SECTION 2

# Construction of the Facilities

## 2.1 Solar Field Design, Layout, Installation, and Construction Processes Including Timetable and Sequence

Construction of the Project, from site preparation and grading to commercial operation, is expected to take place from the fourth quarter of 2010 to the fourth quarter of 2014. Construction will include the major phases of mobilization, construction grading and site preparation, installation of drainage and erosion controls, PV panel/tracker assembly, and solar field construction.

### 2.1.1 Design, Layout, and Installation

Final design will take place during the final phase of project permitting. Drainage design, for example will be based on a detailed topographic map developed using the light detection and ranging (LIDAR) remote sensing technology. The LIDAR survey will be tied to an established grid coordinate system for accuracy. Licensed professional surveyors will conduct the final project boundary surveys and will stake out the project site design layout before construction.

### 2.1.2 Construction Process Timetable and Sequence

Major construction process milestones are listed in Table 2-1. This schedule is conceptual and subject to change, including potential acceleration, depending on market conditions within the regional power markets.

**TABLE 2-1**
Project Construction Schedule Major Milestones

| Activity | Date |
|---|---|
| NEPA Record of Decision | 4th Quarter 2010 |
| Begin construction | 4th Quarter 2010 |
| First PV modules placed into commercial operation | 2nd Quarter 2012 |
| Full commercial operation of all PV modules | 4th Quarter 2014 |

Table 2-2 lists the activities that will occur at the Project site beginning with site mobilization. A detailed, site-specific project schedule will be developed during final project design.

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**TABLE 2-2**
Anticipated Project Construction Schedule

| Activity | Timeframe |
|---|---|
| NEPA Record of Decision | Month 1 |
| Mobilization | Month 1 |
| Delineate and mark the boundaries of the construction zone | Month 1 |
| Stabilize construction entrance/exit and roadway. Install tire wash | Month 1 |
| Establish parking and staging areas for vehicle and equipment storage, maintenance | Month 1 |
| Establish fabrication and laydown area(s) for fabrication, assembly, and materials storage/staging | Month 1 |
| Establish concrete washout area | Month 1 |
| Clear and grub – Strip topsoil | Months 1–2 |
| Install certified weed-free fiber rolls or silt fence at the base of slopes adjacent to delineated sensitive areas (i.e., wetlands), if any | Months 1–2 |
| Construct stormwater infiltration/evaporation area | Months 2–7 |
| Assemble and erect PV modules commence commercial operation in 2 to 5 MW increments | Months 9–48 |

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Assembly of the tracker units and construction of the solar array will occur concurrently. The trackers will be assembled onsite in two temporary covered assembly areas, each approximately 40,000 square feet and 35 feet tall. Additionally, multiple temporary staging and laydown areas will be located throughout the Project site to support final assembly and installation. The staging areas will be approximately 6 acres each and the laydown areas will be approximately 0.75 acre each. Approximately 15 staging areas and 43 laydown areas will be required throughout the Project construction period. As construction progresses across the site, equipment will be removed from each temporary staging and laydown area, solar tracker units will be installed, and the areas will be revegetated, as appropriate.

During peak construction, an estimated 53 truck trips per day will be required to supply concrete, construction materials, Project components, and equipment to the site. To provide concrete for PV module foundations and other uses, either a concrete batch plant will be located onsite or an offsite ready mix plant will be used. In either case, a similar number of trucks would be required to supply either concrete or concrete raw materials.

Construction of the solar array will occur in a series of approximately 1- to 3-MW blocks. Each block will be connected to the electrical grid as it is completed. The tilted tracker units will be constructed approximately 17 feet apart in east-west rows and connected to a drive motor that rotates the solar panels to follow the sun's east-to-west progression across the sky. One motor can drive approximately 1,200 feet of trackers. The rows of trackers will be located approximately 16 feet apart in a north-south direction. If horizontal trackers are used, the tracker rows will run in a north-south direction and will be approximately 15 feet apart. If fixed tilt supports are utilized, rows would be oriented east-west and the rows

would be closer together. Improved (earthen or gravel) roads will be located in a generally north-south orientation to allow access within the solar array. Most of the remaining ground surface within the solar array will either be left vegetated or will be revegetated as necessary to minimize dust. Trimming or other methods of vegetation control may be necessary in order to avoid vegetation interfering with the solar equipment and for fire protection.

Construction of the proposed 220-kV transmission line will occur as described below, concurrent with the solar array construction and tracker unit assembly. The centerline of the transmission line route will first be surveyed, with each pole location clearly staked. Pole holes will be approximately 6 feet in diameter, 20 to 30 feet deep, and will be augured wherever feasible. Structures and conductor support hardware will be assembled at each pole location to minimize damage during transport. Erection of the poles will occur along the road ROW, and flagmen will be used as required during construction to ensure traffic safety and uninterrupted flow.

It is expected that an area of approximately 100 feet by 150 feet will be required at each pole location for use as temporary laydown or as a staging area for equipment, poles, and hardware. In general, little to no grading is expected to be required for these areas, and disturbance to sensitive vegetation will be minimized or avoided. Conductor stringing will occur by stationing stringing equipment at these sites, with smaller equipment (pickup trucks and flatbed trucks) traveling along the transmission line route as the conductor is installed.

Typical equipment expected to be used for transmission line construction includes: 1) backhoe, 2) truck-mounted pole hole auger, 3) forklift, 4) crane, 5) line truck with air compressor, 6) various pickup and flatbed trucks, 7) conductor reel and pole trailers, 8) bucket trucks, and 9) truck-mounted tensioner and puller.

## 2.2 Approach to Phased Construction and Operations

The Project is not a phased project, but will be constructed in a single phase.

## 2.3 Access and Transportation System, Component Delivery, Worker Access

The Project access road will extend from the existing frontage road located along Interstate 15 north of Primm to an existing railroad crossing within Section 3 in the Silver State North Project area (see Figure 1-3). From this point, the access road will follow an existing route to the southeast. An auxiliary road will be extended west to the O&M building that will be shared with the Silver State North Project. The Silver State South Project access road proper will continue east along the southern boundary of Section 3, and will then turn due south to run along the western boundary of Section 11 to the substation located in Section 11, immediately north of the Silver State South Project boundary at Section 14. The access road will be paved and will be used for delivery of all project components, as well as access by workers traveling to the site for construction.

Alternatively, access to the site will be from Primm Boulevard and will use the existing Union Pacific railroad overpass that provides access to the NV Energy Higgins Power Plant

Substation. A new 0.3-mile-long access road would be constructed to connect with the Silver State North Project site.

Construction access road beds will typically be 20 feet wide and surfaced with gravel, with 6-foot-wide crushed rock shoulders. A stabilized entrance/exit will be provided to clean vehicle wheels prior to exiting the construction area. Most construction staff and workers will come daily to the job site from within Clark County.

Parking areas for construction workers and laydown areas for construction materials will be prepared inside the solar field area. Detailed information regarding the location within the solar field of the laydown and parking areas will be developed after a contractor is hired to construct the facility.

## 2.4 Construction Workforce Numbers, Vehicles, Equipment, Timeframes

The onsite construction workforce will consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. The onsite construction workforce is expected to reach a peak of approximately 285, with a monthly average workforce of approximately 160. This workforce will be shared with that at the Silver State North Project site.

Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures.

Construction materials such as concrete, pipe, PV modules, tracker assemblies, wire and cable, fuels, reinforcing steel, and small tools and consumables will be delivered to the site by truck. Initial grading work will include the use of excavators, graders, dump trucks, and end loaders, in addition to the support pickups, water trucks, and cranes. It is anticipated that approximately 20 pieces of this type of large equipment will be onsite for the first year of construction for grading. As the Project moves into the next stages of civil work after the first couple of months, equipment for foundations and road construction will be brought in, including paving machines, trenching machines, concrete mixers and pumps, additional excavators for foundation drilling, tractors, and additional support vehicles. Based on similar projects, this type of work will continue into Month 48 of the Project as the field is built out. It is anticipated that the following equipment will be required:

- Scraper (3)
- Motor grader (3)
- Excavator (4)
- Dozer (3)
- Dump truck (4)
- Pad drum vibratory roller (2)
- 4,000-gallon water truck (6)
- Concrete truck (6)
- Backhoe/loader (2)
- Truck mounted crane (5)
- Grade-all (5)
- Flatbed truck for precast foundations (5)
- Trencher (3)
- Lightweight truck (50)

## 2.5 Site Preparation: Surveying and Staking

A licensed professional surveyor will conduct a land survey of the project site and will stake the construction area as needed before construction begins.

## 2.6 Site Preparation: Vegetation Removal and Treatment

Vegetation will be cleared or cut just ahead of the PV module installation activity and only in areas where it is necessary for the rows of trackers. The project will establish a plant nursery on site during clearing as necessary in order to store salvage plants, including cactus and yucca that are protected under Nevada State law (Nevada Revised Statues 527.060-120 and Nevada Administrative Code 527). Before clearing, field crews will remove and transplant all cacti and yucca to the nursery and will make them available for sale to commercial nurseries or free of charge to members of the public.

## 2.7 Site Clearing, Grading, and Excavation

The project will require a positive natural terrain slope of less than 5 percent (existing slope varies from 3.0 to 4.5 percent from east to west). To the extent possible, the PV modules will be placed on existing terrain with minimal grading and clearing.

## 2.8 Solar Array Assembly and Construction

Solar PV tracker construction work will require a pre-assembly area which will be located on the Silver State North Project site. The assembled solar PV trackers will be installed on the pre-cast concrete foundations or other suitable foundation to form a row of panels attached to an aboveground driveshaft driven by a tracker. Electrical connections between each row of trackers will be placed underground by means of an open-cut trench. Specialty trucks will be used to transport the assembled PV modules to the solar field. A small mobile crane will be used for setting the solar trackers on the pre-cast foundations. Trenching machines will be used for base trenching, light skiploaders for backfill, and light rollers for compaction. Final field assembly will require small cranes, tractors, welding machines, and forklifts. At any given time, there will be 8 to 12 five-man crews working the site, each with roughly eight additional vehicles.

## 2.9 Construction Waste Management

During construction, the primary waste generated will be nonhazardous solid waste. However, some nonhazardous liquid waste and hazardous waste (solid and liquid) will also be generated. All of the hazardous wastes will be generated at the plant site. The types of waste and their estimated quantities are described in the following discussion. Typical wastes generated during construction are identified in Table 2-3. NextLight will prepare a Waste Management Plan that will describe the storage, transportation, and handling of wastes and will emphasize the recycling of construction wastes where possible and will identify the specific landfills that will receive construction wastes that cannot be recycled. Construction wastes will be managed in accordance with the Resource Conservation and

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Recovery Act (RCRA) (42 USC 6901, et seq. and RCRA's implementing regulations at 40 CFR 260, et seq.) and other applicable state and local regulations.

**TABLE 2-3**
Wastes Generated during Construction

| Waste | Origin | Composition | Estimated Quantity | Classification | Disposal |
|---|---|---|---|---|---|
| Scrap wood, steel, glass, plastic, paper, calcium silicate insulation, mineral wool insulation | Construction activities | Normal refuse | 200 tons | Nonhazardous | Recycle and/or dispose of in industrial or municipal landfill |
| Scrap metals | Construction activities | Parts, containers | <2 tons | Nonhazardous | Recycle and/or dispose of in industrial or municipal landfill |
| Empty hazardous material containers | Operation and maintenance of plant | Drums, containers, totes* | <1 ton | Hazardous and nonhazardous solids | Containers <5 gal will be disposed as normal refuse. Containers >5 gal will be returned to vendors for recycling or reconditioning. |
| Spent welding materials | Construction activities | Solid | 1,500 lb | Hazardous | Disposal at an industrial landfill |
| Waste oil filters | Construction equipment and vehicles | Solids | 500 lb | Nonhazardous | Recycle at a permitted Treatment, Storage, and Disposal Facility (TSDF) |
| Oily rags, oil sorbent excluding lube oil flushes | Cleanup of small spills | Hydrocarbons | 100 cu ft | Hazardous | Recycle or dispose at a permitted TSDF |
| Solvents, paint, adhesives | Maintenance | Solids and liquids | 500 gal | Hazardous | Recycle at a permitted TSDF |
| Spent lead acid batteries | Construction machinery | Heavy metals | 10 | Hazardous | Store no more than 10 batteries (up to 1 year)–recycle off site. |
| Spent alkaline batteries | Equipment | Metals | 50 lb | Universal waste solids | Recycle or dispose offsite at a Universal Waste Destination Facility |
| Waste oil | Equipment, vehicles | Hydrocarbons | 500 gal | Hazardous liquid | Dispose at a permitted TSDF |
| Sanitary waste | Portable toilet holding tanks | Solids and liquids | 200,000 gal | Nonhazardous liquid | Remove by contracted sanitary service |
| Stormwater | Rainfall | Water | 6,870 gal/yr | Nonhazardous liquid | Discharge to stormwater drain |

*Containers include <5-gallon containers and 55-gallon drums or totes

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### 2.9.1 Nonhazardous Solid Waste

The following nonhazardous waste streams potentially could be generated from construction of the Project:

- **Paper, wood, glass, and plastics**. During construction, approximately 200 tons of paper, wood, glass, and plastics will be generated from packing materials, waste lumber, insulation, and empty nonhazardous chemical containers. These wastes will be recycled to the extent practical. Waste that cannot be recycled will be disposed of weekly in a municipal landfill. On site, the waste will be placed in dumpsters.
- **Metal.** Approximately 2 tons of metal including steel (from welding and cutting operations, packing materials, and empty nonhazardous chemical containers) and aluminum waste (from packing materials and electrical wiring) will be generated during construction. Waste will be recycled where practical. All wastes that that cannot be recycled (empty hazardous materials containers, spent welding materials, waste oil) will be deposited in a municipal landfill.

Landfills located nearest the Project site include the Boulder City Landfill in Boulder City (Class I Municipal Solid Waste) and Wells Cargo Landfill in Las Vegas (Class III Industrial Waste).

### 2.9.2 Wastewater

Wastewater generated during construction will include stormwater runoff and equipment washdown water.

Wastewater generated during construction will include sanitary waste, stormwater runoff, equipment washdown water and water from excavation dewatering during construction (if dewatering is required). These wastewaters may be classified as hazardous or nonhazardous depending on their chemical quality, and handled and disposed of in accordance with applicable law.

### 2.9.3 Hazardous Waste

A small amount of hazardous waste will be generated during construction primarily from small petroleum spills resulting from the operation of heavy equipment and filling of transformer and hydraulic equipment reservoirs. These spills will be cleaned up when they occur and the resultant waste material properly disposed in accordance with federal and state regulations.

Most of the hazardous waste generated during construction will consist of liquid waste, such as water from excavation dewatering (if it contains contaminants), flushing and cleaning fluids, passivating fluid (to prepare pipes for use), and solvents. Some hazardous solid waste, such as welding materials and dried paint, may also be generated during construction.

When pipes are cleaned and flushed, waste liquid will be generated. The volume of flushing and cleaning liquid waste generated is estimated to be one to two times the internal volume of the pipes cleaned. The quantity of welding, solvent, and paint waste is expected to be minimal. Wastewaters generated during construction could also be considered hazardous,

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based on sampling. A SPCC plan will be developed in accordance with federal regulations to protect the environment from spills of petroleum products.

## 2.10 Gravel, Aggregate, and Concrete Needs and Sources

Concrete ballasts, if used, and pads to support the PV panels and tracker units will be pre-cast and delivered to the site or constructed on site. A small amount of concrete may be poured in place for fence footing and miscellaneous small pads. Aggregate material will be used for the parking lot and access roads. Interior roads will be compacted gravel. Concrete will be supplied to the site from a commercial source or an onsite batch plant.

Concrete, mechanical, and electrical works will be performed over a period of 48 months, with the aid of graders, rollers, front loaders, dump trucks, trenching machines, concrete mixer and pump trucks, cranes, and pick-ups.

## 2.11 Electrical Construction Activities

Electrical construction will include installation of electrical equipment and necessary infrastructure to energize the equipment. Construction areas will include the project solar field and interconnecting transmission line.

Electrical construction will consist primarily of the following elements:

- **Equipment**—Installation of all electrical equipment including transformers, MCCs, circuit breakers, disconnect switches, switchgear and distribution panels, lighting, communication, control, and SCADA equipment.
- **Cables**—Installation of all cables necessary to energize the project equipment including instrument control wiring. High, medium, and low voltage cables will be routed via cable trays, abovegrade conduits, belowgrade conduit in duct bank, and overhead transmission structures as necessary.
- **Grounding**—All equipment and structures will be grounded as necessary. Within the panel field, an appropriate grounding system will be engineered and constructed in order to maintain personnel safety and equipment protection.
- **Telecommunications**—Multiple communication systems will be required for the site to properly operate, including T-1 internet cables, fiber optic, and phone. All communications will be installed during electrical construction.

Transmission line construction will consist of installing a 2.5-mile-long transmission line. The interconnection to the existing 220-kV transmission line (SCE-planned upgrade from 115 kV) will occur through a new switchyard located near the existing transmission line. The transmission line is detailed further in Section 3.1.

Switchyard construction will consist of site grading, concrete equipment foundation forming and pouring, crane-placed electrical and structural equipment, underground and overhead cabling and cable termination, ground grid trenching and termination, control building erection, and installation of all associated systems including, but not limited to,

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HVAC, distribution panels, lighting, communication and control equipment, and lightening protection.

## 2.12 Aviation Lighting

The project site is more than 20,000 feet from a runway that is 3,200 feet long and is therefore exempt from filing Federal Aviation Administration (FAA) Form 7460 (Notice of Proposed Construction or Alteration) for compliance with the FAA's regulations at 14 CFR Part 77. The nearest airport is Jean Airport (OL7), which is more than 10 miles (52,800 feet) north of the Project site. The tallest structures at the site will be the transmission towers. These structures will not require aviation lighting.

The southern end of the nearest runway planned for the Ivanpah Valley Airport is approximately 19,500 feet from the northern project boundary and NextLight, therefore, may be required to file Form 7460 at some point as the new airport approaches construction (timing currently undetermined). At this distance, it is unlikely that transmission towers of this height would be found to be a hazard to air navigation

## 2.13 Site Stabilization, Protection, and Reclamation Practices

### 2.13.1 Erosion and Sediment Control Measures

Because of the large amount of soil and vegetation that will be removed or disturbed during construction, appropriate water erosion and dust-control measures will be required to prevent an increased dust and sediment load to ephemeral washes around the construction site. Except for cactus and yucca species protected by Nevada state law, no cleared vegetation will leave the site. It will be mulched or composted on site to assist in erosion control and limit waste disposal. In some areas to be graded that lie outside of the solar field, native vegetation may be harvested for replanting to augment soil stabilization. Cactus and yucca will be salvaged and made available for public use.

Soil stabilization measures will be used to prevent soil being detached by stormwater runoff. NextLight will employ BMPs to protect the soil surface by covering or binding soil particles. The Project will incorporate erosion-control measures required by regulatory agency permits and contract documents as well as other measures selected by the contractor. Site-specific BMPs will be designed by the contractor, and associated figures are to be included in the final Project SWPPP. Figures 1-6 and 1-7 show the initial site drainage plan. At a minimum, the Project will implement the following practices for temporary and final erosion control:

**Year-round:**

- Monitor the weather using National Weather Service reports to track conditions and alert crews to the onset of rainfall events.
- Preserve existing vegetation where required and when feasible. Conduct clearing and grading only in areas necessary for project activities and equipment traffic. Install temporary fencing prior to construction along the boundaries of the construction zone to clearly mark this zone, preventing vehicles or personnel from straying onto adjacent offsite habitat.

- Sequence construction activities with the installation of erosion control and sediment control measures. Arrange the construction schedule as much as practicable to leave existing vegetation undisturbed until immediately prior to grading.
- Protect slopes susceptible to erosion by installing controls such as hay bales, fiber rolls, and gravel bags.
- Stabilize non-active areas as soon as feasible after construction is complete and no later than 14 days after construction in that portion of the site has temporarily or permanently ceased. Reapply as necessary to maintain effectiveness.
- Place covers over stockpiles prior to forecasted storm events and during windy conditions. Place sediment controls (fiber rolls or gravel bags) around the perimeter of stockpiled materials year-round. Excess sand and gravel will be stockpiled for BLM material sale.
- Maintain sufficient erosion control materials on site to allow implementation in conformance with General Permit requirements and as described in the SWPPP. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of rain.
- Promptly repair and reapply controls according to BMPs in areas for which erosion is evident.

**During the rainy season:**

- Implement temporary erosion control measures such as fiber rolls, straw bales, geotextiles and mats, and gravel bags at regular intervals throughout the defined rainy season and as needed determined by site conditions.
- Inspect and stabilize disturbed areas with temporary or permanent erosion control measures before rain events.

**During the non-rainy season:**

- Conduct construction activities that will have an impact on waters of the United States during the dry season to the extent feasible to minimize erosion.

A combination of the following erosion controls may be used at the site:

- Scheduling of activities to avoid times of erosion susceptibility
- Preservation of existing vegetation
- Mulch and hydraulic mulch
- Straw mulch
- Geotextiles and mats
- Earth dikes and drainage swales
- Velocity dissipation devices
- Slope drains
- Streambank stabilization

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BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, erosion controls will be adjusted accordingly to control stormwater runoff at the downgrade perimeter.

### 2.13.2 Sediment Control Measures

Sediment controls are intended to complement and enhance selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. The Project will incorporate sediment control measures required by regulatory agency permits and contract documents as well as other measures selected by the contractor. The Project will implement the following practices for temporary sediment control:

**Year-round:**

- The installation of detention ponds to control all stormwater flow off site. The ponds will be designed to control sediment transport off site. Sediment will be removed from the ponds periodically and transported off site to a designated fill area.
- Maintain the following temporary sediment control materials onsite: silt fence materials, gravel bags for linear barriers, and fiber rolls in sufficient quantities throughout the project to implement temporary sediment controls in the event of predicted rain and to respond to failures or emergencies, in conformance with General Permit requirements and as described in the SWPPP. Install gravel filter berms at the base of slopes adjacent to delineated sensitive areas (wetlands, dry washes), if any. Native onsite stones/rocks will be used in construction of gravel filter berms or check dams.
- Install gravel filter berms along the boundaries of delineated sensitive areas, if any, within the boundaries of the Project site or areas that receive runoff from the Project site. Native onsite stones/rocks will be used in construction of gravel filter berms or check dams.

**During the rainy season:**

- Implement temporary sediment controls at the draining perimeter of disturbed soil areas, at the toe of slopes, and at outfall areas.

**During the non-rainy season:**

- Implement temporary sediment controls such as hay bales, fiber rolls, or gravel bags at the draining perimeter of disturbed soil areas.

A combination of the following sediment controls may be used at the site:

- Silt fence
- Sediment basin
- Sediment trap
- Check dam
- Fiber rolls
- Gravel bag berm
- Street sweeping and vacuuming

BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, sedimentation controls will be adjusted accordingly to control stormwater runoff at the downgrade perimeter.

### 2.13.3 Rehabilitation Plan

NextLight will develop a Site Rehabilitation Plan for the revegetation and rehabilitation of all areas disturbed by the Project. This plan will be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the transmission line route that involve disturbance. The Project facilities have an expected life of 50 years or more and the Site Rehabilitation Plan will include plans for the restoration of the Project site assuming the cessation of operation of the facility and its eventual removal. The Site Rehabilitation Plan will cover the following topics:

- Goals and objectives of the plan
- Methods to be used to achieve site rehabilitation
- Criteria to be used to determine the success or failure of the rehabilitation
- Monitoring and maintenance of the site during and periodically after rehabilitation
- Noxious weed control during rehabilitation
- Annual reporting
- Rehabilitation implementation and monitoring schedule

## 2.14 Construction Water Usage

Construction activities are expected to take place over a period of approximately 48 months.[2] Water trucks will be used to deliver the water supply to the site for dust control.

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[2] Combined duration for both Silver State South and Silver State North Projects.