Possum Point Power Station CCB Pond Closures
Underdrain Tie In Pump Station Concepts Review: Agenda

Date:	November 19, 2015
Project No.:	C150132.00 Task 054
Project Title:	Possum Point Power Station CCB Pond Closures
Meeting:	Underdrain Tie In Pump Station Concepts Review
Purpose:	GAI/Dominion Coordination and Progress Update
Meeting Date:	November 19, 2015
Location:	Call : 1-800-406-9301 Code: 987633

Attendees:

Company	Representative	Phone	Fax / Email
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Discussion Agenda:

1) <u>General Overview</u>

a) The purpose of this meeting is to discuss GAI's hydraulic evaluation of the Station's existing Sanitary Grinder Pump and Forcemain system that discharges to the Prince William County Service Authority's (PWCSA's) sewer collection system on Possum Point Road. The evaluation included:

i) The presumed grinder pump systems for the residential customers that discharge to the sanitary forcemain downstream.

ii) Identifying the general Total Dynamic Head (T.D.H.) requirements for a proposed Underdrain Pump to minimize effects to residential customers and the Station's sanitary pump.

iii) Identifying the general T.D.H. requirements for a replacement (upsized T.D.H.) sanitary grinder pump to provide minimum flushing velocities with the proposed Underdrain Pump.

b) Discuss the conceptual operational considerations of the proposed Underdrain Pump.

c) Discuss the power availability / requirements for the proposed Underdrain Pump and upgraded Sanitary Grinder Pump.

d) Discuss the discharge piping for the proposed Underdrain Pump.

2) <u>Hydraulic Evaluation</u>

a) Replace the station's sanitary grinder pump with one that supplies same flow but with 30% more T.D.H.

b) Proposed Underdrain Forcemain pump will likely have similar flow rates as station's sanitary grinder pump but lower head capabilities due to the elevation and less distance to the PWCSA sewer collection system.

3) <u>The operational considerations for Underdrain sump pump station are as follows:</u>

a) Lead pump ON water level.

b) Lead and Lag pump OFF water level (same).

c) Lag pump ON water level is a bit higher than Lead ON water level (turn on ONLY if lead pump is not operating; i.e., for redundancy only).

d) High Water Level:

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i) Use redundant lag pump as backup; include alarm when lag pump is being utilized.
ii) Provide automated inlet valve that begins to close as high water level is approached and closes if high water level is reached.

e) When pump approaches a low discharge or "dead head" scenario (e.g., when Station's sanitary forcemain is overwhelmed by the Station's Sanitary Grinder Pump and the downstream residential users), a pressure transducer on the pump discharge can shut off the pump.
   i) The pump control panel would allow the pressure transducer set point to be manually-adjusted by the station for actual conditions experienced in the field.
   ii) A timer in the control panel could prevent short cycling of the pump motor when this setpoint is reached (e.g., 10 minute wait before re-starting the pump).

f) Include tie in point on the Underdrain Pump Forcemain to allow Pond D Comingled Water to be pumped and discharged to the Station's Sanitary Forcemain.
   i) Allows for new Underdrain Pump Station to be constructed while not holding up the discharge of construction related dewatering waters to the PWCSA system. Contractor would need to control and monitor flows and ensure pumps do not overwhelm downstream residential users and station.
   ii) Could be temporary pressure pipe laid on the ground surface.

g) A gravity discharge from the Metals Cleaning Waste Treatment Facility (Outfall 501 Water) could be included to drain to the Underdrain Sump Pump Station. It can include a similar automated valve as provided for the Pond D Underdrainage.

h) A meter can be included, as required by PWCSA.
   i) GAI to discuss with PWCSA.

i) What is station's preference / recommendation for communicating the Underdrain Pump Controls / Status in real time?

4) <u>Power Availability</u>

a) GAI has electrical drawing for the Station's Sanitary Grinder Pump Station. Potential replacement / upgraded pump can be selected and the required power requirements will allow us to identify what electrical upgrades may be required.

b) GAI understands there is no power along Possum Point Road that we can tie-into for the proposed Underdrain Pump Station. The closest power poles are near the residences along possum point road, or at the upper end of Pond D (where the proposed power for the construction trailer is). It appears that a new line from the Pond D power poles would supply power to the proposed Underdrain Pump Station.

5) <u>Underdrain Pump Discharge Piping</u>

a) GAI proposes to route the Underdrainage Pump Station discharge forcemain through an existing RCP culvert across Possum Point Road. However, we should not place it through the VDOT Culvert as it is defined by the DRAFT VPDES Permit (i.e., the pipe without the old ash sluicing lines) since it accepts drainage. Station plans to remove the existing ash sluice lines from the other two existing RCP culverts that generally do not accept drainage.

b) The ends of the culvert may be buried and the pipe may also include insulation for freeze protection (e.g., when underdrainage flows become very low and pump does not operate regularly in winter). GAI could incorporate casing spacers and fill material for the void area inside the culvert.

c) A high point will be created at the culvert / road crossing, and our plan is to incorporate an air/vacuum release valve and vault.

SUMMARY TABLE OF HYDRAULIC EVALUATIONS

FUTURE PUMP T.D.H. / PUMP COMBINATION SCENARIO EVALUATED[1]		PROJECTED / PRESUMED FUTURE FLOW RANGES WITH NEW UNDERDRAIN PUMP [gpm]					
STATION SANITARY GRINDER PUMP	**NEW** POND D UNDERDRAIN PUMP	STATION SANITARY GRINDER PUMP FLOWS[2]		**NEW** UNDERDRAIN PUMP FLOWS[3]		1st RESIDENCE SANITARY PUMP FLOWS[4]	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
100% (Utilize Existing Pump)	80%	23.3	43.6	48.9	145.6	22.4	32.2
	90%	0.0	32.7	82.1	150.7	19.0	31.5
	100%	0.0	21.9	94.6	155.3	12.8	31.0
	110%	0.0	11.3	107.6	159.6	3.1	30.6
110% (Install New Pump)	80%	45.1	56.5	28.4	145.6	22.0	31.9
	90%	26.2	46.7	60.1	150.7	17.2	31.0
	100%	0.0	37.1	94.6	155.3	12.8	30.3
	110%	0.0	27.8	107.6	159.6	3.1	29.7
120% (Install New Pump)	70%	66.7	76.5	0.0	140.0	23.9	32.8
	80%	45.1	56.5	28.4	145.6	22.0	31.9
	90%	46.0	58.6	42.3	150.7	16.3	30.7
	100%	30.2	49.8	71.9	155.3	7.6	29.7
	110%	13.0	41.2	98.9	159.6	0.0	28.9
130% (Install New Pump)	60%	73.2	93.7	0.0	133.9	22.1	33.8
	70%	73.2	85.6	0.0	140.0	22.1	32.7
	80%	72.7	77.4	1.4	145.6	21.9	31.6
	90%	60.6	69.0	28.6	150.7	15.8	30.4
	100%	47.9	60.8	57.5	155.3	5.0	29.3
	110%	34.3	52.8	81.4	159.6	0.0	28.2
140% (Install New Pump)	60%	79.4	101.3	0.0	133.9	20.1	33.8
	70%	79.4	93.8	0.0	140.0	20.1	32.7
	80%	79.4	86.1	0.0	145.6	20.1	31.5
	90%	72.5	78.4	17.1	150.7	15.6	30.3
	100%	61.5	70.7	45.9	155.3	3.2	29.0
	110%	49.9	63.1	67.9	159.6	0.0	27.7

Footnotes/Notes:

1) Basis is % T.D.H. of Station's Existing Sanitary Grinder Pump (Rated at 100 to 130-gpm).

2) Assumes Sanitary Grinder and Underdrain Pump ON only for Max. Range; Min. Range assumes also 1/3 Residential Pumps ON

3) Assumes Underdrain Pump ON only for Max. Flow; Min. Range assumes also Sanitary Grinder Pump and 1/3 Residential Pumps ON.

4) Assumes Sanitary Grinder, Underdrain, 1st Residence Pumps ON only for Max. Range; Min. Range assumes also 1/3 Residential Pumps ON

5) RED highlighted cells represent < 81-gpm (i.e., < 2-fps minimum self cleansing velocity) for Station Sanitary Forcemain or <10-gpm for Residential Customer.

6) YELLOW highlighted cells represent < 100-gpm presumed underdrainage flow rate.

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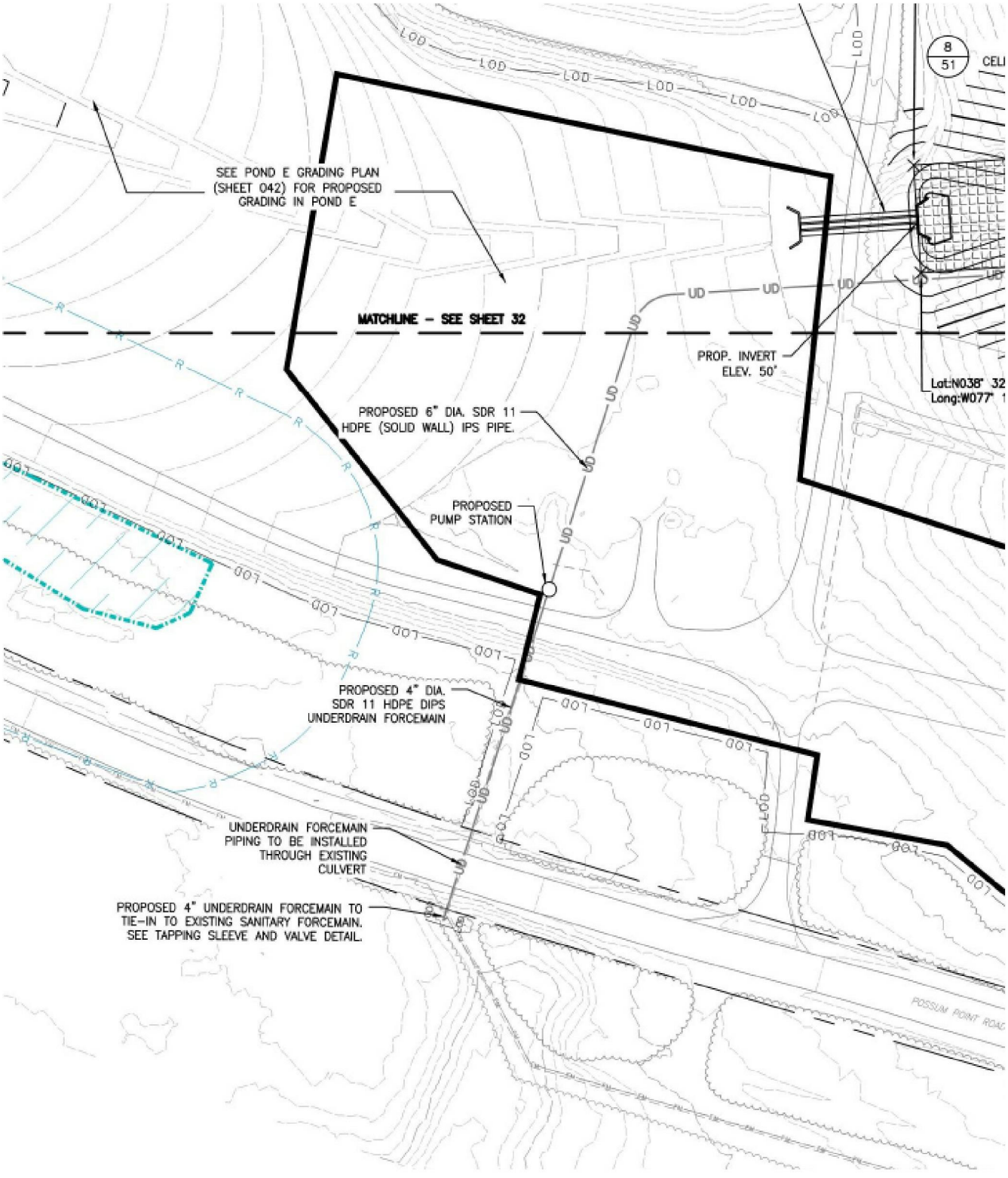
SKETCH OF POTENTIAL UNDERDRAIN PUMP STATION SYSTEM



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