B. Description of Proposed Action/Project and Alternatives

B.1 Project Site Location

The proposed action would be primarily located within the Littlerock Reservoir (Reservoir), along public roads used as haul routes, and in large quarries west of the community of Littlerock. The Reservoir is a man-made feature formed by the impoundment of water by the Littlerock Dam. Figure B-1 illustrates the regional vicinity of the Project. The Reservoir is located within the boundaries of the Santa Clara Mojave Rivers Ranger District of the Angeles National Forest (ANF). Regionally, the Reservoir is located approximately 10 miles southeast of the City of Palmdale and 4 miles south of the community of Littlerock in the northern Los Angeles County area. Figure B-2 shows the Littlerock Reservoir and relevant proposed action areas, as described below in Section B.2.

B.2 Overview of the Proposed Action/Project

Within the notice of intent (NOI) and notice of preparation (NOP) dated March 19, 2014 to notify interested parties of the preparation of this environmental impact statement (EIS) and environmental impact report (EIR), key portions of the proposed action (Project) were described as:

- The removal of approximately 1,000,000 cubic yards of sediment from the Reservoir; and
- Construction of a mostly subterranean grade control structure that would span approximately 260 feet of channel (bank to bank) just downstream of Rocky Point. The maximum depth of the structure would be approximately 80 feet underground. The subterranean portion of the structure would extend downstream approximately 200 feet.

Since publication of the NOI and NOP, additional refinements to Reservoir topographical maps and analysis of sediment inflow to the Reservoir has increased the estimated amount of sediment necessary to the restore the Reservoir to 1992 design storage capacity. Additionally, further engineering of the grade control structure has resulted in different dimensions than what was presented in the NOI and NOP. These changes are identified below and analyzed within this EIS/EIR.

B.2.1 Overview of the Project

The proposed action consists of the following three components:

- Construction of a subterranean grade control structure within the Reservoir at Rocky Point.
- Total initial removal of approximately 1,165,000 cubic yards of accumulated sediment from within the Reservoir to restore 1992 design water storage and flood control capacity. This initial removal period would occur over a 7 to 12 year timeframe and would include annual restoration activities.
- Ongoing annual sediment removal (estimated at 38,000 cubic yards per year) to maintain Reservoir design capacity, including annual restoration activities.

These three Project actions are necessary to restore and preserve the Reservoir capacity, which has been substantially reduced over time by the deposition of sediment behind Littlerock Dam during seasonal inflows. The 1992 design capacity of the Reservoir is 3,500 acre-feet (af) of water storage. Currently, the Reservoir storage capacity has been reduced to approximately 3,037 af because of sedi-ment buildup. The USDA Forest Service's (Forest Service) proposed action is to amend an existing PWD

permit to allow for construction of the grade control structure and update an existing operations and maintenance (O&M) plan for the Reservoir.

Public Access Restrictions

As discussed in Section C.9 (Recreation and Land Use) within this EIS/EIR, the Littlerock Dam and Reservoir are authorized on National Forest System (NFS) lands by a special use authorization, considered a non-recreation special-use. Palmdale Water District (PWD) is authorized to lower the Reservoir to a "minimum" pool level after Labor Day, using the water for beneficial potable water needs. In drought years, PWD can lower the Reservoir earlier with approval by the California Department of Water Resources. One of the few recreational opportunities available during these periods is use of the lowered Reservoir bed as an OHV area, which was last opened in 2013. Use of this OHV area is assessed annually by the Forest Service, based on weather and water levels. The Reservoir is currently physically closed to public access to protect public health and safety, but no official Forest Service Closure Order has been issued. This means the entry gate is closed and locked but it is not illegal to enter the area.

The Reservoir would be closed to the public during proposed action activities. This is necessary for public safety. As discussed above, when the Reservoir is lowered, OHV within the Reservoir bed is one of the few recreational opportunities available. This area would be under construction and unavailable for OHV use. As discussed in more detail later in this section, closures of the Reservoir to the public are anticipated to be from:

- July through November the first year of Project activities for grade control structure construction;
- Labor Day to when seasonal water refill of the Reservoir suspends construction activities (estimated between mid-November and January) for initial sediment removal activities (7 to 12 years) to restore the Reservoir to 1992 design capacity; and
- After Reservoir restoration, as-needed between Labor Day to when seasonal water refill of the Reservoir suspends construction activities (estimated between mid-November and January) for ongoing sediment removal activities to maintain Reservoir design capacity.

B.2.2 Grade Control Structure

Before sediment removal can occur, a grade control structure would be constructed within the Reservoir at an area known as Rocky Point. Construction of the grade control structure is necessary to ensure that sediment removal will not result in degradation to designated critical habitat for the arroyo toad located immediately upstream of Rocky Point by inducing head-cutting (lowering) of the channel bed upstream of the structure. This location of the proposed grade control structure and arroyo toad habitat is depicted in Figure B-2.

The grade control structure would be constructed of soil cement (or roller-compacted concrete) derived from natural sand materials from the reservoir bed, simulating a natural, but hardened, ground surface. The primary structure will be a subterranean dam-like structure, with the top being flush with, or slightly above, the existing Reservoir bottom. Soil cement bank protection would extend laterally from the primary structure, as well as along the west upstream bank, to protect adjacent side slopes. This soil cement structure plus adjacent bank protection would span approximately 250 to 476 feet of channel (bank to bank) with a maximum depth of approximately 56 feet underground. The subterranean portion of the structure would extend downstream approximately 112 feet at approximately 2-to-1 slope. Figures B-3 and B-4 show a conceptual cross section of the primary grade control structure and a plan view of the overall structure, respectively.

Because the grade control structure and most of the adjacent bank protection would be constructed below grade, only the upper lip of the structure (at the greatest point upstream) would be visible when the reservoir water level is lowered (approximately 8 feet by 200 feet). Soil cement bank protection adjacent to the structure and on the west bank upstream of the structure would extend approximately 9 feet above the reservoir bed as shown in Figures B-3 and B-4. Figure B-5 depicts a visual simulation of the completed grade control structure when the Reservoir water level is lowered, thus exposing the upper lip of the structure.

B.2.2.1 Grade Control Construction

Construction of the grade control structure would begin in July of 2017, with the Reservoir lowered to a level allowing full access to the site. Construction is currently estimated to take approximately 20 weeks to complete. Construction would typically occur between 7:00 a.m. and 7:00 p.m., 6 days per week (no work on Sundays or federal holidays). Temporary night construction may be necessary during large volume soil cement activities and due to an earlier sundown during the fall months. Any necessary night work would be conducted consistent with the Standard Project Commitments (SPCs) identified in Appendix A (as discussed below in Section B.3) and is not expected to extend very far into the evening hours. It is anticipated that night construction may be needed for up to 14 nights.

Disturbance Areas

Construction activities would disturb a section of channel and adjacent bank up to 500 feet wide in a direction perpendicular to stream flow, and up to 470 feet wide in the direction parallel to the flow of the creek. The total disturbance during construction would be approximately 3.5 acres for the grade control structure and would extend approximately 175 feet into designated critical habitat for the arroyo toad (as shown on Figure B-2). It is important to note that a majority of this construction disturbance occurs in an area that may be underwater in any given year as the reservoir fills.

Excavation for the grade control structure would require the movement of approximately 96,000 cubic yards of material. This material would not be transported off site, but would be stockpiled within the downstream bed of the Reservoir and then used for soil cement base and backfill as the grade control structure is built.

All equipment would be stored within the existing paved areas shown in Figure B-2 when not in use at the grade control structure site. Construction staging areas would occur within these paved areas as well.

Water Diversion

Construction of the grade control structure may require diversion of subsurface and surface flows around the construction area in the reservoir bed at Rocky Point. Subsurface flows will likely be collected by installing a series of dewatering wells to a maximum depth of approximately 70 feet in the reservoir bed along the upstream and downstream limits of construction. These wells will pump subsurface water into a temporary pipeline that will convey the water around the construction site to be discharged into the reservoir bed downstream of the construction. Wells are expected to be approximately 4 to 6 inches in diameter and spaced in a line at 3- to 10-foot intervals upstream and downstream of the excavation perimeter (as shown in Figure B-3).

Intermediate wells may be necessary along the cut slope between the primary wells and the bottom of the excavation, within the main disturbance area. All dewatering wells would be temporary, removed after construction, and the ground restored to the pre-construction condition. Dewatering water would be pumped to the reservoir bed surface downstream of the construction site.

During normal rain events and stream inflow to the Reservoir, surface water flows would be collected by temporary coffer dam (referred to as a Flow Control Berm on Figure B-4) and diverted by gravity-flow surface pipeline or pumped surface pipeline around the work area.

Soil Cement

The grade control structure and adjacent bank protection would require approximately 9,285 cubic yards of soil cement. To provide slurry for the grade control structure soil cement, a portable concrete batch plant would be stationed within the paved Project staging area nearest Rocky Point (refer to Figure B-2). Sand for the soil cement would come from excavated material, which would first be fed through a portable rock screener for sorting. Portland cement and flyash would be obtained from off-site commercial sources and trucked to the staging area. Flyash is one of the residues generated by coal combustion, typically from power plants. The United States Environmental Protection Agency (EPA) published in December 2014 a final rule, which establishes that coal flyash is not to b45 e classified as a hazardous waste. Almost half of the flyash produced is recycled and used as a partial replacement for Portland cement in concrete production to improve the workability. Cementitious materials would be stored on site for use in construction of the grade control structure.

Soil cement mixture would be transported in trucks from the batch plant to the grade control site. Needed water would be obtained from the Reservoir and transported by truck or temporary pipeline. The excavation would be filled as the structure grows. As discussed in Appendix A, SPCs will ensure that potential contaminants from equipment and all construction activities occurring on paved parking areas (including cement water) do not enter the Reservoir or stream channel.

Construction Equipment

The anticipated maximum equipment necessary for construction of the grade control structure would include:

- Portable Concrete Plant (1) – 400 ton/hour capacity
- Portable Rock Screener (1) – 400 ton/hour capacity
- Roller compactor (1)
- D9 Bulldozers (2)
- Forklift (1) – 10-ton
- Grader/Spreader (1)
- Front End Loaders (1) – 6 yard capacity
- Excavators (1), with multiple attachments
- Water Trucks (1) – 4,600 gallon capacity
- Articulated Trucks (3) – 12-yard capacity
- Brush chipper/shredders and chain saws
- Generators and dewatering pumps (up to 12) and possibly lights (for any necessary temporary nighttime construction, assumed up to 14 working days)

Cleanup and Restoration

Construction debris would be removed from the site and transported to the Antelope Valley Recycling and Disposal Facility. Disturbed channel areas would be returned to pre-construction conditions. Restoration activities that would occur after construction of the grade control structure are described within Section B.2.5.

Grade Control Construction Summary

Table B-1 provides a summary of the proposed grade control structure and construction.

Table B-1. Grade Control Structure Summary
• A permanent structure of soil cement at Rocky Point and extending from bank to bank. The structure would prevent head cutting (erosion) upstream of Rocky Point, preserving arroyo toad habitat.
• Constructed mostly below grade, with only the top or upper lip of the structure and some adjacent bank protection visible in the stream surface and adjacent banks after completion.
• Temporary ground disturbance of approximately 3.5 acres. Permanent disturbance after construction would consist of the crest of the grade control structure that remains visible above grade (approximately 8 feet by 200 feet), plus bank protection adjacent to the structure. Total area of visible (above ground) soil cement bank protection after construction, including the grade control structure crest, is approximately 0.34 acres.
• Construction duration of 20 weeks to begin in July and extend through the fall.
• Construction equipment would be operated up to 12 hours per day, 6 days a week, with night construction possibly required for a maximum of 14 nights.
• Workforce ranging in size from 9 to 14 persons.
• Maximum of 30 daily worker vehicle trips and 6 daily truck delivery trips

B.2.3 Initial Annual Sediment Removal – Restore to 1992 Design Capacity

B.2.3.1 Overview

Upon completion of the grade control structure, PWD would remove approximately 1,165,000 cubic yards of sediment from the Reservoir bottom, restoring the Reservoir to 1992 design capacity. Sediment would be removed annually during a temporary closure of the Reservoir starting in 2017 after Labor Day until seasonal water refill of the Reservoir suspends removal efforts (estimated between mid-November and January). The Reservoir would be closed to the public during this period.

It is estimated that under a maximum removal schedule, approximately 7 to 12 years of annual sediment removal would be required to achieve 1992 design capacity of the Reservoir. This excavation rate assumes that 16, 12-cubic-yard-capacity dump trucks, with associated necessary off-road equipment, are working a total of 60 days annually between Labor Day and mid- to late November each year to remove a total of 166,430 cubic yards of sediment each year. It is estimated that there is an annual inflow rate of 38,000 cubic yards of new sediment into the Reservoir (loss of 23 af of water storage annually), Therefore, the net annual increase in Reservoir capacity during each of the 7 to 12 years of initial annual sediment removal is approximately 80 af.

The above maximum sediment removal scenario is utilized to represent worst-case potential for environmental impacts. However, unknown variables (such as annual dump truck availability, seasonal rainfall during the removal period, sediment recycling/reuse at civil projects more distant than the proposed disposal sites) may occur. Therefore, it is likely the initial disposal period could extend up to 10 to 12 years to achieve 1992 design capacity.

Sediment removal activities would involve the excavation of material from inside the Reservoir bed, within the disturbance area shown in Figure B-2. Sediment removal will not alter the Reservoir footprint, but will simply deepen the Reservoir within the excavation area shown in Figure B-2. The excavation area starts just upstream of the Dam and extends 4,500 feet upstream of the Dam. The maximum excavation depth would be approximately 14 feet approximately 800 feet upstream of the Dam. The new

channel bottom would taper upstream to the existing grade at the upstream limits of excavation. This disturbance area is contained entirely within the Reservoir inundation area.

B.2.3.2 Annual Sediment Removal Activities

Biological Surveys and Vegetation Clearing

PWD would conduct pre-construction surveys and establish exclusion areas before commencing annual sediment removal to reduce potential impacts to sensitive biological resources. Refer to Appendix A for SPCs related to preconstruction survey requirements, the establishment of any annual temporary exclusion areas, and biological monitoring during annual sediment removal. Vegetation clearing within the sediment removal area may be required annually. PWD would salvage vegetation for future restoration efforts or dispose of vegetation at an approved landfill accepting organic material, such as the Antelope Valley Recycling and Disposal Facility. If any emergent vegetation is removed, focused preconstruction nesting surveys for birds would be conducted to ensure there is no loss of nesting birds or their young.

Removal of Invasive Fish Species. The Littlerock Reservoir does not support any species of native fish. Based on sampling, creel census surveys, and biological surveys conducted in the Reservoir, only non-native species have been detected. Many of these species have been observed in designated Critical Habitat for arroyo toad located upstream of the Reservoir. Furthermore, the Lahontan Regional Water Quality Control Board (Lahontan RWQCB) found fish within the Reservoir to be contaminated with Mercury, and are currently designated unsafe for consumption by the California Office of Environmental Health Hazard Assessment (LRWQCB, 2014). As part of this Project, additional fish tissue samples were taken. The results of these tests are provided in Appendix D and discussed in Section C.3 (Biological Resources). In order to improve habitat conditions for arroyo toad and other native species, all non-native fish will be removed from the Reservoir during sediment removal activities.

During the first year of sediment removal, all water will be diverted from the Reservoir in order to strand non-native fish. A qualified biologist will supervise this activity and be available to inspect for any native reptiles or amphibians. If present, these species will be collected and relocated to upstream areas. Fish carcasses will be immediately collected and disposed in an approved landfill accepting such waste to ensure no adverse odor is created and to prevent other species of wildlife from consuming the fish. As discussed in Appendix A (Standard Project Commitments), no less than 120 days prior to the first year of sediment removal, the Palmdale Water District shall coordinate with the authorized officer for the ANF to develop consensus on methods of removing non-native fish from the Reservoir (SPC LAND -2).

Based on PWD's recent tests of fish from the Reservoir (refer to Appendix D), the mercury and PCB levels found would not classify them as Class I hazardous waste. Because each individual fish killed would not be tested, it is assumed all fish could potentially be contaminated. Consistent with applicable regulations for the disposal of contaminated waste, all removed fish would disposed at a licensed facility (likely the nearest Class III landfill, Antelope Valley Landfill in Palmdale). In the event this determination changes, fish would be disposed of at Laidlaw Landfill in Kern County, the nearest Class I landfill.

Prior to each subsequent annual sediment removal period, after water has been diverted from the Reservoir, a biologist will determine if any invasive fish species are present and will assess the need for additional fish removals. The Reservoir is not currently listed for recreational fish stocking by the California Department of Fish and Wildlife (CDFW). Therefore, after several annual sediment removal periods, no fish would likely remain within the Reservoir.

Water Diversion

To provide access to the full excavation area, PWD would first divert water for beneficial use from the Reservoir lowering to a dead pool level (resulting in a pool between the furthest downstream excavation area and the Dam). As surface flows from rainfall begin to refill the Reservoir, a coffer dam and/or temporary pipeline may be required to pass low stream flows around the work area as sediment removal moves upstream later in the fall within the excavation area.

Construction Access

Access to and from the sediment removal area would occur from the existing boat ramp and other existing access points located on the west side of the Reservoir (as shown in Figure B-2). Access road preparation would involve:

1. Providing and marking access roads and travel paths for construction equipment; and
2. Clearance or grading of the road surface to accommodate necessary travel within the Reservoir.

Sediment removal operations would require traffic control (flagmen) stationed near the boat ramp and gated entrance to the Reservoir on Cheseboro Road. Additional locations for temporary traffic signal/flagmen may be required between these two points. However, this segment of roadway would be closed to public access during the annual closure period.

Disposal of Removed Sediment

Excavated sediment would be loaded into trucks and hauled to off-site locations. Sediment may first be stockpiled within the excavation area if drying is needed. PWD will first seek to recycle excavated material as feasible, likely for use on PWD and other municipal projects within Palmdale and the surrounding area. All excavated sediment would be trucked off site to one of two locations (refer to Figure B-1):

- **Exhausted mining pits at existing quarries within Littlerock.** The majority of removed sediment would be used for backfilling exhausted mining pits at existing sand and gravel mines located in the community of Littlerock, approximately 6 miles north of the Dam (as shown in Figure B-1). Currently, 6 individual quarries operate within this area, including Holiday Rock, AV Aggregate, Robertson's, Granite Construction Company, Hi-Grade Materials Company, and Vulcan Materials Company. Exhausted pits at these locations have capacity that exceeds 1,200,000 cubic yards. PWD will coordinate with these quarries on an annual basis to determine the exhausted pit(s) that will receive sediment for spreading and backfill. Disposal of material within the exhausted pits will require that the selected mining operation, or operations, submit for a major modification to their new Conditional Use Permit (CUP) or that a new CUP application be submitted. Additionally, the City of Palmdale Office of Mine and Reclamation would require notification of the major modification to the approved Reclamation Plan(s).
- **PWD-owned property on 47th Street East, just north of the California Aqueduct.** This 21-acre site is shown in Figure B-1. A small portion in the northeast corner of this site would be used for temporary sediment storage, allowing for future use (recycling) of material. Sediment would be stored at this location only for the short-term, allowing for recycling of the material for other civil projects and PWD uses (should stockpiling the material at the recycle location not be allowed at the time of removal from the Reservoir). This site has an at-grade truck access and disturbed staging area on 47th Street. Sediment storage would occur only in depressions located in the northeast portion of the site, ensuring the greatest distance from adjacent residences, ephemeral streams, and the California

Aqueduct. Furthermore, stockpiled sediment material would not be mounded above the existing grade of 47th Street. The amount of excavated sediment stored at this location would likely vary from year to year as reuse is evaluated annually. However, the amount of material temporarily stored at this location would not exceed 10,000 cubic yards. PWD will annually evaluate the amount of material that can be recycled. It is also likely that some material could be trucked directly to the site of reuse. The storage area would require clearing of vegetation that would not be restored so the site is available for temporary sediment storage and recycling.

Sediment removed from the Reservoir consists of a combination of fine sediments, sand, coarse gravels, and cobble. Disposal of the materials would follow federal regulations and policies for the appraisal and sale of commercial mineral materials, if applicable. In September of 2014, sediment from the Reservoir was tested to identify any potential contaminants. Sediment samples were taken at eleven (11) different locations within the proposed removal area. Sediment was tested both from the surface and at a depth of 4-6 feet at each of the eleven locations. No sediment tested contained pesticides, polychlorinated biphenyl (PCB) congeners, or mercury levels exceeding method detection limits (MDL) or above levels normal within soils. These results are provided in Appendix D.

Construction Equipment, Materials, and Schedule

Construction equipment staging would occur within the existing paved surface parking lots within the Littlerock Reservoir, as shown in Figure B-2. All staging, temporary employee parking, and material storage activities would occur in previously disturbed or paved areas. No fuel or mobile equipment would be stored within the Reservoir.

Typical equipment required for annual sediment removal includes, but is not limited to, loaders, dozers, dump trucks, excavators, and water trucks. PWD proposes to use front-end loaders and 12-yard capacity dump trucks to haul material off site for disposal. The following provides approximate equipment types and numbers utilized during annual sediment removal:

- D9 Bulldozers (2)
- Grader (1)
- Sweeper (1)
- Front End Loader (1) – 6 yard capacity
- Excavators (1)
- Dump Trucks (16) – 12 yard capacity
- Water Truck (1) – 4,600 gallon capacity
- Fuel Truck (1)
- Maintenance Truck (1)
- Brush chipper/shredders and chain saws

Construction equipment would be operated only between 7:00 a.m. and 7:00 p.m., up to 6 days a week (no activities occurring on Sundays or federal holidays). Saturday activities may be restricted in order to minimize impacts to residents along Cheseboro Road between the Reservoir and the sediment disposal site (e.g., no work every first and third weekend). With a daily workforce of approximately 30 personnel, including dump truck drivers, over 60 working days of excavation would be required to perform annual sediment removal. In addition, there would be a few days of clearing, staging, and cleanup before and after each of the annual excavation events.

Cleanup and Restoration

Upon cessation of annual sediment removal, all disturbed areas will be restored (refer to Section B.2.5, below). Construction debris would be removed from the site and transported to the Antelope Valley Recycling and Disposal Facility. Disturbed channel areas would be returned to pre-construction conditions.

Annual Sediment Removal Summary

A summary of annual sediment removal activities restoring the Reservoir capacity is shown in Table B-2.

Table B-2. Summary of Annual Sediment Removal to Restore Reservoir Capacity
• Excavation of approximately 1,165,000 cubic yards of accumulated sediment to restore Littlerock Reservoir to 3,500 af of water storage capacity.
• Temporary annual closure of the Reservoir starting after Labor Day until seasonal water refill of the Reservoir suspends removal efforts (estimated between mid-November and January).
• Sediment removal activities would occur during daylight hours up to 12 hours per day Monday through Saturday (no work on Sundays or federal holidays)
• Maximum annual disturbance of approximately 30 acres within the Reservoir bed.
• Equipment staging within paved parking areas along Reservoir.
• Maximum of 480 (240 round trip) dump truck trips per day. Requires the use of 16 dump trucks.
• Annual restoration of disturbed areas.
• Minimum duration of approximately 7 years, up to 12 years, to restore 1992 design capacity.

B.2.4 Ongoing Annual Sediment Removal – Operation and Maintenance

Current estimates indicate Reservoir capacity is reduced by siltation at an average annual rate of approximately 38,000 cubic yards of sediment per year, amounting to a loss of approximately 23 acre-feet of water capacity annually. Therefore, upon restoring the Reservoir to 1992 capacity, an average of 38,000 cubic yards of sediment would be removed from the Reservoir annually. The actual amount of sediment removed from the Reservoir would be based on the expected amount of sediment deposition that occurred during each year's winter storms.

Annual O&M sediment removal would occur for the life of the Reservoir similar or identical to that discussed below in Section B.2.5. However, because annual O&M sediment removal would need to remove an average of only 38,000 cubic yards of sediment per year, it may have a shorter annual duration when compared to initial restoration sediment removal. This would depend on the number of dump trucks used. Table B-3 provides a summary of O&M sediment removal.

Table B-3. Summary of Operation and Maintenance Sediment Removal
• Approximately 38,000 cubic yards of sediment removed from the Reservoir annually (actual amount removed would be based on the expected amount of sediment deposition carried into the Reservoir during each year's winter storms)
• Would occur sometime after Labor Day and be finished prior to mid-November of each year
• Sediment removal activities would occur during daylight hours up to 12 hours per day Monday through Saturday (no work on Sundays or federal holidays)
• Maximum annual disturbance of approximately 15 acres within the Reservoir bed.
• Maximum of 180 (90 round trip) dump truck trips per day. Requires the use of 6 dump trucks.

B.2.4.1 Annual Return to Reservoir Minimum Pool Level

Currently, the Reservoir has a minimum pool obligation that was put in place by the California Department of Water Resources (DWR) to help facilitate recreation at the Reservoir through Labor Day. After water is diverted from the Reservoir for beneficial drinking water use, the minimum pool is reestablished in the fall or early winter by inflow at varying times (depending on inflow rate). Based on analysis of inflow records from 1931 to 2005, inflow is generally sufficient under current conditions to fill

the Reservoir to minimum pool by mid-December, with a normal range of October to February. In very dry years, the Reservoir may not reach minimum pool level at all. The minimum pool is not defined by a volume of water in the Reservoir, but rather when the Reservoir water level reaches an elevation of 3231.

After the Reservoir has been restored to design capacity, the topography of the Reservoir will be changed such that the volume of water required to fill the minimum pool to Elevation 3231 will be increased. Based on past inflow records, the Reservoir will require approximately ten days to two weeks longer, on average, to refill to minimum pool level under with-project conditions compared to without-project conditions. This typically occurs between January and March when seasonal rain and snowmelt occurs and refills the Reservoir to minimum pool depths.

B.2.5 Annual Sediment Removal Site Clean-up and Restoration

B.2.5.1 Reservoir and Shoreline Restoration Activities

Following the excavation and removal of sediment from the Reservoir, the area would be graded to smooth the Reservoir bottom and remove any scars resulting from the excavation activities. Any construction debris would be removed from the site and transported to the Antelope Valley Recycling and Disposal Facility. It should be noted that the majority of the disturbed area would be Reservoir inundation area that is highly disturbed.

Any disturbances along the shoreline or other areas outside the Reservoir inundation area (sediment stockpiling, construction equipment storage, and staging areas) would be restored. Native seed mixes and live plant material would be planted in areas that contained vegetation disturbed during construction of the grade control structure or sediment removal activities. Reseeding would be focused primarily on disturbed areas outside or adjacent to the Reservoir inundation area. Within the Reservoir inundation area, limited seeding may occur to stabilize soil and control dust as outlined in the Habitat Restoration Plan (see Appendix A).

In targeted areas outside the reservoir inundation area, where any persistent native vegetation is removed for proposed action activities, the area would be revegetated and restored to its previous state. Noxious weed controls including washing of ground-disturbing equipment and removal of weeds prior to disturbance would be implemented to ensure that restored areas are not colonized by invasive plants. Appendix A presents general guidelines for revegetation. Site restorations would begin immediately following the cessation of construction activities concurrent with appropriate planting conditions and permit requirements.

B.2.5.2 Roadway and Parking Area Restoration Activities

At the completion of grade control structure construction and annual sediment removal activities, PWD contractors would restore all internal Reservoir access roads, parking areas, and travel paths to equal or better conditions as they existed prior to activity commencement. Further specifics pertaining to road and paved parking area restoration are provided in Appendix A. In summary, these activities include:

Initial Repair Work

- Road repair will be completed after Grade Control Structure construction and before the first year of sediment removal.
- Road repair will be completed from the upper use of the road used during Grade Control Structure construction down to the border of National Forest System lands, and parking areas utilized for construction staging will be resealed/repaved as necessary.

- Initial road repairs will be completed in a manner that will allow the road to handle the increase in truck traffic without the need to complete repairs more than once every 10 years.

Ongoing Repair Work

- Pothole repair, minor resealing, and crack sealing will be completed on an as needed basis to maintain road integrity between major resurfacing events.
- Resealing or repaving of all parking area used during annual sediment removal as necessary.
- Necessary maintenance (resurfacing, pothole repair, crack sealing, etc.) of the access road located below the Dam would also occur. This is required for annual inspection and to repair any damage caused by seasonal storm flows.

B.3 Standard Project Commitments

PWD has developed SPCs as part of its Project activities (see Appendix A). Appendix A includes the detailed list of SPCs. Adherence to all SPCs identified in Appendix A is considered part of the proposed action, and the SPCs include the commitments PWD will incorporate during all proposed action activities, if selected by the lead agencies in their respective decision documents.

The SPCs identified in Appendix A were developed to proactively protect sensitive resources at the Reservoir and reduce environmental impacts associated with Project activities. PWD and its contractors will follow SPCs at all times during all Project activities. SPCs can also evolve to become better as improvements are discovered. A number of the SPCs have been developed to specifically protect natural resources (plants, fish and wildlife, and for cultural resources). SPCs include, among other things, pre-construction flagging of sensitive resource areas and the need for other restrictions. In making final decisions on the Project, the lead agencies are allowed to weigh the feasibility and need for these SPC's, and may not make all of them applicable to the Project. If any of the SPC's are not selected, the rationale for excluding them shall be provided in the decision document, along with a determination that the impacts of the Project are still within the scope of those described in the EIS/EIR.

All Project personnel would be subject to an annual training that covers applicable SPCs, environmental laws and regulations, and applicable agency requirements. Adherence to all applicable SPCs would be included as part of PWD's written contract with any contractor selected to conduct proposed Project activities. Prior to conducting Project activities, PWD personnel would review the SPCs with the selected contractor to ensure the intent and background of each procedure is clearly understood. In addition, PWD and Forest Service personnel (or representatives) would monitor the contractor during activities and conduct follow-up inspections of the job site at periodic intervals after the work had been completed.

B.4 Development and Screening of Alternatives

B.4.1 NEPA and CEQA Requirements for Alternatives Assessment

NEPA and CEQA both require consideration of a reasonable range of alternatives to the proposed action. In addition, CEQA requires the consideration of how to avoid or substantially lessen any of the significant or adverse effects caused by the Project. The following section describes the process and information used in screening potential alternatives, and determining the reasonable range. For background on these requirements, please consult NEPA and CEQA regulations, either online or by request from the lead agencies. The Forest Service has not identified an Agency Preferred Alternative in this Draft EIS/EIR. One will be identified in the Final EIS/EIR.

B.4.2 Issues Raised During Scoping Process

Public or agency scooping comments regarding the proposed action and alternatives are included in Table B-4.

Table B-4. Scoping Issues Relevant to all Issue Areas

Comment	Consideration in the EIS/EIR
Lahontan Regional Water Quality Control Board	
In addition to obtaining required permits and conducting monitoring, the EIS/EIR must include other BMPs and mitigation measures to reduce Project impacts.	Proposed mitigation measures to reduce impacts are included within Draft EIS/EIR Section C environmental analyses. SPCs to reduce environmental impacts are identified in Appendix A.
Streambed and lakebed alteration and/or discharge of fill material to a surface water may require a Clean Water Act (CWA) §401 water quality certification for impacts to federal waters or dredge and fill waste discharge requirements for impacts to non-federal waters.	As identified within Appendix A, PWD will obtain all necessary permits applicable to Project activities would be obtained prior to activities. Copies of all permits applicable to activities within National Forest System lands will be provided to the Forest Service. A list of necessary permits is provided in Section A.4 (Authorized Actions) of this EIS.
Land disturbance of more than 1 acre may require a CWA, §402(p) storm water permit [e.g., National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit, Water Quality Order (WQO) 2009-0009-DWQ].	As identified within Appendix A, PWD will obtain all necessary permits applicable to Project activities would be obtained prior to activities. Copies of all permits applicable to activities within National Forest System lands will be provided to the Forest Service.
Water diversion or dewatering activities may be subject to discharge and monitoring requirements per NPDES General Permit, Limited Threat Discharges to Surface Waters (Board Order R6T-2008-0023), or General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality (WQ0-2003-0003).	As identified within Appendix A, PWD will obtain all necessary permits applicable to Project activities would be obtained prior to activities. Copies of all permits applicable to activities within Forest Service lands will be provided to the Forest Service.
The Draft EIS/EIR should evaluate these alternatives to stabilize Little Rock Creek upstream of the dam: ▪ Stream channel stabilization practices, including various types of revetments, grade control structures, and flow restrictors. ▪ Bioengineering techniques that reduce flow velocities and scour by increasing sediment deposition. ▪ Structural practices, both direct and indirect, that protect or rehabilitate eroded streambanks. ▪ Vegetative methods used in conjunction with or over structural methods.	The Project includes installation of a grade control structure to stabilize the stream channel upstream. While they may generally limit erosion along streambanks, the other suggested alternatives and practices are not considered sufficient to meet the Project's purpose and need of restoring reservoir capacity.
The Draft EIS/EIR should evaluate the feasibility of constructing an inline debris/sediment basin to capture sediment upstream of the reservoir over the short and long term.	These alternatives were evaluated but eliminated from further consideration, as discussed in Section B.4.6.
The EIS/EIR should include a discussion of the long-term maintenance plan to maintain the established baseline conditions. Include specific routine and non-routine activities such as dredging and recontouring, and the thresholds that will trigger when maintenance activities are warranted.	Long-term operations and maintenance activities associated with the Project are identified in Section B.2.4.
Department of Fish and Wildlife	
The EIS/EIR should include a complete discussion of the purpose and need for, and description of, the Project, as well as a range of feasible alternatives that are fully considered and evaluated in the EIS/EIR and that avoid or minimize impacts to sensitive biological resources.	Section A.2 provides the purpose and need of the Proposed Action. Section B.2 provides a description of the Proposed Action/Project. Alternatives evaluated in detail and those eliminated from further consideration are included in Sections B.4.5 and B.4.6, respectively.

Table B-4. Scoping Issues Relevant to all Issue Areas	
Comment	Consideration in the EIS/EIR
City of Palmdale	
The project description indicated that sediment would be transported off-site to properties owned by the PWD or locations accepting sediment for placement and spreading. A Temporary Use Permit for Stockpiling will be required for this activity. No undisturbed land can be used to store/stockpile sediment and any stockpiling cannot exceed three feet in height of material.	These requirements are included in Section B.2.3.2 as part of the Project.
Alternative 1 (Long Term Closure of the Reservoir), as described in the NOP, does not specify where sediment will be transported in order to maintain Reservoir storage capacity. The method of disposal of sediment must be discussed as part of Alternative 1.	This alternative has been removed from further consideration and is not analyzed within this EIS/EIR.
The existing mining operations that are referred to in Alternative 2 (per the NOP) as a potential site for sediment disposal are operating under a Conditional Use Permit (CUP). Any disposal or infill of any material within the open pits will require the selected mining operation(s) to submit for a major CUP modification or to apply for a new Conditional Use Permit. The Office of Mine and Reclamation will be notified of major modification to the approved Reclamation Plan(s). Alternative 2 also identifies the potential for slurry pipelines to transport sediment to selected quarry pit(s). An encroachment permit will be required for any work to be done in the public right-of-way.	These requirements are included in Section B.2.3.2 as part of the Project.
U.S. Army Corps of Engineers, Los Angeles District	
Project activity may require a U.S. ACOE permit. An application for a Department of the Army permit is available at: http://www.usace.army.mil/Portals/2/docs/civilworks/permitapplication.pdf	As identified within Appendix A, PWD will obtain all necessary permits applicable to Project activities would be obtained prior to activities, including an individual 404 Permit from the U.S. ACOE (see 404(b)(1) Evaluation Summary in Appendix F). Copies of all permits applicable to activities within National Forest System lands will be provided to the Forest Service. A list of necessary permits is provided in Section A.4 (Authorized Actions) of this EIS.

B.4.3 Alternatives Screening Methodology

Alternatives have been considered in a manner to foster meaningful public participation and informed decision making. The alternatives screening process for this EIS/EIR consist of two primary steps, which are developed and intended to fulfill the requirements of NEPA Regulations (40 CFR 1502.14), the Forest Service Handbook Section 14 (USFS, 2012), and CEQA Section 15126:

Develop clear descriptions of each alternative to allow for comparative evaluation:

- Consider alternatives suggested by participants in scoping and public involvement activities;
- No specific number of alternatives is required or prescribed. Develop other reasonable alternatives fully and impartially; and
- Ensure that the range of alternatives does not prematurely foreclose options that might protect, restore, and enhance the environment.

Evaluate each alternative using the following criteria:

- Reasonable alternatives should fulfill basic project purpose and need objectives, and policy and regulatory objectives;
- Potential to avoid or substantially lessen the significant adverse effects of the proposed action;
- Potential for provision of clear environmental advantages over the proposed action; and
- Technical and regulatory feasibility.

When developing alternatives, among the factors taken into account when addressing the feasibility of alternatives are:

- Environmental impacts,
- Site suitability,
- Economic viability,
- Availability of infrastructure,
- Regulatory limitations,
- Jurisdictional boundaries, and
- The project proponent's ability to reasonably acquire, control, or otherwise have access to lands necessary to implement an alternative.

An environmental review document need not consider an alternative whose effects cannot be reasonably identified, whose implementation is remote or speculative, and that would not achieve the basic project objectives. If an alternative clearly does not provide potential overall environmental advantage as compared to the proposed action, it is eliminated from further consideration. Alternatives have been evaluated to identify elements that are likely to be the sources of impact and to relate them, to the extent possible, to general conditions in the subject area.

For the screening analysis, the technical and regulatory feasibility of potential alternatives was assessed at a general level. Alternatives were deemed infeasible due to significant technical obstacles, regulatory restrictions, cost, and other factors rather than by the degree of environmental impact resulting from activities associated with the Alternatives.

This screening analysis does not focus on relative economic factors of the alternatives (as long as they are economically feasible) given the guidance provided by both CEQA and NEPA. Instead, alternatives capable of eliminating or reducing significant environmental effects have been considered even though they may "impede to some degree the attainment of the project objectives, or would be more costly" (CEQA Guidelines Section 15126.6(b)).

B.4.4 Summary of Screening Results

Alternatives identified by PWD, Forest Service, EIS/EIR preparers, and the public are summarized below according to the determination made for analysis (i.e., retained for full analysis or dismissed from further consideration). The alternatives include a modification to the annual sediment removal schedule and the No Action/No Project Alternative.

B.4.4.1 Alternatives Fully Analyzed in the EIS/EIR

Alternatives were assessed for their ability to reasonably achieve the Project objectives and reduce the significant environmental impacts of the Project. Based on these screening criteria, the following alternatives were selected for detailed analysis in the EIS/EIR:

- Reduced Sediment Removal Intensity Alternative
- No Action/No Project Alternative

B.4.4.2 Alternatives Eliminated from Full Consideration in the EIS/EIR

Infeasible alternatives and alternatives that clearly offered no potential for overall environmental advantage were removed from further detailed analysis in this EIS/EIR. Based on the screening criteria described in Section B.4.3 (Alternatives Screening Methodology) the following alternatives were eliminated from full consideration:

- Slurry Excavation Alternative
- Forest Service Side Canyon Alternative
- Sediment Excavation Alternatives
- Disposal Site Alternatives
- Raising the Spillway Alternative

B.4.5 Description of Project Alternatives Evaluated in the EIS/EIR

B.4.5.1 Reduced Sediment Removal Intensity Alternative (Alternative 1)

Under Alternative 1, construction of the grade control structure would be identical to that of the proposed action. Once restored, ongoing sediment removal to maintain Reservoir capacity would be identical to that of the proposed action. Therefore, this alternative only differs from the proposed action during the initial (restorative) sediment removal. Alternative 1 seeks to reduce certain environmental impacts (primarily air quality and traffic) by:

- Starting the initial sediment removal period on July 1 (annually), instead of after Labor Day.
- Sediment removal activities would occur 5 days per week, instead of 6 (with the proposed action).
- Restoring the Reservoir to 1992 design water storage and flood control capacity within a minimum of 13 years, instead of 7 to 12 years (with the proposed action).

Alternative 1 requires approval by the California Department of Water Resources (DWR) allowing PWD to drawdown the Reservoir (for beneficial use) to dead pool level starting on July 1 for the entire duration of sediment removal years to achieve 1992 design water storage capacity. Currently, PWD is required to maintain a minimum Reservoir pool until Labor Day. PWD has coordinated with DWR on this possibility, which has been found as feasible by the DWR. For example, due to the current severe drought conditions, DWR authorized early drawdown of the Reservoir in July of 2014. DWR is in the process of determining the feasibility of early drawdown during sediment removal restoring the Reservoir to 1992 design capacity.

Site preparation, disturbance area, construction staging/access, and annual restoration activities would be the same under Alternative 1 as that described for the proposed action during initial/restoration

sediment removal. However, the amount of equipment used, weekly construction scheduling, and construction workforce would be reduced when compared to the proposed action. While these reductions would reduce air quality emissions and the number of daily truck trips, it would double the number of years needed to restore the Reservoir to 1992 capacity. Therefore, this alternative seeks to reduce the intensity of construction activities of the proposed action.

A summary of the key differences between Alternative 1 and the proposed action is shown in Table B-5.

Table B-5. Summary Comparison of Alternative 1 against the Proposed Action

	Alternative 1	Proposed Action
Grade Control Structure Construction	Identical to proposed Project	Begin in July of 2017 and take approximately 20 weeks to complete
Initial/Restoration Sediment Removal		
Amount of sediment removed to restore Littlerock Reservoir to 1992 water storage capacity	Approximately 1,400,000 cubic yards.	1,165,000 cubic yards
Temporary annual closure period	Starting July 1 until seasonal water refill of the Reservoir suspends removal efforts (estimated between mid-November and January).	Starting after Labor Day until seasonal water refill of the Reservoir suspends removal efforts (estimated between mid-November and January).
Weekly work schedule	Up to eight hours per day Monday through Friday (no work on weekends or federal holidays)	Up to 12 hours per day Monday through Saturday (no work on Sundays or federal holidays)
Number of dump trucks utilized per day	6	16
Maximum number of truck trips per day	180 (90 round trips)	480 (240 round trips)
Number of years to achieve 1992 water storage capacity	Minimum of 13 years	7 to 12 years
Ongoing annual O&M sediment removal	Identical to proposed Project	Removal of approximately 38,000 cubic yards starting after Labor Day

B.4.5.2 No Action/No Project Alternative

Under the No Action/No Project Alternative, sediment removal activities would not occur and sediment would continue to accumulate upstream of Littlerock Dam at the annual average rate of 38,000 cubic yards per year, reducing the capacity of the Reservoir by approximately 23.6 acre-feet annually. Should the Reservoir be filled with sediment to the Dam spillway, sediment accumulated behind the Dam would be approximately 7.4 million cubic yards. As Reservoir capacity is lost each year, PWD would be forced to acquire additional water from other sources to supply communities within PWD's service territory.

Continued sediment deposition could compromise the long-term integrity of the Dam. In this event, the California Department of Water Resources (DWR) Division of Safety of Dams could require the Dam to be breached. In addition, as the Reservoir would no longer function as a viable water storage facility, it would not be in compliance with the ANF Special Use Permit under which it currently operates. Subsequently, the Dam would be demolished per the conditions identified in the ANF's Special Use Permit. Demolition of the Dam would result in the elimination of the potential for water impoundment at the Reservoir and permanent loss of this potable water source. While 7.4 million cubic yards of sediment would accumulate within the Reservoir, demolition of the Dam is estimated to only require the removal of approximately 2.8 million cubic yards of sediment and dam concrete. Such a scenario would result in a project similar to, but larger, than the proposed Project and restore Little Rock Creek stream flow through the existing Reservoir.

Either scenario potentially occurring under the No Action/No Project Alternative would also eliminate any downstream flood-control benefit the dam currently provides. It would result in 23 acre-feet per year of sediment, which is currently held by the Dam, being transported naturally by flows into the downstream bed of Little Rock Creek, with potential associated reductions in flood conveyance capacity of the creek and in-stream structures such as road crossings and alteration of the in-stream habitat.

Either scenario potentially occurring under the No Action/No Project Alternative would also lead the existing Reservoir area becoming similar to upstream conditions. Riparian vegetation would be expected to recruit along the margins of the active channel and may eventually develop into a mature riparian community. Other areas of the Reservoir likely would be similar to alluvial fan communities and consist of a mosaic of upland and various riparian vegetation depending on the scour regime associated with the creek. Should this occur, the Reservoir area may develop characteristics that would support habitat for the arroyo toad and other riparian and floodplain associated species.

B.4.6 Description of Alternatives Eliminated from Further Consideration

Initial feasibility studies and constraint analyses have been conducted for various alternatives to the proposed Project since 2004. Through ongoing studies regarding their viability and/or fundamental environmental advantages or disadvantages, the alternatives were grouped into the following categories:

- Alternatives that were developed as part of the Project design;
- Alternatives that were further studied but ultimately eliminated from analysis in the EIS/EIR; and
- Alternatives that were eliminated earlier in the development of the Project due to unresolvable conflicts, issues of feasibility, or anticipated environmental degradation without any advantages over the proposed Project.

Section B.4.6.1 describes the alternatives that were studied in detail but have been eliminated from further consideration in the EIS/EIR. Section B.4.6.2 discusses the alternatives that were eliminated during preliminary analysis of the Project.

B.4.6.1 Alternatives Considered but Eliminated from Full Analysis

Slurry Excavation Alternative

Alternative Description. The Slurry Excavation Alternative would construct a slurry line to transport dredged sediment from Littlerock Reservoir to the exhausted quarry pits within Palmdale (along Avenue T) for disposal, and would require a water return pipeline between the Reservoir and the quarries. This alternative would consist of the following components:

- a floating dredge that could reach a depth of approximately 50 feet below the water surface;
- a slurry pipe (approximately 12 inches in diameter) that would either be constructed on the surface or buried along the existing roadway right-of-way. The pipeline would extend approximately 33,500 feet from Littlerock Dam to the disposal pit, and from the disposal pit to Little Rock Creek for pit dewatering; and
- booster pumps (approximately 8) that would move the slurry along the 6-mile pipeline to the disposal pits. Power delivery to the booster pumps may require reconductoring the existing power line.

Project Objectives/Purpose and Need. The Slurry Excavation Alternative could remove enough sediment to restore the Reservoir to its 1992 design water storage and flood control capacity. The total

excavation amount would depend upon the number of years permitted for slurry activities, the capacity of available sediment disposal sites, and cost of slurry operations.

Feasibility. Preliminary analysis has indicated that quarry sites would require sediment stockpile and processing, and water collection and pumping facilities for slurry excavation (Aspen Consulting Engineers, 2007). Quarry sites that would be used for collecting initial slurry sediment would need to accommodate a sediment volume that could be as much as 10 times greater than dry excavated sediment, due to the added volume of the water used in the slurry operation. Ultimately, this water would be pumped out of the quarry during pit dewatering, with the final volume of disposed sediment being the same as with proposed trucking removal. Another constraint with slurry operations is a high set-up cost that includes acquiring a dredge, pipeline, booster pumps, and associated equipment (e.g., motor, control equipment). Compared with the cost of trucking operations for sediment removal, the Slurry Excavation Alternative would become cost effective only with large-volume excavation (i.e., minimum of 1,500,000 cubic yards) (Aspen Consulting Engineers, 2007).

Environmental Advantages/Disadvantages. The use of dredging and a slurry pipeline to remove sediment would lessen some of the anticipated adverse effects of proposed trucking operations, such as air emissions, traffic impacts, and restrictions to recreational uses. However, there are a number of disadvantages to slurry operations in lieu of proposed trucking activities, which include:

- Pipeline Construction – Approximately 3 months would be required to construct a slurry pipeline from the Reservoir to the quarry and from the quarry to Little Rock Creek. Impacts from pipeline construction and operation could include: emissions from construction equipment, construction-related dust, noise from construction equipment and booster pumps, soil erosion, contamination of surface waters, impacts to native vegetation along pipeline route, barriers to wildlife movement, traffic impacts during construction along public roads, and potential conflicts with existing utilities;
- Ongoing Use of a Dredge – The dredge would remain at the Reservoir for a minimum of 4 months (February 1 to May 31) each year, with the potential scenario of remaining onsite for up to 9 months (November to August) depending on the hydrology of the Reservoir in any given year. It is likely that the dredge would not be stored at the Reservoir during non-dredging months, but would be considered a permanently recurring feature for annual sediment removal;
- Water Delivery – Use of a slurry would require substantial water use from the Reservoir, which may impact PWD's water deliveries during slurry operations;
- Water Discharge Permit – Slurry water would be pumped via two pipelines: (1) from the Reservoir to the sediment disposal pit(s), and (2) from the disposal pit(s) to Little Rock Creek;
- Sediment Disposal – A slurry alternative must involve a large-volume of excavated sediment (minimum of 1,500,000 cubic yards) in order to be cost-effective; however, the added volume of water during slurry activities would require an initial disposal pit capacity up to ten times greater than the capacity needed for the dry excavated sediment; and
- Complexity – Slurry operations are common in coastal harbors and large navigable waters, but not in variable desert lakes such as the Reservoir. Given the climate of the Project area, an ongoing obstacle that would arise from a slurry is the variability of scheduling operations that depend on existing Reservoir volume, seasonal inflow to the Reservoir, and coordination with PWD's water deliveries. Ultimately, the amount of excavated sediment that could be expected each year would be less certain with the use of slurry excavation than with the use of trucking.

Alternative Conclusion: *ELIMINATED*. This alternative would meet the Project objectives/purpose and need, and would lessen the adverse effects to air quality and traffic from proposed trucking operations. However, these advantages would be offset by the following:

- Impacts from pipeline construction and operation;
- The alternative's reliance on large amounts of water and its creation of an additional waste stream (i.e., slurry water); and
- The high set-up cost of slurry operations, and the uncertainty in scheduling excavation activities and estimating the excavation amount in any given year.

Given these additional constraints and uncertainty, the Slurry Excavation Alternative has been eliminated from further consideration.

Forest Service Side Canyon Alternative

Alternative Description. The Forest Service Side Canyon Alternative was developed to mitigate the Project's air quality and traffic impacts resulting from trucking of removed sediment off site. This alternative would transport excavated sediment to a 25-acre canyon on National Forest System lands that is to the west of, and adjacent to, the Reservoir. Clean sediment would be spread within the canyon, while any contaminated materials (identified through a sediment testing program) would be transported to an approved hazardous material storage facility. Haul routes for trucks would be sited from the canyon towards two Reservoir access points (i.e., boat ramp and Rocky Point). Within the canyon, truck access roads would be graded and sediment would be dumped and spread at the lowest elevations first, until the canyon would be filled and re-contoured to match adjacent slopes. Under this alternative, all non-contaminated sediment would be disposed of within the canyon and there would be no trucking to disposal sites identified north of the Project area (i.e., 47th Street East property, exhausted mining pits at local quarries).

Construction of the grade control structure at Rocky Point and sediment removal activities at the reservoir would be identical to the proposed Project.

Project Objectives/Purpose and Need. The Forest Service Side Canyon Alternative would remove enough sediment to restore the Reservoir to its 1992 design water storage and flood control capacity, thereby meeting Project objectives and the purpose and need.

Feasibility. The Forest Service Side Canyon Alternative was identified as a possible sediment disposal site during preliminary Project feasibility analyses in 2012. Use of the side canyon on National Forest System lands would require a special use authorization from the Forest Service, as well as an amendment to the Forest Land Management Plan that identifies the land use zone encompassing the side canyon as suitable for sediment disposal. In 2013, the Forest Service determined that the proposed alternative was not consistent with the Land Management Plan, and would result in additional habitat loss and other adverse environmental impacts. The side canyon is no longer a feasible sediment disposal site.

Environmental Advantages/Disadvantages. The Forest Service Side Canyon Alternative would divert trucking from city and county roads. Adverse traffic impacts to Cheseboro Road, State Route 138, and Avenue T would not be subject to heavy-duty truck traffic under this alternative; consequently, residential and commercial land uses along the aforementioned roads would not be exposed to the same extent of construction-related nuisance impacts such as air quality, noise, and traffic.

Given the location of trucking routes within National Forest System lands, this alternative would impact recreational use of the Project area and Forest Service roadways. Temporary closure of the Reservoir would be similar to the proposed action, with both the alternative and the proposed action creating a short-term preclusion of recreational facilities. However, due to the proximity of the side canyon to the Reservoir, this alternative would require less time for initial sediment excavation activities and for annual sediment removal. It is likely that full closure of the Reservoir for sediment excavation would be of shorter duration under this alternative in comparison to the proposed Action.

Despite the advantages to the Forest Service Side Canyon Alternative, the alternative would be inconsistent with Forest Service policy directives. Sediment disposal is no longer considered a compatible use with National Forest System lands, and this alternative site would not be granted a special use authorization.

Alternative Conclusion. *ELIMINATED*. The Forest Service Side Canyon Alternative would meet the Project objectives/purpose and need, and would lessen traffic and land use impacts along public roadways near off-site sediment disposal sites. However, this alternative is not consistent with the ANF Land Management Plan, and would increase habitat loss on NFS lands, therefore it has been eliminated from further consideration.

Inline Debris/Sediment Basin to Capture Sediment Upstream of the Reservoir over the Short and Long Term Alternative

As identified in Table B-4, the Lahontan RWQCB proposed this alternative during Project scoping.

Project Objectives/Purpose and Need. This alternative would still require the implementation of the Proposed Action or Alternative 1 to ensure enough sediment can be removed to restore the Reservoir to its 1992 design water storage and flood control capacity, thereby meeting Project objectives and the purpose and need.

Feasibility. It is assumed the purpose of this alternative is to construct a catch basin to capture annual sediment inflow upstream of the Reservoir after being restored to 1992 design capacity. Because this alternative would still require the implementation of the grade control structure and sediment removal activities proposed under the Proposed Action or Alternative 1 to restore design capacity, such a basin would need to be constructed upstream of the proposed grade control structure location.

Environmental Advantages/Disadvantages. While technically feasible, this alternative would require the construction of the sediment catch basin and access roads through Designated Critical Habitat for Arroyo Toad. Such an alternative is considered environmentally infeasible. Furthermore, the construction of such a sediment catch basin at this location would only replace the removal of sediment under operation and maintenance within the Reservoir inundation area under the Proposed Action or Alternative 1. The area proposed for ongoing sediment removal under the Proposed Action or Alternative 1 is highly disturbed, does not contain Designated Critical Habitat, and is already served by existing roads and access points.

Alternative Conclusion. *ELIMINATED*. This alternative would still require full implementation of either the Proposed Action or Alternative 1 to meet the Project objectives/purpose and need of restoring the Reservoir to 1992 design capacity. It would only alter the location of ongoing sediment removal occurring under operation and maintenance activities of the Proposed Action or Alternative 1. However, this alternative is not feasible given such a catch basin and access roads would need to be constructed upstream of Rocky Point in Designated Critical Habitat for Arroyo Toad. Therefore, it has been eliminated from further consideration.

B.4.6.2 Alternatives Eliminated During Preliminary Project Analysis

Sediment Excavation Alternatives

In 2005, a Hydrologic and Sediment Transport Analysis for Littlerock Reservoir examined the feasibility and potential effects of removing a range of sediment quantities during initial excavation, followed by subsequent excavations of varying amounts (Aspen Environmental Group, 2005). The following alternatives were considered in that report:

- Excavation Alternative A: Excavate 270,000 cubic yards of sediment from the reservoir, utilizing a steep cut slope with an approximate 80-foot bottom width and 5:1 side slopes. Remove an additional 54,000 cubic yards annually.
- Excavation Alternative B: Excavate 270,000 cubic yards of sediment from the reservoir, utilizing a flatter cut slope with an approximate 200-foot bottom width and 5:1 side slopes. Remove an additional 54,000 cubic yards annually.
- Excavation Alternative C: Excavate 540,000 cubic yards of sediment from the reservoir, utilizing a steep cut slope with an approximate 80-foot bottom width and 5:1 side slopes. Remove an additional 270,000 cubic yards every 5 years.
- Excavation Alternative D: Excavate 540,000 cubic yards of sediment from the reservoir, utilizing a flatter cut slope with an approximate 200-foot bottom width and 5:1 side slopes. Remove an additional 270,000 cubic yards every 5 years.

Preliminary analysis of Excavation Alternatives A through D indicated that these scenarios would contribute to substantial channel degradation and dramatic fluctuations in the channel bed elevations. The study was used to determine the Project components that would minimize adverse impacts to the Reservoir and to Little Rock Creek, which have been developed into the components for the proposed action (Project). No further consideration has been given to these initial excavation alternatives.

Disposal Site Alternatives

During the initial development of the proposed action, other sediment disposal sites were examined to determine feasible alternatives for disposing the excavated sediment. These sites included the following:

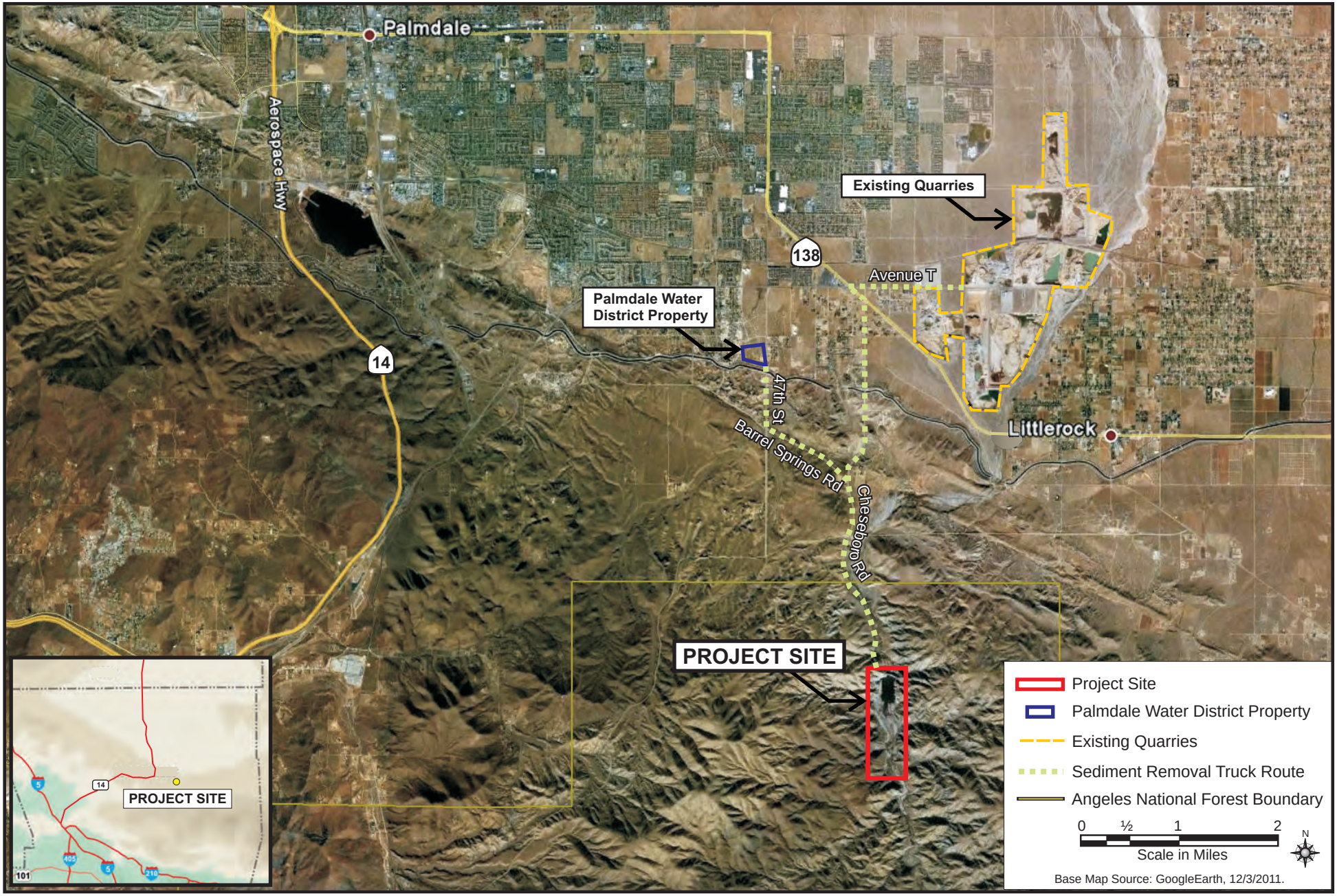
- **Mount Emma Road Site:** This 20-acre site is owned by the PWD, and is located on the southwest corner of Mount Emma Road and Cheseboro Road. The site has a significant southward slope and is bisected by an existing Southern California Edison right-of-way and transmission line. Only a portion of the site would be available for sediment disposal.
- **Lancaster Landfill:** This site is operated by the Los Angeles County Department of Public Works. Public Works determined that the Project's excavated sediment could not be used for daily cover at the landfill. A significant amount of sand would be needed to cap the landfill when it closes, although the total amount of Reservoir sediment that could be used for this purpose is uncertain. While the planned closure of the landfill was August 2012, it is still in operation.

As indicted in the list above, the additional sites were found to have site restrictions, incompatible land uses, or insufficient or unknown capacity that would make them infeasible or undesirable for sediment disposal. These alternative sites were eliminated from further consideration in the Project analysis.

Raising the Spillway Alternative

Initial Project analysis conducted in 1993 considered the feasibility of raising the height of Littlerock Dam to increase the capacity of the Reservoir (WCC, 1993). The components of this alternative included: (1) construction of a roller-compacted concrete buttress to strengthen the Dam, and (2) raising the crest of the existing Dam and spillway to increase reservoir storage.

While raising the spillway and the height of the Dam would temporarily increase the capacity of the Reservoir, it would not address the ongoing accumulation of approximately 38,000 cubic yards of sediment per year that continues to limit the Reservoir's water storage and flood control capacity. This alternative was eliminated from further consideration due to its inability to meet the Project objectives of restoring the Reservoir to its 1992 design water storage and flood control capacity.



Regional Project Location and Sediment Removal Truck Routes

LITTLEROCK RESERVOIR SEDIMENT REMOVAL PROJECT

Figure B-1

May 2016

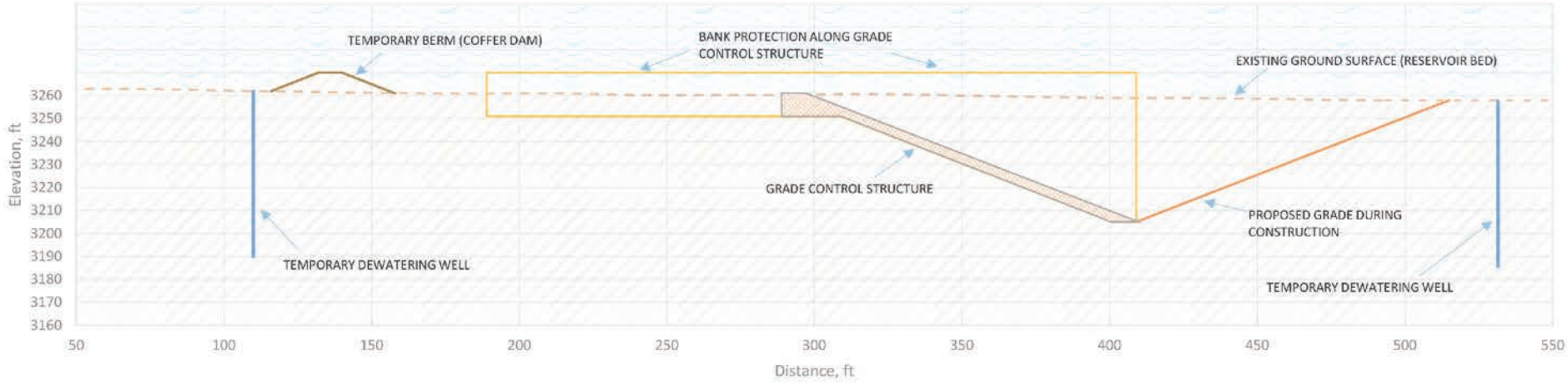


Littlerock Reservoir
Project Overview Areas

LITTLEROCK RESERVOIR SEDIMENT REMOVAL PROJECT

Figure B-2

May 2016



Surface

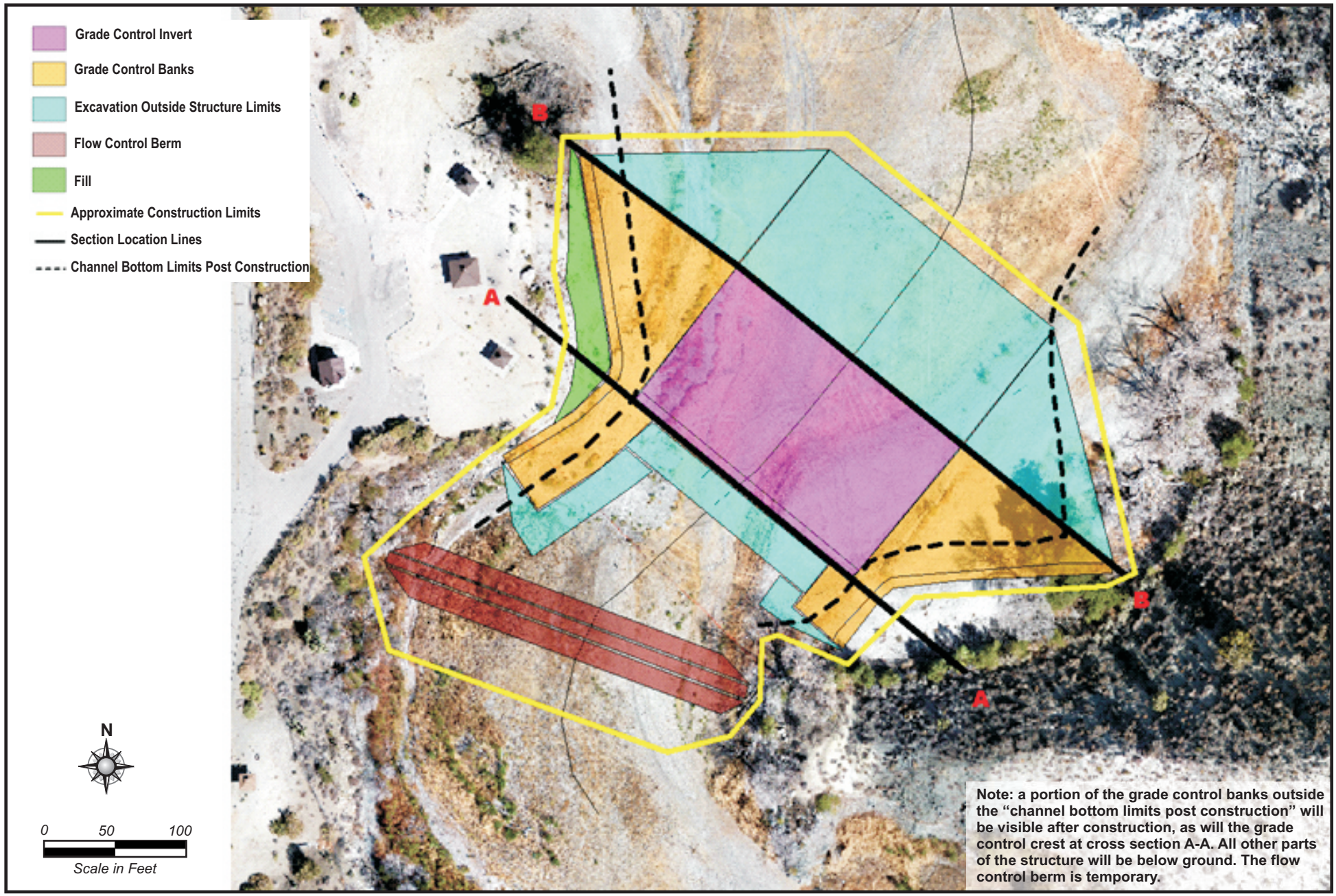
Subsurface

Grade Control Structure Side Profile

LITTLEROCK RESERVOIR SEDIMENT REMOVAL PROJECT

Figure B-3

May 2016



Grade Control Structure Concept Plan View

LITTLEROCK RESERVOIR SEDIMENT REMOVAL PROJECT

Figure B-4

May 2016



Grade Control Structure Surface Visual Simulation

LITTLEROCK RESERVOIR SEDIMENT REMOVAL PROJECT

Figure B-5

May 2016