BOLTON & MENK
Real People. Real Solutions.

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PO Box 68
Jefferson, IA 50129

Phone: (515) 766-4423
Bolton-Menk.com

May 7, 2026

Board of Supervisors
Worth County Courthouse
1000 Central Ave
Northwood, Iowa 50459

RE: Amendment No. 3 to the Engineer's Report
Drainage District No. 18
Project No.: 24X135030000

Dear Board Members:

Open Ditch Permitting:

In October of 2025, the district received a letter from the Army Corps of Engineers indicating that no stream mitigation permit is required for this drainage improvement project. That letter is attached to this amendment. This opens the possibility for construction of an open ditch improvement, which was discussed in Amendment No. 2.

At the informational meeting held in July of 2024, landowners mentioned the possibility of extending the open ditch only as far as Cardinal Avenue or 410th Street, in an effort to minimize the number of landowners whose land would be severed by the ditch.

With an open ditch being a feasible option that does not require a stream mitigation permit, we wish to add an option which includes extending the open ditch to Cardinal Ave. and installation of a main tile upstream of the ditch.

The estimated total cost to construct the ditch and main tile with a ½" DC is $1,758,000. A cost estimate breakdown is attached to this amendment which includes an estimated construction cost as well as estimates for purchasing right-of-way and severance payments to landowners whose land would be divided by the open ditch.

Tile Capacity Analysis

Drainage District No. 18 as a whole has limited contained surface storage. This means much of the runoff from rain events flows overland, while some is contained in naturally occurring potholes. An analysis was conducted to determine if larger drainage coefficients would have a major impact on the detention time of runoff in these potholes. Tables are attached to this amendment that show the results of this analysis.

The ½" DC is the standard accepted drainage coefficient, with larger coefficients only recommended when significant ponded storage requires a tile outlet to properly drain. For the three drainage coefficient options presented, only one pothole saw a significant reduction in detention time, while the other two potholes saw only minor differences.

Days to Drain Potholes by DC			
DC	[1] Pothole 1	[2] Pothole 2	[2] Pothole 3
½"	4.52	0.36	0.36
¾"	3.21	0.24	0.24
1"	2.35	0.18	0.18

[1] Days to drain reflect a rainfall depth of 7.7". Days to drain a 3.1" rainfall range from 1.1 days to 2.1 days.
[2] Days to drain is the same for all storm events.

The revised open ditch option included in this amendment, along with the four options discussed previously in Amendment No. 2 will all provide the drainage improvement sought by the district. We recommend the ½" DC option presented in Amendment No. 2 due to the relatively small storage volume in the district.

Sincerely,
Bolton & Menk, Inc.

Jon Rosengren, P.E.
Project Manager

Attached:
Army Corps of Engineers Letter to the District
Project Cost Estimate
Pothole Locations Map
Overflow Analysis Tables

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, ROCK ISLAND DISTRICT
PO BOX 2004 CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61204-2004

October 15, 2025

Regulatory Division

SUBJECT: CEMVR-RD-2024-1074

Mr. Colton Cummingham
Water Resource Design Engineer
Bolton and Menk, Inc.
430 E. Grand Avenue, Suite 101
Des Moines, IA 50309

Dear Mr. Colton Cummingham:

Our office has reviewed your application received on September 24, 2024, concerning the proposed DD 18 Proposed Open Ditch located in Section 32, Township 99 North, Range 22 West, Worth County, Iowa 43.3570372, -93.4606024.

We have determined that your project, as proposed, is a non-regulated activity and does not require a Department of the Army (DA) permit under Section 404 of the Clean Water Act. The decision regarding this action is based on information found in the administrative record which documents the District's decision-making process, the basis for the decision, and the final decision.

You are advised that this determination for your project is valid for five years from the date of this letter. If the project is not completed within this five-year period or your project plans change, you should contact our office for another determination.

Although a DA permit will not be required for the project, this does not eliminate the requirement that you must still acquire other applicable Federal, state, and local permits.

The Rock Island District Regulatory Division is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our web site at https://regulatory.ops.usace.army.mil/ords/f?p=136:4 (be sure to select "Rock Island District" under the area entitled: Which Corps office did you deal with?).

Should you have any questions, please contact our Regulatory Division by letter, email Jeffrey.e.nelson@usace.army.mil, or telephone Jeff Nelson at 309/216-5036.

Sincerely,

Jeff Nelson
Eastern Branch
Regulatory Division

Enclosures

cc:
section401wqc@dnr.iowa.gov

ENGINEER'S ESTIMATE

DRAINAGE REPAIRS- OPEN DITCH
DRAINAGE DISTRICT NO. 18
DALLAS COUNTY, IOWA
BMI PROJECT NO. 24X135030000

BOLTON & MENK
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Date: 5/7/2026

Item No.	Item	Estimated Quantity	Unit	Unit Price	Total Amount
NOTE: COUNTY ROAD, UTILITY AND RAILROAD COSTS HAVE NOT BEEN CALCULATED FOR THIS TIME.					
CONSTRUCTION DIVISION 1 - DD 18 MAIN OPEN DITCH CONSTRUCTION - END AT CARDINAL AVE					
101	EXCAVATION	53,000	CY	$3.00	$159,000.00
102	TOPSOIL STRIPPING	8,000	CY	$4.00	$32,000.00
103	SPOIL LEVELING (BOTH SIDES)	49	STA	$300.00	$14,700.00
104	DAILY SEED & FERTILIZE BANKS	49	STA	$100.00	$4,900.00
105	SPOIL TILLAGE AND ROCK PICK-UP	49	STA	$50.00	$2,450.00
106	SPOIL TEMPORARY SEEDING	49	STA	$80.00	$3,920.00
107	TILE EXTENSION, 12" CMP	360	LF	$30.00	$10,800.00
108	TILE EXTENSION, 15" CMP	60	LF	$35.00	$2,100.00
109	TILE EXTENSION, 18" CMP	20	LF	$45.00	$900.00
110	SURFACE DRAIN, 18" CMP	360	LF	$60.00	$21,600.00
111	SURFACE DRAIN, 24" CMP	40	LF	$75.00	$3,000.00
112	RIPRAP, CLASS D	180	TN	$65.00	$11,700.00
113	EROSION MANAGEMENT PLAN	1	LS	$1,000.00	$1,000.00
114	SILT FENCE	100	LF	$3.00	$300.00
115	FENCE CUTS	2	EA	$250.00	$500.00
116	TILE OUTLET MODIFICATIONS	12	EA	$250.00	$3,000.00
117	MOBILIZATION	1	LS	$15,700.00	$15,700.00
					$287,570.00
CONSTRUCTION DIVISION 2 - DD 18 OPEN DITCH REPAIR					
201	EXCAVATION	12	STA	$250.00	$3,000.00
202	SPOIL LEVELING (BOTH SIDES)	12	STA	$200.00	$2,400.00
203	DAILY SEED & FERTILIZE BANKS	12	STA	$100.00	$1,200.00
204	SPOIL TILLAGE AND ROCK PICK-UP	12	STA	$30.00	$360.00
205	SPOIL TEMPORARY SEEDING	12	STA	$80.00	$960.00
206	ADMINISTRATION OF EROSION MANAGEMENT PLAN	1	LS	$1,000.00	$1,000.00
207	SILT FENCE	100	LF	$3.00	$300.00
208	MOBILIZATION	1	LS	$500.00	$500.00
CONSTRUCTION DIVISION 3 - DD 18 OPEN MAIN TILE IMPROVEMENT					
301	2000D R.C.P. 18" DIA.	525	LF	$42.00	$22,050.00
302	2000D R.C.P. 24" DIA.	2,500	LF	$47.00	$117,500.00

Item No.	Item	Estimated Quantity	Unit	Unit Price	Total Amount
303	2000D R.C.P. 30" DIA.	3,100	LF	$62.00	$192,200.00
304	2000D R.C.P. 36" DIA.	2,500	LF	$80.00	$200,000.00
305	12" ON XX" DIA. R.C.P. TEE	17	EA	$1,000.00	$17,000.00
306	18" DIA. R.C.P. ELBOW SEC., FABRICATION	1	EA	$600.00	$600.00
307	24" DIA. R.C.P. ELBOW SEC., FABRICATION	3	EA	$700.00	$2,100.00
308	24" TO 18" DIA. R.C.P. REDUCER, FABRICATION	1	EA	$1,200.00	$1,200.00
309	BEEHIVE TILE INTAKES	2	EA	$500.00	$1,000.00
310	CRUSH EXISTING TILE	2,425	LF	$5.00	$12,125.00
311	LATERAL TILE CONNECTIONS, 10" DIA. OR SMALLER	10	EA	$550.00	$5,500.00
312	LATERAL TILE CONNECTIONS, 12" DIA. OR LARGER	2	EA	$1,100.00	$2,200.00
313	TILE TRENCH STABILIZATION & CRADLING ROCK	50	TN	$30.00	$1,500.00
314	ADMINISTRATION OF EROSION MANAGEMENT PLAN	1	LS	$1,000.00	$1,000.00
315	FENCE CUTS	1	EA	$250.00	$250.00
316	MOBILIZATION	1	LS	$8,800.00	$8,800.00
					$585,025.00
				ESTIMATED CONSTRUCTION COSTS TOTAL:	**$872,600.00**
				CONSTRUCTION CONTINGENCY	**$43,600.00**

ALTERNATIVE ADDITIONAL SEEDING METHODS					
401	HYDRAULIC MULCH SEEDING	61	STA	$300.00	$18,300.00
402	CONVENTIONAL MULCH SEEDING	61	STA	$300.00	$18,300.00

Associated Project Costs		
	DAMAGES	$36,000.00
	RIGHT-OF-WAY AND SEVERANCE	$560,000.00
Engineering		
	SURVEY, STUDY & REPORT THORUGH HEARINGS	$50,000.00
	PERMITS AND ENVIRONMENTAL COMPLIANCE	$10,000.00
	CONSTRUCTION PLANS, SPECIFICATIONS & BID LETTING	$15,000.00
	CONSTRUCTION ENGINEERING SERVICES	$35,000.00
	LEGAL SEVICES, PUBLICATIONS, MAILINGS, ETC.	$5,000.00
	FINANCE & INTEREST	$130,200.00
	ESTIMATED ASSOCIATED PROJECT COSTS TOTAL:	**$841,200.00**
	ESTIMATED PROJECT COST :	**$1,757,400.00**
	TOTAL ESTIMATED COST ASSESSED TO LANDOWNERS :	**$1,758,000.00**

Estimated Average Cost Per Benefited Acre (1,416 ac)	$1,242
Estimated Average Cost Per Acre Per Year (10 years)	$199
Estimated Average Cost Per Acre Per Year (20 years)	$127

Drainage District No. 18 - Tile Improvements

Worth County, Iowa

Pothole Locations

May 2026

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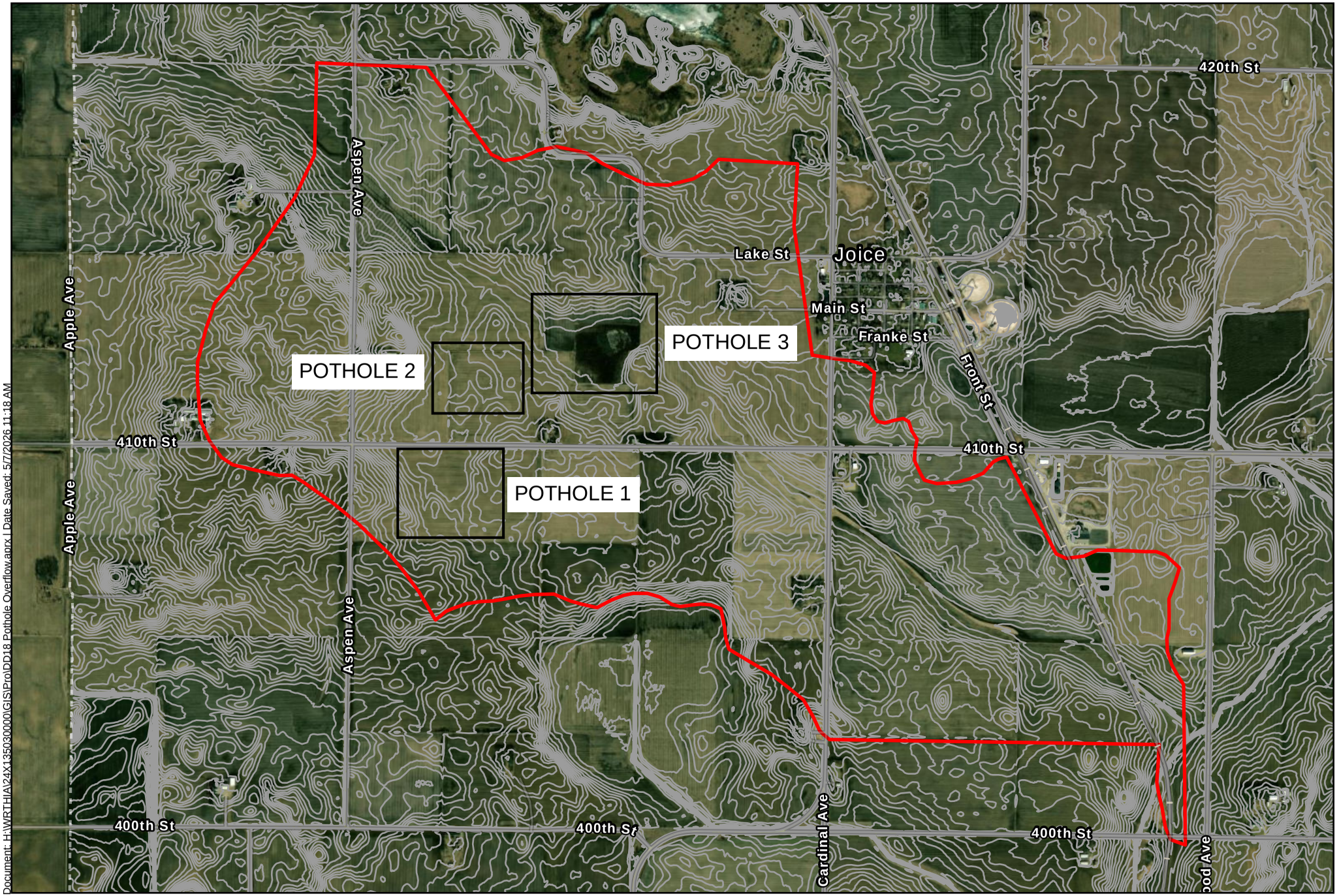

Map Document: H:\WRTHIA\24X135030000\GIS\Proj\DD18 Pothole Overflow.aprx | Date Saved: 5/7/2026 11:18 AM

1/2" DC - Pothole 1

				WSHD		149.00	D_c		0.56	
							D_c		0.024	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}		3.510	
1254.00	1454.00	0.03		0.00	0.00		7 Day Ac		#N/A	
1255.00	142215.00	3.26	1.65	1.65	0.13					
1256.00	316104.00	7.26	5.26	6.91	0.56					
1258.00	612908.00	14.07	24.59	26.24	2.11				ac-in	in
			31.50						378.02	2.54

Runoff AMC 1 Poorly Drained AMC Adjusted CN=78

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	1.17		1.17	NO	1256.79	0.00	0.00	**2.09**
5.00	3.83	1.75		1.75	NO	1257.54	0.00	0.00	**3.13**
10.00	4.55	2.33		2.33	NO	1389.43	0.00	0.00	**4.16**
25.00	5.67	3.29		3.29	YES	Over	0.75	9.34	**4.52**
50.00	6.63	4.14		4.14	YES	Over	1.60	19.91	**4.52**
100.00	7.68	5.10		5.10	YES	Over	2.56	31.77	**4.52**

1/2" DC - Pothole 2

				WSHD		146.00	D_c		0.68	
							D_c		0.029	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}		8.450	
1251.00	1338.00	0.03		0.00	0.00		7 Day Ac		#N/A	
1252.00	41290.00	0.95	0.49	0.49	0.04					
1253.00	95258.00	2.19	1.57	2.06	0.17					
1254.00	244572.00	5.61	3.90	5.96	0.48	5.84			ac-in	in
			5.96						71.49	0.49

Runoff AMC 1 Well Drained AMC Adjusted CN=70

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	0.75		0.75	YES	Over	0.26	3.14	**0.36**
5.00	3.83	1.22		1.22	YES	Over	0.73	8.86	**0.36**
10.00	4.55	1.71		1.71	YES	Over	1.22	14.84	**0.36**
25.00	5.67	2.55	0.77	3.31	YES	Over	2.82	34.35	**0.36**
50.00	6.63	3.31		3.31	YES	Over	2.82	34.35	**0.36**
100.00	7.68	4.19		4.19	YES	Over	3.70	45.03	**0.36**

1/2" DC - Pothole 3

				WSHD		527.00	D_c		0.44	
							D_c		0.019	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}		15.330	
1246.00	92730.00	2.13		0.00	0.00		7 Day Ac		#N/A	
1247.00	599007.00	13.75	7.94	7.94	0.64					
1248.00	968447.00	22.23	17.99	25.93	2.09					
1249.00	1247241.00	28.63	25.43	51.36	4.14	181.67			ac-in	in
			51.36						616.37	1.17

Runoff AMC 2 Poorly Drained CN=91

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	2.13	0.07	2.20	YES	Over	1.71	20.79	**0.36**
5.00	3.83	2.85		2.85	YES	Over	2.37	28.78	**0.36**
10.00	4.55	3.55		3.55	YES	Over	3.06	37.19	**0.36**
25.00	5.67	4.63		4.63	YES	Over	4.14	50.43	**0.36**
50.00	6.63	5.57		5.57	YES	Over	5.09	61.87	**0.36**
100.00	7.68	6.61		6.61	YES	Over	6.12	74.45	**0.36**

3/4" DC - Pothole 1

				WSHD		149.00	D_c	0.79	
							D_c	0.033	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}	4.950	
1254.00	1454.00	0.03		0.00	0.00	7 Day Ac		#N/A	
1255.00	142215.00	3.26	1.65	1.65	0.13				
1256.00	316104.00	7.26	5.26	6.91	0.56				
1258.00	612908.00	14.07	24.59	26.24	2.11			ac-in	in
			31.50					378.02	2.54

Runoff AMC 1 Poorly Drained AMC Adjusted CN=78

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	1.17		1.17	NO	1256.79	0.00	0.00	**1.48**
5.00	3.83	1.75		1.75	NO	1257.54	0.00	0.00	**2.22**
10.00	4.55	2.33		2.33	NO	1389.43	0.00	0.00	**2.95**
25.00	5.67	3.29		3.29	YES	Over	0.75	9.34	**3.21**
50.00	6.63	4.14		4.14	YES	Over	1.60	19.91	**3.21**
100.00	7.68	5.10		5.10	YES	Over	2.56	31.77	**3.21**

3/4" DC - Pothole 2

				WSHD		146.00	D_c	1.02	
							D_c	0.043	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}	12.680	
1251.00	1338.00	0.03		0.00	0.00	7 Day Ac		#N/A	
1252.00	41290.00	0.95	0.49	0.49	0.04				
1253.00	95258.00	2.19	1.57	2.06	0.17				
1254.00	244572.00	5.61	3.90	5.96	0.48	5.84		ac-in	in
			5.96					71.49	0.49

Runoff AMC 1 Well Drained AMC Adjusted CN=70

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	0.75		0.75	YES	Over	0.26	3.14	**0.24**
5.00	3.83	1.22		1.22	YES	Over	0.73	8.86	**0.24**
10.00	4.55	1.71		1.71	YES	Over	1.22	14.84	**0.24**
25.00	5.67	2.55	0.77	3.31	YES	Over	2.82	34.35	**0.24**
50.00	6.63	3.31		3.31	YES	Over	2.82	34.35	**0.24**
100.00	7.68	4.19		4.19	YES	Over	3.70	45.03	**0.24**

3/4" DC - Pothole 3

				WSHD		527.00	D_c	0.68	
							D_c	0.029	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}	23.650	
1246.00	92730.00	2.13		0.00	0.00	7 Day Ac		#N/A	
1247.00	599007.00	13.75	7.94	7.94	0.64				
1248.00	968447.00	22.23	17.99	25.93	2.09				
1249.00	1247241.00	28.63	25.43	51.36	4.14	181.67		ac-in	in
			51.36					616.37	1.17

Runoff AMC 2 Poorly Drained CN=91

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	2.13	0.07	2.20	YES	Over	1.71	20.79	**0.24**
5.00	3.83	2.85		2.85	YES	Over	2.37	28.78	**0.24**
10.00	4.55	3.55		3.55	YES	Over	3.06	37.19	**0.24**
25.00	5.67	4.63		4.63	YES	Over	4.14	50.43	**0.24**
50.00	6.63	5.57		5.57	YES	Over	5.09	61.87	**0.24**
100.00	7.68	6.61		6.61	YES	Over	6.12	74.45	**0.24**

1" DC - Pothole 1

				WSHD		149.00	D_c	1.08	
							D_c	0.045	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}	6.750	
1254.00	1454.00	0.03		0.00	0.00	7 Day Ac		#N/A	
1255.00	142215.00	3.26	1.65	1.65	0.13				
1256.00	316104.00	7.26	5.26	6.91	0.56				
1258.00	612908.00	14.07	24.59	26.24	2.11			ac-in	in
			31.50					378.02	2.54

Runoff AMC 1 Poorly Drained AMC Adjusted CN=78

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	1.17		1.17	NO	1256.79	0.00	0.00	**1.09**
5.00	3.83	1.75		1.75	NO	1257.54	0.00	0.00	**1.63**
10.00	4.55	2.33		2.33	NO	1389.43	0.00	0.00	**2.16**
25.00	5.67	3.29		3.29	YES	Over	0.75	9.34	**2.35**
50.00	6.63	4.14		4.14	YES	Over	1.60	19.91	**2.35**
100.00	7.68	5.10		5.10	YES	Over	2.56	31.77	**2.35**

1" DC - Pothole 2

				WSHD		146.00	D_c	1.35	
							D_c	0.057	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}	16.790	
1251.00	1338.00	0.03		0.00	0.00	7 Day Ac		#N/A	
1252.00	41290.00	0.95	0.49	0.49	0.04				
1253.00	95258.00	2.19	1.57	2.06	0.17				
1254.00	244572.00	5.61	3.90	5.96	0.48	5.84		ac-in	in
			5.96					71.49	0.49

Runoff AMC 1 Well Drained AMC Adjusted CN=70

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	0.75		0.75	YES	Over	0.26	3.14	**0.18**
5.00	3.83	1.22		1.22	YES	Over	0.73	8.86	**0.18**
10.00	4.55	1.71		1.71	YES	Over	1.22	14.84	**0.18**
25.00	5.67	2.55	0.77	3.31	YES	Over	2.82	34.35	**0.18**
50.00	6.63	3.31		3.31	YES	Over	2.82	34.35	**0.18**
100.00	7.68	4.19		4.19	YES	Over	3.70	45.03	**0.18**

1" DC - Pothole 3

				WSHD		527.00	D_c	0.91	
							D_c	0.038	
Elev	ft^2	Ac	Avg V (ac-ft)	Cum V (ac-ft)	D (in)		Q_{out}	31.530	
1246.00	92730.00	2.13		0.00	0.00	7 Day Ac		#N/A	
1247.00	599007.00	13.75	7.94	7.94	0.64				
1248.00	968447.00	22.23	17.99	25.93	2.09				
1249.00	1247241.00	28.63	25.43	51.36	4.14	181.67		ac-in	in
			51.36					616.37	1.17

Runoff AMC 2 Poorly Drained CN=91

Return	Rain D	Runoff D	Overflow D_{in}	Total D_{in}	Full?	Elev	Overflow D_{oi}	Overflow V	**Drain T**
2.00	3.06	2.13	0.07	2.20	YES	Over	1.71	20.79	**0.18**
5.00	3.83	2.85		2.85	YES	Over	2.37	28.78	**0.18**
10.00	4.55	3.55		3.55	YES	Over	3.06	37.19	**0.18**
25.00	5.67	4.63		4.63	YES	Over	4.14	50.43	**0.18**
50.00	6.63	5.57		5.57	YES	Over	5.09	61.87	**0.18**
100.00	7.68	6.61		6.61	YES	Over	6.12	74.45	**0.18**