2016 Lake Limerick Dredging: Final Report

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

October 8th, 2016

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Project Summary

Marine Industrial Construction, LLC (MIC) performed the 2016 Lake Limerick dredging in July to September of 2016. This included mobilizing equipment to the project site and dredging with a MudCat dredge to clear bio-muck from Kings Cove and Cranberry Cove. The removal of sediment exposed cobble for habitat; allowed future transport of sediment to downstream locations in the lake; and improved access to docks and other facilities. The bio-muck consisted of very fine silt sediments with high amounts of organics. The material, over 5000 cy of in situ sediments, were pumped to geo textile dewatering bags (located at Log Toy Park) with polymer based flocculants to increase dewatering and compaction of sediments. MIC trucked the sediments to Kennedy quarry where it will be used for fill materials in reclamation projects. In October, MIC demobilized equipment and restored Log Toy Park to complete the project.

Major data collections indicated:

- Over 5,000 c.y. of very fine sediment deposited over well graded cobbles. Depth of sediments averaged 3.5 feet in depth (more at some locations and deeper at others)
- Aquatic plants encountered during dredging were: 1) nominal in upper stream tributary locations, 2) moderately and submerged at tributary / lake confluences and 3) consisted of thicker aquatics matt in deeper lake locations
- Substrate encounters were: 1) upstream locations large cobble at surface (nominal sediments), 2) mid-stream tributary channel fine silts (2 to 3.5 feet) with underlying moderate sized cobble, 3) tributary / lake interface with small woody debris and fine sediments (3.5 to 4 feet) underlying hard rocks and cobble, and 4) deeper lake locations fine sediment and some sands, periodic large woody debris and pockets of large quantities of small woody debris (variable 3 to 4 foot plus depth) underlying hard substrate (unknown materials expected rock, cobble and/or some clays).
- In situ lake sediment had very high water content and the resulting compaction and dewatered sediments were over 5:1.
- Sediment densities average roughly 1789 lbs / c.y.
- Equipment was demobilized by October 7, 2018

Reporting

Detailed reporting was completed before the project began outlining the methods and approach (submittals and pre project engineering), daily and weekly updates and status reporting, water quality reporting, and post dredging maps and transects.

Restoration

Log Toy Park was the primary project site (excluding the in-lake dredging locations). There were impacts to the site from the dewatering activities and MIC has restored the site with cleaning activities, additional/new aggregate for the parking lot, replacement plants (if needed) and reseeded the grass. All

anthropogenic material removed during the dredging (ropes, a piece of siding, etc.) were brought to WCP for appropriate disposal. Four loads of ¾ inch minus gravel were placed on the parking lot and the road, spread and packed. The replanting (scheduled with LLCC) will be completed in March of 2017 with hydro-seeding the area.

Appendix A. Paper Summarizing Project - Dredging for Success

Attached

Dredging for Success:
Lake Limerick, Washington

By Joe Bernert[1], Rob Plotnikof[2], Brian Smith[3], Kelly Evans[4] and Harry Gibbons[5]

Lake Limerick is located in western Washington north of Olympia. The lake (143 acres) is a manmade lake constructed in 1966. A golf community is located around the lake with numerous amenities in Mason County, WA (near Shelton, WA; Figure 1). In addition to the nine-hole golf course, the community has over 1,100 homes and recreational lots, a country club, 3 boat ramps and parks for recreational use. Several recreational activities take place on the lake including native and stocked fishing (Trout), swimming, paddle boarding, kayaking and other boating. The lake and the primary tributaries are salmon and steelhead bearing streams. The community has land use controls and collects fees for managing the lake. For several decades Lake Limerick has had a research Limnologist reviewing the lake (Harry Gibbons at Tetra Tech) and planning/advising weed control, fisheries and water quality.

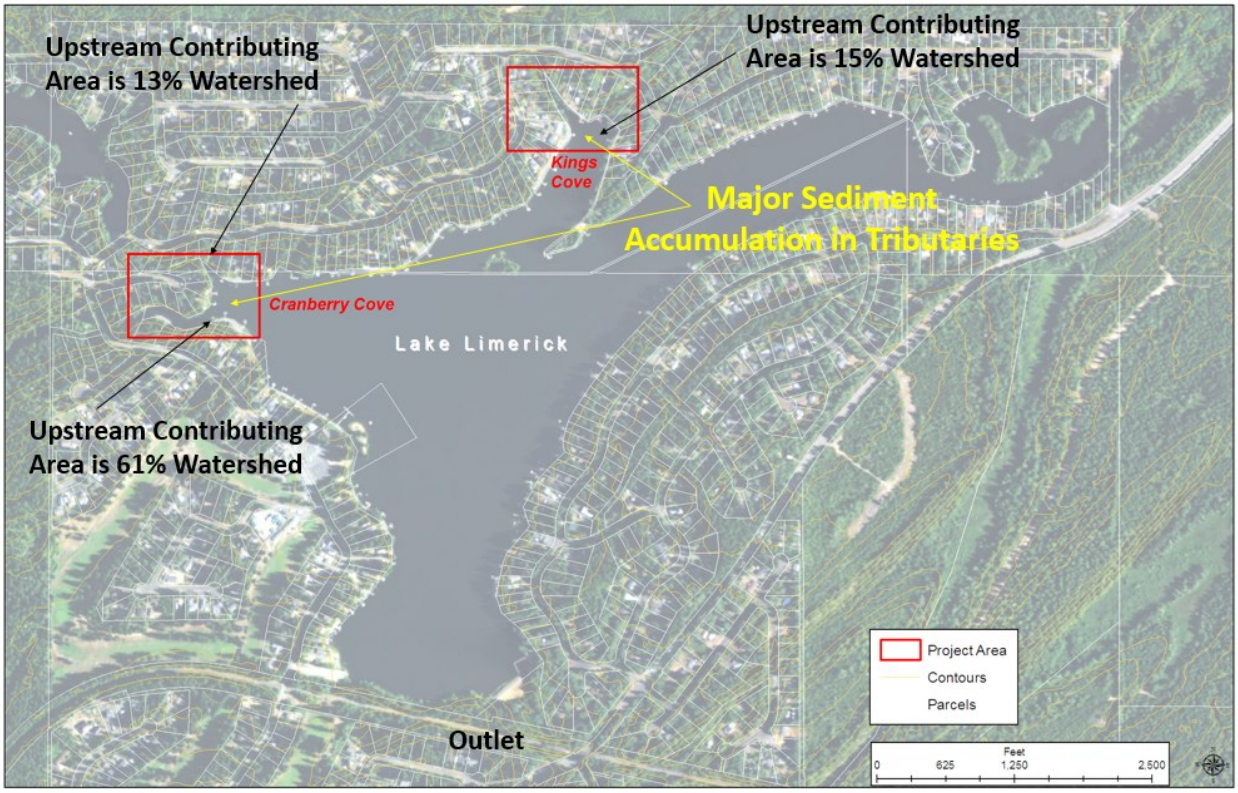


Figure 1. Lake Limerick and project locations.

[1] Joe Bernert is a compliance officer at Marine Industrial Construction, LLC in Wilsonville, Oregon.
[2] Rob Plotnifkof is an a Senior Aquatic Ecologist at Tetra Tech, Seattle, Washington
[3] Brian Smith, AICP is the project manager for Lake Limerick on the dredging project
[4] Kelly Evans is the president of Lake Limerick Country Club
[5] Harry Gibbons, PhD. Is a limnologist at Tetra Tech, Seattle, Washington

The sediments are variable but overall the sediments are fine silts and decomposed organic material (Figure 2). Overall the majority of the material passed a US Standard sieve # 230 indicating very fine materials. Minor components of fine sands are present, with occasional small woody debris and some cobble near the bottom of the original lake/stream bed. Preliminary assessment at Lake Limerick has found that this sediment has accumulated within the lake but is particularly deeper deposits in the primary tributaries of Beaver Creek and Cranberry Creek. Over 89% of the watershed area is coming from Cranberry Creek, Leprechaun Creek, Beaver Creek and the Unnamed Creek in Kings Cove (5,764 acres).

Figure 2. Sediments from dredging.

Many lakes in the United States have not been historically dredged and have numerous factors that have accelerated sedimentation that include invasive aquatic weed decomposition; upland erosion from agriculture, forest and urban land uses; natural geologic conditions (such as landslides, etc.) Fine sediment (organics and colloidal) can be problematic for fisheries habitat by clogging potential spawning gravels. Additionally, the sediment is limiting boat access and creates turbidity in some of the shallowest sections in the lake. Wind, boating and other uses mobilize the sediments creating water quality issues as well. Dredging, if holistically approached, can be a long-term and effective solution with benefits for fisheries and other habitat, as well as for recreational users.

The State of Washington and other agencies regulate dredging activities. Mechanical dredges (clamshells and excavators) or specialized hydraulic dredges are often used to remove lake sediments to increase depth and to eliminate nutrient-rich sediments. Dredging may control rooted aquatic vegetation, deepen the water body, and increase lake volume. By removing nutrient-rich sediment, dredging projects typically improve water quality. However, dredging can also have some issues including the re-suspension of sediments during the work and potential destruction of habitat. Dredging can be expensive due to specialized equipment, permitting and disposal, so it is important to have an effective plan.

A Plan to Dredge

The Lake Limerick Team, which was composed of local land owners, consulting scientists (from Tetra Tech and other environmental consultants), worked jointly with Mason County, Washington Department of Fish and Wildlife and the Squaxin tribe to obtain the appropriate permits for dredging and to develop a plan for successful implementation. This included dredging only the bio-muck (the fine sediments), and aquatics vegetation that trapped the sediments. In many locations aquatic weeds were serving as sediment traps and when boats passed near the weeds elevated turbidity would be noted (see Figure 3).

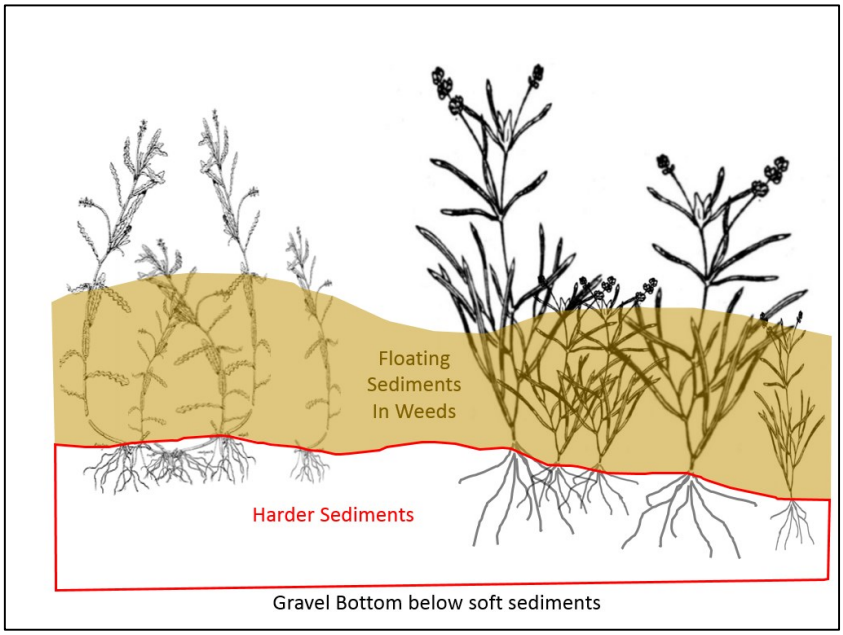


Figure 3. Aquatic Weeds trapping sediments.

The project pan selected a hydraulic / suction dredge to minimize turbidity, and ease of deployment (mobilization). The primary dredging is for approximately 3,000 to 6,000 cubic yards of in lake sediment and dead aquatic weed materials (bio-muck) out of the lake. The material rests on the lake bottom, has a blanket thickness of approximately 1 to 5 feet in depth and a water content generally of 75 to 90 percent. The bio-muck is principally composed of silt, sand and dead soft-stemmed aquatic weed material. Minor amounts of woody branches from trees, and minor amounts of small gravel and pieces of litter were also encountered. The bio-muck rests on the lake bed and tributary streams which has a significantly greater density of native soil materials (including gravel and cobble) sharply contrasting with the bio-muck. Total depth of water – bio-muck column within the work area generally ranges from 1 foot to 5 feet.

The purpose of the dredging design was to: 1) improve habitat (removing an average 3 to 4 feet of fine sediment on top of gravels and cobble), 2) improve recreation access to docks, 3) remove muck that

aquatic weeds are rooting in, and 4) pathway to assist on mobilizing future sedimentation into deeper locations in the lake.

Sediments

The nature of the sediments influences the project significantly and the lake managers and contractors need to analyze the materials to determine appropriate dredging methods. Hard sediments require cutter heads able to penetrate whereas softer sediments need to be able to mobilize the fines into the intake.

The Equipment

One of the first decisions for the dredging was the specific equipment. Hydraulic or suction dredging has many advantages to mechanical approaches using clamshells or excavators in lake dredging. Mechanical approaches are better with coarser and harder sediments, ability to work in tight areas, significant amounts of debris or distant disposal locations. Hydraulic dredges are typically preferred in shallower deposit, when pumping distances are relatively short in distance. The main way to compare dredges is to evaluate the pump capacity and this is typically determined by the pump intake/outtake diameter.

Figure 4. MudCat dredge deployed at Lake Limerick.

The dredging contract for the project was with Marine Industrial Construction, LLC (MIC) that had three hydraulic dredge pumps available for the project. The systems are:

- **MudCat** - Primarily used in shallow muddy (soft) sediments which uses a rotating head and a 100 Horsepower pump with 6" / 8" pump at 2000 gallons a minute (pictured in Figure 4).
- **Toyo 150 DP** – Submersible pump with 150 Horsepower Electric pump powered with a high pressure jet ring with a 10 Inch discharge pipe and 3200 gallon per minute.
- **DragFlow 300 HY** with excavator and high pressure ring – 10/12" diameter pump powered by a dedicated hydraulic power unit and roughly 4000 gallons per minute rate.

Below are the comparisons of the pumps capabilities for dredging.

Specification	MudCat	Toyo 150B	DragFlow 300 HY
Estimate C.Y. per hour	50 to 120	100 to 200	300 to 500
Pump Rate (gal/min)	2000 g/min	3200 g/min	4000 g/min
Sediment size Capabilities	Fine grain sediments – Silts to Sands (fine Gravels) (3" Max.)	Silts/Sand to Fine Gravels (5" Max)	Clays, Silts/Sand to Coarse Gravels/Cobble (5" Max)
Average % solids	10 to 30	20 to 40 (max near 70)	20 to 40 (max near 70)
Maximum Depth (feet)	18	70 feet	120 Feet
Turbidity / WQ impacts	Low turbidity	Very low turbidity	Low turbidity
Water Jets / Excavators	None / None	High Pressure Jets	High Pressure Jets & Side Excavators
Powered	Self Power (GM6V71) – 250 HP	External Cummins Generator (QSX) 500 HP	External Hydraulic Power Unit (750 HP)
Fuel Consumption	50 gallons / hour	100 gallons / hour	150 gallons / hour
Labor Required	Operator and Assistant	PEO Operator, Mate and Assistant	PEO Operator, Mate and Assistant
Set Up Labor	Additional Mate	Additional Mate/Skipper	Additional Mate/Skipper
Equipment	Small Tug, Skiff	Crane Barge/Excavator, Tugboat and Barge	Crane Barge/Excavator, Tugboat and Barge
Pipe required	As defined to disposal	As defined to disposal	As defined to disposal
Relative Costs	Low Cost	Moderate Cost	Moderate to higher

The MudCat was determined to be the best option for this project because of fine muddy sediments, lower cost to mobilize and set up. MIC worked on dredging Lake Limerick in summer of 2016 using this horizontal auger suction dredge for 20 days of dredging. MIC used anchors in the lake (a combination of 150 pound Danforth with an additional 300 pound concrete anchors so no additional heavy equipment was required.). In very soft sediments, the dredge could be positioned with a propulsion system (i.e. an outboard motor).

Dredging Methods

The dredging materials were pumped into dewatering geosynthetic bags to drain for transport to an offsite disposal site to be used as fill. The geotextile bags are very effective dewatering system and the

effluent is clean enough to be returned to the source. Additionally, a flocculent polymer based system was used to speed up dewatering in the bags. The systems of the dewatering bags and polymers created faster drainage, dryer sludge, more compaction, better retention, cleaner filtrate and reduced hauling and disposal costs.

Tracking the volumes during dredging is important to know how the project is proceeding. Volumes were tracked with multiple methods during the project. This is important so all parties know the project status. Since the work is underwater and not easy to see, multiple methods of quality control were implemented and reported (daily and in detail weekly). One primary way is for the operator to track the distances covered (using GPS and shore side measurements) determined the area covered and the depth removed. The depth was tracked with logs from the cutter head depth and lead line soundings (Figure 5). Sloughing was evaluated based on the nature of the materials and observed conditions (of slope angles and field measures). Pre-dredge, spot checked depths and post-dredge surveys were also used to evaluate the volumes. The dredged material on shore in the dewatering bags were also evaluated for volume. Field measures were performed to determine the reduction in volume from water content, compaction, and sediment densities for refining estimates. Hours of production dredging, sampled sediment concentration were also used to bound volume estimates. At Lake Limerick the dredging volume was roughly 5,000 c.y. in situ in the lake and about 1,000 cy of compacted dried material from the de-watering bags. This was hauled to a local gravel mine where it was used for fill in restoration projects.

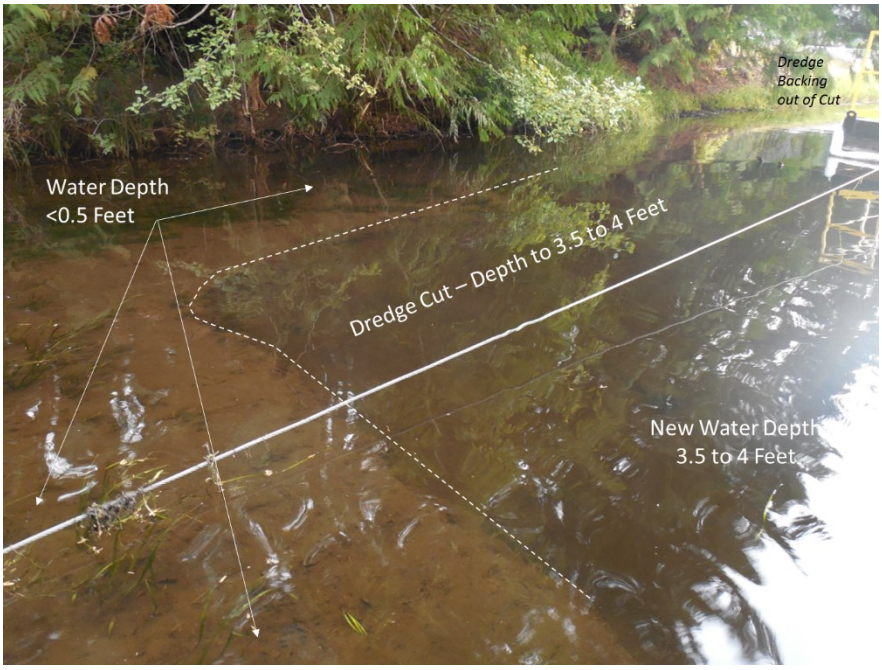


Figure 5. Photo of recently dredged area with MudCat at Lake Limerick.

Water Quality and Compliance

Overall the water quality conditions at Lake Limerick are good. There are very low turbidities in the lake under normal circumstances. However, localized elevated turbidity are common when boats or other activities occur in the deep fine sediments which have accumulated in tributaries and locations in the lake. A turbidity curtain was placed around the work area to maintain lake water quality. The lake is mesotrophic and typically has Total Phosphorus is around 9 ug/L. It is expected that the majority of the total phosphorus is from the sediments on the lake bottom. The removal of these sediment should improve water quality. The turbidities are monitored during dredging operations for compliance above the dredging in the tributary, below the dredge (roughly 150 feet and inside the turbidity curtain) for an early warning site, and 300 feet below the work (outside the turbidity curtain). The references/background turbidity above the dredge never was more than 5 NTUs above the early warning site and on average was 1.6 NTU higher (Figure 6). This is not surprising given the nature of the MudCat's cutter head (Figure 7). The dredge is designed to minimize the potential for creating water quality issues.

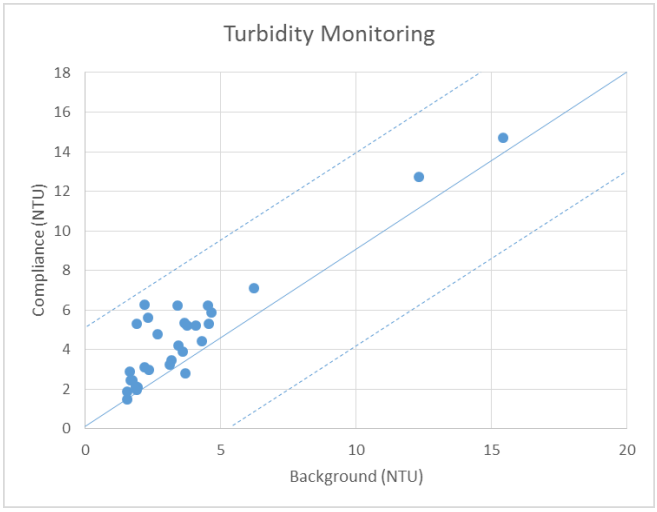


Figure 7. MudCat cutter head configuration.

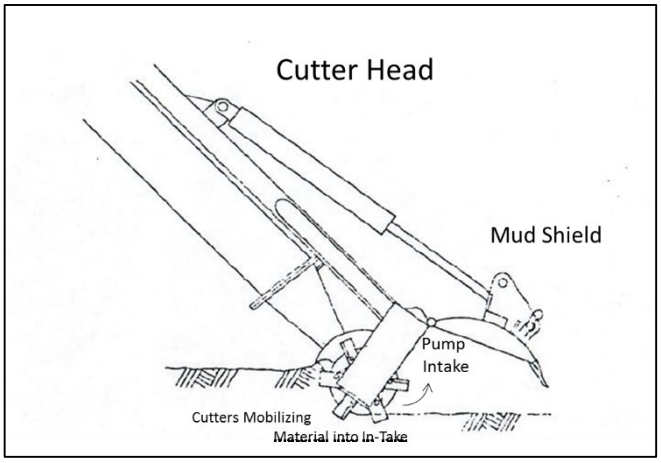


Figure 6. Field Turbidly (NTUs) above and below dredging.

Disposal

In water disposal is typically the least costly solution but not always a good long term cumulative solution since sediments will most likely be mobilized to another location over time. At the disposal site one of the major considerations related to cost is to have the shortest pipe lengths. Longer lengths require having booster pumps to get material moved, barges for floating equipment and additional labor and fuel for equipment.

On this project the disposal site was off site so the dredged material was pumped into dewatering bags and then trucked offsite (Figure 7). The dewatering water was drained back into the lake after flowing through an additional silt fence.

Controlling Costs

One of the major issues on a dredging project on a lake is controlling cost. The costs are typically broken into the following major costs:

- Mobilization and Demobilization of equipment and supplies to site
- Dredging Costs (typically bid as a cost per cubic yard)
- Disposal Costs

All activities that can reduce costs and meet the major objectives should be incorporated since this is beneficial for the entire team. Obstacles and issues create costs and need to be identified and minimized whenever possible. Some of the major Obstacles are:

Figure 8. Matt Fobert (Supervisor) standing by dewatering bag.

1. Anthropogenic material (wood, ground cloth, tires, metal, etc.). Overall Lake Limerick was a very clean (compared to other dredging MIC has competed). Some small woody debris (most likely from failed upstream beaver dams) was present but only limited production slightly.
2. Rocks and large cobble (> 2" in particular). These are difficult to mobilize in a smaller dredge pump. This is also an indication we are near the bottom material and better habitat and we ceased dredging in this material. At Lake Limerick dredging stopped at these depth and assisted in minimizing costs.
3. Aquatic weeds – various aquatics weeds were encountered including:
    a. Live rooted weeds with sediment
    b. Dead weed matts

From the dredger's perspective what is key for determining the most cost effective dredging options are to use the correct equipment and match the labor resources. The best options optimizes the equipment so it is typically the smallest and easiest to get on site, the most fuel efficient, able to perform the job within the time lines and has no compliance (environmental, nuisance [typically noise], etc.) or other issues.

Dredging Options for Lake Managers

There are many ways to set up a dredging contract. Lake Managers needs to determined options that meet their objectives and can ensure cost effective option proposed by vendors. There are two primary component to dredging projects: the design and permitting phase and the deployment/work phase. The work can be done internally and/or can be contracted to external firm and companies. Each approach has advantages and disadvantages.

In- House Dredging

There are hosts of small dredges that are available from contractors or suppliers to perform the work. In house approaches requires typically purchasing and/or renting a dredge; or having an external company complete the work. Small used dredges can be purchased from $200,000 to over a million. Many options are available and outlined below.

		Impellor In-take for Pump				
Dredging Companies / Options	References / Examples	4 inch	6 Inch	8 Inch	10 Inch	12 Inch
Dredging Supply Company	http://www.dscdredge.com			Morary, Badger	Barracuda	Barracuda
Liquid Waste Technology	http://www.lwtpithog.com					
Mud Cat Division/Ellicott	http://www.lwtdredge.com		MudCat 100	MudCat 727, MudCat 815	MudCat2010 , 920, 745	
SRS Crisafulli	http://www.crisafulli.com	Rotomite SD-110, RD-75	Rotomite 6000			
VMI Inc.	http://www.vmi-dredges.com	MD-415	MD-615	MDX-827CS, MD-815	MDX-1027CS	MDX-1227CS
Ellicot	http://www.dredge.com			360-SL8	370 HP . 460 SL-10	
IMS Dredges	http://www.imsdredge.com				Versi-5012	Versi-5012
Keene Engineering	http://keeneeng.com	Configuration	Configuration			
Dredge Pumps - Submersible	Toyo, DragFlow, EddyPump, SMP Pumps, Piranha, Godwin, etc.					
Dredge Pumps	Thomas, Metso, Peirce, Xylem, etc.					

Contracting

The contracting approach provides the results and burden on someone else whereas in some cases equipment configured for a project can be effective if people cannot assume the responsibility on permit compliance, and performing the work.

Most typically, projects are divided between costs associated with mobilization and demobilization, dredging costs (per c.y.) and disposal. Mobilization costs are lowest typically for firms with less travel and smaller equipment (easier to transport). Dredging costs are typically fixed price or based on a per yardage production. There are many ways to measure the dredging volume. The most common is the difference from a pre-dredge and post dredge survey (in situ). The nature of the sediments can drive the costs and methods and needs to be carefully considered. Other options is measurement of yardage at the disposal (if it is visible).

Future Consideration for Projects

It is very important to allocate enough time for the project since this impact the project design and deployment. For instance, many jobs are constrained by environmental factors such as fish windows, access and other reasons. Having enough time allows smaller crew deployments with smaller less costly equipment (significantly less set up time). At Lake Limerick we designed the project with only a fork lift in the field a limited used of a truck mounted crane. Using a larger dredge would have required several days of crane rentals, larger boats (portable tugs), portable barges configured on site with spuds, etc. which all would have added costs in equipment and labor. However, sometimes, time constrains require this to meet the objectives and need larger equipment.

At Lake Limerick, we primarily used a 3 man crew onsite during the project. This includes the dredge operator (running the MudCat), an on-site supervisor/lead and Quality Control (assisting on the dredge and dewatering activities, performed sampling and routine monitoring and tended pipe), and a third person at the dewatering site)tending the flocculent system, walking the dewatering bags [encourages liquid release], maintaining temporary erosion and sediment control and related activities).

Larger equipment requires more trucking (or water transport) to sites, larger crane and/or specialize equipment to launch and maintain. However, larger equipment can perform work more quickly. Therefore having enough time in a project can allow more cost effective solutions.

The Geotextile Bags worked effective at dewatering and obtaining sediment. However, this is a significant cost increase for the project compared to upland and/or in-water disposal.

It is estimated that the disposal site was roughly 30% of the budget and if this was a simpler disposal would have been able to dredge twice as much material (since mobilization and set up is a major components of a dredging project.

Acknowledgements

The authors would like to thanks the follow people who help design, review and ensure the success of the project: Margie Bigelow, Habitat Biologist, Washington Department of Fish and Wildlife, Grace Miller, Planning Lead, Mason County and Sarah Zaniewski, Fisheries Biologist, Squaxin Island Tribe and the residents and land owners at Lake Limerick. The MIC project team was Matt Fobert, Michael Eakin, Eric Hittle and Steve Godsil.

Appendix B. Post Dredging Maps and Transect

Attached

2016 Lake Limerick Dredging

Engineering & Project Design/Deployment

Marine Industrial Construction, LLC

September 20th, 2016 Version

SHEET INDEX

PROJECT NOTES

Coordinates are Washington State Plane South, International Feet, NAD 1983, NAVD88 Vertical Control

PROJECT DESCRIPTION

2016 Dredging Project for Lake Limerick. Hydraulic / suction dredging of approximately 5,000 cubic yards of in situ sediment and dead aquatic weed materials (bio-muck) out of Lake Limerick, Mason County, WA (near Shelton, WA).

PROJECT TEAM

MIC TEAM MEMBER
Michael Eakin, Lead Estimator
Colleen Evan, Project Support – Administrative Support
Matt Fobert, Supervisor
Tom McCauley, Marine Manager
Dave Bernert, P.E. – President & Technical Review
Joe Bernert, Quality Control & Technical Review

LAKE LIMERICK COUNTRY CLUB
Kelly Evans, President
Brian Smith, AICP
Joe Castelluccio

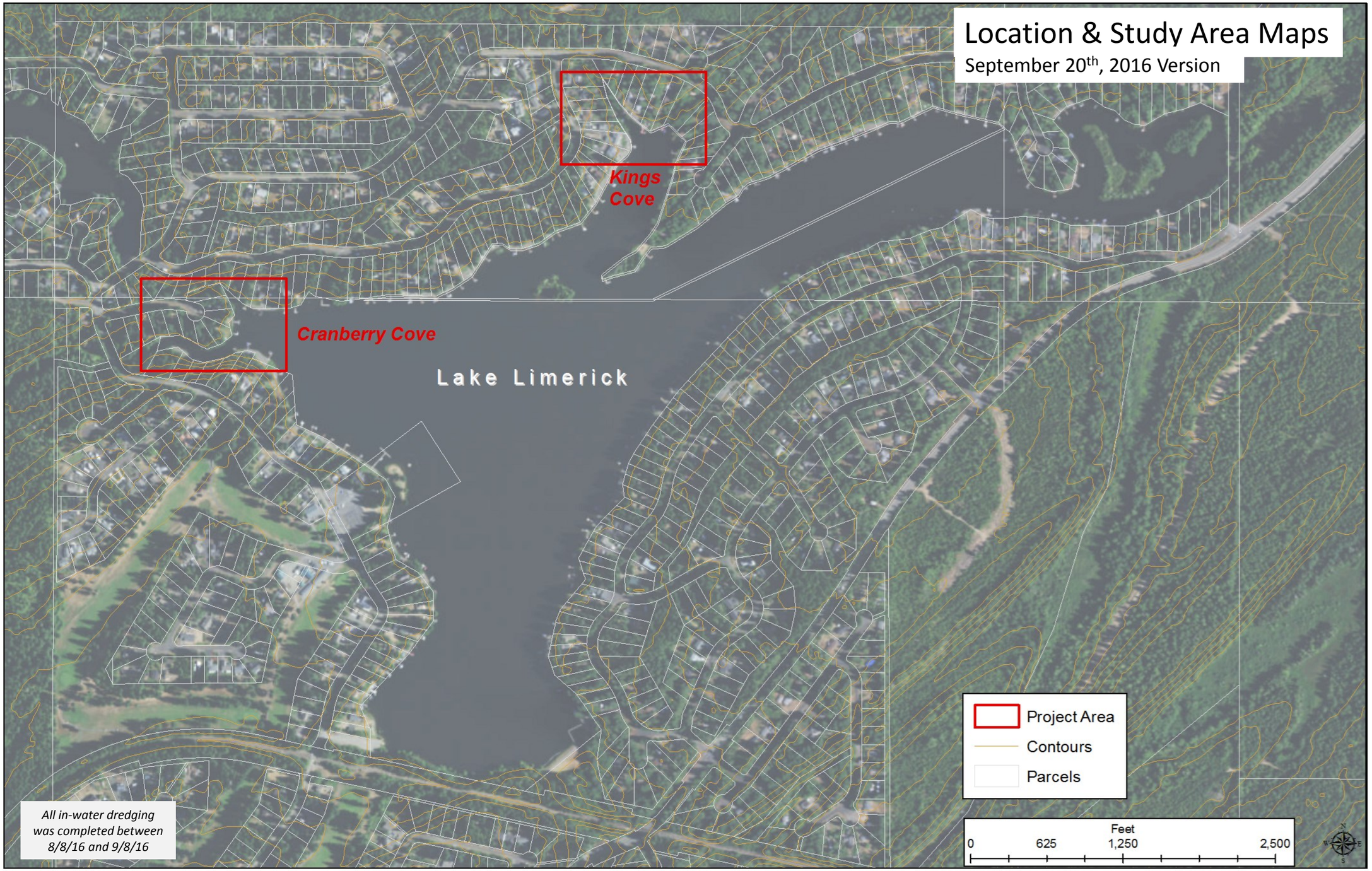
LAKE LIMERICK TEAM
Rob Plotnikoff (Tetra Tech)
Harry Gibbons (Tetra Tech)
Margaret Bigelow (WDFW)

VICINITY MAP

Lake Limerick Country Club Dredging Project 2016		Sheet Contents: **Cover Sheet & Index**	Sheet Number: 1 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: MMB Date: 9/20/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Location & Study Area Maps

September 20th, 2016 Version



All in-water dredging was completed between 8/8/16 and 9/8/16

PROJECT NOTES

Project permit conditions were outlined in detail in the following project specifications:

1. Permit Environmental Conditions Lake Limerick Dredging.
2. Habitat Management Plan (HMP) dated May, 2015
3. Washington Ecology Shoreline / Mason County Permit SHR2013-00003
4. State of Washington Fish and Wildlife Hydraulic Project Approval HEP - 2015-6-527+01
5. Dredge Materials Management Program (DMMP)including Corp, Washington Ecology Department of Natural Resources, and United States Environmental Protection Agency (EPA).
6. Dewatering in accordance with Fish & Wildlife Habitat Conservation Area for project.

Disposal to Log Toy Park with de-watering and staging. The Log Toy Park had temporary erosion and sediment control and turbidity curtains deployed.

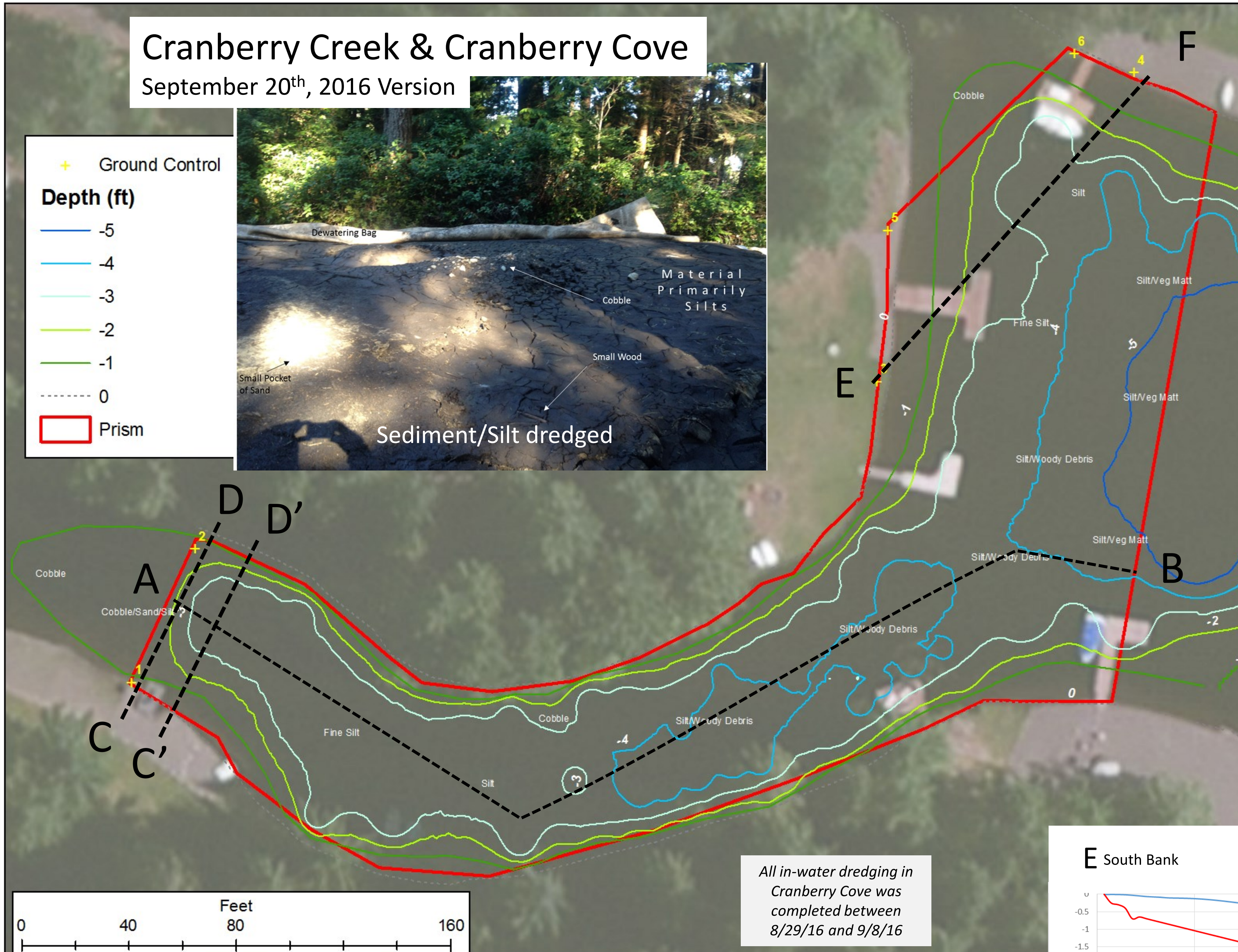
The work was completed with the defined Work Window for the Project: July 15, 2016 to September 10, 2016. Disposal at Kennedy Quarry, Shelton, WA.

Additional information on the Project is available in weekly reports and Daily Construction Reports.

Lake Limerick Country Club	**Lake Limerick** Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Lake Limerick & Project Area**	Sheet Number: 2 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: MMB Date: 9/20/16	**Marine Industrial Construction, LLC** http://marineindust.com/	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

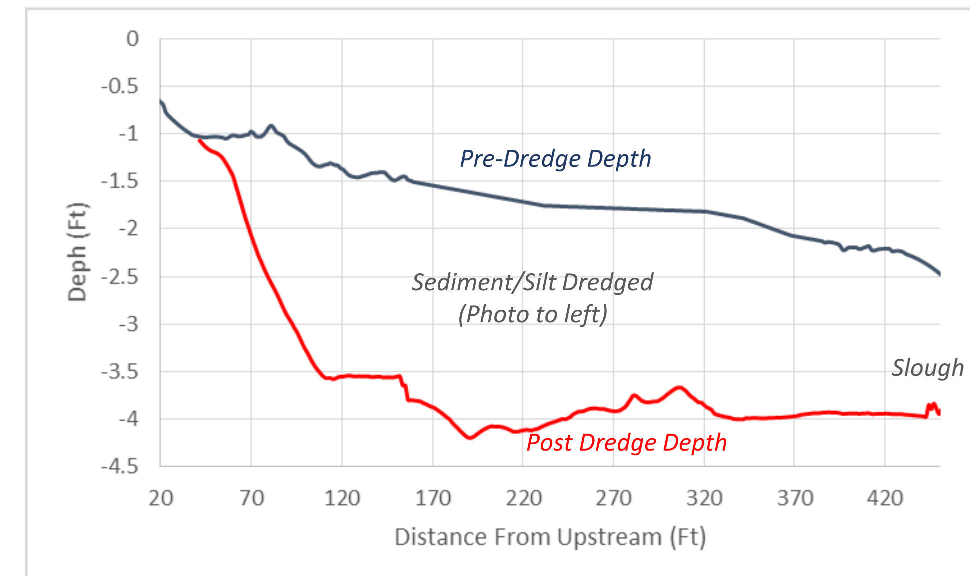
Cranberry Creek & Cranberry Cove

September 20th, 2016 Version



Thalweg Transect Cranberry Creek

A Upstream Creek to Lower Creek to Lake B

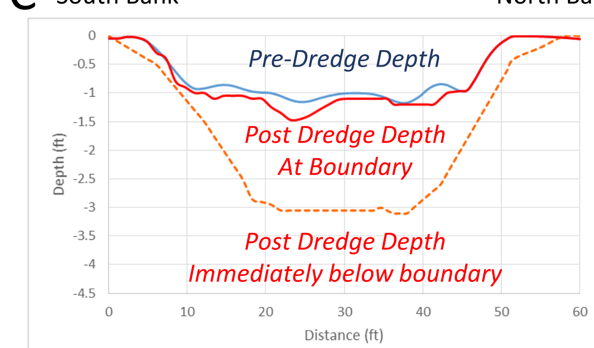


Monitoring Station Cross Section Profiles

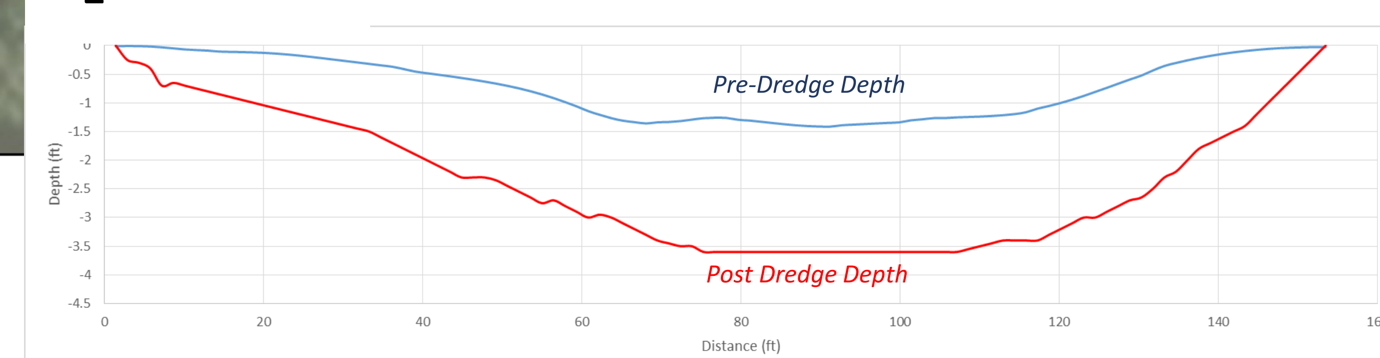
C South Bank North Bank D

Cranberry Monitoring Station

Significant cobble noted at site and dredging stopped below with major sloughing. Second transect immediately downstream (dashed lined)



E South Bank North Bank F



PROJECT NOTES

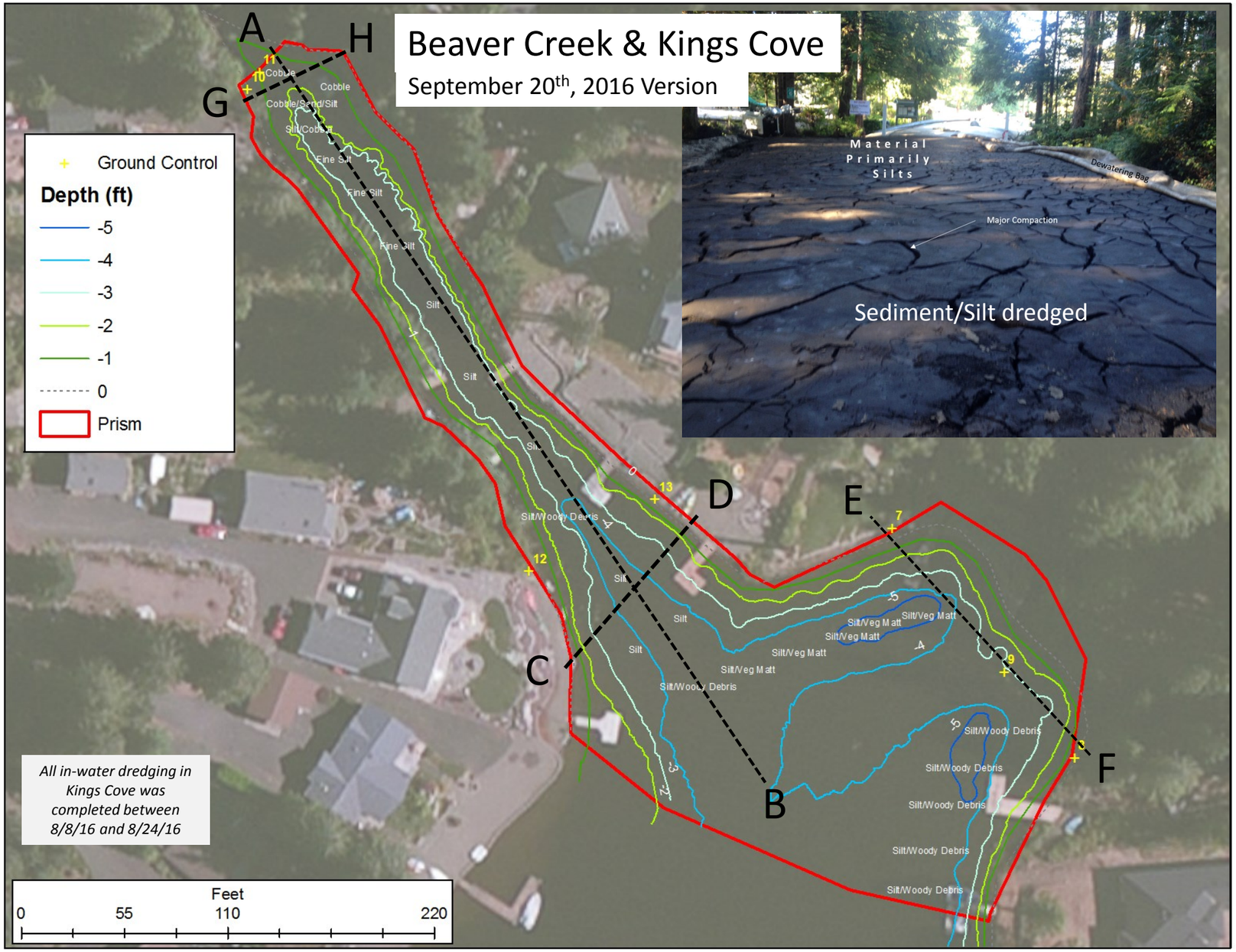
Survey data was collected September 12, 2016 and combined with dredging logs (sediment encountered noted on map). Post dredging substrate was moderate to large round cobble (minor amounts of fine sediments in near shore locations expected to slough with higher flows). Sediments removed were very fine sand and silt. Average sediment depths of 2.5 to 3 feet were removed.

Project permit conditions under the Mason County Environmental Permit (MEP) included the generation of a detailed topographic - bathymetric transect profile(s). All In water work completed by 9/10/16.

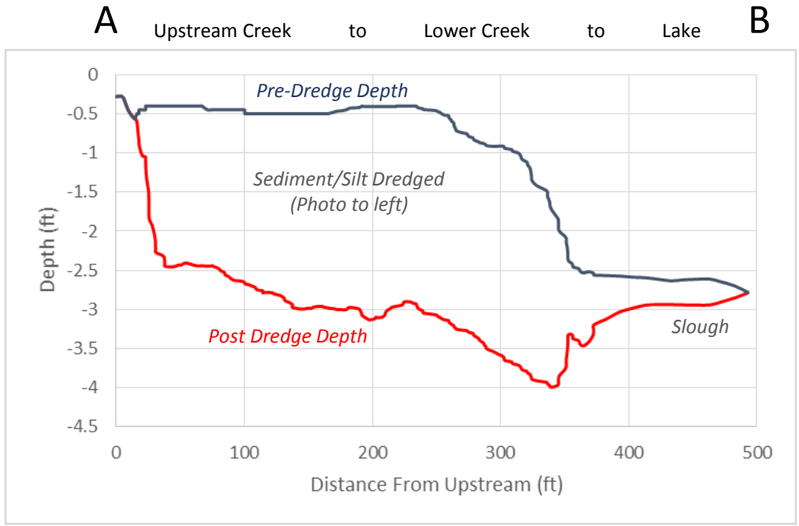
Lake Limerick Country Club Dredging Project 2016	Sheet Contents: **Cranberry Creek & Cove**	Sheet Number: 3 of 10 Project Number: 2016-101	Scale: Noted on Maps Compiled By: JAB Review By: MMB Date: 9/20/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Beaver Creek & Kings Cove

September 20th, 2016 Version

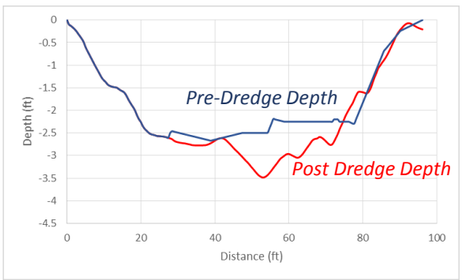


Thalweg Transect Kings Cove

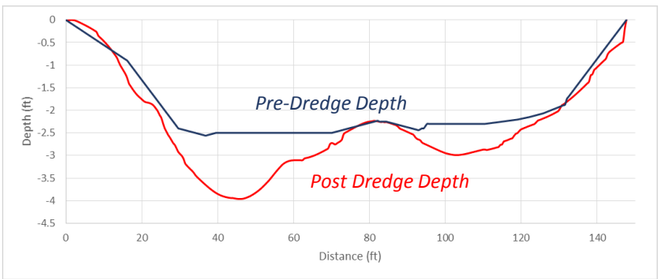


Monitoring Station Cross Section Profiles

C West Bank — East Bank D



E West Bank — East Bank F



PROJECT NOTES

Survey data was collected September 12, 2016 and combined with dredging logs (sediment encountered noted on map). Post dredging substrate was moderate to large round cobble (minor amounts of fine sediments in near shore locations expected to slough with higher flows). Sediments removed were very fine sand and silt . Average sediment depths of 3 to 4 feet were removed.

Project permit conditions under the Mason County Environmental Permit (MEP) included the generation of a detailed topographic - bathymetric transect profile(s). The above survey was completed within one week of completion of dredging operations. The transect was a profile (adjusted to same stage as pre-survey) through the thalweg (and respective long term monitoring locations). All In water work completed by 9/10/16.

Lake Limerick Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Beaver Creek & Kings Cove**	Sheet Number: 4 of 10 Project Number: 2016-101	Scale: Noted on Maps Compiled By: JAB Reviewed By: MMB Date: 9/20/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Appendix C. Water Quality Data Collections / Results

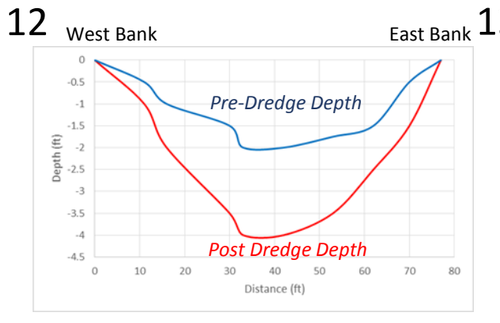
Attached

Supplemental Ground Control and Transect(s)

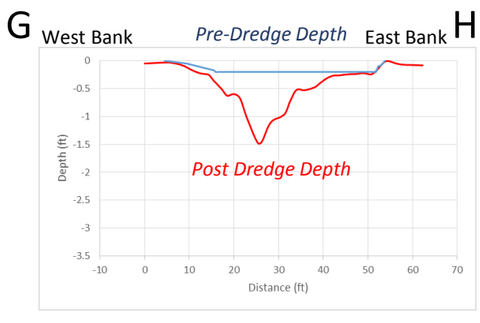
September 20th, 2016 Version

ID	Location	Bank	Latitude	Longitude	Address	Name	Location	Northing	Easting
1	Cranberry	RB	47.286583	-123.054984	100 E Shannon Pl.	CRANBERRY COVE DELTA AREA	EDGE	722579	1006413
2	Cranberry	LB	47.286722	-123.054895	1030 E St Andrews Dr.	CRANBERRY COVE DELTA AREA	EDGE	722629	1006437
3	Cranberry	RB	47.286916	-123.053879	121 E. Shannon Place	LEPRECHAUN CREEK DELTA AREA	LONG TERM GRADE MONITOR BASE LINE	722692	1006691
4	Cranberry	LB	47.287241	-123.053508	120 E. Way Tipperary Street	LEPRECHAUN CREEK DELTA AREA	LONG TERM GRADE MONITOR BASE LINE	722807	1006787
5	Cranberry	RB	47.287071	-123.053870	121 E. Shannon Place	LEPRECHAUN CREEK DELTA AREA	UPSTREAM DREDGE LIMIT	722748	1006696
6	Cranberry	LB	47.287258	-123.053598	120 E. Way Tipperary Street	LEPRECHAUN CREEK DELTA AREA	UPSTREAM DREDGE LIMIT	722814	1006765
7	Kings	RB	47.289973	-123.044249	1970 E. St Andrews Drive	KINGS COVE, UN-NAMED CREEK DELTA AREA	LONG TERM GRADE MONITOR BASE LINE	723729	1009116
8	Kings	LB	47.289646	-123.043841	50 E. Tregaron Court	KINGS COVE, UN-NAMED CREEK DELTA AREA	LONG TERM GRADE MONITOR BASE LINE	723606	1009214
9	Kings	CENTER	47.289768	-123.043999	In Lake	KINGS COVE, UN-NAMED CREEK DELTA AREA	DREDGE LIMIT	723652	1009176
10	Kings	RB	47.290584	-123.045663	570 E. Way to Tipperary St	KINGS COVE --- BEAVER CREEK DELTA AREA	UP STREAM DREDGE LIMIT	723963	1008773
11	Kings	LB	47.290610	-123.045638	1880 E. St. Andrews Drive	KINGS COVE --- BEAVER CREEK DELTA AREA	UP STREAM DREDGE LIMIT	723972	1008779
12	Kings	RB	47.289893	-123.045026	530 E. Way to Tipperary St	KINGS COVE --- BEAVER CREEK DELTA AREA	LONG TERM GRADE MONITOR BASE LINE	723706	1008923
13	Kings	LB	47.290004	-123.044760	1950 E. St. Andrews Drive	KINGS COVE --- BEAVER CREEK DELTA AREA	LONG TERM GRADE MONITOR BASE LINE	723744	1008990
C	Kings	RB	47.289748	-123.044936	Lot 63	KINGS COVE --- BEAVER CREEK DELTA BELOW MONITORING	SUPPLEMENTAL LOCATION	723652	1008943
D	Kings	LB	47.289977	-123.044665	Lot 75	KINGS COVE --- BEAVER CREEK DELTA BELOW MONITORING	SUPPLEMENTAL LOCATION	723733	1009013
B	Kings	Downstream	47.289564	-123.044497	In Lake	KINGS COVE --- BOTTOM DREDGED AREA	SUPPLEMENTAL LOCATION	723582	1009050
A	Kings	Upstream	47.290642	-123.045605	In Stream	KINGS COVE --- BEAVER CREEK TOP BOUNDARY	SUPPLEMENTAL LOCATION	723983	1008788
A	Cranberry	Upstream	47.286663	-123.054944	In Stream	CRANBERRY CREEK	SUPPLEMENTAL LOCATION	722608	1006424
C'	Cranberry	LB	47.286530	-123.054934	100 E Shannon Pl.	CRANBERRY CREEK	SUPPLEMENTAL LOCATION	722559	1006425
D'	Cranberry	RB	47.286747	-123.054795	1030 E St Andrews Dr.	CRANBERRY CREEK	SUPPLEMENTAL LOCATION	722637	1006462
B	Cranberry	Downstream	47.286736	-123.053481	In Lake	CRANBERRY COVE DELTA AREA	SUPPLEMENTAL LOCATION	722623	1006788
Inside	Cranberry	In Lake	47.286743	-123.053668	In Lake	CRANBERRY CREEK	SUPPLEMENTAL LOCATION	722627	1006742
Outside	Cranberry	In Lake	47.286475	-123.054394	In Lake	CRANBERRY CREEK	SUPPLEMENTAL LOCATION	722535	1006558

Monitoring Station Cross Section Profile
Kings Cove Delta Location



Additional Cross Section Profile
Upstream Location



Coordinates are Washington State Plane South, International Feet, NAD 1983, NAVD88 Vertical Control.

Locations were verified with high resolution GPS (Trimble Geo 7 on tripod mount with Zephyr Antenna and a Trimble GeoExplorer XH). Both provide real-time sub foot (<30 cm) accuracy to identify exact locations for support QC measures. This is used with either a built in Trimble laser (+/- 0.26 foot accuracy) and/or a Laser Technology TruPulse Range Finder (+/- 1) foot accuracy).

Trimble's TerraSync and Pathfinder Office were used for processing real time planning and data conversion and differential correction.

ArcGIS (including 3D and Spatial Analyst), Excel and Access were used for data processing, graphics and map generation.

Lake Limerick Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Supplemental Ground Control**	Sheet Number: 5 of 10 Project Number: 2016-101	Scale: Noted on Maps Compiled By: JAB Reviewed By: MMB Date: 9/20/16	**Marine Industrial Construction, LLC** 10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Lake Limerick Water Quality Samples

Date	Sample	Site	Time	Depth (ft)	Turbidity (NTU)	Temp. C	Probe / Meter	Sample Type
8/8/2016	1	Background	1:35	2.35	6.25	21.25	Horiba U53	Sample
8/8/2016	1	Early Warning	1:44	1.80	8.28	22.40	Horiba U53	Sample
8/8/2016	1	Compliace	1:48	2.10	7.12	22.35	Horiba U53	Sample
8/9/2016	2	Background	11:35	2.40	3.67	20.70	Horiba U53	Sample
8/9/2016	2	Early Warning	11:36	2.30	5.96	20.70	Horiba U53	Sample
8/9/2016	2	Compliace	11:40	2.10	5.33	20.70	Horiba U53	Sample
8/9/2016	3	Background	2:35	2.10	4.56	21.20	Horiba U53	Sample
8/9/2016	3	Early Warning	2:44	2.40	6.32	21.20	Horiba U53	Sample
8/9/2016	3	Compliace	2:55	2.30	5.32	21.20	Horiba U53	Sample
8/10/2016	4	Background	11:00	2.50	3.75	20.50	Horiba U53	Sample
8/10/2016	4	Early Warning	11:05	2.40	4.67	20.50	Horiba U53	Sample
8/10/2016	4	Compliace	11:15	2.40	5.21	20.50	Horiba U53	Sample
8/10/2016	5	Background	3:05	2.20	4.55	20.90	Horiba U53	Sample
8/10/2016	5	Early Warning	3:10	2.60	4.06	20.90	Horiba U53	Sample
8/10/2016	5	Compliace	3:15	2.50	6.22	20.90	Horiba U53	Sample
8/11/2016	6	Background	11:00	2.50	12.32	20.50	LaMotte 2020WE	Grab
8/11/2016	6	Early Warning	11:05	2.40	15.24	20.50	LaMotte 2020WE	Grab
8/11/2016	6	Compliace	11:15	2.40	12.73	20.50	LaMotte 2020WE	Grab
8/11/2016	7	Background	3:05	2.20	15.44	20.90	LaMotte 2020WE	Grab
8/11/2016	7	Early Warning	3:10	2.60	16.22	20.90	LaMotte 2020WE	Grab
8/11/2016	7	Compliace	3:15	2.50	14.72	20.90	LaMotte 2020WE	Grab
8/15/2016		Background	11:00	2.00	15.67	20.80	Horiba U53	Sample - Recalibrate
8/15/2016	8	Background	11:05	2.20	3.46	20.90	LaMotte 2020WE	Grab
8/15/2016	8	Early Warning	11:15	2.10	4.12	20.90	LaMotte 2020WE	Grab
8/15/2016	8	Compliace	11:29	2.30	4.22	20.90	LaMotte 2020WE	Grab
8/15/2016	9	Background	3:12	2.20	4.67	21.50	LaMotte 2020WE	Grab
8/15/2016	9	Early Warning	3:22	2.30	5.21	21.50	LaMotte 2020WE	Grab
8/15/2016	9	Compliace	3:29	2.40	5.88	21.50	LaMotte 2020WE	Grab
8/16/2016		Calibration	11:00	N.A.	12.50	N.A.	LaMotte 2020WE	Calibration 10 NTU Standard - Blank Scan
8/16/2016	10	Background	11:00	2.00	4.30	21.40	LaMotte 2020WE	Grab
8/16/2016	10	Early Warning	11:05	2.00	4.50	21.40	LaMotte 2020WE	Grab

8/16/2016	10	Compliace	11:12	2.00	4.40	21.40	LaMotte 2020WE	Grab
8/16/2016	11	Background	2:25	2.00	4.10	21.90	LaMotte 2020WE	Grab
8/16/2016	11	Early Warning	2:30	2.00	5.80	21.90	LaMotte 2020WE	Grab
8/16/2016	11	Compliace	2:35	2.00	5.20	21.90	LaMotte 2020WE	Grab
8/17/2016		Calibration	10:25	N.A.	10.96	N.A.	LaMotte 2020WE	Calibration 10 NTU Standard - Blank Scan
8/17/2016	12	Background	10:30	2.00	3.20	21.30	LaMotte 2020WE	Grab
8/17/2016	12	Early Warning	10:35	2.00	3.40	21.30	LaMotte 2020WE	Grab
8/17/2016	12	Compliace	10:40	2.00	3.45	21.30	LaMotte 2020WE	Grab
8/17/2016	13	Background	2:30	2.00	3.40	21.80	LaMotte 2020WE	Grab
8/17/2016	13	Early Warning	2:35	2.00	7.60	21.80	LaMotte 2020WE	Grab
8/17/2016	13	Compliace	2:40	2.00	6.20	21.80	LaMotte 2020WE	Grab
8/18/2016	14	Background	10:38	2.00	2.33	21.30	LaMotte 2020WE	Grab
8/18/2016	14	Early Warning	10:41	2.00	6.78	21.30	LaMotte 2020WE	Grab
8/18/2016	14	Compliace	10:43	2.00	5.61	21.30	LaMotte 2020WE	Grab
8/18/2016	15	Background	2:50	2.00	2.19	21.70	LaMotte 2020WE	Grab
8/18/2016	15	Early Warning	2:58	2.00	7.13	21.70	LaMotte 2020WE	Grab
8/18/2016	15	Compliace	2:59	2.00	6.26	21.70	LaMotte 2020WE	Grab
8/19/2016	16	Background	9:05	2.00	1.91	21.40	LaMotte 2020WE	Grab
8/19/2016	16	Early Warning	9:10	2.00	6.22	21.40	LaMotte 2020WE	Grab
8/19/2016	16	Compliace	9:12	2.00	5.32	21.40	LaMotte 2020WE	Grab
8/19/2016	17	Background	2:00	2.00	2.67	21.90	LaMotte 2020WE	Grab
8/19/2016	17	Early Warning	2:05	2.00	5.91	21.90	LaMotte 2020WE	Grab
8/19/2016	17	Compliace	2:10	2.00	4.77	21.90	LaMotte 2020WE	Grab
8/19/2016		Calibration	8:30	N.A.	0.22	N.A.	LaMotte 2020WE	Calibration Tap
8/22/2016	18	Background	10:03	2.00	1.54	21.10	LaMotte 2020WE	Grab
8/22/2016	18	Early Warning	10:13	2.00	2.98	21.10	LaMotte 2020WE	Grab
8/22/2016	18	Compliace	10:15	2.00	1.49	21.10	LaMotte 2020WE	Grab
8/22/2016	19	Background	3:10	2.00	1.56	21.10	LaMotte 2020WE	Grab
8/22/2016	19	Early Warning	3:15	2.00	3.78	21.10	LaMotte 2020WE	Grab
8/22/2016	19	Compliace	3:18	2.00	1.89	21.10	LaMotte 2020WE	Grab
8/23/2016	20	Background	9:40	2.00	1.67	21.70	LaMotte 2020WE	Grab
8/23/2016	20	Early Warning	9:45	2.00	2.94	21.70	LaMotte 2020WE	Grab
8/23/2016	20	Compliace	9:47	2.00	2.44	21.70	LaMotte 2020WE	Grab
8/23/2016	21	Background	2:21	2.00	1.76	21.80	LaMotte 2020WE	Grab

8/23/2016	21	Early Warning	2:25	2.00	3.54	21.80	LaMotte 2020WE	Grab
8/23/2016	21	Compliace	2:30	2.00	2.45	21.80	LaMotte 2020WE	Grab
8/24/2016	22	Background	8:20	2.00	1.65	21.90	LaMotte 2020WE	Grab
8/24/2016	22	Early Warning	8:25	2.00	3.54	21.90	LaMotte 2020WE	Grab
8/24/2016	22	Compliace	8:28	2.00	2.87	21.90	LaMotte 2020WE	Grab
8/24/2016		Dewater Bag	11:10	2.00	34.2		LaMotte 2020WE	Off bag (prior to filtration/silt fence)
8/29/2016	23	Background	2:30	2.00	1.86	21.8	LaMotte 2020WE	Cranberry
8/29/2016	23	Early Warning	2:40	2.00	1.82	21.8	LaMotte 2020WE	Cranberry
8/29/2016	23	Compliace	2:45	2.00	2.13	21.8	LaMotte 2020WE	Cranberry
8/30/2016	24	Background	11:00	1.00	1.92	20.7	LaMotte 2020WE	Cranberry
8/30/2016	24	Early Warning	11:10	2.00	2.67	21.4	LaMotte 2020WE	Cranberry
8/30/2016	24	Compliace	11:15	2.00	1.98	21.4	LaMotte 2020WE	Cranberry
8/30/2016	25	Background	2:30	1.00	1.93	20.7	LaMotte 2020WE	Cranberry
8/30/2016	25	Early Warning	2:35	2.00	3.21	21.4	LaMotte 2020WE	Cranberry
8/30/2016	25	Compliace	2:38	2.00	2.11	21.4	LaMotte 2020WE	Cranberry
8/30/2016	26	Background	9:40	1.00	1.86	20.6	LaMotte 2020WE	Cranberry
8/30/2016	26	Early Warning	9:45	2.00	2.56	21.6	LaMotte 2020WE	Cranberry
8/30/2016	26	Compliace	9:48	2.00	2.11	21.6	LaMotte 2020WE	Cranberry
8/30/2016	27	Background	2:30	1.00	2.18	20.6	LaMotte 2020WE	Cranberry
8/30/2016	27	Early Warning	2:35	2.00	4.12	21.9	LaMotte 2020WE	Cranberry
8/30/2016	27	Compliace	2:38	2.00	3.12	21.9	LaMotte 2020WE	Cranberry
8/31/2016	28	Background	10:15	1.00	2.34	20.4	LaMotte 2020WE	Cranberry
8/31/2016	28	Early Warning	10:25	2.00	3.41	20.8	LaMotte 2020WE	Cranberry
8/31/2016	28	Compliace	10:30	2.00	2.98	20.8	LaMotte 2020WE	Cranberry
8/31/2016	29	Background	3:10	1.00	3.11	20.4	LaMotte 2020WE	Cranberry
8/31/2016	29	Early Warning	3:30	2.00	4.12	20.8	LaMotte 2020WE	Cranberry
8/31/2016	29	Compliace	3:35	2.00	3.22	20.8	LaMotte 2020WE	Cranberry
9/1/2016	30	Background	9:00	1.00	3.69	20.2	LaMotte 2020WE	Cranberry
9/1/2016	30	Early Warning	9:20	2.00	2.88	20.8	LaMotte 2020WE	Cranberry
9/1/2016	30	Compliace	9:25	2.00	2.78	20.8	LaMotte 2020WE	Cranberry
9/1/2016	31	Background	2:50	1.00	3.61	20.2	LaMotte 2020WE	Cranberry
9/1/2016	31	Early Warning	3:05	2.00	3.45	20.7	LaMotte 2020WE	Cranberry
9/1/2016	31	Compliace	3:10	2.00	3.91	20.7	LaMotte 2020WE	Cranberry
9/2/2016	32	Background	9:10	1.00	3.84	20.1	LaMotte 2020WE	Cranberry

9/2/2016	32	Early Warning	9:15	2.00	2.56	20.8	LaMotte 2020WE	Cranberry
9/2/2016	32	Compliace	9:20	2.00	2.33	20.7	LaMotte 2020WE	Cranberry
9/2/2016	33	Background	3:10	1.00	3.22	20.1	LaMotte 2020WE	Cranberry
9/2/2016	33	Early Warning	3:15	2.00	3.01	20.7	LaMotte 2020WE	Cranberry
9/2/2016	33	Compliace	3:18	2.00	2.77	20.7	LaMotte 2020WE	Cranberry
9/6/2016	34	Background	2:15	1.00	1.89	20.4	LaMotte 2020WE	Cranberry
9/6/2016	34	Early Warning	2:20	2.00	2.12	21.3	LaMotte 2020WE	Cranberry
9/6/2016	34	Compliace	2:25	2.00	2.55	21.3	LaMotte 2020WE	Cranberry
9/7/2016	35	Background	10:45	1.00	1.58	20.8	LaMotte 2020WE	Cranberry
9/7/2016	35	Early Warning	10:50	2.00	2.11	21.2	LaMotte 2020WE	Cranberry
9/7/2016	35	Compliace	10:55	2.00	1.64	21.2	LaMotte 2020WE	Cranberry
9/7/2016	36	Background	3:15	1.00	1.88	20.9	LaMotte 2020WE	Cranberry
9/7/2016	36	Early Warning	3:20	2.00	1.55	21.6	LaMotte 2020WE	Cranberry
9/7/2016	36	Compliace	3:25	2.00	1.97	21.6	LaMotte 2020WE	Cranberry
9/8/2016	37	Background	9:45	1.00	1.98	20.8	LaMotte 2020WE	Cranberry
9/8/2016	37	Early Warning	9:48	2.00	3.76	21.2	LaMotte 2020WE	Cranberry
9/8/2016	37	Compliace	9:50	2.00	2.88	21.2	LaMotte 2020WE	Cranberry
9/8/2016	38	Background	2:11	1.00	2.15	20.9	LaMotte 2020WE	Cranberry
9/8/2016	38	Early Warning	2:25	2.00	3.77	21.6	LaMotte 2020WE	Cranberry
9/8/2016	38	Compliace	2:28	2.00	2.38	21.6	LaMotte 2020WE	Cranberry

Appendix D. Weekly Dredging Reports (Chronological)

Attached

Lake Limerick Dredging Weekly Report: July 18 to July 21, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

July 22, 2016

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Table of Contents

Work Summary

Marine Industrial Construction, LLC (MIC) started the work for the Lake Limerick Dredging Project during the week of July 11th, 2016 preparing equipment for mobilization. Equipment was mobilized during the week of July 18th, 2016. Matt Fobert is the on-site Project Manager/Supervisor leading the project. He has a crew supporting this work. The primary work site was at Log Toy Park. This is the disposal/dewatering site and is being used for the staging and access location.

July 18, 2016

Monday, July 18, 2016 the MIC crew of Matt Fobert and Eric Hittle were onsite and started unloading mobilized equipment (5 trucks) including: forklift, pipe, floats, buoy, rigging, flex hose, portable 7.5 KW generator plant (trailer mounted), and tools and equipment. The team launched the skiff in the lake and put floats on pipes and started prepping pipes. Meeting with Brian Smith, Kelly Evans, Joe Castelluccio from LLCC and Rob Plotnikoff from Tetra TechTech. Work started at 7:00 am and went to 5:00 pm with a safety meeting at 7:00 am. The weather was clear and sunny (71 degrees) and no major issues were noted.

July 19, 2016

Tuesday, July 19, 2016 the MIC crew of Matt Fobert, Eric Hittle and Michael Goetz were onsite and started working on preparing equipment. The team reviewed goals and project objectives. Put HDPE pipe together, pulled into lake with anchors to hold pipe (line to island), set up 3 flashing buoys on pipe for night, secured end of pipe on bank. Locate to job site and gave all clear to dig trenches for Temporary Erosion Control. Work started at 7:00 am and went to 5:00 pm. The weather was clear and sunny (73 degrees) and no major issues were noted.

Adjacent landowner told us in the morning (8:00 am) that he ran off 3 kids at midnight who were messing around at the work site.

July 20 2016

Wednesday, July 20, 2016 the MIC crew of Matt Fobert, Eric Hittle and Michael Goetz were onsite and started working on preparing equipment. Safety Meeting at 7:00 am on sight. Continued Building HDPE pipe together (floats, connections, etc.). Meet with Joe Castelluccio from Lake Limerick and reviewed docks in Kings Inlet. Joe installed camera on site. Worked on Temporary Erosion Control at Log Toy (disposal site). Work ended at 5:00 pm.

The weather was clear and sunny (80 degrees) and no major issues were noted.

July 21, 2016

Thursday, July 21, 2016 the MIC crew of Matt Fobert, Eric Hittle and Michael Goetz were onsite and started working on preparing equipment. Safety Meeting at 7:00 am on sight. Continued Building HDPE pipe together and worked on Temporary Erosion Control at Log Toy (disposal site). Pipe was floated between the park and island (photo below provided by Lake Limerick Team). Work ended at 5:00 pm. The weather was cloudy (possible thunderstorms) with temperatures in the 80's. Equipment secured for weekend and crew returned to home/off site until Monday (7/25/16).

On Site Equipment

The current MIC equipment onsite includes:

- Forklift
- 3000' 10" HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.
- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Concrete anchors
- Rigging (rope, wire, slings, shackles, etc.)
- Skiff (Lund with outboard)
- Flocculent injection pump and polymers (UGLY System)
- Turbidity Curtain

Supplies (project disposal items) include:

- Silt Fence
- Geo-fabric
- Polymers/flocculent

Additionally our trucks (pickup) were onsite as well as a Rental fork lift which was used for launching pipe and equipment. All expensive and technical equipment (i.e. tools) are secured and removed off site after work hours. Company locks are on all equipment to assist in securing.

Marine Activities

Dredging has not start. Still working on set up activities.

The primary dredging order will be to focus initially in Kings Cove and then Cranberry Cove. Attached are maps of the dredging prism with dredging transects (based on interactions with Lake Limerick Management Team).

Estimates

Estimates of volume are tracked daily by the crew. This includes

1. Tracking the area dredged and the estimated depth removed from the operators logs and computer tracking (tracking using Global Positioning Systems [GPS]) and calculating volume assuming a simple box cut model (i.e. volume of a rectangle).
2. Estimates of slurry concentration (percent solids) and pumping time records (using rates and densities).
3. Estimates of volume observed on bio-bags (can require settling and dewatering time).

Use these methods the follow is the estimated material dredged each day and forecast dredging activities and schedule.

Shore Side Activities

De-watering

The objective will be to dredge in Kings Cove initially and dewater at Log Toy Park.

Reporting

The MIC team continued to report and plan for the project using the best available data collected during the dredging activities.

Safety

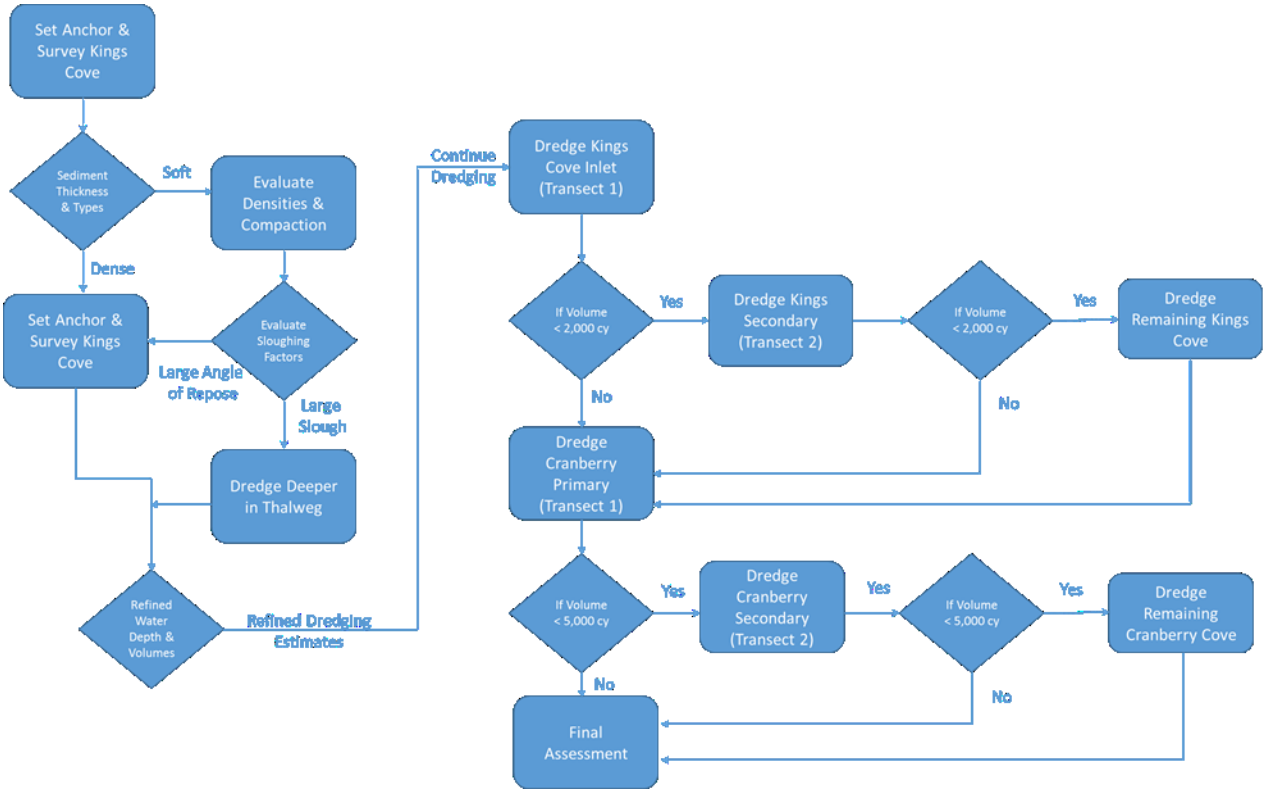
No safety incidents or near missed were reported. On Monday to Thursday Matt lead on site safety Meeting.

Environmental

No issues noted

Upcoming Schedule

The decision making process is expected to follow the following flow chart.



As work proceeded the field crew will gain additional information on the sediments thickness, the depth and be able to continually refine the dredge estimates.

Critical to the dredge tracking of volumes and progress is having a strong data collections process. On the dredge, we will have a dedicated computer with specialized software (connected to additional hardware) for tracking progress. Data from the GIS was converted and input into the dredging software. These initial calibration files are used to track data collection activities. This is use to highlight the dredging areas, pipeline crossing, and other features. The operator has the data available to them real time for effective decision making. Data files are review nightly by Quality Control staff.

Upcoming Tasks

The primary upcoming tasks are:

1. Additional equipment delivery – Monday and possible Tuesday/Wednesday. This include geobags, filter fabric, and additional anchors on Monday. A crane is required for the MudCat Dredge unloading which is being scheduled for Tuesday and/or Wednesday.
2. Complete set up
    a. Erosion Control (Trencher to be delivered), including installing silt fence at disposal site – Monday

   b. Set up instrumentation, surveying and quality control – Monday/Tuesday
   c. Posting of information – Monday (at parks and job site)
   d. Temporary Erosion Control at Disposal Site – Monday/Tuesday
   e. Set up geo-bags – Tuesday/Wednesday
   f. Configure flocculent system – Tuesday/Wednesday
3. Launch Dredge
   a. Dredge delivery and unloaded into lake – Scheduling crane for Tuesday/Wednesday (availability of crane services pending [Snell Crane and/or Axis Crane]).
   b. Place anchors –Tuesdays/Wednesday
   c. Dredging
      i. Test Configuration– Wednesday
      ii. Deploy into production mode –Thursday

Equipment to be delivered next week include (mostly scheduled for Monday delivery):

- MudCat Dredge
- Dewatering Bio-bag
- Instrumentation (gages, water quality multi-meters, GPS, computers, Radios, etc.)
- Additional Anchors
- Assorted pipes and additional fixtures
- Job posting board

Reporting

The Daily Construction Reports were provided to the Lake Limerick Team daily. Other inspection logs, safety meeting notes and related information is filed on site (and online). No dredging logs were completed since dredging as not started.

Lake Limerick Dredging Weekly Report: July 25 to July 28, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

July 28, 2016

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Work Summary

Marine Industrial Construction, LLC (MIC) continued the work for the Lake Limerick Dredging Project set up during the week of July 25th, 201. Addition equipment was mobilized during the week. Matt Fobert is the on-site Project Manager/Supervisor leading the project. He has a crew supporting this work. The primary work site was at Log Toy Park and Kings Cove.

July 25, 2016

Lake Limerick Weekly Update Meeting at 7:30 on Site. Discussion of status of project and upcoming schedule. MIC crew safety Meeting and posted job board with safety notes and additional job site signs. Additional Mobilization (semi delivery) of equipment. Floating turbidity curtain was assembled and deployed into lake (currently tied off the floating pipe into Kings Cove). Worked on setting up erosion control including trenching, install silt fence, laying ground cloth. Matt and Joe met with Gas company representative regarding Cranberry Cove crossing (reviewed maps, methods, etc.- they will be placing buoys and having divers confirm location). One geo-bag was opened and laid on in the disposal area and folded to side to allow crane access for launching dredge later this week. Matt coordinated with Michael and local for disposal material. All permits and ready at initial site for up to 3500 cy. Set up additional security cameras. Secured equipment at 5:00 pm and stopped work at project site.

July 26 2016

Safety Meeting at 7:00 on Site led by Joe and Pinch Points. Matt had overview of day's tasks. Continued work on installing silt fence and erosion control ground cloth. Matt coordinated with Tom on supplies and last of mobilization for MudCat. Crane Scheduled for 10:00 am on Wednesday with MudCat Delivery (Mitchell Brother confirmed Trucking). Place 3 anchors (anchors are 500 lbs. each) and shore lines at upstream location in Kings Cove. Also placed two anchors at end of run in lake with ropes. Place additional anchors in lake to be used by dredge with A Frame. Joe C (LLCC) provide lock for storage shed at park for storing miscellaneous supplies. Secured equipment at 1:00 pm and stopped work at project site; Matt and Eric off to purchase supplies locally including pipe fitting for flocculent system, tools (pipe die), etc. Ended work at 5:00 pm.

July 27 2016

Safety Meeting at 7:00 am on Site led by Joe on electrical hazards. Matt had overview of day's tasks. Continued work on erosion control set up. Surveyed 3 transect lines in

tributary. Worked on pipe fitting and connections for flocculent system including intake, discharge and mixing. Tapped HPDE pipe for coupler input (flocculent) and 2 sample ports (one before and after admixture). Truck crane arrived at 9:50 and MudCat at 10:15. Launched dredge. Installed A frame and motor. Set up electronics (GPS and Pressure transducer). Moved dredge to upper section of Kings Cove and dropped ladder to secure. Rope to anchors and trees (safeties) on upstream end. Anchors and lines secured on downstream and (in lake). Added pipe on MudCat (soft/hard/soft). Additional pipes and floats to reach Tributary added to pipeline. Prepped wire on MudCat travel winches. Laid out geo-bag at disposal and set up input pipe. Crew meeting to be ready for Tom McCauley onsite tomorrow for starting MudCat (Tom is company expert on MudCat operations and mechanics). Secured equipment at 6:00 pm and stopped work at project site.

July 28, 2016

Safety Meeting at 7:00 am on Site led by Matt. Matt had overview of day's tasks and updated crew as to status of disposal site approval. Onsite crew worked on final pipe set up and configuration; completed work early morning and secured all equipment for weekend and left site. Crew returned to Wilsonville. Boat returned to have tune up on outboard. Work continued on finalization of the disposal site approval.

On Site Equipment

The current MIC equipment onsite includes:

- Forklift
- 3000' 10" HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.
- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Anchors (Concrete 300 and 500 lbs.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Rigging (rope, wire, slings, shackles, etc.)
- Skiff (Lund with outboard)
- Flocculent injection pump and polymers (UGLY System)- 4 totes of polymer onsite
- Turbidity Curtain
- Geobags/Bio Bags (6 total)
- MudCat Dredge

Supplies (project disposal items) include:

- Silt Fence
- Geo-fabric
- Polymers/flocculent

Additionally our trucks (pickup) were onsite as well as a Rental fork lift which was used for launching pipe and equipment.

Marine Activities

Dredging has not started. All marine equipment is in place and ready to start production. MudCat positioned in. MudCat Engine started at dock for 1 minute after opening lines. MudCat engine started after positioning for anchoring. *No Pumps started (and all pipe closed).*

Shore Side Activities

The shore side activities include the de-watering site at Log Toy Park and the final disposal site off-site.

Dewatering Site

All shore side equipment is set up and ready for operation at the de-watering site. Minor configuration (daily) for setting up the freshwater pump required (removed every night). We plan to demonstrate the dewater potent

Disposal Site

Final disposal site was verbally indicated ready for receiving materials by Patrick Paradise to field crew (indicating permits in place and ability to receive up to 3500 CY of material at a 5000 CY site [1500 CY received]). The permit information has been requested by Mason County (and other regulators). MIC

office attempted to follow up on information for Mason County with no material received (after numerous calls and email not being returned). Looking and following up on additional sites with Lake Limerick Team. Status is presented below:

Name	Status	Mason County Permit - Approval Number/Information	Miles (One Way)
Patrick Paradise	Agreed to Accept; Cannot finalize documentation	Unknown - not provided	3
BCP Topsoil	May Accept; finalizing	In Progress to be forwarded as available	5
McKenzie Quarry	Indicated Will Accept	High price associate.	5
Port Orchards Site	Refused		5
Brady Site	Refused		8
Miles Sand & Gravel	Refused		17

Reporting

The MIC team continued to provide Daily Construction Reports to Team (expanded Email distribution on daily work). Summarized in Weekly Report. Also posted all submittals and reports to internet public access for team at:

https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z

Safety

No safety incidents or near missed were reported. Daily safety meeting held with handouts that are posted on job board on site.

Environmental

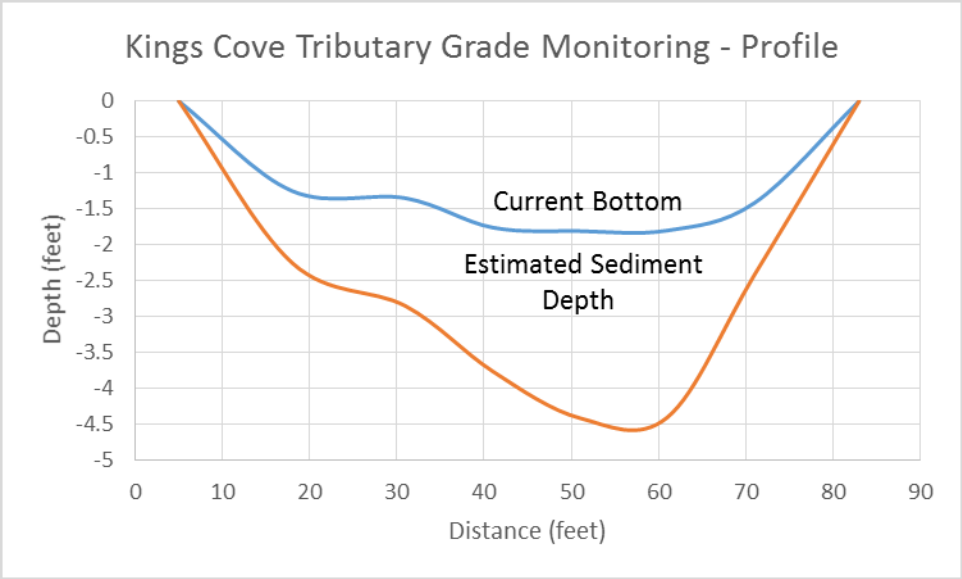
No dredging occurred; minor localized turbidity when using outboards in shallows.

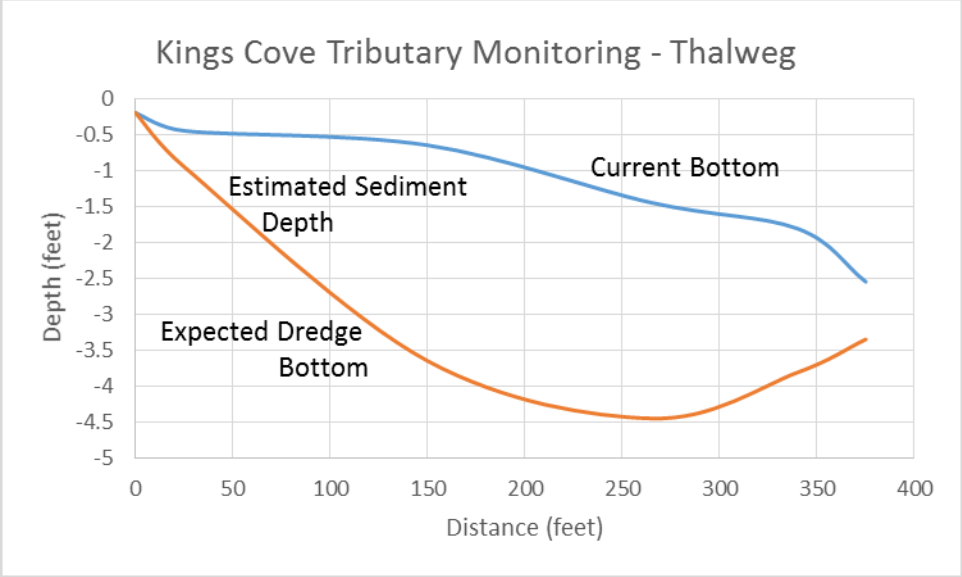
Depths / Sediment

Pre dredging surveys were completed on 7/27/16 at constant lake levels. Measurements were made from the skiffs positioned stably anchored in tributary. Sediment was noted as soft. The lead line (which has an 8 pound mushroom anchor) easily penetrated soft muds resulting in erroneous water column depths. The depths were transects and data was logged in a multi-meter (Horiba U53) and the sensor is 4 pounds in weight and laid in the sediments in the water column (roughly 1 to 3 inches of penetration). The profile and thalweg transect lines are presented on the maps as dashed blue lines for long term references.

Sediment depths were observed to be variable and noted. A steel post was used to penetrate the sediments until resistance was observed. The water depths were recorded from water surface to tops

of sediment. The post was removed and estimated sediment depth measured (constant post depth minus water depths). The depths and estimated sediment depths are presented below for a profile and transect in the tributary inlet (data collection is indicated on the following map).





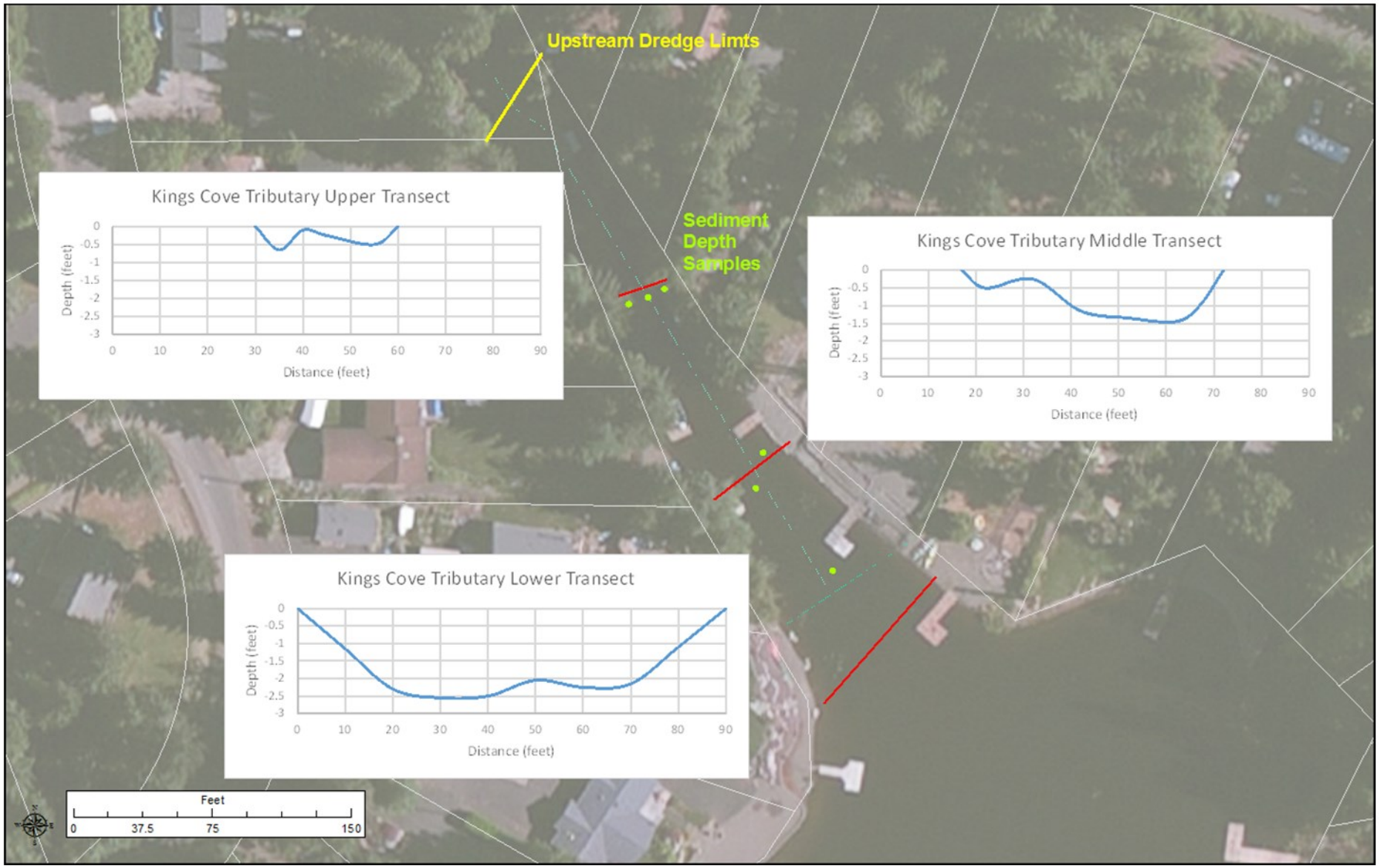
Water Quality

Water quality samples were collected for background conditions on 7/27/16. Lake surface turbidites (measrued from 2.85 to 3.85 feet in depth ranged from 9.38 to 10.2 NTUs , temperatures from 21.48 to 22.28 degrees Celcius.

When we completed the water depth sampling the probes was dragged through the sediment on the lake bottom and turbidity data was collected. As expected turbidity increased when the pobe was dragging in the sediments (values rangeing from 82 to 386 NTUs were observed) but were localized to less than 1 foot. (i.e. probes dropped into mud).

Access to the Beaver Creek tributary above the dredge zone has some potental problems we are explorer due to: 1) shallow depth in water for placing probe, 2) access from the water requires walking in soft sediments, and 3) shoreside access is only available from private property. There may be access to other potential access off Mason Lake Drive which will be reviewed. Also the area to the south east of Log Toy Park is also a good location for observing background conditions since it has access to deeper water, a consolidated bottom (not silt but prmiarily fine gravels and coarse sands). The water flow to the locations is not from Kings Cove and should represent background lake conditions for additional reference conditions. This location due to depth and bottom sediments is not impacted by wave action from recreational activities.

Our Horiba U53 probe was recently recalibrated in the factory (Horiba) during repairs and has only collected 10 samples since calibration. We have a second LaMotte turbidity meter we will use to run field audit samples for turbidity next week.


Upstream Dredge Limts
Sediment Depth Samples
Kings Cove Tributary Upper Transect
Depth (feet)
0
-0.5
-1
-1.5
-2
-2.5
-3
0 10 20 30 40 50 60 70 80 90
Distance (feet)
Kings Cove Tributary Middle Transect
Depth (feet)
0
-0.5
-1
-1.5
-2
-2.5
-3
0 10 20 30 40 50 60 70 80 90
Distance (feet)
Kings Cove Tributary Lower Transect
Depth (feet)
0
-0.5
-1
-1.5
-2
-2.5
-3
0 10 20 30 40 50 60 70 80 90
Distance (feet)
Feet
0 37.5 75 150

Upcoming Schedule

As work proceeded the field crew will gain additional information on the sediments thickness, the depth and be able to continually refine the dredge estimates.

Tasks proceeding according to plan for setting up the dredging equipment. We are roughly 1 to 2 hours of additional prep work before starting production dredging. Status of the disposal site (trucking location) is undetermined (but hopefully to be finalized in next day) and we are waiting final verification and approval before starting any dredging. Tom McCauley (senior operator) and Joe Bernert (QC) were scheduled to be on-site on 7/28/16 and have returned to Wilsonville. Michael and Matt will continue to work toward final disposal approval and the status will be updated when information is available.

Upcoming Tasks

The primary upcoming tasks are:

1. Dredging
    a. Test Configuration with additional training and review; review computer operator data processing and environmental methods (coordinated with Tom McCauley and Joe Bernert)
    b. Start Dredging in Kings Cove
    c. De-water of Sediments.

Reporting

The Daily Construction Reports were provided to the Lake Limerick Team daily. Other inspection logs, safety meeting notes and related information is filed on site (and online). No dredging logs were completed since dredging as not started.

No On Site Work Performed

Lake Limerick Dredging Weekly Report: July 29 to August 4, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

August 4, 2016

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Work Summary

Marine Industrial Construction, LLC (MIC) was off due to permit compliance issues from July 29th to August 4, 2016. All marine and shore side equipment was secured at Lake Limerick.

Crew returned to Wilsonville. Boat returned to have tune up on outboard. Work continued on finalization of the disposal site approval. Tetra Tech, Lake Limerick County Club and others continued working with the State Regulators, the Tribes and County on finalization of all permit conditions so dredging can proceed.

On Site Equipment

The current MIC equipment onsite includes:

- Forklift
- 3000' 10" HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.
- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Anchors (Concrete 300 and 500 lbs.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Rigging (rope, wire, slings, shackles, etc.)
- Flocculent injection pump and polymers (UGLY System)- 4 totes of polymer onsite
- Turbidity Curtain
- Geobags/Bio Bags (6 total)
- MudCat Dredge

Supplies (project disposal items) include:

- Silt Fence
- Geo-fabric
- Polymers/flocculent

Marine Activities

Dredging has not started. All marine equipment is in place and ready to start production. MudCat positioned in. Awaiting County permit approvals. *No Pumps started (and all pipe closed).*

Shore Side Activities

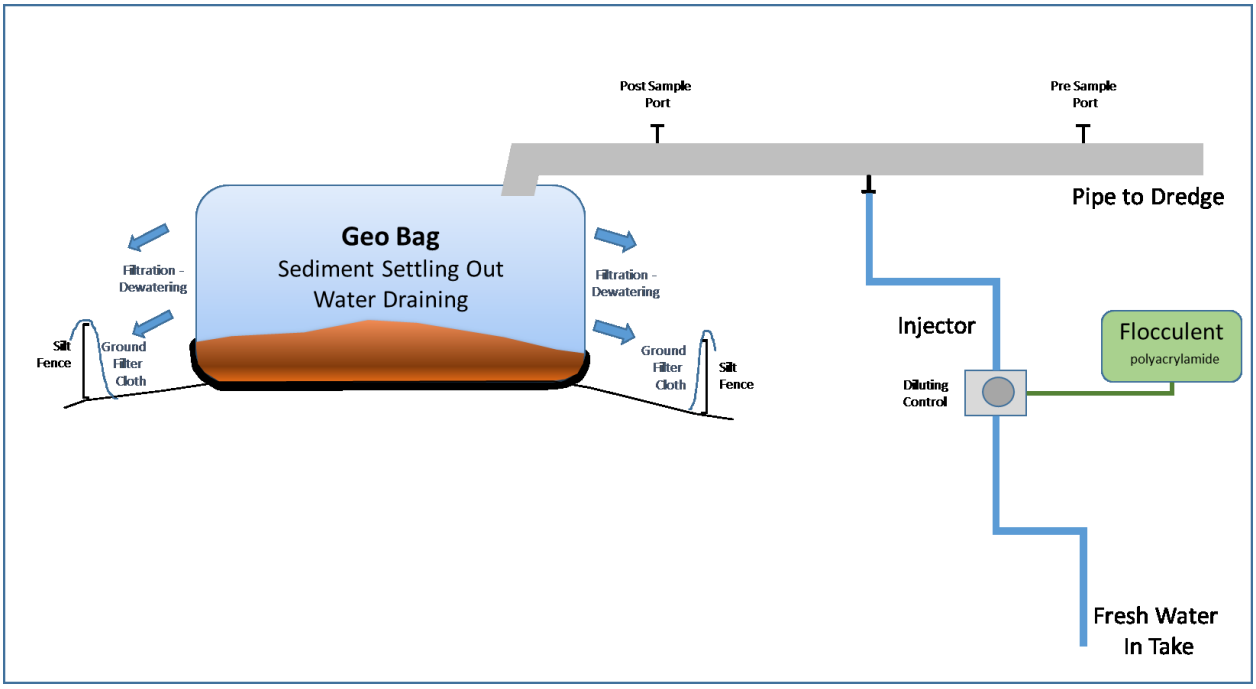
No shore side activities were completed.

All shore side equipment is set up and ready for operation at the de-watering site. Minor configuration (daily) for setting up the freshwater pump required (removed every night).

The system has sampling on both sides of the injector. The flocculent system enters the 10" HPDE pipe on a 1 ½ inch pipe (pressure value plumbed and higher pressure on pump [which is diluted with fresh water intake]). There is a sampling port (a 3/4" inch gate value for sample prior to injection) up stream of the flocculent entry point (about 10 feet). There is another sampling location downstream of the injection port (about same distance). We sample at both locations and perform settling tests. If additional flocculent is required, the solution can be increased or decreased into the system (at the pump).

We expect to use low amount in the upper materials and probably no polymers in the lower material since we expect some organics and some fines at surface and only sands deeper (based on the sediment sampling). The sampling and results will be reporting in the DCR and weekly reports.

The system for the dewatering is presented in the following schematic for the site.



The flocculent is polymer (polyacrylamide) and was recommended by the dewatering system specialist (who we are renting the system from) and will be effective to stabilize the material and assist on the dewatering. The flocculent is a water diluted Aquamark Aq 587 and is a safe, clean de-water agent which is readily biodegradable. This is an effective and safe polymer for dewatering applications in bio-bags. The material is labeled (29 CFR 1910.1200(f)) with no Hazards or Precautionary statements.

Reporting

The MIC team continued to provide Daily Construction Reports to Team (expanded Email distribution on daily work). Summarized in Weekly Report. Also posted all submittals and reports to internet public access for team at:

https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z

Safety

No safety incidents or near missed were reported. Daily safety meeting held with handouts that are posted on job board on site.

Upcoming Schedule

As work proceeded the field crew will gain additional information on the sediments thickness, the depth and be able to continually refine the dredge estimates.

Tasks proceeding according to plan for setting up the dredging equipment. We are roughly 1 to 2 hours of additional prep work before starting production dredging. Status of the disposal site (trucking location) is undetermined (but hopefully to be finalized in next day) and we are waiting final verification and approval before starting any dredging. Tom McCauley (has the most hours as an operator on the MudCat) and Joe Bernert (QC) are scheduled to be on-site ASAP pending permit approval by Mason County (with Field Crew: Matt Fobert, Eric Hittle and Mike Geotz) to start dredging.

Tom McCauley (WCP/MIC Marine Manager) is coordinating with Matt Fobert (Lake Limerick Supervisor) are working to reconfigure crewing options as the work window is becoming compressed due to permit issues. We are expected to move ahead on the schedule using two crews (one 4 10 hour schedule from Monday to Thursday) and a second scheduled shift working potentially on Friday, Saturday and possible Sundays). Environmental Permit work windows are from July 15th to September 15th, with a scheduled project completion date on September 10th, 2016. As of August 4, 2016, over 35% of the project work windows has passed and dredging has not started. WCP and MIC are coordinating other on-going project to ensure we can effective crew the project to meet the project timeline.

Upcoming Tasks

The primary upcoming tasks are:

1. Dredging – Too start ASAP pending approvals

a. Test Configuration with additional training and review; review computer operator data processing and environmental methods (coordinated with Tom McCauley and Joe Bernert)
b. Start Dredging in Kings Cove
c. De-water of Sediments.

Reporting

No Daily Construction Reports were provided since no work occurred.

Lake Limerick Dredging Weekly Report: August 5 to August 11, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

August 11, 2016

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Work Summary

Tetra Tech and Lake Limerick Country Club obtained the Mason County Environmental Permit (MEP) on August 5th. Marine Industrial Construction, LLC (MIC) reinitiated all onsite on August 8th, 2016 (with crew arriving on Sunday night and on the lake for August 9th. Off-site equipment was prepared and configured on 8/5/2016 and 8/6/2016.

Summary of major tasks include:

- Worked a 30 hour week onsite Monday to Wednesday 10 hour days (returned early to repair boat motor and build / bring up bag filling manifold next week).
- Boat access through pipeline will be provided
- Working in Kings Cove tributary with MudCat. The primary swath is 225 feet with a minimum width of 8 feet and depths average 3 feet of biomuck. Significant amount of sloughing is occurring. Estimates are the volume removed was conservatively estimated at 350 to 450 cy in the water column. Volume noted in the dewatering bags is estimated at 150 to 200 cy based on observation. Additional compression/compaction in the bags is expected over weekend.

Dredging, dewatering and work commenced. Estimated weekly volume dredging is 325 to 450 cubic yards (c.y.).

August 8th, 2016

A dredging meeting was held at 7:30 am with the dredging team (Lake Limerick County Club, Tetra Tech, and MIC). After meeting set up final pipe, anchor lines and checked configuration till about noon. Joe B arrived on site at 11:30. Final set up on bags. Started dredge and began dredging including water pump testing. Stopped dredging after 1/2 hour dredging to refine configuration at dewatering site. Additional silt fence deployed and refinements and adjustment on flocculent system. Initial Adjusting injection and concentration amounts (system bled, primed and evaluated). Began pumping mud again around 1:30 for 15 minutes. Water quality sampling. Stopped dredging to adjust geotextile bags (position moved and needed additional securing due to small area, unleveled slopes, etc). In afternoon additional adjustment to flocculent system was performed. Eric H arrived late afternoon. Cleaned flocculent system. Shut down and clean up. Material dredged very easily. However stern anchors were moving due to buoyancy of concrete anchors. Will evaluate additional lines to far shore (tie to trees to keeping tension on line). Note this will not have much force. Area dredged on second operation was 8 feet wide, by 3 to 3.5 feet deep and we traveled 12 to 15 feet.....very easily at low RPMs. Probing indicted a hole of these dimensions. Material was primarily fines (redox odor noted) and sands were noted/heard in pipe. Dredge operator easily felt bottom and proceeded on travel. Will configure additional bags to control dewatering volumes and piping movement. Each bag can be filled to capacity in roughly 1 1/2 to 2 hours with 1 line directly feeding. Initially, given site constraints and issues at Log Toy Park, MIC crew pumped slowly until volume stabilized in location. Design started for manifold setup to deploy in future (potential reduced labor at dewatering site and increased head loss, material moved into multiple bags).

Roughly 10 to 15 cy in this whole excluding sloughing into the dredging area (a good production rate observed).

August 9th, 2016

Safety Meeting in am. Deployed additional stakes on to geotextile to ensure stability. Additional posts, stakes installed on Temporary Erosion and Sediment Control (TESC). Changed fixtures on flocculent system (working fine with increase pressure lines). Started dredging. Pump material from upper Kings Cove into first bag. Stopped dredging let drain and rolled out second bag and secured on site (leveler site). Dredged. Periodic debris clearing and one large rock caught in pump head (Rock Box). Cleared and resumed dredging. Repositioned anchors; approval for tying off to tree higher in King Cove will allow access to upper reach. Resumed Dredging. Water Quality sample performed (see below). Material is primarily very fine sediments is suspension. We are running flocculent at the 45 setting and samples indicated achieving good results. Material dredged very easily. ***Good progress made estimated volume dredged around 100 cy.***

August 10th, 2016

Safety Meeting in am. Checked all bags on dewatering condition. Used boat to add anchors on pipe line to allow boat access to dock in Kings Cove. Required anchoring pipeline on bottom and repositioning existing anchors holding pipe in position. Started dredging with new end anchor on upper end of Kings Cove tributary. Removed center anchor off Kelly Evans House. Primarily pumped into second bag (holding more material and level in site allowing more water). Second bag started to fill in membrane with fines causing slower dewatering. First bag filled (alternating between by manually changing pipe). Periodic debris clearing from rock box. Maximizing percentage solids (sampled off dewater ports on inline HDPE) by running MudCat at low to moderate rpms and slow cutter speeds (resulting in higher concentration solids [less water) and longer run time on dredging]. Water Quality sample performed (see below). Major amounts of slough were noted into the area dredged from yesterday (resulting in covering the same area). Also dredged and upstream and downstream in tributary. Will need several additional sticks of pipe to continue after anchor pipeline to allow dredge access to upper end of trib. The dredged material is primarily very fine biomuck sediments. We recalibrated flocculent and sampled multiple times during the day and have lower concentration with good separation (now running at the 28 setting). Motor on Skiff failed again in afternoon (moved 25 HP motor from MudCat onto Skiff). Clean up and shut down. ***Good progress made estimated volume dredged around 200 to 300 cy.***

August 11th, 2016

Off site in Wilsonville having Skiff motor repaired (changing the 40 HP to 60 HP [and putting 40 HP in for new pumps and cleaning out mud and debris]).

On Site Equipment

The current MIC equipment and supplies onsite includes:

- Forklift
- 3000’ 10” HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.

- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Anchors (Concrete 300 and 500 lbs.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Rigging (rope, wire, slings, shackles, etc.)
- Flocculent injection pump and polymers (UGLY System)- 4 totes of polymer onsite
- Lund Skiff with outboards
- Turbidity Curtain
- Geobags/Bio Bags (6 total)
- MudCat Dredge
- Silt Fence
- Geo-fabric
- Polymers/flocculent

Marine Activities

Dredging started with the MudCat and dewatering at Log Toy Park with dewatering bags and polymer. The skiff provide support activities. Pipe and anchors were repositions supporting dredging.

Dredged Area

The dredged area in Kings Cove was tracked with field maps and noting locations. Since the dredge is in a depression (the tributary), in thick forest cover, we are experiencing poor GPS reception on the dredge mounted antennas. To assist we are tracking with external GPS measurement (using offsets with laser range finder) and cadastral data (and marked/survey tax lot flagging onsite).

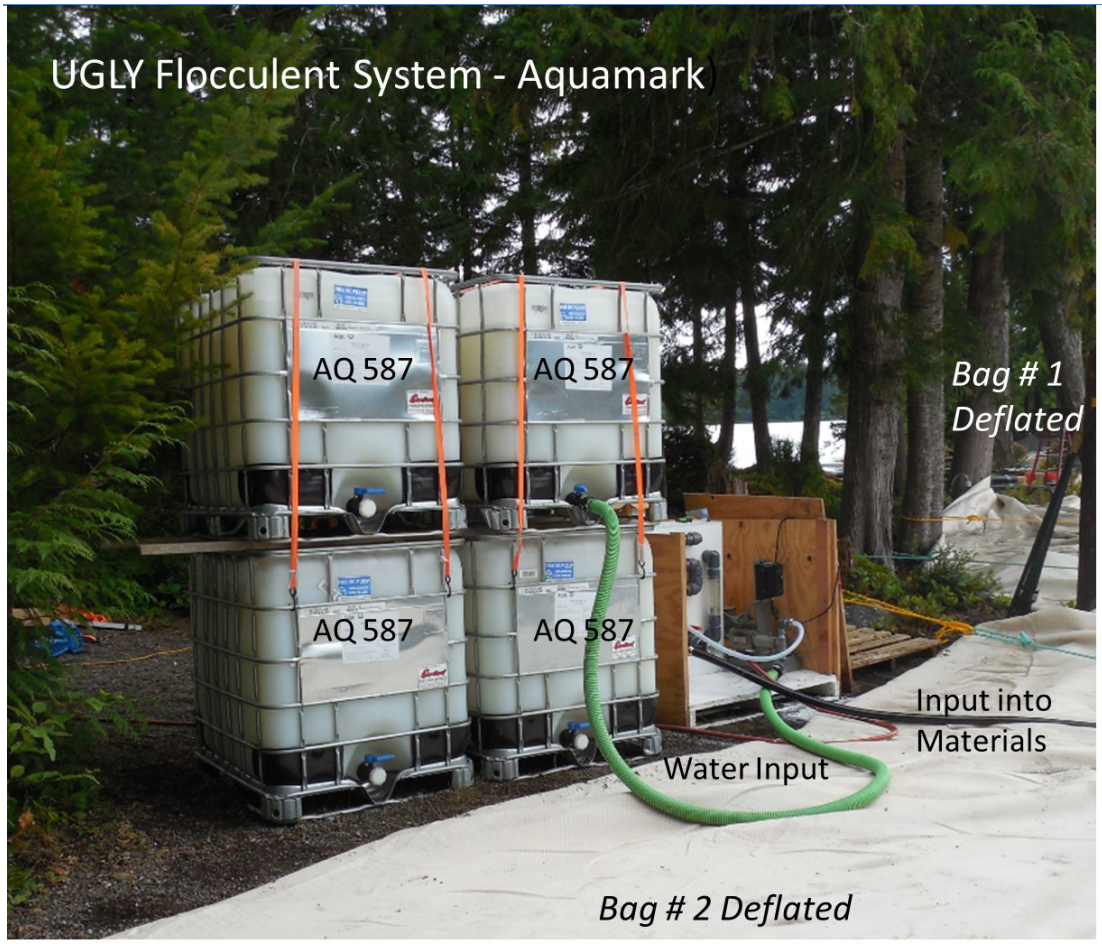
Shore Side Activities

Shore side activities included the monitoring and configuring the dewatering system, polymer concentration and sampling, changing geo-bags, and optimizing the configuration/production.

Sampling and Rates

Sampling is performed prior and after polymer injection for optimize dewatering rates. Polymer rates are presented below:

The flocculent is polymer (polyacrylamide) is effective in stabilizing the material and assists on the dewatering and coagulant. The polymer is a water diluted Aquamark AQ 587 and is a safe, clean de-water agent which is readily biodegradable. This is an effective and safe polymer for dewatering applications in bio-bags. The material is labeled (29 CFR 1910.1200(f)) with no Hazards or Precautionary statements. The polymer is NSF/ANSI STANDARD 60 safe for Drinking Water Treatment.



The system was calibrated and we are finding optimum configures (from sample slurry concentration) to be at 27 to 45 setting on the injection pump (a low setting and flocculent is being slowly used). Prior to flocculent injection the slurry is taking over 45 minutes for initial settle.

Reporting

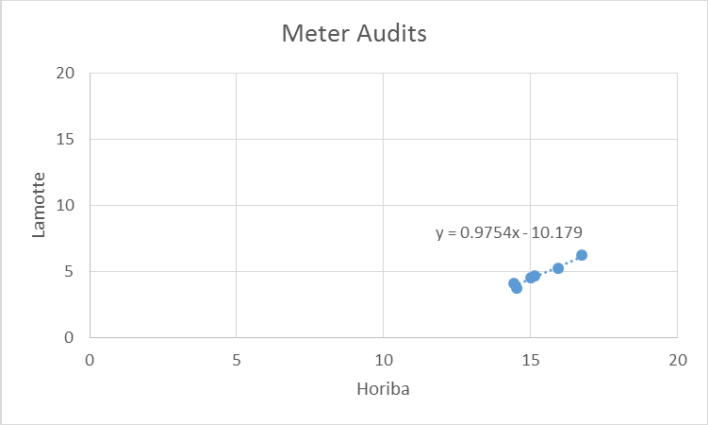
The MIC team continued to provide Daily Construction Reports to Team (expanded Email distribution on daily work). Summarized in Weekly Report. Also posted all submittals and reports to internet public access for team at:

https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z

Safety

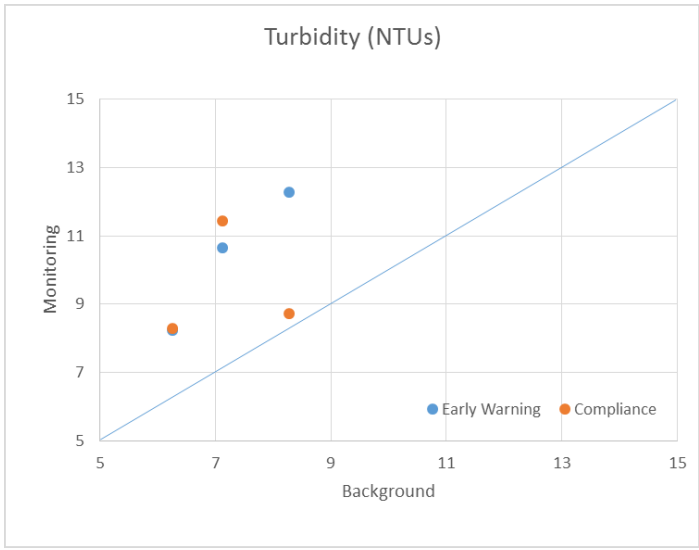
No safety incidents or near missed were reported. Daily safety meeting held with handouts that are posted on job board on site.

Environmental Compliance



Turbidity samples were collected daily using a multi-meter (Horiba U-52) and a bench Turbidity (LaMotte Series 2020) meter. Multi-parameter water quality meter in accordance with methods described in the Lake Limerick Water Quality Monitoring Plan. The Horiba was calibrated prior to deployment with standards prior to deployment on the Lake Limerick Project. The meter (which has a high resolution pressure transducer and GPS in addition to other parameters) was used for the field surveying. This required having the sensor in thick sediments and sampling (yielding turbidity is the 700 NTU plus range [up to 1000]). Back ground samples were also collected using a Lamotte and/or Hanna bench turbidity meter onsite for comparing calibrations/measurements. The results are presented below for standards and audit samples:

The LaMotte meter is field calibrated with 1, 10, 100 and DIW. Audit scans on the 10 NTU Audit meter solution never varied more than 0.25 NTUs. Direct comparison of samples of the meters against one another shows the variability (a bias of +10.5 NTUs). We will bring solution standard and re-calibrate (field Lab) the Horiba in the future as needed (and or bring additional sensor). We are using grab samples and LaMotte meter for all Water Quality turbidity reporting. We are using the Horiba meter for location (GPS as available), depth and measure dredge slurry concentrations, and resulting dewatering conditions which are all high concentrations.



Samples were twice per day when and presented below with no issues noted for compliance.

Upcoming Schedule

The material is extremely fine materials some silts and some sands. Materials is very soft and easy to dredge until bottom is encounters (which is consolidated sands and cobble). Since fast dredging can be performed but requiring stopping dredging and allowing the bags to dewatering. Therefore to increase production we are going to implement the following next week to increase production:

- Working 5 to 6 days with 10 hours of work each

- Adding an aluminum manifold (the 10" HPDE will use channeled into 8" Aluminum pipes with valve controls (instead of one entry in to one bag allows 4 entries in 2 bags allowing increase pumping times). Will bring on site Monday or Tuesday.
- Adding 2 new geotextile bags with smaller footprint (100 feet by 35 feet) which will fit better in Log Toy Park and also allow more pumping time (new bags). Ordered on Friday and to be delivered on site.

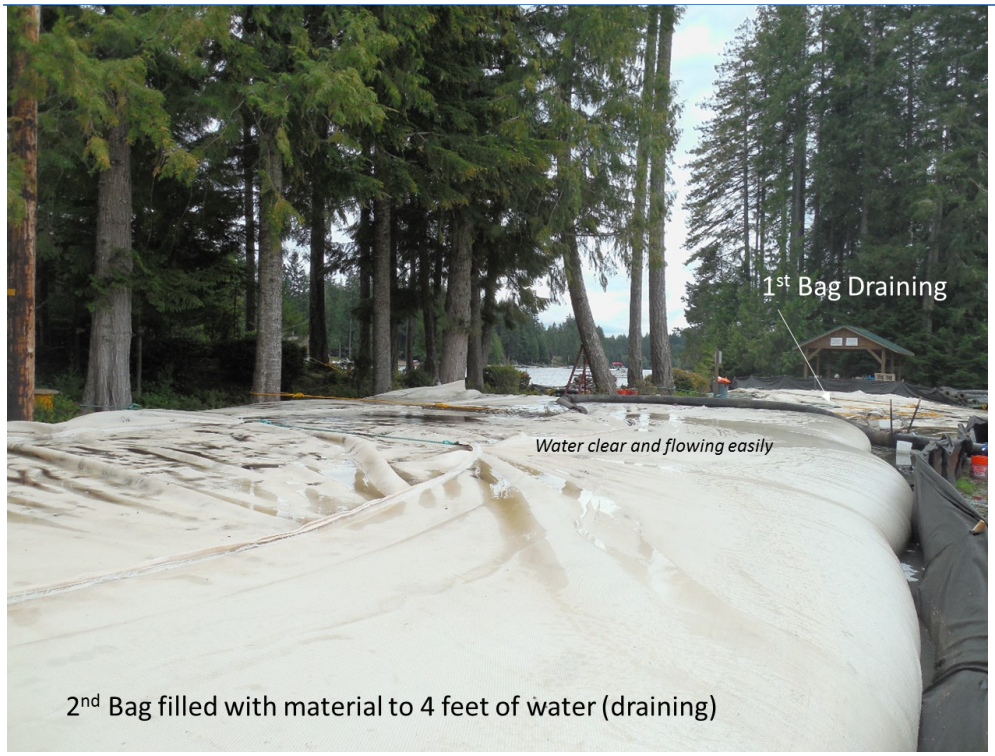
Upcoming Tasks

The primary upcoming tasks are:

1. Continue Dredging
    a. Kings Cove
    b. De-water of Sediments.
        i. Set up addition methods for increasing water time
2. Support and QC Tasks Scheduled this week
    a. Continuing routine monitoring (locations, volumes estimates, water quality)
    b. Survey on Wednesday (depending on progress) - Transects to be competed in Kings Cove Tributary
    c. Field sediment analysis include density, major gradation and estimates of compaction to be completed

Our estimated schedule is attached (we will refined as we get additional pumping time to refined production estimates). We are noting the production is limited by long dewatering times.

Calendar							
M	T	W	T	F	S	S	
1	2	3	4	5	6	7	August
8	9	*Today*	11 --- Prep/ Manifold--|	12	13	14	
15 ---Kings Cove Dredging ----------|	16	17	18	19	20	21	
22 --Kings Cove Clean Up	23	24 Move to other Side-|	25	26	27	28	
29 ---Cranberry Cove Dredging------|	30	31	1	2	3	4	September
5 ---Cranberry Cove Dredging -----|	6	7	8	9	*Last Day of Dredging*	11	
12 ---Dewater time------|	13	14	15	*Permit End*	17	18	
19 ---Disposal Site & Demob -----|	20	21	22	23	24	25	
26	27	28	29	30			



Risk Management

The major risks for completing the project is not getting all the hours in production for dredging. Since dredging production is high, the limiting factors are associated with the dewatering time (i.e. stop dredging when the de-water bags are full).

Dewatering Site

Our issues dealt with the small site area and unlevel surface. We have several proactive approaches we will implement to improve dewatering including additional smaller dewater bags (our current bags and 100' x 75' and are ordering new 100' x 35' bags), manifold system with valves for controlling bag filling (and adding additional pipes [i.e. 1 10" pipe changed to 4 8" pipes with head reduction]).

Crewing

We have been crewing with 3 to 4 crew members. The primary three employees have been Matt Fobert (Supervisor, Operator and Dewatering Site), Eric Hittle (Operator, Dewatering and Labor) and Mike Goetz (Support Labor). Additionally Tom McCauley and Joe Bernert have been on site to assist with labor and Quality Control. On Thursday (8/11/16) Mike G became unavailable due to family illness and will no longer be available for the project. Matt and Tom are determined additional crew member to join the Team. Joe will continue to provide assistance (3 to 4 days per week on and off site).

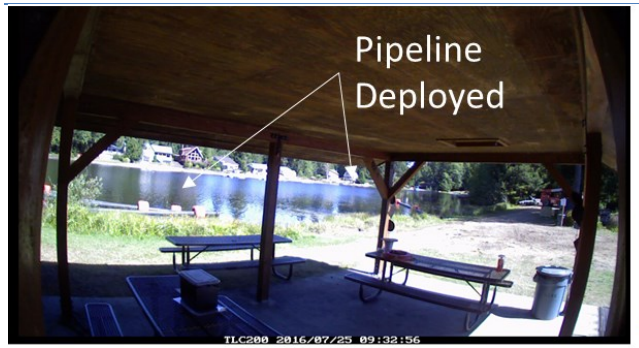
Debris and other Issues

We have not had any serious issues with debris (minor clogging from small woody materials), water quality or other factors. All of our interactions with local residents has been very positive (including neighbors watching our equipment). Only limited local boat traffic and not impacted any work and we

improved access by sinking pipelines for expanded access. So far the noise from the MudCat appear to be acceptable and appreciate the residences tolerance. Typically we are operating at lower engine levels and noise is greatest at start up and when clearing mud from the lines.

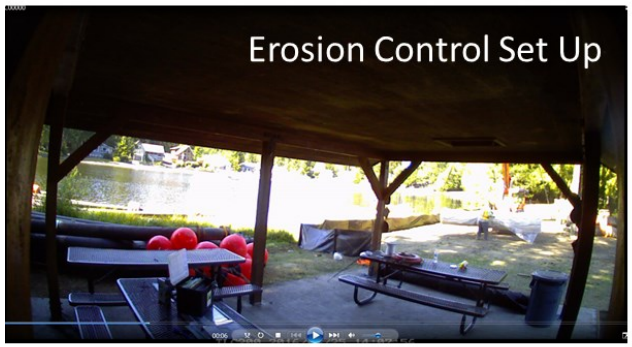
Reporting

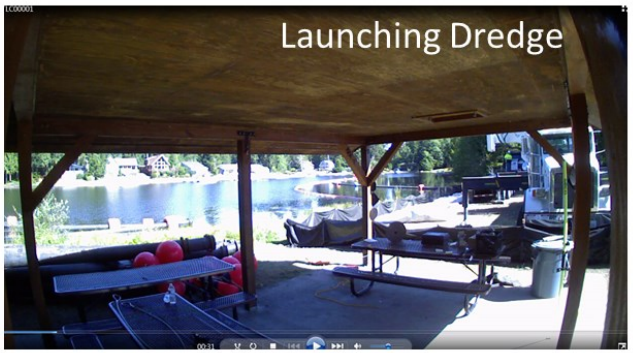
Daily Construction Reports were provided daily. Annotated photo documentation of work activities are presented below, to date.


Pipeline
Deployed
TLC200 2016/07/25 09:32:56


Set Up Initial Bag


Pumping Bag 2


Erosion Control Set Up


Launching Dredge


Positioning Bags


Erosion Control Set Up


Pumping Bag 1


Bags Dewatering

Lake Limerick Dredging Weekly Report: August 12 to August 18, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

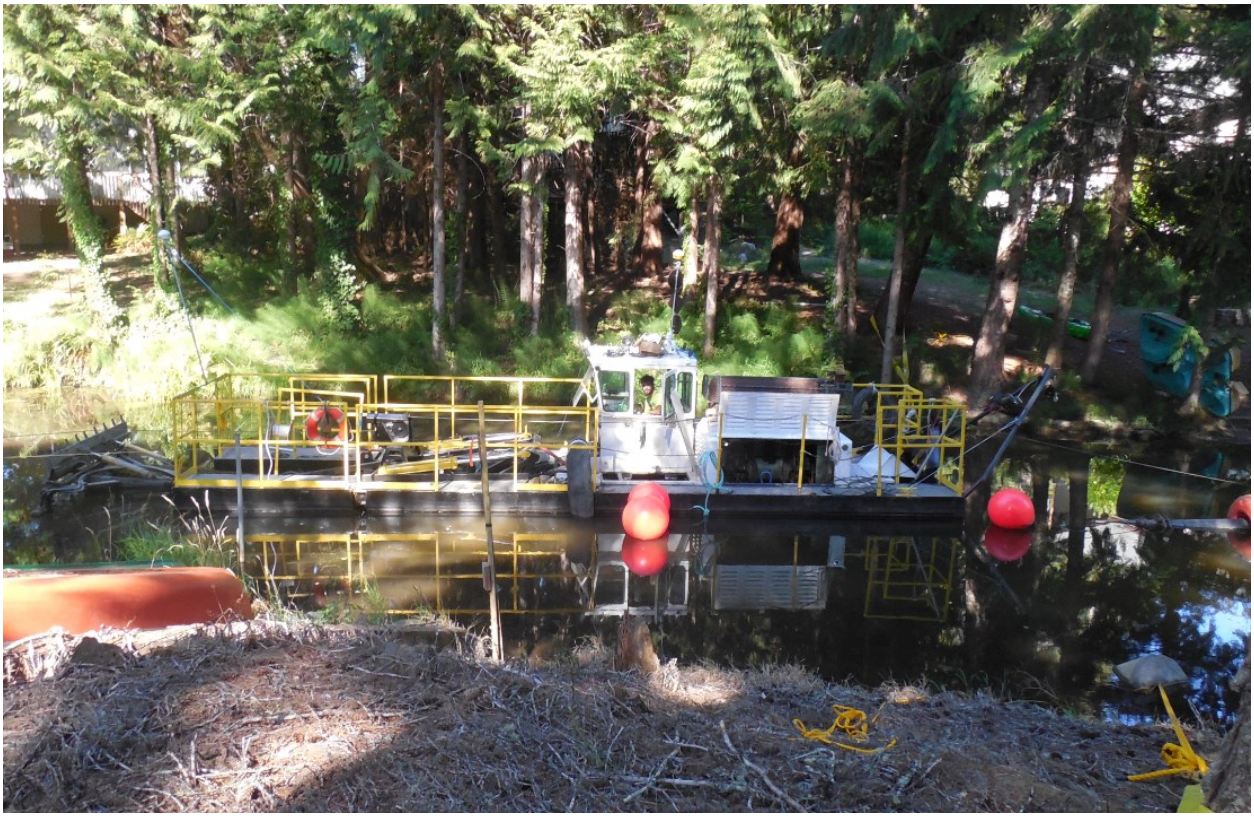
Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

August 18, 2016



MudCat Dredging upper end of Kings Cove Tributary

Table of Contents

Work Summary

Marine Industrial Construction, LLC (MIC) resumed dredging the week of August 15th, 2016 (with crew arriving on Sunday night and on the lake early Monday). Off-site equipment was prepared in Wilsonville by Tom McCauley.

Summary of major tasks include:

- Working a 50 hour week onsite Monday to Friday 10 hour / plus days (dedicated crew of 3 on sites with field support on QC for 3 days with 1.5 people).
- Working in Kings Cove tributary with MudCat. The primary

Dredging, dewatering and work commenced. Estimated total volume dredging is 14000 cubic yards (c.y.).

August 15, 2016

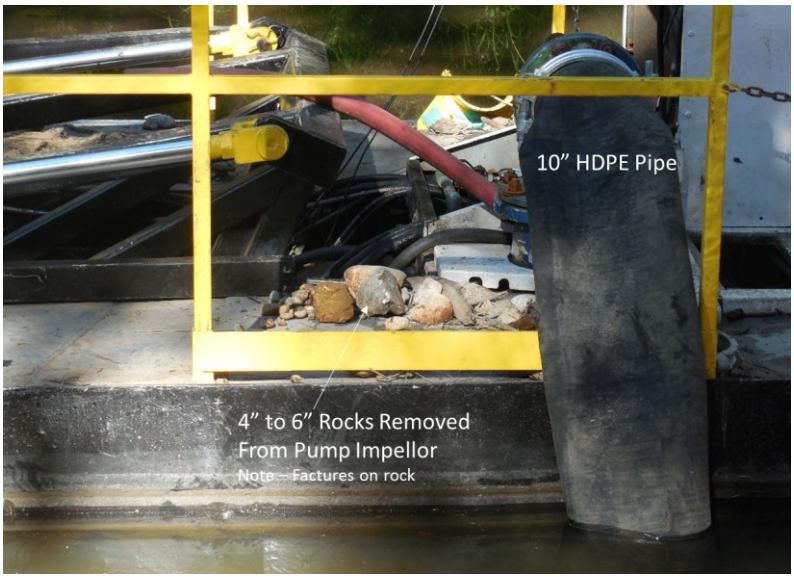
Lake Limerick Project Meeting on site with Rob, Brian, Kelly and Joe. Safety Meeting afterwards with Matt/Eric. New employee on site to assist as labor / train to Equipment Operator (at 9:00 am). Sloughing around MudCat buried Dredge in soft material. Pulled dredge back with Skill and started dredging the new slough. Dredging in Kings Cove Tributary area (significant sloughing from upstream and side slopes / near shore). Dewatering in existing bags which had drained completely and consolidated material present in bags. Water Quality sample performed (see below). Current bags are filling with very fine materials blocking the sieve sizes. Flocculent running at 30 with good settling observed; increased later in day to make clearer effluent. 7 Dredge runs throughout the day (wait times increasing on dewatering due to the larger than expected amounts of fines). Rewired German cable pull once. Additional pipe added to reach top end of dredging prism in tributary (note crushed gravel encountered). We believe based on afternoon samples we can removed crushed rock with dredge which is laying on additional layers of biomuck. Estimated total volumes dredge roughly 200 CY (difficult to estimate [low side] due to large sloughing). Material is extremely fine with 15% great than Sieve #120, 35% sieve #230 and 50% passing.

We are noting clogging on the dewatering bags due to the extremely large amount of very fine materials resulting in long dewatering time. This is causing dredging to stop and wait for dewatering. We are setting up another large dewatering bag up (early in the week) from the existing bags to dewater into the existing dewatering (TESC) area (up towards restrooms). We have ordered several custom sized smaller dewatering bags to be placed on top of the existing bags near the shelter and dock (narrow and long) which should arrive

late this week and early next week. Since dewatering times are the limiting factors we will continue to install and configure additional dewatering capabilities. Storage area in Log Toy Park is very limited given the material we are encountering and the site conditions (i.e. slopes on ground, vegetation present, access, width of lay down area, etc.).

Roughly 200 cy estimated volume.

August 16, 2016



Lake Limerick Safety Meeting at 7:00 am. Pumping into Bag 2 during day with MudCat (5 x 15 to 30 min production runs). Huge amounts of sloughing noted at upper end of prism. Covered/dredged area in depth at 0.5 foot of water and area of roughly 25 feet in length and 8 to 10 feet in width. Dredging depth to roughly 4 to 5 feet of sediment. Solids concentration running very high at close to 40%. Have only about 10 feet remaining to top of dredging prism. Slough from upstream and side slope occurring during work. Anthropogenic rock removed (buried in 1 feet of muck under laid by more muck). Flocculent running at 35 on gage. Dewatering in Bag 2 slow but increased by walking tubes. Bag running at an estimated 30% full of sediment (estimated at approximately 500 cy of compacted materials). Water quality sampling completed***.***

Good progress made estimated volume dredged around 200 cy.

August 17th, 2016

Lake Limerick Safety Meeting at 7:00 am (Matt, Eric, Steve). Joe arrived at 7:30. Pumping into Bag 2 during day with MudCat. At end and encountering gravel and pumping into bag. Started setting up bag 3 in parking area. Joe and Brian reviewed gravel area. Starting pumping for extended time period in to 3rd bag from upper end. Encounter large diameter rocks and cobble (river round). Numerous rocks over 4" to 6" jamming in rock box. Removed several large rocks stopped pump and required removal from impellor (luckily rocks sheared in half and no significant damage to pump [photo documented]). Third bag dewatering well and supporting longer pump times. Received delivery of smaller dewatering bag (at end of day) and aluminum manifold pieced (and misc. supplies). Motor on skiff experience additional issues associated with operations in shallows/mud. 2nd skiff requested to be developed on site on 8/18 to support moving anchors.

Good progress made estimated volume dredged around 200 to 300 cy.

August 18th, 2016

Safety Meeting in morning. Duckworth scheduled to replace Lund Skiff. Move dredge back and pumped. Removed pipe and pulled anchor lines. Dredged into bag 3 (dewatering performing well). Dredge aground on starboard shore. Freed and Dredging resumed. Water Quality sampling. Meet with Washington Department of Fish & Wildlife. Survey for assessment started. Pipe shortened for morning dredging.

Good progress made estimated volume dredged around over 300 cy.

August 19th, 2016

Work will continue on August 19th (Friday) as MIC proceeds to move ahead. Starting next week MIC will crew 6 days a weeks; and add additional crew as needed (for moving to other side of lake). The crew is confident that all dredging in the Kings Cove tributary will be completed by COB on 8/19/16. Anchors need to be placed and dredging to continue.

Volume estimates for day are expected to be near 500 cy since anchors and dredge positioned on Thursday (and bio bag in place).

On Site Equipment

The current MIC equipment and supplies onsite includes:

- Forklift
- 3000’ 10” HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.
- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Anchors (Concrete 300 and 500 lbs.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Rigging (rope, wire, slings, shackles, etc.)
- Flocculent injection pump and polymers (UGLY System)- 4 totes of polymer onsite
- Lund/Duckworth Skiff with outboards
- Turbidity Curtain
- Geobags/Bio Bags (6 total); 1 small additional
- MudCat Dredge
- Silt Fence
- Geo-fabric
- Manifold
- Polymers/flocculent

Marine Activities

Dredging continues with the MudCat in Kings Cove Tributary and dewatering at Log Toy Park with geotextile bags and polymer. The skiff provide support activities. Pipe and anchors were repositions supporting dredging.

Dredged Area

The dredged area in Kings Cove was tracked with field maps and noting locations. Since the dredge is in a depression (the tributary), in thick forest cover, we are experiencing poor GPS reception on the dredge mounted antennas. To assist we are tracking with external GPS measurement (using offsets with laser range finder) and cadastral data (and marked/survey tax lot flagging onsite). Field mapping and surveying was completed on 8/17 with additional transected to be competed on 8/18. Confirmed volumes will be determined of in place mud removed.

Shore Side Activities

Shore side activities included the monitoring and configuring the dewatering system, polymer concentration and sampling, changing geo-bags, and optimizing the configuration/production.

Sampling and Rates

Sampling is performed prior and after polymer injection for optimize dewatering rates. Polymer rates are presented below:

The flocculent has been running from 27 to 35 setting on the injection pump (a low setting and flocculent is being slowly used). Material is being pumped at 10% to 30% solids on average. Lower concentration were encountered (slower dredging) when rock encountered. Prior to flocculent injection the slurry is taking over 45 minutes for initial settle. The material in the water column is very fluid but stabilizes quickly (and passes Paint Filter test very quickly – see photo documentation below). Material is dominantly very fine suspended materials.

Reporting

The MIC team continued to provide Daily Construction Reports to Team (expanded Email distribution on daily work). Summarized in Weekly Report. Also posted all submittals and reports to internet public access for team at:

Safety

No safety incidents or near misses were reported. Daily safety meeting held with handouts that are posted on job board on site.

Environmental Compliance

Turbidity samples were collected daily using a LaMotte Series 2020 meter. No violations has been observed and turbidity has remained low. Washington Fish and Wildlife has a site visit on 8/18/16 and met with Joe Bernert on site.

Upcoming Schedule

Dredging production is expected to significantly increase since we will be leaving the Kings Cove Tributary. The narrow nature of the tributary required removing and adding pipe to change the dredges range (instead of pipe floating freely in water), encountered rocks and harder digging, and needed to watch for obstacles. Additionally, MIC had shore side issues with de-water bags at Log Toy Park that appear to have been resolved with the lay out in the upper parking lot (and we still have small bags and the manifold system we can deploy).

Our major risk now is anchor deployment for securing the dredge. Shore side trees have been the most effective anchoring and using winches and wire level ratchets (i.e. come-alongs) to cover broader areas. In addition to meet schedule MIC has implemented the following next week: to increase production:

- Working 5 to 6 days with 10 hours of work each (Monday to Friday/Saturday)
- Another smaller geotextile bags with smaller footprint (100 feet by 35 feet) will arrive next week
- Gate values for manifold piping
- Additional large Danforth / Fortress anchor to be brought on site.

Upcoming Tasks

The primary upcoming tasks are:

1. Continue Dredging
    a. Two (2) Lake Transects in Kings Cove
        i. Anchor Points to be determine and placed
    b. De-water of Sediments.
        i. Set up addition methods for increasing water time
2. Prepared to move to Cranberry Cove
3. Support and QC Tasks Scheduled this week
    a. Continuing routine monitoring (locations, volumes estimates, water quality)

Our estimated schedule is attached. We are still using the previous schedule and using Saturday to make up for any losses or issues slowing production. We will continue to refined as we get additional pumping time to refined production estimates). We are noting the production is limited by long dewatering times.

Calendar							
M	T	W	T	F	S	S	
1	2	3	4	5	6	7	August
8	9	*Today*	11 --- Prep/ Manifold--|	12	13	14	
15 ---Kings Cove Dredging ----------|	16	17	18	19	20	21	
22 --Kings Cove Clean Up	23	24 Move to other Side-|	25	26	27	28	
29 ---Cranberry Cove Dredging------|	30	31	1	2	3	4	September
5 ---Cranberry Cove Dredging -----|	6	7	8	9	*Last Day of Dredging*	11	
12 ---Dewater time------|	13	14	15	*Permit End*	17	18	
19 ---Disposal Site & Demob -----|	20	21	22	23	24	25	
26	27	28	29	30			

Risk Management

The major risks for completing the project is not getting all the hours in production for dredging. The Team has actively worked at identifying and resolving all issues associated with the dredging production. One on the primary components of dredging is the amount of set up time. Production from the dredge has continued to remain high. The potential risks and limiting factors are associated with the equipment breakdown and anchor set ups.

Dewatering Site

The 3rd Bag (seen above) has been able to support 3 plus hours of pumping with good dewatering. The TESC was simple and effective using existing infrastructure. Bag 2 still has volume and has drained completely with major consolidation. We have one smaller bags (45' cicumference by 100') on site which can fit into the lower area of Log Toy Park where the remaining equipment is positioned and another to be delivered next week. We have only used ½ a tote of polymer (3 ½ on site).

Crewing

We have been crewing with 3 to 4 crew members. The primary three employees have been Matt Fobert (Supervisor, Support and Dewatering Site), Eric Hittle (Primary Operator, Dewatering and Labor) and Steve Godsil (Support). Additionally Tom McCauley and Joe Bernert have been on site to assist with labor and Quality Control. Joe will continue to provide assistance (3 to 4 days per week on and off site).

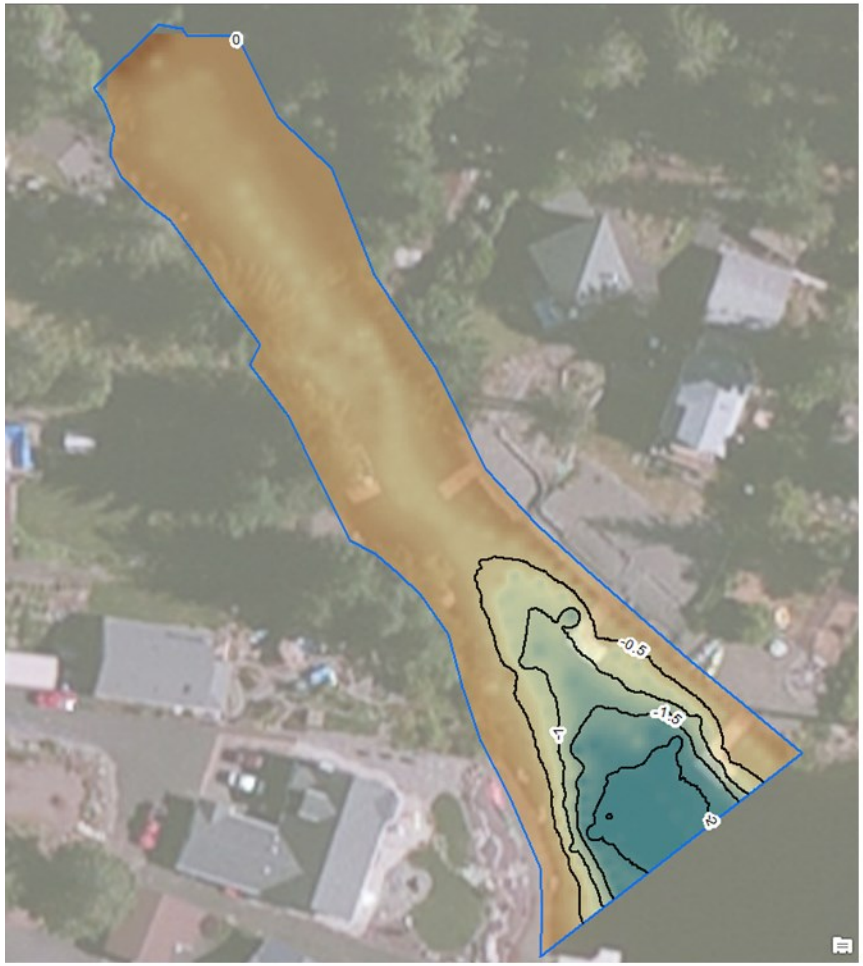
Reporting

Daily Construction Reports were provided daily. Annotated photo documentation of work activities are presented below, to date.

Preliminary Surveys are presented below. Additional data collection is expected on 8/19/16 for updates and revisions. Preliminary volumes are in agreement with daily estimates. The bottom end of the Kings Cove Tributary is scheduled for removal on 8/19/16 (dredge in position and no obstacles expected). Skiffs are able to motor in area. Previous to dredging upper end was running 6" (or less) of water over the bio-muck.

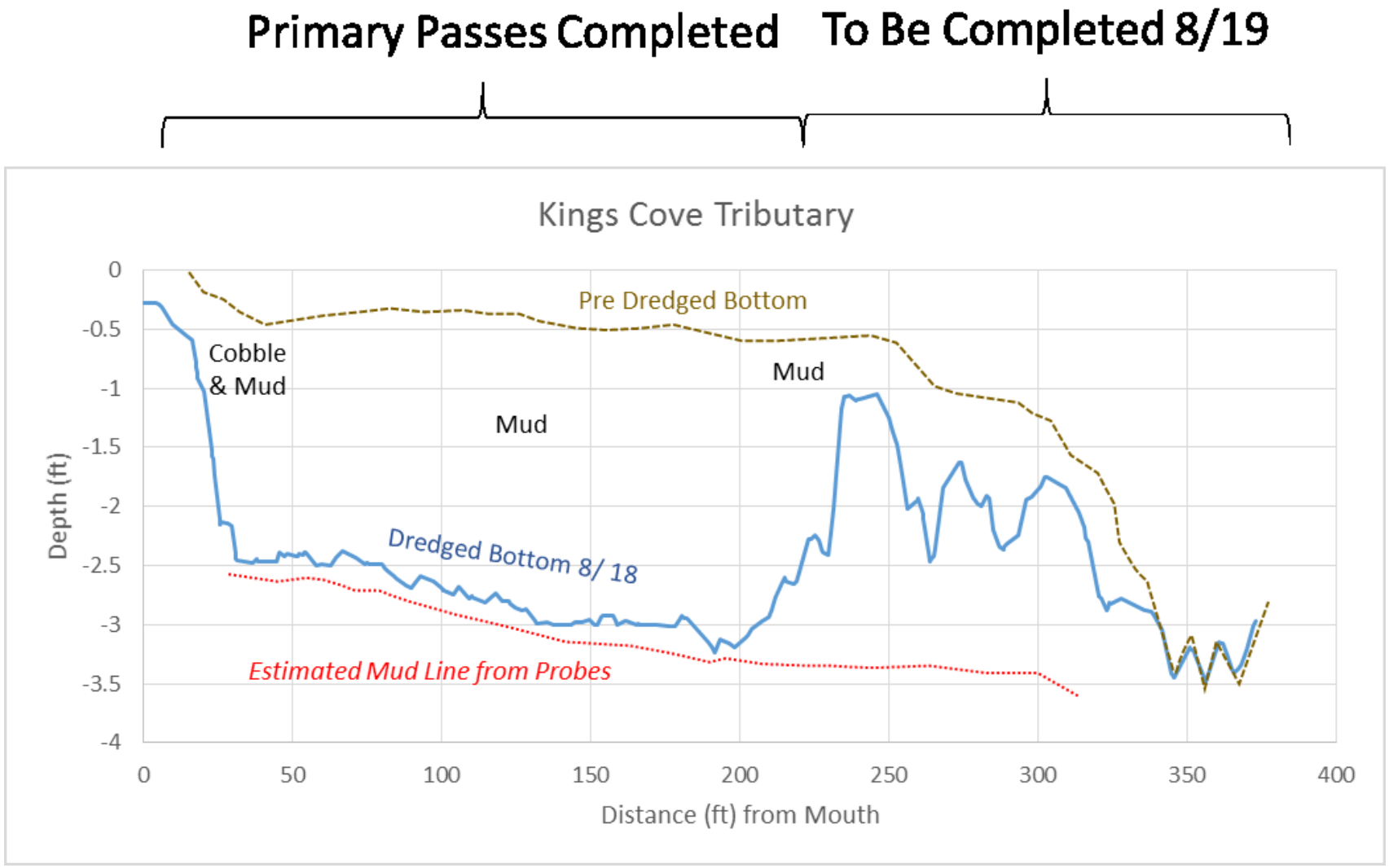
A transect down the center is presented which shows where the dredging has stopped. Slough is going upstream to the dredge as it has worked downstream. The depth of the sediment is unknown as we get into the lake since we cannot easily penetrate / sample due to increase water depth. We probe the dredged area and find / feel nominal sediment (couple inches). Propeller wash troughs are apparent in the survey and visually in the tributary / lake due to our boat work required for access. Note this is increasing sloughing actions.

Pre Dredged Survey from Transect



Dredged Survey 8/18/16

Note Transect on Survey


Primary Passes Completed
To Be Completed 8/19
Kings Cove Tributary
Pre Dredged Bottom
Cobble & Mud
Mud
Mud
Dredged Bottom 8/ 18
Estimated Mud Line from Probes
Depth (ft)
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
0
50
100
150
200
250
300
350
400
Distance (ft) from Mouth

Lake Limerick Dredging Weekly Report: August 19 to August 26, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

August 27, 2016

MudCat Set Up in Cranberry Cove

Table of Contents

Work Summary

Marine Industrial Construction, LLC (MIC) resumed dredging the week of August 22, 2016 (with crew arriving on Sunday night and on the lake early Monday). Off-site equipment was prepared in Wilsonville by Matt Fobert over preceding weekend.

Summary of major tasks include:

- Working a 40 plus hour week onsite Monday to Friday 10 hour / plus days (dedicated crew of 3 to 4 people on sites on dredging and mobilization and on site QC for 3 days with 1.5 people).
- Completed Lake transect dredging Working in Kings Cove with MudCat.
- Mobilization of pipe, anchors, dredge to Cranberry Cove.

Dredging, dewatering and work commenced. Estimated total volume dredging is 2,750 cubic yards (c.y.).

August 22, 2016

Meeting with LLCC and TT. Safety Meeting in morning. Repaired Duckworth motor. Changed anchor locations into the Lake. Secured on tree at lake end. Danforth and concrete anchors in lake. Dredged 170 swath with 3.5 to 4.5 feet of sediment. Noted coarser material including cobble (turkey grit, pea gravel and other material intermixed in sediments). Woody debris also encountered. WQ samples taken. A large log was encountered and dredged on both sides. Bags filling so switched from Bag 3 to Bag 2 and back again. Flocculent at 30. Resulting lake depth are to 5 – 6 feet. Encountered large amount of matted submerged vegetation with thickness from 6 inches to 12 inches (photo attached – landscape figures). Many clog to cutter head (3 clogs in 30 minutes during start up) but easily cleaned. Material is not sloughing very quickly (as in tributaries) due to vegetation holding angles of repose. Ended dredging at 1700, shut down and secured.

Roughly 350 cy estimated volume.

August 23, 2016

Safety Meeting in morning. Changed anchor locations into the Lake (south side Kings Cove). Secured anchor on shore and shallows (and on tree at lake end). Started dredging on East (upstream) side. Initially 16 feet wide (2 passes) narrowing to 8 feet (in thick rooted materials with significant woody debris). Multiple logs encountered. Dredged by dock and rotate dredge head for additional access to dock (owner present and appeared pleased with progress). WQ sampled. Pumped in Bag 2 and Bag 3. Organics are not settling as fast as the fine sediments. Material was moderate with aquatic weeds but lots of small woody debris (photo). Starting water depths 1 foot and sediment depth removed average about 4 to 5 feet deep. Moderate sloughing occurring during dredging, some side stabilization due to roots and woody materials. The pass is over 50% complete and will shorten pipe on Wednesday morning and complete pass. Numerous clogs on cutter head required clearing auger head. Ended dredging at 1700, shut down and secured.

Roughly 300 cy estimated volume.

August 24, 2016

Safety Meeting at 7 am with Matt, Eric, Steve, Joe and Ryan. Tom arrived with Lund Boat (2nd boat for moving pipe). Removed 2 sections of pipe. Started dredging with MudCat. WQ sampling. Brian stopped by and Matt/Joe and Brian reviewed depth and sediment all sites in King Cove (2 lake transected and tributary). Brian talked with several land owners; and MIC explained methods. MIC crew volunteered to removed large metal piece on Thursday (see in photo above) when water clears (caused issues on cutter head [visible now when water clear]). Started moving and configuring pipe for cranberry Cove. Anchored pipelines. Started the set up additional bag. Shutdown for night and secured at 1700.

Roughly 300 cy estimated volume.

August 25, 2016

Safety Meeting in morning. Continued mobilization to Cranberry and set up MudCat for dredging on Monday. Safety Meeting at 7 am with Matt, Eric, Steve and Ryan. Joe ran samples including testing and mapping. Moved pipe, dredge, anchors, etc. Sunk /anchor pipeline passageway and marked with green and red buoys. Flashing lights on pipeline. Obtain Permission for anchor Point on tree in top of Cranberry. We also obtained permission to use a tree at 2579 Leisure World, Lake Limerick 3 lot 30 for dredging the Leprechaun area. Shutdown for night and secured at 1700.

No Dredging.

August 26, 2016

Brief Meeting at 7 am with Matt, Eric, Steve, Joe, Mary and Ryan. Joe/Mary performed sediment samples, paint filter tests and general clean up at Log Toy Park. Crew worked on setting up soft lines, anchors, positioning dredge and configurations as to start dredging on Monday (8/29/16) morning. Matt, Joe and Mary did field surveys and mapping work in Cranberry. Noted significantly more live weeds. Shutdown for night and secured at 1545.

No Dredging.

On Site Equipment

The current MIC equipment and supplies onsite includes:

- Forklift
- 3000' 10" HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.
- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Anchors (Concrete 300 and 500 lbs.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Rigging (rope, wire, slings, shackles, etc.)
- Flocculent injection pump and polymers (UGLY System)- 4 totes of polymer onsite
- Lund & Duckworth Skiff with outboards
- Turbidity Curtain
- Geobags/Bio Bags (6 total); 1 small additional
- MudCat Dredge
- Silt Fence
- Geo-fabric
- Manifold pipes
- Polymers/flocculent

Marine Activities

Dredging completed in Kings Cove Tributary and dewatering at Log Toy Park with geotextile bags and polymer. We also mobilized equipment to Cranberry Cove. Skiffs provide support activities. Pipe and anchors were repositions supporting dredging.

Dredged Area

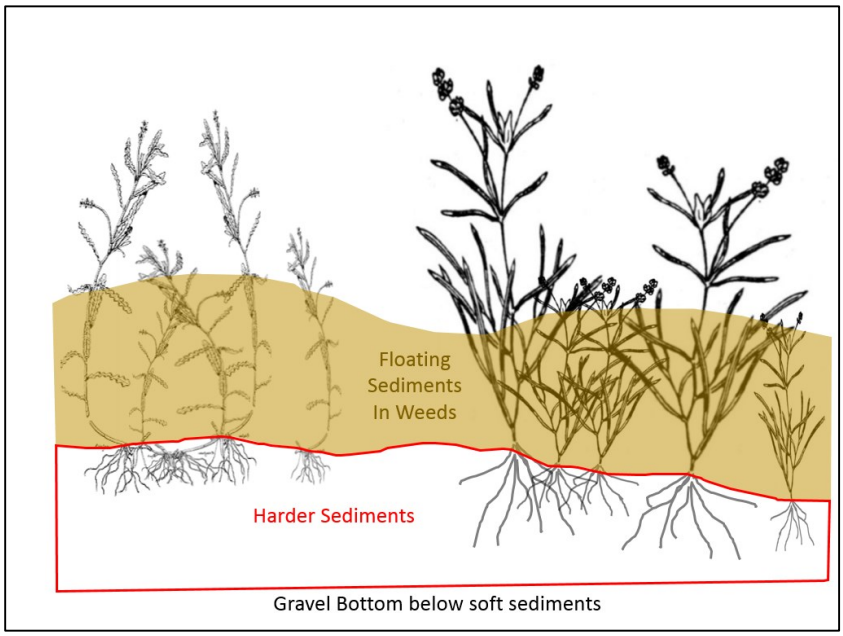
The dredged area in Kings Cove Lake transects north and south in attached maps (Kings Corrected for Flow / Lake Stage).

Pre dredge surveys and transects were completed for Cranberry Cove (see attached maps). Three methods were used to determine depth and all were somewhat problematic due to the very fine nature

of the sediments and presence of aquatics weeds. All methods agreed in calibration of Log Toy dock and included:

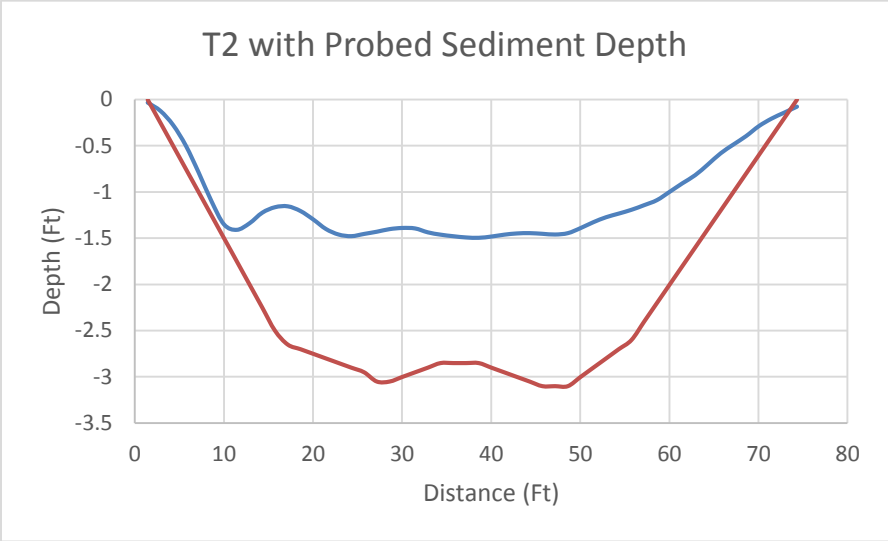
- Sonar (echo sounder) portable unit (HawkEye)
- Lead lines with 5 lbs weight
- Calibrated measuring probe

The probe yielded the most reliable results (and also depth to hard material [i.e. gravel]) but determining where the weeds sediment interface was difficult. Sounding tended to show tops of weeds and/or no reading if turbidity was generated from the boat. The lead line over estimated depths and underestimated sediment depth due to sinking into the fines. Overall the probe samples were average 2.5 to 3.0 feet on average. No deep deposits (i.e. > 4.0 feet), like in Kings Cove Lake, were observed. In some scoured areas (in the creek and at boat docks) only a fine layer of sediment was noted. It is expected that this was prop wash and changes frequently.



The attached pre-survey maps are focused on the red line on the attached figure (harder sediments to floating sediment in weeds interface) and an underestimate of the potential volumes.

Below is the probed transect midway to top of Cranberry Cove showing roughly 2.5 feet of sediments. Hard gravel substrate with large cobble (4 to 6 inch rock with round).



Shore Side Activities

Shore side activities included the monitoring and configuring the dewatering system, polymer concentration and sampling, changing geo-bags, and optimizing the configuration/production on Monday to Wednesday. Wednesday to Friday general set up to maximize production next week during dredging include maintenance of TESC, additional dewatering bag, set up and manifold installation.

Sediment Drying

Paint Filter Tests (EPA 9095B) was performed on dewatered sediment collected from the bags after 20 hours from dredging. The sample did not pass but close (3 ml of water released from 500 ml of sediment. After 2 days of dewatering and materials is dry and passed the test. The longer the material sits in the bags is also obtaining additional compaction we are obtaining.

Reporting

The MIC team continued to provide Daily Construction Reports to Team (expanded Email distribution on daily work). Summarized in Weekly Report. Also posted all submittals and reports to internet public access for team at:

Safety

No significant safety incidents occurred. Minor cuts and scrapes occurred and were discussed. This is minimized when Joe is not allowed to have pocket knife. Daily safety meeting held with handouts that are posted on job board on site.

Environmental Compliance

Turbidity samples were collected daily using a LaMotte Series 2020 meter. No violations has been observed and turbidity has remained low. No sampling on non-dredging days.

Upcoming Schedule

Dredging production is expected to significantly increase as we move into Cranberry Cove due to less aquatic weed mats and thinner deposit depths. We note that we expect to be running the MudCat at higher RPM in Cranberry to:

1. Support high velocities in the pipe (longer run) to minimize pipe clogs
2. More aggressive on the live vegetation with coincident fine suspected sediments.

Our major risk now is anchor deployment for securing the dredge. Shore side trees have been the most effective anchoring and using winches and wire level ratchets (i.e. come-alongs) to cover broader areas. In addition to meet schedule MIC has implemented the following next week.

- Working 5 days with 10 hours of work each (Monday to Friday); Saturdays if needed.

Upcoming Tasks

The primary upcoming tasks are:

1. Start Dredging in Cranberry Cove
    a. Continuing routine monitoring (locations, volumes estimates, water quality)

Our estimated schedule is attached. We are still using the previous schedule and using Saturday to make up for any losses or issues slowing production. We will continue to refine as we get additional pumping time to refined production estimates). The only production limitation is removed cutter clogs on debris and / or vegetation.

Calendar							
M	T	W	T	F	S	S	
1	2	3	4	5	6	7	
8	9	*Today*	11 --- Prep/ Manifold--|	12	13	14	August
15 ---Kings Cove Dredging ----------|	16	17	18	19	20	21	
22 --Kings Cove Clean Up	23	24 Move to other Side-|	25	26	27	28	
29 ---Cranberry Cove Dredging------|	30	31	1	2	3 Work Day Off on Mon Labor Day	4	September
Labor Day 5 ---Cranberry Cove Dredging -----|	6	7	8	9	*Last Day of Dredging*	11	
12 ---Dewater time------|	13	14	15	*Permit End*	17	18	
19 ---Disposal Site & Demob -----|	20	21	22	23	24	25	
26	27	28	29	30			

Risk Management

The major risks for completing the project is not getting all the hours in production for dredging. The Team has actively worked at identifying and resolving all issues associated with the dredging production. Production from the dredge has continued to remain high. The potential risks and limiting factors are associated with the unscheduled down time, equipment breakdown and anchor set ups.

Upcoming Risks:

- Status of Macro Invertebrate Survey (stopping dredging production scheduled for Monday)
- Additional Anchor required, if possible, on tree at: 1020 E St Andrews Dr (Limerick 3 Lot 4 [Martinez]). There is a large tree on the shore (northwest corner of the parcel) with some chairs and a boat in front of the tree (Joe C is following up on contacting owners).
    - Alternatives:
        - If we cannot tie to this tree we can put in anchors in the channel but will not be able to get as close to the shore line and remove as much material and south shore.
        - We have surveyed and reviewed the detailed Mason County Cadastral (Tax lot) data and the shoreline and large rock are in the lake ownership and will bring red head, drill and zinger to evaluate pining to rock if required.

Dewatering Site

The new 4rd Bag is ready for additional dewatering support as 3rd large bag begins to fill. The aluminum manifold was also configured to assist on future dewatering ease. The TESC was simple and effective using existing infrastructure. Bags 1 & 2 will not be used again. We have only used ¾ a tote of polymer (3 more on site).

Crewing

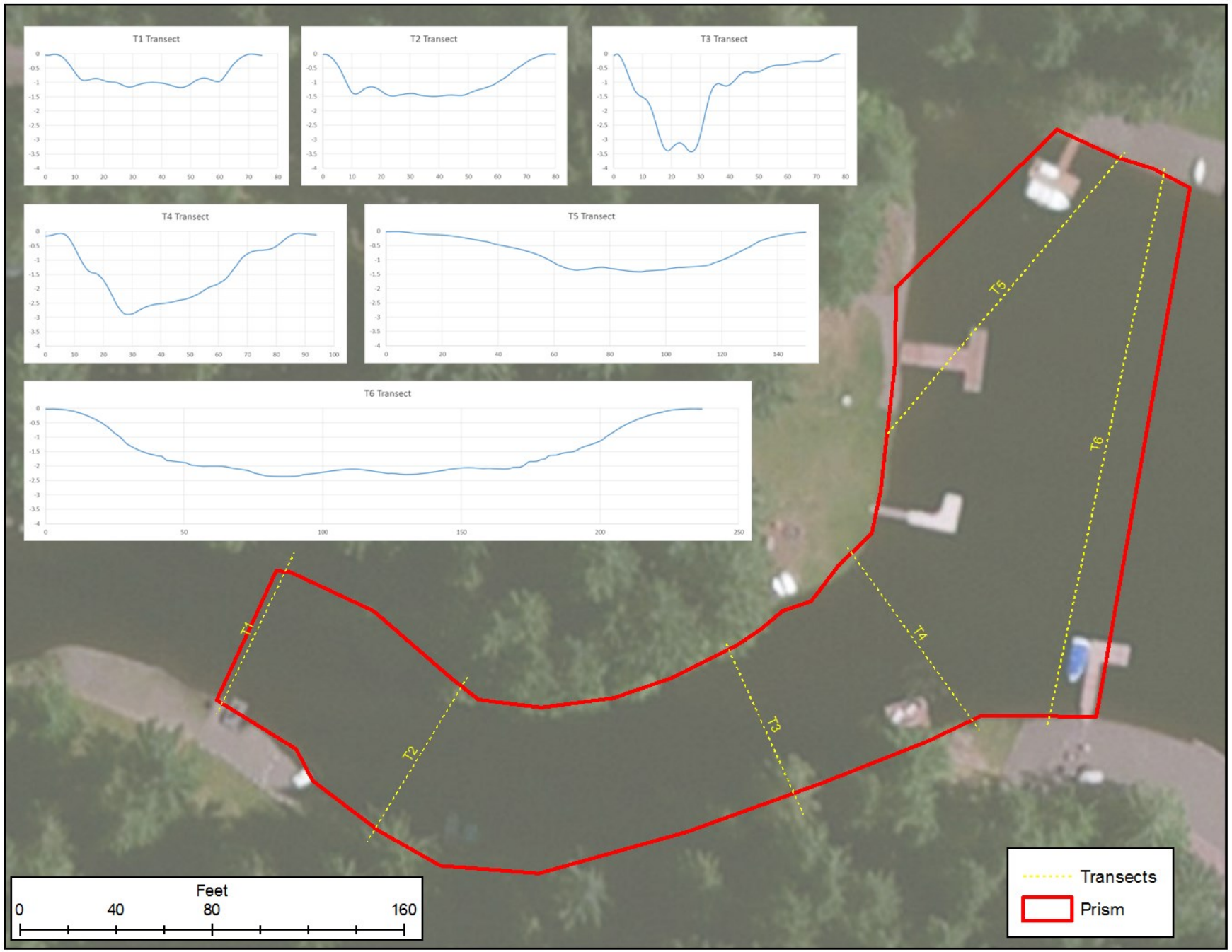
We have been crewing with 4 to 5 crew members this week and plan to move back to 3 crew primary members. The primary three employees have been Matt Fobert (Supervisor, Support and Dewatering Site), Eric Hittle (Primary Operator, Dewatering and Labor) and Steve Godsil (Support). Ryan Hemmingway provided additional assistance on site this week for assisting on moving to Cranberry Cover and other set up. Joe Bernert have been on site to assist with labor and Quality Control. Joe will continue to provide assistance (2 to 3 days per week on site and additional off site support

Reporting

Daily Construction Reports were provided daily.

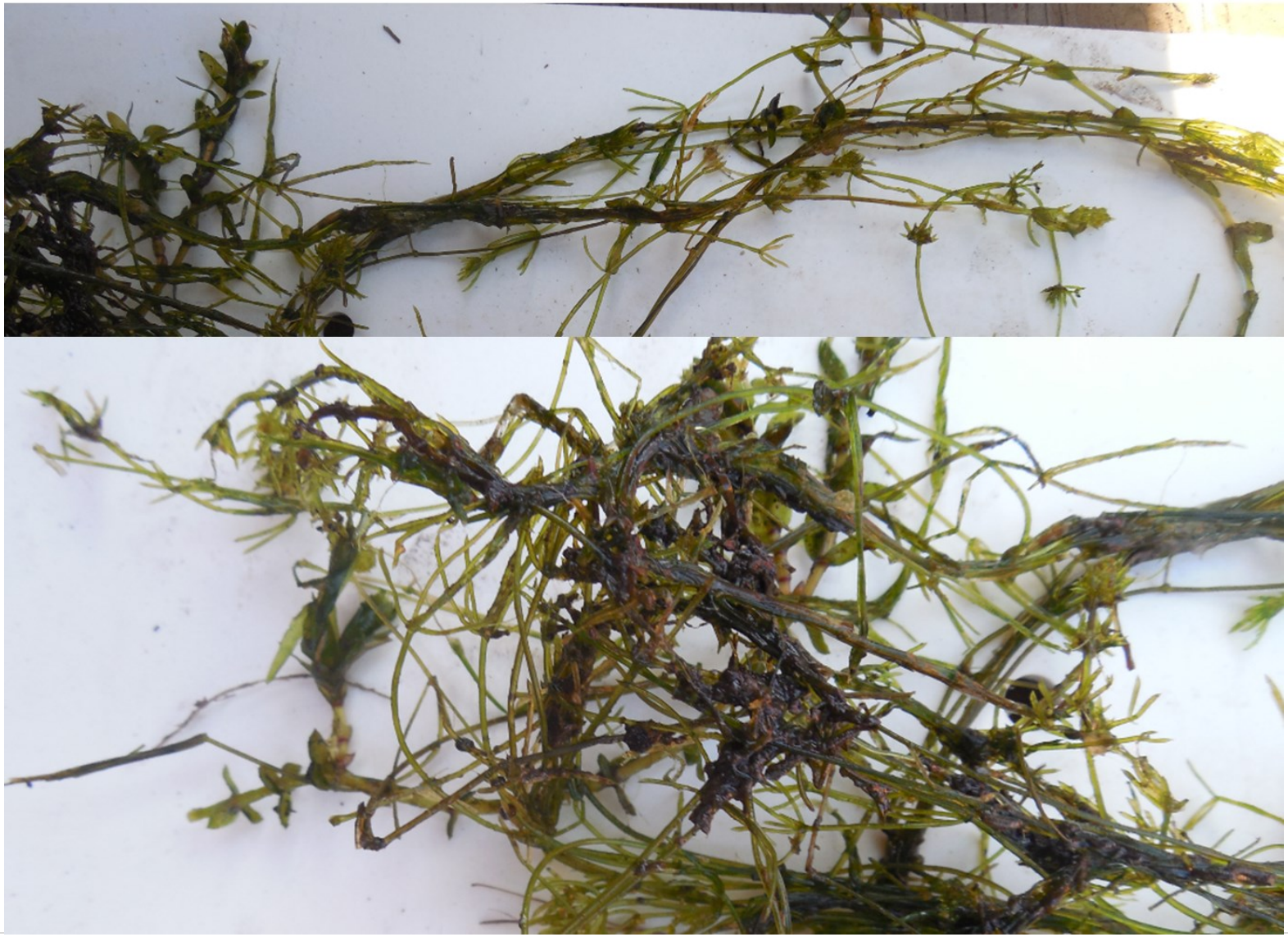
https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z

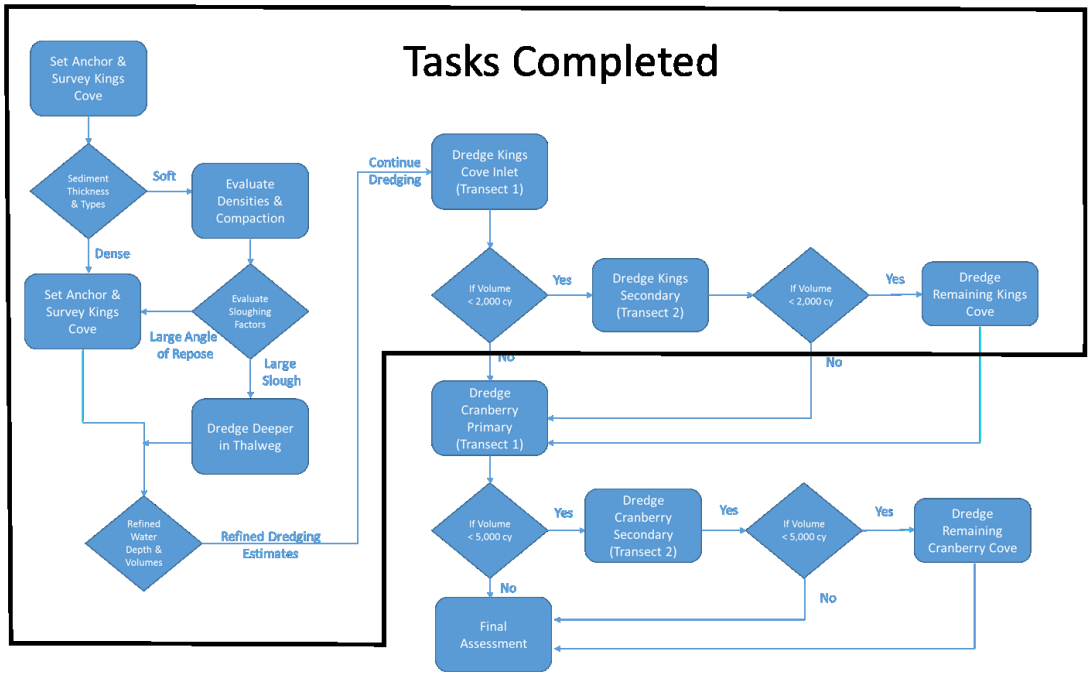

T1
T2
T3
T4
T5
T1 Transcet
Cobble
T2 Transect
T3 Transect
T5 Transect
T4 Transect
Feet
0
50
100
200
Transect
Prism

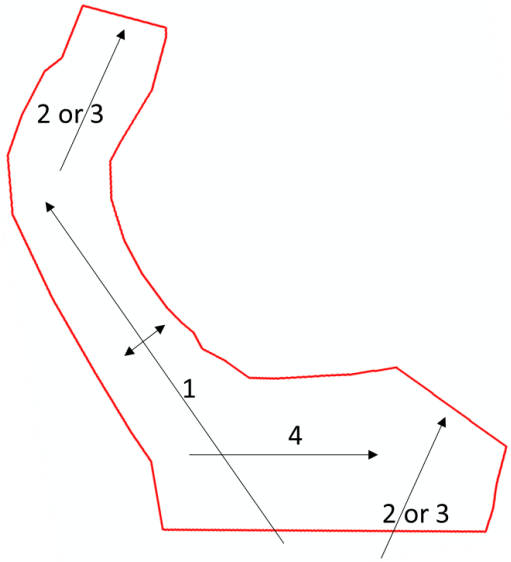

T1 Transect
T2 Transect
T3 Transect
T4 Transect
T5 Transect
T6 Transect
T1
T2
T3
T4
T5
T6
Feet
0
40
80
160
Transects
Prism

Thick Matted Weed on Bottom in King Cove Lake – North Side

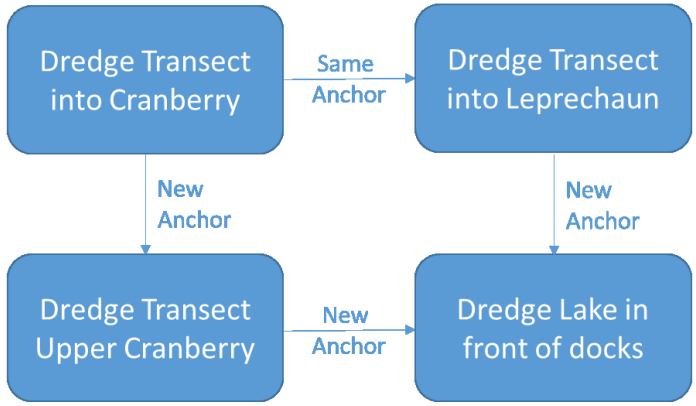
Aquatic Weed in Cranberry Cove







Cranberry Cove – 3000 CY



Lake Limerick Dredging Weekly Report: August 29 to September 2, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

September 3, 2016

MudCat Set Up in Cranberry Creek

Table of Contents

Work Summary

Marine Industrial Construction, LLC (MIC) resumed dredging the week of August 29, 2016 (with crew arriving on Sunday night and on the lake early Monday).

Summary of major tasks include:

- Working a 50 plus hour week onsite Monday to Friday 10 hour / plus days (dedicated crew of 3 people on sites on dredging one on site QC (and off site).
- Dredging Cranberry Creek and Cove.

Estimated total volume dredging from Cranberry Cove 2,540 cubic yards (c.y.). Roughly 750 to 1,000 cy remaining.

August 29, 2016

Weekly Meeting with Lake Limerick. Site visits in Cranberry in morning (for sediment sampling: Macro Invertebrate sediment samples taken on Monday by Rob -Tetra Tech). Proceeded to setting final anchor on tree with German ratchet. Pipe realignment. Added Additional anchors to pipeline. Dredging in lower Cranberry Creek. Excellent production. Six (6) clogs occurred and no issues on head pumping rate to de-watering site. Dewatering into large bag (Bag 3) with manifold. New narrow bag ready for deployment. WQ sampling. Secured equipment for night.

Material is finer sediments than in Kings Cove with higher water content (numerous locations up to 95% water). No vegetated matted material and aquatics weeds are easily removed and input into the cutters.

Roughly 390 c.y. estimated volume.

August 30, 2016

Safety Meeting in morning with crew. Dredging in Cranberry Cove south (Lake Section) and lower Cranberry Creek. Excellent production with long hours in production. Seven (7) clogs from wood and rocks occurred and no issues on head pumping rate to de-watering site. Lake depths to 4.5-4.8 feet and creek water depth to 3.5 feet. Dewatering into large bag (Bag 3) with manifold. WQ sampling. Secured equipment for night.

Very thick deposit had excellent production and volumes.

Roughly 750 c.y. estimated volume.

August 31, 2016

Safety Meeting in morning with crew. Dredging in lower Cranberry Creek and move to upper Cranberry. Excellent production with long hours in production (major sloughing). Reached area on bend with very thick bio-muck (up to 4 feet of mud). Repositioned with skiff. Six (6) clogs from wood and

rocks occurred. Creek water depth to 3.5 feet. Dewatering into large bag (Bag 3 and then into Bag 4) with manifold. WQ sampling. Secured equipment for night.

Completed thick deposit and moving into upper reach. Encountering more cobble and deposit becoming shallower.

Roughly 700 c.y. estimated volume.

September 1, 2016

Safety Meeting in morning with crew. Added 130 feet pipe to dredge to access upper reach. Dredging in middle Cranberry Creek. Major jam/clog of small woody required removing top of pump and clearing manually. Good production with major sloughing. Passed area on bend with very thick muck. Attempted to removal small grassy outcrop but encountered rocks. Several other minor clogs from wood and rocks occurred. Torrential rainfall in afternoon. Dredged creek water depth to 3.5 feet. Dewatering into large bag 4 with manifold. WQ sampling. Large cobble and nice gravel habitat is visible in creek after dredging (see photo below).

The clogs today slowed progress and crew decided to work Friday to ensure we complete Cranberry Creek. Tied last shore-side anchor. Joe C. received permission from the land owner and we move a paddle boat and skiffs out of the way so dredge wires will not impact them during the dredging. The paddle boat and skiffs will be moved back into location when we removed the dredge from Cranberry Creek (scheduled for Tuesday September 4, 2016).

Secured equipment for night.

Roughly 350 c.y. estimated volume.

September 2, 2016

Safety Meeting in morning with crew. Added flex pipe for bend in creek. Dredging in upper Cranberry Creek. Good production until 6 to 8 feet from upper boundary when sediment was intermixed with large amounts of gravels and large cobble (6" to 8" rocks) causing major jam/clog on entire intake. We stop dredged near upstream boundary due to encountering large cobble: One side is 6 feet short and other side about 8 feet short of marked boundary.

Significant biomass encountered creating numerous clogs during dredging. Creek water depth to 3.5 feet to 2.5 feet at upper end. Dewatering into large bag 4 with manifold. Added additional anchors to pipeline to secure for weekend. WQ sampling. Secured equipment for night (left in Cranberry Creek to ensure pipeline is pulled tight and not able to move in lake and keep out of the weather).

Roughly 350 c.y. estimated volume.

On Site Equipment

The current MIC equipment and supplies onsite includes:

- Forklift
- 3000' 10" HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.
- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Anchors (Concrete 300 and 500 lbs.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Rigging (rope, wire, slings, shackles, etc.)
- Flocculent injection pump and polymers (UGLY System)- 4 totes of polymer onsite
- Lund & Duckworth Skiff with outboards
- Turbidity Curtain
- Geobags/Bio Bags (6 total); 1 small additional
- MudCat Dredge
- Silt Fence
- Geo-fabric
- Manifold pipes
- Polymers/flocculent

Marine Activities

Dredging completed in Kings Cove Tributary and dewatering at Log Toy Park with geotextile bags and polymer. We also mobilized equipment to Cranberry Cove. Skiffs provide support activities. Pipe and anchors were repositions supporting dredging.

Dredged Area

See attached map presenting the dredged area this week. The dredging logs indicated 2,570 c.y. dredged in Cranberry, the area covered and depth (from maps) indicated that at 3.5 feet of material on average is roughly 2,250 (including no sloughing), the material dredged in the bags is roughly estimated

at 500 c.y. ([see table below] this is all of the material in Bag 4 and roughly 50% of the material in Bag 3). The 500 c.y. with a 4:1 to 5:1 compaction from dewatering is roughly 2,000 to 2,500 c.y. Given the area to dredge and observed sediment depth there is less than 1000 c.y. are remaining in the dredging prism, and is expected to dredge quickly since it is similar to southern sections of Cranberry Cove.

Shore Side Activities

Shore side activities included the monitoring and configuring the dewatering system, polymer concentration and sampling, changing geo-bags, and optimizing the configuration/production on Monday to Friday.

Sediment Sampling and Processing

Additional tests have indicated that after 2 to 3 days of dewatering and materials is dry enough to pass Paint Filter Test (EPA 9095). However the longer the material sits in the bags, we are obtaining additional compaction which will assist in minimizing disposal costs by reducing trucking costs.

The estimated 5,000 c.y. of material in situ in the lake dredged is expected to be compacted dewatered materials of 4:1 to 5:1 for disposal in the bags (use of polymer flocculent). This is roughly 1,000 c.y. of material (which generally agrees with the volumes observed in the bags dredged to date [see table below]).

	Feet						
Disposal	**Length**	**Circ.**	**Width**	**Average Height**	**Lay Out (percent)**	**CY**	**Notes**
Bag 1	100	75	37.5	1	50%	69.4	Bag - 3 feet on side 0.2 feet other side
Bag 2	100	75	37.5	1.5	50%	104.2	Bag - 3 feet on side 1 feet other side
Bag 3	100	75	37.5	3.5	100%	486.1	Bag - 4.5 feet on side 2.5 feet other side
Bag 4	100	45	22.5	3	100%	250.0	Bag - 3 feet on side 2 feet other side
Total						**909.7**	*Estimated total Dewater Compacted*

It is conservatively estimated that dry weight will range from 25% to 50% of the compacted volumes. So an estimate of 500 c.y. to 750 c.y. At a density of 3000 lbs. per c.y. (based on field samples) for an estimated weight of 750 to 1200 tons, conservatively.

Upcoming Disposal

Next week we will move to the transport and disposal of the material. Coordination effort with Matt and the MIC office will be on-going and reported for the trucking and approved disposal site. The approved trucking site is not as close as was expected before the project started and the hauling time is expected to take up to 3 or more days (and will be on going with demobilization); depending on number of trucks required. *Note - MIC/WCP has a fleet of 8 dump trucks but is considering subcontracting this*

work to a local contracting since Washington licensing will be required. The number of trucks to be determined based on travel time and loading.

Detailed Measurement and Payment methods are outlined in Section 10 20 00 1.04 A. These methods require the LLCC Project Manager to be onsite during the work activities (approving each loaded truck before departure). MIC proposes to perform photo documentation and sample sediments and provide to Lake Limerick for each trucks to allow team flexibility (since we are on-site performing loading) for sediment drying at the Lake Limerick Clubhouse. Additionally, the MIC team will tracking loaded weights [dependent on scale], photo documenting volumes, tracking number / volume of bucket loaded (and/or scaled loader) and total tallies [truck number, driver, time, volume and weight with representative sample collected for each truck].

Note current specification require the project manager to sign each truck ticket before the vehicle leaves the site for payment. Additional LLCC / Project Manager is required to sample each truck and perform Bone Dry Weight Measurements. MIC can provide assistance as needed.

Reporting

The MIC team continued to provide Daily Construction Reports to Team (expanded Email distribution on daily work). Summarized in Weekly Report. Also posted all submittals and reports to internet public access for team at:

https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z

Safety

No significant safety incidents occurred. Daily safety meeting held with handouts that are posted on job board on site.

Environmental Compliance

Turbidity samples were collected daily using a LaMotte Series 2020 meter. No violations has been observed and turbidity has remained low. Digital data was forwarded.

Upcoming Schedule

Dredging production increase significantly as we move into Cranberry Cove due to less aquatic weed, softer sediment, and higher water content in the sediments. Higher RPM on the MudCat have not been required to keep production high in Cranberry Cove.

No significant risks exist for the dredging since we only have a small area remaining to dredge. The schedule MIC will implemented for next week.

- Working 3 days with 10 hours of work each (Tuesday to Thursday); Friday if needed.

Upcoming Tasks

The primary upcoming tasks are:

1. Complete Dredging in Cranberry Cove
    a. Continuing routine monitoring (locations, volumes estimates, water quality)
2. Move to demobilization and hauling to disposal

Our estimated schedule is attached.

Calendar: September

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		← Dredging Cranberry →				
4	Labor Day 5	6	7	Last Dredging Day 8	9	10
	← De-mobilize Equipment & Starting to Haul to Disposal Site →					
11	12	13	14	Last Dredging Day on Permit 15	16	17
	← Complete De-mobilizing All Equipment & Clean Up Log Toy →					
18	19	20	21	22	23	24
25	26	27	28	29	30	1
			October			
2	3	4	5	6	7	8
9	10	11	12	13	14	15

Risk Management

Overall no major risks exist as we move to completing the in water portion of the project. Production from the dredge has continued to remain high due to soft deep sediment with major water content. Upcoming Risks:

- Major catastrophic equipment failure

The new 4rd Bag was deployed and being used for Cranberry sediment and biomass (3rd bag pictured to the right dewatering). The aluminum manifold was use to switch between bags to maximize volumes and compaction of materials in dewatering bags. The TESC was simple and effective using existing infrastructure. We used slightly over 1 tote of polymer (2 ¾ more on site).

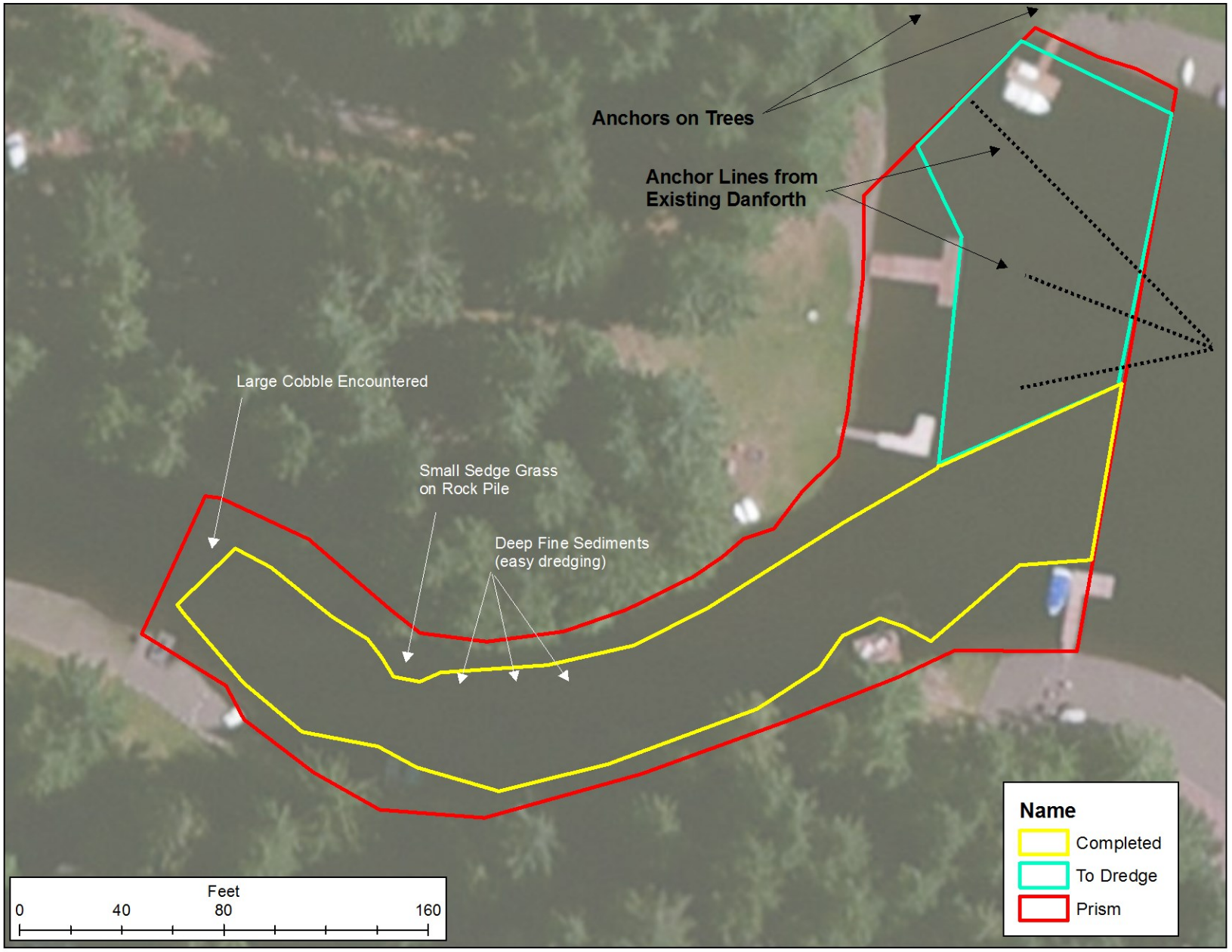
Crewing

We have been crewing with 3 crew members this week. The primary three employees have been Matt Fobert (Supervisor, Support and Dewatering Site), Eric Hittle (Primary Operator, Dewatering and Labor) and Steve Godsil (Support). Joe Bernert was on site 1 day to assist with Quality Control. Joe also continued to provide assistance off site (2 to 3 days per week).

Reporting

Daily Construction Reports were provided daily.

https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z


Anchors on Trees
Anchor Lines from Existing Danforth
Large Cobble Encountered
Small Sedge Grass on Rock Pile
Deep Fine Sediments (easy dredging)
Name
Completed
To Dredge
Prism
Feet
0
40
80
160

Lake Limerick Dredging Weekly Report: September 6 to September 9, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

September 9, 2016

MudCat Cutters with Vegetation

Table of Contents

Work Summary

Marine Industrial Construction, LLC (MIC) continued dredging the week of September 6, 2016 (with crew arriving on Monday night and on the lake early Tuesday). Monday was a holiday and crew was off site. All dredging was completed by 9/8/2016.

Summary of major tasks include:

- Working a 30 hour week onsite Tuesday to Thursday 10 hour / plus days (dedicated crew of 3 to 4 people on sites on dredging)
- Meeting on site on Tuesday morning
- Completed post dredging surveying in Cranberry Cove.
- Finished dredging in Cranberry Cove; started demobilization

Dredging, dewatering and work commenced. Estimated total volume dredging is 3,764 cubic yards (c.y.) from Cranberry Cove. Total estimated in situ dredged volume was 6,454 c.y. (additional detailed in volume section).

September 6, 2016

Safety Meeting in morning with crew. Removed pipe and pulled MudCat from Cranberry Creek into Lake. Good production off docks and removing 2 to 3 feet of material. Tied German come along on north shore tree. Sediment was intermixed with wood, large amounts of gravels and large cobble (3" to 6" rocks). Wood causing minor jam/clog on pump (past impellor). Dewatering into large bag 4 with manifold. WQ sampling. Secured equipment for night.

Roughly 444 cy estimated volume.

September 7, 2016

Safety Meeting in morning with crew. Dredging crew deployed. Meeting with Brian, Joe, Matt and Rob (Conference call). MudCat dredging main area in lake. Changed anchor points. As we moved further into lake we encountered the thick vegetative matt (similar to Kings Cove). Minor jams. Dewatering into large bag 4 with manifold. WQ sampling. Secured equipment for night.

Roughly 410 cy estimated volume.

September 8, 2016

Safety Meeting in morning with crew. Dredge crew deployed into complete final passes in Cranberry Cove in Lake Section (outer section of Prism with multiple passes). Thick aquatic weed matt encountered as crew moved toward the lake (away from shore). Returned to inside and dredged additional material that had sloughed into prism from shoreline. Dredged material to large harder cobble. Moderate sloughing throughout. Water quality sampling performed. Completed all dredging. Picked up free anchor and started to prepare for next week. MudCat on Anchor / boom lowered and secured pipeline for weekend. Secured equipment.

Roughly 310 cy estimated volume.

On Site Equipment

The current MIC equipment and supplies onsite includes:

- Forklift
- 3000' 10" HDPE Pipe
- Flexible pipe, connections, Bolts/Nuts, etc.
- ~100 Dredge pipeline floats
- Other assorted buoys and navigation floats
- Trailer Mounted 7.5 KW generator/light
- Assorted tools (impact guns, wrenches, pry bars, etc.)
- Anchors (Concrete 300 and 500 lbs.)
- Safety Supplies and equipment (First Aid, Fire Extinguishers, PPE, etc.)
- Rigging (rope, wire, slings, shackles, etc.)
- Flocculent injection pump and polymers (UGLY System)- 4 totes of polymer onsite
- Lund & Duckworth Skiff with outboards
- Turbidity Curtain
- Geobags/Bio Bags (6 total); 1 small additional
- MudCat Dredge
- Silt Fence
- Geo-fabric
- Manifold pipes
- Polymers/flocculent

Marine Activities

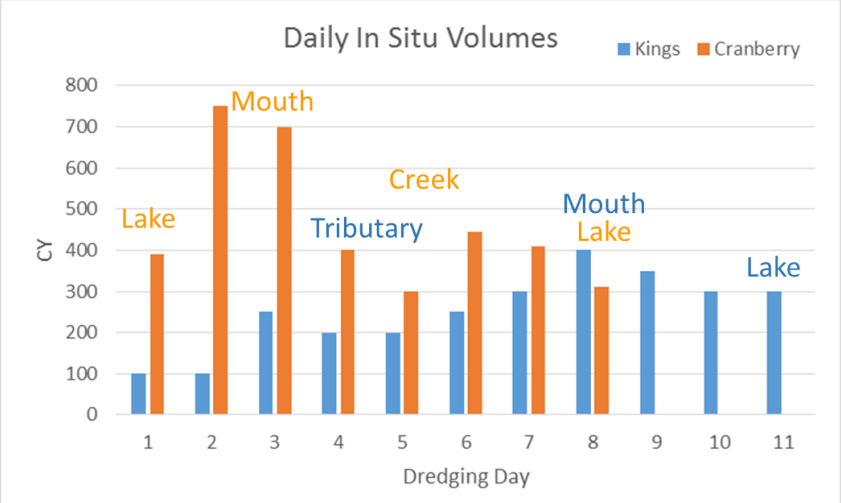
Dredging completed in Cranberry Creek and Cove this week. The final dredging day was met ahead of time and in compliance with the contract (ending dredging date of 9/9/16). This is also in compliance with the permit (end of in water work by 9/15/16) and in the general volume estimates for the permit [Mason County SHR2913-0003]).

Dredged Area / Volume

The dredged areas are presented on the attached maps. Overall, as seen on the profiles, between 2.5 feet and 3.5 feet of material on average were removed.

Dredging Logs/Records

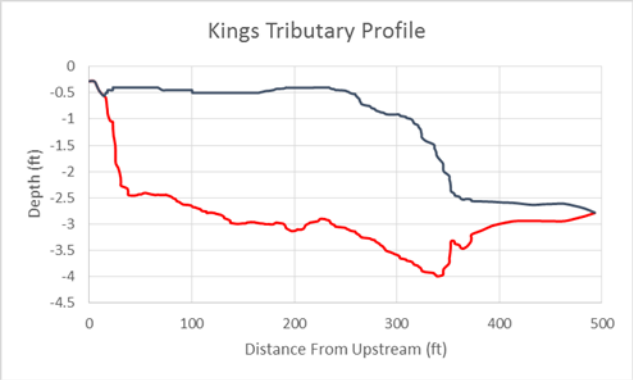
Overall the dredging production of in situ sediments in the lake is estimated at 6,454 c.y. (see daily production sheet [compiled from daily logs and reported in the Daily Construction Report]). This was estimated from the operators daily dredge logs and field notes using the area covered in the dredge (length of cut and width) and the depth (i.e. a box cut). The box cut then added the sloughing amount based on the area adjacent and observed angles of repose (conservatively set to 42 degrees typically). Maps of the areas tracked are presented on the following page for Cranberry and Kings Cove. Below is a bar chart of the daily production by dredging day in each area. Note that the highest productions in both tributaries are in the high depositional areas between the tributaries and the lakes. Production typically was lower higher in the tributaries (encountered cobble) and lower in the Lake (encountering aquatics vegetation matts). A total of 19 days had pumping.

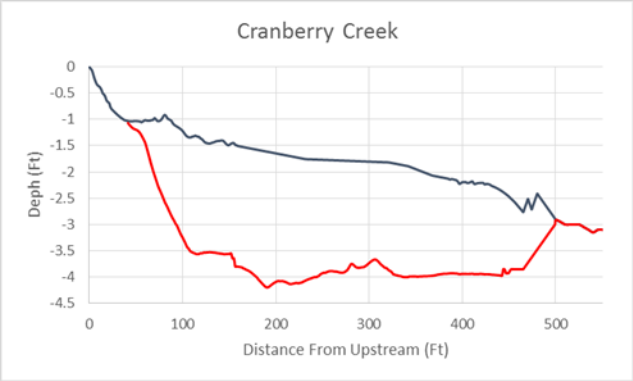


Rates

The dredging sampled rates for the sediment ranged from 10 to 35 percent solids. These samples were taken at the flocculent port and used as samples to determine polymer concentration. Samples were collected in buckets and percent solids volumes estimated (fast assessments). Period samples were massed for percent by weight. The pump curve for the pump (using friction calculated head loss on the pipe) was averaging 2000 gallons a minute. This is 595 cy per hour of water. At 20% solids the production rate is 119 c.y. of solids per hours. The dredging logs indicated 19 days dredging. The hours of dredge pump operation per day ranged from 2 to 7 hours pumping. The rest of the hours in the 19 days of dredging was used in pipe configuration (adding and removing sections), placing anchors, clearing jams, positioning the dredge and other non-pumping activities. Forty six (46%) percent of the dredging production time was in pumping. The 88 hours in production pumping at a conservative suspended solids of 12.6% equates to 75 c.y. of sediment per hour. This is an estimated total in situ volume of 6,600 c.y.

Bathymetry

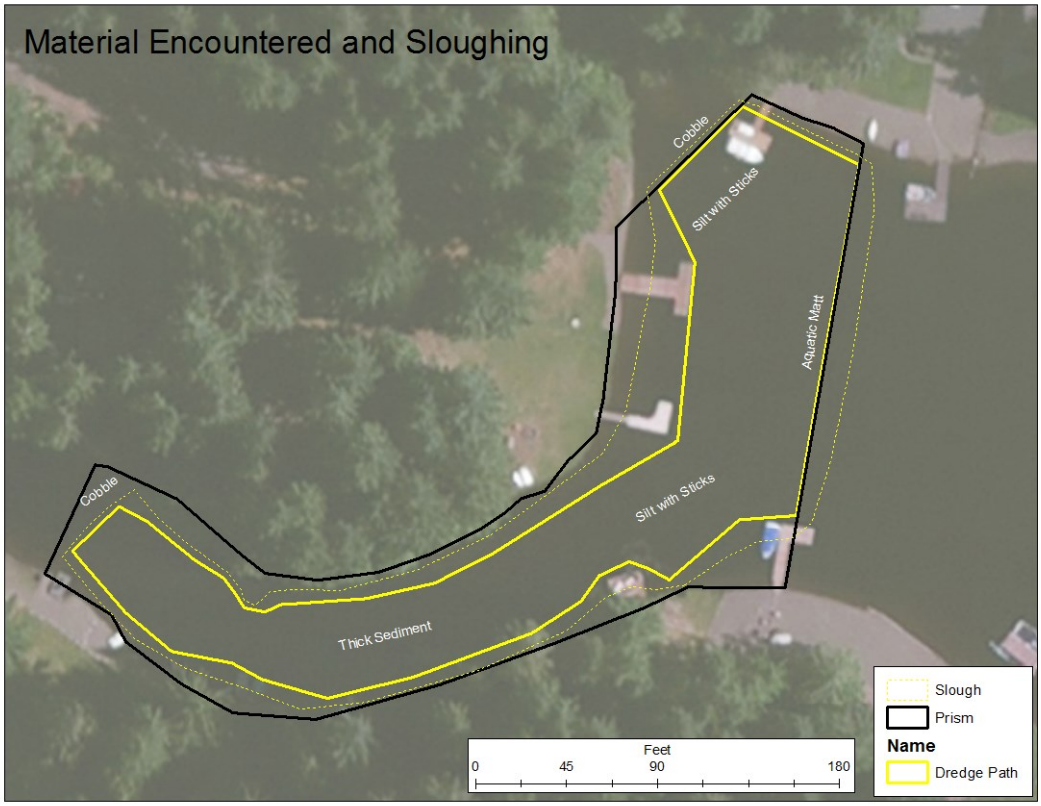


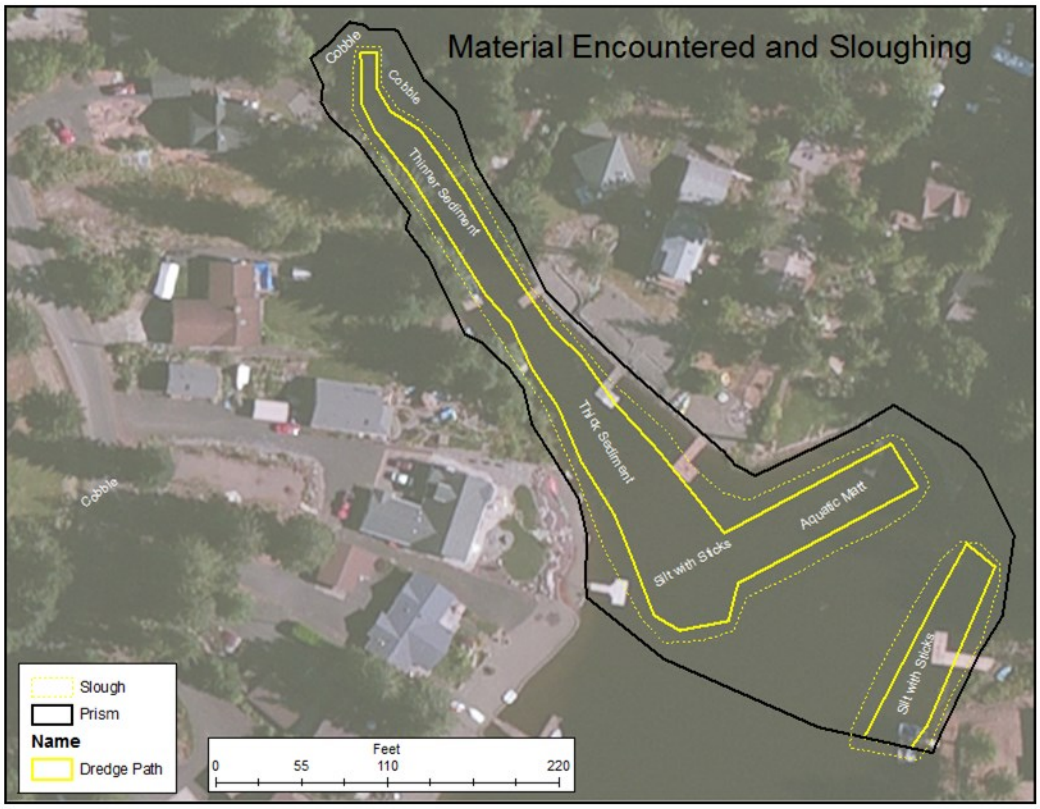


The area of the Cranberry prism is 1.0 acre and Kings Cove is 1.4 acres. Pre dredge and post dredge profiles are presented (to the side) from surveys (on page 13 for Cranberry Cove and page 14 for Kings Cove). The dredging records tracked and inventories of the dredging locations are presented in the following maps (page 8). Sloughing is expected to occur into the areas under the dredging. The dredging percentage of the total prism recorded directly under the dredge is 63 and 35 percent respectively for Cranberry and Kings Cove (as represented on maps on page 8). Note that less area was covered in Kings Cove due to more sloughing on slopes of side channels whereas the bathymetry in Cranberry was flatter requiring more passes to obtain volumes. The primary dredging areas were determined prior to equipment deployment to maximize quantity, future sediment transport, boat access and improve habitat. With the average dredging depth in Cranberry of 3.2 feet and Kings of 3.6 feet the volumes are 3,291 c.y. and 2,899 cy respectively. This is a total of 6,199 total CY and a conservative estimate of only 10% sloughing makes the volumes 6,809 c.y.

Dewatering Bags

Currently in the bag the materials is in various stages of dewatering and compaction. Initial dewatering and compaction is very fast (i.e. less than 1 day) and Paint Filter Tests (EPA 9095) indicated material is free of liquids in a representative sample in 2 days in the dewatering bags. The material meets the requirements (40 CFR 264.314) and can be placed in any landfill. The existing bags were evaluated and measured and the volume of c.y. is estimated at roughly 1,000 c.y. of dewatered (and compacted materials). This is a 6:1 compactions from the in-situ conditions in the lake (volume in situ if 6,000 cy). This is slightly higher than expected (we were expecting a 5:1 ratio and comparable to sludge) given the pre-dredging sediment samples. However, sampling of sediments during dredging indicates that a great proportion of silt may have been present in the dredging prism. Additional compaction occurring due to the use of the polymer flocculants and higher percentage of organic matter (biomass, decomposition and resulting Total Organic Carbon).


Material Encountered and Sloughing
Cobble
Silt with Sticks
Aquatic Matt
Cobble
Silt with Sticks
Thick Sediment
Slough
Prism
Name
Dredge Path
Feet
0
45
90
180


Material Encountered and Sloughing
Cobble
Cobble
Thinner Sediment
Thick Sediment
Cobble
Aquatic Matt
Silt with Sticks
Silt with Sticks
Slough
Prism
Name
Dredge Path
Feet
0
55
110
220

	Feet							
Disposal	Length	Circ.	Width	Average Height	Width	Lay Out (percent)	CY	Notes
Bag 1	100	75	37.5	1.05	17	44%	64.2	Compacted and partially dry
Bag 2	100	75	37.5	1.3	23	60%	108.3	Partially Wet due to draining Bag 3
Bag 3	100	75	37.5	3.49	38	100%	484.7	Very Dry and Compacting
Bag 4	100	45	22.5	3.59	23	100%	299.2	Wet and compacting occuring
Total							**956.4**	*Estimated total Dewater Compacted*

	Feet									
	Measures on Bag (10 spaced Measurements)									
Bag 1	3.0	2.5	2.0	1.0	0.5	0.5	0.5	0.5	0.0	0.0
Bag 2	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5
Bag 3	4.8	4.5	4.4	3.8	3.7	3.5	3.3	3.2	2.4	1.3
Bag 4	3.6	3.6	3.6	3.5	3.5	3.5	3.7	3.7	3.7	3.5

The various measures conducted for tracking volumes indicated roughly that 6,500 cy of in situ sediments have been dredged from Lake Limerick. This is estimated to be roughly 1,000 cy of compressed sediment (dewatered) in the dewatering bags (field calculating and observations). This will be measured when trucking occurs with multiple field measures.

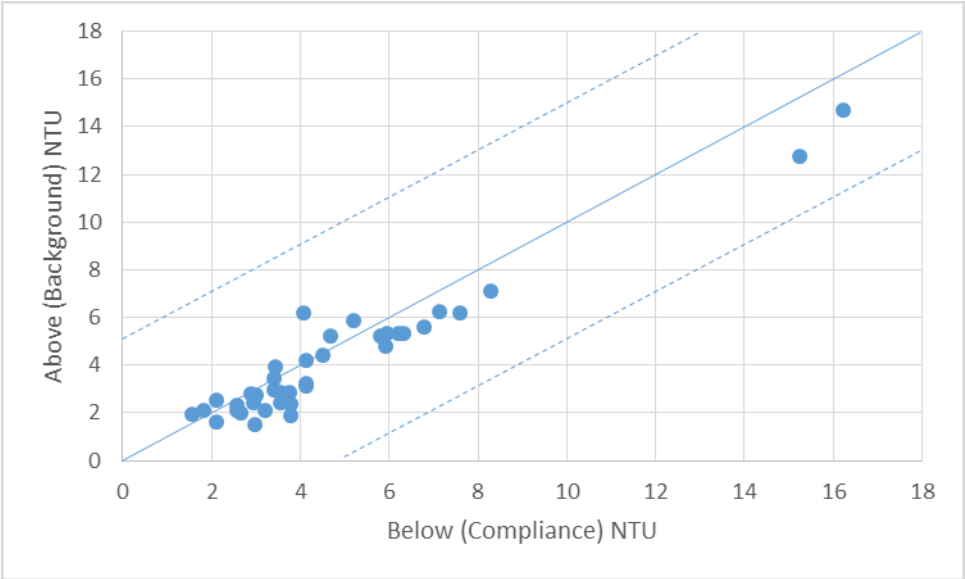
Production Issues

Dredging Production Limitations:

- Lower production per day on stream locations requiring more set up (i.e. docks in proximity, narrower, cobble/woody and/or debris)
- Highest productions in deeper deposits between lake and tributaries (i.e. depositional zones with deeper, cleaner sediments and moderate aquatics weeds)
- Moderate production in area in lake (most distance from shore line in Coves) due to large aquatic matte that is difficult to penetrate requiring additional cutter passes and numerous clogs in pump and cutter head.

Environmental Compliance

Turbidity samples were collected daily using a LaMotte Series 2020 meter. No violations has been observed and turbidity has remained low. No sampling on non-dredging days. The sampling for the entire project are presented in the following graph for turbidity above and below the dredging.



Shore Side Activities

Shore side activities included the monitoring and configuring the dewatering system, polymer concentration and sampling, changing geo-bags, and optimizing the configuration/production on Monday to Wednesday. Wednesday to Friday general set up to maximize production next week during dredging include maintenance of TESC, additional dewatering bag, set up and manifold installation.

Upcoming Tasks

The primary upcoming tasks are:

1. Trucking (including loading) of sediments
2. Demobilization
3. Restoration and clean-up of Log Toy Park

Timing to completion:

- Removing material from Log Toy Park (haul to disposal site): starting 9/12/16 and going to 9/16/16
- Demobilization of water equipment (pipe, dredge, etc.) from 9/12/16 to 9/21/16

The detailed Measurement and Payment methods are outlined in Section 10 20 00 1.04 A. These methods require the LLCC Project Manager to be onsite during the work activities (approving each loaded truck before departure).

Truck Tallies

Daily trucking tickets and haul volume daily summary log will be compiled and reported (see page 15 for sample form).

MIC proposes to perform photo documentation and sample sediments and provide to Lake Limerick for each trucks to allow team flexibility (since we are on-site performing loading) for sediment drying at the Lake Limerick Clubhouse. Additionally, the MIC team will tracking loaded weights (dependent on scale [we are locating scales for weighting), photo documenting volumes, tracking number / volume of bucket loaded (and/or scaled loader) and total tallies (truck number, driver, time, volume and weight with representative sample collected for each truck).

Disposal

Trucking should begin on 9/12/16 and the transport and disposal of the material to the approved site. We expect 1 to 2 trucks for 3 to 6 days. We have our own trucks however, we have also obtained estimates using local contractors to assist on trucking (WCP Veterans Truck pictured here).

Dry Weight Calculations

The Project Manager and Contractor will review dry weight calculation results sheets. MIC has digital scales, beakers, graduated cylinder, sieves, and drying pans (on site at Log Toy Park) for onsite sediment sampling. It is noted that these shall be completed using Standard Methods Protocol (oven temperature 110 Fahrenheit) for dry weight measurement. ***MIC has a bench grade laboratory oven that we can bring on site to assist with processing samples. The oven is a 0.7 Cubic Foot Gravity Convection oven;*** *Will be brought on site on Monday, September 12, 2016.*

Method and daily inspection may be observed by LLCC, Tetra Tech and Contractor representative at any time. Calculations of bone dry equivalent weights verified by all.

For planning and scheduling trucking we are using a density is 3,000 lb. per c.y. for the estimated 1,000 c.y. we are looking at 1,500 tons. Water volume in the dewatered sediments are variable but are conservatively estimated 25% water content. This is an estimate of 1,125 tons.

Estimating the payment is not simple because it is based on dry weight. As per the contract:

- Bid Specs. Estimated of roughly 1,500 tons at $133.34 per ton Total: $200,010
- Estimated of roughly 1,125 tons at $133.34 per ton Total: $150,008

Risk Management

Limited risks exist for completing the project.

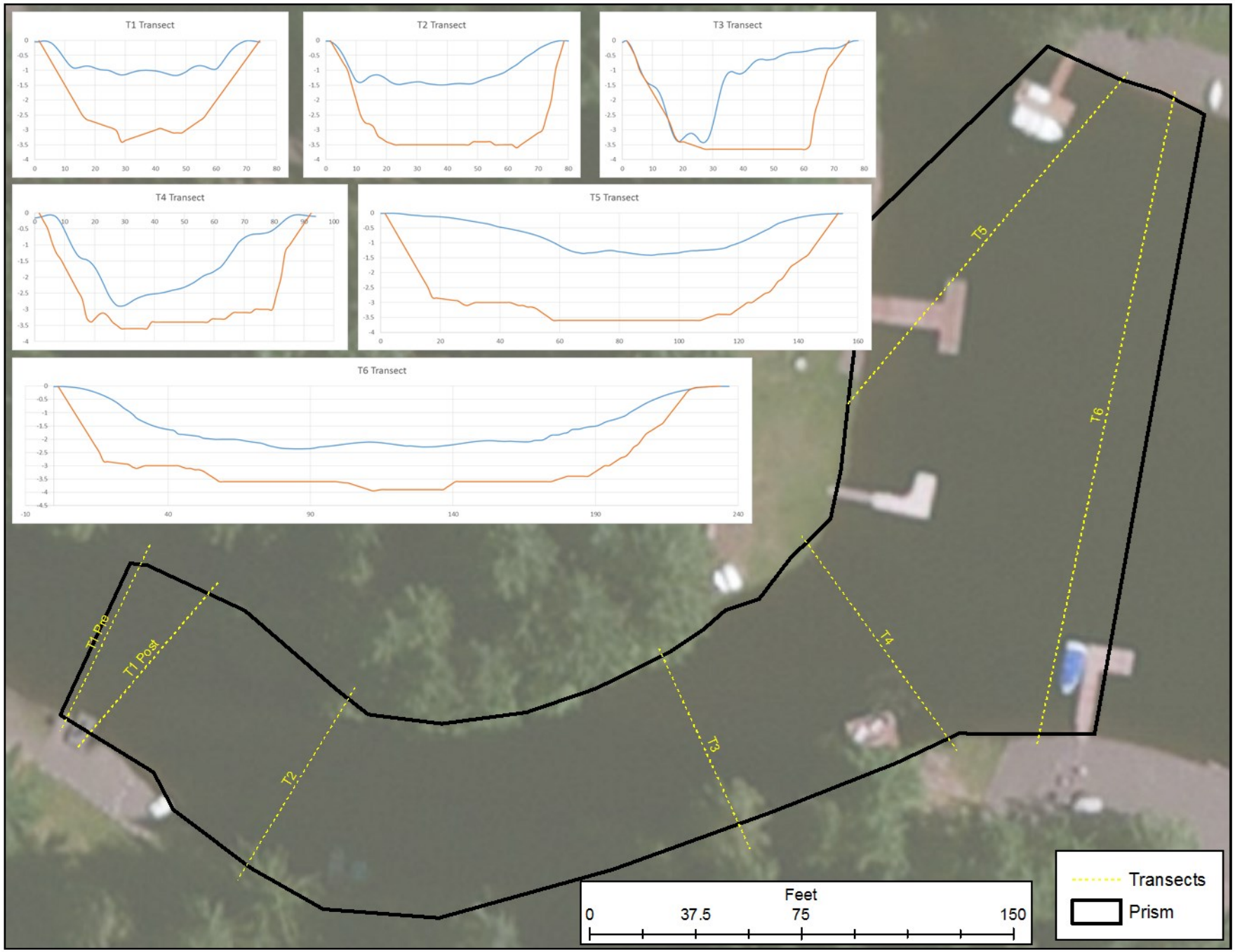
Crewing

We have been using 3 primary crew members. The primary three employees have been Matt Fobert (Supervisor, Support and Dewatering Site), Eric Hittle (Primary Operator, Dewatering and Labor) and Steve Godsil (Support). Joe Bernert has been on site to assist with labor and Quality Control. Joe will continue to provide assistance (2 to 3 days per week on site and additional off site support. We expect 1 to 2 additional crew for trucking the sediments and demob.

Reporting

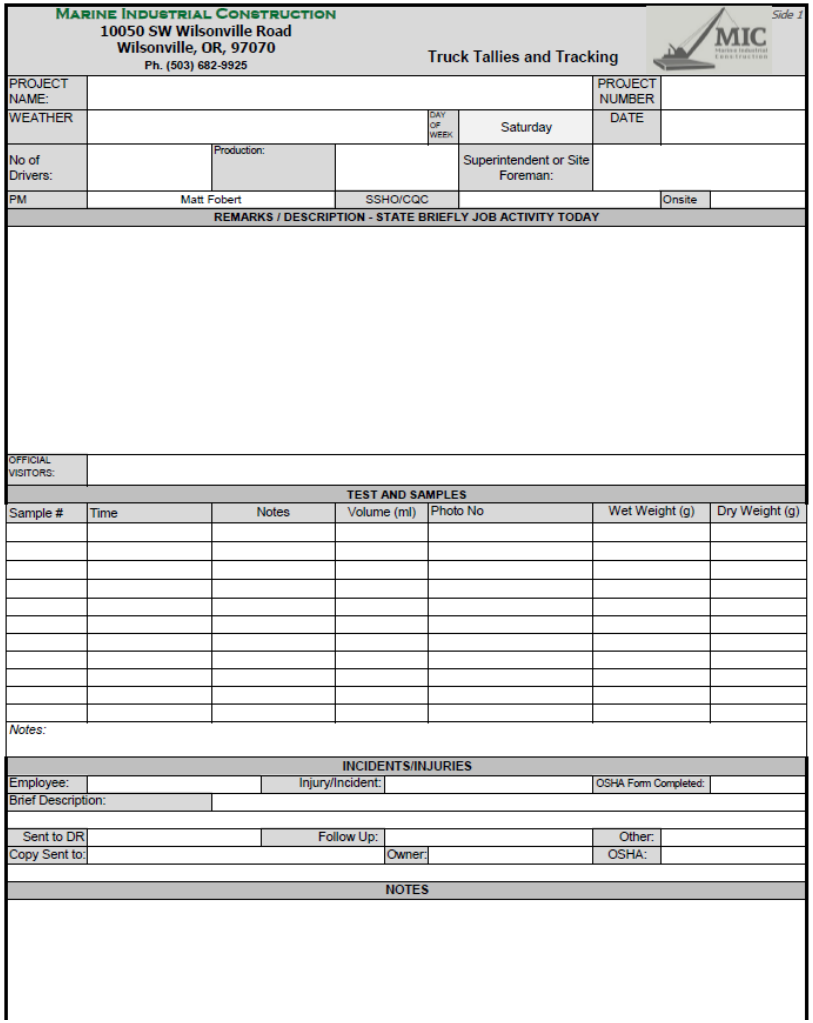
Daily Construction Reports were provided daily. Weekly reports are also compiled and all are posted:

https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z


T1 Transect
T2 Transect
T3 Transect
T4 Transect
T5 Transect
T6 Transect
T1 Pre
T1 Post
T2
T3
T4
T5
T6
Feet
0
37.5
75
150
Transects
Prism


T1
T2
T3
T4
T5
T1 Transect
T2 Transect
T3 Transect
T5 Transect
T4 Transect
Feet
0
50
100
200
Transect
Prism

Trucking Sheets



MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

Side 1

Truck Tallies and Tracking

PROJECT NAME:				PROJECT NUMBER	
WEATHER		DAY OF WEEK:	Saturday	DATE	
No of Drivers:		Production:		Superintendent or Site Foreman:	
PM	Matt Fobert	SSHO/CQC		Onsite	

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

OFFICIAL VISITORS:

TEST AND SAMPLES

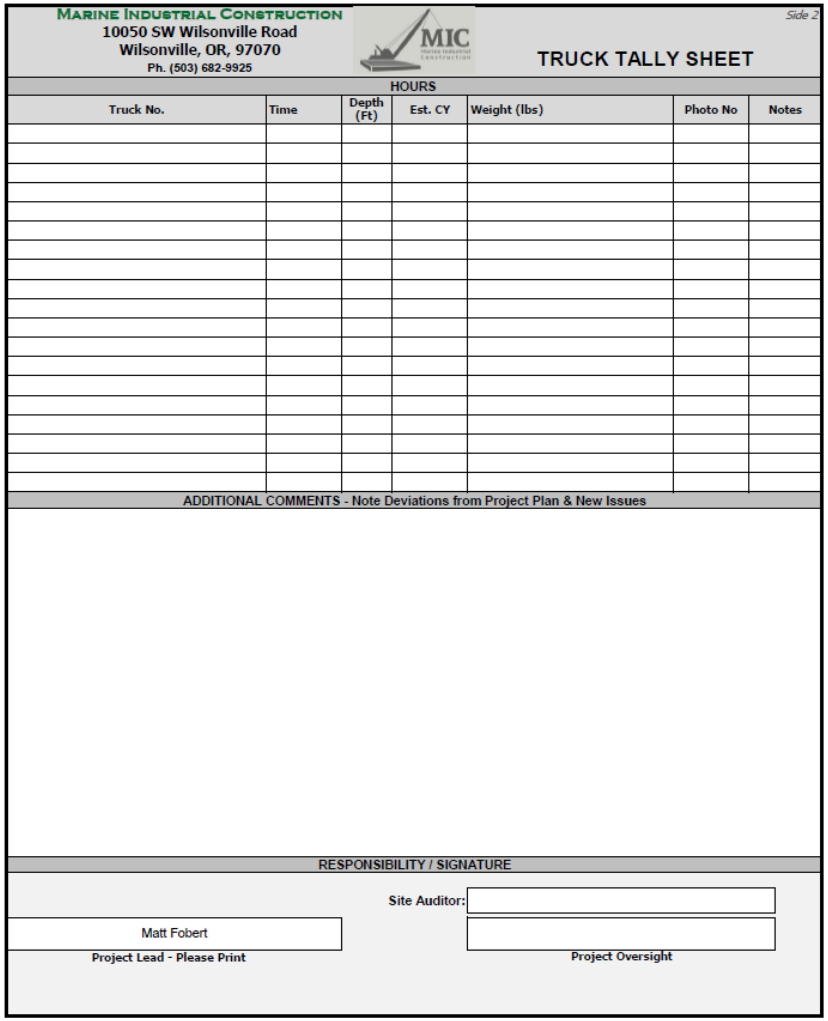
Sample #	Time	Notes	Volume (ml)	Photo No	Wet Weight (g)	Dry Weight (g)

Notes:

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES



MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

Side 2

TRUCK TALLY SHEET

HOURS

Truck No.	Time	Depth (Ft)	Est. CY	Weight (lbs)	Photo No	Notes

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert
Project Lead - Please Print

Project Oversight

Lake Limerick Dredging Weekly Report: September 12 to September 16, 2016

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

Contractor:

Marine Industrial Construction, LLC

For:

Kelly Evans
Brian Smith

Rob Plotnikoff

September 16, 2016

Compacted Silts

Table of Contents

Work Summary

Marine Industrial Construction, LLC (MIC) completed dredging last week and moved to transporting materials off site to the disposal site.

Work was completed on site from Monday (9/12/16) to Thursday (9/15/16).

The initial bag has been hauled to the disposal and sampling has indicated densities around 1700 lbs / c.y. Over 450 C.Y. have been moved accounting for around 400 tons. Clean up in the parking area has started. Other bags are still dewatering.

Bathymetry

Attached detailed bathymetry with profile for submission to Mason County and others.

Risk Management

Limited risks exist for completing the project.

Crewing

We have been using 3 to 4 primary crew members. The primary three employees have been Matt Fobert (Supervisor, Support and Dewatering Site), Eric Hittle (Primary Operator, Dewatering and Labor), Steve Godsil (Support) and Chris (truck driver). Joe Bernert has been on site Monday (for weekly meeting) and performed Quality Control.

Reporting

Daily Construction Reports were provided daily. Weekly reports are also compiled and all are posted:

https://app.box.com/s/xbhkgmpihz2red546yvic9en8nuibf6z

Appendix E. Daily Construction Reports (Chronological)

Attached

Marine Industrial Construction, LLC
10050 SW Wilsonville Rd
PO Box 37
Wilsonville, OR 97070

Ph. (503) 682-9925 **Fax. 503-783-6100**

DAILY CONSTRUCTION REPORT

PROJECT NAME		PROJECT NUMBER
Lake Limerick		**2016-107**
WEATHER	DAY OF WEEK	DATE
overcast warm	Monday	07/18/16
CONTRACT WORK T&M	F.C.O.	

REMARKS - STATE BRIEFLY JOB ACTIVITY TODAY

start at 7:00 am, 7:30 am meet with Brian Smith, Kelly Evans, Joe Castelluccio from LLCC and Rob Plotnikoff from Tetra Tech. Forklift showed up at 7:58 am, first truck from mitchall bros showed up at 8:25 am last truck left (5 trucks total). Put lund in water messure power lines put floats on pipe the rest of the day aproximentally 15 pipes with floats on them.

MATERIALS RECEIVED TODAY

CONCRETE:
STEEL:
PIPING:
OTHER: HDPE floats, HDPE pipe, ancors, pipe lights,Flex hose excet

TEST RESULTS TODAY

Employee	Trade	HOURS WORKED ST	OT	DT	Employee	Trade	HOURS WORKED ST	OT	DT
Matthew Fobert	supervisc	10	0	0	9	0	0	0	0
Eric Hittle	Laborer	10	0	0	10	0	0	0	0
Eric Hittle	0	10	0	0	11	0	0	0	0
3	0	0	0	0	12	0	0	0	0
4	0	0	0	0	13	0	0	0	0
5	0	0	0	0	14	0	0	0	0
6	0	0	0	0	15	0	0	0	0
7	0	0	0	0	16	0	0	0	0
8	0	0	0	0	17	0	0	0	0

EQUIPMENT	ON SITE	HRS. USED	EQUIPMENT	ON SITE	HRS. USED
JGL reach forklift	yes	8 HRS			
Lund Boat	yes	10 mins			

Site Auditor: _____

CONTRACTOR

OWNERS REPRESENTATIVE

Marine Industrial Construction, LLC
10050 SW Wilsonville Rd
PO Box 37
Wilsonville, OR 97070
Ph. (503) 682-9925 **Fax. 503-783-6100**

DAILY CONSTRUCTION REPORT

PROJECT NAME		PROJECT NUMBEI
Lake Limerick		**2016-107**
WEATHER	DAY OF WEEK	
sunny warm	Tuesday	07/19/16
CONTRACT WORK	T&M	F.C.O.

REMARKS - STATE BRIEFLY JOB ACTIVITY TODAY

7:00 am start, Get intreduced to michael, have safety meeting and show michael what we are doing and the goals we are trying to achieve, start putting HDPE pipe together and deploying in water, put more floats on HDPE pipe and deploy anchors to hold HDPE pipe in water, Put 3 flashing buoys along pipe for the night secure end of pipe on the bank, Locate came out to the job sight and said it was all clear to dig, clean up job site for night, leave at 5:00 pm

At 8:00 am the guy in the adjacent house to the job sight said he ran off 3 kids at midnight last night that were in there messing around,

MATERIALS RECEIVED TODAY

CONCRETE	
STEEL:	
PIPING:	
OTHER:	

TEST RESULTS TODAY

Employee	Trade	HOURS WORKED ST	OT	DT	Employee	Trade	HOURS WORKED ST	OT	DT
Matthew Fobert	0	10	0	0	9	0	0	0	0
michael Goetz	0	10	0	0	10	0	0	0	0
Eric hittle	0	10	0	0	11	0	0	0	0
3	0	0	0	0	12	0	0	0	0
4	0	0	0	0	13	0	0	0	0
5	0	0	0	0	14	0	0	0	0
6	0	0	0	0	15	0	0	0	0
7	0	0	0	0	16	0	0	0	0
8	0	0	0	0	17	0	0	0	0

EQUIPMENT	ON SITE	HRS. USED	EQUIPMENT	ON SITE	HRS. USED
fork lift	yes	1			
lund boat	yes	2			

Site Auditor: _____

CONTRACTOR

OWNERS REPRESENTATIVE

Marine Industrial Construction, LLC
10050 SW Wilsonville Rd
PO Box 37
Wilsonville, OR 97070
Ph. (503) 682-9925 **Fax. 503-783-6100**

DAILY CONSTRUCTION REPORT

PROJECT NAME		PROJECT NUMBER
lake lemireck		**2016-107**
WEATHER	DAY OF WEEK	DATE
sunny warm	Wednesday	07/20/16
CONTRACT WORK	T&M	F.C.O.

REMARKS - STATE BRIEFLY JOB ACTIVITY TODAY

7:00 am start time uggly pump and flock showed up at 7:10 am unload truck, start putting HDPE pipe floats on pipe and deploying in water, take joe from llcc out in boat to show him what docks to take out for dredging, joe put up one camera for securety, tie up (2) 500' sectionsof HDPE pipe from paninsala to island and put flashers on pipe for night, secure everything and leave at 5:00pm

MATERIALS RECEIVED TODAY

CONCRETE:
STEEL:
PIPING:
OTHER:

TEST RESULTS TODAY

Employee	Trade	HOURS WORKED ST	OT	DT	Employee	Trade	HOURS WORKED ST	OT	DT
Matthew Fobert	10	0	0	0	9	0	0	0	0
eric hittle	10	0	0	0	10	0	0	0	0
michael	10	0	0	0	11	0	0	0	0
3	0	0	0	0	12	0	0	0	0
4	0	0	0	0	13	0	0	0	0
5	0	0	0	0	14	0	0	0	0
6	0	0	0	0	15	0	0	0	0
7	0	0	0	0	16	0	0	0	0
8	0	0	0	0	17	0	0	0	0

EQUIPMENT	ON SITE	HRS. USED	EQUIPMENT	ON SITE	HRS. USED

Site Auditor: _____

CONTRACTOR

OWNERS REPRESENTATIVE

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging			PROJECT NUMBER	2016-107
WEATHER	Sunny and Clear, No restrictions	DAY OF WEEK	Monday	DATE	7/25/2016
No of Employee's:	4	Production:		Superintendent or Site Foreman:	Matt Fobert
PM	Matt Fobert	SSHO/CQC	Joe Bernert	Onsite	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Lake Limerick Weekly Update Meeting at 7:30 on Site. Discussion of status of project and upcoming schedule. MIC crew safety Meeting and posted job board with safety notes and additional job site signs. Additional Mobilization (semi deleivery) of equipment. Floating turbidty curtain was assembled and deployed into lake (currently tied off the floating pipe into Kings Cove). Worked on setting up erosion control including trenching, install silt fence, laying ground cloth. Matt and Joe met with Gas conpany representative regarding Craneberry Cove crossing (reviewed maps, methods, etc.- they will be placing buoys and having divers confirm location). One geobag was opened and layed on in the disposal area and folded to side to allow crane access for lauching dredge later this week. Matt coodinated with Michael and local for disposal material. All permits and ready at initial site for up to 3500 cy. Set up additional security cameras. Secured equipment at 5:00 pm and stopped work at project site.

OFFICIAL VISITORS:	Rob P. (Tetra Tech) and Lake Limerick Management Team (Kelly, Brian and Joe C); Final Disposal site representative (Patrick Paradise) confirming material receiving; Gas company representative.

MATERIALS RECEIVED TODAY

Misc equipment in Company truck at 7:00 am. Joe brought dredge electronics, sampling equipment (including WQ probes), and surveying field equipment at 7:00 am. Semi truck with geo bags, turbidity curtain, additional anchors, anchor A frame, and other supplies arrived at 1:00 pm. United Rental provided trencher on site at 2:00 pm.

TEST AND SAMPLES

No Test Performed

Time	Depth	Turbidity	Temp.

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day				Matt Fobert	10	1
Floats	All Day				Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day				Joe Bernert	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day				Mike Geotz	10	3
Pollution Control and Related equipment	All Day	6					
Portable Tools (generator, hand, etc)	All Day	6					
19' Lund Skiff and Equipment	All Day	2					
Fork Lift	All Day	6					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Tasks proceeding according to plan. Working on scheduling crane for putting crane in Lake. Dredge to be delivery prior to crane on site.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging			PROJECT NUMBER	2016-107
WEATHER	Cool in morning and then Sunny and Clear, No restrictions	DAY OF WEEK	Tuesday	DATE	7/26/2016
No of Employee's:	4	Production:		Superintendent or Site Foreman:	Matt Fobert
PM	Matt Fobert	SSHO/CQC	Joe Bernert	Onsite	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting at 7:00 on Site led by Joe and Pinch Points. Matt had overview of day's tasks. Continued work on installing silt fence and erosion control ground cloth. Trenching completed. Matt coordinated with Tom on supplies and last of mobilization for MudCat. Crane Scheduled for 10:00 am on Wednesday with Mudcat Delivery (Mitchell Brother confirmed Trucking). Place 3 anchors (anchors are 500 lbs. each) and shore lines at upstream location in Kings Cove. Also placed two anchors at end of run in lake with ropes. Place additional anchors in lake by dock (for access) to be used by dredge with A Frame. Joe C (LLCC) provide lock for storage shed at park for storing miscellaneous supplies. Secured equipment at 1:00 pm and stopped work at project site; Matt and Eric off to purchase supplies locally including pipe fitting for flocculent system, tools (pipe die), etc. Ended work (Matt / Eric) at 5:00 pm (earlier for Joe and Mike).

OFFICIAL VISITORS:	Joe C provide lock for storage shed at park.

MATERIALS RECEIVED TODAY

None received; Matt purchasing in afternoon to bring on site on Wednesday am.

TEST AND SAMPLES

No Test Performed

Time	Depth	Turbidity	Temp.

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day				Matt Fobert	10	1
Floats	All Day				Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day				Joe Bernert	6	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day				Mike Geotz	6	3
Pollution Control and Related equipment	All Day	6					
Portable Tools (generator, hand, etc)	All Day	6					
19' Lund Skiff and Equipment	All Day	4					
Fork Lift	All Day	3					
Elecrtronic, Instruments, Surveying Equip.	All Day						

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Tasks proceeding according to plan. Crane schedule (and dredge mobilization) scheduled for Wednesday. We encountered rope and ground cloth in our propellor (clogged) after placing anchors and working in Kings Cove (easily cleared). Michael / Matt finalizing disposal site. Also noted and flags location of large burried log in dredging prism on Lake North swath in King Cove. Suspect will move easily after dredging adacent materials.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging			PROJECT NUMBER	2016-107
WEATHER	Cool in morning and then Sunny and hot, No restrictions	DAY OF WEEK	Wednesday	DATE	7/27/2016
No of Employee's:	4	Production:		Superintendent or Site Foreman:	Matt Fobert
PM	Matt Fobert	SSHO/CQC	Joe Bernert	Onsite	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting at 7:00 am on Site led by Joe on electrical hazards. Matt had overview of day's tasks. Continued work on erosion control set up. Surveyed 3 transect lines in tributary. Worked on pipe fitting and connections for flocculent system including intake, discharge and mixing. Tapped HPDE pipe for coupler input (flocculent) and 2 sample ports (one before and after admixture). Truck crane arrived at 9:50 and MudCat at 10:15. Launched dredge. Installed A frame and motor. Set up electronics (GPS and Pressure transducer). Moved dredge to upper section of Kings Cove and dropped ladder to secure. Rope to anchors and trees (safeties) on upstream end. Anchors and lines secured on downstream and (in lake). Added pipe on MudCat (soft/hardsoft). Additional pipes and floats to reach Tributary added to pipeline. Prepped wire on MudCat travel winches. Laid out geo-bag at disposal and set up input pipe. Secured equipment at 6:00 pm and stopped work at project site.

OFFICIAL VISITORS:	Brian during dredge launch; Gas Pipeline Inspection Updated on Buoys in Craneberry (and delivery drivers).

MATERIALS RECEIVED TODAY

Morning Matt/Eric brought pipe fitting and supplies and additional tools. Snell crane with 50 ton truck crane. Mitchell Bros delivered MudCat dredge.

TEST AND SAMPLES

Surveyed 3 transects in Kings Cove inlet (results pending to Weekly report)

Time	Depth	Turbidity	Temp.

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day				Matt Fobert	11	1
Floats	All Day				Eric Hittle	11	3
Portable Generator (7.5 KW)	All Day				Joe Bernert	11	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	4			Mike Geotz	11	3
Pollution Control and Related equipment	All Day	6					
Portable Tools (generator, hand, etc)	All Day	8					
19' Lund Skiff and Equipment	All Day	6					
Fork Lift	All Day	6					
Elecrtronic, Instruments, Surveying Equip.	All Day	2					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Tasks proceeding according to plan for setting up the dredging equipment. We are roughly 1 to 2 hours of additional prep work before starting production dredging. Status of the disposal site (trucking location) is undetermined and we will secure equipment and waiting final verification and approval before starting any dredging. Tom McCauley (senior operator) and Joe Bernert (QC) were scheduled to be on-site on 7/28/16 and have returned to Wilsonville. Michael and Matt will continue to work toward final disposal approval and the status will be updated when information is available.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging			PROJECT NUMBER	2016-107
WEATHER	Cool in morning , warm with clouds	DAY OF WEEK	Monday	DATE	8/8/2016
No of Employee's:	4	Production:		Superintendent or Site Foreman:	Matt Fobert
PM	Matt Fobert	SSHO/CQC	Joe Bernert	Onsite	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

7:00 am started at site with safety meeting. Meeting with Lake Limerick Team. MIC crew is Matt F., Tom M., Mike G. After meeting set up final pipe, anchor lines and checked configuration till about noon. Joe B arrived on site at 11:30. Final set up on bags. Started dredge and began dredging including water pump testing. Stopped dredging after 1/2 hour dredging to refine configuration at dewatering site. Additional silt fence deployed and refinements and adjustment on flocculent system. Initial Adjusting injection and concentration amounts (system bled, primed and evaluated). Began pumping mud again around 1:30 for 15 minutes. Water quality sampling. Stopped dredging to adjust geotextile bags (position moved and needed additional securing due to small area, unlevel slopes, etc). In afternoon additional adjustment to flocculent system was performed. Eric H arrived late afternoon. Cleaned flocculent system. Shut down and clean up. Material dredged very easily. However stern anchors were moving bouncy of concrete anchors). Will evaluate addition lines to far shore (tie to trees to keeping tension on line). Note this will not have much force. Area dredged on second operation was 8 feet wide, by 3 to 3.5 feet deep and we traveled 12 to 15 feet.....very easily at low RPMs. Probing indicted a hole of these dimensions. Roughly 10 to 15 cy in this whole excluding sloughing into the dredging area (this is good production rate). Material was primarily fines (redox odor noted) and sands were noted/heard in pipe. Dredge operator easily felt bottom and proceeded on travel. Will configure additional bags to control dewatering volumes and piping movement. Each bag can be filled to capacity in roughly 1 1/2 to 2 hours with 1 line directly feeding. Initially, given site constrains and issues at log toy park, we will pump slowly untill volume stabilized in location. Design started for manifold setup to deploy in future (potential reduced labor at dewatering site and increased head loss, material moved into multiple bags).

However stern anchors were moving bouncy of	On site meeting in am. Brian, Kelly, and MIC team.

MATERIALS RECEIVED TODAY

Lund Boat returned to Site. Gear in Company Pick Up.

TEST AND SAMPLES

Only 1 sample run due to 1/2 day dreding. No issues.

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 1:35	2.35	6.25	21.25
Early Warning / 1:44	1.80	8.28	22.40
Compliace / 1:48	2.10	7.12	22.35

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

10050 SW Wilsonville Road
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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day				Matt Fobert	10	1
Floats	All Day				Eric Hittle	1	3
Portable Generator (7.5 KW)	All Day				Joe Bernert	5	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	4			Mike Geotz	10	3
Pollution Control and Related equipment	All Day	6			Tom McCauley	10	2
Portable Tools (generator, hand, etc)	All Day	8					
19' Lund Skiff and Equipment	All Day	6					
Fork Lift	All Day	6					
Elecrtronic, Instruments, Surveying Equip.	All Day	2					
MudCat Dredge	All Day	4					
UGLY Flocculent System	All Day	6					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

No Deviations

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Cool in morning, warm with clouds			DAY OF WEE	Tuesday	DATE	8/9/2016
No of Employee's:	4	Production:			Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Onsite	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in am. Deployed additional stakes on to geotextile to ensure stability. Additional posts put on TESC. Replubed flocculent system (working fine with increase pressure lines). Started dredging. Pump material from upper Kings Cove into first bag. Stopped dredging let drain and rolled out second bag and secured on site (leveler site). Dredged. Periodic debris clearing and one large rock caught in pump head (Rock Box). Cleared and resumed dredging. Repositioned anchors; approval for tieing off to tree higher in King Cove will allow access to upper reach. Resumed Dredging. Water Quality sample performed (see below). Good progress made estaimed volume dredged around 100 cy. Material is primarily very fine sediments is suspension. We are running flocculent at the 45 setting and samples idicated achiveing good results. Material dredged very easily.

OFFICIAL VISITORS:	None

MATERIALS RECEIVED TODAY

Joe puchased materials at Home Depot (Olympia) and brought in additional rope, Fence post stakes, fittings (UGLY system), C Clamp and Pipe wrenches.

TEST AND SAMPLES

No issues noted

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 11:35	2.40	3.67	20.70
Early Warning / 11:36	2.30	5.96	20.70
Compliace / 11:40	2.10	5.33	20.70
Background / 2:35	2.10	4.56	21.20
Early Warning / 2:44	2.40	6.32	21.20
Compliace / 2:55	2.30	5.32	21.20

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION

10050 SW Wilsonville Road
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Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	3			Joe Bernert	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	4			Mike Geotz	10	3
Pollution Control and Related equipment	All Day	6			Tom McCauley	10	2
Portable Tools (generator, hand, etc)	All Day	8					
19' Lund Skiff and Equipment	All Day	8					
Fork Lift	All Day	4					
Elecrtronic, Instruments, Surveying Equip.	All Day	2					
MudCat Dredge	All Day	6					
UGLY Flocculent System	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

No Deviations; poor GPS reception in Kings Cove due to trees; Using Taxlot boundaries and marking distances covered.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Very warm with high humidity; cloudy and some sun.			DAY OF WEE	Wednesday	DATE	8/10/2016
No of Employee's:	3	Production:	Estimated at 200 - 300 cy		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Onsite	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in am. Checked all bags on dewatering condition. Used boat to add anchors on pipe line to allow boat access to dock in Kings Cove. Required anchoring pipeline on bottom and repositioning existing anchors holding pipe in position. Started dredging with new end anchor on upper end of Kings Cove tributary. Removed center anchor off Kelly Evans House. Primarily pumped into second bag (holding more material and level in site allowing more water). Second bag started to fill in membrane with fines causing slower dewater. First bag filled (alternating between by manually changing pipe). Periodic debris clearing from rock box. Maximizing percentage solids (sampled off dewater ports on inline HDPE) by running MudCat at low to moderate rpms and slow cutter speeds (resulting in higher concentration solids [less water) and longer run time on dredging]. Water Quality sample performed (see below). Good progress made estimated volume dredged around 200 to 300 cy. Major amounts of slough were noted into the area dredged from yesterday (resulting in covering the same area). Also dredged and upstream and downstream in tributary. Will need several additional sticks of pipe to continue after anchor pipeline to allow dredge access to upper end of trib. The dredged material is primarily very fine bio much sediments. We recalibrated flocculent and sampled multiple times during the day and have lower concentration with good separation (now running at the 28 setting). Motor on Skiff failed again in afternoon (moved 25 HP motor from MudCat onto Skiff). Clean up and shut down.

OFFICIAL VISITORS:	Neighbor with pontoon boat came by and we apologized for not sinking pipe sooner (appeared happy with us).

MATERIALS RECEIVED TODAY

None – used existing material / equipment onsite. Preparing list for building manifold to increase pumping efficiencies at dewater site (will build off site on Thursday and Friday) and will also bring onsite next week with Skiff motor replaced / repaired. Additional supplies will incude waders for the dewater site (water is release from walking on the bags [in water]).

TEST AND SAMPLES

No issues noted

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 11:00	2.50	3.75	20.50
Early Warning / 11:05	2.40	4.67	20.50
Compliace / 11:15	2.40	5.21	20.50
Background / 3:05	2.20	4.55	20.90
Early Warning / 3:10	2.60	4.06	20.90
Compliace / 3:15	2.50	6.22	20.90

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

Wet feet at dewatering site. Suggestion for wading and/or hip boot brought on site to improve conditions.

10050 SW Wilsonville Road
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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	10			Mike Geotz	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	6					
Portable Tools (generator, hand, etc)	All Day	8					
19' Lund Skiff and Equipment	All Day	8					
Fork Lift	All Day	2					
Elecrtronic, Instruments, Surveying Equip.	All Day	2					
MudCat Dredge	All Day	8					
UGLY Flocculent System	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Shut down early on Thursday to return to Wilsonville and get skiff repair and prepared other equipment. This is the second motor requiring repair in a week. On site we have had to removed large amount of sediment and mud from motor due to moving through the bio-muck (i.e. need to replace cooling water pump). Will be bringing in additional equipment and supplies next week for longer production runs (and more solids production). This will include dewatering manifold (ability to pump into multiple bags with valves) and ordering smaller dewatering bags that will fit into the de-watering area more effectively. We anticipate longer crewing next week (may be up to 6 days in the week). We expect that over the next several days the sediment will slough into the primary dredging prism from the side slopes. The soft materials are very mobile and move into the deeper locations in the channel.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and clear			DAY OF WEE	Tuesday	DATE	8/16/2016
No of Employee's:	3	Production:	Estimated at 200 cy		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Onsite	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Lake Limerick Project Meeting on site with Rob, Brian, Kelly and Joe. Safety Meeting afterwards with Matt/Eric. New employee on site to assist as labor / train to Equipment Operator (at 9:00 am). Sloughing around MudCat buried Dredge in soft material. Pulled dredge back with Skill and started dredging the new slough. Dredging in Kings Cove Tributary area (significant sloughing from upstream and side slopes / near shore). Dewatering in existing bags which had drained completely and consolidated material present in bags. Water Quality sample performed (see below). Current bags are filling with very fine materials blocking the sieve sizes. Flocculent running at 30 with good settling observed; increased later in day to make clearer effluent. 7 Dredge runs thoughout the day (wait times increasing on dewatering due to the larger than expected amounts of fines). Rewired German cable pull once. Additional pipe added to reach top end of dredging prism in tributary (note crushed gravel encountered). We believe based on afternoon samples we can removed crushed rock with dredge which is laying on additional layers of biomuck. Estimated total volumes dredge roughly 200 CY (difficult to estimate [low side] due to large sloughing).

OFFICIAL VISITORS:	Rob P., Kelly Evans, Brian Smith, Joe Castelluccio for Project Meeting

MATERIALS RECEIVED TODAY

Miscellaneous Supplies from WCP.

TEST AND SAMPLES

No issues noted; minor prop wash observed periodicially in shallows from skiff. Sampling completed with both Horiba and Lamotte meters. Noted other performing QC sampling in morning. Sampleing also completed with Horiba Probe (Sample 9.23 NTU background, 9.44 NTU Outside Curtain and 9.32 NTIU Inside Curtain) at 2.0 feet.

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 11:05	2.20	3.46	20.90
Early Warning / 11:15	2.10	4.12	20.90
Compliace / 11:29	2.30	4.22	20.90
Background / 3:12	2.20	4.67	21.50
Early Warning / 3:22	2.30	5.21	21.50
Compliace / 3:29	2.40	5.88	21.50

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10.5	1
Floats	All Day	10			Eric Hittle	10.5	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10.5	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	10					
19' Lund Skiff and Equipment	All Day	10					
Fork Lift	All Day	4					
Elecrtronic, Instruments, Surveying Equip.	All Day	2					
MudCat Dredge	All Day	8					
UGLY Flocculent System	All Day	8					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

We are noting clogging on the dewatering bags due to the extremely large amount of very fine materials resulting in long dewatering time. This is causing dredging to stop and wait for dewatering. We are setting up another large dewatering bag up (early in the week) from the existing bags to dewater into the existing dewatering (TESC) area (up towards restrooms). We have ordered several custom sized smaller dewatering bags to be placed on top of the existing bags near the shelter and dock (narrow and long) which should arrive late this week and early next week. Since dewatering times are the limiting factors we will continue to install and configure additional dewatering capabilities. Storage area in Log Toy Park is very limited given the material we are encountering and the site conditions (i.e. slopes on ground, vegetation present, access, width of lay down area, etc.).

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny, clear and warm.			DAY OF WEEK	Tuesday	DATE	8/16/2016
No of Employee's:	3	Production:	Estimated well over 200 cy; sloughing significant		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Onsite	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Lake Limerick Safety Meeting at 7:00 am. Pumping into Bag 2 during day with MudCat (5 x 15 to 30 min production runs). Huge amounts of sloughing noted at upper end of prism. Covered/dredged area in depth at 0.5 foot of water and area of roughly 25 feet in length and 8 to 10 feet in width. Dredging depth to roughly 4 to 5 feet of sediment. Solids concentration running very high at close to 40%. Have only about 10 feet remaining to top of dredging prism. Slough from upstream and side slope occurring during work. Anthropogenic rock removed (burried in 1 feet of muck unerlayed by more muck). Flocculent running at 35 on gage. Dewatering in Bag 2 slow but increased by walking tubes. Bag running at an estimated 30% full of sediment (estimated at approximately 500 cy of compacted materials). Water quality sampling completed.

OFFICIAL VISITORS:	Brain stopped by to check status; May return Wednesday to meet with Joe.

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

No issues noted; minor prop wash observed periodicially in shallows from skiff.
LaMotte Meter

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 11:00	2.00	4.30	21.40
Early Warning / 11:05	2.00	4.50	21.40
Compliace / 11:12	2.00	4.40	21.40
Background / 2:25	2.00	4.10	21.90
Early Warning / 2:30	2.00	5.80	21.90
Compliace / 2:35	2.00	5.20	21.90

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	10					
19' Lund Skiff and Equipment	All Day	10					
Fork Lift	All Day	4					
Elecrtronic, Instruments, Surveying Equip.	All Day	2					
MudCat Dredge	All Day	8					
UGLY Flocculent System	All Day	8					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Joe Bernert is going to be onsite on Wednesday and perform survey to refined volumes. We believe our daily estimates are low due to the significant sloughing. Additional dewatering bags will be delivered (Tom McCualey will bring on site) and configured. We anticipate after setting up additional bags, manifold, etc. we can increase pumping times which will allow more dewatering. Additional resources will be order after configuration.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

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DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging				PROJECT NUMBER	2016-107	
WEATHER	Sunny, clear and warm.		DAY OF WEEK	Wednesday	DATE	8/17/2016	
No of Employee's:	4.2	Production:	Estimated well over 200 cy; sloughing significant	Superintendent or Site Foreman:	Matt Fobert		
PM	Matt Fobert	SSHO/CQC	Joe Bernert		Onsite	Yes	

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Lake Limerick Safety Meeting at 7:00 am (Matt, Eric, Steve). Joe arrived at 7:30. Pumping into Bag 2 during day with MudCat. At end and encountering gravel and pumping into bag. Started setting up bag 3 in parking area. Joe and Brian reviewed gravel area. Starting pumping for extended time period in to 3rd bag from upper end. Encounter large diameter rocks and cobble (river round). Numerous rocks over 4" to 6" jamming in rock box. Removed several large rocks stopped pump and required removal from impellor (luckily rocks sheared in half and no significant damage to pump [photo documented]). Third bag dewatering well and supporting longer pump times. Received delivery of smaller dewatering bag (at end of day) and aluminum manifold pieced (and misc. supplies). Motor on skiff experience additional issues associated with operations in shallows/mud. 2nd skiff requested to be developed on site on 8/18 to support moving anchors.

OFFICIAL VISITORS:	Brain stopped by to check status; Will check in again on Friday

MATERIALS RECEIVED TODAY

Aluminum Manifold; 45' (Circimfrene) x 100 dewatering bag.

TEST AND SAMPLES

No issues noted; minor prop wash observed periodicially in shallows from skiff.
LaMotte Meter

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 10:30	2.00	3.20	21.30
Early Warning / 10:35	2.00	3.40	21.30
Compliace / 10:40	2.00	3.45	21.30
Background / 2:30	2.00	3.40	21.80
Early Warning / 2:35	2.00	7.60	21.80
Compliace / 2:40	2.00	6.20	21.80

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	9	2
Pollution Control and Related equipment	All Day	10			Tom McCualey (Delivery)	1	5
Portable Tools (generator, hand, etc)	All Day	10					
19' Lund Skiff and Equipment	All Day	10					
Fork Lift	All Day	4					
Elecrtronic, Instruments, Surveying Equip.	All Day	2					
MudCat Dredge	All Day	8					
UGLY Flocculent System	All Day	8					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging				PROJECT NUMBER	2016-107	
WEATHER	Sunny and Hot		DAY OF WEEK	Thursday	DATE	8/18/2016	
No of Employee's:	4	Production:	Estimated well over 200 cy; sloughing significant	Superintendent or Site Foreman:	Matt Fobert		
PM	Matt Fobert		SSHO/CQC	Joe Bernert	Onsite	Yes	

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning. Duckworth scheduled to replace Lund Skiff. Move dredge back and pumped. Removed pipe and pulled anchor lines. Dredged into bag 3 (dewatering performing well). Dredge aground on starboard shore. Freed and Dredging resumed. Water Quality sampling. Meet with Washington Department of Fish & Wildlife. Survey for assessment started. Pipe shortened for morning dredging.

OFFICIAL VISITORS:	Maggie from WDF&W

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Additional prop wash observed periodicially in shallows from skiff (with 115 HP Pump motor)

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 10:38	2.00	2.33	21.30
Early Warning / 10:41	2.00	6.78	21.30
Compliace / 10:43	2.00	5.61	21.30
Background / 2:50	2.00	2.19	21.70
Early Warning / 2:58	2.00	7.13	21.70
Compliace / 2:59	2.00	6.26	21.70

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

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10050 SW Wilsonville Road
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Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	10			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	9	2
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and Very Hot (high 90's)			DAY OF WEEK	Friday	DATE	8/19/2016
No of Employee's:	4	Production:	Estimated well over 400 CY		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Onsite	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning. Work continued on entrance to Kings Cove Trib (past Orange Dock and into lake proper). Repositioed anchors farther into lake. Started dredging with high production. Volume estimates for day near 400 cy. Thick vegetative matt found in lake in waters deeper than 2 feet. Moved equipment into tributuary to allow access to docks on weekend. Secured equipment and left.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 9:05	2.00	1.91	21.40
Early Warning / 9:10	2.00	6.22	21.40
Compliace / 9:12	2.00	5.32	21.40
Background / 2:00	2.00	2.67	21.90
Early Warning / 2:05	2.00	5.91	21.90
Compliace / 2:10	2.00	4.77	21.90

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

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10050 SW Wilsonville Road
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Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	10			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	10	2
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging				PROJECT NUMBER	2016-107	
WEATHER	Sunny and hot		DAY OF WEEK	Monday	DATE	8/22/2016	
No of Employee's:	3	Production:	Estimated at 300 to 400 CY with lots of orgaics	Superintendent or Site Foreman:	Matt Fobert		
PM	Matt Fobert		SSHO/CQC	Joe Bernert	Onsite	No	

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Meeting with LLCC and TT. Safety Meeting in morning. Repaired Duckworth motor. Changed anchor locations into the Lake. Secured on tree at lake end. Danforth and concrete anchors in lake. Dredged 170 swath with 3.5 to 4.5 feet of sediment. Noted more coarser material including cobble (turkey grit and other material intermixed in sediments). Woody debris also encountered. WQ samples taken. A large log was encountered and dredged on both sides. Bags filling so switched from Bag3 to Bag 2 and back again. Flocculent at 30. Resulting lake depth are to 5 – 6 feet. Encountered large amount of matted submerged vegetation with thickness from 6 inches to 12 inches. Many clog to cutter head (3 clogs in 30 minutes during start up) but easily cleaned. Material is not sloughing very quickly (as in tributaries) due to vegetation holding angles of repose. Ended dredging at 500, shut down and secured.

OFFICIAL VISITORS:	Brian and Rob for Weekly Meeting

MATERIALS RECEIVED TODAY

Misc supplies from wilsonville including come along, Mercury fuel line replacement, etc.

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 10:03	2.00	1.54	21.10
Early Warning / 10:13	2.00	2.98	21.10
Compliace / 10:15	2.00	1.49	21.10
Background / 3:10	2.00	1.56	21.10
Early Warning / 3:15	2.00	3.78	21.10
Compliace / 0.1375	2.00	1.89	21.10

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

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Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	10			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and hot			DAY OF WEEK	Tuesday	DATE	8/23/2016
No of Employee's:	3	Production:	Estimated at 300 to 400 CY with lots of roots and woody		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Onsite	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning. Changed anchor locations into the Lake (south side Kings Cove). Secured anchor on shore and shallows (and on tree at lake end). Started dredging on East (upstream) side. Initially 16 feet wide (2 passes) narrowing to 8 feet (in thick rooted materials with significant woody debris). Multiple logs encountered. Dredged by dock and rotate dredge head for additional access to dock (owner present and appeared pleased with progress). WQ sampled. Pumped in Bag 2 and Bag 3. Organics are not settling as fast as the fine sediments. Starting water depths 1 foot and sediment depth removed average about 4 to 5 feet deep. Moderate sloughing occurring during dredging due to roots and woody materials. The pass is over 50% complete and will shorten pipe on Wednesday morning and complete pass. Numerous clogs on cutter head required clearing auger head. Ended dredging at 1700, shut down and secured.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 9:40	2.00	1.67	21.70
Early Warning / 9:45	2.00	2.94	21.70
Compliace / 9:47	2.00	2.44	21.70
Background / 2:21	2.00	1.76	21.80
Early Warning / 2:25	2.00	3.54	21.80
Compliace / 2:30	2.00	2.45	21.80

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
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Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	10			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Hoped to finish King Cove today, but woody material slowed down production; plan to complete tomorrow. Have additional boat and 2 more people arriving tomorrow to assist on moving pipe and setting up additional dewatering bags, etc.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging				PROJECT NUMBER	2016-107	
WEATHER	Sunny and very hot		DAY OF WEEK	Wednesday	DATE	8/24/2016	
No of Employee's:	5	Production:	Estimated at 300 with moderate roots and woody	Superintendent or Site Foreman:	Matt Fobert		
PM	Matt Fobert		SSHO/CQC	Joe Bernert	Yes	No	

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting at 7 am with Matt, Eric, Steve and Ryan. Tom arrived with Lund Boat (2nd boat for moving pipe). Removed 2 sections of pipe. Started dredging with MudCat. WQ sampling. Brian stopped by and Matt/Joe and Brian reviewed depth and sediment all sites in King Cove (2 lake transected and tributary). Talked with several land owners. MIC crew volunteered to removed large metal piece on Thursday when water clears (caused issues on cutter head [visible now when water clear]). Started moving and configuring pipe for cranberry Cove. Anchored pipelines. Set up additional bag. Shutdown for night.

OFFICIAL VISITORS:	Brian - Matt/Joe/Brian wwent out in boat and reviewed dredge depths in transects and sediment depths; Several People asking questions (to Brian) and to MIC during day.

MATERIALS RECEIVED TODAY

Lund Boat arrived for 2 boat to move equipment to Cranberry Cove.

TEST AND SAMPLES

No Afternoon dredging only one sample taken.

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 8:20	2.00	1.65	21.90
Early Warning / 8:25	2.00	3.54	21.90
Compliace / 8:28	2.00	2.87	21.90
Dewater Bag/ 11:10	off bag	34.20	

INCIDENTS/INJURIES

Employee:	Joe Bernert	Injury/Incident:	Cut Finger	OSHA Form Completed:	
Brief Description:	While cutting anchor line minor cut on right thumb. No Dr or stiches required.				

Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

Minor Cut. Will used in Thursday Safety meeting on cutting line in marine situation and knots.

MARINE INDUSTRIAL CONSTRUCTION
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Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	10			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	9	2
Pollution Control and Related equipment	All Day	10			Ryan	10	3
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Started moving pipe to Cranberry Cove and Setting up additional bag

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and very hot			DAY OF WEEK	Thursday	DATE	8/25/2016
No of Employee's:	5	Production:	N.A.		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting at 7 am with Matt, Eric, Steve and Ryan. Moved pipe, dredge, anchors, etc. Sunk /anchor pipeline passageway and marked with green and red buoys. Flashing lights on pipeline.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

Lund Boat arrived for 2 boat to move equipment to Cranberry Cove.

TEST AND SAMPLES

No dredging - No Samples

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	10			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	10	2
Pollution Control and Related equipment	All Day	10			Ryan Hemmingway	10	3
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	2					
UGLY Flocculent System	All Day	0					
Lund Skill	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Obtain Permission for anchor Point on tree in top of Cranberry.
Additional Anchor required, if possible, on tree at:
- 1020 E St Andrews Dr (Limerick 3 Lot 4 [Martinez]). There is a large tree on the shore (northwest corner of the parcel) with some chairs and a boat in front of the tree.
- If we cannot tie to this tree we can put in anchors in the channel but will not be able to get as close to the shore line and remove as much material and south shore.
We may also need a tree at 2579 Leisure World, Lake Limerick 3 lot 30 [Fiest] later for the Leprechaun

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and very hot			DAY OF WEEK	Friday	DATE	8/26/2016
No of Employee's:	5	Production:	N.A.		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Brief Meeting at 7 am with Matt, Eric, Steve, Joe, Mary and Ryan. Shutdown for night. Joe/Mary performed sediment samples, paint filter tests and general clean up at Log Toy Park. Crew worked on setting up soft lines, anchors, positioning dredge and configurations as to start dredging on Monday (8/29/16) morning. Matt, Joe and Mary did field surveys and mapping work in Cranberry. Noted significantly more live weeds. Shutdown for night and secured at 1545.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

Purchased additional 1 5/16 drivers for pipe bolts (dropped socket)

TEST AND SAMPLES

No Dredging - No Sampling

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

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10050 SW Wilsonville Road
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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	8	1
Floats	All Day	10			Eric Hittle	8	3
Portable Generator (7.5 KW)	All Day	10			Steve Godsil	8	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	8	2
Pollution Control and Related equipment	All Day	10			Ryan Hemmingway	8	3
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	4					
MudCat Dredge	All Day	2					
UGLY Flocculent System	All Day	0					
Lund Skiff	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Would like an Anchor at 1020 E St Andrews Dr (Limerick 3 Lot 4 [Martinez]). There is a large tree on the shore (northwest corner of the parcel) with some chairs and a boat in front of the tree. Rock in water appears on Lake Limerick property (from survey and Mason County Cadastral / Tax Maps. Could also drill and bolt in if needed. Joe C was going to contact owners. Staus of macro invertebrate sampling is unknown.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
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DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging				PROJECT NUMBER	2016-107	
WEATHER	Sunny and Cooler		DAY OF WEEK	Monday	DATE	8/29/2016	
No of Employee's:	3	Production:	390 CY (estimated 25% containing Biomass	Superintendent or Site Foreman:	Matt Fobert		
PM	Matt Fobert		SSHO/CQC	Joe Bernert	Yes	No	

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Weekly Meeting with Lake Limerick. Site visits in Cranberry in morning. (for sediment sampling). Proceeded to setting final anchor on tree with German ratchet. Pipe realinement. Added Additional anchors to pipeline due to comments from dock owners (forwarded them to LLCC '[Brain & Kelly]). Dredging in lower Cranberry Creek. Excelllent production. Six (6) clogs occured and no issues on head pumping rate to dewating site. Dewatering into large bag (Bag 3) with manifold. New narrow bag ready for deployment. WQ sampling. Secured equipment for night.

OFFICIAL VISITORS:	Rob, Brian, Kelly & (Matt/Eric)

MATERIALS RECEIVED TODAY

Supplies from WCP to support work (paper towels, TP, water, etc.)

TEST AND SAMPLES

Only started dredging late in day due to additional set up - One sample collected. Background collected by walking up stream bed in Cranberry Crrek.

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 2:30	2.00	1.86	21.80
Early Warning / 2:40	2.00	1.82	21.80
Compliace / 2:45	2.00	2.13	21.80

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					
Lund Skill	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and Cooler			DAY OF WEEK	Tuesday	DATE	8/30/2016
No of Employee's:	3	Production:	750 CY (estimated 15% containing Biomass		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning with crew. Dredging in Cranberry Cove south (Lake Section) and lower Cranberry Creek. Excelllent production with long hours in production. Seven (7) clogs from wood and rocks occured and no issues on head pumping rate to dewating site. Lake depths to 4.5-4.8 feet abd creek water depth to 3.5 feet. Dewatering into large bag (Bag 3) with manifold. WQ sampling. Secured equipment for night.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Matt took sample off top of biobag when bag 3 at capacity (very clear and low turbidity [1.72 NTUs]).

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 11:00	1.00	1.92	20.70
Early Warning / 11:10	2.00	2.67	21.40
Compliace / 11:15	2.00	1.98	21.40
Background / 2:30	1.00	1.93	20.70
Early Warning / 2:35	2.00	3.21	21.40
Compliace / 2:38	2.00	2.11	21.40
Dewatering Bag		1.72	

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					
Lund Skill	All Day	10					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging				PROJECT NUMBER	2016-107	
WEATHER	Cloudy and Light Mist		DAY OF WEEK	Wednesday	DATE	8/31/2016	
No of Employee's:	3	Production:	700 CY (estimated 15% containing Biomass	Superintendent or Site Foreman:	Matt Fobert		
PM	Matt Fobert		SSHO/CQC	Joe Bernert	Yes	No	

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning with crew. Dredging in lower Cranberry Creek and move to upper Cranberry. Excelllent production with long hours in production (major sloughing). Reached area on bend with very tick bimuck (up to 4 feet of mud). Repositioned with skiff. Six (6) clogs from wood and rocks occured. Creek water depth to 3.5 feet. Dewatering into large bag (Bag 3 and then into Bag 4) with manifold. WQ sampling. Secured equipment for night.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 10:15	1.00	2.34	20.40
Early Warning / 10:25	2.00	3.41	20.80
Compliace / 10:30	2.00	2.98	20.80
Background / 3:10	1.00	3.11	20.40
Early Warning / 3:30	2.00	4.12	20.80
Compliace / 3:35	2.00	3.22	20.80

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	11			Matt Fobert	11	1
Floats	All Day	11			Eric Hittle	11	3
Portable Generator (7.5 KW)	All Day	11			Steve Godsil	11	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	11					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	11					
UGLY Flocculent System	All Day	11					
Lund Skill	All Day	2					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Cloudy and Heavy/severe rain.			DAY OF WEEK	Thursday	DATE	9/1/2016
No of Employee's:	4	Production:	350 CY (estimated 10% containing Biomass		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning with crew. Added 130 feet pipe. Dredging in lower Cranberry Creek. Major jam/clog of small woody required rmoving top of pump and clearing manually. Good production with major sloughing. Passed area on bend with very thick muck. Attempted to removel small grassy outcrop but encountered rocks. Several other minor clogs from wood and rocks occured. Torrential rainfall in afternoon. Creek water depth to 3.5 feet. Dewatering into large bag 4 with manifold. WQ sampling. Secured equipment for night.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 9:00	1.00	3.69	20.20
Early Warning / 9:20	2.00	2.88	20.80
Compliace / 9:25	2.00	2.78	20.80
Background / 2:50	1.00	3.61	20.20
Early Warning / 3:05	2.00	3.45	20.80
Compliace / 3:10	2.00	3.91	20.80

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	11			Matt Fobert	11	1
Floats	All Day	11			Eric Hittle	11	3
Portable Generator (7.5 KW)	All Day	11			Steve Godsil	11	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	11			Joe Bernert	5	2
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	11					
UGLY Flocculent System	All Day	11					
Lund Skill	All Day	2					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

The clogs today slowed progress and we will work a partial day tomorrow (Friday) to ensure we complete Cranberry Creek. We will tie our last anchor off in the morning. Joe C. reieved permission from the land owner and we are going to also move a paddle boat and skiffs out of the way so our our wire will not impact them during the dredging. The paddle boat and skiffs will be moved back into location when we are compeltd tomorrow (just moved for the day).

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging			PROJECT NUMBER	2016-107
WEATHER	Cloudy , Wind and Rain	DAY OF WEEK	Friday	DATE	9/2/2016
No of Employee's:	3	Production:	300 CY (estimated 30% Pluscontaining Biomass	Superintendent or Site Foreman:	Matt Fobert
PM	Matt Fobert	SSHO/CQC	Joe Bernert	Yes	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning with crew. Added flex pipe for bend in creek. Dredging in upper Cranberry Creek. Good production until 6 to 8 feet from upper boundary when sediment was intermixed with large amounts of gravels and large cobble (6" to 8" rocks) causing major jam/clog on entire intake. Significant biomass encountered creating numerous clogs during dredging. Creek water depth to 3.5 feet to 2.5 at upper end. Dewatering into large bag 4 with manifold. Added additional anchors to pipeline to secure for weekend. WQ sampling. Secured equipment for night (left in Cranberrty Creek to ensure pipeline is pulled tight and not able to move in lake and keep out of the weather).

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 9:10	1.00	3.84	20.10
Early Warning / 9:15	2.00	2.56	20.80
Compliace / 9:20	2.00	2.33	20.70
Background / 3:10	1.00	3.22	20.10
Early Warning / 3:15	2.00	3.01	20.70
Compliace / 3:18	2.00	2.77	20.70

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	11			Matt Fobert	11	1
Floats	All Day	11			Eric Hittle	11	3
Portable Generator (7.5 KW)	All Day	11			Steve Godsil	11	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	11					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	11					
UGLY Flocculent System	All Day	11					
Lund Skill	All Day	2					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Had to stop dredged near upstream boundary due to encountring large cobble. One side is 6 feet short and other side about 8 feet short of marked boundary.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging			PROJECT NUMBER	2016-107
WEATHER	Cloudy and light rain	DAY OF WEEK	Tuesday	DATE	9/6/2016
No of Employee's:	3	Production:	444 CY (estimated 20% Pluscontaining Biomass	Superintendent or Site Foreman:	Matt Fobert
PM	Matt Fobert	SSHO/CQC	Joe Bernert	Yes	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning with crew. Removed pipe and pulled MudCat from Cranberry Creek into Lake. Good production off docks and removing 2 to 3 feet of material. Tieds german come along on north shore tree. Sediment was intermixed with wood, large amounts of gravels and large cobble (3" to 6" rocks). Wood causing minor jam/clog on pump (past impellor). Dewatering into large bag 4 with manifold. WQ sampling. Secured equipment for night.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

No dredging in morning so no sampling / monitoring for WQ. Taken in pm.

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 2:15	1.00	1.89	20.40
Early Warning / 2:20	2.00	2.12	21.30
Compliace / 2:25	2.00	2.55	21.30

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					
Lund Skill	All Day	0					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Had to stop dredged near upstream boundary due to encountring large cobble. One side is 6 feet short and other side about 8 feet short of marked boundary.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Cloudy and light rain			DAY OF WEEK	Wednesday	DATE	9/7/2016
No of Employee's:	4	Production:	410 CY (estimated 30% Biomass)		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	Yes AM

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning with crew. Dredging crew deployed. Meeting with Brian, Joe, Matt and Rob (Conference call). MudCat dredging main area in lake. Changed anchor points. As we moved further into lake we encountered the thick vegetative matt (similar to Kings Cove) . Minor jams. Dewatering into large bag 4 with manifold. WQ sampling. Secured equipment for night.

OFFICIAL VISITORS:	Brian, Joe, Matt - Conference Call with Rob

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 10:45	1.00	1.58	20.80
Early Warning / 10:50	2.00	2.11	21.20
Compliace / 10:55	2.00	1.64	21.20
Background / 3:15	1.00	1.88	20.90
Early Warning / 3:20	2.00	1.55	21.60
Compliace / 3:25	2.00	1.66	21.60

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	3	
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					
Lund Skill	All Day	0					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Should finished up dredging tomorrow.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Cloudy, Clear and Nice			DAY OF WEEK	Thursday	DATE	9/8/2016
No of Employee's:	3	Production:	300 Plus CY (estimated 20% Biomass)		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety Meeting in morning with crew. Dredge crew deployed into complete last passes in Cranberry Cove in Lake Section (outer section of Prism with multiple passes). Thick aquatic matt encountered as move toward lake (away from shore). Returned to inside and dredged additional material that has sloughed into prism from shoreline. Dredged material to large harder cobble. Moderate sloughing throughout. Water quality sampling perform. Completed all dredging. Picked up free anchor and started to prepare for next week. MudCat on Anchor / boom lowered and secured pipeline for weekend. Secured equipment.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C
Background / 9:45	1.00	1.98	20.80
Early Warning / 9:48	2.00	3.76	21.20
Compliace / 9:50	2.00	2.88	21.20
Background / 2:11	1.00	2.15	20.90
Early Warning / 2:25	2.00	3.77	21.60
Compliace / 2:28	2.00	2.38	21.60

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	8			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10					
Pollution Control and Related equipment	All Day	10					
Portable Tools (generator, hand, etc)	All Day	6					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	10					
UGLY Flocculent System	All Day	10					
Lund Skill	All Day	0					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Should finished up dredging tomorrow.

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and Clear			DAY OF WEEK	Monday	DATE	9/12/2016
No of Employee's:	4	Production:	None		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	Yes

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety meeting with MIC crew on using knifes. Lake Limerick Meeting with Rob, Joe, Matt, Kelly and Brian. Opened bags and started reviewing material for disposal. Survey completed for additional transects. Started demobilization by pulling pipes and breaking sections. Laid pipe along side island. Secured for night.

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Sampling not required; dredging Completed

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C	

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	2			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Joe Bernert	4	2
Pollution Control and Related equipment	All Day	2					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	2					
UGLY Flocculent System	All Day	0					
Lund Skill	All Day	0					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Proposed revision to be submitted on measurements

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and Clear			DAY OF WEEK	Tuesday	DATE	9/13/2016
No of Employee's:	4	Production:	None		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety meeting with MIC crew. Truck arrived at on-site at 7:00. Backhoe arrived at 9:30. Worked on loading trucks and hauling. Assistance with crew on loading. Marine crew also deployed additional pipe and anchors from the lake. Truck loaded and ready to go in morning. Four loads taken to disposal, material was light and trucks loaded to over 12 CY each (and underweight). Secured for night

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Sampling not required; dredging Completed

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C	

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

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DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	2			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Chris (Driver)	10	4
Pollution Control and Related equipment	All Day	2					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	2					
UGLY Flocculent System	All Day	0					
Lund Skill	All Day	0					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

Proposed revision to be submitted on measurements

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and Clear			DAY OF WEEK	Wednesday	DATE	9/14/2016
No of Employee's:	4	Production:	None		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety meeting with MIC crew. Worked on loading trucks and hauling and cleaning site. Eight loads to disposal. Secured for night

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Sampling not required; dredging Completed

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C	

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

HOURS

EQUIPMENT	ON SITE	HRS. USED	Fuel	Lds	Personnel	HRS	Job Activity
Pipe HPDE 3000 lf	All Day	10			Matt Fobert	10	1
Floats	All Day	10			Eric Hittle	10	3
Portable Generator (7.5 KW)	All Day	2			Steve Godsil	10	3
HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Chris (Driver)	10	4
Pollution Control and Related equipment	All Day	2					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	2					
UGLY Flocculent System	All Day	0					
Lund Skill	All Day	0					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
Ph. (503) 682-9925

DAILY CONSTRUCTION REPORT

PROJECT NAME:	Lake Limerick 2016 Dredging					PROJECT NUMBER	2016-107
WEATHER	Sunny and Clear			DAY OF WEEK	Thursday	DATE	9/15/2016
No of Employee's:	4	Production:	None		Superintendent or Site Foreman:	Matt Fobert	
PM	Matt Fobert		SSHO/CQC		Joe Bernert	Yes	No

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

Safety meeting with MIC crew. Worked on loading trucks and hauling and cleaning site. Seven loads to disposal. Secured for night

OFFICIAL VISITORS:	

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Sampling not required; dredging Completed

Site / Time	Depth (ft)	Turbidity (NTU)	Temp. C	

INCIDENTS/INJURIES

Employee:		Injury/Incident:		OSHA Form Completed:	
Brief Description:					
Sent to DR	No	Follow Up:		Other:	
Copy Sent to:		Owner:		OSHA:	

NOTES

MARINE INDUSTRIAL CONSTRUCTION
10050 SW Wilsonville Road
Wilsonville, OR, 97070
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HPDE Pipe Connections, Flex Pipe, etc.	All Day	10			Chris (Driver)	10	4
Pollution Control and Related equipment	All Day	2					
Portable Tools (generator, hand, etc)	All Day	10					
Duckworth & Lund Skiff	All Day	10					
Fork Lift	All Day	0					
Elecrtronic, Instruments, Surveying Equip.	All Day	1					
MudCat Dredge	All Day	2					
UGLY Flocculent System	All Day	0					
Lund Skill	All Day	0					

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor:

Matt Fobert

Project Lead - Please Print

Project Oversight

Appendix F. Submittals (Pre-Dredging Deployment)

Attached

Submittal Version
7/12/16

Lake Limerick Country Club
790 East St. Andrews Drive,
Shelton, WA 98584

LAKE LIMERICK 2016
BIOMUCK DREDGING

Project Submittals

Contractor:

Marine Industrial Construction, LLC

July 12, 2016

Intentionally Blank

Prepared for
Lake Limerick Dredging Team
Kelly Evans
Brian Smith
Rob Plotnikoff
Harry Gibbons

Prepared by
Marine Industrial Construction

This is the pre-dredging submittal packets related to Marine Industrial Construction, LLC:

Recommended Approach and Equipment
Layout and Configuration
Implementation Plans

Version 7/12/16a

Table of Contents

<u>Attached Engineering Drawing (11" x 17" Format)</u>

CONFIDENTIALITY NOTE: The information contained in this Submittal legally privileged and confidential information intended only for the use of the individual or entity named above (Lake Limerick Country Club and their respective Consultant). If the reader of this document is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this document is strictly prohibited. If you have received this in error, then please notify us by telephone and destroy the original.

Thanks you for your assistance and feel free to contact us at:

Marine Industrial Construction, LLC
Telephone: 503-682-9925
10050 SW Wilsonville Road
Wilsonville, OR 97070

Background

The project is to hydraulic dredge approximately 5,000 cubic yards (c.y.) of sediments and dead aquatic weed materials (bio-muck) from Lake Limerick, Mason County, WA (near Shelton, WA, Vicinity map presented on Sheet 1). The material ranges from 1 to 5 feet in depth and is principally composed of sand, silt, and dead soft-stemmed aquatic weed material. The water sediment water column depth in defined project areas ranges from 1 foot to 14 feet. The majority of the work area depth does not exceed 12 feet depth.

Lake Limerick is a human made lake (from damming) and is approximately 50 years old. The project areas were last dredged approximately 30 years ago during the mid 1980's.

Point of Contact for LLCC

Lake Limerick Country Club (LLCC) has the following lead contacts for the project:

Owners Representative

Brian J. Smith
360-451-6679 (mobile)
360-868-2048 (facsimile)
360-868-2025 (home)
smithbnl@comcast.net

Owners Technical Representative

Robert W. Plotnikoff, Tetra Tech
206-838-6255 work)
206-303-9174 (mobile)
206-728-9670 (facsimile)
robert.plotnikoff@tetratech.com

Contractor

Marine Industrial Construction, LLC (MIC) was the selected contractor. MIC is a construction company committed to providing quality services to our customers based out of Wilsonville, Oregon. We are dedicated to honest, hard work and provide the best choices and solutions for clients and our employees. MIC was formed in 2009 by members of the Bernert family. The Bernert family started working on the Willamette and Columbia Rivers in the 1860's. We have a rich history doing revetment and construction work for the Corps of Engineers; marine transport; dredging for aggregate sources as well as navigation; and other marine related activities. In the late 1950's we formed an aggregate and concrete company (Wilsonville Concrete –WCP) and dredged over 200,000 c.y. of sand and gravel annually from 1958 until 2009. Since 2009, we have dredged and performed construction work for the Corp of Engineers, Port of Vancouver, Port of Portland, and numerous other public and private clients performing dredging, pipeline replacement, debris removal, and salvage. Currently the next generation of the family and their children (5th generation) are operating the business.

Dredging Plan

The attached dredging plan reviews all the mobilization, dredging and dredge material in-water placement and demobilization activities associated with the Lake Limerick 2016 Bio-muck Dredging. This includes a complete description of the equipment to be used to accomplish the work, schedule and related project plans. This project will be by suction dredging using various marine equipment.

Methods

The Lake Limerick dredging is located in Cranberry Cove and Kings Cove inlets on Lake Limerick in Shelton, WA (Project area presented on Sheet 2). The material is pumped to Log Toy Park and dewatered in bio-bags. The material appears to be fine sand and silts sediments that will be disposed of

in bio-bags at defined location. Sediment samples presented in the solicitation indicate the sediment is soft and primarily composed of sands (roughly 80%), silts (17%) and clays (3%). Nominal amounts of gravel were present at less than 3/8" cobble. Two primary dredging areas were defined at Cranberry Cove (North western inlets) and Kings Cover (North eastern inlets). The disposal site is located at Log Toy Park. The dredging volume is specified at 5,000 c.y.

Several conservation measures are being deployed for this project:

- High power suction pump
- Disposal in appropriate specified location in bio-bags and transported to other upland disposal site.
- Minimize environmental impacts by using hydraulic dredging configuration.

Initial dredging is expected to be roughly 5,000 c.y. The bid specification present two dredging area at:

- Kings Cove
- Cranberry Cove

Equipment

The equipment will be mobilized from the WCP/MIC facilities in Wilsonville/Salem, Oregon. The equipment will include dredge(s), boat(s), floats, pipe, portable barges, pipe/floats, trucks and power equipment. MIC currently has a large supply of dredging equipment including 4 mechanical dredges, 3 hydraulic dredges, a complete marine fleet (with 3 Tugs from 1500 to 1800 HP; 3 tugs from 600 to 900 HP; 3 dredge tenders from 250 to 300 HP; 2 small skiffs), several cranes, 3 excavators, 5 loaders, 7 dump trucks with pups and other equipment.

Hydraulic Dredges

The project will use suction dredging (i.e. employing pumps and water to dig and transport material). We have multiple sets of equipment we can use for this activity:

- **MudCat** - Primarily used in shallow muddy (soft) sediments which uses a rotating head and a 100 Horsepower pump with 8"/10" discharges.
- **Toyo 150 DP** – Submersible pump with 150 Horsepower Electric pump powered with a high pressure jet ring with a 10 Inch discharge pipe and 3200 gallon per minute.
- **DragFlow 300 HY** with excavator and high pressure ring – 10/12" diameter pump powered by a dedicated hydraulic power unit and roughly 5000 gallons per minute rate.

Each configuration has an advantage and disadvantage. The Engineering associated with each dredge is presented on Sheet 3.

Option 1. MudCat

The MudCat features a diesel-powered (Detroit Diesel 6V71 engine) that powers a pumping unit and submersible hydro – solids pump. The unit has a shrouded 8' auger head with a triple sheaved winch. It is constructed from 10 gauge steel pontoon with floatation. The dredge uses a 10" discharge pipe.

The MC-15 MudCat has a front Auger which will breakup and fluidize the materials to be sucked up by a large capacity pump which is rated at 2,000 gallon per minute. This is used in conjunction with our 10" HDPE pipeline The MudCat can be directly transported to the site using a haul truck and launched with a crane.

The MudCat has a winch system on-board to pull itself back and forth in a systematic pattern to remove materials down to 15 feet deep. We also use a skiff to position the suction dredge. The MudCat is 40 feet long x 8 feet wide and 21,000 lbs. It has production rate which can reach from 10 to 15% solids and remove up to 50 to 80 c.y. per hour solids. It is operated by one crew member and a Mate (on board or on skiff - for positioning assistance and pipe support). Roughly 4000 linear feet of pipe will be used for pumping the material to the in water disposal site. Anchors systems and temporary spuds can be deployed on the MudCat for positioning.

Option 2. Toyo 150B

The Toyo submersible pump is specifically designed for heavy and abrasive slurries. It is a centrifugal pump with a closed impellors and a unique agitator which lift sediments into suspension. This enables continuous pumping at high concentrations. The Toyo 150 submersible hydraulic pump is:

- Flow rated at 3200 gallons per minute with a 72 foot head
- Maximum solid size of slight under 5"
- 10 inch discharge diameter
- Impellor diameter 25 inches
- 705 rpm
- Weight over 8000 lbs with attachments
- Voltage 460/ 575

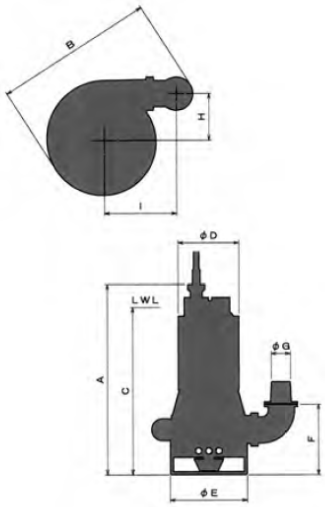
It is powered by Cummins 350 KW generator mounted on trailer. We have custom rigging and pipe configurations. The pump specifications are presented below.

SIZE

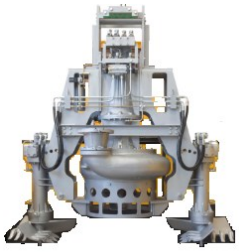
Unit : mm

MODEL	A (HEIGHT)	B (WIDTH)	C (LWL)	D	E	F	G	H	I
DP-100B-1	1875	1570	1650	600	760	695	200	460	713
DP-100BH-1 *	1875	1570	1650	600	760	695	200	460	713
DP-100BL	2058	1645	1850	600	820	840.5	250	560	643
DP-150	2734	1610	2300	640	1010	940	200	550	628
DP-150L	2734	1610	2300	640	1010	940	200	550	628
DP-150B	2794	1695	2400	640	1010	970	250	530	723
DP6-100B	1815	1195	1500	540	660	712.5	200	325	553
DP6-120B	1865	1195	1550	540	660	712.5	200	325	553

- Specifications are changeable without notice. Please ask for Specification Sheet for the details.
- * only 60Hz available.



Option 3. DragFlow 300 HY



The DragFlow 300 HY is a large capacity dredge pump with side cutting excavator and high pressure ring. The dump is over 12,000 pounds and placed in the dredging column with a high capacity crane or a hydraulic excavator (such as our Cat 375 L [180,000 pound machine]). System is powered by a dedicated hydraulic power unit.

Recommended Dredge - MudCat

A comparison of the specifications for the three hydraulic dredges is presented below, summarizing the capabilities with potential advantages and disadvantages. Details of the systems were discussed in the pre-construction meeting on July 6th 2016 with the Lake Limerick Management Team, and based on the goals and objective of the project, the nature of sediments and area to be dredged the MudCat was determined to be the recommended configuration.

Specification	MudCat	Toyo 150B	DragFlow 300 HY
Estimate C.Y. per hour	50 to 120	100 to 200	300 to 500
Pump Rate (gal/min)	2000 g/min	3200 g/min	5000 g/min
Optimum sediment size	Fine grain sediments	Sand to Fine Gravel	Sand to Gravels
Average % solids	10 to 30	20 to 40 (max near 70)	20 to 40 (max near 70)
Maximum Depth (ft)	18	70 feet	120 Feet
Turbidity / WQ impacts	Low turbidity	Very low turbidity	Low turbidity
Powered	Self Power (GM6V71) – 250 HP	External Cumming (QSX) 750 HP	External Hydraulic Power Unit (750 HP)
Fuel Consumption	50 gallons / hr	100 gallons / hr	110 gallons / hr
Labor Required	Operator and Assistant	PEO Operator, Mate and Assistant	PEO Operator, Mate and Assistant
Set Up Labor	Additional Mate	Additional Mate/Skipper	Additional Mate/Skipper
Equipment	Small Tug, Skiff	Crane Barge/Excavator, Tugboat and Barge	Crane Barge/Excavator, Tugboat and Barge
Pipe required	As defined to disposal	As defined to disposal	As defined to disposal
Relative Costs	Low Cost	Moderate Cost	Moderate to higher

The major difference is the MudCat is relatively slower at the dredging but takes fewer resources (i.e. slower but less expensive) whereas the Toyo and Dragflow are higher capacity pumps but require more equipment and personnel to operate. The MudCat should have the optimized configuration in the sediments at Lake Limerick since it can also be configured to cover larger areas and can be made more time efficient by using anchors (as opposed to spud configurations). For this project we opt to use the MudCat Dredge since it could be submerged into the sediment and directly remove sediment with minimal agitation, minimizing turbidity releases to the water column and it will meet the projects objectives with a minimal footprint.

The Mud Cat is the preferred hydraulic dredge for Sludge and soft sediment (bio muck) removal. The horizontal auger dredge covers a large swath with the submersible pump and covered/showed cutter head (with mud shield).The dredge is equipped with a centrifugal vortex style impeller capable of passing up 6 inch solids. This pump will deliver 2000 Gallon per minute (GPM) against 120 feet of total dynamic head and produce up to 124 cubic yards per hour at 30% solids content.

Horizontal auger dredges are excellent for soft, loose colloidal sediments and sludge with slurry flow rates in the 500 to 2,000 GPM range, but they do not perform well in compacted sand and virgin soil.

Support Equipment

Support equipment (to the dredge) include pipe and floats, skiffs, flexi-floats for portable spud barge (placing anchors), bio-bags, loader, dump trucks and pups. The equipment will be configured on site at park (Toy Log) and boat ramp.

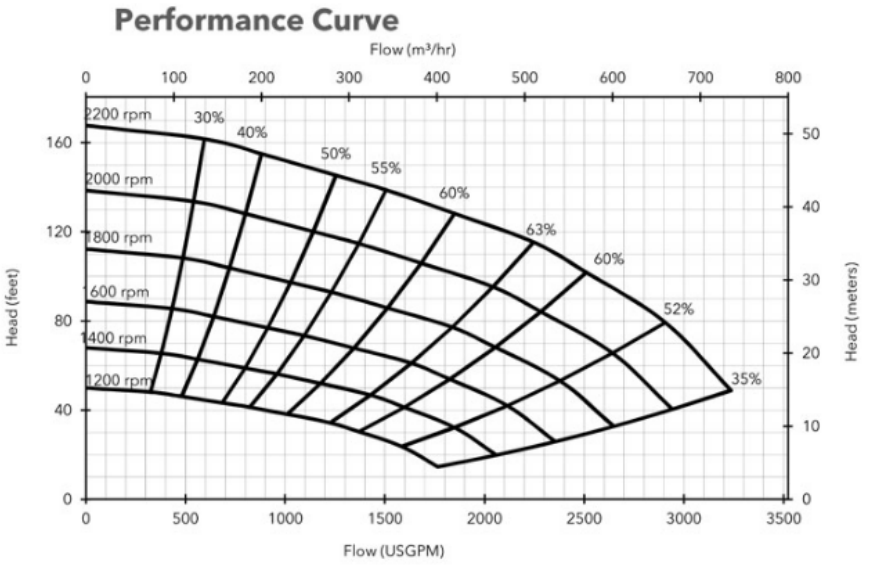
Pipeline

The 10” HPDE pipe will be configured so that is can pump from the dredging locations to the disposal site. A conceptual schematic of the configuration (layout) for the operation is presented in Sheet 4

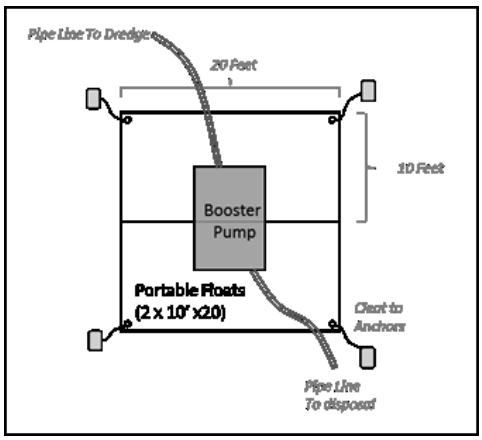
including pipe connections and floats. Pipe will be anchored and secured as needed to ensure safe passage and access (and limited movement). Correspondingly, all floating pipe lines will also have flashing yellow lights.

Booster Pump

A booster pump will be used to facilitate the longer transport and maximize the production. The Godwin booster pump is a CDM225 Dri-Prime diesel system and will be placed on a floating barge approximately 2,000 feet from the primary dredge and the disposal site. The pump is rated at 3,510 gpm and has the capability to handle solids up to 3.0" in diameter with an automatic prime up to 28 feet.



The pump is 6.4' wide and 9.6' in length with a weight of 5,400 lbs. This will be configured on a portable barge of 2 flexi-floats for a 20' x 20' barge with plates/cribbing for distributing load (buoyancy capacity of each float is over 50% at 13 tons each). Additional detail is presented in the next section.



This barge will be positioned and anchored with a set of 100 lbs. anchors on each corner. The barge will be accessed via a skiff for maintenance and monitoring.

Pump Capacity

The pump is within the capacity of the project plan. The detailed performances are outlined below.

The pump performance curve indicates the pumping rate of 2000 gallons a will have significant head loss and we opt for including a booster pump to ensure high rate of transport to the disposal site.

The suction dredge discharge pipe has minimum of 10 inches in diameter. The dredged material shall be transported from the suction dredge to the in-water placement site with a submerged or floating pipeline. The liquid friction loss for the maximum run of pipe associated with the pumps are outlined in the following table with a maximum pumping distance including additional line for shore side manifolds and related baffling (indicating a booster pump to be deployed):

Liquid Friction Pressure Loss	
Clean Pressure Loss (psi): 38 **Dirty Pressure Loss (psi): 45.6** **Clean Head Loss (feet): 87.8** **Dirty Head Loss (feet): 105.3**	
Line Number: Limerick	**Piping Length (ft):** 4300
Date: 6/28/2016	**Long Radius Elbows:** 2
Nominal Pipe Size: 10	**T flow Thru:** 1
Pipe Schedule: SCH 80	**45 degree Elbows :** 2
Flow Rate (gpm): 2000	**Gates**: 2
Viscosity (cP): 1.0	**No Increases:1**
Specific Gravity (water=1): 1	**Increase Out Size (in):** 8
Temperature (F): 55	**Increase in Clean Pressure Drop (%):** 20
Pipe Roughness (ft): 0.000016	
Actual Pipe ID (in.): 9.562	
Fluid Velocity (ft/sec): 8.94	
Reynolds Number: 661490	
Flow Region: Turbulent	
Friction Factor: 0.013	
Overall K: 70.74	

The booster pump will be located at a mid-pipe location (~1000 feet from Cranberry Cove) to maximize efficiency. The booster needs to be effectively designed into the piping configuration since it can cause malfunctions and potential safety issues, cause lost production, inefficiency, pump breakage, and blown pipelines and fittings. The booster pump needs to be located in the discharge line between the dredge pump and discharge point at effective pumping locations related to initial pump, pipe length and head loss. The following are basic requirements on the booster pump:

- The openings through the booster pump impeller must be the same size or larger than the openings through dredge pump impeller
- Mid located at where pressure loss is optimized by the pump placement (typical at 45% of pipe run)
- Ensure pressure at the booster pump inlet is always POSITIVE under all pumping conditions.
    - Install Whistle Pipe on Booster input (to allow air to enter the booster pump whenever its inlet pressure becomes a vacuum)

Barges (Equipment Barge and Pumping Barge)

The barges is constructed from portable sectional floats (10’ x 20’ x 48”) and weigh over 10,000 lbs. for each float. One barge will be for the booster pump (which will be 2 floats). A second will be used for equipment storage used in the dredging and anchor placement (1 to 2 floats required).

Skiff

We anticipate accessing the equipment with a skiff which is a small aluminum boat (Lund and/or Duckworth skiffs with outboards).

Anchors

Anchor configurations are critical to an effective dredge plan since these are the working arms for the paths to be dredged. Anchors and spud barges are identified and connected with wire cable to working locations. The anchor system requires significant effort to reposition and to be placed on the lake bottom. We use several anchor configurations as needed including barge spuds and traditional anchors. The anchors include:

- Small lead anchors (< 30 lbs.)
- 100 pound Bulk Concrete
- 500 lb. to 750 Mushroom ballast – custom made for Lake Limerick Project
- 1200 lb. ½ concrete block
- 2000 lb. Danforth lead
- Larger concrete block anchors (2800 to 4000 lbs.) as needed

Anchors are secured with wire and synthetic ropes. Anchoring configurations for the dredge are presented in Sheet 6.

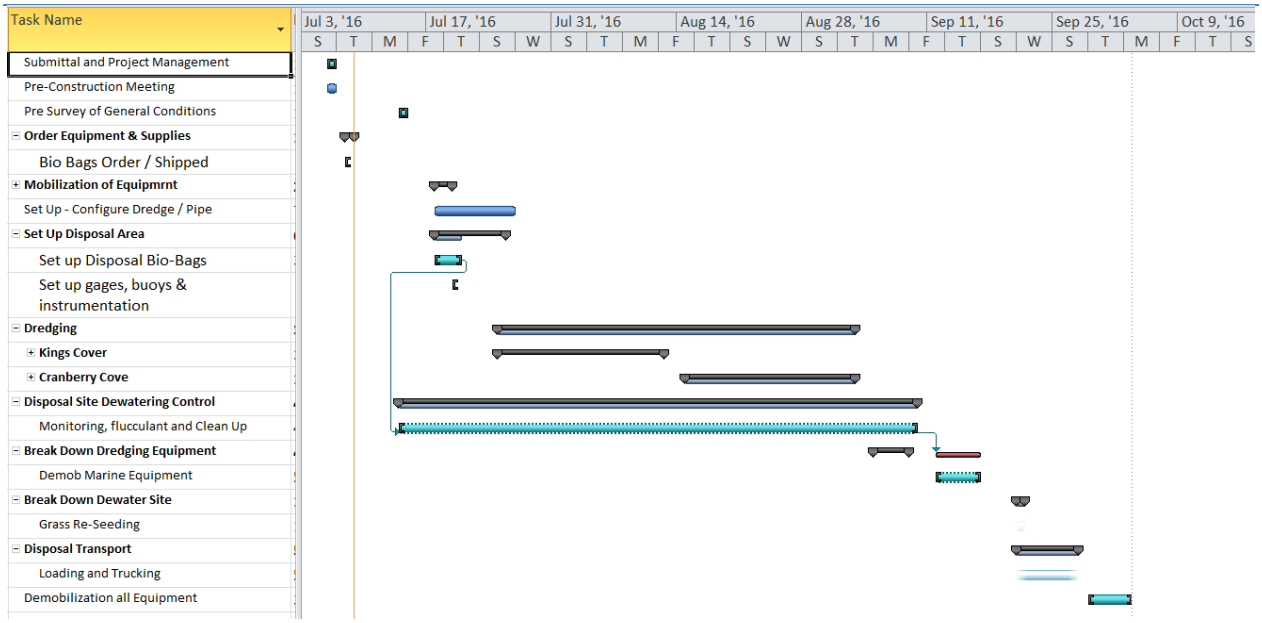
Weight requirements for anchors were determined based on the dredge size, the water depth, sediment types the drag coefficients and basic engineering. We anticipate anchors of 500 lbs to hold dredge in position with enough force for traction/pump uptake. Due to the shallow depths in the inlets, these are near the maximum capacity that can be man handled into position.

Shore Side Equipment

The shore-side equipment will include dump trucks with pups, loaders and equipment as needed. The equipment will be positioned at Log Toy Park. A crane will be used to unload the dredge and portable barges. Our crane operators are all NCCCO certified and in compliance with Washington State 296-155 WAC rule.

Schedule & Critical Path

The work is planned to be completed in eight to ten weeks during the in- water work window (i.e. early September). A detailed project plan is developed in Microsoft project and follows the outlined Gantt Chart.


Task Name
Submittal and Project Management
Pre-Construction Meeting
Pre Survey of General Conditions
Order Equipment & Supplies
Bio Bags Order / Shipped
Mobilization of Equipmrnt
Set Up - Configure Dredge / Pipe
Set Up Disposal Area
Set up Disposal Bio-Bags
Set up gages, buoys & instrumentation
Dredging
Kings Cover
Cranberry Cove
Disposal Site Dewatering Control
Monitoring, flucculant and Clean Up
Break Down Dredging Equipment
Demob Marine Equipment
Break Down Dewater Site
Grass Re-Seeding
Disposal Transport
Loading and Trucking
Demobilization all Equipment
Jul 3, '16
Jul 17, '16
Jul 31, '16
Aug 14, '16
Aug 28, '16
Sep 11, '16
Sep 25, '16
Oct 9, '16
S T M F T S W S T M F T S W S T M F T S W S T M F T S W S T M F T S

The Critical Path and schedule are presented in the following table.

Tasks - Milestones	Begin	End
Mobilization General and Kings Cove	July 18, 2016	July 23, 2016
Dredging Kings Cove	July 15, 2016	August 5, 2016
Evaluation of Volume and assessment of residual high spots	August 9, 2016	August 9, 2016
Spots in Review - Cleanup and High spot dredging Kings Cove	August 10, 2016	August 12, 2016
Mobilization Cranberry Cove	August 13, 2016	August 16, 2016
Dredging Cranberry Cove	August 17, 2016	September 1, 2016
Evaluation of Volume and assessment of residual high spots	September 1, 2016	September 1, 2016
Spots in Cranberry Cove (LLCC) Cleanup and High spot dredging Kings Cove	September 2, 2016	September 3, 2016
All Other Work	October 1, 2016	

Work Times will be 7 am to 7 pm daily with a work schedule for 4 days (Monday to Thursday). The Identified key phases of work are:

1. Equipment mobilization from Wilsonville, OR and Portland, OR to project site near Shelton, WA
    a. Dredge, Booster Pump, Pipe/Floats, Anchors, Skiff, Portable Barges, Bio-Bags to be loaded and prepared for transport.
    b. Unloading equipment at Project site (and place in lake) and disposal site.
    c. Dump Truck other equipment (loaders/excavator) to site and configure (Log Toy) when material needs to be transported.
2. Set up base control for QA including
    a. bounding marker (ranges) shore side
    b. Buoys in disposal area
    c. Install Gages
3. Equipment set up (spud barge, connect and lay pipe, etc.) on site at Ramp - entire set up 4 people for 3 day 10 hour days
    a. Turbidity boom placed around dredge (Containment boom prepared).
4. Dredge area and pipe discharge to disposal site (including daily reporting and QA)
5. Transport dredge spoils to landfill
6. De-mobilization of all equipment - entire breakdown 4 people for 3 day 10 hour days

The project will be completed in roughly 10 weeks based on initial assessments. This will be updated as production rates are monitored.

The initial area dredged would be a Kings Cove and then Cranberry Cove (see Sheet 2 and Sheet 9/10).

Dredging Project Tasks

1. Project Plan Tasks
    a. Administrative/Contract, etc.
        i. Insurance, Bonding and related activities
    b. Prepare Schedule with Critical Mile Stones
        i. Goals
        ii. Subcontracts
    c. Internal Pre-Construction Strategy Meeting (typically involved review by Technical Leads from Parent Company WCP and Science staff (include PE).
    d. Official Pre-Construction Meeting with Lake Limerick
2. Submittals (as required) but others should be clearly understood so Team has clear understanding of roles and responsibilities
    a. Project Specific Plan – Detailed with schedule and dredging plan. Developed by Supervisor with critical input from Administrative Staff (estimator) and reviewed as to scope and goals (budgets). Complete 100% agreement is require by MIC Internal Management Team (President, Secretary and WCP General Manager and Marine Manager) prior to any deployment to minimize company's risks.
    b. Communication Plan – internal for team with specific roles / responsibilities and the related accountability; this include daily and weekly reporting (including trucking, volumes, weights, etc.)
    c. Health and Safety Plan including Contacts (emergency and others)
    d. Environmental Plans
        i. Spill Control and Countermeasure Plan
        ii. Turbidity Curtain Plan and environmental components
        iii. Dewatering Plan including layouts equipment, environmental quality control, etc.
    e. Quality Control Plan – this is to ensure the Project Plan (production) is meet and monitored and used for planning; as well as compliance measures (environmental, legal, etc.). Identify roles and responsibilities.
3. Review Equipment, Inspections and critical resources
    a. Test and verify equipment and maintenance (review records)
    b. Pre-Deployment Inspections
    c. Verify supplies, Tools, etc.
    d. Agency / Customer Equipment / Project Inspections (if required)
4. Order all supplies and materials needed (bio-bags, flocculates, etc.)
5. Project Set Up
    a. Employment Sign On (Temporary, Union Hall, Contractors, etc.)
    b. Mobilization Planning and scoping
    c. Logistics, Lodging, Office, etc.
    d. Project / Safety Board; other requirements
    e. Reporting (project form box) – should be scaled to project and resources allocated/budgeted in project. Driven by requirement and specific objectives of the

project (has to add value or not required). Specific may include (typically short checklists) in descending value:

i. Timesheets, Expenses, etc.
ii. Daily Construction Reports
iii. Inspections (as determined)
iv. Quality Control (as required by project scope and budget)
v. Safety Reporting and Meeting (as needed)

f. Project Meetings (time and resources needed to meet goals of project/budget):
   i. Daily Team
   ii. Weekly Client Progress Meeting
   iii. Variants (as determined ahead of time)

6. Deploy project and plan
   a. Computer mapping and drawing:
      i. Perform (review and/or have) and/or get a pre-survey for the area to be dredged. Ensure boundaries are incorporated and control points can be established to check equipment (bias and accuracy). This is (will be) used to determine the volumes for the dredging (with the post dredging survey which needs to be completed with similar precision). Determine local ground control. Process the data to include:
         1. Prism Volume
         2. Slough Volumes
         3. Total volume estimates
         4. Build files in GIS and/or CAD and process to putting into dredging software (such as WinOPS).
         5. Have plan and methods will lead and supporting all defined (on site, remote, etc.)
   b. Install the tide gage. The tide gage needs to be installed with the pressure transducer in a stilling well that can be checked against a manual tide board (may also need to be installed). The vertical data is critical on this and needs to be within at least 0.1 on quality control checks. If not local benchmark are available, additional surveying may need to be completed. Radio beacon needs to be checked against the tide gages and compared to other gages.
   c. Disposal site GPS in and set up in GPS field gear for locating end pipe or related information.
   d. Ongoing / Required Water quality reporting plan and equipment
      i. Turbidity, Temperature, DO, Depth, Location, etc.
      ii. Sediment Sampling and sieve processing, density, slurry concentrations, etc.
   e. Any potential navigation issues and /or dredging limitation (pipe lines, recreational traffic, commercial vessels etc.) – ensure equipment need appropriate signage and lights as per scope.
   f. Quality Control tracking volume from pump (curve and density samples of slurry concentrations); area covered and depth (in GIS); use scientific approach not guesses. Support provided as needed and scoped.

i. Multiple measures of quantity from Displacement (densities and logs), slurries/rate problems, mapped areas, bucket counts (operator logs), discharge rates, area dredge volume calculation (including box cuts), etc.
ii. Surveys and Measures

g. Project work deployed and completed

i. Dredging (pumping to disposal)
ii. Dewatering. Stockpiling, and transport to final disposal site

h. Post survey assessment and/or quantity assessment

7. Close Out
   a. Demobilization
   b. Temporary Employment signoff
   c. Post Project Meeting with Team / Crew
   d. Client Lessons Learned Meeting

Project Phases

The project Phases will be

- Mobilization to staging area including dewatering operations set up, hydraulic transmission pipeline set up, installation of safety provisions (buoy makers, lights, exclusion areas)
- Environmental protection measures: Install turbidity curtains and silt fences / straw bales as needed, prepare (and implement as needed) spill response contingencies and counter-measures
- Public safety measures: Install work area markers, pipeline buoys, and exclusion areas
- Dredging operations
  - Dredging
  - Dewatering operations
- Hauling to disposal site
- Demobilization of equipment
- Project Close Out

Layout and configurations

The primary dredging locations are presented on Sheets 9 and 10 (at Cranberry and Kings Cove). The area extent defined in both areas is variable and will be defined with Lake Limerick base on priorities and production. The specifics are present on maps (See Sheet 9 and 10). To optimize the dredging it is expected to focus the dredging on the channel and improving the access and having a grade that is advantageous for sediment transport.

Modification to the dredging design can be made with the Lake Limerick and MIC team to obtain the 5000 cy goals of solids.

Cutter-head Control

The following section is a description of the survey monitoring, control and implementation of the suction cutter head bucket location and depth in the dredging prism. The quality control procedures to be used to achieve the lines and grades are shown in the project plans. The of methods used to ensure dredging and placement within specified limits are outlined below, which includes the manufacturer, model, and equipment operating frequency for the electronic positioning, elevation control and tide measuring equipment and procedures for verifying accuracy.

The cutter head location is monitored both horizontally and vertically.

Geographic Control

The horizontal (geographic position) is monitored and tracked using with high precision Raven and Trimble differential Global Position System (dGPS). These sophisticated dual-channel beacon receiver with superior impulse noise performance provides reliable tracking of USCG, Canadian, or IALA beacon signals automatically). Satellite differential correction is also available using WAAS DGPS corrections and/or USCG radio beacons. The 10-channel GPS engine completes the process providing quick and stable satellite acquisition. Boom Tip differential GPS for recording bucket and boom location (Raven Precision Instruments) which are WAAS and/or Radio Beacon enabled. Also two differential GPS used for determining angle (direction) of the bucket located at the rear of the dredge (offset for triangulating). Additional gyroscopes can be used to assist in heading lost due to close proximity on docks face interfering with satellite reception (but have lower resolution). Heading is less critical in suction dredging than clamshell dredging since the intake on Toyo is circular and the boom tip location tracks the location.

Additionally a handheld high resolution GPS (Trimble GeoExplorer XH) provides real-time sub foot (<30 cm) accuracy to identify exact locations for support QC measures. This is used with a Laser Technology TruPulse Range Finder (+/- 1) foot accuracy on shoots) for inaccessible locations. The real time GPS data is used surveyed with respect to buoys to assist in specific precision underwater excavation.

Ranges and markers will also be set on the shore side of the operation for the operator to verify the dredge operator is within the prism.

Depth Control

Depth control is tracked using several methods and requires monitoring both current water depth (stage from datum) and tide levels. The primary methods is detailed marking on the pump and dredge depth indicator. The booms are marked/painted and checked during the operation so depth is maintained. Unique color combinations are used so the crane operator can review the depth.

The color combinations checked daily with measurements from the bottom of the pump to locations above the saddle on lines. The color codes are/can be used by the mate, MIC QA personal and on site Inspectors to verify depths.

In addition, we incorporate other QA methods for tracking depth. On the pump we have installed an automated Pressure Sensor transducer for monitoring and tracking depth. The Solinst Gold can measure 0 to 100 feet of water depth at sea level with a water level accuracy of 1.5 cm (0.05 feet) water and maximum error of 0.1 feet. This data is logged during the operation and downloaded at the end of each day for review and provided to the client. This data is also useful in evaluating the material removed.

Skiffs are also configured with a calibrated echo-sounder located on the bow of the skiff providing a real-time depth profile. It should be noted that during dredging these are subject to interference from the pump placement and underwater disturbance but also provide an additional QA check to the operator in a real time mode. Lead lines and staffs are also on the dredge and skiff for checking depth and the Quality Control repots.

In addition, boom angle and depth are fed into the WinOPS to provide real time read outs to both the QA officer and dredge operator. The detailed data logs will be incorporated into the GIS and data files will be used for detailed maps, cross sections and reporting. Data files will be posted daily on public access site for the client's review.

Tide Level/Datum

We use a Caplan Tide (or Etrac) gage integrated with wireless modem into each dredge cab manual gage record installed on site (gage on post/stake near dredging). This is integrated with the design and provides the real time read out to the operator of the dredging depth. It is important to incorporate QA measure to verify the lake level.

QA Software

The WinOPS dredging system (software and hardware) is installed on the digging dredges with multiple high resolution GPS, integration into echo-sounders with remote keyboards and monitors in the operators cab. A digital gyro-compass will be used to assist on monitoring the crane's orientation.

WinOPS

WinOPS is a state of the art Dredge Positioning / Marine Construction Software designed to position all dredge types, tugs, scows and construction support vessels. It support (showing to the operator and others hydrographic data, dredging prism, anthropogenic features, and other information:

- Position Tracking and monitoring
- Cross Section Display
- Volume computation
- Tide / water level changes

WinOPS is configured with high precision differential GPSs (location), pressure transducer/echo sounders, (depths), and other sensor data to provide detailed engineering and mapping data. The data is parsed and provided as input into mapping, CAD and GIS data.

GIS and GPS Software

We used Geographic Information System (GIS) software for mapping and maintaining databases. This is used to map and assess volumes, dredging prism, and related data. We use ArcGIS (including Spatial Analyst and 3D analyst), AutoCad, DrDepth (processing side scanning images) and Trimble's TerraSync and Pathfinder Office (processing real time planning and processing, differential correction, etc.). Access and SQL/Server are used for tracking the data collection for processing and using in engineering programs.

Our standard dredging plans require daily monitoring for depths (using depth of lines, staff gages, automated gage, and other sampling techniques, detailed daily tracking of location (using differential GPS and laser and optical range finder) will be tracked and maintained in a database for reporting.

Additionally, for marking dredging location, temporary buoy placement and GPS waypoint marking, shall occur to ensure dredging occurs within the designated areas.

Hydrographic Surveys

Periodic hydrographic surveys may be completed to examine the status and quality of the dredging. Survey control methodology and procedures prevent exceeding depths. MIC has extensive experience with mapping related to dredging activities. We use state of the art technology for tracking the dredging location and depths and also use standard plane surveying and mapping methods.

The bathymetric surveys will be completed using a Global Position System (GPS) integrated with an echo sounder for determining river depth. In addition, in the areas where satellite reception is poor and/or depth signals are distorted, standard field mapping techniques (and soundings) will be employed. We use three high resolution GPS systems for bathymetric surveying associated with dredging:

- Trimble GeoExplorer 2008/XH (handheld real time with standard 30 cm accuracy and decimeter precision available)
- Trimble Pathfinder Pro XR with TDC1 Asset Surveyor (portable device with 30 cm in carrier phase with 5 minutes tracking and 1 cm with 45 minute tracking and post processing)
- Trimble Pathfinder Pro (XR/H) Receiver (configured with sub-meter precision) integrated with a Furuno echo sounder/depth finder.

These three Global Positioning Systems provide real-time sub-meter accuracy by combining real-time beacon, Wide Area Augmentation System (WAAS), and GPS capabilities in a single receiver and antenna. The Global Positioning System provides real-time sub-meter accuracy by combining a real-time beacon, Wide Area Augmentation System (WAAS), and GPS capabilities in a single receiver and antenna. The Pro XR integrates with Trimble's Asset Surveyor® software running on the TCD1™ data collector. The GeoXH has an on board computer with Windows mobile and TerraSync Software and uses H-Star™ technology. The GPSs integrate real-time differential GPS and can run in carrier phase modes. This incorporates a 12-channel and differential beacon receiver in one housing. WAAS differential ready uses patented EVEREST™ multi-path rejection technology to remove multi-path signals in reflective environments and supports NMEA-0183 output and RTCM SC-104 input/output. The DGPS was geometrically adjusted based on nearby National Geodetic Survey Points and geometric corrections were completed to a Community Base stations.

The GPS systems are integrated with a hydro acoustic echo sounder for determining water depths. Several echo sounders are used including a Furuno's LS6000 LCD system, a Furuno FCV 620, and a Furuno 582L depth finders. The hardware is 300 and 600 watt (2400 Watts peak-to-peak) systems of output power and dual 200 kHz and 50 kHz frequencies. The 6" diagonal high-definition LCD screen assists in fieldwork by providing a real-time detailed picture of bottom structure to assist in field data collection. Hummingbird 998C HD side scanning and down imaging sonar (with integrated GPS) is also available for additional textural detail on the bottom materials.

Navigational Safety

All of our dredges have the navigational day shape for a dredge and/or during restricted ability to move (Ball – Diamond – Ball) and we have flashing yellow lights to deploy on dredge pipelines. Additionally, we deploy anchor lights and other required equipment associated with USCG regulations for marine operations. All pertinent information for navigational operations, lights and related activities are logged in the vessel log daily by the dredge master and/or boat skipper.

Marine activities will primarily occur during day (with equipment moored at night). The vessels will monitor VHF-FM channel 13 and 16. The working VHF-FM Channel will be 79a on low watts. For additional information, contact Marine Industrial Construction at 503-682-9925. All dredging equipment, piping, and barges shall be properly signed and illuminated to ensure safe vessel movement around the work area.

Debris Disposal

Larger debris, when and if encountered, can be loaded onto the dredge/barge (or pulled to shore) for ease of off-loading and used in mitigation. This will be tracked and reported daily by operators.

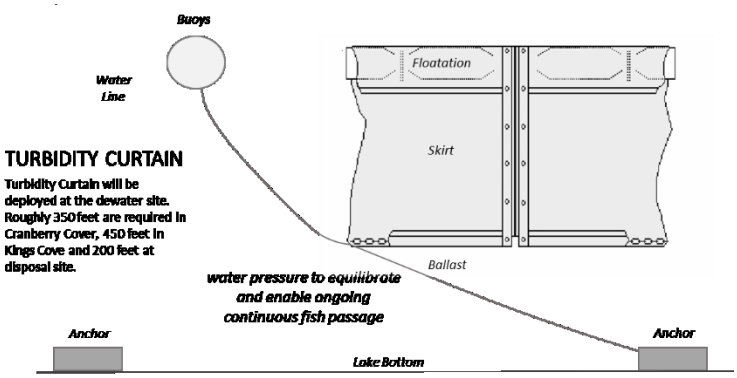
Larger debris, when encountered, can be loaded onto the dredge or moved ashore for later transport. All clean Large Woody Debris will be used in mitigation projects, if possible. If disposal of clean material is needed MIC will use WCPs upland disposal site located on Brown's Island, Salem, OR as per Oregon fill permit associated with WCP mining activities (DOGAMI Permit 24-0010; DEQ 1200A 110811). Any recyclable material will be trucked to our corporate recycling storage in Wilsonville, Oregon at the project end.

Layout Plans

The plans and shop drawings provided by MIC describe the location for the work activities. The schematic (attached Engineering Sheets) show the conceptual layout and the dredging process, equipment, and containment measures used for in-water placement of the dredge material are outlined in additional graphics (to scale). MIC will maintain a large printout daily of the dredging area and disposal area for annotated work activities. These note and mapped data will be incorporated into the dredge log file and map and profile.

Turbidity Curtain Plan

A silt boom will be used at various locatior presented on Sheet 5. The curtain has a fi passage maintain by keeping and opening bottom of the curtain. Also there is positive pressure from inflowing inlets. Below is the configuration used on the turbidity booms/curtains.



Floating Absorptive Containment Boom

A floating absorptive containment boom will be deployed as needed (if issues are noted).

Product Data Sheet	
Part Number:	B810
Nomenclature:	Absorbent boom composed of Polypropylene Hydrophobic Fiber, spun bond sleeve, yellow rope, Polyester Netting with UV inhibitor, rings and snaps.
Unit Color:	White/ Multi colored. Yellow rope, White netting.
Unit Dimensions:	8" dia.(nominal) X 10' length (x/- 2") ½" concentricity
Unit Weight:	10 lbs
Unit Absorbency:	20.933 gallons
Units per Case /Bale:	4
Case / Bale Absorbency:	83.73 gallons
Case / Bale Weight:	40 lbs.
Case / Bale Dimensions:	24" diam. x 23" high
Case / Bale per Pallet:	16
Pallet Dimensions:	42" x 48" x 98"
Pallet Weight:	675 lbs.

Description: Primarily used to absorb / skim oil and hydrocarbon spills from all terrain and bodies of water. Link together into barriers of any length for containment and absorption. Manufactured using an outer net of polyester and an inner sock of spun bond polypropylene filled with an all natural, oil only hydrophobic fiber.

- Rope running along length of Boom adds strength for deployment and retrieval
- Strong, zinc-plated carbon steel attachment clips and rings allow you to link Booms together for greater length
- Oil-Only Poly fill is highly absorbent and selective in absorbing oil-based spills in a variety of environments.
- Tough outer mesh resists snags and debris while remaining pliable
- Spun bond polypropylene skin is UV resistant up to 12 months; meets NFPA 99 standards for static decay
- Absorbs and retains oils and oil-based liquids—including lubricants, fuels and cleaning agents—without absorbing a drop of water
- Hugs ground to confine and soak up spills on land; floats to confine and soak up spills on water
- White / Multi colored.
- Can be incinerated.

Regulations and Compliance

33 CFR 154.1047(c)(2)	" Containment boom, sorbent boom, silt curtains, or other methods for containing the petroleum oil that may remain floating on the surface or to reduce spreading on the bottom"

Component Specifications		
Net Material	Natural color polyester multifilament yarn.	
Yarn Construction	72 strands or more around the circumference w/ 500 denier each strand.	
Thermal Properties	Melts at 450 degrees F	
Mesh Pattern	Hexagon, 2-stitch	
Tensile Strength	875 lbs, 8.61 lbs per end	
Tenacity	7.71 grams	
Sock Material	1.25 ounce per square yard hydrophobic spun bond polypropylene	
Weight	40 gsm +/- 10%	per ASTM D3776-96
Tensile strength M.D.	124 N/cm^2 +/- 20%	per ASTM D5034-90
Tensile strength C.D.	101 N/cm^2 +/- 20%	per ASTM D5034-90
Elongation M.D.	80% +/- 20%	per ASTM D5034-90
Elongation C.D.	90% +/- 20%	per ASTM D5034-90
Trapezoid Tear M.D.	9 lbs +/- 20%	per ASTM D5733-95
Trapezoid Tear C.D.	12.4 lbs +/- 20%	per ASTM D5733-95
Rope Material	3 strand monofilament polypropylene	
Diameter	¼"	
Circumference	¾"	
Tensile Strength	1,125 lbs	
Bit Snap specification	Rope sets in the base of the bit-snap and then clipped to hold the bit-snap in place.	
Location	19" (+/- 1" from end of boom)	
Material	100% ¼" zinc plated steel	
Size	2 1/2" long	
Break Strength	895 lbs	
O-ring specification	Rope, net and sock are looped through the o-ring and fastened with the clip	
Material	4.5 mm thick nickel plated welded steel ring.	
Size	1 ¼" diameter	
Break Strength	2878 lbs	
Clip Specification	Aluminum alloy cross clip, applied by a pneumatic clipper.	
Size	.188" Diameter	
Break Load	470 – 530 lbs.	

Material Placement Plan

The material is transported to the disposal site via 10" HDPE pipe connected with metal flanges secured with high strength bolts, washer and nuts. The bolts are secured with rattle guns, impact wrenches and manual tools as needed. The dredged materials are transported in a slurry using floating or submerged piping systems for in-water placement. The pipes are floated with additional buoys constructed of sealed PVC pipe and ropes; and custom float configurations. Flashing yellow lights can be secured to the pipeline for navigational visibility.

The auger located at the intakes moved the material into slurry and pumped into the pipe. Dredge material is sucked up into the pipe and transferred through a pump and pipeline to the in-water placement area.

The pumping capacity is capable of transporting dredge material via the pipe from the suction dredge/cutter head to the in-water placement area.

Dewatering Plan

The Dewatering Plan includes the site layout (see Sheet 7). The slurry is pumped to the bio-bags and material filters thru the materials and uses gravity to drain to Lake Limerick. Silt fences and hays bails will be placed to ensure minimal sedimentation and/or erosion. The configuration will be inspected by a Washington State Certified Erosion Control and Sediment Lead (CESL License ECO-3-9231505). The return flow water will be filtered and control measures will be deployed.

The dewater tubes will be GSI fabricates GEOSTRUX™ geotextile tubes. These are used where dewatering of sediments and industrial wastes is required. GEOSTRUX™ geotextile tubes are fabricated to exacting tolerances that allow them to be used for dewatering of contaminated sediments, fly ash, copper tailings and at numerous marinas, lakes and rivers. The effectiveness of the geotextile tube dewatering is underscored by the fact that the effluent is clean enough to be returned to the source. GEOSTRUX™ geotextile tubes can be fabricated to custom sizes to facilitate placement specific to the project. We will maintain a water quality multi-meter on site to measure turbidity and related water quality measures on site. As needed, the sediment/slurry will be treated with a polymer in the geotextile tubes so that dewatering is accelerated. As the sediment enters the geotextile tubes, the sediments particles will flocculate increasing the size of the particle. The result of this chemical action is that the geotextile tubes dewater more rapidly and the discharged water has dramatically less solids.

To control erosion MIC and minimize sedimentation a water permeable geo fabric will be placed on the ground where the tubes are located. This will also protect the turf in the area. The geotubes are placed on the geofabric. A silt fence perimeter will provide a circumference around the geotube and geofabric. The silt fence with stakes will be set six inches into the ground as required. On the opposite side of the silt fence, if sediment is noted, a straw filter barrier will be installed around the perimeter. This should keep all organics in the disposal area and in the geotubes.

It is expected that MIC will use a polymer to assist in the separation of solids from the water. The polymer will be fish friendly. The tubes have been engineered to allow up to 5,000 cubic yards of material. The material will be allowed to decant and dewater. Once dewatered the tube can be cut open and allowed to dry further. After the material has dried, it will be prepared for transport to the disposal. A loader will be used to place dredge spoils (slightly moist or dry) in 30 ton dump truck (and trailers) for hauling and disposal. Volumes and weights will be tabulated. Once the dredge spoils are removed from the disposal area (at Log Toy Park), the tubes, fabric and silt fences will be rolled up and disposed. The site will be leveled, if necessary, and seeded if necessary.

The expected dewater rate from the geo-textile tubes is expected to range from 20 to 80 gallon per minutes with a holding volume of estimated a 1000 c.y. (100'x 30' x 10'). Details can be provided when final geo-textiles are determined (based on site specifications [from field visits at pre-construction times]). Since the inflow is at 2000 gallons per minute, that a 1000 c.y. bio-bag will be at its water capacity in less than 2 hours of pumping (not accounting for draining). Therefore, water management will be critical at the disposal site. Additional engineering detailed will be determined after field measurements at the disposal site (for layout configuration).

After the initial de-watering (configured at Log Toy Island Park) with effectiveness of the of de-watering will be evaluated (time biomuck is stored), weight reduction of the stored material, or by reduction in volume of biomuck in geo bags (filtration bags); use of flocculent, etc. to optimize the production

(needed to meet work windows). Technical consultant on geo-textile engineering are available from the material suppliers.

Transport and Placement

The sediment slurry transport pipe diameter matches the diameter of the dredge discharge pipe (10”). The dredge material discharge barge is a ramp barge with positional spuds which can be anchored so it is easily moved with the skiff. The discharge pipe will be a combination of:

- Anchored/dropped to the river bed with anchor so it stays within the boundaries of the in-water placement site.
- Floating pipes

The transport pipe shall be adequately anchored for both floating and submerged pipeline. The pipeline placement and discharge barge shall be located or installed with minimal physical impact to the environment and other river uses.

The pipeline and discharge barge anchoring shall take into consideration the river conditions such as, but not limited to, river surface, elevation, wind, and river velocity changes. The spud barge has 2 spuds that can be used to effective place the barge and secure it in place during variable conditions.

The disposal will be placement in bio-bags at Log Toy Park. Buoys will be deployed in the disposal area to ensure the placement is maintained and to reduce access to the area by recreational boaters and others.

Quality Assurance and Control Plan

The QA and Dredging BMPs are a description of dredging methods to be used to minimize turbidity at the dredging site and meet the water quality requirements as stated in the project permits. The key to good quality assurance and control is reliable, up to date monitoring and reporting. This ensures that problems, if they arise, are attended to immediately. MIC will prepare several routine reports during the course of the project each day on an on-going basis. This information will be sent to the Lake Limerick Management Team after completion. This includes all records of the quality control operations, activities, and tests performed. These documents shall include photos, material delivery lists, handover materials lists, minutes of meetings with our team, punch lists, test and sampling reports, letters, and other documents as required for a complete and traceable record of continuous quality control. Major daily data (including dredge quantities, locations, tasks complete are all maintained in an Access database which is used for preparing daily reports).

- Daily Construction Reports including the daily dredging logs. MIC also has staff maintain daily equipment logs (see examples on next page)
    - Boat and dredge (Time, location, work performed, notes etc.) including conditions, samples, notes, etc.
    - Spud Barge movements, Pipe Movement; Booster Pump
    - Disposal – turbidity, volumes of solids/slurry, etc.; following by stockpiling and trucking
- Weekly and/or Monthly Progress Reports
- Water Quality Monitoring Reporting be contractor (Quality Control)
- Dredging Location and Quantity Contractor and Subcontractor area of responsibility
- Operating plant/equipment with hours working, idle, or repairs.
- Off-site Quality Control Inspections & Reports.

- Job safety evaluations.
- Hydrographic Surveys (as needed; not major method for evaluating volumes related to contract)
- Material deliveries and acceptance report.

The critical component of the quality assurance plan has been outlined in the work plan and is:

1. Maintain Water Quality (see water quality plan and Best Management Practices)
2. Maintain dredging depths/water levels
3. Maintain precise geographic location within dredging prism

Horizontal (geographic control)

Dredging Monitoring and Positioning Equipment: Use an on-board electronic real-time differential global positioning system (DGPS) while performing dredging work. Dredging operations shall be conducted through the use of GPS positioning. MIC shall submit electronic and hard copy printouts of GPS tracks digging locations upon final acceptance of the work. MIC shall review the report and the format of the report with the permit for completeness and content prior to submission. MIC shall also review startup procedures and methods of tracking "digging locations" prior to the start of dredging each day.

Vertical (depth control)

Depth control is performed with: 1) line/boom depth marking on dredge ladder (boom), 2) pressure transducer data logging on cutter head, 3) periodic depth check (using handheld echo-sounders, multi-meter probes, staffs and lead lines) and 4) single beam hydrographic surveys as needed.

Water Quality Monitoring and Control Plan

Below is MIC plan with methods and procedures for controlling water quality during dredging including all the Best Management Practices for dredging.

MIC will implement dredging BMP's for this project and has experience with implementation in the past. In suction dredging effective penetration of fine sediments is critical in order to eliminate kick up turbidity that can cause suspension of material as the impact shock waves travel on the river bottom. The suction flow rate, cutter rpm, and the thickness of cut are the driving factors that can impact the turbidity. Additionally the depth of the dredging prism has a significant impact on the surface (or visually observable turbidity).

Photo-documentation and inspections are completed periodically by the operators and recorded on vessel logs.

MIC conducts dredging and material in-water placement operations to ensure adherence to the turbidity and water quality requirements as stipulated in the permits. This includes preventing re-suspension of material in the vicinity of the site. All work in the dredging area shall be done to minimize turbidity, erosion of banks or bottom sloughing, or other water quality impacts. MIC will take all normal precautions to prevent turbidity at the dredging site. The water quality monitoring will be conducted as described in the dredge and in-water placement monitoring plan in the permits (by Lake Limerick) and MIC will perform additional sampling as needed to ensure we are meeting BMPs and permit conditions.; we have several multiport-meters (Depth, Temperature, Dissolved Oxygen, pH, etc.) and standard

turbidity meters and water related instrumentation and sampling gear (Ponar and Ekman Dredges, Van Dorn and other grad samples, Secchi disks, etc.).

MIC shall keep an operator's log and a daily progress chart aboard the dredge at all times for inspection. The daily progress report shall include data regarding work areas completed, and cubic yards dredged and placed. These documents shall be submitted to the customer for retention with the contract file at the completion of the dredging work.

Water Quality Monitoring and Control Contingency Plan

MIC assumes (as specified in the bid specs) that Lake Limerick will have a third party measuring turbidity. In additional MIC monitors conditions (to ensure permit compliance).

If issues arise with turbidity the following steps will be taken:

At dredging location:

1. Review Dredging Method
    a. Examine and review cutter-head teeth, pump suction and other equipment specifications. Minimize cutter impacts (or high pressure washing) in area of uptake. Evaluate blades and use of high pressure ring (water cutters)
        i. Cutter-head
        ii. Horizontal Plow
    b. Increase Pump in-take
2. Eliminate use of high pressure water break up methods (we do not expect to deploy this on the project)
3. Reduce penetration – lower the pump into the sediments slower
4. Reduce movement (horizontal swing) – to ensure as sediments are displaced the pump can uptake the material
5. Deploy silt curtains in the immediate dredging zone
    a. Initially booms with drop curtains (3 to 5 feet)
    b. Secondarily boom with longer (or bottom placed) silt curtains. At project site 10 foot curtains would be effective.
6. Secondary silt curtains, as necessary, if needed.

At the disposal location:

1. Ensure pipe fitting secure
2. Evaluate drainage from bio-bags
3. Ensure silt fences and related erosion protection (hay bales) are in place and functioning
4. Deploy silt curtains, if required, in the immediate disposal area
    a. Initially booms with drop curtains (3 to 5 feet)
    b. Secondarily boom with longer (or bottom placed) silt curtains. At project site 10 to 20 foot curtains would be effective
5. Secondary silt curtains, as necessary, if needed.

Spill Prevention, Control, and Containment Response Plan

The Spill Prevention Control and Countermeasures (SPCC) Plan is outlined below. The Spill Control Plan address chemicals and fuels to be on site, their storage and location of use, spill control and response plan, response and control supplies to be kept on site, and training for site personnel.

Implementation and adherence of the spill prevention, control and countermeasure plan is the responsibility of all employees on the worksite. A lead on site person will be identified for the project. They will be the responsible person(s) to implement this plan and to supervise the containment and cleanup with proper disposal for any spills or releases**.**

a) The onsite lead will be Matt Fobert and/or Joe Bernert. They are trained as Washington State Certified Erosion and Sediment Control Lead (CESL) and training in pollution control methods.
b) Matt Fobert, Joe Bernert or Michael Eakin will be the individuals who will report any spills or hazardous substance releases with follow-up documentation as to the spill issue. Their contact cell phone is (24x7):
    1.) Matt Fobert at 503-849-6155
    2.) Joe Bernert at 503-975-9043
    3.) Michael Eakin at 360-635-7208
c) He (they) will contact the National Response Center at **1-800-424-8802** and immediately notify the Contracting Officer Representative and will notify MIC's Project Manager.
d) The list of required reporting channels and phone numbers is attached to this plan as well as spill documentation forms.
e) MIC does not expect hazardous waste or sediment to be discharged from this site.
f) For small spill (<10 gallons; variable on material), we perform in-house spill containment.
g) For large spills, when needed, we will utilize contractors:
h) Training of our supervisors and crew with instructions and assistance in Environmental Awareness, Prevention, Containment, and Clean-up as well as the removal of such waste has been and will be provided by Integrity Safety Services.
i) MIC has staff trained as Hazardous Material Technicians as defined by 29CFR 1910.120. They are also trained on how to initiate an emergency response sequence and to notify the proper authorities of the release. Training is a combination of classroom and hands on field exercise.
j) To help control spills and sediment we will be utilizing silt fences and / or barricades such as spill socks around drains, Access openings, and sloped areas such as the sills. The Project Foreman will inspect these areas daily or as conditions change (weather, work). Inspections will be noted on the QC report.
k) The Spill Control Plan starts with prevention. Construction equipment, tugboats, barges, dredges, and any other equipment shall be inspected daily for leaks and noted on the QC report. Stationary equipment that contains hydrocarbons will be inspected. Plastic sheeting and absorbent pads will be placed under other equipment with spill potential. Fuel shall be stored over FRP Containment units at a safe distance from the equipment.

Regulated and/or Hazardous Material

Several regulated and/or hazardous materials are used in routine business processes. This primarily includes diesel, gasoline, oils, grease, etc. Inspection and reporting procedures are implemented. MSDS booklets are available on each piece of equipment with up dated lists of material.

For visible storage tanks and piping the following are routinely performed:

- Regular visual inspections of tanks, fill lines, and associated appurtenances
- Inspections of piping, use and fueling areas
- If small leakage/drips are detected, the appropriate service personnel are contacted immediately to correct the problem.

The most common materials on site include: Diesel and lubrication oils. In additional the following may be present for periods of time: Gasoline

- Paints
- De-greasers
- Solvents
- Batteries
- Cleaning Solutions
- Antifreeze
- Engine Oils
- Hydraulic Oil
- Brake Cleaner
- Grease

Equipment specific MSDS are kept on site and dated for last crew inspection.

Spill Response Plan

If material is released or spilled on surface or in any water body, the material will be contained as quickly as possible. Initial actions to be conducted may include:

1. Attempt to stop the release at the source. If the source of the release has not been found; if special protective equipment is necessary to approach the release area; or if assistance is required to stop the release, a fire department response will be initiated by contacting the appropriate state, federal and local authorities.
2. Contain the material released into the environment. Following proper safety procedures, the spill should be contained by absorbent materials and dikes using shovels and brooms. If in a water body, booms and appropriate absorbent material will be used. The appropriate authorities (U.S. Coast Guard, Washington Department of Ecology, etc.) will be informed as soon as possible.
3. Recover or cleanup the material spilled. As much material as possible should be recovered and reused where appropriate. Material which cannot be reused must be discarded as hazardous waste. Liquids absorbed by solid materials shall be shoveled into an open top drum or, if the size of the spill warrants, into a roll-off container. When drums are filled after a cleanup, the drum lids shall be secured and appropriately labeled by content, date of the spill/cleanup, site name and location. Non-compatible materials can cause potentially dangerous chemical and/or physical reactions and will not be stored together. Compatibility information can be found on the material safety data sheets available at each worksite.
4. Cleanup of the spill area. Surfaces that are contaminated by the release shall be cleaned using an appropriate substance or water. Cleanup water must be minimized, contained and properly disposed of. Occasionally, porous materials (such as wood, soil, or oil-dry) may be contaminated; such materials will require special handling for disposal.
5. Decontaminate tools and equipment used in cleanup. Even if dedicated to cleanup efforts, tools and equipment that have been used must be decontaminated before replacing them in the spill control kit.
6. Notification and reports to outside agencies. The Emergency Response Coordinator shall determine if a reportable spill has occurred and shall make all necessary notifications. Verbal

notification to government agencies and emergency planning committees shall be executed if necessary. In all cases where verbal notification is given, a confirming written report shall be sent to the same entity.

7. Arrange for proper disposal of any waste materials. The waste material from the cleanup must be characterized and documented. Representative sampling and analysis may be necessary to make this determination. The waste must be transported and disposed of in compliance with all applicable laws and regulations.
8. Review the Spill Containment Plan. Appropriate personnel shall review spill response efforts, notification procedures, and cleanup equipment usage to evaluate their adequacy during the episode. Where deficiencies are found, the plan shall be revised and amended.

Inspections

Daily Inspections will be conducted by our crew to review potential problems. This will include:

1. No substances regulated by 40 CFR 68, 40 CFR 302 and 40 CFR 355 will be utilized by MIC, nor are they expected to be found during construction. If a spill does occur, it will most likely come from a piece of construction equipment. Types of spills could include hydraulic oil, motor oil, diesel, gasoline, and radiator coolant. Based on the type of equipment being used a reportable quantity will not occur. Spill kits will be located near construction equipment for quick response to ruptured hoses and other possible means of leaks or spills.
2. Joe Bernert and/or a contract employee will be responsible for implementing and supervising the containment and cleanup.
3. MIC's Spill Kits will be located at the top surface area on dredge with a spill response boat for quick access. Additional material is stored at the project site for quick deployment. When working in the machine room galley a small spill kit will be placed in the immediate area. Additional spill protection equipment includes:
    a. Oil-absorbent booms: 10 each, 10 feet long
    b. Oil-absorbent pads or bulk material, adequate for coverage of 2,000 square feet of surface area
    c. Oil-skimming system
    d. Hay bales
    e. Oil dry-all, gloves, etc.

    100' 16" Oil Sweep
    2x10ft x8" Petroleum Sorbent booms
    2x10ft x8" Absorbent skimmer booms
    200'Sea Curtain
    <u>EnviroSorb Spill Kit (10 gallons)</u>

100 pads 15x19	8 disposable bags w/zip ties
10 Socks 3"x 4 ft	3 Bags UltraSorb, 5 lbs.
2 Socks 3" x 8 ft.	3 pillows 18 "x 18"
2 pr of Goggles and Gloves	Instruction sheet.

<u>The small 20 gal. Overpack Spill Kit contains:</u>

20 Pads heavy wt.	4 Socks 3" x 4 ft.
1 Sock 3" x 8 ft.	Instruction sheet.
3 disposal bags w/zip ties	
1 pr. Goggles and Gloves	

2 Pillows 18" x 18"
1 Bag UltraSorb, 5 lbs

Also stored with the large spill kit will be a 30 gallon salvage drum with lid for disposal of oily rags and materials. MIC also has on-site stock of oil boom, Sea Curtains, made up in 5" x 20" sections. Bags of Quick Sorb will also be available to build berms, dams and to fill voids where necessary.

4. The suppliers of these materials shall be:
   Safety and Supply Co.
   8441 N Albina Ave
   Portland, OR 97217

   Or from Ben Meadows online

5. Emergency Action methods and procedures to use during a spill:
   a. Locate spill kit and put on protective clothing. Note: proper protective clothing must be worn during any spill cleanup.
   b. Attempt to stop the leak at the source (for example plug, patch, or otherwise stop the release.)
   c. Contain and control the spill. This should be done by building a dike around the area involved using the absorbent material.
   d. The small absorbent pads should be used for spills, they can absorb ½ gallon of oil
   e. On larger spills – the boom should be placed in front of the oil flow direction. The absorbent sheets should then be thrown down and use the clay material (quick sorb) to fill any voids
   f. If the above measures are not sufficient enough to contain the spill, a dirt berm should be built around the area.
   g. Cordon off the area of the spill using barrier tape after the spill is contained. (This is to prevent unauthorized entry into the contaminated area.)
   h. All saturated booms and pads should be disposed of in an open top 5 gallon drum for removal to the appropriate recycling facility.

Non-hazardous solid waste disposal plan

MIC shall maintain a waste container with secured lids in our work areas to dispose of trash, packing materials, and other non-hazardous materials. These containers shall be emptied off site each week to maintain a clean and safe work place. Location of containers will be in our work area on the dredges and boats.

If material or debris is encountered that is considered Hazardous, the contents will be placed in a plastic bag and placed in a special labeled plastic container for removal and disposal by the client. If the debris is considered Non-Hazardous, the contents will be disposed of in the dumpster, taken off-site and disposed by Waste Management to a landfill. Our SSHO/QC person(s) will provide chain of custody documentation with the testing agency report to the client's representative for disposal.

Recycling and solid waste minimization plan includes:

MIC will make every effort to recycle solid waste when appropriate.

Containers for recycled waste will be clearly marked “RECYCLE ONLY”.

MIC will order materials to be shipped with minimal packaging to reduce waste materials.

Air pollution control plan includes:

MIC equipment shall be operated only as needed, with engines off when not required. Since the work will be performed during the Oregon Rainy season, we do not expect any dust from the worksite. MIC performs cleanup for any mud or debris that is created from work operations on a daily basis.

Contamination prevention plan:

- MIC shall prepare the work areas with barricades, shop vacuums, and cleanup materials with training of the workforce to prevent, and minimize contamination of our personnel and work areas. Good housecleaning is the key to prevention.

MIC and WCP maintain a book of MSDS sheets for products that are commonly used during the course of our work. Specific MSDS sheets for this project shall be placed at the front of our book for easy access. The MSDS Book shall be kept onsite during all working hours. The amount of hazardous and non-hazardous materials shall be kept to a minimum at the jobsite and brought on-site as needed.

Training for Site Crew

The crew is trained in correct use and management of materials. In additional the lead is trained as a Washington State Certified Erosion and Sediment Lead (CESL), trained with USCG (merchant marines) marine safety and pollution control training. Company specific training is provided to all employees on spill response and related environmental protection.

Health and Safety Plan

The Health and Safety Plan (HASP) is specifically designed for the Lake Limerick Dredging Project. Safety is a critical component of all MIC dredging operations. The company safety inspections are performed routinely by all employees include tugboat captains, deckhands, dredge operators and other crew members.

Safety Plan Components

The HASP for Lake Limerick will focus on the most like safety issues. ***In the case of an incident call 911***. Emergency information contacts are:

Mason General Hospital
901 Mountain View Drive
Shelton, WA. 98584
360-426-1611

Shelton Police Department
525 W Cota St,
Shelton, WA 98584
360-426-4441

Mason County Sheriff
322 N 3rd St,
Shelton, WA 98584
360-427-9670

Mason County Fire District 5 Station 4 - Lake Limerick
122 Franklin Street
Shelton, WA 98584
360-275-2889

Man Overboard Protection and Prevention

Written safety briefing will be posted on all boats and dredges and verbal review and log will be maintained at each site prior to using the equipment to ensure no man overboard situations. Non-skid painted surface and strips are used in all areas where overboard situation are most probable. A directional antenna will be located on the skiff if weather conditions warrant.

Man overboard rescue techniques

1. Through PDF and attachments (light/Buoy)
2. Yell "Man Overboard"
3. Notify Bridge/SSHO
4. All stop work in vicinity and proactively assume responsibility (directional antenna, etc.)
5. Locate MOB (watch and point)
6. At night use flare gun (white parachute)
7. Access to him (though safety/heaving lines; access to boat, etc.)
8. Bring onboard (hoisting)
9. Treat Hypothermia and other conditions

Additional Personal Floatation Devices are available on various locations on the decks of the dredges

Drug Program

MIC has a comprehensive drug program. It includes random sampling of all employees and a pre-employment drug screen. Additional information is available in our Drug Program plan which can be provided. Members of the crew all testing under USCG (and/or US DOT) Consortium programs.

Safety Violation and Discipline

MIC will use a three step disciplinary procedure for all at-fault accidents, incidents, violation of company policy and safety violations. The three step process shall be adhered to for any violations in a twelve month period.

- Step One – Written warning and a disciplinary counseling session with the supervisor or superintendent. You may also be subject to post incident drug testing, suspension or dismissal based on evaluation of the circumstances
- Step Two - Written warning and a disciplinary counseling session with the Company President and/or the Safety Director. An automatic unpaid suspension for a minimum of two days will occur. There may be a delay of pay review date for at least six months or further suspension, post incident drug testing and or dismissal based on the evaluation of the circumstances.
- Step Three - Written warning and a disciplinary counseling session with the Company President and/or the Safety Director. An automatic unpaid suspension for a minimum of two weeks will occur. There may be a delay of pay review date for at least 12 months or further suspension, post incident drug testing and or dismissal based on the evaluation of the circumstances

Site Specific Fall Protection Plan

The Supervisor/Competent Persons are Tim Bernert and Joe Bernert

1. At the worksite (Lake Limerick Dredging locations) will you be using fall protection methods other than guardrails, fall arrest, fall restraint or Safety Nets? *No*
2. Identify all fall hazards in the work area. *Working on the dredge and/or barge/boat decks during dredging, transport and QC work.*
3. What forms of fall protection will be used for each hazard?
    a. Guard rail system: *The dredges and boat have handrails located at critical safety points. Removable handrails shall be installed so that workers in the general area of operation can work without being tied off.*
    b. Personal fall protection: *Fall protection devices shall be worn when working off of ladders to access the upper part of the gate or when working next to the unguarded gate opening. Self Retracting lifelines shall be used with a rope pull line so that workers can access when needed. While the rigging is being down the workers will be tied off using 100% fall protection while on an extension ladder.*
    c. Floor openings: *All floor openings on the decks area sealed*
    d. Red Warning Tape: *The removable handrails shall be installed so that they go past the bay at least one section of handrail width on each side of the bay. Red tape will then be run from the end of the handrails back to secure walls. Any workers working past these barriers shall be tied off at all times.*
4. Overhead Protection: *All workers working in or around overhead operation shall at a minimum wear hardhats at all times. Where needed, warning signs and warning tape shall be used to warn workers to avoid the overhead work areas.*
5. Procedures for handling, storage and securing of tools and equipment. *All tools, equipment and materials not needed directly in the work area shall be stored in storage containers in the approved lay down area. Tools, materials and equipment that may be dislodged and fall shall be secured by either a tagline or screens that will prevent it from falling. This includes materials that may be in someone's hand while working.*
6. Rescue Procedures: *MIC will be the first responder in the event of a fall. The main fall hazard identified is when workers are accessing the top of the gate using extension ladders. If a worker falls from this point a 10' step ladder shall be set up and placed under the worker and they will then descend using the ladder. In the event of a fall requiring emergency services the competent person shall immediately call 911.*
7. Inspections: *Fall protection equipment and lifelines shall be inspected daily or before each use. Items shall be checked for wear, fraying, deformed pieces, mildew, anchorage points, and service tags. In the event of a fall, all equipment and lifelines shall be immediately taken out of service and replaced.*
8. Employee Training Documentation: *All employees shall be trained in both fall protection and its proper use and to the specifics of this plan. The acknowledgement for employee signature is at the back of this plan.*

Personal Protection Equipment

PPE equipment need to be used by employees at the worksite. The following is the minimum requirements for work clothing:

- **Appropriate Cloth/Safety Boot** - Employees shall wear clothing suitable for the weather however minimum requirements for work shall be short-sleeve shirt, long pants (excessively long or baggy pants are prohibited) and leather work shoes. Safety-toed (or other protective) footwear will be necessary in any open deck settings (i.e., dredge operator, deckhands, etc.) and in construction and mine settings
- **Head Protection** - Hard hats shall comply with ANSI Z89.1 and shall be worn by all workers when a head hazard exists. At a minimum, hard hats shall be worn when performing work activities, especially when around overhead equipment including cranes. In appropriate locations (i.e. skipper in pilot house, etc.) hard hats are not required.
- **Hearing Protection** - Hearing protection must be worn by all those exposed to high noise activities (to include grass mowing and trimming, chainsaw operations, tree chipping, stump grinding and pruning).
- **Eye and Face Protection** - Eye and face protection shall be worn as determined by an analysis of the operations being performed HOWEVER, all involved in chain saw use, chipping, stump grinding, pruning operations, grass mowing, weed eating and blowing operations shall be provided safety eyewear (Z87.1) at a minimum.
- **High Visibility Apparel** shall be worn in work places. It needs to comply with ANSI/ISEA 107, Class 3 requirements at a minimum and shall be worn by all workers in open deck setting or in any transport.
- **Gloves** of the proper type shall be worn by persons involved in activities that expose the hands to cuts, abrasions, punctures, burns and chemical irritants.
- **Personal Floatation Devices** (PFD) of type III or Type IV (or coast guard approved floatation devices). All PFD will have light reflective tape.

Hard hats, gloves, hearing protection, safety glasses, high visibility vests, and PFD are all provided at no costs by the company to all employees and are inventoried on equipment (i.e. project office [trailers], dredges, company offices/shops, etc.).

Marine Safety Equipment

These marine specific lifesaving devices are in addition to the general items listed in the MIC section containing first-aid equipment. The following shall be kept and maintained on each vessel or plant (and available from the MIC/WCP office):

- Inherently buoyant Type III, Type V work vests, or better USCG-approved , International Orange
- Ring buoys with 90 feet of 3/8-inch rope attached (in standard throw bags) with automatic floating electric water lights; extra life ring are located on barges and other locations
- Water lights/Whistles/Horns
- PFDs equaling the skiff rating for the maximum number of personnel allowed on board
- Emergency lighting
- Rescue ladder

- Safety skiff when needed at appropriate jobs sites
- First Aid Kits

Personal Flotation Devices

Buoyant Type III, Type V work vests USCG-approved personal flotation devices (PFDs) shall be provided and properly worn (zipped, tied, latched, etc., in closed fashion) by all persons in the following circumstances:

- On floating pipelines, pontoons, rafts, or stages
- On structures or equipment extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees
- Working alone at night where there are drowning hazards regardless of other safeguards provided
- In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit; or
- Whenever there is a drowning hazard.

PFDs must be inspected, maintained, stowed and used only in accordance with the manufacturer's instructions (currently not intended to be used in areas of heavy construction or maintenance or where hot work (welding, brazing, cutting, soldering, etc.) is to be performed. When conditions warrant, each PFD shall be equipped with a USCG-approved automatically activated light. All PFDs shall be equipped with retro reflective tape in accordance with USCG requirements

Rescue Boat

MIC will have a skiff that can serve as a Rescue / Spill protection boat and a boat used for water quality sampling, bathymetric surveys and other miscellaneous work task.

Signage

Extensive signage exists on all equipment. Additional signs for safety indicating hard hat, life vests, no smoking and potential danger areas, are posted when needed on project sites. The decks of all marine equipment are painted with dark red with black markings. All protrusions that extend from the decks are painted safety Yellow.

Safety Painting and Security

Security devices are located on all the equipment. This includes locks on all doors and lights to reduce potential vandalism. No trespassing sign are posted on all sides of the equipment. Additional signs are posted related to areas where flammable materials, fuel, etc. Painted safety lines (yellow) are on equipment where swing lines are located, on all raised surfaces and in areas of potential danger (steps, near spuds, etc.).

Safety Swing lines are marked in yellow on red deck. Signs on equipment marking swing areas. Shackles, posts and cavils are marked with safety yellow (note double safety lines: 1 inch plus braided rope line and winched cable to outside rig). Other desk installed equipment is painted with safety yellow and markings. Decks are all free, clean and visible. Fenders are on boats to minimize bumps and jarring movements.

First Aid and other Measures

Full first aid kits are available at numerous locations on all equipment. Multiple extinguishing agents are located on the equipment. All crew members are First Aid and AED Trained.

Auxiliary floatation / flotsam are located on all river equipment. Lifejackets are on all equipment and signs are posted that indicate that life jackets are required as well as hard hats. Safety vests are used on all equipment to increase visibility.

VHF radios and NexTel radios are located on the equipment and/or with the operator to assist in communication on the equipment. Log books will be on all vessels including documentation, inspection notes s, and operating manuals. Each day any work that is completed on any piece of equipment requires a vessel log.

Cleats, gaskets and other devices on the vessels are examined regularly to ensure the conditions are seaworthy. Additionally, hull conditions (bulwarks), mechanical and electrical are routinely inspected.

Shoreline Securing and Tying

All marine equipment is secured to the shore with multiple methods which allow for varying river levels. Shore lines are connected to docks and berths. Multiple lines are located on the offshore and inshore stern and boat lines; breasts; aft bow and forward quarter springs. These are connected to the vessels with large cavils and/or posts. Spuds on dredges will be lowered when conditions warrant. US Coast Guard Marine Safety (Manual) Measures are used and are periodically inspected by Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA), US Coast Guard (USCG), Corp of Engineers (COE), and other authorities.

Equipment Surveys & Inspections

A comprehensive detailed marine survey exists on all the equipment. It is all in proper functioning condition and has routine inspections from several regulatory agencies including: MSHA, OSHA, USCG, COE, etc. Additionally our underwriters and insurers are available to inspect any equipment.

Site Safety and Health Officer

We will have two identified Site and Safety Officers (SSHO) on the project: The Lead SSHO and an alternative SSHO. One will always be present at the job sites. The Lead SSHO is primarily responsible for development and plans and policy and the Lake Limerick Site Specific Safety Plan. The Lead SSHO is the SSHO when on site. This position is a collateral position with technical (i.e. Environmental and Quality Control) and/or supervision/management position. The leads are required to be working on completing the licensure and certification in Safety (National Board of Safety Professional [ASP or CSP]) and have at least 5 demonstrated experience as a safety lead in the field (marine construction and dredging). The alternative serves the same role as the lead, while onsite, but does not develop policies and plans. All SSHO serve as implementing a safety work place in accordance with the site plan.

All Onsite SSHO have the following training and licensure:

- First Aid, AED training and certification

- Company specific training of safety related to equipment deployed (reviewed and approved by HR/safety manger and supervisor)
- Occupational Safety and Health Administration (OSHA) 40 Safety Supervisor training and certification
- OSHA competent persons related to activities as required (fall protection, shipyard, confined space, scaffolding, etc.)
- Mine Safety and Health Administration (MSHA) safety training certification – Part 46 specific to mine/excavation activities (include update on refreshers)
- State approved Crane, rigging and related safety training (AGC, or equivalent) and certification
- US Army Corp of Engineers training related Safety (Em-385), and/or current on Corp Construction Quality Management Certification
- Federal Licensure related to Industry Specific Activities (i.e. Dredging) including:
    - Licensure and credentials include marine safety (required officer ratings in merchant marines [i.e. US Coast Guard 50 to 1600 Ton Captains/Master Mate Licenses)
    - Licensure and credential for crane operations crane/rigging (including National Commission For The Certification of Crane Operators [NCCCO])

All employees are first aid and company trained in operations of equipment safely and daily safety meeting are held and open to the customer to attend. The SSHO and crew are all trained thoroughly trained in rescue procedures and the use of all necessary safety equipment.

Safety Review and Inspection

MIC SSHO Officers shall be responsible to conduct weekly job site safety inspections. This will occur at the beginning of the job and at the beginning of each subsequent week after this. Additionally MIC shall conduct daily inspections to ensure that all personnel are working in a safe and healthful manner

MIC shall make available to the Lake Limerick Team the completed safety inspection form. If any unsafe conditions or unsafe acts are found they are to be corrected immediately. The corrections shall be documented on the inspections report.

When conducting the safety inspection the SSHO Officer will have a specific checklist that they will use to inspect to make certain that the work site is free from all recognized hazards. It will be the right of each and every employee to raise specific safety questions at any time if they feel that a hazard exists, and it will be the responsibility of the superintendent/foreman to investigate those questions in a timely manner and to respond to the employee. Any unsafe conditions or practices by employees will be corrected immediately. Any employee who continues to work in an unsafe manner may be subject for review and appropriate disciplinary action. Any machinery, tools or equipment that are found to be in an unsafe condition shall be immediately red tagged “Do not use” and taken out of service. These items shall be either repaired or discarded.

Reporting and Communication Plan

Daily Tailgate Meeting will be held and crew will complete the daily safety form, review previously Daily Construction Report (DCR) : discussions to include safety, upcoming work tasks: This includes equipment and supplies needed, logistical needs, environmental compliance status, and report in the work flow and/or planning needs. This DCR summary sheet shall be submitted to:

- Daily to Lake Limerick Project Manager; Copy kept on file at project site with Project Supervisor and to MIC Administrative Support (Colleen Evans who will file on Cloud base storage). The Supervisor has signature authority on the DCR and related daily reporting (Safety Meeting, Dredging Report and Inspection Forms); At Lake Limerick the Project Supervisor is also the Project Manager.
- Weekly project meetings: Lake Limerick Project Manager with MIC Project Supervisor, and on-site crew as needed; MIC QC Staff may periodically attend meeting and/or attend remotely.
- Daily trucking tickets and haul volume daily summary log; and
- Review, Quality Control Measures and approval of bone dry weight calculation results sheets.

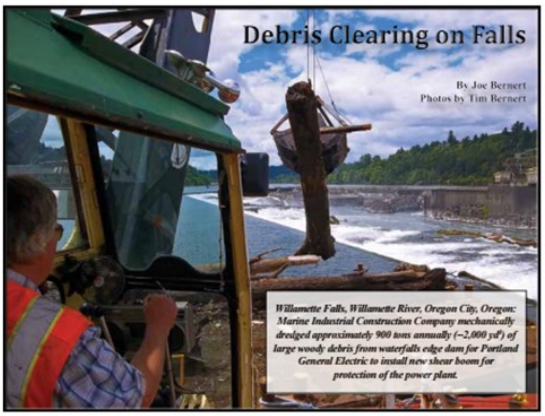
Example of MIC DCR is presented in Appendix A)

1. MIC shall keep an:
    a. Operator's log and a daily progress chart aboard the dredge at all times for inspection. Include daily progress; starts and stops; and report any major within the specific area being dredged.
        i. Vessel Logs
        ii. Dredge Logs
        iii. Disposal site reporting and logs (slurry concentrations, bio-bag volume, etc.)
    b. Digital files daily at the completion of the dredging work (WinOPS).
    c. Inspection sheets for all equipment
        i. Dredge Inspection
        ii. Boat Inspection
        iii. Booster Inspection
        iv. Shore side Equipment Inspection (Loader, Forklift, Crane, trucks, etc.)

MIC will include all observations, note changes in turbidity, monitoring of operations, other water quality concerns, locations of debris of substantial size and any other conditions impacting dredging and related information.

Player	Freq	Document	Mechanism	Provided to	Feedback Mechanisms
Project Supervisor serving as the Project Manager (no PM on this project)	Weekly	Weekly Report with planning & Narrative	Email/Report	Lake Limerick Management Team	Internal; Weekly Meeting with Customer
Project Supervisor	Daily	Daily Construction Report	Scanned / Form	Lake Limerick Project Manager	Crew and QC ; Filed digitally with company
Quality Control	Daily	QC Logs	Digital	Project Supervisor	Crew interaction
Dredge Operator	Shift	WinOPS computer Log; depths observed; surry	Digital – Email attachment	Supervisor and QC Staff	Crew interaction
Crew / Mate Vessel Logs	Shift	Copy of Vessel log (one on rig; other to Supervisor)	Form- carbonless copy	Supervisor	Crew interaction
Inspections (Dredge, Boat, Pump, Generator, forklift, etc)	Shift	Provide to Supervisor to scan and back to rig	Form - checklist	Supervisor	Crew interaction
Safety Training (designated – various leads)	Daily	Provide to Supervisor to scan	Form – every morning	Supervisor	Crew interaction

MIC routinely publishes it successful projects in journals including *Dredging World*, *International Dredging Review*, and Corp of Engineers publications. Below are recent publications by MIC on dredging projects. We believe effective communication is key to a successful project.



Background

The Willamette River is a major tributary of the Columbia River. Willamette Falls is located 26 miles from the mouth of Willamette at the Columbia River. The ***Willamette Falls is the second largest falls in the United States*** (behind Niagara Falls). It is over 1700 ft wide and vertically drops 42 ft with flows averaging over 20,000 ft³ per second (cfs). The falls are composed of basalt which occurred in the mid Miocene geologic epoch 15 million years ago. Winter flows can exceed over 250,000 cfs while summer low conditions are nearer to 5,000 cfs.

River levels at this site range with water flow. A recent high of 69.5 ft was recorded during the 1996 flood whereas typically during the summer elevations are 52 to 53 ft. The velocity of the water at the top of the falls is variable and at higher water levels (discharges) the velocities increase.

The watershed at the falls drains over 10,000 mi² of forested, agricultural and urban lands. The Willamette is noted for carrying significant amounts of large woody debris (LWD) which falls into the main stem or its numerous tributaries and which is then transported downstream. This woody debris is important to fisheries habitat and other important components of the riverine system.

Debris accumulates on the falls edge since it is one of few locations for debris deposition in the lower river. Trees and other LWD falling into the river are very common in the river. This debris is transported downstream during storm events. The extensive LWD in the river system is due to high variability in stream flow, unstable soils, long periods of

Bonneville Dam keeps a clear channel for adult fish

By Diana Fredlund, Public Affairs Office

Rivers can be very deceptive. From above, they seem to move gently, smoothly flowing around stones or other obstacles. Look beneath the surface and you find a relentless force that shapes everything in its path.

While humans have used rivers as a transportation system for thousands of years, a river has its own purposes, using its force to move mountains of sediment miles downstream. Only when it encounters something that slows its progress does the river give up its cargo … something like Bonneville Lock and Dam.

Built across the Columbia River, Bonneville Dam uses the river to create electricity and to guide adult fish into the ladders that allow them to pass the dam. While much of the water flows through the large hydropower turbines, biologists know fish use a river's current to find their way upstream, so a small portion of the river is used to create attraction flow for the fish ladders. Attraction flow at Powerhouse 2 is supplied by two small turbines that fill the auxiliary water supply system – a series of flow channels used to supply water to the fish entrances, the adult collection channel and to the lower end of the North Shore Fish ladder. These connected fish channels route fish up the North Shore Fish ladder where they exit into the Bonneville pool upstream of the Washington shore fish viewing building.

The river slows before entering the small turbine units, causing it to drop some of the heavier sediment it carries. "The heavier sediment collects near the small turbine unit entrances upstream of the dam. Additionally, some of the sediment that passes through the small turbine units drops out into the AWS system and to a lesser extent in the North Shore fish ladder," said Kevin Perletti, mechanical engineer at Bonneville Lock and Dam. "All that buildup of sediment in the AWS and the adult collection channel makes the system hydraulically less efficient for fish passage. Since 1996, we've had to remove sediment several times from the AWS and the adult collection channel."

When Powerhouse 2 began operating in 1982, Powerhouse 1, located near the Oregon shore, still had priority for power generation. That meant much of the river and its sediment was drawn through the turbines at Powerhouse 1. In the 2001, Powerhouse 2 became the priority power generator, which shifted the river's flow toward it. "Most of the sediment flushes through all the turbine units, but some of it falls out and builds up sediment piles upstream of Powerhouse 2 near the AWS entrance. This leads to sediment being pulled through the small turbine units and discharged into the relatively slow moving water of the AWS and adult collection channel," Perletti said.

Sediment can alter the water's velocity by increasing the flow speed, or by changing the actual dimensions of the adult collection channel. "The AWS has a fixed channel width – it has a clean profile. If sediment builds up in corners or drifts appear it can alter the flow pattern," Portland District hydraulic engineer Laurie Ebner said.

Employees noticed a large buildup of sediment in the AWS after the high river flows in 1996. They removed sediment from the AWS, the north ladder and the adult collection channel. "We found such large deposits we had to hoist a

Top: Mechanical engineer Kevin Perletti, left, discusses dredging operations at Bonneville Dam with Rick Mettler, Bonneville Dam's chief of Engineering and Contracts.
Above: Contractors move sediment from a barge in Bonneville Dam's forebay onto nearby Cascades Island. More than 6,000 cubic yards will be placed and after it dries employees will seed it with native grasses.
Opposite: Corps contractors dredge sediment near Bonneville Dam. If not removed by dredging, sediment can entar a flow channel where it can settle inside the dam structure, where its removal is much more difficult.

10 March - April 2013 Correspondent

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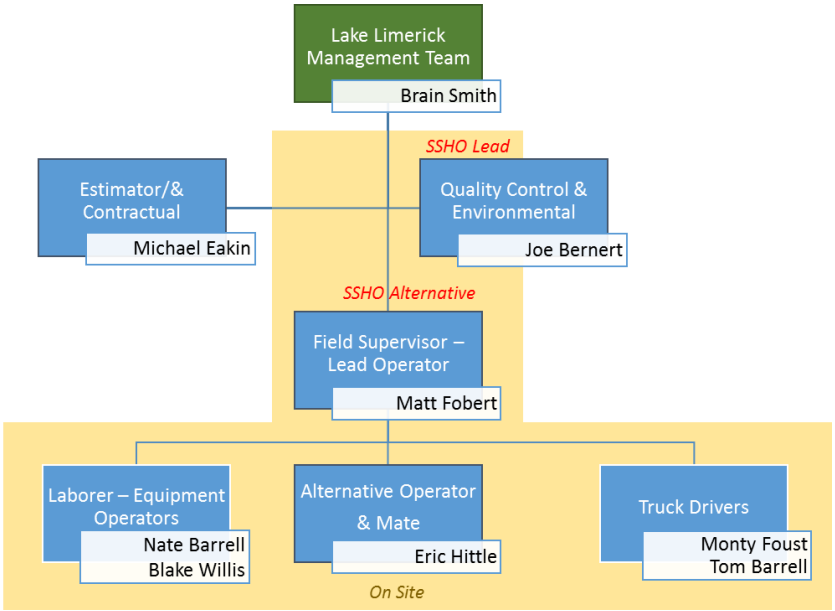
Crew



The Crew will include a contractual support (Michael Eakin and Colleen Evans), a Quality Control Person (Joe Bernert), a Supervisor (Matt Fobert) who is also a lead dredge operator and back up dredge operator (Eric Hittle). Additional operators and crew / laborers (performing project deployment, pump operations, pipe set up, and operating shore side equipment as needed including loaders, trucks, cranes and related equipment. The employees are trained and experienced dredge operators and have experience with this type of dredging. Matt will be the primary contact on site for the company and will be present for the entire project. Eric is also dedicated to the site. Both of these employees are leading the on-site activities. Joe will be onsite periodically to assist with quality control measure. Joe will also have remote access to all the computers and instrumentation for performing Quality Control, checking

measurements and assisting on documentation. Additional crew will be required during initial pipe set up and project set up. We have over 80 employees available that can be rotated into these roles. Many of these employees have worked on numerous dredging and related projects (including Monty, Tommy, Bill, Blake and Nate and other can assist in the labor pool for set up, mob/demob and other supporting task. Drivers (CDL) are also available in Tommy, Monty, Charlie, Ed and others. Colleen (Evans) and Michael will support the administrative tasks.

Due to the small crew and extensive amount of time this crew has worked together on dredging jobs – there will be collateral duties for the Project Supervisor, Safety Lead and Quality Control positions. The project safety and inspections will be completed by all the crew. The Daily Construction Report (DCR) will by compiled by the Supervisor. Since the Lead and Alternate Dredge Operator all have dredging experience dredging it is expected they will rotate in and out of the seat to maximize dredging time and effectiveness. The daily safety and toolbox training will be lead be all on the crew on a rotating basis (documented by the SSHO). Each crew member will lead the meeting and perform documentation. All hand outs and related information will be posted on the Project Job Board in the Parking lot and available to Lake Limerick Project Management.

Crew Qualifications

Michael J. Eakin

MIC, Wilsonville, OR | Cell: 360-635-7208 | michaele@marineindust.com

PROJECT MANAGER & ESTIMATOR

Over 20 years of experience with environmental and safety field work, project management associated primarily with marine, dredging and construction projects. Extensive experience with diving, construction, and project management. **Current skills include:**

- Corp of Engineers Construction Quality Management for Contractors Certificate.
- OHSA 30 Supervisor Certified; Shoring & Excavation, Lead in Construction Awareness, HAZWOPER
- CPR & First Aid Trained
- Project Management experience on numerous construction projects including coordination and supervision of staff, reporting and contract management
- Graduate Divers Institute of Technology

EXPERIENCE

WCP/MIC, Wilsonville, OR — 12/2014 – Present
Environmental & Safety Lead / Vice President

Coordinate and provide guidance on Environmental and safety related components for business operations in marine construction (Marine Industrial Construction, LLC) and concrete company (Wilsonville Concrete Products), including project management, developing safety plans, and overseeing technical assessments.

Ballard Marine Construction, LLC. / Northwest Underwater Construction, LLC. — 1/2000 – 12/2014
Vancouver, Washington
Vice President / Chief Estimator

Advanced American Construction, — 1/1993 – 12/1999
Portland, Oregon
Diver / Diver Supervisor

American Inland Divers / J. Agi and Associates — 1/1991 – 12/1993
Diver / Bridge Inspection

Recent Key Related Projects include:

- 2015 Gleason Dredging
- 2015 Port of Vancouver Dredging
- 2014 Port of Burbank Barge slip Dredging
- 2015 McNary Dam Navigation Lock Repairs
- 2016 Dryden Intake Dredging

Captain Joe Bernert

MIC/WCP | Wilsonville, OR | Cell: 503-975-9043 | jbernert@comcast.net &
Joe.Bernert@OregonState.edu

ENVIRONMENTAL & SAFETY LEAD – DREDGING QA

Over 20 years of experience with environmental and safety field work, project management associated primarily with marine, dredging and construction projects. Extensive experience with surveying (GPS, theodolite, Total Station), computer mapping & Geographic Information System (GIS), sediment analysis (including transport modeling), and numerous computer and other software packages. **Current skills include:**

- 15 years' experience with Dredging Software experience with Hydropack, WinOPS, Dredge, Tide Gage (Hardware and software)
- Licensed Tugboat Operator - USCG Merchant Marine Credential Master Mate (Recently skipper on M/V Duchess B. and Sarah B)
- 10 years' experience as Safety Lead (currently being certified as Certified Safety Profession [ASP level in progress]); 80 hr. Maine Safety Training [Columbia Pacific Maritime], 8 hr. AGC Crane Safety, OSHA 30 Trained
- Corp of Engineers Construction Quality Management for Contractors Certificate.
- 10 years Project Management experience on numerous projects including coordination and supervision of staff (Professional, Technical and labor)
- Currently on Faculty at Oregon State University (GIS/Database Manager Institute for Natural Resources).
- 20 years Surveying and Mapping (AutoCad, ArcGIS, Trimble Suite, Leica, etc.) experience

EXPERIENCE

WCP/MIC, Wilsonville, OR 10/1995 – Present

Environmental & Safety Lead / Vice President (Part -Time)

Coordinate and provide guidance on Environmental and safety related components for business operations in marine construction (Marine Industrial Construction, LLC) and concrete company (Wilsonville Concrete Products), including project management, developing safety plans, and overseeing technical assessments.

Key Recent Related Projects Include:

- 2015 Gleason Dredging
- 2015 Port of Vancouver Dredging
- 2014 Port Orford Dredging
- 2013 Port of Portland Terminal 4 Dredging
- 2013 Port of Vancouver Maintenance Dredging
- 2012 US Army Corp of Engineers Bonneville B2 Intake Dredging
- 2012/2013 PGE Willamette Falls Debris Clearing
- 2011 US Army Corp of Engineers Bradford Island Dredging
- 2011-2012 Port of Portland Terminal 6 Dredging an d Berth 315 Debris Clearing
- 2011 Port of Vancouver Berth Deepening and Dredging
- 1995 to 2007 Willamette River Dredging and Biological Assessment (and resulting NOAA BioOp)
- 2001 to Present WCP Mine Dredging activities

Other Employment 9/1985 – Present

Technical Positions

Lead for university, several agencies and consulting firm. Prepared and coordinated effort and staff as needed. Performed numerous detailed analysis (water quality, mapping, environmental assessment, computer processing, etc.)

Key Positions

- GIS & Database Manager, Research Faculty Oregon State University, Institute for Natural Resources (Portland State University Campus), 2009 to present
- GIS Coordinator/TDML Modeler, Oregon Department of Environmental Quality & Employment Department, 1997 to 2009
- Environmental Scientist/Lead Water Quality Modeler, E&S Environmental Chemistry, 1988-1997
- Statistical Programmer, Environmental Protection Agency, Aquatic Effect Program, 1986-1988

EDUCATION & TRAINING

Oregon State University

- M.S., 1987, Geography / Statistics
- B.S., 1985, Geography – Cartography

- US Coast Guard Master Mate License (50 Tons) – Commercial Boat Captain
- OSHA Safety Supervisor (30); Competent/Qualified Person (Fall Protection), First Aid & CPR
- Wetland Delineation (USACE) Certification; USACE Construction Quality Management Certificate

SELECTED PUBLICATIONS – 1987 TO PRESENT

Bernert, J and G. Anderson, 2014. MIC Performs Maintenance Dredging at Port Orford, Oregon, ***International Dredging Review***, #4, pp 4-8.

Bernert, J., 2014. Debris Clearing on the Falls, ***World Dredging: Mining and Construction***, Volume 48, Nos. 9/10 - 02/14, pp. 33-42

Powers, J. and J. Bernert, 2012. MIC accomplished maintenance at Port of Portland without exceeding Turbidity Requirements, March/April, ***International Dredging Review***, p. 6-8.

Bernert, J.A., J.M. Eilers, B.J. Eilers, E. Blok, S.G. Daggett and K.F. Bierly, 1999. Recent wetland trends 1981/2-1994) in the Willamette Valley, Oregon, USA, ***Wetlands***, 19:3, pp/ 545-559.

Bernert, J.A., J.M. Eilers, T.J. Sullivan, K.E. Freemark and C. Ribic, 1997. A quantitative method for delineating regions: An example for the Western Corn Belt Plains of the USA, ***Environmental Management***, 21:3, pp 405-420 (with color insert)

Newell, A. and J. Bernert, 1996. Scientific and management issues in Oregon's Lake Ecoregions, ***Northwest Science***, 70:2, pp1-12.

Kingston, J. , D.R. Thomas and J.A. Bernert, 1990. Error Estimation Chapter in Sullivan, T.J., 1990, ***Surface Water Acid-Base Chemistry in Response to Acidic Deposition***. State of the Science, SOS/T 11, National Acid Precipitation Assessment Program; US Congressional Report. Washington D.C. 212 pp

Sullivan, T.J., D.F. Charles, J.P. Smol, B.F. Cumming, A.R. Selle, D.R. Thomas, J.A. Bernert, and S.S. Dixit, 1990. Quantification of changes in lakewater chemistry in response to acidic deposition. ***Nature***, 345:54-58 (cover article).

Matt Fobert

Wilsonville, OR | Cell: 503-849-6155 | Matt@marineindust.com

FIELD SUPERVISOR & DREDGE OPERATOR

Over 8 years of experience in marine construction work include lead marine crane operator including tugboat mate/deckhand. Lead Crane and Dredge operator, deckhand/mate, Power Equipment Operator (excavator, bull dozer, front end loaders, etc), safety field lead **Current skills include:**

- NCCCO Crane Operator (Lattice Boom and Hydraulic [Mobile, Large Swing and Small])
- NCCCO and AGC Certifications for Rigging and Signalman
- OHSA 30 Supervisor Certified; OSHA Excavation Trenching & Shoring Competent Person
- CPR & First Aid Trained
- USACE Quality Construction Management Certification
- Forklift Operator, Lock out Tag Out Competent Person
- Transportation Worker Identification Credentials
- Oregon Boaters License
- Mining Safety and Health Administration (MSHA 30 CFR Part 46.8) Safety Training / Certified

EXPERIENCE

WCP/MIC, Wilsonville, OR 5/2005 – Present

Dredge Operator/Marine Lead Supervisor

Lead for company on marine side maintenance and project oversight. Strong mechanical skills, welding, marine mechanics and support. Involved on dredging projects since 2005 as lead operator on marine dredge. Lead operator for numerous jobs for Ports, Corp of Engineers and private clients.

Key Recent Related Projects Include:

- 2016 Dryden Intake Dredging
- 2015 Gleason Dredging
- 2015 Port of Vancouver Dredging
- 2014 Port Orford Dredging
- 2013 Port of Portland Terminal 4 Dredging
- 2013 Port of Vancouver Maintenance Dredging
- 2012 US Army Corp of Engineers Bonneville B2 Intake Dredging
- 2012/2013 PGE Willamette Falls Debris Clearing
- 2011 US Army Corp of Engineers Bradford Island Dredging
- 2011-2012 Port of Portland Terminal 6 Dredging an d Berth 315 Debris Clearing
- 2011 Port of Vancouver Berth Deepening and Dredging
- 2010 CalPotland Santosh Dredging
- 2001 to Present WCP Mine Dredging activities

Eric Hittle

Wilsonville, OR | Cell: 503-xxx-xxx |

DREDGE OPERATOR

Five years of experience in construction work include lead marine activities. Dredge operator, deckhand/mate, Power Equipment Operator (excavator, bull dozer, front end loaders, etc.), safety field lead. **Current skills include:**

- Crane Operator (Lattice Boom and Hydraulic [Mobile, Large Swing and Small] in training
- AGC Certifications Crane Safety, Rigging and Signalman
- OHSA 30 Supervisor Certified
- CPR & First Aid Trained
- Mining Safety and Health Administration (MSHA 30 CFR Part 46.8) Safety Training / Certified

EXPERIENCE

WCP/MIC, Wilsonville, OR — 2014 – Present

Dredge and Equipment Operator

Support and Lead for company on marine side maintenance and construction. Strong mechanical skills, welding, off road driver for mining, and other equipment. Experience on marine dredging operations, deckhand/Mate, Crane Operations (in training), and related activities.

Key Recent Related Projects Include:

- 2016 WCP related Marine improvement including:
  - Vicki B (1400 HP Tug) engine/mechanical improvements
  - Dredge maintenance and improvements (JBT 14 and JBT 16)
- Previous dredging projects for Corp of Engineers

Other Labor

Additional Laborer will be used during project set up and deployment and will include:

- Nate Barrell – Mate, Support, Power Equipment Operator (loader) and other labor
- Monty Foust– CDL Truck Driver, Dredge Operator, Power Equipment Operator, Crane Operator (NCCCO), Maintenance and other labor
- Tom Barrell – CDL Truck Driver, Dredge Operator, Power Equipment Operator, Crane Operator (NCCCO), Maintenance and other labor
- Blake Willis – Mate, Support and other labor
- Charlie Fobert – CDL Truck Driver, Power Equipment Operator
- Monty Foust– CDL Truck Driver, Dredge Operator, Power Equipment Operator, Crane Operator (NCCCO), Maintenance and other labor
- Bill Sliecher – CDL Truck Driver, Mate, Power Equipment Operator, Crane Operator (NCCCO), Maintenance and other labor
- Ed Ames – CDL Truck Driver, Mate, Power Equipment Operator, Maintenance and other labor
- Others crew as needed from MIC/WCP Crews

Reporting

Daily Progress Narrative

This report details the daily activities and includes photo documentation and other reporting forms.

- Day and Work Conditions – notes equipment, crew and weather and river conditions
- Major Accomplishment – identifies mobilization, demobilization, dredging, and equipment placement. Issues including breakdowns are outlined with references back to risk management activities identified.
- Dredging Activities -includes location and estimates of amount dredged (methods outlined), nature of material and issues arising. QA sampling of lead lines, and bathymetric surveys. Hours tracked on dump and measure of discharge rates and percent solids. QA GPS measures on boom tip. Maps from WinOPS and depth data logging for pressure transducer.
    - Cumulative chart of dredged materials.
- Disposal Activities –tracking movement of pipe location (on vessel logs) and GPS locations for discharge pipe. Periodic lead lines and bathymetric surveying on disposal bed.
- Upcoming Activities
- Appendices of DCR, Logs, etc.

WCP (Marine Industrial Construction)
River Sites (Ashgrove Moorage)
Portland and Wilsonville, Ore

Side 2

Marine Industrial Construction
A WCP Company
Wilsonville, Ore
Ph. (503) 682-2525

Side 1

DAILY CONSTRUCTION REPORT

PROJECT NAME: Port Orford Hoist Dredging					**PROJECT NUMBER**
WEATHER				**DAY OF WEEK**	**DATE**
No of Employee's:		Production: cy/tons	Off-Loaded:	Superintendent or Site Foreman:	
PM			SSHO/CQC		

REMARKS / DESCRIPTION - STATE BRIEFLY JOB ACTIVITY TODAY

OFFICIAL VISITORS:

MATERIALS RECEIVED TODAY

TEST AND SAMPLES

Time	Depth	Turbidity	Temp.

INCIDENTS/INJURIES

Employee:		Injury/Incident:		A/MSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to: Office:		Owner:		OSHA:	

NOTES

Side 1

Marine Industrial Construction
A WCP Company
Wilsonville, Ore
Ph. (503) 682-2525

DAILY CQC/SSHO REPORT

PROJECT NAME: Port Orford Hoist Dredging			PROJECT NUMBER
SAFTY MEETING		MANUAL	DATE
Employee's Present		Presenter	
Follow Up			

QCM NOTES - STATE BRIEFLY

DEPTH QC/QA

Time	Depth	Tide	Notes

TIDE GAGE

Time	TIDE (manual)	KAPLAN	NOTES

INCIDENTS/INJURIES

Employee:		Injury/Incident:		A/MSHA Form Completed:	
Brief Description:					
Sent to DR		Follow Up:		Other:	
Copy Sent to: Office:		Owner:		OSHA:	

NOTES

WCP (Marine Industrial Construction)

Side 2

River Sites (Ashgrove Moorage)
Portland and Wilsonville, Ore
Ph. (503) 682-2525

DAILY CQC/SSHO REPORT

GPS Checks

Description	Time	Equip	Depth	Tide	Notes	Coord X	Coord Y

ADDITIONAL COMMENTS - Note Deviations from Project Plan & New Issues

RESPONSIBILITY / SIGNATURE

Site Auditor: ______________________

____
CQC - Please Print

____
Project Oversight

MARINE INDUSTRIAL CONSTRUCTION, LLC

CRANE OPERATOR DAILY INSPECTION CHECKLIST							
Crane name/number	Crane type:			Crane capacity		Date of inspection:	
Location:	Hour Meter: Start:_____ Stop:			Total hours operated:			
Operator's name:				Oiler's name:			
INSTRUCTIONS: *Check all items indicated. Inspect and indicate as satisfactory = S, Unsatisfactory = U, or not applicable = N/A*							
Walk around inspection	**U**	**S**	**N/A**	**Operator Cab Inspection**	**U**	**S**	**N/A**
Safety guards and plates				Gauges			
Carrier frame, rotate base				Warning & indicator lights			
General hardware				Control/brakes			
Wire rope				Visibility			
Reeving				Load rating charts			
Block				Safety devices			
Hook				Emergency stops			
Sheeves				List/trim indicators			
Boom/Jib				Boom Angle/Radius Indicator			
Gantry, pendants, boom stops				**Machinery House Inspection**	**U**	**S**	**N/A**
Walks, ladders, handrails				Housekeeping			
Wind locks, chocks, stops				Engine/Compressor			
Tires, wheels, tracks				Leaks- Fuel, lube, Oil, Water			
Leaks-Fuel, oil, lube, water				Lubrication			
Radius indicator				Battery			
Outrigger/locking device				Lights			
Operation Inspection	**U**	**S**	**N/A**	Glass			
Area safety				Clutch/Brake linings			
Unusual noises				Electric motors			
Control Action				Warning tags			
Brakes/boom/load/rotate				Fire extinguisher			
Crane stability				Comments:			
No load test							
Fleeting sheeve							
Limit switches							
Operator's signature:				Supervisor's signature:			

This checklist is based on EM 385-1-1, dated 3 September 1996. Use of this checklist 1s optional.

DAILY REPORT OF OPERATIONS – PIPELINE, DIPPER, OR BUCKET OPERATIONS				CONTRACT NO:			
TO:	CONTRACTOR			DATE(S)	REPORT NO: CONTRACT DAY:		
PROJECT AND BAR	NAME:		AUTHORIZED DIMENSIONS	WIDTH:	DEPTH		
	LOCATION (include station no.):			OVERDEPTH:			
DREDGE	NAME AND TYPE	SIZE	PIPELINE: in. dia. disch.	DIPPER OR BUCKET: cy. cap.			
	HORSEPOWER OF	DREDGE PUMP:	SUCTION PIPE JET:	CUTTER OR BUCKET:	PROPULSION:		
	NUMBER OF CREW MEMBERS			WORK SCHEDULE			
	Dredge:	Shore:	Other: Total:	Shifts per day:	Days per week		
CHANNEL CONDITION	AVERAGE DEPTH	BEFORE DREDGING	AFTER DREDGING	MINIMUM SOUNDING	BEFORE DREDGING:	AFTER DREDGING:	
CHARACTER OF MATERIAL AND PERCENTAGE	GRAVEL	MUD	STONE	DISTRIBUTION OF TIME			
	SAND	CLAY	HARDPAN	EFFECTIVE WORKING TIME (chargeable to cost of work)	HOURS	MIN	
	SILT	OTHERS:		PUMPING OR DREDGING			
WORK PERFORMED				BOOSTER (in line)			
ITEM	UNIT	QTY		NONE-EFFECTIVE WORKING TIME			
AVERAGE WIDTH OF CUT	FEET			HANDLING PIPE LINES			
TOTAL ADVANCE THIS PERIOD	FEET			HANDLING ANCHOR LINES			
TOTAL ADVANCE PREVIOUS TO THIS PERIOD	FEET			CLEARING PUMP AND PIPE LINE			
TOTAL ADVANCE TO DATE	FEET			CLEARING CUTTER OR SUCTION HEAD			
FLOATING PIPE:	SHORE PIPE:			WAITING FOR SCOWS			
TOTAL LENGTH OF DISCHARGE PIPE	FEET			TO AND FROM WHARF OR ANCHORAGE			
AVERAGE LIFT	FEET			CHANGING LOCATION OF PLANT ON JOB			
AVERAGE PUMP SPEED	R.P.M.			LOSS DUE TO OPPOSING NATURAL ELEM.			
AVERAGE DREDGED PER PUMP HOUR, GROSS	CU.YD.			LOSS DUE TO PASSING VESSELS			
SCOWS LOADED	NUMBER			SHORE LINE AND SHORE WORK			
AVERAGE LOAD PER SCOW	CU. YD.			WAITING FOR BOOSTER			
CUBIC YARDS REMOVED				MINOR OPER. REPAIRS (explain below)			
AMOUNT DREDGED THIS PERIOD:				WAITING FOR ATTENDANT PLANT			
(1) GROSS (computed amount)				PREPARATION AND MAKING UP TOW			
(2) CREDITED (pay place)				TRANSFERRING PLAN BETWEEN WORKS			
AMOUNT PREVIOUSLY REPORTED:				LAY TIME OFF SHIFT AND SATURDAYS			
(1) GROSS (computed amount)				SUNDAYS AND HOLIDAYS			
(2) CREDITED (pay place)				FIRE DRILL			
AMOUNT DREDGED TO DATE:				MISCELLANEOUS (explain below)			
(1) GROSS (computed amount)				TOTAL NON-EFFECTIVE WORKING TIME			
(2) CREDITED (pay place)				TOTAL EFFECTIVE AND NON-EFFECTIVE TIME (chargeable to cost of work)			
ATTENDANT PLANT				LOST TIME (chargeable to cost of work)			
ITEM	NAME OR NUMBER	HOURS					
				MAJOR REPAIRS AND ALTERATIONS			
				CESSATION			
				COLLISIONS			
				MISCELLANEOUS			
				TOTAL LOST TIME:			
				TOTAL TIME IN PERIOD			
Has anything developed which might lead to a change order or claim:				ALL WORK PERFORMED DURING THIS PERIOD COMPLIES WITH THE CONTRACT SPECIFICATIONS AND DRAWINGS:			
TITLE				SIGNATURE			

A4-1

MARINE INDUSTRIAL CONSTRUCTION, LLC

PUMP OPERATION & DAILY INSPECTION CHECKLIST						
Pump name/number	Pump type:			Pump capacity		Date of inspection:
Location:	Hour Meter Start:			Hour Meter Stop:		
Total hours operated:				Supervisor name:		
Operator's name:				Oiler's name:		
NOTES & INSPECTIONS						
Pump Inspection	**U**	**S**	**N/A**	**Pump Log / Times**	**Pressur**	**Notes/Solids (est)**
Gages Operational						
Vissibe Damage on Pump						
Pump packing showing any discharge						
Pump free from unusual vibration						
Packings, bearings, casings not Overheating						
Engine Water Temperature in Normal Range						
Heat Exchanger Cooling Water Discharge OK						
Valves (Inspections)						
Engine Speed Adequate						
Electral connections						
Battery Terminals Corrosion Free						
Piping / Connections / Fittings						
Leaks						
High Pressure Intake						
Impellor Inspection						
Other						
Operating Notes						
				Totals		
				Comments:		
Operator's signature:				Supervisor's signature:		

MARINE INDUSTRIAL CONSTRUCTION, LLC

GENERATOR OPERATION & DAILY INSPECTION CHECKLIST			
Generator name/number	Manufacturer:	KV capacity	Date of inspection/Operation:
Location:	Hour Meter Start:	Hour Meter Stop:	
Total hours operated:		Supervisor name:	
Operator's name:		Oiler's name:	

NOTES & INSPECTIONS						
INSPECION	U	S	N/A	Running Time	Condition	Notes
Goundings						
Interlocks						
Resistence						
Lubrication						

Levels	Starting	Ending	Notes
Fuel			
Filters			

Insulation / Resistence @ V	A-GRD	B-GRD	C-GRD	A-B	B-C	C-A		
Measurement Description	**Voltage**				**Current**			

Operating Notes	
Operator's signature:	Supervisor's signature:

Marine Industrial Construction Float Plan

Vessel: _____

Date:_____/_____/_____ Time:_____

Operator:_____

Location:_____

Destination:_____

Expected time of departure, route, and time of return:_____

_____

_____

This Float Plans is prepared by a qualified boat operator _____who is licensed by_____ with a_____. Detailed information is on file at the company's corporate office and carried by the qualified operator.

Purpose of operation and details on activities:
Launch/Access:_____ Inspection:_____
Surveying:_____ Tow:_____
Other:_____
Notes:_____

_____

Means of communication: VHF Present Cellular Present Other

Personnel on Board:

Boat Safety Checklist complete: _____ (initials)

MIC
OR. CCB #: 188698 WA. CCB #: MARINIC911RD

MARINE INDUSTRIAL CONSTRUCTION, LLC
5123 NE 94TH AVE – SUITE A
VANCOUVER, WA. 98662
PH: 360-718-7607 FAX: 360-718-7440
WWW.MARINEINDUST.COM

SAFETY MEETING – TRAINING FORM

DATE:_____ TIME:_____AM / PM

PROJECT NAME: _____ PROJECT NO.: _____

LOCATION OF SAFETY MEETING/TRAINING: _____

SAFETY/TRAINING MEETING LEADER: _____

SAFETY MANUAL SECTION: _____ TOPIC: _____

HAVE ALL EMPLOYEES BEEN TRAINED IN:

1.	GENERAL SAFETY RULES	YES	NO	**9.**	FORK LIFT OPERATOR	YES	NO
2.	MSDS – HAZARDOUS MATERIALS	YES	NO	**10.**	WELDING OPERATIONS	YES	NO
3.	DRUG TESTED (WITHIN 6 MONTHS)	YES	NO	**11.**	EXCAVATION/TRENCHING	YES	NO
4.	PPE REQUIRED AND USE	YES	NO	**12.**	FIRE PREVENTION	YES	NO
5.	PERSONAL FLOATATION DEVICES	YES	NO	**13.**	RESPIRATION PROTECTION	YES	NO
6.	FALL PROTECTION	YES	NO	**14.**	CONFINED SPACE	YES	NO
7.	LOCK OUT/TAG OUT	YES	NO	**15.**	OTHER:_____	YES	NO
8.	CRANE OPERATIONS – SIGNALING & RIGGING	YES	NO	**16.**	OTHER:_____	YES	NO

NOTE: THE INFORMATION ABOVE HELPS THE PROJECT SUPERINTENDENT KNOW YOUR TRAINING BACKGROUND AND MANAGEMENT CAN THEN SET-UP TRAINING CLASSES TO PROVIDE MISSING TRAINING/CERTIFICATIONS.

PERSON'S ATTENDING THIS MEETING/TRAINING EVENT:

NAME	TRAINING CURRENT IN	EMPLOYEE SIGNATURE HERE
EXAMPLE	1, 2, 3, 6	*SIGNATURE HERE*

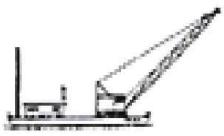
IF TRAINING CLASS: WHAT WAS COVERED, DURATION OF CLASS, TRAINER & TRAINER CERTIFICATIONS:

_____

_____

_____ DATE OF NEXT MEETING: _____
PROJECT MGR./SUPERINTENDENT SIGNATURE

Origination Date: 12/20/2011



MARINE INDUSTRIAL CONSTRUCTION, LLC
5123 NE 94TH AVE SUITE A
VANCOUVER, WA. 98662
PH: 360-718-7607
FAX: 360-718-7440

Forklift Operator's Daily Checklist

Forklift No.: _____ Date: _____
Shift: _____ Hour Meter Reading: _____
Supervisor: _____ Operator's Signature: _____

Check boxes accordingly: 1-OK 2-Needs attention or repair

Inspect for Obvious Damage

Visual Checks:

____ Engine Oil Level	____ Fuel Level	____ Radiator Water Level
____ Hydraulic Fluid Level	____ Wiring	____ Exhaust System
____ Hydraulic System	____ Fan Belt	____ Radiator Hoses
____ Battery (connections, fluid level)	____ Air Filter	____ Seat/Seat Belt
____ Propane Cylinder (leaks, safety straps secure, pressure relief valve up)	____ Lights	____ Fire Extinguisher
____ Roll Over Protection System (ROPS)	____ Forks (bent, cracks)	____ Chains (must have equal tension)
____ Masts (channels must be clear, hoses in good shape)	____ Tires (pressure, condition, lug nuts)	____ Capacity Chart

Operational:

____ Brakes (including parking)	____ Steering	____ Horn
____ Backup Alarm	____ Gauges	____ Oil Pressure
____ Warning Lights (if required)	____ Shift Linkage and Gears	____ Mast Operation
____ Hour Meter	____ Seat Belt (smoothly)	

Comments:

This checklist is to be completed by the operator before each shift begins. When completed it is to be turned into the supervisor, IF you discover a problem with anything previously listed, have it repaired before using the forklift. You could be held responsible for an accident caused by faulty equipment if you knew about the problem beforehand.

Use back of Inspection Report for additional comments.
If any items, which are noted, are not repaired the safety manager shall be made aware immediately.

Technical Drawings & Specifications (large format 11”x17”)

Attached PDF and Files

Appendix H. Pre Project Engineering

Attached

2016 Lake Limerick Dredging

Engineering & Project Design/Deployment

Marine Industrial Construction, LLC

Submittal Version 7/12/16

SHEET INDEX

PROJECT NOTES

Coordinates are Washington State Plane South, International Feet, NAD 1983, NAVD88 Vertical Control

PROJECT DESCRIPTION

2016 Dredging Project for Lake Limerick. Hydraulic / suction dredging of approximately 5,000 cubic yards of insitu sediment and dead aquatic weed materials (bio-muck) out of Lake Limerick, Mason County, WA (near Shelton, WA).

PROJECT TEAM

MIC TEAM MEMBER
Michael Eakin, Lead Estimator
Colleen Evan, Project Support – Administrative Support
Matt Fobert, Supervisor
Tom McCauley, Marine Manager
Dave Bernert, P.E. – President & Technical Review
Joe Bernert, Quality Control & Technical Review

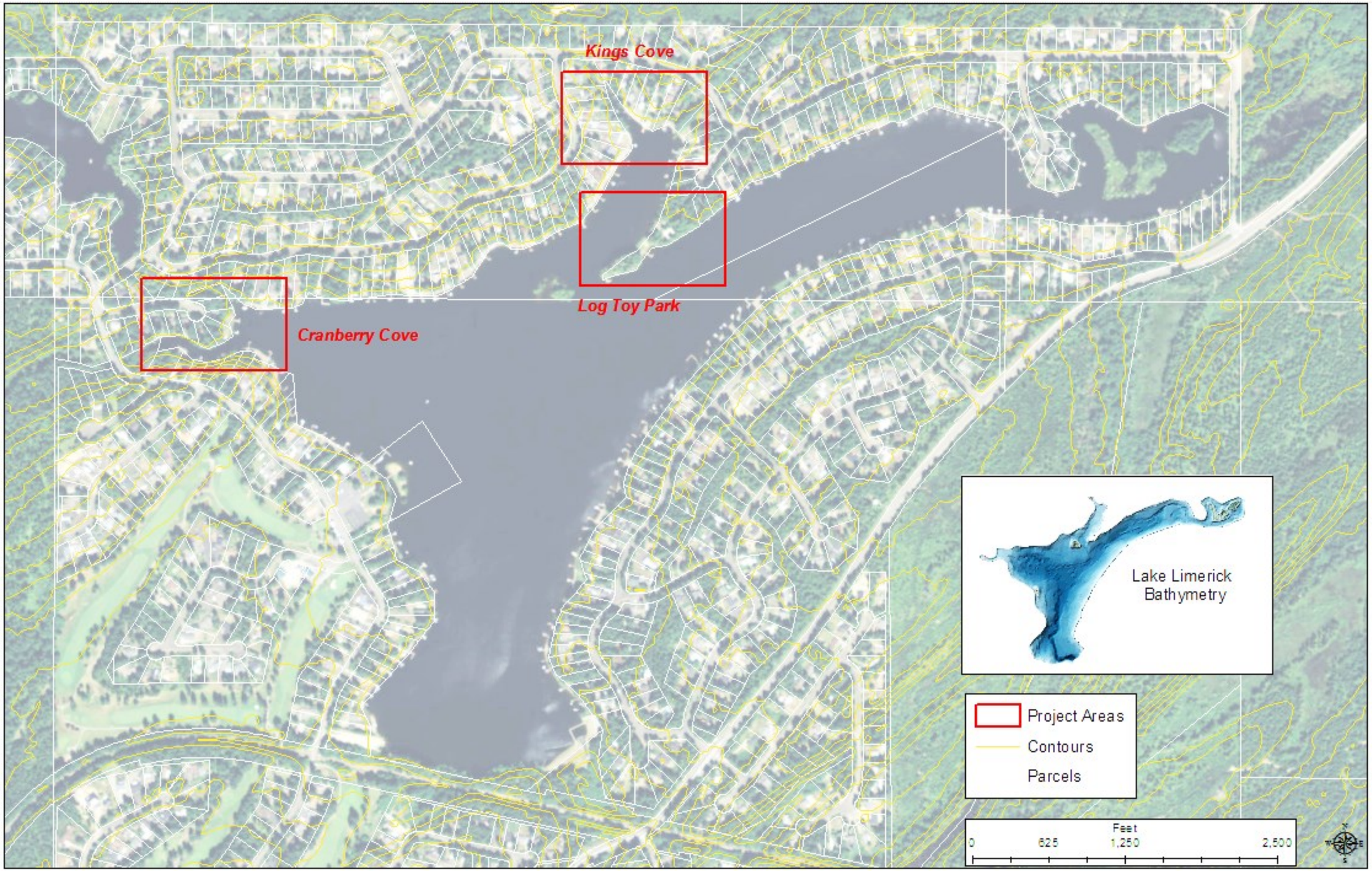
LAKE LIMERICK COUNTRY CLUB
Kelly Evans, President
Brian Smith, AICP
Joe Castelluccio

LAKE LIMERICK TEAM
Rob Plotnikoff (Tetra Tech)
Harry Gibbons (Tetra Tech)
Margaret Bigelow (WDFW)

TETRA TECH

VICINITY MAP

Lake Limerick Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Cover Sheet & Index**	Sheet Number: 1 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525



PROJECT NOTES

Project permit conditions are outlined in detail in the following project specifications:

1. Permit Environmental Conditions Lake Limerick Dredging.
2. Habitat Management Plan (HMP) dated May, 2015
3. Washington Ecology Shoreline / Mason County Permit SHR2013-00003
4. State of Washington Fish and Wildlife Hydraulic Project Approval HEP - 2015-6-527+01
5. Dredge Materials Management Program (DMMP)including Corp, Washington Ecology Department of Natural Resources, and United States Environmental Protection Agency (EPA).
6. Dewatering in accordance with Fish & Wildlife Habitat Conservation Area for project.

Disposal to Log Toy Park with de-watering and staging. The Log Toy Park will have turbidity curtains deployed.

Work Window for the Project is July 15, 2016 to September 10, 2016.

Work Complete from 7:00 am to 7:00 pm

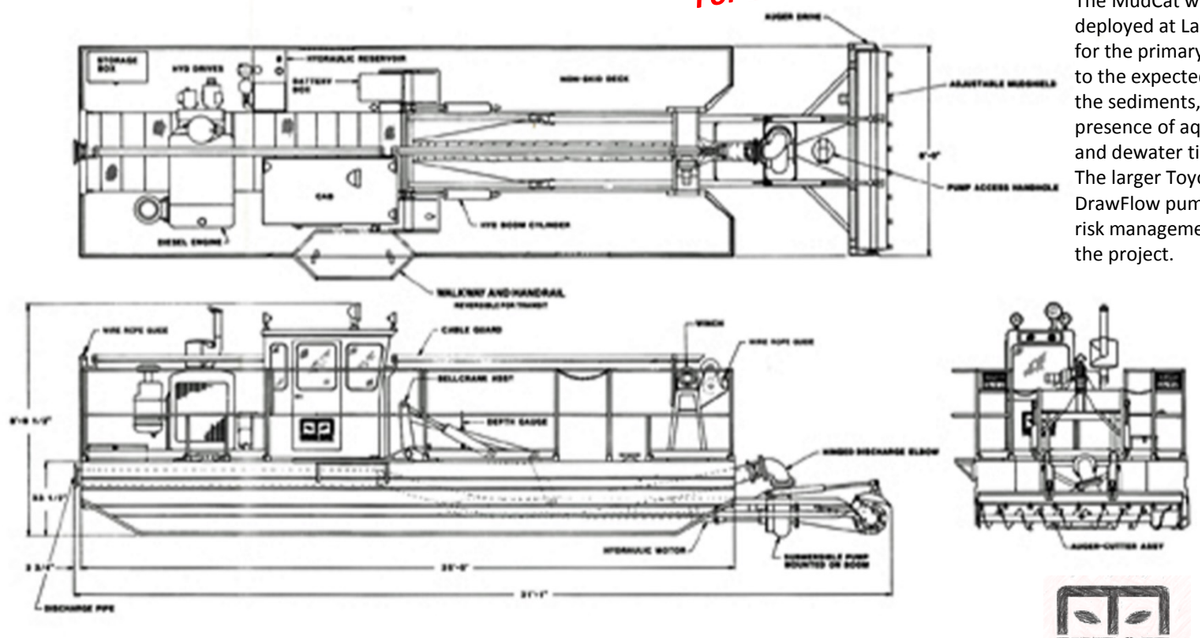
Additional information on the Project is available at the Lake Limerick Country Club Web sites:

http://www.lakelimerick.com/

Lake Limerick Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Lake Limerick & Project Area**	Sheet Number: 2 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC** http://marineindust.com/	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

MudCat 225 HP Dredge

Recommended Dredge
For Lake Limerick 2016 Dredging



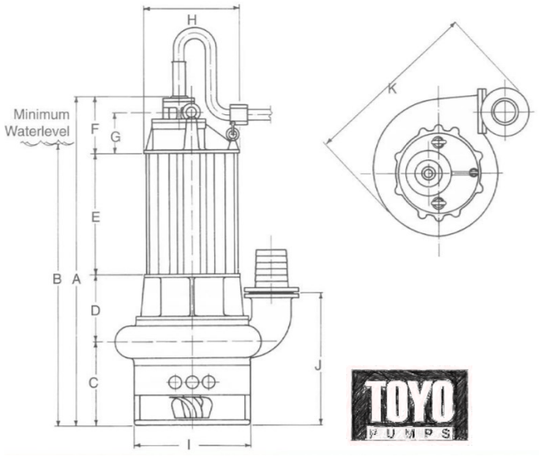
DREDGE SPECIFICATION

The MudCat will be deployed at Lake Limerick for the primary dredge due to the expected nature of the sediments, compaction, presence of aquatic weed, and dewater time required. The larger Toyo and DrawFlow pumps serve as risk management options on the project.

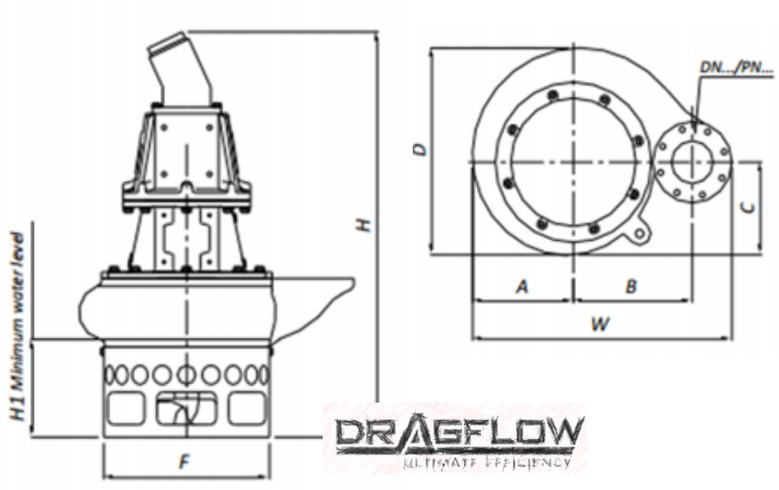
MIC DREDGE COMPARISON

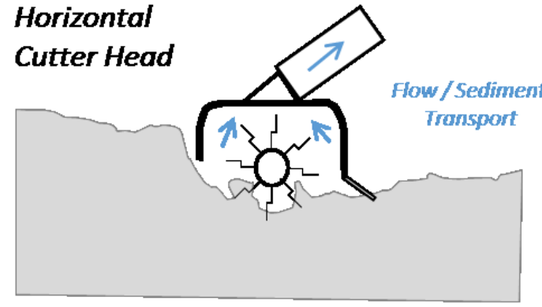
Specifications	MudCat	Toyo 150 DP	Drag Flow 300 HY
Pump Capacity (M3/Hr)	453	720	1200
Maximum Head (meter)	37	22	28
Rated HP on Pump	100	150	300
Powering Units	Detroit Diesel 6I81	External 350 KW Generator	External Hydraulic
Maximum Solids Handling (mm)	120	120	120
Pump Weight (kg)	2500	3500	4200
Delivery Capacity (pipe in mm)	152	250	300
Placement	Ladder on Pontoons	Placed with A Frane (Pontoon/floats) or with Cranes)	
Cutters	Weed Blade and knives	High pressure ring and auger	High pressure ring, 2 excavators (35 HP) and auger
Solids Percentage (expected)	20%	25%	30%
Estimate Material Transport (M3/Hr)	68	135	270

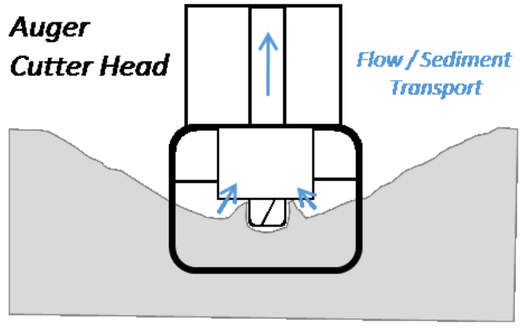
Toyo 150 DP



DragFlow 300 HY





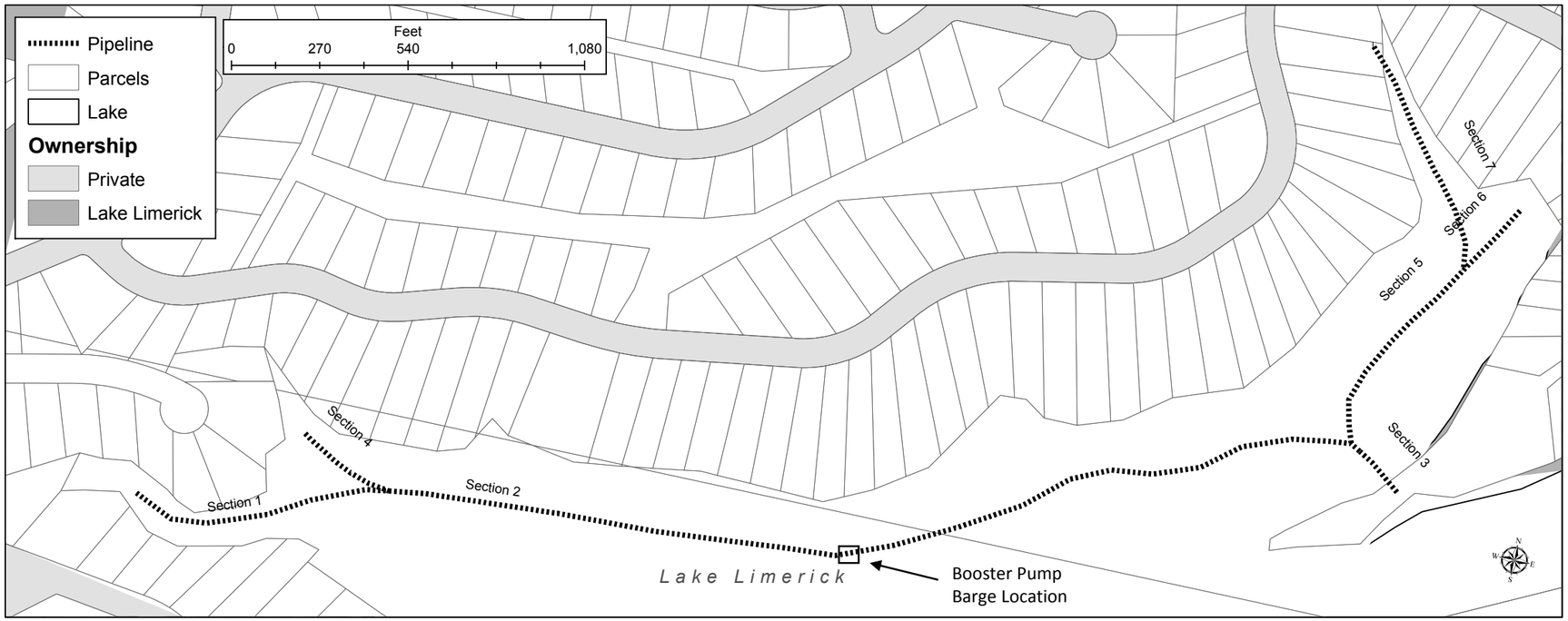


CUTTER HEAD CONFIGURATION

The dredge pump cutting head is designed to maximize intake of sediments into the dredge pump. Cutter heads with tines and/or augers are below casing that direct and channel sediment delivery. This precision control minimize the potential re-suspension of sediment.

Lake Limerick Country Club	**Lake Limerick** Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Dredge Options / Configuration**	Sheet Number: 3 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC** 10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Pipeline Layout and Configuration



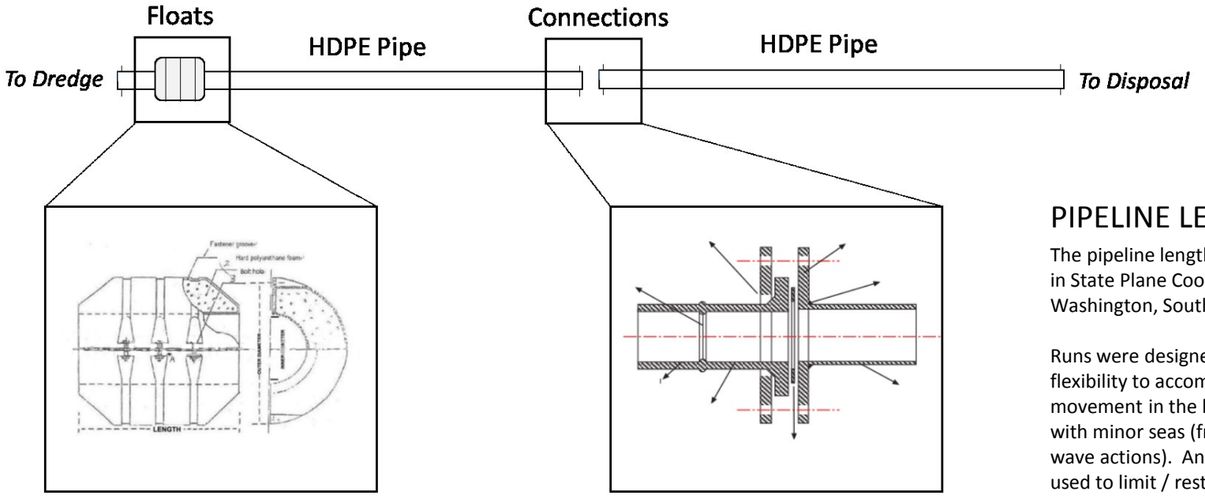
PIPELINE LENGTHS

Name	Length (Feet)
Section 1	225
Section 2	2,076
Section 3	118
Section 4	219
Section 5	451
Section 6	175
Section 7	512

Total Run	Length (Feet)
Cranberry Cove Run 1 (Sections 1,2,3)	2,419
Cranberry Cove Run 2 (Sections 2,3,4)	2,413
King Cover Run 1 (Sections 3,5,6)	744
King Cover Run 2 (Sections 3,5,7)	1,081

PIPELINE NOTES

The HDPE 10" pipe is connected with flanges and washers. The pipeline is supported with floats on each pipe and flashing yellow lights are affixed for navigational notification.



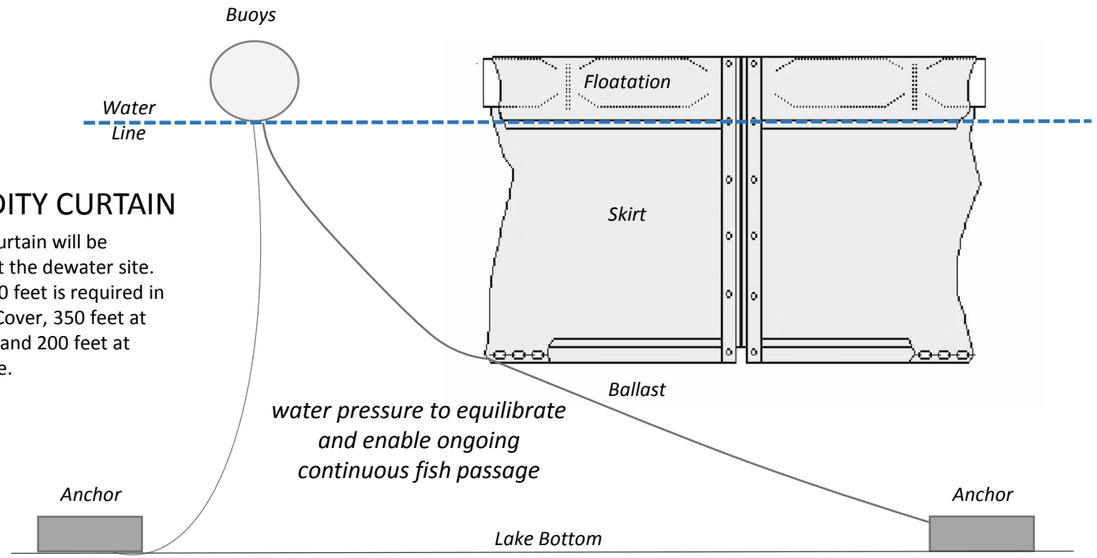
PIPELINE LENGTHS

The pipeline length was measured in State Plane Coordinates, Washington, South Feet, NAD 83.

Runs were designed to have flexibility to accommodate movement in the lake associated with minor seas (from wind and wave actions). Anchors may be used to limit / restrict movement.

Lake Limerick Country Club	**Lake Limerick** Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Dredge and Piping Schematics**	Sheet Number: 4 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

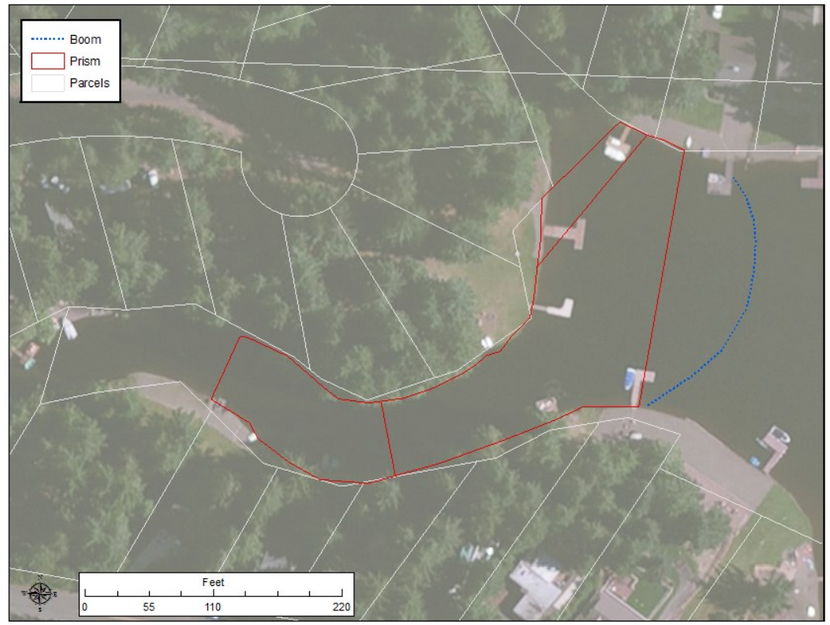
Turbidity Curtain



TURBIDITY CURTAIN

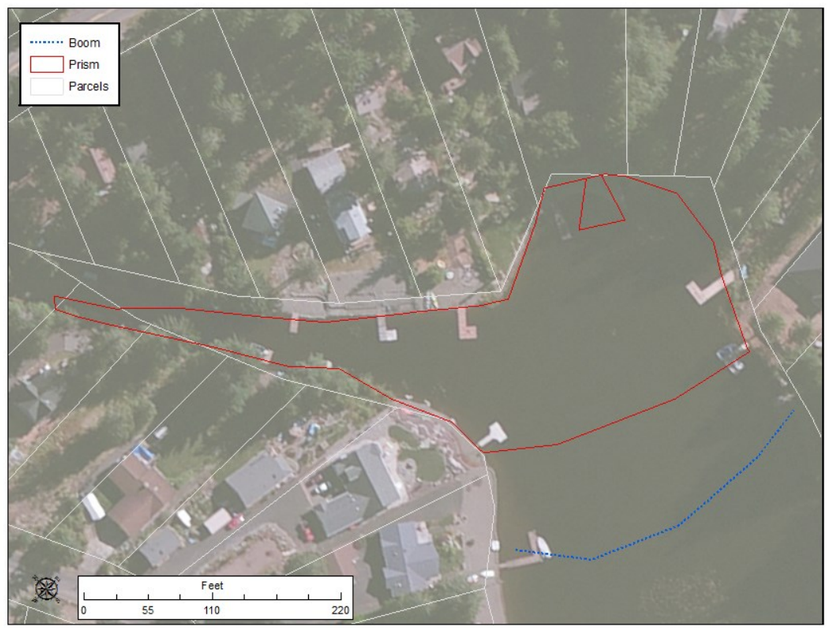
Turbidity Curtain will be deployed at the dewater site. Roughly 250 feet is required in Cranberry Cover, 350 feet at Kings Cove and 200 feet at disposal site.

Cranberry Cove



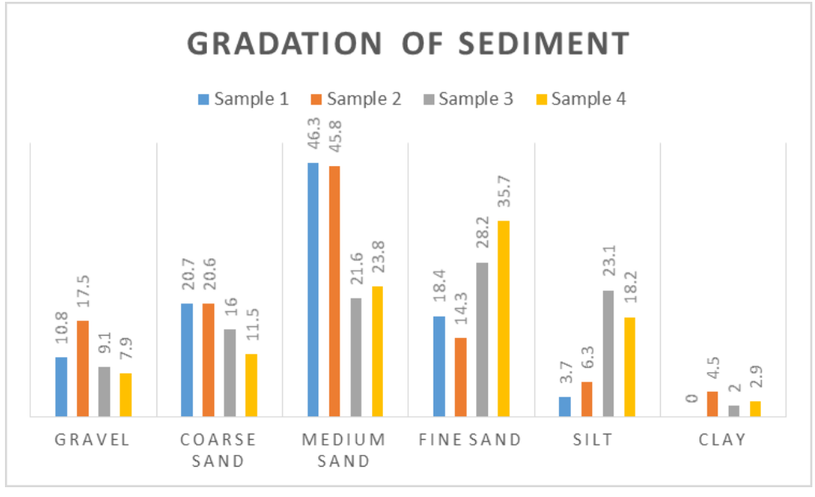
CURTAIN PLACEMENT

Turbidity Curtain is roughly 240 feet at Cranberry Cove, 290 Feet at King Cover and roughly 100 feet at the disposal site



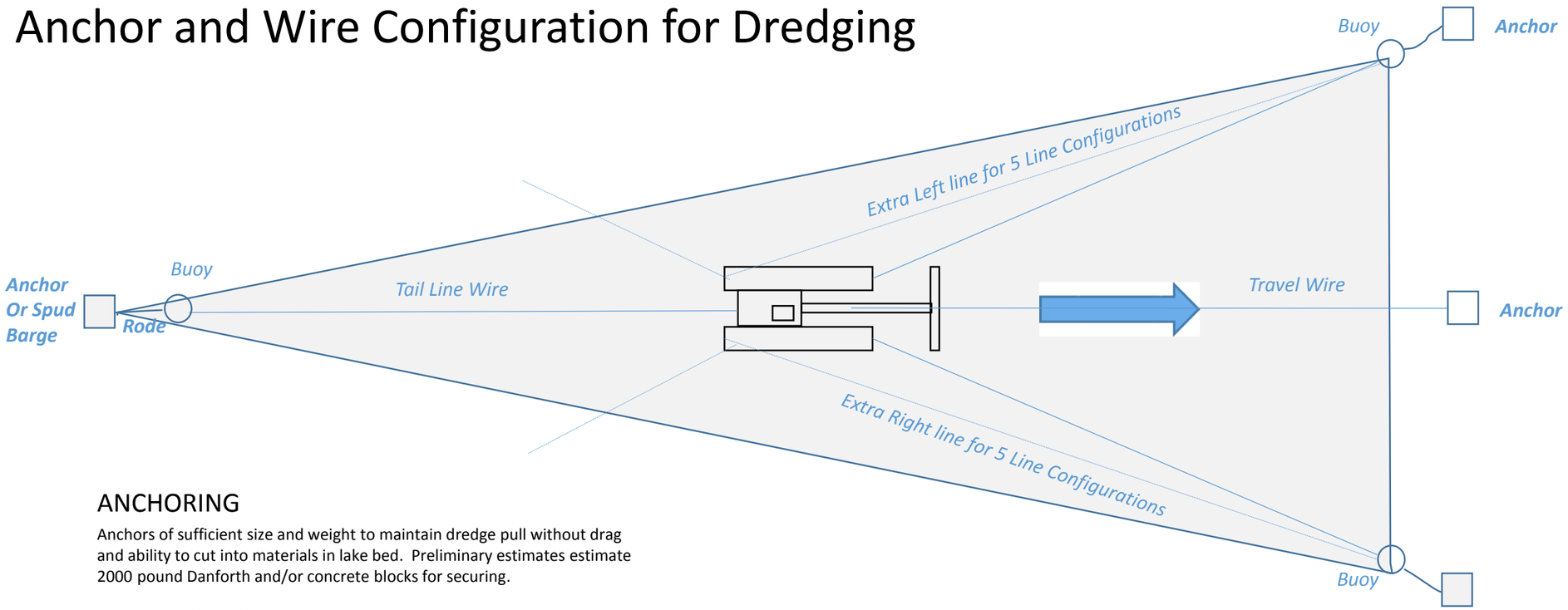
SEDIMENT NOTES

Sediment samples presented in Bid Specification indicated a dominance of sands and easily transported material.



Lake Limerick Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Turbidity Curtain Configuration**	Sheet Number: 5 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Anchor and Wire Configuration for Dredging



THREE LINE CONFIGURATION

A 3 line configuration is recommended and allows movement on 1 or 2 winches (blocked) to fixed anchors for maximizing production.

5 Lines (2 additional lines) can be used for harder digging but requires additional labor and equipment.

ANCHORING

Anchors of sufficient size and weight to maintain dredge pull without drag and ability to cut into materials in lake bed. Preliminary estimates estimate 2000 pound Danforth and/or concrete blocks for securing.

Wire gage sufficient for tensioning tail and whip lines to secured anchors.

Below are estimated holding forces (Newton) on possible configurations.

Anchoring System / Configuration	Hold Weight	Force Load (kN)
Small lead anchors (< 30 lbs.)	20	5
100 pound Bulk Concrete	100	22
500 lb. Mushroom	500	66
1200 lb. ½ concrete block	1200	124
2000 lb. Danforth lead	2000	182
Larger concrete block anchors (2800 lbs.)	2800	245
Larger concrete block anchors (4000 lbs.)	4000	325
Spud 12" Diameter Vaiable Length (weight)	5000	450
Spud 20" Diameter Vaiable Length (weight)	10000	500
Spud 24" Diameter Vaiable Length (weight)	15000	550
Shore Line Anchoring Options - TDB based on Field Visists & Reviews	variable	variable

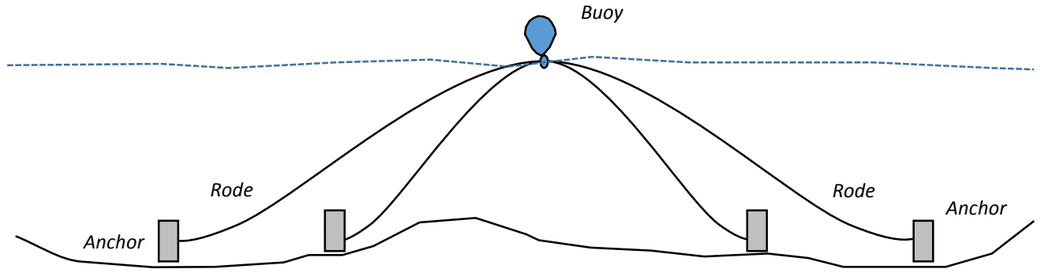
ADDITIONAL ANCHORS

Based on onsite field conditions and assessment, WCP will be building some custom concrete anchors to allow anchoring on shallow locations which are inaccessible with a winch barge due to draft. These anchors will be configured to hold dredge and allow movement. Expected design size of anchors are:

20” to 22” Round diameters with variable heights (proportional to weight) of 20” to 30”. The concrete anchors (500 lbs. to 600 lbs.) will be able to be man handled on site with limited mechanical assistance.

MULTIPLE ANCHORS ON BUOY

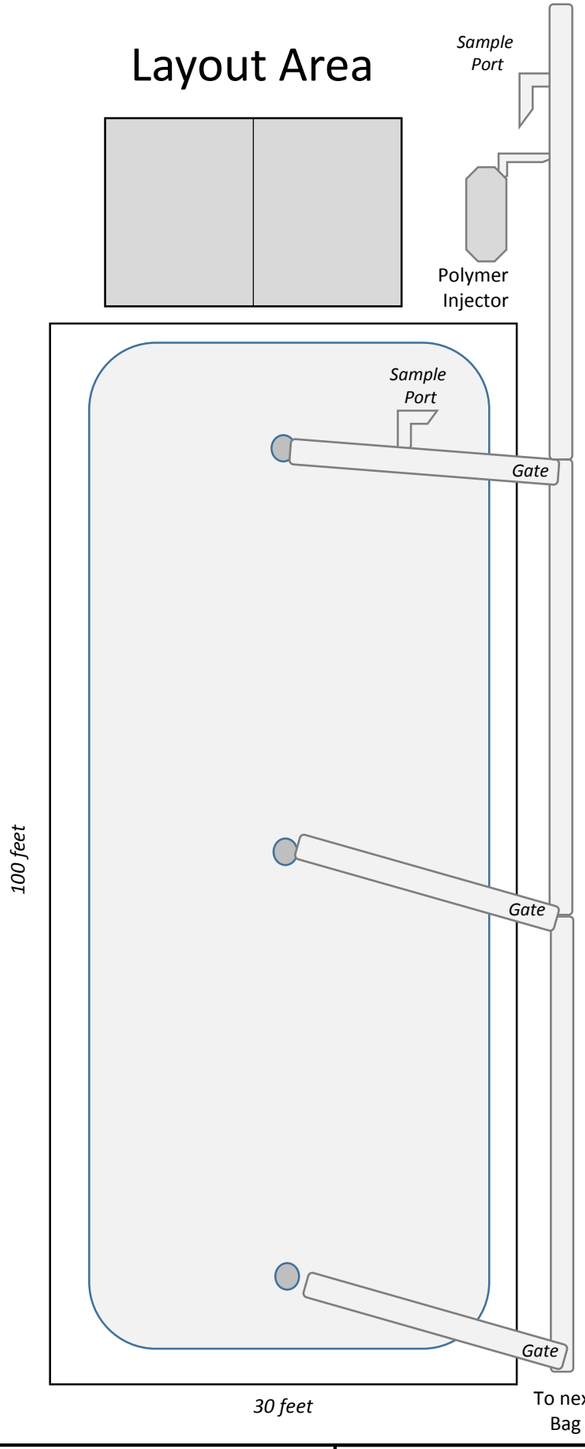
Multiple anchor configuration for additional holding capacity. Calculated for force requirement on pull for mobilizing equipment/



Lake Limerick Country Club	**Lake Limerick** Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Anchoring Configuration**	Sheet Number: 6 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Disposal Site & Geotextile Configuration

Layout Area



DEWATERING CONFIGURATION

Geotextile / Bio Bags will be used for the dewater and placed in the open area (with sloping drainage to Lake Limerick). The will facilitate effective drainage and allow the bio-bags to be moved and dried material to be stockpiled.

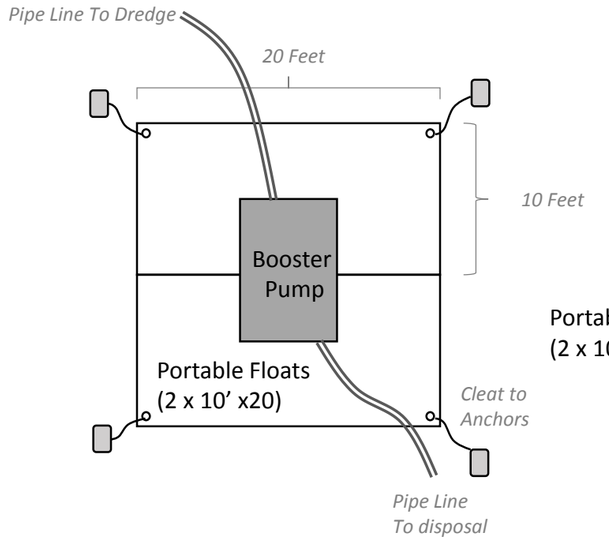
POLYMER INJECTION

AQUAMARK AQ 587 is a Cationic high charge density flocculation agent. The injection system pump is supplied by:
AQUAMARK, INC.
P O Box 773
Chesterland, Ohio 44026

Lake Limerick Country Club	**Lake Limerick** Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Disposal Site Configurations & Bio Bag Layouts**	Sheet Number: 7 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC** 10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Barge Configurations

Booster Pump Barge

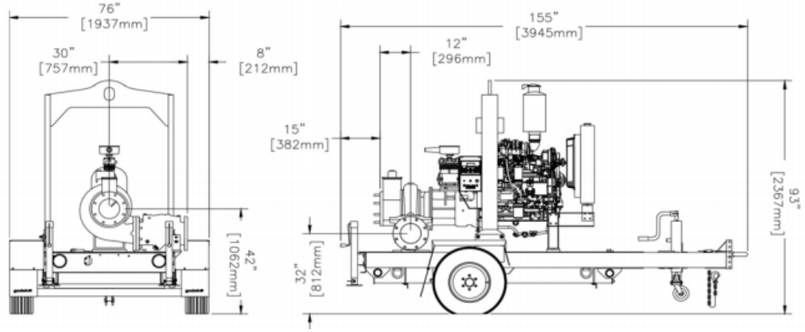


BOOSTER BARGE ANCHORING

The barge will be anchored with 4 (or more as needed) 100 lb. anchors secured off the corner cleats. The barge will also be fixed with pipes to the dredge and disposal location. The barge and anchor are designed to be able to move slightly in variable water conditions.

Portable Floats
(2 x 10' x20)

Booster Pump

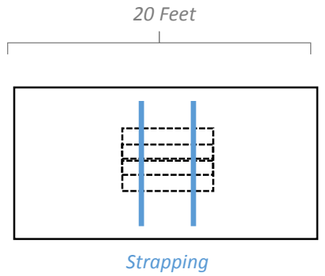


BOOSTER PUMP

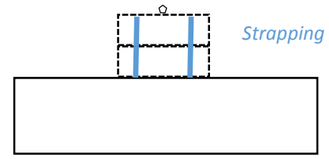
The Godwin Dri-Prime CD225M pump offers flow rates to 3240 USGPM and has the capability of handling solids up to 3.0" in diameter.

Anchor Barge

Top



Side

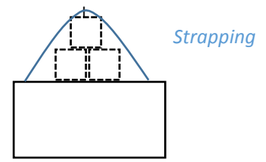


Flexi Float Weight
12,726 lbs.

Portable Floats
(1 x 10' x20 with 5' Draft
Poseidon I Modular Barge)

Weights secured to barge with strapping to secure anchor stability.

End



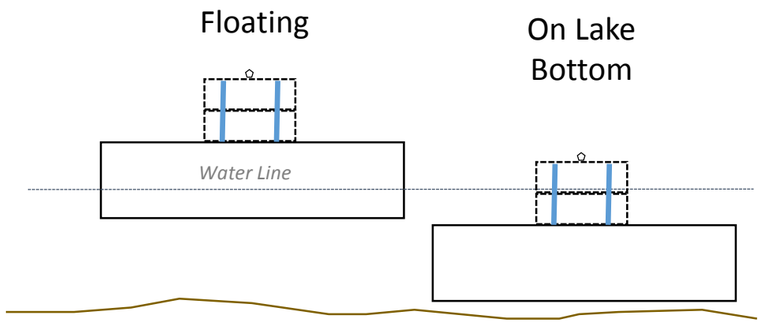
ANCHOR BARGE

The anchor barge is used for providing a secure point for pulling the dredge against. Securing the barge configuration is a function of the drag, velocity/acceleration, water depth and distance.

This significant anchor will be used if smaller anchors are not sufficient given field conditions. The anchor is 3 Wilsonville Concrete Blocks (WCP) nested together and secured to the barge. The height of the anchor will be 4 feet above the Poseidon I barge (with a maximum draft of 5'). The concrete blocks weight 3,360 lbs each for a total additional displacement of over 5 tons. The weight of the barge plus anchors is 4% greater than the total weight of the barge.

The anchor barge can be lowered to the lake bottom to secure an anchoring point (by pumping water into the flexi float) and using the weight of the barge and additional ballast to displace.

ANCHOR BARGE



Lake Limerick Country Club	**Lake Limerick** Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Barge Configuration**	Sheet Number: 8 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC** 10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Kings Cove

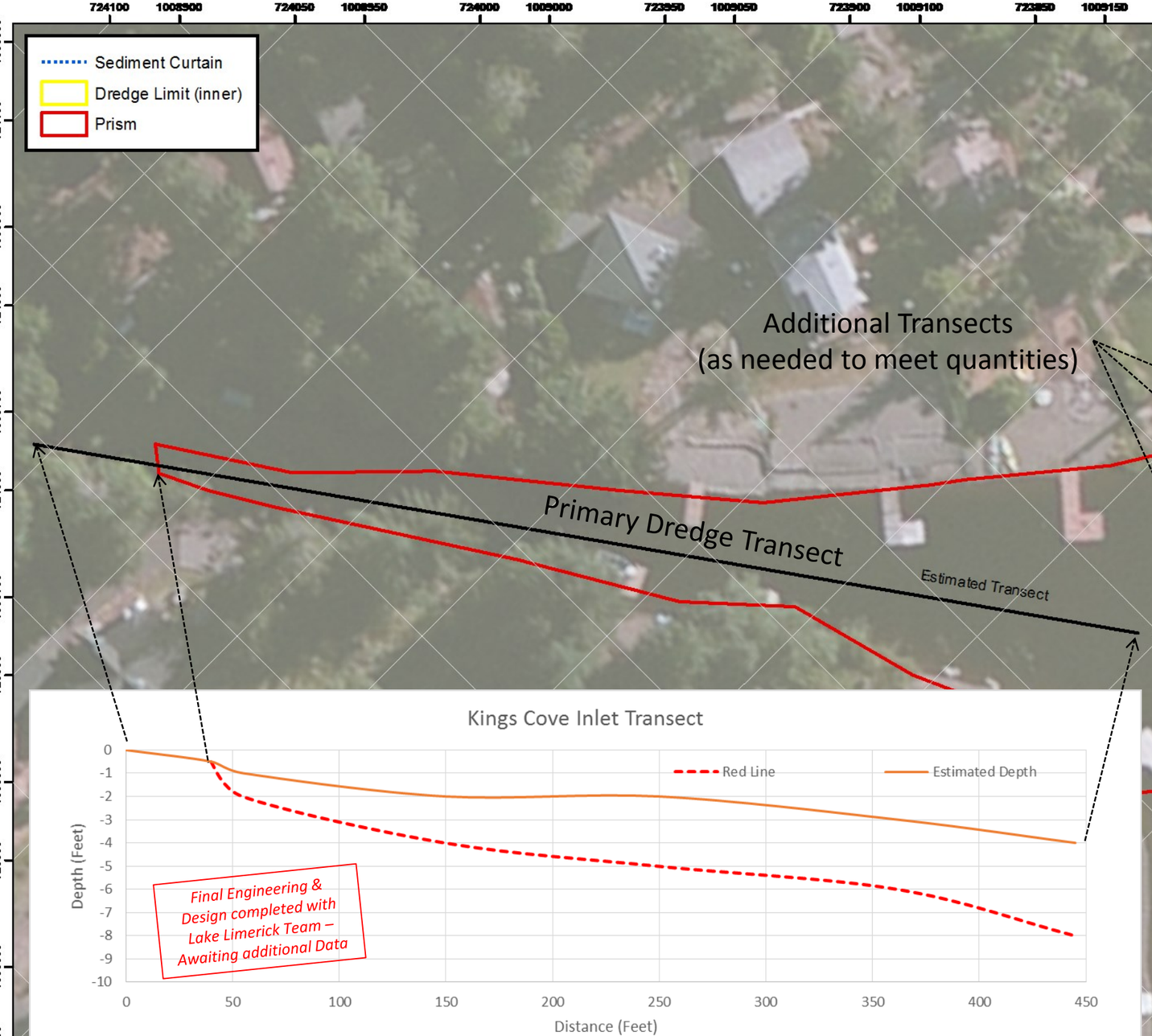
Sediment Curtain
Dredge Limit (inner)
Prism

Additional Transects
(as needed to meet quantities)

Primary Dredge Transect

Estimated Transect

Secondary Dredge Transect



Feet
0 30 60 120

BASELINE

Baseline information is based on a field visit (7/6/16), GIS data available (tax lots) and recent aerial imagery. Depths are estimated at average depth across the channel and it is noted that thalweg depth may be deeper and channel edges are shallower. The objective is to use this for planning purposes on prioritizing and scheduling dredging and other activities.

TRANSECT

Based on the profile below the volume of material is roughly 1,885 cubic yards.

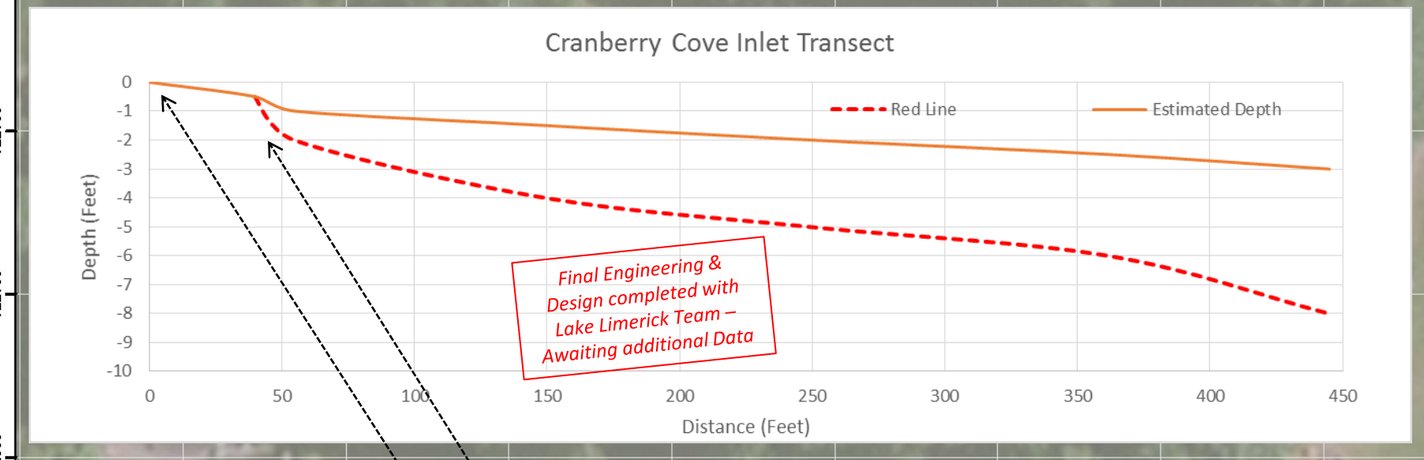
DOCKS

Docks and moving of existing features will be coordinated with Lake Limerick and adequate warning and communication will be performed by the contractor.

Lake Limerick Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Kings Cove**	Sheet Number: 9 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Cranberry Cove

Sediment Curtain
Dredge Limit (inner)
Prism



Secondary Dredge Transect

Primary Dredge Transect

Additional Transects
(as needed to meet quantities)

Feet
0 30 60 120

1006250 1006300 1006350 1006400 1006450 1006500 1006550 1006600 1006650 1006700 1006750 1006800 1006850 1006900

722950 722900 722850 722800 722750 722700 722650 722600 722550 722500 722450

BASELINE

Baseline information is based on a field visit (7/6/16), GIS data available (tax lots) and recent aerial imagery. Depths are estimated at average depth across the channel and it is noted that thalweg depth may be deeper and channel edges are shallower. The objective is to use this for planning purposes on prioritizing and scheduling dredging and other activities.

TRANSECT

Based on the profile below the volume of material is roughly 2,850 cubic yards.

DOCKS

Docks and moving of existing features will be coordinated with Lake Limerick and adequate warning and communication will be performed by the contractor.

Lake Limerick Country Club Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Cranberry Cove**	Sheet Number: 10 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Appendix G. Water Quality Monitoring Plan

Attached

Lake Limerick Water Quality Monitoring Plan – 2016

Below is a draft Lake Limerick Water Quality monitoring program. This plan is based on other monitoring plans used for monitoring dredging in Washington State and approved by Department of Ecology and respective agencies (Laura Inouye and others).

Water Quality Standards (Exceedances)

The permitted turbidity is 5 NTU over background or 10% increase if background is over 50 NTUs as measured at the compliance station or anywhere 150 feet from the compliance station. During any storm event that causes dramatic increases in either flow and/or visual components of turbidity (i.e. Secchi disk depth) we will also implement additional samples to include variability in the water column and samples from the rivers thalweg above and below the dredging operation.

Water Quality Sampling Equipment

Primary instruments include a Horiba U-52 Multi-parameter water quality meter. This field probe including data collection for polarography (Clark cell with wiper) Dissolved Oxygen, a tungsten lamp 90 deg. (EPA approved 0180.1 compliant) turbidity probe with wiper, depth pressure transducer, temperature and conductivity meter, SRP and data logging capabilities. Extra calibration standards are kept on the vessel and staff is experienced in configuring the equipment. Below are the specifications for the primary data recording:

Specifications Turbidity
Range 0.00 to 1 / 1 to 100 NTU / 0 to 1000 NTU
Resolution 0.01 NTU / 0.1 NTU / 1 NTU
Light Source LED and 90°scattering method with wiper
Environment -10 to 55°C; RH 100%
Specifications Dissolved Oxygen
Range 0.0 to 55 mg/L
Resolution 0.01 mg/L
Polarographic Method
Environment -10 to 55°C; RH 100%
Specifications Depth
Range 0.0 to 30 meters
Resolution 0.05 meters
Pressure transducer
Environment -10 to 55°C; RH 100%

In the laboratory on the boat we use an ISO 7027 compliant microprocessor-based turbidity meter which provides lab-grade accuracy. The meter is equipped with an infrared LED as source of light and with a unique GLP (Good Laboratory Practice) feature. GLP circuitry automatically stores and retrieves the last calibration data.

Specifications
Range 0.00 to 50.00 FTU/NTU / 50 to 1000 FTU/NTU
Resolution 0.01 / 1 FTU/NTU
Light Source/Life High Emission Infrared LED / Life of the instrument
Light Detector Silicon Photocell

Environment 0 to 50°C; RH 95%

The probe was calibrated at the Factory in November 2015 and has only been used 10 time (recorded data logs since calibration). Both blank and audit samples will run weekly from standards. Additionally, MIC has a Lamotte and/or Hanna bench turbidity meter onsite for comparing calibrations/measurements.

Water Quality Sampling Crew (Qualifications)

The water quality sampling crew are all trained as Certified Erosion and Sediment Control Lead (CESCL in Washington State). The primary water quality sampling will be performed by: Joe Bernert, Matt Fobert and/or Eric Hittle.

The following form will be compiled daily with the measured water quality parameters (digital files will be maintained by MIC):

Station ID:			**Date:**		**Time:**	
Coordinates:						
Lat/Northing:			Long/Easting			
Weather:			**Total Water Depth:**			
Field Parameters:						
	Water Depth	**Turbidity (NTU)**	**D.O. (% sat.)**	**D.O. (mg/L)**	**Temp. (deg. C)**	
Run 1						
Surface						
Middle						
Deep						
Run 2						
Surface						
Middle						
Deep						
Floating or suspended material			Y/N			
Oil or hydrocarbon sheen			Y/N			
Discoloration or visible turbidity			Y/N			
Odor (H_2S, petroleum, septic, other)			Y/N			
Comments:						
Recorded By:						

Monitoring Schedule

Below the monitoring that has been used previously and for the upcoming dredging. Tier 1 will be used if no issues are noted. If elevated turbidities occur at early warning station the Tier 2 sampling will be initiated.

Parameters	Schedules
Depth (feet) Turbidity (NTU) Temperature (^{o}C)	<u>Tier 1</u> Twice per day, daily monitoring <u>Tier 2</u> Every 2 hours

The dewatering site will be inspected twice daily (and reported) for the any runoff and/or turbidity issues.

Monitoring Location and control

The monitoring location, depth and parameters are outlined below for this project:

Parameters	Locations	Depths
Depth (feet) Turbidity (NTU) Temperature (^{o}C)	1. <u>Compliance Station.</u> 300 ft. downstream of dredge 2. <u>Early Warning Station</u>. 150 ft. downstream of dredge 3. <u>Background Station</u> 500 ft. upstream or reference location	1. Within 3 ft. of surface or midpoint in column 2. Note depths are shallow

MIC will do the following monitoring:

- Sample depth, turbidity, temperature samples will be taken once daily at Tier 1 locations dredging location
    - 500 feet upstream of all dredging (for reference conditions) locations recorded by GPS and/or checked with rangefinders; if unavailable access alternatives will be defined
    - 300 feet downstream below dredging locations recorded by GPS and/or distance checked with rangefinders
    - 150 feet downstream below dredging locations recorded by GPS and/or distance checked with rangefinders
    - Samples will be evaluated after collection to ensure no turbidity issues arise
    - If turbidity issues are noted the following actions are taken:

Table 1. Compliance Measures for turbidity

Above Background in (NTUs)	Action
0 to 5	Continue monitoring
5+ at Early Warning Station	Additional BMPs & continue Monitoring
5+ at Compliance Station	Proceed according to project specific BMPs; Notification of Authorities; continued monitoring

    - Additional Water Quality monitoring can be completed by the onsite QC staff using multi-meter probes if required.
        - On dredge equipment includes
            - 2 horizontal (Van Dorn) style water samplers and clean/new Nalgene sample bottles; 1 grab sampler;
            - Hanna Turbidity (and calibration solutions); beakers;
            - Secchi Disk and weighted lines;
            - De-ionized water for sample cleaning
- Daily Monitoring (turbidity above and below) at the unloading site to ensure impacts
- Weekly photo-documentation and water quality sampling associated sites.

Vertically integrated samples will be collected for Quality Control purposes only during the project, however it shall be noted that composting or averaging of depths will not be allowed for water quality purposes since depths are small. Samples will be stored in Nalgene sample bottles and turbidity will be analyzed with a Hanna Turbidity meters. The meter will be calibrated with Good Laboratory Practices and measurements are recorded by a High Emission Infrared LED light source in Nephelometric Turbidity Units. Quality Assurance measures will be collected during the routine sampling. A set of split samples will be collected (multiple samples from a sample Van Dorn draw), as well as a set of replicate and duplicate samples (where the analysis will be repeated on the same sample) and compared to calibrated probe measurements. Audit blanks and calibration standards will be run on probes at a minimum of every 5 days. Dredged sediment will be collected and assessed (using sieve analyses) to determine potential for creating turbidity issues. Two complete sets of field sieves are located at Log Toy Park (storage shed).

Work Sediment/Turbidity BMPs and monitoring & Dredging BMPs

The dredging BMPs are outlined in the Dredging Plan and including:

- Modification and timing (i.e. decreasing) of cycle times and dredge travel rate
- No multiple bites, control penetration depth of cutter head
- Change cutter speeds (slow down and/or stop [note direction of blades cutting])
- Increase pumping amount (engine speed) for more intake
- Ensuring effective penetration operationally (feathering, placement, adjustments, etc.)

- Use of computer / GPS dredging software (for tracking, monitoring and mapping dredging activities) real-time to the operator
- Change Head configuration (multiple options are available on the dredge including various cutters, weight digging edges, shapes, flappers, etc.)
- Countermeasures such as:
    a. Deploying silt curtain – already in place; additional
    b. Booms
    c. Filtration
    d. Support equipment for containment

Reporting and Documentation

Reporting and daily documentation will be included in the daily construction report. The Water Quality forms are configured so that exceedances are easily noted and other appropriate parties are notified immediately. A copy of all permits will be available at the project site as well as in the office. Reports of water quality will be included in the daily construction report.

Contingency Plan

If issues arise in dredging (i.e. specifically associated with turbidity compliance [or related activities] we will implement the following plan:

1. Increase sampling above and below the operations
    a. If exceedance is at the point of compliance is confirmed sampling must continue every two hours until sunset.
2. Notification to the operators and lead at the site to account for all operational impacts
3. If additional issues are noted below Active BMPs including:
    a. First Stage Assessment and Action
        i. Slowing cycle/production times on the dredging activities (and have QC staff isolate impacts [i.e. location on the water column to determine next action item])
        ii. Dewater activities reviewed in detailed and identification of the sediment load and contribution – dilution and other active solutions
        iii. Bottom sediment transport – modification of operations on cutter head and pump configuration (teeth, cutting face, etc.)
        iv. Sediment sampling to evaluating particle size impact and potential control (i.e. colloidal and related structures and their respective mobilization and settle rate)
    b. Second Stage Active Implementation – continued increased monitoring and reporting documenting the impacts and effective of actions
        i. Deploy additional booms
        ii. Deploy additional sediment curtains
        iii. Active Filtration (bio bag and related approaches)

Turbidity BMP

If turbidity issues arises MIC has several countermeasure options:

Turbidity issue arises are primarily associated with:

1. Elevated turbidity at the at early warning point or (Stage 1)
2. Exceedance at the point of compliance (State 2)

When Stage 1 (early warning compliance elevated values are observed) MIC will continue using standard Dredging BMP with additional operational activities:

3. Standard BMPs
4. In additional when either 10% or 5 NTU above background conditions are observed at the early warning site (Stage 2) , MIC will:
    a. Lowering cycle time
    b. Additional BMPs which are implemented after elevated turbidity are recorded (at the early warning point). This includes changing buckets configurations (lower penetration, less aggressive digging teeth, clean cutting edges, etc.), detailed review of the de-water filtration and systems, etc.
5. If any exceedances at the point of compliance (Stage 2) occur then more BMPs which are implemented. Use aggressive countermeasures such as:
    a. Deploying additional silt curtain and/or other booms if any additional issues arise. Silt curtains are intended to allow suspended sediment at a dredging site to settle out of the water column in a controlled area, minimizing the area that is affected by the increased suspended sediment. We can have silt curtains brought to the site and can be quickly deployed.

It important that he MIC team and onsite crew are experienced and trained with water.

Appendix I. Revised Dredging Map (7/12/16)

Attached

Kings Cove

Sediment Curtain
Dredge Limit (inner)
Prism

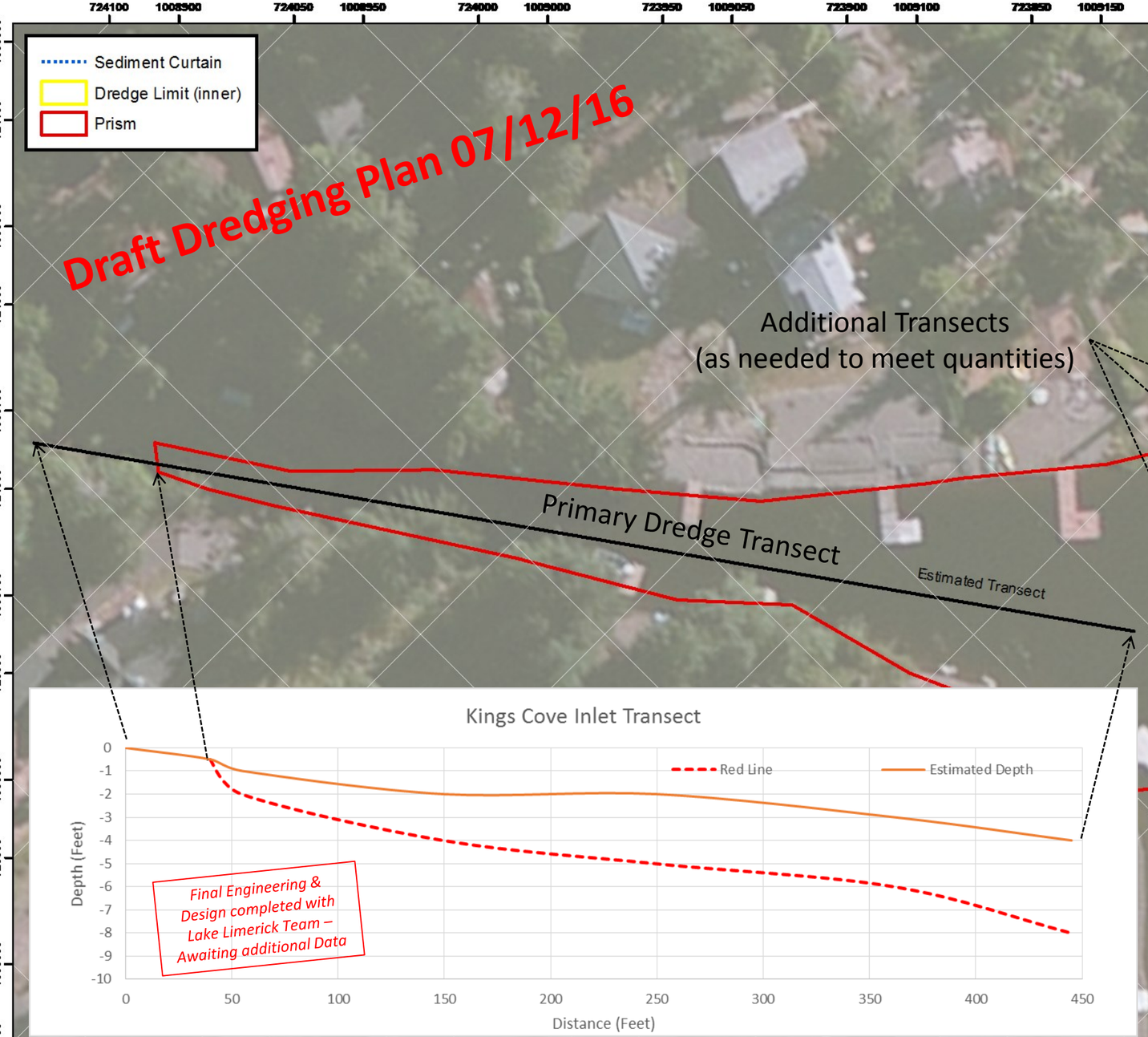
Draft Dredging Plan 07/12/16

Additional Transects
(as needed to meet quantities)

Primary Dredge Transect

Estimated Transect

Secondary Dredge Transect



Feet
0 30 60 120

BASELINE

Baseline information is based on a field visit (7/6/16), GIS data available (tax lots) and recent aerial imagery. Depths are estimated at average depth across the channel and it is noted that thalweg depth may be deeper and channel edges are shallower. The objective is to use this for planning purposes on prioritizing and scheduling dredging and other activities.

TRANSECT

Based on the profile below the volume of material is roughly 1,885 cubic yards.

DOCKS

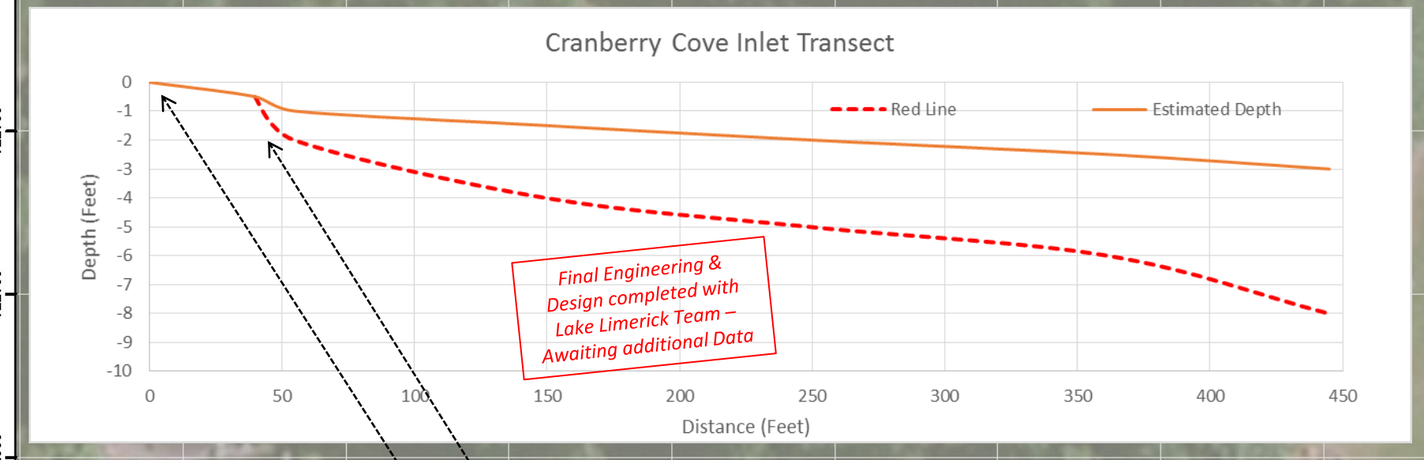
Docks and moving of existing features will be coordinated with Lake Limerick and adequate warning and communication will be performed by the contractor.

Lake Limerick Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Kings Cove**	Sheet Number: 9 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Cranberry Cove

Draft Dredging Plan 07/12/16

Sediment Curtain
Dredge Limit (inner)
Prism



Secondary Dredge Transect

Primary Dredge Transect

Additional Transects
(as needed to meet quantities)

Feet
0 30 60 120

BASELINE

Baseline information is based on a field visit (7/6/16), GIS data available (tax lots) and recent aerial imagery. Depths are estimated at average depth across the channel and it is noted that thalweg depth may be deeper and channel edges are shallower. The objective is to use this for planning purposes on prioritizing and scheduling dredging and other activities.

TRANSECT

Based on the profile below the volume of material is roughly 2,850 cubic yards.

DOCKS

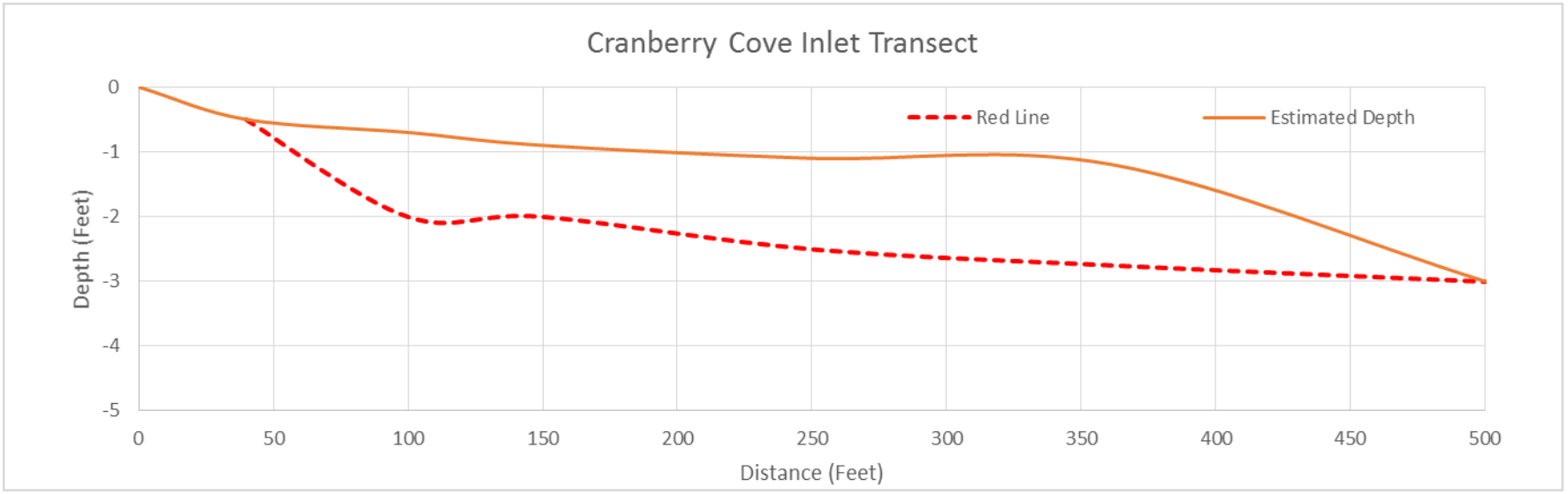
Docks and moving of existing features will be coordinated with Lake Limerick and adequate warning and communication will be performed by the contractor.

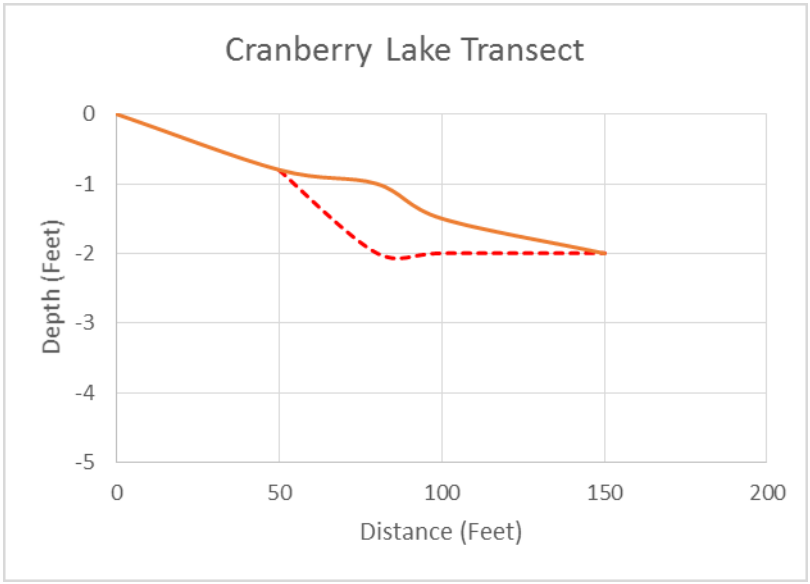
Lake Limerick Country Club Country Club Dredging Project 2016	MIC Marine Industrial Construction	Sheet Contents: **Cranberry Cove**	Sheet Number: 10 of 10 Project Number: 2016-101	Scale: Noted on Maps Drawn By: JAB Approved By: DJB Date: 6/28/16	**Marine Industrial Construction, LLC**	10500 SW Wilsonville Rd Wilsonville, OR, 97070 (503) 682-2525

Appendix J. Revised Dredging Profiles (7/14/16)

Attached

LAKE LIMERICK DREDGING PROFILES



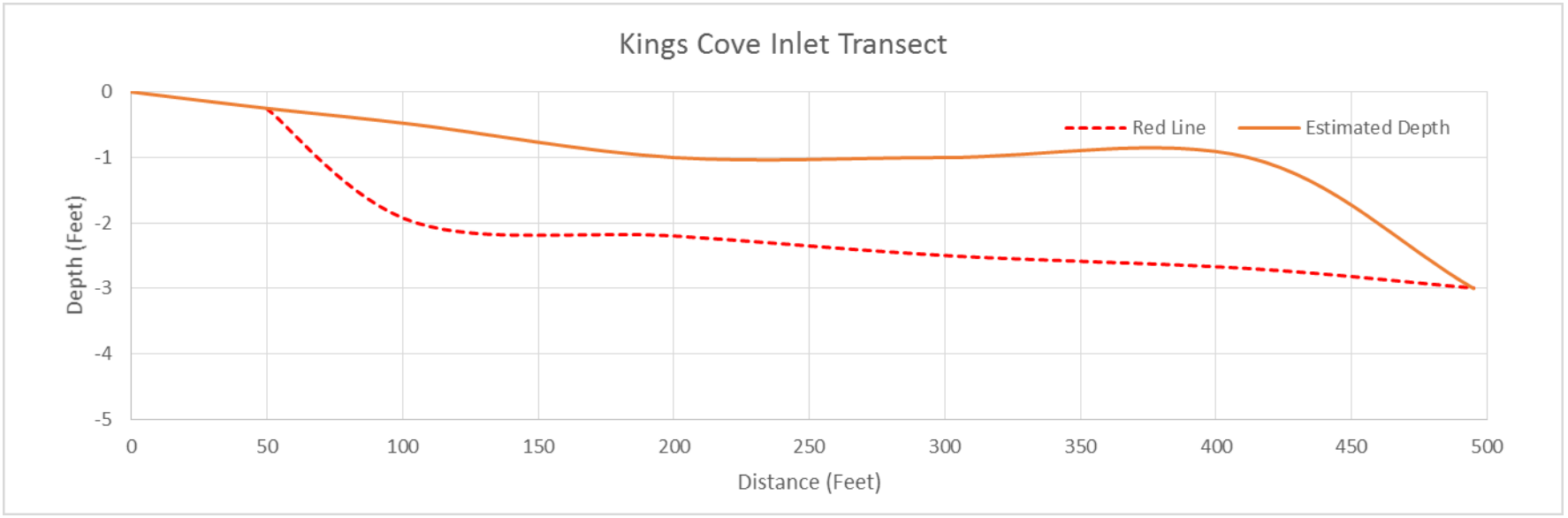


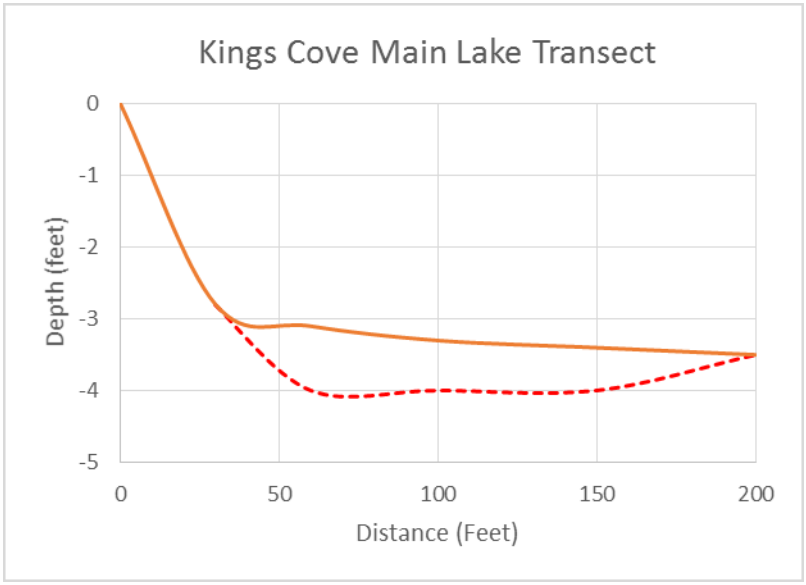
Lake Limerick Country Club

TETRA TECH

MIC Marine Industrial Construction

LAKE LIMERICK DREDGING PROFILES





Lake Limerick Country Club

TETRA TECH

MIC Marine Industrial Construction