVATION = 7842.00'
- NORMAL LOW WATER LEVEL 3 FEET BELOW SPILLWAY ELEVATION.

LEGEND:

- FILL MATERIAL - DAM BUTTRESS (2,860 CY)
- CUT MATERIAL (295 CY)
- RIP RAP - CLASS VARIES BASED ON LOCATION. SEE PLAN SHEETS
- TOE DRAIN - GRAVEL (320 CY)



308 N. CURRY ST., STE. 200
CARSON CITY, NV 89703
TEL: 775.883.7077
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NEVADA STATE PUBLIC WORKS

MARLETTE LAKE DAM
REHABILITATION
PROPOSED DAM SECTIONS

NV

COUNTY

WASHOE

REV	DATE	DESCRIPTION	BY

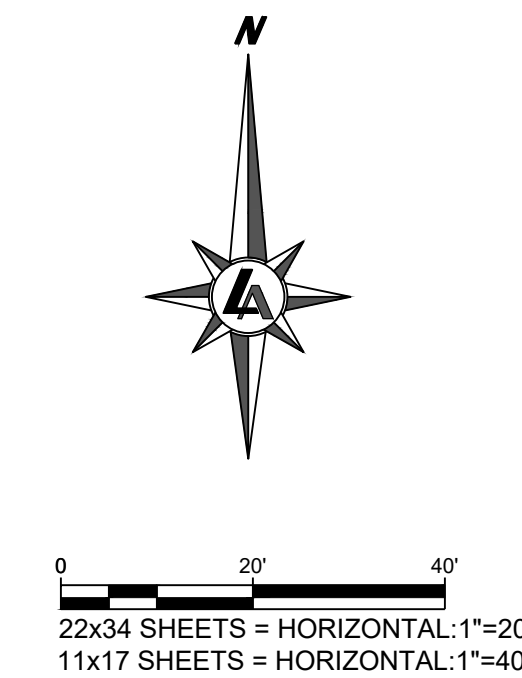
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C10.1

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PROPOSED ACCESS ROAD MODIFICATIONS APPROX. QUANTITIES	
CUT	11 CY
FILL	159 CY

GRADING NOTES:

1. GRADING QUANTITIES SHOWN ARE APPROXIMATE.
CONTRACTOR TO VERIFY QUANTITIES FOR TAKEOFF



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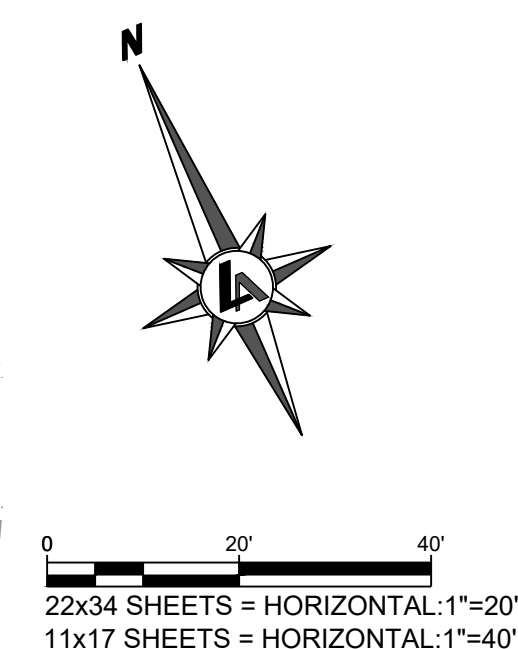
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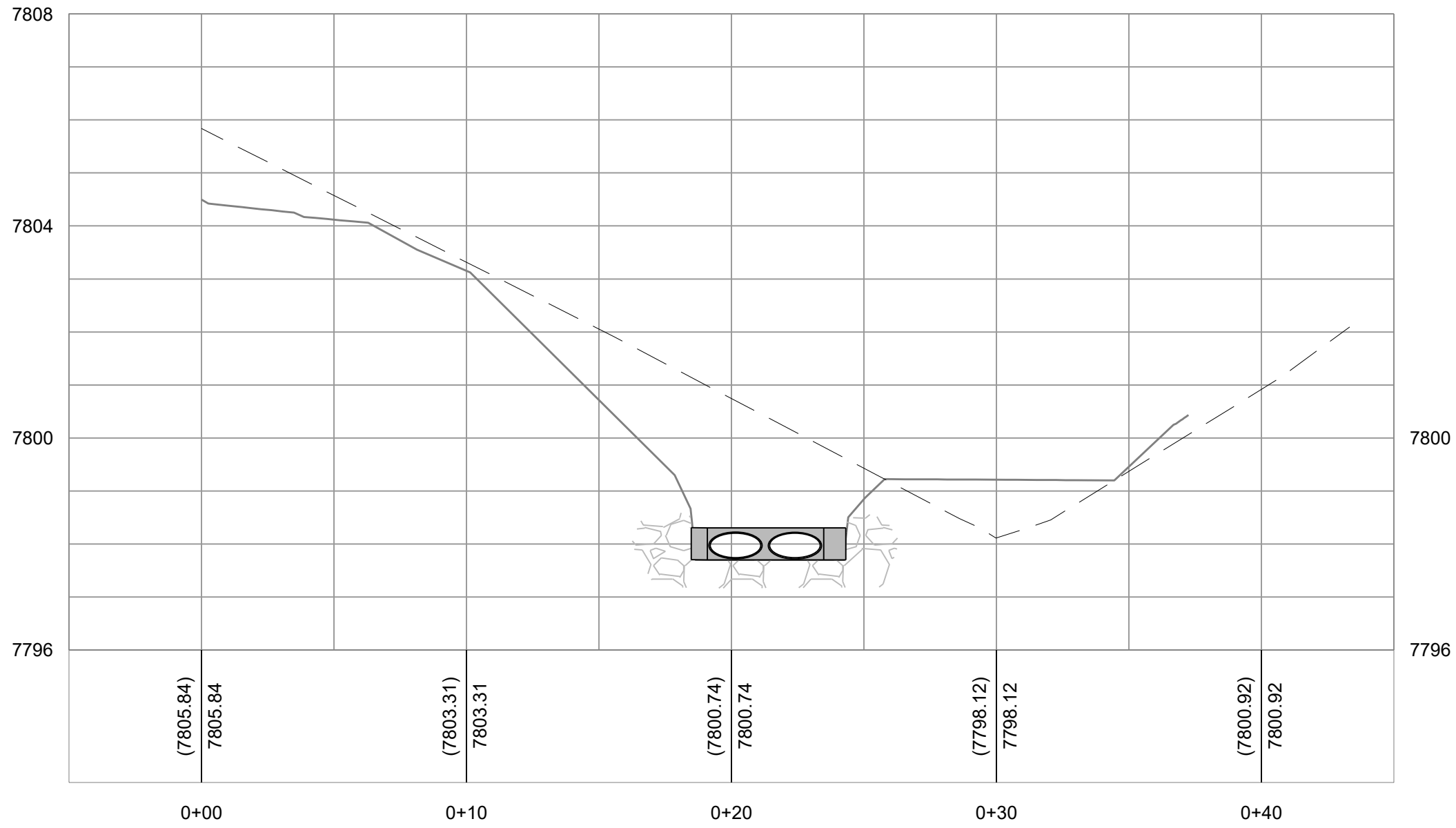
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C11.0

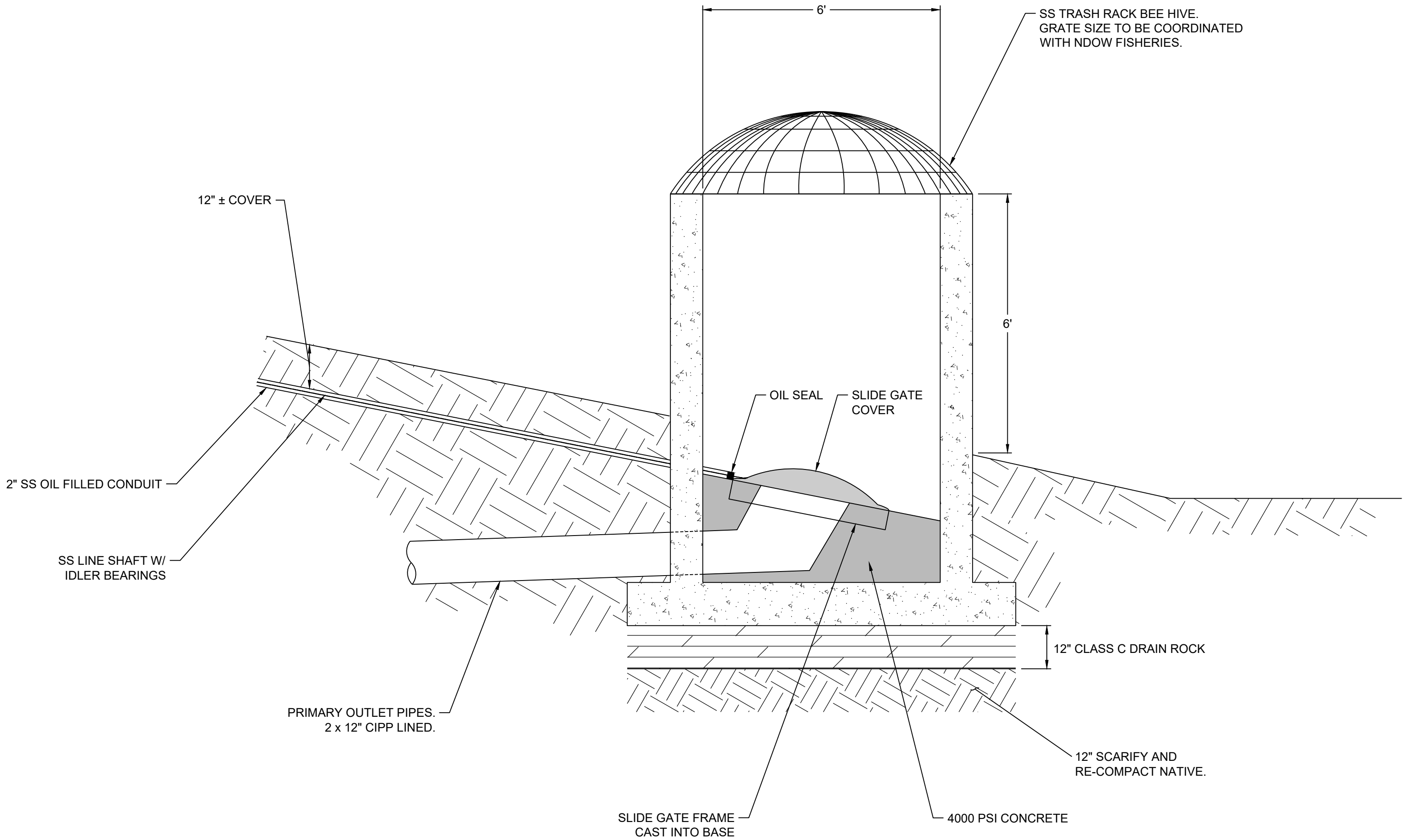
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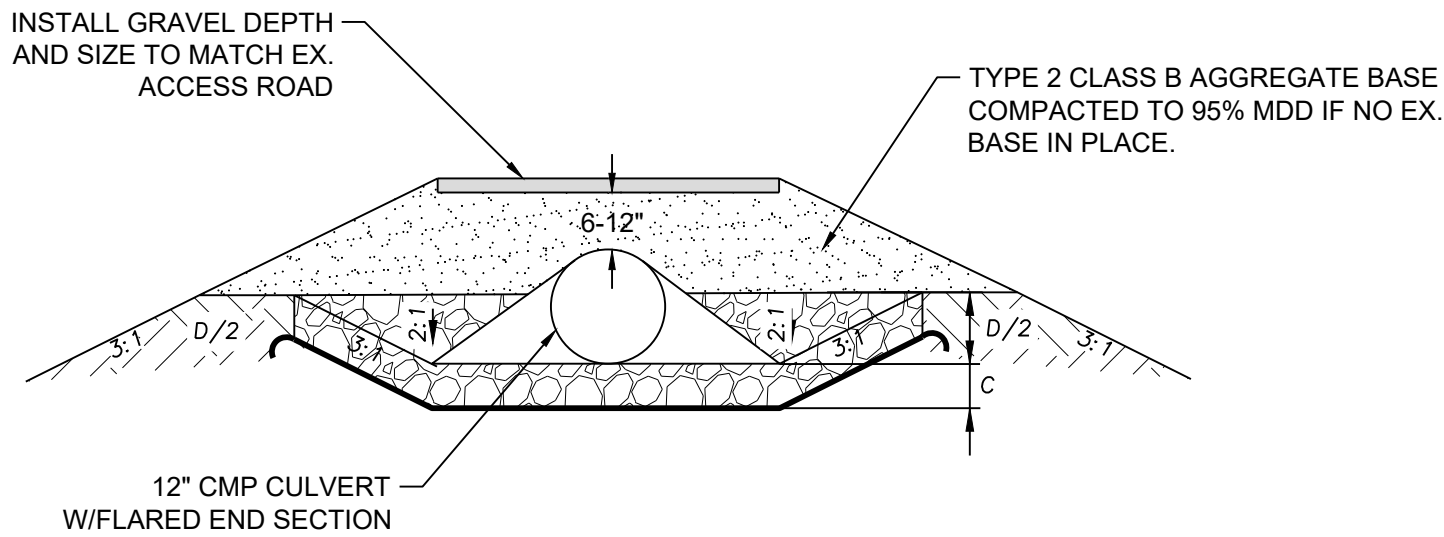
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1
D1.0 PRIMARY OUTLET - GRADING @ OUTLET
SCALE: N.T.S.



2
D1.0 PRIMARY OUTLET - INTAKE STRUCTURE
SCALE: N.T.S.



CULVERT SIZE	A	B	RIPRAP CLASS	C
12"	6'	3'	150	12"
18"	9'	4.5'	150	12"
24"	12'	6'	150	12"
30"	15'	7.5'	300	24"
36"	18'	9'	300	24"

3
D1.0 ACCESS ROAD REPAIR - TYPICAL CULVERT SECTION
SCALE: N.T.S.

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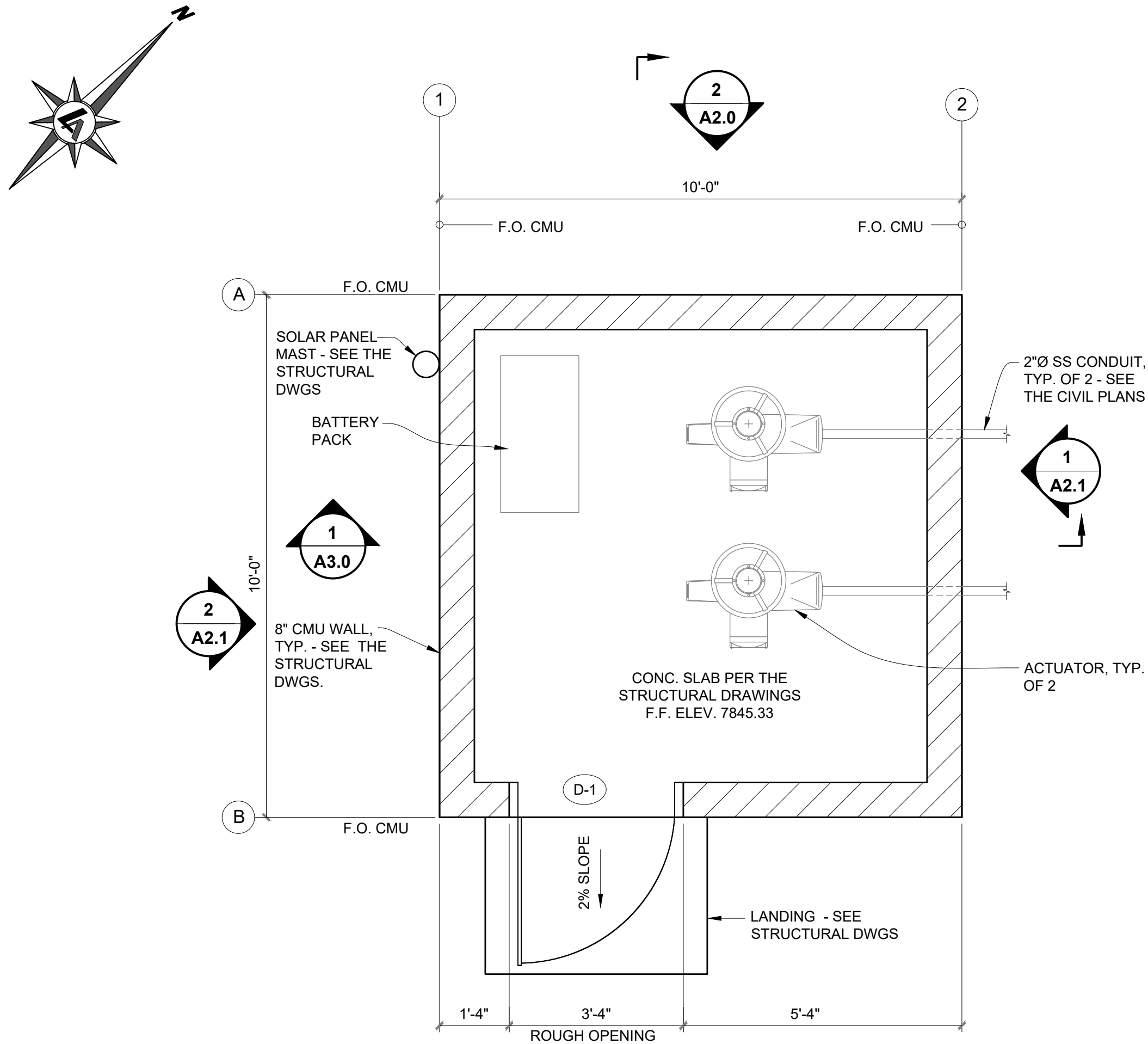
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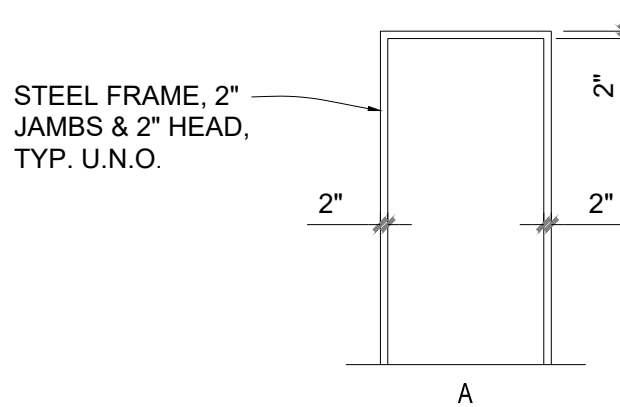
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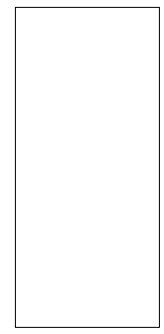
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1
A1.0
FLOOR PLAN
SCALE: 1/2"=1'-0"



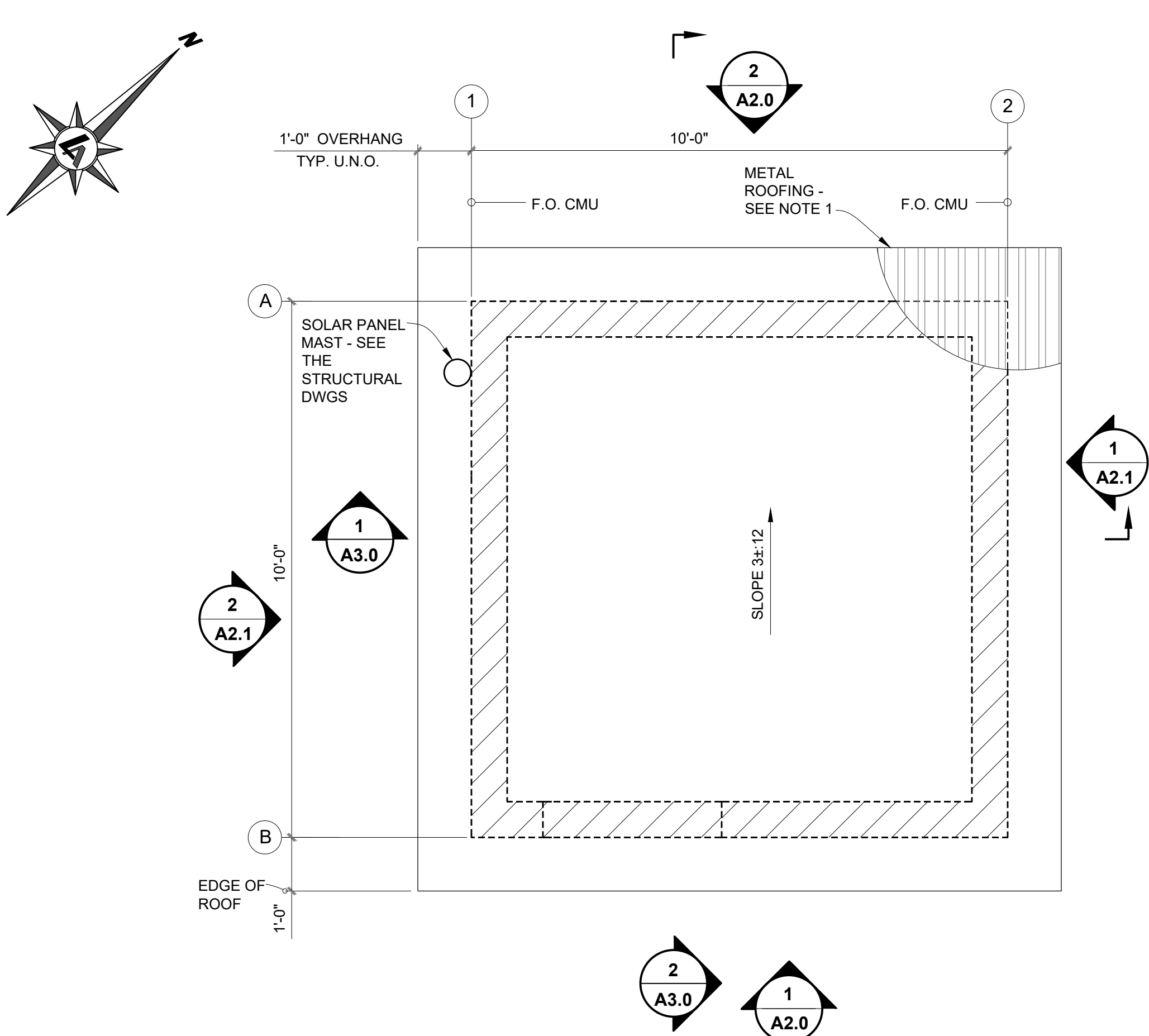
FRAME
ELEVATION
NO SCALE



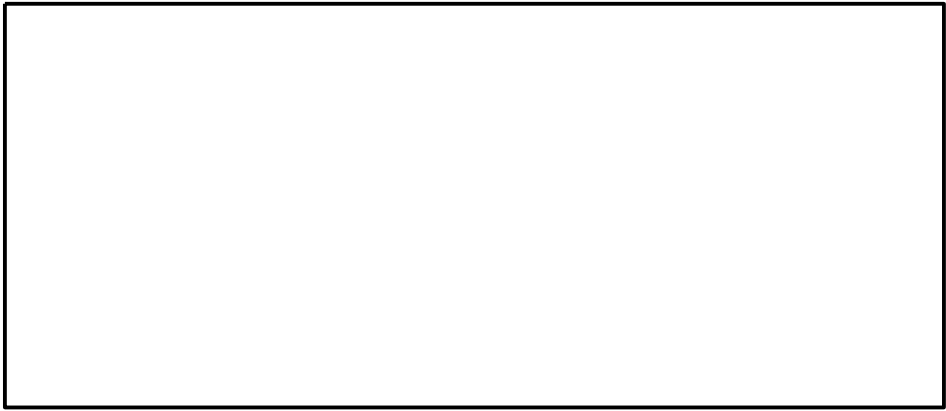
NO SCALE

DOOR SCHEDULE											
DOOR				FRAME		DETAILS			FIRE RT'G	HDWR SET	REMARKS
NO.	SIZE	MAT'L	TYPE	MAT'L	TYPE	SILL	JAMB	HEAD			
D1	3'-0" X 7'-0"	STEEL	F	STEEL	A	-	-	-	2	-	SEE STRUCTURAL NOTES

NOTES: 1. PROVIDE HARDWARE SETS FOR TWO (2) EXTERIOR MAN DOORS & 1 INTERIOR DOOR. COORDINATE REQUIREMENTS w/ NDOT



2
A1.0
ROOF PLAN
SCALE: 1/2"=1'-0"



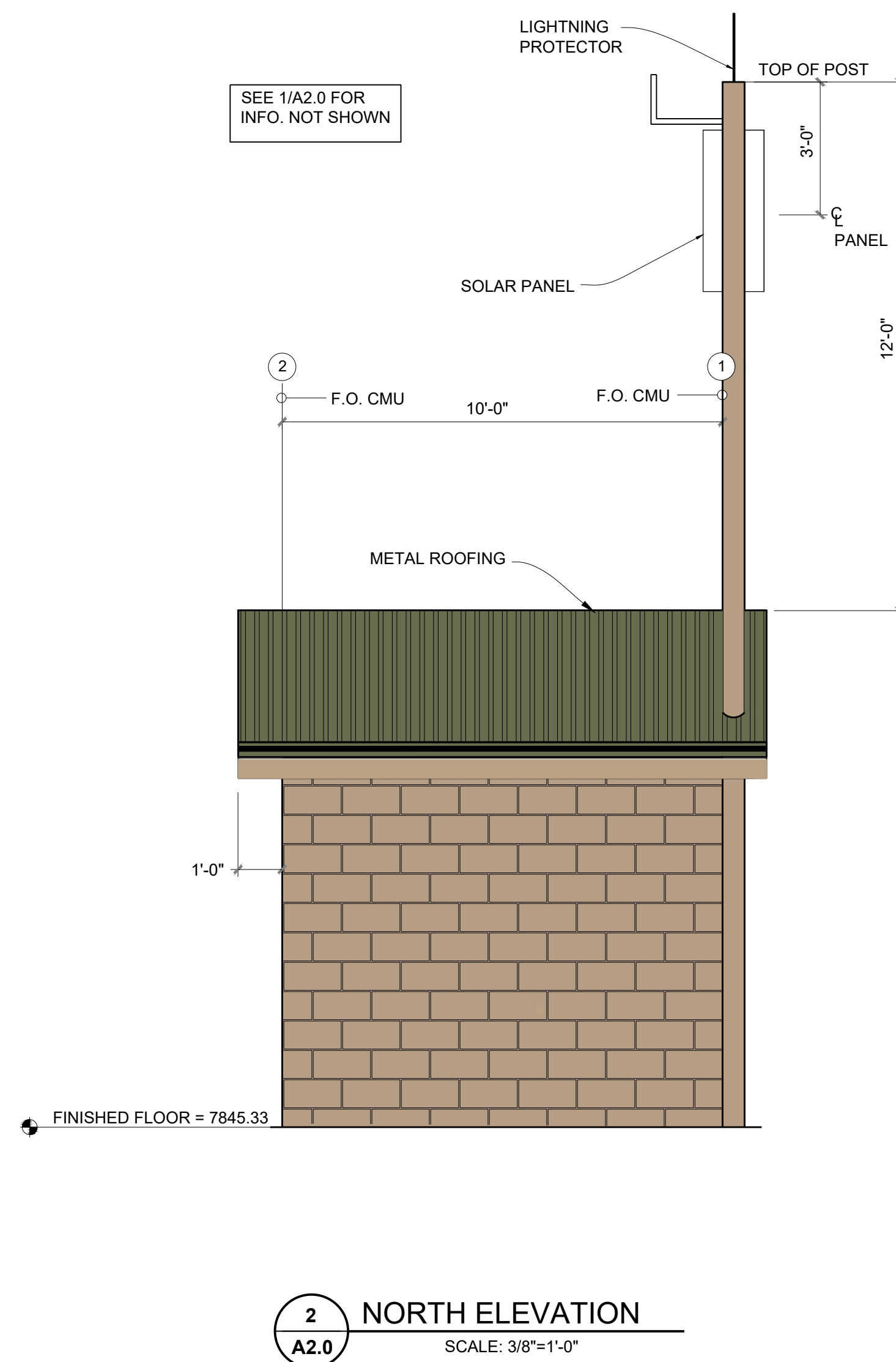
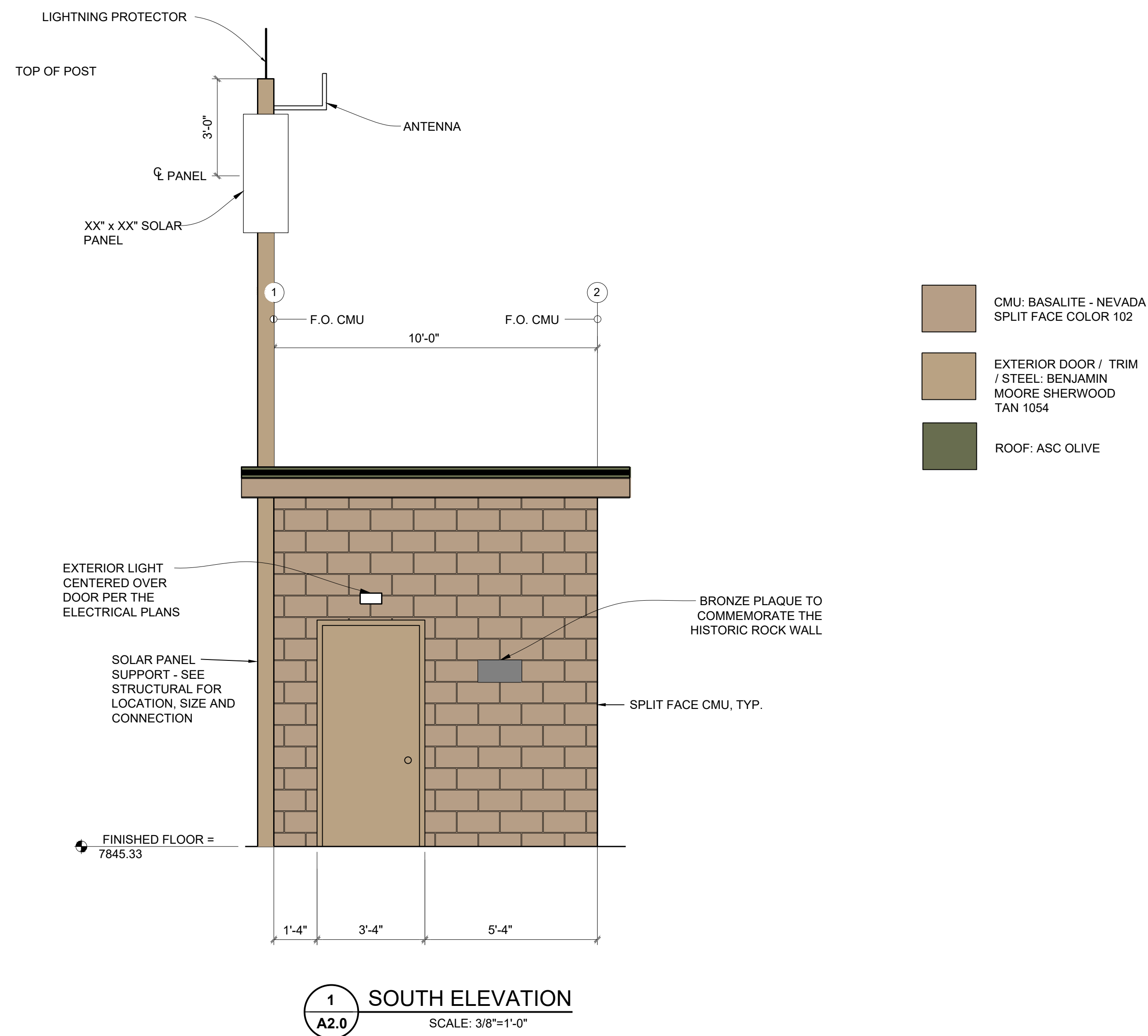
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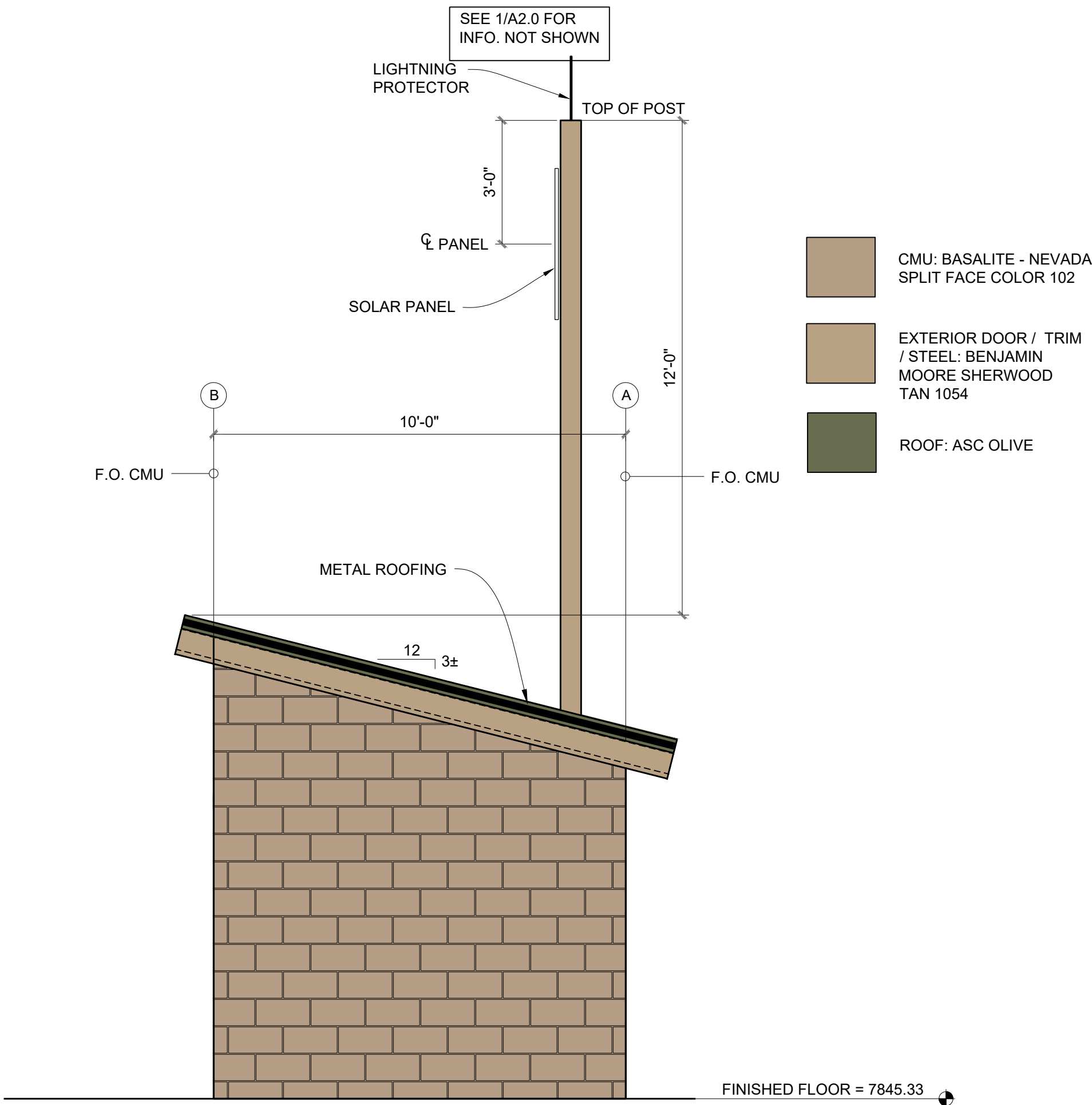
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A1.0

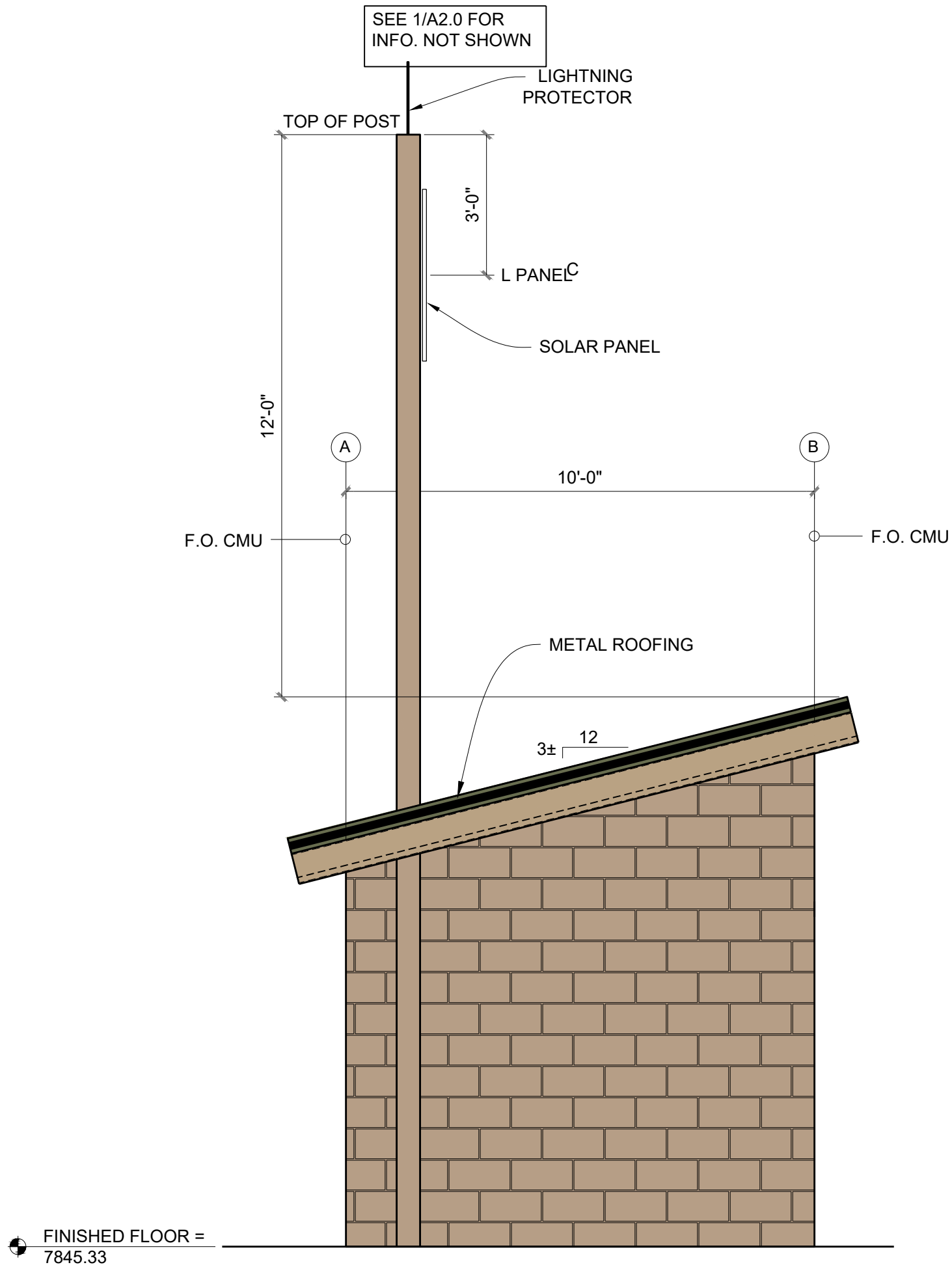
DRAWN BY: S.R.M.
DESIGNED BY: T.R.T.
CHECKED BY:
JOB NO.: 10217.0



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1 EAST ELEVATION
A2.1
SCALE: 3/8"=1'-0"



2 WEST ELEVATION
A2.1
SCALE: 3/8"=1'-0"

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0 1
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A2.1

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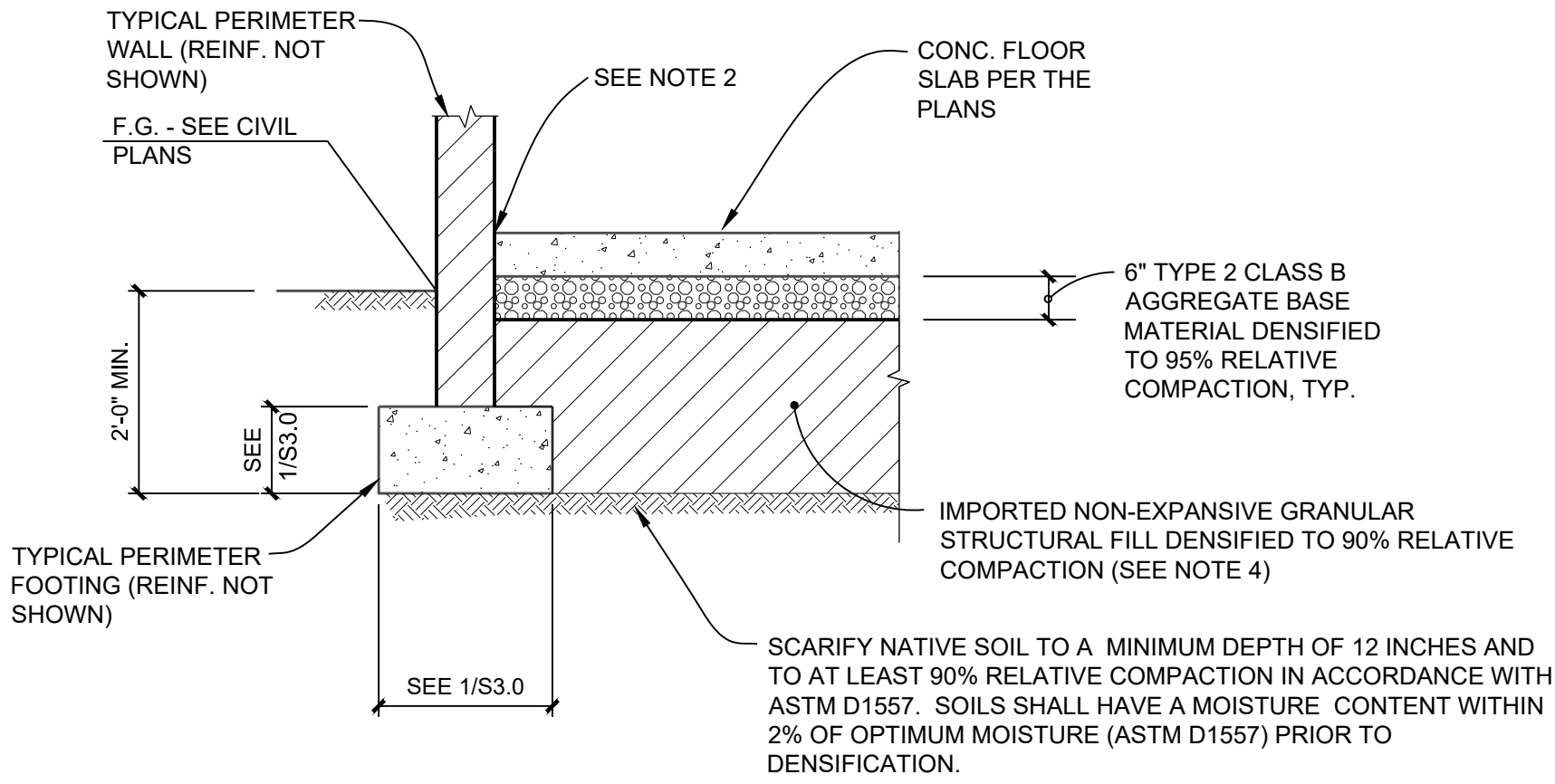
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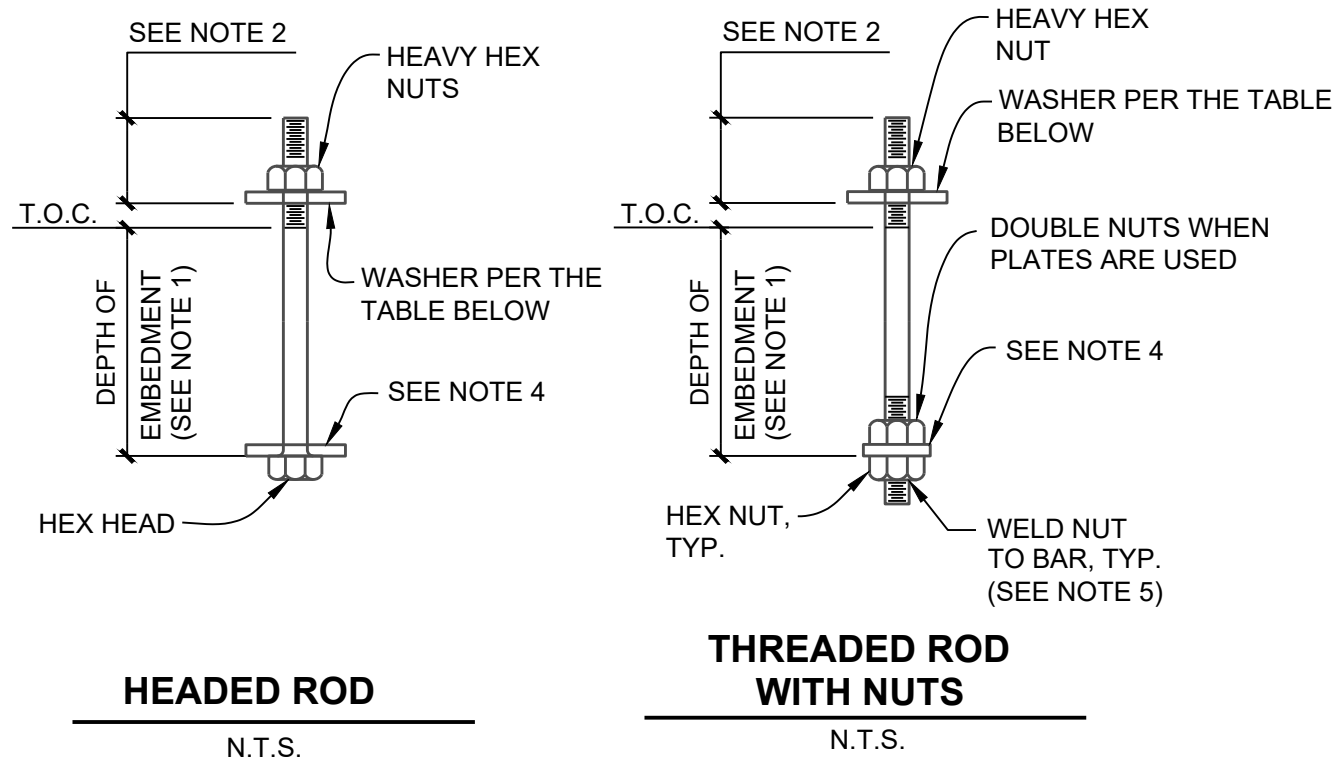
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1 TYPICAL BUILDING FOUNDATION PREPARATION DETAIL

N.T.S.

- NOTES: 1. SEE SHEET C2.1 FOR FINAL GRADES AND EXTERIOR IMPROVEMENTS.
2. THE INTERIOR FLOOR SLAB - BUILDING WALL JOINT SHALL BE CAULKED WITH SIKAFLEX-2C NS OR APPROVED EQUAL. SEE THE STRUCTURAL NOTES & 6/S-8 (SIM.)
3. ALL EXCAVATION SLOPES SHALL BE IN ACCORDANCE WITH OSHA REGULATIONS.
4. STRUCTURAL FILL SHALL BE AS APPROVED BY THE GEOTECHNICAL ENGINEER.



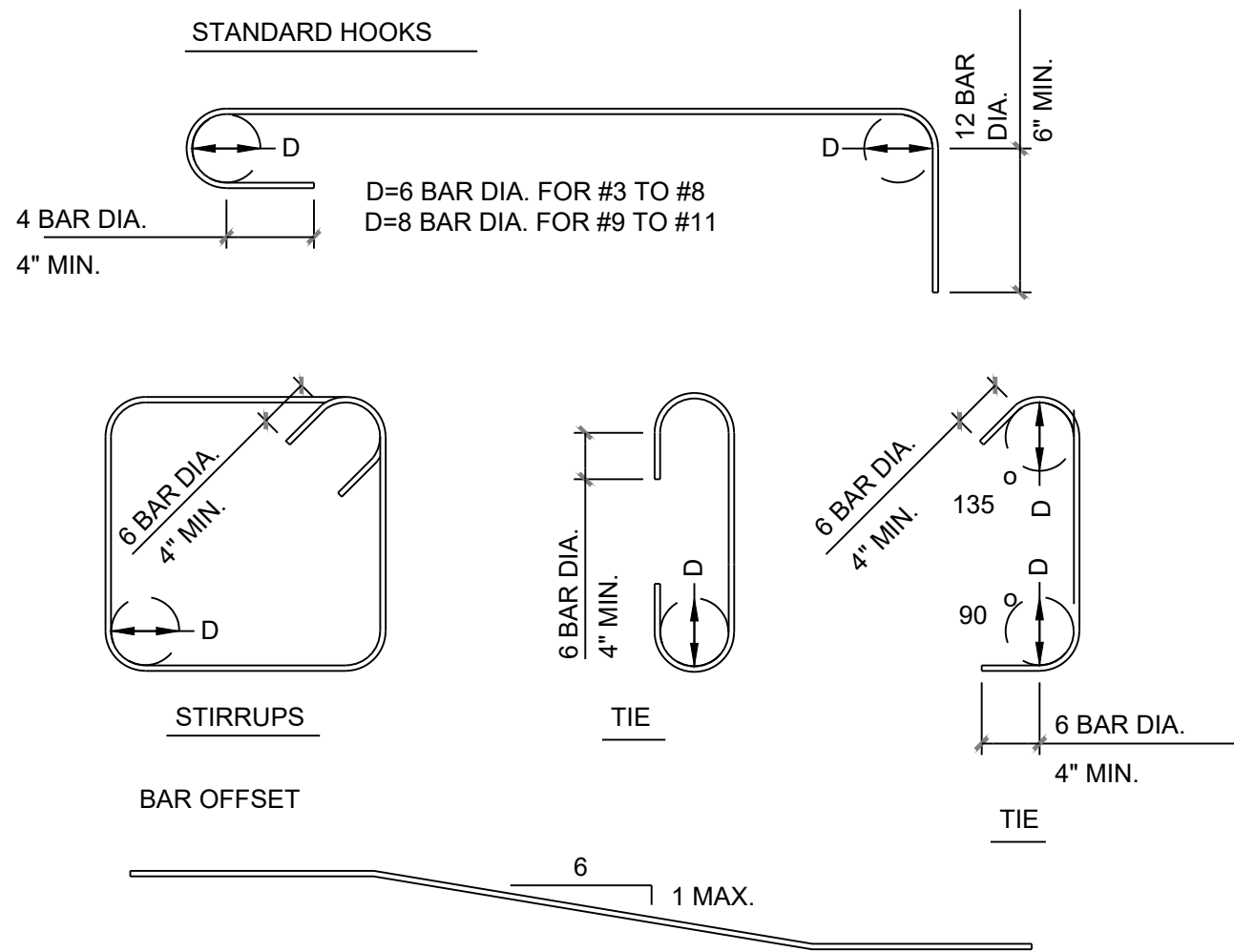
- NOTE: 1. DEPTH OF EMBEDMENT SHALL BE BELOW THE TOP OF CONCRETE OR THE TOP OF ANY CONSTRUCTION JOINTS.
2. BOLT PROJECTION SHALL BE SUFFICIENT TO ALLOW INSTALLATION OF FULLY ENGAGED NUTS AND WASHERS. SEE SPECIFIC DETAILS FOR OTHER REQUIREMENTS.
3. UNLESS SPECIFICALLY NOTED OTHERWISE, EITHER OF THE ANCHOR BOLTS SHOWN CAN BE USED.
4. WHERE NOTED IN THE STRUCTURAL DETAILS, STEEL PLATES SHALL BE ADDED. STEEL PLATE SIZE SHALL BE AS SHOWN IN THE SPECIFIC DETAIL.
5. IN LIEU OF TACK WELDING, THE NUT(S) CAN BE SECURED TO THE ROD BY PUNCHING THE THREADS AT 2 LOCATIONS ABOVE AND BELOW THE NUT(S), 4 LOCATIONS TOTAL.
6. SEE THE TABLE BELOW AND STRUCTURAL NOTES FOR ADDITIONAL INFORMATION.

5 ANCHOR BOLT DETAIL

N.T.S.

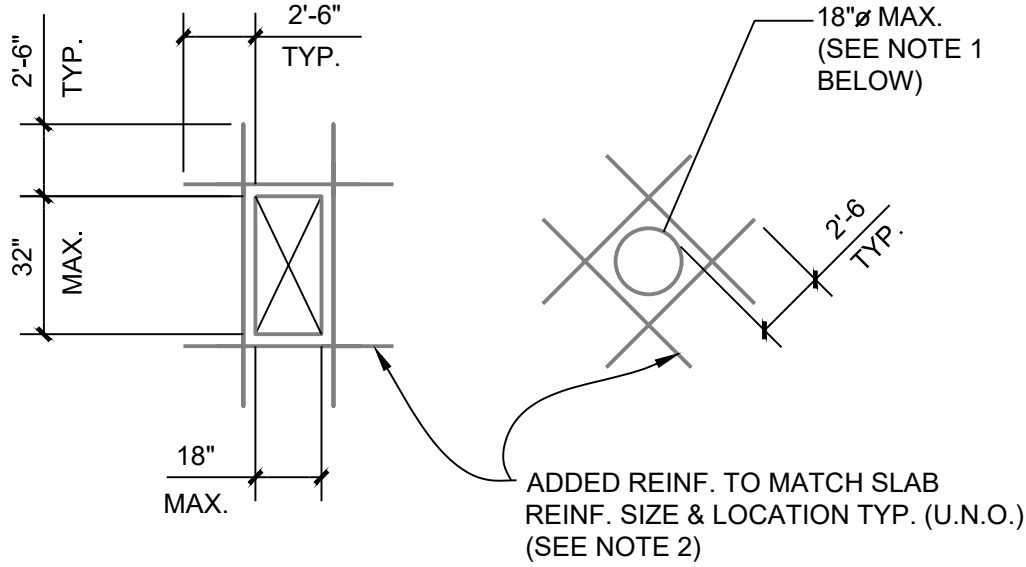
MAX. ANCHOR ROD HOLE SIZES IN BASE PLATES			
ANCHOR ROD DIAMETER, IN.	HOLE DIAMETER, IN.	MINIMUM WASHER SIZE, IN.	MINIMUM WASHER THICKNESS
3/4	1 5/16	2	1/4
7/8	1 9/16	2 1/2	5/16
1	1 13/16	3	3/8
1 1/4	2 1/16	3	1/2
1 1/2	2 5/16	3 1/2	1/2
1 3/4	2 3/4	4	5/8
2	3 1/4	5	3/4
2 1/2	3 3/4	5 1/2	7/8

- NOTE: 1. CIRCULAR OR SQUARE WASHERS MEETING THE SIZE SHOWN ARE ACCEPTABLE.
2. ADEQUATE CLEARANCE MUST BE PROVIDED FOR THE WASHER SIZE SELECTED.
3. THESE REQUIREMENTS DO NOT APPLY TO NON-STRUCTURAL BASE PLATES.



2 REINFORCING STEEL DATA

N.T.S.



6 SLAB OPENING TRIM REINFORCEMENT

N.T.S.

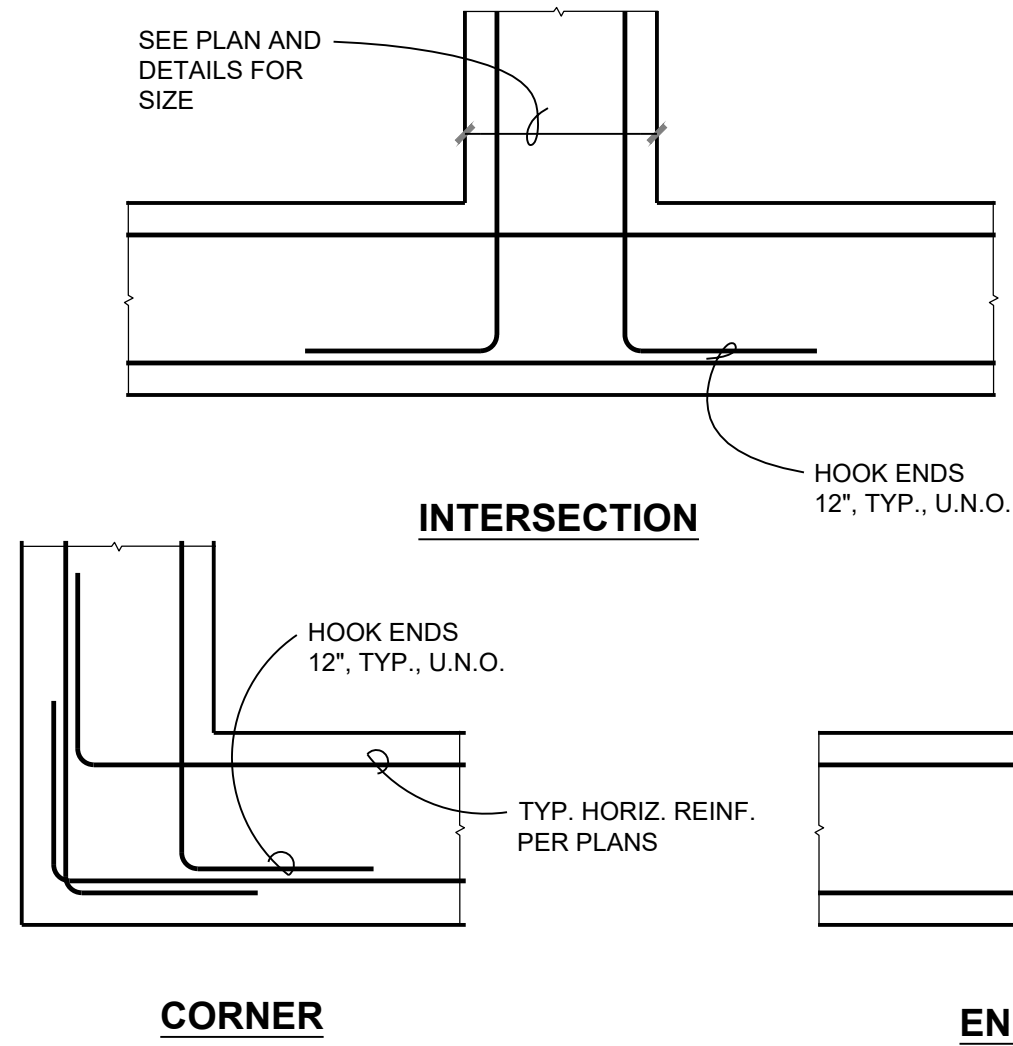
- NOTE: 1. ADDED TRIM BARS ARE NOT REQUIRED IF THE HOLE DIAMETER IS LESS THAN 10" AND THE TYPICAL SLAB REINFORCING IS NOT INTERRUPTED.
2. REINFORCING STEEL EXTENSION SHALL BE 1.3 LD MIN. FOR #5 AND LARGER BARS.

BAR SIZE	REINFORCING BAR LAP SPICE LENGTHS (INCHES)				
	3000 PSI	3500 PSI	4000 PSI	4500 PSI	5000 PSI
#3	22	20	19	18	17
#4	29	27	25	24	22
#5	36	33	31	29	28
#6	43	40	37	35	33
#7	63	58	54	51	49
#8	71	66	62	59	56
#9	81	75	70	66	63
#10	91	84	79	74	71
#11	100	93	87	82	78

- CLEAR SPACING BETWEEN BARS SHALL BE AT LEAST 2 BAR DIAMETERS.
- CLEAR COVER OVER BARS SHALL BE AT LEAST 1 BAR DIAMETER.
- THE SPICE LENGTH OF BARS WITH MORE THAN 12 INCHES OF FRESH CONCRETE BELOW THE BAR SHALL BE INCREASED BY 30%.
- THESE SPICE LENGTHS DO NOT APPLY FOR EPOXY-COATED REINFORCEMENT, BARS IN LIGHTWEIGHT CONCRETE OR BUNDLED BARS.
- BARS LARGER THAN #11 SHALL NOT BE LAP-SPICED.

3 LAP SPICE REQUIREMENTS

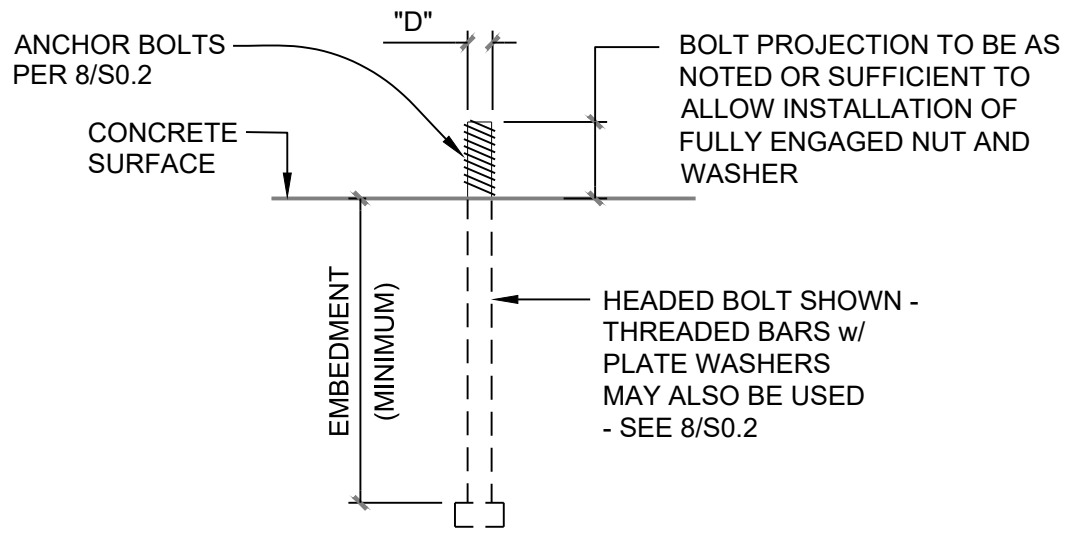
N.T.S.



7 TYPICAL FOOTING REINFORCING LAP AT CORNERS & INTERSECTIONS (U.N.O.)

N.T.S.

- NOTE: 1. PROVIDE VERTICAL DOWELS TO MATCH SIZE AND LOCATION OF WALL REINFORCING, TYP. WHERE OCCURS.
2. USE SIMILAR DETAIL AT PIPE CHASE CORNERS.



BOLT DIA. "D"	MIN. EMBEDMENT LENGTH U.N.O.
1/2"	7"
5/8"	8"
3/4"	9"
7/8"	10"
1"	12"

4 CAST-IN-PLACE ANCHOR RODS IN CONCRETE

N.T.S.

NEVADA STATE PUBLIC WORKS DIVISION
MARLETTE LAKE DAM RECONSTRUCTION
TYPICAL DETAILS
NEVADA
WASHOE COUNTY

REV	DATE	DESCRIPTION	BY

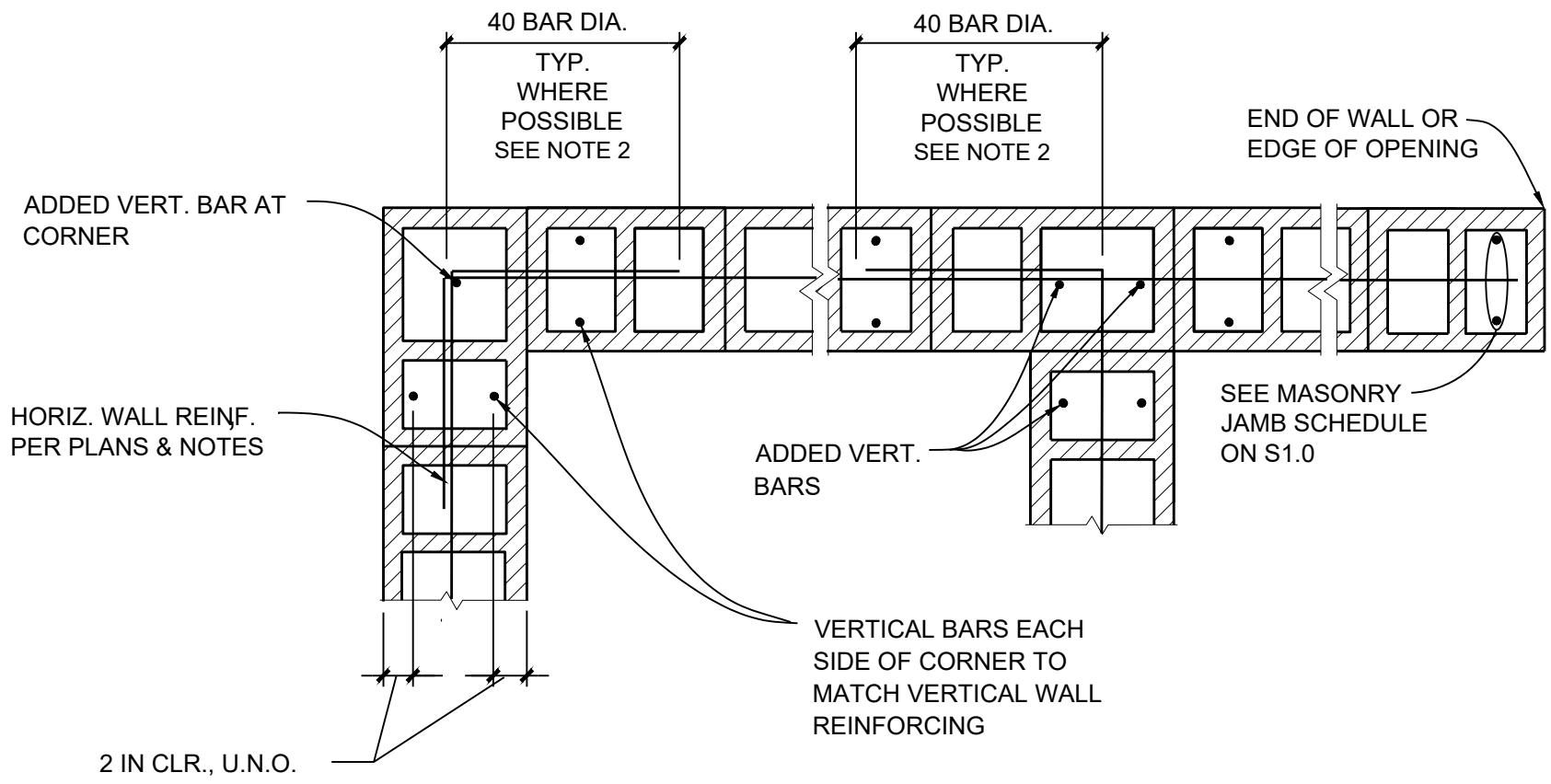
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S0.2

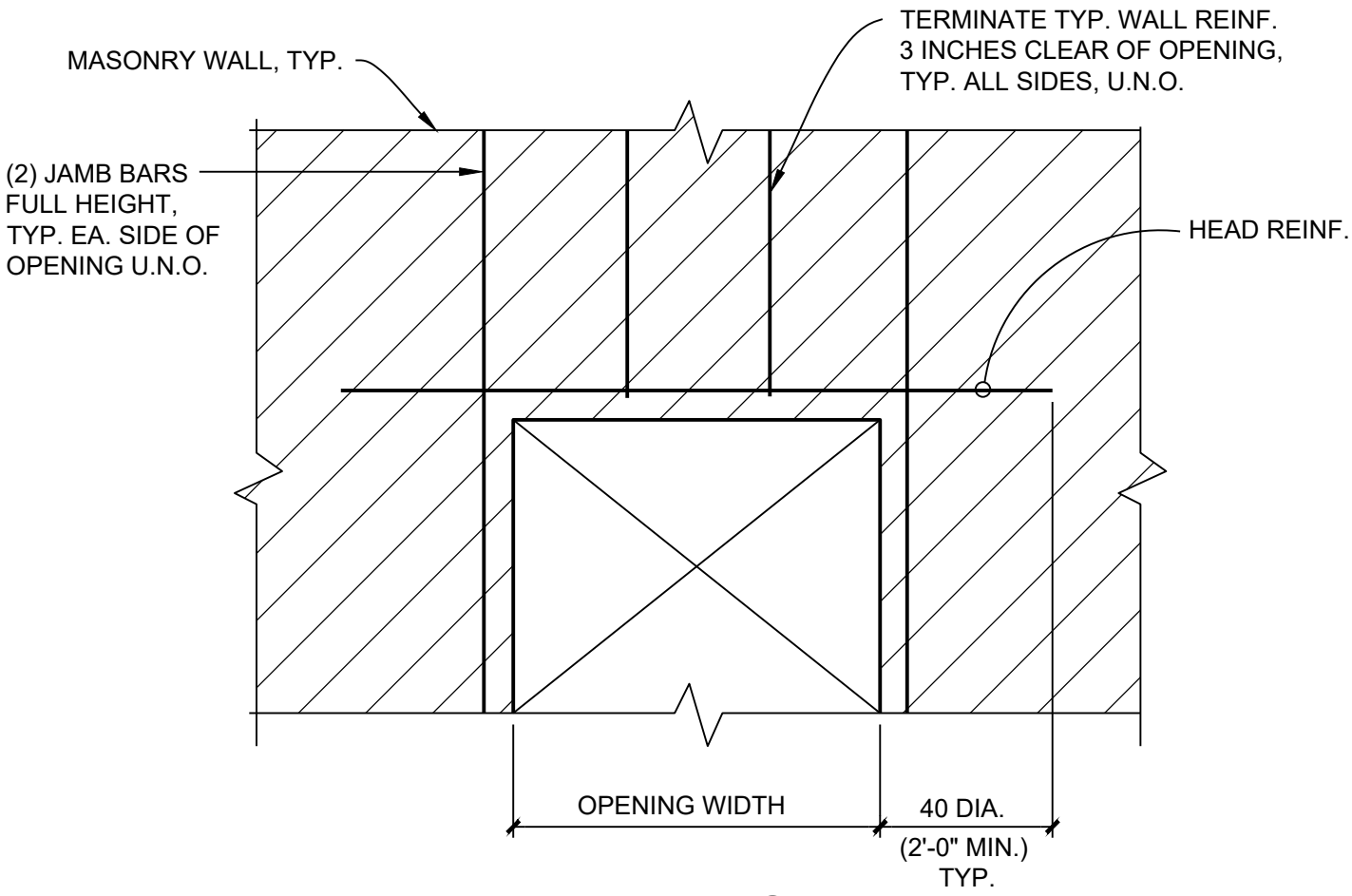
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**TYPICAL MASONRY WALL REINFORCING
PLACEMENT DOUBLE CURTAIN**

- 1
S0.3
- N.T.S.
- NOTES: 1. ADDED VERTICAL BARS TO HAVE MATCHING DOWEL BARS.
2. WHERE EXTENSION IS NOT POSSIBLE, EXTEND AS FAR AS POSSIBLE AND HOOK.



ELEVATION

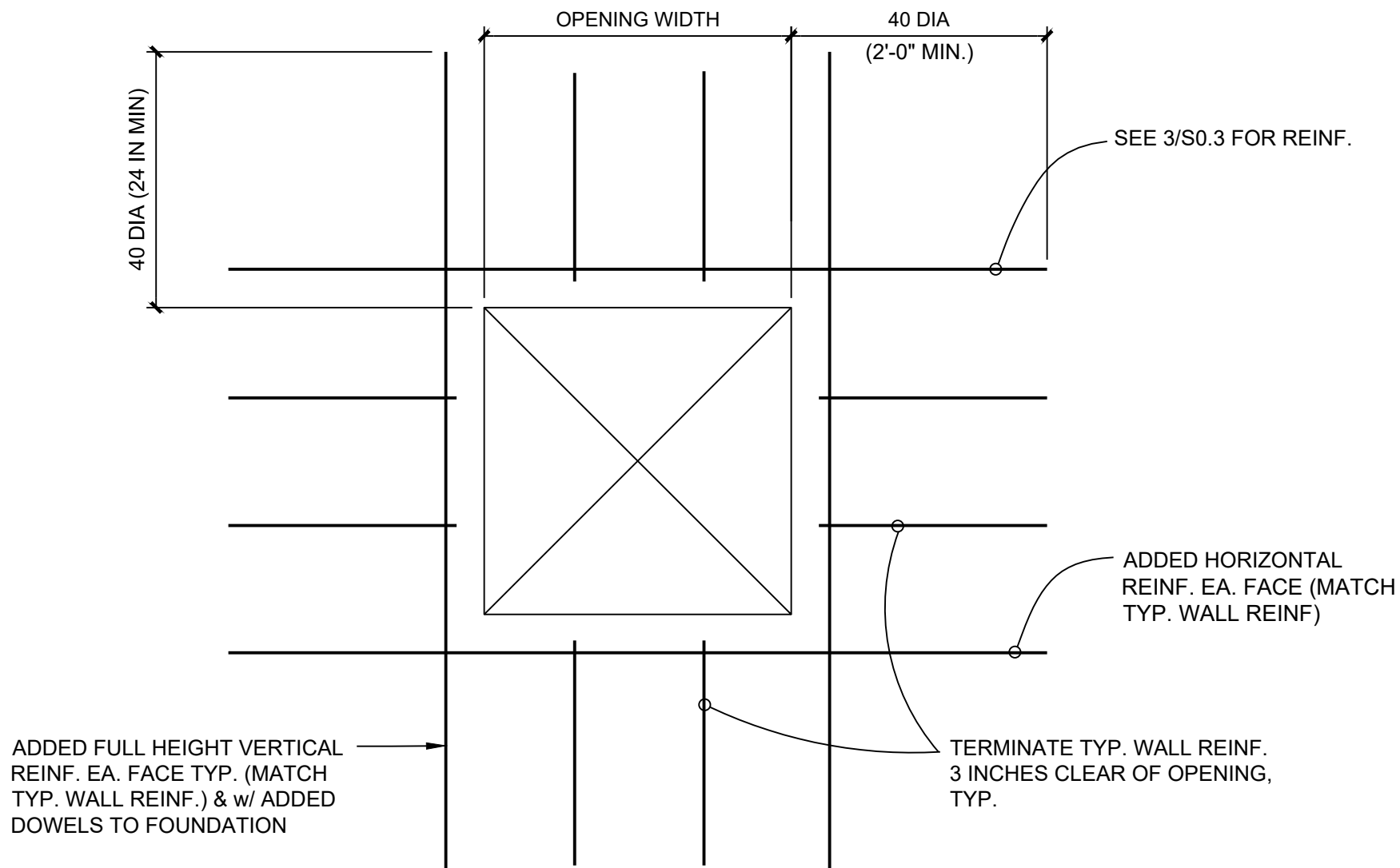
TYPICAL LINTEL

2
S0.3

N.T.S.

LINTEL SCHEDULE				
OPENING WIDTH	DEPTH	HEAD REINF.	TOP BARS	STIRRUPS
0'-0" TO 6'-8"	2'-0"	(1) #5 E.F.	NONE	NONE

- NOTES: 1. SIMILAR DETAIL APPLIES AT OTHER OPENINGS, U.N.O.
2. BEND LINTEL REINFORCING & EXTEND HORIZONTALLY 40 BAR DIAMETERS WHERE OPENING OCCURS AT CORNERS.
3. PROVIDE 4 INCH (MIN.) LINTEL BLOCKS AS NECESSARY TO ACCOMMODATE DOOR & LOUVER FRAMES.

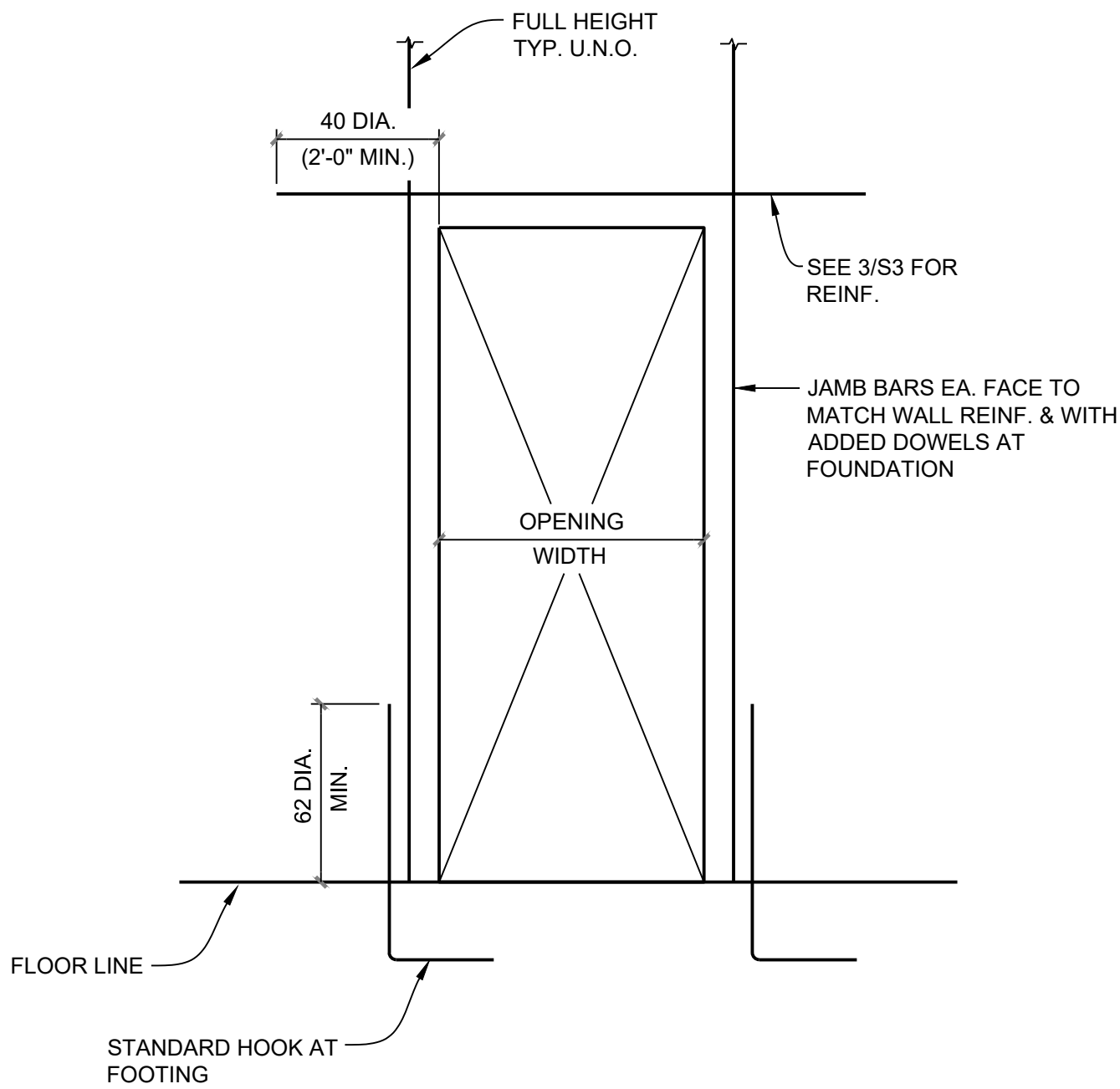


WINDOW / LOUVER HEAD AND JAMB REINFORCING

3
S0.3

N.T.S.

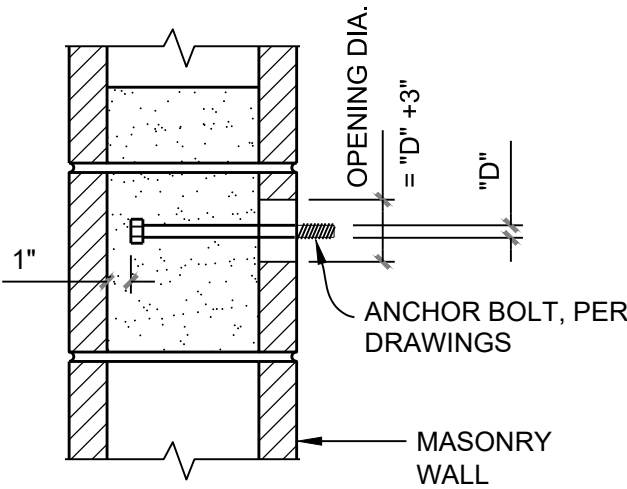
NOTES: 1. USE SIMILAR DETAIL AT PIPE PENETRATIONS.



**DOOR HEAD AND JAMB REINFORCEMENT
TYP. U.N.O.**

4
S0.3

N.T.S.



- NOTES:
1. SET ANCHOR BOLTS WITH TEMPLATE.
2. CUT BLOCK WEB AS REQUIRED TO ALLOW PLACEMENT OF ANCHOR BOLT WITH 1/2" MINIMUM OF GROUT BETWEEN ANCHOR BOLT AND WEB.
3. EPOXY ANCHORS OF EQUAL DIAMETER MAY BE USED IN LIEU OF ANCHOR BOLTS AS SHOWN.

ANCHOR BOLTS IN MASONRY

5
S0.3

N.T.S.

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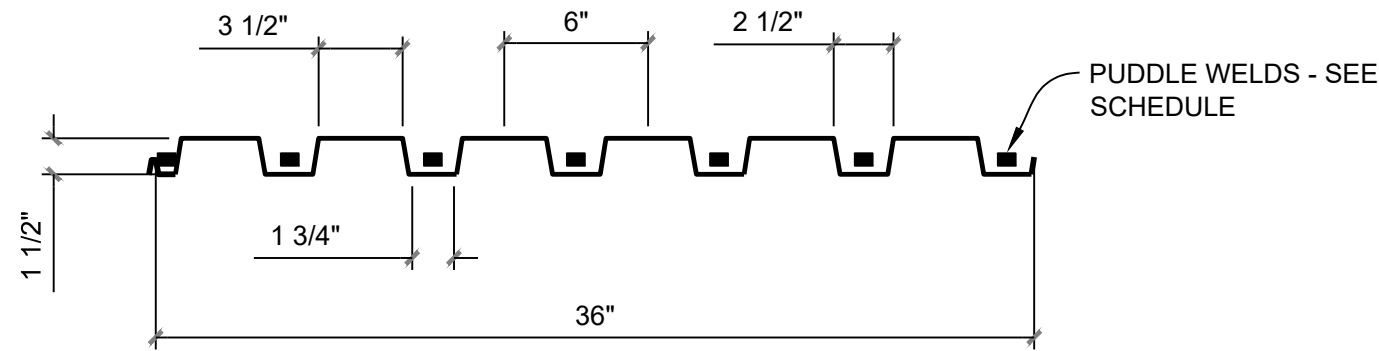
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S0.3

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1
S0.4

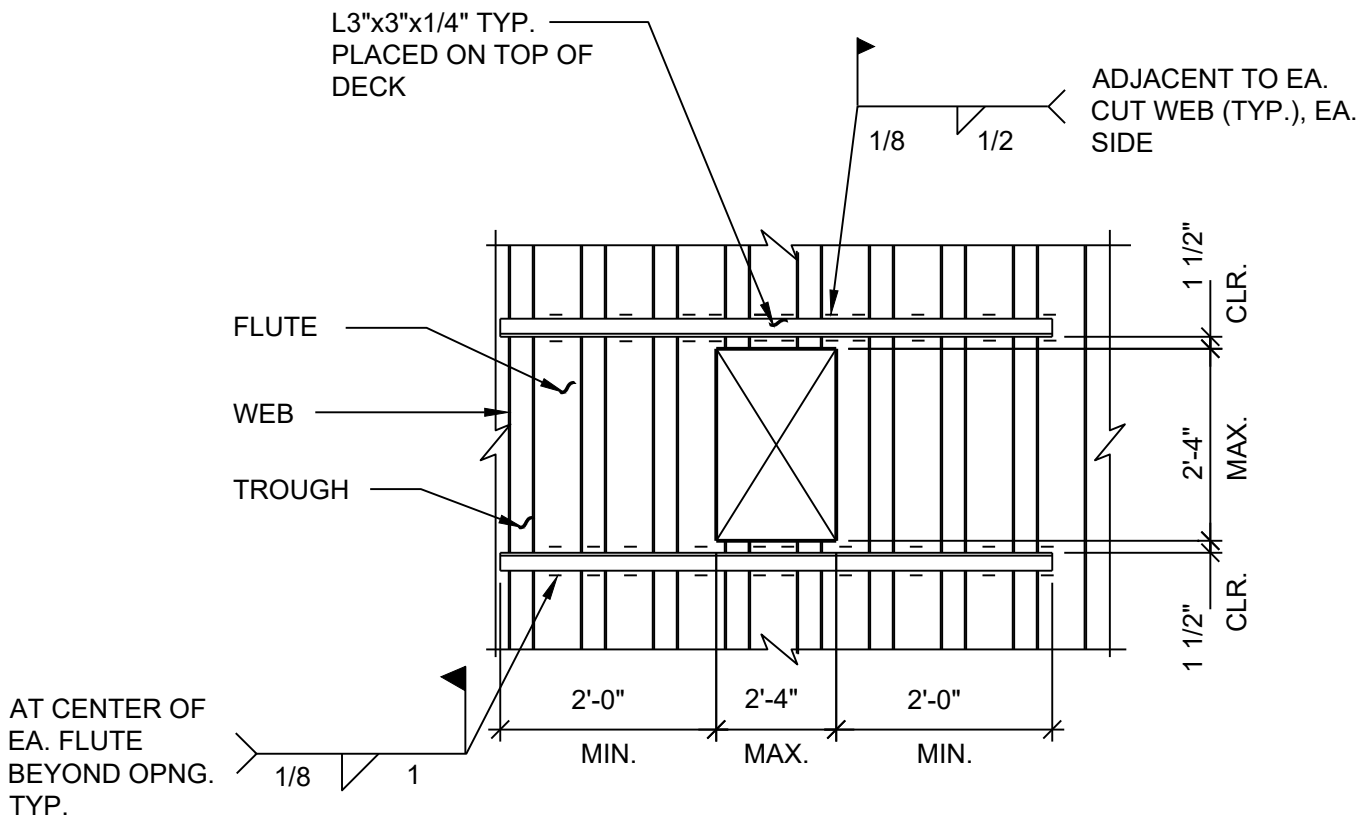
METAL ROOF DECK REQUIREMENTS

N.T.S.

TYPE	GAGE	I, IN ⁴	+S, IN ³	-S, IN ³	WELD PATTERN	VSC 2 PUNCHLOCK II
I	18	.302	.314	.331	36/7	@ 12"o.c.

METAL ROOF DECK NOTES

1. ALL DECKING SHALL BE GALVANIZED (G60).
2. ATTACHMENT TO PERPENDICULAR SUPPORTS SHALL BE AS NOTED IN THE DECK SCHEDULE
3. ATTACHMENT TO PARALLEL SUPPORTS SHALL BE PUDDLE WELDS AT 6 INCHES ON CENTER.
4. SIDE-LAPS SHALL BE FASTENED WITH VERCO SIDE LAP CONNECTION 2 AT SPACING INDICATED.
5. ALL PUDDLE WELDS SHALL HAVE AN EFFECTIVE FUSION AREA OF AT LEAST 3/4 INCH DIAMETER.
6. METAL DECK SHALL BE PLACED WITH 2 SPAN MIN.
7. WELD DECK TO ALL SUPPORT MEMBERS WHETHER SHOWN OR NOT.



2
S0.4

MISCELLANEOUS OPENING IN ROOF DECK

N.T.S.

- NOTES: 1. COORDINATE OPENING LOCATION WITH MECHANICAL PLANS.
2. COORDINATE DETAIL WITH ARCH. REQUIREMENTS.
3. DETAIL BASED ON MAX. WEIGHT OF 300 LBS.

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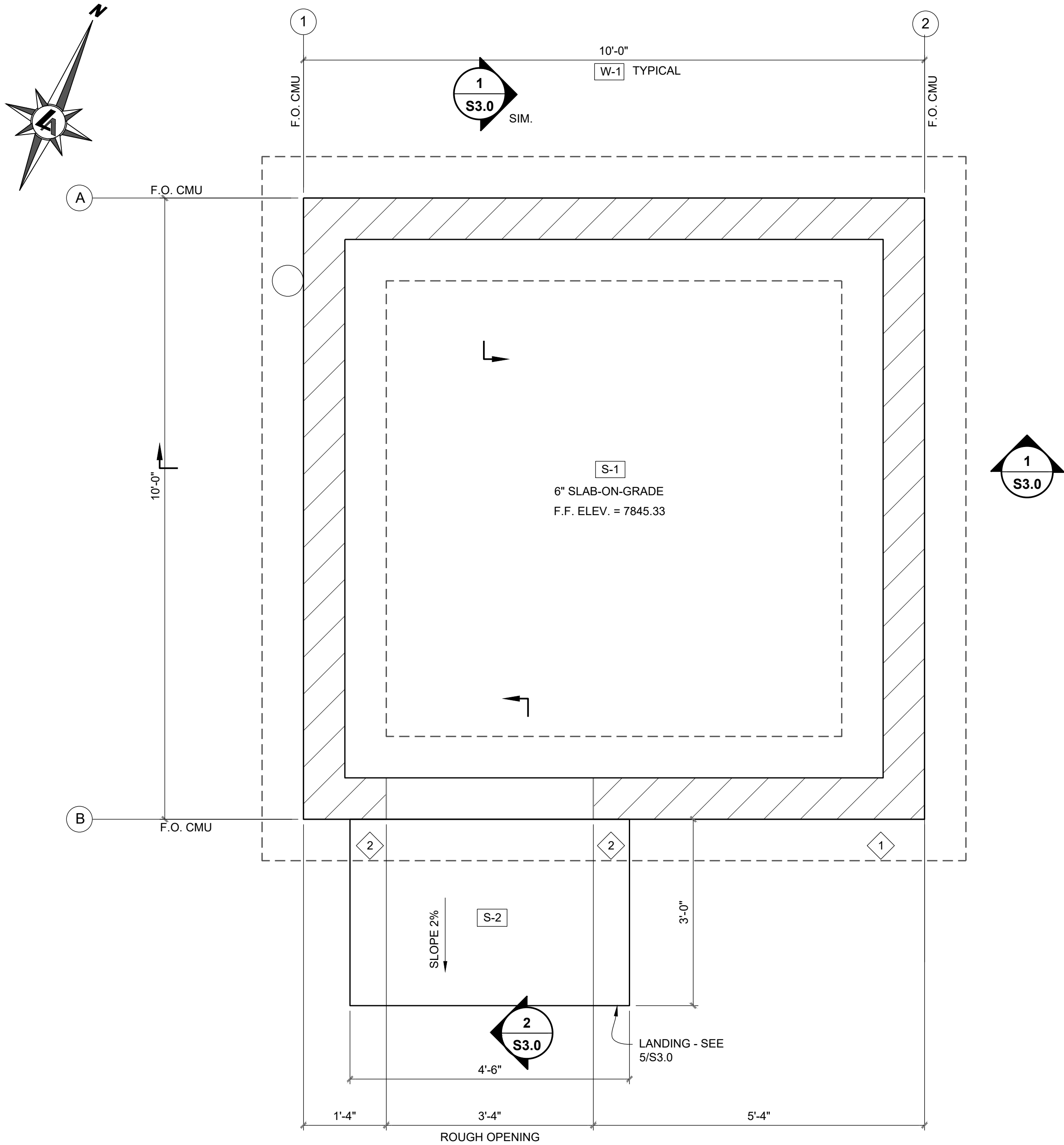
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S0.4

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1
S1.0 FOUNDATION AND SLAB PLAN
SCALE: 3/4"=1'-0"

NOTES: 1. SEE THE GENERAL STRUCTURAL NOTES ON S0.1, S0.1.1 & S0.1.2 FOR ADDITIONAL REQUIREMENTS.

CMU WALL SCHEDULE

MARK	NOMINAL THICKNESS	VERTICAL REINFORCING	HORIZONTAL REINFORCING	CHORD REINFORCING	COMMENTS
MW-1	8 IN	#5's AT 16" o.c.	#5's AT 24" o.c.	(2) #5's	SOLID GROUTED

NOTES: 1. SEE S0.3 FOR TYPICAL CMU WALL DETAILS.

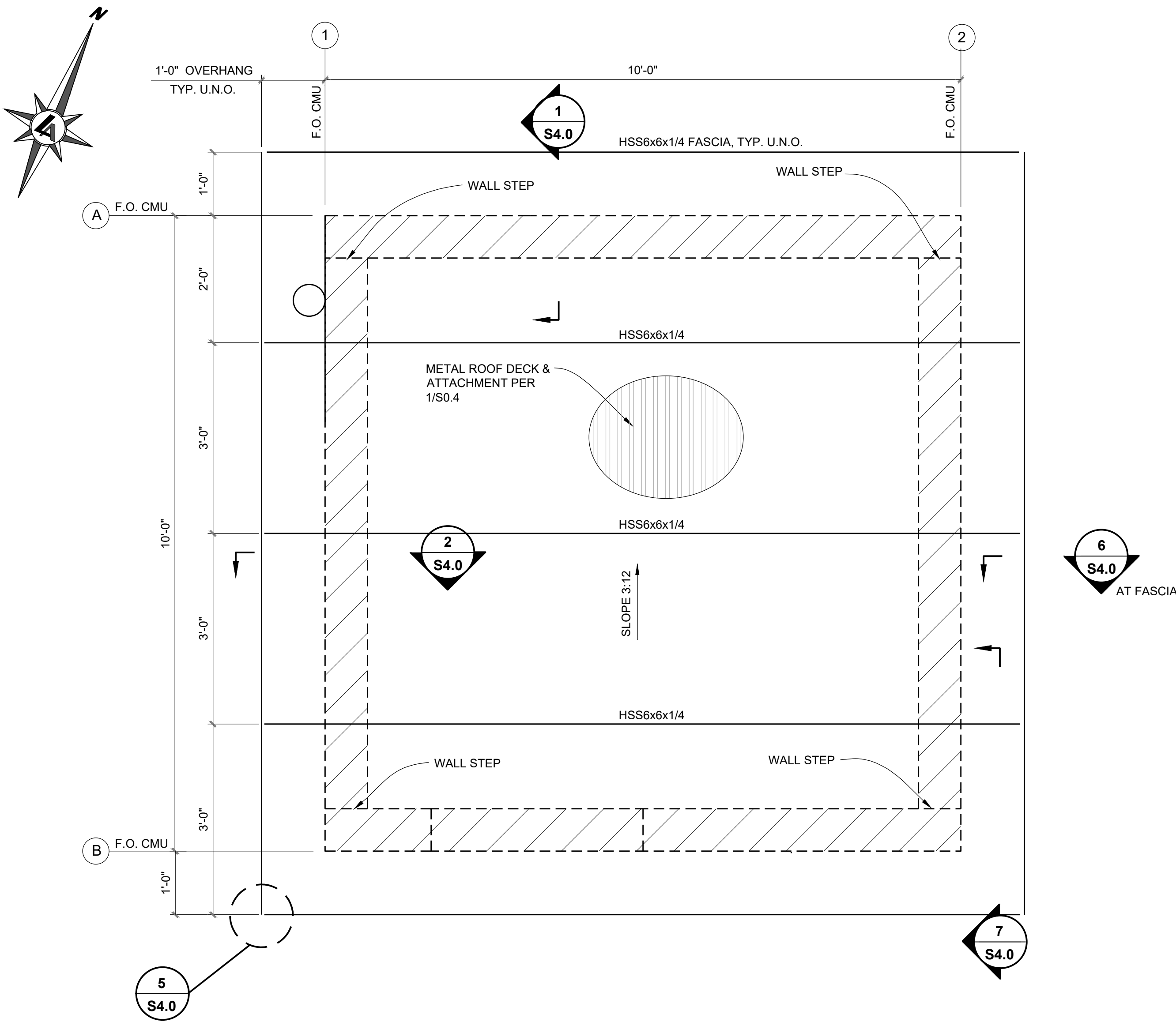
SLAB SCHEDULE

MARK	THICKNESS (MIN.)	AGGREGATE BASE	REINFORCING	COMMENTS
S-1	6"	6" TYPE 2 CL. B	#4's @ 16"o.c. EA WAY	SEE NOTES BELOW
S-2	4"	6" TYPE 2 CL. B	#4's @ 16"o.c. EA. WAY	LIGHT BROOM FINISH

SLAB NOTES: 1. REINFORCING TO BE LOCATED IN THE UPPER 1/3 OF THE SLAB, TYP.
2. SEE 1/S0.2 FOR FOUNDATION PREPARATION REQUIREMENTS.

MASONRY WALL JAMB SCHEDULE

MARK	WALL THICKNESS	VERT REINF.	TIES	COMMENT
1	8"	(1) #5 EA. FACE	-	
2	8"	(2) #5 EA. FACE	-	



2
S2.0 ROOF FRAMING PLAN
SCALE: 3/4"=1'-0"

NOTES: 1. SEE THE GENERAL STRUCTURAL NOTES ON S0.1, S0.1.1 & S0.1.2 FOR ADDITIONAL REQUIREMENTS.
2. ALL EXPOSED STEEL SHALL BE POWDER-COATED. SEE THE GENERAL STRUCTURAL NOTES.

REV	DATE	DESCRIPTION	BY

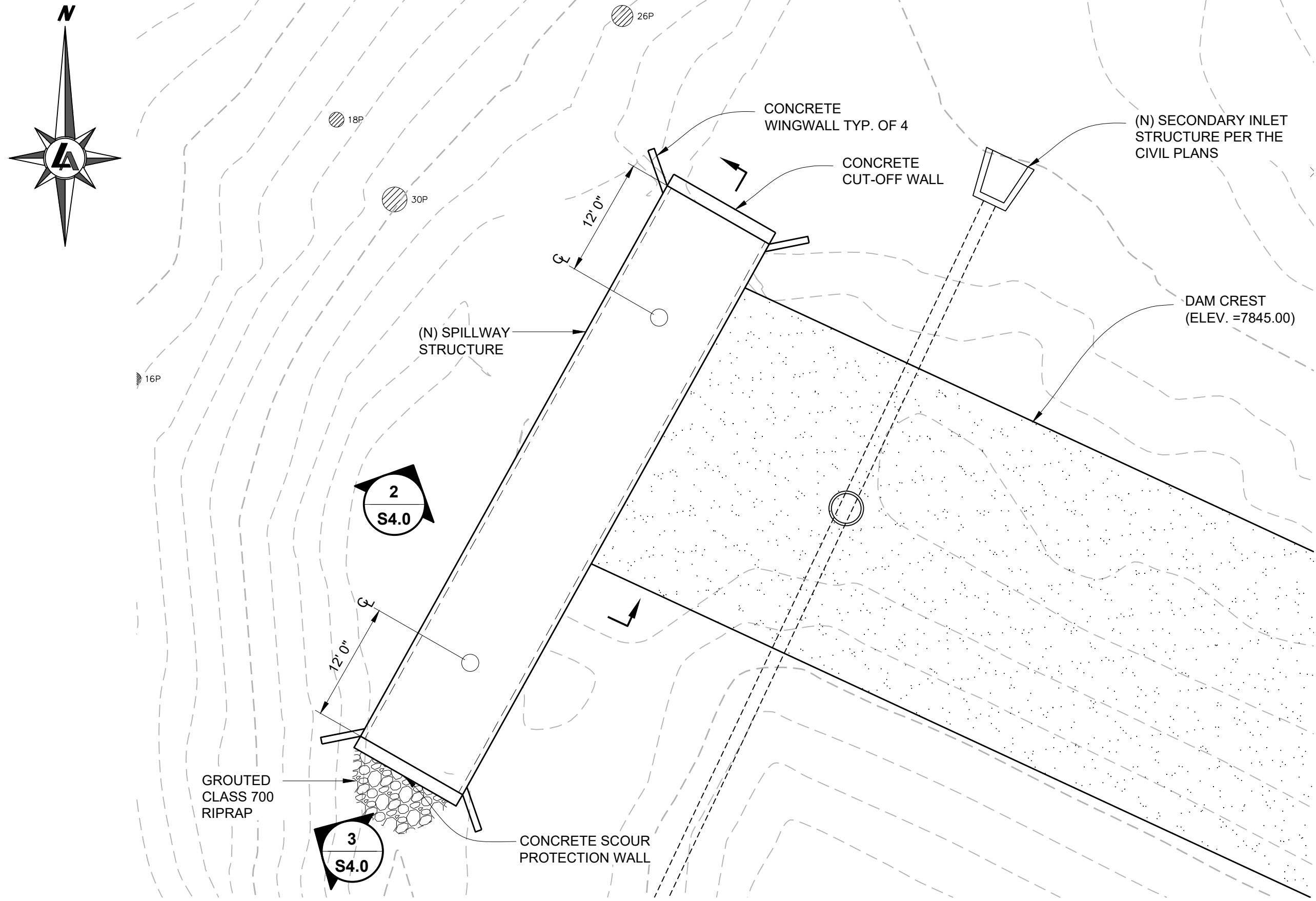
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

S1.0

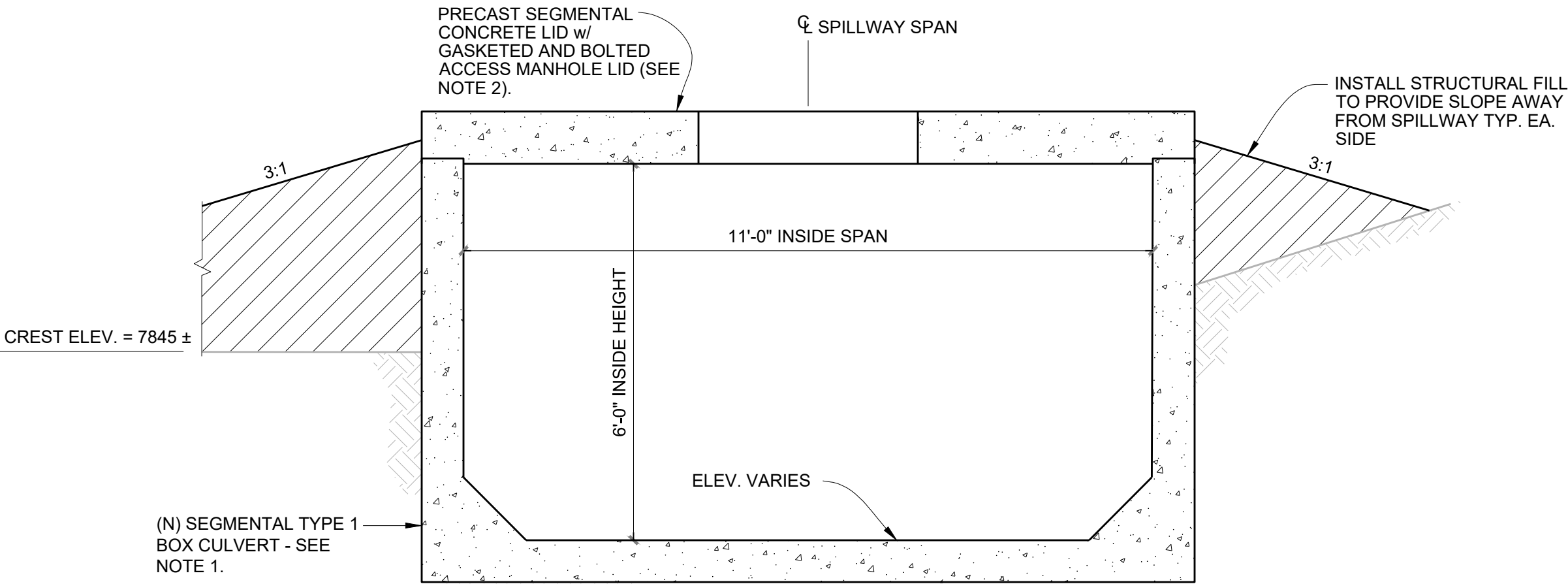
DRAWN BY: S.R.M
DESIGNED BY: T.R.T
CHECKED BY:
JOB NO.: 10217.00

L:\MP\12\1217\000 - Marlette Lake Dam Rehabilitation\DWG\Sheets\FROM STRUCTURAL\Marlette_12172021\Marlette_S4.0.dwg PROPOSED SPILLWAY PLAN AND SECTIONS_S4.0.
12/07/2021 04:49 pm csllrjg



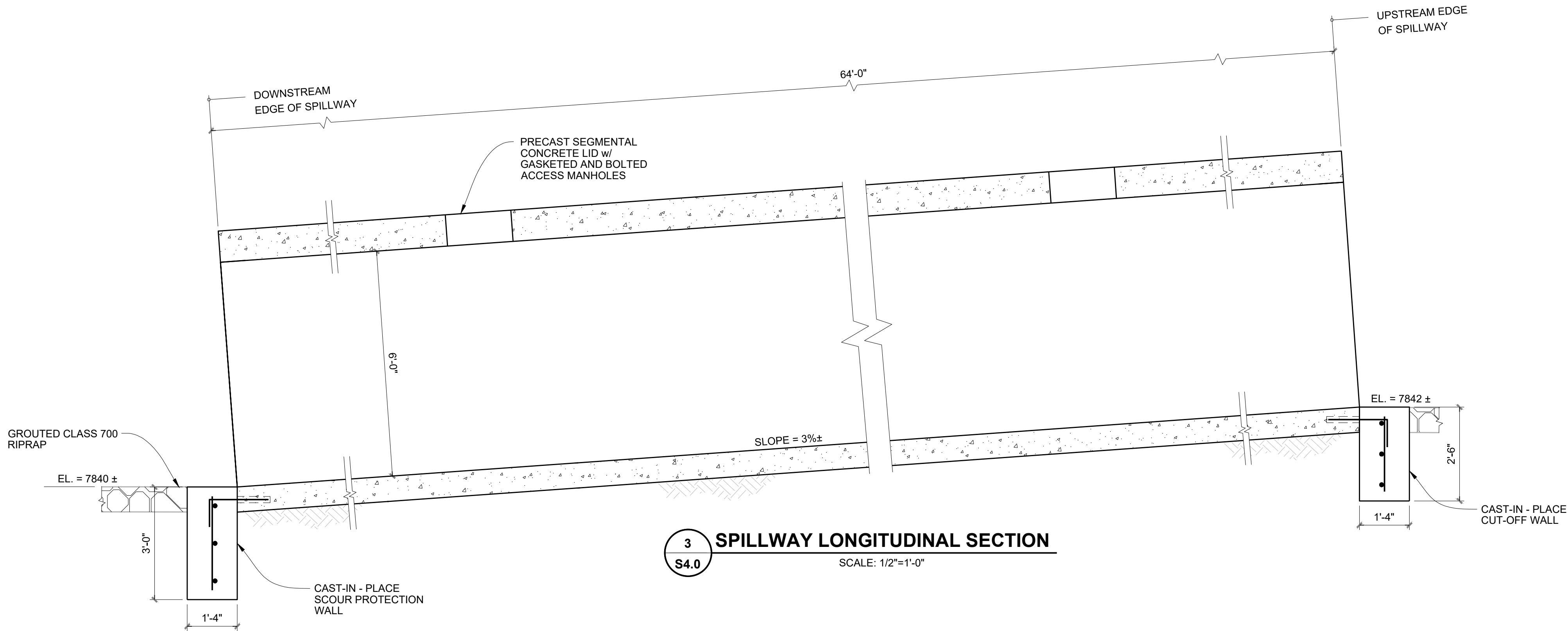
1
S4.0 **SPILLWAY PLAN**
SCALE: 1"=10'

NOTES: 1. SEE CIVIL PLANS FOR THE SPILLWAY LOCATION.



2
S4.0 **SPILLWAY TRANSVERSE SECTION**
SCALE: 1/2"=1'-0"

NOTES: 1. THE SPILLWAY SHALL BE COMPRISED OF A PRECAST TYPE 1 SEGMENTAL BOX CULVERT.
2. ACCESS MANHOLE LIDS SHALL BE HEAVY DUTY DUCTILE IRON OR STEEL WITH A 21 INCH (MIN.) DIAMETER. THE LIDS SHALL HAVE A GASKET TO PREVENT INCIDENTAL SURFACE WATER INFILTRATION. BOLTS SHALL BE STAINLESS STEEL.



3
S4.0 **SPILLWAY LONGITUDINAL SECTION**
SCALE: 1/2"=1'-0"

REV	DATE	DESCRIPTION	BY

BAR IS 1 INCH ON ORIGINAL DRAWING

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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

Appendix C:

IPaC Official Species List



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
Phone: (775) 861-6300 Fax: (775) 861-6301



In Reply Refer To:

April 05, 2023

Project Code: 2022-0079054

Project Name: Marlette Lake Dam Resilient Infrastructure Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <https://www.fws.gov/birds/policies-and-regulations.php>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Migratory Birds

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Reno Fish And Wildlife Office

1340 Financial Boulevard, Suite 234

Reno, NV 89502-7147

(775) 861-6300

PROJECT SUMMARY

Project Code: 2022-0079054
Project Name: Marlette Lake Dam Resilient Infrastructure Project
Project Type: Dam - Maintenance/Modification
Project Description: The proposed action would entail enlarging the downstream embankment of Marlette Lake Dam with imported materials for lateral support and adding a two-stage toe drain. Buttress fill would be placed and compacted in lifts and would extend the downstream toe of the dam an additional 48 feet. The proposed dam crest height would match the existing height (approximately 52 feet). The existing rip-rap protection on the upstream slope would be removed and replaced. The existing concrete spillway would be removed and replaced with a new concrete box culvert. The spillway would convey the Probable Maximum Flood (i.e., the flood that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the drainage basin) and maintain the required freeboard below the dam crest.

The existing outlet pipes would be relined using cured-in-place-pipe lining technology and extended through the new buttress fill to daylight at Marlette Creek. The intake for the outlets would be replaced with an elevated trash rack to prevent siltation. The primary outlet control system would be replaced with an automated control and Supervisory Control and Data Acquisition system, housed in a new building on the dam crest. A new secondary outlet would also be constructed 2 feet below the spillway crest, for additional operational control.

The construction of the new intake structure and re-lining the primary outlets would require dewatering of Marlette Lake to approximately 22 feet below the spillway crest, to an elevation of approximately 7,820 feet above mean sea level (AMSL). The lake would be lowered via the existing primary outlet over a period of up to several months. A water level of 7,820 feet AMSL would expose an existing sediment bar situated approximately 230 feet northeast of the existing dam crest. This sediment bar would be the basis for installing a cofferdam that would isolate the dam structure and forebay from the rest of the lake. The cofferdam would remain in place from approximately May through October 2025, after which point the cofferdam would be removed and the lake would be allowed to recharge naturally. Assuming a lake recovery of approximately 15 feet, and no changes to pumping operations, the lake would take approximately 5 years to fully recover after construction is completed.

A section of the existing access road northeast of the dam site, the Tahoe Flume Trail, would be re-graded and raised using native fill material to accommodate a temporary truck turnaround. The existing road providing

access to the project site, North Canyon Road, runs south to north from Spooner Lake to Marlette Lake. The North Canyon Road connects to SR 28 near its intersection with US 50 (Lincoln Highway). Lake Spooner Trail, which connects to SR 28, would also be used for access. Use of North Canyon Road for access would require some trimming of vegetation and temporary stabilization using aggregate base. Several pullouts along the road would be cleared and improved with minor grading. Following project construction, the road would be restored to pre-project conditions, including the repair of any damaged culvert crossings.

Staging areas would be used for the storage of materials, equipment, and fuel. These areas would be limited to existing disturbed areas. The dewatered lakebed may also be used for temporary staging.

The State Public Works Division assumes that major project construction would extend from May 2025 through October 2025, with the site being stabilized and inactive during the following winter. In May 2026, final construction and capping would be completed and the site would be restored by summer 2026.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@39.144200299999994,-119.89667473031675,14z>



Counties: Carson City, Douglas , and Washoe counties, Nevada

ENDANGERED SPECIES ACT SPECIES

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
North American Wolverine <i>Gulo gulo luscus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Proposed Threatened
Sierra Nevada Red Fox <i>Vulpes vulpes necator</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4252	Endangered

BIRDS

NAME	STATUS
California Spotted Owl <i>Strix occidentalis occidentalis</i> Population: Sierra Nevada No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7266	Proposed Threatened

AMPHIBIANS

NAME	STATUS
Sierra Nevada Yellow-legged Frog <i>Rana sierrae</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9529	Endangered

FISHES

NAME	STATUS
Lahontan Cutthroat Trout <i>Oncorhynchus clarkii henshawi</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3964	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CONIFERS AND CYCADS

NAME	STATUS
Whitebark Pine <i>Pinus albicaulis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1748	Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern \(BCC\)](#) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Jan 1 to Aug 31
Black-throated Gray Warbler <i>Dendroica nigrescens</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jul 20
California Gull <i>Larus californicus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31

NAME	BREEDING SEASON
Cassin's Finch <i>Carpodacus cassinii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Clark's Grebe <i>Aechmophorus clarkii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Evening Grosbeak <i>Coccothraustes vespertinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Golden Eagle <i>Aquila chrysaetos</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31
Lewis's Woodpecker <i>Melanerpes lewis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Olive-sided Flycatcher <i>Contopus cooperi</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Pinyon Jay <i>Gymnorhinus cyanocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15
Western Grebe <i>aechmophorus occidentalis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Willet <i>Tringa semipalmata</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

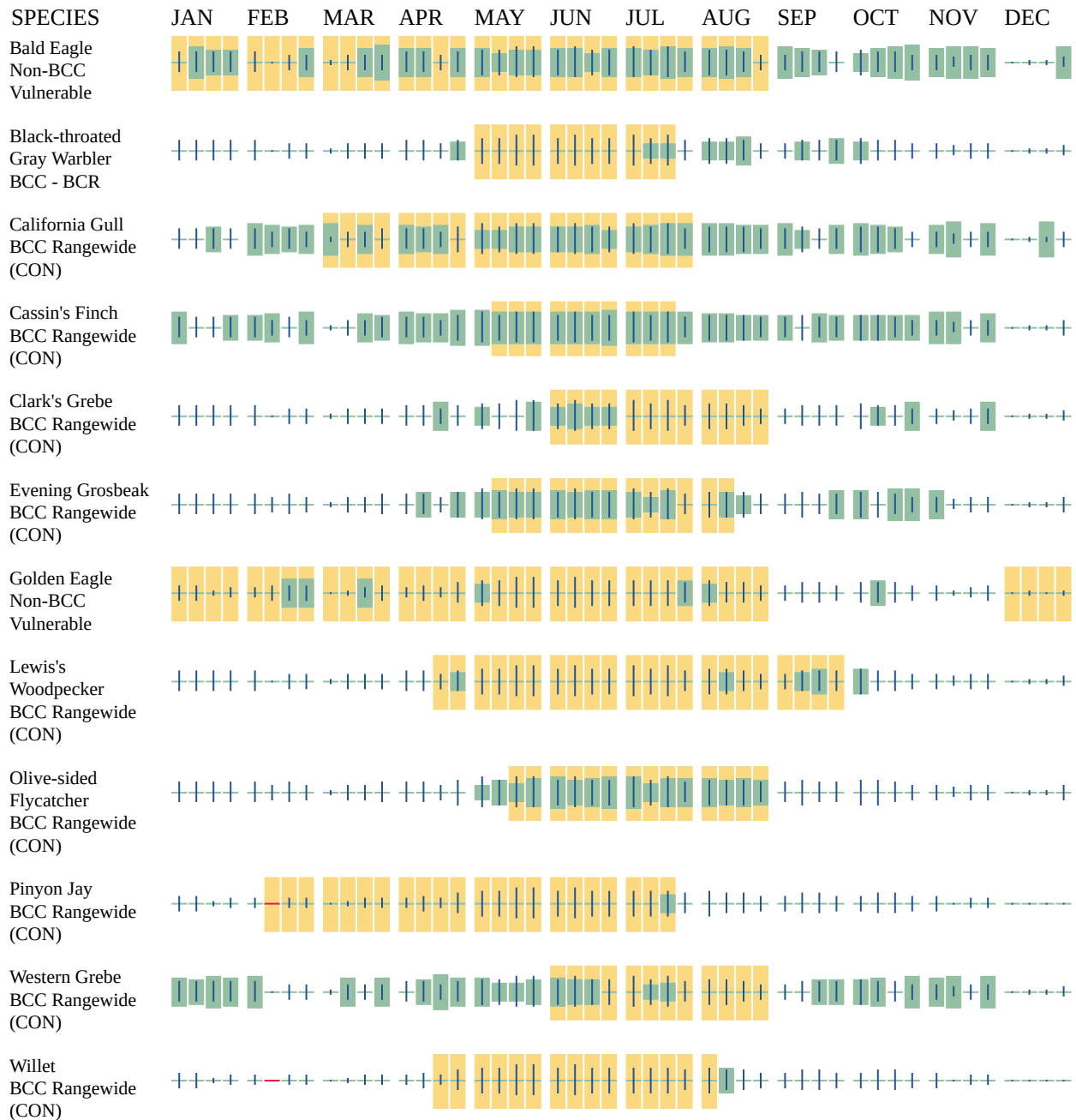
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort — no data



Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point

within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no

data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

IPAC USER CONTACT INFORMATION

Agency: CDM Smith
Name: Sam Bankston
Address: 620 SW 5th Avenue
Address Line 2: Suite 1115
City: Portland
State: OR
Zip: 97204
Email: bankstonse@cdmsmith.com
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LEAD AGENCY CONTACT INFORMATION

Lead Agency: Department of Homeland Security

Appendix D:
Federally Listed Species with the Potential to
Occur in the Action Area

Common Name	Scientific Name	Listing Status	General Habitat	Blooming or Breeding Season	Range or Summary of Population	Potential to Occur in the Action Area/Effect Determination
MAMMALS						
North American wolverine	<i>Gulo gulo luscus</i>	Proposed Threatened	Arctic tundra, subarctic-alpine tundra, boreal forest, mixed forest, redwood forest, and coniferous forest	May through July	The current range of this species includes portions of Washington, Oregon, Idaho, Montana, and Wyoming (USFWS 2018a).	The action area (AA) is within the historical range of this species and contains suitable habitat. However, no wolverines were detected during recent systematic surveys of the region conducted by the California Department of Fish and Wildlife (USFWS 2018a). Therefore, this species is not expected to occur within or near the AA. No critical habitat has been designated for this species. Therefore, no potential direct or indirect effects on this species are anticipated to occur from implementation of the proposed action. Effect Determination: No effect
Sierra Nevada Red Fox	<i>Vulpes vulpes necator</i>	Endangered	High-elevation forested and subalpine habitats	December through March	The current range of this runs near the Sierra crest from about Arnot Peak and California State Highway 4 in the north down into Yosemite National Park in the south (USFWS 2018b)	The AA is within the historical range of this species and contains suitable habitat. However, the AA is approximately 35 miles north of the northern extent of this species' current range (USFWS 2018b). Therefore, this species is not expected to occur within or near the action area. No critical habitat has been designated for this species. Therefore, no potential direct or indirect effects on this species are anticipated to occur from implementation of the proposed action. Effect Determination: No effect

Common Name	Scientific Name	Listing Status	General Habitat	Blooming or Breeding Season	Range or Summary of Population	Potential to Occur in the Action Area/Effect Determination
BIRDS						
California spotted owl, Sierra Nevada distinct population segment	<i>Strix occidentalis occidentalis</i>	Proposed Threatened	Found in older forests that contain structural characteristics necessary for nesting, roosting, and foraging. In the Sierra Nevada range, a majority of California spotted owls occur within mid-elevation ponderosa pine, mixed conifer, white fir, and mixed-evergreen forest types.	February through September	Occurs throughout the Sierra Nevada mountain range in California and Nevada.	The AA is within the current range of this species and may contain suitable habitat. However, based on information provided by USFWS, no effects on this species would result from implementation of the proposed action (Barrett 2023). Effect Determination: No effect
AMPHIBIANS						
Sierra Nevada Yellow-legged Frog	<i>Rana sierrae</i>	Endangered	Lakes, ponds, marshes, meadows and streams at elevations ranging from 4,500 to 12,000 feet	May through August	This species' range extends from the western Sierra Nevada north of Fresno County and the eastern Sierra Nevada in Inyo and Mono counties.	The AA is within the current range of this species and contains suitable habitat. However, a survey of the AA conducted by biologists from the Nevada Department of Fish and Wildlife and USFWS in spring 2022, resulted in a negative finding. Therefore, this species is not expected to occur within or near the action area. No critical habitat has been designated for this species. Therefore, no potential direct or indirect effects on this species are anticipated to occur from implementation of the proposed action. Effect Determination: No effect

Common Name	Scientific Name	Listing Status	General Habitat	Blooming or Breeding Season	Range or Summary of Population	Potential to Occur in the Action Area/Effect Determination
FISH						
Lahontan cutthroat trout	<i>Oncorhynchus clarkii henshawi</i>	Threatened	A wide variety of cold-water habitats including large terminal alkaline lakes, alpine lakes, slow meandering rivers, montane rivers, and small headwater tributary streams.	April through July	Lahontan cutthroat trout currently occupy between 123 to 129 streams within the Lahontan basin and 32 to 34 streams are outside the basin, totaling approximately 482 miles of occupied habitat.	This species is known to occur in the AA within Marlette Lake. Direct effects from the proposed action would consist of harm or mortality that may occur during fish capture and relocation activities. Indirect effects of the proposed action would consist of diminished water quality due to erosion of disturbed soils, accidental chemical spills or leaks, and reservoir drawdown, which would result in decreased habitat availability and quality. Although these effects would be minimized to the maximum extent practicable with the implementation of the proposed best management practices and species-specific measures, it is reasonably certain that some individuals would be stressed, injured, or killed as a result of the proposed action. No critical habitat has been designated for this species. Effect Determination: May affect, and is likely to adversely affect
PLANTS						
Whitebark Pine	<i>Pinus albicaulis</i>	Threatened	Subalpine and timberline areas with rocky, well-drained granitic soils	Spring	Southwest Canada south to the Sierra Nevada in California and east to northern Nevada and Wyoming	The AA is within the current range of this species. However, according to the findings of special-status plant surveys that were conducted in 2021, no suitable habitat for whitebark pine occurs within the AA (Resource Concepts, Inc. 2021). No critical habitat has been designated for this species. Effect Determination: No effect

Note: Species list generated from a review of USFWS IPaC

REFERENCES

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