



US Army Corps  
of Engineers  
Alaska District

# Public Notice of Application for Permit

ANCHORAGE  
Regulatory Division (1145)  
CEPOA-RD  
Post Office Box 6898  
JBER, Alaska 99506-0898

**PUBLIC NOTICE DATE:** March 1, 2013  
**EXPIRATION DATE:** April 1, 2013  
**REFERENCE NUMBER:** POA-2009-366  
**WATERWAY:** Little Squaw Creek

Interested parties are hereby notified that a Department of the Army permit application has been received for work in waters of the United States as described below and shown on the enclosed project drawings.

Comments on the described work, with the reference number, should reach this office no later than the expiration date of this Public Notice to become part of the record and be considered in the decision. Please contact **leslie.w.tose** at (907) 753-5515, toll free from within Alaska at (800) 478-2712, by fax at (907) 753-5567, or by email at **leslie.w.tose@usace.army.mil** if further information is desired concerning this notice.

**APPLICANT:** Nyac Au, Dr. Michael James, 1634 W. 13<sup>th</sup> Ave., Anchorage, AK. 99501  
phone: 907-350-5340 email: [jmjnyac@gmail.com](mailto:jmjnyac@gmail.com)

**AGENT:** ASRC Energy Services Alaska, Inc. (AES) Mr. Joseph Christopher, 3900 C Street, Anchorage, AK 99503 phone: 907-334-1505  
email: [joseph.christopher@asrcenergy.com](mailto:joseph.christopher@asrcenergy.com)

**LOCATION:** The project site is located within Sections 22, 23, 26, 27, 34 and 35, T.32 N., R.3 W., Fairbanks Meridian; USGS Quad Map Chandalar C-3; Latitude 67.5833° N., Longitude 148.1477° W.; near Chandalar, Alaska.

**PURPOSE:** The applicant's stated purpose is to expand existing mine operations for extraction of placer gold resources.

**PROPOSED WORK:** The applicant proposes to discharge 1,280,000 cubic yards (CY) of overburden and rock into 100 acres of palustrine and riparian wetlands for temporary impact, and 20.6 acres of palustrine wetlands for permanent impact, in order to construct, operate, and reclaim a mining operation at Little Squaw Creek in the Chandalar Mining District. The project would occur in three phases over a 5-year period.

1. Phase I, 2013-2014, work in wetlands would consist of:

- Mechanical clearing and reclamation of 10 acres of a 30 acre pit, (Dimensions: 4700 feet (') x 370' x 150' deep) [Note: the remaining 20 acres are in uplands.]
- Construction of a temporary diversion of Little Squaw Creek (Dimensions: 5,200' x 4.5' x 2.5') containing three in-line settling ponds (Average Dimensions 270' x 60' x 9'). Also, 50 cy of armor rock would be discharged into 0.006 acre of wetlands to construct six inflow and outlet structures for the ponds. (Dimensions: each - 15' x 4' x 4')
- Discharge 600 CY of rock bedrock at the bottom of the excavated Phase I pit to construct a French drain system, for de-watering and to provide additional make-up water for the wash plant. (Dimensions: 400' x 10' x 4') This would allow for near-zero discharge back to Little Squaw Creek during mine operation. This system would be constructed within the impact limits for the Phase I Pit; therefore, no additional wetlands impacts would result.
- Discharge 2,553 CY of rock and gravel into 0.3 acre of wetlands for construction of a permanent stream crossing of Spring Creek (Dimensions: 154' x 72' x 8') incorporating two-60' x 36 inch (") corrugated metal pipe (CMP) culverts. Downstream of the crossing, three old settling ponds would be re-activated by construction of a check dam with a rock spillway between ponds 1 and 2. (122 CY discharged into 0.01 acre of wetlands, Dimensions: Check dam, 15' x 11' x 4', Spillway, 60' X 11' x 4'). Pond 2 would be connected to Pond 3 through an existing Spring Creek crossing culvert system. The existing crossing will be upgraded by adding a second 60' x 36" CMP to allow anticipated flows to pass during high rainfall events. (122 CY discharged into 0.01 acre of wetlands, Dimensions: 118' x 72' x 8', one-60' x 36" CMP and a rock spillway: 60' X 11' x 4'.) Pond 3 would then discharge to surrounding wetlands, which discharge in turn, to Spring Creek.
- Once Phase I placer mining is complete, the pit, and the Little Squaw Creek diversion would be reclaimed. 250,000 CY of overburden would be discharged into the mine pit. Reclamation of the pit would entail backfill of the pit with overburden, recontouring to match the surrounding landscape, and re-configuration of Little Squaw Creek into a series of six to seven connected ponds, 0.25-acre to 3 acres each, constructed to become shallow open water/ emergent wetlands with a flow path that fits the gradient of the valley. This constructed system would provide functions of sediment retention, flood flow alteration and habitat diversity that do not otherwise exist at present.

2. Phase II, 2015, work in wetlands would consist of discharge of 30,000 cy of rock and gravel into 20.3 acres of wetlands to construct a new, permanent runway (Dimensions: 5,500' x 161' x 17'). The airstrip would be oriented in a northwest to southeast direction, up into the open valley of Big Squaw Lake, to accommodate the larger aircraft needed for the proposed deep placer operation, and to safely avoid mountains during approaches and take-offs, thereby mitigating hazards associated with the existing airstrip.

3. Phase III, 2015 - 2017, work in wetlands would consist of:

- Mechanical clearing and reclamation of a second 70-acre pit (Dimensions:

4800' x variable width x 150')

- Construction of a temporary diversion channel of Little Squaw Creek (Dimensions: 6,500' x 4.5 x 2.5) containing three in-line settling ponds (Average Dimensions 270' x 60' x 9'), with a flume (Dimensions 4' X 8' X 2') to cross Nugget Creek.
- During reclamation, 1,000,000 CY of rock and overburden would be discharged back into the mine pit. Stockpiled organics and underlying hydric soil would be recontoured over the surface to approximate original contours. The applicant believes that hydrology patterns in this location result from hillside sheet flow, and that natural re-establishment of wetlands would occur. However, if it is not possible to naturally reestablish wetland hydrology, the applicant proposes to revise the reclamation procedures through the USACE approval process.

All work would be performed in accordance with the enclosed plan (sheets 1-19), dated February 11, 2013.

ADDITIONAL INFORMATION:

Jurisdiction:

The site is 350.84 acres in size, of which 120 acres are palustrine wetlands, and 230.24 acres are uplands. The three creeks that would be affected - Little Squaw Creek, Spring Creek, and Nugget Creek are Relatively Permanent Waters (RPWs) that flow into Squaw Creek, an RPW, which flows into Squaw Lake, an RPW, which flows into Lake Creek, an RPW. Lake Creek flows into North Fork Chandalar River, and RPW, which flows into Chandalar Lake, an RPW. Chandalar Lake flows into the Chandalar River, an RPW, which flows into the Yukon River, a Traditional Navigable Water. The wetland delineation is available on request.

Existing conditions:

As a result of a long history of placer mining activities, Little Squaw Creek and the surrounding area have been disturbed. Little Squaw Creek has been relocated and channelized over the years to a point where the original channel location and configuration cannot be determined. In addition, the current system no longer provides adequate sediment transport and frequently overbanks and deposits sediment along the floodplain during high-flow events. The system no longer maintains adequate step pools and other natural energy dissipation features that are typical to high-gradient, upper perennial tributary systems in the region.

The applicant intends to submit reclamation plans by the end of the Public Notice period.

Uplands:

The mine site contains considerable upland areas, including infrastructure from previous mining activities. For example, there is an approximately 15 acre airstrip, and various camp, road, and mill areas. The existing airstrip is oriented east-west and requires aircraft landing and takeoff into the face of a mountain. It does not meet safety standards for the size of aircraft that the applicant proposes for the operation.

Work in uplands would include:

Phase I work in uplands would include excavation and reclamation of 20 acres of the 30 acre open pit, construction of access roads and haul roads, a mud pit system, a wash plant site, area for temporary storage of pay and other overburden, and portions of a French drain system.

Phase III work in uplands would include relocation of the pay gravel storage area to the existing upland airstrip, with continued use of haul roads, mud pit and other upland infrastructure.

APPLICANT PROPOSED MITIGATION: The applicant proposes the following mitigation measures to avoid, minimize, and compensate for impacts to waters of the United States from activities involving discharges of dredged or fill material.

Avoidance:

The applicant will conduct drill testing prior to mining, to determine gold values, and to avoid disturbing any area where gold is not economically recoverable.

The project was configured around a centrally located, approximately 230 acre area of uplands, to be used for development of mine infrastructure that will be used throughout the lifetime of the mine, thereby avoiding impacts to waters of the U.S. Additionally, the applicant will be able to make use of existing disturbed areas, such as previously developed roads, pads and the existing airstrip, for use in mining operations.

Through use of the innovative Mud Pit System, Phase I and Phase III mining activities will achieve a near-zero discharge from the mine operation, before water is discharged back into Little Squaw Creek.

All ground-disturbing activity will be located 50 feet away from water's edge and wetlands when possible. For example, during Phase III construction and operation, there will be a 50' buffer between the pit and the headwaters of Nugget Creek.

Minimization:

Complete avoidance of wetlands and waters of the U.S. is not possible because of the location and nature of the gold deposit. To minimize the impact of this project on the environment, the following measures are proposed:

Prior to disturbance, project limits will be identified in the field (e.g., flagged or staked).

Site preparation, excavation, fill placement, and construction activities will be conducted in a manner so as to prevent, minimize, and contain the erosion and suspension of fine material.

- Appropriate diversion or containment structures will be installed to contain sediment and turbidity at the work site (a) parallel to and within 10 feet of the toe of any fill, or soil exposed within 25 feet of a standing or flowing waterbody, if the fill site has a downslope or surface connection to the waterbody; and (b) Adjacent to any fill placed or soil exposed within a standing or flowing waterbody.

- Erosion protection will be provided and remain in place until the soil is permanently stabilized.
- Fill slopes will be the minimum necessary to construct the project and meet safety requirements, for example, side slopes at the Spring Creek crossing will not exceed 2:1, to minimize the footprint across wetlands.

An extensive system of mud pits, settling ponds, in-line detention ponds, and a French drain will be used to remove suspended material out of mine process water throughout the mine site and during all stages of mining. If suspended material is evident outside the project footprint, appropriate control and containment measures will be applied.

Work in wetlands:

- Any temporary access roads constructed in wetlands will be reclaimed as soon as mining is complete.
- When work in wetlands is necessary, equipment shall minimize disturbance to wetlands and stream channel or stream bank and bottom.

Drainage:

- Natural drainage patterns shall be maintained to the extent practicable by installation of culverts in sufficient number and size to prevent ponding, diversion, or concentrated runoff.
- All control and diversion ditches will be constructed properly and maintained in a functioning manner for the life of the construction period, in circumstances where fill material and exposed soils might cause transport of sediment or turbidity beyond the immediate construction site.

Mining by planning ahead for reclamation:

- Wetlands soils will be segregated during construction and replaced to approximate original contour during reclamation.
- Excavated parent soil material will be used as backfill during reclamation.
- Areas disturbed during project construction will be prepared in a manner that affords natural revegetation, and reduces introduction of native species.
- Disturbed stream banks will be restored and stabilized using organic stripping and overburden to regenerate native vegetation.

Compensation:

The project is located in a remote area, with limited access by aircraft or winter ice road. Currently, there is no approved mitigation bank with a service area in the watershed. The applicant proposes that impacts from direct mining activities in wetlands are temporary and proposes that compensation for all temporary impacts to waters of the U.S. be satisfied by the avoidance and minimization measures presented above, as well as the substance of the Reclamation Plan. The plan will include measures to provide functional lift with regards to sediment retention, flood flow alteration and habitat diversity that do not otherwise exist at Little Squaw Creek at present.

The applicant proposes to mitigate unavoidable permanent impacts, including

the roadway crossing of Spring Creek and the new runway with access road, with compensation through an In-Lieu payment to an approved In-Lieu Fee program at the rate of 1 credit for every 1 debit (1:1).

WATER QUALITY CERTIFICATION: A permit for the described work will not be issued until a certification or waiver of certification, as required under Section 401 of the Clean Water Act (Public Law 95-217), has been received from the Alaska Department of Environmental Conservation.

CULTURAL RESOURCES: The latest published version of the Alaska Heritage Resources Survey (AHRs) has been consulted for the presence or absence of historic properties, including those listed in or eligible for inclusion in the National Register of Historic Places. There are registered or eligible properties in the vicinity of the worksite. They have been designated as being within the proposed Little Squaw Creek Historic District. Because the District has been determined to be within the project area, a determination of effect will be made in consultation with the State Historic Preservation Officer (SHPO). Consultation of the AHRs, and review of a Cultural Resources Survey conducted by the applicant constitute the extent of cultural resource investigations by the District Commander at this time. Any comments SHPO may have concerning presently unknown archeological or historic data that may be lost or destroyed by work under the requested permit will be considered in our final assessment of the described work.

ENDANGERED SPECIES: No threatened or endangered species are known to use the project area.

ESSENTIAL FISH HABITAT: The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996, requires all Federal agencies to consult with the NMFS on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH).

No EFH species are known to use the project area.

TRIBAL CONSULTATION: The Alaska District fully supports tribal self-governance and government-to-government relations between Federally recognized Tribes and the Federal government. Tribes with protected rights or resources that could be significantly affected by a proposed Federal action (e.g., a permit decision) have the right to consult with the Alaska District on a government-to-government basis. Views of each Tribe regarding protected rights and resources will be accorded due consideration in this process. This Public Notice serves as notification to the Tribes within the area potentially affected by the proposed work and invites their participation in the Federal decision-making process regarding the protected Tribal right or resource. Consultation may be initiated by the affected Tribe upon written request to the District Commander during the public comment period.

PUBLIC HEARING: Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, reasons for holding a public hearing.

EVALUATION: The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts of the proposed activity and

its intended use on the public interest. Evaluation of the probable impacts, which the proposed activity may have on the public interest, requires a careful weighing of all the factors that become relevant in each particular case. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. The outcome of the general balancing process would determine whether to authorize a proposal, and if so, the conditions under which it will be allowed to occur. The decision should reflect the national concern for both protection and utilization of important resources. All factors, which may be relevant to the proposal, must be considered including the cumulative effects thereof. Among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people. For activities involving 404 discharges, a permit will be denied if the discharge that would be authorized by such permit would not comply with the Environmental Protection Agency's 404(b)(1) guidelines. Subject to the preceding sentence and any other applicable guidelines or criteria (see Sections 320.2 and 320.3), a permit will be granted unless the District Commander determines that it would be contrary to the public interest.

The Corps of Engineers is soliciting comments from the public; Federal, State, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

AUTHORITY: This permit will be issued or denied under the following authorities:

(X) Discharge dredged or fill material into waters of the United States - Section 404 Clean Water Act (33 U.S.C. 1344). Therefore, our public interest review will consider the guidelines set forth under Section 404(b) of the Clean Water Act (40 CFR 230).

Project drawings and a Notice of Application for State Water Quality Certification are enclosed with this Public Notice.

District Commander  
U.S. Army, Corps of Engineers

Enclosures

# STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION  
DIVISION OF WATER  
401 Certification Program  
Non-Point Source Water Pollution Control Program

**ANCHORAGE**

DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
WQM/401 CERTIFICATION  
555 CORDOVA STREET  
ANCHORAGE, ALASKA 99501-2617  
PHONE: (907) 269-7564/FAX: (907) 334-2415

NOTICE OF APPLICATION  
FOR  
STATE WATER QUALITY CERTIFICATION

Any applicant for a federal license or permit to conduct an activity that might result in a discharge into navigable waters, in accordance with Section 401 of the Clean Water Act of 1977 (PL95-217), also must apply for and obtain certification from the Alaska Department of Environmental Conservation that the discharge will comply with the Clean Water Act, the Alaska Water Quality Standards, and other applicable State laws. By agreement between the U.S. Army Corps of Engineers and the Department of Environmental Conservation, application for a Department of the Army permit to discharge dredged or fill material into navigable waters under Section 404 of the Clean Water Act also may serve as application for State Water Quality Certification.

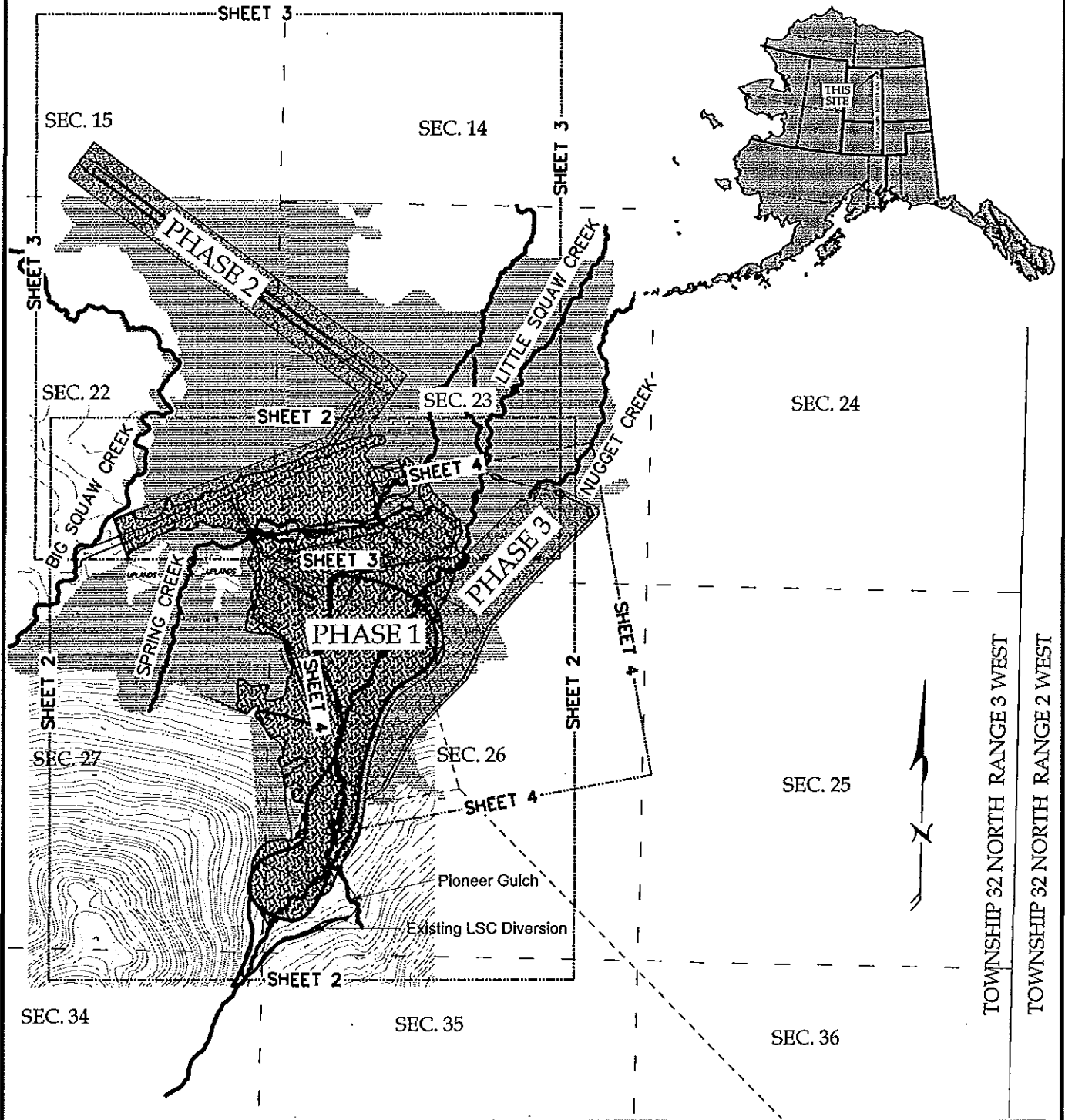
Notice is hereby given that the application for a Department of the Army Permit described in the Corps of Engineers' Public Notice No. POA-2009-366, Little Squaw Creek, serves as application for State Water Quality Certification from the Department of Environmental Conservation.

After reviewing the application, the Department may certify there is reasonable assurance the activity, and any discharge that might result, will comply with the Clean Water Act, the Alaska Water Quality Standards, and other applicable State laws. The Department also may deny or waive certification.

Any person desiring to comment on the project, with respect to Water Quality Certification, may submit written comments to the address above by the expiration date of the Corps of Engineer's Public Notice.



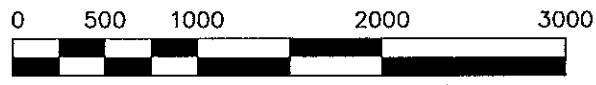
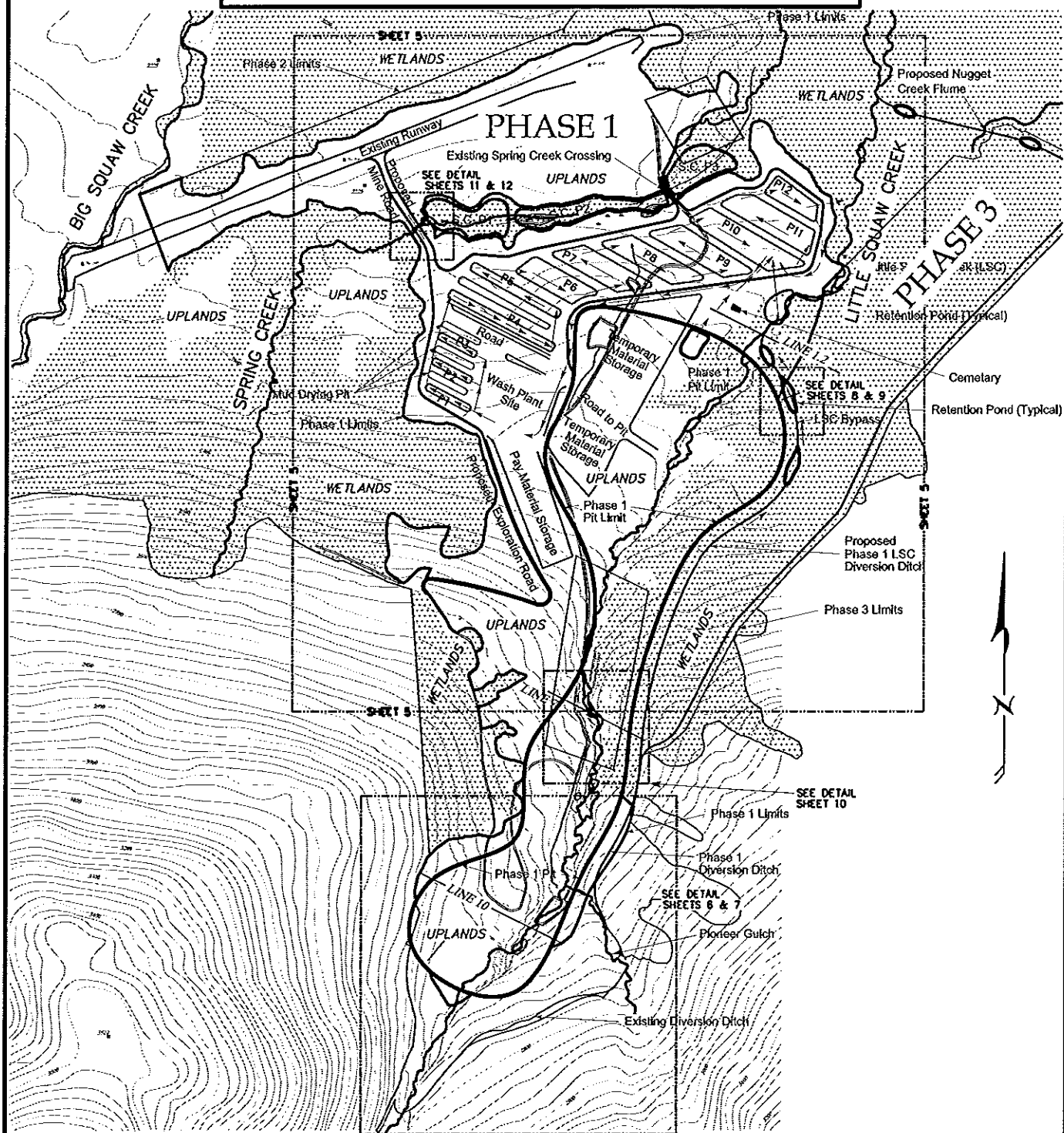
VICINITY MAP, SHEET INDEX, AND PHASES 1, 2, & 3



SCALE: 1" = 2000 FEET

Applicant: NYAC AU, LLC  
 File No: POA-2009-366-Little Squaw Creek  
 Waterway: Little Squaw Creek  
 Proposed Activity: Placer Mining  
 Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
 Lat.: N 67.5833 Long.: W -148.1477  
 Sheet: 1/15 Date: 1/6/2013

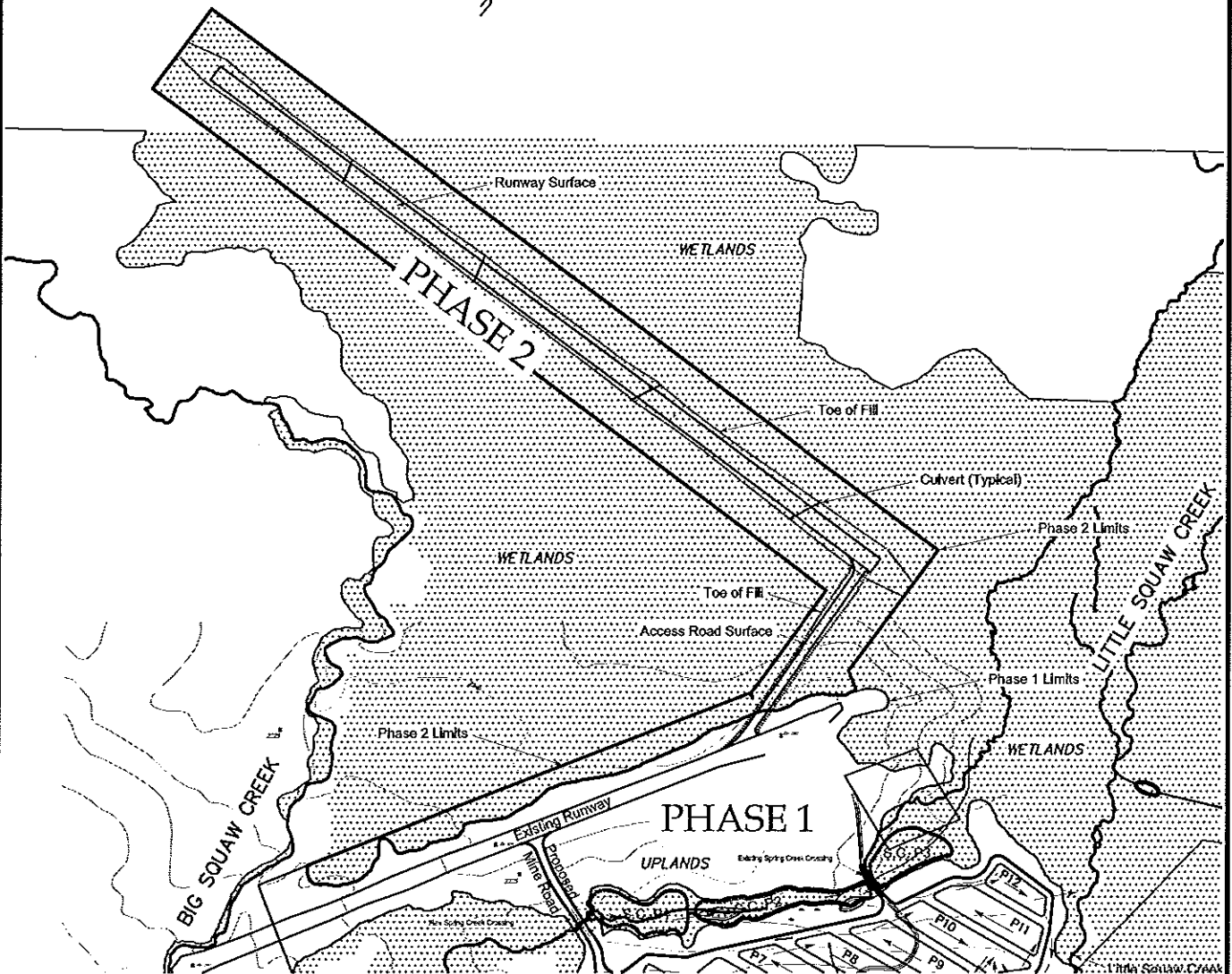
PLAN VIEW & DETAIL INDEX



SCALE: 1" = 1000 FEET

Applicant: NYAC AU, LLC  
 File No: POA-2009-366-Little Squaw Creek  
 Waterway: Little Squaw Creek  
 Proposed Activity: Placer Mine  
 Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
 Lat.: N 67.5833 Long.: W -148.1477  
 Sheet: 2/15 Date: 1/6/2013

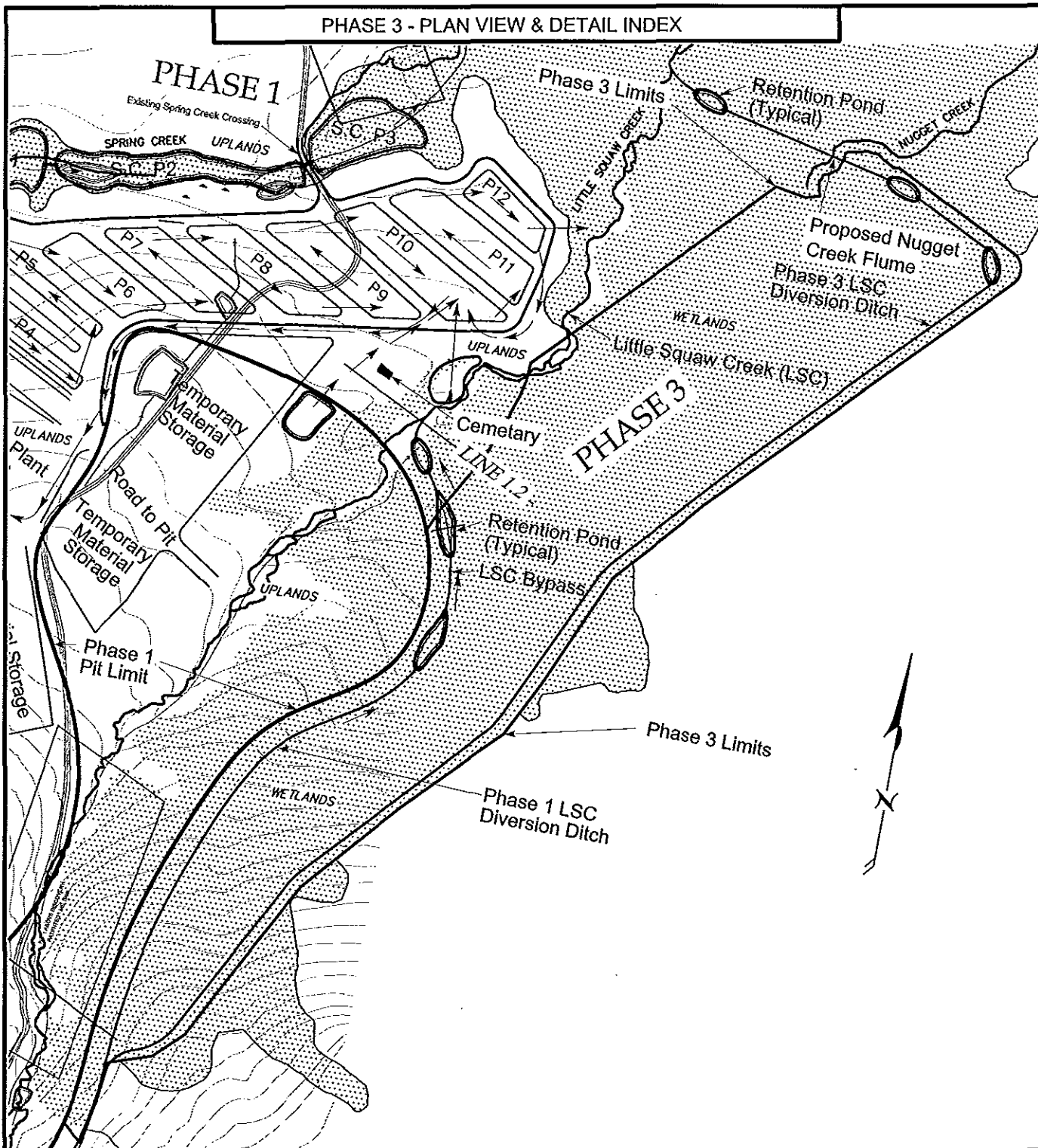
PHASE 2 - PLAN VIEW & DETAIL INDEX



SCALE: 1" = 1000 FEET

Applicant: NYAC AU, LLC  
File No: POA-2009-366-Little Squaw Creek  
Waterway: Little Squaw Creek  
Proposed Activity: Placer Mine  
Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
Lat.: N 67.5833      Long.: W -148.1477  
Sheet: 3/15      Date: 1/6/2013

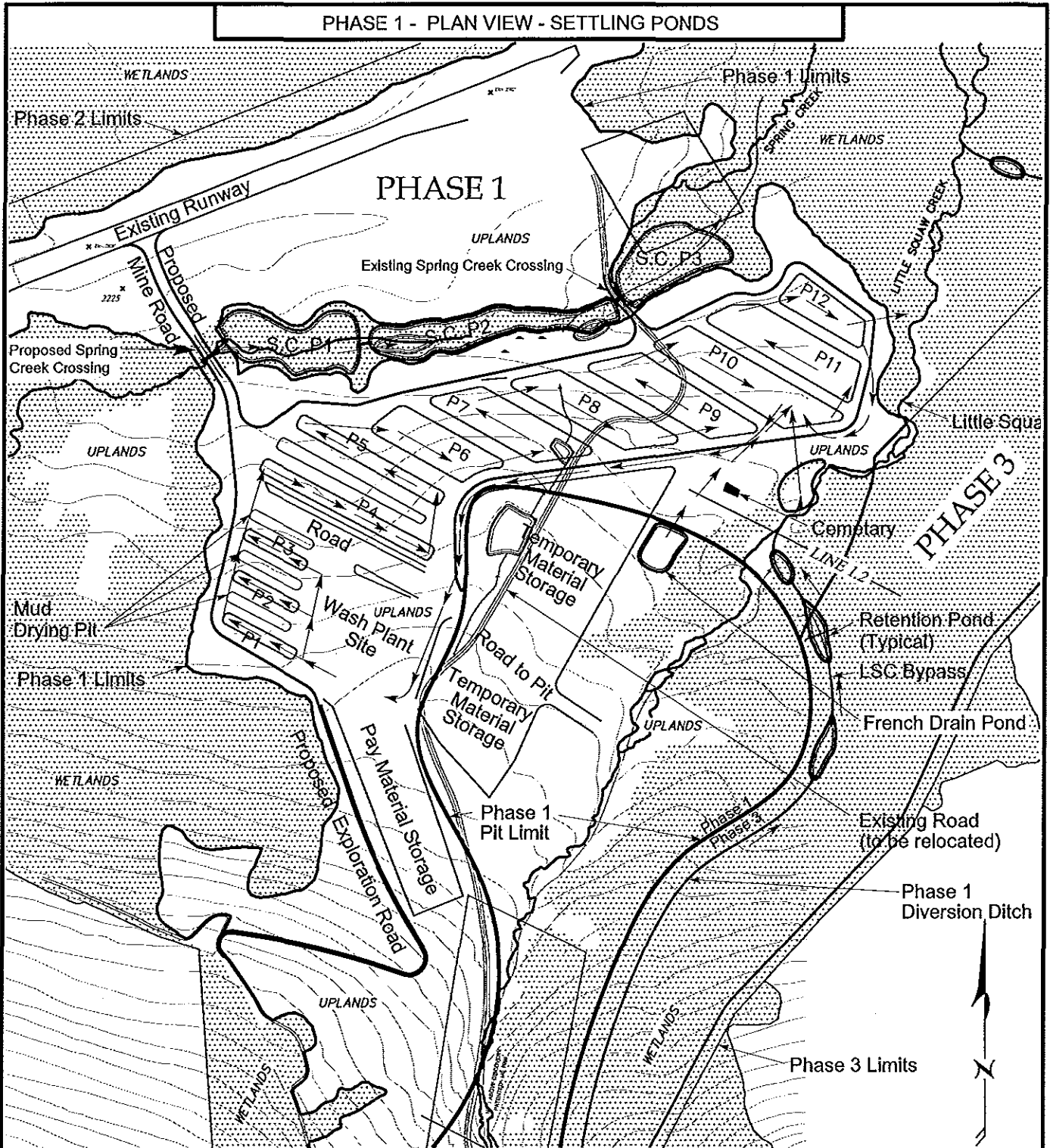
PHASE 3 - PLAN VIEW & DETAIL INDEX



SCALE: 1" = 600 FEET

Applicant: NYAC AU, LLC  
 File No: POA-2009-366-Little Squaw Creek  
 Waterway: Little Squaw Creek  
 Proposed Activity: Placer Mining  
 Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
 Lat.: N 67.5833 Long.: W -148.1477  
 Sheet: 4/15 Date: 1/6/2013

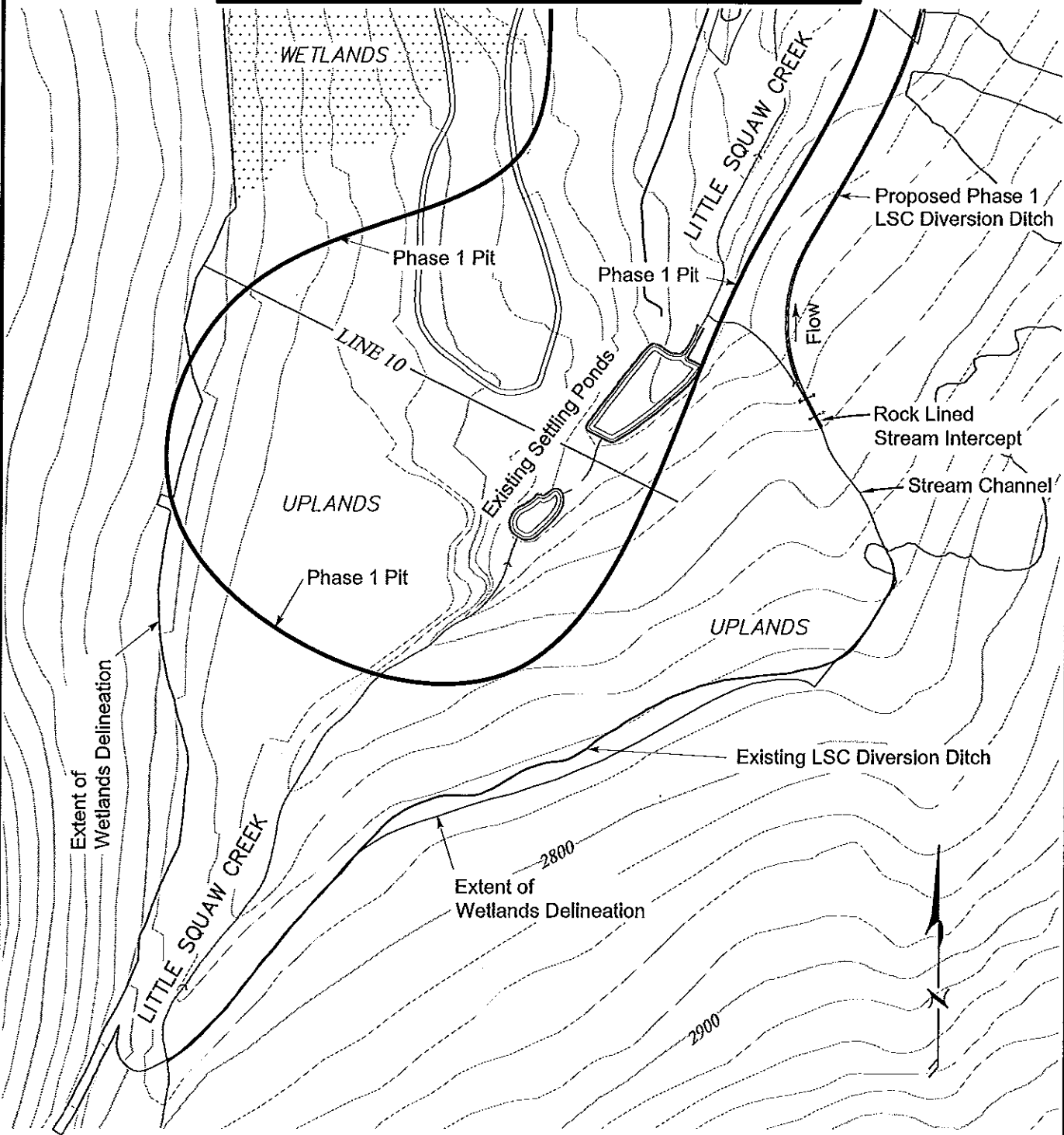
PHASE 1 - PLAN VIEW - SETTLING PONDS



SCALE: 1" = 600 FEET

Applicant: NYAC AU, LLC  
 File No: POA-2009-366-Little Squaw Creek  
 Waterway: Little Squaw Creek  
 Proposed Activity: Placer Mining  
 Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
 Lat.: N 67.5833 Long.: W -148.1477  
 Sheet: 5/15 Date: 1/5/2013

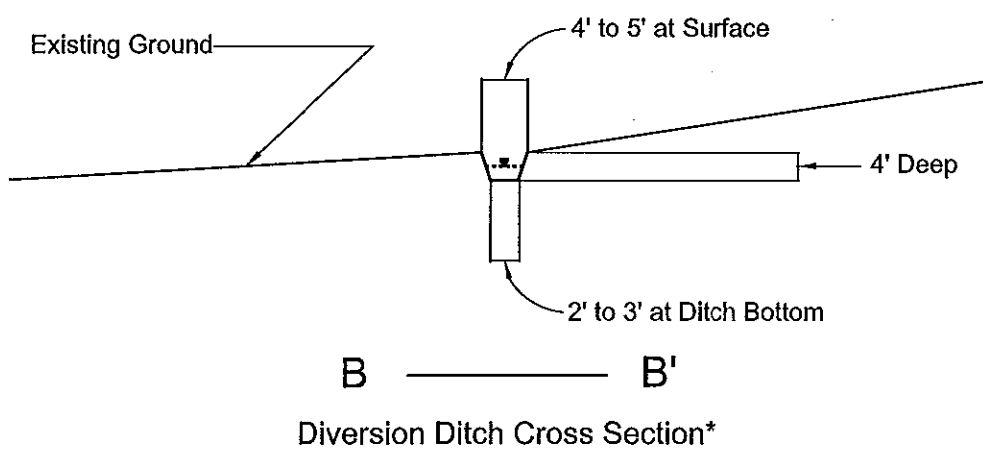
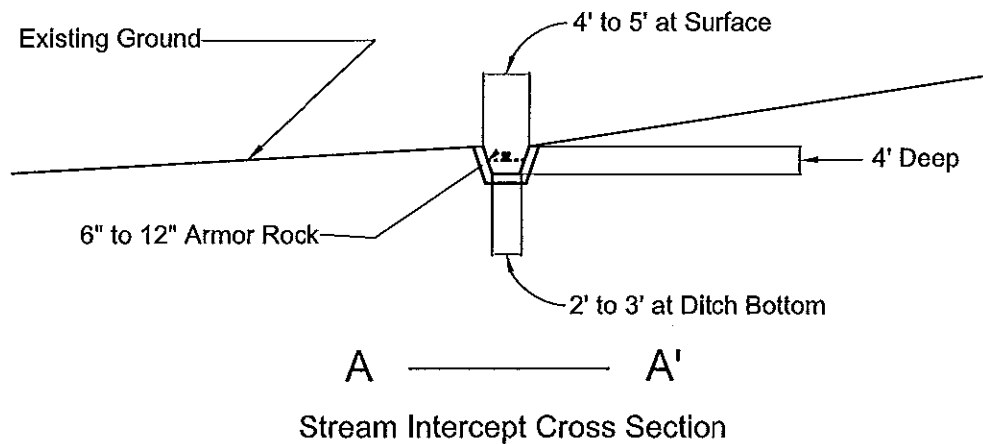
PHASE 1 - PLAN VIEW - LITTLE SQUAW CREEK DIVERSION INLET



SCALE: 1" = 300 FEET

Applicant: NYAC AU, LLC  
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Waterway: Little Squaw Creek  
Proposed Activity: Placer Mine  
Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
Lat.: N 67.5833 Long.: W -148.1477  
Sheet: 6/15 Date: 1/6/2013

PHASES 1 & 3 - LITTLE SQUAW CREEK DIVERSION DITCH - CROSS SECTIONS



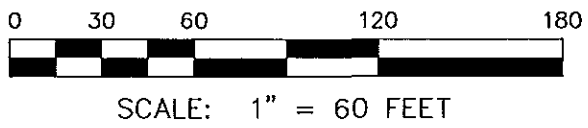
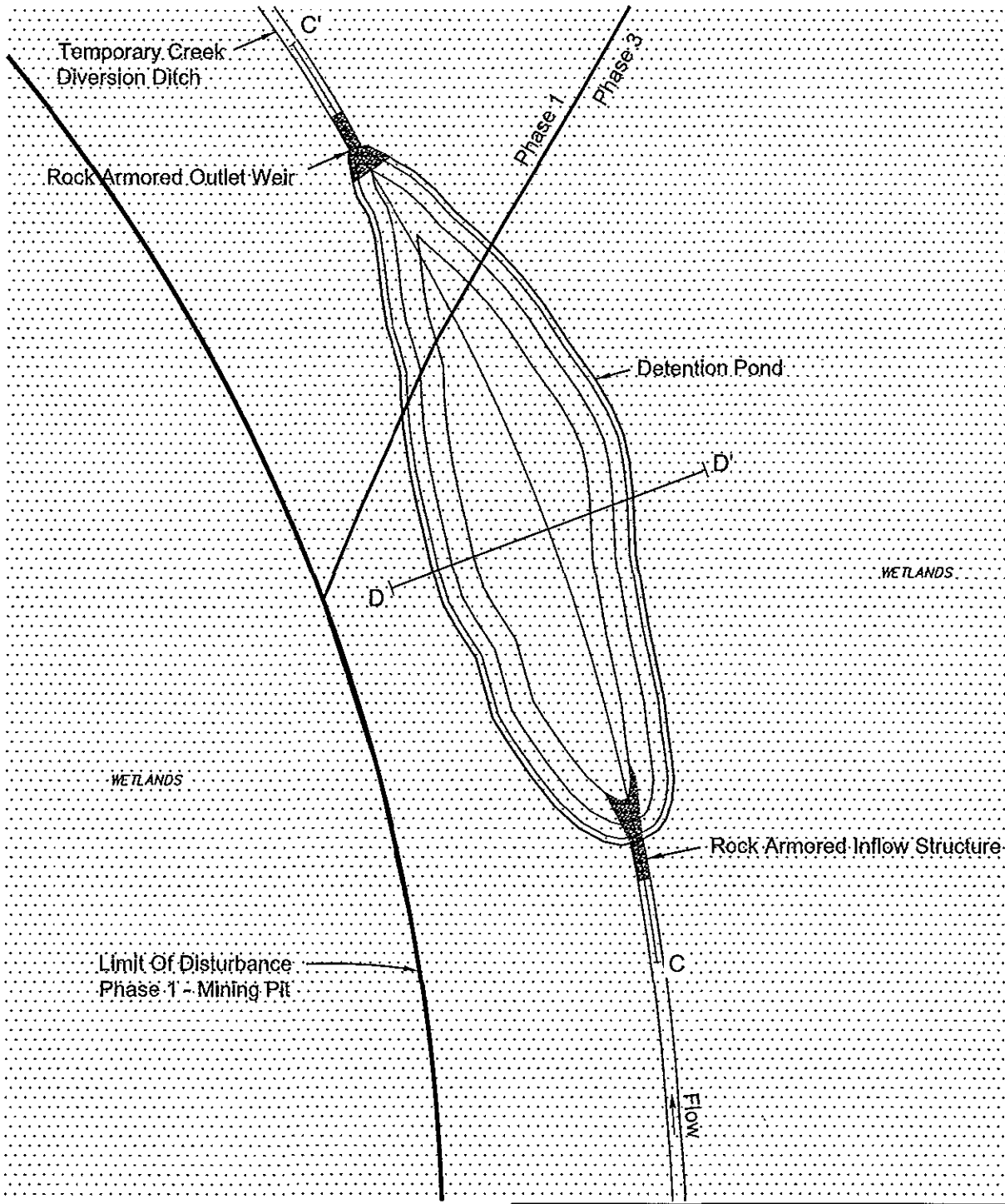
\*Note: The Little Squaw Creek Diversion Ditch will be constructed through competent soils capable of transporting water. A durable, plastic ditch lining will be installed when the diversion ditch is constructed through bedrock outcroppings. The bedrock interfaces readily percolate surface water through them.



SCALE: 1" = 20 FEET

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 Proposed Activity: Placer Mining  
 Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
 Lat.: N 67.5833 Long.: W -148.1477  
 Sheet: 7/15 Date: 1/6/2013

PLAN VIEW - DIVERSION DETENTION POND - TYPICAL

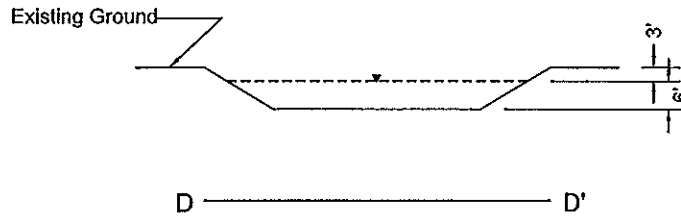
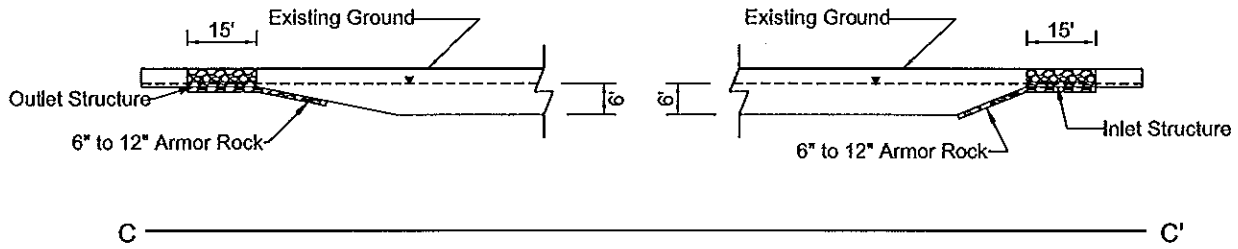


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Waterway: Little Squaw Creek  
Proposed Activity: Placer Mine  
Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
Lat.: N 67.5833 Long.: W -148.1477  
Sheet: 8/15 Date: 1/6/2013

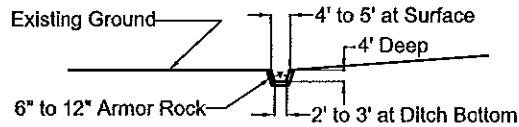


TYPICAL DETENTION POND - CROSS SECTIONS

Diversion Detention Pond Cross Section (Typical)



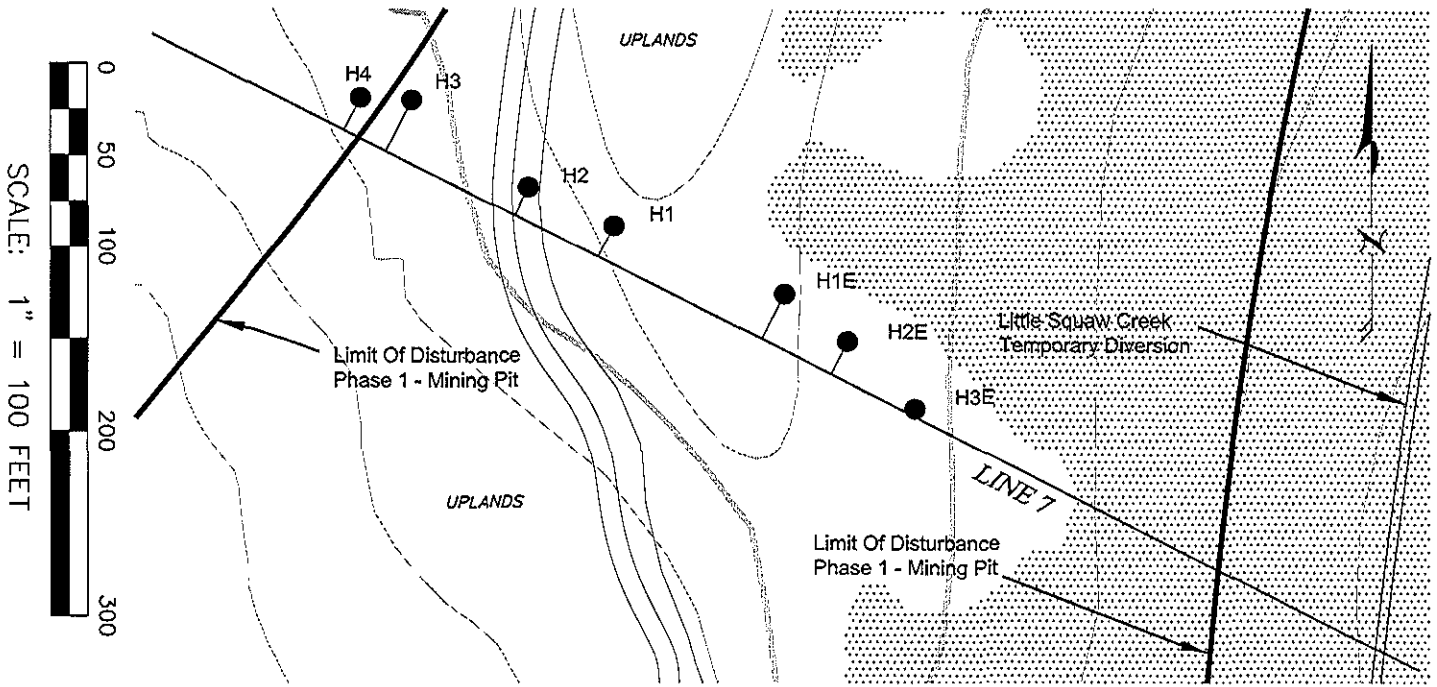
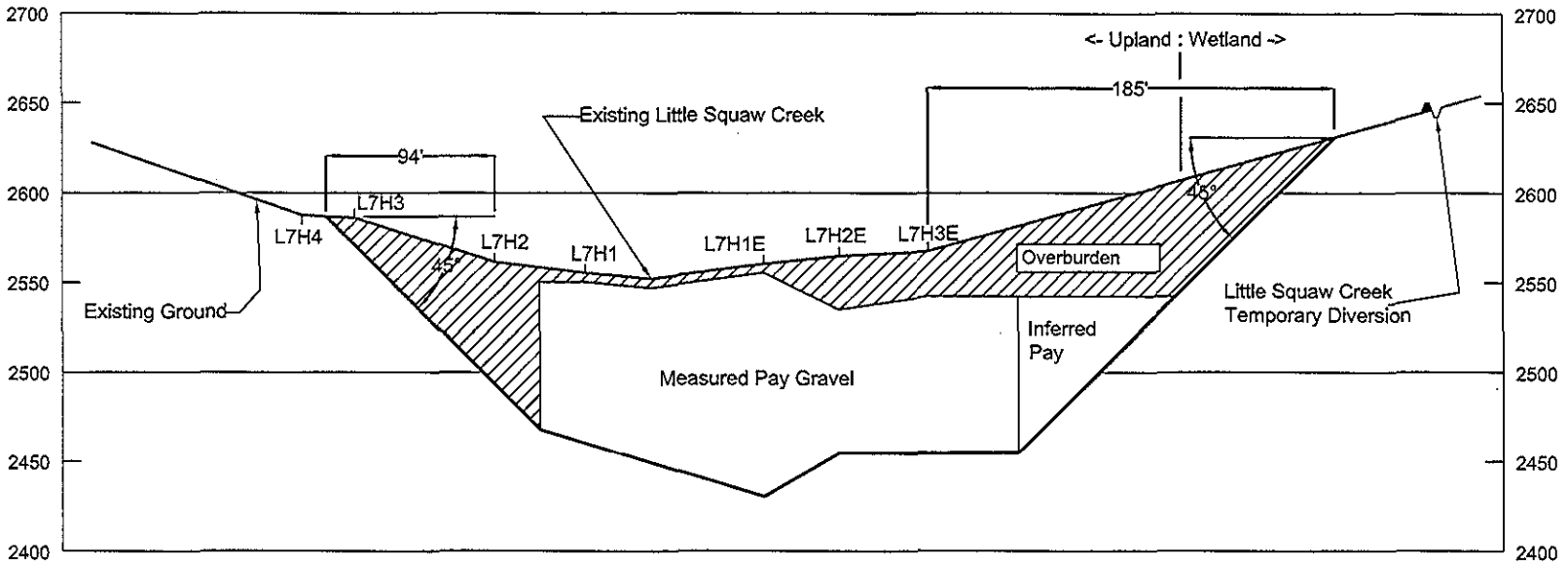
Inlet / Outlet Structures



SCALE: 1" = 40 FEET

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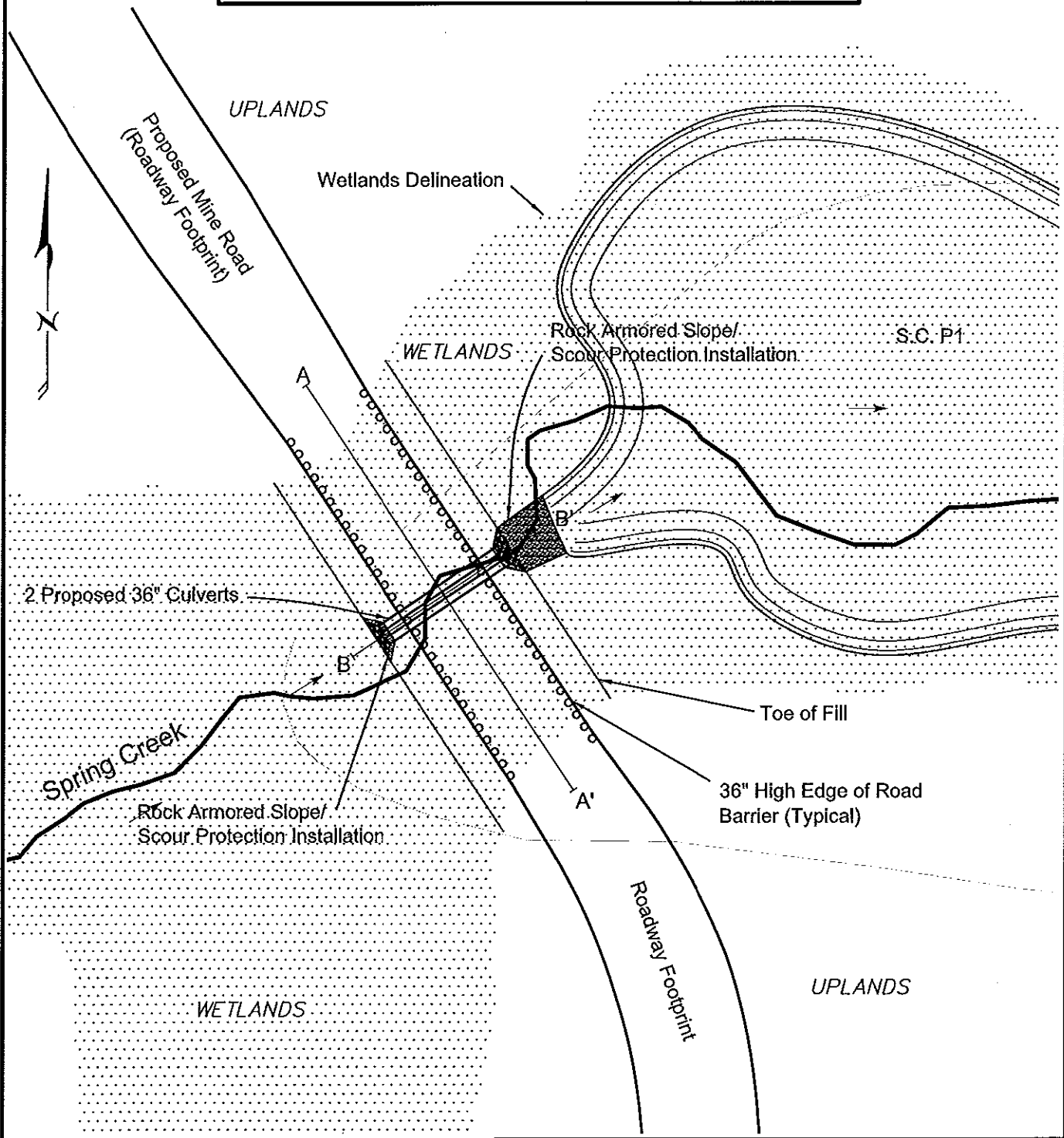
PHASE 1 & 3 - MINE AND PIT SECTION (TYPICAL)



SCALE: 1" = 100 FEET

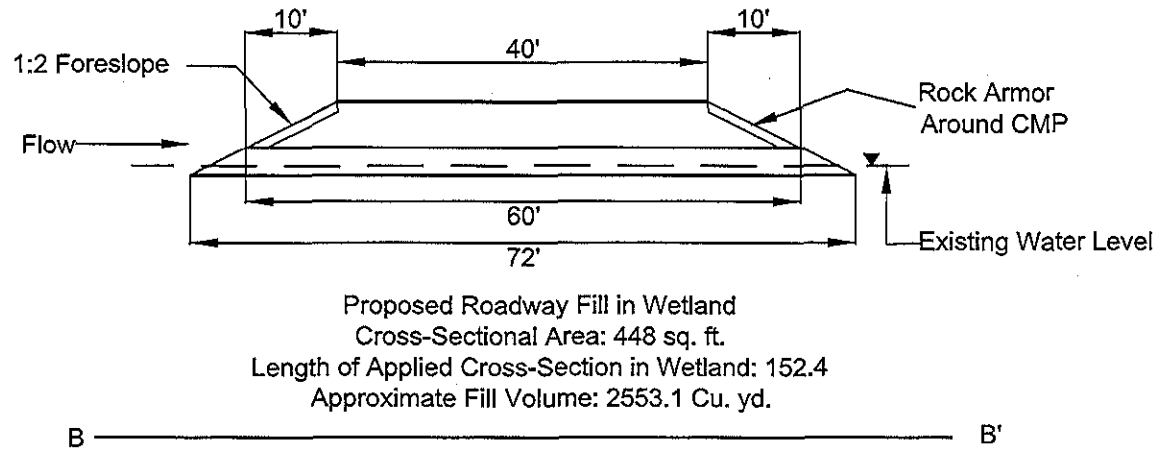
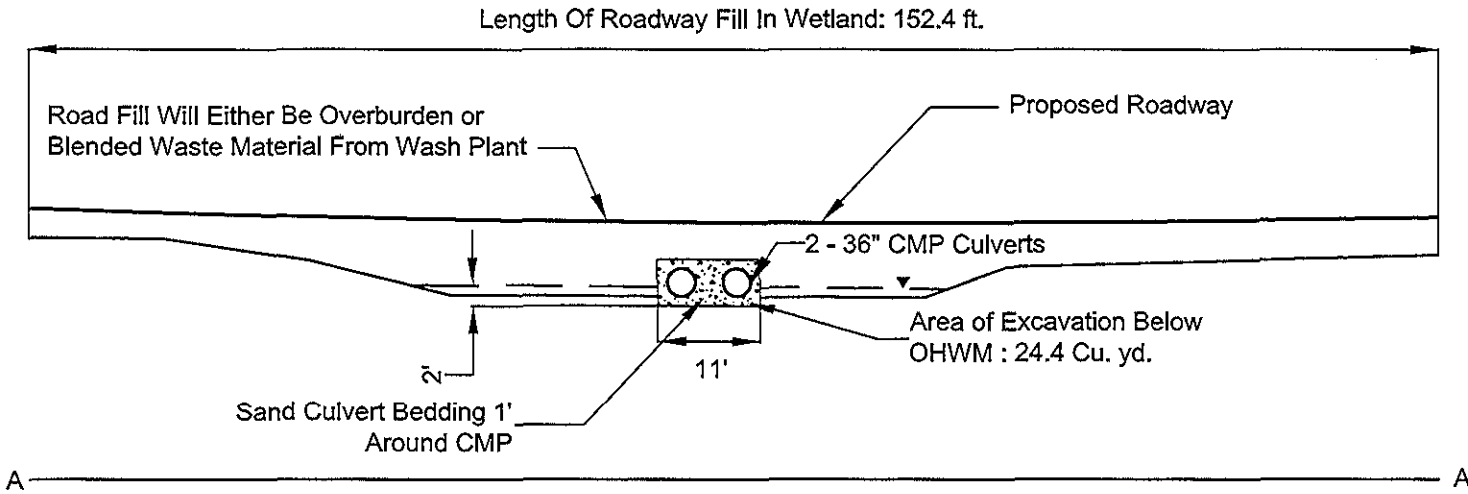
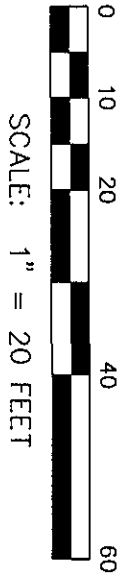
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 Lat.: N 67.5833 Long.: W -148.1477  
 Sheet: 10/15 Date: 1/6/2013

PHASE 1 - PLAN VIEW - SPRING CREEK CROSSING & WETLAND FILL



SCALE: 1" = 60 FEET

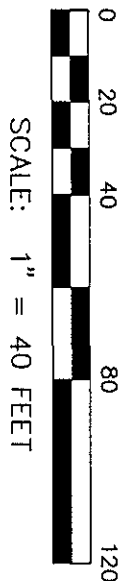
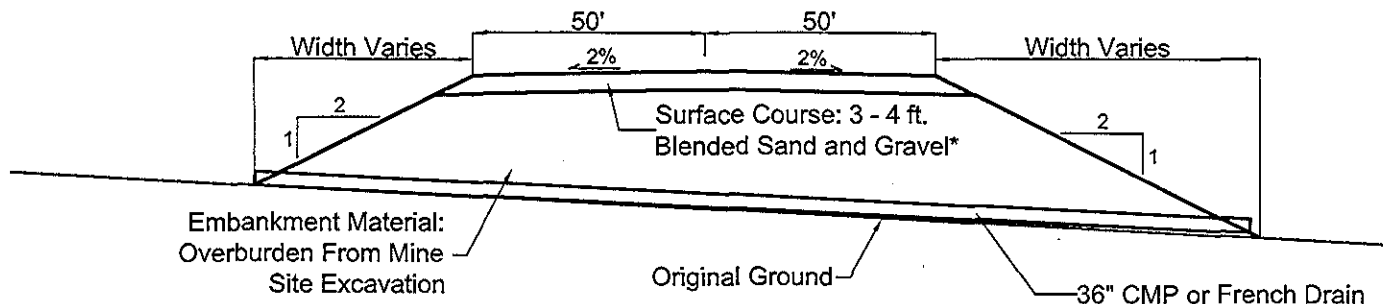
Applicant: NYAC AU, LLC  
File No: POA-2009-366-Little Squaw Creek  
Waterway: Little Squaw Creek  
Proposed Activity: Placer Mine  
Sec. 22, 23, 26, 27, 34, 35; T32N, R3W, FM, Chandalar C-3  
Lat.: N 67.5833      Long.: W -148.1477  
Sheet: 11/15      Date: 1/6/2013



\*On Spring Creek Road Crossing fill slopes re-spread organics, complete surface roughening, and tracking for erosion control.

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 Lat.: N 67.5833 Long.: W -148.1477  
 Sheet: 12/15 Date: 1/6/2013

### Airport Runway Cross Section (Typical)



#### Airport Runway - Typical Cross Section Notes:

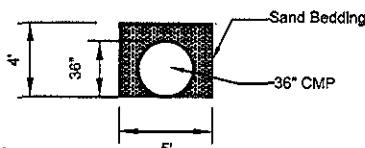
\*It is assumed, for a durable surface course, a blended material of sand and gravel 3 - 4 ft. in depth will be installed. Actual field conditions and material availability will determine the composition of the of the installed surface course.

\*\*On airport fill slopes re-spread organics, complete surface roughening, and tracking for erosion control.

\*\*\* The airport will be constructed on permafrost for its entire length. The selection of whether to use a French Drain or CMP will primarily depend on material availability. A secondary consideration should be made depending on the terrain being drained. Since water is a better conductor of thermal energy than air, where continuous water flow is encountered the use of a CMP should be considered, if the materials are available, to keep water from contact with the soil. For drainage areas subject to perodic flows, a French Drain might be considered.

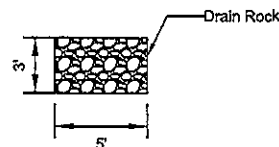
#### Cross Drain Installation\*\*\*

36" CMP - Cross Drain  
(NOT TO SCALE)



- 1) The sand bedding for the 36" CMP should surround the top and the sides of the culvert approx. 1'.
- 2) The base of the culvert should be bedded at the inlet end such that a groove is made in the sand close to the original ground without disturbing the vegetated mat, if possible.
- 3) Increase the depth of the bedding underneath the CMP gradually to 1' in depth while maintaining a grade to drain water.
- 4) The outlet should be armored to prevent the water flow from scouring underneath the CMP.

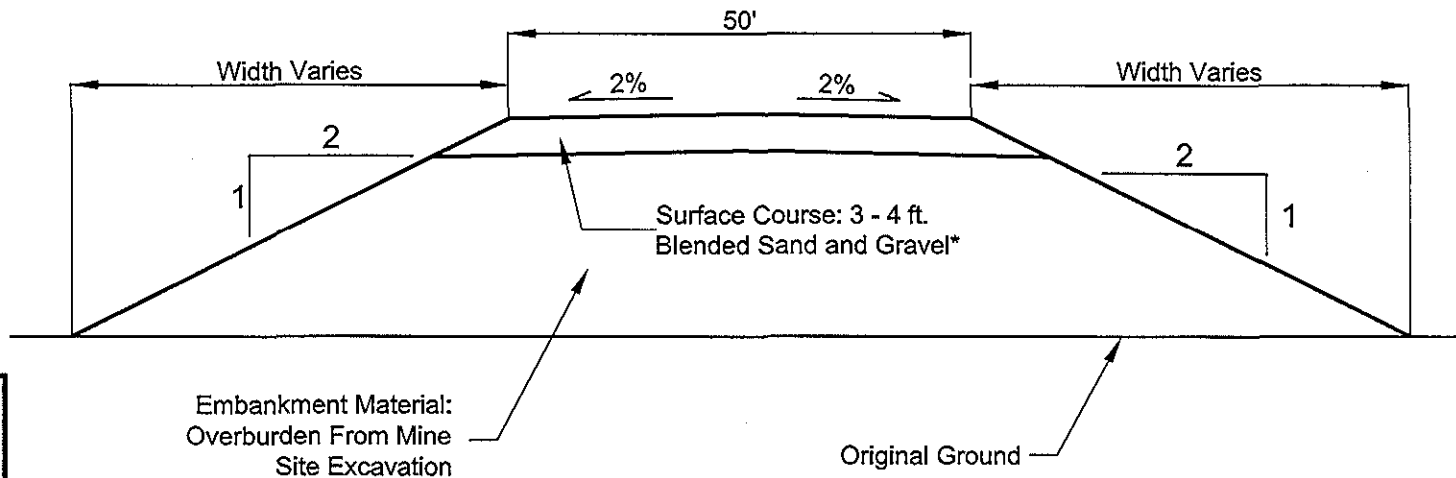
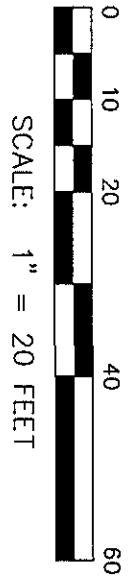
French Drain - Cross Drain  
(NOT TO SCALE)



- 1) The French Drain should be composed of stone 6 in. minus in size.
- 2) The stone can be laid on the original ground if construction takes place during frozen conditions. The vegetated mat should not be disturbed, if possible.
- 3) Plastic sheeting may need to be installed underneath the stone during thaw conditions. The necessity of this measure will depend on field conditions during construction.

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# Airport Access Road - Typical Section



PHASE 2 - AIRPORT ACCESS ROAD - CROSS SECTION

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 Lat.: N 67.5833      Long.: W -148.1477  
 Sheet: 14/15      Date: 1/6/2013

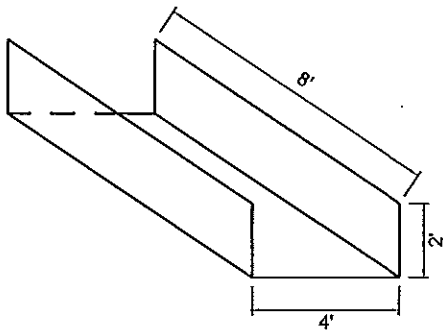
### Airport Access Road - Typical Cross Section Notes:

\*It is assumed, for a durable surface course, a blended material of sand and gravel 3 - 4 ft. in depth will be installed. Actual field conditions and material availability will determine the composition of the of the installed surface course.

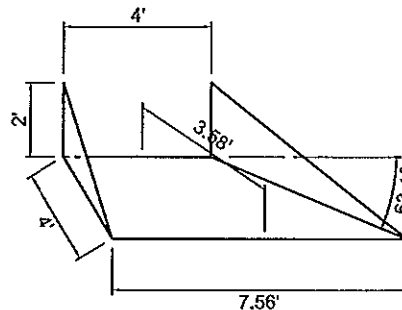
\*\*On Airport Access Road fill slopes re-spread organics, complete surface roughening, and tracking for erosion control.

NUGGET CREEK BYPASS FLUME - TYPICAL DETAILS, END SECTIONS, CUT SHEET, NOTES

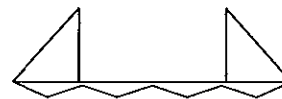
Typical Flume Module \*



End Sections \*\*



Optional Fabrication For Inlet End Sections



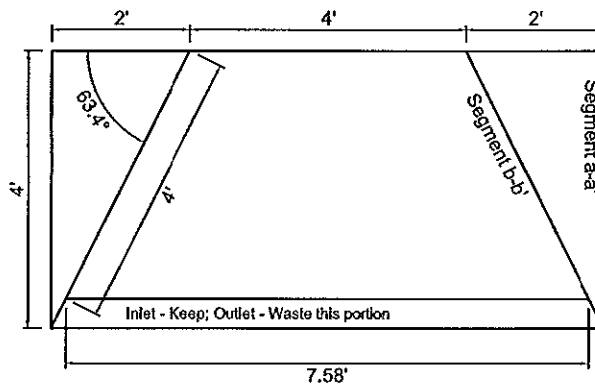
Notes:

- \*All bypass flume modules can be fabricated from one 4' X 8' sheet of 10 gage mild steel.
- 1) The flumes spanning Nugget Creek and Spring Creek Ponds #A and #B will be field fit and have their lengths finalized on site.
- 2) The modular design of the bypass flume allows for a simpler, more efficient fabrication and installation process. Upon completion, the final product is durable and moves large volumes of water with minimal maintenance.

- \*\*End sections should be installed on both inlet and outlet ends of the bypass flume. Each end section can be fabricated from one 4' X 8' sheet of 10 gage mild steel.
- 1) The inlet end section should be installed with the leading edge recessed into the ditch bottom. Recessing the inlet end section will ensure the bypass water will enter the flume and prevent a chance of water eroding a channel under the flume.
- 2) The outlet end section should be installed with the trailing edge just above the surface of the ditch bottom. Unless the ditch is excavated through a non-erodable material, a rock lined ditch bottom should be installed for long term usage. The rock lining for the ditch should be constructed of 6" to 12" stone, approximately 1' in depth for a length between 15' to 25' downstream of the outlet end section. The large rock dissipates velocity/energy of flowing water as it exits the flume, preventing a tendency to develop scour pools on the outlet by laminar flows.

\*\*\*After constructing the end section, a lip will extend beyond side panels approximately 5". Waste this material for outlet end sections. When a ditch is excavated through saturated or easily eroded soils, this section can be welded perpendicular to the bottom surface at the leading edge. A serrated pattern can be cut into the metal to make installation easier. This will act as an anchor, resisting erosive forces.

End Section Cut Sheet \*\*\*



SCALE: 1" = 5 FEET

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