

**Water Flow Measurement-Submerged
Diver Installation
New York City-Department of Environmental Protection-Shaft 9**

Site Characteristics: 4.3 Meter Uptake Tunnel
25 Meter Installation Depth

Configuration: 8 path Internal Mount

Transducers: Model 7634 Transducers with Stainless Steel Mounting Plates

Installation Details: The transducers were pre-mounted on stainless steel mounting plates which are lowered 25 meters into the shaft for installation by divers.



Transducer Installation Procedures

Note prior to starting: The NYC-DEP are responsible to get the shaft water level lowered and flow slowed down and stabilized prior to beginning. NYC-DEP will also have removed the slabs covering the 7x12 foot opening in the floor.

Also Note: Existing 15-ton hook cannot be used to lower/raise personnel.

Accusonic Personnel:

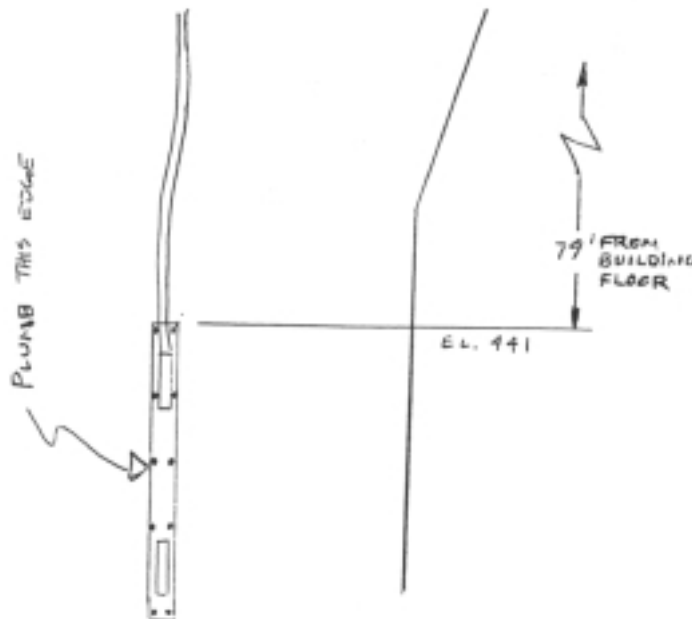
1. Layout (8) transducer assembly plates on the floor with conduit and cables attached, ready for lowering into the shaft.

Diving Personnel: (all equipment to be disinfected prior to work beginning)

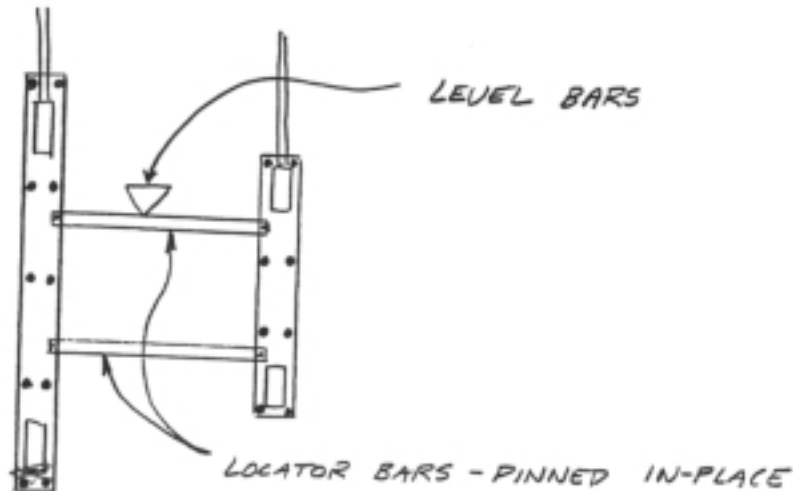
2. Assemble work platform under flooring, near the water level. Approx. 500 ft. elevation.
3. Make initial dive to inspect location of transducer plate assemblies and measure diameter. At approximate elevation of 437 ft.

Note: Concurrent with diving work - the Meter Console and junction box can be readied and mounted and any floor hole coring can be done. NYC-DEP are to provide power to the meter console.

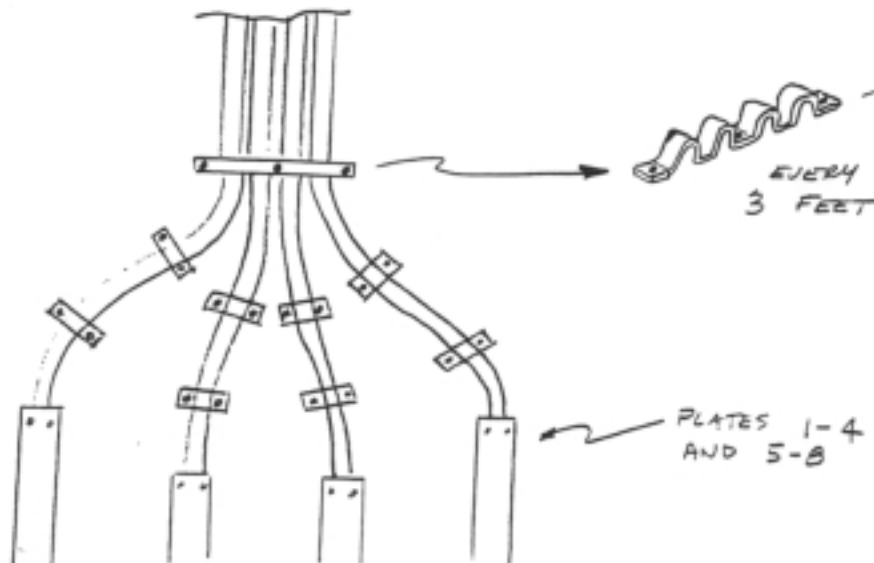
4. Lower first plate assembly (long) until the top edge is at approximately elevation 441 feet. Drill and secure a top anchor bolt in place. Then adjusting plate so it is vertically plumb with a level. Drill and secure a bottom anchor bolt. (1/2" diameter x 6 inch 316 SS mechanical anchor studs) See sketch below:



- Lower second assembly plate (short) with two locator bars attached. Pin rods in place onto the first assembly plate. Using a level, move the second plate up and down until the locator bars are level. Anchor a top and bottom bolt in place. See sketch below:



- Repeat this process for plate assemblies 3 through 8, noting that the locator bars are longer between plates 4 and 5.
- Drill and place anchors in the remaining holes in all eight plates. (16) are done at this point and there are (56) more to go. (10 in the long plates. 8 in the short plates).
- Gather the conduit on one "side" and anchor going up the shaft using the hold-downs' for four conduits. Using 3/8 inch diameter. 316 SS anchors studs (three each) every three feet. Approx. 20 locations each side (120 anchor holes)
- Anchor the conduit near the assembly plates with single hold-downs. Approximately 2 per conduit x 8 conduits x 2 holes each = 32 anchor holes.



10. Neatly run the eight conduit lines up out of the water and across the underside of the sump pump shaft hole.
11. Run conduit lines into the bottom of the junction box under the meter console.
12. Dive back down to transducers and take 8 “as-built” path dimensions.

Accusonic Personnel:

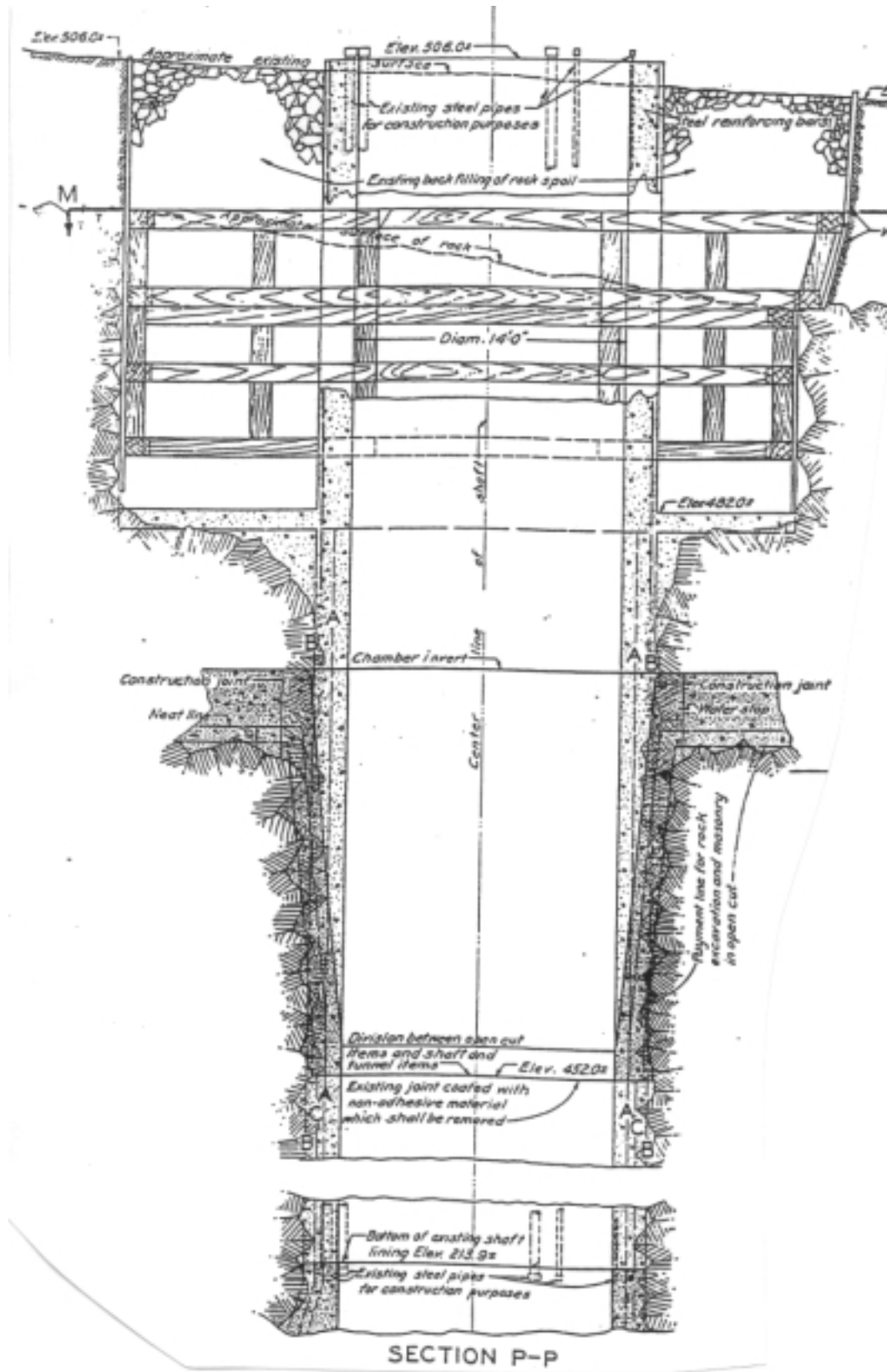
13. Coil up secondary transducer cable in junction box, trimming to a suitable length to be able to run up to meter.
14. Run the other cables into the meter and hook up.
15. Power up meter, enter path data, check each path for operation (alignment).
16. Instruct diving contractor if adjustments are needed.

Diving Personnel:

17. Final dive to video inspect underwater installation.
18. Finish any loose ends.

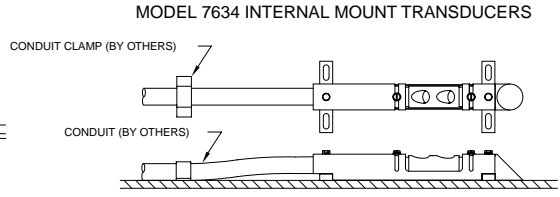
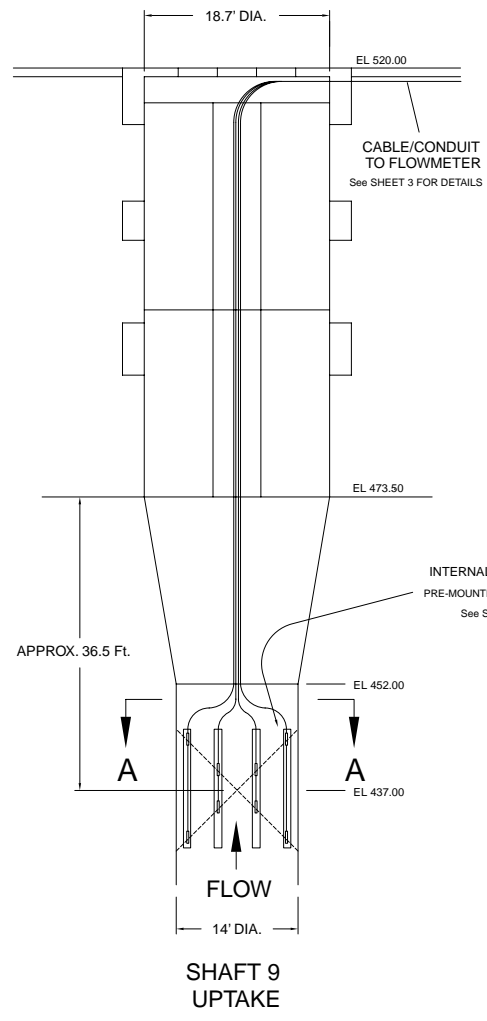
Accusonic Personnel:

19. Complete meter commissioning, start up.
20. Provide Malcolm Pirnie and NYC-DEP personnel training to operate meter.



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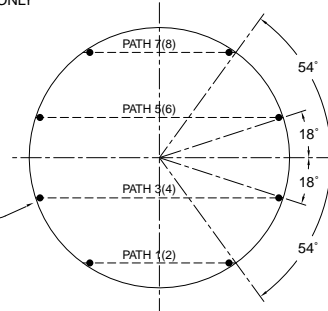
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A5		PLAN VIEW REF. DETAIL ADDED ON SHEET 3	8/25/99	
A6		CONDUIT ROUTING TO 1 SIDE OF PIPE SHEET 3	9/10/99	
A7		POWER SPEC UPDATED	1/21/00	
A8		TRANSDUCER ELEVATION SECTION UPDATED	1/28/00	



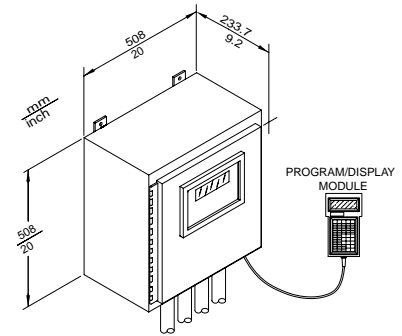
MODEL 7634 INTERNAL MOUNT TRANSDUCER OPERATIONAL LIMITS & SPECIFICATIONS

- TEMPERATURE: DRY PIPE -20°C TO 50°C
WET PIPE 0°C TO 50°C
- PRESSURE: 450 PSI MAX.
- REDUNDANCY: TRANSDUCER IS DESIGNED TO BE FULLY REDUNDANT SUCH THAT IF A TRANSDUCER ELEMENT FAILS, A BACK-UP CAN BE PLACED IN SERVICE, SIMPLY BY MAKING THE CABLE CONNECTION OUTSIDE THE PIPE.

ANGLES SHOWN FOR REF ONLY
-NOT DRILL ANGLES-



MODEL 7634 INTERNAL MOUNT TRANSDUCERS PRE-MOUNTED ON RECTANGULAR PLATES
See SHEET 2 FOR DETAILS



MODEL 7510 FLOWMETER OPERATIONAL LIMITS & SPECIFICATIONS

- ENCLOSURE: NEMA 4X WALL MOUNT, DIMENSIONS AS SHOWN
- WEIGHT: 27Kg/60lbs
- POWER REQUIREMENTS: 90 - 132V AC
47 - 65 Hz
- PARAMETER ENTRY: VIA INTEGRAL KEYPAD ON PROGRAM MODULE OR VIA ACCUFLOW SOFTWARE ON NOTEBOOK
- OUTPUTS: (2) ISOLATED 4-20mA MAXIMUM LOAD 1000 Ohms
(2) CONTACT CLOSURE RELAYS
- TELEPHONE LINE MODEM
- RS-232 INTERFACE
- 2 MB INTERNAL DATA LOGGER
- TEMPERATURE: MAX 50°C
MIN 0°C
- HUMIDITY: 0-95% (NON-CONDENSING)
- PATH CAPABILITY: 8 PATHS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO. FP32080				P.O. Box 799 Falmouth, MA 02541 TEL: (508) 548-5800 FAX: (508) 540-3835	
TOLERANCES ON:		DRAWN Apollo 8/3/98		NAME			
DECIMALS .X .XX .XXX		CHECKED TLB 8/98		NYCDEP DELAWARE AQUEDUCT SHAFT 9			
ANGLES ± °		ENGINEER FCL 8/98		7510 FLOWMETER			
FRACTIONS ±		APPROVED TBS 1/00		8-PATH CONFIGURATION			
SURFACE ROUGHNESS ✓		MATERIAL		SIZE C		CODE IDENT. NO. 25993	
NEXT ASSY		USED ON		DWG. NO. 7510CT0004-151		REV. A8	
APPLICATION		32080Q01.DWG		SCALE NONE		WT. LBS. NA	
				SHEET 1 OF 3			

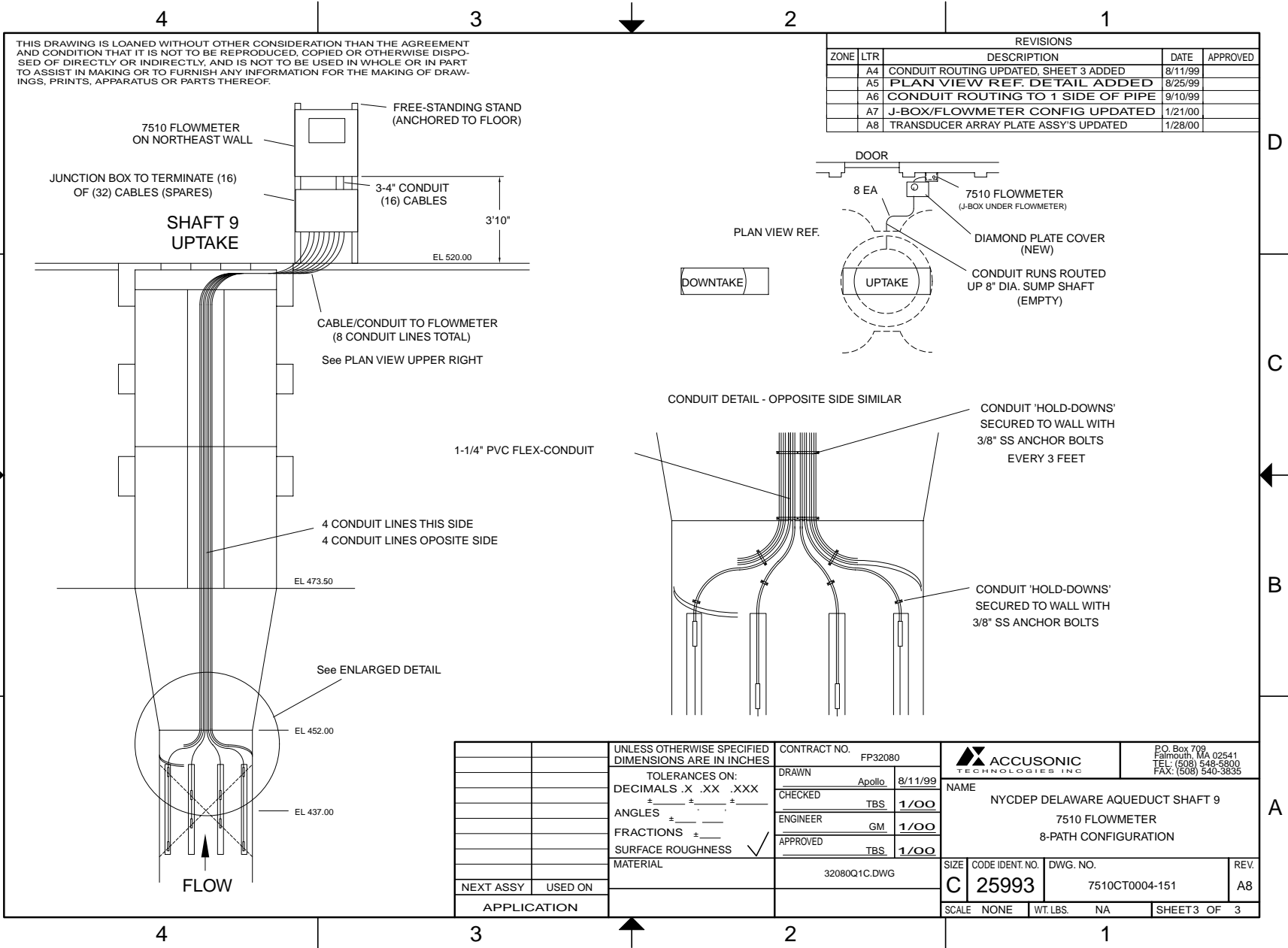
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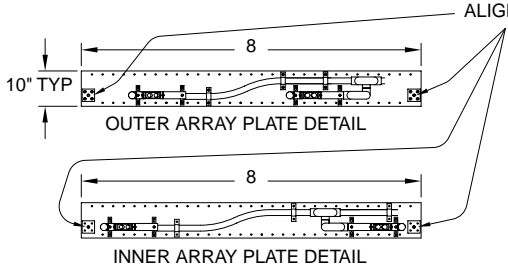
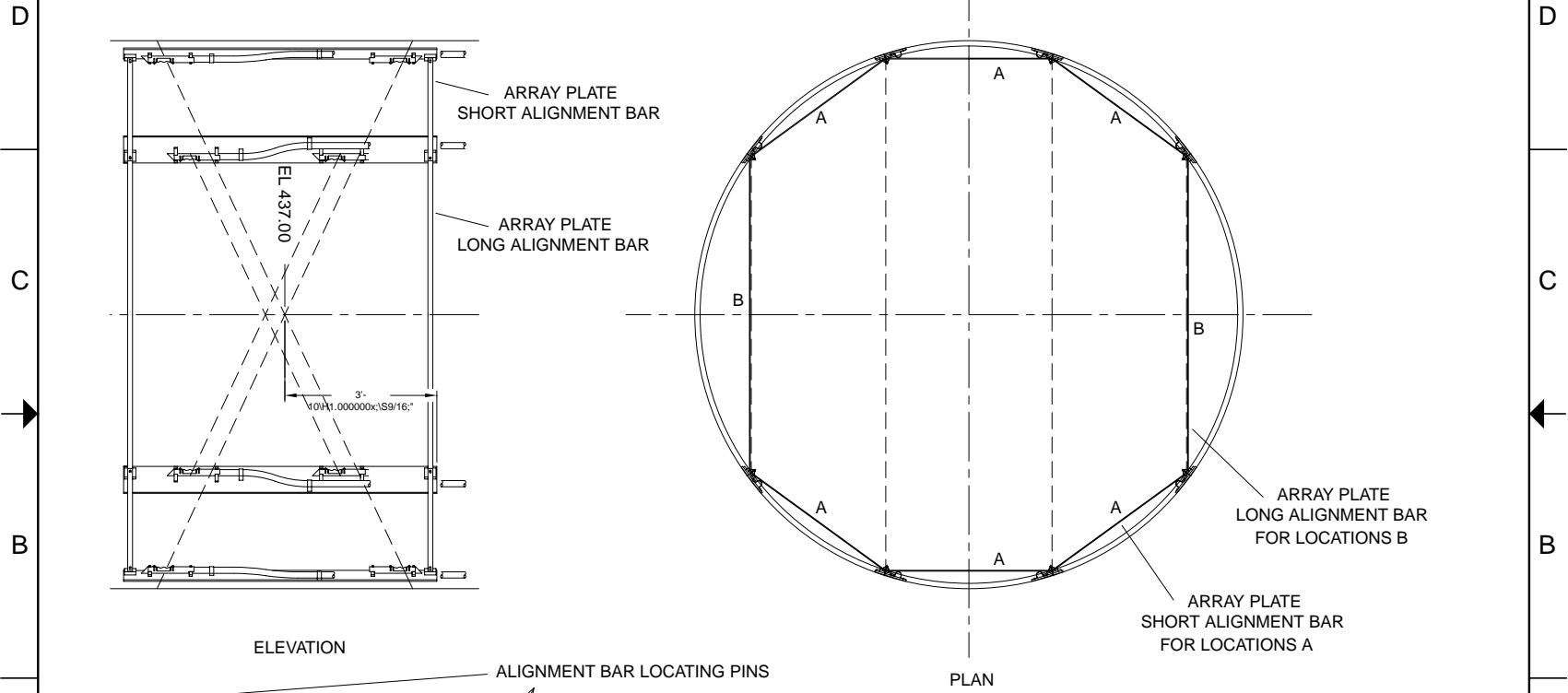
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	A8	TRANSDUCER ARRAY ASSY'S UPDATED	1/28/00	



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DECIMALS .X .XX .XXX		CHECKED	TBS 1/00	NYCDEP DELAWARE AQUEDUCT SHAFT 9			
ANGLES ±		ENGINEER	GM 1/00	7510 FLOWMETER			
FRACTIONS ±		APPROVED	TBS 1/00	8-PATH CONFIGURATION			
SURFACE ROUGHNESS ✓		MATERIAL	32080Q1B.DWG	SIZE	CODE IDENT. NO.	DWG. NO.	REV.
NEXT ASSY	USED ON			C	25993	7510CT0004-151	A8
APPLICATION				SCALE	NONE	WT. LBS.	SHEET 2 OF 3