

# ROUTE 606 LOUDOUN COUNTY PARKWAY/OLD OX ROAD RECONSTRUCTION AND WIDENING

## RFQ QUESTIONS AND ANSWERS

August 9, 2013

1. Can VDOT provide a copy of the current Dam Alteration Permit Application which was submitted to DCR for approval to fully understand the design requirements?

Response: The Dam Alteration Permit Application is attached. Additional information included as an attachment to the application is currently under review and subject to change. Therefore, this information will not be provided at this time. A draft copy of the Geotechnical Report for the Horsepen Dam was provided in the RFQ information package.



Date Prepared: June 2013  
Prepared By: Whitman, Requardt & Associates, LLP (WR&A)

## DESIGN REPORT FOR THE CONSTRUCTION OR ALTERATION OF VIRGINIA REGULATED IMPOUNDING STRUCTURES

Note: Any executed Design Report for construction of an impounding structure must be mailed to the appropriate Regional Engineer. In addition, a completed Certificate and Permit Application Fee Form (DCR199-192) and the required fee must be mailed under separate cover to: Virginia Department of Conservation and Recreation, Division of Finance, Accounts Payable, 203 Governor Street, 4<sup>th</sup> Floor, Richmond, Virginia 23219.

Reference: Impounding Structures Regulations, 4VAC 50-20-10 et seq., including 4VAC 50-20-240, Virginia Soil and Water Conservation Board

### 1. Project Information:

- a. Proposed Construction: Not a new dam. Alteration of existing dam to accommodate proposed VDOT roadway improvements (see below).
- Proposed Alteration: Dam's earth embankment to be widened and raised. Principal spillway outlet structure (box culvert) to be lengthened. New roadway bridge to be built over the existing Emergency Spillway.
- b. Name of Impounding Structure: Horsepen Dam
- c. Inventory Number: 10707 (Leave blank if new Construction)
- d. Name of Reservoir: Horsepen Lake
- e. Purpose of Reservoir: Regional Stormwater Management Retention Lake for Dulles Airport

### 2. Impounding Structure Hazard Classification:

- a. Hazard Potential Classification Table I Impounding Structure Regulations:  
(Check one)  High  Significant  Low

### 3. Location of Impounding Structure:

- a. City or County: Loudoun County
- b. Located On Highway Number VA Rte. 606 (Old Ox Road/future Dulles Loop)
- c. Name of river or stream: Horsepen Run
- d. Latitude: N38° 59' 22" Longitude: W77° 27' 54"

### 4. Ownership:

- a. Owner's Name: Metropolitan Washington Airports Authority (MWAA)  
If a corporation, name of representative: Darrell C. Hollowell, P.E.
- b. Mailing Address: P.O. Box 17045, Washington Dulles International Airport, Washington, DC 20041-0045
- c. Telephone: (Residential) N.A. (Business) (703) 572-2808
- d. Other means of communication: darrell.hollowell@mwa.com; FAX: (703) 572-0131

### 5. Design Engineer:

- a. Design Engineer and Design Firm: David S. Gertz, P.E. - Whitman, Requardt & Associates, LLP
- b. Design Engineer Virginia License Number: #18547
- c. Mailing Address: 9030 Stony Point Parkway, Suite 220  
Richmond, VA 23235
- d. Telephone: (Business) 804-272-8700

**6. Impounding Structure Data:**

a. Type of material: earth X concrete \_\_\_\_\_ masonry \_\_\_\_\_  
 Other: Roadway on upstream face of dam is asphalt surface with aggregate sub-base

Note: Identify datum used for elevations. All elevations are NAVD-88 datum

For new construction, complete the design configuration column.

For alteration, complete both the existing and design configuration columns.

	Existing Configuration			Design Configuration		
b. Top of Dam Elevation	<u>269.02 (lowest crest)</u>			<u>272.80 (lowest crest)</u> Feet		
c. Streambed Elevation at Toe (Lowest)	<u>220</u>			<u>220</u> Feet		
d. Height of Impounding Structure	<u>49.02</u>			<u>52.8</u> Feet		
e. Crest Length (Exclusive of Spillway)	<u>700</u>			<u>700</u> Feet		
f. Crest Width	<u>12</u>			<u>164</u> Feet		
g. Upstream Slope (Horizontal to Vertical)	<u>2.5</u>	H: <u>1</u>	V	<u>2.5*</u>	H: <u>1</u>	V
h. Downstream Slope (Horizontal to Vertical)	<u>2.5</u>	H: <u>1</u>	V	<u>2.0*</u>	H: <u>1</u>	V

**7. Reservoir Data**

	Existing Configuration	Design Configuration	
a. Maximum Capacity	<u>13,135</u>	<u>20,705</u>	Acre-feet
b. Maximum Pool Elevation	<u>269.02</u>	<u>272.8</u>	Feet
c. Maximum Pool Surface Area	<u>1,584</u>	<u>1,910</u>	Acres
d. Normal Capacity	<u>48.5</u>	<u>48.5</u>	Acre-feet
e. Normal Pool Elevation	<u>246.28</u>	<u>246.28</u>	Feet
f. Normal Pool Surface Area	<u>15.8</u>	<u>15.8</u>	Acres
g. Freeboard (to lowest crest elevation)	<u>22.74</u>	<u>26.52</u>	Feet

**8. Spillway Data**

	Type	Construction Material	Design Configuration	Invert Elevation	
a. Low Level Drain	<u>Gate Valve</u>	<u>Steel</u>	<u>36" Dia. Gate Valve:</u>	<u>229.28</u>	Feet
b. Principal Spillway	<u>Multi-stage Riser With Box Culvert</u>	<u>Reinf. Conc.</u>	<u>2-9'x3' slots and 2-5'x3' slots: 10'x13' open top weir: Double 6'x7' box culvert: (to be lengthened from 210' to 300')</u>	<u>246.28 253.28 225.28</u>	Feet
c. Emergency Spillway	<u>Open Channel</u>	<u>Earthen with Grassed Cover</u>	<u>200' wide x 275' long level weir crest</u>	<u>257.2</u>	Feet

**9. Watershed Data:**

a. Drainage Area: 23.3 square miles  
 b. Type and Extent of Watershed Development: Watershed is nearly fully urbanized and consists of mainly industrial /commercial development, with some residential areas, in addition to the airport runways and buildings.

c. Time of Concentration: 1 (approx. total - varies per subarea) (hours)  
 d. Routing Procedure: Reservoir storage-discharge (Mod. Puls) Routing Model used: HEC-HMS  
 e. Spillway Design Flood used (check and state source):  
X PMF, source PMP 6-hour rainfall (28") from HMR #51 and #52 (NOAA National Weather Service)  
 \_\_\_\_\_ 1/2 PMF, source \_\_\_\_\_  
 \_\_\_\_\_ 100 Year, source \_\_\_\_\_  
 \_\_\_\_\_ Other, source \_\_\_\_\_  
 f. Design inflow hydrograph: Volume: 32,806 (Exist. and Design) acre-feet  
 Peak inflow: 112,624 (Exist. and Design) cfs  
 Rainfall duration of design inflow hydrograph: 6 hours  
 g. Freeboard during passage of spillway design flood: -2.28 (Exist.) / 1.0 (Design) feet  
 h. Provide printouts for 6, 12, and 24 hour models – See attached Dam Safety Analysis Technical Report

**10. Additional Information:**

Provide as attachments to the Design Report the following information. Note: For alteration permits the details of this information is to be in accordance with the scope of the proposed alteration:

- a. A description of properties located in the dam break inundation zone downstream from the site of the proposed/existing impounding structure, including the location and number of structures, buildings, roads, utilities and other property that would be endangered should the impounding structure fail. (See Inundation Map and List of Impacted Structures in Attached EAP Document)
- b. Evidence that the local government or governments have been notified of the proposal by the owner to build or alter an impounding structure. (VDOT has notified Loudoun County)
- c. Maps showing the location of the impounding structure that include the county or city in which the proposed/existing impounding structure is located, the location of roads and access to the site, and the outline of the impoundment. Existing aerial photographs or existing topographic maps may be used for this purpose. (See Vicinity, Site, Drainage Area, and Inundation Zone Maps in attached Dam Safety Analysis Technical Report and EAP Document)
- d. A report of the geotechnical investigations(s) of the foundation soils, bedrock, or both and of the materials to be used to construct or alter the impounding structure. (See Attached Geotechnical Report)
- e. Design assumptions and analyses sufficient to indicate that the impounding structure will be stable during construction or alteration and during the life of the impounding structure under all conditions of impoundment operations, including rapid filling, flood surcharge, seismic loadings, and rapid drawdown of the impoundment. (See Attached Geotechnical Report)
- f. Evaluation of the stability of the impoundment rim area to safeguard against impoundment rim slides of such magnitude as to create waves capable of overtopping the impounding structure and evaluation of rim stability during seismic activity. (See Attached Geotechnical Report)
- g. Design assumptions and analyses sufficient to indicate the seepage in, around, through, or under the impounding structure, foundation, and abutments will be reasonably and practically controlled so that internal or external forces or results thereof will not endanger the stability and integrity of the impounding structure. The design report shall also include information on graded filter design. (See Attached Geotechnical Report)
- h. Calculations and assumptions relative to hydraulic and structural design of the spillway or spillways and energy dissipater or dissipaters. Spillway capacity shall conform to the criteria of Table 1 and 4VAC50-20-52. (See Attached Dam Safety Analysis Technical Report)
- i. Provisions to ensure that the impounding structure and appurtenances will be protected against unacceptable deterioration or erosion due to freezing and thawing, wind, wave action, and rain, or any combination thereof. (See Attached Geotechnical Report; also see Emergency Spillway Stability/Head-Cutting analysis in Dam Safety Analysis Technical Report )
- j. Other pertinent design data, assumptions, and analyses commensurate with the nature of the particular impounding structure and specific site conditions, including when required, a plan and water surface profile of the dam break inundation zone. (See attached Dam Safety Analysis Technical Report and Inundation Zone Map in attached EAP Document)
- k. A description of the techniques to be used to divert stream flow during construction so as to prevent hazard to life, health and property, including a detailed plan and procedures to maintain a stable impounding structure during storm events, a drawing showing temporary diversion devices, and a description of the potential impoundment during construction. (See attached Roadway Construction Plans showing design of box culvert extension/replacement. Existing dam outflow capacity will be maintained during temporary culvert alteration construction)
- l. A plan for project construction monitoring and quality control testing to confirm that construction materials and performance standards meet the design requirements. (Roadway project construction will have inspection services provided by VDOT.)
- m. Plans and specifications as required by 4VAC50-20-310 signed and sealed by the engineer. (See attached VDOT Plans; also see Original Dam Construction Plans in Appendix of attached Dam Safety Analysis Technical Report)

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List of attached drawings and specifications:

- 1. VDOT roadway construction plan sheets in vicinity of dam
  - 2. Original dam design construction plans (contained in Dam Safety Analysis Technical Report Appendix)
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