

## APPENDIX B – WETLAND DELINEATION REPORTS

## **WETLAND & WATERWAY DELINEATION REPORT**

EMERALD PARK LANDFILL – WESTERN EXPANSION

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## INTRODUCTION

On behalf of Advanced Disposal Services, Inc. (ADS), Stantec Consulting Services Inc. (Stantec) performed a wetland and waterway delineation on the Emerald Park Landfill's Western Expansion Property (the "Project Area"). The Project Area is located in Section 36, Township 5 North, Range 20 East, City of Muskego, Waukesha County, Wisconsin. Specifically, the project is located southwest of the existing ADS landfill and north of Union Church Drive (Figure 1).

Previous wetland delineations within the Project Area were completed in 1996 by JJR Inc. and in 2005 by Stantec (then Natural Resources Consulting - NRC). Regulatory agencies conducted multiple site reviews since 2007 to evaluate wetlands to provide wetland boundary concurrences and waterway navigability determinations. For reference purposes, concurrence letters from the United States Army Corps of Engineers (USACE) and the Wisconsin Department of Natural Resources (WDNR) are provided in Appendix A. These concurrence letters were based on an October 22, 2009 wetland boundaries map, which included modification to the 2005 wetland boundaries based on agency input. In addition, at a November 12, 2007 agency field meeting, WDNR provided a navigability determination for one waterway (formerly known as D2) within the Project Area (Appendix B). For permitting purposes, a more recent delineation of the Project Area was required.

The purpose and objective of the wetland and waterway delineation was to identify the extent and spatial arrangement of wetlands and waterways within the Project Area. Field work was completed by Stantec over three site visits, the first by Dan Prasch and Melissa Curran on October 14, 2013 (purple Expansion Boundary, Figure 1). After an agency site visit on September 3, 2014, the second and third site visits were completed by Eric Parker and Melissa Curran on October 17, 2014 and Eric Parker and Jaron Tylock on October 23, 2014 (yellow Expansion Boundary, Figure 1). Eleven (11) wetlands were identified within the Project Area, comprised primarily of wet meadow and less commonly shrub-carr and forested wetland community types.

Wetlands that are considered waters of the U.S. are subject to regulation under Section 404 of the Clean Water Act (CWA) and the jurisdictional regulatory authority lies with the United States Army Corps of Engineers (USACE). Additionally, the Wisconsin Department of Natural Resources (WDNR) has regulatory authority over wetlands, navigable waters, and adjacent lands under Chapter 30 Wisconsin State Statutes, Act 6, and Wisconsin Administrative Code NR 103. Stantec recommends this report be submitted to the WDNR and USACE for final jurisdictional review and concurrence.



## METHODS

### Wetlands

Wetland determinations were based on the criteria and methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* (2010), *United States Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1* (1987), and subsequent guidance documents (USACE 1991, 1992), Guidelines for Submitting Wetland Delineations in Wisconsin to the St. Paul District Corps of Engineers (USACE 1996), and the *Basic Guide to Wisconsin's Wetlands and their Boundaries* (WI Dept. of Administration Coastal Management Program 1995).

The wetland determinations involved the use of available resources to assist in the assessment such as United States Geological Survey (USGS) topographic maps, Natural Resources Conservation Service (NRCS) soil survey, Wisconsin Wetland Inventory (WWI) mapping, aerial photography, and a Farm Service Agency (FSA) slide review. In addition to these resources, climate data from the Midwest Regional Climate Center was also analyzed to help justify conclusions that were reached in the field.

On-site wetland determinations were made using the three criteria (vegetation, soil and hydrology) and technical approach defined in the Regional Supplement. According to procedures described in the Regional Supplement, areas that under normal circumstances reflect a predominance of hydrophytic vegetation, hydric soils, and wetland hydrology (e.g., inundated or saturated soils) are considered wetlands. Normal circumstances were not present at many sample points due to the presence of active farm land. For this reason, an FSA Slide Review was completed.

The FSA Slide Review closely followed the methods described in the Wisconsin Wetland Mapping Conventions – USDA, Natural Resources Conservation Service (NRCS) (NRCS 1998), and involved examining aerial photographs for the presence of wetland signatures. A wetland signature is field evidence, recorded by a photograph, of ponding, flooding, or impacts of saturation for sufficient duration that meets wetland hydrology and possibly wetland vegetation criteria. Wetland signatures in cropland for Wisconsin are as follows (NRCS 1998):

1. Hydrophytic vegetation (seen as a different color of green)
2. Surface water (usually black or white)
3. Drowned-out crops (bare soil or mud flats)
4. Differences in color due to different planting dates or isolated areas not farmed with the rest of the field
5. Inclusions of wet areas in set-aside program
6. Patches of greener color in "dry" years
7. Crop stress (yellow) or sparse canopy (light green)
8. Saturated soil visible on infrared (IR) slides or photos



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The antecedent precipitation in the months leading up to each annual crop slide was reviewed and compared to long-term (30-year) precipitation averages and standard deviation to determine if each year was normal, wet, or dry using a WETS analysis (methodology shown in Appendix D). Wet and dry years were ranked.

Mapped poorly and somewhat poorly drained soils were identified on the Property and the annual crop slides were analyzed for signatures of wetness consistency in these areas (FSA Aerial Slide Analysis in Appendix C). Areas within agricultural fields are typically identified as wetland if they contain hydric soils and 50% or more of the aerial photographs taken in the five (or more) most recent normal precipitation years show any of the wetland signatures listed above. However, while the focus of the analysis is on wetland signatures visible in normal precipitation years, years considered wet or dry for received precipitation were also analyzed. Wetland determinations and wetland boundaries are typically identified based on the photograph having the largest wetland boundary during a “normal” rainfall year if signatures were apparent in at least 50% of the years (NRCS 1998).

The wetland boundaries were identified and surveyed with a Global Positioning System (GPS) capable of sub-meter accuracy, and mapped using Geographical Information System (GIS) software.

## Waterways

Review of waterway characteristics and determination of navigability and jurisdiction was beyond the scope of the investigation. However, if observed, waterways that may be under federal or state authority were surveyed using a GPS and mapped using GIS software. Culverts for waterways were located and direction of flow in the waterways was noted.



## RESULTS

### SITE DESCRIPTION

The Project Area is comprised of agricultural hay fields, agricultural row crops, with lesser amounts of existing landfill infrastructure, fallow fields and wetlands. Two tributaries to Big Muskego Lake, which function as agricultural ditches, are in the Project Area. One ditch is located in the north-central portion of the Project Area, and one abuts the western edge of the property. The Project Area is bordered to the south by Union Church Drive, agricultural fields to the west and south, wetland to the north and the existing Emerald Park landfill to the east. Generally, topography varies from nearly level (0-2 percent slopes) to gently sloping (2-6 percent slopes).

Soils mapped in the Project Area by the NRCS Soil Survey of Waukesha County include Ashkum silty clay loam (AsA), Elliott silt loam (EsA), Hebron loam (HeB), Martinton silt loam (MgA), Montgomery silty clay loam (Mzb), Morley silt loam (MzdB), Muskego muck (Mzg), Navan silt loam (Na), Ogden muck (Oc), and Saylesville silt loam (ShB) (Figure 2).

The Ashkum series are poorly drained soils in depressions and drainageways on ground moraines. The Elliott series are somewhat poorly drained soils that are found on concave side slopes of ground moraines. Hebron series are well drained on beach terraces and relict lakebeds. The Martinton series are somewhat poorly drained on concave side slopes of benches terraces and lakebeds of relict glacial lakes. The Montgomery series are very poorly drained of old glacial lakebed and river basins. The Morley series are well drained on convex shoulder slopes of ground moraines. The Muskego series are very poorly drained organic soils from old shallow glacial lake beds. The Navan series are poorly drained formed from old glacial lake basins and river benches. Ogden series are very poorly drained organic soils in depressions and lakebeds. The Saylesville series are well drained in relict lakebeds and beach terraces.

The Ashkum, Montgomery, Muskego, Ogden and Navan series are listed on the Waukesha County Hydric Soils list as hydric; while the Elliott and Martinton series are listed as soils with possible hydric inclusions.

The Wisconsin Wetland Inventory (WWI) map identifies six (6) wetland areas within the Project Area (Figure 3). Two wetlands, predominately comprised of shrub-carr / forested wetland community (T3/E2Ka), are located in the southern portion of the Project Area and generally coincide with field delineated wetlands W-1 and W-11. Four wetlands, predominately comprised of wet meadow and farmed wetland communities (E1K, E1Ha, E2Ka and FOKf), are located in the northern portions of the Project Area. These wetlands generally coincide with field delineated wetlands W-2, W-2A, W-8, W-9, and W-10. Wetlands W-3, W-4, W-5, W-6 and W-7 are not depicted on WWI (Figure 4).

Average precipitation for the investigation area was obtained from the Oconomowoc, WI weather station and used for the WETS analysis for the October 2013 visit. Based on



the WETS analysis, conditions were drier than normal, due to months of July and September (Appendix D). Average precipitation for the investigation area was obtained from the Waukesha, WI weather station and used for the WETS analysis for the October 2014 visits. Based on the WETS analysis, conditions were normal. Determinations were made with this knowledge.

Years examined for the FSA slide review were from 1992 through 2010 (Appendix C). Four years experienced drier than normal conditions (1992, 2005, 1994 and 1995- ranked most dry to least dry), and five years experienced wetter than normal conditions (2010, 2008, 1999, 2001 and 1996- ranked most wet to least wet). Results of the FSA slide review indicate that in the farmed areas outside the previously concurred wetlands less than 50% of the years exhibited consistent and reoccurring signatures. However consistent and reoccurring signatures were observed in more than 50% of the years in locations within the Project Area not previously surveyed. These signatures were noted as various light green, brown and dark tones in the six normal years and three of the least extreme wet and dry years. During the field review, wetland signatures were noted and delineated as wetland.

## **WATERWAYS**

Two agricultural ditches (S1 and S2), which are unnamed tributaries to Big Muskego Lake and the Fox River, are located within the Project Area (Figure 4). S1 is a first order waterway (WBIC 5038269) and is associated with W-2. S2 is a second order waterway (WBIC 5038471) that is contiguous with wetland W-8. S2 has been identified by the WDNR as an Area of Special Natural Resource Interest (ASNRI) due to records of endangered, threatened or special concern species. S1 and S2 generally flow northerly and connect outside the Project Area to the northwest. The WDNR determined the northern portion of S1 to be navigable during a November 12, 2007 site visit.

## **WETLANDS**

Eleven (11) wetlands were identified and delineated within the Project Area. Wetland Determination Data Forms were completed for fifty (50) sample points in the wetland and adjacent uplands (Appendix E). Photographs of the wetland and adjacent uplands are contained in Appendix F. For comparison, previously delineated wetlands are shown in NRC's wetland report (latest revision 12/08 – Appendix G), and October 2009 agency-concurred boundaries are shown in Appendix A. The wetland boundary and sample point locations are shown on Figure 4, and wetland plant communities (cover types) are shown on Figure 5. The wetlands are summarized in Table 1 and described in detail in the following section.

**Table 1.** Summary of the wetlands identified within the Project

<b>Wetland ID</b>	<b>Wetland Type (WDNR)</b>	<b>Wetland Type (Delineated)</b>	<b>Acreage</b>
<b>Wetland 1</b>	T3/E2Ka	Wet Meadow	2.15
		Shallow Marsh	0.23
		Farmed Wetland	0.30
		Shrub-Carr	0.33
		Forested Wetland	0.46
		<b>Total</b>	<b>3.47</b>
<b>Wetland 2</b>	F0Kf	Farmed Wetland	3.73
		Wet Meadow	7.47
		Shrub-carr	0.71
		<b>Total</b>	<b>11.91</b>
<b>Wetland 2A</b>	E2Ka, E1K	Farmed Wetland	0.41
		Wet Meadow	1.52
		Shrub-Carr	1.51
		<b>Total</b>	<b>3.44</b>
<b>Wetland 3</b>	NA	Wet Meadow	<b>0.23</b>
<b>Wetland 4*</b>	NA	Wet Meadow	<b>0.52</b>
<b>Wetland 5</b>	NA	Wet Meadow	<b>0.05</b>
<b>Wetland 6</b>	NA	Wet Meadow	<b>0.07</b>
<b>Wetland 7</b>	NA	Farmed Wet Meadow	<b>0.10</b>
<b>Wetland 8</b>	F0Kf	Farmed Wetland	0.38
		Wet Meadow	0.07
		<b>Total</b>	<b>0.45</b>
<b>Wetland 9</b>	F0Kf	Farmed Wet Meadow	<b>0.04</b>
<b>Wetland 10</b>	E1Ha	Wet Meadow	0.35
		Forested wetland	0.12
		<b>Total</b>	<b>0.47</b>
<b>Wetland 11</b>	T3/E2Ka	Shrub-Carr	<b>0.27</b>

\* Likely non-jurisdictional created wetland within an approved stormwater basin



## Wetland 1 (W-1)

W-1 is a partially farmed wet meadow, shallow marsh, forested, and shrub-carr wetland complex that generally corresponds with the NRCS mapped hydric soil unit Montgomery silty clay loam (Figure 2). Hydrology is being provided for W-1 primarily from surface runoff from adjacent hill slopes. FSA slides indicate recurring signatures in farmed portions of W-1's northeastern lobe. The WWI classified this wetland as broad-leaved forested wetland and narrow-leaved persistent wetland community (T3/E2Ka). Vegetation, hydrology, and soil characteristics are summarized below and described on the data forms contained in Appendix E. W-1 was identified by NRC in a previous report (Appendix G).

### Vegetation

W-1 is comprised of partially farmed wet meadow/shallow marsh/shrub-carr/forested wetland community types (Figure 5). Dominant plants identified within W-1 consist of reed canary grass (*Phalaris arundinacea*), black willow (*Salix nigra*), saw-tooth sunflower (*Helianthus grosseserratus*), hybrid bush honeysuckle (*Lonicera x bella*), common elderberry (*Sambucus nigra*), nannyberry (*Viburnum lentago*), red raspberry (*Rubus idaeus*), prairie cord grass (*Spartina pectinata*), Virginia creeper (*Parthenocissus quinquefolia*), river bank grape (*Vitis riparia*), sand bar willow (*Salix interior*), gray dogwood (*Cornus racemosa*), red osier dogwood (*Cornus alba*), Bebb's willow (*Salix bebbiana*), black locust (*Robinia pseudoacacia*), cottonwood (*Populus deltoides*), and common beggar-ticks (*Bidens frondosa*). Although not all dominant species within the wetland are comprised of hydrophytic vegetation (OBL, FACW and/or FAC), field observations of stunted and/or stressed vegetation within the sample plot indicates it is likely inundated or saturated for prolonged periods.

### Hydrology

W-1 appears to have a seasonally inundated/saturated hydroperiod. Primary hydrology indicators observed within the wetland included A1-Surface water, A2-High Water Table, A3 Saturation, and C3-Oxidized Rhizospheres on Living Roots. Secondary indicators observed included B6-Surface Soil Cracks, C2-Dry-Season Water Table, D2-Geomorphic Position, and D5-FAC-Neutral Test. Therefore, the wetland hydrology criterion was met.



## Soils

Soil within the wetland are mapped by the NRCS as Montgomery silty clay loam, Saylesville silt loam, and Martinton silt loam (Figure 2). Field indicators of hydric soil identified at the sample points completed in W-1 included A-11 Depleted Below Dark Surface, A12-Thick Dark Surface, F3-Depleted Matrix, and F6-Redox Dark Surface per the NRCS Publication Field Indicators of Hydric Soil in the United States – version 7.0. Based on data collected at the sample points, the hydric soil criterion was satisfied.

## Wetland Boundary

The wetland boundary was determined based on distinct differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a wet meadow wetland community dominated by reed canary grass or shrub-carr dominated by willows and red osier dogwood to farmed upland dominated by cultivated crop or upland field dominated by tall fescue (*Schedonorus arundinaceus*); 2) Transition from saturated soils within the wetland to lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from poorly drained hydric soils to somewhat poorly drained non-hydric soils, and 4) location of recurring crop stress signatures from the FSA annual crop slide review in normal precipitation years consistent with observations made in the field. The transition from wetland to upland characteristics generally correlated with a moderately well-defined topographic break.

## Wetland 2 (W-2)

W-2 is adjacent to and within an agricultural field that generally corresponds with WWI mapped wetlands (Figure 3), NRC's wetland report (Appendix G), and October 2009 agency-concurred boundaries shown in Appendix A. Hydrology is being provided for W-2 primarily from surface runoff from hill slopes and a seasonally-high water table. FSA Slides indicate recurring signatures in the farmed portions of W-2. An agricultural ditch (S1) is located within W-2. The WDNR determined the northern portion this waterway is navigable during a November 12, 2007 site visit. The WWI classified W-2 as farmed wet meadow and persistent emergent/wet meadow communities (E2Ka and F0Kf). Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

## Vegetation

W-2 is comprised of low quality wet meadow and shrub-carr community types (Figure 5). A central portion of W-2 was determined to be upland based on a lack of recurring signatures on FSA slides, a well-defined convex slope, and a healthy soybean crop without stress in both 2013 and 2014. Dominant plants identified within W-2 consisted of reed canary grass, narrow-leaf cattail (*Typha angustifolia*), panicled aster (*Symphyotrichum lanceolatus*), barnyard grass (*Echinochloa crus-galli*), witch-grass

(*Panicum capillare*), grass-leaved goldenrod (*Euthamia graminifolia*), and Bebb's willow. The dominant species within the wetland are considered hydrophytic vegetation (OBL, FACW and/or FAC) and therefore the wetland vegetation criterion was satisfied.

### Hydrology

W-2 appears to contain areas with seasonally inundated/saturated hydroperiod and areas which are permanently saturated. Primary hydrology indicators of A3-Saturation and C3-Oxidized Rhizospheres on Living Roots were observed within the wetland. Secondary indicators observed included B6-Surface Soil Cracks, C2-Dry-Season Water Table, C9-Saturation Visible on Aerial Imagery, D2-Geomorphic Position, and D5-FAC-Neutral Test. Therefore, the wetland hydrology criterion was met.

### Soils

Hydric soil units within the wetland are mapped by the NRCS as Ogden muck, Montgomery silty clay loam, and Muskego Muck. Field indicators of hydric soil identified at the sample points completed in W-2 included A11- Depleted Below Dark Surface, A12-Thick Dark Surface, F1- Loamy Mucky Mineral, and F3-Depleted Matrix. Based on data collected at the sample points, the hydric soil criterion was satisfied.

### Wetland Boundary

The wetland boundary was determined based on differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from wet meadow and farmed wetland communities dominated by reed canary grass or shrub-carr dominated by willows and red-osier dogwood to farmed upland dominated by a cultivated crop of soybeans, or upland field dominated by tall fescue; 2) Transition from saturated soils and areas with geomorphic position within the wetland to lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from poorly drained hydric soils to somewhat poorly drained non-hydric soils, and 4) where locations of recurring crop stress signatures on FSA slides were consistent with observations made in the field. The transition from wetland to upland characteristics generally correlated with a poorly-defined topographic transition.



## **Wetland 2A (W-2A)**

W-2A is adjacent to and within an agricultural field and corresponds with WWI-mapped wetlands (Figures 3 and 4). Hydrology is being provided for W-2A primarily from surface runoff from hill slopes and a seasonally high water table. FSA slides displayed recurring signatures in 5 of 6 normal precipitation years at farmed locations southeast of W-2A. W-2A outlets northeasterly to W-2 and waterway S1. The WWI depicts W-2A as a wet meadow (E1K). Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

### **Vegetation**

W-2A is comprised of partially farmed wet meadow, shrub-carr, and forested community types (Figure 5). Dominant plants identified within W-2A consist of reed canary grass, barnyard grass, hummock sedge (*Carex stricta*), Canada goldenrod (*Solidago canadensis*), southern hair grass (*Agrostis hyemalis*), prairie cord grass, witch-grass, pussy willow (*Salix discolor*), white meadow-sweet (*Spiraea alba*), and Bebb's Willow. The dominant species within the wetland are considered hydrophytic vegetation (OBL, FACW and/or FAC) and therefore the wetland vegetation criterion was satisfied.

### **Hydrology**

W-2A appears to contain areas with a seasonally inundated/saturated hydroperiod, and areas which are permanently saturated. Primary hydrology indicators of A1-Surface Water, A2-High Water Table, and A3-Saturation were observed within the wetland. Secondary indicators observed included C2-Dry-Season Water Table, C9-Saturation Visible on Aerial Imagery, D2-Geomorphic Position, and D5-FAC-Neutral test. Therefore, the wetland hydrology criterion was met.

### **Soils**

Hydric soils mapped within mapped-2A by the NRCS are Ogden muck and Montgomery silty clay loam. Field indicators of hydric soil identified at the sample points included A11- Depleted Below Dark Surface and F3-Depleted Matrix. Based on data collected at the sample points, the hydric soil criterion was satisfied.



### Wetland Boundary

The wetland boundary was determined based on differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a wet meadow wetland community dominated by reed canary grass and hummock sedge or farmed wetland dominated by barnyard grass or shrub-carr dominated by pussy willow and sandbar willow to farmed upland with soybean (*Glycine max*) recently harvested and tilled; 2) Transition from saturated soils with water tables present and areas with geomorphic position within the wetland to lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from poorly drained hydric soils to somewhat poorly drained non-hydric sand hydric soils, and 4) location of crop stress signatures visible on crop slides consistent with observations made in the field. Additional boundary determination factors included soil pit transects to determine water table depth. The transition from wetland to upland characteristics generally correlated with a poorly-defined topographic transition.

### **Wetland 3 (W-3)**

W-3 is depressional with the surrounding area being a network of gravel access roads and filled areas. W-3 outlets to W-2 via a culvert (Figure 4). No upland sample point was completed because of the abrupt topographic change from the gravel access roads associated with the existing landfill infrastructure. Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

#### Vegetation

W-3 is a wet meadow community (Figure 5) dominated by narrow-leaf cattail, Canada blue-joint (*Calamagrostis canadensis*), sandbar willow and Bebb's willow. The dominant species within the wetland were considered hydrophytic vegetation (OBL, FACW and/or FAC), and therefore the wetland vegetation criterion was satisfied.

#### Hydrology

W-3 appears to have a seasonally inundated/saturated hydroperiod. No primary hydrology indicators were observed during the site visit. Secondary indicators observed included D2-Geomorphic Position, and D5- FAC-Neutral Test. Therefore, the wetland hydrology criterion was met.

#### Soils

Although typically hydric, Ashkum silty clay loam was the soil mapping unit both within and adjacent to W-3. The hydric soil field indicator observed at the sample point completed within W-3 was the F3-Depleted Matrix. Based on this, the hydric soil criterion was satisfied.

### Wetland Boundary

The wetland boundary was determined based on distinct differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a wet meadow wetland community, dominated by reed canary grass and willows, to upland gravel roads and fill; 2) Transition from a depressional area within the wetland to a lack of wetland hydrology indicators within the adjacent disturbed upland; and 3) Transition from poorly drained hydric soils to non-native fill material. The transition from wetland to upland characteristics generally correlated with a well-defined topographic break.

### **Wetland 4 (W-4)**

W-4 is a constructed infiltration basin that may not be jurisdictional based on its history of being constructed in uplands as part of an approved stormwater plan. This is evidenced by the non-hydric mapped soil type and not being identified on the approved wetland delineation map of October 22, 2009 (Appendix A). Hydrology is being provided for W-4 primarily from storm water and surface drainage from surrounding areas per an approved design for this stormwater basin (Appendix A). W-4 outlets to W-2 via a culvert (Figure 4). Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

#### Vegetation

W-4 is a wet meadow community dominated by reed canary grass and cottonwood. The dominant species within the wetland are considered hydrophytic vegetation (OBL, FACW and/or FAC), and therefore the vegetation criterion was satisfied.

#### Hydrology

W-4 appears to have a temporarily saturated hydroperiod. The primary hydrology indicators observed during the 2013 site visit were A3-Saturation (observed at 4 inches and in a perched condition) and C3-Oxidized Rhizospheres on Living Roots. The secondary indicator of D5-FAC-Neutral Test was also satisfied. Based on this, the wetland hydrology criterion was met.

#### Soils

The non-hydric soil unit located in the wetland was Saylesville silt loam. The NRCS field indicators of A11-Depleted Below Dark Surface and F3-Depleted matrix were identified at the sample point in W-4. Based on data collected, the hydric soil criterion was satisfied.

#### Wetland Boundary

The wetland boundary was determined based on distinct differences in vegetation,

hydrology, soils and topography consisting of the following: 1) Transition from a wet meadow wetland community dominated by reed canary grass and cottonwood to farmed upland dominated by a cultivated crop or upland old field plant species; 2) Transition from saturated soils within the wetland to lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from poorly drained hydric soils to somewhat poorly drained non-hydric soils. The transition from wetland to upland characteristics generally correlated with a moderately well-defined topographic break.

### **Wetlands 5 and 6 (W-5 and W-6)**

W-5 and W-6 are narrow wet meadow wetlands just outside an active farm field, possibly an old end-furrow or shallow ditch. These wetlands are parallel to an upland tree line. Vegetation, hydrology, and soil characteristics are summarized below and described on the data forms contained in Appendix E.

#### *Vegetation*

W-5 and W-6 are wet meadow communities dominated by prairie cord grass, reed canary grass, and broad-leaved wooly sedge (*Carex pellita*). The dominant species within the wetlands were considered hydrophytic vegetation (OBL, FACW and/or FAC), and therefore the vegetation criterion was satisfied.

#### *Hydrology*

W-5 and W-6 appear to have a temporarily saturated hydroperiod. There were no primary hydrology indicators observed during the site visit, although secondary indicators observed included D2-Geomorphic Position and D5-FAC-Neutral test. Therefore, the wetland hydrology criterion was met.

#### *Soils*

The NRCS depicts the hydric soil Montgomery silty clay loam where W-5 and W-6 are mapped. The field indicator of F3-Depleted Matrix was observed within both W-5 and W-6. Based on data collected, the hydric soil criterion was satisfied.

#### *Wetland Boundary*

The wetland boundary was determined based on distinct differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a wet meadow wetland community dominated by broad-leaved wooly sedge, reed canary grass, and prairie cord grass to farmed upland dominated by the hay species tall fescue and red clover (*Trifolium pratense*) and upland tree species (e.g. *Quercus macrocarpa*) in the tree-line; 2) Transition from depleted soils and depressional areas within the wetland to lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from poorly drained hydric soils to somewhat poorly drained non-

hydric soils. The transition from wetland to upland characteristics generally correlated with a moderately well-defined topographic break.

### **Wetland 7 (W-7)**

W-7 is a farmed wet meadow wetland with significant crop stress observed. W-7 is located in an active agricultural field, where soybeans were recently harvested, along the eastern boundary of the Project Area. FSA slides displayed recurring signatures in the form of crop stress saturated soil, altered vegetative growth, and/or inundation visible in 4 of 6 normal precipitation years. Approximately 70% of wetland surface was bare due to crop stress from inundation at the time of the site visit in October 2014. Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

#### **Vegetation**

W-7 is a farmed wet meadow community dominated by narrow leaved-cattail, common plantain (*Plantago major*), common yellow cress (*Rorippa palustris*), and cursed crowfoot (*Ranunculus sceleratus*). The dominant species within the wetland are predominantly considered hydrophytic vegetation (OBL, FACW and/or FAC), and therefore the vegetation criterion was satisfied.

#### **Hydrology**

W-7 appears to have a temporarily/seasonally inundated hydroperiod. The primary hydrology indicators of A1-Surface Water, A2-High Water Table, and A3-Saturation were observed within the wetland. Secondary indicators observed included C9-Saturation Visible on Aerial Photography, D1-Stunted or Stressed Plants, D2-Geomorphic Position, and D5-FAC-Neutral test. Therefore, the wetland hydrology criterion was met.

#### **Soils**

The soil unit within the wetland is mapped by the NRCS as Martinton silt loam, a somewhat poorly drained soil mapping unit that is known to have small inclusions of hydric soil. The field indicator of F6-Redox dark surface was observed in W-7. Based on data collected, the hydric soil criterion was satisfied.

#### **Wetland Boundary**

The wetland boundary was determined based on differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a farmed wet meadow wetland community dominated by narrow leaved-cattail, common plantain, common yellow cress, and cursed crowfoot to farmed upland dominated by recently harvested soybeans; 2) Transition from a depressional area with crop stress within the wetland to a lack of wetland hydrology indicators within the adjacent upland; 3)

Transition from poorly drained hydric soils to somewhat poorly drained non-hydric soils; and 4) location of crop stress signatures visible on FSA slides consistent with observations made in the field. The transition from wetland to upland characteristics generally correlated with a poorly defined topographic break.

## **Wetland 8 (W-8)**

W-8 is a mostly farmed wet meadow wetland with crop stress observed. W-8 was mostly located in an active recently harvested soybean field on the western boundary of the Project Area. W-8 includes a wet meadow riparian to an agricultural waterway (S2). FSA slides displayed recurring signatures in the form of crop stress, saturated soil, altered vegetative growth, and/or inundation visible in 5 of 6 normal precipitation years in the farmed portion of W-8. Approximately 75% of the wetland surface displayed crop stress and a concentration of wetland weed species at the time of the site visit in October 2014. The WWI classified this wetland to be a farmed wet meadow wetland community (F0Kf). Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

### **Vegetation**

W-8 is a farmed wet meadow community dominated by the wetland weed species of barnyard grass and southern hair grass in a recently harvested soybean field. The dominant species within the wetland are considered hydrophytic vegetation (OBL, FACW and/or FAC), and therefore the vegetation criterion was satisfied.

### **Hydrology**

W-8 appears to possess a seasonally inundated/saturated hydroperiod. Primary hydrology indicators of A1-Surface Water, A2-High Water Table, and A3-Saturation were observed within the wetland. Secondary indicators observed included C2-Dry-Season Water Table, C9-Saturation Visible on Aerial Imagery, D2-Geomorphic Position, and D5-FAC-Neutral Test. Therefore, the wetland hydrology criterion was met.

### **Soils**

The hydric soil unit present within the wetland mapped by the NRCS as Montgomery silty clay loam. Field indicators of hydric soil identified at the sample plot included A11-Depleted Below Dark Surface and F3-Depleted Matrix. Based on data collected, the hydric soil criterion was satisfied.

### **Wetland Boundary**

The wetland boundary was determined based on slight differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a farmed wet meadow wetland community dominated by barnyard grass and southern hair

grass to farmed upland comprised of recently harvested soybeans; 2) Transition from depressional areas with crop stress within the wetland to lack of wetland hydrology indicators within the adjacent upland; 3) Transition from poorly drained hydric soils to somewhat poorly drained tilled hydric soils, and 4) location of crop stress signatures visible on FSA slides consistent with observations made in the field. Additional boundary determination factors included soil pit transects to determine water table depth and a topographic break in the vicinity of the adjacent waterway (S2). The transition from wetland to upland characteristics generally correlated with a poorly-defined topographic transition.

### **Wetland 9 (W-9)**

W-9 is a farmed wet meadow where crop stress was also observed. W-9 is located in active agricultural field on the western boundary of the Project Area near W-8. FSA slides displayed recurring signatures in the form of crop stress, saturated soil, altered vegetative growth, and/or inundation in 5 of 6 normal precipitation years. Approximately 90% of wetland surface displayed crop stress and a concentration of wetland weed species at the time of the site visit in October 2014. The WWI depicts W-9 as a farmed wet meadow wetland community (F0Kf). Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

#### *Vegetation*

W-9 is a farmed wet meadow community dominated by barnyard grass. The dominant species within the wetland is considered hydrophytic (OBL, FACW and/or FAC), and therefore the vegetation criterion was satisfied.

#### *Hydrology*

W-9 appears to have a seasonally inundated/saturated hydroperiod. The primary hydrology indicator of A3-Saturation was observed within the wetland. Secondary indicators observed included C2-Dry-seaons water table, C9-Saturation Visible on Aerial Imagery, D2-Geomorphic Position, and D5-FAC-Neutral Test. Therefore, the wetland hydrology criterion was met.

#### *Soils*

The hydric soil unit Montgomery silty clay loam is mapped in the location of W-9. The hydric soil field indicator of A11- Depleted Below Dark Surface was observed at the sample point in W-9. Based on data collected, the hydric soil criterion was satisfied.

#### *Wetland Boundary*

The wetland boundary was determined based on differences in vegetation, hydrology,

soils and topography consisting of the following: 1) Transition from a farmed wet meadow dominated by barnyard grass to a recently harvested and tilled farmed upland planted in soybean in 2014; 2) Transition from a depressional area with crop stress within the wetland to a lack of wetland hydrology indicators within the adjacent uplands; and 3) Transition from poorly drained hydric soils in W-9 to well drained soils in adjacent uplands, and 4) location of crop stress signatures visible on FSA slides r consistent with observations made in the field. The transition from wetland to upland characteristics generally correlated with a moderately-defined topographic transition.

### **Wetland 10 (W-10)**

W-10 is a wet meadow wetland located in the northwestern corner of the Project Area. FSA slides displayed consistent and recurring signatures in the form of crop stress, saturated soil, altered vegetative growth, and/or inundation in 4 of 6 normal precipitation years. The WWI depicts W-10 as wet meadow with possible standing water (E1Ha). Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

#### *Vegetation*

W-10 is a wet meadow and forested community dominated by reed canary grass and quaking aspen (*Populus tremuloides*). The dominant species within the wetland are considered hydrophytic (OBL, FACW and/or FAC), and therefore the vegetation criterion was satisfied.

#### *Hydrology*

W-10 appears to have a seasonally inundated/saturated hydroperiod. Primary hydrology indicators of A2-High Water Table and A3-Saturation were observed within the wetland. Secondary indicators included C2-Dry-Season Water Table, D2-Geomorphic Position, and D5-FAC-Neutral Test. Therefore, the wetland hydrology criterion was met.

#### *Soils*

The soil unit mapped by the NRCS in W-10 is Montgomery silty clay loam, a hydric soil type. Field indicators of hydric soil identified at the sample point in W-10 were A11-Depleted Below Dark Surface and F3-Depleted Matrix. Based on data collected, the hydric soil criterion was satisfied.

#### *Wetland Boundary*

The wetland boundary was determined based on differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a wet meadow wetland community dominated by reed canary grass and quaking aspen to a recently



harvested and tilled farmed upland planted in soybean; 2) Transition from depressional areas with saturated soils and a high water table within the wetland to a lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from poorly drained hydric soils to somewhat poorly drained tilled hydric soils, and 4) location of signatures visible on FSA slides consistent with observations made in the field. The transition from wetland to upland characteristics generally correlated with a poorly-defined topographic transition.

### **Wetland 11 (W-11)**

W-11 is a shrub-carr located in the southwestern corner of the Project Area. FSA slides displayed consistent and recurring signatures in the form of crop stress, saturated soil, altered vegetative growth, and/or inundation in 3 of 6 normal precipitation years. The WWI classified this wetland to be broad-leaved forested and emergent narrow-leaved persistent (T3/E2Ka). Vegetation, hydrology, and soil characteristics of the wetland are summarized below and described on the data forms contained in Appendix E.

#### **Vegetation**

W-11 is a shrub-carr dominated by reed canary grass, common buckthorn (*Rhamnus cathartica*), red-osier dogwood, and silky dogwood (*Cornus obliqua*). The dominant species within the wetland are considered hydrophytic vegetation (OBL, FACW and/or FAC), and therefore the vegetation criterion was satisfied.

#### **Hydrology**

W-11 appears to have a seasonally inundated/saturated hydroperiod. No primary indicators were observed. However secondary indicators included C9-Saturation Visible on Aerial Imagery, D2-Geomorphic Position, and D5-FAC-Neutral Test. Therefore, the wetland hydrology criterion was met.

#### **Soils**

The soil unit mapped by the NRCS in W-11 is the hydric Montgomery silty clay loam. Field indicators of hydric soil identified at the sample point in W-1 included A11-Depleted Below Dark Surface and F3-Depleted Matrix. Based on data collected, the hydric soil criterion was satisfied.

#### **Wetland Boundary**

The wetland boundary was determined based on slight differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a shrub-carr wetland community dominated by reed canary grass, common buckthorn, red osier dogwood, and silky dogwood to a recently harvested and tilled farmed upland planted in soybean or an upland thicket community dominated by invasive facultative



shrub species; 2) Transition from depressional areas within the wetland to a lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from poorly drained hydric soils to somewhat poorly drained tilled and un-tilled hydric soils, and 4) location of signatures visible on FSA slides consistent with observations made in the field. The transition from wetland to upland characteristics generally correlated with a poorly-defined topographic transition.



## UPLANDS

Uplands in the Project Area consisted mostly of agricultural fields where soybeans were recently harvested, hayfield and existing landfill infrastructure. Common upland vegetation included soybean, alfalfa (*Medicago sativa*), tall fescue, quack grass (*Elymus repens*) and dandelion (*Taraxacum officinale*). Also occurring in the Project Area were low quality and invasive upland forest and thicket communities consisting of box elder (*Acer negundo*), quaking aspen, common buckthorn, hybrid bush honeysuckle (*Lonicera X bella*), gray dogwood (*Cornus racemosa*), and American black currant (*Ribes americana*). The uplands generally lacked field indicators of hydric soil, and were not located in landscape positions that typically support wetland communities. During the October 2014 site inspections, it was observed that portions of the farmed uplands had been harvested and recently tilled. The FSA slide review (Appendix C) was used in the determination of upland croplands where normal circumstances were not present. Consequently these areas were not delineated as wetland.

## OTHER ENVIRONMENTAL CONSIDERATIONS

This report is limited to the identification of state and/or federally regulated wetlands within the project area. However, there may be other regulated environmental features within the project, including but not limited to historical or archeological features, endangered or threatened species, navigable waters and/or floodplains, etc. Federal, state, and local units of government and regional planning organizations may have regulatory authority to control or restrict land uses within or in close proximity to these features. Stantec can assist with identification and/or assessment of additional regulated resources at your request, to the extent that the work is within our range of expertise.



## CONCLUSION

Stantec performed a wetland and waterway delineation on the Emerald Park Landfill Western Expansion Property. The Project Area is located in Section 36, Township 5 North, Range 20 East, City of Muskego, Waukesha County, Wisconsin. The wetland delineation were completed by Stantec over three site visits, the first by Dan Prasch and Melissa Curran on October 14, 2013, the second by Eric Parker and Melissa Curran on October 17, 2014, and the third by Eric Parker and Jaron Tylock on October 23, 2014. The purpose and objective of the wetland determinations and delineations was to identify the extent and spatial arrangement of wetlands within the Project Area.

Eleven wetlands were identified and delineated within the Project Area, comprised primarily of wet meadow and less commonly shrub-carr and forested wetland. One wetland (W-4) may not be jurisdictional because it was created as part of an approved stormwater plan. Two navigable waterways (S1 and S2) were identified and mapped within the Project Area. Adjacent uplands are comprised mostly of agricultural fields (soybean and hay), and less commonly old field and disturbed uplands containing landfill infrastructure. Wetlands and their boundaries were surveyed and mapped.

The USACE has regulatory authority over waters of the U.S. including adjacent wetlands, and the WDNR has regulatory authority over wetlands, navigable waters, and adjacent lands under Chapter 30 Wisconsin State Statutes, Act 6, and NR 103 Wisconsin Administrative Code. Local jurisdictions may have additional regulatory authority through shoreland or wetland zoning ordinances.

Prior to beginning work at this site or disturbing or altering wetlands, waterways, or adjacent lands in any way, Stantec recommends that the owner obtain the necessary permits or other agency regulatory review and concurrence with regard to the proposed work to comply with applicable regulations. Stantec can assist with identification and/or assessment of additional regulated resources at your request, to the extent that the work is within our range of expertise.

The information provided by Stantec regarding wetland boundaries is a scientific-based analysis of the wetland and upland conditions present on the site at the time of the fieldwork. The delineation was performed by experienced and qualified professionals using standard practices and sound professional judgment. The ultimate decision on wetland boundaries rests with the USACE and, in some cases, the WDNR or a local unit of government. As a result, there may be adjustments to boundaries based upon review by a regulatory agency. An agency determination can vary from time to time depending on various factors including, but not limited to recent precipitation patterns and the season of the year. In addition, the physical characteristics of the site can change over time, depending on the weather, vegetation patterns, drainage activities on adjacent parcels, or other events. Any of these factors can change the nature and extent of wetlands on the site.

## REFERENCES

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- USDA, NRCS. 1998. *Wisconsin Wetland Mapping Conventions – WI513.30(c) Off-site wetland identification tools*. (WI-180-V-NFSAM). (3<sup>rd</sup> ed.) (Amendment WI21).
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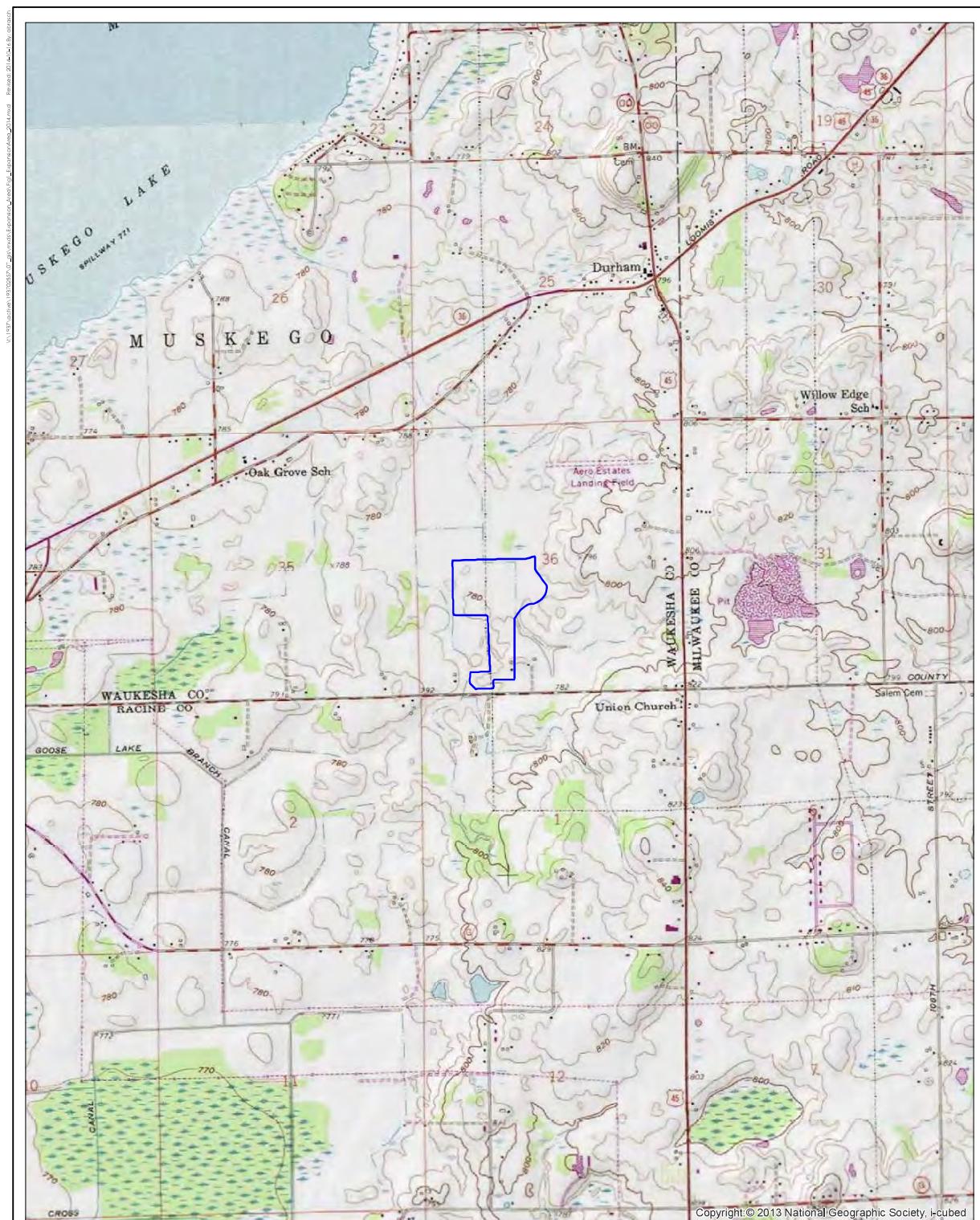


Emerald Park Landfill Western Expansion  
ADS  
December 10, 2014

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

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## FIGURES



Legend  
Expansion Boundary (2014)

Figure No.  
**1**  
Title

**DRAFT**

### Project Location and Topography

Client/Project  
ADS - Emerald Park Landfill  
Western Expansion

Project Location  
S36, T36, R20E  
C. of Muskego,  
Waukesha Co., WI  
Prepared by AB on 2014-10-15  
Technical Review by XX on 2014-XX-XX  
Independent Review by XX on 2014-XX-XX

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Stantec

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 form. The recipient shall be responsible for verifying the accuracy and completeness of the data. The data is released 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**
- Yellow Box: Expansion Boundary (2014)
  - Pink Shaded Areas: NRCS Soil Survey Data
  - Light Pink Shaded Areas: Predominantly Hydric Soils
  - Medium Pink Shaded Areas: Partially Hydric Soils
  - Darker Pink Shaded Areas: Non-Hydric Soils
  - Blue Dashed Lines: DNR 24k Hydrography
  - Blue Solid Lines: Perennial Stream
  - Blue Dotted Lines: Intermittent Stream
  - Blue Shaded Areas: 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

Disclaimer: Stantec assumes no responsibility for data supplied in electronic and paper formats. The recipient shall be responsible for verifying the accuracy and completeness of the data. The data is released 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. 2 **DRAFT**

Title: **NRCS Soil Survey Data**

Client/Project  
ADS - Emerald Park Landfill  
Western Expansion

Project Location  
S36, T36, R20E;  
C. of Muskego,  
Waukesha Co., WI  
Prepared by AB on 2014-10-15  
Technical Review by XX on 2014-XX-XX  
Independent Review by XX on 2014-XX-XX

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Stantec



**Notes**

- Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
- Data Sources include: Stantec, WDNR, and WDOT
- Orthophotography: 2013 NAIP

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Figure No.

3

**DRAFT**

Title

### Wisconsin Wetland Inventory

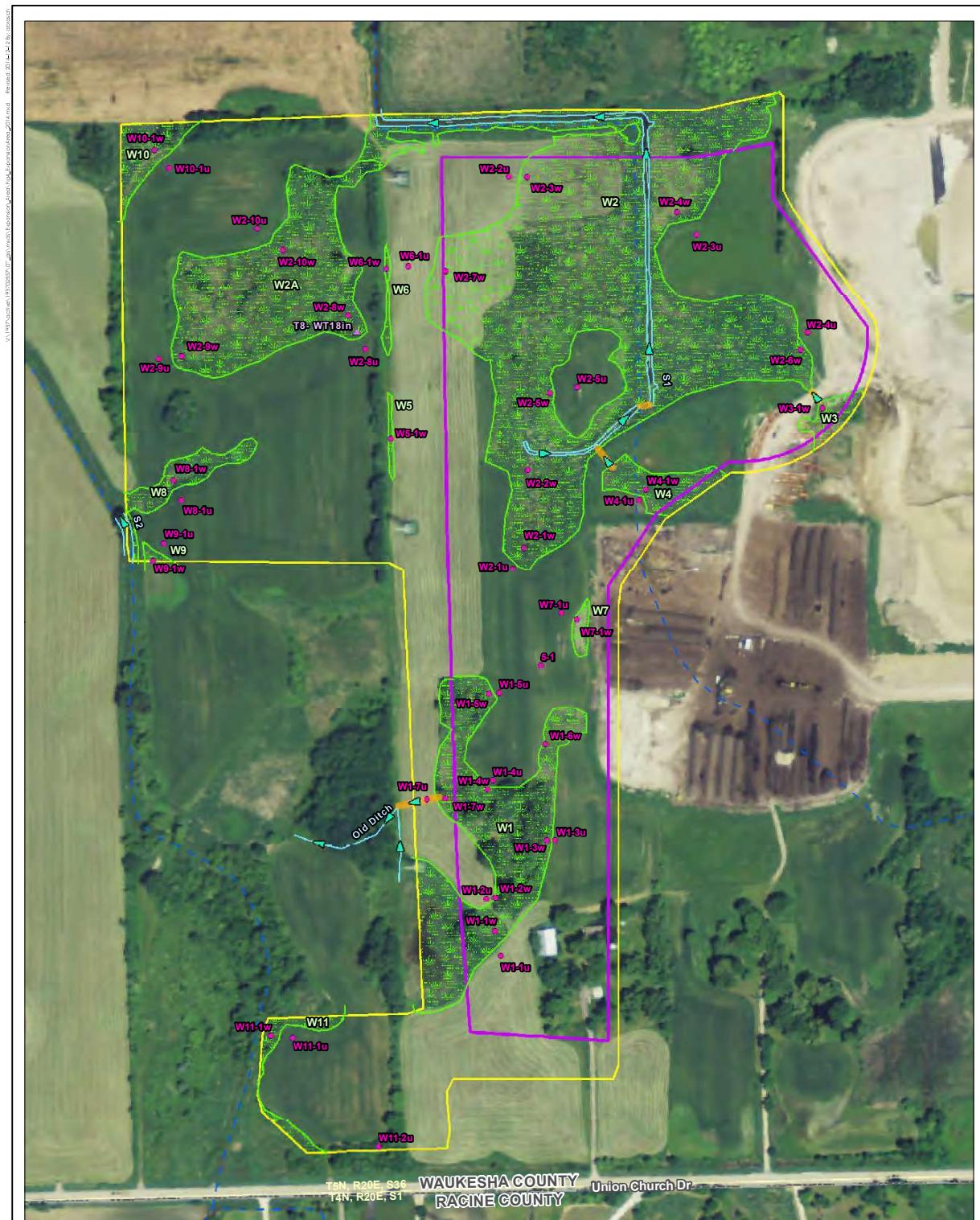
Client/Project  
ADS - Emerald Park Landfill  
Western Expansion

Project Location  
S36, T36N, R20E;  
C. of Muskego,  
Waukesha Co., WI  
Prepared by AB on 2014-10-15  
Technical Review by XX on 2014-XX-XX  
Independent Review by XX on 2014-XX-XX

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**Notes**

- Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet!
- Data Sources include: Stantec, WDNR, and WDOT
- 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  
S36, TSN, R20E;  
C. of Muskego,  
Waukesha Co., WI  
Prepared by AB on 2014-10-15  
Technical Review by XX on 2014-XX-XX  
Independent Review by XX on 2014-XX-XX

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Stantec



**Notes**

- Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet!
- Data Sources Include: Stantec, WDNR, and WDOT
- Orthophotography: 2013 NAIP

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Figure No.

**DRAFT**

5

Title

## Plant Communities

Client/Project  
ADS - Emerald Park Landfill  
Western Expansion

Project Location  
S36, TSN, R20E,  
C. of Muskego,  
Waukesha Co., WI

Prepared by AB on 2014-10-15  
Technical Review by XX on 2014-XX-XX  
Independent Review by XX on 2014-XX-XX

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Stantec



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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**APPENDIX A**  
**AGENCY CONCURRENCE LETTERS AND APPROVED PLANS**



# COPY

DEPARTMENT OF THE ARMY  
ST. PAUL DISTRICT, CORPS OF ENGINEERS  
SIBLEY SQUARE AT MEARS PARK  
190 FIFTH STREET EAST, SUITE 401  
ST. PAUL MN 55101-1638

REPLY TO  
ATTENTION OF

June 23, 2010

Operations  
Regulatory (2009-4421-RMG)

Mr. Jay Warzinski  
Veolia Environmental Services  
W144 S6350 College Court  
Muskego, Wisconsin 53150

Dear Mr. Warzinski:

This is in response to a wetland delineation concurrence request submitted by Natural Resources Consulting for the Emerald Park landfill. The project site is located in Section 36 of Township 5N, Range 20E, Waukesha County, Wisconsin.

We field reviewed the wetland delineation report in October 2009 and received an updated wetland map in January 2010. We concur that the wetland boundary on the property (as depicted in the modified mapping dated January 27, 2010) has been established in accordance with the *Corps of Engineers Wetland Delineation Manual* (1987 Manual) and is adequate to establish the limits of Corps of Engineers Clean Water Act jurisdiction. This wetland delineation shall remain valid for a period of three years from the date of this letter, unless new information warrants revision of the delineation before the expiration date.

This review did not include a jurisdictional determination as to whether the waterbody/wetlands that were identified in this report would come under the Corps of Engineers regulatory authority pursuant to Section 404 of the Clean Water Act. If requested, Preliminary or approved Jurisdictional Determinations may be completed in the future for aquatic resources in the proposed project area.

Pursuant to Section 404 of the Clean Water Act, the Corps of Engineers has regulatory jurisdiction over the discharge of dredged and fill materials, including discharges associated with mechanical land clearing, in all waters of the United States, which includes most wetlands. In addition, the Corps regulates all work in navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act.

Please note that work performed below the ordinary high water mark in waters of the United States, or the discharge of dredged or fill material into wetlands, without a Department of the Army permit could subject you to enforcement action. Receipt of a permit from a state or local agency does not obviate the requirement for obtaining a Department of the Army permit.

Thank you for your cooperation with the U.S. Army Corps of Engineers regulatory program. If you have any questions, contact Rebecca Graser in our Waukesha field office at



## State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor  
Matthew J. Frank, Secretary  
Gloria L. McCutcheon, Regional Director

Waukesha Service Center  
141 NW Barstow, Room 180  
Waukesha, Wisconsin 53188  
Telephone 262-574-2100  
FAX 262-574-2117

March 18, 2010

Mr. Jay Warzinski  
Veolia ES – Emerald Park Landfill, LLC  
W144 S6350 College Court  
Muskego, WI 53150

Subject: Wetland Delineation Review – Veolia Emerald Park Landfill

Dear Mr. Warzinski:

The Department of Natural Resources (Department) has received the wetland delineation package originally dated December 1, 2005, revised December 8, 2008 for the approximately 395-acre Veolia Emerald Park Landfill site in Section 36, Township 5 North, Range 20 East, City of Muskego, Waukesha County. Staff from Natural Resources Consulting, Inc. (NRC) conducted the original delineation fieldwork on October 25-28, 2005 and November 29, 2005. The site was further field reviewed by Department and Army Corps of Engineers (ACOE) staff after reviewing the original report.

After reviewing the original report, including maps and supporting data sheets, and the subsequent additional information submitted after an October 16, 2009 field review, the Department accepts the delineation as shown on Figure 1 Revised Wetland Boundary – October 22, 2008, prepared by NRC as an accurate location of the wetland boundaries for the portion of the parcel identified as “Concurrence Request” on the figure. This wetland concurrence is valid for five years unless changes in site conditions warrant a revision of the delineation before the expiration date.

In addition to the wetlands, there are also navigable waterways on the property. As you are aware, projects proposed in or adjacent to navigable waterways or wetlands may require a Wisconsin State Statute Chapter 30 permit and/or Wetland Water Quality Certification (WQC).

If you have any further questions, please call me at 262-574-2136.

Sincerely,

Pam Schense  
Water Management Specialist

cc: ACOE – Rebecca Graser  
City of Muskego  
Brian Karczewski – Natural Resource Consulting, Inc.  
Joe Lourigan – DNR Sturtevant



Figure 1. Revised Wetland Boundary - Oct. 22, 2009  
Veolia - Emerald Park Landfill



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 007-0264-01  
Last Modified: September 30, 2013



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Legend

- Concurrence Request
- ▨ Wetland Impact Areas
- ▬ Approximate Extent of Impact
- ▬ Initial Wetland Boundary
- ▬ Revised Wetland Boundary

Data Sources include: Stantec, WDNR, WDOA, and WDOT.  
Orthophotography: 2008 NAIP.

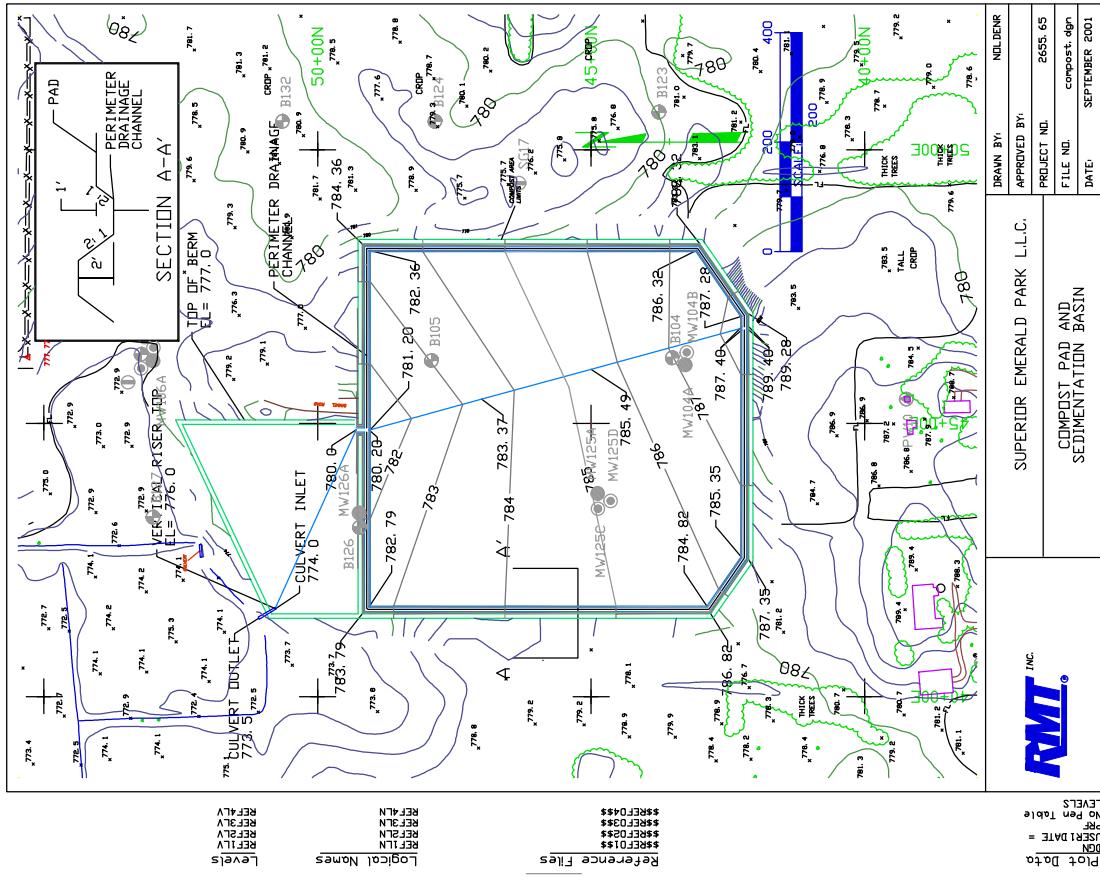
	Inches	Date
Prepared by	CP	10/22/2009
Peer Review by	AB	09/30/2013
Final Review by		

The information on this map has been compiled by Stantec staff from a variety of sources and is subject to change without notice. Stantec makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information.

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Release 1.0 (June, 2001)



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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**APPENDIX B**  
**WDNR NAVIGABILITY DETERMINATION**



**FIGURE 1. EMERALD PARK WETLANDS OVERVIEW**  
Veolia - Emerald Park



**Location**  
Section 36, T5N, R20E  
City of Muskego, Waukesha County, WI

**Project Information**  
NRC Project Number : 007-0264-01  
Modified December 11, 2008

0 250 500 Feet

**Legend**

- Approximate Project Boundary
- Field Delineated Wetland
- Navigable Waterway

**NRC**  
Natural Resources Consulting, Inc.  
209 Commerce Parkway  
P.O. Box 128  
Cottage Grove, WI 53527-0128  
phone: 608-839-1998  
fax: 608-839-1995  
[www.nrcdifference.com](http://www.nrcdifference.com)



Emerald Park Landfill Western Expansion  
ADS  
December 10, 2014

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

---

## **APPENDIX C**

### **FSA SLIDE REVIEW RESULTS**

Farm Service Agency Aerial Color Slide Review<sup>1</sup>  
**Emerald Park Wetland Investigation -193702557**  
 Section 36, T-5-N, R-20E : City of Muskego, Waukesha County

Year	Monthly Rainfall in Inches <sup>2</sup>		Relative Wetness (Dry and Wet Rank)	Cropped and Wetness Signature <sup>3,4,5</sup>									
	April	May		1	2	3	4	5	6	7	8	9	10
1992	2.25	1.20	1.87	Dry #1	CR - Y, 6d	NC - Y, 4	CR - Y, 4	NC - Y, 6d	CR - Y, 6b, 6d	CR - Y, 6b, 6d	CR - Y, 6b, 6d	CR - Y, 6a	CR - Y, 6d
1993	7.21	1.97	7.32	Normal	N	CR - Y, 4	N	NC - Y, 6b	NC - Y, 6b	NC - Y, 6b	CR - Y, 6b	CR - Y, 6a	N
1994	1.60	0.99	3.52	Dry #3	N	CR - Y, 6b, 6d	CR - Y, 4	CR - Y, 6c	NC - Y, 6c	NC - Y, 6b	CR - Y, 6b, 6d	NC - Y, 6c	CR - Y, 4
1995	3.83	3.29	0.53	Dry #4	N	N	CR - Y, 6d	NC - Y, 6b, 6d	NC - Y, 3, 6b, 6d				
1996	3.19	2.78	7.83	Wet #5	N, 7a	NC - Y, 6b, 6d	CR - Y, 6c	NC - Y, 6b, 6d	NC - Y, 6b, 6d	NC - Y, 6b, 6d	NC - Y, 6c, 6d	CR - Y, 6c	
1997	1.36	3.31	6.78	Normal	NC - Y, 6d	NC - Y, 6b	NC - Y, 6b	NC - Y, 6b	NC - Y, 6b, 6d	NC - Y, 6b, 6d	NC - Y, 4, 6b	CR - Y, 6d	NC - Y, 6d
1998	3.57	4.16	3.92	Normal	NC - Y, 5, 6d	N	NC - Y, 6b	NC - Y, 6b	NC - Y, 6b	NC - Y, 6b	NC - Y, 6d	NC - Y, 6c	
1999	5.45	3.82	6.14	Wet #3	CR - Y, 6d	NC - Y, 6a	NC - Y, 6d	N	NC - Y, 6a	NC - Y, 6a	NC - Y, 6b	NC - Y, 6b	CR - Y, 6d
2000	2.97	8.05	4.15	Normal	CR - Y, 6d	NC - Y, 6d	NC - Y, 6d	NC - Y, 6d	NC - Y, 6b, 6d	NC - Y, 6e	CR - Y, 6d	N	CR - Y, 6d
2001	4.75	5.42	4.62	Wet #4	N	NC - Y, 6b, 6d	N	NC - Y, 6b, 6d	NC - Y, 6b	NC - Y, 6c	CR - Y, 6b, 6d	N	N
2002	3.96	2.89	3.30	Normal	N	CR - Y, 6b, 6d	NC - Y, 6e	CR - Y, 6b, 6d	CR - Y, 6b, 6d	CR - Y, 6b, 6d	NC - Y, 6b, 6d	NC - Y, 4	N
2005	1.03	2.86	2.19	Dry #2	N	CR - Y, 6b, 6d	CR - Y, 6d	N	CR - Y, 6b	NC - Y, 6b, 6d	CR - Y, 6b	CR - Y, 6c	CR - Y, 6b, 6b
2006	3.22	4.63	2.18	Normal	N	N	CR - Y, 4	N	CR - Y, 6e	CR - Y, 6d	NC - Y, 6b, 6d	CR - Y, 6d	CR - Y, 6d
2008	5.58	2.23	10.27	Wet #2	CR - Y, 6b, 6b	CR - Y, 6b, 6b	CR - Y, 6c	CR - Y, 6b, 6b	NC - Y, 6c	CR - Y, 6b, 6b	NC - Y, 6b, 6b	CR - Y, 6c	NC - Y, 6b, 6b
2010	3.86	3.75	11.11	Wet #1	CR - Y, 6d	CR - Y, 6d	CR - Y, 6e	CR - Y, 6d	CR - Y, 6e	CR - Y, 6d	N	N	CR - Y, 6d
30% chance less than 30 Year Average	2.54	2.05	2.36	Total wet signatures observed out of 6 "normal precipitation years	3	5	4	5	6	6	6	4	5
30% chance more than 30 Year Average	3.91	3.25	4.05										

Does slide/aerial photo analysis indicate the site is a wetland? YES

DRY  
NORMAL  
WET

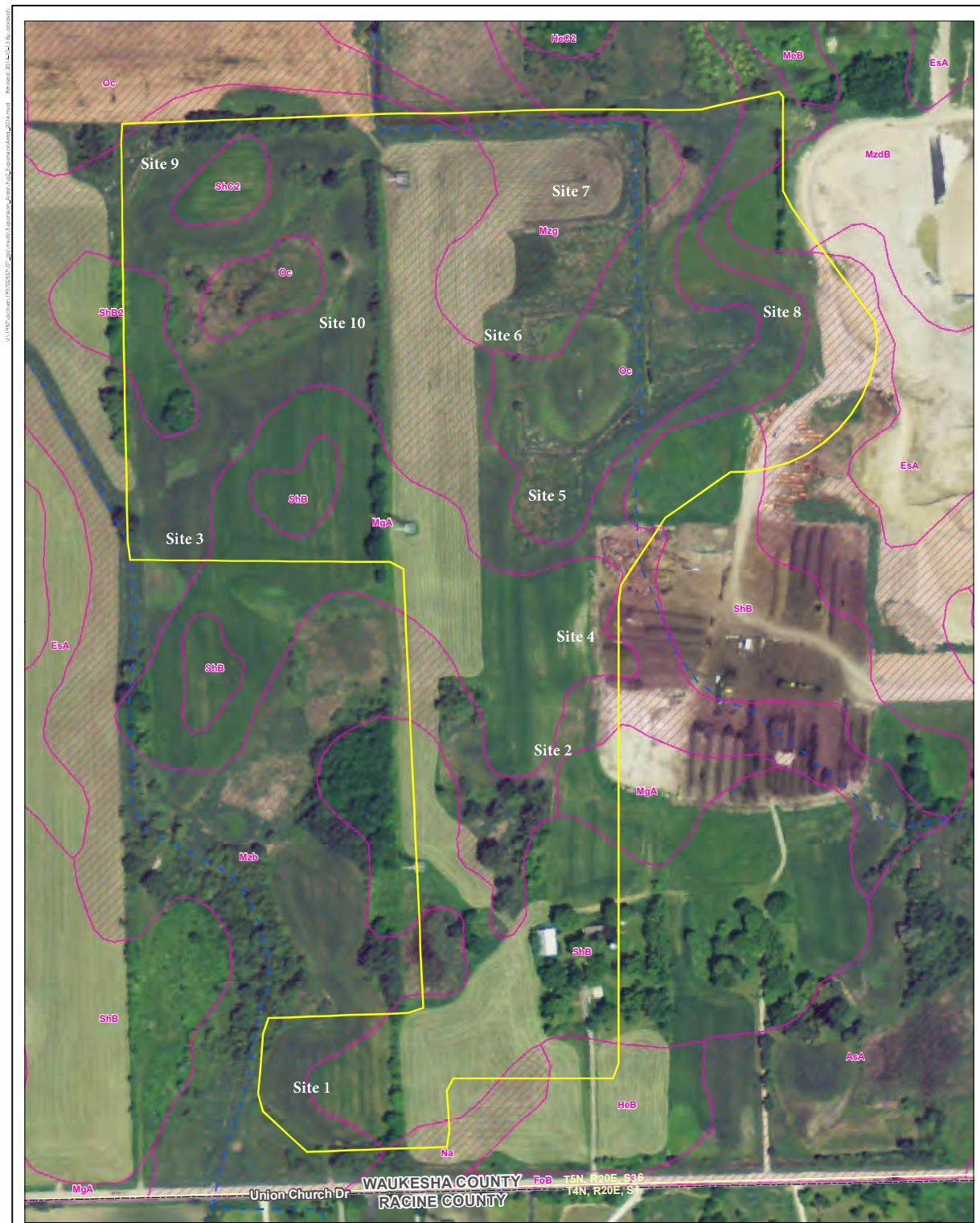
<sup>1</sup> Assumption is made that FSA slides are taken in July, as a result, precipitation analysis focuses on three months prior to July.

<sup>2</sup> Precipitation data from Waukesha Weather Station (478937), Waukesha County, Wisconsin

<sup>3</sup> CR = cropped (row crop or tilled), NC = not cropped (hay pasture, fallow, etc.)

<sup>4</sup> Y = wetness signature present (+) = strong, • = weak; N = No wetness signature

<sup>5</sup> Interpretation Codes: Feature: 1=water, 2=mud flat, 3=barren spot, 4=drowned ground, 5=planted late, Color: 6a=dark green, 6b=light green, 6c=yellow, 6d=brown, 6e=dark brown, 6f=till, 7a=drilled, 7b=filled, 7c=filled, 7d=trashed, Other: write explanation as needed



- Legend**
- Yellow Box: Expansion Boundary (2014)
  - Pink Oval: NRCS Soil Survey Data
  - Pink Oval: Predominantly Hydric Soils
  - Pink Oval: Partially Hydric Soils
  - Pink Oval: Non-Hydric Soils
  - Blue Line: DNR 24k Hydrography
  - Blue Line: Perennial Stream
  - Dashed Blue Line: Intermittent Stream
  - Blue Blob: 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.

**FSA Slide Review Locations**

Client/Project  
ADS - Emerald Park Landfill  
Western Expansion

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

0 125 250 Feet  
1:3,000 [A1 Original document size of 11x17]



Stantec



1992 FSA Slide  
Veolia - Emerald Park Landfill Expansion



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
Yellow Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.



Prepared by	Intake	Date
JF		10/30/2013
Peer Review by		
Final Review by		

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1993 FSA Slide  
Veolia - Emerald Park Landfill Expansion



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
Yellow Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.

 **Stantec**

Prepared by	Intake	Date
JF		10/30/2013
Peer Review by		
Final Review by		

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**1994 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
Yellow Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.



Prepared by	Intake	Date
JF		10/30/2013
Peer Review by		
Final Review by		

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**1995 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
Yellow Box: Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.



Prepared by	Intake	Date
JF		10/30/2013
Peer Review by		
Final Review by		

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**1996 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
Yellow Box: Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.

 **Stantec**

Prepared by	Intake	Date
JF		10/30/2013
Peer Review by		
Final Review by		

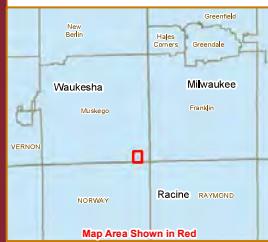
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**1997 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



**Location**  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

**Project Information**  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

**Legend**  
Yellow Box: Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.



	Initials	Date
Prepared by	JF	10/30/2013
Peer Review by		
Final Review by		

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1998 FSA Slide  
Veolia - Emerald Park Landfill Expansion



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
Yellow Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.

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	Initial	Date
Prepared by	JF	10/30/2013
Peer Review by		
Final Review by		

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**1999 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



**Location**  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

**Project Information**  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

**Legend**  
Yellow Box: Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.

 **Stantec**

	Initial	Date
Prepared by	JF	10/30/2013
Peer Review by		
Final Review by		

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**2000 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



Location  
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C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
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Final Review by		

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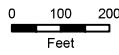
**2001 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



**Location**  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

**Project Information**  
Project Number: 193700000  
Last Modified: October 30, 2013

**Legend**  
■ Approx. Expansion Boundary



Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.



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Peer Review by		
Final Review by		

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**2002 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



**Location**  
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C. of Muskego, Waukesha Co., WI

**Project Information**  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

**Legend**  
Yellow Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.

 **Stantec**

	Initial	Date
Prepared by	JF	10/30/2013
Peer Review by		
Final Review by		

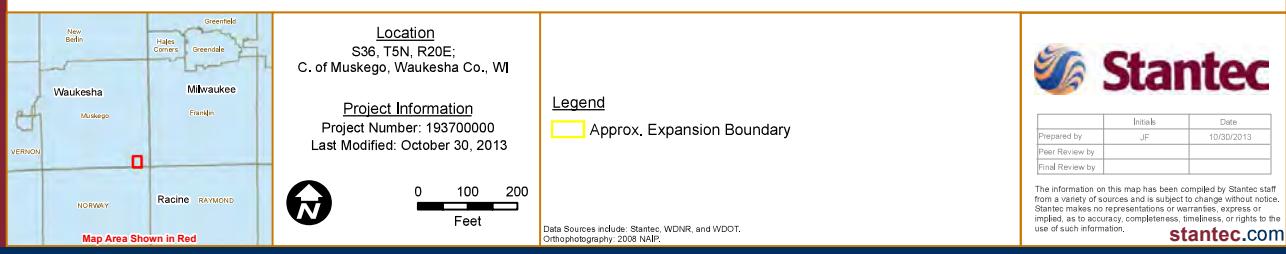
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2005 FSA Slide  
Veolia - Emerald Park Landfill Expansion



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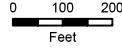
**2006 FSA Slide  
Veolia - Emerald Park Landfill Expansion**



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013

Legend  
Yellow Box: Approx. Expansion Boundary



Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.



Prepared by	Intake	Date
Stantec	JF	10/30/2013
Peer Review by		
Final Review by		

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2008 FSA Slide  
Veolia - Emerald Park Landfill Expansion



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

Project Information  
Project Number: 193700000  
Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
Yellow Approx. Expansion Boundary

Data Sources include: Stantec, WDNR, and WDOT.  
Orthophotography: 2008 NAIP.

 **Stantec**

	Initials	Date
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Peer Review by		
Final Review by		

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2010 Wroc Slide  
Veolia - Emerald Park Landfill Expansion



Location  
S36, T5N, R20E;  
C. of Muskego, Waukesha Co., WI

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Last Modified: October 30, 2013



0 100 200  
Feet

Legend  
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