Proposal for

Minnesota Pollution Control Agency Remediation Master Contract

Category A – Petroleum, Superfund, MDA, and Closed Landfill Program Environmental Services

April 11, 2018

Brian A. Ross, PG, VP
Project Manager | Scientist II
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7804 Industrial Park Rd.
Baxter, MN 56425

WIDSETH SMITH NOLTING

Engineering | Architecture
Surveying | Environmental

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April 10, 2018

Ms. Mary Heininger
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155

RE: Proposal for Category A. Petroleum, Superfund, MDA, Closed Landfill Program Environmental Services

Dear Members of the Evaluation Team:

Category | We have enclosed our qualifications for Category A. Petroleum, Superfund, MDA, Closed Landfill Program Environmental Services.

History | Widseth Smith Nolting (WSN) is a Minnesota corporation, founded in 1975 in Crookston. The firm has expanded by acquiring Dean Anderson of Brainerd, 1978, Hall Engineering, Alexandria, 1979, QED Engineering, Rochester, 2008, FS Engineers, East Grand Forks, 2012, KBM Inc. IN 2016; diversifying into Environmental Services, 1989; and opening new offices in Grand Forks, 1998, Bemidji, 1999, and Forest Lake, 2016. Now with more than 200 employees, our team of professionals—environmental scientists, engineers, architects, and land surveyors—works together to provide our clients with comprehensive, coordinated services. As a Minnesota-based company, WSN serves rural and urban areas throughout the state. Our website address is: www.widsethsmithnolting.com

Organization | WSN is owned by senior-level employees who maintain active roles in their professions, their communities, state organizations, and in the company's management team. The organization is run by a board of directors comprised of WSN employees. The President and Secretary are located in the Baxter office, and the Executive Vice President and Treasurer are in Alexandria. Our Crookston location serves as the firm's business office, where our financial records are kept.

Project Contact | As Vice President and Director of Environmental Services, I will serve as the contact person regarding questions on this proposal as well as be responsible for overall contract administration and quality control. My contact information is as follows:

Brian A. Ross, PG
7804 Industrial Park Road
Baxter, MN 56425
Direct | 218.316.3628
General | 218.829.5117
Mobile | 218.821.3697
Fax | 218.829.2517
Email | Brian.Ross@wsn.us.com

Locations | Projects under this contract will be managed out of our Brainerd/Baxter office with staff/teams mobilizing from the following locations:

Brainerd/Baxter
7804 Industrial Park Road
Baxter, MN 56425
TEL | 218.829.5117
FAX | 218.829.2517

Crookston
216 South Main Street
Crookston, MN 56716
TEL | 218.281.6522
FAX | 218.281.6545

Alexandria
610 Fillmore Street
Alexandria, MN 56308
TEL | 320.762.8149
FAX | 320.762.0263

Day-to-Day Availability | WSN's multiple locations give the firm the proximity, flexibility, and resources to quickly and effectively serve the Contract users. One of our proposed Project Managers and I are located just two blocks from the MPCA Brainerd Regional Office, making us available to meet with MPCA staff on relatively short notice. All of our

team members, of course, would be available for scheduled meetings as needed regardless of location. In terms of discussing such issues as billing and invoicing as well as general issues or information, current technologies (e.g., e-mail, mobile devices, etc.) render physical proximity nearly moot. Contract users will be provided with the contact information needed to reach our team members as appropriate.

Contract Conditions | WSN accepts the Classification Levels and Rates in both Rate Schedule 1 and Rate Schedule 2 in the RFP/Event dated February 28, 2018. We also accept the Equipment and Supplies List, which lists the equipment to perform services with prices per RFP Addendum No. 1.

Contract Experience | WSN appreciates the work given to us by MPCA and MDA over the last five years of the Professional and Technical Services Master Contract and the previous five years of the Multi-Site Contract. We have worked with MPCA Superfund Staff in both the Duluth and St. Paul offices and have worked on over half-dozen Superfund program projects for MPCA in Minnesota communities. We are familiar with Miinnesota's geologic and hydrogeologic characteristics and have over thirty years of environmental investigation and remediation services experience. Using WSN is cost effective because of familiarity with central and northern Minnesota and our office locations in central, north central, and northwestern Minnesota. We would like very much to continue this relationship for the next five-year contract period.

Erosion/Sediment Control Certification Program | More than 40 of WSN's employees have been certified through the University of Minnesota Erosion/Sediment Control Certification Program in construction SWPPP design, construction installation, and construction site management. All certifications are up to date.

We look forward to providing the state with continued high quality, knowledgeable, efficient, and effective environmental services.

Sincerely,
WIDSETH SMITH NOLTING & ASSOCIATES, INC.

Brian A. Ross, PG
Vice President | Director of Environmental Services
Brian.Ross@wsn.us.com

2. Qualifications and Capabilities

Overall Company Capabilities

Widseth Smith Nolting & Associates, Inc.

Good roads, clean water, safe bridges, dynamic spaces, and robust communities are central to our quality of life. Widseth Smith Nolting supports our communities through engineering, architecture, land surveying, and environmental services for public and private clients throughout the Upper Midwest. With more than 200 employees working from eight locations in Minnesota and North Dakota, our integrated multi-discipline team offers a complete package of services to take your project from concept to completion. For you, that means better communication, greater efficiency, and a more satisfying experience. Firm-wide Widseth Smith Nolting's disciplines and staff include:

27 Architecture | 74 Civil Engineering | 4 Structural Engineering
6 Mechanical Engineering | 10 Electrical Engineering | 35 Land Surveying
8 Environmental Services | 7 Water Resources | 2 Funding Specialists
4 Communications | 24 Administrative | 201 Total Employees

Firm History

2016 WSN's services expand to include electrical distribution operations planning and construction design engineering through acquisition of KBM, Inc.
2016 KBM Geospatial LLC added as a subsidiary of WSN
2016 Forest Lake added through acquisition of Hult & Hebeisen
2014 Rochester architecture team expanded through acquisition of Kane and Johnson Architects, Inc.
2013 Brainerd architecture team expanded through acquisition of Architecture One
2012 East Grand Forks is added through acquisition of FS Engineering
2010 WSN's services expand to include water resources through acquisition of JOR Engineering
2008 Rochester added through merger with QED Engineering
1999 Bemidji opens
1999 Brainerd expands through acquisition of EDC Engineering
1998 Grand Forks opens
1996 Brainerd expands through acquisition of Meyer Donnay Architects
1979 Alexandria is added through acquisition of Hall Engineering
1978 Brainerd is added through acquisition of Dean Anderson
1975 Widseth Smith Nolting & Assoc., Inc., is incorporated

Key Staff

Resumes for all key staff are included on the subsequent pages, followed by the Staff Matrix.

Brian A. Ross, PG
Project Manager
Brian.Ross@wsn.us.com

7804 Industrial Park Road
Baxter, MN 56425
218.829.5117

WSN Office Locations

Alexandria
Bemidji
Baxter/Brainerd
Crookston
East Grand Forks
Forest Lake
Grand Forks
Rochester

Key Staff

Brian Ross, PG, VP— Project Manager | Ecological Risk Assessor | Scientist 2

Brian joined WSN in 1991, after six years with a Twin Cities environmental consulting firm. He has extensive experience in site investigation activities including sludge, sediment, soil, surface water and groundwater sampling as well as soil boring logging, monitoring well installation, and aquifer testing. Brian has conducted over 30 investigations of Superfund-type contamination and has experience with response action oversight and remedial actions.

Brian has completed assessments or investigations at more than three dozen RCRA hazardous waste sites around the U.S. He has been involved in pesticide release studies, numerous Phase I and II environmental site assessments, and provided input for Environmental Impact Statements (EIS). His extensive background in hydrogeologic studies and computer modeling of groundwater flow for municipal water wells includes evaluating aquifer characteristics, siting new well fields, designing new wells, delineating wellhead protection areas, and assessing water quality. As project director, Brian has directed all aspects of several projects, from client communication to arranging subcontractors.

Licenses/Certifications

Professional Geologist: MN

Licensed Monitoring Well Contractor

40-Hour OSHA HAZWOPER Training

HAZMAT Site Supervisor Training

Education

MS, Geology | University of Minnesota, 1985

BA, Earth Science | St. Cloud State University, 1981

RELATED PROJECTS

Petroleum Release Sites

- Johnson Cardtrol (Leak Site 20336) — Kennedy, MN, Site Assessment, LSI
- Tom's Resort (Leak Site 16414)—Cass Lake, MN
  Phase I and II ESA, Remedial Investigation, CAD Report (Excavation)
- Gooseberry Falls State Park (Leak Site 9434)—Two Harbors, MN
  UST Removal, Full RI, CAD Report, CAD Install and O&M
- Aitkin Power Plant (Leak Site 8566)—Aitkin, MN
  Emergency Response, Full RI, CAD Report, CAD Install and O&M
- Former Garrison Conoco (Leak Site 16532)—Garrison, MN
  Remedial Investigation
- Mills Fleet Farm (Leak Site 15260)—Owatonna, MN
  UST Removal, Limited Site Investigation
- Former Auto Import Dealership (Leak Site 8234)—Grand Rapids, MN
  Remedial Investigation
- Arneson Direct Service (Leak Site 14817)—Roseau, MN
  UST Removal, Remedial Investigation
- Spicer Fisheries Headquarters (Leak Site 5932)—Spicer, MN
  UST Removal, Full RI, CAD Installation and O&M
- Edwards Oil Bulk Site Corrective Action (Leak Site 5794)—Virginia, MN
  Corrective Action Design, Free Product Recovery, Soil Excavation
- Mills GM (Leak Site 15267)—Baxter, MN
  UST Removal, Limited Site Investigation
- Aitkin County Retention Pond (Leak Site 16050)—Aitkin, MN
  Vapor Survey, Utility Right-of-Way Excavation
- Sobieski Coop (Leak Site 5864)—Sobieski, MN
  CAD Report, CAD Installation and O&M
- Holiday Station Store 369 (Leak Site 18101) - Baxter, MN, Remediation System Design Review

Non-Petroleum Contamination Sites

- Bemidji South Shore Development (Site ID VP14403)—Bemidji, MN
  VIC Investigation Workplan, DRAP Preparation, DRAP Implementation
- Former IGA (Site ID VP-13440)—Little Falls, MN
  UST Removal and Remedial Investigation of PCE Release
- Crookston Iron and Metal (Site ID VP-20380)—Crookston, MN
  CERCLA Investigation and Corrective Action
- Well Replacement—Randall, MN
  Nitrate Assessment, Well Siting and Design, Pumping Test Assessment

Brian Ross continued on the next page

- Former Arrowhead Cleaners (Site ID SA4392)—Grand Rapids, MN
  Phase I and II ESA, Superfund Assessment
- Pequot Publishing (Site ID11400)—Pine River, MN
  Phase I and II ESA, VIC Investigation Workplan, Corrective Action
- Dan's Flying Service (MDA Case File No: CF-2692)—Crookston, MN
  Ag-Chem Phase I, Remedial Investigation, Corrective Action
- Homecrest Industries (Site ID 11500)–Wadena, MN
  Phase I and II ESAs, VIC Investigation
- Former Cedar Services (Site ID GCH255104)—Bemidji, MN
  Remedial Investigation and Monitoring
- Nitrate Assessment—Verndale, MN
  Nitrate Contamination Mapping, Monitoring Well Installation, Pumping Test Assessment
- Biwabik City Hall—Biwabik, MN
  Limited Phase 2 ESA, Assessment work plan,sampling assessment report

Phase I and Phase II Environmental Site Assessments

- MnDOT TH 7/29 Bypass (S.P. 1202-48)—Montevideo, MN
  Phase I ESA, Drilling Investigation
- Mills Fleet Farm—Rochester, MN
  Phase I ESA
- Lexington Manufacturing—Brainerd, MN
  Phase I ESA
- MnDOT Th1/59—Thief River Falls, MN
  Phase 1 and Phase II ESA
- J.R. Simplot Facility—Grand Forks, ND
  Phase I and II ESA
- Former Standard Oil Bulk Site—Aitkin, MN
  Phase I and II ESA
- MNDOT TH 71 Bridge Project—Jackson, MN
  Phase I and Phase I ESA
- Kruse and K&S Motors—Worthington, MN
  Phase I ESA
- Roadway Turnback Project—Pequot Lakes, MN
  Limited Phase I ESA and Phase II Drilling
- Parker-Hannafin Facility—Deerwood, MN
  Phase I ESA, Oil System Removal Assessment

Other Projects

- Municipal Well Assessment and Design—Watson, MN
  New Well Siting, Test Well Design, New Well Plans and Specifications
- Pequot Lakes WWTF Irrigation Study—Pequot Lakes, MN
  Hydrogeologic Study, Nitrate Contamination Assessment
- Municipal Well Replacement—Kerkhoven, MN
  Arsenic Assessment, New Siting and Design, Plans and Specifications
- Ruttgers Bay Lake Townhomes—Deerwood, MN
  Phosphorus and Nitrate Contamination Study
- CSAH 31 Groundwater Seepage Study—Pillager, MN
  Geotechnical Study
- Municipal Well Replacement—Herman, MN
  Design, Plans Specifications
- Municipal Well Replacement—Holloway, MN
  Nitrate Assessment, Hydrogeologic Assessment, new well siting and Design

Licenses/Certifications

Professional Engineer: MN, WI

Education

BS, Civil Engineering
North Dakota State University, 1979

Mark V. Hallan, PE, VP — Engineer 4

Mark joined WSN in 1996 with 17 years of experience in civil and structural engineering projects. As a project engineer with WSN, Mark advises city staff and councils on infrastructure considerations to meet projected growth, the impact of development on existing city systems and funding/assessment alternatives. As a principal in the firm, he is responsible for coordination, design, approvals, construction observation and quality control for water, wastewater, solid waste facilities and street/highway projects. In addition, projects with Camp Ripley have varied from vehicle/tank wash facilities with petroleum, oil, lubricant capture and water reuse to specialized stormwater treatment. Mark further manages WSN's project teams assigned to the preparation of feasibility studies or facility plans, preliminary and final plans/specifications, and construction observation. Mark also represents WSN's clients in all negotiations with State and Federal agencies and prepares permit applications for a variety of agencies.

RELATED PROJECTS

Corrective Action Design Systems

- Hansel Residence (Site ID 19251)—Dalton, MN
  Corrective Action Design Plans and Specifications
- Hutto Residence (Leak Site 17206)—Anoka, MN
  Corrective Action Design, Plans, and Construction Observation
- Dillon Residence (Leak Site 15589)—Paynesville, MN
  Corrective Action Design, Plans, and Construction Observation
- Lamia Ali Residence (Leak Site 17116)—Moorhead, MN
  Corrective Action Design, Plans, and Specifications
- Meyer Residence (Leak Site 13656)—Easton, MN
  Corrective Action Design, Plans, and Specifications
- LaFave Residence (Leak Site 16755)—St. Paul, MN
  Corrective Action Design, Plans, and Construction Observation
- Duncan Residence (Leak Site 5291)—Minneapolis, MN
  Vapor Mitigation System Operation and Maintenance
- Osvold Residence (Leak Site 15602)—Brainerd, MN
  Vapor Survey, LSI, CAD, Vapor Mitigation Construction
- Captain Kirks (Leak Site 464)—Federal Dam, MN
  Corrective Action Design and Implementation, Contaminated Soil Removal

Other

- New Well Review (Leak No. 8524)—Pelican Rapids, MN
  Review Well and Water System Problems with MPCA Staff
- Aitkin County CSAH 1 Rebuild with Contaminated Soils Removal—Aitkin, MN
- Aitkin Bunker Hill Drive Industrial Park—Aitkin, MN
- Aitkin Power Plant Decommissioning Assessment—Aitkin, MN
- Bemidji Water Tower #3—Bemidji, MN
- Municipal Well Replacement and Plant Upgrade—Blackduck, MN
- Camp Ripley Concrete Parking for Building 11-76—Little Falls, MN
- Camp Ripley Outfall #1 Stormwater Treatment System—Little Falls, MN
- Camp Ripley Washrack No. 22 Modifications—Little Falls, MN
- Crosslake/Crow Wing County Joint Public Works Facility—Crosslake, MN
- Crow Wing County Landfill Cells 3 and 4 Construction—Brainerd, MN
- Crow Wing County Landfill Methane Gas Collection—Brainerd, MN
- Hancock Water and Sewer Systems—Hancock, MN

Mark V. Hallan continued on the next page

- Henning Water System Improvements—Henning, MN
- Laporte Water Plant Construction Review—Laporte, MN
- Little Falls Ethanol Plant Sewer and Water Extension—Little Falls, MN
- Lindbergh Drive Reconstruction with Contaminated Soils Removal—Little Falls, MN
- McLeod County Household Hazardous Waste Facility—Hutchinson, MN
- Nisswa Wastewater Irrigation Improvements—Nisswa, MN
- NPC Sewer and Water Extensions with Asbestos Removal—Brainerd, MN
- Pequot Lakes Water System—Pequot Lakes, MN
- Long Prarie Creamery (Leak Site 155)—Long Prarie, MN
  Building Structural Evaluation

Licenses/Certifications

Professional Geologist: MN

40-Hour OSHA HAZWOPER Training

Education

BS, Geological Engineering
University of North Dakota, 1987

AAS, Diversified Agriculture
University of Minnesota-Crookston, 1978

Gregory W. Smith, PG — Project Manager | Scientist 2

Before joining WSN in 1989, Greg was part of an environmental consulting firm in Wayzata, MN. His project experience at WSN includes Phase I and Phase II environmental site assessments, hydrogeologic investigations at petroleum and non-petroleum release sites, oversight of tank removal projects, and groundwater monitoring system design at demolition landfills. Greg is responsible for the coordination of field activities at the landfills including groundwater sample collection, hydrogeologic evaluations, and monitoring well system design. Due to the high number of monitoring wells at the landfills, he is tasked to retrieve, interpret, and collate a large amount of data results on a quarterly basis.

Greg's general responsibilities at WSN include data analysis, interpretation of field data, and effective verbal and written communication with clients and regulators. He prepares technical documents including well installation work plans, remedial investigation reports, and corrective action design reports. Greg is also responsible for providing leadership to other team members to make sure the investigation is moving toward a successful outcome while complying with local, state, and federal regulations and MPCA guidance documents. As the project manager for a wide variety of projects Greg has the ability to organize differing amounts of technical data to make concise and final recommendations.

RELATED PROJECTS

Corrective Action Design Systems

- Hansel Residence (Site ID 19251)—Dalton, MN
  Contaminated Soil Excavation, Vapor Mitigation
- Triangle Oil (Site ID 13383)—Brainerd, MN
  CAD Report, DPE System Design, Install and O&M
- Hutto Residence Corrective Action (Site ID 17206)—Anoka, MN
  Corrective Action Design, Plans, and Construction Observation
- Izaty's Golf & Yacht Club (Site ID 10651)—Onamia, MN
  Drinking Water Well Replacement
- Johnson's Services (Site ID 11617)—Carbon Filter System
  Design, Installation, and O&M

Petroleum Release Sites

- Woitalla Repair Services (Site ID 20585)—Pierz, MN
  Limited Site Investigation
- D&G Auto Repair (Site ID 20306)—Sauk Rapids, MN
  Limited Site Investigation
- Sebeka Public Schools (Site ID 16142)—Sebeka, MN
  Limited Site Investigation
- Melrose Motors (Site ID 17938)—Melrose, MN
  Remedial Investigation
- Ray's Service (Site ID 12719)—Meire Grove, MN
  Remedial Investigation
- Polish Palace (Site ID 11420)—Sobieski, MN
  Remedial Investigation, Free Product Recovery
- Driftwood Family Resort (Site ID 17427)—Pequot Lakes, MN
  Remedial Investigation
- Southside Fuel Plus (Site ID 18065)—Hackensack, MN
  Remedial Investigation
- JL Enterprises (Site ID 17039)—Aitkin, MN
  UST Removal Observation, Excavation Report Preparation
- Johnson Oil Bulk Site (Site ID 15217)—Pine River, MN
  Surface Soil Contamination Assessment
- Izaty's Golf & Yacht Club (Site ID 10651)—Onamia, MN
  Remedial Investigation
- Woodland Store (Site ID 9247)—Lake George, MN
  Remedial Investigation

Gregory W. Smith continued on the next page

- Otter Tail County Garage (Site ID 14493)—Fergus Falls, MN
  Limited Site Investigation, Contaminated Soil Land Treatment
- Johnson's Services (Site ID 11617)—Motley, MN
  Remedial Investigation, Drinking Water Well Replacement

Non-Petroleum Contamination Sites

- Hengel Demolition Landfill (SW-291)—Pillager, MN
  Vinyl Chloride Groundwater Contamination Investigation
- Douglas County Demolition Landfill (SW-406)—Alexandria, MN
  Boron and Manganese Groundwater Contamination Investigation
- Former Brainerd City Dump—Baxter, MN
  Methane Gas Migration Investigation
- Pine River Wood Products—Pine River, MN
  Pesticide Release Investigation (MDA Site)
- Jim's Auto Parts & Salvage—Little Falls, MN
  Subsurface Investigation Work Plan Preparation
- Rudy's Auto Body—Crosslake, MN
  Cleaning Solvent Subsurface Investigation
- Army Corps of Engineers—Red Lake Falls, MN
  Health and Safety Plan Preparation
- Runestone Electric—Alexandria, MN
  VIC Work Plan Preparation, Investigation
- Crow Wing County Landfill (SW-376)—Brainerd, MN
  Leachate Collection, Groundwater Sampling, Report Preparation
- TK Demolition Landfill (SW-333)—Cold Spring, MN
  Landfill Permitting, Groundwater Monitoring System Design
- Wadena County Demolition Landfill (SW-317)—Wadena, MN
  Landfill Permitting, Report Preparation
- Former Brainerd Foundry—Brainerd, MN
  Lead Contamination Investigation, Feasibility Study Preparation

Phase I and Phase II Environmental Site Assessments

- Maple Street Dental—Brainerd, MN
  Phase I ESA
- Houston Ford—Pine River, MN
  Phase I ESA
- MnDOT TH 72 Road Improvements—Kelliher, MN
  Phase I and II ESA
- Former Thorud Motors—Alexandria, MN
  Phase I and Phase II ESA, Excavation
- MnDOT TH 10 Bypass Alternatives (S.P. 5605-18)—Wadena, MN
  Limited Phase I ESA
- MnDOT—Lindstrom, MN
  Phase I ESA
- MnDOT Trunk Highway 371 Bypass—Pequot Lakes, MN
  Phase I ESA
- United Building Center—Brainerd, MN
  Phase I and II ESA
- Izaty's Golf & Yacht Club—Onamia, MN
  Phase I and II ESA
- Headwaters Revolving Loan Fund—Bemidji, MN
  Phase I and II ESA
- Crow Wing Power ESA—Little Falls, MN
  Phase I ESA

Ty J. Fuglseth, PG — Project Manager | Scientist 2

Ty joined WSN in 1995, after two years as an environmental scientist/project manager with a North Carolina environmental consulting firm. He specializes in performing site assessments and investigations involving environmental contamination issues. Responsibilities at WSN include project management, bidding, contractor selection, communication with clients and state agencies, site assessments, site investigations, monitoring, data analysis and interpretation, risk assessment, client and state regulatory compliance, and remediation. Ty has directed numerous tank removals, remedial investigations, contaminated soil excavations, hydrogeologic studies, and environmental site assessments. Ty is experienced in managing and performing all aspects of fieldwork, including utility locating, soil boring advancement, monitoring well installation, soil, groundwater, surface water, and vapor sampling, risk assessments, free product recovery, and aquifer testing in accordance with applicable guidance documents. He also prepares technical reports including Limited Site Investigations/ Remedial Investigations, Hydrogeological Characterization Reports, Phase I and II Assessment Reports, and Asbestos Inspection Reports.

Licenses/Certifications

Professional Geologist: MN

40-Hour OSHA HAZWOPER Training

Certified Asbestos Inspector

Certified Lead Risk Assessor

Education

MS, Geology | University of South Carolina, 1991

BS, Geology | North Dakota State University, 1987

RELATED PROJECTS

Petroleum Release Sites

- Former Sioux Old Retail Site (Site ID 5736)—Winger, MN
  LSI & Corrective Action
- Former Gateway Super Service (Site ID 18412)—Kennedy, MN
  LSI, Sub-Slab Vapor Monitoring, Indoor Air Sampling
- Riverside Bait & Tackle (Site ID 16016)—Warroad, MN
  Groundwater Monitoring, LIF Investigation, Monitoring Reports, and EDCAD Preparation
- Knife River Materials (Site ID 17593)—Bemidji, MN
  Remedial Investigation
- Anderson Oil (Site ID 13524)—Red Lake Falls, MN
  Additional Investigation, Groundwater Monitoring, Vapor Assessment
- Percy's Place (Site ID 11966)—Roosevelt, MN
  Remedial Investigation, Drinking Water Well Sampling, Sub-Slab Vapor Sampling & Assessment
- Anda Construction, Townview Apartments (Site ID 17650)—Red Lake Falls, MN
  Limited Site Investigation
- Bumper to Bumper (Site ID 15344)—Greenbush, MN
  Limited Site Investigation
- Johnson Oil, Roseau Bulk Plant East (Site ID 17630)—Roseau, MN
  Limited Site Investigation
- Jeff's Super Service (Site ID 5837)—Greenbush, MN
  Additional Site Assessment, Groundwater Monitoring, Vapor Assessment, LIF Study, EDCAD Preporation
- Former Blossoms Flower & Gift Shop (Site ID 12866)—Hawley, MN
  Remedial Investigation
- Erickson Oil Company (Site ID 10564)—Fertile, MN
  Free Product Recovery
- Continental Western Group, Sikorski Residence Fuel Oil Spill (Site ID 18960)—Roseau, MN
  Vapor Assessment, Air Sampling, Reporting
- Johnson Oil, Roseau Bulk Plant West (Site ID 14568)—Roseau, MN
  Free Product Recovery, Groundwater Monitoring, Reporting
- Johnson Oil, Hallock Bulk Plant (Site ID 17629)—Hallock, MN
  Limited Site Investigation
- Northern Resources Cooperative, Nelson Residence Fuel Oil Spill (Site ID 19021)—Badger, MN
  Vapor Assessment, Water Well Assessment

Ty J. Fuglseth continued on the next page

Non-Petroleum Contamination Sites

- Former Seaforth Salvage (SA4064)—Seaforth, MN
  Phase II Investigation for Metals, PCBs, PAHs, Dioxins, VOCs, and Petroleum
- Bemidji Regional Events Center South Shore Site—Bemidji, MN
  Formaldehyde and Methane Testing
- Dan's Flying Service (MDA Case File No: CF-2692)—Crookston, MN
  Ag-Chem Phase I, Remedial Investigation, and Corrective Action for an Aerial Applicator Facility
- Agri-Max LLC—Crookston, MN, and Grafton, ND
  Ag-Chem Investigation
- Balzum Construction, Ag-Chem Phase II Investigation, Georgetown Farmers Elevator Site—Georgetown, MN
- Crookston Iron and Metal (Site ID VP20380)—Crookston, MN
  Phase I and Phase II Investigation for Metals, PCBs, and Petroleum Contamination
- Former Cedar Services—Bemidji, MN
  Soil & Groundwater Investigation of a Former PCP Wood Pole Treatment Facility

Phase I and Phase II Environmental Site Assessments (ESA)

- Minnesota Department of Transportation—Thief River Falls, MN
  Phase I & II ESA
- First State Bank of Grand Forks—East Grand Forks Tesoro
  Phase I ESA
- Bemidji Regional Events Center South Shore Site—Bemidji, MN
  Phase I ESA
- Border State Bank, Les's Sanitation—Thief River Falls, MN
  Phase I ESA
- Salem Motors—Crookston, MN
  Phase II ESA
- Valley Eldercare Center—Grand Forks, ND
  Phase I ESA
- Trinidad Benham Elevator & Former Asphalt Plant—Pillsbury, ND
  Phase I & II ESA

Other

- City of Bemidji Municipal Liquor Store—Bemidji, MN
  Asbestos and Hazardous Materials Inspection
- Douglas County DAC—Alexandria, MN
  Asbestos Inspection
- Benson Armory—Benson, MN
  Asbestos and Lead Paint Assessment
- Bemidji Regional Events Center—Bemidji, MN
  DEED Application Preparation for Contamination Investigation and RAP Preparation
- Mills Properties, Former Paul Bunyan Bowl—Brainerd, MN
  Asbestos and Hazardous Materials Inspection
- City of Starbuck-Old Starbuck Hospital—Starbuck, MN
  Asbestos and Hazardous Materials Inspection
- City of Crosby Wastewater Treatment Plant—Crosby, MN
  Asbestos and Hazardous Materials Inspection
- Rice County Bridges 88030, L2755, & 7320—Rice County, MN
  Asbestos and Regulated Waste Assessment
- Crow Wing County, Gull River Road Bridge L2845—Crow Wing County, MN
  Asbestos and Regulated Waste Assessment
- Pennington County Bridge 7248 —Pennington County, MN
  Asbestos and Regulated Waste Assessment

Licenses/Certifications

Professional Engineer: MN, SD

Education

MS, Civil Engineering | South Dakota State University, 1982

BS, Civil Engineering | South Dakota State University, 1980

Larry J. Van Hout, PE, VP, Treasurer — Engineer 4

Larry has widely varied experience in the water and wastewater fields. Before joining WSN, he served as a wastewater operator, a troubleshooter for operational problems at wastewater treatment plants, and trainer for wastewater operators. Since joining WSN in 1986, Larry has worked primarily with water and wastewater treatment projects. Experienced with mechanical wastewater plants includes planning, design, construction administration, start-up, operator training, and preparation of operation and maintenance manuals. Served as project engineer on the planning, design and construction of stabilization ponds and wastewater collection systems. Prepared studies for biosolids handling, infiltration/inflow, sewer use/user charge systems, and stormwater pollution prevention plans. Water system projects include computer analysis of distribution systems, studies of treatment needs, and projection of user demands. Served as project engineer for planning, design and construction administration of water wells, storage, treatment, and distribution projects. Experienced in administering water and wastewater projects financed through community development block grants, MPCA and EPA funds, and Rural Development funds.

RELATED PROJECTS

Petroleum Release Sites

- Water Distribution System Improvements —Herman, MN
  Contaminated Soil
- Old Starbuck Fire Hall Site—Starbuck, MN
  Phase I and Phase II ESA
- Farwell–Kensington Sanitary District Wastewater System—Farwell, MN, and Kensington, MN
  Contaminated Soils
- Water Treatment Plant and Distribution System—Hancock, MN
  Contaminated Soils
- Kensington Water Distribution Project—Kensington, MN
  Contaminated Soils

Other

- Water System Improvements—Wendell, MN
  New Water Treatment Plant, New Wells, Plans and Specifications
- Industrial Park Water and Sewer Extension—Kensington, MN
  Feasibility Study, Plans, Specification
- Industrial Park Watermain and Sanitary Sewer—Starbuck, MN
  Preliminary Cost Estimate, Permits, Plans, Specifications
- Watermain, Wells, Pumphouse, Water Meters, and Elevated Storage Tank—Watson, MN
  Replacement Well Siting, Plans, and Specifications; Rural Development Funding Assistance
- Heritage Industrial Park Phase I New Development—Alexandria, MN
  Feasibility Study, Plans, Specification
- Water Supply Chemical Addition—Holloway, MN
  Feasibility Study, Funding Assistance, Plans, Specification, Construction Administration
- WWTF Phosphorous Removal Upgrade—International Falls, MN
  Facility Plan, Design, Plans, Specifications

Licenses/Certifications

40-Hour OSHA HAZWOPER Training

Erosion & Sediment Control

Education

BS, Resource, Recreation and Tourism | University of Idaho, 2006

AS, Wilderness Management | Vermillion Community College, 2004

Michael L. Bogart — Field Technician | Scientist 1 | On-Site Inspector

Mike joined WSN in January 2012. He has a varied background in wilderness management, natural resources, hazardous site clean-up, sampling, and inspections. His primary responsibilities as an environmental technician include soil/water field sampling, field data collection, and preparation of site drawings. Mike has experience with the collection of groundwater samples at numerous demolition landfills using low flow, dedicated and portable bladder pumps. While at WSN, Mike has worked closely with project managers in defining investigation and remediation solutions on various petroleum remediation projects and landfill investigations. Mike's other responsibilities include computerized data entry, remedial investigation report preparation, and developing remediation plans.

RELATED PROJECTS

Corrective Action Design Systems

- Captain Kirks Remediation Construction Observation Additional Work (Site ID 464)—Federal Dam, MN
- Hutto Residence Corrective Action (Site ID 17206)—Anoka, MN
- Johnson Oil, Dean & Greg's Corrective Action Design (Site ID 6736)—Wannaska, MN
- Johnson's Services Additional Investigation (Site ID 11617)—Motley, MN
- Lamia Ali Residence, Additional Investigation (Site ID 17116)—Moorhead, MN
- Sioux Oil Former Gas Station Corrective Action & Design (Site ID 5736)—Winger, MN

Petroleum Release Sites

- Angus Coop Elevator Limited Site Investigation (Site ID 16452)—Angus, MN
- Boondocks Groundwater Sampling & Vapor Checks (Site ID 17273)—Detroit Lakes, MN
- Gateway Super Service LSI and Vapor Assessment (Site ID 18412)—Kennedy, MN
- Circle R Ranch LSI (Site ID 17825)—Long Prairie, MN
- Continental Western Group Vapor Assessment (Site ID 18960)—Roseau, MN
- Dean & Greg's ASA (Site ID 6736)—Wannaska, MN
- Driftwood Family Resort RI (Site ID 17427)—Pine River, MN
- Hawley Bulk Site Monitoring and Corrective Action (Site ID 14404)—Hawley, MN
- Jeff's Super Service (Site ID 5837)—Greenbush, MN
- Johnson Oil, West Bulk Facility (Site ID 14568)—Roseau, MN
- Kens Amoco 2013 (Site ID 12613) Investigation—Chisholm, MN
- M&G Amoco - Hackensack Groundwater Quarterly Monitoring and Additional Investigation FY2013 (Site ID 12613)—Hackensack, MN
- Woodland Store 2012 Sampling (Site ID 9247)—Park Rapids, MN
- Former Pete's Garage LSI and Monitoring (Site ID 14494)—Ely, MN

Non-Petroleum Contamination Sites

- 2012 Wastewater Treatment Improvements—Nisswa, MN
- Arrowhead Cleaners Site Assessment (Site ID SA4392)—Grand Rapids, MN
- Biwabik 2013 Assessment—Biwabik, MN
- Brainerd Foundry Additional Investigation—Brainerd, MN
- Shoreline Soil Vapor Assessment (Site ID SA134)—Navarre, MN
- Former Cedar Services Wood Treatment—Bemidji, MN
- Methane Testing - Northland Arboretum—Brainerd, MN
- MnDOT TH7—Milan, MN
- MnDOT TH71—Jackson, MN
- Former Seaforth Salvage Limited Investigation (Site IDSA4064)—Seaforth, MN

Michael L. Bogart continued on the next page

Other

- Mahnomen Cty Demo Ground Water Sampling & Reporting—Mahnomen, MN
- TK Demo Landfill Groundwater Sampling and Annual Survey (SW-333)—Cold Spring, MN
- Todd County Demo Landfill Groundwater Sampling and Annual Survey (SW-403)—Browerville, MN
- Ambient Groundwater Quality Monitoring Network Installation for Northern and NE Minnesota
- Crow Wing County Landfill Services (SW-376)—Brainerd, MN
- Hengel Demo Landfill Sampling (SW-291)—Pillager, MN
- Industrial Park Road Basin Cleaning—Baxter, MN
- Omega Demo Monitoring Well Installation (SW-416) —St. Hilaire, MN
- Mahnomen County Demolition Landfill Groundwater Investigation (WS-377)—Mahnomen, MN
- Hengel Demolition Landfill (SW-291)—Pillager, MN
  Vinyl Chloride Groundwater Contamination Investigation
- Douglas County Demolition Landfill (SW-406)—Alexandria, MN
  Boron and Manganese Groundwater Contamination Investigation
- Capital Solutions Vapor and Soil Contamination Construction Observation—Grand Forks, ND
- Potlatch Monofill Sampling—Brainerd, MN

Licenses/Certifications

Professional Engineer: MN, WI

40-hour OSHA HAZWOPER Training

Erosion/Stormwater Management: Design Construction SWPPP

Registered SSTS Advanced Designer

Education

BS, Civil Engineering | North Dakota State University, 1990

David S. Reese, PE, VP — Engineer 3 | Project Manager

Dave has been with WSN since 1992. He provides engineering and planning assistance to clients regarding infrastructure needs and policy development. From feasibility studies through construction, his experience includes sewer, water, road, bridge, and environmental projects. Dave offers a strong background in addressing environmental issues. He has processed wetland fill permits for land development and utility and road construction for private developers, cities, and counties. He has prepared stormwater designs to mitigate runoff pollution and investigated the impact of pollutant releases to the soil and ground water including test drilling, sampling, data analysis, and report preparation.

RELATED PROJECTS

Corrective Action Design Systems

- Gulbranson Equipment (Site ID 15048)—Park Rapids, MN
  Water Line Replacement
- USFWS Wetland Management Office (Site ID 4802)—Detroit Lakes, MN
  Contaminated Soil Excavation

Petroleum Release Sites

- Jeff's Service (Site ID 5837)—Greenbush, MN
  Remedial Investigation
- DNR Forestry Office (Site ID 6464)—Park Rapids, MN
  Remedial Investigation
- Orton Oil, Tabaka Site (Site ID 6045)—Walker, MN
  Limited Site Assessment
- Aitkin Power Plant (Site ID 8566)—Aitkin, MN
  Remedial Investigation

Other

- CSAH 31 Groundwater Seepage Study—Pillager, MN
  Geotechnical Study
- Wilderness Resort—Pequot Lakes, MN
  Wastewater System Design
- Brainerd International Raceway Road Course and Stormwater—Brainerd, MN
  Permits, Plans, and Specifications
- Elbow Lake Airport—Elbow Lake, MN
  UST System Plans, Specifications
- 2007 Sanitary Sewer Project—Lakeshore, MN
  Permits, Plans, And Specifications
- Biosolids Treatment Study—Crosslake, MN
  Project Management, Design, Plans

Tim Ramerth, PE , VP— Engineer 3

Tim is a licensed engineer in Minnesota, he is a Vice President with the firm and has over 26 years of experience in the public and private sectors. He has been a project manager for over half of his career and has extensive experience in project development, project management, permitting, wetland regulation and environmental regulation. As a project manager, he has provided technical design and oversight of many projects from concept through bidding and final closeout. Tim's other responsibilities include municipal engineering, water resources, transportation, and private development. He frequently works with regulating agencies, local governments and state agencies to foster project support and acquire permit approvals for projects. He attends meetings with committees, residents and Councils to present materials and provide guidance and opinions.

Licenses/Certifications

Professional Engineer: ND, MN, WI

Design of Construction SWPPP; Construction Site Management

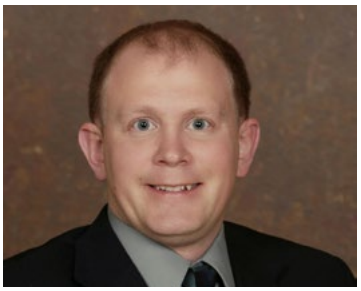
Education

Bachelor of Science, Agricultural Engineering | South Dakota State University, 1992

RELATED PROJECTS

Other

- Ossawinnamakee Channel Clean Out—Pequot Lakes, MN
- Big Lake Outlet Project—Big Lake, MN
- Bois de Sioux Watershed District Permit Application Reviews—Wheaton, MN
  General Watershed Engineering for Bois de Sioux
- General Watershed Engineering for Bois de Sioux Watershed District - Wheaton, MN
- Traverse County Ditch 52—Wheaton, MN
- Wilkin County Ditch 8—Doran, MN
- Wilkin County Ditch 10—Doran, MN
- Grant County Ditch 29—Herman, MN
- Traverse County Ditch 41—Dumont, MN
- Traverse County Ditch 52 Project Team—Wheaton, MN
- Bois de Sioux Watershed Flow Reduction Strategy— Wheaton, MN
- Two Rivers Watershed District Distributed Detention Plan—Hallock, MN
- Joe River Watershed District Distributed Detention Plan— Humboldt, MN
- Demolition Landfills
  - » Hengel Landfill— Hengel, MN
  - » Omega Landfill —Thief River Falls, MN
  - » Grinning Bear Landfill—Backus, MN
  - » Douglas County Landfill—Alexandria, MN
  - » Todd County Landfill—Browerville, MN
- Industrial Storm Water Permits
  - » Brainerd Industrial Center—Brainerd, MN
  - » Hawkes Peat Mining—Marshall County, MN
- NPDES Construction Oversight
  - » MN TH 11— Loman to Pollard, MN
  - » MN TH 2— Bena, MN
  - » MN TH 371— Nisswa to Jenkins, MN
- CATEX
  - » MN TH 23 — Pipestone, MN
  - » MN TH 67— Redwood Falls, MN



Nicholas G. Koos, PE — Engineer 2

Nick Koos joined WSN as a full-time employee in 2006 after having spent five summers working for the firm, performing construction inspection and civil engineering tasks. Since that time, he has assumed greater project responsibilities as well as furthered his career by becoming a licensed professional engineer. Nick is responsible for assisting the project engineer with feasibility studies, street improvements, water and sewer design, site planning and residential development, stormwater pollution prevention plans, wastewater facilities plans, and hydraulic design.

Licenses/Certifications

Professional Engineer: MN

Erosion/Stormwater Management: Design Construction SWPPP; Construction Site Management

MnDOT Certifications: Aggregate Production, Bituminous Street Level II, Concrete Field Level II, Grading & Base Level I

Education

BS, Civil Engineering | North Dakota State University, 2005

RELATED PROJECTS

Corrective Action Design Systems

- Meyer Residence (Site ID 13565)—Easton, MN
  Corrective Action Alternative Analysis

Other

- Wastewater Treatment Facility Upgrade—International Falls, MN
  Plans and Specifications
- Phosphorus Removal Improvements—Starbuck, MN
  Design and Plans
- Southwest Drainage Airport Detention Pond—Alexandria, MN
  Design, Permits, Plan
- Wastewater Stabilization Pond—Hancock, MN
  Design, Plans, and Specifications
- Wendell Water System—Wendell, MN
  Plans and Specifications
- Hospital Demolition Retrieval Investigation—Starbuck, MN
  Environmental Assessment, Plans, and Specifications
- Industrial Stormwater Permit, Morris Sand and Gravel—Morris, MN
  Permit and Plan
- Wastewater Collection System—Forada, MN
  Plans and Construction Observation
- Wilton Overpass Design-Build—Bemidji, MN
  Erosion Control Plans, SWPPP
- Sunopta Monitoring for SWPPP—Alexandria, MN
  Sampling, Permits and Design

Education

Diploma, Computer Aided Design Technologies | Hoosier Hills Area Vocational School, 1995

Joshua W. Rebennack — GIS/CADD Specialist

Joshua joined WSN in 2012. He is primarily responsible for preparing figures for reports and drawings, and is the primary GIS/CADD Specialist for creating the Site Investigations / Limited Site Investigations, Corrective Action Design / Excavation Detailed Corrective Action Design plans, and Environmental Assessment Worksheets figures. Joshua also created plans for nearly a dozen demolition landfill re-permitting applications. He has experience with drafting, design and layout of proposed developments, as well as converting and integrating GIS data. Joshua is experienced with Civil 3D and ArcGIS software for drafting and mapping of relevant features of a site and assists others with GIS mapping and data handling.

RELATED PROJECTS

Phase I and Phase II Environmental Site Assessments

- Hallock Cenex Phase II, Johnson Oil—Hallock, MN
- Houston Ford Phase I ESA—Pine River, MN
- MNDOT Phase I and II ESAs of TH 71 Bridge Corridor—Jackson, MN
- MnDOT & City of Kelliher Phase I and II ESAs of TH72—Kelliher, MN
- Holiday Stores Phase II Assessments—Deerwood, Aitkin, McGregor, MN
- 2012 Facility Review, Lowe's—Cambridge, MN
- 2012 Facility Review, Lively Annex—Baxter, MN
- 2012 Facility Review - Mills Fleet Farm—Carver, MN
- 2012 Facility Review -Mills Parts Center—Willmar, MN
- Willmar Chrysler, Environmental ESA & Phase II—Willmar, MN
- Crosby Cardiovascular Clinic/Cuyuna/Allina—Baxter, MN
- Fair Oaks Lodge Phase II ESA—Wadena, MN
- Fond du Lac Bowling Alley Phase I ESA, Including Asbestos—Fond du Lac, WI
- Frandsen - Clow Stamping Phase I ESA—Merrifield, MN
- Hebert Holdings-Argyle Phase I ESA—Argyle, MN
- Isle Drive Phase I ESA—Baxter, MN

Petroleum Release Sites

- Former Shamrock Café LSI Investigation (Leak Site 19557)—McGregor, MN
- Maple Street Project LSI & ASA (Leak Site 19702)—Aldrich, MN
- Ribaudo Residence LSI (Leak Site 19622)—Culver, MN
- City of Argyle Utility Project LSI (Leak Site 18165) —Argyle, MN
- Circle R Ranch LSI (Leak Site 17825)—Long Prairie, MN
- Clarkfield LSI Investigation (Leak Site16212)—Clarkfield, MN
- Eagle Bend Oil 2013 Investigation (Leak Site 13022)—Eagle Bend, MN
- Former Blossoms ASA (Leak Site 12866)—Hawley, MN
- Former Gas Station (Leak Site 13869)—Ada, MN
- Johnson Oil, East Bulk Facility (Leak Site 17630)—Roseau, MN
- Johnson Oil, Hallock Bulk Facility (Leak Site 17629)—Hallock, MN
- Johnson Oil, West Bulk Facility (Leak Site 14568)—Roseau, MN
- Kens Amoco 2012 Investigation (Leak Site 12613) —Chisholm, MN

Corrective Action Design Systems

- Dean & Greg's ASA (Leak Site 6736)—Wannaska, MN
- Hutto Residence Corrective Action (Leak Site 17206)—Anoka, MN
- Jeff's Super Service (Leak Site 5837)—Greenbush, MN
- Johnson Oil, Dean & Greg's CA Design (Leak Site 6736)—Wannaska, MN

Joshua W. Rebennack continued on the next page

- Johnson's Services Additional Work—Motley, MN
- Kirks CADesign (Leak Site 464)—Federal Dam, MN

Other

- 2016 Alex Rubbish Groundwater Sampling and Annual Survey—Alexandria, MN
- 2017 Alex Rubbish Groundwater Sampling and Annual Survey—Alexandria, MN
- 2017 Glenwood Landfill Permitting—Cold Spring, MN
- 2017 Grinning Bear Demo Landfill Groundwater Sampling and Annual Survey—Pine River, MN
- 2017 Lakes Area Demo Landfill Groundwater Sampling and Annual Survey—Detroit Lakes, MN
- City of Wendell Water System—Wendell, MN
- DeGraff Wastewater System Improvements Study—DeGraff, MN
- Hengel Demo Landfill 2017 Sampling—Pillager, MN

Education

BS, Industrial Technology/ Construction Management
Moorhead State University, 1984

AS, Architectural Commercial Design | Wisconsin Indianhead Technical College, 1994

Coursework, Architecture | North Dakota State University, 1979–1980

Christopher J. Satterlund — CADD Specialist

Chris joined WSN in 1994 and is responsible for architectural and site drawings for remodel and new construction of large municipal, institutional, and commercial facilities (e.g., retail, vehicle maintenance, manufacturing). He is responsible for verifying conditions, design, drafting, estimating, construction administration, construction inspection, and staking. Prior to WSN, Chris worked for a general contractor for 10 years as a quality assurance supervisor, superintendent, and estimator with primary responsibility for construction management, job survey and layout, estimating, and technical report writing. He has experience working on projects including wastewater treatment plants, oil refineries, power plants, dams, churches, and schools.

RELATED PROJECTS

Corrective Action Design Systems

- Dillon Residence (Site ID 15589)—Paynesville, MN
  Corrective Action Design
- Lamia Ali Residence (Site ID 17116)—Moorhead, MN
  Corrective Action Design
- Hutto Residence CAD Implementation (Site ID 17206)—Anoka, MN
  Corrective Action Design
- LaFave Radon System (Site ID 16755)—St. Paul, MN
  Corrective Action Design

Other

- Landfill Assistance—Marshall, MN
  Design and Plans
- Mills Ford Remodel—Brainerd, MN
  Design and Plans
- Mills Fleet Farm Remodel—Baxter, MN
  Plans and Design
- Sioux Falls Landfill Valve House—Sioux Falls, SD
  Building Design and Plans
- Materials and Salt Storage Facility—Nisswa, MN
  Feasibility, Plans, and Design
- Mille Lacs Academy New Campus—Onamia, MN
  Design and Plans
- Mills Fleet Farm New Store—Carver, MN
  Plans and Design
- Slope Stabilization Repairs—Rochester, MN
  Design and Plans

Licenses/Certifications

24-Hour OSHA Hazardous Waste Site Worker Training

Charles M. Nelson — CADD Specialist | Field Technician

Chuck joined WSN in 1978 and has gained extensive experience performing many land corner restoration projects across Minnesota. His experience in both field observations and office calculations has allowed him to provide private and public clients accurate, thorough, and efficient results. He routinely performs historical research/preparation for projects, assists in corner recovery, searches, and monumentation. He is trained in the use of Trimble S6 robotic total stations, Trimble static and RTK GPS systems, data collection and AutoCAD. He has worked on several remonumentation projects with MnDOT, Corps of Engineers, Farmers Home Administration, and the US Forest Service. Chuck is responsible for using AutoCAD Civil 3D to draft land survey certificates, legal descriptions, FEMA Elevation Forms, right-of-ways, and subdivision plats.

RELATED PROJECTS

Other

- MnDOT
- U.S. Army Corps of Engineers
- Farmers Home Administration Wetland Surveys
- U.S. Forest Service Cross-Section Elevations
- Fort Ripley, Hartman Boundary Survey—Crow Wing County, MN
- Living Word Christian Center—Crow Wing County, MN
  Boundary Survey
- Wadena Airport—Wadena, MN
  Boundary Survey
- Lake of the Woods County, MN
  Section Subdivision and Survey Boundary
- TH 78—Ottertail County, MN
  Control Survey
- CSAH 4—Cass County, MN
  Preliminary Survey for Roadway Reconstruction
- City of Baxter, MN
  Right-of-Way Plats, Subdivision Plats, Road Construction Easements, and Boundary Surveys
- Crow Wing County Landfill—Brainerd, MN
  Survey Boundary and Topography
- Former Burlington Northern Tie Plant—Baxter, MN
  Topography of Site and Monitoring Well Elevations
- Pine River Wood Products—Pine River, MN
  Topography of Contaminated Site
- City of Crosslake, MN
  Sanitary Sewer Easements and Construction Staking
- CSAH 20—Crow Wing County, MN
  Road Right-of-Way Determination and Legal Descriptions

Paul A. Strong, EIT — Engineer 1

Paul joined WSN in 2016 after completing a master's degree in civil and environmental engineering. He has experience working in Illinois and California on hydrological studies, stormwater pollution prevention, environmental impact studies, effluent and waste assessments, and wetland delineations. As an environmental engineer, Paul is primarily responsible for hydrologic modeling, environmental reporting, and pollution control and countermeasure plans. He also assists the environmental department with wetland delineations.

Licenses/Certifications

NCEES Engineer in Training

40-Hour OSHA HAZWOPER Training

Education

MS Environmental Engineering | University of California, Los Angeles, 2015

BS, Natural Resources & Environmental Science | University of Illinois Urbana-Champaign, 2014

RELATED PROJECTS

Other

- Water Supply Plan—Pine Island, MN
- Water Supply Plan—Baxter, MN
- Wellhead Protection Plan—Isle, MN
- Wellhead Protection Plan—Pine Island, MN
- Phase I Environmental Site Assessment
  - » Baudette, MN
  - » Minneapolis, MN
  - » Rochester, MN
  - » Deerwood, MN
  - » Kelliher, MN
  - » Monticello, MN
- Phase II Environmental Site Assessment
  - » Nisswa, MN
  - » Owatonna, MN
- Petrofund Application—Herman, MN
- Spill Response Plan—Glenwood, MN
- Spill Prevention Control & Countermeasure Plan
  - » Hermantown, MN
- TH 200 Wetland Delineation—Walker, MN
- Stormwater Pollution Prevention Plan
  - » Brainerd, MN
  - » Baxter, MN
- Facility Assessment—Deerwood, MN

Licenses/Certifications

Wetland Delineation Certified

Education

BS, Natural Resource Management | North Dakota State University, 2013

Joey M. Goeden — Scientist 1 | Field Technician

Joey Goeden graduated from North Dakota State University in 2013 with a B.S. in Natural Resources Management. He has more than three years' experience in wetland delineation and wetland permitting at WSN. He is a certified wetland delineator in the State of Minnesota.

His responsibilities at WSN include Wetland Delineations, Wetland Permitting, Wetland Monitoring, Phase I Environmental Site Assessments and Watershed Monitoring. He has worked on delineation projects that have ranged in size from less than five acres to several hundred acres. The projects have included most of Minnesota's wetland and vegetation types, as well as agricultural lands and atypical situations. He is experienced in GPS equipment and techniques. He has experience writing environmental documents such as Wetland Delineation Reports, Wetland Monitoring Reports, Phase I Environmental Site Assessments, Environmental Assessments and Environmental Impact Statements.

RELATED PROJECTS

Phase I Environmental Site Assessments

- Lakes Region EMS – Lindstrom, MN
  Phase I ESA
- Essentia Heath Clinic – Pequot Lakes, MN
  Phase I ESA
- Essentia Health Clinic – Crosslake, MN
  Phase I ESA
- Mills Fleet Farm – Lakeville, MN
  Phase I ESA
- Mills Fleet Farm – Owatonna, MN
  Phase I ESA
- Mills Fleet Farm – Monticello, MN
  Phase I ESA
- The Bodyworks Super Collision Center – Baxter, MN
  Phase I ESA

Other

- MPCA Watershed Pollutant Load Monitoring Network – Central MN
  Primary Sampler
- Northdale Oil, Inc. – Bemidji, MN
  Environmental Evaluation Checklist (FSA-850)
- Northdale Oil, Inc. – Drayton, ND
  Environmental Evaluation Checklist (FSA-850)
- Excelsior Road Improvements – Baxter, MN
  Soil Borings for Stormwater Pond Design
- MnDOT TH 200 – Cass County, MN
  Wetland Delineation and Report
- Placid Drive Improvements – Crow Wing County, MN
  Wetland Delineation and Permitting / Endangered Species Permit

Licenses/Certifications

Engineer-in-Training: Minnesota

MnDOT Certification:
- Bituminous Street
- Level I & II
- Grading & Base Level I
- Aggregate Production

MN Erosion/Sediment Control Specialist: Design Construction SWPPP

Education

BS, Civil Engineering | University of Minnesota Duluth, 2013

Tony A. Pohl, EIT — Engineer 1

Tony joined WSN in early 2014 with five years of experience in construction. He has expanded his experience to include design for public and private engineering projects including roadways, storm water management systems, and lot development plans. He conducts field inspections, interprets design criteria, develops and reviews site plans and designs, develops special provisions for construction, and coordinates plans and designs with clients. He is responsible for design drafting of an array of civil engineering projects, including new subdivisions, lot and building layouts, water and sewer systems, wastewater treatment systems, storm sewers, and street and highway improvements.

RELATED PROJECTS

Other

- Clark Drive Water Extension—Verndale, MN
- Edgewood Drive Storm Study—Baxter, MN
- Sewer Improvements - Rural Development—Verndale, MN
- Drainage Improvements—Lake Shore, MN
- Malone Island Bridge Design (SAP 048-597-003)—Isle, MN
- Mills Fleet Farm—Monticello, MN
- Inglewood Drive Improvements (SAP 230-107-002)—Baxter, MN
- Pequot Lakes Wastewater Treatment Facility Plan—Pequot Lakes, MN
- Evergreen Court Extension, District III—Hinckley, MN
- Crosby–Ironton High School Track and Field Design—Crosby, MN
- Fosston SuperValu—Fosston, MN
- Nystrom Associates Clinic—Baxter, MN
- River Oaks Dental—Aitkin, MN
- Milford Mine Memorial Park—Crosby, MN
- Dellwood Drive and Novotny Road Improvements (SAP 230-116-001)—Baxter, MN

Carrie E. Freeman — Scientist 1 | Field Technician | GIS Specialist

Carrie joined WSN in 2018 working alongside the environmental department as the firm's first water quality scientist. She has experience in data management for numerous environmental assessment and remediation projects in Minnesota and the Midwest, including data comparison to regulatory criteria and quality assurance of analytical data. Carrie is responsible for expanding our environmental services to include stream and lake water quality modeling, surface water planning, and coordination of stormwater/surface water sampling. She is also an internal resource for other WSN staff with water quality questions and will augment WSN's water sampling capabilities for field work and laboratory analysis.

Education

MS, Water Resources Science | University of Minnesota Duluth, 2016

BS, Environmental Science | Minnesota State University Mankato, 2012

Geographic Information Systems (GIS) Certificate | Minnesota State University Mankato, 2012

RELATED PROJECTS

Other

- Lake Malawi physical limnology observations and modeling—Lake Malawi, Africa
- Impervious Surface Assessment on Madison Lake— Madison Lake, MN
- Lake Andrew EAW — Alexandria, MN
- Greater Blue Earth River Basin Alliance Water Quality Modeling, GIS — Mankato, MN
- Minnesota Pollution Control Agency (MPCA) Watershed Pollutant Load Monitoring Network Sampling—Central Minnesota
- Hawkes Peat Mining Operations, Permitting Assistance—Newfolden, MN

Licenses/Certifications

Certified Mapping Scientist–GIS/LIS (GS291)

Certified GIS Professional (52240)

Education

Bachelor of Science, Geography | University of Minnesota, 1995

Mark T. Reineke, CMS, GISP — GIS Specialist

Mark has more than 20 years' experience in spatial analysis, mapping, and Geographic Information Systems (GIS). He coordinates GIS projects among the firm's offices and manages WSN's extensive spatial database. Mark assists and advises project teams by providing analysis, mapping, and technical support necessary for overall project success. His varied cartographic works include museum displays, published works in books, numerous thematic maps and graphics for Environmental Assessment Worksheets (EAW), Environmental Impact Statements (EIS), engineering reports, and comprehensive plans. Mark works extensively with LiDAR to derive project specific datasets, develop hydrologic applications, and is an active member in the Committee on 3D Geomatics (3DGeo).

RELATED PROJECTS

Other

- Overall Plans – Analysis, maps and graphics. Bois de Sioux Watershed, Two Rivers, Roseau River and Joe River Watershed Districts, 2003-2004
- University of Minnesota Parking Services Map. Map and brochure for the University of Minnesota, Twin Cities
- Interim Guidance on Acquisition of Culvert Geospatial Data – MN Digital Elevation Committee – R&E, 2011
- AT&T Cell Tower Visualization Studies—various locations, MN
- Verizon Cell Tower Visualization Studies—various locations, MN & SD
- Culvert Inventory, Bois de Sioux Watershed—West-Central MN
- ADA Ramp Study—Baxter, MN
- Utility Mapping—International Falls, MN
- Lake Shore Zoning Map—City of Lake Shore, MN
- Bois de Sioux Watershed Distributed Detention Storage Modeling—Portions of MN, ND, & SD
- Ditch Viewer Training; Instructor—Ridgewater College, Willmar, MN
- Big Stone County Ditch 30, 2yr Event Modeling—Big Stone Co, MN
- Ditch Viewing/Redetermination GIS modeling—Blue Earth CD 28, 34; Chippewa CD 13; Douglas CD 17; Jackson JD 22; Kandiyohi CD 26; Lac qui Parle CD 70; Martin CD 6, 8, 13, 26 & JD 4, 13, 29, 35; Meeker CD 15; Mille Lacs CD 2, 14; Murray CD 61, 73 & JD 6, 20; Renville CD 59; Sibley CD 23, 24, 37, 42, 43, 44, 46, 54; Wright CD 38 & JD 14; Yellow Medicine CD 9
- Alexandria Stormwater Plan—Alexandria, MN
- Ditch Records Modernization—Bois de Sioux Watershed District, MN
- Bathymetric Mapping of Johnson Lake/Tastefully Simple Preserve—Alexandria, MN
- Sanford Health Development EAW—Thief River Falls, MN
- Redpath Impoundment Project EAW—Norcross, MN
- Hawkes Wetland Permit Assistance—Newfolden, MN

Juergen Brunkhorst, PLS — GIS/CADD Specialist

Juergen joined WSN in 2002 with over five years' experience in hydrographic and land surveying in Germany. He is experienced in boundary, topographic, ALTA, bridge and geodetic surveys; construction staking; section subdivisions; corner restoration; right-of-way and easement surveys; CAD drafting; writing legal descriptions and easements; record research and analysis; creating base maps; office and field computations; and plat checking. His responsibilities include project management, field crew coordination, and training and mentoring junior staff in field procedures and implementing technology.

HYDROGRAPHIC
Juergen joined WSN in 2002 with over five years' experience in hydrographic and land surveying in Germany. Experienced in single-beam and multi-beam bathymetric surveys; hydrographic survey and processing software; dredge operations software; CAD software; DTM creation; volume calculations; GPS and terrestrial navigation; positioning of various dredger types; and survey vessels operation.

Licenses/Certifications

Land Surveyor: MN (46698), SD (12138)

ACSM/THSOA Certified Hydrographer

Education

Baccalaureate, Surveying Engineering Technology / Evaluation of German Degree by Engineering Credentials Evaluation International (ECEI), 2005

Degree, Hydrographic Surveying | Fachhochschule Hamburg, Germany, 1994

Degree, Surveying Engineering | Fachhochschule Hamburg, Germany, 1992

RELATED PROJECTS

Other

- Dresbach Bridge Design Hydrographic Survey—Dresbach, MN
- Hydrographic Surveys for Bridges
- Replacements—Locations throughout Minnesota
- Dower Lake Pier Replacement—Staples, MN
- Starbuck Marina— Starbuck, MN
- U.S. Army Corps of Engineers Levee Projects—Locations throughout Minnesota
- Marthaler Chevrolet Dealership—Glenwood, MN
- Alexandria Police Department Building—Alexandria, MN
- Douglas County Public Works Facility—Alexandria, MN
- Remodel/Renovation Stevens County Courthouse—Morris, MN
- MnDOT Existing Right of Way Survey—Glenwood, MN
- MnDOT Existing Right of Way Survey—Starbuck, MN
- PLSS Corner Certificates—Glenwood and Starbuck, MN
- Design Survey TH 235—Ottertail County, MN
- Design Survey TH 29 (Nokomis St)—Alexandria, MN
- Design Survey TH 29 (Broadway)—Alexandria, MN

Key Staff Matrix

Name Lic./Certification Classification	Location	OSHA 40-Hr w/8-Hr Yrly Refreshers	OSHA 24-Hour Training	OSHA 8-Hour Supervisor Training	Certified Asbestos Inspector	Certified Lead Risk Assessor	Lic. Monitoring Well Contractor	SWPPP Training and Certification	Years Experience—WSN	Years Experience—Total	Highest Degree Earned	Discipline	Petroleum Release Sites	Non-Petrol Contamination Sites	Ph I & Ph II Environ Site Assess	Corrective Action Dsgn Systems	Other Environ/Engr Projects
Brian Ross, PG PM, S2, ER	BRD	■	■	■			■	■	27	33	MS	Geology	■	■	■	■	■
Mark Hallan, PE E4	BRD								17	34	BS	Civil Engr	■			■	■
Greg Smith, PG PM / S2	BRD	■	■						28	30	BS	Geological Engr	■	■	■	■	■
Ty Fuglseth, PG PM / S2	CKN	■	■		■	■			23	25	MS	Geology	■	■	■	■	■
Larry Van Hout, PE E4	AXN							■	32	36	MS	Civil Engr	■	■		■	■
Mike Bogart FT, S1, OSI	BRD	■	■					■	6	8	BS	Res, Rec & Tourism	■	■	■	■	■
Dave Reese, PE E3	BRD	■	■					■	26	28	BS	Civil Engr	■	■	■	■	■
Tim Ramerth, PE E3	BRD							■	15	15	BS	Civil Engr			■		■
Nick Koos, PE E2	AXN	■	■					■	12	12	BS	Civil Engr				■	■
Joshua Rebennack CS	BRD								6	23	AA	CADD	■	■	■	■	■
Chris Satterlund CS	BRD								24	34	BS	Indust Tech/Constr Mgt	■			■	■
Chuck Nelson CS, FT	BRD		■						40	43	HS	CADD, Land Surveying	■	■	■	■	■
Paul Strong E1	BRD	■							1	3	MS	Environmental Engr	■	■	■		■
Joey Goeden S1, FT	BRD								4	5	BS	Environmental Science					■
Tony Pohl E1	BRD							■	4	5	BS	Civil Engr					■
Carrie Freeman S1, FT	BRD								.5	3	MS	Water Quality Science			■		■
Mark Reineke CS	BRD								8	24	BS	Geography					■
Juergen Brunkhorst CS	AXN								16	25	BS	Land & Hydro. Surveying					■

PM Project Manager
S1 Scientist 1
S2 Scientist 2

E1 Engineer 1
E2 Engineer 2
E3 Engineer 3
E4 Engineer 4
FT Field Technician
OSI On-Site Inspector

ER Ecological Risk Assessor
CS CADD Specialist

AXN Alexandria
BRD Brainerd/Baxter
CKN Crookston

WSN's Experience

Other Federal and State Agency Experience

WSN has had significant contractual experience with several federal agencies including USDA Rural Development, USDA Forest Service, Region 9 (Architectural), U.S. Army Corps of Engineers (Surveying and Civil Engineering), U.S. Air Force (Architectural, Mechanical, and Electrical Engineering at Grand Forks and Minot Air Force Bases), and the U.S. Fish and Wildlife Service (Contamination Investigation at Wildlife Refuges and Waterfowl Production Areas Offices). In addition to our current Professional/Technical Master Contract with the MPCA, WSN is also currently pre-qualified in Contamination Investigation Level 1 and Environmental Documentation Level 2 and 3 for MnDOT and has previously been a pre-approved Contamination Investigation and Environmental Site Assessment contractor for the Minnesota Department of Natural Resources.

Knowledge of MPCA Risk Based Site Evaluation Manual, UST, & AST Release Cleanup Guidance, VIC Guidance, and MDA Guidance Documents

WSN has been involved with the removal of underground and aboveground storage tanks for 30 years. In conjunction with the removal of petroleum storage tanks, WSN has completed hundreds of site investigations at petroleum release sites around Minnesota and eastern North Dakota. WSN is intimately familiar with the MPCA's guidance for Risk Based Site Evaluation, as we utilize the methodology as part of our standard operating procedure for asbestos inspections, underground/aboveground storage tank investigations, Phase II environmental site assessments (ESAs) and Petroleum Brownfield and VIC Guidance at commercial, industrial, and residential sites. We are currently using the VIC guidance for an investigation of a former car dealership in Owatonna, where a new apartment complex is being constructed. When new guidance is released, we quickly incorporate it into our procedures and consistently attend any related training provided by the MPCA's Petroleum Remediation Program. WSN is also intimately familiar with the MDA's guidance documents, having completed pesticide release and remedial investigations for the MDA for other parties in North Dakota. WSN staff use the MPCA guidance on a daily basis for our ongoing investigation and remediation work in Minnesota.

We have become very familiar with Chapter 115C and the Petroleum Tank Fund, commonly referred to as Petrofund. As MPCA's leaking underground storage tank program has developed, so has Petrofund. In response to these developments, WSN has found it necessary to become involved with the evolution of the fund as well as keeping up with the changes in the program. WSN completes almost 100% of our clients' Petrofund applications. Our client list consists of a mix of responsible parties and volunteers. In addition, we have worked with small gasoline retailers as well as personal residence sites that qualify for 92.5% reimbursement.

We are active in petroleum release cleanups and environmental assessments, having completed 20 asbestos inspections, 30 Phase I environmental site assessments, 13 Phase II environmental site assessments, and 22 remedial site investigations in the last five years. Additionally, we are currently contracted with one municipal and 12 demolition landfills for annual monitoring and reporting. A notable project which involved asbestos inspection, tank investigation/removal, and an environmental assessment that WSN has completed is the Digi-Key Alternative Urban Areawide Review (2017), which was adopted by the City of Thief River Falls on January 8, 2018.

Knowledge of MERLA, Land Recycling Act, RCRA, CERCLA, National Oil and Hazardous Substances Contingency Plan (NCP)

WSN has completed numerous environmental projects over the last two years that have fallen under the jurisdiction of CERCLA, MERLA, RCRA, and other

state and federal regulations. WSN regularly refers to Minnesota Statute 115B (MERLA), Minnesota Statute 115C (VIC), and 40 CFR Part 307 when working on projects involving hazardous materials. We deal with sampling and analyzing RCRA hazardous wastes several times a year. Many of WSN's staff maintain 40-hour HAZWOPER certifications and consistently attend trainings and seminars hosted by the MPCA. We regularly refer to Minnesota Rule 7035 for our municipal and demolition landfill work, with particular focus on MR 7035.2565 and 7035.2825 for the annual monitoring reports. On projects where underground storage tank removal is being done we adhere to Minnesota State Fire Code Sections 5704.2.13 and 5704.2.14, and Minnesota Rule 7150. For Petrofund projects we adhere to the standards detailed in Minnesota Rule 2890 and Minnesota Statute 115C. WSN has completed or updated twenty-five Spill Prevention Control and Countermeasure Plans, giving us ample experience with both the NCP, the Clean Water Act, and 40 CFR Part 112. WSN has completed 10 asbestos inspections in the last two years, all of which were conducted in accordance with Minnesota Statutes 326.70 to 326.81, with the recommended abatement activities being compliant with Minnesota Rules 4620.3000 to 4620.3724.

Remedial Investigation Experience

Hansel Residence Remedial Investigation

Dalton, Minnesota

Site Description

The Charles and Karen Hansel residence is located in a rural area south of Dalton, Minnesota. The Hansel's two-story farmhouse was heated with fuel oil, which was stored in a 275-gallon aboveground steel tank (AST) on the north side of the house. Hansel Lake is located approximately 250 feet south of the leak site, and there is small wetland about 750 feet to the north. The balance of the land within 1,000 feet of the site is slightly rolling, tilled agricultural farm land. The only building receptor within 100 feet of the release is the Hansel farmhouse. The water well record for the active on-site drinking water well indicates the well is screened at a depth of 147 feet. Water well records for area wells indicate clay and sandy clay are the primary soil types from the ground surface to a depth of at least 70 feet.

Project Description

The owners of the leak site experienced fuel oil odors in their farmhouse. The odors were reported to the Minnesota Pollution Control Agency on the following day. An emergency response contractor mobilized to the leak site under emergency status to assess the conditions expecting to mitigate the vapors in the living space. A mechanical soil vapor extraction system was installed near the AST and another was installed in the basement attempting to alleviate the indoor fuel oil odors. Widseth Smith Nolting (WSN) subsequently completed a Limited Site Investigation (LSI) Nonstandard Scope of Work where the vertical and horizontal extents of the release were defined. During the LSI, WSN verified the release was from a broken copper fuel oil supply line just inside the basement wall. It was apparent the mechanical equipment was not sufficient to stop the fuel oil odors from entering the interior of the Hansel farmhouse. It was determined the source of the odors was the petroleum saturated soil and rock basement wall. An indoor building survey was completed for the Hansel Residence and 24-hour Indoor air samples were collected to confirm that petroleum vapors were present.

Client

Charles and Karen Hansel

Contact:
Charles Hansel
218.589.8756

Consequently, WSN prepared a corrective action design (CAD) outlining a plan to mitigate the fuel oil saturated soil, eliminating the odors from the living space. The MPCA approved the CAD with the additional requirement of a site visit by WSN's structural engineer to determine if the farmhouse could safely be braced and supported to allow the safe removal of the petroleum impacted soil. WSN facilitated the competitive. The farmhouse was shored up and braced allowing the safe removal of approximately 15 cubic yards of fuel oil saturated soil. Because not all the contaminated soil could be removed without jeopardizing the structural integrity of the farmhouse, a vapor barrier and a passive vent system were installed prior to the construction of a new basement floor, foundation footings, and concrete block basement wall. A final site inspection was conducted by WSN's engineer and the project was deemed to be complete. Upon completion of the CAD, petroleum vapors were not present in the living space of the farmhouse. A Corrective Action Excavation Report was prepared and submitted to the MPCA. Based on the success of the corrective action project, the leak site file was closed.

Tasks Performed	Personnel Involved
Review site data from the MPCA project leader and the emergency response contractor to obtain information regarding past investigative work and petroleum vapor mitigation activities	Greg Smith (S2)
Coordinate and obtain access agreements to perform a LSI	Greg Smith (PM)
Coordinate boring placement, observe boring advancement, and collect soil samples during the LSI	Mike Bogart (FT)
Complete a Vapor Intrusion Interior Building Survey and Indoor Air Sampling	Mike Bogart (FT)
Prepare Corrective Action Design outlining a plan to mitigate the fuel oil release and improve the air quality in the Hansel farmhouse	Greg Smith (S2)
Conduct a site visit to assess the structural integrity of the Hansel farmhouse and complete site sketch	Mark Hallan (E4)
Prepare project plans and specifications to conduct the required corrective action	Mark Hallan (E4) Joshua Rebennack (CS)
Prepare bidding documents and facilitate the bidding process	Mark Hallan (E4) Greg Smith (S2) Joshua Rebennack (CS)
Conduct mandatory pre-bid meeting with prospective corrective action contractors	Mark Hallan (E4) Mike Bogart (FT)
Coordinate project schedule with the contractor and provide on-site observation for the general conformance of the plans and specifications	Mike Bogart (FT)
Observe excavation and screen soil with photoionization detector (PID) during removal of fuel impacted soil	Mike Bogart (FT)
Coordinate with a licensed well driller to seal the unused drinking water well	Mike Bogart (FT)
Conduct final project inspection	Mark Hallan (E4)
Prepare Corrective Action Excavation Report	Greg Smith (S2)

Subcontracted Tasks

The following tasks were subcontracted out.

- Drilling of five LSI soil borings
- Laboratory analysis of all soil and groundwater samples
- Shoring and bracing of the on-site residential structure to allow access for the excavation of the fuel oil contaminated soil
- Removal of basement floor, excavation of fuel oil contaminated soil from beneath the floor and excavate contaminated soil from the dirt and stone foundation walls of the residence
- Disposal of petroleum impacted soil at an approved landfill
- Construction of new masonry footing, concrete block basement wall, and concrete basement floor
- Reconstruction of electrical service and HVAC system
- Replacement/reconstruction of those portions of the residence that were removed to allow access to the contaminated soil

Outcome Achieved

The collection and analyses of the soil and groundwater samples collected during the LSI allowed for the delineation of the soil contamination. The LSI showed the petroleum impacted soil was confined to the north basement wall, under the basement floor, and the soil just outside the Hansel farmhouse, near the fuel oil AST. The removal of the petroleum impacted soil and the installation of the plastic vapor barrier and passive vent system eliminated the fuel oil odors from the interior of the Hansel farmhouse.

Johnson Oil-Riverside Bait and Tackle

Warroad, Minnesota

Site Description

The Johnson Oil-Riverside Bait and Tackle Facility is located in Warroad, MN. Johnson Oil owns the tanks associated with the Riverside Bait and Tackle facility and is the responsible party. A release at the site was reported in 2005. The facility is located in central Warroad and is bordered by State Highway 11 to the west, Lake Street NE to the north, and River Street NE to the south. The Warroad River is approximately 230 feet to the south. An abandoned school is located to the west across State Highway 11. The underground storage tanks are located west of the convenience store between the store and the dispenser island. The majority of the facility is covered with an impervious surface. A grassed park and boat parking/ docking area is located to the south of the facility. The site has historically been used as a gas station and bait shop. Currently the site is not being used and is vacant.

Project Description

The Riverside Bait and Tackle facility subsurface release was reported in 2005 after the removal of an underground storage tank. In response, a remedial investigation (RI) was initiated by another consultant. As part of this investigation, soil probes and associated soil and groundwater samples were collected and analyzed for petroleum contamination, and four monitoring wells were installed. One full year of groundwater monitoring was completed. Before the investigation was completed, the consultant went out of business and WSN was contracted to complete the remedial investigation. The available project files were sent to WSN. Initially, two rounds of groundwater monitoring and vapor sampling of the sanitary sewer was completed at the facility by WSN and a monitoring report and Conceptual Corrective Action Design Report (CCAD) was submitted to the MPCA. Data collected from monitoring wells located adjacent to the Warroad River showed that the contamination plume had reached the Warroad River and detections of DRO and GRO and benzene were present at levels that exceeded the Surface Water/Water Quality Standards for the Warroad River. Continued quarterly groundwater monitoring of the monitoring wells and vapor monitoring of the sanitary sewer has been completed at the facility. WSN also completed a Laser Induced Fluorescence Focused investigation to determine the presence and distribution of LNAPL, along with three additional soil borings to

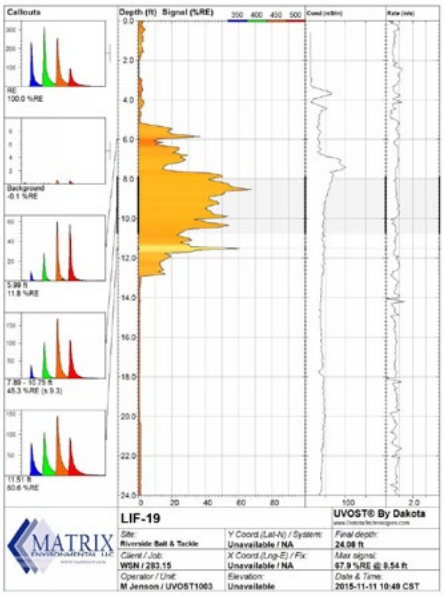
Client

Johnson Oil Company

Contact:
Todd Johnson
218.843.2681

confirm site stratigraphy and allow for grain-size analyses. The grain-size analysis results were reviewed to determine if the lithology at the Riverside Bait and Tackle site was too fine-grained to accommodate a sparge and/or vent system. As a result of the CCAD and LIF Focused investigation, an EDCAD has been completed with the goal of completing an excavation that targets the source of the contamination plume by removing LNAPL and any petroleum saturated soils present. As part of the excavation, the underground storage tank basin will be decommissioned, and the dispenser islands and associated piping will be removed. The corrective action is expected to be completed during the summer of 2018.

Tasks Performed	Personnel Involved
Reviewed available data from former consultant to obtain available information regarding past investigative work	Brian Ross (PM)
Coordinated and obtained access agreements for the advancement of LIF and soil probes	Ty Fuglseth (S1)
Performed a LIF Focused Investigation, including the coordination and oversight of the advancement of three soil borings, soil sample collection & analyses, and receptor surveys	Ty Fuglseth (S1) Mike Bogart (FT)
Completed and submitted a Focused Investigation Report to present the results of the LIF investigation	Ty Fuglseth (S1) Mike Bogart (FT) Brian Ross (PM) Joshua Rebennack (CS)
Completed quarterly monitoring of the monitoring wells and vapor sampling of the sanitary sewer	Ty Fuglseth (S1) Mike Bogart (FT)
Analyzed collected data and completed an EDCAD for the excavation of LNAPL and petroleum saturated soils at the site	Ty Fuglseth (S1) Brian Ross (PM) Joshua Rebennack (CS)

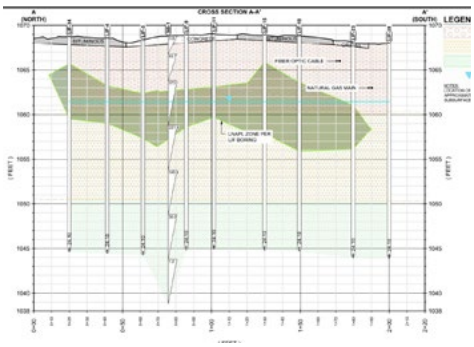


Subcontracted Tasks

The following tasks were subcontracted out.

- Advancement of LIF borings and soil borings
- Laboratory analysis of all soil and groundwater samples

Outcome Achieved



The collection of the soil and groundwater data allowed for delineation of the contaminant plume extent and magnitude. Groundwater analytical results from monitoring wells MW-2 and MW-3 located on the north edge of the Warroad River show that groundwater contamination exceeds the Surface Water/Water Quality Standards for the Warroad River for GRO, DRO, and benzene. Furthermore, the completion of the LIF Focused Investigation showed that LNAPL and petroleum saturated soils are present at the facility. The primary migration pathway for contaminants appears to be thin saturated silty and sandy zones within the till. A release has occurred at the site and has the potential to affect human health and the environment. It is expected that an excavation will be conducted during the summer of 2018 to address LNAPL and petroleum saturated soils to allow for the natural in-situ remediation of any remaining, unrecoverable contamination and prevent further surface water contamination of the Warroad River.

3. Scope of Services

Prepare Engineering Evaluation Cost Analysis (EECA)

Projects with local, state or federal funding typically require preparation of a preliminary report, feasibility study, facility plan or engineering evaluation cost analysis as named by the various regulatory or funding agencies. The numerous reports, studies, plans or analyses prepared by WSN engineering staff each year for various projects follow a similar format. Projects specific to environmental or remediation issues/action generally follow the outline below:

- Executive Summary: Brief summary of data, information and recommendations.
- Introduction: Outlines general information on the site characterization and may include history, previous investigations, actions, extent/nature/sources of contamination, risk evaluation and specific site information.
- Removal Action Objectives: This section identifies the scope, objectives, and goals for a non-time critical action. Specific objectives for the removal action are defined along with justification for the proposed action. Applicable or relevant and appropriate requirement (ARAR) groups are identified and brief descriptions are provided.
- Removal Action Technologies and Development of Alternatives: Options for applicable technologies to address the project needs are outlined in this section. If no specific option meets the project needs, then alternatives (combinations of options) are reviewed with recommendations of such to meet the project needs.
- Comparative Analysis of Alternatives: Options and/or alternatives are reviewed with respect to effectiveness and feasibility. Capital, operating, maintenance, periodic and salvage costs are estimated and evaluated for options or alternatives being considered. Environmental considerations are also identified along with how the environment may be impacted by the options or alternatives under review.
- Recommended Removal Action Alternative: Based on evaluation of the relative performance of alternatives reviewed, this section identifies the removal action alternative that best satisfies the project needs. Schedules, equipment, materials, preliminary design and general descriptions are provided specific to the project/alterative.

WSN works with regulatory agencies to help identify and confirm the scope of reports, studies, plans and analyses required for the project to allow both WSN and agency staff to proceed effectively while meeting the needs of the project.

Oversee or Conduct Pilot Testing of Remediation Systems

WSN has completed several pilot tests for a variety of engineered remediation systems including multiple SVE/AS systems, groundwater pump and treatment systems, and dual phase extraction systems. The pilot tests have been completed at several locations around northern Minnesota, including DNR release sites and near lakes and rivers. We have prepared Pilot Test Work Plans to provide background information on the site, strategy for remediation, a description of the equipment, details of testing procedures and monitoring, a discussion on how the data will be evaluated, and information on schedule and costs of the pilot test. WSN has coordinated the installation of monitoring points and observation wells to monitor the subsurface response of the pilot testing apparatus. We have purchased or rented the blowers and pumps needed to complete the testing process and have mobilized staff to the site to get the pilot testing completed. WSN staff are familiar with operation of pilot test equipment and the field instrumentation needed to monitor the subsurface response. We have tabulated and evaluated the data during and after the testing for inclusion in reports. WSN has prepared Pilot Test Reports, including those on Petroleum Remediation Program Guidance Document 7-06. The Pilot Test Reports include information on the site characteristics (i.e., site conceptual model), a description of the pilot test, including information on the different stages of the test, as well as any changes from the work plan. It also provides information

Tom's Resort Pilot Test, Cass Lake, MN

on the operation monitoring and subsurface response monitoring. The Pilot Test Reports discuss, in detail, an evaluation of the data, a feasibility determination of the proposed remediation, an evaluation of life-cycle costs, and an alternatives comparison. Finally, the reports provide a recommendation and proposed next steps for the project. WSN CCAD staff are familiar with the maps, cross-sections, and graphs needed to describe and display the results of the Pilot Testing.

Operate and Maintain Remediation Systems

Triangle Store East Remedial System Building, Brainerd, MN

WSN staff operate and maintain all the remedial systems we have installed. WSN has conducted operation and maintenance for a variety of engineered remediation systems including multiple SVE/AS systems, groundwater pump and treat systems, and dual phase extraction systems. WSN is also familiar with and has conducted operation and maintenance associated with thermal oxidizers and granulated activated carbon systems used to treat discharges from remediation systems. Our technicians are familiar with all components of the various remediation systems and are experienced in troubleshooting, repairing, and replacing equipment associated with the systems. The operation of the systems includes the collection of air and groundwater samples, regulation of flow rates for the sparge and vent blowers, removal of water from the condensate tank, collection of vacuum and pressure data from well heads, and measurement of PID and vapor concentrations from extraction points.

Remedial system maintenance performed by WSN includes tasks such as replacing air filter elements, changing oil in pumps, cleaning water treatment system components and changing bag filters. In addition to the collection of the air and groundwater samples, field measurements of several parameters are obtained to evaluate the effectiveness of natural biodegradation. These parameters include dissolved oxygen, nitrate, soluble iron, sulfate, temperature, and pH.

Prepare Corrective Action Design Documents

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Conceptual Corrective Action Design Report (CCAD)
Petroleum Remediation Program
Guidance Document 7-02
Doc Type: Corrective Action Design

Instructions: Complete this report to recommend a final corrective action. See Guidance Document 7-01 *Corrective Action Design and Implementation* for more information and requirements. Complete Section 1 if this report is not included as an appendix to Guidance Documents 4-06 *Investigation Report Form* or 4-08 *Monitoring Report*. Complete Section 2 for every corrective action. Complete Section 3 for a simple corrective action or Section 4 for a complex corrective action. Complete Section 5 if a remediation system or other in situ remediation technology is proposed. Do not revise or delete any text or questions from this report form. Items may be added if they are needed to support the corrective action design. If an item is not applicable, provide a brief explanation.

MPCA Leak ID: 11817 Report date: March 23, 2012

Responsible Party Information
Name: Genevieve Johnson Phone: 218.575.2244
Mailing address: 34217 Aztec Road
City: Motley State: MN Zip code: 56466
Alternate contact (if any) for responsible party: Mike Auger Phone: 218.575.2385

Leak Site Information
Leak site name: Johnson's Services Phone: 218.575.2385
Leak site address: 33885 Highway 10
City: Motley MN Zip code: 56466 County: Morrison

Consultant (or other) Information
By signing this document, I/we acknowledge that we are submitting this document on behalf of and as agents of the responsible person or volunteer for this leak site. I/we acknowledge that if information in this document is inaccurate or incomplete, it will delay the completion of remediation and may harm the environment and may result in a reduction in Petrofund reimbursement. In addition, I/we acknowledge on behalf of the responsible person or volunteer for this leak site that if this document is determined to contain a false material statement, representation, or certification, or if it omits material information, the responsible person or volunteer may be found to be in violation of Minn. Stat. § 115.075 (2007) or Minn. R. 7000.0300 (Duty of Candor), and that the responsible person or volunteer may be liable for civil penalties.

Company name: Widseth Smith Nolting
Mailing address: 7804 Industrial Park Road
City: Baxter State: MN Zip code: 56425
Project manager name: Greg Smith Phone: 218.316.3623
Fax: 218.829.2517 E-mail: Greg.Smith@wsn.us.com

Report Author(s)
Print name: Greg Smith Title: Professional Geologist
Signature: Gregory W. Smith Date: 3/23/2012
Print name: Title:
Signature: Date:

www.pca.state.mn.us • 651-296-6300 • 800-657-3864 • TTY 651-282-5332 or 800-657-3864 • Available in alternative formats

Conceptual Corrective Action Design Report (CCAD)

WSN has prepared a variety of CAD documents including Conceptual Corrective Action Design (CCAD) Reports, Focused Investigation (FI) Reports, Pilot Test Reports, Remediation System Detailed Design (SDCAD) Reports, Excavation Detailed Correction Action Design (EDCAD) Reports, Monitoring Reports, detailed plans and specifications for construction of remediation systems, remediation system operation reports, and as-built drawings. We have 30 years of experience in the preparation of these documents for sites across Minnesota and North Dakota. Our Corrective Action Design Documents are prepared by using the MPCA Petroleum Remediation Program corrective action guidance documents 7-02 through 7-08 or by using a template designed by WSN. TThe documents generally include a format of some background information about the site characterization, an overview of the CAD, followed by a detailed description of the proposed work, how the work will be monitored, the projected outcome, and an estimation of costs associated with the CAD. The figures included in the CAD documents show the site location, site details, location of investigation elements, location of wells and borings, CAD details, monitoring results, and cross-sections of the target zone.

Prepare Health and Safety Plans (HASP)

WSN standard procedures include preparing a site-specific HASP for each site that requires on-site activities. The level of detail for each HASP depends on the complexity of the work required for the site. A HASP prepared by WSN typically includes the following elements;

- Site location and project contact information
- Local emergency contact information, hospital location, and map
- Assignment of site safety responsibilities
- An evaluation of site hazards, including chemical, physical, and biological hazards, flammability, excavation, mechanical, drilling, electrical, utility, confined space, traffic, railroad, and temperature
- Personnel training, job safety meeting, and surveillance requirements

- Personal protective equipment requirements and upgrade and downgrade thresholds
- Monitoring procedures, equipment and applicable action levels
- Site control measures such as entry and egress, communication, site rules and work zones
- Safety Data Sheets (SDS)

Oversee Site Investigation Services for Soil Boring Advancement and Monitoring Well Installation using both Standard Drilling Methods and Direct Push Methods

WSN is a licensed monitoring well contractor and is very familiar with drilling and well installation techniques. Our scientists and field technicians are very familiar with standard drilling methods and push probe technology. We have extensive experience with mud rotary drilling, cable tool drilling, Rotosonic drilling, and laser induced fluorescence (LIF) probing. WSN does not use solid-stem flight augers unless prior approval is received from the MPCA's project hydrologist. WSN staff are very familiar with the standard drilling method of hollow stem augers with split spoon sampling. We have used hollow stem auger drilling to define the geology at hundreds of petroleum leak sites but have switched to using more push probe drilling for its speed and cost efficency. The continuous core samples obtained when using push probe drilling provides an accurate lithology assessment during a release site investigation. This allows field personnel to make informed decisions during field investigations and enables the relay of pertinent information to the project manager for assistance in the decision-making process.

Rotosonic Drilling for City of Biwabik Assessment

Push probes are the most common drilling method WSN has used for field investigations at contamination sites. Push probes are often used in the early stages of an investigation to define the extent of contamination as well as determine site lithology. Push probes allow field personnel to collect continuous core samples with a less intrusive operation. WSN also uses push probe methods after the site geology has been defined but further definition of the contaminant plume is required. With the push probe method, discrete samples can be obtained with less risk of cross-contamination. Having worked at leak sites across the entire state of Minnesota, we have encountered many different types of geology and, thus, have a good understanding of the advantages and disadvantages of each drilling method.

WSN typically uses hollow stem auger drilling for the installation of groundwater monitoring wells. However, WSN personnel have installed drive point wells at locations inaccessible by truck mounted drill rigs. We have been involved with the installation of hundreds of monitoring wells at many petroleum leak sites across Minnesota. At a small number of these leak sites, a downward vertical hydraulic gradient is present, which requires the installation of nested wells. WSN personnel are on-site to verify the wells are installed at the appropriate locations and are constructed in accordance with MDH and MPCA guidelines and regulations. WSN has also directed the installation of nearly 100 monitoring wells for MPCA's Ambient Groundwater Monitoring Network.

WSN completes a drilling log for every soil boring that is advanced under our direction and prepares well construction diagrams when monitoring wells are constructed, in accordance with the MPCA Guidance documents.

Conduct Ground Water, Soil, Surface Water, Sediment, Ground Water and Air Sampling and Monitoring

WSN personnel have collected thousands of soil and groundwater samples and numerous surface water, sediment, and air samples from dozens of sites throughout the state of Minnesota. These sites include underground and above ground storage tanks, sanitary and demolition/debris landfills, private and public water systems, residential and business sites, and wastewater treatment systems. WSN personnel are experienced in the sampling methods and equipment needed to sample water, soil, and air resources. Including pumps (e.g., submersible, air diaphragm, bladder, and purge) and bailers (e.g., stainless steel, PVC, and Teflon®) for groundwater, and automated water bottle samplers for surface water. Soil sampling is performed using drill rigs equipped with hollow stem augers and split spoon samplers, push probes with continuous core sample capabilities, hand augers, manual push probe corers, and the occasional shovel. WSN personnel are experienced in sediment sampling using methods such as Coliwasa samplers and box cores and air sampling using vacuum canisters in conjunction with Tedlar sample bags, Drager tubes, and Suma canisters. WSN staff is experienced in conducting on-site field analyses of groundwater and surface water samples for parameters including pH, conductivity, dissolved oxygen, temperature, nitrate, iron, sulfide, and hardness. WSN is also familiar with the proper handling and chain-of-custody procedures and other paperwork necessary when samples are collected for field and/or laboratory analysis.

Installation of Passive Soil Gas Monitoring Canisters Biwabik Site Assessment, Biwabik, MN

Conduct Vapor/Air Monitoring for Health and Safety and Air Quality Criteria

WSN conducts air monitoring in the breathing zone during field activities that could result in the potential exposure to high petroleum vapor concentrations. This monitoring is typically conducted using a PID. WSN has also used colorimetric direct reading gas detection tubes and sampling devices to measure specific gas concentrations in the field.

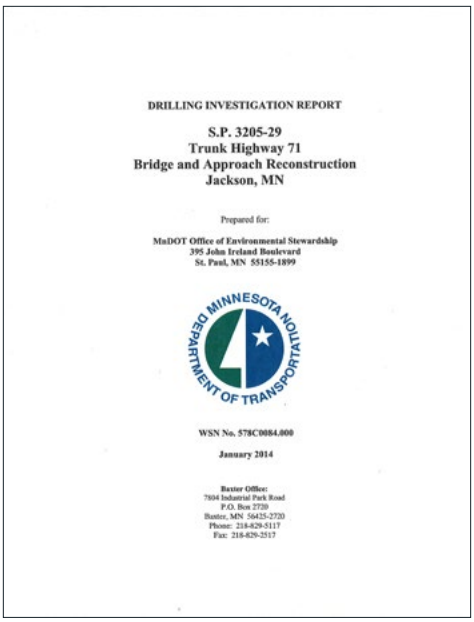
WSN has conducted indoor air sampling to determine potential vapor intrusion impacts. This sampling was conducted using Summa canisters with flow regulators. An Occupied Dwelling Questionnaire was completed prior to each sampling event and instructions were provided to the occupants to minimize the potential for cross contamination. Samples were collected over a 24-hour period and a background sample was collected during each sampling event.

At various contamination sites, the results of the vapor assessment indicate that a vapor survey should be completed in the areas where petroleum vapors could accumulate or migrate. These areas include backfilled utility trenches, sanitary and storm sewers, basements, and crawl spaces. WSN has been involved with numerous release sites where vapors have been detected and where the conditions are conducive to vapor migration or accumulation. When either of these situations are present, vapor monitoring is typically completed.

WSN is involved with a particular release site where a combination soil venting/air sparging system has been installed for the remediation of gasoline impacted groundwater. Vapor monitoring of an adjacent basement is completed periodically to assure the operating system is not forcing petroleum vapors into the structure through sewer drains or cracks in the basement walls or floor. At another petroleum release site, it was determined that a gasoline release had impacted the local sanitary sewer and storm sewer. A blower was installed to assist in the mitigation of the vapors. The source of the contamination has been removed and the blower is no longer needed; however, vapor monitoring is ongoing. WSN personnel periodically check 23 locations over a six-block area for the presence of petroleum vapors using an explosimeter and PID. During the vapor monitoring program, records are kept documenting the time, monitoring point, and explosimeter and PID readings. This documentation is important in making an informed decision as to when the petroleum vapors are no longer a threat to human health.

Vapor Monitoring, Sikorski Residence, Roseau, MN

Conduct and/or Oversee Site Assessment Activities (Phase I and Phase II), Limited Site Investigations, and Remedial Investigations



DRILLING INVESTIGATION REPORT

S.P. 3205-29
Trunk Highway 71
Bridge and Approach Reconstruction
Jackson, MN

Prepared for:

MnDOT Office of Environmental Stewardship
395 John Ireland Boulevard
St. Paul, MN 55155-1899

MINNESOTA DEPARTMENT OF TRANSPORTATION

WSN No. 57BC0084.000

January 2014

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Having completed more than 100 Phase I and/or Phase II Environmental Site Assessments (ESA), WSN is very familiar with the American Society for Testing and Materials (ASTM) standards for environmental site assessments (E 1527-05). Clients have included municipalities, financial institutions, hospitals, realtors, resorts, manufacturing facilities, corporations, individuals, and government agencies. Facilities have consisted of gasoline retail stations, dry cleaning facilities, auto body and service stations, hospitals, retail buildings, resorts, and manufacturing facilities.

Over the past five years, WSN has completed or is currently involved in two large Phase I and Phase II ESAs for MnDOT. The ESAs have been performed on the mid-town highways in Jackson and Thief River Falls. The study areas are one to two miles long.

WSN was recently involved with a Phase II ESA at a former steel garage door manufacturing facility. Review of a Phase I report indicated that petroleum storage tanks were present on the property in the past and that solvents were used as part of the manufacturing process. Because the client was purchasing the property, a Phase II was recommended to determine if past activities had impacted the property. The Phase II ESA included the advancement of several soil borings to collect soil and groundwater samples to determine if any contamination was associated with the property. Results of the Phase II indicated that petroleum contaminants were present in the soil and groundwater underlying a portion of the property. The release was reported to the MPCA Duty Officer and a leak number was issued. WSN performed additional research into the location of the former storage tanks and into contamination associated with a known release site that is located immediately adjacent to the property. The data collected supported the theory that the contamination encountered in the Phase II boring was likely related to the adjacent property release and not from the former garage door facility. This information was submitted to the MPCA for final determination as to whether the on-site contamination is associated with the adjacent property and to determine if the new leak site would be closed without additional investigation. If the MPCA determines that the contamination is not related to the adjacent property, a remedial investigation will be conducted to better define the extent of contamination and determine if the contamination is a risk to human health and the environment.

WSN has completed hundreds of remedial investigations (RI) and limited site investigations (LSI). Because MPCA's Remediation Program is a risk-based program, WSN performs an LSI with an objective to quickly evaluate the level of risk associated with the petroleum release. If the information collected during the LSI indicates groundwater monitoring wells are required, a full RI is performed. WSN has completed RIs where only three monitoring wells are necessary to define the extent of the groundwater contamination. On the other hand, we have investigated a petroleum release site with strong, vertical and horizontal gradients and 20 monitoring wells were necessary to adequately define the extent of the contaminant plume.

Conduct Surface Water, Groundwater, Air, and Vapor Receptor Surveys

Petroleum release investigations generally require the performance of one or a combination of the three risk assessments. Over the past five years, WSN has completed surface water, groundwater, and vapor risk assessments for release sites throughout Minnesota.

We consider the groundwater risk assessment as a two-phased event. When the results of an LSI indicate significant petroleum contamination, it is then necessary to determine if the release poses a risk to the local groundwater. Assuming further investigation discovers that the risk is imminent or the groundwater has been impacted, the second phase of the groundwater assessment would be performed to

determine if the aquifer is a resource aquifer or if there is sufficient distance between the impacted unit and the first resource aquifer. In either case, a water well survey, including a MGS well search and 500-foot walking survey, should be completed to ascertain the risk to local drinking water wells.

The first described risk assessment was concerned with the impacts or potential impacts to the groundwater. Assuming the groundwater was found to be contaminated, it may be necessary to complete a surface water risk assessment. This assessment considers the potential impacts through the discharge of contaminated groundwater to surface water including rivers, lakes, and wetlands. In conducting the surface water assessment, WSN first identifies those waters within one-quarter mile of the release. We then proceed with a review of the results of the remedial investigation with particular emphasis on determining if there is a clean downgradient monitoring well or soil boring between the point of the release and the concerned surface water. Assuming a clean sampling point downgradient of the release, an assessment would be completed discussing the contamination risk potential to the identified surface water.

Although not as prevalent as the impacts to the waters of Minnesota, the conditions produced by the migration or collection of petroleum vapors typically require immediate attention. Depending on the surrounding soil conditions, petroleum vapors may readily move through the ground and can produce explosive conditions. Because of these potentially dangerous situations, vapor risk assessments are an important part of a petroleum release investigation and should be implemented soon after discovering the release. The most critical vapor risk setting is when the contaminated groundwater intersects utility trenches, basements, and sewer lines. In a scenario such as this, the assessment would include a discussion regarding the location of these subsurface features with respect to the release or the impacted groundwater. If it is determined that there is a history of vapor impacts in the area or the potential for vapor migration or accumulation exists, a vapor survey would be completed as soon as possible.

Oversee Construction to Mitigate Vapors and Conduct Non-Construction Mitigation Measures

WSN has varied experience with the mitigation of petroleum vapors. WSN staff was responsible for maintaining a vapor mitigation system that had been installed to remove vapors from the storm sewer system in Herman, Minnesota. This included performing monthly and/or quarterly vapor surveys of the sewer system to ensure the vapor mitigation system was operating properly. A recent project completed by WSN consisted of design and oversight of a corrective action to mitigate vapor intrusion resulting from a release that seeped below the basement of a residence. The corrective action involved removing the basement floor to excavate the petroleum contaminated soil, followed by installing a venting system, sealing the cores of the basement wall, and replacing the basement floor. WSN was involved in the mitigation of petroleum vapors in the basement of a retail business in Greenbush, Minnesota, where free product had seeped into the basement, causing vapor concerns, such as inhalation and explosion. WSN has also been involved with a site in Crookston, Minnesota where petroleum vapors from a ten-year-old release began impacting a private residence. WSN was retained by the home owner to investigate the situation under emergency status. We advanced several hand-augered soil borings inside the basement to determine if free product was still present. When product was not found, WSN designed and implemented a corrective action that entailed the installation of a vapor barrier and a new basement floor to mitigate the vapor issues. WSN staff also have experience with the various components of the vapor mitigation systems such as piping, circuit breakers, switches, blowers, timers, etc., to aid in the proper design and operation of vapor mitigation systems.

Vapor Mitigation Blower

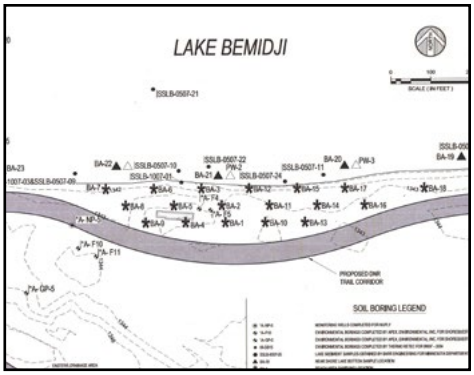
Install Stainless Steel Soil Gas Sampling Ports using Electric Drill Through Floor Slabs

WSN has installed several sub-slab soil gas sampling ports across the state of Minnesota by drilling through floor slabs. Realizing the importance of collecting samples without leakage from above the slab, a hammer drill is generally used to create a hole for vapor port installation and a concrete slurry is then used to seal the port into place. We are experienced with the MPCA's sample train setup and Summa® canister use. We are also familiar with the MPCA's water dam testing procedure and the Vapor Pin® Kit for more convenient and quicker sampling of inset flush-mounted installation.

Arrowhead Cleaners, Grand Rapids, MN

Oversee Construction to Complete Sediment Sampling and Non-Construction Sediment Sampling as Needed

WSN has project experience with contaminated sediment sampling from lakes and stormwater basins. The most notable of these projects was sampling sediments through the ice on Lake Bemidji as part of a Development Response Action Plan (DRAP) for the Lake Bemidji South Shore Development Project. The sampling was conducted with a geoprobe to obtain cores of the sediment for analysis and material description. After taking the sediment samples, they were moved into a temporary, warm structure to prevent freezing and allow for soil screening of organic vapors. The sediment samples were analyzed for diesel range organics (DRO), polynuclear aromatic hydrocarbons (PAHs), and RCRA metals. In addition, three sediment composite samples were analyzed for dioxins, organochlorine pesticides and herbicides. Porewater samples from the sediment were also obtained and analyzed for volatile organic compounds (VOCs) and formaldehyde. The results of the sampling were included in a Phase II ESA Report. Sediment sampling in stormwater settling ponds has mainly been for metals and semi-volatile organics.



Conduct or Oversee Operation and Maintenance on Remedial Systems

WSN's staff operates and maintains all the remedial systems we have installed. WSN has conducted operation and maintenance for a variety of engineered remediation systems including multiple SVE/AS systems, groundwater pump and treat systems, and dual phase extraction systems. WSN is also familiar with and has conducted operation and maintenance associated with thermal oxidizers and granulated activated carbon systems used to treat discharges from remediation systems. Our technicians are familiar with all components of the various remediation systems and are experienced in troubleshooting, repairing, and replacing equipment. Our experience in system operations include the collection of air and groundwater samples, regulation of flow rates for the sparge and vent blowers, removal of water from the condensate tank, collection of vacuum and pressure data from well heads, and measurement of PID and vapor concentrations from extraction points.

Remedial system maintenance performed by WSN includes tasks such as replacing air filter elements, changing oil in pumps, cleaning water treatment system components and changing bag filters. In addition to the collection of air and groundwater samples, field measurements of several parameters are obtained to evaluate the effectiveness of natural biodegradation. These parameters include dissolved oxygen, nitrate, soluble iron, sulfate, temperature, and pH.

Arrange for Transportation, Storage, and Proper Management of Wastes

WSN has been involved with numerous corrective action sites where wastes are generated and need to be managed. Wastes commonly generated during the course of corrective action activities include contaminated groundwater, contaminated soils, and free-product. WSN staff is experienced in the removal, storage, transportation, and treatment of wastes generated through corrective action activities. WSN has worked with numerous contractors including excavators, truckers, thermal treatment operations, and land farm operators, as well as private landowners where arrangements have been made to treat contaminated soils. WSN staff is also familiar with completing the necessary applications and notification forms required by the MPCA to track the progress of soil treatment activities. These include land treatment site approval, approval to thermal treat, soil batch approval, notification of spreading contaminated soils, and soil monitoring results reporting. WSN has arranged for pumper trucks to remove and dispose of wastes (i.e., old product and contaminated groundwater) found in underground and above ground storage tanks before removal. We have also coordinated the removal of highly contaminated groundwater from underground storage tanks prior to excavation. WSN personnel have also arranged for drums and/or skid-mounted storage tanks to be on-site for the temporary storage of free-product recovered as part of corrective action and subsequent disposal of the recovered free-product and/or contaminated groundwater waste.

Rotosonic Drilling Waste, Biwabik Assessment, Biwabik, MN

Evaluate the need for and Oversee the Implementation of Alternative Drinking Water, Including Point-of-use Treatment (i.e. Carbon Filtration)

WSN's staff has been involved with the installation of several alternative water supply sources and two point-of-use treatment systems. The alternative water supply source investigations required the assessment of the current water supply source, investigating the geology to locate another aquifer, completing the specifications for a new well and installing the new well using registered well contractors. The point-of- use treatment included maintaining an activated carbon filter system to remove the contaminants from the water supply system. WSN staff have also been involved in the location of new well fields/alternative water supply sources for numerous communities around Minnesota, including an alternative water supply source for a community whose municipal well had been contaminated with nitrates. In addition, WSN staff has designed extensions of municipal water supply systems to connect private residences and businesses throughout Minnesota. In some of these designs, the driving force was impacted private water supplies and the presence of a municipal water supply system in the area.

Sioux Oil GAC System (point of use treatment)

Evaluate, Monitor, Design and Remediate Contaminated Sediment and other Necessary Restorative Activities

The Lake Bemidji South Shore Beach project included working on design plans to monitor and remediate contaminated sediment from the future beach area. The extensive amount of wood debris from past lumber mills at the site complicated the remediation solution. As part of the South Shore Project, WSN restored several wetland areas that had been impacted by brownfield industrial-use areas along the shore. After removal of the contaminated materials the areas were stabilized with wetland vegetation and erosion control nets. The areas became part of the wetland mitigation completed for the project due to impacts to wetlands from new roads and building areas.

Coordinate Remedy Planning, Restoration Planning, and End Use Planning

WSN does a lot of planning in general for land use in cities where we are the designated city engineer and where our surveyor teams are completing planned use developments (PUD)s). Often times the planning is for Brownfield sites, where WSN coordinates the remediation and restoration activities for the site and competes the layout of the properties for development and roads. We have worked on several such sites in Minnesota including the Pine River Wood Products development area in Pine River, MN, the Agassiz Townhomes project in Crookston, MN, the Former Falls Fabricating in Little Falls, and the Warroad Park site (Former Warroad Care Center) in Warroad, MN. The most notable site WSN has worked on for remediation planning has been the Lake Bemidji South Shore Development project where, as part of redevelopment of large brownfield area, we planned an extensive Response Action Plan (RAP) for handling the contamination, restoring contamination, especially excavation areas, and layout of large scale mixed use development which include the Bemidji Regional Event Center, now the Sanford Center. The end use plan general PUD seen in the plan map to the right.

Bemidji South Shore Development, Bemijdi, MN

Search, Gather, and Evaluate Bathymetric Data

WSN has extensive experience finding and gathering bathymetric data for many of our water resource, road improvement, and hydrographic surveying projects. Our water resources team finds available data and gathers additional depth data for projects involving river gauging stations and river and lake crossings. Our environmental staff have been involved in several lake studies in which depth, sediment type, and vegetation species information was collected. Many of our road projects are adjacent to lakes, requiring the acquisition of depth information for road slope design and erosion control. In addition, our hydrographic surveyors have worked on several projects to measure depth of lakes and major river impoundments for projects with the DNR, MnDOT, and the Corps of Engineers. We are currently working on the Marsh Lake restoration project in western Minnesota for construction of a new variable water level control outlet structure and new fish ladders for the old fixed crest dam. Another recent project was part of a DNR dredging project on a Mississippi River impoundment backwater near Wabasha, MN. This project involved measuring the depth of the lake bottom during dredging operations to determine and evaluate dredging success.

Hydrographic Survey of Goose Lake, Kellogg, MN

Coordinate and Cooperate with other State-Contracted Services such as Sampling and Analytical, Emergency Response Contrators, and Hazardous Waste Services

WSN coordinates with other State contractors for their services on a regular basis. Throughout the past few years, we have worked with State- contracted laboratories and drilling companies on over 100 projects. Initially, a project manager verifies that the tasks assigned to the State contractor are within the scope of the State Contract prior to issuing a State Contract Order Form (SCOF). We complete the SCOF using the State contractor's information and the unit prices listed in the applicable Minnesota Department of Administration's Contract Release. We are aware that it is essential the SCOF is signed by WSN and the State contractor before commencing the work.

WSN has also worked with State contractors for electrical services. Four active sub slab vapor points and an exhaust fan were installed to remove vapors from the basement of a residence in Moorhead. The current owner of the home is not the responsible party and chose not to pay the electrical charges associated with the vapor extraction system. Consequently, a State contracted electrician was retained to install a separate electric meter for the vapor extraction system.

Benzene was detected in a drinking water well above the established health risk limits (HRLs) at a petroleum release site in Winger. WSN coordinated with the MPCA

and a State emergency response contractor to expedite the installation of a carbon filter treatment system at the residence until a long term drinking water solution could be implemented. Because WSN was responsible for the maintenance of the treatment system, we also found it necessary to work with a State contractor to obtain replacement carbon filters and dispose of the contaminated carbon.

Arrange for Geophysical Activities

WSN does not have geophysical capabilities in house, but has subcontracted geophysical studies to several subcontractors. We have used subcontractors for magnetometer surveys, seismic refraction/ reflection surveys, and resistivity studies. We have also worked with the Minnesota Geological Survey in using Bouguer gravity anomaly readings in searching for new water supply sources for communities in Minnesota. WSN staff members are familiar with the purpose and applicability of other geophysical techniques including seismic reflection/refraction and ground penetrating radar. Recently, we have worked with the City of Little Falls in assisting with completion of a seismic reflection survey to determine depth to bedrock as part of their search to locate a bedrock valley for new water well locations. We are currently working with their staff to conduct a magnetometer search for old municipal wells as part of their wellhead protection plan implementation.

Seismic Refraction Survey, Little Falls

Oversee Subcontractors and State Contractors During Investigation and Cleanups Oversee Tank Removals

WSN routinely performs oversight of contractors and subcontractors during investigation and clean up. Subcontracted tasks for which WSN provides oversight for includes drilling services, excavation, remedial system installation, equipment assembly, electrical, plumbing, demolition, application of soils, dewatering, composting, and construction. WSN has provided oversight for all phases of several remedial system installations and multiple contaminated soil excavations. In addition, WSN has provided oversight of utility contractors during removal of soil contamination during utility projects.

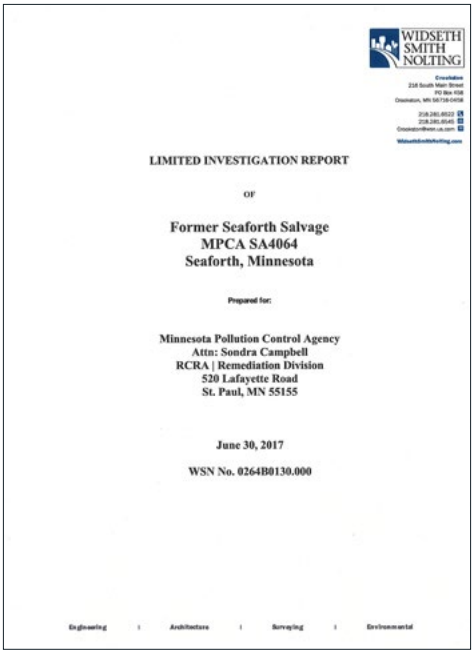
Observing State Contractors, Mitigation Project

WSN worked with Otter Tail County on a project that consisted of three tax forfeited properties, all containing underground petroleum storage tanks. In addition to the tanks, each site contained abandoned buildings, which also needed to be razed and removed. WSN was responsible for the preparation of bidding documents for the removal of any and all petroleum storage tanks and the removal of all on-site structures and debris. It was decided to award the work at all three sites to one contractor. WSN provided the oversight at all three sites. Along with the preparation of the bidding documents and assisting the County in selecting a contractor, WSN was on site to assure the work was completed in accordance with the scope of work outlined in the project specifications.

WSN has been involved with tank removals at petroleum sites since we began doing environmental work. As an engineering and environmental consultant to several Counties and Cities, WSN has designed tank replacements for many different sites, including airports, a bus garage, an electric power plant, nursing homes, maintenance garages, fish hatcheries, wastewater treatment plants, and schools. These replacements have included removing tanks from 300 to 15,000 gallons in size. We are familiar with the issues and problems involved in tank removals. Another area we have utilized our tank removal expertise is assisting Counties with removal of tanks on their tax-forfeited properties. Recently, we have been involved with numerous above ground tank removals, both as a prime contractor and as a subcontractor to tank contractors. WSN has also overseen the removal of several abandoned tanks encountered during utility installation projects. These tanks typically are not anticipated and must be addressed after they are discovered.

Prepare and Evaluate Reports (e.g., Investigation Reports, Monitoring Reports, Free Product Recovery Reports)

There are numerous documentation reports associated with MPCA's Superfund program. The report most often associated with investigations is the Remedial Investigation (RI) Report Form. This report is used to document work performed during the Remedial Investigation. The RI Form will provide sufficient information to allow the MPCA's project manager to make an informed site cleanup decision. As directed, care is taken not to revise or delete any part of the text or questions in the RI Report. Furthermore, to assist MPCA's project manager in the decision making process, WSN personnel are encouraged to provide any additional investigative information that they believe will assist MPCA in making a site cleanup decision. Other information is added in the appendices such as analytical data, boring logs, monitoring well construction logs, methods, and procedures, and previous reports, if available. WSN as completed investigation report forms for hundreds of sites since the early 1990s.


WIDSETH SMITH NOLTING

LIMITED INVESTIGATION REPORT

OF

Former Seaforth Salvage
MPCA SA4064
Seaforth, Minnesota

Prepared for:

Minnesota Pollution Control Agency
Attn: Sondra Campbell
RCRA | Remediation Division
520 Lafayette Road
St. Paul, MN 55155

June 30, 2017

WSN No. 0264B0130.000

Engineering | Architecture | Surveying | Environmental

WSN has done several assessments for the MPCA to determine the nature of contamination so that MPCA staff can determine their next step. The reports may range from including Phase I Environmental Assessments to Assessment Reports that simply discuss the sampling results. In all of these reports, we pride ourselves on providing detailed site maps so the buildings, roads, borings, and other structures are spatially accurate.

The MDA also has a series of guidance documents starting with the Remedial Investigation Work Plan (Document GD9) and going through Groundwater Sampling Guidance (GD12). WSN has worked with all the documents and is familiar with the documents and MDA's approach both by working directly for MDA and by working with private parties required to address the contamination.

Evaluate Invoices

WSN has a system set up to evaluate invoices. When subcontractor invoices are received, they are reviewed by the project manager who compares the work requested with the billed amount. The project manager then checks the field reports to confirm that the number, amount, and type of units on the invoice match what was completed in the field. If there is a discrepancy, the project manager contacts the subcontractor and resolves the discrepancy or asks for a new invoice. Once the invoice reflects the work completed, the project manager signs and dates the invoice, dates it, puts the WSN project number on it, makes a copy for their file, and sends the original to our business office for billing.

Collect and Manage Field and Laboratory Data for Electronic Submittal in a format specified by MPCA

WSN collects and manages large amounts of field and laboratory data for submittal to MPCA in the electronic data delivery (EDD) format. WSN has worked with labs to provide the data to us in formats where we can download the data directly into MPCA tables within report worksheets. The project manager reviews the data reports to see that they are complete, contain the data requested, the data QA/QC is reported, and the data match the field reports. If there are discrepancies, the project manager contacts the subcontractor to resolve the difference and/or obtain a revised data report. WSN samples groundwater monitoring wells at several landfills and the EDD system is used by us to submit the data to MPCA as part of the permit. In addition, WSN samples surface water at MPCA Watershed Pollutant Load Monitoring Network (WPLMN) sites in the central portion of the state for the Mississippi Headwaters Board (MHB). The field data from this sampling is submitted to MPCA in the Canvas® format and EQUIS template. The analytical data is submitted to MPCA using the EDD system.

Evaluate Data Quality and Data Verification Reports

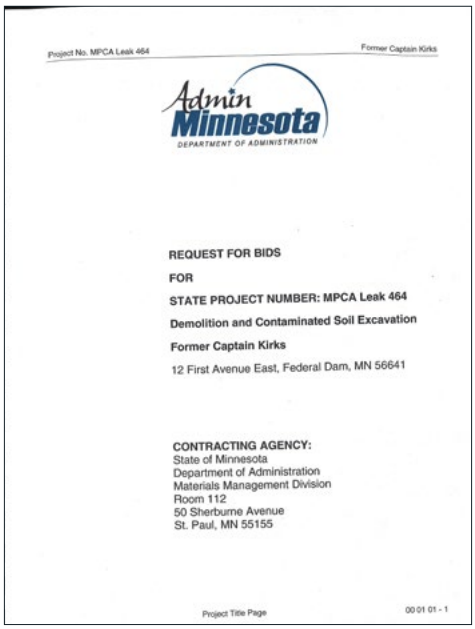
In preparing data verification reports, WSN follows the criteria listed in MPCA's fact sheet "Laboratory Data Checklist." WSN's project manager is responsible for reviewing the laboratory data and preparing the associated data verification report. After the data has been sufficiently reviewed, a report is prepared which includes information regarding hold times, laboratory calibrations, reporting limits, and analytical results of blanks, surrogate, and matrix spike samples. An overall assessment or summary of the data is included and the report is signed by the project manager.

Arrange for Site Access

WSN routinely works with clients and adjacent property owners for site access with respect to petroleum-related investigative activities. Clients are informed about the details of the investigative activities and how they relate to site access issues such as drilling in drive areas, tank and piping and dispenser areas, and other areas that may be difficult to access. Any client concerns about access locations and access times are taken into consideration when performing investigations. Access to immediately adjacent properties is also necessary in many projects. If off-site access is necessary to complete an investigation, the client is informed and asked for their input into the adjacent property on items such as owner name and relationship with the adjacent owner. WSN subsequently contacts the property owner and discusses the ongoing investigation and explains the need to access their property for completing the investigation. If access is granted, an agreement is obtained in writing from the adjacent property owner prior to continuing the investigation. If sufficient information regarding the likelihood of needing off-site access is known, prior to initiating the investigation, access agreements would be obtained before beginning investigative activities to avoid delays. WSN is also familiar with the procedures and policies employed by the local railroads for obtaining access to railroad property for investigation and remediation activities. WSN personnel have also completed the Contractor Orientation Course required by the railroad to access their right-of-way for investigative activities. WSN has experience negotiating access agreements with private parties, cities, counties and MnDOT.

Coordinate Utility Locates by Contacting the appropriate entity and if applicable Coordinate Traffic Control

WSN is very familiar with utility locates and utility meets. Prior to completing any subsurface investigations (i.e., soil probes, soil borings, test trenching, excavation, etc.) WSN contacts Gopher State One Call to complete a utility locate. Whenever possible, a utility meet is performed instead of a blank locate. We feel a utility meet is a better means to reduce the chance of encountering underground utilities because the locations of the proposed underground work can be directly relayed to the respective utility locators. In addition, a utility meet is also preferred by the utility companies because it reduces the time they spend on locates and helps maintain good working relationships with the utility companies. WSN has also contracted with a private utility locator to perform a locate on areas or properties that have limited and/ or incomplete public utility or private utility information. On occasion, investigation activities occur within an area where traffic control is needed. In such instances, WSN has engineers that are familiar with traffic control and signage issues. If necessary, a traffic signage company such as TSS or 3D is contacted about setting up the appropriate signage. In instances that do not involve a state highway, the local governing agency is contacted to coordinate traffic control issues.


Project No. MPCA Leak 464 Former Captain Kirks

Admin Minnesota
DEPARTMENT OF ADMINISTRATION

REQUEST FOR BIDS
FOR
STATE PROJECT NUMBER: MPCA Leak 464
Demolition and Contaminated Soil Excavation
Former Captain Kirks
12 First Avenue East, Federal Dam, MN 56641

CONTRACTING AGENCY:
State of Minnesota
Department of Administration
Materials Management Division
Room 112
50 Sherburne Avenue
St. Paul, MN 55155

Project Title Page 00 01 01 - 1

Prepare and Evaluate Bid Specifications

WSN specializes in preparing bid specifications because we are the municipal engineer for many large construction projects, including remediation, in Minnesota and North Dakota. Our support staff is familiar with the requirements of bid specifications from preparing bid sheets to detailing insurance requirements and

average two to three bid specifications per week. We have prepared remedial action designs, with preparation of bid specifications, for the U.S. Fish and Wildlife Service, Minnesota DNR, and many private parties. Many of these designs were for sparge, vapor extraction, and groundwater pumpout at petroleum release sites. WSN has also prepared bid specifications for vapor mitigation and large soil excavation remedial action designs. In addition, many of our other projects for local units of government incorporate remedial action design elements because the projects encounter contaminated media. Finally, our environmental staff has additional experience preparing bid specifications for the many city well projects they work on.

Conduct and Review Human Health and/or Ecological Risk Assessments

WSN uses human health and ecological risk assessments as part of most remedial investigations and Phase II Environmental Site Assessments (ESAs) we complete. We assess the risks caused by constituents of concern in the contamination at the site to receptors such downgradient drinking water wells, lakes, and or rivers. We understand the science of health risk assessments and how health risk levels are established. We have knowledge of the intrusion screening values (ISVs) and the manner in which they were developed.

Prepare and Review Quality Assurance Project Plans (QAPP) and Sampling and Analysis Plans (SAP) in accordance with state and federal requirements

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

WPLMN
Quality Assurance Project Plan
Watershed Pollutant Load Monitoring Network (WPLMN)

Doc Type: Grant Application

Document control

This document has been prepared according to the U.S. Environmental Protection Agency (EPA) publication, *EPA Requirements for Quality Assurance Project Plans* (U.S. EPA QA/R5, March 2001). This Quality Assurance Project Plan (QAPP) will be reviewed annually and updated as needed. Updated versions of this QAPP will bear a new [x + 1) revision number. The local partner will assume responsibility for archiving outdated versions of this QAPP which will be kept at project headquarters. Archived versions of this QAPP will be retained for a minimum of ten years from the date of archival.

Process

Step 1: The local partner drafts a Project Summary in Part I, reviews remainder of QAPP, and sends the draft QAPP electronically to the analyzing lab for completion of Table 1.
Step 2: Analyzing lab completes Table 1 and returns to the local partner.
Step 3: The local partner submits the draft QAPP electronically to the Minnesota Pollution Control Agency (MPCA) Project Manager and Quality Assurance/Quality Control (QA/QC) Coordinator for review.
Step 4: Upon approval, the local partner will contact the lab sign one copy and send to the local partner. The local partner will sign and send to the MPCA Project Manager.
Step 5: The MPCA Project Manager will sign and send to the MPCA QA/QC Coordinator for final signature.
Step 6: The MPCA QA/QC Coordinator will sign and scan the QAPP. Electronic versions will be provided to the MPCA Project Manager, local partner, and analyzing lab. The MPCA QA/QC Coordinator will retain the original copy of the QAPP.

Note: The QAPP needs to be finalized prior to receiving the first reimbursement of funds and prior to any sampling and lab analysis.

Certification

By their signatures below, the undersigned attest that they are familiar with the requirements of this document and agree to fulfill their responsibilities as specified herein.

Project title: Mississippi Headwaters Board WPLMN Sampling

QAPP project organization:

Analyzing laboratory responsibility – must be MDH or MPCA accredited and certified for all certifiable parameters shown in Table 1, conduct sample analysis of certifiable parameters, submit analytical data to the local partner and the MPCA Project Manager; complete Table 1; and participate in the MPCA's Lab Round Robin efforts.

Analyzing Laboratory: Pace Analytical Services
Laboratory representative: Kabor Xiong — Email: kabor.xiong@pacelabs.com
Signature: — Date (mm/dd/yyyy):

Local Partner responsibility – adhere to QA/QC procedures; review, validate and submit data; conduct sampling activities.

Organization name: Mississippi Headwaters Board
Water Sampler name(s): Joey Geeden and Mike Bogart
Project Leader: Tim Terrill — Email: tim@mississippiheadwaters.org
Project Leader signature: — Date (mm/dd/yyyy):

MPCA Project Manager responsibility – technical assistance; training; data review.

Project Manager name: Jim MacArthur — Email: jim.macarthur@state.mn.us
Signature: — Date (mm/dd/yyyy):

MPCA Water Quality QA/QC Coordinator responsibility – QAPP review and QA/QC resource for problems and concerns.

QA/QC Coordinator: Sandy McDonald — Email: sandy.mcdonald@state.mn.us
Signature: — Date (mm/dd/yyyy):

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WSN has prepared several QAPPs for groundwater sampling at demolition landfills and wastewater treatment facilities. For these, we have used MPCA's Groundwater Sampling and Analysis Plan and Protocols. WSN is currently reviewing and revising the Water Quality Monitoring Protocol for the Crow Wing County Landfill Monitoring which includes sampling of wells, leachate, and surface water. Other landfills where WSN has recently prepared or is currently working on SAPs include Hengel Demolition Landfill, Douglas County Demolition Landfill, Grinning Bear Demolition Landfill, Todd County and Omega Demolition Landfill. WSN has also prepared Phase II Investigation Workplans for some of the Brownfield Program sites we have investigated.

Perform Feasibility and Treatability Studies

WSN staff have completed many feasibility and treatability studies for water treatment projects all over Minnesota. The treatability studies are used to determine the levels of chemical and mechanical treatment needed to treat water to obtain suitable drinking water. The data and information from the testing are used to prepare the feasibility report. The feasibility report includes information on design and costs to build full-scale water treatment plants an it looks at all costs from construction to chemicals needed to operation and maintenance costs. The feasibility and treatability studies are often used to obtain funding for the projects.

Design Comprehensive Remedial Action Remedies and Remediation Systems

WSN has designed comprehensive remedial action remedies for several contamination sites we have worked on. The largest of these sites is the Lake Bemidji South Shore Development, which had several types of contamination including ash disposal area, petroleum spillage area, treated wood disposal area,

wood debris landfill, polycyclic aromatic hydrocarbon contamination area, and formaldehyde groundwater contamination. The remedies included full excavation, covering areas of contamination, and depressurization systems beneath structures. Often the projects we are involved in include residential buildings where a remedy of targeted soil contamination removal and venting systems are used. WSN has designed several remediation systems to using a variety of remediation technologies including dual phase extraction, soil vapor extraction, air sparging, pump and treat, and product skimming. In several cases, systems have included a combination of technologies to best achieve cleanup objectives.

The dual phase extraction systems we have designed have used both dual and single pump technology. These systems are typically the most complex as they require management and treatment of water, air, vapors, and free product. These systems are designed to be fully automated to minimize required operation and maintenance. We have also designed sub-slab depressurization systems. Another project featured an air sparge barrier to intercept a plume migrating towards a creek.

Our strong background in civil engineering has given WSN significant experience with utility and municipal projects that are applicable to remedial system design as well. Most of the trenching and underground construction associated with remedial system installation is based on the principles of utility installation. The proper installation of underground components and piping of a remediation system are essential to its success.

Oversee Installation of Remedial Actions and Remedial Systems

WSN staff have overseen many remedial actions and all of our designed remediation systems, which includes more than a dozen remediation systems. Some of the remedial actions have required the removal of entire buildings to access the areas of contaminated soil and groundwater. Others have involved lifting houses to allow for contamination removal and installation of vent systems. WSN provides oversight for both the underground construction of associated with system installation and the assembly and construction of remediation equipment and buildings. WSN is familiar with means and methods of construction due to our strong civil engineering background. In addition, we have developed procedures for construction observation and documentation that are valuable during system installation. These procedures include detailed and accurate field notes, clear documentation of field changes, obtaining signed contract changes, and obtaining accurate documentation of quantities in the field. WSN has overseen the drilling for soil vapor extraction points, air sparge points, vapor extraction trenches, dual phase extraction wells, groundwater recovery wells, granulated activated carbon (GAC) systems, new water supply lines, and municipal water wells.

Completion of Approved Response Action Capital Solutions Site, Grand Forks, ND

Conduct Surface Water, Groundwater and Hydrodynamic Modeling

WSN has completed surface water and groundwater modeling as part of our water resource and hydrogeologic studies for a variety of projects. The surface water modeling is to used to estimate flood volumes for bridge, ditch, road crossing, dike, and flood impoundment studies as part of engineering design projects. In general, watershed scale studies use HEC-RAS to look at different storm events, such as 10-year and 100-year floods. For smaller stormwater runoff and treatment studies, models like HydroCAD are used to estimate water quantities. For groundwater modeling, we use ModFlow to look at the effect of pumping on groundwater levels in observation and drinking water wells. This modeling is usually used for wellhead protection plan studies, but we have also used them to estimate response to remediation wells. WSN staff have used the Regional Ocean Modeling System (ROMS) for hydrodynamic modeling.

Perform Asbestos Identification and if necessary Oversee Asbestos Abatement and Removal

Our firm has a MDH-licensed asbestos inspector to complete asbestos inspections of buildings, demolition debris, and landfilled materials. The asbestos inspector is trained in sampling techniques and identification of potential asbestos containing materials (ACMs). We conduct several asbestos inspections each year for mainly state, municipalities, housing redevelopment authorities (HRAs) and, county governments. Some of our remediation projects have required sampling of potential ACMs encountered during removal operations. WSN staff have coordinated the abatement and removal of ACMs as part of building demolition and remodeling projects, but have also needed to do it for some remediation projects, where we have overseen the removal and abatement of the ACMs. We have then coordinated and tracked disposal of the asbestos materials to assure that the ACMs were disposed of properly.

Asbestos containing pipe wrap, Benson Armory Asbestos Inspection

Conduct Third Party Review and Analysis of Technical Information for the Purpose of Providing Conclusions and Recomendations to the State

WSN has conducted review and analysis of technical information for many of our municipal, state, and county clients. Recently, we are providing review of pilot testing plans/reports and sewer lining plans on the Holiday Station Store #369 for the City of Baxter and assisting them with conclusions and recommendations regarding risks to their sewer and water distribution infrastructure. WSN has also provided MPCA third party review of municipal water well installation projects for the Park Region Coop (Leak Site 8524) in Pelican Rapids and Public Supply Well Contamination (Leak Site 122) in Foley. These reviews resulted in brief reports to the state describing our analysis and conclusions. On another project, Long Prairie Creamery (Leak No. 155) in Long Prairie, we provided structural review of an adjacent abandoned building and provided recommendations to MPCA on if the building could be demolished for remediation work without damaging an adjacent building.

Provide Support for the Analysis and Development of Program Policy and Guidance, including Developing Health or Ecological Risk Criteria/Standards (including technical report preparation).

WSN can provide support for MPCA's development of program policy and guidance by providing knowledge of our work in the investigative and remediation field. Our senior staff have nearly 90 years of combined experience in the remedial investigation and remediation industry with experience at hundreds of sites.

Perform 5-Year Reviews and Site Reviews

The Compensation Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) is referred to by the public as Superfund. Under CERCLA, a five-year review is required when a response action is implemented. The purpose of the five-year review is to evaluate the execution and performance of the remedial action. The review will determine if the action continues to be effective in protecting human health and the environment. WSN worked with the MPCA on a Superfund site in Brainerd, the Former Brainerd Foundry. The site had an initial removal action completed by EPA in the 1980s. WSN was hired to review the removal action and performed a followup RI/ES at the foundry. IN other work, WSN was hired to complete site reviews of the Brainerd Dump in Crow Wing County and the La Grande sanitary Landfill in Douglas County. These reviews were completed for clients needing an understanding of the contamination and remedial actions completed at the sites.

Prepare Draft Decision Documents and Other Documents such as Grant Applications, Draft Institutional Controls, Permit Applications

WSN has prepared several record of decision documents for environmental assessment worksheets (EAWs) and alternative urban areawide reviews. We have prepared grant applications for our brownfield sites and surface water sampling work. We have worked with MPCA to prepare draft institutional control documents for our brownfield sites. The most notable was the Lake Bemidji South Shore site where we assisted the Bemidji City Attorney in drafting the documents using MPCA templates to provide use limitations on some of the parcels at the site. WSN is preparing permit applications daily for wetland permits, DNR water appropriation permits, DNR public water permits, air permits, permits for wastewater treatment facilities, NPDES permits, U.S. Corps of Engineers Section 404 permits, MDH municipal well approvals, and MDH water line extension permits.

Prepare Operation and Maintenance System Review and Optimization

WSN staff engineering staff have prepared several operation and maintenance system reviews for water and wastewater plants and some remediation systems. The reviews examine the system components to understand the operation of the system, as well as review the sampling and discharge data to determine plant or system operation parameters. Using the data, the system performance is then assessed to provide conclusions and recommendations. The recommendations are usually related to adjusting the system or adding new components to optimize performance. This was recently done for the North Koochiching Area Sanitary District (NKASD). WSN also reviewed the Laporte water plant and the Kenny's Oil for MPCA.

Research, Evaluate and Implement Innovative Technologies

WSN was part of the initial assessments completed for oxygen releasing compound (ORC®) in Minnesota at the Farmers Association Coop (Leak No. 869) in Deer Creek. At this site, we researched the technology, implemented ORC® injections on two trial areas, and evaluated the results in the downgradient groundwater monitoring wells and Deer Creek. At the Biwabik City Hall site, WSN implemented a new technology, at the time, passive soil gas monitoring to assist with determining source area for a perchloroethylene (PCE) release. This was found to be a quick and cost effective approach to assessing an area to lower the cost of drilling needed for the investigation. WSN staff are always researching and evaluating new technologies to stay abreast of the remediation industry.

Prepare Presentations and Present Information at Meetings

WSN staff have a lot of experience preparing presentations and presenting information at meetings because we attend many city council, county board, planning and zoning commission, and other public meetings. Often we are presenting technical information to the general public with powerpoint presentations or graphs. WSN environmental staff also have experience giving presentations about our work at conferences and presenting rules information to our clients. As part of many wetland permit applications, we are required to present project and permit application information to various agency staff in technical evaluation panel (TEP) meetings.

Oversee Stormwater Program Requirements During Construction Activities

WSN has years of experience doing construction stormwater oversight and inspections. Several staff have certifications as construction stormwater site management and are knowledgeable about stormwater control requirements

for construction projects. We have been contracted to complete inspections of stormwater erosion and sediment control components for MnDOT highway construction projects. We have also done construction stormwater inspections on some of the municipal projects we have designed and managed. WSN completes several Stormwater Pollution Prevention Plans (SWPPP) each year and are familiar with using them.

Construction Stomwater Inspection—MN TH 371, Nisswa, MN

Provide Technical Assistance to State in the Evaluation and Interpretation of Data and Information

WSN has experience providing technical assistance to the state for several of the MPCA projects we have worked on for them. This includes evaluating data and providing information on several water system corrective actions for Laporte, Foley, and Pelican Rapids. We have also been tasked to provide a building structural evaluation for an MPCA leak site in Long Prairie. Our staff are familiar with the MPCA investigation and remediation process and have worked together with MPCA on many contamination sites. We have staff who specialize in collating data and providing statistical analysis of it to evaluate the data and provide conclusions.

Oversight of Responsible Party and Voluntary Party Contractors During Site Investigations and Response Actions

WSN staff have experience providing oversight of contractors working for responsible and voluntary parties. We have completed this type of work for MPCA on the Burlington Northern (BN) Tie Plant site in Baxter, where we observed AECOM staff during investigation and remediation work on this Superfund site. One of our major retail clients retains us to observe contractors doing work for responsible parties on properties they are interested in purchasing. We observed the responsible party contractor doing a remedial investigation at the Former ICO fuel station site in Baxter. This client also retains us to review other contractor's data and reports for contamination site they are investigating or cleaning up in Wisconsin.

Oversee or Conduct Bench scale Lab Treatability Studies, Pilot Testing, and Field Demos

WSN staff have conducted several bench-scale lab treatment studies on water and wastewater to determine the levels of chemical and mechanical treatment needed for producing treated water. The data and information from the treatability testing are used to design a field scale pilot test. We then work with a contractor to conduct a pilot test in the field to determine the success for full-scale treatment system design. WSN has completed pilot testing of different remediation technologies over the years. We were part of initial assessments completed for oxygen releasing compound (ORC®) in Minnesota at the Farmers Association Coop (Leak No. 869) in Deer Creek. At this site, we researched the technology, implemented ORC® injections on two trial areas, and evaluated the results in the downgradient groundwater monitoring wells and Deer Creek.

Pilot test equipment at the North Koochiching Area Sewer District wastewater treatment plant.

Assist and Provide Training as Requested by the MPCA or MDA Regarding Topics Related to the Scope of this Work

WSN provides training and seminars internally for employees and for clients. Recent internal training provided by WSN for its employees included project construction management and contaminated soil management during utility projects. WSN also provides training for clients related to regulatory compliance. In conjunction with completing Spill Prevention Control and Countermeasure (SPCC) plans for a chain of service stations in the upper Midwest, WSN prepared and presented training in SPCC regulations and standard operating procedures for UST compliance. We routinely meet with this client to assist them with UST system audits and train their staff in UST monitoring requirements. WSN prepared and hosted training

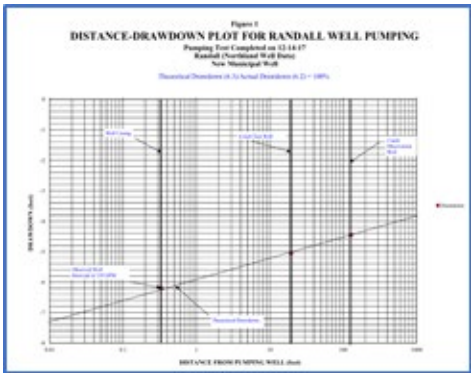
for demolition landfill operators related to new MPCA regulations and ongoing compliance requirements.

Follow MPCA Green Practices/Procedures Relative to Remediation Projects

WSN is well versed in MPCA's Green practices requirements because since their implementation for stimulus act (ARRA) projects in 2009. In response to the Green practice requirement, we joined the Minnesota Waste Wise program to help us look our resource usage and evaluate ways we can be greener. WSN has always looked at ways to cut travel and equipment costs by teaming field work with other projects for both our field staff and contractors, but the green practices requirements helped us to formalize our process and put them into greater usage. We have been regularly using the Green Practices Work Plan Attachment for our Petroleum Remediation Program work plans over the last several years.

Regarding green practices for remediation projects, WSN has used the green practices to consider all the environmental effects of corrective action implementation and look at options to minimize the environmental footprint of remediation. We attended MPCA's Green Remediation Day training and have discussed the program at our Environmental Services department meetings. Some of WSN project managers have taken the Interstate Technology and Regulatory Council (ITRC) training class for Green and Sustainable Remediation. We have reviewed the Green and Sustainable Remediation: A Practical Framework document also put out by ITRC. We understand EPA's core elements of minimize energy use, air and greenhouse gas emissions, and water use and reduce waste and protect ecosystems for green cleanup. As part of a foundry emission investigation and cleanup, we are incorporating green remediation ideas into our planning for the remediation. We are aware of the green remediation SiteWise™ and SRT tools for assistance with quantifying environmental impacts.

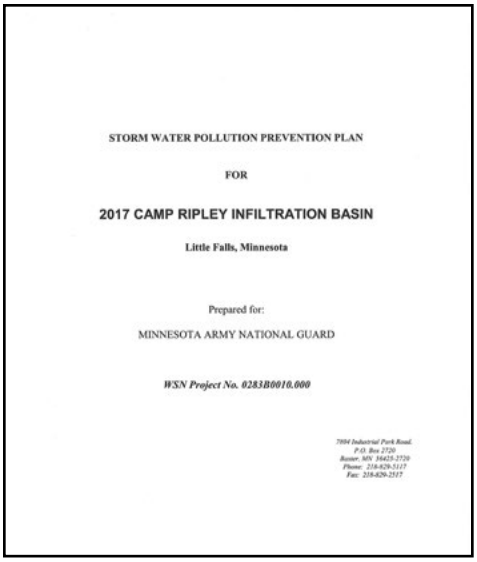
Oversee Hydrogeologic Investigations including Fate and Transport Modeling, Capture Zone Analysis, and Pump Tests



WSN's geologists and engineers have overseen many hydrogeologic investigations, capture zone analysis, and pumping tests for many of our municipal and remediation site projects. Most of the hydrogeologic investigations are in search of new water supplies for cities that have had their wells impacted by nitrate or petroleum contamination. One of the largest investigations was for the City of Baxter, who had their wellfield impacted by benzene and found the aquifer was vulnerable at the current wellfield location. WSN completed a hydrogeologic investigation for them to identify an area for a new and larger wellfield. The investigation looked at over one hundred residential wells in the area and completed a dozen deep test borings to evaluate the area aquifers. A test well and observation wells were installed to complete a pumping test and evaluate water quality. A pilot test for water treatability was completed. We also completed capture zone analysis for the new well field as well as transport modeling of the benzene from the old well field. We have also completed hydrogeologic studies for new municipal wells due to contamination for Beardsley, Randall, Holloway, Verndale, and Watson. We have also included as part of hydrogeologic investigations, pumping tests and capture zone analysis at some of our remediation sites including Gooseberry State Park, Woodland Store (Leak Site 9274), and Lake Alice Store (Leak Site 209).

Prepare and Determine if the Stormwater Pollution Prevention Plan (SWPPP) is being followed and Make Recommendations if Revisions are needed during the life of the Construction Project

WSN prepares dozens of SWPPPs each year for our many construction projects for municipalities, counties, and state agencies. We have several staff with Design of Construction SWPPP certifications, who put together SWPPPs using the MPCA SWPPP Templates for Construction Sites. The completed template accompanies project plans and specifications, which includes sheets with maps showing nearby waters and wetlands, existing and final grades, locations of disturbed areas, erosion control BMPs, and standard details for the BMPs. We have staff who are certified Construction Site Managers to observe if the SWPPP is being implemented correctly and document the problems with inspection notes. We are familiar with the process to revise the SWPPP during construction based on site-specific issues that arise during construction



STORM WATER POLLUTION PREVENTION PLAN

FOR

2017 CAMP RIPLEY INFILTRATION BASIN

Little Falls, Minnesota

Prepared for:

MINNESOTA ARMY NATIONAL GUARD

WSN Project No. 0283B0010.000

Experience with Agricultural Chemical Investigations and Cleanups

WSN has significant experience in agricultural chemical investigations and cleanups in Minnesota and North Dakota. Related projects include subsurface investigations at several agricultural chemical storage, packaging, distribution/sales, and seed sales facilities to determine if soil and/or groundwater had been impacted from current and historical operations at the facility. These sites include investigations for Cenex Harvest States on former Terra Ag-Chem facilities in Grand Forks and Larimore, North Dakota, as a precursor to purchasing the property. Similar subsurface investigations were also performed for sites in Crookston and Georgetown, MN.

WSN has recently performed subsurface soil investigations using both push probes and rotosonic drilling methods, groundwater investigations entailing the installation of numerous monitoring wells at various depths to best represent the geology of the site, and groundwater monitoring to assess contaminant trends and determine vertical and horizontal gradients at a former wood pole treatment facility in Bemidji, MN, where PCP and diesel fuel were used to treat telephone poles. WSN has also performed a similar subsurface investigation at a former wood products treatment facility in Pine River where PCP was used to treat wood spools.

WSN has also completed several investigations on facilities currently or historically used as aerial applicator staging facilities, including Dan's Flying Service in Crookston, MN, and Agri-Max LLC sites in Fisher, MN, and Grafton, ND.

WSN was contracted by Dan's Flying Service to prepare a Remedial Investigation Workplan to address contamination issues discovered during a spot inspection by MDA. Upon MDA approval, the work plan was implemented and included the advancement of 22 soil borings and associated soil sample collection and analysis. The results were subsequently incorporated into a Remedial Investigation Report recommending corrective action through soil excavation and land treatment. A Corrective Action Plan was submitted to MDA, and upon approval the impacted soil was excavated and treated. A Corrective Action Report was submitted, and upon approval MDA issued a No Further Action Required Letter. More recently, WSN was contracted by Balzum Construction to perform a soil assessment at a former agricultural facility they were interested in developing. Several soil borings were advanced and representative soil samples collected for field vapor screening and subsequent laboratory analysis of MDA List 1, TKN, and Nitrate-Nitrogen.

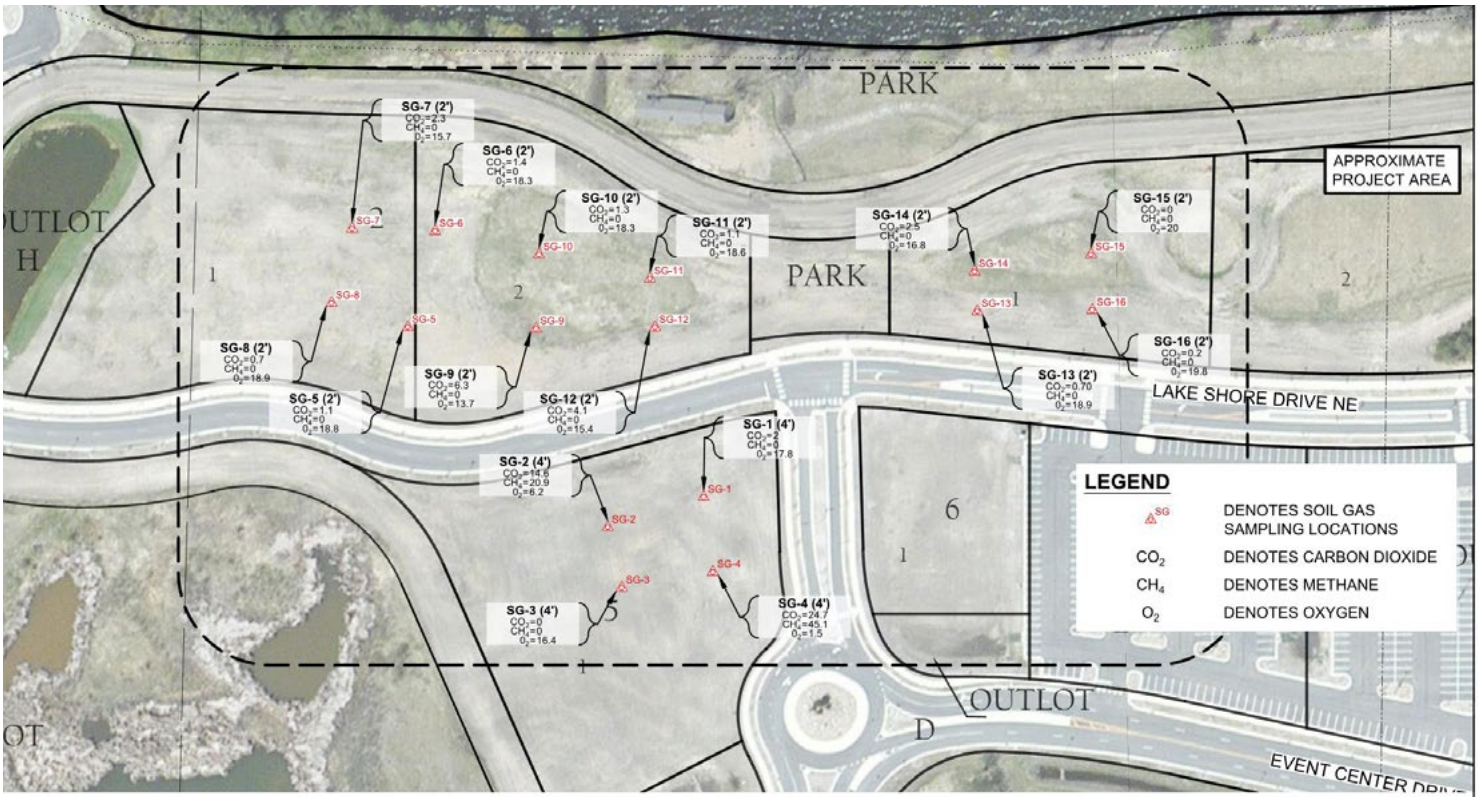
Recently, WSN has been assisting the City of Randall address nitrate contamination in their municipal wells. We worked with them to identify the extent to the contamination, which was widespread in the area, but the highest concentrations seemed to emanate from a turkey farming operation upgradient of town. Based on the nitrate contamination extent, we identified an aquifer on the east of the Little Elk River on the east side of town that did not have nitrate contamination. A test well was drilled, but water quality was high in total organic carbon (TOCs) and not suitable for their drinking water system. WSN then coordinated a test boring near their current well and found a deeper confined aquifer that did not have nitrate contamination. A new municipal well and water plant were designed and being constructed to supply the city with a water source without nitrate contamination. WSN has also worked with the cities of Holloway, Beardsley, and Verndale, which each had similar nitrate contamination problems.

List of Remediation Technologies

WSN has experience with the following remediation technologies:

- Soil Gas Venting Trenches
- Sparging
- Sparge and Soil Gas Venting
- Groundwater Pumping and Treatment Systems
- LNAPL Recovery
- Dual Phase Extraction
- Sub-Slab Depressurization Systems
- Soil Excavation
- Sub-Slab Passive Vent Piping

4. Project Descriptions



Hazardous Waste Site Project | Lake Bemidji South Shore Development

Bemidji, Minnesota

Site Description

The Lake Bemidji South Shore had been under used for years because of its industrial use for over a century. Committed to reclaiming the premier 145-acre site located on the south shore of Lake Bemidji, the City of Bemidji retained Widseth Smith Nolting (WSN) to assess contamination areas, prepare response plans, and oversee contamination management. Over 20,000 yards of contaminated soil and 16,000 yards of ash were tested, excavated, and either re-used under the Sanford Center parking area as controlled fill or removed for proper disposal. Runoff is treated before entering the site's 31 acres of wetlands, Lake Bemidji, and the Mississippi River.

Project Description

A brownfield redevelopment of a 145-acre complex on the south shore of Lake Bemidji historically occupied by a wood products manufacturing plant, landfill area, power plant, and railroad maintenance industrial area on the south shore of Lake Bemidji. The project included a Phase I Environmental Site Assessment (ESA) on the entire industrial complex and several Phase II ESAs to assess various contaminated properties within the complex. Formaldehyde contamination in the groundwater has been documented in water samples collected from several groundwater monitoring wells in the vicinity of the former Georgia Pacific hardboard plant and nearby Mill Pond. The Georgia Pacific plant manufactured hardboard using wood fiber, crude wax, and a phenolic-formaldehyde resin pressed into sheets and heat cured. For many years of plant operations, waste materials consisting of wood fiber and hardboard ends and pieces were disposed of by dumping in the adjacent Mill Pond, south of the plant. Reported thicknesses of these wastes range from a few feet to as much as 35 feet. It is believed that formaldehyde from the resin used in the hardboard manufacturing process has leached out of these waste materials and entered the groundwater. In addition, degradation of the buried wood fiber materials and hardboard ends and pieces was a concern for the presence of methane gas and soil vapor intrusion issues on parcels marketed for redevelopment.

Client

City of Bemidji

Contact:
Craig Gray
218.759.3565

WSN assisted the City with entering the MPCA Voluntary Investigation and Cleanup (VIC) program for approval of Phase II Investigation Workplans and Development Response Action Plans (DRAP) for site development of the Sanford Center area as well as the beach area, DNR trail, and, several other lots the City is selling for development. Investigations into the methane and formaldehyde concerns and reporting of results have been some of the more recent projects on the South Shore site because of the ongoing development of the former brownfield site.

Tasks Performed	Personnel Involved
Reviewed available historical data from earlier WSN and other consultant investigations to obtain all available information regarding past investigative work and design	Brian Ross (PM) Ty Fuglseth (S2) Joshua Rebennack (CS)
Coordinated investigation for the advancement of numerous soil probes/borings to facilitate soil, groundwater, and soil gas sample collection	Ty Fuglseth (S2)
Performed a contaminant Investigation, including the direction and oversight of the advancement of 23 soil borings, including five borings through the ice of Lake Bemidji, for soil sample and/or lake bottom sediment collection & analyses	Ty Fuglseth (S2) Mike Bogart (FT)
Performed a contaminant investigation, including the completion of 16 soil probes on four separate parcels, for the collection of soil vapor samples to determine if methane generated from the degradation of wastes from the former Georgia Pacific hardboard plant, will be a health concern for development and will need to be addressed as part of the development	Ty Fuglseth (S2) Mike Bogart (FT)
Collected soil vapor samples and analyzed for methane concentrations, in the field, utilizing field instrumentation	Mike Bogart (FT)
Compiled and analyzed the collected data and presented the results/conclusions in an assessment report documenting the distribution of methane vapors in the soil and presented conclusions/recommendations	Ty Fuglseth (S2) Brian Ross (PM)

Subcontracted Tasks

The following tasks were subcontracted out.

- Advancement of soil boring and push probes for soil and groundwater sample collection
- Laboratory analysis of all soil and groundwater samples

Outcome Achieved

The former brownfield site was reclaimed and developed into a multi-use area in south Bemidji that includes a large event center (The Sanford Center), wetlands, hotels, restaurants, and housing developments with future development plans for a swimming beach, parks, and other businesses. The collection of the soil and groundwater data and soil gas data allowed for determinations of development possibilities and what safety measures may need to be considered when developing several of the available parcels.

Agricultural Chemical Investigation Project | Randall Water Treatment Plant

Randal, Minnesota

Site Description

The site is a city owned property located in a residential area in the northwestern corner of the City of Randall. The adjacent land uses are residential to the south, agricultural fields to the north and west, and State Highway 10 to the east. The topography on the site is fairly flat, sloping down to the northeast towards State Highway 10. The site is accessed from Ash Drive from the southeast. Two buildings existed on the site; the City's storage garage and City's Well House #1. The site has also been used by the City as a storage yard for trailers, construction materials, and other non-hazardous materials.

Project Description

Contamination of the City's water supply Well #1 by nitrates has exceeded the MDH's Health Risk Limit, necessitating treatment of the water source or the utilization of a different water source. Working with the city to do a nitrate testing investigation of several wells in the area. An assessment of potential contaminant sources for water supply Well #1 was done, however, no primary source could be definitively identified but it appears a turkey farming operation was the likely source. The City received a corrective action notice from the Minnesota Department of Health, and Widseth Smith Nolting (WSN) was retained to investigate alternative water sources and design the water treatment system. The following elements were included in the consideration of each water source;

- Proximity to existing water supply infrastructure
- Availability of the property for purchase/development
- Water quantity
- Water quality
- Surrounding land uses
- Compatibility of water source mixing
- Treatment system operations and maintenance
- Treatment system byproducts and discharge to the municipal wastewater treatment plant

Client

City of Randall

Contact:
Matt Pantzke
320.749.2159

Three potential water sources were investigated for contamination; the existing water supply, an unconfined aquifer on the northwest side of Randall, and a confined aquifer located beneath the existing well house #1. These later two locations were selected because of their proximity to existing water supply infrastructure and their availability to the City for development. The investigation of each water source consisted of groundwater sampling and a pumping test to determine the quality and quantity of the water available.

The aquifer to the northwest was eliminated at the recommendation of the MDH due to the risk posed by high levels of total organic carbon. The investigation of the confined aquifer found manageable levels of iron and manganese in the water. The existing water supply has increasing levels of nitrates and is highly sensitive to further contamination, and the byproducts of nitrate removal would strain the city's existing wastewater treatment plant. After assessing the available water sources and discussing the key elements with the MDH, City, and the Minnesota Pollution Control Agency, it was determined that utilizing the confined aquifer source was the preferred option.

Tasks Performed	Personnel Involved
Performed site investigations including groundwater collection and analysis and receptor surveys.	Dave Reese (PM) Brian Ross (S3) Mark Hallan (E4) Paul Strong (E1) Mike Bogart (F2)
Submitted site investigation reports and design recommendations	Dave Reese (PM) Mark Hallan (E4)
Designed new well and water treatment system	Dave Reese (PM) Mark Hallan (E4) Paul Strong (E1)
Prepared bid specifications	Dave Reese (PM)
Construction Oversight	Dave Reese (PM) Tony Pohl (E1) Paul Strong (E1)
Review contractor invoices and construction documentation	Dave Reese (PM)

Subcontracted Tasks

The following tasks were subcontracted out.

- Drilling of Groundwater sampling wells
- Laboratory analysis of groundwater samples
- Contractor services for corrective action design implementation

Outcome Achieved

WSN assisted the City with the investigation of alternative water supply sources and treatment systems. A confined water source was found, limiting the risk of future contamination by nitrates or other agricultural chemicals. WSN completed the water treatment plant design for iron and manganese removal. The water treatment plant is currently under construction and is expected to be operational in 2018.

Hazardous Vapor Mitigation Project | Capital Solutions Site

Grand Forks, North Dakota

Site Description

The Capital Solutions Site (subject property) consists of two parcels along Demers Avenue in Grand Forks, ND, totaling approximately 8.14 acres. At the time of a Phase I Environmental Site Assessment (ESA), completed by Widseth Smith Nolting (WSN), the subject property was mostly vacant and unused, except for the storage of miscellaneous railroad related materials, a short railroad spur, and a railroad office/shop structure. The Phase I ESA determined that the subject property was historically used for agricultural purposes, until development as a railroad rail yard. The historical use of the subject property as a rail yard was considered a recognized environmental concern because of the possibility of leakage, spillage, and/or drippage from locomotives and various railcars over the years of operation. Petroleum-impacted soils were found on the subject property during a Phase II ESA completed by WSN, and the results of multiple investigations and remediation measures is found in the project description below. Currently, The Boden student housing development and the railroad easement grounds are located on the subject property.

Project Description

On June 17, 2013, a Phase I ESA was completed by WSN on the subject property. In response to the findings in the Phase I ESA, a limited Phase II ESA was completed by WSN on the subject property in November 2013, to determine if the historical use of the property as a railroad rail yard has impacted the subsurface soils and/or groundwater on the subject property. In conjunction with a geotechnical evaluation of the subject property, WSN was retained to screen several soil borings for the presence of organic vapors in soil and collect samples for laboratory analysis. As indicated from the laboratory analyses, petroleum-impacted soils were present in several areas on the subject property. Because of the planned development of the subject property as an apartment complex, it was recommended that care should be exercised to reduce any risks to the residents. Recommendations included the use of a vapor barrier and excavation of near-surface soil contamination. In an effort to determine how much petroleum-impacted soil may be encountered during the excavation of the footings for the apartment building, a test pit assessment was

Client

Capital Solutions, Inc.

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performed on the subject property. The assessment included the completion of twenty test pits, to a depth of approximately seven feet below land surface (BLS) along the perimeter of the proposed building. During advancement of the test pits, soil samples were collected for organic vapor screening. The results of the test pit assessment indicated two areas of contamination were present along the planned perimeter of the apartment structure. The results of the test pit assessment were also submitted to the North Dakota Department of Health (NDDOH), for review. To document any contamination encountered during subsurface work, the developer retained WSN personnel to observe the excavation of the building footings and utility installation, to screen soils for contamination and determine what soil needed to be separated for land treatment. Petroleum-impacted soils were stockpiled on-site and on plastic pending lab analysis. A topo-survey of the stockpile was completed and a calculation of 1,600 yards was obtained. In July 2014, eight composite soil samples were collected from the soil stockpile and submitted to a laboratory for DRO and GRO analyses. Subsequently, a formal request letter was prepared and submitted to the NDDOH, requesting approval to land treat the impacted soils by using the soil as controlled fill underneath the parking lot areas. On July 31, 2014, the NDDOH issued an approval to land treat the impacted soils on site and place the soils as controlled fill underneath the parking lot areas. The NDDOH also requested that the soil be worked frequently, prior to placement as controlled fill, to maximize the reduction of petroleum levels. This was accomplished by spreading and frequently tilling the soil to agitate and expose the soil to air and sun. To ensure the apartment structure will not be impacted by petroleum vapors, the developer installed a high-quality vapor barrier (i.e., Stego Industries, Inc.) prior to pouring the concrete floor. To ensure the proper installation of the barrier, WSN was retained to observe and inspect the installation of the barrier. All edges, penetrations, and seams were sealed with specially designed tape and adhesives obtained from Stego Industries, Inc. and specifically designed for use with the Stego vapor barrier materials. In addition, prior to placement of the vapor barrier, a passive venting system was installed, again under the observation and inspection of WSN. This system consists of perforated piping embedded in the coarse sand bedding, running underneath the vapor barrier that are vented outside the roof of the apartment structure. In August 2014, a Phase II drilling investigation of the subject property was completed under request of the NDDOH. The request included the delineation of the petroleum impacts with soil and groundwater analyses. The request was made to determine if the proposed vapor barrier will be adequate protection to the proposed apartment building. A work plan for the advancement of 14 soil probes, scattered across the 8.14-acre subject property to provide for a comprehensive summary, and associated soil and groundwater sampling was submitted to the NDDOH, prior to implementation. The soil probe locations and analyses were approved by NDDOH. The probes also served to document that contamination present on the subject property has not migrated off-site. As indicated in the results of this assessment, only the boring adjacent to an area of known contamination encountered during the excavation for the storm sewer line, registered detectable concentrations of petroleum compounds in the soil and groundwater samples. The NDDOH determined the petroleum contamination remaining on the site does not pose a risk to human health or the environment and the NDDOH will not require additional site assessment or remediation work. On September 25, 2014, three additional composite soil samples were collected for laboratory analysis, by WSN personnel from the land treatment area, to document the reduction in contaminant concentrations prior to the soil being used as controlled fill. These lab results indicated that GRO contamination had decreased by an average of 75% and DRO contamination had decreased by an average of 93% prior to using the soil as controlled fill.

Tasks Performed	Personnel Involved
Completion of initial Phase I ESA	Ty Fuglseth (PM) Brian Ross (S2) Joshua Rebennack (CS)

Completion of the Limited Phase II ESA to determine if the historical use of the property as a railroad rail yard has impacted the subsurface soils and/or groundwater on the subject property.	Ty Fuglseth (PM) Brian Ross (S2) Mike Bogart (S1) Joshua Rebennack (CS)
Screening several soil borings for the presence of organic vapors in soil and collect samples for laboratory analysis.	Ty Fuglseth (PM) Mike Bogart (S1)
Completing soil test pit assessment (20 soil test pits) to estimate the amount of contamination onsite.	Ty Fuglseth (PM) Brian Ross (S2) Mike Bogart (S1) Joshua Rebennack (CS)
Construction observation to screen soils and determine contaminated soils to stockpile.	Ty Fuglseth (PM) Mike Bogart (S1)
Observing installation of the vapor barrier.	Ty Fuglseth (PM) Mike Bogart (S1)
Completing Phase II drilling investigation (14 soil probes).	Ty Fuglseth (PM) Brian Ross (S2) Mike Bogart (S1) Joshua Rebennack (CS)
Collecting three additional composite soil samples for laboratory analysis.	Ty Fuglseth (PM) Brian Ross (S2) Mike Bogart (S1)
Completion of updated Phase I ESA.	Ty Fuglseth (PM) Mike Bogart (S1) Joshua Rebennack (CS)

Subcontracted Tasks

The following tasks were subcontracted out.

- Pace Analytical and ALS Environmental completed the laboratory analysis.
- Soil test pits were completed by Florian Excavating.
- Terracon completed a geotechnical evaluation.
- Soil borings were completed by Midwestern Drilling.

Outcome Achieved

WSN conducted and completed the above-mentioned Phase I ESA, Phase II, Test Pits, and additional Phase II, which in total, provided an accurate, comprehensive summary of the 8.14-acre subject property. The results proved that the subject property demonstrated that appropriate redevelopment of the 8.14-acre subject property is not a concern to future users, occupants or owners, provided that the recommended construction procedures take place – vapor barrier, passive venting, and land treatment of petroleum impacted soils. The NDDOH also came to the same conclusion. WSN observed and inspected the successful installation of the vapor barrier and completion of the land treatment of impacted soil and subsequent use as controlled fill. On November 22, 2016, Ty Fuglseth, WSN Environmental Scientist, mobilized to the site to perform a site reconnaissance to determine if any new environmental concerns exist, since WSN completed their previous environmental work. During the site visit, the newly developed grounds (The Boden), the railroad easement grounds, and the adjacent properties were observed. The Boden development appeared in excellent condition with no new environmental concerns. The railroad easement grounds appeared the same as was observed during the earlier environmental work and all adjacent properties exhibited no changes since WSN was last present on the site. As a result, WSN concludes that appropriate and successful redevelopment of the 8.14-acre subject property is complete and there is no concern to future users, occupants, or owners.

5. Scenario A–Example Workplans and Spreadsheets

Attachment A

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Example Workplan

Project Title: Category A: Petroleum, Superfund, MDA and Closed Landfill Program Environmental Services – Scenario A - Remedial Investigation

1. Project Summary:

A former bulk chemical storage and manufacturing site has known groundwater contamination and is located near a town with sensitive receptors. Households in the affected area are supplied by private wells and there are known soil gas detections near structures adjacent to the contamination site. A responsible party (RP) search has not identified a viable RP, and the site has been purchased for redevelopment into a golf course. Known contamination on/from the site consists of agricultural fertilizers and pesticides/herbicides, solvents from vehicle/equipment cleaning, and petrochemicals likely leaked from storage tanks on site. The property owner conducted a limited investigation, taking 23 samples within the Maintenance garage, nine soil gas samples in the greater area, and 13 groundwater samples in the greater area. Over the course of the investigation, levels of contamination above the health risk limit for TCE were discovered in the groundwater to the south of the river and levels of soil gas vapors above the ISVs were found both on the site and in the adjacent residential areas.

2. Statement of Problems, Opportunities, and Existing Conditions

Problems – Detected levels of nitrates, metolachlor, and dicamba in the groundwater above the health risk limits within the aquifer supplying private wells has been identified. Known TCE contamination of groundwater is present at these wells and probable contamination of the groundwater by other petrochemicals is likely. Elevated levels of hazardous soil vapors have been detected in and around residential areas. It is probable that hazardous material has migrated into the stream adjacent to the site. Contamination source areas are still present. The current property owner is being uncooperative with the MPCA.

Existing Conditions – The soils on the site are generally sandy with lenses of clay and silt intermixed. These soils are highly permeable, allowing for contamination to quickly migrate to groundwater and off the site. Significant portions of the town are on private wells and are at risk of being or are already contaminated. Sensitive populations are located downgradient of the contamination and vapor intrusion above the intervention limit is known to exist in the structures adjacent to the contamination site. The stream running through the middle of town appears to be acting as a barrier to contamination migrating further north.

Opportunities – The City can extend the existing water supply system to buildings currently on private water. Excavation and grading as part of golf course construction could be coupled with contaminated soil removal. Partnership with other agencies (such as the DNR or SWCD) for stream monitoring could be done to minimize sampling costs. The previous investigation of the maintenance garage was thorough, minimizing the need for additional work to characterize the extent of contamination.

Assumptions

- Soil, soil gas, and groundwater samples would be processed by the lab at the standard turnaround rate of ten days. Expedited sample processing is available for some analytes and could reduce the time to complete each objective.
- All necessary access has been achieved.
- All structures in blocks 5 and 7 are supplied by separate wells.

3. Goals, Objectives, Tasks, and Subtasks

4. **Objective 1**: Define the extent of soil gas contamination.

Task A: *Complete soil gas borings.*

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Advance soil gas borings at the locations indicated on Figure A. Samples will be collected over a period of 24 hours.

Subtask 4: Screen the soils collected from the borings with a PID 11.7 every five feet and advance additional soil gas borings as needed to determine the extents of soil gas contamination.

Subtask 5: Complete soil boring logs and tables summarizing the data obtained during the assessment.

Task B: *Collect subslab soil gas samples at the easternmost structures in blocks 5 and 7.*

Subtask 1: Coordinate field work with subslab contractor, MPCA project manager, field technician, and property owners.

Subtask 2: Install the subslab sample points. Screen the soils collected during the subslab installation with a PID 11.7.

Subtask 3: Collect the first round of subslab samples at structures within 100 feet of any boring where an exceedance of the 33X intrusion screening value is detected. While 1-2 samples are shown on Figure A, the total number of subslab samples per structure will be determined using the MPCA guidance on the suggested number of samples per building foundation size (c-rem3-06h). Samples will be collected over a period of 24 hours.

Subtask 4: Assess the results of the subslab sampling and complete soil gas maps and tables summarizing the data obtained during the assessment.

Task C: *Determine indoor air quality at the residence with the pregnant lady.*

Subtask 1: Contact property owner and coordinate site access.

Subtask 2: Complete Vapor Intrusion Building Survey at this residence.

Subtask 3: Sample indoor air quality to determine exposure levels. Collect a second subslab soil gas sample if the sampling point still exists. Samples will be collected over 24 hours.

Subtask 4: Collect background air quality samples to compare to indoor samples.

Subtask 4: Complete letter report summarizing the data obtained during the assessment.

Task D: *Conduct Vapor Intrusion Building surveys at structures within 100 feet of a boring where an exceedance of the 33X intrusion screening value is detected using MPCA best management practices for vapor investigation in the affected areas.*

Subtask 1: Review the results of the subslab soil gas sampling and develop an indoor air sampling plan.

Subtask 2: Contact property owner and coordinate site access.

Subtask 3: Complete Vapor Intrusion Building surveys at the affected structures.

Subtask 4: Conduct indoor air quality sampling to determine levels of exposure in structures with subslab soil gas contamination above the vapor screening level (i.e. 33X ISV).

Subtask 5: Complete letter report summarizing the data obtained during the assessment, including recommendations for corrective action.

Task E: *Conduct the second round of subslab samples during the alternate season that the first round was taken to determine if an exceedance of the vapor screening level (i.e. 33X ISV) has occurred. Conduct additional vapor intrusion building surveys as needed.*

Subtask 1: Coordinate site access with property owners.

Subtask 2: Collect subslab soil gas samples at the residences where soil gas levels were below the vapor screening level. Samples will be collected over a period of 24 hours.

Subtask 3: Complete a summary report of the data obtained during the second round of soil gas assessment.

Objective 1 Timeline: Task A, B, and C would be completed concurrently. Task D could commence once laboratory results from the first round of subslab samples are received, which is expected to be within two weeks after sampling. Per the MPCA best management practices for vapor investigation, one sample will need to be taken during the non-heating season and the other during the heating season. As such, soil gas sampling for Task E would occur four to six months after Task B is completed. Development and execution of the indoor air sampling plan could be completed within four weeks of MPCA approval.

Objective 1 Deliverables: A report with the results of Tasks A, B, C, and E consisting of nine or more vapor intrusion surveys, a soil gas analytical report, and an illustration of the approximate extents of the soil gas contamination. A letter report detailing the results of Task D and the recommended corrective action. Additional figures will be included as needed per MPCA guidance.

Objective 2: Define the extent of groundwater contamination from TCE and agricultural chemicals.

Task A: Investigate maintenance garage area – Take groundwater samples at one location within the maintenance garage area. Borings are to be to 50 feet with groundwater samples taken at the groundwater interface, then every 10 feet to determine the depth of contamination. Samples are to be analyzed for VOCs. Samples will be collected in accordance with "MDA Guidance Document 12 – Ground Water Sampling Guidance".

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Conduct field investigation. Screen the soils collected from the borings with a PID 11.7 every five feet. Collect samples at each of the borings indicated on Figure A and at all nine private wells in blocks 5 and 7.

Subtask 4: Complete boring logs and tables summarizing the data obtained during the maintenance garage area assessment.

Task B: Investigate the former fertilizer building, scale area, and water fill area – Borings are to be advanced to 50 feet with groundwater samples taken at the groundwater interface, then every 15 feet to determine the depth of contamination. Samples are to be analyzed for VOCs, nitrates, ammonia, total nitrogen, and MDA List 1 & 2. Samples will be collected in accordance with "MDA Guidance Document 12 – Ground Water Sampling Guidance".

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Conduct field investigation. Screen the soils collected from the borings with a PID 11.7 every five feet. In addition to the other analyses listed in task B, two of the four borings in the former fertilizer building are to be sampled for DRO and GRO as part of the petroleum investigation. Soil/groundwater samples for DRO and GRO for these two borings are to be taken every five feet until a depth of 25 feet or to 10 feet below the deepest measured contamination. These two borings are indicated on Figure A.

Subtask 4: Complete letter report summarizing the data obtained during the fertilizer building area assessment.

Task C: Investigate blocks 5 and 7 – Borings are to be advanced to 50 feet with groundwater samples taken at the groundwater interface, then every 10 feet to determine the depth of contamination. Screen the soils collected from the borings with a PID 11.7 every five feet. Samples are also to be taken at each of the private wells located within blocks 5 and 7. Samples are to be analyzed for VOCs, nitrates, ammonia, total nitrogen, and MDA List 1 & 2. Additional samples may be required to define the extent of contamination to the west. Samples will be collected in accordance with "MDA Guidance Document 12 – Ground Water Sampling Guidance".

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Conduct field investigation. Screen the soils collected from the borings with a PID 11.7 every five feet.

Subtask 4: Complete letter report summarizing the data obtained during the fertilizer building area assessment.

Task D: Install monitoring wells - Install the monitoring wells at the locations indicated on Figure A. The monitoring wells will consist of four nested monitoring wells (consisting of a shallow well screened at 5'-15' and a deeper well screened at 20'-30'), one upgradient well screened at 5-15 feet, one well at the maintenance garage screened at 5-15 feet, and the utilization of the old water supply well on site as a 30' monitoring well. The four nested monitoring wells are indicated on Figure A. Sample monitoring locations for VOCs, ammonia, total nitrogen, nitrates, and MDA List 1 & 2 twice or more at a

six week interval for the initial round of testing. Samples will be collected in accordance with "MDA Guidance Document 12 – Ground Water Sampling Guidance".

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Install monitoring wells at the locations indicated on Figure A.

Subtask 4: Collect the first round of samples from each of the monitoring wells.

Subtask 5: Complete a memo report of the first round of samples collected from the monitoring wells.

Subtask 6: Collect second round of samples for VOCs, ammonia, total nitrogen, nitrates, and MDA List 1 & 2.

Subtask 7: Collect additional samples as directed by the MPCA project manager.

Objective 2 Timeline: Tasks A through D could be implemented concurrently with each other and Objective 1. Monitoring as part of Task D would take six weeks for the initial sampling. Site and seasonal conditions permitting, the field investigation could be completed within two weeks. The site analysis could then be completed within two to three weeks. If additional borings are required to define the extent of groundwater contamination, then the investigation would take an additional four to five weeks.

Objective 2 Deliverables: A groundwater investigation report with illustrations of the approximate extents of the TCE and agricultural chemical contamination. Figures with the extent of contamination within the aquifer. Geologic cross sections of the site. Quarterly memos on groundwater contamination sampling results.

Objective 3: Define the extent of agricultural and TCE soil contamination.

Task A: Investigate the former fertilizer building, scale area, and water fill area – Couple soil sampling for this task with groundwater sampling for Objective 2. Soil samples are to be taken at the surface/below the slab, then every five feet down to fifteen feet. Arrange samples in line with the crack in the foundation.

Samples are to be analyzed for VOCs, nitrates, ammonia, total nitrogen, and MDA List 1 & 2. Additionally, two borings in the former fertilizer building are to be sampled for DRO and GRO as part of the petroleum investigation, if possible. These two borings are indicated on Figure A. Advance additional borings as needed to define the extent of soil contamination. All composite soil samples will be collected in accordance with "MDA Guidance Document 11 – Soil Sampling Guidance".

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Conduct field investigation. Two borings in the former fertilizer building are to be sampled for DRO and GRO as part of the petroleum investigation if possible. Screen the soils collected from the borings with a PID 11.7 every five feet. Soil/groundwater samples for DRO and GRO for these two borings are to be taken every five feet down to groundwater, or further as outlined in the MPCA guidance for "Soil and groundwater assessments performed during site investigation". These two borings are indicated on Figure A. Composite samples of surface soils will be taken in accordance with "MDA Guidance Document 11 – Soil Sampling Guidance".

Subtask 4: Complete letter report summarizing the data obtained during the fertilizer building area assessment.

Task B: Investigate the area of stained soils – Three boings will be advanced along the northern perimeter of the area of stained soils to determine the extent of contamination north of the garage. Sample location will be finalized after a site inspection. Samples will be analyzed for VOCs.

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Conduct field investigation. Samples will be analyzed for VOCs.

Subtask 4: Complete letter report summarizing the data obtained during the assessment of the area of stained soils.

Objective 3 Timeline: Site and seasonal conditions permitting, the field investigation could be completed within two weeks. The execution of Objective 3 would be coupled with Objective 2. The report and associated documents could then be completed within three weeks. If additional borings are required to define the extent of soil contamination, then the investigation would take an additional four to five weeks.

Objective 3 Deliverables: A soil investigation report and illustrations of the approximate extents of soil contamination from TCE and agricultural chemicals. Corrective action design recommendations will be included for areas with high risk levels of contamination.

Objective 4: Define the extent of petroleum soil and groundwater contamination.

Task A: Sample the areas around the 1,000-gallon UST, 500-gallon AST, and the trench drain UST for DRO and GRO. Soil and/or groundwater samples will be taken every 5 feet from the surface to a depth of 25 feet or to 20 feet below the contamination as detected in the field. Samples will be analyzed for DRO, GRO, and VOCs. The surface soil assessment will be conducted in accordance with MPCA Guidance Document c-prp4-01 – "Soil and groundwater assessments performed during site investigation".

Subtask 1: Clear local utilities.

Subtask 2: Coordinate field work with boring contractor, MPCA project manager, field technician, and property owners.

Subtask 3: Sample trench drain UST area. A sample will be taken in the tank basin and downgradient to the northwest. Samples will be analyzed for DRO, GRO, and VOCs.

Subtask 4: Sample 500-gallon AST area. A sample will be taken in the tank basin and downgradient to the west-northwest. Samples will be taken for VOCs and DRO.

Subtask 5: Sample 1,000-gallon UST area. A sample will be taken in the tank basin and downgradient to the northwest. Samples will be analyzed for VOCs and GRO.

Subtask 6: Complete letter report summarizing the data obtained during the tank assessments.

Task B: Take additional samples as needed to determine the extent of petroleum contamination if needed.

Objective 4 Timeline: Site and seasonal conditions permitting, the field investigation could be completed within two weeks. The execution of Objective 4 would be coupled with Objectives 2 and 3 if possible. After completion of the field work and receipt of laboratory results, the site analysis could be completed within two to three weeks. If additional borings are required to define the extent of soil contamination, then the investigation would take an additional four to five weeks.

Objective 4 Deliverables: An LSI report including illustrations of the extent of the approximate extents of soil and groundwater petroleum contamination. If extensive petroleum soil contamination is found, then the LSI report will include recommendations for further investigation (i.e. a laser induced fluorescence study).

Objective 5: Assess stream impacts from the contamination site.

Task A: Setup monitoring locations in the locations identified on Figure A.

Subtask 1: Coordinate site access with the property owner, field technician, and MPCA project manager.

Subtask 2: Take first round of surface water samples from the monitoring locations.

Subtask 3: Complete a memo report of the first round of samples taken from each location.

Task B: Sample monitoring locations twice for VOCs, Ammonia, total nitrogen, nitrates, and MDA List 1 & 2 twice at a six week interval. Submit a remedial investigation report.

Objective 5 Timeline: Task A would be coupled with Objective 2, Task D, Subtask 5 if possible so that all monitoring samples can be taken at the same interval. Task B could then be completed in approximately six weeks.

Objective 5 Deliverables: Annual monitoring report and quarterly memos on surface water contamination. Quarterly memos on surface water contamination sampling results. A Surface Water Toxics Impact Assessment Request may be included if significant contamination is discovered in the stream.

Additional Work: Additional soil, soil gas, and groundwater sampling/monitoring may be required to further define the extent of contamination and the potential impacts to human health and the environment. The number and locations of additional borings would be discussed with the MPCA/MDA project manager. This additional work may consist of additional borings to define the horizontal and/or vertical extent of contamination on the target property to inform remediation activities. Additional deeper monitoring wells may be required depending on the results of the groundwater investigation and site geology. Petroleum contamination could be delineated through laser-induced fluorescence (LIF).

Additional contaminant impact surveys and/or receptor surveys may be required depending on the results of the subslab

and groundwater investigations at the adjacent structures. The number and locations of additional surveys would be discussed with the MPCA/MDA project manager. This additional work may consist of additional Vapor Intrusion Building surveys if additional structures are affected. If elevated levels of contaminants are detected in the surface water, a Surface Water Toxics Impact Assessment Request will be completed for the site.

Proposed Sampling

- 50' Soil Boring
- 25' Boring
- Monitoring Well
- Subslab Sample
- Soil Gas Boring
- Indoor Air Sample
- Private Well Sample

GW Sample & TCE Result

Vapor Sample & TCE Result

= Block Number from Scenario Text

N

0 250 500 1,000 Feet

1 2 3 4 5 6 7

0 ug/m3 0 ug/L 0 ug/m3

20 ug/L 115 ug/L 20 ug/L 6 ug/L

10 ug/L 100 ug/m3 5 ug/L 10 ug/L 0 ug/L

15'&30' NESTED

STREAM

Stream

Trench Drain and UST

5'-15'

STAINED SOIL AREA

MONITOR EXISTING 30' WELL

Waterfill Area Supply Well

500 ug/L

Former Dry Fertilizer Building

Scale

Gravel 200 ug/m3

21000 ug/m3 Vehicle/Equipment Maintenance Garage

500 Gal Fuel Oil AST

1,000 Gal Gasoline UST

30 ug/L

DRO, GRO

0 ug/L

200 ug/L

10 ug/L

See Figures

5'-15'

NOTE: PROPOSED MONITORING AND SAMPLING LOCATIONS ARE PRELIMINARY. ADDITIONAL BORINGS MAY BE REQUIRED TO CHARACTERIZE THE CONTAMINATION.

WIDSETH SMITH NOLTING

SCALE: AS SHOWN

MPCA PROPOSAL
SCENARIO A
FORMER AGRICULTURAL CHEMICAL PLANT

PROPOSED SAMPLING PLAN MAP

Date: APRIL 2018

JOB No. PROPOSAL

FIGURE A

SAMPLING PLAN SUMMARY TABLE - SCENARIO A

Project title: Category A: Petroleum, Superfund, MDA and Closed Landfill Program Environmental Services – Scenario A Sampling Plan

					Soil Analytical							Groundwater Analytical							Soil Gas Analytical			
Site Name	**Subslab Samples**	**Monitoring Wells**	**Private Water Wells**	**Borings**	**VOC**	**GRO**	**DRO**	**Nitrate**	**Ammonia**	**Total Nitrogen**	**MDA List 1 & 2**	**VOC**	**GRO**	**DRO**	**Nitrate**	**Ammonia**	**Total Nitrogen**	**MDA List 1 & 2**	**TO-15 (Subslab Round 1)**	**TO-15 (Subslab Round 2)**	**TO-15 (Soil Gas Borings)**	**TO-15 (Indoor Air & Background)**
Soil Gas Investigation																						
Block 5	9	0	0	1															**9**	**9**	**0**	**4**
Block 7	6	0	0	2															**6**	**6**	**0**	**2**
Downgradient (Eastern Blocks 3, 4 and 6)	0	0	0	5															**0**	**0**	**5**	**0**
SUBTOTAL	15	0	0	8															15	15	5	6
Groundwater Investigation																						
Upgradient (South of Garage)	0	1	0	0								**2**	**2**	**2**	**2**	**2**	**2**	**2**				
Block 5	0	2	5	1								**12**	**0**	**0**	**12**	**12**	**12**	**12**				
Block 7	0	2	4	2								**14**	**0**	**0**	**14**	**14**	**14**	**14**				
Downgradient (Eastern Blocks 3, 4, and 6)	0	2	0	3								**13**	**0**	**0**	**13**	**13**	**13**	**13**				
Former Dry Fertilizer Building	0	2	1	4								**17**	**3**	**3**	**17**	**17**	**17**	**17**				
Waterfill/Scale Area	0	0	0	4								**12**	**0**	**0**	**12**	**12**	**12**	**12**				
Vehicle/Equipment Maintenance Garage	0	1	0	1								**5**	**0**	**0**	**5**	**5**	**5**	**5**				
SUBTOTAL	0	10	10	15								75	5	5	75	75	75	75				
Agricultural Chemical Area Soil Investigation																						
Former Dry Fertilizer Building	0	0	0	4	**0**	**0**	**0**	**8**	**8**	**8**	**8**											
Waterfill/Scale Area	0	0	0	4	**0**	**0**	**0**	**8**	**8**	**8**	**8**											
SUBTOTAL	0	0	0	0	0	0	0	16	16	16	16											
Petroleum Investigation																						
1,000 Gallon Gasoline UST	0	0	0	2	**6**	**6**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**0**	**0**	**0**	**0**				
500 Gallon Fuel Oil AST	0	0	0	2	**6**	**0**	**4**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**0**	**0**	**0**	**0**				
Trench Drain UST	0	0	0	2	**6**	**6**	**6**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**0**	**0**	**0**	**0**				
Area of Stained Soils	0	0	0	3	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**				
SUBTOTAL	0	0	0	9	27	12	10	0	0	0	0	9	6	6	0	0	0	0				
QA/QC																						
Blanks (Four Sampling Visits)	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8	8	0	0	0	0

					Surfacewater Analytical						
					VOC	**GRO**	**DRO**	**Nitrate**	**Ammonia**	**Total Nitrogen**	**MDA List 1 & 2**
Surface Water Investigation											
Stream Area (Two Rounds, Two Locations)	0	Surface Water	0	0	**4**	**0**	**0**	**4**	**4**	**4**	**4**

					Soil Analytical							Surface/Groundwater Analytical							Soil Gas Analytical			
	Subslab Samples	**Monitoring Wells*/***	**Private Water Wells**	**Borings****	**VOC**	**GRO**	**DRO**	**Nitrate**	**Ammonia**	**Total Nitrogen**	**MDA List 1 & 2**	**VOC**	**GRO**	**DRO**	**Nitrate**	**Ammonia**	**Total Nitrogen**	**MDA List 1 & 2**	**TO-15 (subslab)**	**TO-15 (Round 1)**	**TO-15 (Round 2)**	**TO-15 (Indoor Air)**
Totals	**15**	**10**	**10**	**32**	**27**	**12**	**10**	**16**	**16**	**16**	**16**	**92**	**19**	**19**	**83**	**83**	**83**	**83**	**15**	**15**	**5**	**6**

*- Four of the monitoring locations will be nested wells with two wells each. There will be a total of 7 monitoring well sites and two surface water monitoring sites.

** - Borings will be sampled for soil at the surface, the groundwater interface, and at the bottom of the boring. Soil gas samples will be taken between 5 and 10 feet, above the groundwater level. Groundwater samples will be taken at the groundwater interface, then at 15' below the groundwater interface, and at the bottom of the boring.

*** - Monitoring locations will be sampled at least twice at a six week interval. Quarterly groundwater sampling will likely be needed, but is not included in this sampling summary.

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Attachment B
*Example Scenario Project Spreadsheet

Project title: Category A: Petroleum, Superfund, MDA and Closed Landfill Program Environmental Services – Scenario A Sampling Plan

	1. Personnel					2. Subcontracting	3. Equipment		4. Other Expenses			Totals (Extended)
Project Budget	Project Manager	Engineer IV	Engineer I	GIS/CAD Specialist	Field Technician	Wells Drilling/Environmental Borings	PID 11.7	Sampling Equipment	Soil Gas Samples	Water Samples	Soil Samples	
	(Hours)	**(Hours)**	**(Hours)**	**(Hours)**	**(Hours)**	**(# of borings/wells)**	**(# of days)**	**(# of days)**	**(# of Samples)**	**(# of Samples)**	**(# of Samples)**	**(Hours)**
*** Objective 1 - Soil Gas Investigation**												
Task A - Soil Gas Borings	6	**2**	14	2	27	8	2	0	8	0	0	51
Task B - Subslab Samples (Round 1)	4	**2**	6	3	20	15	2	0	15	0	0	35
Task C- Indoor Air Quality	2	**0**	4	1	4	0	1	0	6	0	0	11
Task D - Vapor Intrusion Building Surveys	**6**	**3**	**6**	**1**	**6**	**0**	**2**	0	**0**	**0**	**0**	22
Task E - Subslab Samples (Round 2)*	4	**1**	**6**	**3**	**20**	**0**	**2**	0	**15**	**0**	**0**	34
Total for Objective 1 Hrs	**22**	**8**	**36**	**10**	**77**	**23**	**9**	**0**	**44**	**0**	**0**	**153**
Objective 2 - Groundwater Investigation									*Fewer samples may be needed if ISV is exceeded.			
Task A - Garage Area	5	1	2	2	2	1	1	1	0	3	0	13
Task B - Fertilizer Area	5	1	12	2	16	8	1	1	0	25	0	44
Task C - Blocks 4, 5, 6 & 7	5	1	9	2	12	6	1	1	0	27	0	35
Task D - Monitoring Wells (Two Rounds)	**6**	**2**	**2**	**6**	**28**	10	2	2	0	20	0	54
Total for Objective 2 Hrs	**21**	**5**	**25**	**12**	**58**	**25**	**5**	**5**	**0**	**75**	**0**	**121**
Objective 3 - TCE/AgChem Soil Investigation												
Task A - Scale, Waterfill, Fertilizer building	8	2	4	8	24	16	2	2	0	0*	8	46
Task B - Stained Soil Area	6	2	6	4	18	3	1	1	0	3	8	36
Total for Objective 3 Hrs	**14**	**4**	**10**	**12**	**42**	**19**	**3**	**3**	**0**	**3**	**16**	**82**
Objective 4 - Petroleum Investigation										* - taken during objective 2, task B		
Task A - Petroleum Sampling	8	0	4	6	24	27	3	0	0	6	27	42
Task B - Additional Sampling	4	0	2	2	8	27	1	0	0	TBD	TBD	16
Total for Objective 4 Hrs	**12**	**0**	**6**	**8**	**32**	54			**0**	**6**	**27**	58
Objective 5 - Stream Monitoring												
Task A - Monitoring setup	**4**	**0**	**2**	**2**	**4**	0	0	1	0	0	0	12
Task B - Monitoring Sampling (Two Rounds)	**2**	**0**	**2**	**2**	**6**	0	0	2	0	4	0	12
Total for Objective 5 Hrs	**6**	**0**	**4**	**4**	**10**	**0**	**0**	**3**	**0**	**4**	**0**	24
QA/QC												
Blanks	0	0	0	0	0	0	0	0	0	8	0	
	Project Manager	Engineer IV	Engineer I	GIS/CAD Specialist	Field Technician	Wells Drilling/Environmental Borings	PID	Sampling Equipment	Soil Gas Samples	Water Samples	Soil Samples	
	(Hours)	**(Hours)**	**(Hours)**	**(Hours)**	**(Hours)**	**(# of borings/wells)**	**(# of days)**	**(# of days)**	**(# of Samples)**	**(# of Samples)**	**(# of Samples)**	
Total Project Hours	75	17	81	46	219	121	17	11	44	96	43	438

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Example Workplan

Project Title: Category A: Petroleum, Superfund, MDA and Closed Landfill Program Environmental Services – Scenario A – Remedial Design/Remedial Action Activities

1. Project Summary:

A former bulk chemical storage and manufacturing site has known groundwater contamination and is located near a town with sensitive receptors. Households in the affected area are supplied by private wells and there are known soil gas detections near structures adjacent to the contamination site. A responsible party (RP) search has not identified a viable RP, and the site has been purchased for redevelopment into a golf course. Known contamination on/from the site consists of agricultural fertilizers and pesticides/herbicides, solvents from vehicle/equipment cleaning, and petrochemicals likely leaked from storage tanks on site. The property owner conducted a limited investigation, taking 23 samples within the Maintenance garage, nine soil gas samples in the greater area, and 13 groundwater samples in the greater area. Over the course of the investigation, levels of contamination above the health risk limit for TCE were discovered in the groundwater to the south of the river and levels of soil gas vapors above the ISVs were found both on the site and in the adjacent residential areas.

2. Statement of Problems, Opportunities, and Existing Conditions

Problems – Detected levels of nitrates, metolachlor, and dicamba in the groundwater above the health risk limits within the aquifer supplying private wells has been identified. Known TCE contamination of groundwater is present at these wells and probable contamination of the groundwater by other petrochemicals is likely. Elevated levels of hazardous soil vapors have been detected in and around residential areas. It is probable that hazardous material has migrated into the stream adjacent to the site. Contamination source areas are still present. The current property owner is being uncooperative with the MPCA.

Existing Conditions – The soils on the site are generally sandy with lenses of clay and silt intermixed. These soils are highly permeable, allowing for contamination to quickly migrate to groundwater and off the site. Significant portions of the town are on private wells and are at risk of being or are already contaminated. Sensitive populations are located downgradient of the contamination and vapor intrusion above the intervention limit is known to exist in the structures adjacent to the contamination site. The stream running through the middle of town appears to be acting as a barrier to contamination migrating further north.

Opportunities – The City can extend the existing water supply system to buildings currently on private water. Excavation and grading as part of golf course construction could be coupled with contaminated soil removal. Partnership with other agencies (such as the DNR or SWCD) for stream monitoring could be done to minimize sampling costs. The previous investigation of the maintenance garage was thorough, minimizing the need for additional work to characterize the extent of contamination.

Assumptions

- Soil, soil gas, and groundwater samples would be processed by the lab at the standard turnaround rate of ten days. Expedited sample processing is available for some analytes and could reduce the time to complete each objective.
- All necessary access has been achieved.
- The maintenance building will continue to be used and a drinking water supply will be required on site.
- The existing capabilities of the city's wastewater treatment facility are insufficient to treat the contamination on site, making a pump and treat system at the site economically infeasible.
- The fertilizer building, maintenance building, and structures in blocks 3, 5, and 7 utilize(d) individual sewage treatment (septic) systems. Blocks 1, 2, 4, and 6 are served by a municipal sewer system.

3. Goals, Objectives, Tasks, and Subtasks

Objective 1: Eliminate the immediate TCE exposure for the residents with private drinking water wells located in blocks 5 and 7.

Task A: Provide a source of safe drinking water to the residents in blocks 5 and 7.

Subtask 1: Review the results the groundwater investigation completed previously.

Subtask 2: Inform residents in the affected area of the potential risks associated with the contaminants of

concern.
Subtask 3: Provide bottled water to the residents in blocks 5 and 7 until water treatment can be established.
Subtask 4: Based on the analytical results (i.e. contaminant concentration) for the groundwater samples taken during the investigation conducted in the previous remediation phase, and the water demands/usage for each structure, design the appropriate GAC system. Systems will be either whole house or point of use for each impacted structure identified during site reconnaissance.
Subtask 5: Install the selected water treatment systems.

Task B: Document the effectiveness of each individual water treatment system

Subtask 1: Directly after installation, sample the influent and effluent of each system, and from the mid-point sampling port for the GAC systems.
Subtask 2: Immediately submit the samples to the laboratory for 24-hour TAT analyses.
Subtask 3: Considering the analytical results, contact the GAC system supplier to determine the life of the activated carbon to assist in defining a sampling schedule for each individual system.
Subtask 4: Work with the GAC supplier to prepare a mandatory maintenance schedule for each system.

Task C: Ensure a source of safe drinking water at the maintenance building.
Subtask 1: Coordinate site access with the property owner and Site Assessment Group.
Subtask 2: Discuss the intended use of the onsite water supply with the property owner.
Subtask 3: Disconnect the structure from the existing well.
Subtask 4: Install a water tank/bottles on site.
Subtask 5: Flush the maintenance building plumbing and sample for TCE contamination at end points. If contamination over the health risk limit is discovered, then assess using end point filtration or replacement of contaminated plumbing components.

Task D: Present findings of field investigation and remediation activities to local water supplier. Recommend extension of the drinking water utilities currently serving properties in blocks 1, 2, 4 and 6 to all properties in blocks 5 and 7.

Objective 1 Timeline: Subtasks 1-3 of Task A could be completed shortly after the completion of the groundwater investigation. The time it will take to complete Task A, Subtask 4 and Task B depends on how quickly the GAC systems can be made available and shipped to the site. Installation of the systems will be from one to two weeks. The completion of Task C will depend on the intended use of the water supply on site and the extent of contamination of the maintenance garage's plumbing system. If/when access is obtained the modification and sampling of the maintenance garage water system could be completed within three weeks.

Objective 1 Deliverables: *As-built documents of the GAC systems and GAC maintenance plans. Sampling reports for systems installed at Blocks 5 and 7. Summary report of water supply system remediation work done at the maintenance garage.*

Objective 2: Based on analytical results, minimize indoor air exposure from soil vapor intrusion.

Task A: Minimize indoor air exposure in residential areas through active subslab depressurization.

Subtask 1: Coordinate site access with the property owners in the affected residences.

Subtask 2: Conduct subslab testing to determine radius of influence.

Subtask 3: Review the field investigation results and create a plan for the installation of subslab depressurization systems.

Subtask 4: Coordinate subslab system installation.

Subtask 5: Sample indoor air quality to determine subslab system efficacy.

Subtask 6: Conduct additional analysis and remediation at structures where indoor air is not meeting the designated screening value.

Subtask 7: Prepare tables summarizing sampling data and system installation.

Task B: Install an active subslab depressurization system in the regularly occupied areas of the garage (i.e. office space). Install a passive subslab depressurization system in the unoccupied areas of the garage.

Subtask 1: Coordinate building access with the property owner and discuss planned use to determine subslab system

layout.

Subtask 2: Review the field investigation results and create a plan for the installation of subslab depressurization systems.

Subtask 3: Coordinate subslab system installation. Actively ventilate the structures after system installation.

Subtask 4: Sample indoor air quality to determine subslab system efficacy.

Subtask 5: Conduct additional analysis and remediation if indoor air is not meeting the designated screening value.

Subtask 6: Prepare tables summarizing sampling data and system installation.

Objective 2 Timeline: Tasks A and B would be completed concurrently if possible, with Task A taking priority. Objective 3 could be completed concurrently with Objectives 1. System installation would be contingent on getting site access from the property owners and the conditions within the building. System installation and troubleshooting could likely be completed within four weeks.

Objective 2 Deliverables: A summary report detailing the results of Task A and B. Maintenance plans for the various subslab systems.

Objective 3: Remove contamination source material from the maintenance building and fertilizer building areas.

Task A: Remove AST and USTs from site.

Subtask 1: Coordinate site access with the property owner and MPCA Site Assessment Group.

Subtask 2: Develop a health and safety plan for the excavation site.

Subtask 3: Coordinate underground/aboveground storage tank removal in accordance with MPCA guidance. If removal is deemed impractical, such as for the trench drain UST, then abandon the underground storage tank(s) in accordance Minnesota State Fire Code 5704.2.13.1.4. Dispose of materials at an appropriately permitted facility.

Subtask 4: Complete tank closure documentation and submit to the MPCA.

Task B: Excavate highly contaminated material from the area of stained soil as determined by the field investigation.

Subtask 1: Review the sampling data for the site and determine if an LIF assessment is needed.

Subtask 2: Complete LIF assessment (if needed) and prepare an EDCAD. Submit LIF assessment and EDCAD for MPCA review and approval.

Subtask 2: After EDCAD approval, prepare plans and specifications for excavation.

Subtask 3: Coordinate bid process for CAD implementation.

Subtask 4: Coordinate site access with the property owner, excavation contractor, field technician, and MPCA project manager.

Subtask 5: Coordinate excavation of contaminated material. Sample excavated material with a PID with an 11.7eV lamp and separate clean and contaminated material. Replace contaminated material with clean fill.

Subtask 6: Coordinate disposal of contaminated material.

Task C: Excavate highly contaminated material from the area around the fertilizer building, scale, and water fill area as determined by the field investigation.

Subtask 1: Coordinate EDCAD and bidding process with Task B Subtasks 1, 2, and 3.

Subtask 2: Coordinate site access with the property owner, excavation contractor, field technician, and MPCA project manager.

Subtask 3: Develop a demolition plan for the old slab and scale. Avoid the existing 30 foot well if possible. If grading

and excavation necessitate the demolition of the existing 30 foot well, then replace the existing well with a new monitoring well screened at 5'-15' after grading and excavation is complete.

Subtask 4: Develop an excavation plan for the site. Couple with the grading plan for the golf course if possible.

Subtask 5: Develop a health and safety plan for the excavation site.

Subtask 6: Coordinate demolitions and excavation of contaminated material. Sample excavated material with a PID with an 11.7eV lamp and separate clean and contaminated material. Replace contaminated material with clean fill.

Subtask 7: Coordinate disposal of contaminated material.

Objective 3 Timeline: Tasks A, B, and C could be completed concurrently. Excavation could proceed after consultation with a structural engineer on how to prevent damage to the structure. The timeline for excavation would be dependent on the structural engineer's recommendations and available budget. Demolition and excavation near the fertilizer building and scale could proceed immediately once access is obtained, and would most likely take 2-3 weeks to complete.

Objective 3 Deliverables: Site specific health and safety plan (HASP), demolition report, and an excavation report combining the results of Tasks A, B, and C. If a new monitoring well is required at the water fill area as part of task C, a well record will be completed and submitted to the MDH.

Objective 4: Conduct a pilot test study for TCE removal in groundwater near the source area.

Task A: Develop a pilot test work plan using MPCA Guidance Document 7-05 – Pilot Test Work Plan.

Subtask 1: Evaluate the sampling and excavation reports from the tasks previously completed on the site.

Subtask 2: Develop a pilot test work plan using MPCA Guidance Document 7-05 – Pilot Test Work Plan. The work plan will include detailed descriptions of the site, staff involved, pilot test objectives and setup, monitoring, and evaluation of the data collected.

Subtask 3: Submit the pilot test workplan to MPCA for review and approval.

Task B: Conduct the pilot test.

Subtask 1: Coordinate site access with the property owner, air sparge point and vent point driller, and field technician and MPCA Site Assessment Group.

Subtask 2: Install the pilot air sparge and vent points.

Subtask 3: Install the monitoring locations.

Subtask 4: Setup sampling and monitoring equipment and establish background levels in the monitoring locations.

Subtask 5: Mobilize equipment and connect pilot test blowers to system.

Subtask 6: Activate sparging system and sample the monitoring locations per the workplan.

Subtask 7: Complete the pilot test and evaluate the results. Determine the technical feasibility of the system.

Subtask 8: Complete a Pilot Test Report (MPCA form c-prp7-06) to the MPCA project manager.

Objective 4 Timeline: Objective 4 would be implemented after the construction of the monitoring wells and the completion of Objective 3. Completion of the workplan and installation of the pilot test system (Task A) would take approximately six weeks. The pilot test (Task B) could then be completed within three weeks.

Objective 4 Deliverables: Pilot Test Work Plan (MPCA form c-prp7-05), Pilot Test Report (MPCA form c-prp7-06), and soil boring logs from sparge and monitoring locations. The pilot test report will include a technical feasibility determination, an economic feasibility determination, and recommendations for further work.

Additional Work:
Additional work associated with objective 4 may involve the expansion of the air sparge system to other areas around the

contamination site. Additional assessment and remediation of septic systems at the maintenance and/or fertilizer buildings may be required to determine if these are significantly contaminated. Given the history of the site it is possible that these systems were incorrectly used.

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Attachment B
Example Scenario Project Spreadsheet

Project title: Category A: Petroleum, Superfund, MDA and Closed Landfill Program Environmental Services – Scenario A - Remedial Design/Remedial Action Activities

	1. Personnel					2. Subcontracting	3. Equipment		4. Other Expenses			Totals (Extended)
Project Budget	Project Manager	Engineer IV	Engineer I	GIS/CAD Specialist	Field Technician	Wells Drilling/Environmental Borings	PID	Sampling Equipment	Soil Gas Samples	Soil Samples	Water Samples	
	(Hours)	**(Hours)**	**(Hours)**	**(Hours)**	**(Hours)**	**(# of borings/wells)**	**(# of days)**	**(# of days)**	**(# of Sample Locations)**	**(# of Sample Locations)**	**(# of Sample Locations)**	**(Hours)**
Objective 1 - Drinking Water Treatment												
Task A - Blocks 5 & 7 Treatment	8	4	16	0	44	0	0	4	0	0	0	72
Task B - GAC Evaluation	4	0	2	0	24	0	0	2	0	0	54	30
Task C - Prepare Reports	4	4	8	8	8	0	0	0	0	0	0	32
Total for Objective 1 Hrs	**16**	**8**	**26**	**8**	**68**	**0**	**0**	**6**	**0**	**0**	**54**	**126**
Objective 2 - Indoor Air Protection												
Task A - Block 5 & 7 Subslab Systems	12	8	12	0	118	0	10	6	27	0	0	150
Task B - Prepare Report	4	2	4	12	24	0	0	0	0	0	0	46
Total for Objective 2 Hrs	**16**	**10**	**16**	**12**	**142**	**0**	**10**	**6**	**27**	**0**	**0**	**196**
Objective 3 - Excavation of Source Material												
Task A - AST/UST Removal	12	6	10	14	56	24**	3	3	0	9	0	98
Task B - Soil Excavation - Stained Soils Area	4	2	6	3	8	EXCAVATION	1	1	0	6	0	23
Task C - Soil Excavation - Stained Fertilizer Building Area	4	2	6	3	8	EXCAVATION	1	1	0	6	0	
Total for Objective 3 Hrs	**20**	**10**	**22**	**20**	**72**	**24**	**4**	**4**	**0**	**21**	**0**	**144**
Objective 4 - Air Sparge and Vent Pilot Test											* - taken during objective 2, task B	
Task A - Develop Pilot Test Work Plan	12	12	40	8	12	0	0	0	0	0	0	84
Task B - Conduct Pilot Test	12	6	40	10	20	0	2	2	2	0	2	88
Total for Objective 4 Hrs	**24**	**18**	**80**	**18**	**32**		2	2	**2**	**0**	**2**	172
	Project Manager	Engineer IV	Engineer I	GIS/CAD Specialist	Field Technician	Wells Drilling/Environmental Borings	PID	Sampling Equipment	Soil Gas Samples	Soil Samples	Water Samples	
	(Hours)	**(Hours)**	**(Hours)**	**(Hours)**	**(Hours)**	**(# of borings/wells)**	**(# of days)**	**(# of days)**	**(# of Sample Locations)**	**(# of Sample Locations)**	**(# of Sample Locations)**	
Total Project Hours	76	46	144	58	314	24	16	18	29	21	56	638

*** Assumes seven homes will require sub-slab depressurization systems.**

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