ATTACHMENT B

Supplemental Report on Feasibility of Alternatives to Water Treatment for Discharges From The East Materials Storage Area

January 22, 2015

Introduction

This report provides information requested by Santa Clara County concerning the feasibility of alternatives for reducing selenium in stormwater runoff from the East Materials Storage Area ("EMSA"). The Planning Department, following the November 20, 2014 Planning Commission meeting, asked that Lehigh provide input on three specific alternatives: (1) expanding Pond 30, located at the eastern toe of the EMSA, to detain greater amounts of runoff; (2) delivering water from Pond 30 to the quarry pit using water trucks; and (3) constructing a pipe and pump system to deliver water from Pond 30 to the quarry pit. This report provides the information requested, and supplements the feasibility report that Lehigh Southwest Cement Company ("Lehigh") provided to the Planning Commission for the November 20 meeting.

Background

The Permanente Quarry is a surface mining operation located in the unincorporated foothills of western Santa Clara County, approximately two miles west of the City of Cupertino. The Quarry occupies approximately 614 acres of 3,510 acres owned by Hanson Permanente Cement, Inc., and operated by Lehigh. The EMSA is a 54-acre portion of the Quarry used for permanently storing overburden. Permanente Creek, a seasonal stream , receives stormwater from the EMSA and other areas of the Quarry.

In June 2012, the County approved an amended Reclamation Plan, pursuant to California's Surface Mining and Reclamation Act ("SMARA") and the County's surface mining ordinance. The Reclamation Plan was designed in large part to reduce concentrations of selenium in runoff to Permanente Creek. Selenium, which can have toxic effects at high concentrations, occurs naturally in the Quarry's limestone rock and can be released when limestone is exposed to oxygen and water.

The amended Reclamation Plan included strategies to reduce or eliminate selenium in runoff. For the EMSA, the primary reclamation approach is to isolate limestone rock from air and water by covering the EMSA stockpile with a minimum one-foot layer of non-limestone material, followed by a second layer of revegetation growth media. The amended Reclamation Plan projected that these actions would reduce selenium in EMSA runoff to levels meeting the current water-quality standards.

The County's Conditions of Approval for the Reclamation Plan included conditions (Nos. 79, 80, 81, 82) intended to limit the potential for interim (i.e., pre-reclamation) discharges of selenium to Permanente Creek. These conditions required Lehigh to implement various "best management practices" for selenium control; ongoing sampling and testing for selenium; and further study of a treatment facility. These conditions, notably, were intended to minimize but not entirely prevent selenium discharges, as the EIR recognized that reclamation activities involve earth moving that could temporarily increase selenium in runoff. (*See*, Final EIR, pp. 3.1-24, 4.10-43-50.) In addition, Condition 82 required Lehigh to analyze the feasibility of building a water treatment facility, or an alternative, at the EMSA to reduce selenium in runoff. Lehigh provided this information to the County in connection with the November 20, 2014 Planning Commission meeting.

First, Lehigh presented information on the anticipated timing of reclamation. The approved Reclamation Plan requires reclamation to commence in the EMSA earlier than in other areas of the Quarry. Final reclamation, including placement of a non-limestone cover, must begin by 2015 in the EMSA, whereas reclamation in other areas will not begin until at least 2025. Moreover, Lehigh has committed to starting final reclamation on an earlier schedule. Lehigh will begin installation of a non-limestone cover in October 2014 and complete the cover in 2015 before the 2015-16 wet season begins. As such, a treatment system would have utility for no more than the remainder of the 2014-15 winter, after which the protective non-limestone cover will be in place.

Second, Lehigh provided information regarding the technological feasibility of installing a water treatment system at the EMSA. The EMSA is designed so that storm runoff flows to a series of ditches, and then to a series of sedimentation basins, including a final basin (Pond 30), which discharges into Permanente Creek. Because of the EMSA's size and drainage controls, and because the EMSA is composed mainly of pervious fill, it generates relatively little runoff to the creek. The EMSA produced only two measurable discharges during the 2012-13 and 2013-14 wet seasons, respectively. The current treatment technologies require a steady inflow to establish and maintain anaerobic "reducing" conditions to treat selenium. A treatment system is not able to function effectively based on the small, intermittent discharges which characterize the EMSA. Unlike the pit, which collects and stores water from a large area that can be pumped in a continuous flow, the EMSA rarely generates a treatable volume of runoff. Based on these considerations, Lehigh explained that a stand-alone treatment facility at the EMSA is technologically infeasible.

Finally, Lehigh analyzed if it is feasible to treat EMSA runoff by delivering stormwater directly to Pond 4A, where the ITS facility is located. Lehigh explained that delivering EMSA stormwater directly to the ITS risks upsetting the treatment system by introducing variations in temperature and water quality represented by the EMSA influent. As the EMSA produces only surface water, water from the EMSA would have a different profile for temperature and suspended solids than the pit/WMSA influent currently treated through the interim treatment system installed adjacent to the pit. Technologically, it was unknown whether the existing treatment system could effectively absorb and tolerate such influent variations without reducing performance.

The Planning Department staff has generally concurred with these conclusions, based on staff's independent review and input from the Planning Department's technical consultant. As a result, the Planning Department requested, following the November 20 meeting, that Lehigh consider the feasibility of three alternative methods of reducing selenium in stormwater discharges from the EMSA during the interim period before reclamation is complete: (1) an alternative that would expand Pond 30, located at the eastern toe of the EMSA, to detain greater amounts of runoff; (2) an alternative that deliver water from Pond 30 to the quarry pit using water trucks; and (3) an alternative of constructing a pipe and pump system to deliver water from Pond 30 to the quarry pit. Each alternative is discussed below.

Pond 30 Enlargement

Presently, Pond 30 is built and configured according to the Reclamation Plan. It is an unlined pond with a design capacity of approximately 0.184 acre feet (8,000 cubic feet). The pond is located on a relatively flat pad at the eastern base of the EMSA. It is the ultimate collection point for most stormwater runoff in the EMSA, which is routed to the pond through a series of engineered swales, ditches and intermediate ponds/basins. When water levels in Pond 30 are sufficiently high, water enters a standpipe and is routed for discharge to Permanente Creek.

As requested, Lehigh has developed a preliminary design for enlarging Pond 30 to a capacity that will minimize the likelihood of a stormwater discharge to Permanente Creek under foreseeable storm events. Lehigh prepared the design with input from Lehigh's technical consultants. The design, shown conceptually in Figure 1 (attached), would maximize the space existing at the flat pad east of the EMSA that currently surrounds the pond. This conceptual design would result in a pond with an approximate capacity of 14.5 acre-feet, capable of detaining a volume roughly equivalent to the 10-year, 24-hour storm event. This size of pond also represents, volumetrically, the largest basin that may be installed without special permitting by dam authorities. The enlarged pond would be designed and built according to accepted engineering practices and the Regional Water Board's requirements.

Preliminarily, the alternative of enlarging Pond 30 appears to be feasible, subject to the need for a more detailed engineering design and inter-agency review (some aspects of the enlarged pond would be subject to Regional Water Board and Department of Fish and Wildlife requirements). The term "feasible," as explained in our November 20, 2014 submittal, means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (Pub. Resources Code, § 21061.1; Cal. Code of Regulations, tit. 14, § 15364.) It should be noted that the existing conceptual design represents the maximum possible pond size with the available space, and an as-built basin may vary in size or volume based on engineering, agency or operational constraints. Lehigh submits that it would be appropriate for the Planning Commission to require Lehigh to provide a status update regarding the feasibility of enlarging Pond 30 at the time of the 2015 annual report.

Trucking Water to Quarry Pit

The Planning Department also requests that Lehigh provide its evaluation of an alternative of delivering water from Pond 30 to the quarry pit using water trucks. To determine the practical requirements of this alternative, Lehigh has first assessed the rate of inflow into Pond 30 during specified storm events which will equal the maximum rate at which water must be pumped and trucked from Pond 30 to prevent a discharge.

Lehigh accomplished this by obtaining hydrologic modeling from its consultant, Golder Associates, using standard surface hydrology modeling techniques. The modeling determined stormwater volumes and rates of flow (hydrographs) to Pond 30 based on specific storm events. For this analysis, Lehigh used the 10-year 24-hour storm event, and the 100-year 24-hour storm event. The model shows that the 10-year 24-hour storm event would generate 4.98 inches of precipitation and accumulate 17.2 acre-feet of water. The 100-year 24-hour storm event would generate 7.68 inches of precipitation and accumulate 35.7 acre-feet of water. Corresponding hydrographs are provided in Figure 2 (attached).

The next step in the analysis is to determine the rate at which Pond 30 water can be pumped into water trucks and delivered. The analysis depends on a number of critical factors, below, which can then be used to calculate the maximum number of truck trips needed in an hour and the …er of trucks to achieve those trips:

Should evaluate 2 yr 5 yr

- …size of the tank on an off-road diesel water truck: 11,000 gallons
- …e for a loaded truck to safely drive over an 13% average grade (some sections …derably steeper) over the approximately 1.9-mile route, emptied, and returned to …d at the EMSA: 1.5 hours
- …imited to daytime hours (under COA 87), which is conservatively assumed to …ours during the wet season.
- Ensure that sufficient trucks are available in excess of truck trips to allow for trucks to be filled while others are travelling up and down the hill.

Applying these factors, the 100-year 24-hour storm event generates 21.2 acre-feet of stormwater in excess of the 14.5 acre-foot pond capacity, thus, pumping would be required to avoid a discharge. It was calculated that a pond-to-truck pumping rate of 8,400 gallons per minute (gpm) or 0.026 acre-feet/min (afm) would be necessary to avoid a discharge from the enlarged Pond 30. To transport this volume of water by truck, 56 truck trips per hour are needed and a fleet of 84 total trucks are required to provide these trips. This equates to one truck being filled per minute and thus the pumping rate must be increased to 11,000 gpm for peak hours. Under the 10-year 24-hour storm event, precipitation will generate 2.7 acre-feet of stormwater in excess of the 14.5 acre-foot pond capacity. To avoid a discharge, Pond 30 water would need to be pumped into trucks at a rate of 1,200 gallons per minute (gpm) or 0.0037 acre-feet/min (afm). To transport this volume by truck, 9 truck trips per hour are needed and a fleet of 14 total trucks are required to operate in a given hour to provide these trips. This equates to one truck being filled every 6 minutes and thus the pumping rate must be increased to 1,800 gpm for peak hours.

This data does not permit a finding that trucking water from Pond 30 to the quarry pit is feasible based upon technological factors. (Pub. Resources Code, § 21061.1; Cal. Code of Regulations, tit. 14, § 15364.) It is not possible to fill and empty an 11,000-gallon water truck every minute as would be necessary to match the inflow rate to Pond 30 in the 100-year 24-hour storm scenario, or every six minutes as required by the 10-year 24-hour scenario. Trucks could not be filled rapidly enough to match the inflow necessary to prevent a discharge. In addition, the most direct path from Pond 30 to the quarry pit is not a two-way roadway, and returning trucks would need to pause during their circuits to allow oncoming traffic to pass (loaded water trucks traveling uphill cannot stop). Lehigh also has very serious safety concerns over what would essentially be a constant line of trucks traveling back and forth to over steep inclines during a major rainstorm. This is not a typical or safe operating scenario, and Lehigh typically suspends heavy truck operations during major storms. Lehigh does not believe that the hauling activities relating to this alternative can be safely performed.

Piping/Pumping Water to Quarry Pit

As a third alternative, the Planning Department has asked that Lehigh consider the feasibility of designing and building a system of pipes and pumps capable of deliver water from Pond 30 to the quarry pit. The project would require approximately 1.9 miles of pipe to link the two areas. It also would require a series of pumps to lift water over a 700 to 800-foot vertical gradient in order to cross a ridge separating the EMSA from the quarry pit. The approximate alignment of the piping and pumping system is illustrated in the map below.

Lehigh's preliminary analysis indicates that a very large pumping facility would be required. To transport the volume of water generated by the 100-year 24-hour storm event, it is assumed that eight 1,200 gpm pumps rated at 1000 feet total head and capable of high-sediment water will be required, and that the project would require four parallel pipelines (diameter unknown). To transport the volume of water generated by the 10-year 24-hour storm event, it is assumed that four 400 gpm pumps rated at 1000 feet total head and capable of high sediment water would be required, together with three parallel pipelines (diameter unknown). Outside of these broad assumptions, further engineering design and study would be necessary to develop a conceptual design and accurate cost model. It is not known if a pump intake structure for the high capacity pumps can successfully be installed in a relatively small basin such as Pond 30 (either in its current size or in an expanded configuration). It is unknown if these pipelines can actually be built and secured at such a high pumping rate, and whether the current electrical power supply to the Permanente quarry is large enough to power these pumps.

The information does not permit a finding that piping and pumping water from Pond 30 to the quarry pit is feasible, considering technological and timing factors. (Pub. Resources Code, § 21061.1; Cal. Code of Regulations, tit. 14, § 15364.) The information gathered so far does not permit the determination of whether a pumping/piping system can, from an engineering perspective, be successfully built. The project requires a formal design process undertaken by specialized consultants. This alternative also presents timing issues. It will require an estimated two years to design and build the system, assuming it is technologically feasible (excluding any time that may be required to prepare an environmental review). By the time this system would be operational, the EMSA will already have been covered with the non-limestone layer called for by the Reclamation Plan to protect against selenium, and the delivery system would no longer have usefulness. In short, this alternative is not "capable of being accomplished in a successful manner within a reasonable period of time..." (Pub. Resources Code, § 21061.1.)

Legal Authority to Reconfigure EMSA Stormwater Runoff

The Planning Department has requested that Lehigh explore whether legal authority presently exists, or can be obtained, from the Regional Water Board to reroute EMSA runoff to the quarry pit or another destination. In this regard, Lehigh's March 2014 discharge permit from the Regional Water Board contains language that potentially restricts Lehigh from changing the current configuration of EMSA runoff. In connection with the November 20, 2014 Planning Commission hearing, however, a representative of the Regional Water Board offered statements indicating that the Regional Water Board might permit such a change. In a more recent letter to the Planning Department dated January 7, 2015, the Regional Water Board stated that "the NPDES permit and the CDO can be amended to recognize facility and operational changes intended to improve compliance with discharge limits and protect water quality." As such, it appears that the change in configuration is not currently authorized, but that the Regional Water Board would consider granting an application submitted by Lehigh to amend its discharge permit to allow this activity to occur.

Conclusion

Lehigh appreciates the opportunity to provide this input to the County, and looks forward to answering questions that may be presented by the Planning Commission or Planning Department staff at the January 22, 2015 meeting.

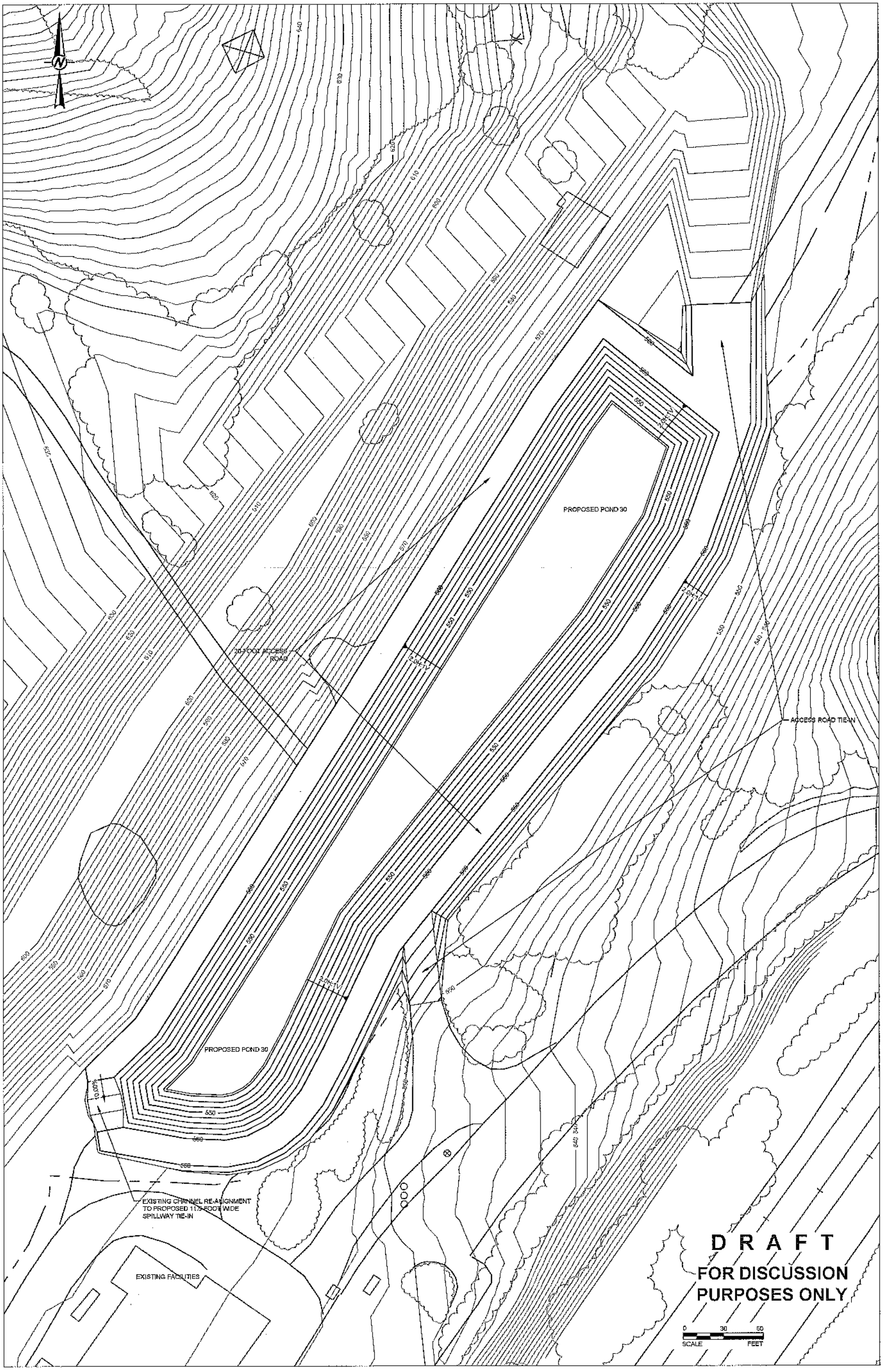
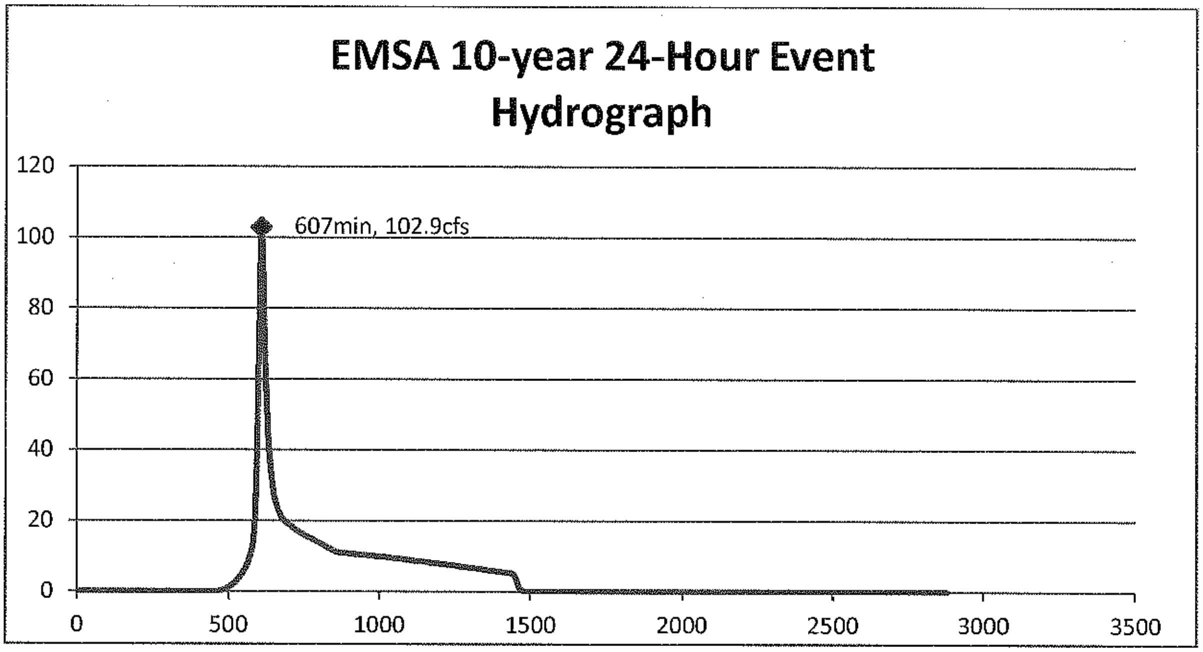
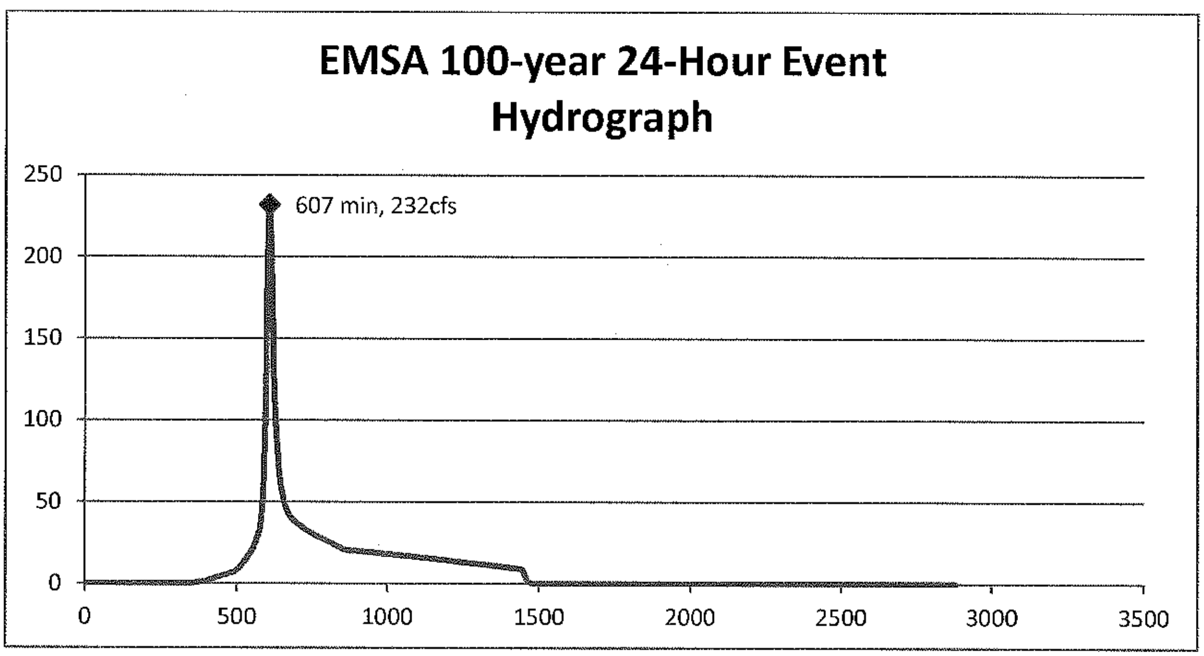
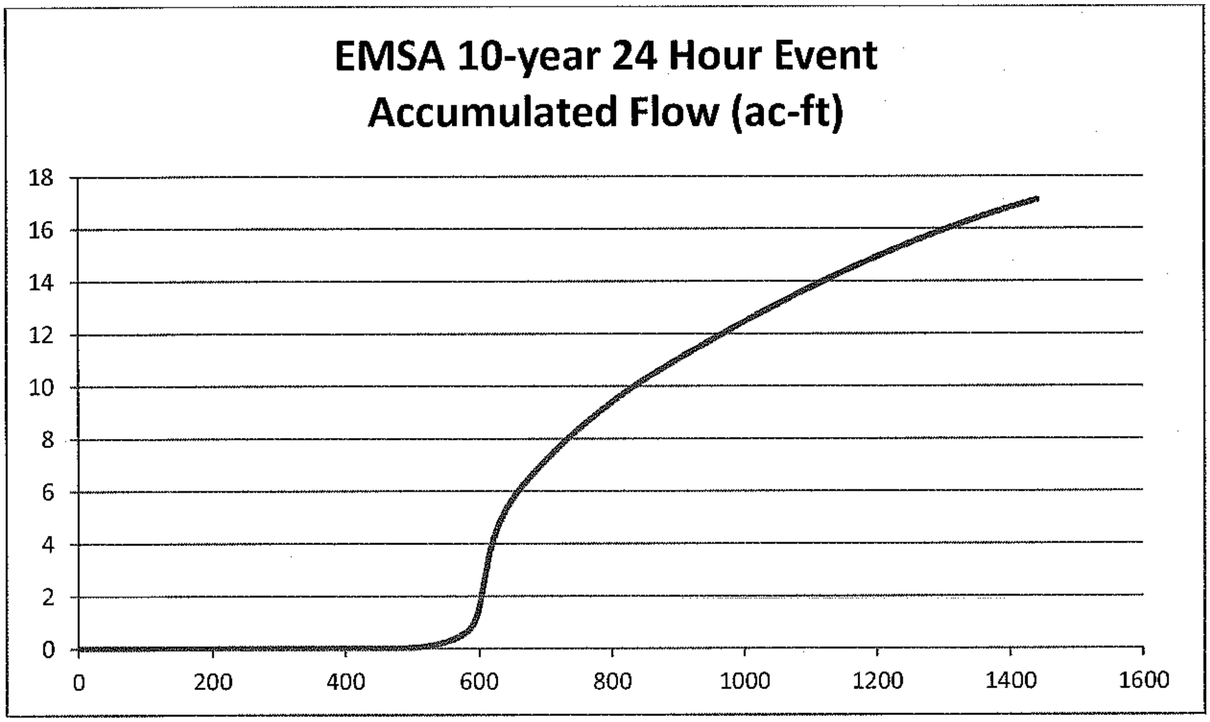
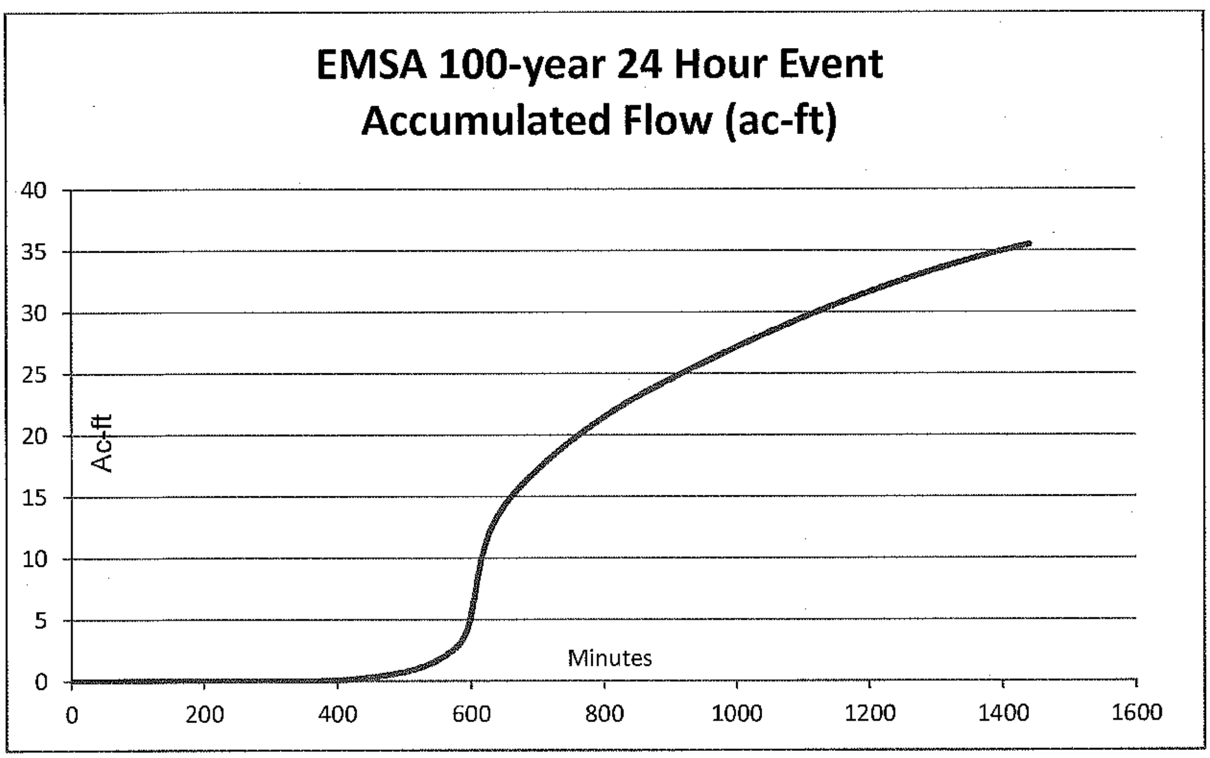

PROPOSED POND 30
20-FOOT ACCESS ROAD
ACCESS ROAD TIE-IN
PROPOSED POND 30
EXISTING CHANNEL RE-ALIGNMENT TO PROPOSED 11.0-FOOT WIDE SPILLWAY TIE-IN
EXISTING FACILITIES
DRAFT
FOR DISCUSSION PURPOSES ONLY
0 30 60
SCALE FEET

Figure 2
Storm Event Hydrographs






EMSA 10-year 24 Hour Event
Accumulated Flow (ac-ft)
18
16
14
12
10
8
6
4
2
0
0
200
400
600
800
1000
1200
1400
1600


EMSA 100-year 24 Hour Event
Accumulated Flow (ac-ft)
40
35
30
25
20
15
10
5
0
Ac-ft
Minutes
0
200
400
600
800
1000
1200
1400
1600