TEMPORARY SEDIMENT BASIN DESIGN SHEET

Computed by: BAG Date: 1/15/20
Checked by: DAS Date: 1/27/20

Project Name: Pxe
Basin No.: Sd3 #B-3
Total area draining to basin: 14.80 acres
Disturbed area to basin: 11.60 acres

Runoff Coefficient, c, for disturbed area to basin: <not used>
Runoff Coefficient, c, for offsite area to basin: <not used>

Avg. rainfall Intensity for 2-yr storm in region (assume 10min Tc) I: <not used> in/hr
Avg. rainfall Intensity for 25-yr storm in region (assume 10min Tc) I: <not used> in/hr

Volume

1. Compute minimum required storage volume (Vs)
   Vs = 67 cy/ac * 14.80 acres = 992 cy or **26,773** cf
2. Compute volume of basin at clean-out (Vc)
   Vs = 22 cy/ac * 14.80 acres = 326 cy or **8,791** cf
3. Determine elevation corresponding to minimum required storage volume, Vs
   Min. riser crest elevation = **407.1** ft (from stage/storage relationship)
   Design riser crest elevation = **407.1** ft (from actual riser crest elevation used)
4. Determine elevation corresponding to clean-out volume, Vc
   Clean-out elevation = **405.5** ft (from stage/storage relationship)
   Note: clean-out elevation shall be clearly marked on the riser or by a post near riser
5. Compute length of riser
   Riser length = Design elevation of riser crest - Lowest elev of pipe at riser
   Riser length = **407.1** ft - **402.95** ft
   Riser length = **4.2** ft

Stormwater Runoff

6. Compute peak discharge from a 2-yr, 24-hr storm event
   Q_2 = **30.3** cfs (taken from Hydrographs)
7. Compute peak discharge from 25-yr, 24-hr storm event
   Q_{25} = **71.9** cfs (taken from Hydrographs)

Surface Area/Configuration Design

8. Compute minimum basin surface area (SAmin)
   SAmin = 0.01 ac/cfs* Q2
   SAmin = 0.01 ac/cfs* 30.25 cfs
   SAmin = 0.303 ac = 43,560 sf/ac * 0.303 cfs = **13,177** sf
9. Check available area at riser crest
   Available Area = **13,413** sf (determined by stage/storage relationship)
   Available area >=SAmin? Yes **X** No
10. Compute required length to achieve 2:1 L:W ration
    Average width = **100 ft**
    Required length = 2 * average width
    Required length = 2 * 100 ft
    Required length = **200 ft**
    Available length = **250 ft**
    2:1 L:W ratio satisfied? Yes **X** No
    If no, refer to figure 6-22.2 for baffle designs. Note any required baffles on E&SC plan and include calculations and details for baffle(s).

Principal Spillway (ps)

11. Determine maximum principal spillway capacity Qmax = Q2 = 30.25 cfs
12. Compute the vertical distance between the centerline of the outlet pipe and the emerg. spillway crest (H)
    H = **4.7 ft**
13. Compute the total pipe length of the principal spillway, L, using Figure 6-22.3
    L = [A-(B+C)/2][Zu+Zd] + T + E
    Lreq = **38 ft**
    Lactual = **45 ft**

A =	409.00	Zu =	2.50
B =	403.18	Zd =	3.00
C =	402.95	T =	5.00
		E =	0.00

14. Determine diameter of principal spillway (Dps) and flow through principal spillway (Q) from Table 6-22.1 using H and Qmax
    Dps = **36 (double 36" culver)** **Q =** **145.00** cfs (actual value from 6-22.1)
    Note: Table 6-22.1 is for CMP, this is RCP, see equation 2.3.4 in GSMM for flow rate
15. Compute actual flow through principal spillway, using Table 6-22.1 to determine the correction factor for pipe length, L.
    Qps = Q * correction factor = 145.00 * 1.00 (RCP, not CMP)
    Qps = 145.00 cfs > Q_{25}= **71.88**
    Therefore Principal Spillway is adequate to handle the 25-year storm an emergency spillway is for redundancy only
16. Compute riser diameter (Dr)
    Dr >= 1.5 * Dps
    Dr >= 1.5 * 36 in
    Dr >= 54 in
    Dr = **54 in**
17. Compute trash rack diameter (Dt)
    Dt >= 1.4 * Dr
    Dt >= 1.4 * 54 in
    Dt >= 75.6 in
    Dt = **80 in**
18. Determine minimum distance between the riser crest and the emergency spillway crest, h, using table 6-22.2, Dr, and Qps
    h = **2.0 ft**

Actual Q=	**123.9**	<	145.00 (Qps)

Concrete Riser Base Design

19. Determine the volume of concrete per certical foot of riser height needed from Table 6-22.3 to prevent floatation.
    Required volume of concrete per vertical foot = **13.9 cf/vf**
20. Compute total volume of concrete required
    Total required volume of concrete = Require volume per vertical foot * Riser Length
    Total required volume of concrete = 13.9 cf/vf * 4.2 ft
    Total volume of concrete required = **57.69 cf**
21. Assume base thickness (usually 18") (B).
    B = **18** in = **1.5 ft**
22. Compute required surface area
    Required surface area = Total volume required / B
    Required surface area = 57.69 cf / 1.5 ft
    Required SA = **38.5 sf**
23. Compute riser base length (l) and width (w) (assume square base). (AKA "B" and "C" in Sd3 cross section)
    l = w = (required SA)$^{1/2}$
    l = w = 6.20 ft = 12in/ft * 6.20 ft = **74 in**

Anti-Seep Collar Design

24. Determine if anti-seep collar is required. If yes to any of the following conditions, a collar is required:
    ___ The settled height of the dam is greater than 15 feet.
    ___ The principal spillway diameter (D_{ps}) is smooth pipe larger than 8".
    ___ The principal spillway diameter (D_{ps}) is corrugated metal pipe larger than 12".
25. Determine if anti-seep collar is required.
    X 18-inch projection (for heads (H) less than or equal to 10 feet).
    ___ 24-inch projection (for heads (H) greater than 10 feet).

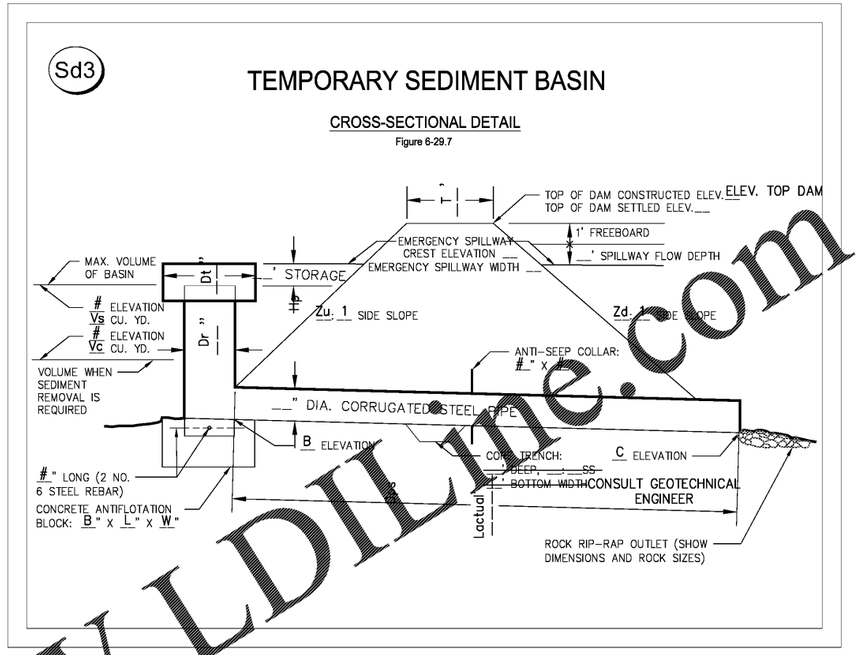
Emergency Spillway (es) **No Spillway Provided. 100yr storm contained within Sd3**

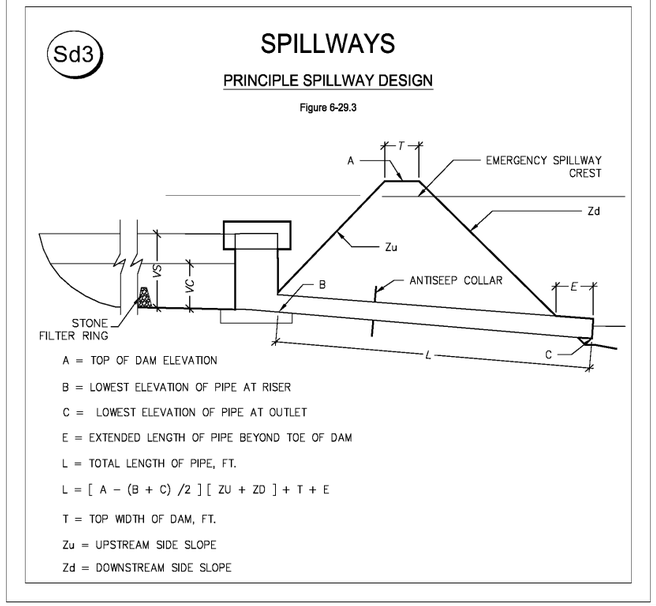
26. Compute minimum capacity of emergency spillway (Qes)
    Qes = Q_{25} - Qps = 71.88 - 145.00
    Qes = **-73.12 cfs** Therefore, Size for Q25 (redudancy) Qes **71.88 cfs**
27. Determine stage (Hp), bottom width (b), velocity (V), and minimum exit slope (S) using Table 6-22.4 and Qes.
    Hp = ___ ft **b =** ___ ft
    V = ___ fps **S =** ___ %
28. Actual entrance channel slope, Se = ___ %
29. Actual exit channel slope, So = ___ %
    Note: If So is steeper than S (from Table 6-22.4), then the velocity in the exit channel exit channel will increase.
    a) Calculate the new exit velocity (Vo)
    Vo = V(So/S)$^{0.5}$
    Vo = **#DIV/0!** fps **#DIV/0!** 5 fps; therefore, #DIV/0!

    Refer to Channel Stabilization (Ch) to determine proper lining for emerg. spillway
    Grass ___ **Rip-rap** **X** **Concrete** ___
    Therefore, use: Rip-Rap

Design Elevations

30. **Riser crest elevation =** **407.1 ft**
31. Compute minimum emergency spillway crest elevation
    Min. emergency spillway crest = riser crest elevation + h
    Min. emergency spillway crest = 407.1 + 2.0
    Min. emergency spillway crest = **409.1 ft**
    Design emergency spillway crest = **409.1 ft**
32. Determine design high water elevation
    Design high water elevation = Emerg. spillway crest + Stage elevation (Hp)
    Design high water elevation = 409.1 + 0.0
    Design high water elev. = **409.1 ft**
33. Determine elevation of top of dam
    Elevation of top of dam = Design high water elevation + 1 ft freeboard
    Elevation of top of dam = 409.1 + 1ft freeboard
    Elevation of top of dam = **410.1 ft**
    Actual Elevation of top of dam = **410.0 ft** (existing driveway)





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Sd3 CALCULATIONS

BASIN I.D.	RISER BOX & PRINCIPLE SPILLWAY										EMERGENCY SPILLWAY				DAM					SEDIMENT STORAGE				
									AF Block												Maximum		Clean-Out	
	Dps (in)	Dr (in)	Dt (in)	Riser Elev.	Length, L (ft)	Inv Elev. (Up)	Inv Elev. (Down)	Storage, h (ft)	A (in)	B (in)	C (in)	Crest Elev	Bottom Width (ft)	Hp (ft)	Lining	T (ft)	SS1 (H:1V)	SS2 (H:1V)	Freeboard (ft)	Top of Dam Elev.	Drainage Area (ac)	Vs Elev.	Volume, Vs (cf)	Vc Elev.	Volume, Vc (cf)
1	36	54	80	407.1	45	403.2	403.0	2	18	74	74	409.1	0	0	Rip-Rap	5.00	2.50	3.00	1.0	410.0	14.80	407.1	26,773	405.5	8,791

PXE
PERRY-HOUSTON COUNTY AIRPORT AUTHORITY

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GEORGIA REGISTERED AE 033236 PROFESSIONAL ENGINEER
2/17/20
DAVID A. SKURKY
GSWCC LEVEL II DESIGN PROF. #0000072532 EXP. 10/21/2022

CONSULT GEOTECHNICAL ENGINEER

REVISIONS

No.	Description	Date	By

Project Name:
APRON EXPANSION PROJECT

Sheet Name:
ES&PCP DETAILS NO. 2

GDOT Project Number: **APXXX-XXXX-XX(XXX)**	Holt Project Number: **GAxxxx-xx**
Designer: **W. MCNAMARA** Technician: **B. GARROW**	Checked by: **D. SKURKY**
CAD File: CX.07 Erosion Details.dwg	Submittal / Issue Date: **FEBRUARY, 2020**
Plotted: Feb 17, 2020 - 8:21am by GeorgeSummers	Drawing Number: **CE 5.02**
Scale: **N.T.S.**	