Major Water Quality Impact Assessment

Conditional Use Permit and Conditional Rezoning Application

SPSA Regional Landfill

Suffolk Virginia
June 2016

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1 Project Purpose

The Southeastern Public Service Authority (SPSA) is proposing to expand the Regional Landfill located off Bob Foeller Drive in Suffolk, Virginia. Currently, the Regional Landfill property consists of approximately 833 acres and is comprised of three parcels owned by SPSA, Tax Map Nos. 27*37, 27*37*1 and 27*38A. Tax Map Nos. 27*37 and 27*37*1 comprise 308 acres and are zoned Heavy Manufacturing (M-2). Tax Map 27*28A contains 525 acres and is mixed zoning of Agricultural (A) 440.34 acres and M-2 84.8 acres (Figure 1: Site Plan).

The existing landfill is comprised of six cells (Cells I-VI) which have been constructed on parcels 27*37 and 27*37*1. Cells I-IV are closed with a final cover system and Cells V and VI are currently operational. Cell VII has been permitted with the Virginia Department of Environmental Quality (VADEQ) for construction onto a portion of parcel 27*38A, which is currently zoned as M-2. The Cell VII area (73 acres) is currently being used by SPSA as a soil borrow area in accordance with the Erosion and Sediment Control Permit, ESC-2009-00002. Based on current operations and estimated future disposal needs, Cell VII is anticipated to be constructed for operation beginning after 2024.

SPSA is requesting, through applications to the City of Suffolk, conditional rezoning of the remaining portion of parcel 27*38A from Agricultural (A) to M-2 and Conditional Use approval of Cell VII landfill and development of a sand or gravel extraction (soil borrow operation) and vegetative composting system on 129 acres (Future Cell VIII and IX) of the property within portions of the property to be rezoned. The future Cell VIII and IX area is located to the north of Cell VII and to the east of the closed Cells I-IV.

In accordance with Appendix B-4(e)(2) and B-5(h) of the Unified Development Ordinance, this Water Quality Impact Assessment (WQIA) has been prepared as a supplement to SPSA's application for the Conditional Rezoning of a portion of parcel 27*28A, and the Conditional Use Permit Application.

Prior to development of the Cell VII Borrow Area, Map Lot 27*28A contained approximately 425 acres of non-tidal, seasonally flooded palustrine forested wetlands. Approximately 12 acres of wetlands were disturbed for the development of Cell VII borrow area and landfill, and SPSA has provided 98 acres of preservation, restoration and enhancement as mitigation in accordance with the 88-0707 401/404 permits issued by VADEQ and US Army Corps of Engineers for the work.

Since the development of this site impacts more than 10,000 square feet of land within the Chesapeake Bay Preservation Area (CBPA), a major water quality impact assessment is required for the Conditional Use Permit and Conditional Rezoning applications. SPSA has contracted with HDR to prepare this WQIA report. This WQIA addresses landfill Cell VII, and borrow area in Future Cells VIII and IX (Study Area), which comprise 202 acres of the SPSA Regional Landfill facility (Figure 2: Study Area).

2 Overview

Much of the information required by the City's WQIA regulations is included in the Final Environmental Impact Statement (EIS) prepared by the US Army Corps of Engineers (Norfolk District) completed May 1995 regarding expansion options for the Regional Landfill. The EIS evaluated over 88 sites within the Regional Landfill service area and identified four potential landfill sites for further analysis, including the 525 acre parcel 27*28A adjacent to the existing landfill facility. The 525-acre property was selected as the least environmentally damaging practicable alternative and SPSA proceeded with acquisition of the property and permitting of the Cell VII landfill expansion. In July 2005, a WQIA was submitted as part of a CUP application to the City of Suffolk for the development of Cell VII of the Regional Landfill.

Pertinent information relating to the proposed expansion site was excerpted from the EIS for inclusion into the WQIA. This WQIA will specifically evaluate the 202-acre site of Cells VII, VIII and IX which is a sub-area of the 525-acres evaluated in the 1995 EIS. Excerpts from the EIS have been edited to specifically reference the 202-acre portion of the parcel. Text taken from the EIS has been *italicized* in this report and includes reference to the specific source sections of the EIS.

The Study Area is located within the Resource Management Area (RMA) of the Chesapeake Bay Preservation Overlay District. Therefore, the WQIA narrative follows the format of Appendix B-13 of the Suffolk Unified Development Ordinance titled "Environmental Documentation Within Chesapeake Bay Preservation Area (CBPA)" and includes pertinent sections to the proposed project. The City has previously confirmed that the project site is not located in a Resource Protection Area (RPA) of the CBPA. This report is written following the City requested information for a Major Water Quality Impact Assessment for ease of review.

3 Minor Water Quality Impact Assessment

Information in Section 3.1 reflects what is requested in the Appendix B-13(b) of the Suffolk Unified Development Ordinance, Minor Water Quality Impact Assessment.

3.1 RPA and Buffer Locations

The 202-acre Study Area is not located in the portion of the CBPA designated as the RPA (Figure 1: Site Plan). Additionally, no 100-foot buffer areas are located in the expansion site. The closest RPA is located a half mile to the west of the SPSA landfill site at Burnett's Mill Creek.

However, Map Lot 27*28A is located in the region designated as the RMA, as all areas within the CBPA not inside the RPA are considered to be in the RMA. The RMA boundary falls across the majority of Cell VII (~59 acres) and a small portion overlaps Cell VIII and IX (~6.1 acres). RMA's are contiguous to RPA's and may include flood plains, highly erodible soils associated with steep slopes, non-tidal wetlands, not included in the RPA and other lands necessary to protect water quality.

3.2 Encroachment Nature

The development in the RMA will consist of borrow and landfilling activities, along with associated erosion and sedimentation control measures.

The proposed activities will have minimal impact on the amount of impervious surface within the Study Area. Currently, Cell VII is being used as a borrow area and has erosion control measures in place. Since the Cell VII expansion and future borrow area site is located adjacent to the current landfill facilities, the existing paved landfill entrance roadway and site roadways will be utilized for access to operations of Cell VIII and the borrow areas in Future Cell VIII and IX. A perimeter gravel roadway will be installed as part of Cell VII construction for operation and access for maintenance of the erosion control and stormwater best management practices. The perimeter gravel roadway will be approximately 30 feet in width and be 5,100 feet in length for approximately 153,000 square feet of new impervious gravel surface, or less than 5% of the total area. For a proposed layout of Cell VII landfill development, Figure 1: Site Plan is included for reference. The construction and operation of a borrow area or composting system will utilize the existing gravel access road to the east of Cells I – IV for access to the area, and would have minimal impervious areas generating run-off.

3.3 Best Management Practices

As shown in Figure 3: Basegrade Plan, the Cell VII borrow area has been developed with drainage swales and two sediment basins for treatment of runoff from the borrow area and a diversion dike to route off-site stormwater around the Cell VII area. The erosion and sediment control practices are being constructed and maintained in accordance with the Erosion and Sediment Control Permit, ESC-2009-00002.

The design for Cell VII includes grass lined drainage channels around the perimeter of the landfill to direct flow toward the existing sediment basins. The design also includes a series of built in drainage benches in the slopes to catch and direct runoff to slope drains or reinforced drainage channels (Appendix A). These slope drains and/or reinforced drainage channels will direct runoff down the slopes into the perimeter channels shown on the Plan 0C-09 in Appendix A. The channels are designed to discharge into the sediment basins and the discharge rates controlled to reduce the peak flows off-site through the use of perforated riser outlet structures. See Appendix A for stormwater calculations and the final grading plan for the closed conditions at Cell VII (2009 Cell VII Permit Application).

The development of the soil borrow area within future Cells VIII and IX will be completed similarly to the Cell VII soil borrow area and will incorporate drainage channels and sediment basins for treatment of run-off during operation. Based on the VADEQ Erosion and Sediment Control Handbook, if all 129 acres were to be developed as the borrow area, the sediment basin would need to provide 134 CY/acre of storage volume (17,286 CY) and 33.5 CY/acre of sediment storage (4,322 CY). A sediment basin with an area of approximately 3 acres and depth of 7 feet, would provide sufficient storage and treatment for the stormwater run-off. Conceptual calculations for the sediment basin are included in Appendix B.

The potential development of a compost system would require installation of some impervious areas for collection of contact water for treatments and some gravel roadways for access to the facility areas. The development of the soil borrow would be subject to an erosion and sediment control permit from the City of Suffolk. The vegetative waste composting system would be subject to VADEQ solid waste permitting as well as City of Suffolk site plan approval, which would include review of proposed erosion and sediment and stormwater management systems.

3.4 Existing Site Vegetation

The majority of the proposed landfill Cell VII does not have much in the way of vegetation as it is being used as a borrow area. At the tie-in of Cell V and Cell VII, there is an approximate 70 foot wide vegetated area between the cells. The eastern part of this strip, adjacent to Cell VII, is vegetated with native vegetation. This strip of native vegetation is 30-40 feet wide. The western part of the ±70 foot wide strip is mowed grasses. Table 3-1 describes the 30-40 foot wide strip of natural vegetation between Cells V and VII.

Table 3-1 Site Vegetation Between Cells V and VII

Common Name	Scientific Name
Trees	
Sweet Gum	*Liquidambar styraciflua*
Water Oak	*Quercus nigra*
Loblolly Pine	*Pinus taeda*
Saplings	
Sweet Bay	*Magnolia virginiana*
Swamp Chestnut Oak	*Quercus michauxii*
Shrubs/herbaceous	
Sweet Gum	*Liquidambar styraciflua*
Pepper Bush	*Clethra alnifolia*
Persimmon	*Diospyros virginiana*
Switch Cane	*Arundinaria tecta*
Vines	
Greenbrier	*Smilax rotundifolia*
Poison Ivy	*Toxicodendron radicans*
Virginia Creeper	*Parthenocissus quinquefolia*

Source: Davis Environmental, June 2016 field reports

The existing vegetation within Cell VII is sparse and patchy due to current borrow activities. This area is characterized as ever-changing with young volunteer pine (*Pinus taeda*) and invasive species such as cattails (*Typha* sp.).

The vegetation across the 129 acres of Cells VIII and IX are similar in character. Two plant communities were identified and include Community 1, which is characterized by hardwood forested wetlands; and Community 2, which supports a slightly drier plant community represented by mixed forested uplands. Community 1 makes up the majority of the area, and Community 2 represents small hummock uplands scattered in the southeast area of Cells VIII and IX. This forested area was cut for timber in the 1980s and represents a mixed age stand of trees ranging from 28 to 60 years. Increased harvesting of timber occurred in the southern third of the site; therefore, the southern third has younger trees (90% cover) while the remainder has fewer young trees (70% cover). The following two tables list the dominant trees, shrubs, vines and forbes in each plant community.

Table 3-2 Plant Community 1 (Wetland)

Common Name	Scientific Name	Estimated % Cover (can exceed 100%)
Trees		
Red Maple	*Acer rubrum*	60
Sweet Gum	*Liquidambar styraciflua*	20
Swamp Chestnut Oak	*Quercus michauxii*	20
Water Oak	*Quercus nigra*	5
Sweet Bay	*Magnolia virginiana*	3
American Holly	*Ilex opaca*	2
Loblolly Pine	*Pinus taeda*	1
Shrubs		
Pepper Bush	*Clethra alnifolia*	30
Switch Cane	*Arundinaria tecta*	30
Highbush Blueberry	*Vaccinium corymbosum*	8
Sweet Bay	*Magnolia virginiana*	3
Vines		
Greenbriar	*Similax rotundifolia*	25
Poison Ivy	*Toxicodendron radicans*	15
Laurel-leaf Greenbriar	*Similax laurifolia*	2
Forbes		
Netted Chain Fern	*Woodwardia areolata*	25
Virginia Chain Fern	*Woodwardia virginica*	25
Lizard Tail	*Saururus cemuus*	20
Royal Fern	*Osmunda regalis*	5

Source: Davis Environmental, June 2016 field reports;

Table 3-3 Plant Community 2 (Upland)

Common Name	Scientific Name	Estimated % Cover (can exceed 100%)
Trees		
Red Maple	*Acer rubrum*	30
Sweet Gum	*Liquidamabar styraciflua*	30
Yellow Poplar	*Liriodendron tulipifera*	30
Loblolly Pine	*Pinus taeda*	30
American Holly	*Ilex opaca*	10
Shrubs		
Pawpaw	*Asimina triloba*	25
Highbush Blueberry	*Vaccinium corymbosum*	10
Switch Cane	*Arundinaria tecta*	10
Vines		
Japanese Honeysuckle	*Lonicera japonica*	25
Virginia Creeper	*Parthenocissus quinquefolia*	10
Poison Ivy	*Toxicodendron radicans*	10
Grape	*Vitis rotundifolia*	5
Forbes		
New York Fern	*Thelypteris noveboracensis*	30
Lady Fern	*Athyrium filix-femina*	30
Netted Chain Fern	*Woodwardia areolata*	10

Source: Davis Environmental, June 2016 field reports

4 Major Water Quality Impact Assessment

4.1 Existing Hydrogeological Elements

4.1.1 Existing Topography

The Study Area lies entirely within the Swamps and Peatlands (63c) Level IV Ecoregion of the Middle Atlantic Coastal Plain (63) Level III Ecoregion of Virginia (EPA, 2003). The Middle Atlantic Coastal Plain is a low, nearly flat plain with many swampy or marshy areas that extend northeastward from Georgia to New Jersey. The Swamps and Peatlands, also known as the Dismal Swamp, is a large, forested wetland with extensive organic deposits. This ecoregion is nearly flat, poorly drained, and is underlain by lagoonal strata and impermeable clays. Elevation of the Study Area ranges from 16 to 20 feet above sea level.

Changes in elevation in the vicinity of the Study Area are marked by four topographic features: the sand ridge and dunes along the Atlantic Ocean; and the Suffolk, Hazleton, and Surry Scarps, which represent former beachfronts. The Suffolk Scarp is located approximately four miles west of the Study Area; Godwin Blvd. is located atop this scarp.

4.1.2 Geology

3.1.2[1]

The coastal plain province of Virginia consists of an eastwardly thickening sedimentary wedge composed principally of unconsolidated gravels, sand silt, and clay with variable amounts of shell material. These deposits range in thickness from approximately 300 feet in Southampton County to over 2,000 feet in Virginia Beach. The sediment is underlain by consolidated basement bedrock, which consists of metamorphic and igneous rocks (Teifke 1973; USACE, 1995)

4.1.3 Soil Characteristics

3.1.3[1]

Coastal plain soils originated from unconsolidated marine and fluvial sediments. The textures of the soils often consist of loams, sands, muck, and combinations thereof, with loams constituting between 50 and 80 percent of the soils. The deep soils are generally moderately to poorly drained, with a great deal of wetness being common in some locations.

The Suffolk County Soil Survey dataset identified six soil types within the Study Area, all which are hydric soils (Figure 4: NRCS Soils). The majority of soils within Cell VII have been disturbed due to current borrow activities and those in Cell VIII and IX are mainly undisturbed except for previous forest clearing activities during the 1908's. Table 4-1 lists the soils and acreage in the Study Area.

[1] EIS, Chapter 3

Table 4-1 Study Area Soils

Soil Series Name (Map Symbol)	Cell VII (Ac.)	Cell VIII and IX (Ac.)
Tomotley loam (24)	63.6	66.3
Torhunta loam (25)	-	59.4
Levy silt clay loam (13)	5.0	-
Deloss mucky loam (4)	-	3.1
Rains fine sandy loam (19)	2.5	-
Dragston fine sandy loam (6)	1.9	-

Source: Suffolk County Soil Survey shapefile (USDA, 2010)

4.1.4 Mineral Resources

3.1.4[1]

Highly priced, precious mineral resources are not abundant in the coastal plain area. The mineral resources that are available include sand, gravel, clay, and coquina. Economical utilization of these resources is dependent upon their distance from the surface and geographic proximity to their destined use site. Sand obtained from several formations in the area is used for general construction and road fill. Many sand borrow pits exist west of the Suffolk Scarp in the lower member of the Windsor Formation. East of the Suffolk Scarp, sand is taken from the Sand Bridge Formation.

Analysis of clay samples from Isle of Wight County indicates the potential for use as a lightweight aggregate or in face brick and drain tile. Coquina facies in the Yorktown Formation provide a source of calcium carbonate for cement manufacturing. Coquina, which is composed of more than 90 percent shell fragments, is exposed in isolated patches just east of the Suffolk Scarp from the James River south to Chuckatuck.

4.1.5 Hydrology and Hydrography

The Study Area is located in the Nansemond River-Cedar Lake basin, more specifically in the Hampton Roads Hydrologic Unit No. 02080208 (USGS 2006). Approximately 6,415 feet of stream channel, representing two unnamed tributaries (UTs) identified by the National Hydrography Dataset (NHD) in the Study Area (USGS, 2006). However, field reconnaissance by Davis Environmental Consultants, Inc. in June 2016 did not confirm the presence of any defined stream channels within the Study Area.

3.1.5[1]

The U.S. Geological Survey recently completed an in-depth study of the groundwater resources in southeastern Virginia. Their report, Hydrogeologic Framework of the Virginia Coastal Plain (USGS, 1988) defined eight separate aquifers. Ranging from shallowest to deepest, the aquifers are known as: Columbia, Yorktown-Eastover, St. Marys-Choptank, Chickahominy-Piney Point, Aquia, Upper Potomac, Middle Potomac, and Lower Potomac. The Columbia aquifer is also known as the water-table aquifer and except for some localized areas is generally not confined. Because of its closeness to the surface, this shallow aquifer is susceptible to contamination

from septic tanks and agricultural or industrial discharges. The remaining aquifers are confined and are under artesian pressure. These lower aquifers are generally not as vulnerable to contamination from surface sources; however, some leakage between formations does occur where head relationships favor such movements (USGS 1988).

4.1.6 Shellfish Beds, Submerged Aquatic Vegetation and Fish Spawning Areas

There are no shellfish beds or submerged aquatic vegetation within the Study Area. The National Marine Fisheries Service (NMFS) Essential Fish Habitat (EFH) Mapper did not identify any essential fish habitat necessary for fish spawning, breeding or feeding within the Study Area (NMFS, 2016). A list of potential freshwater fish that may use the ditches within the Great Dismal Swamp within the vicinity of the Study Area are represented in Table 4-2. The stream channel within Cell VII is upstream of Burnett's Mill Creek and connects to a network of Great Dismal Swamp ditches downstream of the Study Area, south of Portsmouth Boulevard (Routes 460/58/13).

Table 4-2 Possible Fish Species in Drainage Ditches connected to The Great Dismal Swamp National Wildlife Refuge

Common Name	Scientific Name
Longnose gar	*Lepisosteus osseus*
Bowfin	*Amia calva*
Redfin pickerel	*Esox americanus*
Chain pickerel	*Esox niger*
Golden shiner	*Notemigonus crysoleucas*
White catfish	*Ameiurus catus*
Channel catfish	*Ictakurus punctatus*
Yellow bullhead	*Ameiurus natalis*
Brown bullhead	*Ameiurus nebulosus*
American eel	*Anquilla rostrata*
Mosquitofish	*Gambusia holbrooki*
Swampfish	*Chologaster comuta*
Pirate perch	*Aphredoderus sayanus*
Mud sunfish	*Acantharchus pomotis*
Flier	*Centrarchus marcopterus*
Warmouth	*Lepomis gulosus*
Bluespotted sunfish	*Enneacanthus gloriousus*
Banded sunfish	*Enneacanthus obesus*

Common Name	Scientific Name
Redbreast sunfish	*Lepomis auritus*
Pumpkinseed	*Lepomis gibbosus*
Bluegill	*Lepomis microchirus*
Largemouth bass	*Micropterus salmoides*
Black crappie	*Pomoxis nigromaculatus*
Eastern swamp darter	*Etheostoma fusiforme*
Yellow perch	*Perca flavescens*
Eastern mudminnow	*Umbra pygmaea*
Creek chubsucker	*Erimyzon oblongus*

Source: Animals of the Great Dismal Swamp (USFWS, 2013)

4.1.7 Requisite Permits from Agencies

Below is a list of anticipated permits for applicable agencies needed to develop the project.

Table 4-3 Federal, State and Local Permits Needed for Project

Permit Type	Issuing Agency/ Authority	Permitted Activity
Conditional Use Permit	City of Suffolk	Construction and operation of municipal solid waste landfill
Solid Waste Permit	Virginia Department of Environmental Quality (DEQ)	Construction and operation of municipal solid waste landfill Cells VII and use of borrow from Cells VIII and IX
Industrial Wastewater Discharge	Hampton Roads Sanitation District	Discharge of leachate to local publicly owned treatment works
VA Pollutant Discharge Elimination Permit	DEQ-Water Division	Discharge of storm water and process waste water to Burnett's Mill Creek
Section 401 of Clean Water Act	VADEQ	Impact of ~129 acres of forested wetlands for Cells VIII and IX development
Section 404 of the Clean Water Act	US Army Corps of Engineers	Impact of ~129 acres of forested wetlands for Cells VIII and IX development

4.2 Impacts to Hydrogeological Elements

4.2.1 Site Clearing and Subgrade Preparation

In landfill Cell VII, the site will continue to be used for borrow until such time that the landfill cell is required for operations. The soil borrow operations are being completed in conformance with the permitted Cell VII landfill subgrade elevations. Final subgrade preparation and installation of the liner and leachate collection system for Cell VII would be conducted when appropriate. In Cell VIII and IX, areas would be cleared and grubbed of all vegetation including trees, stumps, brush vines, downed timber logs, rotten wood, roots and rubbish and other debris. All depressions caused by clearing would be filled, unless further earthwork or excavation is required, and compacted to the density of the surrounding material. The existing woody vegetation in the Cell VIII and IX area is relatively new growth of red maple, sweet gum and swamp chestnut oak, and SPSA will likely provide the clearing contractor with the option of harvesting the timber or chipping and selling it for biomass. Topsoil materials will be stripped and stockpiled on-site for use in final closure construction of existing cells of the landfill, or stabilization of berms and swales in the Cell VII construction.

Groundwater will be dewatered from beneath the Cell VII landfill base liner system by an underdrain and pumping system. This system would be comprised of a network of perforated plastic pipe laterals which drain to collection header pipes and pump. These drains would prevent groundwater intrusion and facilitate initial site construction. Following construction of the Cell VII liner system and installation of cover materials and initial lifts of waste for ballast, it is anticipated that the groundwater dewatering system would cease operation. SPSA has applied for a Special Exception Permit from VADEQ for the groundwater dewatering, and technical review is planned to be completed closer to the planned Cell VII landfill construction start.

Approximately 97% of the 129-acre Study Area will need to be cleared for the development of the soil borrow area. A proposed 50-foot buffer between the Cell VIII and IX area and wetland preservation area will be maintained to reduce potential impacts of the development on the wetland system. Figure 1: Site Plan shows the wooded areas of the Study Area and the proposed limits of clearing for Cell VIII and IX.

4.2.2 Pre- and Post Development Pollutant Loads in Runoff

The proposed expansion of the SPSA Regional Landfill (Study Area) within the City is required to meet the criteria as set forth in the CBPA. Any land disturbing project within the CBPA is required to provide BMP for surface runoff, if the pollutant loading for proposed conditions is greater than that for existing conditions. Pollutant loading, expressed as total phosphorus load using CBPA procedures, is principally a function of the area of the site, percentage of imperviousness, average annual rainfall, and the flow weighted mean pollutant concentration.

The Study Area is located within a Chesapeake Bay Preservation RMA. The Study Area is classified as a new development. For the determination of pollutant loading for existing conditions, the City has adopted the default value for CBPAs of 16 percent of average watershed imperviousness. For any new developments, if the site imperviousness is less than

the average watershed imperviousness of 16 percent, then no further determination of post development pollutant loading is required and no BMP measures are necessary.

Development of Cell VII will be constructed to Virginia Department of Solid Waste Management regulations, which requires stabilized intermediate cover on the finished slopes and a final cap design consisting of eighteen (18) inches of final cover soil material and six (6) inches of topsoil, which is a pervious material. The only new impervious areas would mainly consist of the perimeter access roads and internal haul roads. Since the proposed Cell VII area is adjacent to the existing landfill facility, the landfill's existing roadways should be utilized for access to the new cell. A perimeter gravel roadway will be installed as part of Cell VII construction for operation and access for maintenance of the erosion control and stormwater best management practices. The perimeter gravel roadway will be approximately 30 feet in width and be 5,100 feet in length for approximately 153,000 square feet of new impervious gravel surface, or less than 5% of the total 73 acre area.

The development of the soil borrow area within future Cells VIII and IX will be completed similarly to the Cell VII soil borrow area and will incorporate drainage channels and sediment basins for treatment of run-off during operation. The potential development of a compost system would require installation of some impervious areas for collection of contact water for treatments and some gravel roadways for access to the facility areas, but any impervious surface would be much less than 5% of the total 129 acre area. The development of the soil borrow would be subject to an erosion and sediment control permit from the City of Suffolk. The vegetative waste composting system would be subject to VADEQ solid waste permitting as well as City of Suffolk site plan approval, which would include review of proposed erosion and sediment and stormwater management systems. There is ample area within the 129 acres to incorporate the sediment basins required for treatment of the runoff from the disturbed area.

The proposed expansion of landfill Site Cell VII and the soil borrow or compost system in the Cell VIII and IX area would not result in an increase of impervious area greater than the default value of 16 percent. Therefore no further analysis should be needed to determine pre- and post-development pollutant loading.

4.2.3 Wetland Impacts and Justification

[2]*The Southeastern Public Service Authority of Virginia (SPSA) was established in 1973 under the Virginia Water and Sewer Authorities Act to develop a regional water supply system. In 1976, its responsibilities were amended to include the development of a regional solid waste disposal and resource recovery system. SPSA was the first regional waste management operation in Virginia organized under this Act.*

The 2,000-square mile Service Area, shown on Figure 5: Service Area *includes the cities of Chesapeake, Franklin, Norfolk, Portsmouth, Suffolk, and Virginia Beach and the counties of Isle of Wight and Southampton. SPSA is governed by a board of directors which consists of a representative and an alternate appointed by each of the member communities. SPSA handles virtually all of the municipal solid waste generated in each participating community, with the*

[2] EIS, Chapter 1.1 Introduction

exception of some non-processible bulky items and white goods (major household appliances) and currently serves a population of just over 1.1 million people.

Currently, SPSA operates an integrated solid waste management system, which includes the Regional Landfill in Suffolk, nine transfer stations located throughout the service area, and contract for disposal of processible waste at Wheelabrator Technologies, Inc. (Wheelabrator) waste-to-energy facility located in Portsmouth, Virginia. The contract with Wheelabrator expires in January 2018, and SPSA has entered into an agreement RePower South, LLC (RePower) with respect to a new facility proposed to be constructed in Chesapeake, Virginia. The RePower facility will process the disposed waste stream to remove additional recyclables and to produce fuel pellets for use at coal and biomass power generating facilities. The residue from the RePower and non-processible wastes are anticipated to be disposed of at the SPSA Regional Landfill.

Other components of SPSA's solid waste system include recycling programs, three permanent household hazardous waste collection facilities, and several landfill ancillary facilities described below. In 2015, SPSA handled over 1 million tons of waste, of which approximately 39% were delivered by the member communities. In 2015 approximately 295,000 tons of waste were managed at SPSA for disposal at the Regional Landfill. In order for SPSA to continue to provide long term disposal capacity for its member communities, SPSA began working with the Norfolk District Corps of Engineers in 1988 to find a suitable landfill site within its Service Area. The expansion onto this 525 acre site, Map Lot 27*28A, was one of four scenarios reviewed in an EIS prepared by the US Army Corps of Engineers, and ultimately selected as the alternative having the least environmentally damaging practicable alternative and SPSA proceeded with acquisition of the property and permitting of the Cell VII landfill expansion.

The borrow area for Cell VII resulted in the permanent impact of approximately 12 acres of non-tidal, palustrine, forested wetlands associated with an unnamed tributary of Bennett's Mill Creek. Mitigation for the wetland impacts was submitted and approved under a 404 Permit modification, dated October 30, 2002. Cell VII has been designed and was permitted for construction approval by VADEQ on June 8, 2011 as an amendment to the existing Solid Waste Permit #417.

Forested wetland impacts to the Study Area, for this next expansion will encompass the majority of the 129-acre area of Cell VIII and IX. Small areas of uplands were located on Cell VIII and IX but approximately 95% of the site was determined to be hardwood forested wetlands.

4.2.4 Supply of Water to Wetlands, Streams, Lakes, Rivers or Other Water Bodies Impacts

4.1 Floodplain Management[3]*: The proposed expansion site is not located within an established 100-year floodplain, and lies well above the 100-year flood elevation of the Nansemond River tributary to which it drains. While additional surface flow to this tributary could result from development of the site, its flood storage capacity would not be altered since development would occur upstream of and outside the floodplain. Flow increases would be minimized through*

[3] EIS, Chapter 4 Environmental Consequences

proper implementation of stormwater management controls. According to 1990 the flood insurance rate maps for the City of Suffolk, the site does lie within an "approximate flood hazard area" which appears to closely match the delineation of the Dismal Swamp on the U.S.G.S. Chuckatuck typographic quadrangle

During permitting of the Cell VII landfill, SPSA performed a floodplain study and determined that the 100-year floodplain elevation for the Cell VII area is approximately 18.6 feet MSL, which is less than the existing topography of the area. A Letter of Map Revision (LOMR) application was approved by the Federal Emergency Management Agency (FEMA) to revise the 100-year floodplain to be outside the proposed facility boundary.

Land upstream and contiguous to the proposed landfill expansion site is comprised principally of undeveloped wetlands. Hence, potential damage to upstream structures, roads, etc., would not be a concern. Existing and proposed surface water drainage leads to an existing 8-foot by 6-foot double box culvert (designed by the Virginia Department of Transportation) which crosses beneath the U.S. Routes 460/58 bypass. This drainage structure appears to have the capacity to accommodate an increase in flow, but would be evaluated more thoroughly in the design phase should this alternative be approved. Stormwater controls would be installed as required to comply applicable regulations regarding increased surface water flow from the site. The only structures downstream of the proposed expansion and upstream of this culvert are the support facilities (office/maintenance complex, metals recovery facility, etc.) at the existing landfill. Drainage is presently, and would continue to be, diverted around these structures to avoid possible flooding.

Because of the presence of wetland acreage at the site, the potential loss of flood storage capacity due to wetland conversion was investigated. Part of the functional value of a wetland is in its capacity for storing floodwaters. An assessment methodology developed in Evaluation Wetlands for Flood Storage (Simon et al., 1987) yields a quantitative tool for determining the loss in flood storage capacity through a volumetric comparison of watershed runoff to storage available within a wetland. One major assumption of the method is that "wetlands with a maximum storage-to-runoff ratio of less than 25 percent do not perform a significant flood storage function" (Simon et. al, 1987).

A wetland storage volume of 77.5 acre-feet was determined based on the assumption of an average standing water depth of two inches over the surface of the area of wetlands estimated to be present at the proposed expansion site. Total runoff volume was computed for the Beamon Pond watershed using a land-use based curve number approach (SCS, 1986). The following table presents the basic land use types and estimated percentages of each for the watershed.

Table 4-4 Land Use in Beamon Pond Watershed

Land Use	Acreage	Percentage of Drainage Subbasin (Beamon Pond Watershed)
Landfill (existing)	250	9.8
Farmland	45	1.8
Junkyard	65	2.6
Wetlands	2,190	86

Source: Final EIS, (USACE 1995; page 4-2)

A composite curve number based on soil type and moisture conditions was established for the watershed. Total rainfall resulting from a two-year, 24-hour storm was determined using average rainfall intensity curved developed for the area.

The total expected runoff from the watershed was subsequently estimated to be 735 acre-feet based on the composite curve number and the chosen storm frequency and duration.

A ratio of the estimated on-site wetland storage volume (77.5 acre-feet) to total watershed runoff volume (735 acre-feet) yields a value of 10.5 percent. According to the assumptions of the methodology followed herein, the wetland loss associated with the proposed landfill expansion would not represent a substantial loss in the watershed's flood storage capacity. The estimated 10 percent loss of flood storage capacity would not be considered limiting in terms of control of peak flows. Stormwater management would be required at the expansion site to ensure control of peak flow conditions.

4.2.5 Hydrology, Wetland and Stream Circulation Pattern Impacts

4.8 Stream Flows[3]

Potential changes to stream flow patterns can be assessed by estimating peak runoff alterations due to development. Anticipated changes in runoff value are typically based on changes in land surface characteristics, and the possibility of alterations in timing and duration of peak flows.

For landfills in southeastern Virginia, the concern with stream flow alterations and associated water quality impacts has been effectively addressed through the Chesapeake Bay Preservation Act, the requirements for permitting of stormwater discharges as required under the Clean Water Act, the Virginia Stormwater Management Regulations, and Virginia Solid Waste Management Regulations.

The landfill construction must also comply with state and local regulations for erosion and sedimentation control in accordance with the plans approved prior to construction. Together, these regulations require the site to be developed so that the runoff rate of flow during and after development will be as close as possible to the pre-development runoff rate, and require water quality impacts to be mitigated through the use of BMPs (best management practices).

The Erosion and Sediment Control Plan for the Cell VII soil borrow area included use of vegetated drainage swales and two temporary sediment basins sized for the flow from the proposed 54 acres of disturbance. The proposed stormwater management system includes routing run-off from the intermediate cover and final cover the Cell VII landfill and adjacent closed areas of Cell V, toward the sediment basins for treatment and peak flow reduction. Calculations from the proposed stormwater management system are included in Appendix A for reference.

The Erosion and Sediment Control Plan to be developed for the proposed 129 acre soil borrow area in Cell VIII and IX areas will utilize similar practices to manage the peak flows from the disturbed areas for sediment removal and peak run-off control. The temporary sediment basins will be sized in accordance with the requirements of Section 3.14 of the Virginia Erosion and Sediment Control Handbook.

4.8.1[3] Alteration of Water Volume and Drainage Patterns

The proposed Cell VII landfill expansion and soil borrow area site lies within the Burnetts Mill watershed in which Beamon Pond is located (Figure 2: Study Area). The expansion site was evaluated to determine the potential difference in the timing and quantity of surface runoff between existing conditions and the conditions expected after development. The evaluation was based on change in land surface characteristics to assess peak runoff rates, and estimate of change in timing of peak runoff flow conditions (time of concentration, tc) based on anticipated landfill and soil borrow area design.

The development site acreage of 202 acres was used as the drainage area in calculating peak flows for existing conditions and for post-development conditions. The Site Plan shows site drainage characteristics before and after development of the expansion area.

The surface and runoff results and all pertinent variables of peak flows are summarized in Table 4-5. The net change in peak runoff from undeveloped to post-developed conditions for the storm frequencies of two and ten years is 214 cubic feet per second (cfs) and 250 cfs, respectively. These changes do not consider BMPs to control discharge.

Table 4-5 Rational Method Determination of Peak Surface Runoff Rates without Consideration of BMPs

			Storm Intensity (I) (in/hr)			Q (cfs)	
Stage in Development	**C**	**Tc (min)**	**2 yr**	**10 yr**	**A (acres)**	**2 yr**	**10 yr**
Existing Conditions/ Undeveloped	0.20	50	1.8	2.3	202	73	93
Post-Development Cell VII	00.5	8	4.9	5.7	73	179	208
Post Development Borrow Area Cell VIII & IX	0.35	33	2.4	3.0	129	108	135

The impact of increased runoff due to development of the landfill site on the outlet currently draining the Beamon Pond watershed (approximately 2,550 acres) was also considered. A double 8 ft x 6 ft box culvert exists beneath the Portsmouth Boulevard (Routes 460/58/13) and does not appear vulnerable to flooding. Preliminary estimates show the flow increases due to development of the site resulting from the two and ten-year storms. Without on-site retention, the two and ten-year storms would comprise 14 and 16 percent of the culvert's ultimate capacity, respectively. In light of the substantial available headwater depth at the culvert (approximately 18 feet) and considering the use of BMP stormwater controls at the site to reduce the peak flows, no adverse impact is anticipated. All drainage details (such as ensuring adequate on-site storage to meet regulatory standards and minimal downstream impact) would be detailed during the design phase of the project.

4.8.2[3] Alteration of Timing and Duration of Discharge Peaks

The maximum possible discharge from a drainage basin is attained only if the duration of a storm is greater than or equal to the time of concentration of the basin. It follows that storms which have duration less that the basin time of concentration would procure peak discharges less than the maximum theoretical discharge. Assuming all other pertinent parameters remain the same (i.e., same constant rainfall intensity, time of concentration and storm recurrence interval), storms having shorter duration would yield lower peak discharges than those discussed earlier, and these peaks would occur sooner.

Implementation of BMP stormwater controls at any of the landfill sites would serve to reduce the peak quantity of surface flow leaving the site, as required by regulation, and thus render alteration of timing of peak flows inconsequential.

4.2.6 Source Location and Description of Proposed Fill Material

A landfill is constructed in three basic phases. These phases consist of a base liner, waste, and a final cap. Each of these phases involves placement of several different layers of material.

The base liner system consists of structural fill, a geocomposite (a geonet between two geotextiles), a foot of soil liner material, a 40 mil geomembrane liner, a geosynthetic clay liner (made of bentonite between two geotextiles), a 60 mil geomembrane liner, a leachate collection layer (geocomposite and a series of interconnecting HDPE piping), and a foot of protective cover material (with a hydraulic conductivity of $2x10^{-5}$ cm/sec or less).

Waste placement consists of placement of municipal solid waste, daily cover material, and intermediate cover material. Daily cover material is placed over the working area at the end of each day whereas the intermediate cover is a foot of material placed on any areas that will be left undisturbed for a period of 12 months or greater.

Placement of the final cap consists of an eighteen (18) inch thick layer of clay with a hydraulic conductivity of $1x10^{-5}$ cm/sec or less, a 40 mil geomembrane, a geocomposite, an eighteen (18) inch thick final cover layer, and six inches of topsoil.

It is likely that the clay soil materials required for construction of the landfill liner systems and final cover systems will need to be obtained from off-site locations. The soils excavated from the soil borrow areas in the Cell VII area and future Cells VIII and IX areas may be used as the protective cover materials on the liner and above the geocomposite on the final cover system. Excavated on-site soils will also be utilized for daily and intermediate cover soils in support of landfill operations.

4.2.7 Pre- and Post Development Pollutant Loads in Runoff

The proposed expansion of the SPSA Landfill within the City is required to meet the criteria as set forth in the CBPA. Any land disturbing project within the CBPA is required to provide BMP for surface runoff, if the pollutant loading for proposed conditions is greater than that for existing conditions. Pollutant loading, expressed as total phosphorus load using CBPA procedures, is principally a function of the area of the site, percentage of imperviousness, average annual rainfall, and the flow weighted mean pollutant concentration.

The Study Area is located within a Chesapeake Bay Preservation RMA. A portion of the Study Area, Cell VIII and IX, is classified as a new development. For the determination of pollutant loading for existing conditions, the City has adopted the default value for CBPAs of 16 percent of average watershed imperviousness. For any new developments, if the site imperviousness is less than the average watershed imperviousness of 16 percent, then no further determination of post development pollutant loading is required and no BMP measures are need to be placed.

The proposed Cell VII area encompasses approximately 73 acres, and the proposed soil borrow area in future Cells VIII and IX encompasses approximately 129 acres. The proposed Cell VII will be constructed to Virginia Department of Solid Waste Management regulations. This means the landfill will have a final cap design consisting of eighteen (18) inches of final cover soil material and six (6) inches of topsoil, which is a pervious material. The only new impervious areas would mainly consist of haul and perimeter access roads. The perimeter gravel roadway will be approximately 30 feet in width and be 5,100 feet in length for approximately 153,000 square feet of new impervious gravel surface, or less than 5% of the total 73 acre area.

The development of the soil borrow area within future Cells VIII and IX will be completed similarly to the Cell VII soil borrow area and will incorporate drainage channels and sediment basins for treatment of run-off during operation. The potential development of a compost system would require installation of some impervious areas for collection of contact water for treatments and some gravel roadways for access to the facility areas, but any impervious surface would be much less than 5% of the total 129 acre area.

The proposed expansion of landfill Site Cell VII and the soil borrow or compost system in the Cell VIII and IX area would not result in an increase of impervious area greater than the default value of 16 percent. Therefore no further analysis should be needed to determine pre- and post-development pollutant loading.

4.3 Mitigation to Hydrological Elements

4.3.1 Erosion and Sediment Control Mitigation Measures

The proposed erosion and sediment control measures for the Cell VII landfill will consist of vegetated exterior intermediate and final cover slopes with built-in benches every 40 vertical feet to collect stormwater and direct it to either slope drains or reinforced channels which will drain to the perimeter channel shown on the Site Plan. The perimeter channels will direct the runoff to the proposed sediment basin for treatment and peak flow control, prior to discharge into the existing drainage system.

The soil borrow area in future Cells VIII and IX will be developed in accordance with an erosion and sediment control plan to be developed and approved by the City of Suffolk. It is anticipated that the plan will be similar to that employed for the Cell VII soil borrow area and will include vegetated drainage channels and temporary sediment basins for settlement and management of silty soils.

All disturbed areas will be seeded to minimize runoff. Some channels may have rip-rap placed within them to minimize erosion and runoff velocities. All erosion and sedimentation control devices will be maintained during and after construction to ensure that the devices will operate properly.

4.3.2 Wetland Mitigation

SPSA has mitigated for the 12 acres of permanent wetland impacts at Cell VII by providing on-site wetland compensation in the form of 12 acres of restored forested wetlands, 36 acres of enhanced forested wetlands and 50 acres of preserved forested wetlands (Figure 1: Site Plan). These areas are located to the northeast of Cell VII and to the east of the proposed borrow Cells VIII and IX.

Restoration of wetland hydrology in the enhancement and restoration areas was initiated in summer 2007 with construction of two earthen berms. Restoration success has been evaluated based on the permit conditions and outlined in the compensatory mitigation plan dated November 13, 2007. Site monitoring began in 2008 and two future years of monitoring (2016, 2017) are required by the permits. A statement of compliance with compensatory wetland mitigation requirements under Corps and DEQ permit #88-0707 is enclosed in Appendix C.

The majority (> 95%) of the 129 acres in Cell VIII and IX is wetlands and will require compensatory mitigation. A jurisdictional determination package will be prepared by Davis Environmental Consultants Inc. in the summer of 2016 and an exact area of wetlands will be determined for Cell VIII and IX.

Per conversations with the Corps representative, a 2:1 mitigation ratio will be applied for wetlands impacts. Mitigation credits must be acquired from mitigation banks in the HUC 02080208 (Hampton Roads), where available. A database search of the Regulatory In-lieu Fee and Banking Information Tracking System (RIBITS) for this sub-basin has determined credits are available (as of June 27, 2016) from private mitigation banks. Davis Mitigation, implemented by The Great Dismal Swamp Restoration Bank, has 180 wetland acre-credits available, and

Dover Farm has 500 wetland acre-credits available. SPSA has yet to determine which bank will provide the needed wetland credits to cover the permanent wetland impacts.

4.4 Existing Landscape Elements

Natural vegetation within the Study Area is described in Section 3.4.

4.5 Impact to Landscape Elements

Plant communities within the Study Area will be removed in their entirety during the multiple phasing of the landfill. Vegetation between existing Cell V and proposed Cell VII will be removed to join the landfill cells. As Cells VIII and IX are used for borrow for Cell VII landfill activities, areas will be incrementally removed as borrow is needed.

4.6 Mitigation to Landscape Elements

Section 4.3.2 of this document addresses wetland mitigation measures.

In the conditions section of the Conditional Use Permit, C19-05 issued on September 21, 2007, an evergreen vegetative buffer approximately 2,000 feet in length, at least 50 feet in width, and located within the 200-foot property line buffer would be installed immediately north of Portsmouth Boulevard (Routes 460/58/13) and adjacent to Landfill Cell VII. The condition states that the selected evergreen vegetation should reach a height of 20 feet within five years of installation.

The evergreen buffer was not installed for several reasons, including construction of the Chesapeake water line. The current buffer vegetation was assessed for quality and compliance of the CUP condition in June 2016. The vegetative buffer east of the stream crossing is approximately 75% effective as a visual buffer (Figure 1: Site Plan). Loblolly pine is the dominant species and the remaining 25% of the area is relatively thin with smaller trees. The remainder of the buffer, the area west of the stream crossing, located between the linear sediment basin and waterline easement currently lacks an effective visual buffer. Appendix B includes photographs of the current footprint of the proposed buffer areas and adjacent waterline easement.

It is recommended a 25-foot wide buffer be enhanced along the entire 2,000-foot length of Bob Foeller Drive (Figure 1: Site Plan). The enhanced buffer will be located adjacent and north of the Chesapeake waterline easement for the majority of the 2,000 feet. A cost effective method would be to re-establish and enhance the current 25-foot buffer area with loblolly pine seedlings, while concentrating the majority of tree plantings between the sediment basin and waterline on the west side of the buffer area. Planting of the seedlings during the winter-spring season and using a local tree source such as the Virginia Department of Forestry will ensure optimal seedling survival. Approximately 1,000-2,000 seedlings will be needed to plant the entire area west of the stream crossing between the waterline and sediment basin and enhance the 25% of the buffer east of the stream crossing that has gaps in tree growth. Delineating the buffer area with posted signs and potentially fencing the area will ensure it remains untouched.

4.7 Existing Environmental Elements

The online Information, Planning and Consultation (IPaC) system from the U.S. Fish and Wildlife Service (USFWS) provides a preliminary assessment of potentially occurring state and federally listed species within the vicinity of the Study Area. The 525-acre (Tax Map 27*28A) SPSA parcel was used as input to generate results for the smaller 129-acre Study Area.

A species conclusion table for federally listed species has been generated and is included in Appendix E. The Northern long-eared Bat (*Myotis septentrionalis*) is listed as threatened and was the one federally listed species documented as having suitable habitat within the project vicinity. There are no critical habitats for federally listed species and no refuges or fish hatcheries within the project vicinity. Rare plant species were not noted in the IPaC review.

As part of the IPaC, the Virginia Fish and Wildlife Information Service (VaFWIS) lists federal, and state species that are located within 2 miles of the Study Area. The following five species are known or likely to occur in the vicinity of the Study Area: Canebrake rattlesnake (*Crotalus horridus*), tri-colored bat (*Perimyotis subflavus*), Mabee's salamander (*Ambystoma mabeei*), bald eagle (*Haliaeetus leucocephalus*), and spotted turtle (*Clemmys guttata*). The canebrake rattlesnake and the tri-colored bat are both state endangered and the Mabee's salamander is state threatened. The spotted turtle is a collection concern species. A further listing of 60 species by the Virginia Department of Conservation and Recreation (DCR) represents those federal and state listed species found within Suffolk County (Appendix E).

Species descriptions for state and federally listed species with habitat or known or likely to occur in the vicinity of the Study Area are detailed below.

The Northern long-eared bat (NLEB) occurs widely across much of Canada and the southeastern United States, but is unevenly distributed and rarely found in large numbers. It is more common in the northern part of its range than in the southern portion. Winter hibernacula for the NLEB include caves and mines. Hibernacula/winter roosts in central and eastern Virginia may include other landscape features. Suitable summer habitat for the NLEB is generally characterized as forested areas with trees over three inches in DBH. Summer roost sites include tree cavities or crevices, the loose bark of live or dead trees, and abandoned buildings.

The NLEB was officially listed by the USFWS as a threatened species in April of 2015. The listing became effective May 2, 2015. On January 14, 2016 the USFWS also established a final rule under the authority of section 4(d) of the Endangered Species Act that provides measures for the conservation of NLEB. This bat species is federally threatened due to white-nose syndrome, a fungal disease that affects hibernating bats and has lead to widespread mortality of these animals in eastern and mid-western North America. Forested habitat exists within the forested portions of the Study Area in Cells VIII and IX.

The canebrake rattlesnake inhabits hardwood and mixed hardwood-pine forests, cane fields, and the ridges and glades of swampy areas in localized areas of southeastern Virginia. This snake is at the northern limit of its distribution in southeastern Virginia. It overwinters in the base of hollow trees or in stumps. This venomous snake is state endangered because of the loss of habitat primarily through conversion to developed lands but potentially in part because of the

ditching and draining activities in its' habitat. The canebrake rattlesnake had three species occurrences observed during 2000, 2001 and 2009 within 1 mile of the Study Area (Appendix E). One occurrence intersects the Study Area and the other two occurrences are located within 1 mile to the north and east of the Study Area.

The tri-colored bat was historically one of the most common species of bats found throughout the eastern forests of the America. They seem to prefer edge habitats near areas of mixed agricultural use and have been know to feed on large hatches of grain moths emerging from corn cribs. They hibernate in caves or mines and are among the first bats to enter hibernation each fall and the late to emerge in spring. The tri-colored bat was observed in 1996 within 1 mile of the Study Area. This occurrence is located to the southeast in the current wetland enhancement area (Appendix E).

Mabee's salamander is common in the Carolinas but rare in Virginia where it breeds in temporary ponds in bottomland mixed pine-hardwood forests. It is known from five localities in southeastern Virginia, including Suffolk. It is a relatively small species with a small head and long slender toes. The coloration is dark brown-gray to black with silvery whie flecks that are abundant on the side but sparse on the back. The breeding season is in the late fall to early spring. The breeding sites are fish-free vernal ponds or ephemeral coastal plain sinkholes up to 1.5 meters deep with surrounding forests generally composed of hardwoods mixed with pine. Mabee's salamander was observed in 1900 within 2 miles of the Study Area. It was located to the southwest of the Study Area, south of Portsmouth Boulevard (Routes 460/58/13).

The bald eagle has a range from Alaska to the northern border of Mexico and from the Pacific to the Atlantic Coast. The bald eagle is the only eagle found exclusively on the North American continent. The Chesapeake Bay hosts a large influx of summer migrants from Florida and other Gulf Coast states from May to September. Generally, northern (breeding north of 40° N), non-coastal populations including those in Alaska, generally migrate south for the winter between August and January. Habitat for the bald eagle primarily consists of mature forests in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1 mile of open water. Occurrences of the bald eagle have been noted within the 2 mile vicinity of the Study Area and no known nests have been recorded by the Virginia Center for Conservation Biology eagle nest locator (Appendix E). The bald eagle was formally "delisted" or removed from the federal Endangered Species Act; however, it is protected under the Bald and Golden Eagle Protection Act.

4.8 Impacts to Environmental Elements

In general, the proposed project will expand into forested swampland of the Dismal Swamp and remove viable forested habitat for many wildlife species. The federal and state listed species that are afforded protection include NLEB, canebrake rattlesnake, Mabee's salamander and tri-colored bat. Species habitat assessment will be performed this summer to determine presence or absence of habitat each listed protected species.

Impacts to the federal and state listed species have not yet been determined; furthermore, biological field surveys may be required by the USFWS and or state agencies (DCR, VDGIF) to

better assess species impacts. Coordination between USFWS, DCR and Virginia Department of Game and Inland Fisheries (VDGIF) will be sought during the 404/401 permitting process in the summer of 2016.

4.9 Mitigation to Environmental Elements

Mitigation for impacts to protected species will be decided during consultation with USFWS, DCR and VDGIF during the 401/404 process.

5 References

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U.S. Geological Survey (USGS). 2006. National Hydrography Dataset for Virginia (NHD). 2006. http://datagateway.nrcs.usda.gov

Figures

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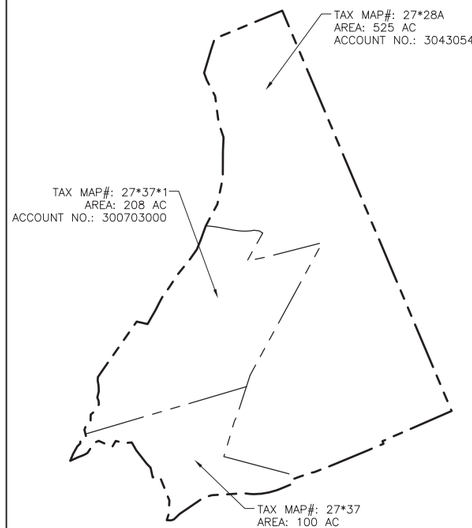
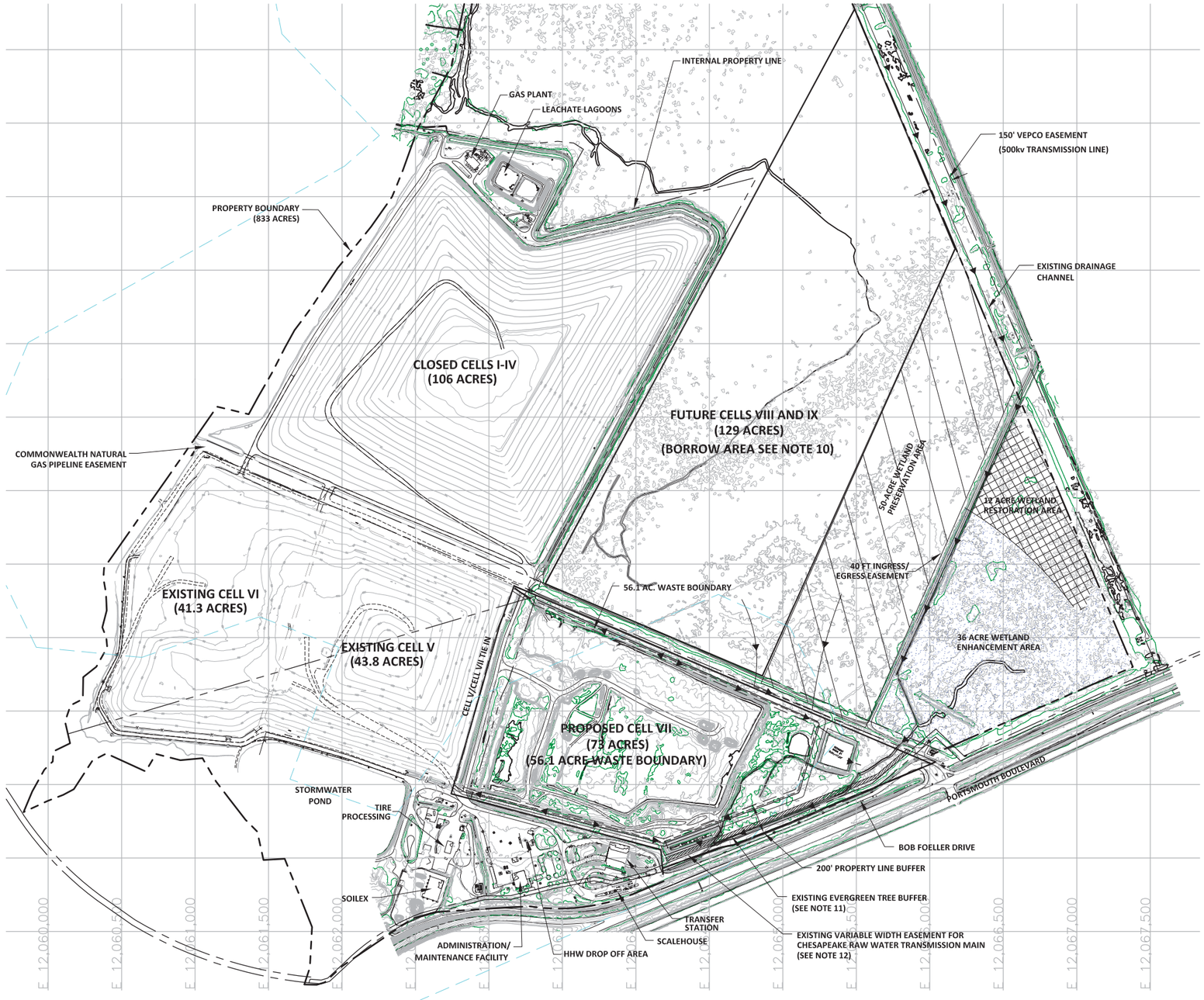


TAX MAP KEY



- PROPOSED DRAINAGE CHANNEL
- EXISTING DRAINAGE CHANNEL
- CHESAPEAKE BAY PRESERVATION AREA
- STREAMS
- PROPERTY LINE
- INTERNAL PROPERTY LINE
- FACILITY BOUNDARY (APPROXIMATE)
- EASEMENT
- WETLAND PRESERVATION AREA
- WETLAND RESTORATION AREA
- WETLAND ENHANCMENT AREA

N

NOTES:

1. EXISTING TOPOGRAPHY WITHIN TAX MAP# 27*28A SUPPLIED BY HOGGARD–EURE ASSOCIATES BASED ON AERIAL PHOTOGRAPHY DATED MARCH 22, 2016. BASE PLAN AND TOPOGRAPHY OF AREAS OUTSIDE TAX MAP# 27*28A COMPILED FROM AERIAL AND FIELD SURVEYS FROM 2005 – 2015.
2. ELEVATIONS REFER TO NGS MEAN SEA LEVEL HORIZONTAL CONTROL BASED UPON VIRGINIA STATE PLANE COORDINATE SYSTEM SOUTH ZONE NAD 1983.
3. PROPERTY LINE BOUNDARY FROM VANASSE HANGEN BRUSTLIN DATED FEBRUARY 29, 2000.
4. WETLAND PRESERVATION, RESTORATION AND ENHANCEMENT AREAS FROM THE US ARMY CORP OF ENGINEERS, SECTION 404 WETLAND PERMIT (88–0707–12) ISSUED NOVEMBER 30, 2002 AND VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY, SECTION 401 WETLAND PERMIT (88–0707) ISSUED JUNE 3, 2002, FOR THE PROPOSED 12 ACRES OF WETLAND DISTURBANCE REQUIRED FOR THE CELL VII EXPANSION OF THE REGIONAL LANDFILL. PERMIT APPLICATIONS WERE PREPARED BY TELLUS ENVIRONMENTAL ASSOCIATES, INC. AND DAVIS ENVIRONMENTAL CONSULTANTS, INC..
5. CONSTRUCTION OF PROPOSED CELL VII AND ANCILLARY FACILITIES IS LIMITED TO THE 56.1 ACRE AREA DEPICTED IN THIS DRAWING.
6. PROPOSED CELL VII AREA WILL BE UTILIZED AS A SOIL STOCKPILE AREA OR BORROW SOURCE PRIOR TO CONSTRUCTION AND OPERATION OF CELL VII.
7. PROPOSED CELL VII IS ANTICIPATED TO TIE INTO CELL V TO FORM ONE CONTIGUOUS LANDFILL CELL.
8. APPROVAL FOR THE CONSTRUCTION AND OPERATION OF THE CELL VII EXPANSION WAS GRANTED BY THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY WITH THE ISSUANCE OF THE PERMIT AMENDMENT TO PERMIT #417, ON JUNE 8, 2011. CONSTRUCTION START DATE FOR CELL VII IS NOT YET DETERMINED AND WILL DEPEND ON THE REMAINING LIFE OF EXISTING CELL VI, WHICH IS ANTICIPATED TO REMAIN OPERATIONAL THROUGH AT LEAST 2024 AND MAY BE AS LONG AS THROUGH 2040.
9. SOIL DISTURBANCE WITHIN CELL VII AREA BORROW OPERATIONS IS BEING COMPLETED IN ACCORDANCE WITH EROSION AND SEDIMENT CONTROL PERMIT ISSUED BY THE CITY OF SUFFOLK (ESC–2009–00002), MARCH 26, 2009.
10. DISTURBANCE OF SOILS AND WETLANDS WITHIN FUTURE CELLS VIII AND IX 129 ACRE AREA WILL REQUIRE 404 AND 401 WETLAND PERMITS THROUGH US ARMY CORP OF ENGINEERS AND VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY, AND EROSION AND SEDIMENT CONTROL PERMIT THROUGH THE CITY OF SUFFOLK. THE FUTURE CELL VIII AND IX AREA IS PLANNED FOR USE AS A SAND OR GRAVEL EXTRACTION (SOIL BORROW) AREA TO SUPPORT LANDFILL CONSTRUCTION AND OPERATION, AND MAY BE UTILIZED AS A VEGETATIVE WASTE COMPOST SYSTEM AREA, SUBJECT TO STATE AND LOCAL PERMITTING. THE 129 ACRE DEVELOPMENT AREA INCLUDES ANCILLARY FACILITIES INCLUDING PERIMETER BERMS, ACCESS ROADS, AND STORMWATER AND LEACHATE MANAGEMENT AREAS.
11. EXISTING VARIABLE WIDTH EVERGREEN TREE BUFFER (TYP 25' WIDTH) TO BE SUPPLEMENTED WITH LOBLOLLY PINE SEEDLINGS TO RE–ESTABLISH AND ENHANCE VISUAL BUFFER WEST OF STREAM CROSSING NEAR SEDIMENT BASIN #2.
12. EXISTING VARIABLE WIDTH EASEMENT FOR CITY OF CHESAPEAKE RAW WATER TRANSMISSION MAIN (TYP 40' WIDTH). LOCATIONS OBTAINED FROM CITY OF CHESAPEAKE RAW WATER FACILITIES, RED TOP TO LAKE GASTON WATER TREATMENT PLANT RAW WATER TRANSMISSION MAIN DRAWINGS, ISSUED FOR CONSTRUCTION SEPTEMBER 2012, PREPARED BY HDR ENGINEERING, INC.

HDR Engineering, Inc.
555 Fayetteville Street, Suite 900
Raleigh, NC 27601
919.232.6600

ISSUE	DATE	DESCRIPTION
-	-	-

PROJECT MANAGER	J. MURRAY, P.E.
PROJECT ENGINEER	T. PREDDY, E.I.
DRAWN BY	T. PREDDY, E.I.
PROJECT NUMBER	107091–279011–018

Southeastern Public Service Authority

Water Quality Impact Assessment

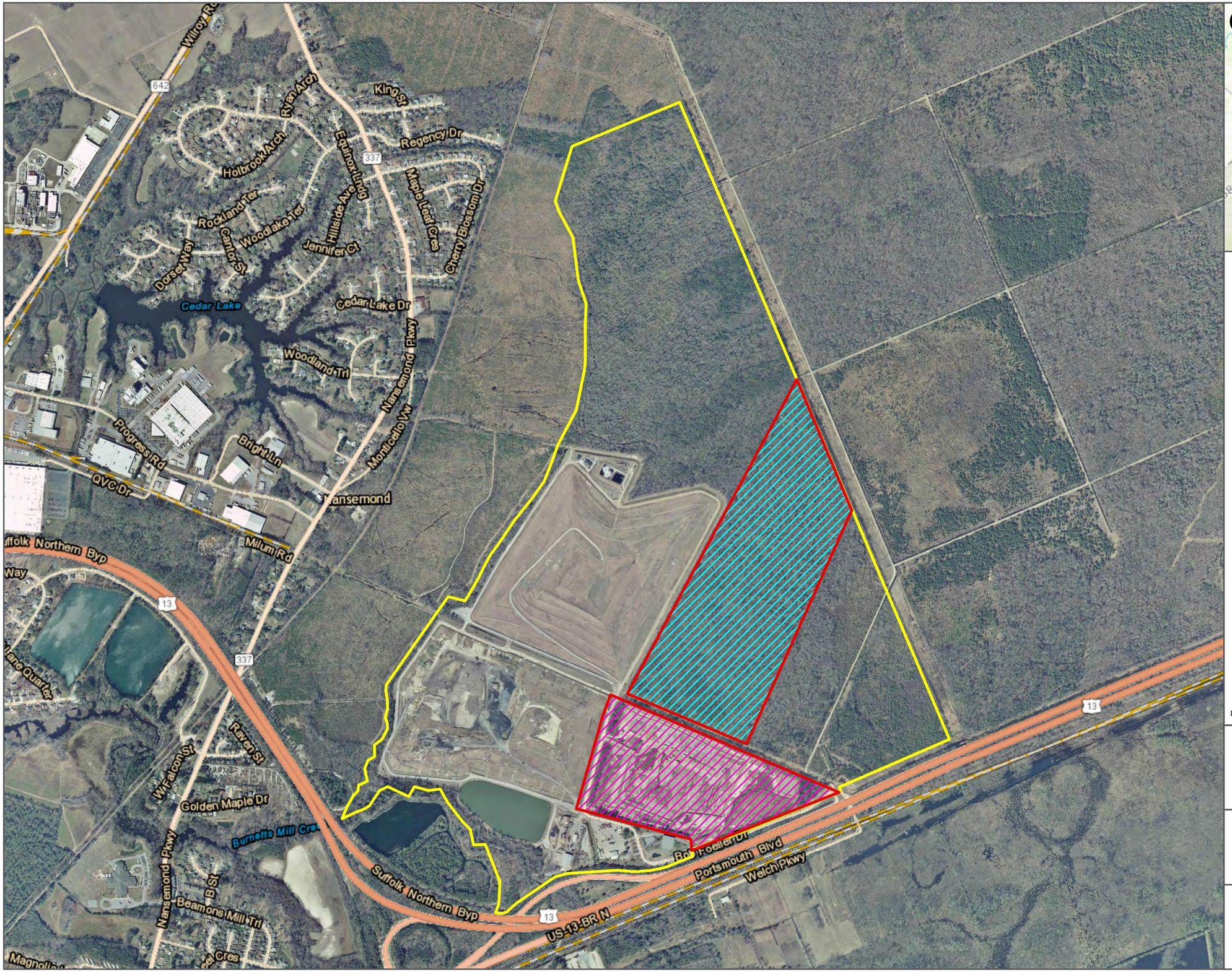
SUFFOLK VIRGINIA

SITE PLAN

0 1" 2"

FILENAME Figure 1.DWG
SCALE 1"=400'

SHEET
Figure 1



LEGEND

- Study Area (Cells VII, VIII, IX)
- SPSA Property Boundary
- Cell VII (Landfill)
- Cell VIII and IX (Borrow Area)

DATA SOURCES: USGS Orthoimagery

STUDY AREA

SPSA MAJOR WATER QUALITY IMPACT ASSESSMENT

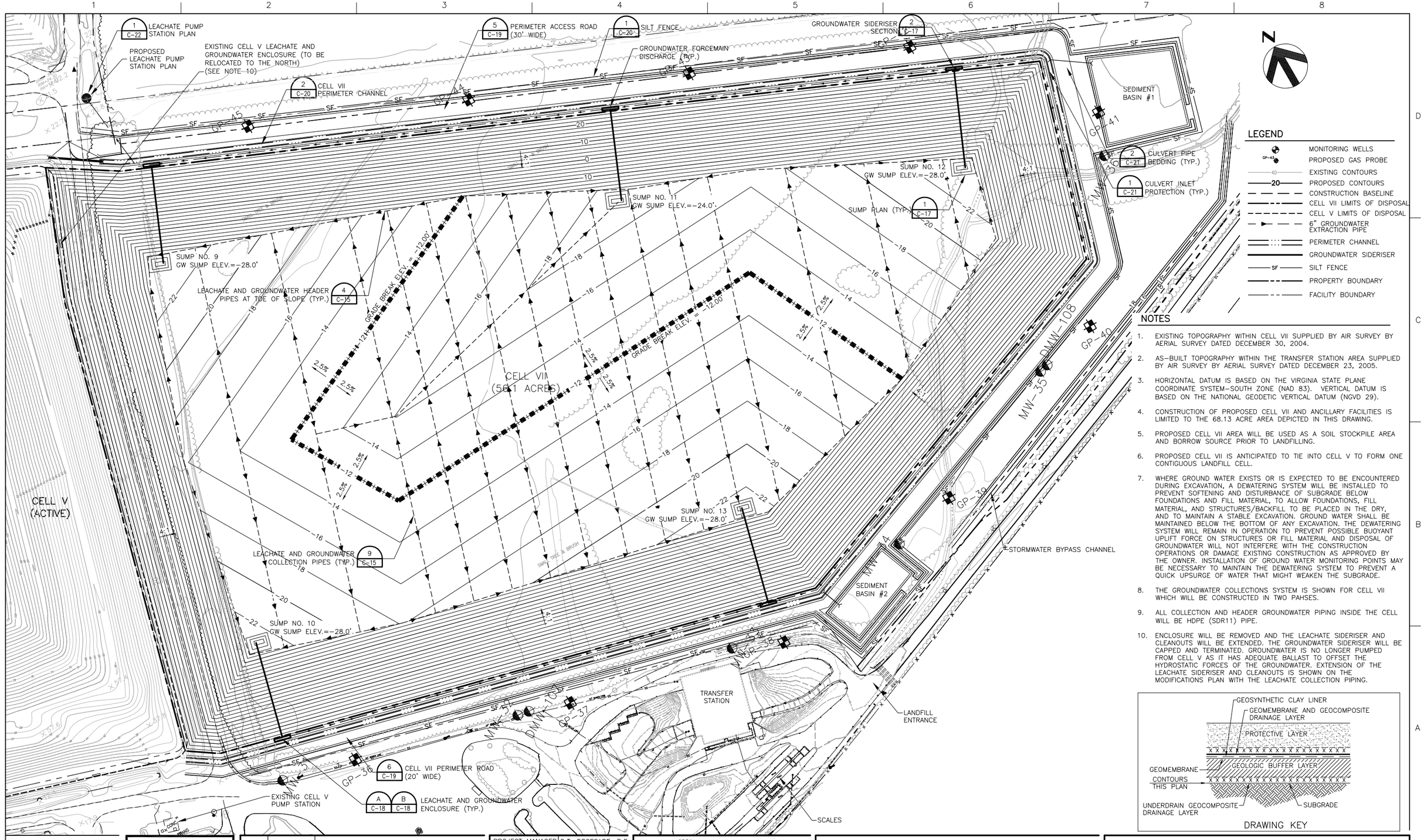
0 500 1,000
FEET

SPSA
Southeastern Public Service Authority
Protecting the environment in South Hampton Roads

HDR

FIGURE 2

PATH: \\CLTSMAIN\GIS_DATA\GIS\PROJECTS\001743_SOUTHEASTERNPUBLICSERVICEAUTHORITY\0279011_SPSA-CONDUSEPERMITAPP(C)\7.2_WORK_IN_PROGRESS\MAP_DOCS\MXD\WORKING\SPSA_STUDYAREA_11X17_LM.MXD - USER: LMEADOWS - DATE: 6/23/2016



HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 | Raleigh, NC 27612

ISSUE	DATE	DESCRIPTION
C	04/2010	REVISED TO INCLUDE PROPOSED GAS PROBES, MONITORING WELLS, AND NOTE 10
B	02/2009	REVISED DISPOSAL LIMITS
A	08/2008	ISSUED FOR APPROVAL

PROJECT MANAGER	D.T. DECESARE, P.E.
	T.M. YANOSCHAK, P.E.
	G.M. WILLIAMS, E.I.
PROJECT NUMBER	00002889.018

COMMONWEALTH OF VIRGINIA THOMAS M. YANOSCHAK Lic. No. 043303 PROFESSIONAL ENGINEER
COMMONWEALTH OF VIRGINIA Lic. No. 38556 PROFESSIONAL ENGINEER

SPSA Southeastern Public Service Authority

Regional Landfill Cell VII Expansion

Part B Application

SUFFOLK **VIRGINIA**

FIGURE 3: BASEGRADE PLAN

0 1" 2"

FILENAME	00C-02.dwg
SCALE	1"=100'

SHEET C-02

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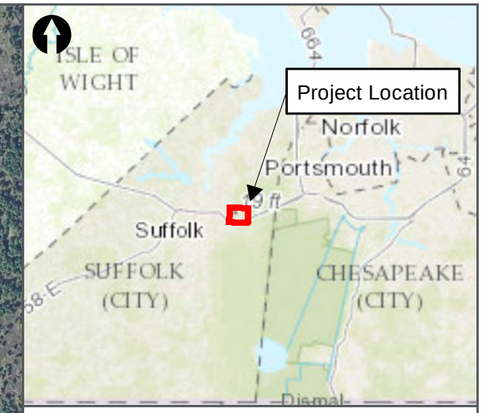
Soil Series Name (Map Symbol)	Cell VII (Ac.)	Cell VIII and IX (Ac.)
Tomotley loam (24)	63.6	66.3
Torhunta loam (25)	-	59.4
Levy silt clay loam (13)	5.0	-
Deloss mucky loam (4)	-	3.1
Rains fine sandy loam (19)	2.5	-
Dragston fine sandy loam (6)	1.9	-



LEGEND

- Study Area (Cells VII, VIII, IX)
- Cell VII (Landfill)
- Cell VIII and IX (Borrow Area)
- Soils

DATA SOURCES: USGS Orthoimagery and Suffolk County Soil Survey (USDA, 2010)

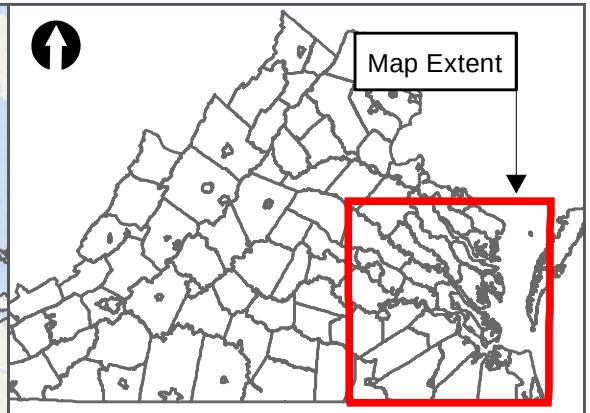
NRCS SOILS

SPSA MAJOR WATER QUALITY IMPACT ASSESSMENT

0 250 500
FEET

FIGURE 4

PATH: \\CLTSMAIN\GIS_DATA\GISPROJECTS\001743_SOUTHEASTERNPUBLICSERVICEAUTHORITY\0279011_SPSA-CONDUSEPERMITAPP(C)\7.2_WORK_IN_PROGRESS\MAP_DOCS\MXD\WORKING\SPSA_NRCSSOILS_11X17_LM.MXD - USER: LMEADOWS - DATE: 6/23/2016



LEGEND

SPSA Service Area

County/City Boundaries

DATA SOURCES: US Census, VGIN

SERVICE AREA SOUTHEASTERN VIRGINIA

SPSA MAJOR WATER QUALITY IMPACT ASSESSMENT

0 6 12
MILES

FIGURE 5

PATH: \\CLTSMAIN\GIS_DATA\GIS\PROJECTS\001743_SOUTHEASTERNPUBLICSERVICEAUTHORITY\0279011_SPSA-CONDUSEPERMITAPP(C)\7.2_WORK_IN_PROGRESS\MAP_DOCS\MXD\WORKING\SPSA_SERVICEAREA_8.5X11_LM.MXD - USER: LMEADOWS - DATE: 6/23/2016

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A

Appendix A – Stormwater Calculations for Closed Conditions at Cell VII

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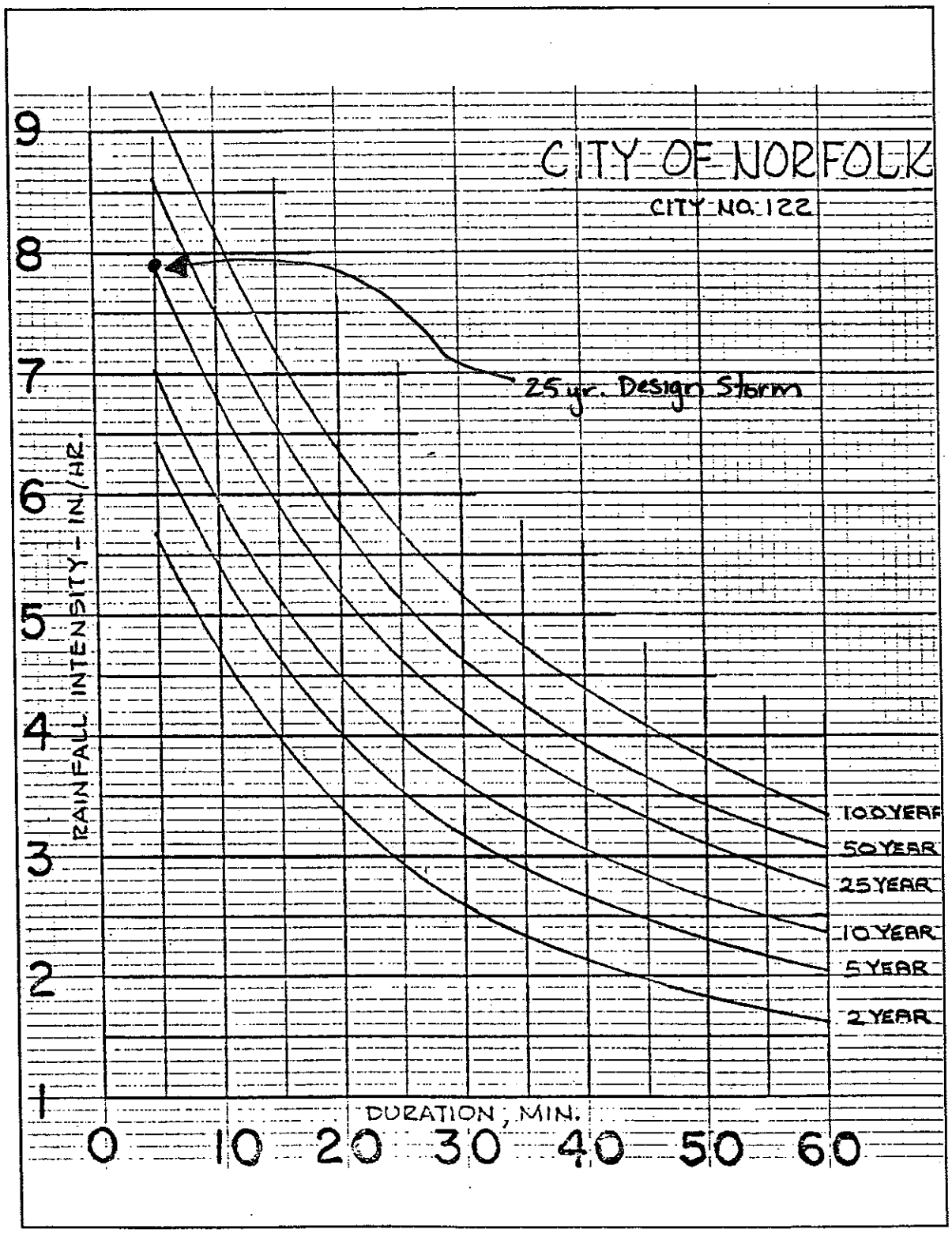


Source: VDOT

Plate 5-5

TABLE 5-2
VALUES OF RUNOFF COEFFICIENT (C) FOR RATIONAL FORMULA

Land Use	C	Land Use	C
Business:		Lawns:	
Downtown areas	0.70-0.95	Sandy soil, flat, 2%	0.05-0.10
Neighborhood areas	0.50-0.70	Sandy soil, average, 2-7%	0.10-0.15
		Sandy soil, steep, 7%	0.15-0.20
		Heavy soil, flat, 2%	0.13-0.17
		Heavy soil, average, 2-7%	0.18-0.22
		Heavy soil, steep, 7%	0.25-0.35
Residential:		Agricultural land:	
Single-family areas	0.30-0.50	Bare packed soil	
Multi units, detached	0.40-0.60	* Smooth	0.30-0.60
Multi units, attached	0.60-0.75	* Rough	0.20-0.50
Suburban	0.25-0.40	Cultivated rows	
		* Heavy soil, no crop	0.30-0.60
		* Heavy soil, with crop	0.20-0.50
		* Sandy soil, no crop	0.20-0.40
		* Sandy soil, with crop	0.10-0.25
		Pasture	
		* Heavy soil	0.15-0.45
		* Sandy soil	0.05-0.25
		Woodlands	0.05-0.25
Industrial:		Streets:	
Light areas	0.50-0.80	Asphaltic	0.70-0.95
Heavy areas	0.60-0.90	Concrete	0.80-0.95
		Brick	0.70-0.85
Parks, cemeteries	0.10-0.25	Unimproved areas	0.10-0.30
Playgrounds	0.20-0.35	Drives and walks	0.75-0.85
Railroad yard areas	0.20-0.40	Roofs	0.75-0.95

Note: The designer must use judgement to select the appropriate "C" value within the range. Generally, larger areas with permeable soils, flat slopes and dense vegetation should have the lowest C values. Smaller areas with dense soils, moderate to steep slopes, and sparse vegetation should be assigned the highest C values.

Source: American Society of Civil Engineers

Project: SPSA Cell VII	Computed: GMW	Date: 2/11/09
Subject: Storm Water Drainage	Checked PMW	Date 2-12-09
Task: Sideslope Channels	Sheet 1	Of 2

References

1. Elements of Urban Stormwater Design, H. Rooney Malcom, P.E.
2. Virginia Erosion and Sediment Control Handbook

Objective Design and size perimeter ditches to handle flow from a 25 year storm event.

Equations

Normal Depth Procedure (Manning's Eqn)

$AR^{2/3}=Qn/1.49s^{0.5}$ Area (A)= $bd+z(d^2)$ $Z_{av}=AR^{2/3}$

$Z_{req}=Qn/1.49s^{0.5}$ $R=Area/(b+2d((z^2+1)^{0.5})$ Avg Shear Stress(T) = d*s*unit weight of water

Design Channels along the access road

Min Channel Freeboard =	0.5	ft
Inside Channel Side Slope =	3	(enter X for X:1)
Outside Channel Side Slope =	2	(enter X for X:1)
Bottom Width, b =	0	ft

Q (cfs) = CIA = Peak Flow

Runoff Coefficient, C = 0.3 Ag Land, Bare Packed Soil, Rough (0.20 - 0.50) Ref 2, Table 5-2, p V-29

Design Storm: 25-Yr, 5-min

I (in/hr) = 7.9 Ref 2, Plate 5-5, Norfolk, p V-15

A (Ac) = 1.72 based on max drainage area off the LF waste pile (North East side of Cell 7, Fig 1)

Calculated Flow Rate Q (cfs) = 4.08

Various Lining Types

Lining Type	Lining Description	Manning's n depths of 0.5-2.0 ft	Vp (ft/sec)	Allowable Shear Stress psf
A	Jute Net (HEC-15)	0.015	2.0	0.45
B	Erosion Control Blanket Single Net (Curlex 1)	0.034	5.0	1.55
C	Erosion Control Blanket Double Net (Curlex HV)	0.026	10.0	1.65
D	Ordinary Firm Loam (Ref 2)	0.020	3.5	2.0
E	Grass Lined (Ref 2)	0.030	5.0	2.0
F	6" Rip Rap (Ref 2, Ref 1)	0.069	9.0	2.0
G	Unvegetated Turf Reinforcement Mat (TRM) (NAG C350)	0.025	9.5	2.25
H	Class D Phase 2 (Partially vegetated) TRM (NAG C350)	0.048	14.0	3.34
I	12" Rip Rap (Ref 2, Ref 1)	0.078	12.5	4.0
J	Class B Phase 3 (Fully vegetated) TRM (NAG C350)	0.048	18.0	5.7
K	Concrete (HEC-15, EPA 832-F-99-002)	0.013	25.0	10.0

Project: SPSA Cell VII	Computed: GMW	Date: 2/11/09
Subject: Storm Water Drainage	Checked PAW	Date 2-12-09
Task: Sideslope Channels	Sheet 2	Of 2

Select Lining System for each channel slope that will handle the design flow when vegetated and when initially constructed.

Assume the channel slope is constructed at 3% but settles to 1%

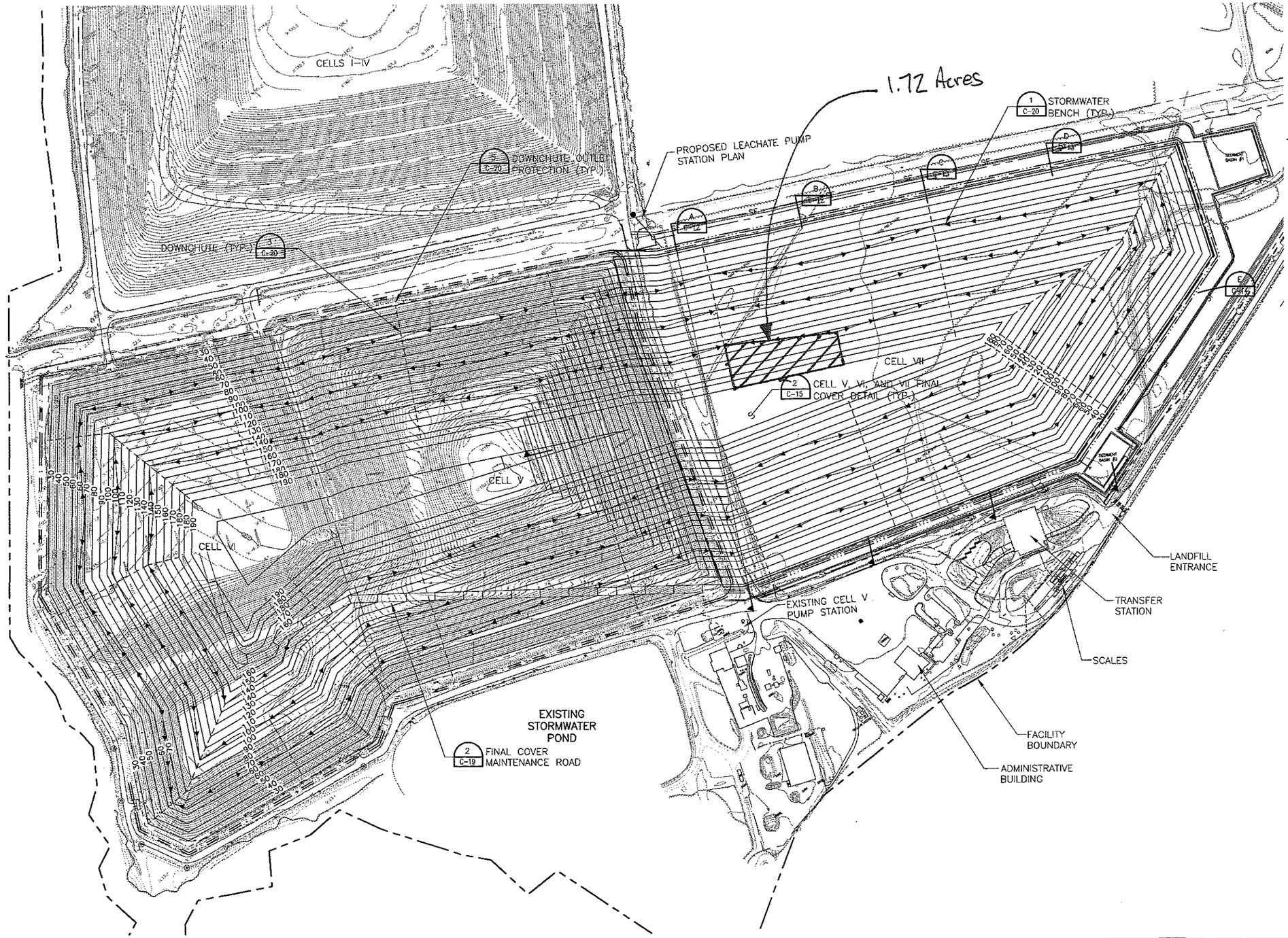
Lining Type	Channel Slope	Z_{req}	Flow Depth d (ft)	Cross Sectional Area (sf)	R	Z_{avail}	Velocity (ft/sec)	Average Shear Stress (lb/sf)	
Permanent Lining									
E	3.0%	0.47	0.6	1.05	0.30	0.47	3.9	1.2	
E	1.0%	0.82	0.8	1.59	0.37	0.82	2.6	0.5	
Initial Lining									
D	3.0%	0.32	0.6	0.79	0.26	0.32	5.2	1.0	Need Temp Lining
D	1.0%	0.55	0.7	1.18	0.32	0.55	3.5	0.4	
Temporary Lining									
B	3.0%	0.54	0.7	1.16	0.32	0.54	3.5	1.3	
B	1.0%	0.93	0.8	1.75	0.39	0.93	2.3	0.5	

CONCLUSION

1. The above calculations are for the "Worst Case Scenario" or largest drainage area of a sideslope channel for Cells V, VI andVII
   Drainage area= 1.72 ac
   Bottom Width (ft) = 0
   Depth (ft) = 1.3
   Channel Slope = 3.0%
   Side Slope= 3H:1V Inside and 2H:1V Outside

2. The sideslope channel design approved for Cells V, VI, and VII are as follows:
   Bottom Width (ft) = 0
   Side Slopes = 3H:1V Inside and 2H:1V Outside
   Depth = 2

3. Permanent lining shall be grass and the temporary lining shall be Curlex I.



N

NOTES

1. TOPOGRAPHY WITHIN AREA OF EXPOSED GEOSYNTHETICS ON SOUTH SIDE OF CELLS I–IV SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED NOVEMBER 6 AND 15, 2007.
2. TOPOGRAPHY WITHIN AREAS OF CELLS I–IV WITH SOIL COVER OVER GEOSYNTHETICS (EXCLUDING EAST SLOPE) SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED MAY 2, 2008.
3. TOPOGRAPHY WITHIN EAST SLOPE OF CELLS I–IV SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED APRIL 1, 2008.
4. EXISTING TOPOGRAPHY WITHIN CELL V AND CELL VI PHASE 1 SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED DECEMBER 27, 2007.
5. AS–BUILT TOPOGRAPHY WITHIN CELL VI PHASE 2 SUPPLIED BY BATEMAN CIVIL–SURVEY CO., PC FROM FIELD SURVEY DATED NOVEMBER 12, 2007.
6. EXISTING TOPOGRAPHY WITHIN CELL VII SUPPLIED BY AIR SURVEY BY AERIAL SURVEY DATED DECEMBER 30, 2004.
7. AS–BUILT TOPOGRAPHY WITHIN THE TRANSFER STATION AREA SUPPLIED BY HURT AND PRIFFITT DATED SEPTEMBER 19, 2005.
8. HORIZONTAL DATUM IS BASED ON THE VIRGINIA STATE PLANE COORDINATE SYSTEM–SOUTH ZONE (NAD 83). VERTICAL DATUM IS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM (NGVD 29).
9. THE BUFFERS OUTLINED IN 9VAC 20–80–250 A(7) WILL BE MAINTAINED.
10. THE CONDITIONS SHOWN AS EXISTING ON THIS DRAWING REPRESENT GENERAL CONDITIONS AT THE TIME OF THE SURVEYS REFERENCED HEREIN.
11. FINAL COVER GRADES DEPICT TOP OF FINAL COVER.
12. STORMWATER BENCHES ARE SHOWN SCHEMATICALLY. ARROWS SHOW DIRECTION OF FLOW.

LEGEND

- EXISTING CONTOURS
- FINAL COVER GRADES
- CONSTRUCTION BASELINE
- FACILITY BOUNDARY
- SILT FENCE
- SIDESLOPE BENCH
- DOWNCHUTE
- PROPERTY BOUNDARY
- PERIMETER CHANNEL

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HDR Engineering, Inc. of the Carolinas
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PROJECT MANAGER	D.T. DECESARE, P.E.
	T.M. YANOSCHAK, P.E.
	G.M. WILLIAMS, E.I.
PROJECT NUMBER	00002889.018

SPSA

Regional Landfill Cell VII Expansion

Part B Application

SUFFOLK VIRGINIA

FINAL GRADING AND DRAINAGE PLAN

0 1" 2"

FILENAME	00C-09.dwg
SCALE	1"=200'

SHEET FIG 1

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Project:	SPSA Cell VII	Computed:	GMW	Date:	2/11/09
Subject:	Storm Water Drainage	Checked	PAW	Date	2-12-09
Task:	Reno Mattress Lined Downchute	Sheet	1	Of	2

Objective

Size a Reno Mattress downchute based on sideslope swale inlet flow rates

Constraints

Minimize the cross sectional area since this will be incorporated into the cover system

References:

1. Elements of Urban Stormwater Design, H. Rooney Malcom, P.E.
2. VA Erosion and Sediment Control Handbook
3. Macaferri, Inc.

Drainage Area

Calculate Peak Flow

Q (cfs) = CIA = Peak Flow

Drainage Area, A (acres) = to be determined

Runoff Coefficient, C =	0.3	Ag Land,Bare Packed Soil, Rough (0.20 - 0.50)	Ref 2, Table 5-2, p V-29
Intensity, I (in/hr) =	7.9	25-year, 5-min Design Storm	Ref 2, Plate 5-5, Norfolk, p V-15

Equations:

Normal Depth Procedure (Ref 1)

$AR^{2/3}=Qn/1.49s^{0.5}$ Area (A)= bd+z(d^2) $Z_{av}=AR^{2/3}$

$Z_{req}=Qn/1.49s^{0.5}$ R=Area/(b+2d((z^2)+1)^.5) Q=CIA

Assumptions

The drainage area may vary for each downchute, therefore determine the max drainage area that may be routed through the downchute.

Max (ac) =	8.94	See attached drawing (Figure 2)
Flow Rate Q (cfs) =	21.2	flow at bottom of downchute (max drainage area)

Project:	SPSA Cell VII	Computed:	GMW	Date:	2/11/09
Subject:	Storm Water Drainage	Checked	PMW	Date	2-12-09
Task:	Reno Mattress Lined Downchute	Sheet	2	Of	2

Prefer Reno Mattress

Manning's n =	0.07	Reno Mattress Lined, 6" (Ref 3)
max permissible velocity (ft/sec) =	13.8	for 6" (Ref 3)
Desired Freeboard =	0.5	ft
Design Channel Slope (s) =	3	X:1
Design Channel Slope (s) =	0.33	feet fall / foot run
Channel Side Slope (z) =	3	X:1
Bottom Width (b) =	8	ft

Flow Depth d (ft)	Cross Sectional A (sf)	Z_{req}	R	Z_{avail}	V (ft/sec)	Comment
0.39	3.54	1.72	0.34	1.72	6.0	OK

Check effects of settlement (flatter slope) on flow depth

Assume the landfill settles to approximately a 3.5:1 slope.

Channel Slope After Settlement (s) =	3.5	X:1
Channel Slope After Settlement (s) =	0.286	ft fall / foot run
Channel Side Slope (z) =	3	X:1
Bottom Width (b) =	8	ft

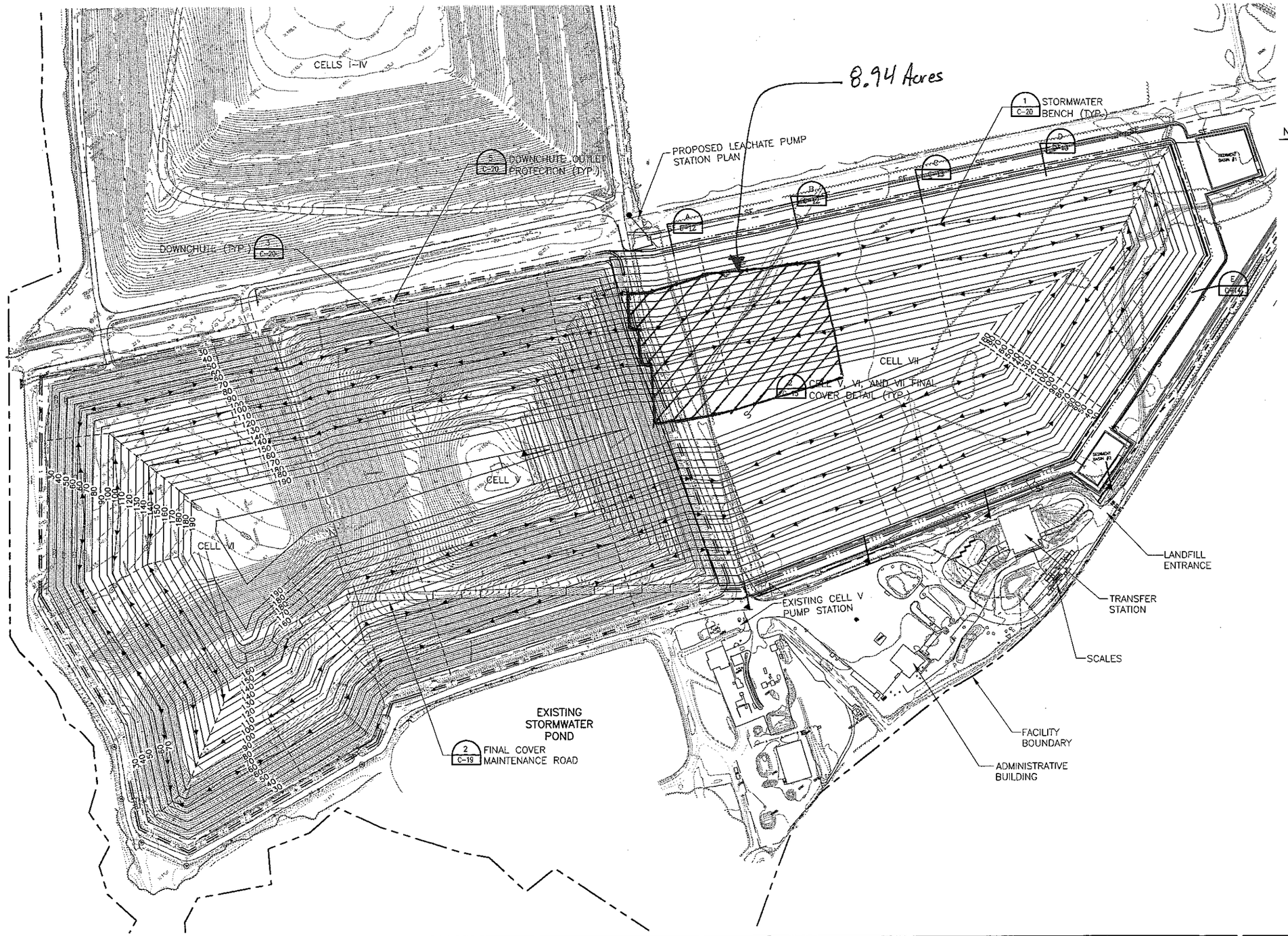
Flow Depth d (ft)	Cross Sectional A (sf)	Z_{req}	R	Z_{avail}	V (ft/sec)	Comment
0.53	3.83	1.86	0.34	1.86	5.5	OK

Conclusion:

Construct a trapezoidal shaped channel with the following dimensions:

Min Depth of downchute (ft) =	1.03	(includes freeboard)
Set Depth of downchute (ft) =	1.50	
Outside Channel Side Slope (X:1) =	3	
Inside Channel Side Slope (X:1) =	3	
Design Channel Slope (X:1) =	3	
Bottom Width (ft) =	8	

Permanent Lining type = Reno Mattress w/6" diameter rip rap



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SPSA

Regional Landfill Cell VII Expansion

Part B Application

SUFFOLK VIRGINIA

FINAL GRADING AND DRAINAGE PLAN

0 1" 2"

FILENAME	00C–09.dwg
SCALE	1"=200'

SHEET FIG 2

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Project: SPSA Cell VII	Computed: GMW	Date: 2/11/09
Subject: Storm Water Drainage	Checked PAW	Date 2-12-09
Task: Perimeter Channels	Sheet 1	Of 2

References

1. Elements of Urban Stormwater Design, H. Rooney Malcom, P.E.
2. Virginia Erosion and Sediment Control Handbook

Objective Design and size perimeter ditches to handle flow from a 25 year storm event.

Equations

Normal Depth Procedure (Manning's Eqn)

$AR^{2/3}=Qn/1.49s^{0.5}$ Area (A)= $bd+z(d^2)$ $Z_{av}=AR^{2/3}$

$Z_{req}=Qn/1.49s^{0.5}$ $R=Area/(b+2d((z^2+1)^{0.5})$ Avg Shear Stress(T) = d*s*unit weight of water

Design Channels along the access road

Min Channel Freeboard =	0.5	ft
Inside Channel Side Slope =	2	(enter X for X:1)
Outside Channel Side Slope =	2	(enter X for X:1)
Bottom Width, b =	8	ft

Q (cfs) = CIA = Peak Flow

Runoff Coefficient, C = 0.3 Ag Land, Bare Packed Soil, Rough (0.20 - 0.50) Ref 2, Table 5-2, p V-29

Design Storm: 25-Yr, 5-min

I (in/hr) = 7.9 Ref 2, Plate 5-5, Norfolk, p V-15

A (Ac) = 46.1 based on max drainage area off the LF waste pile (North East side of Cell 7, Figure 3)

Calculated Flow Rate Q (cfs) = 109.1

Various Lining Types

Lining Type	Lining Description	Manning's n depths of 0.5-2.0 ft	Vp (ft/sec)	Allowable Shear Stress psf
A	Jute Net (HEC-15)	0.015	2.0	0.45
B	Erosion Control Blanket Single Net (Curlex 1)	0.034	5.0	1.55
C	Erosion Control Blanket Double Net (Curlex HV)	0.026	10.0	1.65
D	Ordinary Firm Loam (Ref 2)	0.020	3.5	2.0
E	Grass Lined (Ref 2)	0.030	5.0	2.0
F	6" Rip Rap (Ref 2, Ref 1)	0.069	9.0	2.0
G	Unvegetated Turf Reinforcement Mat (TRM) (NAG C350)	0.025	9.5	2.25
H	Class D Phase 2 (Partially vegetated) TRM (NAG C350)	0.048	14.0	3.34
I	12" Rip Rap (Ref 2, Ref 1)	0.078	12.5	4.0
J	Class B Phase 3 (Fully vegetated) TRM (NAG C350)	0.048	18.0	5.7
K	Concrete (HEC-15, EPA 832-F-99-002)	0.013	25.0	10.0

Project: SPSA Cell VII	Computed: GMW	Date: 2/11/09
Subject: Storm Water Drainage	Checked PAW	Date 2-12-09
Task: Perimeter Channels	Sheet 2	Of 2

Select Lining System for each channel slope that will handle the design flow when vegetated and when initially constructed.

Channel Bottom Slope around Cell V & VI varies from 0.2% to 0.4%.
Assume channel slope around Cell VII will be constucted as 0.4%.

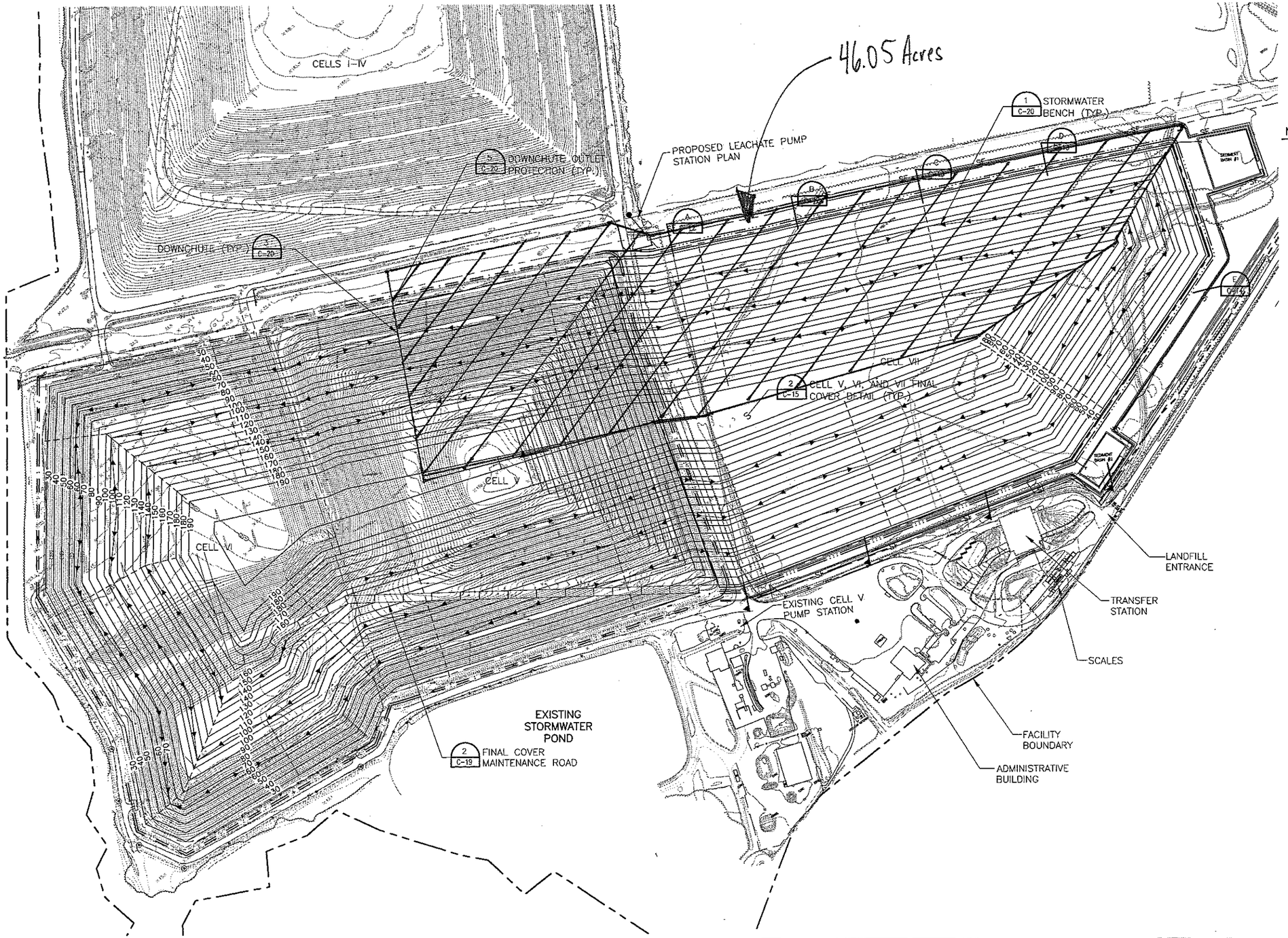
Lining Type	Channel Slope	Z_{req}	Flow Depth d (ft)	Cross Sectional Area (sf)	R	Z_{avail}	Velocity (ft/sec)	Average Shear Stress (lb/sf)	
Permanent Lining									
E	0.4%	34.74	2.2	26.48	1.50	34.74	4.1	0.5	
E	0.2%	49.14	2.6	33.98	1.74	49.14	3.2	0.3	
Initial Lining									
D	0.4%	23.16	1.7	19.85	1.26	23.16	5.5	0.4	Need Temp Lining
D	0.2%	32.76	2.1	25.39	1.47	32.76	4.3	0.3	
Temporary Lining									
B	0.4%	39.38	2.3	28.97	1.58	39.38	3.8	0.6	
B	0.2%	55.69	2.8	37.21	1.83	55.69	2.9	0.3	

CONCLUSION

1. The above calculations are for the "Worst Case Scenario" or largest drainage area that drains to a perimeter ditch around Cell V & VII.
   Drainage area= 46.05 ac
   Base (ft) = 8
   Depth (ft) = 2.8
   Side Slope= 2H:1V
   Channel Slope = 0.4%

2. The perimeter channel design approved for Cell VI, are as follows:
   Bottom Width (ft) = 8
   Side Slopes = 2H:1V
   Depth = 3

3. Permanent lining shall be grass and the temporary lining shall be Curlex I.



N

NOTES

1. TOPOGRAPHY WITHIN AREA OF EXPOSED GEOSYNTHETICS ON SOUTH SIDE OF CELLS I–IV SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED NOVEMBER 6 AND 15, 2007.
2. TOPOGRAPHY WITHIN AREAS OF CELLS I–IV WITH SOIL COVER OVER GEOSYNTHETICS (EXCLUDING EAST SLOPE) SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED MAY 2, 2008.
3. TOPOGRAPHY WITHIN EAST SLOPE OF CELLS I–IV SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED APRIL 1, 2008.
4. EXISTING TOPOGRAPHY WITHIN CELL V AND CELL VI PHASE 1 SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED DECEMBER 27, 2007.
5. AS–BUILT TOPOGRAPHY WITHIN CELL VI PHASE 2 SUPPLIED BY BATEMAN CIVIL–SURVEY CO., PC FROM FIELD SURVEY DATED NOVEMBER 12, 2007.
6. EXISTING TOPOGRAPHY WITHIN CELL VII SUPPLIED BY AIR SURVEY BY AERIAL SURVEY DATED DECEMBER 30, 2004.
7. AS–BUILT TOPOGRAPHY WITHIN THE TRANSFER STATION AREA SUPPLIED BY HURT AND PRIFFITT DATED SEPTEMBER 19, 2005.
8. HORIZONTAL DATUM IS BASED ON THE VIRGINIA STATE PLANE COORDINATE SYSTEM–SOUTH ZONE (NAD 83). VERTICAL DATUM IS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM (NGVD 29).
9. THE BUFFERS OUTLINED IN 9VAC 20–80–250 A(7) WILL BE MAINTAINED.
10. THE CONDITIONS SHOWN AS EXISTING ON THIS DRAWING REPRESENT GENERAL CONDITIONS AT THE TIME OF THE SURVEYS REFERENCED HEREIN.
11. FINAL COVER GRADES DEPICT TOP OF FINAL COVER.
12. STORMWATER BENCHES ARE SHOWN SCHEMATICALLY. ARROWS SHOW DIRECTION OF FLOW.

LEGEND

- EXISTING CONTOURS
- 20 FINAL COVER GRADES
- CONSTRUCTION BASELINE
- FACILITY BOUNDARY
- SILT FENCE
- SIDESLOPE BENCH
- DOWNCHUTE
- PROPERTY BOUNDARY
- PERIMETER CHANNEL

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 | Raleigh, NC 27612

ISSUE	DATE	DESCRIPTION
B	01/2009	REVISED DISPOSAL LIMITS
A	08/2008	ISSUED FOR APPROVAL

PROJECT MANAGER	D.T. DECESARE, P.E. T.M. YANOSCHAK, P.E. G.M. WILLIAMS, E.I.
PROJECT NUMBER	00002889.018

SPSA

Regional Landfill Cell VII Expansion

Part B Application

SUFFOLK VIRGINIA

FINAL GRADING AND DRAINAGE PLAN

0 1" 2"

FILENAME	00C–09.dwg
SCALE	1"=200'

SHEET FIG 3

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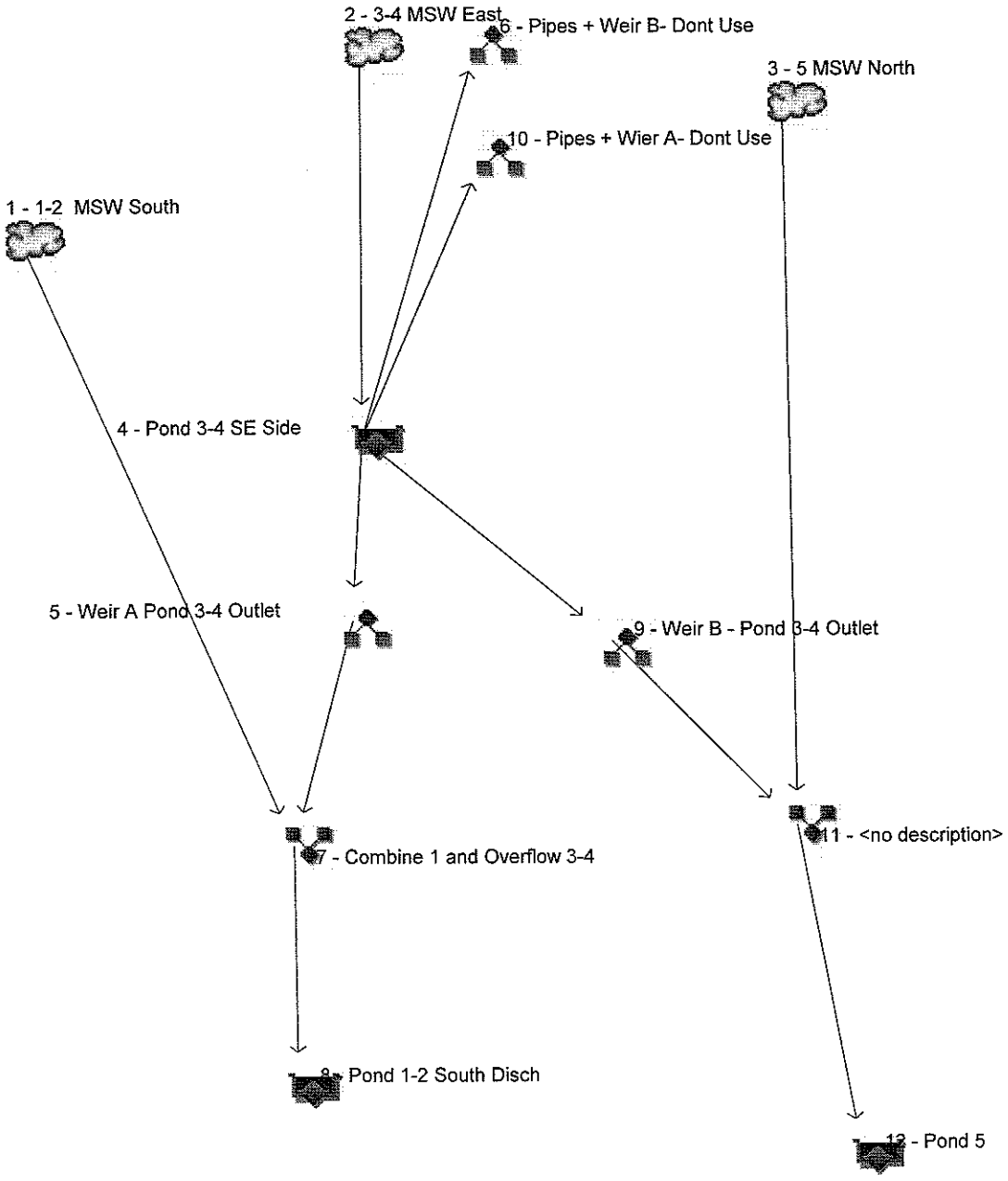
Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	142.36	1	727	12.330	------	------	------	1-2 MSW South
2	SCS Runoff	264.00	1	727	22.866	------	------	------	3-4 MSW East
3	SCS Runoff	113.68	1	727	9.847	------	------	------	5 MSW North
4	Reservoir	181.43	1	736	21.678	2	23.63	3.83	Pond 3-4 SE Side
5	Diversion1	82.91	1	736	7.613	4	------	------	Weir A Pond 3-4 Outlet
6	Diversion2	98.52	1	736	14.064	4	------	------	Pipes + Weir B- Dont Use
7	Combine	208.07	1	729	19.944	1, 5,	------	------	Combine 1 and Overflow 3-4
8	Reservoir	175.40	1	737	19.774	7	17.07	1.85	Pond 1-2 South Disch
9	Diversion1	55.54	1	736	2.782	4	------	------	Weir B - Pond 3-4 Outlet
10	Diversion2	125.90	1	736	18.895	4	------	------	Pipes + Wier A- Dont Use
11	Combine	154.65	1	729	12.629	3, 9,	------	------	<no description>
12	Reservoir	127.38	1	738	12.629	11	21.52	1.71	Pond 5

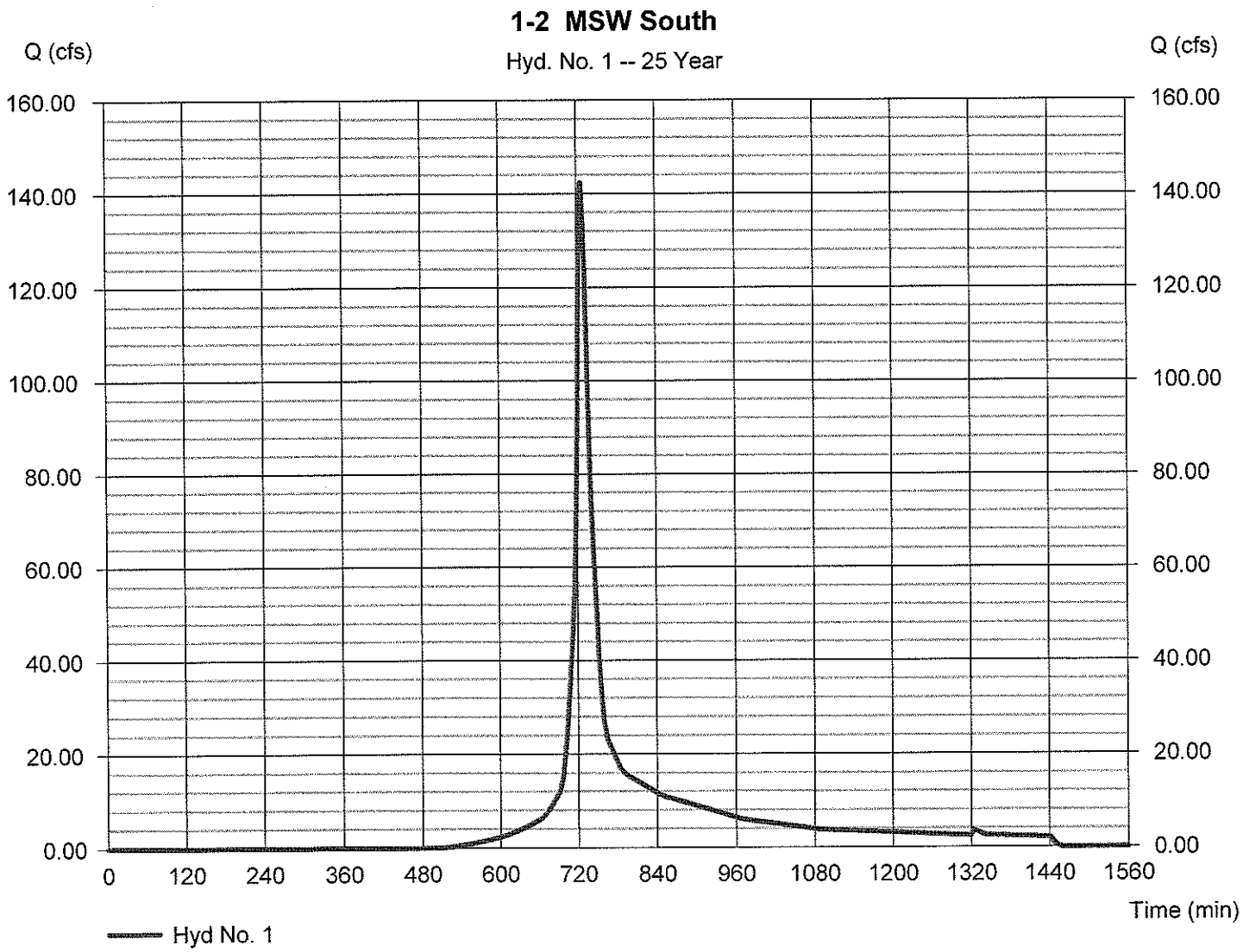
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 1

1-2 MSW South

Hydrograph type	= SCS Runoff	Peak discharge	= 142.36 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 12.330 acft
Drainage area	= 42.200 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 256



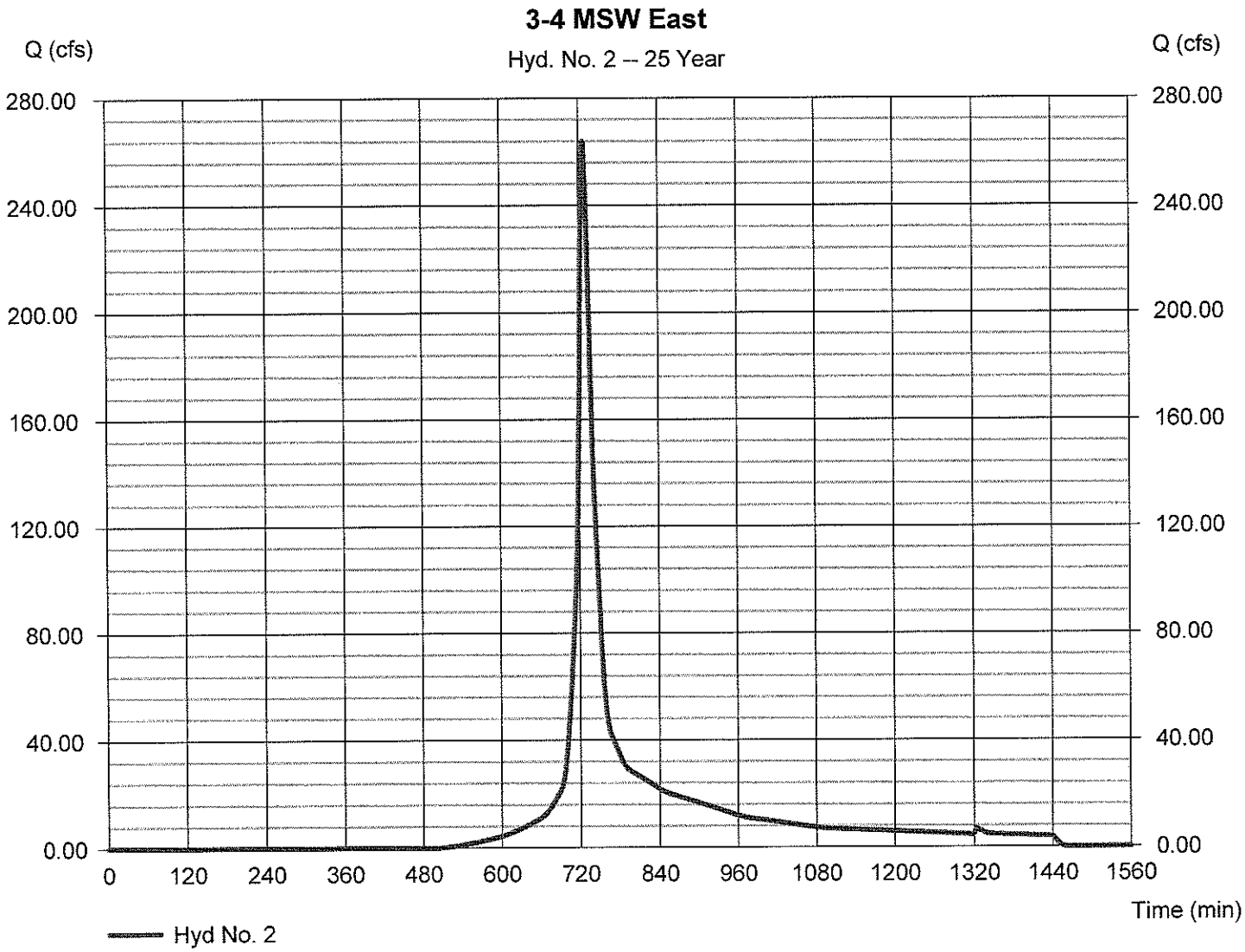
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 2

3-4 MSW East

Hydrograph type	= SCS Runoff	Peak discharge	= 264.00 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 22.866 acft
Drainage area	= 78.260 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 256



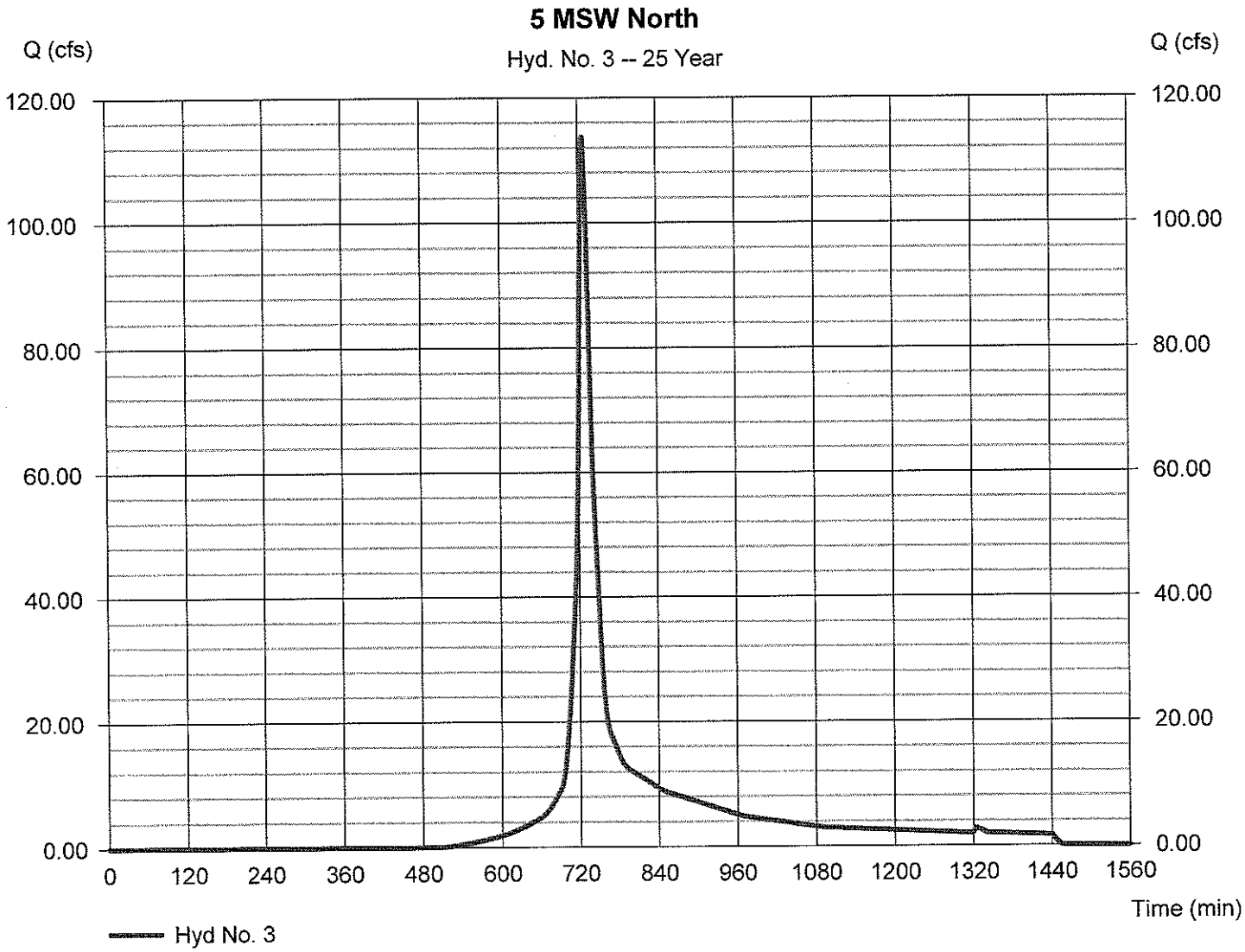
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 3

5 MSW North

Hydrograph type	= SCS Runoff	Peak discharge	= 113.68 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 9.847 acft
Drainage area	= 33.700 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 256



Hydrograph Report

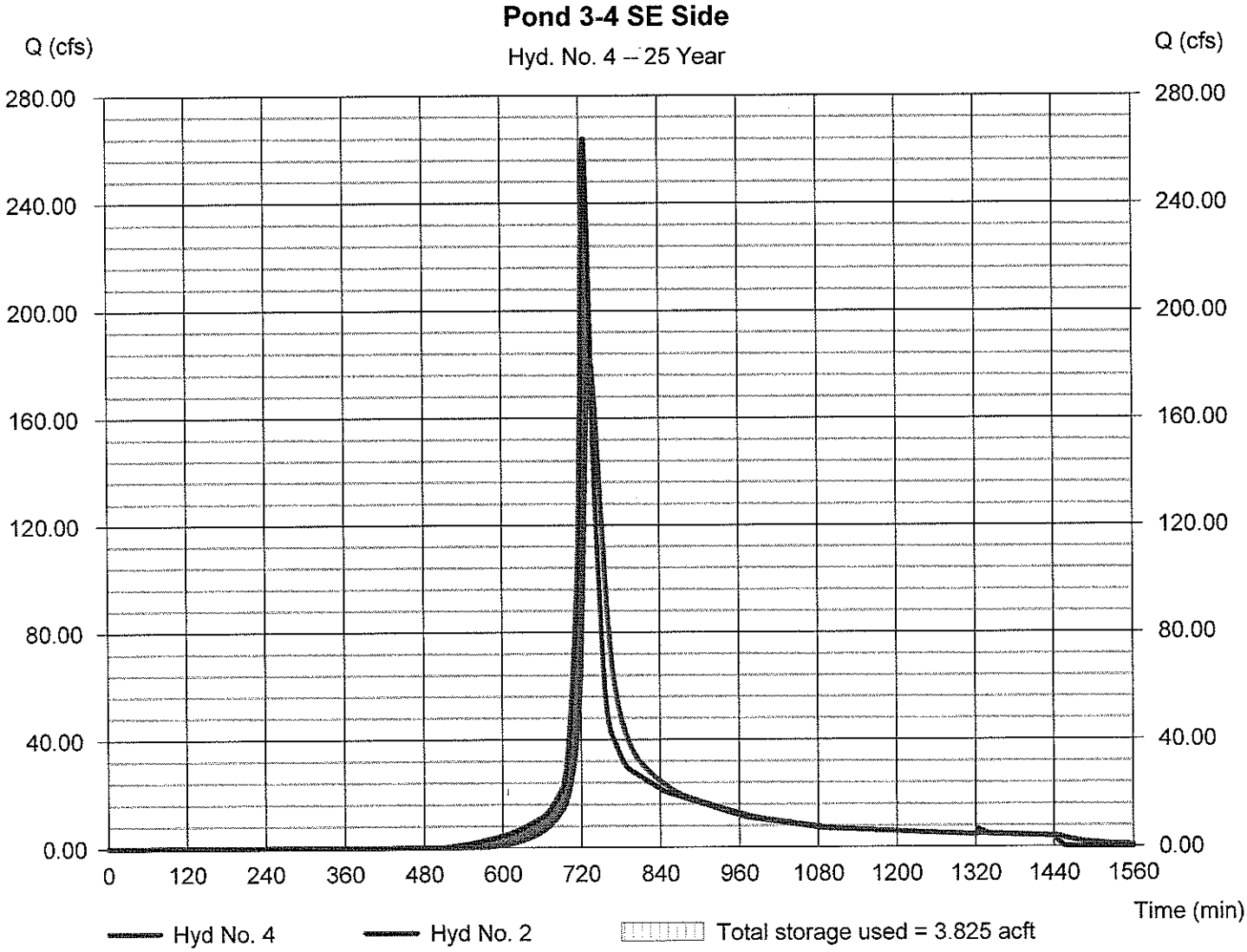
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 4

Pond 3-4 SE Side

Hydrograph type	= Reservoir	Peak discharge	= 181.43 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 21.678 acft
Inflow hyd. No.	= 2 - 3-4 MSW East	Max. Elevation	= 23.63 ft
Reservoir name	= 3-4 Pond	Max. Storage	= 3.825 acft

Storage Indication method used.



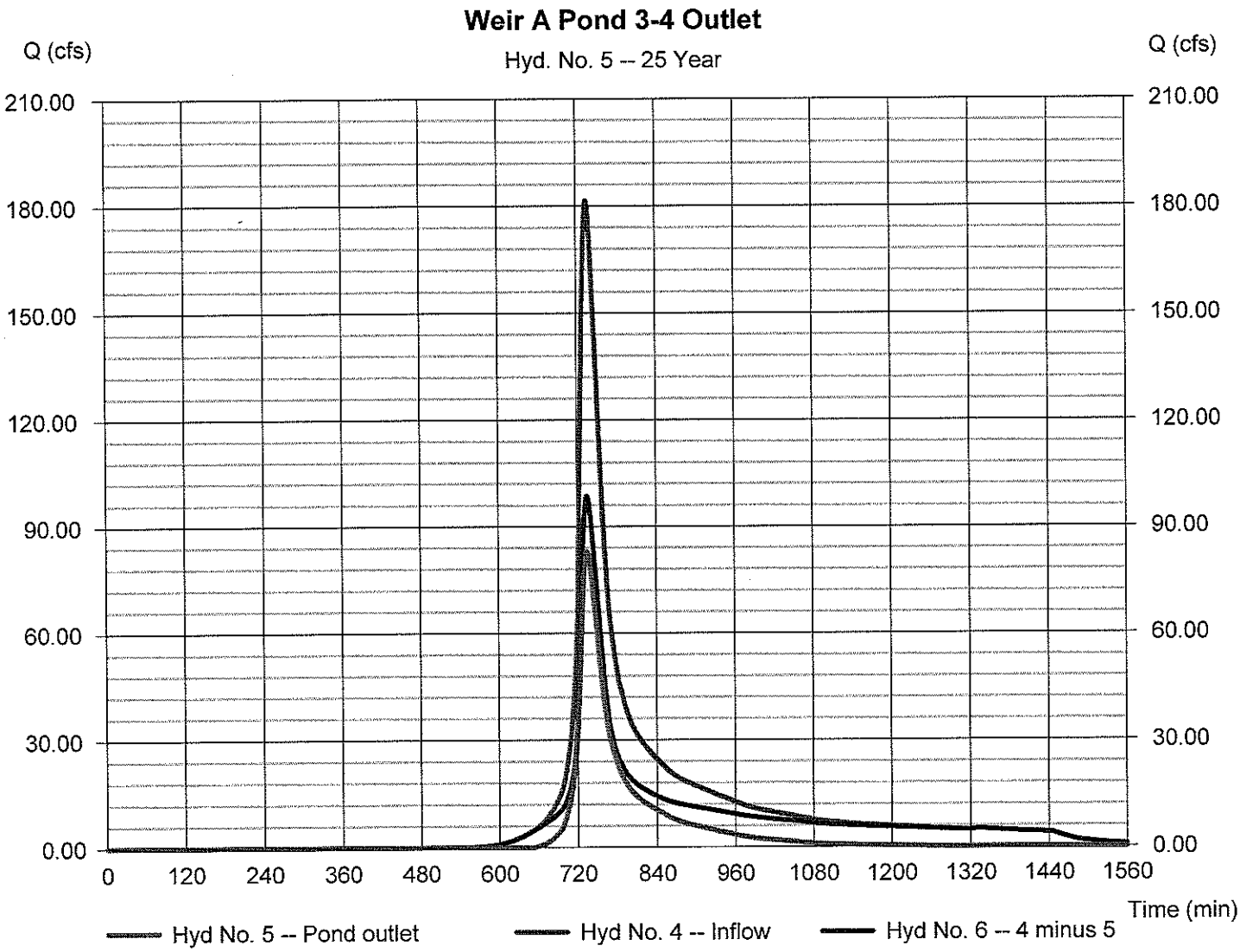
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 5

Weir A Pond 3-4 Outlet

Hydrograph type	= Diversion1	Peak discharge	= 82.91 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 7.613 acft
Inflow hydrograph	= 4 - Pond 3-4 SE Side	2nd diverted hyd.	= 6
Diversion method	= Pond - 3-4 Pond	Pond structure	= Weir A



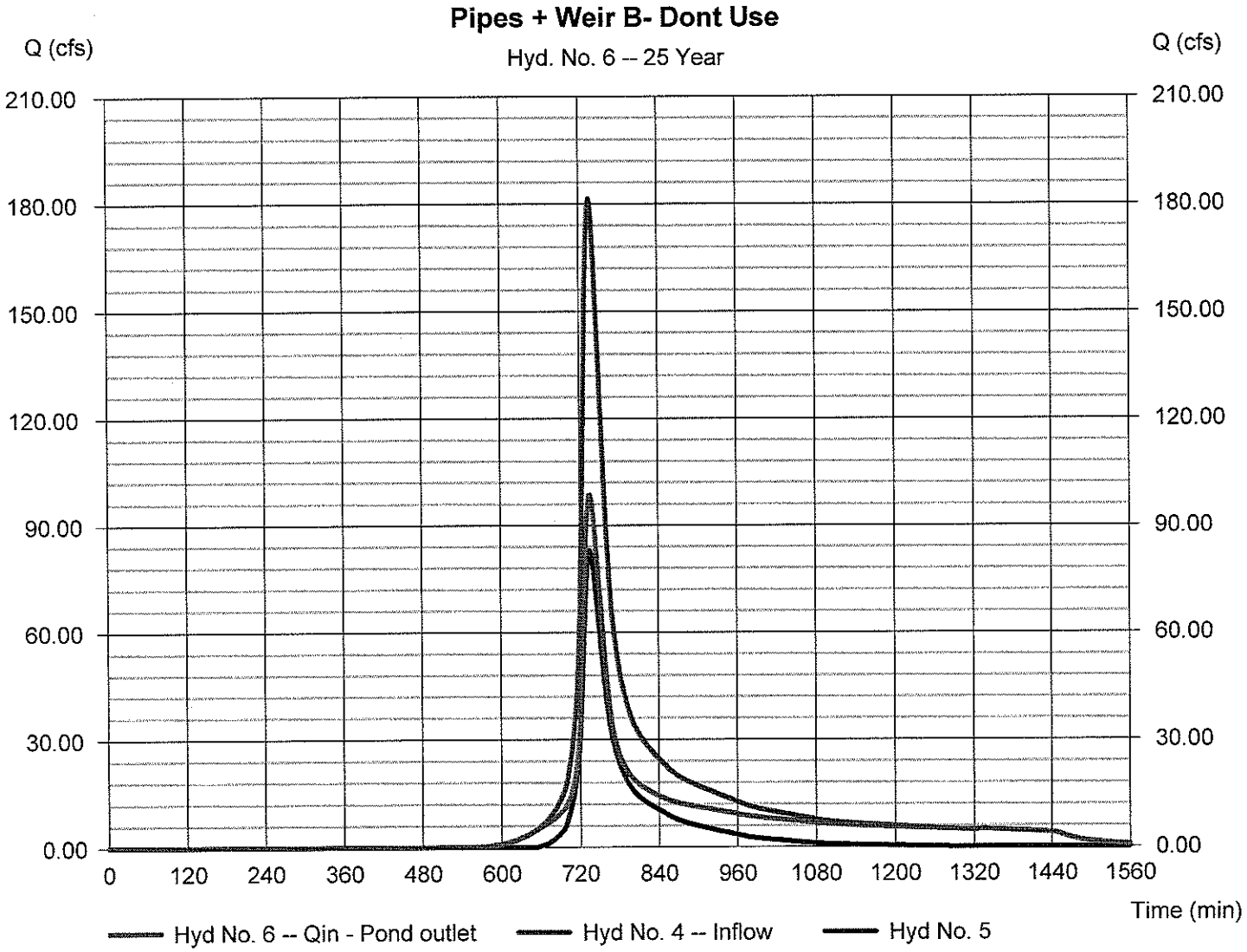
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 6

Pipes + Weir B- Dont Use

Hydrograph type	= Diversion2	Peak discharge	= 98.52 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 14.064 acft
Inflow hydrograph	= 4 - Pond 3-4 SE Side	2nd diverted hyd.	= 5
Diversion method	= Pond - 3-4 Pond	Pond structure	= Weir A



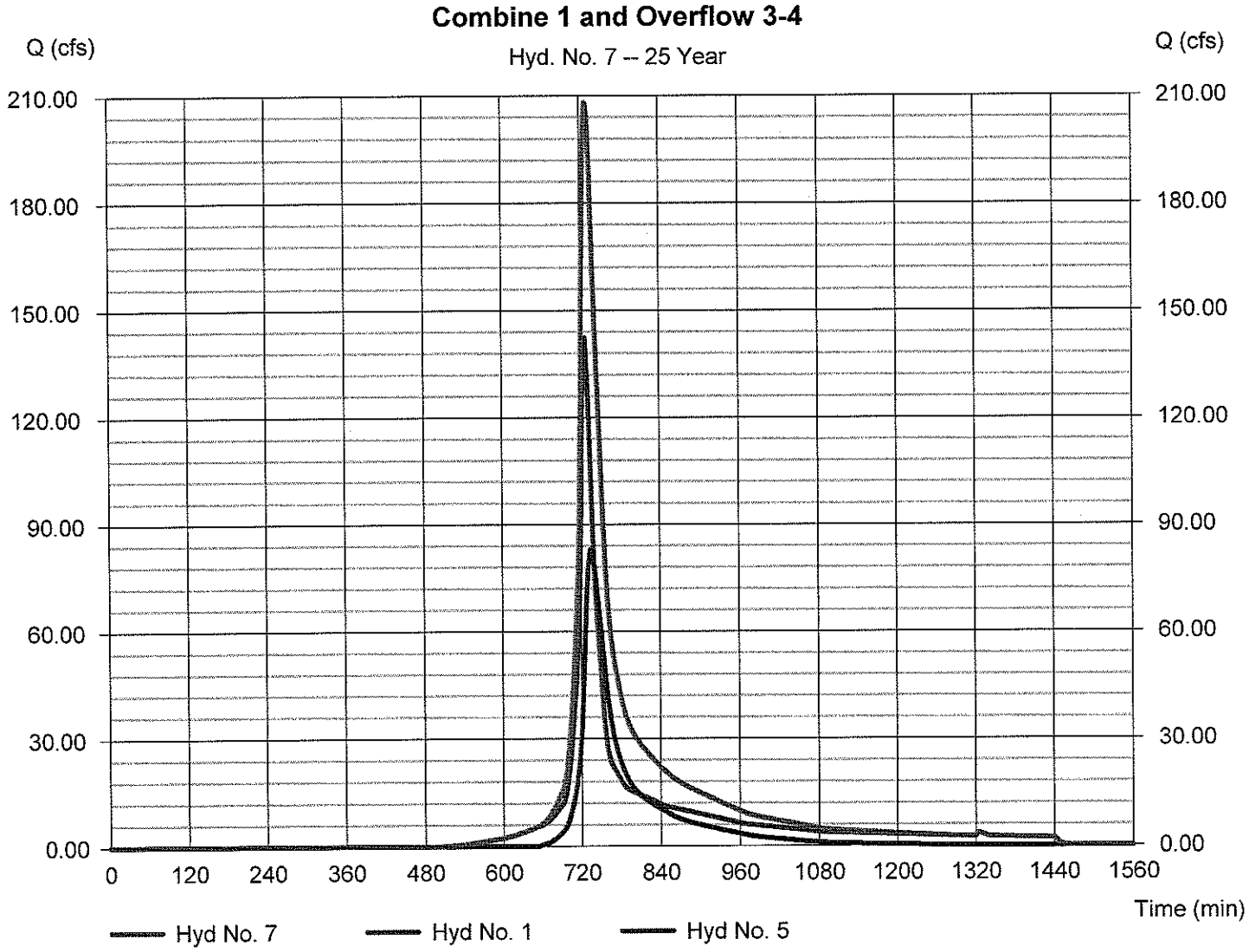
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 7

Combine 1 and Overflow 3-4

Hydrograph type	= Combine	Peak discharge	= 208.07 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 19.944 acft
Inflow hyds.	= 1, 5	Contrib. drain. area	= 42.200 ac



Hydrograph Report

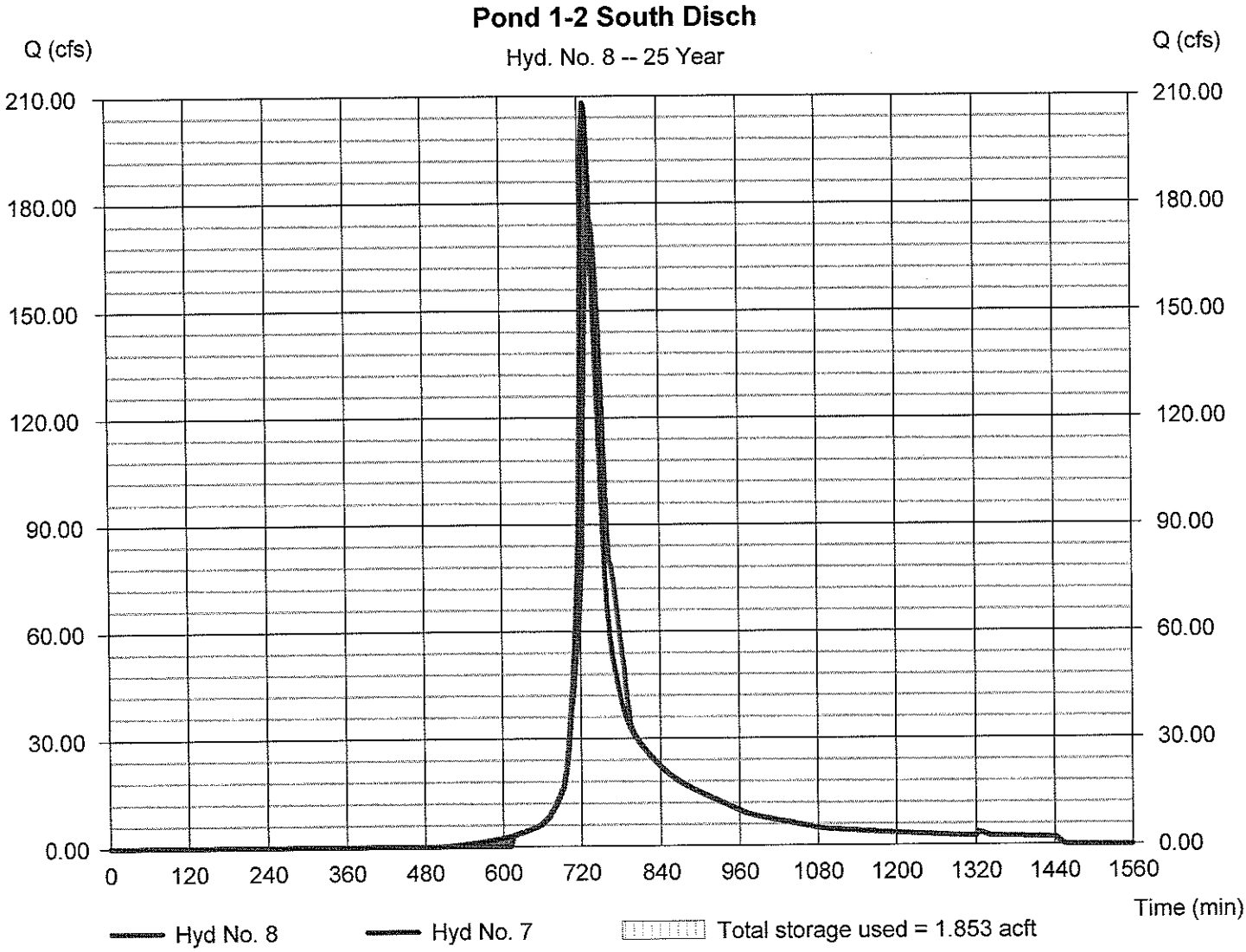
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 8

Pond 1-2 South Disch

Hydrograph type	= Reservoir	Peak discharge	= 175.40 cfs
Storm frequency	= 25 yrs	Time to peak	= 737 min
Time interval	= 1 min	Hyd. volume	= 19.774 acft
Inflow hyd. No.	= 7 - Combine 1 and Overflow 3-4	Max. Elevation	= 17.07 ft
Reservoir name	= Pond 1-2	Max. Storage	= 1.853 acft

Storage Indication method used.



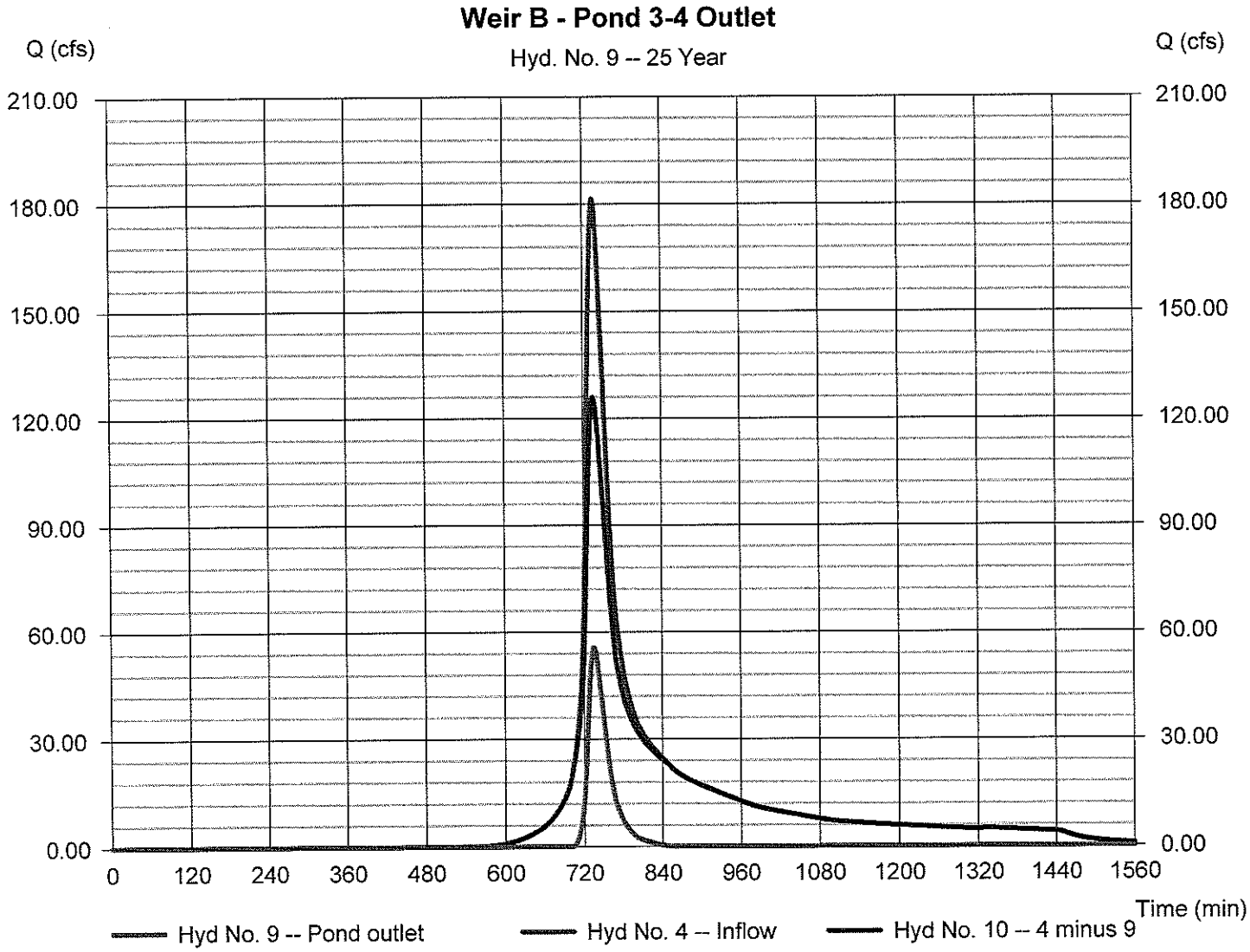
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 9

Weir B - Pond 3-4 Outlet

Hydrograph type	= Diversion1	Peak discharge	= 55.54 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 2.782 acft
Inflow hydrograph	= 4 - Pond 3-4 SE Side	2nd diverted hyd.	= 10
Diversion method	= Pond - 3-4 Pond	Pond structure	= Weir B



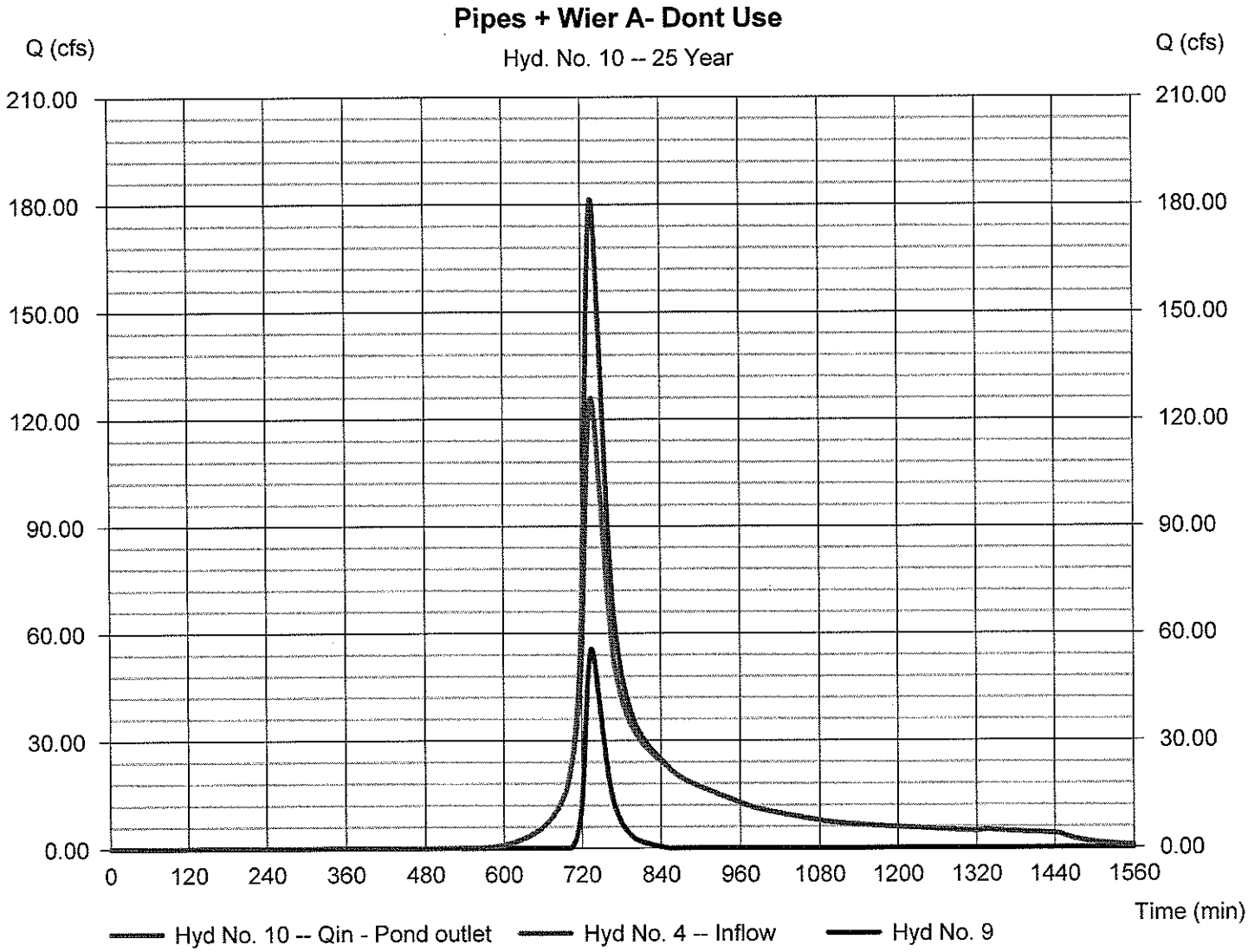
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 10

Pipes + Wier A- Dont Use

Hydrograph type	= Diversion2	Peak discharge	= 125.90 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 18.895 acft
Inflow hydrograph	= 4 - Pond 3-4 SE Side	2nd diverted hyd.	= 9
Diversion method	= Pond - 3-4 Pond	Pond structure	= Weir B



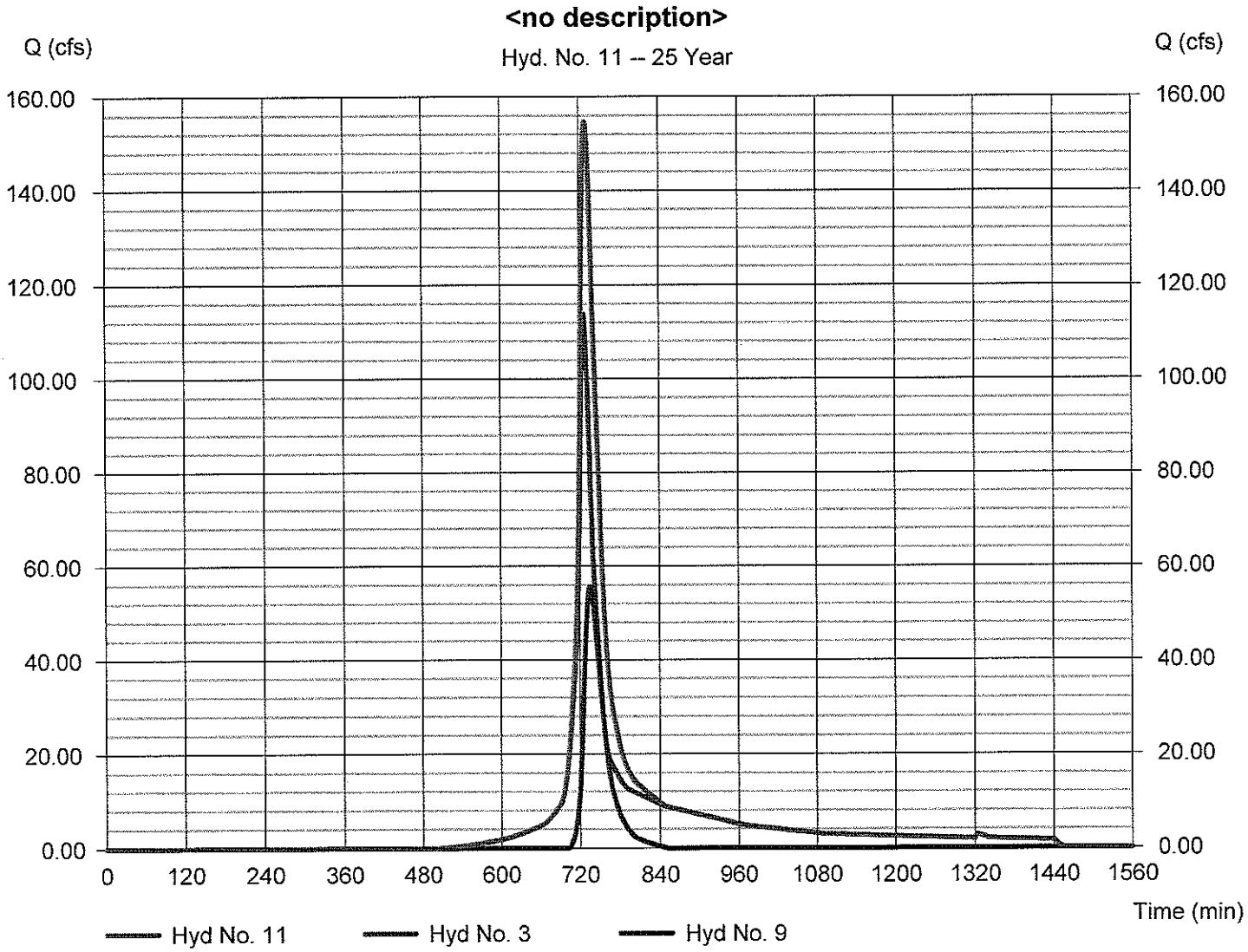
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

Hyd. No. 11

<no description>

Hydrograph type	= Combine	Peak discharge	= 154.65 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 12.629 acft
Inflow hyds.	= 3, 9	Contrib. drain. area	= 33.700 ac



Hydrograph Report

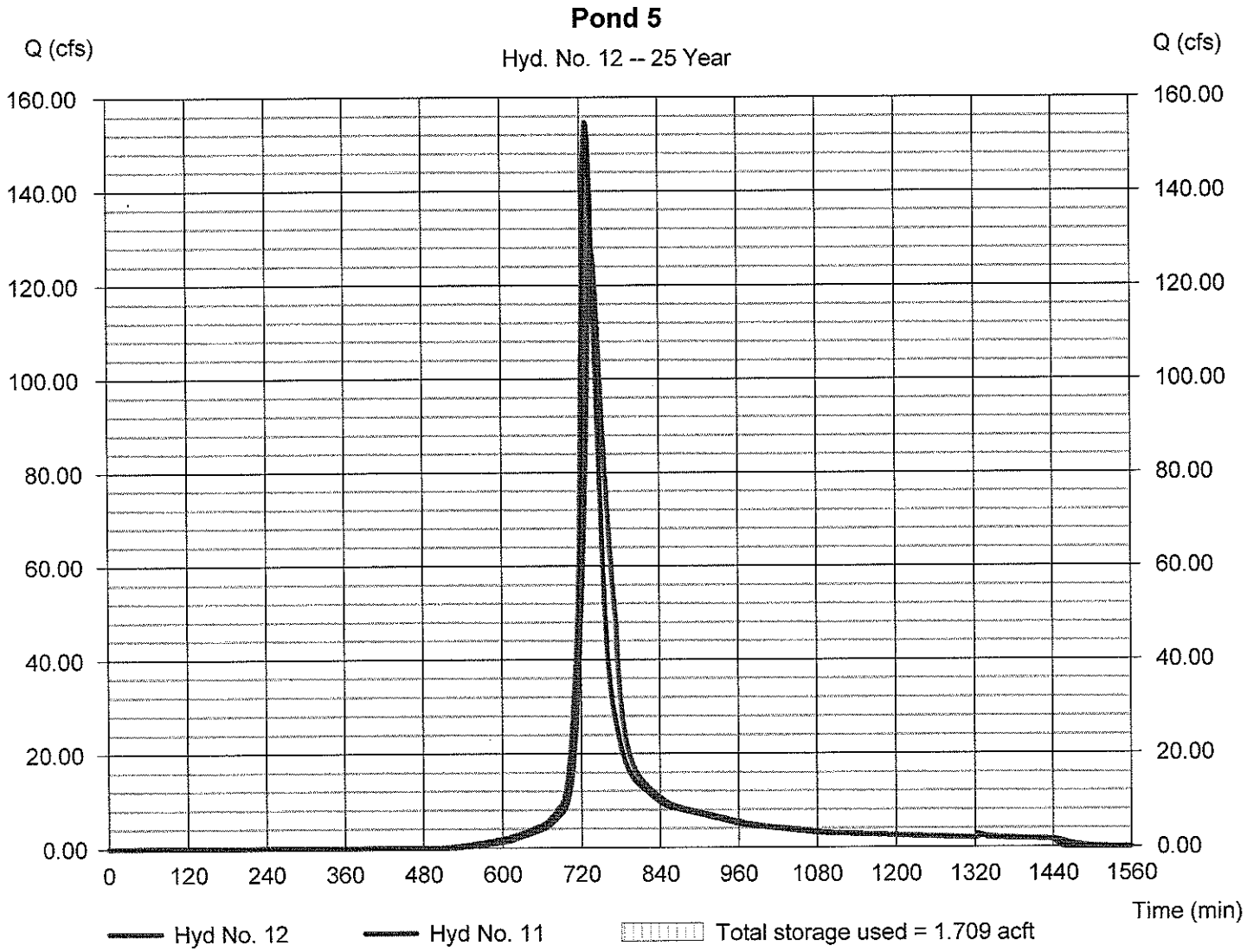
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052 — Thursday, Feb 12, 2009

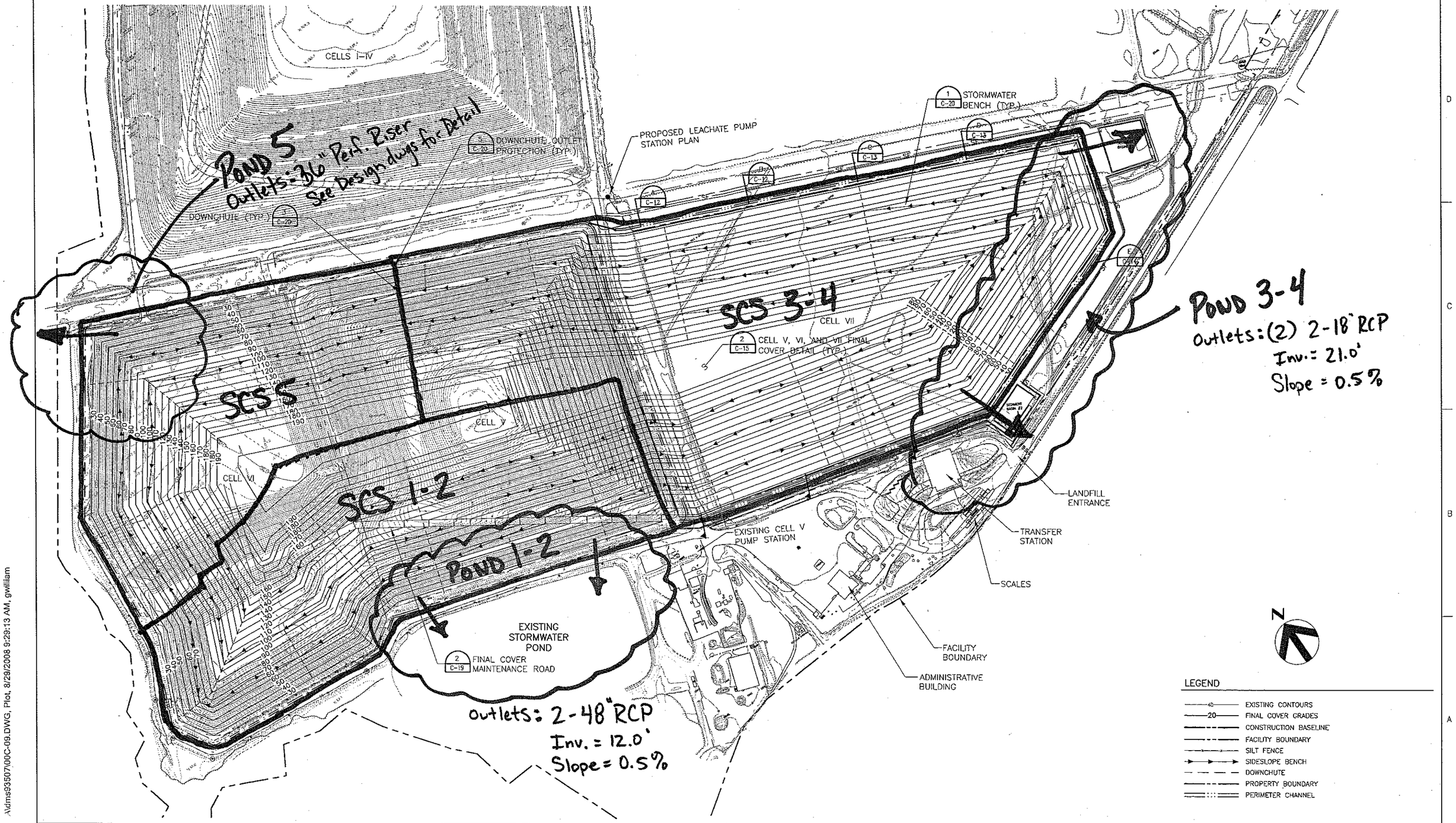
Hyd. No. 12

Pond 5

Hydrograph type	= Reservoir	Peak discharge	= 127.38 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 1 min	Hyd. volume	= 12.629 acft
Inflow hyd. No.	= 11 - <no description>	Max. Elevation	= 21.52 ft
Reservoir name	= Pond 5	Max. Storage	= 1.709 acft

Storage Indication method used.





HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 | Raleigh, NC 27612

ISSUE	DATE	DESCRIPTION
A	8/2008	ISSUED FOR APPROVAL

PROJECT MANAGER	D.T. DECESARE, P.E.
	T.M. YANOSCHAK, P.E.
	G.M. WILLIAMS, E.I.
PROJECT NUMBER	00002889.018

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SPSA

Regional Landfill Cell VII Expansion

Part B Application

SUFFOLK VIRGINIA

FINAL GRADING AND DRAINAGE PLAN

0 1" 2"

FILENAME	00C-09.dwg
SCALE	1"=200'

SHEET C-09

C:\PWworkin\..\dms93507\00C-09.DWG, Plot, 8/29/2008 9:29:13 AM, gwilliam

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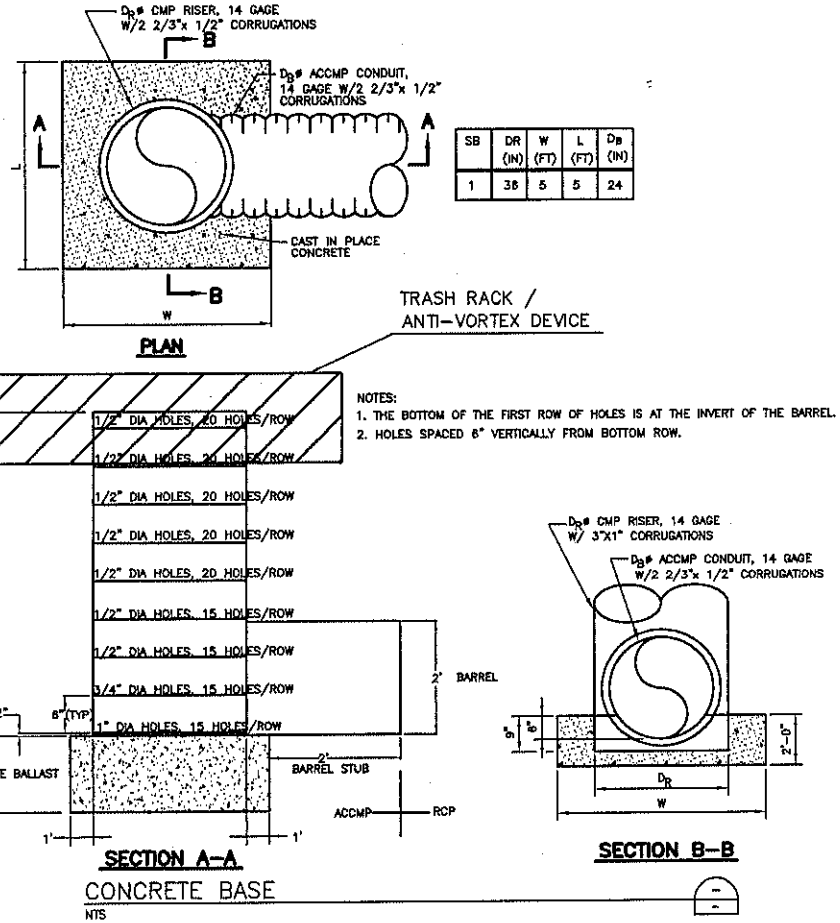
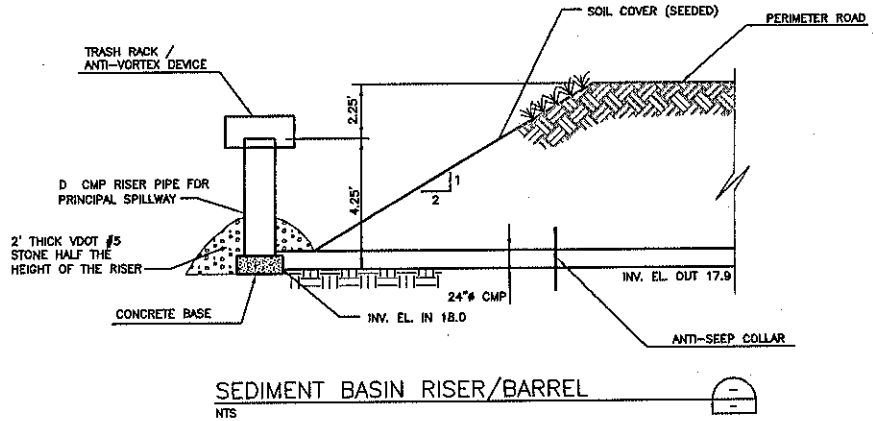


SB	DR (IN)	W (FT)	L (FT)	D_B (IN)
1	38	5	5	24



HDR
HDR Engineering, Inc. of the Carolinas
128 S Tryon Street, Suite 1400 | Charlotte, NC 28202

STORM DRAINAGE

PERFORATED RISER DETAIL

DATE
8/29/08

FIGURE
1

SPSA Borrow Area

Sediment Basin # 1

25 - year Storm Event

Post Development

HDR Project No.01743-2889-018

Qp =	135.4	cfs	
Tp =	27.9	minutes	
dT = Max of	3	minutes	
or	2.0%	of increment to peak	

b = 1.9

Ks = 6,537

Diameter of Barrel =	24	(in)		
Height of Riser above barrel =	2.25	(ft)	elevation	20.25
ight of Riser from bottom of barrel=	4.25	(ft)	elevation	22.25
Emergency Spillway =	5.00	(ft)	elevation	23.00
Total Height of Dam =	6.00	(ft)	elevation	24.00
Length of Emergency Spillway =	8	(ft)		
Diameter of Riser =	36	(in)		
Permanent Pond Stage =	0	(ft)	elevation	18.0

5.9E-03	Settling Velocity of design particle (fps)	
2	Effective number of cells (2 is construction site #)	
93%	Minimum Settling Efficiency	
6.0 ft	Maximum Stage	24.00 msl elevation
58.5 cfs	Peak outflow	
33.8 cfs	Peak Barrel outflow	
24.7 cfs	peak weir flow	

Notes:

1. Length of emergency spillway is the bottom width of the emergency spillway.
2. Settling efficiency neglects permanent pond volume

TIME [min]	INFLOW [cfs]	STORAGE [cu ft]	STAGE [ft]	PERF FLOW [cfs]	RISER CAPACITY [cfs]	WEIR FLOW [cfs]	BARREL CAPACITY [cfs]	TOTAL OUTFLOW [cfs]	BOUND DISCHG [cfs]	Est. Surface Area (sf)	SETTLING EFF. [%]
0	0.0	0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	-	N/A
3	3.8	0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	-	N/A
6	14.9	691	0.3	0.18	0.18	0.00	0.18	0.18	9.46	4,298	100%
9	32.0	3,344	0.7	0.38	0.38	0.00	0.38	0.38	19.66	8,936	100%
12	53.1	9,032	1.2	0.62	0.62	0.00	0.62	0.62	31.18	14,172	100%
15	75.9	18,476	1.7	0.86	0.86	0.00	0.86	0.86	43.46	19,756	100%
18	97.7	31,975	2.3	1.15	1.15	0.00	1.15	1.15	56.06	25,483	100%
21	116.1	49,353	3.0	1.45	1.45	0.00	1.45	1.45	68.57	31,169	100%
24	129.1	69,995	3.6	1.78	1.78	0.00	1.78	1.78	80.65	36,657	100%
27	135.1	92,909	4.1	2.15	2.15	0.00	2.15	2.15	91.97	41,806	100%
30	133.4	116,833	4.7	2.46	11.50	0.00	29.01	11.50	102.29	46,496	99%
33	124.3	138,776	5.1	2.67	28.86	1.28	30.74	30.14	110.80	50,362	97%
36	109.5	155,725	5.5	2.79	44.67	7.72	31.93	39.65	116.88	53,129	96%
39	95.2	168,297	5.7	2.81	57.22	14.11	32.75	46.86	121.17	55,078	95%
42	82.8	176,997	5.9	2.81	66.22	19.07	33.29	52.36	124.04	56,382	94%
45	71.9	182,469	6.0	2.81	72.01	22.37	33.62	55.99	125.81	57,184	94%
48	62.5	185,341	6.0	2.81	75.08	24.15	33.79	57.94	126.72	57,600	94%
51	54.4	186,170	6.0	2.81	75.97	24.67	33.83	58.51	126.98	57,719	93%
54	47.3	185,425	6.0	2.81	75.17	24.21	33.79	58.00	126.75	57,612	94%
57	41.1	183,494	6.0	2.81	73.10	23.00	33.68	56.68	126.13	57,333	94%
60	35.7	180,689	5.9	2.81	70.12	21.28	33.51	54.79	125.23	56,925	94%
63	31.1	177,256	5.9	2.81	66.49	19.22	33.30	52.53	124.12	56,420	94%
66	27.0	173,392	5.8	2.81	62.46	16.97	33.07	50.03	122.86	55,846	95%
69	23.5	169,246	5.7	2.81	58.19	14.63	32.81	47.44	121.49	55,222	95%
72	20.4	164,932	5.6	2.81	53.80	12.30	32.53	44.83	120.04	54,564	95%
75	17.7	160,535	5.6	2.81	49.41	10.04	32.25	42.29	118.55	53,884	96%
78	15.4	156,117	5.5	2.79	45.05	7.90	31.95	39.86	117.02	53,191	96%
81	13.4	151,719	5.4	2.77	40.80	5.92	31.66	37.58	115.48	52,490	96%
84	11.7	147,368	5.3	2.73	36.68	4.14	31.35	35.50	113.93	51,786	96%
87	10.1	143,076	5.2	2.69	32.71	2.59	31.05	33.64	112.38	51,081	97%
90	8.8	138,845	5.1	2.67	28.92	1.30	30.74	30.22	110.82	50,374	97%
93	7.7	134,990	5.1	2.62	25.56	0.41	30.45	25.97	109.38	49,720	98%
96	6.7	131,695	5.0	2.60	22.78	0.00	30.20	22.78	108.14	49,153	98%
99	5.8	128,792	4.9	2.58	20.41	0.00	29.98	20.41	107.02	48,647	98%
102	5.0	126,160	4.9	2.56	18.32	0.00	29.77	18.32	106.00	48,183	99%
105	4.4	123,768	4.8	2.53	16.48	0.00	29.58	16.48	105.07	47,757	99%
108	3.8	121,588	4.8	2.51	14.85	0.00	29.40	14.85	104.20	47,365	99%
111	3.3	119,599	4.7	2.49	13.41	0.00	29.24	13.41	103.41	47,004	99%
114	2.9	117,779	4.7	2.46	12.14	0.00	29.09	12.14	102.67	46,670	99%
117	2.5	116,112	4.7	2.44	11.00	0.00	28.95	11.00	102.00	46,363	99%
120	2.2	114,582	4.6	2.44	10.02	0.00	28.81	10.02	101.37	46,078	100%
123	1.9	113,170	4.6	2.41	9.11	0.00	28.69	9.11	100.79	45,814	100%
126	1.6	111,869	4.6	2.39	8.31	0.00	28.58	8.31	100.25	45,569	100%
129	1.4	110,669	4.6	2.39	7.61	0.00	28.47	7.61	99.75	45,341	100%
132	1.2	109,555	4.5	2.36	6.97	0.00	28.38	6.97	99.28	45,129	100%

135	1.1	108,525	4.5	2.36	6.41	0.00	28.28	6.41	98.85	44,931	100%
138	0.9	107,564	4.5	2.36	5.92	0.00	28.20	5.92	98.44	44,746	100%
141	0.8	106,668	4.5	2.33	5.45	0.00	28.12	5.45	98.06	44,573	100%
144	0.7	105,834	4.4	2.33	5.05	0.00	28.04	5.05	97.70	44,411	100%
147	0.6	105,053	4.4	2.31	4.67	0.00	27.97	4.67	97.37	44,258	100%
150	0.5	104,324	4.4	2.31	4.35	0.00	27.90	4.35	97.05	44,115	100%
153	0.5	103,638	4.4	2.31	4.06	0.00	27.84	4.06	96.76	43,981	100%
156	0.4	102,990	4.4	2.28	3.78	0.00	27.78	3.78	96.48	43,853	100%
159	0.4	102,383	4.4	2.28	3.55	0.00	27.72	3.55	96.21	43,733	100%
162	0.3	101,808	4.4	2.28	3.34	0.00	27.66	3.34	95.96	43,619	100%
165	0.3	101,261	4.3	2.28	3.16	0.00	27.61	3.16	95.72	43,510	100%
168	0.2	100,741	4.3	2.25	2.96	0.00	27.56	2.96	95.49	43,406	100%
171	0.2	100,249	4.3	2.25	2.82	0.00	27.52	2.82	95.28	43,307	100%
174	0.2	99,778	4.3	2.25	2.69	0.00	27.47	2.69	95.07	43,213	100%
177	0.2	99,325	4.3	2.25	2.58	0.00	27.43	2.58	94.87	43,121	100%
180	0.1	98,888	4.3	2.25	2.48	0.00	27.39	2.48	94.67	43,033	100%
184	0.1	98,324	4.3	2.22	2.34	0.00	27.33	2.34	94.42	42,919	100%
188	0.1	97,789	4.3	2.22	2.26	0.00	27.28	2.26	94.18	42,811	100%
192	0.1	97,268	4.3	2.22	2.22	0.00	27.23	2.22	93.95	42,705	100%
196	0.1	96,753	4.2	2.22	2.22	0.00	2.22	2.22	93.72	42,600	100%
200	0.1	96,235	4.2	2.19	2.19	0.00	2.19	2.19	93.49	42,494	100%
204	0.0	95,723	4.2	2.19	2.19	0.00	2.19	2.19	93.25	42,389	100%
208	0.0	95,208	4.2	2.19	2.19	0.00	2.19	2.19	93.02	42,283	100%
212	0.0	94,692	4.2	2.19	2.19	0.00	2.19	2.19	92.79	42,176	100%
216	0.0	94,174	4.2	2.15	2.15	0.00	2.15	2.15	92.55	42,069	100%
220	0.0	93,663	4.2	2.15	2.15	0.00	2.15	2.15	92.32	41,963	100%
224	0.0	93,152	4.2	2.15	2.15	0.00	2.15	2.15	92.08	41,856	100%
228	0.0	92,639	4.1	2.15	2.15	0.00	2.15	2.15	91.85	41,749	100%
233	0.0	91,998	4.1	2.10	2.10	0.00	2.10	2.10	91.55	41,615	100%
238	0.0	91,371	4.1	2.10	2.10	0.00	2.10	2.10	91.26	41,483	100%
243	0.0	90,744	4.1	2.10	2.10	0.00	2.10	2.10	90.97	41,351	100%
248	0.0	90,116	4.1	2.08	2.08	0.00	2.08	2.08	90.68	41,218	100%
253	0.0	89,495	4.1	2.08	2.08	0.00	2.08	2.08	90.39	41,086	100%
258	0.0	88,874	4.0	2.08	2.08	0.00	2.08	2.08	90.10	40,953	100%
263	0.0	88,252	4.0	2.08	2.08	0.00	2.08	2.08	89.80	40,820	100%
268	0.0	87,631	4.0	2.05	2.05	0.00	2.05	2.05	89.51	40,686	100%
273	0.0	87,016	4.0	2.05	2.05	0.00	2.05	2.05	89.22	40,553	100%
278	0.0	86,401	4.0	2.05	2.05	0.00	2.05	2.05	88.92	40,420	100%
284	0.0	85,664	4.0	2.03	2.03	0.00	2.03	2.03	88.57	40,260	100%
290	0.0	84,935	4.0	2.03	2.03	0.00	2.03	2.03	88.22	40,100	100%
296	0.0	84,206	3.9	2.03	2.03	0.00	2.03	2.03	87.87	39,940	100%
302	0.0	83,477	3.9	2.00	2.00	0.00	2.00	2.00	87.51	39,779	100%
308	0.0	82,757	3.9	2.00	2.00	0.00	2.00	2.00	87.16	39,620	100%
314	0.0	82,037	3.9	1.97	1.97	0.00	1.97	1.97	86.81	39,460	100%
320	0.0	81,327	3.9	1.97	1.97	0.00	1.97	1.97	86.46	39,301	100%
326	0.0	80,617	3.8	1.97	1.97	0.00	1.97	1.97	86.11	39,141	100%
332	0.0	79,906	3.8	1.95	1.95	0.00	1.95	1.95	85.76	38,981	100%
339	0.0	79,089	3.8	1.95	1.95	0.00	1.95	1.95	85.35	38,795	100%
346	0.0	78,272	3.8	1.92	1.92	0.00	1.92	1.92	84.94	38,609	100%
353	0.0	77,467	3.8	1.92	1.92	0.00	1.92	1.92	84.53	38,424	100%
360	0.0	76,662	3.7	1.92	1.92	0.00	1.92	1.92	84.12	38,238	100%
367	0.0	75,857	3.7	1.89	1.89	0.00	1.89	1.89	83.71	38,051	100%
374	0.0	75,065	3.7	1.89	1.89	0.00	1.89	1.89	83.31	37,866	100%
381	0.0	74,273	3.7	1.85	1.85	0.00	1.85	1.85	82.90	37,680	100%
389	0.0	73,384	3.7	1.85	1.85	0.00	1.85	1.85	82.43	37,470	100%
397	0.0	72,495	3.6	1.80	1.80	0.00	1.80	1.80	81.97	37,259	100%

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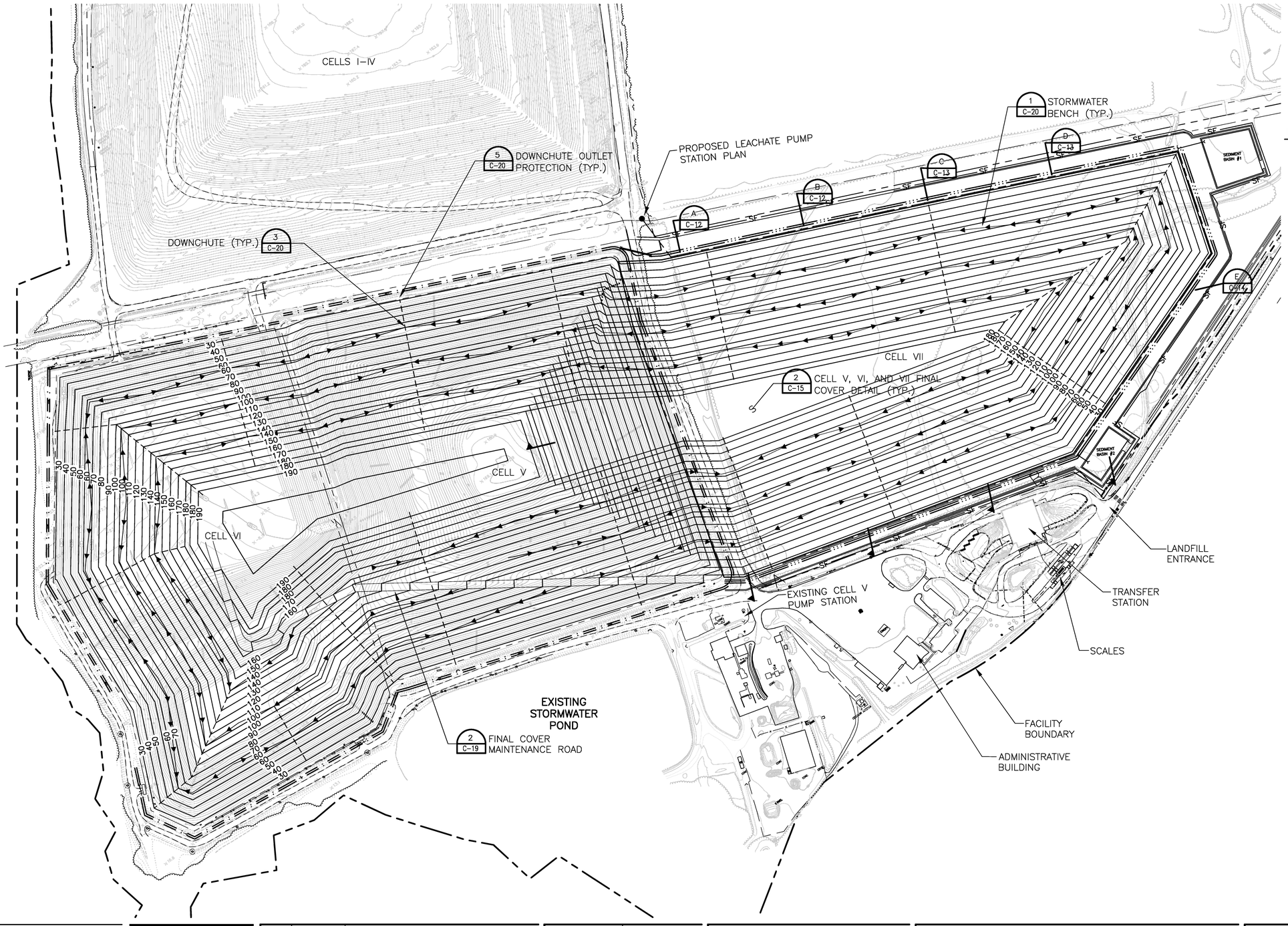

NOTES

1. TOPOGRAPHY WITHIN AREA OF EXPOSED GEOSYNTHETICS ON SOUTH SIDE OF CELLS I–IV SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED NOVEMBER 6 AND 15, 2007.
2. TOPOGRAPHY WITHIN AREAS OF CELLS I–IV WITH SOIL COVER OVER GEOSYNTHETICS (EXCLUDING EAST SLOPE) SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED MAY 2, 2008.
3. TOPOGRAPHY WITHIN EAST SLOPE OF CELLS I–IV SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED APRIL 1, 2008.
4. EXISTING TOPOGRAPHY WITHIN CELL V AND CELL VI PHASE 1 SUPPLIED BY HOGGARD & EURE ASSOC., PC FROM FIELD SURVEY DATED DECEMBER 27, 2007.
5. AS–BUILT TOPOGRAPHY WITHIN CELL VI PHASE 2 SUPPLIED BY BATEMAN CIVIL–SURVEY CO., PC FROM FIELD SURVEY DATED NOVEMBER 12, 2007.
6. EXISTING TOPOGRAPHY WITHIN CELL VII SUPPLIED BY AIR SURVEY BY AERIAL SURVEY DATED DECEMBER 30, 2004.
7. AS–BUILT TOPOGRAPHY WITHIN THE TRANSFER STATION AREA SUPPLIED BY HURT AND PRIFFITT DATED SEPTEMBER 19, 2005.
8. HORIZONTAL DATUM IS BASED ON THE VIRGINIA STATE PLANE COORDINATE SYSTEM–SOUTH ZONE (NAD 83). VERTICAL DATUM IS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM (NGVD 29).
9. THE BUFFERS OUTLINED IN 9VAC 20–80–250 A(7) WILL BE MAINTAINED.
10. THE CONDITIONS SHOWN AS EXISTING ON THIS DRAWING REPRESENT GENERAL CONDITIONS AT THE TIME OF THE SURVEYS REFERENCED HEREIN.
11. FINAL COVER GRADES DEPICT TOP OF FINAL COVER.
12. STORMWATER BENCHES ARE SHOWN SCHEMATICALLY. ARROWS SHOW DIRECTION OF FLOW.

LEGEND

- EXISTING CONTOURS
- FINAL COVER GRADES
- CONSTRUCTION BASELINE
- FACILITY BOUNDARY
- SILT FENCE
- SIDESLOPE BENCH
- DOWNCHUTE
- PROPERTY BOUNDARY
- PERIMETER CHANNEL

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 | Raleigh, NC 27612

ISSUE	DATE	DESCRIPTION
A	8/2008	ISSUED FOR APPROVAL

PROJECT MANAGER	D.T. DECESARE, P.E.
	T.M. YANOSCHAK, P.E.
	G.M. WILLIAMS, E.I.
PROJECT NUMBER	00002889.018

COMMONWEALTH OF VIRGINIA — THOMAS M. YANOSCHAK — Lic. No. 043303 — PROFESSIONAL ENGINEER — 8/27/08

COMMONWEALTH OF VIRGINIA — DOUGLAS GARY DECESARE — Lic. No. 38558 — PROFESSIONAL ENGINEER — 8-27-08

SPSA

Regional Landfill Cell VII Expansion

Part B Application

SUFFOLK **VIRGINIA**

FINAL GRADING AND DRAINAGE PLAN

0 1" 2"

FILENAME	00C–09.dwg
SCALE	1"=200'

SHEET **C-09**

C:\pwworking\tpal\dms65507\00C-09.DWG, Plot, 8/28/2008 10:45:22 AM, lpatters

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B

Appendix B – Conceptual Calculations for a Sediment Basin for Cells VIII and IX

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HDR Computation

Job No. 1743-115-018

Project:	SPSA Cell VIII and IX Soil Borrow Area	Computed: JSM	Date: 6/20/16
Subject:	Drainage	Checked:	Date:
Task:	Sediment Basin SB #3	Sheet	Of

References 1. "Elements of Urban Stormwater Design" by H. Rooney Malcom, P.E.
2. Virginia Erosion and Sediment Control Handbook.

Pond Volume Requirements

Pre Dev Drainage Area A (ac) = 129.00

67	cy/acre wet storage	8643	cy	Ref 2, III-78
67	cy/acre dry storage	8643	cy	
134	Total Volume	17286	cy	
33.5	cy/acre Minimum sediment storage volume	4322	cy	

Estimate Depth of Runoff for design storm @ location: Ref 1, III-4

Determine Ultimate Storage Capacity (S): Soil Group B

CN = Varies Ref 2, V-56

S = (1000/CN) - 10 = Varies

Q_p = (qu)(A)(Q^*)

Runoff Depth Q^* (inches) = (P-0.2S)2/(P+0.8S)

T_P (min) = 60.5(Q^*)A/Q_P/1.39

CN		Pre development	Post Development
98	Impervious Area (ac) =	0	0
61	Pervious Area (ac) =	129	129
	Total	129	129

Calculate Peak Flow Into Basin

Development	Post	Post	Post	Post		
Storm Event (yrs) =	2	10	25	100		
Time of conc (min) =	5	5	5	5		
Rainfall Depth P (in) =	3.7	5.7	6.7	8.5	(24 rainfall)	Ref 2, V-50
Initial Abstraction Ia (in)=	1.279	1.279	1.279	1.279		Ref 2, V-64
Ia/P ratio =	0.346	0.224	0.191	0.150		
Curve Number CN =	61.00	61.00	61.00	61.00		Ref 2, V-56
S =	6.39	6.39	6.39	6.39		
qu (cfs/sq.mi./in) =	1000	1000	1000	1000		Ref 2, V-55
Drainage Area A (ac) =	129.0	129.0	129.0	129.0		
Peak Flow Q_p (cfs) =	134.1	364.3	501.4	772.0		
Runoff Depth Q^* (inches) =	0.67	1.81	2.49	3.83		
Time to Peak T_p (min) =	27.86	27.86	27.86	27.86		Ref 1, III-4

Determine Shape of Basin:

Measure the area of the Basin using AutoCADD.

Calculate Volume of the Basin using Truncated Pyramid Method.

Elevation (ft)	Depth (ft)	Area (sf)	Volume (cf)	Cumulative Vol (cf)	Cumulative Vol (cy)	
15	0	126,825	-	0	0	
16	1	132,088	129,448	129,448	4,794	
17	2	137,458	132,106	132,106	4,893	
18	3	138,818	132,776	264,882	9,810	
19	4	148,520	143,642	408,524	15,131	
20	5	154,212	151,357	559,881	20,736	Spillway Crest
21	6	160,010	157,102	716,983	26,555	
22	7	165,915	162,954	879,937	32,590	

Determine the Sediment Cleanout Interval:

V_C (cf) = 18 * T * $A^{0.84}$

V_C (cf) = Cleanout Volume

T (days) = Cleanout Interval

A (acres) = Drainage Area

34 CY/acre = 118,422 cf

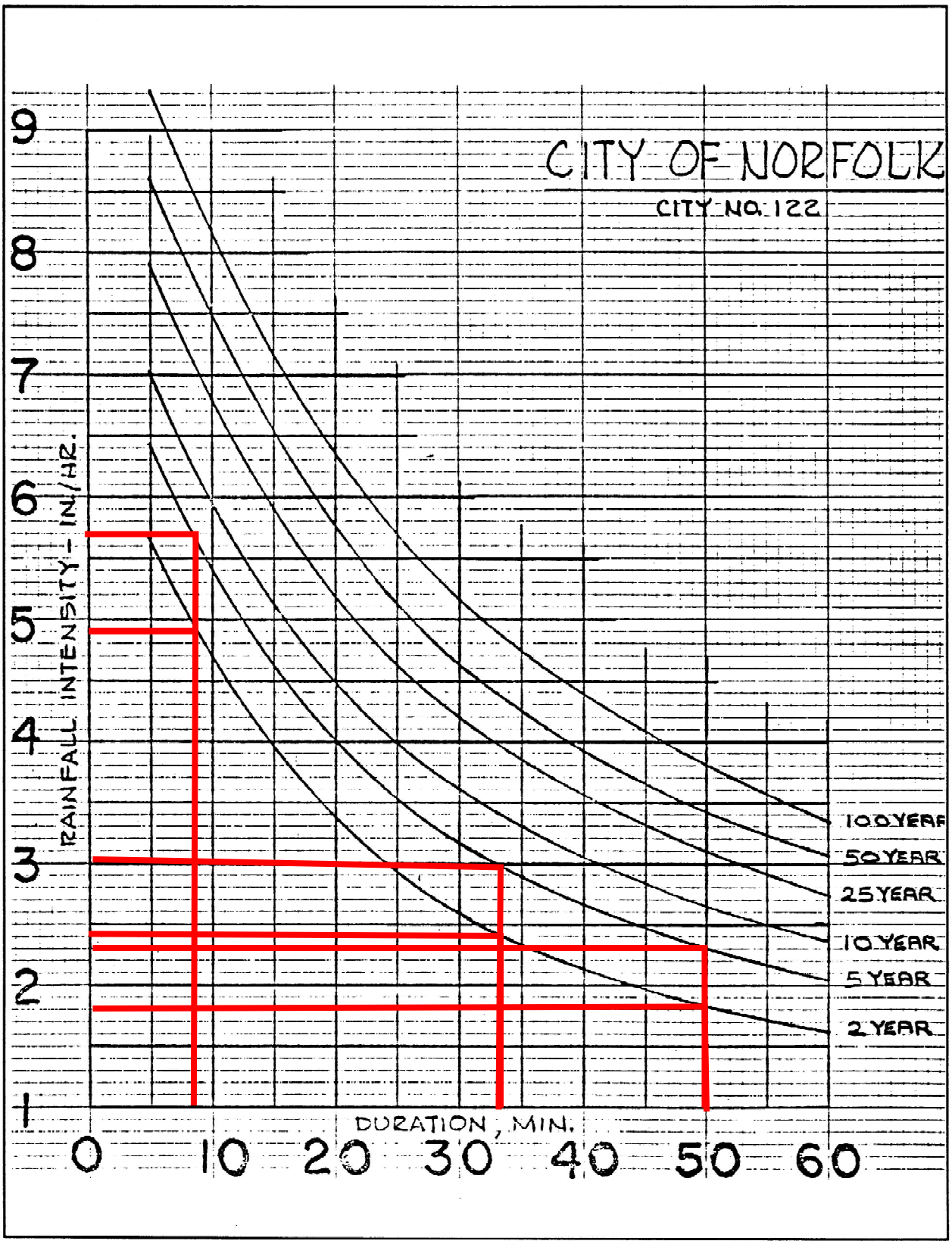
Set Sediment Storage Elevation Z_{sed} (ft) = 1.5

Sediment Volume corresponding to the Sediment Storage Elevation V_C(cf) = 129,448

Clean Out Interval (T), days = 121 or as needed

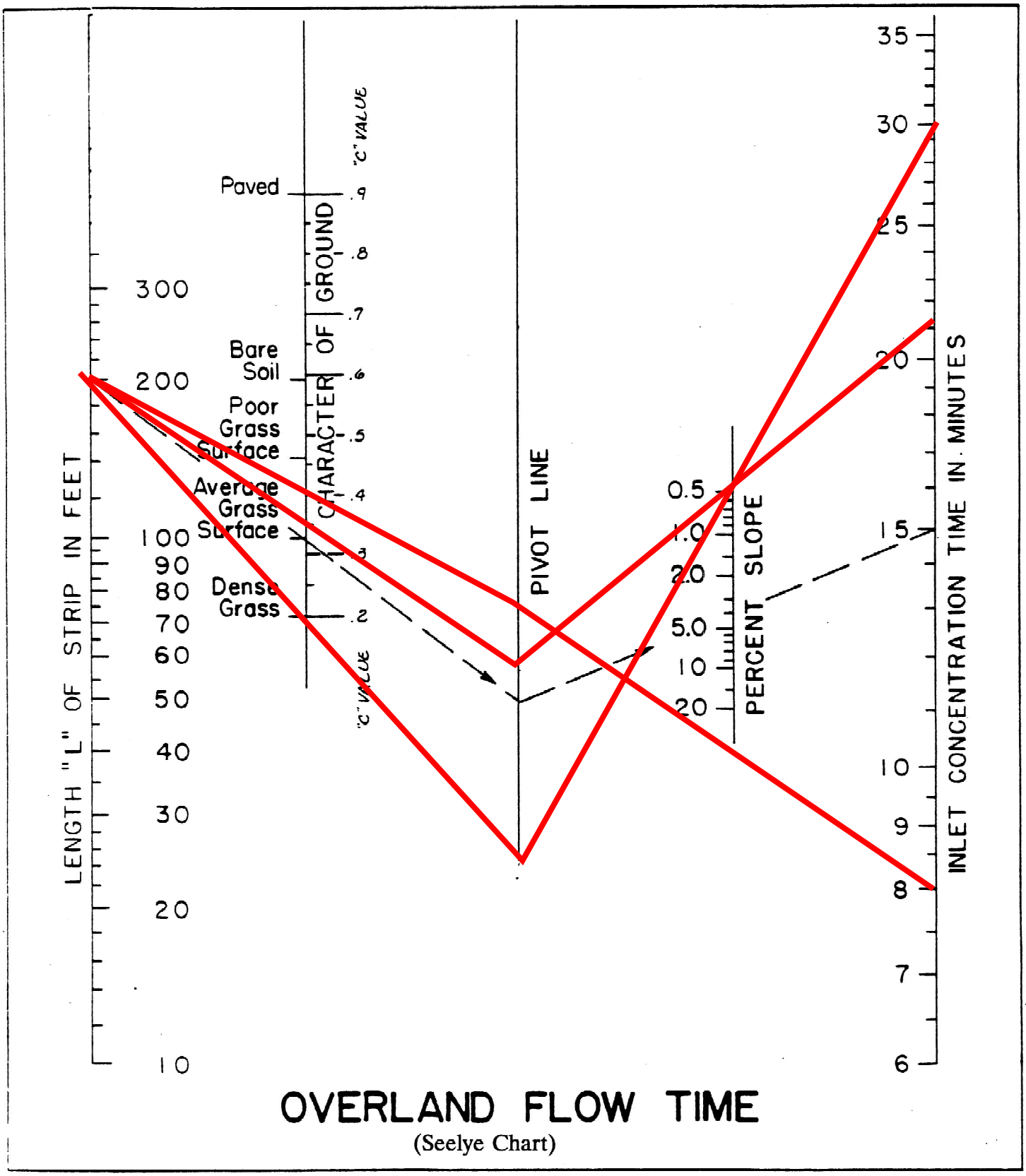
Conclusion

Pond to have permanent pool @ elevation 20 with a 2' berm around the basin. Spillway to route a 25 year storm.



Source: VDOT

Plate 5-5



OVERLAND FLOW TIME

(Seelye Chart)

Source: Data Book for Civil Engineers, E.E. Seelye

Plate 5-1

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C

Appendix C – Statement of Compliance with Compensatory Wetland Mitigation Requirements

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DAVIS
ENVIRONMENTAL
CONSULTANTS, INC.

Southeastern Virginia Public Service Authority
Statement of Compliance with Compensatory Wetland Mitigation Requirements under Corps and DEQ permits # 88-0707

The Southeastern Virginia Public Service Authority (SPSA) obtained United States Army Corps of Engineers and Virginia Department of Environmental Quality individual permits in 2002 to impact 12 acres of palustrine, forested wetlands as part of a landfill expansion project (Permit #88-0707). To compensate for the wetland impacts, 50 acres of forested wetlands were preserved, 36 acres of recently clear-cut wetlands were enhanced, and 12 acres of forested wetlands were restored. Restoration of wetland hydrology in the enhancement and restoration areas was initiated in summer 2007 with construction of two earthen berms. The earthen berms were designed to conserve water onsite by restricting surface flow in two natural drainages. Restoration success shall be evaluated based on criteria set forth in the permit conditions and outlined in the compensatory mitigation plan dated November 13, 2007. Permit requirements include annual monitoring of hydrology, vegetation, and soils in the restoration and enhancement areas and a qualitative site assessment of the preservation area.

Davis Environmental Consultants (DEC) assisted in the wetland permitting, prepared the Compensatory Mitigation Plan, performed construction management duties, and then performed the required wetland mitigation site monitoring beginning in 2008. DEC monitored the mitigation sites annually starting in 2008 and prepared the necessary monitoring reports for submittal to the Corps and DEQ. This work was done in accordance with the requirements of the Corps and DEC permits. Periodically, DEC met on site with wetland regulators to confirm the findings of these reports. There has been no indication from wetland regulators that these reports were deficient in any way. Two more years of monitoring are required by the permits (2016, 2017). The data for 2016 has already been collected and that report is in preparation for submittal by November 30, 2016.

In addition to the required monitoring, SPSA was obligated under the permits to prepare and record a real estate instrument that preserves, in perpetuity, the entire +/- 98 acre compensation site. A Declaration of Restriction Covenants was prepared on May 1, 2008 by SPSA , approved by the Corps, and was recorded at the City of Suffolk Circuit Court on June 2, 2008, in accordance with permit requirements.

Conclusion

It is the conclusion of DEC that the Southeastern Virginia Public Service Authority is in compliance with the wetland permit requirements for compensatory wetland mitigation for its landfill expansion authorized under permit #88-0707.

5654-B Parliament Drive • Virginia Beach, Virginia 23462 • (757) 456-9331 • Fax (757) 456-2736

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D

Appendix D – Photographs of Vegetative Buffer Area North of Bob Foeller Drive

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GPS Coordinates for SPSA Buffer Photos
Suffolk, VA
14 June 2016

Buffer along North side of Water Line along Bob Foeller Drive

Photo	Latitude	Longitude	Direction
1	N 36° 46.416'	W 76° 30.584'	+/- Due W

Edge of gas line ROW at entrance. Loblolly pine +/-30' tall (6-10" DBH), sweetgum in understory, switchcane (4-6' tall).

Photo	Latitude	Longitude	Direction
2	N 36° 45.377'	W 76° 30.683'	S 85 W

+/-350' west of #1 at bend of water line ROW. Loblolly pine >15' tall on N.side of stream; sweetgum6-8' tall along S.edge of ditch.

Photo	Latitude	Longitude	Direction
3	N 36° 45.377'	W 76° 30.683'	+/-NW

Twd.bend in stream; scattered loblolly pine, sweetgum 5-10' tall south of stream (big gap); scattered loblolly pine (thin along atream); N side of stram: 30' gap then thick lob.pine >15' tall.

Photo	Latitude	Longitude	Direction
4	N 36° 45.355'	W 76° 50.734'	+/- Due N

At valve box. Lob.pine >15' tall across stream (dense).

GPS Coordinates for SPSA Buffer Photos
Suffolk, VA
14 June 2016

Buffer along North side of Water Line along Bob Foeller Drive

Photo	Latitude	Longitude	Direction
5	N 36° 45.345'	W 76° 30.770'	NE

+/-200' W of #4 (3ple Cherrybark Oak); Scattered Lob.Pine 15-20' tall on South stream bank, dense lob.pine >15' on North site stream

Photo	Latitude	Longitude	Direction
6	N 36° 45.345'	W 76° 30.770'	NW

+/-200' W of #4 (3ple Cherrybark Oak); Few scattered Lob.Pine, Sweetgum on south stream bank; dense lob.pine 10-15' tall (thick) on N.stream bank.

Photo	Latitude	Longitude	Direction
7	N 36° 45.323'	W 76° 30.822'	N

+/-300' W of #5/6. Lob.pine <3' tall along S stream bank; lob.pine 10-15' tall along N stream bank - thick along stream; many but thian areas w/lob.pine 3-6' tall behind.

GPS Coordinates for SPSA Buffer Photos
Suffolk, VA
14 June 2016

Buffer along North side of Water Line along Bob Foeller Drive

Photo	Latitude	Longitude	Direction
8	N 36° 45.310'	W 76° 30.879'	NE

Big pine @ stream crossing. West end of veg.buffer: scattered lob.pine, sweetgum, sycamore, baccharis <3' tall on berm N of stream. Wet swale behind (N of) berm.

Photo	Latitude	Longitude	Direction
9	N 36° 45.310'	W 76° 30.879'	N

Big pine @ stream crossing. N: Similar veg. <3' tall on berm, rock N of stream. Vegetation on berm had been cut; now regenerating; though fewer pines than before.

Photo	Latitude	Longitude
10	N 36° 45.310'	W 76° 30.879'

Big pine @ stream crossing. NW: Scattered Lob.pine, sweetgum, baccharis on berms, logs NW stream.

Photo	Latitude	Longitude
11	N 36° 45.310'	W 76° 30.879'

Big pine @ stream crossing. +/-W: Looking twd scales, transfer station.

GPS Coordinates for SPSA Buffer Photos
Suffolk, VA
14 June 2016

Buffer along North side of Water Line along Bob Foeller Drive

Photo	Latitude	Longitude	Direction
12	N 36° 45.323'	W 76° 30.890'	E

+/-E along berm. 2ndary berm behind wet swale: scat. Lob.pine, baccharis; was much more lob.pine before cut.

Photo	Latitude	Longitude	Direction
13	N 36° 45.323'	W 76° 30.890'	W

+/-W along berm. 2ndary berm behind wet swale: scat. Lob.pine, baccharis; was much more lob.pine before cut.

Photo	Latitude	Longitude
14	N 36° 45.295'	W 76° 30.936'

At culvert: NE: Mostly herbaceous veg. on waterline ROW, shrubs, saplings on berm; scattered sweetgum, baccharis south of berm.

Photo	Latitude	Longitude
15	N 36° 56.976'	W 76° 35.642'

At culvert: NE: Mostly herbaceous veg. on waterline ROW, shrubs, saplings on berm; scattered sweetgum, baccharis south of berm.

E

Appendix E – IPAC Submittal to USFWS

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Date: 5/17/2016

Self-Certification Letter

Project Name: SPSA Expansion Cells VII, VIII and IX

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Ecological Services online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the project named above in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. . 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in:

- "no effect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, not likely to adversely affect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, likely to adversely affect" determination for the Northern long-eared bat (*Myotis septentrionalis*) and relying on the findings of the January 5, 2016 Programmatic Biological Opinion for the Final 4(d) Rule on the Northern long-eared bat; and/or
- "no Eagle Act permit required" determinations for eagles.

We certify that use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the "no effect" or "not likely to adversely affect" determinations for proposed and listed species and proposed and designated critical habitat; the "may affect" determination for Northern long-eared bat; and/or the "no Eagle Act permit required" determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of proposed or listed species, proposed or designated critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for 1 year.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Troy Andersen of this office at (804) 824-2428.

Sincerely,

Cindy Schulz
Field Supervisor
Virginia Ecological Services

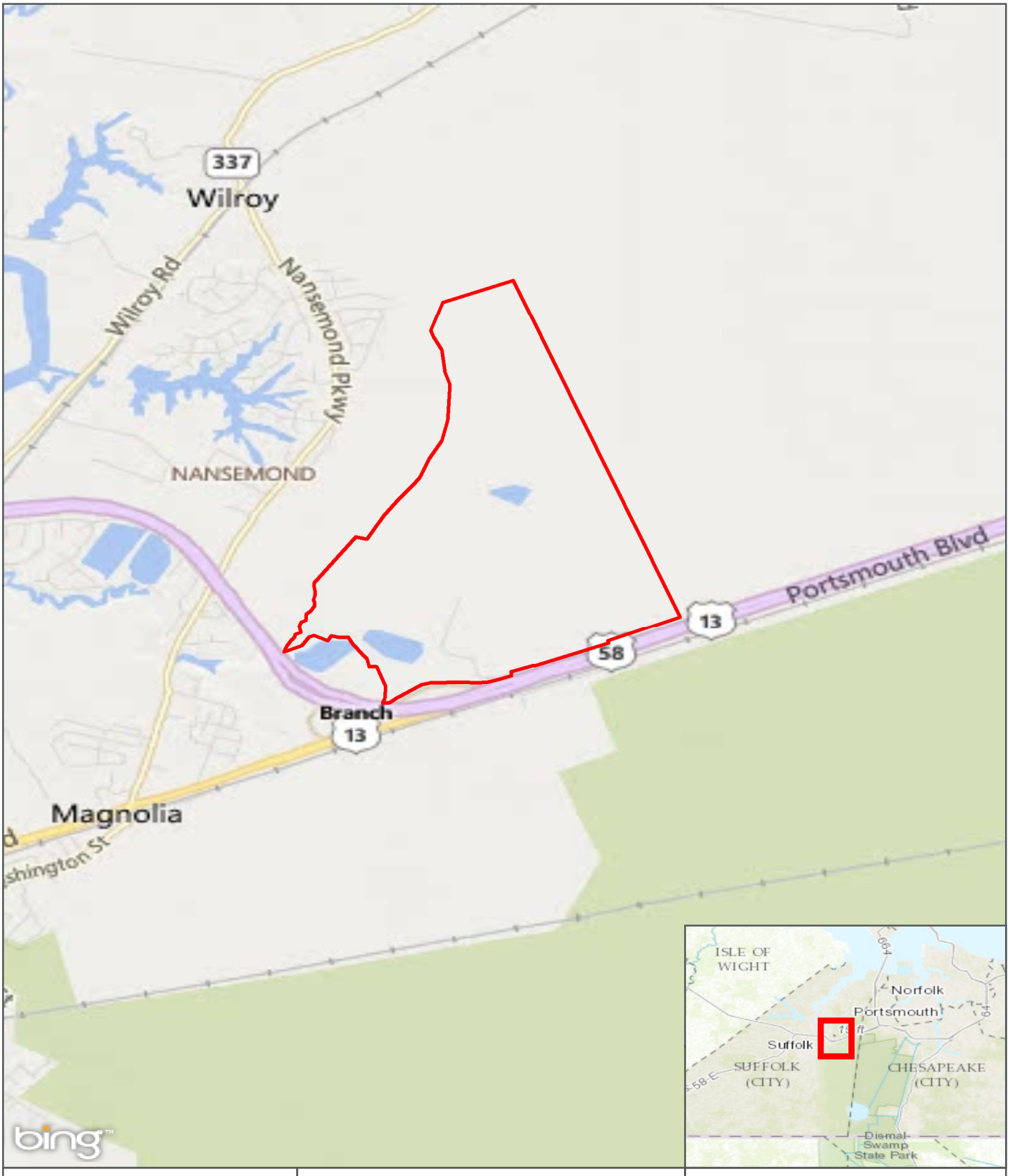
Enclosures - project review package

SOUTHEASTERN PUBLIC SERVICE AUTHORITY OF VIRGINIA

CONDITIONAL USE PERMIT APPLICATION

SUFFOLK, VIRGINIA

PROJECT AREA MAP



0 1,000 2,000 FEET

LEGEND

Project Location

PROJECT AREA MAP

DATA SOURCES: Bing Maps Road

FIGURE 1

PATH: - USER: LMEADOWS - DATE: 6/8/2016

SOUTHEASTERN PUBLIC SERVICE AUTHORITY OF VIRGINIA

CONDITIONAL USE PERMIT APPLICATION

SUFFOLK, VIRGINIA

IPaC OFFICIAL SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Code: 05E2VA00-2016-SLI-2641 May 16, 2016
Event Code: 05E2VA00-2016-E-03165
Project Name: SPSA CUP-WQIA

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and

endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: SPSA CUP-WQIA

Official Species List

Provided by:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

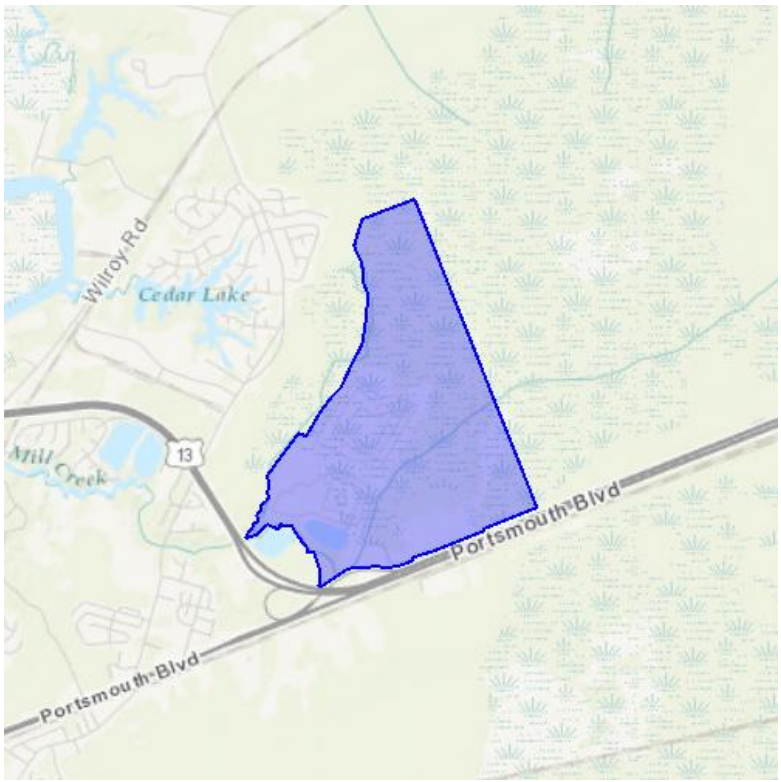
Consultation Code: 05E2VA00-2016-SLI-2641
Event Code: 05E2VA00-2016-E-03165

Project Type: Landfill

Project Name: SPSA CUP-WQIA
Project Description: Proposed landfill expansion.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Suffolk, VA

United States Department of Interior
Fish and Wildlife Service

Project name: SPSA CUP-WQIA

Endangered Species Act Species List

There are a total of 1 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Mammals	**Status**	**Has Critical Habitat**	**Condition(s)**
Northern long-eared Bat *(Myotis septentrionalis)*	Threatened		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Appendix A: FWS National Wildlife Refuges and Fish Hatcheries

There are no refuges or fish hatcheries within your project area.

SOUTHEASTERN PUBLIC SERVICE AUTHORITY OF VIRGINIA

CONDITIONAL USE PERMIT APPLICATION

SUFFOLK, VIRGINIA

SPECIES CONCLUSION TABLE

Species Conclusions Table

Project Name: Southeastern Public Service Authority

Date: June 7, 2016

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Northern long-eared Bat (*Myotis septentrionalis*)	Suitable habitat present. No critical habitat present.	No effect/Not Likely to Adversely Affect	Implementing a TOYR (April 15-Sept 15) for tree clearing.
Bald Eagles	No suitable habitat present. No critical habitat present. Unlikely to disturb nesting bald eagles. Does not intersect with an eagle concentration area.	No Eagle Act permit required	The Center for Conservation Biology VA Eagle Nest Locator did not have any records of eagle nests in the vicinity of the project area and the project limits are between 2,500 and 600 feet from the Bald Eagle concentration areas. The VAEagles map is attached.
Critical Habitat	No critical habitat present	No effect	Project is located in Suffolk, Virginia.

SOUTHEASTERN PUBLIC SERVICE AUTHORITY OF VIRGINIA

CONDITIONAL USE PERMIT APPLICATION

SUFFOLK, VIRGINIA

DEPARTMENT OF GAME AND INLAND FISHERIES SEARCH RESULTS

VaFWIS - Department of Game and Inland Fisheries

36.76400 -76.51699
is the Search Point
Submit Cancel

Search Point
- **Change** to "clicked" map point
- **Fixed** at 36.76400 -76.51699

Show Position Rings
Yes No
1/2 mile and 1/8 mile at the **Search Point**

Show Search Area
Yes No
2 Search distance miles radius

Search Point is at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search

Map Overlay Legend
Position Rings 1/2 mile and 1/8 mile at the Search Point
2 mile radius Search Area

Virginia Fish and Wildlife Information Service

back | Refresh Browser Page

Map Click: Pan Id M | Map Scale: In Zoom Out | Screen Size: Small Size Big | Help

N

500 0 500 1000 1500 2000 Meters
2000 0 2000 4000 6000 8000 Feet

Point of Search 36.76400 -76.51699
Map Location 36.76400 -76.51699

Select **Coordinate System:**
- Degrees,Minutes,Seconds Latitude - Longitude
- Decimal Degrees Latitude - Longitude
- Meters UTM NAD83 East North Zone
- Meters UTM NAD27 East North Zone

Base Map source: Topographic maps from TOPO! copyright 2006 (see National Geographic Maps for details)

VaFWIS Initial Project Assessment Report Compiled on 4/15/2016, 4:21:16 PM

Help

Known or likely to occur within a **2 mile radius around point 36.7640000 -76.5169995** in **800 Suffolk City, VA**

View Map of Site Location

567 Known or Likely Species ordered by Status Concern for Conservation (displaying first 41) (41 species with Status* or Tier I** or Tier II**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
040228	FESE	I	Woodpecker, red-cockaded	Picoides borealis		BOVA
010032	FESE	II	Sturgeon, Atlantic	Acipenser oxyrinchus		BOVA
030074	FESE		Turtle, Kemp's ridley sea	Lepidochelys kempii		BOVA
030071	FTST	I	Turtle, loggerhead sea	Caretta caretta		BOVA
040120	FTST	I	Plover, piping	Charadrius melodus		BOVA
040144	FTST	IV	Knot, red	Calidris canutus rufa		BOVA
050022	FTST		Bat, northern long-eared	Myotis septentrionalis		BOVA
040110	SE	I	Rail, black	Laterallus jamaicensis		BOVA
050034	SE	I	Bat, Rafinesque's eastern big-eared	Corynorhinus rafinesquii macrotis		BOVA
030013	SE	II	Rattlesnake, canebrake	Crotalus horridus	Yes	BOVA,Habitat,SppObs
050027	SE		Bat, tri-colored	Perimyotis subflavus	Yes	BOVA,SppObs
040096	ST	I	Falcon, peregrine	Falco peregrinus		BOVA
040293	ST	I	Shrike, loggerhead	Lanius ludovicianus		BOVA
020044	ST	II	Salamander, Mabee's	Ambystoma mabeei	Yes	BOVA,Habitat,SppObs
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA

070131	FS	I	Isopod, Phreatic	Caecidotea phreatica		BOVA
100176	FS	I	Skipper, Arogos	Atrytone arogos arogos		BOVA
040093	FS	II	Eagle, bald	Haliaeetus leucocephalus	Yes	BOVA,SppObs
070105	FS	III	Crayfish, Chowanoke	Orconectes virginiensis		BOVA
100192	FS	III	Roadside-skipper, dusky	Amblyscirtes alternata		BOVA
100002	FS	III	Skipper, Duke's (or scarce swamp)	Euphyes dukesi		BOVA
010038	FS	IV	Alewife	Alosa pseudoharengus		BOVA
100001	FS	IV	fritillary, Diana	Speyeria diana		BOVA
010045	FS		Herring, blueback	Alosa aestivalis		BOVA
030067	CC	II	Terrapin, northern diamond-backed	Malaclemys terrapin terrapin		BOVA,Habitat
030063	CC	III	Turtle, spotted	Clemmys guttata	Yes	BOVA,SppObs
040129		I	Sandpiper, upland	Bartramia longicauda		BOVA
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius		BOVA
040319		I	Warbler, black-throated green	Setophaga virens		BOVA
040422		I	Warbler, Wayne's	Dendroica virens waynei		Habitat
020063		II	Toad, oak	Anaxyrus quercicus		BOVA,Habitat
040038		II	Bittern, American	Botaurus lentiginosus		BOVA
040052		II	Duck, American black	Anas rubripes		BOVA
040029		II	Heron, little blue	Egretta caerulea caerulea		BOVA
040036		II	Night-heron, yellow-crowned	Nyctanassa violacea violacea		BOVA
040105		II	Rail, king	Rallus elegans		BOVA,Habitat
040186		II	Tern, least	Sterna antillarum		BOVA
040187		II	Tern, royal	Sterna maxima maximus		BOVA

040320		II	Warbler, cerulean	Setophaga cerulea		BOVA
040304		II	Warbler, Swainson's	Limnothlypis swainsonii		BOVA
040266		II	Wren, winter	Troglodytes troglodytes		BOVA

To view **All 567 species** View 567

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
II=VA Wildlife Action Plan - Tier II - Very High Conservation Need;
III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Bat Colonies or Hibernacula: **Not Known**

Anadromous Fish Use Streams (2 records)

View Map of All Anadromous Fish Use Streams

Stream ID	Stream Name	Reach Status	Anadromous Fish Species			View Map
			Different Species	Highest TE*	Highest Tier**	
P118	Nansemond river	Potential	0			Yes
P24	Burnetts Mill	Potential	0			Yes

Impediments to Fish Passage (1 records)

View Map of All Fish Impediments

ID	Name	River	View Map
785	BRIGHTS DAM	TR-NANSEMOND RIVER	Yes

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters

N/A

Managed Trout Streams

N/A

Bald Eagle Concentration Areas and Roosts

N/A

Bald Eagle Nests

N/A

Habitat Predicted for Aquatic WAP Tier I & II Species

N/A

Habitat Predicted for Terrestrial WAP Tier I & II Species (7 Species)

View Map of Combined Terrestrial Habitat Predicted for 7 WAP Tier I & II Species Listed Below

ordered by Status Concern for Conservation

BOVA Code	Status*	Tier**	Common Name	Scientific Name	View Map
030013	SE	II	Rattlesnake, canebrake	Crotalus horridus	Yes
020044	ST	II	Salamander, Mabee's	Ambystoma mabeei	Yes
030067	CC	II	Terrapin, northern diamond-backed	Malaclemys terrapin terrapin	Yes
040422		I	Warbler, Wayne's	Dendroica virens waynei	Yes
020063		II	Toad, oak	Anaxyrus quercicus	Yes
040105		II	Rail, king	Rallus elegans	Yes
050008		IV	Shrew, Dismal Swamp southeastern	Sorex longirostris fisheri	Yes

Public Holdings: (1 names)

Name	Agency	Level
Great Dismal Swamp National Wildlife Refuge	U.S. Fish and Wildlife Service	Federal

Compiled on 4/15/2016, 4:21:16 PM I722444.0 report=IPA searchType= R dist= 3218 poi= 36.7640000 -76.5169995

PixelSize=64; Anadromous=0.024939; BECAR=0.01352; Bats=0.013761; Buffer=0.100683; County=0.068445; Impediments=0.024283; Init=0.149665; PublicLands=0.036414; SppObs=0.253828; TEWaters=0.022878; TierReaches=0.053463; TierTerrestrial=0.212339; Total=1.087; Tracking_BOVA=0.173581; Trout=0.0241130000000001

Map projection is UTM Zone 18 NAD 1983 with left 360605 and top 4073766. Pixel size is 8 meters . Coordinates displayed are decimal Degrees North and West. Map is currently displayed as 1000 columns by 1000 rows for a total of 1000000 pixles. The map display represents 8000 meters east to west by 8000 meters north to south for a total of 64.0 square kilometers. The map display represents 26251 feet east to west by 26251 feet north to south for a total of 24.7 square miles.

Topographic maps and Black and white aerial photography for year 1990+-
are from the United States Department of the Interior, United States Geological Survey.
Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia Geographic Information Network.
Shaded topographic maps are from TOPO! ©2006 National Geographic
http://www.national.geographic.com/topo
All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries.

map assembled 2016-04-15 16:18:45 (qa/qc March 21, 2016 12:20 - tn=722444 dist=3218 I)
$poi=36.7640000 -76.5169999

Virginia Department of Game and Inland Fisheries

4/15/2016 4:21:52 PM

Fish and Wildlife Information Service

VaFWIS Search Report Compiled on 4/15/2016, 4:21:52 PM

Help

Known or likely to occur within a **2 mile radius around point 36.7640000 -76.5169995** in **800 Suffolk City, VA**
where (030013) **Rattlesnake, canebrake** observed.

View Map of Site Location

Species Observations where Rattlesnake, canebrake (030013) observed

(3 records , 3 Observations with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Rattlesnake, canebrake (030013) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE*	Highest Tier**	
321321	SppObs	Jul 18 2009	John Kleopfer	1	SE	II	Yes
63623	SppObs	Oct 10 2001	Lance Gardner and Sue Young	1	SE	II	Yes
65797	SppObs	Jun 1 2000	ALAN H. SAVITZKY (PRINCIPLE PERMITTEE), CHRISTOPHER E. PATTERSEN (COLLECTOR)	1	SE	II	Yes

Displayed 3 Species Observations where Rattlesnake, canebrake (030013) observed

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
II=VA Wildlife Action Plan - Tier II - Very High Conservation Need;
III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Habitat Predicted for Aquatic WAP Tier I & II Species where Rattlesnake, canebrake (030013) observed

N/A

Habitat Predicted for Terrestrial WAP Tier I & II Species where Rattlesnake, canebrake (030013) observed

BOVA Code	Status*	Tier**	Common Name	Scientific Name	View Map
030013	SE	II	Rattlesnake, canebrake	Crotalus horridus	Yes

Compiled on 4/15/2016, 4:21:52 PM I722444.1 report=BOVA searchType= R dist= 3218 poi= 36.7640000 -76.5169995

audit no. 722444 4/15/2016 4:21:52 PM Virginia Fish and Wildlife Information Service

3 Species Observations where Rattlesnake, canebrake (030013) observed

36,45,50.4 -76,31,01.2 is **the Search Point**

Show Position Rings
(•) Yes ( ) No
1/2 mile and 1/8 mile at the **Search Point**

Show Search Area
(•) Yes ( ) No
2 Search distance miles radius

Search Point is at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

Position Rings 1/2 mile and 1/8 mile at the Search Point

2 mile radius Search Area

Data Observation Site

Virginia Fish and Wildlife Information Service

back | Refresh Browser Page

Map Click: Pan | Id | M
Map Scale: In | Zoom | Out
Screen Size: Small | Size | Big
Help

N

500 0 500 1000 1500 2000 Meters
2000 0 2000 4000 6000 8000 Feet

Point of Search 36,45,50.4 -76,31,01.2
Map Location 36,45,50.4 -76,31,01.2

Select **Coordinate System:**
(•) Degrees,Minutes,Seconds Latitude - Longitude
( ) Decimal Degrees Latitude - Longitude
( ) Meters UTM NAD83 East North Zone
( ) Meters UTM NAD27 East North Zone

Base Map source: Topographic maps from TOPO! copyright 2006 (see National Geographic Maps for details)

Virginia Department of Game and Inland Fisheries

4/15/2016 4:23:15 PM

Fish and Wildlife Information Service

VaFWIS Search Report Compiled on 4/15/2016, 4:23:15 PM

Help

Known or likely to occur within a **2 mile radius around point 36.7640000 -76.5169995** in **800 Suffolk City, VA**
where (050027) **Bat, tri-colored** observed.

View Map of Site Location

Species Observations where Bat, tri-colored (050027) observed

(1 records , 1 Observation with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Bat, tri-colored (050027) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE*	Highest Tier**	
53380	SppObs	Jul 29 1996	Steven M. Roble, Ph. D. , DCR	2	SE		Yes

Displayed 1 Species Observations where Bat, tri-colored (050027) observed

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened;
FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
II=VA Wildlife Action Plan - Tier II - Very High Conservation Need;
III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Compiled on 4/15/2016, 4:23:15 PM I722444.1 report=BOVA searchType= R dist= 3218 poi= 36.7640000 -76.5169995

audit no. 722444 4/15/2016 4:23:15 PM Virginia Fish and Wildlife Information Service

1 Species Observations where Bat, tri-colored (050027) observed

36,45,50.4 -76,31,01.2 is **the Search Point**

Show Position Rings
(•) Yes ( ) No
1/2 mile and 1/8 mile at the **Search Point**

Show Search Area
(•) Yes ( ) No
2 Search distance miles radius

Search Point is at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

Position Rings 1/2 mile and 1/8 mile at the Search Point

2 mile radius Search Area

Data Observation Site

Virginia Fish and Wildlife Information Service

back 36,47,53.3 -76,30,05.4 Refresh Browser Page

Map Click Pan Id M Map Scale In Zoom Out Screen Size Small Size Big Help

N

500 0 500 1000 1500 2000 Meters
2000 0 2000 4000 6000 8000 Feet

Point of Search 36,45,50.4 -76,31,01.2
Map Location 36,45,50.4 -76,31,01.2

Select **Coordinate System:**
(•) Degrees,Minutes,Seconds Latitude - Longitude
( ) Decimal Degrees Latitude - Longitude
( ) Meters UTM NAD83 East North Zone
( ) Meters UTM NAD27 East North Zone

Base Map source: Topographic maps from TOPO! copyright 2006 (see National Geographic Maps for details)

Virginia Department of Game and Inland Fisheries

4/15/2016 4:28:45 PM

Fish and Wildlife Information Service

VaFWIS Search Report Compiled on 4/15/2016, 4:28:45 PM

Help

Known or likely to occur within a **2 mile radius around point 36.7640000 -76.5169995** in **800 Suffolk City, VA**
where (020044) Salamander, Mabee s observed.

View Map of Site Location

Species Observations where Salamander, Mabee s (020044) observed

(1 records , 1 Observation with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Salamander, Mabee s (020044) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE*	Highest Tier**	
365908	SppObs	Jan 1 1900		1	ST	II	Yes

Displayed 1 Species Observations where Salamander, Mabee s (020044) observed

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
II=VA Wildlife Action Plan - Tier II - Very High Conservation Need;
III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Habitat Predicted for Aquatic WAP Tier I & II Species where Salamander, Mabee s (020044) observed

N/A

Habitat Predicted for Terrestrial WAP Tier I & II Species where Salamander, Mabee s (020044) observed

BOVA Code	Status*	Tier**	Common Name	Scientific Name	View Map
020044	ST	II	Salamander, Mabee's	Ambystoma mabeei	Yes

Compiled on 4/15/2016, 4:28:45 PM I722444.1 report=BOVA searchType= R dist= 3218 poi= 36.7640000 -76.5169995

audit no. 722444 4/15/2016 4:28:45 PM Virginia Fish and Wildlife Information Service

1 Species Observations where Salamander, Mabee s (020044) observed

36,45,50.4 -76,31,01.2 is **the Search Point**

Show Position Rings
(•) Yes ( ) No
1/2 mile and 1/8 mile at the **Search Point**

Show Search Area
(•) Yes ( ) No
2 Search distance miles radius

Search Point is at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

Position Rings 1/2 mile and 1/8 mile at the Search Point

2 mile radius Search Area

Data Observation Site

Virginia Fish and Wildlife Information Service

back 36,47,56.1 -76,31,17.1 Refresh Browser Page

Map Click Pan Id M Map Scale In Zoom Out Screen Size Small Size Big Help

N

500 0 500 1000 1500 2000 Meters
2000 0 2000 4000 6000 8000 Feet

Point of Search 36,45,50.4 -76,31,01.2
Map Location 36,45,50.4 -76,31,01.2

Select **Coordinate System:**
(•) Degrees,Minutes,Seconds Latitude - Longitude
( ) Decimal Degrees Latitude - Longitude
( ) Meters UTM NAD83 East North Zone
( ) Meters UTM NAD27 East North Zone

Base Map source: Topographic maps from TOPO! copyright 2006 (see National Geographic Maps for details)

SOUTHEASTERN PUBLIC SERVICE AUTHORITY OF VIRGINIA

CONDITIONAL USE PERMIT APPLICATION

SUFFOLK, VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION SEARCH RESULTS

Natural Heritage Resources

Your Criteria

Taxonomic Group: Select All

Global Conservation Status Rank: Select All

State Conservation Status Rank: Select All

Federal Legal Status: LE - Listed endangered,LT - Listed threatened,PE - Proposed endangered,PT - Proposed threatened

State Legal Status: LE - Listed endangered,LT - Listed threatened,PE - Proposed endangered,PT - Proposed threatened

County: Suffolk (City)

Physiographic Province: Select All

Watershed (8 digit HUC): Select All

Subwatershed (12 digit HUC): Select All

Search Run: 4/19/2016 16:46:59 PM

Result Summary

Total Species returned: 60

Total Communities returned: 0

Click scientific names below to go to NatureServe report.

Click column headings for an explanation of species and community ranks.

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
Suffolk (City)							
Outer Coastal Plain Albemarle Cypress Swamp-Dragon Swamp							
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
Dismal Swamp Southeastern Shrew	Sorex longirostris fisheri	G5T4	S2	None	LT	8	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp Canal-Cross Canal-Corapeake Ditch (NC)							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Dismal Swamp Canal-Big Entry Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain	G4T4	S1	None	LE	19	Y

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
	population]						
Dismal Swamp-Dismal Swamp Canal-Fivemile Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Jericho Ditch-Washington Ditch							
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Lake Drummond-Lake Drummond Feeder Ditch-Moss Swamp							
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
Dismal Swamp Southeastern Shrew	Sorex longirostris fisheri	G5T4	S2	None	LT	8	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Nansemond River-Cedar Lake							

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Southern Branch Elizabeth River-Deep Creek							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Western Branch Elizabeth River							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Hampton Roads							
Cypress Swamp-Dragon Swamp							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp Canal-Cross Canal-Corapeake Ditch (NC)							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Dismal Swamp Canal-Big Entry Ditch							
REPTILES							

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Dismal Swamp Canal-Fivemile Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Jericho Ditch-Washington Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Lake Drummond-Lake Drummond Feeder Ditch-Moss Swamp							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Nansemond River-Bennett Creek							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Nansemond River-Cedar Lake							
MAMMALS							
Dismal Swamp	Sorex longirostris	G5T4	S2	None	LT	8	Y

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
Southeastern Shrew	fisheri						
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Southern Branch Elizabeth River-Deep Creek							
MAMMALS							
Dismal Swamp Southeastern Shrew	Sorex longirostris fisheri	G5T4	S2	None	LT	8	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Western Branch Elizabeth River							
MAMMALS							
Dismal Swamp Southeastern Shrew	Sorex longirostris fisheri	G5T4	S2	None	LT	8	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Southern Coastal Plain							
Albemarle Corapeake Swamp-Adams Swamp							

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
Cypress Swamp-Dragon Swamp							
AMPHIBIANS							
Mabee's Salamander	Ambystoma mabeei	G4	S1S2	None	LT	17	Y
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
Dismal Swamp Southeastern Shrew	Sorex longirostris fisheri	G5T4	S2	None	LT	8	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp Canal-Cross Canal-Corapeake Ditch (NC)							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Dismal Swamp Canal-Big Entry Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain	G4T4	S1	None	LE	19	Y

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
	population]						
Dismal Swamp-Dismal Swamp Canal-Fivemile Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Jericho Ditch-Washington Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Lake Drummond-Lake Drummond Feeder Ditch-Moss Swamp							
MAMMALS							
Dismal Swamp Southeastern Shrew	Sorex longirostris fisheri	G5T4	S2	None	LT	8	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Nansemond River-Cedar Lake							
AMPHIBIANS							
Mabee's Salamander	Ambystoma mabeei	G4	S1S2	None	LT	17	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain	G4T4	S1	None	LE	19	Y

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
	population]						
Southern Branch Elizabeth River-Deep Creek							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Western Branch Elizabeth River							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Blackwater							
Blackwater River-Union Camp Holding Pond							
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
Chowan							
Jones Swamp-Spivey Swamp							
BIRDS							
Red-cockaded Woodpecker	Picoides borealis	G3	S1	LE	LE	7	Y
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
Lake Kilby-Speights Run							
BIRDS							
Red-	Picoides	G3	S1	LE	LE	7	Y

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
cockaded Woodpecker	borealis						
Somerton Creek-Chapel Swamp							
MAMMALS							
Eastern Big-eared Bat	Corynorhinus rafinesquii macrotis	G3G4T3	S2	None	LE	36	Y
Hampton Roads Cypress Swamp-Dragon Swamp							
AMPHIBIANS							
Mabee's Salamander	Ambystoma mabeei	G4	S1S2	None	LT	17	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp Canal-Cross Canal-Corapeake Ditch (NC)							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Dismal Swamp Canal-Big Entry Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Dismal Swamp Canal-Fivemile Ditch							
REPTILES							
Canebrake	Crotalus	G4T4	S1	None	LE	19	Y

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
Rattlesnake	horridus [Coastal Plain population]						
Dismal Swamp-Jericho Ditch-Washington Ditch							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Dismal Swamp-Lake Drummond-Lake Drummond Feeder Ditch-Moss Swamp							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Jones Swamp-Spivey Swamp							
BIRDS							
Red-cockaded Woodpecker	Picoides borealis	G3	S1	LE	LE	7	Y
Lake Kilby-Speights Run							
BIRDS							
Red-cockaded Woodpecker	Picoides borealis	G3	S1	LE	LE	7	Y
Nansemond River-Cedar Lake							
AMPHIBIANS							
Mabee's Salamander	Ambystoma mabeei	G4	S1S2	None	LT	17	Y
REPTILES							
Canebrake Rattlesnake	Crotalus horridus	G4T4	S1	None	LE	19	Y

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
	[Coastal Plain population]						
Southern Branch Elizabeth River-Deep Creek							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y
Western Branch Elizabeth River							
REPTILES							
Canebrake Rattlesnake	Crotalus horridus [Coastal Plain population]	G4T4	S1	None	LE	19	Y

Note: On-line queries provide basic information from DCR's databases at the time of the request. They are NOT to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.

For Additional Information on locations of Natural Heritage Resources please submit an information request.

To Contribute information on locations of natural heritage resources, please fill out and submit a rare species sighting form.

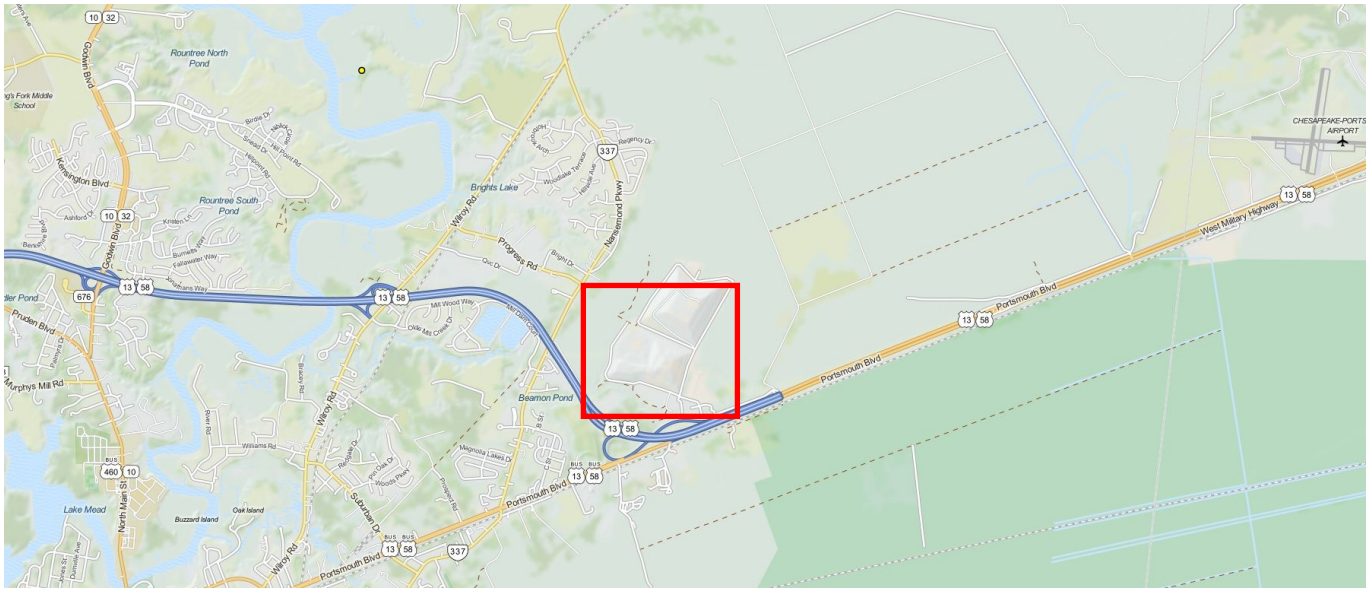
SOUTHEASTERN PUBLIC SERVICE AUTHORITY OF VIRGINIA

CONDITIONAL USE PERMIT APPLICATION

SUFFOLK, VIRGINIA

CENTER FOR CONSERVATION BIOLOGY MAP

CCB Mapping Portal



Layers: VA Eagle Nest Locator

Map Center [longitude, latitude]: [-76.5190029144287, 36.76549819221185]

Map Link:
http://www.ccbbirds.org/maps/#layer=VA+Eagle+Nest+Locator&zoom=14&lat=36.76549819221185&lng=-76.5190029144287&legend=legend_tab_7c321b7e-e523-11e4-a-a0-0e0c41326911&base=Street+Map+%28MapQuest%29

Report Generated On: 06/08/2016

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