

EXAMPLE #1

For projects less than one acre and no new connections to the City/County storm sewers

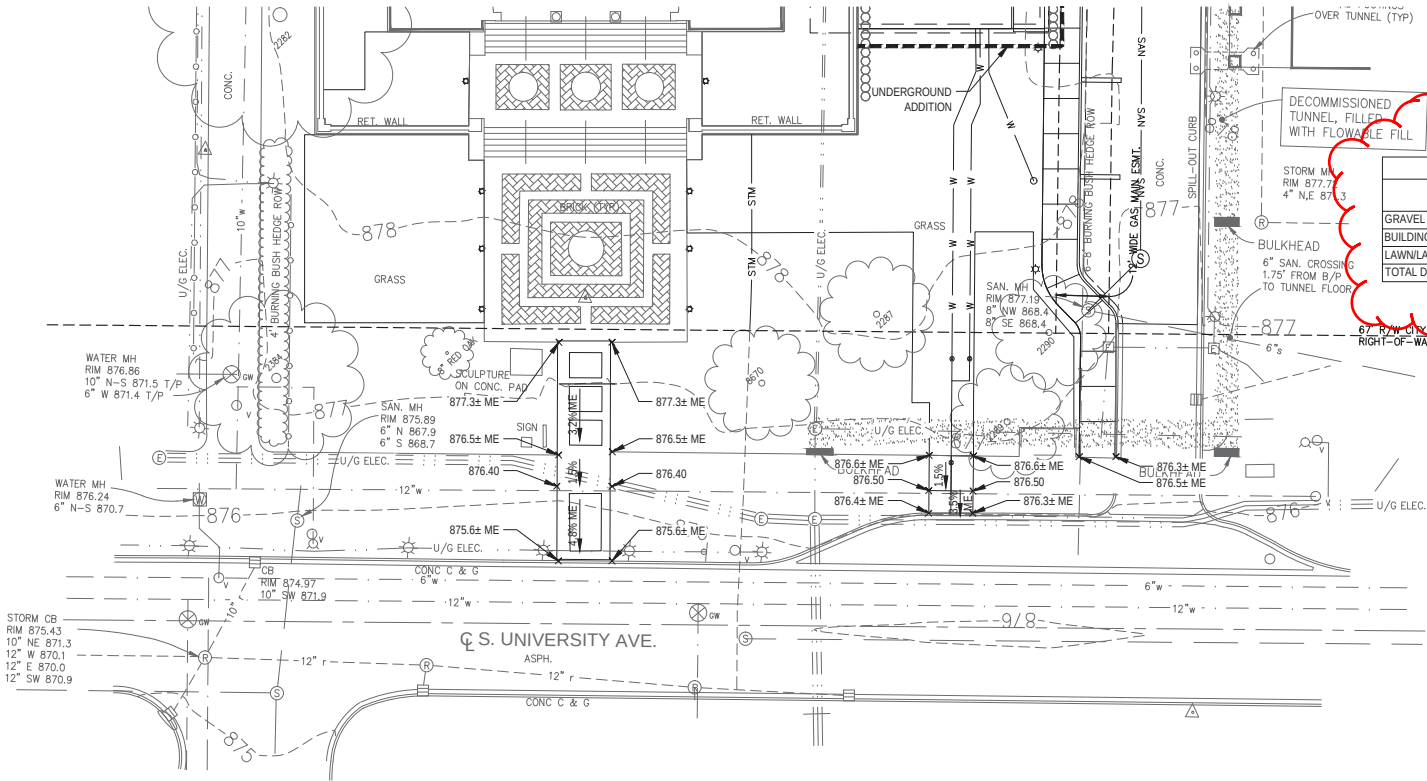
Storm Water Notes:

- 1. No new connections to city storm sewer systems are proposed.
- 2. Proposed earth disturbance is _____ SF (_____ acres).
- 3. U-M NPDES permit post-construction storm water management requirements are not applicable since the proposed earth disturbance is less than one acre.

Show chart of with change in impervious -see attached example chart. Increase in impervious must be reviewed/approved by U-M Campus Planning and project team may be directed to design additional storm water management BMPs.

Provide a list of elective storm water BMP's to be installed and quantify benefits, if feasible.

Include the language: "Construction and operation of the storm water (infiltration/detention pond) or (BMP's on the plans) is/are in compliance with the requirements of State and Federal water pollution control laws."



GRADING & DRAINAGE LEGEND

- STM STORM SEWER PIPING
- W WATER MAIN PIPING; SEE CUL.1
- 800 MAJOR CONTOUR LINE
- 800 MINOR CONTOUR LINE
- 800 EXISTING CONTOUR LINE
- 800 SPOT ELEVATION
- 1% GRADE

GRADING & DRAINAGE ABBREVIATIONS

- G = GUTTER
- ME = MEET EXISTING
- T/C = TOP OF CURB

Replace chart with format matching example chart below

Area Comparision (for earth disturbance)			
Type	CN	Existing Area (sf)	Proposed Area (sf)
Gravel	85	3500	0
Bldg Roof/Pavement	98	3000	3500
Lawn/Landscaping	61	6500	8000
Pervious Pavement	79.5	0	1500
Total Disturbed area		13000	13000
Total Impervious		6500	3500
Composite CN		76	73

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500 GRISWOLD
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DETROIT, MI 48226
313.983.3600
www.smithgroupjjr.com

3 WORKING DAYS
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800-482-7171
(TOLL FREE)



BENCH MARK	SURVEY BOOK	REV. NO.	DESCRIPTION	DATE	DR.BY	CH.BY
		1	CD FINAL REVIEW/CITY PLAN REVIEW	10/3/13	JBW	JBW
		0	CITY PPR SUBMITTAL	8/23/13	JBW	JBW

PROJECT MANAGEMENT - PUBLIC SERVICES - CITY OF ANN ARBOR	
UNIVERSITY OF MICHIGAN WILLIAM L. CLEMENTS LIBRARY INFRASTRUCTURE IMPROVEMENTS AND ADDITION UM PROJECT NUMBER: P00001692 RIGHT OF WAY GRADING PLAN	
SCALE HORIZ. 1"=20' VERT. 1"=2'	INCH 0 1
DRAWING NO.	CG1.1
SHEET NO.	OF

EXAMPLE #2

Greater than an acre, new connection to the City System

UNIVERSITY OF MICHIGAN

ATHLETIC DEPARTMENT OPERATIONS CENTER

PRELIMINARY SITE PLAN REVIEW

UM AEC Proj No #: P00008399;

THE UNIVERSITY OF MICHIGAN
ATHLETICS DEPARTMENT
ANN ARBOR, MI 48105

For City projects only - Title Sheet Listing type of City Review

SPALDING DEDECKER ASSOCIATES, INC.

SPALDING DEDECKER ASSOCIATES
905 SOUTH BOULEVARD EAST
ROCHESTER HILLS, MI 48307
P (248) 844 - 5400

CIVIL

- T-1C
- C001C
- C002C
- C101C
- C102C
- C103C
- C104C
- C104AC
- C104BC
- C105C
- COVER SHEET
- TOPO SURVEY
- DEMOLITION PLAN
- SITE PLAN
- UTILITY PLAN - RIGHT-OF-WAY
- PAVING PLAN - RIGHT-OF-WAY
- STORMWATER MANAGEMENT SUMMARY SHEET
- STORMWATER MANAGEMENT PLAN
- STORMWATER MANAGEMENT DETAILS
- FIRE SAFETY SITE PLAN



VICINITY PLAN

SCALE: NTS

UNIVERSITY of MICHIGAN

UM Athletic Department
Operations Center
ANN ARBOR, MICHIGAN
48105

WORK SCOPE

NEW OPERATIONS BUILDING
INCLUDES ADMINISTRATION OFFICES, LAUNDRY FACILITIES, ATHLETICS GENERAL STORAGE, LOADING DOCK AND A MAINTENANCE SHOP FOR MINOR REPAIRS. THESE REPAIR FUNCTIONS MILLWORK, WELDING, PAINTING AND SMALL EQUIPMENT. THE BUILDING IS APPROXIMATELY 18,500 SF OF SPACE. THE BUILDING IS STEEL FRAMED W/ INSULATED METAL PANEL AND INSULATED MASONRY VENEER WALLS. INTERIOR FINISHES INCLUDE CMU, GYPSUM BOARD, CEILINGS ARE EXPOSED METAL DECK PAINTED.

THE UNIVERSITY OF MICHIGAN

Architecture, Engineering and Construction
University Architect's Office
326 E. Hoover Ave.
Mail Stop E
ANN ARBOR, MICHIGAN 48109-1002

NIAGARA MURANO

ARCHITECTURE
2215 COLE STREET
BIRMINGHAM, MICHIGAN 48009
TELEPHONE: 248.646.5765
FACSIMILE: 248.646.5813

Architect's Project No. - 13144.0

issue: date:

City Site Plan Review	April 28, 2014
Prelim. City Site Plan Review	March 19, 2014
Owner Review	Feb 19, 2014
DD Review	December 20, 2013
SD Review	November 27, 2013
Owner Review	October 28th 2013
Owner Review	October 28th 2013
Owner Review	October 21st 2013
Owner Review	October 9th 2013

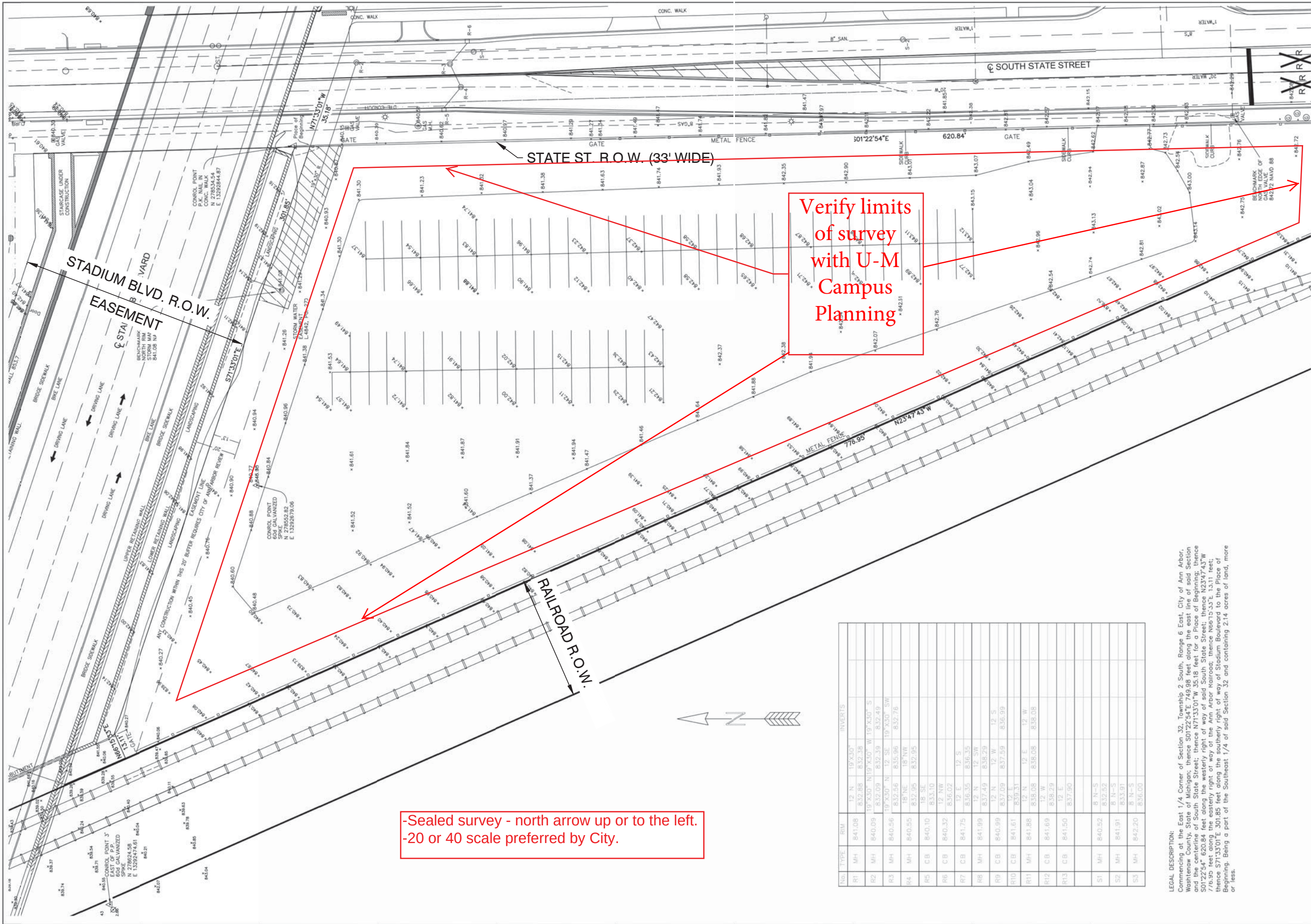


submitted to: HFES	NO	BFS:	NO
AEC constr mgmt no.	P00008399		
building no.	-		
designed	David B		
drawn	SB, RHS & GG		
coordination checked	John K.		
checked	R Sherman approved	John K.	
um design manager			
location	UM Athletic Ops Center		
keywords	TITLE		

project:
UM Athletic Department
Operations Center

sheet title:
PRELIMINARY CITY
SITE PLAN REVIEW

project number: sheet number:
UM AEC :
P00008399 T-1C



NO.		TYPE	RIM	INVERTS	
R1	MH	841.08	12 N	19'X30"	
R2	MH	840.09	19'X30"	N19'X30" W 19'X30" S	
R3	MH	840.56	19'X30"	N 12 SE 19'X30" SW	
R4	MH	840.55	18"NE	18"NW	
R5	CB	840.10	18 SE	832.05	
R6	CB	840.32	12 NW	833.10	
R7	CB	841.75	836.35	836.35	12 E 12 S
R8	MH	841.99	837.49	836.29	12 N 12 SW
R9	CB	840.99	837.09	837.59	12 W 12 S
R10	CB	841.61	839.31		12 E 836.99
R11	MH	841.88	838.08	838.08	12 N 12 W
R12	CB	841.69	838.29		12 W 838.08
R13	CB	841.50	837.90		12 E
S1	MH	840.52	8 N-S	832.52	
S2	MH	841.91	8 N-S	833.91	
S3	MH	842.20	8 N-S	836.00	

LEGAL DESCRIPTION:
Commencing at the East 1/4 Corner of Section 32, Township 2 South, Range 6 East, City of Ann Arbor, Washtenaw County, State of Michigan; thence S01°22'54"E 749.98 feet along the east line of said Section and the centerline of South State Street; thence N71°33'01"W 35.18 feet for a Place of Beginning, thence S01°22'54" 620.84 feet along the westerly right of way of said South State Street; thence N23°47'43"W 776.95 feet along the easterly right of way of the Ann Arbor Railroad; thence N66°13'33"E 111.11 feet, thence S71°33'01"E 301.85 feet along the easterly right of way of Stadium Boulevard to the face of a Benchmark, Being a part of the Southeast 1/4 of said Section 32 and containing 2.14 acres of land, more or less.



Know what's below.
Call before you dig.

- SECTION CORNER

FOUND IRON PIPE

FOUND IRON ROD

SET IRON PIPE

SET MAG NAIL

FOUND MAG NAIL

CONTROL POINT

MEASURED DIMENSION

RECORDED DIMENSION

SURFACE FLOW
- WATER MANHOLE

FIRE HYDRANT

GATE VALVE

BEEHIVE CATCH BASIN

CURB CATCH BASIN

STORM MANHOLE

CULVERT / END SECTION

SANITARY MANHOLE

LIGHT POLE

UTILITY POLE

TELEPHONE RISER

GAS MAIN RISER
- ELECTRIC LINE

GAS MAIN

WATER MAIN

STORM LINE

SANITARY LINE

CABLE TV LINE

PHONE LINE

CHAIN LINK FENCE

WOOD FENCE

BARBED WIRE FENCE

CLIENT: UNIVERSITY OF MICHIGAN
RED LOT PARKING AREA
TOPOGRAPHICAL SURVEY
S. STATE ST. @ STADIUM BLVD.
SECTION 32, T2S, R6E,
CITY OF ANN ARBOR
MICHIGAN

Arbor Land Consultants, Inc.
Professional Land Surveyors
2936 Madrona Ct.
Ann Arbor, MI 48103
Tel 1-734-669-2960
Fax 1-734-669-2961

DATE: 11-25-2011
REVISION: 10-03-2013
JOB No. 10912/03613/11313
SHEET 8 OF 8
SCALE 1 INCH = 20 FEET

THE UNIVERSITY OF MICHIGAN

Architecture, Engineering and Construction
University Architect's Office
326 E. Hoover Ave.
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ANN ARBOR, MICHIGAN 48109-1002



Architect's Project No. - 13144.0

Spalding DeDecker Associates, Inc.



Engineering Consultants
Infrastructure • Land Development • Surveying
905 South Blvd. East
Rochester Hills, MI 48307
Phone: (248) 844-5400
Fax: (248) 844-5404
www.sda-eng.com
(800) 598-1600

SDA Project No. - NP13033

issue: date:

City Site Plan Review	April 28, 2014
Prelim. City Site Plan Review	April 25, 2014
Prelim. City Site Plan Review	March 19, 2014
Owner Review - City Submitted	February 19, 2014
DD Review	December 20, 2013
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Owner Review #2	November 7, 2013
Owner Review	October 24, 2013



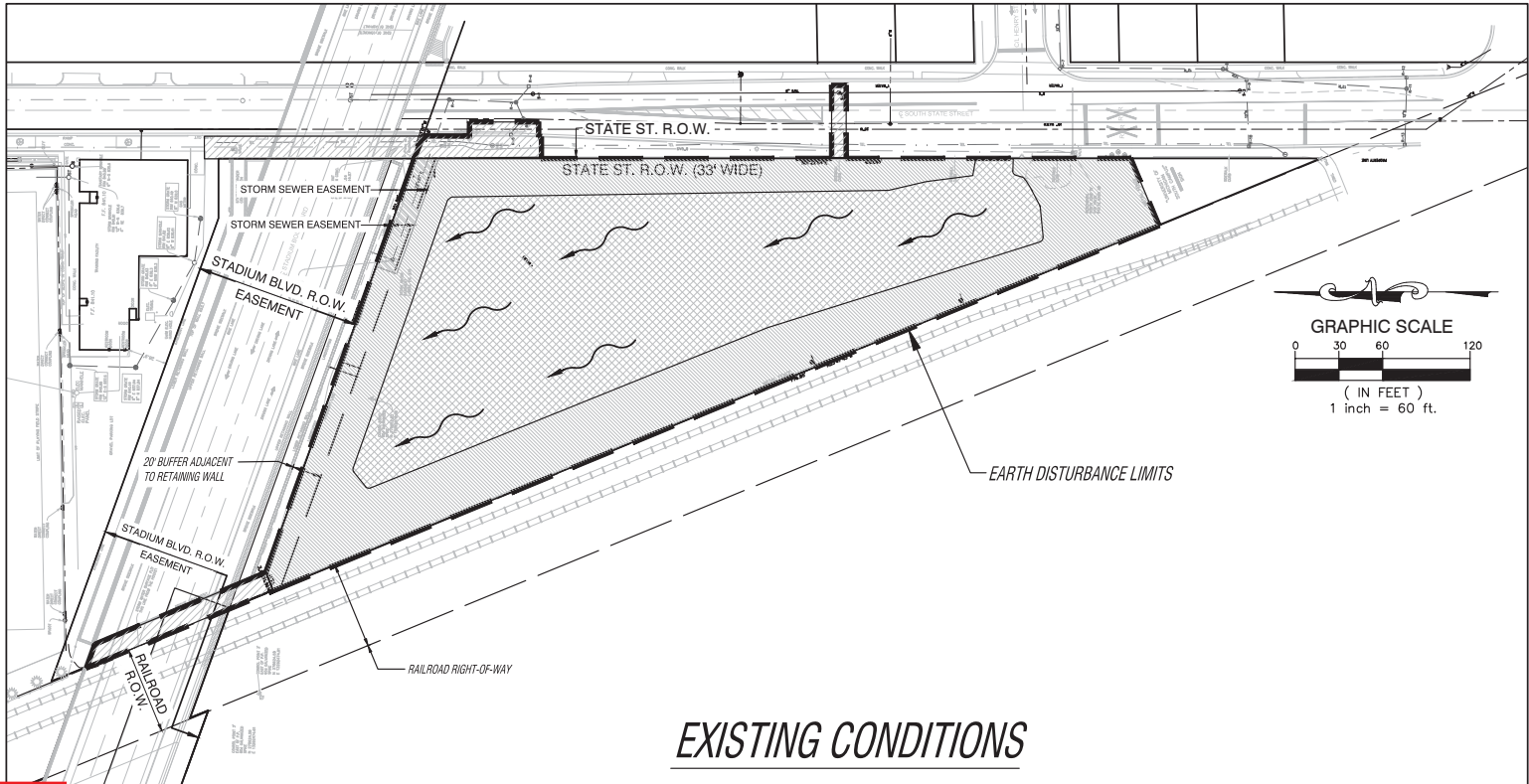
submitted to: HFES	NO	BFS:	NO
AEC constr mgmt no.	P00008399		
building no.	-		
designed	T. Sovel		
drawn	J. Ensley		
coordination checked	T. Sovel		
checked	T. Sovel approved	T. Sovel	
um design manager			
location	UM Athletics Ops Center		
keywords			

project:
UM Athletics
Department Operations
Center

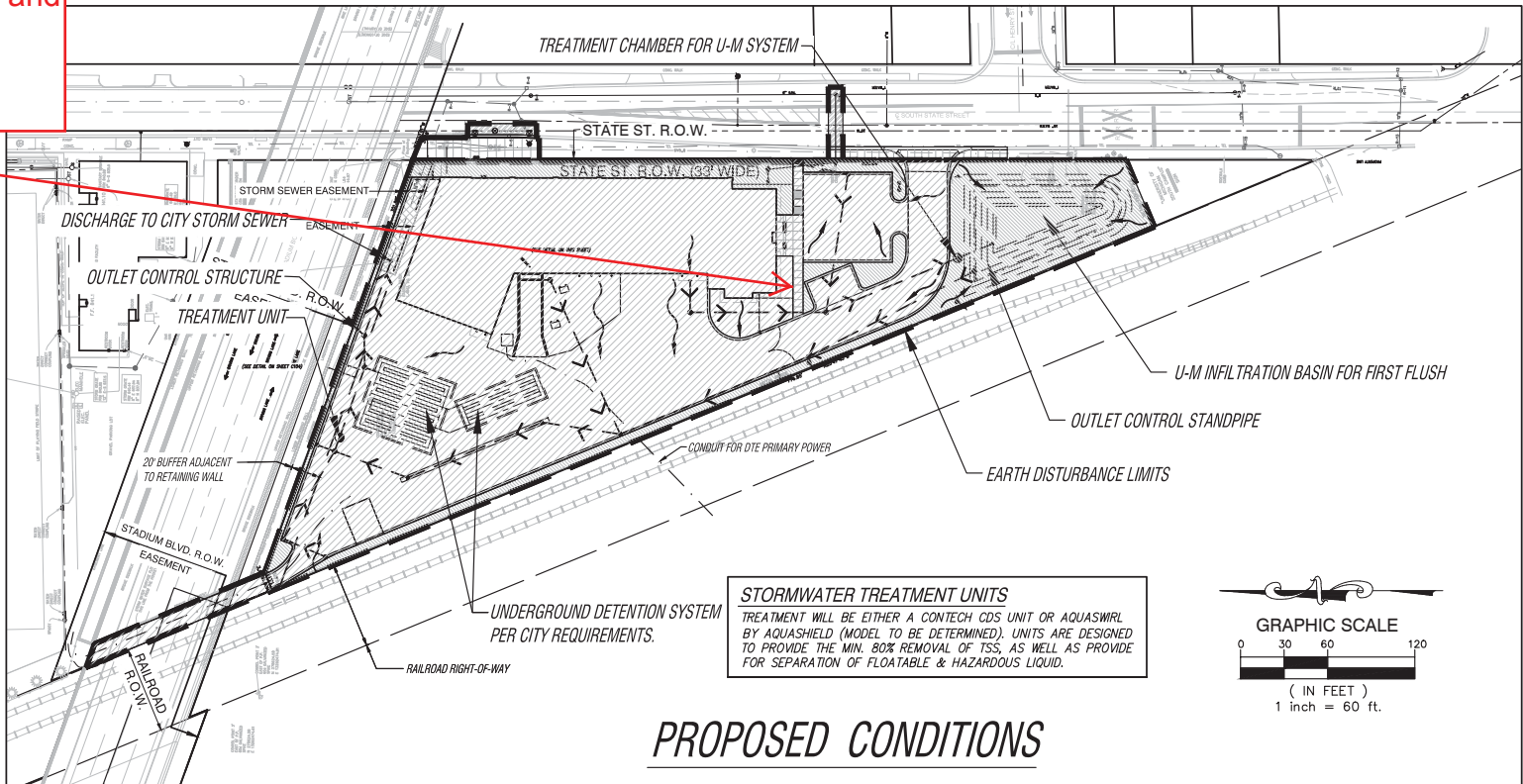
sheet title:
Storm Water
Management Plan
Summary Sheet

project number: sheet number:
UM AEC :
P00008399

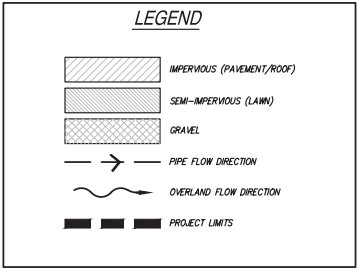
C104C



Adjust this graphic to provide hatching of surface based on imperviousness and remove site paving details



STORMWATER TREATMENT UNITS
TREATMENT WILL BE EITHER A CONTECH CDS UNIT OR AQUASHIELD BY AQUASHIELD (MODEL TO BE DETERMINED). UNITS ARE DESIGNED TO PROVIDE THE MIN. 80% REMOVAL OF TSS, AS WELL AS PROVIDE FOR SEPARATION OF FLOATABLE & HAZARDOUS LIQUID.



- Storm water sheet.
- Show drainage patterns of proposed and existing conditions with different hatching based on imperviousness. (See Campus Planning level of detail provided on U-M property)
- Provide narrative summarizing storm water as noted below.

STORM WATER NARRATIVE:

1. EXISTING CONDITIONS STORM WATER SUMMARY (SEE SHEET C104BC FOR SUPPORTING CALCULATIONS):
EXISTING DRAINAGE IS OVERLAND IN A NORTH AND WEST DIRECTION TOWARDS THE NORTHWEST CORNER OF THE SITE. THE DRAINAGE FLOWS INTO THE RAILROAD DRAINAGE DITCH AND TO THE NORTH, WITH ULTIMATE DISCHARGE TO THE ALLEN CREEK DRAIN.

COVER TYPE	AREA (AC)	C	CN
GRAVEL PARKING	1.12	.85	85
OPEN SPACE (LAWN)	.88	.25	81
TOTAL	2.00	.59	78

EXISTING RUNOFF VOLUME = 1,884 CF
EXISTING PEAK RUNOFF RATE = 0.384 CFS
(VOLUME AND RATE SHOWN FOR 2 YR, 24-HR STORM PER U-M CALCS PROVIDED ON SHEET C104BC)

2. PROPOSED CONDITIONS STORM WATER SUMMARY (SEE SHEET C104BC FOR SUPPORTING CALCULATIONS):
PROPOSED EARTH DISTURBANCE IS 9385.4 SF (2.13 ACRES). THIS INCLUDES DISTURBED AREAS OUTSIDE THE PROPERTY LIMITS THAT DO NOT CONTRIBUTE TO THE DRAINAGE SYSTEM. DISTURBED AREA CONTRIBUTING TO THE DRAINAGE SYSTEM IS 87,120 SF (2.00 ACRES).
A NEW CONNECTION TO THE CITY STORM WATER SYSTEM IS PROPOSED. PROPOSED STORM DRAINAGE WILL BE DIRECTED INTO THE CITY'S STORM SEWER SYSTEM LOCATED IN THE NORTHEAST CORNER OF THE SITE BY CONNECTION TO THE EXISTING CITY STORM MANHOLE. IN ACCORDANCE WITH U-M REQUIREMENTS, THE INCREASED VOLUME FOR 2 YEAR 24 HOUR STORM CALCULATED PER U-M NPDES PERMIT REQUIREMENTS WILL BE DISCHARGED THROUGH AND RETAINED IN AN INFILTRATION SYSTEM AT THE SOUTH END OF THE SITE. THE INCREASED RUNOFF VOLUME RESULTING FROM SITE DEVELOPMENT FOR THE 2 YEAR 24 HOUR STORM EVENT 65,381 CUBIC FEET, WHICH EXCEEDS THE CITY'S FF REQUIREMENT OF 2,504 CF, WITH CITY FF REQUIREMENTS ACCOMMODATED WITHIN THE INFILTRATION SYSTEM, THE CITY'S DETENTION REQUIREMENTS WILL BE A TWO-STAGE SYSTEM, ACCOMMODATING THE BANKFULL AND DETENTION VOLUME REQUIREMENTS (LESS THE VOLUME ACCOMMODATED WITHIN THE INFILTRATION SYSTEM). THE PROPOSED STORM SYSTEM IS ROUTED THROUGH A TREATMENT UNIT AT THE NORTH END OF THE SITE PRIOR TO ENTERING THE UNDERGROUND DETENTION PIPING AND ULTIMATELY DISCHARGING INTO THE CITY STORM SEWER SYSTEM.

COVER TYPE	AREA (AC)	C	CN
PAVING/ROOF	1.57	.85	98
OPEN SPACE (LAWN)	.43	.25	81
TOTAL	2.00	.80	90

PROPOSED RUNOFF VOLUME = 9,075 CFS
PROPOSED PEAK RUNOFF RATE = 0 CFS (BASED ON SOIL TESTING, THE FIRST FLUSH VOLUME WILL INFILTRATE WITH NO DISCHARGE)
(VOLUME AND RATE SHOWN FOR 2 YR, 24-HR STORM PER U-M CALCS PROVIDED ON SHEET C104BC)

3. CHANNEL PROTECTION
U-M NPDES PERMIT
REQUIRED: 5,581 CF OF RETENTION REQUIRED FOR FIRST FLUSH VOLUME (DIFFERENCE BETWEEN EXISTING AND PROPOSED RUNOFF VOLUMES NOTED ABOVE)
PROVIDED: 9,808 CF WILL BE PROVIDED WITHIN INFILTRATION BASIN AT THE SOUTH END OF THE SITE
CITY OF ANN ARBOR
REQUIRED:
300 YR DETENTION = 21,088 CF (SUBTRACT 9,808 CF OF RETENTION PROVIDED) = 11,280 CF
BANKFULL FLOOD VOLUME = 13,988 CF (SUBTRACT 9,808 CF OF RETENTION PROVIDED) = 4,180 CF
FIRST FLUSH (FF) VOLUME = 2,504 CF (SUBTRACT 9,808 CF OF RETENTION PROVIDED) = NO FURTHER REQUIREMENTS
PEAK RUNOFF RATE = 0.30 CFS (0.13 CFS/ACRE FOR 4 ACRES)
PROVIDED:
RETENTION = 9,808 CF WILL BE PROVIDED WITHIN INFILTRATION BASIN ON THE SOUTH END OF THE SITE
DETENTION = 13,430 CF WILL BE PROVIDED WITHIN DETENTION PIPING ON THE NORTH END OF THE SITE
4. MINIMUM TREATMENT VOLUME STANDARD - TSS REMOVAL
THERMINIMUM QUALITY TREATMENT IS DESIGNED TO REMOVE 80 PER CENT OF THIS TOTAL SUSPENDED SOLIDS (AS COMPARED TO UNCONTROLLED RUNOFF) FOR 90 PERCENT ANNUAL NON-EXCESSIVE STORMS.
REQUIRED: QUALITY TREATMENT FOR 2,504 CF OF WATER WITH 15 MINUTE TIME OF CONCENTRATION AND PEAK DISCHARGE OF 0.30 CFS (THIS DOES NOT INCLUDE THE SEPARATE U-M SYSTEM, WHICH PROVIDES TREATMENT AND INFILTRATION FOR 9,808 CF OF WATER).
PROVIDED: TWO STORMWATER TREATMENT UNITS ARE PROPOSED AND WILL BE OTHER CONTECH CDS UNIT OR AQUASHIELD BY AQUASHIELD (MODEL TO BE DETERMINED). THE UNITS WILL BE SIZED TO MEET THE REMOVAL AND PEAK DISCHARGE FLOW CRITERIA.
THE PROJECT WILL BE DESIGNED TO MEET THE U-M POST CONSTRUCTION NPDES PERMIT AND CITY STORM WATER REQUIREMENTS.

Storm water narrative

REFER TO SHEETS C1044C AND C104BC FOR
SYSTEM LAYOUT, DETAILS AND CALCULATIONS

Architecture, Engineering and Construction
University Architect's Office
326 E. Hoover Ave.
Mail Stop E
ANN ARBOR, MICHIGAN 48109-1002

Architect's Project No. - 13144.0



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DA Project No. - NP13033

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submitted to: HFES	NO	BFS:	NO
AEC constr mgmt no.	P00008399		
building no.	-		
designed	T. Sovel		
drawn	J. Ensley		
coordination checked	T. Sovel		
checked	T. Sovel	approved	T. Sovel
um design manager			
location	UM Athletics Ops Center		
keywords			

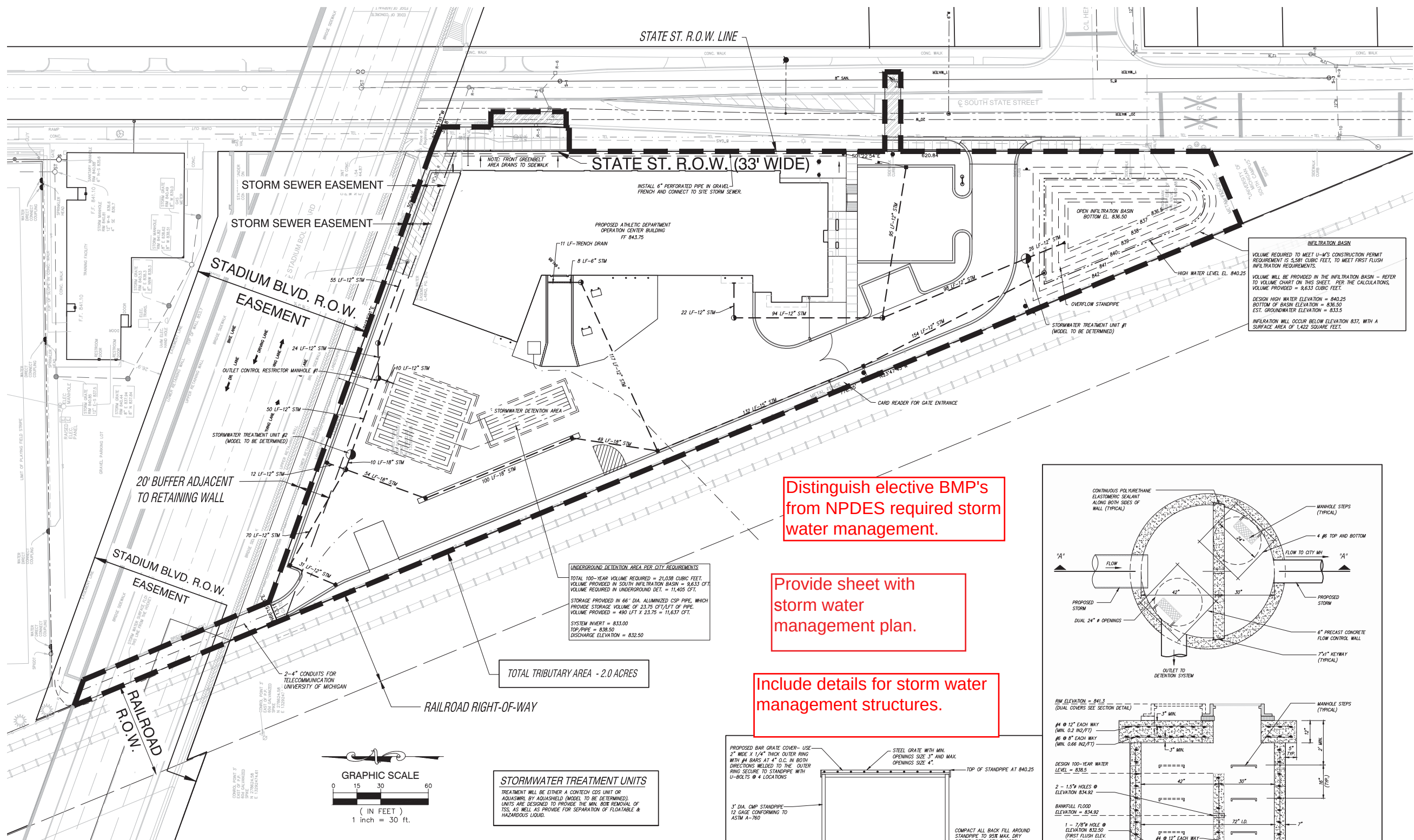
project:
UM Athletics
Department Operations
Center

sheet title:
Storm Water
Management Plan

project number: sheet number:

UM AEC :
P00008399

C104AC

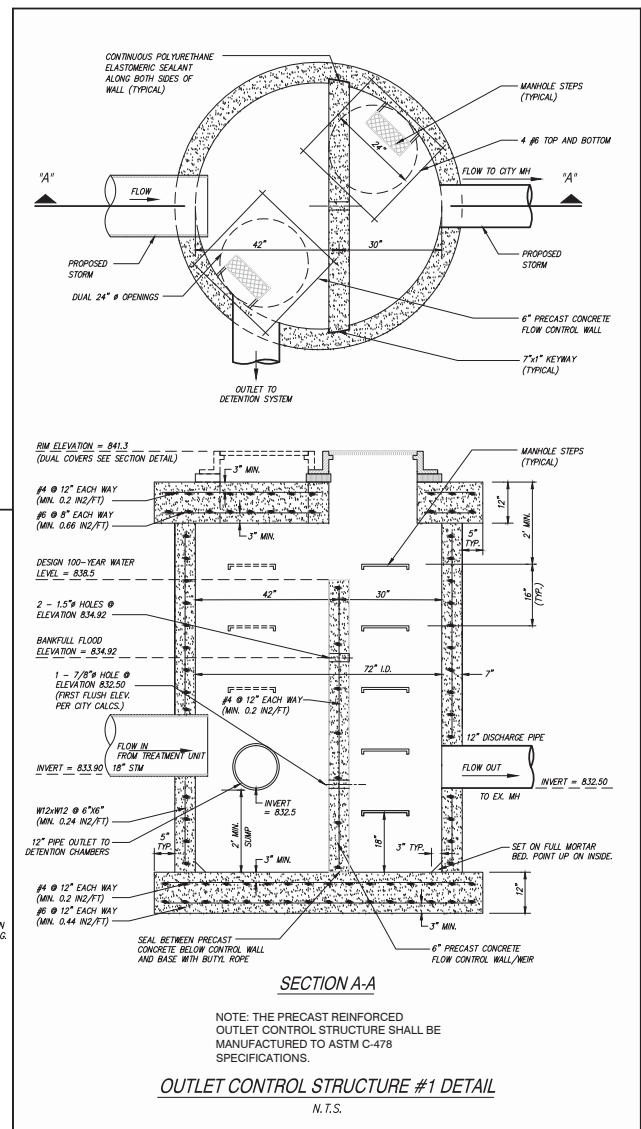
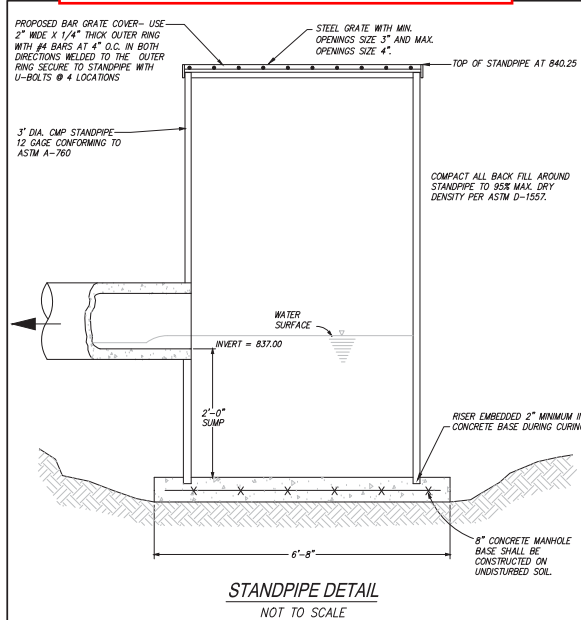


Distinguish elective BMP's from NPDES required storm water management.

Provide sheet with storm water management plan.

Include details for storm water management structures.

INFILTRATION BASIN VOLUME			
Contour (FT)	Area (SFT)	Volume (CFT)	Total Storage Volume (CFT)
840.25	4590.85	1111.44	9,632.79
840.00	4300.64	3758.92	8,521.35
839.00	3217.20	2737.39	4,762.43
838.00	2267.57	1839.67	2,025.05
837.00	1421.76	617.94	185.38
836.50	1050.00		
(NOTE: VOLUME BETWEEN 836.50 AND 837.00 WILL BE FILLED WITH STONE)			
Volume Provided =	9,632.79 cft		
Design water depth =	3.75 ft		



Architecture, Engineering and Construction
University Architect's Office
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ANN ARBOR, MICHIGAN 48109-1002

Architect's Project No. - 13144.0

SDA Project No. - NP13033



and Calculations

UM AEC : C104BC
P00008399

project:

and Calculations

UM AEC : C104BC
P00008399