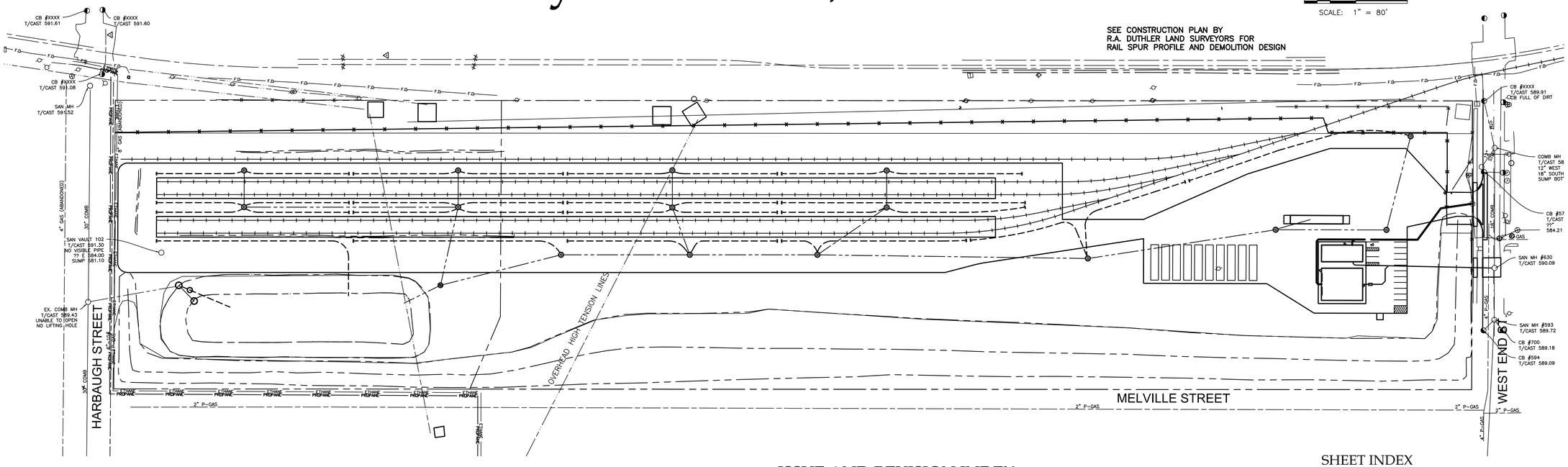
Crown Enterprises
8100 Melville Street
City of Detroit, MI 48209

Know what's below. Call before you dig.

NORTH

0 40' 80' 160'

SCALE: 1" = 80'



ISSUE AND REVISION INDEX

Issued for Regulatory Review	01.28.2026
Revised & Reissued for Regulatory Review	02.24.2026
Revised & Reissued for Regulatory Review	08.26.2026

SHEET INDEX

SHEET TITLE	SHEET NO.
SITE DEMOLITION PLAN	C1
SITE LAYOUT PLAN	C2
SITE GRADING PLAN	C3
STORM SEWER PLAN & PROFILE	C4
STORMWATER CALCULATIONS	C5
STORMWATER DETAILS	C6
SITE DETAILS	C7
SITE DETAILS	C8
LANDSCAPE PLAN	C9
SOIL EROSION CONTROL PLAN	C10
SOIL EROSION NOTES & DETAILS	C11

CONTRACTOR NOTE:

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS OF ALL EXISTING UTILITIES BEFORE COMMENCING CONSTRUCTION. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT OCCUR BY THEIR FAILURE TO EXACTLY LOCATED AND PRESERVE ANY ALL ALL UNDERGROUND UTILITIES.

PROJECT COORDINATE SYSTEM

MICHIGAN STATE PLANE COORDINATE SYSTEM, NAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID

STATE OF MICHIGAN
TAMMY ZIEMNICK
6201049309
LICENSED PROFESSIONAL ENGINEER

08-26-2026

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
3	Revised & Reissued for Regulatory Review	08.26.2026
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title

COVER SHEET

ZFE Project Number 25011	Sheet Number G0
Project Date 02.24.2026	
Engineer: TZF	
Checked By: JWF	

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

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

KEY NOTES

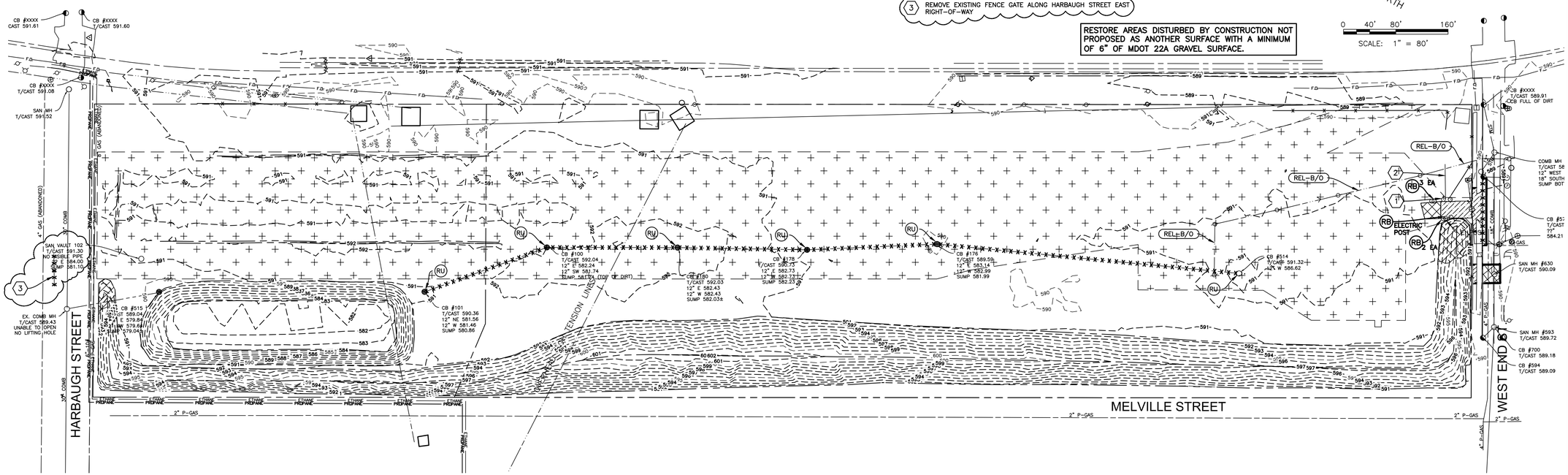
1. SALVAGE EX. MAILBOX PRIOR TO COMMENCING CONSTRUCTION. RELOCATE TO NEW LOCATION COORDINATED WITH OWNER.
2. SALVAGE EX. SLIDING GATE. REPOSITION TO COORDINATE WITH PROPOSED DRIVEWAY AND FENCE INSTALLATION AND OWNERS REQUIREMENTS.
3. REMOVE EXISTING FENCE GATE ALONG HARBAUGH STREET EAST RIGHT-OF-WAY

RESTORE AREAS DISTURBED BY CONSTRUCTION NOT PROPOSED AS ANOTHER SURFACE WITH A MINIMUM OF 6" OF MDOT 22A GRAVEL SURFACE.

NORTH

0 40' 80' 160'

SCALE: 1" = 80'



GENERAL DEMOLITION NOTES

1. ALL WORK TO BE ACCOMPLISHED IN STRICT ACCORDANCE WITH ALL CITY, COUNTY AND STATE REGULATIONS.
2. WITHIN THE SUBJECT PROPERTY, THE INTENT IS TO HAVE A CLEAN, CLEAR SITE, FREE OF ALL EXISTING ITEMS NOTED TO BE REMOVED IN ORDER TO PERMIT THE CONSTRUCTION OF THE NEW PROJECT.
3. REMOVE AND DISPOSE OF ANY PAVEMENT, FENCING, DEBRIS AND RUBBISH REQUIRING REMOVAL FROM THE WORK AREA IN AN APPROVED OFFSITE LANDFILL.
4. THE CONTRACTOR SHALL SECURE ALL PERMITS FOR THE DEMOLITION AND DISPOSAL OF THE DEMOLITION MATERIAL TO BE REMOVED FROM THE SITE. THE CONTRACTOR SHALL POST BONDS AND PAY PERMIT FEES AS REQUIRED.
5. THE DETAILED PLANS MAY NOT REFLECT ALL UTILITIES ON THE SITE OR SURROUNDING STREETS AND PROPERTIES. THE CONTRACTOR SHALL VERIFY LOCATIONS AND EXISTENCE OF UTILITY SERVICES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CALL "MISS DIG" AT 1-800-482-7171 OR 811, 72 HOURS PRIOR TO CONSTRUCTION.
6. THE CONTRACTOR SHALL REMOVE ALL UTILITIES TO EXISTING STRUCTURES WHETHER SHOWN OR NOT OR ARRANGE FOR THE APPROPRIATE UTILITY COMPANY TO CUT AND CAP SERVICE PIPING AT THE PROPERTY LINE OR MAIN (AS REQUIRED). ALL SERVICES MAY NOT BE SHOWN ON THIS PLAN.
7. FOR ALL ITEMS NOTED TO BE REMOVED, REMOVE NOT ONLY THE ABOVE GROUND ELEMENTS, BUT ALL UNDERGROUND ELEMENTS AS WELL, INCLUDING BUT NOT NECESSARILY LIMITED TO: FOUNDATIONS, GRAVEL FILLS, ROOTS, OLD PIPES, ETC.
8. BACKFILL ALL EXCAVATIONS RESULTING FROM THE DEMOLITION WORK TO MEET THE REQUIREMENTS FOR FILL OUTLINED IN THE GEOTECHNICAL REPORT OR PROJECT SPECIFICATIONS. ALL UTILITY TRENCH BACKFILL SHALL CONSIST OF MDOT CL 11 SAND COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM SPECIFICATIONS.
9. THE CONTRACTOR SHALL PROTECT ALL SURVEYING IRON PINS, MONUMENTS AND PROPERTY CORNERS DURING CONSTRUCTION. ANY CONTRACTOR DISTURBED PINS, MONUMENTS, ETC. SHALL BE RESET BY A LICENSED LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.
10. THE CONTRACTOR SHALL RESTORE ANY UTILITY STRUCTURE, PIPES, PAVEMENT, CURBS, SIDEWALKS OR LANDSCAPED AREAS DISTURBED DURING DEMOLITION TO THEIR ORIGINAL CONDITION AND TO THE SATISFACTION OF THE OWNER.
11. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
12. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
13. SPECIFIC DEMOLITIONS ITEMS HAVE BEEN INDICATED ON THE PLANS AS A GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE. AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT THE SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH LOCAL CODES.
15. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNS, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE MICHIGAN MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MMTUCD) LATEST EDITION, OR AS DIRECTED BY THE GOVERNING AUTHORITY.
16. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.

DEMOLITION LEGEND

- ABANDON EXISTING UTILITY LINE IN PLACE, CAP EXISTING ENDS
- REMOVE EXISTING UTILITY LINE
- SAWCUT SURFACE TREATMENT
- REL-B/O — RELOCATED OR LOWERED UTILITY BY OTHERS
- SAWCUT AND REMOVE EXISTING ASPHALT PAVEMENT SURFACE
- SAWCUT AND REMOVE EXISTING CONCRETE PAVEMENT SURFACE
- SAWCUT AND REMOVE EXISTING CONCRETE CURB AND GUTTER
- RS — REMOVE SIGN & SALVAGE TO OWNER
- RB — REMOVE EX. PIPE BOLLARD
- REMOVE EX. EARTH BERM AREA
- REMOVE EX. SURFACE TREATMENT IN PROPOSED DEVELOPMENT AREA, AREA SHOWN MAY NOT REPRESENT ALL THE REMOVE THAT IS REQUIRED
- RU — REMOVE UTILITY STRUCTURE

STATE OF MICHIGAN TAMMY ZIEMNICK ENGINEER 62010493O9 LICENSED PROFESSIONAL ENGINEER

08-26-2026

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
3	Revised & Reissued for Regulatory Review	08.26.2026
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title

SITE DEMOLITION PLAN

ZFE Project Number 25011	Sheet Number C1
Project Date 02.24.2026	
Engineer: TZF	
Checked By: JWF	

GENERAL SITE LAYOUT NOTES

1. ALL DIMENSIONS SHOWN ARE TO EDGE OF PAVEMENT, BACK OF CURB, FACE OF SIDEWALK, OUTSIDE FACE OF BUILDING, PROPERTY LINE, CENTER OF MANHOLE/CATCHBASIN OR CENTERLINE OF PIPE UNLESS OTHERWISE NOTED.
2. ALL DISTURBANCES INCURRED TO ANY ADJOINING PROPERTY DUE TO CONSTRUCTION OR DEMOLITION SHALL BE RESTORED TO THE PREVIOUS CONDITION OR BETTER, AND TO THE SATISFACTION OF THE OWNER, MUNICIPALITY OR STATE AUTHORITY.
3. PROPERTY LINE AND RIGHT-OF-WAY MONUMENTS SHALL NOT BE DISTURBED BY CONSTRUCTION, IF DISTURBED, THEY SHALL BE RESET BY A LICENSED PROCESSIONAL SURVEYOR TO THEIR ORIGINAL LOCATIONS AT THE CONTRACTOR'S EXPENSE.
4. PROOF ROLL ALL PAVEMENT AREAS. NOTIFY OWNER OF ANY UNACCEPTABLE AREAS.
5. THE CONTRACTOR SHALL PROVIDE RECORD DRAWINGS OF ALL CONSTRUCTION TO THE OWNER AT THE END OF CONSTRUCTION.
6. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF DETROIT CURRENT STANDARDS AND REGULATIONS.
7. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

SITE SPECIFIC NOTES

1. ALL RUBBISH, TRASH OR DEBRIS WILL BE CONTAINED ON SITE WITHIN THE OFFICE BUILDING OR WITHIN SITE DUMPSTER UNTIL THEIR SCHEDULED PICK-UP BY A CONTRACTED PICK-UP SERVICE.
2. NO COAL OR COKE RELATED MATERIALS, PRODUCT'S, ETC. WILL BE STORED ON SITE AT ANY TIME.

GENERAL NOTES

1. THE CONTRACTOR SHALL OBTAIN A SEPARATE RIGHT-OF-WAY PERMIT FROM THE DEPT. OF PUBLIC WORKS, CITY ENGINEERING DIVISION, PERMIT OFFICE PRIOR TO WORK PERFORMED WITHIN THE PUBLIC RIGHTS-OF-WAY.

SITE FEATURE LEGEND

- 6" CONCRETE SURFACE
- 8" REINFORCED CONCRETE SURFACE
- INDUSTRIAL HEAVY-DUTY BITUMINOUS PAVEMENT
- WEST END STREET BITUMINOUS PAVEMENT RESTORATION, SEE CITY OF DETROIT UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION DETAIL SHEET C5
- CONCRETE CURB & GUTTER
- NEW CHAIN LINK FENCE, HEIGHT TO MATCH EXISTING

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MADB3 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

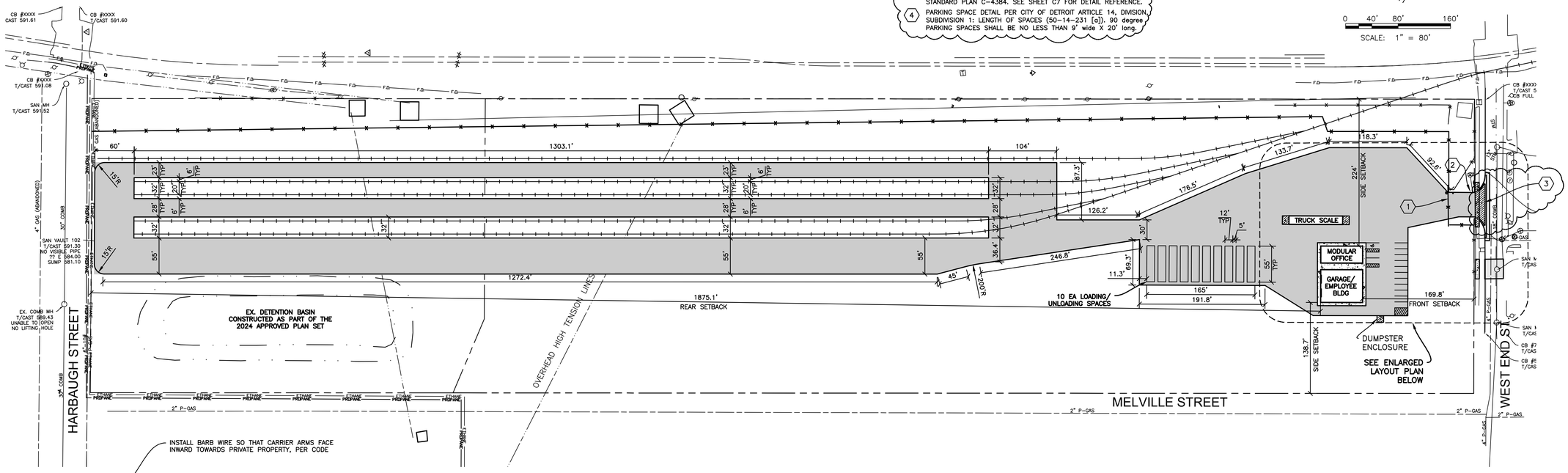
Know what's below. Call before you dig.

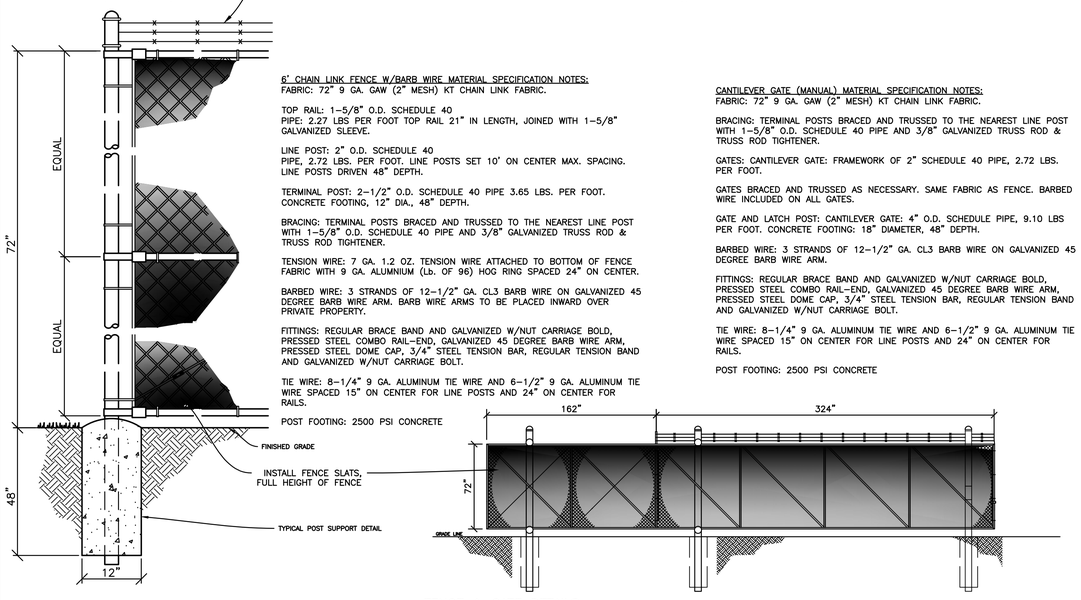
KEY NOTES

1. SALVAGE EX. SLIDING GATE. REPOSITION TO COORDINATE WITH PROPOSED DRIVEWAY AND FENCE INSTALLATION AND OWNERS REQUIREMENTS.
2. REINSTALL SALVAGED MAILBOX. COORDINATE LOCATION OF MAILBOX WITH THE OWNER.
3. INSTALL DRIVEWAY IN ACCORDANCE WITH CITY OF DETROIT BUILDINGS, SAFETY ENGINEERING, AND ENVIRONMENTAL DEPARTMENT (BSEED) STANDARD PLAN C-4384. SEE SHEET C7 FOR DETAIL REFERENCE.
4. PARKING SPACE DETAIL PER CITY OF DETROIT ARTICLE 14, DIVISION, SUBDIVISION 1: LENGTH OF SPACES (50-14-231 (a)). 90 degree PARKING SPACES SHALL BE NO LESS THAN 9' wide X 20' long.

RESTORE AREAS DISTURBED BY CONSTRUCTION NOT PROPOSED AS ANOTHER SURFACE WITH A MINIMUM OF 6" OF MDOT 22A GRAVEL SURFACE.

NORTH
0 40' 80' 160'
SCALE: 1" = 80'





6' CHAIN LINK FENCE W/BARB WIRE MATERIAL SPECIFICATION NOTES:
FABRIC: 72" 9 GA. GAW (2" MESH) KT CHAIN LINK FABRIC.

TOP RAIL: 1-5/8" O.D. SCHEDULE 40 PIPE: 2.27 LBS PER FOOT TOP RAIL 21" IN LENGTH, JOINED WITH 1-5/8" GALVANIZED SLEEVE.

LINE POST: 2" O.D. SCHEDULE 40 PIPE, 2.72 LBS. PER FOOT. LINE POSTS SET 10' ON CENTER MAX. SPACING. LINE POSTS DRIVEN 48" DEPTH.

TERMINAL POST: 2-1/2" O.D. SCHEDULE 40 PIPE 3.65 LBS. PER FOOT. CONCRETE FOOTING, 12" DIA., 48" DEPTH.

BRACING: TERMINAL POSTS BRACED AND TRUSSED TO THE NEAREST LINE POST WITH 1-5/8" O.D. SCHEDULE 40 PIPE AND 3/8" GALVANIZED TRUSS ROD & TRUSS ROD TIGHTENER.

TENSION WIRE: 7 GA. 1.2 OZ. TENSION WIRE ATTACHED TO BOTTOM OF FENCE FABRIC WITH 9 GA. ALUMNIUM (Lb. OF 96) HOG RING SPACED 24" ON CENTER.

BARBED WIRE: 3 STRANDS OF 12-1/2" GA. CL3 BARB WIRE ON GALVANIZED 45 DEGREE BARB WIRE ARM. BARB WIRE ARMS TO BE PLACED INWARD OVER PRIVATE PROPERTY.

FITTINGS: REGULAR BRACE BAND AND GALVANIZED W/NUT CARRIAGE BOLD, PRESSED STEEL COMBO RAIL-END, GALVANIZED 45 DEGREE BARB WIRE ARM, PRESSED STEEL DOME CAP, 3/4" STEEL TENSION BAR, REGULAR TENSION BAND AND GALVANIZED W/NUT CARRIAGE BOLT.

TIE WIRE: 8-1/4" 9 GA. ALUMINUM TIE WIRE AND 6-1/2" 9 GA. ALUMINUM TIE WIRE SPACED 15" ON CENTER FOR LINE POSTS AND 24" ON CENTER FOR RAILS.

POST FOOTING: 2500 PSI CONCRETE

CANTILEVER GATE (MANUAL) MATERIAL SPECIFICATION NOTES:
FABRIC: 72" 9 GA. GAW (2" MESH) KT CHAIN LINK FABRIC.

BRACING: TERMINAL POSTS BRACED AND TRUSSED TO THE NEAREST LINE POST WITH 1-5/8" O.D. SCHEDULE 40 PIPE AND 3/8" GALVANIZED TRUSS ROD & TRUSS ROD TIGHTENER.

GATES: CANTILEVER GATE: FRAMEWORK OF 2" SCHEDULE 40 PIPE, 2.72 LBS. PER FOOT.

GATES BRACED AND TRUSSED AS NECESSARY. SAME FABRIC AS FENCE. BARBED WIRE INCLUDED ON ALL GATES.

GATE AND LATCH POST: CANTILEVER GATE: 4" O.D. SCHEDULE PIPE, 9.10 LBS PER FOOT. CONCRETE FOOTING: 18" DIAMETER, 48" DEPTH.

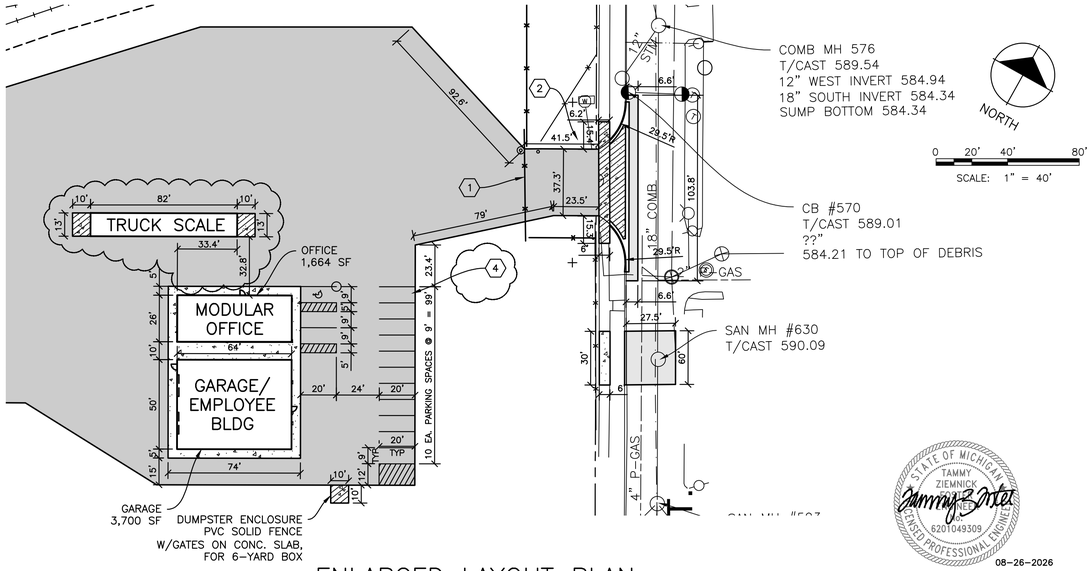
BARBED WIRE: 3 STRANDS OF 12-1/2" GA. CL3 BARB WIRE ON GALVANIZED 45 DEGREE BARB WIRE ARM.

FITTINGS: REGULAR BRACE BAND AND GALVANIZED W/NUT CARRIAGE BOLD, PRESSED STEEL COMBO RAIL-END, GALVANIZED 45 DEGREE BARB WIRE ARM, PRESSED STEEL DOME CAP, 3/4" STEEL TENSION BAR, REGULAR TENSION BAND AND GALVANIZED W/NUT CARRIAGE BOLT.

TIE WIRE: 8-1/4" 9 GA. ALUMINUM TIE WIRE AND 6-1/2" 9 GA. ALUMINUM TIE WIRE SPACED 15" ON CENTER FOR LINE POSTS AND 24" ON CENTER FOR RAILS.

POST FOOTING: 2500 PSI CONCRETE

FENCE & GATE DETAILS
NO SCALE



ENLARGED LAYOUT PLAN

08-26-2026

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved
Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
3	Revised & Reissued for Regulatory Review	08.26.2026
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.282026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title

SITE LAYOUT PLAN

ZFE Project Number	Sheet Number
25011	C2
Project Date 02.24.2026	
Engineer: TZF	
Checked By: JWF	

STATE OF MICHIGAN TAMMY ZIEMNICK REGISTERED 6201049309 LICENSED PROFESSIONAL ENGINEER

Approved For Permit
Approved
Date: 9/21/2026
City of Detroit Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

GENERAL GRADING NOTES

1. THE STAGING OF CONSTRUCTION ACTIVITIES SHALL OCCUR ONLY WITHIN THE SITE BOUNDARIES OR EASEMENTS AS SHOWN. ANY CONSTRUCTION ACTIVITIES OUTSIDE OF THE SCOPE OF THESE DRAWINGS SHALL BE AT THE SOLE RESPONSIBILITY AND RISK OF THE CONTRACTOR.
2. IF APPLICABLE, THE CONTRACTOR SHALL PERFORM ALL EARTHWORK AND GRADING OPERATIONS IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL REPORT OR PROJECT SPECIFICATIONS.
3. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED IN ACCORDANCE WITH THE LANDSCAPE PLANS. PROVIDE A MINIMUM OF 3" OF TOPSOIL IN THESE AREAS UNLESS OTHERWISE NOTED.
4. THE CONTRACTOR SHALL NOTE EXISTING UNDERGROUND UTILITIES WITHIN AND ADJACENT TO THE SITE. BACKFILL FOR EXISTING UTILITY TRENCHES SHALL BE EXAMINED CRITICALLY. ANY TRENCHES FOUND TO HAVE SOFT, UNSTABLE OR UNSUITABLE BACKFILL MATERIAL, IN THE OPINION OF THE GEOTECHNICAL ENGINEER, THAT ARE TO BE WITHIN THE ZONE OF INFLUENCE OF THE PROPOSED BUILDINGS OR PAVEMENT AREAS SHALL BE COMPLETELY EXCAVATED AND BACKFILLED WITH MDOT CLASS II SAND.
5. ALL SITE WORK, MATERIALS OF CONSTRUCTION, AND CONSTRUCTION METHODS SHALL CONFORM TO THE PROJECT SPECIFICATIONS, DETAILS AND APPLICABLE SECTIONS OF CITY OF DETROIT, WAYNE COUNTY AND THE STATE OF MICHIGAN DEPT. OF TRANSPORTATION (MDOT) STANDARDS.
6. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED SMOOTH AND 3" OF TOPSOIL APPLIED. IF ADEQUATE TOPSOIL IS NOT AVAILABLE ON THE SITE, THE CONTRACTOR SHALL PROVIDE TOPSOIL, APPROVED BY THE ENGINEER AS NEEDED. THE AREA SHALL BE FERTILIZED, WATERED AND MAINTAINED UNTIL HARDY GRASS GROWTH IS ESTABLISHED IN ALL AREAS (SEE LANDSCAPE PLAN IF AVAILABLE). ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE PROJECT SHALL BE CORRECTED BY THE CONTRACTOR AT NOT ADDITIONAL COST TO THE OWNER.
7. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL BE PROVIDED A COPY OF THESE PLAN AND STRICTLY ADHERE TO THEIR REQUIREMENTS.
8. ALL WASH WATER (CONCRETE TRUCKS, VEHICLE CLEANING, EQUIPMENT CLEANING, ETC) SHALL BE DISPOSED OF IN A MANNER THAT PREVENTS CONTACT BETWEEN THESE MATERIALS AND STORM WATER THAT IS DISCHARGED FROM THE SITE.
9. MAINTAIN ON THE SITE OR HAVE READILY AVAILABLE SUFFICIENT OIL AND GREASE ABSORBING MATERIALS AND FLOTATION BOOMS TO CONTAIN AND CLEANUP FUEL OR CHEMICAL SPILLS OR LEAKS.
10. NO RUBBISH, TRASH, GARBAGE, OR OTHER SUCH MATERIALS SHALL BE DISCHARGED INTO DRAINAGE DITCHES OR WATER OF THE STATE.
11. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.
12. PRIOR TO CONSTRUCTION OF PROPOSED PAVEMENT, THE SITE SHALL BE GRADED SO AS TO PROVIDE SETTLING AREAS AROUND CATCH BASINS. CATCH BASIN RIMS SHALL BE SET AT FINISH GRADE. AREAS IMMEDIATELY ADJACENT TO BASINS SHALL BE SEVERAL INCHES BELOW FINISH GRADE UNTIL PAVEMENT IS CONSTRUCTED.
13. TOPS OF STOCKPILES SHALL BE COVERED IN SUCH A MANNER THAT STORMWATER DOES NOT INFILTRATE THE MATERIALS AND THEREBY RENDER THE MATERIALS UNSUITABLE FOR THEIR INTENDED USE.

SITE UTILITY AND GRADING LEGEND

PIPE CONTENTS	ABBREVIATIONS
GAS	NATURAL GAS
SAN	SANITARY SEWER
STM	STORM SEWER
WTR	WATER
FM	FORCE MAIN

PIPE MATERIAL	ABBREVIATIONS
CSP	CORRUGATED STEEL PIPE
CSPA	CORRUGATED STEEL PIPE ARCH
DIP	DUCTILE IRON PIPE
NRCP	NON-REINFORCED CONCRETE PIPE
PE	POLYETHYLENE
PE PERF.	POLYETHYLENE PIPE PERFORATED
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE

- 12" STM — STORM SEWER & MANHOLE
- CATCH BASIN
- 6" U.D. — UNDERDRAIN
- ADJ — ADJUST EX. STRUCTURE CASTINGS
- 505 — PROPOSED CONTOUR ELEVATION
- 865.00 EC — PROPOSED EDGE OF CONCRETE SURFACE SPOT ELEVATION
- 865.00 T/CAST — PROPOSED TOP OF CASTING SPOT ELEVATION
- 865.00 FG — PROPOSED FINISHED GRADE ELEVATION
- 865.00 BIT — PROPOSED EDGE OF BITUMINOUS PAVEMENT SPOT ELEVATION
- 865.00 CONC — PROPOSED EDGE OF CONCRETE PAVEMENT SPOT ELEVATION

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

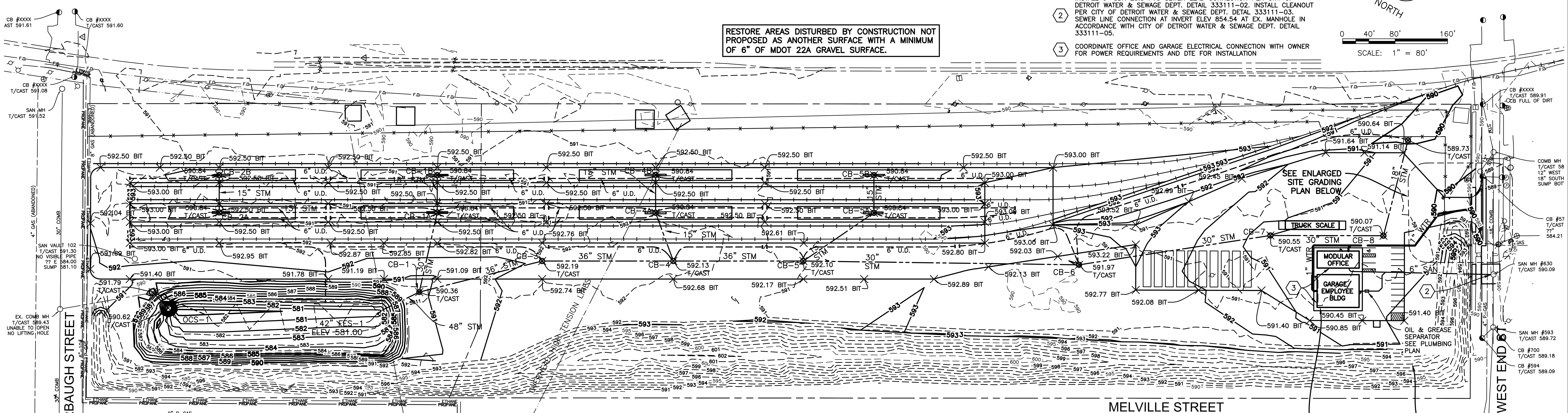
BENCHMARKS & PROJECT COORDINATE SYSTEM

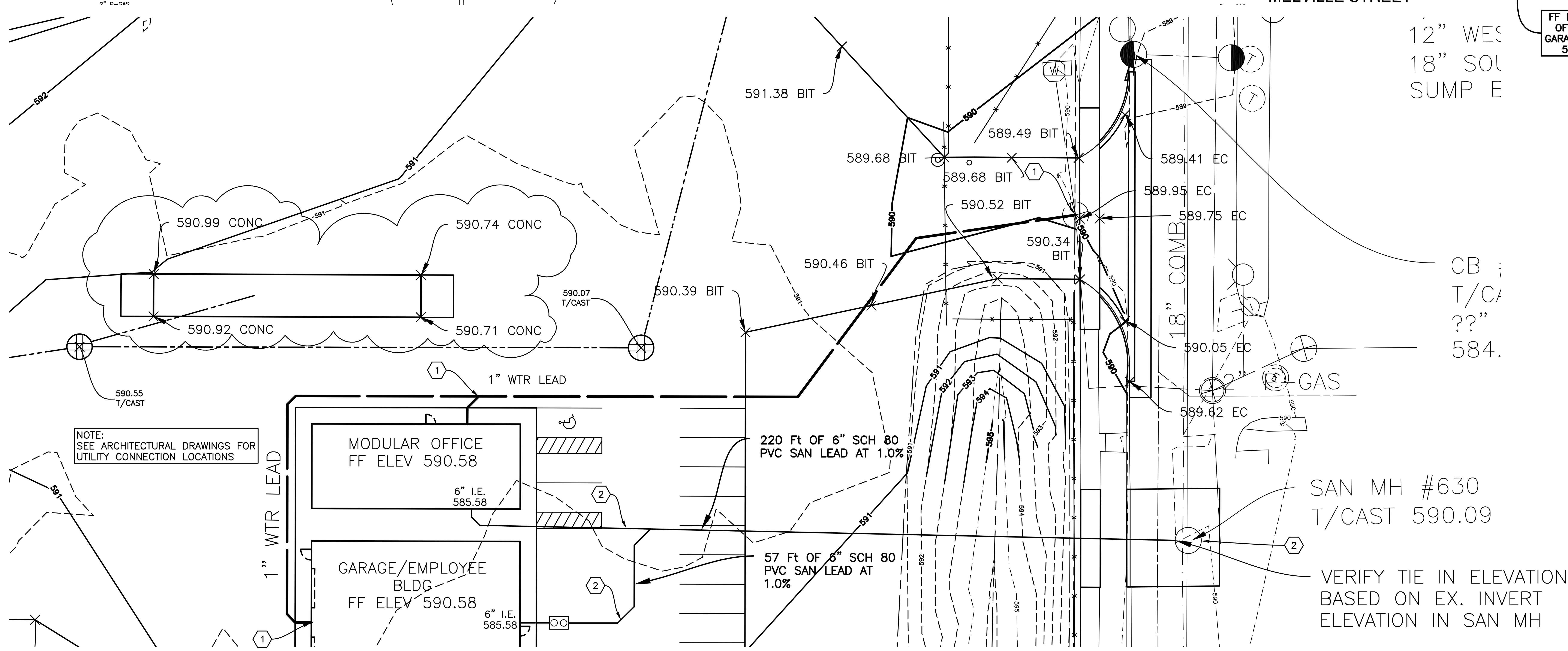
BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102 LOCATED APPROX. 60' EAST OF EX. FENCELINE ON WEST SIDE OF PROPERTY

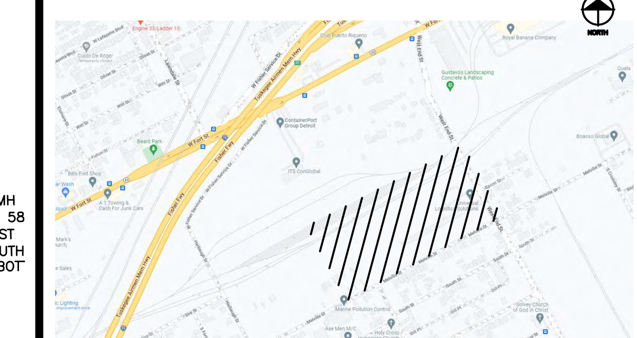
MICHIGAN STATE PLANE COORDINATE SYSTEM, MAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

KEY NOTES

1. INSTALL 1"ø TYPE K COPPER WATER SERVICE. CONNECT NEW WATER SERVICE TO EXISTING WATER METER. ADJUST WATER METER TO GRADE.
2. INSTALL 6" SDR 23.5 PVC SEWER LEAD CONNECTION PER CITY OF DETROIT WATER & SEWAGE DEPT. DETAIL 333111-02. INSTALL CLEANOUT PER CITY OF DETROIT WATER & SEWAGE DEPT. DETAL 333111-03. SEWER LINE CONNECTION AT INVERT ELEV 854.54 AT EX. MANHOLE IN ACCORDANCE WITH CITY OF DETROIT WATER & SEWAGE DEPT. DETAIL 333111-05.
3. COORDINATE OFFICE AND GARAGE ELECTRICAL CONNECTION WITH OWNER FOR POWER REQUIREMENTS AND DTE FOR INSTALLATION.







LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
3	Revised & Reissued for Regulatory Review	08.26.2026
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

Zfe
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name
Crown Enterprises
8100 Melville Street
2026 Site Development
City of Detroit, Wayne County, Michigan

Sheet Title
SITE GRADING PLAN

STATE OF MICHIGAN TAMMY ZIEMNICK FOSTER ENGINEER No. 6201049309 LICENSED PROFESSIONAL ENGINEER
08-26-2026

ZFE Project Number	Sheet Number
25011	C3
Project Date 02.24.2026	
Engineer: TZF	
Checked By: JWF	

KEY NOTES

1. DOWNSTREAM OF OUTLET CONTROL STRUCTURE (OCS–1) INSTALL A 12"ø CHECKMATE ULTRAFLEX IN–LINE CHECK VALVE B RED VALVE COMPANY, INC. (OR APPROVED EQUAL) ON THE EXISTING COMBINE SEWER LINE. VERIFY SIZE OF EXISTING OUTLET PIPE PRIOR TO ORDERING TO ENSURE THE CORRECT DIAMETER FOR THE EXISTING PIPE. MATCH DIAMETER OF EXISTING PIPE.
2. INSTALL ANTI–SEEPAGE COLLAR, PER DETAIL ON THE DETENTION BASIN OUTLET PIPE PRIOR TO THE PIPE FOR ENTERING NEW 4' MH TO REPLACE EX. CB 515. ALL JOINTS FROM OCS–1 TO PROPOSED 4' STRUCTURE SHALL BE WATERTIGHT JOINTS.
3. MH–1 SHALL HAVE A SOLID LID ONLY, EJIW 1040 TYPE A OR EQUAL, INSTALLED
4. INSTALL 6" HDPE DRAIN PIPE FROM BOTTOM OF DETENTION POND ELEVATION 580.0 (APPROX). TO 4' DIAMETER PRECAST GATE VALVE & STRUCTURE (SEE DETAIL). CONNECT 6" HDPE OUTLET FROM PRECAST GATE VALVE STRUCTURE TO MH–1 AT ELEVATION 579.64 (VERIFY)
5. INSTALL 6" HDPE DRAIN PIPE AT LOCATIONS, ELEVATIONS & AS DETAILED PER THE RAILROAD PROFILE SECTION DRAWINGS (BY OTHERS). PROVIDE POSITIVE SLOPE FROM THE CAPPED END OF EACH PIPE TOWARD THE NEAREST PROPOSED STORM STRUCTURE. AS APPLICABLE, PIPE TO PRECAST STORM STRUCTURE CONNECTION SHALL BE MADE WATER TIGHT. INVERT ELEV AT STORM STRUCTURE APPROXIMATELY 5.5' BELOW RIM ELEVATION.
6. COORDINATE INSTALLATION OF DRAIN PIPE FOR DISCHARGE LINES FROM TRUCK SCALE SUMP PUMPS WITH SCALE INSTALLATION CONTRACTOR AND MANUFACTURERS RECOMMENDATIONS

SITE UTILITY AND GRADING LEGEND

PIPE CONTENTS	ABBREVIATIONS
GAS	NATURAL GAS
SAN	SANITARY SEWER
STM	STORM SEWER
WTR	WATER
FM	FORCE MAIN

PIPE MATERIAL	ABBREVIATIONS
CSP	CORRUGATED STEEL PIPE
CSPA	CORRUGATED STEEL PIPE ARCH
DIP	DUCTILE IRON PIPE
NRCP	NON–REINFORCED CONCRETE PIPE
PE	POLYETHYLENE
PE PERF.	POLYETHYLENE PIPE PERFORATED
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE

12" STM — STORM SEWER & MANHOLE

CATCH BASIN

6" U.D. — UNDERDRAIN & CAP

ADJ — ADJUST EX. STRUCTURE CASTINGS

505 — PROPOSED CONTOUR ELEVATION

10–YEAR HYDRAULIC GRADE LINE (HGL)

RESTORE AREAS DISTURBED BY CONSTRUCTION NOT PROPOSED AS ANOTHER SURFACE WITH A MINIMUM OF 6" OF MDOT 22A GRAVEL SURFACE.

HYDRAULIC GRADE LINE CALCULATION

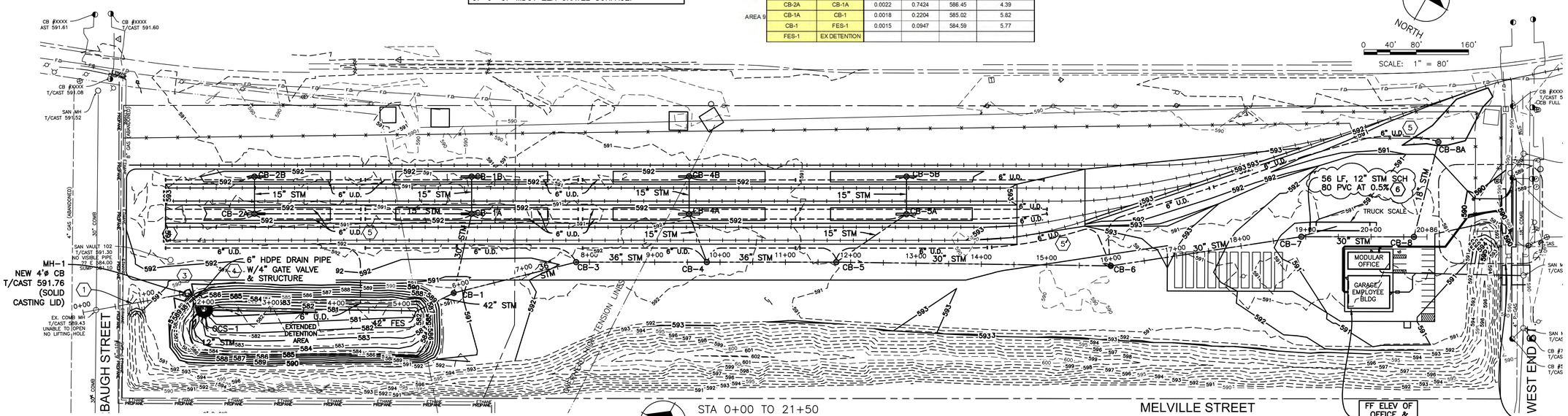
LOCATION		10 YEAR		HGL	HGL √
STRUCTURE LABEL		SLOPE	HEADLOSS IN PIPE	"Upstream" HGL ELEV.	Dist Between Water Level and Rim
UPSTREAM	DOWNSTREAM	ft/ft	ft	ft	ft
		S'	H	HGL	
AREA 16	CB-8A				
AREA 15	CB-8A	CB-8	0.0023	0.3511	587.17	2.56
AREA 14	CB-8	CB-7	0.0010	0.1715	586.82	3.25
AREA 13	CB-7	CB-6	0.0009	0.2524	586.65	3.90
AREA 4		CB-5B				
AREA 8	CB-5B	CB-5A	0.0034	0.1943	586.27	4.57
AREA 12	CB-6	CB-5	0.0011	0.4569	586.11	5.86
	CB-5A	CB-5	0.0034	0.4355	586.02	4.82
AREA 3		CB-4B				
AREA 7	CB-4B	CB-4A	0.0019	0.1088	585.46	5.38
AREA 11	CB-5	CB-4	0.0008	0.1568	585.58	6.52
	CB-4A	CB-4	0.0018	0.1393	585.32	5.52
AREA 10	CB-4	CB-3	0.0011	0.2216	585.18	6.95
	CB-3	CB-1	0.0011	0.2051	584.80	7.39
AREA 2		CB-1B				
AREA 6	CB-1B	CB-1A	0.0020	0.1153	586.83	4.01
AREA 1		CB-2B				
AREA 5	CB-2B	CB-2A	0.0023	0.1307	586.58	4.26
	CB-2A	CB-1A	0.0022	0.7424	586.45	4.39
AREA 9	CB-1A	CB-1	0.0018	0.2204	585.02	5.82
	CB-1	FES-1	0.0015	0.0947	584.59	5.77
	FES-1	EX DETENTION				

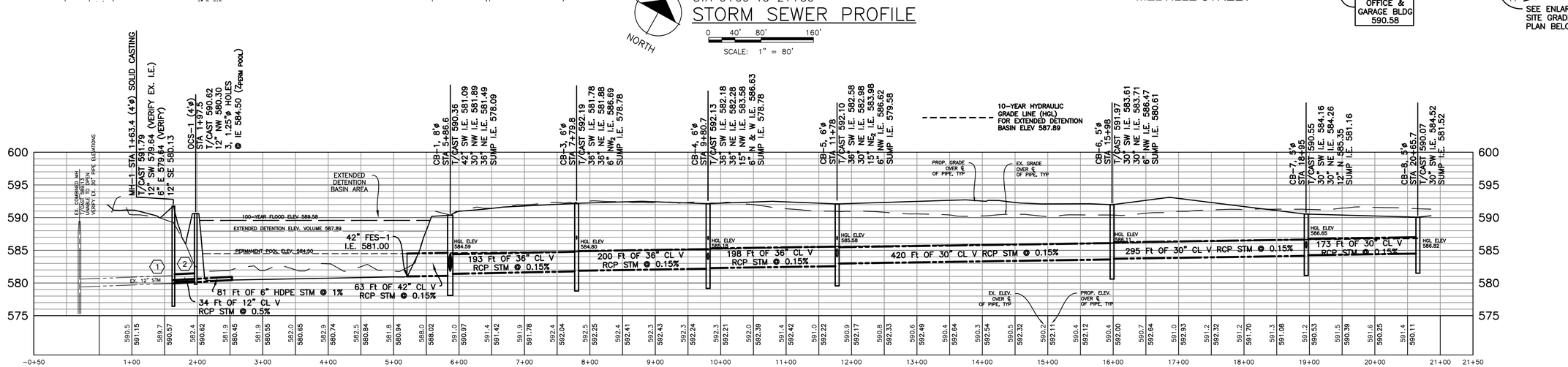
CATCH BASIN PROFILE SUMMARY TABLE

STRUCTURE	T/CAST ELEV	DIA. (Ft)	PIPE PROFILE	INVERT ELEV.	CONNECTING STRUCTURE	HGL Elev	Dist. Btwn HGL & Rim (Ft)
CB-1A	590.84	4	125 Ft OF 15" CL V RCP STM AT 0.5%	30 " SE 582.52	CB-1	585.02	5.82
			333 Ft OF 15" CL V RCP STM AT 0.5%	15" SW 583.52	CB-2A		
			58 Ft OF 15" CL V RCP STM AT 0.5%	15" NW 583.42	CB-1B		
CB-1B	590.84	4	58 Ft OF 15" CL V RCP STM AT 0.5%	15" SE 583.91	CB-1A	586.83	4.01
CB-2A	590.84	4	333 Ft OF 15" CL V RCP STM AT 0.5%	15" NE 585.19	CB-1A	586.45	4.39
			58 Ft OF 15" CL V RCP STM AT 0.5%	15" NW 585.29	CB-2B		
CB-2B	590.84	4	58 Ft OF 15" CL V RCP STM AT 0.5%	15" SE 585.58	CB-2A	586.58	4.26
CB-4A	590.84	4	78 Ft OF 15" CL V RCP STM AT 0.5%	15" SE 583.82	CB-4	585.32	5.52
			58 Ft OF 15" CL V RCP STM AT 0.5%	15" NW 583.92	CB-4B		
CB-4B	590.84	4	58 Ft OF 15" CL V RCP STM AT 0.5%	15" SE 584.21	CB-4A	585.46	5.38
CB-5A	590.84	4	130 Ft OF 15" CL V RCP STM AT 0.5%	15" S 854.63	CB-5	586.02	4.82
			58 Ft OF 15" CL V RCP STM AT 0.5%	15" NW 584.73	CB-5B		
CB-5B	590.84	4	58 Ft OF 15" CL V RCP STM AT 0.5%	15" SE 585.02	CB-5A	586.27	4.57
CB-8A	589.73	4	150 Ft OF 18" CL V RCP STM AT 0.5%	18" SE 585.23	CB-8	587.17	2.56

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

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance





NOTE: ADJUST BOTTOM OF EXCAVATED DETENTION BASIN CONSTRUCTED AS PART OF THE 2024 APPROVED SITE PLAN REVIEW TO MATCH THE GRADING PLAN AND ELEVATIONS SHOWN HEREIN

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX. FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

STATE OF MICHIGAN — TAMMY ZIEMNICK — 6201049309 — REGISTERED PROFESSIONAL ENGINEER

08–26–2026



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
3	Revised & Reissued for Regulatory Review	08.26.2026
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

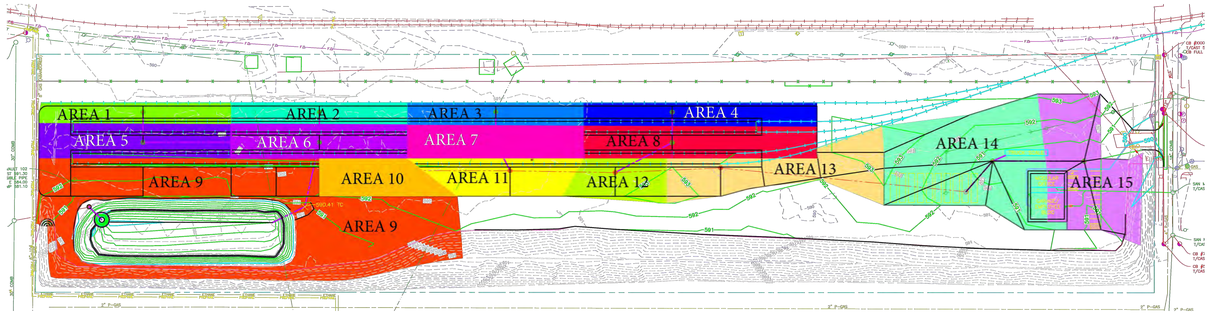
City of Detroit, Wayne County, Michigan

Sheet Title
STORM SEWER PLAN & PROFILE

ZFE Project Number	Sheet Number
25011	C4
Project Date: 02.24.2026	
Engineer: TZF	
Checked By: JWF	

DRAINAGE AREA SURFACE TREATMENT CACLULATIONS

Project No. 25011 - Crown Melville Detroit
01/22/2026 T.Z. Foster



	AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	AREA 6	AREA 7	AREA 8	AREA 9	AREA 10	AREA 11	AREA 12	AREA 13	AREA 14	AREA 15
GRAVEL	5341	5985	6520	7735	11347	11977	11454	11007	38928	2783	4994	3824	6493	4124	
ROOF														2432	2432
ASPHALT	8854	8650	7658	11689	12449	9314	9320	15729	91207	12353	13909	9923	24035	50509	35600
GRASS									35577						
TOTAL (SF)	14,195	14,635	14,178	19,424	23,796	21,291	20,774	26,736	165,712	15,136	18,903	13,747	30,528	57,065	38,032
TOTAL (AC)	***0.326***	***0.336***	***0.325***	***0.446***	***0.546***	***0.489***	***0.477***	***0.614***	***3.804***	***0.347***	***0.434***	***0.316***	***0.701***	***1.310***	***0.873***
												Total Contributing Area		494,152	sf
														11.34	Ac

2024 Approved and Constructed Detention Basin Areas

Updated for the 2026 Proposed Design

Area	Elevation	Depth	Incremental Volume, V_i	Cumulative Volume	
29707	584.5			0	Elev of permanent pool
31292	585	0.5	15,248	15,248	584.50
34326	586	1	32,797	48,045	V_{ED} storage volume
37463	587	1	35,883	83,928	is reached at elev.
40666	588	1	39,054	122,982	587.89
43956	589	1	42,300	165,282	
48300	590	1	46,111	211,393	100-year storage volume
					is reached at elev
					589.58

Basin Water Depth 5.50 ft
Basin Mean Depth 4.19 ft

Total Storage Volume Provided 211,393 cf
4.85 acre-ft
Built for the 2024 Constrution Project, Approved 02/2024

Total Storage Volume Required 191,954 cf
4.41 acre-ft

otal Storage Volume Required Extended Detention 118,702 cf
2.73 acre-ft

Pyrimoidal Equation

$V_i = (E2-E1)/3*(A_1+A_2+(A_1*A_2)^2$, where

V_i = Incremental Volume (cf)
A_1 = Area at elevation E_1 (cf)
A_2 = Area at elevation E_2 (cf)
E_1 = Lower Elevation (ft)
E_2 = Higher Elevation (ft)

Total Regulated Area (A)	946,222	sf	$C_{pre\text{-}develop}$=	0.813	Q_t= 0.15	cfs/acre	allowable peak
	21.722	Acres	$C_{post\text{-}develop}$=	0.792			discharge per acre

Water Quality

Extended Detention Alternative Compliance Measures

V_{ED}= 6,897 * C * A
118,702 cft

Infrastructure 2-year peak flow control

Difference Cpre-develop and Cpost-develop
ΔC= -0.021

$V_{2\text{-}yr}$= 6,897 * ΔC * A
$V_{2\text{-}yr}$= -3101 cft

Flood Control for 100-year, 24-hour storm (Regulated Area > 5 acres)

Critical Storm Duration D_{100}
D_{100}= $50*[(Q_o/C)]^{-0.984}$ Equation 4-8
D_{100}= 257.2 minutes

Design Storm Intensity (i)
i = $(38.42*T^{-0.208})/(12.33+D_{100})^{0.841}$ Equation 4-1
i = 0.905 in/hour T= 100 years

Required Detention Pond Storage, C
V_{100}= $(60.5 * D_{100} * C * A * i) - (60 * D_{100} * Q_R * A)$ Equation 4-9
V_{100}= 191,954 cft

POST–DEVELOPMENT C–VALUE CALCULATION

AREA	UNITS	PAVEMENT 0.95	ROOF 0.95	WATER 1.00	GRASS 0.40	GRAVEL 0.85	TOTAL AREA	CUMULATIVE AREA	WEIGHTED C
POST-DEVELOPMENT	sf	248,736	4,884	48,300	193,766	450,437	946,123	946,123	0.79
	acres	5.71	0.11	1.11	4.45	10.34	21.72	21.72	
SITE TOTAL	sf	248,736	4,884	48,300	193,766	450,437	946,123	946,123	0.792
	acres	5.71	0.11	1.11	4.45	10.34	21.72	21.72	

WEIGHTED SITE C VALUE = 0.792

CONTROL OUTLET STRUCTURE DESIGN

Sizing Outlet Structure Holes for Extended Detention

Water Quality (ex detention) discharge should be released within time perio 48 hours

Q_{avg}=	0.69	cfs	$Q = V_{ED}/(3600*T)$		
h_{avg}=	1.695	ft	$0.5 * [(Z_{ED} - Z_{perm\ pool})]$		
A=	0.1060459	ft^2	$Q_{avg} / (C \times ((2*g*h_{avg})^{0.5})$		
Hole Dia.	1.5	inches	Area of hole=	0.012272	ft^2
# of Holes=	8.6413982				
Use	3	holes	@ elevation	584.50	$Z_{perm\ pool}$
A_{actual}=	0.0368155	ft^2			
$Q_{ED\ actual}$=	0.7154378	cfs	$Q_{actual}=C \times A_{actual} \times (2*g*h_{avg})^{0.5}$		
Actual Time=	46.09	hours			
D actual is within	-4%	of	48	hours	OK
	LESS THAN	10% of Required Release Time			

Sizing for 100-year Flood Control Volume

Flood Control discharge should be released within time period 24 hours

Q_{allow}=	3.258	cfs	Q_{allow} * Total Area		
Q_0=	2.543		Q_{allow}-$Q_{ED\ actual}$		
h_{100}=	5.08	ft	$(Z_{100}-Z_{perm\ pool})$		
A_{100}=	0.22873	ft^2	$Q_0/C \times ((2*g*h_{100})^{0.5})$		
Hole Dia.=	2.75	inches	Area of hole=	0.041247	ft^2
Hole # =	5.50				
Use	5	holes	@ elevation	589.58	Z_{100}
$A_{100(actual)}$=	0.2062352	ft^2	# of holes * Area of hole		
$Q_{100\ actual}$=	2.312733	cfs	$C \times A_{actual} \times ((2*g*h_{100})^{0.5})$		
Actual T_{100} =	23.06	hours	$V_{100}/(Q_{100\ actual} * 3600)$		
T_{100} is within	-4%	of	24	hours	OK
$Q_{0\ actual\ total}$=	3.028	cfs	LESS THAN	Q_{allow}= 3.258	cfs
	0.139	cfs/acre			OK

Emergency Overflow Casting Height Calculation

Q_{allow}=	3.258	cfs	Q_{allow} for regulated area, Q_0	
A_{emerg}=	1.94444	ft^2		
h_{emerg}=	0.0971388	ft	[Qallow/(5.376*A)]^2	
	1.1656651	ft		
$Z_{100\text{-}yr\ /\ emerg}$=	590.75	min	$Z_{100}+h_{emerg}$	Set Casting Height for Emergency Overflow
			w/MDOT Type E Casting	
			Opening area (A)	280 in^2
				1.944444444 ft^2

Summary of Controlling Input Factors

Q_{allow}=	0.15	cfs/ac	Impervious
Q_0=	3.258	cfs	Impervious
V_{ff}=	(3,101)	ft^3	
V_{ED}=	118,702	ft^3	
V_{100}=	191,954	ft^3	
Z_{ff}=	controlled by extended detention		
Z_{ED}=	587.89		
Z_{100}=	589.58		
Z_{out}=	580.30		
$Z_{perm\ pool}$=	584.50		
C=	0.62		sharp-crested weir
g=	32.2		ft/sec
T_{ff}=			hours
T_{ED}=	48		hours
T_{100}=	24		hours
Total Regulated Area =	21.72		acres
	946,222		sf

100–YEAR ORIFICES NOT NEEDED BASED ON DWSD PLAN REVIEW COMMENT DATED 02/20/2024

Know what's below. Call before you dig.

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

STORM SEWER PIPE DESIGN

LOCATION		AREA						CA			TIME			INTENSITY			DISCHARGE			PROFILE					DESIGN										10 YEAR	HGL	HGL √
STRUCTURE LABEL		GRASS	PAVEMENT	ROOF	GRAVEL	INCR.	TOTAL	WEIGHTED C	INCR. C*A	CUM. C*A	TO INLET	IN PIPE	TOTAL	5 YEAR	10 YEAR	100 YEAR	5 YEAR	10 YEAR	100 YEAR	PIPE LENGTH	"Upstream" INVERT OUT	"Downstream" INVERT IN	"Upstream" RIM	"Upstream" Cover Depth	COMPUTED DIAMETER	PIPE DIAMETER	PIPE DIAMETER	n VALUE	SLOPE	SLOPE	V_{FULL}	PIPE CAPACITY	SLOPE	HEADLOSS IN PIPE	"Upstream" HGL ELEV.	Dist. Between Water Level and Rim
UPSTREAM	DOWNSTREAM	sq ft	sq ft	sq ft	sq ft	acres	acres				min	min	min	in/hr	in/hr	in/hr	cfs	cfs	cfs	ft	ft	ft	ft	ft	in	in	ft		ft/ft	%	ft/s	cfs	ft/ft	ft	ft	ft
		0.40	0.95	0.95	0.85	A	A^2	C=V/G	C*A		T_i	T_p	T_i=T_i+T_p	i	i^{10}	i^{100}	Q_i=C_i * A	Q_{10}=C_{10} * A	Q_{100}=C_{100} * A	L					D=COMP	D	D	n	S		V_{FULL}	Q_{FULL}	S_f	H	HGL	
AREA 16					24622.00	0.565	0.57	0.85	0.48	0.48	15	0.00	15.00	3.32	3.88	5.96	1.60	1.86	2.86																	
AREA 15	CB-8A	CB-8A																																		
	CB-8	CB-8	35600.00	2432.00		0.873	1.44	0.95	0.83	1.31	0	0.00	15.00	3.32	3.88	5.96	4.35	5.08	7.81	150	585.37	584.62	589.73	2.61	15.62	18	1.50	0.013	0.0050	0.50%	4.20	7.43	0.0023	0.3511	587.17	2.56
AREA 14	CB-8	CB-7	50509.00	2432.00	4124.00	1.310	2.75	0.94	1.24	2.54	0	0.59	15.59	3.28	3.83	5.89	8.34	9.75	14.98	173	584.52	584.26	590.07	3.03	24.98	27	2.25	0.013	0.0015	0.15%	3.02	12.01	0.0010	0.1715	586.82	3.25
AREA 13	CB-7	CB-6	24035.00		6493.00	0.701	3.45	0.93	0.65	3.20	0	0.95	16.55	3.21	3.75	5.77	10.26	12.00	18.43	295	584.15	583.71	590.55	3.61	27.03	30	2.50	0.013	0.0015	0.15%	3.23	15.84	0.0009	0.2524	586.65	3.90
AREA 4		CB-5B	11689.00		7735.00	0.446	0.45	0.91	0.41	0.41	15	0.00	15.00	3.32	3.88	5.96	1.35	1.57	2.42																	
AREA 8	CB-5B	CB-5A	15729.00		11007.00	0.614	1.06	0.91	0.56	0.96			15.00	3.32	3.88	5.96	3.20	3.74	5.74	58	585.02	584.73	590.84	4.32	13.92	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0034	0.1943	586.27	4.57
AREA 12	CB-6	CB-5	9923.00		3824.00	0.32	3.76	0.92	0.29	3.49			15.00	3.32	3.88	5.96	11.58	13.53	20.78	420	583.61	582.98	591.97	5.57	28.25	30	2.50	0.013	0.0015	0.15%	3.24	15.89	0.0011	0.4569	586.11	5.86
	CB-5A	CB-5				0.00	1.06		0.00	0.96			15.00	3.32	3.88	5.96	3.20	3.74	5.74	130	584.63	583.98	590.84	4.71	13.92	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0034	0.4355	586.02	4.82
AREA 3		CB-4B	7658.00		6520.00	0.33	0.33	0.90	0.29	0.29			15.00	3.32	3.88	5.96	0.98	1.14	1.75																	
AREA 7	CB-4B	CB-4A	9320.00		11454.00	0.48	0.80	0.89	0.43	0.72	0	0.00	15.00	3.32	3.88	5.96	2.39	2.80	4.30	58	584.21	583.92	590.84	5.13	12.48	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0019	0.1088	585.46	5.38
AREA 11	CB-5	CB-4	13909.00	4994.00		0.43	5.26	0.95	0.41	4.86	0	0.26	15.26	3.30	3.86	5.93	16.06	18.77	28.83	198	582.58	582.28	592.10	6.19	31.88	36	3.00	0.013	0.0015	0.15%	3.67	25.96	0.0008	0.1568	585.58	6.52
	CB-4A	CB-4				0.00	0.80		0.00	0.72		0.90	16.16	3.24	3.79	5.82	2.34	2.73	4.19	78	583.92	583.58	590.84	5.42	12.69	15	1.25	0.013	0.0044	0.44%	3.48	4.26	0.0018	0.1393	585.32	5.52
AREA 10	CB-4	CB-3	12353.00		2783.00	0.35	6.41	0.93	0.32	5.91	0	0.37	16.53	3.21	3.76	5.77	18.99	22.20	34.11	200	582.18	581.88	592.13	6.62	34.02	36	3.00	0.013	0.0015	0.15%	3.65	25.83	0.0011	0.2216	585.18	6.95
	CB-3	CB-1				0.00	6.41		0.00	5.91		0.91	17.44	3.15	3.68	5.66	18.59	21.74	33.41	193	581.78	581.49	592.19	7.08	33.74	36	3.00	0.013	0.0015	0.15%	3.66	25.85	0.0011	0.2051	584.80	7.39
AREA 2		CB-1B	8650.00		5985.00	0.34	0.34	0.91	0.31	0.31	15	0.00	15.00	3.32	3.88	5.96	1.01	1.19	1.82																	
AREA 6	CB-1B	CB-1A	9314.00		11977.00	0.49	0.82	0.89	0.44	0.74	0	0.00	15.00	3.32	3.88	5.96	2.46	2.88	4.42	58	585.58	585.29	590.84	3.76	12.62	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0020	0.1153	586.83	4.01
AREA 1		CB-2B	8854.00		5341.00	0.33	0.33	0.91	0.30	0.30	15	0.00	15.00	3.32	3.88	5.96	0.99	1.15	1.77																	
AREA 5	CB-2B	CB-2A	12449.00		11347.00	0.55	0.87	0.90	0.49	0.79	0	0.00	15.00	3.32	3.88	5.96	2.62	3.07	4.71	58	583.91	583.62	590.84	5.43	12.92	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0023	0.1307	586.58	4.26
	CB-2A	CB-1A				0.00	0.87		0.00	0.79	0	0.26	15.26	3.30	3.86	5.93	2.61	3.05	4.69	333	585.20	583.52	590.84	4.14	12.87	15	1.25	0.013	0.0050	0.50%	3.74	4.59	0.0022	0.7424	586.45	4.39
AREA 9	CB-1A	CB-1	35577.00	91207.00		38928.00	3.80	5.50	0.81	3.08	4.61	0	1.48	16.74	3.20	3.74	5.74	14.73	17.22	26.46	125	582.52	581.89	590.84	5.53	24.64	30	2.50	0.013	0.0050	0.50%	5.93	29.12	0.0018	0.2204	585.02	5.82
	CB-1	FES-1				0.00	11.91		0.00	10.52	0	0.35	17.10	3.17	3.71	5.70	33.35	39.00	59.93	63	581.09	581.00	590.36	5.39	42.02	42	3.50	0.013	0.0015	0.15%	4.05	38.97	0.0015	0.0947	584.59	5.77
	FES-1	EX DETENTION				0.00	11.91		0.00	10.52	0	0.26	17.35	3.15	3.69	5.67	33.17	38.79	59.61																	

STATE OF MICHIGAN
TAMMY ZIEMNICK
6201049309
LICENSED PROFESSIONAL ENGINEER
08.26.2026



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

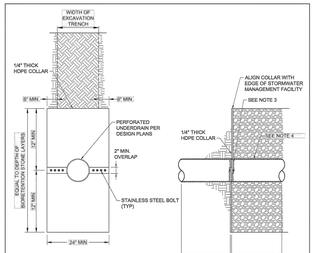
8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title
STORMWATER CALCULATIONS

ZFE Project Number 25011
Project Date 02.24.2026
Engineer: TZF
Checked By: JWF

Sheet Number
C5



SECTION
ANTI-SEEP COLLAR

DETAIL A
UNDERDRAIN CONNECTION WITH ANTI-SEEP COLLAR

NOTES:
1. DIMENSION "H" SHALL BE MINIMUM OF 3X THE DIAMETER OF THE INTERSECTION PIPE.
2. COLLAR SHALL BE CONSTRUCTED OF HDPE. BOLTS SHALL BE GRADE 304 STAINLESS STEEL.
3. SEAL SURFACE OF PIPE AND ANTI-SEEP COLLAR WITH NON-SHRINK FLEXIBLE SEALANT THAT WILL BOND TO HDPE.
4. PIPE MATERIAL AND SI ING WILL VARY BY FUNCTION.
5. THE PURPOSE OF THE ANTI-SEEP COLLAR IS TO PREVENT WATER STORED IN THE RESERVOIR LAYER FROM EXITING THE STORMWATER FACILITY THROUGH THE TRENCH BACKFILL AND RE-INFILTRATING INTO THE SEWER MAIN.

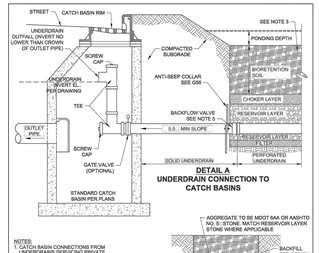
REV.	DESCRIPTION	DATE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

REVISIONS

STORMWATER FACILITY ANTI-SEEP COLLAR

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 12/20/18 | DWG. No. **G/56**



DETAIL A
UNDERDRAIN CONNECTION TO CATCH BASINS

DETAIL B
UNDERDRAIN BEDDING

NOTES:
1. CATCH BASIN CONNECTIONS FROM UNDERDRAINS SERVICING PRIVATE PROPERTY ARE PROHIBITED.
2. WHEN STORMWATER FACILITY IS LOCATED MORE THAN 10 FEET FROM CATCH BASIN, UNDERDRAIN SHALL BE CONNECTED TO EDGE OF STORMWATER FACILITY WITHIN 10 FEET OF CATCH BASIN.
3. WHEN STORMWATER FACILITY DEPICTED IS BIORETENTION FACILITY, CONNECTIONS TO CATCH BASIN WILL ALSO APPLY TO PERMEABLE PAVEMENTS AND LINEAR BIORETENTION SYSTEMS WITH UNDERDRAINS.
4. OPTIONAL PVC GATE VALVE OR PVC PIPE CAP TO BE USED TO REGULATE FLOW IN UNDERDRAIN. SEE G56 FOR GATE VALVE DESIGN PLANS. VALVE MAY ALSO BE USED IN OVERFLOW RISER AS DIRECTED.
5. WHEN CONNECTING TO A COMBINED SEWER SYSTEM, A BACKFLOW VALVE WITH SERVICEABLE ACCESS SHALL BE REQUIRED AT CONNECTION BETWEEN PERFORATED AND NON-PERFORATED PIPE.

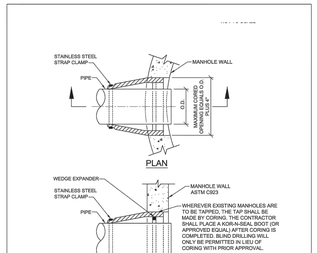
REV.	DESCRIPTION	DATE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

REVISIONS

STORMWATER FACILITY UNDERDRAIN BEDDING AND CATCH BASIN CONNECTION

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET:
DATE: 12/20/18 | DWG. No. **G/53**



SECTION

NOTE:
1. ALL NEW PIPE OPENINGS FOR PROPOSED MANHOLES SHALL BE MADE BY MANHOLE MANUFACTURER.

WATERTIGHT RESILIENT CONNECTOR FOR CONNECTING PROPOSED PIPES TO EXISTING MANHOLES AND EXISTING PIPES TO PROPOSED MANHOLES

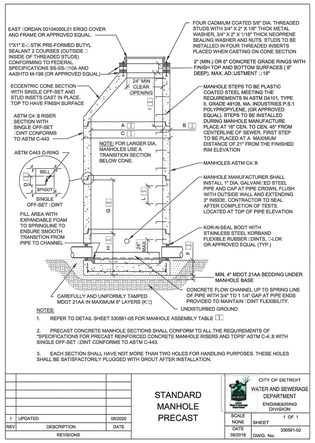
REV.	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

SEWER PIPE CONNECTION WITH MANHOLE

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 9/2018 | DWG. No. 333111-05



NOTES:
1. REFER TO DETAIL SHEET 330581-05 FOR MANHOLE ASSEMBLY TABLE [1]
2. PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ALL THE REQUIREMENTS OF "SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS" ASTM C-4:8 WITH SINGLE OFF-SET ; DINT CONFORMS TO ASTM C-443.
3. EACH SECTION SHALL HAVE NOT MORE THAN TWO HOLES FOR HANDLING PURPOSES. THESE HOLES SHALL BE SATISFACTORILY PLUGGED WITH GROUT AFTER INSTALLATION.

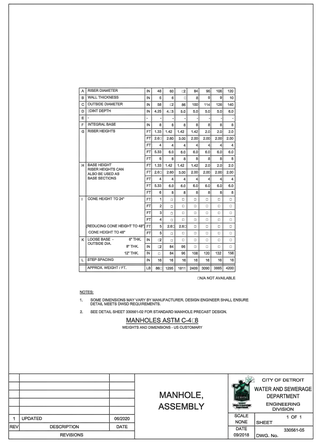
REV.	DESCRIPTION	DATE

REVISIONS

STANDARD MANHOLE PRECAST

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 09/2018 | DWG. No. 330581-03



A	IN	40	60	72	84	96	108	120
B	IN	5	6	6	6	6	6	10
C	IN	22	36	36	36	36	36	48
D	IN	4.83	4.13	5.0	5.0	5.0	5.0	6.0
F								
F	IN	6	6	6	6	6	6	9
G	FT	1.83	1.42	1.42	1.42	2.42	2.42	3.0
	FT	2.83	2.83	3.00	2.83	2.83	2.83	3.0
	FT	3.83	3.83	4.0	3.83	3.83	3.83	4.0
	FT	4.83	4.83	5.0	4.83	4.83	4.83	5.0
	FT	5.83	5.83	6.0	5.83	5.83	5.83	6.0
H	FT	1.83	1.42	1.42	1.42	2.42	2.42	3.0
	FT	2.83	2.83	3.00	2.83	2.83	2.83	3.0
	FT	3.83	3.83	4.0	3.83	3.83	3.83	4.0
	FT	4.83	4.83	5.0	4.83	4.83	4.83	5.0
	FT	5.83	5.83	6.0	5.83	5.83	5.83	6.0
I	FT	1	1	1	1	1	1	1
	FT	2	2	2	2	2	2	2
	FT	3	3	3	3	3	3	3
	FT	4	4	4	4	4	4	4
	FT	5	5	5	5	5	5	5
J	IN	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	IN	3	3	3	3	3	3	3
L	IN	16	16	16	16	16	16	16
	LB	480	1,000	1811	3400	3900	3900	4300

CMA NOT AVAILABLE

NOTES:
1. SOME DIMENSIONS MAY VARY BY MANUFACTURER. DESIGN ENGINEER SHALL ENSURE DETAIL MEETS SHAD REQUIREMENTS.
2. SEE DETAIL SHEET 330581-05 FOR STANDARD MANHOLE PRECAST DESIGN.

MANHOLES ASTM C-4: 8
WEIGHTS AND DIMENSIONS : US CUSTOMARY

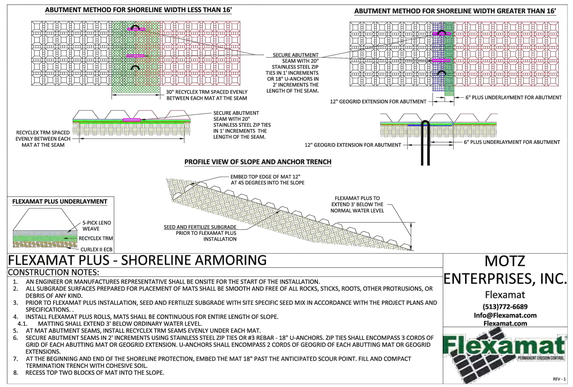
REV.	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

MANHOLE, ASSEMBLY

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 09/2018 | DWG. No. 330581-05



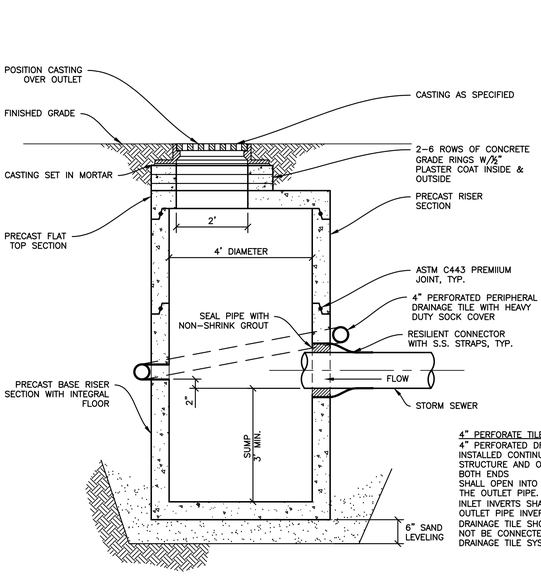
FLEXAMAT PLUS - SHORELINE ARMORING

CONSTRUCTION NOTES:
1. AN ENGINEER OR MANUFACTURES REPRESENTATIVE SHALL BE ONSITE FOR THE START OF THE INSTALLATION.
2. ALL SUBGRADE SURFACES PREPARED FOR PLACEMENT OF MATS SHALL BE SMOOTH AND FREE OF ALL ROCKS, STICKS, ROOTS, OTHER PROTRUSIONS, OR DEBRIS OF ANY KIND.
3. PRIOR TO FLEXAMAT PLUS INSTALLATION, SEED AND FERTILIZE SUBGRADE WITH SITE SPECIFIC SEED MIX IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.
4. INSTALL FLEXAMAT PLUS ROLLS, MATS SHALL BE CONTINUOUS FOR ENTIRE LENGTH OF SLOPE.
   4.1. MATTING SHALL EXTEND 3' BELOW ORDINARY WATER LEVEL.
5. AT MAT ABUTMENT SEAMS, INSTALL RECYCLEX TRM SEAMS EVENLY UNDER EACH MAT.
6. SECURE ABUTMENT SEAMS IN 2' INCREMENTS USING STAINLESS STEEL ZIP TIES OR #8 REBAR - 18" U-ANCHORS. ZIP TIES SHALL ENCOMPASS 3 CORDS OF GRID OF EACH ABUTTING MAT OR GEOGRID EXTENSION. U-ANCHORS SHALL ENCOMPASS 2 CORDS OF GEOGRID OF EACH ABUTTING MAT OR GEOGRID EXTENSIONS.
7. AT THE BEGINNING AND END OF THE SHORELINE PROTECTION, EMBED THE MAT 18" PAST THE ANTICIPATED SCOUR POINT. FILL AND COMPACT TERMINATION TRENCH WITH COHESIVE SOIL.
8. RECESS TOP TWO BLOCKS OF MAT INTO THE SLOPE.

MOTZ ENTERPRISES, INC.
Flexamat
(513)772-6689
Info@Flexamat.com
Flexamat.com

REV - 1

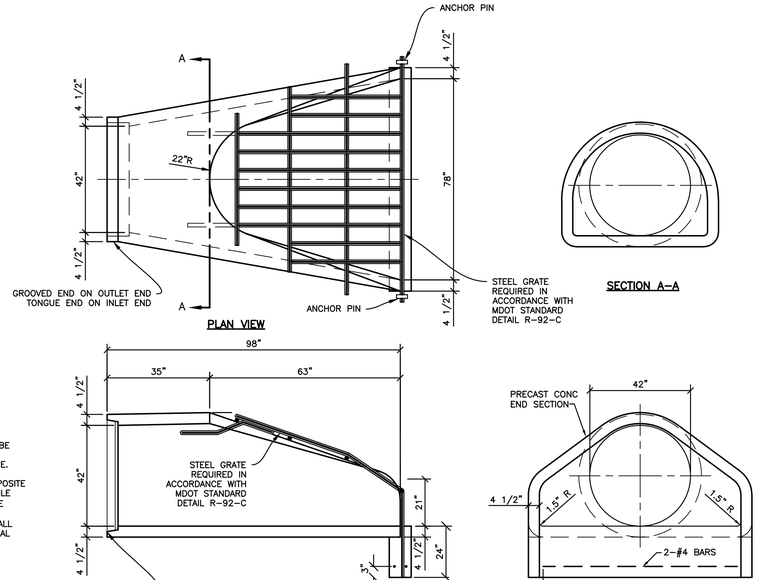
DETENTION POND BUFFER STRIP SURFACE TREATMENT (15' WIDE MIN.) SECTION DETAIL
SCALE: AS NOTED



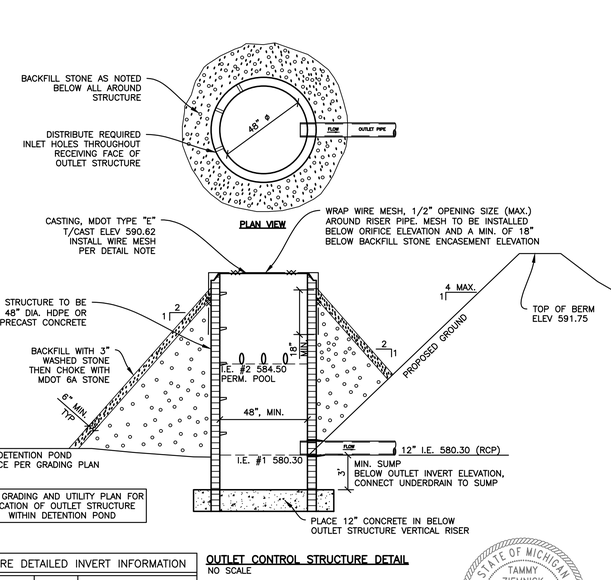
CATCH BASIN DETAIL
NO SCALE

4" PERFORATE TILE NOTE:
4" PERFORATED DRAINAGE TILE SHALL BE INSTALLED CONTINUOUSLY AROUND THE STRUCTURE AND OVER THE OUTLET PIPE. BOTH ENDS SHALL OPEN INTO THE STRUCTURE OPPOSITE THE OUTLET PIPE. THE PERIPHERAL TILE INLET INVERTS SHALL BE 2" ABOVE THE OUTLET PIPE INVERT. ANY ADDITIONAL DRAINAGE TILE SHOWN ON PLAN(S) SHALL NOT BE CONNECTED TO THIS PERIPHERAL DRAINAGE TILE SYSTEM.

DRAINAGE STRUCTURE CASTINGS
EJIW 6508 – DITCHLINES – MDOT COVER E
EJIW 7045 TYPE B – HIGH BACK CURB – MDOT COVER K
EJIW 5100 M1 – STRAIGHT CURB – MDOT COVER D
EJIW 1040 – STORM MANHOLE – MDOT COVER B



42" FLARED END SECTION DETAIL
NO SCALE



OUTLET STRUCTURE DETAILED INVERT INFORMATION				
INVERT NO.	NO. OF HOLES	HOLE DIA.	ELEV.	DESCRIPTION
1	N/A	N/A	580.30	12" RCP OUTLET PIPE SUBMERGED OUTLET
2	3	1.5" ø	584.50	PERMANENT POOL ELEVATION

OUTLET CONTROL STRUCTURE DETAIL
NO SCALE



08.26.2026

EXHIBIT B - STORM WATER OPERATION AND MANAGEMENT SYSTEM LONG-TERM MAINTENANCE PLAN

A. Physical Limits of the Storm Water Management System
The storm water management system (SWMS) subject to this long-term maintenance plan (Plan) is depicted on Sheets C5 and C6plot (attached) to the permit and includes without limitation the storm sewers, swales, catch basins, manholes, inlets, bioretention system, detention system, outlet control structure and outlet pipe that conveys flow from the stormwater detention system to an existing combined sewer manhole in Harbaugh Street that outlets to an existing 30-inch combined sewer. For the purposes of this plan, the SWMS and all of its components as shown in Sheets C5 and C6 are referred to as "Crown Melville Rail Yard SWMS".

B. Time Frame for Long-Term Maintenance Responsibility
Crown Enterprises, LLC is responsible for maintaining the Crown Melville Rail Yard SWMS including complying with applicable requirements of the City of Detroit or Wayne County soil erosion and sedimentation control program until the City of Detroit releases the construction permit. Long-term maintenance responsibility for the Crown Melville Rail Yard SWMS commences when defined by the maintenance permit issued by the City of Detroit. Long-term maintenance continues in perpetuity.

C. Manner of Insuring Maintenance Responsibility
Crown Enterprises, LLC has assumed responsibility for long-term maintenance Crown Melville Rail Yard SWMS.

To ensure that the Crown Melville Rail Yard's SWMS is maintained in perpetuity, the map of the physical limits of the storm water management system on Sheets C2A and C2B, this plan (Exhibit B), will be recorded with the Wayne County Register of Deeds. Upon recording, a copy of the recorded documents will be provided to the City of Detroit.

D. Long-Term Maintenance Plan and Schedule
Table 1 identifies the maintenance activities to be performed, organized by category (monitoring/inspections, preventative maintenance and remedial actions). Table 1 also identifies site-specific work needed to ensure that the storm water management system functions properly as designed.

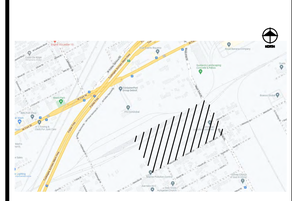
TABLE 1
STORM WATER MANAGEMENT SYSTEM LONG-TERM MAINTENANCE SCHEDULE

MAINTENANCE ACTIVITIES	SYSTEM COMPONENTS: Storm Collection System (Pipes, Catch Basins, Manholes)	Bioretention and Detention System	Basin Inlets, Outlets & Gratings	Outlet Control Structures	Gravel and Pavement Areas	FREQUENCY
Monitoring/Inspection						
Inspect for Sediment Accumulation/Clogging	X	X	X	X	X	Annually
Inspect for Floatables, Dead Vegetation & Debris	X	X	X	X	X	Annually & After Major Events
Inspect for Erosion & Integrity of System and banks and berms	X	X	X			Annually & After Major Events
Inspect all components during wet weather & compare to Record Drawings	X	X	X	X	X	Annually
Monitor Plantings/Vegetation		X				Minimum of 2 times/ year
Ensure Maintenance Access Remain Open/Clear	X	X	X	X	X	Annually
Preventative Maintenance						
Mowing		X				Up to 2 times / year
Remove Accumulated Sediments	X	X	X	X	X	As-Needed (See Note Below)
Remove Floatables, Dead Vegetation & Debris	X	X	X	X	X	As Needed
Replace or wash/reuse stone riser debris				X		Every 3 years; more frequently if needed
Sweeping of Paved Surfaces					X	As Needed
Remedial Actions						
Repair/Stabilize Areas of Erosion	X				X	As Needed
Replace Dead Plantings & Reseed Bare Areas	X	X				As Needed
Structural Repairs	X	X	X	X	X	As Needed
Make Adjustments/Repairs to Ensure Proper Functioning	X	X	X	X	X	As Needed
Oil and Gas Spills					X	Immediately

PROJECT:	PROPERTY OWNER:	ENGINEER:	DATE: 01/28/2026
Crown Melville	Crown Enterprises, LLC	Ziemnick Foster Engineering, LLC	
Rail Spur Development	8100 Melville Street	426 S. Clinton Street	
City of Detroit	Detroit, MI 48209	Grand Ledge, MI 48837	SHEET 1 OF 1
		517-627-8086	

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

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

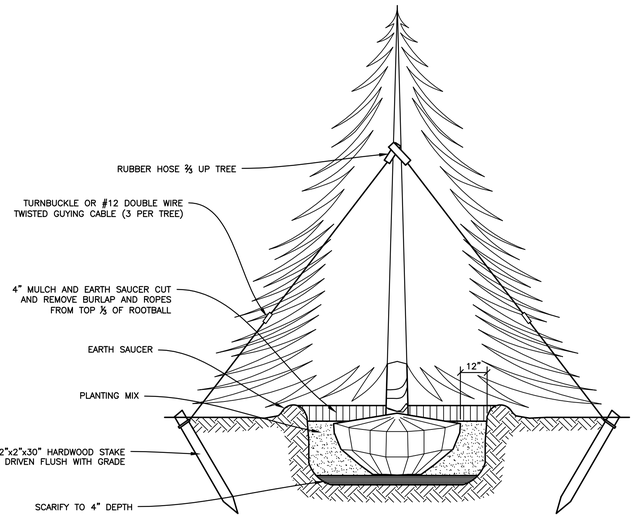
Crown Enterprises

8100 Melville Street
2026 Site Development

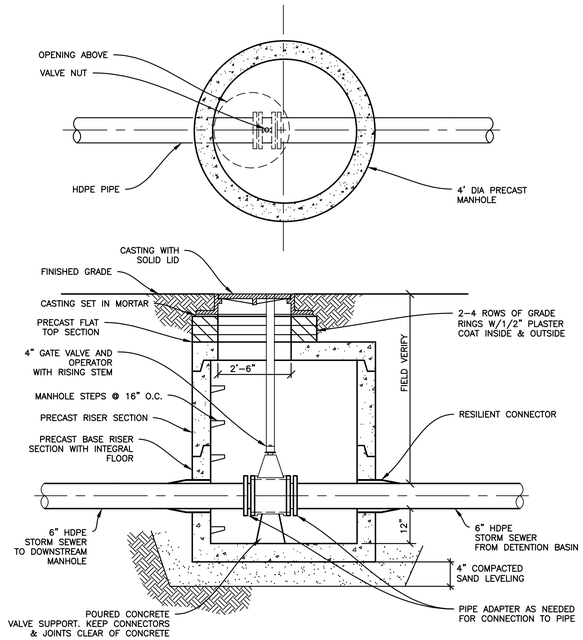
City of Detroit, Wayne County, Michigan

Sheet Title
STORMWATER DETAILS

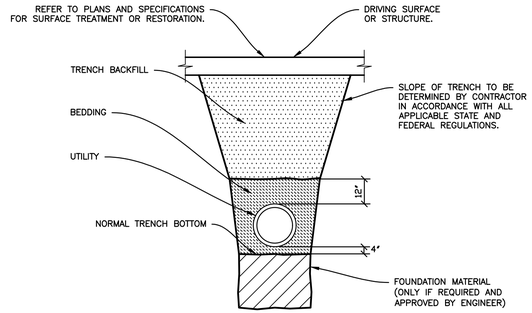
ZFE Project Number	Sheet Number
25011	C6
Project Date: 02.24.2026	
Engineer: TZF	
Checked By: JWF	



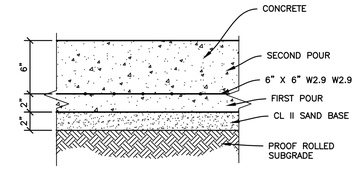
CONIFER PLANTING DETAIL: 6' HEIGHT AND GREATER
NO SCALE



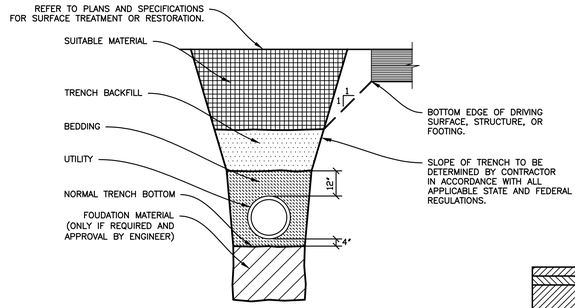
GATE VALVE & STRUCTURE
NO SCALE



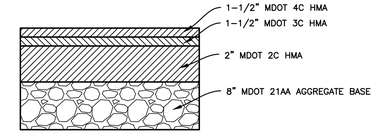
TRENCH BELOW DRIVING SURFACE OR STRUCTURE
NO SCALE



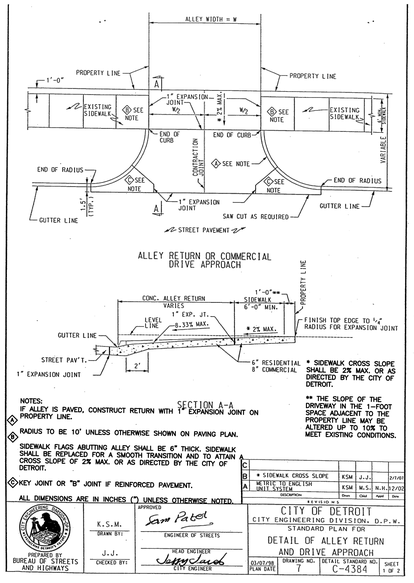
8" REINFORCED CONCRETE
NO SCALE

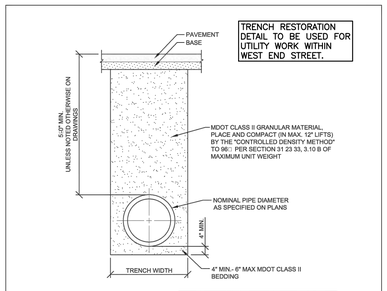


TRENCH ADJACENT TO DRIVING SURFACE OR STRUCTURE
NO SCALE



PAVEMENT SECTION
INDUSTRIAL HEAVY DUTY
NO SCALE





NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

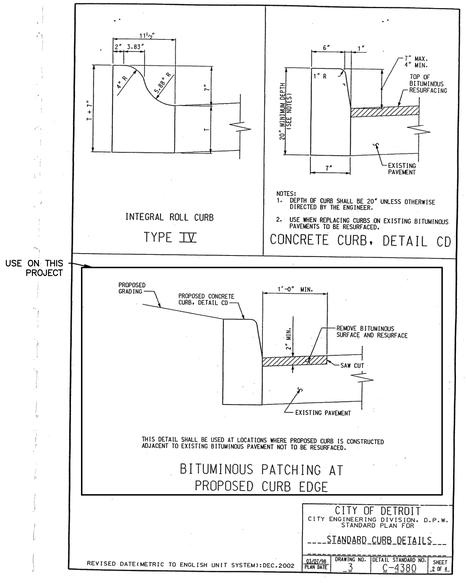
NOTES:
1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. REFER TO PAVEMENT RESTORATION DETAILS FOR BASE AND PAVEMENT WIDTH.
3. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR WATER MAIN UNDER ROAD BED, PARKING LOTS, SIDEWALKS, DRIVEWAYS, CURBS, GRAVEL ROADS AND ALLEYS

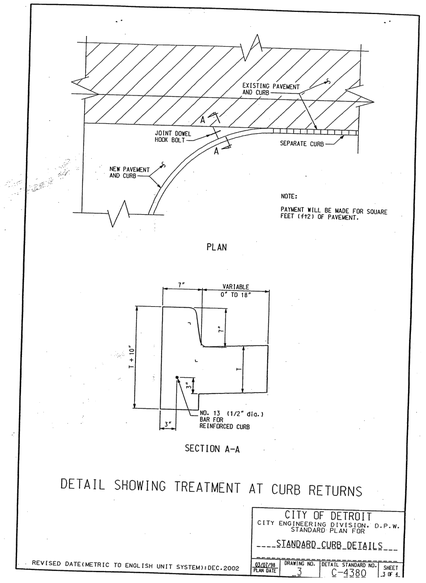
REV	DESCRIPTION	DATE
1	UPDATED	5/2020
REVISIONS		

UTILITY TRENCH, WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION
SCALE NONE
SHEET 1 OF 3
DATE 9/2018
DWG. No. 312333-04



CITY OF DETROIT
CITY ENGINEERING DIVISION- D.P.W.
STANDARD PLAN FOR
STANDARD CURB DETAILS
01/07/08 PLAN DATE
DRAWING NO. 3
DETAIL STANDARD NO. C-4380
SHEET 2 OF 6
REVISED DATE(METRIC TO ENGLISH UNIT SYSTEM):DEC.2002



CITY OF DETROIT
CITY ENGINEERING DIVISION- D.P.W.
STANDARD PLAN FOR
STANDARD CURB DETAILS
01/07/08 PLAN DATE
DRAWING NO. 3
DETAIL STANDARD NO. C-4380
SHEET 3 OF 6
REVISED DATE(METRIC TO ENGLISH UNIT SYSTEM):DEC.2002

STATE OF MICHIGAN
TAMMY ZIEMNICK
6201049309
LICENSED PROFESSIONAL ENGINEER
08.26.2026

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

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title

SITE DETAILS

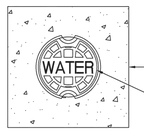
ZFE Project Number 25011

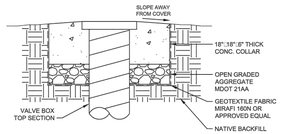
Project Date 02.24.2026

Engineer: TZF

Checked By: JWF

Sheet Number C7





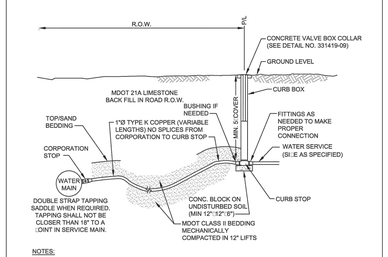
NOTE:
1. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □4,000 PSI.

REV	DESCRIPTION	DATE
	REVISIONS	

CONCRETE VALVE BOX COLLAR

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	NONE	SHEET	1 OF 1
DATE	5/2020	DWG. No.	331419-09



NOTES:
1. CURB BOX SHALL BE INSTALLED ON PROPERTY LINE.
2. TRENCH CONSTRUCTION / BACK FILL SHALL BE DONE IN SAME MANNER AS WATER MAIN TRENCH DETAIL.
3. IF EXISTING SERVICE RUN IS LEAD PIPE (P□), THEN REPLACE PER SPECIFICATIONS SECTION 33141□-81.
4. WRAP CORPORATION AND SERVICE SADDLE WITH WAX TAPE CONFORMING WITH AWWA C21□.

REV	DESCRIPTION	DATE
	REVISIONS	

CONNECTION, RESIDENTIAL SERVICE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

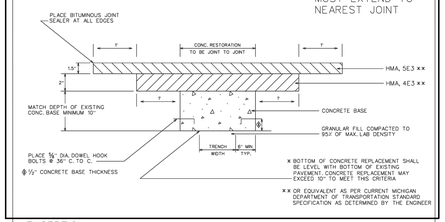
SCALE	NONE	SHEET	1 OF 1
DATE	5/2020	DWG. No.	33141□-01

USE MAJOR STREET RESTORATION FOR WEST END STREET UTILITY TRENCHES

WEST END STREET RESTORATION INFORMATION

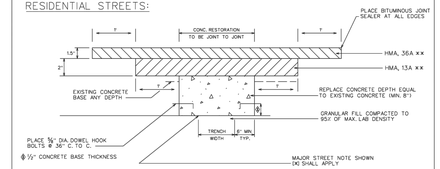
MAJOR STREETS:

NOTE: PAVEMENT CUTS MUST EXTEND TO NEAREST JOINT



EXCEPTION:
TO ABOVE 3" HMA REPLACEMENT, WHEN PAVEMENT REPLACEMENT IS 100 FEET FROM EITHER SIDE OF UNDERPASS REPLACE 10" MIN CONCRETE BASE WITH TOP OF CONCRETE LEVEL WITH TOP OF EXISTING CONCRETE AND REPLACE HMA SECTION AS EXISTING

RESIDENTIAL STREETS:



ISOLATED CUT:
TRIM JOINT TO OBTAIN VERTICAL CUT

B					
A					
	DESCRIPTION	REV□	CHE□	APP□	DATE
	REVISIONS				
DRAWN BY	WLW	CHECKED	KSM		
DATE	08/29/18	APPROVED	SRB		

HMA SURFACE ON CONCRETE BASE UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION

CITY OF DETROIT
CITY ENGINEERING DIVISION
SURVEY BUREAU

JOB NO.

DRWG.NO. 1 OF 2

CITY OF DETROIT NOTES

1. MILL (REMOVE) HMA PAVEMENT WITHIN AND BEYOND THE AREA OF TRENCH PAVEMENT REMOVAL IN ORDER TO DETERMINE LOCATION OF UNDERLYING CONCRETE BASE PAVEMENT JOINTS. MILL MINIMUM TO 1' BEYOND NEAREST CONCRETE JOINTS.
2. EXTEND UTILITY TRENCH CONCRETE PAVEMENT REMOVAL TO ALL CONCRETE PAVEMENT JOINTS AND / OR CURBS ADJACENT TO THE TRENCH AREA. REMOVAL SHALL BE "JOINT TO JOINT".
3. CONCRETE PAVEMENT CUTS SHALL BE MINIMUM 3' WIDE.
4. ALL PAVEMENT CUTS SHALL BE MINIMUM 1' WIDER THAN TRENCH WIDTH.
5. ALL REMOVALS SHALL BE SAWCUT STRAIGHT AND SQUARE (90 DEGREES).
6. CONCRETE RESTORATION PAVEMENT SHALL BE MDOT P1 MIX (3,500 PSI).
7. RESTORED CONCRETE PAVEMENT SHALL MATCH THICKNESS OF EXISTING CONCRETE PAVEMENT IN CONFORMANCE WITH MDOT STANDARDS DETAIL R-44-F.
8. RESTORED CONCRETE SHALL BE ANCHORED TO EXISTING CONCRETE PAVEMENT IN CONFORMANCE WITH MDOT STANDARD DETAIL R-44-F
9. APPLY HMA TACK COAT PER MDOT STANDARD SPECIFICATIONS SECTION 904.
10. RESTORE HMA PAVEMENT 3½" TO MATCH EXISTING, IN 2 LIFTS:
    1ST LIFT - 2" MDOT HMA 4E3 (13A RESIDENTIAL), COMPACTED, EXTENDED 1' BEYOND BASE CONCRETE REPAIR.
    2ND LIFT - 1½" MDOT HMA 5E3 (36A RESIDENTIAL), COMPACTED, EXTENDED 1' BEYOND 1ST LIFT.
11. BITUMINOUS JOINT SEALER SHALL BE PLACED AT ALL FINISHED HMA JOINTS.
12. ALL DISTRUBED PAVEMENT MARKINGS AND OTHER ASSETS, INCLUDING BIKE LANE DELINEATORS, WILL HAVE TO BE REPLACED AT THE COST OF THE PERMIT HOLDER, AND SHALL CONFORM TO THE LATEST CED / TED STANDARDS.
13. FOR OTHER RELATED SPECIFICATIONS (BACKFILL COMPACTION, MATERIALS, ETC...), REFER TO DIVISION 15 OF THE STANDARD SPECIFICATIONS FOR PAVING AND RELATED CONSTRUCTION.
14. NOTIFY THE CITY OF DETROIT ENGINEERING DEPARTMENT 24 HOURS PRIOR TO STARTING CONSTRUCTION.
15. ANY OPEN EXCAVATIONS ARE TO BE STEEL PLATED. IF EXCAVATIONS ARE IN THE PAVEMENT, THE PLATES ARE TO BE SPIKED AND RAMPED WITH COLD PATCH. CONTACT THE CITY WITH LOCATION OF THE STEEL PLATE.
16. THE CITY OF DETROIT REQUIRES ALL CONCRETE WORK TO BE STAMPED WITH A CONTRACTORS IDENTIFICATION STAMP.

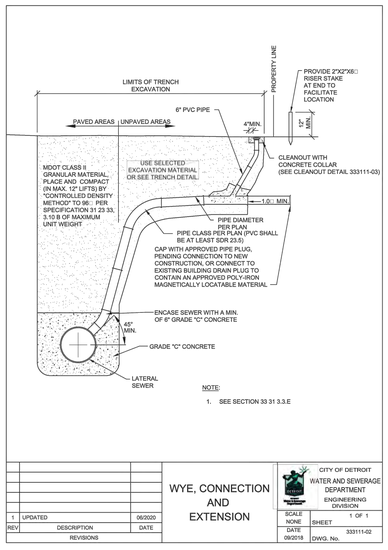
B					
A					
	DESCRIPTION	REV□	CHE□	APP□	DATE
	REVISIONS				
DRAWN BY	WLW	CHECKED	KSM		
DATE	08/29/18	APPROVED	SRB		

HMA SURFACE ON CONCRETE BASE UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION

CITY OF DETROIT
CITY ENGINEERING DIVISION
SURVEY BUREAU

JOB NO.

DRWG.NO. 2 OF 2



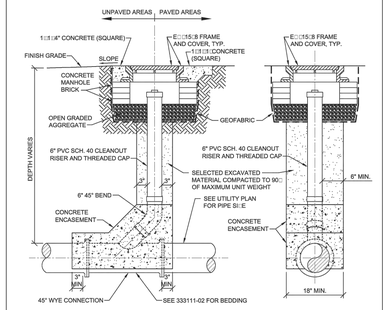
NOTE:
1. SEE SECTION 33 31 3.3.E

REV	DESCRIPTION	DATE
1	UPDATED	06/2020
	REVISIONS	

WYE, CONNECTION AND EXTENSION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	NONE	SHEET	1 OF 1
DATE	09/2018	DWG. No.	333111-02



SIDE VIEW

FRONT VIEW

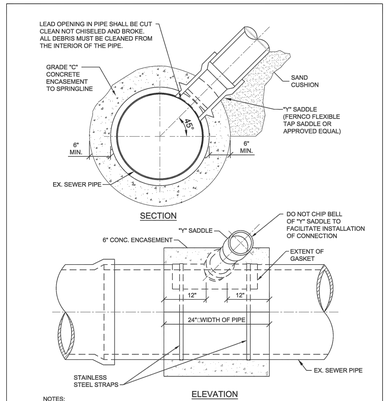
NOTES:
1. MINIMUM SEPARATION DISTANCE BETWEEN LATERALS: 5 FT
2. MINIMUM DEPTH OF COVER OVER PIPE: 2 FT

REV	DESCRIPTION	DATE
1	UPDATED	06/2020
	REVISIONS	

CLEANOUT

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	NONE	SHEET	1 OF 1
DATE	9/2018	DWG. No.	333111-03



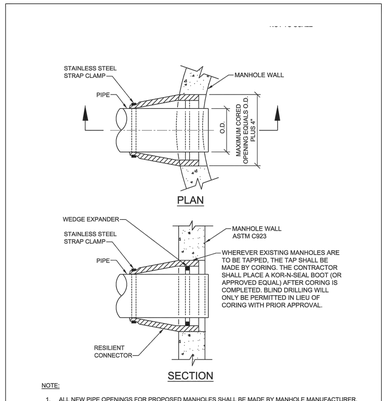
NOTES:
1. FOR SEWERS 18" OR LESS A "Y" SADDLE MAY BE USED IF THE OUTSIDE DIA. OF THE TAP IS LESS THAN ONE HALF THE DIA. OF THE SEWER BEING TAPPED.
2. PROVIDE EXTENSION CLAMPS FOR 15" SEWERS AND LARGER.
3. CONCRETE BELOW PIPE IS ONLY REQUIRED FOR 15" SEWERS AND LARGER WITH STRAPS.

REV	DESCRIPTION	DATE
1	UPDATED	06/2020
	REVISIONS	

CONNECTION, SADDLE TO LATERAL SEWER

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	NONE	SHEET	1 OF 1
DATE	09/2018	DWG. No.	333111-01



NOTE:
1. ALL NEW PIPE OPENINGS FOR PROPOSED MANHOLES SHALL BE MADE BY MANHOLE MANUFACTURER.

WATERTIGHT RESILIENT CONNECTOR FOR CONNECTING PROPOSED PIPES TO EXISTING MANHOLES AND EXISTING PIPES TO PROPOSED MANHOLES

REV	DESCRIPTION	DATE
1	UPDATED	06/2020
	REVISIONS	

SEWER PIPE CONNECTION WITH MANHOLE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	NONE	SHEET	1 OF 1
DATE	9/2018	DWG. No.	333111-05

Know what's below. Call before you dig.

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title

SITE DETAILS

ZFE Project Number	Sheet Number
25011	C8
Project Date: 02.24.2026	
Engineer:	
Checked By:	

STATE OF MICHIGAN
TAMMY ZIEMNICK
6201049309
LICENSED PROFESSIONAL ENGINEER

08.26.2026

SURFACE RESTORATION LEGEND

- SEED AND MULCH
- RIP RAP ARMOR
- 6" CONCRETE SURFACE
- BITUMINOUS PAVEMENT SURFACE
- STANTEC NURSERY STORMWATER SEED MIX INSTALLATION AREA
- STANTEC NURSERY WETLAND EDGE SEED MIX INSTALLATION AREA
- STANTEC NURSERY SLOPE STABILIZATION SEED MIX INSTALLATION AREA
- FLEXAMAT, TIED CONCRETE BLOCK MAT WITH UNDERLAYMENT INSTALLATION AREA, SEE DETAIL

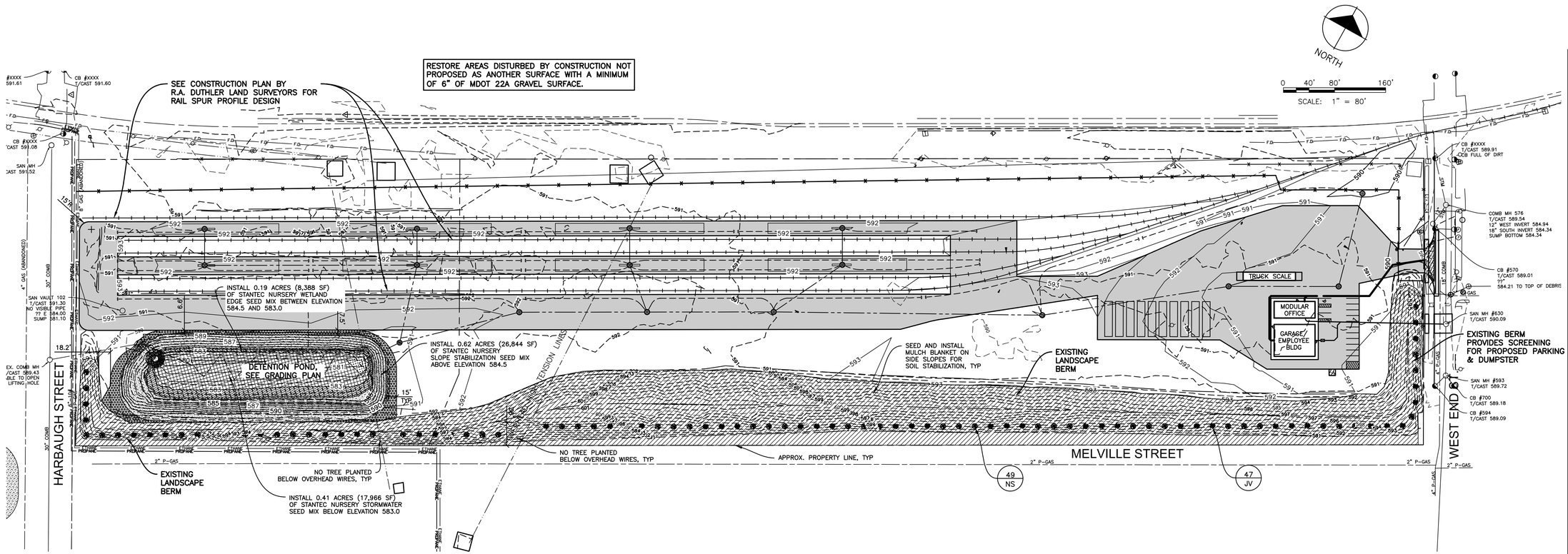
BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MADB3 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

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

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

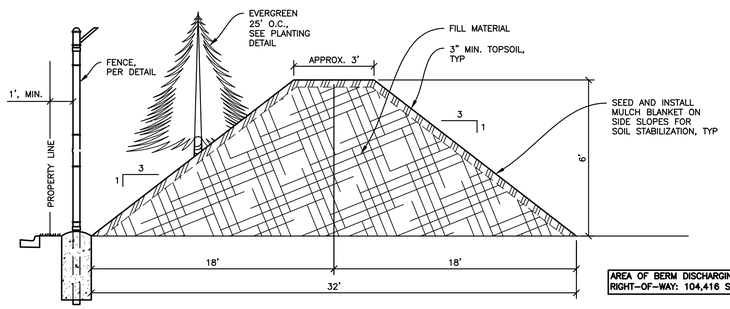
Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

PLANT LIST

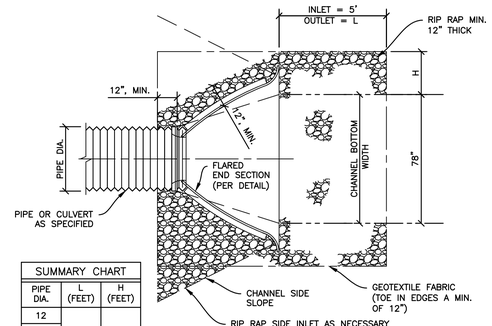
KEY	QTY	SCIENTIFIC NAME	COMMON NAME	SIZE	ROOT	REMARKS
EVERGREEN TREES						
JV	46	Juniperus Virginiana	Eastern Red Cedar	8'-0"	B&B	25' O.C.
NS	47	Picea abies	Norway Spruc	6'-0"	B&b	25' O.C.

49 NS — NO. OF PLANTS; TYPE OF PLANT PER PLANT LIST KEY



PERIMETER EARTH BERM
NO SCALE

AREA OF BERM DISCHARGING RIGHT-OF-WAY: 104,416 SF (2.40 ACRE)



SUMMARY CHART		
PIPE DIA.	L (FEET)	H (FEET)
12	5	2
15		
18		
42	15	6
48		
54		
60		

NOTE:
"H" PROVIDES FOR RIP RAP UP TO THE MIDPOINT OF THE AVERAGE PIPE DIAMETER IN THE GROUPING.

"L" FOLLOWS MINIMUM APRON LENGTHS BASED ON EMPIRICAL FORMULA U.S.E.P.A. 1976 L=3Q/D3/2 FOR TAILWATERS GREATER THAN 0.50 (D=DIAMETER)

RIP RAP END TREATMENT
NO SCALE

PLANTING MIXTURE NOTES

1. MIXTURE SHALL BE A MIXTURE OF ⅓ TOPSOIL, ⅓ SAND, AND ⅓ PEAT. ADD FERTILIZER AT THE QUANTITY AS RECOMMENDED BY THE MANUFACTURER. PLANTING MIXTURE SHALL BE FREE FROM STICK, STONES, SOD CLODS AND OTHER MATERIAL WHICH MIGHT LEAVE POCKETS AROUND THE ROOTS.

2. TOPSOIL
   2.1. TOPSOIL SHALL BE FERTILE, FRIABLE, SNADY CLAY LOAM WITH ADMISTRURE OF SUBSOIL. TOPSOIL IS TO BE FREE OF GLASS, STONES GREATER THAN ONE (1) INCH IN ANY DIMENSION, WEEDS, UNDESIRABLE GRASSES AND OTHER EXTRANEOUS MATERIALS. TOPSOIL SHALL HAVE THE FOLLOWING RANGE OF VALUES:
   pH 5.0 TO 7.5
   SOLUABLE SALTS 500 PPM MAX
   ORGANIC CONTENT 5% TO 30%
   SILT CONTENT 35% TO 50%
   CLAY CONTENT 5% TO 10%
   DELETEREOUS MAT'L* 5% MAX
   *ROCK, GRAVEL, STONE, STICKS, ROOTS, SOD, ETC.

   2.2. COMPOST MAY BE MIXED WITH TOPSOIL TO OBTAIN THE DESIRED CONTENT, TOPSOIL IS TO BE FINAL SCREENED THROUGH A ½" MAXIMUM MESH SCREEN PRIOR TO DELIVERY TO THE PROJECT SITE. TOPSOIL SHALL BE PLACED IN 3-INCH MINIMUM THICKNESS THROUGHOUT.

3. SAND FOR PLANTING MIXTURE SHALL BE CLEAN, COURSE, UNGRADED SAND CONFORMING TO ASTM C3 FOR FINE AGGREGATES.

4. PEAT: GRANULATED RAW CANADIAN PEAT OR BALED CANADIAN PEAT CONTAINING NOT MORE THAN 9% MINERAL ON A DRY BASIS.

PLANTING NOTES

1. ALL PLANTING AREAS, INCLUDING TOPSOIL LANDSCAPING BERM, SHALL RECEIVE A MINIMUM OF 3-INCHES OF TOPSOIL.

2. DETENTION BASIN SHALL RECEIVE 24" OF PLANTING SOIL IN BOTTOM AND 12" OF PLANTING SOIL ON SIDE SLOPES.

3. STANTEC NURSERY SEED MIX APPLICATION RATES SHALL BE PER MANUFACTURER'S RECOMMENDATION.

STATE OF MICHIGAN TAMMY ZIEMNICK LICENSED PROFESSIONAL ENGINEER 6201049309
08.26.2025

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

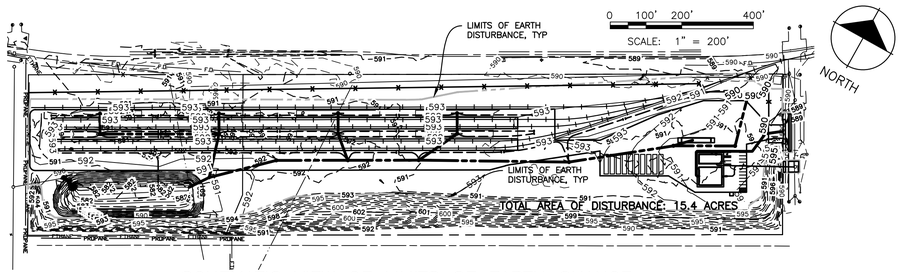
Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title
LANDSCAPE PLAN

ZFE Project Number	Sheet Number
25011	C9
Project Date 02.24.2026	
Engineer: TZF	
Checked By: JWF	



SCHEMATIC VIEW OF LIMITS OF EARTH CHANGE

SITE UTILITY AND GRADING LEGEND

PIPE CONTENTS ABBREVIATIONS	
GAS	NATURAL GAS
SAN	SANITARY SEWER
STM	STORM SEWER
WTR	WATER
FM	FORCE MAIN

PIPE MATERIAL ABBREVIATIONS	
CSP	CORRUGATED STEEL PIPE
CSPA	CORRUGATED STEEL PIPE ARCH
DIP	DUCTILE IRON PIPE
NRCP	NON-REINFORCED CONCRETE PIPE
PE	POLYETHYLENE
PE PERF.	POLYETHYLENE PIPE PERFORATED
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE

- 12" STM — STORM SEWER & MANHOLE
- CATCH BASIN
- 6" U.D. — UNDERDRAIN
- ADJ — ADJUST EX. STRUCTURE CASTINGS
- 505 — PROPOSED CONTOUR ELEVATION
- APPROX. LIMITS OF EARTH DISTURBANCE
- PERIMETER SILT FENCE
- 6" CONCRETE SURFACE
- INDUSTRIAL HEAVY-DUTY BITUMINOUS PAVEMENT
- 8" REINFORCED CONCRETE SURFACE
- WEST END STREET BITUMINOUS PAVEMENT RESTORATION, SEE CITY OF DETROIT UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION DETAIL SHEET C5

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

LEGAL DESCRIPTION – PARCEL #: 20001110.3

NORTH MELVILLE PART OF PC 340 LYING BETWEEN WEST END, MELVILLE, AND HARBAUGH BEGINNING ON THE SOUTH 437.79 FEET ON WEST LINE AND THE SOUTH 448.75 FEET ON THE EAST LINE. CONTAINING 21.96 ACRES, COMBINED ON 02/21/2023 FROM 20011110.001, 20001110.002L, 20001111, 20001112, 20001113.001, AND 20001113.002L

SITE SOIL TYPES

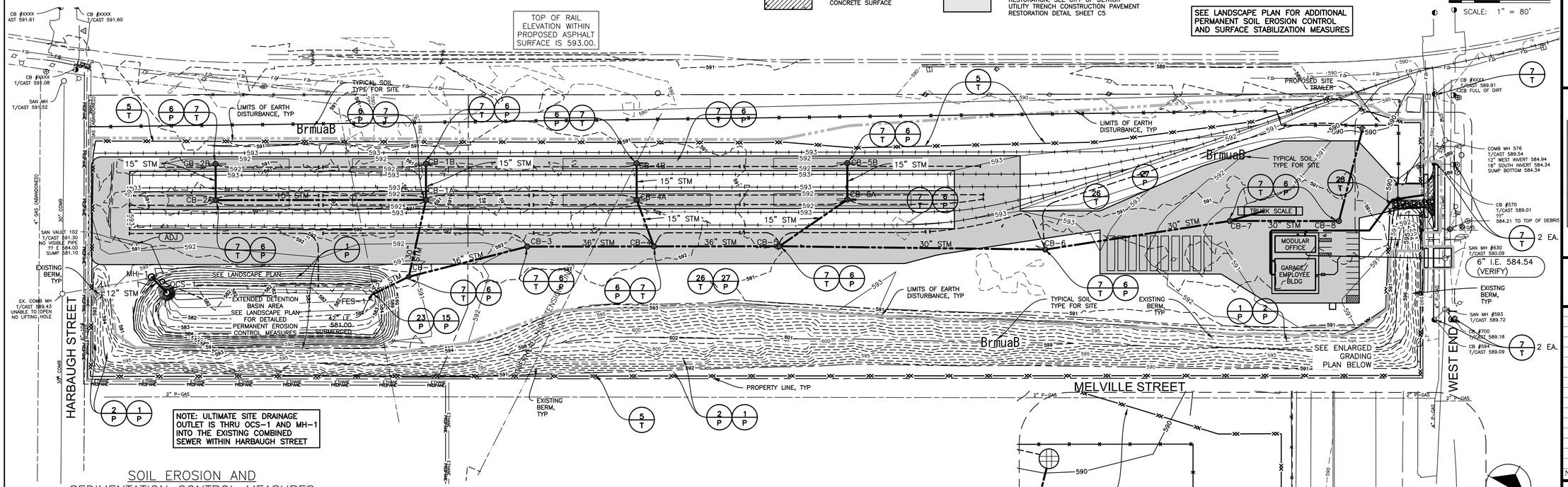
USDA NATURAL RESOURCE CONSERVATION SERVICE SOIL SURVEY DATA REPORTS THAT THE ENTIRE PROPERTY HAS THE SAME SOIL TYPE, BRE#S–URBAN LAND COMPLEX – BrmuaB WITH 0 TO 4 PERCENT SLOPES

Know what's below. Call before you dig.

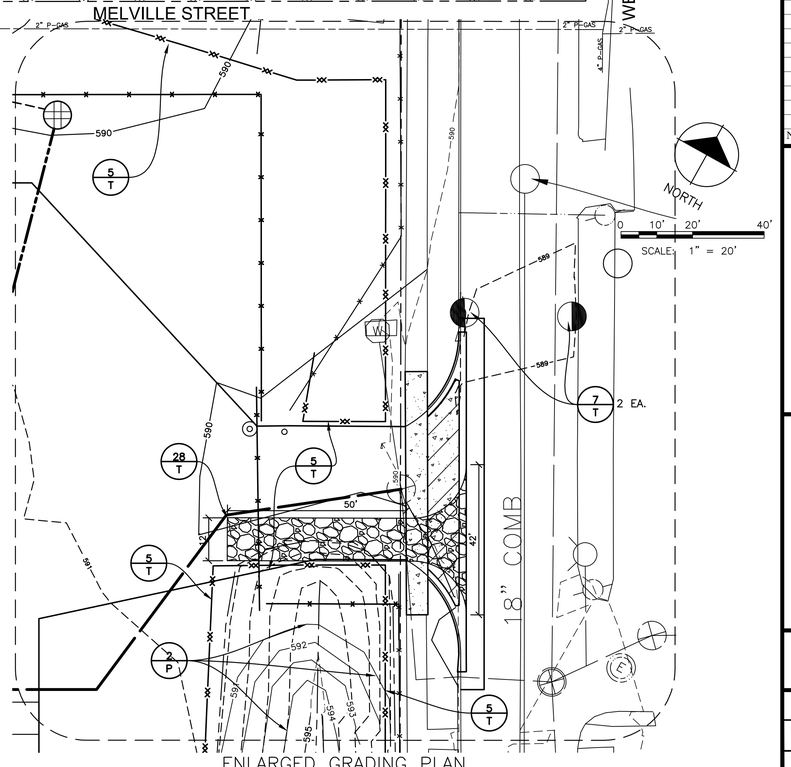
Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

TOP OF RAIL ELEVATION WITHIN PROPOSED ASPHALT SURFACE IS 593.00.

SEE LANDSCAPE PLAN FOR ADDITIONAL PERMANENT SOIL EROSION CONTROL AND SURFACE STABILIZATION MEASURES



NOTE: ULTIMATE SITE DRAINAGE OUTLET IS THRU OCS–1 AND MH–1 INTO THE EXISTING COMBINED SEWER WITHIN HARBAUGH STREET



ENLARGED GRADING PLAN

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES MACDC KEYING SYSTEM

KEY	SESC MEASURE	SYMBOL	WHERE USED
1	SEEDING		WHEN BARE SOIL IS EXPOSED, TEMPORARILY OR PERMANENTLY, TO EROSIVE FORCES FROM WIND AND OR WATER ON FLAT AREAS, MILD SLOPES, GRASSED WATERWAYS AND SPILLWAYS, DIVERSION DITCHES AND DIKES, BORROW AND STOCKPILE AREAS, AND SPOIL PILES.
2	MULCH		ON FLAT AREAS, SLOPES, GRASSED WATERWAYS AND SPILLWAYS, DIVERSION DITCHES AND DIKES, BORROW AND STOCKPILE AREAS, AND SPOIL PILES WHEN AREAS ARE SUBJECT TO RAINDROP IMPACT, AND EROSIVE FORCES FROM WIND OR WATER.
4	TREES, SHRUBS, VINES AND GROUND COVER		WHEN BARE SOIL OR RECENTLY VEGETATED SLOPES ARE EXPOSED TO EROSIVE FORCES FROM WIND AND/OR WATER.
5	PERIMETER SEDIMENT CONTROL MEASURES (SILT FENCE, STRAW WATTLES, ETC.)		AS A TEMPORARY MEASURE USED TO CAPTURE SEDIMENT FROM SHEET FLOW. MAY ALSO DIVERT SMALL VOLUMES OF SHEET FLOW TO PROTECTED OUTLETS.
6	CATCH BASIN		WHERE SURFACE WATER ACCUMULATES AND NEEDS AN OUTLET OR AN OPEN DRAIN DISCHARGES TO A STREAM OR DRAIN AT EROSIVE VELOCITIES. WITHIN AN ENCLOSED DRAIN SYSTEM TO PROVIDE AN INLET AND A SUMP.
7	STORM DRAIN INLET PROTECTION		AROUND THE ENTRANCE TO A CATCH BASIN OR AN INLET THAT WILL CAPTURE RUNOFF FROM AN EARTH CHANGE ACTIVITY.
15	RIPRAP		ALONG DRAIN BANKS, SHORELINES, OR WHERE CONCENTRATED FLOWS OCCUR. SLOWS VELOCITY, REDUCES EROSION AND SEDIMENT LOAD.
23	OUTFALL STABILIZATION		IN THE STREAM OR DRAIN BANK USUALLY ABOVE THE ORDINARY HIGH WATER MARK WHERE AN ENCLOSED DRAIN OR TILE DISCHARGES TO AN OPEN DRAIN.
26	DUST CONTROL		AS A TEMPORARY MEASURE ON EXPOSED AND UNSTABILIZED AREAS THAT MUST BE PROTECTED FROM WIND OR WATER EROSION.
27	STABILIZED SURFACE COVER		CAN BE USED IN ANY AREA WHERE A STABLE CONDITION IS NEEDED FOR CONSTRUCTION OPERATIONS, EQUIPMENT STORAGE OR IN HEAVY TRAFFIC AREAS. REDUCES POTENTIAL SOIL EROSION AND FUGITIVE DUST BY STABILIZING RAW AREAS.
28	STONE CONSTRUCTION ACCESS		AT LOCATIONS WHERE CONSTRUCTION EQUIPMENT WILL ENTER AND EXIT THE DRAIN EASEMENT AND TRACKING OF SOIL IS ANTICIPATED.

XX T TEMPORARY MEASURE

XX P PERMANENT MEASURE

STREET CLEANING SCHEDULE

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
SCRAPE STREETS		X	X	X	X	X	X
SWEEP STREETS				X			

SOIL EROSION CONTROL SEQUENCE OF CONSTRUCTION

ACTIVITY DESCRIPTION	SEPT 2026	OCT 2026	NOV 2026	DEC 2026	JAN 2027	FEB 2027	MAR 2027	SPRING 2027	JUNE 2027
STONE TRACKING MAT INSTALLATION ATOP GEOTEXTILE LINER									
INSTALL PERIMETER SILT FENCE AND STORM STRUCTURE INLET PROTECTION ON EX. CATCH BASINS									
REMOVE EXISTING SURFACE TREATMENTS SCHEDULE FOR DEMOLITION									
BEGIN EXCAVATION AND GRADING FOR RAIL SPUR AND SITE WORK COMPONENTS									
EXCAVATE DETENTION BASIN, INSTALL APPROVED OUTLET CONTROL STRUCTURE, STABILIZE BASIN PRIOR TO PAVING COMMENCING									
INSTALL UNDERGROUND UTILITIES									
INSTALL STORM INLET PROTECTION FILTERS ON INSTALLED CATCH BASINS									
CONSTRUCT RAIL SPUR COMPONENTS									
INSTALL PAVEMENT AND AGGREGATE SURFACE TREATMENTS									
FINALIZE INSTALLATION OF PUBLIC UTILITIES									
ESTABLISH VEGETATION FOR ALL DISTURBED AREAS AND ROAD, AND RIGHTS–OF–WAY									
REMOVE ACCUMULATED SEDIMENT WITHIN DETENTION BASIN AND STORM INLETS TO PROPOSED DESIGN SPECIFICATIONS									
ESTABLISH PERMANENT, STABILIZED VEGETATION									
DORMANT SEEDING, IF NECESSARY BEFORE APRIL 15, 2027									
CALL SESC PERMITTING AUTHORITY FOR FINAL INSPECTION OF STABILIZED SITE									
REMOVE SILT FENCE AND STORM INLET PROTECTIONS									

STATE OF MICHIGAN
TAMMY ZIEMNICK
LICENSED PROFESSIONAL ENGINEER
6201049309
08–26–2026

©Copyright 2026
All Rights Reserved
Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
3	Revised & Reissued for Regulatory Review	08.26.2026
2	Rev. & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title: SOIL EROSION CONTROL PLAN

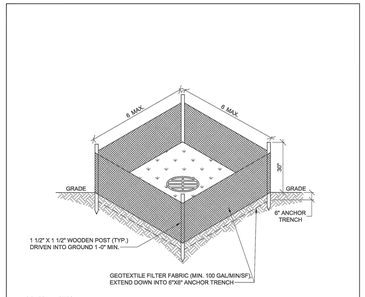
ZFE Project Number: 25011
Project Date: 02.24.2026
Engineer: TZF
Checked By: JWF

Sheet Number: C10

SOIL EROSION CONTROL & SEDIMENTATION CONTROL (SESC) PERFORMANCE REQUIREMENTS

1. CONSTRUCT AND MAINTAIN ALL SOIL EROSION CONTROL MEASURES IN ACCORDANCE WITH THE WAYNE COUNTY SOIL EROSION OFFICE, CITY OF DETROIT AND PROJECT DOCUMENT REQUIREMENTS.
2. SECURE PERMIT AND CONSTRUCT PROJECT IN COMPLIANCE WITH PART 91 OF ACT NO. 451 OF 1994 AS AMENDED, OF THE MICHIGAN COMPILED LAWS ENTITLED "SOIL EROSION AND SEDIMENTATION CONTROL" UNDER THE CONTROL OF THE WAYNE CO. DRAIN COMMISSION PERMIT AGENCY CHARGED WITH ADMINISTERING THE PROVISION OF THE ACT. FOLLOW THE PROCEDURES DELINEATED ON THE SESC PLAN AND CONSTRUCT AND MAINTAIN THE FACILITIES SHOWN ON THE DRAWINGS AND AS REQUIRED TO CONTROL WATER AND WIND EROSION DURING CONSTRUCTION OF THE PROJECT.
3. CONSTRUCT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES PRIOR TO STARTING CONSTRUCTION. MEASURES INDICATED ON THESE PLANS ARE CONSIDERED TO BE MINIMUM AND SHALL BE SUPPLEMENTED AS REQUIRED BY CONSTRUCTION PHASING AND SITE CONDITIONS.
4. ANY EROSION AND SEDIMENT FROM WORK ON THE SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT IN ANY OFF-SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDED NATURAL AND MANMADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
5. ANY DEWATERING ACTIVITIES SHALL PASS THROUGH A FILTER PRIOR TO OUTLETTING INTO A STORM SYSTEM.
6. CONSTRUCT AND MAINTAIN INLET FILTERS AT ALL CATCH BASINS AND INLET STRUCTURES UNTIL PERMANENT MEASURES ARE IN PLACE.
   - 6.1. PAVED STORM INLETS SHALL BE PROTECTED BY A HIGH FLOW SACK TYPE INLET FILTER CONFORMING TO SILT SACK-HIGH FLOW BY ACE ENVIRONMENTAL OR INLET PROP-HIGH FLOW SEDIMENT BAG BY HANES GEO COMPONENTS OR CATCH-ALL INLET FILTERS BY MARATHON MATERIALS, INC. OR DANDY CURB SACK BY DANDY PRODUCTS, INC.
   - 6.2. BEEHIVE TYPE INLETS SHALL BE PROTECTED BY SedCage YARD INLET PROTECTION MANUFACTURED BY SedCatch ENVIRONMENTAL PRODUCTS, OR A BOX FILTER FABRIC FENCE CONFORMING TO CSI GEOTURF 36-INCH MDOT SPEC SILT FENCE SECURELY FIXED TO 2"x2" HARDWOOD STAKES SPACED NO MORE THAN 6.5-FEET ON CENTER, TIED TO 4-FOOT STEEL POSTS AT ALL FOUR CORNERS AND TRENCHED A MINIMUM OF 10-INCHES INTO THE GROUND. SEE WAYNE COUNTY DETAIL FOR REAR YARD GUARD.
7. A TEMPORARY CRUSHED ROCK TRACKING PAD WILL BE INSTALL AT THE CONSTRUCTION EXIT AS SHOWN ON THE PLAN. DIRECT ALL CONSTRUCTION TRAFFIC TO THIS EXIT. STONE EXITS MUST BE MAINTAINED WITH FRESH STONE AS NECESSARY TO MAINTAIN ANTI-TRACKING PROPERTIES. ADD ADDITIONAL STONE WHEN ACCESS ROAD BECOMES INEFFECTIVE DUE TO LOSS OF STONE OR COVERED WITH MUD.
8. ALL EXPOSED EARTH SHALL BE STABILIZATION WITH SEEDING AND/OR MULCH WITHIN FIVE (5) DAYS OF FINAL GRADING. SEDIMENT BASINS SHALL BE STABILIZED WITH SEED AND STRAW BLANKETS OR AS DETAILED ON THE LANDSCAPE PLAN. STRAW MULCH BLANKETS SHALL BE STAKED INTO THE GROUND FIVE (5) DAYS AFTER THE CONSTRUCTION OF THE SEDIMENT BASIN.
9. AN UNDISTURBED, VEGETATIVE BUFFER STRIP OF AT LEAST TWENTY-FIVE (25) FEET SHALL BE RETAINED AROUND RIVERS, CREEKS, STREAMS, WETLANDS, DRAINS AND OTHER SENSITIVE AREAS.
10. INSPECT THE SOIL EROSION AND SEDIMENT CONTROL DEVICES ONCE EACH WEEK AND WITHIN TWENTY-FOUR (24) HOURS OF A PRECIPITATION EVENT WHICH RESULTS IN A STORM WATER DISCHARGE FROM THE SITE. A LOG OF INSPECTION REPORTS SHALL BE MAINTAINED AND ACCESSIBLE IN ACCORDANCE WITH NPDES REQUIREMENTS.
11. SEEDING SHALL BE PREPARED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. INSPECT THE AREA AFTER SEEDING IS COMPLETED. AREAS THAT ARE BARE OR NOT MULCHED PROPERLY WILL NEED TO BE RE-SEEDED AND/OR RE-MULCHED.
12. MAINTAIN DUST CONTROL AT ALL TIMES DURING CONSTRUCTION. SPRINKLING TANK TRUCKS SHALL BE AVAILABLE AT ALL TIMES AND USED FOR ON-SITE DISTURBED AREAS, OR OTHER PLACES WHERE DUST BECOMES A PROBLEM AS A RESULT OF CONSTRUCTION EFFORTS.
13. PROMPTLY REMOVE ALL MUD, DIRT AND DEBRIS TRACKED ON EXISTING AND SURROUNDING ROADS FROM THE CONSTRUCTION SITE. AT A MINIMUM, STREET SCRAPING SHALL BE DONE AT THE END OF EACH WORKDAY; STREET SWEEPING SHALL BE DONE AT LEAST ONCE A WEEK DURING THE CONSTRUCTION PERIOD.
14. MAINTENANCE OF TEMPORARY AND PERMANENT SOIL EROSION CONTROL MEASURES SHALL BE THE CONTRACTORS RESPONSIBILITY DURING THE DURATION OF THE CONSTRUCTION PROJECT. UPON SATISFACTION OF WARRANTY PERIOD, MAINTENANCE OF THE PERMANENT SOIL EROSION CONTROL MEASURES WILL BE THE OWNERS RESPONSIBILITY.
15. NO DEWATERING IS CURRENTLY PLANNED. SHOULD DEWATERING BECOME NECESSARY DURING CONSTRUCTION, NOTIFY THE OWNER IMMEDIATELY.
16. STRAW MULCH BLANKETS SHALL BE USED ON SLOPES 3:1 OR GREATER (THREE (3)-FOOT HORIZONTAL, ONE (1)-FOOT VERTICAL).
17. DITCHES, SWALES, AND OTHER AREAS THAT WILL CHANNEL CONCENTRATED RUNOFF MUST BE STABILIZED WITHIN FIFTEEN (15) DAYS OF CONSTRUCTION. TEMPORARY ROCK CHECK DAMS MAY BE REQUIRED TO SLOW WATER TO NON-EROSIVE VELOCITIES IN AREAS OF CONCENTRATED FLOW.
18. AREAS OF EARTH CHANGE THAT ARE DISTURBED BEYOND THE FALL SEEDING DEADLINE (NOVEMBER 1ST) MAY REQUIRE DORMANT SEEDING AND STRAW MULCH SECURELY CRIMPED TO THE GROUND.
19. ROAD RIGHT-OF-WAYS MUST BE STABILIZED A MINIMUM WIDTH OF FIFTEEN (15)-FEET BACK OF CURB WITH SEED AND MULCH WITHIN FIVE (5) DAYS OF COMPLETING UTILITY WORK IN THE RIGHT-OF-WAY.
14. TOTAL AREA OF EARTH DISTURBANCE: 15.4 ACRES

APPLICABLE CITY OF DETROIT-ENGINEERING DIVISION STANDARD DETAILS FOR SOIL EROSION & SEDIMENTATION CONTROL MEASURES



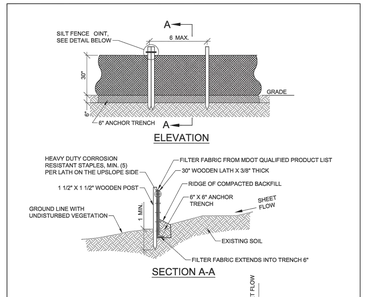
GENERAL NOTES:
1. REFER TO SILT FENCE DETAIL 015 13-02 FOR INSTALLATION PROCEDURES.
2. WEEKLY INSPECTION AND MAINTENANCE MUST BE PROVIDED TO INSURE THAT THE DRAIN GUARD OPERATES EFFICIENTLY.
3. SOD INTERIOR OF DRAIN GUARD UNLESS INDICATED OTHERWISE.
4. REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT AS NECESSARY, PER SPECIFICATION SECTION 015 13.

REV	DESCRIPTION	DATE
	REVISIONS	

DRAIN GUARD

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE	NONE
SHEET	1 OF 1
DATE	09/2018
DWG. No.	015 13-01



GENERAL NOTE:
SILT FENCE MATERIAL SHALL MEET THE REQUIREMENTS IN SECTION 910.04 AND TABLE 910-1 IN MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

NOTE:
FABRIC TO BE WRAPPED AROUND FENCE POST.

SILT FENCE OINT - TOP VIEW

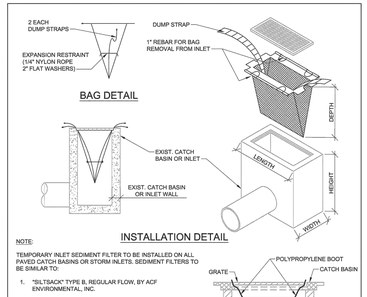
REV	DESCRIPTION	DATE
	REVISIONS	

EROSION CONTROL, SILT FENCE

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE	NONE
SHEET	1 OF 1
DATE	09/2018
DWG. No.	015 13-02

SEE SESC PERFORMANCE REQUIREMENTS NOTE #6 FOR APPROVED PRODUCTS



NOTE:
TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVED CATCH BASINS OR STORM INLETS. SEDIMENT FILTERS TO BE SIMILAR TO:
1. "SILTSACK" TYPE B, REGULAR FLOW, BY ACF ENVIRONMENTAL, INC.
2. "INLET PRO SEDIMENT BAG", STANDARD FLOW, WITH OPTIONAL FOAM DEFLECTOR BY HANES GEO COMPONENTS.
3. "DANDY CURB SACK" BY DANDY PRODUCTS, INC.
4. "BASIN BAG", REGULAR FLOW BY CSI GEOTURF, CLEAN FILTER AS NEEDED.

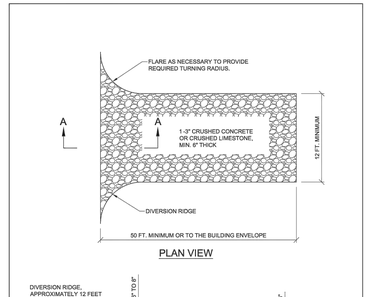
GENERAL NOTES
1. CONTRACTOR SHALL OBTAIN PERMISSION OF THE ENFORCING ROAD AGENCY BEFORE THIS TYPE OF CONTROL IS CONSTRUCTED IN THE ROAD RIGHT-OF-WAY.
2. CONTRACTOR SHALL KEEP CURBS GUTTER INLET FILTERS (AFTER PAVING) IN PLACE UNTIL ALL AREAS CONTRIBUTING TO THEIM ARE STABILI ED WITH VEGETATION.
3. CONTRACTOR SHALL PERFORM WEEKLY INSPECTION AND MAINTENANCE TO ENSURE THAT THE CURB GUTTER INLET FILTER (AFTER PAVING) OPERATES EFFICIENTLY.

REV	DESCRIPTION	DATE
	REVISIONS	

INLET PROTECTION FABRIC DROP

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE	NONE
SHEET	1 OF 1
DATE	09/2018
DWG. No.	015 13-05



REV	DESCRIPTION	DATE
	REVISIONS	

GRAVEL ACCESS APPROACH

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE	NONE
SHEET	1 OF 1
DATE	09/2018
DWG. No.	015 13-0

SOIL EROSION AND SEDIMENTATION CONTROL TEMPORARY FACILITIES

THE CONTRACTOR SHALL CONSTRUCT THIS PRO ECT IN COMPLIANCE WITH PART 91 OF ACT NO. 451 OF 1994, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, OF THE MICHIGAN COMPILED LAWS ENTITLED "SOIL EROSION AND SEDIMENTATION CONTROL" UNDER THE CONTROL OF THE LOCAL PERMIT AGENCY CHARGED WITH ADMINISTERING THE PROVISIONS OF THIS ACT. THE CONTRACTOR SHALL FOLLOW THE PROCEDURES DELINEATED BELOW AND CONSTRUCT AND MAINTAIN THE FACILITIES SHOWN ON THE DRAWINGS TO CONTROL WATER AND WIND EROSION DURING CONSTRUCTION OF THIS PRO ECT.

ALL DISTURBED SURFACE AREA (INCLUDING UTILITY TRENCHES) SHALL BE TEMPORARILY GRADED AND/OR DITCHED TO DIRECT ALL WATER RUNOFF FROM SUCH AREAS TO SEDIMENTATION CONTROL DEVICES WHICH WILL PREVENT WATER CARRYING ERODED SOIL FROM ENTERING A WATERCOURSE, SEWER, OR AD ACENT LANDS. SUCH SEDIMENTATION CONTROL DEVICES SHALL INCLUDE BUT NOT BE LIMITED TO PROTECTIVE DITCHES, SEDIMENT TRAPS, SEDIMENT FILTERS, DITCH TRAPS, PIPE BARRIERS, AND FILTERS AS DETAILED AND REQUIRED AND WHERE INDICATED ON THE DRAWINGS. AFTER THE PRO ECT WORK HAS BEEN COMPLETED, INSPECTED, AND APPROVED, THE CONTRACTOR SHALL REMOVE ALL SEDIMENTATION CONTROL DEVICES, MATERIAL, AND THEIR COLLECTED SILT AND DEBRIS AND RESTORE THE AREA IN ACCORDANCE WITH THE DRAWINGS.

IN ROADWAY AREAS TEMPORARY AGGREGATE SURFACING SHALL BE PLACED IMMEDIATELY AFTER THE BACKFILLING OPERATION HAS BEEN COMPLETED. POSITIVE DUST CONTROL MEASURES SHALL BE TAKEN AT ALL TIMES.

PERMANENT STABILI ATION SHALL BE COMPLETED WITHIN 5 DAYS OF FINAL EARTH CHANGE. FINAL CLEANUP AND RESTORATION WILL CONSIST OF FINAL GRADING, TOPSOILING, SEEDING AND MULCHING AND/OR SODDING OF ALL DISTURBED AREAS OF THE PRO ECT.

IF SEASONAL CONDITIONS PREVENT FINAL CLEANING AND RESTORATION, THE CONTRACTOR SHALL PROCEED WITH TEMPORARY STABILI ATION OF THE DISTURBED AREA. TEMPORARY STABILI ATION SHALL CONSIST OF ROUGH GRADING THE DISTURBED AREA IN ACCORDANCE WITH THESE SPECIFICATIONS. TEMPORARY STABILI ATION MATERIALS SHALL BE REMOVED AND DISPOSED OF AND FINAL CLEANUP AND RESTORATION SHALL BE COMPLETED NOT LATER THAN 5 DAYS AFTER SEASONAL CONDITIONS ALLOW PERFORMANCE OF THE REQUIRED WORK.

REV	DESCRIPTION	DATE
	REVISIONS	

SOIL EROSION SEDIMENTATION CONTROL, TEMPORARY FACILITIES

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE	NONE
SHEET	1 OF 1
DATE	09/2018
DWG. No.	015 13-10

SOIL EROSION AND SEDIMENTATION CONTROL MAINTENANCE NOTES

THE CONTRACTOR SHALL INSPECT SOIL EROSION AND SEDIMENTATION CONTROL DEVICES WEEKLY AND WITHIN 24 HOURS OF A SIGNIFICANT RAIN EVENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

MAINTENANCE INCLUDES ALL WORK NECESSARY FOR PROPER OPERATION OF THE DEVICES. DEVICES WHICH CAN NOT BE REPAIRED MAY NEED TO BE REPLACED. MAINTENANCE OF THE DEVICES SHALL BE PERFORMED WITHIN 24 HOURS OF INSPECTON.

SEDIMENT SHALL BE REMOVED AS NECESSARY TO MAINTAIN THE EFFECTIVENESS OF SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

SEDIMENT DEPOSITED ALONG SILT FENCE SHALL BE REMOVED WHEN IT REACHES 1/3 TO 1/2 THE HEIGHT OF THE FENCE.

TURF ESTABLISHMENT MEASURES SHALL BE MAINTAINED AS WOULD ANY OTHER DEVICES PRIOR TO ESTABLISHMENT OF PERMANENT TURF.

ALL MUD, DIRT AND DEBRIS TRACKED ONTO EXISTING ROADS FROM THIS SITE SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR.

CONTRACTOR SHALL ENSURE THAT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES PROTECT AGAINST LOSS OF SOIL BY THE ACTION OF WATER, ICE, GRAVITY OR WIND.

REV	DESCRIPTION	DATE
	REVISIONS	

SOIL EROSION AND SEDIMENTATION CONTROL, MAINTENANCE NOTES

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE	NONE
SHEET	1 OF 1
DATE	09/2018
DWG. No.	015 13-11

SUMMARY OF BASIC PRINCIPLES:

1. KEEP DISTURBED AREA AS SMALL AS POSSIBLE.
2. STABILI E AND/OR PROTECT DISTURBED AREAS AS SOON AS POSSIBLE.
3. KEEP STORM WATER RUNOFF VELOCITIES LOW.
4. RETAIN SEDIMENT WITHIN IMMEDIATE CONSTRUCTION AREA.

THE PURPOSE OF THIS PLAN IS TO SPECIFY METHODS FOR TEMPORARY EROSION CONTROL DURING CONSTRUCTION. IT IS INTENDED THAT MEASURES CALLED FOR IN THE SPECIFICATIONS AND SHOWN ON THESE STANDARD DETAILS PLANS BE STRICTLY ADHERED TO. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT CONSTRUCTION PROCEDURES UNDERTAKEN BE IN CONFORMANCE WITH THE STATE OF MICHIGAN ACT 451 OF 1994 PART 91, SOIL EROSION AND SEDIMENTATION CONTROL.

ALL SOIL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE REGULARLY MAINTAINED BY THE CONTRACTOR THROUGHOUT THE DURATION OF THE PRO ECT. COLLECTED SILT AND SEDIMENTATION SHALL BE REMOVED PERIODICALLY TO MAINTAIN THE EFFECTIVENESS OF THE SILT TRAPS OR SEDIMENTATION CONTROL DEVICES. WHERE REQUIRED, THE CONTRACTOR SHALL REPLACE FILTER MATERIALS WHICH HAVE BECOME INEFFECTIVE DUE TO CONTAMINATION OR PHYSICAL DETERIORATION.

IF POSSIBLE, NO GRUBBING SHOULD BE DONE WITHIN 30' OF AN ACTIVE WATERCOURSE.

AGGREGATES PLACED IN STREAMS SHOULD CONTAIN A MINIMUM OF FINES. AS A GENERAL RULE FOR DAMS IN SMALL STREAMS, AT LEAST 50 STONE SHOLD BE 6" DIAMETER OR LARGER. 3" OR LARGEH STONE SHALL BE USED FOR LINING STREAM BOTTOMS WHERE LINING IS REQUIRED.

ALL TEMPORARY EROSION CONTROL FACILITIES SHOULD BE REMOVED BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION UNLESS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE. CARE SHALL BE TAKEN DURING REMOVAL TO MINIMI E SILTATION IN NEARBY DRAINAGE COURSES.

SURFACE DISRUPTION IN ADVANCE OF CONSTRUCTION INCLUDING CLEARING, GRADING OR SIGNIFICANT SOD REMOVAL SHALL BE LIMITED AS FOLLOWS, UNLESS PERMISSION IS OTHERWISE OBTAINED FROM THE GOVERNING AGENCY:

A. WET WEATHER SEASON (MARCH, APRIL, MAY) - 5 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.
B. DRY WEATHER SEASON (UNE, ULY, AUGUST, SEPTEMBER, OCTOBER, NOVEMBER) - 10 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.
C. COLD WEATHER SEASON (DECEMBER, ANUARY, FEBRUARY) - 15 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

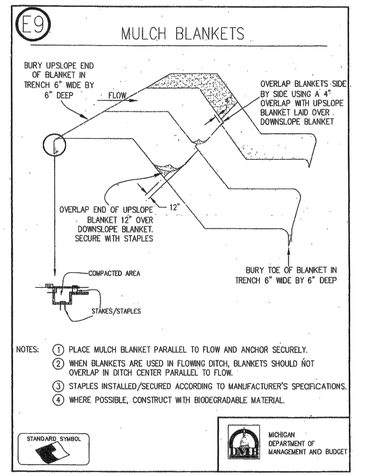
REV	DESCRIPTION	DATE
	REVISIONS	

SOIL EROSION AND SEDIMENTATION CONTROL, GENERAL NOTES

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE	NONE
SHEET	1 OF 1
DATE	09/2018
DWG. No.	015 13-12

APPLICABLE FOR SESC MEASURE, KEY# 2 ON SESC PLAN SHEET C7



NOTES:
1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.
2. WHEN BLANKETS ARE USED IN FLOWING DITCH, BLANKETS SHOULD NOT OVERLAP IN DITCH CENTER PARALLEL TO FLOW.
3. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. WHERE POSSIBLE, CONSTRUCT WITH BIODEGRADABLE MATERIAL.

STANDARD SYMBOL

MICHIGAN DEPARTMENT OF MANAGEMENT AND BUDGET

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

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance



LOCATION MAP
NO SCALE

©Copyright 2026
All Rights Reserved

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

No.	Revision	Date
2	Revised & Reissued for Regulatory Review	02.24.2026
1	Issued for Regulatory Review	01.28.2026

ZFE
ZIEMNICK FOSTER ENGINEERING, LLC
426 S. Clinton Street
Grand Ledge, MI 48837
Tel: 517.627.8068
www.zfengineering.com

Project Name

Crown Enterprises

8100 Melville Street
2026 Site Development

City of Detroit, Wayne County, Michigan

Sheet Title
SOIL EROSION CONTROL NOTES & DETAILS

ZFE Project Number	25011
Project Date	02.24.2026
Engineer:	TZF
Checked By:	JWF
Sheet Number	C11

STATE OF MICHIGAN TAMMY ZIEMNICK 6201049309 LICENSED PROFESSIONAL ENGINEER

08.26.2026

Cr
Rai
Stormwa
Original A
Revised Site Subı



STORMWATER DESIGN REPORT

Project: Melville & West End Street
Rail Spur Development

FOR:
Crown Enterprises, LLC
8100 Melville
City of Detroit, Wayne County, MI

January 28, 2026
Original Approval 02/21/2024

Prepared by: Ziemnick Foster Engineering, LLC (ZFE)
426 S. Clinton Street
Grand Ledge, MI 48837
517-627-8068
Design Engineer: Tammy Z. Foster, P.E.
tzfoster@zfengineering.com



zfe

Cro
Rai
Stormwat
Original A
Revised Site Subr



Project Description**

Site development modifications to construct a 5-line rail spur. Development includes t
pavement adjacent to the rail spur and site revisions to support an onsite modular office trailer and a garage/employee building. Further site modifications detail use of on-site stormwater detention pond for stormwater management which was built in 2024 as part of a construction project originally approved in February 2024.

Total Site Area	21.72 Acres
New or Replaced Impervious Area	5.71 Acres
Construction Activity Area	13.76 acres
Regulated Area	21.72 acres
Receiving Sewer System	Existing onsite within Harbaugh St. Ex. Combined Sewer Manhole

Applicable Stormwater Management Performance Standards

Stormwater Management Standard Description	*Method of Compliance Proposed*
TSS-Water Quality (First Flush)	On-site high-water table Alternative Compliance Measures, Extended Detention Time = 48 hour
Infrastructure Performance Standard for Combined Sewers	Detain the 2-year, 24-hour storm event volume with controlled release rate Achieved through extended detention and permanent pool of water
Flood Control for 100-year, 24-hour storm event	Detain the 100-year, 24-hour storm event volume.

*****See Site Plan Set dated 01/28/2026 for project details.***

Project Narrative – 8100 Melville Street Rail Spur Development

The existing site was an industrial yard with heavily trafficked areas. Sufficient site space is available for the installation of a proposed detention basin to manage the onsite stormwater as well as construct the proposed rail spur lines. An original site plan was submitted and approved in February 2024 and partially constructed. A revised site plan is provided herein, adding additional rail spur length to the 2024 design as well as an employee/garage building. The surface-level, extended detention basin proposed in the 2024 project has been partially constructed. The Owner wishes to utilize the onsite space to use this surface-level, extended detention basin to manage the stormwater rather than install a stormwater management structure which will be buried underground and potentially not maintained adequately.

Hydrologic Analysis

The total site area is 21.72 acres. This area is currently having an existing gravel surface, with a calculated C_{ex}= 0.813.

The area which will be developed and paved is directly adjacent to the proposed rail spur lines which equates to a disturbed development area of 13.76 acres, or 63.4% of the total site area.

Approved For Permit
Approved
Date:
9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number:
BLD2026-00154
Approved
Reviewed for Code Compliance

The post development calculated C_{prop}=0.792. This relates to a total regulated the total site area, or 21.72 acres.

In-situ infiltration rates were performed on the site by Testing Engineers & Cor March 7, 2023. A summary report from this on-site testing can be found in Appendix B later in this document. In-situ infiltration rates were measured in two (2) locations on the site noted at test pits I-1 and I-2 to depth of 6 feet and 5 ½ feet. The average infiltration rate measured was 4.4 inches/hour.

Per Chapter 7, Section 7.3.2, Layout and Geometry of Detention Practices, for a dry detention practice, the lowest elevation of dry detention basin shall be at least two (2) feet above the seasonal high-water table. The March 2023 geotechnical soil evaluation noted a water table elevation higher than the lowest elevation of the proposed detention basin; therefore, we have detailed a design for a wet detention basin with a permanent pool water elevation of approximately 5-feet in depth.

Therefore, an on-site extended, surface level, wet detention basin area has been designed with an outlet control structure upstream of the existing City of Detroit combined sewer system on site. A portion of this proposed detention basin was constructed following the 2024 approval of the site plan review package at that time.

Infrastructure protection for the 2-year, 24-hour rainfall event is achieved by the design of the extended detention and permanent pool detention basin area. Our calculations determined that an extended detention volume of (V_{ED}) 118,702 cft^3 is required and a 100-year, 24-hour detention volume of (V_{100}) 191,954 cft^3 is required.

An outlet control structure (OCS-1) has been designed within the extended detention basin area as a 4-foot diameter pre-cast concrete structure surrounded by MDOT 6A stone overtop of 3-inch diameter washed stone. Drilled holes (or orifices) have been sized to control the inlet from the detention basin into the structure at one (1) elevational levels corresponding to the Water Quality Extended Detention Volume at a permanent pool elevation of 584.50.

As a part of the approved detention basin design in 2024, three (3), 1.50” diameter orifices were proposed in OCS-1 at the permanent pool elevation of 584.50. Based on the 2026 calculations, and new Z_{ED} elevation of 587.89 (h=3.39’), these 1.50” diameter orifices will release the 2026 calculated extended detention required volume at a flow rate (Q_{ED}) of 0.715 cfs over a period of 46.09 hours.

The top of the outlet control structure casting is proposed at an elevation of 590.62, approximately 2-feet above the 100-year Flood Volume control inlet elevation of 589.58. The top of the casting for OCS-1 is designed to be an emergency overflow device, in lieu of the required emergency spillway for the detention area. The casting on OCS-1 is an MDOT Type E inlet with an opening area equal to 1.944 ft^2. Calculations are shown that demonstrate this casting set at a minimum elevation of 590.62 will release 3.258 cfs (or $Q_{allowable}$).

Cro
Rai
Stormwat
Original A
Revised Site Subr



Below are Table 1 and 2 which summarize information provided above. In add
been included which summarizes the design information for the proposed outl
structure within the proposed detention basin.

Table 1: Site Conditions**		
	Value	Units
New or Replaced Impervious Area	5.71	Acres
Construction Activity Area	13.76	Acres
Measured Infiltration Rate	4.4	in/hour
Overall Development Site Area	21.72	Acres
Existing Site Runoff Coefficient, C_{ex}	0.813	Unitless
Proposed Site Runoff Coefficient, C_{prop}	0.792	Unitless
Construction Area % of Development Area	63.4	%
Regulated Area	21.72	Acres
Detention Return Period	100	years

See Sheet C5 for detailed information and calculations

Table 2: Hydrologic Summary Table**				
Performance Standard	Design Storm	Volume (CF)	Peak Flow (CFS)	Notes
Water Quality (Extended Detention Requirement)		118,702	0.715	
Infrastructure Protection (2-yr/24-hour storm)	Post-Construction 2-yr, 24-hr storm	-3,101	Achieved through extended detention	
Flood Control	Post-Construction 100-yr	191,954	3.258	$Q_{allowable}$ = 0.15 cfs/ac or 3.258 cfs over the regulated area

See Sheet C5 for detailed information and calculations

Table 3: Outlet Structure Design Summary Information**					
Description	No. of Holes	Hole Dia.	Elevation (Ft)	Flow, Q (CFS)	Time to discharge (hours) Emergency Overflow through a top of casting elevation of 590.62
12" RCP Stm Outlet			580.30		
Extended Detention, Water Quality Volume	3	1.50-inch	584.50	0.715	46.09
See Sheet C5 for detailed information and calculations					

Per Section 7.3.4, Extended Wet Detention of the Stormwater Management Design Manual, a 3-foot-deep minimum pool shall be provided. The proposed top elevation of the wet detention

Approved For Permit
Approved
Date:
9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number:
BLD2026-00154
Approved
Reviewed for Code Compliance

permanent pool is 584.50 and the bottom elevation of the constructed detentio
proposed to be excavated to a depth of 580.50, resulting in a permanent pool

A mean depth of 3 to 10-feet shall be provided for a wet detention pond, where is calculated by dividing the storage volume by the pond surface. For this wet detention pond design with the noted storage volume of 211,393 cft and a surface area of 48,300 sf, the mean depth is 4.4'.

Landscaping has been proposed within the wet detention basin to create a littoral zone around the perimeter of the permanent pool where Stantec Nursery slope stabilization seed mix is proposed. Below the permanent pool elevation, Stantec Nursery stormwater seed mix is proposed within the detention basin below elevation 583.0 while Stantec Nursery wetland edge seed mix is proposed between the permanent pool elevation of 584.50 and 583.0. A 15-foot-wide buffer strip has been detailed around the outside perimeter of the detention basin area with a surface treatment of shoreline protection-type armoring with a product called Flexamat, an erosion control product which will allow vegetation growth within the buffer strip area, see detail on Sheet C6.

No liner is designed for this wet detention basin. A 6" HDPE drain pipe has been designed with a 4-inch diameter gate valve within a precast concrete structure for dewatering of the permanent pool water within the detention pond area. The 6" drain pipe outlets into MH-1 downstream of the detention basin.

Alternative Compliance Request

Due to a high-water table on site, ZFE, together with the Owner, Crown Enterprises, LLC request the use of on-site mitigation for Volume Control through the Extended Detention Alternative Compliance method to meet the TSS – Stormwater Water Quality requirements for the site located at 8100 Melville Street, Detroit, Wayne County, MI.

The following pages in Appendix A provide detailed information as to the stormwater design calculations used to develop the above information.

Cro
Rai
Stormwat
Original A
Revised Site Subr



APPENDIX A
STORMWATER CALCULATIONS



Site C Value Calculation of Contributing Area

PROJECT: Crown Melville 2026 Rail Development
JOB NUMBER: 25011
DATE: 1/26/2026
COUNTY (MI): Wayne

AREA	UNITS	PAVEMENT 0.95	ROOF 0.95	WATER 1.00	GRASS 0.40	GRAVEL 0.85	TOTAL AREA	CUMULATIVE AREA	WEIGHTED C
POST-DEVELOPMENT	sf	248,736	4,884	48,300	193,766	450,437	946,123	946,123	0.79
	acres	5.71	0.11	1.11	4.45	10.34	21.72	21.72	
SITE TOTAL	sf	248,736	4,884	48,300	193,766	450,437	946,123	946,123	**0.792**
	acres	5.71	0.11	1.11	4.45	10.34	21.72	21.72	

WEIGHTED SITE C VALUE = 0.792



Total Regulated Area (A)	946,222	sf	$C_{pre\text{-}develop}$=	0.813
	21.722	Acres	$C_{post\text{-}develop}$=	0.792

Water Quality

Extended Detention Alternative Compliance Measures

V_{ED}= 6,897 * C * A

118,702 cft

Infrastructure 2-year peak flow control

Difference Cpre-develop and Cpost-develop

ΔC= -0.021

$V_{2\text{-}yr}$= 6,897 * ΔC * A

$V_{2\text{-}yr}$= -3101 cft

Flood Control for 100-year, 24-hour storm (Regulated Area > 5 acres)

Critical Storm Duration D_{100}

D_{100}= $50*[(Q_r/C)]^{\wedge -0.984}$ Equation 4-8

D_{100}= 257.2 minutes

Design Storm Intensity (*i*)

i = $(38.42*T^{\wedge 0.208}) / (12.33 + D_{100})^{\wedge 0.841}$ Equation 4-1

i = 0.905 in/hour T= 100 years

Required Detention Pond Storage, C

V_{100}= $(60.5 * D_{100} * C * A * i) - (60 * D_{100} * Q_R * A)$ Equation 4-9

V_{100}= 191,954 cft



Sheet Summary

PROJECT: **Melville 2026 Rail Development**
JOB NUMBER: **25011**
DATE: **1/26/2026**
COUNTY (MI): **Wayne**

2024 Approved and Constructed Detention Basin Areas

Updated for the 2026 Proposed Design

Area	Elevation	Depth	Incremental Volume, V_i	Cumulative Volume
29707	584.5			0
31292	585	0.5	15,248	15,248
34326	586	1	32,797	48,045
37463	587	1	35,883	83,928
40666	588	1	39,054	122,982
43956	589	1	42,300	165,282
48300	590	1	46,111	211,393

Elev of permanent pool
584.50
V_{ED} storage volume
is reached at elev.
587.89

100-year storage volume
is reached at elev
589.58

Basin Water Depth	5.50	ft
Basin Mean Depth	4.19	ft
Total Storage Volume Provided	211,393	cf
	4.85	acre-ft
Total Storage Volume Required	191,954	cf
	4.41	acre-ft
Total Storage Volume Required Extended Detention	118,702	cf
	2.73	acre-ft

Built for the 2024 Constrution Project, Approved 02/2024

Pyrimoidal Equation

$V_i = (E2-E1)/3*(A_1+A_2+(A_1*A_2)^2$, where

Vi = Incremental Volume (cf)
A_1 = Area at elevation E_1 (cf)
A_2 = Area at elevation E_2 (cf)
E_1 = Lower Elevation (ft)
E_2 = Higher Elevation (ft)



CONTROL OUTLET STRUCTURE DESIGN

Sizing Outlet Structure Holes for Extended Detention

Water Quality (ex detention) discharge should be released within time period 48 hours

Q_{avg}=	0.69 cfs	$Q = V_{ED}/(3600*T)$	
h_{avg}=	1.695 ft	$0.5 * [(Z_{ED} - Z_{perm\ pool})]$	
A=	0.1060459 ft^2	$Q_{avg} / (C \times ((2*g*h_{avg})^{\wedge 0.5})$	
Hole Dia.	1.5 inches	Area of hole=	0.012272 ft^2
# of Holes=	8.6413982		
Use	3 holes	@ elevation	584.50 $Z_{perm\ pool}$
A_{actual}=	0.0368155 ft^2		
$Q_{ED\ actual}$=	0.7154378 cfs	$Q_{actual}=C \times A_{actual} \times (2*g*h_{avg})^{\wedge 0.5}$	
Actual Time=	46.09 hours		
$_{ED\ actual}$ is within	-4% of	48 hours	OK
	LESS THAN	10% of Required Release Time	

Sizing for 100-year Flood Control Volume

Flood Control discharge should be released within time period

Q_{allow}=	3.258 cfs	Q_{allow} * Total Area	24 hours
Q_0=	2.543	$Q_{allow}-Q_{ED\ actual}$	
h_{100}=	5.08 ft	$(Z_{100}-Z_{perm\ pool})$	
A_{100}=	0.22673 ft^2	$Q_0/C \times ((2*g*h_{100})^{\wedge}0.5)$	
Hole Dia.=	2.75 inches	Area of hole=	0.041247 ft^2
Hole # =	5.50		
Use	5 holes	@ elevation	589.58 Z_{100}
$A_{100(actual)}$=	0.2062352 ft^2	# of holes * Area of hole	
$Q_{100\ actual}$=	2.312753 cfs	$C \times A_{actual} \times ((2*g*h_{100})^{\wedge}0.5)$	
Actual T_{100} =	23.06 hours	$V_{100}/(Q_{100\ actual} * 3600)$	
T_{100} is within	-4% of	24 hours	OK

100-YEAR ORIFICES NOT NEEDED BASED ON DWSD PLAN REVIEW COMMENT DATED 02-20-2024 FOR EXTENDED, WET DETENTION

$Q_{0\ actual\ total}$=	3.028 cfs	LESS THAN	Q_{allow} =	3.258 cfs
	0.139 cfs/acre			OK

Emergency Overflow Casting Height Calculation

Q_{allow}=	3.258 cfs	Q_{allow} for regulated area, Q_0	
A_{emerg}=	1.94444 ft^2		
h_{emerg}=	0.0971388 ft	[Qallow/(5.376*A)]^2	
	1.1656651 ft		
$Z_{100\text{-}yr\ /\ emerg}$=	590.75 min	$Z_{100}+h_{emerg}$	Set Casting Height for Emergency Overflow

w/MDOT Type E Casting

Opening area (A) 280 in^2

1.944444444 ft^2



Summary of Controlling Input Factors

Q_{allow}=	0.15	cfs/ac	Impervious
Q_0=	3.258	cfs	Impervious
V_{ff}=	(3,101)	ft^3	
V_{ED}=	118,702	ft^3	
V_{100}=	191,954	ft^3	
Z_{ff}=	controlled by extended detention		
Z_{ED}=	587.89		
Z_{100}=	589.58		
Z_{out}=	580.30		
$Z_{perm\ pool}$=	584.50		
C=	0.62	sharp-crested weir	
g=	32.2	ft/sec	
T_{ff}=		hours	
T_{ED}=	48	hours	
T_{100}=	24	hours	

Total Regulated Area =	21.72	acres
	946,222	sf



	LOCATION		AREA						CA			TIME			INTENSITY			DISCHARGE			PROFILE					DESIGN									10 YEAR HGL		HGL √
	STRUCTURE LABEL		GRASS	PAVEMENT	ROOF	GRAVEL	INCR.	TOTAL	WEIGHTED C	INCR. C*A	CUM. C*A	TO INLET	IN PIPE	TOTAL	5 YEAR	10 YEAR	100 YEAR	5 YEAR	10 YEAR	100 YEAR	PIPE LENGTH	"Upstream" INVERT OUT	"Downstream" INVERT IN	"Upstream" RIM	"Upstream" Cover Depth	COMPUTED DIAMETER	PIPE DIAMETER	PIPE DIAMETER	n VALUE	SLOPE	SLOPE	V_{FULL}	PIPE CAPACITY	SLOPE	HEADLOSS IN PIPE	"Upstream" HGL ELEV.	Dist. Between Water Level and Rim
	UPSTREAM	DOWNSTREAM	sq ft	sq ft	sq ft	sq ft	acres	acres	C_{AVG}	C*A		min	min	min	in/hr	in/hr	in/hr	cfs	cfs	cfs	ft	ft	ft	ft	ft	in	in	ft		ft/ft	%	ft/s	cfs	ft/ft	ft	ft	ft
			0.40	0.95	0.95	0.85	A	A_T				T_i	T_p	$T_c=T_i+T_p$	i_5	i_{10}	i_{100}	$Q_5=C*i_5*A$	$Q_{10}=C*i_{10}*A$	$Q_{100}=C*i_{100}*A$	L					D_{COMP}	D	D	n	S		V_{FULL}	Q_{FULL}	S_F	H	HGL	
AREA 15		CB-8		35600.00	2432.00		0.873	0.87	0.95	0.83	0.83	15	0.00	15.00	3.32	3.88	5.96	2.75	3.22	4.94																
AREA 14	CB-8	CB-7		50509.00	2432.00	4124.00	1.310	2.18	0.94	1.24	2.06	0	0.00	15.00	3.32	3.88	5.96	6.85	8.01	12.30	173	584.52	584.26	590.07	2.76	23.21	30	2.50	0.013	0.0015	0.15%	3.24	15.89	0.0004	0.0660	589.05	1.02
AREA 13	CB-7	CB-6		24035.00		6493.00	0.701	2.88	0.93	0.65	2.72	0	0.89	15.89	3.26	3.81	5.85	8.84	10.34	15.88	295	584.15	583.71	590.55	3.61	25.54	30	2.50	0.013	0.0015	0.15%	3.24	15.89	0.0006	0.1874	588.98	1.57
AREA 4		CB-5B		11689.00		7735.00	0.446	0.45	0.91	0.41	0.41	15	0.00	15.00	3.32	3.88	5.96	1.35	1.57	2.42																
AREA 8	CB-5B	CB-5A		15729.00		11007.00	0.614	1.06	0.91	0.56	0.96	0	0.00	15.00	3.32	3.88	5.96	3.20	3.74	5.74	58	585.02	584.73	591.99	5.47	13.92	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0034	0.1943	589.05	2.94
AREA 12	CB-6	CB-5		9923.00		3824.00	0.316	3.20	0.92	0.29	3.01	0	0.26	15.26	3.30	3.86	5.93	9.93	11.60	17.83	420	583.61	582.98	591.97	5.57	26.67	30	2.50	0.013	0.0015	0.15%	3.24	15.89	0.0008	0.3361	588.80	3.17
	CB-5A	CB-5					0.000	1.06		0.00	0.96	0	2.16	17.42	3.15	3.68	5.66	3.04	3.55	5.46	130	584.63	583.98	591.99	5.86	13.65	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0030	0.3928	588.85	3.14
AREA 3		CB-4B		7658.00		6520.00	0.325	0.33	0.90	0.29	0.29	15	0.00	15.00	3.32	3.88	5.96	0.98	1.14	1.75																
AREA 7	CB-4B	CB-4A		9320.00		11454.00	0.477	0.80	0.89	0.43	0.72	0	0.00	15.00	3.32	3.88	5.96	2.39	2.80	4.30	58	584.21	583.92	591.99	6.28	12.48	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0019	0.1088	588.58	3.41
AREA 11	CB-5	CB-4		13909.00		4994.00	0.434	4.69	0.92	0.40	4.37	0	0.26	15.26	3.30	3.86	5.93	14.43	16.87	25.91	198	582.58	582.28	592.36	6.45	30.69	36	3.00	0.013	0.0015	0.15%	3.65	25.83	0.0006	0.1267	588.46	3.90
	CB-4A	CB-4					0.000	0.80		0.00	0.72	0	0.90	16.16	3.24	3.79	5.82	2.34	2.73	4.19	78	583.92	583.58	591.99	6.57	12.69	15	1.25	0.013	0.0044	0.44%	3.48	4.26	0.0018	0.1393	588.47	3.52
AREA 10	CB-4	CB-3		12353.00		2783.00	0.347	5.84	0.93	0.32	5.42	0	0.37	16.54	3.21	3.76	5.77	17.41	20.35	31.27	200	582.18	581.88	592.36	6.85	32.93	36	3.00	0.013	0.0015	0.15%	3.65	25.83	0.0009	0.1862	588.33	4.03
	CB-3	CB-1					0.000	5.84		0.00	5.42	0	0.91	17.45	3.15	3.68	5.66	17.04	19.93	30.63	193	581.78	581.49	592.36	7.25	32.67	36	3.00	0.013	0.0015	0.15%	3.65	25.83	0.0009	0.1724	588.15	4.21
AREA 2		CB-1B		8650.00		5985.00	0.336	0.34	0.91	0.31	0.31	15	0.00	15.00	3.32	3.88	5.96	1.01	1.19	1.82																
AREA 6	CB-1B	CB-1A		9314.00		11977.00	0.489	0.82	0.89	0.44	0.74	0	0.00	15.00	3.32	3.88	5.96	2.46	2.88	4.42	58	585.58	585.29	591.99	4.91	12.62	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0020	0.1153	588.31	3.68
AREA 1		CB-2B		8854.00		5341.00	0.326	0.33	0.91	0.30	0.30	15	0.00	15.00	3.32	3.88	5.96	0.99	1.15	1.77																
AREA 5	CB-2B	CB-2A		12449.00		11347.00	0.546	0.87	0.90	0.49	0.79	0	0.00	15.00	3.32	3.88	5.96	2.62	3.07	4.71	58	583.91	583.62	591.99	6.58	12.92	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0023	0.1307	589.07	2.92
	CB-2A	CB-1A					0.000	0.87		0.00	0.79	0	0.26	15.26	3.30	3.86	5.93	2.61	3.05	4.69	333	585.20	583.52	591.99	5.29	12.88	15	1.25	0.013	0.0050	0.50%	3.73	4.58	0.0022	0.7424	588.94	3.05
AREA 9	CB-1A	CB-1	35577.00	91207.00		38928.00	3.804	5.50	0.81	3.08	4.61	0	1.49	16.75	3.20	3.74	5.74	14.73	17.22	26.46	125	582.52	581.89	591.99	6.68	24.64	30	2.50	0.013	0.0050	0.50%	5.93	29.12	0.0018	0.2204	588.20	3.79
	CB-1	FES-1					0.000	11.34		0.00	10.02	0	0.35	17.10	3.17	3.71	5.70	31.79	37.18	57.13	63	581.09	581.00	590.41	5.44	41.27	42	3.50	0.013	0.0015	0.15%	4.05	38.97	0.0014	0.0860	587.98	2.43
	FES-1	EX DETENTION					0.00	11.34		0.00	10.02	0	0.26	17.36	3.15	3.69	5.67	31.61	36.98	56.82															587.89	

Cro
Rai
Stormwat
Original A
Revised Site Subr



APPENDIX B

Stormwater Infiltration Evaluation
By Testing Engineers & Consultants, Inc.
Dated March 13, 2023

Testing Engineers & Consultants, Inc.
1343 Rochester Road • PO Box 249 • Troy, Michigan 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G • Fax (248) 588-6232
www.testingengineers.com
Engineering Client Success

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

TEC Report: 63333
Date Issued: March 13, 2023

Mr. Andrew Falzarano
Crown Enterprises, LLC
12225 Stephens Road
Warren, Michigan 48089

Re : Proposed Storm Water Infiltration Evaluation
For Proposed Detention Pond
Private Railroad Extension
8100 Melville Road
Detroit, Michigan

Dear Mr. Falzarano :

This report documents the soil conditions and soil infiltration tests at the area of the proposed detention pond of the vacant property at 8100 Melville Road. The vacant parcel is to be developed as a private railroad extension.

Two (2) test pits were scheduled to be excavated along with a double ring infiltration test for each test pit as requested by the client. The work was authorized with Purchase Order 123512-26030 dated February 1, 2023 and in accordance with TEC Proposal 060-22-139Rev1. The two test pits were excavated to a depth of 8 feet.

The two test pits, designated as I-1 and I-2, were excavated on March 7, 2023 at the approximate locations shown on the Test Pit Location Plan included with this letter report. The test pit locations and depths were selected by Testing Engineers & Consultants, Inc. (TEC). The excavator and operator were provided by TEC's subcontractor. Soil conditions of each test pit are described below.

At the two test pit areas, the ground surface was covered with 8 and 12 inches of brown sand and gravel fill. Additional fill consisting of black sand with some crushed gravel and asphalt was encountered below and extended to a depth of 4 feet below existing ground surface.

Copyright 2018 Testing Engineers & Consultants, Inc. All rights reserved.

All services undertaken are subject to the following policy Reports are submitted for exclusive use of the clients to whom they are addressed Their significance is subject to the adequacy and representative character of the samples and the comprehensiveness of the tests, examinations and surveys made No quotation from reports or use of TEC's name is permitted except as expressly authorized by TEC in writing

Approved For Permit
Approved
Date:
9/21/2026
CITY OF DETROIT
Buildings, Safety Engineering & Environmental Department
Permit Number:
BLD2026-00154
Approved
Reviewed for Code Compliance

The underlying native soil at Test Pit I-1 was brown well graded sand with some silt and a trace of gravel that extended to a depth of 6 feet below existing ground surface. At Test Pit I-2, the underlying native soil was brown gravelly medium to fine sand with some silt that extended to a depth of 5 ½ feet. At both test pits the sand was underlain by brown sand with some silt.

Ground water was first observed in Test Pits I-1 and I-2 at depths of 6 and 5 ½ feet, respectively. After completion of excavation of the test pits, water was measured at depths of 5 ½ feet.

Laboratory particle size distribution testing was performed on two selected samples of the soil below the infiltration test depth using sieve analysis and hydrometer analysis methods. The results are attached.

Double ring infiltrometer tests were performed in the test pits at a depth of 4 ½ feet below existing ground surface. The infiltration test depth was limited by the shallow ground water below. The double ring infiltrometer consists of two concentric rings which are driven into the ground and filled with water. The outer ring helps prevent divergent flow. The drop in the water level within the inner ring is determined and used to calculate the infiltration rate which is the drop in the water level per unit of time. The testing methodology used is the double ring infiltrometer test outlined in the Low Impact Design Manual for Michigan and the City of Detroit requirements. The City requires excavation 4 feet deeper than expected infiltration depth to verify soil and ground water conditions.

The table below outlines the encountered soil, the depth at which the test was performed and the determined infiltration rate in inches per hour.

Test Pit I.D.	Soil Description	Test Depth (A)	Infiltration Rate, Inches Per Hour	Design Infiltration Rate, Inches Per Hour (B)
I-1	Brown well graded sand with some silt and trace of gravel	4.5'	5.3	2.6
I-2	Brown gravelly medium to fine sand with some silt	4.5'	12.4	6.2

(A) Below existing ground surface.
(B) Based on a safety factor of 2.



Mr. Andrew Falzarano
Crown Enterprises, LLC
March 13, 2023

TEC Report: 63333

A safety factor of 2 should be incorporated in the design of the infiltration by the designer.

The planned depth of the infiltration was 6 feet which is the assumed depth of the proposed detention pond. But due to the shallow depth of the ground water at 5 ½ to 6 feet, the infiltration test depth was limited to about 4 ½ feet.

We are pleased for the opportunity to provide our services. Should you have any questions or require additional information, please feel free to contact our office.

Respectfully submitted,

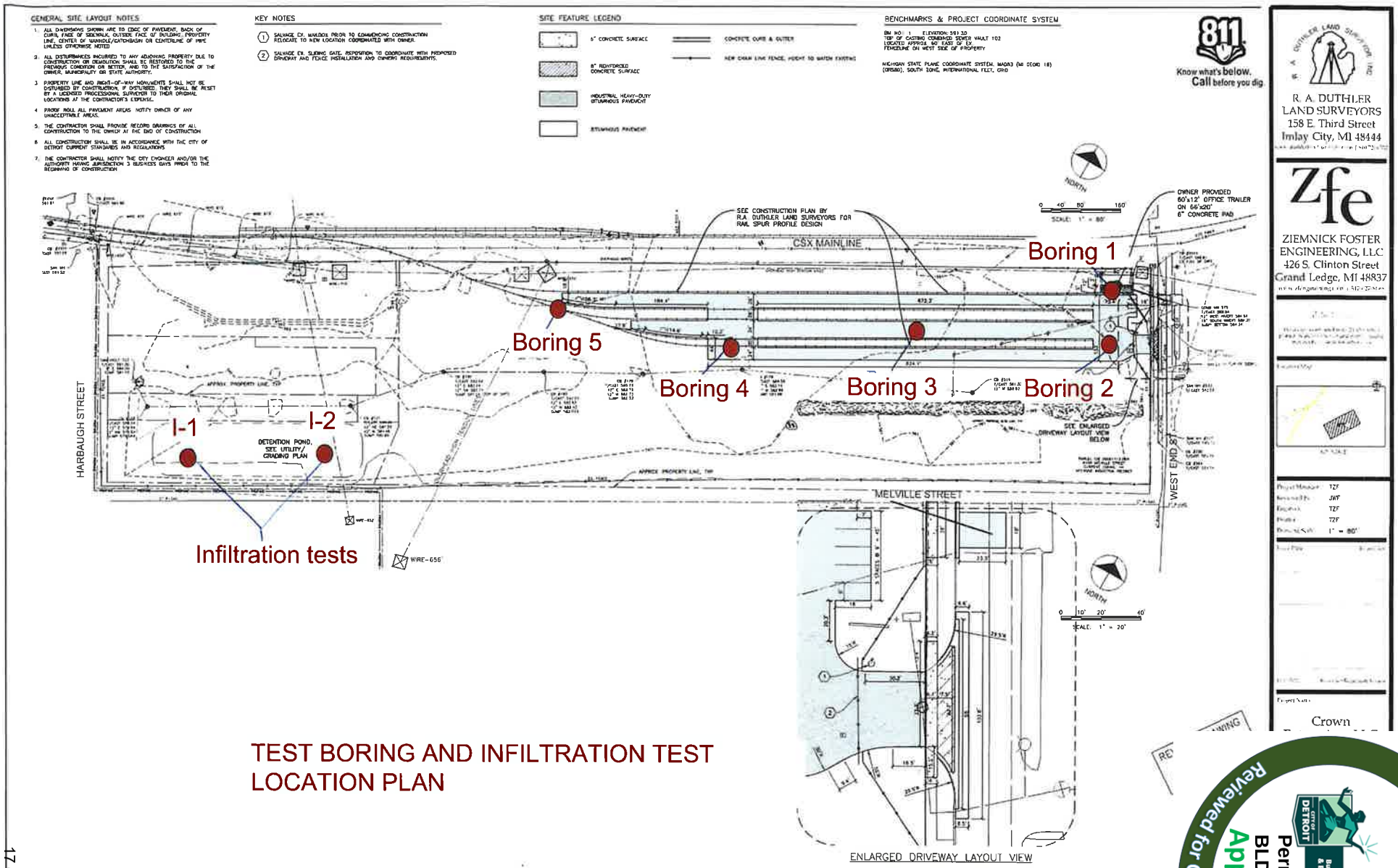
TESTING ENGINEERS & CONSULTANTS, INC.

Gary E. Putt

Gary E. Putt, PE
Senior Project Engineer

Carey J. Suhan, PE
Vice President, Geotechnical
& Environmental Services

GEP/CJS/ln
Enclosure



TEST BORING AND INFILTRATION TEST LOCATION PLAN

Reviewed For Code Compliance
Approved For Permit
Approved
Date: 9/21/2026
Permit Number: BLD2026-00154
Approved
City of Detroit Buildings, Safety Engineering & Environmental Department

Testing Engineers & Consultants

1343 Rochester Road - PO Box 249 - Troy, Michigan - 4809
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

Test Pit No.: TP I-1 **Job No.:** 63333

Project: Private Railroad Exte

Client: Crown Enterprises, LLC

Location: Detroit, Michigan

Type of Rig: Mini Excavator

Logged By: G. Putt, PE

Drilling Method: Test Pit

Started: 3/7/2023

Ground Surface Elevation:

Completed: 3/7/2023

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			67	Moist Brown Sand & Gravel-FILL (8")			
2.5				Moist Black Sand With Some Crushed Gravel & Asphalt-FILL			
			4				
5.0				Moist Brown Well Graded Sand With Some Silt & Trace Of Gravel			
			6				
				Wet Brown SAND With Some Silt			
7.5			8				
				Bottom of Test Pit at 8'			
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 6'0"

At Completion: 5'5"

Test Pit No. TP I-1

Testing Engineers & Consultants

1343 Rochester Road - PO Box 249 - Troy, Michigan - 4809
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

Test Pit No.: TP I-2 **Job No.:** 63333

Project: Private Railroad Exte

Client: Crown Enterprises, LLC

Location: Detroit, Michigan

Type of Rig: Mini Excavator

Logged By: G. Putt, PE

Drilling Method: Test Pit

Started: 3/7/2023

Ground Surface Elevation:

Completed: 3/7/2023

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			1	Moist Brown Sand & Gravel-FILL (12")			
2.5				Moist Black Sand With Some Crushed Gravel & Asphalt-FILL			
			4				
5.0			5.5	Moist Brown Gravelly Medium To Fine SAND With Some Silt			
			7	Wet Brown SAND With Some Silt			
7.5			8	Wet Brown Medium SAND			
				Bottom of Test Pit at 8'			
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 5'6"

At Completion: 5'6"

Test Pit No. TP I-2

Testing Engineers and Consultants, Inc.

1343 Rochester Road PO Box 249 Troy, Michigan 48099-0249
248-588-6200 or 313 T-E-S-T-I-N-G
Fax 248-588-6232

SIEVE ANALYSIS RESULTS

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

PROJECT: Private Railroad Extension
8100 Melville Road
LOCATION: Detroit, Michigan
CLIENT: Crown Enterprises LLC

TEC REPORT NUMBER: 63:

DATE: 3/10/2023

Material Description: Brown Well Graded Sand With Some Silt & Trace of Gravel

Date Sampled: 3/7/23

Sample Source / Depth: Test Pit I-1 @ 4'

Sampled By: G. Putt

Sample Location:

TEC Lab Sample Number:

Intended Use:

Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"				
1/2"		0.0	100.0	
3/8"	1.6	0.5	99.5	
#4	15.2	5.1	94.9	
#10	68.7	23.2	76.8	
#20	124.1	41.9	58.1	
#30	146.1	49.3	50.7	
#40	173.8	58.7	41.3	
#100	248.8	84.0	16.0	
#200	264.6	89.3	10.7	
Total Sample	296.2	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	296.2
Weight After Wash (g)	264.6
Loss in Weight (g)	31.6
Loss by Wash (%)	10.7%

Tested By: J. Johnson

Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
Testing Engineers and Consultants, Inc.

Testing Engineers and Consultants, Inc.

1343 Rochester Road PO Box 249 Troy, Michigan 48099-0249
248-588-6200 or 313 T-E-S-T-I-N-G
Fax 248-588-6232

SIEVE ANALYSIS RESULTS

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

PROJECT: Private Railroad Extension
8100 Melville Road
LOCATION: Detroit, Michigan
CLIENT: Crown Enterprises LLC

TEC REPORT NUMBER: 63

DATE: 3/1[illegible]/2023

Material Description: Brown Gravelly Medium to Fine Sand With Some Silt

Date Sampled: 3/7/23

Sample Source / Depth: Test Pit I-2 @ 4'

Sampled By: G. Putt

Sample Location:

TEC Lab Sample Number: 1792

Intended Use:

Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"		0.0	100.0	
1/2"	19.4	9.5	90.5	
3/8"	31.8	15.6	84.4	
#4	58.3	28.5	71.5	
#10	75.1	36.7	63.3	
#20	93.9	45.9	54.1	
#30	99.6	48.7	51.3	
#40	111.0	54.3	45.7	
#100	153.3	75.0	25.0	
#200	179.4	87.8	12.2	
Total Sample	204.4	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	204.4
Weight After Wash (g)	179.4
Loss in Weight (g)	25.0
Loss by Wash (%)	12.2%

Tested By: J. Johnson

Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 MTM 108/109

Remarks:

Respectfully Submitted:
Testing Engineers and Consultants, Inc.

Test Pit I-1 @ 4'



JOB NAME:	Private Railroad Extension		
PROJECT NO.	63333		
SAMPLE SOURCE:	Test Pit I-1 @ 4.5'		
SAMPLE ID:		INTENDED USE:	Classification
DATE SAMPLED:	3/7/2023		

ASTM D-422/D-4318

	TOTAL SAMPLE WT.=	296.2 (gms.)			TOTAL	DIAMETER
+10 SIEVE PORTION	SIEVE SIZE	CUM WT. RET	PART % RET	PART % PASS	**PASSING**	**(mm)**
	1	0.0	0.0%	100.0%	**100.0%**	**25.000**
	3/4 IN	0.0	0.0%	100.0%	**100.0%**	**19.000**
	1/2 IN	0.0	0.0%	100.0%	**100.0%**	**12.500**
	3/8 IN	1.6	0.5%	99.5%	**99.5%**	**9.500**
	#4	15.2	5.1%	94.9%	**94.9%**	**4.750**
	#10	68.7	23.2%	76.8%	**76.8%**	**2.000**
	WT. OF SAMPLE AT START OF HYDRO=	227.5 (gms.)				
-#10 SIEVE PORTION	#20	55.4	24.4%	75.6%	**58.1%**	**0.850**
	#40	105.1	46.2%	53.8%	**41.3%**	**0.420**
	#100	180.1	79.2%	20.8%	**16.0%**	**0.150**
	#200	195.9	86.1%	13.9%	**10.7%**	**0.075**
HYDROMETER	TEMPERATURE(°C)=	18.0				
PORTION	TEMP BATH BULB READ=	13.0				
	SPECIFIC GRAVITY Gs=	2.70 (assumed)				
	ELAPSED TIME (MIN)	UNCORR	CORRECTED	% PASS		
	1	28.0	15.0	6.5%	**5.0%**	**0.0471**
	2	25.0	12.0	5.2%	**4.0%**	**0.0340**
	5	23.0	10.0	4.4%	**3.3%**	**0.0218**
	15	20.0	7.0	3.0%	**2.3%**	**0.0128**
	30	18.0	5.0	2.2%	**1.7%**	**0.0092**
	60	16.0	3.0	1.3%	**1.0%**	**0.0066**
	120	15.0	2.0	0.9%	**0.7%**	**0.0047**
	240	14.0	1.0	0.4%	**0.3%**	**0.0033**
	1450	13.0	0.0	0.0%	**0.0%**	**0.0014**

soil classification: **Well Graded Sand With Some Silt & Trace of Gravel**

GRAVEL=	**5 %**
SAND=	**84 %**
SILT=	**11 %**
CLAY=	**0 %**

Test Pit I-2 @ 4.5"



JOB NAME:	Private Railroad Extension		
PROJECT NO.	63333		
SAMPLE SOURCE:	Test Pit I-2 @ 4.5'		
SAMPLE ID:		INTENDED USE:	Classification
DATE SAMPLED:	3/7/2023		

ASTM D-422/D-4318

					TOTAL	DIAMETER
	TOTAL SAMPLE WT.=	204.4 (gms.)				
+10 SIEVE PORTION	SIEVE SIZE	CUM WT. RET	PART % RET	PART % PASS	**PASSING**	**(mm)**
	1	0.0	0.0%	100.0%	**100.0%**	**25.000**
	3/4 IN	0.0	0.0%	100.0%	**100.0%**	**19.000**
	1/2 IN	19.4	9.5%	90.5%	**90.5%**	**12.500**
	3/8 IN	31.8	15.6%	84.4%	**84.4%**	**9.500**
	#4	58.3	28.5%	71.5%	**71.5%**	**4.750**
	#10	75.1	36.7%	63.3%	**63.3%**	**2.000**
	WT. OF SAMPLE AT START OF HYDRO=	129.3 (gms.)				
-#10 SIEVE PORTION	#20	18.8	14.5%	85.5%	**54.1%**	**0.850**
	#40	64.1	49.6%	50.4%	**31.9%**	**0.420**
	#100	78.2	60.5%	39.5%	**25.0%**	**0.150**
	#200	104.3	80.7%	19.3%	**12.2%**	**0.075**
HYDROMETER	TEMPERATURE(°C)=	18.0				
PORTION	TEMP BATH BULB READ=	13.0				
	SPECIFIC GRAVITY Gs=	2.70 (assumed)				
	ELAPSED TIME (MIN)	UNCORR	CORRECTED	% PASS		
	1	26.0	13.0	10.0%	**6.3%**	**0.0477**
	2	24.0	11.0	8.4%	**5.3%**	**0.0343**
	5	21.0	8.0	6.1%	**3.9%**	**0.0221**
	15	19.0	6.0	4.6%	**2.9%**	**0.0129**
	30	18.0	5.0	3.8%	**2.4%**	**0.0092**
	60	17.0	4.0	3.1%	**1.9%**	**0.0065**
	120	15.0	2.0	1.5%	**1.0%**	**0.0047**
	240	14.0	1.0	0.8%	**0.5%**	**0.0033**
	1450	13.0	0.0	0.0%	**0.0%**	**0.0014**

soil classification: **Gravelly Medium to Fine Sand With Some Silt**

GRAVEL=	**29 %**
SAND=	**59 %**
SILT=	**12 %**
CLAY=	**0 %**

Approved For Permit
Approved
Date:
9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number:
BLD2026-00154
Approved
Reviewed for Code Compliance

Testing Engineers Consultants, Inc.

DOUBLE RING INFILTROMETER TEST

TEC Project No.: 63333

Client: Cruum Enterprises, LLC

Project Private Railroad Extension

Test Location: Test Pit I-1

Date: March 7, 2025

Comments:

Test

Time Interval (min.)	Water level from top of ring (in.)	
0		
10	1	10:03
20	1	11:03
30	3/4	11:13
40	3/4	11:23
50		
60		
70		
80		
90		
100		
110		
120		

Procedure:

1. Presoak for one hour in two 30 minute intervals, refilling after each 30 minutes.

2. For last 30 minute interval:

If water drop is two inches or more use 10 minute intervals

If water level drop is less than two inches use 30 minute intervals.

3. Continue readings for a minimum of eight readings (re fill after each reading)

or

until there is 1/4 inch or less drop between the highest and lowest of four consecutive readings

Presoak

Time Interval (min.)	Water level from top of ring (in.)	
30	2 1/2	10:13
60	2	10:43

Infiltation Rate (in/hr): 5.3

Approved For Permit
Approved
Date:
9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number:
BLD2026-00154
Approved
Reviewed for Code Compliance

Testing Engineers Consultants, Inc.

DOUBLE RING INFILTROMETER TEST

TEC Project No.: 62333

Client: Crown Enterprises, LLC

Project Railroad Extension

Test Location: Test Pit I-2

Date: March 7, 2023

Comments:

Test

Time Interval (min.)	Water level from top of ring (in.)	
0		
10	2 1/4	11:10
20	2	11:20
30	2	11:30
40	2	11:40
50		
60		
70		
80		
90		
100		
110		
120		

Procedure:

1. Presoak for one hour in two 30 minute intervals, refilling after each 30 minutes.

2. For last 30 minute interval:

If water drop is two inches or more use 10 minute intervals

If water level drop is less than two inches use 30 minute intervals.

3. Continue readings for a minimum of eight readings (re fill after each reading)

or

until there is 1/4 inch or less drop between the highest and lowest of four consecutive readings

Presoak

Time Interval (min.)	Water level from top of ring (in.)	
30	5	10:36
60	4	11:00

Infiltation Rate (in/hr): 12.4

CONSTRUCTION DRAWINGS

CROWN ENTERPRISES RAIL SPUR (DESIGN 6)

8100 MELVILLE STREET

CITY OF DETROIT, MICHIGAN 48209

FEBRUARY 23, 2026

Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

INDEX

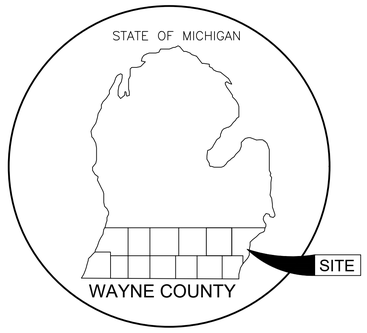
SHEET TITLE	SHEET No.
TITLE SHEET, GENERAL NOTES	SHEET 1
PLAN AND PROFILE	SHEET 2-3
CROSS SECTIONS	SHEET 4-7
UNDERDRAIN DETAIL	SHEET 6
NS TYPICAL CROSS SECTION	SHEET 7
TIMBER CROSSING DETAIL	SHEET 7

ISSUED FOR REVIEW/APPROVAL

SITE MAP
(NOT TO SCALE)



DETROIT, MI



GENERAL CONSTRUCTION NOTE:

1. IF THERE IS TO BE ANY CONSTRUCTION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE LOCAL TELEPHONE COMPANY, DETROIT EDISON COMPANY, LOCAL GAS COMPANY AND LOCAL MUNICIPALITY TO VERIFY THE LOCATION AND/OR EXISTENCE OF ANY UNDERGROUND UTILITIES WHICH MAY AFFECT CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE LOCAL MUNICIPALITY, DRAIN COMMISSION, AND MICHIGAN DEPARTMENT OF TRANSPORTATION.
3. ALL ELEVATIONS OF THESE PLANS ARE NAVD88 DATUM.
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND/OR OBTAIN ANY INFORMATION NECESSARY REGARDING THE PRESENCE OF UNDERGROUND UTILITIES WHICH MIGHT AFFECT THE JOB PRIOR TO COMMENCEMENT OF CONSTRUCTION.
5. ALL ITEMS OF WORK NOT SPECIFICALLY INDICATED AS PAY ITEMS IN THE PROPOSED SHALL BE CONSIDERED INCIDENTAL ITEMS.
6. ALL PROPERTIES OR FACILITIES IN THE SURROUNDING AREAS, INCLUDING FIELD TILES, PUBLIC OR PRIVATE, DESTROYED OR OTHER WISE DISTURBED DUE TO CONSTRUCTION SHALL BE REPLACED AND/OR RESTORED TO THE ORIGINAL CONDITION BY CONTRACTOR.
7. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL ON-SITE TREES, BRUSH, STUMP, ROCKS, STONES, FENCE, WIRE, TRASH, OR OTHER UNWANTED DEBRIS AT THE DEVELOPER'S DIRECTION RESULTING FROM THE CONSTRUCTION AND SHALL BE AN INCIDENTAL ITEM.
8. CONTRACTOR TO CONTACT LOCAL MUNICIPALITY 48 HOURS PRIOR TO CONSTRUCTION SUCH THAT THE PROPER INSPECTIONS CAN BE SCHEDULED.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING ELEVATIONS OF INVERTS PRIOR TO CONSTRUCTION.
10. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
11. CONTRACTOR SHALL CHECK BENCHMARK RELATIVE TO SITE GRADE PRIOR TO CONSTRUCTION.

NOTES:

- NO TITLE WORK HAS BEEN SUPPLIED BY THE CLIENT FOR PURPOSES OF THIS SURVEY THEREFORE NO GUARANTEE IS MADE THAT ANY OR ALL EASEMENTS, BOTH RECORDED AND UNRECORDED ARE SHOWN ON THIS SURVEY.
- THE LOCATION OF UTILITIES SHOWN ON THIS SURVEY, BOTH ABOVE AND BELOW GROUND, ARE SHOWN FROM INFORMATION OF RECORD SUPPLIED TO THE SURVEYOR AND A VISUAL INSPECTION OF THE PREMISES; NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS AND ACCURACY THEREOF. EXACT LOCATION SHOULD BE VERIFIED IN THE FIELD WITH THE UTILITY COMPANY PRIOR TO ANY CONSTRUCTION WHICH MAY AFFECT THE UTILITY.

CONTRACTOR NOTE:
The locations of existing underground utilities are shown in an approximate way only. The contractor shall determine the exact location of all existing utilities before commencing work. He agrees to be fully responsible for any and all damages which might be occasioned by his failure to exactly locate and preserve any and all underground utilities.

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

PROJECT COORDINATE SYSTEM

MICHIGAN STATE PLANE COORDINATE SYSTEM, NAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

R.A. DUTHLER LAND SURVEYING, P.C.
158 E. THIRD
IMLAY CITY, MI
PH. (810) 724-
FAX. (810) 724-

STATE OF MICHIGAN ★★★ LICENSED ★★★ RICHARD ALAN DUTHLER, JR PROFESSIONAL SURVEYOR No. 47200 SURVEYOR

RICHARD A. DUTHLER P.S.
No. 47200

RAIL ADVANCEMENT PROJECT
RAIL SPUR DESIGN FOR CROWN ENTERPRISES LLC LOCATED AT
8100 MELVILLE STREET
DETROIT, MI 48209

PREPARED FOR:
CROWN ENTERPRISES LLC
12225 STEPHENS ROAD
WARREN, MI 48089

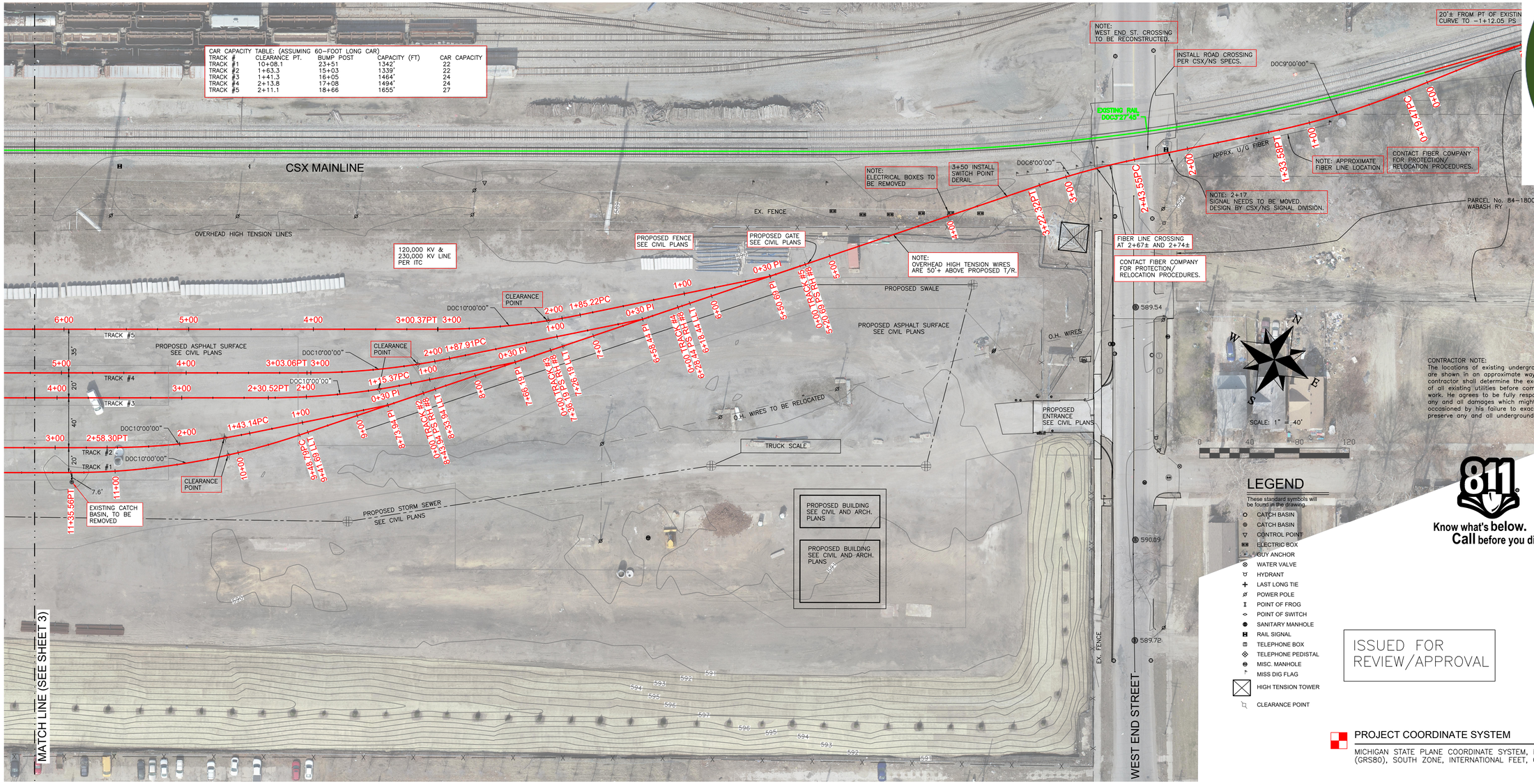
JOB No. 220712_RR_DESIGN 6

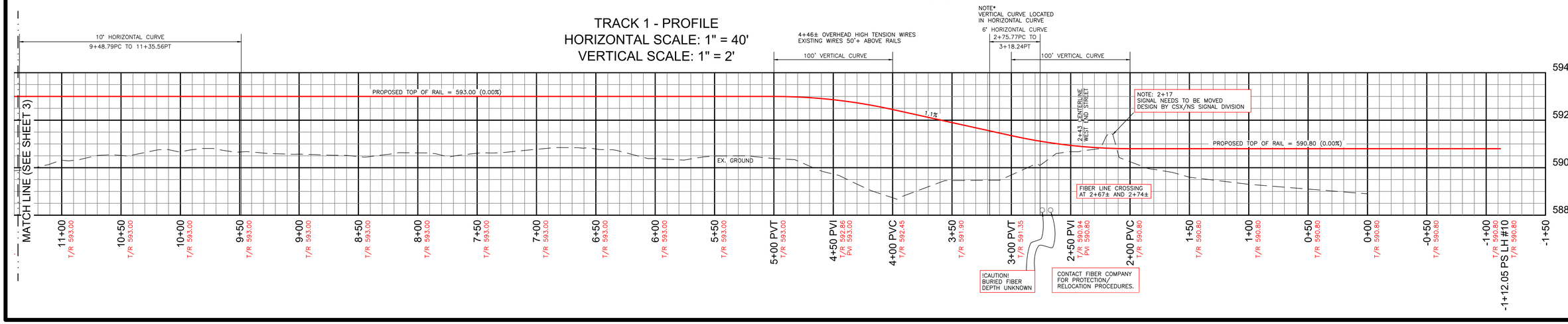
DRAWN BY: RICHARD DUTHLER/A.H.

DATE: FEBRUARY 23, 2026

SCALE:
SHEET 1 OF 7
REVISION DATES:
1
2
3
4

RAIL ADVANCEMENT PROJECT FOR CROWN ENTERPRISES





Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT
Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

R.A. DUTHLER LAND SURVEYING
158 E. THIRD
IMLAY CITY, MI
PH. (810) 724-
FAX. (810) 72

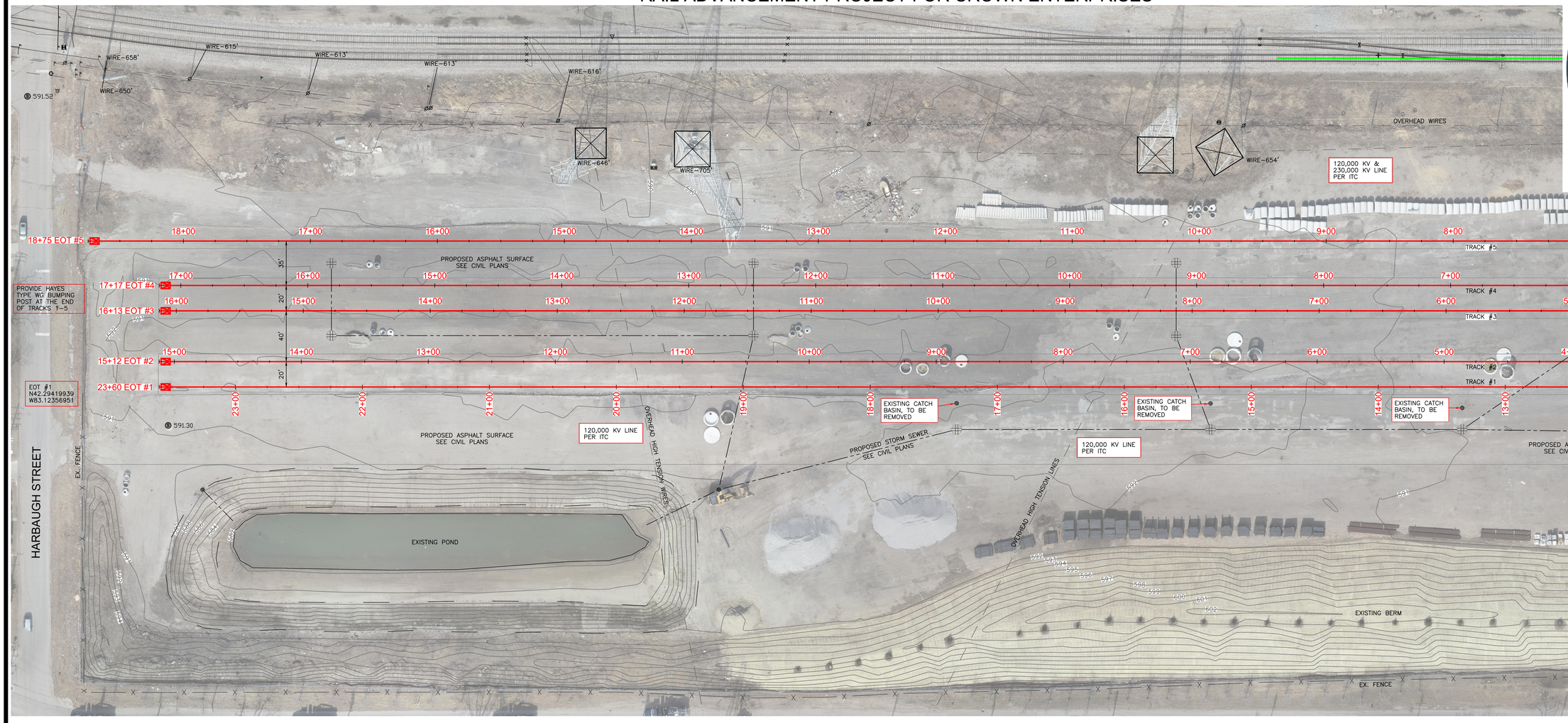
RICHARD ALAN DUTHLER, JR. PROFESSIONAL SURVEYOR No. 47200
RICHARD A. DUTHLER P.S.
No. 47200

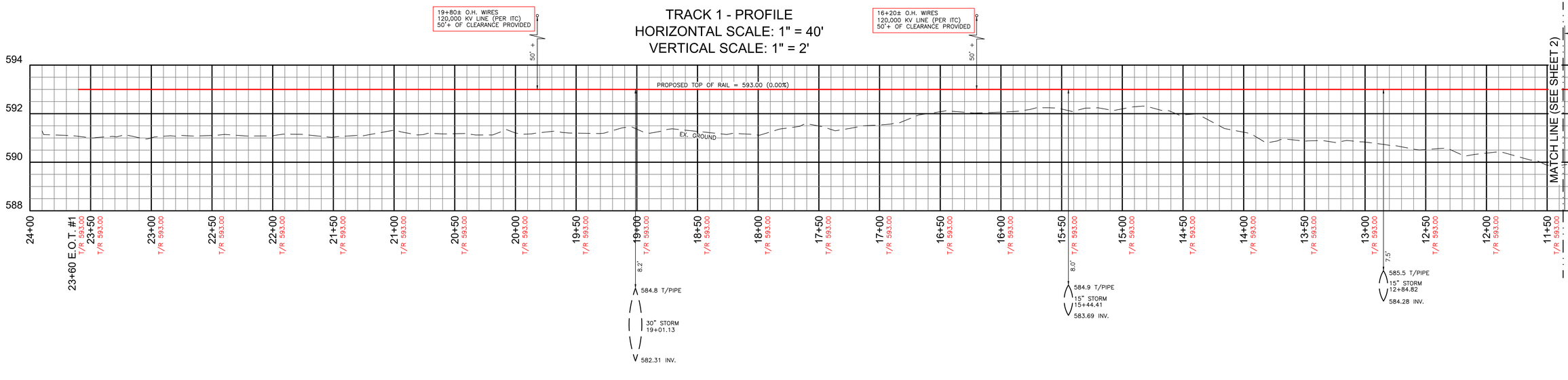
RAIL ADVANCEMENT PROJECT
DESIGN 6
-1+12 TO 11+50
RAIL SPUR DESIGN FOR CROWN ENTERPRISES LLC LOCATED AT
8100 MELVILLE STREET
DETROIT, MI 48209

PREPARED FOR:
CROWN ENTERPRISES LLC
12225 STEPHENS ROAD
WARREN, MI 48089
JOB No. 220712_RR_DESIGN 6

DRAWN BY: RICHARD DUTHLER/A.H.
DATE: FEBRUARY 23, 2026
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'
SHEET 2 OF 7
REVISION DATES:

RAIL ADVANCEMENT PROJECT FOR CROWN ENTERPRISES





Approved For Permit
Approved
Date: 9/21/2026
Buildings, Safety Engineering & Environmental Department
CITY OF DETROIT
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

R.A. DU
LAND SU
158 E. THIRD
IMLAY CITY, M
PH. (810) 724-
FAX. (810) 72

STATE OF MICHIGAN ★★ LICENSED ★★ PROFESSIONAL SURVEYOR
RICHARD ALAN DUTHLER, JR
PROFESSIONAL SURVEYOR
No. 47200
RICHARD A. DUTHLER P.S.
No. 47200

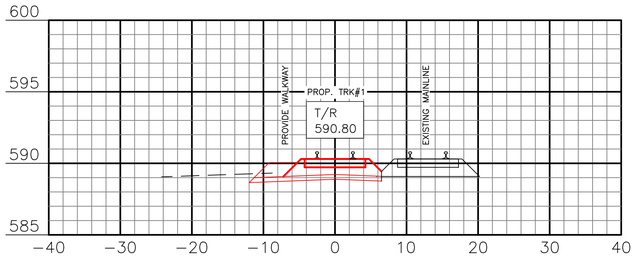
RAIL ADVANCEMENT PROJECT
DESIGN 6
11+50 TO 23+60
RAIL SPUR DESIGN FOR CROWN ENTERPRISES LLC LOCATED AT
8100 MELVILLE STREET
DETROIT, MI 48209

PREPARED FOR:
CROWN ENTERPRISES LLC
12225 STEPHENS ROAD
WARREN, MI 48089
JOB No. 220712_RR_DESIGN 6

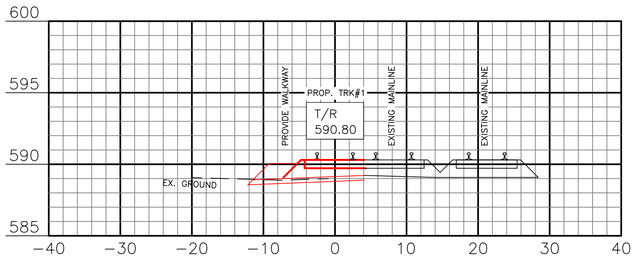
DRAWN BY: RICHARD DUTHLER/A.H.
DATE: FEBRUARY 23, 2026
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE:
SHEET 3 OF 7

RAIL ADVANCEMENT PROJECT FOR CROWN ENTERPRISES

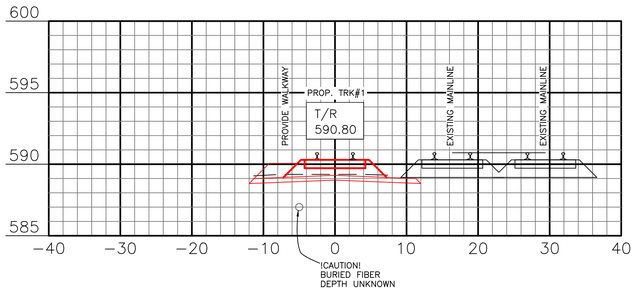
-1+12 CROSS SECTION



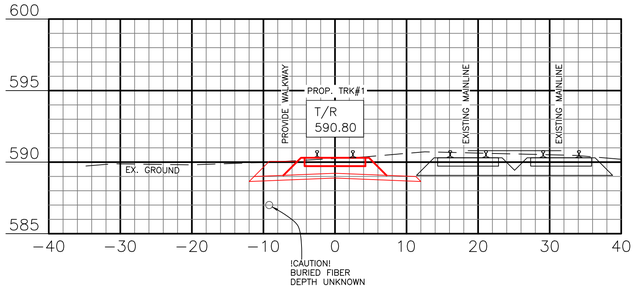
0+00 CROSS SECTION



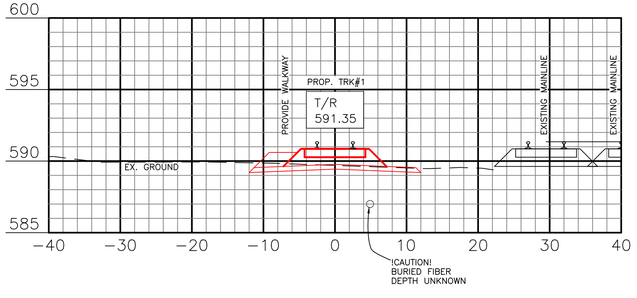
1+00 CROSS SECTION



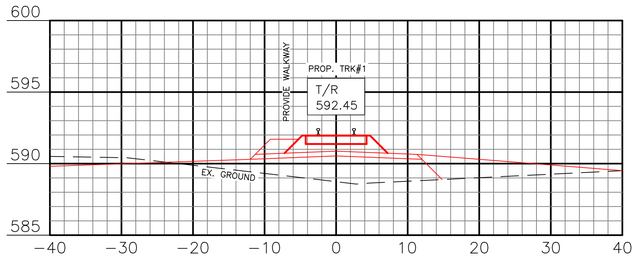
2+00 CROSS SECTION



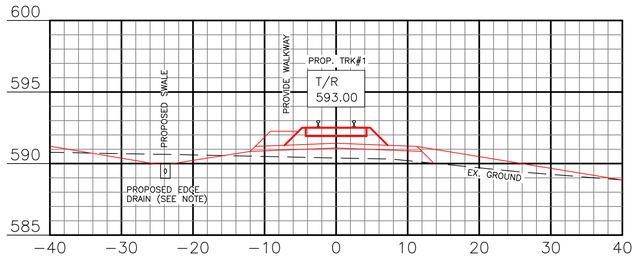
3+00 CROSS SECTION



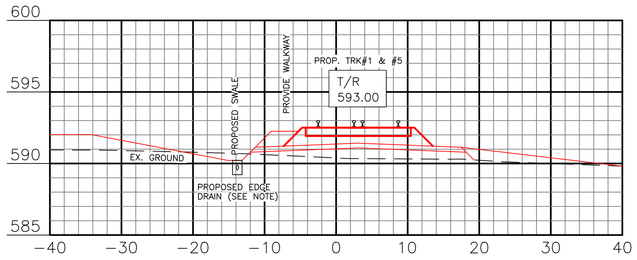
4+00 CROSS SECTION



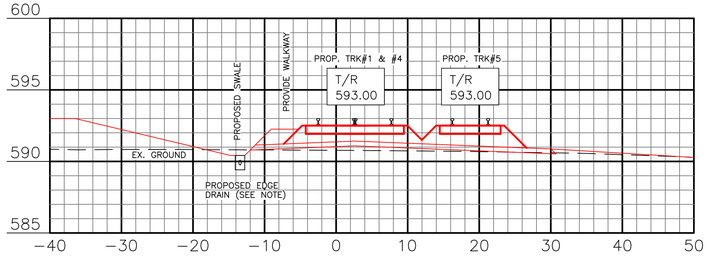
5+00 CROSS SECTION



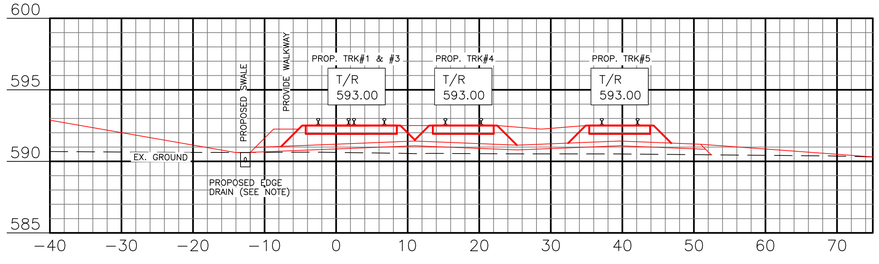
6+00 CROSS SECTION



7+00 CROSS SECTION



8+00 CROSS SECTION



NOTE: PROPOSED EDGE DRAIN ALONG EDGE OF SUB-BALLAST.
SEE CIVIL PLANS FOR CONNECTION TO PROPOSED STORM SEWER
SEE DETAIL ON SHEET #6

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

R.A. DU
LAND SU
158 E. THIRD
IMLAY CITY, M
PH. (810) 724-
FAX. (810) 72

STATE OF MICHIGAN ★★★ LICENSED ★★★ PROFESSIONAL SURVEYOR
RICHARD ALAN DUTHLER, JR
PROFESSIONAL SURVEYOR
No. 47200
RICHARD A. DUTHLER P.S.
No. 47200

RAIL ADVANCEMENT PROJECT
CROSS SECTIONS
-1+12 TO 8+00
RAIL SPUR DESIGN FOR CROWN ENTERPRISES LLC LOCATED AT
5101 MELVILLE STREET
DETROIT, MI 48209

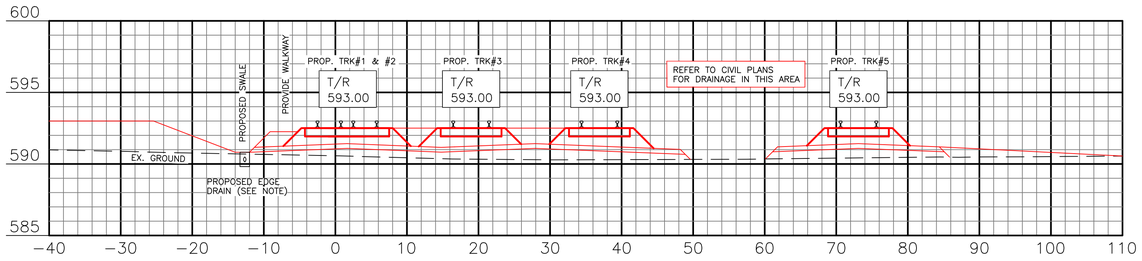
PREPARED FOR:
CROWN ENTERPRISES LLC

JOB No. 220712RR_DESIGN 6

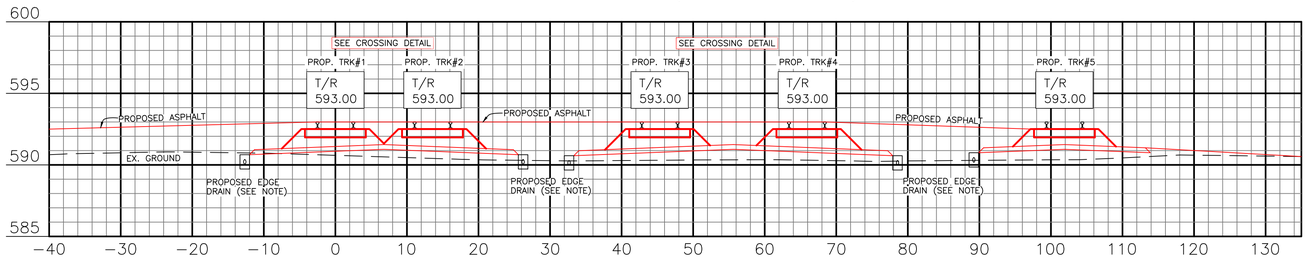
DRAWN BY: RICHARD DUTHLER/A.H.
DATE: FEBRUARY 23, 2026
HORIZONTAL SCALE: 1"= 10', VERTICAL SCALE: 1" = 5'
SHEET 4 OF 7
REVISION DATES:
1.
2.
3.
4.

RAIL ADVANCEMENT PROJECT FOR CROWN ENTERPRISES

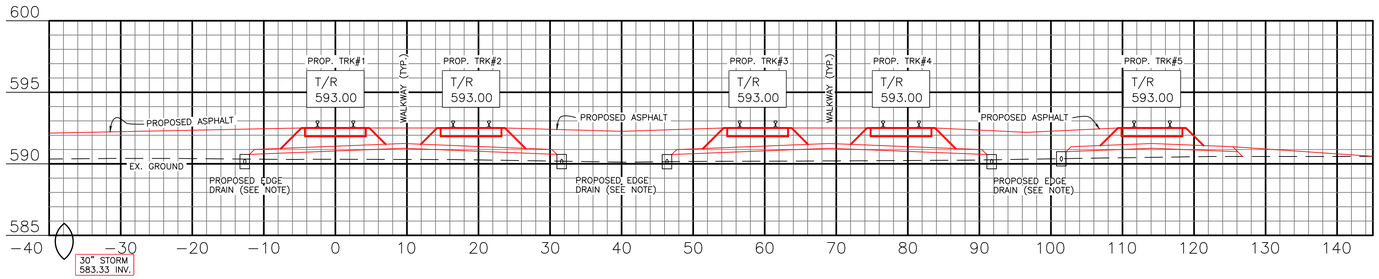
9+00 CROSS SECTION



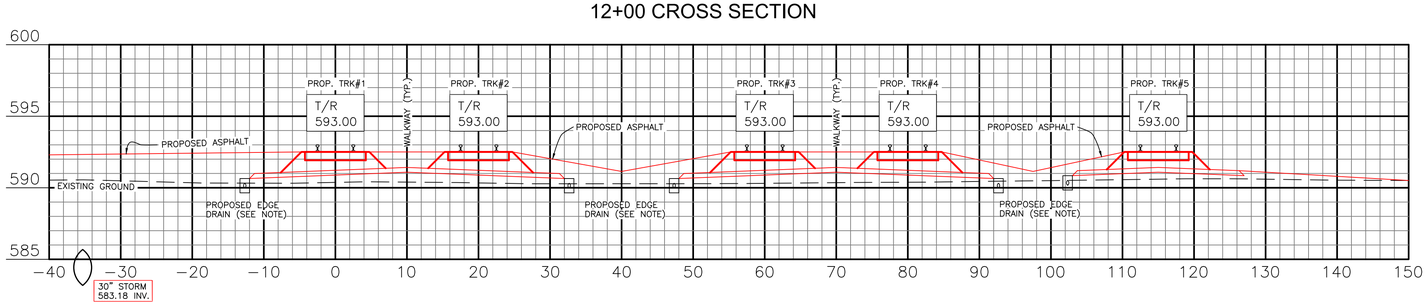
10+00 CROSS SECTION (ROAD CROSSING)



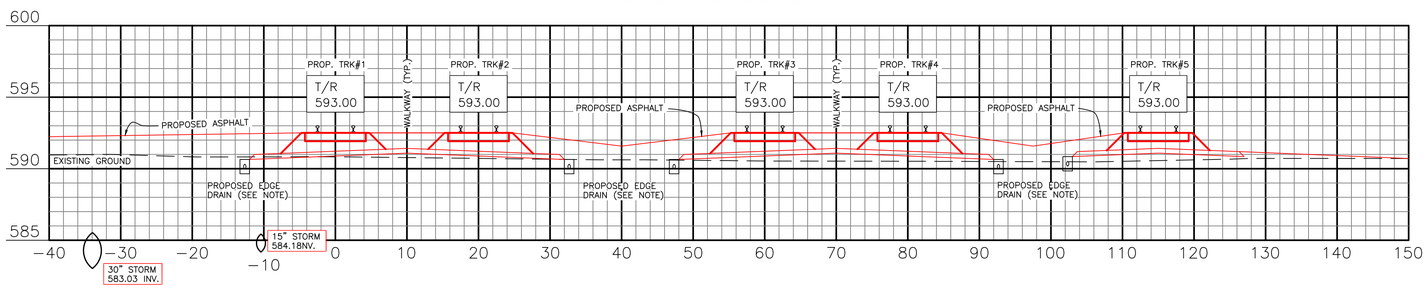
11+00 CROSS SECTION



12+00 CROSS SECTION



13+00 CROSS SECTION



NOTE: PROPOSED EDGE DRAIN ALONG EDGE OF SUB-BALLAST.
SEE CIVIL PLANS FOR CONNECTION TO PROPOSED STORM SEWER
SEE DETAIL ON SHEET #6

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

R.A. DUTHLER LAND SURVEYING, P.C.
158 E. THIRD
IMLAY CITY, MI
PH. (810) 724-
FAX. (810) 724-

STATE OF MICHIGAN ★★★ LICENSED ★★★ PROFESSIONAL SURVEYOR
RICHARD ALAN DUTHLER, JR
PROFESSIONAL SURVEYOR
No. 47200
RICHARD A. DUTHLER P.S.
No. 47200

RAIL ADVANCEMENT PROJECT
CROSS SECTIONS
9+00 TO 13+00
RAIL SPUR DESIGN FOR CROWN ENTERPRISES LLC LOCATED AT
8 OAKLEVILLE STREET
DETROIT, MI 48209

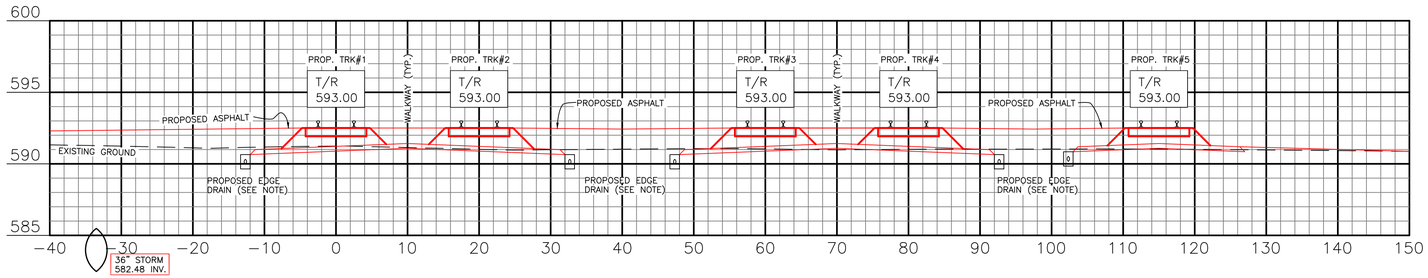
PREPARED FOR:
CROWN ENTERPRISES LLC

JOB No. 220712RR_DESIGN 6

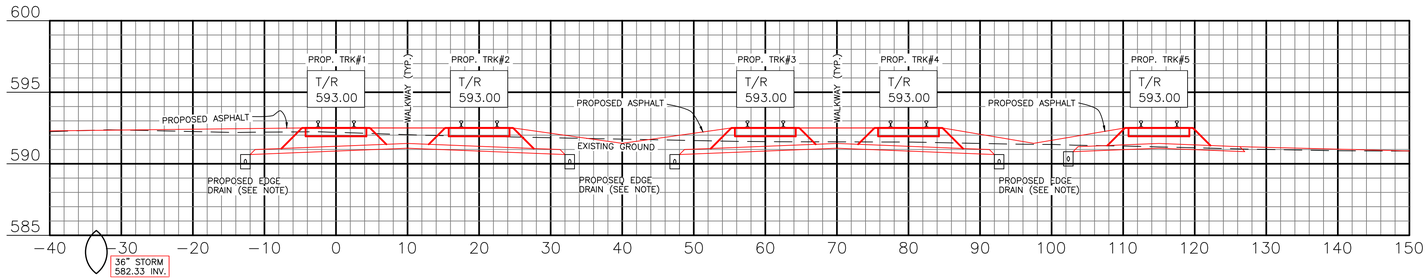
DRAWN BY: RICHARD DUTHLER/A.H.
DATE: FEBRUARY 23, 2026
HORIZONTAL SCALE: 1"= 10', VERTICAL SCALE: 1" = 5'
SHEET 5 OF 7
REVISION DATES:
1.
2.
3.
4.

RAIL ADVANCEMENT PROJECT FOR CROWN ENTERPRISES

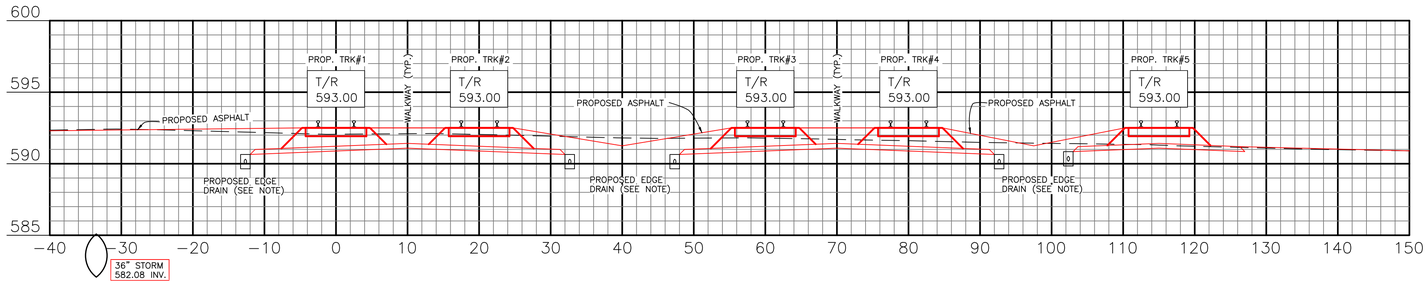
14+00 CROSS SECTION



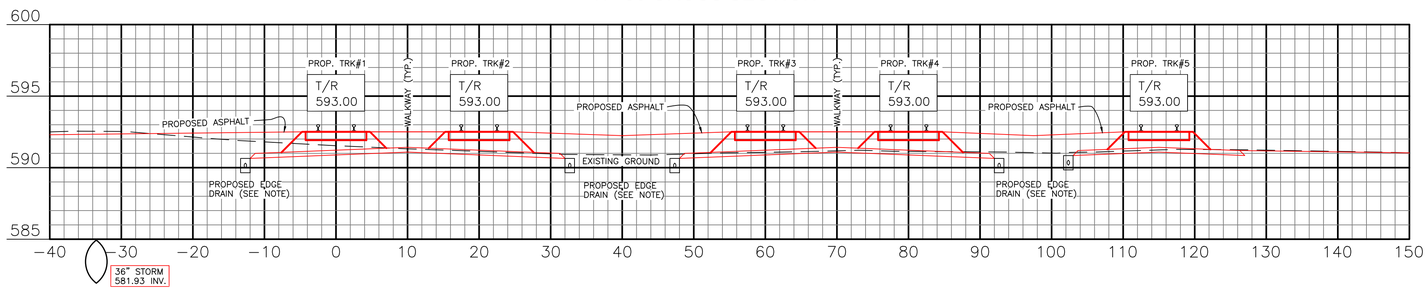
15+00 CROSS SECTION



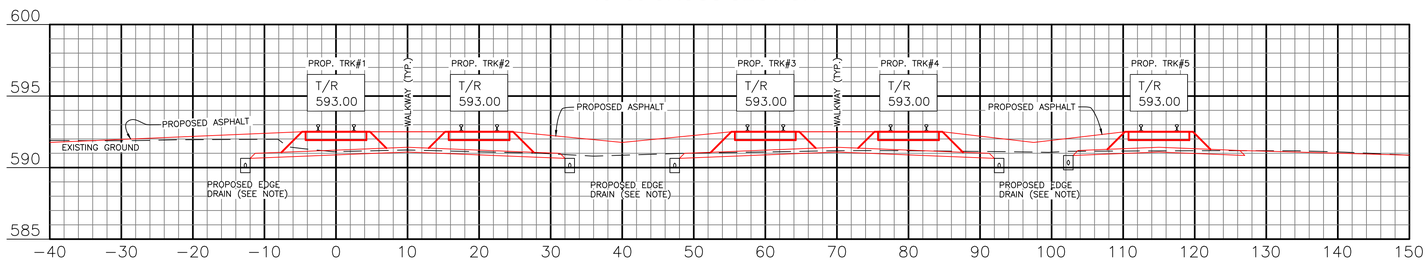
16+00 CROSS SECTION

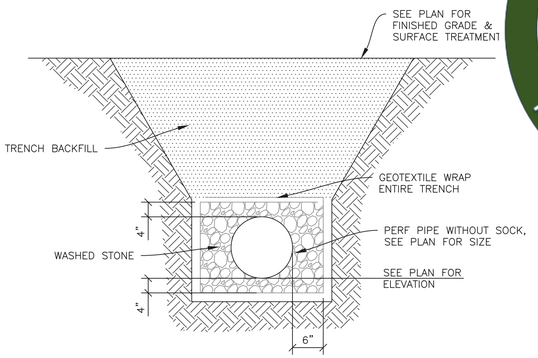


17+00 CROSS SECTION



18+00 CROSS SECTION





UNDERDRAIN DETAIL
NO SCALE

NOTE: PROPOSED EDGE DRAIN ALONG EDGE OF SUB-BALLAST. SEE CIVIL PLANS FOR CONNECTION TO PROPOSED STORM SEWER SEE DETAIL ON SHEET #6

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

R.A. DU
LAND SU
158 E. THIRD
IMLAY CITY, M
PH. (810) 724-
FAX. (810) 72

STATE OF MICHIGAN ★★★ LICENSED PROFESSIONAL SURVEYOR ★★★
RICHARD ALAN DUTHLER, JR
PROFESSIONAL SURVEYOR
No. 47200
4/17/26

RICHARD A. DUTHLER P.S.
No. 47200

RAIL ADVANCEMENT PROJE
CROSS SECTIONS
14+00 TO 18+00
RAIL SPUR DESIGN FOR CROWN ENTERPRISES LLC LOCATED AT
8 OOLITE VILLE STREET
DETROIT, MI 48209

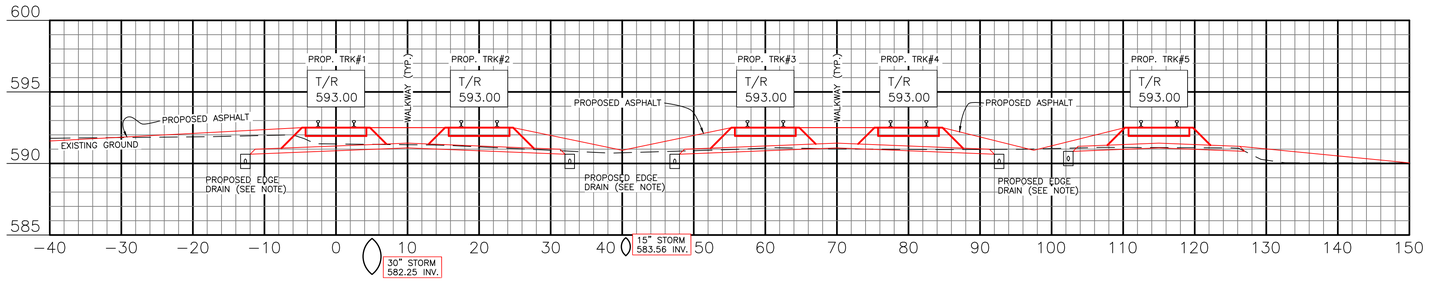
PREPARED FOR:
CROWN ENTERPRISES LLC

JOB No. 220712RR_DESIGN 6

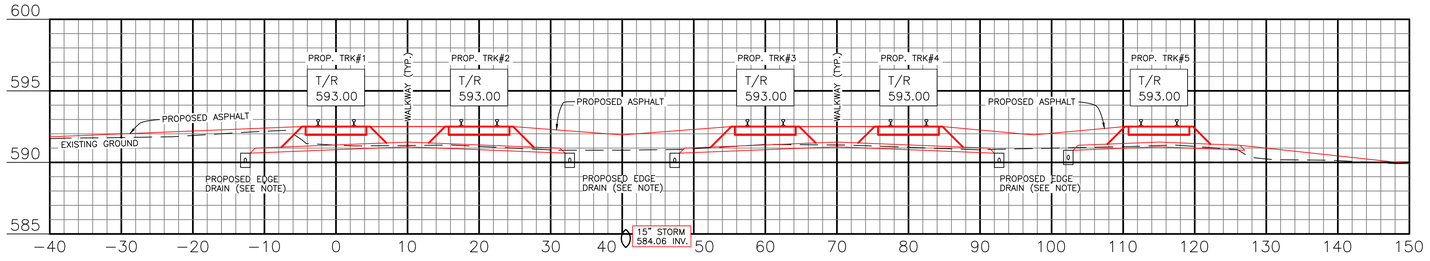
DRAWN BY: RICHARD DUTHLER/A.H.
DATE: FEBRUARY 23, 2026
HORIZONTAL SCALE: 1"= 10', VERTICAL SCALE: 1" = 5'
SHEET 6 OF 7
REVISION DATES:
1.
2.
3.
4.

RAIL ADVANCEMENT PROJECT FOR CROWN ENTERPRISES

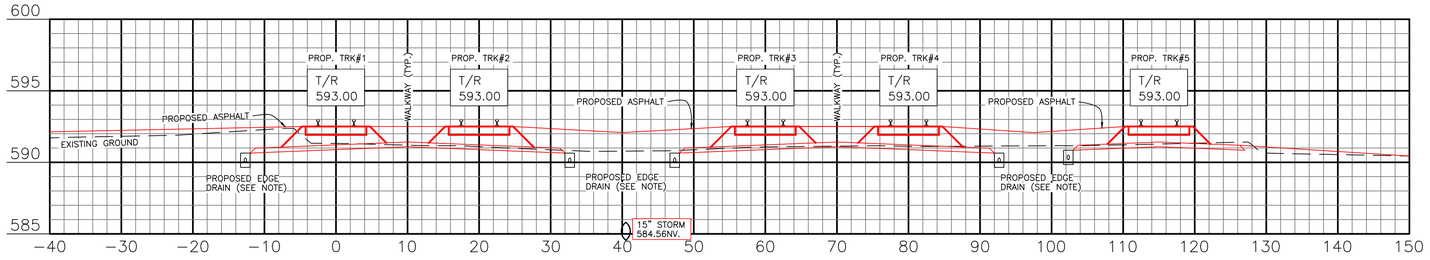
19+00 CROSS SECTION



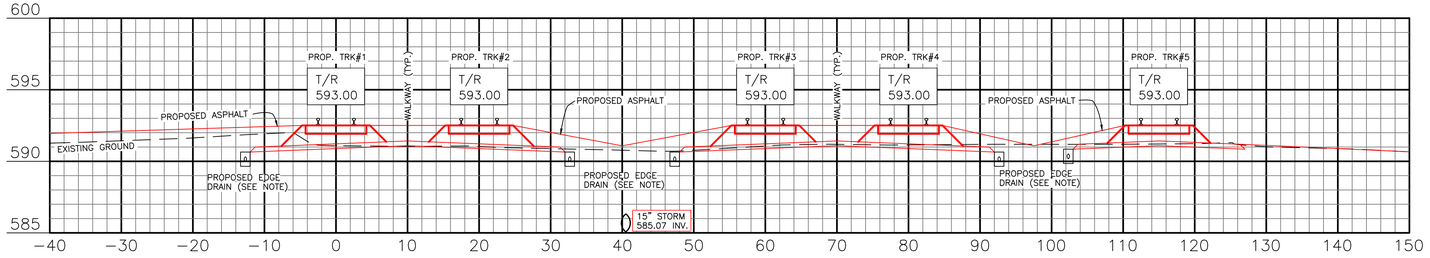
20+00 CROSS SECTION



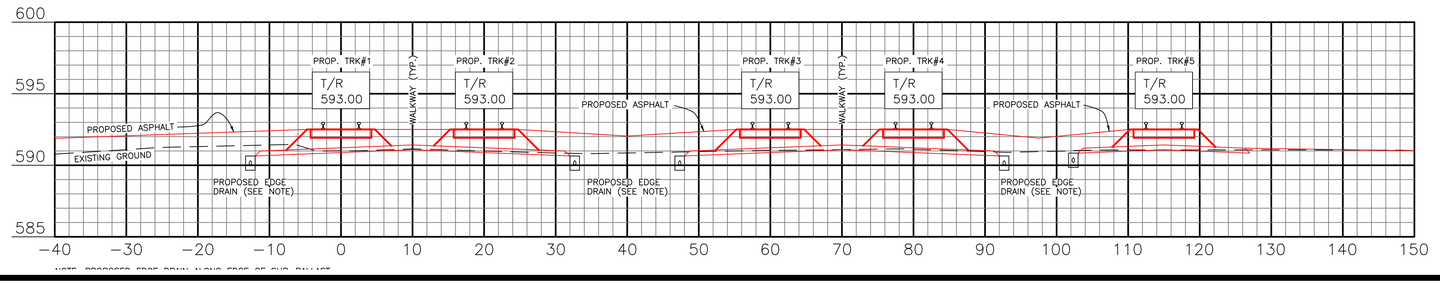
21+00 CROSS SECTION



22+00 CROSS SECTION



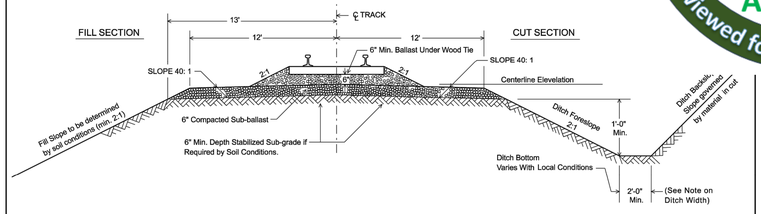
23+00 CROSS SECTION



NOTE: PROPOSED EDGE DRAIN ALONG EDGE OF SUB-BALLAST.
SEE CIVIL PLANS FOR CONNECTION TO PROPOSED STORM SEWER
SEE DETAIL ON SHEET #6

INDUSTRIAL TRACKS

PLAN NOT TO SCALE



GENERAL NOTES

(1) Sub-grade may be stabilized with lime, lime-fly ash, cement or stone.

(2) Tamping of ballast must not disturb compacted sub-ballast.

(3) Top of sub-grade is to be crowned.

DITCH WIDTH NOTES

(1) On NORFOLK SOUTHERN right-of-way, minimum ditch width should be calculated to carry volume of water for a 100 year storm event, or be at a minimum 5' wide, whichever is greater.

(2) Where ditch back slopes on NORFOLK SOUTHERN right-of-way are in cut sections greater than 25' in height, ditch width should be increased to a minimum of 10' wide.

NOTE:
Roadbed Sections Proposed Near Structures And/Or In Pavement Locations Will Need To Be Designed And Submitted For Review And Approval.

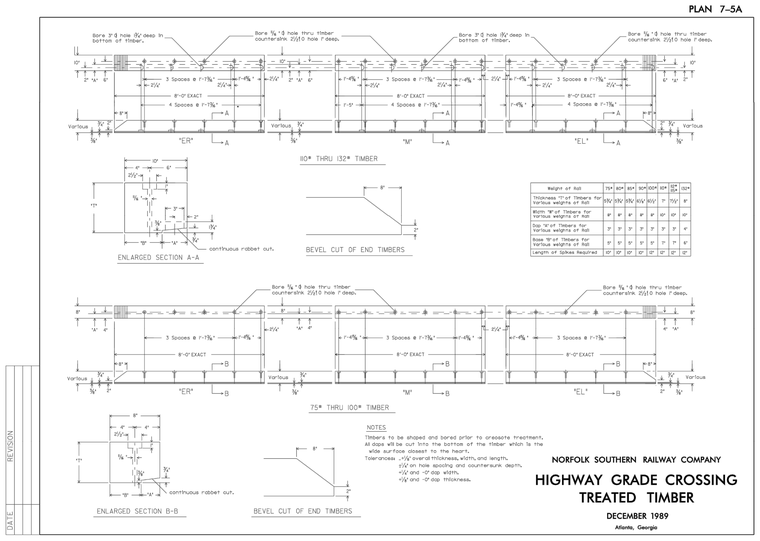
REVISION
DATE
1 11/06 ADDED CUT SECTION NOTES
03/10 ADD NOTE & 1' TO DITCH BOTTOM

NORFOLK SOUTHERN RAILWAY COMPANY

ROADBED SECTION
FOR INDUSTRIAL TRACKS

JANUARY 1989
Atlanta , Georgia

PLAN 7-5A



REVISION
DATE

NORFOLK SOUTHERN RAILWAY COMPANY

HIGHWAY GRADE CROSSING TREATED TIMBER

DECEMBER 1989
Atlanta, Georgia

Approved For Permit
Approved
Date: 9/21/2026
CITY OF DETROIT
Buildings, Safety Engineering & Environmental Department
Permit Number: BLD2026-00154
Approved
Reviewed for Code Compliance

R.A. DU...
LAND SU...
158 E. THIRD
IMLAY CITY, M...
PH. (810) 724-...
FAX. (810) 72...

STATE OF MICHIGAN ★★★ LICENSED ★★★ PROFESSIONAL SURVEYOR
RICHARD ALAN DUTHLER, JR. PROFESSIONAL SURVEYOR No. 47200

RICHARD A. DUTHLER P.S.
No. 47200

RAIL ADVANCEMENT PROJECT
CROSS SECTIONS
19+00 TO 23+00

RAIL SPUR DESIGN FOR CROWN ENTERPRISES LLC LOCATED AT
8 MILE AND LIVERNOIS
DETROIT, MI 48209

PREPARED FOR:
CROWN ENTERPRISES LLC

JOB No. 220712RR_DESIGN 6

DRAWN BY: RICHARD DUTHLER/A.H.
DATE: FEBRUARY 23, 2026
HORIZONTAL SCALE: 1"= 10', VERTICAL SCALE: 1" = 5'
SHEET 7 OF 7
REVISION DATES:
1
2
3
4