Four Seasons Mall Water Quality Improvement Feasibility Report

Prepared for

City of Plymouth

July 2012



Four Seasons Mall Water Quality Improvement Feasibility Report

Wenck File #1756-05

Prepared for:

CITY OF PLYMOUTH, MN 3400 Plymouth Boulevard Plymouth, MN 55447-1482

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- A Four Seasons Mall Soil Analysis
- B Wetland Delineation Report
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1.1 INTRODUCTION

The City of Plymouth and the Bassett Creek Watershed Management Commission (BCWMC) commissioned the development of this Feasibility Study to select an approach for water quality improvements for the North Branch subwatershed south of County Road 9 and west of Northwood Lake. The goal of the project is to evaluate a suite of Best Management Practices (BMPs) and/or capital projects to reduce total suspended solids and phosphorus loading with a target load reduction of 73 pounds of phosphorus.

Several potential options were identified including:

- A. Regional water quality ponding improvements within basin NB07 including wetland mitigation
- B. Water quality ponding improvements on the City of New Hope's outlot east of Highway 169
- C. Alum treatment, including the possibility of an alum dosing plant, near pond NB07
- D. Wetland restoration and habitat improvement under Minnesota Rule 8420.0420 Subp. 9.
- E. Stream restoration from Lancaster Lane to the west
- F. Flow restriction at the outlet of Pond NB07 to improve the water quality function of the pond
- G. A partnership with the Four Seasons Mall Property to develop improvements that meet the BCWMC goals and development requirements of the City as well as identify additional areas that may increase pollutant reductions.

The ultimate goal of the project is to develop a project or a suite of projects to reduce 73 pounds/year or more of phosphorus loading to Northwood Lake. To that end, Wenck Associates, Inc. reviewed these projects to assess their cost and feasibility. Wenck also reviewed the entire watershed for additional opportunities that may be collectively implemented to meet the project goal of reducing watershed loading by 73 pounds/year.

1.2 PURPOSE

The purpose of this Feasibility Study is to identify the cost and feasibility of a suite of BMPs in the North Branch subwatershed in Plymouth, MN that drains to Northwood's Lake in New Hope, MN. The overall goal of the project is to reduce total phosphorus loading from the North Branch subwatershed in Plymouth by 73 pounds.

2.1 PROJECT AREA

The project area is located in the North Branch Subwatershed south of County Road 9 and west of Highway 169 (Figure 2.1). The project area is further bordered by 36th Avenue on the south and by Lost Lake on the west including Pilgrim Lane Elementary School and Park and a City park located on 40th Avenue and Pilgrim Lane. The North Branch of Bassett Creek flows to the east of the mall and eventually discharges to the wetland located to the south of the mall. A tributary to the creek flows through the City Park before discharging to the creek before entering the wetlands to the south of the mall. The wetland then discharges east of Highway 169 and eventually to Northwood Lake.

The portion of the subwatershed north of County Road 9 was researched to provide accurate drainage to the Four Seasons Mall. However, the area north of County Road 9 was not part of this evaluation for possible stormwater improvement locations.

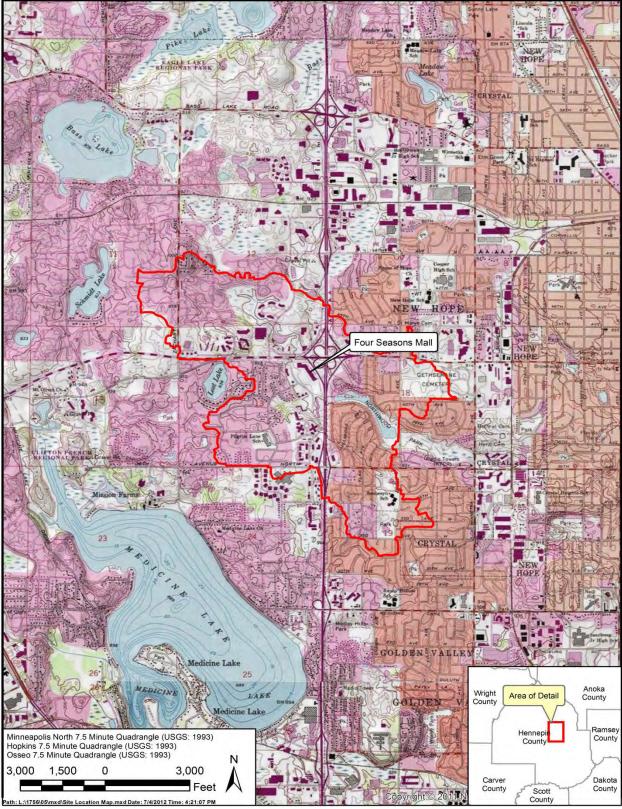


Figure 2.1. Site Location Map.

2.2 SOILS

The Hennepin County Soil Survey identified the hydric soil groups in the project area as predominantly B soils with some B/D and C soils in the southwest (Figure 2.2). Hydric soil group B is composed of soil series Angus and Lester, which are classified as well drained soils. Infiltration rates associated with soils groups B, D, and C soils According to the *Minnesota Stormwater Manual* (MPCA, 2008) are shown in Table 2.1. The proposed stormwater ponds are located in these soils.

The soils associated with the wetlands (Section 2.4) are classified as Houghton, Klossner and Glencoe and are considered poorly drained soils.

Wenck had soil borings collected at the Four Seasons Mall to determine depth to ground water and the composition of the soil and whether the existing soil would allow infiltration. The soil boring analysis was conducted by Glacial Ridge Drilling, Inc. on 06/31/2012. In summary, the soils at the Four Seasons mall are predominantly Unified Soil Classification System (ASTM D-2487-98) CL and OL soil classifications (see Table 2.1) to a depth of 8 feet. Groundwater was determined at 8 feet. See Appendix A for the field results.

	Infiltration		
Hydrologic	Rate		
Soil Group	(inches/hour)	Soil Textures	Corresponding Unified Soil Classification
	0.6	Silt loam	SM - Silty sands, silty gravelly sands
В	0.3	Loam	MH – Micaceous silts, diatomaceous silts, volcanic ash
C	0.2	Sandy clay loam	ML - Silts, very fine sands, silty or clayey fine sands
D	<0.2	Clay loam, silty clay loam, sandy clay, silty clay or clay	 GC – Clayey gravels, clayey sandy gravels SC – Clayey sands, clayey gravelly sands CL – Low plasticity clays, sandy or silty clays OL – Organic silts and clays of low plasticity CH – Highly plastic clays and sandy clays OH – Organic silts and clays of high plasticity

Table 2.1. Hydrologic Soil Group Infiltration Rates.

Source: Minnesota Stormwater Manual, MPCA (2008).

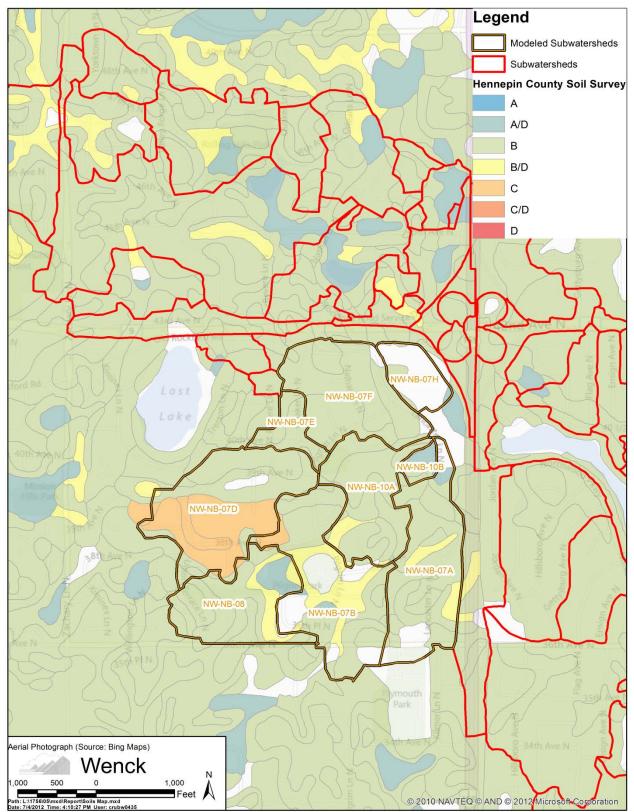


Figure 2.2. SSURGO Soils Inventory for Hennepin County in the Project Area.

2.3 LAND USE

The Metropolitan Council (METC) 2010 land use in the project area is predominantly residential with the remainder commercial, institutional, and parks and recreation (Figure 2.3). The residential land use is mostly single family homes to the west of the mall and multifamily homes to the south and southwest. The project area is bordered on the east by a major highway (Hwy 169) and a large commercial area to the north. A redevelopment study of the Four Seasons Mall area was completed in 2011 by the City of Plymouth.

2.4 WETLAND DELINEATION

A wetland delineation report completed by Arrowhead Environmental Consulting (AEC) in 2011 identified five wetland basins in the project area (Figure 2.4). Wetlands 1 and 4 were also identified on the National Wetland Inventory (NWI) map. None of the wetlands are identified on the Minnesota Department of Natural Resources (MNDR) Public Water Inventory (PWI) map.

Refer to the Wetland Delineation Report (AEC, 2011) in Appendix B for additional details regarding the wetlands in the project area.

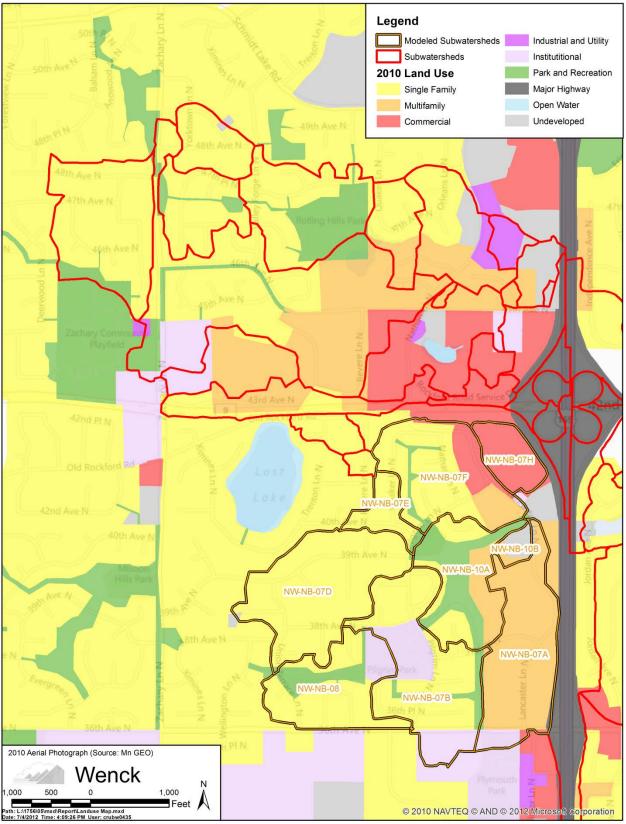


Figure 2.3. Land Use Delineation in the Project Area.

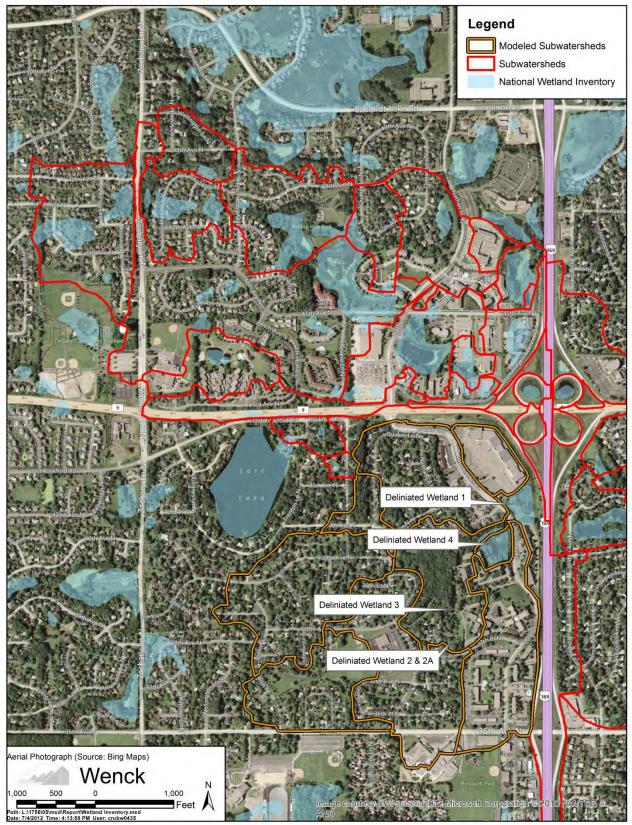


Figure 2.4. Wetland Delineation within the Project Area.

3.1 INITIAL PROJECT IDENTIFICATION

An initial list of projects was developed by reviewing watershed open space, land ownership, local soils, groundwater elevations, and other site specific conditions to guide the types of projects that are feasible for the area. A major constraint in the study area is space availability and land ownership. These constraints limited the areas of interest for ponding and filtration practices to open area parks located within the subwatershed, and the Four Seasons mall area itself. The initial projects identified in this first phase are shown in Figure 3.1 and briefly described as follows:

- 1. *Pilgrim Park Neighborhood Stormwater Pond* Construct a stormwater pond with an iron enhanced filtration bench in the neighborhood park adjacent to Union Terrace Lane. The total treatment area for this project is 35 acres.
- 2. *Pilgrim Lane Elementary Stormwater Pond* Construct a stormwater pond with an iron enhanced filtration bench in the green space available at the Pilgrim Elementary School. The total treatment area for this project is approximately 25 acres.
- 3. 40th Avenue Park Stormwater Pond Construct a stormwater pond with an iron enhanced filtration bench in the wooded area behind the park adjacent. The total treatment area for this project is 140 acres.
- 4. *Four Seasons Mall Stormwater Treatment Pond* Construct a stormwater pond with an iron enhanced filtration bench in the Parking lot at the Four Seasons Mall. The total treatment area for this project is 63 acres.
- 5. *Channel Restoration* Restore the seasonal stream flowing south-north from 37th Pl North and then west east towards Lancaster Lane. The total treatment area for this project is 33 acres.
- 6. *Alum Injection Facility at the Four Season Mall Site* Construct an underground storage unit that will contain a large percentage of the stormwater from the southern watershed and run it through an alum injection and primary clarification process. The total treatment area for this project is 203 acres.
- 7. *Four Seasons Mall Wetland Conversion and Outlet Modification* Convert delineated wetland #1 to function as a regional stormwater pond and/or modify the outlet to function under more optimal hydraulic loads. The total treatment area for this project is 286 acres.

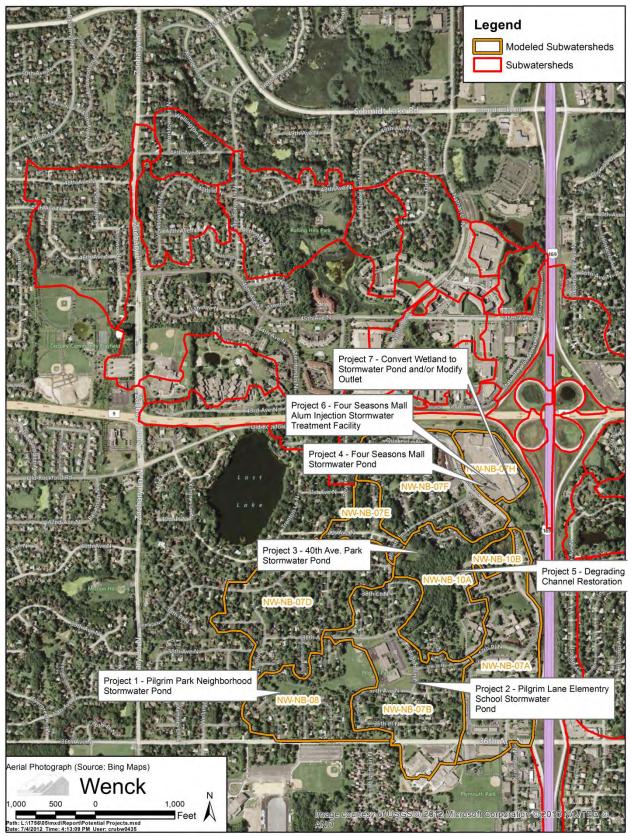


Figure 3.1. Initial Project Identification Inventory.

The next step was to perform a site investigation of all of the potential projects. A second objective during the site visit was to get a better understanding of the flow patterns between the subwatersheds in the project area. A major unknown prior to site investigations was the connectivity of subwatersheds north of Rockford Road to the Four Seasons Mall area. This step was critical to identify the volume of water moving through the Four Seasons Mall area.

The following sections describe the data that were obtained during the site surveys that were completed on 4/20/2012 and 4/24/2012.

3.1.1 Four Seasons Mall and Local Green Space Site Survey

Topographic and other site specific data was collected in areas considered for ponding/filtration projects. All four ponding/filtration project sites identified have reasonable space and existing infrastructure to implement ponding/infiltration strategies. The Pilgrim Park area, Pilgrim Elementary area, and Four Seasons Mall area have relatively flat terrain and easy access to the existing stormwater infrastructure. The open area at the 40th Avenue park location is elevated from the street limiting the ponding capability there. However the area behind the park is heavily wooded but has plenty of space for a pond to be installed that could intercept flows from 114 acres of the subwatershed. There is a channel through the wooded area that starts at a stormwater pipe outfall and winds behind the 40th Ave. Park eventually discharging to the Four Seasons Mall wetland and then to Northwoods Lake.

3.1.2 Flow Path Determination

It was important to determine the flow paths of all of the sewersheds within the subwatershed in order to accurately determine the annual and event volumes that would be experienced at each site. One major unknown at the beginning of the project was how the flows from the Northern portion of the watershed (north of Rockford Road) were related to the Four Seasons Mall Wetland area (delineated wetland No. 1). As built stormsewer information was reviewed and a survey was conducted to collect topographic and storm sewer outlet data in and around the Roadside ditch just north of Rockford Road to determine the connectivity of the Northern portion of the watershed to the southern portion (Figure 3.2). During this survey it was determined that there is a connection from north to south through a 24" RCP pipe running north-south under Rockford Road (Figure 3.3). This was an important factor when considering a regional pond conversion of the wetland at the Four Seasons Mall.

The flow directions within the subwatershed indicating how the sewersheds are interconnected based on this overview of information and site survey are shown in Figure 3.4.



Figure 3.2. Rockford Road Roadside Ditch. Facing east from storm sewer outlet toward the connecting culvert directing flow towards the Four Seasons Mall.



Figure 3.3. 24 inch Reinforced Concrete Pipe. Pipe leads flow from ditch to Four Seasons Mall delineated wetland area.

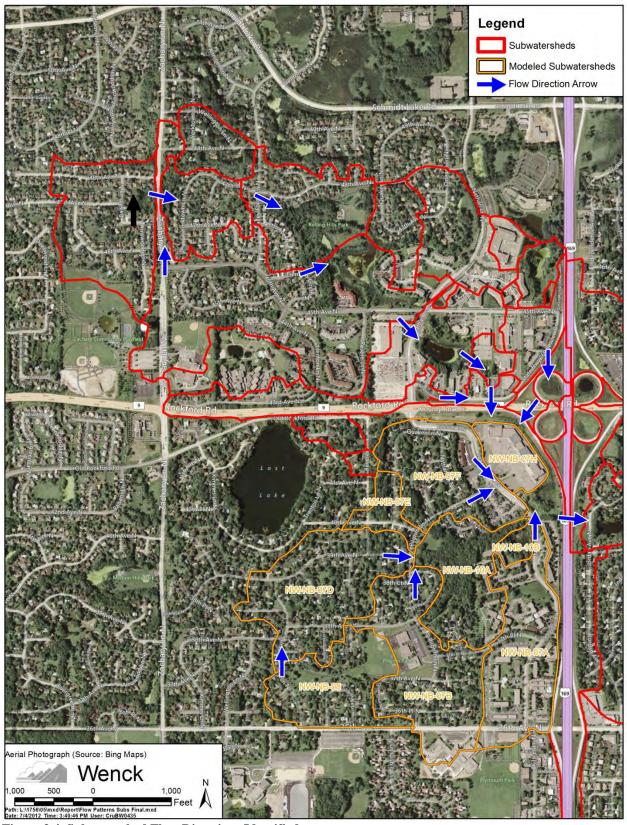


Figure 3.4. Subwatershed Flow Directions Identified.

3.1.3 Channel Degradation Investigation

A series of channels flow west to east through city owned land between Pilgrim Lane and Lancaster Lane. These channels are in woods and discharge into the Lancaster Lane wetland (delineated wetland number 4) and then into Northwood Lake and the North Branch of Bassett Creek (see Figure 3.5). The Right Reach appears to be the primary channel, and conveys runoff from the adjacent commercial and residential areas, including runoff discharged from a 12" outfall from the Nathan Lane North cul-de-sac. The wooded area is at a lower elevation than the adjacent development to the north and west, and the Center and Left Reaches flow along the toe of a slope, conveying mainly overland flow. The three channels converge in the vicinity of a 12" outfall from the Orleans Lane North cul-de-sac.

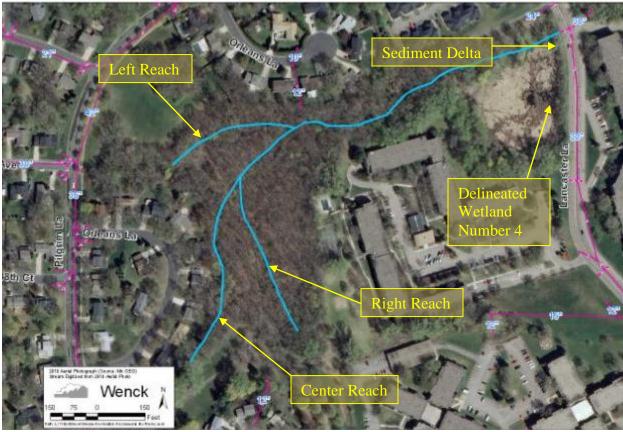


Figure 3.5. Channel Stabilization Investigation Reaches.

Wenck conducted a visual inspection of these reaches to evaluate conditions and identify the nature and extent of any channel degradation and its probable cause. All three channels are experiencing erosion and mass wasting. The Right Reach is headcutting and widening. The channel is slightly meandered, with degradation of the outer banks and bare tree roots. The other two reaches are more stable, with areas of spot erosion. The 12" outfall from the Nathan Lane North cul-de-sac is broken, and the drainage swale to the Center Reach is scoured and unstable. The channel downstream of a 24" culvert under a trail crossing on the Center reach is scoured and downcut.

A significant factor in this soil loss is likely the heavy canopy, which shades out the growth of bank-stabilizing woody and herbaceous vegetation. Flashy stormwater flows erode the unstable, exposed banks, resulting in headcutting and undercutting.

3.1.3.1 Lancaster Wetlands Sediment Analysis

There is a significant accumulation of sediment in the Lancaster wetland (delineated wetland 4) on figure 3.5) where flow from the channel slows down and spreads out into the wetland. The outlet structure is partially buried and obstructed by woody debris. There is also a sediment delta at the 30" outfall from Lancaster Lane.

Sediment samples were collected at the sediment delta to assess the level of chemical contamination and to determine if dredging restrictions apply. Sediment was collected from three boring locations on the delta, ranging in depth from the surface to 15 inches deep, and combined into a one composite sample. Wenck determined that MPCA guidelines for storm water ponds were applicable for a sediment delta formed by runoff from residential property, streets and channel erosion. MPCA guidance states that the following parameters should be analyzed in storm water ponds where maintenance dredging may take place:

- Copper
- Arsenic
- PAH's (Polycyclic Aromatic Hydrocarbons). PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. There are more than 100 different PAHs. PAHs generally occur as complex mixtures (for example, as part of combustion products such as soot), not as single compounds.

As indicated in Table 3.1 below, the soil samples collected from the sediment delta are below Tier 1 standards and therefore do not have disposal restrictions. The lab analysis report is in Appendix A.

Table 3.1. Sediment Sample Results							
Parameter	Tier 1 Standards	Sample Results					
Arsenic	9	1.5 J					
Copper	100	9.6					
PAH's	2.0	0.973					

J – Estimated value, sample results between the Reporting Limit and Method Detection Limit.

3.2 PROJECTS ELIMINATED FROM CONSIDERATION

As discussed above, several projects were initially identified and explored based on City owned open space and location in the watershed. Based on discussions with the City of Plymouth, these projects were eliminated because it was determined that implementation was unlikely to occur or potentially objectionable to the City. Following is a brief description of those projects and the reasons for their elimination.

3.2.1 Pilgrim Lane Elementary School Pond

Pilgrim Lane Elementary School (Figure 3.1) has a fair amount of open space that could be used for ponding to treat stormwater coming from the developed area to the southeast. However, the school is currently vacant and the ultimate fate and use of the school and the surrounding land is uncertain and it is unlikely that the School Board would be willing to agree to stormwater practices with such high uncertainty. Based on this understanding, the Pilgrim Park Elementary School pond was eliminated from consideration.

3.2.2 Pilgrim Park Pond

Another pond location considered in the watershed was Pilgrim Park located off of Union Terrace Lake just west of Pilgrim Park Elementary School. Based on discussions with the City of Plymouth, this green space was highly utilized by local residents and would be considered a considerable loss to the City. Based on this discussion, the Pilgrim Park Pond project was eliminated from consideration.

3.2.3 Four Seasons Mall Wetland Conversion and Outlet Modification

The wetland at the Four Seasons Mall (delineated wetland number 1) was initially determined as a potential stormwater improvement strategy for the watershed. However, due to the amount of water currently flowing to this wetland (both north and south portions of the subwatershed) mitigation costs associated with wetland conversion (approximately \$1.50 to \$2.00 per square foot of wetland disturbed) this project was deemed cost prohibitive.

Modification to the 66" RCP outlet to the Four Seasons Mall Wetland was eliminated due to the same factors: cost of wetland mitigation and limited effectiveness. Although the culvert is considered hydraulically overloaded, the cost benefit analysis for any modifications is not within the best interest of this project.

3.2.4 Infiltration

Infiltration practices are not a viable option for treatment within the watershed based on mediocre drainability of the soils, limited space for BMPs based on the size of the subwatersheds, and a high groundwater table in the suggested locations. The predominant HSG in the area is B soils with medium to poor drainage (Figure 2.2).

In addition to the mediocre soils, the two areas where infiltration would be considered (40th Avenue and at the four Seasons Mall) have contributing areas that are too large to effectively infiltrate. Infiltration basins are typically designed to treat smaller areas where 10 acres is typically the maximum size treatable. The Minnesota Stormwater Manual suggests that an area of 50 acres is treatable with an infiltration basin. Since the contributing areas for 40th avenue and at the Four Seasons Mall are 140 and 63 acres, respectively. Infiltration was eliminated as a possibility.

4.0 Hydrologic and Water Quality Modeling

Hydrologic and Water quality models were developed and used to estimate the magnitude of event storm volumes, to determine base total phosphorus loading, and to determine the effectiveness of the suggested BMPs. HydroCad[™] and P8 models were developed for sewersheds NW-NB-07A, NW-NB-07B, N-NB-07D, NW-NB-07E, NW-NB-07F, NW-NB-07H, NW-NB-08, NW-NB-10A and NW-NB-10B using standard Natural Resources Conservation Services (NRCS) hydrology methods. A subset of the P8 model that was developed by Barr Engineering for this project was used to estimate annual total phosphorus loading. HydroCad was used to estimate event storm volumes for BMP sizing.

4.1 CURVE NUMBER ESTIMATION

Curve numbers were estimated within each subwatershed based on USGS NLCD 2006 Imperviousness, 2010 Metropolitan Council Land use, and the Hennepin County soils data (see sections 2.2 and 2.3 of this report for land use and soils coverage). A composite curve number was estimated for each watershed by using the weighted average (see Table 4.1). Time of concentration (Table 4.1) is estimated based on the existing land uses designations, the sewershed delineation, and stormsewer information.

	Area	Composite	Time of
Subwatershed	(acre)	Curve Number	Concentration (min)
NW-NB-07A	45.5	60.7	40
NW-NB-07B	53.5	61.0	30
NW-NB-07D	52.5	67.1	26
NW-NB-07E	9.6	61.0	25
NW-NB-07F	40.5	61.0	15
NW-NB-07H	12.4	98.0	10
NW-NB-08	34.0	59.1	23
NW-NB-10A	33.0	61.0	30
NW-NB-10B	4.0	51.0	6

Table 4.1. Watershed Data for Existing Conditions.

4.2 IMPERVIOUS FRACTION

P8 calculates runoff separately for pervious and impervious areas. Therefore, it is necessary to determine the impervious fraction of each watershed. Directly connected and indirectly connected imperviousness was derived from land use designations within the 2010 Metropolitan Council Land Use coverage database such as single-family residential, parks, and undeveloped

land. Table 4.2 shows the directly and indirectly connected impervious fractions estimated for each watershed.

Table 4.2. Impervious Fraction Estimates for Existing Conditions.							
	Directly Connected Indirectly Connected						
Subwatershed	Impervious %	Impervious %	Pervious %				
NW-NB-07A	47.0%	0.0%	53.0%				
NW-NB-07B	19.5%	0.0%	80.5%				
NW-NB-07D	17.6%	9.3%	73.1%				
NW-NB-07E	17.9%	9.8%	72.3%				
NW-NB-07F	27.1%	6.6%	66.3%				
NW-NB-07H*	100%	0.0%	0.0%				
NW-NB-08	21.9%	7.1%	71.0%				
NW-NB-10A	16.3%	3.2%	80.5%				
NW-NB-10B	19.5%	0.0%	80.5%				

 Table 4.2. Impervious Fraction Estimates for Existing Conditions.

* Four Season Mall Property

4.3 P8 WATER QUALITY COMPONENT

The sample water quality component concentrations were derived from the National Urban Runoff Program (NURP) studies performed by the United States Environmental Protection Agency (USEPA) in 1983. The default NURP 50th percentile particle file was used to estimate watershed pollutant loading.

A slight modification to the filtration efficiency for the dissolved fraction particles within the NURP 50 default file was made to reflect values found in a recent study completed in the City of Prior Lake (Erickson et.al. 2010). The conclusions from the Prior Lake study were that iron-enhanced sand filtration trenches captured approximately 85-90% of the dissolved phosphorus for rainfall events within the study period. Based on this research, a filtration efficiency of 85% was used in the P8 model for dissolved particles.

4.4 P8 WATERHSEDS AND DEVICES

All subwatersheds, except NW-NB-07H, used in the P8 model were delineated by Barr Engineering. Additional subwatersheds are shown on the figures but are not applicable to the BMP study and therefore were not modeled.

Ponds with Iron Enhanced sand filters at 40th Avenue and at the Four Seasons Mall were modeled as general devices in P8. This allowed the user to define infiltration and discharge rates for given water levels. An infiltration rate of 28 feet per day was used to size the filter benches to drain 1 foot of water in 48 hours (using a factor of safety of 3). With the area of the filter bench and the infiltration rate respective discharge rates were determined for the infiltration component of the general device. Discharge rates associated with the normal and over flow outlets were based on standard engineering hydraulic equations for weir, orifice, and conduit flow.

4.5 RAINFALL AND TEMPERATURE

Rainfall frequencies and depths used in the HydroCad modeling are provided in Table 4.3. Rainfall depths were obtained from the *Hydrology Guide for Minnesota* (USDA 1966). 10-year 24-hour rainfall is estimated to be 4.1 inches using the *Hydrology Guide for Minnesota*, USDA 1966.

	Precipitation
Frequency	Depth (inches)
2-year (50% annual chance)	2.7
10-year (10%)	4.1
100-year (1%)	5.9

 Table 4.3. Precipitation Depth by Event Frequency.

Rainfall and temperature data used in the P8 model were obtained for the period of January 1, 1999 to December 31, 2011 from the Minneapolis/St. Paul International Airport observation location. The resolution of the data obtained from this site is accumulated daily precipitation (inches) and average daily maximum and minimum temperature (degrees Fahrenheit). The temperature data requirements for P8 are satisfied with daily resolution; however, P8 requires that the precipitation to have hourly resolution. Hourly data was estimated for the daily precipitation obtained from the airport site by using a SCS 24-hour type 2 distribution as described in Mays, 2005.

5.0 Concept Design and Engineering Cost Estimates

5.1 SCENARIO DEVELOPMENT

Once the initial project screening was completed, the final list of projects to evaluate was broken into two scenarios. These projects were selected based on input from the City of Plymouth and the City of New Hope and were considered the most feasible projects in the watershed for reaching the goal of 73 ponds removal of phosphorus. The projects were also presented to regulators for an initial review.

The first scenario includes more passive stormwater treatment including ponds with iron enhanced sand filter outlets and stream stabilization. The second scenario includes active treatment of stormwater using aluminum sulfate (alum) injection and a clarifier connected to the sanitary sewer. Following is a detailed description of each component of the two scenarios along with preliminary design and engineering cost estimates.

5.2 WATERSHED PONDING AND STREAM RESTORATION (SCENARIO 1)

Scenario 1 includes two ponds located at strategic points in the watershed. These ponds were selected based on location in the watershed and land ownership. Both ponds incorporate iron enhanced filter benches in order to capture more of the dissolved fraction of total phosphorus. A typical cross section depicting the general layout of a pond with an iron enhanced filter bench is shown in Figure 5.1.

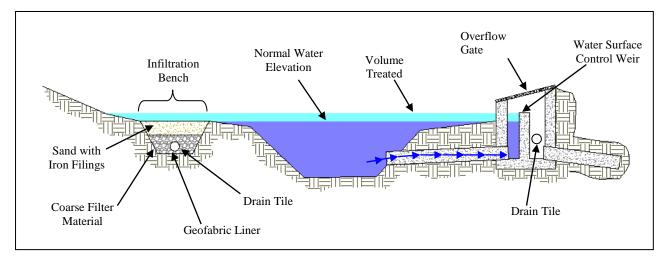


Figure 5.1. Schematic of a Stormwater Pond with an Iron Enhanced Filter Bench.

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A second component of Scenario 1 is stream restoration and stabilization of the channel east of Pilgrim Lane. Channel stabilization activities include but are not limited to installing brush bundles, boulder toe protection, riprap plunge pool and riffle structures, cross vanes, tree removal and seeding.

5.2.1 40th Ave. Pond with Iron Enhanced Sand Filtration

This project consists of replacing the existing pipe leading into the channel running behind the park with a 42 inch reinforced concrete pipe (RCP) to intercept runoff from storm sewersheds NW-NB-07B (53.5 acres), NW-NB-07D (52.5 acres), and NW-NB-08 (34.0 acres; Figure 5.2). The runoff from the pipe will enter into the existing channel and then into a newly constructed pond fitted with a 10 foot wide iron enhanced sand filter bench at elevation 920. The outlet of the pond will be controlled by a weir at elevation 921 embedded into a 108 inch diameter overflow structure with a crest elevation of 922.5 foot. A 48 inch RCP will serve as the mechanism for the normal water level to be controlled by the weir. Additionally a 48 inch RCP will discharge from the overflow structure back in to the existing stream. The stream immediately downstream of the pond will be protected by a riprap lined plunge pool. Figure 5.3 shows the work plan/conceptual design of the 40th avenue pond project.

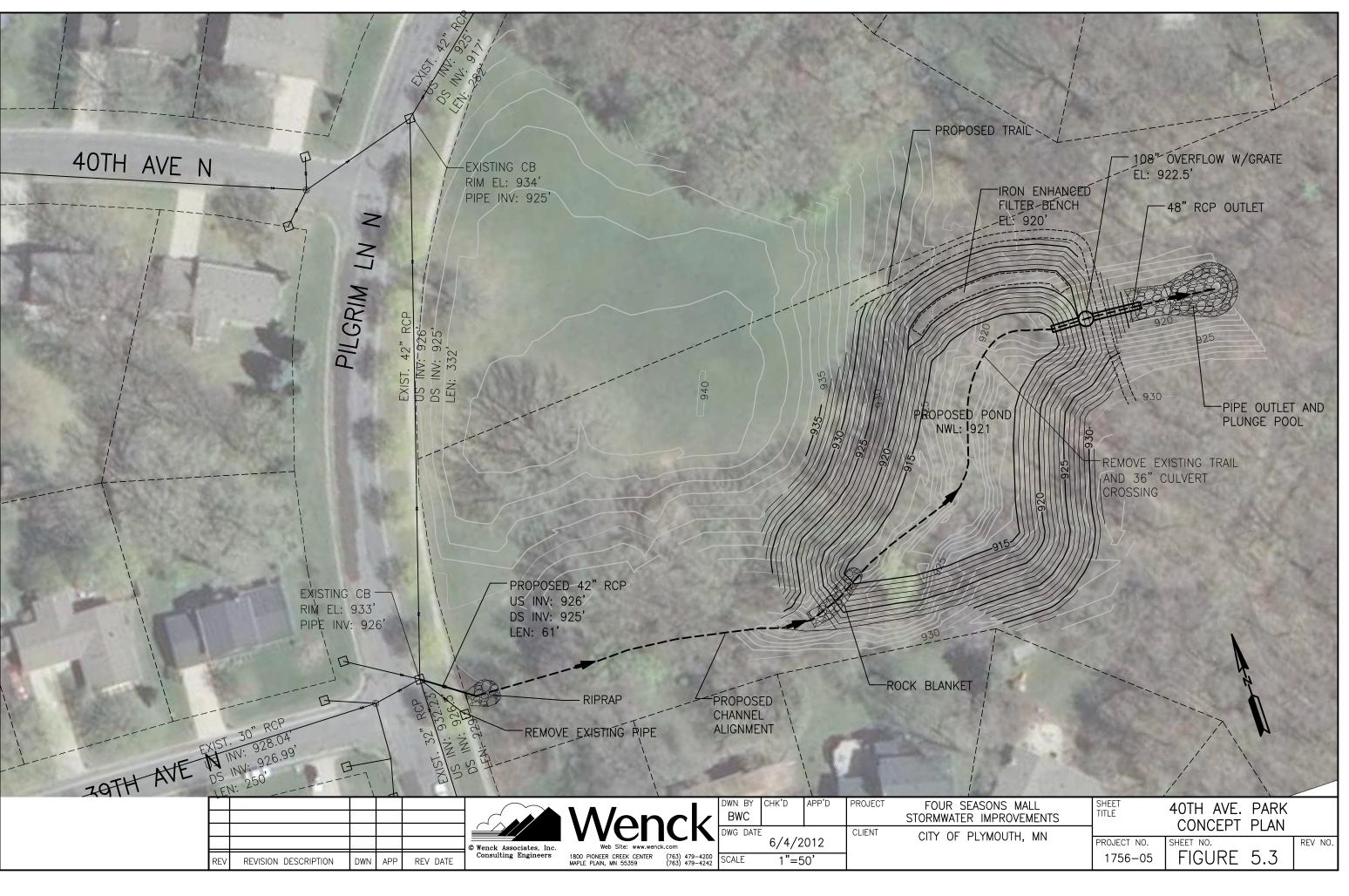
The estimated cut volume for this design is 8,109 cubic yards of material of which 200 cubic yards could be reused as fill to construct the berm at the outlet assuming that the soils are conducive to this type of fill. This area is very dense with tree cover, so tree removal is a large component of the constructing this pond. Once construction activities are completed the perimeter of the affected area will be seeded and mulched and trees will be planted to assist in the aesthetics of the park. Additionally a new foot trail will be constructed around the pond to enable residents to access the city trail along the main creek system.

5.2.2 Four Seasons Mall Pond with Iron Enhanced Sand Filtration

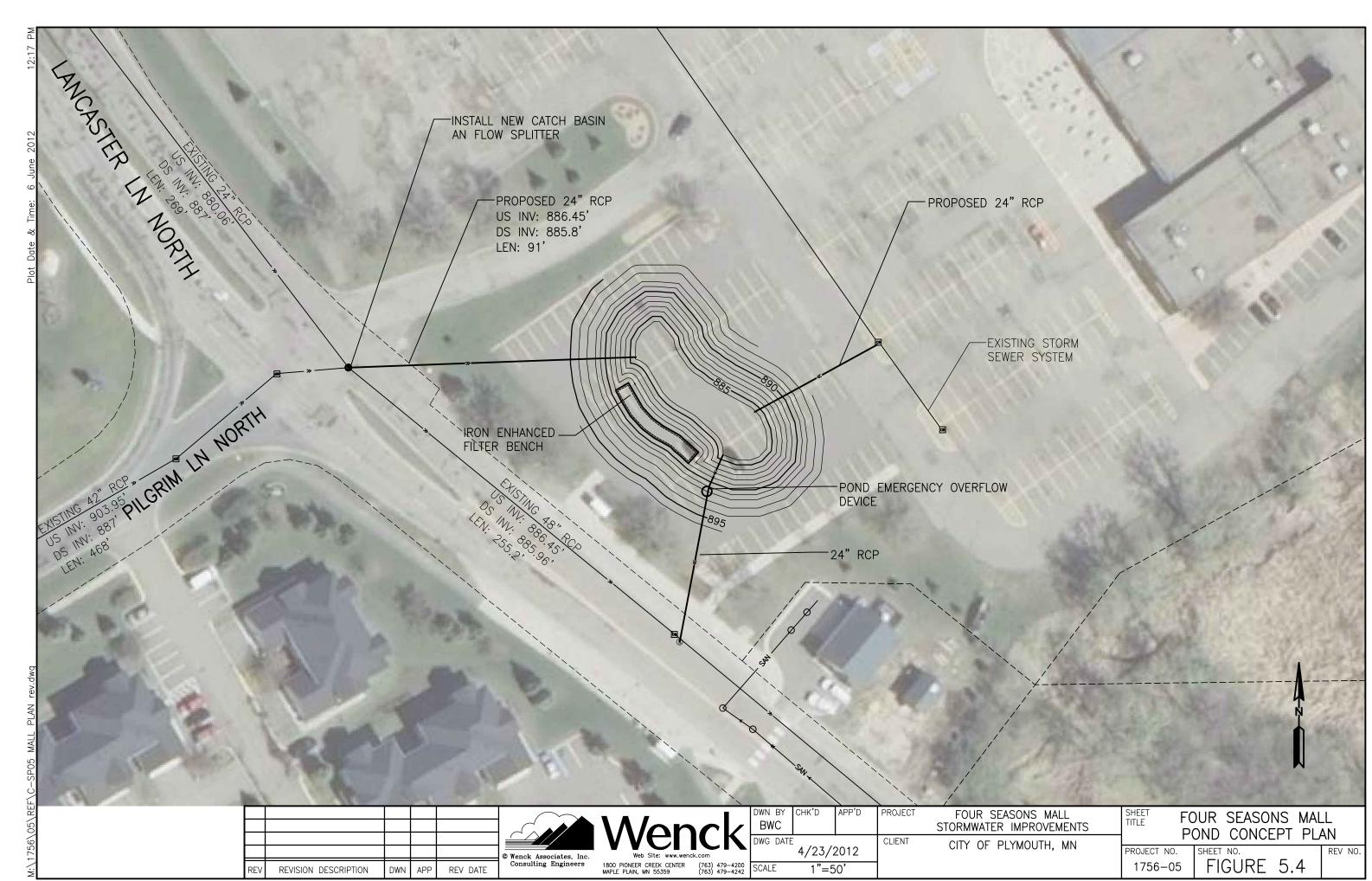
This project consists of installing a catch basin, flow splitter in line with the existing stormwater at the intersection of Pilgrim Lane and Lancaster Lane. The splitter will direct flows coming from the north along Lancaster Lane (47.1 acres of residential area from NW-NB-07E and NW-NB-07F into a proposed pond located on the Four Seasons Mall Property. The existing parking lot drainage system is assumed to flow from the northwest side of the parking area towards the wetland (delineated wetland number 1, see Figure 2.4). As part of this project it is assumed that all of the impervious area from the Four Seasons Mall Property will be directed to the pond. The effective drainage area of 63 acres is shown in Figure 5.2.

An iron enhanced filter bench will be integrated with the pond outlet system at elevation 889 feet. The normal water level in the pond will be controlled by a concrete weir installed in a 108 inch overflow structure. The weir elevation is proposed to be at elevation 890 feet. The overflow crest is proposed to be set at 891 feet. The total cut volume for this design is 4,194 cubic yards. Figure 5.4 shows the work plan/conceptual design for this project.





:\1756\05\REF\C-SP04 40th Street Plan.d



5.2.3 Stream Channel Restoration and Stabilization

Stabilization of streambanks reduces the transport of sediment-attached phosphorus from these channels to Northwood Lake. In addition, there are numerous locations along the Center Channel where residents are dumping leaves and grass clippings on the streambanks. These property owners should be educated about the impacts of those actions and encouraged to discontinue those practices.

One of the primary causes of channel degradation is the heavy tree canopy that shades the banks and prevents the growth of stabilizing long-rooted herbaceous and woody vegetation. Trees in the channel corridors should be thinned to open the canopy, and a 30 foot wide buffer established on each side of the channel.

There are approximately 2,375 linear feet of channel that would benefit from some type of improvement (Figure 5.5). Just less than 1,000 feet of channel are in relatively good condition and would benefit from simple tree and brush thinning, minor regrading, and planting a 30 foot wide buffer with mulched seed and native woody vegetation. An additional 500 feet of bank could be seeded and protected until vegetation establishment with an erosion control blanket on the slopes and mulch and woody vegetation in the buffer. About 325 linear feet has experienced some erosion and mass wasting which may continue if not stabilized. A treatment of tree thinning, brush bundles stacked on the streambanks, and native vegetation in a 30 foot buffer would be sufficient to stabilize the banks and filter overland runoff. Finally, about 570 linear feet appears to be actively eroding, and a boulder toe should be considered to provide stability, along with a native buffer. This includes areas downstream of culverts and outfalls as well as the streambank downstream of the proposed 47th Avenue Pond outlet.

Some segments of these channels are sloped at 0.05 or greater, and are headcutting. Each of the channels would benefit from installation of rock vane grade controls, at least one for every 2-3 feet of elevation change. Where there are steeper slopes and more headcutting, grade controls at every one foot elevation change should be considered.

Some of the recommended work is suitable for city forces (tree thinning and brush removal) or completion by Tree Trust or Minnesota Conservation Corps crews. Many of these crew leaders have experience felling trees and using the removed limbs and branches to form and install brush bundles. The Minnesota Conservation Corps has received funding in the last few years from the Minnesota Clean Water, Land and Legacy Amendment, and awards grants to public partners in the form of crew days. A cost-effective way of accomplishing the stream Restoration work would be to complete work such as grading, boulder toes and grade control structures by public contract, and the less equipment-intense work by Tree Trust or MCC crews guided by knowledgeable engineers and crew leaders.



Figure 5.5. Conceptual Work Plan for the Stream Restoration Project.

5.2.4 Removal Efficiency and Estimated Cost

The estimated cost and total phosphorus removal efficiency associated with the projects described in this section are shown in Table 5.1. The phosphorus removal efficiency shown in Table 5.1 is based on P8 modeling results (pond performance) and field evaluations and literature values (stream restoration). The ponds efficiency is based on 12year average P8 results for years 2000-2011. Figures 5.6 and 5.7 illustrate the annual variability in the phosphorus load and BMP efficiency predicted in the P8 model for 40th avenue and Four Seasons Mall sites. Low phosphorus load values and efficiency values correspond to years with low precipitation.

Project	Treatment Area (acres)	Average Annual Load (lbs-TP/year)	Average Removal Efficiency	Total 30 year Life Cycle Cost
40 th Street Pond*	140	75	79%	\$421,104
Four Seasons Mall Pond*	57	52	41%	\$326,997
Stream Restoration**	15	25	100% ***	\$320,566
Total	212	152	69%	\$1,068,667

Table 5.1. Project Estimated Cost and Phosphorus Removal Efficiency.

*Estimated as the TP removal for an eleven year average in the P8 model using the general device described in Section 4.4 **Estimated based on field estimates on the total weight of annual soil loss per year and a conversion factor of 200mg TP/kg soil

*** The 100% efficiency associated with the stream restoration project assumes that the banks are stabilized and no further degradation is occurring.

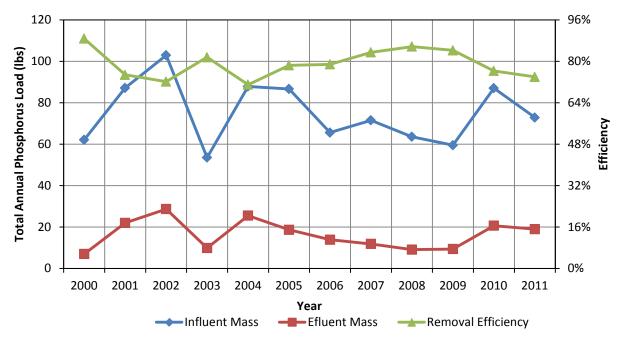


Figure 5.6. P8 Outputs for Modeled Years 2000 through 2011 - 40th Street Pond.

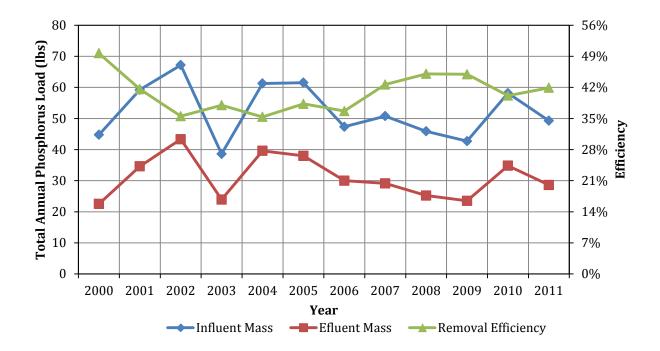


Figure 5.7. P8 Outputs for Modeled Years 2000 through 2011 - Four Seasons Mall Pond.

To determine the annual load produced by stream degradation, two assumptions were made. First, it is assumed that there is 200 mg total phosphorus per kg soil (Cross and Schlesinger, 1995). Second, the bank material consists of sandy loam soil with a density of 100 lbs per cubic foot (NRCS 2003). The average bank height and recession rates were determined during the stream assessment on 4/24/12 (described in Section 3.1.3). The Recession rate assigned to each reach was based on criteria described in Table 5.2. The general calculation for annual phosphorus load due to the restoration is described by Equation 1. Parameters used to determine TP load with Equation 1 are listed in Table 5.3.

$$\begin{bmatrix} \text{Annual} \\ \text{TP Load} \\ \left(\frac{\text{lbs}}{(\text{year})}\right) \end{bmatrix} = \begin{bmatrix} \text{Length of} \\ \text{the reach} \\ (\text{ft}) \end{bmatrix} \times \begin{bmatrix} 2 \\ \text{For two sides} \\ \text{of the channel} \end{bmatrix} \times \begin{bmatrix} \text{Lateral} \\ \text{Recession} \\ \text{Rate} \\ \left(\frac{\text{ft}}{(\text{yr})}\right) \end{bmatrix} \times \begin{bmatrix} \text{Average} \\ \text{Bank} \\ \text{Height} \\ (\text{ft}) \end{bmatrix} \times \begin{bmatrix} \text{Convert} \\ \frac{\text{lbs}}{(\text{Lbs})} \end{bmatrix}$$

$$\times \begin{bmatrix} \text{Convert} \\ \text{to TP} \\ 200 \text{ mg TP} \\ \text{per} \\ \text{kg Soil} \end{bmatrix} \times \begin{bmatrix} \text{Convert} \\ \text{back to lbs} \\ 2.2 \times 10^{-6} \\ (\text{lbs/mg)} \end{bmatrix}$$

$$= \begin{bmatrix} \text{Equation 1} \end{bmatrix}$$

A more detailed breakdown of the individual project costs are shown in Appendix C, Tables C1 to C3. Thirty-year life cycle costs are estimated based on an annual inflation rate of 2.3% and an annual discount rate of 3.5%. Assumed life cycle costs for each project are shown in Appendix C, Table C5.

Lateral		
Recession		
Rate	Category	Description
(ft/yr)		
0.01-0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06-0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang. Some exposed tree roots but no slumps or slips.
0.3-0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross section becomes U-shaped as opposed to V-shaped.
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross section is U-shaped and stream course may be meandering.

Table 5.2. Lateral Recession Rates for Stream Bank Erosion.

*(Source Wisconsin Field Office Technical Guide (FOTG), NRCS http://efotg.sc.egov.usda.gov/treemenuFS.aspx).

	Center Reach	Center Reach			
Parameter	0+00 - 9+50	9+50 - 17+50	Right Reach	Left Reach	Total
Total Length	1 000	1 600	1 400	000	F 900
(ft)	1,900	1,600	1,400	900	5,800
Bank Height	0.5	2.0	2.0	0.5	
(ft)	0.5	2.0	3.0	0.5	-
Recession Rate (ft/yr)	0.05	0.10	0.25	0.05	-
Soil Density (lbs/ft ³)	100	100	100	100	-
Annual Soil Loss (lb/yr)	4,750	32,000	105,500	2,250	144,500
Annual Phosphorus					
Load	0.95	6.39	20.96	0.45	28.75 ^{**}
(lbs/yr)					

Table 5.3. Annual Stream Degradation Soil Loss and Phosphorus Load.

*Reach locations shown on Figure 3.5 **To be conservative use 25 lb TP per year removed

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5.3 STORMWATER COLLECTION AND ALUM INJECTION (SCENARIO 2)

Scenario 2 includes collection of stormwater into an underground storage vault at the Four Seasons Mall site and then active treatment using alum. Stormwater from the 1 inch runoff event will be collected into underground storage chambers and then pumped to a clarifier. A one inch runoff event corresponds to 90% of the storms that occur in the metro area. Stormwater will be injected with alum prior to entering the clarifier. Alum floc will be settled to the bottom of the clarifier which is connected to the sanitary sewer. The treatment of stormwater with alum can achieve up to an 80% removal of total phosphorus and has the added advantage of removing dissolved phosphorus. Stormwater ponds typically only address particulate phosphorus, however the addition of iron enhance sand filtration at the pond outlet adds dissolved phosphorus removal.

Alum injection facilities require a considerable amount of annual maintenance including annual chemical and electrical costs, metering adjustments, and pump maintenance.

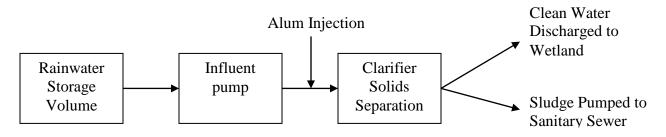
Figure 5.8 shows the effective treatment area for this scenario. Figure 5.9 shows the work plan/conceptual design for this scenario.

5.3.1 Underground Stormwater Storage

Because stormwater is episodic in nature, it must be stored prior to treatment with alum. The 1 inch runoff volume from sewersheds NW-NB-07A, NW-NB-07B, NW-NB-07D through F, NW-NB-08, NW-NB-10A and NW-NB-10B, and all of the impervious area at the Four Seasons Mall site (NW-NB-07H) is estimated to be 0.84 acre-ft. This can be stored using five 96 inch corrugated metal pipe culverts as storage units. The work involved with these units requires removal of pavement, sidewalk and curb both in the parking lot and in the street. Another component of the work involved with this scenario would be the installation of a new catch basin that will be retrofit with a SAFL Baffle and used as pretreatment for large solids into the storage vaults.

5.3.2 Chemical Treatment System

In general the chemical treatment train for the alum injection stormwater treatment system is described by the process flow diagram shown below.



Water will be pumped from the stormwater storage chambers to the clarifier through an influent pump station. The influent lift station consists of a precast concrete, 8-foot-diameter, 15-foot-deep structure, located near the stormwater storage system. The pump requirements include two pumps, operated in Lead/Lag (2 cfs or 900 gpm) and operated by level float switches. The forcemain to the clarifier would be 10 inch PVC pipe.

Before reaching the Clarifier Alum will be injected to the influent. The injections system includes a storage tank and a feed pump that has a start/stop mechanism based on run status of the influent lift station pumps. The estimated alum dosing rate is 10 ppm (but this needs to be verified by jar testing at project startup). The monthly chemical usage is to be determined with initial tests but is assumed to cost around \$5,000 per year including delivery to the site. The storage tank size necessary for the site is a 300 gal (this can be modified as needed based on jar testing results).

The solids from the clarifier are handled in a dry pit, precast concrete structure. Flocculated material effluent is pumped from the system to the MCES sanitary sewer located south and west on Lancaster Road.

5.3.3 Removal Efficiency and Estimated Cost

The estimated cost and total phosphorus removal efficiency associated with the projects described in this section are provided shown in Table 5.4. A more detailed breakdown of the individual project costs are shown in Appendix C, Tables C1 to C3. Thirty-year life cycle costs are shown in Table 5.4. These are estimated based on an annual inflation rate of 2.3% and an annual discount rate of 3.5%. Assumed life cycle costs for each project are shown in Appendix C, Table C5.

Project	Treatment Area (acres)	Annual Load (lbs-TP/year)	Removal Efficiency	Total 30 year Life Cycle Cost
Alum Injection System	203	127	70%*	\$1,853,345
Total	203	127	70%	\$1,853,345

Table 5.4.	Thirty-Year	Life Cycle Costs.	
		Life Office Costst	

*Removal efficiency is less than stated 80% for Alum treatment since we are only targeting the 1 inch volume storm events assuming that 90% of the annual storm events are less than 1 inches.

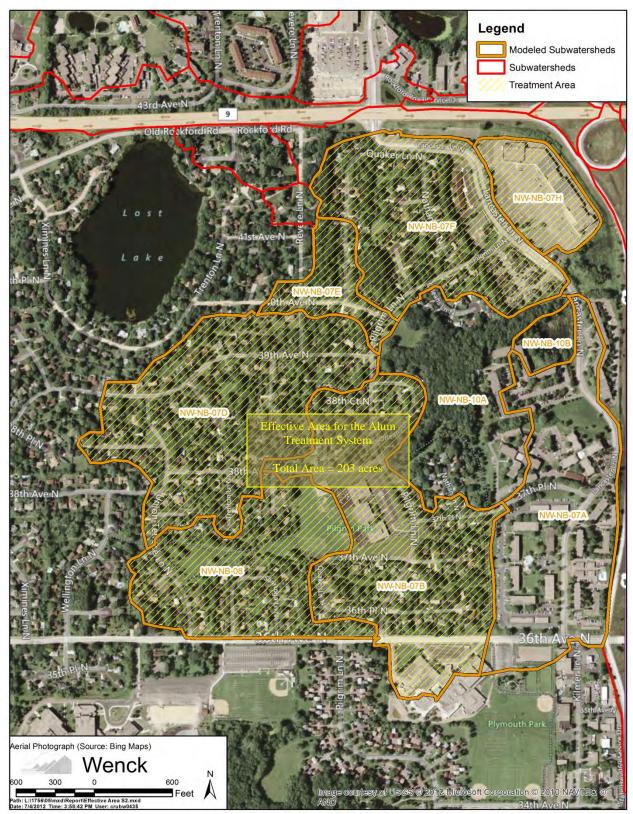
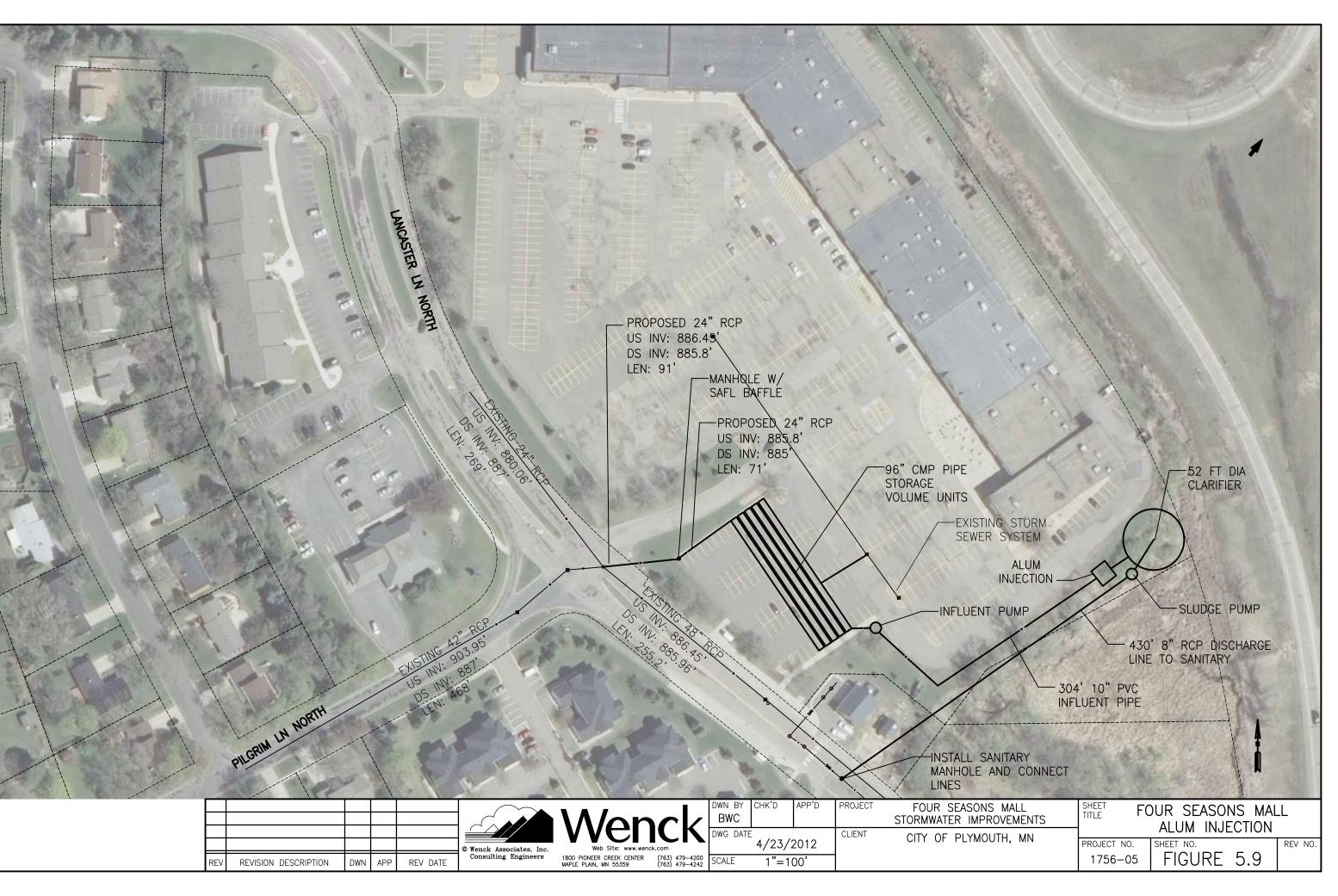


Figure 5.8. Effective Areas for Scenario 2 BMPs.



6.1 WATERSHED PONDING AND STREAM RESTORATION (SCENARIO 1)

Scenario 1 represents more passive treatment in the watershed and includes two ponds located at strategic points in the watershed. These ponds were selected based on location in the watershed and land ownership. A second component of this scenario is stream restoration and stabilization of the channel east of Pilgrim Lane.

The proposed project is located in the Bassett Creek Watershed Management Organization (BCWMO). The BCWMO requires all construction projects that with greater than 10,000 square feet or more than 200 cubic yards of cut or fill to apply for a permit.

6.2 STORMWATER COLLECTION AND ALUM INJECTION (SCENARIO 2)

Scenario 2 includes collection stormwater into underground storage at the Four Seasons Mall site and then active treatment using alum. Stormwater from the 1 inch runoff event will be collected into underground storage chamber and then pumped to a clarifier. Stormwater will be injected with alum prior to entering the clarifier. Alum floc will be settled to the bottom of the clarifier which is connected to the sanitary sewer.

The proposed project is located in the Bassett Creek Watershed Management Organization (BCWMO). The BCWMO requires all construction projects that with greater than 10,000 square feet or more than 200 cubic yards of cut or fill to apply for a permit.

The proposed project includes discharge to the sanitary sewer system. A Sanitary Sewer Extension Permit is required by the Minnesota Pollution Control Agency (MPCA) to connect to the sanitary sewer. Before the MPCA approves of the sewer connection, the permit must first be approved by the Metropolitan Council Environmental Services (MCES).

Since the Alum Injection is considered a stormwater BMP, the requirements are set forth in the MS4 and a National Pollution Discharge Elimination System/Surface Water Discharger (NPDES/SDS) permit would not be required. If the City of Plymouth does not wish to incorporate the Alum Injection BMP into the MS4, an individual NPDES/SDS permit is required.

Seven projects were initially chosen as potential candidates for reaching a goal of 73 lb/year removal of phosphorus from the North Branch subwatershed in Plymouth, MN. This list was refined into two scenarios through field investigations and coordination between the City of Plymouth and the agencies. The scenarios presented in this Feasibility study are watershed ponding and stream restoration (scenario 1) and stormwater collection and alum injection (scenario 2).

Both scenarios are effective at reaching the 73 lb/year removal goal. Scenario 1 removes a total of 105 lbs of phosphorus per year and has a total present day value construction cost estimate of \$939,831. The 30-year lifecycle cost for scenario 1 is \$1,068,667. Scenario 2 removes a total of 89 pounds of phosphorus per year and has a present day value cost estimate of \$1,205,826. The 30-year lifecycle cost of scenario 2 is estimated to be \$1,853,345. Lifecycle costs are based on a 2.3% inflation rate and a 3.5% discount rate. The costs are associated with things like general maintenance to outlet structures, replacement of equipment, site inspections, and other general operations and maintenance. Table 7.1 summarizes the performance and cost information for both scenarios. Table C5 in Appendix C itemizes the various lifecycle costs and their frequency of occurrence over the 30 year span for each project.

Scenario	Total TP Removed (lbs/year)	Present Value Construction Cost Estimate	30-year lifecycle cost estimate
1 - Watershed ponding and stream restoration	105	\$939,831	\$1,068,667
2 - Stormwater collection and alum injection	89	\$1,205,826	\$1,853,345

Table 7.1. Scenario Removal and Cost Summary .

- Arrowhead Environmental Consulting (AEC). 2011. Four Seasons Mall Wetland Delineation Report. Arrowhead Environmental Consulting, Mound, MN.
- Cross, A.F., Schlesinger, W.H. 1994. A Literature review and evaluation of the Hedley fraction: Applications to the biogeochemical cycle of soil phosphorus in natural ecosystems. Geoderma. Vol. 64. Pages 197-214.
- Erickson, A.J., Gulliver, J.S. 2010. Performance Assessment of an Iron-Enhanced Sand Filtration Trench for capturing Dissolved Phosphorus. Project Report No. 549, Minneapolis, MN.
- Mays, L.W. 2005. Water Resources Engineering. John Wiley & Sons, Hoboken, NJ.
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- NRCS, WI. 2003. Field Office Technical Guide. Stream Bank Erosion Section NRCS <u>http://efotg.sc.egov.usda.gov/treemenuFS.aspx</u>
- U.S. Department of Agriculture (USDA). 1966. Hydrology Guide for Minnesota. U.S. Department of Agriculture, Soil Conservation Service, St. Paul, Minnesota.
- U.S. Department of Agriculture (USDA). 1986. Urban Hydrology for Small Watersheds (TR-55). <<u>http://www.cpesc.org/reference/tr55.pdf</u>>
- U. S. Environmental Protection Agency (USEPA). 1983. Results of the Nationwide Urban Runoff Program, Vol.1 Final Report. NTIS PB84-185552. << <u>http://www.epa.gov/npdes/pubs/sw_nurp_vol_1_finalreport.pdf</u>>>

Appendix A Four Seasons Mall Soil Boring Analysis

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Braun Intertec Corporation 11001 Hampshire Avenue S. Minneapolis, MN 55438
 Phone:
 952.995.2000

 Fax:
 952.995.2020

 Web:
 braunintertec.com

July 09, 2012

Report #: 1203606

Mr. Jeff Madejczyk Wenck Associates, Inc. 1800 Pioneer Creek Center P.O. Box 428 Maple Plain, MN 55359

RE: 1756-05 City of Plymouth

Dear Jeff Madejczyk:

Braun Intertec Corporation received samples for the project identified above on June 21, 2012. Analytical results are summarized in the following report.

All routine quality assurance procedures were followed, unless otherwise noted.

Analytical results are reported on an "as received" basis unless otherwise noted. Where possible, the samples will be retained by the laboratory for 14 days following issuance of the initial final report. The samples will be disposed of or returned at that time. Arrangements can be made for extended storage by contacting me at this time.

We appreciate your decision to use Braun Intertec Corporation for this project. We are committed to being your vendor of choice to meet your analytical chemistry needs.

If you have any questions please contact me at the above phone number.

Sincerely,

Stor J. albrecht

Steven J. Albrecht Project Manager

BRAUN INTERTEC

11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Qualifiers and Abbreviations

vn	The surrogate recovery is below the laboratory generated control limits.
vi	The method reporting limit (MRL) is elevated because a dilution was required due to the presence of a sample matrix interference with the internal standard.
sd	See case narrative section for further information.
J	Detected but below the Method Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
go	The laboratory control sample recovery is outside of laboratory control limits.
A2	Dibenzo(a,h)pyrene recovery for the second source sample is 61.7%. Method requirements are 70% to 130%. There may be a bias in the reported results.
A1	1,8-Dinitropyrene recovery for the continuing calibration sample is 126%. Method requirements are 80% to 120%. There may be a high bias in the reported results.
COC	Chain of Custody
dry	Sample results reported on a dry weight basis
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
ND	Analyte NOT DETECTED above the MDL value
NR	Not Reported
%Rec	Percent Recovery
RPD	Relative Percent Difference
VOC	Volatile Organic Compound



11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Sample Summary

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
062112	1203606-01	Soil	06/21/12 11:00	06/21/12 12:10

BRAUN INTERTEC

Wenck Associates, Inc. 1800 Pioneer Creek Center P.O. Box 428 Maple Plain, MN 55359

Conditions Upon Receipt

Cooler: Cooler 1

Temperature: 8.3 °C Temperature Blank: Yes Received on Ice: Yes Preservation Confirmed: No

COC Included: Yes COC Complete: Yes COC & Labels Agree: Yes Sufficient Sample Provided: Yes

Custody Seals Used: No Custody Seals Intact: NA Hand Delivered by Client: Yes Headspace Present (VOC): No

Report #: 1203606

Account ID: W02540

Project Mgr: Steven J. Albrecht

EPA Lab ID: MN00063

Reports\RPT 09.08

11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Client Ref: 1756-05 City of Plymouth Client Contact: Mr. Jeff Madejczyk PO Number:

			120360	52112 06-01 (Soil) 12 11:00							
Classical Chemistry Param	eters										
Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
% Solids	93	0.050	0.010	% Wt	1	B2F0562	6/22/12	6/22/12	MJW	EPA 3545A 11.4	
Metals											
Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Arsenic	1.5 J	1.9	0.15	mg/kg dry	1	B2F0556	6/22/12	6/26/12	DRM	EPA 6010C	
Copper	9.6	0.93	0.011	mg/kg dry	1	B2F0556	6/22/12	6/26/12	DRM	EPA 6010C	
Polyaromatic Hydrocarbon	is by Selected Ion	Monito	ring						5	Sample Note	(s): sd, vi
Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
1,6-Dinitropyrene	ND	5400	26	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	go
1,8-Dinitropyrene	ND	5400	12	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D	A1
1-Methylnaphthalene	ND	54	29	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
1-Nitropyrene	ND	110	21	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
2-Chloronaphthalene	ND	21	17	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
2-Methylnaphthalene	ND	21	15	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
2-Nitrofluorene	ND	110	17	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
3-Methylcholanthrene	ND	54	4.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
4-Nitropyrene	ND	110	9.0	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
5-Methylchrysene	ND	21	1.4	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D	
5-Nitroacenaphthene	ND	110	20	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D SIM	
6-Nitrochrysene	ND	110	26	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
7,12-Dimethylbenz(a)anthracene	ND	21	3.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
7H-Dibenzo(c,g)carbazole	ND	54	4.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Acenaphthene	7.6 J	21	6.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Acenaphthylene	ND	21	16	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Anthracene	22	21	6.6	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	

Client Ref: 1756-05 City of Plymouth

Client Contact: Mr. Jeff Madejczyk

PO Number:

BRAUN INTERTEC

Wenck Associates, Inc.

Maple Plain, MN 55359

1800 Pioneer Creek Center P.O. Box 428

11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Report #: 1203606

Account ID: W02540

Project Mgr: Steven J. Albrecht

Reports\RPT 09.08

EPA Lab ID: MN00063

Page 5 of 13

EPA Lab ID: MN00063

The results in this report apply only to the samples analyzed in accordance with the

Reports\RPT 09.08

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1203606-	01 (Soil)		
6/21/12	11:00		

Del	II	bas Calastad	T	M
Polyaromatic	Hydrocarbons	by Selected	ION	Monitoring

Polyaromatic Hydrocarbo	ons by Selected Ion	Monito	ring							Sample Note	e(s): sd, vi
Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analys	t Method	Notes
Benz(a)anthracene	96	21	1.9	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Benzo(a)pyrene	150	54	2.1	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Benzo(b)fluoranthene	150	54	2.0	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Benzo(e)pyrene	210	21	2.1	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	go
Benzo(g,h,i)perylene	130	21	2.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Benzo(j)fluoranthene	66	54	1.4	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Benzo(k)fluoranthene	66	54	1.0	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Carbazole	ND	110	3.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Chrysene	180	21	3.1	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Dibenz(a,h)acridine	ND	54	11	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Dibenz(a,h)anthracene	ND	21	3.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Dibenz(a,j)acridine	ND	54	3.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Dibenzo(a,e)pyrene	10 J	54	2.6	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Dibenzo(a,h)pyrene	ND	110	2.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	A2
Dibenzo(a,i)pyrene	ND	110	3.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Dibenzo(a,l)pyrene	ND	54	1.6	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Dibenzofuran	ND	21	7.7	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Fluoranthene	250	21	7.8	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Fluorene	11 J	21	7.0	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Indeno(1,2,3-cd)pyrene	83	21	2.0	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Naphthalene	ND	54	11	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Perylene	60	21	2.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	go
Phenanthrene	100	21	5.1	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Pyrene	260	21	7.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D SIM	

Client Ref: 1756-05 City of Plymouth

062112

Client Contact: Mr. Jeff Madejczyk

PO Number:

BRAUN INTERTEC

Wenck Associates, Inc.

Maple Plain, MN 55359

1800 Pioneer Creek Center P.O. Box 428

11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Report #: 1203606

Account ID: W02540

Project Mgr: Steven J. Albrecht

00	54	1.0	ug/kg ury	10	B200011	//2/12	//0/12	SOM	SIM		
ND	110	3.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
80	21	3.1	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D		
	21	5.1	ug/ng ui y	10	D200011	// 2/ 12	110/12	5611	SIM		
ND	54	11	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
									SIM		
ND	21	3.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
- D				10	DOCIONII	<i>Z/0/10</i>	7/6/10	0.014	SIM		
ND	54	3.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
10 J	54	2.6	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D		
10 5	54	2.0	ug/kg uiy	10	B200011	//2/12	//0/12	SOM	SIM		
ND	110	2.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D	A2	
	110	2.5	ug/ng ui y	10	D200011	// 2/ 12	110/12	56111	SIM	112	
ND	110	3.3	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
			00,						SIM		
ND	54	1.6	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
									SIM		
ND	21	7.7	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
									SIM		
250	21	7.8	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
									SIM		
11 J	21	7.0	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
	21	2.0	4 1	10	D2 C0011	7/0/10	7/6/10	COM	SIM		
83	21	2.0	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D		
ND	54	11	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	SIM EPA 8270D		
	54	11	ug/kg uly	10	B260011	112/12	110/12	50111	SIM		
60	21	2.5	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D	go	
				- 0	=====			~		0~	

nnle Note(s): sd, vi

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11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Sample Note(s): sd, vi

Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

062112

1203606-01 (Soil)

6/21/12 11:00

Polyaromatic Hydrocarbons by Selected Ion Monitoring

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analys	t Method	Notes
Quinoline	ND	54	3.6	ug/kg dry	10	B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Surrogate: 2-Fluorobiphenyl	77.4 %	Limits: 30-	120%			B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Surrogate: Nitrobenzene-d5	68.8 %	Limits: 30-	120%			B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	
Surrogate: Terphenyl-d14	88.7 %	Limits: 30-	120%			B2G0011	7/2/12	7/6/12	SGM	EPA 8270D SIM	



Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Classical Chemistry Parameters - Quality Control

Batch B2F0562 - % Solids

Method Blank (B2F0562-BLK1)							Preparec	l & Analyz	ed: 06/22/1	2	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	0.0259 J	0.050	0.010	% Wt	NA	NA	NA	NA	NA	NA	
Duplicate (B2F0562-DUP1)Source: 1203512-01Prepared & Analyzed: 06/22/12											
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	96.8	0.050	0.010	% Wt	NA	96.8	NA	NA	0.0469	20	
Standard Reference Material (B2F0562-	SRM1)						Preparec	ł & Analyz	ed: 06/22/1	2	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	91.6			% Wt	91.9	NA	99.6	90-110	NA	NA	

BRAUN INTERTEC

Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Metals - Quality Control

Batch]	B2F0556 -	- EPA	3050B
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Method Blank (B2F0556-BLK1)							Prepared	d: 06/22/12	Analyzed:	06/25/12	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	ND	2.0	0.16	mg/kg	NA	NA	NA	NA	NA	NA	
Copper	0.0350 J	1.0	0.012	mg/kg	NA	NA	NA	NA	NA	NA	
Laboratory Control Sample (B2F0556-B	S1)						Prepared	d: 06/22/12	Analyzed:	06/25/12	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	299	2.0	0.16	mg/kg	300	NA	99.7	80-120	NA	NA	
Copper	299	1.0	0.012	mg/kg	300	NA	99.7	80-120	NA	NA	
Laboratory Control Sample Duplicate (F	82F0556-BSI	D1)					Prepared	d: 06/22/12	Analyzed:	06/25/12	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	300	2.0	0.16	mg/kg	300	NA	100	80-120	0.503	20	
Copper	300	1.0	0.012	mg/kg	300	NA	100	80-120	0.317	20	
Matrix Spike (B2F0556-MS1)				Source	e: 1203633-	01RE1	Prepared: 06/22/12 Analyzed: 06/25/12				
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	257	9.3	0.72	mg/kg	279	2.70	91.3	75-125	NA	NA	
Copper	285	4.6	0.056	mg/kg	279	27.9	92.3	75-125	NA	NA	
Matrix Spike Duplicate (B2F0556-MSD1	.)			Source	e: 1203633-	01RE1	E1 Prepared: 06/22/12 Analyzed: 06/25/12				
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	281	10	0.78	mg/kg	299	2.70	93.0	75-125	8.97	20	
Copper	309	5.0	0.060	mg/kg	299	27.9	94.0	75-125	8.15	20	
Standard Reference Material (B2F0556-	SRM1)						Prepared	d: 06/22/12	Analyzed:	06/25/12	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	120	4.3	0.34	mg/kg	133	NA	90.2	57.1-110	NA	NA	

BRAUN		11001 Hampshire Ave. S. Minneapolis, MN 55438
INTERTEC		952.995.2000 Phone 952.995.2020 Fax
Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428 Maple Plain, MN 55359	Client Contact: Mr. Jeff Madejczyk PO Number:	Project Mgr: Steven J. Albrecht Account ID: W02540

Polyaromatic Hydrocarbons by Selected Ion Monitoring - Quality Control

Batch B2G0011 - EPA 3546

Method Blank (B2G0011-BLK1)							Preparec	1: 07/02/12	Analyzed:	07/05/12	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,6-Dinitropyrene	ND	500	2.4	ug/kg	NA	NA	NA	NA	NA	NA	
1,8-Dinitropyrene	ND	500	1.1	ug/kg	NA	NA	NA	NA	NA	NA	
1-Methylnaphthalene	ND	5.0	2.7	ug/kg	NA	NA	NA	NA	NA	NA	
1-Nitropyrene	ND	10	1.9	ug/kg	NA	NA	NA	NA	NA	NA	
2-Chloronaphthalene	ND	2.0	1.5	ug/kg	NA	NA	NA	NA	NA	NA	
2-Methylnaphthalene	ND	2.0	1.4	ug/kg	NA	NA	NA	NA	NA	NA	
2-Nitrofluorene	ND	10	1.5	ug/kg	NA	NA	NA	NA	NA	NA	
-Methylcholanthrene	ND	5.0	0.40	ug/kg	NA	NA	NA	NA	NA	NA	
l-Nitropyrene	ND	10	0.84	ug/kg	NA	NA	NA	NA	NA	NA	
-Methylchrysene	ND	2.0	0.13	ug/kg	NA	NA	NA	NA	NA	NA	
-Nitroacenaphthene	ND	10	1.8	ug/kg	NA	NA	NA	NA	NA	NA	
-Nitrochrysene	ND	10	2.4	ug/kg	NA	NA	NA	NA	NA	NA	
,12-Dimethylbenz(a)anthracene	ND	2.0	0.32	ug/kg	NA	NA	NA	NA	NA	NA	
'H-Dibenzo(c,g)carbazole	ND	5.0	0.40	ug/kg	NA	NA	NA	NA	NA	NA	
Acenaphthene	ND	2.0	0.59	ug/kg	NA	NA	NA	NA	NA	NA	
Acenaphthylene	ND	2.0	1.5	ug/kg	NA	NA	NA	NA	NA	NA	
Anthracene	ND	2.0	0.62	ug/kg	NA	NA	NA	NA	NA	NA	
Benz(a)anthracene	ND	2.0	0.18	ug/kg	NA	NA	NA	NA	NA	NA	
Senzo(a)pyrene	ND	5.0	0.20	ug/kg	NA	NA	NA	NA	NA	NA	
Senzo(b)fluoranthene	ND	5.0	0.19	ug/kg	NA	NA	NA	NA	NA	NA	
Benzo(e)pyrene	ND	2.0	0.20	ug/kg	NA	NA	NA	NA	NA	NA	
enzo(g,h,i)perylene	ND	2.0	0.23	ug/kg	NA	NA	NA	NA	NA	NA	
Senzo(j)fluoranthene	ND	5.0	0.13	ug/kg	NA	NA	NA	NA	NA	NA	
enzo(k)fluoranthene	ND	5.0	0.098	ug/kg	NA	NA	NA	NA	NA	NA	
arbazole	ND	10	0.33	ug/kg	NA	NA	NA	NA	NA	NA	
Thrysene	ND	2.0	0.29	ug/kg	NA	NA	NA	NA	NA	NA	
Dibenz(a,h)acridine	ND	5.0	1.0	ug/kg	NA	NA	NA	NA	NA	NA	
Dibenz(a,h)anthracene	ND	2.0	0.32		NA	NA	NA	NA	NA	NA	
	ND	2.0 5.0	0.32	ug/kg	NA	NA	NA	NA	NA	NA	
Dibenz(a,j)acridine	ND			ug/kg							
Dibenzo(a,e)pyrene		5.0	0.24	ug/kg	NA	NA	NA	NA	NA	NA	
Dibenzo(a,h)pyrene	ND ND	10 10	0.21	ug/kg	NA	NA NA	NA NA	NA	NA NA	NA NA	
Dibenzo(a,i)pyrene			0.31	ug/kg	NA			NA			
Dibenzo(a,l)pyrene	ND	5.0	0.15	ug/kg	NA	NA	NA	NA	NA	NA	
Dibenzofuran	ND	2.0	0.72	ug/kg	NA	NA	NA	NA	NA	NA	
luoranthene	ND	2.0	0.72	ug/kg	NA	NA	NA	NA	NA	NA	
luorene	ND	2.0	0.66	ug/kg	NA	NA	NA	NA	NA	NA	
ndeno(1,2,3-cd)pyrene	ND	2.0	0.19	ug/kg	NA	NA	NA	NA	NA	NA	
laphthalene	ND	5.0	1.0	ug/kg	NA	NA	NA	NA	NA	NA	
erylene	ND	2.0	0.23	ug/kg	NA	NA	NA	NA	NA	NA	
henanthrene	ND	2.0	0.48	ug/kg	NA	NA	NA	NA	NA	NA	
Pyrene	ND	2.0	0.70	ug/kg	NA	NA	NA	NA	NA	NA	
Quinoline	ND	5.0	0.33	ug/kg	NA	NA	NA	NA	NA	NA	
urrogate: 2-Fluorobiphenyl	31.0			ug/kg	62.4	NA	49.7	30-120			
urrogate: Nitrobenzene-d5	18.5			ug/kg	62.4	NA	29.7	30-120			vn
Surrogate: Terphenyl-d14	55.7			ug/kg	62.4	NA	89.2	30-120			

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INTERTEC		952.995.2000 Phone 952.995.2020 Fax
Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Polyaromatic Hydrocarbons by Selected Ion Monitoring - Quality Control

Batch B2G0011 - EPA 3546

Laboratory Control Sample (B2G	0011-BS1)						Preparec	l: 07/02/12	Analyzed:	07/05/12	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,6-Dinitropyrene	ND	500	2.4	ug/kg	498	NA	NA	50-120	NA	NA	
1,8-Dinitropyrene	399 J	500	1.1	ug/kg	498	NA	80.2	50-120	NA	NA	
-Methylnaphthalene	58.1	5.0	2.7	ug/kg	49.8	NA	117	50-120	NA	NA	
I-Nitropyrene	39.4	10	1.9	ug/kg	49.8	NA	79.2	50-120	NA	NA	
2-Chloronaphthalene	30.0	2.0	1.5	ug/kg	49.8	NA	60.3	50-120	NA	NA	
2-Methylnaphthalene	29.3	2.0	1.4	ug/kg	49.8	NA	58.9	50-120	NA	NA	
2-Nitrofluorene	45.8	10	1.5	ug/kg	49.8	NA	92.1	50-120	NA	NA	
-Methylcholanthrene	40.3	5.0	0.40	ug/kg	49.8	NA	80.9	50-120	NA	NA	
Nitropyrene	42.8	10	0.84	ug/kg	49.8	NA	86.1	50-120	NA	NA	
-Methylchrysene	43.4	2.0	0.13	ug/kg	49.8	NA	87.3	50-120	NA	NA	
-Nitroacenaphthene	50.8	10	1.8	ug/kg	49.8	NA	102	50-120	NA	NA	
Nitrochrysene	51.1	10	2.4	ug/kg	49.8	NA	103	50-120	NA	NA	
,12-Dimethylbenz(a)anthracene	46.7	2.0	0.32	ug/kg	49.8	NA	93.8	50-120	NA	NA	
/H-Dibenzo(c,g)carbazole	43.6	5.0	0.40	ug/kg	49.8	NA	87.7	50-120	NA	NA	
Acenaphthene	36.8	2.0	0.59	ug/kg	49.8	NA	73.9	50-120	NA	NA	
Acenaphthylene	35.7	2.0	1.5	ug/kg	49.8	NA	71.8	50-120	NA	NA	
Anthracene	41.3	2.0	0.62	ug/kg	49.8	NA	82.9	50-120	NA	NA	
enz(a)anthracene	50.6	2.0	0.18	ug/kg	49.8	NA	102	50-120	NA	NA	
enzo(a)pyrene	47.8	5.0	0.20	ug/kg	49.8	NA	96.1	50-120	NA	NA	
enzo(b)fluoranthene	50.7	5.0	0.20	ug/kg ug/kg	49.8	NA	102	50-120	NA	NA	
enzo(e)pyrene	133	2.0	0.19	ug/kg	99.5	NA	133	50-120	NA	NA	
	52.2	2.0	0.20		99.3 49.8	NA	133	50-120 50-120	NA	NA	
enzo(g,h,i)perylene	52.2 41.6	2.0 5.0		ug/kg		NA NA	83.7	50-120 50-120	NA NA	NA	
tenzo(j)fluoranthene			0.13	ug/kg	49.8						
enzo(k)fluoranthene	50.5	5.0	0.098	ug/kg	49.8	NA	101	50-120	NA	NA	
arbazole	49.3	10	0.33	ug/kg	49.8	NA	99.0	50-120	NA	NA	
Chrysene	50.6	2.0	0.29	ug/kg	49.8	NA	102	50-120	NA	NA	
bibenz(a,h)acridine	42.7	5.0	1.0	ug/kg	49.8	NA	85.8	50-120	NA	NA	
Dibenz(a,h)anthracene	51.5	2.0	0.32	ug/kg	49.8	NA	104	50-120	NA	NA	
ibenz(a,j)acridine	42.7	5.0	0.30	ug/kg	49.8	NA	85.8	50-120	NA	NA	
Dibenzo(a,e)pyrene	42.5	5.0	0.24	ug/kg	49.8	NA	85.4	50-120	NA	NA	
Dibenzo(a,h)pyrene	28.2	10	0.21	ug/kg	49.8	NA	56.6	40-120	NA	NA	
Dibenzo(a,i)pyrene	37.0	10	0.31	ug/kg	49.8	NA	74.4	50-120	NA	NA	
Dibenzo(a,l)pyrene	38.6	5.0	0.15	ug/kg	49.8	NA	77.5	50-120	NA	NA	
Dibenzofuran	32.5	2.0	0.72	ug/kg	49.8	NA	65.3	50-120	NA	NA	
luoranthene	48.5	2.0	0.72	ug/kg	49.8	NA	97.6	50-120	NA	NA	
luorene	40.3	2.0	0.66	ug/kg	49.8	NA	81.0	50-120	NA	NA	
ndeno(1,2,3-cd)pyrene	51.3	2.0	0.19	ug/kg	49.8	NA	103	50-120	NA	NA	
aphthalene	31.4	5.0	1.0	ug/kg	49.8	NA	63.1	50-120	NA	NA	
erylene	88.7	2.0	0.23	ug/kg	49.8	NA	178	50-120	NA	NA	
henanthrene	45.1	2.0	0.48	ug/kg	49.8	NA	90.6	50-120	NA	NA	
yrene	48.1	2.0	0.70	ug/kg	49.8	NA	96.6	50-120	NA	NA	
Quinoline	34.5	5.0	0.33	ug/kg	49.8	NA	69.4	50-120	NA	NA	
urrogate: 2-Fluorobiphenyl	32.0			ug/kg	62.2	NA	51.5	30-120			
urrogate: Nitrobenzene-d5	22.1			ug/kg	62.2	NA	35.6	30-120			
Surrogate: Terphenyl-d14	55.0			ug/kg	62.2	NA	88.4	30-120			

EPA Lab ID: MN00063

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BRAUN		11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax
Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Polyaromatic Hydrocarbons by Selected Ion Monitoring - Quality Control

Batch B2G0011 - EPA 3546

Laboratory Control Sample Duplica	Prepared: 07/02/12 Analyzed: 07/06/12										
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,6-Dinitropyrene	ND	500	2.4	ug/kg	498	NA	NA	50-120	NA	20	
1,8-Dinitropyrene	451 J	500	1.1	ug/kg	498	NA	90.7	50-120	12.2	20	
1-Methylnaphthalene	54.1	5.0	2.7	ug/kg	49.8	NA	109	50-120	7.07	20	
1-Nitropyrene	41.0	10	1.9	ug/kg	49.8	NA	82.4	50-120	4.04	20	
2-Chloronaphthalene	28.5	2.0	1.5	ug/kg	49.8	NA	57.3	50-120	5.23	20	
2-Methylnaphthalene	27.3	2.0	1.4	ug/kg	49.8	NA	54.9	50-120	6.94	20	
2-Nitrofluorene	47.3	10	1.5	ug/kg	49.8	NA	95.1	50-120	3.21	20	
3-Methylcholanthrene	41.5	5.0	0.40	ug/kg	49.8	NA	83.5	50-120	3.08	20	
4-Nitropyrene	44.0	10	0.84	ug/kg	49.8	NA	88.5	50-120	2.78	20	
5-Methylchrysene	45.4	2.0	0.13	ug/kg	49.8	NA	91.2	50-120	4.34	20	
5-Nitroacenaphthene	51.5	10	1.8	ug/kg	49.8	NA	104	50-120	1.34	20	
6-Nitrochrysene	45.0	10	2.4	ug/kg	49.8	NA	90.5	50-120	12.7	20	
7,12-Dimethylbenz(a)anthracene	48.2	2.0	0.32	ug/kg	49.8	NA	96.9	50-120	3.25	20	
7H-Dibenzo(c,g)carbazole	44.6	5.0	0.40	ug/kg	49.8	NA	89.7	50-120	2.25	20	
Acenaphthene	36.1	2.0	0.59	ug/kg	49.8	NA	72.7	50-120	1.76	20	
Acenaphthylene	35.4	2.0	1.5	ug/kg	49.8	NA	71.1	50-120	0.966	20	
Anthracene	42.0	2.0	0.62	ug/kg	49.8	NA	84.4	50-120	1.78	20	
Benz(a)anthracene	52.8	2.0	0.18	ug/kg	49.8	NA	106	50-120	4.20	20	
Benzo(a)pyrene	50.9	5.0	0.20	ug/kg	49.8	NA	102	50-120	6.16	20	
Benzo(b)fluoranthene	53.0	5.0	0.19	ug/kg	49.8	NA	102	50-120	4.52	20	
Benzo(e)pyrene	139	2.0	0.20	ug/kg	99.5	NA	140	50-120	4.86	20	
Benzo(g,h,i)perylene	53.3	2.0	0.23	ug/kg	49.8	NA	107	50-120	2.10	20	
Benzo(j)fluoranthene	44.2	5.0	0.13	ug/kg	49.8	NA	88.9	50-120	6.03	20	
Benzo(k)fluoranthene	53.1	5.0	0.098	ug/kg	49.8	NA	107	50-120	4.99	20	
Carbazole	51.2	10	0.33	ug/kg	49.8	NA	103	50-120	3.91	20	
Chrysene	52.6	2.0	0.29	ug/kg	49.8	NA	105	50-120	3.75	20	
Dibenz(a,h)acridine	44.4	5.0	1.0	ug/kg	49.8	NA	89.2	50-120	3.88	20	
Dibenz(a,h)anthracene	53.1	2.0	0.32	ug/kg	49.8	NA	107	50-120	2.89	20	
Dibenz(a,j)acridine	43.9	5.0	0.32	ug/kg	49.8	NA	88.3	50-120	2.87	20	
Dibenzo(a,e)pyrene	43.9	5.0	0.24	ug/kg	49.8	NA	86.3	50-120	1.04	20	
Dibenzo(a,e)pyrene	30.5	10	0.24	ug/kg	49.8	NA	61.3	40-120	7.93	20	
Dibenzo(a,i)pyrene	38.0	10	0.21	ug/kg	49.8	NA	76.4	50-120	2.54	20	
Dibenzo(a,1)pyrene	39.5	5.0	0.15	ug/kg	49.8	NA	70.4	50-120	2.34	20	
Dibenzofuran	33.1	2.0	0.13		49.8	NA	66.5	50-120	1.84	20	
Fluoranthene	49.7	2.0	0.72	ug/kg ug/kg	49.8 49.8	NA NA	00.5 99.8	50-120 50-120	2.30	20	
Fluorene	49.7	2.0	0.72		49.8 49.8	NA	99.8 82.6	50-120 50-120	2.30 1.86	20	
	41.1 53.0	2.0 2.0	0.66	ug/kg		NA NA	82.6 107	50-120 50-120		20 20	
ndeno(1,2,3-cd)pyrene	53.0 28.1	2.0 5.0		ug/kg	49.8 49.8	NA NA	107 56.5		3.15 11.0	20 20	
Naphthalene	28.1 90.9	5.0 2.0	1.0	ug/kg			56.5 183	50-120 50-120	2.52	20	
Perylene			0.23	ug/kg	49.8	NA		50-120			
Phenanthrene	47.4	2.0	0.48	ug/kg	49.8	NA	95.3	50-120	4.97	20	
Pyrene Quinoline	49.9 32.8	2.0 5.0	0.70 0.33	ug/kg ug/kg	49.8 49.8	NA NA	100 66.0	50-120 50-120	3.67 5.07	20 20	
Surrogate: 2-Fluorobiphenyl	35.1			ug/kg	62.2	NA	56.5	30-120			
Surrogate: Nitrobenzene-d5	26.5			ug/kg	62.2	NA	42.6	30-120			
Surrogate: Terphenyl-d14	56.3			ug/kg	62.2	NA	90.6	30-120			

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11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: Steven J. Albrecht
Maple Plain, MN 55359	PO Number:	Account ID: W02540

For Braun Intertec Use Only Laboratory Work Order No. 1 20 7606 Braun Intertec Co 11001 Hampshir Minneapolis, MN	prporation Bot e Ave. S lab 55438 Pho	UEST FOR NALYTICAL tle orders and sam services@bra one: 952-995-2600	Deling inquires: Unintertec.co Fax: 952-995-	S m 2601	L T F F	Date Results Time Rush Charge: Rush / Quote	Request s Authori #	zed?	Yes		10			ue 0 0 8	1
Contact Name Jeff Madejcz/k Project ID/Name 1756-05, Company Wenck. Mailing Address 1800 Proveer Creek center City, State, zip Maple Plain, MN Telephone # 763 - 479-4263 Fax # 763 - 479-4242 The phone # 763 - 479-4263 Fax # 763 - 479-4242 Telephone # 763 - 479-4242 Telephone # Telephone # 763 - 479-4242 Telephone # Telephone # T					Metals Field Filtered Y/N TO	ANALYSIS REQUESTED								7	
$\begin{array}{c c} LAB \\ \hline LAB \\ \hline D# \\ \hline \hline \\ \hline $	DATE SAM SAMPLE SAM (6-2)-12 11 : (-2)-12 11	00 00	VOLUME/AREA (specify units)	Number	Image: Second										
CHAIN Collected by: (Print) Carle OF Relinquished by: Custody Seal Intact Yes No On Ice Yes No Temp Blank Yes No Temp: \$.3 °C	[Date/Time 6-2 Date/Time Date/Time		Rece Conte Rece Conte	eivec ived ents N	ot Verified: 📈	e C	an (Q L	nge	~	Date/1	īme G	/ 71 / 12	17:[0 2

Appendix B Wetland Delineation Report

T:\1756 Plymouth\05\Report\Final Report\Final Feasibility Report.docx

Four Seasons Mall - Plymouth, MN

Wetland Delineation Report For:

Derek Asche Water Resources Manager City of Plymouth 3400 Plymouth Boulevard Plymouth, MN 55447

arowhead environmental consulting

> Wetland Consulting Services Performed by: Ben Carlson, WDC (#1125)

AEC Project # 2011-019

June 9, 2011

Arrowhead Environmental Consulting 2909 Meadow Lane Mound, MN 55364

TABLE OF CONTENTS

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Project Figures and Supporting Data:

Figure 1: Map of Project Location (USGS Topo) Figure 2: Map of Project Location (MN DNR PWI Map) Figure 3: Hennepin County Soil Survey Figure 4: National Wetland Inventory Map Figure 5: Map of Wetland Delineation (GPS Located)

Field Data Collection Forms (Data Sheets) Soil Texture and Feature Guide Photo Log

Project Overview

On May 16 and 19, 2011 Arrowhead Environmental Consulting (AEC) performed a wetland delineation for the Four Seasons Mall project located in Plymouth, MN.

- Five wetland basins were delineated within the project boundary; Wetland 1 is a
 Fresh (Wet) Meadow/Shallow Marsh (Type 2/3) wetland within the northeastern
 portion of the project, Wetlands 2 and 2A are Seasonally Flooded Basins (Type 1)
 in the very southern portion of the project, Wetland 3 is a Fresh (Wet) Meadow
 (Type 2) in the south-central portion of the project, and Wetland 4 is a Shallow
 Marsh (Type 3) in the east-central portion of the project.
- The SE portion of Wetland 1 is indicated on the NWI map as a PEMCd wetland. Wetlands 2 and 2A are not indicated on the NWI map, Wetland 3 is not indicated on the NWI map, Wetland 4 is indicated on the NWI map as a PEMC/PEMF wetland.
- None of the delineated wetlands are indicated on the Minnesota Department of Natural Resources Public Water Inventory Map (PWI),
- Wetland 1 is mapped in the Angus, Hamel, Houghton, and Lester soil series. Wetlands 2 and 2A are mapped in the Glencoe soil series. Wetland 3 is mapped in the Glencoe soil series, and Wetland 4 is mapped in the Hamel and Klossner soil series.
- Wetland 1 is dominated by reed canary grass, cattail and sedge species, with scattered willows; Wetlands 2 and 2A are dominated by Kentucky bluegrass, fowit bluegrass, giant manna grass, and standing water; Wetland 3 is dominated by hummock sedge, reed canary grass, giant goldenrod, and Canada thistle; Wetland 4 is dominated by reed canary grass, sedge species, and cattail.
- The wetland boundaries were generally placed along the vegetative transition from hydrophytic to non-hydrophytic vegetation (which correlated to a rise in topography), the shift from hydric to non-hydric soils, and the presence or lack of hydrology indicators.

Introduction

The Four Seasons Mall delineation is located SW of the intersection of Highway 169 and Rockford road (along Lancaster Lane). The legal description of the project location is: A part of the E ½ of Section 13, T118N, R22W, Hennepin County, Plymouth, Minnesota, The project is a total of 48 acres (are of investigation).

Methods

AEC utilized the 1987 US Army Corps of Engineers Wetlands Delineation Manual and Midwest Regional Supplement to perform the wetland delineation. A United States Geological Survey (USGS) Map (Osseo Quad) (Figure 1), the Minnesota Department of Natural Resources (MN DNR) Public Water Inventory (PWI) Map (Figure 2), the Hennepin County Soil Survey Map (Figure 3), and the National Wetland Inventory (NWI) Map (Figure 4) were reviewed prior to the site visit and used in the delineation process. The delineated wetland boundaries (GPS located) are indicated on Figure 5 and are overlaid on a 2010 aerial image. AEC used the routine delineation method.

Wetland classification followed methods described by the USACOE - St. Paul District: Eggers and Reed "Wetland Plants and Plant Communities of MN and WI". The Circular 39 and Cowardin et al. classifications are given as well. The indicator status of plants was determined using the National List of Plant Species That Occur in Wetlands – Region 3 (Sabine 1999). In accordance with the Midwest Regional Supplement, the + and – have been removed from the vegetation indicator status.

Pink pinflags were used to delineate the wetlands and were numbered sequentially: flagging was hung from adjacent vegetation to aid in location of the pinflags. Sample points were taken to document the vegetation, soils, and hydrology indicators within representative upland and wetland locations.

Results

Office Results

The SE portion of Wetland 1 is indicated on the NWI map as a PEMCd wetland, Wetlands 2 and 2A are not indicated on the NWI map. Wetland 3 is not indicated on the NWI map. Wetland 4 is indicated on the NWI map as a PEMC/PEMF wetland. Wetland 1 is mapped in the Angus, Harnel, Houghton, and Lester soil series, Wetlands 2 and 2A are mapped in the Glencoe soil series. Wetland 3 is mapped in the Glencoe soil series, and Wetland 4 is mapped in the Harnel and Klossner soil series. The Glencoe, Klossner, Harnel and Houghton soil series are classified as hydric soils (SCS Hydric Soils of the United States). None of the delineated wetlands are indicated on the Minnesota Department of Natural Resources Public Water Inventory Map (PWI).

Field Results

Wetland 1

AEC classified Wetland I as a Fresh (Wet) Meadow/Shallow Marsh (Type 2/3, PEME/PEMF) wetland. Wetland I is dominated by reed canary grass (Phalaris

arundinacea), narrow leaved cattail (Typha angustifolia), sedge (Carex) species, with scattered willow species (sandbar and crack willow, Salix exigua and Salix fragilis respectively). The adjacent upland area is dominated by smooth brome (Bromus inermis), Kentucky bluegrass (Poa pratensis), and dandelion (Taraxacum officinale).

The western and northern portion of Wetland 1 is a shallow drainage swale (generally 30-40' in width) that flows to the SE and discharges into the shallow marsh portion of Wetland 1. The boundary for Wetland 1 varied significantly with portions exhibiting a broad transition while other areas exhibited rather steep slopes, the wetland edge was place approximately 12-18" above the current water line which generally correlated to a shift in the vegetation (from hydrophytic to non-hydrophytic). The wetland soil borings met the A2 (Histic Epipedon) and F3 (Depleted Matrix) hydric soil indicators and water was generally observed within 6" of the soil surface (with saturation to the surface). The upland soil borings did not meet any hydric soil indicators with no saturation observed (the upland sample points appeared to be fill material for the adjacent road embankments).

Wetlands 2/2A

AEC classified Wetlands 2 and 2A as a Seasonally Flooded Basins (Type 1, PEMA) wetlands. Wetlands 2 and 2A are divided by a bike trail but are connected by a culvert. Wetlands 2/2A are dominated by mostly open water with Kentucky bluegrass, fowI bluegrass (*Poa palustris*), and giant manna grass (*Glyceria grandis*). The adjacent upland area is dominated by Kentucky blue grass, dandelion, and white clover (*Trifolium repens*).

Wetlands 2/2A are small depressional basins that are likely inundated during spring time snow melt and after significant precipitation events. The boundary for Wetlands 2/2A exhibited moderate slopes, the wetland edge was placed approximately 6" above the current water line. The wetland soil borings met the F3 (Depleted Matrix) hydric soil indicator and standing water was observed. The upland soil borings did not meet a hydric soil indicator; water was observed at 12" below the soil surface.

Wetland 3

AEC classified Wetland 3 as a Fresh (Wet) Meadow (Type 2, PEMB) wetland. Wetland 3 is dominated by sedge species (Hummock sedge, *Carex stricta*), reed canary grass, giant goldenrod (*Solidago gigantea*), and Canada thistle (*Cirsium arvense*). The adjacent upland area is dominated by Kentucky blue grass, dandelion, and Canada thistle.

The boundary for Wetland 3 exhibited moderate slopes; the wetland edge was placed along the transition from hydrophytic vegetation to non-hydrophytic vegetation and where the soil was no longer saturated to the surface. The wetland soil boring met the A12 (thick dark surface) hydric soil indicator and water was observed at 8" below the soil surface (with saturation to the surface). The upland soil boring did not meet a hydric soil indicator and saturation was observed at 8" below the soil surface.

Wetland 4

AEC classified Wetland 4 as a Shallow Marsh (Type 3, PEMC/PEMF) wetland. Wetland 4 is dominated by sedge species, reed canary grass, and cattail. The adjacent upland area is dominated by common buckthorn (*Rhamnus cathartica*) and basswood (*Tilia americana*).

The boundary for Wetland 4 exhibited rather steep slopes; the wetland edge was placed along an abropt rise in elevation that correlated to a shift in the vegetation. The wetland soil boring met the A2 (Histic Epipedon) hydric soil indicator and water was observed at 1" below the soil surface (with saturation to the surface). The upland soil boring did not meet a hydric soil indicator and no saturation was observed.

Throughout the forested area down-slope from Wetland 3 (and west of Wetland 4) AEC noted a number of highly eroded drainage channels (see Photo Log). These drainage channels convey water to Wetland 4 during spring time snow melt and after significant precipitation events. The forested area adjacent to the drainage ditches is dominated by basswood, common buckthorn, and green ash (*Fraxinus pennsylvanica*). A soil boring within the ditch indicated non-hydric soils as is typical in this setting. Flowing water was observed at the time of sampling however, flowage is likely temporary. These drainage ditch areas do not meet jurisdictional wetland criteria.

Discussion

Five wetland basins and were delineated within the project bounds. Areas delineated as wetland met the three criteria required for a wetland delineation: dominance of hydrophytic vegetation, presence of hydric soil, and (at a minimum) one primary hydrology indicator or two secondary hydrology indicators under normal conditions.

In order to be official the wetland delineation must be reviewed and approved by the Local Government Unit (LGU) and potentially other agencies (Local, State, Federal). Any work within or adjacent to a wetland will require Wetland Conservation Act (WCA) permits (and potentially other permits). Please consult with AEC if you plan on filling, draining, excavating wetlands within your project location.

If you have any questions regarding this report or any questions about our services please feel free to contact Ben Carlson at any time (612-237-5996).

Thank you.

Son Carbon

Ben Carlson, WDC Ecologist/Owner Arrowhead Environmental Consulting

Data Sources:

USGS Quadrangle Map - Osseo 7.5-Minute Quadrangle, Minnesota, U.S.A.

Minnesota Department of Natural Resources Protected Waters Inventory Map, Hennepin County 1983 (Revised 1996 data from the Mn DNR Data Deli, online).

Soil Survey of Hennepin County, U.S.D.A. Data obtained from the NRCS/SSURGO website.

United States Fish and Wildlife Service National Wetland Inventory Map - Hopkins Quadrangle. 1991. (Taken from May 1980 aerial photographs).

Aerial Photos were obtained the Land Management Information Center website (2010).

Literature Referenced/Technical Documents:

Environmental Laboratory. 1987. 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Army Engineer Research and Development Center, 2007. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region. US Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.

Eggers, Steve D. and Donald M. Reed. 1997. Wetland Plants and Plant Communities of Minnesota and Wisconsin. US Army Corps of Engineers, St. Paul District. 263pp, unclassified.

Shaw, S.P., and C.G. Fredine. 1956. Wetlands of the United States. U.S. Fish and Wildlife Service, Circular 39. 67pp.

Cowardin, L.M., V. Carter, F.C. Golet, and R.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. 103pp.

Sabine, B. J. 1999. National List of Plant Species that Occur in Wetlands: Region 3 – North Central (Indiana, Illinois, Iowa, Michigan, Minnesota, Missouri, Wisconsin), Resource Management Group, Inc. 77pp.

USDA Soil Conservation Service, Washington, D.C., Misc. 2006. Field indicators of Hydric Soils in the United States. A guide for Identifying and Delineating Hydric Soils, Version 6.0

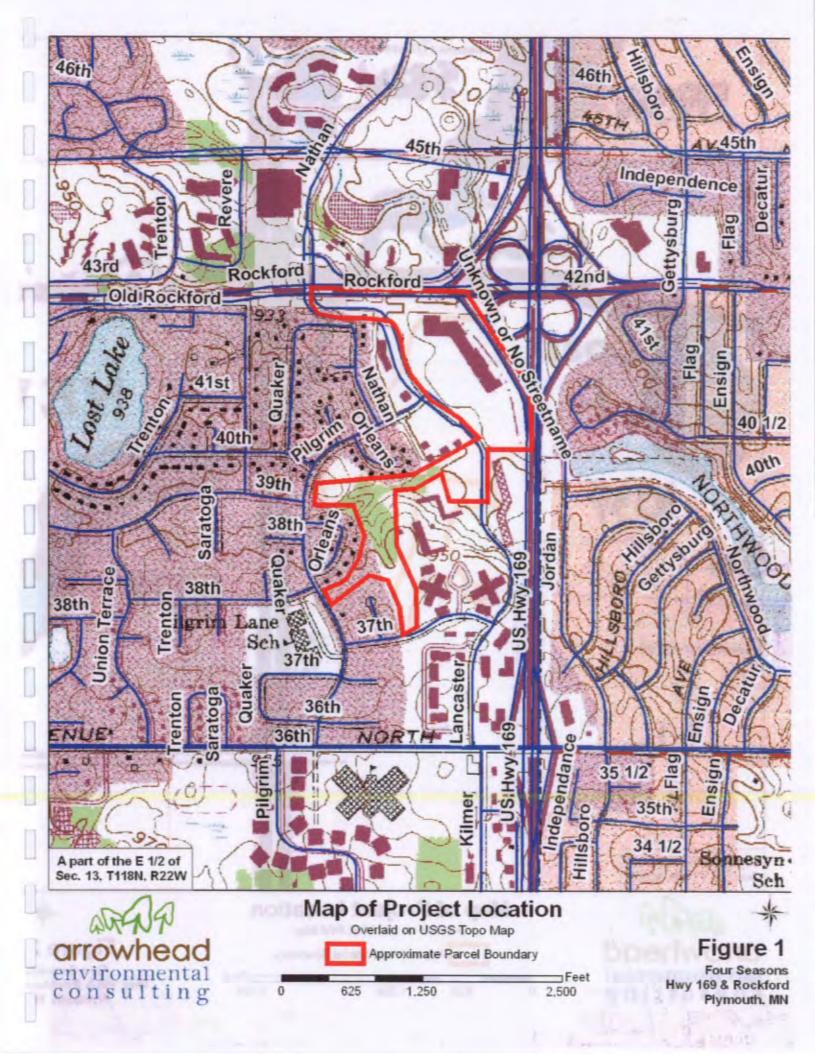
National Technical Committee for Hydric Soils. 1991. Hydric Soils of the United States. USDA Soil Conservation Service, Washington, D.C., Misc. Publication Number 1491. 1991.

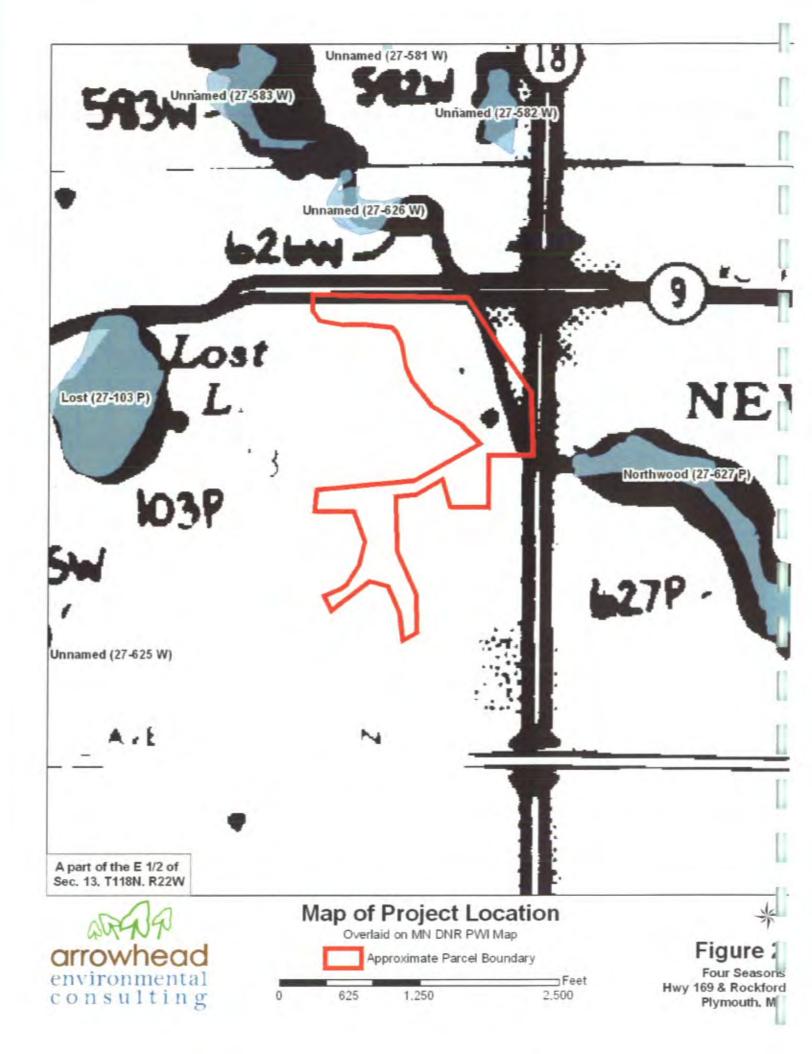
Figures

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Four Seasons Hwy 169 & Rockford Plymouth, M

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consulting

500

Feet

1.000



Supporting Data

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site Four Seasons Mall	City	County; P	lymouth/Her	nnepin Sampling Date:	5/16/2011				
Applicant/Owner: City of Plymouth	_	State:	MN	Sampling Point	1-1 Wet				
nvestigator(s): BPC (WDC #1125)		Section	on. Township	b, Range: Sec. 13, T1	18N, R22W				
andform (hillslope, terrace, etc.): B	Local relief (concave, convex, none): Concave								
Slope (%): 2 Lat	Long Datum								
Soil Map Unit Name Urban Land	VWI Classification: None								
re climatic/hydrologic conditions of the site typical f	or this time o	f the year?	Y 0	f no, explain in remarks)					
re vegetation soil or hydr	ology	significantly	disturbed?	Are "normal circums	tannes"				
Are vegetation , soil , or hydr		naturally pro	blematic?		resent? Yes				
SUMMARY OF FINDINGS				(If needed, explain any answ	ers in remarks.)				
Hydrophytic vegetation present? Y									
Hydric soil present? Y	Is the sampled area within a wetlanu Y								
Wetland hydrology present? Y	f yes, optional wetland site ID								
Inmoter /Europia attomatica manadutar bara aria	a secondaria	in int 1							
lemarks: (Explain alternative procedures here or in	a separate te	abour)							
EGETATION Use scientific names of pla	ants.								
This Charles (This same in	Absolute	Dominan	Indicator	Dominance Test Workshee					
Tree Stratum (Plot size: 30°)	% Cover	t Species	Staus	Number of Dominant Species					
2		-		that are OBL, FACW, or FAC.					
3				Total Number of Dominant Species Across all Strata					
4		_		Percent of Dominant Species					
5				that are OBL FACW, or FAC.					
	0	= Total Cover	_	A STATE OF THE CONTRACT OF THE OWNER	insingly (Mark				
Sapling/Shrub straturr (Plot size: 15'	1		0.111	Prevalence Index Workshe	et				
1	1.1.1		C	Total % Cover of:					
2				OBL species 50 x 1	= 50				
3				FACW species 50 x 2	= 100				
4				FAC species 0 x 3	= 0				
5				FACU species 0 x 4					
Unit destant	0	= Total Cover		UPL species 0 x 5					
Herb stratum (Plot size: 5)	2		and l	Column totals 108 (A)	(B)				
1 Phalaris arundiriacea	50	Y	FACW	Prevalence Index = B/A =	1.50				
2 Typha angustifolia 3 Carex stricta		- <u>Y</u>	OBL	14. d d. d					
4	30	<u> </u>	OBL	Hydrophytic Vegetation In					
5				Rapid test for hydrophyti X Dominance test is >50%					
6				X Prevalence index is ≤3 0					
7									
8				Morphogical adaptations supporting data in Rema					
9				separate sheet)	and on on a				
0	_			Problematic hydrophytic	vegetation*				
Accession and the second second second	100	= Total Cover		(explain)					
Woody vine stratum (Plot size: 15"	1			Indicators of hydric soil and well	and hydrology must t				
				present, unless disturbed					
1	-		-	Hydrophytic					
2	_								
1	0	= Total Cover		vegetation present? Y					

Depth	Matrix		Re	dox Feat	ures				
(inches)	Color (moist)	- 96	Color (moist)		Type*	Loc**	Text	ште	Remarks
0-6	10YR 4/2	100					Clay loam	+	
6-16	10GY 6/1	95	7.5YR 4/6	5	C	-M-	Clay loam		
0.10	1001.01		1.511.40				and y rotan		
		-		-					
				-					
				+	-		_		
							22.2		
	Concentration, D :	= Depleti	on, RM = Reduct	ed Matrix	MS = M	lasked Sa			= Pore Lining, M = Matri
	oil Indicators:								tic Hydric Soils:
	tisol (A1)			ndy Gleye		(S4)			A16) (LRR K, L, R)
His	tic Epipedon (A2)			ndy Redo				Surface (S7) (LI	
Bla	ck Histic (A3)		Str	ipped Ma	trix (S6)				eat (S3) (LRR K, L, R)
Hys	trogen Sulfide (A4	1)	Loa	amy Muck	ky Minera	al (F1)	Iron-	Mangariese Mas	ses (F12) (LRR K, L, R)
Stra	atified Layers (A5		X Los	arry Gley	ed Matrix	c(F2)	Very	Shallow Dark Su	urface (TF12)
2 0	TI MUCK (A10)		X. De	pleted Ma	atrix (F3)		Othe	r (explain în rema	arks)
the second se	leted Below Dark	Surface	(A11) Re	dox Dark	Surface	(F6)	_		
	ck Dark Surface (pleted Da			Indica	ators of hydrophy	tic vegetation and weltan
	dy Mucky Minera			dox Depr					esent, unless disturbed or
	m Mucky Peat or						19.00		lematic
	Layer (if observe	ed):							
							1. In contrast on a	Piterseen line	- V.
ype:		_			201		Hydric	soil present?	<u>Y</u>
ype: Depth (mche Remarks:	es):						Hydric	soil present?	<u>x</u>
epth (mche emarks:							Hydric	soil present?	<u>Y</u>
emarks:	DGY						Hydric	soil present?	<u>Y_</u>
epth (mchi lemarks:		ers:							<u>×_</u>
Pepth (mche lemarks: IYDROL(Vetland Hy	DGY		reguired, check i	all that ar				condary Indicato	rs (minimum of two requi
Pepth (mchi lemarks: IYDROL(Vetland Hy Inimary Indi Surface	DGY drology Indicate cators (minimum Water (A1)		required, check i		oply) Fauna (B1	13)		condary Indicato Surface Soil C	racks (B6)
Pepth (mchi lemarks: IYDROL(Vetland Hy Inimary Indi Surface	DGY drology Indicate cators (minimum		required, check :	Aquatic F True Aqu	Fauna (B) uatic Plan	(B14)	55	condary Indicato Surface Soil C Dramage Pate	tracks (B6) ems (B10)
Pepth (mchi lemarks: IYDROL(Vetland Hy Inimary Indi Surface	DGY drology Indicato cators (minimum Water (A1) ter Table (A2)		reaured, check i	Aquatic F True Aqu	Fauna (B) uatic Plan		55	condary Indicato Surface Soil C Dramage Pate	racks (B6)
Pepth (mche lemarks: HYDROL(Vetland Hy Surface X High Wa X Saturatic	DGY drology Indicato cators (minimum Water (A1) ter Table (A2)		required check	Aquatic I True Aqu Hydroge	Fauna (B) uatic Plan n Sulfide (ts (B14) Odor (C1)	55	sondary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro	Cracks (B6) erns (B10) Jater Table (C2) ws (C8)
Pepth (mche lemarks: HYDROL(Vetland Hy Surface X High Wa X Saturatic Water M	DGY drology Indicato cators (minimum Water (A1) der Table (A2) on (A3)		reguired, check	Aquatic I True Aqu Hydroge Oxidized (C3)	Fauna (B1 uatic Plan n Sulfide I I Rhizosph	ts (B14) Odor (C1) heres on L	Še Wing Roots	condary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis	Cracks (B6) ems (B10) Vater Table (C2) ws (C8) ible on Aerial Imagery (D9)
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Algal Ma Iron Dep	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) on (A3) adds (B1) it Deposits (B2) rosits (B3) f or Crust (B4) osits (B5)	of one is		Aquatic I True Aqu Hydroger Oxidized (C3) Presence Recent In (C6)	Fauna (B1 uatic Plan n Sulfide (I Rhizosph I Rhizosph e of Reduction ron Reduction	ts (B14) Odor (C1) heres on L ced fron (ction in Til	iving Roots CA) led Solls	condary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri	Cracks (B6) erns (B10) Vater Table (C2) ws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fosition (D2)
Algal Ma Iron Dep Inundabid	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) on (A3) arks (B1) it Deposits (B2) rosits (B3) t or Crust (B4) osits (B5) on Visible on Aenai	of one is	(87)	Aquatic I True Aqu Hydroger Diodized (C3) Presence (C6) Thin Mut	Fauna (B1 uatic Plan in Sulfide (I Rhizosph e of Redu ron Reduc ck Surface	ts (B14) Odor (C1) heres on L ced Iron (I ction in Till e (C7)	iving Roots CA) led Solls	Condary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P	Cracks (B6) erns (B10) Vater Table (C2) ws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fosition (D2)
Pepth (inche lemarks: IYDROL(Vetland Hy Nimary Indi Surface X High Wa Saturatic Water M Sedimer X Drift Dep Algal Ma Iron Dep Inundatic Sparsely	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) m (A3) adds (B1) it Deposits (B2) rosits (B3) it or Crust (B4) osits (B5) on Visible on Aenal Vegetated Concar	of one is Imagery ve Surfac	(87)	Aquatic I True Aqu Hydrogei (C3) Presence Recent II (C6) Thin Muc Gauge o	Fauna (B1 uatic Plan n Sulfide I I Rhizosph e of Redu ron Reduc ck Surface r Well Da	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7) ta (D9)	iving Roots CA) led Solls	Condary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P	Cracks (B6) erns (B10) Vater Table (C2) ws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fosition (D2)
Pepth (inche lemarks: IYDROL(Vetland Hy Nimary Indi Surface X High Wa Saturatic Water M Sedimer X Drift Dep Algal Ma Iron Dep Inundatic Sparsely	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) on (A3) arks (B1) it Deposits (B2) rosits (B3) t or Crust (B4) osits (B5) on Visible on Aenai	of one is Imagery ve Surfac	(87)	Aquatic I True Aqu Hydrogei (C3) Presence Recent II (C6) Thin Muc Gauge o	Fauna (B1 uatic Plan in Sulfide (I Rhizosph e of Redu ron Reduc ck Surface	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7) ta (D9)	iving Roots CA) led Solls	Condary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P	Cracks (B6) erns (B10) Vater Table (C2) ws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fosition (D2)
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Pepth (inche lemarks: IYDROL(Vetland Hy Nimary Indi Surface X High Wa Saturatic Water M Sedimer X Drift Dep Algal Ma Iron Dep Inundatic Sparsely	DGY drology Indicato cators (minimum Water (A1) ter Table (A2) on (A3) adks (B1) it Deposits (B2) rosits (B3) it or Grust (B4) osits (B5) on Visible on Aenai Vegetated Conca tained Leaves (B9) vations:	of one is Imagery ve Surfac	(B7) e (B8)	Aquatic I True Aqu Hydrogei (C3) Presence Recent II (C6) Thin Muc Gauge o	Fauna (B1 uatic Plan n Sulfide (I Rhizosph e of Redu ron Reduc ck Surface r Well Da xplain in F	ts (B14) Odor (C1) heres on L ced fron ((ction at Till e (C7) ts (D9) Remarks) nchies):	iving Roots CA) led Solls	sondary Indicato Surface Soli C Dramáge Pátti Dry-Season W Crayfish Burro Saturation Vis Stunted ór Stri X Geomorphic P X FAC-Neutral T Wetland	Packs (B6) ems (B10) Vater Table (C2) rws (C8) ible on Aerial Imagery (D9) essed Plants (D1) Position (D2) Pest (D5)
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Pepth (inche Ternarks: TYDROLO Vetland Hy 'nimary Indi Surface X High Wa X Saturatic Water M Sedimer Algal Ma Iron Dep Inundatic Sparsely Water-Si Teld Obser urface water /ater table aturation p	DGY drology Indicato cators (minimum Water (A1) der Table (A2) on (A3) arks (B1) it Deposits (B2) vosits (B3) it or Crust (B4) osits (B5) on Visible on Aeria Vegetated Conca talned Leaves (B9) vations: er present? present?	Umagery ve Surfac Yes Yes	(B7) e (B8)	Aquatic I True Aqu Hydroger Oxidized (C3) Presence Recent In (C6) Thun Muc Gauge o Other (E)	Fauna (B1 uatic Plan n Sulfide (I Rhizosof e of Reduc ron Reduc ck Surface r Well Da xplain in F Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron ((ction in Till e (C7) ta (D9) Remarks) nches) nches)	Ving Roots (24) led Solls	Surface Soll C Drainage Path Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P X FAC-Neutral T Wetland hydrolog	Packs (B6) ems (B10) Vater Table (C2) rws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fostion (D2) fest (D5)
Pepth (inche Ternarks: TYDROL(Vetland Hy Primary Indi Surface X High Wa Surface M Sedimer X Drift Dep Inundation Sparsely Water S Seld Obser urface walk /ater table aluration p ncludes ca	DGY drology Indicato cators (minimum Water (A1) der Table (A2) on (A3) adds (B1) it Deposits (B2) vosits (B3) it or Crust (B4) osits (B5) on Visible on Aena Vegetated Conca talned Leaves (B9) valions: er present? present? present? present? pillary fringe)	Ves Yes Yes	(B7) e (B8) X. Na X. Na	Aquatic I True Aqu Hydroger Oriodized (C3) Presence Recent Ir (C6) Thin Muc Gauge o Other (E)	Fauna (B1 vatic Plan n Sulfide I I Rhizosph e of Reduc ron Reduc ron Reduc ck Surface r Well Da xptain in P Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron ((ction in Till e (C7) ta (D9) Remarks) nches) nches) nches)	Ving Roots	econdary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P X FAC-Neutral T Wetland hydrolog present 3	Packs (B6) ems (B10) Vater Table (C2) rws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fostion (D2) fest (D5)
Pepth (inche Ternarks: TYDROL(Vetland Hy Primary Indi Surface X High Wa Surface M Sedimer X Drift Dep Inundation Sparsely Water S Seld Obser urface walk /ater table aluration p ncludes ca	DGY drology Indicato cators (minimum Water (A1) der Table (A2) on (A3) arks (B1) it Deposits (B2) vosits (B3) it or Crust (B4) osits (B5) on Visible on Aeria Vegetated Conca talned Leaves (B9) vations: er present? present?	Ves Yes Yes	(B7) e (B8) X. Na X. Na	Aquatic I True Aqu Hydroger Oriodized (C3) Presence Recent Ir (C6) Thin Muc Gauge o Other (E)	Fauna (B1 vatic Plan n Sulfide I I Rhizosph e of Redu ron Reduc ron Reduc ck Surface r Well Da xptain in P Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron ((ction in Till e (C7) ta (D9) Remarks) nches) nches) nches)	Ving Roots	econdary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P X FAC-Neutral T Wetland hydrolog present 3	Packs (B6) ems (B10) Vater Table (C2) rws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fostion (D2) fest (D5)
Pepth (inche Ternarks: TYDROL(Vetland Hy Primary Indi Surface X High Wa Surface M Sedimer X Drift Dep Inundation Sparsely Water S Seld Obser urface walk /ater table aluration p ncludes ca	DGY drology Indicato cators (minimum Water (A1) der Table (A2) on (A3) adds (B1) it Deposits (B2) vosits (B3) it or Crust (B4) osits (B5) on Visible on Aena Vegetated Conca talned Leaves (B9) valions: er present? present? present? present? pillary fringe)	Ves Yes Yes	(B7) e (B8) X. Na X. Na	Aquatic I True Aqu Hydroger Oriodized (C3) Presence Recent Ir (C6) Thin Muc Gauge o Other (E)	Fauna (B1 vatic Plan n Sulfide I I Rhizosph e of Redu ron Reduc ron Reduc ck Surface r Well Da xptain in P Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron ((ction in Till e (C7) ta (D9) Remarks) nches) nches) nches)	Ving Roots	econdary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P X FAC-Neutral T Wetland hydrolog present 3	Packs (B6) ems (B10) Vater Table (C2) rws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fostion (D2) fest (D5)
Pepth (inche Ternarks: TYDROL(Vetland Hy Primary Indi Surface X High Wa Surface M Sedimer X Drift Dep Inundation Sparsely Water S Seld Obser urface walk /ater table aluration p ncludes ca	DGY drology Indicato cators (minimum Water (A1) der Table (A2) on (A3) adds (B1) it Deposits (B2) vosits (B3) it or Crust (B4) osits (B5) on Visible on Aena Vegetated Conca talned Leaves (B9) valions: er present? present? present? present? pillary fringe)	Ves Yes Yes	(B7) e (B8) X. Na X. Na	Aquatic I True Aqu Hydroger Oriodized (C3) Presence Recent Ir (C6) Thin Muc Gauge o Other (E)	Fauna (B1 vatic Plan n Sulfide I I Rhizosph e of Redu ron Reduc ron Reduc ck Surface r Well Da xptain in P Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron ((ction in Till e (C7) ta (D9) Remarks) nches) nches) nches)	Ving Roots	econdary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P X FAC-Neutral T Wetland hydrolog present 3	Packs (B6) ems (B10) Vater Table (C2) rws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fostion (D2) fest (D5)
Algal Ma Iron Dep Inundatio Sourface X High Wa Sourface X High Wa Sourface Water M Sedimer Algal Ma Iron Dep Inundatio Sparsely Water S ield Obser unface water fater table aturation p includes ca lescribe rec	DGY drology Indicato cators (minimum Water (A1) der Table (A2) on (A3) adds (B1) it Deposits (B2) vosits (B3) it or Crust (B4) osits (B5) on Visible on Aena Vegetated Conca talned Leaves (B9) valions: er present? present? present? present? pillary fringe)	Ves Yes Yes	(B7) e (B8) X. Na X. Na	Aquatic I True Aqu Hydroger Oriodized (C3) Presence Recent Ir (C6) Thin Muc Gauge o Other (E)	Fauna (B1 vatic Plan n Sulfide I I Rhizosph e of Redu ron Reduc ron Reduc ck Surface r Well Da xptain in P Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron ((ction in Till e (C7) ta (D9) Remarks) nches) nches) nches)	Ving Roots	econdary Indicato Surface Soll C Dramage Pate Dry-Season W Crayfish Burro Saturation Vis Stunted or Stri X Geomorphic P X FAC-Neutral T Wetland hydrolog present 3	Packs (B6) ems (B10) Vater Table (C2) rws (C8) ible on Aerial Imagery (D9) essed Plants (D1) fostion (D2) fest (D5)

ATT & Wolfer

S & 180 '

Project/Site Four Seasons Mall		City/County:	Plymouth/He	nnepin Samplin	ng Diate:	5/16/201	11
Applicant/Owner City of Plymouth		State	e MN	Samplin	g Point	1-1.Up	
nvestigator(s): BPC (WDC #1125)		S	ection, Townshi	p, Range.	Sec. 13, T11	BN, R22W	
Landform (hillslope, terrace, etc.):	Slope	Loc	al relief (concav	e, convex, none).	0	Concave	
Slope (%): 5 Lat		Long		Datum.			
Soil Map Unit Name Urban Land			- AMG	Classification:	N	lane	
Are climatic/hydrologic conditions of the	a site typical for this	time of the year	2 Y (I no, explain in rer	narks)		
Are vegetation . soil	, or hydrology	significa	ntly disturbed?	Are "no	mal circums	tances"	
Are vegetation soil	, or hydrology	naturally	problematic?			resent? Y	'es
SUMMARY OF FINDINGS			-	(It needed, expla	ain any answ	ers in rema	arks.)
Hydrophytic vegetation present?	N						
Hydric soll present?	N	Is th	e sampled are	a within a wetland	N		
Wetland hydrology present?	N	I ves	optional wetlan	nd site ID:		_	
VEGETATION Use scientific n		solute Domina	n Indicator	Dominance Te	st Workshee	et.	-
Tree Stratum (Plot size1		Cover I Specie		Number of Domi that are OBL_FA	the second se	0	(A)
2				Total Number	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
3				Species Acro	oss all Strata.	1	(日)
4			2. C	Percent of Domin	nant Species		-
5		· · · · · · · · · · · · · · · · · · ·		that are OBL, FA	CW. or FAC:	0.00%	(A/B)
State Part of the state of the		0 = Total Co	wer				
Sapling/Shrub stratum (Plot size	15			Prevalence Ind		et	
				Total % Cover a			
4				OBL species FACW species	= f x 0 = S x 0		-
4				FAC species	10 x2=	-	-
5				FACU species	0 x4:	-	-
	<u></u>	D = Total Co	wer	UPL species	90 x5=	-	-
Hade cleanurs / Plat size	-			Column totals	100 (1)	400	-

a							FACW species	0 x5		-
4							FAC species	10 ×3	-	-
5		_		_			FACU species	0 x4		_
			-	0	= Total Cover		UPL species	90 x 5		
Herb stratum	(Plot size	5'	1				Column totals	100 (A)	480	(B)
1 Bromus inermis				90	Y	UPL	Prevalence Inde	x = B/A =	4.BO	
2 Poa pratensis				10	N	FAC				-
3 4 5 6 7 8 9 0							Hydrophytic Ve Rapid test fo Dominance Prevalence i Morphogical supporting d separate she Problematic	or hydrophy test is >50% index is ≤3 adaptation lata in Rem eet)	tic vegetatio 5 0° s° (provide arks or on a	
			-	100	= Total Cover	-	(explain)			
Woody vine stratum	(Plot size	15'	-1				"indicators of nydri present, up	c soil and wel liess disturbed		
2	-			0	= Total Cover		Hydrophyti vegetation present?	C N		

SOIL										
Profile Des	cription: (Descri	ibe lo lh	e depth needed	to docu	ment th	e indicat	or or confirm	the absence	of indica	tors.)
Depth	Matrix		Rec	iox.Feat						
(Inches)	Color (moist)	10	Color (moist)	- %-	Type"	Loc**	Tex	ure		Remarks
0-8	10YR 3/2	100					Clay loam		_	
8-18	10VR 4/4	100					Clay loam	- 11		
							1.100			
-		-								
		-		-	1					
				-	-		-			
		-		-	-					
				-	-					
		= Depleti	on RM = Reduce	d Matrix	c, MS = N	lasked Sa				Lining, M = Matrix
	il Indicators:		1.1	10.0				rs for Problem		
	isol (A1)				ed Matro	(54)		st Prairie Redo		
	ic Epipedon (A2)			dy Redo				Surface (S7)		
	ak Histic (A3)	<i></i>			atrox (S6)					3) (LRR K, L, R)
	trogen Sulfide (A4				ky Minera red Matrix			Manganese M Shallow Dark		2) (LRR K, L, R)
	fied Layers (A5) n Muck (A10)				atrix (F3)					(1)2)
	n Muck (A10) leted Below Dark	Sudana	and the second sec		Surface		Cane	r (explain in re	(idin 51	
	k Dark Surface (ark Surfa	10 million (1990)	1 looks	alone of inclusion	hutie Date	etation and weltand
	dy Mucky Mineral				ESSIONS					nless disturbed or
	n Mucky Peat or I			an mahi	000101101	20	inyon		oblematic	
						-	_		0.040	
restrictive	Layer (if observe	ed in								
							Livelein	null monori?	- 84	
Type: Depth (inche	1 7 m 7 m m m			_			Hydric	soil present?	.N.	
ype	1 7 m 7 m m m			_			Hydric	soil present?	N	
iype: Depth (inche Remarks;	·s):			-			Hydric	soil present?	N	-
iype: Depth (inche Remarks;	1 7 m 7 m m m		ent	-			Hydric	soil present?	N	
ype: Depth (inche Remarks: Fill mater	s):		ent				Hydric	soil present?	<u>N</u>	
ype: Depth (inche Remarks: Fill mater	is): rial for road em	bankm	ent				Hydric	soil present?	N	
Voe: Depth (inche Remarks: Fill mater HYDROLO Vetland Hyd	ial for road em DGY drology Indicato	ıbankm		II that a						
Type: Depth (inche Temarks: Fill mater HYDROLC Vetland Hyd Inmary Indic	ial for road em OGY drology Indicato alors (minimum (ıbankm	required, check a			121		condary Indica	ators (min	mum ol two require
ype: Depth (inche Remarks: Fill mater HYDROLC Vetland Hyd Surface V	rial for road em DGY drology Indicato rators (minimum (Water (A1)	ıbankm	required, check a	Aquatic	Fauna (B			condary Indica Surface So	itors (min	B6)
Voe: Depth (inche Remarks: Fill mater HYDROLC Vetland Hyd Surface V High Wal	rial for road em OGY drology Indicato sators (minimum (Water (A1) ter Table (A2)	ıbankm	required; check a	Aquatic True Aqu	Fauna (B uatic Plan	ts (B14)	9	condary Indica Surface So Drainage Pi	ators (min I Cracks () attems (81	86) 10)
ype: Depth (inche Remarks: Fill mater HYDROLC Vetland Hyd Surface V	rial for road em OGY drology Indicato sators (minimum of Water (A1) ter Table (A2) n (A3)	ıbankm	required; check a	Aquatic True Aqu Hydroge	Fauna (B uatic Plan n Sulfide	ts (B14) Odor (C1	3	condary Indica Surface So	ators (min I Cracks () attems (81 Water Ta	86) 10) ble (C2)
Type: Depth (inche Remarks: Fill mater HYDROLC Vetland Hyd Primary India Surface V High Wat Saturatio Water Ma	rial for road em OGY drology Indicato sators (minimum of Water (A1) ter Table (A2) n (A3)	ıbankm	required; check a	Aquatic True Aqu Hydroge	Fauna (B uatic Plan n Sulfide	ts (B14) Odor (C1	9	econdary Indica Surface So Drainage P Dry-Season Crayfish Bu	ators (min I Cracks () attems (8* Water Ta mows (C8)	86) 10) ble (C2)
Voe: Depth (inche Remarks: Fill mater HYDROLC Vetland Hyd Surface V High Wal Saturatio Water Ma Sediment Drift Dep	rial for road em OGY drology Indicato sators (minimum (water (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3)	ıbankm	required; check a	Aquatic True Aqu Hydroge Oxidized (C3)	Fauna (B uatic Plan n Sulfide I Rhizospi	ts (B14) Odor (C1	Serving Roots	condary Indica Surface So Drainage P Dry-Season Crayfish Bu Saturation Stunted or S	ators (min I Cracks () attems (B Water Ta mows (Ca (sible on Stressed P	86) (0) ble (C2) Aerial Imagery (C9) fants (D1)
Voe: Depth (inche Remarks: Fill mater HYDROLC Vetland Hyd Saturatio Vater Ma Saturatio Water Ma Sediment Drift Dep Algal Mat	rial for road em OGY drology Indicato sators (minimum (Nater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4)	ıbankm	required; check a	Aquatic True Aqu Hydröge Oxidized (G3) Presenc Recent I	Fauna (B uatic Plan n Sulfide I Rhizospt e of Redu	ts (B14) Odor (C1) heres on L	Se wing Roots	condary Indica Surface So Drainage P Dry-Season Crayfish Bu Saturation Stunted or 3 Geomorphic	ators (min I Cracks () attems (B Water Ta mows (Ca (sable on Stressed P : Position	86) (0) ble (C2) Aariai Imagery (C9) lants (D1) (D2)
Type: Depth (inche Remarks: Fill mater HYDROLC Vetland Hyd Saturatio Water Ma Sediment Drift Dep Algal Mat Iron Depo	rial for road em OGY drology Indicato ators (minimum (Nater (A1) ter Table (A2) n (A3) atks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5)	ibankm rs: of one is	required; check a	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6)	Fauna (B uatic Plan n Sulfida I Rhizospi e of Redu ron Reduc	ts (B14) Odor (C1) heres on L ced Iron (ction in Til	Se wing Roots	condary Indica Surface So Drainage P Dry-Season Crayfish Bu Saturation Stunted or S	ators (min I Cracks () attems (B Water Ta mows (Ca (sable on Stressed P : Position	86) (0) ble (C2) Aariai Imagery (C9) lants (D1) (D2)
ype: Depth (inche Remarks: Fill mater HyDROLC Vetland Hyd Saturation Water Ma Saturation Water Ma Saturation Drift Dep Algal Mai Iron Depx Inundatio	rial for road em OGY drology Indicato vators (minimum of vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) t of Crust (B4) osits (B5) n Visible on Aerial	ibankm rs: of one is	required; check a	Aquatic True Aqu Hydröge Oxidized (C3) Presenc Recent I (C6) Thin Mu	Fauna (B uatic Plan n Sulfide I Rhizospi e of Redu ron Redu ck Surface	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7)	Se wing Roots	condary Indica Surface So Drainage P Dry-Season Crayfish Bu Saturation Stunted or 3 Geomorphic	ators (min I Cracks () attems (B Water Ta mows (Ca (sable on Stressed P : Position	86) (0) ble (C2) Aariai Imagery (C9) lants (D1) (D2)
ype: Depth (inche Remarks: Fill mater HyDROLC Vetland Hyd Saturatio Saturatio Water Ma Sediment Drift Dep Algal Mat Iron Depo Inundatio Sparsely	rial for road em OGY drology Indicato rators (minimum (Nater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) n Visible on Aerial Vegetated Conces	Imagery e Surface	(B7) (68)	Aquatic True Aqu Hydröge Oxidized (C3) Presenc Recent I (C6) Thin Mui Gauge o	Fauna (B uatic Plan n Sulfide I Rhizospi e of Redu ron Redu ck Surface r Well Da	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7) tá (D9)	Se wing Roots	condary Indica Surface So Drainage P Dry-Season Crayfish Bu Saturation Stunted or 3 Geomorphic	ators (min I Cracks () attems (B Water Ta mows (Ca (sable on Stressed P : Position	86) (0) ble (C2) Aariai Imagery (C9) lants (D1) (D2)
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Project/Site Four Seasons Mall	Ci	ty/County:	Plymouth/He	nnepin Sa	Impling Date:	5/16/20	11
Applicant/Owner City of Plymouth		State.	MN	l Sa	mpling Point	1-2 We	st
Investigator(s): BPC (WDC #1125)		Sec	tion Townshi	p. Range:	Sec. 13, T	118N. R22W	1
Landform (hillslope, terrace, etc.):	Basin	Loca	relief (corica)	e, convex, n	one):	Concave	
Slope (%): 1 Lat		Long		Da	atum		
Soil Map Unit Name Houghton	_		4WI	Classification	ú l	PEMCd	
Are climatic/hydrologic conditions of the site typ	oical for this time	of the year?	Y (If no, explain	in remarks)		
Are vegetation . soil . 6/	hydrology	significant	ly disturbed?	Ar	e "normal circun	nstances"	
Are vegetation , soil , or	hydrology	naturally p	oroblematic?			present?	(es
SUMMARY OF FINDINGS				(It needed	explain any ans	swers in rema	arks]
Hydrophytic vegetation present? Y							
Hydric soll present? Y		Is the	sampled are	a within a w	etlani Y		
Wetland hydrology present? Y	1.00	I yes, o	ptional wetla	nd site (D:			
Remarks: (Explain alternative procedures here	or in a senarate	report i					
VEGETATION Use scientific names of	of plants	_					
Contraction of the second termine manies of	Absolut	e Dominan	Indicator	Dominand	e Test Worksh	eet	-
Tree Stratum (Plot size: 30'	1 % Cove		Staus	C	Dominant Specie		
1 Fraxinus perinsylvanica		Y	FACW		L FACW, or FAC		(A)
2 Salix nigra	20	Y	OBL		mber of Dominar	-	
3					s Across all Strata		(日)
4				Percent of	Dominant Specie	5	10
5				that are OB	L FACW. or FAC	C 100.00%	(A/B)
Constraint Amount of the	40	= Total Cov	er			_	
Sapling/Shrub stratum (Plot size 15').				e Index Workst	neel	
1		-		Total % Co		- 13 A	
2				OBL speci			1
4				FACW species		2 = 40 3 = 0	-
5				FACU speci		4= 0	-
	0	= Total Cov	er	UPL speci		5= 0	-
Herb stratum (Plot size 51	1	-		Column to			(B)
1 Carex lacustris	60	Y	OBL	1 M	e Index = B/A =		-
2 Typha angustifolia	20	- Y	OBL		e nater - Siri		-
3		-		Hydrophy	tic Vegetation	Indicators:	-
4				Rapid	test for hydrophy	ytic vegetatio	m
5				X Domin	ance lest is >50	56	
6				X Preval	lence index is ≤3	8.0°	
7				Morph	ogical adaptatio	ns" (provide	
8					rting data in Ren	narks or on a	3
9					ate sheet)		
10		Table			matic hydrophyt	ic vegetation	*
Wendburge stratum / Distance 101	80	= Total Cov	er	(explai	Contraction and the		
Woody vine stratum (Plot size 15'	/				of hydric soil and we senit, unless disturbe		
				D/04	SHALL TRUE CONTRACTOR		

= Total Cover

Ū.

vegetation

present?

Remarks: (Include photo numbers here or on a separate sheet)

Sampling Point: 1-2 Wet

rofile Desi	cription: (Descri	be to the	e depth ne	eded	to docu	ment the	indicat	or or confirm	the absenc	e of indica	itors.)	
Depth	Matrix			Rec	iox Feat	ures	A					
(Inches)	Color (moist)	- A.	Color (m	c(st)	%	Type*	Loc**	Text	ure		Remarks	
0-B	N 2.5/0	100						Sapric (Ca)				
							1					
		-		-	-							
		-		-	-							_
		-										
		_		-			-					
				_			1.1					_
							1			_		
	oncentration, D =	Depletion	n = MR	educe	d Matrix	. MS = Ma	asked Sa				E Lining: $M = M$	atrix
	il Indicators:								s for Proble			
	isol (A1)		_			ed Matrix	(S4)				RR K. L. R)	
	ic Epipedori (A2)		_		dy Redd				Surface (S7		Contraction of the second	
	k Histic (A3)		_			trix (S6)			Contraction of the second		3) (LRB K, L, F	
	rogen Sullide (A4					ky Minera					2) (LRR K, L,	R)
	tified Layers (A5)		_			ed Matrix	(F2)		Shallow Darl		17 12)	
	n Muck (A10)		a	_		atnx (F3)		Othe	r (explain in r	emarks)		
	leted Below Dark		(A11)			Surface						
	k Dark Surface (/					ark Surfac					etation and we	
	dy Mucky Mineral			Heo	ox Depr	essions (i	-6)	nyaro		present, a problemate	nless disturbe	1.01
	n Mucky Peat or F		_							Dubleman	-	_
	Layer (if observe	:(b:										
vpe:								Liteleter				
								Hyune	soil present		-	
epth (inche emarks:	s):				_	-		Hydric	soil present			
epth (inche emarks:						-		Hyune	soil present			
epth (inche emarks: YDROLC	OGY							Hyune:	soil present			
epth (inche emarks: YDROLC		rs:						Hyune	soil present			
epth (inche emarks: YDROLC etland Hyd	OGY		required: c	heck a	ill that an	adiy)					imum oł two re	quite
epth (inche emarks: YDROLC etland Hyd	OGY drology Indicato		required: c			o <u>plyi</u> Fauna (81	3)		condary Indi			quite
Pepth (inche emarks: YDROLC Vetland Hyt imary Indu C Surface (High Wai	DGY drology Indicato ators (minimum o Vater (A1) ler Table (A2)		required: c	_	Aquatic I True Aqu	Fauna (81 Jatic Plant	s (B)4)	Se	condary Indi Surface S Drainage	cators (min oil Cracks (Pattems (B	86) 10)	equite
epth (inche emarks: YDROLC retland Hyt imary India (Surface \ High Wai Saturatio	DGY drology Indicato ators (minimum o Vater (A1) ler Table (A2) n (A3)		required: c	TD	Aquatic I True Aqu Hydroge	Fauna (81 Jatic Plant n Sulfide (s (B)4) Ddor (C1	<u>88</u>	condary Indi Surface S Drainage Dry-Seaso	cators (min oil Cracks (Patterns (B n Water Ta	86) 10) ble (C2)	quite
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Project/Site Four S	Seasons Mail		City/County:	Plymouth/Henn	epin Sampling	Date: 5/16/2011
Applicant/Owner:	City of Plymouth		State	< MN	Sampling	Point 1-2 Up
investigator(s): Bi	PC (WDC #1125)		Se	ction, Township,	Range: S	ec. 13, T118N, R22W
Landform (hillslope	e, ferrace, etc.):	Slope	Loca	al relief (concave,	convex, none):	Concave
Slope (%): 5	Lat		Long		Datum:	
Soil Map Unit Nam	e Urban Land			WWI Cla	assification	None
Are climatic/hydrol	ogic conditions of the	site typical for this	time of the year?	Y ()fr	no, explain in rema	arks)
Are vegetation	. soil	_ or hydrology	significan	ntly disturbed?	Are *norr	nal circumstances"
Are vegetation	, soil	, or hydrology	naturally	problematic?		present? Yes
SUMMARY OF	FINDINGS				(If needed, explain	n any answers in remarks.)
Hydrophytic ve	agetation present?	Y				
Hydric soil pre	sent?	N	Is the	e sampled area v	within a wetlane	N
Wetland hydro	ology present?	N	lyes,	optional wetland	site ID:	
Remarks: (Explain	alternative procedure	es here or in a sepa	arate report.)			

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30') 1 Fraxinus pennsylvanica	Absolute % Cover 40	Dominan t Species	Indicator Staus FACW	Dominance Test Worksheet Number of Dominant Species that are OBL_FACW, or FAC. 4 (Å)
2 Salix nigra 3	30	Ŷ	OBL	Total Number of Dominant Species Across all Strata: 5 (E)
	_			Percent of Dominant Species that are OBL FACW, or FAC: 80.00% (A/B
and the second sec	70	= Total Cover		
apling/Shrub stratum (Plot size 15") Rhamnus frangüla	5	¥	FAC	Prevalence Index Worksheet Total % Cover ol: OBL species 30 x1 = 30 FACW species 40 x2 = 80 FAC species 15 x3 = 45
erb stratum (Plot size: 5	5	= Total Cover		FACU species 13 $A3 =$ 43 FACU species 25 $x 4 =$ 100 UPL species 0 $x 5 =$ 0 Column totals 110 (A) 255
Geranium maculatum	20	Y	FACU	Prevalence Index = B/A = 2.32
Taraxacum officinale	5	N	FACU	
Poa pratensis	10	Y	FAC	Hydrophytic Vegetation Indicators: Rapid test for hydrophytic vegetation X Dominance test is >50% X Prevalence index is <3.0*
Voody vine stratum (Plot size 15)	35	= Total Cover		(explain) *Indicators of hydric soil and welland hydrology must present, unless disturbed or problematic
	Ø	= Total Cover		Hydrophytic vegetation present? Y

SOIL											7-2 Up
Profile Des	cription: (Descri	ibe to th	e depth needed	to doce	ument the	e indicate	or or confirm	n the absence	e of indi	ators.)	
Depth	Matrix		Re	edox Fea					-		
(Inches)	Color (moist)	96	Color (moist)	16	Type*	Loc**	Tex	ture	1.00	Remarks	
0-18	10YF 3/2	100					Loam				
18-22	10YR 4/4	100					Clay loam				
		-									
				-		-					
				-							
		-		-	-	-			-		
	1			-					-		
			2								
*Type: C = C	Concentration, D =	Depleti	on. RM = Reduc	ed Matri	(MS = Ma	asked Sa	and Grains	"1.ocation	PL = Po	re Lining, M	= Matros
	il Indicators:							irs for Proble	ematic Hy	dric Soils:	
Hist	(A1)		Sa	ndy Gley	ed Matrix	(S4)		st Praine Red			3)
Hist	ic Epipedon (A2)		Sa	ndy Red	ox (S5)			k Surface (S7			
Blai	ck Histic (A3)		Str	ipped Ma	atrix (S6)			n Mucky Peat			
Hyd	trogen Sulfide (A4	L)			ky Mineral			-Manganese			L, R)
Stra	atified Layers (A5)		Lo	arny Gley	ed Matrix	(F2)		/ Shallow Dar		(TF12)	
2 ct	n Muck (A10)				latrix (F3)		Othe	er (explain in	remarks)		
	leted Below Dark				Surface (Y					
	ck Dark Surface (i				ark Surfac			ators of hydro			
	idy Mucky Minera			dox Dep	ressions (F	FB)	hydr	ology must be			rbed or
5 07	n Mucky Peat or F	Peat (53)	6						problema	tic	
Restrictive	Layer (if observe	ed):			1						
Type							Hydric	soil present	? N		
Depth (inche Remarks:	rial for road em	bankm	ent				Hydric	soll present	17 <u>N</u>		
Depth (inche Remarks: Fill mater	rial for road em	bankm	ent				Hydric	soll present	? <u>N</u>		
Depth (inche Remarks: Fill mater HYDROLO	rial for road err		ent				Hydric	soll present	? <u>N</u>		
Depth (inche Remarks: Fill mater HYDROLO	rial for road em		ent				Hydric	soll present	? <u>N</u>		
Depth (inche Remarks: Fill mater HYDROLO Wetland Hy	rial for road err	rs:		all that a				econdary Ind	cators (m	inimum of tw	ió requi
Depth (inche Remarks: Fill mater HYDROLO Wetland Hy Primary India Surface	nal for road em DGY drology Indicato cators (minimum i Water (A1)	rs:		Aqualic	Fauna (B1			econdary Indi Surface S	cators (m	inimum of tw	o requi
Depth (inche Remarks: Fill mater HYDROLO Wetland Hy Primary India Surface High Wa	nal for road em DGY drology Indicato cators (minimum i Water (A1) ter Table (A2)	rs:		Aquatic True Aq	Fauna (B1 uatic Plant	ts (B14)	<u>S</u>	econdary Indi Surface S Dramage	cators (m oil Cracks Patterns (татат of tw (B6) B10)	o requi
Pepth (inche Remarks. Fill mater HYDROLO Wetland Hy Primary India Surface High Wa Saturatio	rial for road em DGY drology Indicato cators (minimum i Water (A1) ter Table (A2) m (A3)	rs:		Aquatic True Aq Hydroge	Fauna (B) uatic Plant en Sulfide (ts (B14) Odor (C1)	<u>s</u>	econdary Ind Surface S Dramage Dry-Seas	cators (m oil Cracks Patterns (on Water	inimum of tw (B6) B10) Table (G2)	o requi
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Project/Site Four S	Seasons Mall		City/County:	Plymouth/Hennepm	Sampling (Date 5/1	6/2011
Applicant/Owner	City of Plymouth		State	2 MN	Sampling F	oint 1-	3 Wet
Investigator(s): B	PC (WDC #1125)		Se	ection, Township, Rang	je: Se	ec. 13, T118N, F	822W
Landform (hillslop	e, terrace, etc.):	Basin	Loc	al reliet (concave, conv	ex, none):	Concar	ve
Slope (%): 2	Lat		Long		Datum:		
Soil Map Unit Nan	né Houghton			VWI Classific	cation	None	
Are climatic/hydro	logic conditions of the	site typical for this	time of the year	? Y (If no, ex	plain in remai	rks)	
Are vegetation	, soil	, or hydrology	significa	ntly disturbed?	Are "norma	al circumstances	5*
Are vegetation	, soil	, or hydrology	naturally	problematic?			? Yes
SUMMARY OF	FINDINGS			(If ne	eded, explain	any answers in	remarks)
Hydrophytic ve	egetation present?	Y					
Hydric soil pre	isent?	Y	is th	e sampled area within	a wetland	Y	
Wetland hydro	ology present?	Y	1 yes	optional wetland site I	0		
Remarks: (Explain	alternative procedure	s here or in a sepa	arate report.)				

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size 30')	Absolute % Cover	Dominan t Species	Indicator Staus	Dominance Test Worksheet Number of Dominant Species
1			1	that are OBL, FACW, or FAC (A)
3	_	-		Total Number of Dominant Species Across all Strata. 2 (B)
1				Percent of Dominant Species
				that are OBL_FACW, or FAC: 100.00% (A/B
Sapling/Shrub stratum (Plot size 15)		= Total Cover		Prevalence Index Worksheet
sability Siraturi (Fiol size. 10	5			Total % Cover of:
				OBL species 0 x 1 = 0 FACW species 100 x 2 = 200
1				FAC species 0 x3= 0
				FACU species 0 x 4 = 0
-	0	= Total Cover	_	UPL species 0 x 5 = 0
Herb stratum (Plot size 5'	1			Column totals 100 (A) 200 (B)
Phalaris arundinacea	80	Y	FACW	Prevalence index = B/A = 2.00
Solidago gigantea	20	-Y-	FACW	
1				Hydrophytic Vegetation Indicators:
	_			Rapid test for hydrophytic vegetation
			_	X Dominance test is >50%
				X Prevalence index is ≤3.0*
		_		Morphogical adaptations' (provide
				supporting data in Remarks or on a
			-	separate sheet)
				Problematic hydrophytic vegetation*
and a second	100	= Total Cover		(explain)
Moody vine stratum (Plot size: 15'	P			*Indicators of hydric soil and wotland hydrology must present, unless disturbed or problematic
2				Hydrophytic
	0	= Total Cover		vegetation
				present? Y

Sampling Point: 1-3 Wet

Depth		ibe to th	e depth needed	to docu	ment the	e indicat	tor or confirm	the absence	of indica	stors.)
	Matrix		Rec	dox Feat						2010
(Inches)	Color (moist)	56	Color (moist)	16	Type*	Loc**	Text	146		Remarks
0-7	10YR 3/2	98	10YFI 4/4	2	C	M	Clay loam			
7-18	10VFI 4/2	95	10YR 5/4	5	G	M	Sandy Clay	(can)		
				1						
_	1			1	1	-				
					-	-	-			
		-				-			_	
		-								
Type: C = C	Concentration, D =	= Depleti	on, RM = Reduce	d Matrix	MS = M	lasked S	and Grams,	**Location:	PL = Por	e Lining, M = Matrix
Hydric So	il Indicators:							s for Problem		
Hist	tisal (A1)				ed Matrix	(S4)				LRR K, L, R)
Hist	tic Epipedon (A2)			dy Redo				Surface (S7)		the second se
Bla	ck Histic (A3)		Strij	oped Ma	trox (S6)		5 cm	Mucky Peat of	r Peat (S	3) (LRR K, L, R)
Hyd	irogen Sulfide (Ad	9	Loa	my Much	cy Minera	sl (F1)	Iron-M	Manganese M	asses (F	12) (LRR K, L, R)
	atified Layers (A5)		Loa	my Gley	ed Matrix	(F2)	Very	Shallow Dark	Surface	TF12)
	m Muck (A10)		X Dep	leted Ma	atrix (F.3)		Cither	(explain in re	marks)	
	eted Below Dark	Surface	(A11) Red	iox Dark	Surface	(F6)				
	ck Dark Surface (J				ark Surta		*indica	tors of hydrod	hytic veo	etation and weltand
	dy Mucky Mineral				essions					unless disturbed or
	m Mucky Peat or F					. an			roblemaß	
lestrictive	Layer (if observe	ed):			-					
ype.							Hydric s	soil present?	Y	
Depth (inche	1/36									
Remarks:										
Remarks:										
Remarks:	DGY									
Remarks: HYDROLO Wetland Hy	DGY drology Indicato									
Remarks: HYDROLO Vetland Hy Primary India	DGY drology Indicato cators (minimum d		required; check a				<u>5</u> e			timum of two requir
HYDROL(Wetland Hy Primary India Surface	DGY drology Indicato cators (minimum o Water (A1)		required; check a	Aquatic I	Fauna (B1	10.000	54	Surface So	Cracks	86)
HYDROLO Wetland Hy Primary India Surface 1 X High Wa	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2)		_	Aquatic I True Aqu	Fauna (B1 Jatic Plan	ts (814)	-	Surface So Drainage P	i Cracks i atterns (B	86) 10)
HYDROLO Wetland Hy Primary India Surface 1 X High Wa X Saturatio	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2) on (A3)		Ē	Aquatic I True Aqu Hydroge	Fauna (B1 Jatic Plan n Sulfide I	ts (B14) Odor (C1	-	Surface So Drainage P Dry Seasor	i Cracks i attems (B Water Ta	86) 10) able (C2)
HYDROLC Vetland Hy Primary India Surface 1 X High Wa X Saturatic Water Mi	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2) on (A3) arks (B1)		Ē	Aquatic I True Aqu Hydroge Oxidized	Fauna (B1 Jatic Plan n Sulfide I	ts (B14) Odor (C1	-	Surface So Drainage P Dry-Seasor Crayfish Bu	il Cracks (attems (B Water To mows (C8	86) 10) able (C2))
HYDROLO Vetland Hy Surface V X High Wa X Saturatio Water M Sedimen	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2) on (A3) arks (B1) t Deposits (B2)		Ξ	Aquatic I True Aqu Hydroge Oxidized (G3)	Fauna (B1 Jatic Plan n Sulfide I Rhizosph	ts (B14) Odor (C1 heres on)	Uving Roots	Surface So Drainage P Dry-Seasor Crayfish Bu Saturation	I Cracks I attems (B I Water Tr movis (C8 Visible on	86) 10) able (C2)) Aenal Imageny (C9)
HYDROLC Vetland Hy Primary Indic Surface V X High Wa X Saturatic Water M Sedimen X Drift Dep	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2) on (A3) arks (B1) t Deposits (B2) osits (B3)		Ξ	Aquatic I True Aqu Hydroge Oxidized (C3) Presence	Fauna (B1 Jatic Plan n Sulfide I Rhizosph s of Redu	ts (B14) Oder (C1 heres on I ced Iron (Uving Roots	Surface So Drainage P Dry Seasor Crayfish Bu Saturation Stunted or 1	I Cracks I attems (B I Water Ti mows (C8 Visible on Stressed F	86) 10) able (C2)) Aenal Imageny (C9) Plants (D1)
HYDROLC Vetland Hy Primary India Surface V X High Wa X Saturatic Water M Sedimen X Drift Dep Algal Ma	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2) on (A3) arks (B1) t Deposits (B2) osits (B3) f or Crust (B4)			Aquatic I True Aqu Hydroge Oxidized (C3) Presence Recent II	Fauna (B1 Jatic Plan n Sulfide I Rhizosph s of Redu	ts (B14) Oder (C1 heres on I ced Iron (Living Roots	Surface So Drainage P Dry Seasor Crayfish Bu Saturation Stunted or 1 C Geomorphi	I Cracks I atterns (B Water Tr movis (C8 Visible on Stressed F c Position	86) 10) able (C2) 1 Aenal Imageny (C9) Plants (D1) (D2)
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HYDROLC Vetland Hy Primary India Surface 1 X High Wa X Saturatic Water M Sedimen X Drift Dep Algal Ma Iron Dep Inundatio	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2) on (A3) arks (B1) t Deposits (B2) osits (B3) f or Crust (B4) osits (B5) on Visible on Aerial	of one is	(87)	Aquatic I True Aqu Hydroge Oxidized (C3) Presence Recent II (C6) Thin Muc	Fauna (B1 Jatic Plan n Sulfide I Rhizosph s of Reduction Reduction & Surface	ts (B14) Odar (C1 teres on I cad Iron (ction in Ti e (C7)	Living Roots	Surface So Drainage P Dry Seasor Crayfish Bu Saturation Stunted or 1 C Geomorphi	I Cracks I atterns (B Water Tr movis (C8 Visible on Stressed F c Position	86) 10) able (C2) 1 Aenal Imageny (C9) Plants (D1) (D2)
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Armarkis: HYDROLO Vetland Hy Primary India Surface V Surface V Surface V Surface V Sedimen X Drift Dep Algal Ma Iron Dep Inundatio Sparsely Water St Field Obser Surface wate	DGY drology Indicato cators (minimum of Water (A1) ter Table (A2) on (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) on Visible on Aerial Vegetated Concav tained Leaves (B9) vations: er present?	Imagery re Surfac Yes	(B17) e (B8)	Aquatic I True Aqu Hydroger Oxidized (C3) Presence Recent Ir (C6) Thin Muc Gauge o	Fauna (B1 Jatic Plan n Sulfide I Rhizosph s of Reduk ron Reduk % Surface well Dat Depth (in	ta (B14) Odor (C1 heres on I cold fron (ction in Ti e (C7) ta (D9) Remarks)	Living Roots C4) Iled Soils	Surface So Drainage P Dry-Seasor Crayfish Bu Saturation Stunted or 1 K Geomorphi K FAC-Neutra	I Cracks (atterns (B Water Tri mows (C8 Visible on Stressed F c Position al Tast (D) nd.	86) 10) able (C2) 1 Aenal Imageny (C9) Plants (D1) (D2)
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Project/Site Four Seasons Mail		City/County:	Plymouth/He	nnepin Samplir	ng Date: 5/16/2011
Applicant/Owner. City of Plymouth	_	State			-
Investigator(s): BPC (WDC #1125)		Sé	ction, Townsh		Sec. 13, T118N, R22W
Landform (hillslope, terrace, etc.):	Slope			ve, convex, none).	and a set of the set o
Slope (%): 5 Lat		Long		Datum:	
Soil Map Unit Name Lester			NWI	Classification:	None
Are climatic/hydrologic conditions of the site to	voical for this	time of the year?		and the second sec	11 87 (8)
and he shares the second se	or hydrology		tly disturbed?		mai circumstances"
	or hydrology		problematic?	ALS 110	present? Yes
SUMMARY OF FINDINGS	1 I I I I I I I I I I I I I I I I I I I		0.000	(If needed, expla	ain any answers in remarks.)
Hydrophytic vegetation present? N		1.1.1			
Hydric soil present? N		Is the	sampled are	a within a wetlan	N
Wetland hydrology present? N			optional wetla		
Remarks: (Explain alternative procedures her	-		1. 1. 1. Colo 1		
VEGETATION Use scientific names		olute Dominar	Indicator	Dominance Te	st Workshool
Tree Stratum (Plot size 30'		over 1 Species		Number of Domi	, , , , , , , , , , , , , , , , , , ,
1				that are CBL, FA	
2		_		Total Number	of Dominant
3				Species Acro	oss all Strata (B)
4				Percent of Domi	
5		a = Total Con		that are OBL, FA	CW, or FAC: 0.00% A/B
Sapling/Shrub stratur (Plot size:1) 1 2 2 2 3 2 4 2 5 2				Prevalence Ind Total % Cover o OBL species FACW species FAC species FACU species	
		0 = Total Cov	er	UPL species	85 x 5 = 425
Herb stratum (Plot size 5'	1			Column totals	100 (A) 485 (B)
1 Bromus inermis	6	15 Y	UPL	Prevalence Inde	ex = B/A = 4.85
2 Solidago canadensis 3		5 N	FACU	Rapid test I Dominance Prevalence	egetation Indicators: or hydrophytic vegetation test is >50% index is ≤3.0°
8910	==	==	\equiv	supporting of separate sh	
1	t	00 = Total Cov	er	(explain)	hydrophytic vegetation*
		and the second sec		-	
Woody vine stratum (Plot size15					ic soil and welland hydrology must b nless disturbed or problematic IC

Profile Description: (Descripte to the depth needed to document the indicator or confirm the absence of indicators.) Depth (inches) Data (Inches) Data (Inches) Description (Inches) Permarks 0-10 10/14.32 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 <th>SOIL</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Sampling Point:</th> <th>1-S Up</th>	SOIL								Sampling Point:	1-S Up
Clober (most) % Color (most) % Type* Loc* Texture Remarks 0-10 10YR 32 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Profile Des	cription: (Descr	ribe to th	e depth needed	to docu	ment the	e indicat	or or confirm the al	bsence of indicators.)	
O-10 10YR 3/2 100 10YR 5/4 2 C M Sandy Clay loam Gravels 15-18 10YR 5/3 100 10YR 5/4 2 C M Sandy Clay loam Gravels 15-18 10YR 5/3 100 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10		the second s								
10-15 10/FR-4/3 98 10/FR-5/4 2 C M Sandy Clay loam Gravits 15-18 10/FR-5/3 100 Image: construction of the second with th	(Inches)	Color (moist)	1.5	Color (moist)	16	Type*	Loc**	Texture	Remar	¥5
15-18 10YR 5/3 100 Clay Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. "Location: PL = Pore Lining, M = Matrix Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. "Location: PL = Pore Lining, M = Matrix Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. "Location: PL = Pore Lining, M = Matrix Type: C = Concentration, D = Depletion, RM = Reduced Matrix, KS = Masked Sand Grains. "Location: PL = Pore Lining, M = Matrix Hattic (A1)	0-10	10YR 3/2	100				1.11	Sandy Clay loam		
Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. "Location: PL = Pore Uning, M = Matrix Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. "Indicators for Problematic Hydric Soils: Habits: C Soil Indicators: Indicators for Problematic Hydric Soils: Indicators for Problematic Hydric Soils: Habits: C Soil Indicators: Indicators for Problematic Hydric Soils: Indicators for Problematic Hydric Soils: Habits: C Soil Indicators: Indicators for Problematic Hydric Soils: Coast Praine Redox (A16) (LRB K, L, B) Back Histe: (A3) Stroped Matrix (S6) Coarn Wucky Mineral (F1) Orgenetic Matrix (F2) Depleted Below Dark Surface (A12) Depleted Dark Surface (F7) "indicators of hydroothytic vegetation and weltan hydroidgy must be presenteraris?) Bandy Mucky Peat or Peat (S3) Exercise (F6) "indicators of hydroothytic vegetation and weltan hydroidgy must be present?] Fill material for road embankment Hydric soil present?] Mydric Soils Secondary indicators: Fill material for road embankment Aquatic Flaus (B1) Daringe Palatins (B10) Daringe Palatins (B10) Hydrics Soils (B3) Dirace Reductors (C1) Dirace Reductors (C1) Dirace Reductors (C2) Fill material for road embankment Aquatic Flaus (B1)	10-15	10YR 4/3	98	10YR 5/4	2	C	M	Sandy Glay loam	Gravels	
Type: C = Concentration. D = Depletion. RM = Reduced Matrix. MS = Masked Sand Grains. "Location: PL = Pore Uning, M = Matrix. Type: C = Concentration. D = Depletion. RM = Reduced Matrix. MS = Masked Sand Grains. "Location: PL = Pore Uning, M = Matrix. Type: C = Concentration. D = Depletion. RM = Reduced Matrix. MS = Masked Sand Grains. "Location: PL = Pore Uning, M = Matrix. Type: C = Concentration. D = Depletion. RM = Reduced Matrix. (S6) Indicators for Problematic Hydric Sonis. Type: C = Concentration. D = Depletion. RM = Reduced Matrix. (S6) Coast Praine Reduce (A16) (LRB K L, B) Back Histo: (A3) Stroped Matrix. (S6) Dark Surface (S7) (LBB K L, C, B) Tinck Dark Surface (A11) Depleted Matrix. (F2) Other (Sand) maskes (F12) (LBB K L, L, B) Depleted Back Natrix. (S6) Depleted Dark Surface. (F7) "Indicators of hydroothytic vegetation and weltan hydroidy must be presentiated and provide must be present? Tink: Dark Surface (A12) Depleted Matrix (F3) Bedox Depressions (F8) "Indicators of hydroothytic vegetation and weltan hydroidy must be present and the provide must be present and hydroidy must be present and the previde must be present and the provide must be present and the previde must be present and the provide must be present and the previde must be present and the previde must be previde must be present and the previde must be previde must be	15-18	10YB 5/3	100					Clay		
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Project/Site Four Seasons Mall		City/	County:	Plymoutt/He	ennepin	Sampling	Date	5/16/20	11
Applicant/Owner: City of Plymouth			State:	M	V	Sampling	Point	2-1 We	et.
Investigator(s): BPC (WDC #1125)			Sec	tion, Townsh	ip, Range:	S	ec. 13, T1	18N, R22W	r -
Landform (hillslope, terrace, etc.)	Basin		Local	relief (conca	vė, convex	k, nane):	(Coricave	
Slope (%): 1 Lat			Long			Datum:			
Soil Map Unit Name Glencoe				WW	Classificat	tion:	1	None	
Are climatic/hydrologic conditions of the si	te typical for this	time of	f the year?	Y	(If no, expl	ain in rema	arks)		
Are vegetation , soil	or hydrology		significant	y disturbed?		Are *nom	al circums	tances"	
Are vegetation , soil	or hydrology	-	naturally p	roblematic?		1.0.0		resent?	'es
SUMMARY OF FINDINGS		_			(If need	ted, explain	n any answ	ers in rema	ans.)
Hydrophytic vegetation present?	Y		-						-
Hydric soil present?	Y		is the s	sampled are	ee within a	wetland	Y		
Wetland hydrology present?	Y			ptional wetla				-	
		uale fe	(port)			_	_		
Remarks. (Explain alternative procedures VEGETATION Use scientific nam	nes of plants.			Indicator	Domina	ance Test	Workshee	et	
	nes of plants. Abs	iolute Sover	Dominan t Species	Indicator Staus	Number	r of Domine	Worksher		(4)
VEGETATION Use scientific nam	nes of plants. Abs	olute	Dominan		Number that are	of Domine	int Species W. or FAC	2	_(A)
VEGETATION Use scientific nam	nes of plants. Abs	olute	Dominan		Number that are Tota	r of Domina OBL FAC I Number o	int Species	2	(A) (B)
VEGETATION Use scientific nam	nes of plants. Abs	olute	Dominan		Number that are Tota Spe	r of Domine OBL FAC I Number o ides Acros	nt Species W. or FAC f Dominant	2	-
VEGETATION Use scientific nam	nes of plants. Abs 	colute Cover	Dominan t Species	Staus	Number that are Tota Spe Percent	r of Domine OBL FAC I Number o cles Across t of Domine	int Species W. or FAC f Dominant s all Strata int Species	2	(B)
VEGETATION Use scientific nam Tree Stratum (Plot size:	nes of plants. Abs ∃⊨ C	colute Cover	Dominan	Staus	Number that are Tota Spe Percent that are	r of Domine OBL FAC I Number o des Across f of Domina OBL FAC	int Species W. or FAC f Dominant s all Strata int Species W, or FAC	2 2 100.00%	(B)
VEGETATION Use scientific nam	nes of plants. Abs ∃⊨ C	colute Cover	Dominan t Species	Staus	Number that are Total Spe Percent that are Prevals	r of Domina OBL FAC I Number of toles Across f of Domina OBL FAC	int Species W. or FAC f Dominant s all Strata int Species W, or FAC	2 2 100.00%	(B)
VEGETATION Use scientific nam <u>Tree Stratum</u> (Plot size	nes of plants. Abs ∃⊨ C	colute Cover	Dominan t Species	Staus	Number that are Total Spe Percent that are Prevale Total 3	r of Domina OBL FACI I Number of cles Across t of Domina OBL FACI ence Indes a Cover of	int Species W. or FAC f Dominant s all Strata ant Species W, or FAC	2 2 100.00%	(B)
VEGETATION Use scientific nam <u>Tree Stratum</u> (Plot size	nes of plants. Abs ∃⊨ C	colute Cover	Dominan t Species	Staus	Number that are Total Spe Percent that are Prevale Total 3= OBL sp	r of Domina OBL FACI I Number of cides Across t of Domina OBL FACI ence Index Cover of pedes	Int Species W. or FAC f Dominant s all Strata unt Species W, or FAC Workshe	2 2 100.00% ret = 5	(B)
VEGETATION Use scientific nam Tree Stratum (Plot size:	nes of plants. Abs ∃⊨ C	colute Cover	Dominan t Species	Staus	Number that are Total Spe Percent that are Prevale Total ¹ OBL sp FACW	r of Domina OBL_FAC I Number of des Across t of Domina OBL_FAC ence Index a Cover of species species	Int Species W. or FAC f Dominant s all Strata unt Species W, or FAC Workshe	2 100.00% eet = 5 = 0	(B)
VEGETATION Use scientific nam Tree Stratum (Plot size:	nes of plants. Abs ∃⊨ C	colute Cover	Dominan t Species	Staus	Number that are Total Spe Percent that are Prevals Total 3 OBL sp FACW FAC sp	r of Domina OBL FACI I Number of cides Across t of Domina OBL FACI ence Index Cover of pedes	Int Species W. or FAC. f Dominant s all Strata unt Species W. or FAC Workshe 5 x 1 0 x 2	2 100.00% eet = 5 0 30	(B)
VEGETATION Use scientific nam Tree Stratum (Plot size:	nes of plants. Abs Be C	colute Cover	Dominan t Species	Staus	Number that are Total Spe Percent that are Prevals Total 3 OBL sp FACW FAC sp	r of Domina OBL_FACI I Number of totes Across i of Domina OBL_FACI ence Index Cover of vectes species species species	Int Species W. or FAC f Dominant s all Strata int Species W, or FAC Workshe 5 x 1 0 x 2 10 x 3	2 100.00% eet = 5 = 0 = 30 = 0	(B)

4							FAC species	10	x 3 =	30	
5							FACU species	0	× 4 =	0	1
	Contraction of the			D	= Total Cover		UPL species	0	x 5 =	0	
Herb stratum	(Plot size	- 5'	1				Column totals	15	(A)	35	(B)
1 Poa pratensis				70	Y	FAC	Prevalence Inde	x = B//	A =	2.33	
2 Glyceria grandis				6	Y	OBL					-
3 4 5 6 7 8 9							Hydrophytic Ve Rapid test fo X Dominance X Prevalence i Morphogical supporting d separate shi Problematic	nr hydri test is index i adapt ata in set)	ophytic >50% s <3.0* ations* (Remark	vegetatio (provide s or on a	
Woody vine stratum	(Plot size	15'	_)	15	= Total Cover		(explain) Indicators of hydro present, ur				
2				0	= Total Cover		Hydrophyb vegetation present?	C	¥		

OIL				dorf t	to docu	ment the	indicat	ar ar an E	rm the absen	ce of ind	(antare)
ofile Des	cription: (Descri	ibe to th	e depth nee	ucu y		utente nie	mulcat	or or comin		ACC OF ITTM	icators./
Depth	Matrix				iox Feat						
(Inches)	Color (moist)	96	Color (mo	st	Эe	Type*	Loc**	Te	exture.		Remarks
0-12	10YR 5/2	95	10YR 3/	4	5	C	M	Loam			
-		_		-	-		-			-	
		-	-	-			-	-		-	
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					-		1.1	_		-	
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							-	-			
	Concentration, D =	Depleti	ori, FIM = Fie	duced	d Matrix	MS = Ma	asked Sa				ore Lining, M = Ma
	oil Indicators:				1.00	The second			tors for Prob		
	tisol (A1)		-			ed Matrix	(54)				(LRR K, L, R)
-	tic Epipedon (A2)		_		dy Fledo				ark Surface (S		
	ck Histic (A3)				A	trux (S6)	(est)				(S3) (LRR K, L, R)
	trogen Sulfide (A4					y Mineral			n-Manganese ry Shallow Da		(F12) (LRR K, L, R
	atified Layers (A5)		10			ed Matrix	(F2)				
	m Muck (A10) bleted Below Dark	Sudaria				atrix (F3) Surface (E6)		her (explain in	TENEIKS	
	ck Dark Surface ()		(A11)			surface (irk Surfac		-	instant of most	minimutia	egetation and weltz
	idy Mucky Mineral					essions (F					t, unless disturbed
	n Mucky Peat or F		_	1 ieus	av mehn	caalona (r	<i>u</i>)	1.02	noingly mean	problem	
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1										
strictive	Laver (if observe	d):				- 1		_			
	Layer (if observe	ed):						Hydr	ic soil preser	nt? v	
pie: :pth (inche emarks:	35)1	ed):						Hydr	ic soil preser	nt?	
pe: epth (inche emarks: YDROLC etland Hy Surface 1 High Wa Saturatio Water M Sedimen Drift Dep	DGY drology Indicato calors (minimum (Water (A1) ter Table (A2)	15:	reguired; che		Aquatic F True Aqu Hydroger Croldized (C3) Presence	Fauna (81) Jábo Plánts n Sulfide C	s (B14) odor (C1) eres on 1 ed from (iving Roots	Secondary In Surface Drainage Crayfish Saturate	dicators (n Spil Crack e Patterns son Water Burrows (on Voible o or Stresse	(B10) Table (C2) CR) on Aerial Imagery (C d Plants (D1)
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Project/Site Four S	seasons Mall		City/County:	Plymouth/Henr	nepin Sampli	ng Date	5/16/2011
Applicant/Owner	City of Plymouth		Stat	e: MN	Samplin	ng Point:	2-1 Up
Investigator(s): BF	PC (WDC #1125)		S	ection, Township,	Range:	Sec. 13,	T118N, R22W
Landform (hillslope	e, terrace, etc.)	Slope	Loc	al relief (concave	, convex, none)	_	Concave
Slope (%): 1	Lat		Long:		Datum		
Soil Map Unit Nam	ne Glencoe			VWI CI	assification		None
Are climatic/hydrol	logic conditions of the	site typical for this	time of the year	? Y (if	no, explain in re	marks)	
Are vegetation	, soil	, or hydrology	significa	antly disturbed?	Are 'no	ormal circu	mstances"
Are vegetation	, soil	, or hydrology	naturally	y problematic?			present? Yes
SUMMARY OF	FINDINGS				(If needed, exp	lain any ar	swers in remarks.
Hydrophytic ve	egetation present?	N		the second second			
Hydric soil pre-	sent?	N	Is th	e sampled area	within a wetlan	e N	1. State 1.
Wetland hydro	ology present?	N	/ yes	, optional wetland	I site ID:	-	
Remarks: (Explain	alternative procedure	s hère or in a sepa	arale report.)				
VEGETATION -	Use scientific na	mes of plants.					
		A.5-	initian Dentition	and the second s	Dominanao Tr	of Markel	a net

	ADSCILLE	Dominan	Indicator	Dominance rest worksheet
Tree Stratum (Plot size: 30')	% Cover	1 Species	Staus	Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
23	-	-		Total Number of Dominant Species Across all Strata: 3 (B)
4	0	= Total Cover	_	Percent of Dominant Species that are OBL, FACW, or FAC, 33,33% (A/B)
Saplind/Shrub straturr (Plot size: 15'				Prevalence Index Worksheet Total % Cover of:
2	-			OBL species 0 x 1 = 0
3				FACW species 0 x 2 = 0
5				FAC species 50 x.3 = 150 FACU species 25 x.4 = 100
	0	= Total Cover		UPL species 25 x 5 = 125
Herb stratum (Plot size: 5*	-			Column totals 100 (A) 375 (B)
1 Tntolium arvense	25	Y	UPL	Prevalence Index = B/A = 3.75
2 Taraxacum officinale	25	Y	FACU	
3 Poa pratensis 4 5 6	50	<u> </u>	FAC	Hydrophytic Vegetation Indicators: Rapid test for hydrophytic vegetation Dominance test is >50% Prevalence index is <3.0*
7 8 9		_	=	Morphogical adaptations" (provide supporting data in Remarks or on a separate sheet)
10	100	= Total Cover	_	Problematic hydrophyfic vegetation* (explain)
Woody vine stratum (Plot size: 15'		_		*indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
2	0	= Total Cover		Hydrophytic vegetation present? N

SOIL

Sampling Point: 2-1 Up

		10 10 11	e depth needed			a manabi	or or commit		mulcalo(s.)
Depth	Matrix			dox Fea		0.00	1		-
(Inches)	Color (moist)	16	Color (moist)	9 ₁₀	Type*	Loc**	Textu		Remarks
0-4	SIE AYOF	100			1	1.1	Sandy Loam	-	
4-16	10YR 4/4	100					Loamy Sand	1.1.1.1.1.1.1	
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1000							
		1.1.1							
						1			
			-	-	-	-			
		-		-	-	-			
		_		-	-				
Type: C = C	oncentration, D =	Depleto	on. RM = Reduce	d Matro	r, MS = M	lasked Sa			= Pore Lining, M = Matrix
Hydric Soi	Indicators:								ic Hydric Soils:
Histi	sol (A1)				ed Matrix	(S4)			A16) (LRR K, L, R)
Histi	c Epipedon (A2)			dy Redi				Surface (S7) (L	
Blac	k Histic (A3)				atrix (S6)				eat (S3) (LRR K, L, A)
	rogen Sulfide (A4	1			ky Minera				ses (F12) (LRR K, L, R)
	tified Layers (AS)				ed Matnx	((F2)		Shallow Dark Su	
	Muck (A10)				atrix (F3)		Other	(explain in rema	BFK(S)
	leted Below Dark				Surface				
	k Dark Surface (/				ark Surfac				tic vegetation and weltand
	ty Mucky Mineral			lox Depr	ressions (F8)	hydrole		sent, unless disturbed or
5 01	Mucky Peat or P	Peat (S3)						prob	lematic
Restrictive L	ayer (if observe	d):							
ype.							Hydric s	oil present?	N
Jepth (inches	2)-				-				
alabert former al					-				
Remarks;									
Remarks:									
Remarks:	GY								
Remarks: HYDROLO Wetland Hyd	GY frology Indicato								
Remarks: HYDROLO Wetland Hyd	GY		required; check a	ali that a	DDIy)		Sec		rs (minimum of two require
Remarks: HYDROLO Vetland Hyc Pimary India Surface V	IGY frology Indicato ators (minimum o Vater (A1)		required; check a	Aquatic	Fauna (B1		Sec	Surface Soil C	racks (B6)
Aemarks: AYDROLO Vetland Hyc Pimary Indic Surface V X High Was	GY frology Indicato ators (minimum o Vater (A1) er Table (A2)		required; check a	Aquatic True Aq	Fauna (B1 uatic Plan	ts (B14)	-	Surface Soil C Drainage Patte	racks (B6) ems (B10)
Aemarks: AYDROLO Vetland Hyc Primary Indic Surface V X High Was X Saturation	GY frology Indicato ators (minimum o Vater (A1) er Table (A2) 1 (A3)		Ξ	Aquatic True Aq Hydroge	Fauna (B1 uatic Plan In Sulfide (ts (B14) Odor (C1	. ÷	Surface Soil C Drainage Patte Dry-Season W	racks (B6) ems (B10) later Table (C2)
Aemarks: AYDROLO Vetland Hyc Primary Indic Surface V X High Wat X Saturation Water Ma	GY frology Indicato ators (minimum o Vater (A1) er Table (A2) 1 (A3) rks (B1)		Ξ	Aquatic True Aq Hydroge Oxidized	Fauna (B1 uatic Plan In Sulfide (ts (B14) Odor (C1	-	Surface Soil C Drainage Patte Dry-Season W Crayfish Burro	racks (B6) ems (B10) later Table (C2) ws (C8)
Aemarks: AYDROLO Vetland Hyc Primary Indic Surface V X High Wat X Saturation Water Ma Sediment	GY frology Indicato ators (minimum of Vater (A1) er Table (A2) 1 (A3) irks (B1) Deposits (B2)		Ξ	Aquatic True Aq Hydroge Oxidized (C3)	Fauna (B1 uatic Plán en Sultide (1 Ahizosph	ts (B14) Odor (C1) heres on L	iving Roots	Surface Soil C Drainage Patte Dry-Season W Grayfish Burro Seturation Visi	racks (B6) ems (B10) ater Table (C2) ws (C8) ble on Aenal Imagery (C9)
Aemarks: AYDROLO Vetland Hyc Primary Indic Surface V X High Wat X Saturation Water Ma Sediment Drift Depo	GY frology Indicato ators (minimum of Vater (A1) er Table (A2) 1 (A3) 1 (A3) inks (B1) Deposits (B2) psits (B3)		Ξ	Aquatic True Aq Hydroge Oxidized (C3) Presenc	Fauna (B1 uatic Plan In Sulfide (I Ahizosph I Ahizosph	ts (B14) Odor (C1) teres on L ced (ron (iving Roots	Surface Soil C Drainage Path Dry-Season W Grayfish Burro Saturation Visi Stunted or Stra	racks (B6) ems (B10) ater Table (C2) ws (C8) ble on Aenal Imagery (C9) essed Plants (C1)
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Armarks: Armarks: Armark Indic Surface V X High Wate X Saturation Water Ma Sediment Drift Depo Algal Mat Iron Depo Inundation Sparsely Water-Sto	GY frology Indicato ators (minimum of Vater (A1) er Table (A2) 1 (A3) irks (B1) Deposits (B2) pists (B3) or (Crust (B4) pists (B5) 1 Visible on Aerial Vegetated Concav ained Leaves (B9)	Imagery	(87)	Aquatic True Aq Hydroge Oxidized (C3) Presenc Recent I (C6) Thin Mu Gauge o	Fauna (B1 uatic Plan en Sulfide (1 Rhizosph e of Redu ron Reduc ck Surface	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7) ta (D9)	iving Roots	Surface Soil C Drainage Path Dry-Season W Grayfish Burro Saturation Visi Stunted or Stra Geomorphic P	racks (B6) ems (B10) later Table (C2) ws (C8) ble on Aenal Imagery (C9) essed Plants (D1) osition (D2)
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Armarks: AYDROLO Vetland Hyc Pinnary Indic Surface V X High Wat Sediment Drift Depo Algal Mat Iron Depo Inundation Sparsely Water-Sta Vater table p aturation pro- ncludes cap	GY frology Indicato ators (minimum of Vater (A1) er Table (A2) 1 (A3) inks (B1) Deposits (B2) or Crust (B4) sits (B3) or Crust (B4) sits (B5) 1 Visible on Aenal Vegetated Concav aned Leaves (B9) rations: r present? esent? illary fringe)	Imagery e Surface Yes Yes	(B7) e (B8) X No X No	Aquatic True Aq Hydroge Oxidizec (C3) Presenc (C6) Thin Mu Gauge o Other (E X	Fauna (B1 uatic Plan en Sulfide i 1 Rhizosph e of Reduc ron Reduc ron Reduc ck Surface r Well Dal xplain in F Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced (ron (dtion in Til e (C7) ta (D9) Remarks) hohes) hohes)	Iving Roots	Surface Soil C Drainage Patie Dry-Season W Grayfish Burro Saturation Visi Stunted or Stra Geomorphic P FAC-Neutral T Wetland hydrolog present?	racks (B6) ems (B10) atter Table (C2) ws (C8) ble on Aenal Imagery (C9) essed Ptants (D1) osition (D2) est (D5)
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Project/Site Four Seasons Mail					nepin Sampling Date	5/16/2011
Applicant/Owner: City of Plymouth		7	State	MN		
nvestigator(s): BPC (WDC #1125)			Secti	on, Township	, Range: Sec. 1.	3, T118N, R22W
andform (hillslope, terrace, etc.):	Basir	1	Local r	eliet (concav	e, convex, none):	Concave
Slope (%): 1 Lat			Long		Datum	
Soil Map Unit Name Glencoe		-		VWI C	Classification	Norie
ve climatic/hydrologic conditions of the	site typical for t	his time o	f the year?	Y ()	no, explain în remarks)	
re vegetation soil	, or hydrolog	TY	significantly	disturbed?	Are *normal cir	rumstances"
re vegetation . soil	. or hydrolog	ay.	naturally pr	oblematic?	Page Horrighton	present? Yes
UMMARY OF FINDINGS					(If needed, explain any	answers in remarks
Hydrophytic vegetation present?	Y					
Hydric soil present?	Y		Is the s	ampled area	within a wetland	Y
Wetland hydrology present?	Y		fyes, or	tional wetlan	d site ID:	
remarks: (Explain alternative procedure /EGETATION Use scientific na			sport.)			
ENE INTION - USE SCIENTING THE		Absolute	Dominan	Indenator	Dominance Test Worl	reheat
Tree Stratum (Plot size 3		% Cover	t Species	Staus	Number of Dominant Sp	111.2.2.2
1 Fraxinus pennsylvanica	<u>, </u>	30	Y	FACW	that are OBL FACW, or	
2		_			Total Number of Dom	
3					Species Across all S	
4					Percent of Dominant Sp	ecies
5			1000		that are OBL, FACW, or	FAC: 100.00% (A/B
		30	= Total Cover		1	
Sapling/Shrub stratum (Plot size	15' J				Prevalence Index Wor	ksheet
1					Total % Gover of:	
2		_				x1= 0
					FACW species 70 FAC species 0	$x^{2} = 140$ $x^{3} = 0$
5					FACU species 0	x4= 0
		0	= Total Cover		UPL species 0	x5= 0
Herb stratum (Plot size:	5)				Column totals 70	(A) 140 (B)
1 Poa palustris		40	Y	FACW	Prevalence Index = B/A	
2						
3					Hydrophytic Vegetati	on Indicators:
4					Rapid test for hydro	phytic vegetation
5				5	X Dominance test is	
6					X Prevalence index is	s ≤3.0*
					Morphogical adapt	
8			<u> </u>	-	supporting data in	Remarks or on a
0					separate sheet)	
					Backlour Blue	
	;	40	- Total Course		Problematic hydrop	phytic vegetation"
	15'	40	= Total Cove		(explain)	
0	15')	40	= Total Cove		(explain) Indicators of hydric soil an	d wetland hydrology mest
0	15')	40	= Total Cove		(explain) Indicators of hydric soil an	
0 Woody vine stratum (Plot size:	15')		= Total Cover		(explain) "Indicators of nydric soil an present, unless dis	d wetland hydrology must p

Sampling Point:

2A-1 Wel

Depth	Matrix		8	edox Fea	tures.		1		
(Inches)	Color (maist)	4	Color (moist		Type*	Loc**	Text	ture	Remarks
0-12	10YR 5/2	95	10YR 3/4	5	C	M	Loam		
				-	-	-			
		-		+	-	-			
				-	-	-			
				-	-				
					1				
		-		1					
		-	-	+	-	-			
-				_					
	Concentration, D :	= Depleti	on, RM = Redu	ced Matri	$x MS \neq M$	lasked Si			L = Pore Lining, M = Math
	il Indicators:					12.70			tic Hydric Soils:
	Isol (A1)				red Matrix	(\$4)			(A16) (LRR K, L, R)
	ic Epipedori (A2)			andy Red				Surface (S7) (L	
	ck Histic (A3)			thpped Mi					Peat (S3) (LRR K, L, R)
Hyd	irogen Sulfide (A4	4)			sky Minera			and the second s	sses (F12) (LRR K, L, R)
Stra	tified Layers (A5)	5	L	samy Gle	yed Matrix	(F2)	Very	Shallow Dark S	urface (TF12)
2 cm	n Muck (A10)		X D	epleted M	latrix (F3)		Othe	er (explain in rem	arks)
Dep	leted Below Dark	Surface	(A11) B	edox Dark	k Surface	(F6)			
Thic	k Dark Surface (A12)	D	epleted D	ark Surfa	ce (E7)	*Indica	ators of hydroph	ytic vegetation and weltan
San	dy Mucky Minera	(S1)	R	edox Dep	ressions ((F.8)			esent, unless disturbed or
5 cm	n Mucky Peat or	Peat (S3)	y					pro	blematic
anteintium I	Layer (if observe	-line				1			
pe.	reater (ii observe	eu).					Hudric	soil present?	
Ue.									and the second se
	e la	_			-		in and	oon prosent:	
epth (inche emarks:				_			, ijano		
epth (inche marks:							144.0		
epth (inche marks: YDROLC	DGY	075:			-		144.0		
epth (inche emarks: YDROLC etland Hyd	DGY drology Indicate		ren ured: cher-	all that a					ors (minum of two regins
epth (inche emarks: YDROLC etland Hyr imary Indic	OGY drology Indicato ators (minimum		required; check			121		econdary Indical	
epth (inche emarks: YDROLC etland Hyu imary India Surface (DGY drology Indicato cators (minimum Water (A1)		required; check	Aquatic	Fauna (81			econdary Indicat Surface Soil	Cracks (B6)
epth (inche emarks: YDROLC etland Hyd imary India Surface I High Wa	DGY drology Indicato cators (minimum Water (A1) ter Table (A2)		required; check	Aquatic True Aq	Fauna (Br juatic Plan	ts (814)	3	econdary Indicat Surface Soil Drainage Pat	Cracks (B6) tems (B10)
epth (inche emarks: YDROLC etland Hyd mary India Surface (High Wa Saturatio	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) n (A3)		required; check	Aquatic True Aq Hydroge	Fauna (B1 Juatic Plan en Sulfide (ts (814) Odor (C1	3	econdary Indical Surface Soil Drainage Pat Dry-Season V	Cracks (B6) tems (B10) Vater Table (C2)
Popth (inche amarks: YDROLC etland Hyd imary India Surtace (High Wat Saturatio Water Ma	DGY drology Indicato cators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1)		required; check	Aquatic True Aq Hydroge Oxidize	Fauna (B1 Juatic Plan en Sulfide (ts (814) Odor (C1	3	econdary Indical Surface Soil Drainage Pat Dry-Season V Crayfish Burr	Cracks (B6) tems (B10) Vater Table (C2) ows (C8)
PDROLC entarks: YDROLC etland Hyd imary India Surface High Wat Saturatio Water Ma Sedimen	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2)		required; check	Aquatic True Aq Hydroge Oxodizes (C3)	Fauna (B1 Juato Plan en Sulfide d Rhizosph	ts (814) Odor (C1 heres pri)	Se .ving Roots	econdary Indicat Surface Soil Drainage Pat Dry-Season V Crayfish Bur Saturation Ve	Cracks (86) tems (810) Vater Table (C2) ows (C8) sible on Aenal Imagery (C9)
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PDROLC emarks: PDROLC etland Hyd imary India Surface V High Wat Saturatio Water Ma Sedimen Drift Dep Algal Mat Iron Depi Inundatio	DGY drology Indicato cators (minimum) Nater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) tor Crust (B4) osits (B5) n Visible on Aenal	of one is	(87)	Aquabic True Ao Hydroge (C3) Present (C6) Thin Mu	Fauna (B1 juatic Plan en Sulfide I d Rhizosph pe of Redu Iron Reduc ick Surface	ts (814) Odor (C1 heres pri) ced Iron (ction in Ti e (C7)	Jving Roots C4) Ied Soits	econdary Indical Surface Soil Drainage Pat Dry-Season V Crayfish Burn Saturation Ve Stunied of St X Geomorphic	Cracks (86) tems (810) Vater Table (C2) ows (C8) sible on Aerial Imagery (C8) ressed Plants (D1) Position (D2)
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WETI AND DETERMINATION DATA FORM - Midwoot Ro

Investigator(s): BPC (WDC #1125) Section, Township, Range: Sect. 13, T118N, R22 Landform (hillslope, terrace, etc.): Stope Local relief (concave, convex, none) Concave Soli Map Unit Name Glencoe NWI Classification: None None Are climatic/hydrologic conditions of the site typical for this time of the year? Y (if no, explain in remarks) Are vegetation soil or hydrology significantly disturbed? Are 'normal bicumstances' SUMMARY OF FINDINGS (if needed, explain any answers in rem Hydrophylic vegetation present? N Is the sampled area within a wetland N Hydrophylic vegetation present? Y Is the sampled area within a wetland N Indicator Wetland hydrology present? Y Is beolute Dominan Indicator Yes: optional wetland site ID: 1 Total americana 2 1 Total americana 2 3 3 30 FACU FACU Total Number of Dominant Species Intai are OBL; FACW, or FAC: 1 Total Number of Dominant Species 1 10a americana 30 Y FACU Prevalence Index Worksheet 1 30	Project/Site Four Seasons Mall		City/C	ounty:	Plymouth/He	nnepin 3	Sampling Date:	5/16/20	11
Landform (hillslope, terrace, etc.): Slope Local reliet (concave, convex, none); Concave Slope (%): 1 Lat Long Datum Soli Map Unit Name Glencoe VVV Classification: None Are elimatic/hydrologic conditions of the site typical for this time of the year? Y (if no, explain in remarks) Are vegetation soli or hydrology significantly disturbed? Are "normal birouristances" Are vegetation soli or hydrology naturally problematic? Are "normal birouristances" SUMMARY OF FINDINGS (If needed, explain any answers in ren Hydrophytic vegetation present? N Hydrophytic vegetation present? Y Is the sampled area within a wettany N Yes, optional wetland site ID:	Applicant/Owner: City of Plymouth			State:	MN	S	Sampling Point	2A-1 U	р.
Slope (%): 1 Lat. Long Datum Soil Map Unit Name Glencoe VWI Classification: None Vre deplation soil or hydrology significantly disturbed? Are "normal pround tances" present? Vre vegetation soil or hydrology naturally problematic? Are "normal pround tances" present? SUMMARY OF FINDINGS (If needed explain any answers in ren Hydrophytic vegetation present? N Hydrophytic vegetation present? Y Is the sampled area within a wetland. Wetland hydrology present? Y Is the sampled area within a wetland. Wetland hydrology present? Y Is the sampled area within a wetland. VEGETATION Use scientific names of plants. Dominant indicator Dominant Species Tree Stratum (Plot size: 30 Y FACU 1 Tilia americana 30 Y FACU 1 30 Y FACU Total Number of Dominant 1 30 Y FACU Total Number of Dominant 2 30 Y FACU FACW or FAC: 1 1 Tilia americana <td>nvestigator(s): BPC (WDC #1125)</td> <td></td> <td></td> <td>Sec</td> <td>tion, Townshi</td> <td>p, Range.</td> <td>Sec. 13,</td> <td>T118N, R22W</td> <td>1</td>	nvestigator(s): BPC (WDC #1125)			Sec	tion, Townshi	p, Range.	Sec. 13,	T118N, R22W	1
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In elimatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks) ine vegetation	Nope (%): 1 Lat.			Long		1	Datum		
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re vegetation	re vegetation soil	or hydrology		significant	ly disturbed?		Are "normal circu	mstances*	
UMMARY OF FINDINGS (If needed, explain any answers in ren Hydrophytic vegetation present? N Is the sampled area within a wetlank N Hydrophytic vegetation present? Y Is the sampled area within a wetlank N Wetland hydrology present? Y Is the sampled area within a wetlank N emarks: (Explain alternative procedures here or in a separate report.) If yes, optional wetland site ID Image: Cover of the size of	re vegetation , soil	, or hydrology					the record block	present?	/es
Hydric soil present? Y Is the sampled area within a wetland N Wetland hydrology present? Y i yes, optional wetland site ID: N ermarks: (Explain alternative procedures here or in a separate report.) Percent of Dominant Species N Tree Stratum (Plot size:30') Absolute Dominant Indicator Dominance Test Worksheet 1 Tile americana 30' FACU N 2 30' FACU Total Number of Dominant Species 3 30' FACU Total Number of Dominant Species 4 30' FACU 5 30' Fotal Cover 1 30' Fotal Cover 1			_			(If neede	explain any an	swers in rema	arks.)
Wetland hydrology present? Y if yes, optional wetland site ID emarks: (Explain alternative procedures here or in a separate report.) EGETATION Use scientific names of plants. Tree Stratum (Plot size:30') Absolute Dominant Indicator Staus Dominant Species 1 Tilia americana 30 Y FACU Number of Dominant Species 2 30 Y FACU Total Number of Dominant Species 1 3 30 Y FACU Total Number of Dominant Species 1 5 30 S Total Number of Dominant Species 1 2 3 30 S FACU Total Number of Dominant Species 1 5 30 S Total Cover Percent of Dominant Species 1 1 30 Total Cover Prevalence Index Worksheet 1 1 30 Total Cover Prevalence Index Worksheet 1 1 5 0 x1 = 0 0 FACW species 0 x1 = 0 1 0 = 0 = 0 FACU species 0 x1 = 0 <td>Hydrophytic vegetation present?</td> <td>N</td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td>	Hydrophytic vegetation present?	N				_			
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Emarks: (Explain alternative procedures here or in a separate report.) EGETATION Use scientific names of plants. Tree Stratum (Plot size. 30 Y FACU Dominant Number of Dominant Number of Dominant 1 Tillia americana 30 Y FACU Total Number of Dominant Species that are OBL, FACW, or FAC: 1 2 30 Y FACU Total Number of Dominant Species that are OBL, FACW, or FAC: 1 4 5 30 = Total Cover Percent of Dominant Species that are OBL, FACW or FAC: 50,00% 1 30 = Total Cover O Total Number of Dominant Species 50,00% 1 30 = Total Cover O Prevalence Index Worksheet 50,00% 2 3	Wetland hydrology present?	Y		í ves. c	potional wetlar	d site ID:	0.13		
2	Tree Stratum (Plot size, 3	Ab (0') %	cover		Staus	Number	of Dominant Spec	12 5	(A)
S 30 = Total Cover that are OBL, FACW, or FAC: 50,00% Sapling/Shrub stratum (Plot size: 15' 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2		_			Total I	Number of Domin	the	(B)
30 = Total Cover Sapling/Shrub stratum (Plot size: 15' 1 - - Total Cover 2 - - OBL species 0 x 1 = 0 3 - - - - OBL species 0 x 1 = 0 4 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -<	4			_					
Sapling/Shrub stratum (Plot size: 15' Prevalence Index Worksheet 1 Total % Cover of: Total % Cover of: OBL species 0 x 1 = 0 2	5			THE		that are C	BL, FACW, or FA	AC: 50.00%	_(A/B
0 = Total Cover UPL species 0 x 5 = 0 Herb stratum (Plot size: 5') Column totals 130 (A) 420	Sapling/Shrub stratum (Plot size: 1 2 3 45	15'				Total HE OBL spe FACW s FAC spe	Cover of: cies 0 a pecies 0 a cies 100 a	(1 = 0) (2 = 0) (3 = 300)	-
Herb stratum (Plot size 5') Column totals 130 (A) 420			0 -	Total Cour		0.000.000.000			-
	Herb stratum (Plot size	5'		TOTE OUV		1 C.			(B)
			100	Y	FAC	0.00			
2	2					1.000		-	-

100 = Total Cover

= Total Cover

0

Rapid test for hydrophytic vegetation

Morphogical adaptations' (provide

supporting data in Remarks or on a

Problematic hydrophytic vegetation*

"Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

N

Dominance test is >50%

Prevalence index is ≤3.0*

separate sheet)

(explain)

Hydrophytic vegetation

present?

(Plot size

15'

Remarks. (Include photo numbers here or on a separate sheet)

4 5

6

7

8

9

10

Woody vine stratum

ofile Des	cription: (Descri	ibe to th	e depth needed	to docu	iment the	e indicati	or or contirm t		of indicators.)
Depth	Matrix	14 14 14 14 14 14 14 14 14 14 14 14 14 1		dox Feat				1	
(Inches)	Color (moist)	36.	Color (moist)	96	Type*	Loc**	Textur	e .	Remarks
0-8	10YR 3/2	100			T		Loam		
8-14	10YR 5/2	95	10YR 3/4	5	C	M	Løam		
0.14	10711202	55	10/11/24	~	~				
				-	-				
				-	-				
	1			-					
-		1							
				-					
vpe: C = 0	Concentration, D =	Depleh	on, RM = Reduc	ed Matrix	. MS = M	lasked Sa	and Grains.	"Location: F	PL = Pore Lining, M = Matrix
	il Indicators:							for Problem	atic Hydric Soils:
His	tisol (A1)		Sa	ndy Gley	ed Matrix	(S4)	Coast	Prairie Redo	(A16) (LRR K, L, R)
list	tic Epipedon (A2)		Sa	dy Redo	ox (S5)		Dark S	Surface (S7) (LRR K, L)
Bla	ck Histic (A3)		Str	pped Ma	atrix (S6)		5 cm M	Aucky Peat or	Peat (S3) (LRR K, L, R)
Hyd	irogen Sulfide (A4	(2	Loa	errry Muc	ky Minera	al (F1)	Iron-M	langanése Ma	asses (F12) (LRR K, L, R)
Stra	atified Layers (A5)		Loa	arny Gley	ed Matrix	r (F2)	Very S	hallow Dark :	Surface (TF12)
	n Muck (A10)				atrix (F3)		Other	explain in rei	TIB/KS)
	pleted Below Dark				Surface				
	ck Dark Surface (/				ark Surfac				hytic vegetation and weltand
	dy Mucky Mineral			sox Depr	ressions (F8)	hydrolo		resent, unless disturbed or
5 m	n Mucky Peat or F	Peat (S3	1					pr	oblematic
estrictive	Layer (if observe	ed):							
/pe:							Hydric S	oil present?	Y
							rigance of	on presents	
and the second	es):						injuic s	on present?	
marks:							injune s	on present?	
emarks: YDROLO	DGY	rs:					injune s	on present?	
	DGY drology Indicato		required check	ali Ihat a					tors (minimum of two requir
YDROLO	DGY drology Indicato cators (minimum e		required: check			13)		ondary Indica	tors (minimum of two requir Cracks (86)
emarks: YDROLO letland Hy rimary India Surface 1	DGY drology Indicato cators (minimum (Water (A1)		required_check	Aquatic	Fauna (B1			ondary Indica	Cracks (B6)
YDROLO etland Hy imary India Surface 1 C High Wa	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2)		required; check	Aquatic True Aq		ts (B14)	Sec	ondary Indica Surface Soil Drainage Pa	Cracks (B6)
YDROLO VDROLO International Surface 1 C High Wa C Saturatio	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2)		required check	Aquatic True Aqu Hydroge	Fauna (B1 uatic Plan n Sulfide I	ts (B14) Odor (C1)	Sec	ondary Indica Surface Soil Drainage Pa Dry-Season Crayfish Bur	Cracks (86) attems (810) Water Table (C2) rows (C8)
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YDROLC etland Hy imary India Surface I High Wa Saturatio Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatic Sparsely	DGY drology Indicato cators (minimum o Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5)	Imagery e Surface	(B7)	Aquatic 1 True Aqu Hydroge Oxidized (C3) Present 1 (C6) Thin Mu Gauge o	Fauna (B1 uatic Plan n Sulfide I 1 Rhizosph e of Redu roh Reduc ck Surtace r Welt Dal	ts (B14) Odor (C1) neres on L ced Iron (I ction in Till e (C7) ta (D9)	Sec 	ondary Indica Surface Soil Drainage Pa Dry-Season Crayfish Bur Saturation V Stunted or S Geomorphic	Cracks (86) Littems (810) Water Table (C2) tows (C8) Isible on Aerial Imagery (C9) tressed Plants (D1) Position (D2)
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Project/Site Four Seasons Mall	City/	County: F	Plymouth/He	nnepin Sampling Date	5/16/2011
Applicant/Owner. City of Plymouth		State:	MN	Sampling Poin	t: 3-1 Wet
investigator(s): BPC (WDC #1125)		Section	ion, Townshi	p, Range: Sec. 1	3, T118N, R22W
Landform (hillslope, terrace, etc.): B	lasin	Local)	relief (concav	ve, convex, rione):	Concave
Slope (%): 1 Lat		Long:		Datum:	
Soil Map Unit Name Glencoe			WWI	Classification	None
Are climatic/hydrologic conditions of the site typical	for this time o	f the year?	Y (f no, explain in remarks)	
Are vegetation soil or hyd	rology	significantly	y disturbed?	Are "normal ci	no imstances*
Are vegetation , soil , or hyd	rology	naturally pr	oblematic?		present? Yes
SUMMARY OF FINDINGS				(If needed, explain any	answers in remarks.)
Hydrophytic vegetation present7 Y					
Hydric soil present? Ý		Is the s	ampled are	a within a wetland	Y
Wetland hydrology present? Y		I yes, or	ptional wetlar	nd site ID:	
Remarks: (Explain alternative procedures here or in		aport.)			
VEGETATION Use scientific names of pl	ants.				
Tree Stellar (Distance 20)	Absolute	Dominan	Indicator	Dominance Test Wor	
Tree Stratum (Plot size)	a Cover	t Species	Staus	Number of Dominant Sp that are OBL, FACW, or	
2				Total Number of Don	
3		_		Species Across all 5	7.2.2
4				Percent of Dominant St	pecies
5	_		1	that are OBL, FACW, or	FAC: 100.00% (A/B)
and the second	0	= Total Cove	¢.	1000 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 -	
Sapling/Shrub stratum (Plot size: 15	1			Prevalence Index Wo	orksheet
1				Total % Cover of.	1.4
3				OBL species 40 FACW species 50	x = 40 x = 100
4				FAC species 0	x3= 0.
5				FACU species 10	x 4 = 40
	p	= Total Cove	r I	UPL species 0	x5= 0
Herb stratum (Plot size: 5))			Column totals 100	(A) 180 (B)
1 Phalaris arundinacea	30	Y	FACW	Prevalence Index = B/	A = 1.80
2 Carex stricta	40	Y.	OBL		
3 Solidago gigantea	20	Y	FACW	Hydrophytic Vegetat	
4 Cirsium arvense	10	N	FACU		rophytic vegetation
5				X Dominance test is X Prevalence index	
7					
8				Morphogical adap supporting data in	
9			200	separate sheet)	Contracting on part of
10				Problematic hydro	phytic vegetation*
AND THE REAL PROPERTY AND THE REAL	100	= Total Cove	F	(explain)	
Woody vine stratum (Plot size: 15"	_1				nd welland hydrology must be sturbed or problematic
				Hydrophytic	
2				1000000000000	
2	0	= Total Cove	5	vegetation present?	÷

SOIL						_			ig Point: 3-1 We
rofile Desi		ibe to th				e indicati	or or confirm	the absence of it	ndicators.)
Depth	Matrix			dox Feat		1.1			-
(Inches)	Color (maist)	34	Color (moist)	8	Type*	Loc**	Textu	re .	Rémarks
0-20	10YR-2/1	100		-	1		Loam		
20-26	10YR 5/2	95	10YR 3/4	5	C	M	Clay loam		
						1.1.1			
					1.000		Print and a second s		
		-	-	-					
				+					
		-		-	-				
	Concentration, D :	Deeler			115 14	and and Ch	and Cambrid	tti padingi Gi a	Pore Lining, M = Matri
	il Indicators:	= Debieù	on, HW = Healics	ed Matro	C, MS ≈ M	askel 3a		s for Problematic	
	isol (A1)		Sa	ndy Glav	ed Matrix	1541			16) (LRR K, L, R)
the second se	ic Epipedori (A2)			ndy Redo		l'real.		Surface (S7) (LRI	
	k Histic (A3)				trox (S6)				at (S3) (LBR K, L, R)
	rogen Sulfide (A-	SV.		A. S. Y. Y. Y. Y. Y. Y.	ky Minerá	# (F1)			5 (F12) (LRR K, L, R)
	tified Layers (A.5)				ed Matrix			Shallow Dark Surf	
	n Muck (A10)				atrix (F3)	11		(explain in remar	
	leted Below Dark	Surface			Surface	(F6)			
	k Dark Surface (ark Surtac		*Indical	tors of hydrophyte	vegetation and weltan
San	dy Mucky Minera	(S1)	Rei	dox Depr	essions (F8)			ent, unless disturbed or
5 cm	Mucky Peat or	Peat (S3)						proble	matic
estrictive	Layer (if observe	ed):			1				
	and all for an and the								~
voe:					_		Hydric s	oil present?	
ype:)epth (inche (emarks:	s):						Hydric s	oil present?	
lepth (inche (emarks:							Hydric s	oil present?	
epth (inche emarks:	DGY						Hydric s	oil present?	
epth (inche emarks: IYDROLO Vetland Hyd	DGY drology Indicato								
epth (inche emarks: IYDROLO Vetland Hydrimary India	DGY drology Indicato ators (minimum		required; check					ondary Indicators	
epth (inche emarks: IYDROLO Vetland Hyd /rimary India Surface \	DGY drology Indicato sators (minimum Water (A1)		required; check (Aquatic	Fauna (B1			ondary Indicators Surface Soil Cra	icks (B6)
Vepth (inche lemarks: IYDROLO Vetland Hyd Inimary India Surface \ X High Wal	DGY drology Indicato sators (minimum Nater (A1) ser Table (A2)		required; check (Aquatic True Aqu	Fauna (81 uatic Plant	(B14)	Sec	ondary Indicators	icks (86) ns (810)
epth (inche emarks: IYDROLO Vetland Hyd /rimary India Surface \	DGY drology Indicato sators (minimum Nater (A1) ser Table (A2) n (A3)		required; check	Aquatic True Aqu Hydroge	Fauna (B1 uatic Plant n Sulfide (ts (B14) Odor (C1)	Sec	ondary Indicators Surface Soil Cra Dramage Patter	icks (B6) ns (B10) ter Table (C2)
Vepth (inche temarks: IYDROLO Vetland Hyd Animary India Surface V X High Wat X Saturatio Water Ma	DGY drology Indicato sators (minimum Nater (A1) ser Table (A2) n (A3)		required; check	Aquatic True Aqu Hydroge	Fauna (B1 uatic Plant n Sulfide (ts (B14) Odor (C1)	Sec	ondary Indicators Surface Soil Cra Dramage Patter Dry Season Wa Crayfish Burrow Saturation Visib	icks (86) ns (810) ter Table (C2) s (C8) le on Aenal Imagery (C9)
Vepth (inche (emarks: AYDROLC Vetland Hyd Surface V X High Wat X Saturatio Water Ma Sedimen	DGY drology Indicato sators (minimum Nater (A1) ser Table (A2) n (A3) arks (B1)		required; check	Aquatic True Aqu Hydroge Oxidized (C3) Presence	Fauna (B1 uatic Plant n Sulfide (I Rhizosph e of Redu	ts (B14) Odor (C1) beres on L ced fron (i	Sec 	ondary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Sturated or Stres	icks (86) ns (810) ter Table (C2) s (C8) le on Aerial Imagery (C9) sed Plants (D1)
Vepth (inche (emarks: APDROLC Vetland Hyd Surface V X High Wat X Saturatio Water Ma Sedimen Drift Dep Algal Mal	DGY drology Indicato sators (minimilim Water (A1) ter Table (A2) m (A3) arks (B1) t Deposits (B2) osits (B3) for Crust (B4)		required; check	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I	Fauna (B1 uatic Plant n Sulfide (I Rhizosph	ts (B14) Odor (C1) beres on L ced fron (i	Sec 	ondary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Pos	icks (86) ns (810) ter Table (C2) s (C8) le on Aerial Imagery (C9) sed Plants (D1) sition (D2)
Vepth (inche (emarks: APPROLO Vetland Hyd Surface V X High Wat Saturatio Water Ma Sedimen Drift Dep Algal Mal Iron Dept	DGY drology Indicato sators (minimilim Water (A1) ter Table (A2) m (A3) arks (B1) t Deposits (B2) osits (B3) (or Crust (B4) osits (B5)	of one is		Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6)	Fauna (B1 uatic Plant n Sulfide (I Rhizosph e of Redu ron Reduc	ts (B14) Odor (C1) neres on L ced fron (ction in Til	Sec 	ondary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Sturated or Stres	icks (86) ns (810) ter Table (C2) s (C8) le on Aerial Imagery (C9) sed Plants (D1) sition (D2)
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Vepth (inche Remarks: IYDROLC Vetland Hyd Surface V X High Wal X Saturatio Water Ma Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely	DGY drology Indicato rators (minimum) Water (A1) ter Table (A2) m (A3) arks (B1) t Deposts (B2) osits (B3) (or Crust (B4) osits (B5) n Visible on Aerial Vegetated Conce	imagery ve Surface	(87)	Aquatic True Aqu Hydroge Oxidized (C3) Presenc (C6) Thin Mut Gauge o	Fauna (B1 uatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ck Surface ir Well Dat	ts (B14) Odor (C1) beres on L ced fron (i ction in Til s (C7) ta (D9)	Sec 	ondary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Pos	icks (86) ns (810) ter Table (C2) s (C8) le on Aerial Imagery (C9) sed Plants (D1) sition (D2)
Vepth (inche Remarks: APPROLO Vetland Hyd Yrimary Indio Surface V X High Wai X Saturatio Water Ma Sedimen Drift Dep Algal Mai Iron Depu Inundatio Sparsely Water-St	DGY drology Indicato ators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposts (B2) osits (B3) (or Crust (B4) osits (B5) n Visible on Aeria Vegetated Conca- ained Leaves (B9)	imagery ve Surface	(87)	Aquatic True Aqu Hydroge Oxidized (C3) Presenc (C6) Thin Mut Gauge o	Pauna (B1 In Sulfide (I Rhizosph e of Reduc ron Reduc	ts (B14) Odor (C1) beres on L ced fron (i ction in Til s (C7) ta (D9)	Sec 	ondary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Pos	icks (86) ns (810) ter Table (C2) s (C8) le on Aerial Imagery (C9) sed Plants (D1) sition (D2)
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Vepth (inche lemarks: IYDROLO Vetland Hyd rimary Indio Surface V X High Wat Sedimen Drift Dep Algal Mai Iron Depu Inundatio Sparsely Water-St ield Observ urface wate	DGY drology Indicato ators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B3) t or Crust (B4) osits (B5) n Visible on Aerial Vegetated Conca- ained Leaves (B9) vations: r present?	Imagery ve Surface Yes	(87) = (88)	Aquatic True Aqu Hydroge Oxidized (C3) Presenc (C6) Thin Mut Gauge o	Fauna (B1 uatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ch Surface r Well Dat xplain in F	ts (B14) Odor (C1) beres on L ced fron (i ction in Til ction in Til ction in Til ction in Til ction in Til ction in Til ction (C7) ta (D9) Remarks)	Sec Aring Roats C4) Led Soils	ondary Indicators Surface Soil Cra Drainage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Pat FAC-Neutral Ter Wetland	icks (B6) hs (B10) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)
Vepth (inche lemarks: IYDROLO Vetland Hyd rimary Indio Surface V X High Wat Sedimen Drift Dep Algal Mai Iron Depu Inundatio Sparsely Water-St ield Observ urface water later table p	DGY drology Indicato ators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B3) or Crust (B4) osits (B5) n Visible on Aerial Vegetated Conca- ained Leaves (B9) vations: r present?	of one is Imagery ve Surface Yes Yes	(87) = (88) X No	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thin Mut Gauge o Other IE	Fauna (B1 uatic Plant in Sulfide (I Rhizosph e of Reduc ron Reduc ck Surface r Well Dat xplain in F Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron (i ction in Til ction (C7) ta (D9) Remarks) hothes):	Aving Roats C4) Led Soils	ondary Indicators Surface Soil Cra Draimage Patter Dry-Season Wa Crajyfish Burrow Saturation Visib Stunted or Stres Geomorphic Pos FAC-Neutral Te Wetland hydrology	icks (B6) hs (B10) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)
Vepth (inche lemarks: IYDROLO Vetland Hyd rimary Indio Surface V X High Wai Sedimen Drift Dep Algal Mai Iron Depu Inundatio Sparsely Water St ield Observ urface water Jater table (aturation pr	DGY drology Indicato ators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) for Crus((B4) osits (B5) n Visible on Aeria Vegetated Conca ained Leaves (B9) vations: n present? esent?	Imagery ve Surface Yes	(87) = (88)	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thin Mut Gauge o Other IE	Fauna (B1 uatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ch Surface r Well Dat xplain in F	ts (B14) Odor (C1) heres on L ced fron (i ction in Til ction (C7) ta (D9) Remarks) hothes):	Sec Aring Roats C4) Led Soils	ondary Indicators Surface Soil Cra Drainage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Pat FAC-Neutral Ter Wetland	icks (B6) hs (B10) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)
Vepth (inche ternarks: TYDROLO Vetland Hyd rimary India Surface V X High Wal X Saturatio Water Ma Sedimen Drift Dep Algal Mal Iron Depu Inundatio Sparsely Water St vater table p aturation pr ncludes cap	DGY drology Indicato sators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) (or Crus((B4) osits (B5) n Visible on Aerial Vegetated Conca- ained Leaves (B9) vations: r present? esent? esent? iillary fininge)	Imagery ve Surface Yes Yes Yes	(87) e (88) X. No X. No	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Muc Gauge o Other (E X	Fauna (B1 vatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ron Redui ron Redui ron Redui r Well Dat xplain in P Depth (in Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron (i ction in Til s (C7) ta (D9) Remarks) hothes): hothes):	Sec wing Roots C4) led Solis X X B D	Condary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Poi FAC-Neutral Te Wettand hydrology present?	icks (B6) hs (B10) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)
Vepth (inche ternarks: TYDROLO Vetland Hyd rimary India Surface V X High Wal X Saturatio Water Ma Sedimen Drift Dep Algal Mal Iron Depu Inundatio Sparsely Water St vater table p aturation pr ncludes cap	DGY drology Indicato ators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) for Crus((B4) osits (B5) n Visible on Aeria Vegetated Conca ained Leaves (B9) vations: n present? esent?	Imagery ve Surface Yes Yes Yes	(87) e (88) X. No X. No	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Muc Gauge o Other (E X	Fauna (B1 vatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ron Redui ron Redui ron Redui r Well Dat xplain in P Depth (in Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron (i ction in Til s (C7) ta (D9) Remarks) hothes): hothes):	Sec wing Roots C4) led Solis X X B D	Condary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Poi FAC-Neutral Te Wetland hydrology present?	icks (B6) hs (B10) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)
Vepth (inche ternarks: TYDROLO Vetland Hyd rimary India Surface V X High Wal X Saturatio Water Ma Sedimen Drift Dep Algal Mal Iron Depu Inundatio Sparsely Water St vater table p aturation pr ncludes cap	DGY drology Indicato sators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) (or Crus((B4) osits (B5) n Visible on Aerial Vegetated Conca- ained Leaves (B9) vations: r present? esent? esent? iillary fininge)	Imagery ve Surface Yes Yes Yes	(87) e (88) X. No X. No	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Muc Gauge o Other (E X	Fauna (B1 vatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ron Redui ron Redui ron Redui r Well Dat xplain in P Depth (in Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron (i ction in Til s (C7) ta (D9) Remarks) hothes): hothes):	Sec wing Roots C4) led Solis X X B D	Condary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Poi FAC-Neutral Te Wetland hydrology present?	ns (B10) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)
Vepth (inche ternarks: TYDROLO Vetland Hyd rimary India Surface V X High Wal X Saturatio Water Ma Sedimen Drift Dep Algal Mal Iron Depu Inundatio Sparsely Water St vater table p aturation pr ncludes cap	DGY drology Indicato sators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) (or Crus((B4) osits (B5) n Visible on Aerial Vegetated Conca- ained Leaves (B9) vations: r present? esent? esent? iillary fininge)	Imagery ve Surface Yes Yes Yes	(87) e (88) X. No X. No	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Muc Gauge o Other (E X	Fauna (B1 vatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ron Redui ron Redui ron Redui r Well Dat xplain in P Depth (in Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron (i ction in Til s (C7) ta (D9) Remarks) hothes): hothes):	Sec wing Roots C4) led Solis X X B D	Condary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Poi FAC-Neutral Te Wetland hydrology present?	icks (86) ns (810) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)
Vepth (inche ternarks: TYDROLO Vetland Hyd Surface V X High Wal Sedimen Drift Dep Algal Mal Iron Depu Inundatio Sparsely Water St Veter table p aturation pr ncludes cap escribe rec	DGY drology Indicato sators (minimum Vater (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) (or Crus((B4) osits (B5) n Visible on Aerial Vegetated Conca- ained Leaves (B9) vations: r present? esent? esent? iillary fininge)	Imagery ve Surface Yes Yes Yes	(87) e (88) X. No X. No	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Muc Gauge o Other (E X	Fauna (B1 vatic Plant in Sulfide (I Rhizosph e of Redui ron Redui ron Redui ron Redui ron Redui r Well Dat xplain in P Depth (in Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced fron (i ction in Til s (C7) ta (D9) Remarks) hothes): hothes):	Sec wing Roots C4) led Solis X X B D	Condary Indicators Surface Soil Cra Dramage Patter Dry-Season Wa Crayfish Burrow Saturation Visib Stunted or Stres Geomorphic Poi FAC-Neutral Te Wetland hydrology present?	icks (B6) hs (B10) ter Table (C2) s (C8) e on Aenal Imagery (C9) sed Plants (D1) sition (D2) sition (D2)

1.8

Project/Site Four Seasons Mall	AND DEIL		County F	Plymouth/He		Sampling Date	5/16/2011
Applicant/Owner: City of Plymouth			State:	MA		Sampling Point	3-1 Up
investigator(s): BPC (WDC #1125)						Sec. 13	
Landform (hillslope, terrace, etc.):	Sic	ope		eliet (concar			Concave
Slope (%): 1 Lab			Long	and the states		Datum	
Soil Map Unit Name Angus				WW	Classificat	ion:	None
Are climatic/hydrologic conditions of the s	site typical fo	or this time o	the year?				
Are vegetation , soil	, or hydro			disturbed?		Are "normal circ	moltane at
Are vegetation , soil	, or hydro		the second se	oblematic?		Are normal circ	present? Yes
SUMMARY OF FINDINGS			5 - 447 V. 19		(It need	ed, explain any a	answers in remarks.)
Hydrophytic vegetation present?	N			-			
Hydric soil present?	N		is the s	ampled are	a within a	wetlani	4
Wetland hydrology present?	Y		t yes, op	tional wetla	nd site ID;		
Remarks: (Explain alternative procedures VEGETATION Use scientific nar			aport.)				
		Absolute	Dominan	Indicator	Domina	ance Test Work	sheet
Tree Stratum (Plot size: 30	7)	% Cover	1 Species	Staus	Number	of Dominant Spe	cies
t	-			_	that are	OBL, FACW, or F	AC: 1 (A)
2						Number of Domi	Contraction of the second se
3						cies Across all St	
4	_					of Dominant Spe	
°		0	= Total Cove		inal are	UBL FALW, OF	AC: 50.00% (A/B)
Sapling/Shrub straturr (Plot size	15)	- Iola Ovic		Prevale	nce Index Worl	sheet
1	-				10.17.23	Cover of:	
2					OBL sp	ecies 0	x 1 = 0
3					FACW	species 0	¥.2 = 0
4				1 - F 4	FAC sp		x 3 =210
5					FACU s		x 4 = 120
Unit status (Distained	~		= Total Cove	r	UPL sp		x 5 = 0
Herb stratum (Plot size:	5	1		3.20			(A) <u>330</u> (B)
1 Cirsium arvense		20	- Y	FACU	Prevale	nce Index = B/A	= 3.30
2 Taraxacum officinale 3 Poa pratensis		70	-N-	FACU	Hudron	butin Vonstatio	n Indiantese
4	_			- PAG		hytic Vegetatio	phytic vegetation
5						ninance test is >	
6			_			valence index is	
7					-	phogical adapta	
8		_			sup		lemarks or on a
10					Pro	blematic hydrop	hytic vegetation*
		100	= Total Cove	r	(eq	olain)	
Woody vine stratum (Plot size:1	15	2			1	present, unitess riest	wetland hydrology must be abed or problematic
2		1000				drophytic	
		0	= Total Cove	r		sent?	N
	r on a sepa				- Pie	auto:	-

SOIL

Sampling Point: 3-1 Up

Depth (Inches) 0-20							or or confirm I		
	Matrix	1.0		lox Fea		1			Description
0-20	Color (moist)	56	Color (moist)	14	Type"	Loc"	Textu	10	Fiemarks
2 20	10YH 2/1	100			-		Loam		
20-28	10YFI 3/2	100		-	-		Clay Loam		
		1							
						-			
					-				
					-				
						-			
Type C = Cr	oncentration. D =	Depleti	on, RM = Reduce	d Matro	MS = M	lasked Sa	and Grains	**Location PL =	Pore Lining, M = Matrix
	I Indicators:							for Problematic	
	sol (A1)		San	dy Gley	ed Matrix	(54)	Coast	Prairie Rediox (A1	(LRR K. L. R)
	c Epipedon (A2)			dy Red		12-10		Surface (S7) (LRR	
	Histic (A3)				atrox (S6)				at (\$3) (LRR K, L, R)
	ogen Sulfide (A4	0.1			ky Minera	al (E1)			s (F12) (LRR K, L, R)
	ified Layers (A5)				ed Matrix			hallow Dark Surfa	
	Muck (A10)				atrix (F3)			explain in remark	
	eted Below Dark	Surtana			Surface			(middlenen) (() (201) mill	
	Dark Surface (/				ark Surtae		Indicat	are of hudenabutin	vegetation and welland
	ty Mucky Mineral				essions (ent, unless disturbed or
	Mucky Peat of P			on Depi	pacinie (Tryanon	proble	
								P date	10801
	ayer (if observe	:d):			100.00			1	
Туре				-	-		Hydric s	oil present?	N
Depth (inches	5)								
HYDROLO	GY								
	GY rology Indicato	rs:		_			_		
Wetland Hyd	rology Indicato		required: check a	li that a	poly)		Sed	ondary Indicators	(mmimum of two require
Wetland Hyd Pnmary Indica	ators (minimum a		required; check a			13)	Sec	and the second se	
Wetland Hyd Pnmary Indica Surface W	ators (minimum c later (A1)			Aquatic	Fauna (B)		<u>Sec</u>	Surface Snil Cra	cks (B6)
Wetland Hyd Pnmary Indica Surface W High Wate	rology Indicato ators (minimum c later (A1) er Table (A2)			Aquatic True Aq	Fauria (B) uatic Plan	ts (B14)	- 12	Surface Snil Cra Drainage Pattern	cks (86) is (810)
Wetland Hyd Pnmary Indica Surface W	rology Indicato ators (minimum o later (A11 er Table (A2) r (A3)		Ξ	Aquatic True Aq Hydroge	Fauna (B) uatic Plan n Sulfide (ts (B14) Odor (C1)	=	Surface Snil Cra	cks (86) is (810) er Table (C2)
Wetland Hyd Pnmary Indica Surface W High Wate X Saturation Water Mar	rology Indicato ators (minimum o later (A11 er Table (A2) r (A3)		Ξ	Aquatic True Aq Hydroge	Fauna (B) uatic Plan n Sulfide (ts (B14) Odor (C1)	- 12	Surface Snil Crai Drainage Pattern Dry Season Wat Crayfish Burrows	cks (86) is (810) er Table (C2)
Wetland Hyd Pnmary Indica Surface W High Wate X Saturation Water Mar	rology Indicato ators (minimum c later (A11 er Table (A2) t (A3) rks (B1) Deposits (B2)		H	Aquatic True Aq Hydroge Oxidized (C3)	Fauna (B) uatic Plan n Sulfide (ts (B14) Odor (C1) heres on L	iving Roots	Surface Snil Crai Drainage Pattern Dry Season Wat Crayfish Burrows	cks (B6) is (B10) er Table (C2) s (C8) e on Aerial Imagery (C9)
Wetland Hyd Primary Indica Surface W High Wate X Saturation Water Mar Sediment Drift Depo	rology Indicato ators (minimum c later (A11 er Table (A2) t (A3) rks (B1) Deposits (B2)		H	Aquatic True Aq Hydroge Oxidized (C3) Presenc	Fauria (B) uatic Plan n Sulfide I I Rhizosph	ts (B14) Odor (C1) heres on L ced Iron (iving Roots	Surface Soil Crai Drainage Pattern Dry Season Wat Crayfish Burrows Saturation Visible	cks (B6) is (B10) er Table (C2) i (C8) e on Aenal Imagery (C9) sed Plants (D1)
Wetland Hyd Primary Indica Surface W High Wate X Saturation Water Mar Sediment Drift Depo	rology Indicato alors (minimum c later (A11 er Table (A2) r(A3) rks (B1) Deposits (B2) sits (B3) or Crust (B4)		H	Aquatic True Aq Hydroge Oxidized (C3) Presenc	Fauria (B) uatic Plan n Sulfide (I Rhizosph e of Redu	ts (B14) Odor (C1) heres on L ced Iron (iving Roots	Surface Soil Crai Drainage Pattern Dry Season Wat Crayfish Burrows Saturation Visible Stunted or Stress	cks (86) is (810) er Table (C2) i (C8) s on Aerial Imagery (C9) sed Plants (D1) illion (D2)
Wetland Hyd Primary Indica Surface W High Wate X Saturation Water Mar Sediment Drift Depo Algal Mat o Iron Depos	rology Indicato alors (minimum c later (A11 er Table (A2) r(A3) rks (B1) Deposits (B2) sits (B3) or Crust (B4)	ot one is		Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6)	Fauria (B) uatic Plan n Sulfide (I Rhizosph e of Redu	ts (B14) Odor (C1) heres on L ced Iron (cbon in Til	iving Roots	Surface Soil Crail Drainage Pattern Dry-Season Wat Crayfish Burrows Saturation Visible Stunted or Stress Geomorphic Pos	cks (B6) is (B10) er Table (C2) i (C8) s on Aerial Imagery (C9) sed Plants (D1) illion (D2)
Wetland Hydi Primary Indica Surface W High Wate X Saturation Water Mar Sediment Drift Depor Algal Mat Iron Depos Inundation	rology Indicato ators (minimum c later (A1) er Table (A2) r (A3) rks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5)	imagery	(87)	Aquatic True Aqu Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Mu	Fauna (B) uatic Plan In Sulfide I I Rhizosph e of Redu ton Reduc	ts (B14) Odor (C1) heres on L ced Iron (cbon in Til e (C7)	iving Roots	Surface Soil Crail Drainage Pattern Dry-Season Wat Crayfish Burrows Saturation Visible Stunted or Stress Geomorphic Pos	cks (86) is (810) er Table (C2) i (C8) s on Aerial Imagery (C9) sed Plants (D1) illion (D2)
Wetland Hyd Primary Indica Surface W High Wate X Saturation Water Mar Sediment Drift Depor Algal Mat Iron Depos Inundation Sparsely V	rology Indicato ators (minimum c later (A1) er Table (A2) (A3) rks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) i Visible on Aerial	imagery e Surfac	(87) e (68)	Aquatic True Aq Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Mu Gauge o	Fauna (81 uatic Plan In Sulfide I I Rhizosph I Rhizosph I Rhizosph I Rhizosph I Reduc Ion Reduc	ts (B14) Odor (C1) heres on L ced Iron (cbon in Tri s (C7) ta (D9)	iving Roots	Surface Soil Crail Drainage Pattern Dry-Season Wat Crayfish Burrows Saturation Visible Stunted or Stress Geomorphic Pos	cks (86) is (810) er Table (C2) i (C8) s on Aerial Imagery (C9) sed Plants (D1) illion (D2)
Wetland Hyd Primary Indica Surface W High Wate X Saturation Water Mar Sediment Drift Depor Algal Mat Iron Depos Inundation Sparsely V	rology Indicato ators (minimum) /ater (A1) er Table (A2) r(A3) rks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) i Visible on Aerial /egetated Concav ined Leaves (B9)	imagery e Surfac	(87) e (68)	Aquatic True Aq Hydroge Oxidized (C3) Presenc Recent I (C6) Thim Mu Gauge o	Fauna (B) uatic Plani n Sulfide I I Rhizosph e of Redu ton Reduc ton Reduc ck Surface r Well Dal	ts (B14) Odor (C1) heres on L ced Iron (cbon in Tri s (C7) ta (D9)	iving Roots	Surface Soil Crail Drainage Pattern Dry-Season Wat Crayfish Burrows Saturation Visible Stunted or Stress Geomorphic Pos	cks (86) is (810) er Table (C2) i (C8) s on Aerial Imagery (C9) sed Plants (D1) illion (D2)
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Project/Site Four S	easons Mall		City/County:	Plymouth/H	lennepin	Sampling I	Date	5/19/20	311
Applicant/Owner	City of Plymouth		St	ate N	1N	Sampling P	point:	4-1 W	et
westigator(s) BP	PC (WDC #1125)			Section, Towns	hip, Range	Se	c. 13, T118M	V, R22	N
andform (hillislope	e, terrace, etc.):	Basin	L	ocal reliet (conc	ave, conve	x none)	Cor	icave	
ilope (%): 1	Lat		Long			Datum.			
oil Map Unit Nam	e Klossner			-VW	() Classifica	stion:	PEM	IC	
re climatic/hydrolo	ogic conditions of th	e site typical for the	s time of the ye	ar? Y	(If no, expl	ain in rema	rks)		
	, soil						al circumstar	ices"	
re vegetation	, soil	, or hydrology	natura	ally problematic?				sent?	Yes
SUMMARY OF	FINDINGS			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(If neer	ded, explain	any answers	s in ren	narks,
Hydrophytic ve	getation present?	Y				-			
Hydric soil pres	sent?	Y	Is	the sampled a	rea within a	a wetlani	Y		
Wetland hydrol	logy present?	Y	1 V	es, optional wet	and site ID				
	alternative procedu Use scientific r			_					
		Al	bsolute Domi	nan Indicator	Domin	ance Test	Worksheet	_	_
Tree Stratum		30') %	Cover 1 Spec			r of Dominar			
1 Fraxinus pen	insylvanica		30 Y	FACW	that are	OBL, FACM	V, or FAC:	4	(ð
2				_		al Number of	o e in renne		
3					- 1. Control 1.		all Strata:	-4	(B
4					Percen	it of Cominar	t Species		

3			-	Species Across all Strata: 4 (B)
4				Percent of Dominant Species
5				that are OBL, FACW, or FAC: 100.00% (A/B)
the second s	30	= Total Cover		
Sapling/Shrub straturr (Plot size: 15')	0			Prevalence Index Worksheet
1	<u></u>			Total % Cover of:
2	000			OBL species 40 x 1 = 40
3	1			FACW species 40 x 2 = - 80
4				FAC species 0 x 3 = 0
5				FACU species 0 x 4 = 0
A CONTRACT OF A	0	= Total Cover	5.000	UPL species 0 x 5 = 0
Herb stratum (Plot size: 5')	(-		Column totals BQ (A) 120 (B)
1 Phalaris arundinacea	10	Y	FACW	Prevalence Index = B/A = 1.50
2 Typha angustifolia	30	Y	OBL	
3 Carex hystericina	10	Y	OBL	Hydrophytic Vegetation Indicators:
4				Rapid test for hydrophytic vegetation
5	-			X Dominarice test is >50%
6				X Prevalence index is ≤3.0*
7				Morphogical adaptations* (provide
8	_	_		supporting data in Remarks or on a
9	_			separate sheet)
0	-		_	Problematic hydrophytic vegetation*
	50	= Total Cover	-	(explain)
Woody vine stratum (Plot size, 15')	("Indicators of hydric soil and welland hydrology must t
1				present, unless disturbed or problematic
2	-			Hydrophytic
	0	= Total Cover		vegetation
				present? Y

Sampling Point:

4-1 Wei

Depth	Matrix			Redbix Fe	atures	1000			and the second sec
(inches)	Color (maist)	36	Color (mois		Type*	Loc**	Te	sture	Remarks
0-8	N 2:5/0	100		1	1	1	Sepric (0	241	
				-	1				
		-		+	+	-			
					-	-			
				_					1
				-	+				
_		-		-	-				
		1					1		
Type: C = C	Concentration, D =	= Depleti	on RM = Red	uced Matr	tx, MS = N	lasked Sa			n: PL = Pore Lining, M = Mab
Hydric So	il Indicators:								lematic Hydric Soils:
His	tisol (A1)				yed Matrix	(\$4)			dox (A16) (LRR K, L, R)
X His	tic Epipedon (A2)			Sandy Rei					7) (LRR K, L)
Bla	ck Histic (A3)			Stripped N	latrix (S6)		5.0	m Mucky Pea	t or Peat (S3) (LRR K, L, R)
Hyd	Irogen Sulfide (A4	()		camy Mu	cky Minera	al (F1)	Irc	n-Manganese	Masses (F12) (LRR K, L, R)
	atified Layers (A5)			camy Gle	eyed Matrix	(F2)	Ve	ry Shallow Da	rk Surface (TF12)
	n Muck (A10)		_	Depleted I	Matrix (F3)		Ot	her (explain in	remarks)
	leted Below Dark	Surface			k Surface		_		
	k Dark Surface (and the second sec		Dark Surta		*loc	icators of hvd	rophytic vegetation and weltar
San	dy Mucky Minera	(51)			oressions (e present, unless disturbed o
	n Mucky Peat or I					S 77			problematic
						-			
	Layer (if observe	au):					Liver		12 1
Abe.							Hyar	ic soil presen	ite i
	Sec. 1				-			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
Jepth (Inche Remarks					2				
lemarks					2				
emarks IYDROLO	DGY				2				
TYDROLO	DGY drology Indicato								
TYDROL(Vetland Hy Primary India	DGY drology Indicato cators (minimum)		required; che					Secondary Inc	Sicators (minimum of two requ
HYDROL(Vetland Hy Primary India X Surface	DGY drology Indicato cators (minimum) Water (A1)		required; che	Aquati	Fauna (B			Secondary Inc Surface	Solt Cracks (B6)
TYDROLO Vetland Hy Inmary India X Surface X High Wa	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2)		required; che	Aquati True A	c Fauna (B quatic Plan	ts (B14)		Secondary Inc Surface	Soit Crecks (B6) Patterns (B10)
HYDROLO Vetland Hy Primary India X Surface X High Wa X Saturato	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3)		required: che	Aquation True A Hydrog	c Fauna (B) quatic Plan gen Sulfide	ts (B14) Odor (C1		Secondary Inc Surface Dramage Dry-Seas	Soil Crecks (B6) : Patterns (B10) son Water Table (C2)
HYDROLO Vetland Hy Primary India X Surface X High Wa X Saturato Water M	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1)		required: che	Aquati True A Hydrog Oxidizi	c Fauna (B) quatic Plan gen Sulfide	ts (B14) Odor (C1		Secondary Inc Surface Dramage Crayfish	Soil Cracks (B6) : Patterns (B10) son Water Table (C2) Burrows (C8)
Permarks: Permarks: Perimary India X Surface X High Wa X Saturato Water M Sedimen	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2)		required; che	Aquati True A Hydrog Oxidizi (C3)	c Fauna (B' quatic Plan gen Sulfide ad Rhizosph	ts (B14) Odot (C1) heres on L	iving Boots	Secondary Ing Surface Dramage Dry-Seas Crayfish Saturatio	Soil Cracks (B6) : Patterns (B10) son Water Table (C2) Burrows (C8) ri Visible on Aerial Imagery (C9
Permarks: TYDROL(Vetland Hy Primary India X Surface X High Wa X Saturato Water M Sedimen Drift Dep	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3)		required; che	Aquati True A Hydrog Oxidizi (C3) Preser	c Fauna (B quatic Plan gen Sulfide ad Rhizosph ace of Redu	ts (B14) Odot (C1) heres on (ced Iron (iving Roots C4)	Secondary Inc Surface Dramage Crayfish Saturatio Sturnted	Soil Cracks (B6) : Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1)
TYDROLO Vetland Hy Primary India X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4)		réquired: che	Aquatie True A Hydrog Oxidizi (C3) Presen Recent	c Fauna (B' quatic Plan gen Sulfide ad Rhizosph	ts (B14) Odot (C1) heres on (ced Iron (iving Roots C4)	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted X Geomorp	Soil Crecks (B6) Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2)
Primary India X Surface X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5)	of one is		Aquati True A Hydrog Oxidizi (C3) Presen Recent (C6)	c Fauna (B) quatic Plan gen Sulfide ed Rhizoaph ice of Redu t Inon Reduc	ts (B14) Odor (C1) heres on L ced Iron (ction in Til	iving Roots C4)	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted X Geomorp	Soil Cracks (B6) : Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1)
Primary India X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio	DGY drology Indicato cators (minimum) Water (A1) ter Table IA2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial	of one is	(87)	Aquati True A Hydrog Oxidizi (C3) Presen (C8) Thin M	c Pauna (B) quatic Plan ger Sulfide ad Rhizosph ice of Redu ice of Redu uck Surface	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7).	iving Roots C4)	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted X Geomorp	Soil Crecks (B6) Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2)
Permarks: Permarks: Permark India X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5)	imageny e Surtap	(87)	Aquati True A Hydrog Oxidizi (C3) Preser Recent (C6) Thin M Gauge	c Fauna (B) quatic Plan gen Sulfide ed Rhizoaph ice of Redu t Inon Reduc	ts (B14) Odor (C1) heres on L ced Iron (ction in Til s (C7) ta (D9)	iving Roots C4)	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted X Geomorp	Soil Crecks (B6) Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2)
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ItyDROLO Vetland Hy Inimary India X Surface X High Wa X Saturatio Water M Sedimen Drift Dep Inundatio Sparsely Water St ield Obser	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar ained Leaves (B9) vations:	imagenj e Surfaci	(B7) = (B8)	Aquati True A Hydrog Oxidizi (C3) Preser Recent (C6) Thin M Gauge	c Fauna (B) quatic Plan yen Sulfide ad Rhizoaph ice of Redu ice of Redu t Inon Reduc or Well Da	ts (B14) Odor (C1) heres on (cod fron (ction in Til e (C7) ta (D9) Remarks)	iving Roots C4)	Secondary Inc Surface Dramage Dry-Sea Crayfish Saturatio Stunted (X Geomon X FAC-Neu	Soil Crecks (B6) Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2)
ItyDROLO Vetland Hy Inimary India X Surface X High Wa X Saturatio Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely Water St ield Obser urface wate	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar ained Leaves (B9) vations: er present?	imageny e Surtap	(87)	Aquati True A Hydrog Oxidizi (C3) Presen (C6) Thin M Gauge Other (c Pauna (B) quatic Plan yen Sulfide ad Rhizosph ice of Redu ice of	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7) ta (D9) Remarks) nches):	iving Roots C4)	Secondary Ind Surface Dramage Dry-Seas Crayfish Saturatio Sturted (X Geomorp X FAC-Neu Wet	Soil Cracks (B6) Fatterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2) utral Test (D5)
Hemarks: HYDROL(Vetland Hy mmary India X Surface X Surface X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely Water St ield Obser urface water Vater table	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar almed Leaves (B9) vations: er present? present?	Imageny Yes	(B7) # (B8) X No	Aquati True A Hydrog Oxidizi (C3) Presen (C6) Thin M Gauge Other (c Pauna (B) quatic Plan yen Sulfide ad Rhizosph tice of Redu tilion Redu uck Surface or Well Da Explain m F	ts (B14) Odor (C1) heres on (cdon in Tri e (C7) ta (D9) Remarks) nohes): nohes):	iving Roots C4) Ied Soils	Secondary Ind Surface Dramage Dry-Seas Crayfish Saturatio Sturted i X Geomorp X FAC-Neu Wet hyd	Soil Cracks (B6) a Patierns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2) utral Test (D5) fand
Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks: Permarks:	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar almed Leaves (B9) vations: er present? present?	Imageny e Surface Yes Yes	(B7) # (B8) X No	Aquati True A Hydrog Oxidizi (C3) Presen (C6) Thin M Gauge Other (c Pauna (B) quatic Plan en Sulfide ad Rhizosph ice of Redu ice of Redu uck Surface or Well Dis Explain in P Depth (In Depth (In	ts (B14) Odor (C1) heres on (cdon in Tri e (C7) ta (D9) Remarks) nohes): nohes):	iving Roots C4) Ied Soils 1 0	Secondary Ind Surface Dramage Dry-Seas Crayfish Saturatio Sturted i X Geomorp X FAC-Neu Wet hyd	Soll Cracks (B6) a Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2) uthal Test (D5) fand rology
Temarks: TYDROLO Vetland Hy Immary India X Surface X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely Water St Vater table Vater table Vater table	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar ained Leaves (B9) vations: er present? present?	Imageny re Surface Yes Yes	(B7) # (B8) X No X No	Aquati True A Hydrog Owdizi (C3) Preser Recent (C6) Thin M Gauge Other (c Fauna (B' quatic Plan gen Sulfide ad Rhizosph ice of Redu t Inon Reduc uck Surface or Well Da Explain in F Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7). ta (D9) Remarks) nones): nones): nones)	iving Roots C4) led Soils 1 0	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted i X Geomorp X FAC-Net Wet hyd pres	Soll Cracks (B6) a Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2) uthal Test (D5) fand rology
Temarks: TYDROLO Vetland Hy Immary India X Surface X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely Water St Vater table Vater table Vater table	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar ained Leaves (B9) vations: er present? present? present? present? present? present?	Imageny re Surface Yes Yes	(B7) # (B8) X No X No	Aquati True A Hydrog Owdizi (C3) Preser Recent (C6) Thin M Gauge Other (c Fauna (B' quatic Plan gen Sulfide ad Rhizosph ice of Redu t Inon Reduc uck Surface or Well Da Explain in F Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7). ta (D9) Remarks) nones): nones): nones)	iving Roots C4) led Soils 1 0	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted i X Geomorp X FAC-Net Wet hyd pres	Soll Cracks (B6) a Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2) uthal Test (D5) fand rology
Temarks: TYDROLO Vetland Hy Immary India X Surface X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely Water St Vater table Vater table Vater table	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar ained Leaves (B9) vations: er present? present? present? present? present? present?	Imageny re Surface Yes Yes	(B7) # (B8) X No X No	Aquati True A Hydrog Owdizi (C3) Preser Recent (C6) Thin M Gauge Other (c Fauna (B' quatic Plan gen Sulfide ad Rhizosph ice of Redu t Inon Reduc uck Surface or Well Da Explain in F Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7). ta (D9) Remarks) nones): nones): nones)	iving Roots C4) led Soils 1 0	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted i X Geomorp X FAC-Net Wet hyd pres	Soll Cracks (B6) a Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2) uthal Test (D5) fand rology
Permarks: HYDROLO Vetland Hy Primary India X Surface X High Wa X Saturato Water M Sedimen Drift Dep Algal Ma Iron Dep Inundatio Sparsely Water St Vater table i aturation pri nolucies cap Jescribe rec	DGY drology Indicato cators (minimum) Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) in Visible on Aerial Vegetated Concar ained Leaves (B9) vations: er present? present? present? present? present? present?	Imageny re Surface Yes Yes	(B7) # (B8) X No X No	Aquati True A Hydrog Owdizi (C3) Preser Recent (C6) Thin M Gauge Other (c Fauna (B' quatic Plan gen Sulfide ad Rhizosph ice of Redu t Inon Reduc uck Surface or Well Da Explain in F Depth (in Depth (in	ts (B14) Odor (C1) heres on L ced Iron (ction in Til e (C7). ta (D9) Remarks) nones): nones): nones)	iving Roots C4) led Soils 1 0	Secondary Inc Surface Dramage Dry-Seas Crayfish Saturatio Stunted i X Geomorp X FAC-Net Wet hyd pres	Soll Cracks (B6) a Patterns (B10) son Water Table (C2) Burrows (C8) in Visible on Aerial Imagery (C9 or Stressed Plants (D1) ohic Position (D2) uthal Test (D5) fand rology
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Sampling Date:	5/19/2011
Sampling Point:	4-1 Up
Sec. 13	T118N, R22W
x, none).	Convex
Datum:	
ation:	Norie
lain in remarks)	
Ate "normal circ	umstances"
and contained	present? Yes
ded, explain any a	answers in remarks.)
a wetlane	4
E	

VEGETATION - Use scientific names of plants.	
Absolute	D

Tree Stratum (Plot size 30')	Absolute % Cover	Dominan t Species	Indicator Staus	Dominance Test Worksheet
1 Fraxinus pennsylvanica	20	Y	FACW	Number of Dominant Species that are OBL_FACW, or FAC 4 (A)
2 Tilia americana	20	Y	FACU	Total Number of Dominant
3				Species Across all Strata: 8 (B)
4				Percent of Dominant Species
5		1		that are OBL FACW, or FAC: 50.00% (A/B)
and the second sec	40	= Total Cover	-	
Sapling/Shrub stratur (Plot size 15));			Prevalence Index Worksheet
1 Rhamnus cathartica	20	Y -	FAC	Total % Cover of
2				OBL species 0 x 1 = 0
3	_	-	-	FACW species 30 x 2 = 60
4				FAC species 40 x 3 = 120
5				FACU species 35 x 4 = 140
the second s	20	= Total Cover		UPL species 0 x 5 = 0
Herb stratum (Plot size: 5'	1			Column totals 105 (A) 320 (B)
1 Cirsium vulgare	5	Y	FACU	Prevalence Index = B/A = 3.05
2 Taraxacum officinale	5	Y	FACU	and the second se
3 Cirsium arvense	5	Y	FACU	Hydrophytic Vegetation Indicators:
4 Rhamnus cathartica	20	Y	FAC	Rapid test for hydrophytic vegetation
5 Phalaris arundinacea	10	Y	FACW	Dominance test is >50%
6				Prevalence index is <3.0*
7				Morphogical adaptations* (provide
B			_	supporting data in Remarks or on a separate sheet)
10				Problematic hydrophytic vegetation*
	45	= Total Cover	_	(explain)
Woody vine stralium (Plot size: 15'	1			*Indicators of hydric soil and wetland hydrology must his present, unless disturbed or problematic
2				Hydrophytic
	0	= Total Cover		vegetation present? N

SOIL

Sampling Point: 4-1 Lip

Profile Des	cription: (Descri	ibe to th				e indicat	or or confirm th	e absence of in	dicators.)
Depth	Matrix			fox Fea		10.21			
(Inches)	Color (moist)	%	Color (moist)	2	Type*	Loc**	Texture		Flemarks
0-20	10YR 3/1	100			1		Loam	D	
20-28	10YR 2/1	100		1			Clay Loam		
							-		
	1								
	-	-			-		1		
				-	-				
*Type C = (Concentration. D =	= Depleti	on, RM = Reduce	d Matro	MS = M	lasked Sa	and Grains	"Location PL = I	Pore Lining. M = Matrix
Hydric So	oil Indicators:				_		Indicators	or Problematic	Hydric Soils:
His	tisol (A1)		San	dy Gley	ed Matrix	(S4)	Coast P	raine Redox (A1)	6) (LRR K, L, R)
His	tic Epipedon (A2)		San	dy Red	XX (S5)		Dark St	urface (S7) (LRR	K. L)
Bla	ck Histic (A3)		Strip	oped Ma	strix (SE)		5.cm M	ucky Peat or Pea	(S3) (LRR K, L, R)
Hyc	trogen Sulfide (A4	Q. 1	Loa	my Muc	ky Minera	2 (FT)	Iron-Ma	nganese Masses	(F12) (LRR K, L, R)
Stra	atified Layers (A5)		Loar	my Gley	ed Matrix	(F2)	Very Sh	allow Dark Surfa	C8 (TF12)
20	m Muck (A10)		Dep	leted M	atrix (F3)		Other (e	explain in remarks	5)
Dep	pleted Below Dark	Surface	(A11) Red	lox Dark	Surface	(F6)	_		
Thu	ck Dark Surface (A12)			ark Surtad		"Indicato	rs of hydrophytic	vegetation and weltand
Sar	ndy Mucky Mineral	(S1)	Red	ox Dep	ressions (F8)	hydrolog	gy must be prese	nt, unless disturbed or
5 pt	m Mucky Peat or F	Peat (\$3	1					problem	natic
Restrictive	Layer (if observe	ed):							
Type:					111		Hydric so	I present?	N
Depth (inche	26)			_					
Remarks:									
INPROL	0.014	_							
HYDROL(drology Indicato				_	_			
1			and the stand of the second					and the second second	
	cators (minimum a	at one is					Seco		minimum of two require
	Water (A1) tter Table (A2)				Fauna (B) uatic Plan			Surface Soil Crac Drainage Patients	
Saturatio					n Sulfide (Dry-Season Wate	
	arks (B1)						iving Roots	Crayfish Burrows	
	it Deposits (B2)			(C3)	C. B. (Brook)	10102 011 0		the second s	on Aerial Imagery (C9)
	oosits (B3)				e of Redu	ced (ron (C4)	Stunted or Stress	and the second se
Algal Ma	t or Crust (B4)			Recent	ron Reduc	tion in Til	led Soits	Geomorphic Posil	ion (D2)
Iron Dep	osits (B5)			(C6)				FAC-Neutral Test	(D5)
	on Visible on Aerial				ok Surface		_		
	Vegetated Concav			-	r Well Dat				
Water-St	tairied Leaves (B9)	-		Other (E	xplain in P	lemarks)			
Field Obser					L				
Surface wate		Yes.	Nö	X	Depth (in			Wetland	
Water table)		Yes .	No	X	Depth (in			hydrology	
Saturation pr		Yes	No	X	Depth (in	iches):		present?	<u>N</u>
	pillary fringe)		a Collection of the rest		2000	(ALC: 14)			
Describe rec	orded data (stream	m gauge	, monitoring well.	aenal p	hotos, pre	evious ins	pections), if ava	hable.	
Remarks				_					
- sector a									

Project/Site Four Set	asons Mail		City/County:	Plymouth/He	annepin	Sampling Date.	5/19/2	011		
Applicant/Owner	City of Plymouth		Sta	ite; Mt	N	Sampling Point	SP-	A		
nvestigator(s): BPC	(WDC #1125)			Section, Townsh	ip, Range:	Sec. 13, 1	1118N, R22	W		
andform (hillslope,	terrace, etc.):	Ditch	Lo	cal relief (conca	ive, convex	none);	Concave	_		
Slope (%): 2	Lat		Long:			Datum.				
oil Map Unit Name	Lester			VW3	Classificat	ion:	None			
re climatic/hydrolog	nic conditions of the	site typical for this	s time of the yea	17 Y	(If no, expla	an in remarks)				
re vegetation						Are "normal circur	mstances"			
ve vegetation	, soil	, or hydrology	natural	ly problematic?			present?	Yes		
SUMMARY OF F	INDINGS	• 101-101-0-0-0			(If need	ed, explain any an	swers in ren	narks,		
Hydrophytic vege	etation present?	Y								
Hydric soil prese	nt?	N.	Is t	he sampled are	ea within a	wetlank N				
Wetland hydrolo	gy present?	Y	17 ve	I yes, optional wetland site ID						
Temarks: (Explain a				_						
			solute Domin	an indicator	Domina	ance Test Worksh	neet			
Tree Stratum	(Plot size: 3	0') %	Cover t Speci	ies Staus	Number	of Dominant Specie	85			
1 Fraxinus penn	sylvanica		40 Y	FACW	that are	OBL, FACW, or FA	C; 2	(A)		
2 Tilia americana	a		30 Y	FACU		Number of Domina		-		
					sper	cies Across all Strat	ta: 3	(B		

			FAGU	Species Across all Strata: 3 (B)
	-		_	Percent of Dominant Species
			-	that are OBL, FACW, or FAC 66.67% (A/B)
	70	= Total Cover	977 - P	
15)	- C. C. C.		Prevalence Index Worksheet
-	40	Y	FAC	Total % Cover of:
				OBL species 0 x 1 = 0
			————————————————————————————————————	FACW species 40 x 2 = 80
			-	FAC species 40 x.3 = 120
				FACU species 30 x 4 = 120
	-40	= Total Cover		UPL species 0 x 5 = 0
5'	Y			Column totals 110 (A) 320 (B)
				Prevalence Index = B/A =291
			_	
			-	Hydrophytic Vegetation Indicators:
	_			Rapid test for hydrophytic vegetation
	_			X Dominarice test is >50%
				X Prevalence index is ≤3.0*
				Morphogical adaptations* (provide
			_	supporting data in Remarks or on a
			_	separate sheet)
		Telef Carrier		Problematic hydrophytic vegetation*
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13	1			"Indicators of Flydric soil and wetland hydrology must be
	_			present, unless disturbed or problematic Hydrophytic
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Sampling Point:

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	tic Epipedon (A2)			dy Red					S7) (LRR K,	
	ck Histic (A3)				atrix (S6)					33) (LRR K, L, R)
	trogen Sulfide (A4				ky Miriera					12) (LRR K. L. R)
	atified Layers (A5)				ed Matrix	(F2)			ark Surface	(TF12)
	n Muck (A10)				atrix (F3)		Othe	er (explain)	n remarks)	
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	ck Dark Surface (A				ark Surfac					getation and weltand
	idy Mucky Mineral			lax Depi	ressions ()	F8)	hydr	ology must		unless disturbed or
5 ta	n Mucky Peat or F	eat (S3							problemat	ic.
estrictive	Layer (if observe	d):					_			
ype	and a second considera				-		Hydric	soil prese	nt? N	
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Soil Texture and Feature Guide

TEXTURES

LS	Loamy Sand	An "F" modifier in front of any sandy soil texture	
SL Loam	Sandy Loam Loam	abbreviation ("S") represents "Fine" ie. FSL or FLS.	
SiL	Silt Loam		
SCL	Sandy Clay Loam		
CL	Clay Loam		
SiCL	Silty Clay Loam		
SC	Sandy Clay		
Clay	Clay		
SiC	Silty Clay		

FEATURES

F	few	/	VF F	very fine fine	1	F	faint
С	common	/	М	medium	/	D	distinct
М	many	/	C	coarse	/	Р	prominent
		/	VC	very coarse	/		

- IOSM Iron Oxide Soft Masses
- ORC Oxidized Root Channels

DPL Depletions

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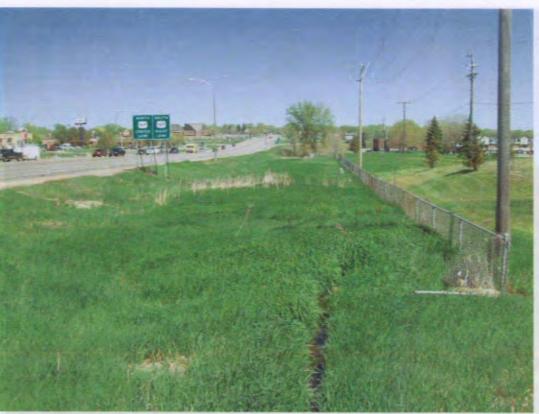
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Photo 1: View of Wetland 1 edge at transect 1-1 location facing west.



Photo 2: View of Wetland 1 facing northwest from transect 1-1 location.



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Photo 3: View of Wetland 1 facing east from the northwestern edge.



Photo 4: View of Wetland 1 edge at transect 1-2 location facing south.



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Photo 5: View of Wetland 1 edge at transect 1-3 location facing west.

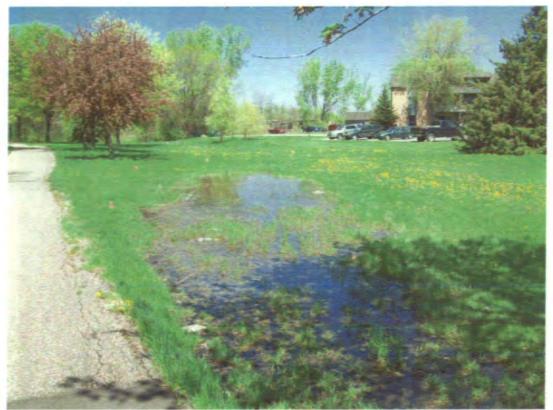


Photo 6: View of Wetland 2 facing northeast.





Photo 8: View of Wetland 3 edge at transect location facing east.



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Photo 9: View of Wetland 4 edge at transect location facing south.



Photo 10: View of SP-A (drainage channel) facing west.

Appendix C Cost Estimates

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Table C1: Estimated Present Value Fees for	Unit	Quantity	Unit Cost	Total Cost
			ł ł	
Mobilization	LS	1	\$10,500.00	\$10,500.00
Clearing and Grubbing	Acre	2.0	\$5,000.00	\$10,000.00
Erosion Control Common Excavation On site (assumes reuse of onsite	LS	1	\$15,000.00	\$15,000.00
matl.)	CY	200	\$6.00	\$1,200.00
Common Excavation Off site	CY	7,909	\$20.00	\$158,180.00
Class II Riprap	CY	200	\$125.00	\$25,000.00
48" RCP	LF	40	\$120.00	\$4,800.00
42" RCP	LF	40	\$120.00	\$4,800.00
84" DIA Outlet Control Structure	EA	1	\$7,500.00	\$7,500.00
48" RCP FES w/TG	EA	1	\$2,000	\$2,000.00
42" RCP FES w/TG	EA	1	\$2,000	\$2,000.00
Connection to Storm Sewer MH	EA	1	\$800.00	\$800.00
Removal of old Pipe	LF	40	\$5.00	\$200.00
Geotextile Fabric	SY	1,400.0	\$3.00	\$4,200.00
Clean Sand	CY	60.0	\$35.00	\$2,100.00
Coarse filter material	CY	40	\$45.00	\$1,800.00
Iron Fillings	Т	1.5	\$800.00	\$1,200.00
Drain tile	LF	150.0	\$8.00	\$1,200.00
Remove Sidewalk	SF	150.0	\$2.00	\$300.00
Replace Sidewalk	SF	150.0	\$7.00	\$1,050.00
Upland perimeter seeding and mulching	Acre	1.0	\$2,000.00	\$2,000.00
Trees	EA	5.0	\$500.00	\$2,500.00
Traffic Control	LS	1.0	\$1,500.00	\$1,500.00
Aggregate Base Class V	TON	30.0	\$20.00	\$600.00
Salvage existing Topsoil	LS	1.0	\$2,500.00	\$2,500.00
Site Cleanup	LS	1.0	\$2,500.00	\$2,500.00
Construction Cost Estimate				\$265,430.00
Contingency (20 %Construction Cost)				\$53,086.00
Total Construction Cost				\$318,516.00
Construction Management Services (5%)				\$15,925.80
Design Fee (15 %)				\$47,777.40
Preliminary Cost Estimate				\$382,219.20

Table C1: Estimated Present Value Fees for the 40th Ave. Pond Project

Item	Unit	Quantity	Unit Cost	Total Cost
Mobilization	LS	1	\$10,000.00	\$10,000.00
Excavation	CY	4,194	\$15.00	\$62,910.00
24" RCP	LF	100.0	\$120.00	\$12,000.00
24" RCP	LF	200.0	\$120.00	\$24,000.00
24" RCP	LF	122.0	\$120.00	\$14,640.00
Class II Riprap	CY	13	\$90.00	\$1,170.00
Pond Outlet Structure	EA	1	\$1,800.00	\$1,800.00
Manhole/Flow Splitter Installation	LS	1	\$15,000.00	\$15,000.00
Connect Existing SS Lines to MH	EA	3	\$800.00	\$2,400.00
Connect New SS Lines to MHs	EA	3	\$800.00	\$2,400.00
Pavement Removal	SY	3,572.0	\$3.00	\$10,716.00
Pavement Replacement	SY	500.0	\$25.00	\$12,500.00
Sidewalk Removal	SF	300.0	\$2.00	\$600.00
Sidewalk Replacement	SF	300.0	\$7.00	\$2,100.00
Curb Removal	LF	60.0	\$5.00	\$300.00
Curb Replacement	LF	60.0	\$20.00	\$1,200.00
Traffic Control	LS	1.0	\$2,000.00	\$2,000.00
Traffic Detour	LS	1.0	\$3,500.00	\$3,500.00
Geotextile Fabric	SY	64.0	\$3.00	\$192.00
Clean Sand	CY	20.0	\$35.00	\$700.00
Iron Fillings	TON	1.5	\$800.00	\$1,200.00
Coarse filter material	CY	10	\$45.00	\$450.00
Drain tile	LF	100.0	\$8.00	\$800.00
Erosion Control	LS	1	\$15,000.00	\$15,000.00
Site Cleanup	LS	1.0	\$2,500.00	\$2,500.00
Construction Cost Estimate				\$200,078.00
Contingency (20 %Construction Cost)				\$40,015.60
Total Construction Cost				\$240,093.60
Construction Management Services (5%)				\$12,004.68
Design Fee (15 %)				\$36,014.04
Preliminary Cost Estimate				\$288,112.32

Table C2: Estimated Present Value Fees for the Four Seasons Mall Pond Project

of the Channel Kestoration Project Cost Estimate								
Item	Unit	Quantity	Unit Cost	Total Cost				
Mobilization/Demobilization, ESC, misc. removals	EA	1	\$10,000.00	\$10,000.00				
Clear and grub brush & small trees	LF	3,700	\$5.00	\$18,500.00				
Tree removal >20"	EA	90.0	\$200.00	\$18,000.00				
Reslope and minor grading	LF	3,700.0	\$2.00	\$7,400.00				
Brush bundles (100 LF)	LF	200.0	\$17.00	\$3,400.00				
Seed & ECB (500 LF)	SY	1,110	\$5.00	\$5,550.00				
Native seed and mulch	Acre	3	\$4,000.00	\$10,000.00				
Toe protection (370 LF)	TON	186	\$100.00	\$18,630.00				
Cross vane 10' (10)	CY	49	\$300.00	\$14,700.00				
12" FES	EA	1	\$1,000.00	\$1,000.00				
Plunge pool 12" riprap	CY	8.0	\$100.00	\$800.00				
Plunge pool 12" geotextile	SY	6.0	\$2.50	\$15.00				
24" FES	EA	1.0	\$1,200.00	\$1,200.00				
Plunge pool 24" riprap	CY	12.0	\$100.00	\$1,200.00				
Plunge pool 24" geotextile	SY	7.0	\$2.50	\$17.50				
Shrubs	EA	150.0	\$35.00	\$5,250.00				
Construction Cost Estimate				\$115,662.50				
Contingency (20 %Construction Cost)				\$23,132.50				
Total Construction Cost				\$138,795.00				
Construction Management Services (5%)				\$6,939.75				
Design Fee (15 %)				\$20,819.25				
Total Cost Estimate				\$166,554.00				

 Table C3: Present Value Fees for the Center Channel Portion

 of the Channel Restoration Project Cost Estimate

Item	Unit	Quantity	Unit Cost	Total Cost
Mobilization/Demobilization, ESC	EA	1	\$10,000.00	\$10,000.00
Clear and grub brush & small trees	LF	1,050	\$5.00	\$5,250.00
Tree removal >20"	EA	30.0	\$200.00	\$6,000.00
Reslope and minor grading	LF	1,050.0	\$5.00	\$5,250.00
Brush bundles (225 LF)	LF	450.0	\$17.00	\$7,650.00
Native seed and mulch	Acre	1	\$4,000.00	\$2,400.00
Toe protection (200 LF)	TON	138	\$100.00	\$13,800.00
Cross vane 10' (12)	CY	59	\$300.00	\$17,640.00
Shrubs	EA	100	\$35.00	\$3,500.00
Construction Cost Estimate				\$71,490.00
Contingency (20 %Construction Cost)				\$14,298.00
Total Construction Cost				\$85,788.00
Construction Management Services (5%)				\$4,289.40
Design Fee (15 %)				\$12,868.20
Engineer's Cost Estimate				\$102,945.60

 Table C3 (Continued): Right Channel Portion of the Channel Restoration Project

 Present Value Cost Estimate

Table C4: Present Value Estimated Fees f	Unit	Quantity	Unit Cost	Total Cost
Mobilization	LS	1	\$12,000	\$12,000
Pond Excavation	CY	9,852.0	\$15	\$147,780
Clarifier Excavation and Backfill	CY	1,000	\$15	\$15,000
Controlled Fill	CY	6,169	\$5	\$30,845
Pavement Removal	SY	2,958	\$3	\$8,874
Erosion Control	LS	1	\$15,000	\$15,000
Install New Manhole	LS	1	\$2,600	\$2,600
SAFL Baffle	EA	1	\$3,500	\$3,500
24" RCP	LF	124	\$120	\$14,880
Connection to Storm Sewer MH	EA	1	\$800	\$800
Connection to Sanitary Sewer	EA	2	\$1,000	\$2,000
Install Sanitary Manhole	EA	1	\$3,000	\$3,000
CMP Storage Units	LF	950	\$150	\$142,500
Removal of Pavement	SY	250	\$3	\$750
New Pavement	SY	250	\$25	\$6,250
Remove Sidewalk	SF	150	\$2	\$300
Replace Sidewalk	SF	150	\$7	\$1,050
Remove Curb	LF	30	\$5	\$150
Replace Curb	LF	30	\$20	\$600
Clarifier Concrete	CY	213	\$600	\$128,000
Clarifier Internals	FT-DIA	52	\$2,000	\$105,000
4" PVC Sludge Pipe	LF	460	\$40	\$18,000
10" PVC Influent Pipe	LF	410	\$65	\$27,000
14" PVC Effluent Pipe	LF	25	\$75	\$2,000
Influent Pump	EA	2	\$20,000	\$40,000
Influent Lift Station	LS	1	\$10,000	\$10,000
Sludge Pump	LS	2	\$5,000	\$10,000
Sludge Pump Structure	LS	1	\$30,000	\$30,000
Alum Treatment Building	SF	120	\$75	\$9,000
Chemical Feed System	LS	1	\$10,000	\$10,000
Electric and Controls	LS	1	\$30,000	\$30,000
Traffic Control	LS	1	\$2,000	\$2,000

Table C4: Present Value Estimated Fees for the Alum Injection System

Item	Unit	Quantity	Unit Cost	Total Cost
Traffic Detour	LS	1	\$3,500	\$3,500
Site Restoration	LS	1	\$5,000	\$5,000
Construction Cost Estimate				\$837,379.00
Contingency (20 %Construction Cost)				\$167,475.80
Total Construction Cost				\$1,004,854.80
Construction Management Services (5%)				\$50,242.74
Design Fee (15 %)				\$150,728.22
Preliminary Cost Estimate	\$1,205,825.76			

Table C4 (continued): Present Value Estimated Fees for the Alum Injection System

			Associated
			Present Value
Project	Item/action	Frequency	Cost
	General O&M/Site Visits	Annually	\$500
40th Ave. Pond	Repair/retrofit Outlet Structure	Once every 10 years	\$6,000
	Remove Sediment from Pond	Once every 30 years	\$17,000
	General O&M/Site Visits	Annually	\$500
Four Seasons Mall Pond	Repair/retrofit Outlet Structure	Once every 10 years	\$6 <i>,</i> 000
	Remove Sediment from Pond	Once every 30 years	\$17,000
	General O&M/Site Visits	Annually	\$900
Channel Restoration	Repair/retrofit Outlet Structure	Once every 10 years	\$6,000
	Maintain fallen debris and obstructions	Once every 30 years	\$20,000
	Apply Chemicals	Annually	\$5,000
	General Clarifier Maintenance	Annually	\$25,000
	Electricity for Pumps	Annually	\$2 <i>,</i> 000
	Strength Charge for Discharge to Sanitary	Annually	\$10,000
Alum System	Replace Influent and Sludge Pumps	Once every 10 years	\$40,000
	Replace Clarifier Internals	Once every 20 years	\$105,000
	Replace Chemical Feed System	Once every 20 years	\$10,000
	Repairs to Storage Structure and SAFL Baffle	Once every 10 years	\$10,000
	Remove Sediment from Storage Area	Once every 30 years	\$17,000

 Table C5: Items Considered for 30 Year Life Cycle Costs

Appendix D Soil Chemical Analyses

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Mr. Jeff Madejczyk

Wenck Associates, Inc.

Maple Plain, MN 55359

Braun Intertec Corporation 11001 Hampshire Avenue S. Minneapolis, MN 55438
 Phone:
 952.995.2000

 Fax:
 952.995.2020

 Web:
 braunintertec.com

July 05, 2012

Report #: 1203606

RE: 1756-05 City of Plymouth

1800 Pioneer Creek Center P.O. Box 428

Dear Jeff Madejczyk:

Braun Intertec Corporation received samples for the project identified above on June 21, 2012. Analytical results are summarized in the following report.

All routine quality assurance procedures were followed, unless otherwise noted.

Analytical results are reported on an "as received" basis unless otherwise noted. Where possible, the samples will be retained by the laboratory for 14 days following issuance of the initial final report. The samples will be disposed of or returned at that time. Arrangements can be made for extended storage by contacting me at this time.

We appreciate your decision to use Braun Intertec Corporation for this project. We are committed to being your vendor of choice to meet your analytical chemistry needs.

If you have any questions please contact me at the above phone number.

Sincerely,

DRAFT REPORT Project Manager

11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax

Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: DRAFT REPORT
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Qualifiers and Abbreviations

- J Detected but below the Method Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
- COC Chain of Custody
- dry Sample results reported on a dry weight basis
- MDL Method Detection Limit
- MRL Method Reporting Limit
- NA Not Applicable
- ND Analyte NOT DETECTED above the MDL value
- NR Not Reported
- %Rec Percent Recovery
- RPD Relative Percent Difference
- VOC Volatile Organic Compound

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Wenck Associates, Inc.	Client Ref: 1756-05 City of Plymouth	Report #: 1203606
1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: DRAFT REPORT
Maple Plain, MN 55359	PO Number:	Account ID: W02540

Sample Summary

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DRAFT: 062112	1203606-01	Soil	06/21/12 11:00	06/21/12 12:10

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Wenck Associates, Inc.Client Ref: 1756-05 City of PlymouthReport #: 12036061800 Pioneer Creek Center P.O. Box 428Client Contact: Mr. Jeff MadejczykProject Mgr: DRAFT REPORTMaple Plain, MN 55359PO Number:Account ID: W02540

Conditions Upon Receipt

Cooler: Cooler 1

Temperature:8.3 °CTemperature Blank:YesReceived on Ice:YesPreservation Confirmed:No

COC Included: Yes COC Complete: Yes COC & Labels Agree: Yes Sufficient Sample Provided: Yes Custody Seals Used: No Custody Seals Intact: NA Hand Delivered by Client: Yes Headspace Present (VOC): No

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Maple Plain, MN 55359	PO Number:	Account ID: W02540

Analyte		Result	MRL	MDL	Units	Batch	Prepared	Analyzed	/Analyst	Method	Notes
1203606-01	DRAFT: 062112										
Arsenic		1.5 J	1.9	0.15	mg/kg dry	B2F0556	6/22/12	6/26/12	DRM	EPA 6010C	
Copper		9.6	0.93	0.011	mg/kg dry	B2F0556	6/22/12	6/26/12	DRM	EPA 6010C	
% Solids		93	0.050	0.010	% Wt	B2F0562	6/22/12	6/22/12	MJW	EPA 3545A	
										11.4	

BRAUN		11001 Hampshire Ave. S. Minneapolis, MN 55438 952.995.2000 Phone 952.995.2020 Fax
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Maple Plain, MN 55359	PO Number:	Account ID: W02540

DRAFT: Classical Chemistry Parameters - Quality Control

Batch B2F0562 - % Solids											
Method Blank (B2F0562-BLK1)							Preparec	l & Analyz	ed: 06/22/12	2	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	0.0259 J	0.050	0.010	% Wt	NA	NA	NA	NA	NA	NA	
Duplicate (B2F0562-DUP1)				Source	e: 1203512-	-01	Preparec	ł & Analyz	ed: 06/22/12	2	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	96.8	0.050	0.010	% Wt	NA	96.8	NA	NA	0.0469	20	
Standard Reference Material (B2	F0562-SRM1)						Preparec	ł & Analyz	ed: 06/22/12	2	
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids											

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Maple Plain, MN 55359	PO Number:	Account ID: W02540

DRAFT: Metals - Quality Control

Batch B2F0556 - EPA 3050B

Method Blank (B2F0556-BLK1)							Preparec	06/25/12				
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Arsenic	ND	2.0	0.16	mg/kg	NA	NA	NA	NA	NA	NA		
Copper	0.0350 J	1.0	0.012	mg/kg	NA	NA	NA	NA	NA	NA		
Laboratory Control Sample (B2F0556-BS1)							Prepared: 06/22/12 Analyzed: 06/25/12					
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Arsenic	299	2.0	0.16	mg/kg	300	NA	99.7	80-120	NA	NA		
Copper	299	1.0	0.012	mg/kg	300	NA	99.7	80-120	NA	NA		
Laboratory Control Sample Duplicate (B2F0556-BSD1)							Preparec	1: 06/22/12	Analyzed:	06/25/12		
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Arsenic	300	2.0	0.16	mg/kg	300	NA	100	80-120	0.503	20		
Copper	300	1.0	0.012	mg/kg	300	NA	100	80-120	0.317	20		
Matrix Spike (B2F0556-MS1)				Source	: 1203633-	01RE1	Prepared: 06/22/12 Analyzed: 06/25/12					
I ()												
Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
• • • •	Result 257	MRL 9.3	MDL 0.72	Units mg/kg	Spike Level 279	Source Result 2.70	%REC 91.3	%REC Limits 75-125	RPD NA	RPD Limit NA	Notes	
Analyte						Result		Limits		Limit	Notes	
Analyte Arsenic Copper	257 285	9.3	0.72	mg/kg mg/kg	279	Result 2.70 27.9	91.3 92.3	Limits 75-125	NA NA	Limit NA NA	Notes	
Analyte Arsenic Copper	257 285	9.3	0.72	mg/kg mg/kg	279 279	Result 2.70 27.9	91.3 92.3	Limits 75-125 75-125	NA NA	Limit NA NA	Notes	
Analyte Arsenic Copper Matrix Spike Duplicate (B2F0556-M	257 285 SD1)	9.3 4.6	0.72 0.056	mg/kg mg/kg Source	279 279 :: 1203633 -	Result 2.70 27.9 01RE1 Source	91.3 92.3 Preparec	Limits 75-125 75-125 1: 06/22/12 %REC	NA NA Analyzed:	Limit NA NA 06/25/12 RPD		
Analyte Arsenic Copper Matrix Spike Duplicate (B2F0556-M Analyte	257 285 SD1) Result	9.3 4.6 MRL	0.72 0.056 MDL	mg/kg mg/kg Source Units	279 279 :: 1203633- Spike Level	Result 2.70 27.9 01RE1 Source Result	91.3 92.3 Preparec %REC	Limits 75-125 75-125 1: 06/22/12 %REC Limits	NA NA Analyzed: RPD	Limit NA NA 06/25/12 RPD Limit		
Analyte Arsenic Copper Matrix Spike Duplicate (B2F0556-M Analyte Arsenic	257 285 SD1) Result 281 309	9.3 4.6 MRL 10	0.72 0.056 MDL 0.78	mg/kg mg/kg Source Units mg/kg	279 279 :: 1203633- Spike Level 299	Result 2.70 27.9 01RE1 Source Result 2.70	91.3 92.3 Prepared %REC 93.0 94.0	Limits 75-125 75-125 d: 06/22/12 %REC Limits 75-125	NA NA Analyzed: RPD 8.97 8.15	Limit NA NA 06/25/12 RPD Limit 20 20		
Analyte Arsenic Copper Matrix Spike Duplicate (B2F0556-M Analyte Arsenic Copper	257 285 SD1) Result 281 309	9.3 4.6 MRL 10	0.72 0.056 MDL 0.78	mg/kg mg/kg Source Units mg/kg	279 279 :: 1203633- Spike Level 299	Result 2.70 27.9 01RE1 Source Result 2.70	91.3 92.3 Prepared %REC 93.0 94.0	Limits 75-125 75-125 d: 06/22/12 %REC Limits 75-125 75-125	NA NA Analyzed: RPD 8.97 8.15	Limit NA NA 06/25/12 RPD Limit 20 20		
Analyte Arsenic Copper Matrix Spike Duplicate (B2F0556-M Analyte Arsenic Copper Standard Reference Material (B2F05	257 285 SD1) Result 281 309 S6-SRM1)	9.3 4.6 MRL 10 5.0	0.72 0.056 MDL 0.78 0.060	mg/kg mg/kg Source Units mg/kg mg/kg	279 279 279 279 279 290 299 299 299 299	Result 2.70 27.9 01RE1 Source 27.9	91.3 92.3 Preparec %REC 93.0 94.0 Preparec	Limits 75-125 75-125 1: 06/22/12 %REC Limits 75-125 75-125 1: 06/22/12 %REC	NA NA Analyzed: <u>RPD</u> 8.97 8.15 Analyzed:	Limit NA NA 06/25/12 <u>RPD</u> Limit 20 20 06/25/12 RPD	Notes	

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1800 Pioneer Creek Center P.O. Box 428	Client Contact: Mr. Jeff Madejczyk	Project Mgr: DRAFT REPORT
Maple Plain, MN 55359	PO Number:	Account ID: W02540

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