FACILITIES PROGRAM

GREAT SALT LAKE MARINA DREDGING

DFCM PROJECT NO. 15247510

MAY 2016

J-U-B Engineers, Inc.

466 North 900 West Kaysville, Utah

J·U·B ENGINEERS, INC.

REVIEW AND SIGNATURE PAGE

Utah State Department of Natural Resources
State Parks Division
Review Signatures

We, the representatives for the State of Utah Department of Natural Resources, State Parks Division, have reviewed the Program for the Great Salt Lake Marina Dredging Project and hereby sanction that this Program adequately represents our goals, objectives and program needs. We further acknowledge that all appropriate parties involved in the programming effort have reviewed this document for completeness and accuracy.

_____ _____

Dan Clark
Construction and Development Manager
Utah State Division of Parks and Recreation

Date

Division of Facilities Construction & Management, State of Utah
Review Signatures

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_____ _____

Matt Boyer
Project Manager

Date

GREAT SALT LAKE MARINA DREDGING PROGRAM

REVIEW SIGNATURES

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1.0 EXECUTIVE SUMMARY

1.1 PROJECT OBJECTIVES

The Great Salt Lake State Park has been a focal point for many activities in and around the Great Salt Lake since 1978. The State Park provides boat slips, public viewpoints, sail and motorboat access to the lake, and serves as a search and rescue operations center.

Over the last several years of draught the lake levels have been slowly receding. The current lake levels are approaching historic lows. This fact, when combined with the migratory nature of the lake bottom due to wave action, have resulted in limited access for boats into and out of the marina. The Great Salt Lake Yacht Club is headquartered at the Marina. Many of the sail boats have been pulled from the marina because of the low water levels.

The primary goal of this project is to improve boat access into and out of the lake. This will require dredging of the marina itself and some work out in the lake, near the mouth of the marina to provide more depth and greater access for boaters. This work needs to be done while minimizing the impacts to activities currently available in the Park.

1.2 PROGRAMMING PROCESS

Over the last 1.5 years, State Parks has been working to first secure funding and then determine the requirements that need to be met in order to dredge the marina. Criteria that govern this effort include:

1.2.1 Total project construction budget cannot exceed $1,284,988.00

1.2.2 On April 20, 2016, the U.S. Army Corps of Engineers issued a letter stating that a Department of the Army Permit is not required for this work provided the following criteria are met:

Dredging methods:

1.2.2.1 Suction dredging must be used to remove materials from the marina and the lake, minimizing turbidity and disturbance of the lake bottom

Slurry Pipe:

1.2.2.2 Materials removed from the marina and lake are to be piped to an approved disposal site approximately 4 miles to the northeast

1.2.2.3 The slurry pipe shall follow the proposed alignment showed on the plans in Appendix A. The pipe is to follow the existing road and will be located well above the toe of the slope for the roadway embankment.

1.2.2.4 The slurry pipe will be buried as it crosses the frontage of the Saltair Resort and at a few select locations along its alignment to allow access to facilities for maintenance and events.

1.2.2.5 Locations of booster pumps, if needed, will need to be approved by State Parks and may not impede traffic or disturb existing wetlands.

Disposal Pond: Contractor will be required to provide the engineering necessary for the construction of the retainage pond. All engineering calculations will be performed by a licensed State of Utah engineer.

1.2.2.6 A containment pond needs to be constructed within the footprint shown on the plans provided in Appendix A. The design-build aspects of this project will include maximizing the amount of material that can be removed for the given budget.

1.2.2.7 Sensitive areas and existing wetlands have been identified and will need to be avoided and protected during the project.

1.2.2.8 A minimum freeboard of 1 foot will need to be maintained for the containment pond at the maximum slurry level

1.2.2.9 The intent of the project is to provide a permanent storage location for the materials dredged. With time many of the liquids will either percolate or evaporate leaving only the lake bottom materials in the pond

1.2.2.10 A minimum dike height of 2 feet needs to be constructed on the uphill side of the pond area to help keep water from running on to the pond site from properties adjacent to the pond

1.2.2.11 The pond may be constructed using materials from the site provided that the bottom of the pond not be excavated any lower than elevation 4202.0

Other General Requirements

1.2.2.12 A Stormwater Pollution Prevention Plan (SWPPP) must be prepared, approved by Salt Lake County, and implemented during all phases of the project. A preliminary SWPPP is included in Appendix B

1.3 EXISTING MATERIALS ESTIMATES

A survey of the marina has been completed. The following table summarizes the quantities of materials that State Parks would like to have removed. Materials have been listed in priority order.

Table 1 – Dredging priorities and estimated quantities

Priority/ Area	Description	Average Depth to Remove	Volume Removed (CY)
1	Harbor Channel and E Dock	5.5 ft	23,800
2	West Bay and I Dock	3.5 ft	23,500
3	Outer Channel in the Lake	Spot locations	20,000

4	South Bay	3.5 ft	25,650

Areas correspond to Figure 1.

1.3.1 The survey was completed using sub-surface sounding equipment to map the shape and contours of the marina area. This survey was done in October of 2015. A preconstruction survey will be done within 30 days prior to the commencing the dredging. The Contractor must request this service a minimum of 21 days in advance to allow adequate scheduling time for said survey. The volume of material removed for pay quantities will be determined by comparing the "preconstruction" survey with the "after" survey and calculating the net loss in materials. The "after" survey shall be completed using the same sub-surface sounding equipment used in the "preconstruction" survey. The contractor is welcome to and encouraged to attend both the preconstruction and after surveys services..

1.3.2 Just outside the mouth of the harbor is a known ledge of biomass. This material is harder than the unconsolidated lake bottom, but should be readily removed using cutter heads on typical suction dredging equipment.

1.4 PROJECT SCHEDULE

The desire is to have the materials removed as soon as possible. The functionality of the marina in its current state is limited. All work needs to be completed by **January 14, 2017**, with all equipment and materials removed and full access restored to all facilities. The asphalt driveway at Saltair may be repaired when temperatures are conducive, but no later than April 30, 2017. Maintenance of the Saltair driveway where the temporaty pipe crosses will be part of this project until the driveway has been satisfactorily repaired.

2.0 PERMITTING

2.1 ENVIRONMENTAL

Work has already been done with the U.S. Army Corps of Engineers (USACOE). The USACOE has issued a letter of no permit required based on the application submitted. A copy of the letter and the completed application are included in Appendix C.

It is important that the project constructed be in agreement with the documents reviewed by the USACOE. The size of the pond can be reduced but must fit within the footprint shown. Suction dredging is the only method acceptable for removing materials. The pipeline must avoid all existing or possible wetland areas.

2.2 SALT LAKE COUNTY

Salt Lake County has oversight jurisdiction for this project as it relates to stormwater regulations. A preliminary SWPPP was prepared and submitted to Salt Lake County for review. A copy of the SWPPP as submitted is included in Appendix B, along with the County's Plan Review Checklist. Names of responsible parties will all need to be changed and contact information will need to be modified. The contractor may also redo any portions that he sees fit.

2.3 SOVEREIGN LANDS

This project will also require a permit with the Division of Forestry, Fire and Lands for use of their property for the disposal of the dredged materials. This permit has been applied for and will be made available once the permit is obtained.

3.0 SITE CONDITIONS

3.1 ONGOING FUNCTIONS AT THE MARINA

The State Park at the Marina is still open and functional and will need to remain open during this work. Parking areas and visitor's centers will need to be open and accessible. The pipeline alignment shown on the plans has been chosen to minimize disruption and maximize functionality of the facilities. Currently there are few boats in the harbor. During the dredging operations there will be no boats in those areas where work is occurring. There may be occasional need to get search and rescue boats and equipment through the active construction site, but day-to-day use and recreational activities will be suspended in those work areas. The docks will remain in place and will need to be worked around.

The contractor will need to provide access from the parking area to beach areas and may be required to provide a means to cross the temporary pipeline. Any existing improvements that are damaged or removed to accommodate the work will need to be replaced or repaired at the completion of the work.

3.2 SALTAIR

The existing Saltair facilities are open and operational for events and sightseeing. They will need to remain open and accessible during the project. The temporary pipeline will need to be buried along the road for the entire frontage of the Saltair facility. It is the hope and thought of the project that the pipe will be in the right-of-way for the road and will avoid fencing, landscaping, monuments and other existing improvements. The area between the existing fence and the edge of the road is used for parking and will need to be open and useable during the project. Asphalt that is removed for trenching of the pipe will need to be replaced and repaired at the completion of the work. Maintenance of the trench through those sections will be the responsibility of the contractor.

3.3 ACCESS TO FACILITIES

3.3.1 Along the pipe alignment there are a few locations where existing sanitary sewer lift stations or other facilities exist that will need continued access during the project. The pipe will be buried through these short sections to maintain access to the facilities.

3.3.2 Access to the proposed pond site from the frontage road will need to cross property that has been identified as sensitive lands. The access road running between the frontage road and the pond site should follow closely the alignment shown on the conceptual site plan. Construction fencing or other means of site access constraint shall be utilized between the edge of the access

road and these sensitive areas wherever the road comes within 25 feet of the sensitive areas. Sensitive areas have been shown on the conceptual site plan.

3.3.3 It shall be the responsibility of the contractor to provide site security. There is currently a fence along the right-of-way for the frontage road. A new gate will need to be installed to allow the contractor access for construction. It is the responsibility of the contractor to control access through that gate and secure the site during non-working hours.

3.4 SOILS

Soil samples were taken from the marina floor and tested. Results of those tests are included in Appendix D. A gradation and proctor were run along with chemical testing of the soils. This information is provided for your use as you see fit.

3.5 RISKS/CONCERNS

The following paragraphs describe risks and concerns that may be associated with this project:

3.5.1 The proposed disposal site is composed of old lake bottom materials. The materials are likely similar in nature to the materials being removed from the marina.

3.5.2 Weather conditions are among some of the biggest concerns. Weather on the lake is highly unpredictable. Winds often reach velocities of 50 to 70 mph. Lake effects during precipitation events add to the unpredictable nature of things.

3.5.3 The soils at the disposal site do not drain quickly. Rain and other forms of precipitation may take several days to dry out. The fine nature of the soils combined with saturated conditions make for soft soils and difficult working conditions.

3.5.4 This area is in and around a State Park. There are many visitors coming and going every day. Saltair is home to many concerts and special events, with sometimes thousands of visitors at a single event. Whenever you have large gatherings of public there will be associated risks.There is existing power at the marina. State Parks will allow the contractor to utilize power that is available for the operations. It is believed that the electrical system is a three phase, three wire, delta system with 110V AC available at the campground, restroom building, Yacht Club building, entrance station and the harbor master's office. The campground has a dedicated circuit panel, with one 30 amp and one 50 amp services. There are two circuit panels on the lawn by the restroom. There is also 240 V and 480 V available at different locations. In the past, the old delta Y system has been a little unreliable with roughly 20 outages a year plus or minus. Outages typically last anywhere from 2 to 8 hours. Outages typically occur in association with weather events, but they are not exclusive to those events. As an alternative to utilizing power supplied by State Parks, the contractor may also utilize generators. Generators will need to be located so

that noise from the generators is minimized relative to the campers and overnight guests at the marina.

3.5.5 Information provided in this programming document is intended to assist the proposer in preparing their proposal and is not a guarantee of site conditions or circumstances. The contractor is required to field verify existing conditions before submitting a bid.

3.5.6 Time is of the essence. The marina, in its current state, cannot support its intended programming. The water is not currently deep enough to store many of the boats that typically rent space. It is the desire of all involved to get boats back into the water and make the marina operational as soon as possible.

4.0 PROJECT REQUIREMENTS

4.1 METHODS AND APPROACH

The underlying goal of this project is to remove as much material from the harbor as possible for the budget identified. Because of the relatively sensitive environment surrounding the Great Salt Lake and the delicate balance of the ecosystem there will be restrictions enforced on this project. There are several things that are not negotiable. They include:

1. The method used for dredging will be the low impact suction dredging method. The reason for this is to minimize lake bed disturbance and to keep turbidity at a minimum. One of the terms of the "No Permit Required" ruling from the USACOE is that suction dredging will be used to remove materials.
2. If a slurry pipeline is used, its alignment may not cross through any wetlands or suspected wetlands without being elevated. The plans show an alignment that has been approved by the USACE that includes following the existing road, maintaining an alignment that is safely outside of any suspected wetlands, while not impeding traffic on the road. Other alignments or methods of transporting the slurry to the disposal site may be considered, but will need to be approved.
3. The disposal site is set. The actual size and configuration of the containment will be left to the contractor as long as;
    a. The footprint does not exceed the footprint shown on the preliminary plans
    b. The bottom elevation of the disposal site before depositing any materials will not be lower than 4202.0
    c. There will be a dike at least 2 feet high constructed between the disposal area and the natural ground on the southeast (uphill) side of the disposal area
    d. Any dikes constructed for containment shall include at least 1 foot of freeboard above the highest level of the disposed materials.

e. An emergency spillway shall be constructed on any pond facilities that has the capacity to discharge the full pumping rate of pumps plus an additional 25 cfs. The height of liquid slurry at this stage will be at least 1 foot lower than the top of bank.

f. All slurry must be contained and will not be allowed to flow back into the lake.

g. All currently vegetated areas that are disturbed during construction will need to be revegetated at the completion of the project with an approved native seed mix.

5.0 PROPOSAL SUBMITTAL

5.1 PROPOSAL ELEMENTS

The following elements ~~could be~~ are required in the proposal:

5.1.1 The names and contact information of all proposal team members including engineers, surveyors, construction management groups or individuals, contractors, and dredging companies.

5.1.2 Identification of the lead proposer.

5.1.3 The quantity of material to be removed under the proposal in each of the areas identified in Table 1 above (Section 1.3). This quantity will be verified by survey of the marina bottom, as described in section 1.3.1 above, after the work is completed and before final acceptance.

5.1.4 The proposer's proposed schedule for completion.

5.1.5 A description of the team's approach to completing the work including (this information is required to be able to assess whether or not a proposal complies with the environmental requirements for this project):

5.1.5.1 Specifications for proposed dredging equipment

5.1.5.2 Method of transporting slurry from the marina to the disposal site including: Size and description of proposed slurry pipeline, size and capacity of pumping equipment; identification of any booster pump locations and pump specifications along with the path of the slurry pipe to and from the marina.

5.1.5.3 Proposed footprint for disposal of slurry materials

5.1.5.4 Proposed method of containment including: materials to be used to construct the containment, proposed depth of contained materials, methods anticipated to be utilized to protect surrounding sensitive areas

5.1.5.5 Other thoughts, ideas or suggestions to maximize the amount of material to be removed for the budgeted price

APPENDIX A – Preliminary Plans

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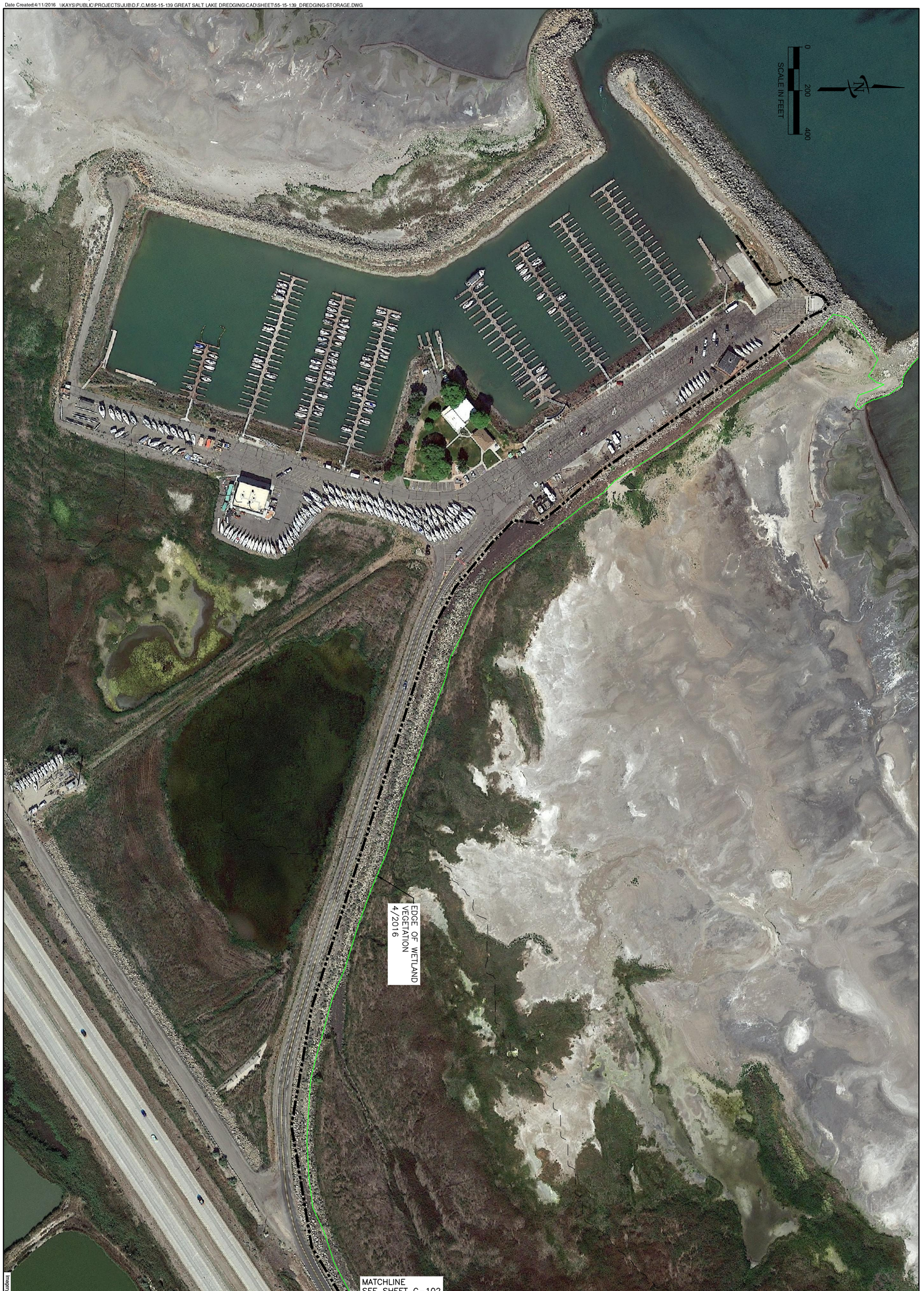

GREAT SALT LAKE MARINA DREDGING

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PIPE ROUTING

PLAN VIEW

C-101

SHEET NUMBER:

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NO.	DESCRIPTION	BY	APP. DATE

PRELIMINARY PLANS

NOT FOR CONSTRUCTION

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PIPE ROUTING
PLAN VIEW

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PIPE ROUTING

PLAN VIEW

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GREAT SALT LAKE MARINA DREDGING

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PIPE ROUTING

PLAN VIEW

C-104

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PIPE ROUTING

PLAN VIEW

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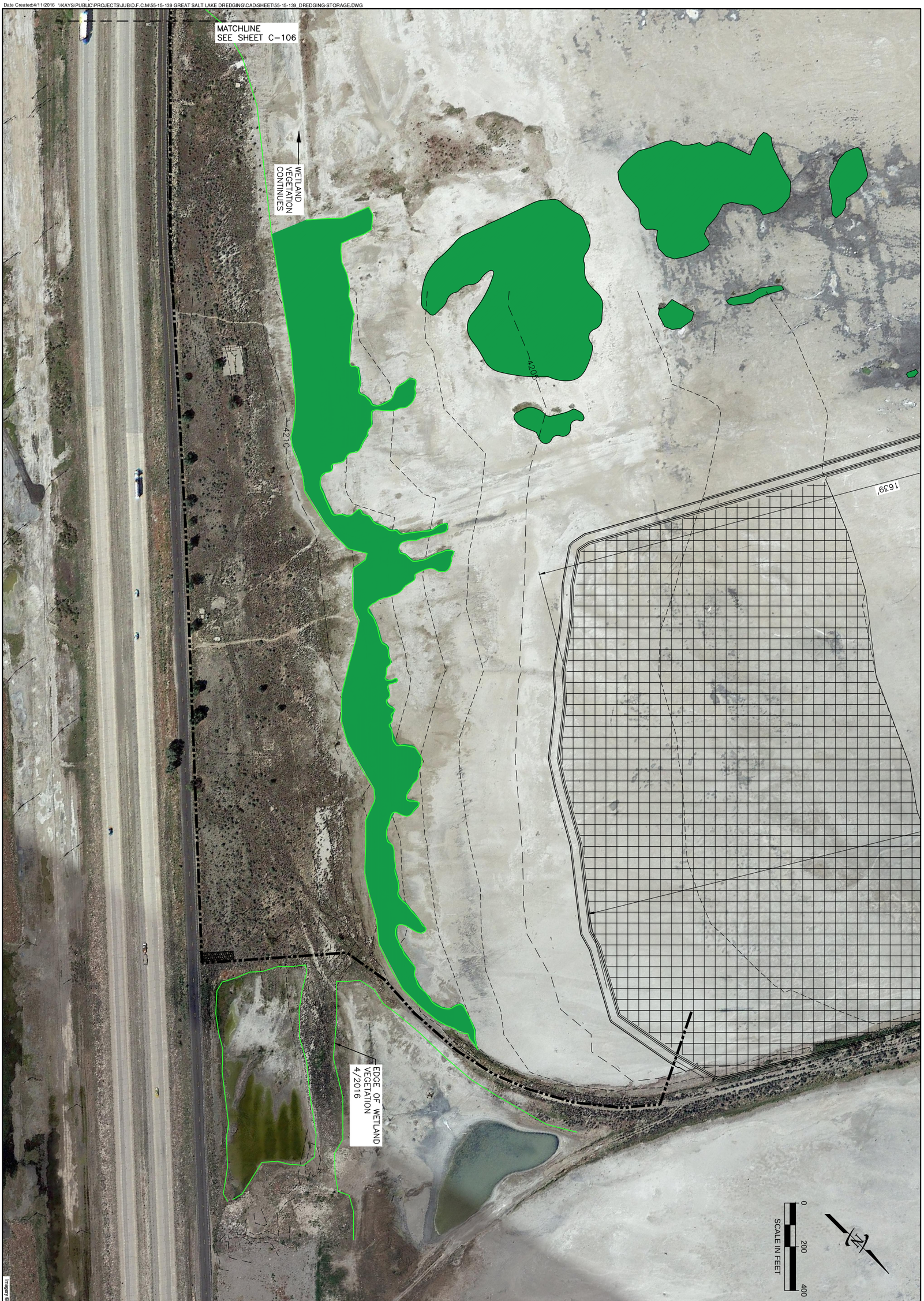

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PIPE ROUTING

PLAN VIEW

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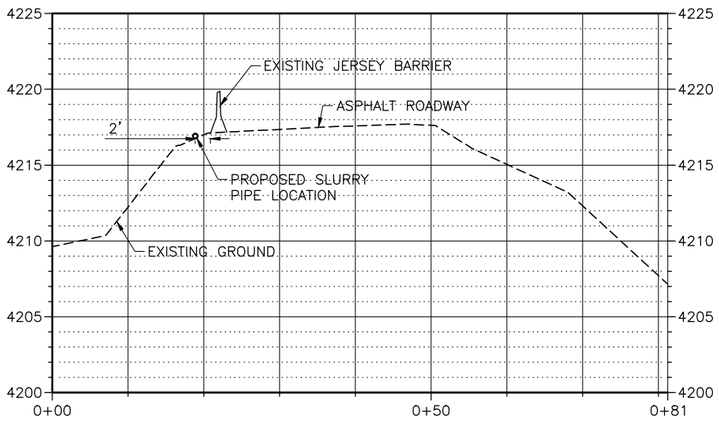

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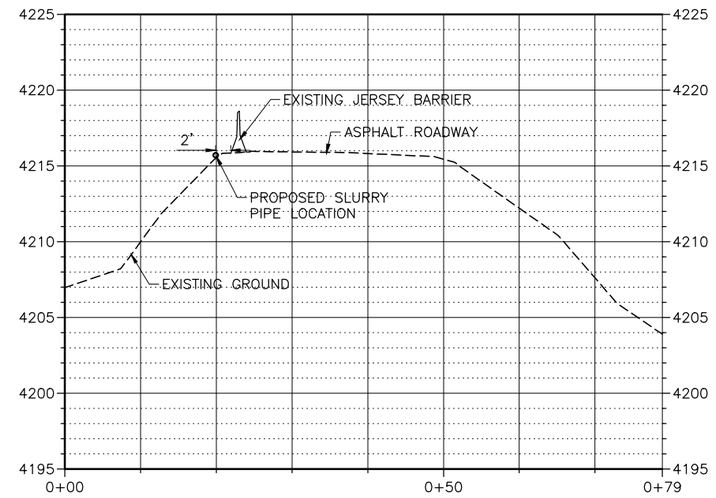

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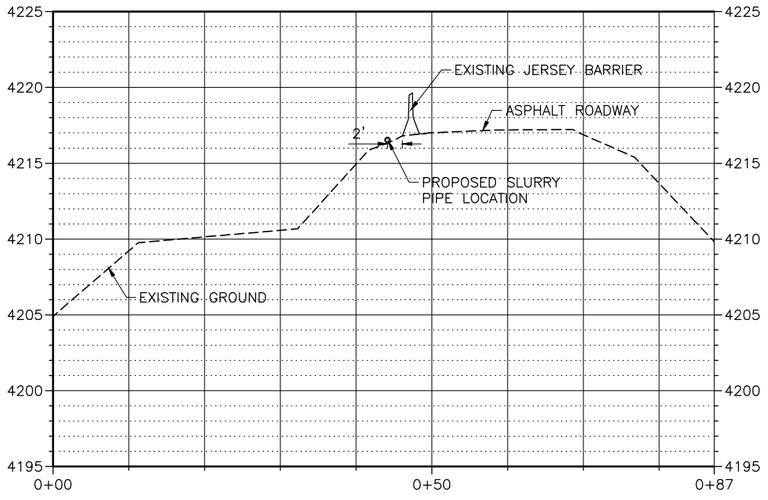

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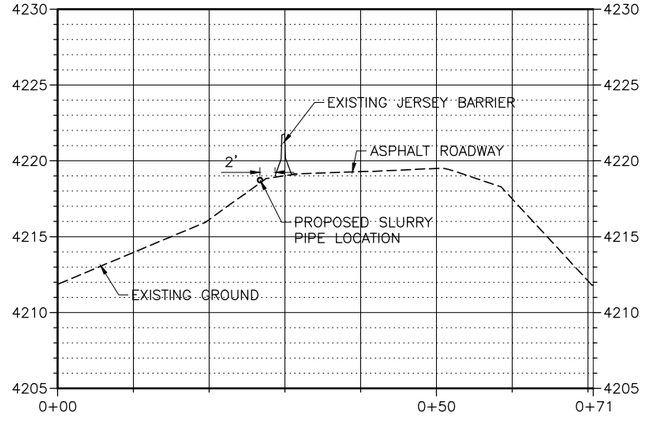

D ROAD CROSS SECTION

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GREAT SALT LAKE MARINA DREDGING
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PIPE ROUTING
ROAD CROSS SECTION VIEWS

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APPENDIX B – Preliminary SWPPP with County Comments

Salt Lake County Planning and Development

Stormwater Discharges from Construction Activity (UTR 3000000)

Stormwater Pollution Prevention Plan Review Checklist

Project Name: Great Salt Lake Marina Site Address: 11408 W N. Temple (Frontage)	☐ Basic SWPPP (E&SC Plan)	☒ Full SWPPP
	Municipality: County: Salt Lake	Reviewer: G.M.B
Owner/Operator: State Parks + Rec Address: 1084 N Redwood Rd.	Phone: 801-533-5127 Fax:	Date: 5/2/16 UPDES General Permit ID Number: UTR

SWPPP Deficiencies as checked below:

	Yes	No	N/A	
1)	☑	☐	☐	Owner/Operator name, legal address, phone number
2)	☐	☑	☐	Copy of signed Notice of Intent (NOI)
3)	☐	☑	☐	Signature of SWPPP Preparer on NOI (must be a Professional Engineer for SWPPPs with engineered practices)
4)	☐	☑	☐	Contractor (and subcontractors if applicable) certification statement(s)
5)	☑	☐	☐	Site address and legal description of site
6)	☑	☐	☐	Vicinity Map, showing project boundary and receiving water(s)
7)	☐	☑	☐	MS4 SWPPP Acceptance Form (for projects located in regulated MS4s)

Comments:

Existing and proposed mapping and plans (recommended scale of 1" = 50') which illustrate at a minimum:

SWPPP Deficiencies as checked below:

	Yes	No	N/A	
1)	☐	☑	☑	Existing and proposed topography (minimum 2-foot contours recommended)
2)	☐	☐	☑	Location of perennial and intermittent streams
3)	☑	☐	☐	Mapping and description of soils from USDA Soil Survey, including hydrologic soil group, as well as location of any site-specific borehole investigations that may have been performed
4)	☐	☐	☑	Boundaries of existing predominant vegetation and proposed limits of clearing
5)	☑	☐	☐	Location and boundaries of resource protection areas such as wetlands, lakes, ponds and other setbacks (e.g. stream buffers, drinking water well setbacks, septic setbacks)
6)	☐	☐	☑	Boundary and acreage of upstream watershed
7)	☑	☐	☐	Location of existing and proposed roads, lot boundaries, buildings and other structures
8)	☑	☐	☑	Location and size of staging areas, equipment storage areas, borrow pits, waste areas and concrete washout areas
9)	☐	☐	☑	Existing and proposed utilities (e.g. water, sewer, gas, electric) and easements
10)	☐	☐	☑	Location and flow paths of existing and proposed conveyance systems such as channels, swales, culverts and storm drains
11)	☐	☑	☐	Location of floodplain/floodway limits
12)	☐	☐	☑	Location and dimensions of proposed channel modifications, such as bridge or culvert crossings
13)	☐	☑	☐	Location, size, maintenance access and limits of disturbance of proposed temporary and permanent stormwater management and erosion and sediment control practices, including timing and duration of temporary practices
14)	☐	☑	☐	Documentation from State of Utah Historic Preservation Office that the project has no effect on property on or eligible for historic registers
15)	☐	☑	☐	Plans stamped and signed by qualified professional (must be a licensed professional on plans with engineered practices)

Comments:

Erosion and Sediment Control Plans and Vegetative Measures:

SWPPP Deficiencies as checked below:

	Yes	No	N/A	
1)	☐	☐	☑	Description of temporary and permanent structural and vegetative measures for soil stabilization, runoff control and sediment control for each stage of the project from initial land clearing and grubbing to project close-out
2)	☐	☐	☑	Material specifications, dimensions, installation details and operations and maintenance requirements for erosion and sediment control practices, including the location and sizing calculations for any temporary sediment basins
3)	☑	☐	☐	Site map/construction drawing(s) showing the specific locations, sizes, and lengths of each erosion and sediment control practice
4)	☐	☐	☑	Identification of any design elements not in conformance with the State of Utah and Salt Lake County

And the reason for the deviation or alternative design, and demonstration that the alternative is equivalent to the technical standard

5) ☑ ☐ ☐ Inspection and Maintenance schedule to ensure continuous and effective operation of the erosion and sediment control practices, in accordance with the Salt Lake County

6) ☑ ☐ ☐ Description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable

7) ☑ ☐ ☐ Construction phasing plan and sequencing plan describing the intended sequence of construction activities, including clearing and grubbing; excavation and grading; implementation, timing and duration of temporary and permanent erosion and sediment control practices; installation of utilities and infrastructure; any other soil disturbing activity; and acreage to be disturbed in each phase

8) ☐ ☐ ☑ Final landscaping plans for structural stormwater management practices and any reforestation or vegetation

9) ☑ ☐ ☐ Description of pollution prevention measures to control construction litter, construction chemicals and debris

10) ☐ ☐ ☑ Description and location of any stonmwater discharges associated with industrial activity other than construction at the site, including but not limited to, stormwater discharges from asphalt plants and concrete batch plants on the construction site

Comments:

For construction activities listed in Table 2 of Appendix B of GP-0-08-001:

Hydroiogic and hydraulic analysis for all structural components of stormwater system (e.g. storm drains, open channels, swales, stormwater management practices, manufactured treatment systems, etc.) for applicable design storms including:

SWPPP Deficiencies as checked below:

	Yes	No	N/A	
1)	☐	☐	☑	Existing and Proposed condition analyses for time of concentrations, runoff rates, volumes, velocities, water surface elevations and routing showing methodologies used and supporting calculations
2)	☐	☐	☑	Channel Protection Volume and detention time calculations
3)	☐	☐	☑	Comparison summary of post-development stormwater runoff conditions with pre-development conditions for 1-year, 10-year, 100- year design storms in accordance with Salt Lake County
4)	☐	☐	☑	Stormwater management practice sizing calculations using the Enhanced Phosphorus Removal Standards (TMDL watersheds)
5)	☐	☐	☑	Pollutant removal efficiencies of stormwater treatment practices, where necessary
6)	☐	☐	☑	Infiltration/percolation tests, where required

Comments:

Representative cross-section and profile drawings and details of structural stormwater management practices and conveyances (e.g.storm drains, open channels, swales, etc.) which include:

SWPPP Deficiencies as checked below:

	Yes	No	N/A	
1)	☐	☐	☑	Existing and proposed structural elevations (e.g. invert of pipes, manholes, etc.)
2)	☑	☐	☐	Construction drawing(s) identifying the specific locations and sizes of each post-construction stormwater control practice
3)	☐	☐	☑	Description, dimensions, material specifications and installation details for each post-construction stormwater control practice, including outlet structures, embankments, spillways, settling basins, grade control structures, conveyance channels, etc.
4)	☐	☐	☑	Logs of borehole investigations and supporting geotechnical report, if borings have been taken

Comments:

SWPPP Deficiencies as checked below:

	Yes	No	N/A	
1)	☑	☐	☐	Post-construction maintenance schedule to ensure continuous and effective operation of each post-construction stormwater control practice, including monitoring and maintenance frequency, identification of responsible parties, description of applicable easements, vegetative requirements, access and safety issues, and testing and disposal of sediments as they are removed
2)	☑	☐	☐	Weekly or twice-weekly inspection checklist identifying measures to be inspected by a qualified site inspector
3)	☐	☑	☐	Request to disturb greater than five acres at any given time including justification for disturbance, additional erosion and sediment control measures to mitigate disturbance, phasing plan, cuts and fills plan, and total acreage to be disturbed in each phase
4)	☐	☐	☑	Documentation of downstream analysis or discharge to request waiving controls of Channel Protection.
5)	☐	☐	☑	Identification of any stormwater management practices that deviate from Salt Lake County and the reason for the deviation and demonstration that the alternative practice or deviation is equivalent to the technical standard

Stormwater Pollution Prevention Plan

for:

Great Salt Lake Marina Dredging
11408 W North Temple Frontage Rd
Magna, Utah 84044

Operator(s):

Company Name
Contact Person
Address
City, Utah
Phone, office
Phone, Cell
email

SWPPP Contact(s):

Company Name
Contact Person
Address
City, Utah
Phone, office
Phone, Cell
email

SWPPP Preparation Date:

__ / __ / __

Estimated Project Dates:

Project Start Date: __ / __ / _
Project Completion Date: _ / __ / ___

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Appendix G – SWPPP Amendment Log (or in Part 6.2)
Appendix H – Subcontractor Certifications/Agreements
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Appendix J – Training Log
Appendix K – Delegation of Authority
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Appendix M – BMP Specifications

SECTION 1: CONTACT INFORMATION/ RESPONSIBLE PARTIES

1.1 Owner(s), Operator, Contractors

Instructions:

- List the operator(s), project managers, stormwater contact(s), and person or organization that prepared the SWPPP. Indicate respective responsibilities, where appropriate.
- Also, list subcontractors expected to work on-site. Notify subcontractors of stormwater requirements applicable to their work.
- See *SWPPP Guide*, Chapter 2.B.

Owner(s):
Utah State Parks and Recreation
Jamie Harsh
1084 North Redwood Road
Salt Lake City, Utah
(801) 533-5127 office
(801) 946-6859 cell, jamieharsh@utah.gov

Operator(s) & Project Manager(s):
Company Name
Contact Person
Address
City, Utah
Phone, office
Phone, Cell
email

Site Supervisor(s):
Company Name
Contact Person
Address
City, Utah
Phone, office
Phone, Cell
email

SWPPP Contact(s):
Company Name
Contact Person
Address
City, Utah
Phone, office
Phone, Cell
email

This SWPPP was Prepared by:
Company Name
Contact Person
Address
City, Utah
Phone
email

Subcontractor(s):
None

Emergency 24-Hour Contact:
Company Name
Contact Person
Address
City, Utah
Phone, office
Phone, Cell
email

1.2 Storm Water Team

Insert Role or Responsibility:Responsible for on-site construction activities, BMP installation and maintenance, SWPPP modifications, taking corrective actions
Insert Position: Construction Supervisor
Insert Name:Jamie Harsh
Insert Telephone Number: 801 946-6859
Insert Email:jamieharsh@utah.gov

Insert Role or Responsibility: SWPPP Developer and SWPPP Inspections

Insert Position:Consultant
Insert Name:Paul Taylor
Insert Telephone Number:801 725-4701
Insert Email:ptaylor@jub.com

SECTION 2: SITE EVALUATION, ASSESSMENT, & PLANNING

2.1 Project/Site Information

Project/Site Name: GSL Marina Dredging Disposal Containment
Project Street/Location: 2 miles northeast of Saltair 12408 W Saltair Drive
City: Magna State: Utah ZIP Code: 84044
County or Similar Subdivision: Salt Lake County

Latitude/Longitude (Use **one** of three possible formats, and specify method)

Latitude:	Longitude:
1. _40 º 45 ' 58.87" N (degrees, minutes, seconds)	1. 112 º09 '25.98" W (degrees, minutes, seconds)
2. _ _ º _ _ . _ _' N (degrees, minutes, decimal)	2. _ _ º _ _ . _ _' W (degrees, minutes, decimal)
3. _ _ . _ _ _ _ º N (decimal)	3. _ _ . _ _ _ _ º W (decimal)

Method for determining latitude/longitude:
☐ USGS topographic map (specify scale: _____) ☐ EPA Web site ☐ GPS
☒ Other (please specify): Google Earth

Is the project located in Indian country? ☐ Yes ☒ No
If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."_____

Is this project considered a federal facility? ☐ Yes ☒ No

UPDES project or permit tracking number*:_____

**(This is the unique identifying number assigned to your project by your permitting authority after you have applied for coverage under the appropriate National Pollutant Discharge Elimination System (UPDES) construction general permit.)*

2.2 Nature of Construction Activity

Describe the general scope of the work for the project, major phases of construction, etc:

Construct a 60+ acre containment area for marina dredging slurry. Containment to be built using native soils in a combination of excavation and embankment construction. Finished embankment will be roughly 6 feet high upon completion. The top of the embankment will be 12 feet wide with 3:1 sideslopes.

What is the function of the construction activity?

☐ Residential ☐ Commercial ☐ Industrial ☐ Road Construction ☐ Linear Utility

☒ Other (please specify): Dredging slurry storage

Estimated Project Start Date: _05 / 01 /2016_

Estimated Project Completion Date: _07 / 01 / 2016_

2.3 Construction Site Estimates

The following are estimates of the construction site.

Total project area:	57 acres
Construction site area to be disturbed:	30 acres
Percentage impervious area before construction:	0 %
Runoff coefficient before construction:	0.50
Percentage impervious area after construction:	0 %
Runoff coefficient after construction	0.05

2.4 Soils, Slopes, Vegetation, and Current Drainage Patterns

Soil type(s): Silty Sands. The site was previously the floor of the Great Salt Lake

Slopes: The current slope across the site averages approximately 0.2% toward the Great Salt Lake. Upon completion the majority of the site will be contained within the embankments and will not allow any storm water to gravity drain.

Drainage Patterns: (See description above)

Vegetation: As this is the former lake bed, there is no vegetation on the majority of the site. The proposed embankment will tie into existing embankments with a light smattering of upland species, grasses and brush

2.5 Emergency Related Projects

Emergency-Related Project? ☐ Yes ☒ No

2.6 Phase/Sequence of Construction Activity

Phase I

- This project will be completed in one phase. It will consist of excavating materials from the floor of the proposed containment pond and placing and compacting those materials around the perimeter to create embankment dikes to hold the dredging slurry. As material is removed it will be transported and compacted in place along the dike alignment.
- This phase will begin construction on/near May 1 and continue for approximately 2 months.
- A small containment berm will be cut into native soils on the south and west sides for the project site. Once the initial lift on the proposed embankment has been placed all stormwater runoff should be contained within the proposed pond boundary.
- As the existing soils will not support vegetation, and as the existing site has no current vegetation the final method of stabilization will be to cat track the outside slope of the embankment running the track vehicle up and down the finished slope.

2.7 Site Features and Sensitive Areas to be Protected

There currently are some small wetland areas that have been identified, running along the southwest side of the proposed pond area. There are also some wet areas with possible wetland implications along the southeast side of the containment area. The wetlands will be protected by cutting a small berm outside of the proposed construction footprint to keep runoff from the construction site from flowing into the wetland areas. The wet areas on the southeast of the construction site are higher in elevation than the construction site. These areas will be protected by marking of these areas and building a construction access that comes in near the northeast corner of the site, avoiding these potentially sensitive areas.

2.8 Maps

Maps are included in Appendix A

SECTION 3: POLLUTION PREVENTION STANDARDS

3.1 Potential Sources of Pollution

Potential sources of sediment to stormwater runoff:

It is the intent of this project to not have any stormwater runoff. The purpose of the project is to build a containment pond. There is only a small fraction of the project site that has even potential to discharge stormwater – the area outside the embankments. These areas will be contained by constructing a small berm around the perimeter. All other runoff should be contained within the embankment. A very small fraction of the site currently has vegetation. The site is the old Great Salt Lake lake bottom and nothing grows on those soils.

Potential pollutants and sources, other than sediment, to stormwater runoff:

Pollutant-Generating Activity	**Pollutants or Pollutant Constituents** (that could be discharged if exposed to stormwater)	**Location on Site** (or reference SWPPP site map where this is shown)
Vehicle traffic to and from site	Mud and track out materials	Shown on the site plan
Vehicle/equipment maintenance	Oils and fuels	Vehicle storage area shown on the site plan

3.2 Non-Stormwater Discharges

Authorized Non-Storm Water Discharges	**Comments**
Water used to control dust	Care will be taken to not overwater. The materials being used will be extremely hard to work with if oversaturated. Control of this should be relatively easy

3.3 Natural Buffers or Equivalent Sediment Controls

Buffer Compliance Alternatives

Are there any surface waters within 50 feet of your project's earth disturbances? ☐ YES ☒ NO

(Note: If no, no further documentation is required for the SWPPP Template.)

SECTION 4: EROSION AND SEDIMENT CONTROLS

4.1 Minimize Disturbed Area and Protect Natural Features and Soil

BMP Description: None needed	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.2 Establish Perimeter Controls and Sediment Barriers

BMP Description: Perimeter berm – roughly 6" high	
Installation Schedule:	First thing on site – April 04 through 06
Maintenance and Inspection:	Inspect weekly
Responsible Staff:	

BMP Description: Construction fencing on southeast edge between the site access and the sensitive areas	
Installation Schedule:	First week – part of site prep work
Maintenance and Inspection:	Inspect weekly – this fence is to establish boundaries so it shouldn't require a lot of maintenance
Responsible Staff:	

Repeat as needed

4.3 Retain Sediment On-Site

BMP Description: Perimeter berm – roughly 6" high	
Installation Schedule:	First thing on site – April 04 through 06
Maintenance and Inspection:	Inspect weekly
Responsible Staff:	

BMP Description: Track out pad

Installation Schedule:	First week of site work
Maintenance and Inspection:	Inspect weekly – maintain when cobbles and rocks become compacted and welded together
Responsible Staff:	

4.4 Establish Stabilized Construction Exits

BMP Description: Track out pad	
Installation Schedule:	First week of site work
Maintenance and Inspection:	Inspect weekly – maintain when cobbles and rocks become compacted and welded together
Responsible Staff:	

4.5 Protect Slopes

BMP Description: Tracking of finished slopes – running track equipment up and down the finished slopes	
Installation Schedule:	At the completion of embankment construction (June timeframe)
Maintenance and Inspection:	Weekly inspection after completion – retrack if ridges aren't being maintained
Responsible Staff:	

4.6 Stockpiled Sediment or Soil

BMP Description: Stockpiles contained within pond perimeter – no additional action needed	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.7 Minimize Dust

BMP Description: Use water trucks as needed for dust control	
Installation Schedule:	Ongoing during embankment construction
Maintenance and Inspection:	Daily monitoring
Responsible Staff:	

4.8 Topsoil

BMP Description: There is no topsoil to preserve, nor do we plan to import any	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.9 Soil Compaction

BMP Description: There is no vegetation in conjunction with this project	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.10 High Altitude/Heavy Snows (NOT APPLICABLE)

Date Snow is Expected	**Date of High Altitude/Heavy Snow Conditions BMPs to be Installed**	**Date of First Heavy Snow**
	Scheduled:	
	Actual:	

4.11 Linear Activities (NOT APPLICABLE)

Description of why perimeter controls are not practicable.

INSERT TEXT or TABLE HERE.

4.12 Chemical Treatment (NOT APPLICABLE)

4.13 Stabilize Soils

BMP Description: There is currently no vegetation on the site. The site consists of the old lake bed for the Great Salt Lake. The soils and site conditions do not support vegetation. Soils will be stabilized by equipment tracking (see above). No other soil stabilization practices are anticipated.

☐ ***Permanent***	☐ ***Temporary***
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

4.14 Final Stabilization

BMP Description: Final stabilization on the outside of the embankments will be accomplished by equipment tracking (see above sections)

Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

SECTION 5: POLLUTION PREVENTION

5.1 Spill Prevention and Response

SPILL PREVENTION, REPORTING AND CLEANUP PLAN

Spill prevention, reporting and cleanup are important aspects to any construction site. The first and best defense is always to avoid spills, but sometimes spills occur in spite of our best efforts. This plan outlines precautions to be taken to first avoid spills and then to contain and clean them up if they do occur. This plan also covers reporting protocols to be followed if a spill occurs.

Spill Prevention:

Good Housekeeping

1. The quantity of materials stored on the project shall be limited, as much as practicable, to the quantity required to perform the work in an orderly sequence.
2. Materials stored on-site will be stored in a neat and orderly manner, in their original containers with original manufacturer's labels when possible.
3. Containers shall be empty prior to disposal.
4. Manufacturer's recommendations for proper use and disposal shall be followed.
5. The Contractor shall walk through storage areas daily to check for proper storage and disposal of materials.
6. Materials shall be stored in controlled areas only.

Hazardous Products

1. Hazardous products shall be kept in original containers with their original labels unless they are not re-sealable or are damaged.
2. Material safety data sheets shall be retained and must be available to all personnel at all times.
3. If surplus products must be disposed of, manufacturer's recommendation and local state and federal regulations shall be followed.

Steps to Successful Spill Prevention

1. Make an inventory of all liquids on site.
2. Include the quantity in the inventory.
3. Identify high-risk or spill-prone areas.
4. Keep updated safety data sheets for all liquids.
5. Store all hazardous materials in or with secondary containment.
6. Provide spill prevention/cleanup kits on site.
7. Make the kits easy to find and easy to use.
8. Maintain kits as materials are used.

9. Regular staff training on best practices and methods of controlling spills and cleanup of spills can help minimize the dangers.
    a. Helping staff understand proper use of various materials
    b. Teaching staff proper disposal techniques
    c. Teaching staff on proper reporting procedures

Product Specific Practices:

The following product specific practices shall be followed on-site:

1. Petroleum Products – All on-site vehicles and equipment shall be monitored for leaks and receive regular prevention maintenance to reduce the chance of leakage. Petroleum products shall be stored in tightly sealed containers (preferably the original containers with original labeling) that are clearly labeled. Any petroleum products used on-site shall be applied according to manufacturer's recommendations and/or these specifications.
2. Fertilizers – Fertilizers used will be applied only in the manner and amounts required by the specifications. Material shall be stored in a covered area and shall not be exposed to precipitation. Partially used bags shall not be discarded, but removed and disposed of properly.
3. Paints and Solvents – All containers shall be tightly sealed and stored when not required for use. Excess material and waste will not be discharged, but shall be properly disposed of according to manufacturer's instructions and/or State and Federal regulations.
4. Concrete Trucks – Concrete trucks will be allowed to discharge surplus concrete or drum wash water on site only in contained areas as designated.

Spill Response:

When a spill occurs the following procedures shall be followed:

1. Before the spill occurs – know where to find the spill kit
2. As soon as you are aware of a spill, sound the alarm
3. Identify the materials and establish what risks might be associated
4. Protect yourself and make sure you have the appropriate protective gear and equipment available
5. Help the injured only if it is safe to do so
6. Stop the source
7. Contain the spill
8. Protect any surface water drains
9. Clean up work can now commence
    a. Work from the outside towards the center of the spill.
    b. All contaminated materials to be bagged and double bagged
    c. Label all bags and hold in a quarantine area until they can be properly disposed of

10. Restock spill kit and leave ready for use again.

Spill Reporting:

The following practices shall be followed as Spill Reporting and Cleanup Practices:
Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302 occurs during a 24-hour period, the following action shall be taken:

1. Any person, as soon as he/she has knowledge of the discharge, shall notify the Superintendent.
2. A report shall be submitted to the Utah Department of Environmental Quality within 14 calendar days of the knowledge of the release. The report shall include a written description of the release (including the type and estimate of the amount of material released); the date that such a release occurred; the circumstances leading to the release; and the corrective actions taken.
3. The Stormwater Pollution Prevention Plan must be modified within 14 calendar days of knowledge of the release by addition of the above information. Review and modification of the plan must be made to identify measures to prevent the reoccurrence of such releases, and to respond to such releases.
4. All spill area shall be contained and personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
5. Manufacturer's recommended methods for spill cleanup shall be followed along with proper disposal methods referred to previously.

Any discharges in 24 hours equal to or in excess of the reportable quantities listed in 40 CFR 117, 40 CFR 110, and 40 CFR 302 will be reported to the National Response Center and the Division of Water Quality (DWQ) as soon as practical after knowledge of the spill is known to the permittees. The permittee shall submit within 14 calendar days of knowledge of the release a written description of: the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and measures taken and/or planned to be taken to the Division of Water Quality (DWQ), 288 North 1460 West, P.O. Box 144870, Salt Lake City, Utah 84114-4870. The Storm Water Pollution Prevention Plan must be modified within14 calendar days of knowledge of the release to provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

Agency	Phone Number
National Response Center	(800) 424-8802
Division of Water Quality (DWQ) 24-Hr Reporting	(801) 538-6146 (801) 536-4123

Utah Department of Health Emergency Response	(801) 580-6681

Material	Media Released To	Reportable Quantity
Engine oil, fuel, hydraulic & brake fluid	Land	25 gallons
Paints, solvents, thinners	Land	100 lbs (13 gallons)
Engine oil, fuel, hydraulic & brake fluid	Water	Visible Sheen
Antifreeze, battery acid, gasoline, engine degreasers	Air, Land, Water	100 lbs (13 gallons)
Refrigerant	Air	1 lb

5.2 Construction and Domestic Waste

BMP Description: Haul in Haul out – This project will not generate construction debris as there are no non-native materials being used. There may be minor debris from lunch wrappers etc.. These will be haul in haul out daily.	
Installation Schedule:	
Maintenance and Inspection:	Inspect weekly
Responsible Staff:	

5.3 Washing of Applicators and Containers used for Concrete, Paint or Other Materials (NOT APPLICABLE)

5.4 Establish Proper Building Material Staging Areas (NOT APPLICABLE)

5.5 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

BMP Description: Equipment fueling – Equipment will be refueled from the supervisor's tank in his pick-up. All equipment will be refueled in the staging area shown on the plans in a controlled setting. Any spills will be addressed according to the spill prevention plan outlined herein.	
Installation Schedule:	Ongoing during construction

Maintenance and Inspection:	Inspect Weekly
Responsible Staff:	

5.6 Control Equipment/Vehicle Washing

BMP Description: It is not anticipated that equipment or vehicles will be washed on-site	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

5.7 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials (NOT APPLICABLE)

5.8 Other Pollution Prevention Practices (NOT APPLICABLE)

SECTION 6: INSPECTIONS & CORRECTIVE ACTIONS

6.1 Inspections

1. ***Inspection Personnel:*** Identify the person(s) who will be responsible for conducting inspections and describe their qualifications:

2. ***Inspection Schedule and Procedures:***

Describe the inspection schedules and procedures you have developed for your site (include frequency of inspections for each BMP or group of BMPs, indicate when you will inspect, e.g., before/during/and after rain events, spot inspections):
Weekly inspections of the site will be conducted

Describe the general procedures for correcting problems when they are identified. Include responsible staff and time frames for making corrections:
When corrective actions are noted, these will be reported to the site supervisor and the SWPPP contact as noted previously.

Attach a copy of the inspection report you will use for your site.
REFERENCE ATTACHMENT
Reduction in Inspection Frequency (if applicable) – Not applicable

For the reduction in inspections resulting from stabilization: SPECIFY (1) LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED AND (2) DATE THAT THEY WERE COMPLETED

For reduction in inspections due to frozen conditions: INSERT BEGINNING AND ENDING DATES OF FROZEN CONDITIONS ON YOUR SITE

6.2 Corrective Actions

See Appendix F.

6.3 Delegation of Authority (Not Applicable)

SECTION 7: TRAINING AND RECORDKEEPING

7.1 Training

Individual(s) Responsible for Training:

Describe Training Conducted:

- General stormwater and BMP awareness training for staff and subcontractors:
  SWPPP requirements review including site specific BMPs and spill response training
- Detailed training for staff and subcontractors with specific stormwater responsibilities:
  INSERT TEXT HERE

Training Attendee Name	Title of Training	Duration	Date of Training

Additional training documentation should be included in Appendix J.

7.2 Recordkeeping

Records will be retained for a minimum period of at least 3 years after the permit is terminated.

Date(s) when major grading activities occur:
INSERT LOG HERE or REFERENCE ATTACHMENT

Date(s) when construction activities temporarily or permanently cease on a portion of the site:
INSERT LOG HERE or REFERENCE ATTACHMENT

Date(s) when an area is either temporarily or permanently stabilized:
INSERT LOG HERE or REFERENCE ATTACHMENT

7.3 Log of Changes to the SWPPP

See Appendix G

SECTION 8: WATER QUALTIY

8.1 UIC Class 5 Injection Wells (NOT APPLICABLE)

☐ French Drain
☐ Commercially Manufactured pre-cast or pre-built subsurface infiltration system
☐ Drywell(s), seepage pit(s), improved sinkhole(s)

Description of your Class V Injection Well:
INSTERT DESCRIPTION AND/OR INCLUDE SPECIFICATIONS IN APPENDIX G

8.2 Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☐ Yes ☒ No

List the MS4 that receives the discharge from the construction project: INSERT TEXT HERE

Are there any surface waters that are located within 50 feet of your construction disturbances?
☐ Yes ☒ No

List the water body: There are some adjacent (60 to 70 feet away) wetlands that are protected by a berm. No stormwater is anticipated to leave the site.

8.3 Receiving Waters

Table 1 – Names of Receiving Waters (see http://wq.deq.utah.gov)

Name(s) of the first surface water that receives stormwater directly from your site and/or from the MS4. (note: multiple rows provided where your site has more than one point of discharge that flows to different surface waters)
1. If water was to leave the site it would flow in to the Great Salt Lake or
2. Adjacent wetlands
3.
4.
5.
6.

8.4 Impaired Waters

(see http://wq.deq.utah.gov look in the bottom half of the left hand column)

		If you answered yes, then answer the following:

	Is this surface water listed as "impaired"?	What pollutant(s) are causing the impairment?	Has a TMDL been completed?	Pollutant(s) for which there is a TMDL
1.	☐ Yes ☒ No		☐ Yes ☐ No	
2.	☐ Yes ☒ No		☐ Yes ☐ No	
3.	☐ Yes ☐ No		☐ Yes ☐ No	
4.	☐ Yes ☐ No		☐ Yes ☐ No	
5.	☐ Yes ☐ No		☐ Yes ☐ No	
6.	☐ Yes ☐ No		☐ Yes ☐ No	

8.5 High Water Quality

Table 3 – High Water Quality (Answer the following for each surface water listed in Table 1 above)
(see http://wq.deq.utah.gov look in the bottom half of the left hand column)

	Is this surface water designated as High Water Quality? (see Appendix C)	If you answered yes, specify which category the surface water is designated as?
1.	☐ Yes ☒ No	☐ Category 1 ☐ Category 2
2.	☐ Yes ☒ No	☐ Category 1 ☐ Category 2
3.	☐ Yes ☐ No	☐ Category 1 ☐ Category 2
4.	☐ Yes ☐ No	☐ Category 1 ☐ Category 2
5.	☐ Yes ☐ No	☐ Category 1 ☐ Category 2
6.	☐ Yes ☐ No	☐ Category 1 ☐ Category 2

8.6 Dewatering Practices (NOT APPLICABLE)

8.7 Control Stormwater Flowing onto and through the Project

BMP Description: The project includes the construction of a berm on the uphill side of the site. This berm will not allow run-on to occur	
Installation Schedule:	First month of construction
Maintenance and Inspection:	Inspect weekly during construction
Responsible Staff:	

8.8 Protect Storm Drain Inlets (NOT APPLICABLE)

SECTION 9: POST-CONSTRUCTION BMPs

BMP Description: The project is to construct a containment pond. When completed there will be no off-site discharges of stormwater.	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

SECTION 10: CERTIFICATION

Professional/SWPPP Author

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – General Location Map (Not Used)

Appendix B – Site Maps

Appendix C – Construction General Permit

Appendix D – NOI and Acknowledgement Letter from EPA/State/MS4

Appendix E – Inspection Reports

Appendix F – Corrective Action Log (or in Part 5.3)

Appendix G – SWPPP Amendment Log (or in Part 6.2)

Appendix H – Subcontractor Certifications/Agreements

Appendix I – Grading and Stabilization Activities Log (or in Part 6.1)

Appendix J – Training Log

Appendix K – Delegation of Authority

Appendix L – Additional Information (i.e., Other permits such as dewatering, stream alteration, wetland; and out of date swppp documents)

Appendix M – BMP Specifications

Appendix A – General Location Map (Not Used)

Appendix B – SWPPP Drawings/Maps

Appendix C – Construction General Permit

Appendix D - NOI and Acknowledgement Letter from EPA/State/MS4

Appendix E – Inspection Report Form

Construction Site Storm Water Pollution Prevention Plan (SWPPP) Observation Form

Status		
	☐ Site Complies ☐ Site Does Not Comply	
	☐ Follow-up inspection	
	Enforcement Actions	
	☐ Warning	No.
	☐ Project Shutdown	

SWPPP	On-Site?		Up-to-date?	
	Yes	No	Yes	No
	Date of Latest Revision _____			

General Information		
	Project:	Date:
	Address:	Inspector:
		Weather Conditions:
	Owner:	Contractor:
	Is perimeter contained? Yes No	Are storage areas contained? Yes No
	Are disturbed areas contained? Yes No	Rate the effectiveness of the plan G F P

General Site and SWPPP Management				Comments
		Yes	No	
	Has the local permitting been completed?			
	Is there a SWPPP sign designating how to obtain a copy of the SWPPP?			
	Are the proper SWPPP certifications in place and signed?			
	Is the inspector qualified?			
	Is the site generally in order and organized?			
	Is the SWPPP up to date and current?			
	Have previous corrective action items been taken care of?			
	Has the staff been trained? Is the training log current?			
	Is the site free from pollutant discharges?			

Perimeter & Erosion Control	SWPPP IDENTIFIED BMP	BMP Used		Maint. Req'd		Comments
		Yes	No	Yes	No	
	Is Run-on berm in place and functioning?					
	Is there disturbance outside of contained areas?					
	Is construction fencing in place between access road and adjacent sensitive areas?					

Sediment Control	SWPPP IDENTIFIED BMP	BMP Used		Maint. Req'd		Comments
		Yes	No	Yes	No	
	Is the perimeter berm in place and functioning?					
	Is the track out pad in place and in good repair?					
	Is there mud/dirt on the frontage road?					
	Is there excessive dust in the air?					

Materials Handling & Spill Prevention	SWPPP IDENTIFIED BMP	BMP Used		Maint. Req'd		Comments
		Yes	No	Yes	No	
	Are there stockpiles outside of the pond area?					
	Are materials stored outside the staging area?					
	Are spill kits on site and available?					

Waste Management	SWPPP IDENTIFIED BMP	BMP Used		Maint. Req'd		Comments
		Yes	No	Yes	No	
	Port-a-potties					
	Are Liquids controlled?					
	Are Solid Wastes on-site?					

Good Housekeeping	SWPPP IDENTIFIED BMP	BMP Used		Maint. Req'd		Comments
		Yes	No	Yes	No	
	Street Sweeping					
	Vehicle & Equip. Maint.					

Other Comments:

I hereby certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	
Contractor's Representative:	Date:
Site Observer:	Date:

SWPPP OBSERVATION ACTION LIST

The following list contains items that need to be corrected as a result of observations made on

_____ by _____.
(Date of Observation) (Observer's Name)

	Item Needing Correction	Action Taken	Date Completed
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

Appendix F – *Sample* Corrective Action Log

Project Name:
SWPPP Contact:

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

Appendix G – *Sample* SWPPP Amendment Log

Project Name:
SWPPP Contact:

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Appendix H – *Sample* Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

Appendix I – *Sample* Grading and Stabilization Activities Log

Project Name:
SWPPP Contact:

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location

Appendix J – *Sample* SWPPP Training Log

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

- ❑ **Erosion Control BMPs**
- ❑ **Emergency Procedures**
- ❑ **Sediment Control BMPs**
- ❑ **Good Housekeeping BMPs**
- ❑ **Non-Stormwater BMPs**

Specific Training Objective:_____

_____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Appendix K – *Sample* Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in _____ (Reference State Permit), and that the designee above meets the definition of a "duly authorized representative" as set forth in _____ (Reference State Permit).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Appendix L – Additional Information (Letter from USACE)

APPENDIX C – Request for "No Permit Required" Letter and Letter

March 15, 2016

Hollis Jencks, Project Manager
Utah Regulatory Office, USACE
533 West 2600 South, Ste. 150
Bountiful, UT 84010

Subject: Request for "No Permit Required" letter for Great Salt Lake Marina Dredging Project.

Dear Hollis,

I am writing to you requesting a "No Permit Required" letter from the USACE regarding the proposed dredging of the Great Salt Lake Marina Project. The proposed project would include the dredging of the marina and harbor entrance at the Great Salt Lake State Park, the placement of the dredged slurry pipeline between the marina and disposal location, and the deposit of dredged slurry material from the Great Salt Lake Marina to a parcel of land located on the old lakeshore. The Great Salt Lake Marina is located approximately 1.75 miles southwest along the North Temple Frontage Road from the Saltair Dr. (SR 202) exit off of I-80 westbound from Salt Lake City (see attached Vicinity Map). The slurry pipeline would run from the marina to the proposed spoils site. The pipeline would be placed along the north side of the rocky fill slope within the right-of-way of the North Temple Frontage Road. The proposed spoils site is located approximately 3.5 miles northeast of the Great Salt Lake Marina off of the North Temple Frontage Rd (see attached Vicinity Map).

Contact Information for the Applicant and Land Owner:

Applicant	**Land Owner**
Dan Clark, Construction Manager	State of Utah
Division of Utah State Parks and Recreation	Division of Forestry, Fire and State Lands
1594 West North Temple, Ste. 116	1594 W North Temple, Ste. 3520
Salt Lake City, Utah 84116-6001	Salt Lake City, Utah 84114-5703
Office: 801-538-7311	Office: 801-538-5540
Email: danclark@utah.gov	Email: lauraault@utah.gov

Description of Activity

The proposed project would dredge the Great Salt Lake Marina to allow continued use of the marina as the Great Salt Lake (GSL) level continues to drop. The method to dredge the marina and the harbor entrance would involve a pump placed on land that would extract a slurry mixture of accumulated sediments and lake water. Best Management Practices (BMPS) would be implemented throughout the duration of the dredging activities to ensure that water quality is maintained and that the activity would not result in a new discharge into the lake. The Contractor would be required to implement an approved Stormwater Pollution Prevention Plan (SWPPP) and file a Notice of Intent with the State of Utah. Coordination with Bill Damery on March, 2016, indicates that the proposed activity would fall under the State of Utah's General Construction Permit and no individual water quality permit would be required for the proposed project.

To dispose of the slurry material from the dredging operation, an 8 to 12 inch pipe would be laid from the dredging pump to the deposit location. The pipe would run through the marina

parking lot and then along the upland, rock-filled roadway fill slope of the North Temple Frontage Road. The pipe alignment would avoid any wetlands that may be located in the vicinity of the project area. The total length of the temporary pipeline would be approximately 4 miles, and would be placed on the surface of the ground. The deposit location would contain a constructed berm on all sides to contain the dredged slurry. The ground surface within the berm would be graded by heavy equipment, and some of the material would be used to construct the berm if it is determined to be appropriate material for berm construction. To access the open unvegetated alkali mud to construct the berm, heavy equipment would cross the vegetated edge of the alkali mud by the old Saltair road (long spit of uplands see on the Spoils Area Map). If any areas along the edge of the unvegetated alkali mud contain hydrophytic vegetation where machines and other vehicles pass through would be protected using trackmats during the period of site construction, and then the mats would be removed once the operation has finished. Any disturbance areas which contain vegetation would be reseeded using appropriate seed mixtures (such as coastal saltgrass - *Distichlis spicata* in saline edges and a wheatgrass upland mix for any upland areas). All construction disturbance areas would be placed such that there is a minimum 30-foot buffer between the disturbance (such as the outer edge of the berm) and any vegetated areas including the edge of the alkali mud (on the southeast and northeast sides) and the area containing vegetated wetland hummocks to the southwest (see attached Aquatic Resources Delineation Map).

Dredging Spoils Deposit Area

The proposed area to deposit the dredging spoils is located on the unvegetated alkali mud that constitute the historic shoreline of the GSL. As of September 28, 2015, the USACE has determined that the current GSL OHWM for the South Arm of the lake is 4,200 feet (USACE Regulatory Division Memorandum 2015-02). The new 4,200-foot OHWM for the GSL is now approximately 0.7 miles from the edge of the roadway fill slope, and approximately 500 to 700 feet from the edge of the proposed disturbance area. The GSL has not actually achieved the elevation of 4,200 feet since around 2002 (USACE Regulatory Division Memorandum 2015-02 – Appendix Table).

To be sure the GSL has not reached the location of the spoils deposit area in at least the last 10 years, the project area was compared against available aerial imagery over the last decade to assess how close the actual lake level has come to the proposed deposit area (see attached GSL Level Map Series). In 2006, the GSL edge appears to be well over a mile or more from the edge of the road. However, in 2011, the previous winter had record snowfall and snowpack, raising the lake level higher than in previous years. Although the lake level was higher, the area of wetness (higher than the water level in the image) was still approximately 4,500 feet from the edge of the road, and approximately 1,600 feet from the nearest portion of the proposed deposit area. By 2014, the GSL had receded lower than where it was in 2006.

The alkali mud areas were examined to be sure no features existed that could hold water for extended periods and potentially be considered as ponds or other depressional water features. The site was on December 18, 2015, to sample and investigate conditions in and around the proposed project site. At the time of the December 18th investigation, the alkali mud was partially covered by snow, thin ice and some surface water, due to a strong winter storm that occurred in the area over the two previous days. However, as temperatures rose above freezing during the site visit, the surface water began to flow northwest towards the lake via sheet flow and many small, temporary rivulets. There was no observed evidence of

OHWM features such as soil cracks, salt or biotic crusts, rack lines, or effects of wave action (see attached Site Photos). The alkali mud in this area appears to all gently but steadily slope to the northwest towards the GSL. The ground survey of the spoils area confirms the sloping of the area to the northwest (see attached Spoils Area Map). Due to the mildness of the slope (generally 0.2 %, ranging between 0.13% and 0.32%), water from precipitation events moves slowly off of these alkali mud areas but it does consistently sheet flow away from the shore and out to the GSL. If the precipitation is frozen from low temperatures as can be the case during the winter months, then ice could of course remain on the surface for longer until it melts and flows off.

Three potential indicators of the OHWM were observed during the site visits but are none are conclusive. A change in vegetation and/or absent vegetation is often a common indicator of either strong flows scouring away vegetation or long periods of inundating that prevent vegetation from existing below the OHWM. There exists a relatively quick change in vegetation from the steeper vegetated slopes to the bare alkali mud area (Photos 1 through 5). The alkalinity of the soil is likely high in the vegetated areas, but is also likely very high in the alkaline mud areas, too high for all but the most tolerant, halophytes (salt-loving vegetation). This change in vegetation is an indicator of a strong change in soil alkalinity but not of current hydrology. Halophyte species such as red saltwort are found thriving well beyond the alkali mud edges (outside of the proposed spoils area), but only in areas where sufficient hydrology can support these species. These areas where water is concentrated and remains for some time during the growing season as seen during the investigation of areas outside of the defined spoils area (Photos 6 through 8). Species such as red saltwort are not living in the unvegetated areas because of the lack of hydrology, not because of high water or scouring wave action. Therefore this indicator does not appear to be reliable in situations of strongly alkaline soils and is not applicable to the project area.

The second indicator is change in the character of the soil. From Photos 1 and 3 (see attached Photo Inventory), a change in consistency of the soil can be observed. During the investigation of the soil pit samples, this change appears to primarily indicate the strong lack of organic material in the alkali mud areas. Some organic material from the vegetation was present in the soil profile of the vegetated areas. The primary soil texture is still sand, but with organic material from the vegetation having changed the color and texture of the soil to some degree. Organic material in a sandy soil can give it more of a light texture and allow more oxygen to infiltrate to keep the soil oxygenated for plant roots. However, the soil in the unvegetated mud areas was solely one size and color of oolitic sand. Upon careful examination of the sand grains using a hand-lens, no organic material was observed. This over time would allow for the soil to compact and appear smoother and heavier in texture. It is also likely that the historic flooding of these areas many decades ago also has played an important role in the development of the oolitic sandy soils. Therefore, this indicator too is unlikely to be reliable.

Lastly, a natural line impressed on the bank could be discerned (Photos 1 and 3 of the Photo Inventory). Historically, these alkaline mud areas were inundated by the GSL, with the most recent high levels occurring during the mid-1980s when the GSL expanded because of a few record precipitation years and flooded upland areas. The areas seen in Photos 1 and 3 are at approximately 4,204 feet of elevation, which was likely the location of the GSL shoreline in the late 1980s (USACE 2015). High GSL levels were obviously more common the farther back in history. Before the 1980s, this area was either flooded or an active lake shore in the mid-

1920s and most of the later part of the 19th century (USGS 2016). Before the 1840s no records exist for the GSL levels as the native tribes and scattering of European trappers did not accurately record the lake shore. The many centuries as an active lake shore has left its mark on this land that is not likely to be quickly erased from the past decade or two of lower GSL levels. Evidence of a relic lake shores can be very persistent, even over thousands of years. This indicator alone can be unreliable with respect to historic and ancient lake shores. And therefore is not applicable to proposed project area.

In 2015, USACE concluded that the most current active lake shore for the South Arm of the GSL is 4,200 feet (USACE 2015). As the proposed project area is only a mile or so from the current edge of the GSL, this area of alkaline mud would likely be most influenced by the GSL. Since the GSL is no longer considered a direct source of hydrology for this location, some other feature would be required to supply the hydrology. No other features were apparent during the site investigations or the detailed ground survey. The entire 66.4-acre spoils deposit area gently slopes to the northwest, without any recorded or visually apparent depressional features or basins in which to hold stormwater runoff or ground water. The tight nature of these uniform sand-grain soils and the mild sloping terrain can slow down runoff from storm events for short periods. However, once the storm event is over, drainage does not appear to be impeded, especially without vegetation or other ground surface roughness factors to slow the sheet flow action of the runoff.

The area southwest of the proposed deposit area appears to be an area of concentrated drainage (the area appears dark on the attached Spoils Area Map). Water appears to collect and flow in a more organized pattern through that area in many braided channels. The survey lines clearly show dips, indicating a change in slope in this area. This area contains micro-topographical features that appear to retain water for longer periods of time as they contain small islands and hummocks of wetland halophytes (salt-loving wetland plants such as red saltwort-OBL, Utah swampfire-OBL, and western seepweed-FACW) surrounded by algae on the inundated soil surface (see Photos 8 and 9). All disturbance would occur at least 100-feet away from this area.

As discussed during our onsite meeting on December 16, 2015, we are supplying the USACE with our plans for the proposed Great Salt Lake Marina dredging, placement of the dredged slurry pipe, dredging spoils deposit area, and the results of our intensive site investigation for our request of "No Permit Required" for these actions. Please note that based on our conversation on March 8, 2016, the proposed disposal site location has been moved an additional 200-feet towards the lake (see attached Spoils Area Map). The change in the proposed disposal site boundary would provide a larger buffer between the proposed project disturbance area and the vegetation located adjacent to the proposed project area. This expanded buffer area would avoid areas that currently contain water that is draining from the vegetated areas.

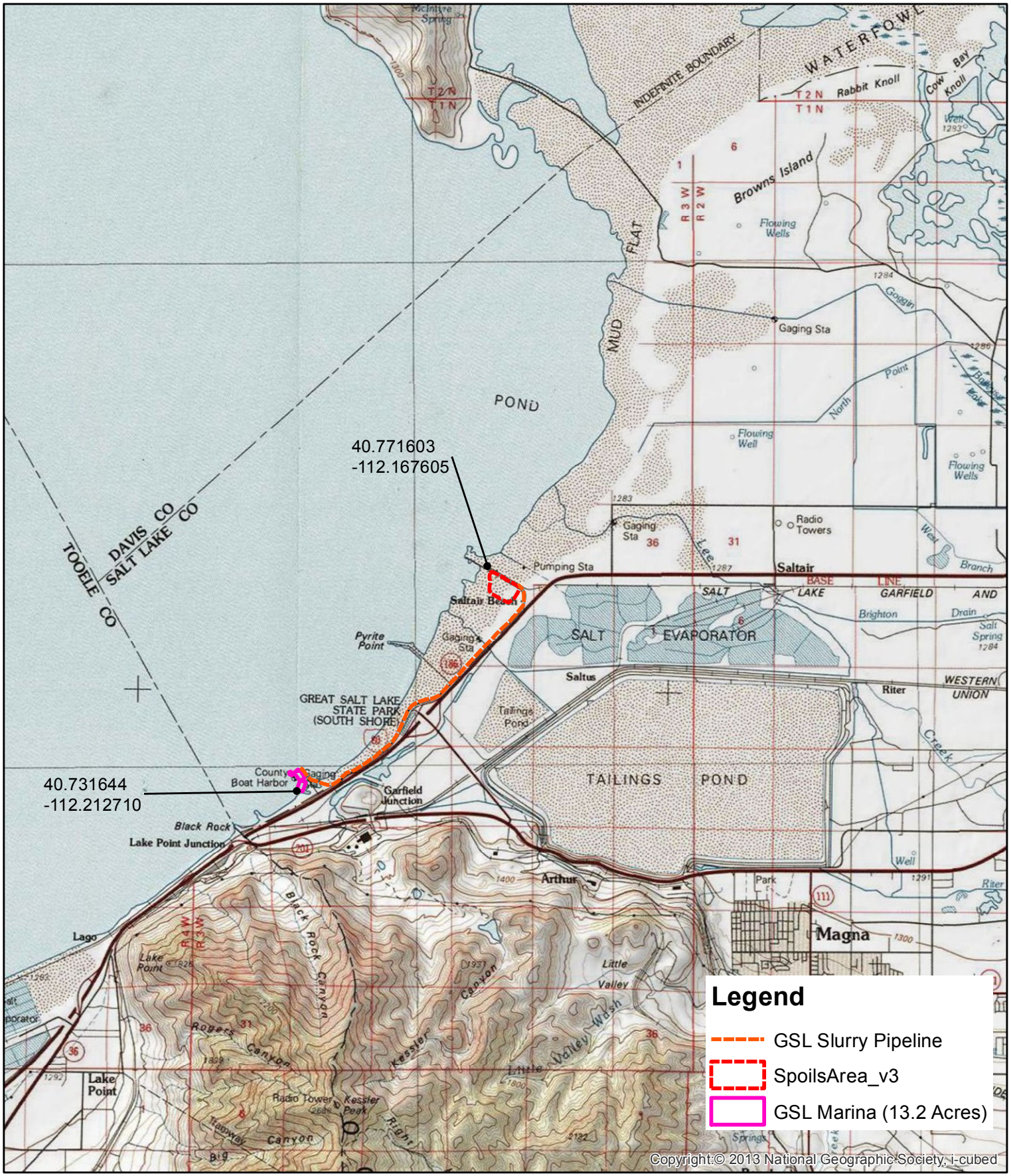
Please respond back to this request for No Permit Required at your earliest convenience. If any additional information or further explanations of plans are needed, please contact me at 385.226.2224 or at ttoler@jub.com.

Sincerely,

Trent Toler, Biologist
J-U-B ENGINEERS, Inc.

Attachments

- Vicinity Map
- Wetland Survey Memo
- Aquatic Resources Delineation Map
- Plan View and Details Map
- GSL Level Map Series (3)
- Site Photos and Photo Points Map (March)
- Photo Inventory (Winter)
- Custom Soil Report
- National Wetland Inventory Map
- Data Sheets



N
W E
S

1 in = 2 miles

0 0.5 1 2 3 4 Miles

J·U·B ENGINEERS, INC.

Great Salt Lake Marina Dredging Spoils Area

Vicinity Map

USGS Quad: Antelope Island South
S 3 & 10, T 1 South, R 3 West
Salt Lake Base and Meridian

J-U-B COMPANIES THE LANGDON GROUP GATEWAY MAPPING INC.

J·U·B ENGINEERS, INC.

Date: March 15, 2016

To: Hollis Jencks, Project Manager, USACE Bountiful Field Office;
Paul Taylor, P.E., Project Manager, J-U-B Engineers, Inc.

From: Trent Toler, Biologist, J-U-B Engineers, Inc.

Subject: Wetland Survey Memo of Proposed Spoils Deposit Area for GSL Marina Dredging

The State of Utah is proposing to dredge the Great Salt Lake Marina to return function to the facility after many years of drought, lake level drops and sediment deposition. As a part of the marina dredging project, an area has been identified to deposit the dredged spoils. The proposed dredged spoils area is located along the old GSL shore alkali mud expanses between the vegetated terraces north and west of I-80, and the current GSL level (at or below 4,200 feet) (see attached Aquatic Resources Delineation Map). This part of the old lake shore is south and west of the abandoned access road to one of the old locations of Saltair before it burned down in 1970.

Methods

The proposed spoils deposit area was surveyed for waters of the U.S. on December 18, 2015, and revisited on February 11 and 16, and March 4, 2016, to document late winter/early spring site drainage. During the first site visit, approximately 56 acres of GSL alkali mud were surveyed for the presence of wetlands and all other waters of the U.S. The delineation was conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008).

Data points were collected using a sub-meter GPS unit to delineate shifts from upland terrace, wetland vegetation, and the unvegetated open alkali mud. All data points/soil test pits were taken within the vegetated area located outside of the proposed spoils area. No soil test pits were taken within the proposed spoils deposit area because there is no vegetation or signs of wetlands vegetation within the proposed spoils area.

Vegetated areas in the general vicinity of the proposed spoils area were identified and delineated using a sub-meter GPS unit. These vegetated areas were delineated and photographed to assist the project team in selecting a disposal site that is located outside of the vegetated area. This information may also be used to gain a better understanding of the area surrounding the proposed spoils area.

Results and Discussion

After surveying the 55.8-acre spoils area and its surroundings, no aquatic features were identified within the proposed spoils area boundary. The spoils area is entirely made up of a gently sloping alkali mud area that is completely unvegetated and without standing water.

Area Adjacent to Spoils Area

The soil observed in the soil pit at the edge of the open alkali mud (SP1) (located approximate 300 feet southeast of the proposed spoils area) indicated light-color soils but upon close examination of the soil it was determined that the upper 14 or more inches of the soil consists entirely of light-colored oolitic sand. No organic material was observed in this

sand in the upper 14 inches, therefore the soil was not depleted but displayed the color of the native parent material of the sand. The water table was high (5 inches) and soil saturation was close to the surface (at 2 inches). This sample was taken during the winter storm season, many months before the start of the growing season. Soil conditions were similar in the wetland vegetated bank (SP2) located south of SP1 and approximately 450 feet outside of the proposed spoils deposit area. A gley soil color was present in SP2 but too deep to be considered hydric in sandy soils. The water table and saturation were still high and indicated wetland hydrology conditions. This vegetated wetland area was sparsely dominated by red saltwort (*Salicornia rubra*, OBL).

Ordinary High Water Mark Analysis

No shallow shelving from wave action, algal mats or other biotic crusts, mud cracks, sediment staining, vegetation and dead brine shrimp or brine fly racking, scour, or other surface indicators of hydrology were observed. The spoils area ranges from 1 to 5 feet in vertical elevation above the current 4,200-foot ordinary high water mark (OHWM) of the GSL as outlined by the USACE (USACE 2015). After precipitation events, water sheet flows off this area, moving northwest towards the GSL (currently a mile or more away). At the time of the December 2015 field survey, there were puddles of frozen or liquid precipitation from the strong winter storm that struck northern Utah the day prior. Due to the freezing temperatures, ice was prevalent in these puddles as shown in some of the pictures (see attached Photo Inventory). However, during the field visits in February and March 2016 the ice began to melt and the mud began to drain and dry out rapidly (see attached Site Photos and Photo Points Map).

Three potential indicators of the OHWM were observed during the site visits but are none are conclusive. A change in vegetation and/or absent vegetation is often a common indicator of either strong flows scouring away vegetation or long periods of inundating that prevent vegetation from existing below the OHWM. There exists a relatively quick change in vegetation from the steeper vegetated slopes to the bare alkali mud area (Photos 1 through 5). The alkalinity of the soil is likely high in the vegetated areas, but is also likely very high in the alkaline mud areas, too high for all but the most tolerant, halophytes (salt-loving vegetation). This change in vegetation is an indicator of a strong change in soil alkalinity but not of current hydrology. Halophyte species such as red saltwort are found thriving well beyond the alkali mud edges (outside of the proposed spoils area), but only in areas where sufficient hydrology can support these species. These areas where water is concentrated and remains for some time during the growing season as seen during the investigation of areas outside of the defined spoils area (Photos 6 through 8). Species such as red saltwort are not living in the unvegetated areas because of the lack of hydrology, not because of high water or scouring wave action. Therefore this indicator does not appear to be reliable in situations of strongly alkaline soils and is not applicable to the project area.

The second indicator is change in the character of the soil. From Photos 1 and 3 (see attached Photo Inventory), a change in consistency of the soil can be observed. During the investigation of the soil pit samples, this change appears to primarily indicate the strong lack of organic material in the alkali mud areas. Some organic material from the vegetation was present in the soil profile of the vegetated areas. The primary soil texture is still sand, but with organic material from the vegetation having changed the color and texture of the soil to some degree. Organic material in a sandy soil can give it more of a light texture and allow more oxygen to infiltrate to keep the soil oxygenated for plant roots. However, the soil in the

unvegetated mud areas was solely one size and color of oolitic sand. Upon careful examination of the sand grains using a hand-lens, no organic material was observed. This over time would allow for the soil to compact and appear smoother and heavier in texture. It is also likely that the historic flooding of these areas many decades ago also has played an important role in the development of the oolitic sandy soils. Therefore, this indicator too is unlikely to be reliable.

Lastly, a natural line impressed on the bank could be discerned (Photos 1 and 3 of the Photo Inventory). Historically, these alkaline mud areas were inundated by the GSL, with the most recent high levels occurring during the mid-1980s when the GSL expanded because of a few record precipitation years and flooded upland areas. The areas seen in Photos 1 and 3 are at approximately 4,204 feet of elevation, which was likely the location of the GSL shoreline in the late 1980s (USACE 2015). High GSL levels were obviously more common the farther back in history. Before the 1980s, this area was either flooded or an active lake shore in the mid-1920s and most of the later part of the 19th century (USGS 2016). Before the 1840s no records exist for the GSL levels as the native tribes and scattering of European trappers did not accurately record the lake shore. The many centuries as an active lake shore has left its mark on this land that is not likely to be quickly erased from the past decade or two of lower GSL levels. Evidence of a relic lake shores can be very persistent, even over thousands of years. This indicator alone can be unreliable with respect to historic and ancient lake shores. And therefore is not applicable to proposed project area.

In 2015, USACE concluded that the most current active lake shore for the South Arm of the GSL is 4,200 feet (USACE 2015). As the proposed project area is only a mile or so from the current edge of the GSL, this area of alkaline mud would likely be most influenced by the GSL. Since the GSL is no longer considered a direct source of hydrology for this location, some other feature would be required to supply the hydrology. No other features were apparent during the site investigations or the detailed ground survey. The entire 66.4-acre spoils deposit area gently slopes to the northwest, without any recorded or visually apparent depressional features or basins in which to hold stormwater runoff or ground water. The tight nature of these uniform sand-grain soils and the mild sloping terrain can slow down runoff from storm events for short periods. However, once the storm event is over, drainage does not appear to be impeded, especially without vegetation or other ground surface roughness factors to slow the sheet flow action of the runoff.

During site visits in late February and early March, the snow and ice were gone and the upland and wetland vegetation areas were all draining and flowing northwest across the sloping alkali mud towards the GSL (Photos 9 through 12). The result was observed as some wet areas closest to the wetland vegetation, as the water infiltrates and sheet flows out to the lake, but not farther out into alkali mud of the proposed spoils area.

Conclusion

No water features within the proposed spoils area were observed during field investigations and ground surface survey. Vegetated areas that indicate wetland conditions do exist in the general area but are outside the proposed spoils area. Although the area was historically a part of the GSL, a recent ruling by the USACE designating the GSL lake level at 4,200 feet mean sea level (MSL) and the lack of reliable hydrology indicators on the ground suggest this area is a relic, unvegetated alkaline playa feature that is no longer active. Therefore there are no indications of wetlands or waters of the U.S. in the proposed project area.

References

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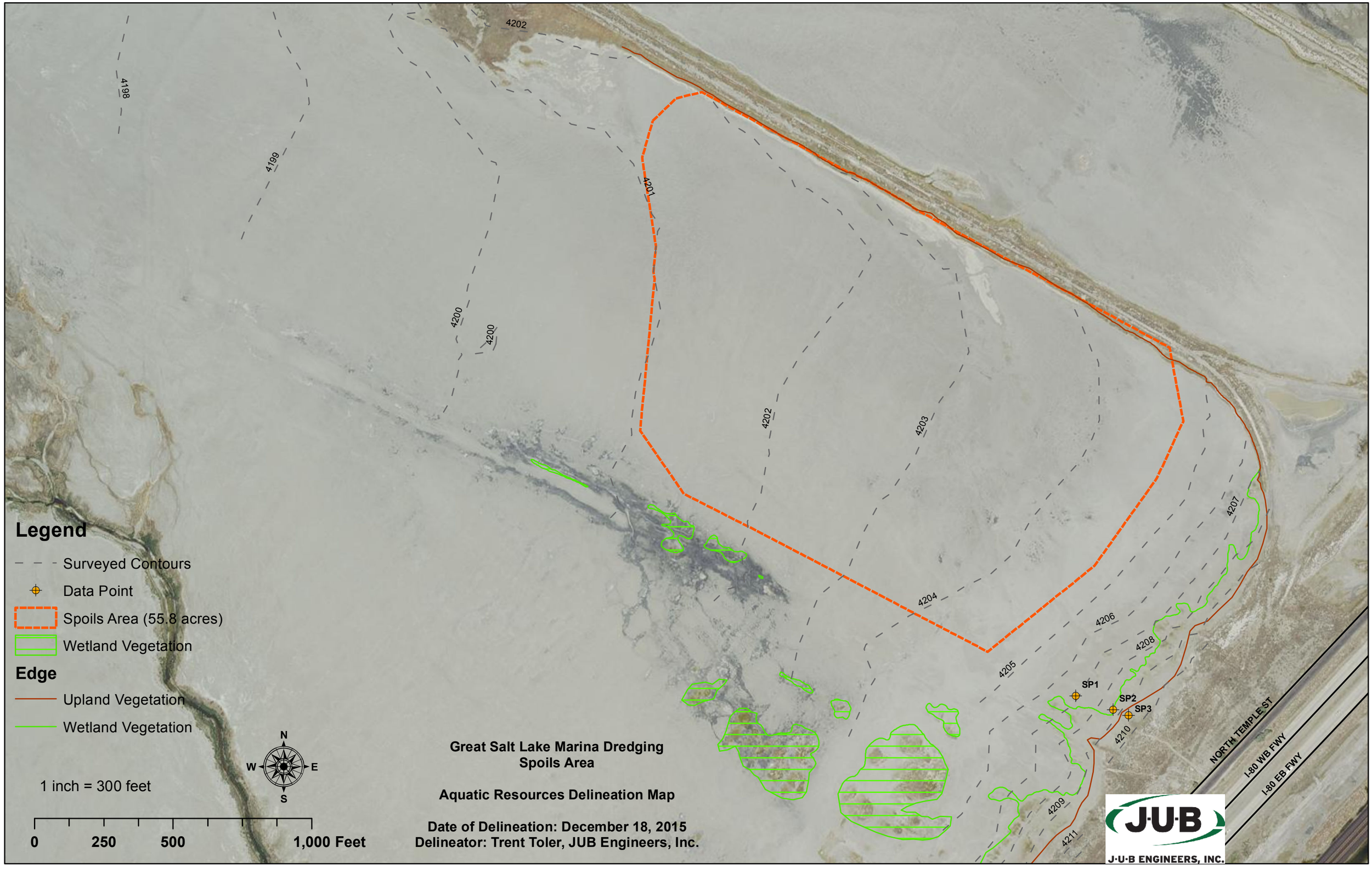
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SP1
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NORTH TEMPLE ST
I-80 WB FWY
I-80 EB FWY
Legend
Surveyed Contours
Data Point
Spoils Area (55.8 acres)
Wetland Vegetation
Edge
Upland Vegetation
Wetland Vegetation
N
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E
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1 inch = 300 feet
0
250
500
1,000 Feet
Great Salt Lake Marina Dredging
Spoils Area
Aquatic Resources Delineation Map
Date of Delineation: December 18, 2015
Delineator: Trent Toler, JUB Engineers, Inc.
J·U·B
J·U·B ENGINEERS, INC.

VICINITY MAP

1 TYPICAL BERM DETAIL
SCALE:H: 1"=20' - V:1"=5'

2 POND SECTION
SCALE:H:1"=200' - V:1"=5'

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Fax: 801.547.0397
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PRELIMINARY PLANS

NOT FOR CONSTRUCTION

NO.	DESCRIPTION	BY	APR.	DATE
	REVISION			

GREAT SALT LAKE MARINA DREDGING - PLAN VIEW

FILE : 55-15-139_DREDGING-STORAGE
JUB PROJ. # : 55-15-139
DRAWN BY: TAG
DESIGN BY: PJT
CHECKED BY: PJT
ONE INCH
AT FULL SIZE. IF NOT ONE INCH, SCALE ACCORDINGLY
LAST UPDATED: 3/15/2016

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NOTE:
PROPOSED SLURRY PIPELINE WILL ONLY BE PLACED ON ROADWAY FILL OR OTHER UPLAND AREAS

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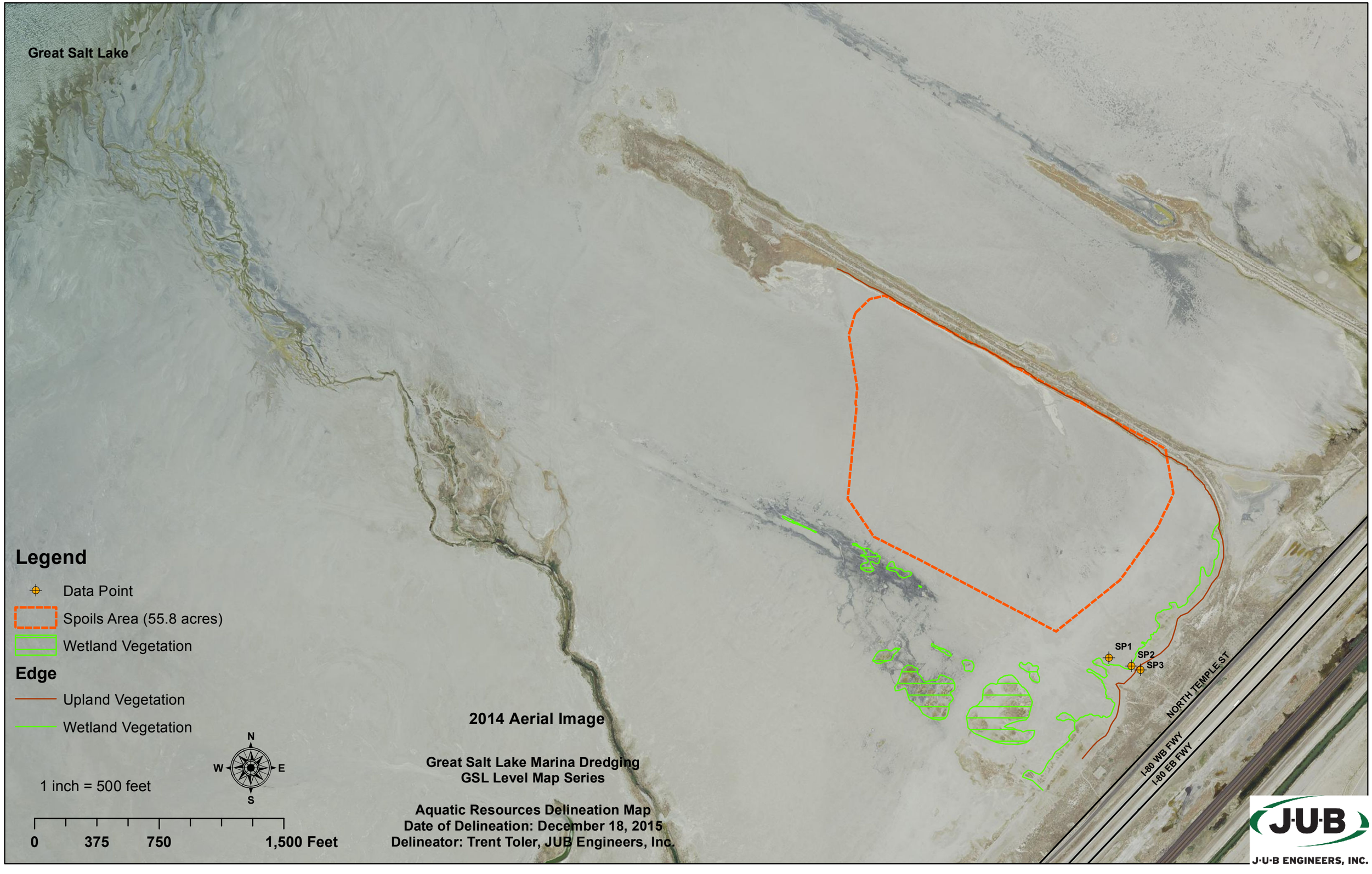
Great Salt Lake
Legend
Data Point
Spoils Area (55.8 acres)
Wetland Vegetation
Edge
Upland Vegetation
Wetland Vegetation
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1 inch = 500 feet
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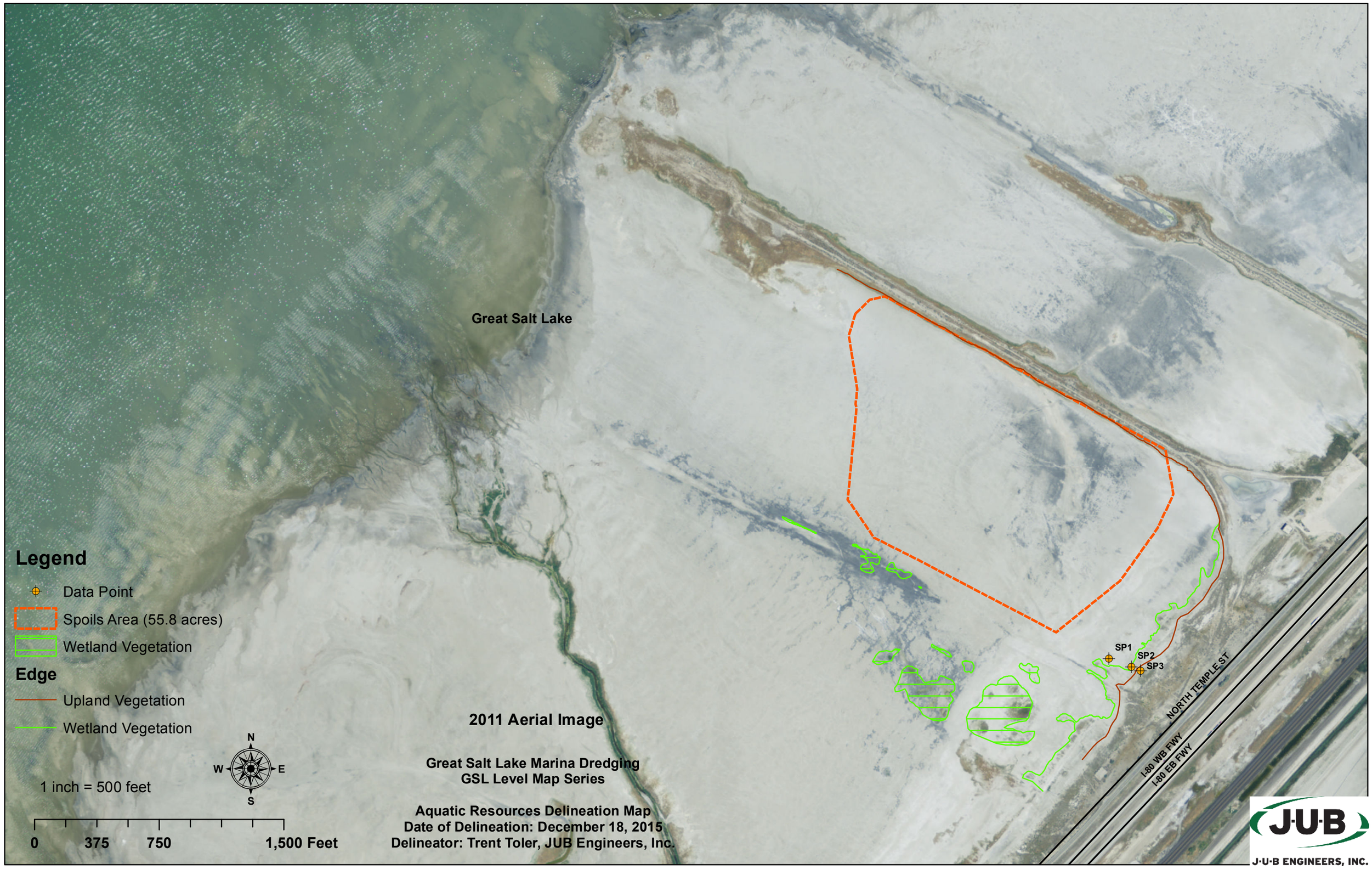
375
750
1,500 Feet
2014 Aerial Image
Great Salt Lake Marina Dredging
GSL Level Map Series
Aquatic Resources Delineation Map
Date of Delineation: December 18, 2015
Delineator: Trent Toler, JUB Engineers, Inc.
SP1
SP2
SP3
NORTH TEMPLE ST
I-80 WB FWY
I-80 EB FWY
J·U·B
J·U·B ENGINEERS, INC.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Spoils Area (55.8 acres)
Wetland Vegetation
Edge
Upland Vegetation
Wetland Vegetation
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1 inch = 500 feet
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2011 Aerial Image
Great Salt Lake Marina Dredging
GSL Level Map Series
Aquatic Resources Delineation Map
Date of Delineation: December 18, 2015
Delineator: Trent Toler, JUB Engineers, Inc.
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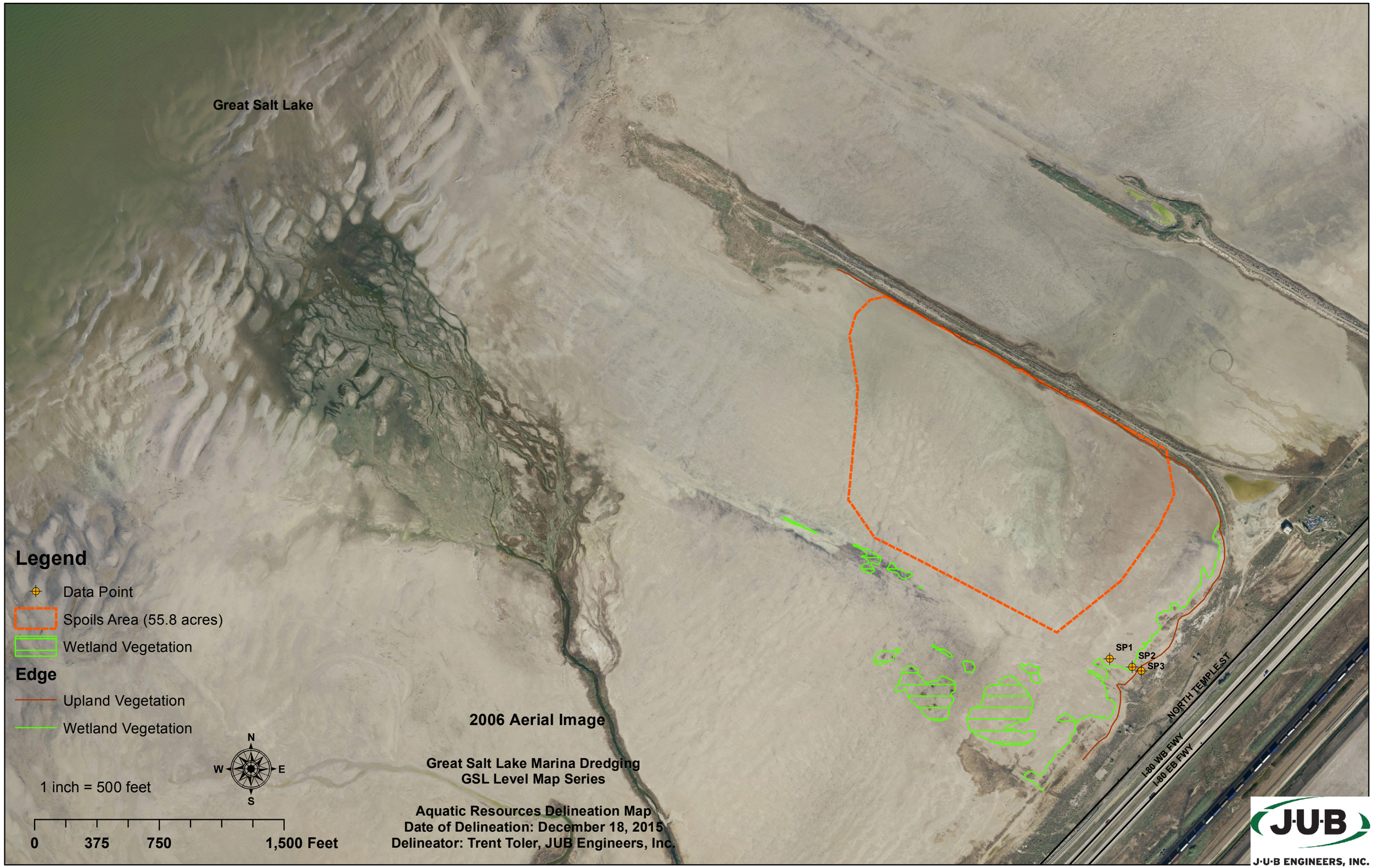
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Spoils Area (55.8 acres)
Wetland Vegetation
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Upland Vegetation
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1 inch = 500 feet
0
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750
1,500 Feet
2006 Aerial Image
Great Salt Lake Marina Dredging
GSL Level Map Series
Aquatic Resources Delineation Map
Date of Delineation: December 18, 2015
Delineator: Trent Toler, JUB Engineers, Inc.
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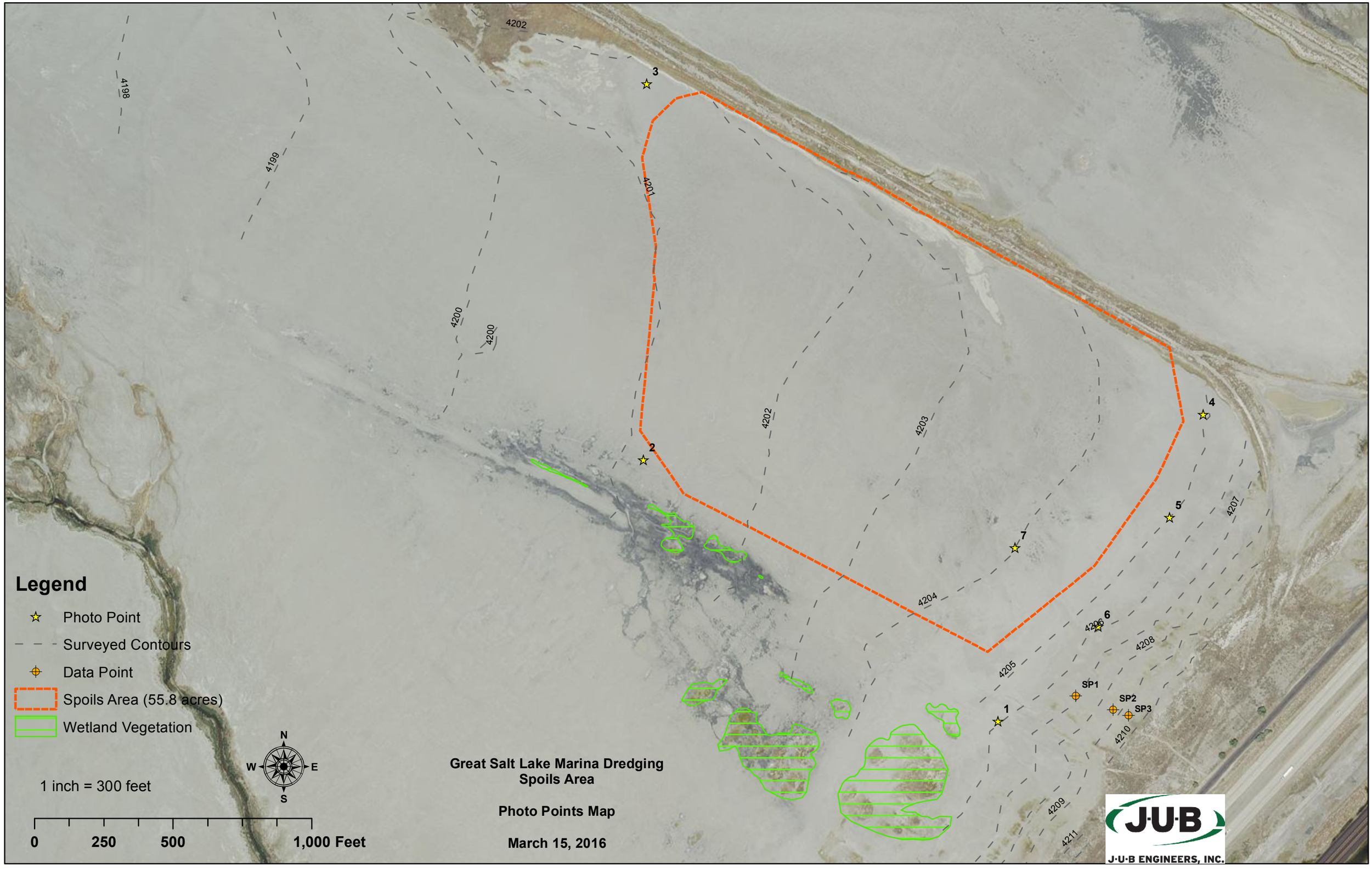
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Photo Point
Surveyed Contours
Data Point
Spoils Area (55.8 acres)
Wetland Vegetation
N
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1 inch = 300 feet
0
250
500
1,000 Feet
Great Salt Lake Marina Dredging
Spoils Area
Photo Points Map
March 15, 2016
J·U·B
J·U·B ENGINEERS, INC.

PHOTO INVENTORY

Proposed Spoils Disposal Site (Winter)

See attached Photo Points Map and additional photos for March conditions.

Photo 1. Upland vegetated edge of alkali mud, looking northwest towards Stansbury Island. No OHWMs were observed. (February 16, 2016)

Photo 2. View of central portion of proposed dredging spoils area, looking southwest. (February 16, 2016)

Photo 3. Vegetated edge of alkali mud, looking southeast towards Kennecott Tailings. The edge of the constructed berm should run along this edge, and vehicles could likely access the spoils area from the uplands (left side of photo) close to this point. (February 16, 2016)

Photo 4. View to the north-northeast towards Antelope Island (in the fog), across the northern edge of the proposed deposit area. (February 11, 2016)

Photo 5. View of the proposed deposit area from the northwestern corner to the southeastern corner, with the Kennecott Tailings and the Wasatch Range (in the fog) in the background. (February 11, 2016)

Wetland Areas Outside of Proposed Spoils Disposal Site (Winter)

Photo 6. Concentrated drainage area with vegetated hummocks and rivulets southeast and outside of the proposed spoils area. View looking southeast. Some darker, mineral sand is close to the surface here. (February 11, 2016)

Photo 7. Another view of the concentrated drainage area with vegetated hummocks and rivulets southeast and outside of the proposed spoils area. View looking northwest. (February 11, 2016)

Photo 8. Looking northeast from outside of the proposed deposit area by about 200 feet, with the edge of a vegetated area with algae surrounding. (December 18, 2015)

Photo 9. Looking northwest from the south corner of the proposed deposit area towards the north corner. An old firepit can be seen in the foreground as this area is close to a public access point and is used by the public in the summer months when it's dry. (February 11, 2016)

Photo 10. South view of the edge of the old Saltair Road and the wetland vegetation area along the edge of the uplands (upper left-hand side of the photo). (February 16, 2016)

Photo 11. West view of the transition from the wetland vegetated edge out across the alkali mud, with Stansbury Island in the background. (February 16, 2016)

Photo 12. Northwest view of the old Saltair Road and Antelope Island (background), with the wetland vegetated area in the foreground. (February 16, 2016)

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Salt Lake Area, Utah

December 21, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 8, Sep 28, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 2, 2011—Aug 29, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Salt Lake Area, Utah (UT612)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
LE	Lasil-Goggin complex, 1 to 6 percent slopes	0.3	0.4%
PU	Playas	63.4	99.6%
Totals for Area of Interest		**63.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Salt Lake Area, Utah

LE—Lasil-Goggin complex, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1r34c
Elevation: 4,200 to 4,210 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Lasil, sand, and similar soils: 50 percent
Goggin and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lasil, Sand

Setting

Landform: Lake plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

A - 0 to 10 inches: sand
2Btkn - 10 to 21 inches: silty clay loam
2Bk - 21 to 36 inches: silty clay loam
2Cg - 36 to 60 inches: silty clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: Very rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 90 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 60.0
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Description of Goggin

Setting

Landform: Dunes, ridges
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex, linear

Typical profile

H1 - 0 to 3 inches: sand
H2 - 3 to 60 inches: sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 99.90 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: Very rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 90 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Upland Sand (Black Greasewood, Indian Ricegrass) (R028AY330UT)

Minor Components

Jordan

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Alkali Flat (Black Greasewood) (R028AY004UT)

Saltair

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Desert Salty Silt (Iodinebush) (R028AY132UT)

Playas

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (three-dimensional): Talf, rise

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Desert Salty Silt (Iodinebush) (R028AY132UT)

PU—Playas

Map Unit Setting

National map unit symbol: 1qr66
Elevation: 4,190 to 4,350 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 45 to 53 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Playas: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Playas

Setting

Landform: Lake plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: stratified fine sandy loam to silty clay

Properties and qualities

Slope: 0 to 1 percent
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 40 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Strongly saline (32.0 to 100.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 90.0
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: D
Ecological site: Desert Salty Silt (Iodinebush) (R028AY132UT)

Minor Components

Saltair

Percent of map unit: 3 percent
Landform: Lake plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Desert Salty Silt (Iodinebush) (R028AY132UT)

Eimarsh

Percent of map unit: 2 percent
Landform: Lake plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Saline Meadow (Saltgrass) (R028AY024UT)

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U.S. Fish and Wildlife Service
National Wetlands Inventory

Great Salt Lake Dredging Spoils Area

Dec 21, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

User Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Great Salt Lake Marina City/County: Salt Lake County Sampling Date: 12-18-2015

Applicant/Owner: UDWR State: UT Sampling Point: SP1

Investigator(s): Trent Toler Section, Township, Range: S3, T1S, R3W

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): D Lat: 40.765288 Long: -122.162032 Datum: WGS84

Soil Map Unit Name: Lasil-Goggin complex, 1-6% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks: Open, unvegetated mudflats, but currently damp from recent storm event. No vegetation and soils only consist of light brown oolitic sand. Water table at this time of year is high, within 5 inches of the surface. However, water table might not be as high during the summer months.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks: No vegetation of any type is present, and is likely never present at this data point.

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10 YR 6/2	100					sand	color due to native material
14-20	10 YR 6/1	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: The color of the oolitic sand is due to the color of the native material that makes up the sand. No organic material was visible in between the sand grains.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☒ No ☐ Depth (inches): 5

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 2

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water table very high, and saturation near the surface at this time of year. Recent heavy precipitation might also be contributing to the high water table.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Great Salt Lake Marina City/County: Salt Lake County Sampling Date: 12-18-2015

Applicant/Owner: UDWR State: UT Sampling Point: SP2

Investigator(s): Trent Toler Section, Township, Range: S3, T1S, R3W

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): D Lat: 40.765154 Long: -122.161544 Datum: WGS84

Soil Map Unit Name: Lasil-Goggin complex, 1-6% slopes NWI classification: PEME

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks: Near the edge of the open, unvegetated mudflats, but currently damp from recent storm event. Sparce vegetation and soils are borderline but just fail to indicate shallow enough hydric conditions. Water table at this time of year is high, within 7 inches of the surface. However, water table might not be as high during the growing season given the wet time of year. However, given the alkaline soil conditions, some hydric soil indicators could be not apparent (such as redox concentrations), and given the presence of hydrophytic vegetation and wetland hydrology, it is likely that the site is in wetlands.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5m)			
1. Salicornia rubra	7	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	7 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 93 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: Only very sparse clumps of Salicornia, no other vegetation. Cover could be higher during the growing season, as this species is an annual and has died back at this time of year.

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR 6/3	100					sand	
8-15	Gley1 5/N	100					sand	
15-18	10YR 7/3	60	Gley1 5/N	40	CS	M	silty clay	Gley part is sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: For sandy soils, the gley color must begin at 6 inches, but this gley color did not until 8 inches. The profile does suggest hydric conditions are very close and could be considered borderline.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☒ No ☐ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 3

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water table very high, and saturation near the surface at this time of year. Recent heavy precipitation might also be contributing to the high water table.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Great Salt Lake Marina City/County: Salt Lake County Sampling Date: 12-18-2015

Applicant/Owner: UDWR State: UT Sampling Point: SP3

Investigator(s): Trent Toler Section, Township, Range: S3, T1S, R3W

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): D Lat: 40.765096 Long: -122.161344 Datum: WGS84

Soil Map Unit Name: Lasil-Goggin complex, 1-6% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks: Area above the mudflats, partially vegetated by hydrophytic plants but both the soils and hydrology fail to indicate wetland conditions.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5m)			
1. Distichlis spicata	15	Y	FAC
2. Suaeda calceoliformis	10	Y	FACW
3. Salicornia rubra	5		OBL
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks: Saline beach hydrophytic plant community.

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 6/3	100					sand	
15-20	10YR 6/2	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: Light-colored oolitic sand, not from depletion but from the native color of the material. Very slight color change below 15 inches, but might be due to the wet sand appearing slightly lower in chroma.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
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- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☒ No ☐ Depth (inches): 15

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 12

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Saturation very close to minimum to be considered as wetland hydrology, but due to recent heavy precipitation, both water table and saturation might be typically lower at this location.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

April 20, 2016

Regulatory Division (SPK-2008-00309-UO)

Utah State Parks and Recreation
Attn: Mr. Dan Clark
1594 W. North Temple, Suite 116
Salt Lake City, Utah 84114

Dear Mr. Clark:

This concerns your proposed project to dredge the Great Salt Lake Marina and harbor entrance. The approximately 72-acre project site is located at the Great Salt Lake State Park and extends northeast along the North Temple Frontage Road for approximately 4 miles before it terminates northwest of the frontage road and south of an abandoned dirt road, Latitude 40.73468°, Longitude -112.21405°, Salt Lake County, Utah.

Based on the information you provided, as illustrated on the enclosed Great Salt Lake Marina Dredging Plan View and Sheet Numbers C-101 through C-107, dated 4/11/2016, we determined that the proposed work will not result in the discharge of dredged or fill material within waters of the United States. Therefore, a Department of the Army Permit is not required for this work. Measures should be taken to prevent construction materials and/or activities from entering any waters of the United States. Appropriate soil erosion and sediment controls should be implemented onsite to achieve this end.

Our disclaimer of jurisdiction is only for this activity as it pertains to Section 404 of the Federal Clean Water Act and does not refer to, nor affect jurisdiction over, any waters present on site. Other Federal, State, and local laws may apply; therefore, you should contact other regulatory authorities to determine whether your activities require other authorizations or permits.

We appreciate feedback. At your earliest convenience, please complete the *Customer Survey* from the link on our website at http://www.spk.usace.army.mil/Missions/Regulatory.aspx.

Please refer to identification number SPK-2008-00309-UO in any correspondence concerning this project. If you have any questions, please contact Hollis Jencks at the Utah Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010, email *Hollis.G.Jencks@usace.army.mil*, or telephone at 801-295-8380, extension 18.

Sincerely,

Jason A. Gipson
Chief, Utah-Nevada Branch
Regulatory Division

Enclosures

cc: (w/o encls)
Trent Toler, JUB Engineers Inc., ttoler@jub.com

APPENDIX D – Existing Soils Information (from the bottom of the marina)

J-U-B ENGINEERS, INC.

J-U-B COMPANIES | THE LANGDON GROUP | GATEWAY MAPPING INC.

MEMORANDUM

DATE: November 9, 2015

TO: Dan Clark, Utah State Parks

CC: Matt Boyer, D.F.C.M.

FROM: Paul Taylor, P.E.

SUBJECT: GREAT SALT LAKE STATE PARK MARINA SOIL SAMPLE TEST RESULTS

On November 3, 2015 American West Analytical Laboratories (AWAL) accepted soil samples taken from the Great Salt Lake State Park marina. We requested that AWAL test for Priority Pollutant Metals, Polychlorinated biphenyls (PCBs), Pesticides, Herbicides, Organophosphorus Pesticides, Polycyclic aromatic hydrocarbons (PAHs), and Volatiles. This memorandum summarizes the results.

Test Results

After receiving test results we compared measured levels with the EPA Region 8 Residential Screening Levels (RSLs). The RSLs are typically used to assess the risk of exposure and toxicity to predict the probability and/or severity as it relates to non-cancer and cancer effects. These levels are used for assessing risk only and are not regulatory in any way.

Attached is a summary of key elements as they compare to the RSLs for our area. The only measured level that exceeds the RSLs is arsenic. It should be noted that arsenic levels in Utah are generally considerably higher than the RSLs with background levels averaging between 25 and 30. Although the arsenic levels are higher than the RSLs they are lower than normal background levels.

The complete test results are also available upon request.

Estimated Quantities

In January 2015 we did some preliminary calculations on the quantities of material that needs to be removed. These calculations are rough estimates. In the next two to three weeks we hope to complete a more detailed hydrographic survey to establish quantities for bid documents. The quantities include:

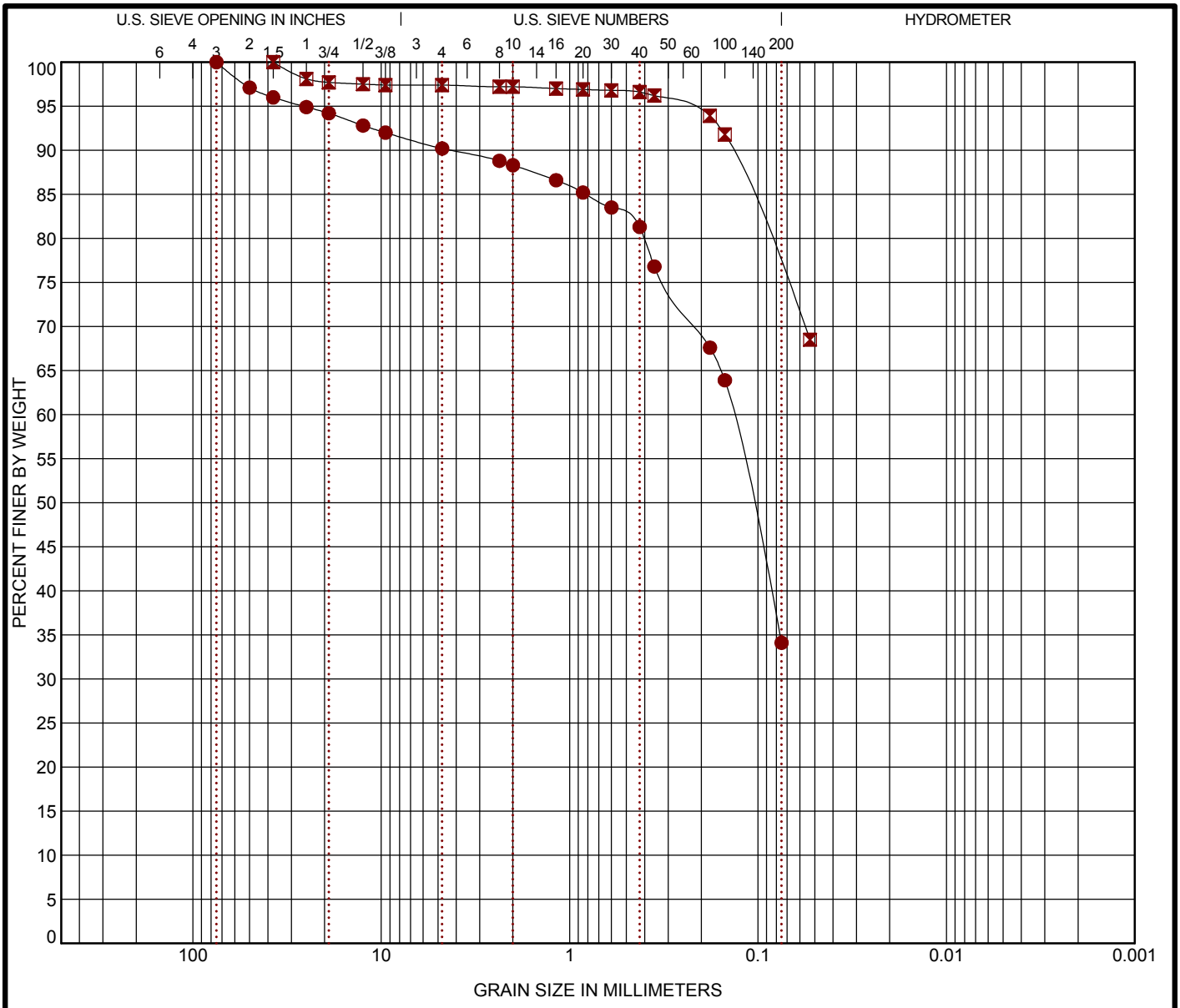
Location	Estimated Quantity
Outer Channel	73,335 cy
Inner Channel	19,030 cy
West Harbor	92,185 cy

South Harbor	56,112 cy
Total	240,662 cy

At the present time we are assuming that there will not be enough money to dredge the entire marina. We anticipate starting with the Outer Channel then moving to the inner channel. Once that is complete we anticipate starting on the lake side of the western harbor and working our way through that harbor to the south harbor until the money has been used. Quantities were calculated based on suction dredging with a 20% slurry. Once the material has been dried it should shrink to about 20% of the initial volume.

GRAIN SIZE DISTRIBUTION

ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
Great Salt Lake Marina	0	SILTY SAND (SM)	NP	NP	NP		
Utah Lake Marina	0	SILT with SAND (ML)	NP	NP	NP		

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Fines
Great Salt Lake Marina	0	75	0.137			9.8	56.1	34.1
Utah Lake Marina	0	37.5				2.6	21.1	76.3

PROJECT: Utah Lake and Great Salt Lake Marinas

SITE: Provo, Utah

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

PROJECT NUMBER: 61155083

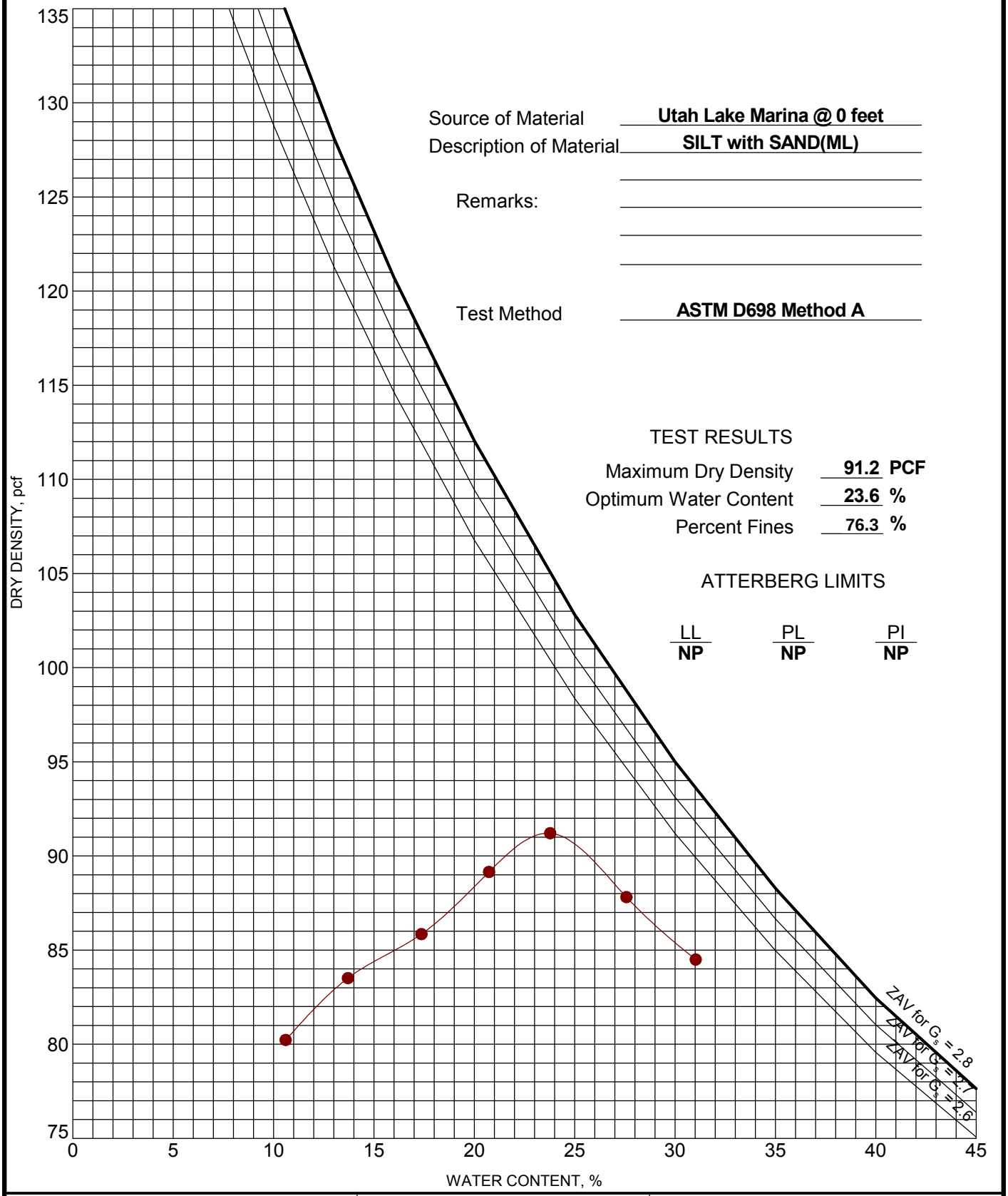
CLIENT: J-U-B Engineers, Inc.

EXHIBIT: 1

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 61155083 UTAH LAKE AND GREAT SALT LAKE MARINAS.GPJ TERRACON2012.GDT 11/23/15

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **Utah Lake Marina @ 0 feet**

Description of Material: **SILT with SAND(ML)**

Remarks:

Test Method: **ASTM D698 Method A**

TEST RESULTS

Maximum Dry Density	**91.2**	**PCF**
Optimum Water Content	**23.6**	**%**
Percent Fines	**76.3**	**%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: Utah Lake and Great Salt Lake Marinas

SITE: Provo, Utah

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

PROJECT NUMBER: 61155083

CLIENT: J-U-B Engineers, Inc.

EXHIBIT: 2

Contaminants Above EPA standard limits - Great Salt Lake Marina

Analysed Contaminant	Reporting Limit	Anaylytical Result	Resident Soil (mg/kg)
Arsenic	2.53	8.04	0.68
Chromium	10.1	16.7	see note
Copper	15.7	19.5	3100
Lead	6.57	23.3	64
4,4' -DDD	1.26	4.99	N/A
4,4' -DDE	1.26	15.5	N/A
Acetone	12.5	51.3	61000
MevinPhos	33.3	141*	N/A
Diazinon	33.3	135*	44
Methyl Parathion	33.3	152*	16
Fenthion	33.3	159*	N/A
Chlorpyrifos	33.3	147*	63

American West
ANALYTICAL LABORATORIES

3440 South 700 West
Salt Lake City, UT 84119

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Paul Taylor
J.U.B. Engineers
466 North 900 West
Kaysville, UT 84037
TEL: (801) 547-0393

RE: Great Salt Lake Marina / 55-15-019

Dear Paul Taylor: Lab Set ID: 1510552

American West Analytical Laboratories received sample(s) on 10/27/2015 for the analyses presented in the following report.

American West Analytical Laboratories (AWAL) is accredited by The National Environmental Laboratory Accreditation Program (NELAP) in Utah and Texas; and is state accredited in Colorado, Idaho, New Mexico, Wyoming, and Missouri.

All analyses were performed in accordance to the NELAP protocols unless noted otherwise. Accreditation scope documents are available upon request. If you have any questions or concerns regarding this report please feel free to call.

The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or purging efficiency. The "Reporting Limit" found on the report is equivalent to the practical quantitation limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit. Analytical results are reported to three significant figures for quality control and calculation purposes.

Thank You,

Approved by: Kyle F. Gross Digitally signed by Kyle F. Gross Date: 2015.11.03 11:03:27 -07'00'

Laboratory Director or designee

Sample(s) were subcontracted for the following analyses:

Herbicides

Organophosphorous Pesticides

INORGANIC ANALYTICAL REPORT

Client: J.U.B. Engineers **Contact:** Paul Taylor
Project: Great Salt Lake Marina / 55-15-019
Lab Sample ID: 1510552-001
Client Sample ID: GSL
Collection Date: 10/27/2015 1015h
Received Date: 10/27/2015 1330h

Analytical Results TOTAL METALS

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Antimony	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	4.05	< 4.05	
Arsenic	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	2.53	**8.04**	
Beryllium	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	2.02	< 2.02	
Cadmium	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	0.860	< 0.860	
Chromium	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	10.1	**16.7**	3
Copper	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	15.7	**19.5**	
Lead	mg/kg-dry	10/27/2015 1900h	10/30/2015 637h	SW6020A	6.57	**23.3**	3
Mercury	mg/kg-dry	10/27/2015 1720h	10/28/2015 952h	SW7471B	0.0485	< 0.0485	
Nickel	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	20.2	< 20.2	
Selenium	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	8.60	< 8.60	
Silver	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	1.52	< 1.52	
Thallium	mg/kg-dry	10/27/2015 1900h	10/29/2015 2039h	SW6020A	4.05	< 4.05	
Zinc	mg/kg-dry	10/27/2015 1900h	10/30/2015 637h	SW6020A	50.6	< 50.6	

[3] - Matrix spike recoveries and/or high RPDs indicate suspected sample non-homogeneity. The method is in control as indicated by the LCS.

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Salt Lake City, UT 84119

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Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

ORGANIC ANALYTICAL REPORT

Client: J.U.B. Engineers **Contact:** Paul Taylor
Project: Great Salt Lake Marina / 55-15-019
Lab Sample ID: 1510552-001C
Client Sample ID: GSL
Collection Date: 10/27/2015 1015h
Received Date: 10/27/2015 1330h
Test Code: 8081-S-3546

Analytical Results Organochlorine Pests. By GC/ECD Method 8081B/3546

Analyzed: 10/30/2015 2039h **Extracted:** 10/28/2015 1411
Units: µg/kg-dry **Dilution Factor:** 1 **Method:** SW8081B

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
4,4´-DDD	72-54-8	1.26	**4.99**	@
4,4´-DDE	72-55-9	1.26	**15.5**	¹@
4,4´-DDT	50-29-3	1.26	< 1.26	
Aldrin	309-00-2	1.26	< 1.26	¹@
alpha-BHC	319-84-6	1.26	< 1.26	@
alpha-Chlordane	5103-71-9	1.26	< 1.26	@
beta-BHC	319-85-7	1.26	< 1.26	¹@
Chlordane, total	57-74-9	6.28	< 6.28	
delta-BHC	319-86-8	1.26	< 1.26	¹@
Dieldrin	60-57-1	1.26	< 1.26	
Endosulfan I	959-98-8	1.26	< 1.26	
Endosulfan II	33213-65-9	1.26	< 1.26	@
Endosulfan sulfate	1031-07-8	1.26	< 1.26	¹@
Endrin	72-20-8	1.26	< 1.26	
Endrin aldehyde	7421-93-4	1.26	< 1.26	@
Endrin ketone	53494-70-5	1.26	< 1.26	¹@
gamma-BHC	58-89-9	1.26	< 1.26	¹@
gamma-Chlordane	5566-34-7	1.26	< 1.26	¹@
Heptachlor	76-44-8	1.26	< 1.26	¹@
Heptachlor epoxide	1024-57-3	1.26	< 1.26	
Methoxychlor	72-43-5	6.28	< 6.28	¹@
Toxaphene	8001-35-2	12.6	< 12.6	

Surrogate	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: Decachlorobiphenyl	2051-24-3	9.61	12.55	76.6	10-180	
Surr: Tetrachloro-m-xylene	877-09-8	0	12.55	0	10-135	S

@ - High RPD due to suspected sample non-homogeneity or matrix interference.
¹ - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.
Gel-Permeation Chromatography (GPC) Cleanup, method 3640A, utilized for this sample.
S - Surrogate outside recovery limits. Minimum method criteria of one surrogate within established recovery limits was met.

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Salt Lake City, UT 84119

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web: www.awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

ORGANIC ANALYTICAL REPORT

Client: J.U.B. Engineers **Contact:** Paul Taylor
Project: Great Salt Lake Marina / 55-15-019
Lab Sample ID: 1510552-001B
Client Sample ID: GSL
Collection Date: 10/27/2015 1015h
Received Date: 10/27/2015 1330h

Test Code: 8082-S-3546

Analytical Results PCBs by GC/ECD Method 8082A/3546

Analyzed: 10/28/2015 1824h **Extracted:** 10/27/2015 1533
Units: µg/kg-dry **Dilution Factor:** 1 **Method:** SW8082A

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Aroclor 1016	12674-11-2	31.3	< 31.3	@[1]
Aroclor 1221	11104-28-2	31.3	< 31.3	
Aroclor 1232	11141-16-5	31.3	< 31.3	
Aroclor 1242	53469-21-9	31.3	< 31.3	
Aroclor 1248	12672-29-6	31.3	< 31.3	
Aroclor 1254	11097-69-1	31.3	< 31.3	
Aroclor 1260	11096-82-5	31.3	< 31.3	

Surrogate	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: Decachlorobiphenyl	2051-24-3	4.06	6.260	64.9	10-180	
Surr: Tetrachloro-m-xylene	877-09-8	4.06	6.260	64.8	10-145	

@ - High RPD due to suspected sample non-homogeneity or matrix interference.
[1] - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.
Sulfuric acid cleanup method 3665A utilized for this sample.

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ORGANIC ANALYTICAL REPORT

Client: J.U.B. Engineers **Contact:** Paul Taylor
Project: Great Salt Lake Marina / 55-15-019
Lab Sample ID: 1510552-001D
Client Sample ID: GSL
Collection Date: 10/27/2015 1015h
Received Date: 10/27/2015 1330h
Test Code: 8270-S-3546

Analytical Results SVOA PNAs by GC/MS Method 8270D/3546

Analyzed: 11/2/2015 1819h **Extracted:** 10/28/2015 1411
Units: µg/kg-dry **Dilution Factor:** 1 **Method:** SW8270D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
1-Methylnaphthalene	90-12-0	1,280	< 1,280	
2-Methylnaphthalene	91-57-6	1,280	< 1,280	
Acenaphthene	83-32-9	1,280	< 1,280	
Acenaphthylene	208-96-8	1,280	< 1,280	
Anthracene	120-12-7	1,280	< 1,280	
Benz(a)anthracene	56-55-3	1,280	< 1,280	
Benzo(a)pyrene	50-32-8	1,280	< 1,280	
Benzo(b)fluoranthene	205-99-2	1,280	< 1,280	
Benzo(g,h,i)perylene	191-24-2	1,280	< 1,280	
Benzo(k)fluoranthene	207-08-9	1,280	< 1,280	
Chrysene	218-01-9	1,280	< 1,280	
Dibenz(a,h)anthracene	53-70-3	1,280	< 1,280	
Fluoranthene	206-44-0	1,280	< 1,280	
Fluorene	86-73-7	1,280	< 1,280	
Indene	95-13-6	1,280	< 1,280	
Indeno(1,2,3-cd)pyrene	193-39-5	1,280	< 1,280	
Naphthalene	91-20-3	1,280	< 1,280	
Phenanthrene	85-01-8	1,280	< 1,280	
Pyrene	129-00-0	1,280	< 1,280	

Surrogate	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 2,4,6-Tribromophenol	118-79-6	11,800	20,080	58.7	10-237	
Surr: 2-Fluorobiphenyl	321-60-8	5,550	10,040	55.3	17-179	
Surr: 2-Fluorophenol	367-12-4	9,130	20,080	45.5	10-186	
Surr: Nitrobenzene-d5	4165-60-0	4,800	10,040	47.8	10-166	
Surr: Phenol-d6	13127-88-3	9,580	20,080	47.7	10-194	
Surr: Terphenyl-d14	1718-51-0	5,980	10,040	59.5	10-265	

Gel-Permeation Chromatography (GPC) Cleanup, method 3640A, utilized for this sample.

ORGANIC ANALYTICAL REPORT

Client: J.U.B. Engineers **Contact:** Paul Taylor
Project: Great Salt Lake Marina / 55-15-019
Lab Sample ID: 1510552-001A
Client Sample ID: GSL
Collection Date: 10/27/2015 1015h
Received Date: 10/27/2015 1330h

Test Code: 8260-S

Analytical Results VOAs AWAL List by GC/MS Method 8260C

Analyzed: 10/27/2015 1655h
Units: µg/kg-dry **Dilution Factor:** 0.99 **Method:** SW8260C

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Compound	CAS Number	Reporting Limit	Analytical Result	Qual
1,1,1-Trichloroethane	71-55-6	2.50	< 2.50	
1,1,2,2-Tetrachloroethane	79-34-5	2.50	< 2.50	
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	2.50	< 2.50	
1,1,2-Trichloroethane	79-00-5	2.50	< 2.50	
1,1-Dichloroethane	75-34-3	2.50	< 2.50	
1,1-Dichloroethene	75-35-4	2.50	< 2.50	
1,2,4-Trichlorobenzene	120-82-1	2.50	< 2.50	
1,2-Dibromo-3-chloropropane	96-12-8	6.24	< 6.24	
1,2-Dibromoethane	106-93-4	2.50	< 2.50	
1,2-Dichlorobenzene	95-50-1	2.50	< 2.50	
1,2-Dichloroethane	107-06-2	2.50	< 2.50	
1,2-Dichloropropane	78-87-5	2.50	< 2.50	
1,3-Dichlorobenzene	541-73-1	2.50	< 2.50	
1,4-Dichlorobenzene	106-46-7	2.50	< 2.50	
2-Butanone	78-93-3	12.5	< 12.5	
2-Hexanone	591-78-6	6.24	< 6.24	
4-Methyl-2-pentanone	108-10-1	6.24	< 6.24	
Acetone	67-64-1	12.5	**51.3**	
Benzene	71-43-2	2.50	< 2.50	
Bromodichloromethane	75-27-4	2.50	< 2.50	
Bromoform	75-25-2	2.50	< 2.50	
Bromomethane	74-83-9	6.24	< 6.24	
Carbon disulfide	75-15-0	2.50	< 2.50	
Carbon tetrachloride	56-23-5	2.50	< 2.50	
Chlorobenzene	108-90-7	2.50	< 2.50	
Chloroethane	75-00-3	2.50	< 2.50	
Chloroform	67-66-3	2.50	< 2.50	
Chloromethane	74-87-3	6.24	< 6.24	
cis-1,2-Dichloroethene	156-59-2	2.50	< 2.50	
cis-1,3-Dichloropropene	10061-01-5	2.50	< 2.50	

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Lab Sample ID: 1510552-001A
Client Sample ID: GSL

Analyzed: 10/27/2015 1655h
Units: µg/kg-dry **Dilution Factor:** 0.99 **Method:** SW8260C

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Cyclohexane	110-82-7	2.50	< 2.50	
Dibromochloromethane	124-48-1	2.50	< 2.50	
Dichlorodifluoromethane	75-71-8	2.50	< 2.50	
Ethylbenzene	100-41-4	2.50	< 2.50	
Isopropylbenzene	98-82-8	2.50	< 2.50	
Methyl Acetate	79-20-9	6.24	< 6.24	
Methyl tert-butyl ether	1634-04-4	2.50	< 2.50	
Methylcyclohexane	108-87-2	2.50	< 2.50	
Methylene chloride	75-09-2	6.24	< 6.24	
Naphthalene	91-20-3	2.50	< 2.50	
Styrene	100-42-5	2.50	< 2.50	
Tetrachloroethene	127-18-4	2.50	< 2.50	
Toluene	108-88-3	2.50	< 2.50	
trans-1,2-Dichloroethene	156-60-5	2.50	< 2.50	
trans-1,3-Dichloropropene	10061-02-6	2.50	< 2.50	
Trichloroethene	79-01-6	2.50	< 2.50	
Trichlorofluoromethane	75-69-4	2.50	< 2.50	
Vinyl chloride	75-01-4	1.25	< 1.25	
Xylenes, Total	1330-20-7	2.50	< 2.50	

Surrogate	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 1,2-Dichloroethane-d4	17060-07-0	76.9	62.39	123	51-170	
Surr: 4-Bromofluorobenzene	460-00-4	60.2	62.39	96.4	60-144	
Surr: Dibromofluoromethane	1868-53-7	65.7	62.39	105	60-145	
Surr: Toluene-d8	2037-26-5	60.4	62.39	96.9	50-138	

Sampling and analytical preparation performed by method 5030C modified for analysis of soil samples collected in 2 or 4 oz jars.

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Contact: Paul Taylor
Lab Set ID: 1510552
Dept: ME
Project: Great Salt Lake Marina / 55-15-019
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-39960	Date Analyzed: 10/29/2015 1349h												
Test Code: 6020-S	Date Prepared: 10/27/2015 1900h												
Antimony	19.4	mg/kg	SW6020A	0.291	3.20	20.00	0	97.0	85 - 115				
Arsenic	19.2	mg/kg	SW6020A	0.0648	2.00	20.00	0	96.2	85 - 115				
Beryllium	18.9	mg/kg	SW6020A	0.00476	1.60	20.00	0	94.5	85 - 115				
Cadmium	19.1	mg/kg	SW6020A	0.0135	0.680	20.00	0	95.6	85 - 115				
Chromium	19.9	mg/kg	SW6020A	1.94	8.00	20.00	0	99.3	85 - 115				
Copper	19.7	mg/kg	SW6020A	1.23	12.4	20.00	0	98.7	85 - 115				
Lead	18.8	mg/kg	SW6020A	2.40	5.20	20.00	0	94.1	85 - 115				
Nickel	19.6	mg/kg	SW6020A	1.75	16.0	20.00	0	98.2	85 - 115				
Selenium	17.7	mg/kg	SW6020A	0.436	6.80	20.00	0	88.6	85 - 115				
Silver	19.4	mg/kg	SW6020A	0.0179	1.20	20.00	0	96.9	85 - 115				
Thallium	18.6	mg/kg	SW6020A	0.00404	3.20	20.00	0	93.2	85 - 115				
Zinc	96.3	mg/kg	SW6020A	4.04	40.0	100.0	0	96.3	85 - 115				
Lab Sample ID: LCS-39952	Date Analyzed: 10/28/2015 1040h												
Test Code: HG-S-7471B	Date Prepared: 10/27/2015 1720h												
Mercury	0.467	mg/kg	SW7471B	0.00135	0.0400	0.4000	0	117	80 - 120				

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: ME
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: **MB-39960**	Date Analyzed:	10/29/2015 1655h											
Test Code: 6020-S	Date Prepared:	10/27/2015 1900h											
Antimony	< 1.60	mg/kg	SW6020A	0.145	1.60								
Arsenic	< 1.00	mg/kg	SW6020A	0.0324	1.00								
Beryllium	< 0.800	mg/kg	SW6020A	0.00238	0.800								
Cadmium	< 0.340	mg/kg	SW6020A	0.00674	0.340								
Chromium	< 4.00	mg/kg	SW6020A	0.972	4.00								
Copper	< 6.20	mg/kg	SW6020A	0.614	6.20								
Lead	< 2.60	mg/kg	SW6020A	1.20	2.60								
Nickel	< 8.00	mg/kg	SW6020A	0.874	8.00								
Selenium	< 3.40	mg/kg	SW6020A	0.218	3.40								
Silver	< 0.600	mg/kg	SW6020A	0.00896	0.600								
Thallium	< 1.60	mg/kg	SW6020A	0.00202	1.60								
Zinc	< 20.0	mg/kg	SW6020A	2.02	20.0								
Lab Sample ID: **MB-39952**	Date Analyzed:	10/28/2015 928h											
Test Code: HG-S-7471B	Date Prepared:	10/27/2015 1720h											
Mercury	< 0.0400	mg/kg	SW7471B	0.00135	0.0400								

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: ME
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001EMS Date Analyzed: 10/29/2015 2042h													
Test Code: 6020-S Date Prepared: 10/27/2015 1900h													
Antimony	23.1	mg/kg-dry	SW6020A	0.360	3.97	24.79	0.491	91.4	75 - 125				
Arsenic	32.7	mg/kg-dry	SW6020A	0.0803	2.48	24.79	8.04	99.6	75 - 125				
Beryllium	23.4	mg/kg-dry	SW6020A	0.00590	1.98	24.79	0.514	92.5	75 - 125				
Cadmium	23.6	mg/kg-dry	SW6020A	0.0167	0.843	24.79	0.418	93.6	75 - 125				
Chromium	53.7	mg/kg-dry	SW6020A	2.41	9.91	24.79	16.7	149	75 - 125				3
Copper	46.4	mg/kg-dry	SW6020A	1.52	15.4	24.79	19.5	108	75 - 125				
Nickel	35.4	mg/kg-dry	SW6020A	2.17	19.8	24.79	8.36	109	75 - 125				
Selenium	23.2	mg/kg-dry	SW6020A	0.540	8.43	24.79	0	93.7	75 - 125				
Silver	23.4	mg/kg-dry	SW6020A	0.0222	1.49	24.79	0.103	93.9	75 - 125				
Thallium	22.8	mg/kg-dry	SW6020A	0.00501	3.97	24.79	0.186	91.3	75 - 125				
Lab Sample ID: 1510553-001EMS Date Analyzed: 10/29/2015 2052h													
Test Code: 6020-S Date Prepared: 10/27/2015 1900h													
Antimony	32.4	mg/kg-dry	SW6020A	0.496	5.45	34.08	0	95.1	75 - 125				
Arsenic	44.0	mg/kg-dry	SW6020A	0.110	3.41	34.08	11.9	94.2	75 - 125				
Beryllium	32.1	mg/kg-dry	SW6020A	0.00811	2.73	34.08	0.39	93.2	75 - 125				
Cadmium	32.8	mg/kg-dry	SW6020A	0.0230	1.16	34.08	0.909	93.6	75 - 125				
Chromium	60.6	mg/kg-dry	SW6020A	3.31	13.6	34.08	18.8	122	75 - 125				
Copper	46.4	mg/kg-dry	SW6020A	2.09	21.1	34.08	15.6	90.4	75 - 125				
Nickel	44.4	mg/kg-dry	SW6020A	2.98	27.3	34.08	11.8	95.6	75 - 125				
Selenium	32.1	mg/kg-dry	SW6020A	0.743	11.6	34.08	0.753	91.9	75 - 125				
Silver	33.0	mg/kg-dry	SW6020A	0.0305	2.04	34.08	0.197	96.2	75 - 125				
Thallium	32.1	mg/kg-dry	SW6020A	0.00688	5.45	34.08	0.47	92.9	75 - 125				
Lab Sample ID: 1510552-001EMS Date Analyzed: 10/30/2015 640h													
Test Code: 6020-S Date Prepared: 10/27/2015 1900h													
Lead	60.0	mg/kg-dry	SW6020A	2.97	6.44	24.79	23.3	148	75 - 125				3
Zinc	192	mg/kg-dry	SW6020A	5.01	49.6	123.9	45.9	117	75 - 125				

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: ME
QC Type: MS

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**1510553-001EMS**	Date Analyzed:	10/30/2015 650h											
Test Code:	6020-S	Date Prepared:	10/27/2015 1900h											
Lead		86.7	mg/kg-dry	SW6020A	4.08	8.86	34.08	56.7	88.1	75 - 125				
Zinc		394	mg/kg-dry	SW6020A	6.88	68.2	170.4	250	84.4	75 - 125				
Lab Sample ID:	**1510553-001EMS**	Date Analyzed:	10/28/2015 1002h											
Test Code:	HG-S-7471B	Date Prepared:	10/27/2015 1720h											
Mercury		0.998	mg/kg-dry	SW7471B	0.00237	0.0701	0.7013	0.0837	130	80 - 120				[3]
Lab Sample ID:	**1510552-001EMS**	Date Analyzed:	10/28/2015 954h											
Test Code:	HG-S-7471B	Date Prepared:	10/27/2015 1720h											
Mercury		0.581	mg/kg-dry	SW7471B	0.00158	0.0467	0.4668	0.0315	118	80 - 120				

[3] - Matrix spike recoveries and/or high RPDs indicate suspected sample non-homogeneity. The method is in control as indicated by the LCS.

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: ME
QC Type: MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001EMSD	Date Analyzed:	10/29/2015 2045h											
Test Code: 6020-S	Date Prepared:	10/27/2015 1900h											
Antimony	22.8	mg/kg-dry	SW6020A	0.365	4.01	25.09	0.491	89.0	75 - 125	23.1	1.36	20	
Arsenic	32.9	mg/kg-dry	SW6020A	0.0813	2.51	25.09	8.04	99.1	75 - 125	32.7	0.554	20	
Beryllium	23.1	mg/kg-dry	SW6020A	0.00597	2.01	25.09	0.514	90.0	75 - 125	23.4	1.49	20	
Cadmium	23.3	mg/kg-dry	SW6020A	0.0169	0.853	25.09	0.418	91.4	75 - 125	23.6	1.12	20	
Chromium	46.2	mg/kg-dry	SW6020A	2.44	10.0	25.09	16.7	117	75 - 125	53.7	15.1	20	
Copper	44.3	mg/kg-dry	SW6020A	1.54	15.6	25.09	19.5	98.8	75 - 125	46.4	4.49	20	
Nickel	33.5	mg/kg-dry	SW6020A	2.19	20.1	25.09	8.36	100	75 - 125	35.4	5.63	20	
Selenium	22.7	mg/kg-dry	SW6020A	0.547	8.53	25.09	0	90.4	75 - 125	23.2	2.36	20	
Silver	23.1	mg/kg-dry	SW6020A	0.0225	1.51	25.09	0.103	91.8	75 - 125	23.4	1.03	20	
Thallium	22.5	mg/kg-dry	SW6020A	0.00507	4.01	25.09	0.186	88.8	75 - 125	22.8	1.59	20	
Lab Sample ID: 1510553-001EMSD	Date Analyzed:	10/29/2015 2055h											
Test Code: 6020-S	Date Prepared:	10/27/2015 1900h											
Antimony	32.0	mg/kg-dry	SW6020A	0.505	5.56	34.75	0	92.0	75 - 125	32.4	1.36	20	
Arsenic	44.7	mg/kg-dry	SW6020A	0.113	3.48	34.75	11.9	94.1	75 - 125	44	1.38	20	
Beryllium	32.0	mg/kg-dry	SW6020A	0.00827	2.78	34.75	0.39	90.9	75 - 125	32.1	0.462	20	
Cadmium	32.8	mg/kg-dry	SW6020A	0.0234	1.18	34.75	0.909	91.6	75 - 125	32.8	0.154	20	
Chromium	50.2	mg/kg-dry	SW6020A	3.38	13.9	34.75	18.8	90.2	75 - 125	60.6	18.8	20	
Copper	47.1	mg/kg-dry	SW6020A	2.13	21.5	34.75	15.6	90.7	75 - 125	46.4	1.50	20	
Nickel	44.1	mg/kg-dry	SW6020A	3.04	27.8	34.75	11.8	93.0	75 - 125	44.4	0.621	20	
Selenium	32.2	mg/kg-dry	SW6020A	0.758	11.8	34.75	0.753	90.6	75 - 125	32.1	0.517	20	
Silver	32.6	mg/kg-dry	SW6020A	0.0311	2.09	34.75	0.197	93.1	75 - 125	33	1.26	20	
Thallium	31.9	mg/kg-dry	SW6020A	0.00702	5.56	34.75	0.47	90.4	75 - 125	32.1	0.700	20	
Lab Sample ID: 1510552-001EMSD	Date Analyzed:	10/30/2015 643h											
Test Code: 6020-S	Date Prepared:	10/27/2015 1900h											
Lead	47.2	mg/kg-dry	SW6020A	3.01	6.52	25.09	23.3	95.0	75 - 125	60	24.0	20	3
Zinc	172	mg/kg-dry	SW6020A	5.07	50.2	125.5	45.9	100	75 - 125	192	10.9	20	

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: ME
QC Type: MSD

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**1510553-001EMSD**	Date Analyzed:	10/30/2015 653h											
Test Code:	6020-S	Date Prepared:	10/27/2015 1900h											
Lead		86.4	mg/kg-dry	SW6020A	4.16	9.04	34.75	56.7	85.6	75 - 125	86.7	0.321	20	
Zinc		405	mg/kg-dry	SW6020A	7.02	69.5	173.8	250	89.2	75 - 125	394	2.78	20	
Lab Sample ID:	**1510553-001EMSD**	Date Analyzed:	10/28/2015 1004h											
Test Code:	HG-S-7471B	Date Prepared:	10/27/2015 1720h											
Mercury		0.766	mg/kg-dry	SW7471B	0.00197	0.0584	0.5844	0.0837	117	80 - 120	0.998	26.3	20	@
Lab Sample ID:	**1510552-001EMSD**	Date Analyzed:	10/28/2015 955h											
Test Code:	HG-S-7471B	Date Prepared:	10/27/2015 1720h											
Mercury		0.525	mg/kg-dry	SW7471B	0.00147	0.0435	0.4346	0.0315	113	80 - 120	0.581	10.2	20	

@ - High RPD due to suspected sample non-homogeneity or matrix interference.

[3] - Matrix spike recoveries and/or high RPDs indicate suspected sample non-homogeneity. The method is in control as indicated by the LCS.

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-39966	Date Analyzed: 10/30/2015 2019h												
Test Code: 8081-S-3546	Date Prepared: 10/28/2015 1411h												
4,4´-DDD	5.88	µg/kg	SW8081B	0.670	1.00	10.00	0	58.8	35 - 150				
4,4´-DDE	5.78	µg/kg	SW8081B	0.596	1.00	10.00	0	57.8	33 - 134				
4,4´-DDT	5.87	µg/kg	SW8081B	0.610	1.00	10.00	0	58.7	48 - 176				
Aldrin	4.98	µg/kg	SW8081B	0.474	1.00	10.00	0	49.8	26 - 123				
alpha-BHC	5.79	µg/kg	SW8081B	0.513	1.00	10.00	0	57.9	35 - 124				
alpha-Chlordane	6.23	µg/kg	SW8081B	0.570	1.00	10.00	0	62.3	30 - 127				
beta-BHC	7.09	µg/kg	SW8081B	0.787	1.00	10.00	0	70.9	40 - 140				
delta-BHC	5.83	µg/kg	SW8081B	0.592	1.00	10.00	0	58.3	40 - 146				
Dieldrin	5.57	µg/kg	SW8081B	0.547	1.00	10.00	0	55.7	31 - 138				
Endosulfan I	5.72	µg/kg	SW8081B	0.569	1.00	10.00	0	57.2	10 - 136				
Endosulfan II	5.25	µg/kg	SW8081B	0.533	1.00	10.00	0	52.5	10 - 152				
Endosulfan sulfate	6.15	µg/kg	SW8081B	0.631	1.00	10.00	0	61.5	46 - 145				
Endrin	5.79	µg/kg	SW8081B	0.893	1.00	10.00	0	57.9	23 - 162				
Endrin aldehyde	3.65	µg/kg	SW8081B	0.664	1.00	10.00	0	36.5	10 - 140				
Endrin ketone	5.30	µg/kg	SW8081B	0.646	1.00	10.00	0	53.0	42 - 150				
gamma-BHC	5.20	µg/kg	SW8081B	0.461	1.00	10.00	0	52.0	34 - 126				
gamma-Chlordane	5.72	µg/kg	SW8081B	0.535	1.00	10.00	0	57.2	31 - 126				
Heptachlor	7.80	µg/kg	SW8081B	0.793	1.00	10.00	0	78.0	33 - 133				
Heptachlor epoxide	5.69	µg/kg	SW8081B	0.512	1.00	10.00	0	56.9	26 - 131				
Methoxychlor	6.47	µg/kg	SW8081B	0.679	5.00	10.00	0	64.7	51 - 207				
Surr: Decachlorobiphenyl	11.2	µg/kg	SW8081B			10.00		112	25 - 166				
Surr: Tetrachloro-m-xylene	5.18	µg/kg	SW8081B			10.00		51.8	33 - 140				
Lab Sample ID: LCS-39947	Date Analyzed: 10/28/2015 1749h												
Test Code: 8082-S-3546	Date Prepared: 10/27/2015 1533h												
Aroclor 1016	131	µg/kg	SW8082A	6.92	25.0	166.7	0	78.8	23 - 136				
Aroclor 1260	125	µg/kg	SW8082A	6.63	25.0	166.7	0	74.9	25 - 133				
Surr: Decachlorobiphenyl	4.01	µg/kg	SW8082A			5.000		80.2	15 - 131				

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-39947	Date Analyzed:	10/28/2015 1749h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Surr: Tetrachloro-m-xylene	3.38	µg/kg	SW8082A			5.000		67.5	10 - 124				

LCS-39947: Sulfuric acid cleanup method 3665A utilized for this sample.
LCS-39966: Gel-Permeation Chromatography (GPC) Cleanup, method 3640A, utilized for this sample.

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB-39966	Date Analyzed:	10/30/2015 2000h											
Test Code: 8081-S-3546	Date Prepared:	10/28/2015 1411h											
4,4´-DDD	< 1.00	µg/kg	SW8081B	0.670	1.00								
4,4´-DDE	< 1.00	µg/kg	SW8081B	0.596	1.00								
4,4´-DDT	< 1.00	µg/kg	SW8081B	0.610	1.00								
Aldrin	< 1.00	µg/kg	SW8081B	0.474	1.00								
alpha-BHC	< 1.00	µg/kg	SW8081B	0.513	1.00								
alpha-Chlordane	< 1.00	µg/kg	SW8081B	0.570	1.00								
beta-BHC	< 1.00	µg/kg	SW8081B	0.787	1.00								
Chlordane, total	< 5.00	µg/kg	SW8081B	3.36	5.00								
delta-BHC	< 1.00	µg/kg	SW8081B	0.592	1.00								
Dieldrin	< 1.00	µg/kg	SW8081B	0.547	1.00								
Endosulfan I	< 1.00	µg/kg	SW8081B	0.569	1.00								
Endosulfan II	< 1.00	µg/kg	SW8081B	0.533	1.00								
Endosulfan sulfate	< 1.00	µg/kg	SW8081B	0.631	1.00								
Endrin	< 1.00	µg/kg	SW8081B	0.893	1.00								
Endrin aldehyde	< 1.00	µg/kg	SW8081B	0.664	1.00								
Endrin ketone	< 1.00	µg/kg	SW8081B	0.646	1.00								
gamma-BHC	< 1.00	µg/kg	SW8081B	0.461	1.00								
gamma-Chlordane	< 1.00	µg/kg	SW8081B	0.535	1.00								
Heptachlor	< 1.00	µg/kg	SW8081B	0.793	1.00								
Heptachlor epoxide	< 1.00	µg/kg	SW8081B	0.512	1.00								
Methoxychlor	< 5.00	µg/kg	SW8081B	0.679	5.00								
Toxaphene	< 10.0	µg/kg	SW8081B	4.23	10.0								
Surr: Decachlorobiphenyl	6.67	µg/kg	SW8081B			10.00		66.7	25 - 166				
Surr: Tetrachloro-m-xylene	4.24	µg/kg	SW8081B			10.00		42.4	33 - 140				
Lab Sample ID: MB-39947	Date Analyzed:	10/28/2015 1737h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Aroclor 1016	< 25.0	µg/kg	SW8082A	6.92	25.0								

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB-39947	Date Analyzed:	10/28/2015 1737h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Aroclor 1221	< 25.0	µg/kg	SW8082A	11.4	25.0								
Aroclor 1232	< 25.0	µg/kg	SW8082A	16.3	25.0								
Aroclor 1242	< 25.0	µg/kg	SW8082A	6.48	25.0								
Aroclor 1248	< 25.0	µg/kg	SW8082A	2.95	25.0								
Aroclor 1254	< 25.0	µg/kg	SW8082A	7.66	25.0								
Aroclor 1260	< 25.0	µg/kg	SW8082A	6.63	25.0								
Surr: Decachlorobiphenyl	3.23	µg/kg	SW8082A			5.000		64.6	15 - 131				
Surr: Tetrachloro-m-xylene	2.48	µg/kg	SW8082A			5.000		49.6	10 - 124				

MB-39947: Sulfuric acid cleanup method 3665A utilized for this sample.
MB-39966: Gel-Permeation Chromatography (GPC) Cleanup, method 3640A, utilized for this sample.

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001CMS	Date Analyzed:	10/30/2015 2058h											
Test Code: 8081-S-3546	Date Prepared:	10/28/2015 1411h											
4,4´-DDD	20.9	µg/kg-dry	SW8081B	0.839	1.25	12.52	4.99	127	35 - 150				
4,4´-DDE	38.2	µg/kg-dry	SW8081B	0.746	1.25	12.52	15.5	181	50 - 150				1
4,4´-DDT	6.44	µg/kg-dry	SW8081B	0.764	1.25	12.52	0	51.5	10 - 190				
Aldrin	57.0	µg/kg-dry	SW8081B	0.593	1.25	12.52	0	455	34 - 121				1
alpha-BHC	9.55	µg/kg-dry	SW8081B	0.642	1.25	12.52	0	76.3	35 - 124				
alpha-Chlordane	17.2	µg/kg-dry	SW8081B	0.714	1.25	12.52	0	138	50 - 150				
beta-BHC	81.7	µg/kg-dry	SW8081B	0.985	1.25	12.52	0	653	10 - 154				1
delta-BHC	157	µg/kg-dry	SW8081B	0.741	1.25	12.52	0	1,250	40 - 146				1
Dieldrin	9.07	µg/kg-dry	SW8081B	0.685	1.25	12.52	0	72.4	10 - 185				
Endosulfan I	9.97	µg/kg-dry	SW8081B	0.712	1.25	12.52	0	79.6	10 - 164				
Endosulfan II	12.1	µg/kg-dry	SW8081B	0.667	1.25	12.52	0	97.0	10 - 171				
Endosulfan sulfate	88.6	µg/kg-dry	SW8081B	0.790	1.25	12.52	0	708	50 - 150				1
Endrin	13.9	µg/kg-dry	SW8081B	1.12	1.25	12.52	0	111	10 - 157				
Endrin aldehyde	13.6	µg/kg-dry	SW8081B	0.831	1.25	12.52	0	109	10 - 139				
Endrin ketone	7.28	µg/kg-dry	SW8081B	0.809	1.25	12.52	0	58.1	50 - 150				
gamma-BHC	8.25	µg/kg-dry	SW8081B	0.577	1.25	12.52	0	65.9	19 - 126				
gamma-Chlordane	29.6	µg/kg-dry	SW8081B	0.670	1.25	12.52	0	236	31 - 126				1
Heptachlor	123	µg/kg-dry	SW8081B	0.993	1.25	12.52	0	983	10 - 169				1
Heptachlor epoxide	6.30	µg/kg-dry	SW8081B	0.641	1.25	12.52	0	50.3	10 - 195				
Methoxychlor	33.7	µg/kg-dry	SW8081B	0.850	6.26	12.52	0	269	50 - 170				1
Surr: Decachlorobiphenyl	7.97	µg/kg-dry	SW8081B			12.52		63.6	10 - 180				
Surr: Tetrachloro-m-xylene	0	µg/kg-dry	SW8081B			12.52		0	10 - 135				S
Lab Sample ID: 1510553-001BMS	Date Analyzed:	10/28/2015 1912h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Aroclor 1016	988	µg/kg-dry	SW8082A	12.0	43.4	289.6	0	341	12 - 143				1
Aroclor 1260	195	µg/kg-dry	SW8082A	11.5	43.4	289.6	0	67.4	10 - 162				
Surr: Decachlorobiphenyl	4.60	µg/kg-dry	SW8082A			8.687		52.9	10 - 180				

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Jose Rocha
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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510553-001BMS	Date Analyzed:	10/28/2015 1912h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Surr: Tetrachloro-m-xylene	5.01	µg/kg-dry	SW8082A			8.687		57.6	10 - 145				
Lab Sample ID: 1510552-001BMS	Date Analyzed:	10/28/2015 1836h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Aroclor 1016	251	µg/kg-dry	SW8082A	8.71	31.5	209.9	0	120	12 - 143				
Aroclor 1260	128	µg/kg-dry	SW8082A	8.35	31.5	209.9	0	60.9	10 - 162				
Surr: Decachlorobiphenyl	3.43	µg/kg-dry	SW8082A			6.297		54.5	10 - 180				
Surr: Tetrachloro-m-xylene	3.74	µg/kg-dry	SW8082A			6.297		59.4	10 - 145				

[1] - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.
1510552-001BMS: Sulfuric acid cleanup method 3665A utilized for this sample.
1510552-001CMS: Gel-Permeation Chromatography (GPC) Cleanup, method 3640A, utilized for this sample.
1510553-001BMS: Sulfuric acid cleanup method 3665A utilized for this sample.
S - Surrogate outside recovery limits. Minimum method criteria of one surrogate within established recovery limits was met.

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001CMSD	Date Analyzed:	10/30/2015 2117h											
Test Code: 8081-S-3546	Date Prepared:	10/28/2015 1411h											
4,4´-DDD	13.3	µg/kg-dry	SW8081B	0.830	1.24	12.39	4.99	67.5	35 - 150	20.9	44.1	35	@
4,4´-DDE	20.4	µg/kg-dry	SW8081B	0.738	1.24	12.39	15.5	39.5	50 - 150	38.2	60.5	35	¹@
4,4´-DDT	6.08	µg/kg-dry	SW8081B	0.756	1.24	12.39	0	49.1	10 - 190	6.44	5.72	76	
Aldrin	32.0	µg/kg-dry	SW8081B	0.587	1.24	12.39	0	258	34 - 121	57	56.2	18	¹@
alpha-BHC	6.06	µg/kg-dry	SW8081B	0.635	1.24	12.39	0	48.9	35 - 124	9.55	44.7	35	@
alpha-Chlordane	12.0	µg/kg-dry	SW8081B	0.706	1.24	12.39	0	96.7	50 - 150	17.2	36.0	35	@
beta-BHC	46.2	µg/kg-dry	SW8081B	0.975	1.24	12.39	0	373	10 - 154	81.7	55.5	35	¹@
delta-BHC	45.7	µg/kg-dry	SW8081B	0.733	1.24	12.39	0	369	40 - 146	157	110	35	¹@
Dieldrin	8.54	µg/kg-dry	SW8081B	0.678	1.24	12.39	0	68.9	10 - 185	9.07	5.96	19	
Endosulfan I	8.09	µg/kg-dry	SW8081B	0.705	1.24	12.39	0	65.3	10 - 164	9.97	20.8	35	
Endosulfan II	7.17	µg/kg-dry	SW8081B	0.660	1.24	12.39	0	57.9	10 - 171	12.1	51.4	35	@
Endosulfan sulfate	5.56	µg/kg-dry	SW8081B	0.782	1.24	12.39	0	44.9	50 - 150	88.6	176	35	¹@
Endrin	11.0	µg/kg-dry	SW8081B	1.11	1.24	12.39	0	89.1	10 - 157	13.9	22.8	78	
Endrin aldehyde	7.52	µg/kg-dry	SW8081B	0.822	1.24	12.39	0	60.7	10 - 139	13.6	57.8	35	@
Endrin ketone	< 1.24	µg/kg-dry	SW8081B	0.800	1.24	12.39	0	0	50 - 150	7.28	200	35	¹@
gamma-BHC	< 1.24	µg/kg-dry	SW8081B	0.571	1.24	12.39	0	0	19 - 126	8.25	200	14	¹@
gamma-Chlordane	13.4	µg/kg-dry	SW8081B	0.663	1.24	12.39	0	108	31 - 126	29.6	75.3	35	@
Heptachlor	39.9	µg/kg-dry	SW8081B	0.982	1.24	12.39	0	322	10 - 169	123	102	15	¹@
Heptachlor epoxide	6.40	µg/kg-dry	SW8081B	0.634	1.24	12.39	0	51.7	10 - 195	6.3	1.66	35	
Methoxychlor	10.1	µg/kg-dry	SW8081B	0.841	6.19	12.39	0	81.5	50 - 170	33.7	108	35	@
Surr: Decachlorobiphenyl	6.76	µg/kg-dry	SW8081B			12.39		54.6	10 - 180				
Surr: Tetrachloro-m-xylene	0	µg/kg-dry	SW8081B			12.39		0	10 - 135				S
Lab Sample ID: 1510553-001BMSD	Date Analyzed:	10/28/2015 1924h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Aroclor 1016	1,190	µg/kg-dry	SW8082A	12.0	43.4	289.1	0	410	12 - 143	988	18.1	35	¹
Aroclor 1260	219	µg/kg-dry	SW8082A	11.5	43.4	289.1	0	75.7	10 - 162	195	11.5	35	
Surr: Decachlorobiphenyl	5.57	µg/kg-dry	SW8082A			8.673		64.2	10 - 180				

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: GC
QC Type: MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510553-001BMSD	Date Analyzed:	10/28/2015 1924h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Surr: Tetrachloro-m-xylene	17.5	µg/kg-dry	SW8082A			8.673		202	10 - 145				S
Lab Sample ID: 1510552-001BMSD	Date Analyzed:	10/28/2015 1848h											
Test Code: 8082-S-3546	Date Prepared:	10/27/2015 1533h											
Aroclor 1016	375	µg/kg-dry	SW8082A	8.63	31.2	207.8	0	181	12 - 143	251	39.7	35	¹@
Aroclor 1260	169	µg/kg-dry	SW8082A	8.27	31.2	207.8	0	81.2	10 - 162	128	27.6	35	
Surr: Decachlorobiphenyl	4.34	µg/kg-dry	SW8082A			6.234		69.6	10 - 180				
Surr: Tetrachloro-m-xylene	4.48	µg/kg-dry	SW8082A			6.234		71.9	10 - 145				

@ - High RPD due to suspected sample non-homogeneity or matrix interference.
¹ - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.
1510552-001BMSD: Sulfuric acid cleanup method 3665A utilized for this sample.
1510552-001CMSD: Gel-Permeation Chromatography (GPC) Cleanup, method 3640A, utilized for this sample.
1510553-001BMSD: Sulfuric acid cleanup method 3665A utilized for this sample.
S - Surrogate outside recovery limits. Minimum method criteria of one surrogate within established recovery limits was met.

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: MSSV
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-39965	Date Analyzed:	11/02/2015 1623h											
Test Code: 8270-S-3546	Date Prepared:	10/28/2015 1411h											
Acenaphthene	2,620	µg/kg	SW8270D	136	340	5,333	0	49.1	10 - 150				
Benzo(a)pyrene	3,870	µg/kg	SW8270D	141	340	5,333	0	72.5	13 - 114				
Pyrene	2,920	µg/kg	SW8270D	96.6	340	5,333	0	54.8	22 - 167				
Surr: 2,4,6-Tribromophenol	2,770	µg/kg	SW8270D			5,333		51.9	10 - 157				
Surr: 2-Fluorobiphenyl	1,310	µg/kg	SW8270D			2,667		49.2	15 - 103				
Surr: 2-Fluorophenol	2,160	µg/kg	SW8270D			5,333		40.4	10 - 135				
Surr: Nitrobenzene-d5	1,240	µg/kg	SW8270D			2,667		46.4	10 - 145				
Surr: Phenol-d6	2,490	µg/kg	SW8270D			5,333		46.7	10 - 157				
Surr: Terphenyl-d14	1,580	µg/kg	SW8270D			2,667		59.2	10 - 109				

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: MSSV
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB-39965	Date Analyzed:	11/02/2015 1559h											
Test Code: 8270-S-3546	Date Prepared:	10/28/2015 1411h											
1-Methylnaphthalene	< 340	µg/kg	SW8270D	178	340								
2-Methylnaphthalene	< 340	µg/kg	SW8270D	164	340								
Acenaphthene	< 340	µg/kg	SW8270D	136	340								
Acenaphthylene	< 340	µg/kg	SW8270D	129	340								
Anthracene	< 340	µg/kg	SW8270D	86.7	340								
Benz(a)anthracene	< 340	µg/kg	SW8270D	91.6	340								
Benzo(a)pyrene	< 340	µg/kg	SW8270D	141	340								
Benzo(b)fluoranthene	< 340	µg/kg	SW8270D	106	340								
Benzo(g,h,i)perylene	< 340	µg/kg	SW8270D	83.6	340								
Benzo(k)fluoranthene	< 340	µg/kg	SW8270D	149	340								
Chrysene	< 340	µg/kg	SW8270D	82.8	340								
Dibenz(a,h)anthracene	< 340	µg/kg	SW8270D	86.0	340								
Fluoranthene	< 340	µg/kg	SW8270D	86.6	340								
Fluorene	< 340	µg/kg	SW8270D	123	340								
Indene	< 340	µg/kg	SW8270D	153	340								
Indeno(1,2,3-cd)pyrene	< 340	µg/kg	SW8270D	281	340								
Naphthalene	< 340	µg/kg	SW8270D	171	340								
Phenanthrene	< 340	µg/kg	SW8270D	105	340								
Pyrene	< 340	µg/kg	SW8270D	96.6	340								
Surr: 2,4,6-Tribromophenol	997	µg/kg	SW8270D			5,333		18.7	10 - 157				
Surr: 2-Fluorobiphenyl	1,210	µg/kg	SW8270D			2,667		45.3	15 - 103				
Surr: 2-Fluorophenol	1,920	µg/kg	SW8270D			5,333		36.1	10 - 135				
Surr: Nitrobenzene-d5	1,060	µg/kg	SW8270D			2,667		39.6	10 - 145				
Surr: Phenol-d6	2,260	µg/kg	SW8270D			5,333		42.3	10 - 157				
Surr: Terphenyl-d14	1,600	µg/kg	SW8270D			2,667		60.1	10 - 109				

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: J.U.B. Engineers
Contact: Paul Taylor
Lab Set ID: 1510552
Dept: MSSV
Project: Great Salt Lake Marina / 55-15-019
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001DMS	Date Analyzed:	11/02/2015 1843h											
Test Code: 8270-S-3546	Date Prepared:	10/28/2015 1411h											
Acenaphthene	8,520	µg/kg-dry	SW8270D	498	1,250	19,540	0	43.6	31 - 113				
Benzo(a)pyrene	12,900	µg/kg-dry	SW8270D	517	1,250	19,540	0	65.8	38 - 169				
Pyrene	9,050	µg/kg-dry	SW8270D	354	1,250	19,540	0	46.3	31 - 150				
Surr: 2,4,6-Tribromophenol	9,660	µg/kg-dry	SW8270D			19,540		49.4	10 - 237				
Surr: 2-Fluorobiphenyl	4,180	µg/kg-dry	SW8270D			9,771		42.7	17 - 179				
Surr: 2-Fluorophenol	6,930	µg/kg-dry	SW8270D			19,540		35.5	10 - 186				
Surr: Nitrobenzene-d5	4,190	µg/kg-dry	SW8270D			9,771		42.9	10 - 166				
Surr: Phenol-d6	7,990	µg/kg-dry	SW8270D			19,540		40.9	10 - 194				
Surr: Terphenyl-d14	4,680	µg/kg-dry	SW8270D			9,771		47.9	10 - 265				

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: MSSV
QC Type: MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001DMSD	Date Analyzed:	11/02/2015 1905h											
Test Code: 8270-S-3546	Date Prepared:	10/28/2015 1411h											
Acenaphthene	10,300	µg/kg-dry	SW8270D	512	1,280	20,080	0	51.3	31 - 113	8520	18.9	35	
Benzo(a)pyrene	14,900	µg/kg-dry	SW8270D	531	1,280	20,080	0	74.2	38 - 169	12900	14.7	35	
Pyrene	10,800	µg/kg-dry	SW8270D	364	1,280	20,080	0	54.0	31 - 150	9050	18.0	35	
Surr: 2,4,6-Tribromophenol	11,100	µg/kg-dry	SW8270D			20,080		55.3	10 - 237				
Surr: 2-Fluorobiphenyl	4,930	µg/kg-dry	SW8270D			10,040		49.1	17 - 179				
Surr: 2-Fluorophenol	8,270	µg/kg-dry	SW8270D			20,080		41.2	10 - 186				
Surr: Nitrobenzene-d5	4,660	µg/kg-dry	SW8270D			10,040		46.4	10 - 166				
Surr: Phenol-d6	9,230	µg/kg-dry	SW8270D			20,080		46.0	10 - 194				
Surr: Terphenyl-d14	5,430	µg/kg-dry	SW8270D			10,040		54.0	10 - 265				

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: MSVOA
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS VOC-3 102715A Date Analyzed: 10/27/2015 1410h													
Test Code: 8260-S													
1,1,1-Trichloroethane	17.9	µg/kg	SW8260C	0.169	2.00	20.00	0	89.6	52 - 153				
1,1-Dichloroethene	14.6	µg/kg	SW8260C	0.557	2.00	20.00	0	73.2	36 - 184				
1,2-Dichlorobenzene	15.1	µg/kg	SW8260C	0.109	2.00	20.00	0	75.5	52 - 135				
1,2-Dichloroethane	18.5	µg/kg	SW8260C	0.199	2.00	20.00	0	92.6	62 - 149				
1,2-Dichloropropane	18.3	µg/kg	SW8260C	0.124	2.00	20.00	0	91.3	56 - 139				
Benzene	17.3	µg/kg	SW8260C	0.0675	2.00	20.00	0	86.7	50 - 155				
Chlorobenzene	16.0	µg/kg	SW8260C	0.129	2.00	20.00	0	79.8	57 - 140				
Chloroform	17.6	µg/kg	SW8260C	0.127	2.00	20.00	0	87.8	55 - 131				
Ethylbenzene	15.6	µg/kg	SW8260C	0.168	2.00	20.00	0	78.0	49 - 152				
Isopropylbenzene	16.2	µg/kg	SW8260C	0.123	2.00	20.00	0	80.8	55 - 167				
Methyl tert-butyl ether	18.9	µg/kg	SW8260C	0.0757	2.00	20.00	0	94.3	35 - 157				
Methylene chloride	18.3	µg/kg	SW8260C	0.264	5.00	20.00	0	91.3	32 - 185				
Naphthalene	14.0	µg/kg	SW8260C	0.118	2.00	20.00	0	69.9	40 - 148				
Toluene	14.4	µg/kg	SW8260C	0.133	2.00	20.00	0	72.2	56 - 140				
Trichloroethene	14.5	µg/kg	SW8260C	0.128	2.00	20.00	0	72.4	51 - 154				
Xylenes, Total	44.7	µg/kg	SW8260C	0.445	2.00	60.00	0	74.5	49 - 152				
Surr: 1,2-Dichloroethane-d4	52.7	µg/kg	SW8260C			50.00		105	51 - 170				
Surr: 4-Bromofluorobenzene	50.7	µg/kg	SW8260C			50.00		101	60 - 144				
Surr: Dibromofluoromethane	51.5	µg/kg	SW8260C			50.00		103	60 - 145				
Surr: Toluene-d8	51.8	µg/kg	SW8260C			50.00		104	60 - 140				

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Jose Rocha
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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: MSVOA
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB VOC-3 102715A Date Analyzed: 10/27/2015 1451h													
Test Code: 8260-S													
1,1,1-Trichloroethane	< 2.00	µg/kg	SW8260C	0.169	2.00								
1,1,2,2-Tetrachloroethane	< 2.00	µg/kg	SW8260C	0.128	2.00								
1,1,2-Trichloro-1,2,2-trifluoroethane	< 2.00	µg/kg	SW8260C	0.777	2.00								
1,1,2-Trichloroethane	< 2.00	µg/kg	SW8260C	0.143	2.00								
1,1-Dichloroethane	< 2.00	µg/kg	SW8260C	0.137	2.00								
1,1-Dichloroethene	< 2.00	µg/kg	SW8260C	0.557	2.00								
1,2,4-Trichlorobenzene	< 2.00	µg/kg	SW8260C	0.178	2.00								
1,2-Dibromo-3-chloropropane	< 5.00	µg/kg	SW8260C	0.259	5.00								
1,2-Dibromoethane	< 2.00	µg/kg	SW8260C	0.139	2.00								
1,2-Dichlorobenzene	< 2.00	µg/kg	SW8260C	0.109	2.00								
1,2-Dichloroethane	< 2.00	µg/kg	SW8260C	0.199	2.00								
1,2-Dichloropropane	< 2.00	µg/kg	SW8260C	0.124	2.00								
1,3-Dichlorobenzene	< 2.00	µg/kg	SW8260C	0.158	2.00								
1,4-Dichlorobenzene	< 2.00	µg/kg	SW8260C	0.150	2.00								
2-Butanone	< 10.0	µg/kg	SW8260C	1.73	10.0								
2-Hexanone	< 5.00	µg/kg	SW8260C	0.282	5.00								
4-Methyl-2-pentanone	< 5.00	µg/kg	SW8260C	0.284	5.00								
Acetone	< 10.0	µg/kg	SW8260C	4.28	10.0								
Benzene	< 2.00	µg/kg	SW8260C	0.0675	2.00								
Bromodichloromethane	< 2.00	µg/kg	SW8260C	0.125	2.00								
Bromoform	< 2.00	µg/kg	SW8260C	0.129	2.00								
Bromomethane	< 5.00	µg/kg	SW8260C	0.615	5.00								
Carbon disulfide	< 2.00	µg/kg	SW8260C	0.225	2.00								
Carbon tetrachloride	< 2.00	µg/kg	SW8260C	0.221	2.00								
Chlorobenzene	< 2.00	µg/kg	SW8260C	0.129	2.00								
Chloroethane	< 2.00	µg/kg	SW8260C	0.679	2.00								
Chloroform	< 2.00	µg/kg	SW8260C	0.127	2.00								
Chloromethane	< 5.00	µg/kg	SW8260C	0.121	5.00								

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Lab Set ID: 1510552
Project: Great Salt Lake Marina / 55-15-019

Contact: Paul Taylor
Dept: MSVOA
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB VOC-3 102715A Date Analyzed: 10/27/2015 1451h													
Test Code: 8260-S													
cis-1,2-Dichloroethene	< 2.00	µg/kg	SW8260C	0.181	2.00								
cis-1,3-Dichloropropene	< 2.00	µg/kg	SW8260C	0.137	2.00								
Cyclohexane	< 2.00	µg/kg	SW8260C	0.346	2.00								
Dibromochloromethane	< 2.00	µg/kg	SW8260C	0.105	2.00								
Dichlorodifluoromethane	< 2.00	µg/kg	SW8260C	0.143	2.00								
Ethylbenzene	< 2.00	µg/kg	SW8260C	0.168	2.00								
Isopropylbenzene	< 2.00	µg/kg	SW8260C	0.123	2.00								
Methyl Acetate	< 5.00	µg/kg	SW8260C	2.77	5.00								
Methyl tert-butyl ether	< 2.00	µg/kg	SW8260C	0.0757	2.00								
Methylcyclohexane	< 2.00	µg/kg	SW8260C	0.177	2.00								
Methylene chloride	< 5.00	µg/kg	SW8260C	0.264	5.00								
Naphthalene	< 2.00	µg/kg	SW8260C	0.118	2.00								
Styrene	< 2.00	µg/kg	SW8260C	0.147	2.00								
Tetrachloroethene	< 2.00	µg/kg	SW8260C	0.140	2.00								
Toluene	< 2.00	µg/kg	SW8260C	0.133	2.00								
trans-1,2-Dichloroethene	< 2.00	µg/kg	SW8260C	0.392	2.00								
trans-1,3-Dichloropropene	< 2.00	µg/kg	SW8260C	0.137	2.00								
Trichloroethene	< 2.00	µg/kg	SW8260C	0.128	2.00								
Trichlorofluoromethane	< 2.00	µg/kg	SW8260C	0.281	2.00								
Vinyl chloride	< 1.00	µg/kg	SW8260C	0.0954	1.00								
Xylenes, Total	< 2.00	µg/kg	SW8260C	0.445	2.00								
Surr: 1,2-Dichloroethane-d4	56.9	µg/kg	SW8260C			50.00		114	51 - 170				
Surr: 4-Bromofluorobenzene	50.0	µg/kg	SW8260C			50.00		99.9	60 - 144				
Surr: Dibromofluoromethane	52.8	µg/kg	SW8260C			50.00		106	60 - 145				
Surr: Toluene-d8	49.8	µg/kg	SW8260C			50.00		99.7	60 - 140				

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QA Officer

QC SUMMARY REPORT

Client: J.U.B. Engineers
Contact: Paul Taylor
Lab Set ID: 1510552
Dept: MSVOA
Project: Great Salt Lake Marina / 55-15-019
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001AMS Date Analyzed: 10/27/2015 1715h													
Test Code: 8260-S													
1,1,1-Trichloroethane	18.6	µg/kg-dry	SW8260C	0.213	2.52	25.21	0	73.7	20 - 144				
1,1-Dichloroethene	17.0	µg/kg-dry	SW8260C	0.702	2.52	25.21	0	67.5	24 - 174				
1,2-Dichlorobenzene	14.7	µg/kg-dry	SW8260C	0.137	2.52	25.21	0	58.5	10 - 148				
1,2-Dichloroethane	16.5	µg/kg-dry	SW8260C	0.251	2.52	25.21	0	65.5	54 - 133				
1,2-Dichloropropane	16.4	µg/kg-dry	SW8260C	0.156	2.52	25.21	0	65.1	28 - 140				
Benzene	16.9	µg/kg-dry	SW8260C	0.0851	2.52	25.21	0	67.2	17 - 138				
Chlorobenzene	16.8	µg/kg-dry	SW8260C	0.163	2.52	25.21	0	66.6	13 - 150				
Chloroform	16.5	µg/kg-dry	SW8260C	0.160	2.52	25.21	0	65.5	21 - 147				
Ethylbenzene	17.5	µg/kg-dry	SW8260C	0.212	2.52	25.21	0	69.6	10 - 164				
Isopropylbenzene	18.7	µg/kg-dry	SW8260C	0.155	2.52	25.21	0	74.3	26 - 146				
Methyl tert-butyl ether	17.0	µg/kg-dry	SW8260C	0.0954	2.52	25.21	0	67.4	28 - 137				
Methylene chloride	17.3	µg/kg-dry	SW8260C	0.333	6.30	25.21	0	68.8	10 - 217				
Naphthalene	12.1	µg/kg-dry	SW8260C	0.149	2.52	25.21	0	48.2	13 - 156				
Toluene	14.9	µg/kg-dry	SW8260C	0.168	2.52	25.21	0	59.1	23 - 168				
Trichloroethene	17.1	µg/kg-dry	SW8260C	0.161	2.52	25.21	0	67.8	14 - 161				
Xylenes, Total	52.4	µg/kg-dry	SW8260C	0.561	2.52	75.62	0	69.3	10 - 160				
Surr: 1,2-Dichloroethane-d4	73.0	µg/kg-dry	SW8260C			63.02		116	51 - 170				
Surr: 4-Bromofluorobenzene	61.2	µg/kg-dry	SW8260C			63.02		97.2	60 - 144				
Surr: Dibromofluoromethane	65.9	µg/kg-dry	SW8260C			63.02		105	60 - 145				
Surr: Toluene-d8	60.3	µg/kg-dry	SW8260C			63.02		95.6	50 - 138				

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QC SUMMARY REPORT

Client: J.U.B. Engineers
Contact: Paul Taylor
Lab Set ID: 1510552
Dept: MSVOA
Project: Great Salt Lake Marina / 55-15-019
QC Type: MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1510552-001AMSD Date Analyzed: 10/27/2015 1736h													
Test Code: 8260-S													
1,1,1-Trichloroethane	22.1	µg/kg-dry	SW8260C	0.209	2.47	24.70	0	89.7	20 - 144	18.6	17.6	35	
1,1-Dichloroethene	20.0	µg/kg-dry	SW8260C	0.688	2.47	24.70	0	81.1	24 - 174	17	16.4	35	
1,2-Dichlorobenzene	17.3	µg/kg-dry	SW8260C	0.135	2.47	24.70	0	70.2	10 - 148	14.7	16.1	35	
1,2-Dichloroethane	19.3	µg/kg-dry	SW8260C	0.246	2.47	24.70	0	78.2	54 - 133	16.5	15.7	35	
1,2-Dichloropropane	19.9	µg/kg-dry	SW8260C	0.153	2.47	24.70	0	80.8	28 - 140	16.4	19.5	35	
Benzene	21.0	µg/kg-dry	SW8260C	0.0834	2.47	24.70	0	84.9	17 - 138	16.9	21.4	35	
Chlorobenzene	20.4	µg/kg-dry	SW8260C	0.159	2.47	24.70	0	82.7	13 - 150	16.8	19.6	35	
Chloroform	20.4	µg/kg-dry	SW8260C	0.157	2.47	24.70	0	82.6	21 - 147	16.5	21.1	35	
Ethylbenzene	21.9	µg/kg-dry	SW8260C	0.208	2.47	24.70	0	88.8	10 - 164	17.5	22.3	35	
Isopropylbenzene	22.2	µg/kg-dry	SW8260C	0.152	2.47	24.70	0	90.0	26 - 146	18.7	17.1	35	
Methyl tert-butyl ether	20.1	µg/kg-dry	SW8260C	0.0935	2.47	24.70	0	81.4	28 - 137	17	16.8	35	
Methylene chloride	21.1	µg/kg-dry	SW8260C	0.326	6.18	24.70	0	85.3	10 - 217	17.3	19.4	35	
Naphthalene	12.3	µg/kg-dry	SW8260C	0.146	2.47	24.70	0	49.8	13 - 156	12.1	1.25	35	
Toluene	18.2	µg/kg-dry	SW8260C	0.164	2.47	24.70	0	73.7	23 - 168	14.9	20.0	35	
Trichloroethene	20.7	µg/kg-dry	SW8260C	0.158	2.47	24.70	0	84.0	14 - 161	17.1	19.3	35	
Xylenes, Total	61.5	µg/kg-dry	SW8260C	0.550	2.47	74.11	0	83.0	10 - 160	52.4	15.9	35	
Surr: 1,2-Dichloroethane-d4	67.8	µg/kg-dry	SW8260C			61.76		110	51 - 170				
Surr: 4-Bromofluorobenzene	59.5	µg/kg-dry	SW8260C			61.76		96.3	60 - 144				
Surr: Dibromofluoromethane	62.4	µg/kg-dry	SW8260C			61.76		101	60 - 145				
Surr: Toluene-d8	58.7	µg/kg-dry	SW8260C			61.76		95.1	50 - 138				

American West Analytical Laboratories

5 Day Rush

OL: D

WORK ORDER Summary

Work Order: **1510552** Page 1 of 1

Client: J.U.B. Engineers Due Date: 11/3/2015

Client ID: WALKIN **Contact:** Paul Taylor

Project: **Great Salt Lake Marina / 55-15-019** **QC Level:** II+ WO Type: Standard

Comments: 5 Day Rush - samples taken to ALS for Herbs & Organophosphorous Pests. Call client when report is available, he will give credit card #;

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
1510552-001A	**GSL**	10/27/2015 1015h	10/27/2015 1330h	**8260-S**	Soil		voC	1
				Test Group: 8260-S-AWAL; # of Analytes: 49 / # of Surr: 4				
1510552-001B				**3546-PCBS-PR**			Walkin-PCB	
				8082-S-3546			Walkin-PCB	
				Test Group: 8082-S-PCB-3546; # of Analytes: 7 / # of Surr: 2				
1510552-001C				**3546-PEST-PR**			Walkin-Pest	
				8081-S-3546			Walkin-Pest	
				Test Group: 8081-S-Pest-3546; # of Analytes: 22 / # of Surr: 2				
1510552-001D				**3546-SVOA-PR**			Walkin-Semi	
				8270-S-3546			Walkin-Semi	
				Test Group: 8270-S-PNA-3546; # of Analytes: 19 / # of Surr: 6				
1510552-001E				**3051A-ICPMS-PR**			DF-Metals	2
				6020-S			DF-Metals	
				12 SEL Analytes: SB AS BE CD CR CU PB NI SE AG TL ZN				
				HG-S-7471B			DF-Metals	
				HG-S-PR-B			DF-Metals	
				PMOIST			DF-Metals	
1510552-001F				**OUTSIDE LAB**			ALS	

Printed: 10/28/2015 FOR LABORATORY USE ONLY [fill out on page 1]: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ HOK_____ HOK_____ HOK_____ COC Emailed_____

American West Analytical Laboratories

3440 S. 700 W. Salt Lake City, UT 84119
Phone # (801) 263-8686 Toll Free # (888) 263-8686
Fax # (801) 263-8687 Email awal@awal-labs.com
www.awal-labs.com

CHAIN OF CUSTODY

1510552

AWAL Lab Sample Set #

Page _____ of _____

All analysis will be conducted using NELAP accredited methods and all data will be reported using AWAL's standard analyte lists and reporting limits (PQL) unless specifically requested otherwise on this Chain of Custody and/or attached documentation.

QC Level: 1 2 (2+) 3 3+

Turn Around Time: 1 2 3 4 (5) Stnd

Unless other arrangements have been made, signed reports will be emailed by **5:00 pm** on the day they are due.

Due Date: 11/3

Client: J·U·B Engineers
Address: 466 N. 900 W
Kaysville Utah
Contact: Paul Taylor
Phone #: 801·547·0393 Cell #: 801·725·4701
Email: ptaylor@jub.com
Project Name: Great Salt Lake Marina
Project #: 55·15·019
PO #:
Sampler Name: Paul Taylor

☐ Report down to the MDL
☐ Include EDD:
☐ Lab Filter for:
☐ Field Filtered For:

For Compliance With:
☐ NELAP
☐ RCRA
☐ CWA
☐ SDWA
☐ ELAP / A2LA
☐ NLLAP
☐ Non-Compliance
☐ Other:

	Sample ID:	Date Sampled	Time Sampled	# of Containers	Sample Matrix	PP Metals	PCBs	Pest	Herb	Organophosphorus Pest	PAHs	Volatiles				Known Hazards & Sample Comments
1	GSL-1	10·27·15	10:15	1	S	✓	✓	✓	✓	✓	✓	✓				
2	GSL-2	10·27·15	10:15	1	S											
3	GSL-3	10·27·15	10:15	1	S											
4	GSL-4	10·27·15	10:15	1	S											
5	GSL-5	10·27·15	10:15	1	S											
6	GSL-6	10·27·15	10:15	1	S											
7	GSL-7	10·27·15	10:15	1	S											
8	GSL-8	10·27·15	10:15	1	S											
9																
10																
11																
12																

Laboratory Use Only

Samples Were:
1 Shipped or hand delivered
2 Ambient or Chilled
3 Temperature 3.8 °C
4 Received Broken/Leaking (Improperly Sealed) Y (N)
5 Properly Preserved (Y) N Checked at bench
6 Received Within Holding Times (Y) N

COC Tape Was:
1 Present on Outer Package Y N (NA)
2 Unbroken on Outer Package Y N (NA)
3 Present on Sample Y N (NA)
4 Unbroken on Sample Y N (NA)

Discrepancies Between Sample Labels and COC Record? Y (N)

Relinquished by: Signature	Paul J. Taylor	Date: 10·27·15	Received by: Signature	Erika Hayward	Date: 10/27/15
Print Name:	Paul J. Taylor	Time: 13:30	Print Name:	Erika Hayward	Time: 1330
Relinquished by: Signature		Date:	Received by: Signature		Date:
Print Name:		Time:	Print Name:		Time:
Relinquished by: Signature		Date:	Received by: Signature		Date:
Print Name:		Time:	Print Name:		Time:
Relinquished by: Signature		Date:	Received by: Signature		Date:
Print Name:		Time:	Print Name:		Time:

Special Instructions: