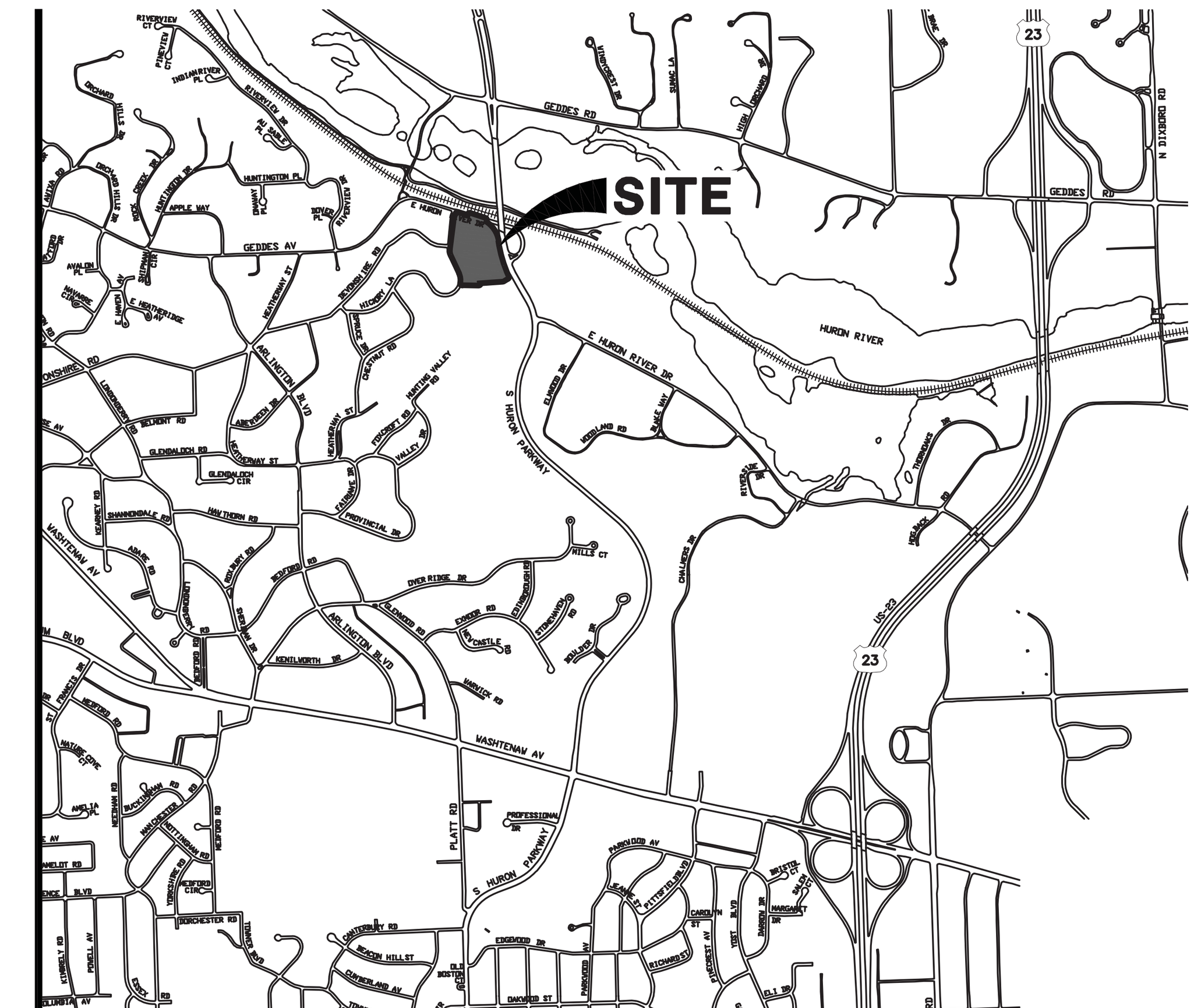
CITY OF ANN A

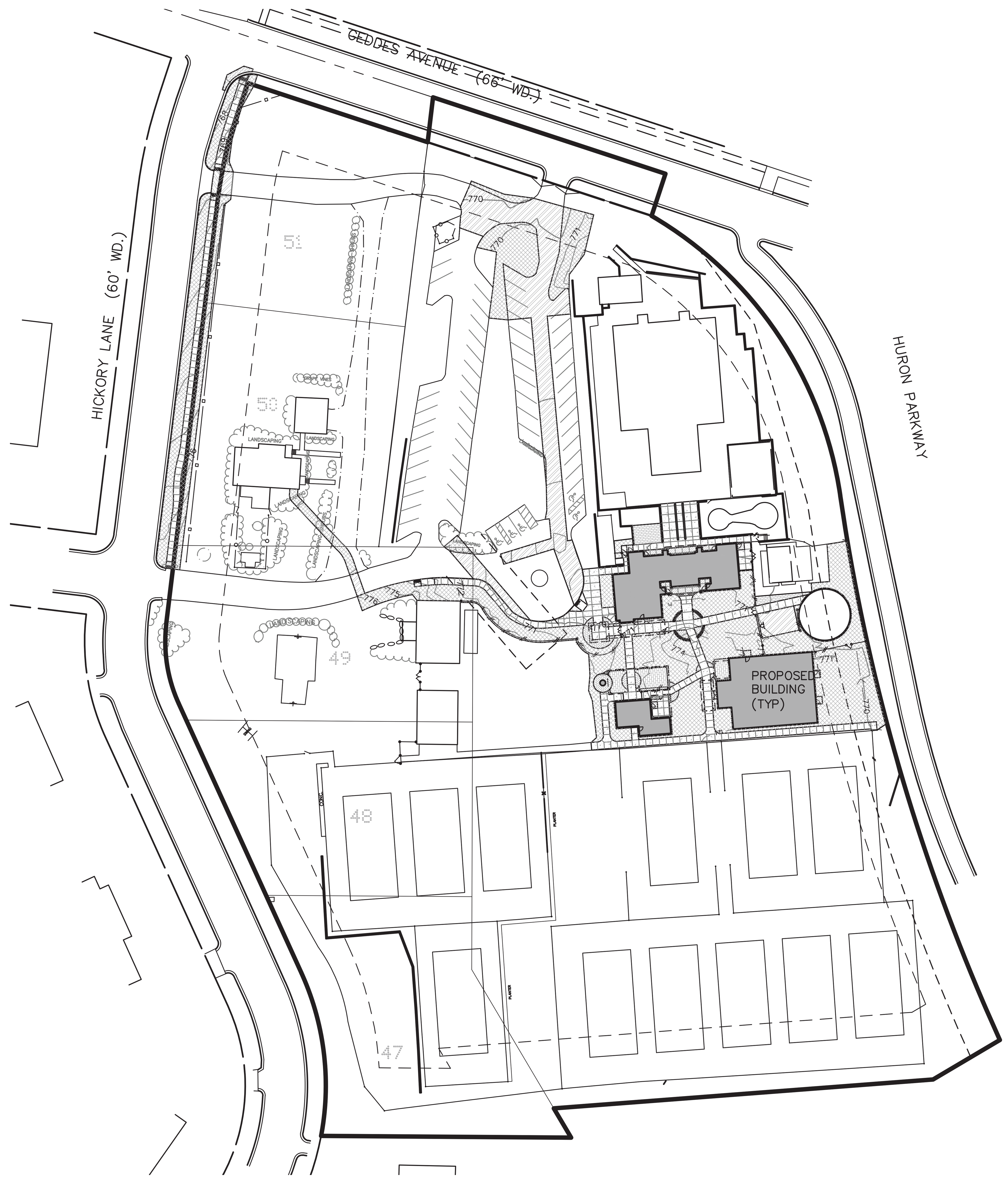


OWNER/DEVELOPER

RACQUET CLUB OF ANN ARBOR
3010 HICKORY LANE.
ANN ARBOR, MI 48108
PH: (734) 216-0579
ATTN: BRENT SCHOMAKER

Sheet Index

#	SHEET TITLE
1	Cover Sheet
2	Existing Conditions
3	



ANN ARBOR RACQUET CLUB
Narrative Description

I. DEVELOPMENT PROGRAM SUMMARY

The Ann Arbor Racquet Club is a tennis and swim club that began in the mid 1960's and is located at 3010 Hickory lane at the southwest corner of Geddes and Huron Parkway. Facilities at the club include clay and all weather tennis courts, a full size pool, tennis locker rooms, office and pro shop, children's pool, playground amenities and grilling and food vending. The facility is open seasonally during daylight hours only. The original pool and tennis building are 50 years old and lacking modern functionality and accessibility. The tennis building has been particularly problematic in that it has a basement that cannot be utilized due to groundwater flooding. Additionally the building is constructed such that visitor must ascend and descend a half of a flight of stairs to enter and exit the building.

The proposal contained here-in includes the demolition of the existing tennis building and replacing it with a new, single story 3533 SF facility that will be accessible to all. Also included is an addition to the pool building that will facilitate a common, central entry and check in point for all entering and exiting club members as well as new office and laundry facilities. Additional improvements include and addition to the snack shack, patio and pedestrian improvements and storm water detention.

A. Proposed Land Use

The Ann Arbor Racquet Club will continue to operate as a private tennis, swim and recreational facility.

B. Phasing and Construction Cost

(B.1) Preliminary Phasing: All construction shall be completed in one phase beginning in the fall of 2015 and being completed in the spring of 2016.

(B.2) Preliminary Cost Estimate: The combined estimated total project construction cost, including utilities, structures, landscaping and site amenities is approximately $2.5 million.

1. <u>Community Analysis</u>

(a) Impact on Schools

The project will have no impact on the school system.

(b) Relationship with Neighboring Uses

The proposal is consistent with the existing use at this site and should present no objection to neighboring uses.

North of Site: The north side of the site is Geddes Road leading down to the Huron River.
West of Site: Hickory Lane lies west of the site and serves adjacent residential properties that were developed after the club was established.
South of Site: Contains the Huron Hills Golf course.
East of Site: Contains a public ROW for what once was the entrance from Geddes Road onto south bound Huron Parkway. It is now a bike lane.

(c) Impact on Adjacent Uses

The proposed development will have no negative impact on existing uses around the site and is consistent with the current use.

(d) Impact of Development Relevant to Various Issues:

- Air Quality: The proposal will have no impact on air quality.
- Water Quality: The reconstructed parts of this site will be provided with storm water management facilities in accordance with current standards and discharged in accordance with City of Ann Arbor and Washtenaw County Water Resources Commissioner standards. There currently are no stormwater management facilities on the site at all. Stormwater will be collected from the parking lot through an existing network and then directed into a new underground stormwater tank farm for storage and infiltration.
- Natural Features: Sheet 1 of the site plan provide a graphic description of the natural features that are found on the site. Natural features on this site consist solely of landmark trees. The area that is proposed for development is almost entirely existing improvements in the form of buildings and pedestrian improvements. The development program concentrates all of the activities in this area thus eliminating any impact to landmark trees.
- Wetlands: The site contains no wetlands.
- Steep Slopes: the site contains no steep slopes.
- Floodplains: There are no 100 year floodplains or watercourses that will be impacted by the development.
- Endangered Species or Habitat: None known to exist.
- Woodlands: There are no qualifying woodlands on site.
- Solid Waste – Solid waste removal will be contracted privately using the existing facilities.
- There are no historical sites, structures or districts impacted by the proposed development.

1. <u>Site Analysis</u>

(a) Existing Land Use

The existing land zoning is Agricultural while the use of the parcel is recreational. The land has been utilized in this fashion for decades.

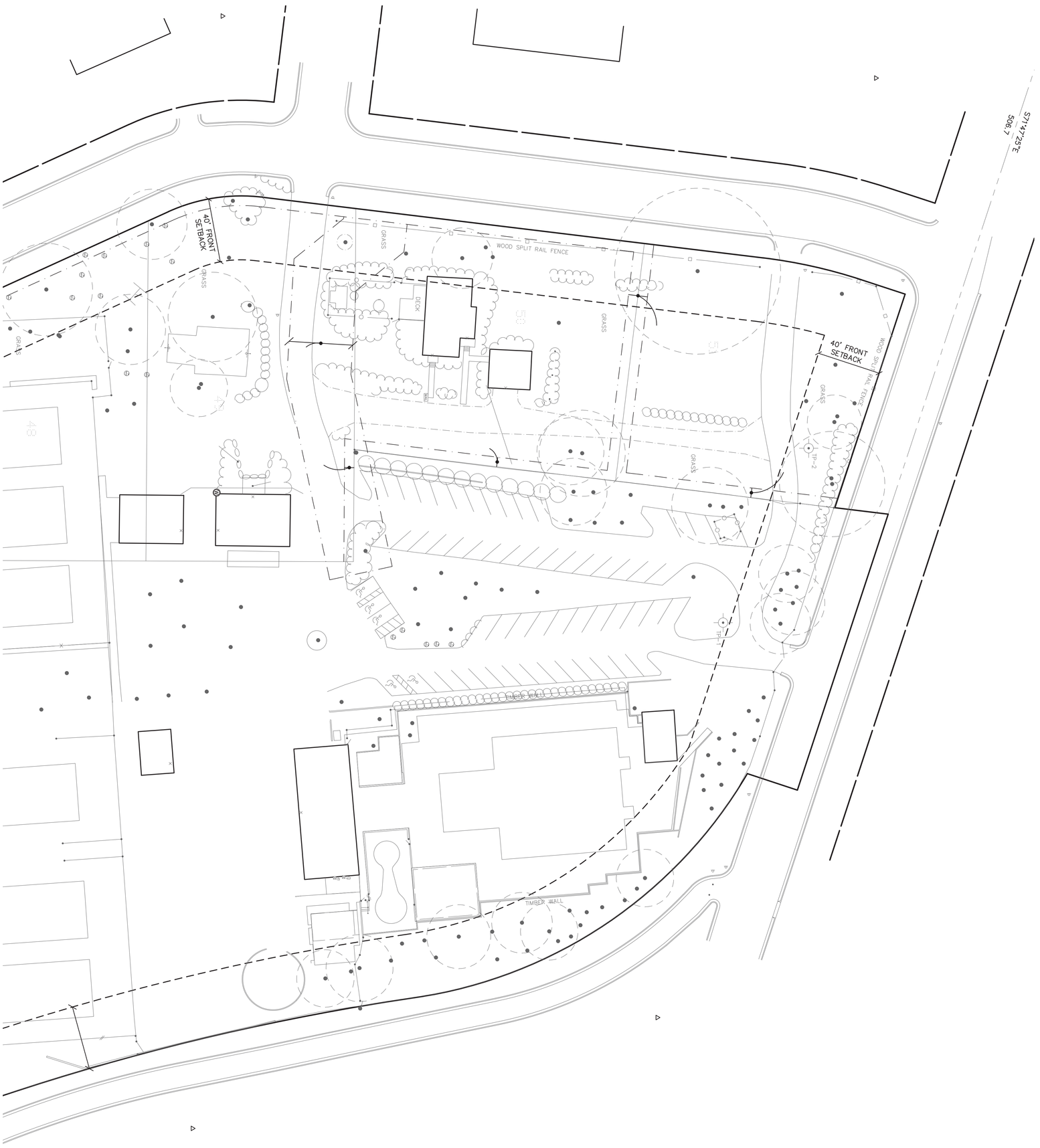
(b) Site Conditions

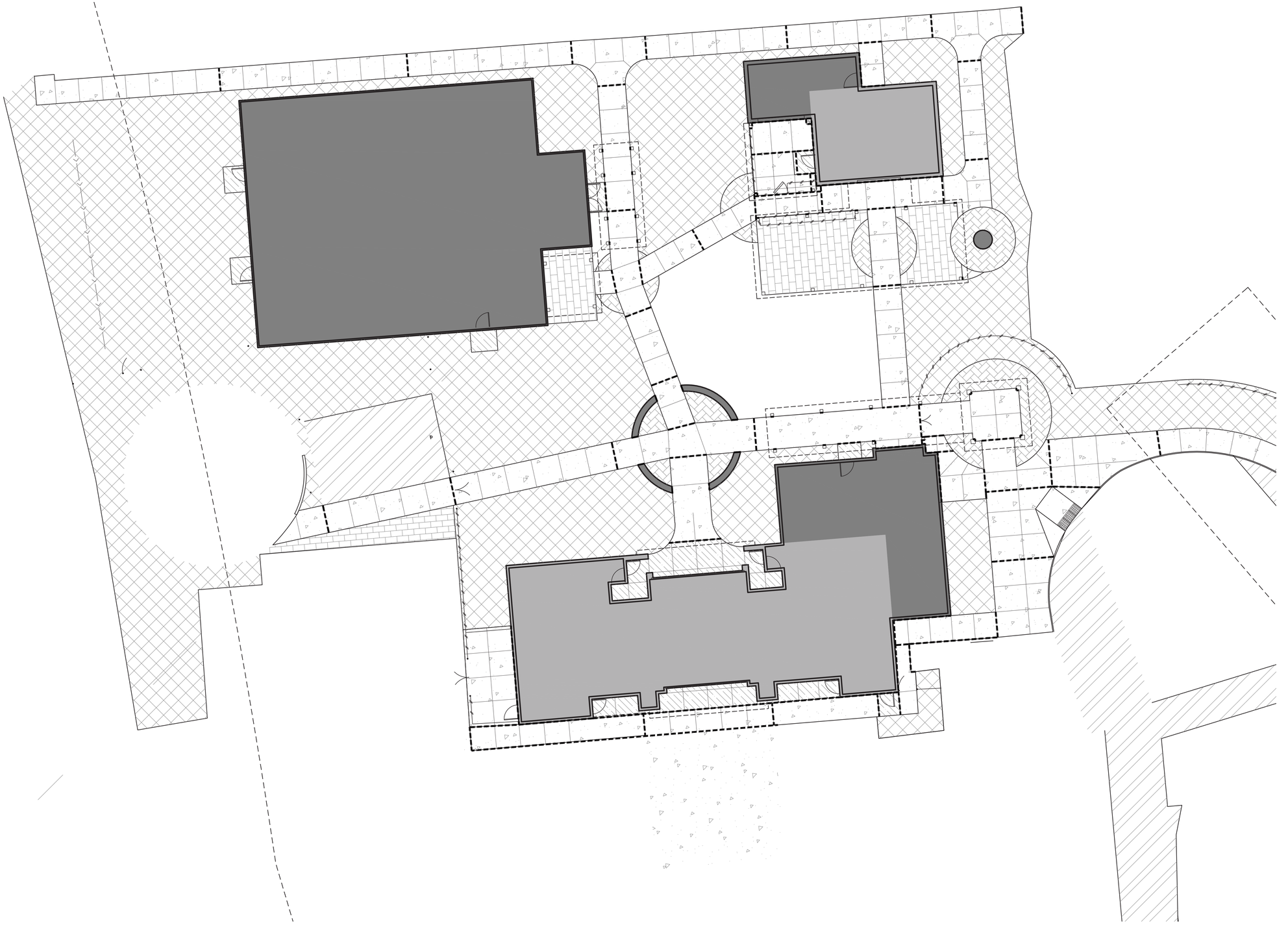
The site is shown in the USDA Soil Conservation Service Soil Survey of Washtenaw County to be primarily Boyer series with 0 to 6% slopes. Site vegetation includes almost exclusively planted trees and shrubs and several native landmark trees that will not be

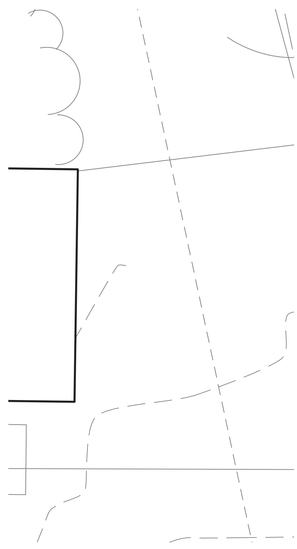
SITE PLAN SUBMITTAL 1 1/26/2015

STATE OF MICHIGAN
SCOTT W. BETZOLDT
ENGINEER
No. 38141
LICENSED PROFESSIONAL ENGINEER


40' FRONT SETBACK
TP-2
TP-1
WATER METER PIT
s-03
SAN MH*
(APPROX. GIS)
36" INV. ~759.1
s-02
36"x6" WYE*
(APPROX. GIS)
36" INV. ~758.8
6" INV. ~762
40' FRONT SETBACK


S71°47'25"E
508.7
40' FRONT SETBACK
WOOD SPLIT RAIL FENCE
GRASS
DECK
40' FRONT SETBACK
WOOD SPLIT RAIL FENCE
GRASS
TIMBER WALL
TIMBER WALL





POOL BLDG.

SNACK SHACK

BRICK WALL

TRELLIS

DINING DECK

CANOPY

BRICK

CHILDREN'S PLAY AREA

TIMBER WALL

BIKE RACK

CONC.

STRM CB
RIM=771.51
6"N INV=764.6
6"SE INV=764.8

PR. 7 LF
@ 1.00%
6" PVC

3x3"T

2"G

2x3"E

3"E

1.5"G

E-3"E

1473

1474

1471

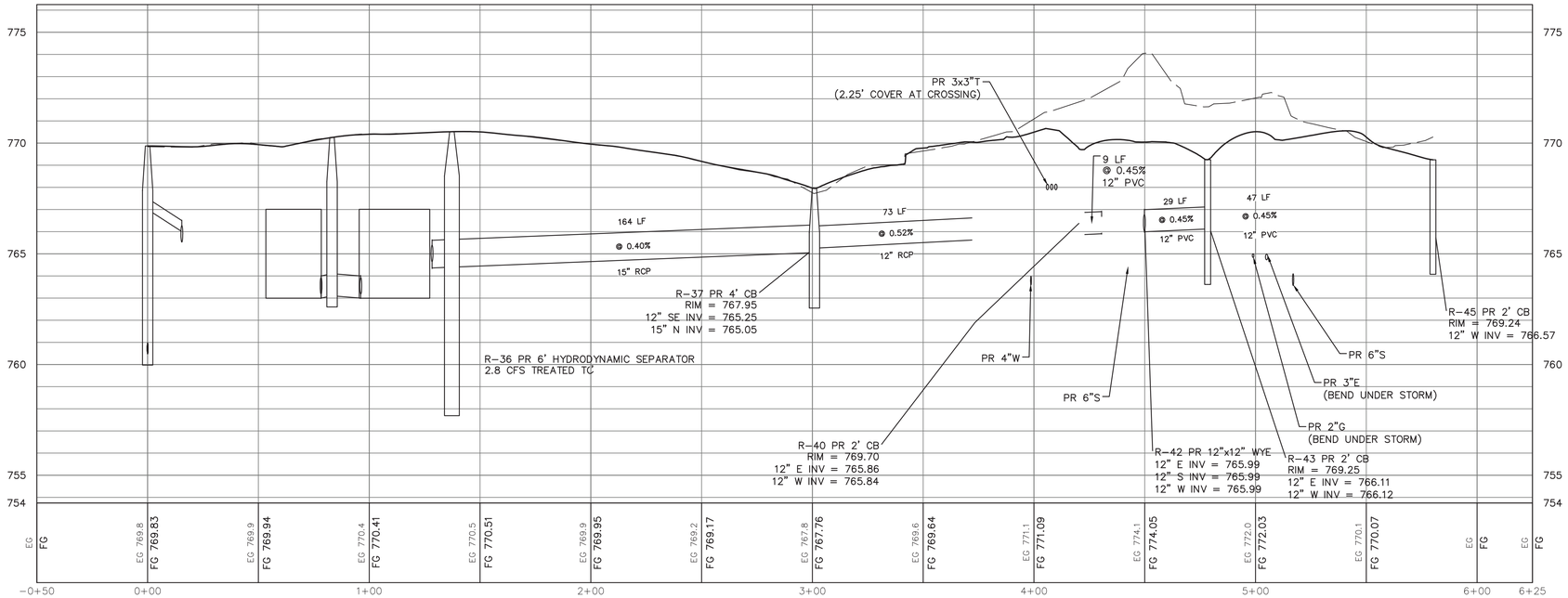
1479

1480

1482

5"M

r=25


775
770
765
760
755
754
PR 3x3"T
(2.25' COVER AT CROSSING)
9 LF
@ 0.45%
12" PVC
29 LF
@ 0.45%
12" PVC
47 LF
@ 0.45%
12" PVC
164 LF
@ 0.40%
15" RCP
73 LF
@ 0.52%
12" RCP
R-37 PR 4' CB
RIM = 767.95
12" SE INV = 765.25
15" N INV = 765.05
R-36 PR 6' HYDRODYNAMIC SEPARATOR
2.8 CFS TREATED TC
PR 4"W
PR 6"S
PR 6"S
PR 3"E
(BEND UNDER STORM)
PR 2"G
(BEND UNDER STORM)
R-45 PR 2' CB
RIM = 769.24
12" W INV = 766.57
R-40 PR 2' CB
RIM = 769.70
12" E INV = 765.86
12" W INV = 765.84
R-42 PR 12"x12" WYE
12" E INV = 765.99
12" S INV = 765.99
12" W INV = 765.99
R-43 PR 2' CB
RIM = 769.25
12" E INV = 766.11
12" W INV = 766.12
EG 769.8
FG 769.83
EG 769.9
FG 769.94
EG 770.4
FG 770.41
EG 770.5
FG 770.51
EG 769.9
FG 769.95
EG 769.2
FG 769.17
EG 767.8
FG 767.76
EG 769.6
FG 769.64
EG 771.1
FG 771.09
EG 774.1
FG 774.05
EG 772.0
FG 772.03
EG 770.1
FG 770.07
EG
FG
EG
FG
-0+50
0+00
1+00
2+00
3+00
4+00
5+00
6+00
6+25

Racquet Club of Ann Arbor - Sub-Watershed Analysis
Midwestern Consulting
5/12/2015

Steep Vegetated (>8%)	Water
0.25	1.00
0.35	1.00
0.40	1.00
0.55	1.00

ologic Soil Group - 0.60 - 6.00 in/hour infiltration

otal imp.	sft perm. Paver	sft veg.	Soil Type	Imp. C	Perm. Paver C	Veg. C	CxA (sft)	CxA (ac)	Area (ac)	C Value
4,976	72	1,852	A	0.95	0.25	0.20	5,116	0.117	0.158	0.74
278	459	573	A	0.95	0.25	0.20	493	0.011	0.030	0.38
642	384	926	A	0.95	0.25	0.20	891	0.020	0.045	0.46
1,341	454	3,223	A	0.95	0.25	0.20	2,032	0.047	0.115	0.40
51	0	2,486	A	0.95	0.25	0.20	546	0.013	0.058	0.22
302	0	797	A	0.95	0.25	0.20	446	0.010	0.025	0.41
915	0	736	A	0.95	0.25	0.20	1,016	0.023	0.038	0.62
3,562	0	0	A	0.95	0.25	0.20	3,384	0.078	0.082	0.95
812	0	0	A	0.95	0.25	0.20	771	0.018	0.019	0.95
4,433	0	0	A	0.95	0.25	0.20	4,211	0.097	0.102	0.95
0	0	1,163	A	0.95	0.25	0.20	233	0.005	0.027	0.20
1,344	0	1,077	A	0.95	0.25	0.20	1,492	0.034	0.056	0.62
182	0	983	A	0.95	0.25	0.20	370	0.008	0.027	0.32
3,679	0	2,958	A	0.95	0.25	0.20	4,087	0.094	0.152	0.62
1,827	0	149	A	0.95	0.25	0.20	1,765	0.041	0.045	0.89
8,463	0	8,747	A	0.95	0.25	0.20	9,789	0.225	0.395	0.57
2,190	0	4,406	A	0.95	0.25	0.20	2,962	0.068	0.151	0.45

disturbed areas, free released. C = undisturbed areas, routed through infiltration chamber. D = Total flows into Inlet 37

17,312	1,369	10,593	A	0.95	0.25	0.20	18,907	0.434	0.672	0.65
7,032	0	6,330	A	0.95	0.25	0.20	7,946	0.182	0.307	0.59
8,463	0	8,747	A	0.95	0.25	0.20	9,789	0.225	0.395	0.57
13,439	72	10,599	A	0.95	0.25	0.20	14,905	0.342	0.553	0.62

urbed areas)

24,344	1,369	16,923	A	0.95	0.25	0.20	26,854	0.616	0.979	0.63

B to allow for practical water distribution)

25,775	1,369	19,340	A	0.95	0.25	0.20	28,697	0.659	1.067	0.62

t intends to treat C instead of B as follows:
ea A, near Area A, to release at 0.15 cfs/acre of A
ea C, instead of Area A
0-year storm in Area B. Release rate will be 0.15 cfs/acre of C.
ement requirements, and they are also off the property on City right-of-way, so the Hickory Sidewalk Area is not included

Racquet Club of Ann Arbor
Preliminary Detention/Infiltration Calculations - Summary Table
Midwestern Consulting, LLC
5/12/2015

Portions of the disturbed site free drain, but portions of undisturbed site flow through the stormwater treatment systems.
This table compares the 2-year and 100-year runoff volumes to ensure that the flows actually reaching the stormwater treatment systems are at least as great as the volumes required.

Infiltration Volume Required (Disturbed Area):	4,304	cft	0.099 ac-ft
Actual 2-year Volume (Detained Area):	4,557	cft	0.105 ac-ft
Total 100-year Runoff Required (Disturbed Area):	10,353	cft	0.24 ac-ft
Actual 100-year Volume (Detained Area):	10,978	cft	0.252 ac-ft

Volume Provided:

RTank Chambers are used to conserve space and reduce surface demolition and construction costs.

Sizing Calculations

Storage Required:	10,353	cft	
Void Ratio of Chambers:	93%		
RTank Volume Required:	11,132	cft	
Bottom of Chambers:	763.0		Infiltration Test Elevation
Top of Chambers:	767.0		(2.5' under low point of 769.5, 3' under pavement of 770.0)
Height of Chambers	4.0	ft	
Rtank Area Required:	2,783	sft	minimum area required to store stormwater in 4' height.
Check for Infiltration:			
Infiltration Rate by TP-1	27.75	in/hr	
Factor of Safety	4		(WCWRC 2 minimum - also accounting for soils variation)
Design Infiltration Rate	6.94	in/hr	0.578 ft/hr
Time to Infiltrate	48	hr	
Minimum Volume to Infiltrate per hour	216	cft/hr	
Minimum Infiltration Area	373	sft	minimum infiltration area required.
RTank Area Provided	2,700	sft	

W13 - Storage-Elevation Data

Basin Storage Information	Elevation (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)	Cum. Volume (ac-ft)
Bottom of Basin	763	2,800	2,604	2,604	0.06
	764	2,800	2,604	5,208	0.12
	765	2,800	2,604	7,812	0.18
	766	2,800	2,604	10,416	0.24
Top of Basin and Overflow Weir	767	0	0	10,416	0.24
Low Point Ground Elevation	769.5	0	0	10,416	0.24

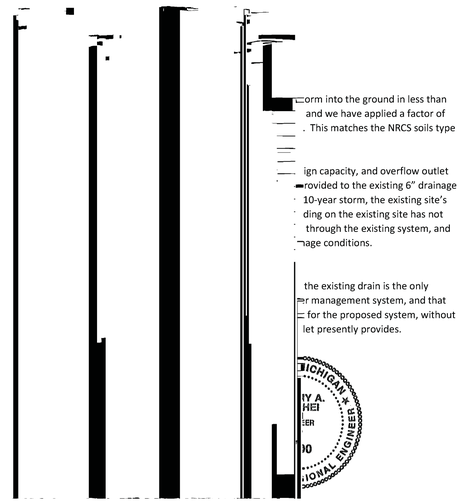
Storage Volumes

1" Event	2,391	cft	0.05	ac-ft
2-year Event volume	4,557	cft	0.10	ac-ft
Full Tank volume	10,353	cft	0.24	ac-ft

Infiltration Rate	1,561	cft/hr	0.036	ac-ft/hr	0.43 cfs
Time to infiltrate 1" event	1.5	hr	(<24 hours)		
Time to infiltrate 2-year event	2.9	hr	(<48 hours)		
Tiime to infiltrate 100-year event	6.6	hr			

Storage Elevations

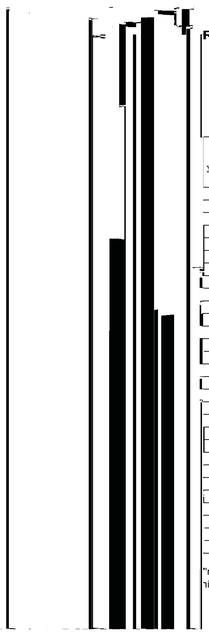
Elevation for 1" event	763.92	Elevation	0.92	ft. depth
Elevation for 2-year event	764.75	Elevation	1.75	ft. depth
Elevation for 100-year event	766.98	Elevation	3.98	ft. depth



orm into the ground in less than
and we have applied a factor of
. This matches the NRCS soils type

ign capacity, and overflow outlet
rovided to the existing 6" drainage
10-year storm, the existing site's
ding on the existing site has not
through the existing system, and
nage conditions.

the existing drain is the only
r management system, and that
for the proposed system, without
let presently provides.



STORM DRAINAGE CALCULATION SHEET
Racquet Club of Ann Arbor - 14058.00 - 5/15/2015

Runoff Formula: Q = CIA

I = x/(T+y) x = 175 y= 25 (10 Year Storm Event)
Type of Pipe = rcp
n = 0.013 Min time of concentration 15.00 min

Σ CxA	Time T (min.)	Rainfall I (in./hr.)	Q (cfs)	Q Inlet Here	Pipe Dia. (in.)	Pipe Length (ft.)	Pipe Slope %	H.G. Slope %	Velocity Flowing Full (ft./sec.)	Travel Time (min.)	Sewer Capacity (cfs)	Spare Capac. (cfs)
					6	15	6.48	0.00	7.29	0.03	1.43	1.43
					12	18	0.77	0.00	3.99	0.08	3.13	3.13
0.66	17.31	4.14	2.73	0.00	15	9	0.40	0.18	3.34	0.04	4.10	1.37
0.66	16.50	4.22	2.78	1.50	15	164	0.40	0.19	3.34	0.82	4.10	1.31
0.32	16.13	4.26	1.35	0.05	12	73	0.52	0.14	3.28	0.37	2.58	1.22
0.31	16.05	4.26	1.30	0.00	12	13	0.45	0.13	3.05	0.07	2.40	1.09
0.31	15.87	4.28	1.31	0.09	12	34	0.45	0.14	3.05	0.19	2.40	1.09
0.29	15.82	4.29	1.22	0.00	12	9	0.45	0.12	3.05	0.05	2.40	1.17
0.19	15.72	4.30	0.81	0.00	12	19	0.45	0.05	3.05	0.10	2.40	1.59
0.16	15.56	4.31	0.69	0.20	12	29	0.45	0.04	3.05	0.16	2.40	1.71
0.11	15.30	4.34	0.50	0.00	12	47	0.45	0.02	3.05	0.26	2.40	1.90
0.01	15.00	4.38	0.06	0.06	12	55	0.45	0.00	3.05	0.30	2.40	2.34
0.03	15.06	4.37	0.12	0.04	12	65	0.50	0.00	3.22	0.34	2.53	2.40
0.02	15.04	4.37	0.08	0.00	8	8	2.00	0.00	4.91	0.03	1.71	1.63
0.02	15.00	4.38	0.08	0.08	8	11	2.00	0.00	4.91	0.04	1.71	1.63
0.02	15.00	4.38	0.10	0.10	12	26	0.50	0.00	3.22	0.13	2.53	2.42
0.08	15.02	4.37	0.34	0.00	8	5	2.00	0.08	4.91	0.02	1.71	1.37
0.08	15.00	4.38	0.34	0.34	8	5	2.00	0.08	4.91	0.02	1.71	1.37
0.10	15.01	4.37	0.42	0.00	8	14	2.00	0.12	4.91	0.05	1.71	1.29
0.10	15.00	4.38	0.42	0.42	8	2	2.00	0.12	4.91	0.01	1.71	1.29

"n" of 0.06 for poor condition natural channel,
inimum slope, can handle 8.574 cfs at 0.8' full,

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

M:\Civil3d_Proj\14058\Site Plan\14058DA2.dwg, 13, 5/14/2015 4:28:55 PM, JAM, DWG to PDF.pc3

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RACQUET CLUB OF ANN ARBOR
3010 HICKORY LANE
ANN ARBOR, MI 48104
BRENT SCHOMAKER
(734) 216-0579

RACQUET CLUB OF ANN ARBOR

SITE PLAN

STORMWATER MANAGEMENT CALCULATIONS

13

JOB No. 14058
REVISIONS:
REV. DATE

DATE: 5/15/2015
SHEET 13 OF 22
CADD: WAJ
ENG: JAM
PM: SWB
TECH:
14058DA2.dwg

Racquet Club of Ann Arbor
Preliminary Detention/Infiltration Calculations - Total Disturbed Area
Midwestern Consulting, LLC
5/12/2015

Total Disturbed Area Calculations (to Determine Infiltration and Detention Required)
W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Total Site Area (Disturbed Area) **0.98 ac**
Total Site Area Excluding "Self-Crediting" BMPs* (Main Infiltration Chamber) **0.98 ac**
*** Used for remainder of calculations below**

Rational Method Variables (for first flush)
0.95 for impervious surfaces
0.25 for permeable pavers (use "steep vegetated" value)
0.20 for pervious surfaces

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) (Area)
Roofs	A	8,807	0.20	0.95	0.19
Pavements	A	15,537	0.36	0.95	0.34
Perm. Pavers	A	1,369	0.03	0.25	0.01
Landscaping	A	16,923	0.39	0.20	0.08
Total		42,636	0.98	0.63	0.62

Total - Sum(C)(Area) 0.62 ac
Area Total 0.98 ac
Weighted C - (Sum(C)(Area))/(Area Total) 0.63

Pervious

NRCS Variables (for bankfull and 100-year calculations)
68 for Permeable Pavers, Soil Type A (use "Landscaping, Poor Condition, Soil Type A" value)
39 for Landscaping, Good Condition, Soil Type A

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Perm. Pavers	A	1,369	0.03	68	0.02
Landscaping	A	16,923	0.39	39	0.15
Total		18,292	0.42	41	0.17

Total - Sum(C)(Area) 0.17
Area Total 0.42
Weighted C - (Sum(C)(Area))/(Area Total) 41.2

Impervious

NRCS Variables (for bankfull and 100-year calculations)
98 for Roofs
98 for Pavements

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Roofs	A	8,807	0.20	98	0.20
Pavements	A	15,537	0.36	98	0.35
Total		24,344	0.56	98	0.55

Total - Sum(C)(Area) 0.55
Area Total 0.56
Weighted C - (Sum(C)(Area))/(Area Total) 98.0

W2 - First Flush Runoff Calculations (Vff)

A. Vff = 1" x 1'/12" x 43560 sft/ac x A x C 2,238 cft
0.05 ac-ft

W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pre-Development CN 30
(Good Cover Woods, Type A Soils)
C. S = (1000 / CN) - 10 23.333 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.000 in
E. Total Site Area excluding "Self-Crediting" BMPs 42,636 sft
F. Vbf-pre = Q x (1/12) x Area - cft
- *ac-ft*

W4 - Pervious Cover Post-Development Bankfull Runoff Calculations (Vbf-per-post)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pervious Cover CN From Worksheet 1 41
C. S = (1000 / CN) - 10 14.289 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.000 in
E. Pervious Cover Area from Worksheet 1 18,292 sft
F. Vbf-per-post = Q x (1/12) x Area - cft
- *ac-ft*

W5 - Impervious Cover Post-Development Bankfull Runoff Calculations (Vbf-imp-post)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Impervious Cover CN From Worksheet 1 98
C. S = (1000 / CN) - 10 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 2.122 in
E. Impervious Cover Area from Worksheet 1 24,344 sft
F. Vbf-imp-post = Q x (1/12) x Area 4,304 cft
0.10 ac-ft

W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post)

A. 100 year / 24 hour storm event: P= 5.11 in
B. Pervious Cover CN From Worksheet 1 41
C. S = (1000 / CN) - 10 14.289 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.307 in
E. Pervious Cover Area from Worksheet 1 18,292 sft
F. V100-per-post = Q x (1/12) x Area 467 cft
0.01 ac-ft

W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post)

A. 2 year / 24 hour storm event: P= 5.11 in
B. Impervious Cover CN From Worksheet 1 98
C. S = (1000 / CN) - 10 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 4.873 in
E. Impervious Cover Area from Worksheet 1 24,344 sft
F. Vbf-imp-post = Q x (1/12) x Area 9,886 cft
0.23 ac-ft

W8 - Time of Concentration (Tc-hrs)

A. Assume 15-minute minimum time of concentration 0.25 hr

W9 - Runoff Summary & On-Site Infiltration Requirement

A. Summary from Previous Worksheets

First Flush Volume (Vff)	2,238 cft	0.05 ac-ft
Pre-Development Bankfull Runoff Volume (Vbf-pre)	- cft	- ac-ft
Pervious Cover Post-Development Bankfull Volume (Vbf-per-post)	*- cft*	*- ac-ft*
Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post)	*4,304 cft*	*0.10 ac-ft*
Total BF Volume (Vbf-post)	4,304 cft	0.10 ac-ft
Pervious Cover Post-Development 100-Year Volume (V100-per-post)	*467 cft*	*0.01 ac-ft*
Impervious Cover Post-Development 100-Year Volume (V100-imp-post)	*9,886 cft*	*0.23 ac-ft*
Total 100-Year Volume (V100)	10,353 cft	0.24 ac-ft

B. Determine Onsite Infiltration Requirement
Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume

Total Post-Development Bankfull Volume (Vbf-post)	4,304 cft	0.10 ac-ft
Pre-Development Bankfull Runoff Volume (Vbf-pre)	- cft	- ac-ft
Bankfull Volume Difference	**4,304 cft**	**0.10 ac-ft**
Compare to First Flush Volume (Vff)	2,238 cft	0.05 ac-ft
Greater of Bankfull Volume or First Flush Volume	**4,304 cft**	0.10 ac-ft
To be Infiltrated		

W10 - Detention/Retention Requirement

Detention

A. Qp = 238.6 Tc^-0.82	743.63 cfs/(in x sq. mi)	
B. Total Site Area excluding "Self-Crediting" BMPs	0.98 ac	
C. Q100 = Q100-per + Q100-imp (from W6 and W7, respectively)	5.180 in	
D. Peak Flow (PF) = Qp x Q100 x Area / 640	5.89 cfs	
E. Delta = PF - 0.15 x Area (ac)	5.74 cfs	
[0.15 x Area (ac)]	*0.15 cfs*	
F. Vdet = Delta / PF x V100 - Vinf	(5,319) cft	(0.12) ac-ft
Required Detention	(All Runoff is infiltrated)	

Retention

A. Vret = 2 x V100	20,706 cft	0.48 ac-ft

W11 - Determine Applicable BMPs and Associated Volume Credits

Proposed BMP	Area (sft)	Stor. Vol. (cft)	Ave Inf. Rate (in/hr)	6-hour Inf. Storm (cft)	Total Red. (cft)
Infiltration Chambers	2,700	10,353	6.9	9,366	19,719

(Area conservatively taken at bottom of pond)
Average infiltration rate at Test Pit 10 (pond location) is 14 in/hr, FS of 2 is 7 in/hr. 3.0in/hr is used here to be conservative.

Total Volume Reduction Credit by Proposed Structural BMPs	19,719	cft
Runoff Volume Infiltration Requirement (Vinf) from Worksheet 9	4,304	cft
Runoff Volume Credit	15,415	cft

Minimum Surface Area Check

Contributing Impervious Surface	24,344	sft
Contributing Total Surface	42,636	sft
Impervious Surface Ratio	9.0	Type A soils at 6.9"/hour drain quickly.
Total Surface Ratio	15.8	

W12 - Natural Features Inventory

Existing Natural Resources	Mapped	Total Area (ac)	Protected Area (ac)
Wetlands	Yes	0.00	0.00
Woodlands	Yes	0.00	0.00
Total Existing		0.00	0.00

Racquet Club of Ann Arbor
Preliminary Detention/Infiltration Calculations - Detained Area
Midwestern Consulting, LLC
5/12/2015

Total Disturbed Area Calculations (to Determine Actual Flow Rates and Volumes to Chambers)
W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Total Site Area (Proposed Detained Area) **1.07 ac**
Total Site Area Excluding "Self-Crediting" BMPs* (Main Detention Basin) **1.07 ac**
*** Used for remainder of calculations below**

Rational Method Variables (for first flush)
0.95 for impervious surfaces
0.25 for permeable pavers (use "steep vegetated" value)
0.20 for pervious surfaces

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) (Area)
Roofs	A	9,547	0.22	0.95	0.21
Pavements	A	16,228	0.37	0.95	0.35
Perm. Pavers	A	1,369	0.03	0.25	0.01
Landscaping	A	19,340	0.44	0.20	0.09
Total		46,484	1.07	0.62	0.66

Total - Sum(C)(Area) 0.66
Area Total 1.07 ac
Weighted C - (Sum(C)(Area))/(Area Total) 0.62 ac

Pervious

NRCS Variables (for bankfull and 100-year calculations)
68 for Permeable Pavers, Soil Type A (use "Landscaping, Poor Condition, Soil Type A" value)
39 for Landscaping, Good Condition, Soil Type A

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Perm. Pavers	A	1,369	0.03	68	0.02
Landscaping	A	19,340	0.44	39	0.17
Total		20,709	0.48	41	0.19

Total - Sum(C)(Area) 0.19
Area Total 0.48
Weighted C - (Sum(C)(Area))/(Area Total) 40.9

Impervious

NRCS Variables (for bankfull and 100-year calculations)
98 for Roofs
98 for Pavements

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Roofs	A	9,547	0.22	98	0.21
Pavements	A	16,228	0.37	98	0.37
Total		25,775	0.59	98	0.58

Total - Sum(C)(Area) 0.58
Area Total 0.59
Weighted C - (Sum(C)(Area))/(Area Total) 98.0

W2 - First Flush Runoff Calculations (Vff)

A. Vff = 1" x 1'/12" x 43560 sft/ac x A x C 2,391 cft
0.05 ac-ft

W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pre-Development CN 30
(Good Cover Woods, Type A Soils)
C. S = (1000 / CN) - 10 23.333 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.000 in
E. Total Site Area excluding "Self-Crediting" BMPs 46,484 sft
F. Vbf-pre = Q x (1/12) x Area - cft
- *ac-ft*

W4 - Pervious Cover Post-Development Bankfull Runoff Calculations (Vbf-per-post)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pervious Cover CN From Worksheet 1 41
C. S = (1000 / CN) - 10 14.440 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.000 in
E. Pervious Cover Area from Worksheet 1 20,709 sft
F. Vbf-per-post = Q x (1/12) x Area - cft
- *ac-ft*

W5 - Impervious Cover Post-Development Bankfull Runoff Calculations (Vbf-imp-post)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Impervious Cover CN From Worksheet 1 98
C. S = (1000 / CN) - 10 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 2.122 in
E. Impervious Cover Area from Worksheet 1 25,775 sft
F. Vbf-imp-post = Q x (1/12) x Area 4,557 cft
0.10 ac-ft

W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post)

A. 100 year / 24 hour storm event: P= 5.11 in
B. Pervious Cover CN From Worksheet 1 41
C. S = (1000 / CN) - 10 14.440 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.296 in
E. Pervious Cover Area from Worksheet 1 20,709 sft
F. V100-per-post = Q x (1/12) x Area 511 cft
0.01 ac-ft

W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post)

A. 2 year / 24 hour storm event: P= 5.11 in
B. Impervious Cover CN From Worksheet 1 98
C. S = (1000 / CN) - 10 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 4.873 in
E. Impervious Cover Area from Worksheet 1 25,775 sft
F. Vbf-imp-post = Q x (1/12) x Area 10,467 cft
0.24 ac-ft

W8 - Time of Concentration (Tc-hrs)

A. Assume 15-minute minimum time of concentration 0.25 hr

W9 - Runoff Summary & On-Site Infiltration Requirement

A. Summary from Previous Worksheets

First Flush Volume (Vff)	2,391 cft	0.05 ac-ft
Pre-Development Bankfull Runoff Volume (Vbf-pre)	- cft	- ac-ft
Pervious Cover Post-Development Bankfull Volume (Vbf-per-post)	*- cft*	*- ac-ft*
Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post)	*4,557 cft*	*0.10 ac-ft*
Total BF Volume (Vbf-post)	4,557 cft	0.10 ac-ft
Pervious Cover Post-Development 100-Year Volume (V100-per-post)	*511 cft*	*0.01 ac-ft*
Impervious Cover Post-Development 100-Year Volume (V100-imp-post)	*10,467 cft*	*0.24 ac-ft*
Total 100-Year Volume (V100)	10,978 cft	0.25 ac-ft

B. Determine Onsite Infiltration Requirement
Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume

Total Post-Development Bankfull Volume (Vbf-post)	4,557 cft	0.10 ac-ft
Pre-Development Bankfull Runoff Volume (Vbf-pre)	- cft	- ac-ft
Bankfull Volume Difference	**4,557 cft**	**0.10 ac-ft**
Compare to First Flush Volume (Vff)	2,391 cft	0.05 ac-ft
Greater of Bankfull Volume or First Flush Volume	**4,557 cft**	0.10 ac-ft
To be Infiltrated		

W10 - Detention/Retention Requirement

Detention

A. Qp = 238.6 Tc^-0.82	743.63 cfs/(in x sq. mi)	
B. Total Site Area excluding "Self-Crediting" BMPs	1.07 ac	
C. Q100 = Q100-per + Q100-imp (from W6 and W7, respectively)	5.169 in	
D. Peak Flow (PF) = Qp x Q100 x Area / 640	6.41 cfs	
E. Delta = PF - 0.15 x Area (ac)	6.25 cfs	
[0.15 x Area (ac)]	*0.16 cfs*	
F. Vdet = Delta / PF x V100 - Vinf	(4,457.50) cft	(0.10) ac-ft
Required Detention		

Retention

A. Vret = 2 x V100	21,956 cft	0.50 ac-ft

W11 - Determine Applicable BMPs and Associated Volume Credits

Proposed BMP	Area (sft)	Stor. Vol. (cft)	Ave Inf. Rate (in/hr)	6-hour Inf. Storm (cft)	Total Red. (cft)
Infiltration Chambers	2,700	10,353	6.9	9,366	19,719

(Area conservatively taken at bottom of pond)
Average infiltration rate at Test Pit 10 (pond location) is 14 in/hr, FS of 2 is 7 in/hr. 3.0in/hr is used here to be conservative.

Total Volume Reduction Credit by Proposed Structural BMPs	19,719	cft
Runoff Volume Infiltration Requirement (Vinf) from Worksheet 9	4,557	cft
Runoff Volume Credit	15,162	cft

Minimum Surface Area Check

Contributing Impervious Surface	25,775	sft
Contributing Total Surface	46,484	sft
Impervious Surface Ratio	9.5	Type A soils at 6.9"/hour drain quickly.
Total Surface Ratio	17.2	

W12 - Natural Features Inventory

Existing Natural Resources	Mapped	Total Area (ac)	Protected Area (ac)
Wetlands	Yes	0.00	0.00
Woodlands	Yes	0.00	0.00
Total Existing		0.00	0.00

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

MIDWESTERN CONSULTING
Civil, Environmental and Transportation Engineers
Planners, Surveyors
Landscape Architects
3815 Plaza Drive
Ann Arbor, Michigan 48108
Phone: 734.995.0200
Fax 734.995.0599

CLIENT
RACQUET CLUB OF ANN ARBOR
3010 HICKORY LANE
ANN ARBOR, MI 48104
BRENT SCHOMAKER
(734) 216-0579

RACQUET CLUB OF ANN ARBOR

SITE PLAN

STORMWATER MANAGEMENT WCWRC WORKSHEETS

14

DATE: 5/15/2015
SHEET 14 OF 22
CADD: WAJ
ENG: JAM
PM: SWB
TECH:
14058DA3.dwg

JOB No. 14058

REVISIONS: REV. DATE

WOOD SPLIT RAIL FEN

40' FRONT SETBACK

GRASS

TP-2

U.P.

TP-1

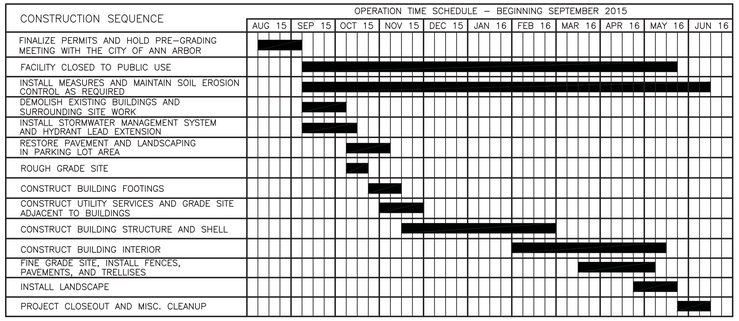
TIMBER WALL

DECK

40' FRONT SETBACK

49

48



PROGRAM PROPOSAL

THE RACQUET CLUB MANAGEMENT STAFF SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND REPLACEMENT, IF NECESSARY, OF ANY AND ALL OF THE PERMANENT SOIL EROSION CONTROL FEATURES ASSOCIATED WITH SEDIMENT AND SOIL EROSION CONTROL WITHIN THE DEVELOPMENT. THE FINANCIAL IMPLICATIONS OF SAID MAINTENANCE WILL BE ADDRESSED BY THE RACQUET CLUB MANAGEMENT STAFF.

CONSTRUCTION SEQUENCE:

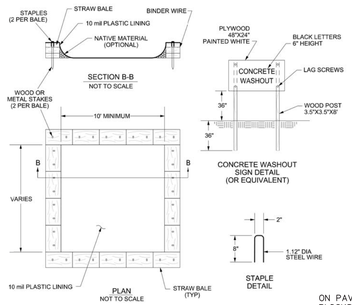
1. OBTAIN SOIL EROSION AND SEDIMENTATION CONTROL, AND GRADING PERMIT FROM THE CITY OF ANN ARBOR. CERTIFIED MDEQ STORM WATER OPERATOR TO INSPECT SITE ONCE A WEEK AND IMMEDIATELY FOLLOWING EACH PRECIPITATION EVENT. MAINTAIN WRITTEN REPORTS ON SITE.
2. SCHEDULE AND ATTEND A SOIL EROSION AND SEDIMENTATION CONTROL PRE-GRADING MEETING WITH THE CITY OF ANN ARBOR.
3. MARK TREES AND BRUSHFOR REMOVAL AND PROTECTION.
4. CLOSE FACILITY TO THE PUBLIC ON LABOR DAY, 2015.
5. CLEAR BRUSH AND TREES WHERE INDICATED, ABOVE STUMPS ONLY.
6. INSTALL TREE PROTECTION FENCE, SITE SECURITY FENCE, SILT FENCE, INLET FILTER SILT SACKS, AND OTHER SESC DEVICES. SEE DEMOLITION PLAN AND EROSION CONTROL PLAN FOR FURTHER DETAILS ON NATURAL FEATURES PROTECTION.
7. REMOVE PAVEMENT, STUMPS, AND SITE STRUCTURES, WHERE INDICATED.
8. STRIP TOPSOIL AND STOCKPILE ON-SITE FOR REUSE.
9. CONSTRUCT STORMWATER MANAGEMENT SYSTEM IN PARKING LOT AREA. INSTALL INLET FILTER SILT SACKS IN ALL NEW INLETS AS SOON AS THEY ARE CONSTRUCTED.
10. EXTEND HYDRANT LEAD.
11. INSTALL COMMUNICATIONS CONDUIT IN PARKING LOT AREA.
12. WHILE PARKING LOT UTILITY WORK IS IN PROGRESS, DISCONNECT AND REMOVE UTILITIES WHERE INDICATED ON REMOVALS PLAN.
13. WHILE PARKING LOT UTILITY WORK IS IN PROGRESS, DEMOLISH STRUCTURES WHERE INDICATED ON REMOVALS PLAN AND ARCHITECTURAL PLANS.
14. WHILE PARKING LOT UTILITY WORK IS IN PROGRESS, ROUGH GRADE SITE NEAR BUILDINGS.
15. RESTORE PAVEMENT IN PARKING LOT AREA, AS SOON AS POSSIBLE, IN THE FALL OF 2015.
16. RESTORE LANDSCAPE IN PARKING LOT AREA, WITHIN 5 DAYS OF THE FINAL EARTH CHANGE, AS SOON AS POSSIBLE, IN THE FALL OF 2015.
17. INSTALL SANITARY SEWER AND STORM SEWER NEAR BUILDINGS. INSTALL INLET FILTER SILT SACKS ON ALL NEW INLETS AS SOON AS THEY ARE CONSTRUCTED.
18. AFTER STORMWATER SYSTEM IS OPERATIONAL, OBTAIN BUILDING PERMITS AND INSTALL BUILDING FOOTINGS.
19. INSTALL REMAINDER OF SITE UTILITIES NEAR BUILDINGS, AND GRADE SITE.
20. CONSTRUCT BUILDING STRUCTURE AND SHELL.
21. CONSTRUCT BUILDING INTERIOR.
22. IN EARLY SPRING 2016, CONSTRUCT SITE PAVEMENTS, FENCES, AND TRELLISES.
23. PLACE TOPSOIL AND LANDSCAPE SITE. ALL SOILS MUST BE LANDSCAPED (WITH ALL PERMANENT SESC CONTROLS) WITHIN FIVE DAYS OF THE FINAL EARTH CHANGE.
24. CLEAN UP SITE.
25. OPEN FACILITY TO THE PUBLIC ON MEMORIAL DAY, 2016.
26. MAINTAIN ALL SESC DEVICES UNTIL VEGETATION IS FULLY ESTABLISHED, THEN REMOVE TEMPORARY SESC DEVICES.
27. CLOSE OUT SITE PERMITS.

MAINTENANCE REQUIREMENTS

1. ALL SILT FENCE SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. IF AT ANY TIME THE DEPTH OF SILT AND SEDIMENT COMES TO WITHIN 12" OF THE TOP OF ANY SILT FENCE, ALL SILT AND SEDIMENT SHALL BE REMOVED TO ORIGINAL GRADE.

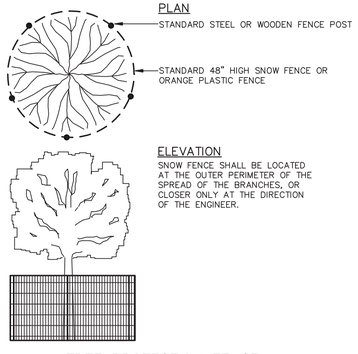
2. ALL TEMPORARY GRAVEL FILTERS SHOULD BE ADJUSTED AS TO LOCATION PER ACTUAL FIELD CONDITIONS. THE REMOVAL OF TRAPPED SEDIMENT AND THE CLEANOUT OR REPLACEMENT OF CLOGGED STONE MAY BE NECESSARY AFTER EACH STORM EVENT DURING THE PROJECT.

3. ONLY UPON STABILIZATION OF ALL DISTURBED AREAS MAY EROSION CONTROL DEVICES BE REMOVED. ALSO, ALL STORM SEWERS MUST BE CLEANED OF ALL SEDIMENT.



CONCRETE WASHOUT

NOT TO SCALE



TREE PROTECTION FENCE

NOT TO SCALE

SOIL EROSION AND SEDIMENTATION CONSTRUCTION NOTES:

1. ALL SOIL EROSION CONTROL MEASURES SHALL COMPLY WITH THE CURRENT CITY OF ANN ARBOR ORDINANCES, WASHTENAW COUNTY STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, AND STATE OF MICHIGAN "SOIL EROSION AND SEDIMENTATION CONTROL ACT" (ACT #347).

2. CONTRACTOR SHALL HAVE A PRE-GRADING MEETING WITH THE CITY OF ANN ARBOR SOIL EROSION CONTROL STAFF PRIOR TO ANY GRADING ACTVITIES.

3. THE SITE REQUIRES AN SESC PERMIT FROM THE CITY OF ANN ARBOR. INSPECTIONS WILL BE PERFORMED BY A CERTIFIED MDEQ STORM WATER OPERATOR AT LEAST ONCE A WEEK AND IMMEDIATELY FOLLOWING EACH PRECIPITATION EVENT.

4. PRIOR TO COMMENCING EARTHMOVING OPERATIONS, THE GRADING CONTRACTOR SHALL INSTALL THE MUD TRACKING MAT, THE SILT FENCE AND TEMPORARY GRAVEL FILTER(S) SHOWN ON THE PLANS.

5. ANY LAWN AREA WHICH WILL HAVE A SLOPE STEEPER OR EQUAL TO 3:1 (3 FT. MEASURED HORIZONTALLY AND 1 FT. MEASURED VERTICALLY) SHALL BE SODDED AND PEGGED OR SEEDED AND MULCHED USING A SOIL EROSION CONTROL FABRIC OR BLANKET. HYDROSEEDING MAY BE USED IN LIEU OF SEED AND MULCH OR SOD WHERE SLOPES ARE FLATTER THAN 3:1.

6. THE ACTUAL LOCATION OF THE MUD TRACKING MATS AND THE GRAVEL FILTERS MAY BE ADJUSTED BY THE CONTRACTOR TO MATCH CONTRACTOR'S OPERATIONS AND FIELD CONDITIONS BUT ONLY IF APPROVED BY THE ENGINEER.

7. ALL DISTURBED AREAS, EVEN WHERE FUTURE PAVEMENT AND BUILDINGS ARE PROPOSED, ARE TO BE REVEGETATED PER COUNTY STANDARDS FOR TEMPORARY SEEDING.

8. BOTH INTERNAL AND EXTERNAL STREETS WILL BE CLEANED OF ANY MUD IMMEDIATELY FOLLOWING EACH MUD TRACKING OCCURRENCE.

9. PERMANENT SOIL EROSION CONTROLS ARE REQUIRED TO BE INSTALLED WITHIN 5 DAYS AFTER FINAL GRADING OR FINAL EARTH CHANGE.

10. DRAINAGE FROM ALL IMPERVIOUS AREAS IS TO BE DIRECTED TO THE ON-SITE STORM WATER MANAGEMENT SYSTEM.

11. THE OBTAINING OF BUILDING PERMITS, AND BUILDING FOOTING CONSTRUCTION MAY NOT BEGIN UNTIL THE SITE STORMWATER MANAGEMENT SYSTEM IS INSTALLED AND OPERATIONAL.

12. THE ESTIMATE COST TO ESTABLISH A GRASS SEED MIX IN DISTURBED AREAS, IF CONSTRUCTION WERE TO BE DISCONTINUED, IS $8,000, FOR TOPSOIL SPREADING, SEEDING, AND WATERING.

13. THE PROJECT WILL INVOLVE APPROXIMATELY 600 CYD OF CUT, 800 OF FILL, AND 1,900 CYD OF UTILITY TRENCH CUT AND BACKFILL. THIS NUMBER WILL VARY BASED UPON CONTRACTOR TECHNIQUES, AND ALL BIDDERS ARE REQUIRED TO PERFORM THEIR OWN EARTHWORK CALCULATIONS BEFORE BIDDING.

14. THE PROJECT'S DISTURBED AREA IS APPROXIMATELY 1.13 ACRES.

STORMWATER /SESC MAINTENANCE SCHEDULE
RACQUET CLUB OF ANN ARBOR

DURING CONSTRUCTION:

TASK	Paved Areas	Pervious Areas	Riprap & Silt Fence	Storm Pipes	Catch Basins and Manholes	Inlet Grates	Flow Restriction Devices	Chambers & QC Devices	SCHEDULE
Inspect for sediment accumulation	X		X	X	X		X	X	Weekly
Removal of sediment accumulation	X		X	X	X		X	X	As needed* & prior to turnover
Inspect for floatables and debris				X	X	X	X	X	Quarterly
Cleaning for floatables and debris				X	X	X	X	X	Quarterly and at turnover
Inspect for erosion		X	X						Weekly
Reestablish permanent vegetation on eroded slopes		X							As needed* & prior to turnover
Clean drives and parking lots	X								Weekly or as determined by permitting agency
Water disturbed areas to provide dust control	X	X							As needed* & prior to turnover
Inspect structural elements during wet weather and compare to as-built plans (by a professional engineer reporting to the owner)			X	X			X	X	Annually and at turnover
Make adjustments or replacements as determined by wet weather inspection			X	X			X	X	As needed* & prior to turnover

* "as needed" means when sediment has accumulated to a minimum of one foot depth. **Total Project Phase Cost**

Maintenance of soil erosion and sedimentation during construction to be the repsonsibility of the to-be-selected contractor, and ultimately to the developer.

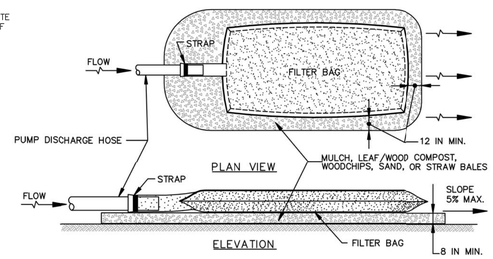
PERMANENT MAINTENANCE:

TASK	Paved Areas	Pervious Areas	Riprap	Storm Pipes	Catch Basins and Manholes	Inlet Grates	Flow Restriction Devices	Chambers & QC Devices	SCHEDULE
Inspect for sediment accumulation	X		X	X	X		X	X	Annually
Removal of sediment accumulation	X		X	X	X		X	X	Annually, and as needed*
Inspect for floatables and debris				X	X	X	X	X	Annually
Cleaning for floatables and debris				X	X	X	X	X	Annually, and as needed*
Inspect for erosion		X	X						Every six months
Reestablish permanent vegetation on eroded slopes		X							As needed*
Clean drives and parking lots	X								Annually
Mowing		X							Weekly during growing season
Inspect structural elements during wet weather and compare to as-built plans (by a professional engineer reporting to the owner)			X	X			X	X	Annually
Make adjustments or replacements as determined by wet weather inspection			X	X			X	X	As needed*
Keep records of all inspections and maintenance									Annually
Keep records of all costs for inspections.									Annually
Property owner to review cost-effectiveness of the preventative maintenance program and make necessary adjustments.									Annually
Onwer to hire a professional engineer to carry out emergency inspections upon identification of severe problems.									As needed*

Total Annual Cost

* "as needed" means when sediment has accumulated to a minimum of one foot depth.

Permanent maintenance of soil erosion and sedimentation control to be the resPonsibility of the Racquet Club of Ann Arbor, and enforced by the City of Ann Arbor.



CONSTRUCTION SPECIFICATIONS

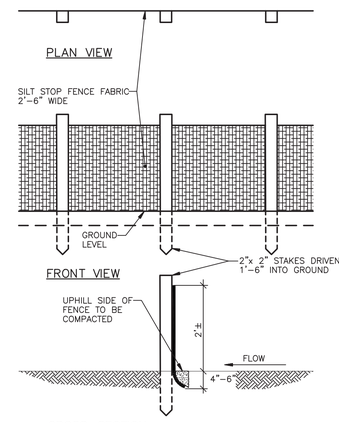
1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARV) FOR THE FOLLOWING:

GRAB TENSILE	250 LB	ASTM D-4632
PUNCTURE	150 LB	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT²	ASTM D-4491
PERMITTIVITY (SEC⁻¹)	1.2 SEC⁻¹	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-4751
SEAM STRENGTH	90%	ASTM D-4632

6. REPLACE FILTER BAG IF BAG CLOGS OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

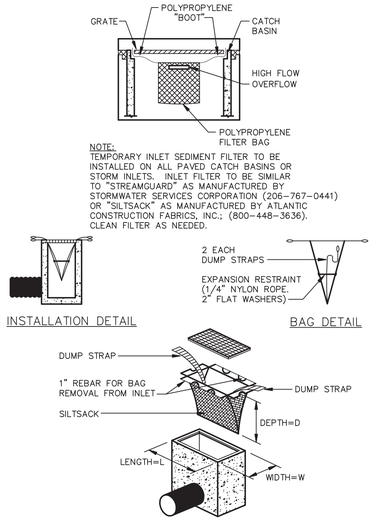
DEWATERING FILTER BAG

NOT TO SCALE



SILT FENCE DETAIL

NO SCALE



SILT SACK (INLET FILTER)

NO SCALE

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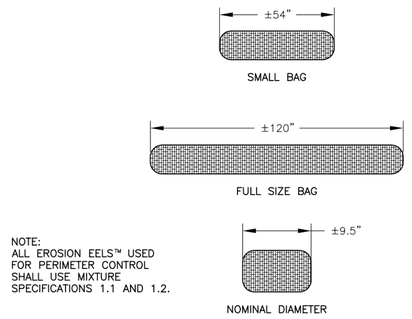
SITE PLAN
SESC NOTES AND DETAILS

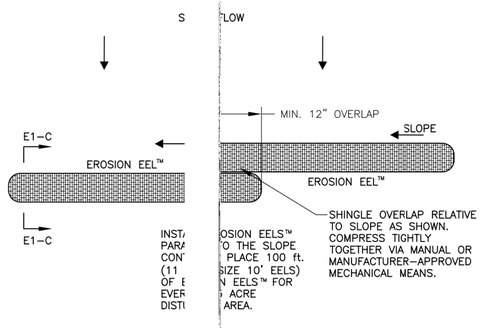
16

DATE: 5/15/2015
SHEET 16 OF 22
CADD: WAJ
ENG: JAM
PM: SWB
TECH:
14058DT1.dwg

JOB No. 14058
REVISIONS:
REV. DATE

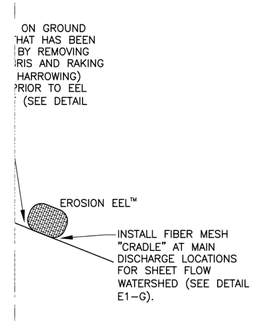


DETAIL E1–A: EROSION EELs™
N.T.S.

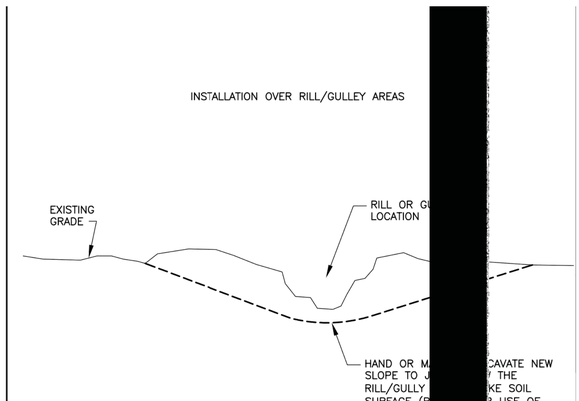


DETAIL E1–E
PERPENDICULA

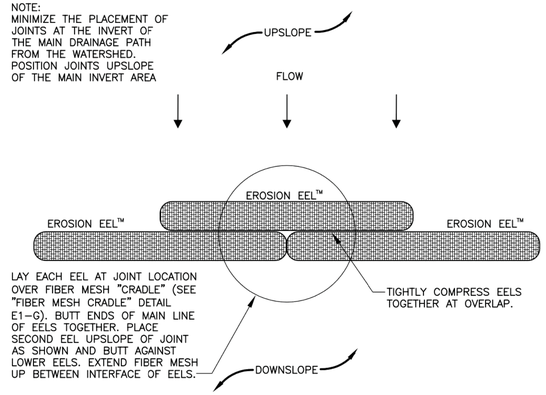
RCEPTING SHEET FLOW
FLOW PATH – PLAN VIEW



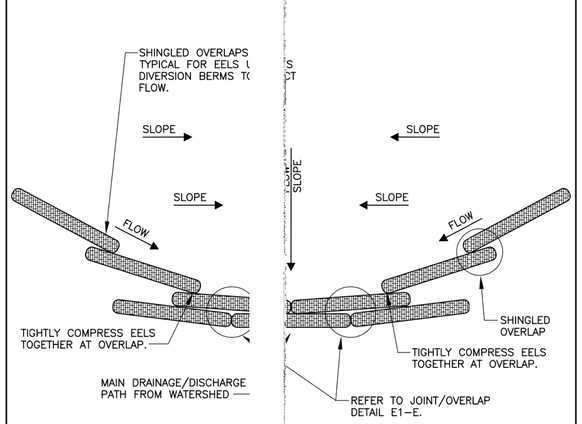
SHEET FLOW
– PLAN VIEW



DETAIL E1–D: CROSS–SECTION VIEW
N.T.S.

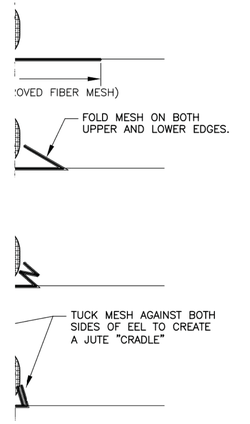


DETAIL E1–E: PLAN VIEW –
OVERLAP/JOINT DETAIL NEAR DISCHARGE POINTS FROM WATERSHED
N.T.S.

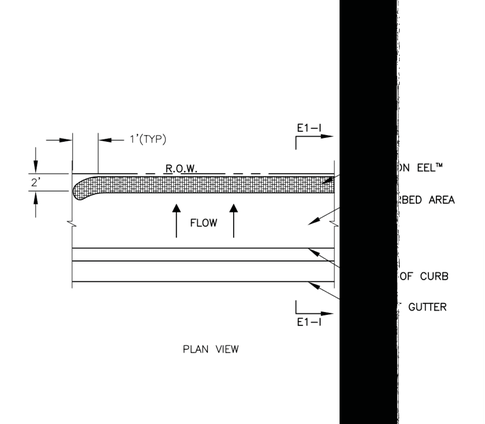


DETAIL E1–
ARRANGEMENT OF E

AN VIEW – TYPICAL
ED FOR PERIMETER CONTROL
T.S.

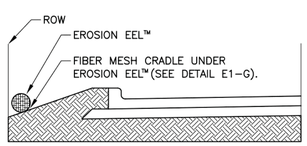


MESH "CRADLE"

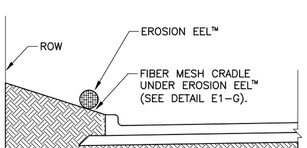


PLAN VIEW

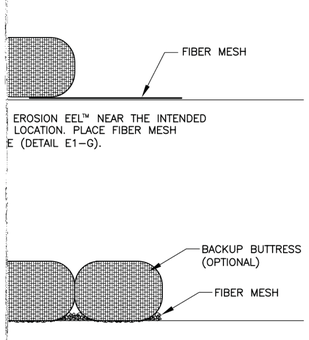
DETAIL E1–H: EROSION EEL™
PLACED AT EDGE OF ROADWAY RIGHT–OF–WAY
N.T.S.



DETAIL E1–I: SECTION
N.T.S.



DETAIL E1–J: SECTION
N.T.S.



–K: STABILIZING PROCEDURE FOR
OVER HARD SURFACE (PAVED, ROCK, ETC.)
N.T.S.

r the Erosion Eel™
ercepting Sheet Flow on Slopes

*Stacked Dual eel spacing (ft)
N/A
N/A
N/A
N/A
N/A
N/A
N/A
N/A
N/A
N/A
25
15
10
6

EELS
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DETAIL

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AND RETAIN
N. EROSION EELS™
VEL BEDDING
R PERIMETER
REVENT FLOW AND
BY HAND OR
EELS™ SHALL
STORAGE
FT. LENGTHS)
FOR STEEL
DED A MINIMUM OF 2

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SITE PLAN

SESC EROSION EEL DETAIL

17

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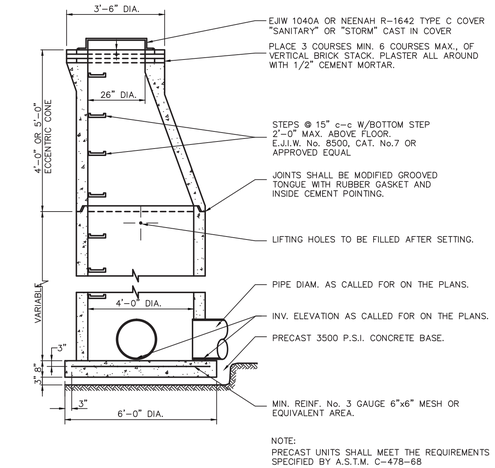

SANITARY AND STORM MANHOLE

NOT TO SCALE

SANITARY SEWER LEAD CLEANOUT

NOT TO SCALE

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SITE PLAN

UTILITY AND PAVING DETAILS

18

JOB No. 14058

REVISIONS: REV. DATE

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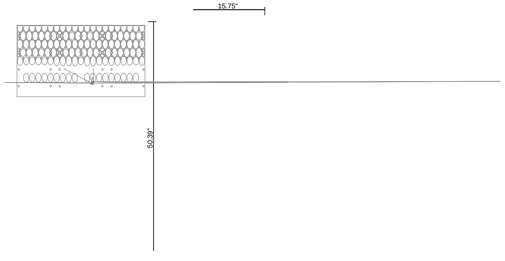


PLAN VIEW | FRONT VIEW | ISOMETRIC VIEW

SIDE VIEW

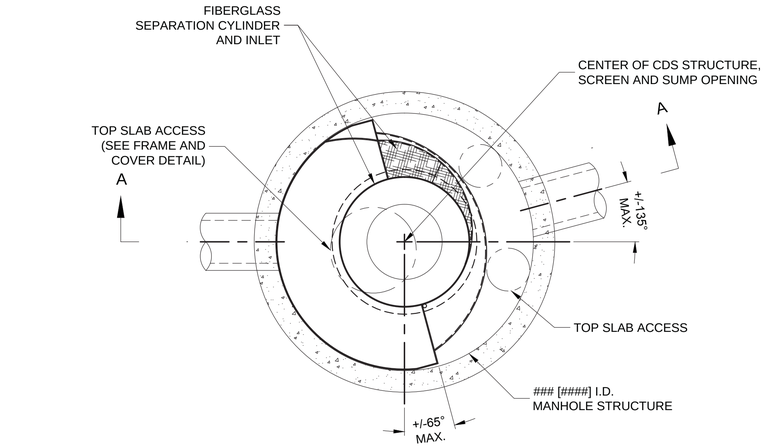
MODULE DATA

GEOMETRY: LENGTH = 28.15 IN. (715 MM)
WIDTH = 15.75 IN. (400 MM)
HEIGHT = 50.39 IN. (1280 MM)
STORAGE VOLUME = 12.28 CF (348 L)
VOID INTERNAL VOLUME: 95%
VOID SURFACE AREA: 90%

LOAD RATING: 40 PSI, (MODULE ONLY)
HS25, (WITH ACF COVER SYSTEM)

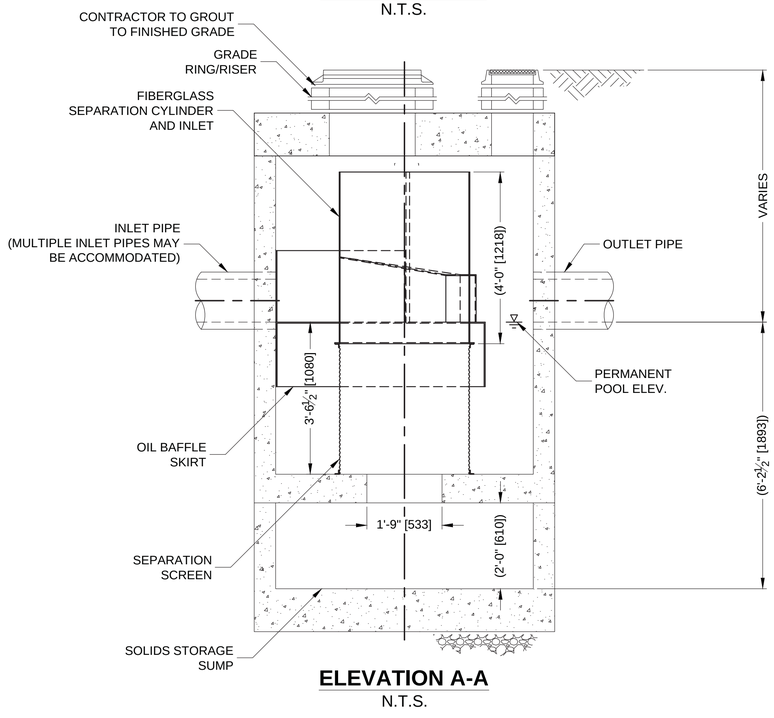
MATERIAL: 85% RECYCLED POLYPROPYLENE

R-TANK^{HD} - TRIPLE MODULE



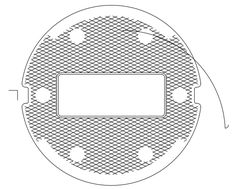
PLAN VIEW B-B

N.T.S.



ELEVATION A-A

N.T.S.



FRAME AND COVER

(DIAMETER VARIES)

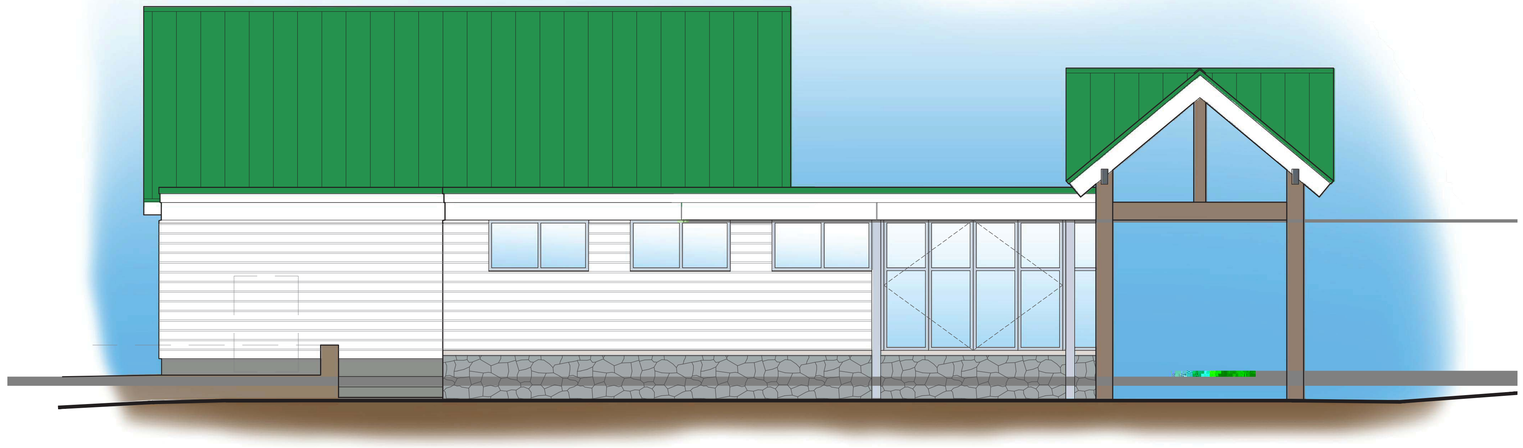
N.T.S.

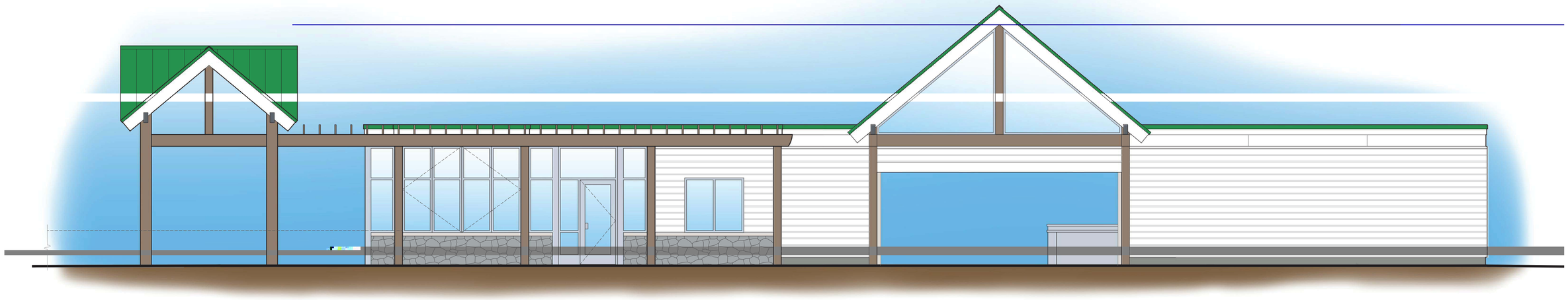
GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.





Ann Arbor Racque

Ann Arbor Racquet