Lower Menominee River, South Channel Ogden Street Bridge, Sediment Assessment for Material Disposal Marinette, Wisconsin

Quality Assurance Project Plan

EPA Grant Funding Source: GLRI
Grant #: GLRI- TBD in the near future
SWIMS ID: CAP_7_2015

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Prepared: 07/29/2015
Revision #: 0

Approvals: **Date:**

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Cheryl Bougie, Sediment & WQ Monitoring Coordinator

Jim Killian — 8/26/15
Jim Killian, Water and Sediment Resource Specialist

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Donalea Dinsmore, WDNR Great Lakes Quality Assurance Coordinator

Jennifer Connor — 10/15/15
Jennifer Connor, GLNPO Project Manager

Received QA-Track notification on 10/15/15.

Distribution List

Cheryl Bougie (electronic copy)

Jim Killian (electronic copy)

Donalea Dinsmore will place the approved, electronic version of this QA Plan in SWIMS associated with the project records where it is accessible to all staff working on the project. She will also provide a copy to GLNPO for inclusion in GLNPO's QA Track.

Jennifer Connor, GLNPO Project Manager

Executive Summary

The engineering design for the Menominee River South Channel Habitat Restoration includes sediment and debris removal under the Ogden Street Bridge to improve stream connectivity, fish passage and flows between the South Channel and Menekaunee Harbor, Lower Menominee River AOC in the City of Marinette. This material will likely require special disposal because of the presence of the heavy metals transported from the remediation sites upstream along with years of historic discharges to the watershed. Dredging has occurred both above and below the Ogden Street Bridge in 2014 (Tyco turning basin to Ogden Street Bridge & Menekaunee Harbor); in both instances, special handling of dredged material was required for disposal due to heavy metal concentrations. It is possible that the Ogden Street Bridge work will encounter similar levels of contamination and the same special handling requirements. This sampling and analysis plan was developed in response to the design and given the project time constraints. The materials will be assessed considering NR 347 requirements, sediment quality guidelines, and the overall remediation and betterment goals for the Menominee River. The GLRI AOC Capacity Monitoring Grant funds will be used to pay for the laboratory analysis (CAP_7_2015).

A. Project Organization

Cheryl Bougie, Sediment & WQ Monitoring Coordinator (Project Manager), Wisconsin DNR – Cheryl is the WDNR coordinator for S Channel and Menekaunee Harbor restoration projects. She is responsible for managing the grant and assuring that the restoration projects are implemented on schedules and meet specifications. She provides coordination between partners, contractors, and stakeholders involved in the project. Cheryl is also a co-sediment investigator and is responsible for designing and implementing the sampling plan.

Jim Killian, Water and Sediment Resources Specialist, Wisconsin DNR – Jim is the principal sediment investigator for the project and is responsible for evaluating the sampling plan to meet the regulatory requirements, leading the field work, and assessing the results.

Ron Arneson, Laboratory Liaison, Wisconsin DNR – Ron is responsible for contracting for laboratory services that meet the needs of the project and regulatory requirements.

Donalea Dinsmore, Quality Assurance Coordinator - Donalea is responsible for assuring that quality assurance documentation is appropriate for the project and providing the QA Plan to GLNPO.

Problem Definition/Background:

The South Channel of the Menominee River (referred to as the S Channel herein), located in Marinette, Wisconsin, is a site within the Lower Menominee River Area of Concern (AOC). Because fish and wildlife habitat in the S Channel was degraded by invasive plant species, contaminated sediment, and excessive sedimentation, it was targeted as an area for restoration in the AOC. The remediation of arsenic-contaminated sediments in the S Channel is now complete, providing the opportunity to accelerate ecological restoration along the channel and improve the connectivity between the S Channel and Menekaunee Harbor downstream per the *2013 Fish and Wildlife Population and Habitat Management and Restoration Plan Update.* The project is called and known as the S Channel Habitat Restoration project.

This restoration project will create and enhance habitat in the S Channel by implementing the final design and specifications as provided by Anderson Engineering to United States Fish & Wildlife Service (US

FWS). The channel will be narrowed with bar extensions to increase water velocity and create habitat, and native seeds, plants, trees, and shrubs will be planted to improve bank habitat and establish diverse native plant communities. The bar extensions will incorporate large wood (at least 50% with intact root wads), as small jams that are integrated into the toe of the bank to establish improved fish habitat. Individual logs will also be partially buried into the floodplain surface. Nesting structures for waterfowl, wading birds, raptors, passerines and bats will also be established on riverine islands within the project area. Species expected to benefit from habitat creation and improvement include the following: northern pike, largemouth bass, smallmouth bass, walleye, yellow perch, muskellunge, eastern bluebird, great blue heron, wood duck, and osprey. In addition, the bed elevation will be lowered to 577 feet (IGLD 1985) under the Ogden Street Bridge to improve flows, fish passage, and overall stream connectivity from the S Channel into Menekaunee Harbor. Dredging is limited in depth due to a buried sanitary line on the west side of the bridge. However, the 577' target elevation has been shown through hydraulic modeling to meet desired seasonal flow conditions between the S Channel and Menekaunee harbor. Material disposal will be dependent upon sediment characterization results. The sample results for this project will be viewed with the 'Remediation-to-Restoration' goals in mind.

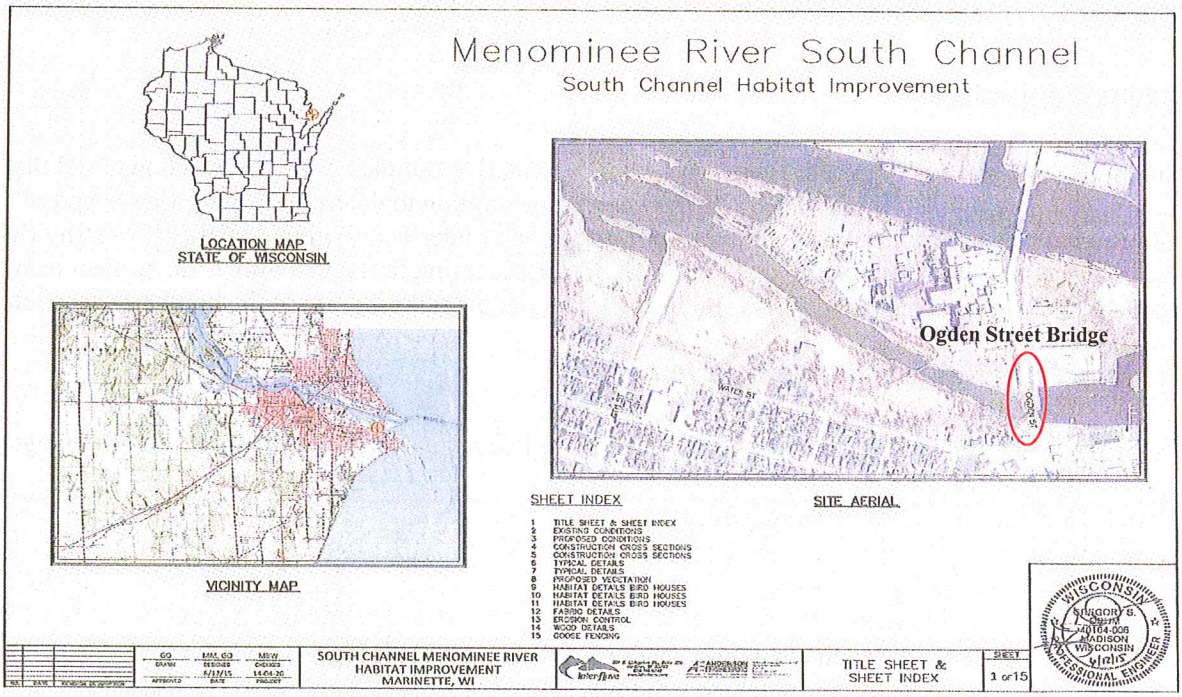

Figure 1. Vicinity Map Menominee River & South Channel Ogden Street Bridge

Photo 1. Ogden Street Bridge S Channel Menominee River - Facing East

Project Objectives

The project objective is two-fold: first, to obtain representative samples of the river bed material that will be removed in conjunction with the S Channel habitat restoration to determine appropriate disposal options, and second; to determine if the new sediment/water interface sediment quality poses any risk to benthos recovery. It is imperative that this work be done in a timeframe that allows the project team to evaluate results and disposal options without impeding the overall progress of the habitat restoration.

Project/Task Description and Schedule

Mobilization for field sampling is scheduled for mid to late August and will consider the following:

- One day needed for sampling event
- Weather
- Site accessibility –
    - plant growth
    - large rip/rap in stream bed under & adjacent to the bridge
    - water levels and seiche conditions
    - clearance under the bridge
    - identified parking and access to the river
- Arrangements for laboratory services – metals, SPLP metals & physical characteristics

Special Equipment or Supplies

Standard sampling equipment available to the sediment section to include:

- Petit Ponar dredge
- Stainless steel hand-driven soil (bucket) auger (3 inch diameter)
- Push Core with 3" Lexan core sleeve, caps & extruding device
- 5 inch Tree spade
- GPS receiver with sub-meter accuracy

  Accuracy (RMS) (Note A):
  MCORR400 differential correction: Submeter + 1 ppm on a second-by-second basis (horizontal)
  Submeter + 2 ppm on a second-by-second basis (vertical)

Carrier phase processing: 30 cm + 5 ppm with 5 minutes tracking satellites
20 cm + 5 ppm with 10 minutes tracking satellites
10 cm + 5 ppm with 20 minutes tracking satellites
1 cm + 5 ppm with 45 minutes tracking satellites (with Centimeter Processing option)
RTCM satellite differential correction: Better than 1 meter (Note B)

- 50' Tape ruler
- Staff rod
- Camera
- Stainless steel bowl and scoop spoons for homogenizing sample
- Coolers for sample transport
- Disposable Nitrile gloves
- Chest waders & wader belts
- PFD
- Field notebook
- Sample containers (glass jars from laboratory for organic samples), with labels
- Ziploc™ bags for non-organic samples
- Permanent markers or pens
- Alconox™ wash, deionized water & cleaning brushes
- Ice

Personnel, Special Training Requirements or Certifications

All staff members on site will be HAZWOPER, applicable WDNR SOP trained.

In addition to being qualified to perform the analyses, the laboratory performing the work must be able to meet the sample turn-around requirements and be one of the following:

1. Wisconsin State Laboratory of Hygiene
2. Wisconsin-certified laboratory for the parameters in question

Documentation and Records

Field data recorded in principal investigator's field notebook includes:

- Sample location (latitude and longitude)
- Site and sample descriptions
  - Sediment description
  - Water content
  - Parent material encountered
  - Notable colors, smells, oil sheen other
  - Sediment depths
  - Water depths
  - Bridge Reference Points
  - Photos of samples & sample locations
- Sample identifier (unique sample ID)
- Sample collection date, time, and collector

Sample labels will be formatted to include: PROJECT, YEAR, SAMPLE TYPE, SAMPLE ID (example ID: **MEN_OGDEN15_SED01-A &** B) depending on the surface and subsurface samples at the same sampling point.

Chain of custody documents will be supplied by the laboratory and used as part of sample transmittal. "Normal" chain of custody will be applied to standard laboratory analyses. The laboratory will supply

electronic data deliverables appropriate for upload into SWIMS. A level 4 analytical report is not required for this project.

The project will be set up in SWIMS and project related documentation will be stored there. All sample results will be uploaded to SWIMS according to standard Water Division procedures.

Report

The project manager will write a report that summarizes the results, estimates the volume of material for disposal and provides recommendations for addressing the material. The reports of sample results will be made available to the disposal facility or in the case of an upland placement site appropriate WDNR Solid Waste Staff (Greg Tilkens).

B. Measurement/Data Acquisition

Sample Process Design

Based on the volume of material potentially slated for removal (114 cubic yards) and site characteristics, the principal investigators determined that 2 distinct sample locations would be necessary to properly characterize the depositional material for waste disposal requirements. Two additional samples will also be collected at the proposed sediment/water interface per NR 347 to determine if there are any concerns with the benthos recovery post dredging. All sampling activities will be performed in accordance with NR 347 Quality Assurance/Quality Control standards.

These distinct sampling sites were chosen within the bounds of the prescribed excavation. Sample sites may be adjusted in-field, based on site conditions. Currently there is hard compacted gravel and rip/rap on the stream bottom under the Ogden Street Bridge. This material will have to be moved in order to sample the sediment beneath the debris. A Trimble Pro-XRS-RTD™ GPS with real-time sub-meter accuracy will be used to mark sample location. In the event the GPS system does not work due to limited satellite reception under the bridge, latitude and longitude will be obtained at the bridge base at all four corners, then a tape ruler will be used to measure the sample site from the corners of the bridge (both end wall corners) to triangulate the sample point.

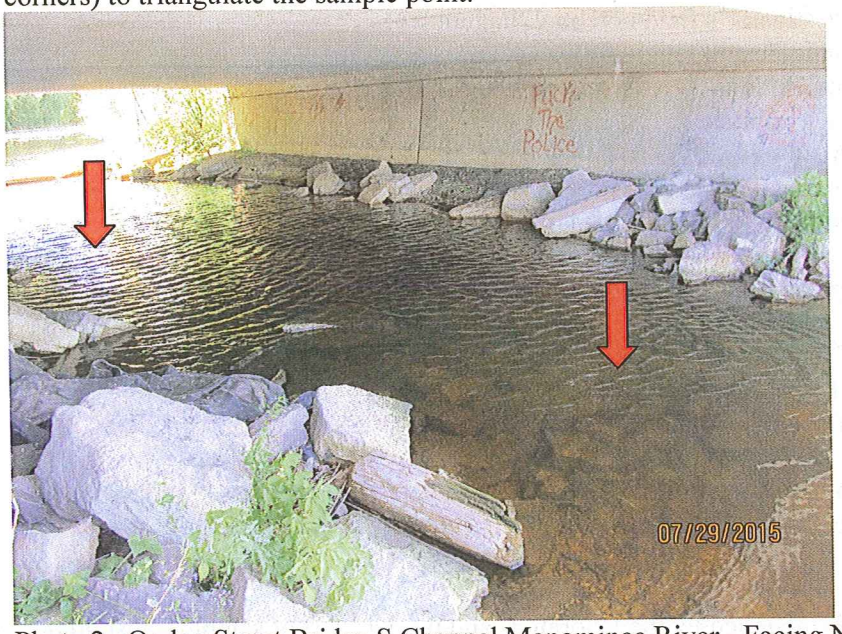

Photo 2. Ogden Street Bridge S Channel Menominee River - Facing Northwest
Proposed Sampling Points

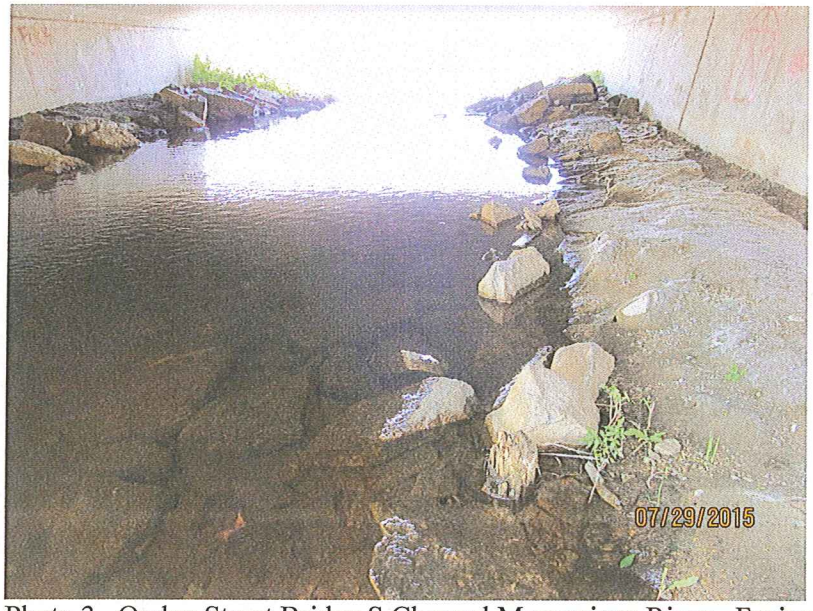

Photo 3. Ogden Street Bridge S Channel Menominee River - Facing East

The samples will be collected at two separate locations with a push core or similar device to extract and analyze the top 12 inches of sediment. Additional volume will be collected and preserved for later analysis in case the material is shown to be at no or low level impact (if the sediment results are below the Threshold Effect Concentration value) for purposes of potential upland placement site. These samples will determine the extent of contamination and determine potential options for material placement or disposal. In the event that the sample results show no or little impacted sediments, SPLP analysis will be performed with the archived sediment sample, to determine an upland placement site.

An additional 12 inches will be collected below the target dredge depth or 12-24 inches and will be analyzed for the same parameters of concern listed below. This data will determine if there are any concerns with the new sediment/water interface with regards to benthic recovery or if a sand layer is feasible or perhaps the dredging is discounted altogether.

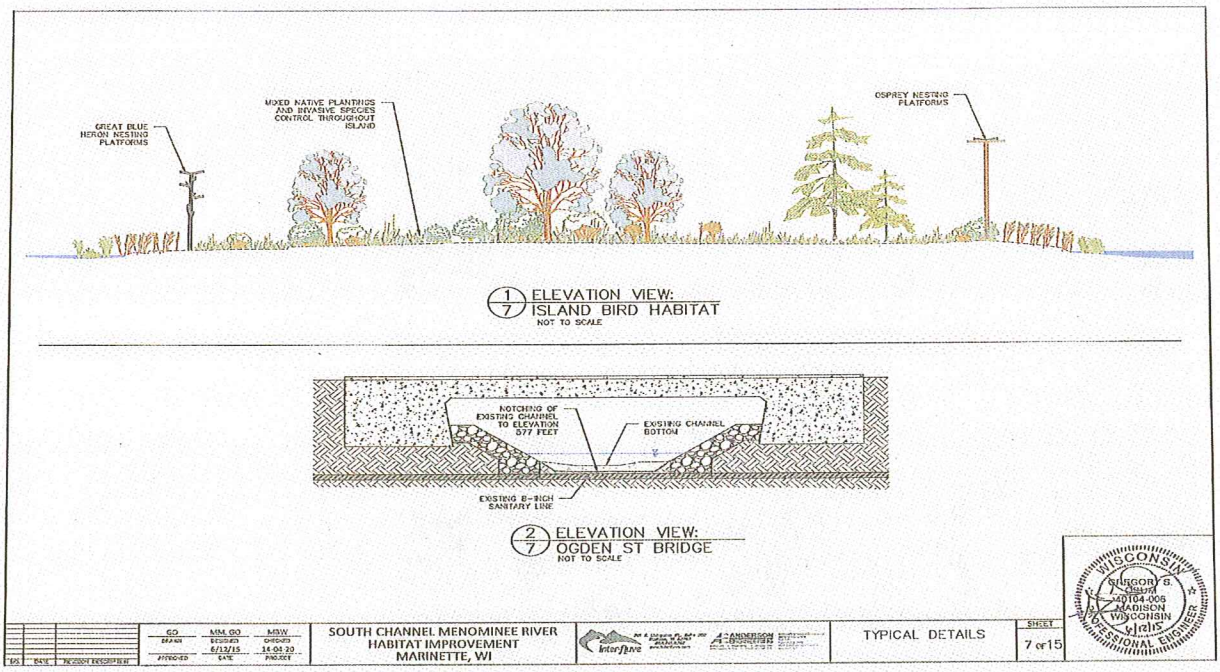

Figure 2. S Channel Menominee River Ogden Street Bridge Cross Section

Sampling Methods

Sediment samples will be collected in the river bed material under Ogden Street Bridge between the S Channel and Menekaunee Harbor. Preliminary sample points are generally identified in Photo 2 above. Due to the large amount of debris (rip/rap stone, tree logs and other) an area will need to be cleared of these items before sampling may occur. It is anticipated that a tree spade with then be used to further clear the area of small hard stone/cobble from the stream bottom in order to access the sediment layer for sampling. Alternate sampling locations may also necessary due to the substrate type and inability to sample. A new site will be selected and documented with field notes, GPS reading and photos.

A push core or similar incremental collection device will be used to obtain representative sediment samples from two core locations as shown in Photo 2 above. All sampling activities will be performed in accordance with NR 347.06 quality assurance and quality control standards. Ideally, a push core would obtain a continuous sample in two-foot intervals to characterize the material that will be dredged and results determine placement (top 12 inches), as well as characterize the new sediment/water interface for benthic recovery post dredge (12-24 inches). This will enable us to determine if additional material would need to be removed due to contamination or if a potential sand cover is needed to boost benthic recovery.

In the event or likelihood that a push core will not recover a sample, shovels, 3"bucket auger, or ponar sampler may be necessary to extract samples. These tools will be available during the sampling event as an adaptive management plan to collect a representative sample.

Any stone will be scraped away with a shovel prior to coring or using the bucket auger/ponar in the event only a surface sample is available. The core will be divided into two samples: 0-12 inches and 12-24 inches. Each sample will be mixed by hand in stainless steel equipment and transferred into sealed, sterilized glass sample jars or Teflon bags supplied by the State Laboratory of Hygiene. Samples will be immediately placed in a cooler of ice. Sample jars will be labeled in the following format: PROJECT,

YEAR, SAMPLE TYPE, SAMPLE ID. Example: MEN_OGDEN15_SED01-A (0-12 inches) and MEN_OGDEN15_SED01-B (12-24 inches). All equipment will be cleaned prior to and between samples. Sample labeling, handling, shipping, and chain of custody will be carried out as described previously and below. Sample replicates will not be considered for the sampling effort as the area above and below Ogden Street Bridge has been extensively sampled pre and post dredging.

Sample Handling and Custody Requirements

Samples will be transported to the WDNR Central Office sample cooler in Madison, WI under the chain of custody (form supplied by the laboratory). Samples will be packaged according to shipping instructions and sealed in coolers. Coolers will be held in the locked WDNR building until staff can transport samples to the State Laboratory of Hygiene, located in Madison, WI. Note that this project does not require enforcement-level of chain of custody. Normal sample handling practices will be carried out by the laboratory upon delivery.

Analytical Requirements

The State Laboratory of Hygiene, in Madison, Wisconsin, a Wisconsin-certified environmental laboratory has been contracted to perform the analyses. As part of the contract, the laboratory is required to provide standard operating procedures and current control limits. Laboratory SOPs were submitted to the Quality Assurance Coordinator and are available upon request of other project team members.

Project Requirements

Analysis	Maximum Detection Level
Solids, Percent	1%
SPLP (As, Cu, Pb, Hg)	
Metals (As, Cu, Pb, Hg,)	20% of regulatory limit

Data Acquisition Requirements (Non-direct Measurements)

The project team used maps & cross section provided by Anderson Engineering and Interfluve Inc. associated with the engineering design that identified the potential excavation areas to determine tentative sampling locations. These maps are directly relevant to the project.

Quality Control Requirements

Standard laboratory quality control procedures required by the DNR Laboratory Certification Program are sufficient for this project (method blanks, LCS, duplicates and spikes). Laboratory-derived control limits are also acceptable for the intended purpose of the data.

Data Management

The laboratory's standard data management practices are sufficient for this project. The laboratory liaison handled the data upload from the laboratory using standard practices. Project records are stored in SWIMS. More information is found in the Documentation and Records section of the QAPP.

C. Assessment/Oversight

Assessments and Response Actions

Prior to mobilizing for field sampling, the investigators tentatively identified sampling locations based on a reconnaissance site visit. During field work, the actual sampling locations will be evaluated to assure that the samples are representative of the excavation areas and material to determine an appropriate placement site (landfill or appropriate upland site). If not, sample locations are not suitable due to heavy riprap or other material that cannot be removed by hand, the sample sites will be moved to another suitable location and will be geo-located..

Given the time constraints for completing the project, the laboratory was instructed to provide preliminary results to the project manager, who then will discuss them with the principal investigator and staff involved in the Menominee River remediation and restoration work. Based on these results, the team will assess whether additional analytical testing is needed to meet disposal requirements and whether the overall design for the habitat restoration meets the goals for the project.

Reports to Management

The project manager (Cheryl Bougie) will confer with Office of the Great Lakes Team when results become available to determine implications for the project and options to proceed. Communications to managers may include cost estimates associated with various options and assess the availability of funding to handle any increased disposal costs.

The project manager will also summarize the findings in a memo provided to GLNPO grant managers on the status of this assessment and its implications for the overall S Channel habitat restoration project, options for handling the material, and the effect on the grant budget and project progress if the cost goes above and beyond the project amount in the bid estimate and specification.

D. Data Validation and Usability

Per the laboratory certification requirements, the laboratory adds qualifiers to results that show excursions from the method or internal control limits. Any data qualifiers associated with the data will be reviewed to determine if data interpretation will be affected. The project team will review the sample results to identify any patterns or anomalies in the results beyond what would be expected for sediment quality in this type of setting.

Reconciliation with Data Quality Objectives

Heavy metal results will be used to determine the estimated amount of material that will require disposal at a licensed landfill and the costs associated with the options to proceed. Based on this assessment, the project team will review the results to assure that the analyses will meet the requirements for sending the affected material to a licensed landfill or an appropriate upland placement site in accordance with NR 500.

Appendix A – Laboratory Control Limits

State Laboratory of Hygiene Detection Limits:

As	1 ug/g
Cu	.5 ug/g
Pb	1 ug/g
Hg	.014 ug/g

Appendix B – Laboratory Parameter Cost Worksheet CAP_7_2015

Project Name:	Ogden Street Bridge Sediments - S Channel Menominee River						
Activity Category Name/Code:							
Activity Name/Code:							
Project Number*:							
Mon. Activity Code:							
SLOH Acct. Code*:							
FY of Analysis:	FY 2015						
Test ID	Test Description	Unit Price	# of Samples	Total for Test	NR 347 List	Required Detection Limit ug/g Dry Wt	SLH Detection Limit ug/g Dry Wt
Inorganics							
ICC44002	AMMONIA BY LACHAT IN SOLIDS	$50.00		$0.00	Yes		
ICC46002	NO3+NO2 as N SOLIDS	$50.00		$0.00	Yes		
ICC47002	TKN SOLID	$50.00		$0.00	Yes		
ICC52014	PHOSPHORUS SOLID	$50.00		$0.00	Yes		
ICC64000	PERCENT VOLATILE SOLIDS	$10.03		$0.00	No		
ICC64002	PERCENT SOLIDS	$30.39		$0.00	No		
ICC49001	OIL/GREASE - SOLIDS	$178.75		$0.00	Yes		
Metals							
ICC49501	METALS SOLIDS DRYING FEE	$26.82	4	$107.28			
ICC32200	METALS DIGESTION FEE	$23.24	4	$92.96			
ICC13009	ALUMINUM, SOLID ICP	$21.45		$0.00	No		1
ICC14009	ANTIMONY, SOLID ICP	$21.45		$0.00	No		1
ICC15009	ARSENIC, SOLID ICP	$21.45	4	$85.80	Yes	2.0	1
ICC16009	BARIUM, SOLID ICP	$21.45		$0.00	Yes		0.5
ICC16509	BERYLLIUM, SOLID ICP	$21.45		$0.00	No		0.1
ICC22009	CADMIUM, SOLID ICP	$21.45		$0.00	Yes	0.02	0.1
ICC23009	CALCIUM, SOLID ICP	$21.45		$0.00	No		10
ICC26009	CHROMIUM, SOLID ICP	$21.45		$0.00	Yes	5.0	0.5
ICC31009	COPPER, SOLID ICP	$21.45	4	$85.80	Yes	2.0	0.5
ICC37009	IRON, SOLID ICP	$21.45		$0.00	No		10
ICC38009	LEAD, SOLID ICP	$21.45	4	$85.80	Yes	5.0	1
ICC39009	MAGNESIUM, SOLID ICP	$21.45		$0.00	No		10
ICC40009	MANGANESE, SOLID ICP	$21.45		$0.00	Yes		0.5
ICC48009	NICKEL, SOLID ICP	$21.45		$0.00	Yes	5.0	0.5
ICC55009	SELENIUM, SOLID ICP	$21.45		$0.00	Yes		2
ICC57009	SILVER, SOLID ICP	$21.45		$0.00	No		1
ICC61009	THALLIUM, SOLID ICP	$21.45		$0.00	No		1
ICC67009	ZINC, SOLID ICP	$21.45		$0.00	Yes	5.0	0.5
ICC43009	MERCURY IN SOLIDS	$50.00	4	$200.00	Yes	0.02	0.0140
ICC49500	%SAND, SILT, CLAY	$51.84	2	$103.68			
Organics							
OCC15103	PCB CONGENERS IN SOLID	586		$0.00			
OCC15108	PCB AROCLORS IN SOIL/SED	265		$0.00			
OCC15109	PBDE IN SOLIDS	408		$0.00			
OCC15512	VOC'S IN SOIL BY EPA 8260	152		$0.00			
OCC15801	PAH IN SOIL/SED DRY WT	384		$0.00			
Radiochemical							
R210PBD	Lead 210 Sediment Dating (not appropriate for flowages)	$99.00		$0.00			
				$761.32			