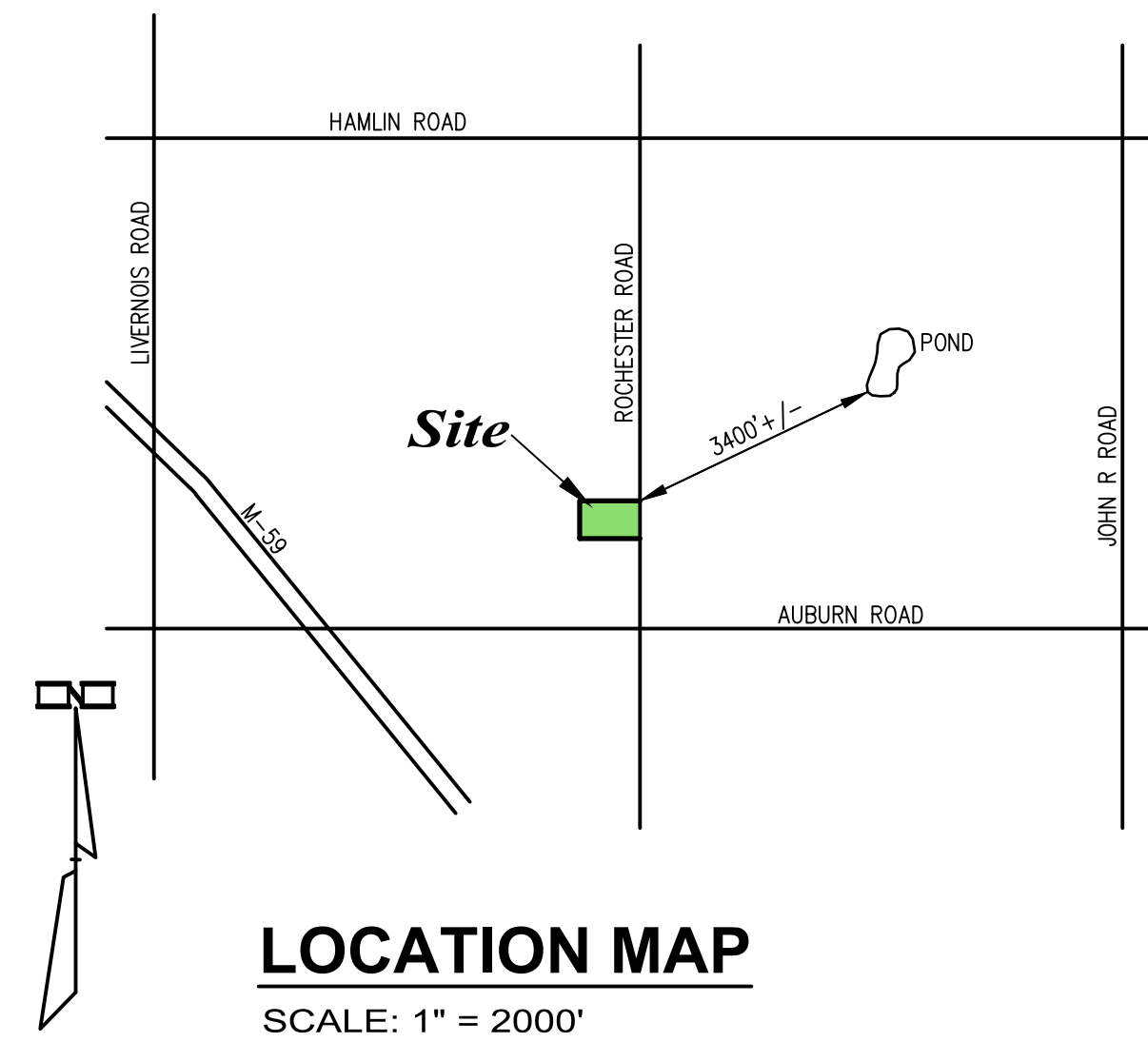


# BEBB OAK MEADOWS

## MIXED USE DEVELOPMENT

2800 S. ROCHESTER RD.  
ROCHESTER HILLS, MI 48307



SHEET INDEX		ISSUED FOR			
DRAWING INDEX KEY:		03.19.21 SPA SUBMITTAL	06.01.21 SPA RE-SUBMITTAL	09.14.21 SPA RE-SUBMITTAL	12.01.21 SPA RE-SUBMITTAL
<input type="checkbox"/>	NOT ISSUED				
<input type="checkbox"/>	NOT REVISED				
<input checked="" type="checkbox"/>	NEWLY ISSUED OR REVISED				
<input checked="" type="checkbox"/>	REFERENCE				
<b>GENERAL</b>					
TS1.1 TITLE SHEET, SHEET INDEX, AND CODE ANALYSIS					
<b>SITE</b>					
1 of 11	CIVIL COVER SHEET				
2 of 11	EXISTING CONDITIONS PLAN & BENCHMARKS				
3 of 11	DEMOLITION PLAN				
4 of 11	OVERALL SITE PLAN				
5 of 11	DETAILED SITE PLAN - EAST				
6 of 11	DETAILED SITE PLAN - WEST				
7 of 11	ROCHESTER ROAD ENTRANCE PLAN				
8 of 11	FIRE PROTECTION PLAN				
9 of 11	STORM SEWER, DETENTION CALCULATIONS AND DETAILS				
10 of 11	SANITARY CALCULATIONS AND DETAILS				
11 of 11	MDOT NOTES & DETAILS				
SL.1	SITE LIGHTING PLAN, PHOTOMETRIC, AND SPECIFICATIONS				
L1	LANDSCAPE PLAN				
L2	LANDSCAPE PLAN SPECIFICATIONS AND DETAILS				
L3	LANDSCAPE PLAN COURTYARD				
L4	IRRIGATION PLAN				
L5	IRRIGATION DETAILS				
<b>ARCHITECTURAL</b>					
A1.1	FIRST FLOOR PLAN				
A1.2	SECOND FLOOR PLAN				
A1.3	THIRD FLOOR PLAN				
A1.4	FOURTH FLOOR PLAN				
A3.1	EXTERIOR ELEVATIONS				
A3.2	SITE VISIBILITY IMAGES				

**OWNER:**  
OYK AFFILIATED, LLC  
30700 TELEGRAPH RD. SUITE 2665  
BINGHAM FARMS, MICHIGAN 48025  
(248) 656-7695

**ARCHITECT:**  
STUCKY VITALE ARCHITECTS  
27172 WOODWARD AVENUE  
ROYAL OAK, MICHIGAN 48067  
(248) 546-6700

**CIVIL ENGINEER:**  
KIEFT ENGINEERING, INC  
5852 S. MAIN ST. SUITE 1  
CLARKSTON, MI 48346  
(248) 625-5251



STUCKY VITALE ARCHITECTS  
27172 WOODWARD AVENUE  
ROYAL OAK, MI 48067-0925  
P. 248.546.6700  
F. 248.546.8454  
WWW.STUCKYVITALE.COM

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Consultants:

Project :

BEBB OAK MEADOWS  
MIXED USE DEVELOPMENT  
2800 S ROCHESTER ROAD  
ROCHESTER HILLS, MI 48307

Issued for :

SPA REVIEW REV. 06.01.21  
SPA REVIEW REV. 09.14.21  
SPA REVIEW REV. 12.01.21  
SPA REVIEW REV. 01.21.22

**APPLICABLE CODES:**

**BUILDING CODE:**  
COMMERCIAL  
MBC 2015 (2015 MICHIGAN BUILDING CODE 2015)  
EFFECTIVE APRIL 20, 2017

**MECHANICAL CODE:**  
MNC 2015 (MICHIGAN MECHANICAL CODE 2015)  
EFFECTIVE APRIL 20, 2017

**PLUMBING CODE:**  
MPC 2015 (MICHIGAN PLUMBING CODE 2015)  
EFFECTIVE APRIL 20, 2017

**ELECTRICAL CODE:**  
NEC 2017 (STATE OF MICHIGAN ELECTRICAL CODE)  
2017 NATIONAL ELECTRIC CODE WITH PART 8 AMENDMENTS.  
EFFECTIVE JANUARY 4, 2019

**ENERGY CODE:**  
MBC 2015 (MICHIGAN BUILDING CODE 2015) -CHAPTER 13 &  
MEC 2015 (MICHIGAN ENERGY CODE 2015) - CHAPTERS 1 THROUGH 6 &  
MICHIGAN ENERGY CODE, PART 10A. RULES (ANSI/ASHRAE/IES  
STANDARD 90.1-2013) ENERGY STANDARDS FOR BUILDINGS  
EFFECTIVE SEPTEMBER 20, 2017

**FIRE CODE:**  
IFC 2015 (INTERNATIONAL FIRE CODE 2015) AS REFERENCED IN 2015  
MICHIGAN BUILDING CODE

**BARRIER FREE REQUIREMENTS:**  
ICC / ANSI 117.1 - 2009

**LIFE SAFETY CODES:**  
FIRE SUPPRESSION:  
COMMERCIAL: NFPA 13 (2013)

**FIRE ALARM:**  
NFPA 72 (2013)  
KITCHEN HOODS: NFPA 17A (2013)

**PROJECT DATA:**

**BUILDING CODE AUTHORITY:**  
CITY OF ROCHESTER HILLS

**TYPE OF CONSTRUCTION:** ---  
TYPE IIB

**USE GROUPS:** ---  
SEPARATED OCCUPANCIES IN ACCORDANCE WITH SECTION 508.4,  
CONSISTING OF THE FOLLOWING:  
GROUP R-2 (APARTMENTS)  
GROUP M (MERCANTILE)  
GROUP A-2 (RESTAURANT)

**FIRE PROTECTION:**  
ENTIRE BUILDING SHALL BE EQUIPPED WITH AUTOMATIC  
SPRINKLER SYSTEM AND FIRE ALARM IN ACCORDANCE WITH  
CHAPTER 9 MBC 903.3.1.1  
**BUILDING HEIGHT AND NUMBER OF STORIES:**  
MAXIMUM BUILDING HEIGHT (TABLE 504.3)  
GROUP A SPRINKLERED - 75' MAX ABOVE GRADE  
GROUP M SPRINKLERED-75' MAX ABOVE GRADE  
GROUP R SPRINKLERED-75' MAX ABOVE GRADE

**NUMBER OF STORIES (TABLE 504.4)**  
GROUP A-2 (FIRST FLOOR ONLY) 2 STORIES MAX ABOVE GRADE  
GROUP M (FIRST FLOOR ONLY) 3 STORIES MAX ABOVE GRADE  
GROUP R-2, 5 STORIES MAX ABOVE GRADE

**BUILDING AREA  
FRONTAGE INCREASE:**

$L_f = [F(P-25)] W/30$   
 $L_f = [1411/(1411-25)] W$   
 $L_f = 75$

**BUILDING AREA CONT.**

ALLOWABLE AREA PER FLOOR INCLUDING FRONTAGE INCREASE

FIRST FLOOR:  
GROUP A-2 35,625 SF / GROUP M 46,875 SF / GROUP R-2 60,000 SF

SECOND FLOOR:  
GROUP R-2 60,000 SF

THIRD FLOOR:  
GROUP R-2 60,000 SF

FOURTH FLOOR:  
GROUP R-2 60,000 SF

ACTUAL AREA PER FLOOR

FIRST FLOOR:  
GROUP A-2 3,503 SF / GROUP M 9,702 SF / GROUP R-2 18,714 SF

SECOND FLOOR:  
GROUP R-2 32,504 SF

THIRD FLOOR:  
GROUP R-2 32,504 SF

FOURTH FLOOR:  
GROUP R-2 24,326 SF TOTAL SF = 121,253

AREA RATIO CALCULATION PER FLOOR

FIRST FLOOR: 0.10 + 0.22 + 0.31 = 0.63

SECOND FLOOR: 0.54

THIRD FLOOR: 0.54

FOURTH FLOOR: 0.41

TOTAL = 2.12 OK <3

**FACADE TRANSPARENCY**

GROUND FLOOR NON-RESIDENTIAL USE MIN. 70%  
MEASURED FROM 2'-8" ABOVE SIDEWALK:  
1180 SF TRANSPARENCY/ 1595 GSF= 73.9% ACTUAL: COMPLIES

UPPER FLOOR RESIDENTIAL RESIDENTIAL USE MIN 20%  
9546 SF TRANSPARENCY/ 43,428 GSF = 21.9%: COMPLIES

**BUILDING MATERIALS**

PRIMARY MATERIALS MIN. 60%  
40,967 SF OF PRIMARY MATERIAL/ 52,215 (TOTAL GSF LESS WINDOWS AND DOORS) =78.5%

ACCENT MATERIALS MAX 40%  
11,248 SF OF ACCENT MATERIAL/ 52,215 (TOTAL GSF LESS WINDOWS AND DOORS) =21.5%

**PROPERTY DESCRIPTION**

Tax Id Number: 15-27-477-058

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF OAKLAND, STATE OF MICHIGAN, AND IS DESCRIBED AS FOLLOWS:

LAND SITUATED IN THE STATE OF MICHIGAN, COUNTY OF OAKLAND, CITY OF ROCHESTER HILLS.

LAND IN THE SOUTHEAST 1/4 OF SECTION 27, TOWN 3 NORTH, RANGE 11 EAST, CITY OF ROCHESTER HILLS, OAKLAND COUNTY MICHIGAN, DESCRIBED AS: COMMENCING AT THE SOUTHEAST SECTION CORNER; THENCE ALONG THE SECTION LINE, NORTH 00 DEGREES 42 MINUTES 00 SECONDS EAST, 985.00 FEET TO THE POINT OF BEGINNING; THENCE NORTH 89 DEGREES 22 MINUTES 00 SECONDS WEST, 603.90 FEET; THENCE NORTH 88 DEGREES 52 MINUTES 00 SECONDS WEST, 57.88 FEET TO THE EASTERLY LINE OF EYSTER'S AVON GARDENS SUBDIVISION, RECORDED IN LIBER 31, PAGE 46 OF PLATS, OAKLAND COUNTY RECORDS; THENCE ALONG THIS LINE, NORTH 00 DEGREES 44 MINUTES 48 SECONDS EAST, 328.00 FEET; THENCE SOUTH 89 DEGREES 00 MINUTES 20 SECONDS EAST, 661.59 FEET TO THE SECTION LINE; THENCE SOUTH 00 DEGREES 42 MINUTES 00 SECONDS WEST, 324.33 FEET TO THE POINT OF BEGINNING, EXCEPT THE EASTERLY 33 FEET FOR ROAD.

ALSO DESCRIBED AS PER ASSESSING DEPARTMENT:  
T3N, R11E, SEC 27 PART OF SE 1/4 BEG AT PT DIST N 00-42-00 E 979.73 FT FROM SE SEC COR, TH N 00-42-00 E 227.60 FT, TH N 89-02-06 W 660.91 FT, TH S 00-42-00 E 226 FT, TH S 88-54-37 E 660.92 FT TO BEG, ALSO N 102 FT OF S 1309.33 FT OF E 660 FT OF SE 1/4.



Drawn by :  
SVA  
Checked by :  
SVA

Sheet Title :  
TITLE SHEET

Project No. :  
2020.137

TS1.1

DO NOT SCALE DRAWINGS  
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NOTE:  
PRIOR TO THE INSTALLATION OF THE ASPHALT LEVELING COURSE OR 2ND LIFT OF ASPHALT BASE, THE CURB BACKFILL MUST BE INSTALLED AND COMPACTED FLUSH TO THE TOP OF CURB.

# SITE PLAN

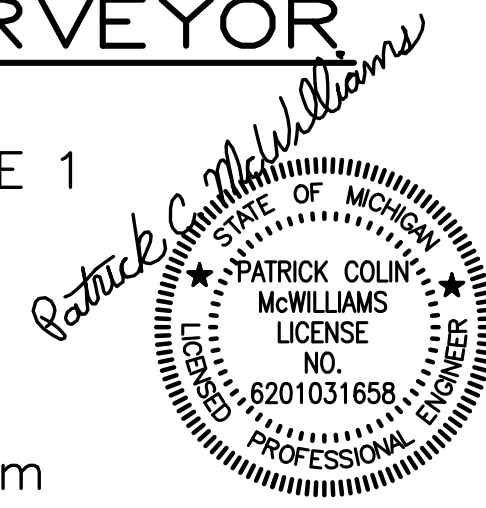
## "Bebb Oak Meadows"

### "Mixed Use Development"

PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

#### ENGINEER & SURVEYOR

KIEFT ENGINEERING, INC.  
5852 SOUTH MAIN STREET, STE 1  
CLARKSTON, MICHIGAN 48346  
Phone (248) 625-5251  
Fax # (248) 625-7110  
Attn: Patrick C. McWilliams  
Email: pmcwilliams@kieferteng.com



#### DEVELOPER/CONTRACTOR

OYK Engineering & Construction  
30700 Telegraph Road, Suite 2665  
Bingham Farms, Michigan 48025  
Ph: (248) 656-7695  
Contact: Fred Hadid  
Email: fhadid@oykconstruction.com

#### PROPERTY DESCRIPTION

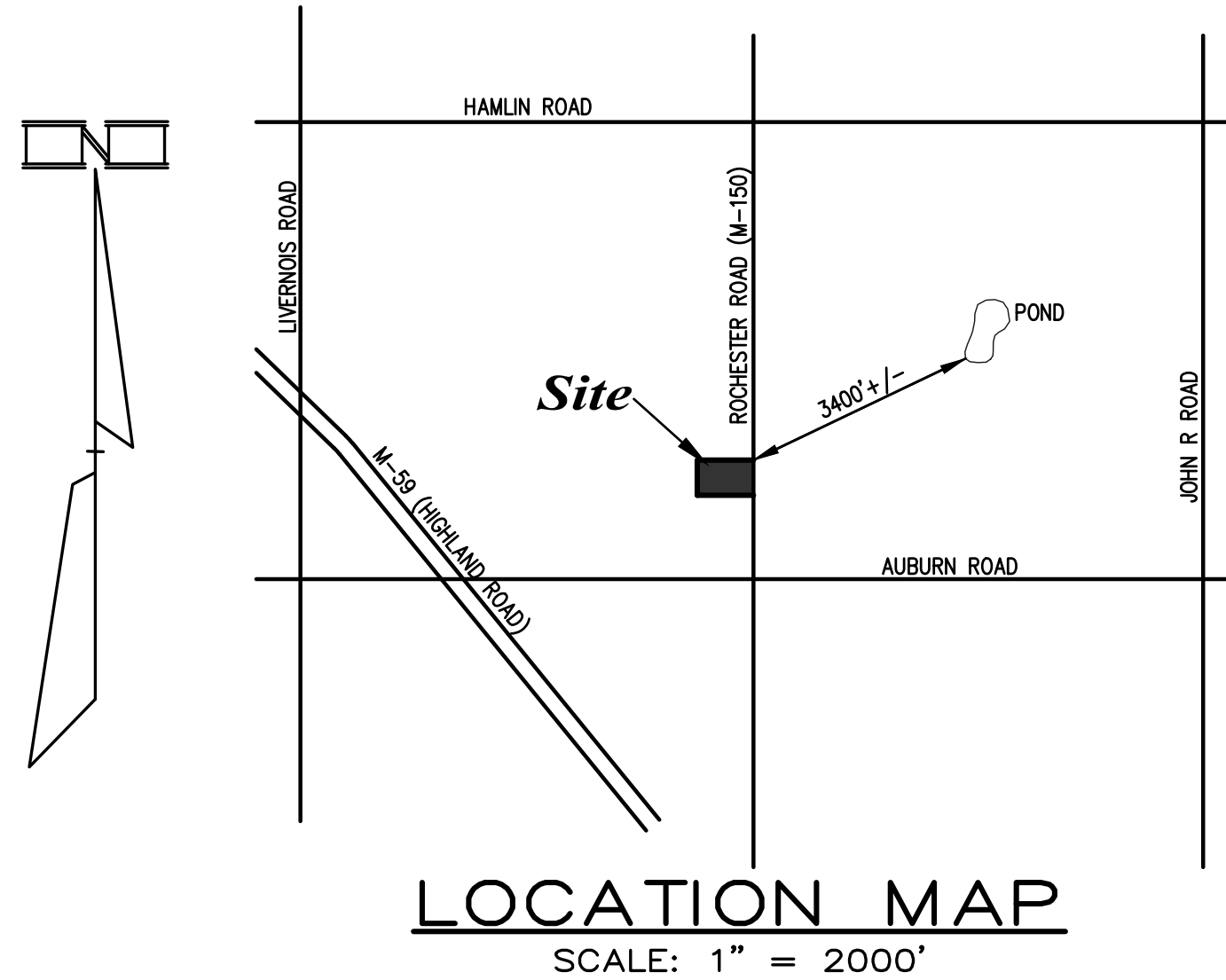
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ALSO DESCRIBED AS PER ASSESSING DEPARTMENT:  
T3N, R11E, SEC. 27 PART OF SE 1/4 BEG. AT PT. DIST N 00-42-00 E 979.73 FT FROM SE. SEC. COR. TH N 00-42-00 E 227.60 FT, TH N 89-02-06 W 660.91 FT, TH S 00-42-00 E 226 FT, TH S 88-54-37 E 660.92 FT TO BEG. ALSO N 102 FT OF S 1309.33 FT OF E 660 FT OF SE 1/4.



#### ARCHITECT

Stucky Vitale Architects  
27172 Woodward Avenue  
Royal Oak, Michigan 48067-0925  
Ph (248) 546-6700, Ext 102  
Contact: John Stucky  
Email: jvitale@stuckyvitale.com

#### SHEET INDEX

- 1) COVER SHEET
- 2) EXISTING CONDITIONS PLAN & BENCHMARKS
- 3) DEMOLITION PLAN
- 4) OVERALL SITE PLAN
- 5) DETAILED SITE PLAN - EAST
- 6) DETAILED SITE PLAN - WEST
- 7) ROCHESTER ROAD ENTRANCE PLAN
- 8) FIRE PROTECTION PLAN
- 9) STORM SEWER, DETENTION CALCULATIONS & DETAILS
- 10) SANITARY CALCULATIONS & DETAILS
- 11) MDOT NOTES & DETAILS, ETC.

#### APPROVALS

##### AGENCY

##### DESCRIPTION

##### DATE

##### EXPIRATION DATE

CITY OF ROCHESTER HILLS

PLANNING COMMISSION  
TOWNSHIP BOARD

\_\_\_\_\_  
\_\_\_\_\_

CITY OF ROCHESTER HILLS

ENGINEERING APPROVAL

- SANITARY  
- WATERMAIN  
- REMANDER

\_\_\_\_\_  
\_\_\_\_\_

OAKLAND COUNTY WATER RESOURCE COMMISSION

SOIL EROSION PERMIT NO.

\_\_\_\_\_  
\_\_\_\_\_

OAKLAND COUNTY WATER RESOURCE COMMISSION

WATER MAIN APPROVAL

\_\_\_\_\_  
\_\_\_\_\_

OAKLAND COUNTY WATER RESOURCE COMMISSION

SANITARY SEWER APPROVAL

\_\_\_\_\_  
\_\_\_\_\_

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY, GREAT LAKES & ENERGY

WATER MAIN PERMIT NO.

\_\_\_\_\_  
\_\_\_\_\_

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY, GREAT LAKES & ENERGY

SANITARY SEWER PERMIT

\_\_\_\_\_  
\_\_\_\_\_

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY, GREAT LAKES & ENERGY

N.P.D.E.S. NOTICE TO COVER

NOT REQUIRED (<5 ACRES DISRUPTION)

\_\_\_\_\_  
\_\_\_\_\_

MICHIGAN DEPARTMENT OF TRANSPORTATION

ROCHESTER ROAD (M-150)

\_\_\_\_\_  
\_\_\_\_\_

##### NOTES:

"THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT".

-GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR THE MAINTENANCE OF THE SOIL EROSION CONTROLS.

#### REVISION INDEX

REV. #	DESCRIPTION	DATE	SHEET NUMBERS													
			1	2	3	4	5	6	7	8	9	10	11			
1	REVISED PER ARCHITECT	3-19-2021	X	X	X	X	X	X	X							
2	REVISED PER CITY (4-15-21)	5-12-2021	X	X	X	X	X	X	X	X	X	X	X	X		
3	REVISED PER CITY (6-29-21)	6-30-2021	X	X	X	X	X	X	X							
4	ADDED HYDRANTS PER FIRE DEPT (6-26-2021)	8-13-2021	X			X	X	X	X							
5	REVISED ENTRANCE APPROACHES PER CLIENT (9-8-2021)	9-24-2021	X		X	X	X	X	X				X			
6	ADDED PATH DETAIL & SIGHT LINES PER CITY/ARC (10-22-2021)	11-15-2021	X	X	X	X	X	X	X	X	X	X	X	X		
7	REVISED ENTRANCE LOADING ZONE/DUMPSTER PER CLIENT (11-22-2021)	1-30-2021	X	X	X	X	X	X	X	X	X	X	X	X		
8	REVISED PER CITY (6-29-21) PER MDOT (1-17-2022)	1-19-2022	X	X	X	X	X	X	X	X	X	X	X	X	X	

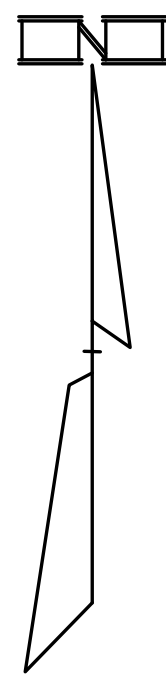
City File #21-008,  
Section 27

DATE: 3-17-2021

SHEET 1 OF 11

KE 2021.053





ALLAA YOUSIF ARABBO  
15-27-477-005  
R-3

"ROCHESTER AUTOMOTIVE CONDOMINIUM" O.C.C.P. NO. 2206  
15-27-477-068  
B-5 + FB-3

SCOTT & ERIKA HOUSER  
15-27-477-006  
R-3

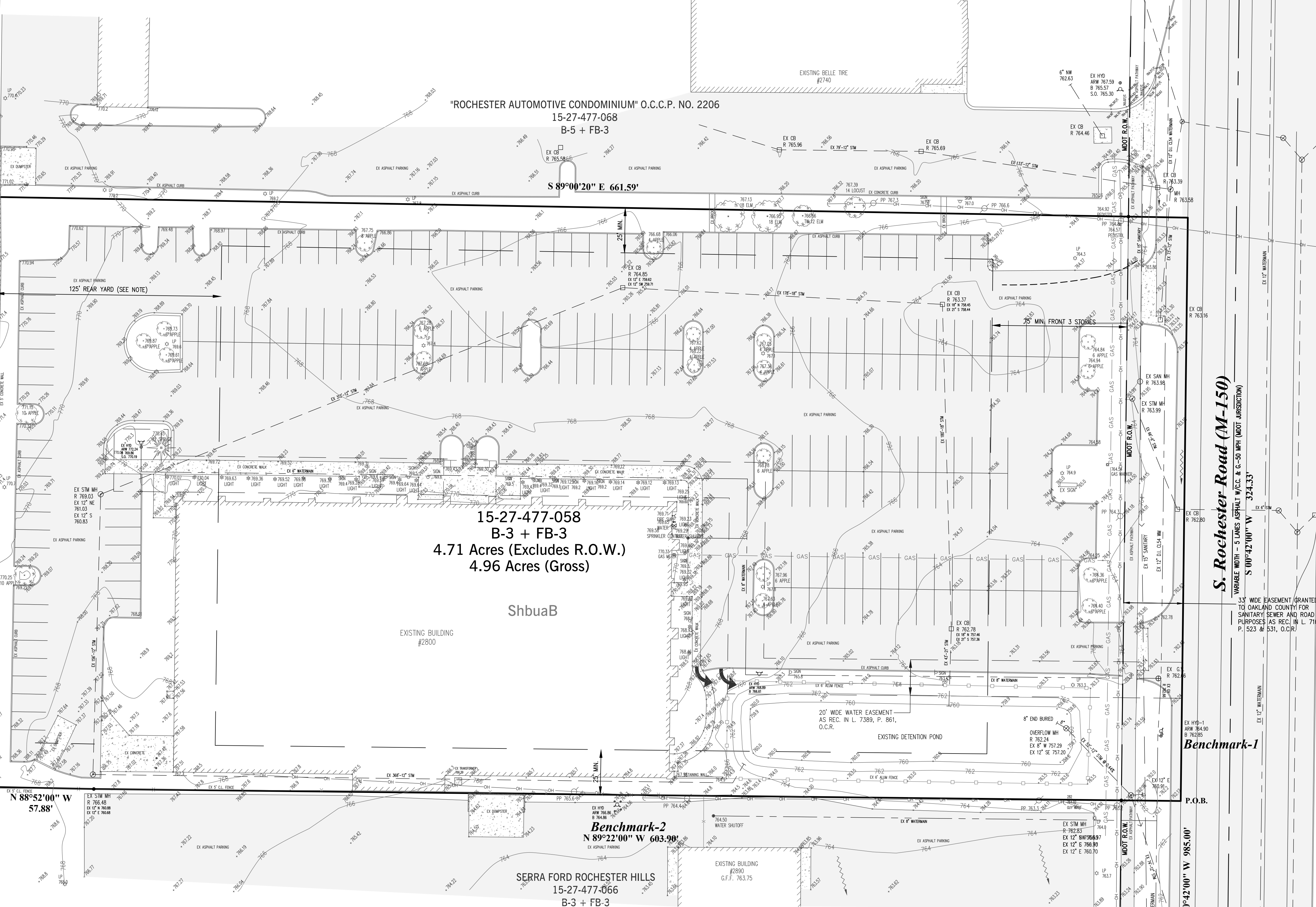
SHERRY WONG  
15-27-477-008  
R-3

ALBERTO MURGUIA TESCH &  
SELENE E. VALQUEZ CARDENAS  
15-27-477-008  
R-3

CHRISTOPHER JOHNSON  
& JOSEPH PETERS  
15-27-477-009  
R-3

'EYESTERS AVON GARDENS' L. 31, P. 46, O.C.R.  
N 00°44'48" E 328.00'

N 00°44'48" E 328.00'



15-26-351-016  
B-3 + FB-3

"HAMPTON VILLAGE CENTRE CONDO" O.C.C.P. NO. 713

15-26-351-016  
B-3 + FB-3

S. Rochester Road (M-150)  
VARIABLE WIDTH - 5 LINES ASPHALT W/C.C. & 0-50 MPH (MOOT JURISDICTION)  
S 00°42'00" W 324.33'

Benchmark-1

P.O.B.

S 00°42'00" W 985.00'

SE Corner  
Section 27  
T3N, R11E

**LEGEND**

EXISTING	STORM SEWER
---	SANITARY SEWER
---	WATERMAIN
---	GAS MAIN
---	ELEC. TELE. CABLE
---	STORM MANHOLE
---	CATCH BASIN
---	INLET
---	REARYARD CATCH BASIN
---	END SECTION
---	SANITARY MANHOLE
---	GATE VALVE AND WELL
---	HYDRANT
---	CONTOURS
---	POWER POLE
---	LIGHT POLE
---	GRADE

**Notes:**

ALL EXISTING UTILITIES SHOWN ON THIS TOPOGRAPHIC SURVEY HAVE BEEN TAKEN FROM VISUAL OBSERVATION, AND RECORD MAPPING, WHERE AVAILABLE. NO GUARANTEE IS MADE, OR SHOULD BE ASSUMED, AS TO THE COMPLETENESS OR ACCURACY OF THE UTILITIES SHOWN ON THIS DRAWING. PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION ACTIVITIES.

BUILDER/DEVELOPER IS RESPONSIBLE FOR CONFIRMING BUILDING SETBACKS.

**Basis of Bearing:**

NORTH 00°42'00" EAST, BEING THE EAST LINE OF SECTION 27, AS DESCRIBED IN PROPERTY DESCRIPTION

**Soils Legend**

<b>SYMBOL</b>	<b>NAME</b>
Shbuab	Shebeon-Urban land complex, 0 to 4 percent slopes

**Benchmarks:**

**BM #1**  
ARROW OF EXISTING HYDRANT LOCATED ON WEST SIDE OF ROCHESTER ROAD, 39'+/- NORTH OF SOUTH PROPERTY LINE.  
ELEVATION = 764.90 NAVD '88

**BM #2**  
ARROW OF EXISTING HYDRANT LOCATED 5' SOUTH OF THE SOUTH PROPERTY LINE & 308'+/- WEST OF ROCHESTER ROAD B.O.C.  
ELEVATION = 766.86 NAVD '88

6/2021/053/ang/abdo Oak Site Plan.dwg, E02, 1/20/2022 9:52:25 AM

DATE	ISSUE
3-19-2021	REVISED PER ARCHITECT
5-12-2021	REVISED PER CITY (4-15-2021)
6-30-2021	REVISED PER CITY (6-24-2021)
11-15-2021	ADDED PAINT DETAIL & SIGHT LINES PER CITY/HRC (10-22-2021)
11-18-2021	REVISED PER CITY (12-21-2021), PER MOOT (1-17-2022)

**Developer/Contractor**  
OYK ENGINEERING & CONSTRUCTION  
30700 TELEGRAPH ROAD, SUITE 2665  
BINGHAM FARMS, MICHIGAN 48025  
(248) 656-7695 FRED HADDI

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**KIEFT ENGINEERING, INC.**  
PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS  
5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346  
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

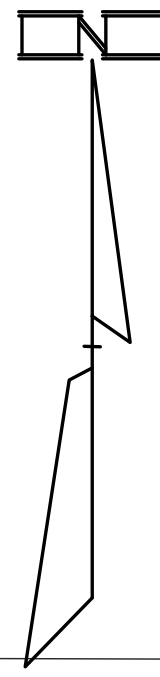
DATE	3-17-2021	CKD. BY	DATE
DRAWN GF			
DESIGN PCM			
SECTION 27		T- 3 - N, R- 11 - E	



**Existing Conditions Plan**  
"BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

City File #21-008,  
Section 27  
SCALE 1" = 30'  
SHEET 2 OF 11  
KE 2021.053





ALLAA YOUSIF ARABBO  
15-27-477-005  
R-3

SCOTT & ERIKA HOUSER  
15-27-477-006  
R-3

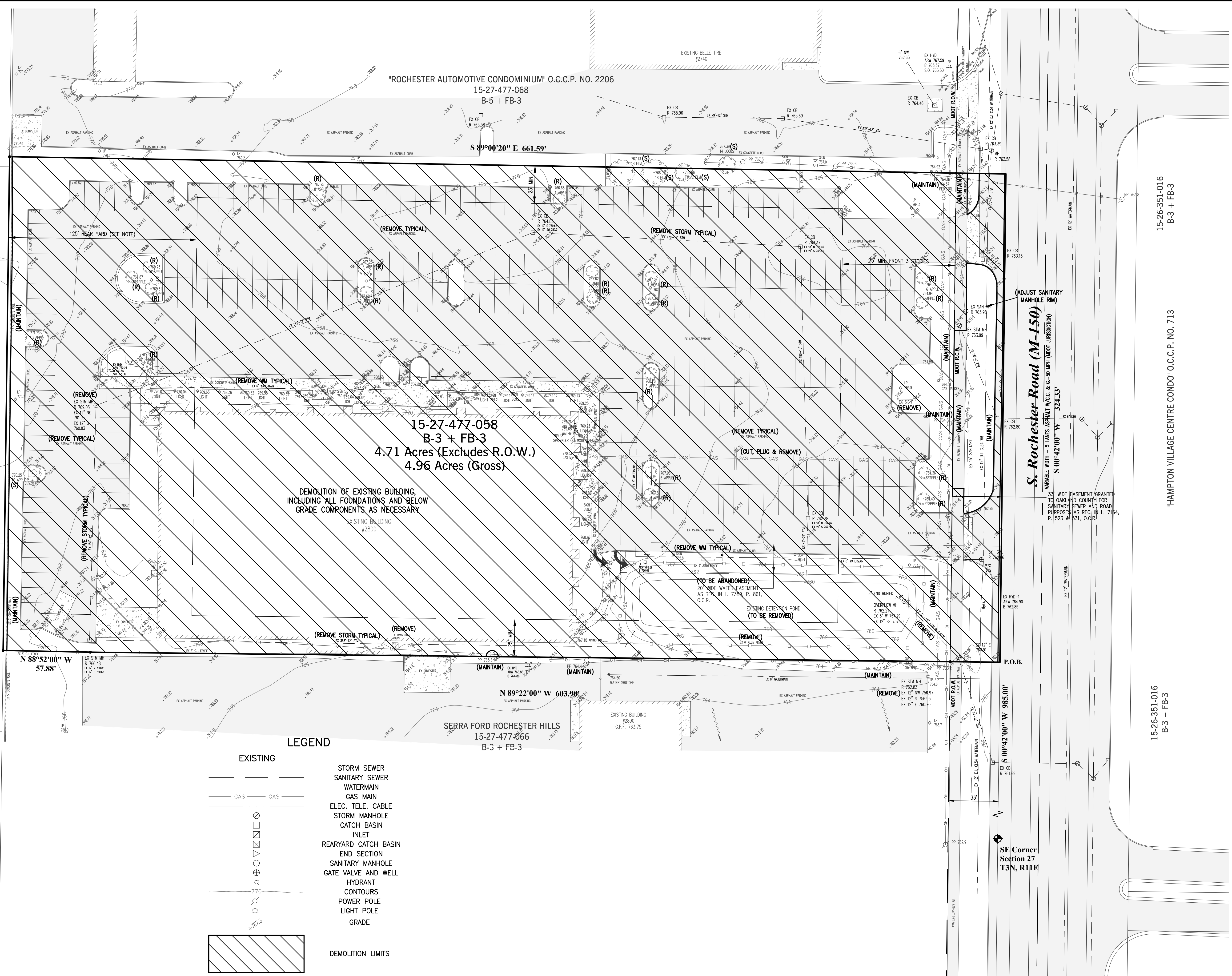
SHERRY WONG  
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SELENE E. VALQUEZ CARDENAS  
15-27-477-008  
R-3

CHRISTOPHER JOHNSON  
& JOSEPH PETERS  
15-27-477-009  
R-3

"EYSTERS AVON GARDENS" L. 31, P. 46, O.C.R.

N 00°44'48" E 328.00'



**LEGEND**

- |  |                      |  |
|--|----------------------|--|
|  | EXISTING             |  |
|  | STORM SEWER          |  |
|  | SANITARY SEWER       |  |
|  | WATERMAIN            |  |
|  | GAS MAIN             |  |
|  | ELEC. TELE. CABLE    |  |
|  | STORM MANHOLE        |  |
|  | CATCH BASIN          |  |
|  | INLET                |  |
|  | REARYARD CATCH BASIN |  |
|  | END SECTION          |  |
|  | SANITARY MANHOLE     |  |
|  | GATE VALVE AND WELL  |  |
|  | HYDRANT              |  |
|  | CONTOURS             |  |
|  | POWER POLE           |  |
|  | LIGHT POLE           |  |
|  | GRADE                |  |
|  | DEMOLITION LIMITS    |  |

DEMOLITION OF EXISTING BUILDING,  
INCLUDING ALL FOUNDATIONS AND BELOW  
GRADE COMPONENTS AS NECESSARY

15-27-477-058  
B-3 + FB-3  
4.71 Acres (Excludes R.O.W.)  
4.96 Acres (Gross)

SERRA FORD ROCHESTER HILLS  
15-27-477-066  
B-3 + FB-3

S. Rochester Road (M-150)  
VARIABLE WIDTH - 5 LANES ASPHALT PAVEMENT & 6'-50" MPH (MOOT JURISDICTION)  
S 00°42'00" W 324.33'

SE Corner  
Section 27  
T3N, R11E

15-26-351-016  
B-3 + FB-3

"HAMPTON VILLAGE CENTRE CONDO" O.C.C.P. NO. 713

15-26-351-016  
B-3 + FB-3

03/2021/0531/ang/9848b Oak Site Plan.dwg, Demos3, 1/20/2022 9:50:55 AM

DATE	ISSUE
3-19-2021	REVISED PER ARCHITECT
5-12-2021	REVISED PER CITY (4-15-2021)
9-24-2021	REVISED ENTRANCE APPROACHES PER CLIENT (9-8-2021)
11-15-2021	ADDED PAINT DETAIL & SIGHT LINES PER CITY/TRAFFIC (10-22-2021)
11-30-2021	REVISE S. ENTRANCE/LOADING ZONE/DUMPSTER PER CLIENT (11-22-2021)
1-18-2022	REVISED PER CITY (12-21-2021), PER MOOT (1-17-2022)

**Developer/Contractor**  
OYK ENGINEERING & CONSTRUCTION  
30700 TELEGRAPH ROAD, SUITE 2665  
BINGHAM FARMS, MICHIGAN 48025  
(248) 656-7695 FRED HADID

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5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346  
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	3-17-2021	CKD. BY	DATE
DRAWN GF			
DESIGN PCM			
SECTION 27		T- 3 - N, R- 11 - E	



72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

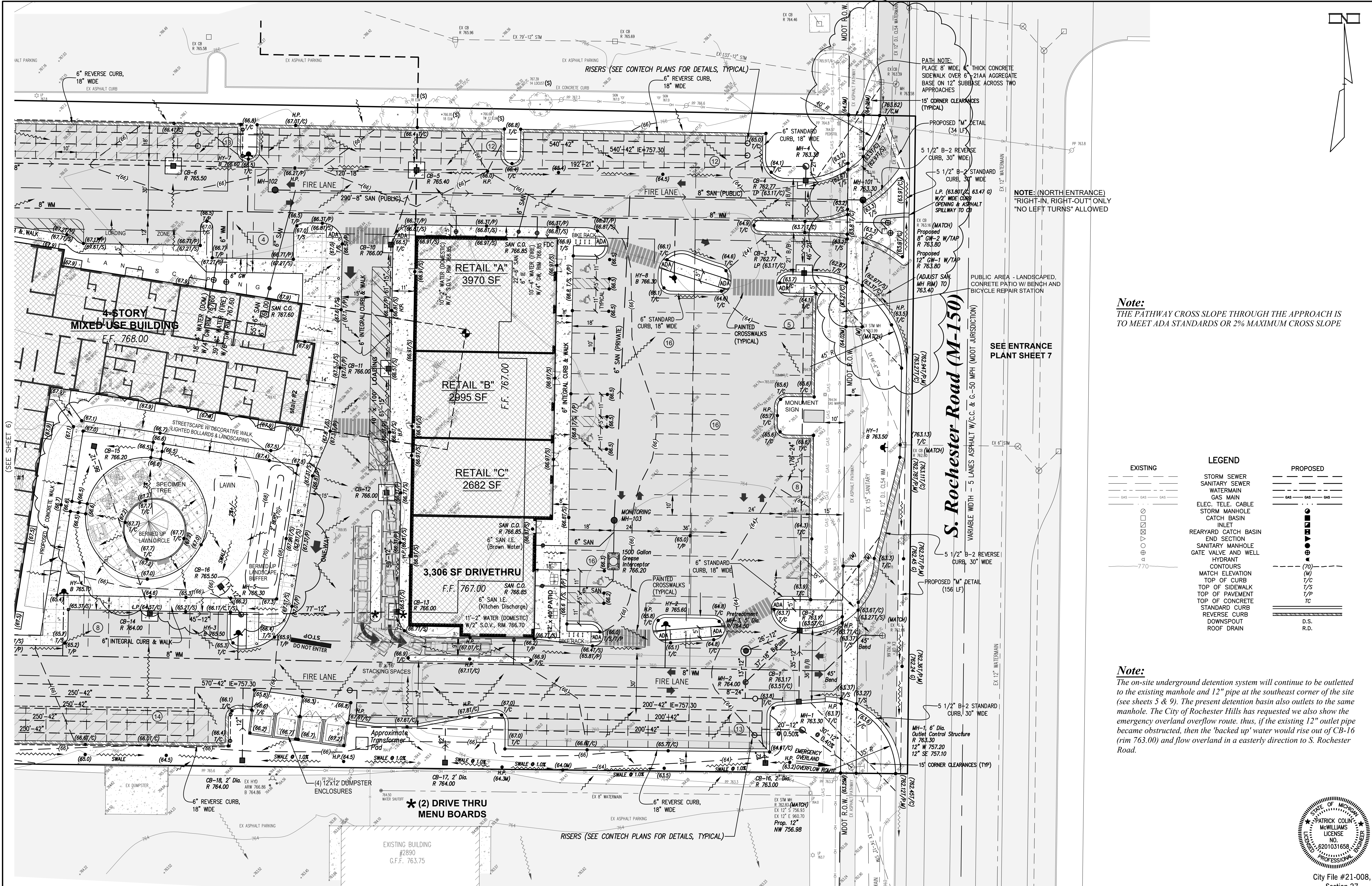
**Demolition Plan**  
"BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

City File #21-008, Section 27  
SCALE 1" = 30'  
SHEET 3 OF 11  
KE 2021.053





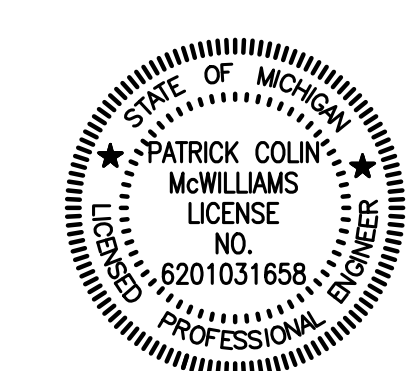




**Note:**  
THE PATHWAY CROSS SLOPE THROUGH THE APPROACH IS TO MEET ADA STANDARDS OR 2% MAXIMUM CROSS SLOPE

EXISTING	LEGEND	PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
	GAS MAIN	
	ELEC. TELE. CABLE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARMYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	CONTOURS	
	MATCH ELEVATION	
	TOP OF CURB	
	TOP OF SIDEWALK	
	TOP OF PAVEMENT	
	TOP OF CONCRETE	
	STANDARD CURB	
	REVERSE CURB	
	DOWNSPOUT	
	ROOF DRAIN	
	D.S.	
	R.D.	

**Note:**  
The on-site underground detention system will continue to be outlotted to the existing manhole and 12" pipe at the southeast corner of the site (see sheets 5 & 9). The present detention basin also outlets to the same manhole. The City of Rochester Hills has requested we also show the emergency overland overflow route, thus, if the existing 12" outlet pipe became obstructed, then the 'backed up' water would rise out of CB-16 (rim 763.00) and flow overland in a easterly direction to S. Rochester Road.



City File #21-008, Section 27

DATE	REVISION	ISSUE
5-17-2021	REVISED PER CITY (4-29-2021)	
6-30-2021	REVISED PER CITY (6-29-2021)	
8-13-2021	ADDED HYDRANTS FOR FIRE DEPT. (8-13-2021)	
9-24-2021	REVISED ENTRANCE APPROACHES PER CLIENT (9-8-2021)	
11-15-2021	ADDED PATH DETAIL & SIGHT LINES PER CITY/DCO (10-22-2021)	
11-30-2021	REVISED S. ENTRANCE/LOADING ZONE DUMPSTER PER CLIENT (11-29-2021)	
11-18-2021	REVISED PER CITY (12-21-2021), PER MDOT (11-17-2022)	

**Developer/Contractor**  
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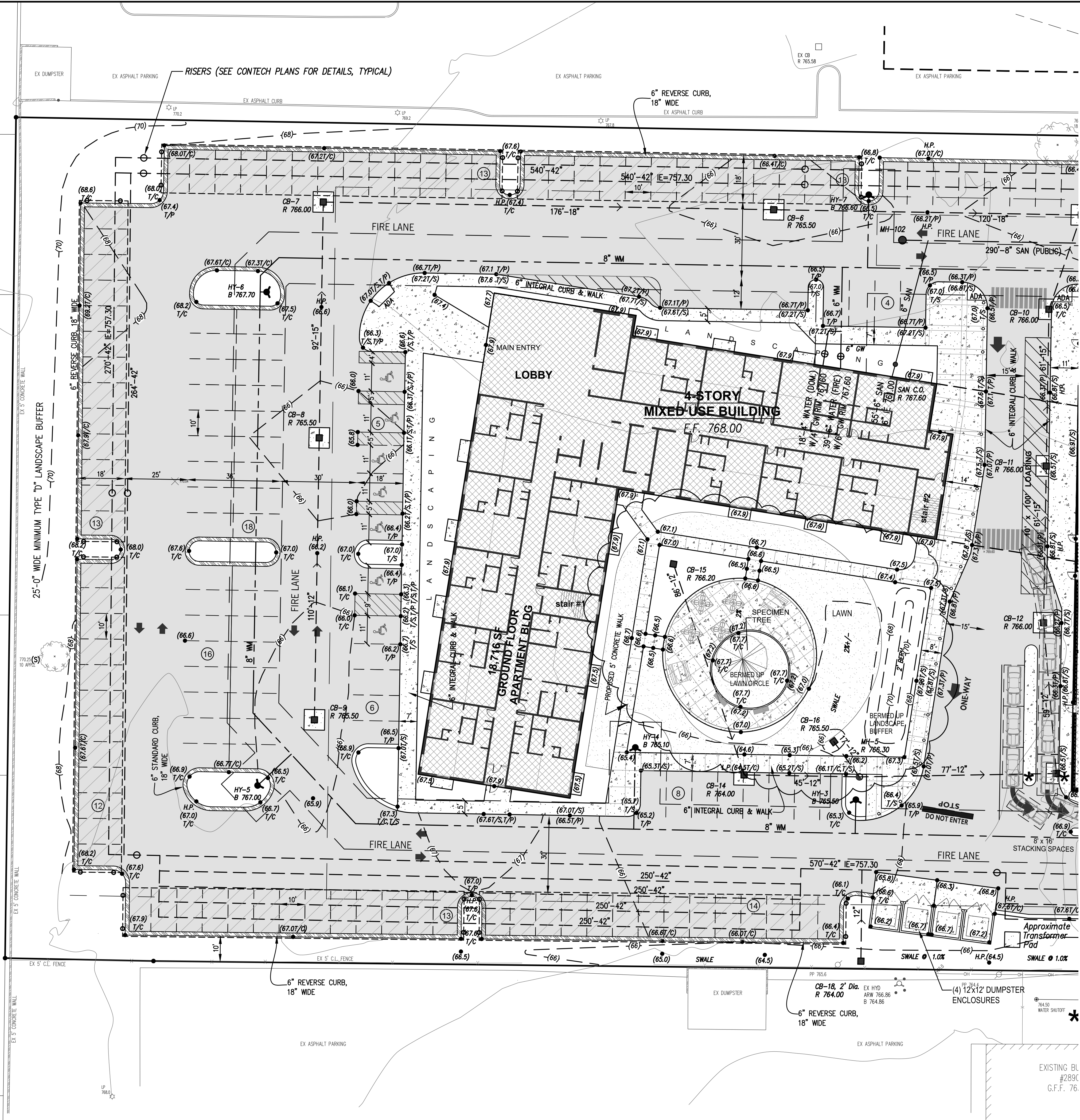
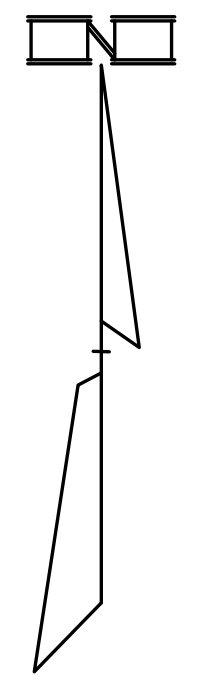
DATE	3-17-2021	CKD. BY	DATE
DRAWN OF			
DESIGN PC/M			
SECTION 27		T-3-N-R-11-E	

72 HOURS BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

**Detailed Site Plan - East**  
"BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 20'  
SHEET 5 OF 11  
KE 2021.053





EXISTING		PROPOSED	
	STORM SEWER		STORM SEWER
	SANITARY SEWER		SANITARY SEWER
	WATER MAIN		WATER MAIN
	GAS MAIN		GAS MAIN
	ELEC. TELE. CABLE		ELEC. TELE. CABLE
	STORM MANHOLE		STORM MANHOLE
	CATCH BASIN		CATCH BASIN
	INLET		INLET
	REAR YARD CATCH BASIN		REAR YARD CATCH BASIN
	END SECTION		END SECTION
	SANITARY MANHOLE		SANITARY MANHOLE
	GATE VALVE AND WELL		GATE VALVE AND WELL
	HYDRANT		HYDRANT
	CONTOURS		CONTOURS
	MATCH ELEVATION		MATCH ELEVATION
	TOP OF CURB		TOP OF CURB
	TOP OF SIDEWALK		TOP OF SIDEWALK
	TOP OF PAVEMENT		TOP OF PAVEMENT
	TOP OF CONCRETE		TOP OF CONCRETE
	STANDARD CURB		STANDARD CURB
	REVERSE CURB		REVERSE CURB
	DOWNSPOUT		DOWNSPOUT
	ROOF DRAIN		ROOF DRAIN

DATE	ISSUE
3-19-2021	REVISED PER ARCHITECT
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11-15-2021	ADDED PATH DETAIL & SIGHT LINES PER CITY/HPC (10-22-2021)
11-30-2021	REVISE S. ENTRANCE/LOADING ZONE/DUMPSTER PER CLIENT (11-29-2021)
11-18-2021	REVISED PER CITY (12-21-2021), PER MDOT (1-17-2022)

**Developer/Contractor**  
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 30700 TELEGRAPH ROAD, SUITE 2665  
 BINGHAM FARMS, MICHIGAN 48025  
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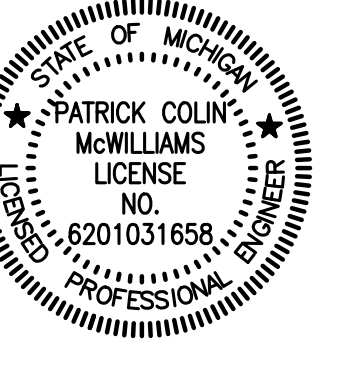
**KIEFT ENGINEERING, INC.**  
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 PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	CKD. BY	DATE
3-17-2021		

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

**Detailed Site Plan - West**  
 "BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
 PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

City File #21-008, Section 27  
 SCALE 1" = 20'  
 SHEET 6 OF 11  
 KE 2021.053

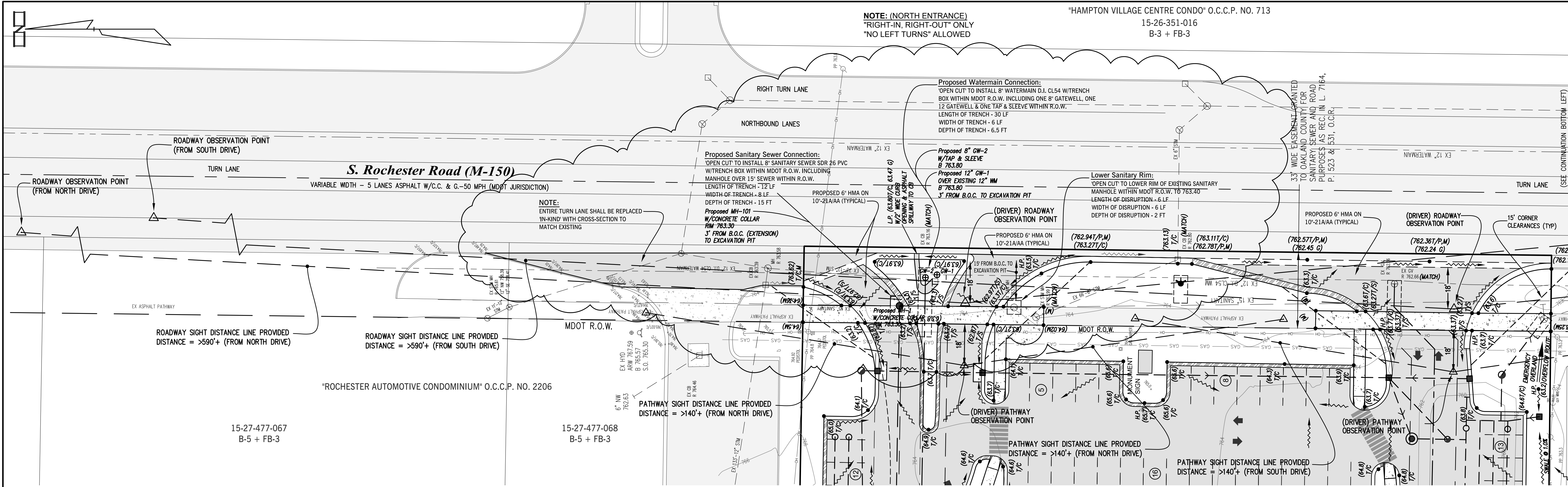


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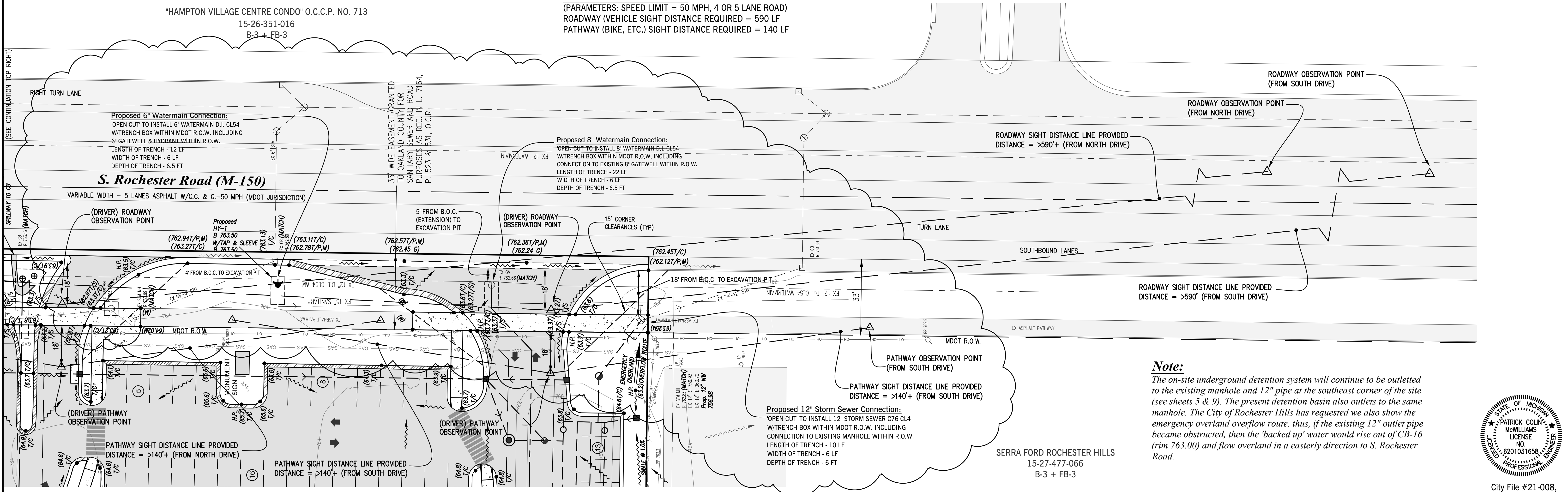


NOTE: (NORTH ENTRANCE)  
"RIGHT-IN, RIGHT-OUT" ONLY  
"NO LEFT TURNS" ALLOWED

"HAMPTON VILLAGE CENTRE CONDO" O.C.C.P. NO. 713  
15-26-351-016  
B-3 + FB-3



**REQUIRED SIGHT DISTANCES:**  
(PARAMETERS: SPEED LIMIT = 50 MPH, 4 OR 5 LANE ROAD)  
ROADWAY (VEHICLE SIGHT DISTANCE REQUIRED = 590 LF  
PATHWAY (BIKE, ETC.) SIGHT DISTANCE REQUIRED = 140 LF



**Note:**  
The on-site underground detention system will continue to be outleted to the existing manhole and 12" pipe at the southeast corner of the site (see sheets 5 & 9). The present detention basin also outlets to the same manhole. The City of Rochester Hills has requested we also show the emergency overland overflow route, thus, if the existing 12" outlet pipe became obstructed, then the "backed up" water would rise out of CB-16 (rim 763.00) and flow overland in an easterly direction to S. Rochester Road.



DATE	ISSUE
11-15-2021	ADDED PATH DETAIL & SIGHT LINES PER CITY/ARC (10-22-2021)
11-30-2021	REVISE S. ENTRANCE/LOADING ZONE/DUMPSTER PER CLIENT (11-22-2021)
1-18-2022	REVISED PER CITY (11-21-2021), PER MDOT (1-17-2022)

**Developer/Contractor**  
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30700 TELEGRAPH ROAD, SUITE 2665  
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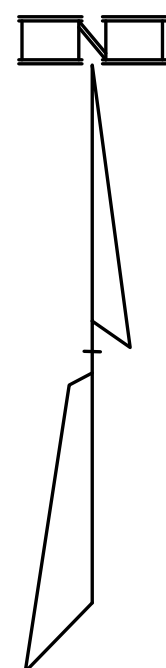
DATE	CKD. BY	DATE
3-17-2021		

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

**Rochester Road Entrance Plan**  
"BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

City File #21-008, Section 27  
SCALE 1" = 20'  
SHEET 7 OF 11  
KE 2021.053





ALLAA YOUSIF ARABBO  
15-27-477-005  
R-3

SCOTT & ERIKA HOUSER  
15-27-477-006  
R-3

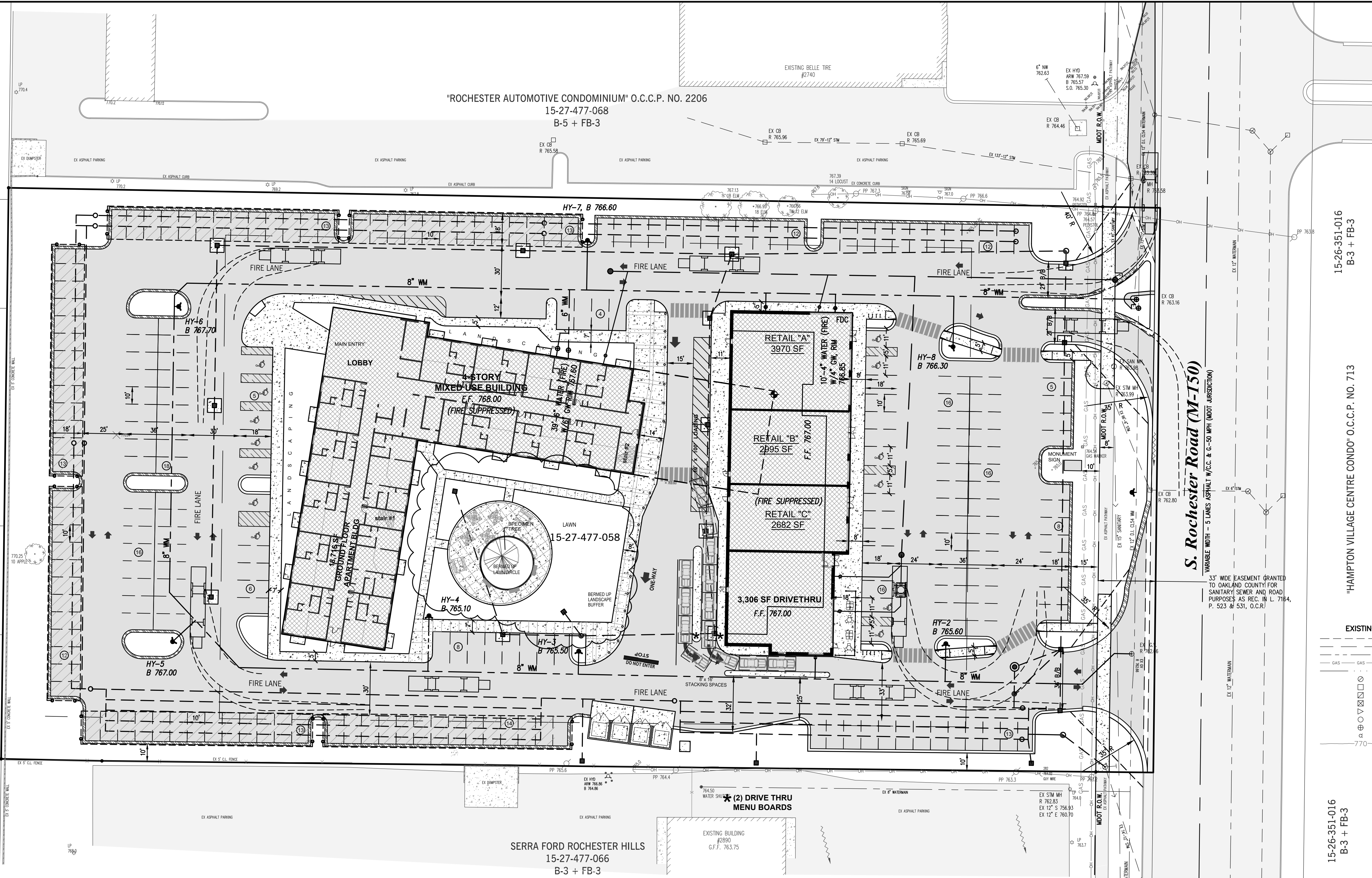
SHERRY WONG  
15-27-477-008  
R-3

ALBERTO MURGUIA TESCH &  
SELENE E. VALQUEZ CARDENAS  
15-27-477-008  
R-3

CHRISTOPHER JOHNSON  
& JOSEPH PETERS  
15-27-477-009  
R-3

"ROCHESTER AUTOMOTIVE CONDOMINIUM" O.C.C.P. NO. 2206  
15-27-477-068  
B-5 + FB-3

SERRA FORD ROCHESTER HILLS  
15-27-477-066  
B-3 + FB-3



15-26-351-016  
B-3 + FB-3

"HAMPTON VILLAGE CENTRE CONDO" O.C.C.P. NO. 713

15-26-351-016  
B-3 + FB-3

**S. Rochester Road (M-150)**  
VARIABLE WIDTH - 3 LANE ASPHALT 1/2 C.C. & 6-50 MPH (MOOT JURISDICTION)

33' WIDE EASEMENT GRANTED TO OAKLAND COUNTY FOR SANITARY SEWER AND ROAD PURPOSES AS REC. IN L. 7164, P. 523 & 531, O.C.R.

**LEGEND**

EXISTING	PROPOSED
--- GAS --- GAS ---	--- GAS --- GAS ---
--- SANITARY SEWER ---	--- SANITARY SEWER ---
--- WATER MAIN ---	--- WATER MAIN ---
--- ELEC. TELE. CABLE ---	--- ELEC. TELE. CABLE ---
--- STORM MANHOLE ---	--- STORM MANHOLE ---
--- CATCH BASIN ---	--- CATCH BASIN ---
--- INLET ---	--- INLET ---
--- REARYARD CATCH BASIN ---	--- REARYARD CATCH BASIN ---
--- END SECTION ---	--- END SECTION ---
--- SANITARY MANHOLE ---	--- SANITARY MANHOLE ---
--- GATE VALVE AND WELL ---	--- GATE VALVE AND WELL ---
--- HYDRANT ---	--- HYDRANT ---
--- CONTOURS ---	--- CONTOURS ---
--- MATCH ELEVATION ---	--- MATCH ELEVATION ---
--- TOP OF CURB ---	--- TOP OF CURB ---
--- TOP OF SIDEWALK ---	--- TOP OF SIDEWALK ---
--- TOP OF PAVEMENT ---	--- TOP OF PAVEMENT ---
--- TOP OF CONCRETE ---	--- TOP OF CONCRETE ---
--- STANDARD CURB ---	--- STANDARD CURB ---
--- REVERSE CURB ---	--- REVERSE CURB ---
--- DOWNSPOT ---	--- DOWNSPOT ---
--- ROOF DRAIN ---	--- ROOF DRAIN ---
---	--- (70) ---
---	--- (M) ---
---	--- (T/C) ---
---	--- (7/S) ---
---	--- (7/P) ---
---	--- (7/C) ---
---	--- D.S. ---
---	--- R.D. ---

**Notes:**

1. UPDATED "NO STOPPING STANDING OR PARKING FIRE LANE" SIGNS MUST BE PROVIDED THROUGHOUT THE SITE.
2. ALL ACCESSIBLE PARKING SPACES SHALL BE IDENTIFIED BY SIGNS PER ICCA117.1-2009, SECTION 502.7.
3. M.D.O.T. R.O.W. USE PERMIT IS REQUIRED.
4. CITY OF ROCHESTER HILLS R.O.W. PERMIT IS REQUIRED.
5. O.C.W.R.C. SOIL EROSION PERMIT IS REQUIRED.
6. ALL PROPOSED SIGNS MEET SECTION 138-8.603 AND CHAPTER 134 OF THE CITY CODE OF ORDINANCES AND WILL BE APPROVED UNDER A SEPARATE PERMIT ISSUED BY THE BUILDING DEPARTMENT.
7. THIS IS CONSTRUCTION TYPE 11B WITH 121,796 SF.

**FIRE PROTECTION PLAN NOTES:**

- A Knox Key system shall be installed in a location approved by the Fire Code Official. Ordering information is available from the Knox Company at www.knoxbox.com - IFC 2006 sec. 1028.2.
- Fire Lanes shall be designated by the Fire Code Official, and shall be conspicuously posted on both sides of the fire lane, with fire lane signs, spaced not more than 100 feet apart. Fire Lane signs shall read "No Stopping, Standing, Parking, Fire Lane" and shall conform to the Michigan manual of Uniform Traffic Control Devices - Fire Prevention Ordinance Chapter 58, sec. 503.
- Construction sites shall be safeguarded in accordance with IFC 2006 Chapter 14.
- Open Burning is not permitted, including the burning of trash, debris, or land clearing materials. Open burning for warming of sand and/or water for the preparation of mortar shall be within the City of Rochester Hills Burn Permit Guidelines - Fire Prevention Ordinance Chapter 58, sec. 307.6.2 & 307.6.2.3.
- Provide a "No Parking Fire Department Connection" sign over the Fire Department Connection.
- Provide a sign above the FDC indicating that they FDC supplies water to the entire structure with a map of the outline of the structure.
- Exit doors shall remain free of obstruction at all times. Provide guard posts or other acceptable means of protecting exit doors opening onto drives and parking areas.
- FDC's shall not be obstructed by landscaping, parking, or by any other permanent or temporary materials or devices.
- If the Fire Department Connection is not located on the street of the building, a white/clear strobe light shall be tied into the fire alarm system and installed over the FDC.

C:\2021\053\dwg\Bebb Oak Site Plan.dwg, File#8, 1/21/2022 8:33:15 AM

DATE	ISSUE
5-17-2021	REVISED PER CITY (4-15-2021)
6-30-2021	REVISED PER CITY (6-28-2021)
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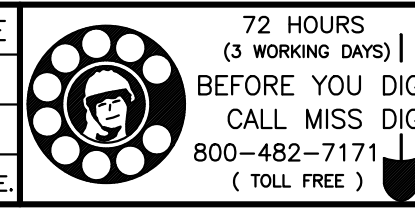
**Developer/Contractor**  
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DATE	CKD. BY	DATE
3-17-2021		
DRAWN GF		
DESIGN PCM		
SECTION 27	T- 3 -N- R- 11 -E	



**Fire Protection Plan**  
"BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30'
SHEET	8 OF 11
KE	2021.053



City File #21-008, Section 27



**"C" Calculations:**

TOTAL SITE AREA = 4.71 ACRES  
 GREENBELTS = 1.09 ACRES @ C=0.25  
 PAVEMENT = 2.92 ACRES @ C=0.95  
 ROOFS = 0.70 ACRES @ C=0.95

$$C = \left( \frac{0.70 \text{ Ac} \times 0.95}{4.71 \text{ Acres}} \right) + \left( \frac{2.92 \text{ Ac} \times 0.95}{4.71 \text{ Acres}} \right) + \left( \frac{1.09 \text{ Ac} \times 0.25}{4.71 \text{ Acres}} \right) = 0.788 = 0.79$$

**25 YEAR DETENTION BASIN CALCULATIONS (i.e. WITH OUTLET)**

ONSITE CONTRIBUTING AREA = 4.71 ACRES  
 OFFSITE CONTRIBUTING AREA = 0.00  
 TOTAL CONTRIBUTING AREA = 4.71 ACRES  
 RUNOFF COEFFICIENT (C) = 0.79  
 $Q_A = (0.20)(4.71 \text{ ACRES}) = 0.942 \text{ C.F.S.}$   
 $Q_0 = \frac{Q_A}{(A)(C)} = \frac{0.942}{(4.71)(0.79)} = 0.253$   
 $T = -25 + \sqrt{\frac{8.062 \cdot 50}{0.0}} = 153.46 \text{ MINUTES}$   
 $V_S = \frac{12,900 \cdot T}{T + 25} - 40 \cdot Q_0 \cdot T = 9,539 \text{ C.F./ACRE}$

$V_T \text{ REQ'D} = V_S \cdot (C)(A) = (9,539)(0.79)(4.71) = 35,494 \text{ C.F. REQ'D.}$

**VOLUME PROVIDED:** USING 42" DIAMETER PIPE  
 $(3,784 \text{ LF}) \times (9.621 \text{ CF/LF}) = 36,405 \text{ CF PROVIDED}$

**ORIFICE FORMULA**

$Q_A = 0.62 (A_0)(2gh)^{1/2}$   
 $A_0 = \text{AREA OF ORIFICE PIPE}$   
 $g = 32.2 \text{ FT./SEC.}^2$   
 $h = \text{DEPTH OF BASIN ABOVE CENTERLINE OUTLET PIPE} = [760.80 - (759.92 + \frac{5 \cdot 1}{2}) = 760.15] = 0.65'$   
 $A_0 = 0.62 (2gh)^{1/2} = \frac{0.942 - 0.292}{0.62 [(2)(32.2)(0.65)]^{1/2}} = 0.1620 \text{ SF}$   
**DIAMETER ORIFICE (D<sub>0</sub>):**  $D_0 = \sqrt{\frac{4(A_0)}{\pi}} = \sqrt{\frac{4(0.1620)}{\pi}} = 0.454 \text{ FT.} = 5.45 \text{ INCH}$   
 HOWEVER, USE 5 1/2" RESTRICTION

THUS,  $Q_A = (0.62)(0.1620)(\sqrt{(2)(32.2)(0.65)}) = 0.65$

**UNDERGROUND DETENTION BASIN (42" DIAMETER PIPES):**

EXISTING WATER ELEVATION = NONE  
 DESIGN HIGH WATER ELEVATION = 760.80  
 1.00' FREEBOARD ELEVATION = 761.80  
 STORAGE REQUIRED = 35,494 CF  
 STORAGE PROVIDED = 36,405 CF (BETWEEN 757.30 UPTO 760.80)  
 TIME TO DRAIN = 35,494 CF / 0.942 CFS = 37,679 SECONDS / 3600 SEC/HR = 10.47 HOURS

**BANK FULL VOLUME CALCULATION:**

VOLUME REQUIRED = 6,788(A)(C)  
 = (6,788)(4.71 Ac)(0.79) = 25,258 CF

REQUIRED AREA PER LF = 25,258 CF / 3,784 LF (OF 42" PIPE) = 6.68 SF  
 (3.5') 42" DETENTION PIPE INVERT = 757.30  
 REQUIRED WATER DEPTH = 75% (3.5') = 2.62' + 757.30 = 759.92

**BANK FULL ORIFICE FORMULA**

$Q_A = 0.62 (A_0)(2gh)^{1/2}$   
 $A_0 = \text{AREA OF ORIFICE PIPE}$   
 $g = 32.2 \text{ FT./SEC.}^2$   
 $h = \text{DEPTH OF BASIN ABOVE CENTERLINE OUTLET PIPE} = [759.92 - (757.30 + \frac{2.75}{2}) = 757.53] = 2.39'$   
 $A_0 = 0.62 (2gh)^{1/2} = \frac{0.292}{0.62 [(2)(32.2)(2.39)]^{1/2}} = 0.0379 \text{ S.F.}$   
**DIAMETER ORIFICE (D<sub>0</sub>):**  $D_0 = \sqrt{\frac{4(A_0)}{\pi}} = \sqrt{\frac{4(0.0379)}{\pi}} = 0.2198 \text{ FT.} = 2.64 \text{ INCH}$   
 USE 2.75" MINIMUM RESTRICTION

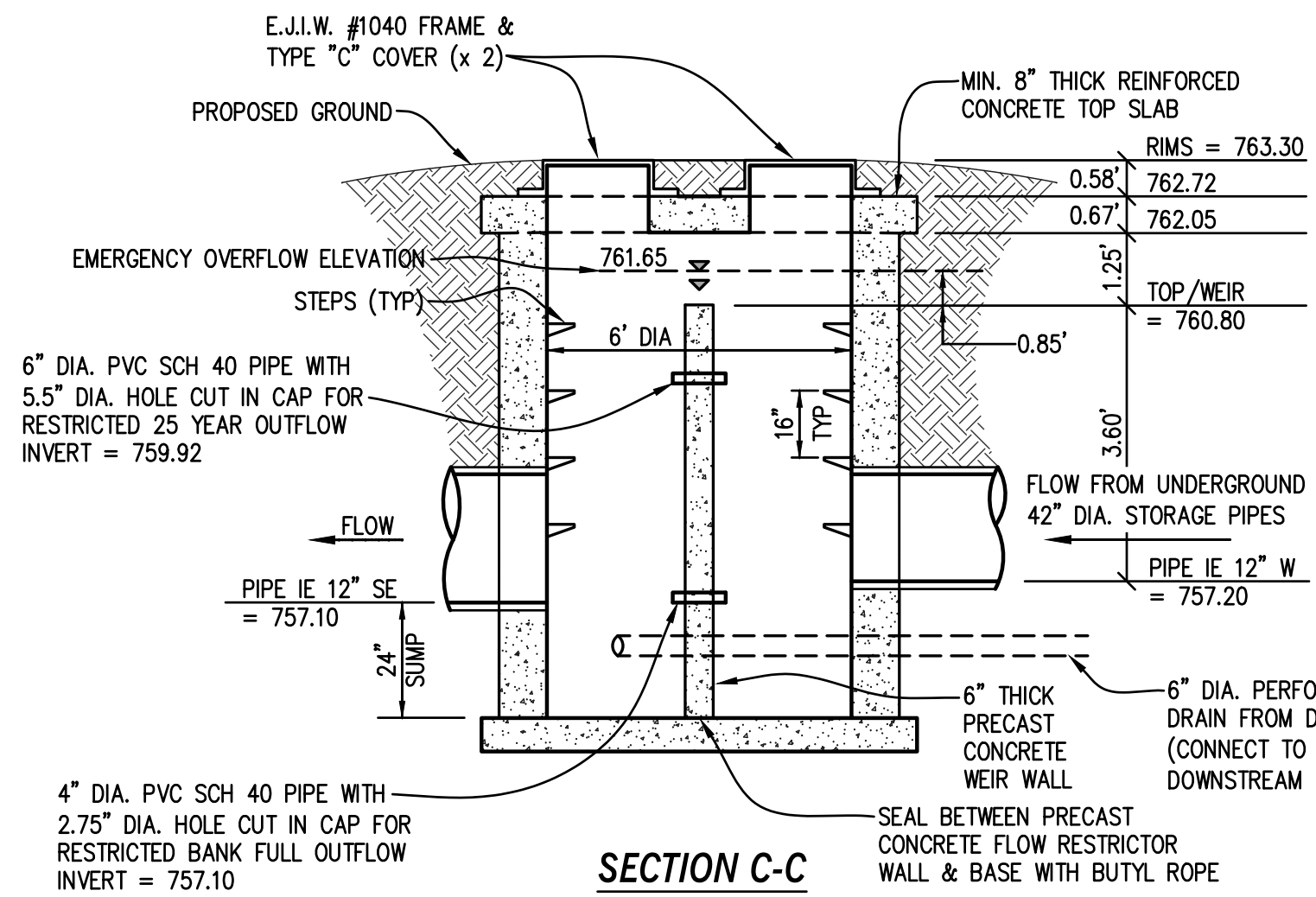
THUS,  $Q_A = (0.62)(0.0379)(\sqrt{(2)(32.2)(2.39)}) = 0.292$

**RESTRICTION CALCULATION:**

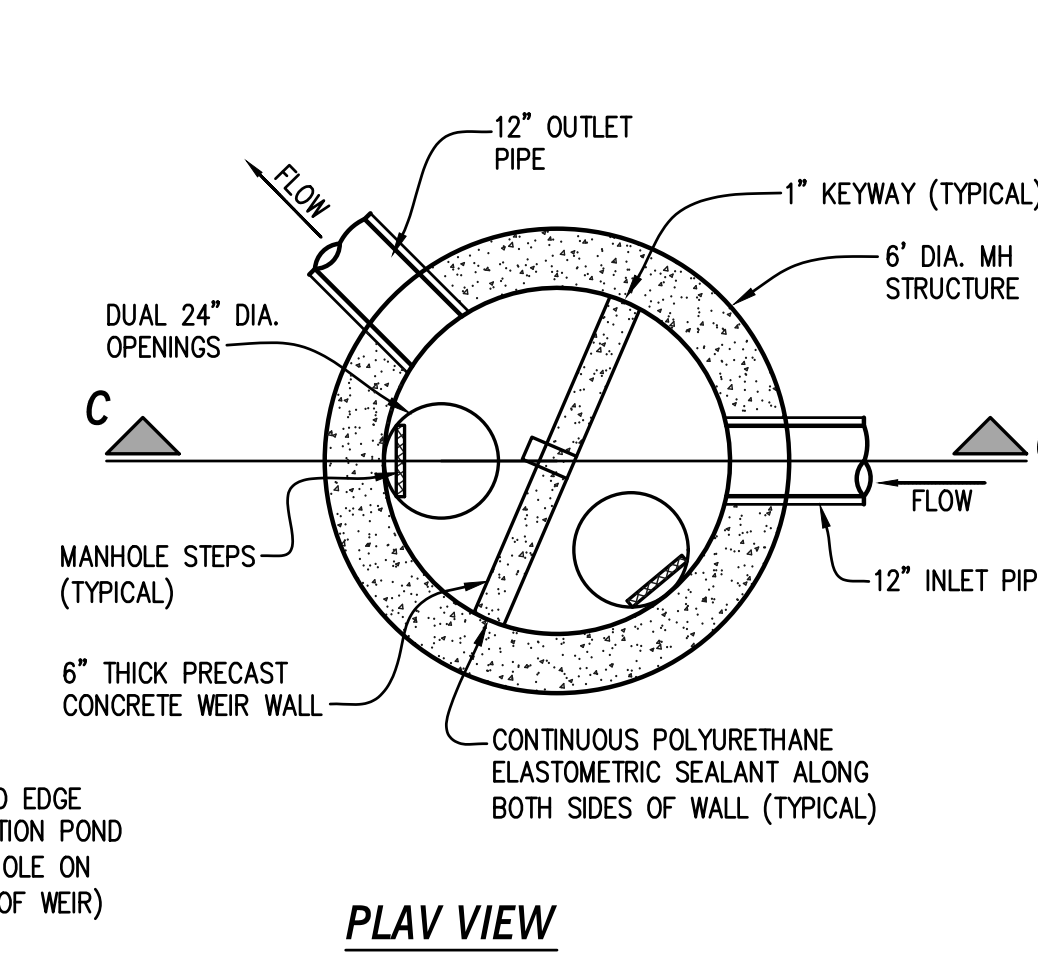
**OC Restrictor Sizing:**  
 Storage Elevation = 760.80  
 Outlet Elevation = 757.30  
 Hmax = 3.50 ft.  
**Bank Full Outlet Restriction:**  
 Bank Full Volume = 6,788 A<sup>3</sup>C = 25,258 cf  
 Required Area per LF = 6.68 sf  
 Detention Pipe Invert = 757.30  
 Water Depth in Pipe = 2.62 ft  
 Zbf = 759.92  
 Release Between 24 and 48 Hours:  
 Qavg (24 hours) = 0.292 cfs  
 Havg (0.667\*Zbf-Zout) = 1.75 ft  
 $A = (Q_{avg} / ((0.62 * (32.2 * 2 * H_{avg})^{0.5}))) = 0.0379 \text{ sf}$   
 BF Hole Dia. Provided = 2.75 in  
 BF Hole Area Provided = 0.0379 sf  
 Qact bf = 0.292 cfs  
 Actual Holding Time = (Vbf/Qact\*3600) = 24.03 hrs  
**25 Year Outlet Restriction:**  
 Qallow = 0.942 cfs  
 Qbf = 0.292 cfs  
 Qadjusted = (Qallow/Qbf) = 0.65  
 $A = (Q_{adjusted} / ((0.62 * (32.2 * 2 * H_{max})^{0.5}))) = 0.1620 \text{ sf}$   
 25 Year Hole Dia. Provided = 5.50 in  
 25 Year Hole Area Provided = 0.1620 sf  
 Qactual (total) = 0.942 cfs <= 0.942

**10 YEAR SPILLWAY DESIGN (WITHIN MH-1)**

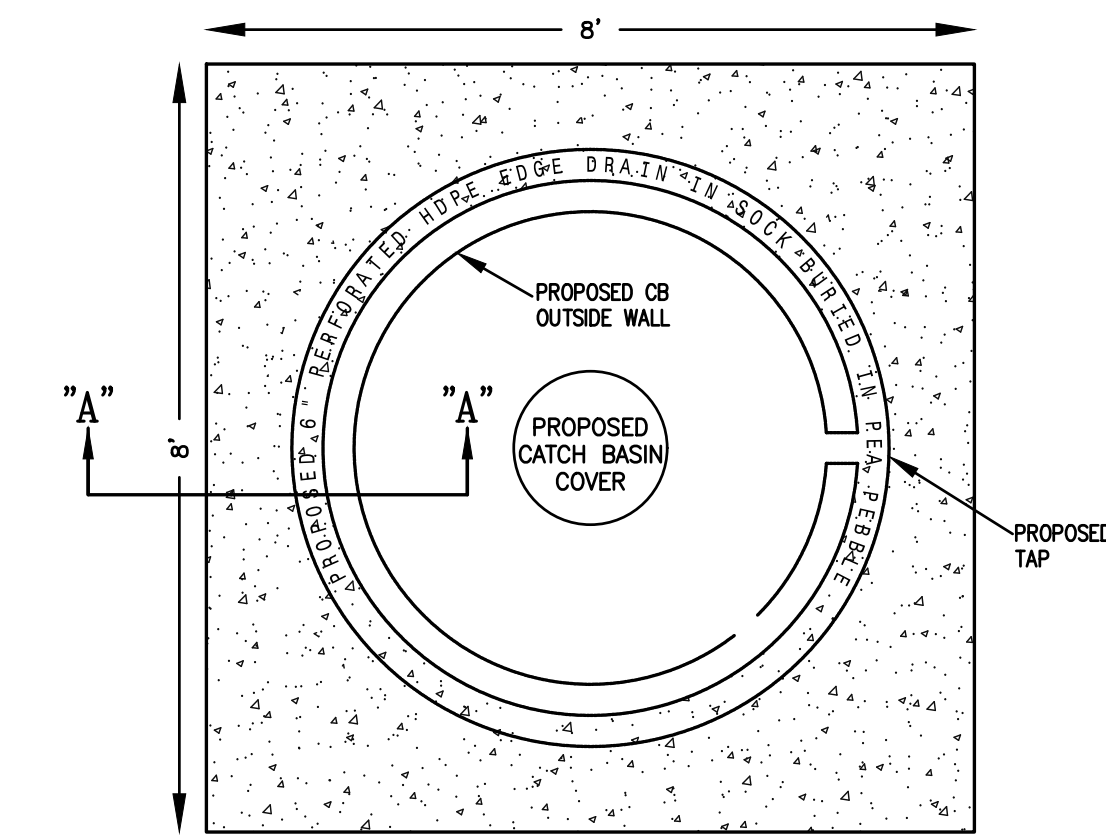
1:10 YR = 175 ; T = 17.00 ; I = 175 = 4.17  
 T+25 17.00  
 $Q \text{ REQUIRED} = ACI = (4.71 \text{ Ac.})(0.79)(4.17) = 15.52 \text{ C.F.S. REQUIRED}$   
 $Q \text{ PROVIDED} = 3.367 \text{ LH } 3/2 ; \text{ TRY } H = 0.50'$   
 $Q = (3.367)(6')(0.85)^{3/2} = 15.83 \text{ CFS PROVIDED, OK!}$



**6' DIA. OUTLET CONTROL STRUCTURE MH-1 DETAIL**

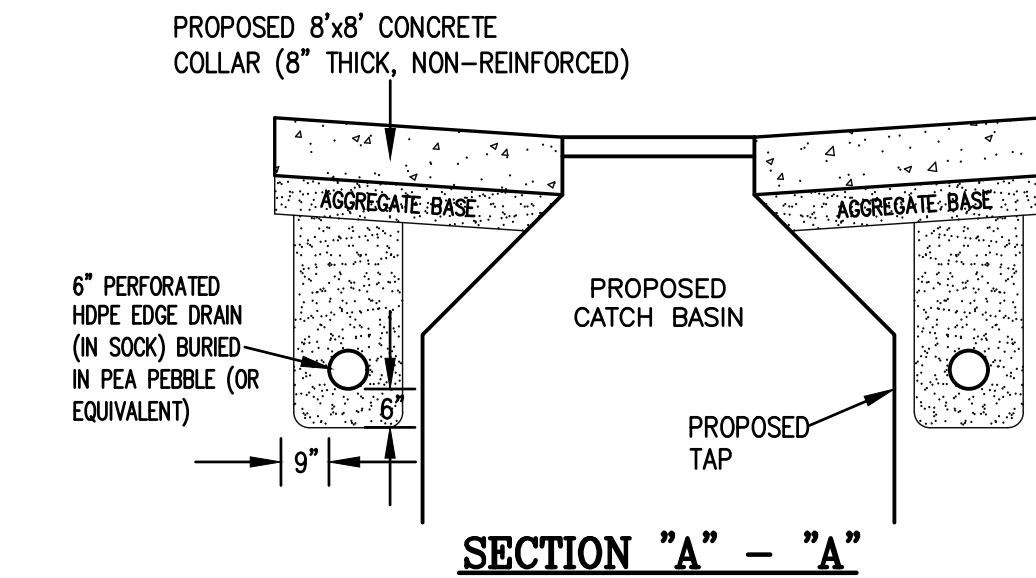


**PLAN VIEW**

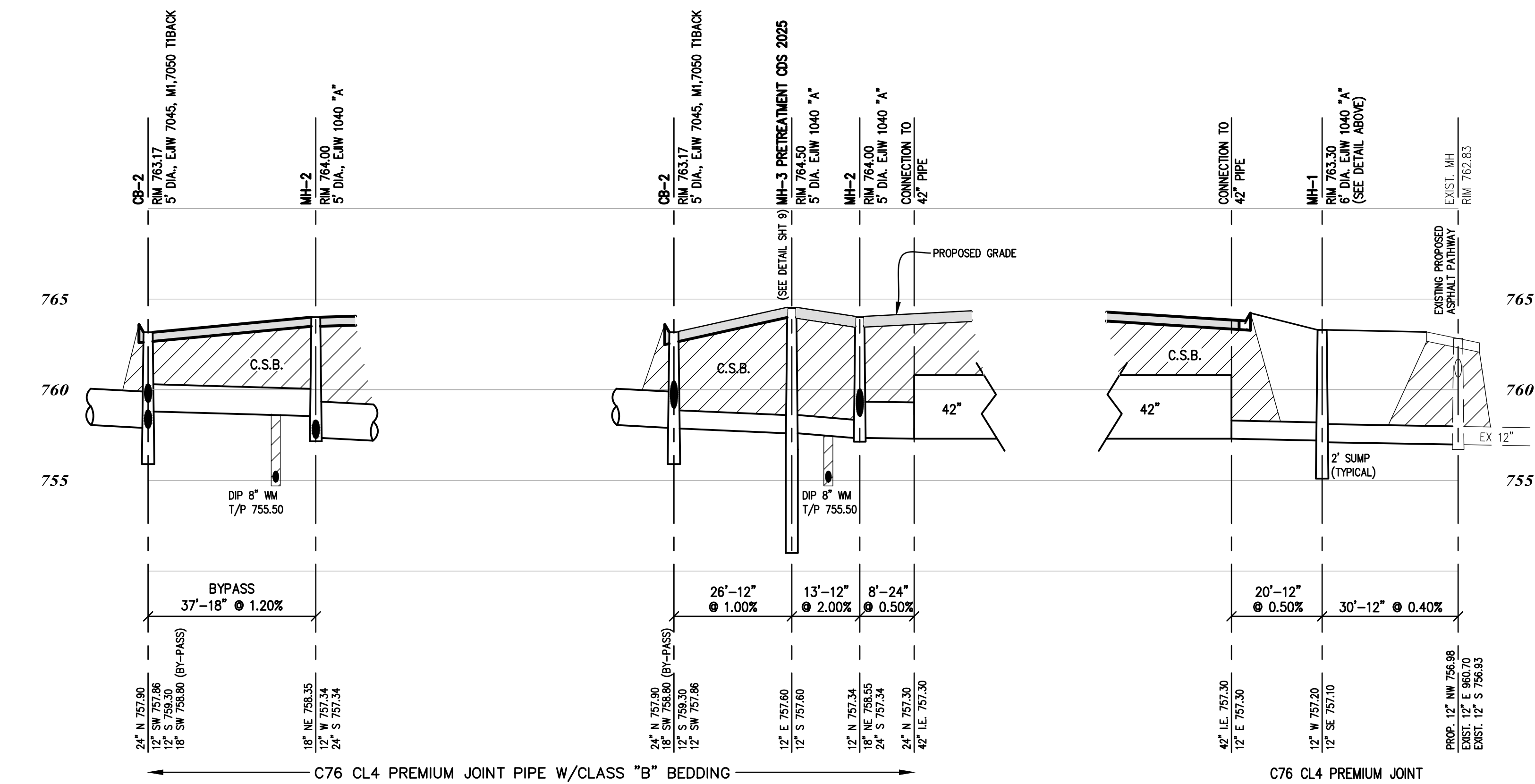


**8" CONCRETE COLLAR & 6" EDGE DRAIN PLAN DETAIL & SECTION**

SCALE: 1" = 2'



**SECTION "A" - "A"**



SCALE: 1" = 20' HORIZ.  
 1" = 5' VERT.

C:\2021\053\dwg\Bebb Oak Site Plan.dwg, Stamp: 12/1/2021 9:31:03 AM

DATE	REVISION	ISSUE
3-19-2021	REVISED PER ARCHITECT	
5-12-2021	REVISED PER CITY (4-15-2021)	
6-30-2021	NO CHANGES	
11-15-2021	ADDED PATH DETAIL & SIGHT LINES PER CITY/PRC (10-22-2021)	
11-30-2021	REVISE S. ENTRANCE/LOADING ZONE/ADJUSTER PER CLIENT (11-22-2021)	

**Developer/Contractor**  
 OYK ENGINEERING & CONSTRUCTION  
 30700 TELEGRAPH ROAD, SUITE 2665  
 BINGHAM FARMS, MICHIGAN 48025  
 (248) 656-7695 FRED HADDI

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**KIEFT ENGINEERING, INC.**  
 PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS  
 5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346  
 PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	3-17-2021	CKD.	BY	DATE
DRAWN OF				
DESIGN PC/M				
SECTION 27				T- 3 -N, R- 11 -E

Not to be Used as Construction Drawings

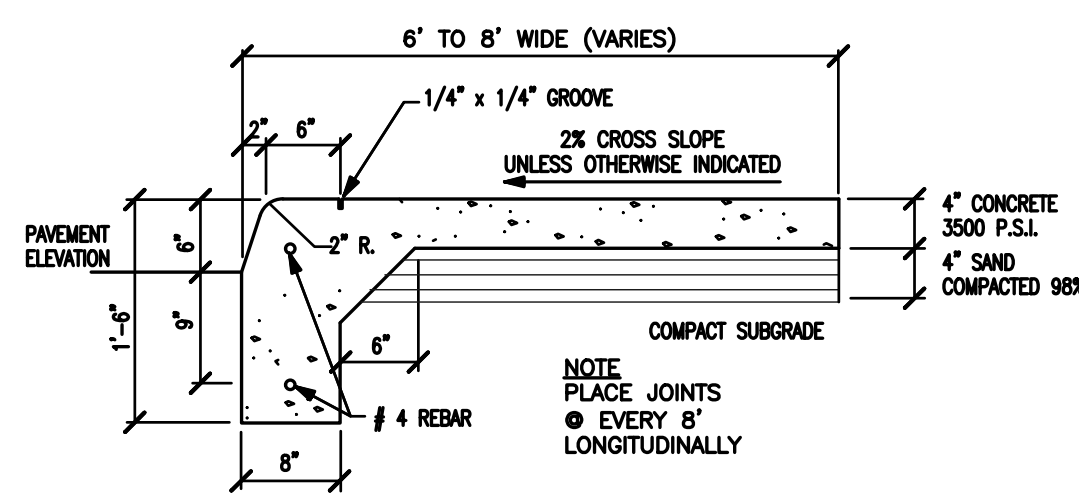
**Storm Sewer, Detention Calculations & Details**  
**"BEBB OAK MEADOWS" MIXED USE DEVELOPMENT**  
 PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN



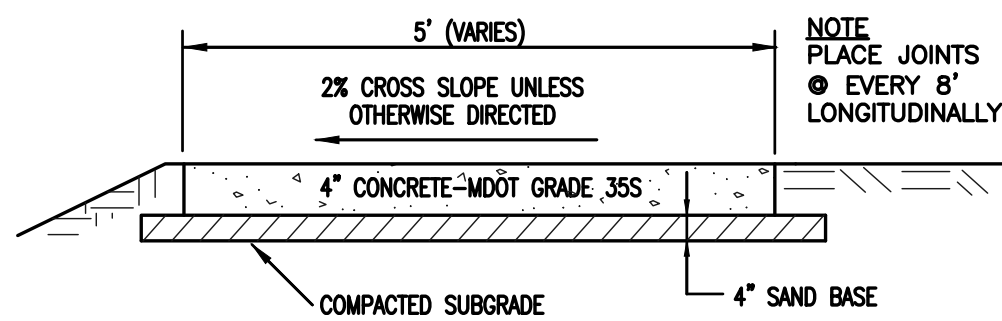
City File #21-008, Section 27

SCALE	N/A
SHEET	9 OF 11
<b>KE 2021.053</b>	

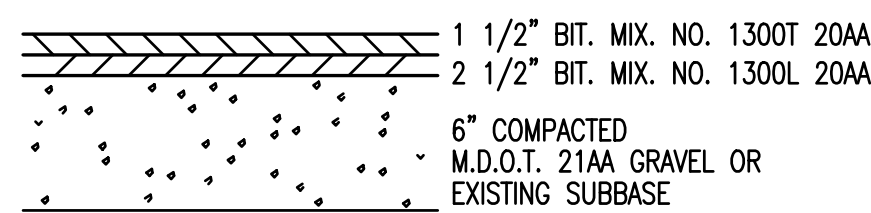




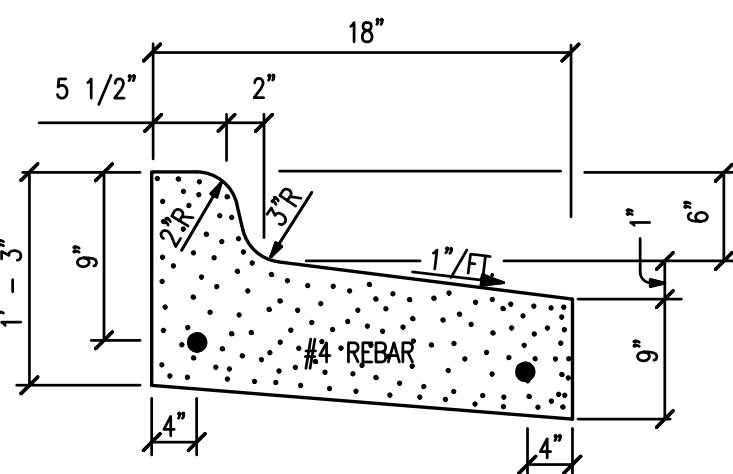
**INTEGRAL CURB & WALK**  
NO SCALE



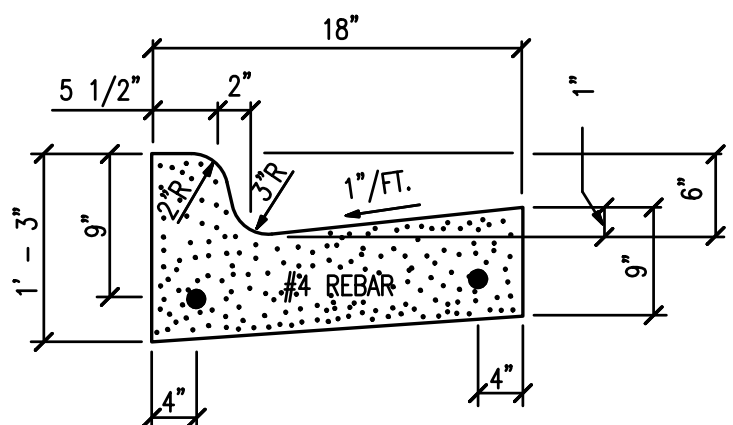
**CONCRETE SIDEWALK (ON-SITE)**  
NO SCALE



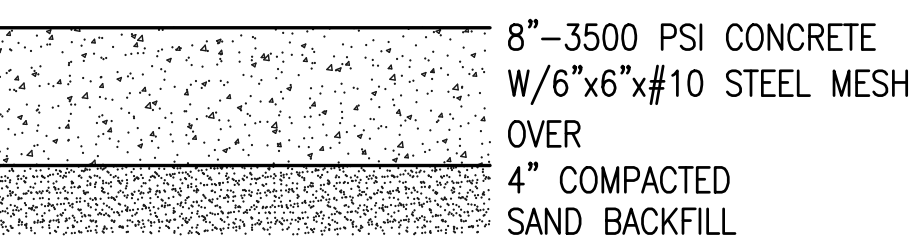
**PAVEMENT SECTION-ONSITE**  
NO SCALE



**STRAIGHT FACED CURB AND GUTTER (REVERSE)**  
NO SCALE



**STRAIGHT FACED CURB AND GUTTER**  
NO SCALE



**8\"/>**

**ON-SITE SANITARY SEWER DESIGN**

APARTMENT BUILDING: 93 UNITS  
UNIT FACTOR = (0.60/UNIT) x (93 UNITS) = 55.8

GENERAL RETAIL BUILDING: 9,660 SF  
UNIT FACTOR = (0.04/1000 SF) x (9,660 SF) = 0.39

DRIVE-THRU RESTAURANT: 3,782 SF  
UNIT FACTOR = 1.00

TOTAL UNIT FACTOR = 55.8+0.39+1.00 = 57.19 = 58

THUS, (58 UNIT FACTOR)(2.44 PERSONS/UNIT FACTOR) = 142 PERSONS

**SANITARY DESIGN**

"AVERAGE FLOW"

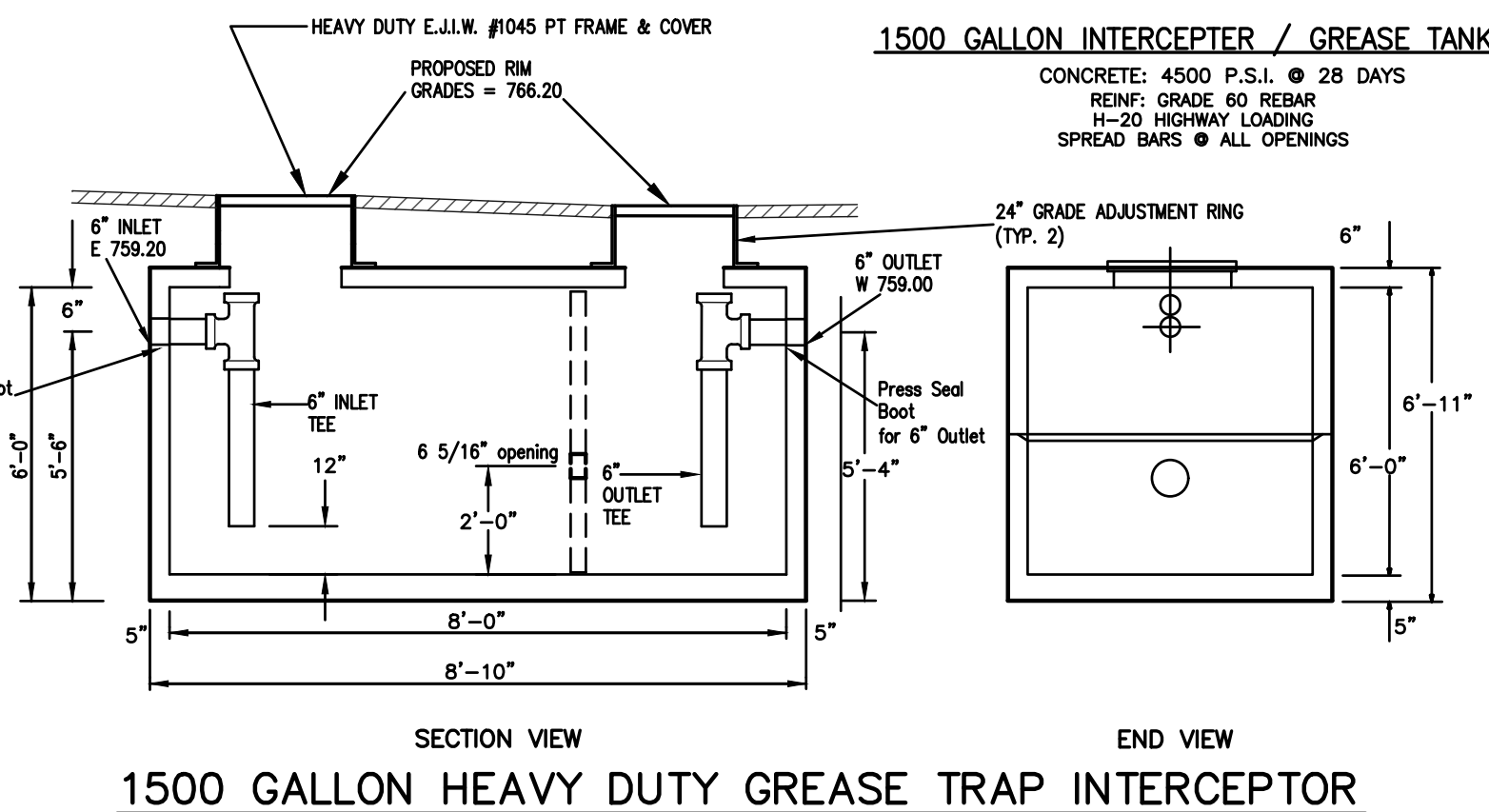
142 PERSONS x 100 GPCD = 14,200 GPD = 0.0142 MGD  
x 1.55 (conversion)  
Q = 0.0220 CFS

"PEAK FLOW"

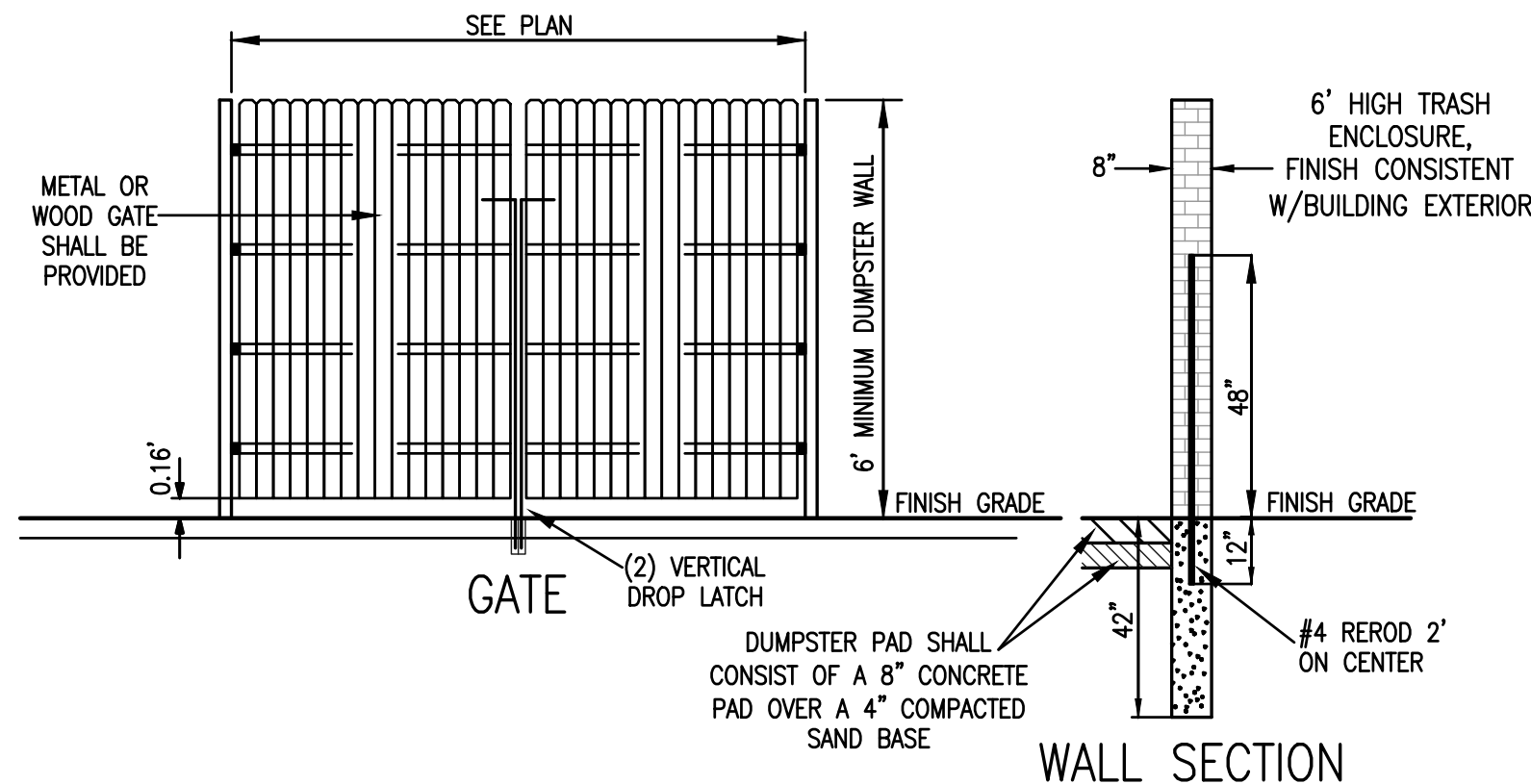
142 PERSONS/1000 = 0.142  
Q = 100 x (18 + √P)/(4 + √P) = 419.87 GPCD

142 PERSONS x 419.87 GPCD = 59,621.54 GPD = 0.059621 MGD  
x 1.55 (conversion)  
Q = REQUIRED = 0.0924 CFS

NOTE: AN 8" TRUSS PIPE @ 0.40% (MINIMUM) CAN CARRY 0.765 CFS @ 2.19 FPS  
A 10" TRUSS PIPE @ 0.30% (MINIMUM) CAN CARRY 1.19 CFS @ 2.19 FPS



**1500 GALLON HEAVY DUTY GREASE TRAP INTERCEPTOR**



**Dumpster Detail**  
NOT TO SCALE

Project: Mixed Use Development  
Location: Rochester Hills, MI  
Prepared For: Kieft Engineering, Inc.



Purpose: To calculate the first flush runoff flow rate (WQV) over a given site area. In this situation the WQV to be analyzed is the runoff produced by the first 0.5" of rainfall.

Reference: United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Structure Name	A (acres)	A (miles <sup>2</sup> )	Runoff Coefficient	Percent Imp. (%)	L (min)	L (hr)
WQU	4.71	0.00736	0.79	81.67	15.0	0.250

\* Assumes runoff coefficient of 0.3 for pervious areas and 0.9 for impervious areas.

Procedure: The Water Quality Flow (WQF) is calculated using the Water Quality Volume (WQV). This WQV converted to watershed inches, is substituted for the runoff depth (Q) in the Natural Resources Conservation Service (formerly Soil Conservation Service), TR-55 G:

1. Compute WQV in watershed inches using the following equation:

WQV = P \* R

where: WQV = water quality volume (watershed inches)  
P = design precipitation (inches)  
R = volumetric runoff coefficient = (0.05 + 0.009\*I)  
I = percent impervious cover

Structure Name	Percent Imp. (%)	R (in)	P (in)	WQV (in)	WQV (CF)
WQU	81.67	0.785	0.5	0.395	6,710.68

2. Compute the NRCS Runoff Curve Number (CN) using the following equation, or graphically using Figure 2-1 from TR-55 (USDA, 1986)

CN = 1000 / (10+5P+10Q-10Q<sup>2</sup>+1.25Q<sup>3</sup>)<sup>0.5</sup>

where: CN = Runoff Curve Number  
P = design precipitation (inches)  
Q = runoff depth (watershed inches)

Structure Name	Q (in)	CN
WQU	0.395	98.96

3. Using computed CN, read initial abstraction (I<sub>a</sub>) from Table 4-1 in Chapter 4 of TR-55; compute I<sub>a</sub>P, interpolating when appropriate.

Structure Name	I <sub>a</sub> (in)	I <sub>a</sub> P
WQU	0.041	0.062

4. Compute the time of concentration (L<sub>c</sub>) in hours and the drainage area in square miles. A minimum L<sub>c</sub> of 0.167 hours (10 minutes) should be used.

Structure Name	L <sub>c</sub> (hr)	A (miles <sup>2</sup> )
WQU	0.250	0.00736

5. Read the unit peak discharge (q<sub>u</sub>) from Exhibit 4-II in Chapter 4 of TR-55 for appropriate L<sub>c</sub> for type II rainfall distribution.

Structure Name	L <sub>c</sub> (hr)	I <sub>a</sub> P	q <sub>u</sub> (csm/min)
WQU	0.250	0.062	731

6. Substituting WQV (watershed inches) for runoff depth (Q), compute the water quality flow (WQF) from the following equation:

WQF = (q<sub>u</sub>I<sub>a</sub>)/Q

where: WQF = water quality flow (cfs)  
q<sub>u</sub> = unit peak discharge (csm<sup>2</sup>/inch)  
A = drainage area (mi<sup>2</sup>)  
Q = runoff depth (watershed inches)

Structure Name	q <sub>u</sub> (csm/min)	A (miles <sup>2</sup> )	Q (in)	WQF (cfs)
WQU	731	0.00736	0.395	2.11

Estimated Net Annual Solids Load Reduction Based on the Rational Rainfall Method

Mixed Use Development  
Rochester Hills, MI  
Water Quality Unit

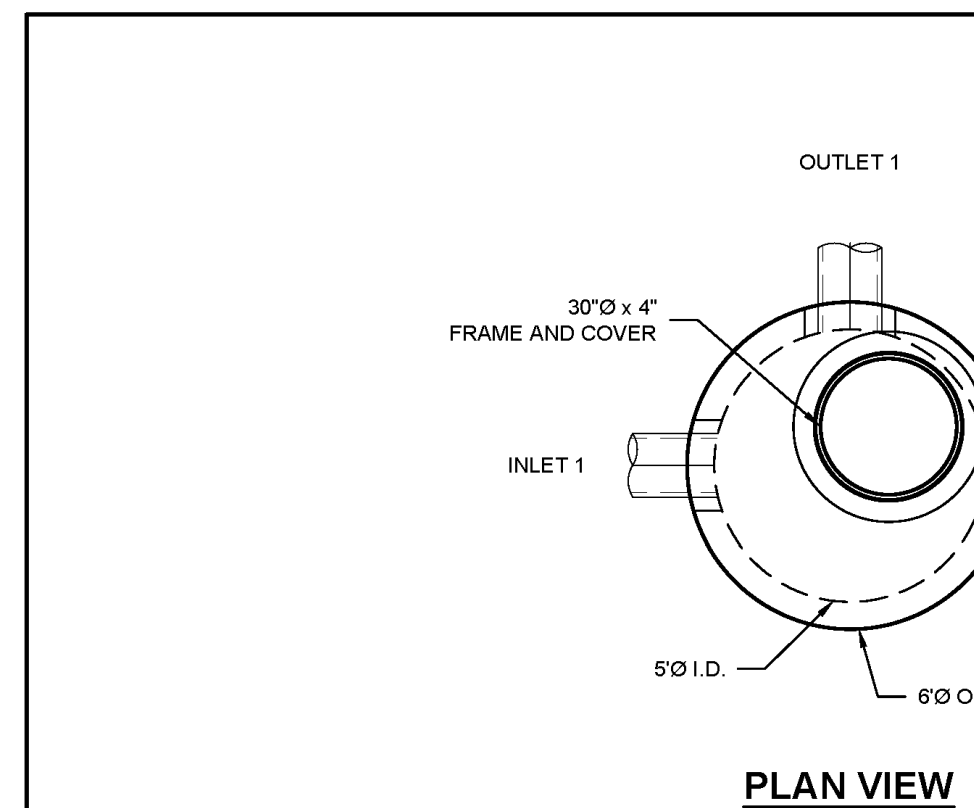
AREA (acres): 4.71  
WEIGHTED C: 0.79  
Tc (minutes): 15

CDS MODEL: 2025  
PARTICLE SIZE (µm): 110

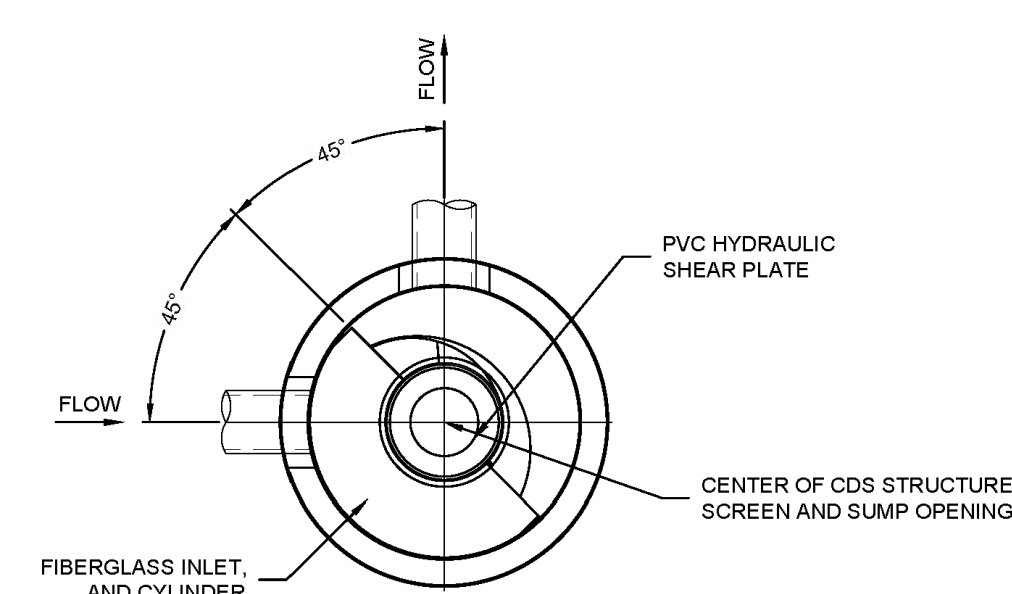
Rainfall Intensity (in/hr)	Percent Rainfall Volume <sup>1</sup>	Cumulative Rainfall Volume	Total Flowrate (cfs)	Removal Efficiency (%)	Incremental Removal (%)
0.02	13.13%	13.13%	0.07	100.00	13.13
0.04	11.36%	24.5%	0.15	99.17	11.27
0.06	10.08%	34.6%	0.22	98.07	9.88
0.08	7.48%	42.1%	0.30	96.96	7.28
0.10	7.01%	49.1%	0.37	95.86	6.72
0.12	5.37%	54.5%	0.45	94.75	5.09
0.14	4.73%	59.2%	0.52	93.65	4.43
0.16	4.13%	63.3%	0.60	92.54	3.82
0.18	3.53%	66.8%	0.67	91.44	3.23
0.20	2.99%	69.8%	0.74	90.33	2.70
0.25	5.50%	75.3%	0.93	87.57	4.62
0.30	4.47%	79.8%	1.12	84.81	3.79
0.35	3.85%	83.6%	1.30	82.04	3.16
0.40	2.16%	85.8%	1.49	79.3	1.7
0.45	2.09%	87.9%	1.67	74.2	1.6
0.50	1.31%	89.2%	1.86	66.8	0.9
0.75	5.07%	94.3%	2.79	44.5	2.3
1.00	2.88%	96.2%	3.72	33.4	0.9
1.50	2.50%	99.4%	5.58	22.3	0.6
2.00	0.51%	99.9%	7.44	16.7	0.1
2.54	0.15%	100.0%	9.45	13.1	0.0
					87.21

Predicted % Annual Rainfall Treated = 93.8%  
Predicted Net Annual Load Removal Efficiency = 87.2%

1 - Based on Rainfall Data from DETROIT METRO AP Station  
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.



**PLAN VIEW**



**SECTION A-A**

**MATERIAL LIST (PROVIDED BY CONTECH)**

COUNT	DESCRIPTION	INSTALLED BY
1	FIBERGLASS INLET AND CYLINDER	CONTECH
1	2400 micron, 2" O.D. x 2.58" SEP. SCREEN	CONTECH
1	3/16 INCH PVC HYDRAULIC SHEAR PLATE *	CONTECH
1	SEALANT FOR JOINTS	CONTRACTOR
1	30" O.D. x 4" FRAME & COVER, E.J.#1600484, OR EQUIV.	CONTRACTOR

\* SEE HYDRAULIC SHEAR PLATE DETAIL

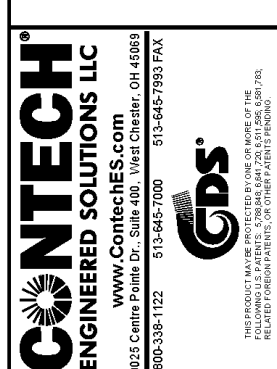
**GENERAL NOTES**

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
  - FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
  - CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
  - STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0'-2" AND GROUNDWATER ELEVATION AT OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M308 AND BE CAST WITH THE CONTECH LOGO.
  - IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
  - CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
- INSTALLATION NOTES**
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
  - CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MAINHOLE STRUCTURE.
  - CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
  - CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
  - CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.
- STRUCTURE WEIGHT**  
APPROXIMATE HEAVIEST PICK = 9500 LBS.  
STRUCTURE IS DELIVERED IN 3 PIECES
- MAX FOOTPRINT = 06'



MARK	DATE	REVISION DESCRIPTION	BY

CDS2025-5-C - 673885-20  
OYK MIXED USE  
ROCHESTER, MI  
for SYSTEM: MH-4



DATE	SCALE
03/26/21	1/4" = 1'-0"
05-19-2021	
06-30-2021	
11-15-2021	

PROJECT NO.	SEQUENCE NO.
673885	20

1 OF 1



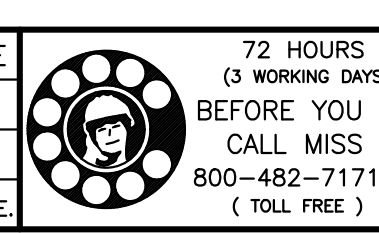
DATE	REVISION	ISSUE
3-19-2021	REVISED PER ARCHITECT	
5-19-2021	REVISED PER CITY (4-15-2021)	
6-30-2021	NO CHANGES	
11-15-2021	ADDED PATH DETAIL & SIGHT LINES PER CITY/HRC (10-22-2021)	

**Developer/Contractor**  
OYK ENGINEERING & CONSTRUCTION  
30700 TELEGRAPH ROAD, SUITE 2665  
BINGHAM FARMS, MICHIGAN 48025  
(248) 656-7695 FRED HADID



**KIEFT ENGINEERING, INC.**  
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5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346  
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	CKD.	BY	DATE
3-17-2021			



72 HOURS (WORKING DAYS) BEFORE DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

**Sanitary Calculations & Details**  
"BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

SCALE	N/A
SHEET	10 OF 11

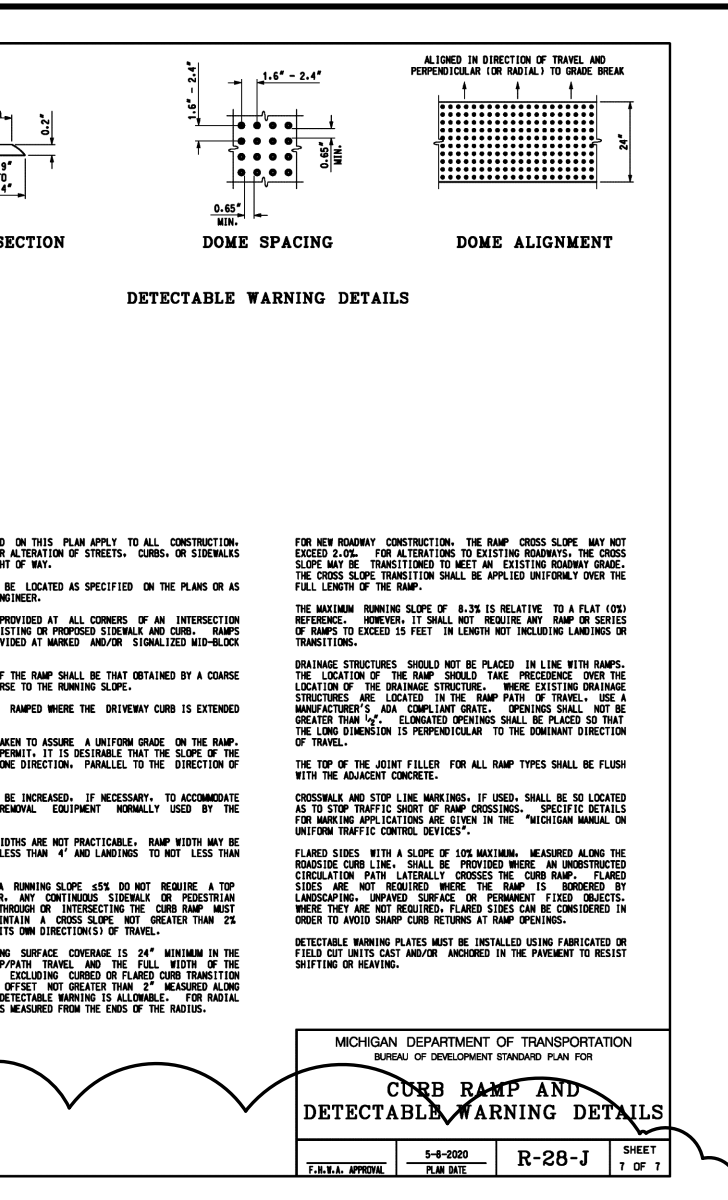
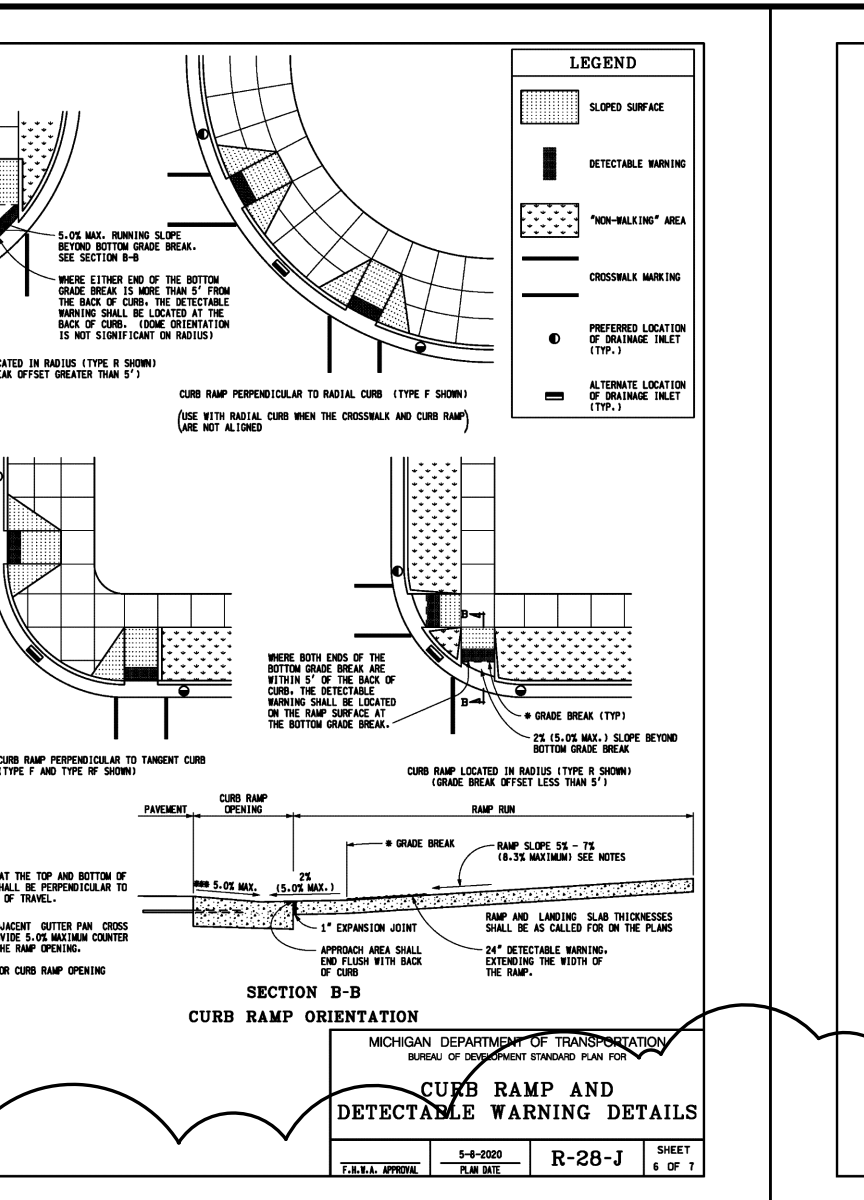
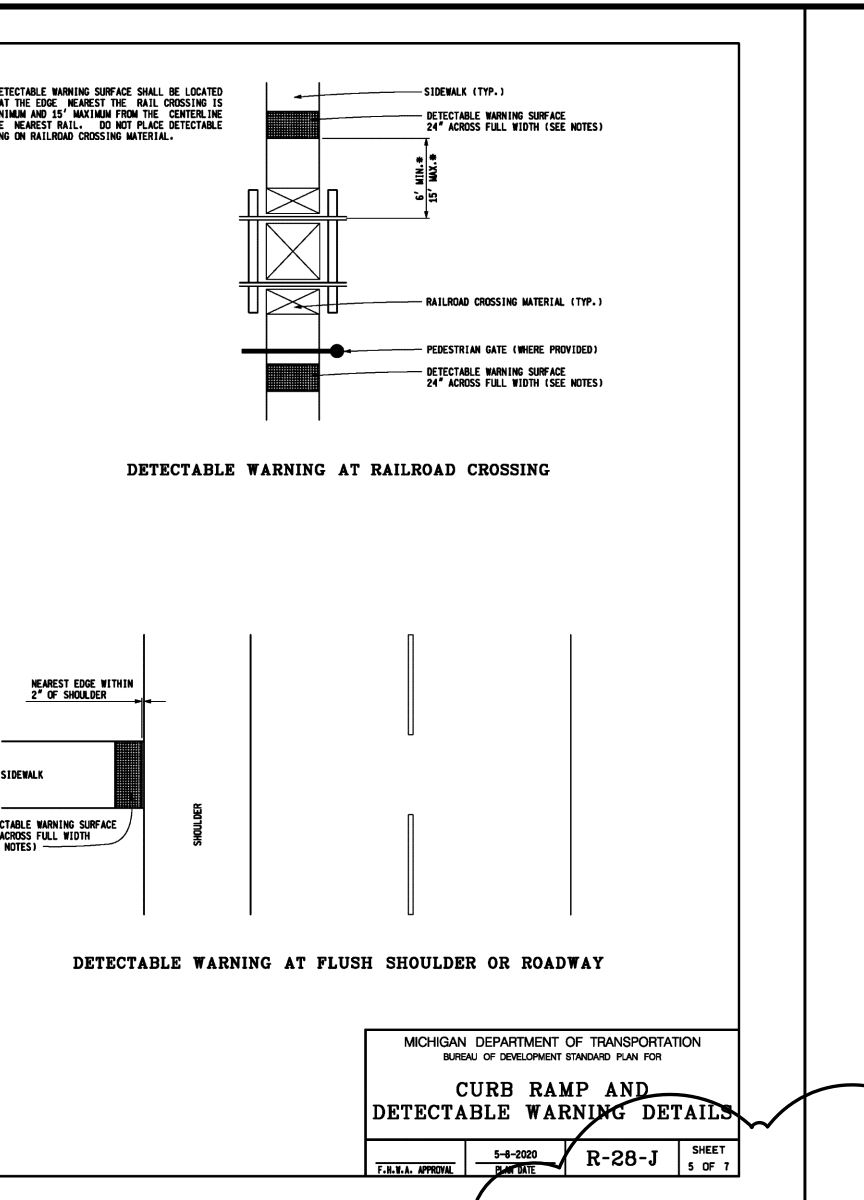
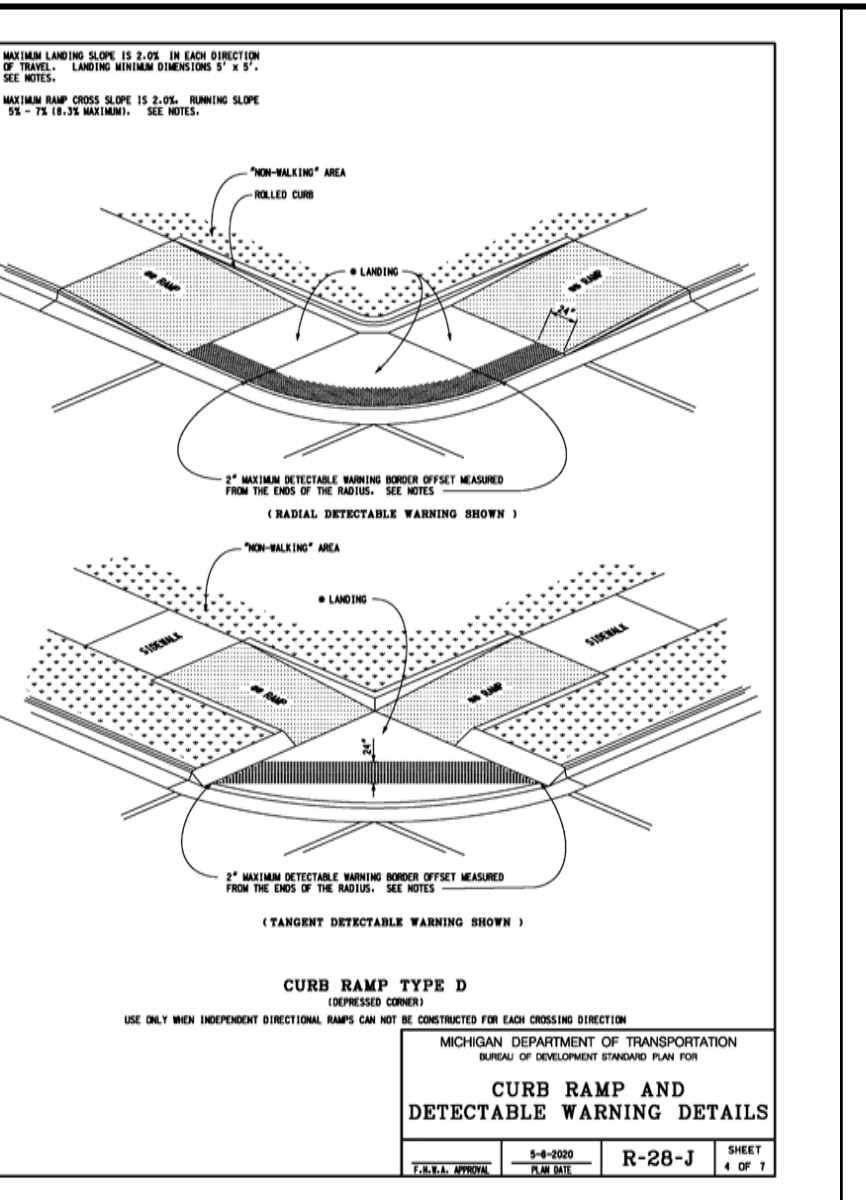
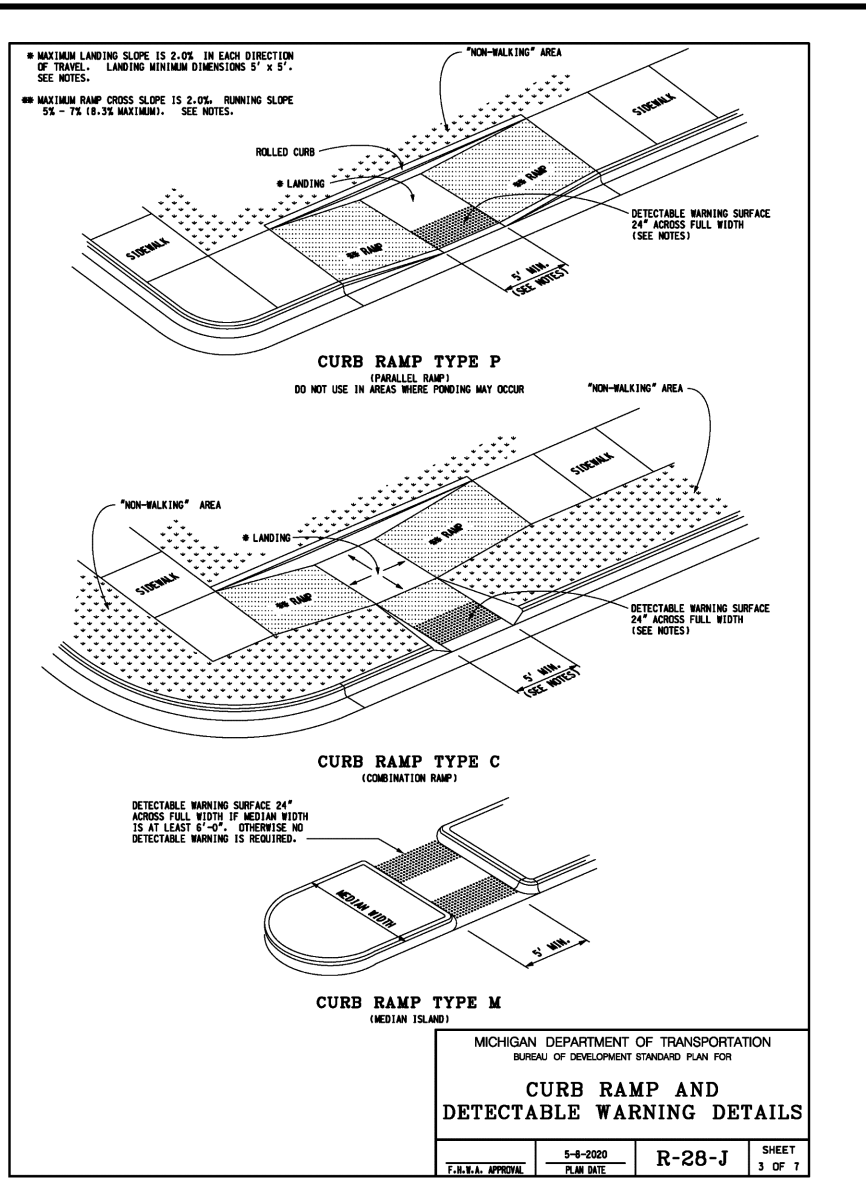
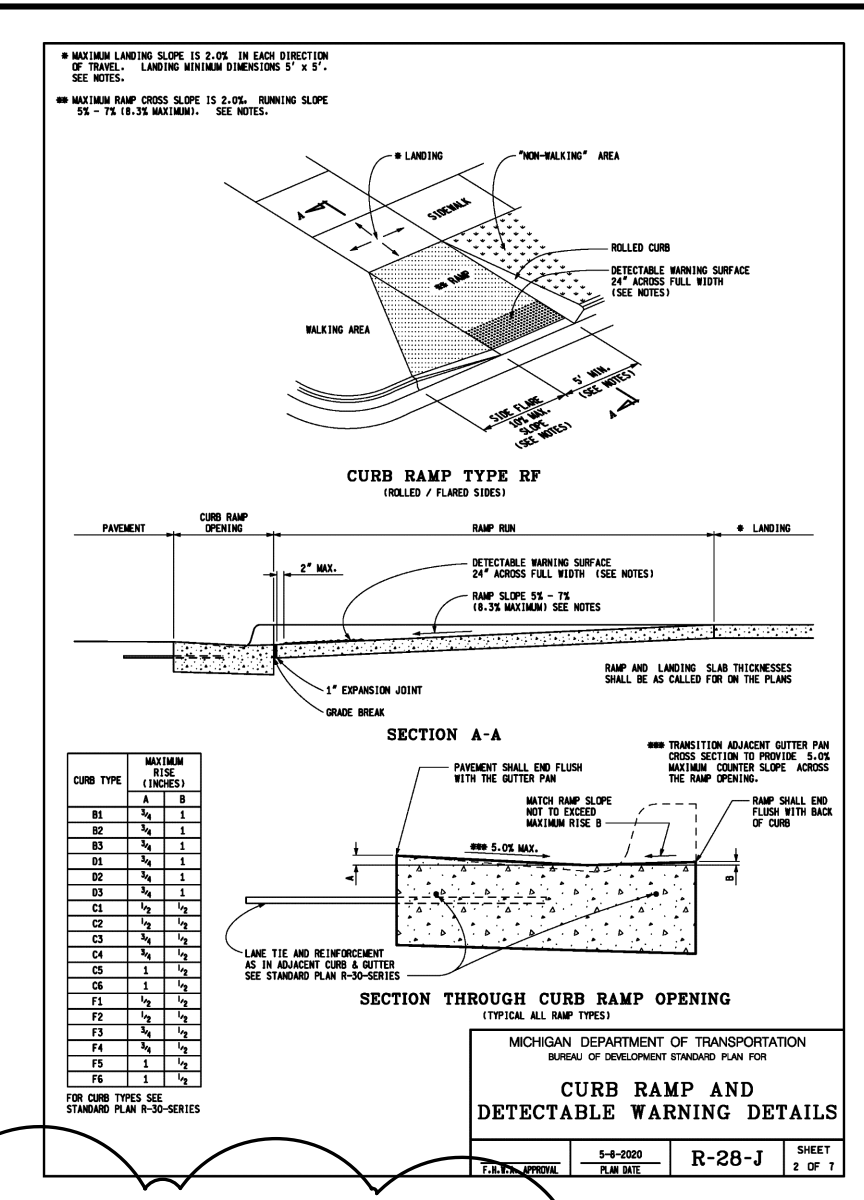
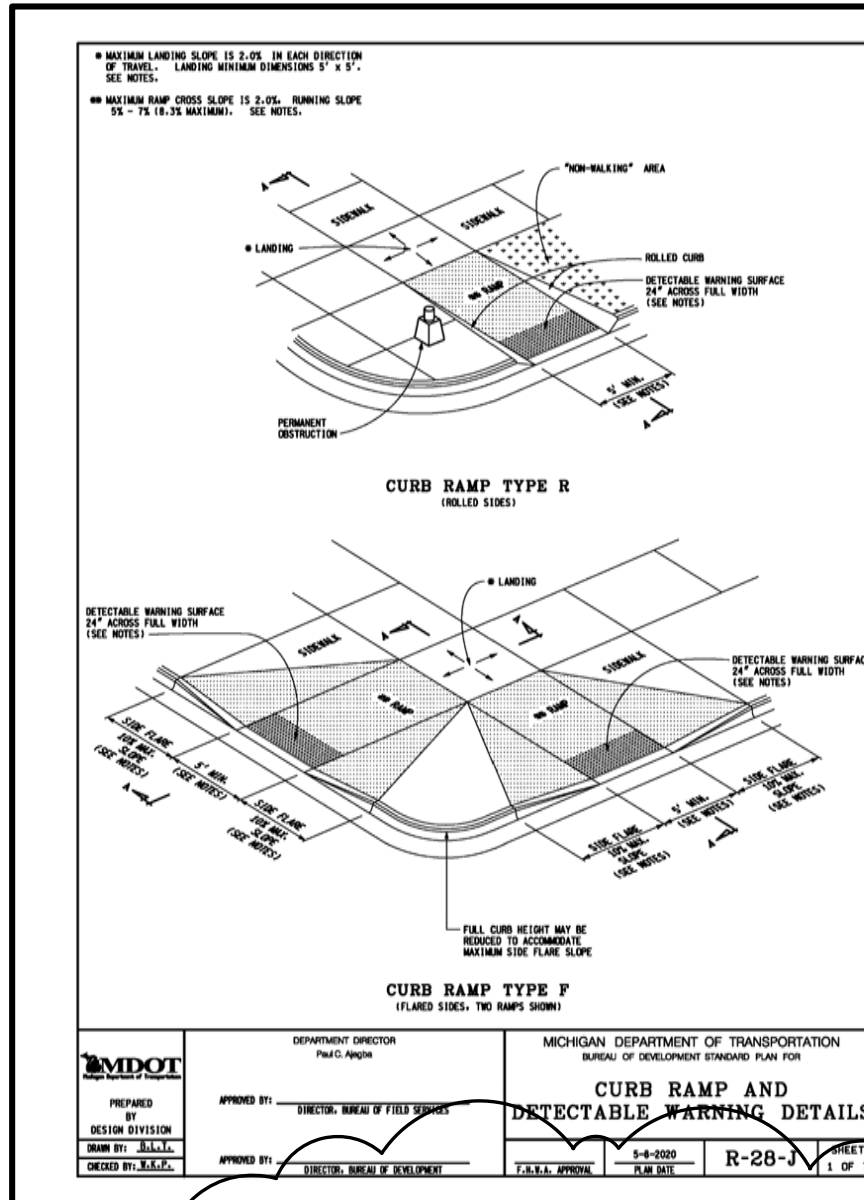
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Not to be Used as Construction Drawings

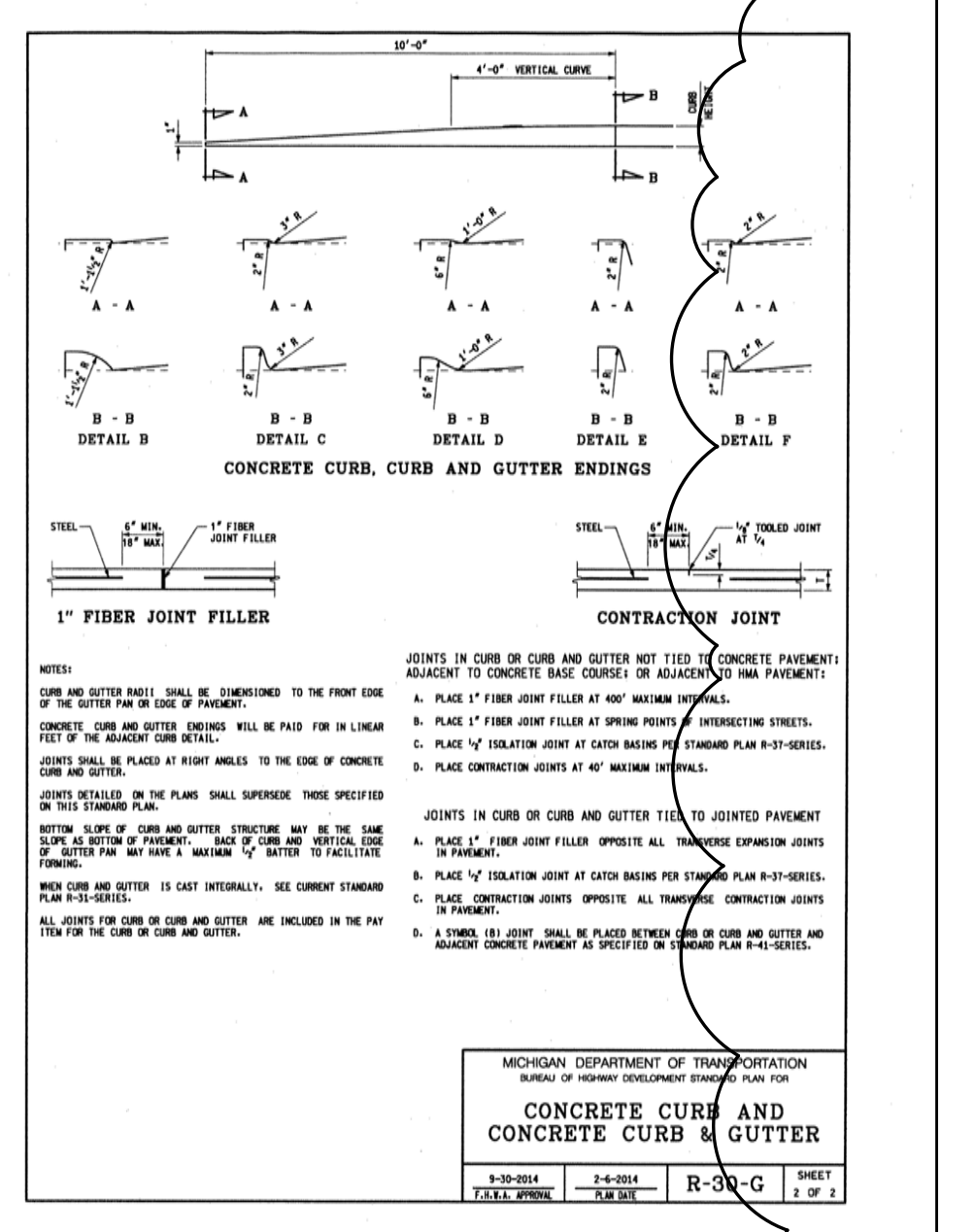
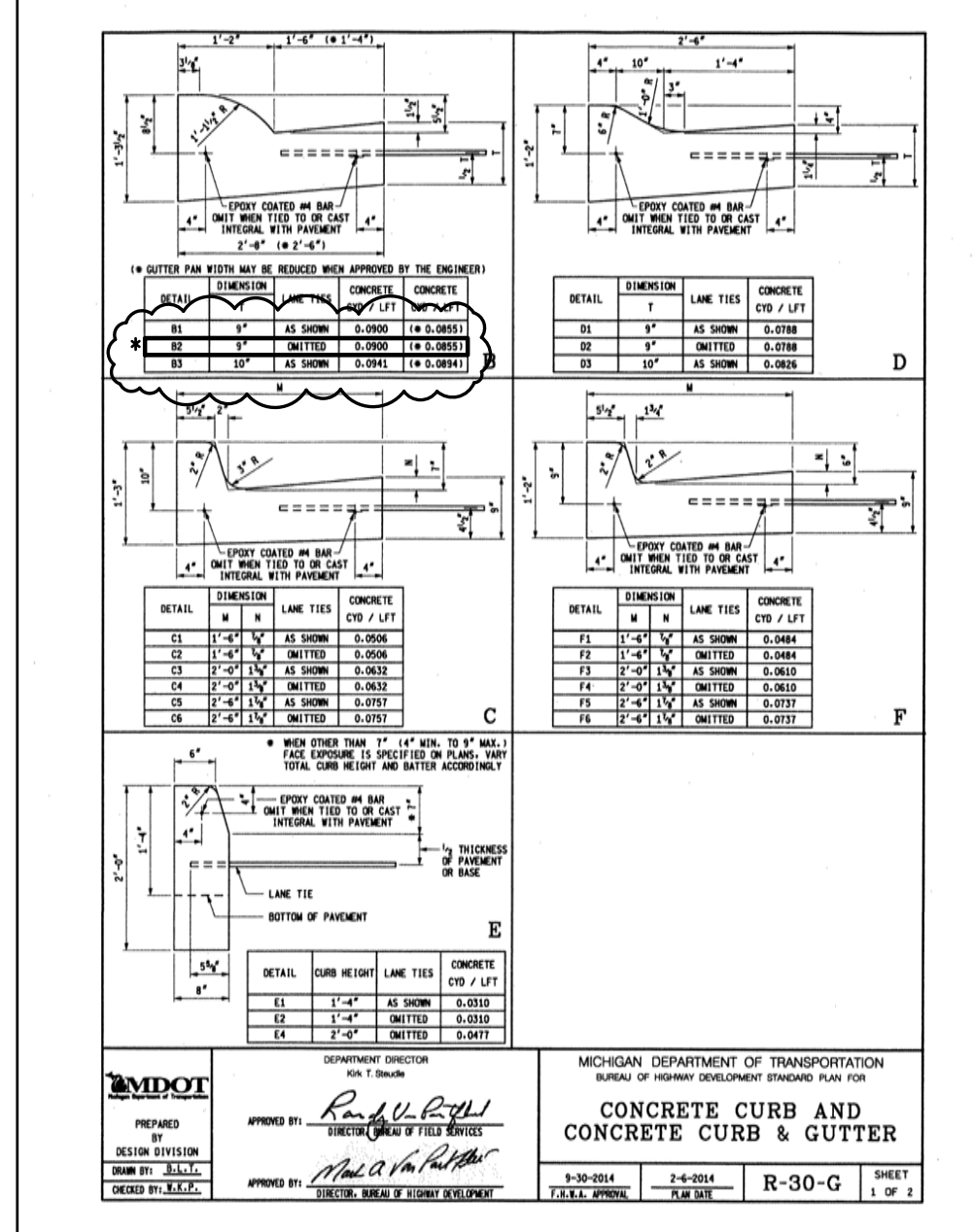
City File #21-008, Section 27





### MDOT NOTES

- ANY REGULATORY SIGNS SHALL BE MAINTAINED.
- THE CONTRACTOR SHALL HAVE AN APPROVED PLAN AND PERMIT ON SITE AT ALL TIMES.
- THE CONTRACTOR SHALL ELECTRONICALLY SUBMIT AN ADVANCE NOTICE TO MDOT A MINIMUM OF 5 DAYS PRIOR TO THE START OF CONSTRUCTION.
- ALL UTILITIES INCLUDING DRAINAGE FACILITIES SHALL BE LOCATED PRIOR TO EXCAVATION IN THE MDOT RIGHT-OF-WAY.
- THE SIDEWALK SHALL BE MADE TO GO THRU THE DRIVE APPROACH AND NOT RAMPED DOWN.
- LABEL THE MDOT ROW LINE ON ALL PLAN SHEETS.
- NO ADVERTISING ALLOWED IN MDOT ROW.
- ALL UTILITY WORK (GAS, ELECTRIC, PHONE, ETC.) WORK PROPOSED IN MDOT ROW WILL REQUIRE SEPARATE PERMITS FROM THE UTILITY COMPANY. PLEASE ADVISE ANY UTILITY COMPANIES YOU ARE WORKING WITH THAT THEY ARE REQUIRED TO PULL THEIR OWN PERMIT.
- PROVIDE CONTRACTOR INFORMATION (NAME, ADDRESS, PHONE #, EMAIL).
- SAWCUT SHALL BE ALONG THE EXISTING CURB LINE. NO BUTT JOINT TO BE SHOWN ON PLANS. ANY REQUIRED BUTT JOINT WILL BE AS DIRECTED BY THE MDOT PERMIT INSPECTOR DURING CONSTRUCTION.
- SIDEWALK SHALL BE PER R-29-I AND GO THRU THE DRIVE APPROACH.
  - NO RAMPING OR RAISED DOMES AT APPROACH - MUST BE ADA COMPLIANT.
  - LABEL GRADES AT FRONT AND BACK OF SIDEWALK TO INDICATE ADA.
- MH-101 SHALL HAVE A CONCRETE COLLAR AROUND IT PER ATTACHED SP FOR STRUCTURE ADJUSTS.
- REMOVE THE NOTE ON PLANS STATING "NOT TO BE USED FOR CONSTRUCTION".
- SINGLE LANE CLOSURE ALLOWED M-F FROM 9 AM TO 3 PM IN ACCORDANCE WITH MDOT TRAFFIC TYPICALS M0020 & M0240.
- PROPOSED SIDEWALK PATH. MDOT RECOMMENDS A MINIMUM 4" HARD SURFACE MATERIAL BUT WILL DEFER TO THE CITY AS THEY MAINTAIN SIDEWALK.
- DRIVE APPROACHES
  - PER R-29 & R-28.
  - CROSS SECTION MUST BE EITHER 6" HMA (IN 3 LIFTS) ON 10" 21A/AA OR 8" P1 PLAIN CONCRETE ON 6" 21A/AA - LABEL ON PLANS.
- ALL CURB AND GUTTER PER R-30.
- EXISTING RIGHT TURN LANE ON NORTHERN END
  - ENTIRE TURN LANE SHALL BE REPLACED "IN-KIND" NOT JUST TO PROPERTY LINE.
  - CROSS SECTION SHALL MATCH EXISTING.
  - PAVEMENT TESTING AND DENSITY ARE REQUIRED.
- INSURANCE - THE PERMIT APPLICANT OR THE APPLICANT'S CONTRACTOR MUST SUBMIT AN ELECTRONIC CERTIFICATE OF INSURANCE IN THE MDOT E-BOND SYSTEM BEFORE THE PERMIT CAN BE ISSUED. PLEASE ELECTRONICALLY SUBMIT MDOT CERTIFICATE OF INSURANCE FOR PERMITTED ACTIVITIES FORM 2020, WHICH REFLECTS THE INSURANCE REQUIREMENTS AND CONDITIONS. THE APPLICANT CONTRACTOR'S INSURANCE AGENT SHALL CONTACT LAURI OLSEN (MDOT LANSING PERMIT OFFICE) VIA E-MAIL AT MDOT-PerformanceBondCOI@michigan.gov OR 517-241-8503 TO REGISTER FOR THE ELECTRONIC SUBMITTAL SYSTEM.
- BOND - A \$35,000 INDIVIDUAL PERFORMANCE BOND IS REQUIRED. IF THE BOND PRINCIPAL IS NOT THE PERMIT APPLICANT, A CERTIFICATE OF AGENCY (MDOT FORM 2209) MUST BE SUBMITTED WHICH APPOINTS THE DESIRED PARTY AS AGENT TO ACT AS PRINCIPAL. THE BOND SHALL BE ELECTRONICALLY SUBMITTED IN THE MDOT E-BOND SYSTEM. YOUR INSURANCE AGENT SHALL CONTACT LAURI OLSEN (MDOT LANSING PERMIT OFFICE) VIA E-MAIL AT MDOT-PerformanceBondCOI@michigan.gov OR 517-241-8503 TO REGISTER FOR THE ELECTRONIC SUBMITTAL SYSTEM. ONCE THE BOND IS ELECTRONICALLY FILED, I WILL NEED A SIGNED AND SEALED PAPER COPY FOR THE FILE ALONG WITH THE POWER OF ATTORNEY.



### MICHIGAN DEPARTMENT OF TRANSPORTATION SPECIAL PROVISION FOR ADJUSTING DRAINAGE STRUCTURE, CASE 1, MODIFIED

CFS DMG 1 of 3 APRR JFS DEP-03-10-20 FHWA APRR-03-13-20

**a. Description.** This work consists of adjusting drainage structures, including utility manhole covers, in accordance with section 403.02 of the Standard Specifications for Construction, as shown on the plans, as directed by the Engineer and as stated herein.

**b. Materials.** Provide materials in accordance with subsection 403.02 of the Standard Specifications for Construction with the following exceptions:

**c. Construction.** For structures within the pavement area remove pavement adjacent to the drainage structure cover using a rotary or sawing method. When using a rotary cutting method, remove a minimum 4 foot diameter section of pavement around the drainage structure frame and cover. If the frame outside diameter measurement is greater than 36 inches, use a rotary cutting head to remove a minimum 4.5 foot diameter section of pavement. When using a sawing method, saw cut clean and remove a 6 foot by 6 foot pavement square.

For structures within the curb line, saw cut and remove a 4 foot by 6 foot section of pavement around the frame with the 6 foot diameter measured along the curb line. Remove curb and/or curb and gutter associated with the adjustment of structures, as directed by the Engineer.

For structures located adjacent to concrete traffic control islands, remove concrete island full-width or up to 5 feet wide to facilitate adjustment of the drainage structure cover frame, as directed by the Engineer.

Prior to setting the frame, compact exposed soil using a method approved by the Engineer.

Support the cover frame over the structure matching the adjacent roadway cross slope. Secure the frame in place to allow for placement of concrete using blocks or blocks as required on a full bed of mortar without altering frame position.

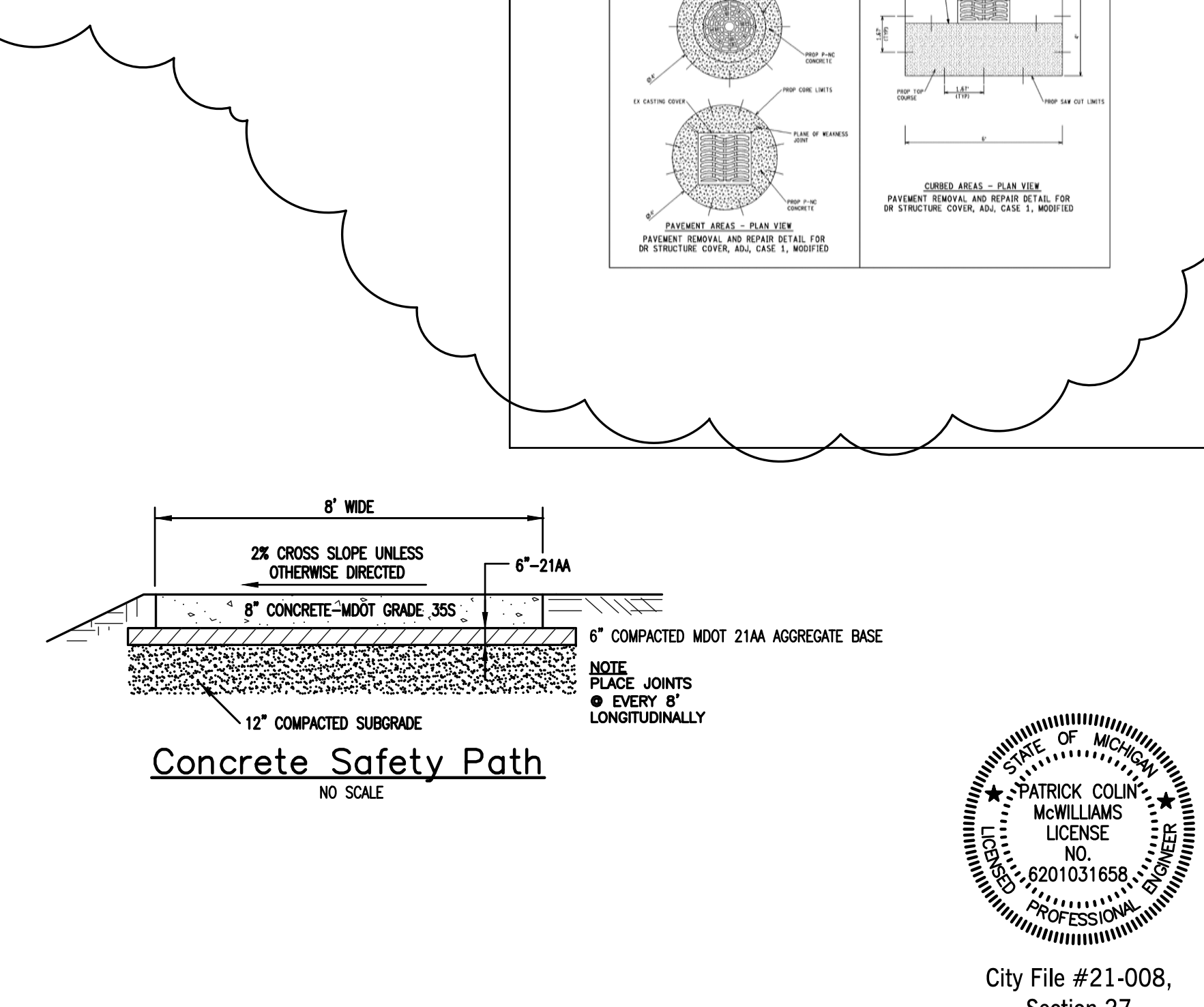
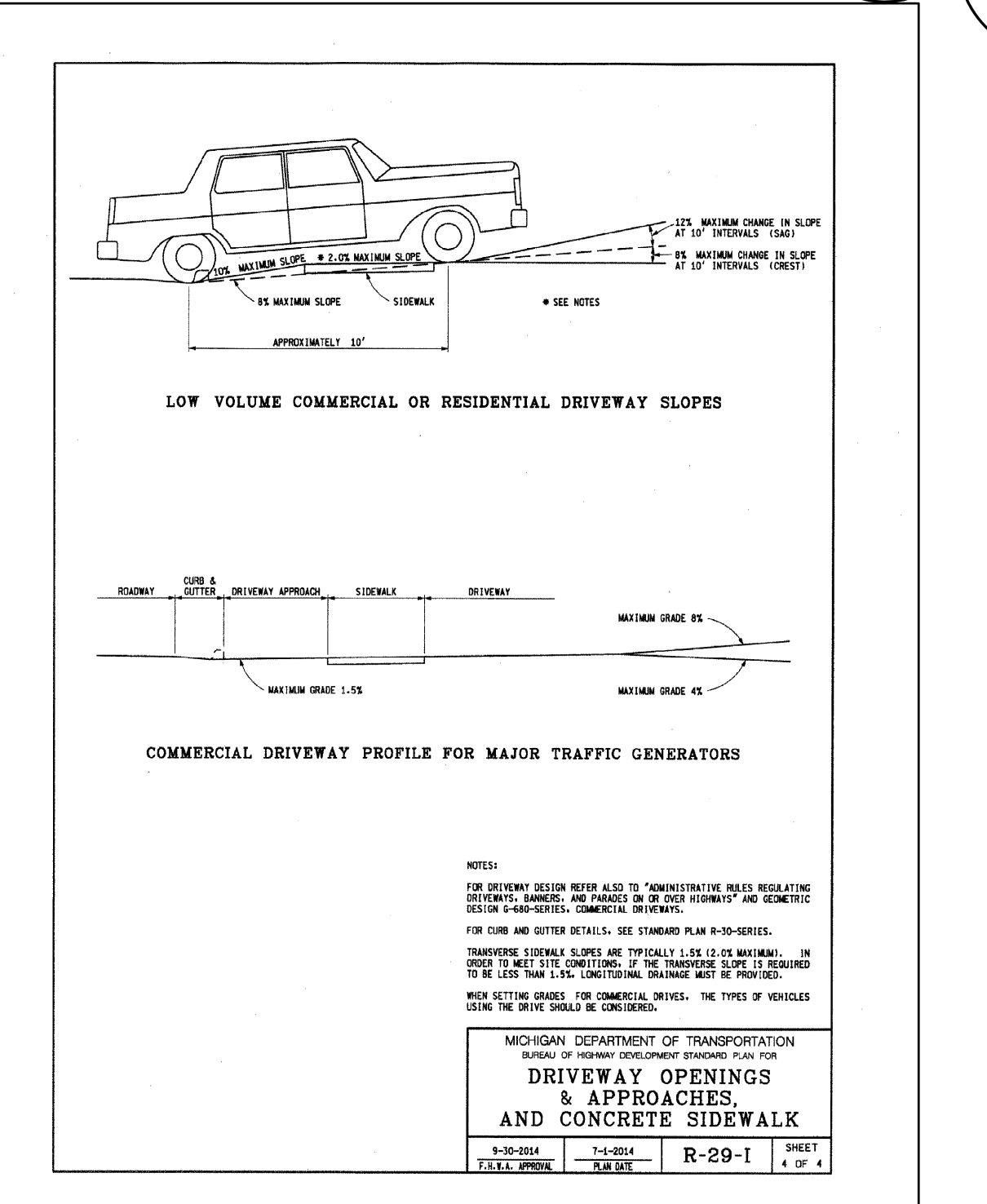
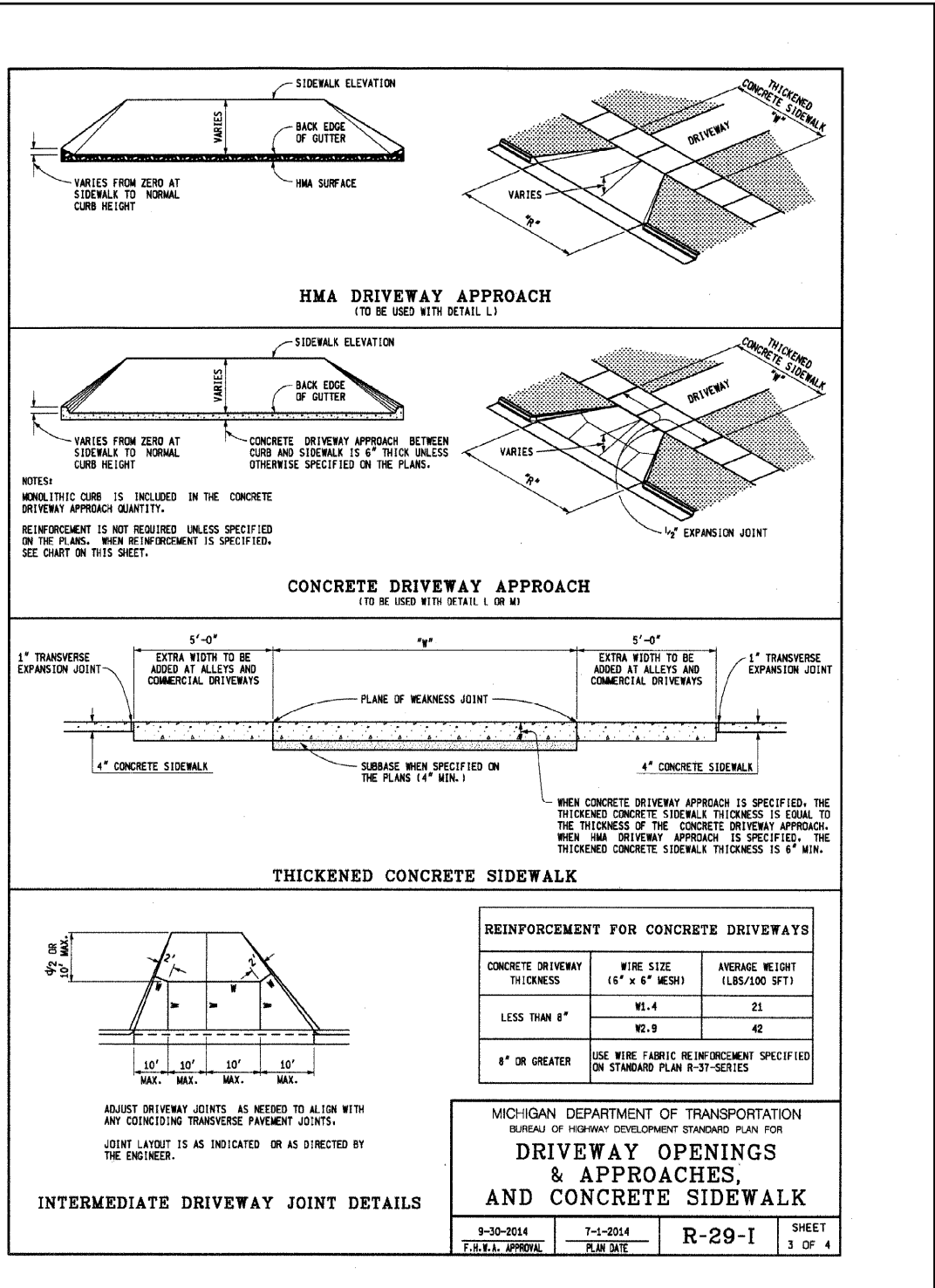
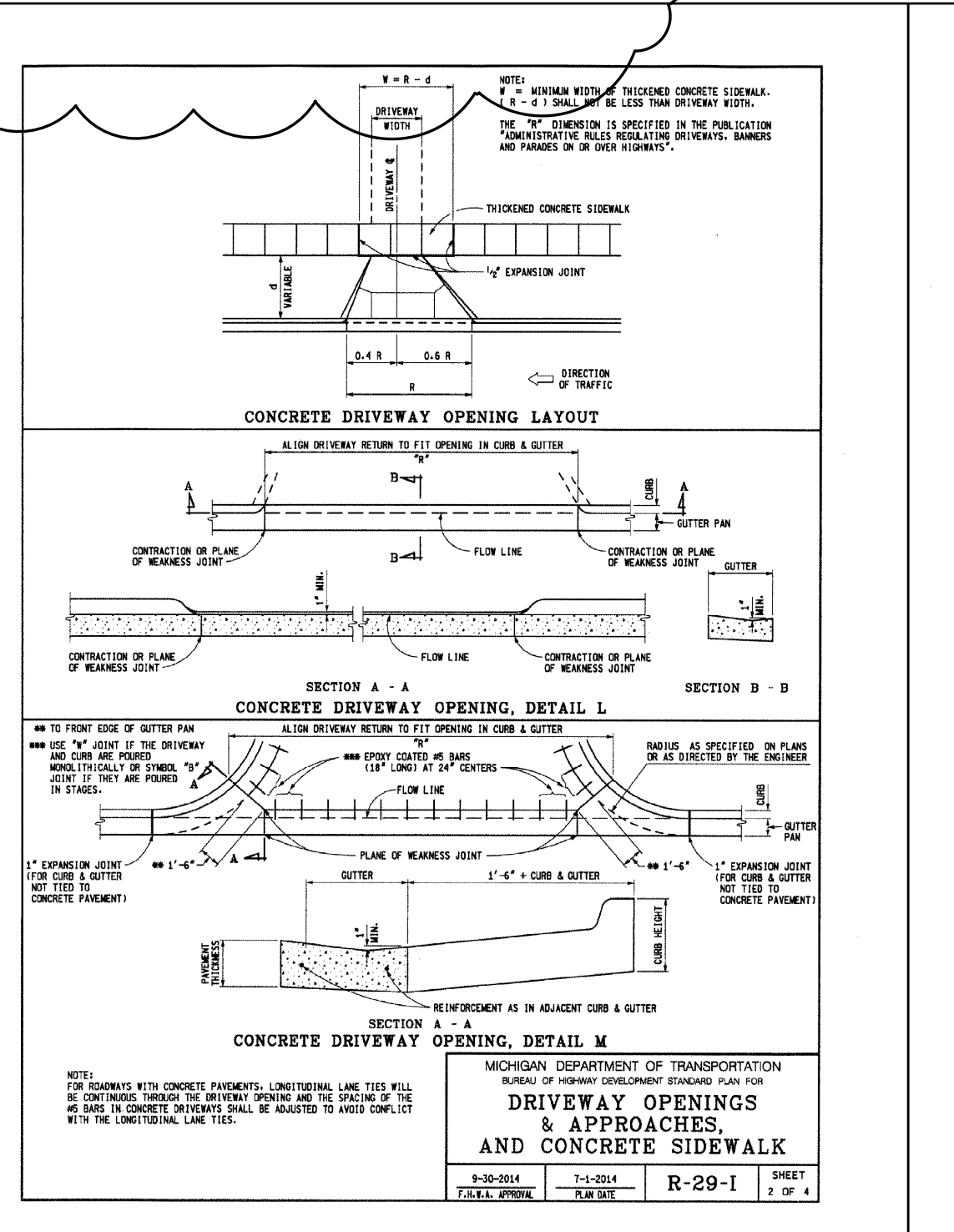
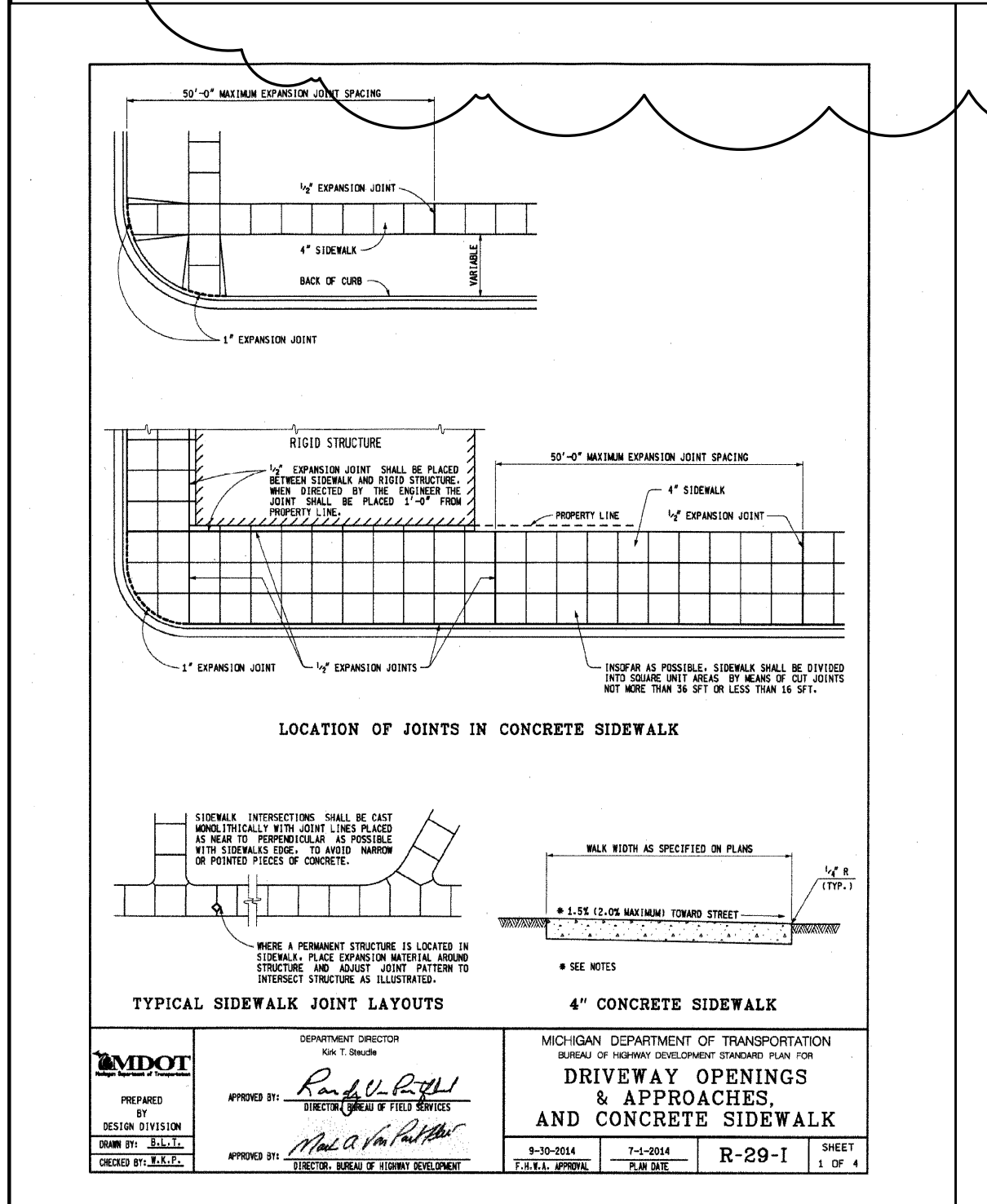
CFS DMG 2 of 3 20SP-403A-01 03-10-20

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Each	Pay Unit
Dr Structure Cover, Adj, Case 1, Modified		Each

Dr Structure Cover, Adj, Case 1, Modified includes furnishing all materials, saw cutting, removal and disposal of existing pavement and curb or gutter, adjustment of cover to required elevation and cross-slope, installation of epoxy anchored lane bars and epoxy coated circular bars, placement and finishing of new curb or curb and gutter, placement and finishing of new concrete and HMA, placement and removal of temporary HMA widening for maintaining traffic, if required, placement of cover on open structures to prevent accumulation of debris and cleaning existing drainage structures due to Contractor operations.

CFS DMG 3 of 3 20SP-403A-01 03-10-20



DATE	ISSUE
5-12-2021	REVISED PER CITY (4-15-2021)
5-12-2021	REVISED PER CITY (4-15-2021)
6-30-2021	NO CHANGE
11-24-2021	REVISED ENTRANCE APPROACHES PER CLIENT (9-8-2021)
11-24-2021	REVISED ENTRANCE APPROACHES PER CLIENT (10-22-2021)
11-18-2021	ADDED PAVEMENT DETAIL & SIGHT LINES PER CITY/HRC
11-18-2021	REVISED PER CITY (11-21-2021), PER MDOT (1-17-2022)

**Developer/Contractor**  
 OYK ENGINEERING & CONSTRUCTION  
 30700 TELEGRAPH ROAD, SUITE 2665  
 BINGHAM FARMS, MICHIGAN 48025  
 (248) 656-7895 FRED HADDI

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DATE	3-17-2021	KKD.	BY	DATE
DRAWN	GF			
DESIGN	PCM			
SHEET	27	T-3-N-R-11-E		

**MDOT Notes & Details**  
 "BEBB OAK MEADOWS" MIXED USE DEVELOPMENT  
 PART OF THE SE 1/4 OF SECTION 27, T3N, R11E,  
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

SCALE N/A  
 SHEET 11 OF 11  
 KE 2021.053



City File #21-008, Section 27