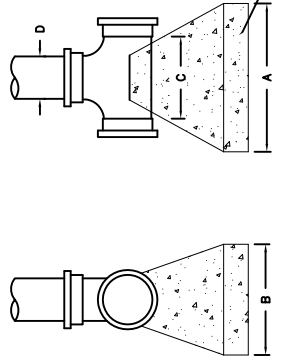


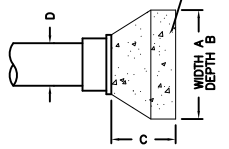
2000 PSI CONCRETE BLOCK WITH MORTAR ENCASEMENT OR 2000 PSI CONCRETE POURED AGAINST UNDISTURBED EARTH



TEE				
DIA. D	A	B	C	
6"	2'	2'	2'	
8"	3'	2'	2'	
12"	4'	4'	2.5'	
16"	5'	5'	2.5'	
24"	6.5'	6.5'	3.5'	

THRUST BLOCK AT TEE

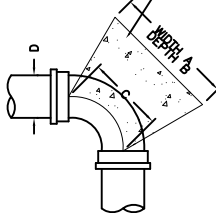
2000 PSI CONCRETE BLOCK WITH MORTAR ENCASEMENT OR 2000 PSI CONCRETE POURED AGAINST UNDISTURBED EARTH



PLUG				
DIA. D	A	B	C	
6"	2'	1'	1'	
8"	3'	2'	1'	
12"	4'	3'	1.5'	
16"	6'	4'	2.5'	
24"	6.5'	6.5'	3.5'	

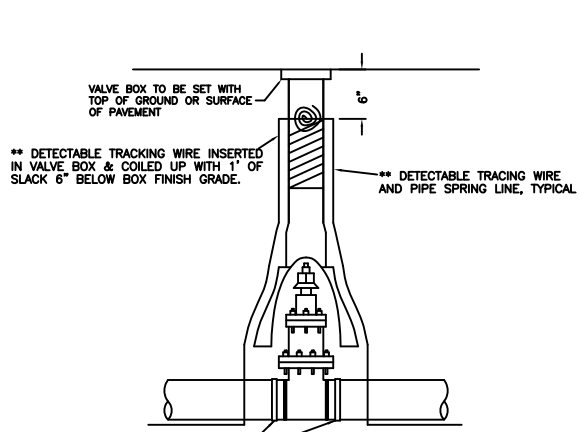
THRUST BLOCK AT PLUG

2000 PSI CONCRETE BLOCK WITH MORTAR ENCASEMENT OR 2000 PSI CONCRETE POURED AGAINST UNDISTURBED EARTH



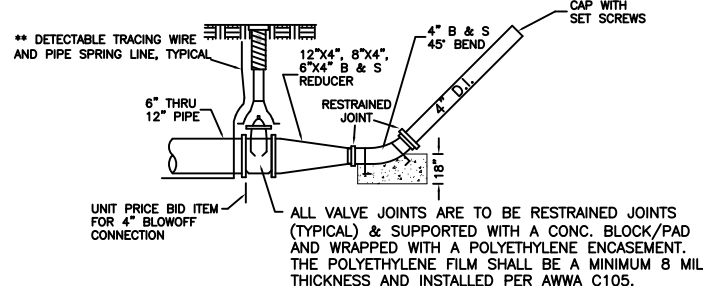
HORIZONTAL BENDS											
DIA. D	22 1/2' BEND			45' BEND			90' BEND				
	A	B	C	A	B	C	A	B	C	A	B
6"	1.5'	1'	1'	2'	1.5'	1.5'	2'	2.5'	2'		
8"	2'	1.5'	1.5'	3'	2'	1.5'	3'	3'	2'		
12"	3'	2'	2'	4'	3'	2'	4'	5'	2'		
16"	3.5'	3'	2'	5'	4'	2'	6'	6'	2.5'		

THRUST BLOCK AT 90° OR SMALLER BENDS

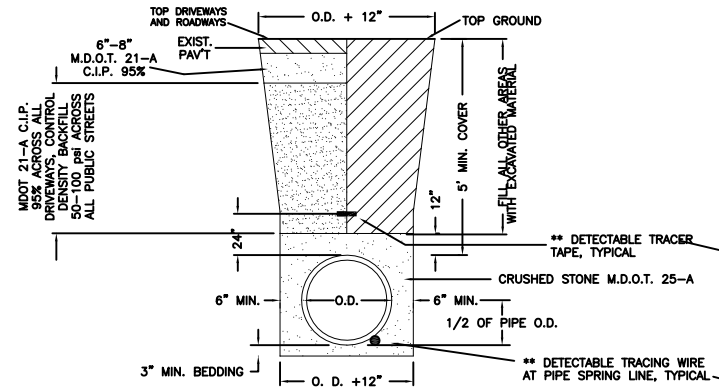


NOTE: ALL VALVE JOINTS ARE TO BE RESTRAINED JOINTS (TYPICAL) & SUPPORTED WITH A CONC. BLOCK/PAD AND WRAPPED WITH A POLYETHYLENE ENCASEMENT. THE POLYETHYLENE FILM SHALL BE A MINIMUM 8 MIL THICKNESS AND INSTALLED PER AWWA C105.

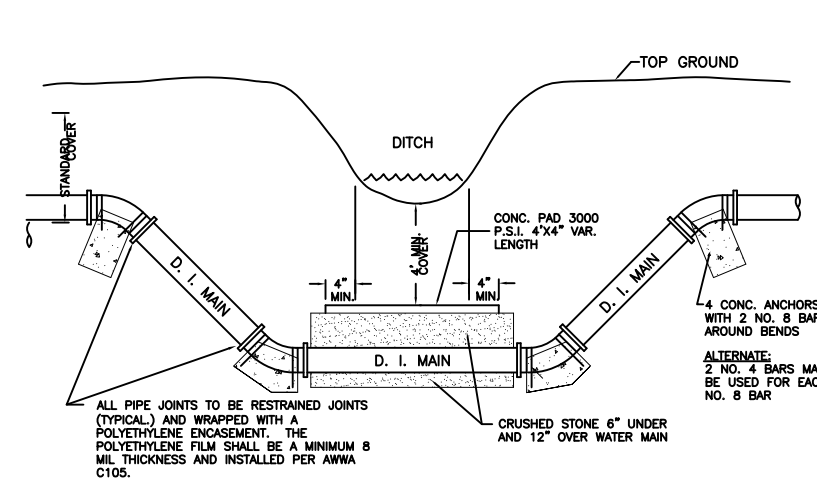
DETAIL OF GATE VALVE AND BOX



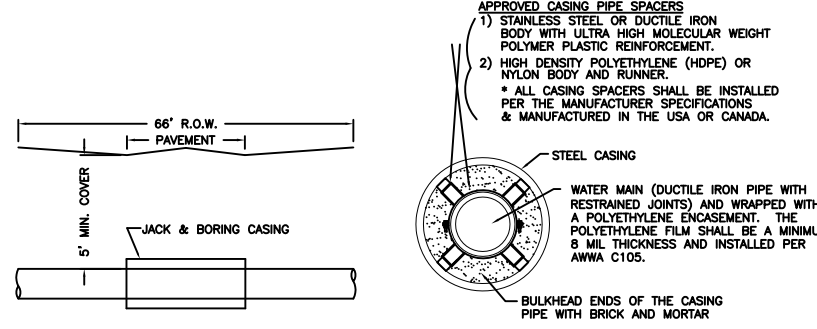
TYPICAL BLOWOFF ASSEMBLY



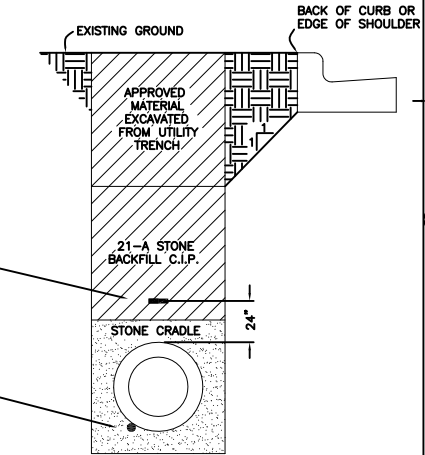
PIPE BEDDING FOR 12" AND SMALLER WM. TYPICAL TRENCH PAY LIMIT



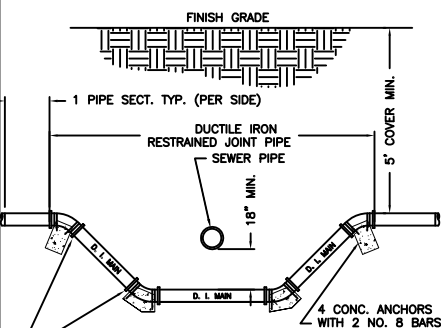
STREAM CROSSING



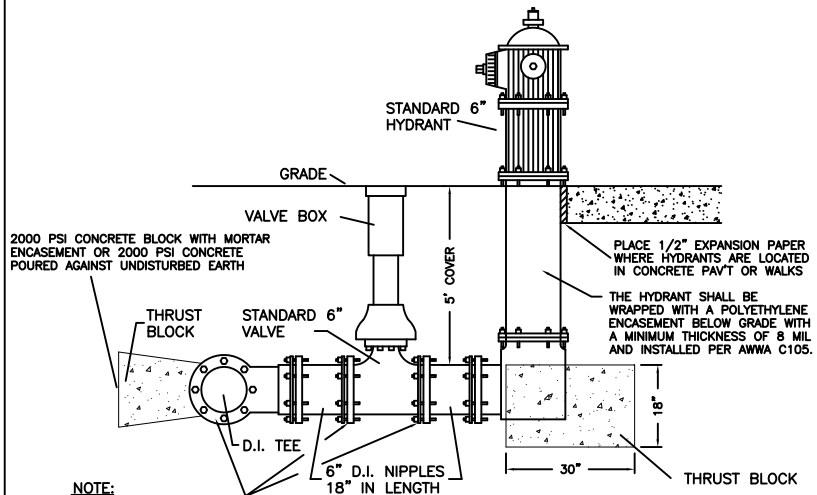
BORING AND JACKING DETAIL



BACKFILL OUTSIDE PAV'T

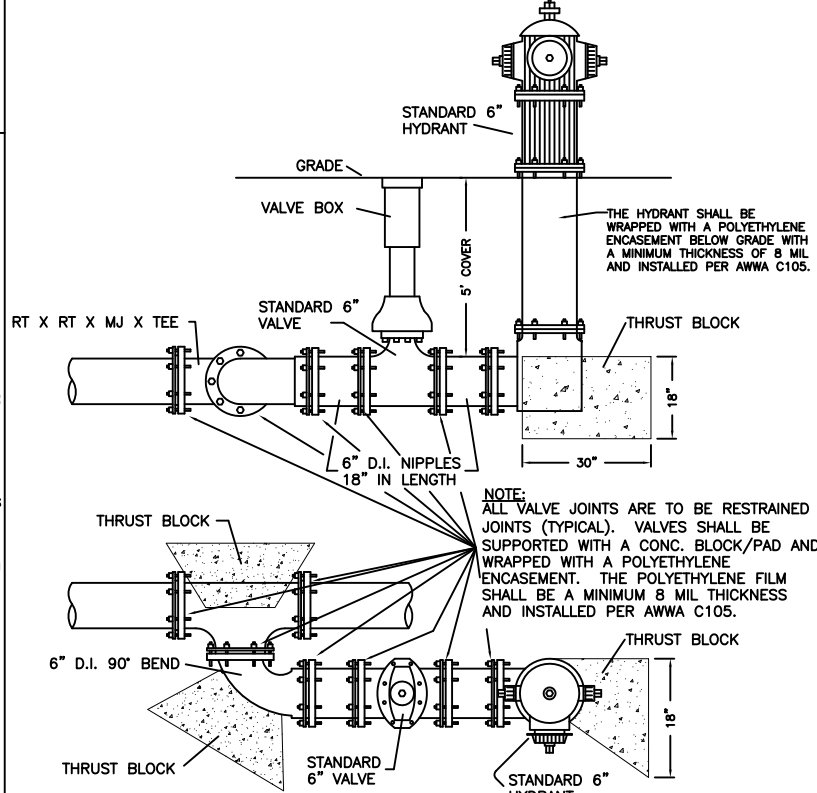


DEFLECTION FOR CONFLICT WITH UTILITIES



STANDARD HYDRANT SETTING

FIRE HYDRANT MODELS:
EAST JORDAN IRON WORKS 5BR-250
MUELLER 5-1/4" MODEL NO. SUPER CENTURION 250



STANDARD CLOSE HYDRANT SETTING

NOTE: SEE SHEET 2 OF 2 FOR NOTES.

REVISIONS		
NO.	DRAWN BY:	DATE:
11	BKS	FEB., 2002
12	BSL	MARCH, 2004
13	BKS	MAY, 2005
14	DGC	JUNE, 2005
15	JR	JUNE, 2006
16	JR	MARCH, 2007
17	JR	OCT., 2007
18	PML	JULY 2010

CITY OF MONROE, MICHIGAN
ENGINEERING DEPARTMENT
WATER DETAILS
SCALE: NONE FILE NO. F-587A
DATE: AUGUST, 1990 SHEET NO. 1 OF 2
APPROVED: _____
CITY ENGINEER

DWG. OF RECORD
DATE: _____

WATER MAIN MATERIALS

1. ALL NUTS, BOLTS AND WASHERS SUPPLIED IN RESILIENT SEAT/WEDGE AND BUTTERFLY VALVES, FITTINGS, MECHANICAL JOINT PIPE, TAPPING SLEEVES, COUPLINGS & RESTRAINED JOINTS SHALL BE COR-BLUE OR #304 STAINLESS STEEL.
2. POLYVINYL CHLORIDE (PVC) & MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PRESSURE PIPE SHALL BE NSF APPROVED. PVC PRESSURE PIPE SHALL MEET THE REQUIREMENTS OF AWWA C900, CLASS 150, DR 18, ANSI/NSF 61 (HEALTH) AND 14 (PERFORMANCE). ALL PVC PIPE SHALL BE STAMPED NSF-pw. PVCO PRESSURE PIPE SHALL MEET THE REQUIREMENTS OF AWWA C909, CLASS 150. PVC (C900) & PVCO (C909) PRESSURE PIPE ARE FOR SIZES 8" THROUGH 12" DIAMETER. PVC (C905), CLASS 235, DR 18, PRESSURE PIPE IS FOR SIZES 14" THROUGH 48" DIAMETER.
3. DUCTILE IRON PIPE SHALL MEET THE REQUIREMENTS OF AWWA C151 (ANSI A21.51). THE MINIMUM PIPE THICKNESS SHALL BE PRESSURE CLASS 350 AS PER AWWA C150 (ANSI A21.50) FOR PIPE SIZES THROUGH 12" DIAMETER AND PRESSURE CLASS 250 AS PER AWWA C150 (ANSI A21.50) FOR PIPE SIZES 14" DIAMETER AND LARGER. PIPE JOINTS SHALL BE BOLTED MECHANICAL, OR PUSH ON RUBBER GASKET MEETING THE REQUIREMENTS OF AWWA C111 (ANSI A21.11). ALL PIPE SHALL BE INSIDE COATED WITH A CEMENT MORTAR LINING IN ACCORDANCE WITH AWWA C104 (ANSI A21.4). PIPE SHALL BE OUTSIDE COATED WITH A BITUMINOUS COATING APPROXIMATELY 1 MIL IN THICKNESS AND WRAPPED WITH POLYETHYLENE ENCASEMENT. THE POLYETHYLENE FILM SHALL BE A MINIMUM 8 MIL THICKNESS & INSTALLED PER AWWA C105.
4. PRESTRESSED CONCRETE PRESSURE PIPE SHALL MEET THE REQUIREMENTS OF THE REVISION OF AWWA C301. THE PIPE SHALL BE DESIGNED FOR A SUSTAINED INTERNAL PRESSURE OF 150 PSI.
5. DETECTABLE TRACER TAPE SHALL BE INSTALLED FOR POSITIVE PIPE LOCATIONS BY PIPE/CABLE LOCATORS AND A VISIBLE WARNING TO EXCAVATORS ON PVC & PVCO PIPE ONLY. INSTALL 24-INCHES ABOVE THE TOP OF WATER MAIN PIPE. A DETECTABLE TRACING WIRE SHALL BE INSTALLED WITH ALL PVC & PVCO PIPE AT THE PIPE SPRING LINE. THE WIRE SHALL BE #12 COPPER-CLAD STEEL (CCS) HIGH STRENGTH SOFT DRAWN 380# TRACER WIRE AS MANUFACTURED BY COPPERWELD. SPLICES OR CONNECTING TWO WIRES SHALL UTILIZE SOLDER, CRIMP CONNECTIONS, SPLIT BOLT CONNECTORS, GREASED WIRE NUT OR SILICON FILLED WIRE NUT AS RECOMMENDED BY THE MANUFACTURER.
6. FIRE HYDRANTS SHALL BE EAST JORDAN IRON WORKS 5BR-250 OR MUELLER MODEL NO. SUPER CENTURION 250 HAVING THE FOLLOWING FEATURES: A 5 1/4" VALVE OPENING, 6" MECHANICAL JOINT INLET AS PER ANSI A21.11, TWO (2) EACH 2 1/2 HOSE NOZZLES, ONE (1) 4 1/2" PUMPER NOZZLE, 1 1/2" PENTAGON SHAPED OPERATING NUTS FOR INSTALLATION IN A 5' 6" TRENCH, OPEN LEFT, BREAKABLE FLANGE AND BOLTS, AND FACTORY PAINTED YELLOW ABOVE GRADE, AND BLACK BELOW.
7. ALL HYDRANTS SHALL BE FURNISHED WITH THE DRAINAGE HOLE FACTORY PLUGGED AND THE HYDRANT FACTORY PAINTED YELLOW, THE HYDRANT SHALL BE WRAPPED WITH A POLYETHYLENE ENCASEMENT BELOW GRADE WITH A MINIMUM THICKNESS OF 8 MIL AND INSTALLED PER AWWA C105. ALL NUTS, BOLTS, & WASHERS SUPPLIED SHALL BE #304 STAINLESS STEEL (ABOVE & BELOW GRADE).
8. RESILIENT SEATED AND RESILIENT WEDGE GATE VALVES SHALL HAVE THE FOLLOWING FEATURES: DUCTILE OR CAST IRON BODY, BRONZE MOUNTED, NON-RISING STEM, RUBBER COVERED GATE, OPEN LEFT, DESIGN OPERATING PRESSURE 250 PSI, 2" OPERATING NUT, AND MECHANICAL JOINT ENDS AS PER AWWA C111 (ANSI 21). ALL RESILIENT SEATED GATE VALVES SHALL MEET THE REQUIREMENTS OF AWWA C509 IN CAST IRON OR DUCTILE IRON CONSTRUCTION OR AWWA C515 DUCTILE IRON CONSTRUCTION. ACCEPTABLE MANUFACTURERS FOR APPLICABLE C509 AND C515 RESILIENT WEDGE VALVES IN THESE SIZES ARE: EJIW, AMERICAN FLOW CONTROL, MUELLER, CLOW, KENNEDY, OR AS APPROVED. ALL VALVE BODY INTERNAL AND EXTERNAL SURFACES AND BONNET SHALL HAVE A FUSION BONDED EPOXY COATING, COMPLYING WITH ANSIAWWA C550, APPLIED ELECTROSTATICALLY PRIOR TO ASSEMBLY. EACH VALVE SHALL BE WRAPPED WITH A POLYETHYLENE ENCASEMENT WITH A MINIMUM THICKNESS OF 8 MIL AND INSTALLED AS PER AWWA C105.

9. BUTTERFLY VALVES (16" AND LARGER) SHALL BE KENNEDY VALVE MANUFACTURING COMPANY STYLE 4500 OR PRATT MODEL "GROUND HOG" HAVING THE FOLLOWING FEATURES: DUCTILE-IRON BODY, RUBBER-SEATED, OPEN LEFT, MECHANICAL JOINT ENDS AS PER AWWA C111 (ANSI A21.11) AND 2" SQUARE OPERATING NUT. ALL BUTTERFLY VALVES SHALL MEET THE REQUIREMENTS OF AWWA C504, CLASS 150B. ALL VALVES USED IN 16" OR LARGER DIAMETER PIPE SHALL BE BUTTERFLY VALVES, UNLESS SPECIFIED. ALL VALVE BODY INTERNAL AND EXTERNAL SURFACES AND BONNET SHALL HAVE A FUSION BONDED EPOXY COATING, COMPLYING WITH ANSIAWWA C550, APPLIED ELECTROSTATICALLY PRIOR TO ASSEMBLY. EACH VALVE SHALL BE WRAPPED WITH A POLYETHYLENE ENCASEMENT WITH A MINIMUM THICKNESS OF 8 MIL AND INSTALLED AS PER AWWA C105.
10. HYDRANT VALVES TO BE OF THE SAME SPECIFICATIONS AS GATE VALVES OR RESILIENT WEDGE VALVES. ALL HYDRANT VALVES SHALL BE 6" IN SIZE.
11. VALVE BOXES SHALL BE TYLER PIPE SERIES 6860, ITEM D. APPROVED EQUALS ARE THE BIBBY-STE-CROIX D VALVE BOX AND EJIW 8560 VALVE BOX D WITH A #6 BASE.
12. ALL FITTINGS 3" TO 24" SHALL MEET THE REQUIREMENTS OF AWWA C153 (ANSI A21.53) PRESSURE CLASS 350 OR AWWA C110 (ANSI A21.10) PRESSURE CLASS 350. ALL FITTINGS 30" TO 64" SHALL MEET THE REQUIREMENTS OF AWWA C110 (ANSI A21.10) PRESSURE CLASS 250. ALL FITTINGS SHALL BE PROVIDED WITH A BOLTED MECHANICAL OR PUSH ON RUBBER GASKET JOINT MEETING THE REQUIREMENTS OF AWWA C111 (ANSI A21.11). ALL FITTINGS SHALL BE CONSTRUCTED OF DUCTILE IRON AND WRAPPED WITH A POLYETHYLENE ENCASEMENT. THE POLYETHYLENE FILM SHALL BE A MINIMUM 8 MIL THICKNESS AND INSTALLED PER AWWA C105.
13. TAPPING SLEEVES: #304 STAINLESS STEEL AND WRAPPED WITH A POLYETHYLENE ENCASEMENT. THE POLYETHYLENE FILM SHALL BE A MINIMUM 8 MIL THICKNESS AND INSTALLED PER AWWA C105.
14. RESTRAINED JOINTS FOR DUCTILE IRON MECHANICAL JOINT PIPE USE MEGALUG JOINT RESTRAINT BY EBAA IRON, INC. SHALL BE USED: THE MEGA BOND RESTRAINT COATING SYSTEM SHALL BE PROVIDED ON ALL CASING BODIES, WEDGE ASSEMBLIES, AND RELATED PARTS. FOR DUCTILE IRON PUSH-ON JOINT PIPE RESTRAINED JOINT GASKETS SHALL BE FAST GRIP GASKET BY AMERICAN DUCTILE IRON PIPE, FIELD LOK GASKETS BY U.S. PIPE OR APPROVED EQUAL. NOTE: APPROPRIATE RESTRAINING GASKETS MUST BE USED IN ACCORDANCE WITH THE PIPE MANUFACTURER.
15. MATERIAL MANUFACTURERS MUST PROVIDE CERTIFICATION OF COMPLIANCE TO THE SPECIFICATION AND THAT THE MATERIAL IS MADE IN THE USA AND CANADA

GENERAL NOTES

1. ALL CONSTRUCTION WITHIN EXISTING AND PROPOSED ROAD RIGHTS-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF MONROE, MONROE COUNTY ROAD COMM. OR MICHIGAN DEPT. OF TRANSPORTATION, AS APPROPRIATE.
2. UNDERGROUND UTILITY LINES AND STRUCTURES SHOWN ARE PER RECORDS MADE AVAILABLE BY UTILITY OR MUNICIPALITY, AND BY FIELD OBSERVATION WHERE POSSIBLE.
3. CONTRACTOR SHALL CALL "MISS DIG" AT (800) 482-7171 72 HOURS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE DONE TO ANY EXISTING UTILITY DURING CONSTRUCTION.
4. ALL WORKMANSHIP, MATERIALS AND TESTING PROCEDURES SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF MONROE FOR WATER MAINS.
5. ALL PROVISIONS OF ACT 347 OF PUBLIC ACTS OF 1972, "SOIL EROSION SEDIMENTATION CONTROL ACT" AND ALL APPLICABLE RULES ON SOIL EROSION AND SEDIMENTATION CONTROL AS ESTABLISHED BY THE MONROE COUNTY DRAIN COMM. SHALL APPLY TO THIS PROJECT.
6. CONTRACTOR SHALL NOTIFY THE CITY OF MONROE ENGINEERING DEPT. 48 HOURS PRIOR TO THE START OF CONSTRUCTION OR TO SCHEDULE TESTING, PHONE 734-384-9126.
7. CONTRACTOR SHALL CONTACT CITY OF MONROE WATER DEPT. FOR OPERATING VALVES OR WATER MAIN CONNECTIONS, AND TO SCHEDULE TESTING, PHONE 734-384-9150.

WATERMAIN NOTES

1. INTERRUPTION OF WATER SERVICE: NO VALVE OR OTHER CONTROL ON THE EXISTING SYSTEM SHALL BE OPERATED FOR ANY PURPOSE BY THE CONTRACTOR.
2. DEPTH OF PIPE COVER: ALL PIPE SHALL BE LAID TO HAVE A DEPTH OF COVER OF FIVE (5) FEET WHEN IN EARTH EXCAVATION AND FOUR AND ONE-HALF (4 1/2) FEET OF COVER WHEN ROCK IS ENCOUNTERED, MEASURED FROM THE ESTABLISHED STREET GRADE, OR THE SURFACE OF THE PERMANENT IMPROVEMENT TO THE TOP OF THE BARRELS OF THE PIPE. FOR PIPE CLEARANCE IN ROCK, SEE DETAILED SPECIFICATIONS.
3. CONNECTION TO EXISTING WATER MAIN SHALL NOT BE MADE UNTIL THE NEW MAIN HAS BEEN PRESSURE TESTED, CHLORINATED, AND DEEMED SATISFACTORY AND SAFE FOR PUBLIC USE, EXCEPT AS CALLED FOR ON THE PLANS AND AS STIPULATED IN WATER MAIN SPECIFICATIONS.
4. AIR TEST: PRIOR TO TAPPING AN EXISTING MAIN FOR A NEW MAIN EXTENSION, THE CONTRACTOR SHALL INSTALL THE TAPPING SADDLE AND APPLY A 90 POUND AIR TEST TO INSURE AGAINST LEAKAGE OF THE SADDLE DURING THE TAPPING OPERATION. SAID TESTING MUST BE WITNESSED BY THE WATER DEPT.
5. HYDROSTATIC TESTS AND CHLORINATION OF ANY AND ALL WATER MAIN CONSTRUCTION IS REQUIRED. SEE DETAILED SPECIFICATIONS FOR SPECIFIC REQUIREMENTS.
6. THRUST BLOCKS ARE TO BE USED WITH BENDS 22 1/2" AND LARGER.
7. ALL TRENCHES UNDER EXISTING AND PROPOSED DRIVES, PARKING LOTS AND WALKS, SHALL BE BACKFILLED WITH APPROVED CRUSHED STONE 21A MATERIAL AND COMPACTED TO 95% OF MAXIMUM UNIT DENSITY.
8. ALL MAINS SHALL BE BEDDED IN CRUSHED STONE, MDOT 25A.
9. ALL TRENCHES WITHIN THE PAVED ROADBED INFLUENCE AREA (PAVEMENT WIDTH PLUS 5 FEET OF EACH EDGE OF PAVEMENT, SHALL BE BACKFILLED WITH CONTROLLED DENSITY BACKFILL WITH A MINIMUM COMPRESSIVE STRENGTH OF 50 PSI IN 28 DAYS AND A MAXIMUM COMPRESSIVE STRENGTH OF 100 PSI IN 28 DAYS FROM TOP OF PIPE TO SUBGRADE LINE. APPLIES IN THE CITY OF MONROE.
10. THE CITY OF MONROE MUST WITNESS AND APPROVE THE HYDROSTATIC TEST AND THE DISINFECTION PROCEDURES AND TESTING. SAID PROCEDURES SHALL BE IN ACCORDANCE WITH AWWA C600, C651, AND C605 AS MODIFIED BY THE CITY. THE CITY OF MONROE'S METERS AND GAUGES MUST BE USED FOR THE PRESSURE AND LEAKAGE TESTING.
11. INSTALLATION: WATER MAIN SHALL BE LAID AT LEAST 10 FT HORIZONTALLY FROM ANY EXISTING OR PROPOSED GRAVITY SEWER SEPTIC TANK, OR SUBSOIL TREATMENT SYSTEM. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE.
12. CROSSING: WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 IN. BETWEEN THE OUTSIDE OF THE WATER MAIN AND OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER WITH PREFERENCE TO THE WATER MAIN LOCATED ABOVE THE SEWER.

* MATERIAL SPECIFICATIONS LISTED ARE PROVIDED FOR INFORMATION, AND ARE NOT NECESSARILY COMPLETE. COMPLETE MATERIALS SPECIFICATIONS SHOULD BE OBTAINED AT THE CITY OF MONROE ENGINEERING DEPT.

NOTE: THIS DETAIL SHEET

REVISIONS			CITY OF MONROE, MICHIGAN ENGINEERING DEPARTMENT	
NO.	DRAWN BY:	DATE:		
13	BKS	MAY, 2005	WATER DETAILS SCALE: NONE FILE NO. F-587A DATE: AUGUST, 1990 SHEET NO. 2 OF 2 APPROVED: _____ CITY ENGINEER	
14	DGC	JUNE, 2005		
15	JR	JUNE, 2006		
16	JR	MARCH, 2007		
17	JR	OCT., 2007		
18	BSL	MAY, 2009		
19	RB	AUGUST, 2009		
20	PML	JULY, 2010		
DWG. OF RECORD				
DATE: _____				