

**GENERAL NOTES**

**1. STANDARDS AND SPECIFICATIONS**

- A. ALL STORM SEWER AND STORM DRAINAGE SYSTEM CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS, THE MACOMB COUNTY OFFICE OF PUBLIC WORKS, THE ROAD COMMISSION OF MACOMB COUNTY AND THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, AS APPLICABLE. CONSTRUCTION AND MATERIALS SHALL ALSO CONFORM TO THE APPLICABLE CURRENT ASTM STANDARD SPECIFICATION OR PRACTICE, WHEN REFERENCED.
- B. ANY MATERIALS OTHER THAN THOSE LISTED ON THE STANDARD DETAIL SHEETS MUST BE APPROVED IN WRITING BY THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS. CONTRACTOR MUST SUBMIT THREE ( 3 ) COPIES OF SHOP DRAWINGS AND SPECIFICATIONS FOR PROPOSED ALTERNATE MATERIAL TO THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS FOR REVIEW AS AN APPROVED EQUAL. DETERMINATION OF ACCEPTANCE BY THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS SHALL BE CONSIDERED FINAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH REVIEW OF THE PROPOSED ALTERNATE MATERIAL AS AN APPROVED EQUAL.
- C. ALL STORM SEWER AND STORM DRAINAGE SYSTEM CONSTRUCTION SHALL HAVE COMPETENT CONSTRUCTION OBSERVATION PROVIDED BY, OR CAUSED TO BE PROVIDED BY, THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS.
- D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES DURING CONSTRUCTION. ALL UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH LIKE MATERIAL. ALL COSTS FOR LOCATING, SUPPORTING, REMOVING AND REPLACING, RELOCATING OR REPAIRING THESE UTILITIES SHALL BE BORNE BY THE CONTRACTOR. THE CONTRACTOR SHALL VERIFY THE DEPTH AND HORIZONTAL LOCATION OF ALL EXISTING UTILITIES BEFORE ANY WORK IS STARTED. THE EXACT LOCATION OF EXISTING UTILITIES SHALL BE DETERMINED BY HAND DIGGING.

**2. PRECONSTRUCTION REQUIREMENTS**

- A. THE DEVELOPER SHALL PROVIDE A BREAKDOWN OF CONSTRUCTION COST TO THE CHARTER TOWNSHIP OF CHESTERFIELD WATER DEPARTMENT AND PAY ALL REQUIRED FEES PRIOR TO SCHEDULING A PRECONSTRUCTION MEETING.
- B. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL ATTEND A PRECONSTRUCTION MEETING AT A TIME AND PLACE AS ARRANGED BY THE TOWNSHIP ENGINEER. THE TOWNSHIP ENGINEER SHALL NOTIFY AFFECTED UTILITY COMPANIES AND GOVERNMENTAL AGENCIES A MINIMUM OF TEN ( 10 ) DAYS PRIOR TO THE PRECONSTRUCTION MEETING. THE OWNER'S ENGINEER SHALL SUBMIT APPROVED PLANS TO ALL UTILITY COMPANIES AND GOVERNMENTAL AGENCIES A MINIMUM OF TEN ( 10 ) DAYS PRIOR TO PRECONSTRUCTION MEETING.
- C. THE CONTRACTOR SHALL NOTIFY MISS DIG AT ( 800 ) 482-7171 OR 811, THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS AT ( 586 ) 949-0400 EXT. 3, AND ANDERSON, ECKSTEIN AND WESTRICK, INC. AT ( 586 ) 726-1234 THREE ( 3 ) WORKING DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL ALSO NOTIFY REPRESENTATIVES OF ANY OTHER FACILITIES, LOCATED IN THE VICINITY OF THE WORK, WHICH ARE NOT PARTICIPANTS OF THE MISS DIG SYSTEM. THE CONTRACTOR SHALL NOTIFY THE MACOMB COUNTY OFFICE OF PUBLIC WORKS AT ( 586 ) 469-5325, AND THE ROAD COMMISSION OF MACOMB COUNTY AT ( 586 ) 463-8671 TWO ( 2 ) WORKING DAYS PRIOR TO CONSTRUCTION.
- D. A MACOMB COUNTY OFFICE OF PUBLIC WORKS, ROAD COMMISSION OF MACOMB COUNTY, AND/OR MICHIGAN DEPARTMENT OF TRANSPORTATION PERMIT IS REQUIRED FOR ALL CONSTRUCTION WITHIN THEIR ROAD AND/OR DRAIN RIGHT-OF-WAYS AND/OR EASEMENTS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SECURE ALL PERMITS AND BONDS PRIOR TO CONSTRUCTION, OR ENSURE THAT ALL REQUIRED PERMITS AND BONDS HAVE BEEN OBTAINED PRIOR TO CONSTRUCTION.

**3. PIPE MATERIAL**

- A. ONLY NEW UNDAMAGED STORM SEWER PIPE SHALL BE USED. THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS SHALL HAVE THE RIGHT TO REJECT ANY OR ALL PIPE.
- B. TWELVE INCH ( 12" ) AND LARGER PIPE SHALL BE REINFORCED CONCRETE CIRCULAR SEWER PIPE WITH MINIMUM WALL THICKNESS C ( ASTM C76, CLASS IV ). SIZE AND CLASS OF PIPE SHALL BE AS INDICATED ON THE PLANS. ALL REINFORCED CONCRETE SEWER PIPE SHALL BE CAST WITH REINFORCING STEEL EXTENDING INTO THE BELL. ALL JOINTS SHALL BE MODIFIED TONGUE AND GROOVE WITH GASKET ( ASTM C361 ). GASKETS SHALL BE SYNTHETIC RUBBER. NATURAL RUBBER GASKETS ARE NOT ACCEPTABLE. ALL CONCRETE STORM SEWER THIRTY-SIX INCH ( 36" ) OR LARGER SHALL HAVE POINTED JOINTS.
- C. THE FOLLOWING PLASTIC PIPE MAY ONLY BE USED WITH THE WRITTEN AUTHORIZATION OF THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS AND WHEN THE PIPE WILL NOT BE SUBJECT TO CRUSHING LOADS FROM CONSTRUCTION EQUIPMENT AND PROPERTY MAINTENANCE AND A MINIMUM THREE FEET ( 3' ) OF COVER CAN BE MAINTAINED:
  - COMPOSITE ( PVC TRUSS ) PIPE: POLYVINYL CHLORIDE ( PVC ) COMPOSITE ( TRUSS ) SEWER PIPE ( ASTM D2680 ) WITH GASKETED JOINTS ( ASTM D3212 ).
  - PVC SOLID WALL PIPE: PVC TYPE PS-115 PLASTIC GRAVITY FLOW SEWER PIPE ( ASTM F789 ), PVC SOLID PLASTIC PIPE, SCHEDULE 40 ( ASTM D1785 ), OR PVC SOLID PLASTIC PIPE, SDR 26 ( ASTM D3034 ) WITH GASKETED JOINTS ( ASTM D3212 ).
  - CORRUGATED PVC: CORRUGATED PVC SEWER PIPE WITH A SMOOTH INTERIOR SURFACE ( ASTM F949 ) WITH GASKETED PUSH-ON JOINTS ( ASTM D3212 ). GASKET SHALL BE A DOUBLE SEALING GASKET THAT INDEXES TWO ( 2 ) CORRUGATIONS. CORRUGATED PVC SEWER PIPE SHALL BE INSTALLED WITH CRUSHED STONE ENCASUREMENT BEDDING.
  - PVC CLOSED PROFILE: PVC CLOSED PROFILE GRAVITY SEWER PIPE ( ASTM F1803 ) WITH BELL AND SPIGOT TYPE JOINTS WITH ELASTOMERIC SEALS ( ASTM D3212 ). PVC CLOSED PROFILE GRAVITY PIPE SHALL BE INSTALLED WITH CRUSHED STONE ENCASUREMENT BEDDING.
  - CORRUGATED POLYETHYLENE: CORRUGATED POLYETHYLENE ( PE ) PIPE WITH A SMOOTH INTERIOR ( ASTM F2306 ). WATERTIGHT PIPE JOINTS SHALL MEET A 10.8 PSI LABORATORY TEST PER ASTM D3212 AND UTILIZE A BELL AND SPIGOT DESIGN WITH A GASKET MEETING ASTM F477. BELL SHALL SPAN OVER THREE ( 3 ) SPIGOT CORRUGATIONS. ONLY TWELVE INCH ( 12" ) THROUGH TWENTY-FOUR INCH ( 24" ) PIPE WILL BE CONSIDERED.

**4. DRAINAGE STRUCTURES**

- A. ALL NEW MANHOLES SHALL BE PRECAST REINFORCED CONCRETE, FLEXIBLE-JOINT TYPE ( ASTM C478 ). THE TOP SECTION SHALL BE A MODIFIED ECCENTRIC CONE SECTION. ALTERNATELY, THE MANHOLE MAY BE CONSTRUCTED WITH A REINFORCED CONCRETE FLAT SLAB COVER ( ASTM C478 ). THE BASE SECTION FOR EIGHT INCH ( 8" ) TO SIXTY INCH ( 60" ) DIAMETER SEWERS SHALL BE A PRECAST RISER SECTION WITH AN INTEGRAL BASE. JOINTS AND GASKETS SHALL BE MODIFIED TONGUE AND GROOVE ( ASTM C443 ). ALL LIFTING HOLES SHALL BE FILLED WITH A NON-SHRINK TYPE MORTAR COMPOSED OF TYPE IIA CEMENT. NON-SHRINK TYPE MORTAR SHALL BE PRECO OR SEKA SET. NO LIME SHALL BE USED IN THE MORTAR. ALTERNATELY, THE BASE SECTION FOR SEWERS FORTY EIGHT INCHES ( 48" ) IN DIAMETER AND LARGER MAY BE A MANHOLE TEE ( ASTM C76, CLASS IV MINIMUM ).
 

NOTE: NEW MANHOLES MAY ALSO BE CONSTRUCTED WITH CONCRETE BLOCK AND MDOT TYPE R-2 MORTAR WITH A PRECAST CONCRETE BASE ( ASTM C478 ) OR A POURED CONCRETE BASE ( 2500 PSI AT 28 DAYS ). IF A PRECAST BASE IS USED, PLACE A MINIMUM TWO INCH ( 2" ) SAND SUB-BASE. THE EXTERIOR OF THE CONCRETE BLOCK DRAINAGE STRUCTURE SHALL HAVE A ONE-HALF INCH ( 1/2" ) MORTAR CEMENT PLASTER COAT. MANMADE STRUCTURES MAY ONLY BE USED WITH THE WRITTEN PERMISSION FROM THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS.
- B. ALL NEW CATCH BASINS SHALL BE FORTY EIGHT INCH ( 48" ) DIAMETER ( MINIMUM ) PRECAST REINFORCED CONCRETE, FLEXIBLE-JOINT TYPE ( ASTM C478 ). THE TOP SECTION SHALL BE A MODIFIED ECCENTRIC CONE SECTION. THE BASE SECTION SHALL BE A PRECAST RISER SECTION WITH AN INTEGRAL BASE. JOINTS AND GASKETS SHALL BE MODIFIED TONGUE AND GROOVE ( ASTM C443 ). ALL LIFTING HOLES SHALL BE FILLED WITH A NON-SHRINK TYPE MORTAR COMPOSED OF TYPE IIA CEMENT. NON-SHRINK TYPE MORTAR SHALL BE PRECO OR SEKA SET. NO LIME SHALL BE USED IN THE MORTAR. ALL CATCH BASINS SHALL BE CONSTRUCTED WITH A TWO FOOT ( 2' ) SUMP ( MINIMUM ).
 

NOTE: NEW CATCH BASINS MAY ALSO BE CONSTRUCTED WITH CONCRETE BLOCK AND MDOT TYPE R-2 MORTAR WITH A PRECAST CONCRETE BASE ( ASTM C478 ) OR A POURED CONCRETE BASE ( 2500 PSI AT 28 DAYS ). IF A PRECAST BASE IS USED, PLACE A MINIMUM TWO INCH ( 2" ) SAND SUB-BASE. THE EXTERIOR OF THE DRAINAGE STRUCTURE SHALL HAVE A ONE-HALF INCH ( 1/2" ) MORTAR CEMENT PLASTER COAT.
- C. PIPE PENETRATION JOINTS FOR NEW PRECAST REINFORCED DRAINAGE STRUCTURES SHALL BE A FLEXIBLE WATER-TIGHT JOINT, "KOR-N-SEAL" FOR SEWERS SIX INCH ( 6" ) THROUGH THIRTY INCH ( 30" ) IN DIAMETER AND "A-LOK" FOR SEWERS THIRTY-SIX INCH ( 36" ) IN DIAMETER AND LARGER. HOLES FOR PIPES SHALL BE CAST IN THE RISER SECTION SO AS TO PROVIDE A MINIMUM CLEARANCE OF TWO INCHES ( 2" ) BETWEEN THE INSIDE BOTTOM OF THE BASE SECTION AND THE OUTSIDE WALL OF THE PIPE. PIPE SHALL NOT EXTEND INTO A MANHOLE BEYOND THE INTERIOR FACE OF THE MANHOLE WALL.
- D. EXISTING PRECAST DRAINAGE STRUCTURES SHALL BE TAPPED WITH THE "KOR-N-SEAL" METHOD, WITH A WATER-TIGHT RUBBER BOOT FOR SEWERS SIX INCH ( 6" ) THROUGH FIFTEEN INCH ( 15" ) IN DIAMETER. EXISTING BRICK DRAINAGE STRUCTURES, AND TAPS FOR SEWERS EIGHTEEN INCH ( 18" ) IN DIAMETER AND LARGER, SHALL HAVE HOLES DRILLED AT FOUR INCHES ( 4" ) CENTER TO CENTER AROUND THE PERIPHERY OF THE OPENING TO CREATE A PLANE OF WEAKNESS BEFORE BREAKING OUT THE SECTION. NON-SHRINK GROUT, PRECO OR SEKA SET, SHALL BE USED TO SEAL THE OPENING. A CONCRETE COLLAR SHALL BE POURED TWELVE INCHES ( 12" ) AROUND THE PIPE AND EXTEND TWELVE INCHES ( 12" ) EXTERIOR TO THE DRAINAGE STRUCTURE.
- E. THE CONTRACTOR SHALL BE REQUIRED TO RECONSTRUCT ANY DRAINAGE STRUCTURE THAT IS DAMAGED WHILE BEING TAPPED.
- F. FIELD TAPS SHALL NOT BE ALLOWED TO THE PIPE SECTION OF MANHOLE TEES. TAPPING OF RISER SECTIONS IS PERMITTED WITH THE WRITTEN AUTHORIZATION OF THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS.
- G. ALL CONNECTIONS TO THE STORM SEWER SHALL BE MADE AT A MANHOLE OR CATCH BASIN. NO BLIND TAPS TO STORM SEWERS WILL BE ALLOWED FOR STORM SEWER OR SUMP LEAD CONNECTIONS.
- H. ALL DRAINAGE STRUCTURES SHALL HAVE UNDERDRAIN, CONSTRUCTED IN ACCORDANCE WITH THE DETAILS ON SHEET STM 1.
- I. GRADE ADJUSTMENTS SHALL BE MADE USING MDOT GRADE S-II CONCRETE BRICKS ( ASTM C55 ) IN FULL MORTAR BED. MORTAR COAT ALL OPEN SPACES AND IRREGULARITIES ON THE INSIDE OF BRICKWORK TO FORM DRAINAGE STRUCTURE INTERIOR. MORTAR COAT ALL OPEN SPACES AND IRREGULARITIES ON THE OUTSIDE OF BRICKWORK. TAPER OUTSIDE MORTAR COAT A MINIMUM OF ONE PERCENT ( 1% ) FROM THE FRAME FLANGE TO THE DRAINAGE STRUCTURE OUTSIDE DIAMETER. BRICKWORK AND MORTAR SHALL NOT OVERHANG BEYOND THE OUTSIDE DIAMETER OF THE DRAINAGE STRUCTURE. MORTAR SHALL BE MDOT TYPE R-2. MINIMUM ADJUSTMENT SHALL BE SIX INCHES ( 6" ) AND MAXIMUM SHALL BE TWELVE INCHES ( 12" )

**J. DRAINAGE STRUCTURE FRAMES AND COVERS SHALL BE AS FOLLOWS:**

- MANHOLE: EJIW 1040 WITH TYPE B COVER OR APPROVED EQUAL
- CATCH BASIN ( PAVEMENT TYPE ): EJIW 5100Z WITH TYPE M1 5105 GRATE OR APPROVED EQUAL ( NO CURB & GUTTER )
- CATCH BASIN ( PAVEMENT TYPE ): EJIW 7045 WITH TYPE M1 GRATE AND 7050 T1 BACK OR ( STR. FACE CURB & GUTTER ) APPROVED EQUAL
- CATCH BASIN ( PAVEMENT TYPE ): EJIW 7065 WITH 7045 TYPE M1 GRATE AND 7060 T1 ( MOUNTABLE CURB & GUTTER ) BACK OR APPROVED EQUAL
- CATCH BASIN ( YARD TYPE ): EJIW 1040 WITH TYPE M1, M2 OR TYPE N GRATE OR APPROVED EQUAL
- CATCH BASIN ( DITCH TYPE ): EJIW 1040 WITH TYPE N, O2 GRATE OR APPROVED EQUAL

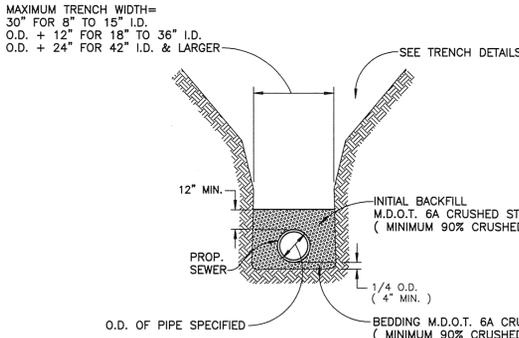
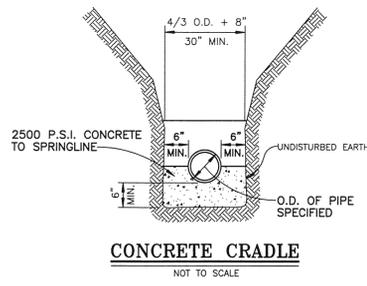
- K. STEPS SHALL BE M.A. INDUSTRIES P.S.I. POLYPROPYLENE OR MSU #360 ALU POLY MANHOLE STEPS AND INSTALLED AT SIXTEEN INCHES ( 16" ) CENTER TO CENTER SPACING. STEPS SHALL HAVE FOOT RECESS AND BE SUITABLY SCORED TO PROVIDE A NONSLIP SURFACE. BOTTOM STEP SHALL BE TWENTY-FOUR INCHES ( 24" ) MAXIMUM ABOVE FLOOR. TOP STEP SHALL BE TWENTY INCHES ( 24" ) MAXIMUM BELOW RIM. STEPS SHALL NORMALLY BE PROVIDED ON A BACK WALL OF THE DRAINAGE STRUCTURE FURTHEST FROM TRAFFIC. IF A DRAINAGE STRUCTURE IS INSTALLED AT A LOCATION WITHIN EXISTING TRAFFIC FLOW, STEPS SHALL BE PROVIDED SUCH THAT PERSONNEL WILL FACE ON-COMING TRAFFIC.
- L. ALL STRUCTURES RECEIVING STORM RUN-OFF SHALL HAVE AT LEAST A TWO FOOT ( 2' ) SUMP.

**5. CONSTRUCTION**

- A. NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWNSPOUT DRAINAGE OR WEEP TILE DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.
- B. A MINIMUM VERTICAL CLEARANCE OF ONE AND ONE-HALF FEET ( 1-1/2' ) MUST BE MAINTAINED BETWEEN THE STORM SEWER AND ANY UTILITIES.
- C. VERTICAL TOLERANCES FOR STRUCTURE RIM GRADES SHALL BE:
  - MANHOLE IN PAVEMENT - 0.00 TO + 0.00 FEET
  - CATCH BASIN IN PAVEMENT - 0.25 TO + 0.00 FEET
  - STRUCTURES IN R.O.W. AND/OR FRONT YARD - 0.00 TO + 0.30 FEET
  - STRUCTURES IN REAR YARD - 0.30 TO + 0.00 FEET
- D. ALL SEWER PIPE SHALL BE LAID USING A LASER TO MAINTAIN GRADE AND ALIGNMENT.
- E. ALL SEWER PIPE AND APPURTENANCES SHALL BE STAKED FOR LINE AND GRADE UNDER THE SUPERVISION OF A LICENSED LAND SURVEYOR OR A LICENSED ENGINEER. CUT SHEETS SHALL BE PROVIDED TO THE TOWNSHIP ENGINEER AND THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS. NO SEWER SHALL BE LAID WITHOUT STAKES.
- F. ALL SEWER PIPE AND APPURTENANCES SHALL BE STAKED UNDER THE SUPERVISION OF A LICENSED LAND SURVEYOR OR A LICENSED ENGINEER. ALL SIGNIFICANT POINTS OF EACH ELEMENT SHALL BE LOCATED. THIS SHALL INCLUDE BUT NOT BE LIMITED TO ALIGNMENT STAKES, OFFSET STAKES, CENTERLINE STAKES AND BENCHMARK REFERENCES. STAKES SHALL BE MARKED WITH ALIGNMENT AND ELEVATION / GRADE CONTROL. CUT SHEETS SHALL BE PROVIDED TO THE TOWNSHIP ENGINEER AND THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS. NO SEWER SHALL BE LAID WITHOUT STAKES.
- G. ANY BUILDING CONNECTION OR SUMP PUMP LEAD SHALL CONNECT TO A CATCH BASIN OR MANHOLE, ALL SUMP PUMP LEAD CONNECTIONS TO PRECAST STRUCTURES SHALL BE CORED. SUMP LEADS SHALL BE A MINIMUM OF THREE INCH ( 3" ) PVC SCHEDULE 40 PIPE WITH FUSED JOINTS.

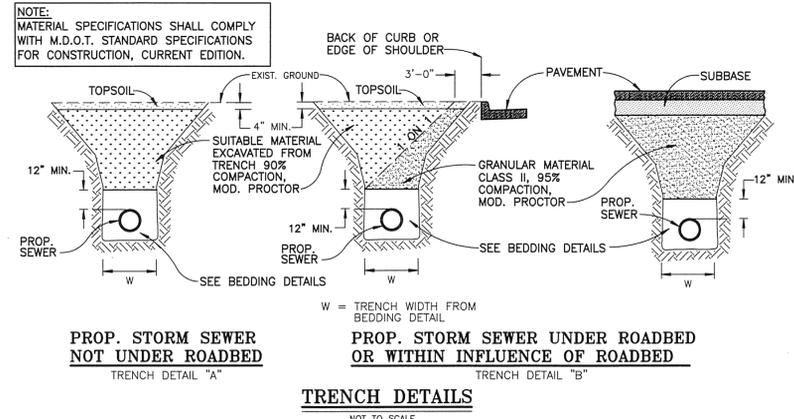
**6. TESTING AND ACCEPTANCE**

- A. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY MATERIALS, EQUIPMENT AND PERSONNEL TO CONDUCT REQUIRED TESTING. THE CHESTERFIELD TOWNSHIP DEPARTMENT OF PUBLIC WORKS REPRESENTATIVE SHALL WITNESS ALL TESTS. ALL SEWER INSTALLATIONS SHALL BE COMPLETE PRIOR TO PERFORMING REQUIRED TESTS.
- B. ALL CORRUGATED PVC SEWER PIPE ( ASTM F949 ), PVC CLOSED PROFILE GRAVITY SEWER PIPE ( ASTM F1803 ) AND CORRUGATED PE SEWER PIPE ( ASTM 2306 ) FOR PUBLIC STORM SEWER INSTALLATIONS SHALL BE SUBJECT TO DEFLECTION TESTING, NO EARLIER THAN THIRTY ( 30 ) DAYS AFTER CONSTRUCTION, WITH A NINE ( 9 ) SIDED MANHOLE. A PROVING RING, PROVIDED BY THE CONTRACTOR, SHALL BE AVAILABLE FOR ALL DEFLECTION TESTS. THE HORIZONTAL AND VERTICAL DEFLECTION AT THE TIME OF INITIAL TESTING SHALL NOT EXCEED FIVE PERCENT ( 5% ). ANY SEWER FOUND EXCEEDING THESE LIMITS SHALL BE REPLACED BY AND AT THE CONTRACTOR'S EXPENSE.
- C. THE CONTRACTOR SHALL PROVIDE FOR CLOSED CIRCUIT TELEVISION ( CCTV ) INSPECTION OF ALL PUBLIC STORM SEWER INSTALLED. ALL PUBLIC STORM SEWER AND STRUCTURES INSTALLED SHALL BE CLEANED, BY AND AT THE CONTRACTOR'S EXPENSE, IMMEDIATELY PRIOR TO CCTV INSPECTION TO ENSURE THE SEWERS ARE FREE OF DEBRIS. THE INSPECTION SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT GUIDELINES OF THE NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES ( NASSCO ). ALL CCTV INSPECTION SHALL BE WITNESSED BY THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS REPRESENTATIVE AND THE CONTRACTOR. ANY CCTV INSPECTION PERFORMED IN THE ABSENCE OF THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS REPRESENTATIVE WILL BE REJECTED.
- D. THE COLOR CCTV CAMERA USED FOR THE INSPECTION SHALL BE ONE SPECIFICALLY DESIGNED AND CONSTRUCTED FOR SUCH INSPECTION. THE CAMERA, PAN AND TILT, SHALL BE OPERATIVE IN 100% HUMIDITY CONDITIONS, AND HAVE A HIGH RESOLUTION LENS CAPABLE OF SCANNING 360-DEGREES CIRCUMFERENCE AND 270-DEGREES ON A HORIZONTAL AXIS TO TELEVIEW SEWERS. LIGHTING FOR THE CAMERA SHALL BE SUITABLE TO ALLOW A CLEAR PICTURE OF THE ENTIRE PERIPHERY OF THE PIPE. THE CAMERA, TELEVISION MONITOR, AND OTHER COMPONENTS OF THE VIDEO SYSTEM SHALL BE CAPABLE OF PRODUCING PICTURE QUALITY TO THE SATISFACTION OF THE OWNER.
- E. ALL CCTV INSPECTION SHALL BE RECORDED ON NEW, PREMIUM QUALITY, SINGLE-SIDED DVD(S) ON WHICH SOUND AND COLORED VIDEO INFORMATION SHALL BE RECORDED AND TURNED OVER TO THE OWNER. DVD SHALL BE OF AN "AUTHORED" FORMAT CAPABLE OF BEING VIEWED IN A STANDARD DVD PLAYER COMMONLY AVAILABLE ( DVD-R, MPEG-2 ). DISPLAY FRAME RATE SHALL BE 30 IN NTSC FORMAT. EACH MANHOLE TO MANHOLE SECTION SHALL BE ON A SEPARATE TRACK. THE DVD SHALL INCLUDE A MENU LISTING SECTION NUMBER, STREET NUMBER, MANHOLE NUMBERS, DIRECTION OF FLOW AND TOTAL FOOTAGE. SELECTION OF AN INDIVIDUAL INSPECTION SECTION SHALL OCCUR THROUGH THIS MENU THE DVD SHALL NOT CONTAIN ANY COPY PROTECTION. THE OWNER SHALL BE ABLE TO MAKE COPIES OF THE FOOTAGE TO ADDITIONAL VHS TAPE, DVD, OR VIDEO-CD. ALL DVD'S SHALL BE CORRECTLY LABELED AND TITLED WITH THE PROJECT NAME AND NUMBER, AND REFERENCE DVD NUMBER. A DVD LOG SHALL CONTAIN A TABLE OF CONTENTS WITH THE PROJECT NAME, NUMBER AND REFERENCE TO THE CONTENTS OF EACH DVD.
- F. THE PROJECT NAME, DATE, TIME, FOOTAGE COUNTER AND STRUCTURE TO STRUCTURE SECTION SHALL BE DISPLAYED CONTINUOUSLY. THE CAMERA SHALL BE MOVED THROUGH THE SEWER AT A RATE OF SPEED NOT TO EXCEED THIRTY FEET ( 30' ) PER MINUTE, STOPPING WHEN NECESSARY TO PERMIT PROPER AUDIO AND VIDEO DOCUMENTATION OF THE SEWER'S CONDITION. THE CAMERA SHALL BE STOPPED IMMEDIATELY ADJACENT TO ALL POINTS OF INFILTRATION, CRACKED OR BROKEN PIPE, DEFECTIVE JOINTS, MISALIGNMENT IN LINE OR GRADE AND LOCATION OF SERVICE CONNECTIONS. THE CAMERA SHALL BE ROTATED TO ALLOW VIEWING OF THE PROBLEM AREA OR INTO THE SERVICE CONNECTION. A REPORT DETAILING ALL NOTES, WYE LOCATIONS, AND OTHER PERTINENT INFORMATION SHALL BE MADE AS A PART OF THE CCTV INSPECTION IN ACCORDANCE WITH NASSCO'S PACP. THE REPORT SHALL BE PRODUCED USING CCTV INSPECTION SOFTWARE PROVIDED BY A NASSCO PACP CERTIFIED VENDOR. ALL CCTV REPORTS SHALL BE DOWNLOADED OR RECORDED ON BOARD THE CCTV VEHICLE. FORMATTING AND LAYOUT, I.E. OBSERVATIONS AND DEFECT CODES SHALL BE NASSCO PACP STANDARD.
- G. CONTRACTOR SHALL SUBMIT TWO ( 2 ) COPIES OF ALL DVD'S ALONG WITH ONE ( 1 ) DIGITAL COPY AND TWO ( 2 ) COLOR COPIES OF INSPECTION REPORTS, WITH TABLE OF CONTENTS, IN TABBED, THREE ( 3 ) HOLE PUNCHED BINDERS, TO THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS UPON COMPLETION OF THE CCTV INSPECTION.
- H. ANY DEFECTS NOTED DURING TESTING AND/OR CCTV INSPECTION SHALL BE SATISFACTORILY REPAIRED OR REPLACED, BY AND AT THE CONTRACTOR'S EXPENSE, AND WITNESSED BY THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS. DEFECTS SHALL INCLUDE, BUT NOT BE LIMITED TO CRACKED OR BROKEN PIPE, DEFECTIVE JOINTS, MISALIGNMENT IN LINE OR GRADE, AND VISIBLE LEAKS OR INFILTRATION. ADDITIONAL TESTING AND CCTV INSPECTION SHALL BE PERFORMED AT EACH AFFECTED SEGMENT, FROM MANHOLE TO MANHOLE, SUBSEQUENT TO REPAIR AND/OR REPLACEMENT.
- I. BEFORE ACCEPTANCE A FINAL REVIEW MUST BE MADE BY THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS AND/OR TOWNSHIP ENGINEER.
- J. **PROJECT BONDS, INSURANCE AND REGISTRATION**
- A. PRIOR TO THE START OF CONSTRUCTION THE CONTRACTOR SHALL BE REGISTERED AT THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS FOR THE YEAR THAT THE WORK IS BEING PERFORMED.
- B. PRIOR TO THE PRE-CONSTRUCTION MEETING, THE CONTRACTOR SHALL PROVIDE CONTRACTUAL LIABILITY INSURANCE TO THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS. THE INSURANCE SHALL BE MAINTAINED THROUGHOUT THE TERM OF THE PROJECT.
- C. A PERFORMANCE BOND MUST BE PROVIDED TO THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS PRIOR TO THE PRE-CONSTRUCTION MEETING. THE BOND AMOUNT SHALL BE ONE HUNDRED PERCENT ( 100% ) OF THE PROPOSED IMPROVEMENTS THAT THE TOWNSHIP INSPECTS.
- D. THE CONTRACTOR SHALL PROVIDE A TWO ( 2 ) YEAR MAINTENANCE AND GUARANTEE BOND TO THE CHARTER TOWNSHIP OF CHESTERFIELD FROM A SURETY LICENSED IN THE STATE OF MICHIGAN, DATED FROM THE TIME OF ACCEPTANCE BY THE CHARTER TOWNSHIP OF CHESTERFIELD DEPARTMENT OF PUBLIC WORKS, FOR 100% OF THE CONSTRUCTION COSTS.



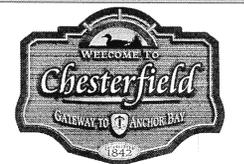
NOTE: WELL ROUNDED PEA PEBBLES, PASSING A 1/2" SIEVE, MAY BE SUBSTITUTED FOR M.D.O.T. 6A CRUSHED STONE FOR BEDDING AND INITIAL BACKFILL IF SEWER IS INSTALLED IN UN-DEWATERED TRENCHES THAT DO NOT EXCEED 20' IN DEPTH AND THE MAXIMUM WIDTH SPECIFIED ABOVE.

**BEDDING DETAIL**



**TRENCH DETAILS**

Anderson, Eckstein and Westrick, Inc.  
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 Shelby Township  
 Michigan 48315  
 Phone 586 726 1234  
 Fax 586 726 8780  
 www.aewinc.com



DATE	SUBMITTALS/REVISIONS
DRAWN BY: MJS	CHECKED BY: AAP
DATE: SEPTEMBER 2010	



GORDON B. WILSON P.E. NO. 34055

**DEPARTMENT OF PUBLIC WORKS**

APPROVED BY: Joseph J. Gaynor, Director

DATE: 9/3/2010

**CHARTER TOWNSHIP OF CHESTERFIELD**

**STANDARD STORM SEWER DETAILS (2 OF 2)**

SHEET NO.

**STM2**