

December 22, 2003

10077.007

Oregon Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, Oregon 97201-4987

VIA Email/Hand Delivery

Attention: Anna Coates

**Subject: Hydrocarbon Seep IRAM Specifications
Astoria Area-Wide Petroleum Site
Astoria, Oregon
DEQ ECSI File #2277**

Dear Ms. Coates:

Enclosed are four copies of the above-referenced document. This IRAM design is being submitted to you on behalf of the Astoria Area-Wide PRP group as described in "RI/FS and IRAM Development Work Plan, Phase 1," dated July 15, 2002. These investigations have been conducted under DEQ Order No. ECSR-NWR-01-11.

The specifications describe the construction of a new storm sewer, abandonment of a storm sewer line that passes through the area where free-phase hydrocarbon has been observed, and construction of an enhanced boom in Slip 2. The new sewer line has been specifically designed with an elevation profile that is above the maximum observed ground-water elevations in the Hydrocarbon Seep IRAM area. Therefore, petroleum hydrocarbon affected soil and ground water are not expected to be encountered during the trenching and associated construction activities. Soil excavated during the trenching activities will be returned to the excavation as backfill if the physical characteristics are consistent with the technical specifications for backfill and the soil is not substantially impacted by petroleum hydrocarbons. However, if soil is encountered containing residual product that is visually apparent, that soil will be segregated, stockpiled, and disposed of at an appropriate facility.

An operation and maintenance schedule for the new enhanced boom system has been developed. After installation, the enhanced boom system will be regularly inspected and maintained to ensure its intended function. The boom system will be inspected weekly to confirm that the booms are moving freely with the fluctuating water surface and that the boom segments are in proper positions to function effectively. In addition, the absorbent boom component will be inspected, maintained, and replaced consistent with the manufacturer's recommendations for effective containment/collection of petroleum hydrocarbons. The amount of free product recovered from

Ms. Anna Coates
December 22, 2003
Page 2

the absorbent boom system (to the extent practicable) and bailed from monitoring wells will be reported to the DEQ on a quarterly basis in the monthly progress reports once construction is complete.

Please call me at (503)768-5121 if you have any questions or comments.

Sincerely,
EnviroLogic Resources, Inc.

Thomas J. Calabrese, R.G.
Principal/Hydrogeologist

cc: Distribution list attached

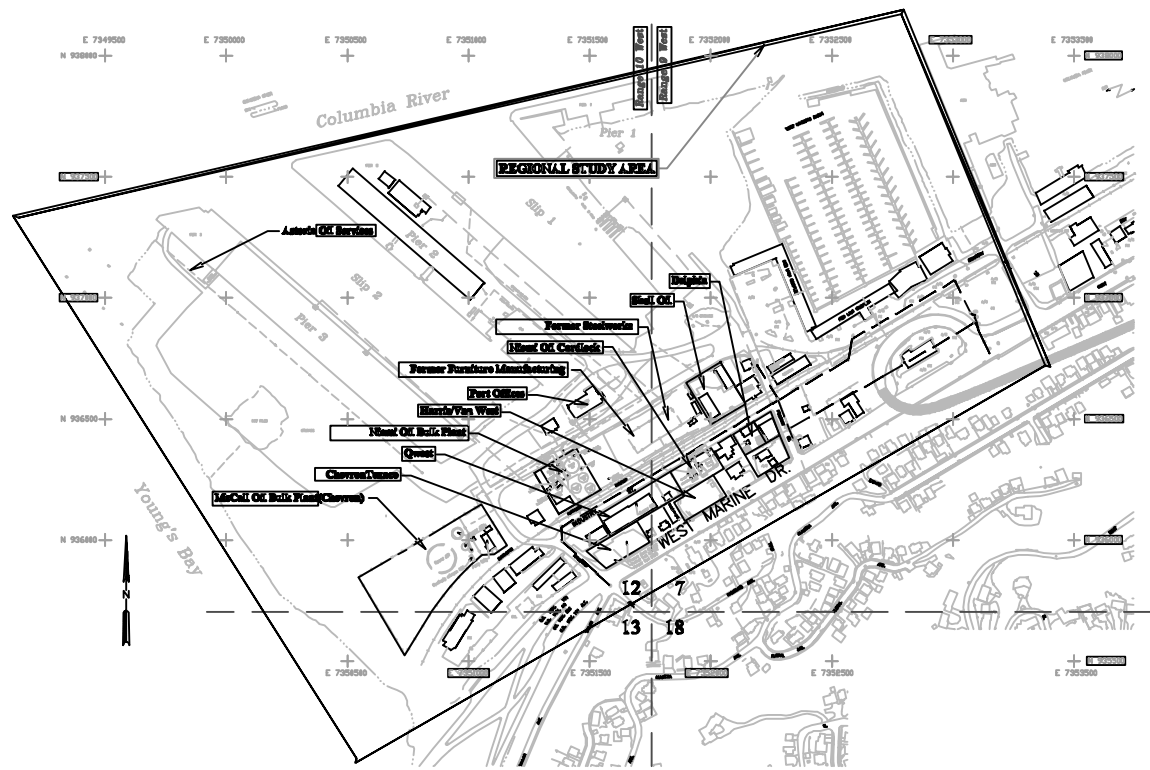
clients/port of astoria/007 IRAMS/hydrocarbon seep/iram specifications/deq122203.doc

Ms. Anna Coates
December 22, 2003
Page 3

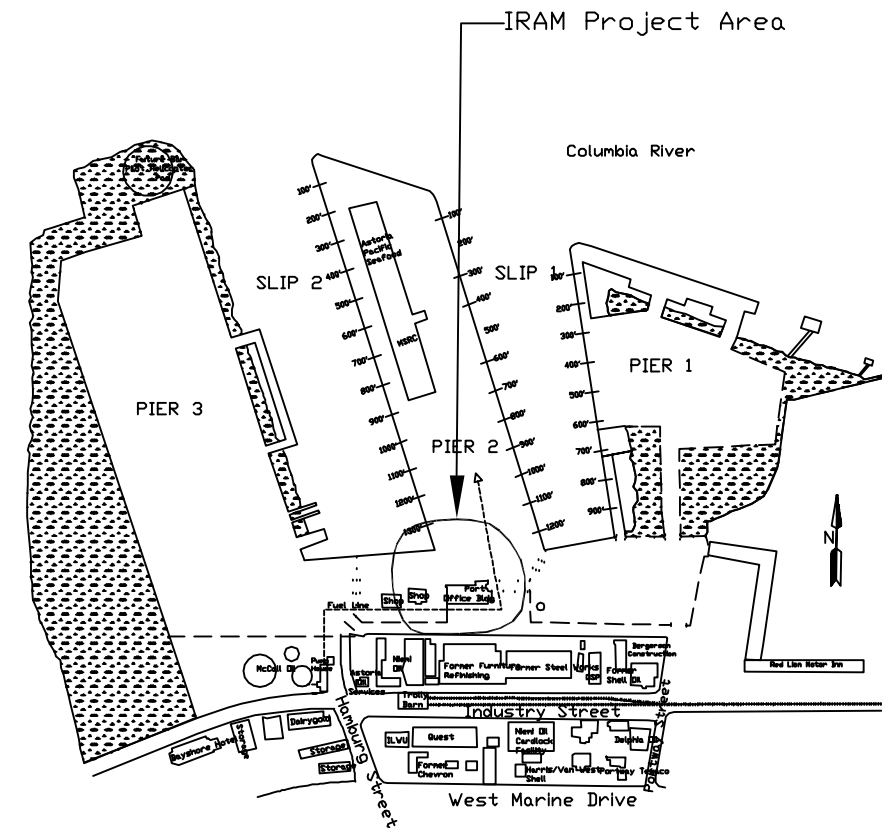
**ASTORIA AREA-WIDE PETROLEUM SITE
Distribution List**

- 4 Anna Coates, DEQ Project Manager, Site Response
 - 1 Mike Lilly, Attorney for Port of Astoria
 - 1 Peter Gearin, Port of Astoria
 - 1 Tom Calabrese, *EnviroLogic Resources, Inc.*, Consultant for PoA and AAW PRP Group
 - 1 Max Miller, Tonkon Torp, Attorney for McCall Oil and Chemical Corporation
 - 1 Ted McCall, McCall Oil and Chemical Corporation
 - 1 John Edwards, Anchor Environmental, LLC, Consultant for McCall Oil and Chemical Corp
 - 1 Cary E. Bechtolt, Niemi Oil Company
 - 1 Allan B. Bakalian, Marten Law Group, PLLC, Attorney for Niemi Oil Company
 - 1 Kurt Harrington, AMEC, Inc., Consultant for Niemi Oil Company
 - 1 Ed Platt, Shell Oil Company
 - 1 Rick Glick, Davis Wright Tremaine, Attorney for Shell Oil Company
 - 1 Leon Lahiere, Hart Crowser, Consultant for Shell Oil Company
 - 1 Brian Harris, Harris Enterprises
 - 1 Larry Vandermay, Flying Dutchman
 - 1 David Bartz & Neal Hueske, Schwabe Williamson & Wyatt, Attorney for Flying Dutchman
 - 1 Jerry Hodson, Miller Nash, Attorney for Harris Enterprises
 - 1 Lon Yandell, Kleinfelder, Consultant for Harris Enterprises
 - 1 Richard Delphia, Delphia Oil Company
 - 1 Chuck Smith, Attorney for Delphia Oil Company
 - 1 Alistaire Clary, Maul Foster Alongi, Consultant for Delphia Oil Company
 - 1 Cheryl Morrison, ChevronTexaco Products Company
 - 1 Charles Lambert, Attorney for ChevronTexaco Products Company
 - 1 Gerry Koschal, SAIC, Consultant for ChevronTexaco Products Company
 - 1 Brian Jacobson, Qwest Communications International, Inc.
 - 1 David Bledsoe, Perkins Coie LLP, Attorney for Qwest Communications International, Inc.
 - 1 Donna LaCombe, Tetra Tech EM, Inc., Consultant for Qwest Communications International
 - 1 Anita W. Lovely, Exxon Mobil Corporation
 - 2 Information Repository
-

Hydrocarbon Seep IRAM ASTORIA AREA-WIDE PETROLEUM SITE Astoria, Oregon



VICINITY MAP



SITE MAP

CONTENTS

SHEET NO.	SHEET TITLE	DRAWING NO.
1	TITLE SHEET	sheet 1
2	CONSTRUCTION SPECIFICATIONS	sheet 2
3	CATCH BASIN AND STORM WATER PLAN AND PROFILE	sheet 3
4	CONSTRUCTION DETAILS	sheet 4

DESCRIPTION	DATE	BY	APPROVED
DRAFT	12/12/03	PL	B.S.E.
FINAL	12/19/03	CCA	B.S.E.
REVISIONS			

PREPARED FOR

TITLE SHEET

drawn	PAL	struct.	date	12/10/03	scale	NONE	file no.	title	OCT 20
checked	RW	mech.	job no.	02-060					
designed	RW	elec.	sheet no.	1 of 4		drawing no.		TITLE	
civil	aa/qc								

SURVEY LINE AND GRADE:

SURVEY LINE AND GRADE CONTROL HUBS WILL BE PLACED IN A MANNER CONSISTENT WITH ACCEPTED PRACTICES. THE CONTRACTOR SHALL TRANSFER LINE AND GRADE INTO THE TRENCH WHERE THEY SHALL BE CARRIED BY MEANS OF A LASER BEAM OR TAUT GRADE LINE SUPPORTED ON FIRMLY SET BATTER BOARDS AT INTERVALS OF NOT MORE THAN 30 FEET. NOT LESS THAN THREE BATTER BOARDS SHALL BE IN USE AT ONE TIME. GRADES SHALL BE CONSTANTLY CHECKED AND IN THE EVENT THE BATTER BOARDS DO NOT LINE UP, THE WORK SHALL BE IMMEDIATELY STOPPED, THE ENGINEER NOTIFIED, AND THE CAUSE REMEDIED BEFORE PROCEEDING WITH THE WORK. ANY OTHER PROCEDURE SHALL HAVE THE WRITTEN APPROVAL OF THE ENGINEER.

TRENCHING:

OSHA REQUIREMENTS FOR TRENCH EXCAVATION AND ASSOCIATED WORK WILL BE MET OR EXCEEDED AT ALL TIMES DURING TRENCHING. EXCAVATE, AS NECESSARY, AT THE LOCATIONS INDICATED IN THE CONTRACT DOCUMENTS AND STAKED IN THE FIELD FOR THE INSTALLATION OF STORM PIPELINE. ACCURATELY GRADE BOTTOM OF TRENCHES TO THE LINES AND GRADES INDICATED. COMPACT DISTURBED TRENCH BOTTOM TO 95 % MAXIMUM DENSITY AS MEASURED BY ASTM D698 PRIOR TO PLACEMENT OF BEDDING OR FOUNDATION STABILIZATION MATERIAL. NOTIFY ALL UTILITY OFFICES AT LEAST 48 HOURS IN ADVANCE OF CONSTRUCTION OPERATIONS. DETERMINE BY HAND DIGGING, WITHIN 24 INCHES (600 MM) OR LESS FROM THE FACILITIES, THE ACTUAL LOCATIONS OF MARKED UNDERGROUND FACILITIES.

PAVEMENT REMOVAL: CUT PAVEMENT TO FULL DEPTH. PROVIDE NEAT STRAIGHT CUT LINES PARALLEL AND EQUIDISTANT FROM THE TRENCH CENTERLINE. PROTECT TRAFFIC FROM ABRUPT EDGE. REMOVE PAVEMENT SUCH THAT THE TRENCHING OPERATION DOES NOT DAMAGE THE EDGES OF THE PAVEMENT LEFT IN PLACE. KEEP REMOVAL OF EXISTING PAVEMENT ALONG TRENCH ALIGNMENT TO A MAXIMUM LENGTH OF ONE DAY AHEAD OF TRENCHING WORK. KEEP PAVEMENT CUTTING TO A MAXIMUM OF TWO WORKING DAYS AHEAD OF THE CONSTRUCTION OPERATION. REMOVE AND REPLACE MISCELLANEOUS STRUCTURES IMPACTED BY EXCAVATION SUCH AS CATCH BASINS AND DRAIN PIPE. REPLACE THESE STRUCTURES IN A CONDITION EQUAL TO OR BETTER THAN THEIR ORIGINAL CONDITIONS.

TRENCH DIMENSIONS: MAXIMUM DURING CONSTRUCTION HOURS - 50 FT (15 M) OF OPEN TRENCH, WHERE OPEN TRENCH IS DEFINED AS ANY PORTION OF THE TRENCH WHICH HAS NOT BEEN BACKFILLED TO FINISH GRADE, OR WHICH IS NOT PASSABLE TO LOCAL TRAFFIC. MAXIMUM AFTER CONSTRUCTION HOURS - BACKFILL TO WITHIN THE LAST SECTION OF PIPE INSTALLED. BARRICADE PER LOCAL AGENCY REQUIREMENTS AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. AT A MINIMUM, SURROUND ENTIRE OPEN TRENCH WITH CONSTRUCTION SAFETY NETTING.

THE SLOPE MUST NOT BE STEEPER THAN 1 1/2 HORIZONTAL TO 1 VERTICAL (3:2) UNLESS THE SOIL IS CLASSIFIED AS SOLID ROCK, TYPE A, OR TYPE B OR THE SLOPING IS DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER.

WIDTH: 24 INCHES (600 MM) PLUS THE OUTSIDE DIAMETER FO THE PIPE BARREL; SUFFICIENT TO INSTALL AND JOIN PIPE AND PROPERLY PLACE THE BEDDING MATERIAL. WIDTH IS MEASURED FROM TRENCH WALL TO TRENCH WALL INSIDE OF SHORING. APPURTENANCES WILL HAVE 12 INCHES (300 MM) CLEARANCE FROM TRENCH WALLS ON ALL SIDES FOR EXCAVATION OF MANHOLES, HYDRANTS, ETC.

DEPTH: MINIMUM REQUIRED FOR INVERT GRADE OF THE PIPE INDICATED IN THE CONTRACT DOCUMENTS, PLUS PIPE WALL THICKNESS INCLUDING BELLS, BEDDING THICKNESS, AND ADDITIONAL DEPTH FOR FOUNDATION STABILIZATION.

TRENCH SIDES AND BOTTOM: HAND TRIM TO ALLOW FOR PIPE BELLS, VALVES AND APPURTENANCES IN A MANNER THAT DOES NOT DISTURB SUBGRADE COMPACTION. PROVIDE UNIFORM BEARING AREA.

TRENCH DEWATERING AND SURFACE WATER CONTROL: FURNISH, INSTALL, MAINTAIN, AND OPERATE ALL NECESSARY MACHINERY, APPLIANCES, AND EQUIPMENT TO KEEP EXCAVATION REASONABLY FREE FROM WATER AND TO KEEP THE GROUNDWATER LEVEL 1 FOOT (300 MM) BELOW THE TRENCH BOTTOM UNTIL THE PLACING OF BEDDING MATERIAL, LAYING AND JOINTING OF THE PIPE, PLACING OF CONCRETE, AND PLACING OF THE INITIAL BACKFILL MATERIAL HAS BEEN COMPLETED, INSPECTED, AND APPROVED, AND ALL DANGER OF FLOTATION AND OTHER DAMAGE IS REMOVED.

DO NOT ALLOW GROUNDWATER, CONSTRUCTION WATER, STORM WATER, WATER FROM BROKEN PIPES, OR OTHER SOURCE TO ENTER THE EXISTING DOWNSTREAM PIPELINE SYSTEM. PRIOR TO CONSTRUCTION, INSTALL A REMOVABLE PLUG IN THE DOWNSTREAM PIPELINE SYSTEM AND ENSURE THAT NO WATER ENTERS THE DOWNSTREAM PIPE.

SHORING, SHEETING AND BRACING: THE DESIGN AND CONSTRUCTION OF THE SHORING AND/OR SUPPORT SYSTEM IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE IN ACCORDANCE WITH THE CONDITIONS AND REQUIREMENTS SET FORTH IN OSHA 29CFR 1926.652, APPENDICES A-D. DESIGNS THAT ARE DRAWN FROM THE MANUFACTURER'S TABULATED DATA SHALL BE IN ACCORDANCE WITH ALL SPECIFICATIONS, RECOMMENDATIONS, AND LIMITATIONS ISSUED OR MADE BY THE MANUFACTURER.

PROVIDE ALL SHORING, BRACING, TIGHT SHEETING, AND TRENCH BOXES REQUIRED TO PREVENT CAVING AND TO PROTECT WORKERS AND ADJACENT PROPERTY AND STRUCTURES. MEET OSHA REGULATIONS AND REQUIREMENTS. WHEN DRIVEN SHEETING IS USED, DO NOT REMOVE OR DISTURB THAT PORTION OF THE SHEETING BELOW THE TOP OF THE PIPE. WHEN DRIVEN SHEETING IS USED FOR PROTECTION OF THE TRENCH WALLS IN WATER BEARING SOIL, REMOVE NO PORTION OF THE SHEETING BELOW A LEVEL OF 4 FEET (1.2 M) ABOVE THE TOP OF THE PIPE.

BEFORE AN EXCAVATION CAN BE SLOPED THE SOIL AND ROCK DEPOSITS MUST BE CLASSIFIED IN ACCORDANCE WITH THE FOLLOWING:

1. THE SOIL MUST BE CLASSIFIED WHENEVER SLOPING, SHORING, OR OTHER PROTECTIVE SYSTEM WILL BE USED TO PREVENT CAVE-IN.
2. THE SOIL CLASSIFICATION SYSTEM IS A METHOD OF CATEGORIZING SOIL AND ROCK DEPOSITS AS TO THEIR STABILITY. CATEGORIES ARE STABLE ROCK, TYPE A, TYPE B, OR TYPE C SOIL IN DECREASING ORDER OF STABILITY.
3. CATEGORIES ARE DETERMINED BASED ON AN ANALYSIS OF THE PROPERTIES AND PERFORMANCE CHARACTERISTICS OF THE SOIL COMPOSITION AND ENVIRONMENTAL CONDITIONS OF EXPOSURE.
4. METHODS USED TO CLASSIFY THE SOIL MUST MEET THE REQUIREMENTS IN OSHA 29CFR 1926.652 APPENDIX A.
5. IF THE SOIL IS NOT CLASSIFIED IT MUST BE ASSUMED TO BY TYPE C SOIL.

WHEN SOIL IS CLASSIFIED THE CLASSIFICATION MUST BE MADE BY A COMPETENT PERSON AND BE BASED ON THE RESULTS OF AT LEAST ONE VISUAL AND ONE MANUAL ANALYSIS.

THE ANALYSES SHALL BE DESIGNED TO PROVIDE SUFFICIENT QUANTITATIVE AND QUALITATIVE INFORMATION AS MAY BE NECESSARY TO PROPERLY IDENTIFY THE PROPERTIES, FACTORS, AND CONDITIONS AFFECTING THE CLASSIFICATION OF THE SOIL.

TRENCH FOUNDATION STABILIZATION:

TYPE II AGGREGATE MATERIAL: IMPORTED MATERIAL OR SELECT EXCAVATED TRENCH MATERIAL WHICH HAS BEEN SCREENED TO PROVIDE FOR MAXIMUM PARTICLE SIZE TO NOT EXCEED 10 % OF THE NOMINAL PIPE DIAMETER. USED FOR FOUNDATION STABILIZATION MEETING THE FOLLOWING GRADATION.

SIEVE SIZE	PASSING
75 MM (3 INCH)	100
4.75 MM (NO. 4)	25-60
0.075 MM (NO. 100)	0-12

SOIL MATERIAL, FINE GRAVEL OR COARSE GRAVEL SPECIFIED AS BEDDING MATERIAL SHALL BE DURABLE, NON-COMPRESSIBLE AND BE WITHIN THE GRADING LIMITS OF THE UNIFIED SOIL CLASSIFICATION SYSTEM, USCS. THE ASTM SPECIFICATIONS FOR CLASSIFYING SOILS ARE: ASTM D-2487, CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES, AND ASTM D-2488, STANDARD PRACTICE FOR DESCRIPTION AND IDENTIFICATION OF SOILS (VISUAL MANUAL PROCEDURE). PLACE TYPE I BEDDING MATERIAL IN LIFTS NO GREATER THAN 6 INCHES (150 MM), COMPACT EACH LIFT TO 95 % OF MAXIMUM DENSITY AS MEASURED BY AASHTO T-99.

PIPING:

PIPE: ALL HDPE PIPE AND FITTINGS SHALL BE FROM A SINGLE MANUFACTURER, WHO IS FULLY EXPERIENCED, REPUTABLE AND QUALIFIED IN THE MANUFACTURE OF THE HDPE PIPE TO BE FURNISHED. THE PIPE SHALL BE DESIGNED, CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE BEST PRACTICES AND METHODS AND SHALL COMPLY WITH THESE SPECIFICATIONS. QUALIFIED MANUFACTURERS SHALL BE: PLEXCO DIVISION OF CHEVRON CHEMICAL COMPANY OR EQUAL AS APPROVED BY THE ENGINEER. MATERIALS USED FOR THE MANUFACTURE OF POLYETHYLENE PIPE AND FITTINGS SHALL BE MADE FROM A PE 3408 HIGH DENSITY POLYETHYLENE RESIN COMPOUND MEETING CELL CLASSIFICATION 345434C PER ASTM D3350; AND MEETING TYPE LLL, CLASS C, CATEGORY 5, GRADE P34 PER ASTM D1238. HIGH DENSITY POLYETHYLENE (HDPE) PIPE SHALL COMPLY WITH AWWA SPECIFICATIONS C900. IF REWORK COMPOUNDS ARE REQUIRED, ONLY THOSE GENERATED IN THE MANUFACTURER'S OWN PLANT FROM RESIN COMPOUNDS OF THE SAME CLASS AND TYPE FROM THE SAME RAW MATERIAL SUPPLIER SHALL BE USED. DIMENSIONS AND WORKMANSHIP SHALL BE AS SPECIFIED BY ASTM F714. HDPE FITTINGS AND TRANSITIONS SHALL MEET ASTM D3261. HDPE PIPE SHALL HAVE A MINIMUM DENSITY OF 0.955 GRAMS PER CUBIC CENTIMETER. ALL HDPE PIPE AND FITTINGS SHALL HAVE A HYDROSTATIC DESIGN BASIS (HDB) OF 1,600 PSI. HDPE PIPE AND ACCESSORIES 4-INCH DIAMETER AND LARGER, SHALL BE 160 PSI AT 73.4 OF MEETING THE REQUIREMENTS OF STANDARD DIMENSION RATIO (S THE NORM-XT TO THEZDR) 17 AS MINIMUM STRENGTH. THE PIPE MANUFACTURER MUST CERTIFY COMPLIANCE WITH THE ABOVE REQUIREMENTS.

EACH HDPE PIPE LENGTH SHALL BE CLEARLY MARKED WITH THE FOLLOWING:
 1. MANUFACTURER'S NAME
 2. PIPE SIZE
 3. SDR OR RING STIFFNESS CONSTANT CLASSIFICATION
 4. PRODUCTION CODE DESIGNATING PLANT LOCATION, MACHINE, AND DATE OF MANUFACTURE.

BEDDING: PIPE BEDDING IS MATERIAL FROM 4 INCHES (100 MM) BELOW THE BOTTOM OF THE PIPE, INCLUDING PIPE BELL HOLES, TO 6 INCHES (150 MM) ABOVE THE TOP OF THE PIPE FOR THE FULL WIDTH OF THE TRENCH.

TYPE 1 BEDDING: TYPE 1 BEDDING MATERIAL: 3/4 INCH (19 MM) 60 % CRUSHED OR FRACTURED (AT LEAST ON ONE SIDE) GRAVEL AND SAND MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE SIZE	PERCENT PASSING
25 MM (1 IN)	100
19 MM (3/4 IN)	80-100
10 MM (3/8 IN)	20-70
4.75 MM (NO. 4)	5-20
2.36 MM (NO. 8)	0-5
0.075 MM (NO. 200)	0-3

CLASS A-1 BEDDING SYSTEM: PLACE TYPE 1 BEDDING 4 INCHES (100 MM) BELOW THE BOTTOM OF THE PIPE AND 6 INCHES (150 MM) ABOVE THE PIPE.

PLACE BEDDING IN LAYERS NO THICKER THAN 6 INCHES (150 MM) IN DEPTH, UNLESS OTHERWISE DIRECTED BY MANUFACTURER INSTRUCTIONS. ALLOW FOR BEDDING DEPTH AROUND PIPE BELLS. SHOVEL SLICE AND TAMP TO ENSURE THAT THE BEDDING MATERIAL IS FIRMLY PLACED. ONCE PIPE IS PLACED, PUT ADDITIONAL BEDDING LAYERS UP TO THE SPRINGLINE OF THE PIPE. SHOVEL SLICE AND TAMP TO ENSURE THAT THE BEDDING MATERIAL FILLS IN AND SUPPORTS THE PIPE LAUNCH AREA. IF THE TRENCH SHORING OR BOX IS BELOW THE SPRINGLINE OF THE PIPE, RAISE THE SHORING OR TRENCH BOX ABOVE THE SPRINGLINE AND RECOMPACT THE BEDDING (SHOVEL SLICE AND TAMPED). PLACE ADDITIONAL BEDDING LAYER FROM THE PIPE SPRINGLINE TO 6 INCHES (150 MM) ABOVE THE PIPE. COMPACT EACH LAYER OF GRANULAR BEDDING MATERIAL TO 92 % OF THE MAXIMUM DENSITY DETERMINED BY ANSI/ASTM D 698.

PIPE LAYING: BEFORE THE STORM LINE PIPE IS PLACED IN POSITION IN TRENCH, THE BOTTOM AND SIDES OF THE TRENCH SHALL BE CAREFULLY PREPARED, THE REQUIRED BEDDING PLACED, AND BRACING AND SHEETING INSTALLED WHERE REQUIRED. THE TRENCH SHALL BE EXCAVATED TO THE DIMENSIONS SHOWN ON THE ENGINEER'S DRAWINGS. EACH PIPE SHALL BE ACCURATELY PLACED TO THE LINE AND GRADE CALLED FOR ON THE DRAWINGS. GRADE SHALL BE CONTROLLED BY A LASER BEAM OR BATTER BOARDS AND A MASON'S LINE. ALL EQUIPMENT FOR MAINTAINING GRADE SHALL BE FURNISHED BY THE CONTRACTOR. ALL PIPE AND FITTINGS SHALL BE INSPECTED BEFORE THEY ARE INSTALLED.

PIPE LAYING SHALL PROCEED UPGRADE, STARTING AT THE LOWER END OF THE GRADE WITH THE BELLS UPHILL. IF THE TRENCH BOTTOM DOES NOT PROVIDE A FIRM AND STABLE WORKING PLATFORM, SUFFICIENT MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED COMPACTED MATERIALS TO PROVIDE A FIRM FOUNDATION FOR THE PIPE. PIPE TRENCHES SHALL BE KEPT FREE FROM WATER DURING PIPE LAYING. JOINTING AND UNTIL SUFFICIENT BACKFILL HAS BEEN PLACED TO PREVENT FLOTATION OF THE PIPE. THE MINIMUM HEIGHT OF BACKFILL TO PREVENT FLOTATION MAY BE OBTAINED FROM THE ENGINEER. THE CONTRACTOR MAY USE SUMP PUMPS, WELL POINTS, OR OTHER DEVICES TO REMOVE WATER FROM THE TRENCH BOTTOM. SMALL PUDDLES THAT ARE NO CLOSER THAN 4' FROM THE BOTTOM OF THE PIPE ARE ACCEPTABLE. THE CONTRACTOR SHALL PROVIDE AMPLE MEANS AND DEVICES TO PROMPTLY REMOVE AND DISPOSE OF ALL WATER FROM ANY SOURCE ENTERING THE TRENCH. NO CONNECTION SHALL BE MADE WHERE JOINT SURFACES AND JOINT MATERIALS HAVE BEEN SOILED BY EARTH IN HANDLING UNTIL SUCH SURFACES ARE THOROUGHLY CLEANED BY WASHING AND WIPING. AS THE WORK PROGRESSES, THE INTERIOR OF ALL PIPES SHALL BE KEPT CLEAN. AFTER EACH LINE OF PIPE HAS BEEN LAID, IT SHALL BE CAREFULLY INSPECTED AND ALL EARTH, TRASH, RAGS, AND OTHER FOREIGN MATTER REMOVED FROM THE INTERIOR. BACKFILLING OF TRENCHES SHALL BE STARTED IMMEDIATELY AFTER THE PIPE IS PLACED IN THE TRENCH.

STRUTTING: WHEN REQUIRED, STRUTS OR HORIZONTAL SUPPORT TIES SHALL BE INSTALLED AS SPECIFIED ON THE DRAWINGS. STRUTS AND TIES SHALL REMAIN IN PLACE UNTIL THE BACKFILL HAS BEEN PLACED TO A HEIGHT OF 5 FEET ABOVE THE TOP OF THE PIPE, OR HAS BEEN COMPLETED IF THE FINISHED HEIGHT IS LESS.

COUPLINGS: COUPLING FOR TWO PIPES OF DISSIMILAR TYPE OR SIZE WILL BE CONDUCTED WITH BAND SEAL COUPLERS MADE BY AN APPROVED MANUFACTURER PROVIDING FOR A WATERTIGHT CONNECTION AND A SMOOTH PIPE INVERT.

JOINTS/TRANSITIONS: PIPE JOINTS SHALL CONFORM TO THE DETAILS PRESCRIBED BY THE MANUFACTURER AND SHOWN ON THE DRAWINGS. PIPE JOINTS SHALL BE SOUND AND WATERTIGHT AT THE PRESSURE SPECIFIED ON THE DRAWINGS. THE JOINTS SHALL BE MADE IN A MANNER SO THAT THE INSIDE OF THE PIPE IS FREE FROM OBSTRUCTIONS. HDPE PIPE MAY BE JOINED TO THE EXISTING CONCRETE PIPE BY MEANS OF COMPRESSION FITTINGS, FLANGES, OR OTHER QUALIFIED TYPES OF MANUFACTURED TRANSITION FITTINGS. THE PREFERRED MECHANISM IS A FERROC 1006 SERIES COUPLING. PRELIMINARILY SELECTED AS 1006-1212, BUT WILL BE FIELD DETERMINED. IN TRANSITIONING FROM A MORE RIGID SUPPORT (MANHOLE) SOIL NEXT TO THE SUPPORT MUST BE OVER-EXCAVATED TO A DEPTH OF NOT LESS THAN 12 INCHES OVER A DISTANCE OF 2 PIPE DIAMETERS ALONG THE PIPE LINE; OVER THE NEXT 2 DIAMETERS AWAY FROM THE RIGID SUPPORT, THE DEPTH OF OVER-EXCAVATION IS GRADUALLY DECREASED UNTIL IT MEETS THE NORMAL TRENCH DEPTH. PIPE GRADE IS THEN RESTORED BY THE ADDITION OF GRANULAR MATERIAL AND IS COMPACTED. IN THE CASE OF CONNECTIONS TO MANHOLES AND BUILDINGS, THE DISTANCE OF OVER-EXCAVATION ALONG THE PIPE LENGTH SHOULD BE NO LESS THAN REQUIRED TO REACH UNDISTURBED SOIL.

THE ANNULAR SPACE BETWEEN HDPE PIPE AND THE CASING PIPE SHALL BE FILLED WITH CONCRETE GROUT. THE CONTRACTOR'S PROCEDURE FOR PLACING THE GROUT SHALL BE APPROVED BY THE ENGINEER. AFTER INSTALLATION OF PIPE IN CASING, THE CASING SHALL BE KEPT DEWATERED UNTIL GROUTING IS COMPLETED. GROUT SHALL BE PLACED BY GRAVITY FLOW ONLY.

BUTT FUSION: SECTIONS OF POLYETHYLENE PIPE SHOULD BE JOINED INTO CONTINUOUS LENGTHS ON THE JOBSITE ABOVE GROUND. THE JOINING METHOD SHALL BE THE BUTT FUSION METHOD AND SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE PIPE MANUFACTURER'S RECOMMENDATIONS. THE BUTT FUSION EQUIPMENT USED IN THE JOINING PROCEDURES SHOULD BE CAPABLE OF MEETING ALL CONDITIONS RECOMMENDED BY THE PIPE MANUFACTURER, INCLUDING, BUT NOT LIMITED TO, TEMPERATURE REQUIREMENTS OF 400 DEGREES FAHRENHEIT, ALIGNMENT, AND AN INTERFACIAL FUSION PRESSURE OF 75 PSI. THE BUTT FUSION JOINING WILL PRODUCE A JOINT WELD STRENGTH EQUAL TO OR GREATER THAN THE TENSILE STRENGTH OF THE PIPE ITSELF. ALL FIELD WELDS SHALL BE MADE WITH FUSION EQUIPMENT EQUIPPED WITH A MCELROY DATA LOGGER. TEMPERATURE, FUSION PRESSURE AND A GRAPHIC REPRESENTATION OF THE FUSION CYCLE SHALL BE PART OF THE QUALITY CONTROL RECORDS.

NOTE: SOCKET FUSION, HOT GAS FUSION, THREADING, SOLVENTS, AND EPOXIES MAY NOT BE USED TO JOIN HDPE PIPE.

MECHANICAL: BOLTED JOINING MAY BE USED WHERE THE BUTT FUSION METHOD CANNOT BE USED. FLANGE JOINING WILL BE ACCOMPLISHED BY USING A HDPE FLANGE ADAPTER WITH A DUCTILE IRON BACK-UP RING. MECHANICAL JOINT JOINING WILL BE ACCOMPLISHED USING EITHER A MOLDED MECHANICAL JOINT ADAPTER OR THE COMBINATION OF A SUR-GRIP RESTRAINER AND PIPE STIFFENER. EITHER MECHANICAL JOINT JOINING METHOD WILL HAVE A DUCTILE IRON MECHANICAL JOINT GLAND.

COATING: ALL COATINGS SHALL BE INSPECTED AFTER FINAL PLACEMENT AND JUST PRIOR TO BACKFILL. ANY PINHOLES AND/OR DAMAGE SHALL BE REPAIRED WITH A MATERIAL THAT IS RECOMMENDED BY THE MANUFACTURER.

PLUGS: FOR PIPE BRANCHES, STUBS, OR OTHER OPEN ENDS WHICH ARE NOT TO BE IMMEDIATELY CONNECTED SHALL BE MADE OF AN APPROVED MATERIAL AND SHALL BE SECURED IN A PLACE WITH A JOINT COMPARABLE TO THE MAIN LINE JOINT, OR STOPPERS MAY BE OF AN INTEGRALLY CAST BREAKOUT DESIGN.

TYPE A TRENCH BACKFILL:

TYPE 1 BEDDING: TYPE 1 BEDDING MATERIAL: 3/4 INCH (19MM) 60 % CRUSHED OR FRACTURED (AT LEAST ON ONE SIDE) GRAVEL AND SAND MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE SIZE	PERCENT PASSING
25 MM (1 IN)	100
19 MM (3/4 IN)	80-100
10 MM (3/8 IN)	20-70
4.75 MM (NO.4)	5-20
2.36 MM (NO.8)	0-5
0.075 MM (NO.200)	0-3

MATERIAL FROM THE TOP OF THE PIPE BEDDING TO A POINT 4 FEET (1.2 M) BELOW SUBGRADE (LOWER ZONE) WILL BE 92 % OF MAXIMUM COMPACTION AND THE UPPER ZONE, FROM 4 FEET (1.2 M) BELOW SUBGRADE TO THE SUBGRADE LEVEL WILL BE COMPACTED TO 95 % OF MAXIMUM. DENSITY WILL FULFILL AASHTO T310 REQUIREMENTS.

TYPE A-1 COMPACTION: DEPOSIT MATERIAL IN LAYERS SUITABLE TO EQUIPMENT USED FOR COMPACTION, TYPICALLY 8' COMPACTION LIFTS. WET TO OPTIMUM MOISTURE CONTENT +/- 3 % AND USE MECHANICAL TEST. RECOMPACT IF ANY THREE TESTS IN THE UPPER ZONE WITHIN A 300 FT (90 M) OF TRENCH DISTANCE FAIL TO MEET 95 % COMPACTION. COMPACTION CAN BE ACCOMPLISHED BY HAND WITH TAMPERS OR SUITABLE POWER COMPACTORS, TAKING CARE NOT TO DISTURB THE PIPE FROM ITS LINE AND GRADE. WHEN COMPACTING THE EMBEDMENT NEAR THE PIPE WITH IMPACT-TYPE TAMPERS, DO NOT ALLOW DIRECT CONTACT OF THE EQUIPMENT WITH THE PIPE. AVOID USAGE OF IMPACT TAMPERS DIRECTLY ABOVE THE PIPE UNTIL SUFFICIENT BACKFILL (USUALLY 12')

HAS BEEN PLACED TO ENSURE NO LOCAL DEFORMATION OF THE PIPE. COMPACTION OF THE EMBEDMENT MATERIAL ALONGSIDE THE PIPE SHOULD NOT CAUSE PIPE TO LIFT OFF OF GRADE. COMPACTION OF PRIMARY INITIAL BACKFILL SHOULD BE CONDUCTED AT, OR NEAR, THE MATERIAL'S OPTIMUM MOISTURE CONTENT. THE BACKFILL SHOULD BE PLACED IN LAYERS, OR LIFTS, THAT ARE BROUGHT UP EVENLY ON BOTH SIDES OF THE PIPE. HDPE PROFILE PIPE SHALL NOT BE SUBJECT TO A ROLLER OR WHEEL LOADS UNTIL A MINIMUM OF ONE DIAMETER OR 36" (WHICHEVER IS LARGER) OF BACKFILL HAS BEEN PLACED OVER THE TOP OF THE PIPE AND A HYDROHAMMER SHALL NOT BE USED UNTIL A MINIMUM DEPTH OF ONE DIAMETER OR 48" (WHICHEVER IS LARGER) OF BACKFILL HAS BEEN PLACED OVER THE TOP OF THE PIPE.

TESTING: THE CONTRACTOR SHALL CONDUCT EITHER AN INFILTRATION TEST OR A WATER TEST FOR LEAKAGE AS DETERMINED BY THE ENGINEER. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH ALL APPLICABLE SAFETY STANDARDS.

INFILTRATION TEST: INFILTRATION SHALL NOT EXCEED 50 GALLONS PER 24 HOURS PER INCH OF DIAMETER PER MILE OF STORM LINE. CONTRACTOR SHALL FURNISH ALL SUPPLIES, MATERIALS, LABOR, SERVICE, ETC., NEEDED TO MAKE INFILTRATION OR EXFILTRATION TESTS INCLUDING WATER. NO SEPARATE PAYMENT WILL BE MADE FOR EQUIPMENT, SUPPLIES, MATERIAL, WATER, OR SERVICES. ANY LEAKAGE, INCLUDING ACTIVE SEEPAGE, SHALL BE CORRECTED WHERE SUCH LEAKAGE EXISTS UNTIL THE PIPELINES MEET THE REQUIREMENTS OF THE ALLOWABLE LEAKAGE SPECIFICATIONS. INFILTRATION TESTS SHALL BE MADE WHEN GROUNDWATER LEVEL IS 18 INCHES OR MORE ABOVE THE TOP OF THE OUTSIDE OF THE PIPE.

WATER TEST: WHEN NORMAL GROUNDWATER DOES NOT STAND AT A LEVEL OUTSIDE THE PIPE SO AS TO ENABLE INFILTRATION TESTS TO BE MADE TO THE SATISFACTION OF THE ENGINEER, THE CONTRACTOR SHALL MAKE EXFILTRATION TESTS BY FILLING THE PIPE OR SECTIONS THEREOF WITH WATER TO A HEAD OF NOT LESS THAN 2 FT. ABOVE THE TOP OF THE OUTSIDE OF THE PIPE AND OBSERVING THE AMOUNT OF WATER REQUIRED TO MAINTAIN THIS LEVEL.

TYPE P SURFACE RESTORATION:

RESTORE ASPHALTIC CONCRETE PAVEMENT, ASPHALT CONCRETE PAVEMENT OVER CONCRETE, BITUMINOUS SURFACE TREATMENT, OR ASPHALTIC CONCRETE SURFACING THAT HAS BEEN DAMAGED OR REMOVED DURING TRENCHING OPERATIONS. USE 8 INCH (200 MM) COMPACTED BASE COURSE OR MATCH EXISTING BASE DEPTH (WHICHEVER IS GREATER) CONSISTING OF TYPE 1 AGGREGATE. COMPACT BASE COURSE TO 95 % OF MAXIMUM DENSITY IN ACCORDANCE WITH ANSI/ASTM D698. ASPHALT CONCRETE PAVEMENT THICKNESS IS TO MATCH EXISTING PAVEMENT DEPTH TO A MAXIMUM DEPTH OF 6 INCHES (150 MM). IN NO CASE SHALL PAVEMENT THICKNESS BE LESS THAN 2.5 INCHES (60 MM). REMOVE PAVEMENT THAT HAS BEEN DAMAGED, BROKEN, OR IS UNSOUND AND PROVIDE A SMOOTH EDGE FOR JOINING THE NEW PAVEMENT.

CREATE/MAINTAIN A SMOOTH TRAVELING SURFACE WITH NO IRREGULARITIES IN EXCESS OF 0.25 FT (0.6 MM) UNLESS THEY ARE PRE-EXISTING. DEVIATIONS IN GRADE CANNOT EXCEED 0.02 FT/10 FT (2MM/M) IN PROFILE.

CONTROLLED DENSITY FILL:

GENERAL: CONTROLLED DENSITY FILL (CDF) shall be a mixture of Portland cement, fly ash, aggregates, water, and admixtures proportioned to provide a non-segregating, self-consolidating, free-flowing and excavatable material that will result in a hardened, dense, non-settling fill. CDF is approved as an alternative to "Trench Backfill" and as an alternate to "Bedding" and may be used at any location on the project at the option of the contractor as approved by the Engineer for foundation stabilization material, pipe base material, pipe zone material, trench backfill material and pavement base material. The use of CDF is required for backfill material associated with High Density Polyethylene manholes.

MATERIALS:
 Materials used in CDF mixture shall conform with the following
 Portland Cement: ASTM C-150 or AASHTO M-85 or ODOT 02010.10
 Fly Ash: ASTM C-618 Class F or Class C or ODOT 02010.10
 Aggregates: ASTM C-33 or ODOT 02690
 Water: ODOT 02020
 Admixtures: ODOT 02040 or AASHTO M-194 or ASTM C-494 or ASTM C-260

CDF shall attain unconfined compressive 28 day-strengths of approximately 100 psi.



NO.	DESCRIPTION	DATE	BY	APPROVED
REVISIONS				

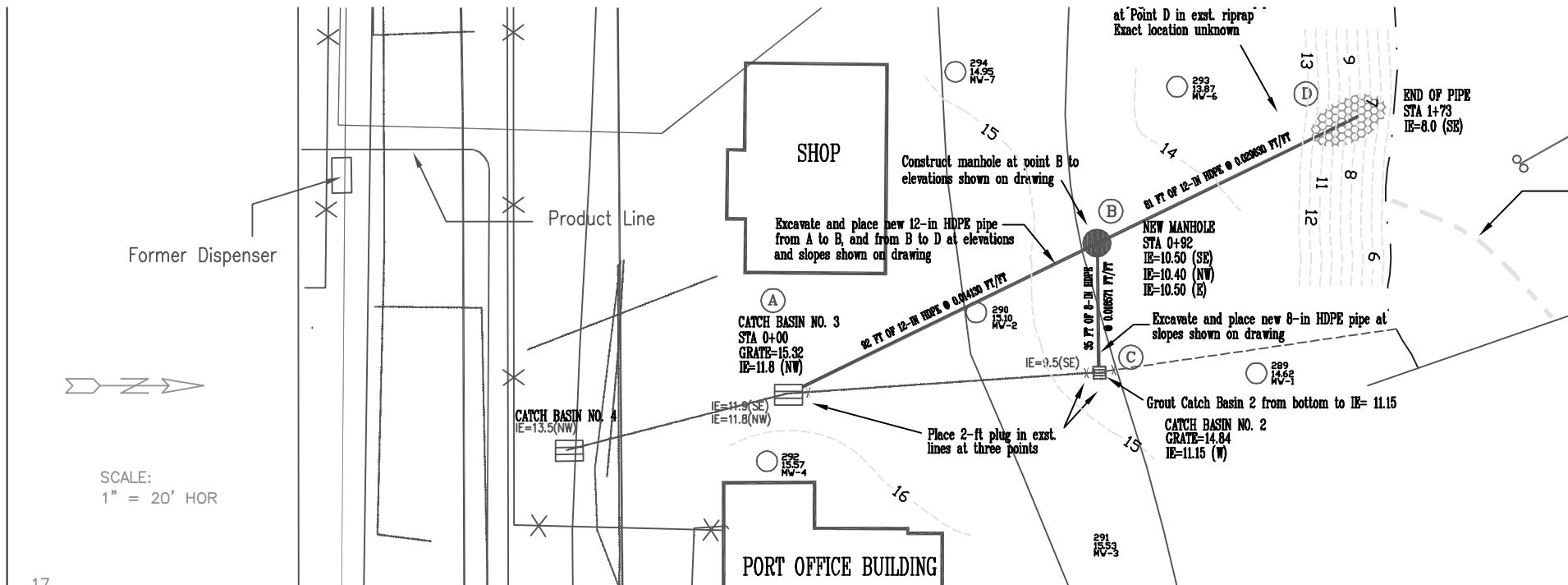
PREPARED FOR

HYDROCARBON SEEP IRAM

CONSTRUCTION SPECIFICATIONS

drawn <i>PAL</i>	struct.	date 12/19/03	scale NONE	file no. SPECS DEC 19
checked <i>RW</i>	mech.	job no. 00-000000		
designed <i>RW</i>	elec.	sheet no. 2 OF 4	drawing no. SPECIFICATIONS	
civil	qa/qc			

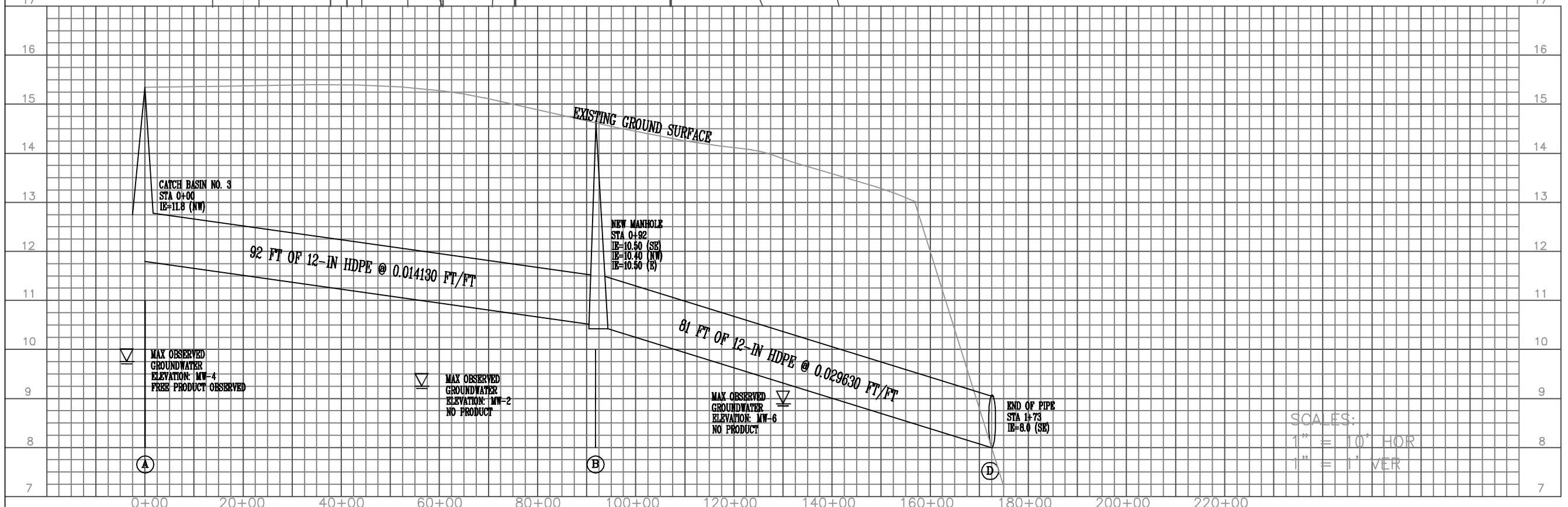
Contractor responsible for verifying and marking subsurface utilities prior to construction.



LOG BOOMS WITH FLOATING ABSORBENT BOOM:
 New Log Booms (2; each one log wide) to be installed parallel and outside existing log boom. New log booms to be constructed of new, bark-stripped, 25 ft long timbers with minimum 14-in diameter. Timbers have holes drilled through each end and fitted with steel sleeves for routing connecting cable or chain. Connecting cable or chain to be secured to existing piling and shoreline in a manner that allows boom to rise and fall freely with river level fluctuations. Sorbant boom to be installed inside new log booms and existing log boom. Sorbant boom to be composed of material designed to adsorb/skim oil from all terrain and water bodies and double net covered to prevent shedding and protect integrity and function, such as Crucial Boom 810SN or similar as approved by engineer/owner. See Sheet 4 of 4 for detail.



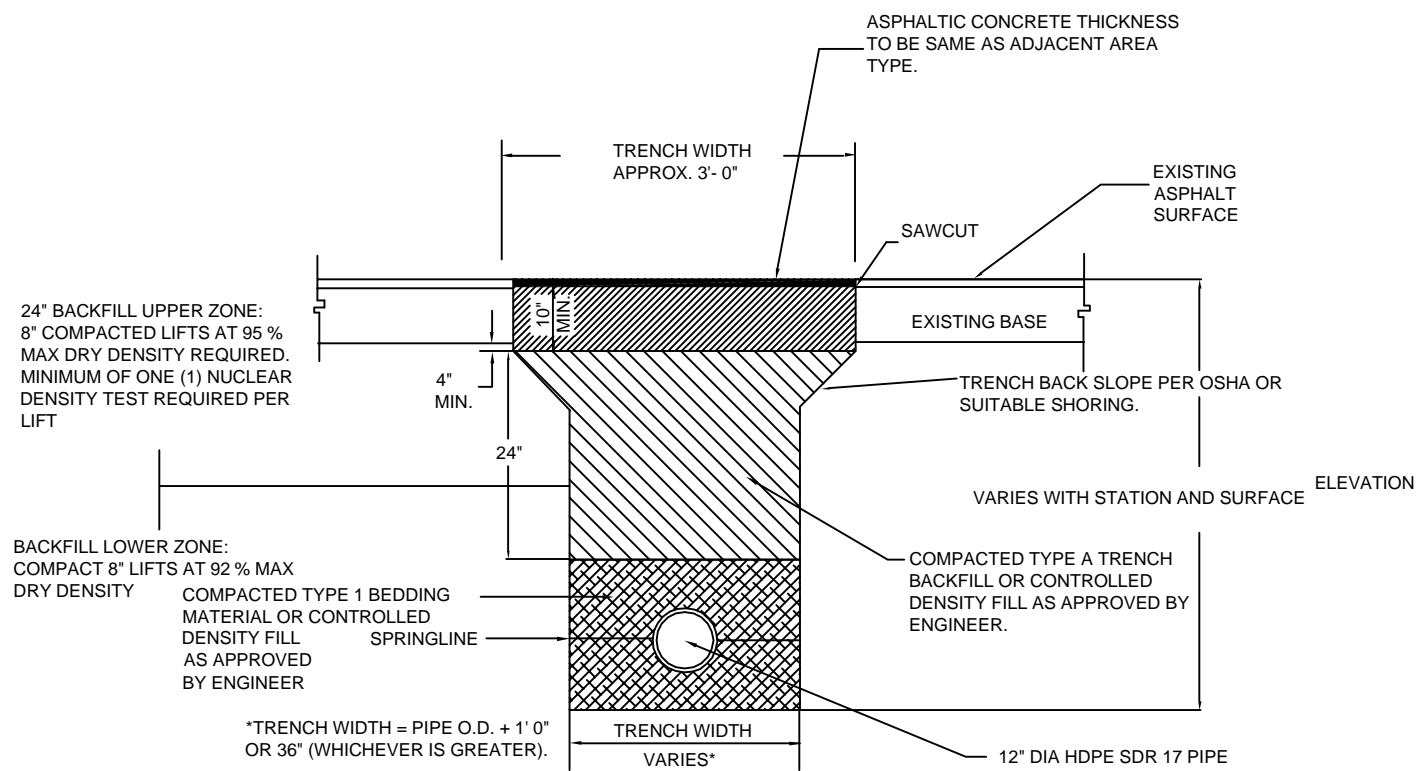
SCALE:
1" = 20' HOR



SCALES:
1" = 10' HOR
1" = 1' VER

 Engineers - Land Surveyors - Environmental Scientists 31960 SW Charbonneau Drive, Suite 101, Wilsonville, OR 97070	<table border="1"> <thead> <tr> <th>INITIALS</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DESIGN B. Berggren</td> <td>12/11/03</td> </tr> <tr> <td>DRAWN R. Waltzin</td> <td>12/11/03</td> </tr> <tr> <td>CHECKED R. Waltzin</td> <td>12/11/03</td> </tr> <tr> <td>APPROVED P. Berggren</td> <td>12/19/03</td> </tr> </tbody> </table>	INITIALS	DATE	DESIGN B. Berggren	12/11/03	DRAWN R. Waltzin	12/11/03	CHECKED R. Waltzin	12/11/03	APPROVED P. Berggren	12/19/03	PREPARED FOR 	<table border="1"> <thead> <tr> <th>NO.</th> <th>REVISIONS</th> <th>BY</th> <th>DATE</th> <th>DATE TO</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	REVISIONS	BY	DATE	DATE TO	A	B	C	D	1	2	3	4	5															Hydrocarbon Seep IRAM Astoria Area-Wide Petroleum Site Astoria, Oregon PROJ. NO. RSV_02060	<table border="1"> <tr> <td>SHEET NO.</td> <td>3</td> </tr> <tr> <td>OF</td> <td>4</td> </tr> </table>	SHEET NO.	3	OF	4
	INITIALS	DATE																																													
	DESIGN B. Berggren	12/11/03																																													
	DRAWN R. Waltzin	12/11/03																																													
CHECKED R. Waltzin	12/11/03																																														
APPROVED P. Berggren	12/19/03																																														
NO.	REVISIONS	BY	DATE	DATE TO	A	B	C	D	1	2	3	4	5																																		
SHEET NO.	3																																														
OF	4																																														

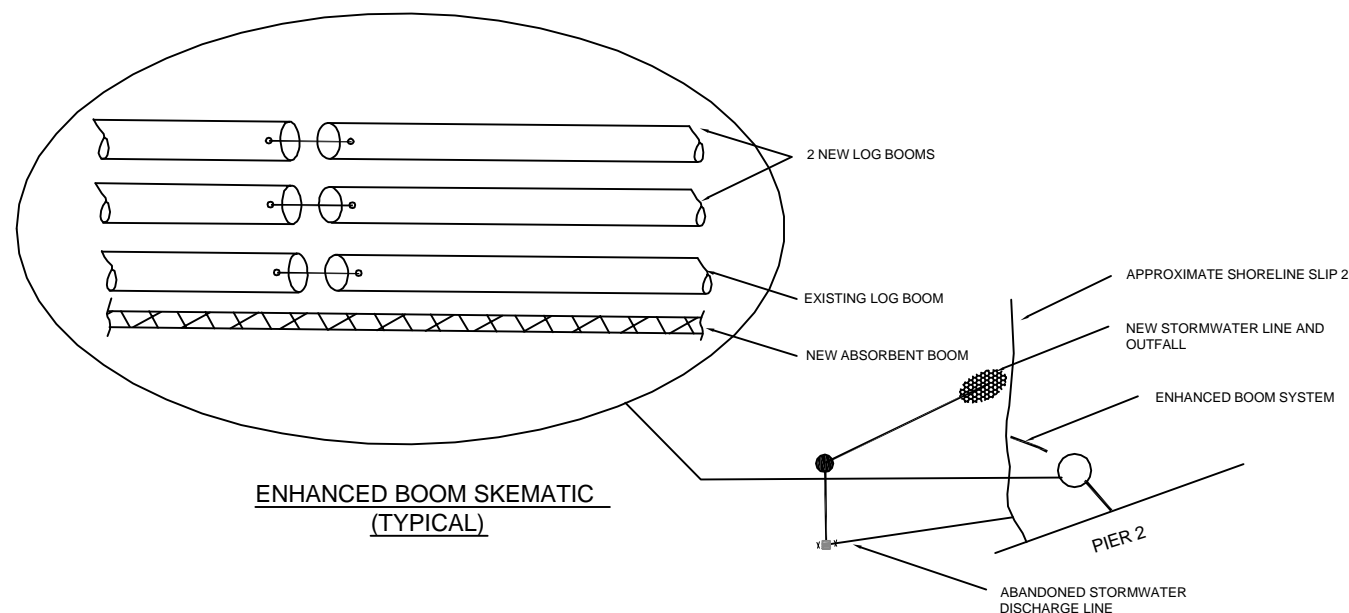
RSV FILE NO./DY/YR



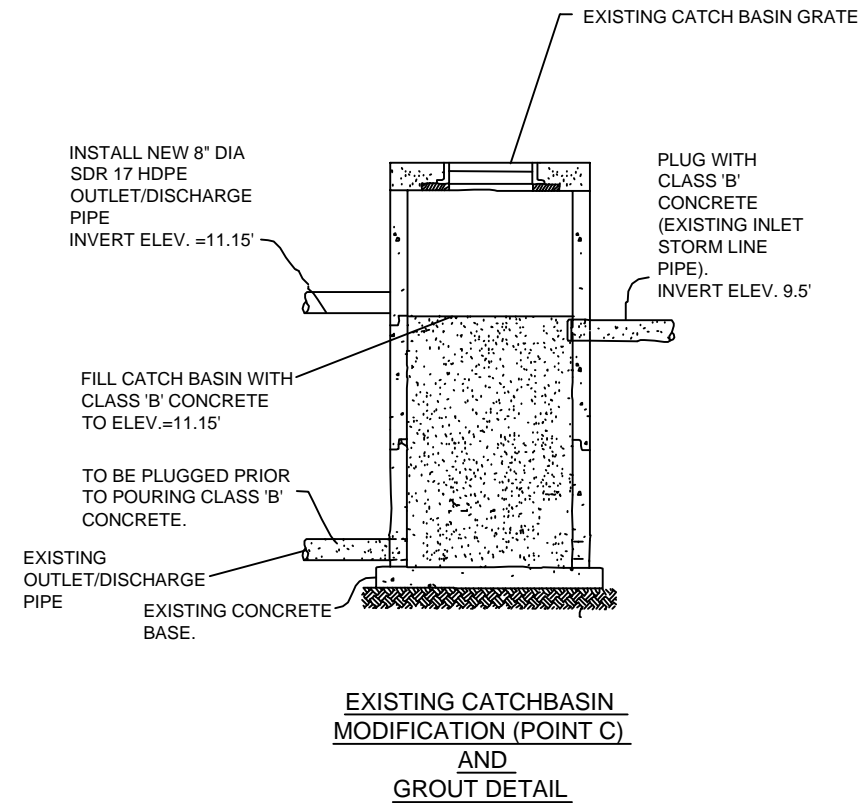
- NOTES: 1. ALL PROCTOR AND DENSITY TESTS SHALL BE TAKEN BY A CERTIFIED LABORATORY.
 2. ALL TESTS WILL BE COMPLETED AND MEET MINIMUM DENSITY REQUIREMENTS PRIOR TO ADDITIONAL BACKFILLING.

SEE SPECIFICATIONS SHEET (G-1) FOR DETAILS ON BACKFILL MATERIALS AND COMPACTION REQUIREMENTS.

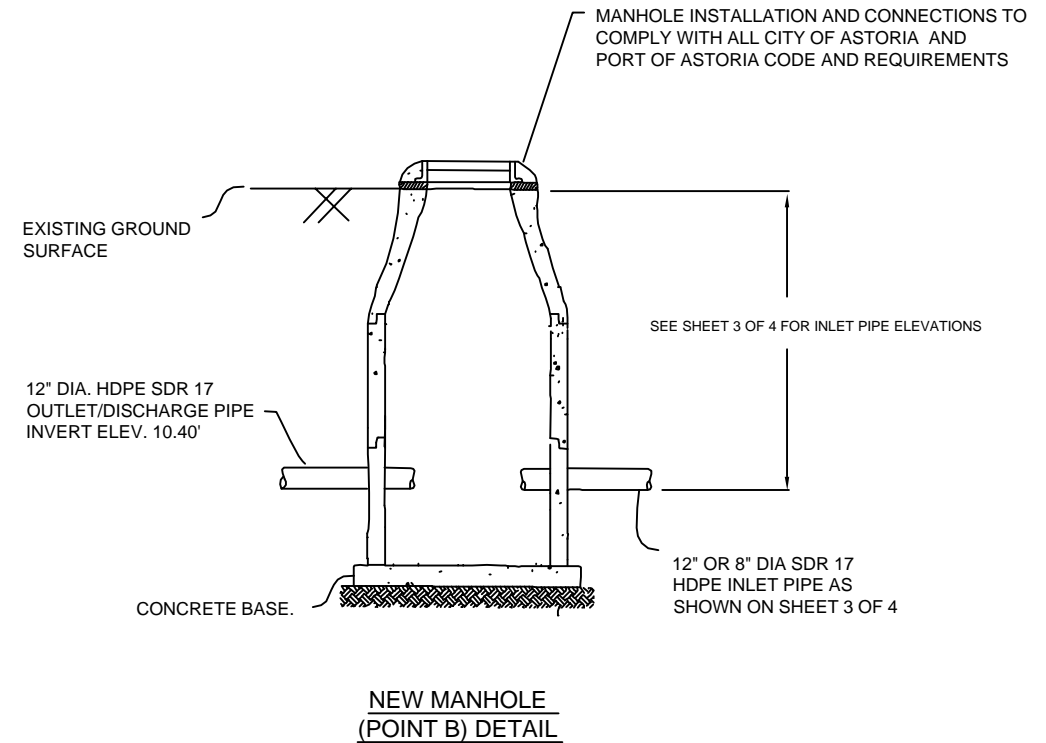
ASPHALT REPLACEMENT AND TRENCHING DETAIL (TYPICAL)



ENHANCED BOOM SKEMATIC (TYPICAL)



EXISTING CATCHBASIN MODIFICATION (POINT C) AND GROUT DETAIL



NEW MANHOLE (POINT B) DETAIL

NO.	DESCRIPTION	DATE	BY	APPROVED

PREPARED FOR

HYDROCARBON SEEP IRAM
CONSTRUCTION DETAILS

drawn <i>PAL</i>	struct. mech.	date 12/19/03	scale NONE	file no. DETAILS DEC 19
checked <i>RW</i>	elec.	job no. 00-00000	sheet no. 4 of 4	drawing no. DETAILS
designed <i>RW</i>	qc/qc			
civil				