PRELIMINARY REPORT

FOR

ALBUQUERQUE STORM WATER PUMPING STATIONS REHABILITATION STUDY - PHASE I STATIONS : 26, 27, 32, 34, 35, 36, 37, AND ALCALDE (PROPOSED)

A/E SERVICES AGREEMENT 81-26

FOR

MUNICIPAL DEVELOPMENT DEPARTMENT CITY OF ALBUQUERQUE

BEI NO. 6001-021

BOVAY ENGINEERS, INC.

BELL/COMMERCIAL S.E. STATION NO. 37

3

STORM WATER PUMPING STATION - BELL AND COMMERCIAL SE STATION NO. 37

I. INTRODUCTION

1. Station Description

The Bell/Commercial SE station is a moderately sized storm water pumping station. Three pumps are installed here which are rated as follows:

Pump No. 1 (Variable Speed)	10,000 gpm
Pump No. 2 (Constant Speed)	25,000 gpm
Pump No. 3 (Constant Speed)	40,000 gpm

Previous engineering construction plans obtained from the City are dated 1971, which is believed to be the year of construction.

The station's collection area is located northerly from the station towards Central Avenue and is bounded by the AT&SF Railroad tracks and Broadway Avenue SE. No major equipment work has been necessary due to breakdowns although renovation work is needed for certain purposes as defined herein.

2. Location Map - See Map No. 1.

Hogan, Dan W.

To: Hogan, Dan W.
Subject: RE: Pumps Bell & Commercial, #37

FYI,

In the late 1990's two pumps (Pump #2 &3) were replaced with Flygt submersible pumps set up in a "Dry Well" configuration. This is where the pumps sit in the original dry well and are not submerged, this use is allowed for this type pump. This also allowed for reuse of two pumps being removed from the treatment plant.

Thanks,

Dan Hogan
COA, DMD/Storm Drainage Design
768-2778

From: Morse, Jerry C.
Sent: Monday, October 01, 2007 10:13 AM
To: Hogan, Dan W.
Cc: Montgomery, David T.
Subject: Pumps Bell & Commercial, #37

Pump 1 is the original pump 75 HP, 10,000 GMP

Pumps 2 & 3 are the smaller RAS pumps from Activated. They are 134 Hp pumps.

Not sure exactly what the discharge flow is. The pump is rated at:

16,300 gpm at 18 ft head.
14,600 gpm at 23 ft head
12,540 gpm at 28 ft head

I figure we are close to 28 ft of head.

II. STORM STATION CAPACITY INFORMATION/IMPROVEMENTS

1. Albuquerque Master Drainage Study (MDS) 1981 Information and Improvements Recommended

Storm Water Pumping Station: Bell & Commercial SE Station No. 37

Albuquerque Storm Water Pumping Stations

Rehabilitation Phase I Report

Subject: Albuquerque Master Drainage Study 1981
by Bohannan-Huston, Inc.

Information Relating to the Storm Water Pumping Stations

Notes:

1. The following information relates to information obtained from the 1981 Master Drainage Study (M.D.S.) as referenced above.

2. Additional information contained herein was obtained via conversations with the engineering consultants for the M.D.S. Also, City Water Resource Dept. files contributed information regarding existing pumping capacity at the storm water stations.

STORM WATER PUMPING STATION: BELL AND COMMERCIAL SE STATION NO. 37

A. General Information

1. Location in the M.D.S.: Volume No. 1. At the intersection of Bell and Commercial SE adjacent to the AT&SF Railroad tracks.

2. Flood Hazard Map: L-14, portion of map included herein with the station location added for reference.

3. M.D.S., Volume No. 1, Plate No. 1, "Existing Storm Drainage Facilities," data:

   This station is not identified, but is located in the area of the south Broadway gravity storm sewer system No. 132, as shown on the map of Plat No. 1 included in the Appendix of this report for reference.

4. M.D.S., Volume No. 2, Plate No. 2, "Proposed Facilities," data:

   No pump station directly related improvements are identified. Improvements are recommended to various storm sewers in the vicinity to alleviate local flooding.

B. Capacity Data

1. No information is provided in the M.D.S. Volume No. 1 in relation to this pump station. Conversations with the engineering consultants for the M.D.S. have indicated that flood water modeling was performed for this pump station. Information related indicates that the present rated capacity of the pump station is 52 cfs.

   This capacity is reported to be sufficient for future improvements to the surrounding storm sewer systems which contribute flood water to this station.

Commercial/Bell Station # 37

2. City records in conjunction with field inspections indicates that the following pumps are installed at this station:

Pump No.	Horsepower	Rated Capacity
1	75	10,000 gpm
2	250	25,000 gpm
3	600	40,000 gpm

C. Proposed Improvements Identified in the M.D.S.

This pump station is associated with storm sewer system No. 132 proposed improvements. These are described in the M.D.S. Volume No. 1, Section VIII.C. Structural Flood Mitigation Measure.

The M.D.S. does not distinguish whether the listed storm sewer improvements discharge to the Bell/Commercial pump station or flow directly to the South Broadway gravity storm sewer system.

No capacity related problems were identified with the pump station's ability to transfer present and future improved conditions floodwater flows.

III. STATION OPERATION CHARACTERISTICS

1. Operating Equipment Observations

A. Actual operating conditions were not able to be observed here insofar as operation of the main storm water pumps. No adverse conditions have been reported insofar as pump foundation problems, shaft vibration or motor support problems.

The solid state controls for the variable speed motor No. 1 are arranged according to air-bubbler wet well level monitoring. It is not known if full speed operation for motor No. 1 occurs before motor No. 2 (constant speed) is called for. Review of telemetry operating printouts indicate that motor No. 2 cycles for short running periods of one to three minutes, which is detrimental for a 250 HP size motor. Controls should be arranged to turn off pump No. 1 (after it reaches full speed due to high water level) whenever pump No. 2 is called for. This would allow for as long as possible running cycle for pump No. 2 whenever the wet well level is high enough to call for its operation. Similar logic should be applied for the largest pump No. 3 operation. For increasing flows, parallel pump operation can be initiated in successive stages.

B. The dry well sump pumps (2) were operated but were unable to pump out the sump in which they are placed. Water was being pumped, but the capacity was very low. It is believed that in the case of a dry well water leak that greater sump pumping capacity would be highly desirable. It is also possible that the existing sump pumps were somehow clogged and need inspection/cleaning/overhauling as appropriate.

C. It was observed that the discharge piping at pump No. 1 is equipped with an isolation valve, whereas the other two pumps do not have this. Also, a running time meter exists for motor No. 1 but not for motor's 2 and 3. No explanation for these differences is known. These items should be common for all pumps.

D. This station is equipped with a 5-ton capacity overhead hoist/crane. Due to the space constraints within the station, any retrieval of equipment from the dry well would require the dismantling of a motor/pump unit. The hoist/crane may be able to be extended a few feet east along the ceiling in order to be positioned over open areas. The latter suggestion would allow retrieval of some dry well equipment via hoisting without motor dismantling. A floor jack and gantry crane equipment located in the dry well would greatly facilitate equipment removal.

E. A vertically cleaned mechanical bar screen was observed in operation here. The device operates quite well with trash screenings collected at ground level. Some sediment has collected at the entrance channel basin which needs manual removal. See Photo No. 1.

2. Operation - Maintenance Problems

Discussions and on-site inspections with operation and maintenance personnel were held in order to assess the overall "O&M" problems at the station. Mr. Emmett D. Goss, an operations and maintenance specialist, was also consulted with and participated in these meetings. The following information summarizes the results of this study:

A. Recommendations

1. Centrifugal pumps need repacking. Water was observed to be standing in packing gland recesses. When repacked, the shaft should be examined for wear; if wear is noted, shafts should be metalized and remachined. Packing should be maintained in such a manner that excessive external leakage does not occur at the packing gland.

2. Hour meters (pumping time) should be installed on Pumps #2 and #3.

3. Isolation valves should be installed on discharge of Pumps #2 and #3.

4. The only access to remove pumping equipment from dry well is located at east end of upper floor level. Overhead crane should be extended to reach this position. The equipment was originally installed such that it is impossible to remove equipment from each bay.

B. Operations

1. Operation of station should be arranged with pumps set in lead and lag position with proper sequence (start and stop); it should be noted that the depth of water in the wet well should be above the level of the pump impellers before the start of pumps. (This is to assure positive suction for pumping). This sump pump should handle the wet well below this level. When the operator arrives, an inspection should be made of equipment while in operation, checking motor and pump bearings for heating and noise; check drive shaft, and packing glands for leaking and heat. Note: When storm water pumps set for long periods they have a tendency to dry out in packing glands; therefore, the pumps should be rotated manually.

2. Necessary repairs should be performed immediately.

3. When pumps are in operation, ampere and discharge gauge readings should be made and recorded.

C. Preventive Maintenance

1. The centrifugal pumps should be packed as follows:

   a. Pump bearings should be lubricated with proper grease and changed about every 12 months. Two rings of packing (Teflon coated) at the bottom of packing box, lantern ring aligned to grease feed hole (if packing wears below this ring, should be replaced to keep alignment to grease hole). Three rings of packing above lantern ring. Proper

pressure of grease to lantern ring should feed through the bottom rings to volute of pump, no grease or water at the top or packing gland. Packing gland should be adjusted level and with small amount of pressure. When repacking pump, shaft should show no wear.

2. Pump Suctions: After each storm with wet well empty (this can be accomplished by drain holes at the bottom of suction chambers draining to sump pump). Pump suction and pump casing should be cleaned with Hydraulic Sewer cleaner to remove all sand and mud from pump casing and impellers. This is to prevent high torque starting and locking of impellers.

3. In stormwater pump stations, interior and exterior pumps are subject to extreme changes in temperature. The motor thrust bearings should be checked every six months for condensation. If any moisture is noted in grease or oil, the grease or oil should be changed out. Regardless of operating time, oil should be flushed and changed out every six months with manufacturer's recommended oil. Proper oil levels must be maintained.

4. Cleaning of wet well is needed periodically.

IV. ELECTRICAL POWER SUPPLY DESCRIPTION

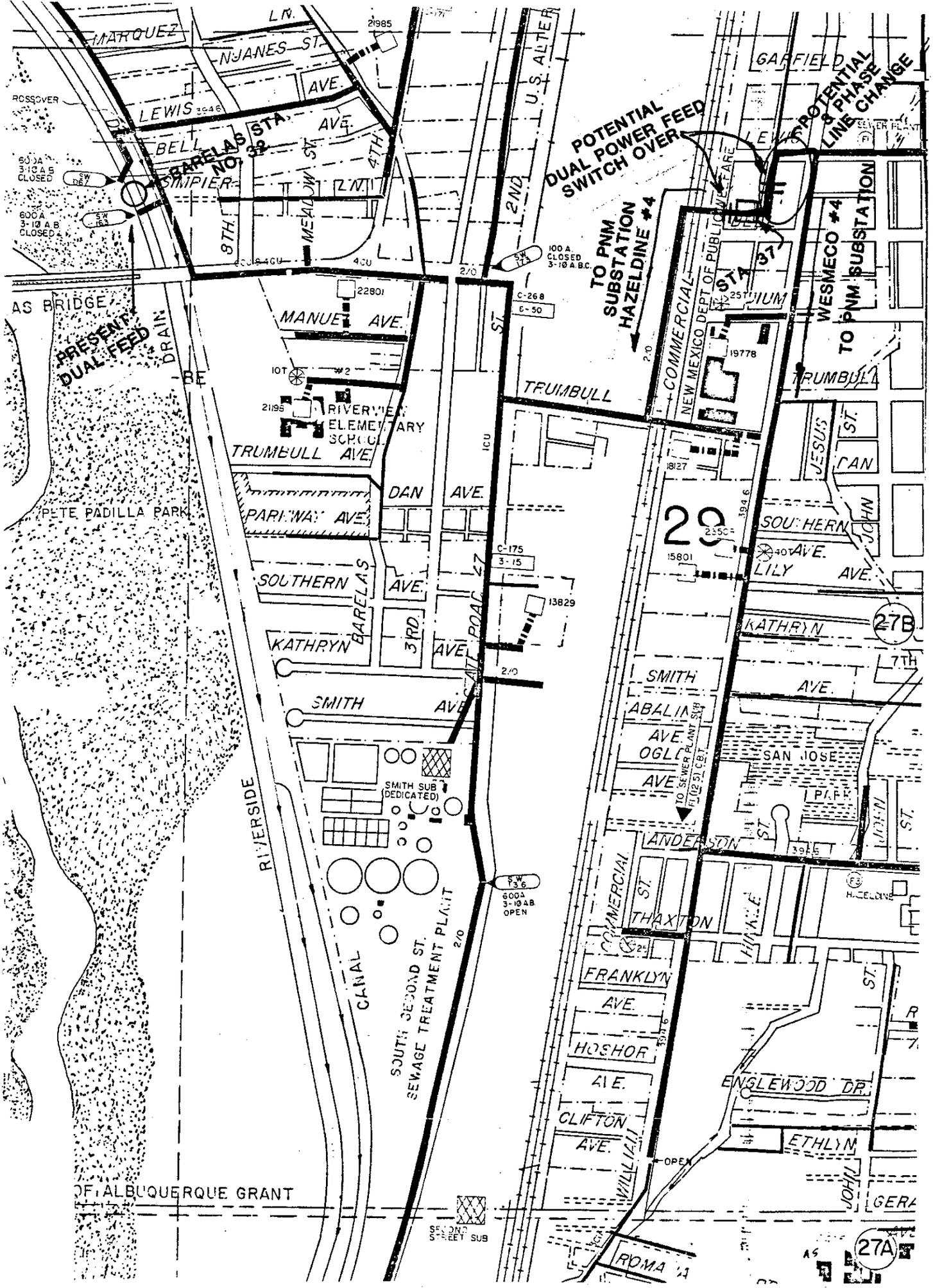
1. Public Service Co. of New Mexico, Dual Primary Power Feed Analysis

Meetings and discussions were held with PNM engineers regarding the above referenced subject. The following information was obtained from PNM for this station:

PUMP STATION NO. 37, BELL & COMMERCIAL SE, PNM INFORMATION:

Dual 4.16 KV source can be made available by extending 3 phase OH line to the site from Lewis and Williams SE. Manual switches would be installed for sectionalizing. Feeds would be from Hazeldine and Wesmeco Substations. Estimated Costs: $12 - $15,000.

Note: See Report Appendix for copies of correspondence and PNM Report Summary notes.



BOVAY ENGINEERS, INC.

HOUSTON • SPOKANE • BATON ROUGE
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BARELAS STORM WATER PUMPING STA. NO. 32 AND BELL & COMMERCIAL ST. S.E. STA. NO. 37, PNM ELECTRIC POWER-DUAL PRIMARY FEED ANALYSIS POTENTIAL IMPROVEMENTS TO SUPPLY BACK-UP SUBSTATIONS POWER FEED.

DESIGNED	RHH	SCALE:
DRAWN	LLW	PROJECT NUMBER
CHECKED		DRAWING NUMBER
APPROVED		
APPROVED		
DATE		

V. DEFECTIVE/POOR CONDITION EQUIPMENT DESCRIPTIONS

(Note: See Figures 1 & 2 for location references.)

1. Motors - Line Shaft Guards For All Motors

Protective shaft guards are needed at the intermediate level below the motors.

2. Pumps - Dry Well Sump Pump Overhauling or Replacement with Larger Capacity Size

The sump pumps need inspection and overhauling. An increased pumping capacity should either be provided with the repaired pumps or with a larger capacity pump(s).

3. All Pumps - Repacking/Replacing Seals and Lubrication

All pumps should be properly repacked to avoid excessive seal leaking as is presently occurring.

4. Piping/Valving

A. Pumps No. 2 & 3 - Isolation Valves Added

Isolation knife gate type valves are needed in order to protect the pumps and afford equipment maintenance.

B. Pumps No. 1, 2 & 3 - Control Valves Overhauling

The existing APCO type butterfly valves for pumps 1 & 3 are unable to properly close. The valves should be overhauled and repaired as necessary. Pump No. 2 control valve should be overhauled as a preventive maintenance measure.

5. Control Systems

A. Motors 2 & 3 - Running Time Meters Added

Accumulative running time meters are needed in order to monitor equipment use.

B. Air Compressor - Back Up Unit Needed

A duplicate air compressor for pump operation is needed. This is a nominal expense item to provide important control back up.

6. Mechanical Systems

A. Overhead Hoist/Crane - Extension of Equipment

The overhead hoist and crane can be extended a few feet easterly within the station which would allow hoisting through openings from the dry well of some equipment items. This would avoid the present necessity to dismantle a motor/pump unit. Coordination of the crane rail extensions is needed with the installed equipment. Some electrical controls additions or adjustments would also be needed.

B. Dry Well - Floor Level Mechanical Jack-Transporter and Gantry Crane

A mechanically mobile floor level jack (with a portable gantry type crane) would enable some items to be retrieved via the overhead hoist/crane. This technique would hopefully serve to avoid the problems and expenses of motor/pump dismantling in some cases, along with the above recommendation to extend the overhead hoist/crane system.

7. Electrical Systems

A. All Gauges - Testing and Recalibration

All gauges and recorders should be tested and recalibrated.

B. All Equipment - Marking and Labeling

All equipment, including electrical controls, should be identified, labeled and marked with permanent vinyl type markings.

8. Power Supply and Distribution

A. Power Supply - Back Up Power Supply Switching or Dual Feed

A back up power supply for the station can be supplied via looped switching as defined by PNM.

VI. SAFETY HAZARDS/OSHA NON-COMPLIANCE DESCRIPTIONS

(Note: The following items were identified by City Safety Department and State of New Mexico Occupational Health and Safety Bureau personnel during inspections at the storm water pumping stations. See letters dated September 29, 1982; October 8, 1981; and October 26, 1981; from Mr. R. Brown NMEID-OSHA to Bovay Engineers, in the Appendix of this Report.)

1. Access Protection

A. Shaft guards for all motor line shafting at the intermediate level platform.

B. Ladders equipped with safety climb devices.

C. Addition of second ladder exit route from dry well with safety provisions. Split level where possible.

D. Extensions of all ladders to 42" above platform levels. Toeboards added around all platform accesses.

E. Intermediate railings added to all platforms.

F. Marking of all floor conduit with yellow warning paint.

VII. CORRECTIVE/REHABILITATIVE PRIORITY CATEGORIES WITH ASSOCIATED COST ESTIMATES

1. Priority Category One: Operator Safety; Critical Equipment Repair Work

	Cost Estimates City Maintenance	Cost Estimates Outside Contract	Key to Figures 1 & 2
A. Operator Safety Items:			
1. Access Protection:			
a. Motors Line Shaft Guards, at intermediate level		$ 2,250	1
b. Safety-Climb Devices (2) Added; split level ladder run modification in dry well		$ 600	2
c. Second Exit Ladder in dry well added with safety provisions		$ 2,000	3
d. Extension added to 2 ladders; toeboards added around platforms in dry well		$ 2,500	4
e. Intermediate Railways added at platforms in dry well		$ 1,725	5
f. Drywell Floor Conduit Yellow Safety Marking	$ 250		6

		Cost Estimates		Key to Figures
		City Maintenance	Outside Contract	1 & 2
B.	Critical Equipment Repairs:			
	1. All Pumps - Control Valves Repair/Overhauling		$ 15,000	7
	2. All Pumps - Replace seals and repacking		$ 2,500	7
	3. Pumps No. 2 & 3 - Isolation "Knife Gate" valves added to each discharge line		$ 18,000	8
	4. Sump Pumps - overhauling, renovating		$ 5,680	9
2.	Priority Category Two: Operator Safety; Equipment Modification/Renovations			
A.	All equipment markings, identification with vinyl type markings	$ 250		10
B.	All electrical gauges and recorders testing & recalibrations	$ 1,200		11
C.	Running Time Meters added for Motors 2 & 3		$ 1,000	12
D.	Back up duplicate air compressor for level/pump controls		$ 385	13

		Cost Estimates		Key to Figures
		City Maintenance	Outside Contract	1 & 2
E.	Overhead Hoist/Crane extension		$ 2,500	14
F.	Dry Well - Floor Level Mechanical Jack and Gantry Crane	$ 8,000		15
G.	Power Supply Back Up to Station		$ 15,000	16

VIII. CONCLUSIONS AND RECOMMENDATIONS

This study has attemped to identify and define the various deficiency related equipment, safety, mechanical, electrical and structural items in need of repairs and renovations. The emphasis has been towards a station functioning restorative concept as opposed to proposing major design/improvement related work.

The Bell/Commercial SE stormwater pumping station is approximately 10 years old and has apparently functioned quite well. Some problems have arisen and are in need of attention in order to maintain the past record of good performance here. City maintenance effort is not funded to levels needed to effect significant rehabilitative work.

Safety provision additions are items of emphasis here, along with preventive maintenance measures. No capacity related problems have been identified insofar as stormwater pumping is concerned. Equipment additions and modifications as recommended would serve to minimize future maintenance costs which will no doubt be necessary during the life cycle of the station.

IX. APPENDIX FOR THE BELL/COMMERCIAL STATION NO. 37

1. Photographs

2. Equipment information, nameplate data, etc.

3. Cost estimating records

4. Correspondence

5. Figures 1 & 2: Bell/Commercial Station No. 37, 50% reduction copes of previous engineering plans; rehabilitative/repair work items with numerical key are shown at appropriate locations.

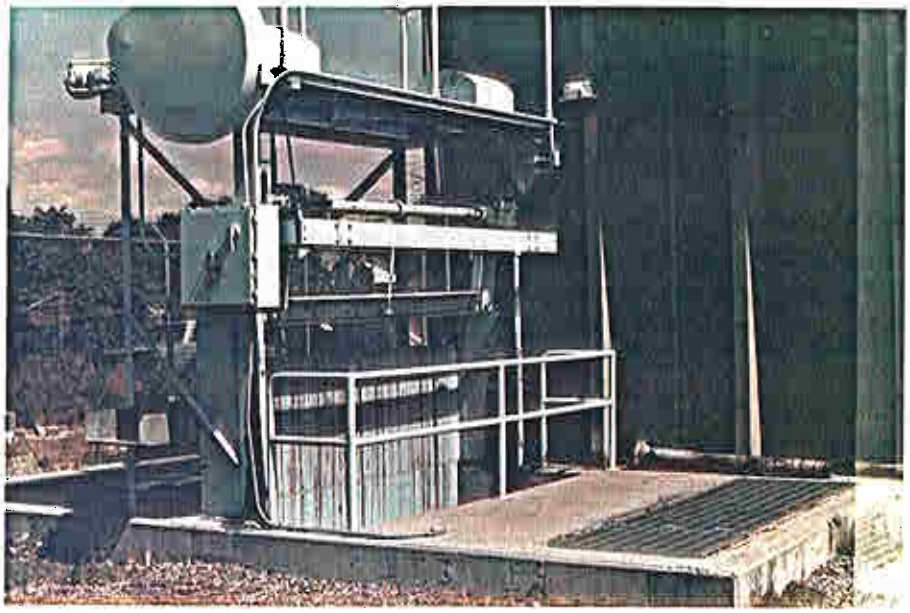


PHOTO NO. 1
VERTICALLY CLEANED, MECHANICAL BAR SCREEN AT ENTRANCE TO STATION.
(BELL & COMMERCIAL STATION NO. 37)

Bell/Commercial Station No. 37

EQUIPMENT DATA SHEET

1. LOCATION: Inside Building

2. EQUIPMENT: Pump/Motor Unit No. 1

3. DATA: Include as much as possible - nameplate, manufacturer, supplier, dates, tags, etc.:

1. Motor Nameplate Data: EM Ampli. Speed
Adjustable Speed Magnetic Drive
SN 172184831
Input Speed 705
Full Load 69 HP at 96% speed
Instr. Book 158 Frame MDS18
Electric Machinery Mfg. Co.
Minneapolis, Minn. 55413

Anti-friction Bearings:

Input End: Internal Rotor Bearing:
Size 6215
Quantity 0.7
Greading Internal Operating Hours 8800

Output End: External Bearing:
Size 7314
Quantity 1
Greasing Internal 8800 hrs.

Internal Bearing:
Size 6215
Quantity 0.7
Greasing Internal 8800 hrs.

2. Other Nameplate on Motor: 75 HP 3pH 60 Cy
KVAC Ser. 7209
Ins. Cl F Frame 445 HPH
40°C rise Model TBDP
Volts 230/440
Amps 200/100
EM SN 172184891
Motor Style 72C43644

Drive or Lower Bearing 70BC035PP3
Opp. Drive or Upper Brg. 65BC035PP3
Good for 5500 ft. alt.

EM Squirrel Cage Induction Motor
Westinghouse Electric Corporation

3. Pump No. 1 Nameplate: Size 18" 5710
GPM 10,000
RPM 695
Head 22'
SN 796118

Bell/Commercial Station No. 37

EQUIPMENT DATA SHEET

1. LOCATION: Inside Building

2. EQUIPMENT: Pump/Motor Unit No. 2

3. DATA: Include as much as possible - nameplate, manufacturer, supplier, dates, tags, etc.:

1. Motor Nameplate: Fairbanks Morse Induction Motor
Chicago, Illinois
Frame IV-12½ HP 250
FL RPM 439 3pH 60 Cy
V 4160 Amps 34.9 40°C
SN B3145 Type QZKU
Ser. Factor 1.15 Duty 24 hrs.
Code E

2. Pump Nameplate: Fairbanks Morse 30" 5710
GPM 25,000 RPM 435 Head 30'
SN 796195

Bell/Commercial Station No. 37

EQUIPMENT DATA SHEET

1. LOCATION: Inside Building

2. EQUIPMENT: Pump/Motor Unit No. 3

3. DATA: Include as much as possible - nameplate, manufacturer, supplier, dates, tags, etc.:

1. Motor Nameplate: Fairbanks Morse SN B3144
Type QZKU Frame IV-20
HP 600 FL RPM 502
3pH 60 Cy 4160 V
SF 1.15 A 78
Duty 24 hrs. 40°C rise Code D

2. Pump Nameplate: Fairbanks Morse Size 30"
GPM 40,000 RPM 495
Head 45' SN 796237

Bell/Commercial Station No. 37

EQUIPMENT DATA SHEET

1. LOCATION: Dry Well at Pump Discharge Pipes

2. EQUIPMENT: 3 Way APCO Control Valve

3. DATA: Include as much as possible - nameplate, manufacturer, supplier, dates, tags, etc.:

Pump No. 2 & 3 Nameplate Data: APCO Control Valve
30" 150 LB. Class
Chicago, Illinois

(Pump #1 is same type, but no visible nameplate exists.)

All air gages indicate 80 to 90 psi normal on valves.
All valves have electrical conduit feed for operation.

Bell/Commercial Station No. 37

EQUIPMENT DATA SHEET

1. LOCATION: Inside Building

2. EQUIPMENT: Electrical Switch Gear

3. DATA: Include as much as possible - nameplate, manufacturer, supplier, dates, tags, etc.:

E-M Auto Control for Squirrel Cage
Induction Motor
SN 4-72-1848-22
Contin. Duty Size MCP4
120 v
Instr. 75
Motor HP 480
Line Volts 97
3 pH 60 Cy

Bell/Commercial Station No. 37

EQUIPMENT DATA SHEET

1. LOCATION: Inside Building

2. EQUIPMENT: Overhead Hoist/Crane System

3. DATA: Include as much as possible - nameplate, manufacturer, supplier, dates, tags, etc.:

Nameplate Data: Stewart Engineering & Equipment Co.
Richardson, Texas
SN B-1009
Cap 5 tons

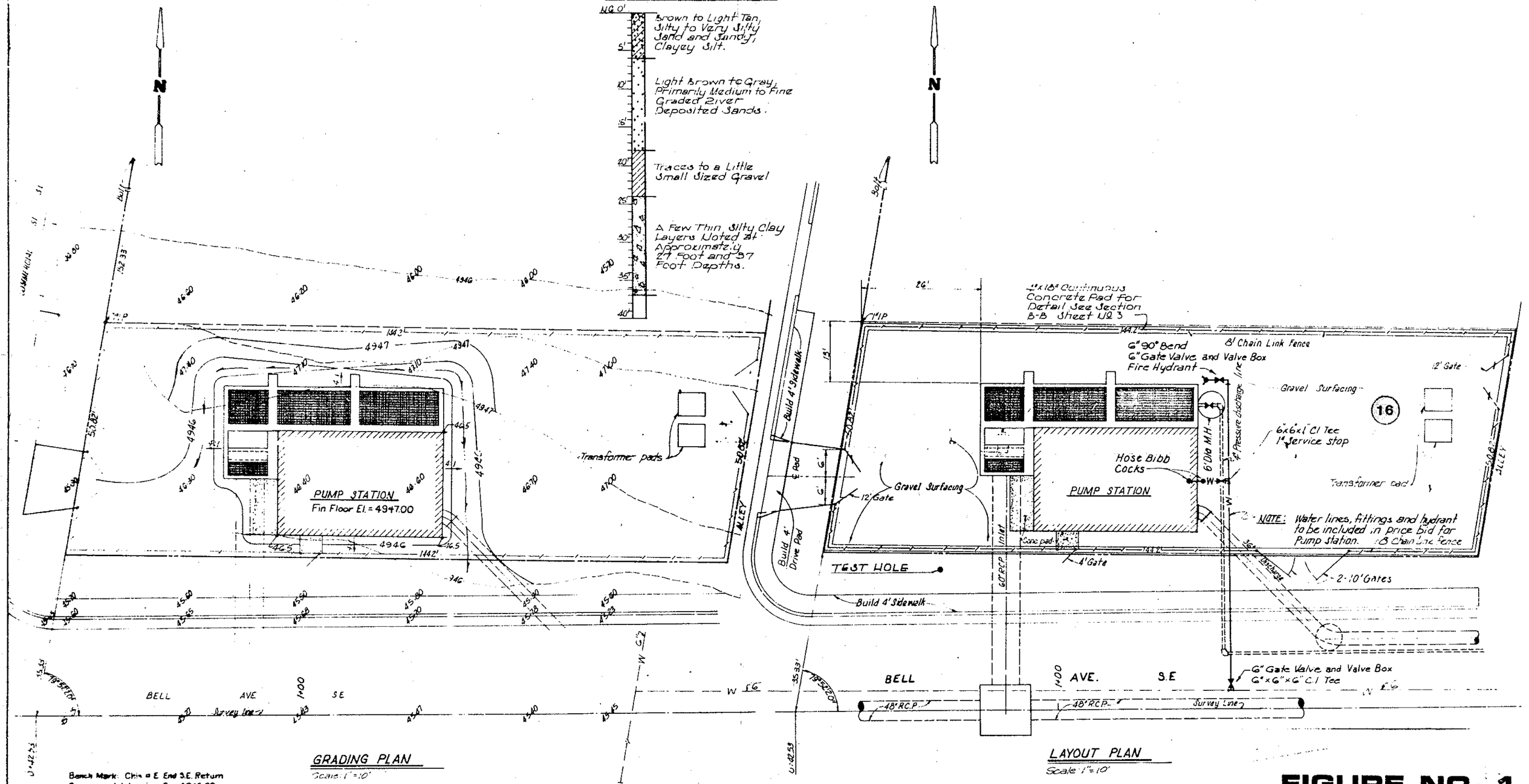
Note: Company has changed name to "Stewart Systems"
Phone No. - (214) 422-5809
Dallas, Texas

KEY TO FIGURES 1 & 2
BELL/COMMERCIAL STATION NO. 37

Rehabilitation/Repair Items List at Locations Shown on Figurs 1 & 2:

1. All motors line shaft protective guards at intermediate level.
2. Safety-climb devices added; split level ladder run modification.
3. Second dry well exit ladder added with safety provisions.
4. Extension added to ladders; toeboards additions to platforms.
5. Intermediate railings added at platforms.
6. Floor conduit yellow safety painting/marking.
7. All pumps - control valves repair/overhauls, replace seals/repacking.
8. Pumps 2 & 3 - isolation valves added (knife gate valves).
9. Sump pumps - overhauling/renovating.
10. All equipment markings, identification with vinyl markers.
11. All gauges/recorders testing/recalibrating.
12. Running time meters added for motors 2 & 3.
13. Back up duplicate air compressor.
14. Overhead hoists/crane extension
15. Dry well - floor level mechanical jack and gantry crane.
16. Power supply back up to station.

BORING LOG-TEST HOLE



Bench Mark: Chis a E. End S.E. Return
Commercial & Lewis El. = 4946.20

GRADING PLAN
Scale 1" = 10'

LAYOUT PLAN
Scale 1" = 10'

FIGURE NO. 1

April 25, 1977

FOR BELL/COMMERCIAL STA. NO. 37

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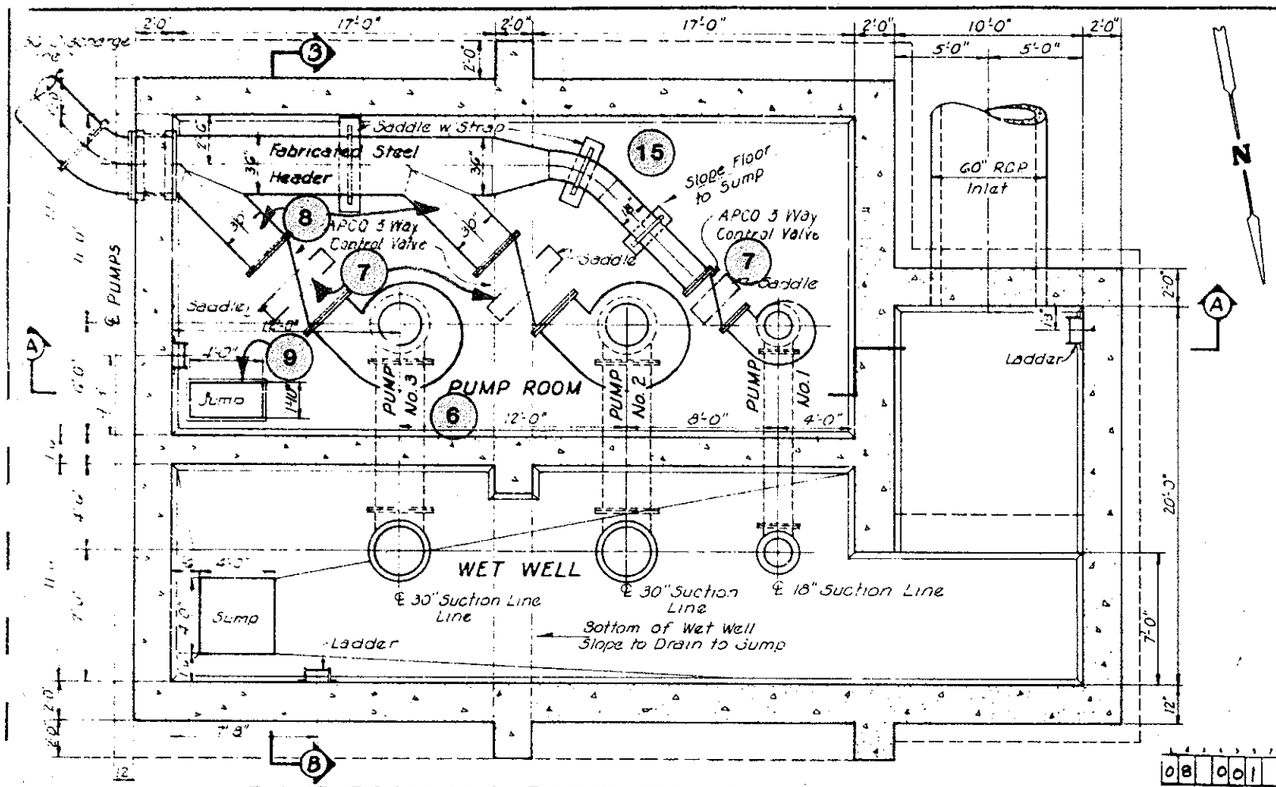
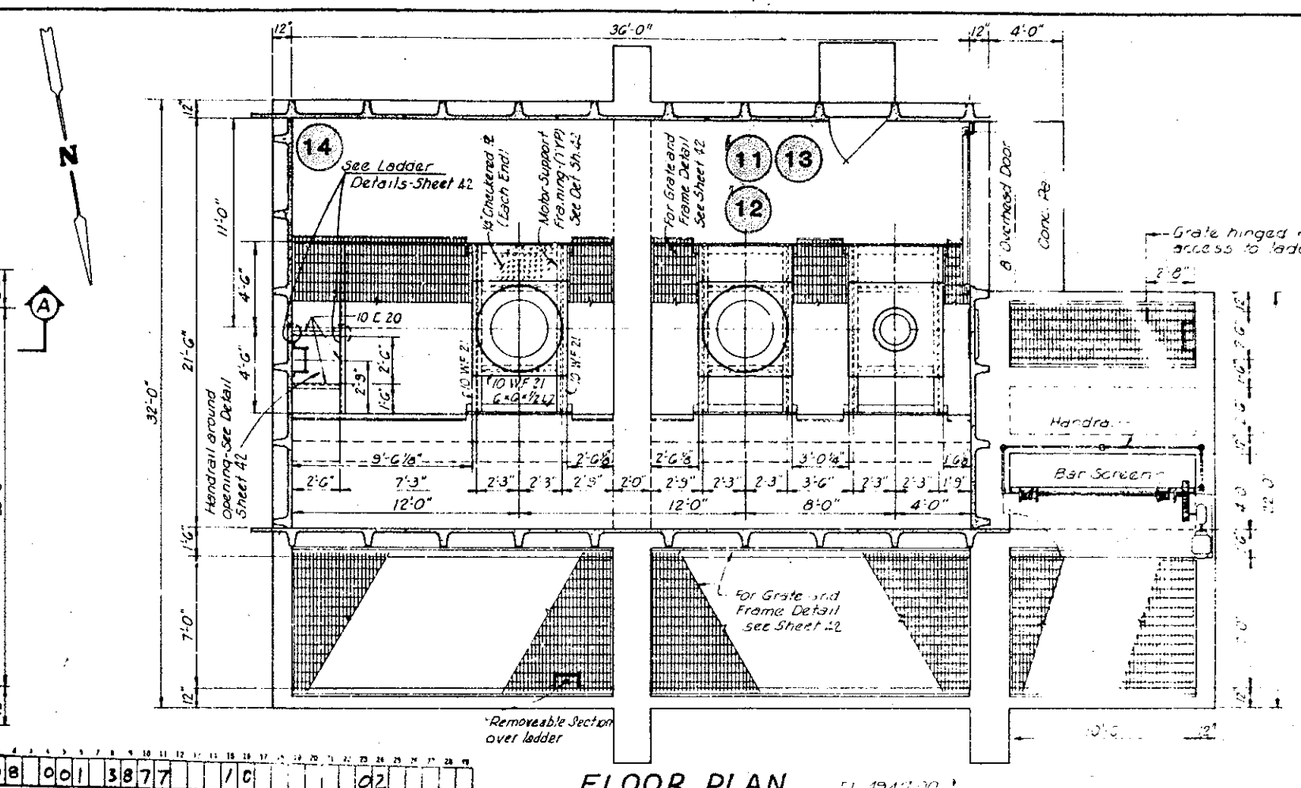
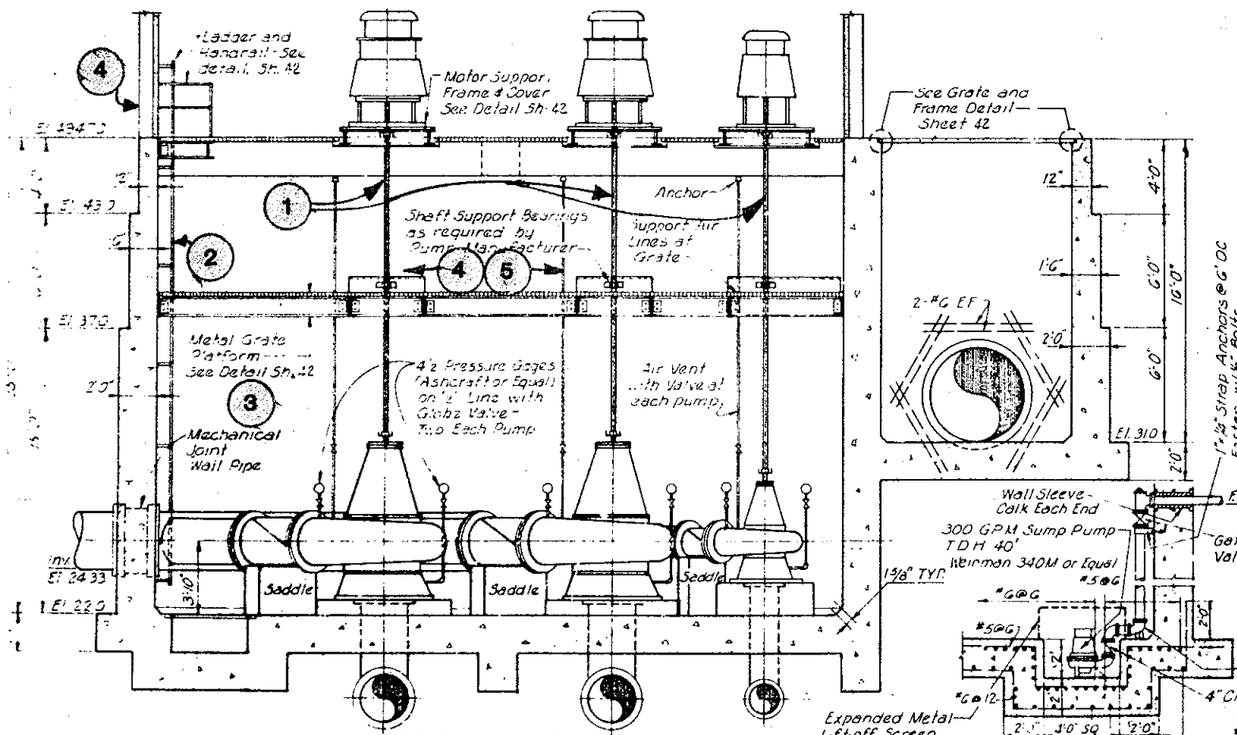


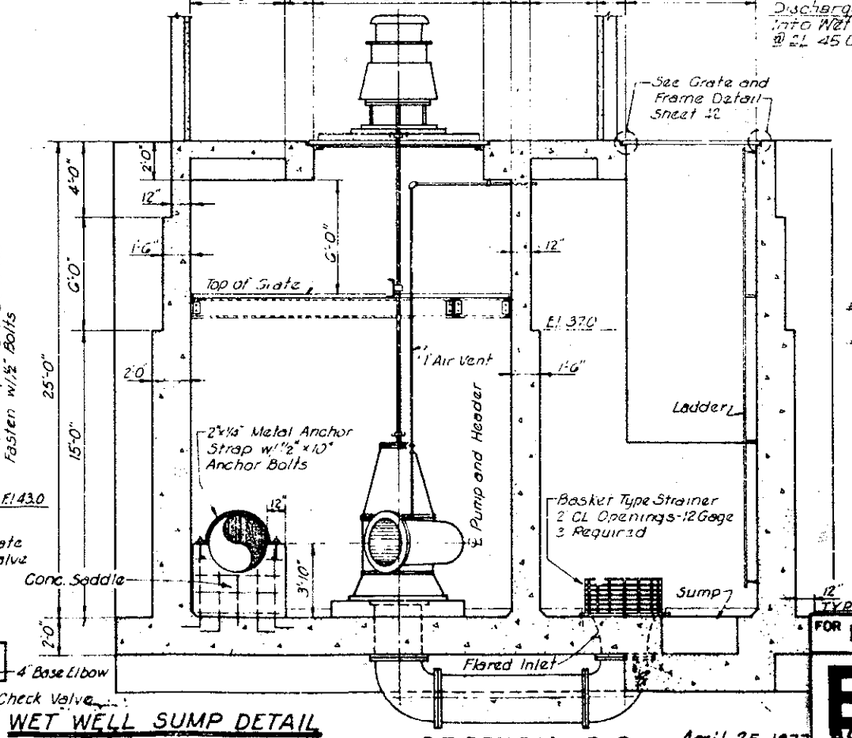
PUMP ROOM AND FOUNDATION PLAN - SECTION C-C



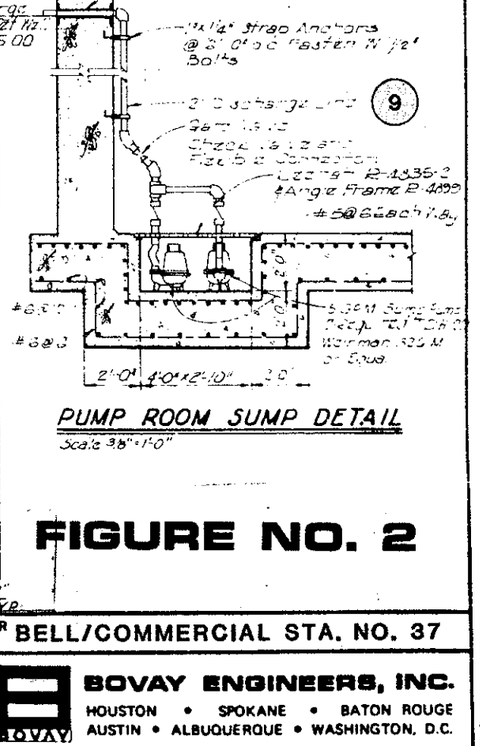
FLOOR PLAN



SECTION A-A



SECTION B-B



PUMP ROOM SUMP DETAIL

Scale 3/8"=1'-0"

WET WELL SUMP DETAIL

Scale 1/4"=1'-0"

FIGURE NO. 2

FOR BELL/COMMERCIAL STA. NO. 37

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April 25, 1977