

Veolia ES Emerald Park Landfill  
December 1, 2005  
Revised December 8, 2008

Wetland Determination and Delineation  
City of Muskego, Waukesha County, Wisconsin  
NRC Project # 05-235

**APPENDIX B**

**MINUTES FROM WDNR FIELD MEETING; NOVEMBER 12, 2007**

***Natural Resources Consulting, Inc.***

Specializing in wetland, biological and environmental permitting services

125





## MEETING MINUTES

<b>SUBJECT:</b> Wetland Boundary Review / Navigability Review – Emerald Park Landfill, Veolia ES	<b>DATE/TIME:</b> Monday, November 12, 2007 / 9:00 am
<b>PROJECT:</b> Emerald Park Landfill Expansion	<b>LOCATION:</b> Emerald Park Landfill, Muskego, WI
<b>ATTENDEES:</b> Ms. Pamela Schense, WDNR; Mr. Jay Warzinski, Veolia ES, Mr. James Dunham, Veolia ES, Mr. Brian Karczewski, Natural Resources Consulting, Inc., Mr. Douglas Genthe, RMT, Inc., Mr. Mark Torresani, RMT, Inc.	

Meeting was held with Ms. Pamela Schense to field review:

- 1) The wetland boundaries within and adjacent to the proposed expansion footprint; and
  - 2) The farm ditches within and adjacent to the proposed expansion footprint.
- 1) Pam Schense indicated that she did receive our opinion paper regarding navigability of the farm ditches within the expansion footprint. She said that she was not aware of the Department dealing with or addressing the applicability of a drainage district with relation to the navigability exemption for farm ditches. This discussion will continue internally within the WDNR.
  - 2) General concurrence regarding the wetland boundaries was obtained. Small changes to the north side of wetland W-4 need to be made. I will visit the site on Monday, November 19<sup>th</sup> to make the necessary changes. Jim will have a survey crew follow up and locate the new flags. It does not appear that this change, considered minor in extent, will impact the proposed expansion.
  - 3) Questions regarding a previously delineated area, wetland W-5, were addressed in the field. Pam agreed that there did not appear to be any indicators of wetland in the area. However, she would like a farm service agency crop slide review completed to show that the area was consistently farmed. If so, she will consider the area upland.
  - 4) Pam agreed with arguments presented in the field that Pond P-6 is not wetland. This area is now considered non-navigable and non-wetland and does not require further evaluation during the practical alternatives analysis process under NR 103.
  - 5) Questions were raised about the field, currently in forage production, located south of the east-west reach of D-2 and west of the north-south reach of D-2. This area has been delineated by Jerry Kelly as wetland in 1996 and in 2005. Pam agreed that the area does not appear to have the characteristics of wetland. She asked if the area could remain fallow in the Spring of 2008 and if we could revisit the issue at that time.
  - 6) Questions were raised about another potential upland area within the heart of wetland 9 located to the south of the area addressed in point 5 and west of the north-south reach of D-2. This area appears to have upland characteristics which Pam agreed with in the field. However, limited information is available to clearly prove an upland condition since it is farmed and the soils are hydric. Pam is willing to consider its removal from wetland status. She will get back to me and let me know if this is possible from the Department's position.

- 7) If the argument regarding the area being part of a drainage district is not accepted by the WDNR, Pam agreed to previously marked locations of navigability for D-4, and our opinion of where navigability starts for D-2 (approximately 240 feet south of the 90 degree bend in D-2). This location needs to be surveyed and presented to Pam on a map for agreement. This should be done after any discussions regarding the drainage district issue play out.

**APPENDIX C**  
**FSA AERIAL REVIEW**



WETLAND DOCUMENTATION RECORD  
Remotely Sensed Data Summary

Appellant: Valeria ES Emerald Park County Waukesha State WI

Slide Reviewer Brian Karczewski, NRC Date 12/8/08

Site Identification No. \_\_\_\_\_ (Tract No. + Site No.)

*for area previously identified as wetland*

**Farm Service Agency Aerial Color Slide Data**

W-5

Date (Mo./Yr)	Rainfall (in) +D/N/W (Apr-June ave.)	Interpretation- (codes listed in box below)
1990	4.44 (W)	Y 4 6b
1991	3.62 (N)	Y 5 6a
1992	1.77 (D)	Y 4 6b
1993	5.73 (W)	Y 4 6b
1994	2.25 (D)	Y 3 6d with white (bone ground on edges)
1995	2.64 (N)	Y 5 6a
1996	4.76 (W)	Y 5 6e
1997	3.40 (N)	Y 4 6e
1998	4.17 (N)	Y 5 6d
1999	4.90 (W)	Y 1, 3 6d
2000	5.39 (W)	Y 3 6c <i>construction of biomass compost area began to south</i>
2001	4.40 (W)	Y 5 6d <i>affecting drainage to W-5 area</i>
2002	3.75 (N)	Y 3 6d
2003	3.89 (N)	N
2004	5.35 (W)	N
2005	2.34 (D)	N
2006	4.46 (W)	N

**Air Photo**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

<b>Y</b> = signal indicates wetness (+ = strong, - = weak)	<b>N</b> = NO wetness signature		
<b>CR</b> = cropped (row crop or tilled)	<b>NC</b> = not cropped (hay, pasture, idle, etc.)		
<b>Feature</b>	<b>Color</b>	<b>Manipulation</b>	<b>Other</b>
1 = water	6a = dark green	7a = ditched	write explanation
2 = mud flat	6b = light green	7b = tilled	
3 = bare spot	6c = yellow	7c = filled	
4 = drowned crop	6d = brown	7d = tree/brush removal	
5 = planted late	6e = black	8 = plowed/tilled	

Does Slide/Air Photo data indicate the site is a wetland? (y/n) \_\_\_\_\_

# \_\_\_\_\_ years out of # \_\_\_\_\_ years observed have wet (Y) signatures.

*new normal circumstance in area surrounding W-5*

Farm Service Agency Aerial Color Slide Review

Veolia ES Emerald Park Landfill, LLC

T-5-N, R-20-E, Section 36; City of Muskego, Waukesha County, Wisconsin

Description of Interest: Area Identified as Wetland W-5 in previous wetland investigations.

Year	Monthly Rainfall in Inches *			Total	Mean (April - May)	Relative Wetness	Cropped?	Witness Signature?
	April	May	June					
1981	4.48	1.08	2.84	8.40	2.80	N		
1982	4.07	4.41	2.67	11.15	3.72	N		
1983	2.68	3.96	2.83	9.47	3.16	N		
1984	3.20	4.57	5.90	13.67	4.56	W		
1985	1.48	1.82	2.28	5.58	1.86	D		
1986	1.88	2.50	6.08	10.46	3.49	N		
1987	4.20	3.50	1.73	9.43	3.14	N		
1988	3.26	0.69	1.33	5.28	1.76	D		
1989	1.98	3.53	2.60	8.11	2.70	N		
1990	1.98	5.49	5.84	13.31	4.44	W	CR	Y
1991	3.97	2.35	4.53	10.85	3.62	N	CR	Y
1992	2.82	0.93	1.55	5.30	1.77	D	CR	Y
1993	7.14	3.46	6.59	17.19	5.73	W	CR	Y
1994	1.26	1.30	4.20	6.76	2.25	D	CR	Y
1995	4.15	3.14	0.62	7.91	2.64	N	CR	Y
1996	3.10	2.50	8.69	14.29	4.76	W	CR	Y
1997	1.48	3.45	5.26	10.19	3.40	N	CR	Y
1998	3.64	3.72	5.16	12.52	4.17	N	CR	Y
1999	6.38	5.23	6.10	17.71	5.90	W	CR	Y
2000	2.84	8.54	4.78	16.16	5.39	W	CR	Y
2001	3.80	4.79	4.61	13.20	4.40	W	CR	Y
2002	4.15	2.48	4.63	11.26	3.75	N	CR	Y
2003	1.97	7.14	2.56	11.67	3.89	N	CR	N
2004	2.43	10.40	3.23	16.06	5.35	W	CR	N
2005	1.32	4.03	1.67	7.02	2.34	D	CR	N
2006	4.30	5.70	3.38	13.38	4.46	W	---	N
30% chance less than	2.39	2.09	2.84	7.32	2.44	---	---	---
30 Year Average	3.25	3.14	3.99	10.38	3.46	---	---	---
30% chance more than	3.77	3.81	4.98	12.56	4.19	---	---	---

\* Oconomowoc Weather Station (476200), Waukesha County, Wisconsin

DRY  
NORMAL  
WET



Farm Service Agency Crop Compliance Slides



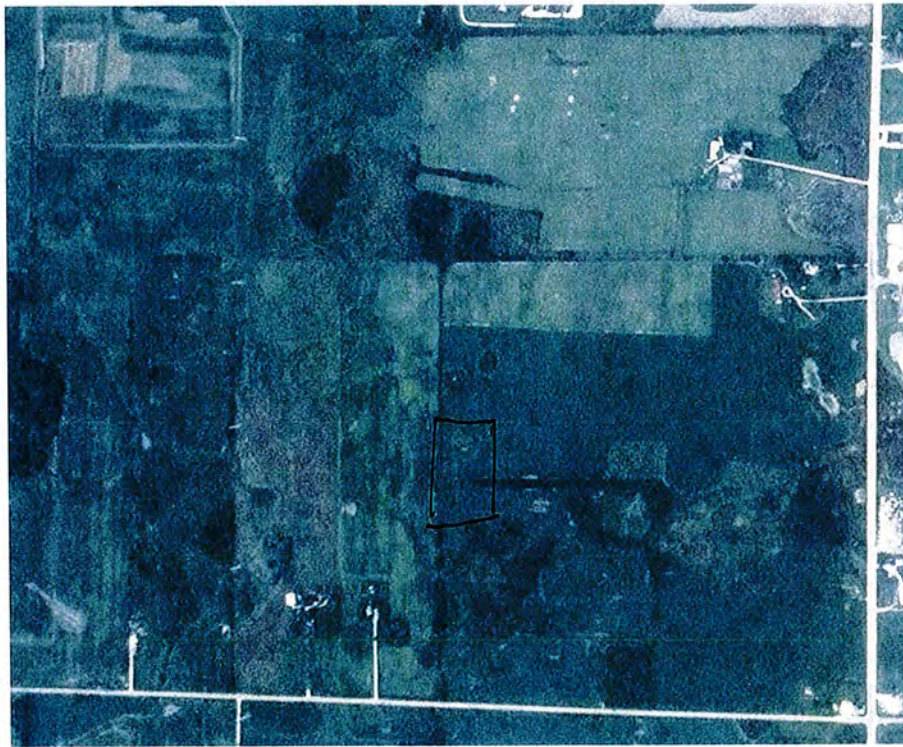
1990



1991



1992



1993



1994



1995



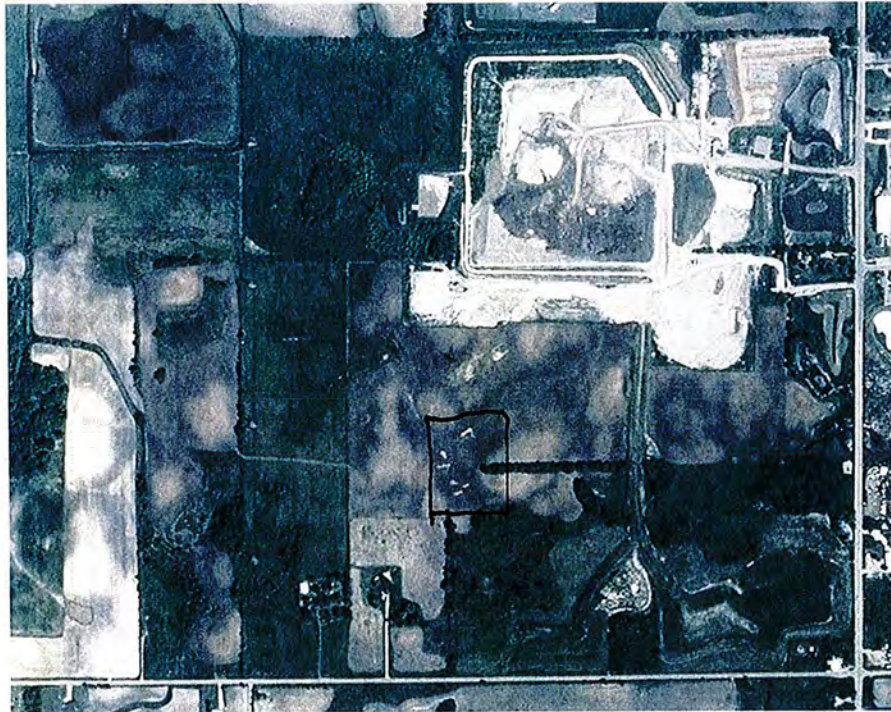
1996



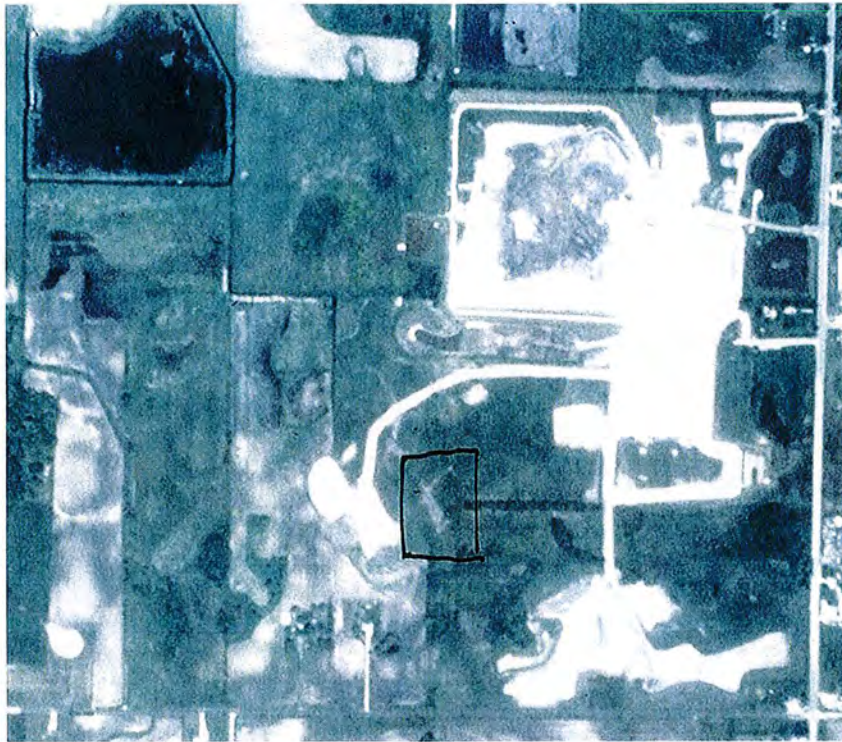
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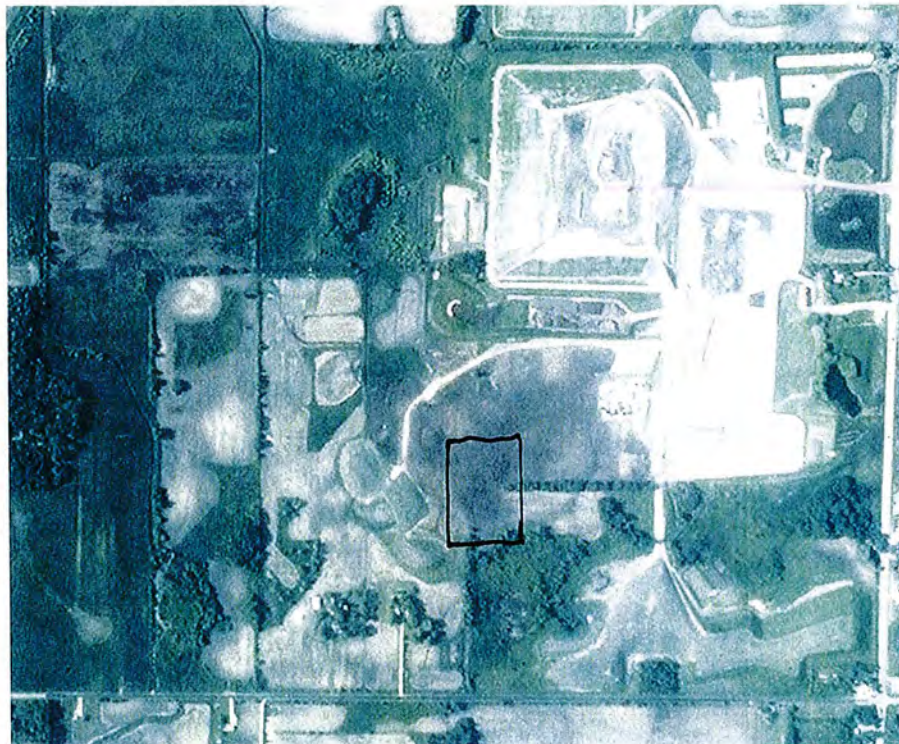
1998



1999



2000



2001



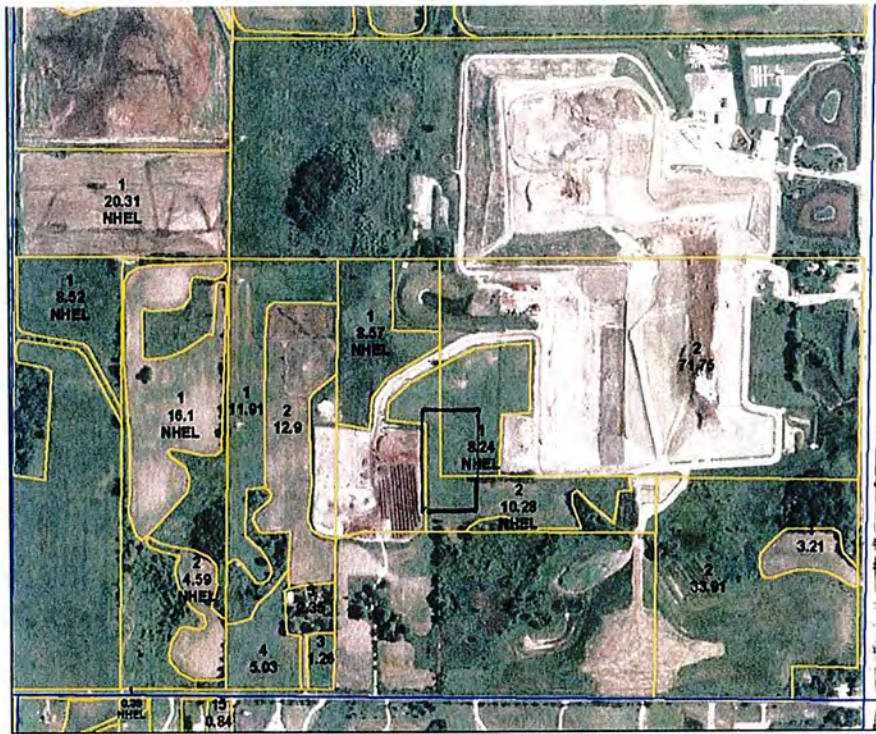
2002



2003



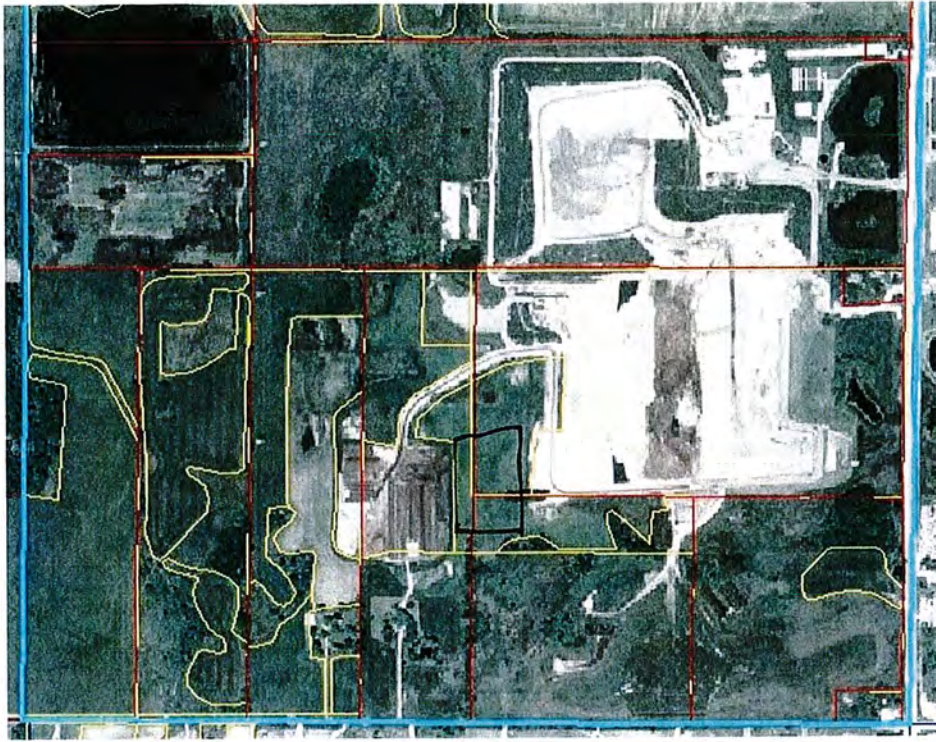
2004



2005

140





2006



Emerald Park Landfill Western Expansion  
ADS  
December 10, 2014

Wetland Delineation Report  
City of Muskego, Waukesha County, Wisconsin  
Stantec Project # 193702557

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## RESUMES

Mr. Parker is a botanist and certified Professional Wetland Scientist, with 30 years of professional and project management experience assisting public and private clientele in Wisconsin, Illinois, Indiana, Michigan, Pennsylvania, Texas, Maryland, Virginia, and North Carolina. His work has supported thousands of transportation, commercial, utility, residential, industrial & institutional projects. Mr. Parker's natural resource specialties include wetland science, botany, endangered resources, restoration & mitigation, environmental regulations & permitting. Mr. Parker has a widespread understanding of the scientific, technical & regulatory aspects of natural resources projects. His interests also include floristic quality assessment (FQA) and wetness categorization of wetland plant species. In 2011 he completed a national study (all 50 states) where he interviewed regional scientists for the purpose of identifying mis-categorized plant species. This work was in response to a CFR public comment solicitation by the U.S. Army Corps of Engineers.

His experience includes the following: Botanical / Biological Surveys & Natural Resource Inventories; Rare Species Surveys, Conservation Plans & Monitoring; Habitat Restoration, Land Reclamation, Planning & Design; Wetland Determination, Delineation & Functional Assessment; Wetland Restoration, Mitigation, Banking & Monitoring; Environmental Assessments & Impact Statements (EA / EIS); Local / State / Federal Permit Applications & Environmental Documentation; Expert Witness Testimony; Wetland investigations and permitting; and Regulatory permit compliance.

## EDUCATION

BS, Watershed Management, Soils Minor, University of Wisconsin - Stevens Point, Stevens Point, WI, 1983

US Army Terrain Analysis Course, Distinguished Graduate, Defense Mapping School, Fort Belvoir, VA, 1984

Introductory NHI Training (T&E Species Database), Wisconsin Department of Natural Resources, Madison, WI, 2011

Wetland Delineation Regional Supplement Field Practicum, Wetland Training Institute, Portage, WI, 2011

Basic Hydric Soils Identification Course, UW-La Crosse, La Crosse, Wisconsin, 2011

Basic Hydric Soils Identification Continuing Education Course, UW-La Crosse, La Crosse, Wisconsin, 2011

Federal Wetland/Waters Regulatory Policy Course, Wetland Training Institute, Cottage Grove, WI, 2010

Regional Supplement Field Practicum, Wetland Training Institute, Portage, Wisconsin, 2011

Midwest Supplement Training, SEWRPC, Pewaukee, WI, 2009

Midwest Supplement Field Training, LCSMC, Lake County, IL, 2009

Effective Negotiations, Advanced Management Institute, Brookfield, WI, 2009

Leadership Development Modules 1-4, Braley Consulting, Milwaukee, WI, 2007, 2008

Sedges ID & Ecology, UWM Cedarburg Bog Field Station, Saukville, WI, 2006

Critical Methods in Wetland Delineation, Madison, WI, 2006

WDNR NHI Database Training, Wisconsin DNR, Fitchburg, WI, 2005

Environmental Corridors Training, SEWRPC, Waukesha, WI, 2004

Advanced Wetland Delineation, UW-LaCrosse, Bayfield County, WI, 2001

# Eric C. Parker PWS

Senior Scientist - Botanist

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Composite Family ID, UWM Cedarburg Bog Field Station, Saukville, WI, 2000

Basic Processes in Hydric Soils, NC State University, Greenville, NC, 2000

Mosses ID & Ecology, UWM Cedarburg Bog Field Station, Saukville, WI, 1998

Grasses ID & Ecology, UWM Cedarburg Bog Field Station, Saukville, WI, 1998

Vegetation Description, UWM Cedarburg Bog Field Station, Saukville, WI, 1998

GPS/GIS End User Course, Corvallis Microtech, Milwaukee, WI, 1997

Basic Wetland Delineation Training, WI Department of Administration, Waukesha, WI, 1997

Effective Streambank Stabilization and Stormwater Channel Design, UW College of Engineering, Madison, WI, 1996

Project Development & Environmental Documentation, FHA Course No. 14205, Madison, WI, 1995

Field Oriented Wetland Delineation Course (1987 Corps Manual), Wetlands Training Institute, St. Paul, MN, 1994

WI Wetlands Regulation Course, CLE International, Milwaukee, WI, 1993

Creating Wetlands for Habitat Enhancement & Mitigation, UW-Extension, Madison, WI, 1993

Environmental Red Book Training, Wisconsin DOT, Waukesha, WI, 1992

Understanding Wetlands and 404 Permitting, ASCE, Chicago, IL, 1992

Managing Environmental Impacts of Highway Projects, UW-Extension, Madison, WI, 1990

Wetland Ecosystems (including delineation & assessment), USEPA Graduate School, Washington DC, 1988

## REGISTRATIONS

Professional Wetland Scientist #838, Society of Wetland Scientists Certification Program

Certified Wetland Scientist #C-058, Lake County, Illinois, Lake County Stormwater Management Commission

Certified Wetland Scientist #W-057, Kane County, Illinois, Kane County Stormwater Management

## MEMBERSHIPS

Past Science Committee Member, Invasive Plants Association of Wisconsin

Board Member, Keep Greater Milwaukee Beautiful, Inc.

Representative, Chicago Wilderness

Past Board Member, Wisconsin Wetlands Association

## PROJECT EXPERIENCE

### Wetlands

#### Various Wetland Delineations 2013, Various Locations, Wisconsin, Illinois, Ohio, and Michigan

*Performed various wetland delineations across Wisconsin in 2012 including the following projects: West Central Lateral - Eau Claire, Clark, Jackson & Monroe Counties, WI (April-May 2013); Murphy Farm Wetland & Primary Environmental Corridor, Pewaukee, WI (October 2013); Walker Cranberry 80-acre Parcel - Cranmoor, WI (Sept - Oct 2013); Citizens Bank Property - Oconomowoc, WI (May 2013); Broken Hill Subdivision, Pewaukee, WI (May, 2013); Agri-Partners Coop Rail siding track, Calumet County, WI (June 2013); Basse Farm Wetland Delineation, City of Muskego, WI (June 2013); Fritz Parcel Wetland Delineation - New Berlin, WI (June 2013); Saltzman Parcel Wetland Investigation - New Berlin, WI (May 2013); Waukesha Gun Club Wetland Delineation - City of Pewaukee, WI (July 2013); Bark Lake Wetland Delineation - Town of Richfield, WI (Aug 2013); Fox River Christian Church Wetland Delineation - Town of Waukesha, WI (Aug 2013); Cedar Grove Warehouse Wetland Delineation - Oostburg, WI (Aug 2013); Waunakee Wetland Delineation - Dane County, WI (Sept 2013); Town of Fulton Wetland Delineation - Rock County, WI (Sept 2013); Berne to Natrium Pipeline, Monroe County, OH (Oct 2013); CNX Noble Pipeline - Noble County, OH (Oct 2013); 4950 Voges Rd Wetland Delineation - Madison, WI (Sept 2013); Pleasant View Subdivision Wetland Delineation - Middleton, WI (Oct 2013); Cherokee Country Club Wetland Delineation - Madison, WI (Oct 2013); Deer Grove Forest Preserve, (November 2013)*

#### Various Wetland Delineations in 2010, Wisconsin

*Performed various wetland delineations across Wisconsin in 2010 including the following projects: Substation Site, Cambridge, WI (November 2010); Lake Edge Rd Parcel, McFarland, WI (November 2010); DeBack Parcel, Muskego, WI (October 2010); I-94 at Fox River, Waukesha, WI (October 2010); USH 45, Racine County, WI (October, 2010); ECB Site I, Franklin, WI (October 2010); STH 11 Improvements, Burlington, WI (October, 2010); Glacier Hills Wind Farm, Friesland, WI (Sept-Oct 2010); ISB Site, New Berlin, WI (September 2010); Gilmore Parcel, New Berlin, WI (September 2010); Palmyra SW Park Site, Palmyra, WI (August 2010); Gateway Substation, Beloit, WI (August 2010); Casey Gas Main, Friesland, WI (August 2010); Oakhill Rd Electric Distribution, Deltona, WI (August 2010); Jefferson School District, Jefferson, WI (July 2010); Bothe Property Site, Kenosha, WI (July 2010); WDOT High Speed Rail, Dane, Jefferson and Waukesha Counties, WI (June-September 2010); USH 151 Sun Prairie, (June 2010); Lacy Road Interchange, Fitchburg, WI (May 2010); Sivyer Rd Parcel, St. Francis, WI (April 2010); Seljan Industries, Lake Mills, WI (April 2010); Retail Site, Whitewater, WI (April 2010); Summit Horse Farm Site, Summit, WI (March 2010); STH 11 Site, Walworth County, WI (March 2010); Scot Industries, East Troy, WI (March 2010)*

#### Various Wetland Delineations 2011, Various Locations, Wisconsin, Illinois, Indiana, and Pennsylvania

*Performed various wetland delineation projects throughout Wisconsin in 2011 including the following projects: Plum Creek Site Soil & Water Table Investigation, Oneida County, WI (Dec 2011); 6B Pipeline Porter County, IN (Nov 2011); STH 67 Sharon, Walworth County, WI (Nov 2011); STH 67 Geneva, Walworth County, WI (Nov 2011); STH 175 Germantown/Richfield, WI (Nov 2011); USH 12 Interchanges, Walworth County, WI (Oct 2011); I-43 Interchanges, Ozaukee County, WI (Oct 2011); STH 145 Germantown, WI (Oct 2011); STH 164 Town of Vernon, WI (Oct 2011); STH 20 Village of Waterford, WI (Oct 2011); Serosun Farms Verification, Kane County, IL (Oct 2011); Marcellus-Dominion Pipeline Clinton, Centre and Mifflin Counties, PA (Sept 2011); Big Eau Pleine Site, Marathon County, WI (Aug 2011)*

## Eric C. Parker PWS

Senior Scientist - Botanist

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*Atlas Resins Site, Taylor, WI (Aug 2011); Reynolds Avenue Site, Westport, WI (Aug 2011); Westbridge Site, Waunakee, WI (Aug 2011); ECB Site II, City of Franklin, WI (Aug 2011); Springdale Rd Parcel, New Berlin, WI (Aug 2011); Belleville Industrial Park, Dane County, WI (Aug 2011); Didion Ethanol Plant, Cambria, WI (July 2011); Towns Property, Mukwonago, WI (July 2011); Bagstad Property, Marquette County, WI (June 2011); Life Church Site, Germantown, WI (June 2011); Sauk Prairie Memorial Hospital, Prairie du Sac, WI (June 2011)*

### Various Wetland Delineations 2012, Various Locations, Wisconsin, Illinois, Indiana, and Texas

*Performed various wetland delineations across Wisconsin in 2012 including the following projects: West Central Lateral (190 miles), Eau Claire, Clark, Jackson & Monroe Counties, WI (Sept-Nov 2012); Schwaab Property Wetland & Primary Environmental Corridor, Nashotah, WI (Nov 2012); Trans-Load Rail Loop, Arcadia, WI (Oct 2012); Fiberdome Property Lake Mills, WI (Sept 2012); Morrison Cr Cranberry, Town of Knapp, WI (Aug 2012); London Mitigation Site, Jefferson County, WI (July 2012); Lathers Property Wetland & Primary Environmental Corridor, Waukesha County, WI (June 2012); Southern Access Pipeline, Sawyer and Washburn Counties, WI (June 2012); Reddick Station, Livingston County, IL (May 2012); Confidential Client Site, Jackson County, WI (April 2012); MATC West Parcel, Madison, WI (April 2012); Alpine Business Park, Oregon, WI (April 2012); I-80 Interchange, LaPorte County, IN (March 2012); Eagle-Ford Shale Wetland & Waterway Investigations, LaSalle and McMullen Counties, TX (Jan-Feb 2012)*

### Various Preliminary Wetland Identifications 2010-2012, Wisconsin

*Performed various preliminary wetland identifications and delineations throughout Wisconsin which included these projects: I-43 Glendale to Grafton (34 miles) - Milwaukee and Ozaukee Counties, WI (May-Aug 2012); STH 60 Jackson to Grafton (9 miles) - Washington and Ozaukee Counties, WI (June-Nov 2012); UW All-Season Softball Site, Madison, WI (Dec 2011); Fiber-Optic Route (40 miles), Wausau, WI (Apr 2011); 27th Street Ponds, Franklin-Oak Creek, WI (July 2010); Burlington Bypass (15 miles), Burlington, WI (Aug 2010); STH 167, Germantown-Mequon, WI (Jul-Aug 2010); USH 45 (10 miles), Bristol, WI (November 2010) STH 20 Roundabout, Dover, WI (November 2010).*

USH 10 Wetland and Waterway Mapping (I-39 to Marshfield)\*, Portage and Wood Counties, WI (Project Manager, Principal-in-Charge, Lead Scientist)

*Budgeted, scheduled, coordinated and participated in numerous tasks to map wetlands and waterways along two contiguous freeway corridor segments totaling approximately 35 miles in length during the growing seasons of 2005 and 2007; Supervised and participated in the final determination, delineation, classification and GPS survey of 174 wetlands; Reviewed and helped write the report.*

Deer Grove Forest Preserve Wetland Delineation and Restoration\*, Cook County, IL (Project Manager and Lead Scientist)

*Budgeted, scheduled, coordinated and participated in numerous tasks to map and classify wetlands and waterways on a 628-acre site located on lands owned by the Forest Preserve District of Cook County. Supervised and participated in final wetland determinations and delineations of 40 wetlands comprising 188 acres; Used GPS to locate wetland boundaries and coordinated with the client, forest preserve district staff and US Army Corps of Engineers regulatory staff in the concurrence of the wetland delineation work; Assisted in the preparation and reviewed the report; Assisted in the preparation of a wetland and upland prairie/woodland restoration concept for the purpose of helping to meet the mitigation requirements of the O'Hare International Airport expansion.*

Melissa Curran is a professional botanist specializing in vascular plant identification, ecological and botanical assessments and characterizations; natural resource inventories including rare, threatened, and endangered species surveys; invasive plant surveys; and long-term biological monitoring. Melissa has extensive experience conducting detailed botanical inventories of plant communities throughout the upper Midwest. Her work has supported hundreds of transportation, commercial, utility, residential, industrial & institutional projects. These projects have ranged from general reconnaissance observations to quantitative, community- and species-specific surveys.

Melissa has an understanding of the technical and regulatory aspects of environmental projects and is highly respected by regulatory personnel. Her experience includes: Wetland investigations and permitting; Regulatory permit compliance; Wetland mitigation design and monitoring; Biological surveys; Natural resource and habitat restoration plans; Project facilitation and collaboration; and, National Environmental Policy Act documentation (EA/EIS).

## EDUCATION

BS, Natural Resources, University of Wisconsin, Madison, WI, 2006

Sedges of Wisconsin, UW-Milwaukee Field Station, Madison, WI, 2008

Grasses: Identification and Ecology, UW-Milwaukee Field Station, Madison, WI, 2009

Natural Heritage Inventory Training, Wisconsin Department of Natural Resources, Madison, WI, 2006

Bureau of Natural Heritage Conservation, Certified Endangered Resources Reviewer Training, Wisconsin Department of Natural Resources, Madison, WI, 2011

## MEMBERSHIPS

Member, Michigan Botanical Club

## PROJECT EXPERIENCE

### Environmental Management

We Energies, Various Location, Wisconsin and Michigan

*Perform environmental management services for small-scale utility projects and major project corridors. Conduct review of project corridors for environmentally sensitive natural features, perform field assessments to identify and map sensitive natural features, and track projects in STORMS database.*

### Natural Resource Services

USDA Forest Service, Various Locations, Michigan and Minnesota

*Conduct rare and invasive plant surveys on proposed timber stands and wildlife management areas within the Ottawa and Chippewa National Forests as part of NEPA requirements. Performed*

Wetland Restoration and Trail, Door County, Wisconsin

*Designed and permitted a ridge and swale restoration and 1/2 mile interpretive trail within The Ridges Sanctuary, a State Natural Area. Completed wetland delineation, boardwalk design, endangered species surveys and extensive agency coordination. Developed multiple boardwalk alternatives to minimize multiple site constraints.*

Wisconsin Power and Light, Grant County, Wisconsin

*Conduct rare and invasive plant surveys/habitat assessments at the site of a proposed new electric generating unit.*

# Melissa Curran

Botanist/Project Manager

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## Copperwood Biological Inventory Project, Various Locations, Michigan

*Designed, coordinated and conducted a comprehensive plant species inventory and plant community mapping on a two square-mile study site located adjacent to Lake Superior in Michigan's Upper Peninsula. Final reporting included comprehensive plant species lists, floristic quality index values and plant community descriptions. Rare species coordination and relocation of 300+ rare orchid species.*

## Mirbeau-Hummel Development, Lake Geneva, Wisconsin

*Delineate primary environmental corridors, inventory natural features, and assess environmental quality of plant communities for a commercial/residential development.*

## Pattison Sand Company, Clayton County, IA

*Completed a vegetation inventory and threatened and endangered species survey for a proposed road realignment.*

## Habitat Assessment and Trail, Manitowoc, Wisconsin

*Completed habitat assessment for 230 acres estuary of the Little Manitowoc River. Prepared an Aquatic Invasive Species grant application to control non-native species within the estuary.*

## CAPX2020, 345kV Transmission Project, Various Location, Minnesota and Wisconsin

*Conducted landscape-scale field habitat assessments and wetland/waterway determinations, and performed preliminary threatened and endangered species and sensitive natural resource area analyses for project macro-corridors.*

## North McGaw Park Neighborhood, Dane County, Wisconsin

*Perform ecological assessment of project area for potential residential development. Responsibilities include a quantitative and qualitative inventory of all natural communities and a thorough ecological review of the soils and wildlife present on the property.*

## Northeast Neighborhood, Dane County, Wisconsin

*Perform ecological assessment of woodland areas for potential residential development. Responsibilities include a quantitative and qualitative inventory of the forest canopy, shrub and herbaceous communities and a thorough ecological review of the soils and wildlife present on the property.*

## Wind Power

### Eurus Energy, Butler Ridge Wind Farm, Dodge County, Wisconsin

*Perform a variety of ecological services including: initial wetland assessment of potential wetland impact areas; official wetland delineations; ordinary high water mark determination (OHWM); and assisting with permit application.*

### Navitas Energy Wind Turbine Project, Manitowoc County, Wisconsin

*Conduct wetland and waterway delineation and provide construction corridor planning assistance to avoid and minimize impacts and streamline permitting processes.*

### Red Oak Wind Energy Project, Grant County, Wisconsin

*Conduct landscape scale habitat assessments for commercial scale wind energy project.*

### Wind Capital Group, White Oak Wind, LLC, Grant County, Wisconsin

*Conducted landscape-scale field habitat assessments, and performed preliminary threatened and endangered species and sensitive natural resource area analyses for project.*

### Alliant Energy Wind Turbine Project, Fond du Lac County, Wisconsin

*Completed wetland delineations, T&E surveys, stream studies, tree surveys, agency coordination, and permitting. Completed 49 jurisdictional determinations. Completed permit compliance and erosion control inspections.*

### We Energies Glacier Hills Wind Energy Project, Dodge County, Wisconsin

*Completed wetland delineations, agency coordination, and permitting. Completed permit compliance and erosion control inspections.*

### Invenergy, Ledge Wind Farm, Brown County, Wisconsin

*Completed NEPA documentation for 150 MW wind energy facility. Completed agency consultation/field reviews, habitat mapping, T&E surveys, wetland and waterway mapping, archaeological surveys and SHPO consultation, and GIS mapping. Participated in public information meetings.*

\* denotes projects completed with other firms



# Melissa Curran

Botanist/Project Manager

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## Power Transmission & Distribution

American Transmission Company, Various Locations  
*Conducted preliminary environmental assessments; including, wetland delineations, vegetation inventories, rare plant species surveys, invasive plant species surveys, community mapping, habitat assessment for the Hine's Emerald Dragonfly and natural resources inventories along existing and proposed transmission line rights-of-way. Draft environmental inventory tables and assisted with supporting documents for Certificates of Authority or Public Convenience and Necessity (CA or CPCN) applications to Public Service Commission of Wisconsin. Projects include: Straits-Pine River (MI), Clear Lake-Woodmin (WI), Aprin-Rock-Run (WI), Arrowhead-Weston (WI), Cranberry-Conover-Plains (WI and MI), Jefferson- Stoney Brook (WI), Rockdale-West Middleton (WI), and Paddock-Rockdale (WI) transmission lines.*

## Wetland Restoration and Mitigation

Tillmann Ulao Ponds, Ozaukee County, Wisconsin  
*Completed annual mitigation site monitoring, vegetation surveys, and performance evaluations for wetland mitigation site.*

Wis-DOT, Jug Creek Wetland Mitigation Monitoring, Vernon County, Wisconsin  
*Completed comprehensive vegetation surveys, mapping, performance evaluations, and reporting of 10-acre mitigation site.*

Wis-DOT, Wildcat Mountain Wetland Mitigation Monitoring, Vernon County, Wisconsin  
*Completed comprehensive vegetation surveys, mapping, performance evaluations, and reporting of 38-acre mitigation site.*

Wis-DOT, London Wetland Mitigation Monitoring, Jefferson County, Wisconsin  
*Completed annual mitigation site monitoring, vegetation surveys, and performance evaluations for wetland mitigation site.*

Ashley Furniture Industries Expansion Project, Arcadia, Wisconsin  
*Completed annual mitigation site monitoring, vegetation surveys, and performance evaluations for 35-acre wetland mitigation.*

Morrison Creek Cranberry Company, Wetland Mitigation Bank Monitoring and Remediation, Oakdale, Wisconsin  
*Completed annual mitigation site monitoring, vegetation surveys, and performance evaluations of 60-acre mitigation bank site. Completed mitigation remediation monitoring of 6+ acre site in compliance with USACE performance standards.*

Glacier Ridge and Emerald Park Landfills, Wisconsin  
*Provided post-mitigation monitoring for restored prairie, wetland, and woodland habitats. Monitoring activities included preparation of comprehensive plant species lists, invasive species mapping, and calculation of floristic metrics. Provided management recommendations to meet project performance standards.*

Moses Creek Restoration and Trail, Stevens Point, Wisconsin  
*Provided post-mitigation monitoring for restored prairie, wetland, and woodland habitats associated with naturalizing Moses Creek on the campus of UW-Stevens Point to serve educational, recreational and interpretive uses.*

Lost Creek Wetland and Stream Restoration, Stevens Point, Wisconsin  
*Completed comprehensive vegetation surveys, mapping, performance evaluations, and reporting of 350-acre mitigation site.*

Mr. Prasch is a project manager and environmental scientist in the energy sector who has managed numerous projects from proposal through field work and into the permitting and construction phases of the project. Environmental services have included extensive wetland and waterway delineations, Endangered Species Act Section 7 reviews, reporting and permitting for Section 404 and state Water Quality Certifications. Additional project work has included regulatory coordination with local municipalities, regional planning commissions, as well as Public Service Board testimonies for Vermont Section 248 and Vermont Act 250 appearances where he represented clients for a diverse suite of land use and wetland permits. Technical services have also included testifying before Vermont Environmental Court with regards to impacts to wetland resources for several projects in the Northeast. Additional qualifications include Certification as a Wetland Scientist by the New Hampshire Joint Board (NHCWS #262).

## EDUCATION

Bachelor of Science, Biological Aspects of Conservation, University of Wisconsin-Madison, Madison, Wisconsin, 2003

## REGISTRATIONS

Certified Wetland Scientist #262, State of New Hampshire Board of Natural Scientists

## PROJECT EXPERIENCE

### Wind Power

UPC Wind-Sheffield Wind Farm\*, Sheffield, Vermont

*Field Lead responsible for conducting wetland/waterway delineations, land cover mapping, and reporting to meet USFWS requests to determine black bear habitat within the project area.*

Green Mountain Power-Kingdom Community Wind\*, Lowell, Vermont

*Project Manager and lead scientist in conducting wetland/waterway delineations, black bear habitat assessments, RTE plant surveys, and land cover mapping for the project. Professional services included pre-filed expert witness testimony and direct testimony before the Vermont Public Service Board in support of a Section 248 Certificate of Public Good. Extensive regulatory coordination including site visits with stakeholders, Army Corps and state Wetland Ecologists. Public presentations, construction feasibility, and coordination with project team were included in professional services to Green Mt. Power and Vermont Energy Research Associates (VERA).*

### Power Transmission & Distribution

Vermont Electric Power Company (VELCO), Lamoille County Project\*, Duxbury to Stowe, Vermont

*Project Manager and team lead for the off-ROW access routes associated with the project. Services included wetland and waterway delineations, reporting, and preparation of an Individual Section 404 permit along with state Water Quality Certification and Vermont Conditional Use Permit for the over-all project.*

Vermont Electric Power Company (VELCO), East Avenue Loop Project\*, Burlington, Vermont

*Project Manager and lead field scientist in support of Section 248 Petition to the Vermont Public Service Board for a Certificate of Public Good. Conducted wetland delineations and RTE surveys, including extensive regulatory coordination with Army Corps of Engineers, VT Fish and Wildlife, and VT Agency of Natural Resources no support findings of no undue adverse impact to the natural environment. Additional services included preparation of pre-filed expert witness testimony, preparation of Individual Section 404 permit, and Vermont Conditional Use permit for impacts to Class II Wetlands along the Winooski River.*

American Transmission Company-Badger Coulee Transmission Line Project, Various Sites, Wisconsin

*Conducted natural resource assessments along several route options for the proposed project. Environmental services included wetland delineations, threatened and endangered plant surveys, and land cover mapping.*

\* denotes projects completed with other firms

# Daniel Prash

Environmental Scientist

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## American Transmission Company-Bay Lakes Project, Holmes to Escanaba, Michigan

*Field team lead for natural resource assessments including wetlands and waterways, land cover mapping, and GPS-based survey of environmental features.*

## National Grid G33-Reconductoring and Refurbishment Project\*, Vermont and New Hampshire

*Project manager responsible for field assessments, reporting, permitting, and regulatory coordination in support of Section 248 petition for a Certificate of Public Good from the Vermont Public Service Board. Client services included pre-filed expert witness testimony, Public Service Board meetings, representation at planning commission reviews, and coordination with VT Fish and Wildlife regarding RTE plants and animals.*

*\* denotes projects completed with other firms*

**Date:** 5/18/2015

**Subject:** RE: Emerald Park Landfill West Expansion Wetland Delineation Confirmation

**From:** Tyler Field

**Attendees:** Neil Molstad (WDNR), Eric Parker (STANTEC), Jon Gumtow (STANTEC), Marie Kopka (ACOE), Joe Lourigan (WDNR), Mike Hackney (ADS), Doug Coenen (ADS) Tyler Field (CEG)

**CC:** Jay Warzinski

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**General Meeting Notes:**

The goal and purpose of this meeting is to agree upon delineated wetland boundaries within the Western Expansion Project area so that a final delineation confirmation can be reached by the WDNR and ACOE. Below is a summary of the items discussed during the meeting and the project site field review.

1. March 9, 2015 Western Expansion Delineation Report: At this time Wisconsin Department of Natural Resources (WDNR) and the Army Corps of Engineers (ACOE) do not see any lacking documentation or issues with the submitted delineation report that would specifically prohibit them from making a determination of confirming the wetland boundaries. Both WDNR and ACOE want to follow up this meeting with a Field walk to view the delineated boundaries.
  2. Wetland 4 Jurisdictional Status: Advanced Disposal Services, Stantec and Cornerstone believe that Wetland 4 is a non-jurisdictional wetland and should not require any further evaluation, or mitigation when it comes time to submit the individual wetland permit, since W4 was created by an engineered stormwater feature created for the operation of the adjacent compost facility. Marie Kopka with ACOE generally agrees with this but needs to have the WDNR's compost facility approval letter before making a final decision. Tyler Field will provide this approval to Marie Kopka.
-

3. Agricultural Drainage Ditch in W2 Navigability: Although not a main point of focus for this meeting Advanced Disposal Services would like to know why the point of navigability as indicated in a memo from Kathy Kramasz dated September 23, 2014 indicates a much different point of navigability compared to the point of navigability the WDNR agreed to during a field visit on November 12, 2007 documented in meeting minutes completed by NRC, which indicated WDNR would agree to a point of navigability starting 240' South of the 90 degree bend in ditch D2. WDNR responded to this by stating that no official determination was made in 2007 and that no written record of a WDNR navigability determination memo has been found. WDNR asked that if Advanced has a WDNR navigability memo that was sent to them to share it so that WDNR can look at the reasons why navigability was determined to be 240' south of the 90 degree bend of Ditch D2 and no further to the south.
4. Functional Values Assessment: On behalf of Advanced Disposal Services (ADS) Stantec has completed a functional values assessment for all wetlands within the project boundary. WDNR indicated that they have not completed a full FVA and would like ADS to send Stantec's FVA for consideration.

**Field Notes:**

In summary the project area was visited and walked. Wetland boundaries identified by Stantec in the delineation report were reviewed by ACOE and WDNR. A few areas were identified in the field as requiring minor boundary adjustments based on visual observations, and soil observations made by soil samples taken by WDNR during the field walk. One new wetland area was also identified. It was agreed that the new wetland area and the adjusted boundaries could be submitted as an addendum to the delineation report to both the WDNR and the ACOE for confirmation purposes. Below is a summary of the areas identified as requiring adjustments and the new wetland identified in the field.

1. An eastern lobe of W2A should be expanded roughly 18 feet further east per field discussion and observation of standing water and soil samples indicating the presence of hydric soils.
  2. Wetlands W5 and W6 were merged following the old ditch-line between them, resulting in a new name "W5/6". Field observation of vegetation in this area
-

and the connecting ditch indicated that these two wetlands should be joined in to one isolated wetland.

3. An eastern lobe of W1 should be added due to observations of hydric soil samples taken by WDNR in this area.
4. A potential Wetland area near the old barn on the Southeast corner of the project site was observed. Standing water and wetland vegetation were present. STANTEC will evaluate the area and add it as a new wetland area if the evaluation indicates it meets requirements for a wetland. It was noted that it looks like the area may have been formed due to a non-functioning drain tile in the adjacent agricultural field.

#### Field Picture



May 18, 2015 (WDNR Soil Sampling East Side of Wetland W1)

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To: Tyler Field, Project Manager  
Cornerstone Environmental

From: Eric Parker, Melissa Curran  
Stantec Consulting Services Inc.

File: Stantec Project No: 193702557

Date: December 16, 2014

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**Reference: Emerald Park Western Expansion Site 2014 Wetland Functional Assessments**

This technical memorandum summarizing functional assessments of wetlands at the reference location (Site) was completed by Stantec Consulting Services Inc. (Stantec) on behalf of Advanced Disposal Services (ADS) based on field work completed in 2014.

## **BACKGROUND**

The Site is approximately 70 acres and is located west of an existing landfill in the City of Muskego, Waukesha County, Wisconsin (Figure 1). A total of twelve (12) wetlands were delineated at the Site in 2013-2014 (W1, W2, W2A, W3, W4, W5, W6, W7, W8, W9, W10 and W11). This report summarizes functional assessments of the delineated wetlands. The wetland delineation report dated December 10, 2014 provides the locations and classifications of wetlands. Figures 1-5 from that report are attached to this memo and show soil mapping, Wisconsin Wetland Inventory, Stantec delineated wetland locations, and wetland classifications.

## **METHODOLOGY**

Wetland functions were evaluated using the Wisconsin Department of Natural Resources' (WDNR's) Wetland Rapid Assessment Methodology (WRAM) version 2.0. The evaluated functions were 1) Floristic Integrity, 2) Human Use Values, 3) Wildlife Habitat, 4) Fish and Aquatic Life Habitat, 5) Shoreline Protection, 6) Flood and Stormwater Storage, 7) Water Quality Protection, and 8) Groundwater Processes. In order to evaluate functional differences among wetlands, wetlands were grouped based on proximity to each other and type. Community classifications are per Eggers & Reed, version 3.1 (2014), and WDNR-NHI Wetland Communities of Wisconsin (2014). A total of eight (8) WRAM's were completed to evaluate the wetland functions of twelve (12) wetlands delineated on the Site in 2013 - 2014.

## **SUMMARY**

Values of the eight evaluated functions generally ranged between low to medium. As part of Floristic Integrity, Floristic Quality Assessments (FQA's) were completed for each wetland based on plant species observed using the universal FQA calculator web site (Freyman and Masters 2013). Generally, floristic integrity on the site was found to be in a degraded condition because the invasive reed canary grass (*Phalaris arundinacea*) was dominant and prevalent in most wetlands. Some portions of the wetlands and much of the uplands on the Site are farmed (row cropped or hay). The wetlands with the lowest floristic integrity were the farmed W8 and W9, both with native mean C's of 0.5 and a native floristic quality index (FQI) of 0.7. The highest floristic integrity was found to be in W2A, with a native mean C of 3.5 and native FQI of 22.7.

Human use values were generally low because the wetlands are on private land and actual uses were generally low. Wildlife values ranged between low and medium depending on their size,

**Reference: Emerald Park Western Expansion Site 2014 Wetland Functional Assessments**

habitat diversity and landscape context. Priority bird species were identified to potentially be present on the Site based on species presence in the region and habitat not only in the wetlands but also of surrounding wetlands and uplands both on the Site and adjacent properties. Wetlands where suitable habitat was determined to be present were W1, W2, W2A, W10, and W11. These species are identified in the Partners in Flight Priorities plan, the Species of Greatest Conservation Need in Wisconsin's Wildlife Action Plan, the North American Waterfowl Management Plan and the Upper Mississippi / Great Lakes Joint Venture shorebird plan. Identified priority bird species were mallard, blue-winged teal, northern harrier, American woodcock, black-billed cuckoo, willow flycatcher, sedge wren, brown thrasher, swamp sparrow, and dickcissel.

The functions of Fish and Aquatic Life Habitat and Shoreline Protection were generally either low or not applicable because most wetlands were headwaters type wetlands that lacked aquatic habitat. The functions of Flood and Stormwater Storage and Water Quality Protection generally ranged low to medium on the Site while Groundwater Processes generally was low based on clayey subsoil.

Please contact us if you require any additional information regarding the wetland functional assessments conducted in 2014 or the results presented in this memorandum.

**STANTEC CONSULTING SERVICES INC.**

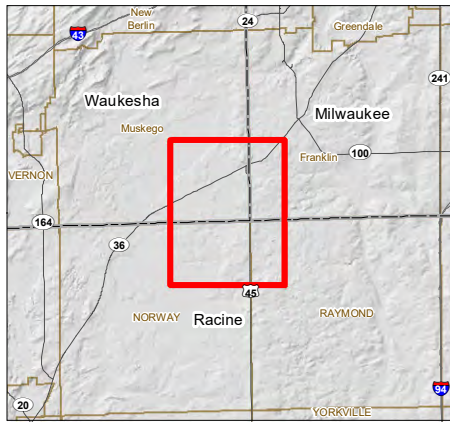
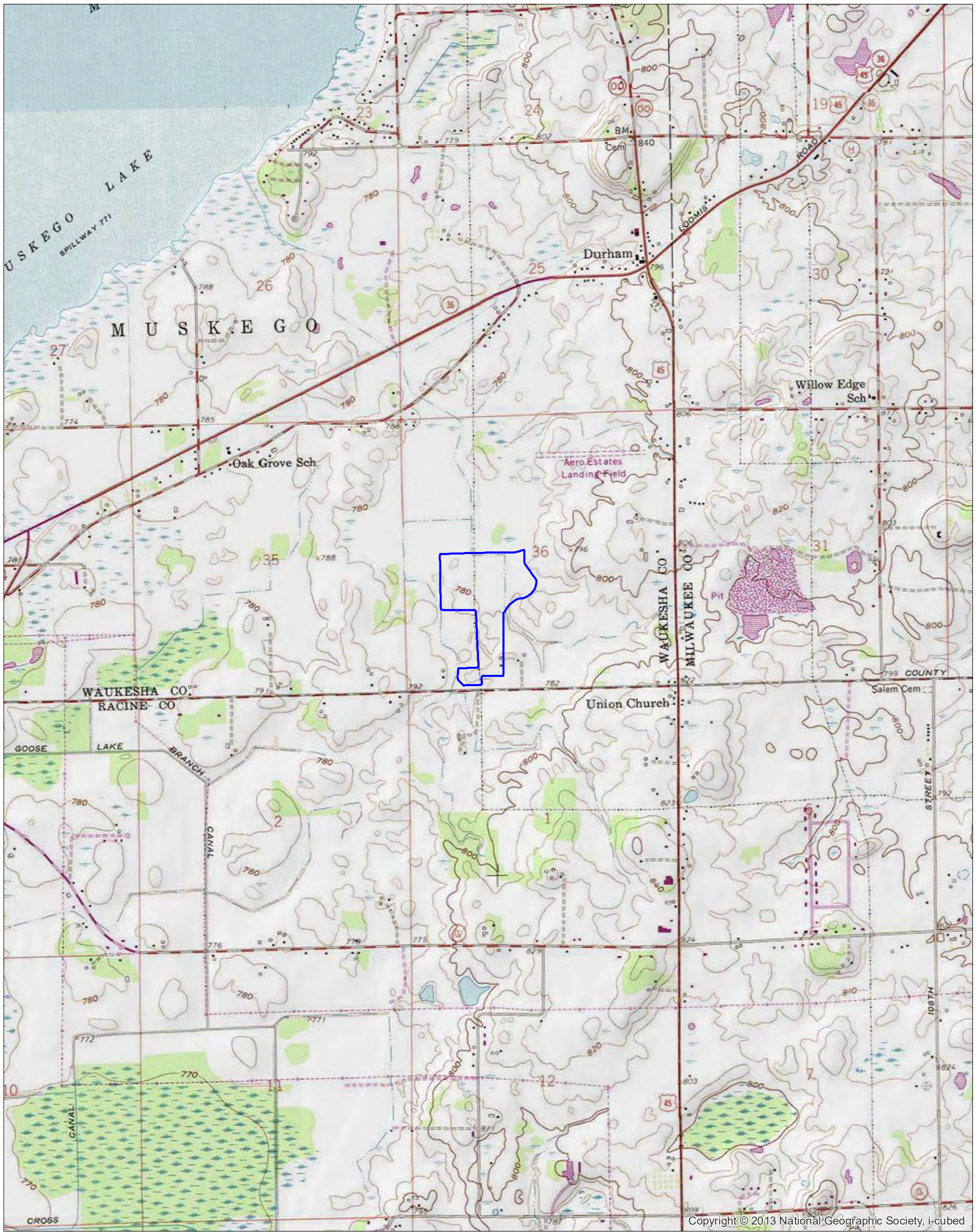


Eric C. Parker, PWS  
Senior Scientist/Botanist  
Phone: (414) 380-0269  
Eric.parker@stantec.com

Attachments: Figures1-5  
Wisconsin Rapid Assessments Forms

c. Melissa Curran  
Melissa.curran@stantec.com  
Stantec Consulting Services Inc.  
Green Bay Office





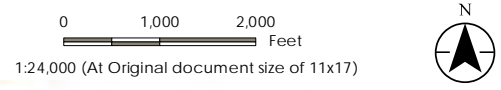
**Legend**  
 Expansion Boundary (2014)

Figure No. **DRAFT**  
 1

Title  
**Project Location and Topography**

Client/Project  
**ADS - Emerald Park Landfill  
 Western Expansion**

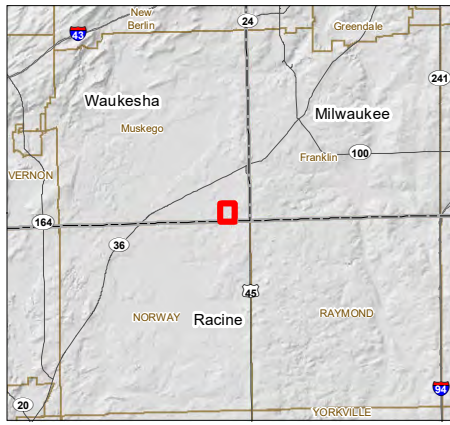
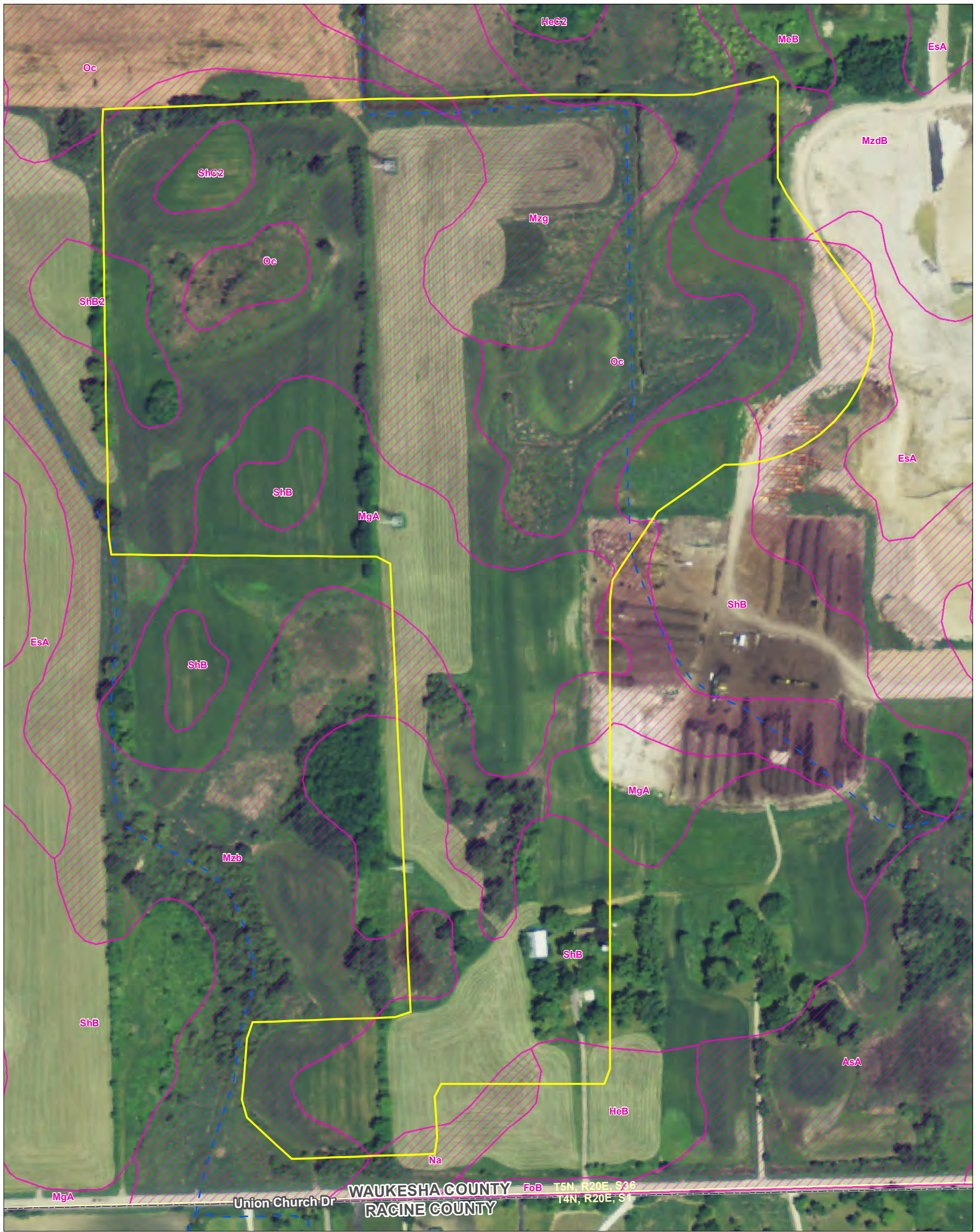
Project Location 193702557  
 S36, T5N, R20E: Prepared by AB on 2014-10-15  
 C. of Muskego, Technical Review by XX on 2014-XX-XX  
 Waukesha Co., WI Independent Review by XX on 2014-XX-XX



**Notes**  
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet  
 2. Data Sources Include: Stantec and USGS  
 3. Background: USGS 7.5' Topographic Quadrangles

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.





- Legend**
- Expansion Boundary (2014)
  - NRCS Soil Survey Data
  - Predominantly Hydric Soils
  - Partially Hydric Soils
  - Non-Hydric Soils
  - DNR 24k Hydrography
  - Perennial Stream
  - Intermittent Stream
  - Waterbody

**Notes**  
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet  
 2. Data Sources Include: Stantec, WDNR, NRCS, WDOT  
 3. Orthophotography: 2013 NAIP

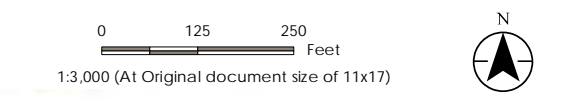
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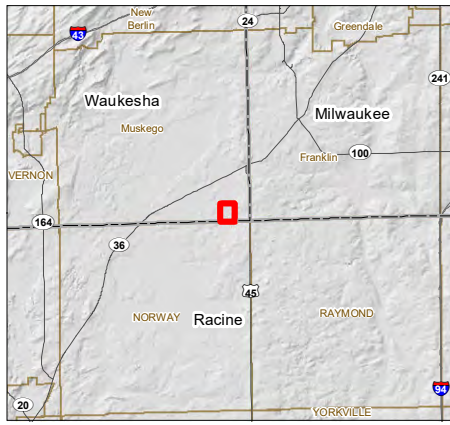
Figure No. **2** **DRAFT**

Title **NRCS Soil Survey Data**

Client/Project **ADS - Emerald Park Landfill Western Expansion**

Project Location **S36, T5N, R20E; C. of Muskego, Waukesha Co., WI** 193702557  
Prepared by AB on 2014-10-15  
Technical Review by XX on 2014-XX-XX  
Independent Review by XX on 2014-XX-XX





- Legend**
- Expansion Boundary (2014)
  - DNR 24k Hydrography
  - ~ Perennial Stream
  - - - Intermittent Stream
  - Waterbody
  - WWI Wetland Class Points
  - Wetland too small to delineate
  - WWI Wetland Class Areas
  - Wetland

**Notes**  
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet  
 2. Data Sources Include: Stantec, WDNR, and WDOT  
 3. Orthophotography: 2013 NAIP

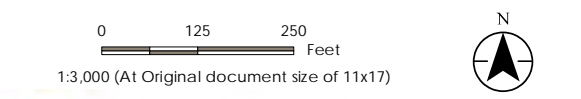
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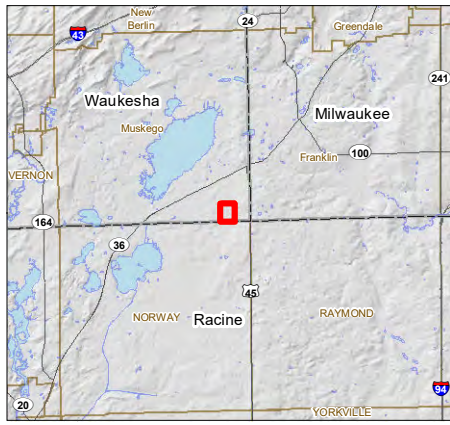
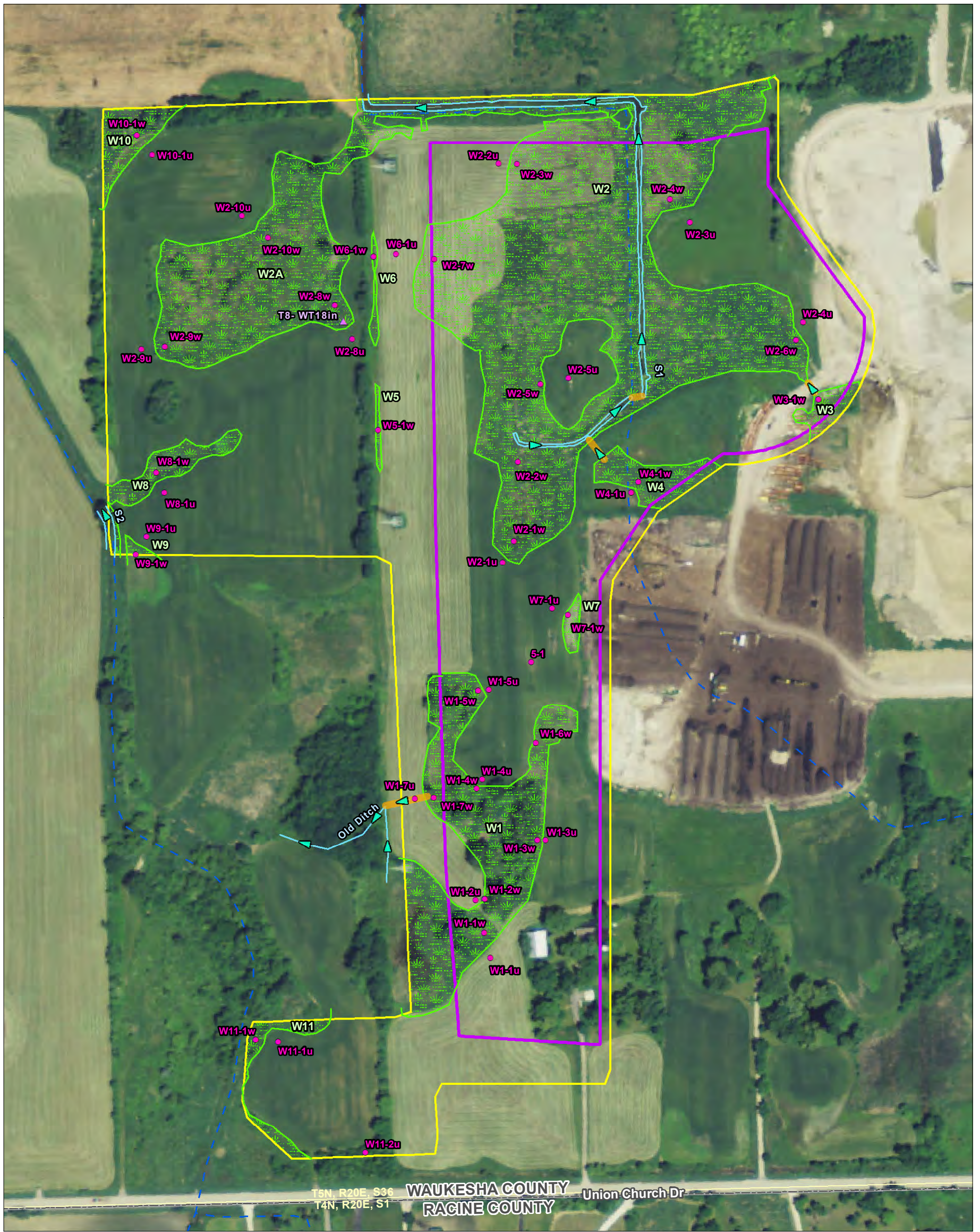
Figure No. **3** DRAFT

Title **Wisconsin Wetland Inventory**

Client/Project **ADS - Emerald Park Landfill Western Expansion**

Project Location **S36, T5N, R20E, C. of Muskego, Waukesha Co., WI** 193702557  
Prepared by AB on 2014-10-15  
Technical Review by XX on 2014-XX-XX  
Independent Review by XX on 2014-XX-XX





- Legend**
- Expansion Boundary (2014)
  - Approximate Expansion Boundary (2013)
  - Sample Point
  - ▲ Soil Bore
  - Culvert
  - Field Delineated Waterway
  - ▶ Flow Direction
  - Field Surveyed Wetland
  - DNR 24k Hydrography
  - Perennial Stream
  - - - Intermittent Stream
  - Waterbody

**Notes**  
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet  
 2. Data Sources Include: Stantec, WDNR, and WDOT  
 3. Orthophotography: 2013 NAIP

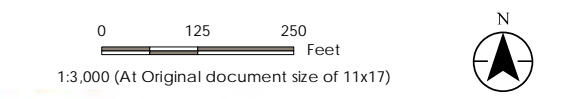
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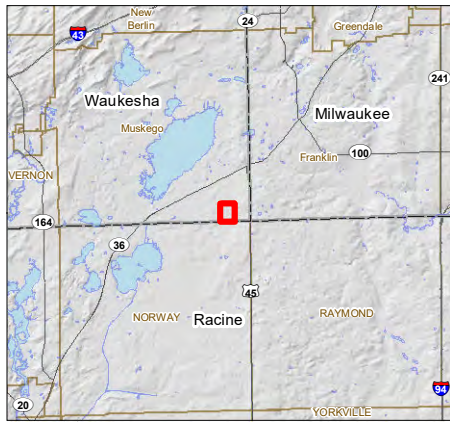
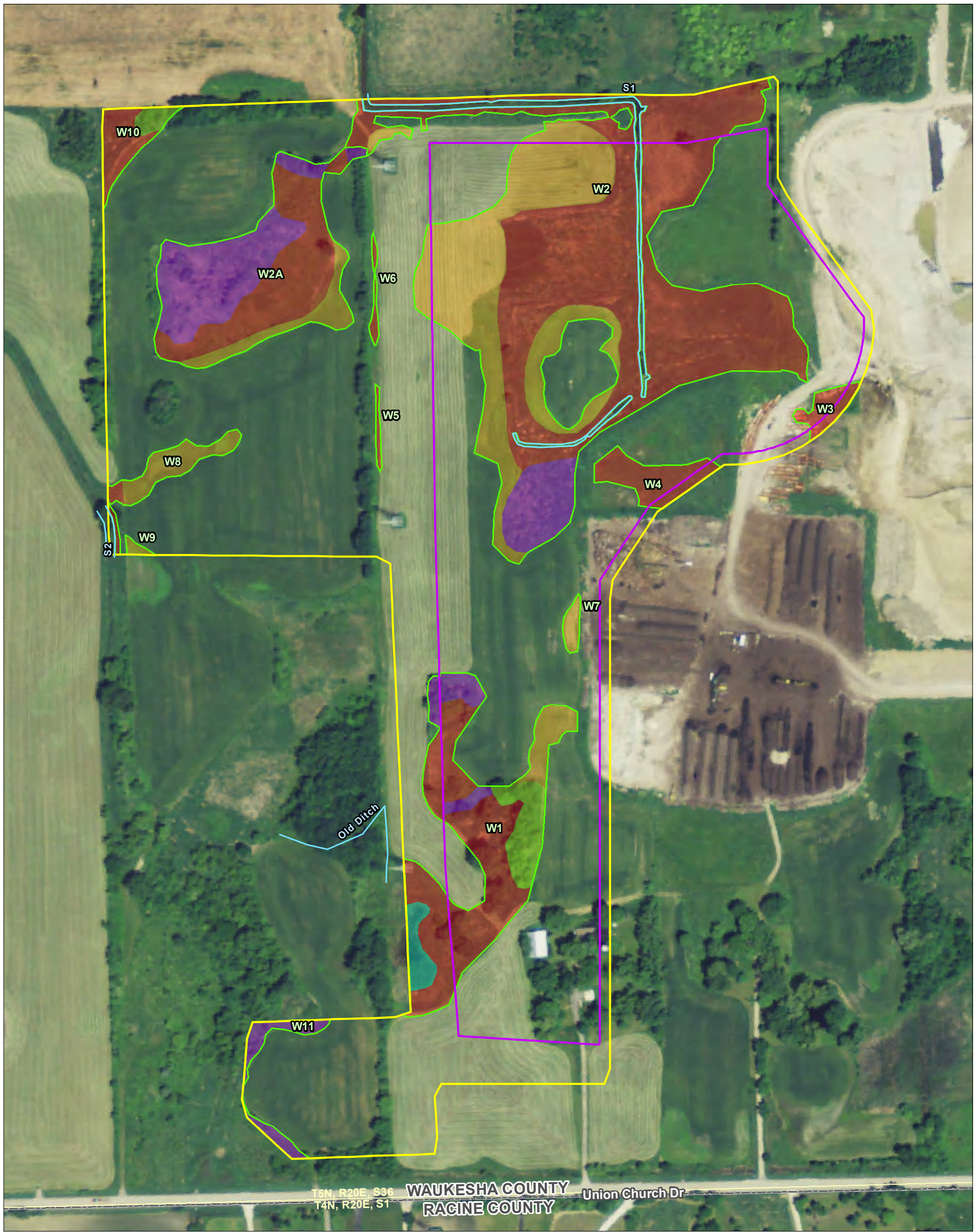
Figure No. **4** DRAFT

Title **Field Delineated Wetland Data**

Client/Project  
**ADS - Emerald Park Landfill  
 Western Expansion**

Project Location 193702557  
 S36, T5N, R20E: Prepared by AB on 2014-10-15  
 C. of Muskego, Technical Review by XX on 2014-XX-XX  
 Waukesha Co., WI Independent Review by XX on 2014-XX-XX





**Notes**

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources Include: Stantec, WDNR, and WDOT
3. Orthophotography: 2013 NAIP

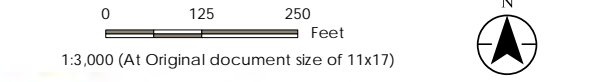
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Figure No. **DRAFT**  
5

Title  
**Plant Communities**

Client/Project  
ADS - Emerald Park Landfill  
Western Expansion

Project Location 193702557  
S36, T5N, R20E: Prepared by AB on 2014-10-15  
C. of Muskego, Technical Review by XX on 2014-XX-XX  
Waukesha Co., WI Independent Review by XX on 2014-XX-XX



**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>			
Project name: <b>Emerald Park Western Expansion Wetlands W1 and W11</b> (portion of larger wetland complex mostly off-site)	Evaluator(s): Eric C. Parker, PWS		
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014		
Location: PLSS: T5N, R20E S36 SW1/4	Ecological Landscape: Southern Lake Michigan Coastal		
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04		
County: Waukesha Town/City/Village: Muskego			
<b>SITE DESCRIPTION</b>			
Soils: Mapped Type(s): (Mzb) Montgomery silty clay loam (Vertic endoaquolls)	WWI Class: T3/E2Ka		
Field Verified: Yes, soils are hydric with depleted matrix or redox in a dark surface generally meeting A11, A12, F3 and/or F6 indicators	Wetland Type(s): Wet meadow, shallow marsh, shrub carr, degraded hardwood swamp (forested), and farmed.		
Hydrology: Seasonally to semi-permanently flooded/saturated, as evidenced by geomorphic position & positive FAC-Neutral Test in most of W1/W11 and primary hydrology indicators in some areas. Runoff from adjacent farm fields and upland woods; portion evaluated set back from waterway. Contiguous w/WBIC 5038471, a second order waterway to the west.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Wetland Size: W1= 3.48 Ac; W11=0.27 Ac</td> <td style="width: 50%; padding: 2px;">Wetland Area Impacted: Unknown</td> </tr> </table>	Wetland Size: W1= 3.48 Ac; W11=0.27 Ac	Wetland Area Impacted: Unknown
Wetland Size: W1= 3.48 Ac; W11=0.27 Ac	Wetland Area Impacted: Unknown		
	Vegetation: Plant Community Description(s): Partially farmed wet meadow dominated by invasive reed canary grass but with natives also present providing moderate diversity of sedges, bulrushes, grasses, forbs, and woody vegetation., agricultural hay fields and degraded woodland.		

**SITE MAP**

<p>See Attached Figures:</p> <ul style="list-style-type: none"> <li>Figure 1 – Project Location and Topography</li> <li>Figure 2 – NRCS Soil Survey Data</li> <li>Figure 3 – Wisconsin Wetland Inventory</li> <li>Figure 4 – Field Delineated Wetland Data</li> <li>Figure 5 – Plant Communities</li> </ul> <p>Figures 4 and 5 depict the wetlands and define the assessment area for wetlands W1 and W11</p>
---

**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N	Y	Used for recreation (hunting, birding, hiking, etc.). List: hunting, birding
2	N	Y	Used for educational or scientific purposes
3	Y		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	Y		In or adjacent to RED FLAG areas-- List: 1) contiguous WBIC 5038471 waterway is ASNRI, 2) W1/W11 are in secondary environmental corridor
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N	Y	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	Y		Wetland and contiguous habitat >10 acres
2	Y		3 or more strata present (>10% cover)
3	Y*		Within or adjacent to habitat corridor or established wildlife habitat area
4	Y		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	Y		Interspersion of habitat structure (hemi-marsh,shrub/emergent, wetland/upland complex,etc.)
7	Y*		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N	Y*	Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	Y*		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	Y*		Wetland is connected or contiguous with perennial stream or lake
2	Y*		Standing water provides habitat for amphibians and aquatic invertebrates
3	Y*		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	n/a		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	n/a		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow or is adjacent to a stream
2	Y		Water flow through wetland is NOT channelized
3	Y		Dense, persistent vegetation
4	N		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	Y		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	Y		Provides substantial storage of storm and floodwater based on previous section
2	Y*		Basin wetland or constricted outlet
3	Y		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	Y		Dense, persistent vegetation
6	Y*		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	Y*		Stormwater or surface water from agricultural land is major hydrology source
8	N		Discharge to surface water
9	Y		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	N		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area

**Section 1 Comments (Refer to Section 1 numbers)**

\*see comment below

WH 3. Part of secondary environmental corridor.

WH 7/8. Mallard, blue-winged teal, northern harrier, woodcock, black-billed cuckoo, willow flycatcher, sedge wren, brown thrasher, swamp sparrow, dickcissel

WH 10. Standing water in W1 in spring provides habitat for common amphibians and invertebrates (e.g. chorus frog, crayfish).

FA 1. Contiguous S2 is intermittent, but flows to Big Muskego Lake, therefore W1/W11 contiguous w/perennial waterbody.

FA 2/3. See WH 10; contiguous waterway S2 is ASNRI for SC, T or E species.

ST 5. Runoff from adjacent agricultural fields.

WQ 2. Constricted outlet westerly via a 100' long culvert from northwestern lobe.

WQ 6. Dense reed canary grass may indicate excess nutrient inputs from upstream sources; but no excess algae/macrophytes.

WQ 7. Surface runoff from adjacent agricultural field.

GW 2. This and other wetlands on the site may be considered headwaters wetlands.

GW 5. Not in City of Muskego wellhead protection area.

**Wildlife Habitat and Species Observation (including amphibians and reptiles)**

**List: direct observation, tracks, scat, other sign; type of habitat: nesting, migratory, winter, etc.**

Observed	Potential	Species/Habitat/Comments
N	Y	Common amphibians and reptiles in wetlands & adjacent wooded and non-agricultural upland likely
Y		White-tailed deer in all areas (tracks, scat, browse, rubs)
Y		Red-tail hawk perching and hunting- direct observation in and adjacent to W1 and W11
N	Y	Small mammals in all parts including meadow vole, cottontail rabbit, opossum, and raccoon (scat)
Y		Various common bird sightings including: robin, red-wing blackbird, sparrows, woodpeckers, crow, ring-billed seagull, Canada goose, catbird

**Fish and Aquatic Life Habitat and Species Observations**

**List: direct observation, other sign; type of habitat: nesting, spawning, nursery areas, etc.**

Observed	Potential	Species/Habitat
Y		Crayfish chimneys



**SECTION 2: Floristic Integrity**

**Plant Community Integrity (circle)\***

	Low	Medium	High	Exceptional
<b>Invasive species cover</b>	> 50%	20-50%	10-20%	<10%
<b>Strata</b>	Missing stratum(a) or bare due to invasive species	All strata present but reduced native species	All strata present and good assemblage of native species	All strata present, conservative species represented
<b>NHI plant community ranking</b>	S4	S3	S2	S1-S2 (S2 high quality)
<b>Relative frequency of plant community in watershed</b>	Abundant	Common	Uncommon	Rare
<b>FQI (optional)</b>	<13	13-23	23-32	>32
<b>Mean C (optional)</b>	<2.4	2.4-4.2	4.3-4.7	>4.7

**Plant Species List (\* dominant); see attached list for complete inventory**

Scientific Name	Common Name	C of C	Plant communities	Comments (Estimate of % Cover, Abundance)
<i>Phalaris arundinacea</i> *	reed canary grass	0	WM - SC	75% overall - Abundant
<i>Salix interior</i> *	sandbar willow	2	SC	15% overall - Common
<i>Bidens frondosa</i> *	common beggar's ticks	1	WM - farmed	5% overall - Common
<i>Populus deltoides</i> *	Eastern cottonwood	2	HWS	10% overall - Common
<i>Helianthus grosseserratus</i> *	sawtooth sunflower	2	WM - SC	5% overall - Common
<i>Robinia pseudoacacia</i> *	black locust	0	HWS	10% overall - Common
<i>Salix amygdaloides</i> *	peach-leaf willow	4	HWS	10% overall - Common
<i>Schoenoplectus fluviatilis</i>	river bulrush	6	Shallow Marsh	10% overall - Common
<i>Sambucus nigra</i> *	common elderberry	3	SC	5% overall - Common
<i>Viburnum lentago</i> *	nannyberry	4	HWS - SC	5% overall - Common
<i>Rubus idaeus var. strigosus</i> *	red raspberry	3	HWS - SC	5% overall - Common
<i>Parthenocissus quinquefolia</i> *	Virginia creeper	5	HWS	5% overall - Common
<i>Vitis riparia</i> *	riverbank grape	2	HWS	5% overall - Common
<i>Cornus racemosa</i> *	gray dogwood	2	SC	5% overall - Common
<i>Cornus alba</i> *	red-osier dogwood	3	SC	5% overall - Common
<i>Echinochloa crus-galli</i> *	barnyard grass	0	WM - farmed	5% overall - Common

**SUMMARY OF FLORISTIC INTEGRITY (Include general comments on plant communities)**

In most areas, W1 and W11 are floristically degraded. Wet meadow is the most common community within W1/W11 and on the overall site - dominated by invasive reed canary grass. In farmed portions, beggar's ticks and barnyard grass dominate. Shrub carr within W1/W11 are dominated by sandbar willow and dogwood species. Hardwood swamp is degraded and dominated by black locust (invasive), peach-leaf willow, woody vines, and reed canary grass. The shallow marsh portion lies beneath transmission lines, is the least degraded portion of W-1/W-11, and is dominated by river bulrush. The overall floristic integrity of W1/W11 is moderate (native mean C=3.1/2.5), but significantly degraded by invasive species in most areas.

**W-1 (Non-farmed portion)**

10/23/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region:

Wisconsin - Midwest Region

FQA DB Publication Year:

2014

FQA DB Description:

Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner:

Eric C. Parker

Weather Notes:

40 degrees and sunny

Duration Notes:

30 minutes

Community Type Notes:

Shrub Carr / Wet Meadow / Shallow Marsh - Mostly Phalaris and Salix interior

Other Notes:

Contiguous w/farmed portion; crayfish chimneys present

Private/Public:

Public

**Conservatism-Based Metrics:**

Total Mean C:	2.6
Native Mean C:	3.3
Total FQI:	16.6
Native FQI:	18.7
Adjusted FQI:	29.2
% C value 0:	24.4
% C value 1-3:	41.5
% C value 4-6:	31.7
% C value 7-10:	2.4
Native Tree Mean C:	3.1
Native Shrub Mean C:	2.6
Native Herbaceous Mean C:	3.6

**Species Richness:**

Total Species:	41	
Native Species:	32	78%
Non-native Species:	9	22%

**Species Wetness:**

Mean Wetness:	-1.3
Native Mean Wetness:	-2

**Physiognomy Metrics:**

Tree:	10	24.40%
Shrub:	9	22%
Vine:	3	7.30%
Forb:	12	29.30%
Grass:	4	9.80%
Sedge:	3	7.30%
Rush:	0	0%
Fern:	0	0%
Bryophyte:	0	0%

**Duration Metrics:**

Annual:	5	12.20%
Perennial:	35	85.40%
Biennial:	1	2.40%
Native Annual:	4	9.80%
Native Perennial:	28	68.30%
Native Biennial:	0	0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Acer negundo; acer interius; negundo	Sapindaceae	ACENEG	native	0	0	tree	perennial	box elder
Amaranthus powellii; amaranthus bo	Amaranthaceae	AMAPOW	non-native	0	5	forb	annual	powells smooth amaranth
Asclepias incarnata	Asclepiadaceae	ASCINC	native	5	-5	forb	perennial	marsh milkweed
Barbarea vulgaris; barbarea arcuata; l	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow-rocket
Bidens cernua; bidens cernuum; bide	Asteraceae	BIDCER	native	4	-5	forb	annual	nodding beggar-ticks
Calamagrostis canadensis; calamagro	Poaceae	CALCAN	native	5	-5	grass	perennial	blue-joint grass
Carex lacustris; carex riparia var. lacu	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	common lake sedge
Carex pellita; carex lanuginosa; carex	Cyperaceae	CXPELL	native	4	-5	sedge	perennial	broad-leaved woolly sedge
Cirsium arvense; carduus arvense; cir	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle
Cornus alba; cornus sericea; cornus st	Cornaceae	CORALB	native	3	-3	shrub	perennial	red-osier dogwood
Cornus racemosa; cornus foemina ssp	Cornaceae	CORRAC	native	2	0	shrub	perennial	gray dogwood
Echinocystis lobata; micrampelis loba	Cucurbitaceae	ECHLOB	native	2	-3	vine	annual	balsam-apple
Frangula alnus; rhamnus frangula	Rhamnaceae	FRALAN	non-native	0	-3	shrub	perennial	glossy invasive buckthorn
Fraxinus pennsylvanica; fraxinus penn	Oleaceae	FRAPEN	native	2	-3	tree	perennial	green ash
Helianthus giganteus; helianthus alier	Asteraceae	HELGIG	native	4	-3	forb	perennial	giant sunflower
Helianthus grosseserratus; helianthus	Asteraceae	HELGRO	native	2	-3	forb	perennial	saw-tooth sunflower
Iris virginica; iris versicolor var. shreve	Iridaceae	IRIVIR	native	5	-5	forb	perennial	southern blue flag
Lonicera x bella	Caprifoliaceae	LONXBEL	non-native	0	3	shrub	perennial	bells invasive honeysuckle
Panicum capillare; panicum barbipulv	Poaceae	PANCAP	native	1	0	grass	annual	common witch grass
Parthenocissus quinquefolia; heder	Vitaceae	PARQUI	native	5	3	vine	perennial	virginia creeper
Persicaria pensylvanica; polygonum p	Polygonaceae	PERPEN	native	1	-3	forb	annual	pennsylvania smartweed
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Populus deltoides; populus deltoides	Salicaceae	POPDEL	native	2	0	tree	perennial	eastern cottonwood
Rhamnus cathartica	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial	common invasive buckthorn
Ribes cynosbati; grossularia cynosbati	Grossulariaceae	RIBCYN	native	3	0	shrub	perennial	eastern prickly gooseberry
Robinia pseudoacacia; robinia pseudo	Fabaceae	ROBPSE	non-native	0	3	tree	perennial	black locust
Rubus idaeus var. strigosus; rubus sac	Rosaceae	RUBIDAVS	native	3	3	shrub	perennial	american red raspberry
Rubus occidentalis; rubus idaeus var.	Rosaceae	RUBOCC	native	2	5	shrub	perennial	black raspberry
Salix amygdaloides; salix nigra var. ar	Salicaceae	SALAMY	native	4	-3	tree	perennial	peach-leaved willow
Salix bebbiana; salix depressa; salix liv	Salicaceae	SALBEB	native	7	-3	tree	perennial	bebbs willow
Salix interior; salix exigua var. interior	Salicaceae	SALINT	native	2	-3	shrub	perennial	sandbar willow
Salix x fragilis; salix fragilis	Salicaceae	SALXFRA	non-native	0	0	tree	perennial	crack willow
Sambucus nigra; sambucus canadensi	Caprifoliaceae	SAMNIG	native	3	-3	shrub	perennial	american elderberry
Schoenoplectus fluviatilis; scirpus fluv	Cyperaceae	SCHFLU	native	6	-5	sedge	perennial	river bulrush
Solidago canadensis; solidago canade	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea; solidago serotina;	Asteraceae	SOLGIG	native	3	-3	forb	perennial	giant goldenrod
Spartina pectinata; spartina michauxi	Poaceae	SPAPEC	native	5	-3	grass	perennial	prairie cord grass
Symphotrichum lanceolatum; aster l	Asteraceae	SYMLAN	native	4	0	forb	perennial	white panicle aster
Ulmus americana; ulmus floridana	Ulmaceae	ULMAME	native	3	-3	tree	perennial	american elm
Viburnum lentago; viburnum x vetteri	Caprifoliaceae	VIBLEN	native	4	0	tree	perennial	nannyberry
Vitis riparia; vitis vulpina ssp. riparia;	Vitaceae	VITRIP	native	2	-3	vine	perennial	riverbank grape

**W-1 (farmed portion)**

10/23/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

USA

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Eric C. Parker

Weather Notes: 40 degrees and sunny

Duration Notes: 30 minutes

Community Type Notes: Farmed wetland

Other Notes:

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 1.6

Native Mean C: 2.6

Total FQI: 5.8

Native FQI: 7.4

Adjusted FQI: 20.4

% C value 0: 53.8

% C value 1-3: 23.1

% C value 4-6: 23.1

% C value 7-10: 0

Native Tree Mean C: n/a

Native Shrub Mean C: n/a

Native Herbaceous Mean C: 2.6

**Species Richness:**

Total Species: 13

Native Species: 8 61.50%

Non-native Species: 5 38.50%

**Species Wetness:**

Mean Wetness: -2.7

Native Mean Wetness: -3.6

**Physiognomy Metrics:**

Tree: 0 0%

Shrub: 0 0%

Vine: 0 0%

Forb: 8 61.50%

Grass: 4 30.80%

Sedge: 1 7.70%

Rush: 0 0%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 6 46.20%

Perennial: 7 53.80%

Biennial: 0 0%

Native Annual: 4 30.80%

Native Perennial: 4 30.80%

Native Biennial: 0 0%

**Species:**

<b>Scientific Name</b>	<b>Family</b>	<b>Acronym</b>	<b>Native?</b>	<b>C</b>	<b>W</b>	<b>Physiognomy</b>	<b>Duration</b>	<b>Common Name</b>
Agrostis hyemalis; agrostis antec	Poaceae	AGRHYE	native	4	0	grass	perennial	southern hair grass
Alisma triviale; alisma plantago- <del>r</del>	Alismataceae	ALITRI	native	4	-5	forb	perennial	northern water-plantain
Bidens frondosa; bidens frondos	Asteraceae	BIDFRO	native	1	-3	forb	annual	common beggar-ticks
Cyperus esculentus; chlorocyper	Cyperaceae	CYPESC	native	0	-3	sedge	perennial	field nut sedge
Echinochloa crus-galli; echinocl	Poaceae	ECHCRU	non-native	0	-3	grass	annual	barnyard grass
Mimulus ringens	Scrophulariaceae	MIMRIN	native	6	-5	forb	perennial	alleggheny monkey-flower
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Plantago major	Plantaginaceae	PLAMAJ	non-native	0	0	forb	perennial	broad-leaved plantain
Ranunculus sceleratus	Ranunculaceae	RANSCE	native	3	-5	forb	annual	cursed crowfoot
Rorippa palustris; radícula hispid	Brassicaceae	RORPAL	native	3	-5	forb	annual	common yellow-cress
Rumex crispus; rumex elongatus	Polygonaceae	RUMCRI	non-native	0	0	forb	perennial	curly dock
Setaria pumila; setaria glauca; se	Poaceae	SETPUM	non-native	0	0	grass	annual	yellow foxtail
Veronica peregrina; veronica she	Scrophulariaceae	VERPEE	native	0	-3	forb	annual	purslane speedwell

**W-11**

10/23/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Eric C. Parker  
 Weather Notes: 40 degrees and sunny  
 Duration Notes: 15 minutes  
 Community Type Notes: Shrub carr  
 Other Notes: Phalaris and Salix interior dominant  
 Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 1.7  
 Native Mean C: 2.5  
 Total FQI: 7.8  
 Native FQI: 9.4  
 Adjusted FQI: 20.4  
 % C value 0: 42.9  
 % C value 1-3: 33.3  
 % C value 4-6: 23.8  
 % C value 7-10: 0  
 Native Tree Mean C: 0  
 Native Shrub Mean C: 3  
 Native Herbaceous Mean C: 2.6

**Species Richness:**

Total Species: 21  
 Native Species: 14 66.70%  
 Non-native Species: 7 33.30%

**Species Wetness:**

Mean Wetness: -1.5  
 Native Mean Wetness: -2

**Physiognomy Metrics:**

Tree: 2 9.50%  
 Shrub: 4 19%  
 Vine: 1 4.80%  
 Forb: 7 33.30%  
 Grass: 4 19%  
 Sedge: 3 14.30%  
 Rush: 0 0%  
 Fern: 0 0%  
 Bryophyte: 0 0%

**Duration Metrics:**

Annual: 1 4.80%  
 Perennial: 19 90.50%  
 Biennial: 1 4.80%  
 Native Annual: 0 0%  
 Native Perennial: 14 66.70%  
 Native Biennial: 0 0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Acer negundo; acer interius; negundc	Sapindaceae	ACENEG	native	0	0	tree	perennial	box elder
Agrostis hyemalis; agrostis anteceden	Poaceae	AGRHYE	native	4	0	grass	perennial	southern hair grass
Barbarea vulgaris; barbarea arcuata;	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow-rocket
Carex pellita; carex lanuginosa; carex	Cyperaceae	CXPELL	native	4	-5	sedge	perennial	broad-leaved woolly sedge
Cirsium arvense; carduus arvense; cir.	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle
Cornus obliqua; cornus amomum; cor	Cornaceae	COROBL	native	4	-3	shrub	perennial	silky dogwood
Cornus racemosa; cornus foemina ss;	Cornaceae	CORRAC	native	2	0	shrub	perennial	gray dogwood
Cyperus esculentus; chlorocyperus p	Cyperaceae	CYPESC	native	0	-3	sedge	perennial	field nut sedge
Echinochloa crus-galli; echinochloa m	Poaceae	ECHCRU	non-native	0	-3	grass	annual	barnyard grass
Eleocharis acicularis; scirpus aciculari	Cyperaceae	ELEACI	native	5	-5	sedge	perennial	needle spike-rush
Geum canadense; geum canadense v.	Rosaceae	GEUCAN	native	2	0	forb	perennial	white avens
Helianthus grosseserratus; helianthus	Asteraceae	HELGRO	native	2	-3	forb	perennial	saw-tooth sunflower
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Poa pratensis; poa agassizensis; poa a	Poaceae	POAPRA	non-native	0	0	grass	perennial	kentucky bluegrass
Rhamnus cathartica	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial	common invasive buckthorn
Ribes americanum; ribes floridum	Grossulariaceae	RIBAME	native	4	-3	shrub	perennial	american black currant
Rumex crispus; rumex elongatus	Polygonaceae	RUMCRI	non-native	0	0	forb	perennial	curly dock
Salix interior; salix exigua var. interior	Salicaceae	SALINT	native	2	-3	shrub	perennial	sandbar willow
Solidago canadensis; solidago canad	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Symphotrichum lateriflorum; aster l	Asteraceae	SYMLAT	native	3	-3	forb	perennial	calico aster
Vitis riparia; vitis vulpina ssp. riparia;	Vitaceae	VITRIP	native	2	-3	vine	perennial	riverbank grape

**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

Assessment Area (AA)	Buffer (100m)	Historic	Impact Level*	Relative Frequency**	Stressor
Y	Y	Y	M	C	Filling, berms (non-impounding)
N	Y	Y	L	UC	Drainage – tiles, ditches
N	N	N	n/a	n/a	Hydrologic changes - high capacity wells, impounded water, increased runoff
N	N	N	n/a	n/a	Point source or stormwater discharge
Y	Y	Y	M	C	Polluted runoff (agricultural)
N	N	N	n/a	n/a	Pond construction
N	Y	Y	H	C	Agriculture – row crops
N	Y	Y	H	C	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	N	N	n/a	n/a	Roads or railroad
Y	Y	Y	L	UC	Utility corridor (above or subsurface)
N	N	N	n/a	n/a	Dams, dikes or levees
N	N	N	n/a	n/a	Soil subsidence, loss of soil structure
Y	Y	Y	L	C	Sediment input
N	Y	Y	L	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
Y	Y	Y	L	UC	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	M	C	Cover of non-native and/or invasive species
N	N	Y	n/a	n/a	Residential land use
N	Y	N	L	UC	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
N	N	N	n/a	n/a	Excavation or soil grading
					Other (list below):
N	N	N	n/a	n/a	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

W1/W11 have been significantly impacted by invasion of reed canary grass. Reed canary grass invasion is the result of other stressors including agricultural runoff carrying sediment and nutrients from adjacent row-cropped and hay fields in the buffer and historic construction and on-going maintenance along the transmission line corridor. Floristic diversity is low in most areas and moderate in limited areas. However, reed canary grass is the dominant plant species overall in W1 and W11. Historic agricultural use has been similar as today for at least several decades. Recreational usage is limited by access; hunting and bird watching are examples of possible uses which are likely not presently occurring.

## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity		X			
Human Use Values	X				
Wildlife Habitat		X			
Fish and Aquatic Life Habitat	X				
Shoreline Protection					X
Flood and Stormwater Storage		X			
Water Quality Protection		X			
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	Reed canary grass abundant with a few conservative species present. Non-Farmed W1 has moderate diversity and quality with a native mean C of 3.3 and native FQI of 18.7. Farmed W1 and W11 have lower diversity and quality with native mean C's of 2.6 / 2.5 and native FQI's of 7.4 / 7.8, respectively. No rare species were identified in W1 or W11.
Human Use Values	There is no public access to this private land, and therefore its value for recreation, hiking, and education are low given present uses. Archaeological resources on the site are not known.
Wildlife Habitat	W1 and W11 provide moderate wildlife habitat that is common to the region.
Fish and Aquatic Life Habitat	Aquatic habitat in the form of depressional ponded areas in W1 or W11 is limited to the spring providing habitat for common invertebrates and frog species that are tolerant of invasive species, agricultural sedimentation, herbicides and pesticides.
Shoreline Protection	Shoreline is not present in W1 or W11.
Flood and Stormwater Storage	W1 provides stormwater storage for precipitation that lands in W1 and its buffer / runoff basin totaling approximately 6-8 acres. Retained stormwater is either evapotranspired, overflows into S2 to the west via a culvert, an old ditch and off-site wetlands, or to a much lesser extent, infiltrates. W11 provides limited storage of flood & stormwater to S2.
Water Quality Protection	W1 provides moderate water quality protection for a basin area of approximately 6-8 acres that is tributary to S2. W11 provides limited water quality protection for the riparian S2.
Groundwater Processes	The relatively small size and clayey sub-soil of W1 and W11 limit their ability to provide significant groundwater interaction, including infiltration.



## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or -)</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W1 and W11 and their buffers.	Loss of wetland is expected to be permanent.	If non-farmed portions of W1 are directly impacted, the significance would be in the medium range due to its overall moderate function. The farmed portions of W1 and W11 would have lesser significance.
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to alter wetland hydrology; increased runoff/nutrient loading are expected to result in degradation of W1 and W11 habitats and water quality depending on stormwater management.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent.	Low because these areas are already in a degraded state (farmed and mostly degraded wetland), secondary impacts are not expected to be significant.
<b>Cumulative Impacts</b> Additional development beyond the current proposed plan has the potential to impact additional portions of W1 and W11 and neighboring wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Significance would be in the medium range given the area to be impacted versus the generally degraded status of wetlands in this area.
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of some wetlands.	Habitat fragmentation is already moderate due to historic and ongoing agricultural practices; fragmentation as a result of the expansion is expected to increase this effect.	If impacted, medium due to moderate habitat function of W1 and W11.
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill may result in loss or degradation of W1 and W11, however rare species are not known to exist in or adjacent to these wetlands.	Loss of rare plants/animals and communities is not expected to occur.	N/A

**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>	
Project name: <b>Emerald Park Western Expansion Wetland W2</b>	Evaluator(s): Eric C. Parker, PWS
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014
Location: PLSS: T5N, R20E S36 SW1/4	Ecological Landscape: Southern Lake Michigan Coastal
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04
County: Waukesha Town/City/Village: Muskego	
<b>SITE DESCRIPTION</b>	
Soils: Mapped Type(s): (Mzb) Montgomery silty clay loam, Muskego muck (Mzg), and Ogden muck (Oc) Field Verified: Yes, soils are hydric via histic epipedon, black histic, loamy mucky mineral, depleted matrix or redox dark surface generally meeting A2, A3, A11, A12, F1, F3, and/or F6 indicators.	WWI Class: F0Kf and E2Ka
	Wetland Type(s): Wet meadow (farmed and unfarmed) and shrub carr.
	Wetland Size: 11.90 Ac      Wetland Area Impacted: Unknown
Hydrology: Seasonally to semi-permanently flooded/saturated, as evidenced by geomorphic position & positive FAC-Neutral Test in most of W2 and primary hydrology indicators in some areas. Runoff from adjacent farm fields and stormwater inputs from detention ponds of existing landfill infrastructure. Associated w/S1 (WBIC 5038269), a first order waterway.	Vegetation: Plant Community Description(s): Partially farmed wet meadow dominated by invasive reed canary grass but with some natives occasionally present providing a limited diversity of other grasses, sedges, forbs and woody vegetation.

**SITE MAP**

<p>See Attached Figures:      Figure 1 – Project Location and Topography             Figure 2 – NRCS Soil Survey Data             Figure 3 – Wisconsin Wetland Inventory             Figure 4 – Field Delineated Wetland Data             Figure 5 – Plant Communities</p> <p>Figures 4 and 5 depict the wetlands and define the assessment area for wetland W2</p>
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**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N	Y	Used for recreation (hunting, birding, hiking, etc.). List: hunting, birding
2	N	Y	Used for educational or scientific purposes
3	N		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	Y		In or adjacent to RED FLAG areas-- List: 1) W2 is in secondary environmental corridor
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N*	Y	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	Y		Wetland and contiguous habitat >10 acres
2	N		3 or more strata present (>10% cover)
3	Y*		Within or adjacent to habitat corridor or established wildlife habitat area
4	Y		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	N		Interspersion of habitat structure (hemi-marsh,shrub/emergent, wetland/upland complex,etc.)
7	Y*		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N	Y*	Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	Y*		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	Y*		Wetland is connected or contiguous with perennial stream or lake
2	Y*		Standing water provides habitat for amphibians and aquatic invertebrates
3	N		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	n/a		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	n/a		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow <u>or</u> is adjacent to a stream
2	N		Water flow through wetland is NOT channelized
3	Y		Dense, persistent vegetation
4	N		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	Y		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	Y		Provides substantial storage of storm and floodwater based on previous section
2	N		Basin wetland <u>or</u> constricted outlet
3	N		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	Y		Dense, persistent vegetation
6	Y*		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	Y*		Stormwater or surface water from agricultural land is major hydrology source
8	Y*		Discharge to surface water
9	Y		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	Y		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area

**Section 1 Comments (Refer to Section 1 numbers)**

\*see comment below

WH 3. Part of secondary environmental corridor.

WH 7/8. Mallard, blue-winged teal, northern harrier, woodcock, black-billed cuckoo, willow flycatcher, sedge wren, brown thrasher, swamp sparrow, dickcissel

WH 10. Standing water in W2 in spring provides habitat for common amphibians and invertebrates (e.g. chorus frog, crayfish).

FA 1. Contiguous S1 is intermittent, but flows to Big Muskego Lake, therefore W2 is contiguous w/perennial waterbody.

FA 2. See WH 10.

ST 5. Runoff from adjacent agricultural fields.

WQ 6. Dense reed canary grass may indicate excess nutrient inputs from upstream sources; but no excess algae/macrophytes.

WQ 7. Surface runoff from adjacent agricultural fields.

WQ 8. Discharges to ditch waterway S1, which typically has surface water.

GW 2. This and other wetlands on the site may be considered headwaters wetlands.

GW 5. Not in City of Muskego wellhead protection area.

**Wildlife Habitat and Species Observation (including amphibians and reptiles)**

**List: direct observation, tracks, scat, other sign; type of habitat: nesting, migratory, winter, etc.**

Observed	Potential	Species/Habitat/Comments
N	Y	Common amphibians/reptiles in wetlands & adjacent wooded and non-agricultural upland likely
Y		White-tailed deer in all areas (tracks, scat, browse, rubs)
Y		Red-tail hawk perching and hunting- direct observation in and adjacent to W2
N	Y	Small mammals in all parts including meadow vole and raccoon, foraging.
Y		Various common bird sightings including: red-wing blackbird, sparrows, ring-billed seagull, Canada goose, mallard - foraging

**Fish and Aquatic Life Habitat and Species Observations**

**List: direct observation, other sign; type of habitat: nesting, spawning, nursery areas, etc.**

Observed	Potential	Species/Habitat
Y		Crayfish chimneys, various common insects

**SECTION 2: Floristic Integrity**

**Plant Community Integrity (circle)\***

	Low	Medium	High	Exceptional
<b>Invasive species cover</b>	> 50%	20-50%	10-20%	<10%
<b>Strata</b>	Missing stratum(a) or bare due to invasive species	All strata present but reduced native species	All strata present and good assemblage of native species	All strata present, conservative species represented
<b>NHI plant community ranking</b>	S4	S3	S2	S1-S2 (S2 high quality)
<b>Relative frequency of plant community in watershed</b>	Abundant	Common	Uncommon	Rare
<b>FQI (optional)</b>	<13	13-23	23-32	>32
<b>Mean C (optional)</b>	<2.4	2.4-4.2	4.3-4.7	>4.7

**Plant Species List (\* dominant); see attached list for complete inventory**

<b>Scientific Name</b>	<b>Common Name</b>	<b>C of C</b>	<b>Plant communities</b>	<b>Comments (Estimate of % Cover, Abundance)</b>
<i>Phalaris arundinacea*</i>	reed canary grass	0	WM - SC	95% overall - Abundant

**SUMMARY OF FLORISTIC INTEGRITY (Include general comments on plant communities)**

W2 is floristically degraded and dominated by invasive reed canary grass. In farmed portions that are being used for hay, reed canary grass also dominates. In farmed areas that are being used for row crops, annual weeds (e.g. barnyard grass) were sparse in fields that were recently plowed. Shrub carr within W2 is a relatively small area dominated by sandbar willow and reed canary grass. All species other than reed canary grass are found only occasionally. The overall floristic integrity of W2 is low (native mean C=2.9; native FQI=11.6) and significantly degraded by invasive species in most areas.

**W-2**

10/17/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Melissa Curran

Weather Notes: 50 degrees and sunny

Duration Notes: 30 minutes

Community Type Notes: Wet Meadow

Other Notes: Dominated by Phalaris, other species are occasional

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 2.4

Native Mean C: 2.9

Total FQI: 10.7

Native FQI: 11.6

Adjusted FQI: 25.9

% C value 0: 25

% C value 1-3: 40

% C value 4-6: 35

% C value 7-10: 0

Native Tree Mean C: 2

Native Shrub Mean C: 2

Native Herbaceous Mean C: 3.3

**Species Richness:**

Total Species: 20

Native Species: 16 80%

Non-native Species: 4 20%

**Species Wetness:**

Mean Wetness: -1.6

Native Mean Wetness: -2

**Physiognomy Metrics:**

Tree: 3 15%

Shrub: 1 5%

Vine: 0 0%

Forb: 13 65%

Grass: 2 10%

Sedge: 1 5%

Rush: 0 0%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 0 0%

Perennial: 19 95%

Biennial: 1 5%

Native Annual: 0 0%

Native Perennial: 16 80%

Native Biennial: 0 0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Acer negundo; acer interius; negundo ii	Sapindaceae	ACENEG	native	0	0	tree	perennial	box elder
Angelica atropurpurea	Apiaceae	ANGATR	native	6	-5	forb	perennial	common great angelica
Asclepias syriaca; asclepias intermedia; Asclepiadaceae	Asclepiadaceae	ASCSYR	native	1	3	forb	perennial	common milkweed
Carex lacustris; carex riparia var. lacustii	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	common lake sedge
Cirsium arvense; carduus arvense; cirsii	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle
Daucus carota	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen annes-lace
Helianthus giganteus; helianthus alienu	Asteraceae	HELGIG	native	4	-3	forb	perennial	giant sunflower
Helianthus grosseserratus; helianthus ii	Asteraceae	HELGRO	native	2	-3	forb	perennial	saw-tooth sunflower
Iris virginica; iris versicolor var. shrevei;	Iridaceae	IRIVIR	native	5	-5	forb	perennial	southern blue flag
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Populus tremuloides; populus tremula	Salicaceae	POPTRE	native	2	0	tree	perennial	quaking aspen
Salix interior; salix exigua var. interior	Salicaceae	SALINT	native	2	-3	shrub	perennial	sandbar willow
Solidago canadensis; solidago canadens	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea; solidago serotina; so	Asteraceae	SOLGIG	native	3	-3	forb	perennial	giant goldenrod
Spartina pectinata; spartina michauxiar	Poaceae	SPAPEC	native	5	-3	grass	perennial	prairie cord grass
Symphotrichum lanceolatum; aster lar	Asteraceae	SYMLAN	native	4	0	forb	perennial	white panicle aster
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail
Typha latifolia	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail
Urtica dioica; urtica procera; urtica grac	Urticaceae	URTDIO	native	1	-3	forb	perennial	stinging nettle
Viburnum lentago; viburnum x vetteri	Caprifoliaceae	VIBLEN	native	4	0	tree	perennial	nannyberry

**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

Assessment Area (AA)	Buffer (100m)	Historic	Impact Level*	Relative Frequency**	Stressor
Y	Y	Y	M	C	Filling, berms (non-impounding)
Y	Y	Y	M	C	Drainage – tiles, ditches
N	N	N	n/a	n/a	Hydrologic changes - high capacity wells, impounded water, increased runoff
Y	Y	N	M	C	Point source or stormwater discharge
Y	Y	Y	M	C	Polluted runoff (agricultural)
N	Y	N	L	UC	Pond construction
Y	Y	Y	H	C	Agriculture – row crops
Y	Y	Y	H	C	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	Y	N	L	UC	Roads or railroad
Y	Y	Y	L	UC	Utility corridor (above or subsurface)
Y	Y	N	M	C	Dams, dikes or levees
Y	Y	Y	M	C	Soil subsidence, loss of soil structure
Y	Y	Y	M	C	Sediment input
Y	Y	Y	M	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
Y	Y	Y	M	C	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	H	C	Cover of non-native and/or invasive species
N	N	Y	n/a	n/a	Residential land use
N	Y	N	L	UC	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
N	Y	N	n/a	n/a	Excavation or soil grading
					Other (list below):
N	N	N	n/a	n/a	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

W2 has been significantly impacted by invasion of reed canary grass, which is dominant. Reed canary grass invasion is the result of other stressors including agricultural runoff carrying sediment and nutrients from adjacent row-cropped and hay fields in the buffer and historic construction and on-going maintenance along the transmission line corridor. Floristic diversity is low throughout W2. Historic agricultural use has been similar as today for at least several decades. Recreational usage does not exist due to lack of public access. Hunting and bird watching are examples of possible uses which are likely not presently occurring.



## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity	X				
Human Use Values	X				
Wildlife Habitat	X				
Fish and Aquatic Life Habitat	X				
Shoreline Protection	X				X
Flood and Stormwater Storage		X			
Water Quality Protection		X			
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	Reed canary grass abundant with a few other species occasional. Native mean C of 2.9 and native FQI of 11.6. Farmed (cropped) portions of W2 were mostly bare ground because they had recently been harvested and plowed. No rare species were identified in W2.
Human Use Values	There is no public access to this private land, and therefore its value for recreation, hiking, and education are low given present uses. Archaeological resources on the site are not known.
Wildlife Habitat	W2 provides low to moderate wildlife habitat that is common to the region.
Fish and Aquatic Life Habitat	Aquatic habitat in the form of depressional ponded areas in W2 is limited to the spring providing habitat for common invertebrates and frog species that are tolerant of invasive species, agricultural sedimentation, herbicides and pesticides.
Shoreline Protection	Shoreline for a water body 1 or more acre in size is not present in W2.
Flood and Stormwater Storage	W2 provides stormwater storage for precipitation that lands in W2 and its buffer / runoff basin totaling approximately 20 acres. Retained stormwater is either evapotranspired, overflows into S1, or to a much lesser extent, infiltrates.
Water Quality Protection	W2 provides moderate water quality protection for a basin area of approximately 20 acres that is tributary to S1.
Groundwater Processes	The organic soils within W2 are limited, and where present, clayey sub-soil of W2 limits its ability to provide significant groundwater interaction, including infiltration.

## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or -)</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W2 and its buffer.	Loss of wetland is expected to be permanent.	Significance is expected to be low given the impacts to the functions of W2 would be mitigated by the nearby wetland mitigation bank.
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to further degrade wetland hydrology. Increased runoff/nutrient loading would further degrade W2's habitats and water quality depending on stormwater management.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent.	Low because these areas are already in a degraded state (farmed and mostly degraded wetland); secondary impacts are not expected to be significant.
<b>Cumulative Impacts</b> Additional development beyond the current proposed plan has the potential to impact additional portions of W2 to the north and other neighboring wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Significance would be in the medium range given the area to be impacted versus the generally degraded status of wetlands in this area.
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of some wetlands.	Habitat fragmentation is already moderate due to historic and ongoing agricultural practices; fragmentation as a result of the expansion is expected to increase this effect.	If impacted, low to medium due to low to moderate habitat function of W2.
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill may result in loss or degradation of W2, however rare species are not known to exist in or adjacent to this wetland.	Loss of rare plants/animals and communities is not expected to occur.	N/A

**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>	
Project name: <b>Emerald Park Western Expansion Wetland W2A</b>	Evaluator(s): Eric C. Parker, PWS
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014
Location: PLSS: T5N, R20E S36 SW1/4	Ecological Landscape: Southern Lake Michigan Coastal
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04
County: Waukesha Town/City/Village: Muskego	
<b>SITE DESCRIPTION</b>	
Soils: Mapped Type(s): (Mzb) Montgomery silty clay loam and (Oc) Ogden muck	WWI Class: E1K .
Field Verified: Yes, soils are hydric with depleted matrix or redox in a dark surface generally meeting A11, F3 and/or F6 indicators	Wetland Type(s): Wet meadow (partially farmed) and shrub carr
	Wetland Size: 3.44 Acres      Wetland Area Impacted: Unknown
Hydrology: Seasonally to semi-permanently flooded/saturated, as evidenced by both primary and secondary hydrology indicators. W2A is fed by stormwater runoff from adjacent farm fields and a high water table. W2A outlets to waterway S1 (WBIC 38269, a first order waterway) at its northeast end.	Vegetation: Plant Community Description(s): Partially farmed wet meadow dominated by invasive reed canary grass and native prairie cordgrass. A moderate diversity of natives is also present including sedges, grasses, forbs, and woody vegetation.

**SITE MAP**

<p>See Attached Figures:      Figure 1 – Project Location and Topography             Figure 2 – NRCS Soil Survey Data             Figure 3 – Wisconsin Wetland Inventory             Figure 4 – Field Delineated Wetland Data             Figure 5 – Plant Communities</p> <p>Figures 4 and 5 depict the wetlands and define the assessment area for wetland W2A</p>
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**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N	Y	Used for recreation (hunting, birding, hiking, etc.). List: hunting, birding
2	N	Y	Used for educational or scientific purposes
3	N		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	Y		In or adjacent to RED FLAG areas-- List: Adjacent to secondary environmental corridor
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N	Y	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	N		Wetland and contiguous habitat >10 acres
2	Y		3 or more strata present (>10% cover)
3	Y*		Within or adjacent to habitat corridor or established wildlife habitat area
4	Y		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	Y		Interspersion of habitat structure (hemi-marsh, shrub/emergent, wetland/upland complex, etc.)
7	Y*		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N	Y*	Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	Y*		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	Y*		Wetland is connected or contiguous with perennial stream or lake
2	Y*		Standing water provides habitat for amphibians and aquatic invertebrates
3	N		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	n/a		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	n/a		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow <u>or</u> is adjacent to a stream
2	Y		Water flow through wetland is NOT channelized
3	Y		Dense, persistent vegetation
4	N		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	Y		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	Y		Provides substantial storage of storm and floodwater based on previous section
2	Y*		Basin wetland <u>or</u> constricted outlet
3	Y		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	Y		Dense, persistent vegetation
6	Y*		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	Y*		Stormwater or surface water from agricultural land is major hydrology source
8	N		Discharge to surface water
9	Y		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	N		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area

**Section 1 Comments (Refer to Section 1 numbers)**

\*see comment below

WH 3. Adjacent to (outlets into) secondary environmental corridor.

WH 7/8. Mallard, blue-winged teal, northern harrier, woodcock, black-billed cuckoo, willow flycatcher, sedge wren, brown thrasher, swamp sparrow, dickcissel

WH 10. Standing water in W2A in spring provides habitat for common amphibians and invertebrates (e.g. chorus frog, crayfish).

FA 1. Contiguous S1 is intermittent, but flows to Big Muskego Lake, therefore W2A is contiguous w/perennial waterbody.

FA 2. See WH 10.

ST 5. Runoff from adjacent agricultural fields.

WQ 2. Constricted outlet northeasterly to W2 and S1.

WQ 6. Dense reed canary grass may indicate excess nutrient inputs from upstream sources; but no excess algae/macrophytes.

WQ 7. Surface runoff from adjacent agricultural field.

GW 2. This and other wetlands on the site may be considered headwaters wetlands.

GW 5. Not in City of Muskego wellhead protection area.

**Wildlife Habitat and Species Observation (including amphibians and reptiles)**

**List: direct observation, tracks, scat, other sign; type of habitat: nesting, migratory, winter, etc.**

Observed	Potential	Species/Habitat/Comments
N	Y	Common amphibians and reptiles in wetlands & nearby treelines and non-agricultural upland likely
Y		White-tailed deer in all areas (tracks, scat, browse, rubs)
Y		Red-tail hawk perching and hunting- direct observation in area adjacent to W2
N	Y	Small mammals in all parts including meadow vole, cottontail rabbit, opossum, and raccoon (scat)
Y		Various common bird sightings including: red-wing blackbird, sparrows, crow

**Fish and Aquatic Life Habitat and Species Observations**

**List: direct observation, other sign; type of habitat: nesting, spawning, nursery areas, etc.**

Observed	Potential	Species/Habitat
Y		Crayfish chimneys

**SECTION 2: Floristic Integrity**

**Plant Community Integrity (circle)\***

	Low	Medium	High	Exceptional
<b>Invasive species cover</b>	> 50%	20-50%	10-20%	<10%
<b>Strata</b>	Missing stratum(a) or bare due to invasive species	All strata present but reduced native species	All strata present and good assemblage of native species	All strata present, conservative species represented
<b>NHI plant community ranking</b>	S4	S3	S2	S1-S2 (S2 high quality)
<b>Relative frequency of plant community in watershed</b>	Abundant	Common	Uncommon	Rare
<b>FQI (optional)</b>	<13	13-23	23-32	>32
<b>Mean C (optional)</b>	<2.4	2.4-4.2	4.3-4.7	>4.7

**Plant Species List (\* dominant); see attached list for complete inventory**

Scientific Name	Common Name	C of C	Plant communities	Comments (Estimate of % Cover, Abundance)
<i>Phalaris arundinacea</i> *	reed canary grass	0	WM - SC	50% overall - Abundant
<i>Spartina pectinata</i> *	prairie cordgrass	5	WM - SC	25% overall - Common
<i>Populus deltoides</i> *	Eastern cottonwood	2	SC	10% overall - Common
<i>Echinochloa crus-galli</i> *	barnyard grass	0	WM - farmed	5% overall - Common

**SUMMARY OF FLORISTIC INTEGRITY (Include general comments on plant communities)**

W2A is floristically degraded mainly by reed canary grass and ongoing adjacent farming. Wet meadow comprises most of W2A and is the most common plant community on the overall site - dominated by invasive reed canary grass. In farmed portions, barnyard grass dominates. Shrub carr within W2A is dominated by cottonwood and three dogwood species, with willows also common. The overall floristic integrity of W2A is moderate (native mean C of 3.5 and native FQI of 20.7).

**W-2A**

10/23/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Eric C. Parker

Weather Notes: 40 Degrees and Sunny

Duration Notes: 30 minutes

Community Type Notes: Shrub Carr / Wet Meadow mostly Phalaris, Populus deltoides and Spartina pectinata

Other Notes: Western Portion of W-2; some portions farmed

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C:	2.9
Native Mean C:	3.5
Total FQI:	20.7
Native FQI:	22.7
Adjusted FQI:	31.8
% C value 0:	23.5
% C value 1-3:	33.3
% C value 4-6:	35.3
% C value 7-10:	7.8
Native Tree Mean C:	3.7
Native Shrub Mean C:	3.2
Native Herbaceous Mean C:	3.5

**Species Richness:**

Total Species:	51	
Native Species:	42	82.40%
Non-native Species:	9	17.60%

**Species Wetness:**

Mean Wetness:	-2.1
Native Mean Wetness:	-2.2

**Physiognomy Metrics:**

Tree:	4	7.80%
Shrub:	6	11.80%
Vine:	1	2%
Forb:	25	49%
Grass:	9	17.60%
Sedge:	5	9.80%
Rush:	1	2%
Fern:	0	0%
Bryophyte:	0	0%

**Duration Metrics:**

Annual:	4	7.80%
Perennial:	47	92.20%
Biennial:	0	0%
Native Annual:	3	5.90%
Native Perennial:	39	76.50%
Native Biennial:	0	0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Agrostis gigantea; agrostis alba; agrost	Poaceae	AGRIG	non-native	0	-3	grass	perennial	redtop
Agrostis hyemalis; agrostis antecedens	Poaceae	AGRHYE	native	4	0	grass	perennial	southern hair grass
Ambrosia trifida; ambrosia integrifolia;	Asteraceae	AMBTRI	native	0	0	forb	annual	giant ragweed
Asclepias incarnata	Asclepiadaceae	ASCINC	native	5	-5	forb	perennial	marsh milkweed
Asclepias syriaca; asclepias intermedia	Asclepiadaceae	ASCYSR	native	1	3	forb	perennial	common milkweed
Calamagrostis canadensis; calamagrosti	Poaceae	CALCAN	native	5	-5	grass	perennial	blue-joint grass
Carex granularis; carex haleana; carex	Cyperaceae	CXGRAN	native	3	-3	sedge	perennial	limestone meadow sedge
Carex lacustris; carex riparia var. lacustris	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	common lake sedge
Carex pellita; carex lanuginosa; carex laxa	Cyperaceae	CXPELL	native	4	-5	sedge	perennial	broad-leaved woolly sedge
Carex stricta; carex strictior; carex hirsuta	Cyperaceae	CXSTRI	native	7	-5	sedge	perennial	hummock sedge
Cicuta maculata	Apiaceae	CICMAC	native	6	-5	forb	perennial	common water-hemlock
Cirsium arvense; carduus arvensis; cirsium	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle
Cornus alba; cornus sericea; cornus stolonifera	Cornaceae	CORALB	native	3	-3	shrub	perennial	red-osier dogwood
Cornus obliqua; cornus amomum; cornus rugosa	Cornaceae	COROBL	native	4	-3	shrub	perennial	silky dogwood
Cornus racemosa; cornus foemina ssp. racemosa	Cornaceae	CORRAC	native	2	0	shrub	perennial	gray dogwood
Cyperus esculentus; chlorocyperus phaeocarpus	Cyperaceae	CYPESC	native	0	-3	sedge	perennial	field nut sedge
Echinochloa crus-galli; echinochloa crus-galli	Poaceae	ECHCRU	non-native	0	-3	grass	annual	barnyard grass
Epilobium coloratum	Onagraceae	EPICOL	native	3	-5	forb	perennial	cinnamon willow-herb
Euthamia graminifolia; solidago graminifolia	Asteraceae	EUTGRA	native	4	-3	forb	perennial	common flat-topped goldenrod
Eutrochium maculatum; eupatorium maculatum	Asteraceae	EUTMAC	native	4	-5	forb	perennial	spotted joe-pye-weed
Fragaria virginiana; fragaria canadensis	Rosaceae	FRAVIR	native	1	3	forb	perennial	wild strawberry
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	-3	shrub	perennial	glossy invasive buckthorn
Geum aleppicum; geum strictum	Rosaceae	GEUALE	native	3	-3	forb	perennial	yellow avens
Helianthus grosseserratus; helianthus scaberrimus	Asteraceae	HELGRO	native	2	-3	forb	perennial	saw-tooth sunflower
Juncus dudleyi; juncus tenuis var. dudleyi	Juncaceae	JUNDUD	native	4	-3	rush	perennial	dudleys rush
Lythrum alatum; lythrum dactyloides	Lythraceae	LYTALA	native	6	-5	forb	perennial	winged loosestrife
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	invasive purple loosestrife
Muhlenbergia mexicana; agrostis mexicana	Poaceae	MUHMEM	native	4	-3	grass	perennial	leafy satin grass
Panicum capillare; panicum barbatiflorum	Poaceae	PANCAP	native	1	0	grass	annual	common witch grass
Panicum dichotomiflorum	Poaceae	PANDIC	native	0	-3	grass	annual	fall panic grass
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Plantago major	Plantaginaceae	PLAMAJ	non-native	0	0	forb	perennial	broad-leaved plantain
Populus deltoides; populus deltoides	Salicaceae	POPDEL	native	2	0	tree	perennial	eastern cottonwood
Ratibida pinnata; rudbeckia pinnata; leucanthemum	Asteraceae	RATPIN	native	4	5	forb	perennial	globular coneflower
Rhamnus cathartica	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial	common invasive buckthorn
Rubus idaeus var. strigosus; rubus occidentalis	Rosaceae	RUBIDAVS	native	3	3	shrub	perennial	american red raspberry
Rumex crispus; rumex elongatus	Polygonaceae	RUMCRI	non-native	0	0	forb	perennial	curly dock
Salix bebbiana; salix depressa; salix lucida	Salicaceae	SALBEB	native	7	-3	tree	perennial	bebbs willow
Salix discolor	Salicaceae	SALDIS	native	2	-3	tree	perennial	pussy willow
Silphium terebinthinaceum	Asteraceae	SILTER	native	7	0	forb	perennial	prairie-dock
Solidago canadensis; solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea; solidago serotina; solidago	Asteraceae	SOLGIG	native	3	-3	forb	perennial	giant goldenrod
Solidago riddellii; oligoneuron riddellii	Asteraceae	SOLRID	native	7	-5	forb	perennial	riddells goldenrod
Solidago rigida; oligoneuron rigidum; solidago	Asteraceae	SOLRIG	native	5	3	forb	perennial	stiff-leaved goldenrod
Spartina pectinata; spartina michauxia	Poaceae	SPAPEC	native	5	-3	grass	perennial	prairie cord grass
Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	white meadowsweet
Symphotrichum lanceolatum; aster lanceolatus	Asteraceae	SYMLAN	native	4	0	forb	perennial	white panicle aster
Symphotrichum novae-angliae; aster novae-angliae	Asteraceae	SYMNOA	native	3	-3	forb	perennial	new england aster
Symphotrichum puniceum; symphyotrichum	Asteraceae	SYMPUN	native	5	-5	forb	perennial	purple-stem aster
Typha latifolia	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail
Vitis riparia; vitis vulpina ssp. riparia; vitis	Vitaceae	VITRIP	native	2	-3	vine	perennial	riverbank grape



**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

Assessment Area (AA)	Buffer (100m)	Historic	Impact Level*	Relative Frequency**	Stressor
N	N	N	n/a	n/a	Filling, berms (non-impounding)
N	Y	Y	L	UC	Drainage – tiles, ditches
N	N	N	n/a	n/a	Hydrologic changes - high capacity wells, impounded water, increased runoff
N	N	N	n/a	n/a	Point source or stormwater discharge
Y	Y	Y	M	C	Polluted runoff (agricultural)
N	N	N	n/a	n/a	Pond construction
N	Y	Y	H	C	Agriculture – row crops
N	Y	Y	L	UC	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	N	N	n/a	n/a	Roads or railroad
N	Y	Y	L	UC	Utility corridor (above or subsurface)
N	N	N	n/a	n/a	Dams, dikes or levees
N	N	N	n/a	n/a	Soil subsidence, loss of soil structure
Y	Y	Y	H	C	Sediment input
N	Y	Y	L	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
N	Y	Y	L	UC	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	M	C	Cover of non-native and/or invasive species
N	N	N	n/a	n/a	Residential land use
N	N	N	L	UC	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
N	N	N	n/a	n/a	Excavation or soil grading
					Other (list below):
N	N	N	n/a	n/a	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

W2A has been significantly impacted by invasion of reed canary grass. Reed canary grass invasion is the result of other stressors including agricultural runoff carrying sediment and nutrients from adjacent row-cropped and hay fields in the buffer. Floristic diversity is low in some areas and moderate in other areas. However, reed canary grass is the dominant plant species overall in W2A. Historic agricultural use has been similar as today for at least several decades. Recreational usage is limited by access; hunting and bird watching are examples of possible uses which are likely not presently occurring.

## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity		X			
Human Use Values	X				
Wildlife Habitat		X			
Fish and Aquatic Life Habitat	X				
Shoreline Protection					X
Flood and Stormwater Storage		X			
Water Quality Protection			X		
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	Reed canary grass abundant with somewhat diverse native species present. W2A has moderate diversity and quality with a native mean C of 3.5 and native FQI of 20.7. No rare species were identified in W2A.
Human Use Values	There is no public access to this private land, and therefore its value for recreation, hiking, and education is low given present uses. Archaeological resources on the site are not known.
Wildlife Habitat	W2A provides moderate wildlife habitat that is common to the region.
Fish and Aquatic Life Habitat	Aquatic habitat in the form of depressional ponded areas in W2 is likely seasonally limited to the spring when habitat is potentially present for common invertebrates and frog species that are tolerant of invasive species, agricultural sedimentation, herbicides and pesticides.
Shoreline Protection	Shoreline is not present in W2A.
Flood and Stormwater Storage	W2A provides moderate stormwater storage for precipitation that lands in W2A and its buffer / runoff basin totaling approximately 6-8 acres. Retained stormwater is either evapotranspired, overflows into S1 to the north via a small ditch, or likely to a much lesser extent, infiltrates.
Water Quality Protection	W2A may provide relatively high capacity to provide a function of water quality protection for the basin area of approximately 6-8 acres that is tributary to S1 through W2A. The limited portions of W2A that are farmed would have a low capacity to provide this function.
Groundwater Processes	The relatively small size and clayey sub-soil of W2A limits its ability to provide significant groundwater interaction, including infiltration.

## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or - )</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W2A and their buffers.	Loss of wetland is expected to be permanent.	If W2A is directly impacted, the significance would be in the medium range due to its overall moderate function.
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to alter wetland hydrology; increased runoff/nutrient loading are expected to result in degradation of W2A habitats and water quality depending on stormwater management.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent.	Medium because W2A is already somewhat degraded. However its functional capacities may be near its maximum.
<b>Cumulative Impacts</b> Additional development beyond the current proposed extent has the potential to impact neighboring wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Significance would be in the medium range given the area to be impacted versus the generally degraded status of wetlands in this area.
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of W2A.	Habitat fragmentation is already moderate due to historic and ongoing agricultural practices; fragmentation as a result of the expansion is expected to increase this effect.	If impacted, medium due to moderate habitat function of W2A.
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill may result in loss or degradation of W2A, however rare species are not known to exist in or adjacent to these wetlands.	Loss of rare plants/animals and communities is not expected to occur.	N/A

**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>	
Project name: <b>Emerald Park Western Expansion Wetlands W3 and W4</b>	Evaluator(s): Eric C. Parker, PWS
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014
Location: PLSS: T5N, R20E S36 SW1/4	Ecological Landscape: Southern Lake Michigan Coastal
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04
County: Waukesha Town/City/Village: Muskego	
<b>SITE DESCRIPTION</b>	
Soils: Mapped Type(s): (Mzb) Montgomery silty clay loam, (AsA) Ashkum loam, (ShB) Saylesville silt loam	WWI Class: Point symbol at west end of W4; None Depicted by WWI for W3
Field Verified: Yes, soils are hydric with depleted matrix meeting A11 and F3 indicators	Wetland Type(s): Wet Meadow (degraded)
Hydrology: Seasonally-Temporarily flooded / saturated, as evidenced by geomorphic position, positive FAC-Neutral Test and saturation. W3 and W4 are man-made, the latter being within a designed stormwater basin.	Wetland Size: W3= 0.23 Ac; W4=0.52 Ac      Wetland Area Impacted: Unknown
	Vegetation: Plant Community Description(s): Both are degraded wet meadow dominated by invasive reed canary grass.

**SITE MAP**

<p>See Attached Figures:      Figure 1 – Project Location and Topography             Figure 2 – NRCS Soil Survey Data             Figure 3 – Wisconsin Wetland Inventory             Figure 4 – Field Delineated Wetland Data             Figure 5 – Plant Communities</p> <p>Figures 4 and 5 depict the wetlands and define the assessment area for wetlands W3 and W4</p>
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**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N		Used for recreation (hunting, birding, hiking, etc.). List:
2	N		Used for educational or scientific purposes
3	N		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	N		In or adjacent to RED FLAG areas List:
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N*	P	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	N		Wetland and contiguous habitat >10 acres
2	N		3 or more strata present (>10% cover)
3	Y*		Within or adjacent to habitat corridor or established wildlife habitat area
4	Y*		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	N		Interspersion of habitat structure (hemi-marsh,shrub/emergent, wetland/upland complex,etc.)
7	N		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N		Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	N		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	N		Wetland is connected or contiguous with perennial stream or lake
2	N		Standing water provides habitat for amphibians and aquatic invertebrates
3	N		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	N		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	Y		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow <u>or</u> is adjacent to a stream
2	Y		Water flow through wetland is NOT channelized
3	Y		Dense, persistent vegetation
4	Y		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	Y		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	Y		Provides substantial storage of storm and floodwater based on previous section
2	Y		Basin wetland <u>or</u> constricted outlet
3	Y		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	Y		Dense, persistent vegetation
6	Y*		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	N		Stormwater or surface water from agricultural land is major hydrology source
8	N		Discharge to surface water
9	Y*		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	N		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area

**Section 1 Comments (Refer to Section 1 numbers)**

*see comment below
HU 7. Archaeological resources undocumented.
WH 3. W4 is adjacent to secondary environmental corridor (W2)
WH 4. W4 YES and W3 NO
ST 5. Runoff and other input from adjacent landfill facilities
WQ 6. Dense reed canary grass may indicate excess nutrient inputs from upstream sources; but very little algae/macrophytes.
WQ 9. W3 YES and W4 NO.
GW 2. This and other wetlands on the site may be considered headwaters wetlands
GW 5. Not in City of Muskego wellhead protection area

**Wildlife Habitat and Species Observation (including amphibians and reptiles)**

**List: direct observation, tracks, scat, other sign; type of habitat: nesting, migratory, winter, etc.**

<b>Observed</b>	<b>Potential</b>	<b>Species/Habitat/Comments</b>
Y		Ring-bill seagull

**Fish and Aquatic Life Habitat and Species Observations**

**List: direct observation, other sign; type of habitat: nesting, spawning, nursery areas, etc.**

<b>Observed</b>	<b>Potential</b>	<b>Species/Habitat</b>
None		

**SECTION 2: Floristic Integrity**

**Plant Community Integrity (circle)\***

	Low	Medium	High	Exceptional
<b>Invasive species cover</b>	> 50%	20-50%	10-20%	<10%
<b>Strata</b>	Missing stratum(a) or bare due to invasive species	All strata present but reduced native species	All strata present and good assemblage of native species	All strata present, conservative species represented
<b>NHI plant community ranking</b>	S4	S3	S2	S1-S2 (S2 high quality)
<b>Relative frequency of plant community in watershed</b>	Abundant	Common	Uncommon	Rare
<b>FQI (optional)</b>	<13	13-23	23-32	>32
<b>Mean C (optional)</b>	<2.4	2.4-4.2	4.3-4.7	>4.7

**Plant Species List (\* dominant); see attached list for complete inventory**

Scientific Name	Common Name	C of C	Plant communities	Comments (Estimate of % Cover, Abundance)
<i>Phalaris arundinacea</i> *	reed canary grass	0	Wet Meadow	90% - Abundant

**SUMMARY OF FLORISTIC INTEGRITY (Include general comments on plant communities)**

Wet Meadow is the most common community on the overall site. W3 and W4 are dominated solely by invasive reed canary grass. The community occurs in areas that receive excess nutrient inputs from adjacent landfill, and have been altered by past agricultural land uses. The overall floristic integrity of W3 and W4 is low.

**W-3**

10/17/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Melissa Curran

Weather Notes: 50 degrees and sunnu

Duration Notes: 15 minutes

Community Type Notes: Wet Meadow

Other Notes: Portion of wetland graded

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 1.3

Native Mean C: 3

Total FQI: 3.9

Native FQI: 6

Adjusted FQI: 20

% C value 0: 55.6

% C value 1-3: 22.2

% C value 4-6: 22.2

% C value 7-10: 0

Native Tree Mean C: n/a

Native Shrub Mean C: n/a

Native Herbaceous Mean C: 3

**Species Richness:**

Total Species: 9

Native Species: 4 44.40%

Non-native Species: 5 55.60%

**Species Wetness:**

Mean Wetness: -2.2

Native Mean Wetness: -2.3

**Physiognomy Metrics:**

Tree: 0 0%

Shrub: 0 0%

Vine: 0 0%

Forb: 4 44.40%

Grass: 4 44.40%

Sedge: 0 0%

Rush: 1 11.10%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 1 11.10%

Perennial: 8 88.90%

Biennial: 0 0%

Native Annual: 0 0%

Native Perennial: 4 44.40%

Native Biennial: 0 0%



**Species:**

<b>Scientific Name</b>	<b>Family</b>	<b>Acronym</b>	<b>Native?</b>	<b>C</b>	<b>W</b>	<b>Physiognomy</b>	<b>Duration</b>	<b>Common Name</b>
Agrostis gigantea; agrostis alba; agros	Poaceae	AGRIG	non-native	0	-3	grass	perennial	redtop
Cirsium arvense; carduus arvense; cir.	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle
Echinochloa crus-galli; echinochloa m	Poaceae	ECHCRU	non-native	0	-3	grass	annual	barnyard grass
Juncus torreyi; juncus megacephalus; Junc	Juncaceae	JUNTOR	native	4	-3	rush	perennial	torreys rush
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Phragmites australis ssp. australis; ph	Poaceae	PHRAUSSM	non-native	0	-3	grass	perennial	invasive common reed
Solidago gigantea; solidago serotina; :Asteraceae	Asteraceae	SOLGIG	native	3	-3	forb	perennial	giant goldenrod
Symphotrichum lanceolatum; aster	Asteraceae	SYMLAN	native	4	0	forb	perennial	white panicle aster
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail

**W-4**

10/17/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region:

Wisconsin - Midwest Region

FQA DB Publication Year:

2014

FQA DB Description:

Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner:

Eric C. Parker

Weather Notes:

50 degrees and sunny

Duration Notes:

15 minutes

Community Type Notes:

Stormwater basin, mostly wet meadow dominated by Phalaris

Other Notes:

Private/Public:

Public

**Conservatism-Based Metrics:**

Total Mean C:	1.7
Native Mean C:	2.8
Total FQI:	6.1
Native FQI:	7.9
Adjusted FQI:	22
% C value 0:	46.2
% C value 1-3:	30.8
% C value 4-6:	23.1
% C value 7-10:	0
Native Tree Mean C:	2
Native Shrub Mean C:	2
Native Herbaceous Mean C:	3.2

**Species Richness:**

Total Species:	13	
Native Species:	8	61.50%
Non-native Species:	5	38.50%

**Species Wetness:**

Mean Wetness:	-1.5
Native Mean Wetness:	-1.8

**Physiognomy Metrics:**

Tree:	2	15.40%
Shrub:	1	7.70%
Vine:	0	0%
Forb:	8	61.50%
Grass:	2	15.40%
Sedge:	0	0%
Rush:	0	0%
Fern:	0	0%
Bryophyte:	0	0%

**Duration Metrics:**

Annual:	2	15.40%
Perennial:	11	84.60%
Biennial:	0	0%
Native Annual:	1	7.70%
Native Perennial:	7	53.80%
Native Biennial:	0	0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Agrostis gigantea; agrostis alba; ag	Poaceae	AGRIG	non-native	0	-3	grass	perennial	redtop
Ambrosia artemisiifolia; ambrosia	Asteraceae	AMBART	native	0	3	forb	annual	common ragweed
Asclepias incarnata	Asclepiadaceae	ASCINC	native	5	-5	forb	perennial	marsh milkweed
Euthamia graminifolia; solidago gr	Asteraceae	EUTGRA	native	4	-3	forb	perennial	common flat-topped goldenrod
Melilotus albus; melilotus alba	Fabaceae	MELALB	non-native	0	3	forb	annual	white invasive sweet-clover
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Populus deltoides; populus deltoic	Salicaceae	POPDEL	native	2	0	tree	perennial	eastern cottonwood
Salix discolor	Salicaceae	SALDIS	native	2	-3	tree	perennial	pussy willow
Salix interior; salix exigua var. inte	Salicaceae	SALINT	native	2	-3	shrub	perennial	sandbar willow
Solidago gigantea; solidago serotir	Asteraceae	SOLGIG	native	3	-3	forb	perennial	giant goldenrod
Sonchus arvensis; sonchus uligino:	Asteraceae	SONARV	non-native	0	3	forb	perennial	field sow-thistle
Symphotrichum lanceolatum; ast	Asteraceae	SYMLAN	native	4	0	forb	perennial	white panicle aster
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail

**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

Assessment Area (AA)	Buffer (50')	Historic	Impact Level*	Relative Frequency**	Stressor
Y	Y	N	H	C	Filling, berms (non-impounding)
Y	Y	N	M	C	Drainage – tiles, ditches
Y	Y	N	H	C	Hydrologic changes - high capacity wells, impounded water, increased runoff
Y	Y	N	H	C	Point source or stormwater discharge
N	Y	Y	L	C	Polluted runoff (agricultural)
Y	Y	N	H	C	Pond construction
N	Y	Y	M	C	Agriculture – row crops
N	N	Y	L	UC	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	Y	N	L	C	Roads or railroad
N	N	N	n/a	n/a	Utility corridor (above or subsurface)
N	N	N	n/a	n/a	Dams, dikes or levees
Y	Y	Y	H	C	Soil subsidence, loss of soil structure
Y	Y	Y	H	C	Sediment input
Y	Y	Y	H	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
N	N	N	n/a	n/a	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	H	C	Cover of non-native and/or invasive species
N	N	N	n/a	n/a	Residential land use
Y	Y	N	H	C	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
Y	Y	N	H	C	Excavation or soil grading
					Other (list below):
Y	Y	N	M	C	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

These wet meadow wetlands are man-made and heavily impacted by invasion of reed canary grass. Reed canary grass invasion is the result of other stressors including runoff carrying sediment and nutrients from adjacent landfill facilities in the buffer and historic agricultural uses. Floristic diversity is low. Recreational usage is not present in W3 and W4.

## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity	X				
Human Use Values	X				
Wildlife Habitat	X				
Fish and Aquatic Life Habitat					X
Shoreline Protection					X
Flood and Stormwater Storage	X				
Water Quality Protection	X				
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	W3 and W4 are small man-made wetlands with low species diversity and quality with native mean C's of 3.0 / 2.8, and native FQI's of 6.0 / 7.9, respectively. No rare plant species were identified.
Human Use Values	There is no public access to this private land, and its value for recreation, hiking, and education are low. Archaeological resources on the site are not known.
Wildlife Habitat	The locations and small sizes of W3 and W4 preclude their significance for wildlife habitat.
Fish and Aquatic Life Habitat	Aquatic habitat is not present in W3 or W4.
Shoreline Protection	A shore is not present in W3 or W4. W4 is a stormwater basin that typically lacks surface water for extended periods.
Flood and Stormwater Storage	W3 lacks significant stormwater retention dimensions (e.g. does not have side walls or berms) while W4 provides stormwater storage as per its engineered design.
Water Quality Protection	The small size of W3 limits its ability to provide significant water quality protection. W4 stores stormwater per its engineered design and does provide a moderate level of water quality protection before water releases via its outlet culvert to waterway S1.
Groundwater Processes	The small size and clayey sub-soil of W3 and W4 limit their ability to provide significant groundwater interaction, including infiltration.

## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or -)</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W3 and W4 and their buffers.	Loss of wetland is expected to be permanent.	Low due to man-made condition and low function of W3 and W4.
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to alter wetland hydrology; increased runoff/nutrient loading are expected to result in further degradation of W3 and W4 habitats if direct impacts are avoided.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent, however, these areas are already in a degraded state.	Low due to man-made condition and low function of W3 and W4.
<b>Cumulative Impacts</b> Additional development beyond the current proposed plan has the potential to impact additional nearby wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Not yet known
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of some wetlands.	Habitat fragmentation is already moderate due to historic and ongoing agricultural and landfill operations; fragmentation as a result of the expansion is expected to increase this effect.	Low due to man-made condition and low function of W3 and W4.
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill is expected to result in loss or degradation of W3 and W4, however rare species are not known to exist in these wetlands.	Loss of rare plants/animals and communities is not expected to occur.	N/A

**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>	
Project name: <b>Emerald Park Western Expansion Wetlands W5 and W6</b>	Evaluator(s): Eric C. Parker, PWS
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014
Location: PLSS: T5N, R20E S36 SW1/4	Ecological Landscape: Southern Lake Michigan Coastal
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04
County: Waukesha Town/City/Village: Muskego	
<b>SITE DESCRIPTION</b>	
Soils: Mapped Type(s): (Mzb) Montgomery silty clay loam (Vertic endoaquolls)	WWI Class: E2K; However None Depicted by WWI
Field Verified: Yes, soils are hydric with depleted matrix meeting A11 and F3 indicators	Wetland Type(s): Wet Meadow, isolated
Hydrology: Seasonally flooded / saturated, as evidenced by geomorphic position and positive FAC-Neutral Test. W5 and W6 are isolated long and narrow- possible relict end furrow; adjacent to an agricultural field. Due to their small size and drainage area, the buffer for W5 and W6 is approx. 50 ft.	Wetland Size: W5= 0.05 Ac; W6=0.06 Ac      Wetland Area Impacted: Unknown
	Vegetation: Plant Community Description(s): Wet Meadow co-dominated by invasive reed canary grass and natives prairie cordgrass and wooly sedge; with moderate diversity of native forbs, and occasional native shrubs and trees collectively not exceeding 30% coverage. Communities appear isolated and are adjacent to a treeline and an agricultural hay field.

**SITE MAP**

<p>See Attached Figures:      Figure 1 – Project Location and Topography             Figure 2 – NRCS Soil Survey Data             Figure 3 – Wisconsin Wetland Inventory             Figure 4 – Field Delineated Wetland Data             Figure 5 – Plant Communities</p> <p>Figures 4 and 5 depict the wetlands and define the assessment area for wetlands W5 and W6</p>
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**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N		Used for recreation (hunting, birding, hiking, etc.). List:
2	N		Used for educational or scientific purposes
3	N		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	N		In or adjacent to RED FLAG areas List:
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N*	P	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	N		Wetland and contiguous habitat >10 acres
2	N		3 or more strata present (>10% cover)
3	N		Within or adjacent to habitat corridor or established wildlife habitat area
4	N		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	N		Interspersion of habitat structure (hemi-marsh,shrub/emergent, wetland/upland complex,etc.)
7	N		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N		Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	N		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	N		Wetland is connected or contiguous with perennial stream or lake
2	N		Standing water provides habitat for amphibians and aquatic invertebrates
3	N		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	N		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	Y		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow <u>or</u> is adjacent to a stream
2	N		Water flow through wetland is NOT channelized
3	Y		Dense, persistent vegetation
4	N		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	N		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	N		Provides substantial storage of storm and floodwater based on previous section
2	Y		Basin wetland <u>or</u> constricted outlet
3	N		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	Y		Dense, persistent vegetation
6	Y*		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	Y*		Stormwater or surface water from agricultural land is major hydrology source
8	N		Discharge to surface water
9	Y		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	N		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area



**Section 1 Comments (Refer to Section 1 numbers)**

*see comment below
HU 7. Archaeological resources undocumented.
ST 5. Runoff from adjacent agricultural field
WQ 6. Dense reed canary grass may indicate excess nutrient inputs from upstream sources; but no excess algae/macrophytes.
WQ 7. Surface runoff from adjacent agricultural field.
GW 2. This and other wetlands on the site may be considered headwaters wetlands
GW 5. Not in City of Muskego Wellhead Protection Area

**Wildlife Habitat and Species Observation (including amphibians and reptiles)**

**List: direct observation, tracks, scat, other sign; type of habitat: nesting, migratory, winter, etc.**

Observed	Potential	Species/Habitat/Comments
N	Y	Common garter snake/ wet meadow & adjacent upland grassy-shrubby tree-line
N	Y	White-tailed deer/wetland and upland, various habitats/visual, tracks, browse

**Fish and Aquatic Life Habitat and Species Observations**

**List: direct observation, other sign; type of habitat: nesting, spawning, nursery areas, etc.**

Observed	Potential	Species/Habitat
None		

**SECTION 2: Floristic Integrity**

**Plant Community Integrity (circle)\***

	Low	Medium	High	Exceptional
<b>Invasive species cover</b>	> 50%	20-50%	10-20%	<10%
<b>Strata</b>	Missing stratum(a) or bare due to invasive species	All strata present but reduced native species	All strata present and good assemblage of native species	All strata present, conservative species represented
<b>NHI plant community ranking</b>	S4	S3	S2	S1-S2 (S2 high quality)
<b>Relative frequency of plant community in watershed</b>	Abundant	Common	Uncommon	Rare
<b>FQI (optional)</b>	<13	13-23	23-32	>32
<b>Mean C (optional)</b>	<2.4	2.4-4.2	4.3-4.7	>4.7

**Plant Species List (\* dominant); see attached list for complete inventory**

Scientific Name	Common Name	C of C	Plant communities	Comments (Estimate of % Cover, Abundance)
<i>Phalaris arundinacea</i> *	reed canary grass	0	Wet Meadow	Overall 30% - Abundant
<i>Spartina pectinata</i> *	prairie cordgrass	5	Wet Meadow	Overall 25% - Abundant
<i>Carex pellita</i> *	broad-leaved woolly sedge	4	Wet Meadow	Overall 20% - Common

**SUMMARY OF FLORISTIC INTEGRITY (Include general comments on plant communities)**

Wet Meadow is a common community on the site. This community is typically dominated solely by invasive reed canary grass, however W5 and W6 have two native species dominating as well. Additional species of native sedges, forbs and woody species are present at varying levels of cover, and commonly low levels on the site. The community occurs in areas that receive excess nutrient inputs from adjacent agricultural areas, and in areas that may have been altered by past agricultural land uses. The overall floristic integrity of W5 and W6 is moderate.

**W-5 & W-6**

10/17/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description:

Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Eric C. Parker

Weather Notes: 50 degrees and sunny

Duration Notes: 30 minutes

Community Type Notes: Wet meadow

Other Notes: Long and narrow; likely very old agricultural ditch or end furrow adjacent to existing farm field

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 3.4

Native Mean C: 4.1

Total FQI: 16.7

Native FQI: 18.3

Adjusted FQI: 37.4

% C value 0: 16.7

% C value 1-3: 33.3

% C value 4-6: 41.7

% C value 7-10: 8.3

Native Tree Mean C: 3.7

Native Shrub Mean C: 3.4

Native Herbaceous Mean C: 4.5

**Species Richness:**

Total Species: 24

Native Species: 20 83.30%

Non-native Species: 4 16.70%

**Species Wetness:**

Mean Wetness: -0.8

Native Mean Wetness: -0.8

**Physiognomy Metrics:**

Tree: 3 12.50%

Shrub: 5 20.80%

Vine: 0 0%

Forb: 11 45.80%

Grass: 4 16.70%

Sedge: 1 4.20%

Rush: 0 0%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 0 0%

Perennial: 24 100%

Biennial: 0 0%

Native Annual: 0 0%

Native Perennial: 20 83.30%

Native Biennial: 0 0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Bromus inermis; bromus inopinatus	Poaceae	BROINE	non-native	0	3	grass	perennial	smooth brome
Carex pellita; carex lanuginosa; ca	Cyperaceae	CXPELL	native	4	-5	sedge	perennial	broad-leaved woolly sedge
Cornus racemosa; cornus foemina	Cornaceae	CORRAC	native	2	0	shrub	perennial	gray dogwood
Corylus americana	Betulaceae	CORAMA	native	5	3	shrub	perennial	american hazelnut
Crataegus mollis; crataegus coccinifolia	Rosaceae	CRAMOL	native	2	0	tree	perennial	downy hawthorn
Euthamia graminifolia; solidago gr	Asteraceae	EUTGRA	native	4	-3	forb	perennial	common flat-topped goldenrod
Helianthus grosseserratus; helianthus	Asteraceae	HELGRO	native	2	-3	forb	perennial	saw-tooth sunflower
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	invasive purple loosestrife
Oxypolis rigidior; oxypolis longifolia	Apiaceae	OXYRIG	native	6	-5	forb	perennial	common water-dropwort
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Poa compressa	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
Prunus americana	Rosaceae	PRUAME	native	3	5	shrub	perennial	american plum
Pycnanthemum virginianum; koeleria	Lamiaceae	PYCVIR	native	6	-3	forb	perennial	common mountain mint
Quercus macrocarpa; quercus macrocarpa	Fagaceae	QUEMAC	native	5	0	tree	perennial	bur oak
Rosa blanda; rosa williamsii; rosa blanda	Rosaceae	ROSBLA	native	4	3	shrub	perennial	early wild rose
Rubus idaeus var. strigosus; rubus idaeus	Rosaceae	RUBIDAVS	native	3	3	shrub	perennial	american red raspberry
Silphium terebinthinaceum	Asteraceae	SILTER	native	7	0	forb	perennial	prairie-dock
Solidago canadensis; solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea; solidago serotina	Asteraceae	SOLGIG	native	3	-3	forb	perennial	giant goldenrod
Solidago riddellii; oligoneuron riddellii	Asteraceae	SOLRID	native	7	-5	forb	perennial	riddells goldenrod
Spartina pectinata; spartina patens	Poaceae	SPAPEC	native	5	-3	grass	perennial	prairie cord grass
Symphotrichum novae-angliae; symphyotrichum	Asteraceae	SYMNOA	native	3	-3	forb	perennial	new england aster
Veronicastrum virginicum; leptanthes	Scrophulariaceae	VERVIR	native	6	0	forb	perennial	culvers root
Viburnum lentago; viburnum x velutifolium	Caprifoliaceae	VIBLEN	native	4	0	tree	perennial	nannyberry

**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

Assessment Area (AA)	Buffer (50')	Historic	Impact Level*	Relative Frequency**	Stressor
N	N	N	n/a	n/a	Filling, berms (non-impounding)
Y	N	N	L	UC	Drainage – tiles, ditches
N	N	N	n/a	n/a	Hydrologic changes - high capacity wells, impounded water, increased runoff
N	N	N	n/a	n/a	Point source or stormwater discharge
Y	Y	Y	M	M	Polluted runoff (agricultural)
N	N	N	n/a	n/a	Pond construction
N	Y	Y	H	C	Agriculture – row crops
N	Y	Y	H	C	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	N	N	n/a	n/a	Roads or railroad
Y	Y	Y	L	UC	Utility corridor (above or subsurface)
N	N	N	n/a	n/a	Dams, dikes or levees
N	N	N	n/a	n/a	Soil subsidence, loss of soil structure
Y	Y	Y	L	C	Sediment input
N	Y	Y	L	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
Y	Y	Y	L	UC	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	M	C	Cover of non-native and/or invasive species
N	N	N	n/a	n/a	Residential land use
N	Y	N	L	UC	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
N	N	N	n/a	n/a	Excavation or soil grading
					Other (list below):
N	N	N	n/a	n/a	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

These wet meadow wetlands have been moderately impacted by invasion of reed canary grass, however not as much as some levels of invasion found throughout the overall expansion area. Reed canary grass invasion is the result of other stressors including agricultural runoff carrying sediment and nutrients from adjacent row-cropped and hay fields in the buffer and historic maintenance along the transmission line corridor. Floristic diversity remains moderate, however reed canary grass is a dominant. Historic agricultural use has been similar as today. Recreational usage is limited by the small size of W5 and W6.

## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity		X			
Human Use Values	X				
Wildlife Habitat	X				
Fish and Aquatic Life Habitat					X
Shoreline Protection					X
Flood and Stormwater Storage	X				
Water Quality Protection	X				
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	W5 and W6 are very small and narrow but have moderate species diversity and quality with a native mean C of 4.1 and native FQI of 18.3. No rare plant species were identified.
Human Use Values	There is no public access to this private land, and its value for recreation, hiking, and education are low given the small size. Archaeological resources on the site are not known.
Wildlife Habitat	The small sizes of W5 and W6 preclude the significance of wildlife habitat.
Fish and Aquatic Life Habitat	Aquatic habitat is not present in W5 or W6.
Shoreline Protection	A shore is not present in W5 or W6.
Flood and Stormwater Storage	Although W5 and W6 provide stormwater storage, their small size allows for limited storage and precludes their ability to significantly affect nearby waterways.
Water Quality Protection	The small size of W5 and W6 limits their ability to provide significant water quality function.
Groundwater Processes	The small size and clayey sub-soil of W5 and W6 limit their ability to provide significant groundwater interaction, including infiltration.

## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or -)</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W5 and W6 and their buffers.	Loss of wetland is expected to be permanent.	Low due to small size and moderate function of W5 and W6
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to alter wetland hydrology; increased runoff/nutrient loading are expected to result in degradation of W5 and W6 habitats and water quality depending on stormwater management.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent, however, these areas are already in a degraded state and changes may not be severe.	Low due to small size and moderate function of W5 and W6
<b>Cumulative Impacts</b> Additional development beyond the current proposed plan has the potential to impact additional nearby wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Not yet known
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of some wetlands.	Habitat fragmentation is already moderate due to historic and ongoing agricultural practices; fragmentation as a result of the expansion is expected to increase this effect.	Low due to small size and moderate function of W5 and W6
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill is expected to result in loss or degradation of W5 and W6, however rare species are not known to exist in W5 and W6.	Loss of rare plants/animals and communities is not expected to occur.	N/A

**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>	
Project name: <b>Emerald Park Western Expansion Wetland W7</b>	Evaluator(s): Eric C. Parker, PWS
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014
Location: PLSS: T5N, R20E S36 SW1/4	Ecological Landscape: Southern Lake Michigan Coastal
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04
County: Waukesha Town/City/Village: Muskego	
<b>SITE DESCRIPTION</b>	
Soils: Mapped Type(s): (MgA) Martinton silt loam	WWI Class: None Depicted by WWI; Classification is F0Kf
Field Verified: Yes, soils are hydric with a redox dark surface meeting the F6 indicator	Wetland Type(s): Wet Meadow (degraded, isolated)
	Wetland Size: 0.10 Ac (isolated)      Wetland Area Impacted: Unknown
Hydrology: Seasonally-Temporarily flooded / saturated, as evidenced by primary hydrology indicators surface water, high water table, saturation and inundation visible on aerial imagery. W7 is isolated and adjacent to the landfill and likely a result of recent related changes to drainage patterns.	Vegetation: Plant Community Description(s): Degraded wet meadow farmed in recent years with the greatest cover by annual weeds, dominated by barnyard grass.

**SITE MAP**

<p>See Attached Figures:</p> <ul style="list-style-type: none"> <li>Figure 1 – Project Location and Topography</li> <li>Figure 2 – NRCS Soil Survey Data</li> <li>Figure 3 – Wisconsin Wetland Inventory</li> <li>Figure 4 – Field Delineated Wetland Data</li> <li>Figure 5 – Plant Communities</li> </ul> <p>Figures 4 and 5 depict the wetland and define the assessment area for wetland W7</p>
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**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N		Used for recreation (hunting, birding, hiking, etc.). List:
2	N		Used for educational or scientific purposes
3	N		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	N		In or adjacent to RED FLAG areas List:
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N*	P	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	N		Wetland and contiguous habitat >10 acres
2	N		3 or more strata present (>10% cover)
3	N		Within or adjacent to habitat corridor or established wildlife habitat area
4	N		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	N		Interspersion of habitat structure (hemi-marsh,shrub/emergent, wetland/upland complex,etc.)
7	N		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N		Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	N		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	N		Wetland is connected or contiguous with perennial stream or lake
2	N		Standing water provides habitat for amphibians and aquatic invertebrates
3	N		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	N		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	N		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow <u>or</u> is adjacent to a stream
2	Y		Water flow through wetland is NOT channelized
3	N		Dense, persistent vegetation
4	Y		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	Y*		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	N		Provides substantial storage of storm and floodwater based on previous section
2	Y		Basin wetland <u>or</u> constricted outlet
3	Y		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	N		Dense, persistent vegetation
6	N		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	Y		Stormwater or surface water from agricultural land is major hydrology source
8	N		Discharge to surface water
9	Y*		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	N		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area





**W-7**

10/17/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).**Practitioner:** Melissa Curran / Eric C. Parker

Weather Notes: 50 degrees and Sunny

Duration Notes: 15 minutes

Community Type Notes: Low Quality Farmed Wetland that is mostly Typha and Phalaris

Other Notes: Mallards in adjacent farmed wetland, which is mostly open water

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 1.4

Native Mean C: 2.6

Total FQI: 7.7

Native FQI: 10.4

Adjusted FQI: 19

% C value 0: 56.7

% C value 1-3: 23.3

% C value 4-6: 20

% C value 7-10: 0

Native Tree Mean C: n/a

Native Shrub Mean C: n/a

Native Herbaceous Mean C: 2.6

**Species Richness:**

Total Species: 30

Native Species: 16 53.30%

Non-native Species: 14 46.70%

**Species Wetness:**

Mean Wetness: -1.5

Native Mean Wetness: -2.8

**Physiognomy Metrics:**

Tree: 0 0%

Shrub: 0 0%

Vine: 0 0%

Forb: 23 76.70%

Grass: 5 16.70%

Sedge: 2 6.70%

Rush: 0 0%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 12 40%

Perennial: 16 53.30%

Biennial: 2 6.70%

Native Annual: 8 26.70%

Native Perennial: 8 26.70%

Native Biennial: 0 0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Abutilon theophrasti; abutilon abutilon	Malvaceae	ABUTHE	non-native	0	3	forb	annual	velvet-leaf
Agrostis hyemalis; agrostis antecedens; c	Poaceae	AGRHYE	native	4	0	grass	perennial	southern hair grass
Alisma subcordatum; alisma plantago-aq	Alismataceae	ALISUB	native	3	-5	forb	perennial	american water-plantain
Alisma triviale; alisma plantago-aquatica	Alismataceae	ALITRI	native	4	-5	forb	perennial	northern water-plantain
Amaranthus powellii; amaranthus bouch	Amaranthaceae	AMAPOW	non-native	0	5	forb	annual	powells smooth amaranth
Ambrosia artemisiifolia; ambrosia elatior	Asteraceae	AMBART	native	0	3	forb	annual	common ragweed
Barbarea vulgaris; barbarea arcuata; bar	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow-rocket
Bidens cernua; bidens cernuum; bidens ξ	Asteraceae	BIDCER	native	4	-5	forb	annual	nodding beggar-ticks
Cyperus esculentus; chlorocyperus phym	Cyperaceae	CYPESC	native	0	-3	sedge	perennial	field nut sedge
Daucus carota	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen annes-lace
Echinochloa crus-galli; echinochloa muric	Poaceae	ECHCRU	non-native	0	-3	grass	annual	barnyard grass
Erigeron strigosus; erigeron ramosus var	Asteraceae	ERISTR	native	2	3	forb	annual	daisy fleabane
Euthamia graminifolia; solidago graminif	Asteraceae	EUTGRA	native	4	-3	forb	perennial	common flat-topped goldenrod
Hordeum jubatum; critesion jubatum; hc	Poaceae	HORJUB	non-native	0	0	grass	perennial	foxtail barley
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	invasive purple loosestrife
Mimulus ringens	Scrophulariaceae	MIMRIN	native	6	-5	forb	perennial	allegheny monkey-flower
Panicum capillare; panicum barbipulvina	Poaceae	PANCAP	native	1	0	grass	annual	common witch grass
Persicaria hydropiper; polygonum hydro	Polygonaceae	PERHYD	non-native	0	-5	forb	annual	marsh-pepper knotweed
Persicaria pensylvanica; polygonum pens	Polygonaceae	PERPEN	native	1	-3	forb	annual	pennsylvania smartweed
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Plantago major	Plantaginaceae	PLAMAJ	non-native	0	0	forb	perennial	broad-leaved plantain
Ranunculus sceleratus	Ranunculaceae	RANSCE	native	3	-5	forb	annual	cursed crowfoot
Rorippa palustris; radicula hispida; rorip	Brassicaceae	RORPAL	native	3	-5	forb	annual	common yellow-cress
Rumex crispus; rumex elongatus	Polygonaceae	RUMCRI	non-native	0	0	forb	perennial	curly dock
Schoenoplectus tabernaemontani; scirp	Cyperaceae	SCHTAB	native	4	-5	sedge	perennial	soft-stem bulrush
Symphotrichum novae-angliae; aster nc	Asteraceae	SYMNOA	native	3	-3	forb	perennial	new england aster
Trifolium hybridum; trifolium elegans	Fabaceae	TRIHYP	non-native	0	3	forb	perennial	alsike clover
Trifolium pratense	Fabaceae	TRIPRA	non-native	0	3	forb	perennial	red clover
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail
Veronica peregrina; veronica sherwoodii	Scrophulariaceae	VERPEE	native	0	-3	forb	annual	purslane speedwell

**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

<b>Assessment Area (AA)</b>	<b>Buffer (50')</b>	<b>Historic</b>	<b>Impact Level*</b>	<b>Relative Frequency**</b>	<b>Stressor</b>
N	Y	N	H	C	Filling, berms (non-impounding)
NY	N	N	n/a	n/a	Drainage – tiles, ditches
Y	Y	N	H	C	Hydrologic changes - high capacity wells, impounded water, increased runoff
N	N	N	n/a	n/a	Point source or stormwater discharge
Y	Y	Y	H	C	Polluted runoff (agricultural)
N	N	N	n/a	n/a	Pond construction
Y	Y	Y	H	C	Agriculture – row crops
N	N	Y	n/a	C	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	N	N	n/a	n/a	Roads or railroad
N	N	N	n/a	n/a	Utility corridor (above or subsurface)
N	N	N	n/a	n/a	Dams, dikes or levees
Y	Y	Y	H	C	Soil subsidence, loss of soil structure
Y	Y	Y	H	C	Sediment input
Y	Y	Y	H	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
N	N	N	n/a	n/a	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	M	C	Cover of non-native and/or invasive species
N	N	N	n/a	n/a	Residential land use
N	Y	N	M	C	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
Y	Y	N	H	C	Excavation or soil grading
					Other (list below):
Y	Y	N	L	C	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

This degraded wet meadow is heavily impacted by ongoing farming and the adjacent landfill. Floristic diversity is low. Recreational usage is not present.

## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity	X				
Human Use Values	X				
Wildlife Habitat	X				
Fish and Aquatic Life Habitat					X
Shoreline Protection					X
Flood and Stormwater Storage	X				
Water Quality Protection	X				
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	W7 is a small farmed wetland with low species diversity and quality with native mean C of 2.6, and native FQI of 10.4, respectively. No rare plant species were identified.
Human Use Values	There is no public access to this private land, and its value for recreation, hiking, and education are low. Archaeological resources on the site are not known.
Wildlife Habitat	The location and small size of W7 precludes its significance for wildlife habitat.
Fish and Aquatic Life Habitat	Aquatic habitat is not present in W7.
Shoreline Protection	A shore is not present in W7. W7 lacks surface water for extended periods.
Flood and Stormwater Storage	W7 lacks significant stormwater retention dimensions.
Water Quality Protection	The small size of W7 limits its ability to provide significant water quality protection.
Groundwater Processes	The small size and clayey sub-soil of W7 limit its ability to provide significant groundwater interaction, including infiltration.

## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or -)</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W7 and its buffer.	Loss of wetland is expected to be permanent.	Low due to man-made condition and low function of W7.
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to alter wetland hydrology; increased runoff/nutrient loading are expected to result in further degradation of W3 and W4 habitats if direct impacts are avoided.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent, however, these areas are already in a degraded state.	Low due to agricultural condition and low function of W7.
<b>Cumulative Impacts</b> Additional development beyond the current proposed plan has the potential to impact additional nearby wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Not yet known
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of some wetlands.	Habitat fragmentation is already moderate due to historic and ongoing agricultural and landfill operations; fragmentation as a result of the expansion is expected to increase this effect.	Low due to agricultural condition and low function of W7.
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill is expected to result in loss or further degradation of W7, however rare species are not known to exist in these wetlands.	Loss of rare plants/animals and communities is not expected to occur.	N/A



**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>	
Project name: <b>Emerald Park Western Expansion Wetland W8 &amp; W9</b> (portion of larger wetland complex mostly off-site)	Evaluator(s): Eric C. Parker, PWS
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014
Location: PLSS: T5N, R20E S36 SW1/4	Ecological Landscape: Southern Lake Michigan Coastal
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04
County: Waukesha Town/City/Village: Muskego	
<b>SITE DESCRIPTION</b>	
Soils: Mapped Type(s): (Mzb) Montgomery silty clay loam (Vertic endoaquolls)	WWI Class: Shown by WWI as F0Kf
Field Verified: Yes, soils are hydric with a depleted matrix meeting the A11, A12 and/or F3 indicators.	Wetland Type(s): Degraded wet meadow (farmed).
	Wetland Size: W8= 0.45 Ac W9=0.04 Ac      Wetland Area Impacted: Unknown
Hydrology: Seasonally flooded / saturated, as evidenced by primary and secondary indicators. Runoff derived from adjacent row-crop field. W8 is contiguous with the intermittent waterway S2 (WBIC 5038471), a second order waterway. A berm of dredge spoils separates surface water in W9 from S2.	Vegetation: Plant Community Description(s): The majority of W8 and W9 are degraded wet meadow dominated by barnyard grass with only a few other species present. The portion of W8 adjacent to S2 is dominated by reed canary grass with cottonwood trees also present.

**SITE MAP**

<p>See Attached Figures:      Figure 1 – Project Location and Topography             Figure 2 – NRCS Soil Survey Data             Figure 3 – Wisconsin Wetland Inventory             Figure 4 – Field Delineated Wetland Data             Figure 5 – Plant Communities</p> <p>Figures 4 and 5 depict the wetlands and define the assessment area for wetlands W8 and W9.</p>
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**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N		Used for recreation (hunting, birding, hiking, etc.). List:
2	N		Used for educational or scientific purposes
3	N		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	Y		In or adjacent to RED FLAG areas-- List: 1) contiguous WBIC 5038471 waterway is ASNRI, 2) W9 and a portion of W8 is in secondary environmental corridor.
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N	Y	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	Y		Wetland and contiguous habitat >10 acres
2	N		3 or more strata present (>10% cover)
3	Y*		Within or adjacent to habitat corridor or established wildlife habitat area
4	Y		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	N		Interspersion of habitat structure (hemi-marsh,shrub/emergent, wetland/upland complex,etc.)
7	N		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N		Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	N		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	Y*		Wetland is connected or contiguous with perennial stream or lake
2	N		Standing water provides habitat for amphibians and aquatic invertebrates
3	Y*		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N*		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	n/a		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	n/a		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow <u>or</u> is adjacent to a stream
2	Y		Water flow through wetland is NOT channelized
3	Y*		Dense, persistent vegetation
4	N		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	Y		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	Y		Provides substantial storage of storm and floodwater based on previous section
2	N		Basin wetland <u>or</u> constricted outlet
3	Y		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	Y		Dense, persistent vegetation
6	Y*		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	Y*		Stormwater or surface water from agricultural land is major hydrology source
8	N		Discharge to surface water
9	N		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	N		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area



**SECTION 2: Floristic Integrity**

**Plant Community Integrity (circle)\***

	<b>Low</b>	<b>Medium</b>	<b>High</b>	<b>Exceptional</b>
<b>Invasive species cover</b>	> 50%	20-50%	10-20%	<10%
<b>Strata</b>	Missing stratum(a) or bare due to invasive species	All strata present but reduced native species	All strata present and good assemblage of native species	All strata present, conservative species represented
<b>NHI plant community ranking</b>	S4	S3	S2	S1-S2 (S2 high quality)
<b>Relative frequency of plant community in watershed</b>	Abundant	Common	Uncommon	Rare
<b>FQI (optional)</b>	<13	13-23	23-32	>32
<b>Mean C (optional)</b>	<2.4	2.4-4.2	4.3-4.7	>4.7

**Plant Species List (\* dominant); see attached list for complete inventory**

<b>Scientific Name</b>	<b>Common Name</b>	<b>C of C</b>	<b>Plant communities</b>	<b>Comments (Estimate of % Cover, Abundance)</b>
<i>Phalaris arundinacea</i> *	reed canary grass	0	WM-degraded	5% overall - Common
<i>Echinochloa crus-galli</i> *	barnyard grass	0	WM-farmed	15% overall - Common

**SUMMARY OF FLORISTIC INTEGRITY (Include general comments on plant communities)**

In the portions evaluated, W8 and W9 are floristically degraded. Degraded and farmed wet meadow comprise most of W8 and is dominated by invasive reed canary grass and barnyard grass. The overall floristic integrity of the evaluated portion of W8 is very low (native mean C is 0.5 and native FQI is 0.7), being significantly degraded by farming and invasive species.

**W-8**

10/23/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Eric C. Parker

Weather Notes: 40 degrees and sunny

Duration Notes: 5 minutes

Community Type Notes: Farmed Wetland dominated by Echinochloa

Other Notes: Wetland connects to Ag Ditch S-2 to west

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 0.3

Native Mean C: 0.5

Total FQI: 0.6

Native FQI: 0.7

Adjusted FQI: 3.5

% C value 0: 75

% C value 1-3: 25

% C value 4-6: 0

% C value 7-10: 0

Native Tree Mean C: n/a

Native Shrub Mean C: n/a

Native Herbaceous Mean C: 0.5

**Species Richness:**

Total Species: 4

Native Species: 2 50%

Non-native Species: 2 50%

**Species Wetness:**

Mean Wetness: -3

Native Mean Wetness: -3

**Physiognomy Metrics:**

Tree: 0 0%

Shrub: 0 0%

Vine: 0 0%

Forb: 1 25%

Grass: 3 75%

Sedge: 0 0%

Rush: 0 0%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 3 75%

Perennial: 1 25%

Biennial: 0 0%

Native Annual: 2 50%

Native Perennial: 0 0%

Native Biennial: 0 0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Agrostis gigantea; agrostis alba; agr	Poaceae	AGRIGIG	non-native	0	-3	grass	perennial	redtop
Echinochloa crus-galli; echinochloa	Poaceae	ECHCRU	non-native	0	-3	grass	annual	barnyard grass
Panicum dichotomiflorum	Poaceae	PANDIC	native	0	-3	grass	annual	fall panic grass
Persicaria pensylvanica; polygonum	Polygonaceae	PERPEN	native	1	-3	forb	annual	pennsylvania smartweed

**W-9**

10/23/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Eric C. Parker

Weather Notes: 40 degrees and sunny

Duration Notes: 5 minutes

Community Type Notes: Farmed wetland dominated by Echinochloa

Other Notes:

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 0.3

Native Mean C: 0.5

Total FQI: 0.6

Native FQI: 0.7

Adjusted FQI: 3.5

% C value 0: 75

% C value 1-3: 25

% C value 4-6: 0

% C value 7-10: 0

Native Tree Mean C: n/a

Native Shrub Mean C: n/a

Native Herbaceous Mean C: 0.5

**Species Richness:**

Total Species: 4

Native Species: 2 50%

Non-native Species: 2 50%

**Species Wetness:**

Mean Wetness: -3

Native Mean Wetness: -3

**Physiognomy Metrics:**

Tree: 0 0%

Shrub: 0 0%

Vine: 0 0%

Forb: 1 25%

Grass: 3 75%

Sedge: 0 0%

Rush: 0 0%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 3 75%

Perennial: 1 25%

Biennial: 0 0%

Native Annual: 2 50%

Native Perennial: 0 0%

Native Biennial: 0 0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Agrostis gigantea; agrostis alba; agros	Poaceae	AGRIG	non-native	0	-3	grass	perennial	redtop
Echinochloa crus-galli; echinochloa m	Poaceae	ECHCRU	non-native	0	-3	grass	annual	barnyard grass
Panicum dichotomiflorum	Poaceae	PANDIC	native	0	-3	grass	annual	fall panic grass
Persicaria pensylvanica; polygonum p	Polygonaceae	PERPEN	native	1	-3	forb	annual	pennsylvania smartweed

**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

Assessment Area (AA)	Buffer (100m)	Historic	Impact Level*	Relative Frequency**	Stressor
Y	Y	N	H	C	Filling, berms (non-impounding)
Y	Y	Y	H	n/a	Drainage – tiles, ditches
N	N	N	n/a	n/a	Hydrologic changes - high capacity wells, impounded water, increased runoff
N	N	N	n/a	n/a	Point source or stormwater discharge
Y	Y	Y	H	C	Polluted runoff (agricultural)
N	N	N	n/a	n/a	Pond construction
N	Y	Y	H	C	Agriculture – row crops
N	N	N	n/a	n/a	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	N	N	n/a	n/a	Roads or railroad
N	N	N	n/a	n/a	Utility corridor (above or subsurface)
N	N	N	n/a	n/a	Dams, dikes or levees
Y	Y	Y	M	C	Soil subsidence, loss of soil structure
Y	Y	Y	M	C	Sediment input
Y	Y	Y	M	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
N	N	N	n/a	n/a	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	H	C	Cover of non-native and/or invasive species
N	N	N	n/a	n/a	Residential land use
N	N	N	n/a	n/a	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
N	N	N	n/a	n/a	Excavation or soil grading
					Other (list below):
N	N	N	n/a	n/a	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

W8 and W9 have been significantly impacted by agricultural row cropping. Reed canary grass invasion in the west part of W8 is the result of other stressors including agricultural runoff carrying sediment and nutrients from historic farming in W8 and adjacent row-cropped fields in its buffer and flooding of waterway S2. Floristic diversity is low throughout W8 and W9. Historic agricultural use has been similar as today for at least several decades. Recreation is not a significant use in W8 and W9.

## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity	X				
Human Use Values	X				
Wildlife Habitat	X				
Fish and Aquatic Life Habitat	X				
Shoreline Protection					X
Flood and Stormwater Storage	X				
Water Quality Protection	X				
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	W8 and W9 are cropped during the growing season and non-native weeds are also present. Reed canary grass is abundant with a few other species present in the evaluated part of W8. Both W8 and W9 have low diversity and quality with a native mean C of 0.5 and native FQI of 0.7. No rare species were identified in W8 or W9.
Human Use Values	There is no public access to this private land, and therefore its value for recreation, hiking, and education are low given present uses. Archaeological resources on the site are not known.
Wildlife Habitat	W8 and W9 do not provide significant wildlife habitat given they are farmed, and the portion of W8 evaluated is only a small part of the overall W8 complex.
Fish and Aquatic Life Habitat	Aquatic habitat is not present in W8 or W9.
Shoreline Protection	Significant shoreline is not present in W8; and is not present in W9.
Flood and Stormwater Storage	W8 and W9 provide stormwater storage for precipitation that lands within their boundaries and their buffers / runoff basin totaling approximately 1-2 acres. Retained stormwater is either evapotranspired, sheetflows into S2 westerly, or to a much lesser extent, infiltrates.
Water Quality Protection	Due to ongoing row-crop farming and associated continual soil disturbance, W8 provides low water quality protection for a basin area of approximately 2 acres that is tributary to S2 through W8. W9 is effectively isolated by a dredge spoil berm and therefore does not provide a function for S2.
Groundwater Processes	The relatively small size and clayey sub-soil of W8 and W9 limit their ability to provide significant groundwater interaction, including infiltration.



## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or -)</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W8 and W9 and their buffers.	Loss of wetland is expected to be permanent.	If W8 or W9 are directly impacted, the significance would be in the low range due to their overall low function.
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to alter wetland hydrology; increased runoff/nutrient loading are expected to result in similar degradation of W8 and W9 as existing conditions.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent.	Low because these areas are already in a degraded state and the area of impact and area serviced by W8 and W9 are relatively small. Therefore secondary impacts are not expected to be significant.
<b>Cumulative Impacts</b> Additional development beyond the current proposed plan has the potential to impact additional portions of W8 and neighboring wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Significance would be in the medium range given the area to be impacted versus the generally degraded status of wetlands in this area.
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of some wetlands.	Habitat fragmentation is already moderate due to historic and ongoing agricultural practices; fragmentation as a result of the expansion is expected to increase this effect.	If impacted, low due to low habitat function of W8 and W9.
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill may result in loss or further degradation of W8 or W9, however rare species are not known to exist in or adjacent to these wetlands.	Loss of rare plants/animals and communities is not expected to occur.	N/A

**Wisconsin Department of Natural Resources  
Wetland Rapid Assessment Methodology – version 2.0**

<b>WETLAND IDENTIFICATION</b>	
Project name: <b>Emerald Park Western Expansion Wetland W10</b> (portion of larger wetland complex mostly off-site)	Evaluator(s): Eric C. Parker, PWS
File #: 193702557	Date of visit(s): 10/17/2014, 10/23/2014
Location: PLSS: <u>T5N, R20E S36 SW1/4</u>	Ecological Landscape: Southern Lake Michigan Coastal
Lat: _____ Long: _____	Watershed: Middle Fox River - Illinois, FX04
County: <u>Waukesha</u> Town/ <span style="border: 1px solid black; padding: 0 2px;">City</span> /Village: <u>Muskego</u>	
<b>SITE DESCRIPTION</b>	
Soils: Mapped Type(s): (Mzb) Montgomery silty clay loam (Vertic endoaquolls)	WWI Class: Shown by WWI as E1Ha, but has small wooded (T3K) portion
Field Verified: Yes, soils are hydric with depleted matrix meeting the A11 and F3 indicators.	Wetland Type(s): Wet meadow and degraded hardwood swamp (forested).
	Wetland Size: 0.46 Ac      Wetland Area Impacted: Unknown
Hydrology: Seasonally to semi-permanently flooded/saturated, as evidenced by primary and secondary indicators. Runoff from adjacent farm fields and upland woods; portion evaluated set back from waterways. Contiguous with two intermittent waterways: 1) WBIC 5038471, a second order waterway to the west; and 2) WBIC 5038269, a first order waterway to the east.	Vegetation: Plant Community Description(s): Degraded wet meadow dominated by invasive reed canary grass with a few natives also present, and degraded wet woods.

**SITE MAP**

<p>See Attached Figures:      Figure 1 – Project Location and Topography             Figure 2 – NRCS Soil Survey Data             Figure 3 – Wisconsin Wetland Inventory             Figure 4 – Field Delineated Wetland Data             Figure 5 – Plant Communities</p> <p>Figures 4 and 5 depict the wetlands and define the assessment area for wetland W10</p>
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**SECTION 1: Functional Value Assessment**

HU	Y/N	Potential	<b>Human Use Values: recreation, culture, education, science, natural scenic beauty</b>
1	N	Y	Used for recreation (hunting, birding, hiking, etc.). List: hunting, birding
2	N	Y	Used for educational or scientific purposes
3	N		Visually or physically accessible to public
4	N		Aesthetically pleasing due to diversity of habitat types, lack of pollution or degradation
5	Y		In or adjacent to RED FLAG areas-- List: 1) contiguous WBIC 5038471 waterway is ASNRI, 2) W10 is in secondary environmental corridor.
6	N		Supports or provides habitat for endangered, threatened or special concern species
7	N	Y	In or adjacent to archaeological or cultural resource site
WH			<b>Wildlife Habitat</b>
1	Y		Wetland and contiguous habitat >10 acres
2	Y		3 or more strata present (>10% cover)
3	Y*		Within or adjacent to habitat corridor or established wildlife habitat area
4	Y		100 m buffer – natural land cover ≥50%(south) 75% (north) intact
5	N		Occurs in a Joint Venture priority township
6	Y		Interspersion of habitat structure (hemi-marsh,shrub/emergent, wetland/upland complex,etc.)
7	Y*		Supports or provides habitat for SGCN or birds listed in the WI All-Bird Cons. Plan, or other plans
8	N	Y*	Part of a large habitat block that supports area sensitive species
9	N		Ephemeral pond with water present > 45 days
10	N		Standing water provides habitat for amphibians and aquatic invertebrates
11	N		Seasonally exposed mudflats present
12	N		Provides habitat scarce in the area (urban, agricultural, etc.)
FA			<b>Fish and Aquatic Life Habitat</b>
1	Y*		Wetland is connected or contiguous with perennial stream or lake
2	N		Standing water provides habitat for amphibians and aquatic invertebrates
3	Y*		Natural Heritage Inventory (NHI) listed aquatic species within aquatic system
4	Y		Vegetation is inundated in spring
SP			<b>Shoreline Protection</b>
1	N		Along shoreline of a stream, lake, pond or open water area (≥1 acre) - if no, not applicable
2	n/a		Potential for erosion due to wind fetch, waves, heavy boat traffic, erosive soils, fluctuating water levels or high flows – if no, not applicable
3	n/a		Densely rooted emergent or woody vegetation
ST			<b>Storm and Floodwater Storage</b>
1	Y		Basin wetland, constricted outlet, has through-flow <u>or</u> is adjacent to a stream
2	Y		Water flow through wetland is NOT channelized
3	Y		Dense, persistent vegetation
4	N		Evidence of flashy hydrology
5	Y*		Point or non-point source inflow
6	N		Impervious surfaces cover >10% of land surface within the watershed
7	N		Within a watershed with ≤10% wetland
8	Y		Potential to hold >10% of the runoff from contributing area from a 2-year 24-hour storm event
WQ			<b>Water Quality Protection</b>
1	Y		Provides substantial storage of storm and floodwater based on previous section
2	N		Basin wetland <u>or</u> constricted outlet
3	Y		Water flow through wetland is NOT channelized
4	N		Vegetated wetland associated with a lake or stream
5	Y		Dense, persistent vegetation
6	Y*		Signs of excess nutrients, such as algae blooms, heavy macrophyte growth
7	Y*		Stormwater or surface water from agricultural land is major hydrology source
8	N		Discharge to surface water
9	N		Natural land cover in 100m buffer area < 50%
GW			<b>Groundwater Processes</b>
1	N		Springs, seeps or indicators of groundwater present
2	Y*		Location near a groundwater divide or a headwater wetland
3	N		Wetland remains saturated for an extended time period with no additional water inputs
4	N		Wetland soils are organic
5	N*		Wetland is within a wellhead protection area

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**Section 1 Comments (Refer to Section 1 numbers)**

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\*see comment below

WH 3. Part of secondary environmental corridor.

WH 7/8. Mallard, blue-winged teal, northern harrier, woodcock, black-billed cuckoo, willow flycatcher, sedge wren, brown thrasher, swamp sparrow, dickcissel

FA 1. Contiguous S1 & S2 intermittent and flow to Big Muskego Lake, therefore W10 contiguous w/perennial waterbody.

FA 3. Contiguous waterway S2 is ASNRI for SC, T or E species.

ST 5. Non-point source runoff from adjacent agricultural fields.

WQ 6. Dense reed canary grass may indicate excess nutrient inputs from upstream sources; but no excess algae/macrophytes.

WQ 7. Surface runoff from adjacent agricultural field.

GW 2. This and other wetlands on the site may be considered headwaters wetlands.

GW 5. Not in City of Muskego wellhead protection area.

**Wildlife Habitat and Species Observation (including amphibians and reptiles)****List: direct observation, tracks, scat, other sign; type of habitat: nesting, migratory, winter, etc.**

Observed	Potential	Species/Habitat/Comments
N	Y	Common amphibians/reptiles in wetlands & adjacent wooded and non-agricultural upland possible
Y		White-tailed deer in all areas (tracks, scat, browse, rubs)
Y		Red-tail hawk perching and hunting- direct observation in area nearby W10
N	Y	Small mammals including meadow vole, cottontail rabbit, opossum, and raccoon
Y		Various common bird sightings including: sparrows, crow, blue jay, Canada goose, catbird

**Fish and Aquatic Life Habitat and Species Observations****List: direct observation, other sign; type of habitat: nesting, spawning, nursery areas, etc.**

Observed	Potential	Species/Habitat
	Y	Crayfish

**SECTION 2: Floristic Integrity**

**Plant Community Integrity (circle)\***

	Low	Medium	High	Exceptional
<b>Invasive species cover</b>	> 50%	20-50%	10-20%	<10%
<b>Strata</b>	Missing stratum(a) or bare due to invasive species	All strata present but reduced native species	All strata present and good assemblage of native species	All strata present, conservative species represented
<b>NHI plant community ranking</b>	S4	S3	S2	S1-S2 (S2 high quality)
<b>Relative frequency of plant community in watershed</b>	Abundant	Common	Uncommon	Rare
<b>FQI (optional)</b>	<13	13-23	23-32	>32
<b>Mean C (optional)</b>	<2.4	2.4-4.2	4.3-4.7	>4.7

**Plant Species List (\* dominant); see attached list for complete inventory**

Scientific Name	Common Name	C of C	Plant communities	Comments (Estimate of % Cover, Abundance)
<i>Phalaris arundinacea</i> *	reed canary grass	0	WM - HWS	95% overall - Abundant
<i>Populus tremuloides</i> *	quaking aspen	2	HWS	20% overall - Common

**SUMMARY OF FLORISTIC INTEGRITY (Include general comments on plant communities)**

In the portion evaluated, W10 is floristically degraded. Wet meadow comprises most of W10 as on the overall site - dominated by invasive reed canary grass. The small wooded area is degraded and dominated by quaking aspen and reed canary grass. The overall floristic integrity of the evaluated portion of W10 is low (native mean C is 1.7 and native FQI is 5.4), being significantly degraded by invasive species.

**W-10**

10/23/2014

Emerald Park West

Muskego

Waukesha

Wisconsin

FQA DB Region: Wisconsin - Midwest Region

FQA DB Publication Year: 2014

FQA DB Description: Parker E.C., Curran M., Waechter Z.S, Grosskopf E.A. 2014. Wisconsin FQA (Floristic Quality Assessment) Databases for Midwest and Northcentral-Northeast Regions for Universal FQA Calculator Web site (<http://universalfqa.org/>).

Practitioner: Eric C. Parker

Weather Notes: 40 degrees and sunny

Duration Notes: 15 minutes

Community Type Notes: Wet Meadow with Hardwood Swamp perimeter

Other Notes: Phalaris and Populus tremuloides dominant

Private/Public: Public

**Conservatism-Based Metrics:**

Total Mean C: 1.3

Native Mean C: 1.7

Total FQI: 4.7

Native FQI: 5.4

Adjusted FQI: 14.9

% C value 0: 46.2

% C value 1-3: 38.5

% C value 4-6: 15.4

% C value 7-10: 0

Native Tree Mean C: 2

Native Shrub Mean C: 2

Native Herbaceous Mean C: 1.6

**Species Richness:**

Total Species: 13

Native Species: 10 76.90%

Non-native Species: 3 23.10%

**Species Wetness:**

Mean Wetness: -1.5

Native Mean Wetness: -1.4

**Physiognomy Metrics:**

Tree: 2 15.40%

Shrub: 1 7.70%

Vine: 0 0%

Forb: 5 38.50%

Grass: 4 30.80%

Sedge: 1 7.70%

Rush: 0 0%

Fern: 0 0%

Bryophyte: 0 0%

**Duration Metrics:**

Annual: 4 30.80%

Perennial: 9 69.20%

Biennial: 0 0%

Native Annual: 4 30.80%

Native Perennial: 6 46.20%

Native Biennial: 0 0%

**Species:**

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Agrostis gigantea; agrostis alba; agrostis	Poaceae	AGRIG	non-native	0	-3	grass	perennial	redtop
Agrostis hyemalis; agrostis anteceden	Poaceae	AGRHYE	native	4	0	grass	perennial	southern hair grass
Ambrosia artemisiifolia; ambrosia elat	Asteraceae	AMBART	native	0	3	forb	annual	common ragweed
Bidens frondosa; bidens frondosus; bic	Asteraceae	BIDFRO	native	1	-3	forb	annual	common beggar-ticks
Cornus racemosa; cornus foemina ssp.	Cornaceae	CORRAC	native	2	0	shrub	perennial	gray dogwood
Cyperus esculentus; chlorocyperus ph	Cyperaceae	CYPESC	native	0	-3	sedge	perennial	field nut sedge
Epilobium coloratum	Onagraceae	EPICOL	native	3	-5	forb	perennial	cinnamon willow-herb
Panicum dichotomiflorum	Poaceae	PANDIC	native	0	-3	grass	annual	fall panic grass
Persicaria pensylvanica; polygonum pe	Polygonaceae	PERPEN	native	1	-3	forb	annual	pennsylvania smartweed
Phalaris arundinacea	Poaceae	PHAARU	non-native	0	-3	grass	perennial	reed canary grass
Populus tremuloides; populus tremula	Salicaceae	POPTRE	native	2	0	tree	perennial	quaking aspen
Rhamnus cathartica	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial	common invasive buckthorn
Symphotrichum lanceolatum; aster l	Asteraceae	SYMLAN	native	4	0	forb	perennial	white panicle aster

**SECTION 3: Condition Assessment of Wetland Assessment Area (AA) and Buffer (100 m)**

Assessment Area (AA)	Buffer (100m)	Historic	Impact Level*	Relative Frequency**	Stressor
N	N	N	n/a	n/a	Filling, berms (non-impounding)
N	N	N	n/a	n/a	Drainage – tiles, ditches
N	N	N	n/a	n/a	Hydrologic changes - high capacity wells, impounded water, increased runoff
N	N	N	n/a	n/a	Point source or stormwater discharge
Y	Y	Y	H	C	Polluted runoff (agricultural)
N	N	N	n/a	n/a	Pond construction
N	Y	Y	H	C	Agriculture – row crops
N	N	N	n/a	n/a	Agriculture – hay
N	N	N	n/a	n/a	Agriculture – pasture
N	N	N	n/a	n/a	Roads or railroad
N	N	N	n/a	n/a	Utility corridor (above or subsurface)
N	N	N	n/a	n/a	Dams, dikes or levees
Y	Y	Y	M	C	Soil subsidence, loss of soil structure
Y	Y	Y	M	C	Sediment input
N	Y	Y	L	C	Removal of herbaceous stratum – mowing, grading, earthworms, etc.
N	N	N	n/a	n/a	Removal of tree or shrub strata – logging, unprescribed fire
N	N	N	n/a	n/a	Human trails – unpaved
N	N	N	n/a	n/a	Human trails – paved
N	N	N	n/a	n/a	Removal of large woody debris
Y	Y	Y	H	C	Cover of non-native and/or invasive species
N	N	Y	n/a	n/a	Residential land use
N	N	N	n/a	n/a	Urban, commercial or industrial use
N	N	N	n/a	n/a	Parking lot
N	N	N	n/a	n/a	Golf course
N	N	N	n/a	n/a	Gravel pit
N	N	N	n/a	n/a	Recreational use (boating, ATVs, etc.)
N	N	N	n/a	n/a	Excavation or soil grading
					Other (list below):
N	N	N	n/a	n/a	Polluted runoff (non-agricultural)

\* L= Low, M = Medium, H = High

\*\*Relative frequency of the impact in comparison to the general condition of wetlands and buffer areas in the region or watershed (C=Common, UC=Uncommon)

**SUMMARY OF CONDITION ASSESSMENT (Include general description and comments)**

W10 has been significantly impacted by invasion of reed canary grass. Reed canary grass invasion is the result of other stressors including agricultural runoff carrying sediment and nutrients from historic farming in W10 and adjacent row-cropped fields in its buffer. Floristic diversity is low. Historic agricultural use has been similar as today for at least several decades. Recreational usage, which would include the entire wetland not just the evaluated portion, is limited by access; hunting and bird watching are examples of possible uses which are likely not presently occurring.



## SUMMARY OF FUNCTIONAL VALUES

FUNCTION	SIGNIFICANCE				
	Low	Medium	High	Exceptional	NA
Floristic Integrity	X				
Human Use Values	X				
Wildlife Habitat		X			
Fish and Aquatic Life Habitat	X				
Shoreline Protection					X
Flood and Stormwater Storage		X			
Water Quality Protection		X			
Groundwater Processes	X				

FUNCTION	RATIONALE
Floristic Integrity	Reed canary grass abundant with a few native species present in the evaluated part of W10. This portion has low diversity and quality with a native mean C of 1.7 and native FQI of 5.4. No rare species were identified in the evaluated portion of W10.
Human Use Values	There is no public access to this private land, and therefore its value for recreation, hiking, and education are low given present uses. Archaeological resources on the site are not known.
Wildlife Habitat	W10 provides moderate wildlife habitat that is common to the region; the portion evaluated is a small part of the overall W10 complex.
Fish and Aquatic Life Habitat	Aquatic habitat in the form of depressional ponded areas in this evaluated portion of W10 is limited to the spring season, possibly providing habitat for common invertebrates and frog species that are tolerant of invasive species, agricultural sedimentation, herbicides and pesticides.
Shoreline Protection	Shoreline is not present in W10.
Flood and Stormwater Storage	W10 provides stormwater storage for precipitation that lands in W10 and its buffer / runoff basin totaling approximately 2 acres. Retained stormwater is either evapotranspired, sheetflows into S1 or S2 to the east and west, or to a much lesser extent, infiltrates.
Water Quality Protection	W10 provides moderate water quality protection for a basin area of approximately 2 acres that is tributary to S1 or S2 through W10.
Groundwater Processes	The relatively small size and clayey sub-soil of W10 limits its ability to provide significant groundwater interaction, including infiltration.

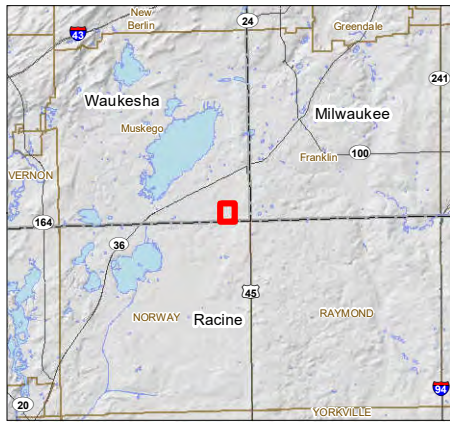
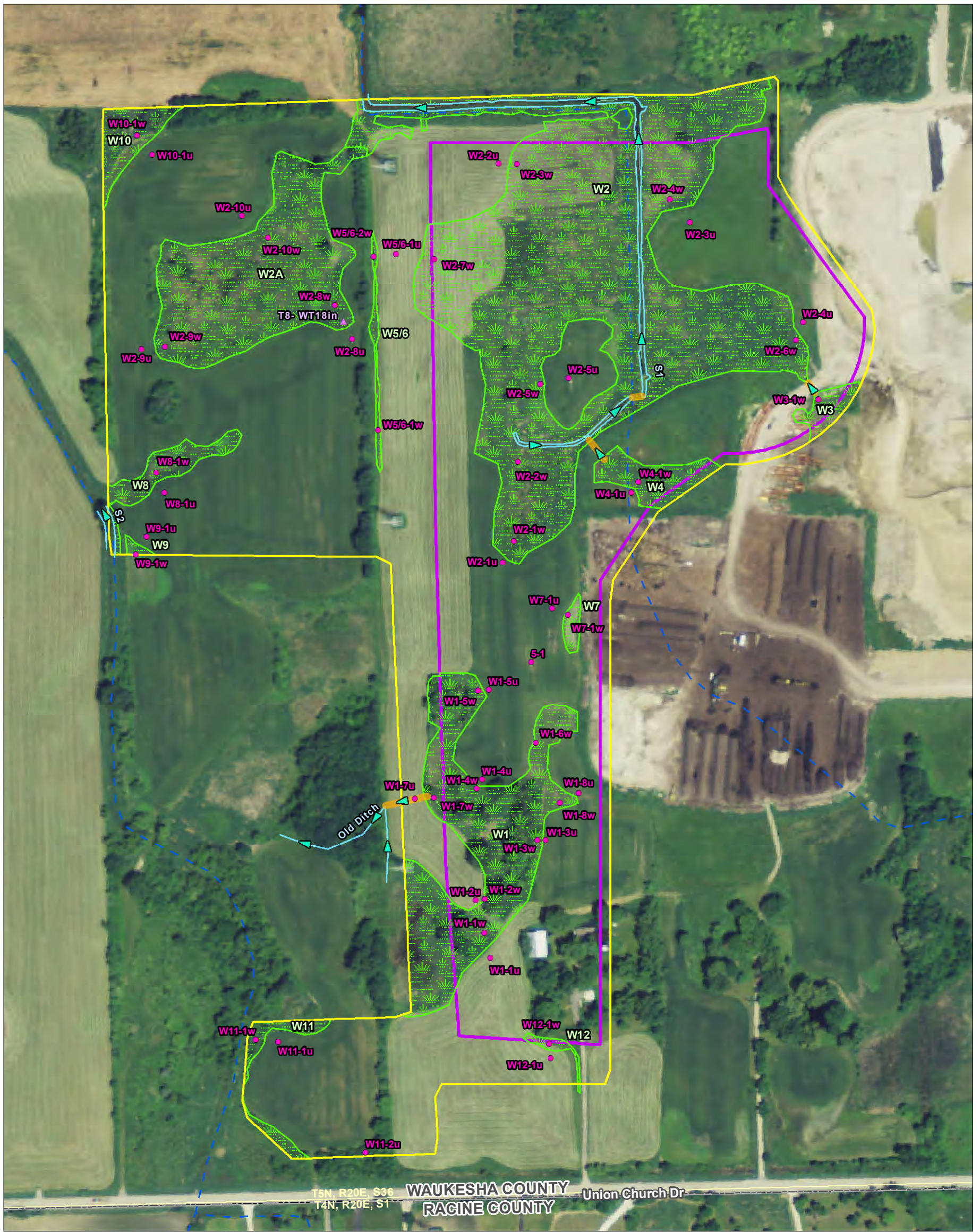
## Section 4: Project Impact Assessment

### Brief Project Description

The proposed project consists of an expansion of the landfill that currently exists to the east of the project area. Specific impacts are not yet known, however it is likely there will be direct impacts of filling and/or excavating the wetlands and/or their buffers.

### Expected Project Impacts

<b>IMPACT: describe ( + or -)</b>	<b>Permanence/Reversibility</b>	<b>Significance (Low, Medium, High)</b>
<b>Direct Impacts</b> The extent of proposed impacts is not yet known; however potential impacts from the expansion include fill for solid waste, roads and ponds, etc. which will directly impact W10 and its buffer.	Loss of wetland is expected to be permanent.	If W10 are directly impacted, the significance would be in the medium range due to its overall moderate function. The farmed portions of W10 would have lesser significance.
<b>Secondary Impacts (including impacts which are indirectly attributable to the project)</b> Filling buffers is expected to alter wetland hydrology; increased runoff/nutrient loading are expected to result in degradation of W10 habitat and water quality depending on stormwater management.	Alterations to wetland hydrology, habitat, water quality, and water table are likely to be permanent.	Low because these areas are already in a degraded state and the area of impact and area serviced by W10 is relatively small. Therefore secondary impacts are not expected to be significant.
<b>Cumulative Impacts</b> Additional development beyond the current proposed plan has the potential to impact additional portions of W10 and neighboring wetlands, their hydrology and/or their buffers.	Additional wetland loss and alterations to their hydrology would be permanent.	Significance would be in the medium range given the area to be impacted versus the generally degraded status of wetlands in this area.
<b>Spatial/Habitat Integrity</b> The configuration of proposed filling and hydrologic alterations is not yet known, but has the potential to increase the isolation of habitat of some wetlands.	Habitat fragmentation is already moderate due to historic and ongoing agricultural practices; fragmentation as a result of the expansion is expected to increase this effect.	If impacted, medium due to moderate habitat function of W10.
<b>Rare Plant/Animal Communities/ Natural Areas</b> Expansion of the landfill may result in loss or further degradation of W10, however rare species are not known to exist in or adjacent to these wetlands.	Loss of rare plants/animals and communities is not expected to occur.	N/A

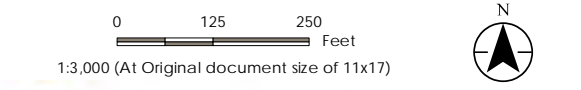


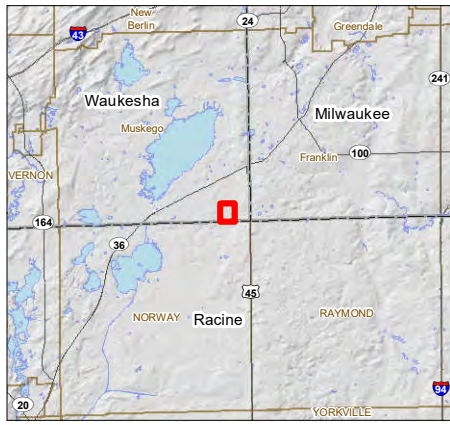
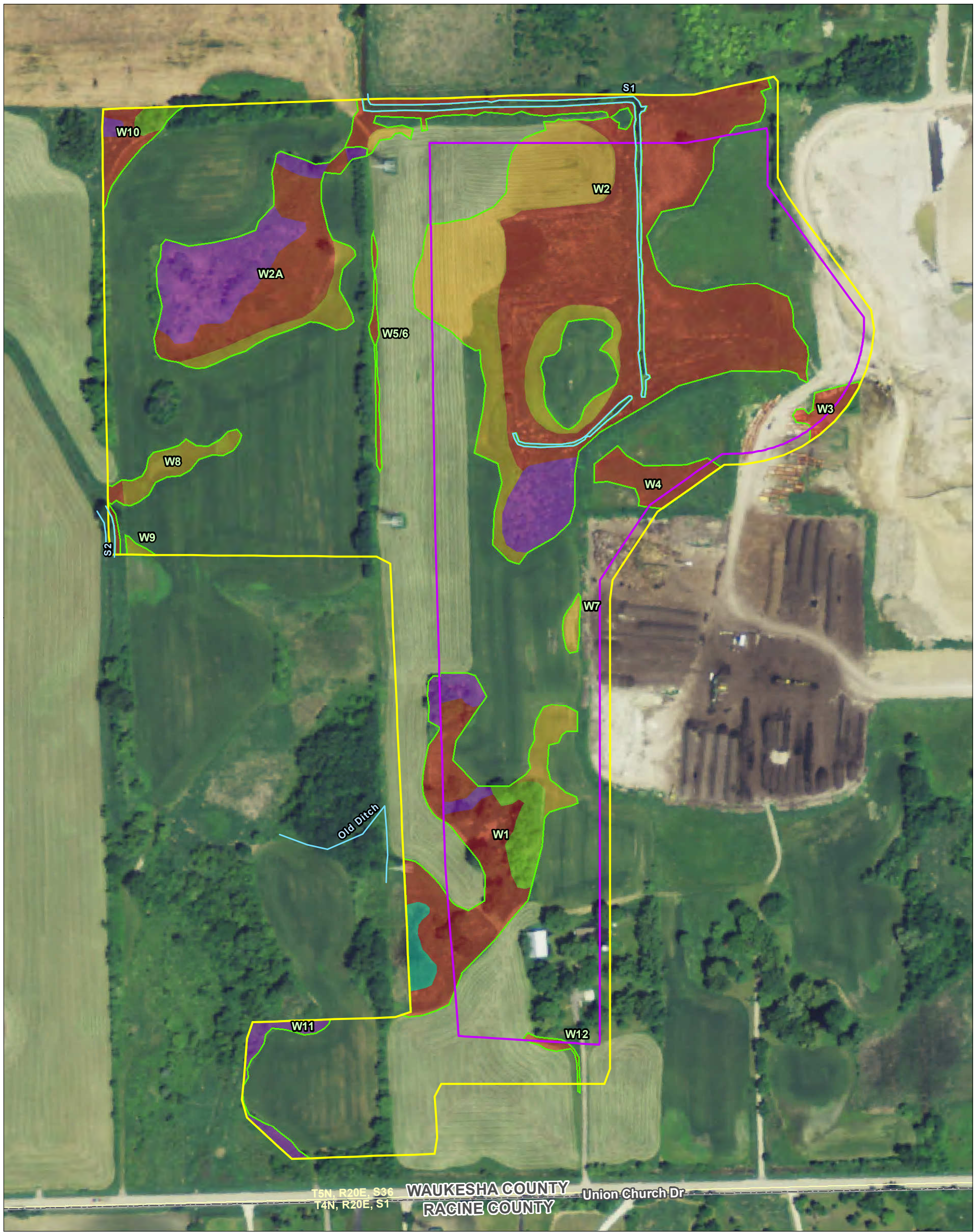
- Legend**
- Project Boundary
  - Proposed Solid Waste Boundary
  - Sample Point
  - ▲ Soil Bore
  - Culvert
  - ~ Field Delineated Waterway
  - ▶ Flow Direction
  - Field Surveyed Wetland
  - ~ DNR 24k Hydrography
  - ~ Perennial Stream
  - - - Intermittent Stream
  - ~ Waterbody

**Notes**  
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet  
 2. Data Sources Include: Stantec, WDNR, and WDOT  
 3. Orthophotography: 2013 NAIP

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Figure No. 4  
 Title Field Delineated Wetland Data  
 Client/Project ADS - Emerald Park Landfill Western Expansion  
 Project Location 193702557  
 S36, T5N, R20E: Prepared by AB on 2015-05-20  
 C. of Muskego, Technical Review by BT on 2015-05-20  
 Waukesha Co., WI Independent Review by EP on 2015-05-20



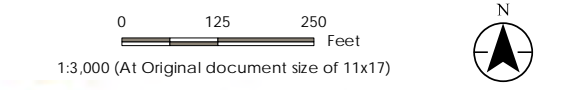


- Legend**
- Project Boundary
  - Proposed Solid Waste Boundary
  - Field Delineated Waterway
  - Field Surveyed Wetland
  - Plant Communities**
  - Farmed Wetland
  - Forested
  - Shallow Marsh
  - Shrub-carr
  - Wet Meadow

**Notes**  
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet  
 2. Data Sources Include: Stantec, WDNR, and WDOT  
 3. Orthophotography: 2013 NAIP

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Figure No. 5  
 Title **Plant Communities**  
 Client/Project **ADS - Emerald Park Landfill Western Expansion**  
 Project Location 193702557  
 S36, T5N, R20E; Prepared by AB on 2015-05-20  
 C. of Muskego; Technical Review by BT on 2015-05-20  
 Waukesha Co., WI Independent Review by EP on 2015-05-20





**Photo 1.** Sample Point W 1-8w by auger in farmed lobe of W-1, view north.



**Photo 2.** Sample point W 1-8u by auger adjacent to farmed lobe of W-1. View southwest.



**Photo 3.** Sample Point W 12-1u by auger, view north toward wetland W-12 (background).



**Photo 4.** Sample Point W 12-1w by auger within W-12, view east.



**Photo 5.** Sample Point W 12-1w by auger within W-12, view west.



WETLAND DETERMINATION DATA FORM
Midwest Region

Project/Site: Emerald Park Landfill - Western Expansion
Applicant: Advanced Disposal Services, INC
Investigator #1: Eric Parker
Soil Unit: Martinton silt loam
Landform: Depression
Slope (%): 2-4
Date: 05/19/15
County: Waukesha
State: Wisconsin
Wetland ID: Adj. to W1
Sample Point: W1-8u
Community ID: Agricultural rowcrops
Section: 36
Township: 5 N
Range: 20 E

SUMMARY OF FINDINGS
Hydrophytic Vegetation Present?
Wetland Hydrology Present?
Remarks: Antecedent moisture conditions expected to be in the normal based on recent WETS analyses in the area for other projects. Point located in an agricultural field with potential hydrological manipulations. Normal circumstances assumed not present.

HYDROLOGY
Wetland Hydrology Indicators (Check here if indicators are not present):
Primary: A1 - Surface Water, A2 - High Water Table, A3 - Saturation, B1 - Water Marks, B2 - Sediment Deposits, B3 - Drift Deposits, B4 - Algal Mat or Crust, B5 - Iron Deposits, B7 - Inundation Visible on Aerial Imagery, B8 - Sparsely Vegetated Concave Surface
Secondary: B6 - Surface Soil Cracks, B10 - Drainage Patterns, C2 - Dry-Season Water Table, C8 - Crayfish Burrows, C9 - Saturation Visible on Aerial Imagery, D1 - Stunted or Stressed Plants, D2 - Geomorphic Position, D5 - FAC-Neutral Test

Field Observations:
Surface Water Present?
Water Table Present?
Saturation Present?
Wetland Hydrology Present?

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Annual Crop Slide Review
Remarks: FSA slides indicate non-wetlands roughly in this location, which is outside a faint recurring signature which was delineated as a lobe of W-1.

SOILS
Map Unit Name: Martinton silt loam
Taxonomy (Subgroup): Aquic Argiudolls
Series Drainage Class: somewhat poorly

Profile Description table with columns: Top Depth, Bottom Depth, Horizon, Matrix (Color, %), Redox Features (Color, %, Type, Location), Texture (e.g. clay, sand, loam). Rows show data for depths 0, 10, 14, 14, and multiple empty rows.

NRCS Hydric Soil Field Indicators (check here if indicators are not present):
A1 - Histosol, A2 - Histic Epipedon, A3 - Black Histic, A4 - Hydrogen Sulfide, A5 - Stratified Layers, A10 - 2 cm Muck, A11 - Depleted Below Dark Surface, A12 - Thick Dark Surface, S1 - Sandy Muck Mineral, S3 - 5 cm Mucky Peat or Peat
Indicators for Problematic Soils: A16 - Coast Prairie Redox, S7 - Dark Surface, F12 - Iron-Manganese Masses, TF12 - Very Shallow Dark Surface, Other (Explain in Remarks)

Restrictive Layer (If Observed) Type: N/A
Depth: N/A
Hydric Soil Present?

Remarks:



**WETLAND DETERMINATION DATA FORM**  
Midwest Region

Project/Site: **Emerald Park Landfill - Western Expansion**

Wetland ID: **Adj. to W1** Sample Point **W1-8u**

VEGETATION (Species identified in all uppercase are non-native species.)				
<b>Tree Stratum (Plot size: 30 ft radius)</b>				
1.	<i>Species Name</i>	% Cover	Dominant	Ind. Status
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover =		0		
<b>Sapling/Shrub Stratum (Plot size: 15 ft radius)</b>				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover =		0		
<b>Herb Stratum (Plot size: 5 ft radius)</b>				
1.	<i>AVENA SATIVA</i>	40	Y	UPL
2.	<i>Veronica peregrina</i>	7	Y	FACW
3.	<i>CAPSELLA BURSA-PASTORIS</i>	5	N	FACU
4.	<i>Erigeron annuus</i>	5	N	FACU
5.	<i>THLASPI ARVENSE</i>	3	N	FACU
6.	<i>PLANTAGO MAJOR</i>	3	N	FAC
7.	<i>TARAXACUM OFFICINALE</i>	3	N	FACU
8.	<i>PERSICARIA MACULOSA</i>	2	N	FACW
9.				
10.				
11.				
12.				
13.				
14.				
15.				
Total Cover =		68		
<b>Woody Vine Stratum (Plot size: 30 ft radius)</b>				
1.				
2.				
3.				
4.				
5.				
Total Cover =		0		
Remarks: <b>Sample point is located adjacent to a farmed wetland lobe of W-1 where healthy crop contrasts with adjacent crop stress in the farmed wetland lobe. Seed oat crop planted in December.</b>				

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:		Multiply by:	
OBL spp.	<u>0</u>	x 1 =	<u>0</u>
FACW spp.	<u>9</u>	x 2 =	<u>18</u>
FAC spp.	<u>3</u>	x 3 =	<u>9</u>
FACU spp.	<u>16</u>	x 4 =	<u>64</u>
UPL spp.	<u>40</u>	x 5 =	<u>200</u>
Total		<u>68</u> (A)	<u>291</u> (B)
Prevalence Index = B/A = <u>4.279</u>			

**Hydrophytic Vegetation Indicators:**

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Rapid Test for Hydrophytic Vegetation
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Dominance Test is > 50%
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Prevalence Index is ≤ 3.0 *
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Morphological Adaptations (Explain) *
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Problem Hydrophytic Vegetation (Explain) *

\* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/Shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

**Woody Vines** - All woody vines greater than 3.28 ft. in height.

**Hydrophytic Vegetation Present**  Yes  No

**Additional Remarks:**

Project/Site: <b>Emerald Park Landfill - Western Expansion</b>		Stantec Project #: <b>193702557</b>	Date: <b>05/19/15</b>
Applicant: <b>Advanced Disposal Services, INC</b>			County: <b>Waukesha</b>
Investigator #1: <b>Eric Parker</b>	Investigator #2: <b>N/A</b>		State: <b>Wisconsin</b>
Soil Unit: <b>Martinton silt loam</b>	NWI/WWI Classification: <b>None</b>		Wetland ID: <b>W1</b>
Landform: <b>Depression</b>	Local Relief: <b>Concave</b>		Sample Point: <b>W1-8w</b>
Slope (%): <b>1-3</b>	Latitude: <b>N/A</b>	Longitude: <b>N/A</b>	Datum: <b>N/A</b>
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			Community ID: <b>Farmed Wetland</b>
Are Vegetation <input checked="" type="checkbox"/> , Soil <input checked="" type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?		Are normal circumstances present?	
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
			Section: <b>36</b>
			Township: <b>5 N</b>
			Range: <b>20 E</b>

**SUMMARY OF FINDINGS**

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Is This Sampling Point Within A Wetland?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks: **Antecedent moisture conditions expected to be in the normal based on recent WETS analyses in the area for other projects. Point located in an agricultural field with potential hydrological manipulations. Normal circumstances assumed not present.**

**HYDROLOGY**

**Wetland Hydrology Indicators** (Check here if indicators are not present ):

<p><u>Primary:</u></p> <input type="checkbox"/> A1 - Surface Water <input type="checkbox"/> A2 - High Water Table <input type="checkbox"/> A3 - Saturation <input type="checkbox"/> B1 - Water Marks <input type="checkbox"/> B2 - Sediment Deposits <input type="checkbox"/> B3 - Drift Deposits <input type="checkbox"/> B4 - Algal Mat or Crust <input type="checkbox"/> B5 - Iron Deposits <input type="checkbox"/> B7 - Inundation Visible on Aerial Imagery <input type="checkbox"/> B8 - Sparsely Vegetated Concave Surface	<input type="checkbox"/> B9 - Water-Stained Leaves <input type="checkbox"/> B13 - Aquatic Fauna <input type="checkbox"/> B14 - True Aquatic Plants <input type="checkbox"/> C1 - Hydrogen Sulfide Odor <input type="checkbox"/> C3 - Oxidized Rhizospheres on Living Roots <input type="checkbox"/> C4 - Presence of Reduced Iron <input type="checkbox"/> C6 - Recent Iron Reduction in Tilled Soils <input type="checkbox"/> C7 - Thin Muck Surface <input type="checkbox"/> D9 - Gauge or Well Data <input type="checkbox"/> Other (Explain in Remarks)	<p><u>Secondary:</u></p> <input checked="" type="checkbox"/> B6 - Surface Soil Cracks <input type="checkbox"/> B10 - Drainage Patterns <input type="checkbox"/> C2 - Dry-Season Water Table <input type="checkbox"/> C8 - Crayfish Burrows <input checked="" type="checkbox"/> C9 - Saturation Visible on Aerial Imagery <input checked="" type="checkbox"/> D1 - Stunted or Stressed Plants <input checked="" type="checkbox"/> D2 - Geomorphic Position <input checked="" type="checkbox"/> D5 - FAC-Neutral Test
---	---	--

**Field Observations:**

Surface Water Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Depth: <b>N/A</b> (in.)	<b>Wetland Hydrology Present?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Water Table Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Depth: <b>N/A</b> (in.)	
Saturation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Depth: <b>N/A</b> (in.)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: **Annual Crop Slide Review**

Remarks: **FSA slides indicate wetlands via recurring faint signatures (crop stress, saturation).**

**SOILS**

Map Unit Name: **Martinton silt loam**      Series Drainage Class: **somewhat poorly**

Taxonomy (Subgroup): **Aquic Argiudolls**

**Profile Description** (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix			Redox Features				Texture (e.g. clay, sand, loam)	
			Color (Moist)	%		Color (Moist)	%	Type	Location		
0	8	1	10YR	3/2	100	--	--	--	--	--	silty clay loam
8	11	2	10YR	3/2	95	10YR	3/4	5	C	M	silty clay loam
11	17	3	2.5Y	3/1	95	10YR	3/4	5	C	M	silty clay loam
17	22	4	10YR	2/1	100	--	--	--	--	--	silty clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

**NRCS Hydric Soil Field Indicators** (check here if indicators are not present ):

<input type="checkbox"/> A1 - Histosol <input type="checkbox"/> A2 - Histic Epipedon <input type="checkbox"/> A3 - Black Histic <input type="checkbox"/> A4 - Hydrogen Sulfide <input type="checkbox"/> A5 - Stratified Layers <input type="checkbox"/> A10 - 2 cm Muck <input type="checkbox"/> A11 - Depleted Below Dark Surface <input type="checkbox"/> A12 - Thick Dark Surface <input type="checkbox"/> S1 - Sandy Muck Mineral <input type="checkbox"/> S3 - 5 cm Mucky Peat or Peat	<input type="checkbox"/> S4 - Sandy Gleyed Matrix <input type="checkbox"/> S5 - Sandy Redox <input type="checkbox"/> S6 - Stripped Matrix <input type="checkbox"/> F1 - Loamy Muck Mineral <input type="checkbox"/> F2 - Loamy Gleyed Matrix <input type="checkbox"/> F3 - Depleted Matrix <input checked="" type="checkbox"/> F6 - Redox Dark Surface <input type="checkbox"/> F7 - Depleted Dark Surface <input type="checkbox"/> F8 - Redox Depressions	<p><b>Indicators for Problematic Soils<sup>1</sup></b></p> <input type="checkbox"/> A16 - Coast Prairie Redox <input type="checkbox"/> S7 - Dark Surface <input type="checkbox"/> F12 - Iron-Manganese Masses <input type="checkbox"/> TF12 - Very Shallow Dark Surface <input type="checkbox"/> Other (Explain in Remarks)
--	--	---

Restrictive Layer (if Observed) Type: **N/A**      Depth: **N/A**

**Hydric Soil Present?**  Yes  No

Remarks: **4th horizon appears to be a buried A horizon; slopewash from erosion and continual plowing over decades may comprise the upper 3 horizons.**

<sup>1</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.



Project/Site: **Emerald Park Landfill - Western Expansion** Wetland ID: **W1** Sample Point **W1-8w**

**VEGETATION** (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 30 ft radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		<b>0</b>		

Sapling/Shrub Stratum (Plot size: 15 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		<b>0</b>		

Herb Stratum (Plot size: 5 ft radius)

1.	<i>Veronica peregrina</i>	30	Y	FACW
2.	<i>Ranunculus sceleratus</i>	15	Y	OBL
3.	<i>AVENA SATIVA</i>	7	N	UPL
4.	<i>PLANTAGO MAJOR</i>	7	N	FAC
5.	<i>Rorippa palustris</i>	5	N	OBL
6.	<i>BARBAREA VULGARIS</i>	5	N	FAC
7.	<i>TARAXACUM OFFICINALE</i>	3	N	FACU
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
Total Cover =		<b>72</b>		

Woody Vine Stratum (Plot size: 30 ft radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
Total Cover =		<b>0</b>		

Remarks: Sample point is located in a farmed wetland with +/- 40% bare soil that may be partially a result of crop stress. Seed oat crop planted in December likely affected in this lobe of W-1 by early season moisture. Adjacent portions of field have a healthy crop.

**Additional Remarks:**

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:

OBL spp.	<u>20</u>	x 1 =	<u>20</u>
FACW spp.	<u>30</u>	x 2 =	<u>60</u>
FAC spp.	<u>12</u>	x 3 =	<u>36</u>
FACU spp.	<u>3</u>	x 4 =	<u>12</u>
UPL spp.	<u>7</u>	x 5 =	<u>35</u>
Total		<u>72</u> (A)	<u>163</u> (B)

Prevalence Index = B/A = 2.264

**Hydrophytic Vegetation Indicators:**

Yes  No Rapid Test for Hydrophytic Vegetation  
 Yes  No Dominance Test is > 50%  
 Yes  No Prevalence Index is ≤ 3.0 \*  
 Yes  No Morphological Adaptations (Explain) \*  
 Yes  No Problem Hydrophytic Vegetation (Explain) \*

\* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/Shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

**Woody Vines** - All woody vines greater than 3.28 ft. in height.

**Hydrophytic Vegetation Present**  Yes  No

Project/Site: <b>Emerald Park Landfill - Western Expansion</b>		Stantec Project #: <b>193702557</b>	Date: <b>05/19/15</b>
Applicant: <b>Advanced Disposal Services, INC</b>			County: <b>Waukesha</b>
Investigator #1: <b>Eric Parker</b>	Investigator #2: <b>N/A</b>		State: <b>Wisconsin</b>
Soil Unit: <b>Hebron loam</b>	NWI/WWI Classification: <b>None</b>		Wetland ID: <b>Adj. to W12</b>
Landform: <b>Backslope</b>	Local Relief: <b>Convex Linear</b>		Sample Point: <b>W12-1u</b>
Slope (%): <b>2-4</b>	Latitude: <b>N/A</b>	Longitude: <b>N/A</b>	Community ID: <b>Hayfield</b>
Are climatic/hydrologic conditions on the site typical for this time of year? (if no, explain in remarks) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			Section: <b>36</b>
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?		Are normal circumstances present?	
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
			Township: <b>5 N</b>
			Range: <b>20 E</b>

**SUMMARY OF FINDINGS**

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is This Sampling Point Within A Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks: **Antecedent moisture conditions expected to be in the normal based on recent WETS analyses in the area for other projects. Point located in hayfield with potential hydrological manipulations, however vegetation was dominated by perennial grasses and weeds, appearing stabilized. Normal circumstances assumed present.**

**HYDROLOGY**

**Wetland Hydrology Indicators** (Check here if indicators are not present ):

<p><u>Primary:</u></p> <input type="checkbox"/> A1 - Surface Water <input type="checkbox"/> A2 - High Water Table <input type="checkbox"/> A3 - Saturation <input type="checkbox"/> B1 - Water Marks <input type="checkbox"/> B2 - Sediment Deposits <input type="checkbox"/> B3 - Drift Deposits <input type="checkbox"/> B4 - Algal Mat or Crust <input type="checkbox"/> B5 - Iron Deposits <input type="checkbox"/> B7 - Inundation Visible on Aerial Imagery <input type="checkbox"/> B8 - Sparsely Vegetated Concave Surface	<input type="checkbox"/> B9 - Water-Stained Leaves <input type="checkbox"/> B13 - Aquatic Fauna <input type="checkbox"/> B14 - True Aquatic Plants <input type="checkbox"/> C1 - Hydrogen Sulfide Odor <input type="checkbox"/> C3 - Oxidized Rhizospheres on Living Roots <input type="checkbox"/> C4 - Presence of Reduced Iron <input type="checkbox"/> C6 - Recent Iron Reduction in Tilled Soils <input type="checkbox"/> C7 - Thin Muck Surface <input type="checkbox"/> D9 - Gauge or Well Data <input type="checkbox"/> Other (Explain in Remarks)	<p><u>Secondary:</u></p> <input type="checkbox"/> B6 - Surface Soil Cracks <input type="checkbox"/> B10 - Drainage Patterns <input type="checkbox"/> C2 - Dry-Season Water Table <input type="checkbox"/> C8 - Crayfish Burrows <input type="checkbox"/> C9 - Saturation Visible on Aerial Imagery <input type="checkbox"/> D1 - Stunted or Stressed Plants <input type="checkbox"/> D2 - Geomorphic Position <input type="checkbox"/> D5 - FAC-Neutral Test
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**Field Observations:**

Surface Water Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Depth: <b>N/A</b> (in.)	<b>Wetland Hydrology Present?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Water Table Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Depth: <b>N/A</b> (in.)	
Saturation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Depth: <b>N/A</b> (in.)	

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

Remarks: **No wetland hydrology indicators observed.**

**SOILS**

Map Unit Name: **Hebron loam** Series Drainage Class: **well**

Taxonomy (Subgroup): **Oxyaquic Hapludaifs**

**Profile Description** (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix		Redox Features				Texture (e.g. clay, sand, loam)		
			Color (Moist)	%	Color (Moist)	%	Type	Location			
0	4	1	10YR	3/2	100	--	--	--	--	silty clay loam	
4	14	2	10YR	3/1	100	--	--	--	--	silty clay	
14	17	3	10YR	3/1	98	10YR	4/4	2	C	M	silty clay
17	21	4	10YR	3/1	100	--	--	--	--	--	clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

**NRCS Hydric Soil Field Indicators** (check here if indicators are not present ):

<input type="checkbox"/> A1 - Histosol <input type="checkbox"/> A2 - Histic Epipedon <input type="checkbox"/> A3 - Black Histic <input type="checkbox"/> A4 - Hydrogen Sulfide <input type="checkbox"/> A5 - Stratified Layers <input type="checkbox"/> A10 - 2 cm Muck <input type="checkbox"/> A11 - Depleted Below Dark Surface <input type="checkbox"/> A12 - Thick Dark Surface <input type="checkbox"/> S1 - Sandy Muck Mineral <input type="checkbox"/> S3 - 5 cm Mucky Peat or Peat	<input type="checkbox"/> S4 - Sandy Gleyed Matrix <input type="checkbox"/> S5 - Sandy Redox <input type="checkbox"/> S6 - Stripped Matrix <input type="checkbox"/> F1 - Loamy Muck Mineral <input type="checkbox"/> F2 - Loamy Gleyed Matrix <input type="checkbox"/> F3 - Depleted Matrix <input type="checkbox"/> F6 - Redox Dark Surface <input type="checkbox"/> F7 - Depleted Dark Surface <input type="checkbox"/> F8 - Redox Depressions	<p><b>Indicators for Problematic Soils<sup>1</sup></b></p> <input type="checkbox"/> A16 - Coast Prairie Redox <input type="checkbox"/> S7 - Dark Surface <input type="checkbox"/> F12 - Iron-Manganese Masses <input type="checkbox"/> TF12 - Very Shallow Dark Surface <input type="checkbox"/> Other (Explain in Remarks)
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Restrictive Layer (if Observed) Type: **N/A** Depth: **N/A**

**Hydric Soil Present?**  Yes  No

Remarks:

<sup>1</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Project/Site: **Emerald Park Landfill - Western Expansion**

Wetland ID: **Adj. to W12** Sample Point **W12-1u**

VEGETATION (Species identified in all uppercase are non-native species.)																																												
Tree Stratum (Plot size: 30 ft radius)																																												
	<u>Species Name</u>	% Cover	Dominant	Ind.Status																																								
1.	--	--	--	--																																								
2.	--	--	--	--																																								
3.	--	--	--	--																																								
4.	--	--	--	--																																								
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6.	--	--	--	--																																								
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8.	--	--	--	--																																								
9.	--	--	--	--																																								
10.	--	--	--	--																																								
Total Cover =		0																																										
Sapling/Shrub Stratum (Plot size: 15 ft radius)																																												
1.	--	--	--	--																																								
2.	--	--	--	--																																								
3.	--	--	--	--																																								
4.	--	--	--	--																																								
5.	--	--	--	--																																								
6.	--	--	--	--																																								
7.	--	--	--	--																																								
8.	--	--	--	--																																								
9.	--	--	--	--																																								
10.	--	--	--	--																																								
Total Cover =		0																																										
Herb Stratum (Plot size: 5 ft radius)																																												
1.	<i>TRIFOLIUM PRATENSE</i>	50	Y	FACU																																								
2.	<i>TARAXACUM OFFICINALE</i>	50	Y	FACU																																								
3.	<i>ALOPECURUS PRATENSIS</i>	20	N	FACW																																								
4.	<i>POA PRATENSIS</i>	15	N	FAC																																								
5.	<i>AGROSTIS GIGANTEA</i>	10	N	FACW																																								
6.	<i>BARBAREA VULGARIS</i>	3	N	FAC																																								
7.	--	--	--	--																																								
8.	--	--	--	--																																								
9.	--	--	--	--																																								
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13.	--	--	--	--																																								
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15.	--	--	--	--																																								
Total Cover =		148																																										
Woody Vine Stratum (Plot size: 30 ft radius)																																												
1.	--	--	--	--																																								
2.	--	--	--	--																																								
3.	--	--	--	--																																								
4.	--	--	--	--																																								
5.	--	--	--	--																																								
Total Cover =		0																																										
<p><b>Dominance Test Worksheet</b></p> <p>Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A)</p> <p>Total Number of Dominant Species Across All Strata: <u>2</u> (B)</p> <p>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)</p>																																												
<p><b>Prevalence Index Worksheet</b></p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 10%;"></td> <td style="width: 10%;">Multiply by:</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td>OBL spp.</td> <td align="center"><u>0</u></td> <td>x 1 =</td> <td align="center"><u>0</u></td> <td></td> </tr> <tr> <td>FACW spp.</td> <td align="center"><u>30</u></td> <td>x 2 =</td> <td align="center"><u>60</u></td> <td></td> </tr> <tr> <td>FAC spp.</td> <td align="center"><u>18</u></td> <td>x 3 =</td> <td align="center"><u>54</u></td> <td></td> </tr> <tr> <td>FACU spp.</td> <td align="center"><u>100</u></td> <td>x 4 =</td> <td align="center"><u>400</u></td> <td></td> </tr> <tr> <td>UPL spp.</td> <td align="center"><u>0</u></td> <td>x 5 =</td> <td align="center"><u>0</u></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;">Total</td> <td></td> <td align="center"><u>148</u> (A)</td> <td align="center"><u>514</u> (B)</td> </tr> <tr> <td colspan="4"></td> <td align="center">Prevalence Index = B/A = <u>3.473</u></td> </tr> </table>					Total % Cover of:		Multiply by:			OBL spp.	<u>0</u>	x 1 =	<u>0</u>		FACW spp.	<u>30</u>	x 2 =	<u>60</u>		FAC spp.	<u>18</u>	x 3 =	<u>54</u>		FACU spp.	<u>100</u>	x 4 =	<u>400</u>		UPL spp.	<u>0</u>	x 5 =	<u>0</u>		Total			<u>148</u> (A)	<u>514</u> (B)					Prevalence Index = B/A = <u>3.473</u>
Total % Cover of:		Multiply by:																																										
OBL spp.	<u>0</u>	x 1 =	<u>0</u>																																									
FACW spp.	<u>30</u>	x 2 =	<u>60</u>																																									
FAC spp.	<u>18</u>	x 3 =	<u>54</u>																																									
FACU spp.	<u>100</u>	x 4 =	<u>400</u>																																									
UPL spp.	<u>0</u>	x 5 =	<u>0</u>																																									
Total			<u>148</u> (A)	<u>514</u> (B)																																								
				Prevalence Index = B/A = <u>3.473</u>																																								
<p><b>Hydrophytic Vegetation Indicators:</b></p> <p><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No    Rapid Test for Hydrophytic Vegetation</p> <p><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No    Dominance Test is &gt; 50%</p> <p><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No    Prevalence Index is ≤ 3.0 *</p> <p><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No    Morphological Adaptations (Explain) *</p> <p><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No    Problem Hydrophytic Vegetation (Explain) *</p> <p style="font-size: small;">* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p>																																												
<p><b>Definitions of Vegetation Strata:</b></p> <p><b>Tree</b> - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.</p> <p><b>Sapling/Shrub</b> - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.</p> <p><b>Herb</b> - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.</p> <p><b>Woody Vines</b> - All woody vines greater than 3.28 ft. in height.</p>																																												
<p><b>Hydrophytic Vegetation Present</b>    <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No</p>																																												
<p>Remarks:    <b>Sample point is located in a hayfield that appears to be infrequently mowed.</b></p>																																												

**Additional Remarks:**

Project/Site: <b>Emerald Park Landfill - Western Expansion</b>		Stantec Project #: <b>193702557</b>	Date: <b>05/19/15</b>
Applicant: <b>Advanced Disposal Services, INC</b>			County: <b>Waukesha</b>
Investigator #1: <b>Eric Parker</b>	Investigator #2: <b>N/A</b>		State: <b>Wisconsin</b>
Soil Unit: <b>Saylesville silt loam</b>	NWI/WWI Classification: <b>None</b>		Wetland ID: <b>W12</b>
Landform: <b>Depression</b>	Local Relief: <b>Concave</b>		Sample Point: <b>W12-1w</b>
Slope (%): <b>1-2</b>	Latitude: <b>N/A</b>	Longitude: <b>N/A</b>	Community ID: <b>Wet Meadow</b>
Datum: <b>N/A</b>			Section: <b>36</b>
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			Township: <b>5 N</b>
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?		Are normal circumstances present?	
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
			Range: <b>20 E</b>

**SUMMARY OF FINDINGS**

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>Is This Sampling Point Within A Wetland?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks: **Antecedent moisture conditions expected to be in the normal based on recent WETS analyses in the area for other projects. Point located adjacent to a hayfield with potential hydrological manipulations.**

**HYDROLOGY**

**Wetland Hydrology Indicators** (Check here if indicators are not present ):

<p><u>Primary:</u></p> <input type="checkbox"/> A1 - Surface Water <input type="checkbox"/> A2 - High Water Table <input checked="" type="checkbox"/> A3 - Saturation <input type="checkbox"/> B1 - Water Marks <input type="checkbox"/> B2 - Sediment Deposits <input type="checkbox"/> B3 - Drift Deposits <input type="checkbox"/> B4 - Algal Mat or Crust <input type="checkbox"/> B5 - Iron Deposits <input type="checkbox"/> B7 - Inundation Visible on Aerial Imagery <input type="checkbox"/> B8 - Sparsely Vegetated Concave Surface	<p><u>Secondary:</u></p> <input type="checkbox"/> B6 - Surface Soil Cracks <input type="checkbox"/> B10 - Drainage Patterns <input type="checkbox"/> C2 - Dry-Season Water Table <input type="checkbox"/> C8 - Crayfish Burrows <input type="checkbox"/> C9 - Saturation Visible on Aerial Imagery <input type="checkbox"/> D1 - Stunted or Stressed Plants <input checked="" type="checkbox"/> D2 - Geomorphic Position <input checked="" type="checkbox"/> D5 - FAC-Neutral Test
--	---

**Field Observations:**

Surface Water Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Depth: <b>N/A</b> (in.)	<b>Wetland Hydrology Present?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Water Table Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Depth: <b>18</b> (in.)	
Saturation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Depth: <b>6</b> (in.)	

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

Remarks: **Point in depressional swale area with some standing water on west end; hydrology potentially derived from disfunctional drain tiles seasonally seeping.**

**SOILS**

Map Unit Name: **Saylesville silt loam**      Series Drainage Class: **moderately well to well**

Taxonomy (Subgroup): **Typic Hapludalfs**

**Profile Description** (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Location: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix			Redox Features				Texture (e.g. clay, sand, loam)	
			Color (Moist)	%		Color (Moist)	%	Type	Location		
0	6	1	10YR	3/1	100	--	--	--	--	--	silty clay loam
6	16	2	10YR	3/1	98	10YR	4/4	2	C	M	silty clay
16	21	3	2.5Y	4/1	95	10YR	4/6	5	C	M	silty clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

**NRCS Hydric Soil Field Indicators** (check here if indicators are not present ):

<input type="checkbox"/> A1 - Histosol <input type="checkbox"/> A2 - Histic Epipedon <input type="checkbox"/> A3 - Black Histic <input type="checkbox"/> A4 - Hydrogen Sulfide <input type="checkbox"/> A5 - Stratified Layers <input type="checkbox"/> A10 - 2 cm Muck <input type="checkbox"/> A11 - Depleted Below Dark Surface <input type="checkbox"/> A12 - Thick Dark Surface <input type="checkbox"/> S1 - Sandy Muck Mineral <input type="checkbox"/> S3 - 5 cm Mucky Peat or Peat	<input type="checkbox"/> S4 - Sandy Gleyed Matrix <input type="checkbox"/> S5 - Sandy Redox <input type="checkbox"/> S6 - Stripped Matrix <input type="checkbox"/> F1 - Loamy Muck Mineral <input type="checkbox"/> F2 - Loamy Gleyed Matrix <input type="checkbox"/> F3 - Depleted Matrix <input checked="" type="checkbox"/> F6 - Redox Dark Surface <input type="checkbox"/> F7 - Depleted Dark Surface <input type="checkbox"/> F8 - Redox Depressions	<p><b>Indicators for Problematic Soils<sup>1</sup></b></p> <input type="checkbox"/> A16 - Coast Prairie Redox <input type="checkbox"/> S7 - Dark Surface <input type="checkbox"/> F12 - Iron-Manganese Masses <input type="checkbox"/> TF12 - Very Shallow Dark Surface <input type="checkbox"/> Other (Explain in Remarks)
--	--	---

Restrictive Layer (if Observed) Type: **N/A**      Depth: **N/A**

**Hydric Soil Present?**  Yes  No

Remarks:

<sup>1</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Project/Site: **Emerald Park Landfill - Western Expansion** Wetland ID: **W12** Sample Point **W12-1w**

**VEGETATION** (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 30 ft radius)				
	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		<b>0</b>		

Total Cover = **0**

Sapling/Shrub Stratum (Plot size: 15 ft radius)				
	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		<b>0</b>		

Total Cover = **0**

Herb Stratum (Plot size: 5 ft radius)				
	Species Name	% Cover	Dominant	Ind.Status
1.	<i>PHALARIS ARUNDINACEA</i>	60	Y	FACW
2.	<i>ALOPECURUS PRATENSIS</i>	30	Y	FACW
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
Total Cover =		<b>90</b>		

Total Cover = **90**

Woody Vine Stratum (Plot size: 30 ft radius)				
	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
Total Cover =		<b>0</b>		

Total Cover = **0**

Remarks:

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:	Multiply by:
OBL spp. <u>0</u>	x 1 = <u>0</u>
FACW spp. <u>90</u>	x 2 = <u>180</u>
FAC spp. <u>0</u>	x 3 = <u>0</u>
FACU spp. <u>0</u>	x 4 = <u>0</u>
UPL spp. <u>0</u>	x 5 = <u>0</u>
<b>Total</b> <u>90</u> (A)	<b>Total</b> <u>180</u> (B)
Prevalence Index = B/A = <u>2.000</u>	

**Hydrophytic Vegetation Indicators:**

Yes  No Rapid Test for Hydrophytic Vegetation

Yes  No Dominance Test is > 50%

Yes  No Prevalence Index is ≤ 3.0 \*

Yes  No Morphological Adaptations (Explain) \*

Yes  No Problem Hydrophytic Vegetation (Explain) \*

\* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/Shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

**Woody Vines** - All woody vines greater than 3.28 ft. in height.

**Hydrophytic Vegetation Present**  Yes  No

**Additional Remarks:**