

PLAN VIEW @ GRADE

- NOTES TO DESIGN ENGINEER:**
- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
  - B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).
  - C. LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
  - D. DESIGN ENGINEER TO VERIFY THE SIZE AND LOCATION OF THE WET WELL HATCHES ACCORDING TO THE HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
  - E. THE ACTUAL LOCATION OF THE WET WELL VENTING MAY VARY ACCORDING TO SITE REQUIREMENTS. WHERE POSSIBLE, LOCATE ON THE NORTHWEST SIDE OF THE WET WELL.
  - F. REPLACE THE 90° ELBOW WITH A FLANGED TEE FOR CONNECTION TO SURGE RELIEF VALVE, IF REQUIRED. SEE DETAILS, SHEET ZOC06.
  - G. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - H. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
  - J. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
  - K. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

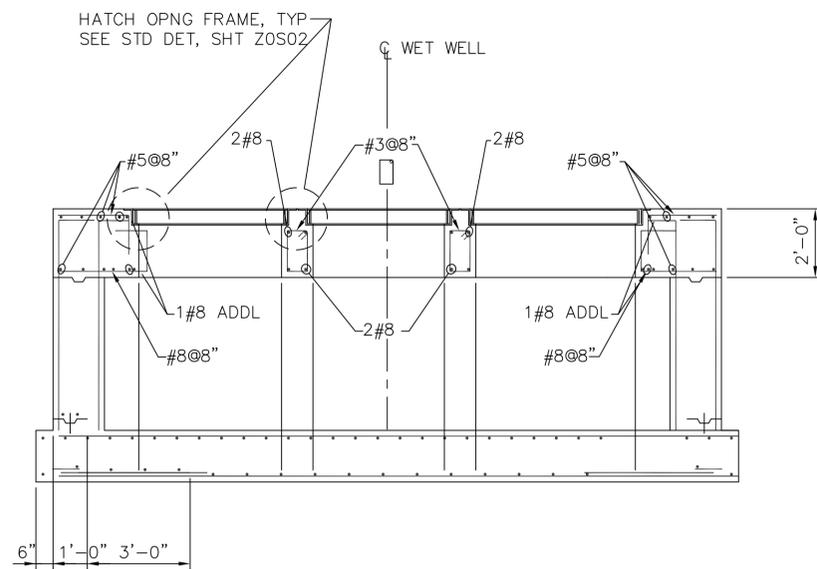
- NOTES:**
1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  2. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
  3. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
  4. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.

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|--|---------------------------|
| <b>PLAN VIEW @ GRADE</b>   |                           |
| 3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE HIGH PROFILE CONFIGURATION                                       |                           |
| PROJECT NO. R-0267-02-2  |                           |
| TITLE<br>CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS                           |                           |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                           |
| APPROVALS  |                           |
| WATER DESIGN   | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN   | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |
| OTHER REVIEWS  |                           |
| PLANNING AND DEVELOPMENT   |                           |
| CITY ENGINEER  | DATE                      |
| SCALE: NOT TO SCALE  | DESIGNED BY:              |
| SUBMITTED:   | DRAWN BY:                 |
| DATE: DECEMBER, 1996   | SHEET NO. OF SHEETS       |
| SURVEY BY:   | DWG. NO. F1C01            |
| FIELD BOOK NO.   |                           |

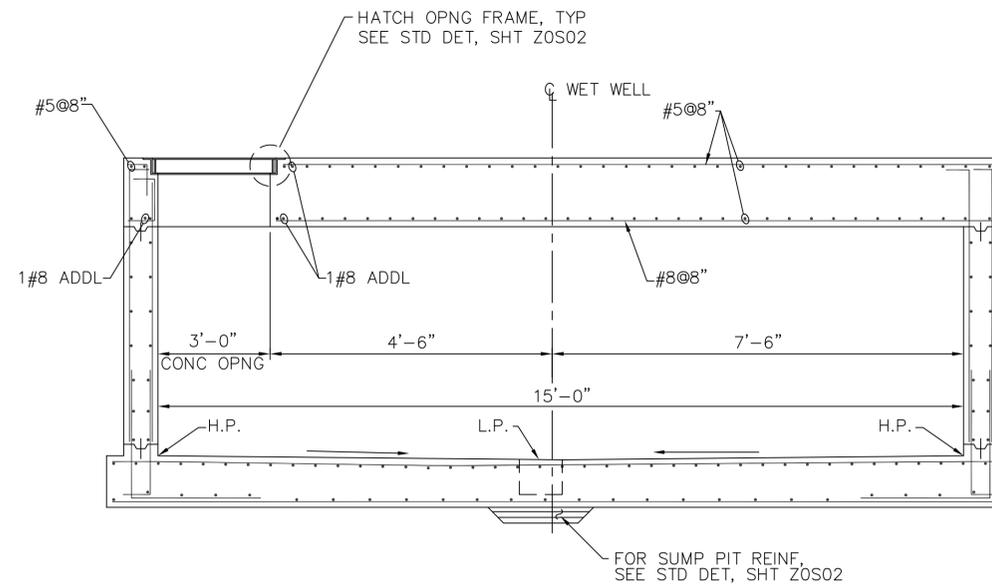
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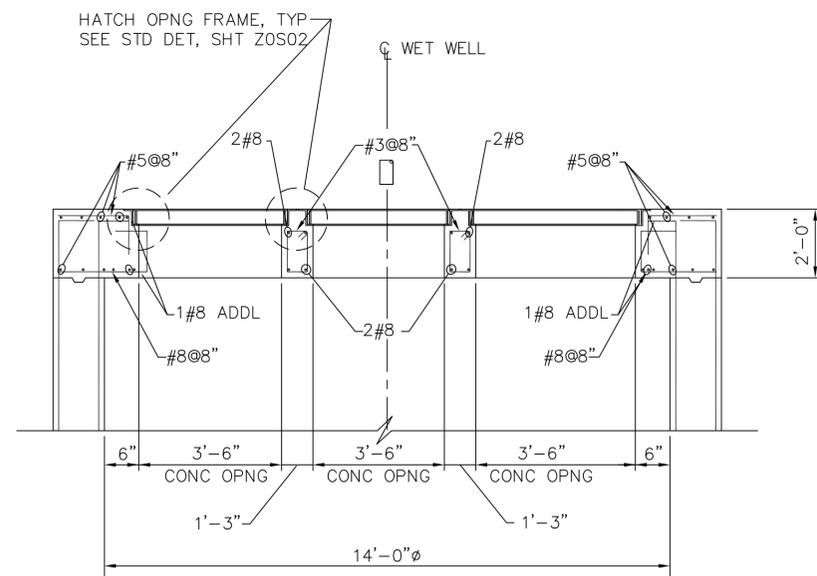
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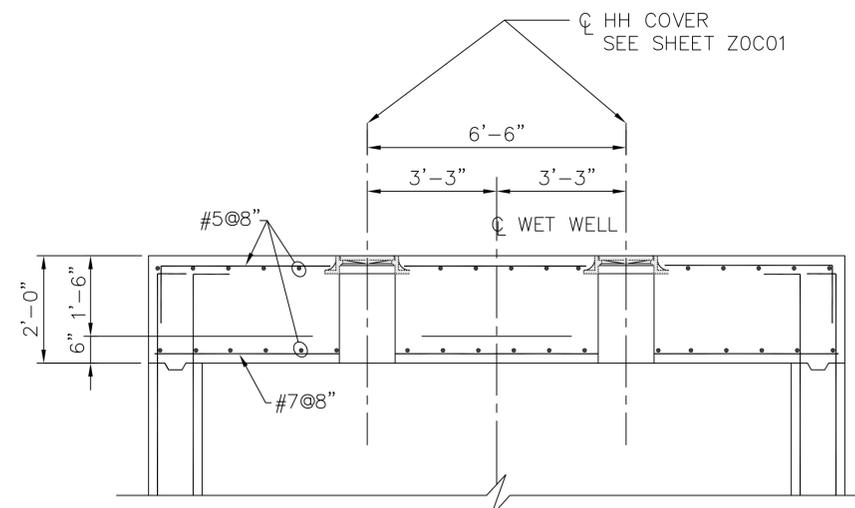
SECTION B  
F3S01



SECTION C  
F3S01



SECTION D  
F3S01



SECTION E  
F3S01

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
- C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
2. CONTRACTOR TO CONFIRM THE SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
3. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

STRUCTURAL  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
ALTERNATE LOW PROFILE CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN TRAFFIC AND SIGNAL DESIGN

STORM SEWER DESIGN STREET, BRIDGE & R.O.W.

WASTEWATER DESIGN CONSTRUCTION

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER DATE

SCALE: NOT TO SCALE DESIGNED BY:

SUBMITTED: DRAWN BY:

DATE: NOVEMBER, 1996 SHEET NO. OF SHEETS

SURVEY BY: DWG. NO.

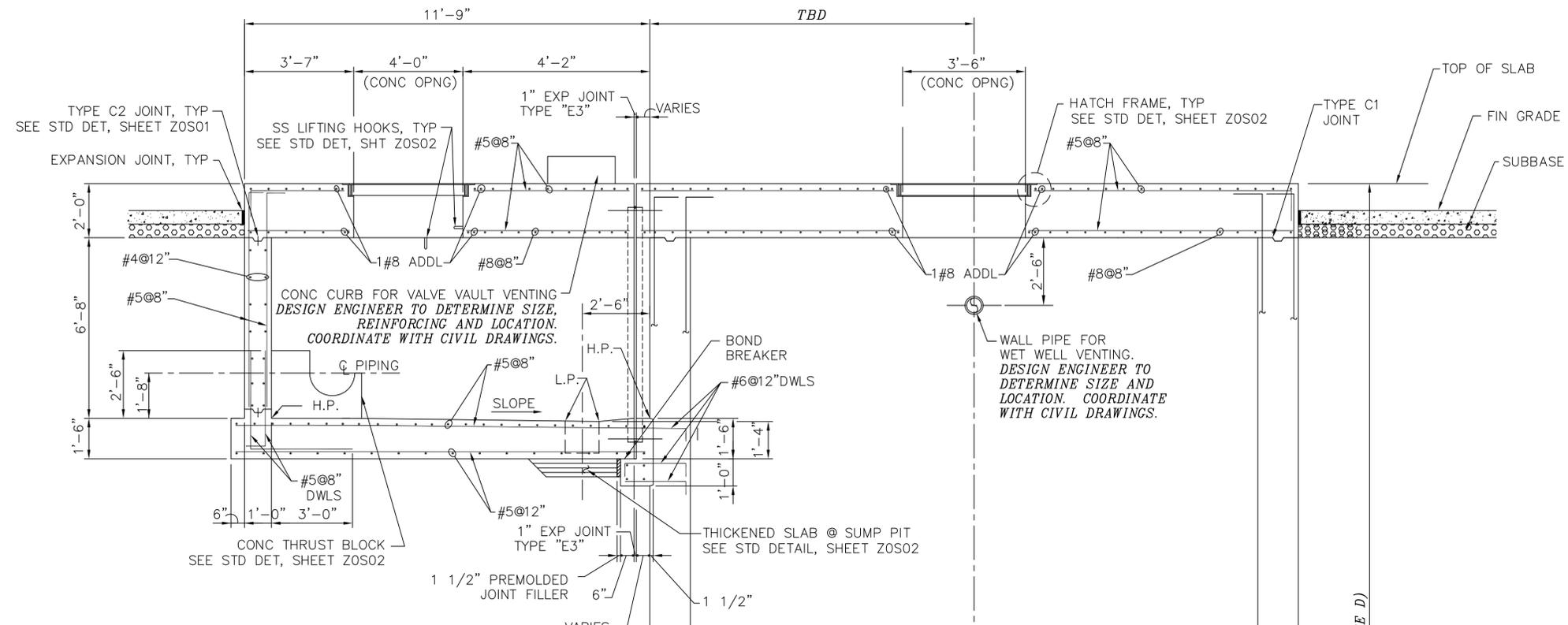
FIELD BOOK NO. F3S04

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F3S04.DWG

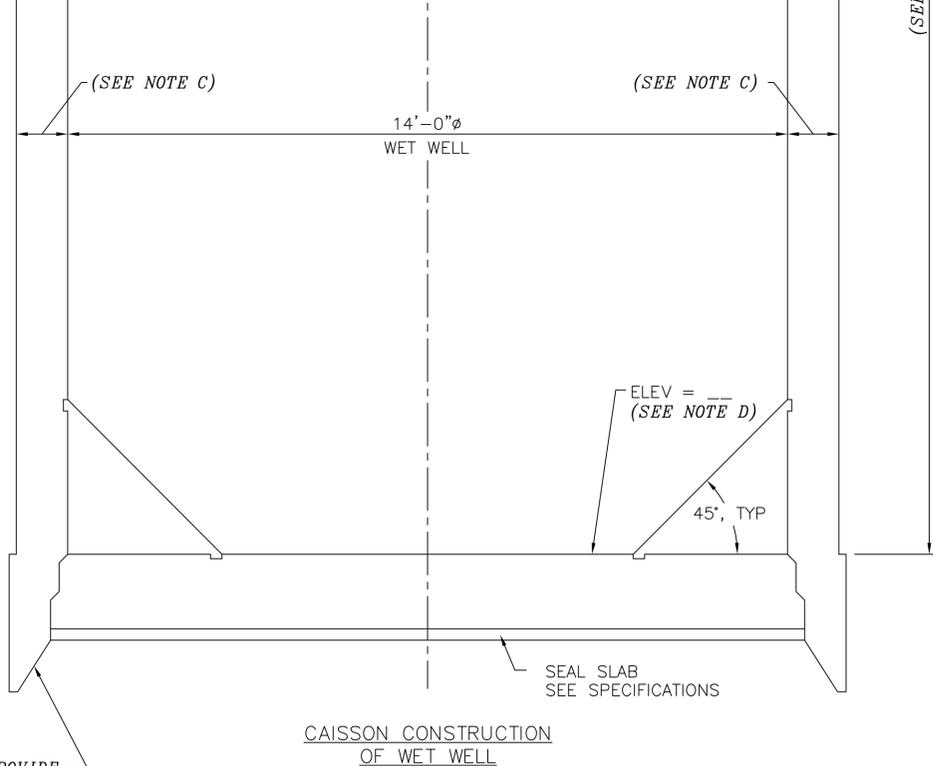
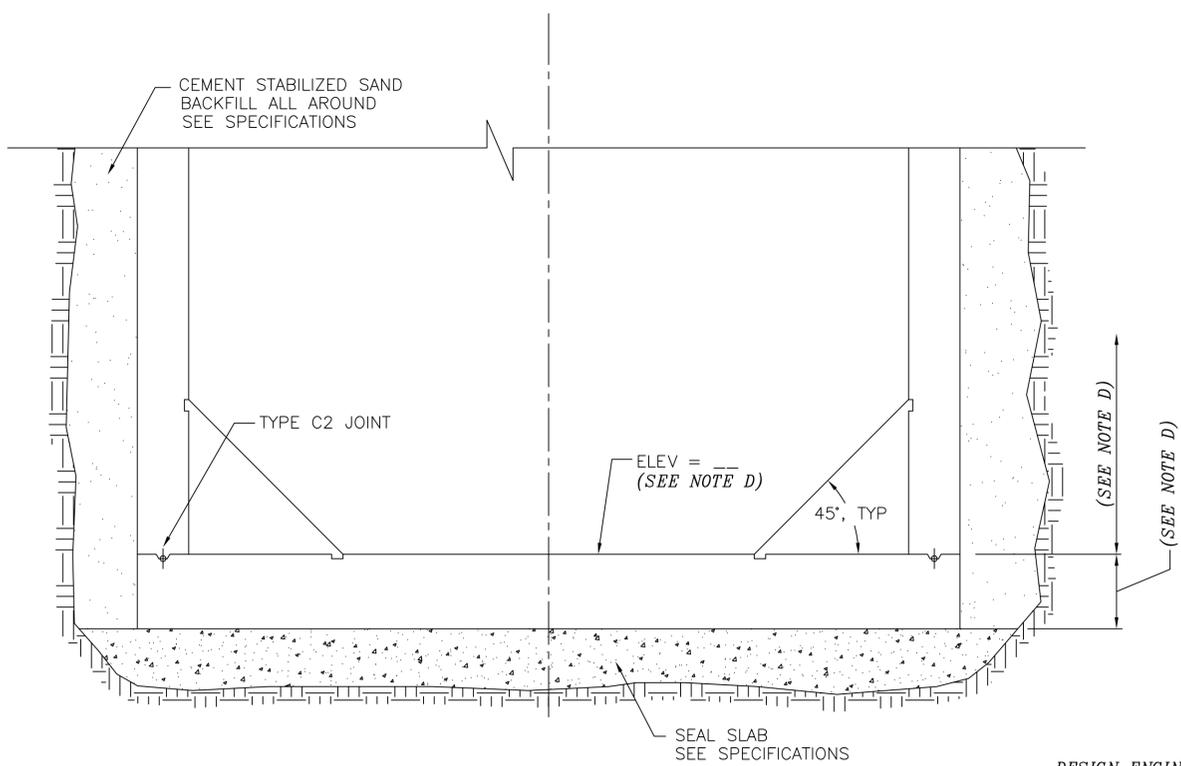
COHSTD.BDR 0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| REV. NO. | DESCRIPTION | APP'D | DATE |
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  - DIMENSIONS, ELEVATIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.
  - SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - DESIGN ENGINEER TO PROVIDE WET WELL DESIGN FOR BOTH OPEN-CUT AND CAISSON CONSTRUCTION WHERE SPECIFIC PROJECT REQUIREMENTS ALLOW FOR EITHER TYPE OF CONSTRUCTION.
  - THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
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- NOTES:**
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  - CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
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  - WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.



DESIGN ENGINEER TO PROVIDE CAISSON BASE DESIGN, SEE TYP BASE DETAIL, SHEET ZOS01

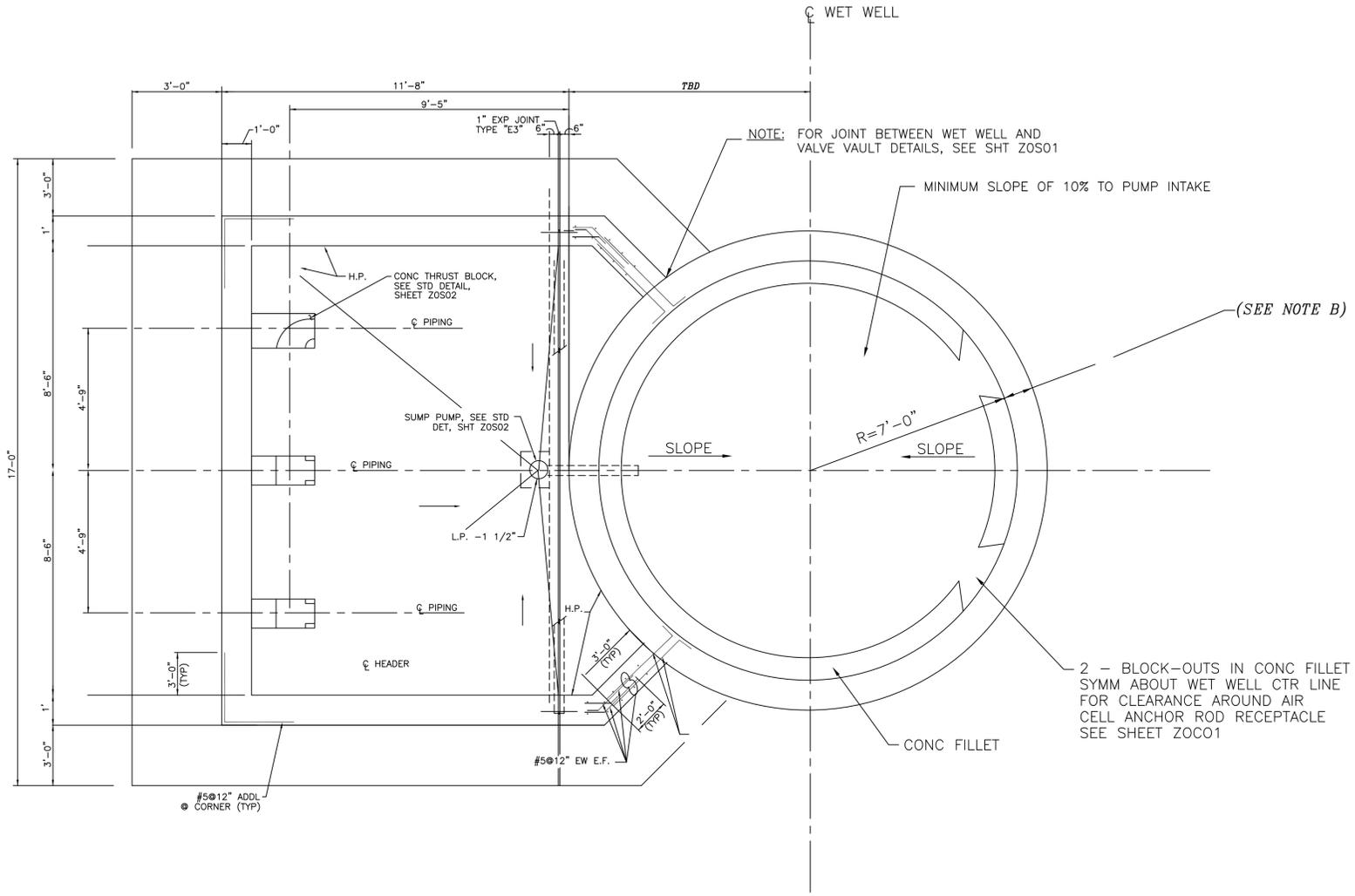
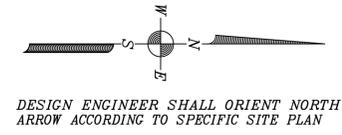
CAISSON CONSTRUCTION OF WET WELL SEE NOTE E

OPEN-CUT CONSTRUCTION OF WET WELL SEE NOTE E

SECTION A F3S01

|   |                           |
|---|---------------------------|
| <b>STRUCTURAL</b>   |                           |
| 3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE LOW PROFILE CONFIGURATION   |                           |
| PROJECT NO. R-0267-02-2   |                           |
| CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS   |                           |
| <b>CITY OF HOUSTON</b><br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                           |
| APPROVALS   |                           |
| WATER DESIGN  | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN  | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN   | CONSTRUCTION              |
| OTHER REVIEWS   |                           |
| PLANNING AND DEVELOPMENT  |                           |
| CITY ENGINEER   | DATE                      |
| SCALE: NOT TO SCALE   | DESIGNED BY:              |
| SUBMITTED:  | DRAWN BY:                 |
| DATE: NOVEMBER, 1996  | SHEET NO. OF SHEETS       |
| SURVEY BY:  | DWG. NO. F3S03            |
| REV. NO.  | DESCRIPTION               |
| APP'D   | DATE                      |
| FIELD BOOK NO.  |                           |

CADD DWG. FILE NO. : F3S03.DWG



PLAN VIEW @ VAULT FLOOR

**NOTES TO DESIGN ENGINEER:**

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B. DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.

C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

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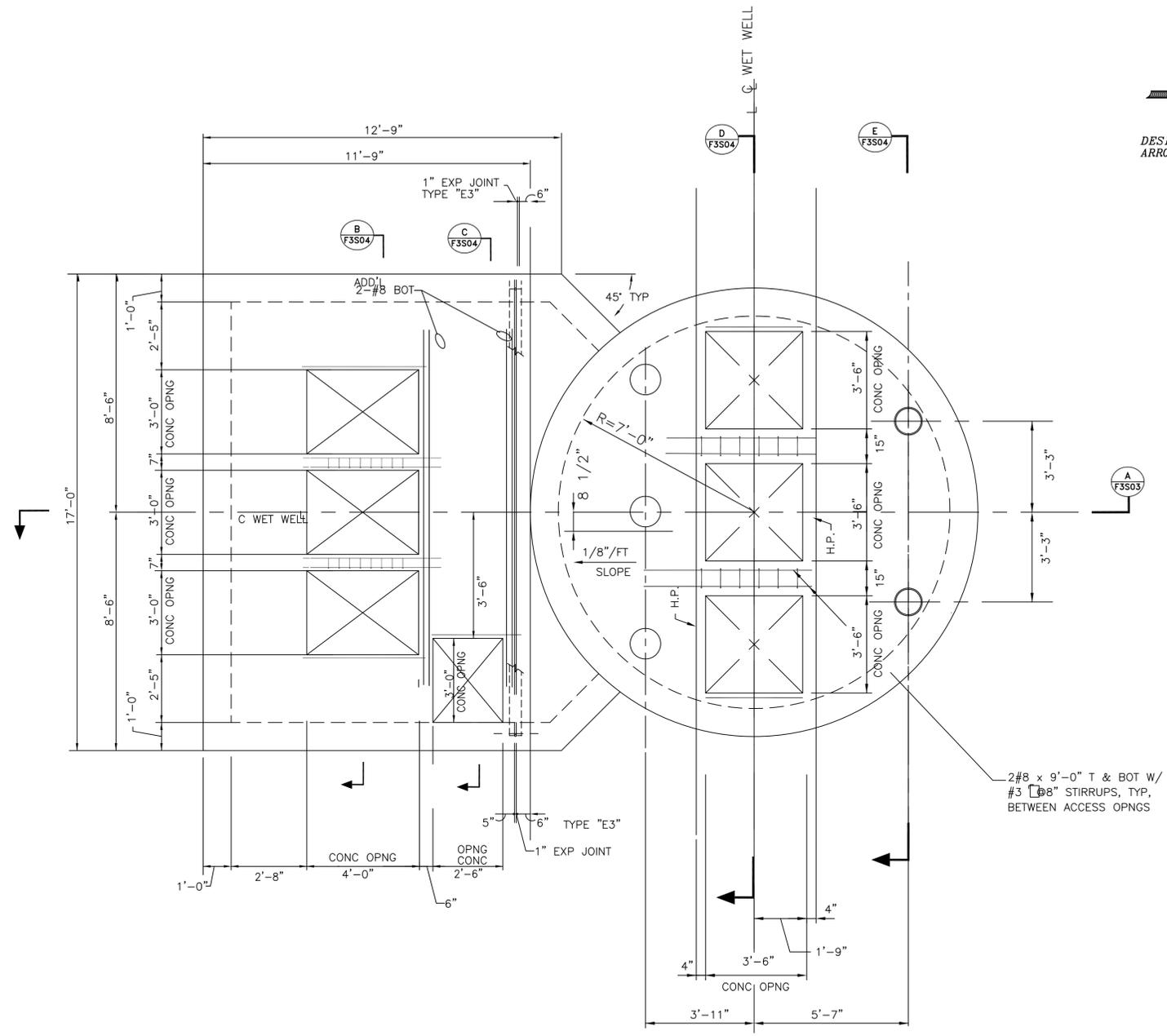
- NOTES:**
- FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
  - DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
  - SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

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|---|---------------------------|
| <b>STRUCTURAL</b>   |                           |
| 3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE LOW PROFILE CONFIGURATION   |                           |
| PROJECT NO. R-0267-02-2   |                           |
| TITLE<br>CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS                                  |                           |
| <b>CITY OF HOUSTON</b><br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                           |
| APPROVALS   |                           |
| WATER DESIGN  | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN  | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN   | CONSTRUCTION              |
| OTHER REVIEWS   |                           |
| PLANNING AND DEVELOPMENT  |                           |
| CITY ENGINEER   | DATE                      |
| SCALE: NOT TO SCALE   | DESIGNED BY:              |
| SUBMITTED:  | DRAWN BY:                 |
| DATE: NOVEMBER, 1996  | SHEET NO. OF SHEETS       |
| SURVEY BY:  | DWG. NO. F3S02            |
| FIELD BOOK NO.  |                           |

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DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN

PLAN VIEW @ GRADE

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  - THE DESIGN ENGINEER SHALL ENSURE GUARDRAIL AND CATWALK MEET THE REQUIREMENTS FOR "AREAS NOT OPEN TO PUBLIC" AS PROVIDED BY THE U.S. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) AND LATEST CODE ENFORCEMENT APPROVED VERSION OF THE INTERNATIONAL BUILDING CODE (IBC).
  - THE DESIGNER ENGINEER SHALL PROVIDE GUARDRAILS FOR ANY WALKING SURFACES WITH A POTENTIAL FALL DISTANCE EQUAL TO OR GREATER THAN 30 INCHES.

- NOTES:**
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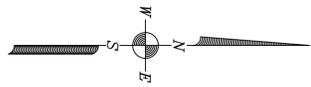
**STRUCTURAL**  
**3 PUMPS @ 1000 - 1399 GPM PER PUMP**  
**ALTERNATE LOW PROFILE CONFIGURATION**  
 PROJECT NO. R-0267-02-2  
 TITLE CITY OF HOUSTON  
 DESIGN GUIDELINE DRAWINGS  
 FOR SUBMERSIBLE LIFT STATIONS  
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

| APPROVALS                |                           |
|--------------------------|---------------------------|
| WATER DESIGN             | TRAFFIC AND SIGNAL DESIGN |
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| CITY ENGINEER            | DATE                      |
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| DATE: NOVEMBER, 1996     | SHEET NO. OF SHEETS       |
| SURVEY BY:               | DWG. NO.                  |
| FIELD BOOK NO.           | F3S01                     |

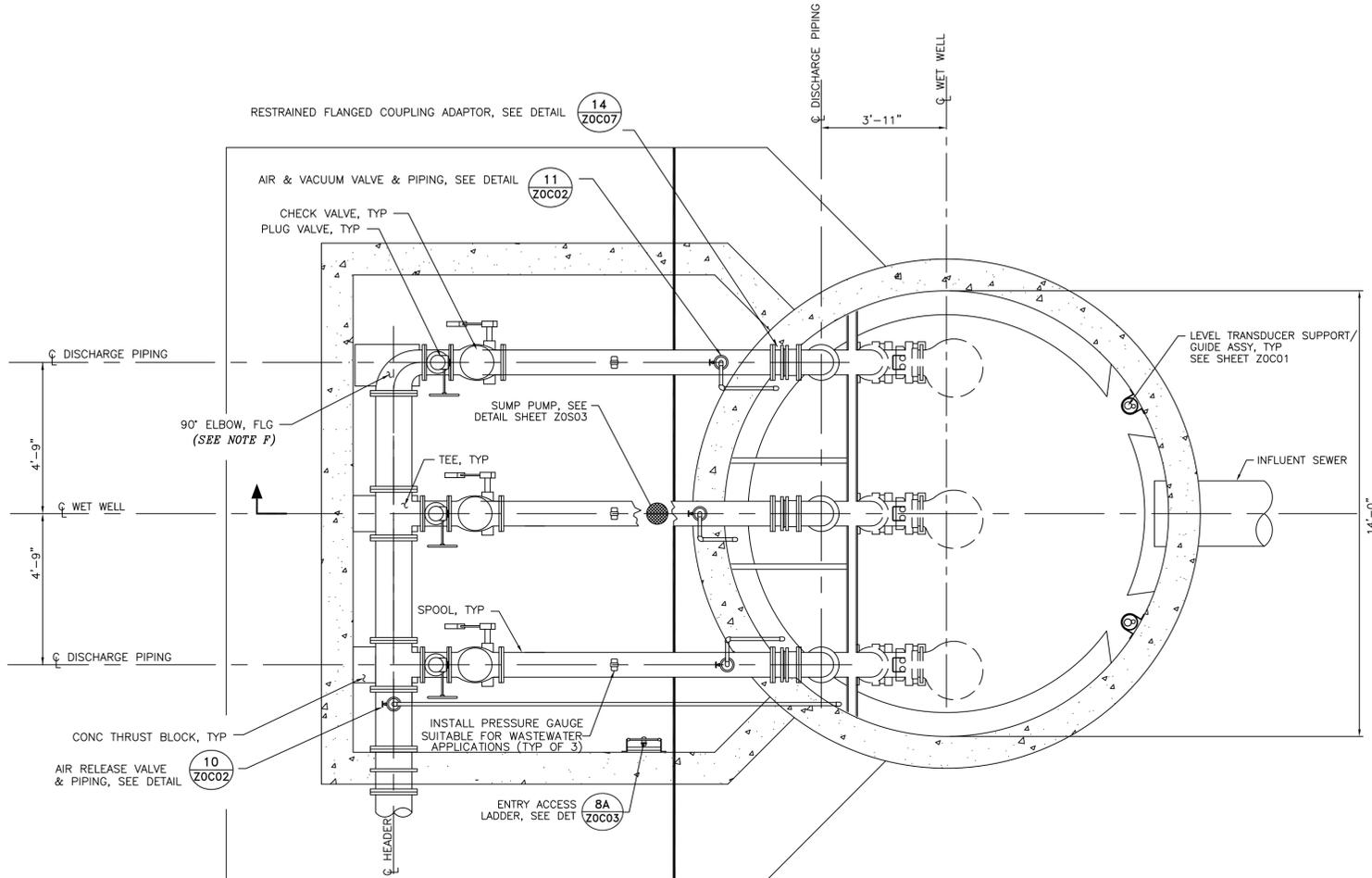
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DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN



SECTION **B**  
F3C02

- NOTES TO DESIGN ENGINEER:**
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  - B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).
  - C. LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
  - D. REPLACE THE 90° ELBOW WITH A FLANGED TEE FOR CONNECTION TO SURGE RELIEF VALVE, IF REQUIRED. SEE DETAILS, SHEET ZOC06.
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  3. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
  4. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
  5. SLEEVED OR CORED DISCHARGE PIPE OPENINGS SHALL BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.

BASE SECTION  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
ALTERNATE LOW PROFILE CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

|                    |                           |
|--------------------|---------------------------|
| WATER DESIGN       | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |

OTHER REVIEWS

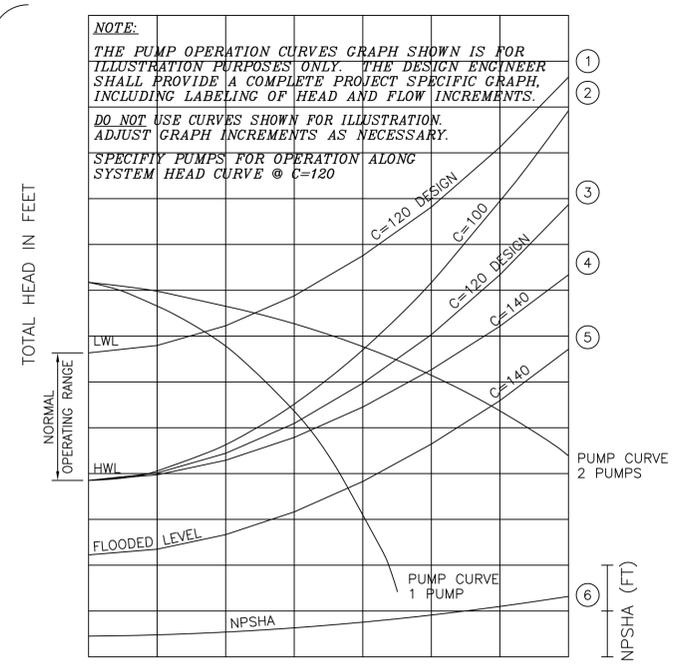
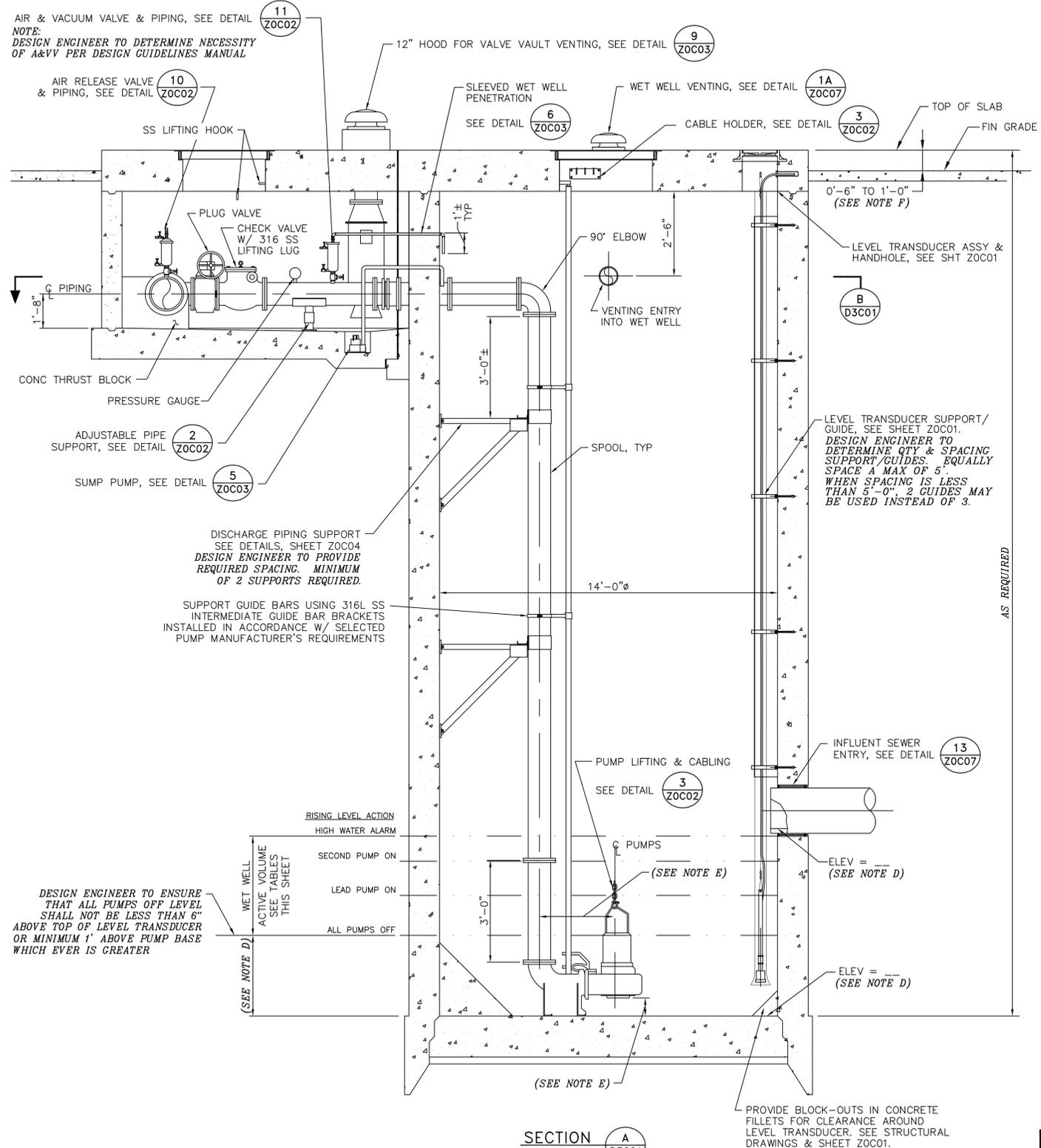
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| PLANNING AND DEVELOPMENT |      |
| CITY ENGINEER            | DATE |

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| SCALE: NOT TO SCALE  | DESIGNED BY:        |
| SUBMITTED:           | DRAWN BY:           |
| DATE: DECEMBER, 1996 | SHEET NO. OF SHEETS |
| SURVEY BY:           | DWG. NO. F3C03      |
| FIELD BOOK NO.       |                     |

| REV. NO. | DESCRIPTION | APP'D | DATE |
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SEAL

CADD DWG. FILE NO. : F3C03.DWG



**PUMP OPERATION CURVES**

PUMP CURVE NOTES:

1. LOW NORMAL OPERATING LEVEL C=120 - DESIGN.
2. HIGH NORMAL OPERATING LEVEL C=100 - INFORMATION ONLY (TCEQ)
3. HIGH NORMAL OPERATING LEVEL C=120 - DESIGN
4. HIGH NORMAL OPERATING LEVEL C=140 - INFORMATION ONLY
5. EMERGENCY FLOODED OPERATING LEVEL C=140 - MAXIMUM DISCHARGE
6. NET POSITIVE SUCTION HEAD AVAILABLE (NPSHA) BASED ON NORMAL OPERATING WATER LEVELS
7. PUMP CURVES ARE MODIFIED FOR STATION LOSSES.

**PUMP DATA TABLE**

| PUMP CHARACTERISTICS | PUMP NO. 1 | PUMP NO. 2 | PUMP NO. 3 |
|----------------------|------------|------------|------------|
| MOTOR DATA           |            |            |            |
| NOMINAL SIZE (HP)    |            |            |            |
| MAX SPEED (RPM)      |            |            |            |
| SOLIDS PASSAGE       |            |            |            |
| MIN SPHERE (IN)      |            |            |            |
| CAPACITY (GPM)       |            |            |            |
| DESIGN RUNOUT        |            |            |            |
| DISCHARGE HEAD (FT)  |            |            |            |
| DESIGN RUNOUT        |            |            |            |
| SHUT OFF             |            |            |            |
| EFFICIENCY (%)       |            |            |            |
| DESIGN               |            |            |            |
| NPSHR (FT)           |            |            |            |
| DESIGN               |            |            |            |
| RUNOUT               |            |            |            |
| PUMP CYCLE TIME      |            |            |            |

**STATION OPERATION TABLES**

| RISING LEVEL CYCLE    |                             |  |
|-----------------------|-----------------------------|--|
| WATER LEVEL ELEVATION | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | PUMPS OFF LEVEL - NO ACTION | ALL PUMPS ARE OFF                                      |
|                       | LEAD PUMP TURNS ON          | LEAD PUMP ON   |
|                       | SECOND PUMP TURNS ON        | LEAD & SECOND PUMPS ON                                 |
|                       | HIGH WATER ALARM ON         | HIGH WATER ALARM SOUND                                 |
| FALLING LEVEL CYCLE   |                             |  |
| WATER LEVEL           | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | HIGH WATER LEVEL ALARM OFF  | LEAD & SECOND PUMPS ON                                 |
|                       | LEAD PUMP TURNS OFF         | SECOND PUMP ON   |
|                       | SECOND PUMP TURNS OFF       | ALL PUMPS STOPPED - STANDBY PUMP SWITCHES TO LEAD PUMP |

**NOTES TO DESIGN ENGINEER:**

- THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).
- LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
- ELEVATIONS AND INFORMATION OMITTED ARE DETERMINED BY DESIGN ENGINEER FOR SPECIFIC SITE REQUIREMENTS.
- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY. DESIGN ENGINEER SHALL PROVIDE RAISED PUMP BASE IF REQUIRED.
- WHERE FLOOD PLAIN CONDITIONS REQUIRE THE TOP SLAB TO BE GREATER THAN 1'-0" ABOVE FINISHED GRADE, DESIGN ENGINEER SHALL PROVIDE CONCRETE STAIRS.
- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

**NOTES:**

- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- PUMP ANCHOR BOLTS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLTS AND PATTERN, INCLUDING CALCULATIONS, DURING SHOP DRAWING SUBMISSION.
- CONTRACTOR TO PROVIDE ADHESIVE ANCHORS IN LIEU OF WEDGE ANCHORS FOR ALL SUBMERGED CONDITIONS, AND SUBMIT DESIGN OF ANCHOR BOLTS DURING SHOP DRAWING SUBMISSION.
- ALL PIPING IN THE WET WELL SHALL BE FLANGED, NO FLANGED COUPLING ADAPTORS, OR VICTAULIC STYLE COUPLINGS SHALL BE PERMITTED INSIDE THE WET WELL.

**ELEVATION SECTION**  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
ALTERNATE HIGH PROFILE CONFIGURATION

PROJECT NO. R-0267-02-2  
TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

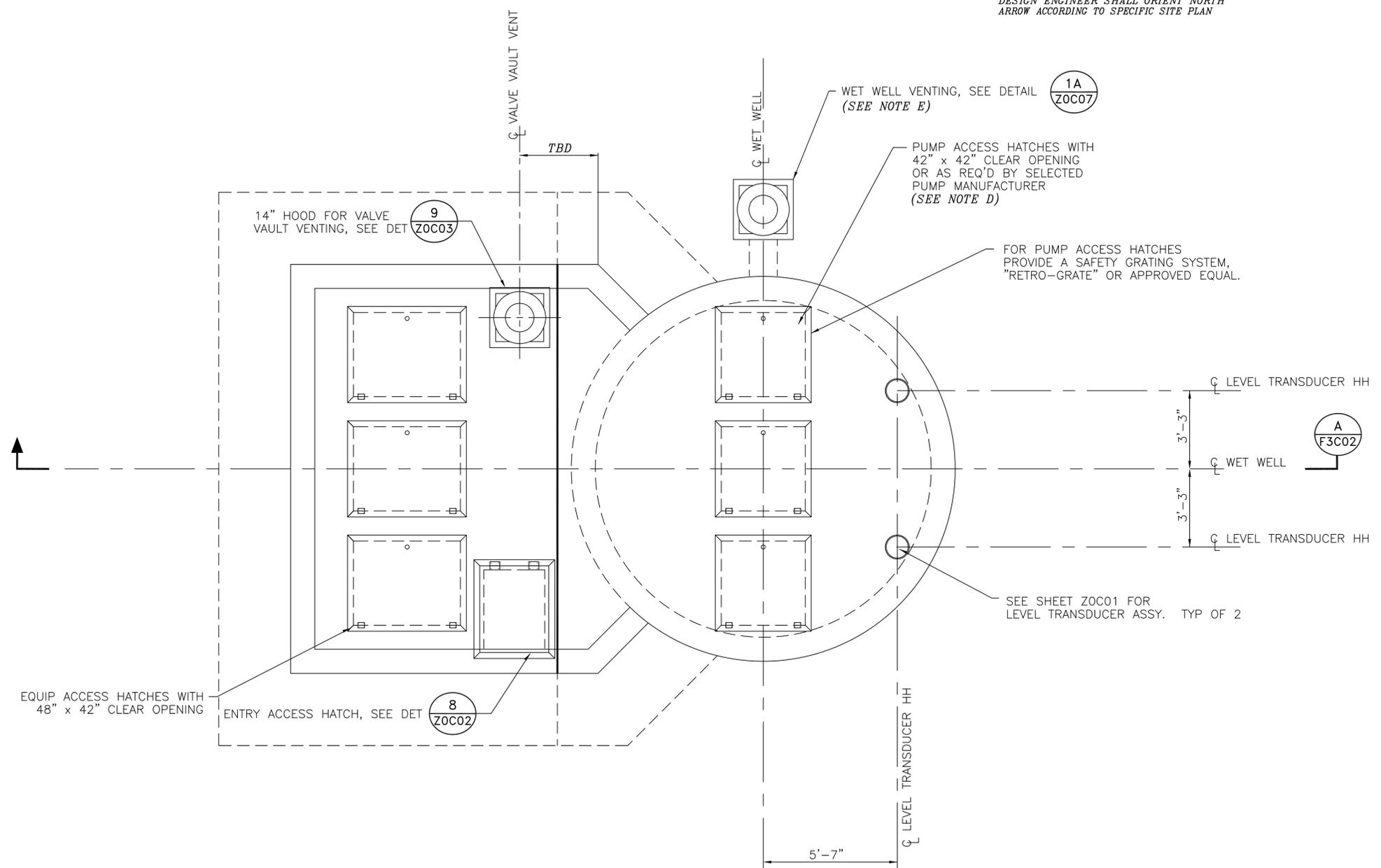
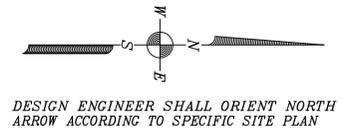
**APPROVALS**

|                          |                           |
|--------------------------|---------------------------|
| WATER DESIGN             | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN       | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN        | CONSTRUCTION              |
| OTHER REVIEWS            |                           |
| PLANNING AND DEVELOPMENT |                           |

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE: NOT TO SCALE DESIGNED BY: \_\_\_\_\_  
SUBMITTED: \_\_\_\_\_ DRAWN BY: \_\_\_\_\_  
DATE: \_\_\_\_\_ SHEET NO. OF SHEETS  
SURVEY BY: \_\_\_\_\_ DWG. NO. F3C02  
FIELD BOOK NO. \_\_\_\_\_

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CADD DWG. FILE NO. : D3C02.DWG

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PLAN VIEW @ GRADE

**NOTES TO DESIGN ENGINEER:**

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.

B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).

C. LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.

D. DESIGN ENGINEER TO VERIFY THE SIZE AND LOCATION OF THE WET WELL HATCHES ACCORDING TO THE SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

E. THE ACTUAL LOCATION OF THE WET WELL VENTING MAY VARY ACCORDING TO SITE REQUIREMENTS. WHERE POSSIBLE, LOCATE ON THE NORTHWEST SIDE OF THE WET WELL.

F. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

G. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

H. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

I. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

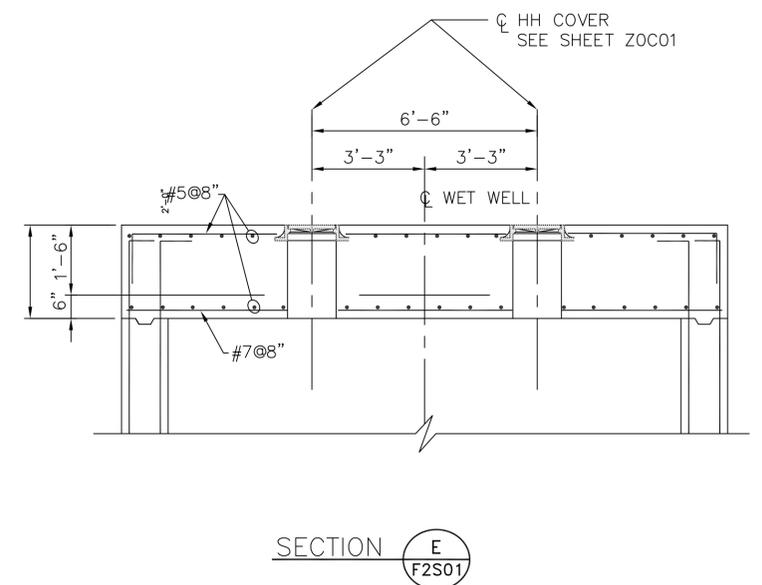
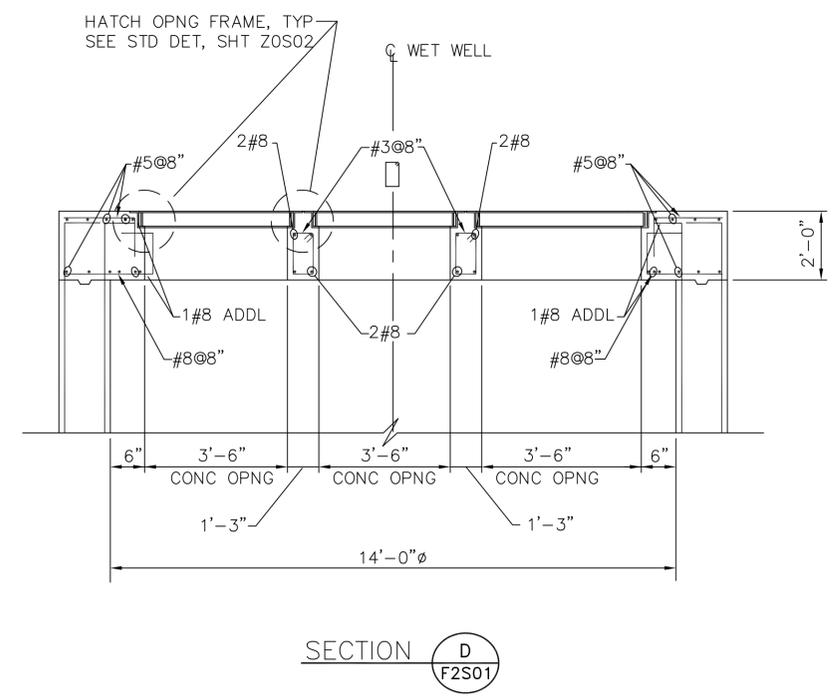
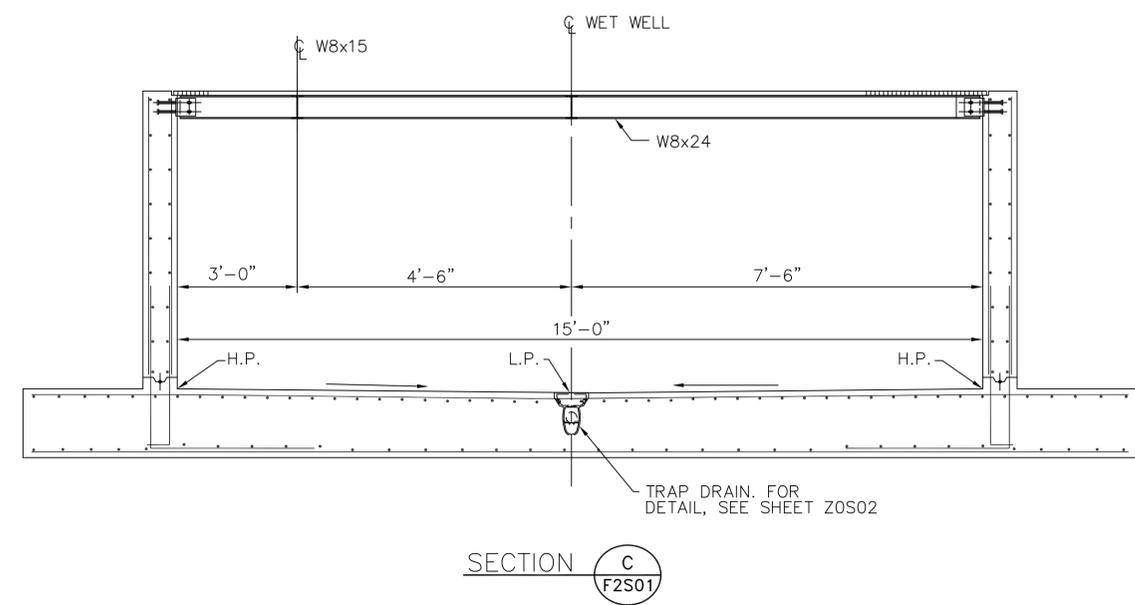
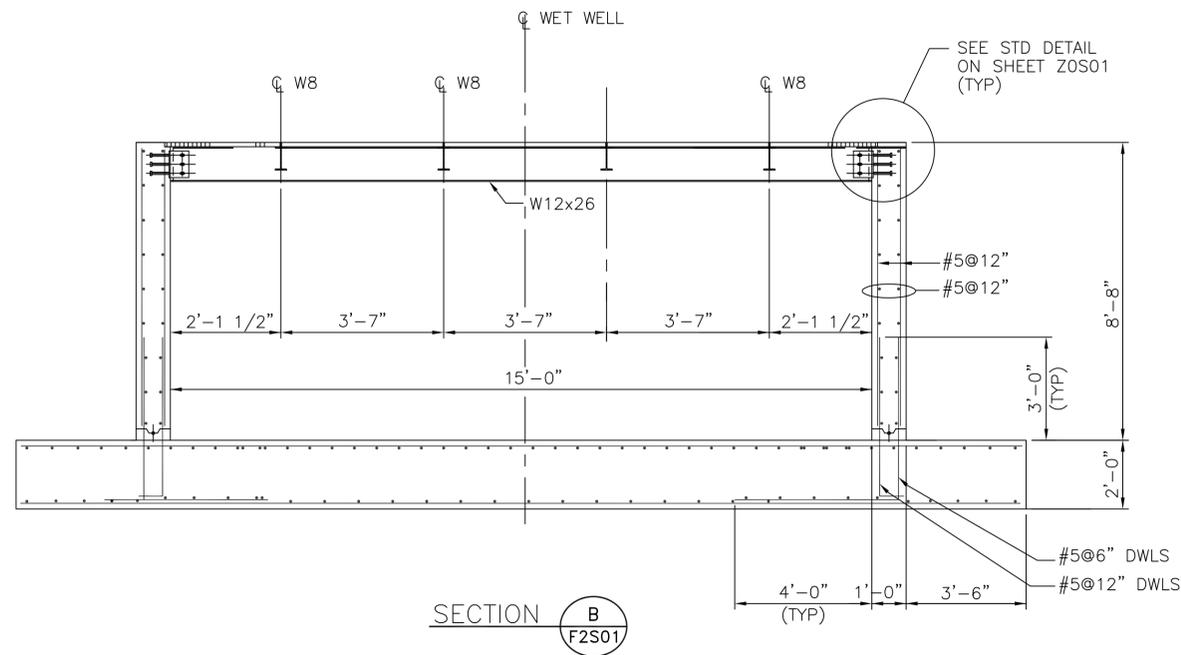
- NOTES:**
- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

|  |   |
|--|---|
| PLAN VIEW @ GRADE  |   |
| 3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE LOW PROFILE CONFIGURATION  |   |
| PROJECT NO.  | R-0267-02-2   |
| TITLE  | CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |   |
| APPROVALS  |   |
| WATER DESIGN   | TRAFFIC AND SIGNAL DESIGN   |
| STORM SEWER DESIGN   | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION  |
| OTHER REVIEWS  |   |
| PLANNING AND DEVELOPMENT   |   |
| CITY ENGINEER  | DATE  |
| SCALE: NOT TO SCALE  | DESIGNED BY:  |
| SUBMITTED:   | DRAWN BY:   |
| DATE: NOVEMBER, 1996   | SHEET NO. OF SHEETS   |
| SURVEY BY:   | DWG. NO. F3C01  |
| FIELD BOOK NO.   |   |

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CADD DWG. FILE NO. : F3C01.DWG

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**NOTES TO DESIGN ENGINEER:**

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.

B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

- NOTES:**
- FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
  - CONTRACTOR TO CONFIRM THE SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
  - SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

**STRUCTURAL**  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN \_\_\_\_\_ TRAFFIC AND SIGNAL DESIGN \_\_\_\_\_

STORM SEWER DESIGN \_\_\_\_\_ STREET, BRIDGE & R.O.W. \_\_\_\_\_

WASTEWATER DESIGN \_\_\_\_\_ CONSTRUCTION \_\_\_\_\_

OTHER REVIEWS \_\_\_\_\_

PLANNING AND DEVELOPMENT \_\_\_\_\_

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: NOT TO SCALE DESIGNED BY: \_\_\_\_\_

SUBMITTED: \_\_\_\_\_ DRAWN BY: \_\_\_\_\_

DATE: NOVEMBER, 1996 SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_ SHEETS

SURVEY BY: \_\_\_\_\_ DWG. NO. F2S04

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CADD DWG. FILE NO. : F2S04.DWG

**NOTES TO DESIGN ENGINEER:**

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
- C. DIMENSIONS, ELEVATIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.
- D. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- E. DESIGN ENGINEER TO PROVIDE WET WELL DESIGN FOR BOTH OPEN-CUT AND CAISSON CONSTRUCTION WHERE SPECIFIC PROJECT REQUIREMENTS ALLOW FOR EITHER TYPE OF CONSTRUCTION.
- F. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- G. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- H. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

**NOTES:**

- 1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
- 2. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
- 3. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
- 4. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- 5. WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

**STRUCTURAL**  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN TRAFFIC AND SIGNAL DESIGN

STORM SEWER DESIGN STREET, BRIDGE & R.O.W.

WASTEWATER DESIGN CONSTRUCTION

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER DATE

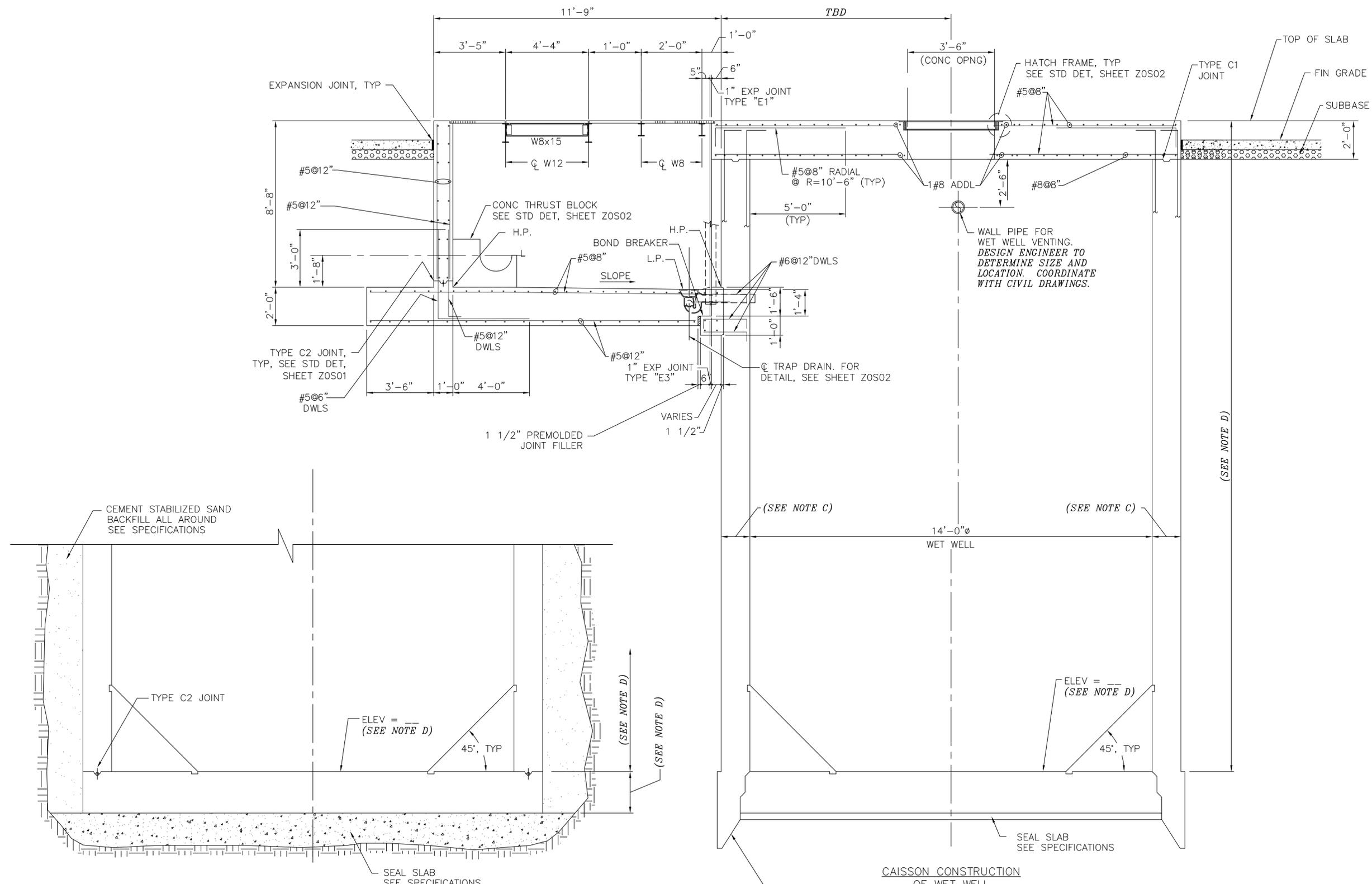
SCALE: NOT TO SCALE DESIGNED BY:

SUBMITTED: DRAWN BY:

DATE: NOVEMBER, 1996 SHEET NO. OF SHEETS

SURVEY BY: DWG. NO. F2S03

FIELD BOOK NO.



OPEN-CUT CONSTRUCTION  
OF WET WELL  
SEE NOTE E

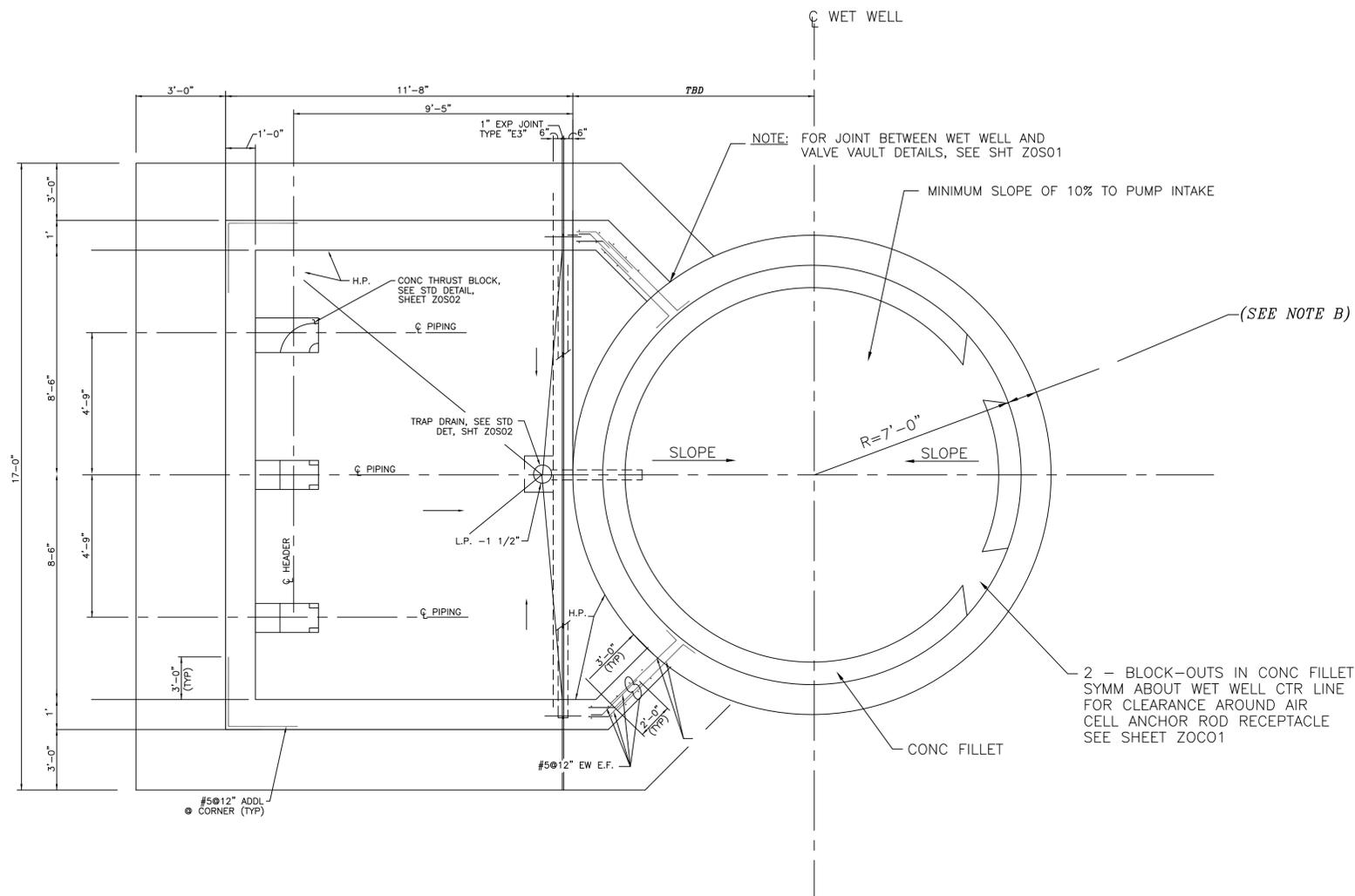
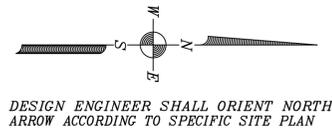
DESIGN ENGINEER TO PROVIDE  
CAISSON BASE DESIGN, SEE TYP  
BASE DETAIL, SHEET ZOS01

CAISSON CONSTRUCTION  
OF WET WELL  
SEE NOTE E

SECTION A  
F2S01

CADD DWG. FILE NO. : F2S03.DWG

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PLAN VIEW @ VAULT FLOOR

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- B. DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.
- C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

- NOTES:
1. FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
  2. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
  3. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  4. WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

STRUCTURAL  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN \_\_\_\_\_ TRAFFIC AND SIGNAL DESIGN \_\_\_\_\_

STORM SEWER DESIGN \_\_\_\_\_ STREET, BRIDGE & R.O.W. \_\_\_\_\_

WASTEWATER DESIGN \_\_\_\_\_ CONSTRUCTION \_\_\_\_\_

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: NOT TO SCALE DESIGNED BY: \_\_\_\_\_

SUBMITTED: \_\_\_\_\_ DRAWN BY: \_\_\_\_\_

DATE: NOVEMBER, 1996 SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_ SHEETS

SURVEY BY: \_\_\_\_\_ DWG. NO. F2S02

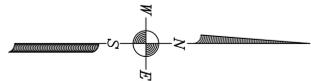
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CADD DWG. FILE NO. : F2S02.DWG

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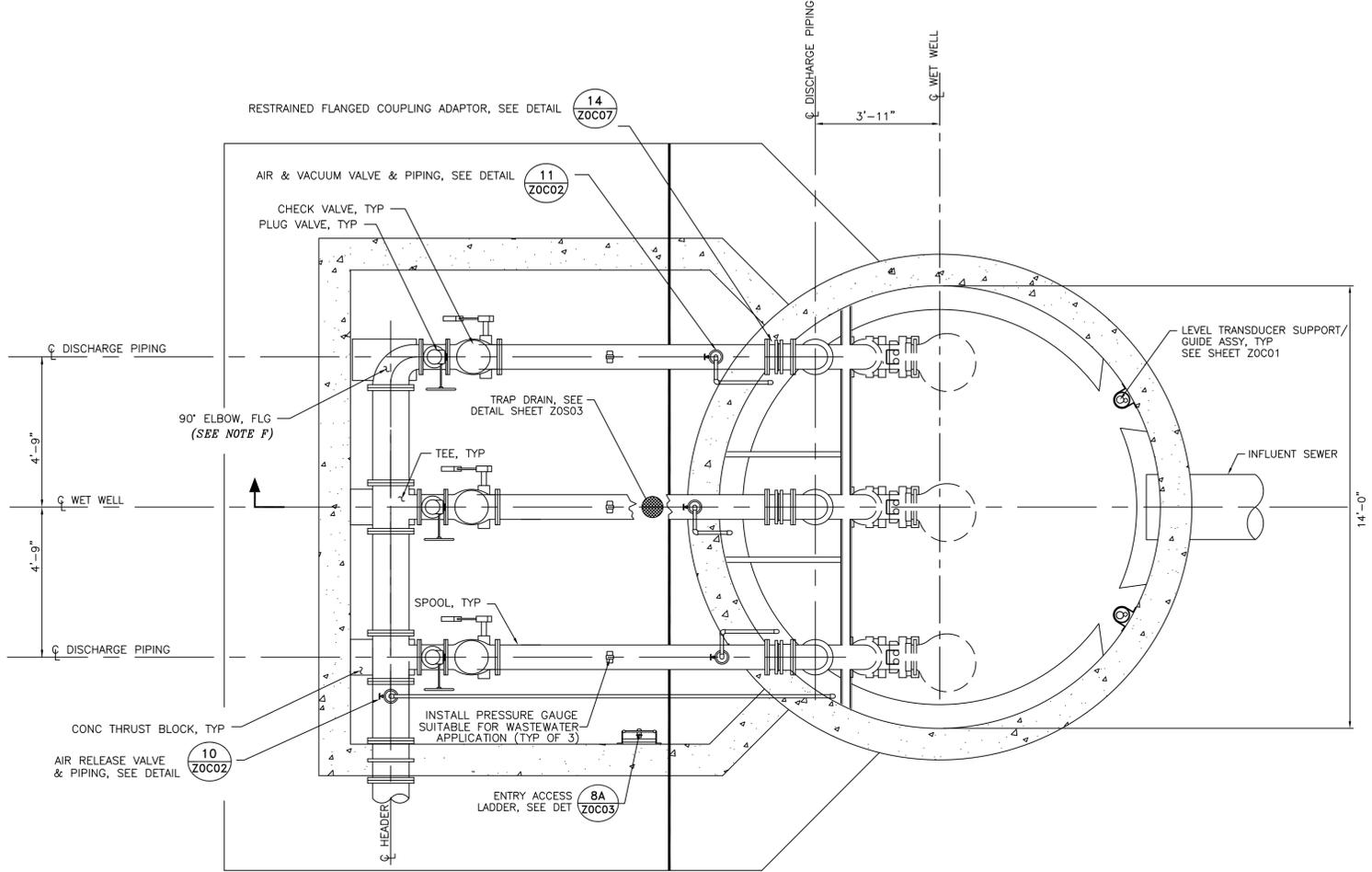
DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN

**NOTES TO DESIGN ENGINEER:**

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).
- C. LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
- D. REPLACE THE 90° ELBOW WITH A FLANGED TEE FOR CONNECTION TO SURGE RELIEF VALVE, IF REQUIRED. SEE DETAILS, SHEET ZOC06.
- E. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY.
- F. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- G. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- H. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- I. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

**NOTES:**

- 1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- 2. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
- 3. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
- 4. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
- 5. SLEEVED OR CORED DISCHARGE PIPE OPENINGS SEALED WITH LINK-SEAL (OR APPROVED EQUAL) MAY BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.



SECTION **B**  
F2C02

BASE SECTION  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

|                    |                           |
|--------------------|---------------------------|
| WATER DESIGN       | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |

OTHER REVIEWS

PLANNING AND DEVELOPMENT

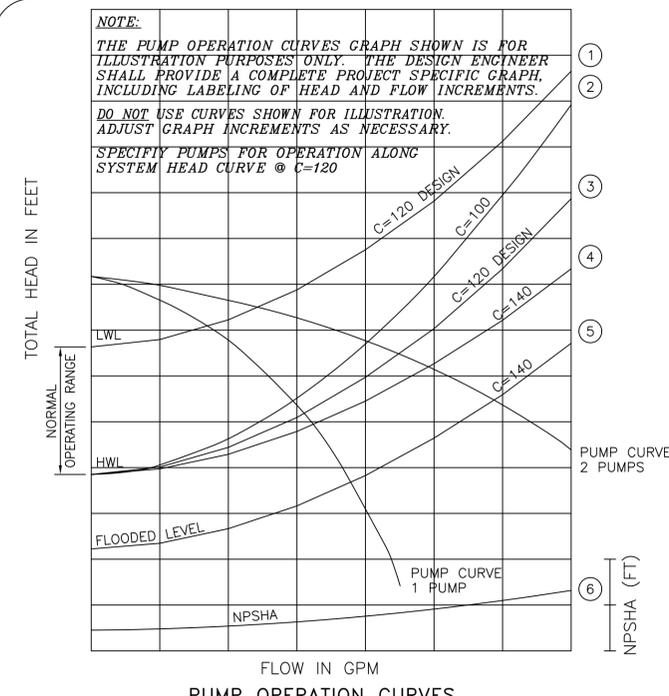
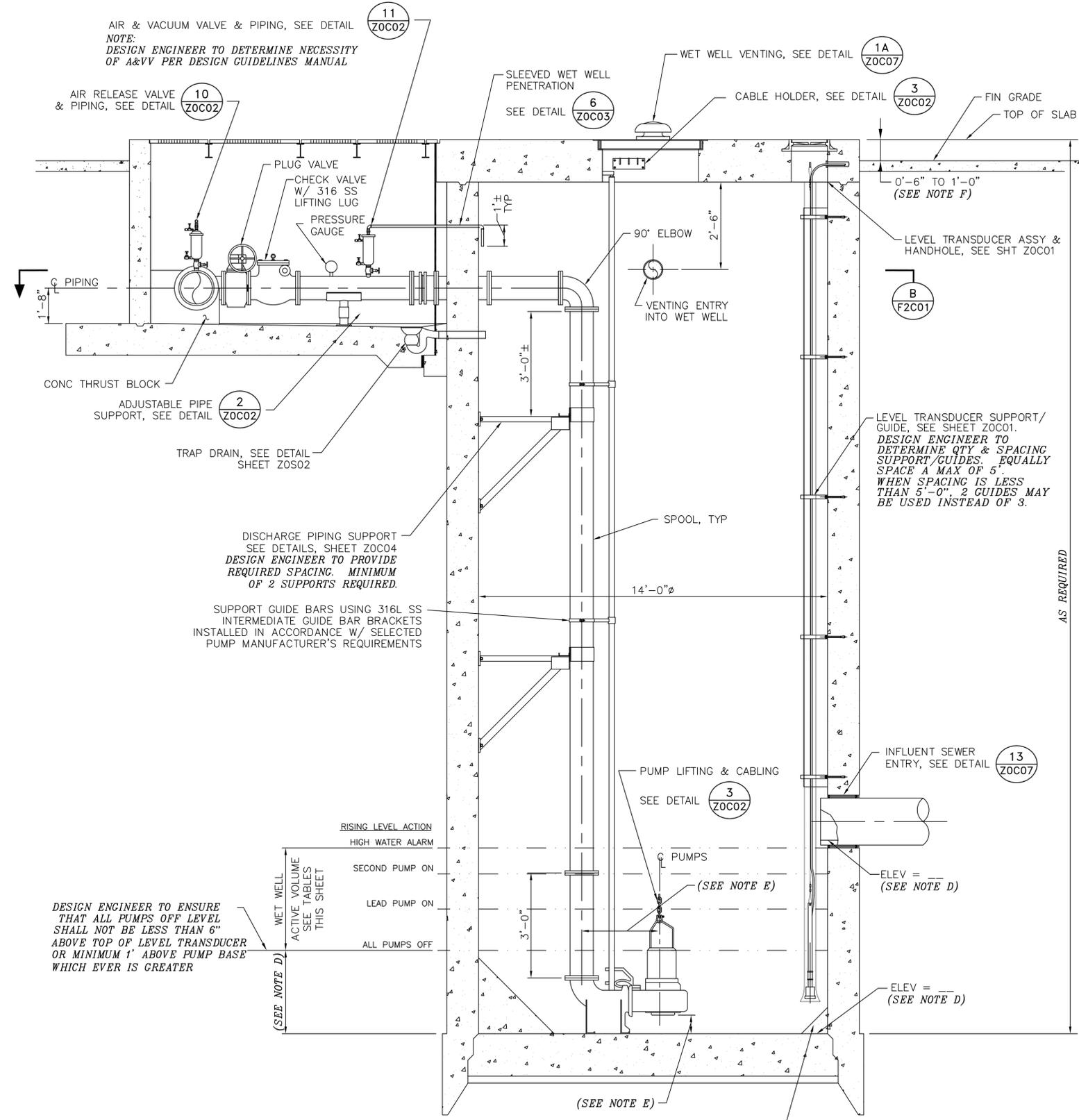
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| CITY ENGINEER | DATE |
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| SCALE: NOT TO SCALE  | DESIGNED BY:        |
| SUBMITTED:           | DRAWN BY:           |
| DATE: DECEMBER, 1996 | SHEET NO. OF SHEETS |
| SURVEY BY:           | DWG. NO. F2C03      |
| FIELD BOOK NO.       |                     |

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CADD DWG. FILE NO. : F2C03.DWG



- PUMP CURVE NOTES:**
1. LOW NORMAL OPERATING LEVEL C=120 - DESIGN.
  2. HIGH NORMAL OPERATING LEVEL C=100 - INFORMATION ONLY (TCEQ)
  3. HIGH NORMAL OPERATING LEVEL C=120 - DESIGN
  4. HIGH NORMAL OPERATING LEVEL C=140 - INFORMATION ONLY
  5. EMERGENCY FLOODED OPERATING LEVEL C=140 - MAXIMUM DISCHARGE
  6. NET POSITIVE SUCTION HEAD AVAILABLE (NPSHA) BASED ON NORMAL OPERATING WATER LEVELS
  7. PUMP CURVES ARE MODIFIED FOR STATION LOSSES.

| PUMP CHARACTERISTICS   | PUMP NO. 1 | PUMP NO. 2 | PUMP NO. 3 |
|------------------------|------------|------------|------------|
| MOTOR DATA             |            |            |            |
| NOMINAL SIZE (HP)      |            |            |            |
| MAX SPEED (RPM)        |            |            |            |
| SOLIDS PASSAGE         |            |            |            |
| MIN SPHERE (IN)        |            |            |            |
| CAPACITY (GPM)         |            |            |            |
| DESIGN RUNOUT          |            |            |            |
| DISCHARGE HEAD (FT)    |            |            |            |
| DESIGN RUNOUT SHUT OFF |            |            |            |
| EFFICIENCY (%)         |            |            |            |
| DESIGN RUNOUT          |            |            |            |
| NPSHR (FT)             |            |            |            |
| DESIGN RUNOUT          |            |            |            |
| PUMP CYCLE TIME        |            |            |            |

| RISING LEVEL CYCLE    |                             |  |
|-----------------------|-----------------------------|--|
| WATER LEVEL ELEVATION | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | PUMPS OFF LEVEL - NO ACTION | ALL PUMPS ARE OFF                                      |
|                       | LEAD PUMP TURNS ON          | LEAD PUMP ON   |
|                       | SECOND PUMP TURNS ON        | LEAD & SECOND PUMPS ON                                 |
|                       | HIGH WATER ALARM ON         | HIGH WATER ALARM SOUND                                 |
| FALLING LEVEL CYCLE   |                             |  |
| WATER LEVEL           | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | HIGH WATER LEVEL ALARM OFF  | LEAD & SECOND PUMPS ON                                 |
|                       | LEAD PUMP TURNS OFF         | SECOND PUMP ON   |
|                       | SECOND PUMP TURNS OFF       | ALL PUMPS STOPPED - STANDBY PUMP SWITCHES TO LEAD PUMP |

- NOTES TO DESIGN ENGINEER:**
- THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREBY CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
  - THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).
  - LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
  - ELEVATIONS AND INFORMATION OMITTED ARE DETERMINED BY DESIGN ENGINEER FOR SPECIFIC SITE REQUIREMENTS.
  - DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY. DESIGN ENGINEER SHALL PROVIDE RAISED PUMP BASE IF REQUIRED.
  - WHERE FLOOD PLAIN CONDITIONS REQUIRE THE TOP SLAB TO BE GREATER THAN 1'-0" ABOVE FINISHED GRADE, DESIGN ENGINEER SHALL PROVIDE CONCRETE STAIRS.
  - SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
  - THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
  - THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

- NOTES:**
- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
  - SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - PUMP ANCHOR BOLTS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLTS AND PATTERN, INCLUDING CALCULATIONS, DURING SHOP DRAWING SUBMISSION.
  - CONTRACTOR TO PROVIDE ADHESIVE ANCHORS IN LIEU OF WEDGE ANCHORS FOR ALL SUBMERGED CONDITIONS, AND SUBMIT DESIGN OF ANCHOR BOLTS DURING SHOP DRAWING SUBMISSION.
  - ALL PIPING IN THE WET WELL SHALL BE FLANGED. NO FLANGED COUPLING ADAPTORS, OR VICTAULIC STYLE COUPLINGS SHALL BE PERMITTED INSIDE THE WET WELL.

**ELEVATION SECTION**  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN \_\_\_\_\_ TRAFFIC AND SIGNAL DESIGN \_\_\_\_\_

STORM SEWER DESIGN \_\_\_\_\_ STREET, BRIDGE & R.O.W. \_\_\_\_\_

WASTEWATER DESIGN \_\_\_\_\_ CONSTRUCTION \_\_\_\_\_

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: NOT TO SCALE DESIGNED BY: \_\_\_\_\_

SUBMITTED: \_\_\_\_\_ DRAWN BY: \_\_\_\_\_

DATE: \_\_\_\_\_ SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_ SHEETS

SURVEY BY: \_\_\_\_\_ DWG. NO. F2C02

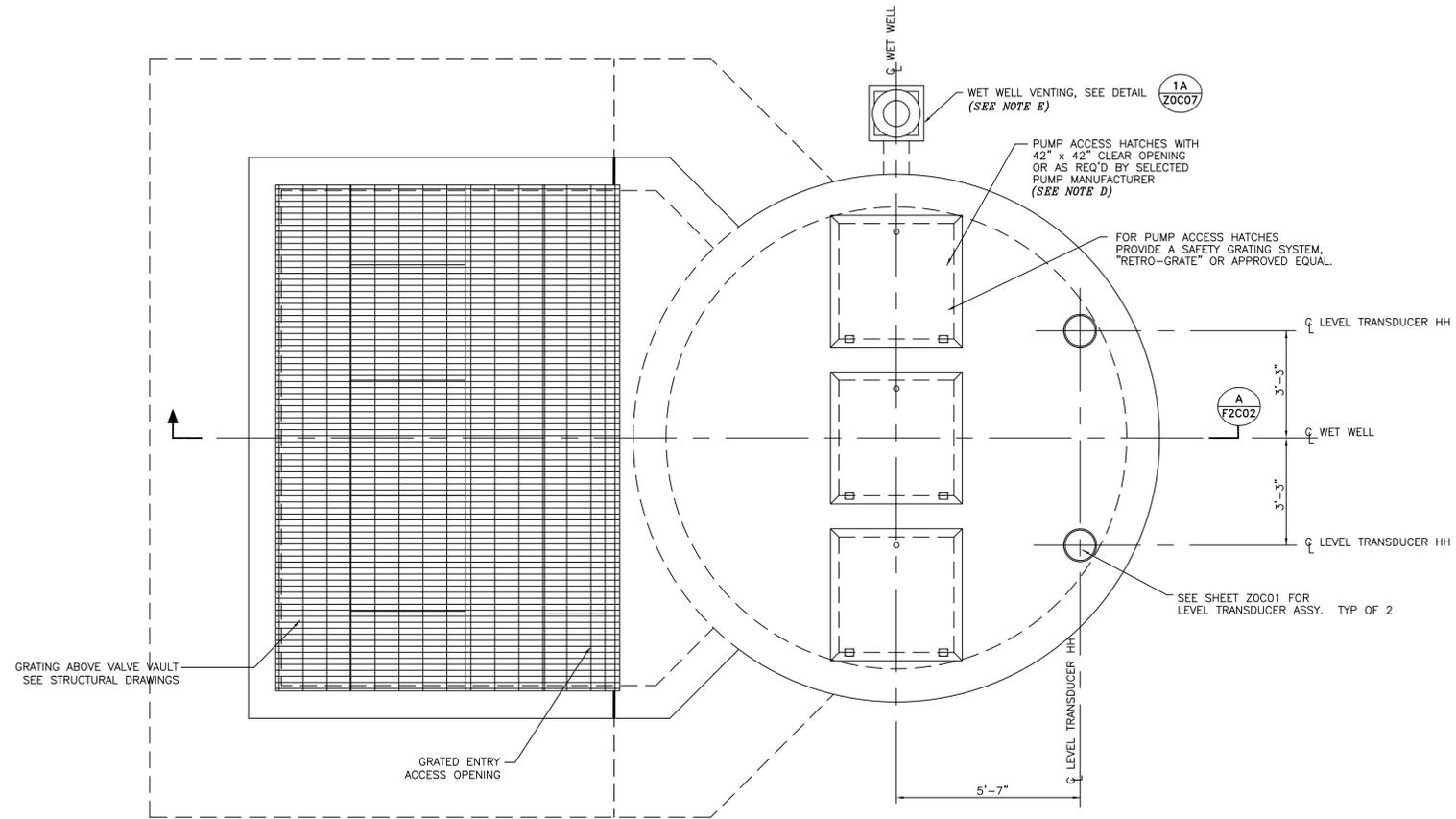
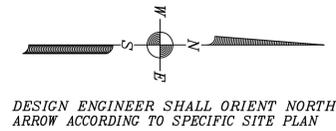
FIELD BOOK NO. \_\_\_\_\_

SECTION A  
F2C01  
ALL WET WELL FILLETS  
NOT SHOWN FOR CLARITY

SEAL

CADD DWG. FILE NO.: F2C02.DWG

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PLAN VIEW @ GRADE

**NOTES TO DESIGN ENGINEER:**

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREBY CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).
- C. LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP, VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
- D. DESIGN ENGINEER TO VERIFY THE SIZE AND LOCATION OF THE WET WELL HATCHES ACCORDING TO THE SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
- E. THE ACTUAL LOCATION OF THE WET WELL VENTING MAY VARY ACCORDING TO SITE REQUIREMENTS. WHERE POSSIBLE, LOCATE ON THE NORTHWEST SIDE OF THE WET WELL.
- F. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- G. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- H. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
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**NOTES:**

- 1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- 2. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

PLAN VIEW @ GRADE  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
PREFERRED CONFIGURATION

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN \_\_\_\_\_ TRAFFIC AND SIGNAL DESIGN \_\_\_\_\_

STORM SEWER DESIGN \_\_\_\_\_ STREET, BRIDGE & R.O.W. \_\_\_\_\_

WASTEWATER DESIGN \_\_\_\_\_ CONSTRUCTION \_\_\_\_\_

OTHER REVIEWS \_\_\_\_\_

PLANNING AND DEVELOPMENT \_\_\_\_\_

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: NOT TO SCALE DESIGNED BY: \_\_\_\_\_

SUBMITTED: \_\_\_\_\_ DRAWN BY: \_\_\_\_\_

DATE: NOVEMBER, 1996 SHEET NO. OF SHEETS

SURVEY BY: \_\_\_\_\_ DWG. NO. F2C01

FIELD BOOK NO. \_\_\_\_\_

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B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

C. DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.

D. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

E. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

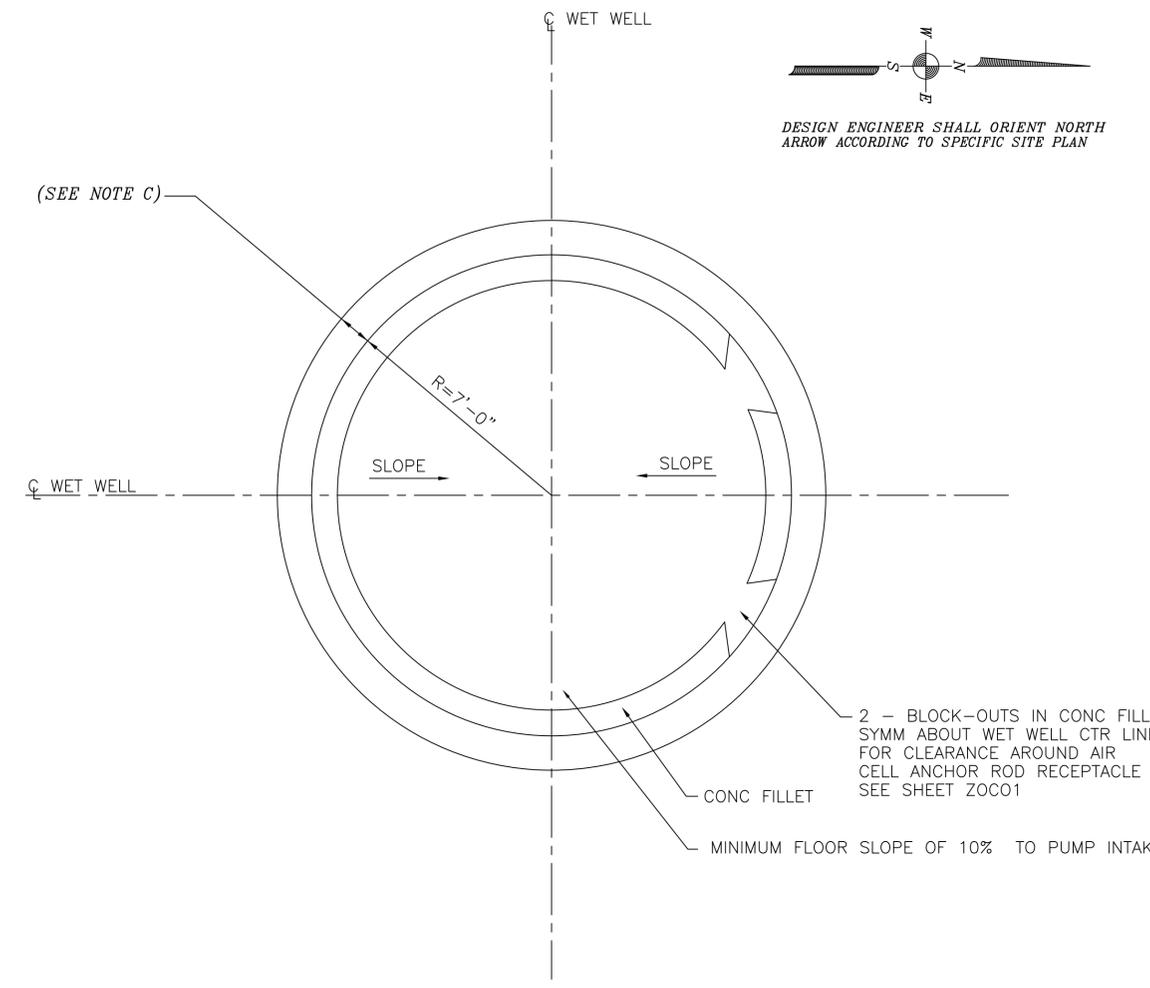
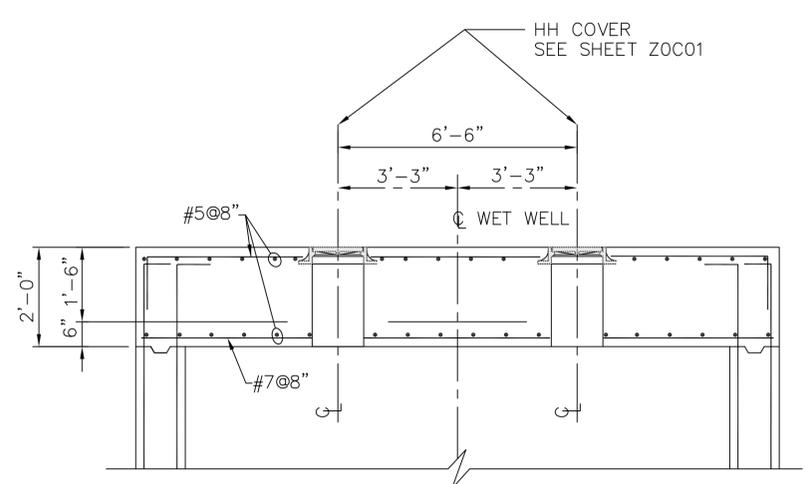
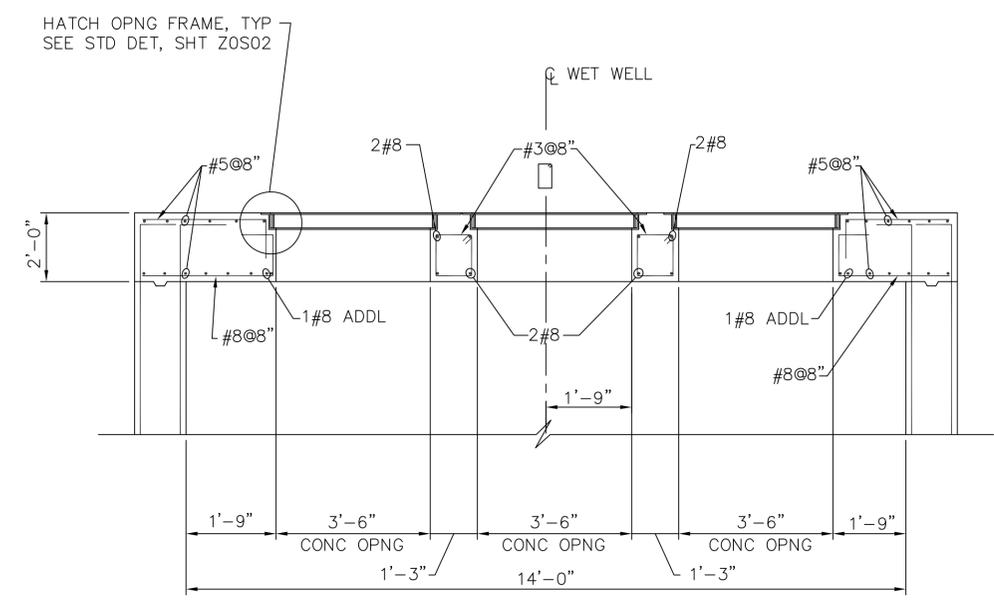
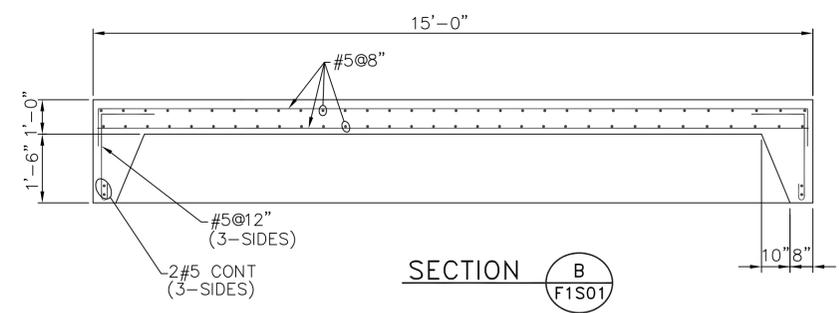
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**NOTES:**

- FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET Z0S01.
- CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
- SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

|  |                           |
|--|---------------------------|
| STRUCTURAL   |                           |
| 3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE HIGH PROFILE CONFIGURATION                                       |                           |
| PROJECT NO. R-0267-02-2  |                           |
| TITLE CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS                              |                           |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                           |
| APPROVALS  |                           |
| WATER DESIGN   | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN   | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |
| OTHER REVIEWS  |                           |
| PLANNING AND DEVELOPMENT   |                           |
| CITY ENGINEER  | DATE                      |
| SCALE: NOT TO SCALE  | DESIGNED BY:              |
| SUBMITTED:   | DRAWN BY:                 |
| DATE: NOVEMBER, 1996   | SHEET NO. OF SHEETS       |
| SURVEY BY:   | DWG. NO. F1S03            |
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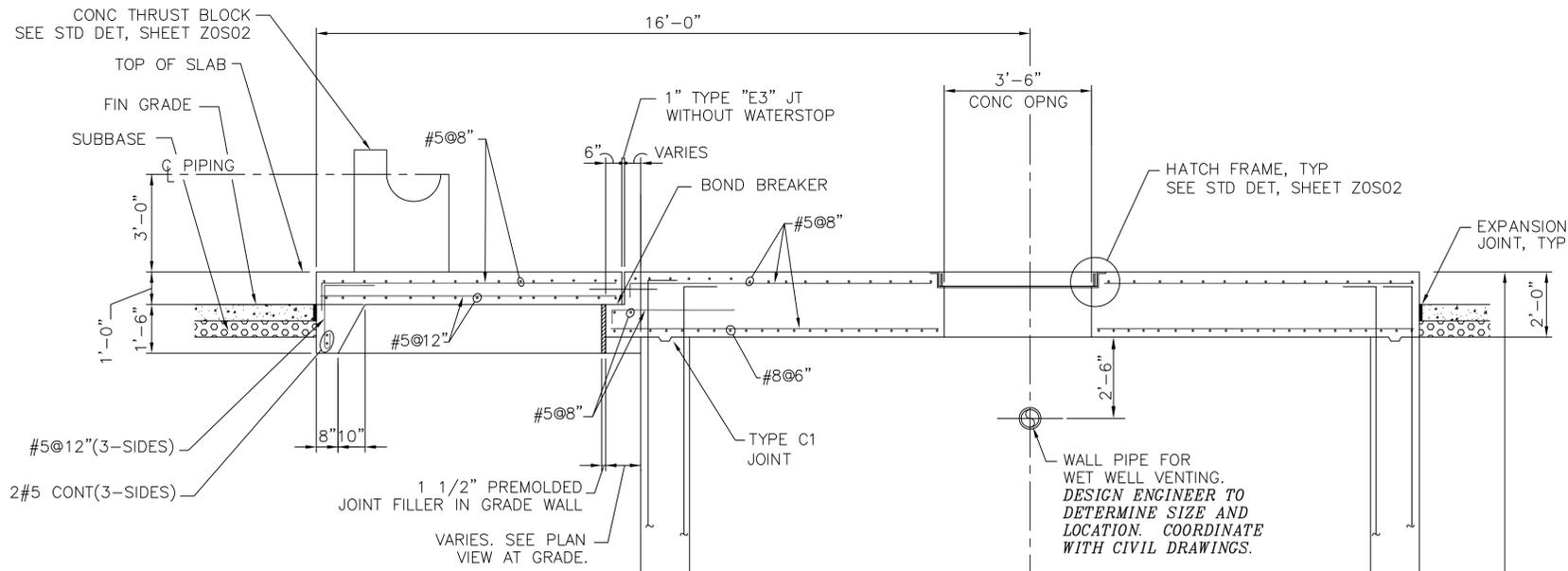
BASE SLAB PLAN

SEAL

CADD DWG. FILE NO. : F1S03.DWG

COHSTD.BDR 0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

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B. DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.

C. SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

D. DIMENSIONS, ELEVATIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.

E. DESIGN ENGINEER TO PROVIDE WET WELL DESIGN FOR BOTH OPEN-CUT AND CAISSON CONSTRUCTION WHERE SPECIFIC PROJECT REQUIREMENTS ALLOW FOR EITHER TYPE OF CONSTRUCTION.

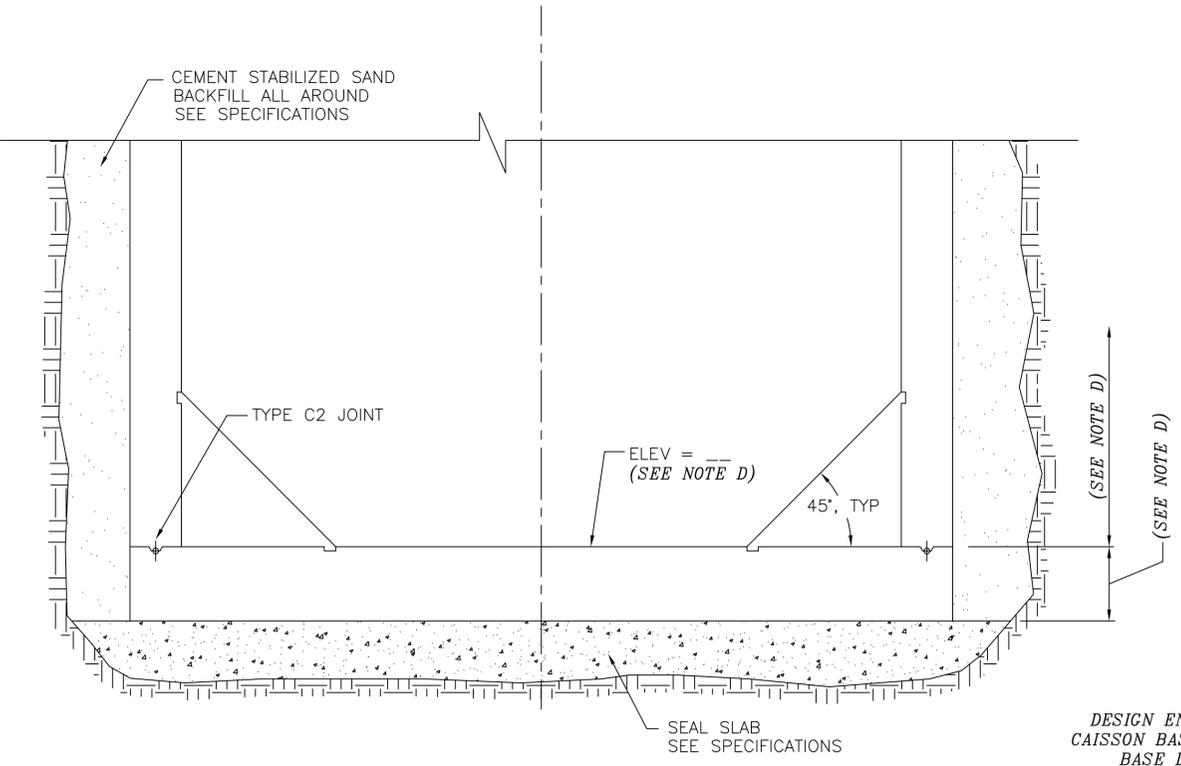
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- NOTES:**
- FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET ZOS01.
  - CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
  - DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
  - SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
  - WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

|  |                           |
|--|---------------------------|
| STRUCTURAL<br>3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE HIGH PROFILE CONFIGURATION                         |                           |
| PROJECT NO. R-0267-02-2  |                           |
| TITLE CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS                              |                           |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                           |
| APPROVALS  |                           |
| WATER DESIGN   | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN   | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |
| OTHER REVIEWS  |                           |
| PLANNING AND DEVELOPMENT   |                           |
| CITY ENGINEER  | DATE                      |
| SCALE: NOT TO SCALE  | DESIGNED BY:              |
| SUBMITTED:   | DRAWN BY:                 |
| DATE: NOVEMBER, 1996   | SHEET NO. OF SHEETS       |
| SURVEY BY:   | DWG. NO. F1S02            |
| FIELD BOOK NO.   |                           |



DESIGN ENGINEER TO PROVIDE  
CAISSON BASE DESIGN, SEE TYP  
BASE DETAIL, SHEET ZOS01

CAISSON CONSTRUCTION  
OF WET WELL  
SEE NOTE E

OPEN-CUT CONSTRUCTION  
OF WET WELL  
SEE NOTE E

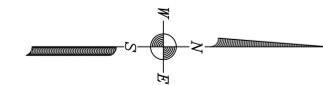
SECTION A  
F1S01

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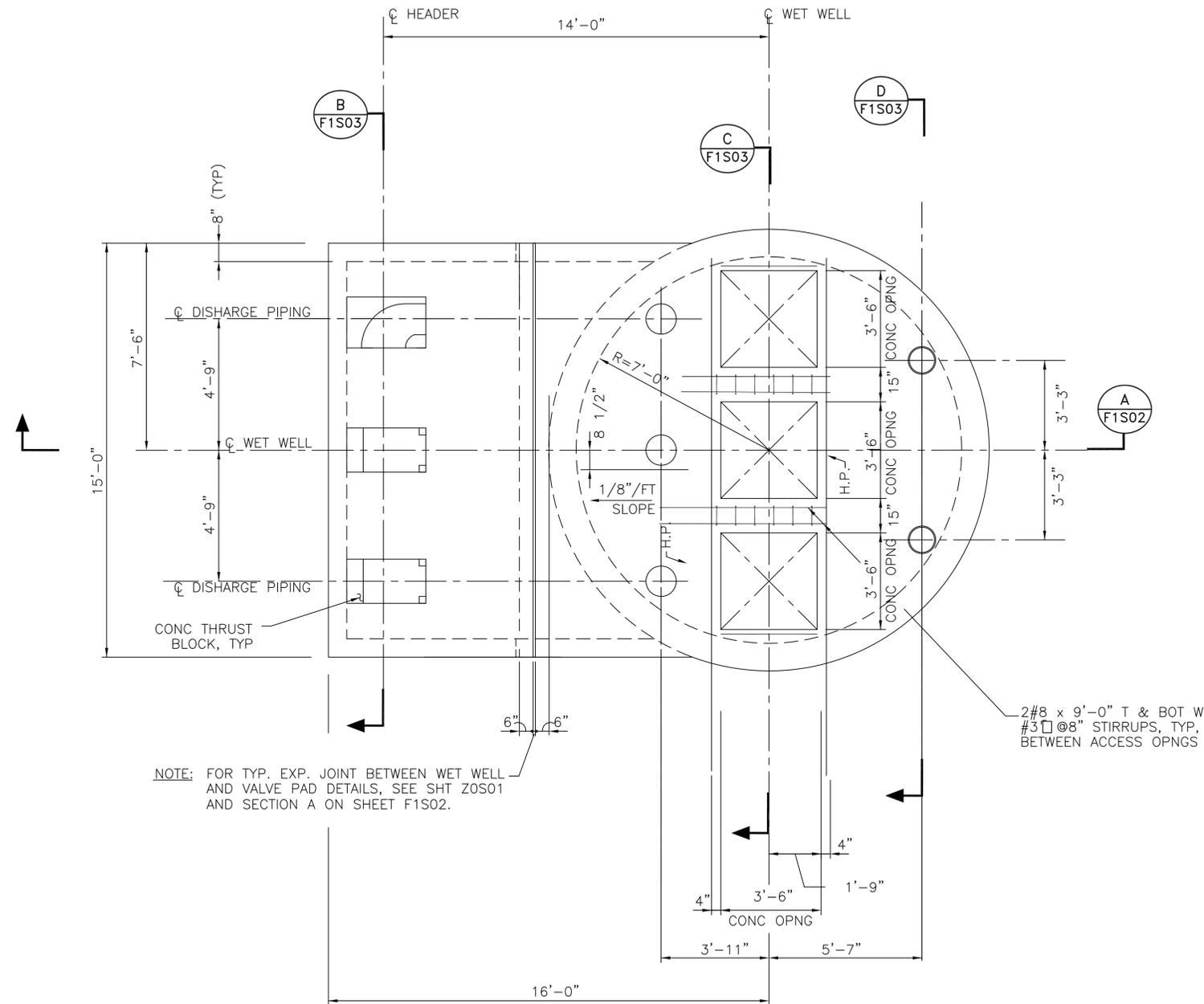
DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN

NOTES:

- FOR ADDITIONAL REINFORCEMENT AT OPENINGS NOT SHOWN, SEE SHEET Z0S01.
- CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER HATCH AND PUMP MANUFACTURER'S REQUIREMENTS.
- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- WET WELL TO BE LINED WITH CONCRETE PROTECTIVE LINER PER PROJECT SPECIFICATIONS, CONSULT WITH COH PROJECT MANAGER FOR APPROVED PRODUCTS. LINER SHALL COVER ALL CONCRETE SURFACES, AND SHALL EXTEND TO A MINIMUM OF 12" BELOW THE LOW WATER ELEVATION.

NOTES TO DESIGN ENGINEER:

- THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- DESIGN ENGINEER TO VERIFY SIZE AND LOCATION OF THE ACCESS HATCH OPENINGS PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
- DIMENSIONS AND REINFORCING NOT PROVIDED ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER APPLICABLE SITE REQUIREMENTS.
- SEE DETAIL AND CIVIL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.
- THE DESIGN ENGINEER SHALL ENSURE GUARDRAIL AND CATWALK MEET THE REQUIREMENTS FOR "AREAS NOT OPEN TO PUBLIC" AS PROVIDED BY THE U.S. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) AND LATEST CODE ENFORCEMENT APPROVED VERSION OF THE INTERNATIONAL BUILDING CODE (IBC).
- THE DESIGNER ENGINEER SHALL PROVIDE GUARDRAILS FOR ANY WALKING SURFACES WITH A POTENTIAL FALL DISTANCE EQUAL TO OR GREATER THAN 30 INCHES.
- THE DESIGN ENGINEER SHALL ENSURE GUARDRAIL AND CATWALK MEET THE REQUIREMENTS FOR "AREAS NOT OPEN TO PUBLIC" AS PROVIDED BY THE U.S. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) AND LATEST CODE ENFORCEMENT APPROVED VERSION OF THE INTERNATIONAL BUILDING CODE (IBC).
- THE DESIGNER ENGINEER SHALL PROVIDE GUARDRAILS FOR ANY WALKING SURFACES WITH A POTENTIAL FALL DISTANCE EQUAL TO OR GREATER THAN 30 INCHES.



NOTE: FOR TYP. EXP. JOINT BETWEEN WET WELL AND VALVE PAD DETAILS, SEE SHT Z0S01 AND SECTION A ON SHEET F1S02.

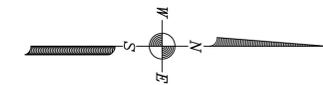
PLAN VIEW @ GRADE

|  |                           |
|--|---------------------------|
| STRUCTURAL   |                           |
| 3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE HIGH PROFILE CONFIGURATION                                       |                           |
| PROJECT NO. R-0267-02-2  |                           |
| TITLE CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS                              |                           |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                           |
| APPROVALS  |                           |
| WATER DESIGN   | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN   | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |
| OTHER REVIEWS  |                           |
| PLANNING AND DEVELOPMENT   |                           |
| CITY ENGINEER  | DATE                      |
| SCALE: NOT TO SCALE  | DESIGNED BY:              |
| SUBMITTED:   | DRAWN BY:                 |
| DATE: NOVEMBER, 1996   | SHEET NO. OF SHEETS       |
| SURVEY BY:   | DWG. NO. F1S01            |
| FIELD BOOK NO.   |                           |

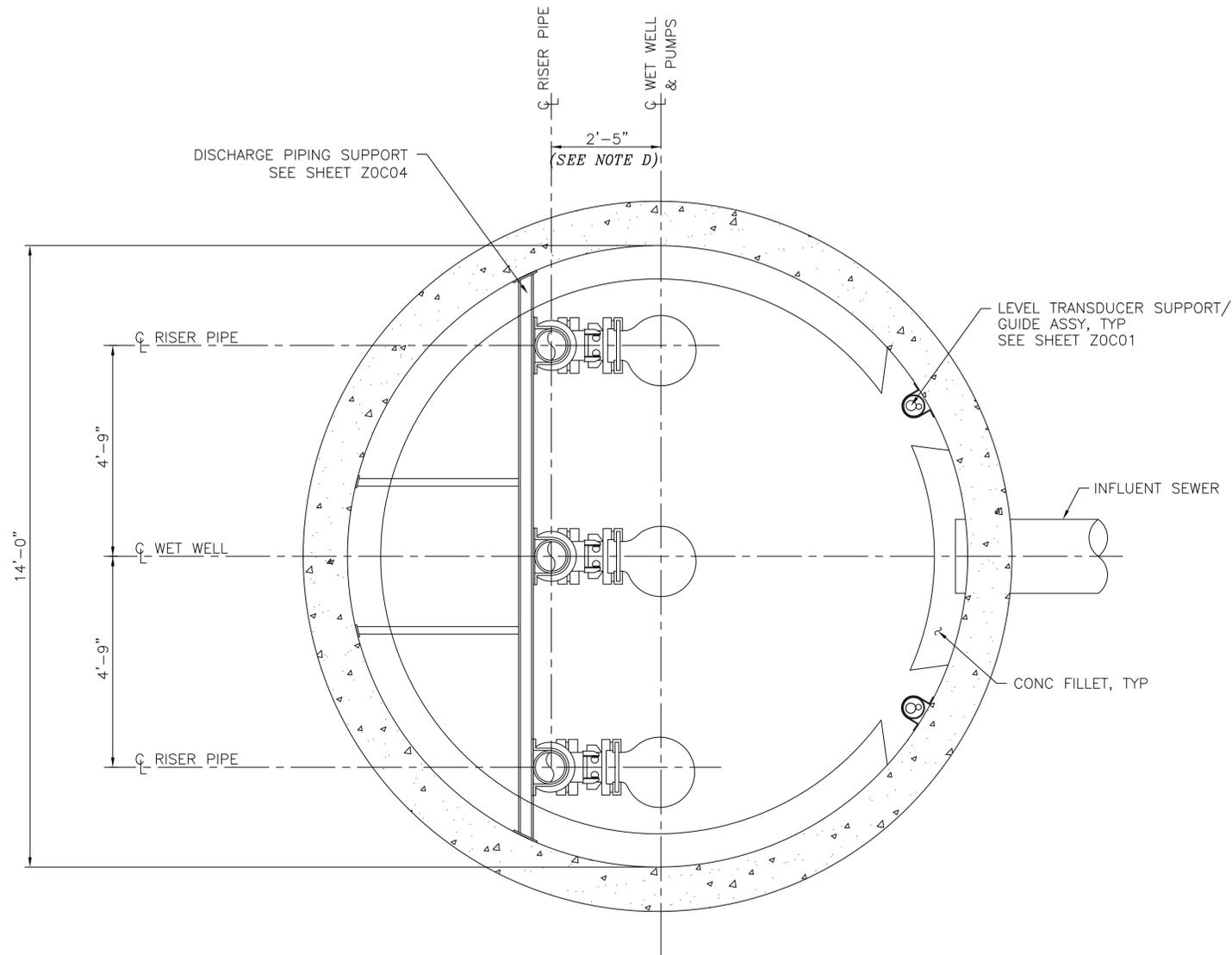
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DESIGN ENGINEER SHALL ORIENT NORTH  
ARROW ACCORDING TO SPECIFIC SITE PLAN



SECTION B  
F1C02

**NOTES TO DESIGN ENGINEER:**

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.

B. THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 GPM PER PUMP).

C. LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.

D. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY.

E. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

F. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

G. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

H. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

**NOTES:**

1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.

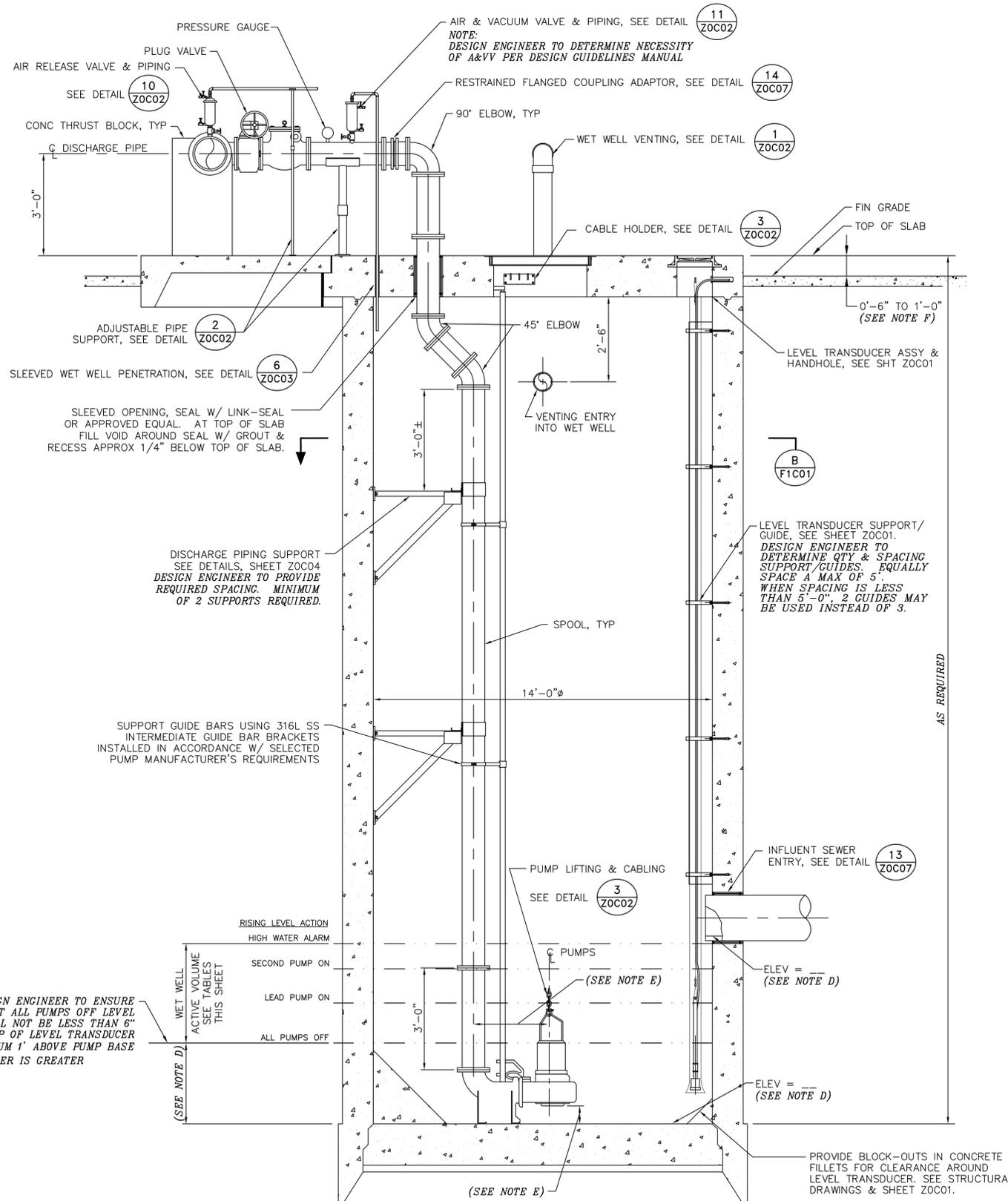
2. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.

|  |                           |
|--|---------------------------|
| BASE SECTION<br>3 PUMPS @ 1000 - 1399 GPM PER PUMP<br>ALTERNATE HIGH PROFILE CONFIGURATION                       |                           |
| PROJECT NO. R-0267-02-2  |                           |
| TITLE<br>CITY OF HOUSTON<br>DESIGN GUIDELINE DRAWINGS<br>FOR SUBMERSIBLE LIFT STATIONS                           |                           |
| CITY OF HOUSTON<br>DEPARTMENT OF PUBLIC WORKS AND ENGINEERING<br>ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP |                           |
| APPROVALS  |                           |
| WATER DESIGN   | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN   | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |
| OTHER REVIEWS  |                           |
| PLANNING AND DEVELOPMENT   |                           |
| CITY ENGINEER  | DATE                      |
| SCALE: NOT TO SCALE  | DESIGNED BY:              |
| SUBMITTED:   | DRAWN BY:                 |
| DATE: NOVEMBER, 1996   | SHEET NO. OF SHEETS       |
| SURVEY BY:   | DWG. NO.                  |
| FIELD BOOK NO.   | F1C03                     |

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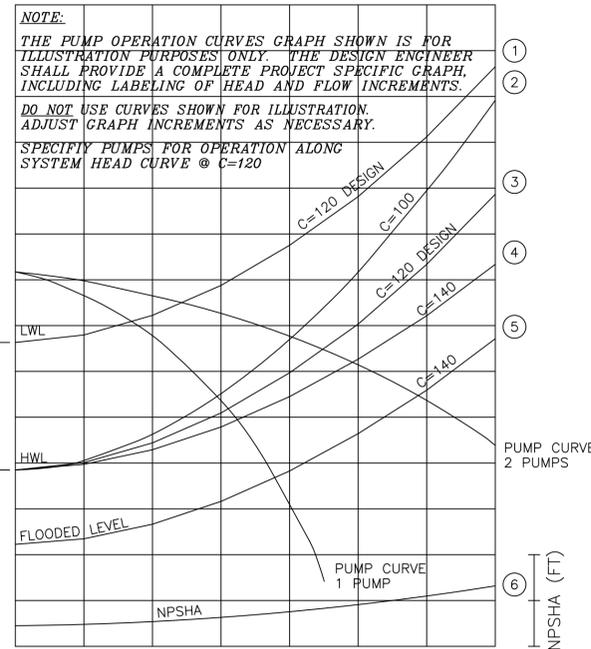
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DESIGN ENGINEER TO ENSURE THAT ALL PUMPS OFF LEVEL SHALL NOT BE LESS THAN 6" ABOVE TOP OF LEVEL TRANSDUCER OR MINIMUM 1' ABOVE PUMP BASE WHICH EVER IS GREATER

WET WELL ACTIVE VOLUME SEE TABLES THIS SHEET

|                     |                  |                |              |               |
|---------------------|------------------|----------------|--------------|---------------|
| RISING LEVEL ACTION | HIGH WATER ALARM | SECOND PUMP ON | LEAD PUMP ON | ALL PUMPS OFF |
|---------------------|------------------|----------------|--------------|---------------|



PUMP OPERATION CURVES

- PUMP CURVE NOTES:
1. LOW NORMAL OPERATING LEVEL C=120 - DESIGN.
  2. HIGH NORMAL OPERATING LEVEL C=100 - INFORMATION ONLY (TCEQ)
  3. HIGH NORMAL OPERATING LEVEL C=120 - DESIGN
  4. HIGH NORMAL OPERATING LEVEL C=140 - INFORMATION ONLY
  5. EMERGENCY FLOODED OPERATING LEVEL C=140 - MAXIMUM DISCHARGE
  6. NET POSITIVE SUCTION HEAD AVAILABLE (NPSHA) BASED ON NORMAL OPERATING WATER LEVELS
  7. PUMP CURVES ARE MODIFIED FOR STATION LOSSES.

PUMP DATA TABLE

| PUMP CHARACTERISTICS | PUMP NO. 1 | PUMP NO. 2 | PUMP NO. 3 |
|----------------------|------------|------------|------------|
| MOTOR DATA           |            |            |            |
| NOMINAL SIZE (HP)    |            |            |            |
| MAX SPEED (RPM)      |            |            |            |
| SOLIDS PASSAGE       |            |            |            |
| MIN SPHERE (IN)      |            |            |            |
| CAPACITY (GPM)       |            |            |            |
| DESIGN RUNOUT        |            |            |            |
| DISCHARGE HEAD (FT)  |            |            |            |
| DESIGN RUNOUT        |            |            |            |
| SHUT OFF             |            |            |            |
| EFFICIENCY (%)       |            |            |            |
| DESIGN               |            |            |            |
| NPSHR (FT)           |            |            |            |
| DESIGN RUNOUT        |            |            |            |
| PUMP CYCLE TIME      |            |            |            |

STATION OPERATION TABLES

| RISING LEVEL CYCLE    |                             |  |
|-----------------------|-----------------------------|--|
| WATER LEVEL ELEVATION | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | PUMPS OFF LEVEL - NO ACTION | ALL PUMPS ARE OFF                                      |
|                       | LEAD PUMP TURNS ON          | LEAD PUMP ON   |
|                       | SECOND PUMP TURNS ON        | LEAD & SECOND PUMPS ON                                 |
|                       | HIGH WATER ALARM ON         | HIGH WATER ALARM SOUND                                 |
| FALLING LEVEL CYCLE   |                             |  |
| WATER LEVEL           | ACTION                      | PUMP(S) IN OPERATION                                   |
|                       | HIGH WATER LEVEL ALARM OFF  | LEAD & SECOND PUMPS ON                                 |
|                       | LEAD PUMP TURNS OFF         | SECOND PUMP ON   |
|                       | SECOND PUMP TURNS OFF       | ALL PUMPS STOPPED - STANDBY PUMP SWITCHES TO LEAD PUMP |

NOTES TO DESIGN ENGINEER:

- THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.
- THIS DESIGN IS BASED UPON THE LARGEST CAPACITY PUMP FOR THIS STANDARD (RANGE: 1000 - 1399 CFM PER PUMP).
- LIFT STATION DESIGN IS BASED UPON 12" NOMINAL PUMP VALVES AND PIPING AS THE SIZES RECOMMENDED FOR THIS STANDARD STATION. THE DESIGN WILL ACCOMMODATE VALVES AND PIPING IF SPECIFIC SITE CONDITIONS REQUIRE.
- ELEVATIONS AND INFORMATION OMITTED ARE DETERMINED BY DESIGN ENGINEER FOR SPECIFIC SITE REQUIREMENTS.
- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. DESIGN ENGINEER SHALL VERIFY. DESIGN ENGINEER SHALL PROVIDE RAISED PUMP BASE IF REQUIRED.
- WHERE FLOOD PLAIN CONDITIONS REQUIRE THE TOP SLAB TO BE GREATER THAN 1'-0" ABOVE FINISHED GRADE, DESIGN ENGINEER SHALL PROVIDE CONCRETE STAIRS.
- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

- DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL CONFIRM.
- SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
- PUMP ANCHOR BOLTS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLTS AND PATTERN, INCLUDING CALCULATIONS, DURING SHOP DRAWING SUBMISSION.
- CONTRACTOR TO PROVIDE ADHESIVE ANCHORS IN LIEU OF WEDGE ANCHORS FOR ALL SUBMERGED CONDITIONS, AND SUBMIT DESIGN OF ANCHOR BOLTS DURING SHOP DRAWING SUBMISSION.
- ALL PIPING IN THE WET WELL SHALL BE FLANGED. NO FLANGED COUPLING ADAPTORS, OR VICTAULIC STYLE COUPLINGS SHALL BE PERMITTED INSIDE THE WET WELL.

ELEVATION SECTION  
3 PUMPS @ 1000 - 1399 GPM PER PUMP  
ALTERNATE HIGH PROFILE CONFIGURATION

PROJECT NO. R-0267-02-2  
TITLE CITY OF HOUSTON  
DESIGN GUIDELINE DRAWINGS  
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

|                    |                           |
|--------------------|---------------------------|
| WATER DESIGN       | TRAFFIC AND SIGNAL DESIGN |
| STORM SEWER DESIGN | STREET, BRIDGE & R.O.W.   |
| WASTEWATER DESIGN  | CONSTRUCTION              |

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE: NOT TO SCALE  
DESIGNED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_ SHEETS  
DWG. NO. F1C02

(SEE NOTE D)

AS REQUIRED

SECTION A (F1C01)

ALL WET WELL FILLETS NOT SHOWN FOR CLARITY

CADD DWG. FILE NO. : D1C02.DWG