B & D INDUSTRIAL PARK

CONCOURSE OFFICE CENTER

PHASES 2 & 3

4343 CONCOURSE DRIVE - CONCOURSE DRIVE PARCEL 'C'

LOCATED IN THE WEST 1/2 OF SECTION 16, T3S, R6E PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN 48108

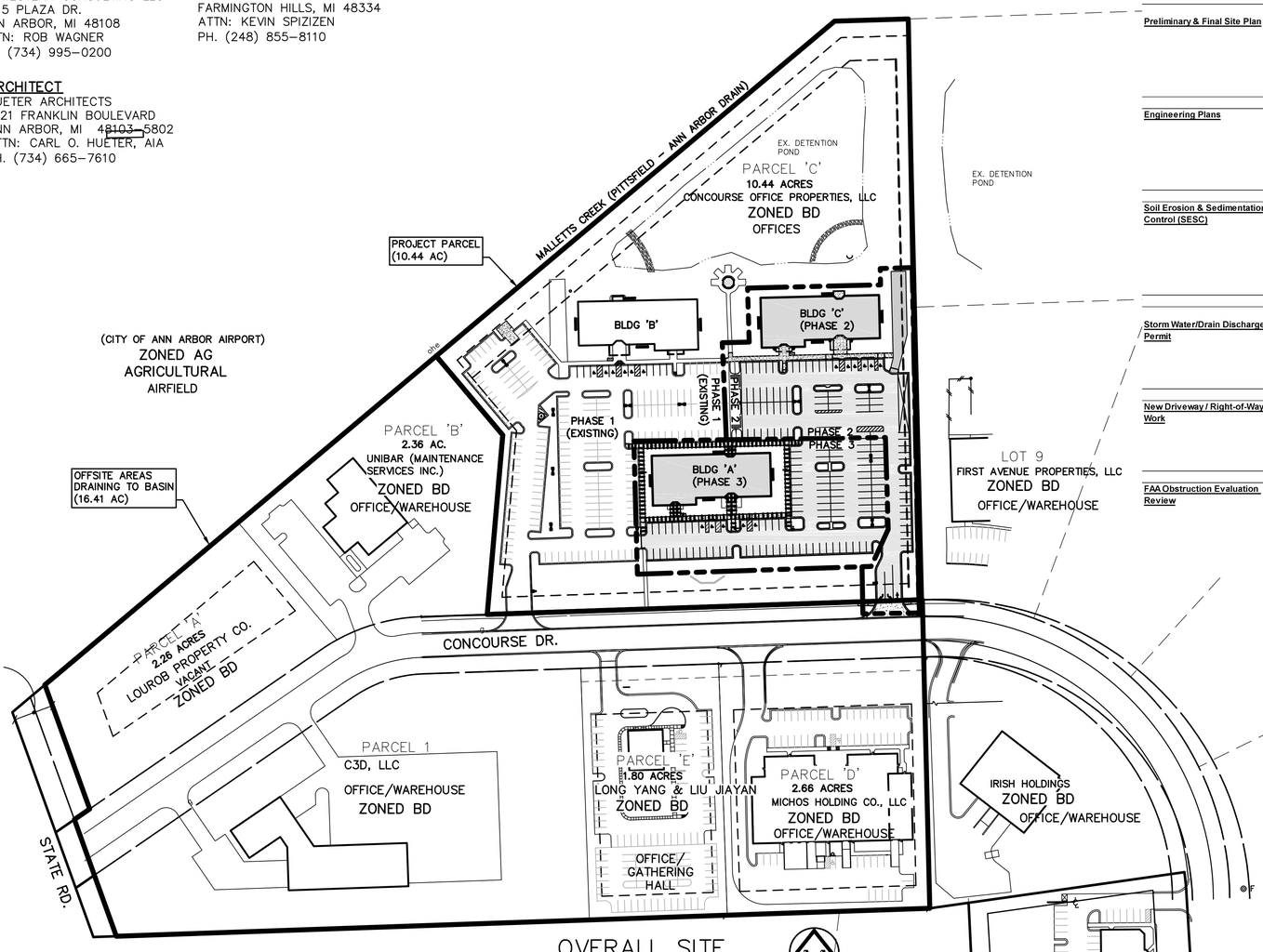
COMBINED PRELIMINARY/FINAL SITE PLAN

TOWNSHIP REVISION 1 - 3/24/2017

SURVEYOR/ENGINEER/ LANDSCAPE ARCHITECT
MIDWESTERN CONSULTING LLC
3815 PLAZA DR.
ANN ARBOR, MI 48108
ATTN: ROB WAGNER
PH. (734) 995-0200

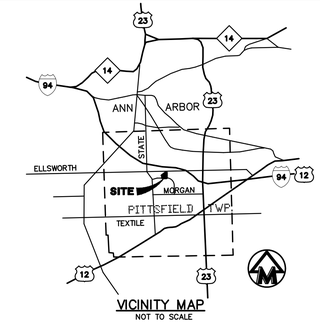
ARCHITECT
HUETER ARCHITECTS
1321 FRANKLIN BOULEVARD
ANN ARBOR, MI 48103-5802
ATTN: CARL O. HUETER, AIA
PH. (734) 665-7610

CLIENT/OWNER
CONCOURSE OFFICE PROPERTIES, LLC
29800 MIDDLEBELT RD., SUITE 200,
FARMINGTON HILLS, MI 48334
ATTN: KEVIN SPIZIZEN
PH. (248) 855-8110



OVERALL SITE
SCALE: 1" = 100'

NOTE: WCRC & WCWRC APPROVALS ARE REQUIRED FOR FINAL SITE PLAN APPROVAL. PRIOR TO A PRE-CONSTRUCTION MEETING, THE APPLICANT SHALL PROVIDE A PERFORMANCE GUARNTEE TO THE TOWNSHIP IN ACCORDANCE WITH SECTION 3.09 OF THE ZONING ORDINANCE.



VICINITY MAP
NOT TO SCALE

PERMITTING & REVIEW AGENCIES

Approval/Permit	Agency	Submitted	Approved	Permit #	Comment
Preliminary & Final Site Plan	**Pittsfield Township** Planning Office, Utilities & Municipal Services Department 6201 West Michigan Avenue Ann Arbor, Michigan 48108 734-822-3130 planning@pittsfield-mi.gov	2/16/2017 (Ph 2&3) 3/24/2017 (Ph 2&3)			3/1/2017 Planning Review Comments 3/15/2017 Engineering/Fire Review Comments
Engineering Plans	**Pittsfield Township** Engineering Division, Utilities & Municipal Services Department 6201 West Michigan Avenue Ann Arbor, Michigan 48108 734-822-3109 engineering@pittsfield-mi.gov				Submitted after Site Plan approval.
Soil Erosion & Sedimentation Control (SESC)	**Pittsfield Township** Planning Office, Utilities & Municipal Services Department 6201 West Michigan Avenue Ann Arbor, Michigan 48108 734-822-3130 planning@pittsfield-mi.gov				Submitted after Site Plan approval.
Storm Water/Drain Discharge Permit	**Washtenaw County Water Resources Commissioner (WCWRC)** 705 North Zeeb Road Ann Arbor, Michigan 48103 734-222-6860 tmarsik@ewashtenaw.org	2/7/2017 (Ph 2) ~~2/17/2017 (Ph 2&3)~~ 2/23/2017 (Ph 2&3) 3/10/2017 (Ph 2&3)	3/22/2017		2/17/2017 Review Comments [Superceded before review] 3/7/2017 Review Comments Approval #1894
New Driveway / Right-of-Way Work	**Washtenaw County Road Commission (WCRC)** 555 North Zeeb Road Ann Arbor, MI 48103 734-761-1500 gstreight@ewashtenaw.org	~~2/7/2017 (Ph 2)~~ 2/17/2017 (Ph 2&3)	2/24/2016		[Superceded before review] Approval #13444
FAA Obstruction Evaluation Review	**Federal Aviation Administration (FAA)** Detroit Airports District Office Obstruction Evaluation Group 11677 South Wayne Road, Suite 107 Romulus, MI 48174 734-229-2900 fred.souchet@faa.gov				Online form to notify building construction in close proximity to airport. Notice of Connstruction will be required after building is built.

LEGAL DESCRIPTION – PARCEL "C"

LEGAL DESCRIPTION OF A 10.44 ACRE PARCEL OF LAND LOCATED IN THE N.W. 1/4 OF SECTION 16, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

Commencing at the center of Section 16, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, thence S 89°50'50" W 489.50 feet along the east-west 1/4 line of said Section 16; thence N 00°09'20" E 461.30 feet along the west line of Runway Plaza Worksenter Subdivision as recorded in Liber 25 of Plats, Pages 1-5, Washtenaw County Records to the POINT OF BEGINNING,

thence along the north line of Concourse Drive (86' wide) the following two courses: S 89°36'39" W 635.05 feet; S 89°34'30" W 18.04 feet;
thence N 06°29'15" E 270.56 feet;
thence N 38°30'45" W 155.31 feet;
thence N 51°29'15" E 782.14 feet;
thence N 89°48'00" E 110.58 feet along the north line of the S.E. 1/4 of the N.W. 1/4 of said Section 16;
thence S 00°09'20" W 873.31 feet along the west line of said RUNWAY PLAZA WORKSENTER TO THE POINT OF BEGINNING, BEING A PART OF THE N.W. 1/4 OF SAID SECTION 16, T3S, R6E, CONTAINING 10.44 ACRES OF LAND MORE OR LESS, AND BEING SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD, IF ANY.

CONCOURSE OFFICE CENTER - PHASES 2 & 3
CONCOURSE DRIVE PARCEL 'C' C.S.P.A. #17-04

Sheet List Table

SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	EXISTING CONDITIONS AND REMOVALS – PHASE 2
3	DIMENSIONAL SITE PLAN – PHASE 2
4	GRADING PLAN – PHASE 2
5	DETAILED GRADING PLAN – PHASE 2
6	SOIL EROSION CONTROL PLAN – PHASE 2
7	UTILITY PLAN – PHASE 2
8	STORM SEWER PLAN & PROFILE – PHASE 2
9	SANITARY SEWER & WATER MAIN PLAN & PROFILE – PHASE 2
10	LANDSCAPE PLAN – PHASE 2
11	EXISTING CONDITIONS AND REMOVALS – PHASE 3
12	DIMENSIONAL SITE PLAN – PHASE 3
13	GRADING PLAN – PHASE 3
14	DETAILED GRADING – PHASE 3
15	SOIL EROSION CONTROL PLAN – PHASE 3
16	UTILITY PLAN – PHASE 3
17	STORM SEWER PLAN & PROFILE – PHASE 3
18	SANITARY SEWER & WATER MAIN PLAN & PROFILE – PHASE 3
19	STRUCTURE TABLES – PHASES 2 & 3
20	LANDSCAPE PLAN – PHASE 3
21	LANDSCAPE DETAILS
22	MISCELLANEOUS SITE DETAILS
23	PHOTOMETRIC LIGHTING PLAN – PHASES 2 & 3
24	FIRE PROTECTION PLAN – PHASES 2 & 3
25	TRUCK ACCESS PLAN
26	SOILS DATA
27	STORMWATER PLAN – PHASES 2 & 3
28	STORMWATER NARRATIVE AND PIPE CALCS
29	STORMWATER BASIN CALCULATIONS
30	EARTHWORK SPECIFICATIONS
31	SOIL EROSION CONTROL DETAILS AND NOTES
32	STORM SEWER DETAILS AND SPECIFICATIONS
33	WATER MAIN DETAILS
34	WATER MAIN SPECIFICATIONS
35	SANITARY SEWER DETAILS
36	SANITARY SEWER SPECIFICATIONS
37	PREVIOUS PLAN STORMWATER NARRATIVE
38	PREVIOUS PLAN STORMWATER CALCULATIONS
39	PREVIOUS PLAN STORMWATER AREA MAP
A3	FLOOR PLAN – FLOOR 1
A4	FLOOR PLAN – FLOORS 2 & 3
A5	FRONT & REAR BUILDING ELEVATIONS
A6	SIDE BUILDING ELEVATIONS

CONCOURSE OFFICE CENTER

JOB No. **16295**

REVISIONS:	REV. DATE
WCWRC REV 1	2/23/17
WCWRC REV 2	3/10/17
TWP REV 1	3/24/17

DATE: 3/10/2017
SHEET 1 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
Site Plan\16295CV1.DWG
FB#460

1

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Land Development • Land Survey • Institutional • Municipal
Wireless Communications • Transportation • Landfill Services

RELEASED FOR:	DATE
RECEIVED MAR 24 2017	

STATE OF MICHIGAN JEREMY A. MATTHEI ENGINEER NO. 53590 LICENSED PROFESSIONAL ENGINEER

JEREMY A. MATTHEI
P.E. # 62010 53590

M:\Civil3d_Proj\16295\Site Plan\16295CV1.dwg, 3/23/2017 11:54 AM, Jeremy A. Matthei, None
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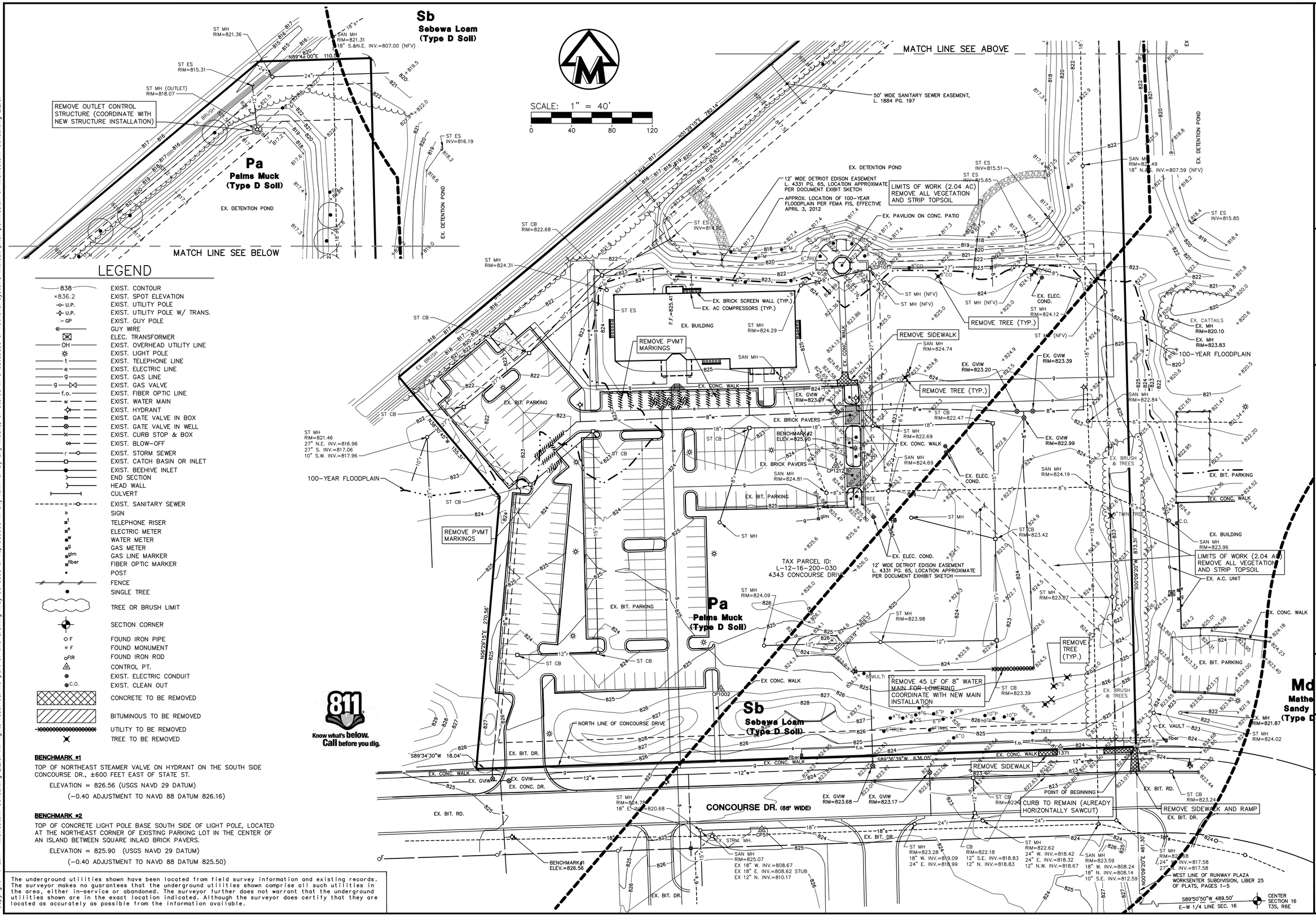

LEGEND

838	EXIST. CONTOUR
×836.2	EXIST. SPOT ELEVATION
U.P.	EXIST. UTILITY POLE
U.P.	EXIST. UTILITY POLE W/ TRANS.
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	EXIST. BLOW-OFF
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	EXIST. BEEHIVE INLET
	END SECTION
	HEAD WALL
	CULVERT
S	EXIST. SANITARY SEWER
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	CONTROL PT.
	EXIST. ELECTRIC CONDUIT
C.O.	EXIST. CLEAN OUT
	CONCRETE TO BE REMOVED
	BITUMINOUS TO BE REMOVED
	UTILITY TO BE REMOVED
	TREE TO BE REMOVED

BENCHMARK #1

TOP OF NORTHEAST STEAMER VALVE ON HYDRANT ON THE SOUTH SIDE CONCOURSE DR., ±600 FEET EAST OF STATE ST.

ELEVATION = 826.56 (USGS NAVD 29 DATUM)

(−0.40 ADJUSTMENT TO NAVD 88 DATUM 826.16)

BENCHMARK #2

TOP OF CONCRETE LIGHT POLE BASE SOUTH SIDE OF LIGHT POLE, LOCATED AT THE NORTHEAST CORNER OF EXISTING PARKING LOT IN THE CENTER OF AN ISLAND BETWEEN SQUARE INLAID BRICK PAVERS.

ELEVATION = 825.90 (USGS NAVD 29 DATUM)

(−0.40 ADJUSTMENT TO NAVD 88 DATUM 825.50)

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.

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KEVIN SPIZIZEN
(248) 855-8110

CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
EXISTING CONDITIONS AND REMOVALS – PHASE 2

2

DATE: 3/10/2017
SHEET 2 OF 39
CADD: WAJ
ENG.: JAM
PM: RCW
TECH: HLE, WAJ
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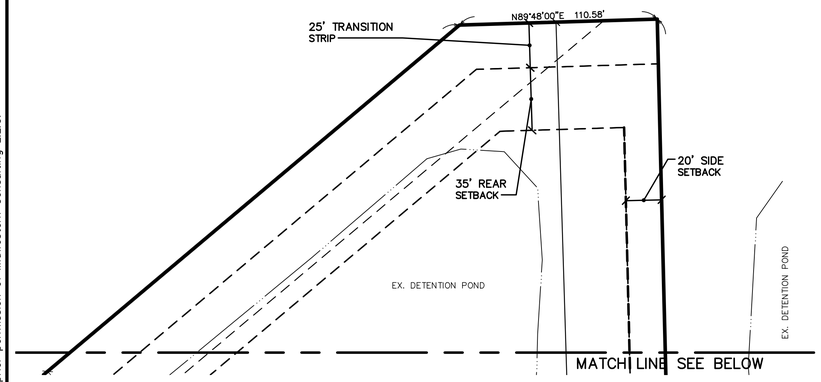
PAPER: ARCH D

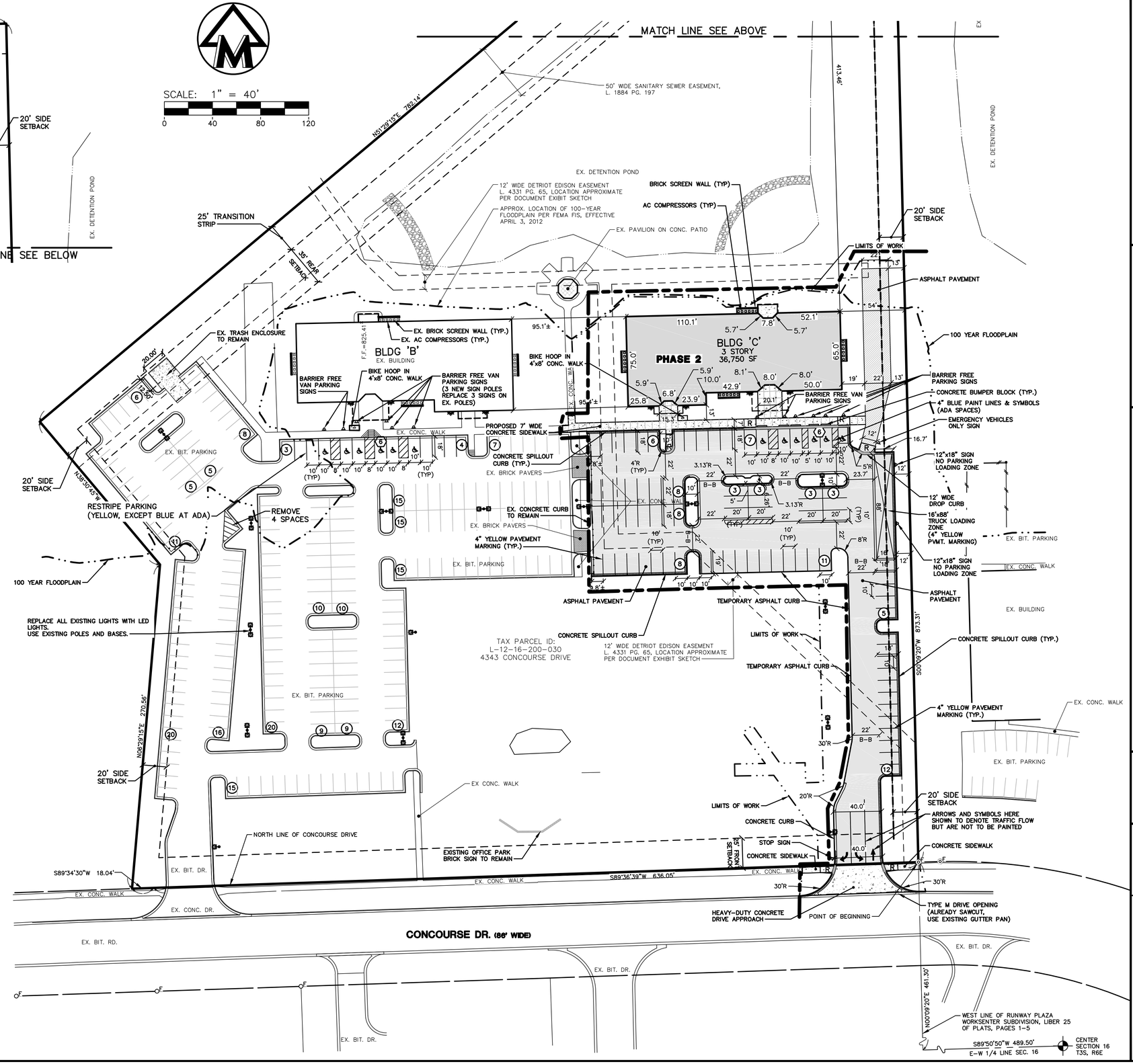
JOB No. 16295

REVISIONS:
WORK REV. 2 — 3/10/17
WORK REV. 1 — 3/24/17



SCALE: 1" = 40'

0 40 80 120



LEGEND

- NUMBER OF STANDARD PARKING SPACES IN ROW
- NUMBER OF BARRIER FREE PARKING SPACES IN ROW
- BF — BARRIER FREE PARKING SIGN
- BFV — VAN ACCESSIBLE BARRIER FREE PARKING SIGN
- BARRIER FREE SIDEWALK RAMP
- PROP. CURB & GUTTER
- PROP. BITUMINOUS PAVEMENT
- PROP. CONCRETE PAVEMENT
- SIGN
- PROP. SINGLE LIGHT
- PROP. DOUBLE LIGHT

NOTES:

1. ALL RADII ARE 4' TYPICAL TO BACK OF CURB UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE BACK OF CURB UNLESS OTHERWISE NOTED.
3. ALL ISLANDS NOT DIMENSIONED ARE 10' WIDE BACK-TO-BACK OF CURB.
4. SITE CONSTRUCTION IS TO BE IN ONE PHASE, BUILDING CONSTRUCTION SEQUENTIAL DEVELOPMENT.
5. THERE ARE NO DEED RESTRICTIONS.
6. PARKING SPACES ARE 10'x20', INCLUDING A 2' OVERHANG AT CURBS. SIDE DIMENSIONS ARE TO BACK OF CURB. DRIVE AISLES ARE 22' WIDE TO FACE OF CURB OR EDGE OF PARKING SPACE.
7. VEHICLES UP THROUGH SU-40 AND PITTSFIELD FIRE TRUCK SIZE CAN MANEUVER THROUGH SITE.
8. SEE ARCHITECTURAL ELEVATIONS FOR EQUIPMENT SCREEN WALL INFORMATION.

Development Summary

	Required/Allowed	After Phase 1 (Ex.)	After Phase 2	After Phase 3
Zoning	Business District (BD)	Business District (BD)	Business District (BD)	Business District (BD)
Land Use	General Office	General Office	General Office	General Office
Minimum Lot Area (Gross)	1 Acre	10.44 Acres (454,749sf)	10.44 Acres (454,749sf)	10.44 Acres (454,749sf)
Net of Malletts Creek		- 0.40 Acre (17,424sf)	- 0.40 Acre (17,424sf)	- 0.40 Acre (17,424sf)
Lot Area (Net)		10.04 Acre (437,325sf)	10.04 Acre (437,325sf)	10.04 Acre (437,325sf)
Minimum Lot Width	150 Feet	654 feet	654 feet	654 feet
Ground Floor Area		12,250 sft	24,500 sft	36,750 sft
Total Floor Area		36,750 sft	73,500 sft	110,250 sft
Maximum Lot Coverage (Gross)	40%	12,250 / 454,749 = 2.7%	24,500 / 454,749sf = 5.4%	36,750 / 454,749sf = 8.1%
Maximum Lot Coverage (Impervious Surface Ratio)	60%	102,976/ 454,749 = 22.6%	158,502 / 454,749sf = 34.9%	214,1545f / 454,749sf = 47.1%
Floor Area Ratio	60% max.	36,750 / 454,749 = 8.1%	73,500 / 454,749sf = 16.2%	110,250sf / 454,749 = 24.2%
Minimum Yards and Setbacks				
Front Yard	25 ft	386 ft to building 70 ft greenbelt 54 ft - West	386 ft to building 70 ft greenbelt 54 ft - West	154ft to building - Phase 3 70 ft greenbelt 54 ft - West
Side Yard (Least)	20 ft	327 ft - East	174 ft - East	174 ft - East
Side Yard (Total)	40 ft	381 ft	228 ft 74 ft phase 1	228 ft 74 ft phase 1
Rear Yard	35 ft	74 ft	246 ft phase 2	246 ft phase 2
Building Height to Eaves		33.0 ft	33.0 ft	33.0 ft
Building Height to Ridge		46.0 ft	46.0 ft	46.0 ft
Code Building Height	45ft max.	39.5 ft	39.5 ft	39.5 ft
Building Stories	3 stories max.	3 stories	3 stories	3 stories
Parking Required	1 per 300 sf gross floor area	36,750 / 300 = 123 spaces required	73,500 / 300 = 245 spaces required	110,250 / 300 = 367 spaces required
Parking Added This Phase		227	79	115
Total Parking Provided		227	306	421
Parking Provided per Bldg.		227	153	140
ADA Parking Required	ADA Chart Minimums		6 for 151-200 total	5 for 101-150 total
ADA Added This Phase*		3	3 at Bldg "B", 6 at Bldg "C"	5 at Bldg "A"
Total ADA Provided		3	12 total	17 total
Van Accessible Required	ADA Chart Minimums		1 for 151-200 total	1 for 101-150 total
Van Access. This Phase		2	6 at Bldg "B", 2 at Bldg "C"	4 at Bldg "A"
Total Van Access. Provided		2	8 total	12 total
* Regular ADA + Van Accessible				
Loading Required**	1 per 20,000 sf up to 60,000. 1 per each 50,000 above 60,000.	2	3	4
Loading This Phase		0	1	0
Total Loading Provided		0	1	1
** Seeking a waiver from Pittsfield Planning Commission				
Bicycle Parking Required	2 per building	2	4	6
Van Access. This Phase		2	2	2
Total Van Access. Provided		2	4	6

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
DIMENSIONAL SITE PLAN – PHASE 2

3

JOB No. 16295

REVISIONS:
WORKING REV 2 3/24/17
WORKING REV 1 3/24/17

DATE: 3/10/2017
SHEET 3 OF 39
CADD: WAJ
ENG.: JAM
PM: RCW
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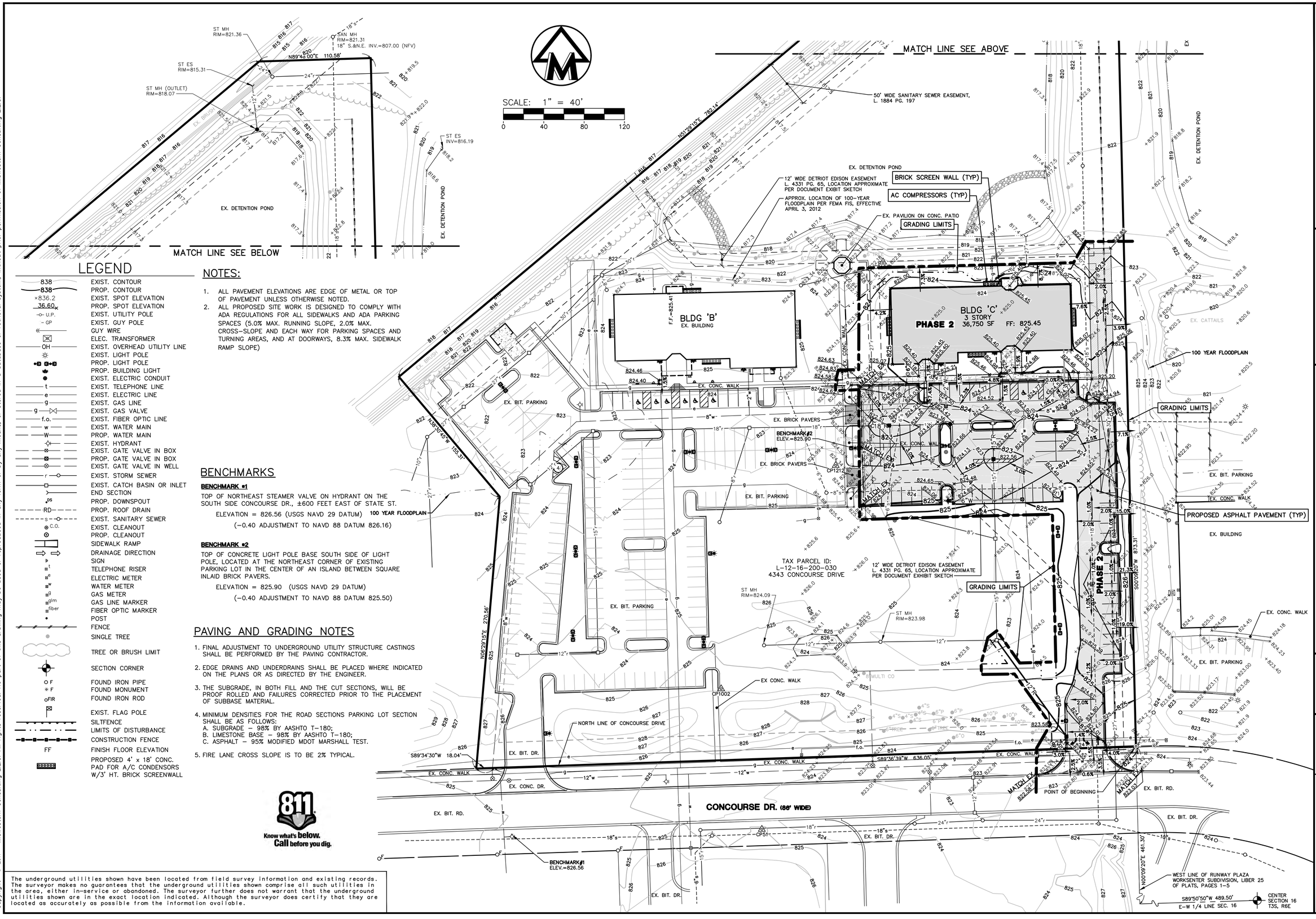

LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60	PROP. SPOT ELEVATION
U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	END SECTION
DS	PROP. DOWNSPOUT
RD	PROP. ROOF DRAIN
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIDEWALK RAMP
	DRAINAGE DIRECTION
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	SILTFENCE
	LIMITS OF DISTURBANCE
	CONSTRUCTION FENCE
FF	FINISH FLOOR ELEVATION
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL

NOTES:

1. ALL PAVEMENT ELEVATIONS ARE EDGE OF METAL OR TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
2. ALL PROPOSED SITE WORK IS DESIGNED TO COMPLY WITH ADA REGULATIONS FOR ALL SIDEWALKS AND ADA PARKING SPACES (5.0% MAX. RUNNING SLOPE, 2.0% MAX. CROSS-SLOPE AND EACH WAY FOR PARKING SPACES AND TURNING AREAS, AND AT DOORWAYS, 8.3% MAX. SIDEWALK RAMP SLOPE)

BENCHMARKS

BENCHMARK #1

TOP OF NORTHEAST STEAMER VALVE ON HYDRANT ON THE SOUTH SIDE CONCOURSE DR., ±600 FEET EAST OF STATE ST.

ELEVATION = 826.56 (USGS NAVD 29 DATUM)

(-0.40 ADJUSTMENT TO NAVD 88 DATUM 826.16)

BENCHMARK #2

TOP OF CONCRETE LIGHT POLE BASE SOUTH SIDE OF LIGHT POLE, LOCATED AT THE NORTHEAST CORNER OF EXISTING PARKING LOT IN THE CENTER OF AN ISLAND BETWEEN SQUARE INLAID BRICK PAVERS.

ELEVATION = 825.90 (USGS NAVD 29 DATUM)

(-0.40 ADJUSTMENT TO NAVD 88 DATUM 825.50)

PAVING AND GRADING NOTES

1. FINAL ADJUSTMENT TO UNDERGROUND UTILITY STRUCTURE CASTINGS SHALL BE PERFORMED BY THE PAVING CONTRACTOR.
2. EDGE DRAINS AND UNDERDRAINS SHALL BE PLACED WHERE INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
3. THE SUBGRADE, IN BOTH FILL AND THE CUT SECTIONS, WILL BE PROOF ROLLED AND FAILURES CORRECTED PRIOR TO THE PLACEMENT OF SUBBASE MATERIAL.
4. MINIMUM DENSITIES FOR THE ROAD SECTIONS PARKING LOT SECTION SHALL BE AS FOLLOWS:
   A. SUBGRADE – 98% BY AASHTO T-180;
   B. LIMESTONE BASE – 98% BY AASHTO T-180;
   C. ASPHALT – 95% MODIFIED MDOT MARSHALL TEST.
5. FIRE LANE CROSS SLOPE IS TO BE 2% TYPICAL.

811 Know what's below. Call before you dig.

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
GRADING PLAN – PHASE 2

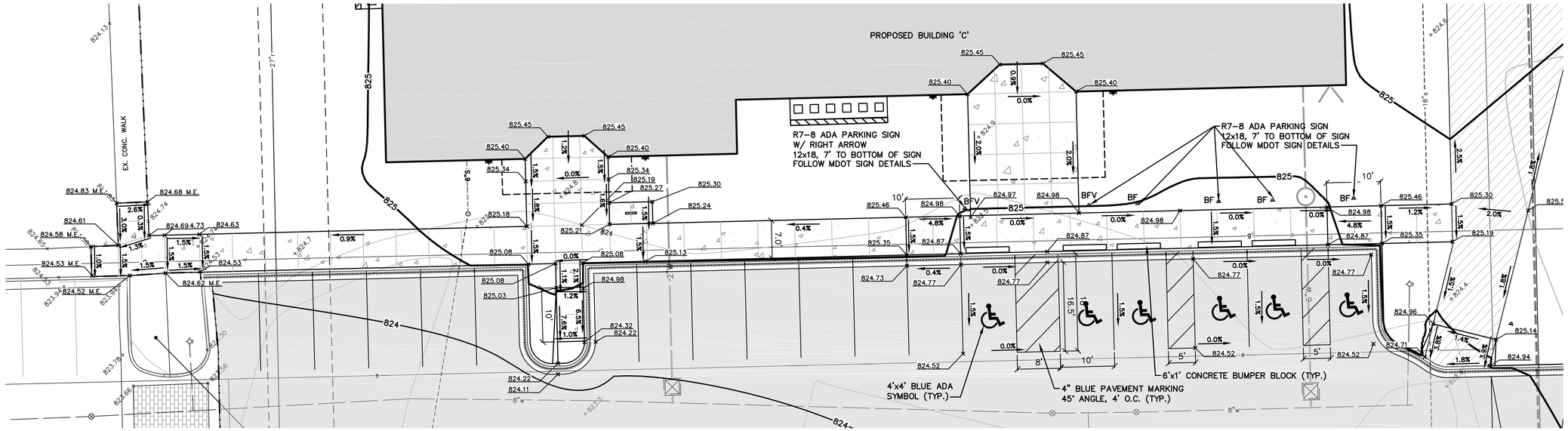
4

DATE: 3/10/2017
SHEET 4 OF 39
CADD: WAJ
ENG.: JAM
PM: RCW
TECH:
16295SP1.dwg

JOB No. 16295

REVISIONS:
WORK REV. 2
SWP REV. 1

REV.	DATE
3	3/10/17
	3/24/17



NOTES:

1. ALL PAVEMENT ELEVATIONS ARE EDGE OF METAL OR TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
2. ALL PROPOSED SITE WORK IS DESIGNED TO COMPLY WITH ADA REGULATIONS FOR ALL SIDEWALKS AND ADA PARKING SPACES (5.0% MAX. RUNNING SLOPE, 2.0% MAX. CROSS-SLOPE AND EACH WAY FOR PARKING SPACES AND TURNING AREAS, AND AT DOORWAYS, 8.3% MAX. SIDEWALK RAMP SLOPE)

BENCHMARKS

BENCHMARK #1

TOP OF NORTHEAST STEAMER VALVE ON HYDRANT ON THE SOUTH SIDE CONCOURSE DR., ±600 FEET EAST OF STATE ST.

ELEVATION = 826.56 (USGS NAVD 29 DATUM)

(−0.40 ADJUSTMENT TO NAVD 88 DATUM 826.16)

BENCHMARK #2

TOP OF CONCRETE LIGHT POLE BASE SOUTH SIDE OF LIGHT POLE, LOCATED AT THE NORTHEAST CORNER OF EXISTING PARKING LOT IN THE CENTER OF AN ISLAND BETWEEN SQUARE INLAID BRICK PAVERS.

ELEVATION = 825.90 (USGS NAVD 29 DATUM)

(−0.40 ADJUSTMENT TO NAVD 88 DATUM 825.50)

PAVING AND GRADING NOTES

1. FINAL ADJUSTMENT TO UNDERGROUND UTILITY STRUCTURE CASTINGS SHALL BE PERFORMED BY THE PAVING CONTRACTOR.
2. EDGE DRAINS AND UNDERDRAINS SHALL BE PLACED WHERE INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
3. THE SUBGRADE, IN BOTH FILL AND THE CUT SECTIONS, WILL BE PROOF ROLLED AND FAILURES CORRECTED PRIOR TO THE PLACEMENT OF SUBBASE MATERIAL.
4. MINIMUM DENSITIES FOR THE ROAD SECTIONS PARKING LOT SECTION SHALL BE AS FOLLOWS:
   A. SUBGRADE – 98% BY AASHTO T-180;
   B. LIMESTONE BASE – 98% BY AASHTO T-180;
   C. ASPHALT – 95% MODIFIED MDOT MARSHALL TEST.
5. FIRE LANE CROSS SLOPE IS TO BE 2% TYPICAL.

Know what's below. Call before you dig.

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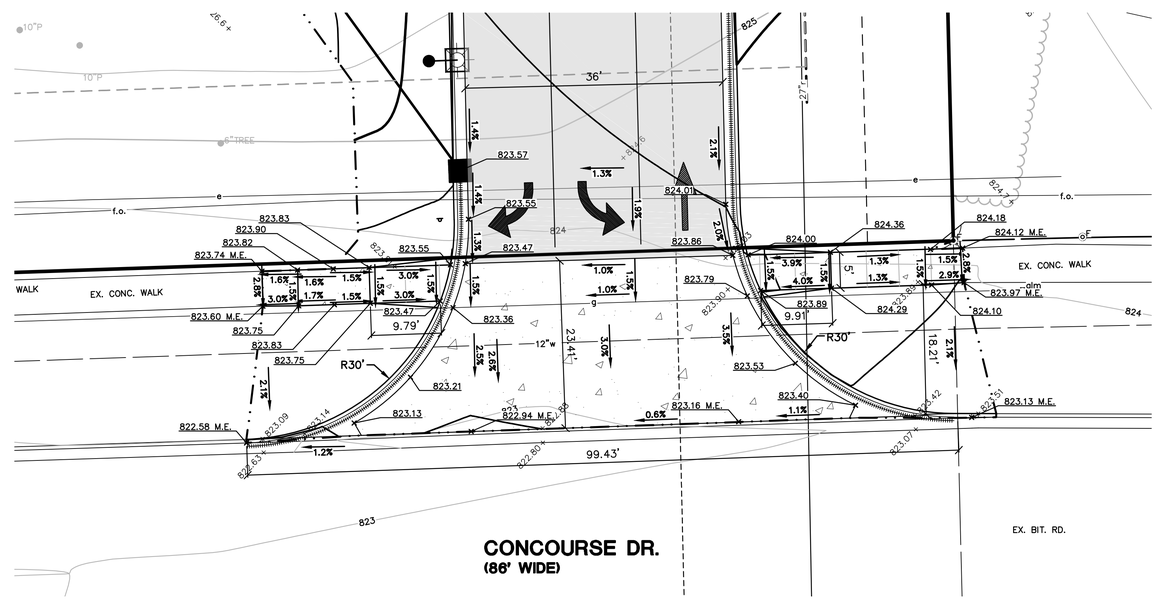
LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60	PROP. SPOT ELEVATION
U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	END SECTION
DS	PROP. DOWNSPOUT
RD	PROP. ROOF DRAIN
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIDEWALK RAMP
	DRAINAGE DIRECTION
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
gm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	SILTFENCE
	LIMITS OF DISTURBANCE
	CONSTRUCTION FENCE
FF	FINISH FLOOR ELEVATION
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
BF	BARRIER FREE PARKING SIGN
BFV	VAN ACCESSIBLE BARRIER FREE PARKING SIGN

SCALE: 1" = 10'

0 10 20 30



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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
DETAILED GRADING PLAN – PHASE 2

5

JOB No. 16295

REVISIONS:
W/WRC: REV 2
WR: REV 1

REV. DATE
B/ 3/23/17
3/24/17

DATE: 3/10/2017
SHEET 5 OF 39
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ENG: JAM
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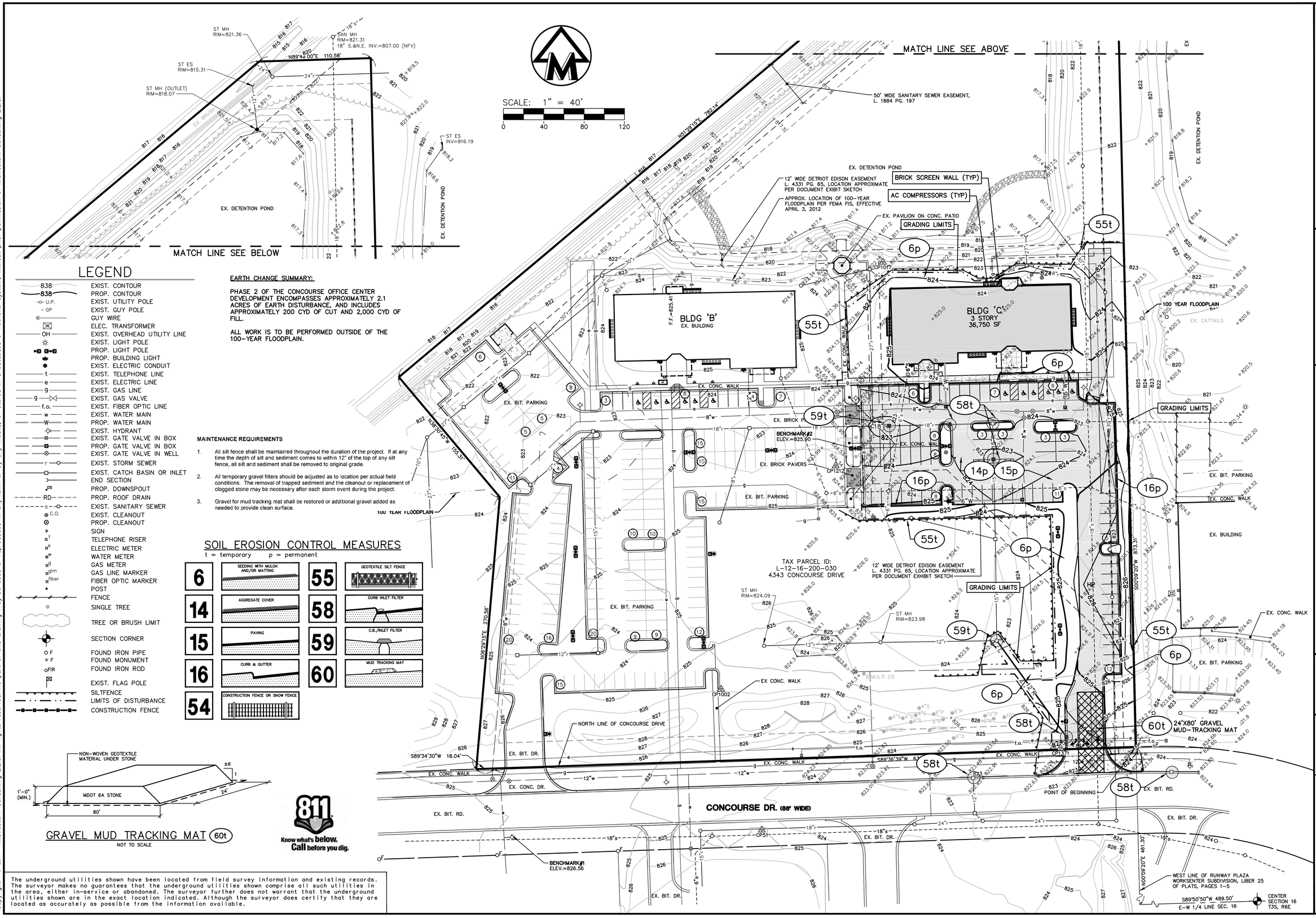

LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	END SECTION
DS	PROP. DOWNSPOUT
RD	PROP. ROOF DRAIN
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	SILTFENCE
	LIMITS OF DISTURBANCE
	CONSTRUCTION FENCE

EARTH CHANGE SUMMARY:

PHASE 2 OF THE CONCOURSE OFFICE CENTER DEVELOPMENT ENCOMPASSES APPROXIMATELY 2.1 ACRES OF EARTH DISTURBANCE, AND INCLUDES APPROXIMATELY 200 CYD OF CUT AND 2,000 CYD OF FILL.

ALL WORK IS TO BE PERFORMED OUTSIDE OF THE 100-YEAR FLOODPLAIN.

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. Gravel for mud tracking mat shall be restored or additional gravel added as needed to provide clean surface.

SOIL EROSION CONTROL MEASURES

t = temporary p = permanent

6	SEEDING WITH MULCH AND/OR MATTING	55	GEOTEXTILE SILT FENCE
14	AGGREGATE COVER	58	CURB INLET FILTER
15	PAVING	59	C.B./INLET FILTER
16	CURB & GUTTER	60	MUD TRACKING MAT
54	CONSTRUCTION FENCE OR SNOW FENCE		

GRAVEL MUD TRACKING MAT (60t)

NOT TO SCALE

811 Know what's below. Call before you dig.

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
SOIL EROSION CONTROL PLAN – PHASE 2

6

JOB No. 16295

REVISIONS: TWP REV 1

REV.	DATE
	3/24/17

DATE: 2/15/17
SHEET 6 OF 39
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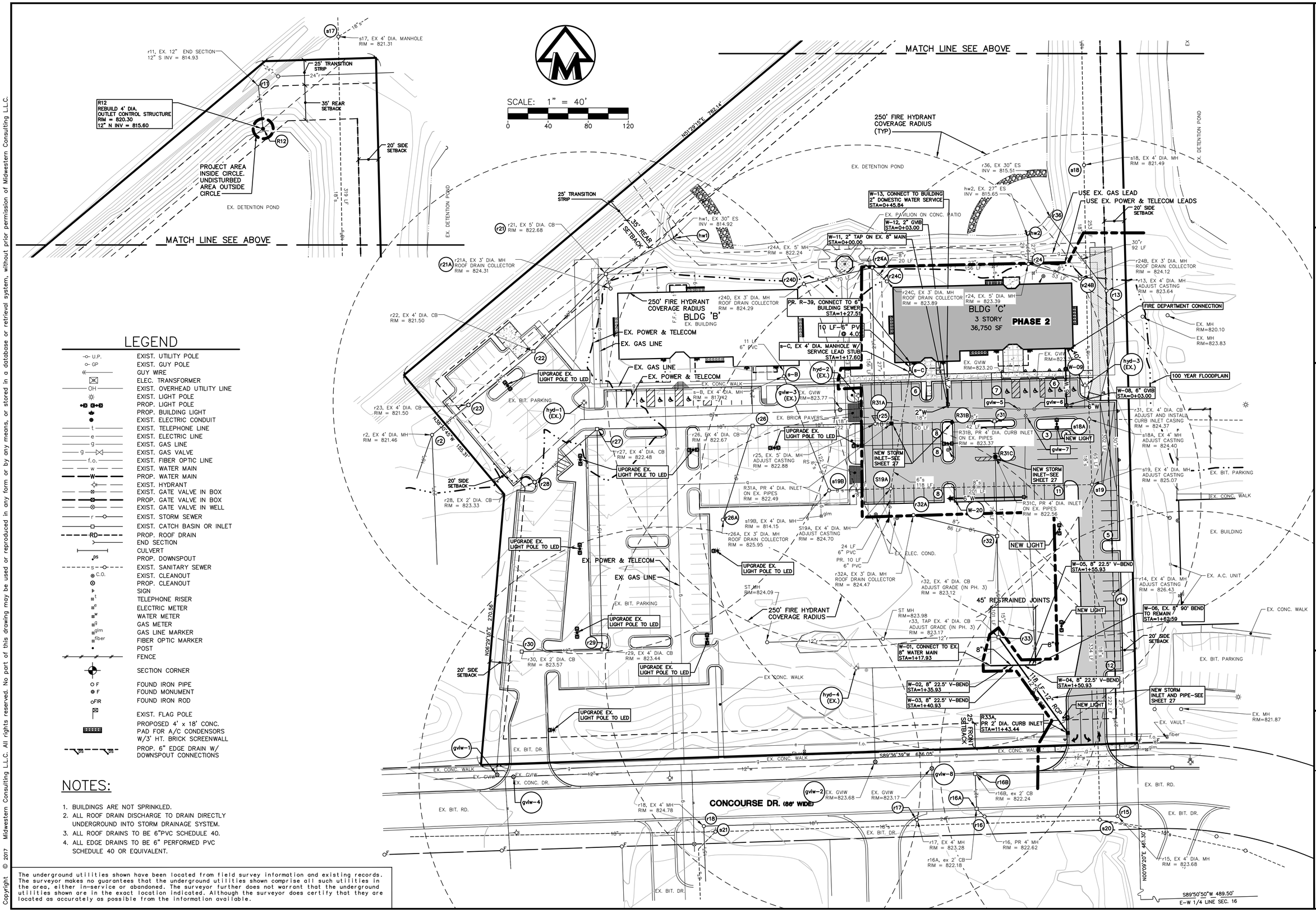

LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
RD	PROP. ROOF DRAIN
	END SECTION
	CULVERT
DS	PROP. DOWNSPOUT
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
DS DS	PROP. 6" EDGE DRAIN W/ DOWNSPOUT CONNECTIONS

NOTES:

1. BUILDINGS ARE NOT SPRINKLED.
2. ALL ROOF DRAIN DISCHARGE TO DRAIN DIRECTLY UNDERGROUND INTO STORM DRAINAGE SYSTEM.
3. ALL ROOF DRAINS TO BE 6"PVC SCHEDULE 40.
4. ALL EDGE DRAINS TO BE 6" PERFORMED PVC SCHEDULE 40 OR EQUIVALENT.

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PRELIMINARY & FINAL SITE PLAN
UTILITY PLAN – PHASE 2

7

DATE: 2/15/17
SHEET 7 OF 39
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JOB No. 16295

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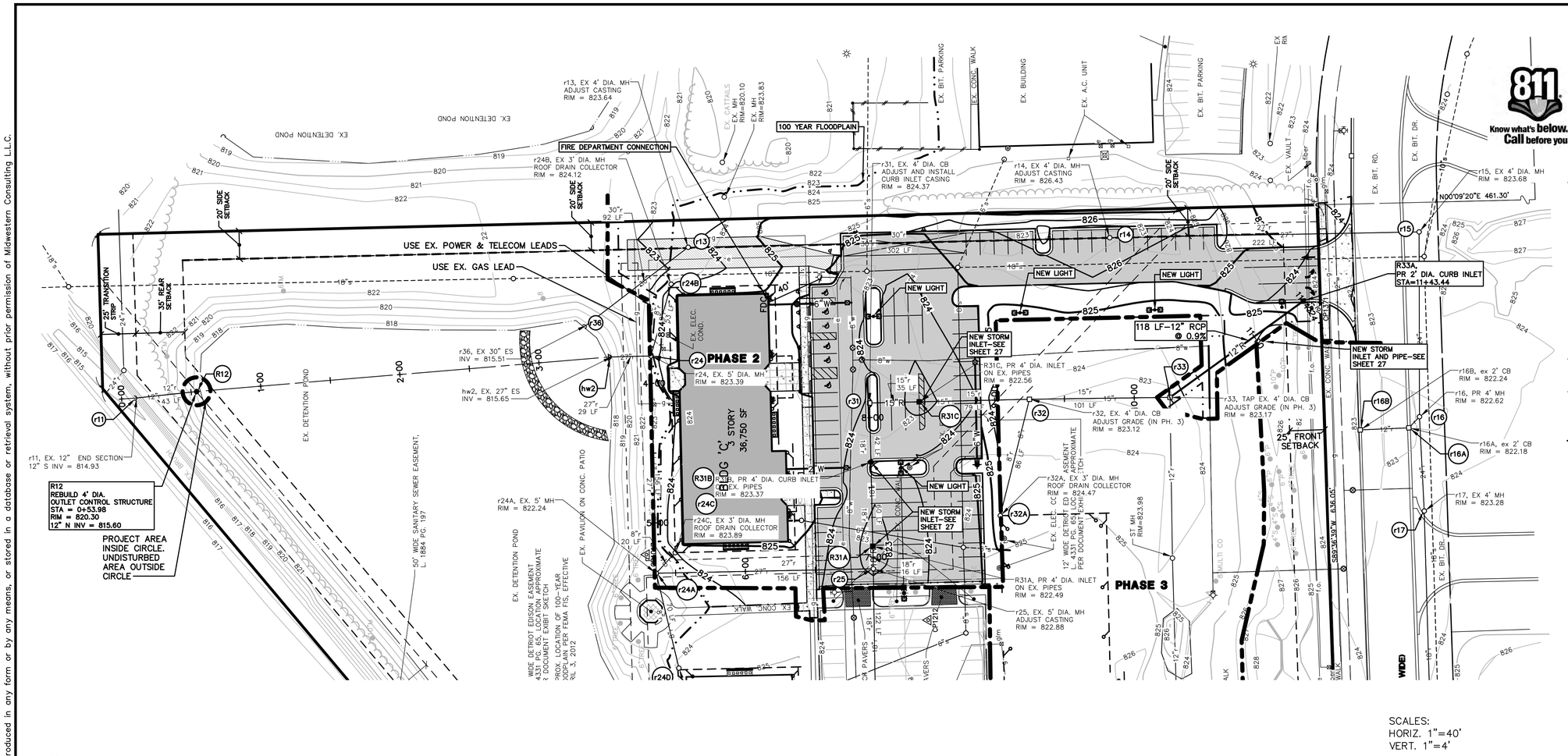

LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
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t	EXIST. TELEPHONE LINE
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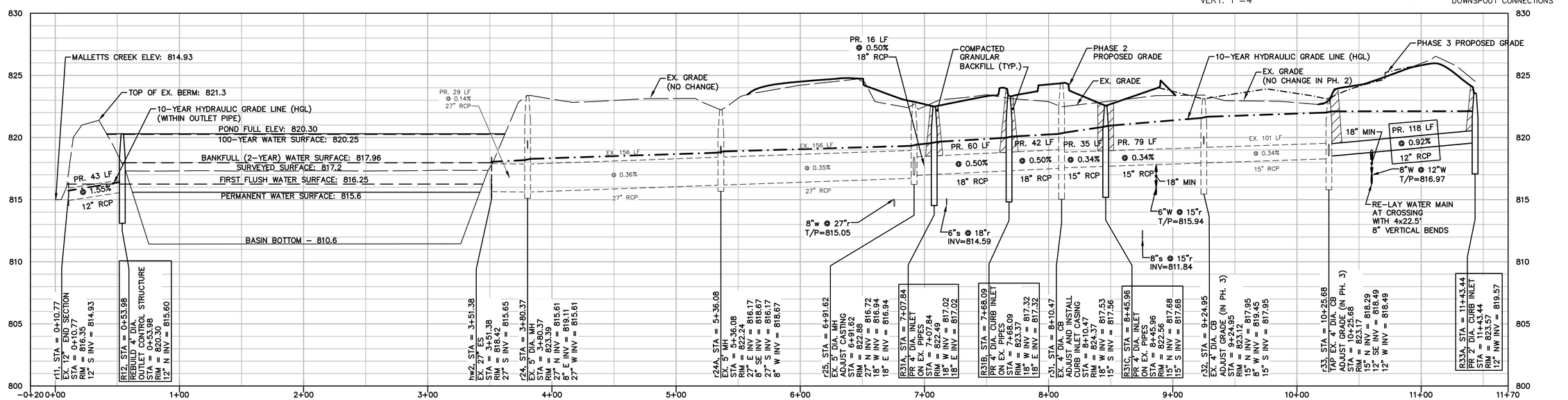
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
DS	PROP. 6" EDGE DRAIN W/ DOWNSPOUT CONNECTIONS



MAIN LINE STORM SEWER PROFILE

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PRELIMINARY & FINAL SITE PLAN
STORM SEWER PLAN & PROFILE – PHASE 2

8

JOB No. 16295

REVISIONS:

REV. DATE:

DATE: 3/24/17
SHEET 8 OF 39
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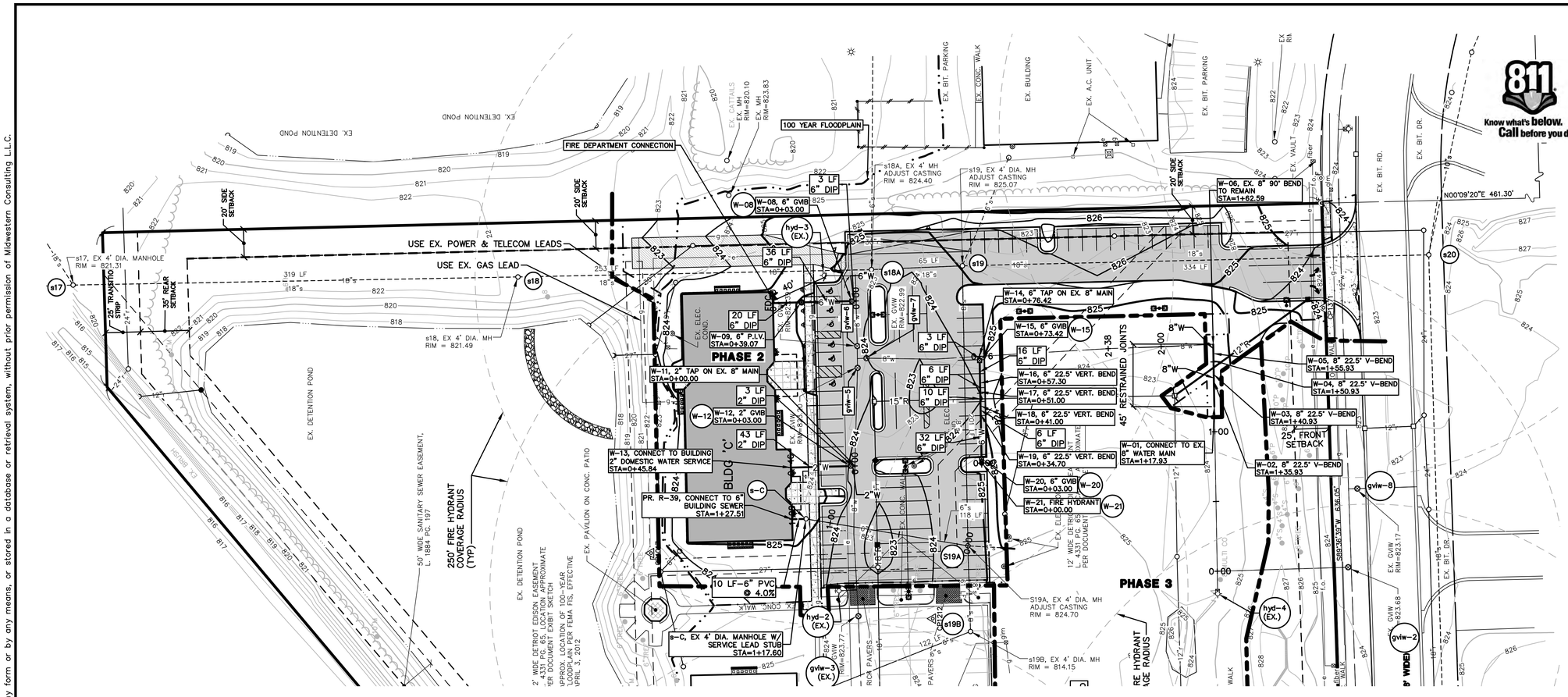
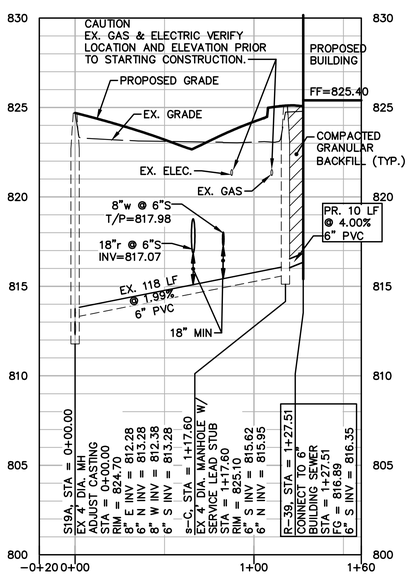


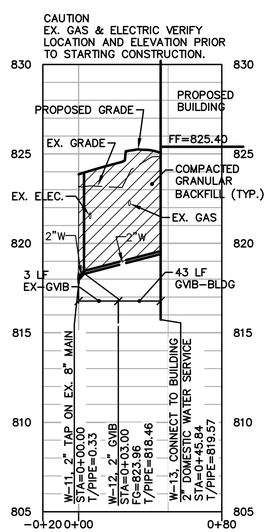
LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
RD	PROP. ROOF DRAIN
	END SECTION
	CULVERT
ps	PROP. DOWNSPOUT
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
DS	PROP. 6" EDGE DRAIN W/ DOWNSPOUT CONNECTIONS

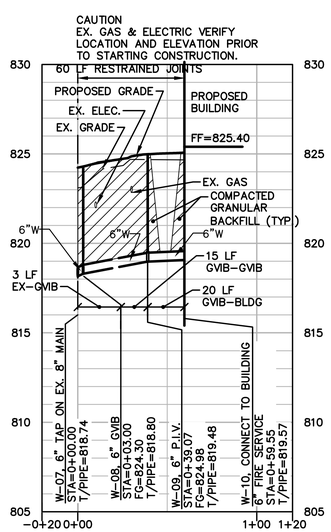
SCALES:
HORIZ. 1"=40'
VERT. 1"=4'



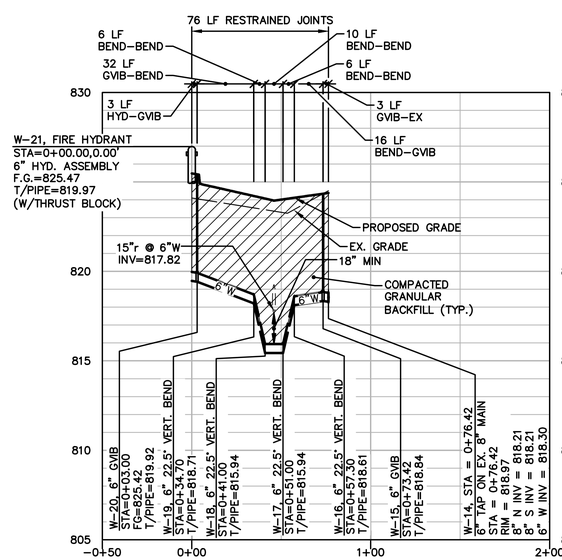
SANITARY SEWER LEAD



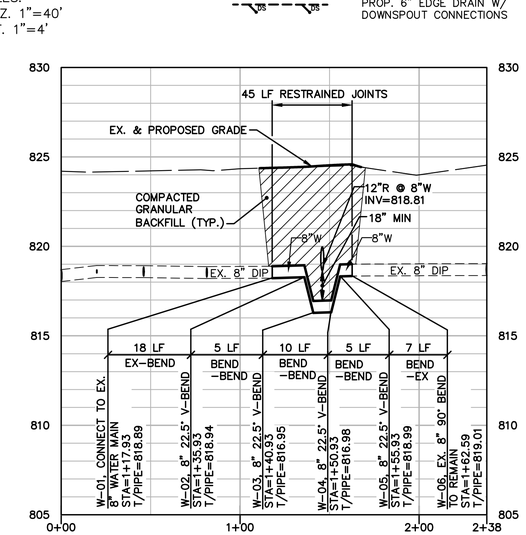
DOMESTIC WATER LEAD



FIRE WATER LEAD



FIRE HYDRANT LEAD



WATER MAIN LOWERING AT STORM CROSSING

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PRELIMINARY & FINAL SITE PLAN
SANITARY SEWER & WATER MAIN PLAN & PROFILE – PHASE 2

9

DATE: 3/24/17
SHEET 9 OF 39
CADD: WAJ
ENG: JAM
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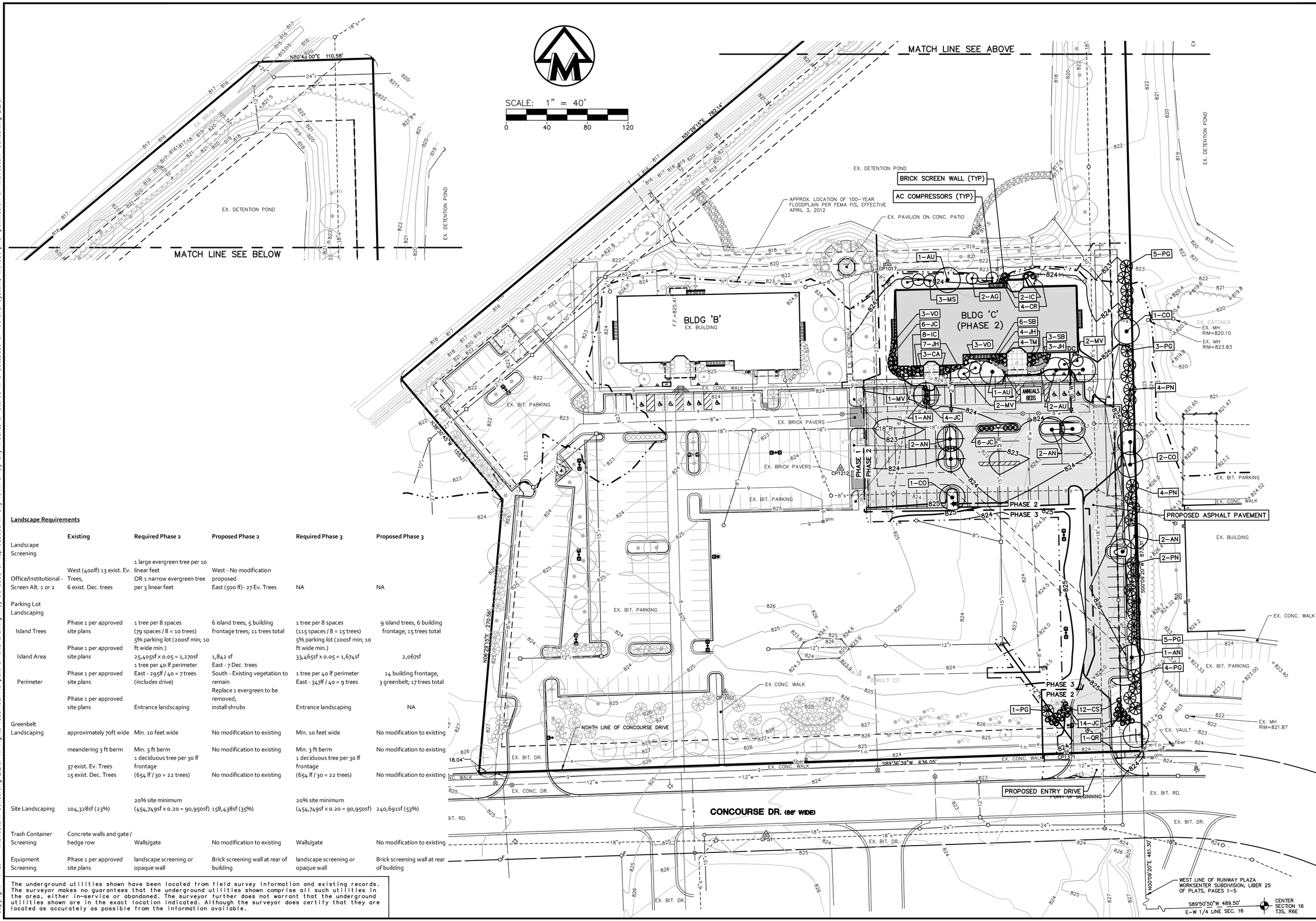
JOB No. 16295
REVISIONS:
REV. DATE:



Landscape Requirements

	Existing	Required Phase 2	Proposed Phase 2	Required Phase 3	Proposed Phase 3
Landscape Screening					
Office/Institutional - Screen Alt. 1 or 2	West (400lf) 13 exist. Ev. Trees, 6 exist. Dec. trees	1 large evergreen tree per 10 linear feet OR 1 narrow evergreen tree per 3 linear feet	West - No modification proposed East (500 lf) - 27 Ev. Trees	NA	NA
Parking Lot Landscaping					
Island Trees	Phase 1 per approved site plans	1 tree per 8 spaces (79 spaces / 8 = 10 trees) 5% parking lot (2005f min; 10 ft wide min.)	6 island trees, 5 building frontage trees; 11 trees total	1 tree per 8 spaces (115 spaces / 8 = 15 trees) 5% parking lot (2005f min; 10 ft wide min.)	9 island trees, 6 building frontage; 15 trees total
Island Area	Phase 1 per approved site plans	25,405sf x 0.05 = 1,270sf	1,842 sf	33,465sf x 0.05 = 1,674sf	2,067sf
Perimeter	Phase 1 per approved site plans	1 tree per 40 lf perimeter East - 295lf / 40 = 7 trees (includes drive)	East - 7 Dec. trees South - Existing vegetation to remain	1 tree per 40 lf perimeter East - 347lf / 40 = 9 trees	14 building frontage, 3 greenbelt; 17 trees total
	Phase 1 per approved site plans	Entrance landscaping	Replace 1 evergreen to be removed; install shrubs	Entrance landscaping	NA
Greenbelt Landscaping	approximately 70ft wide	Min. 10 feet wide	No modification to existing	Min. 10 feet wide	No modification to existing
	meandering 3 ft berm 37 exist. Ev. Trees 15 exist. Dec. Trees	Min. 3 ft berm 1 deciduous tree per 30 lf frontage (654 lf / 30 = 22 trees)	No modification to existing	Min. 3 ft berm 1 deciduous tree per 30 lf frontage (654 lf / 30 = 22 trees)	No modification to existing
Site Landscaping	104,328sf (23%)	20% site minimum (454,749sf x 0.20 = 90,950sf)	158,438sf (35%)	20% site minimum (454,749sf x 0.20 = 90,950sf)	240,691sf (53%)
Trash Container Screening	Concrete walls and gate / hedge row	Walls/gate	No modification to existing	Walls/gate	No modification to existing
Equipment Screening	Phase 1 per approved site plans	landscape screening or opaque wall	Brick screening wall at rear of building	landscape screening or opaque wall	Brick screening wall at rear of building

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.

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KEVIN SPIZIZEN
(248) 855-8110

CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
LANDSCAPE PLAN – PHASE 2

10

DATE: 3/10/2017
SHEET 10 OF 39
CADD: WAJ
ENG.: JAM
PM: RCW
TECH: TRF
16295LP1.dwg
PB#400

JOB No. 16295

REVISIONS:	REV. DATE
WORK REV. 2	3/7/2017
WORK REV. 1	3/24/17

NATURAL FEATURES IMPACT STATEMENT

FLOODWAY AND FLOODPLAIN
AN EXISTING FLOODPLAIN TO ELEVATION 823.4 EXISTS ON THE SITE, IN THE AREAS NORTH AND WEST OF THE BUILDINGS, PER THE 2012 FEMA FLOOD INSURANCE STUDY. WE ARE PROPOSING TO KEEP ALL PROJECT WORK (EXCEPT FOR DETENTION OUTLET STRUCTURE REBUILDING) OUTSIDE OF THE FLOODPLAIN, TO ENSURE NO CUT OR FILL WITHIN IT. NONE OF THIS AREA IS WITHIN THE FLOODWAY, EXCEPT FOR THE PART WITHIN MALLETTS CREEK, A COUNTY DRAIN.

THE EXISTING BUILDING FLOOR ELEVATION IS 825.4 (2.0' ABOVE THE FLOODPLAIN), AND THE PROPOSED BUILDING FLOOR ELEVATIONS ARE 826.2 (2.8' ABOVE THE FLOODPLAIN). THE EXISTING DETENTION BASIN IS WITHIN THE FLOODPLAIN, BUT WE ARE NOT PRPOSING ANY CHANGES TO THE BASIN OTHER THAN REBUILDING THE OUTLET STRUCTURE.

WETLANDS, STEEP SLOPES, AND WOODLANDS
THERE ARE NO WETLANDS, STEEP SLOPES, OR WOODLANDS LOCATED ON THIS SITE.

HERITAGE TREES
THE SITE WAS COMPLETELY CLEARED IN 2000, AND THERE ARE NO HERITAGE TREES LOCATED ON THE SITE.

ENDANGERED SPECIES
ENDANGERED, THREATENED, OR SPECIAL CONCERN SPECIES ARE NOT KNOWN TO EXIST ON THE SITE.

SCALE: 1" = 40'
0 40 80 120

838	EXIST. CONTOUR
×836.2	EXIST. SPOT ELEVATION
U.P.	EXIST. UTILITY POLE
U.P.	EXIST. UTILITY POLE W/ TRANS.
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	EXIST. BLOW-OFF
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	EXIST. BEEHIVE INLET
	END SECTION
	HEAD WALL
	CULVERT
S	EXIST. SANITARY SEWER
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	CONTROL PT.
	EXIST. ELECTRIC CONDUIT
C.O.	EXIST. CLEAN OUT
	CONCRETE TO BE REMOVED
	BITUMINOUS TO BE REMOVED
	UTILITY TO BE REMOVED
	TREE TO BE REMOVED
	PROPOSED PHASE LINE

BENCHMARK #1

TOP OF NORTHEAST STEAMER VALVE ON HYDRANT ON THE SOUTH SIDE CONCOURSE DR., ±600 FEET EAST OF STATE ST.

ELEVATION = 826.56 (USGS NAVD 29 DATUM)

(−0.40 ADJUSTMENT TO NAVD 88 DATUM 826.16)

BENCHMARK #2

TOP OF CONCRETE LIGHT POLE BASE SOUTH SIDE OF LIGHT POLE, LOCATED AT THE NORTHEAST CORNER OF EXISTING PARKING LOT IN THE CENTER OF AN ISLAND BETWEEN SQUARE INLAID BRICK PAVERS.

ELEVATION = 825.90 (USGS NAVD 29 DATUM)

(−0.40 ADJUSTMENT TO NAVD 88 DATUM 825.50)

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
EXISTING CONDITIONS AND REMOVALS

11

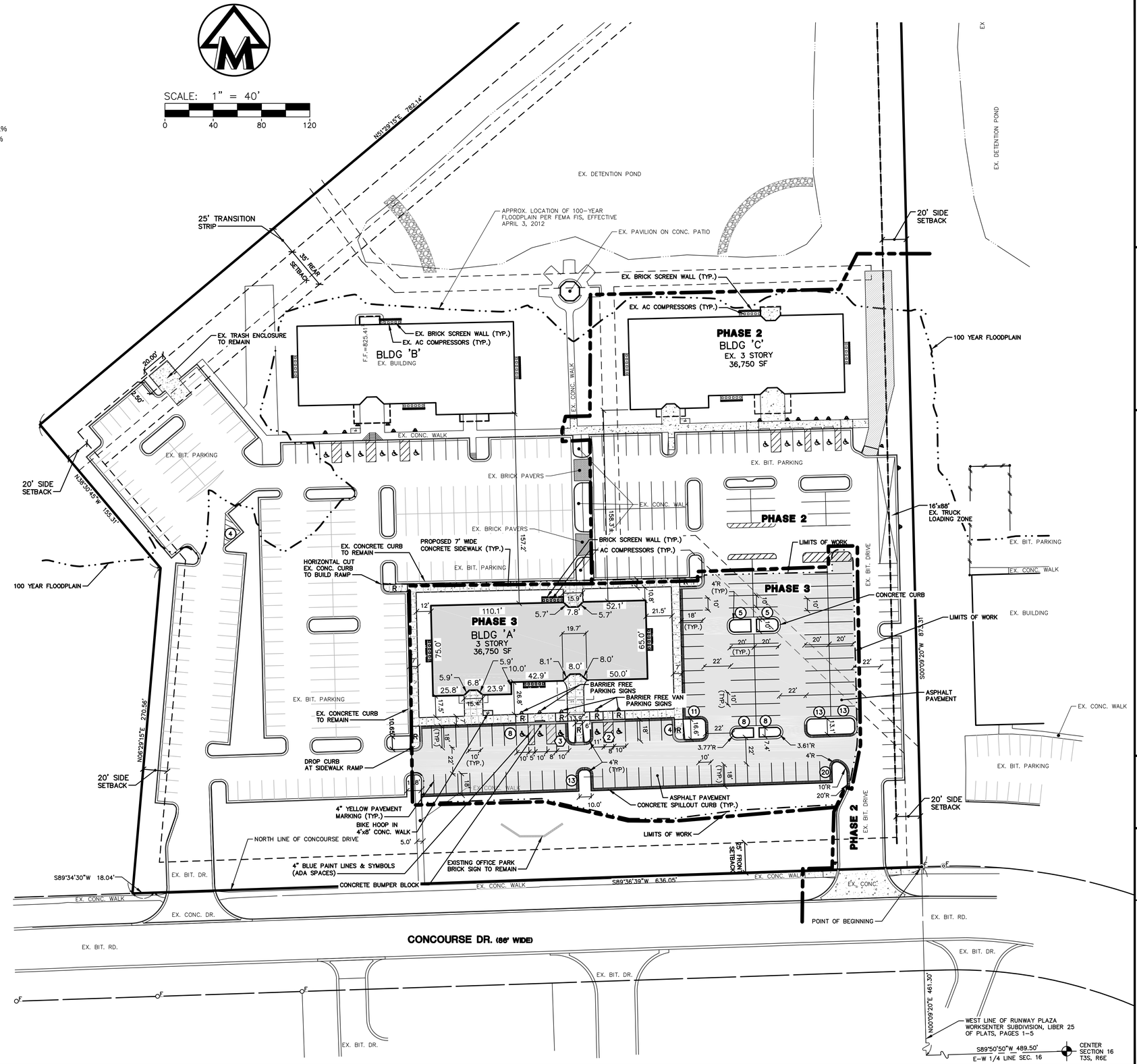
JOB No. 16295

DATE: 3/10/2017
SHEET 11 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295EX2.dwg
PSF1400

REVISIONS:
REV. DATE
TWP. REV 1
REV. 2
3/24/17

Development Summary

	Required/Allowed	After Phase 1 (Ex.)	After Phase 2	After Phase 3
Zoning	Business District (BD)	Business District (BD)	Business District (BD)	Business District (BD)
Land Use	General Office	General Office	General Office	General Office
Minimum Lot Area (Gross)	1 Acre	10.44 Acres (454,749sf)	10.44 Acres (454,749sf)	10.44 Acres (454,749sf)
Net of Malletts Creek		- 0.40 Acre (17,424sf)	- 0.40 Acre (17,424sf)	- 0.40 Acre (17,424sf)
Lot Area (Net)		10.04 Acre (437,325sf)	10.04 Acre (437,325sf)	10.04 Acre (437,325sf)
Minimum Lot Width	150 Feet	654 feet	654 feet	654 feet
Ground Floor Area		12,250 sft	24,500 sft	36,750 sft
Total Floor Area		36,750 sft	73,500 sft	110,250 sft
Maximum Lot Coverage (Gross)	40%	12,250 / 454,749 = 2.7%	24,500 / 454,749sf = 5.4%	36,750 / 454,749sf = 8.1%
Maximum Lot Coverage (Impervious Surface Ratio)	60%	102,976/ 454,749 = 22.6%	158,502 / 454,749sf = 34.9%	214,154sf / 454,749sf = 47.1%
Floor Area Ratio	60% max.	36,750 / 454,749 = 8.1%	73,500 / 454,749sf = 16.2%	110,250sf / 454,749 = 24.2%
Minimum Yards and Setbacks				
		386 ft to building	386 ft to building	154ft to building - Phase 3
Front Yard	25 ft	70 ft greenbelt	70 ft greenbelt	70 ft greenbelt
		54 ft - West	54 ft - West	54 ft - West
Side Yard (Least)	20 ft	327 ft - East	174 ft - East	174 ft - East
Side Yard (Total)	40 ft	381 ft	228 ft	228 ft
			74 ft phase 1	74 ft phase 1
Rear Yard	35 ft	74 ft	246 ft phase 2	246 ft phase 2
Building Height to Eaves		33.0 ft	33.0 ft	33.0 ft
Building Height to Ridge		46.0 ft	46.0 ft	46.0 ft
Code Building Height	45ft max.	39.5 ft	39.5 ft	39.5 ft
Building Stories	3 stories max.	3 stories	3 stories	3 stories
	1 per 300 sf	36,750 / 300 = 123 spaces	73,500 / 300 = 245 spaces	110,250 / 300 = 367 spaces
Parking Required	gross floor area	required	required	required
Parking Added This Phase		227	79	115
Total Parking Provided		227	306	421
Parking Provided per Bldg.		227	153	140
ADA Parking Required	ADA Chart Minimums		6 for 151-200 total	5 for 101-150 total
ADA Added This Phase*		3	3 at Bldg "B", 6 at Bldg "C"	5 at Bldg "A"
Total ADA Provided		3	12 total	17 total
Van Accessible Required	ADA Chart Minimums		1 for 151-200 total	1 for 101-150 total
Van Access. This Phase		2	6 at Bldg "B", 2 at Bldg "C"	4 at Bldg "A"
Total Van Access. Provided		2	8 total	12 total
* Regular ADA + Van Accessible				
	1 per 20,000 sf up to 60,000. 1 per each			
Loading Required**	50,000 above 60,000.	2	3	4
Loading This Phase		0	1	0
Total Loading Provided		0	1	1
** Seeking a waiver from Pittsfield Planning Commission				
Bicycle Parking Required	2 per building	2	4	6
Van Access. This Phase		2	2	2
Total Van Access. Provided		2	4	6



LEGEND

- NUMBER OF STANDARD PARKING SPACES IN ROW
- NUMBER OF BARRIER FREE PARKING SPACES IN ROW
- BF — BARRIER FREE PARKING SIGN
- BFV — VAN ACCESSIBLE BARRIER FREE PARKING SIGN
- R — BARRIER FREE SIDEWALK RAMP
- PROP. CURB & GUTTER
- PROP. BITUMINOUS PAVEMENT
- PROP. CONCRETE PAVEMENT
- SIGN
- PROP. SINGLE LIGHT
- PROP. DOUBLE LIGHT

NOTES:

1. ALL RADII ARE 4' TYPICAL TO BACK OF CURB UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE BACK OF CURB UNLESS OTHERWISE NOTED.
3. ALL ISLANDS NOT DIMENSIONED ARE 10' WIDE BACK-TO-BACK OF CURB.
4. SITE CONSTRUCTION IS TO BE IN ONE PHASE, BUILDING CONSTRUCTION SEQUENTIAL DEVELOPMENT.
5. THERE ARE NO DEED RESTRICTIONS.
6. PARKING SPACES ARE 10'x20', INCLUDING A 2' OVERHANG AT CURBS. SIDE DIMENSIONS ARE TO BACK OF CURB. DRIVE AISLES ARE 22' WIDE TO FACE OF CURB OR EDGE OF PARKING SPACE.
7. VEHICLES UP THROUGH SU-40 AND PITTSFIELD FIRE TRUCK SIZE CAN MANEUVER THROUGH SITE.
8. SEE ARCHITECTURAL ELEVATIONS FOR EQUIPMENT SCREEN WALL INFORMATION.

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
DIMENSIONAL SITE PLAN – PHASE 3

12

JOB No. 16295

REVISIONS:
WORKING REV. 2
TWP. REV. 1

REV.	DATE
	10/07/17
	3/23/17

DATE: 3/10/2017
SHEET 12 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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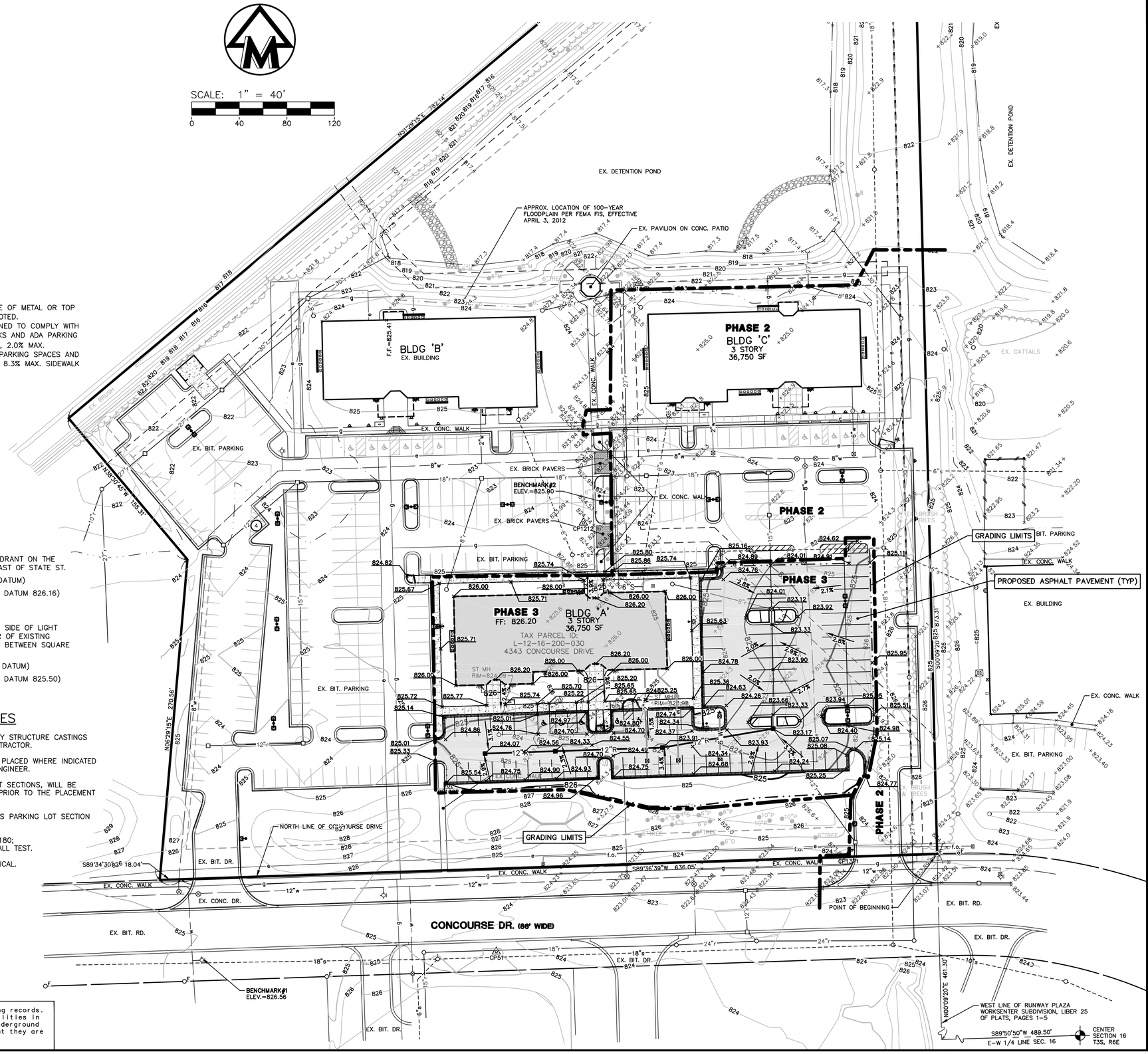
16P460



LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60	PROP. SPOT ELEVATION
U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	END SECTION
DS	PROP. DOWNSPOUT
RD	PROP. ROOF DRAIN
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIDEWALK RAMP
	DRAINAGE DIRECTION
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	SILTFENCE
	LIMITS OF DISTURBANCE
	CONSTRUCTION FENCE
FF	FINISH FLOOR ELEVATION
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL

NOTES:

1. ALL PAVEMENT ELEVATIONS ARE EDGE OF METAL OR TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
2. ALL PROPOSED SITE WORK IS DESIGNED TO COMPLY WITH ADA REGULATIONS FOR ALL SIDEWALKS AND ADA PARKING SPACES (5.0% MAX. RUNNING SLOPE, 2.0% MAX. CROSS-SLOPE AND EACH WAY FOR PARKING SPACES AND TURNING AREAS, AND AT DOORWAYS, 8.3% MAX. SIDEWALK RAMP SLOPE)

BENCHMARKS

BENCHMARK #1

TOP OF NORTHEAST STEAMER VALVE ON HYDRANT ON THE SOUTH SIDE CONCOURSE DR., ±600 FEET EAST OF STATE ST.

ELEVATION = 826.56 (USGS NAVD 29 DATUM)

(-0.40 ADJUSTMENT TO NAVD 88 DATUM 826.16)

BENCHMARK #2

TOP OF CONCRETE LIGHT POLE BASE SOUTH SIDE OF LIGHT POLE, LOCATED AT THE NORTHEAST CORNER OF EXISTING PARKING LOT IN THE CENTER OF AN ISLAND BETWEEN SQUARE INLAID BRICK PAVERS.

ELEVATION = 825.90 (USGS NAVD 29 DATUM)

(-0.40 ADJUSTMENT TO NAVD 88 DATUM 825.50)

PAVING AND GRADING NOTES

1. FINAL ADJUSTMENT TO UNDERGROUND UTILITY STRUCTURE CASTINGS SHALL BE PERFORMED BY THE PAVING CONTRACTOR.
2. EDGE DRAINS AND UNDERDRAINS SHALL BE PLACED WHERE INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
3. THE SUBGRADE, IN BOTH FILL AND THE CUT SECTIONS, WILL BE PROOF ROLLED AND FAILURES CORRECTED PRIOR TO THE PLACEMENT OF SUBBASE MATERIAL.
4. MINIMUM DENSITIES FOR THE ROAD SECTIONS PARKING LOT SECTION SHALL BE AS FOLLOWS:
   A. SUBGRADE – 98% BY AASHTO T-180;
   B. LIMESTONE BASE – 98% BY AASHTO T-180;
   C. ASPHALT – 95% MODIFIED MDOT MARSHALL TEST.
5. FIRE LANE CROSS SLOPE IS TO BE 2% TYPICAL.

811 Know what's below. Call before you dig.

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.

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
GRADING PLAN – PHASE 3

13

DATE: 3/10/2017
SHEET 13 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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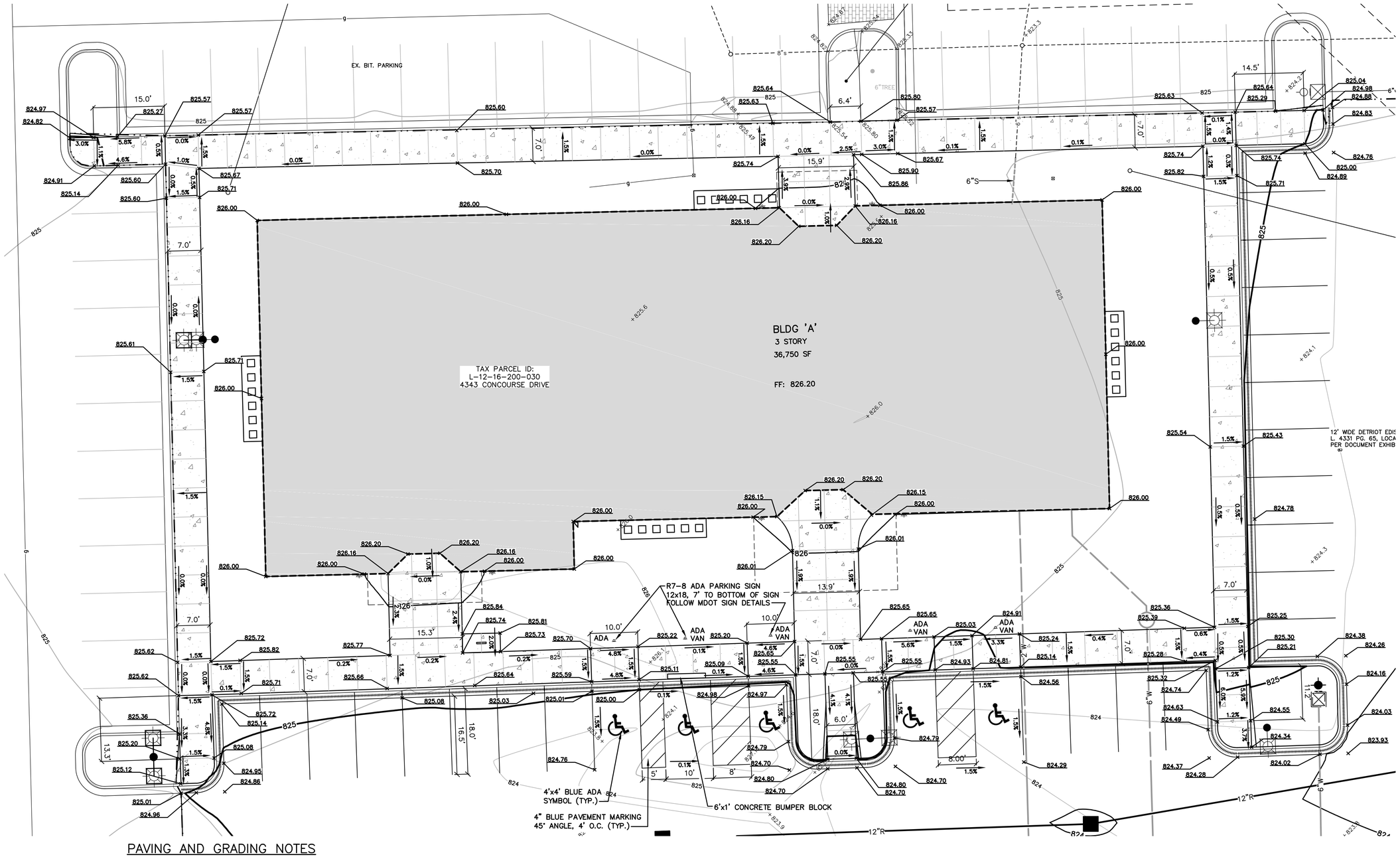
JOB No. 16295

REVISIONS:	REV. DATE	DRAWN BY
WORKING REV. 2	3/23/17	WAJ
TWP. REV. 1	3/24/17	WAJ



PAVING AND GRADING NOTES

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3. THE SUBGRADE, IN BOTH FILL AND THE CUT SECTIONS, WILL BE PROOF ROLLED AND FAILURES CORRECTED PRIOR TO THE PLACEMENT OF SUBBASE MATERIAL.
4. MINIMUM DENSITIES FOR THE ROAD SECTIONS PARKING LOT SECTION SHALL BE AS FOLLOWS:
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   B. LIMESTONE BASE – 98% BY AASHTO T-180;
   C. ASPHALT – 95% MODIFIED MDOT MARSHALL TEST.
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NOTES:

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2. ALL PROPOSED SITE WORK IS DESIGNED TO COMPLY WITH ADA REGULATIONS FOR ALL SIDEWALKS AND ADA PARKING SPACES (5.0% MAX. RUNNING SLOPE, 2.0% MAX. CROSS-SLOPE AND EACH WAY FOR PARKING SPACES AND TURNING AREAS, AND AT DOORWAYS, 8.3% MAX. SIDEWALK RAMP SLOPE)

SCALE: 1" = 10'

0 10 20 30

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
DETAILED GRADING – PHASE 3

14

JOB No. 16295

REVISIONS:
WORK REV. 2 — REV. DATE 3/10/17
WORK REV. 1 — 3/24/17

DATE: 3/10/2017
SHEET 14 OF 39
CADD: WAJ
ENG.: JAM
PM: RCW
TECH:
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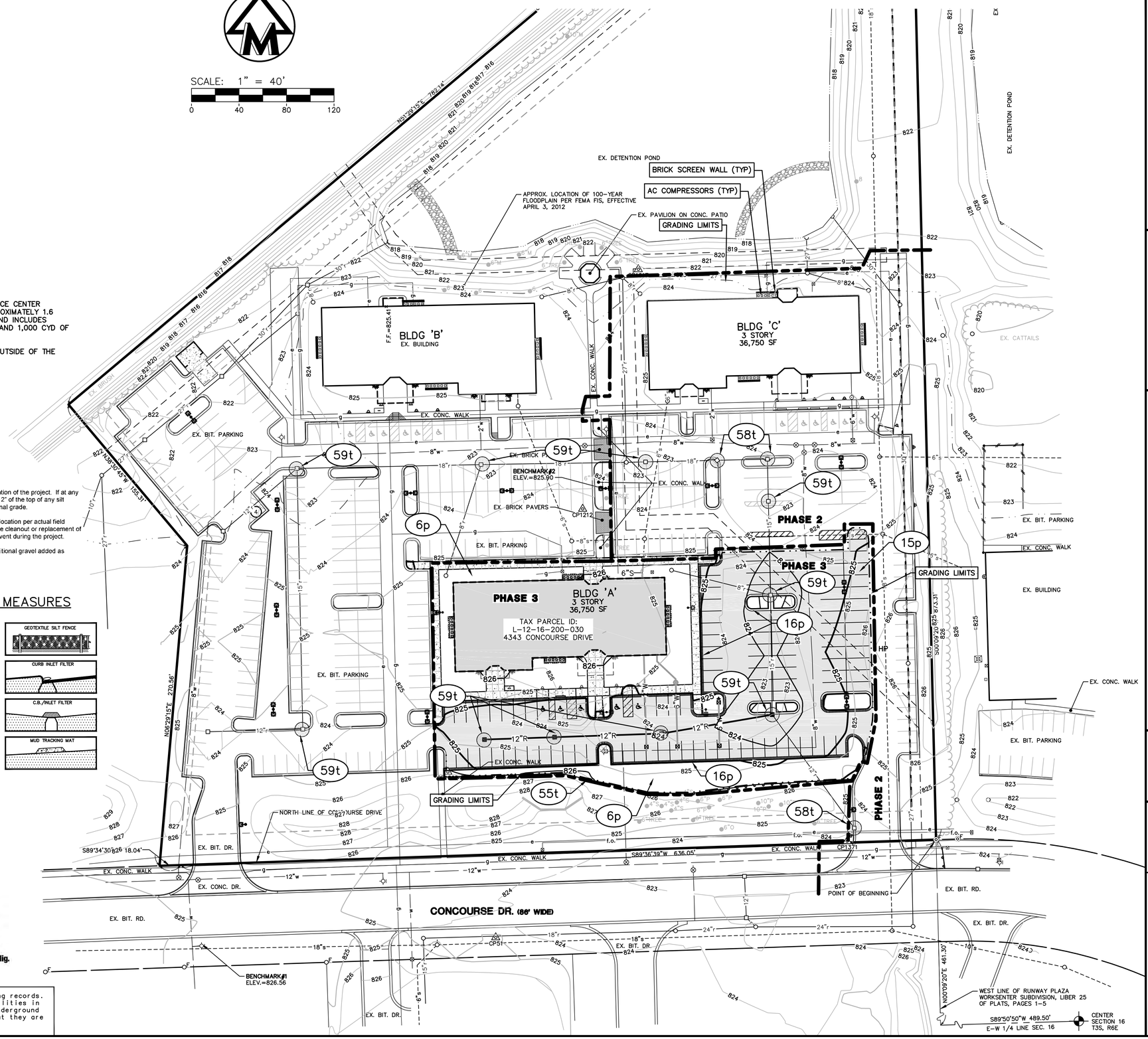
SCALE: 1" = 40'

0 40 80 120



LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	END SECTION
DS	PROP. DOWNSPOUT
RD	PROP. ROOF DRAIN
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
gm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	SILTFENCE
	LIMITS OF DISTURBANCE
	CONSTRUCTION FENCE

EARTH CHANGE SUMMARY:

PHASE 3 OF THE CONCOURSE OFFICE CENTER DEVELOPMENT ENCOMPASSES APPROXIMATELY 1.6 ACRES OF EARTH DISTURBANCE, AND INCLUDES APPROXIMATELY 150 CYD OF CUT AND 1,000 CYD OF FILL.

ALL WORK IS TO BE PERFORMED OUTSIDE OF THE 100-YEAR FLOODPLAIN.

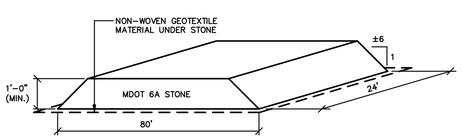
MAINTENANCE REQUIREMENTS

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. Gravel for mud tracking mat shall be restored or additional gravel added as needed to provide clean surface.

SOIL EROSION CONTROL MEASURES

t = temporary p = permanent

6	SEEDING WITH MULCH AND/OR MATTING	55	GEOTEXTILE SILT FENCE
14	AGGREGATE COVER	58	CURB INLET FILTER
15	PAVING	59	C.B./INLET FILTER
16	CURB & GUTTER	60	MUD TRACKING MAT
54	CONSTRUCTION FENCE OR SNOW FENCE		



GRAVEL MUD TRACKING MAT (60t)

NOT TO SCALE

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PRELIMINARY & FINAL SITE PLAN
SOIL EROSION CONTROL PLAN – PHASE 3

15

DATE: 2/15/17
SHEET 15 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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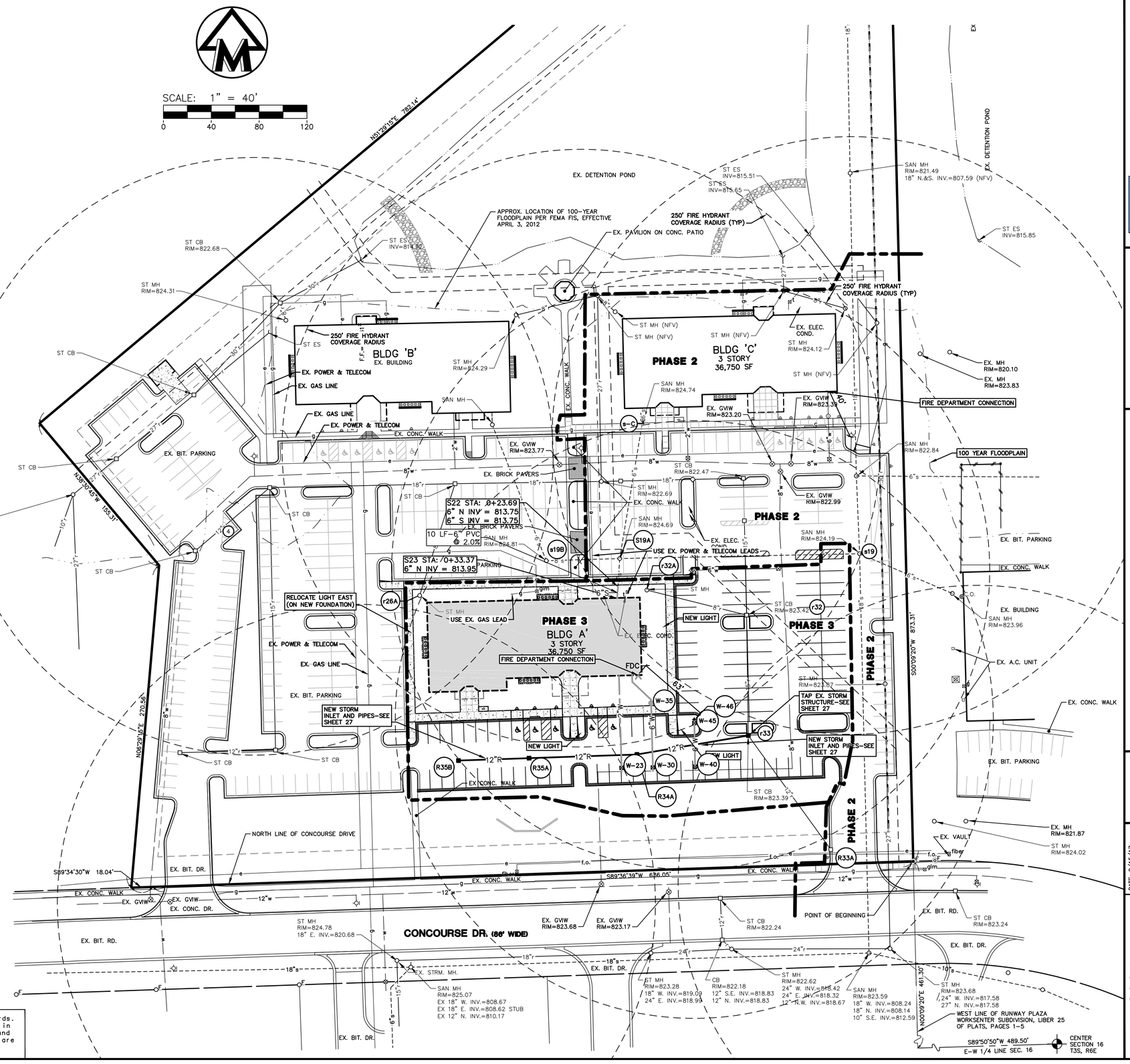
JOB No. 16295

REVISIONS:	REV.	DATE
TWP REV 1		3/24/17



LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
RD	PROP. ROOF DRAIN
	END SECTION
	CULVERT
DS	PROP. DOWNSPOUT
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
DS DS	PROP. 6" EDGE DRAIN W/ DOWNSPOUT CONNECTIONS

NOTES:

1. BUILDINGS ARE NOT SPRINKLED.
2. ALL ROOF DRAIN DISCHARGE TO DRAIN DIRECTLY UNDERGROUND INTO STORM DRAINAGE SYSTEM.
3. ALL ROOF DRAINS TO BE 6"PVC SCHEDULE 40.
4. ALL EDGE DRAINS TO BE 6" PERFORMED PVC SCHEDULE 40 OR EQUIVALENT.

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PRELIMINARY & FINAL SITE PLAN
UTILITY PLAN – PHASE 3

16

DATE: 2/15/17
SHEET 16 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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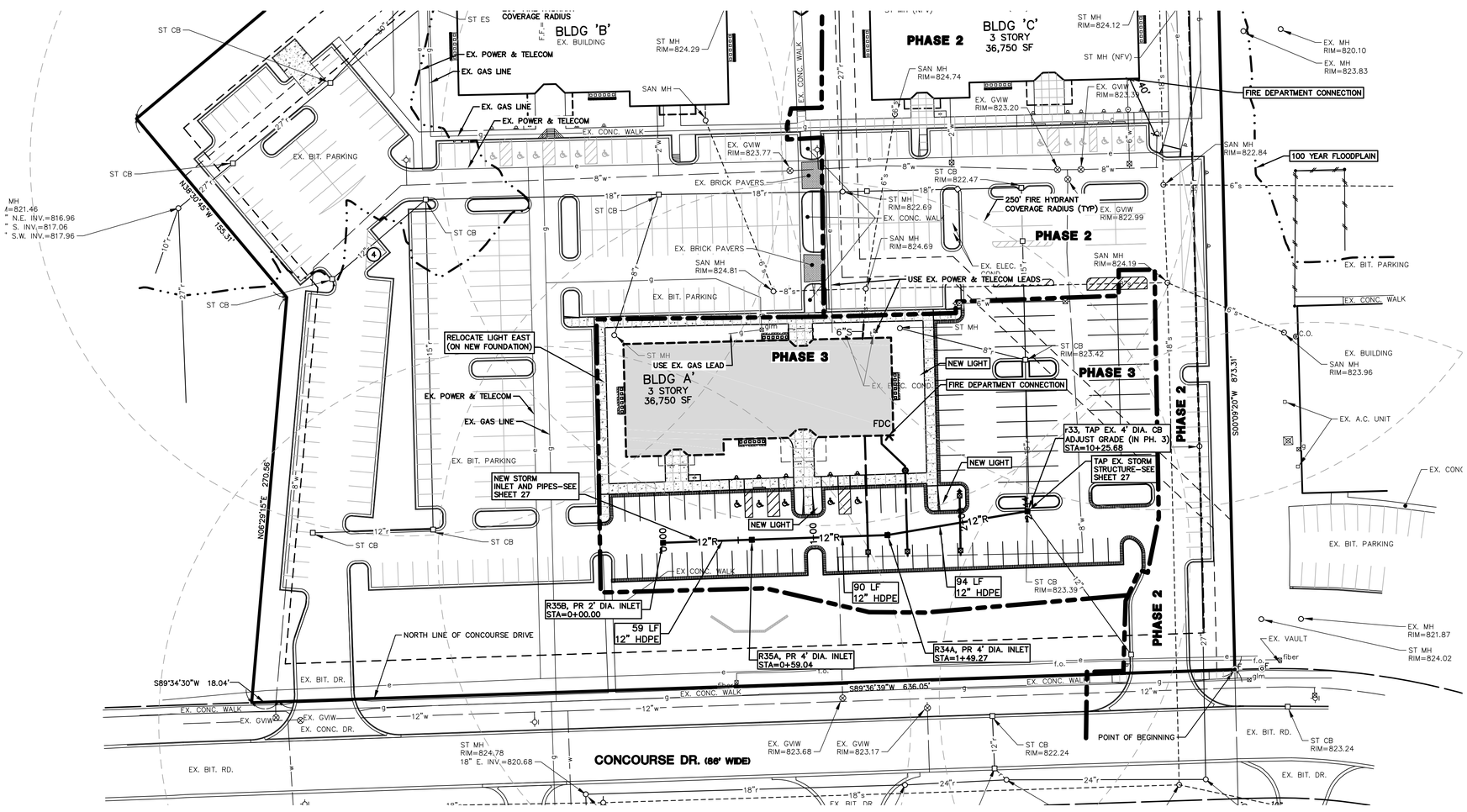
REV.	DATE
	3/24/17

JOB No. 16295
REVISIONS:
TWP REV. 1

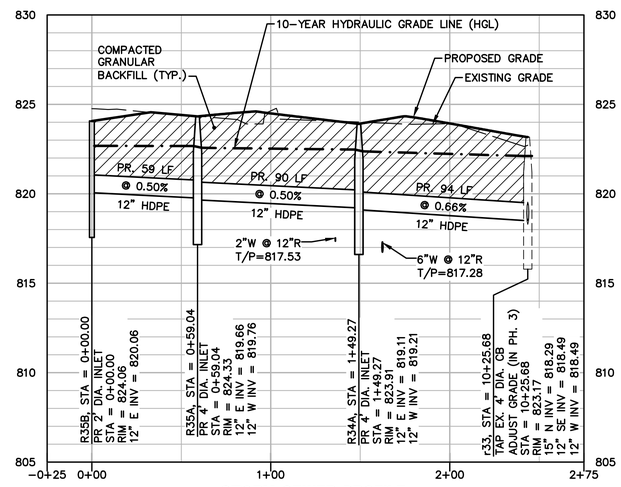


SCALE: 1" = 40'

0 40 80 120

LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
RD	PROP. ROOF DRAIN
	END SECTION
	CULVERT
DS	PROP. DOWNSPOUT
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
DS DS	PROP. 6" EDGE DRAIN W/ DOWNSPOUT CONNECTIONS



SCALES:
HORIZ. 1"=40'
VERT. 1"=4'

STORM SEWER PROFILE

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PRELIMINARY & FINAL SITE PLAN
STORM SEWER PLAN & PROFILE – PHASE 3

17

DATE: 3/24/17
SHEET 17 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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JOB No. 16295
REVISIONS:
REV. DATE

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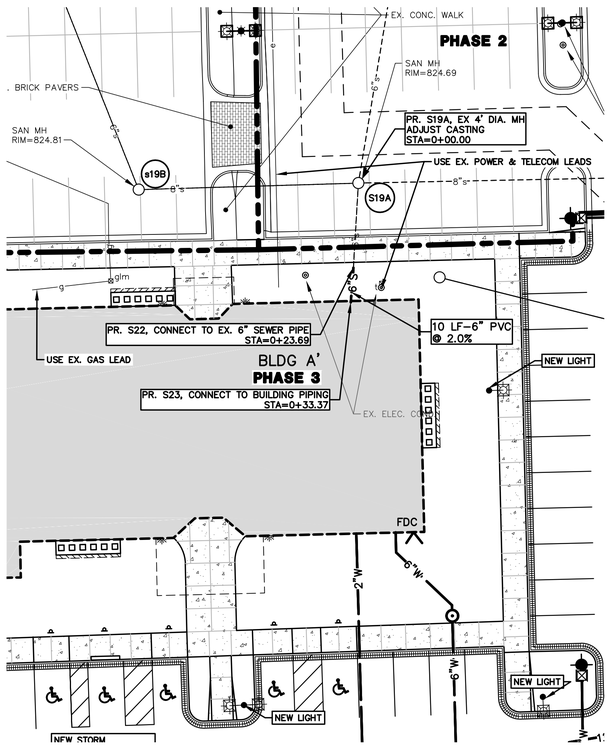
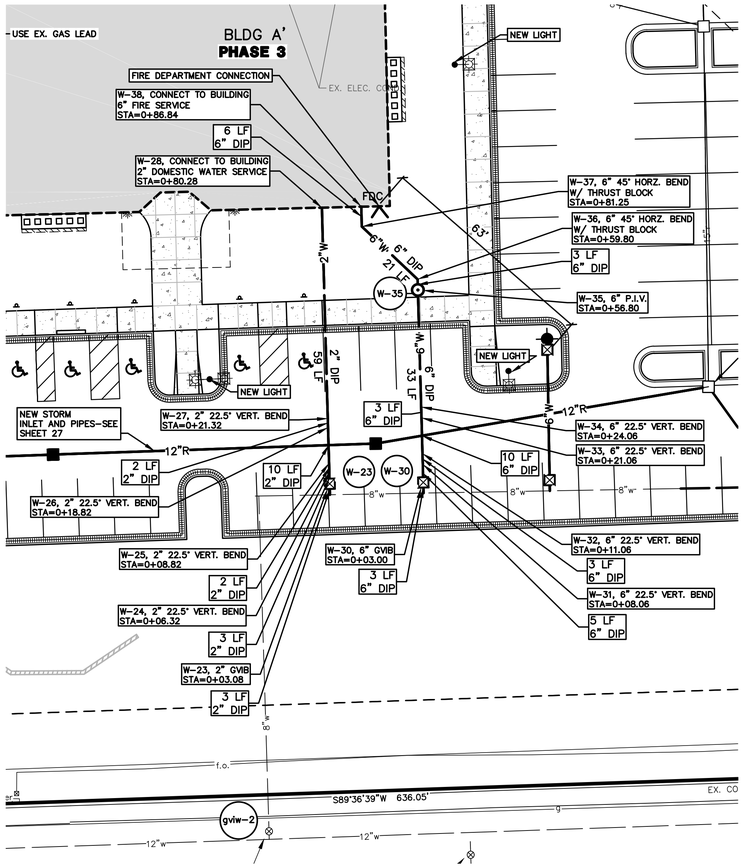
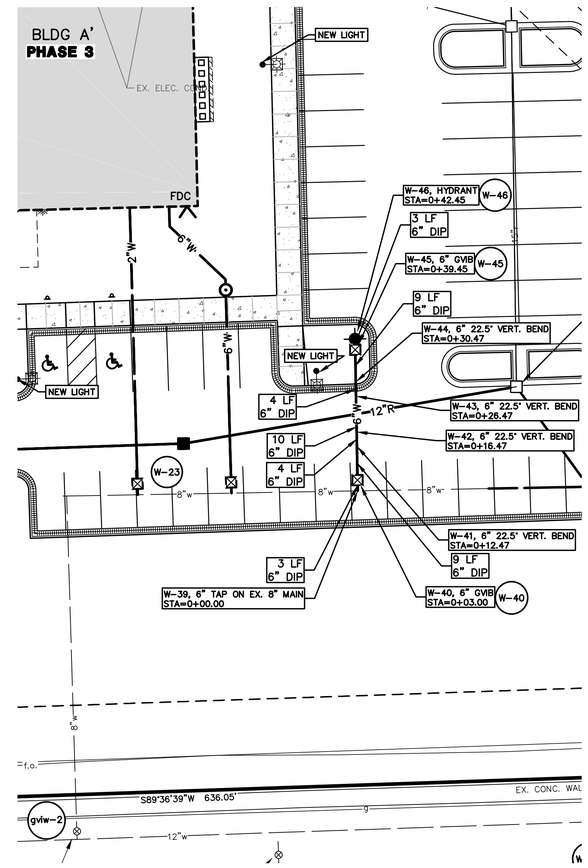




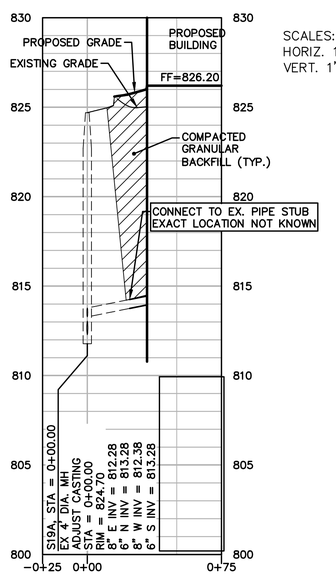


SCALE: 1" = 20'

0 20 40 60

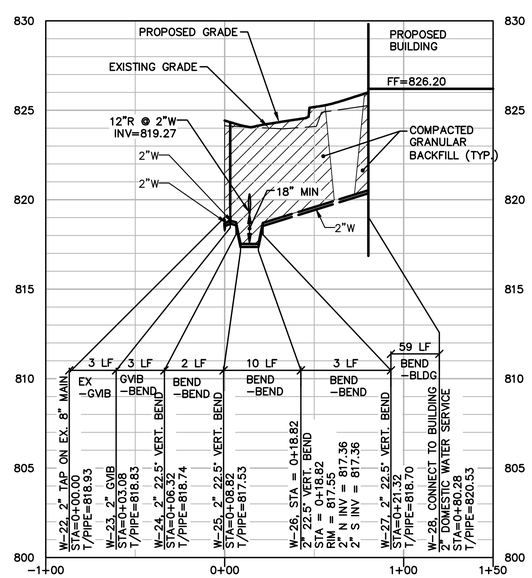
LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
RD	PROP. ROOF DRAIN
	END SECTION
	CULVERT
DS	PROP. DOWNSPOUT
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
DS	PROP. 6" EDGE DRAIN W/ DOWNSPOUT CONNECTIONS

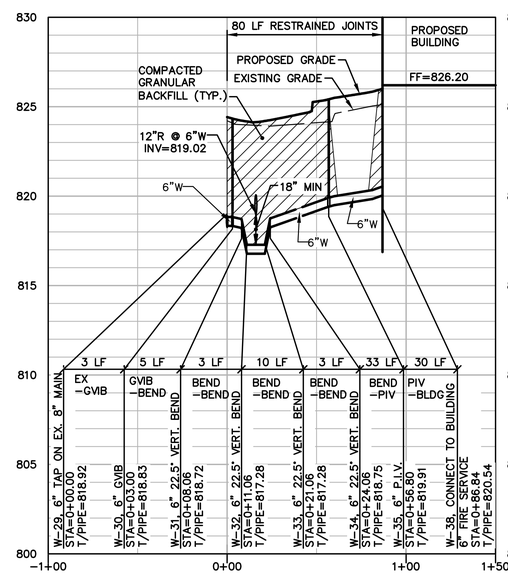


SANITARY SEWER LEAD

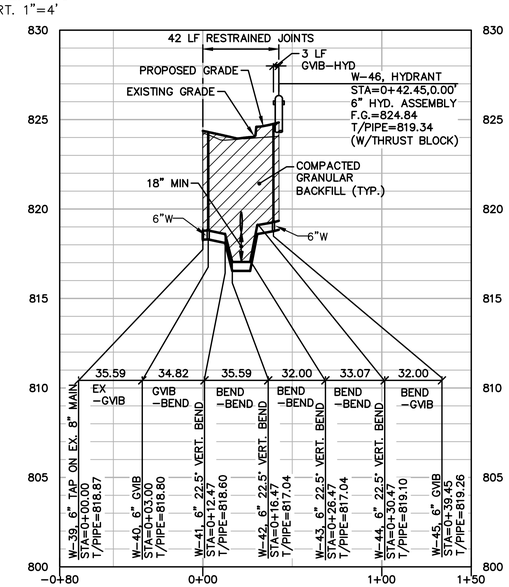
SCALES:
HORIZ. 1"=40'
VERT. 1"=4'



DOMESTIC WATER LEAD



FIRE WATER LEAD



FIRE HYDRANT LEAD

SCALES:
HORIZ. 1"=40'
VERT. 1"=4'

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PRELIMINARY & FINAL SITE PLAN
SANITARY SEWER & WATER MAIN PLAN & PROFILE – PHASE 3

18

JOB No. 16295
REVISIONS:

REV.	DATE: 3/24/17
	SHEET 18 OF 39
	CADD: WAJ
	ENG: JAM
	PM: RCW
	TECH:
	16295PS2.dwg
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STORM STRUCTURE TABLE

STRUCTURE NO.	TYPE	RIM ELEV.	INV.	DEPTH	SUMP	TYPE OF CASTING
hw1	2' ES	817.96	30" SW 814.92	4.98	0'	
hw2	2' ES	818.42	27" S 815.65	2.00	0'	
r2	4' MH	821.46	10" S 817.96 27" S 817.06 27" NE 816.96	4.50	0'	EJIW 1040 Type B
r13	4' MH	823.64	30" S 816.05 30" NW 815.83	7.81	0'	EJIW 1040 Type B
r14	4' MH	826.43	27" S 816.82 30" N 816.82	9.61	0'	EJIW 1040 Type B
r15	4' MH	823.68	24" W 817.58 27" N 817.58	6.10	0'	EJIW 1040 Type B
r16	4' MH	822.62	12" NW 818.42 24" W 818.67 24" E 818.32	4.30	0'	EJIW 1040 Type B
r16A	2' CB	822.18	12" N 818.83 12" SE 818.83	3.35	0'	EJIW 1040 Type M1
r16B	2' CB	822.24	12" S 819.13	3.11	0'	EJIW 1040 Type M1
r17	4' MH	823.28	18" W 819.09 24" E 818.99	4.29	0'	EJIW 1040 Type B
r18	4' MH	824.78	15" S 820.88 18" E 820.68	4.10	0'	EJIW 1040 Type B
r21	2' CB	822.68	8" S 818.85 30" SW 815.85 30" NE 815.85	6.83	0'	EJIW 1040 Type M1
r21A	4' MH	824.31	8" N 819.57	4.74	0'	EJIW 1040 Type B
r22	2' CB	821.50	27" SW 816.40 30" NE 816.26	5.24	0'	EJIW 1040 Type M1
r23	2' CB	821.50	27" SW 816.76 27" NE 816.76	4.74	0'	EJIW 1040 Type M1
r24	4' MH	823.39	27" W 815.61 27" N 815.61 8" E 819.11	7.78	0'	EJIW 1040 Type B
r24A	4' MH	822.24	8" SE 818.67 27" S 816.17 8" W 818.67 27" E 816.17	6.07	0'	EJIW 1040 Type B
r24B	4' MH	824.12	8" W 820.11	4.01	0'	EJIW 1040 Type B
r24C	4' MH	823.89	8" NW 819.47	4.42	0'	EJIW 1040 Type B
r24D	4' MH	824.29	8" E 819.38	4.91	0'	EJIW 1040 Type B
r25	4' MH	822.88	18" W 816.94 18" E 816.94 27" N 816.72	6.16	0'	EJIW 1040 Type B
r26	2' CB	822.67	18" W 817.56 8" S 818.56 18" E 817.56	7.11	2'	EJIW 1040 Type M1
r26A	4' MH	825.95	8" N 820.52	5.43	0'	EJIW 1040 Type B
r27	2' CB	822.48	12" SW 818.19 15" S 818.19 18" E 818.09	6.39	2'	EJIW 1040 Type M1
r28	2' CB	823.33	12" NE 818.60	6.73	2'	EJIW 1040 Type M1
r29	2' CB	823.44	12" W 819.03 15" N 818.93	6.51	2'	EJIW 1040 Type M1
r30	2' CB	823.57	12" E 819.43	6.14	2'	EJIW 1040 Type M1
r31	4' CB	824.37	15" S 817.56 18" W 817.53	8.84	2'	EJIW 1040 Type B
r32	4' CB	823.12	8" W 819.45 15" S 817.95 15" N 817.95	7.17	2'	EJIW 1040 Type B
r32A	4' MH	824.47	8" E 820.67	3.80	0'	EJIW 1040 Type B
r33	4' CB	823.17	12" SE 818.49 12" W 818.49 15" N 818.29	6.88	2'	EJIW 1040 Type B
r36	2' ES	818.55	30" SE 815.51	2.00	0'	??? ???

STORM STRUCTURE TABLE (PHASE 2)

STRUCTURE NO.	TYPE	RIM ELEV.	INV.	DEPTH	SUMP	TYPE OF CASTING
R12	4' OUTLET CONTROL STRUCTURE	820.30	12" N 815.60	6.70	2'	EJIW 1040 Dome Grate
R31A	4' CB	822.49	18" E 817.02 18" W 817.02	7.47	2'	EJIW 1040 Type B
R31B	4' CB	823.37	18" E 817.32 18" W 817.32	8.05	2'	EJIW 1040 Type B
R31C	4' CB	822.56	15" S 817.68 15" N 817.68	6.87	2'	EJIW 1040 Type B
R33A	4' CB	823.57	12" NW 819.57	6.00	2'	EJIW 1040 Type B

STORM STRUCTURE TABLE (PHASE 3)

STRUCTURE NO.	TYPE	RIM ELEV.	INV.	DEPTH	SUMP	TYPE OF CASTING
R34A	4' CB	823.91	12" W 819.21 12" E 819.11	6.80	2'	EJIW 1040 Type B
R35A	4' CB	824.33	12" W 819.76 12" E 819.66	6.67	2'	EJIW 1040 Type B
R35B	2' CB	824.06	12" E 820.06	6.00	2'	EJIW 1040 Type M1

SANITARY STRUCTURE TABLE

STRUCTURE NO.	TYPE	RIM ELEV.	INV.	DEPTH	TYPE OF CASTING
s-B	4' DIAM. MH	817.42	6" N 816.40 6" S 816.07	1.35	EJIW 1040 Type B
s-C	4' DIAM. MH	825.10	6" N 815.95 6" S 815.62	9.48	EJIW 1040 Type B
s17	4' DIAM. MH	821.31	18" S 807.00 18" N 807.00	14.31	EJIW 1040 Type B
s18	4' DIAM. MH	821.49	18" S 807.59 18" N 807.59	13.90	EJIW 1040 Type B
s18A	4' DIAM. MH	824.40	18" S 807.81 18" N 807.81	16.59	EJIW 1040 Type B
s19	4' DIAM. MH	825.07	8" W 811.44 18" S 807.88 18" N 807.88	17.19	EJIW 1040 Type B
s19B	4' DIAM. MH	814.15	6" N 813.63 8" E 812.63	1.52	EJIW 1040 Type B
s20	4' DIAM. MH	823.59	8" E 812.59 18" W 808.24 18" N 808.14	15.45	EJIW 1040 Type B
S19A	4' DIAM. MH	824.70	6" N 813.28 8" W 812.38 6" S 813.28 8" E 812.28	12.42	EJIW 1040 Type B

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PRELIMINARY & FINAL SITE PLAN
STRUCTURE TABLES – PHASES 2 & 3

19

JOB No. 16295

REVISIONS:
WORK REV 2
TWP REV 1

REV.	DATE
	3/10/2017
	3/24/17

DATE: 3/10/2017
SHEET 19 OF 39
CADD: WAJ
ENG: JAM
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TECH:
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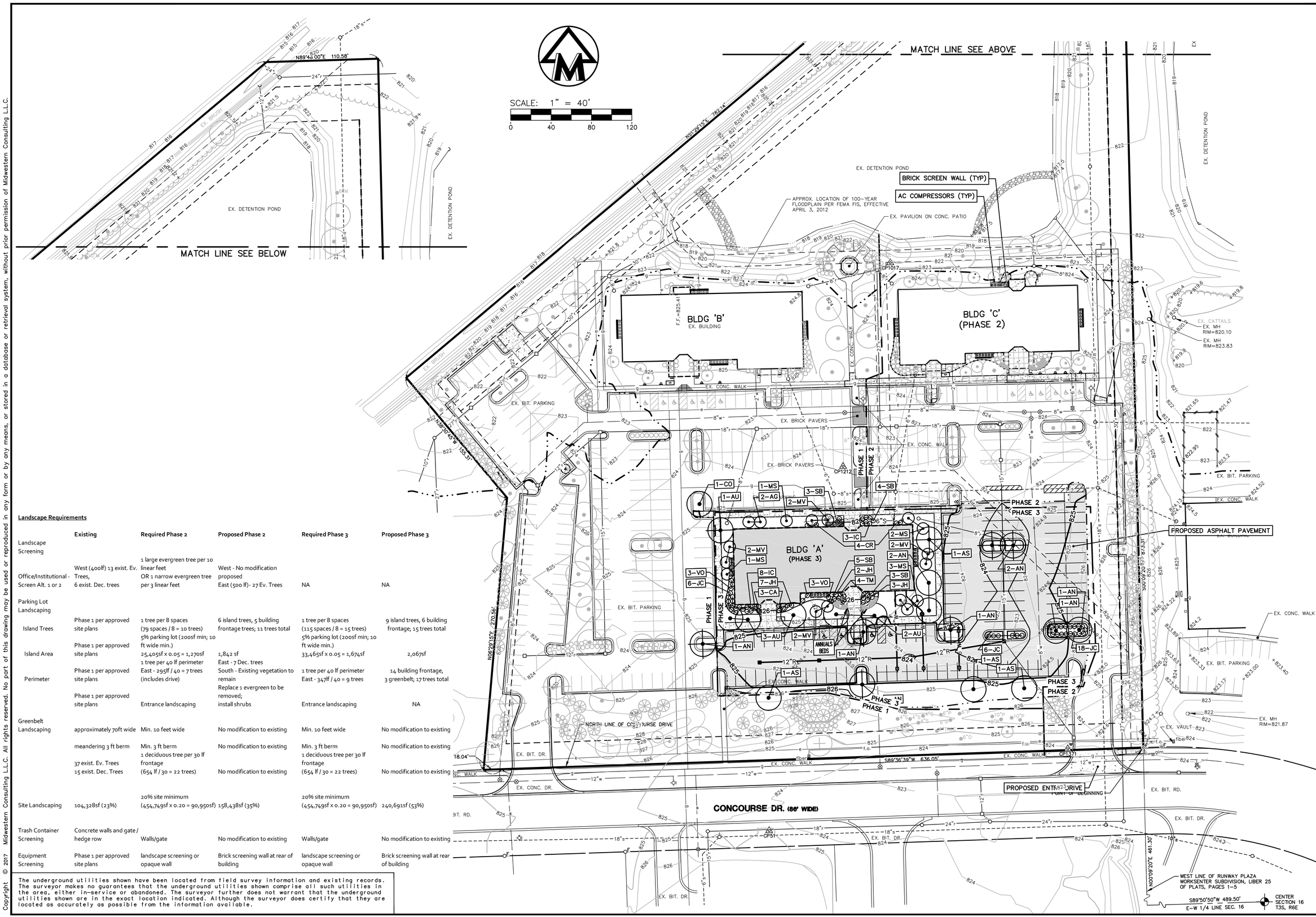

Landscape Requirements

	Existing	Required Phase 2	Proposed Phase 2	Required Phase 3	Proposed Phase 3
Landscape Screening					
Office/Institutional - Screen Alt. 1 or 2	West (400lf) 13 exist. Ev. Trees, 6 exist. Dec. trees	1 large evergreen tree per 10 linear feet OR 1 narrow evergreen tree per 3 linear feet	West - No modification proposed East (500 lf)- 27 Ev. Trees	NA	NA
Parking Lot Landscaping					
Island Trees	Phase 1 per approved site plans	1 tree per 8 spaces (79 spaces / 8 = 10 trees)	6 island trees, 5 building frontage trees; 11 trees total	1 tree per 8 spaces (115 spaces / 8 = 15 trees)	9 island trees, 6 building frontage; 15 trees total
Island Area	Phase 1 per approved site plans	5% parking lot (2005f min; 10 ft wide min.) 25,405sf x 0.05 = 1,270sf	1,842 sf	5% parking lot (200sf min; 10 ft wide min.) 33,465sf x 0.05 = 1,674sf	2,067sf
Perimeter	Phase 1 per approved site plans	1 tree per 40 lf perimeter East - 295lf / 40 = 7 trees (includes drive)	East - 7 Dec. trees South - Existing vegetation to remain	1 tree per 40 lf perimeter East - 347lf / 40 = 9 trees	14 building frontage, 3 greenbelt; 17 trees total
	Phase 1 per approved site plans	Entrance landscaping	Replace 1 evergreen to be removed; install shrubs	Entrance landscaping	NA
Greenbelt Landscaping	approximately 70ft wide	Min. 10 feet wide	No modification to existing	Min. 10 feet wide	No modification to existing
	meandering 3 ft berm	Min. 3 ft berm	No modification to existing	Min. 3 ft berm	No modification to existing
	37 exist. Ev. Trees 15 exist. Dec. Trees	1 deciduous tree per 30 lf frontage (654 lf / 30 = 22 trees)	No modification to existing	1 deciduous tree per 30 lf frontage (654 lf / 30 = 22 trees)	No modification to existing
Site Landscaping	104,328sf (23%)	20% site minimum (454,749sf x 0.20 = 90,950sf)	158,438sf (35%)	20% site minimum (454,749sf x 0.20 = 90,950sf)	240,691sf (53%)
Trash Container Screening	Concrete walls and gate / hedge row	Walls/gate	No modification to existing	Walls/gate	No modification to existing
Equipment Screening	Phase 1 per approved site plans	landscape screening or opaque wall	Brick screening wall at rear of building	landscape screening or opaque wall	Brick screening wall at rear of building

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.

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
LANDSCAPE PLAN – PHASE 3

20

DATE: 3/24/17
SHEET 20 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH: ----
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JOB No. 16295
REVISIONS:
REV. DATE

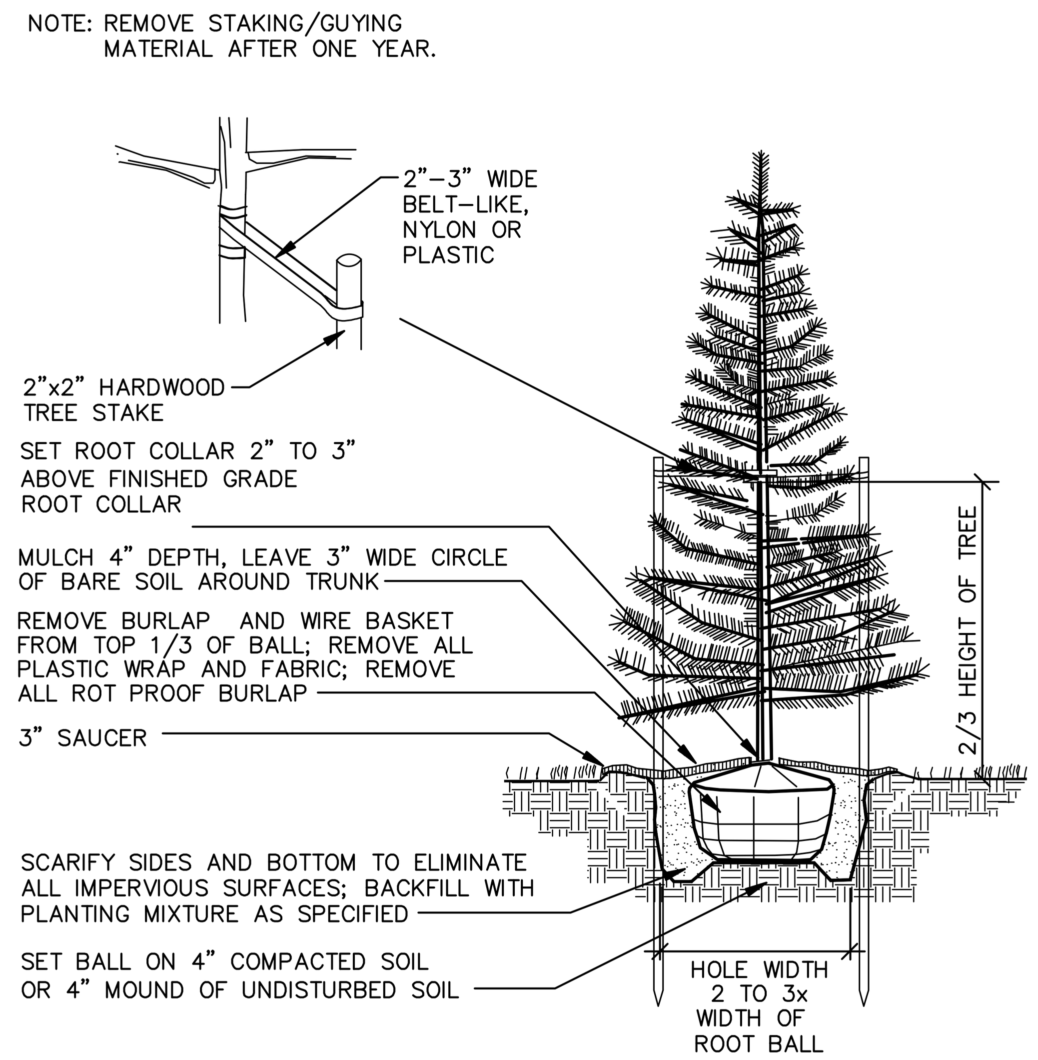
Landscape Maintenance Schedule

Perennial Beds				
Maintenance Task	Winter	Spring	Summer	Fall
Soil Testing				
Prune shade trees, summer flowering shrubs, hedges and groundcovers, check evergreen plants for removal of dead leaves				
Fertilize Trees and Shrubs, planting beds				
Clean flower beds, remove winter weeds and dead plant material left for winter interest				
Apply double shredded bark mulch to tree/shrub beds and ground leaf compost to flower beds				
Pressurize irrigation system and perform spring audit				
Remove all winter mulch from planting beds, Aerate soil with fork hoe				
Install new plantings, add compost during planting				
Water newly planted trees and shrubs				
Prune spring blooming shrubs immediately after flowering				
Prune wither damaged branches or plants that have not begun to grow after last frost				
Replace mulch as necessary				
Weed flower beds routinely				
Install summer annual flowers				
Cut back/pinch spring flowering plants as needed				
Inspect plants for pests and treat as necessary				
Thin out perennial beds and prune plants as needed				
Water beds as needed				
Deadhead spent blooms, deadleaf yellowing foliage				
Prune shrubs to maintain spacing in bed				
Add touch up mulch to planting beds				
Rake leaves, mow or shred for composting				
Clean up planting beds - remove yellowing foliage not left for winter interest, remove stakes/hoops				
Top-dress planting beds with organic matter if not done in spring				
Turn off irrigation system and flush out				
Winter mulch tender plants once ground is frozen				

Turfgrass Areas				
Maintenance Task	Winter	Spring	Summer	Fall
Remove wet leaves, fallen branches/twigs				
Apply pre-emergent crabgrass control herbicide to cool season turfgrass				
Fertilize lawn				
Pressurize irrigation system and perform spring audit				
Aerate lawn as needed (every two years)				
Inspect for grubs, treat as needed				
Hand remove weeds, Spot application of herbicide if necessary				
Weekly mowing of turfgrass (when reaches height of 2.5 to 3 in.), leave grass clippings, remove clumps				
Bi-weekly edging of turfgrass				
Deep water lawn areas (~1 inch per week)				
Prepare and seed bare areas				
Water newly seeded areas				
Rake leaves or mow and leave for composting				
Fertilize lawn				
Turn off irrigation system and flush out				
Routinely remove debris such as leaves, twigs, trash, etc.				

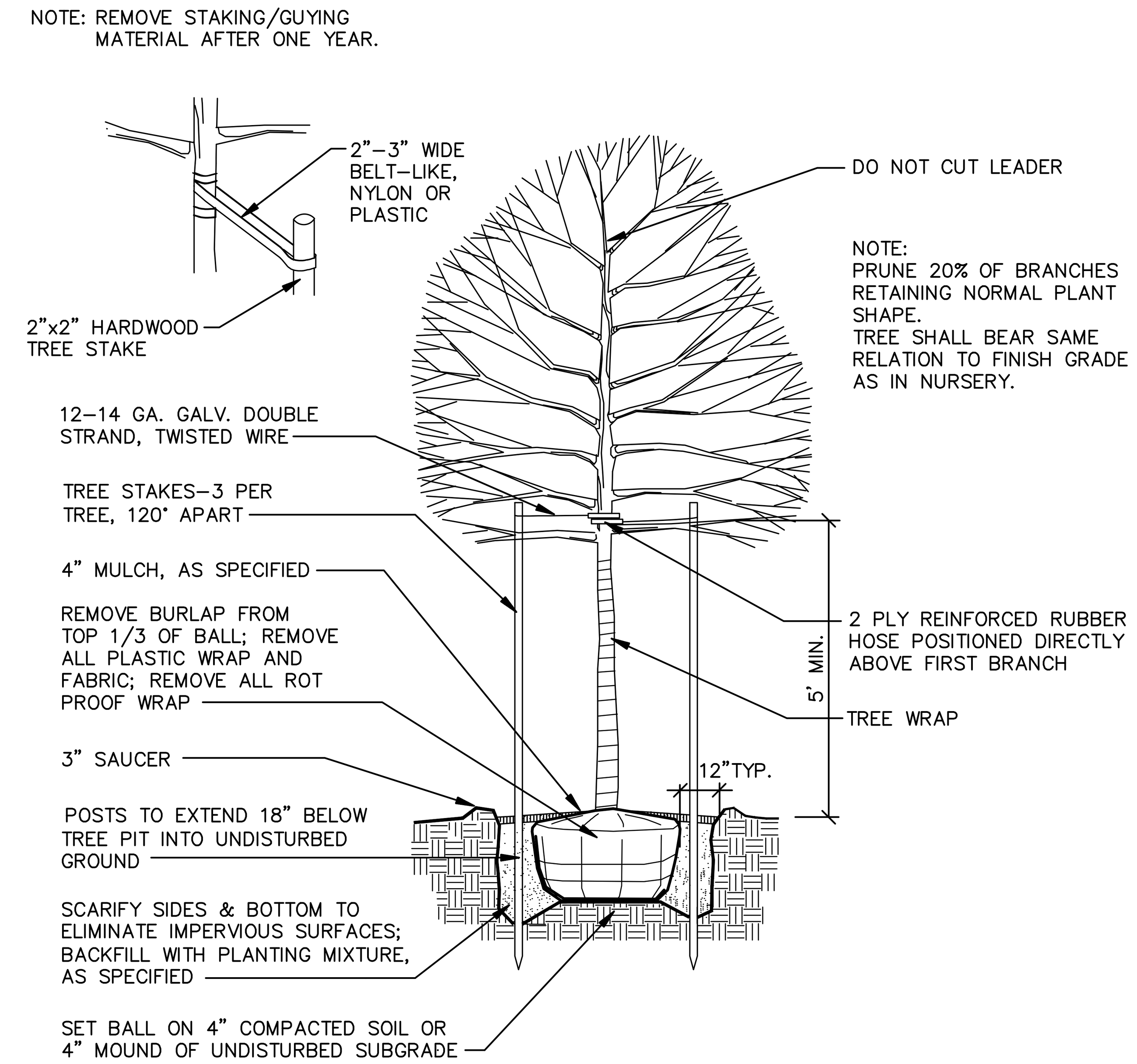
PLANT SCHEDULE

Total	Ph. 2 Parking Lot / Entrance	Ph. 2 Screening	Ph. 2 Site Landscaping	Ph. 3 Parking Lot	Ph. 3 Site Landscaping	Code	Scientific Name	Common Name	Root	Size	Spacing	Notes
18	8			2	8	AN	Acer rubrum 'Northwood'	Northwood Red Maple	B&B	2.5" cal.	As Shown	6' branch height
4				3	1	AS	Acer saccharum	Sugar Maple	B&B	2.5" cal.	As Shown	6' branch height
10			4	6		AU	Acer saccharum 'Columnare'	Upright Sugar Maple	B&B	2.5" cal.	As Shown	6' branch height
4			2		2	AG	Amelanchier x grandiflora 'Autumn Brilliance'	Autumn Brilliance Serviceberry	B&B	2" cal.	As Shown	
5	4			1		CO	Celtis occidentalis	Northern Hackberry	B&B	2.5" cal.	As Shown	6' branch height
8			4		4	CR	Cornus alba 'Regnzam'	Red Gnome Siberian Dogwood	Cont	24" ht	4' o.c.	
12	12					CS	Cornus alba 'Sibirca Ruby'	Ruby Siberian Dogwood	Cont	36" ht	4' o.c.	
6			3		3	CA	Cotoneaster apiculata	Cranberry Cotoneaster	Cont	18" ht	4' o.c.	
21			10		11	IC	Ilex crenata 'Hetzii'	Large Convex Leaved Holly	Cont	18" ht	4' o.c.	
60	24		6		30	JC	Juniperus chinensis 'Sea Green'	Sea Green Juniper	B&B	24" spread	4' o.c.	
26			14		12	JH	Juniperus horizontalis 'Plumosa Youngstown'	Youngstown Andolla Juniper	Cont	18" spread	4' o.c.	
10			3		7	MS	Malus 'Spring Snow'	Spring Snow Crab	B&B	2" cal.	As Shown	
13			5		8	MV	Malus 'Velvet Pillar'	Velvet Pillar Crab	B&B	2" cal.	As Shown	
18	1	17				PG	Picea omorika	Serbian Spruce	B&B	6' ht	As Shown	
10		10				PN	Pinus resinosa	Red Pine	B&B	6' ht	As Shown	
1	1					QR	Quercus rubra	Northern Red Oak	B&B	2.5" cal.	As Shown	6' branch height
24			9		15	SB	Spiraea x bumalda 'Anthony Waterer'	Anthony Waterer Spiraea	B&B	24" ht	4' o.c.	
8			4		4	TM	Taxus x media 'Everlow'	Everlow Yew	B&B	18" spread	4' o.c.	
12			6		6	VO	Viburnum opulus 'Compactum'	Compact European Cranberry	B&B	24" ht	5' o.c.	



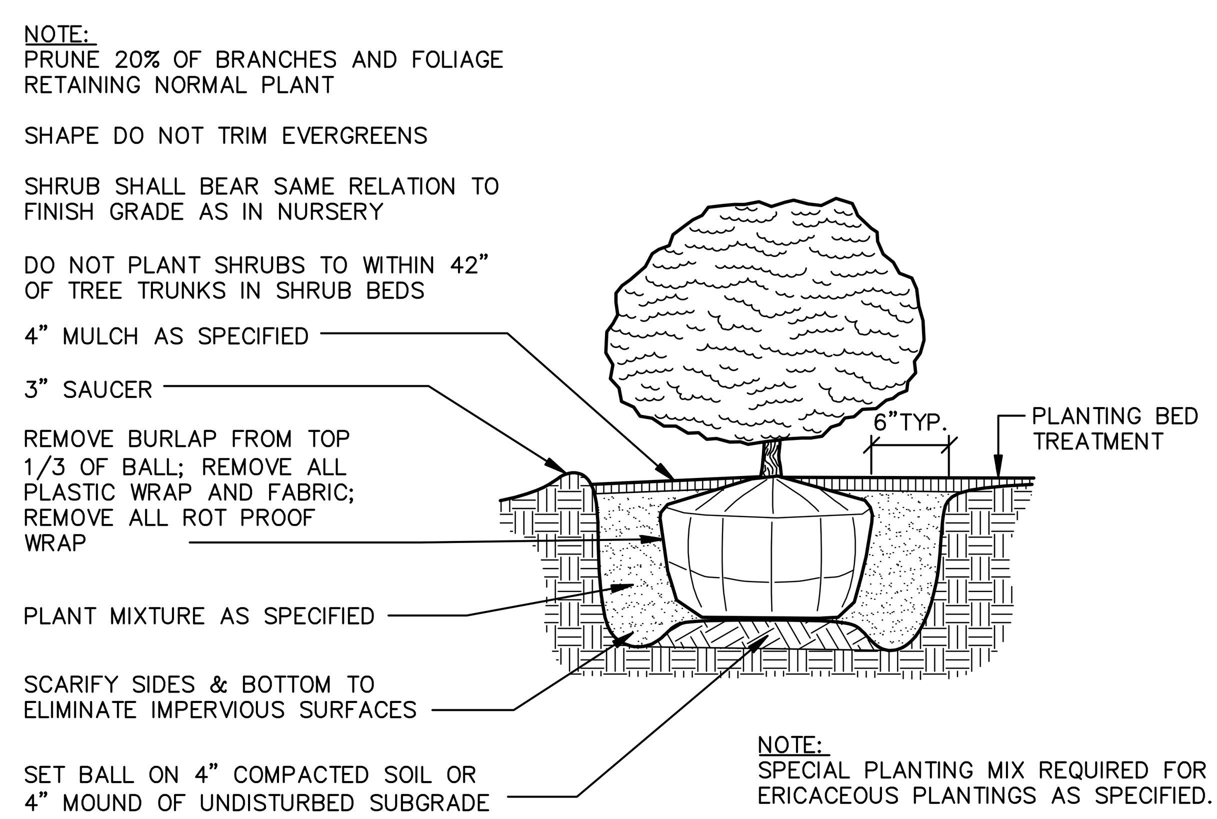
EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE



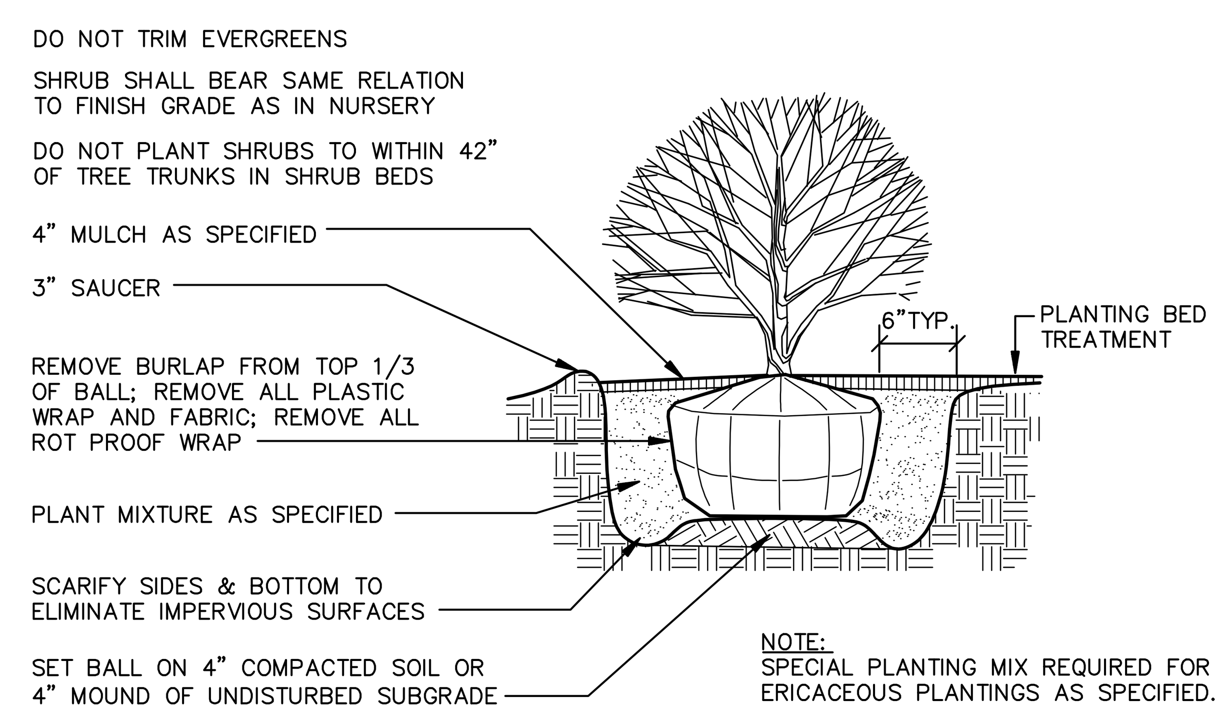
DECIDUOUS TREE PLANTING DETAIL

2–1/2" CAL. OR SMALLER



EVERGREEN SHRUB PLANTING DETAIL

NOT TO SCALE



SHRUB PLANTING DETAIL

NOT TO SCALE

LANDSCAPE NOTES

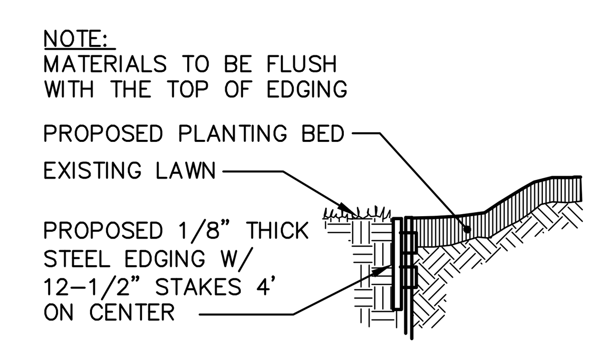
1. Plant materials shall be selected and installed in accordance with standards established by Pittsfield Township.
2. In-ground automatic irrigation shall be provided for all landscaped areas except for the detention basin and naturalized wetland buffer.
3. All diseased, damaged or dead material shown on the site plan as proposed plantings shall be replaced by the end of the following growing season.
4. Restore disturbed areas with a minimum of four (4) inches of topsoil and then seed/fertilize/mulch.
5. All disturbed areas not to be seeded with native seed mix shall be lawn areas. Fertilizer for the initial installation of lawns shall provide not less than one (1) pound of actual nitrogen per 1,000 sq ft of lawn area and shall contain not less than two percent (2%) potassium and four percent (4%) phosphoric acid.
   Lawn (turfgrass) seed mix shall consist of:
   - 15% Rugby Kentucky Bluegrass
   - 10% Park Kentucky Bluegrass
   - 40% Ruby Creeping Red Fescue
   - 15% Pennifine Perennial Ryegrass
   - 20% Scaldis Hard Fescue

   Seed shall be applied at a rate of five pounds (5 lbs) per 1000 sq ft. Mulch within 24 hours with two (2) tons of straw per acre, or 71 bales of excelsior mulch per acre. Anchor straw mulch with spray coating of adhesive material applied at the rate of 150 gals. / acre.
6. After the first growing season, only fertilizers that contain NO phosphorus shall be used on the site.
7. Any disturbed areas within detention basin and side slopes shall be seeded with native grass seed mix below.

Native Grass Seed Mix		
Botanical Name	*Common Name*	*Application*
Andropogon gerardii	Big Blue -Stem	8 oz/acre
Carex vulpinoidea	Fox Sedge	4 oz/acre
Elymus canadensis	Canada Wild Rice	8 oz/acre
Koeleria cristata	Prairie June Grass	1 lbs/acre
Panicum virgatum	Switch Grass	2 lbs/acre
Schizachyrium scoparium	Little Blue Stem	1.5 lbs/acre
Lolium multiflorum	Annual Rye	200 lbs/acre

A bi-annual, mowable, semi-natural, cool-season seed mix suited for basin bottom and side slopes.

8. All seeded areas with slopes less than 1:3 (one vertical foot for every 3 horizontal feet) shall be mulched with straw mulch at the rate of two (2) bales per 1,000 square feet. All seeded areas with slopes greater than 1:3 shall be seeded and biodegradable erosion control blanket North American Green SC150, or equivalent, shall be applied with biodegradable stakes.
9. Deciduous plants shall be planted between March 1 and May 15 and from October 1 until the prepared soil becomes frozen. Evergreen plants shall be planted between March 1 and June 1 and from August 15 to September 15.
10. Native seeding areas shall be seeded after May 1, (when soil is free of frost and in workable condition), but before June 15 or after October 1, but before November 30 (or prior to ground freezing) or as approved by Landscape Architect. Annual cover crop shall be seeded until appropriate permanent seeding time.
11. All planting beds are to receive four (4) inches of shredded bark mulch.
12. All trees to be located a minimum of 10 feet from public utilities.
13. All single trunk, deciduous trees shall have a straight and a symmetrical crown with a central leader. One sided trees or those with thin or open crowns shall not be accepted.
14. All evergreen trees shall be branched fully to the ground, symmetrical in shape and have not been sheared in the last three (3) growing seasons.
15. All compacted subgrade soils in proposed landscape areas shall be tilled to a minimum 12-inch depth prior to placement of topsoil, geotextile fabric, or other planting media as specified.
16. Proposed trees will be planted a minimum of 12 feet apart.
17. Planting Soil: Existing, in-place or stockpiled topsoil. Supplement with imported topsoil as needed. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments to produce planting soil:
    a. Ratio of Loose Compost to Topsoil by Volume: 1:4.
    b. Weight of Lime per 1000 Sq. Ft.: Amend with lime only on recommendation of soil test to adjust soil pH.
    c. Weight of Sulfur or Aluminum Sulfate per 1,000 Sq. Ft.: Amend with sulfur or aluminum sulfate only on recommendation of soil test to adjust soil pH.
    d. Volume of Sand: Amend with sand only on recommendation of Landscape Architect to adjust soil texture.
    e. Weight of Slow-Release Fertilizer per 1,000 Sq. Ft.: Amend with fertilizer only on recommendation of soil test to adjust soil fertility.



STEEL EDGING DETAIL

NOT TO SCALE

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
LANDSCAPE DETAILS

21

JOB No. **16295**

DATE: 3/10/2017
SHEET 21 OF 39
CADD: WAJ
ENG: JAM
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TECH:
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FB#460

REVISIONS:	REV. DATE
WCWRC REV 2	3/10/2017
TWP REV 1	3/24/17

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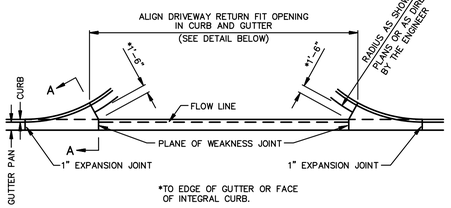
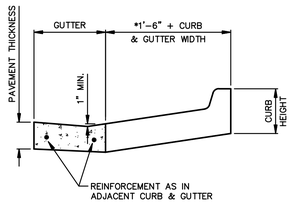
SIDEWALK RAMP – FOLLOW MDOT R-28J (EXCEPT NO TRUNCATED DOMES)

ALL GRADES IN MDOT DETAIL MUST BE MET IN THE AS-CONSTRUCTED RAMPS
ANY RAMPS FOUND TO BE IN NON-COMPLIANCE MUST BE REPLACED AND MADE COMPLIANT



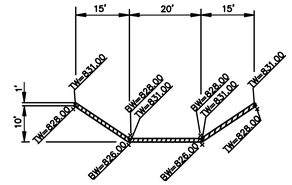
PLAN VIEW



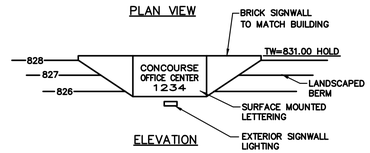
SECTION A-A

CONCRETE DRIVEWAY OPENING – DETAIL M
(MDOT DETAIL II-29I)

NO SCALE

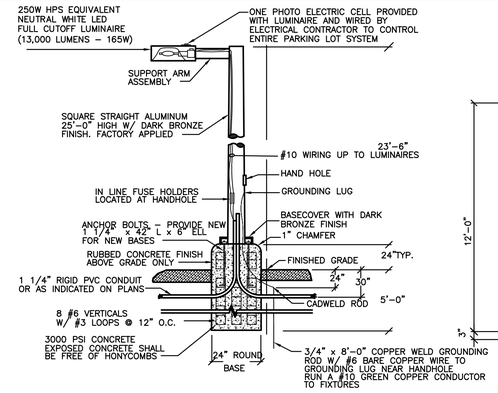


PLAN VIEW

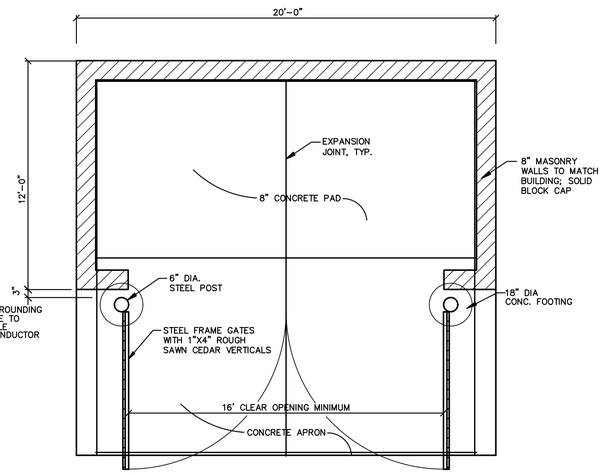


ELEVATION

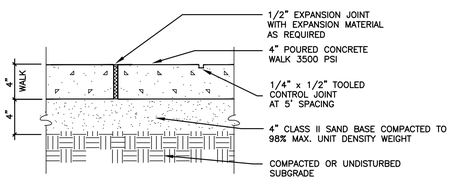
EXISTING OFFICE PARK SIGN DETAIL
FOR REFERENCE ONLY



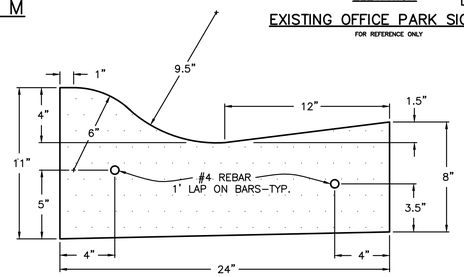
STREETLIGHT AND FOOTING DETAIL
NOT TO SCALE



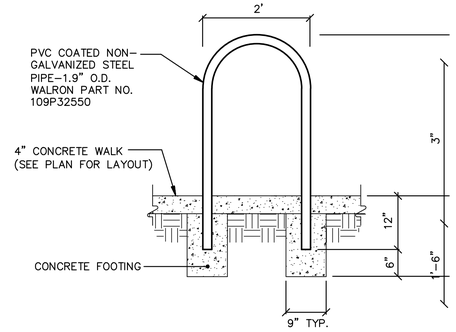
EXISTING TRASH AREA PLAN
FOR REFERENCE ONLY



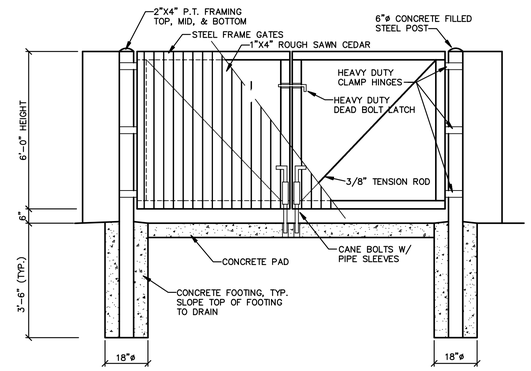
CONCRETE SIDEWALK DETAIL
NO SCALE



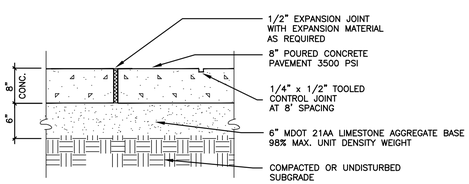
MOUNTABLE CONCRETE CURB & GUTTER
NOT TO SCALE



BIKE HOOP (PROFILE VIEW)
NOT TO SCALE



EXISTING TRASH AREA ELEVATION
FOR REFERENCE ONLY



HEAVY-DUTY CONCRETE DETAIL
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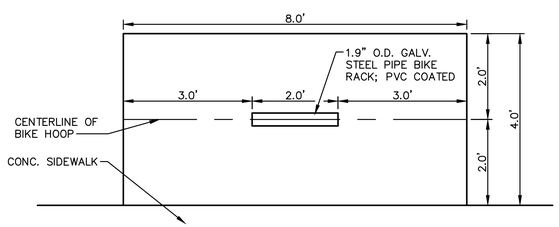
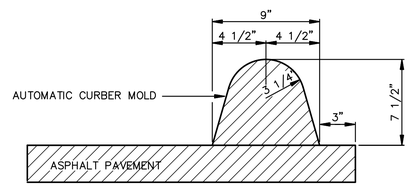


BIKE HOOP (PLAN VIEW)
NOT TO SCALE



TEMPORARY ASPHALT CURB
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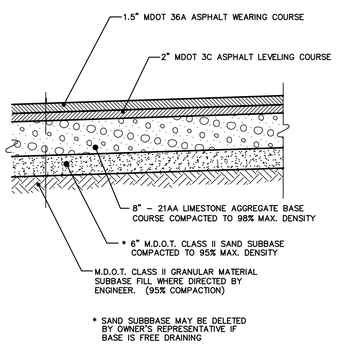

BITUMINOUS PAVEMENT SECTION
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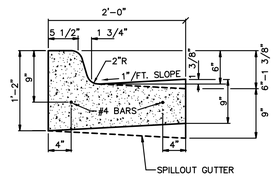

CONCRETE CURB & GUTTER
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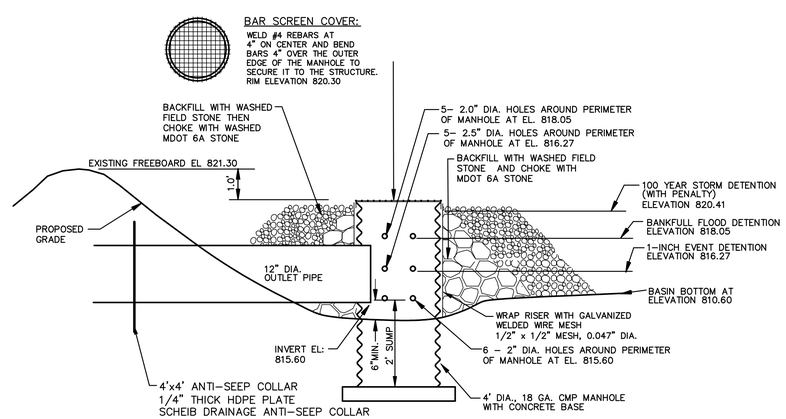

OUTLET CONTROL STRUCTURE DETAIL
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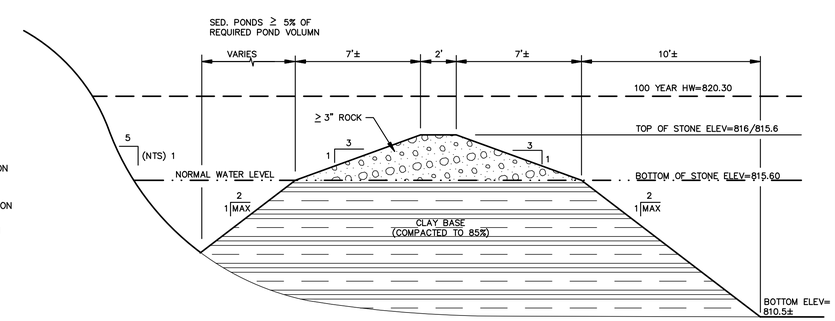

EXISTING SEDIMENT POND SEDIMENT BERM/FILTER SECTION
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CONCOURSE OFFICE CENTER
PRELIMINARY & FINAL SITE PLAN
MISCELLANEOUS SITE DETAILS

22

DATE: 3/10/2017
SHEET 22 OF 39
CADD: WAJ
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REVISIONS:	REV.	DATE
WCWRC REV 1		3/16/2017
WCWRC REV 2		3/24/17
TWP REV 1		

JOB No. 16295

REV. PER TWP. 9-21-01

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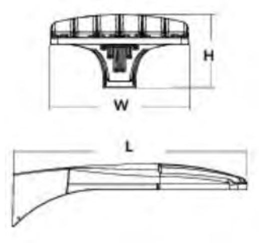
D-Series Size 0
LED Area Luminaire



Catalog Number

Notes

Type

Specifications

EPA:	0.8 ft² (.07 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)

Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment.

The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire. The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX0 LED 40C 1000 40K T3M MVOLT SPA DDBXD

DSX0 LED

Series	LEDs	Drive current	Color temperature	Distribution	Voltage	Mounting
DSX0 LED	**Forward optics** 20C 20 LEDs (one engine); 40C 40 LEDs (two engines); **Rotated optics**[1] 30C 30 LEDs (one engine)	530 530 mA; 700 700 mA; 1000 1000 mA (1A)[2]	30K 3000 K; 40K 4000 K; 50K 5000 K; AMBPC Amber phosphor converted[3]	T1S Type I short; T2S Type II short; T2M Type II medium; T3S Type III short; T3M Type III medium; T4M Type IV medium; TFTM Forward throw medium; T5VS Type V very short; T5S Type V short; T5M Type V medium; T5W Type V wide	MVOLT[4]; 120[4]; 208[4]; 240[4]; 277[4]; 347[5]; 480[5]	**Shipped included** SPA Square pole mounting; RPA Round pole mounting; WBA Wall bracket; SPUMBA Square pole universal mounting adaptor[6]; RPUMBA Round pole universal mounting adaptor[6]; **Shipped separately**[7] KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)

Control options		Other options	Finish
Shipped installed PER NEMA twist-lock receptacle only (no controls)[8]; PER5 Five-wire receptacle only (no controls)[8,9]; PER7 Seven-wire receptacle only (no controls)[8,9]; DMG 0-10V dimming driver (no controls)[10]; DCR Dimmable and controllable via ROAM® (no controls)[11]; PIR Motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc[12]; PIRH Motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc[12]	PIR1FC3V Motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc[12]; PIRH1FC3V Motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc[12]; BL30 Bi-level switched dimming, 30%[5,13]; BL50 Bi-level switched dimming, 50%[5,13]; PNMTDD3 Part night, dim till dawn[14]; PNMT5D3 Part night, dim 5 hrs[14]; PNMT6D3 Part night, dim 6 hrs[14]; PNMT7D3 Part night, dim 7 hrs[14]	**Shipped installed** HS House-side shield[15]; SF Single fuse (120, 277, 347V)[17]; DF Double fuse (208, 240, 480V)[17]; L90 Left rotated optics[1]; R90 Right rotated optics[1]; DDL Diffused drop lens[15]	DDBXD Dark bronze; DBLXD Black; DNAXD Natural aluminum; DWHXD White; DDBTXD Textured dark bronze; DBLBXD Textured black; DNATXD Textured natural aluminum; DWHGXD Textured white

Accessories
Ordered and shipped separately.

Controls & Shields

DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V)[18]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V)[18]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V)[18]
SCU	Shorting cap[18]
DSX0HS 20C U	House-side shield for 20 LED unit[16]
DSX0HS 30C U	House-side shield for 30 LED unit[16]
DSX0HS 40C U	House-side shield for 40 LED unit[16]
DSX0DDL U	Diffused drop lens (polycarbonate)[16]
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish)
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish)[7]

For more control options, visit DTL and ROAM online.

NOTES
1. 30 LEDs (30C option) and rotated options (L90 or R90) only available together.
2. 1000mA not available with AMBPC.
3. AMBPC only available with 530mA or 700mA.
4. MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120V, 208V, 240V or 277V options only when ordering with fusing (SF, DF options).
5. Not available with single board, 530mA product (20C 530 or 30C 530). Not available with BL30, BL50 or PNMT options.
6. Available as a separate combination accessory: PUMBA (finish) U; 1.5 G vibration load rating per ANCI C136.31.
7. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" mast arm (not included).
8. Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories.
9. If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Not available with DCR.
10. DMG option for 347V or 480V requires 1000mA.
11. Specifies a ROAM® enabled luminaire with 0-10V dimming capability; PER option required. Additional hardware and services required for ROAM® deployment; must be purchased separately. Call 1-800-442-6745 or email: sales@roamservices.net. N/A with PER5, PER7, BL30, BL50 or PNMT options.
12. PIR and PIR1FC3V specify the SensorSwitch SBGR-10-ODP control; PIRH and PIRH1FC3V specify the SensorSwitch SBGR-6-ODP control; see Motion Sensor Guide for details. Dimming driver standard. Not available with PER5 or PER7. Ambient sensor disabled when ordered with DCR. Separate on/off required.
13. Requires an additional switched circuit.
14. Dimming driver standard. MVOLT only. Not available with 347V, 480V, DCR, PER5, PER7 or PNMT options.
15. Dimming driver standard. MVOLT only. Not available with 347V, 480V, DCR, PER5, PER7, BL30 or BL50.
16. Also available as a separate accessory; see Accessories information.
17. Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V.
18. Requires luminaire to be specified with PER option. Ordered and shipped as a separate line item from Acuity Brands Controls.

LITHONIA LIGHTING. One Lithonia Way • Conyers, Georgia 30012 • Phone: 800.279.8041 • Fax: 770.918.1209 • www.lithonia.com

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DSX0 LED Rev. 10/27/15 Page 1 of 4

Project Name:	
Catalog Number:	Fixture Type:
Volts/Watts:	Lamps/Board:

ILP

FULL CUTOFF FORWARD THROW - 40W LED
WALL PACK

REPLACES 150W MH

FEATURES
- Die Cast Aluminum Housing
- Hinged Full Cutoff Front Frame
- ½" Coin Plugs with O-rings for Conduit & Photocell
- Textured Architectural Bronze Powdercoat Finish Over a Chromate Conversion Coating
- Forward Throw Optic Lens
- Cast-in Template for Mounting Directly Over a 4" Recessed Outlet Box
- 40W, 5000K (Std)
- ETL Listed for Wet Locations
- Meets Dark Sky Requirements
- Custom Colors Available Upon Request
- DesignLights Consortium® Qualified [2]

LED SYSTEM

Board (CREE Chips)	4 x 6
Calculated L_{70} (TM-21)	380,000 hours [1]
Delivered Lumens	3,602 lm
Total Input Watts	42.43 W
Luminaire Efficacy Rating (LER)	84.89 lm/W
Correlated Color Temperature (CCT)	5000 K
Color Rendering Index (CRI)	76.4
Max Ambient Temp	125° F
Universal Driver	120-277 V

LED System data above based on WPCS-40WLED-UNIV5000K
[1] LED Lumen Maintenance Estimates based on TM-21 projections for the light source at 25°C ambient
[2] Specific Configurations Listed on DLC

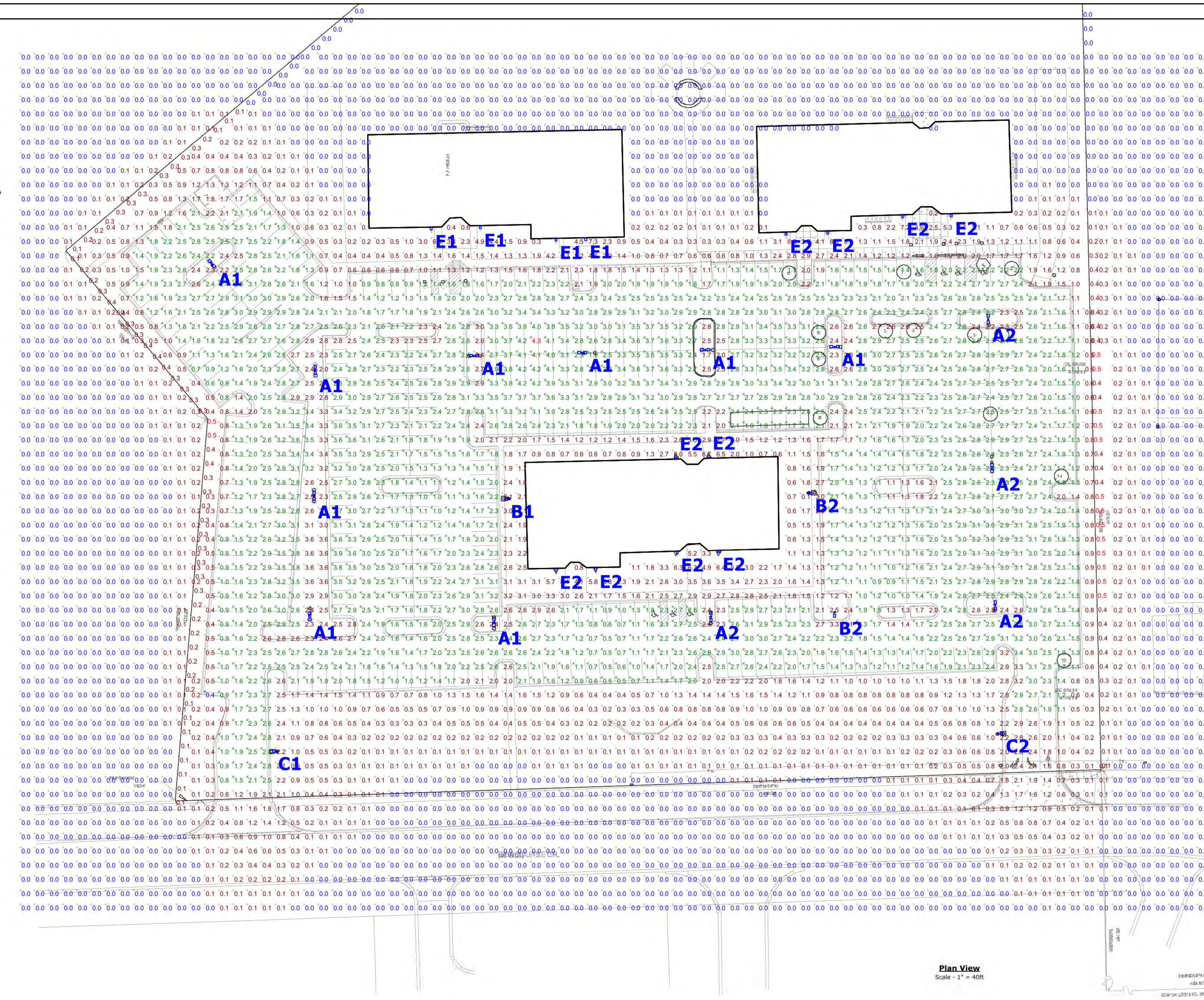
SUITABLE APPLICATIONS
- Parking lots
- Buildings
- General area lighting

Ordering Guide

WPCS	40WLED	UNIV	5000K	
Series	**LED**	**Driver**	**Color**	**Options**
☐ WPCS Full Cutoff Wall Pack	☐ 40WLED 4x6 Board	☐ UNIV 120-277 Driver	☐ 4000K ☐ 5000K*	☐ WPC15Y Adjustable Yoke; ☐ WPC15LG Clear PC Vandal Resistant Guard; ☐ WPC15WG Wire Guard, SS Construction; ☐ CORDx Cord (x = ft); ☐ DIM 0-10V Dimmable Driver; ☐ USDC User Selectable Dimming Control; ☐ PCxxx Photocell (xxx = Voltage)

*DLC Listed Configuration

www.ilp-inc.com   Industrial Lighting Products   407-478-8759



GENERAL NOTE
1. SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
2. SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
3. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: GRADE.

THE ENGINEER AND/OR ARCHITECT MUST DETERMINE APPLICABILITY OF THE LAYOUT TO EXISTING / FUTURE FIELD CONDITIONS. THIS LIGHTING LAYOUT REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRE MAY VARY DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS, AND OTHER VARIABLE FIELD CONDITIONS. MOUNTING HEIGHTS INDICATED ARE FROM GRADE AND/OR FLOOR UP.

THESE LIGHTING CALCULATIONS ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM SUITABILITY AND SAFETY. THE ENGINEER AND/OR ARCHITECT IS RESPONSIBLE TO REVIEW FOR MICHIGAN ENERGY CODE AND LIGHTING QUALITY COMPLIANCE.

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
OVERALL PARKING AREA	⋇	2.3 fc	4.3 fc	0.4 fc	10.8:1	5.8:1	0.5:1
WEST / EAST PROPERTY LINE	+	0.2 fc	0.5 fc	0.0 fc	N/A	N/A	0.4:1

Luminaire Schedule - Existing Location/ Pole

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens per Lamp	LLF	Wattage	Mounting Height
	A1	9	Lithonia Lighting	DSX0 LED 40C 1000 50K T5M MVOLT	DSX0 LED with 40 LEDs @1000 mA , 5000K, Type 5 Medium Optics	LED	1	DSX0_LED_40C_1000_50K_T5M_MVOLT.ies	16075	0.93	276	25'-0"
	B1	1	Lithonia Lighting	DSX0 LED 40C 1000 50K T4M MVOLT	DSX0 LED with 40 LEDs @1000 mA , 5000K, Type 4 Medium Optics	LED	1	DSX0_LED_40C_1000_50K_T4M_MVOLT.ies	15308	0.93	138	25'-0"
	C1	1	Lithonia Lighting	DSX0 LED 40C 1000 50K T2M MVOLT	DSX0 LED with 40 LEDs @1000 mA , 5000K, Type 2 Medium Optics	LED	1	DSX0_LED_40C_1000_50K_T2M_MVOLT.ies	14986	0.93	138	25'-0"
	E1	4	INDUSTRIAL LIGHTING	WPCS-40WLED-UNIV 5000K	SMALL CUT-OFF WALLPACK. Full Cutoff Forward Throw	LED	1	WPCS-40WLED-UNIV.ies	3602	0.93	42.4	10'-0"

Luminaire Schedule - New Location/ Pole

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens per Lamp	LLF	Wattage	Mounting Height
	A2	4	Lithonia Lighting	DSX0 LED 40C 1000 50K T5M MVOLT	DSX0 LED with 40 LEDs @1000 mA , 5000K, Type 5 Medium Optics	LED	1	DSX0_LED_40C_1000_50K_T5M_MVOLT.ies	16075	0.93	276	25'-0"
	B2	2	Lithonia Lighting	DSX0 LED 40C 1000 50K T4M MVOLT	DSX0 LED with 40 LEDs @1000 mA , 5000K, Type 4 Medium Optics	LED	1	DSX0_LED_40C_1000_50K_T4M_MVOLT.ies	15308	0.93	138	25'-0"
	C2	1	Lithonia Lighting	DSX0 LED 40C 1000 50K T2M MVOLT	DSX0 LED with 40 LEDs @1000 mA , 5000K, Type 2 Medium Optics	LED	1	DSX0_LED_40C_1000_50K_T2M_MVOLT.ies	14986	0.93	138	25'-0"
	E2	10	INDUSTRIAL LIGHTING	WPCS-40WLED-UNIV 5000K	SMALL CUT-OFF WALLPACK. Full Cutoff Forward Throw	LED	1	WPCS-40WLED-UNIV.ies	3602	0.93	42.4	10'-0"

CONCOURSE OFFICE CENTER
PHOTOMETRIC SITE PLAN
PREPARED FOR: MIDWESTERN CONSULTING
GASSER BUSH ASSOCIATES
WWW.GASSERBUSH.COM

Designer
LLB/AAM
Date
2/13/2017
rev 3/10/2017
Scale
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1 of 1

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(248) 855-8110

CONCOURSE OFFICE CENTER
PRELIMINARY & FINAL SITE PLAN
PHOTOMETRIC LIGHTING PLAN – PHASES 2 & 3

23

DATE: 2/15/17
SHEET 23 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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FB#460

JOB No. **16295**

REVISIONS:	REV. DATE
TWP REV 1	3/24/17

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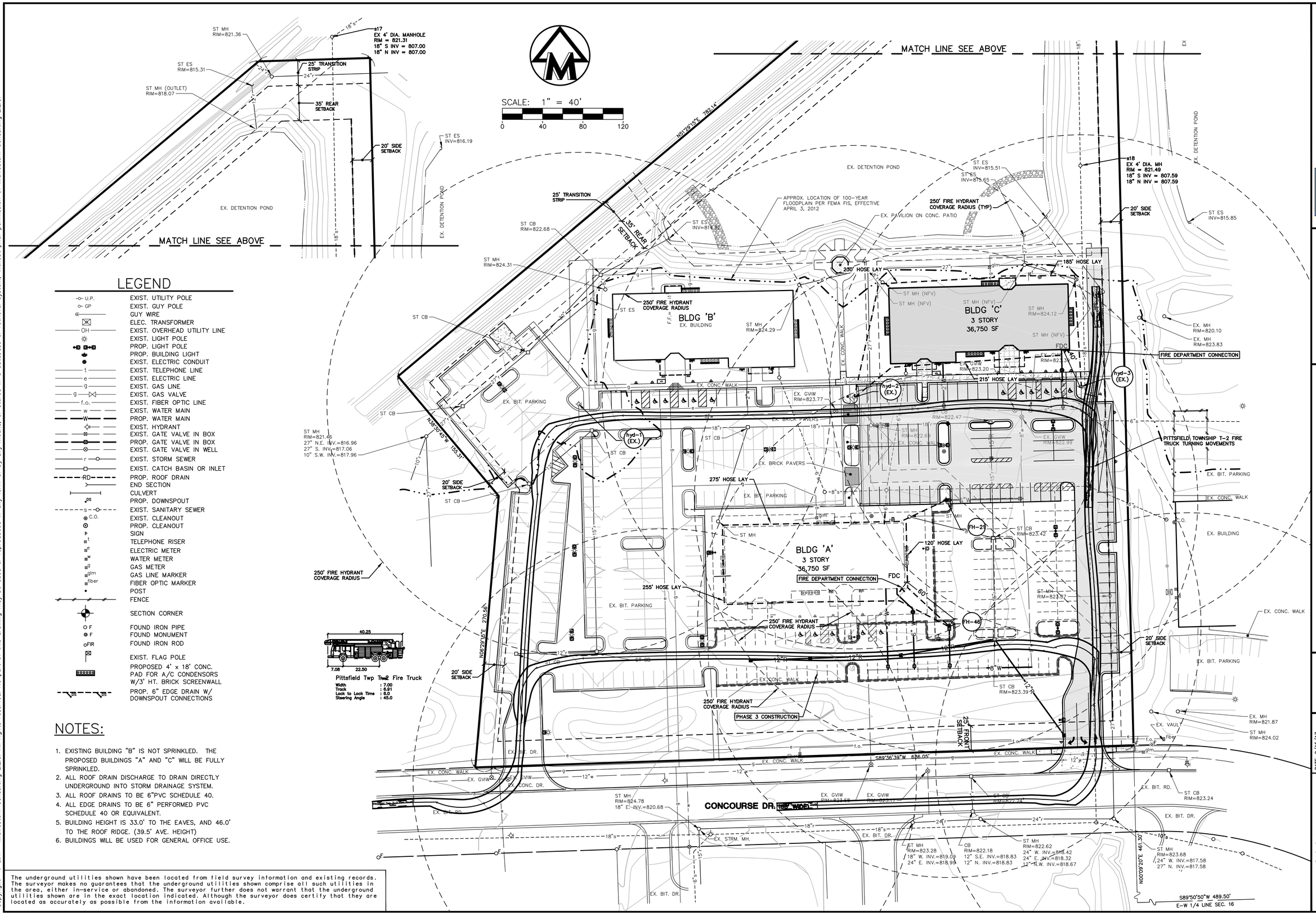

LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
RD	PROP. ROOF DRAIN
	END SECTION
	CULVERT
DS	PROP. DOWNSPOUT
s	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
DS DS	PROP. 6" EDGE DRAIN W/ DOWNSPOUT CONNECTIONS

NOTES:

1. EXISTING BUILDING "B" IS NOT SPRINKLED. THE PROPOSED BUILDINGS "A" AND "C" WILL BE FULLY SPRINKLED.
2. ALL ROOF DRAIN DISCHARGE TO DRAIN DIRECTLY UNDERGROUND INTO STORM DRAINAGE SYSTEM.
3. ALL ROOF DRAINS TO BE 6"PVC SCHEDULE 40.
4. ALL EDGE DRAINS TO BE 6" PERFORMED PVC SCHEDULE 40 OR EQUIVALENT.
5. BUILDING HEIGHT IS 33.0' TO THE EAVES, AND 46.0' TO THE ROOF RIDGE. (39.5' AVE. HEIGHT)
6. BUILDINGS WILL BE USED FOR GENERAL OFFICE USE.

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.

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(248) 855-8110

CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
FIRE PROTECTION PLAN – PHASES 2 & 3

24

DATE: 2/15/17
SHEET 24 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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JOB No. 16295

REVISIONS:
TWP REV 1 — REV. DATE 3/24/17

DELIVERY NARRATIVE & LOADING SPACE WAIVER REQUEST

PITTSFIELD TOWNSHIP'S ZONING ORDINANCE ALLOCATES LOADING SPACES BASED UPON THE SQUARE FOOTAGE OF BUILDINGS, AND TREATS OFFICE AND RETAIL EQUIVALENTLY. BASED UPON THE ORDINANCE, EACH BUILDING OF THIS DEVELOPMENT WOULD REQUIRE TWO LOADING SPACES (SIX TOTAL), OR IF THE SQUARE FOOTAGE WAS GROUPED TOGETHER, THE DEVELOPMENT WOULD REQUIRE FOUR LOADING SPACES.

HOWEVER, THE EXISTING AND PROPOSED USE OF THIS DEVELOPMENT IS OFFICE ONLY, WITH NO WAREHOUSING, MERCHANDISING, OR RETAIL SALES. AS SUCH, THERE IS VERY LITTLE DEMAND FOR DELIVERIES IN THE EXISTING OR PROPOSED USES, AND WE ARE REQUESTING A WAIVER TO INSTALL ONLY 1 LOADING SPACE, WHICH IS LOCATED 117' AND 279' AWAY FROM THE CLOSEST ENTRANCES OF THE PROPOSED BUILDINGS, AND 344' AWAY FROM THE CLOSEST ENTRANCE OF THE EXISTING BUILDING (WHICH CURRENTLY FUNCTIONS ADEQUATELY WITHOUT ANY LOADING SPACES).

PRESENTLY THE MAXIMUM TYPICAL TRUCK LOADING DAILY DEMAND IS TWO FEDEX, TWO UPS, AND TWO OTHER DELIVERY TRUCKS DAILY. TRIPLING THE NON-FEDEX/UPS DELIVERIES TO ACCOUNT FOR THE FULL-BUILDOUT OF THREE BUILDINGS COMES TO A TOTAL OF TEN DELIVERY TRUCKS DAILY, OR ABOUT ONE PER HOUR DURING BUSINESS HOURS. SMALLER DELIVERY VANS DO SERVICE THE COMPLEX, BUT THEY PARK IN STANDARD SPACES. AS SUCH, WE BELIEVE THAT ONE DELIVERY SPACE IS ADEQUATE FOR THE PROPERTY, AND WE HAVE PLACED IT IN THE NORTHEAST CORNER OF THE PARKING LOT.

WE ARE ALSO PROPOSING THE USE OF A WB-40 DESIGN VEHICLE AND TURNING TEMPLATE FOR THE DELIVERY TRUCK INSTEAD OF THE SLIGHTLY LARGER WB-50 VEHICLE. WE PROPOSE THIS BECAUSE WB-50 VEHICLES HAVE NEARLY DISAPPEARED FROM THE ROADWAY, AND THE WB-50 VEHICLE HAS BEEN REMOVED FROM THE AASHTO DESIGN MANUAL. INSTEAD, THE TWO MOST COMMON TRAILER TRUCKS ARE THE WB-40 (33' TRAILER) AND THE WB-67 (53' TRAILER)

THE WB-40 VEHICLE IS THE TYPICAL DELIVERY VEHICLE FOUND ON SUBURBAN STREETS AWAY FROM FREEWAYS AND MAJOR TRUCKING ROUTES, AND IS COMMONLY USED FOR ROAD DESIGN, NEIGHBORHOOD SHOPPING CENTER, AND OFFICE PARK SITES, AS WELL AS FOR MOST UNIVERSITY OF MICHIGAN PROJECTS. IT ALLOWS FOR REASONABLY SIZED TRUCKS TO ACCESS A SITE, WITHOUT CREATING EXCESSIVELY WIDE ROADS AND INTERSECTIONS. THE AASHTO DESIGN MANUAL CALLS IT AN "INTERMEDIATE SIZE TRACTOR-SEMITRAILER COMBINATION", AND STATES THAT "FOR LOCAL ROADS, AND STREETS, THE WB-40 IS OFTEN CONSIDERED AN APPROPRIATE DESIGN VEHICLE". THIS VEHICLE IS LARGER THAN UPS AND FEDEX TRUCKS, AND IS A MANEUVERABILITY STANDARD THAT MANUFACTURERS CREATE LARGER VEHICLES TO FIT (SYSCO TRUCKS ARE LARGER THAN A WB-40 TRUCK, BUT ARE DESIGNED TO TRACK WHEREVER A WB-40 CAN FIT.) WE BELIEVE IT IS THE APPROPRIATE DESIGN VEHICLE FOR THE SITE.

IN CONTRAST THE LARGER WB-67 VEHICLE IS FREQUENTLY USED FOR LONG-DISTANCE TRUCKING, AND FOR RETAILERS WITH EXTENSIVE STOCK REQUIREMENTS (MEIJER, TARGET, WAL-MART, ETC.). THESE VEHICLES ARE THE LARGEST ALLOWED BY FEDERAL REGULATIONS, BUT REQUIRE EXTREMELY LARGE (~100') CURB RADIUSES OR COMPOUND CURVES TO FUNCTION PROPERLY. MOST TRUCK STOPS, MEIJERS, WAL-MARTS, AND INDUSTRIAL PARKS ARE DESIGNED TO THIS STANDARD. THE AASHTO DESIGN MANUAL CALLS IT A "LARGER TRACTOR-SEMITRAILER ALLOWED TO OPERATE ON SELECTED HIGHWAYS BY 'GRANDFATHER' RIGHTS" AND STATES THAT THEY "ARE APPROPRIATE FOR DESIGN OF FACILITIES THAT SERVE OVER-THE-ROAD TRUCKS". WE BELIEVE THAT THIS DESIGN VEHICLE IS NOT APPROPRIATE FOR THIS TYPE OF SITE AS THERE IS NO DEMAND FOR THESE TYPE OF VEHICLES, AND IT WOULD CREATE UNATTRACTIVELY AND UNNECESSARILY LARGE PAVED AREAS THAT REDUCE PEDESTRIAN SAFETY.

IN SUMMARY WE ARE REQUESTING A WAIVER FROM THE PITTSFIELD TOWNSHIP LOADING SPACE REQUIREMENTS TO ALLOW FOR A SINGLE-LOADING SPACE FOR THE SUBJECT PROPERTY, DESIGNED ACCORDING TO THE TURNING TEMPLATES OF THE WB-40 DESIGN VEHICLE.

SOLID WASTE NARRATIVE

THE 2000 SITE PLAN PLACE A TWO-DUMPSTER ENCLOSURE IN THE NORTHWEST CORNER OF THE SITE TO SERVE ALL THREE BUILDINGS, AND WE WISH TO CONTINUE TO USE THIS LOCATION. BASED UPON DISCUSSIONS WITH THE BUILDING MANAGER, THE GARBAGE IS COLLECTED IN EACH BUILDING, AND PROPERTY MANAGEMENT STAFF TRANSFERS IT TO THE DUMPSTERS. PRESENTLY THERE IS ONE TRASH DUMPSTER, WHICH IS COLLECTED ONCE PER WEEK. AFTER CONSTRUCTION OF BUILDING TWO, THIS WILL BE INCREASED TO ONE TRASH AND ONE RECYCLING DUMPSTER, COLLECTED ONCE PER WEEK. ONCE BUILDING THREE IS COMPLETE, COLLECTION FREQUENCY WILL BE INCREASED TO TWICE PER WEEK, OR AS NEEDED TO MEET DEMAND. WE INTEND TO USE THE EXISTING DUMPSTER ENCLOSURE WITH NO MODIFICATION, EXCEPT TO SWAP OUT THE SINGLE DUMPSTER WITH 8 CYD TRASH AND RECYCLING DUMPSTERS. THE EXISTING ENCLOSURE IS LARGE ENOUGH TO FIT BOTH DUMPSTERS.

WITH ONE BUILDING AT FULL-OCCUPANCY AND A SINGLE DUMPSTER PICKUP BEING ADEQUATE TO SERVICE THE SITE, WE EXPECT FOUR PICKUPS (TWO DAYS WITH TWO DUMPSTERS) TO BE MORE THAN ADEQUATE FOR THREE FULL BUILDINGS. THREE PICKUPS PER WEEK IS ALSO VERY COMMON FOR COMMERCIAL PROPERTIES, AND CAN BE PROVIDED IF NEEDED TO SERVICE THE SITE. FROM PREVIOUS CONVERSATIONS WITH SOLID WASTE SERVICE PROVIDERS, WE HAVE BEEN INFORMED THAT OFFICE USES TYPICALLY RECYCLE ABOUT 50% (+/- 10%) OF THEIR WASTE, SO PROVIDING ONE TRASH AND ONE RECYCLING DUMPSTER SHOULD MEET THIS DEMAND. DUMPSTER SIZE AND FREQUENCY OF PICKUP WILL BE ADJUSTED AS REQUIRED, AS TENANTS MOVE IN AND OUT.

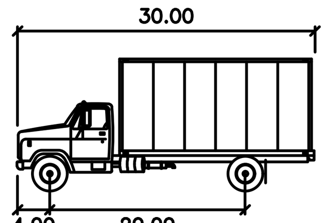
WE HAVE USED THE SU-30 DESIGN VEHICLE TO REPRESENT A GENERIC GARBAGE TRUCK AS IT IS MORE CONSERVATIVE THAN THE INDIVIDUAL GARBAGE TRUCK TEMPLATES WE HAVE OBTAINED, AND ALLOWS FOR FUTURE CHANGE OF PROVIDERS, OR FOR PROVIDERS TO CHANGE THEIR VEHICLES. ALTHOUGH TRASH TRUCKS ARE LARGER THAN THE SU-30 DESIGN VEHICLE, THEIR SHORT WHEELBASES ALLOW THEM TO MANEUVER BETTER THAN THE SU-30 VEHICLE FOR ACCESS THROUGHOUT URBAN SITES. FOR INSTANCE, WE HAVE PROVIDED THE DIAGRAM FOR THE LARGE AUTOCAR XPEDITOR (6x4) WHICH HAS A WHEELBASE OF 17.25' COMPARED TO THE SU-30 WHEELBASE OF 20.0'. THIS ALLOWS IT TO EASILY FIT WHEREVER THE SU-30 COULD MANEUVER.

SCALE: 1" = 40'

0 40 80 120

NOTES:

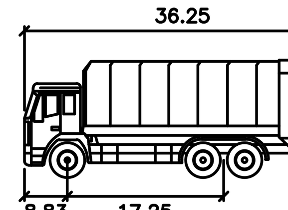
1. LESS THAN 8 DELIVERIES EXPECTED PER DAY
2. WB-40 DESIGN VEHICLE FOR DELIVERIES (TYPICAL URBAN DELIVERY TRAILER TRUCK)
3. 2 DUMPSTERS (TRASH + RECYCLYING) IN DUMPSTER ENCLOSURE, PICKED UP TWICE WEEKLY.
4. SU-30 TRUCK USED TO MODEL TRASH TRUCKS (CONSERVATIVE ASSUMPTION)
5. REPUBLIC SERVICES IS THE CURRENT TRASH AND RECYCLING PROVIDER.
6. TRUCK TURNING MOVEMENTS HAVE BEEN ALLOWED TO PASS OVER THE 18" WIDE FLAT CONCRETE GUTTERS, BUT DO NOT PASS OVER THE RAISED CURBS OF THE CONCRETE CURB & GUTTERS.



SU-30

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

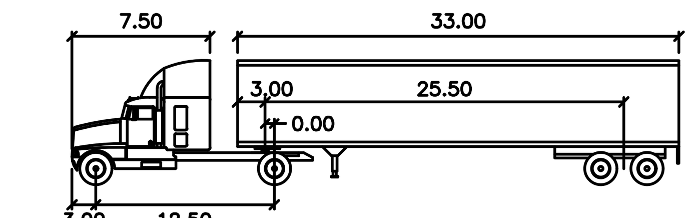
SU-30: TYPICAL SMALL DELIVERY TRUCK/ TYPICAL DESIGN VEHICLE FOR TRASH, SHUTTLES, UTILITY TRUCKS



A2 Trash Xpeditor 6x4 (Autocar)

	feet
Width	: 8.42
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

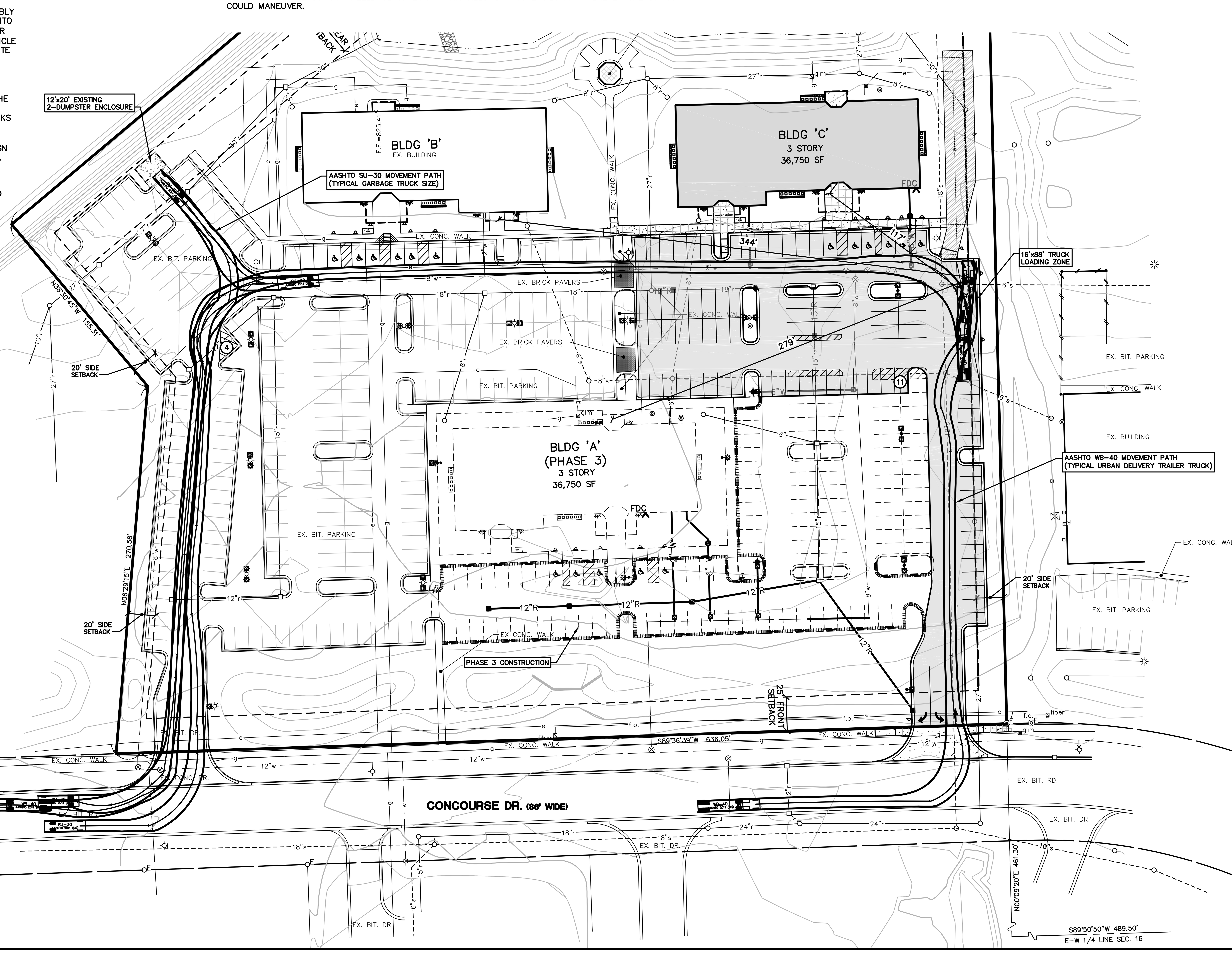
SAMPLE TRASH TRUCK: LONGER LENGTH, BUT SHORTER WHEELBASE TURNS TIGHTER (LESS-CONSERVATIVE) THAN SU-30 VEHICLE



WB-40

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.00	Steering Angle	: 20.3
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.00		

WB-40: TYPICAL SUBURBAN DELIVERY TRAILER TRUCK



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.

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
TRUCK ACCESS PLAN

25

DATE: 3/10/2017
SHEET 25 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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REVISIONS:	REV. DATE
WCWRC REV 2	3/10/2017
TWP REV 1	3/24/17

JOB No. 16295

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CONSULTING GROUP

January 5, 2017

Mr. Tim Aniol
Crescendo Homes, Inc.
29800 Middlebelt Road, Suite 200
Farmington Hills, Michigan 48334

RE: Letter of Infiltration Evaluation
Concourse Office Center Expansion
4343 Concourse Drive, Parcel 'C'
Ann Arbor, Washtenaw County, Michigan
G2 Project No. 163367

Dear Mr. Aniol,

In accordance with your request, we have completed the infiltration evaluation within the area of proposed expansion at the site of the existing Concourse Drive Office Center in the City of Ann Arbor, Washtenaw County, Michigan.

PROJECT BACKGROUND

We understand the proposed expansion project will include the construction of two additional 3-story office buildings and appurtenant site pavements and underground utilities. The proposed expansion will require improvements to the on-site stormwater collection system to accommodate the anticipated increase in stormwater runoff from enlarged areas of impervious roofs and pavements.

Several areas near the south and east expansion limits were evaluated for on-site infiltration. We conducted our infiltration evaluation in accordance with the Washtenaw County Water Resource Commissioner (WCWRC) revised "Rules and Guidelines – Procedures & Design Criteria for Stormwater Management Systems" dated October 17, 2016. The purpose of our investigation is to determine and evaluate the general subsurface soil and groundwater conditions and to determine the infiltration rates within the potential on-site infiltration areas.

FIELD OPERATIONS

Midwestern Consulting, LLC, selected the number, depth, and location of the test pits. The locations of the test pits were determined in the field by use of GPS assisted mobile technology. The approximate locations of the test pits are shown on the Test Pit Location Plan, Plate, No. 1. Ground surface elevations at the test pit locations were approximated based on information presented within the drawing titled "Concourse Office Center – 2016 Soil Test Pit / Infiltration Locations" dated December 20, 2016 by Midwestern Consulting.

The test pits were excavated by Adrian Vasu of Lakes Equipment & Service using a CAT backhoe. Within each test pit, Jeffrey D. Crow, E.I.T. of G2 Consulting Group, LLC maintained logs of the encountered subsurface conditions including changes in stratigraphy and observed groundwater levels. The test pit logs are based on the results of the field and laboratory soil classification and testing.

FIELD AND LABORATORY TESTING

Due to the presence of relatively impermeable cohesive soils extending throughout the explored depth of the test pit excavations, no infiltration testing was performed during our field investigation. Representative soil samples were obtained in the field to determine soil parameters pertinent to the further evaluation and classification of the on-site soils for infiltration.

Soil samples obtained in the field were stored in sealed bags and transported to our Ann Arbor office for laboratory testing and classification. Laboratory testing include natural moisture content and unconfined compressive strength determinations. In addition, the soil samples were classified in accordance with the attached G2 General Notes Terminology.

The results of the field and laboratory testing are indicated on the test pit logs at the depths samples were taken. The test pit logs are presented on Figure No. 1 through 4. We will retain the unused portions of the soil samples for a period of 60 days following the issuance of this report. If you would like the samples returned to you or retained beyond this period, please let us know.

SITE CONDITIONS

The parcel lies within the Malletts Creek Basin and is part of the Huron Valley watershed. A detention basin is located approximately 150 feet north of test pit TP-01. The proposed office buildings "A" and "C" will be constructed to the east and southeast of the existing building "B" and to the south of the existing detention basin.

Site grades throughout the proposed expansion area are relatively flat with a gentle slope from south to north toward the existing detention basin further to the north. Within the proposed expansion area, existing surface grades range between approximate Elevations 823 and 825-1/2 feet. The lowest invert elevation within the detention basin is at approximate Elevation 815-1/2 feet. The development parcel is bounded by Concourse Drive to the south and large trees with heavy vegetation to the north. The surrounding properties are generally commercial in nature.

SOIL AND GROUNDWATER CONDITIONS

Approximately 2 to 5 inches of sandy clay topsoil are present at the ground surface of the test pits TP-01 through TP-04. Within test pit TP-02, sand fill underlies the topsoil and extends to an approximate depth of 3-1/2 feet below the existing ground surface. Sandy clay and silty clay fill soils underlie the sand fill in test pit TP-02 and the topsoil within the remaining test pits and extend to approximate depths of 4 to 7-1/2 feet below the existing ground surface. The cohesive fill soils are generally stiff to hard in consistency with natural moisture contents ranging from 16 to 24 percent and unconfined compressive strengths ranging from 2,500 to 8,000 pounds per square foot (psf). The cohesive fill soils were observed to contain trace amounts of organic matter and construction debris consisting of broken concrete and brick.

Native silty clay underlies the fill soils and extends to the explored depths of 9-1/2 and 10 feet. The native silty clay is generally stiff to hard in consistency with natural moisture contents ranging from 10 to 20 percent and unconfined compressive strengths ranging from 4,000 to 9,000 psf.

Groundwater observations were made during excavation operations. Groundwater seepage was observed at a depth of approximately 9 feet within test pit TP-01. No groundwater was observed during excavation operations within the remaining test pits. Test pit excavations were not left open long enough to identify the long-term static groundwater level. Fluctuations in perched and long-term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation.

INFILTRATION CONSIDERATIONS

The following table provides the results of our infiltration testing for this project:

Test Pit No.	Soil Type (USCS)	Ground Surface Elevation (ft)	Groundwater Depth (ft)
TP-01	Silty Clay (CL)	923.0	9.5
TP-02	Silty Clay (CL)	924.5	---
TP-03	Silty Clay (CL)	925.0	---
TP-04	Silty Clay (CL)	925.0	---

Notes: 1. No suitable soils for infiltration were identified within test pit.

The relatively impermeable cohesive soils present at the anticipated invert of possible infiltration basin locations are not conducive to infiltration. We recommend that an alternative approach be considered and evaluated for on-site stormwater management, or that the detention basin(s) be sized properly to accommodate the full volume of stormwater flow associated with the design rainfall event.

GENERAL COMMENTS

If changes occur in the design, location, or concept of the project, conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm any assumptions regarding the project scope presented herein or make changes in writing. The scope of the present investigation was limited to evaluation of subsurface conditions at the proposed test pit locations. No chemical or environmental testing or analyses were included in the scope of this investigation.

We base the analyses and recommendations submitted in this report upon the data from the test pits performed at the approximate locations shown on the Test Pit Location Plan, Plate No. 1. This report does not reflect variations that may occur between the actual test pit locations and the actual infiltration basin locations. The nature and extent of any such variations may not become clear until the time of construction. We recommend G2 Consulting Group, LLC observe all geotechnical related work, including subgrade preparation and engineered fill placement.

We appreciate the opportunity to be of service to you on this project and look forward to discussing the results presented. In the meantime, if you have any questions regarding this report or any other matter pertaining to the project, please call us.

Sincerely,

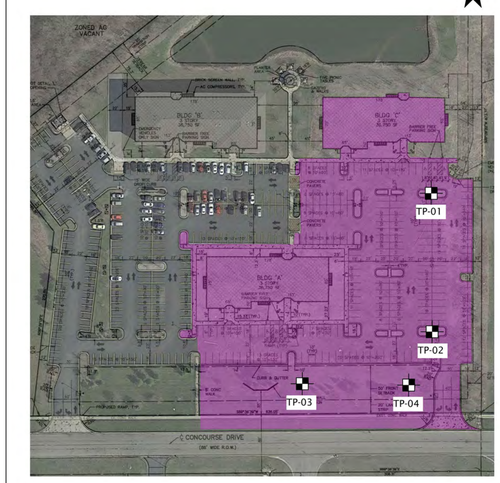
G2 Consulting Group, LLC

Jeffrey D. Crow, E.I.T.
Staff Engineer

David L. Wanlass, P.E.
Project Manager

Encl: Test Pit Location Plan
Test Pit Logs
General Notes Terminology

Plate No. 1
Figure Nos. 1 through 4
Figure No. 5



Legend

Test Pits Excavated by Lakes Equipment & Service on January 3rd, 2017

Test Pit Location Plan

Concourse Office Center
4343 Concourse Drive, Parcel 'C'
Washtenaw County, Michigan

CONSULTING GROUP

Project No. 163367	
Drawn by: JDC	
Date: 1/4/2017	Plate No. 1
Scale: NTS	

Project Name: Concourse Office Center
Project Location: Concourse Drive, Parcel 'C' Washtenaw County, Michigan
G2 Project No. 163367
Latitude: 42.224388° Longitude: -83.731269°

Test Pit No. TP-01

CONSULTING GROUP

SUBSURFACE PROFILE		SOIL SAMPLE DATA					
ELEV. (ft)	GROUND SURFACE ELEVATION: 823.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Topsoil: Dark Brown Sandy Clay with trace gravel (3 inches) 0.3							
	Fill: Very Stiff to Hard Brown Silty Clay with trace sand and gravel		BS-01			16.5		8000*
818.0		5	BS-02			19.2		5000*
	6.0 Fill: Stiff Dark Brown to Black Sandy Clay with trace gravel and organic matter 7.5		BS-03			23.7		2500*
	Very Stiff Gray Silty Clay with trace sand and gravel, occasional sand seams 9.5		BS-04			18.2		6000*
813.0	End of Test Pit @ 9.5 ft	10						
808.0		15						

Total Depth: 9.5 ft
Drilling Date: January 3, 2017
Inspector: J. Crow, E.I.T.
Contractor: Lakes Equipment & Service
Driller: A. Vasu

Water Level Observation:
Groundwater seepage observed at 9 feet during excavation operations

Notes:
* Calibrated Hand Penetrometer

Drilling Method:
CAT Backhoe

Excavation Backfilling Procedure:
Test pit backfilled with excavated spoils

Figure No. 1

Project Name: Concourse Office Center
Project Location: Concourse Drive, Parcel 'C' Washtenaw County, Michigan
G2 Project No. 163367
Latitude: 42.223836° Longitude: -83.731247°

Test Pit No. TP-02

CONSULTING GROUP

SUBSURFACE PROFILE		SOIL SAMPLE DATA					
ELEV. (ft)	GROUND SURFACE ELEVATION: 824.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Topsoil: Dark Brown Sandy Clay with trace gravel (5 inches) 0.4							
	Fill: Brown Sand with trace silt and gravel 3.5		BS-01					
819.5	Fill: Very Stiff Dark Gray Silty Clay with trace sand, gravel, and brick fragments 5.0	5	BS-02			17.5		7500*
	Very Stiff to Hard Gray Silty Clay with trace sand and gravel, occasional sand seams 10.0		BS-03			15.2		9000*
814.5	End of Test Pit @ 10 ft	10	BS-04			16.3		7500*
809.5		15						

Total Depth: 10 ft
Drilling Date: January 3, 2017
Inspector: J. Crow, E.I.T.
Contractor: Lakes Equipment & Service
Driller: A. Vasu

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Drilling Method:
CAT Backhoe

Excavation Backfilling Procedure:
Test pit backfilled with excavated spoils

Figure No. 2

Project Name: Concourse Office Center
Project Location: Concourse Drive, Parcel 'C' Washtenaw County, Michigan
G2 Project No. 163367
Latitude: 42.223616° Longitude: -83.731940°

Test Pit No. TP-03

CONSULTING GROUP

SUBSURFACE PROFILE		SOIL SAMPLE DATA					
ELEV. (ft)	GROUND SURFACE ELEVATION: 825.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Topsoil: Dark Brown Sandy Clay with trace gravel (4 inches) 0.3							
	Fill: Very Stiff Brown Sandy Clay with trace silt, gravel, brick fragments, concrete debris, and occasional cobbles 4.0		BS-01			15.8		5000*
820.0		5	BS-02			19.5		4000*
	Very Stiff Brown Silty Clay with trace sand and gravel 7.0		BS-03			17.9		5500*
	Very Stiff Gray Silty Clay with trace sand and gravel, occasional silt partings 10.0		BS-04			10.3		5500*
815.0	End of Test Pit @ 10 ft	10						
810.0		15						

Total Depth: 10 ft
Drilling Date: January 3, 2017
Inspector: J. Crow, E.I.T.
Contractor: Lakes Equipment & Service
Driller: A. Vasu

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Drilling Method:
CAT Backhoe

Excavation Backfilling Procedure:
Test pit backfilled with excavated spoils

Figure No. 3

Project Name: Concourse Office Center
Project Location: Concourse Drive, Parcel 'C' Washtenaw County, Michigan
G2 Project No. 163367
Latitude: 42.223620° Longitude: -83.731365°

Test Pit No. TP-04

CONSULTING GROUP

SUBSURFACE PROFILE		SOIL SAMPLE DATA					
ELEV. (ft)	GROUND SURFACE ELEVATION: 825.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Topsoil: Dark Brown Sandy Clay with trace gravel (2 inches) 0.2							
	Fill: Very Stiff Brown Sandy Clay with trace silt, gravel, brick fragments, and occasional cobbles		BS-01			17.3		6000*
820.0		5	BS-02			20.4		4500*
	6.0 Hard Gray Silty Clay with trace sand and gravel 9.0		BS-03			16.3		9000*
	Very Stiff Gray Silty Clay with trace sand and gravel, occasional sand seams 10.0		BS-04			13.2		4500*
815.0	End of Test Pit @ 10 ft	10						
810.0		15						

Total Depth: 10 ft
Drilling Date: January 3, 2017
Inspector: J. Crow, E.I.T.
Contractor: Lakes Equipment & Service
Driller: A. Vasu

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Drilling Method:
CAT Backhoe

Excavation Backfilling Procedure:
Test pit backfilled with excavated spoils

Figure No. 4

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
SOILS DATA

26

JOB No. 16295
REVISIONS:
TWP. REV 1

REV.	DATE
	3/24/17

DATE: 2/15/17
SHEET 26 OF 39
CADD: WAJ
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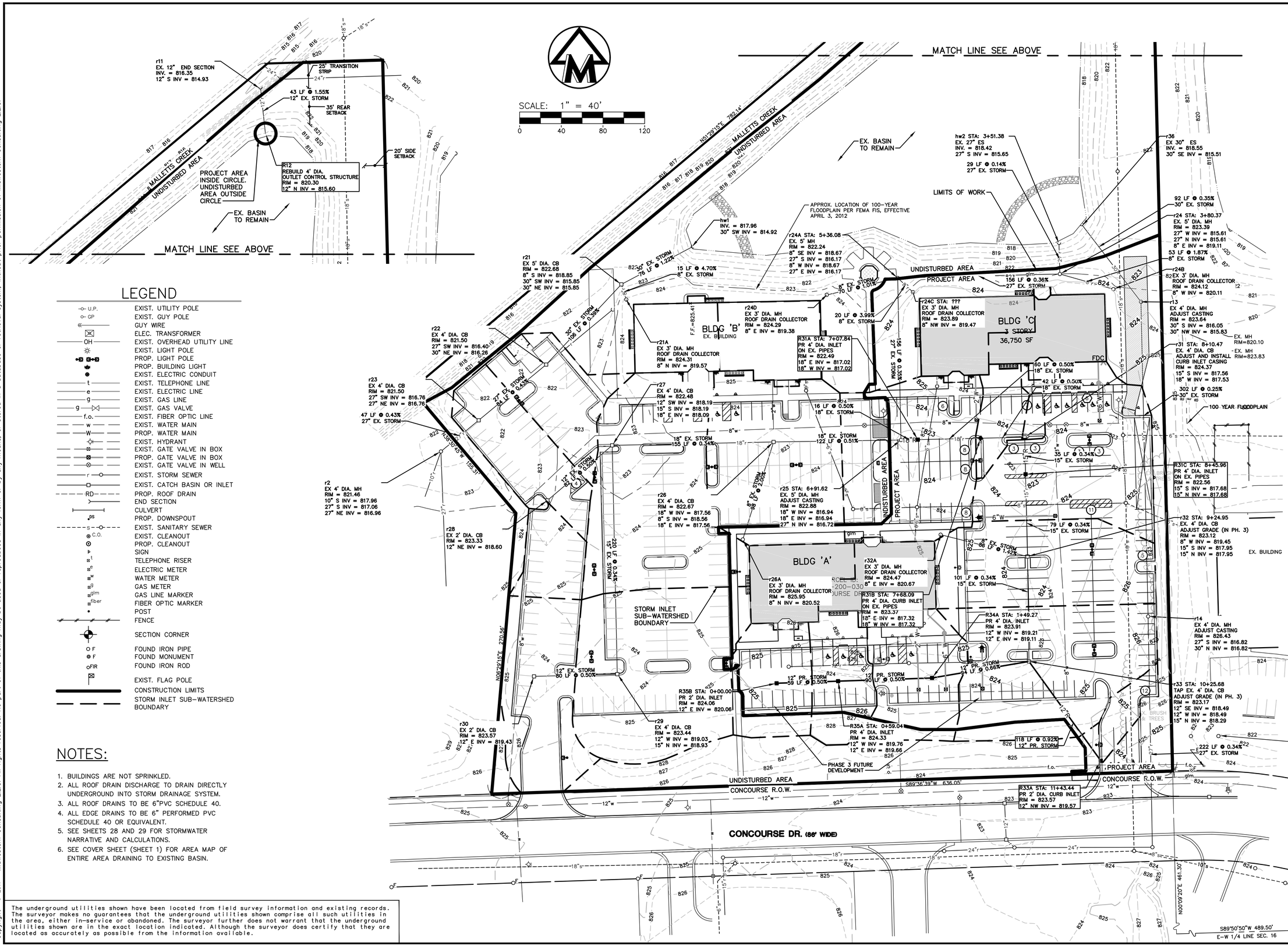

LEGEND

U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
	PROP. BUILDING LIGHT
	EXIST. ELECTRIC CONDUIT
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
RD	PROP. ROOF DRAIN
	END SECTION
	CULVERT
DS	PROP. DOWNSPOUT
S	EXIST. SANITARY SEWER
C.O.	EXIST. CLEANOUT
	PROP. CLEANOUT
	SIGN
t	TELEPHONE RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
	POST
	FENCE
	SECTION CORNER
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. FLAG POLE
	CONSTRUCTION LIMITS
	STORM INLET SUB-WATERSHED BOUNDARY

NOTES:

1. BUILDINGS ARE NOT SPRINKLED.
2. ALL ROOF DRAIN DISCHARGE TO DRAIN DIRECTLY UNDERGROUND INTO STORM DRAINAGE SYSTEM.
3. ALL ROOF DRAINS TO BE 6"PVC SCHEDULE 40.
4. ALL EDGE DRAINS TO BE 6" PERFORMED PVC SCHEDULE 40 OR EQUIVALENT.
5. SEE SHEETS 28 AND 29 FOR STORMWATER NARRATIVE AND CALCULATIONS.
6. SEE COVER SHEET (SHEET 1) FOR AREA MAP OF ENTIRE AREA DRAINING TO EXISTING BASIN.

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.

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
STORMWATER PLAN – PHASES 2 & 3

27

DATE:	3/10/2017
SHEET	27 OF 39
CADD:	WAJ
ENG:	JAM
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JOB No. 16295

REVISIONS:	REV. DATE
W.W.R.C. REV 1	3/10/2017
W.W.R.C. REV 2	3/16/2017
TWP. REV. 1	3/24/17
TWP. REV. 2	

Concourse Office Center
Stormwater Narrative and Outlet Certification
March 8, 2017

Ordinance: This project is within the jurisdiction of Pittsfield Charter Township, Michiga, and drains directly to Malletts Creek, a County Drain. As such, it is bound by the Rules and Guidelines of the Washtenaw County Water Resources Commissioner (WCWRC).

General Approach: In 2001, a Site Plan was approved for three buildings in the Concourse Office Center, however only one building, the detention basin, all of the underground utilities, and a portion of the parking lot was contructed. We are proposing to finish building the site plan in two Phases (Phase 2 and Phase 3), following the previously approved plan as much as possible, in order to provide consistency and uniformity across the site, while updating the plan as required to meet modern regulations. These calculations are for the full buildout after Phase 3, in order to reduce future modifications required.

The NRCS soils map indicates Palms Muck (Pa) and Sebewa Loam (Sb) across the site, both of which are a Type "D" soil when undrained, and the constant presence of water in the detention pond, combined with the presence of a floodplain across the north of the site indicate infiltration is likely infeasible. The geotechnical report prepared by G2 on January 5, 2017, confirms this prediction, with primarily clays found under the previous fill layers.

Calculation Method: Site areas and stormwater volumes for the areas disturbed in Phases 2 and 3 were calculated following the 2016 method, including penalties, and areas and stormwater volumes for the remainder of the site (Phase 1) were calculated using the 2000 method. These volumes were combined together, and added to the offsite areas and volumes calculated in the 2001 site plan to determine the new full required volumes for detention. No allowance for outflow was provided for either the 2000 or the 2016 calculations, leading to calculating the full volume of runoff for each of the three classes of storms. See Sheets 32-34 for the previous 2001 Site Plan calculations, narrative, and area map for the parcels draining to the stormwater basin. We are continuing to use the save C value of 0.70 for the offsite drainage, which was used and approved in 2001.

Detention Basin Design: A detention basin was previously designed and installed as a regional system including this site's full build-out, with no allowance for outflow (requiring full storage of the 100-year event) due to the frequently flooding conditions of Malletts Creek. The pond was designed, approved, and constructed with 0.7' of freeboard between the pond and Malletts Creek, though the freeboard in every other direction is greater than 1 foot. We are also not proposing any additional impervious surface beyond the original proposal, helping to limit any additional volume required.

While detention requirements have become more stringent in more recent regulations, including penalties for non-infiltration, we found that the overall volume required increased only slightly for three reasons:

1) The previous requirement to detain the complete 100-year storm approximates the current requirement.
2) The previous calculations overdetained from a calculation that treated the gross square foot area (on three floors) as equivalent to a roof area (over one floor), calculating for triple the roof area actually proposed.
3) The previous calculations overdetained from including Malletts Creek and its banks into the stormwater volume calcuations, even though water falling directly on Malletts Creek does not flow to the site's basin.

Because the overall detention volume required increased only slightly from 336,901 cft to 334,333 cft (without penalty) and 345,285 cft (with penalty), with a 100-year elevation from 820.30 to 820.41, we are proposing to leave the detention basin in its current condition, with the outlet control structure to be replaced to meet current regulations. With a berm top elevation of 821.0, this will decrease the freeboard slightly between the pond and Malletts Creek from 0.7' to 0.6'. However we are requesting this variance as this direction is already the direction of emergency overflow, and the freeboard in all other directions is greater than 1.0'. Additionally any fill required to raise the height of the berm would require a floodplain permit and corresponding mitigating cut. Water quality treatment is being provided by a permanent 5' deep pool, with a volume of 68.9% of the detention volume. Nominal forebays are also provided at the entrance points for further treatment of stormwater quality.

Orifices are designed in the new outlet control structure to drain the combined first flush storm volume in 24-36 hours, the combined bankfull volume in 36-48 hours, and the combined 100-year volume in under 72 hours, with a maximum outlet rate of 0.15 cfs/acre.

Conveyance Systems: All new pipes are designed to pass the 10-year storm flowing full, and all existing pipes were checked to ensure that the 10-year hydraulic grade line stayed below structure rims. All existing and proposed inlets are designed to accept no more than 2.50 cfs for the 10-year storm. The existing system was utilized as much as possible, although a few new inlets were required to allow for ADA-compliant grading, and to catch additional water before it leaves the site for Concourse Drive.

Conveyance System Structure Numbers: For compatibility of review and to more easily compare with the already-installed storm piping with the 2000 site plan, all structure numbers have been set to match the 2000 plan. Additional new structures are numbered with an "A" or "B" added to the existing structure that they are closest to.

Free Release Areas: The parking lot is at a higher elevation than the property to the east, so some vegetated areas located east of the pariking lot drain free drain east, and the area within the County Drain easement drains into the County Drain. There is a portion of the entry drive that drains into the WCRC Concourse Drive roadway, but this flow is picked up and enters the regional detention basin on the site, and this volume is accounted for in the calculations.

Outlet Path:

The existing wetland and high groundwater tables prevent infiltration, as can be seen from the currently built, and always filled basin. Storm flows will be directed from the basin, through an outlet pipe, and into Malletts Creek, which already receives flow from the site. The 0.15 cfs/acre outlet flow rate will ensure that site stormwater is spread out beyond the 6-hour peak periods of Malletts Creek, and that flooding conditions downstream are not exacerbated.

Outlet Certification:
Based upon the data and criteria outlined above, I hereby certify that the existing drain is the only reasonably achievable stormwater outlet for the proposed stormwater management system, and that the existing drain has sufficient capacity to serve as an adequate outlet for the proposed system, without detriment to or diminution of the drainage serve that the existing outlet presently provides.

Signed: ____________________

Jeremy Matthei, PE #62010 53590

STATE OF MICHIGAN
JEREMY A. MATTHEI
ENGINEER NO.
53590
LICENSED PROFESSIONAL ENGINEER

Concourse Office Park Sub-Watershed Analysis
Midwestern Consulting
3/8/2017

Rational C Values:

Soil Type	Impervious	Pervious	Steep Pervious (>8%)	Water
A	0.95	0.20	0.25	1.00
B	0.95	0.30	0.35	1.00
C	0.95	0.35	0.40	1.00
D	0.95	0.50	0.55	1.00

Inlet #	sft area	Roof (sft)	Road/Swlk Pvmt (sft)	Vegetated (sft)	Water (sft)	Soil Type	Imp. C	Perv. C	CxA (sft)	CxA (ac)	Area (ac)	C Value
R21A	5,922	5,922	0	0	0	D	0.95	0.50	5,626	0.129	0.136	0.95
R22	8,786	0	7,598	1,188	0	D	0.95	0.50	7,812	0.179	0.202	0.89
R23	9,500	0	8,743	757	0	D	0.95	0.50	8,684	0.199	0.218	0.91
R24B	6,352	6,352	0	0	0	D	0.95	0.50	6,034	0.139	0.146	0.95
R24C	6,609	6,609	0	0	0	D	0.95	0.50	6,279	0.144	0.152	0.95
R24D	7,187	7,187	0	0	0	D	0.95	0.50	6,828	0.157	0.165	0.95
R26	20,042	0	16,326	3,716	0	D	0.95	0.50	17,368	0.399	0.460	0.87
R26A	6,263	6,263	0	0	0	D	0.95	0.50	5,950	0.137	0.144	0.95
R27	24,234	0	19,649	4,585	0	D	0.95	0.50	20,959	0.481	0.556	0.86
R28	4,605	0	4,456	149	0	D	0.95	0.50	4,308	0.099	0.106	0.94
R29	24,027	0	15,456	8,571	0	D	0.95	0.50	18,969	0.435	0.552	0.79
R30	13,102	0	8,996	4,106	0	D	0.95	0.50	10,599	0.243	0.301	0.81
R31	1,161	0	922	239	0	D	0.95	0.50	995	0.023	0.027	0.86
R31A	19,120	0	16,584	2,536	0	D	0.95	0.50	17,023	0.391	0.439	0.89
R31B	3,747	0	2,700	1,047	0	D	0.95	0.50	3,089	0.071	0.086	0.82
R31C	19,546	0	17,212	2,334	0	D	0.95	0.50	17,518	0.402	0.449	0.90
R32	16,483	0	14,297	2,186	0	D	0.95	0.50	14,675	0.337	0.378	0.89
R32A	6,693	6,693	0	0	0	D	0.95	0.50	6,358	0.146	0.154	0.95
R33	21,463	0	14,821	6,642	0	D	0.95	0.50	17,401	0.399	0.493	0.81
R33A	2,610	0	2,238	372	0	D	0.95	0.50	2,312	0.053	0.060	0.89
R34A	10,294	0	5,539	4,755	0	D	0.95	0.50	7,640	0.175	0.236	0.74
R35A	6,879	0	3,796	3,083	0	D	0.95	0.50	5,148	0.118	0.158	0.75
R35B	7,850	0	5,199	2,651	0	D	0.95	0.50	6,265	0.144	0.180	0.80
Total Site into Pipes	252,475	39,026	164,532	48,917	0	D	0.95	0.50	217,839	5.001	5.796	0.86
Phase 1 Total (Existing)	286,551	13,275	91,053	110,431	71,792	D	0.95	0.50	226,119	5.191	6.578	0.79
Phase 2+3 Total (Proposed)	150,612	25,380	84,446	40,786	0	D	0.95	0.50	124,728	2.863	3.458	0.83
Site Total (Phase 1, 2, & 3)	437,163	38,655	175,499	151,217	71,792	D	0.95	0.50	350,847	8.054	10.036	0.80
Offsite Contributing	731,372						0.95	0.50	511,960	11.753	16.790	0.70
Grand Total	1,168,535						0.95	0.50	862,807	19.807	26.83	0.74

STORMWATER MAINTENANCE SCHEDULE

DURING CONSTRUCTION:

TASK	Paved Areas	Pervious Areas	Riprap & Silt Fence	Storm Pipes	Catch Basins and Manholes	Inlet Grates	Flow Restriction Devices	Ponds & Forebays	SCHEDULE	PROJECT COST
Inspect for sediment accumulation	X		X	X	X		X	X	Weekly	$500.00
Removal of sediment accumulation	X		X	X	X		X	X	As needed* & prior to turnover	$3,000.00
Inspect for floatables and debris				X	X	X	X	X	Quarterly	$250.00
Cleaning for floatables and debris				X	X	X	X	X	Quarterly and at turnover	$750.00
Inspect for erosion		X	X						Weekly	$500.00
Reestablish permanent vegetation on eroded slopes		X							As needed* & prior to turnover	$2,500.00
Clean drives and parking lots	X								Weekly or as determined by permitting agency	$2,000.00
Water disturbed areas to provide dust control	sturbed areas of site								As needed* & prior to turnover	$2,000.00
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	$500.00
Make adjustments or replacements as determined by wet weather inspection			X	X			X	X	As needed* & prior to turnover	$2,500.00
* "as needed" means when sediment has accumulated to a minimum of one foot depth.									Total Project Phase Cost	$14,500.00

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	Ponds & Forebays	SCHEDULE	PROJECT COST
Inspect for sediment accumulation	X		X	X	X		X	X	Annually	$100.00
Removal of sediment accumulation	X		X	X	X		X	X	Annually, and as needed*	$600.00
Inspect for floatables and debris				X	X	X	X	X	Annually	$50.00
Cleaning for floatables and debris				X	X	X	X	X	Annually, and as needed*	$100.00
Inspect for erosion		X	X						Every six months	$100.00
Reestablish permanent vegetation on eroded slopes		X							As needed*	$150.00
Clean drives and parking lots	X								Annually	$150.00
Mowing		X							Once or Twice (Maximum) Annually	$200.00
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	$100.00
Make adjustments or replacements as determined by wet weather inspection			X	X			X	X	As needed*	$250.00
Keep records of all inspections and maintenance									Annually	$50.00
Keep records of all costs for inspections,									Annually	$25.00
Property owner to review cost-effectiveness of the preventative maintenance program and make necessary adjustments.									Annually	$75.00
Onwer to hire a professional engineer to carry out emergency inspections upon identification of severe problems.									As needed*	$50.00
No chemicals are allowed in the buffer zones with the following exception: Invasive species may be treated with chemicals by a certified applicator.									Total Annual Cost	$2,000.00

* "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 Concourse Office Center.

STORM DRAINAGE CALCULATION SHEET
Concourse Office Center - 16295.00 - 3/8/2017

MIDWESTERN CONSULTING, INC.
3815 Plaza Drive
Ann Arbor, MI 48108

Runoff Formula: Q = CIA

I = x/(T+y) x = 175 y= 25 (10 Year Storm Event)
Type of Pipe = HDPE x = 275 y = 25.00 (100 Year Storm Event)
n = 0.013 Min time of concentration 15.00 min HGL step in manhole 0.1 ft

Structure No. From	Structure No. To	Drainage Area A (Acres)	Runoff Coeff. C	CxA	ADD. CxA	Pipe Data: Σ CxA	Dia. (in.)	Length (ft.)	Slope %	Down stream Invert	Up stream Invert	Down stream Rim	Up stream Rim	10-year Hydraulic Grade Line (HGL): Time T (min.)	Rainfall I (in./hr.)	Q (cfs)	Q Inlet Here	Velocity Flowing Full (ft./sec.)	Travel Time (min.)	Sewer Capacity (cfs)	Spare Capac. (cfs)	H.G. Slope %	Down stream HGL	Up stream HGL	Down stream HGL Cover	Up stream HGL Cover
R-12	R-11						12	43	1.55	814.93	815.60	815.93	820.30			4.02	**4.02**	5.66	0.13	4.45	0.43	1.28	815.73	816.40		3.90
R-21	HW-1	0.000	0.00	0.000	0.129	6.788	30	80	0.40	815.53	815.85	818.03	822.68	15.60	4.31	29.26	**0.00**	5.98	0.22	26.01	-3.25	0.51	818.05	818.46		4.22
R-22	R-21	0.202	0.89	0.179		6.659	30	103	0.40	815.85	816.26	822.68	821.50	15.31	4.34	28.91	**0.78**	5.90	0.29	25.95	-2.96	0.50	818.56	819.07	4.12	2.43
R-23	R-22	0.218	0.91	0.199		6.479	27	84	0.43	816.40	816.76	821.50	821.50	15.11	4.36	28.27	**0.87**	7.13	0.20	20.33	-7.94	0.83	819.17	819.87	2.33	1.63
R-2*	R-23	0.000	0.00	0.000	6.280	6.280	27	47	0.45	816.76	816.97	821.50	823.11	15.00	4.38	27.48	**0.00**	6.93	0.11	20.76	-6.72	0.79	819.97	820.34	1.53	2.77
	* R-2 Offsite CxA Values taken from 2000 Site Plan, and assumed constant																									
R-21A	R-21	0.136	0.95	0.129		0.129	8	12	6.00	818.85	819.57	822.68	824.31	15.00	4.38	0.57	**0.57**	8.50	0.02	2.97	2.40	0.22	819.38	820.10	3.30	4.21
R-24	HW-2	0.000	0.00	0.000	0.139	4.493	27	36	0.36	815.48	815.61	817.73	823.11	18.68	4.01	18.00	**0.00**	4.69	0.13	18.66	0.66	0.34	818.05	818.18		4.93
R-24A	R-24	0.000	0.00	0.000	0.301	4.354	27	156	0.36	815.61	816.17	823.11	822.21	18.13	4.06	17.67	**0.00**	4.68	0.56	18.61	0.94	0.33	818.28	818.78	4.83	3.43
R-25	R-24	0.000	0.00	0.000	1.794	4.054	27	154	0.36	816.17	816.72	822.21	822.69	17.58	4.11	16.66	**0.00**	4.67	0.55	18.56	1.90	0.29	818.88	819.33	3.33	3.36
R-31A	R-25	0.439	0.89	0.391		2.259	18	16	0.50	816.94	817.02	822.69	822.49	17.53	4.11	9.30	**1.71**	5.28	0.05	7.45	-1.85	0.78	819.43	819.55	3.26	2.94
R-31B	R-31A	0.086	0.82	0.071		1.869	18	60	0.50	817.02	817.32	822.49	823.37	17.30	4.14	7.73	**0.31**	4.39	0.23	7.45	-0.28	0.54	819.65	819.98	2.84	3.39
R-31	R-31B	0.027	0.86	0.023		1.798	18	42	0.50	817.32	817.53	823.37	824.37	17.13	4.15	7.47	**0.10**	4.24	0.17	7.45	-0.02	0.51	820.08	820.29	3.29	4.08
R-31C	R-31	0.449	0.90	0.402		1.775	15	35	0.34	817.56	817.68	824.37	822.56	17.04	4.16	7.39	**1.76**	6.04	0.10	3.79	-3.60	1.31	820.39	820.85	3.98	1.71
R-32	R-31C	0.378	0.89	0.337	0.146	1.373	15	79	0.34	817.68	817.95	822.56	823.12	16.76	4.19	5.75	**1.47**	4.70	0.28	3.79	-1.97	0.79	820.95	821.58	1.61	1.54
R-33	R-32	0.493	0.81	0.399	0.437	0.890	15	99	0.34	817.95	818.29	823.12	823.17	16.22	4.25	3.78	**1.75**	3.09	0.53	3.80	0.02	0.34	821.68	822.01	1.44	1.16
R-33A	R-33	0.060	0.89	0.053		0.053	12	118	0.92	818.49	819.57	823.17	823.57	15.00	4.38	0.23	**0.23**	4.35	0.45	3.42	3.19	0.004	822.11	822.12	1.06	1.45
R-34A	R-33	0.236	0.74	0.175		0.437	12	94	0.66	818.49	819.11	823.17	823.91	15.77	4.29	1.88	**0.77**	3.69	0.42	2.90	1.02	0.28	822.11	822.38	1.06	1.53
R-35A	R-34A	0.158	0.75	0.118		0.262	12	90	0.50	819.21	819.66	823.91	824.33	15.31	4.34	1.14	**0.52**	3.22	0.47	2.53	1.39	0.10	822.48	822.57	1.43	1.76
R-35B	R-34B	0.180	0.80	0.144		0.144	12	59	0.50	819.76	820.06	824.33	824.06	15.00	4.38	0.63	**0.63**	3.22	0.31	2.53	1.90	0.03	822.67	822.69	1.66	1.37
R-26	R-25	0.460	0.87	0.399	0.137	1.794	18	124	0.50	816.94	817.56	822.69	822.67	16.17	4.25	7.63	**1.74**	4.33	0.48	7.45	-0.18	0.53	819.43	820.08	3.26	2.59
R-27	R-26	0.556	0.86	0.481	0.679	1.259	18	155	0.34	817.56	818.09	822.67	822.35	15.42	4.33	5.45	**2.11**	3.49	0.74	6.16	0.71	0.27	820.18	820.60	2.49	1.75
R-28	R-27	0.106	0.94	0.099		0.099	12	82	0.50	818.19	818.60	822.35	823.33	15.00	4.38	0.43	**0.43**	3.22	0.42	2.53	2.09	0.01	820.70	820.71	1.65	2.62
R-29	R-27	0.552	0.79	0.435		0.679	15	219	0.34	818.29	819.03	822.35	823.38	15.41	4.33	2.94	**1.91**	3.07	1.19	3.77	0.83	0.21	820.70	821.15	1.65	2.23
R-30	R-29	0.301	0.81	0.243		0.243	12	80	0.50	819.23	819.63	823.38	823.57	15.00	4.38	1.06	**1.06**	3.22	0.41	2.53	1.46	0.09	821.25	821.32	2.13	2.25
R-24B	R-24	0.146	0.95	0.139		0.139	8	51	1.96	819.11	820.11	823.11	824.12	15.00	4.38	0.61	**0.61**	4.86	0.17	1.70	1.09	0.25	819.64	820.64	3.47	3.48
R-24C	R-24A	0.152	0.95	0.144		0.144	8	20	4.00	818.67	819.47	822.21	823.60	15.00	4.38	0.63	**0.63**	6.94	0.05	2.42	1.79	0.27	819.20	820.00	3.01	3.60
R-24D	R-24A	0.165	0.95	0.157		0.157	8	71	1.00	818.67	819.38	822.21	824.29	15.00	4.38	0.69	**0.69**	3.47	0.34	1.21	0.53	0.32	819.20	819.91	3.01	4.38
R-26A	R-26	0.144	0.95	0.137		0.137	8	98	2.00	818.56	820.52	822.67	825.95	15.00	4.38	0.60	**0.60**	4.91	0.33	1.71	1.12	0.24	820.18	821.05	2.49	4.90
R-32A	R-32	0.154	0.95	0.146		0.146	8	86	2.00	818.95	820.67	823.12	825.92	15.00	4.38	0.64	**0.64**	4.91	0.29	1.71	1.07	0.28	821.68	821.92	1.44	4.00

No inlet > 2.5 cfs for 10-year storm (max is 2.10 cfs at R-27)

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CONCOURSE OFFICE CENTER
PRELIMINARY & FINAL SITE PLAN
STORMWATER NARRATIVE AND PIPE CALCS

28

DATE: 3/10/2017
SHEET 28 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295DA.dwg
FB#460

JOB No. **16295**

REVISIONS:	REV. DATE
WCWRC REV 1	2/23/17
WCWRC REV 2	3/10/2017
TWP REV 1	3/24/17

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M:\Civil3d_Proj\16295\Site Plan\16295DA.dwg, 3/23/2017 12:07 PM, Jeremy A. Matthei, None

Concourse Offices - Phases 2 & 3
Stormwater Basin Calculations
Midwestern Consulting, LLC - Project 16295.A
8-Mar-17

Disturbed Areas
W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Total Site Area (Property Limits) 10.44 ac
Disturbed Site Area (Phases 2 & 3 Combined) 3.46 ac
Undisturbed Site Area Draining to Basin (Phase 1, Already Built) 6.58 ac
Total Site Area to Basin 10.04 ac

Malletts Creek and Banks Area within Parcel (Self-Crediting BMP) *0.40 ac* *(not draining to Basin)*
Total Site Area Excluding "Self-Crediting" BMPs 10.04 ac

Total Offsite Area Draining to Basin 16.79 ac
(Regional Basin Data taken from 2000 Site Plan for Concourse Office Center, Parcel 'C', and assumed unchanged)
Total Area Draining to Basin 26.83 ac

Rational Method Variables
(for first flush)

0.50 for pervious surfaces, Soil Type D
0.95 for house roofs, driveways, and roadways
1.00 for water surfaces (2-year pond elevation)

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) (Area)
Roofs	D	25,380	0.58	0.95	0.55
Pavement	D	84,446	1.94	0.95	1.84
Landscaping	D	40,786	0.94	0.50	0.47
Water Surface	D	0	0.00	1.00	-
Total		150,612	3.46	0.83	2.86

Total - Sum(C)(Area) 2.86 ac
Area Total 3.46 ac
Weighted C - (Sum(C)(Area))/(Area Total) 0.83

NRCS Variables
(for bankfull and 100-year calculations)

80 for Landscaping, Good Condition, Soil Type D

Pervious

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Landscaping	D	40,786	0.94	80	0.75
Total		40,786	0.94	80	0.75

Total - Sum(C)(Area) 0.75 ac
Area Total 0.94 ac
Weighted C - (Sum(C)(Area))/(Area Total) 80.0

NRCS Variables
(for bankfull and 100-year calculations)
98 for House Roofs
98 for Driveways and Roadways
98 for water surfaces (2-year pond elevation)

Impervious

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Roofs	D	25,380	0.58	98	0.57
Pavement	D	84,446	1.94	98	1.90
Water Surface	D	0	-	98	0.00
Total		109,826	2.52	98	2.47

Total - Sum(C)(Area) 2.47 ac
Area Total 2.52 ac
Weighted C - (Sum(C)(Area))/(Area Total) 98.0

Undisturbed Areas (Phase 1, Already Built)
Rational Method Variables
(2000 version calculations)

0.50 for pervious surfaces, Soil Type D
0.95 for house roofs, driveways, and roadways
1.00 for water surfaces (2-year pond elevation at 818)

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) (Area)
Roofs	D	13,275	0.30	0.95	0.29
Pavement	D	91,053	2.09	0.95	1.99
Landscaping	D	110,431	2.54	0.50	1.27
Water Surface	D	71,792	1.65	1.00	1.65
Phase 1 Total		286,551	6.58	0.79	5.19
Offsite	D	731,372	16.79	0.70	11.75
Phase 1 + Offsite		1,017,923	23.37	0.70	16.94

W2 - First Flush Runoff Calculations (Vff)

Disturbed Area (Phase 2 & 3 - 2016 Calculations)
A. Vff = 1" x 1'/12" x 43560 sft/ac x A x C 10,394 cft *0.24 ac-ft*

Undisturbed Area (2000 Calculations)
Phase 1 - Vff = 1815 x A x C 9,422 *cft* *0.22 ac-ft*
Offsite - Vff = 1815 x A x C 21,332 *cft* *0.49 ac-ft*

Onsite Total (Phases 1, 2, & 3) 19,816 *cft* *0.45 ac-ft*
Basin Grand Total - First Flush **41,147** ***cft*** 0.94 *ac-ft*

W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre) [Phases 2 & 3]

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pre-Development CN 79
(Good Cover Woods, Type D Soils)
C. S = (1000 / CN) - 10 2.658 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.739 in
E. Disturbed Site Area excluding "Self-Crediting" BMPs 150,612 sft
F. Vbf-pre = Q x (1/12) x Area 9,270 cft *0.21 ac-ft*

W4 - Pervious Cover Post-Development Bankfull Runoff Calculations (Vbf-per-post) [Phases 2 & 3]

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pervious Cover CN From Worksheet 1 80
C. S = (1000 / CN) - 10 2.500 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.787 in
E. Pervious Cover Area from Worksheet 1 40,786 sft
F. Vbf-per-post = Q x (1/12) x Area 2,674 cft *0.06 ac-ft*

W5 - Impervious Cover Post-Development Bankfull Runoff Calculations (Vbf-imp-post) [Phases 2 & 3]

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 1 109,826 sft
F. Vbf-imp-post = Q x (1/12) x Area 19,418 cft *0.45 ac-ft*

Total Post-Development Bankfull - Disturbed Area [Phases 2 & 3]
22,092 cft *0.51 ac-ft*

Bankfull - Undisturbed Area (2000 Version)
Phase 1 - Vbf = 8170 x A x C 42,410 *cft* *0.97 ac-ft*
Offsite - Vbf = 8170 x A x C 96,022 *cft* *2.20 ac-ft*

Onsite Total (Phases 1, 2, & 3) 64,502 *cft* *1.48 ac-ft*
Basin Grand Total - Bankfull **160,524** ***cft*** *3.69 ac-ft*

W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post) [Phases 2 & 3]

A. 100 year / 24 hour storm event: P= 5.11 in
B. Pervious Cover CN From Worksheet 1 80
C. S = (1000 / CN) - 10 2.500 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 2.989 in
E. Pervious Cover Area from Worksheet 1 40,786 sft
F. V100-per-post = Q x (1/12) x Area 10,159 cft *0.23 ac-ft*

W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post) [Phases 2 & 3]

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 1 109,826 sft
F. Vbf-imp-post = Q x (1/12) x Area 44,599 cft *1.02 ac-ft*

Total Post-Development 100-Year - Disturbed Area [Phases 2 & 3]
54,758 cft *1.26 ac-ft*

100year - Undisturbed Area (2000 Version)
Phase 1 - V100 = 16500 x A x C 85,651 cft *1.97 ac-ft*
Offsite - V100 = 16500 x A x C 193,924 cft *4.45 ac-ft*

Onsite Total (Phases 1, 2, & 3) 140,409 cft *3.22 ac-ft*
Basin Grand Total - 100 Year **334,333 cft** *7.68 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 [Phases 2 & 3]	**10,394**	**cft**	**0.24**	**ac-ft**
First Flush Volume [Existing Phase 1]	*9,422*	*cft*	*0.22*	*ac-ft*
First Flush Folume [Offsite]	*21,332*	*cft*	*0.49*	*ac-ft*
First Flush Volume (Vff)	**41,147**	**cft**	**0.94**	**ac-ft**
Pre-Development Bankfull Runoff Volume (Vbf-pre) [Phases 2 & 3]	**9,270**	**cft**	**0.21**	**ac-ft**
Pervious Cover Post-Development Bankfull Volume (Vbf-per-post)	*2,674*	*cft*	*0.06*	*ac-ft*
Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post)	*19,418*	*cft*	*0.45*	*ac-ft*
Total BF Volume (Vbf-post) [Phases 2 & 3]	**22,092**	**cft**	**0.51**	**ac-ft**
Bankfull Volume [Existing Phase 1]	*42,410*	*cft*	*0.97*	*ac-ft*
Bankfull Volume [Offsite]	*96,022*	*cft*	*2.20*	*ac-ft*
Bankfull Volume Grand Total (Vbf)	**160,524**	**cft**	**3.69**	**ac-ft**
Pervious Cover Post-Development 100-Year Volume (V100-per-post)	*10,159*	*cft*	*0.23*	*ac-ft*
Impervious Cover Post-Development 100-Year Volume (V100-imp-post)	*44,599*	*cft*	*1.02*	*ac-ft*
Total 100-Year Volume (V100-post) [Phases 2 & 3]	**54,758**	**cft**	**1.26**	**ac-ft**
100-Year Volume [Existing Phase 1]	*85,651*	*cft*	*1.97*	*ac-ft*
100-Year Volume [Offsite]	*193,924*	*cft*	*4.45*	*ac-ft*
100-Year Volume Grand Total (V100)	**334,333**	**cft**	**7.68**	**ac-ft**

B. Determine Onsite Infiltration Requirement [All Values in this Section are for the Disturbed Areas: Phase 2 & 3 Only]
Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume

Disturbed Post-Dev. Bankfull Volume (Vbf-post)	22,092	cft	0.51	ac-ft
Pre-Development Bankfull Runoff Volume (Vbf-pre)	9,270	cft	0.21	ac-ft
Bankfull Volume Difference	**12,822**	**cft**	**0.29**	**ac-ft**
Compare to Disturbed First Flush Volume (Vff)	**10,394**	**cft**	**0.24**	**ac-ft**
Greater of Bankfull Volume or First Flush Volume To be Infiltrated	**12,822**	**cft**	**0.29**	**ac-ft**

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* 26.83 ac * Total onsite and offsite areas draining to basin
C. Q100 = Q100-per + Q100-imp 7.862 in
(from W6 and W7, respectively)
D. Peak Flow (PF) = Qp x Q100 x Area / 640 245.06 cfs
ASSUME ZERO OUTFLOW WHEN MALLETTS CREEK IS AT FLOOD STAGE, AND STORE FULL 100-YEAR VOLUME
E. Delta = PF - 0 (outflow not considered) 245.06 cfs
[0.15 x Area (ac)] *4.02 cfs*
F. Vdet = Delta / PF x V100 334,333 cft 7.68 ac-ft
Required Detention not including infiltration credit or penalty.

Minimum Forebay Volume (5% of V100) 16,717 cft 0.38 ac-ft
Forebay Provided 13,888 cft 0.32 ac-ft
In addition to the forebay, the pond operates as a stilling basin with a depth of 5 feet below the outlet pipe, serving to settle solids before they exit the basin.
Permanent Pool Provided 221,067 cft 5.07 ac-ft
Permanent Pool % of 100-year Volume 66.1%
Permanent Pool Depth 5.0 ft

Retention
A. Vret = 2 x V100 668,667 cft 15.35 ac-ft

W11 - Determine Applicable BMPs and Associated Volume Credits
Due to the results of test pits performed under WCWRC supervision, infiltration is deemed infeasible on this site due to high groundwater and clay soils.

		Storage Volume (cft)		Design Infilt.	Infilt. Volume in	*Max. Allowable*	Total Volume
Proposed BMP	Area (sft)	Surface	Soil	Rate (in/hr)	6-hour storm (cft)	*48-hour Drawdown*	Reduction (cft)
Infiltration Basin (Elev 755 - 758, 3 feet)	0	0	0	0	0	0	0

Max. Allowable 48-hour drawdown must be greater than storage volume used for infiltration credit reduction.

Total Volume Reduction Credit by Proposed Structural BMPs (cft) 0
Runoff Volume Infiltration Requirement (Vinf) from Worksheet 9 (cft) 12,822
Runoff Volume Credit (cft) (12,822)

W12 - Natural Features Inventory

Existing Natural Resources	**Mapped**	Total Area (ac)	Protected Area (ac)
Water Bodies	Yes	1.94	1.94
Floodplains	Yes	1.69	1.69
Riparian Areas	Yes	0.40	0.40
Wetlands	Yes	0.00	0.00
Woodlands	Yes	0.00	0.00
Slopes (>33%)	Yes	0.00	0.00
Total Existing		4.03	4.03

W13 - Site Summary of Infiltration & Detention

A. Stormwater Management Summary
Minimum Onsite Infiltration Requirement (Vinf) 12,822 cft
Designed/Provided Infiltration Volume 0 cft
% Minimum Required Infiltration Provided 0%
Total Calculated Detention Volume, Vdet 334,333 cft
Net Required Detention Volume 334,333 cft
(Vdet - Designed/Provided Infiltration Volume)
****This represents the detention volume to be provided OVER the lowest orifice elevation****

B. Detention Volume Increase for sites where the required infiltration volume cannot be achieved.
% Required Infiltration NOT Provided 100%
(100% - % Minimum Required Infiltration Provided)

Net % Penalty 20%
(20% x % Required Infiltration NOT Provided)
Volume to Apply Penalty to [Phase 2 & 3] 54,758
Penalty Volume Applied to Disturbed Area Volume 10,951.55 cft
Total Required Detention Volume, including penalty **345,285 cft**
[(100% + Net % Penalty) x Net Required Detention Volume)]
****This represents the detention volume to be provided OVER the lowest orifice elevation****

W14 - Storage-Elevation Data
Pond Storage Information
(Includes forebay areas)

	Elevation (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)	Cum. Volume (ac-ft)
Bottom of Basin	810.6	31,930	0	0	0.00
	811	33,752	13,136	13,136	0.30
	812	38,466	36,109	49,245	1.13
	813	43,403	40,935	90,180	2.07
	814	48,539	45,971	136,151	3.13
	815	53,850	51,195	187,345	4.30
Top of Permanent Pool	815.6	58,554	33,721	221,067	5.07
Lowest Orifice	815.6	58,554	-	-	0.00
	816	60,824	23,876	23,876	0.55
	817	66,611	63,718	87,593	2.01
	818	71,792	69,202	156,795	3.60
	819	77,066	74,429	231,224	5.31
	820	82,466	79,766	310,990	7.14
Freeboard & Overflow Structure	820.3	84,306	25,016	336,005	7.71
Top of Pond	821	88,600	60,517	396,523	9.10

Forebay Storage Information

Elevation (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)	Cum. Volume (ac-ft)
812	132	-	-	0.00
813	553	343	343	0.01
814	1,242	898	1,240	0.03
815	2,185	1,714	2,954	0.07
816	2,844	2,515	5,468	0.13
817	4,151	3,498	8,966	0.21
818	5,693	4,922	13,888	0.32

Total Storage Volumes
1" Event 41,147 cft 0.94 ac-ft
2-year Event 160,524 cft 3.69 ac-ft
100-year Event including Penalty 345,285 cft 7.93 ac-ft

Storage Elevations
Elevation for 1" event 816.27 Elevation 0.67 ft. depth
Elevation for 2-year event 818.05 Elevation 2.45 ft. depth
Elevation for 100-year event 820.41 Elevation 4.81 ft. depth

W15 - Three-Stage Outlet Design
Xbot (bottom detention elevation) 815.60
Xff (first flush elevation) 816.27
Xbf (bankfull detention elevation) 818.05
X100 (100-year + 20% detention elevation) 820.41
Vff (first flush volume) 41,147 cft
Vbf (bankfull detention volume) 160,524 cft
V100 (100-year detention volume + 20% penalty) 345,285 cft

Area Draining to Basin 26.83 ac
Qallow (allowable 100-year release rate) 4.02 cfs 0.15 cfs/acre x area draining to basin

1. First Flush (>24 hours)
Qff = V/T24 0.476 cfs
Openings at bottom of Basin, Elevation: 815.60
Average head 0.45 ft h(ave) = 2/3 (Xff - Xbot)
Required Area 0.143 sft Aff = Qff / .62 / sqrt(2*g*h-ave)

Orifice Diameter 2.00 in
Orifice Area 0.02182 sft
Number Required for 24 hour drainage 6.56
Number of holes used 6.00
Use 6 - 2" dia. holes at 815.60

Actual Area 0.13090 sft
Actual Flow 0.436 cfs Q = 0.62 * A * sqrt(2*g*h-ave)
Actual Time 26.24 hr T = Vff / Q
Time is greater than 24 hours, so design complies.

2. Two-Year Bankfull Storm (36-48 hour holding)
Average head 1.64 ft h(ave) = 2/3 (Xbf - Xbot)

Check if First Flush orifices are adequate.
Flow Rate 0.83 cfs Q = 0.62 * Aff * sqrt(2*g*h-ave)
Time to drain 53.53 hr T = Vbf / Q
Time is > 48 hours. Additional orifices for 2-year storm are required.

Remaining Volume 119,377 cft Vrem = Vbf-Vff
Target Time 42.0 hr
Remaining Time to Target 15.76 hr Trem = Ttot - Tffnew

Average bankfull head at first flush orifices 1.86 ft haveff = 2/3 (Xbf - Xff) + (Xff-Xbot)
Flow in first flush when both sets of orifices contribute 0.89 cfs Q1 = 0.62 * Aff * sqrt (2*g*haveff)
Volume through first flush when both sets contribute 50,397 cft V1 = Trem * Q1 * 3600 sec/ 1 hr

Leftover volume in bankfull orifice 68,980 cft V2 - Vrem - V1
Leftover flow rate in bankfull orifice 1.22 cfs Q2ideal = V2 / Trem * 1 hr / 3600 sec
Average bankfull orifice head 1.19 ft havebf = 2/3 (Xbf - Xff)
Area required for bankfull orifices 0.22411 sft A2 = Q2 / 0.62 / sqrt (2*g*havebf)

Orifice Diameter 2.50 in
Orifice Area 0.03409 sft
Number Required for bankfull drainage 6.57
Number of holes used 5.00
Use 5 - 2.5" dia. holes at 816.27
Actual Area 0.17044 sft
Actual Flow 0.925 cfs Q2actual = 0.62 * A * sqrt(2*g*h-ave)
Time to drain above Bankful Orifice 18.29 hr T2 = Vrem / (Q1+Q2actual) / 3600

Actual Time to fully drain Bankfull 44.53 hr Tbf = T2 + Tff
Time is between 36-48 hours, so design complies.

3. 100-Year Storm (0.15 cfs/acre max outflow)
Maximum (total) head at bottom orifices 4.81 ft htot = X100 - Xbot
Maximum head at bankfull orifices 4.14 ft htotbf = X100-Xff
Maximum head to 100-year orifices 2.36 ft htot100 = X100-Xbf

Allowable outflow 4.02 cfs 0.15 cfs/acre x area draining to basin

Max. Flow from first flush orifices 1.43 cfs Qff = 0.62 * Aff * sqrt(2*g*htot)
Max. Flow from bankfull orifices 1.73 cfs Qbf = 0.62 * Abf * sqrt(2*g*htotbf)
Allowable Max. Flow through 100-year orifices 0.87 cfs Qallow = Qa - Qff - Qbf

Area for 100-year orifices 0.11386 sft A = Qallow / .62 / sqrt(2*g*h100)
Orifice Diameter 2.00 in
Orifice Area 0.02182 sft
Number Required for 100-year drainage 5.22
Number of holes used 5.00
Use 5 - 2" dia. holes at 818.05

Actual Area 0.10908 sft
Actual Max. Flow (100-year orifices) 0.83 cfs Q100 = 0.62 * A100 * sqrt(2*g*htot100)
Combined Max. Flow 3.99 cfs Qtot = Q100 + Qff + Qbf
Actual flow is less than 4.02 cfs (0.15 cfs/acre), so design complies.

4. 100-Year Drawdown (72 hour max)
Volume to draw down to bankfull orifice 184,761 cft Vrem = V100 - Vbf
Average head above 100-year orifice 1.57 ft h100ave = 2/3 (X100 - Xbf)
Average flow rate in 100-year orifice 0.68 cfs Q100ave = 0.62*A100 * sqrt (2*g*h100ave)
Total average rate above 100-year orifice 3.83 cfs Qave = Q100ave + Qff + Qbf)
Time to drain to 100-year orifice 13.38 hr Trem = Vrem / Qave / 3600 (sec/hr)

Total time to drain basin 57.92 hr Ttot = Trem + Tbf
Time is less than 72 hours, so design complies.

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STORMWATER BASIN CALCULATIONS

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DATE: 3/10/2017
SHEET 29 OF 39
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ENG: JAM
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Earthwork

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall perform all excavation and backfilling necessary to complete the work. This shall include the excavation of earth and rock, the removal and disposal of unsuitable material, dewatering, placement of suitable fill and backfill material, pipe boring and jacking, all quality assurance testing, and the restoration and final grading for all earth surfaces.

1.02 WORK WITHIN RIGHTS-OF-WAY

A. Where the governmental bodies having jurisdiction of the streets or rights-of-way have specific specifications relating to the requirements for work within their jurisdiction, such requirements must be met as a minimum requirement, and if these Specifications impose further limitation on the work, they shall also be met as the required work standard.

B. During all operations of the CONTRACTOR in the streets and roadways, the CONTRACTOR shall maintain barricades, lights, and warning signs as required by the agency having jurisdiction.

1.03 WORK WITHIN EASEMENTS

A. During construction within any easements, the CONTRACTOR shall confine himself to the limits shown on the Plans. He shall notify property owners in advance of moving equipment on easements and use of the access routes which will be designated by the OWNER. The OWNER will cooperate in working out the details of access. The topsoil over the trench shall be removed and carefully replaced upon completion of the work. The backfill of the trench in the easement may be left slightly high to provide for any slight residual settlement. Any trees, shrubs, or bushes removed shall be replaced to the satisfaction of the property owner.

1.04 SOIL BORINGS

A. Soil boring results, if taken on a site, are appended to these Specifications with locations noted. Boring logs are shown to be generally representative of the site and to assist in the design and construction of the work.

2.00 PRODUCTS

2.01 BACKFILL MATERIAL

A. For areas not requiring "granular backfill" material, backfill shall be of the excavated material, with the exception that materials such as soft clay, topsoil, muck, cinders, vegetable matter, refuse, boulders and other objectionable and non-packing earth shall be excluded from the backfill and removed from the site. Stone larger than 3 inches in any dimension shall be excluded from the backfill and removed from the site by the CONTRACTOR.

B. Where "granular material" backfill is required as specified herein, backfill material shall be defined as a material meeting granular material Class II as defined in 2003 MDOT 902.08.

C. All utilities within road right-of-way corridor (existing or proposed) shall be backfilled with MDOT CL II granular material compacted to 95% maximum unit weight.

D. All utilities shall be installed with 2 NS sand bedding or better.

2.02 ENCASING PIPE

A. Steel encasing pipe for boring and jacking shall conform to the requirements of either, ASTM A53, Type E or S, Grade B or ASTM A139, Grade B.

B. Steel encasing pipe used under channels and highways shall meet the requirements of the governmental agency having jurisdiction and the following minimum requirements:

Nominal Diameter (Inches)	Maximum Wall Thickness
Under 13	0.188 inches
13-24	0.250 inches
25-36	0.312 inches
42	0.438 inches
48	0.500 inches
54	0.563 inches

C. Steel encasing pipe used under railroads shall meet the requirements of the railroad and the following minimum requirements:

	Minimum Wall Thickness (inches)	
Nominal Diameter (Inches)	Coated or Cathodically Protected	Uncoated & Unprotected
Under 14	0.180	0.251
14-16	0.219	0.282
18	0.250	0.313
20	0.281	0.344
22	0.312	0.375
24	0.344	0.407
26	0.375	0.438
28-30	0.406	0.469
32	0.438	0.501
34-36	0.469	0.532
38-42	0.500	0.563
48	0.563	0.626

D. Casing pipe joints shall be welded to form a leak-proof continuous casing.

E. The inside diameter of casing pipe shall be at least 2 inches greater than the largest outside diameter of the carrier pipe joints or couplings for carrier pipe less than 6 inches in diameter, and at least 4 inches greater than the largest outside diameter of the carrier pipe joints for carrier pipe 6 inches and over in diameter, unless otherwise shown on the Plans.

F. The steel casing pipe shall be of smooth interior and shall be placed accurately to line and grade, allowing for the encased pipe thickness and supports under each length of encased pipe.

3.00 EXECUTION

3.01 GENERAL EXCAVATION

A. Excavation shall be performed by any practicable method consistent with the integrity and protection of the work and neighboring structures, workmen, and the public. Topsoil shall be separately removed and stockpiled for reuse.

B. All excavation, except where necessary to tunnel, bore or jack under roads, railroads, tree roots and other obstructions within the limits indicated on the Plans, may be open cut from the surface. Tunneling or boring under trees shall be considered as incidental to construction and will not be considered as cause for request for additional payment.

C. Foreign material or unsuitable foundation material encountered such as wood, boulders, etc., which obstruct the excavation, shall be removed. Such materials found at the bottom of the excavation shall be removed and the foundation restored with approved materials.

D. If excess excavation is made or the material becomes disturbed so as to require removal beyond the prescribed limits, the resulting space shall be filled with selected material solidly tamped into place, in not more than 6-inch layers to the satisfaction of the ENGINEER, before the construction work proceeds. At the direction of the ENGINEER, the excess excavation may be filled with 2000 psi concrete at the CONTRACTOR's expense.

E. The excavation shall be kept dry during the work. Where water is encountered in the excavation, it shall be removed by pumping or well points. All necessary precautions shall be taken to prevent damage to existing wells and to completed or partially completed structures. The CONTRACTOR shall be responsible for all damages caused by him due to inadequate or improper protection.

F. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction areas, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental the Contract work.

G. Any excavation not backfilled at the end of each day must be clearly marked and surrounded by appropriate safety fencing as directed by the ENGINEER. If directed by the ENGINEER, the CONTRACTOR shall cover the open excavation with a steel plate and light the excavated area.

3.02 EXCAVATION FOR SEWERS AND WATER MAINS

A. Trenches shall be excavated to the depth required with allowance for bedding the pipe. The trench shall be cut wider and deeper at each pipe joint location to provide for properly completing the pipe joint and to relieve the joint of all loadings.

B. The width of the trench at the top of a rigid pipe shall be sufficient to allow the pipe to be laid and jointed properly and shall provide for a minimum net clearance of 6 inches and a maximum net clearance of 12 inches on each side of the barrel of the pipe and to allow the backfill to be placed and properly compacted.

C. The width of trench at the top of a flexible pipe backfill when using concrete bedding shall be sufficient to allow the pipe to be laid and jointed properly with the minimum net clearance of 12 inches and a maximum net clearance of 18 inches on each side of the barrel of the pipe.

D. Where the conditions of the ground require or where the work is in close proximity of existing structures, the sides of excavation shall be securely held by bracing and/or sheeting which may be removed in units when the level of the backfill has reached a point where it is safe to pull the sheeting without disturbing the protected feature. No sheeting, bracing, or other timber shall be left in the excavation upon the completion of the main or other structures, except with the specific review and direction of the ENGINEER.

E. Other underground mains, sewers or structures encountered in the excavation shall be adequately supported during the CONTRACTOR's operations, and before backfilling, shall be given permanent support as directed by the ENGINEER to meet the standards or requirements of the owning utility or agency.

F. Water, sewer, gas and other utility services disturbed by the CONTRACTOR in his operations shall be repaired or replaced in a manner equal to the original condition by the CONTRACTOR at his own expense. Where these services are encountered and are undamaged, they shall be supported and/or protected by the CONTRACTOR at his expense against later settlement and/or damage after backfill. The CONTRACTOR shall consult the agency or the utility firm having jurisdiction over any duct line, gas main, etc., which may cross the excavation to determine method of supporting such duct or pipe.

G. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve manhole covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clean, or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed except as otherwise provided for herein on a temporary basis.

3.03 EXCAVATION FOR STRUCTURES

A. Excavation for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and for practicable construction methods to be followed.

B. Requirements for excavation of sewers and water mains shall also apply to this Section.

3.04 EXCAVATION FOR PAVED SURFACES

A. In excavating around manholes and catch basins or inlets, care shall be exercised to avoid removing the casings and pushing dirt into the structures. Dirt pushed into manholes, catch basins or inlets by the CONTRACTOR's operations shall be immediately removed so that the dirt will not be carried into the sewer by the flow of sewage or storm water.

B. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction area, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in the judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental to the Contract work.

3.05 ROCK EXCAVATION

A. Rock excavation shall consist of excavating igneous, metamorphic and sedimentary rock which cannot be excavated without continuous drilling and blasting or drilling and splitting to fracture the rock. Blasting shall be permitted only after it has been shown that other methods of excavation are impractical. All rock excavation shall be carried to a minimum depth of 8 inches below the pipe or manhole bottom and to the bottom of all footings. The width of the rock excavation shall not exceed the diameter of the pipe plus 12 inches on either side or the edge of the foundation footing.

B. When the use of explosives is necessary for the progression of the work, the CONTRACTOR shall comply with all laws, ordinances and applicable safety code requirements and regulations relative to the handling, storage and use of explosives and protection of life and property. A person competent and experienced in the use of explosives shall be employed to supervise the work. The CONTRACTOR shall schedule all blasting for a definite hour of the day and shall so notify all residents and businesses in the area as to the scheduled day and hour for such blasting operations. Explosive materials shall not be stockpiled and stored in residential areas. Explosives and initiating devices shall not be carried in the same vehicle.

C. Suitable weighted plank coverings or timber mats shall be provided to confine all materials lifted by blasting within the limits of the excavation of trench. Excessive blasting or overshooting shall not be permitted. Any material outside of the authorized excavation cross section which may be shattered or loosened shall be removed at the CONTRACTOR's expense. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

3.06 PIPE BORING AND JACKING

A. The CONTRACTOR shall obtain all necessary permits for jacking the encasing pipe under channels, highways and/or railroads and shall notify the governmental agency and/or company having jurisdiction 48 hrs before work at any crossing is started. The CONTRACTOR shall pay all costs for an inspector and/or flagmen required by a railroad or governmental agency.

B. A suitable approach trench shall be opened, adjacent to the toe of the slope of the embankment. The approach trench shall be long enough to accommodate the length of pipe units to be placed, and wide enough to provide sufficient working room. Guide timbers or rails for keeping the pipe on-line and grade shall be installed in the bottom of the trench and heavy timber backstop supports installed at the rear of the trench to take the thrust of the jacks. A timber bearing a "pushing frame" shall be built and furnished to fit or match the end of the pipe to be jacked, so that the pressure of the jacks will be evenly distributed over the end of the pipe. Two (2) hydraulic jacks of sufficient power shall be used to apply pushing or jacking pressure. For firm ground, excavation shall be carried on from inside the pipe, not to exceed twelve (12) inches ahead of the lead pipe. For unstable ground, the lead pipe shall precede the auger. Excavation at the top and sides shall be accurately cut to line and grade. Adjoining sections of steel pipe shall be welded. Pipe shall be jacked on successive shifts until completed to guard against the "freezing of the line" due to settlement and compaction of surrounding soil.

C. The sheeting of pits along any road will be required if the leading edge of all work pits will be closer to the pavement edge than the shoulder point or ten (10) ft, which ever distance is greater, or on curb and gutter sections, at least five (5) ft from back of curb.

D. Upon completion of the installation of the steel pipe encasement, the contractor shall furnish and install a bolted style casing spacer as described below on the carrier pipe. Casing spacers shall be placed a maximum of seven (7) feet apart along the length of the carrier pipe with one casing spacer within 2-1/2 feet of each side of a pipe joint and the rest evenly spaced. Wood skids are not an acceptable method of supporting the carrier pipe.

1. Casing spacers for carrier pipes from 4" - 24" shall be made of a molded, segmented high density polyethylene plastic with 304 stainless steel connecting nuts and bolts. Minimum spacer width shall be 5.2" for carrier pipes from 4" - 12" and 7.0" for carrier pipes 14" - 24". Each casing spacer shall have at least six (6) integrally molded skids extending 1" beyond the bell or mechanical joint of the carrier pipe. The casing spacers shall be equal to the PSI Ranger as manufactured by Pipeline Seal and Insulator, Inc., Houston, TX.

2. Casing spacers for carrier pipes larger than 24" shall be a PVC fusion bonded coated (10-16 mils) steel shell (minimum 14 gauge steel) with a 90 mil PVC inner liner and 2" wide 30% glass reinforced polyester runners (minimum compressive strength = 18,000 psi) (polyethylene is not an acceptable runner material) attached by 3/8" coated steel studs welded to the steel shell. All bolts and nuts used to fasten the shell to the carrier pipe shall be cadmium plated steel. Where riser are required under the runners they shall be a minimum 10 gauge steel welded to the shell and coated as specified for the shell (epoxy is not an acceptable coating for the shell riser). The casing spacers shall be equal to the PSI Model C as manufactured by Pipeline Seal and Insulator, Inc., Houston, Texas.

E. Boring shall be performed by accepted and recognized methods which will provide adequate safety and protection at all times to workmen employed in the work and to inspectors and others involved in the construction.

F. If voids should develop around the outside of the encasing pipe, grouting or other methods approved by the ENGINEER shall be employed to fill such voids.

G. After the pipes are tested satisfactorily, the remaining space between the carrier pipe and the encasing pipe shall be pressure grouted or otherwise filled with concrete. The carrier pipe shall be adequately braced to prevent floating or movement of the pipe.

3.07 SHORING, SHEETING AND BRACING

A. Where sheet piling, shoring, sheeting, bracing, or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the CONTRACTOR.

B. All sheet piling, shoring, sheeting and bracing shall be designed by a professional engineer engaged by the CONTRACTOR with demonstrated competence and experience in such work. The sheeting system shall be designed to prevent bottom failure and hydrostatic uplift within the excavation. Provision shall also be made in the design for lateral pressures due to side slope and construction equipment or other surcharge loads, as applicable.

C. The CONTRACTOR shall provide to the ENGINEER for his review, design calculation and arrangement drawings of the sheeting system prior to ordering any materials for bracing, sheeting, etc., and prior to the commencement of the excavation.

D. All materials, except as otherwise specified, used for sheeting and sheet piling, lagging, braces, shores, and stringers, or waling strips shall be of approved quality and dimensions throughout.

E. Materials for sheeting systems shall be furnished and driven or set in place by the CONTRACTOR, where necessary or wherever ordered by the ENGINEER, whether the same is or is not considered necessary by the CONTRACTOR. If, in the opinion of the ENGINEER, the materials furnished by the CONTRACTOR are not of proper quality or sufficient size or not properly placed to ensure the safety of the work or of adjacent structures and property, the CONTRACTOR shall, upon notice from the ENGINEER to that effect, forthwith procure, furnish and set in place or drive other and satisfactory materials, or place the material in a satisfactory manner; and if he shall fail or neglect to do so, the ENGINEER may order all or any part of the work to be stopped until such materials so used are furnished and placed; and the CONTRACTOR shall not be entitled to claim, demand, or receive any compensation for larger size or better quality or different disposal of materials ordered by the ENGINEER, nor any compensation for allowance of any kind whatsoever for or on account of any damage or delay resulting from such stoppage of work.

F. Steel sheet piling may be either new or used. It shall be of adequate strength, straight and properly braced. Steel sheet piling shall be of the interlocking type. Friction in the interlocks shall not be assumed to contribute to the strength of the sheet piling.

G. The design, planning, installation and removal, if required, of all sheet piling, shoring, sheeting, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.

H. Steel sheet piling for the excavation shall be driven straight and in-line. The piling shall be supported above ground, before driving, by a guide frame at least 20 ft high which will keep the piling accurately in the required position and vertical. Each piece of piling shall be driven only a few feet at a time and driving shall proceed continuously around the perimeter so that the piles shall reach their full penetration together.

I. Walers and bracing shall be supplied and installed as required to complete the sheeting system. Walers and braces shall be of adequate strength for the load imposed. Splices in walers shall develop the full strength of the member in bending, shear, and axial compression.

J. If bracing members are to be removed during construction, the timing and procedure for removal shall not induce excessive stresses in the permanent structures or in steel sheet piling and bracing members.

K. If the construction sequence of structures requires the transfer of bracing to the completed portions of any structure, the CONTRACTOR shall secure written acceptance of the ENGINEER prior to the installation of such bracing.

L. In trenching operations the use of horizontal strutting below the barrel of pipe or the use of the pipe as support for trench racing will not be permitted. The use of a traveling shield for sewer construction shall require that the device be approved for use by a professional engineer. Sheet piling and timbers in trench excavations shall be withdrawn in a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe.

M. The neglect, failure, or refusal of the ENGINEER to order the use of sheeting, or sheet piling or steel, or to order the same to be left in place, or the giving or failure to give of any order or directions as to the manner or methods of driving or placing sheeting, sheet piling, bracing, shores, etc., shall not in any way relieve the CONTRACTOR of any or all obligations under this Contract. Sheeting left in place shall be cut off one (1) ft below existing grade.

N. The rules of the OSHA and the State Department of Labor with respect to excavation and construction shall at all times be strictly observed.

3.08 GENERAL BACKFILLING

A. For all areas, unless otherwise noted, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum density.

B. Under pavements, curb, paved driveways, and sidewalks, and where pipe is within a one on one influence of pavement, compaction testing shall be performed by an independent testing laboratory. Testing shall be performed at intervals of one test per lift per 50 feet of trench or as determined necessary by the ENGINEER.

C. In residential developments, all backfill within the road corridor shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be as such to obtain 95% of the maximum unit density as determined at the optimum moisture content. For purposes of this section, the road corridor is defined as front of house to front of house, including right-of-way and adjacent easements and setbacks.

3.09 BACKFILLING FOR SEWERS AND WATER MAINS

A. Backfilling shall consist of placement of the prescribed materials from a level 12 inches above the crown of the pipe. Placement shall be as follows:

1. Under gravel driveways, gravel roads and shoulders, the backfill shall be granular material which shall be solidly compacted by mechanical tamps in layers of not more than 12 inches loose thickness with backfilling carried up to within 12 inches of finished grade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

2. Under pavements, curb, paved driveways, and sidewalks, the backfill shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content. After a period of about 60 days or less, if the backfill compaction is satisfactory to the ENGINEER, to provide for any slight settlement, the CONTRACTOR shall retrim neatly any broken edges of pavement and replace the top surface of the backfill within the pavement area with pavement surface equal to that surface which was removed. The pavement shall be replaced in accordance with the standard specifications of the agency having jurisdiction.

3. Backfill around lift stations, or buried underground structures shall be granular material compacted in 12-inch lifts. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

4. For all other areas, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum unit density as determined at the optimum moisture content.

3.10 FILLING AND BACKFILLING FOR STRUCTURES

A. Embankments underlying structural footings, streets and drives, sidewalks and around structures shall be granular material meeting the requirements of the Michigan Department of Transportation for granular material compacted to 95% density.

B. In all other areas, material required for embankments and backfilling shall be soil or soil-rock mixture free of organic and other deleterious matter and shall contain no more than 15% rocks or lumps larger than 2-1/2 inches in the greatest dimension, compacted to 90% density.

C. Under all interior and exterior floor slabs, an 8-inch thick granular cushion shall be placed. This material shall be clean mineral aggregate meeting the following gradation requirements:

Passing the No. 4 Sieve	100%
Passing the No. 200 Sieve	0-3%

D. Where embankment material is placed to achieve a new surface elevation, the top 4 inches shall be approved topsoil either salvaged from the site or hauled in by the CONTRACTOR.

3.11 FILLING AND BACKFILLING FOR PAVED SURFACES

A. Embankments, including sand cushions and granular fills, shall be placed in successive layers not more than 6 inches in depth the full width of the cross section, each layer to be thoroughly compacted by means of vibratory compactors or by an approved pneumatic-tired roller or combination thereof, as required by the ENGINEER. Each layer shall be compacted to not less than 95% of the maximum unit density as determined at the optimum moisture content. All parts of the embankment shall be uniformly compacted and the CONTRACTOR shall so direct all earthmoving equipment used in the work so that the same shall be attained. Embankment or fill outside the limits of the subgrade where sand or gravel is not required shall be made with suitable material which is free from perishable organic matter, rubbish, stones, broken concrete, roots, or other foreign materials, at no additional compensation. Before any embankments are begin, the base shall be made firm and cleared of topsoil, sod or other perishable material. The sides of the embankment shall be neatly and evenly dressed to the slope shown on the Plans, or such other slope as the ENGINEER may direct.

B. Upon completion of the placing of the curbs, and after the concrete has cured sufficiently, forms shall be removed and the excavated space behind the curb shall be backfilled with a good quality of surface soil, free of rubbish, stone, broken concrete, roots or other foreign material. Where adequate acceptable material for backfill behind the curb is not available, granular fill conforming to 2003 MDOT 8.02.06, Class II, shall be used. Where the area behind the curb is in cut, it shall be trimmed from the top of the curb on the slope shown on the Plans. If the area is in embankment or fill, an earth berm shall be placed immediately adjacent to the top of the curb and then the embankment of fill shall be finished to the slope shown on the Plans. All trimming and finishing shall be done in a neat, workmanlike manner. All excess concrete and debris shall be removed from the excavation behind the curb line before backfilling begins.

C. In construction of non-rigid pavements, backfilling back of curb and gutter shall be completed before placement and compaction of the base course of the roadway.

3.12 PREPARATION OF SUBGRADE FOR ROADWAY SURFACES

A. The bottom of the excavation for the pavement or top of the fill shall be known as the pavement subgrade and shall be smoothed, trimmed and compacted to the required line, grade and cross section to receive the road metal. It shall be thoroughly compacted by rolling with a roller of approved type weighing not less than 8 tons. The subgrade shall be compacted to at least 95% of the maximum density as designated by the test method AASHTO T-180. Inaccessible areas, where rolling is not practical, shall be thoroughly compacted by mechanical tampers capable of striking a blow equivalent to at least 250 foot-pounds per square foot. The subgrade thus formed shall be maintained in a smooth and compacted condition until the pavement has been placed. No base course, surfacing, curb, or curb and gutter, shall be placed until the subgrade has been reviewed by the ENGINEER. The subgrade shall be finished in an acceptable condition at least one day in advance of the pavement construction at all times. Six inches of compacted depth of granular material shall be used where uncompactable soil is encountered. The granular fill shall conform to the 2003 MDOT 9.02.08., Class II, compacted to 95% of its density.

B. Immediately prior to placing the pavement, the subgrade shall be tested for conformity with the cross section shown on the Plans by means of an approved template riding on the curb and gutter sections or on side forms. If necessary, materials shall be removed or added, as required, to bring all portions of the subgrade to the correct elevation. Corrected portions shall then be thoroughly compacted and again tested with the template. Pavement material shall not be placed at any portion of the subgrade which has not been tested for correct elevation.

C. The finished subgrade shall be maintained in a smooth and compacted condition until the pavement is placed. No storage piles of fine or coarse aggregate shall be placed directly upon the finished subgrade. Should the subgrade become rutted or disturbed in any manner, it shall be reshaped and recompacted.

3.13 GRADING

A. The CONTRACTOR shall grade the site to achieve the elevations as shown on the Plans. All disturbed areas beyond the grading limits shall be restored to prior condition.

B. Surplus excavated material not needed for embankment shall be disposed of by the CONTRACTOR. Headwalls, culverts, drains, sewers and appurtenances filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, repaired, or replaced at his expense.

C. All temporary earth changes shall be in conformance with the Soil and Erosion Control Act.

3.14 RESTORATION

A. Headwalls, culverts, and drainage systems filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, relaid or rebuilt with new materials to a condition equal to the original state, and of thickness equal to the original structure and to the original line and grade at the CONTRACTOR's expense.

B. Where the excavation is located beside a ditch and/or where an existing ditch is filled or disturbed in the CONTRACTOR's operations, the CONTRACTOR shall clean, repair, or replace the ditch with properly pitched bottom and side slopes and of section and capacity not less than the original section.

C. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

D. The CONTRACTOR shall remove excess dirt and other construction material from the site of the work and leave the site in a condition equal to its original state.

E. The final condition of the streets and roadways shall be subject to the approval of the governmental body having jurisdiction thereof, as well as review by the ENGINEER.

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108–9721
48108–9721
Tel. 734.822.3101
www.pittsfield–mi.gov

Revision	By	Appd.	YY.MM.DD
TWP REV	BWA	DRW	11.04.27
UPDATES	TTN	DRW	10.01.20

Issued — By — Appd. — YY.MM.DD

File Name: SE–02	TTN	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
EARTHWORK SPECIFICATIONS

Project No. 2075001300
Scale NOT TO SCALE
Revision 1

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
EARTHWORK SPECIFICATIONS

30

DATE: 2/15/17
SHEET 30 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
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FB#460

JOB No. 16295
REVISIONS: REV. DATE
TWP REV 1 3/24/17

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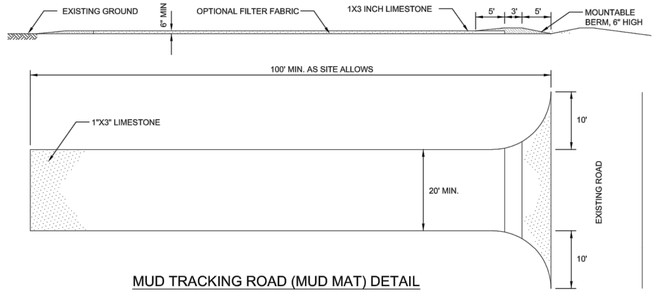
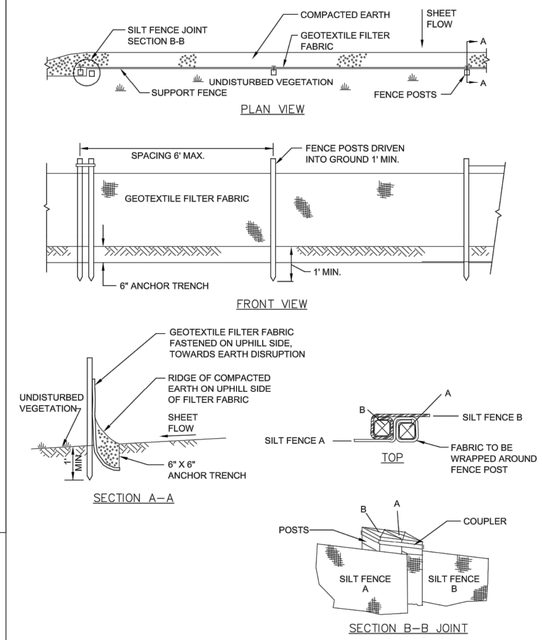
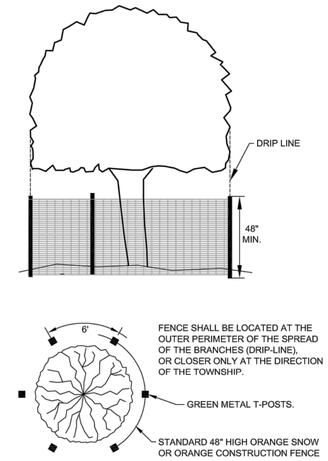


MUD TRACKING ROAD (MUD MAT) DETAIL



SILT FENCE

NOT TO SCALE



NOTES:
1. ALL TREES TO BE REMOVED WILL BE IDENTIFIED BY RED FLAGGING.
2. TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION AND GRADING IS COMPLETE.
3. ALL DEBRIS, FILL, EQUIPMENT OR MATERIAL IS TO BE KEPT CLEAR OF AREA WITHIN PROTECTIVE FENCE. NO CLEANING OF EQUIPMENT OR MATERIAL OR STORAGE OR DISPOSAL OF ANY MATERIAL WITHIN THE DRIP LINE OF ANY TREES TO BE SAVED.

TREE PROTECTION FENCE DETAIL

NOT TO SCALE

PITTSFIELD CHARTER TOWNSHIP
SOIL EROSION AND SEDIMENTATION CONTROL NOTES

GENERAL

1. The contractor shall implement and maintain the soil erosion control measures as shown on the plans at all times during construction on this project. Any modifications or additions to the soil erosion control measures due to construction or changed conditions, shall be complied with as required or directed by the owner, project engineer or Pittsfield Township.
2. All soil erosion and sedimentation control work shall conform to the permit requirements of Pittsfield Township and the laws of the State of Michigan.
3. A NPDES construction activity permit is required for all sites greater than 5 acres.
4. Daily inspections shall be made by the contractor. Periodic inspections may be made by the owner/project engineer/Township to determine the effectiveness of erosion and sedimentation control measures. Any necessary corrections shall be made without delay.
5. Erosion and sedimentation from work on the site shall be contained on the site and not be allowed to collect on any off-site areas or in waterways.
6. All mud/dirt tracked onto roads from the site due to construction, shall be promptly removed by the contractor.
7. Restoration of all disturbed areas, including placement of topsoil, seed, fertilizer and mulch and/or sod shall be done within 5 days of the completion of final grade.
8. Construction operations shall be scheduled and performed so that preventative soil erosion control measures are in place prior to excavation in critical areas and temporary stabilization measures are in place immediately following backfilling operations.
9. Special precautions will be taken in the use of construction equipment to prevent situations that promote erosion.
10. Proper dust control shall be maintained during construction by use of water trucks and/or chloride as required.
11. The contractor shall be responsible for maintaining all temporary soil erosion control measures and removal of some upon authorized completion of project. Completion of project will not be authorized until all site work, home building, road work and utility construction is complete and all soils are stabilized.
12. The contractor shall not grade in existing wetland or conservation areas to be protected. Silt fence shall be installed and maintained adjacent to existing wetland and conservation areas to prevent grading, erosion and sedimentation into them.
13. Tree protection fencing must remain intact until restoration of the site is complete.

SEQUENCE OF CONSTRUCTION

1. Install sediment fence and tree protection fencing prior to any grading operation.
2. Install mud-tracking pad.
3. Construct temporary sediment/detention basin.
4. Place topsoil, fertilizer, seed and mulch over the entire detention basin area.
5. Rough grade site, stockpile topsoil and begin building construction.
6. Install storm drainage system including riprap and parking lot inlet filters and detention basin standpipe.
7. Maintain erosion and sedimentation control measures, as required.
8. Install sanitary sewer and water systems.
9. Bring pavement areas to sub-base grade, place sub-base and bituminous pavement.
10. Install franchised utilities.
11. Finish grade, redistribute topsoil, seed and mulch all disturbed areas.
12. Remove any accumulated sediment within the detention basin and replace clean washed stone around standpipe.
13. Complete construction of site.
14. Insure all soil is stabilized. Remove all temporary soil erosion control measures.

SEEDING/SOD

1. Seed or sod in accordance with project specifications.
2. All areas of disturbed earth that are not to be paved or sodded shall have 4 inches of topsoil, seed, fertilizer and mulch.
3. Immediately after seeding, mulch all seeded areas with unweathered small grain straw (preferably wheat) or hay spread. Spread uniformly at the rate of 1 ½ to 2 tons or 100 pounds (2 to 3 bales) per 1,000 square foot. This mulch should be anchored with a disc-type mulch-anchoring tool.
4. Any disturbed area not paved, seeded or mulched, sodded or built upon by November 15, is to be mulched in the manner as specified above, in order to provide soil erosion protection during the winter and early spring.
5. All erosion and sedimentation control prevention procedures and structures are to comply with the Standards and Specifications for soil erosion and sediment control of the Washtenaw County Soil Conservation District.
6. Drainage ditches and slopes steeper than 1:4 (25%) shall be stabilized with erosion control blankets.
7. Steep slopes that do not take upon initial seeding must be re-seeded and stabilized with erosion control blankets.
8. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

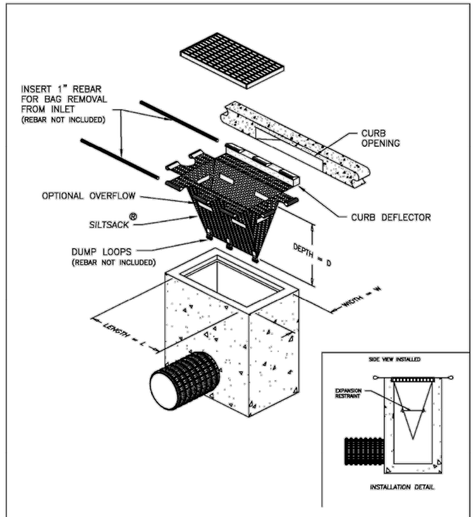
CATCH BASIN/MANHOLE PROTECTION

1. Protect storm sewer catch basins with Siltsack. or approved equivalent as follows:

ROADS

1. During construction, all roads shall be protected from unvegetated areas washing onto road surfaces by placement of silt fence behind curb or a 10 foot wide straw mulch bank behind the curb or other approved method and/or as shown on the plans.
2. During construction of any portion of the project, roads shall be maintained free of dirt, silt and construction debris.

Pittsfield SEC 9/22/2009



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NOTE: THE SILTSACK ® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK ®
(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH		ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION		ASTM D-4632	20 %
PUNCTURE		ASTM D-4833	120 LBS
MULLEN BURST		ASTM D-3786	800 PSI
TRAPEZOID TEAR		ASTM D-4533	120 LBS
UV RESISTANCE		ASTM D-4355	80 %
APPARENT OPENING SIZE		ASTM D-4751	40 US SIEVE
FLOW RATE		ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY		ASTM D-4491	0.50 SEC -1

* HI-FLOW SILTSACK ®
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH		ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION		ASTM D-4632	20 %
PUNCTURE		ASTM D-4833	135 LBS
MULLEN BURST		ASTM D-3786	430 PSI
TRAPEZOID TEAR		ASTM D-4533	45 LBS
UV RESISTANCE		ASTM D-4355	90 %
APPARENT OPENING SIZE		ASTM D-4751	20 US SIEVE
FLOW RATE		ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY		ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK ®
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DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK ,#WITH A WOVEN PILLOW INSERT.

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(* HI-FLOW SILT SACK SHALL BE USED FOR ALL APPLICATIONS WITHIN PITTSFIELD TOWNSHIP)

SILTSACK

NOT TO SCALE

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
SOIL EROSION CONTROL DETAILS AND NOTES

31

SILTSACK	BWA	DRW	12.01.03
TWP REV	BWA	DRW	11.04.27
UPDATES	TTN	DRW	10.01.20
Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: SE-01	TTN	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SOIL EROSION DETAILS AND NOTES

Project No. 2075001300

Scale NOT TO SCALE

Revision 1

JOB No. 16295
REVISIONS: TWP REV 1
REV. DATE 3/24/17
DATE: 2/15/17
SHEET 31 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295DT_PITT.dwg
TB#4067

STORM SEWER AND DRAINAGE STRUCTURES

1.00 GENERAL

1.01 DESCRIPTION

A. Furnish all labor, tools, equipment and materials to construct all storm sewers, and drainage structures as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

1. The CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed or just prior to placing the line in service providing the sewer pipe has been installed for not less than 30 days.

B. Test for Alignment

1. All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

C. Material Tests

1. The CONTRACTOR shall have tests of pipe strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

D. Submittals

1. The CONTRACTOR shall submit shop drawings, or data sheets for all castings, steps and manholes.

2. The CONTRACTOR shall submit certification letters for all pipes. All letters must contain the following: Contractors name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 PIPE

A. Reinforced concrete pipe and manhole tees shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Proposal.

B. Concrete pipe shall have tongue and groove gasketed premium joints.

C. Corrugated steel pipe shall meet the requirements of AASHO M-190 for coated pipe latest revision. Minimum gage thickness shall be as shown on the Plans.

2.02 REINFORCED CONCRETE MANHOLES

A. Manholes shall conform to the current ASTM Specifications for precast reinforced concrete Manhole Sections, serial designation C478. Manhole section joints shall conform to ASTM Designation C990. All cones shall be eccentric with an offset step configuration. Concrete adjustment rings or riser rings shall not be used for adjusting the height of the structure.

B. All manhole component parts shall have the name of the manufacturer stenciled on the inside. The lettering or logo shall be a minimum of 4 inches high.

2.03 MORTAR FOR MANHOLES

A. Mortar for plastering manholes and drainage structures shall be made of one part Portland cement and two parts fine aggregate.

2.04 BRICK AND BLOCK

A. Brick for brick and mortar structures shall conform to the current ASTM Specification C32. Block for block and mortar structures shall conform to the current ASTM Specification C135.

B. The concrete block masonry used to construct manhole and catch basin walls shall be solid curved blocks with the inside and outside surfaces curved to the required radii. The blocks shall have tongue and groove or other approved type of joint at the ends so that the units interlock to form a strong, rigid structure. Curved blocks shall have the inside and outside surfaces parallel.

C. The block shall not exceed 18 inches in length or 8 inches in depth (height). No block shall be less than 6 inches in width (thickness). All blocks in one structure shall be of the same height dimension. The blocks shall be designed for length so that only full-length or half-length blocks are required to lay the circular wall of any one course.

D. Blocks intended for use in the cones or tops of manholes and catch basins shall have such shape as may be required to form the structure as shown on the Plans with inside and outside joint not to exceed 1/4-inch in thickness.

2.05 STRUCTURE FRAMES AND COVERS

A. Structures frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each solid manhole cover shall be marked Storm Sewer with letters integrally cast into the cover.

B. Frames and Covers shall be as follows:
1. For use on manholes: East Jordan 1040Z, with Type B cover lettered "STORM SEWER", or equal. Structures 24-inches in diameter shall have the 1045 Z frame.
2. For use on drainage structures in paved areas: East Jordan 1040Z, with Type M1 cover, with "DUMP NO WASTE" lettering and trout logo.
3. For use on drainage structures in curbed areas: East Jordan 7045 or 7065, with "DUMP NO WASTE" lettering and trout logo.
4. For use on drainage structures in landscaped areas: East Jordan 1040Z, with 1040 N 7", with "DUMP NO WASTE" lettering and trout logo.

C. All frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

D. All covers for drainage structures shall have storm drain markers affixed to the nearest available flat surface. The storm drain markers shall be manufactured by Das Manufacturing and shall be #SDR "No Dumping. Drains to River." The storm drain markers shall be installed per the manufacturer's recommendations.

2.06 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF for precast manholes, PS1-B for block manholes, or equal.

2.07 DRAINAGE STRUCTURES

A. All manholes and catch basins shall be precast unless otherwise specified.

B. Manhole and catch basin bottoms shall be concrete and top of slab shall have a troweled finish.

C. Upon approval by the ENGINEER, the manhole and catch basin walls may be constructed of concrete block masonry or concrete manhole pipe conforming to the requirements of the specifications previously listed. Construction shall be in accordance with the details for Catch Basin and Storm Sewer Manhole shown on the Plans.

D. A plaster coat of mortar 1/2-inch in thickness shall be applied to the inside and outside surface of all manholes and catch basins constructed with concrete block masonry or sewer brick. The inside coat of mortar shall be applied in a smooth, neat workmanlike manner.

E. Final adjustment of the top of manholes and catch basins, so that the manhole or catch basin cover is at finished elevations as shown on the Plans or meets the finished surface, may be accomplished with sewer brick conforming to the previously listed Specifications. The total height of brick for this purpose shall not exceed 9 inches. The total chimney height shall not exceed 18 inches.

F. All block and brick masonry units shall be laid in a full bed of mortar. The inside joints of the block masonry construction shall be tooled in a neat and workmanlike manner.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill 12 inches above the crown of pipe shall conform to Section 2.04, Earthwork of these specifications.

B. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within four pipe lengths behind pipe laying.

3.02 BEDDING

A. Concrete pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches. Where indicated on the Plans or required by the ENGINEER, concrete encasement or cradle shall be used.

B. For all pipes, compacted aggregate material shall be placed at the sides of the pipe in 12-inch lifts and cover not less than 12 inches above the crown of the pipe.

C. "Granular Material" shall be MDOT class II, placed in not more than 6-inch layers and compacted to not less than 90% standard density.

3.03 PIPE INSTALLATION

A. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress, shall be kept dry, and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.

B. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.

C. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities or structures. Any change in location or alignment of piping, which may be found more feasible or practicable as the work progresses, shall be made by the CONTRACTOR, as the ENGINEER may direct.

D. All pipe shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the concrete pipe will be considered cause for rejection.

E. All cutting of the pipe shall be done in a neat workmanlike manner with the least amount of waste and without damage to existing or new lines. A fine toothsaw, tubing cutter or similar tool may be used to cut concrete pipe. Cuts must be square. Ragged edges shall be removed with a cutting tool or file.

F. Breaks in pipe or joints shall be repaired to the satisfaction of the ENGINEER and at the expense of the CONTRACTOR.

3.04 CONNECTIONS TO EXISTING MANHOLES

A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cored into the manhole.

B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.

C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. Reinforcing steel shall not be cut out shall be bent and replaced in the area that is to be patched. A form shall be constructed over the area of pipe penetration. The formed area shall then be filled with concrete.

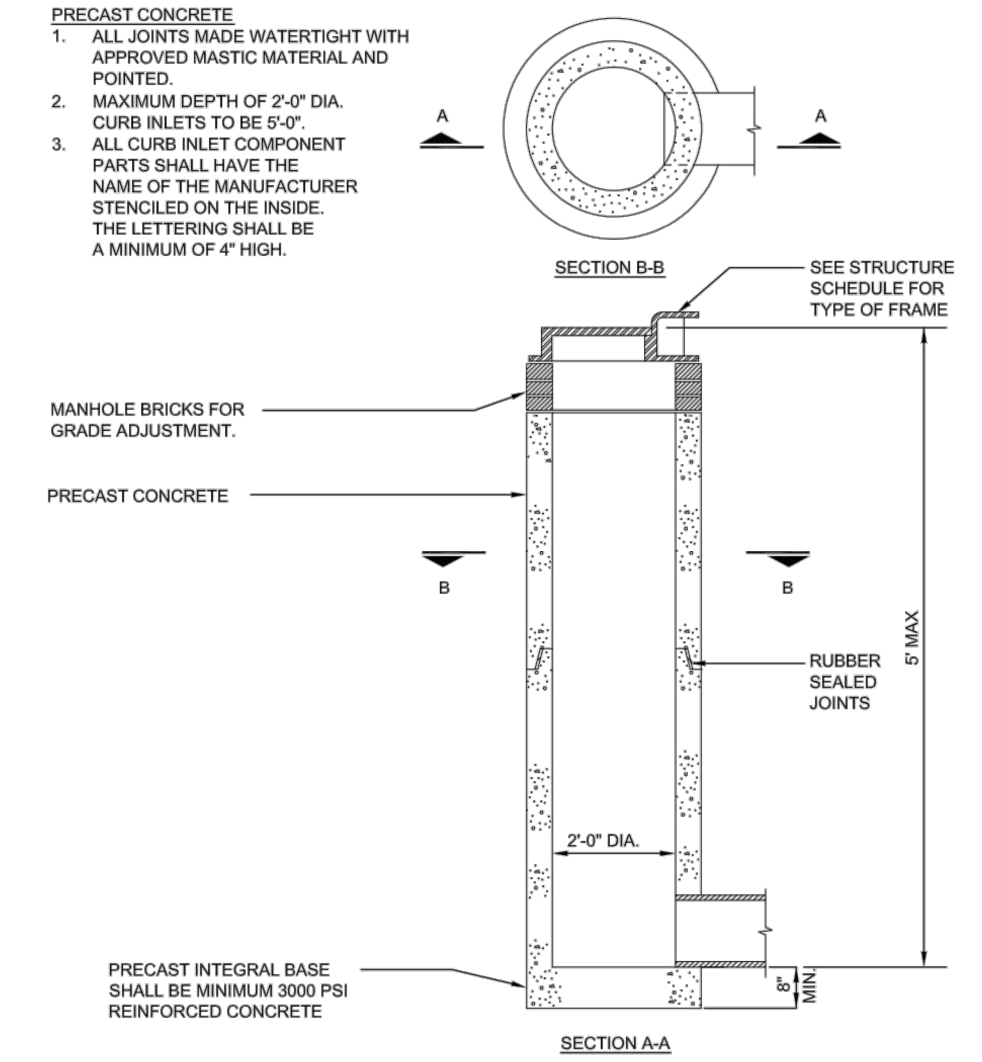
D. Closure of the manhole wall shall be made watertight using concrete.

3.05 ANIMAL GRATES

A. Animal grates shall be required on all endsections greater than 12-inch diameter.

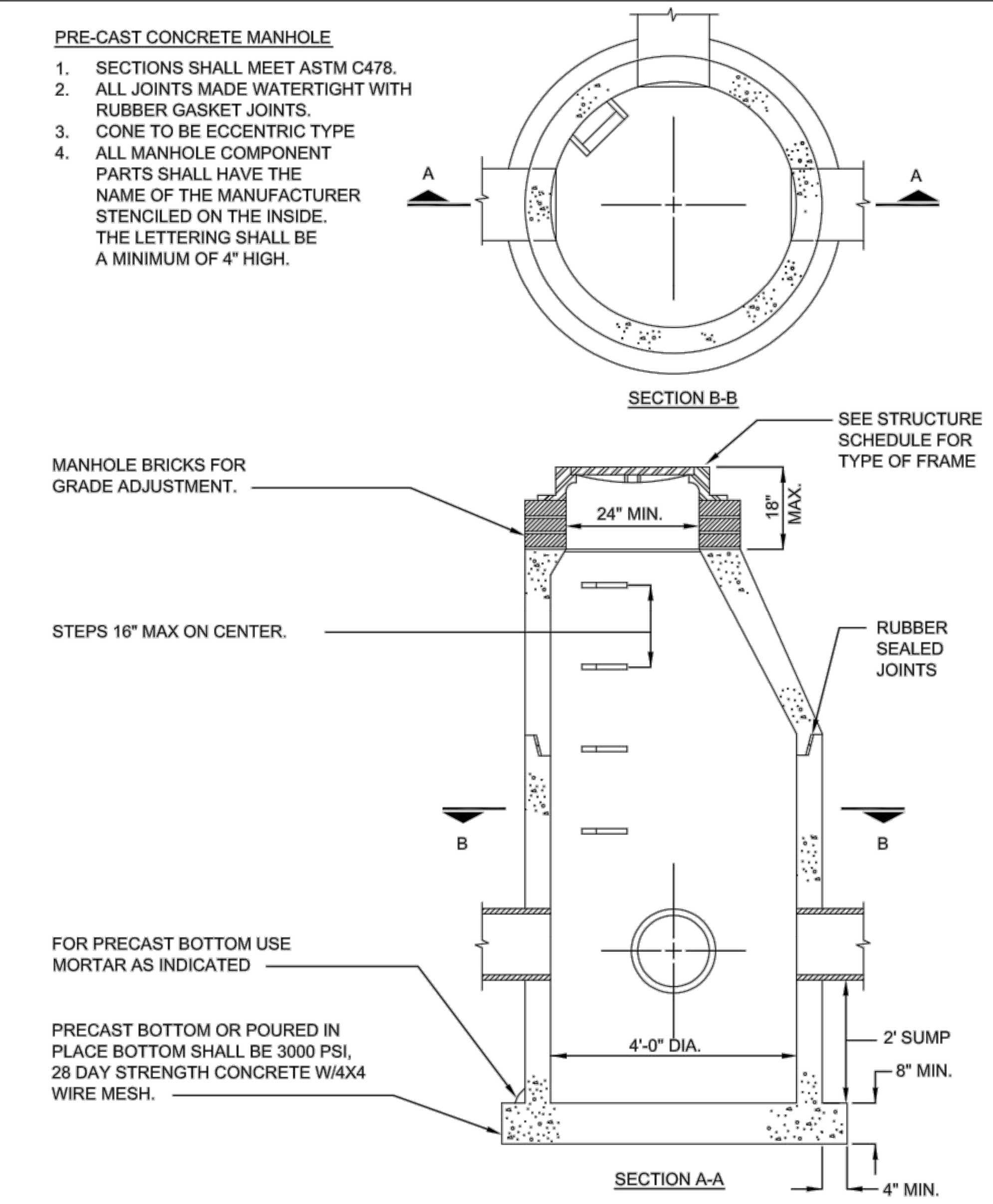
PCT February 2008

PRECAST CONCRETE
1. ALL JOINTS MADE WATERTIGHT WITH APPROVED MASTIC MATERIAL AND POINTED.
2. MAXIMUM DEPTH OF 2'-0" DIA. CURB INLETS TO BE 5'-0".
3. ALL CURB INLET COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



2' DIAMETER INLET

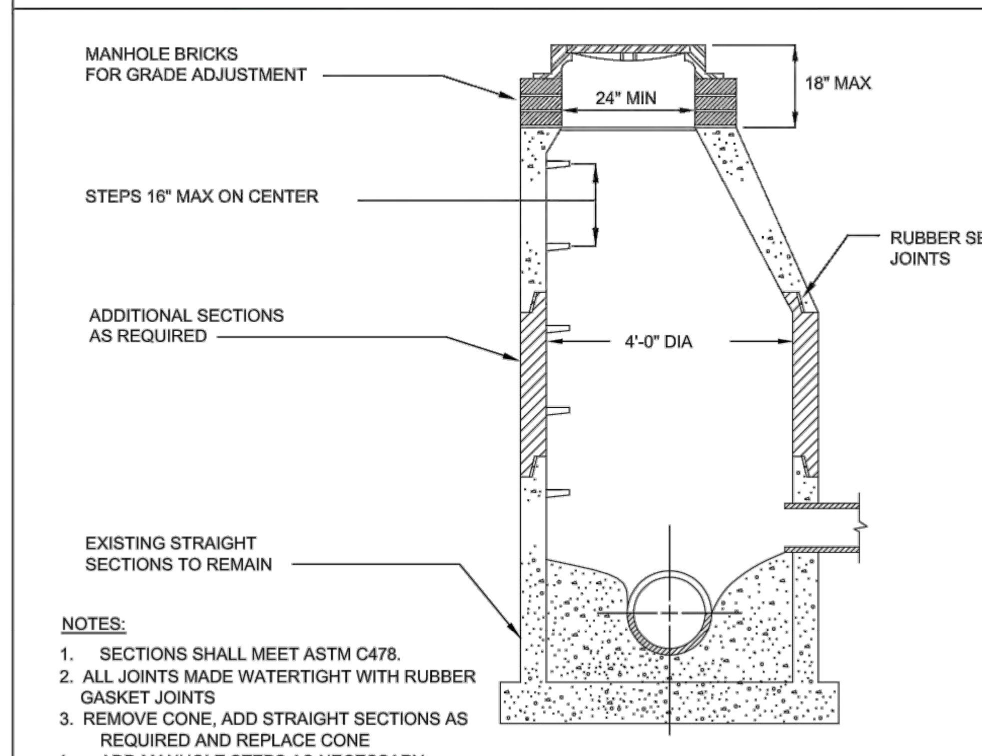
PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS.
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



4' DIAMETER CATCH BASIN

AFFIX TO SURFACE ON OR NEAR ALL DRAINAGE COVERS.

STORM DRAIN MARKER

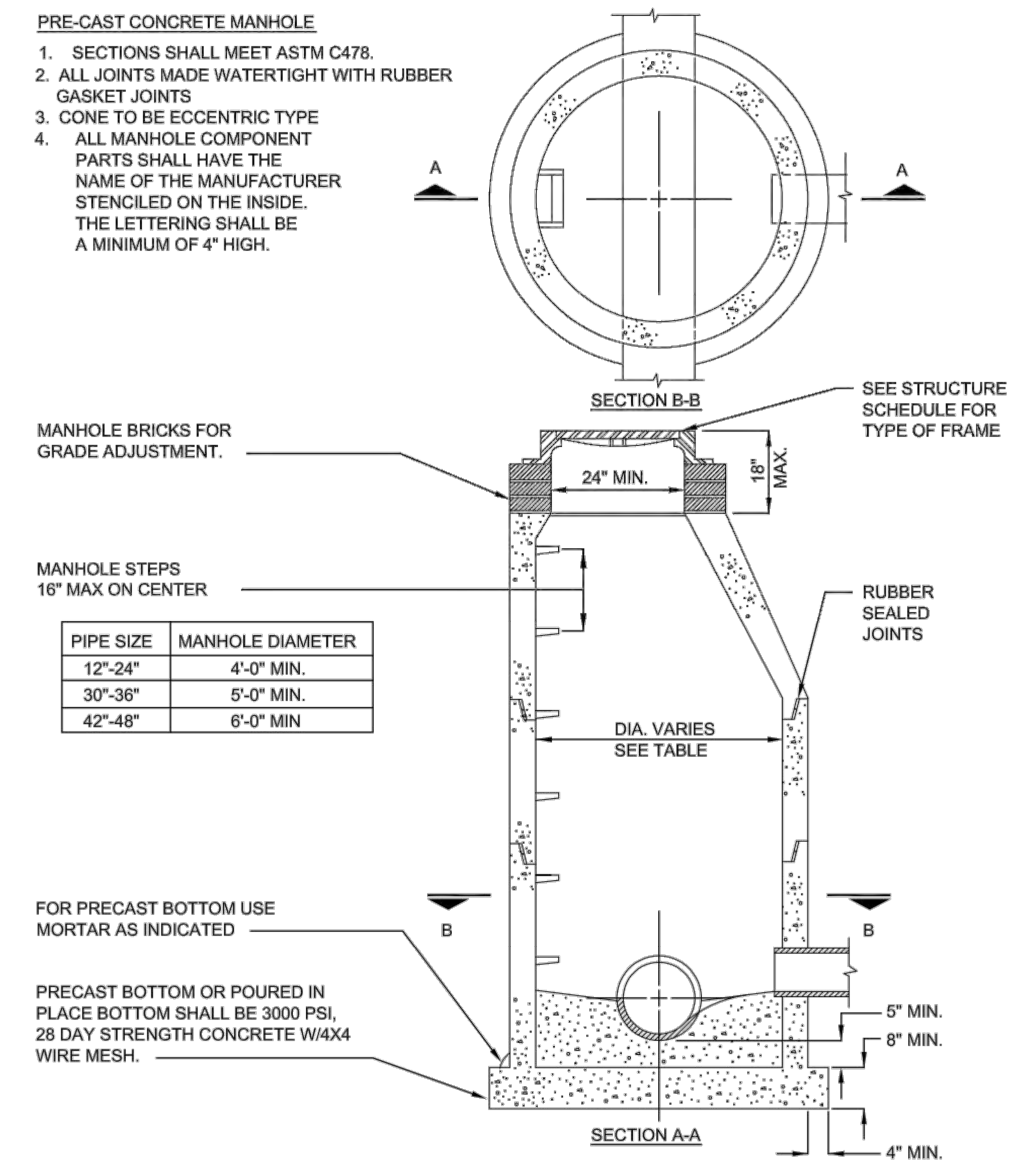


NOTES:
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. REMOVE CONE, ADD STRAIGHT SECTIONS AS REQUIRED AND REPLACE CONE
4. ADD MANHOLE STEPS AS NECESSARY
5. ADD ADJUSTMENT RINGS FOR RIM GRADE ADJUSTMENT

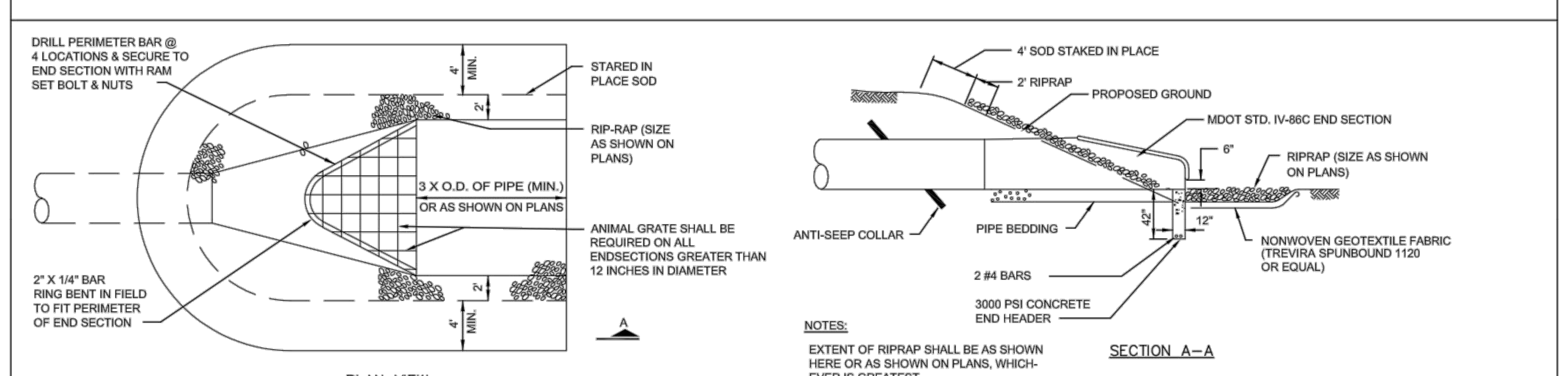
MANHOLE & CATCH BASIN RECONSTRUCTION DETAIL

PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.

PIPE SIZE	MANHOLE DIAMETER
12"-24"	4'-0" MIN.
30"-36"	5'-0" MIN.
42"-48"	6'-0" MIN

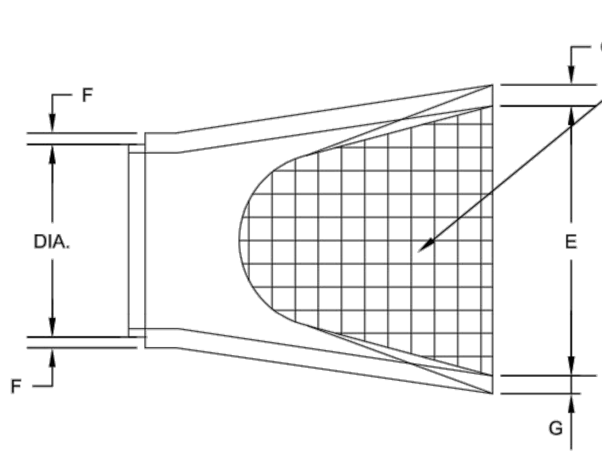


STORM SEWER MANHOLE



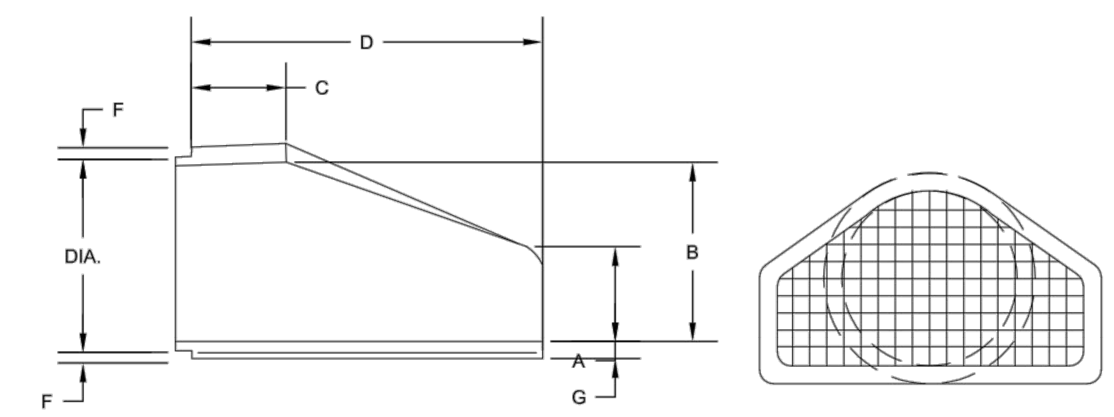
NOTES:
EXTENT OF RIPRAP SHALL BE AS SHOWN HERE OR AS SHOWN ON PLANS, WHICH-EVER IS GREATEST.

END SECTION AND RIPRAP DETAIL



ANIMAL GRATING. (ALL BARS ARE 3/4"Ø)

DIA	A	B	C	D	E	F	G
12"	5"	13"	45.5"	72"	24"	2"	2"
15"	7"	16"	43.5"	72"	30"	2.25"	2.25"
18"	11"	19"	41.5"	72"	36"	2.5"	2.5"
24"	12"	25"	29"	72"	48"	3"	2"
30"	14"	31"	19"	72"	60"	3.5"	3.5"
36"	17"	37"	34.5"	96"	72"	4"	4"
42"	22"	43"	32.5"	96"	78"	4.5"	4.5"
48"	24"	49"	23.5"	96"	84"	5"	5"



NOTE:
FLARED END SECTIONS SHALL BE MANUFACTURED TO THE CLASS SPECIFICATIONS AS THE PIPE ITSELF.

STANDARD END SECTIONS FOR PRECAST CONCRETE

Pittsfield Charter Township
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Revision	By	Appd.	YY.MM.DD
UPDATES	MRH	DRW	14.01.24
TWP REV	BWA	DRW	12.08.09
TWP REV	BWA	DRW	11.04.27
UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued — By — Appd. — YY.MM.DD

File Name: ST–01 | TTN (Dwn.) | DRW (Chkd.) | DRW (Dsgn.) | 07.10.01 (YY.MM.DD)

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
STORM SEWER DETAILS AND SPECIFICATIONS

Project No. 2075001300

Scale **NOT TO SCALE**

Revision

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PRELIMINARY & FINAL SITE PLAN
STORM SEWER DETAILS AND SPECIFICATIONS

32

DATE: 2/15/17
SHEET 32 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295DT_PITT.dwg
FB#460

JOB No. **16295**

REVISIONS:	REV. DATE
TWP REV 1	3/24/17

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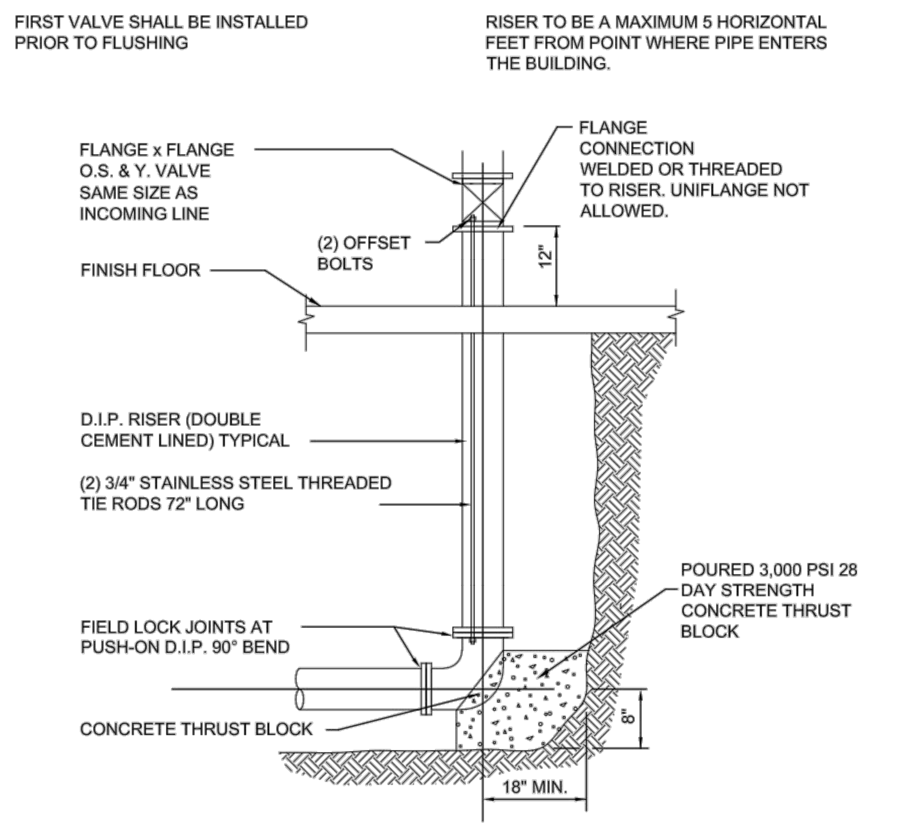
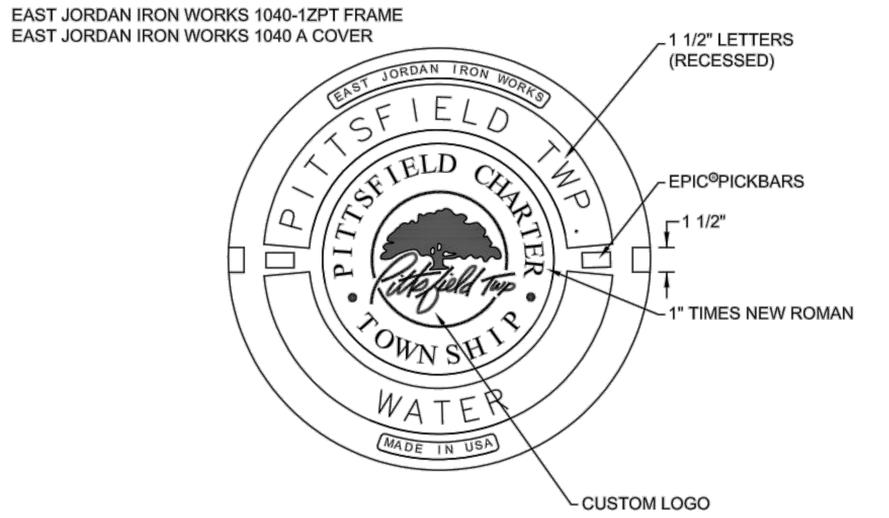
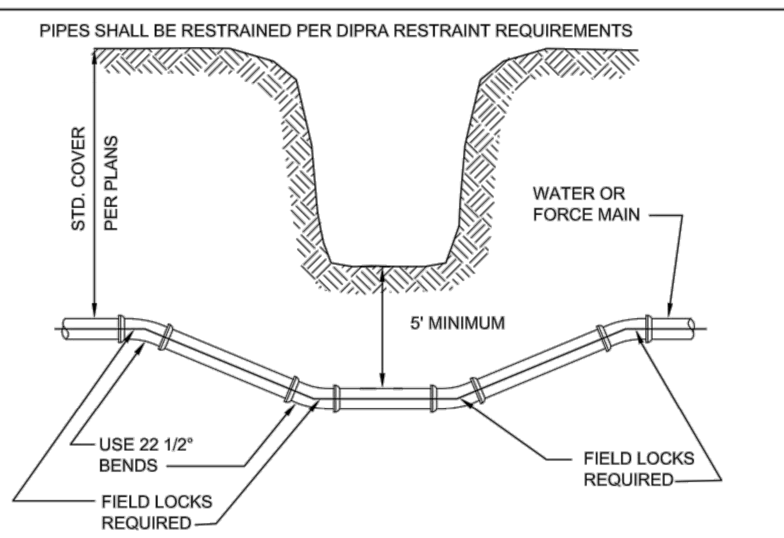


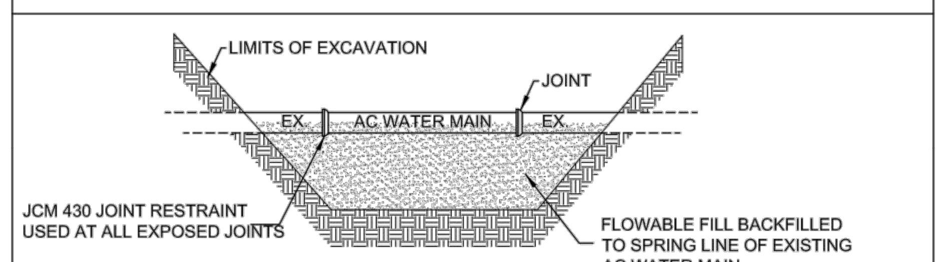
FIRE PROTECTION RISER DETAIL



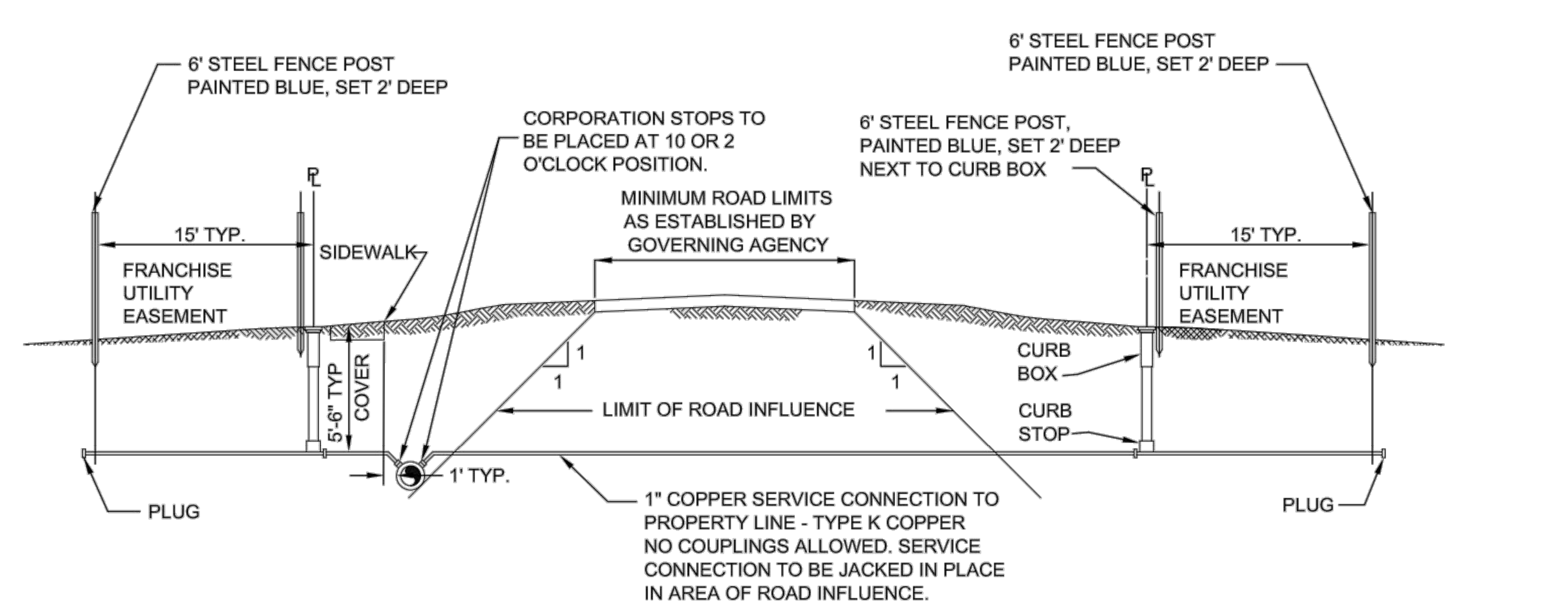
COVER DETAIL



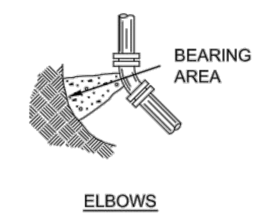
DITCH & STREAM CROSSING

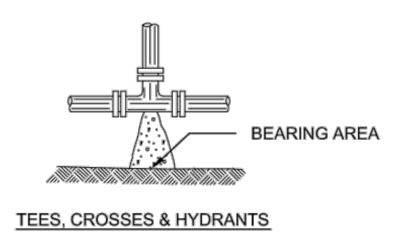


ASBESTOS CEMENT (AC) WATER MAIN



WATER MAIN CONNECTION





ELBOWS					
PIPE DIA. INCHES		BEARING AREA SQUARE FEET 90°	45°	22 1/2°	11 1/4°
4		2.1	1.1	0.6	0.3
6		4.1	2.2	1.1	0.6
8		6.8	3.7	1.9	0.9
10		10.1	5.5	2.8	1.4
12		14.1	7.6	3.9	2.0
16		24.2	13.0	6.7	3.3
18		30.0	16.3	8.3	4.2
20		36.8	19.9	10.1	5.1

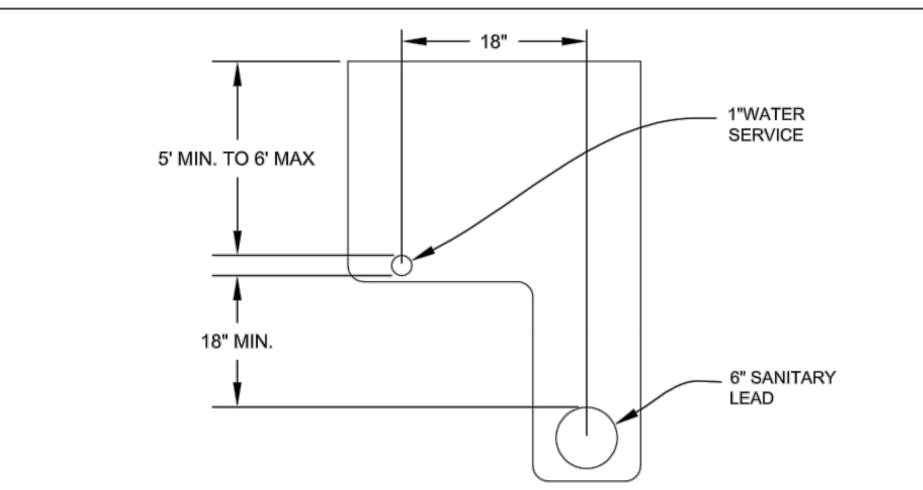
TEES, CROSSES & HYDRANTS		
PIPE DIA. INCHES		BEARING AREA SQUARE FEET
4		1.5
6		2.9
8		4.8
10		7.1
12		10.0
16		17.1
18		21.0
20		26.0

NOTES:
1. CONCRETE FOR ALL THRUST BLOCKS SHALL BE 3000 PSI, 28 DAY STRENGTH MIN.
2. ALL THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH
3. BOLTS, FITTINGS & JOINTS SHALL BE KEPT CLEAR OF CONCRETE
4. A BEARING CAPACITY OF 2000# PER FOOT WAS USED IN DETERMINING THE MINIMUM "BEARING AREAS" IN THE ABOVE TABLE
5. THE CROSS SECTION OF THE THRUST BLOCKS SHALL BE SQUARE
6. IN ADDITION TO THRUST BLOCKS, ALL PIPE JOINTS SHALL BE RESTRAINED WITH LOCKING GASKETS PER DIPRA'S STANDARDS.

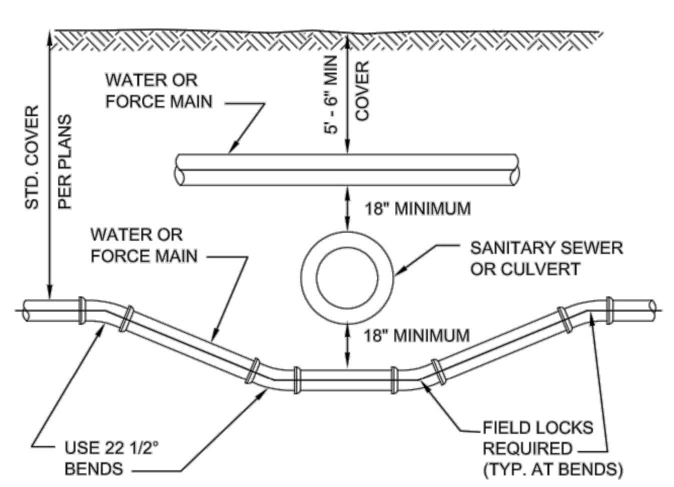
SOIL CHARACTERISTICS	FACTOR
(A) LOOSE COARSE OR MEDIUM SAND; COMPACT FINE SAND; COMPACT SAND-CLAY SOILS; STIFF CLAY	0.33
(B) FIRM FINE SAND; COMPACT INORGANIC SILT; FIRM SAND-CLAY SOILS; MEDIUM CLAY	0.50
(C) LOOSE FINE SAND; FIRM INORGANIC SILT	0.67
(D) LOOSE SAND-CLAY SOILS; LOOSE INORGANIC SILT SOFT CLAY	1.00

"BEARING AREA" x FACTOR = ACTUAL BEARING AREA
2.1 x .5 = 1.05 SQ. FT.
BASED UPON 150# TEST PRESSURE

THRUST BLOCK

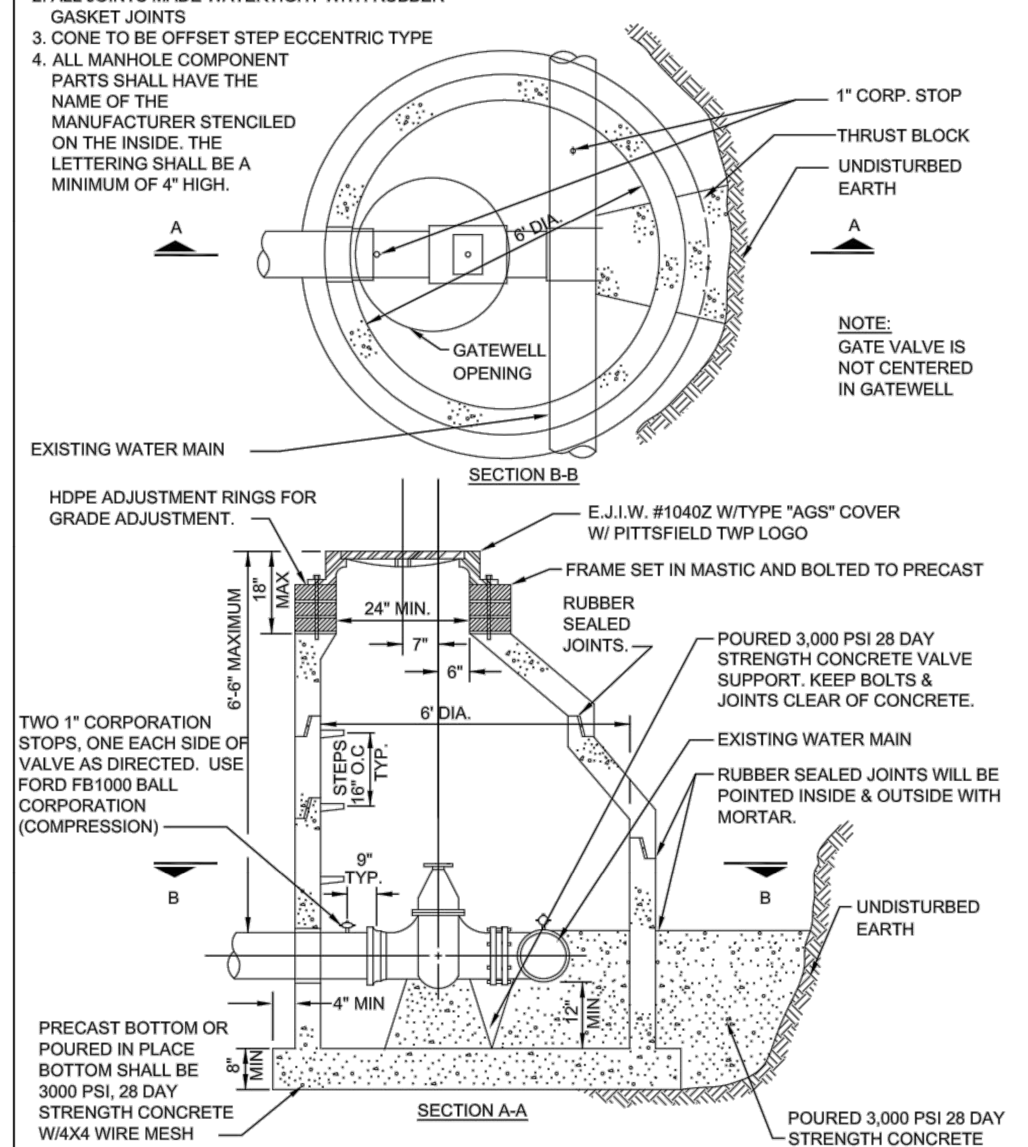


TYPICAL L TRENCH DETAIL HOUSE LEADS



SEWER OR CULVERT CROSSING

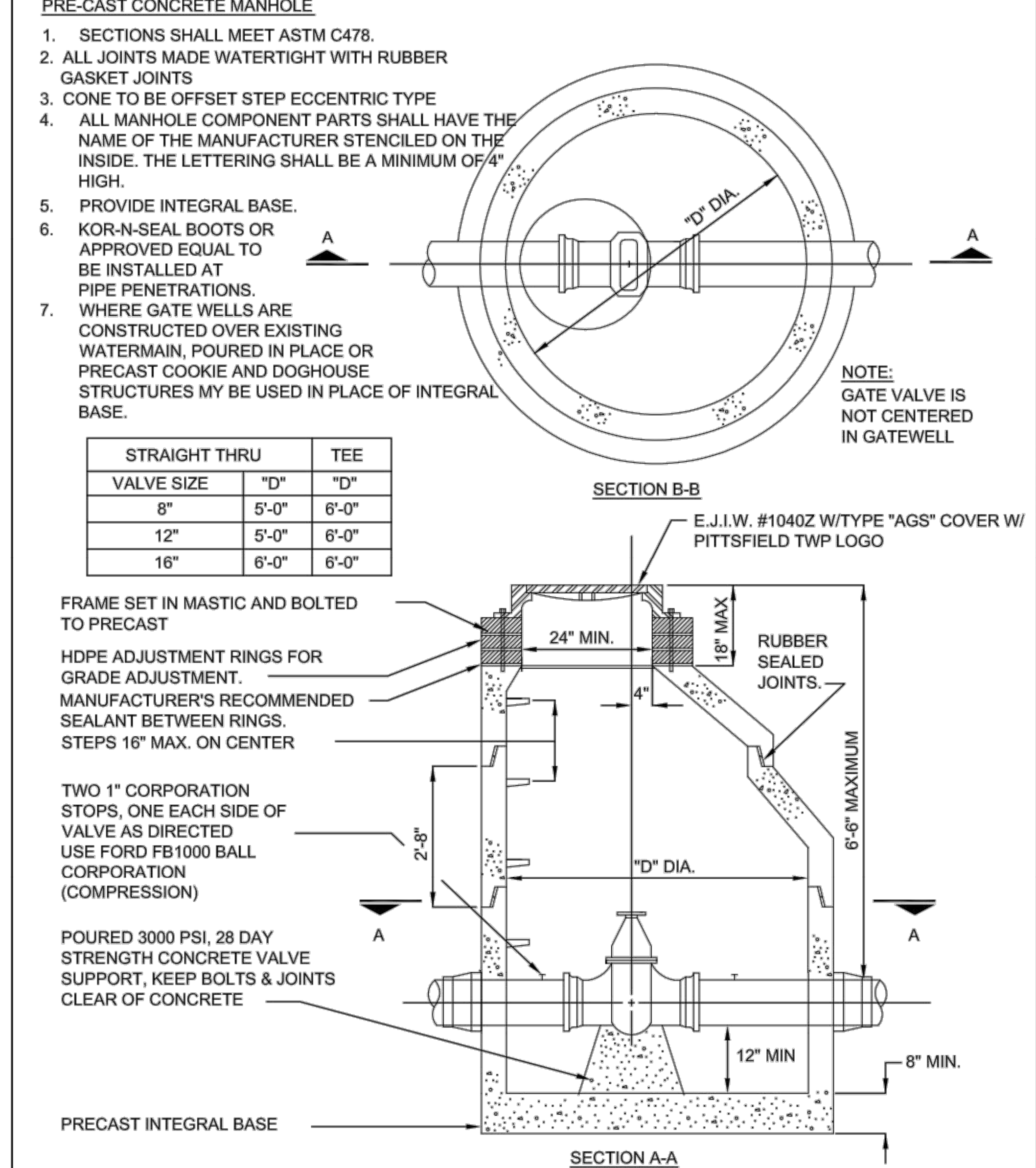
PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



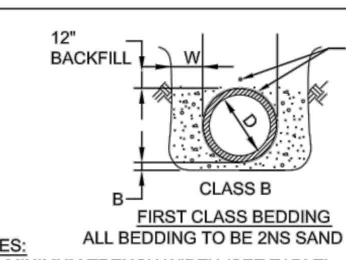
TAPPING SLEEVE & VALVE & WELL

PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
5. PROVIDE INTEGRAL BASE.
6. KOR-N-SEAL BOOTS OR APPROVED EQUAL TO BE INSTALLED AT PIPE PENETRATIONS.
7. WHERE GATE WELLS ARE CONSTRUCTED OVER EXISTING WATERMAIN, POURED IN PLACE OR PRECAST COOKIE AND DOGHOUSE STRUCTURES MY BE USED IN PLACE OF INTEGRAL BASE.

STRAIGHT THRU		TEE
VALVE SIZE	"D"	"D"
8"	5'-0"	6'-0"
12"	5'-0"	6'-0"
16"	6'-0"	6'-0"



STANDARD GATE VALVE & WELL

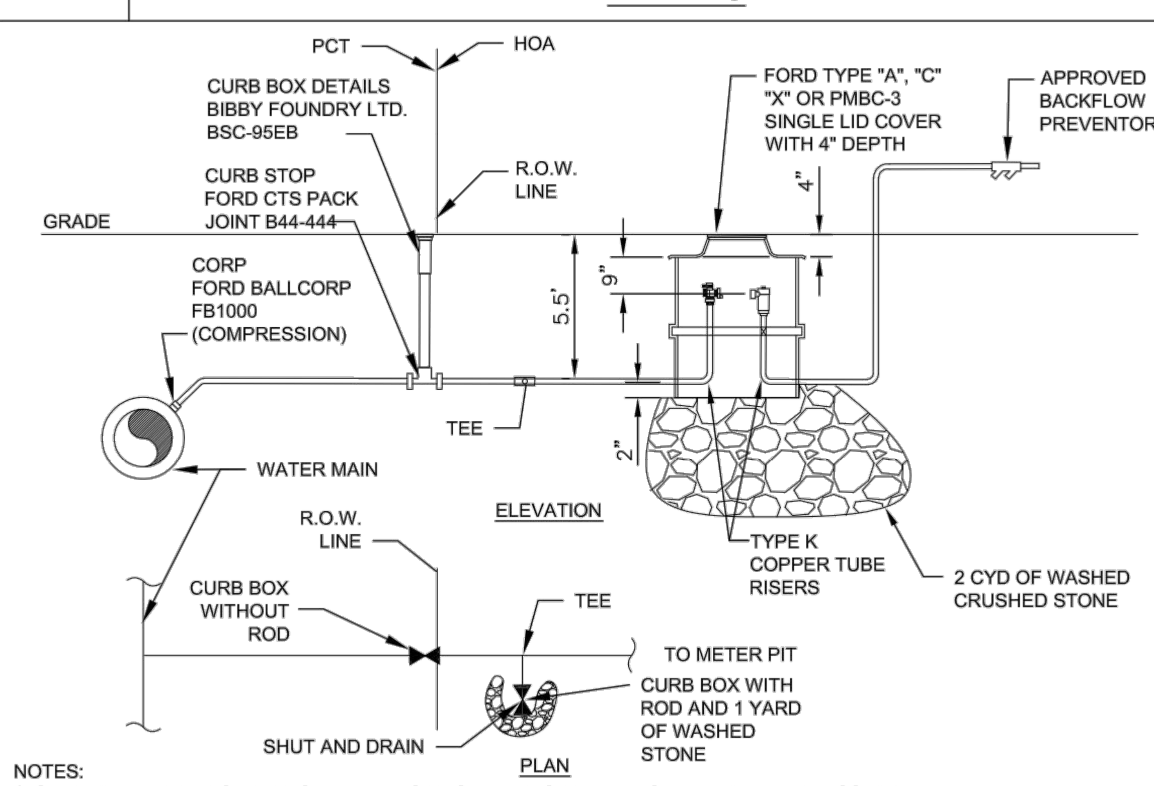


BLUE, 12 GAUGE SINGLE STRAND TRACER WIRE ATTACHED TO WATER MAIN PIPE MUST BE WRAPPED WITH POLLY WRAP AND SECURELY TAPED AT ENDS.

PIPE	D	W	B
PVC	0"-12"	12" MIN. 18" MAX.	4"
A-C,V.C.P.	0"-12"	6" MIN. 12" MAX.	4"
DIP	0"-24"	6" MIN. 12" MAX.	4"
A-C,CONC.	0"-24"	6" MIN. 12" MAX.	4"
CONC. DIP	24" +	6" MIN. 12" MAX.	4"

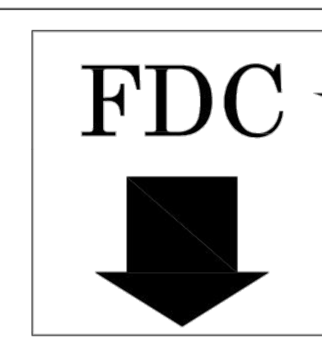
NOTES:
1. MINIMUM TRENCH WIDTH (SEE TABLE).
2. RECESS TRENCH TO RELIEVE THE BELL OF ALL LOAD. PIPE HAUNCHES SHALL BE COMPACTED.
3. 2NS BACKFILL TO DEPTH OF ONE FOOT ABOVE PIPE. TAMPED LAYERS NOT TO EXCEED 6" IN DEPTH. PLATE COMPACT ABOVE PIPE (ON 1st LIFT)
4. ALL PIPE TO BE PLACED AND JOINTED IN A DRY TRENCH AND LAID ACCURATELY TO LINE AND GRADE WITH BELLS UPHILL.
5. ALL CONCRETE ENCASEMENT AND CRADLING TO BE CLASS "A" CONCRETE.

BEDDING



NOTES:
1. SADDLE MAY BE REQUIRED ON MAIN BASED ON LEAD SIZE, MAIN SIZE, AND MAIN PRESSURE
2. ALL WATER MAIN TAPS AND COMPONENT PARTS SHALL BE APPROVED BY THE PITTSFIELD TOWNSHIP UTILITIES DEPARTMENT PRIOR TO INSTALLATION.
3. INSTALLATION SHALL BE INSPECTED AND APPROVED BY THE PITTSFIELD TOWNSHIP UTILITIES DEPARTMENT.

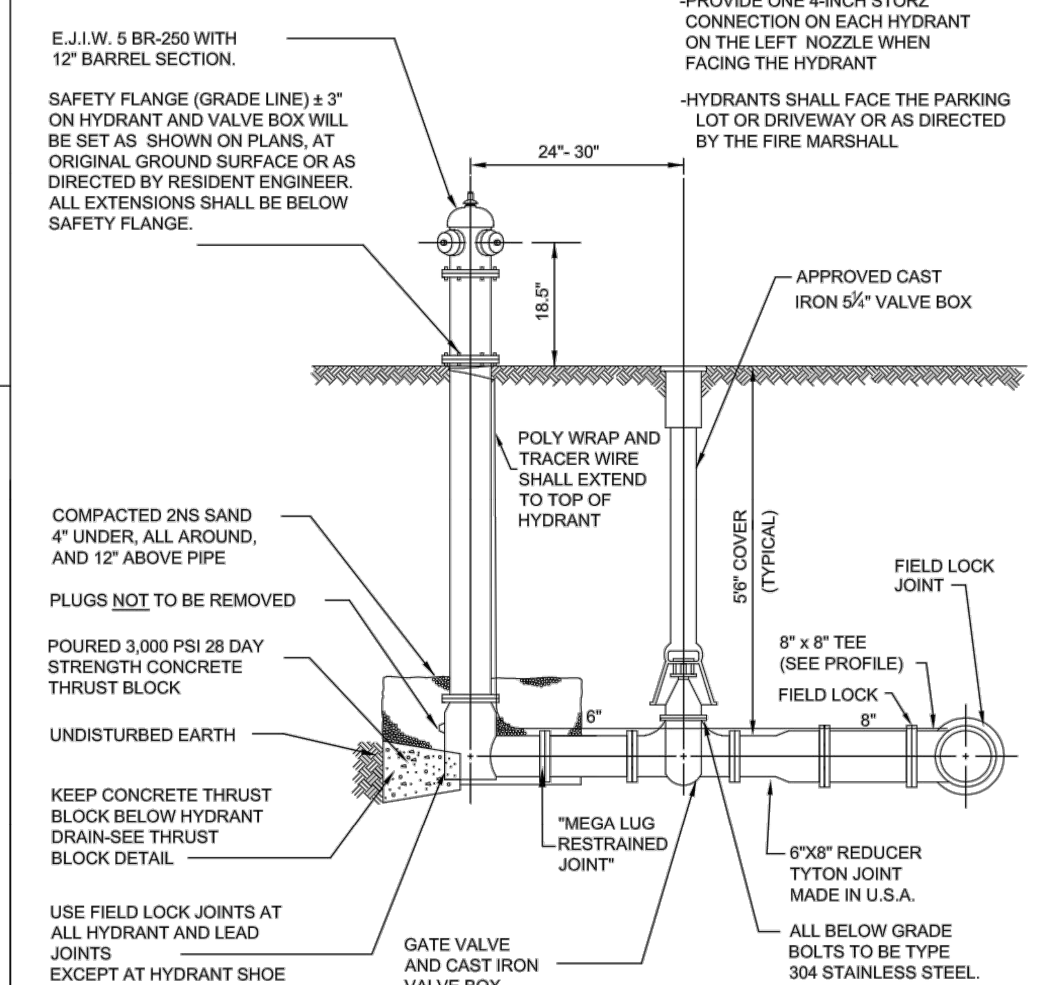
IRRIGATION METER PIT DETAIL



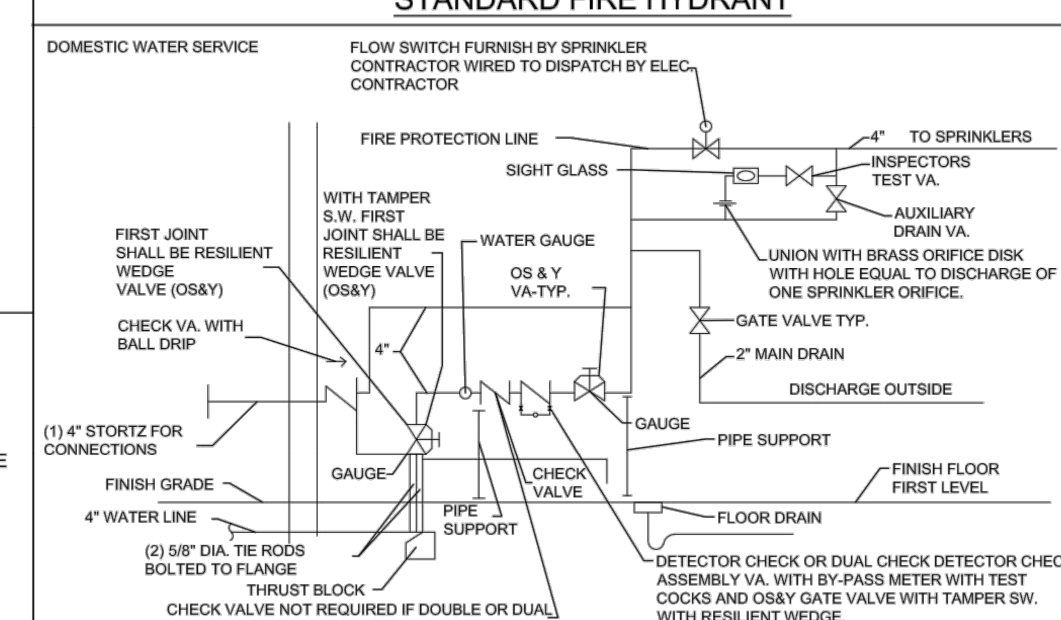
RED "REFLECTIVE" LETTERS WITH WHITE "REFLECTIVE" BACKGROUND. LETTERS WILL BE A MINIMUM OF 8" TALL BY 4" WIDE WITH 2" GIRTH, WITH AN 8" TALL 4" WIDE RED ARROW UNDER LETTERS POINTING DIRECTLY AT THE CONNECTION. TALLER BUILDINGS MAY REQUIRE LARGER LETTERING. SIGN SIZE AND LOCATION DETERMINED BY FIRE MARSHALL

FIRE DEPARTMENT CONNECTION LABEL DETAIL

NOTES:
- PROVIDE ONE 4-INCH STORZ CONNECTION ON EACH HYDRANT ON THE LEFT NOZZLE WHEN FACING THE HYDRANT
- HYDRANTS SHALL FACE THE PARKING LOT OR DRIVEWAY OR AS DIRECTED BY THE FIRE MARSHALL



STANDARD FIRE HYDRANT



METER ROOM DETAIL

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108–9721
48108–9721
Tel. 734.822.3101
www.pittsfield–mi.gov

Revision	By	Appd.	YY.MM.DD
UPDATES	MRH	DRW	14.01.24
FDC UPDATE	BWA	DRW	11.09.13
TWP REV	BWA	DRW	11.04.27
HYDRANT, MANHOLE UPDATE	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued — By — Appd. — YY.MM.DD

File Name: W–01	BWA	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
WATER MAIN DETAILS

Project No. 2075001300
Scale NOT TO SCALE
Revision

MIDWESTERN CONSULTING
3815 Plaza Drive Ann Arbor, Michigan 48108
(734) 995-0200 • www.midwesternconsulting.com
Land Development • Land Survey • Institutional • Municipal
Wireless Communications • Transportation • Landfill Services

CLIENT
CONCOURSE OFFICE PROPERTIES, LLC
29800 MIDDLEBELT RD., SUITE 200
FARMINGTON HILLS, MI 48334
KEVIN SPIZIZEN
(248) 855–8110

CONCOURSE OFFICE CENTER
PRELIMINARY & FINAL SITE PLAN
WATER MAIN DETAILS

33

DATE: 2/15/17
SHEET 33 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295DT_PITT.dwg
FB#460

JOB No. 16295
REVISIONS: TWP REV 1 — REV. DATE 3/24/17

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M:\Civil3dProj\16295\Site Plan\16295DT_PITT.dwg, 3/23/2017 12:08 PM, Jeremy A. Matthei, None
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1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, materials, and equipment required to construct a water main and necessary appurtenant work as herein specified. The water main shall be installed in the locations as shown on the Plans and shall meet all acceptance tests.

1.02 NOTIFICATION

A. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department at (734) 882-2110, 24 hours prior to flushing or chlorination of the water main.

B. CONTRACTOR shall schedule bacteriological testing with the ENGINEER 48 hours prior.

C. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department 48 hours prior to connecting to an existing water main.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, valves, hydrants and the B-1 Poly Pig. The Contractor shall submit a certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, Township name, current date, certification of pipe provided and letterhead of the certifying company.

1.04 TESTING

A. General

1. CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein. All tests shall be conducted under the supervision of the ENGINEER. All water mains, branches and valves shall be subject to cleaning with a poly-pig, hydrostatic pressure testing, disinfection and bacteriological testing. No acceptance tests shall be conducted until the water main has been installed and backfilled for not less than 30 days. A copy of all test results shall be furnished to the ENGINEER.

2. Hydrostatic pressure testing must be performed in accordance with ANSI/AWWA C600. Disinfection and bacteriological testing must be performed in accordance with ANSI/AWWA C651.

3. CONTRACTOR shall furnish all material and labor to provide for an acceptable full size blow-off to flush the poly-pigs out of the main at the far end of the project not connected to the existing system.

4. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair the rejected section and retest until it is within the specified allowance.

5. Only Pittsfield Township personnel or the CONTRACTOR under direct supervision of Pittsfield Township personnel may fill or flush lines.

B. Preparation

1. After the pipe has been laid and backfilled as specified, the CONTRACTOR shall fill the line, or a valve section thereof, to be tested with water in such a manner as to expel all air from the pipe. This may be done through fire hydrants at the high points; or, if no hydrant is available at such point, the CONTRACTOR shall make the taps necessary to accomplish the expulsion of all air. At the close of the test, all taps shall be satisfactorily plugged with brass plugs.

C. Sequence

1. All water mains connected to an existing water system shall be flushed, swabbed, chlorinated and bacteriological tested prior to pressure testing. The sequence for acceptance testing shall be:

   a. Flushing with approved B-1 Poly-Pig
   b. Chlorination
   c. Flushing
   d. Bacteriological Testing
   e. Pressure Testing

2. Where mains can be totally isolated from the existing water system with airgaps, pressure testing shall precede chlorination and bacteriological testing. The sequence for acceptance testing shall be:

   a. Pressure Testing
   b. Connect to System
   c. Flushing with approved B-1 Poly Pig
   d. Chlorination
   e. Flushing
   f. Bacteriological Testing

3. If a hydrostatic pressure test fails, the chlorination and flushing process must be repeated after repairs to the system are completed.

D. Flushing

1. All flushing will be conducted by the TOWNSHIP with clean potable water until the water runs clear.

E. Chlorination

1. All new mains and pipe or any existing mains contaminated by the CONTRACTOR shall be chlorinated to a minimum residual chlorine concentration of fifty (50) parts per million with commercial liquid chlorine solution or approved equal. The chlorinated water shall be allowed to stand in the mains for 24 hours. The end of the 24-hour period the chlorinated water at all parts of the mains shall show a free available chlorine residual of not less than twenty-five (25) parts per million. If less than twenty-five (25) parts per million residual is shown at the end of the first 24 hours period, additional chlorine shall be added until a residual of not less than twenty-five (25) parts per million at all parts of the system is shown after a subsequent 24 hour period. The chlorinated water shall then be removed from the mains and the mains flushed with potable water for bacteriological testing. No flushing shall take place between the two required bacteriological testing.

F. Bacteriological Testing

1. The Pittsfield Township Utilities Department will take bacteriological samples of the water in the mains for analysis at two different times. The first samples will be taken 24 hours after the mains have been satisfactorily chlorinated, flushed and filled with potable water. The second sample will be taken 24 hours later. Each sample will be incubated for 48 hours. No flushing shall be done during or between tests, unless supervised and approved by ENGINEER. Two sets of safe consecutive bacteriological samples, collected at least 24 hours apart, must be obtained before placing the water main in service.

2. The CONTRACTOR shall provide a sufficient number of corporation cocks and copper tubing for taking samples. Samples shall not be collected from hoses or fire hydrants.

3. Bacteriological testing must begin on Mondays to allow Pittsfield Township personnel and the testing laboratory a full work week to conduct the testing.

G. Hydrostatic Pressure Testing

1. The CONTRACTOR shall pressure test sections of water main as sections of 2,000 feet or less unless otherwise authorized by the ENGINEER. When permitted to test lengths in excess of 2,000 feet, only the allowable leakage for 2,000 feet will be permitted.

2. All water mains shall be subjected to a hydrostatic pressure of 150 psi based on the elevation of the lowest point in the system. The main shall be maintained under the test pressure for a minimum continuous period of two (2) hours by pumping potable water into the line at frequent intervals. The volume of water so added shall be measured and considered to represent the leakage from the main. No pipeline installed will be accepted until the leakage measured is less than 0.092 gallons per inch diameter of the pipe per 1 hour per 1,000 feet.

3. In the event that the leakage exceeds the specified amount, the main shall be carefully inspected for leaks and repaired as necessary. Any cracked or defective pipe, fittings, valves or hydrants discovered shall be removed and replaced with sound material and the test repeated to the satisfaction of the ENGINEER.

4. If the CONTRACTOR chooses to pressure test against an existing valve he assumes the responsibility of meeting the leakage requirements. The CONTRACTOR may at his discretion provide a physical break and cutting in sleeve for pressure testing.

5. Temporary connections (jumpers) between existing water mains and the newly constructed system for testing purposes, shall include a reduced zone backflow preventer to prevent backflow and possible contamination of the public water.

H. Material Tests

1. The CONTRACTOR shall have test of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of water main per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturers certificate of compliance to the specifications.

2.00 PRODUCTS

A. All products shall be consistent with the current component part submittal sheet posted on the Township website.

2.01 PIPE AND FITTINGS

A. Ductile-iron pipe water main shall meet all the requirements of the latest revision of ANSI/AWWA C151/A21.51. Pipe shall be furnished in eighteen-foot or twenty-foot lengths, unless otherwise required. All joints, to include joints for fittings, valves and hydrants, must be of the push on joint type and compatible tyton joint gaskets. Ductile iron pipe must be designed in accordance with the latest revision of ANSI/AWWA C150/A21.50 to meet requirements for Pressure Class 350.

B. Ductile iron pipe and fittings shall be double-cement lined with an approved bituminous seal coat in accordance with ANSI/AWWA C104/A21.4.

C. Ductile iron fittings shall meet all the requirements of the latest revision of ANSI/AWWA C110/A21.10 for full body fittings and ANSI//AWWA C153/A21.53 for compact fittings for a minimum working pressure of 250 psi and be of the push-on joint type. Plugs, where shown on the plans, shall be solid mechanical joint plug type.

D. Restrained mechanical joints of the wedge action type shall use a follower gland and shall include a restraining mechanism which, when activated, impart multiple wedging action against the pipe, increasing its resistance as the pressure increases. Twist off nuts shall be used to insure proper actuating of the restraining device. Restrained mechanical joints for ductile iron pipe shall be Megalug, Series 1100, or approved equal. Mechanical joints shall be in conformity with the requirements of the latest revision of the ANSI AWWA C111/A21.11. Bolts and nuts must be type 304 stainless steel.

E. Push-on joints shall meet all requirements of ANSI/AWWA C111/A21.11. Push-on joints shall consist of a ductile-iron bell provided with a recess to receive a circular molder rubber gasket to effect the joint seal. A rubber gasket and sufficient lubricant to assemble the joint shall be furnished with each joint. The lubricant shall have no deleterious effect upon the color, taste or odor of potable water and shall not be corrosive to either the pipe or gasket. Pipe furnished with push-on type joints shall be equal in strength and leak tightness to pipe furnished with mechanical joints as specified when installed under identical conditions, and shall meet all other requirements of these specifications. In addition to the above requirements, the gasket and lubricant shall conform to the latest revision of ANSI/AWWA C111/A21.11. When it is necessary to utilize a locking mechanism for a push-on joint upstream or downstream of a restrained mechanical joint, field-lok gaskets or equal shall be utilized and shall be used in conformance with DIPRA Standards for restraint distance from a restrained mechanical joint fitting.

F. All pipe and fittings shall be manufactured in the United States of America.

G. The ENGINEER shall witness the delivery and unloading of all pipe and collect the appropriate manufacturer's certificate of compliance per Section 1.04 of this Specification.

2.02 VALVES

A. All valves installed under this Specification shall conform to the applicable requirements of ANSI/AWWA C500, C504 and C509 standards governing construction materials and workmanship. Each valve shall carry the name or trademark of the manufacturer. All valves shall have operating nuts that turn to the right (clockwise) to open.

B. Resilient-Seated Gate Valves

1. Resilient seated gate valves shall conform to the applicable requirements of ANSI/AWWA C515. Valves shall have a minimum working pressure of 250 psi. The gate shall be ductile iron encased in a bonded synthetic rubber to form resilient seating surfaces. Stem shall be bronze with a non-rising design and double o-ring packing. Joints shall be push-on type.

2. Resilient Seated Gate Valves shall be manufactured by American Flow Control or Clow.

C. Tapping Sleeves and Valves

1. Tapping sleeves shall be full length of heavy-duty stainless steel construction designed for use with the type of pipe to be tapped. Tapping sleeve flange and body shall be type 304 stainless steel. Bolts and nuts shall be 304 stainless steel. Gasket shall be full circumferential SBR compounded for water service. Tapping sleeve shall contain a test plug to assure seal prior to tapping. Tapping sleeve shall be JCM Industries 432; Romac Industries SST, Ford FAST, Powerseal 3490AS; Dresser 630 or equal.

2. Tapping valves shall meet the specifications for gate valves except that the valve shall have a flange compatible with the tapping sleeve.

3. The tapping sleeves and valves shall be subjected to a hydrostatic pressure of 200 psi. The sleeves and valves shall be maintained under pressure for a minimum continuous period of 5 minutes by pumping potable water into the sleeve. Upon any visual leakage observed by the ENGINEER, the tapping sleeve and valve shall be removed and replaced, and the test repeated at the CONTRACTOR's expense to the satisfaction of the ENGINEER.

D. Corporation Stops

1. Corporation stops used for insertion into mains shall be ball valve type. All stops shall have no lead brass bodies, keys, stem washers and nuts. Inlet threads shall conform to the latest revision of AWWA C800. The outlet connection shall be of the compression type to receive copper service pipe.

E. Valve Boxes

1. Valves boxes shall be 5-1/4-inch and be of cast-iron construction. They shall be of three-piece, screw-type adjustment design. All valve boxes shall be installed flush with the top of the proposed site grade. Cover shall be designed to be removed easily to provide access to the valve. The base shall not rest upon the valve assembly. Valve boxes shall be Tyler 6860 Item DD with number 6 base, or equal.

F. Valve Extensions

1. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem. The length of the extension stem shall reach within 6.5 feet of the ground surface. Details of the extension system and method of installation shall be approved by the ENGINEER prior to installation.

G. Post Indicators and Valves

1. Post indicators, when specified, shall be American Flow Control series A240 or Clow series 2945A with aluminum plates indicating OPEN and SHUT. Post indicators shall open left.

2. Post indicator valves shall be American Flow Control Model 2500 or Clow model F-6120. All valves shall open left.

3. Post indicators and their corresponding valves must be made by the same manufacturer.

4. Bollards must be placed to protect post indicators, except as specified by the ENGINEER.

5. Bollards shall be 4-inch diameter galvanized schedule 40 steel posts 36 to 48 inches high with minimum depth of 24 inches. The posts shall be set in and filled with 3000 psi concrete. Bollards protecting hydrants and PIVs shall be painted red.

2.03 GATEWELLS

A. Gatewells shall conform to the latest revision of ASTM C478 for Precast Reinforced Concrete Manhole Sections. Section joints shall be rubber gasketed and shall conform to ASTM C990. Cone sections shall be eccentric, with an offset step configuration.

B. All gatewell components shall have the name of the manufacturer stenciled on the inside. The lettering shall be a minimum of 4-inches high.

C. Gatewells constructed over an existing water main shall have a doghouse mudded to an 8-inch thick cookie. All other gatewells shall have precast integral base sections.

D. Mortar for masonry or plastering outside of gatewells shall be made of one part of Portland Cement to two parts fine aggregate. Mortar materials and mixing shall correspond, in general, to those for concrete. All openings in gate wells shall be closed with brick and mortar in a manner that will make them watertight.

E. Gatewell steps shall be reinforced polypropylene coated steel. They shall be M.A. Industries models PS1-PF or PS1-B, or approved equal.

2.04 GATEWELL FRAMES AND COVERS

A. Gatewell frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitable notched for convenient removal of the cover.

B. Frames and covers shall be East Jordan Iron Works Model 1040Z frame with 1040 A cover. Each cover shall have the Pittsfield Township logo and the letters "PITTSFIELD TWP WATER" cast integrally into the cover.

C. All frames and covers shall be coated at the place of manufacturer with coal tar pitch varnish or other asphaltum coating approved by the ENGINEER.

2.05 GATEWELL CONNECTIONS

A. Water pipe to gate well connections shall be through a watertight flexible pipe-to-manhole connector, which shall be securely clamped into a core-drilled port. Pipe ports shall be core-drilled at the point of manufacturer and shall be accurately located within 1/2-inch of the proposed water main centerline. Flexible pipe-to-manhole connectors shall meet the requirements of ASTM C923 and shall be NPC, Kor-N-Seal, or equal.

B. All non-rubber components including wedges, bands and pipe clamps shall be stainless steel.

2.06 GATEWELL ADJUSTMENTS

A. All final grade adjustment of gatewell cover and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by Ladtech, Inc., or approved equal. The adjustment rings shall be manufactured from polyethylene plastic meeting the requirements of ASTM D4976. Brick adjustments are not acceptable.

B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.

C. Each adjustment ring shall be sealed with a 3/16 to 1/4-inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet the requirements of ASTM C990.

D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Redhead Trubolt concrete anchors, or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

E. When the depth of the gate well requires an adjustment greater than the maximum allowed, the CONTRACTOR shall provide additional pre-cast gate well barrel sections required to maintain acceptable chimney heights.

2.07 HYDRANTS

A. Fire hydrants shall comply with the latest revision of ANSI/AWWA C502. Hydrants shall be compression type to open with the pressure. They shall have a 5-1/4" valve opening and 6" mechanical joint inlet. Hydrants shall have two 3-1/2" (4.05" O.D.) pumper connections with National Standard 7-1/2 threads per inch. All hydrants shall have City of Ann Arbor standard thread pattern.

B. Fire hydrants shall have an inside barrel dimension of not less than 7.375" I.D. from top to bottom. The 1-1/8" pentagon operating nut shall open left (counter clockwise).

C. All nozzles shall be on a removable head with a flange so that they may be rotated by changing the position of the flange.

D. Hydrant shall be fully bronze mounted, including top of the operating stem where it passes through the double o-ring seal in the bronze packing gland. The forged operating stem in the base and the valve seat shall also be of bronze. The molded valve shall be of composition rubber and the cast iron valve clamps shall be packed with o-ring seals and held tight to the stem by a threaded bronze hex retainer ring and threaded bronze locknut, anchored with set screws.

E. Hydrant shall be designed for 150 psi working pressure and tested to 300 psi. Those portions of the hydrant above grade shall have two coats of red enamel. All unpainted surfaces shall have two coats of coal tar pitch varnish.

F. The hydrants shall be EJIW WaterMaster 5BR-250 with mechanical joint connections and break flange barrel with standard head.

G. Hydrant bolts located below grade shall be type 304 stainless steel

H. All hydrants shall have a 4" Harrington Integral Hydra-Storz (HIHS) adaptor. The HIHS shall meet the requirements of AWWA C502 regarding material and pressure testing. Stortz nozzle shall have a brass metal face and hard anodized ramps and lugs. The aluminum finish shall be hardcoat anodized to MIl-A-8625f, type 3 dark gray. The adapter shall be made from forged or extruded 6061-T6 aluminum.

I. The blind cap shall have hard anodized aluminum Storz ramps and lugs, made of forged or extruded 6061-T6 aluminum. the cap shall be equipped with suction seal. The cap shall be connected to the adapter or the hydrant with 0.125 vinyl coated aircraft cable.

J. Fire hydrant extensions shall be manufactured by the hydrant manufacturer for use with the model hydrant being installed.

K. Hydrants adjacent to truck routes on commercial developments shall be protected by bollards.

2.08 SERVICE LEADS

A. Pipe for service leads 1-inch to 2-inch shall be soft annealed Type K copper. Service leads 4-inch to 8-inch shall be Pressure Class 350 Ductile Iron, Double cement lined.

B. Curb Stops

1. Curb stops used for service connections shall be ball valve type. All parts shall be no lead brass. Both the inlet and outlet connections shall be of the compression type to receive copper service pipe. Curb stops shall be consistent with the most current shop drawing checklist posted on the Township website.

C. Curb Boxes

1. Curb boxes shall be the Bibby Screw Style V010 with S169 top, V201 bottom, V223 extention, and V240 water cover . All curb boxes shall be coated inside and out with a tar base enamel. The minimum bury shall be 5'-0" (60") and the maximum 6' (72"). Curb boxes shall be consistent with the most current shop drawing checklist posted on the Township website.

D. Couplings

1. Couplings used for service connections shall be located outside the pavement and more than 10 feet from any building wherever possible. They shall have a three part union, and both connections shall be of the compression type to receive copper service pipe. All parts shall be no lead brass..

2. All service connections between two copper service pipes (two-inch or less in diameter) located under the pavement or within 10 feet of a building shall be connected using wrought copper, solder-sweat type couplings conforming to ASME B16.18 or ASME B16.22. Fittings shall bear made in USA labels. Joining of copper piping shall be a solder-sweat connection using lead free Silfos. The use of 95-5, Tin-Antimony or equivalent solders will not be allowed.

2.09 TRACER WIRE

A. Tracer wire to be used on open cut pipe shall be AWG #12 single strand copper with blue 30 mil HDPE insulation. Connections shall be made using 3M DBR-6 wire connectors, or equal.

2.10 POLYETHYLENE ENCASEMENT

A. All ductile iron pipe and fittings must be polyethylene encased. In addition, the initial 24-inches of copper service lead must be encased from the corporation stop. Polyethylene encasement must be manufactured in accordance with the requirements of the latest revision of ANSI/AWWA C105/A21.5.

B. Polyethylene Encasement shall be black linear low-density polyethylene with a minimum thickness of 8 mils.

C. The wrap shall overlap the joint by 12 inches to either side and be secured to the pipe with polyethylene adhesive tape.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill shall conform to the Earthwork specification.

3.02 PIPE INSTALLATION

A. The installation of ductile iron water main must conform to the requirements of ANSI/AWWA C600.

B. Any pipe damaged in transport or handling shall be rejected and removed from the site of the work.

C. Before lowering in the trench, and while suspended, each pipe and fitting shall be inspected for defects. Defective, damaged or unsound pipe shall immediately be removed from the construction site. The interior of each pipe shall be inspected for cleanness and cleared of all dirt and foreign matter before being lowered into the trench.

D. In handling and placing ductile iron pipe and fittings, no metal shall be used in contact with the inside of the pipe to fit or support the pipe. The pipe shall be moved only through the use of belt slings or automatic release type pipe tongs. Care shall be taken not to injure the pipe or pipe coating, and no damaged or imperfect pipe shall be used in the work except that minor damage to pipe coating may be repaired subject to the review of the ENGINEER.

E. Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the adjacent pipe; the pipe shoved into position and brought to a true alignment. It will then be secured with sand backfill tamped under and on each side of the pipe, except at bell holes. No earth or other foreign matter shall be allowed to enter the joint space.

F. All excavation and backfill above the pipe shall conform to specifications under Earthwork and as shown on the Drawings.

G. A minimum of 18-inches vertical clearance shall be provided between the water main and any existing underground facility, unless otherwise approved by the ENGINEER. Whenever a main is installed under any existing utility line such as gas, buried electric power, telephone line, sewer or water, provisions shall be made to properly support or distribute any concentrated load to avoid settlement and possible failure of either main. Such provisions shall consist of concrete bedding of the main, complete concrete encasement, or some other method as shown on the plans. Water mains passing under sewers, in addition, shall be protected by providing:

1. A vertical separation of at least 18-inches between the bottom of the sewer and the top of the water main.

2. Adequate structural support for the sewer to prevent excessive deflection of joints and settlement of the sewer about the water main; i.e., a concrete saddle under the pipe with a span length extending to undistributed earth bearing.

H. Water mains shall be installed at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge.

I. In assembly of push-on or shove type joints, the bell socket recess and the gasket shall be wiped clean and the gasket placed properly in position. A thin film of lubricant shall then be applied to the surface of the gasket to come into contact with the entering pipe. The plain end of the entering pipe shall be cleaned and then entered and forced home to the base of the socket.

J. Where necessary to cut pipe, cutting shall be done with approved tools and cut ends of pipe shall be square and regular. Cutting shall be done in a manner to avoid damage to lining and coating. Minor damage may be repaired subject to review of the ENGINEER.

K. To prevent trench water from entering the pipe, joints, which for any reason may not be completed as the pipe is laid, shall be thoroughly packed with approved material, in a manner to make them watertight. Open ends of fittings shall be tightly closed with approved plugs and well packed, as shall the end of the last pipe laid whenever work is not in progress.

L. Each pipe shall be laid accurately to the line and grade shown on the Plans. Wherever deflections at joints are required by changes in grade or alignment or to plumb valve stems, the deflection at any bell and spigot joint shall not exceed that which will cause the spigot end of pipe to be away from home in the bell of the adjacent pipe a distance of 1/4 inch at the point of greatest opening.

M. The deflection at any mechanical joint shall not exceed three-quarters of the maximum deflection recommended by the manufacturer or 3 degrees, whichever is more conservative of the joint used.

N. The CONTRACTOR shall not be entitled to any additional compensation because depth is more than specified at certain locations or due to clearances at manholes, or due to unforeseen obstacles, or occasioned in order to avoid undue changes in grade.

O. Pipe shall be laid at depths to provide minimum cover of 5' - 6" over the top of the pipe unless otherwise noted on the Drawings or elsewhere in these specifications.

3.03 GATE VALVES AND WELLS

A. All pre-cast section joints and lift holes shall be pointed and plugged, inside and outside, with mortar.

B. Gate valves shall be of the size and installed at the location as shown on the plans. They shall be set square with the line of the main, and unless otherwise directed by the Township ENGINEER, all gate valves shall be set with stems plumb. At each side of gate valve, the CONTRACTOR shall furnish and install a 1-inch corporation stop on the main as shown on the Standard Details.

C. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem.

3.04 HYDRANTS

A. Fire hydrants shall be constructed in accordance with the details shown on the plans. Finish grade level to center of nozzle caps shall measure between 24 and 30 inches. A maximum of one hydrant barrel extension and one operating stem extension may be used to accommodate changes in grade. Under no conditions shall extended hydrant have more than one coupling in the operating stem. Pumper connections shall point toward the street.

B. Fire hydrants shall be installed with barrel vertical and properly based. Concrete thrust blocks shall be placed behind the hydrant, tee, and every bend. Care should be taken to insure the drain holes on the hydrant are not plugged by the thrust blocks. Hydrant shall be set in 1 yard of coarse gravel for drainage purposes. If ground water is encountered, the drain hole shall be plugged as directed by the manufacturer. The backfill shall be sand thoroughly tamped around the hydrant and valve box in 1 ft layers.

C. Fire hydrant and gate valve shall be set apart 24 inches. Gate valves and valve box shall be as specified under the valve paragraphs of this section.

D. Hydrant leads shall have a minimum of 5.5 feet of cover in all areas, including crossings through ditch sections.

E. Hydrants shall be carefully plumbed, braced and backfilled so they remain plumb.

F. All grade, facing, and vertical alignment adjustment of hydrants shall be completed prior to pressure testing and charging of the hydrants.

G. All hydrants shall be cleaned and painted with a rust inhibitive, oil base paint such as "rustoleum" or approved equal to the Township's color code prior to acceptance.

H. The lubricant reservoirs in all hydrants having such construction shall be filled with a lubricant acceptable to the Michigan Department of Environmental Quality and recommended by the hydrant manufacturer.

I. Backfilling around fire hydrants shall be carefully tamped sand in 12-inch layers from the centerline of the lead main to a height of 1-foot below finished grade.

J. CONTRACTOR shall place burlap sack or equivalent material over the hydrant nozzles after installation.

K. Fire hydrant nozzles shall be aligned as required by the Township Fire Marshal.

L. Fire hydrant extensions shall be provided as necessary so that the safety flange is located at or above surface grade.

3.05 TRACER WIRE

A. Tracer wire shall be installed along the top of all water mains. For directional drilling, the tracer wire shall be installed at the same time as the pipe. For open cut construction, the tracer wire shall be installed at a height of not more than 6 inches above the main line pipe or service leads. Wire shall be extended to all hydrants, blow-offs, dead ends, service leads and post indicator valves. Tracer wire shall be brought to grade, leaving enough excess material to avoid loss or damage to the wire during construction and subsequent activities. Wire shall be trimmed to finish grade following completion of the landscaping.

B. When tracer wire is to be run along short offsets (less than 20 feet), a loop of wire shall be utilized to loop to the end of the offset, bring the loop to grade and terminate it in an approved manner. For service leads and offsets of more than 20 feet in length, or installed by directional drilling method, a splice may be utilized to make the connection at the main. The tracer wire shall then be installed and terminated in an approved manner.

C. Tracer wire terminations shall be made by one of the following methods:

1. Tracer wire shall be terminated at hydrants by tying off the wire at the head flange, leaving excess material for future trimming following landscape activities.

2. Terminations at valve/curb boxes, post indicators, valves and blow-offs shall be made with 2 wraps of wire at grade around the box or pipe, leaving excess material for future trimming following landscaping.

3. Gatewell terminations shall be made by running the tracer wire through the pipe opening in the wall, down to and across the floor to the steps, up the wall and secure to the top step leaving the stub accessible at the casting. Wire shall be run through the gatewell such that it does not create a hazard.

4. Terminations at existing water mains without tracer wire shall be made at the nearest hydrant or gate well as outlined above. If no hydrant or gatewell is available, an upper section of valve box shall be installed with the tracer wire stubbed up inside

D. When connections are made to existing water mains which do not have tracer wire, the following method most applicable to field conditions shall be used.

1. When connection is made at/near a valve or hydrant, the connection shall be made in the same manner as the termination at said structures in Item C(2) above.

2. When connection takes place in a gatewell, the same procedure shall be used as in termination at a gatewell (see Item C(3) above).

3. If no valve or hydrant is available, the upper section only of a valve box shall be set with the tracer wire stubbed up inside.

3.06 POLYETHYLENE ENCASEMENT

A. The polyethylene encasement must be installed in accordance with the specifications and requirements of ANSI/AWWA C105/A21.5. For open cut applications a single wrap is required, and for directional drill applications a double wrap is required.

B. The polyethylene encasement must be taped and overlapped at pipe joints and must be taped in a spiral configuration along the length of the pipe.

3.07 CONNECTION TO EXISTING MAINS

A. All connections to existing water mains shall be made at the locations as shown on the plans.

B. All valves shall be operated by the Pittsfield Township Utilities Department.

C. Prior to beginning construction of the final connections, the CONTRACTOR shall provide sequence of all final connections to the existing system and coordinate a meeting between the ENGINEER, OWNER and CONTRACTOR in the field to review the procedure.

D. When making a dry connection to an existing main, the existing main to which a connection is to be made shall be isolated by the closing of the necessary existing valves, and the water from the existing main shall then be pumped out or removed by other means so the connection may be made in the dry. After the connection has been acceptably made, the portion of the new line to the nearest valve shall be satisfactorily tested and disinfected, along with the drained portion of the existing water main, before the isolated existing main is placed back in service, except as the ENGINEER may otherwise direct. In as much as residents served by this isolated main will be temporarily out of water during this period, the work shall be executed as rapidly as possible, and the time of, and the procedure in, making such connections shall be subject to the review of the ENGINEER. Such work may be required to be done at night in order to minimize inconvenience of water users. The CONTRACTOR shall not be entitled to any additional compensation because of night work or other special requirements in work under this section.

E. The CONTRACTOR shall make particular effort, prior to bidding, to ascertain whether or not valves in the existing mains to be connected to the new mains are so located as to provide isolation. If valves are not found to be adequate, then the CONTRACTOR shall utilize other means to make the connections with a minimum of interruption to service.

F. When making a wet tap connection to an existing main, a tapping sleeve designed for the type of pipe being tapped shall be utilized and the tap shall be made in accordance with the manufacturer of the tapping equipment.

G. Wherever adapters are required to properly connect the pipe with existing pipe or other material or manufacturer, the nominal I.D. of adapters shall be the same size as the nominal diameter of pipe connected thereto. Adapters shall also be furnished and used as required by the manufacturer for connection to fittings.

3.08 BEDDING

A. Ductile iron pipes shall be fully enclosed in polywrap and laid on a compacted sand cushion, 4 inches thick. Sand shall conform to fine aggregate 2NS as defined in 2003 MDOT, Section 902.

B. 2NS sand bedding material shall be placed around and above the main to a height of 12 inches above the main.

C. Sand shall be compacted on top of the 12-inches of sand above the pipe to not less than 95 percent of the maximum unit density as determined at optimum moisture content.

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Land Development • Land Survey • Institutional • Municipal
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PITTSFIELD CHARTER TOWNSHIP

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Revision	By	Appd.	YY.MM.DD
SPEC. UPDATES	MRH	DRW	14.01.24
TWP REV	BWA	DRW	11.04.27
SPEC. UPDATES	BWA	DRW	10.10.25
SPEC. UPDATES	TTN	DRW	10.01.19

Issued	By	Appd.	YY.MM.DD
File Name: W-02	BWA	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
WATER MAIN SPECIFICATIONS

Project No. 2075001300

Scale

Revision

CLIENT
CONCOURSE OFFICE PROPERTIES, LLC
29800 MIDDLEBELT RD., SUITE 200
FARMINGTON HILLS, MI 48334
KEVIN SPIZIZEN
(248) 855-8110

CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
WATER MAIN SPECIFICATIONS

JOB No. 16295

REVISIONS: TWP REV 1

REV.	DATE
	3/24/17

DATE: 2/15/17
SHEET 34 OF 39
CADD: WAJ
ENG: JAM
PM: RDW
TECH:
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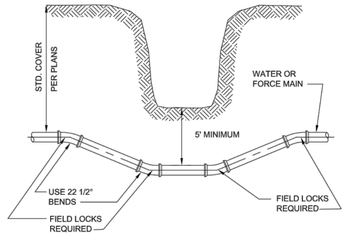
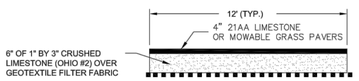
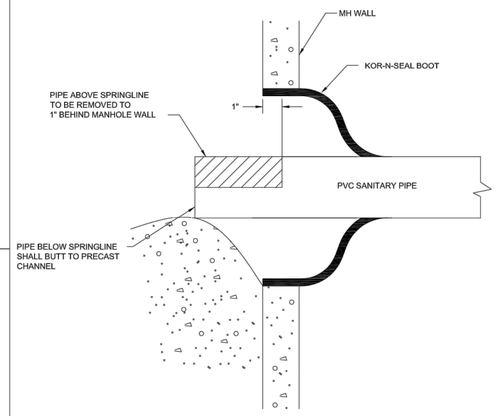
16295



DITCH & STREAM CROSSING

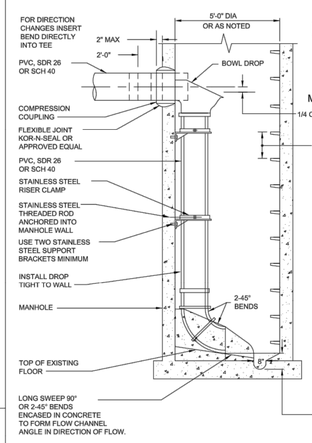


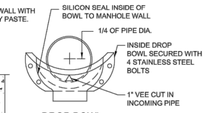
SANITARY SEWER ACCESS PATH



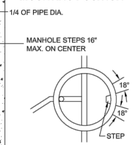
SANITARY PIPE PENETRATION

NOTES:
1. SECURE DROP PIPE TO MANHOLE WALL WITH RELINER-DURAN, INC STAINLESS STEEL ADJUSTABLE CLAMPING BRACKETS OR EQUAL.
2. ATTACH THE DROP BOWL & EACH CLAMPING BRACKET TO THE MANHOLE WALL WITH 3/8" x 3 3/4" RAMSET/RED HEAD BOLTS HELD INPLACE WITH 2 STAGE EPOXY PASTE.





DROP BOWL MOUNTING POSITION



DROP SHALL BE NO CLOSER THAN 16" FROM STEP

SIZE

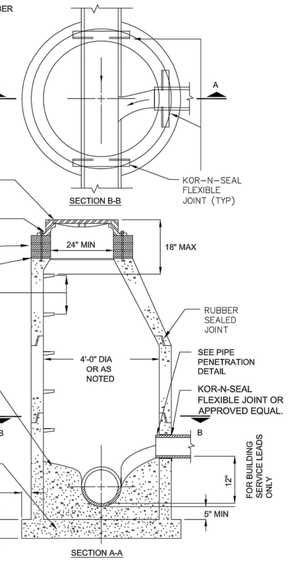
LINE	LINE
4"	4"
6"	6"
8"	8"
10"	8"

MH DIA.	MAX. DROPS
4'	2-6"
5'	4-6"
6'	2-8"
6'	3-8"

NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

INTERIOR DROP SANITARY MANHOLE

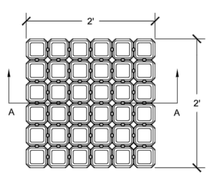
PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
5. PROVIDE INTEGRAL BASE WITH PRECAST CONCRETE CHANNELS.
6. WHERE MANHOLES ARE CONSTRUCTED OVER EXISTING SEWERS, POURED IN PLACE OR PRECAST COOKIE AND DOGHOUSE STRUCTURES MAY BE USED IN PLACE OF INTEGRAL BASE.



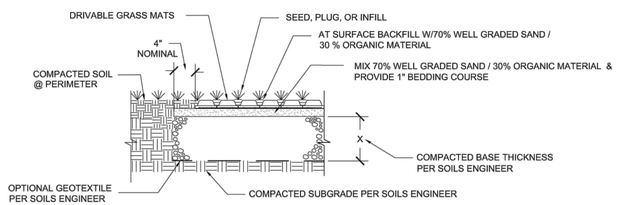
NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

SANITARY MANHOLE

NOTE:
FOR STORMWATER MANAGEMENT APPLICATIONS INCLUDING STORAGE AND INFILTRATION, ALTERNATE INFILLS, BASE MATERIAL, AND DRAINAGE MAY BE REQUIRED

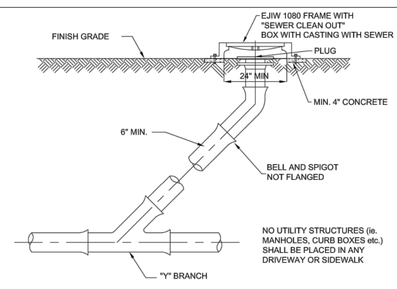


PLAN VIEW

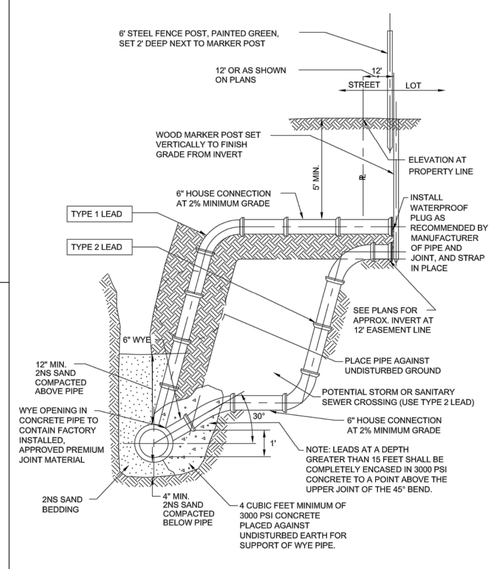


SECTION A-A

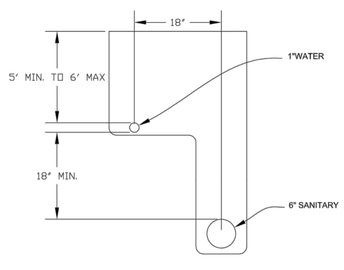
TYPICAL HEAVY TRAFFIC DRIVABLE GRASS DETAIL



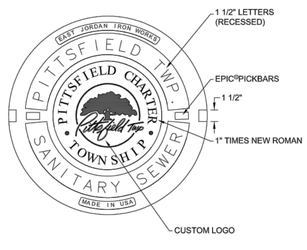
SANITARY SEWER CLEANOUT



SANITARY SEWER SERVICE & RISER CONNECTION DETAIL

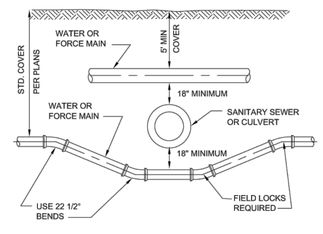


TYPICAL L TRENCH DETAIL HOUSE LEADS



EAST JORDAN IRON WORKS 1040 Z BOLT DOWN FRAME
EAST JORDAN IRON WORKS 1040 AGS COVER

COVER DETAIL



SEWER OR CULVERT CROSSING

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Revision	By	Appd.	YY.MM.DD
COVER DETAIL UPDATE	MRH	DRW	14.01.24
TWP REV	BWA	DRW	11.04.27
MANHOLE UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: SS-01	BWA	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SANITARY SEWER DETAILS

Project No. 2075001300
Scale NOT TO SCALE
Revision

MIDWESTERN CONSULTING
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Land Development • Land Survey • Institutional • Municipal
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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
SANITARY SEWER DETAILS

35

JOB No. 16295
REVISIONS: TWP REV 1
REV. DATE 3/24/17
DATE: 2/15/17
SHEET 35 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295DT_PITT.dwg
TB#400

M:\Civil3d_Proj\16295\Site Plan\16295DT_PITT.dwg, 3/23/2017 12:08 PM, Jeremy A. Matthei, None
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SANITARY SEWER AND MANHOLES

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, tools, equipment and materials to construct all sanitary sewers, manholes and necessary appurtenant work as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

1. The CONTRACTOR shall furnish all equip\-ment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed and has been installed for not less than 30 days.

2. The CONTRACTOR may desire to make an air test prior to backfill for his own purposes but the line acceptance tests shall be conducted after backfilling or extensions.

3. All sewer lines shall be televised while running enough water through the line to be visible at the next downstream manhole.

4. All sewer lines shall be checked for alignment.

5. All manholes shall be tested for leakage. All PVC lines shall be tested for deflection.

6. Sewer pipe 30 inches and smaller shall be air tested. Sewer pipe larger than 30 inches shall be tested by either infiltration or exfiltration and shall be tested in lengths of 1600 feet or less.

7. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair rejected section and retest until it is within specified allowance.

B. Test for Leakage - Air Test

1. Section 33-95 (pg 30-6) 2004-Ten State Standards.

2. After a manhole-to-manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs inflated to 35 psig internal pressure. The design of the pneumatic plugs shall be such that they will hold against the line test pressure without requiring external blocking or bracing.

3. There shall be three (3) hose connections to the pneumatic plug. One hose shall be used only for inflation of the pneumatic plug. The second hose shall be used for continuously reading the air pressure rise in the sealed line. The third hose shall be used only for introducing low pressure air into the sealed line.

4. There shall be a 0-30 psig gauge for reading the internal pressure of the line being tested. Calibrations from the 1-10 psig range shall be in tenths of lbs (not ounces) and this 0-10 portion shall cover 90% of the complete dial range.

5. Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of any ground water pressure that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period, the third hose shall be disconnected.

6. The portion of line being tested shall be accepted if the portion under test meets the following conditions.

a. DI, and RCP Pipes

(1) The time requirement for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time given in the following table:

Pipe	Min. Holding Time Seconds/100 ft. Pipe
4-inch	18
6-inch	42
8-inch	72
10-inch	90
12-inch	108
15-inch	126
18-inch	144
21-inch	180
24-inch	216
27-inch	252
30-inch	288

(2) In areas where ground water is known to exist, the CONTRACTOR shall install a 1/2-inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, the ground water level shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the pipe nipple. The hose shall be held vertically and a measurement of the height in feet of water shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the lbs of pressure that will be added to all readings. For example, if the height of water is 11-1/2 ft, then the added pressure will be 5 psig. This makes the 3.5 psig to be 8.5 psig, and the 2.5 psig to be 7.5 psig. The 1 lb allowable drop and the timing remains the same.

a. PVC Pipe

(1) The time requirement for the pressure to decrease from 3.5 to 3.O psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than that shown in the following table:

(inches)	Pipe Size (seconds)	Holding Time (seconds)	Minimum Holding Time
	4-inch	0.190xL	113
	6-inch	0.427xL	170
	8-inch	0.760xL	227
	10-inch	1.187xL	283
	12-inch	1.709xL	340
	15-inch	2.671xL	425
	18-inch	3.846xL	512

(2) If any section of the sewer fails to meet this requirement, the CONTRACTOR shall perform a television inspection of the faulty section and repair or replace at his own expense all defective materials and/or workmanship to the satisfaction of the ENGINEER. The test procedure shall be repeated until the results are acceptable.

C. Test for Infiltration

1. Sewer pipe over 18 inches shall be tested to measure the infiltration of ground water. If the measured leakage exceeds 100 gallons per inch diameter per mile of pipe per 24 hr period, the CONTRACTOR shall locate the points of excessive leakage and make the necessary repairs at his own expense.

2. In the event the line does not pass the infiltration test as stated above, the test shall be repeated after suitable repairs have been completed.

D. Test for Exfiltration

1. Where the ground water provides less than a 2 ft head on the sewer, an exfiltration test shall be conducted by filling the sewer with water to a 4 ft head or 4 ft above the ground water level, whichever is greater. The allowable water loss shall be 100 gal/in./mi/day as calculated above for infiltration.

2. After the sewer has been filled with water, 4 hrs time shall be allowed for water absorption by the pipe before exfiltration tests are initiated.

3. For the purpose of establishing the 4 ft test head, the head shall be measured from the center of the sewer pipe at the midpoint of the test section length. This procedure shall be used for both infiltration and exfiltration tests.

E. Test for Manhole Leakage

1. All manholes shall be tested for leakage by using plugs on inleting-outleting sewers, and filling the manholes with water to the top of the man\-hole. Four hours shall be allowed for water absorption by the manhole before testing is initiated. Allowable exfiltration for 48-inch diameter manholes shall be 2 gallons per foot of depth per day.

F. Test for Alignment

1. All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

G. Test for Deflection of PVC Pipe

1. PVC pipe sewers shall be installed in such a manner that the initial deflection of the conduit shall conform to the latest revision of ASTM D-3034.

2. Deflection of PVC pipe shall be tested by pulling a rigid pig or equivalent through the pipe. The pig shall be constructed in accordance with the following table of maximum outside diameters and shall be submitted to the ENGINEER for review before testing is initiated.

Pipe I.D.	Pig O.D.
6 inches	5.33 inches
8 inches	7.11 inches
10 inches	8.87 inches
12 inches	10.55 inches
15 inches	12.90 inches
18 inches	15.74 inches

3. The pig shall be drawn by hand through the pipe from manhole to manhole. Any portion of pipe through which the pig passes freely shall be deemed to have passed the deflection test. Sections of pipe through which the pig does not pass shall be located, un\-covered and the pipe zone bedding improved and backfilled by the CONTRACTOR at his own expense. The pipe shall then be retested before acceptance is granted.

H. Material Tests

1. The CONTRACTOR shall have tests of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, and valves. The Contractor shall submit certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 SEWER PIPE

A. Pipe for sewer 24-inch diameter and smaller shall be polyvinyl chloride (PVC). Pipe for 30-inch diameter and larger shall be PVC truss pipe. Ductile iron pipe and reinforced concrete pipe shall be used as specified by the ENGINEER.

B. Pipe for service leads 4 though 8 inches in diameter shall be polyvinyl chloride (PVC).

C. Reinforced concrete pipe shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Pro\-posal.

D. PVC pipe 4 inches through 15 inches in diameter shall meet or exceed all of the requirements of the current ASTM D-3034 SDR-26 polyvinyl chloride sewer pipe and fittings. 18-inch diameter PVC pipe shall meet or exceed all the requirements of the current ASTM F-794 SDR 26 polyvinyl chloride sewer pipe and fittings. Samples of pipe and physical and chemical data sheets shall be submitted to the ENGINEER for review. Approval shall be obtained before pipe is purchased.

E. If the sewer pipe is greater than 15 feet deep PVC pipe shall be SDR 21.

F. Truss pipe shall meet or exceed all of the requirements of the current ASTM D2680.

G. Ductile iron pipe shall meet or exceed all the requirements of ANSI A21.50 with a cement lining.

2.02 SEWER PIPE FITTINGS

A. Fittings shall be of the same material as the pipe, and in no case shall the walls be thinner than that of the pipe furnished.

B. Wye and tee fittings for PVC pipe shall be reviewed by the ENGINEER before purchasing.

C. The dry fit of all fittings must be snug. If the fit is such that it is loose, the pipe or fitting will be rejected as faulty and of improper size.

2.03 SEWER PIPE JOINTS

A. Concrete pipe joints shall be made of a resilient material conforming to the latest revision of ASTM Designation C443. Proper lubricant shall be furnished by the joint manufacturer.

B. Concrete pipe for use with rubber joints shall be smooth and precisely formed to provide a uniform annular space for joint materials.

C. PVC pipe shall be jointed with ring gusseted bell ends. (ASTM-D3212) Jointing materials shall be applied to the bell end of the pipe at the point of manufacture in such a manner that a tight uniform joint will be achieved and such that when the joint is made up in the field, the joint material will not roll or tear from the pipe. A proper joint lubricant shall be furnished by the pipe manufacturer.

2.04 REINFORCED CONCRETE MANHOLES

A. Manholes shall conform to the current ASTM specifications for precast reinforced concrete manhole sections, serial designation C478. Manhole section joints shall conform to ASTM C990-96. Cone sections shall be straight side type, with an offset step configuration.

B. All manhole component parts shall have the name of the manufacturer stenciled on the inside. The lettering or logo shall be a minimum of 4-inches high.

C. Manholes constructed over an existing sewer line shall have a doghouse mudded to an 8-inch thick cookie. The bottom of the existing pipe shall be the channel. All other manholes shall have precast integral base sections with pre-formed concrete channels.

D. All channels shall be constructed to the full flow depth of the pipe.

2.05 MORTAR FOR MANHOLES

A. Mortar for plastering manholes shall be made of one part Portland cement and two parts fine aggregate.

2.06 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each cover shall be marked with the Pittsfield Township logo and the letters, PITTSFIELD TWP SANITARY SEWER integrally cast into the cover.

B. Covers shall be of the "self-sealing" design having a continuous gasket glued in a machined groove and a concealed pickhole. Frames and covers shall be East Jordan 1040Z, with Type AGS cover.

C. All manhole frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

2.07 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF or PS1-B, or approved equal.

2.08 MANHOLE CONNECTIONS

A. Sewer pipe (6-inch to 24-inch) to manhole connections shall be through: 1) a flexible rubber boot which shall be securely clamped into a core-drilled pipe port. Pipe ports shall be core-drilled at the point of manhole manufacturer and shall be accurately located within 1/2-inch of proposed sewer centerline (Kor-N-Seal); or, 2) a self-adjusting mechanical pipe to manhole seal which provides a resilient flexible and infiltration-proof joint (Res-seal); or, 3) a flexible rubber wedge firmly rammed into a rubber gasket which is cast into the manhole (Press Wedge II), or equal. All flexible pipe to manhole connections shall be installed per the manufacturers specifications.

B. Neoprene rubber for the manhole boot shall meet ASTM Specification C443 and shall have a minimum thickness of 3/8-inch. Pipe clamp bands shall be of corrosion-resistant steel.

C. Sewer pipe over 24 inches to manhole connections shall be in accordance with details shown on the Plan.

2.09 SANITARY MANHOLE ADJUSTMENTS

A. All final grade adjustment of manhole covers and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by LADTECH, INC. or approved equal. The adjustment rings shall be manufactured from polyethylene plastic as identified in ASTM Designation D 1248.

B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.

C. Each adjustment ring shall be sealed with a 3/16 to ¼ inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet ASTM specification C-990.

D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Redhead concrete anchors or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

2.10 MANHOLE DROPS

A. Manhole drop connections shall be interior drops using the drop bowl as produced by Reliner-Duran Inc. or approved equal.

B. Drop bowl model A-4" shall be used for all lines up through full 6-inch inlets. Drop bowl model A-6" shall be used for all 8-inch inlets. Drop bowl model B-8" shall be used for all 10-inch inlets. Lines larger than 10 inches shall be as directed by the ENGINEER.

C. The force line hood shall be attached on models A-4" and A-6" when the incoming line is from a force main or the slope is 3 percent or greater.

D. The drop pipe shall be secured to the manhole wall with Reliner-Duran, Inc. stainless steel adjustable clamping brackets or approved equal.

E. The drop bowl and each clamping bracket shall be attached to the manhole wall with 3/8-inch x 3 3/4-inch bolts.

F. The incoming pipe shall be trimmed such that it protrudes 2 inches into the manhole.

G. A 1-inch V shaped notch shall be cut into the bottom edge of the incoming pipe.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill above a line 12 inches above the crown of the pipe shall conform to Section 2.04, Earthwork, of these Specifications.

3.02 BEDDING

A. Reference Section 33.83a of 10 State Standards.

B. Reference Section 33.83b of 10 State Standards.

C. Ductile iron, and concrete pipes shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 3 inches for 24-inch and smaller pipe and not less than 4 inches for pipe larger than 24-inch conforming to Class B bedding as shown on the Plans. Where shown on the Plans or required by the ENGINEER, concrete encasement or concrete cradle shall be used.

D. PVC pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches conforming to Class B bedding as shown on the Plans. Where shown on the Plans, or where the pipe passes under a road with less than 4 ft of cover, the pipes shall be encased.

E. For all pipes, compacted granular material shall be placed at the sides of the pipe and cover not less than 12 inches above the crown of the pipe.

F. "Granular Material" shall be class 2NS sand, pea gravel or crushed stone conforming to ASTM C33 Size No. 67 placed in not more than 6-inch layers and com\-pacted to not less than 95% standard density for PVC and 90% standard density for reinforced concrete.

G. Pea gravel or crushed stone used for bedding shall be separated from the sand backfill with a non-woven geotextile fabric. The fabric shall be Amoco 4551, or approved equal.

3.03 PIPE INSTALLATION

A. Installation of PVC pipe shall be in confor\-mance with ASTM D2321-89.

B. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress shall be kept dry; and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.

C. All joints shall be made up in accordance with the manufacturer's instructions using materials and equipment especially prepared for the type of joint to be used.

D. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by levels, laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.

E. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities, or structures. Any change in location or alignment of piping which may be found more feasible or practicable as the work progresses shall be made by the CONTRACTOR, as the ENGINEER may direct.

F. All pipe and fittings shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the PVC pipe will be considered cause for rejection.

G. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within two pipe lengths behind pipe laying.

H. All cutting of the pipe shall be done in a neat workmanlike manner with the least amount of waste and without damage to existing or new lines. A fine tooth saw, tubing cutter or similar tool may be used to cut PVC pipe. Cuts must be square. Ragged edges shall be removed with a cutting tool or file.

I. After cutting bell and spigot or socket pipe, a stop mark shall be made with a pencil or crayon using dimensions as shown by the manufacturer's instructions or by using another pipe in the field as a guide.

J. Breaks in pipe or joints shall be repaired to the satisfaction of the ENGINEER and at the expense of the CONTRACTOR.

3.04 CONNECTIONS TO EXISTING MANHOLES AND OTHER RIGID STRUCTURES

A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cut into the manhole.

B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.

C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be clamped into the cored hole and used to make the connection.

D. For connections to existing fiberglass manholes, a hole shall be cored into the manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be installed using fiberglass reinforced pipe stubout for Kor-N-Seal boot sealing surface.

3.05 STREAM AND RIVER CROSSING

A. Whenever a pipe is required to cross a stream or river, all work shall be in accordance with the provisions of Act 346, the Inland Lakes and Streams Act of 1962, and the rules and regulations promulgated thereunder. Stream crossings and all restoration required shall be completed within five days of the construction.

B. The CONTRACTOR shall utilize such con\-struction methods as are feasible and practicable to divert or stop stream flow to lay the pipe in the dry. Pipe shall be ductile iron, mechanical joint, or compression gasket joint pipe with joints at transition to other types of sewer pipe encased with no less than 1 cu yd of concrete, placed at a minimum of 6 inches thickness around the pipe. After the sewer is properly laid, jointed and encased, the stream-channel shall be cleaned of dirt and debris resulting from the CONTRACTOR's operations.

C. After the crossing is made, heavy riprap and sodding shall be placed to protect the banks from corrosion as shown on the Plans.

PCT July 2008

Pittsfield Charter Township
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www.pittsfield–mi.gov

Revision	By	Appd.	YY.MM.DD
TWP REV	BWA	DRW	11.04.27
UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued | By | Appd. | YY.MM.DD

File Name: SS–02	BWA	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SANITARY SEWER SPECIFICATIONS

Project No. 2075001300
Scale NOT TO SCALE
Revision 1

MIDWESTERN CONSULTING
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KEVIN SPIZIZEN
(248) 855–8110

CONCOURSE OFFICE CENTER
PRELIMINARY & FINAL SITE PLAN
SANITARY SEWER SPECIFICATIONS

36

DATE: 2/15/17
SHEET 36 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295DT_PITT.dwg
FB#460

JOB No. **16295**
REVISIONS: TWP REV 1
REV. DATE 3/24/17

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STORM DRAINAGE CALCULATION SHEET

MIDWESTERN CONSULTING, L.L.C.
3815 Plaza Drive
Ann Arbor, MI 48108
(734) 995-0200, Fax (734) 995-0599

Runoff Formula: Q = CIA
I = x/T+y x = 175 y= 25 (10 Year Storm Event)
Type of Pipe = rcp
n = 0.013

PROJECT/CLIENT:
Job No.: 99330
Date: 03/14/00
By: TJW
Revised: 07/31/01

Structure No. From	Structure No. To	Drainage Area A (Acres)	Runoff Coeff. C	CxA	ADD. CxA	Σ CxA	Time T (min.)	Rainfall I (in./hr.)	Q (cfs)	Pipe Dia. (in.)	Pipe Length (ft.)	Pipe Slope %	H.G. Slope %	Velocity Flowing Full (ft./sec.)	Travel Time (min.)	Pipe Capacity (cfs)	Surface Elev. Upstr.	H.G. Invert Elev. Upstr.	H.G. Invert Elev. Dwnstr.	Upstr. Invert Elev. Upstr.	Upstr. Invert Elev. Dwnstr.	Upstr. Depth of Cover (ft.)	Dwnstr. Depth of Cover (ft.)	Upstr. Surface to H.G. (ft.)	Jump (ft.)	Elev. (ft.)
EX. r-2	R-23	0.00	0.00	0.00	6.28	6.28	20.00	3.89	24.42	27	47	0.43	0.62	6.16	0.13	20.36	821.46	819.10	818.81	816.97	816.76	2.24	2.49	2.36		
R-23	R-22	0.19	0.84	0.16		6.44	20.13	3.88	24.97	27	84	0.43	0.65	6.30	0.22	20.36	821.50	818.81	818.26	816.76	816.40	2.49	2.85	2.69	-0.06	
R-22	R-21	0.20	0.84	0.17		6.61	20.35	3.86	25.50	30	103	0.40	0.39	5.30	0.32	26.01	821.50	818.26	817.85	816.26	815.85	2.74		3.24		
R-21	HW-1	0.00	0.00	0.00		6.61	20.67	3.83	25.32	30	80	0.40	0.38	5.30	0.25	26.01	822.85	817.85	817.53	815.85	815.53					
R-30	R-29	0.31	0.76	0.24		0.24	15.00	4.38	1.03	12	80	0.50	0.08	3.22	0.41	2.53	823.57	820.43	820.09	819.63	819.23	2.94	3.15	3.14		
R-29	R-27	0.57	0.74	0.42		0.66	15.41	4.33	2.85	15	219	0.34	0.19	3.08	1.19	3.78	823.38	820.09	819.66	819.03	818.29	3.10		3.29		
R-28	R-27	0.13	0.85	0.11		0.11	15.00	4.38	0.48	12	82	0.50	0.02	3.22	0.42	2.53	823.33	819.68	819.66	818.60	818.19	3.73		3.65	-0.3	
R-27	R-26	0.60	0.77	0.46	0.77	1.34	16.60	4.21	5.64	18	155	0.34	0.29	3.48	0.74	6.14	822.35	819.66	819.21	818.09	817.56	2.76	3.61	2.69		
R-26	R-25	0.66	0.84	0.55		1.89	17.34	4.13	7.83	18	124	0.50	0.56	4.44	0.47	7.45	822.67	819.21	818.52	817.56	816.94	3.61		3.46		
R-35	R-34	0.35	0.74	0.26		0.26	15.00	4.38	1.13	12	114	0.50	0.10	3.22	0.59	2.53	824.10	820.75	820.64	819.55	818.98	3.55	4.12	3.35		
R-34	R-33	0.38	0.74	0.28		0.54	15.59	4.31	2.33	12	117	0.50	0.43	3.22	0.61	2.53	824.10	820.64	820.13	818.98	818.39	4.12	4.15	3.46	-0.1	
R-33	R-32	0.48	0.74	0.36		0.90	16.20	4.25	3.80	15	99	0.34	0.35	3.11	0.53	3.78	823.54	820.13	819.79	818.29	817.95	4.00	4.23	3.41		
R-32	R-31	0.41	0.79	0.32		1.22	16.73	4.19	5.11	15	115	0.34	0.63	4.18	0.46	3.78	823.43	819.79	819.07	817.95	817.56	4.23	3.74	3.64	-0.1	
R-31	R-25	0.66	0.77	0.51		1.73	17.19	4.15	7.16	18	117	0.50	0.47	4.21	0.46	7.45	822.55	819.07	818.52	817.53	816.94	3.52		3.48	-0.1	
R-25	R-24a	0.54	0.82	0.44	3.62	4.07	17.81	4.09	16.62	27	154	0.36	0.29	4.69	0.55	18.63	822.67	818.52	817.97	816.72	816.17	3.70		4.15		
R-24a	R-24	0.00	0.00	0.00		4.07	15.00	4.38	17.78	27	156	0.36	0.33	4.69	0.55	18.63	822.21	817.97	817.41	816.17	815.61	3.79	5.25	4.24		
R-24	HW-2	0.00	0.00	0.00		4.07	15.55	4.32	17.54	27	36	0.36	0.32	4.69	0.13	18.63	823.11	817.41	817.28	815.61	815.48	5.25		5.70		

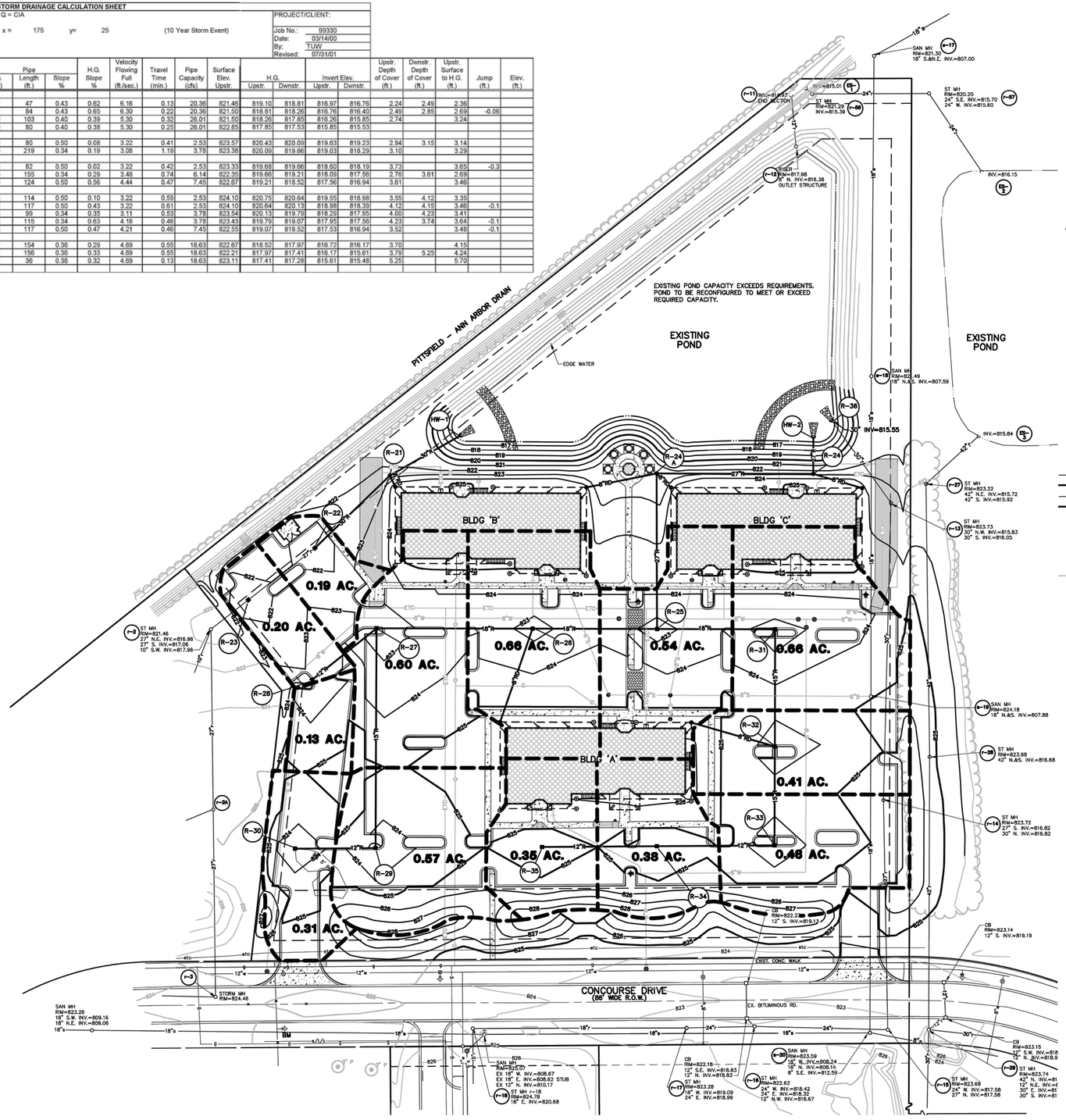
CONCOURSE DRIVE PARCEL'C' STORMWATER NARRATIV E

Drainage from the Concourse Drive Parcel 'C' site will be by utilizing existing storm sewers which cross the parcel and by new sewers constructed only for this site. The existing sewers were originally designed to handle a portion of Parcel 'C'; and the stormwater calculations for Parcel 'C' were done and the drainage areas contributing to the existing sewers limited to the areas defined in the original calculations.

Drainage from Parcel 'C' is directed to the existing detention pond at the rear of the parcel. It was and is designed to handle the storm water detention requirements of this site and the surrounding properties of the Boone & Darr Industrial Park together with the Boone & Darr Co. parcel..

The as-constructed existing detention pond capacity exceeds the WCDC required volume. Even though the existing pond will be reconfigured along the south shore line to facilitate the construction of the buildings on Parcel 'C', the revised detention pond capacity will still be able to handle the 10.44 acres of the Parcel 'C' site with a run-off coefficient of 0.72 (as determined by the current WCDC criteria) and the additional 16.79 acres with a run-off coefficient of 0.70 (as determined by the then existing WCDC criteria).

Because of the modification of the pond, the existing outlet structure will be reconstructed to conform to the current WCDC standards for first flush, bankfull and 100 yr rates of release. The outlet pipe itself will not need to be re-sized or reconstructed but will continue to discharge into the Pittsfield-Ann Arbor Drain with a release rate of 0.15 cfs/acre.



LEGEND

- EXIST. CONTOUR
- PROP. CONTOUR
- EXIST. SPOT ELEVATION
- PROP ELEV.
- EXIST. UTILITY POLE
- GUY WIRE
- ELEC. TRANSFORMER
- EXIST. OVERHEAD UTILITY LINE
- EXIST. LIGHT POLE
- EXIST. ELEC, TELE, CABLE LINES
- EXIST. GAS LINE
- PROP. ELEC, TELE, CABLE LINES
- PROP. GAS LINE
- EXIST. WATER MAIN
- EXIST. HYDRANT
- EXIST. GATE VALVE IN BOX
- EXIST. GATE VALVE IN WELL
- EXIST. CURB STOP & BOX
- REDUCER
- EXIST. BLOW-OFF
- POST INDICATOR VALVE
- THRUST BLOCK
- PROP. WATER MAIN
- PROP. HYDRANT
- PROP. GATE VALVE
- EXIST. STORM SEWER
- PROP. STORM SEWER
- EXIST. CATCH BASIN
- PROP. CATCH BASIN
- END SECTION
- EXIST. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- END SECTION
- EXIST. SANITARY SEWER
- PROP. SANITARY SEWER
- EXIST. CLEANOUT
- SINGLE TREE
- TREE OR BRUSH LIMIT
- FOUND IRON PIPE
- FOUND MONUMENT
- CONTROL PT.
- PROPOSED 4' x 18' CONC. PAD FOR A/C CONDENSORS W/3' HT. BRICK SCREENWALL
- 3' HT. BRICK SCREENWALL

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GUENTHER BUILDING COMPANY
2864 CARPENTER ROAD
ANN ARBOR, MI. 48104
(734) 971-3323

CONCOURSE OFFICE CENTER

CONCOURSE DRIVE PARCEL 'C'
FINAL SITE PLAN
DRAINAGE AREA PLAN

18

JOB No. 99330
REV. PER WCDC 8-1-01
DATE: 3-24-00
SHEET 18 OF 23
CADD: CJM
ENG: JJF
PM: EFO
TECH:
POST: 99330A1
FSP-2B

REVISIONS:
REV. PER. TWP. 6-1-00
REV. PER. TWP. 6-26-00
FINAL SITE PLAN 9-29-00
REV. PER. TWP. 7-7-01
REV. PER. TWP. 7-17-01

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FARMINGTON HILLS, MI 48334
KEVIN SPIZIZEN
(248) 855-8110

CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
PREVIOUS PLAN STORMWATER NARRATIVE

37

JOB No. 16295
DATE: 2/23/17
SHEET 37 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
POST: 16295LD_STORM.dwg
FSP-4C0

REVISIONS:
WORK REV. 1 2/23/17
TWP. REV. 1 3/24/17

REV.	DATE
WORK REV. 1	2/23/17
TWP. REV. 1	3/24/17

M:\Civil3dLPro\16295\Site Plan\16295OLD_STORM.dwg, 3/23/2017 12:09 PM, Jeremy A. Matthei, None
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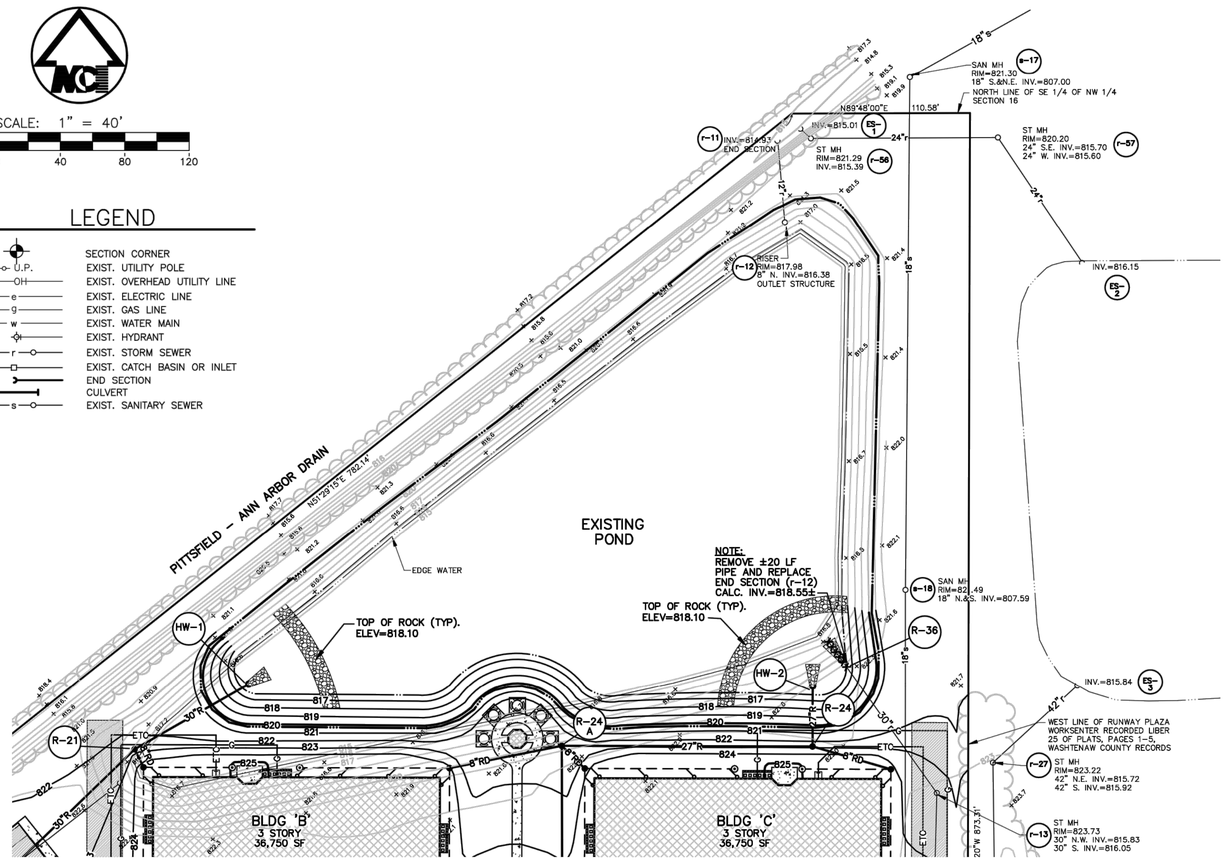
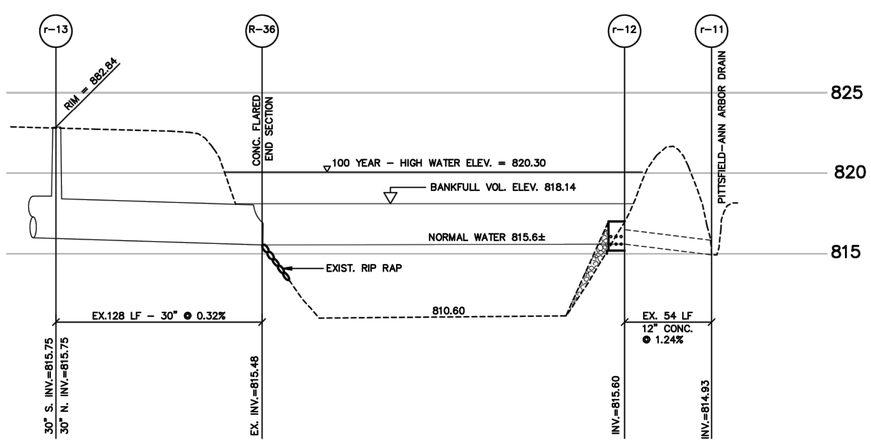
SCALE: 1" = 40'

0 40 80 120

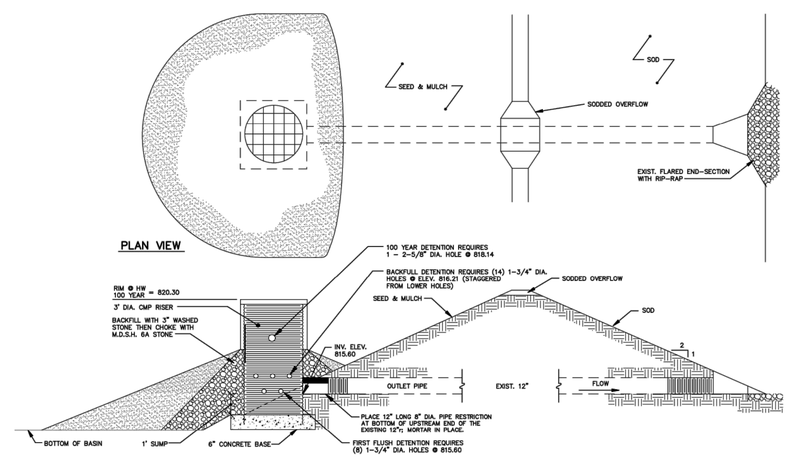
LEGEND

- SECTION CORNER
- U.P. EXIST. UTILITY POLE
- OH EXIST. OVERHEAD UTILITY LINE
- e EXIST. ELECTRIC LINE
- g EXIST. GAS LINE
- w EXIST. WATER MAIN
- EXIST. HYDRANT
- r EXIST. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- END SECTION
- CULVERT
- s EXIST. SANITARY SEWER





SCALE:
1" = 40' HORIZONTAL
1" = 4' VERICAL



NOTE:
EXTREME CARE MUST BE EXERCISED TO INSURE THAT THE OUTLET HOLES IN THE STANDPIPE DO NOT BECOME CLOGGED WITH SEDIMENT.

DETENTION BASIN OUTLET FILTER
NO SCALE

10/06/98
REV:12/02/98
REV:10/30/00
REV:03/02/01

BOONE AND DARR INDUSTRIAL PARK

DETENTION BASIN DESIGN
(Volumes based on Updated Topographical Survey of Pond)

I. Area: (1) Proposed Parcel C 10.44
(2) Existing or Approved Sites 16.79

II. (a) Runoff Coefficient (based on storm sewer design calculations) for Existing and Approved Site Plan Areas: 0.70

VI. Runoff Coefficient for Parcel C Only:

Building Area:	114,750 sq ft	
Pavement:	146,485 sq ft	
Sidewalk:	6,310 sq ft	
Subtotal		267,545 sq ft
Pond (bankfull surface)		72,637 sq ft
Lawn Area:		114,585 sq ft
	Total	454,767 sq ft

$$C = \frac{.95(267545) + 1.0(72637) + .45(114585)}{454767} = 0.83$$

III. Required Detention Volume Calculations:

With no outlet - one (1) 100-year storm (until flood waters of drain recede):

Vol_{100Ex} = 16500 x A x C
= 16500 x 16.79 x 0.70 = 193,925
$Vol_{100Prop}$ = 16500 x 10.44 x 0.83 = 142,976
336,901

IV. Provided Detention Volume Calculations:

Elevation	Area (SF)	Volume (CF)	Total Volume (CF)	
815.6	58,554	0	0	
816.0	60,824	23,874	23,874	
			37,059 @ 816.21	
817.0	66,611	63,696	87,570	
818.0	71,792	69,185	156,755	
			166,817 @ 818.14	
819.0	77,066	74,413	231,168	
820.0	82,466	79,751	310,919	
			336,901 @ 820.30	
821.0	88,600	85,515	396,434	

*Elevation of existing orifice holes

SILTATION/SEDIMENTATION BASIN CALCULATIONS

I. First Flush Calculations:

Vol_{R} = 1815 x A x C

Vol_{R} = 1815 x 10.44 x 0.83 = 15,727 CF
1815 x 16.79 x 0.70 = 21,332 CF
37,059 CF

Outlet Structure:

First Flush:

$$Q_{FF} = \frac{V_{FF}}{T_{24}} = \frac{37{,}059}{(24\ hr)(3600\ sec/hr)} = 0.429\ CFS$$

Orifice Sizing:

$$H_{AVG} = 2/3\ (H_{TF} - H_{BOTTOM}) = 2/3\ (81621 - 81560) = 0.41\ ft$$

$$A = \frac{Q_{FF}}{0.62\sqrt{2gH_{AVG}}} = \frac{0.429}{(.62)\sqrt{(64.4)\,0.41}} = 0.1346\ SF$$

1¾-inch hole = 0.0167 SF

Use eight (8) 1¾-inch orifices at 815.60.

Recalculate flow through eight (8) 1¾-inch diameter holes:

$$Q_{FF} = A_{FF}\,(0.62)\sqrt{2gH_{AVG}} = (8 \times 0.0167)\,(.62)\sqrt{(64.4)(0.41)}$$

Q_{FF} = 0.424 CFS

Detention Time:

$$T_{FF} = \frac{V_{FF}}{Q_{FF}} = \frac{37{,}059}{(0.424)\,(3600\ sec/hr)} = 24.3\ hrs$$

Bankfull Calculations:

Vol = 8170 x A x C

Vol = 8170 x 10.44 x 0.83 = 70,795 CF
8170 x 16.79 x 0.70 = 96,022 CF
166,817 CF

Bankfull volume occurs @ Elevation 818.14.

Bankfull: Check discharge through first flush orifices.

$H_{AVG} = 2/3(H_{BF} - H_{BOTTOM}) = 2/3(81814 - 81560) = 1.69\ ft$

$Q = 0.62A_{FF}\sqrt{2gH_{AVG}} = (0.62)\,(8 \times 0.0167)\sqrt{(64.4)(1.69)} = 0.8650\ CFS$

$T = V_{BF}/Q = (166817)/(0.8650)(3600\ sec/hr) = 5357\ hrs$

Target detention time = 40.3 hrs

$V_{REM} = V_{BF} - V_{FF} = 166{,}817 - 37{,}059 = 129{,}758\ CF$

$T_{REM} = T_{BF} - T_{FF} = 40.3 - 24.3 = 16.0\ hrs$

Calculate volume through eight (8) 1¾-inch holes for additional 16.0 hours:

$H_{AVG} = 2/3(H_{BF} - H_{TF}) + (H_{TF} - H_{BOTTOM}) = 2/3(81814 - 81621) + (81621 - 81560)$

$H_{AVG} = 1.90\ ft$

$Q_1 = (0.62)(A_{FF})\sqrt{2gH_{AVG}} = (0.62)(8 \times 0.0167)\sqrt{(64.4)(1.90)} = 0.916\ CFS$

$V_1 = (T_{REM})(Q_1) = (16.0\ hrs)(3600\ sec/hr)(0.916) = 52{,}730\ CF$

The leftover volume will be released by bankfull orifices.

$V_2 = V_{REM} - V_1 = 129{,}758 - 52{,}730 = 77{,}028\ CF$

$$Q_2 = V_2 / T_{REM} = \frac{77{,}028\ CF}{(16.0\ hrs)(3600\ sec/hr)} = 1.337\ CFS$$

$H_{AVG} = 2/3\,(H_{BF} - H_{TF}) = 2/3\,(818.14 - 816.21) = 1.29\ ft$

$$A_2 = \frac{Q_2}{0.62\sqrt{2gH_{AVG}}} = \frac{1.337}{(0.62)\sqrt{(64.4)(1.29)}} = 0.2370\ SF$$

A 1¾-inch orifice has an area of 0.0167 SF.
Therefore, use fourteen (14) 1¾-inch diameter holes at 816.21.

100-Year: Q_{IA} = 27.25 x 0.15 = 4.088 cfs

$Q_{TF} + Q_{BF} = (0.62)(8 \times 0.0167)\sqrt{(64.4)\,82030 - 81560} = 1.441$
$+ (0.62)(14 \times 0.0167)\sqrt{(64.4)\,(82030 - 81621)} = 2.353$
$= 1.441\ CFS + 2.353\ CFS = 3.794\ CFS$

$Q_{AVG} = Q_{IA} - (Q_{TF} + Q_{BF}) = 4.088 - 3.794 = 0.294\ CFS$

$$A_{105} = \frac{Q_{105}}{0.62\sqrt{2gH_{105}}} = \frac{0.294}{0.62\sqrt{64.4\,(82030 - 81814)}} = 0.0402\ SF$$

A 2-5/8 inch diameter orifice has an area of 0.0376.
Therefore, use one (1) 2-5/8 inch diameter holes at 818.14.

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CONCOURSE OFFICE CENTER
POND AND OUTLET MODIFICATION PLAN

18A

DATE: 10-30-00
SHEET 18A OF 23
CADD: MG
ENG: JJF
PM: ARR
TECH: MJS
DWG: 99A300I2

REV. PER TWP. 8-23-01
JOB No. 99330

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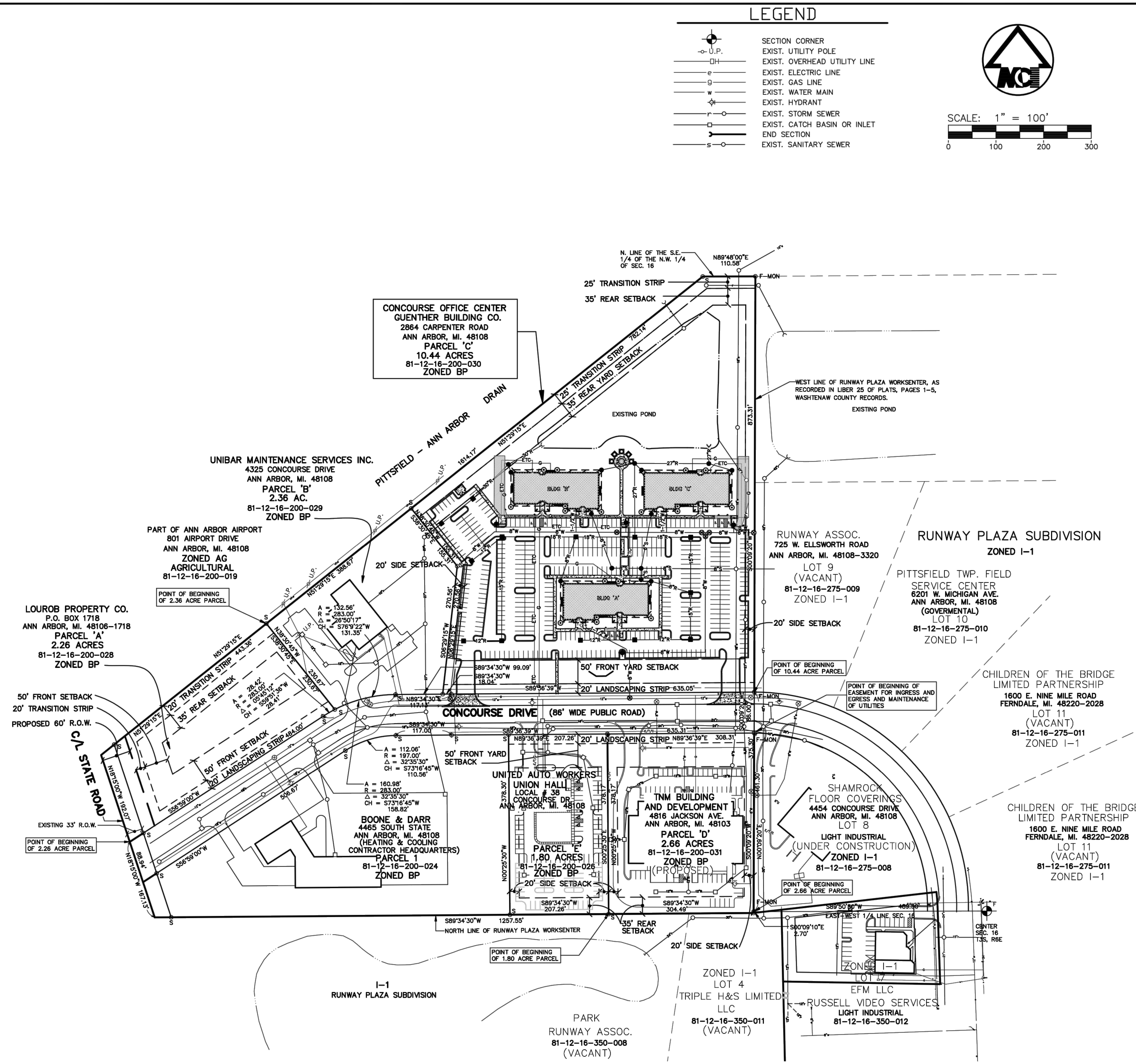
CONCOURSE OFFICE CENTER
PRELIMINARY & FINAL SITE PLAN
PREVIOUS PLAN STORMWATER CALCULATIONS

38

DATE: 2/23/17
SHEET 38 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295OLD_STORM.dwg
16295

JOB No. 16295

REVISIONS:	REV. DATE
REV. PER TWP.	3-7-01
REV. PER TWP. & WCDC	6-8-01
REV. PER TWP.	7-17-01
WCWRC REV. 1	3/20/17
TWP. REV. 1	3/24/17



PARCEL 'A'

LEGAL DESCRIPTION OF A 2.26 ACRE PARCEL OF LAND LOCATED IN THE N.W. 1/4 OF SECTION 16, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

Commencing at the center of Section 16, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, thence S 89°50'50" W 489.50 feet along the east-west 1/4 line of said Section 16; thence S 00°09'10" E 2.70 feet along the west line of Runway Plaza Worksenter Subdivision as recorded in Liber 25 of Plats, Pages 1-5, Washtenaw County Records; thence S 89°34'30" W 1257.55 feet along the north line of said Runway Plaza Worksenter; thence N 18°15'00" W 167.13 feet along the centerline of State Road (66' wide) to the POINT OF BEGINNING,

thence N 18°15'00" W 192.07 feet along the centerline of said State Road;
thence N 51°29'15" E 443.36 feet;
thence S 38°30'45" E 230.67 feet;
thence along the north line of Concourse Drive (86' wide) the following two courses: southwesterly 28.42 feet along the arc of a circular curve to the left, radius 283.00 feet, central angle 05°45'12, long chord S 59°51'36" W 28.41 feet; S 56°59'00" W 484.00 feet to the POINT OF BEGINNING, being a part of the N.W. 1/4 of said Section 16, T3S, R6E, containing 2.26 acres of land more or less, and being subject to easements and restrictions of record, if any.

PARCEL 'B'

LEGAL DESCRIPTION OF A 2.36 ACRE PARCEL OF LAND LOCATED IN THE N.W. 1/4 OF SECTION 16, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

Commencing at the center of Section 16, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, thence S 89°50'50" W 489.50 feet along the east-west 1/4 line of said Section 16, thence S 00°09'10" E 2.70 feet; thence S 89°34'30" W 1257.55 feet along the north line of Runway Plaza Worksenter Subdivision as recorded in Liber 25, Pages 1-5, Washtenaw County Records; thence N 18°15'00" W 359.20 feet along the centerline of State Road (66' wide); thence N 51°29'15" E 443.36 feet to a POINT OF BEGINNING;

thence continuing N 51°29'15" E 388.67 feet;
thence S 38°30'45" E 155.31 feet;
thence S 06°29'15" W 270.56 feet;
thence S 89°34'30" W 99.09 feet;
thence southwesterly 132.56 feet along the arc of a circular curve concave to the south, radius 283.00 feet, central angle 26°50'17", chord S 76°09'22" W 131.35 feet;
thence N 38°30'45" E 230.67 feet to the POINT OF BEGINNING, being a part of the west 1/2 of said Section 16, T3S, R6E, containing 2.36 acres of land more or less, and being subject to easements or restrictions of record, if any.

PARCEL 'C'

LEGAL DESCRIPTION OF A 10.44 ACRE PARCEL OF LAND LOCATED IN THE N.W. 1/4 OF SECTION 16, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

Commencing at the center of Section 16, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, thence S 89°50'50" W 489.50 feet along the east-west 1/4 line of said Section 16; thence N 00°09'20" E 461.30 feet along the west line of Runway Plaza Worksenter Subdivision as recorded in Liber 25 of Plats, Pages 1-5, Washtenaw County Records to the POINT OF BEGINNING,

thence along the north line of Concourse Drive (86' wide) the following two courses: S 89°36'39" W 635.05 feet; S 89°34'30' W 18.04 feet;
thence N 06°29'15" E 270.56 feet;
thence N 38°30'45" W 155.31 feet;
thence N 51°29'15" E 782.14 feet;
thence N 89°48'00" E 110.58 feet along the north line of the S.E. 1/4 of the N.W. 1/4 of said Section 16;
thence S 00°09'20" W 873.31 feet along the west line of said Runway Plaza Worksenter to the POINT OF BEGINNING, being a part of the N.W. 1/4 of said Section 16, T3S, R6E, containing 10.44 acres of land more or less, and being subject to easements and restrictions of record, if any.

PARCEL 'D'

LEGAL DESCRIPTION OF A 2.66 ACRE PARCEL OF LAND LOCATED IN THE W 1/2 OF SECTION 16, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

Commencing at the center of Section 16, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, thence S 89°50'50" W 489.50 feet along the east-west 1/4 line of said Section 16 to the POINT OF BEGINNING,

thence S 00°09'10" E 2.70 feet along the west line of Runway Plaza Worksenter Subdivision as recorded in Liber 25 of Plats, Pages 1-5, Washtenaw County Records;
thence S 89°34'30" W 304.49 feet along the north line of said Runway Plaza Worksenter;
thence N 00°25'30" W 378.17 feet;
thence N 89°36'39" E 308.31 feet along the south line of Concourse Drive (86' wide);
thence S 00°09'20" W 375.30 feet along the west line of said Runway Plaza Worksenter to the POINT OF BEGINNING, being a part of the W 1/2 of said Section 16, T3S, R6E, containing 2.66 acres of land more or less, and being subject to easements and restrictions of record, if any.

PARCEL 'E'

LEGAL DESCRIPTION OF A 1.80 ACRE PARCEL OF LAND LOCATED IN THE W 1/2 OF SECTION 16, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

Commencing at the center of Section 16, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, thence S 89°50'50" W 489.50 feet along the east-west 1/4 line of said Section 16; thence S 00°09'10" E 2.70 feet along the west line of Runway Plaza Worksenter Subdivision as recorded in Liber 25 of Plats, Pages 1-5, Washtenaw County Records; thence S 89°34'30" W 304.49 feet along the north line of said Runway Plaza Worksenter to the POINT OF BEGINNING,

thence S 89°34'30" W 207.26 feet along the north line of said Runway Plaza Worksenter;
thence N 00°25'30" W 378.30 feet;
thence N 89°36'39" E 207.26 feet along the south line of Concourse Drive (86' wide);
thence S 00°25'30" E 378.17 feet to the POINT OF BEGINNING, being a part of the W 1/2 of said Section 16, T3S, R6E, containing 1.80 acres of land more or less, and being subject to easements and restrictions of record, if any.

NOTE: EXISTING ZONING OF PARCELS A-E IS BP.

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CONCOURSE OFFICE CENTER

CONCOURSE DRIVE PARCEL 'C'
FINAL SITE PLAN
AREA PLAN

19

DATE: 3-24-00
SHEET 19 OF 23
CADD: CJM,MG
ENG: SK
PM: EFO
TECH:
CNST\99330SP2
FB#298

JOB No. 99330

REVISIONS:
REV. PER. TWP. 6-1-00
REV. PER. TWP. 6-26-00
REV. PER. TWP. 7-21-00
FINAL SITE PLAN 9-29-00
REV. PER TWP. 3-7-01
REV. PER TWP. 8-23-01
REV. PER TWP 7-17-01
REV. PER TWP. 6-8-01

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CONCOURSE OFFICE CENTER

PRELIMINARY & FINAL SITE PLAN
PREVIOUS PLAN STORMWATER AREA MAP

39

DATE: 2/23/17
SHEET 39 OF 39
CADD: WAJ
ENG: JAM
PM: RCW
TECH:
16295OLD_STORM.dwg
FB#460

JOB No. 16295

REVISIONS:	REV. DATE
WCWRC REV 1	2/23/17
TWP REV 1	3/24/17

M:\Civil3d_Proj\16295\Site Plan\16295OLD_STORM.dwg, 3/23/2017 12:09 PM, Jeremy A. Matthei, None
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TOILET ROOM ACESSORIES AND CABINETRY:

1. THE CABINETRY CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO THEIR COMMENCING FABRICATION OF THEIR WORK.
2. COUNTERS, CABINETS AND BACKSPLASHES TO BE CONSTRUCTED OF PLASTIC LAMINATE COVERED, MINIMUM 5/8 INCH THICKNESS SHOP GRADE PARTICLE DOARD OR MDF BOARD.
3. TOILET PARTITIONS SHALL BE PLASTIC LAMINATE COVERED 5/8 " MINIMUM THICKNESS PAETICLEBOARD. PROVIDE BRUSHED STAINLEDD WIRE PULL HANDLES WITH SIMPLE THROW BOLT LOCKS AT HINGED DOORS.

WALL SYSTEMS:

1 **EXTERIOIR WALL:**

UL# U355 ONE HOUR RATED ASSEMBLY FROM INTERIOR BURN

FROM INTERIOR FACE; ONE LAYER 5/8" THICKNESS GYPSUM DRYWALL ON 2 X 4 WALL STUDS 16 INCHES O.C. WITH3 ½" THICKNESS FIBERGLASS BATT INSULATION, MINIMUM 7/16 INCH EXTERIOR FOAM OR SHEET WALL SHEATHING AND FINISHED SIDING.

2 **CORRIDOR INTERIOR BEARING WALL:**

UL #356 MODOFIED ONE RATED ASSEMBLY

2 X 6 STUDS IN LIEU OF 2 X 4. SEE #3 BELOW @ FIRST FLOOR ONLY

X 305

3 **INTERIOR SHEAR WALL:**

UL#U356 ONE HOUR RATED ASSEMBLY

ONE LAYER 5/8" THICKNESS TYPE 'X GYPSUM DRYWALL OVER MINIMUM ½" THICKNESS OSB SHEATHING PANELS ON 2 X 4 WALL STUDS 16 INCHES O.C. WITH 3 ½" OPEN FACED FIBERGLASS ACOUSTICAL BATTS IN EACH SUD SPACE.

4 **TENANT PARTITION WALL:**

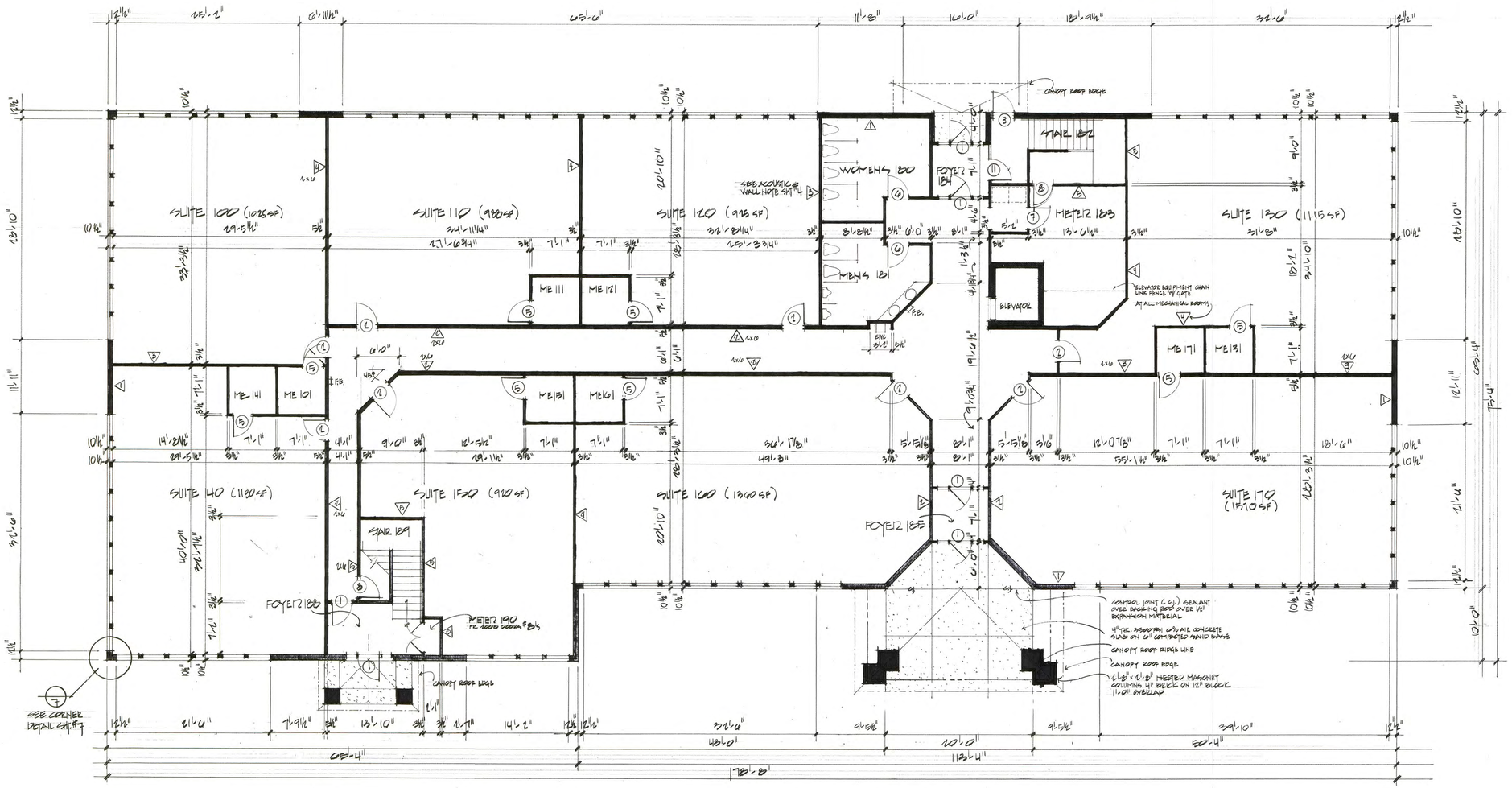
UL# 333 ONE HOUR RATED ASSEMBLY

ONE LAYER 5/8" TYPE'X' GYPSUM DRYWALL BOTH SIDES OF 2 X 4 WALL STUDS 16 INCHES O.C. WITH 3 ½" THICKNESS OPEN FACE FIBERGLASS ACOUSTICAL BATTS COMPLETELY FILLING EACH STUD SPACE.

5 **STAIRWAY ENCLOSURE WALL:**

UL# U301 TWO HOUR RATED ASSEMBLY

TWO LAYERS 5/8" THICKNESS TYPE 'X' GYPSUM DRYWALL EACH SIDE OF 2 X 4 WOOD STUDS AT 16 INCHES O.C.



NEW OFFICE BUILDING FOR
CONCOURSE CENTER 2
ON
CONCOURSE DRIVE
PITTSFIELD TOWNSHIP
MICHIGAN

10-22-1999 SP SUBD
REVIEW 1 JAN. 2001
BIDDING 11 APRIL 2001
REVISED 5 JUNE 2001
REVISED 13 SEPT 2001

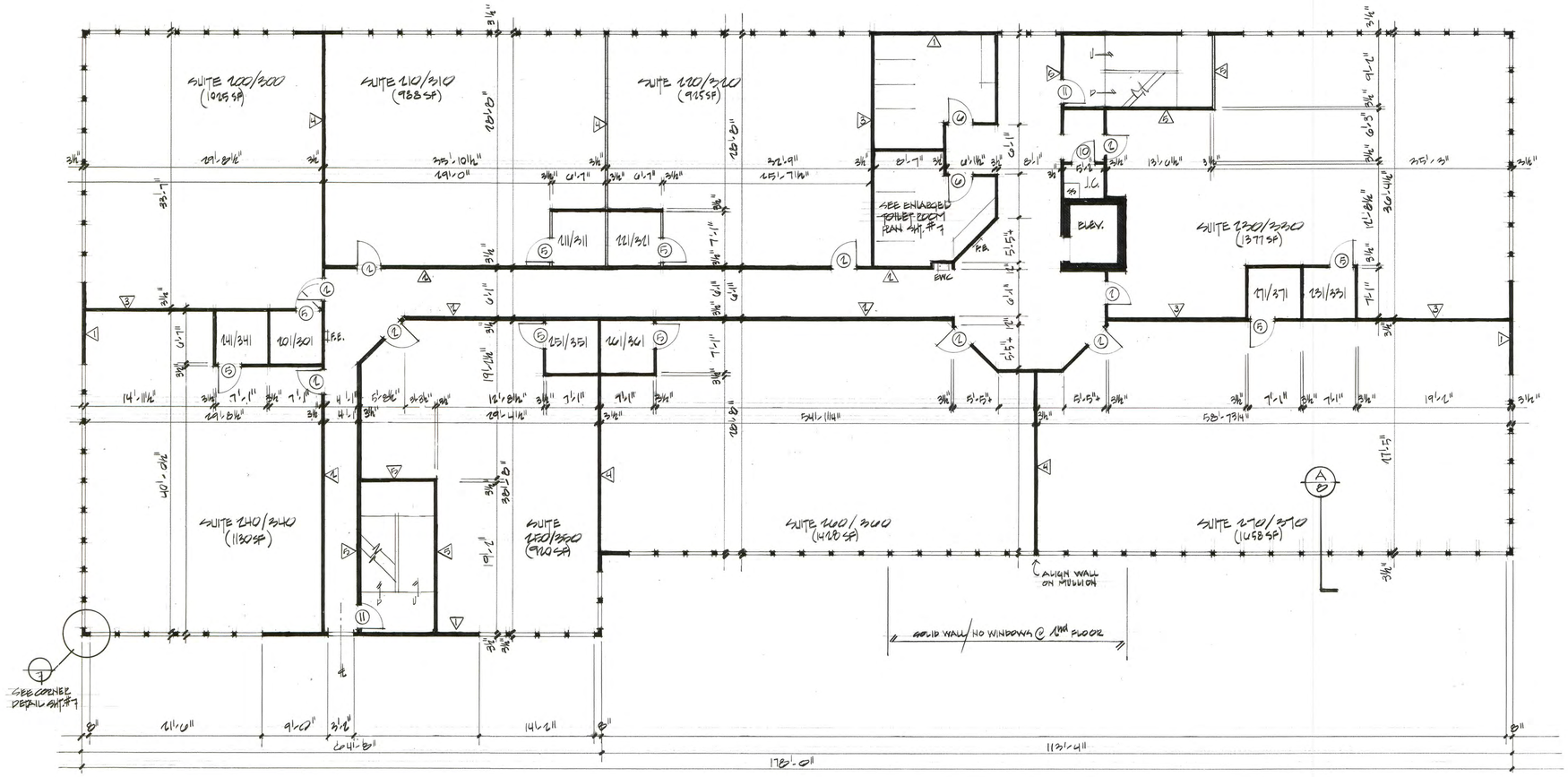
FIRST FLOOR PLAN @ 1/8" = 1'-0"

- ALL MECHANICAL ROOMS TO HAVE 5 WALLS W/ 5/8" TYPE DRYWALL CEILING
- REFER TO M & E DRAWINGS TO COORDINATE METER, CONDUIT, PIPING, EQUIPMENT, ETC., LOCATIONS
- FIRST FLOOR INTERIOR & EXTERIOR BEARING WALLS ARE TO BE 2X6'S 16" O.C.
- CHECK/VERIFY ALL DIMENSION STRINGS W/ ARCHITECT PRIOR TO THE START OF CONSTRUCTION

2A

CONCOURSE CTR.

NEW OFFICE BUILDING
FOR
CONCOURSE CENTER 2
ON
CONCOURSE DRIVE
PITTSFIELD TOWNSHIP
MICHIGAN



REVIEW | JAN 2001
BIDDING | 12 APRIL 2001
REVISED | 5 JUNE 2001

SECOND & THIRD FLOOR PLANS @ 1/8" = 1'-0"

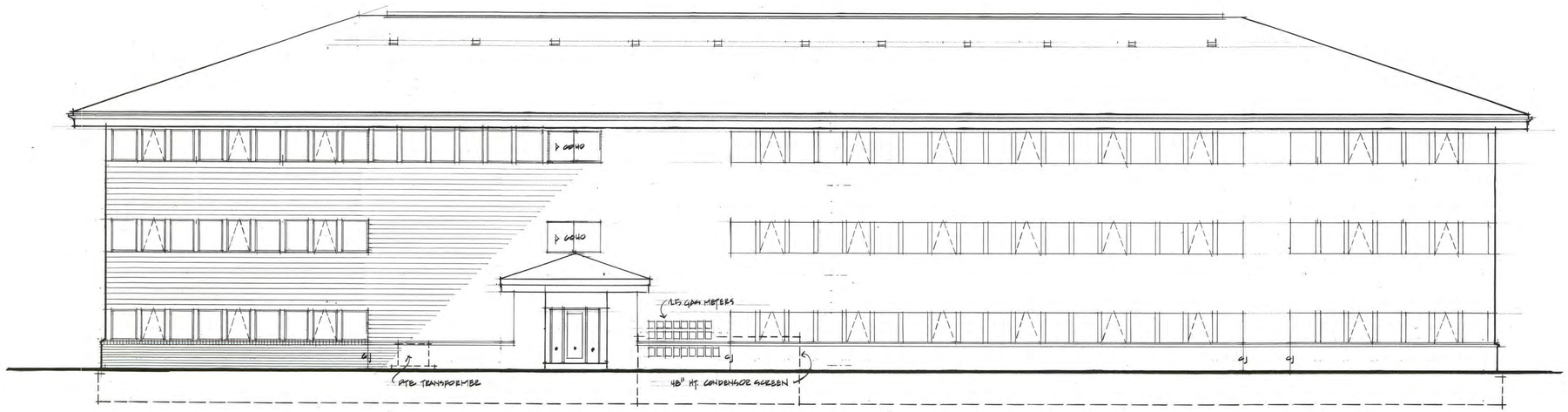
* SEE GENERAL NOTES ON FIRST FLOOR PLAN SHT #3

4

CONCOURSE CTR.

3

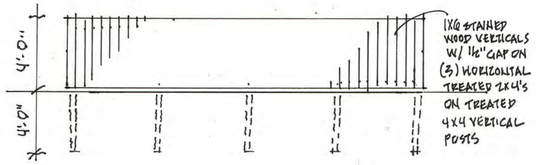
NEW OFFICE BUILDING
FOR
CONCOURSE CENTER 2
ON
CONCOURSE DRIVE
PITTSFIELD TOWNSHIP
MICHIGAN

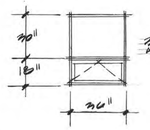


REAR ELEVATION

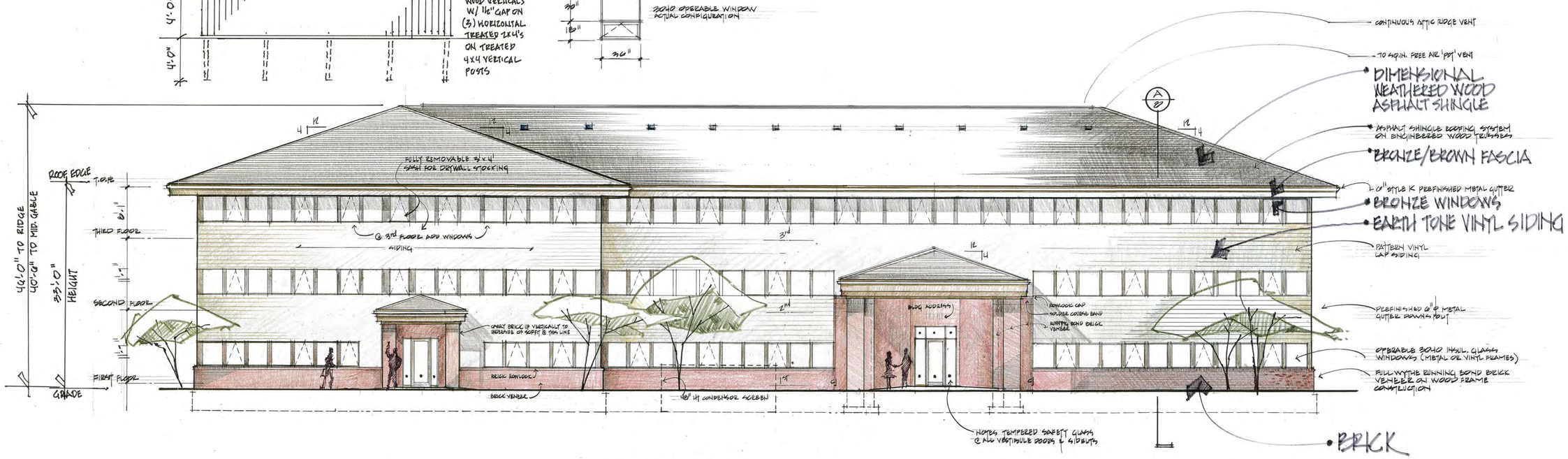
SEE NOTES @ FRONT ELEVATION BELOW

CONDENSOR SCREEN FENCE @ 1/4" = 1'-0"





3040 OPERABLE WINDOW ACTUAL CONFIGURATION



RENDERED
FRONT ELEVATION @ 1/8" = 1'-0"

- COORDINATE DOWNSPOUT LOCATIONS W/ CIVIL ENGINEERING STORM WATER DRAWINGS.
- CONDENSOR SCREENS, TRANSFORMER & SITE LIGHTS ON CIVIL ENG'S DRAWINGS

10-31-2000 SP SUB
REVIEW 1 JAN 2001
BIDDING 12 APRIL 2001
REVISED 5 JUNE 2001
REVISED 13 SEPT 2001
BLDG#2 SITE PLAN 2/14/17
BLDG#2 SITE PLAN 3/02/17

CONCOURSE DR.

4

ROOM FINISHES SCHEDULE

ROOM	FLOOR	BASE	WALL	CEILING	REMARKS
VESTIBULE	CERAMIC TILE	VINYL	PTD. DRYWALL	PTD. D.W.	
LOBBY	CARPET	VINYL	PTD. D. W.	SUSPENDED	
CORRIDORS	CARPET	VINYL	PTD. D. W.	SUSPENDED	
TOILET ROOMS	CERAMIC TILE	VINYL	PTD. D. W.	SUSPENDED	
STAIR TOWERS	CARPET	VINYL	PTD. D. W.	PTD. D.W.	CARPETED TREADS
MECHANICAL ROOM	CONCRETE	VINYL	PTD. D. W.	PTD. D.W.	
JANITOR'S CLOSET	CONCRETE/VCT	VINYL	PTD. D. W.	PTD. D.W.	
ELEVATOR MACHINE ROOM	CONCRETE	VINYL	PTD. D. W.	PTD. D.W.	
SUITE MECH. ROOMS	VCT	VINYL	PTD. D. W.	PTD. D.W.	
SUITE SPACE	CARPET	VINYL	PTD. D. W.	SUSPENDED	

DOOR SCHEDULE

NO.	LOCATION	SIZE	QTY	TYPE	MATERIAL	FINISH	FRAME	FRAME FIN.	HARDWARE	RATING
1 *	ENTRANCES	3'-0" x 7'-0"	6	A	ALUM.	BRONZE	ALUM.	BRONZE	BLDG. ENT. LOCKSET	
2	SUITE ENTRY	3'-0" x 6'-8"	24	B	S.C. OAK	STAIN	HM	PT.	SUITE ENT. LOCKSET	1/2 LABEL
3 *	STAIR EXIT	3'-0" x 6'-8"	1	C	INSUL. HM	PT.	HM.	PT.	PANIC	
4										
5	MECH. ROOMS @ SUITE	3'-0" x 6'-8"	24	C	S.C. OAK	STAIN	HM.	PT.	PASSAGE	1/2 LABEL
6	TOILET ROOM ENTRY	3'-0" x 6'-8"	6	C	S.C. OAK	STAIN	HM.	PT.	PUSH / PULL	1/2 LABEL
7	MECHANICAL ROOM	3'-0" x 6'-8"	1	C	S.C. OAK	STAIN	HM.	PT.	LOCKSET	1/2 LABEL
8	ELEVATOR MACHINE RM	3'-0" x 6'-8"	1	D	FENCE	GALV.	PIPE	GALV.	LOCKSET	
9										
10	JANITOR'S CLOSET	3'-0" x 6'-8"	3	C	S.C. OAK	STAIN	HM.	PT.	LOCKSET	1/2 LABEL
11 *	EXIT STAIR	3'-0" x 6'-8"	5	C	S.C. OAK	STAIN	HM.	PT.	PASSAGE	1 HR LABEL

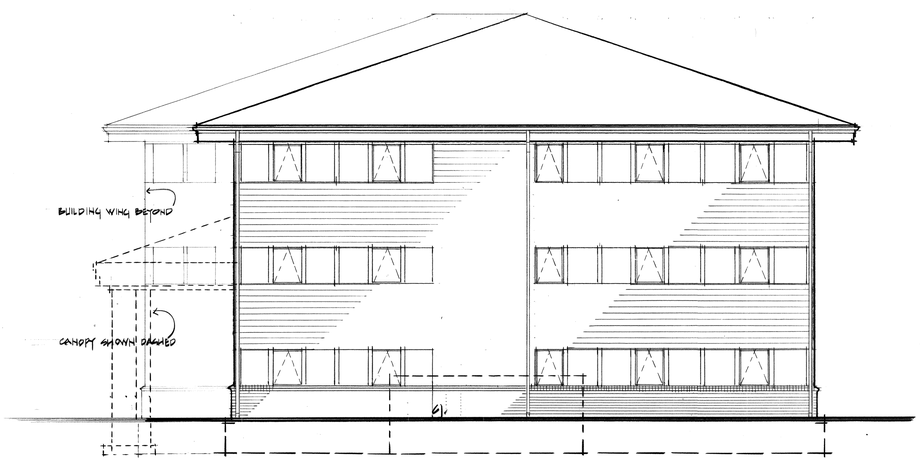
- * HARDWARE TO PROVIDE EGRESS W/O USE OF KEY OR SPECIAL KNOWLEDGE OR EFFORT WHEN SUBJECT TO 15# OPENING FORCE
- ALL RATED DOORS TO BE SELF CLOSING

+1'-0" SIDE LTS./SEE PLAN

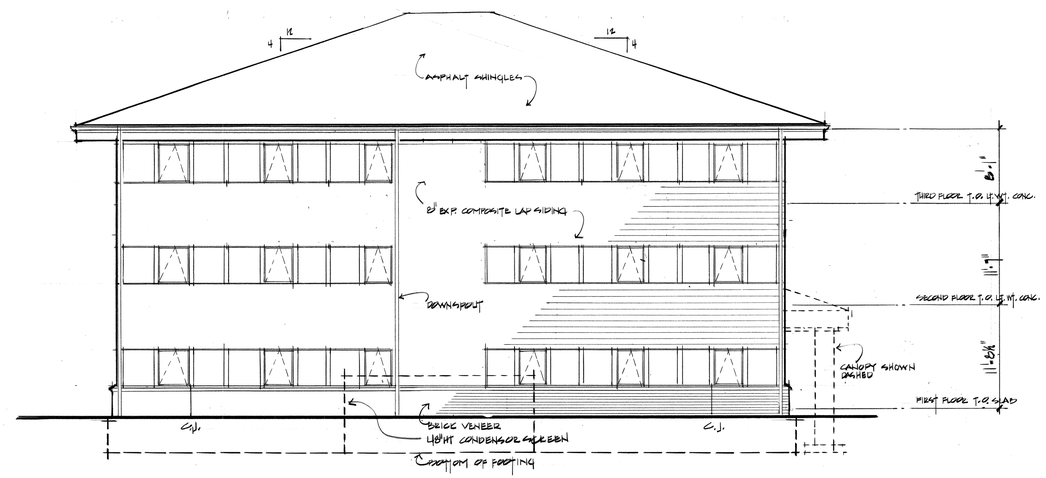
NEW OFFICE BUILDING
FOR
CONCOURSE CENTER

ON
CONCOURSE DRIVE
PITTSFIELD TOWNSHIP
MICHIGAN

1023-2000 SP DUE
BIDDING 12 APRIL 2002
REVISED 5 JUNE 2002
BLDG. #2 SITE PLAN 2/14/17



RIGHT ELEVATION



LEFT ELEVATION @ 1/8" = 1'-0"

6

CONCOURSE DRIVE