

# LIFT STATION DESIGN SUBMITTAL PRELIMINARY REVIEW

(BASED ON SECTION 11.4 OF SAWS UTILITY SERVICES REGULATIONS AND SAWS LIFT STATION DESIGN GUIDELINES)

**Project/Lift Station:** \_\_\_\_\_

**Consultant:** \_\_\_\_\_

Item No.	Description	USR	Yes	No	N/A
<b>Utility Services Regulations</b>					
1	Design of the lift station incorporates a wet well sized for the ultimate capacity of the development sewershed.	11.4.1	[ ]	[ ]	[ ]
2	Force main is of High Density Polyethylene (HDPE). Only fused joints along the	11.4.2	[ ]	[ ]	[ ]
3	Engineering report includes a present value analysis of the cost of constructing gravity mains compared to the cost of the lift station/force main system. the analysis must show that the cost of the lift station plus 30 years of operation and maintenance would be less expensive than the cost of the gravity mains.	11.4.3	[ ]	[ ]	[ ]
<b>Content of Engineering Report</b>					
4	Construction feasibility and site analysis	11.4.4	[ ]	[ ]	[ ]
5	Lift Station present value analysis	11.4.4	[ ]	[ ]	[ ]
6	Flow development under present and future conditions (initial and final phases)	11.4.4	[ ]	[ ]	[ ]
7	Wet Well design and detention times (for initial and final phases)	11.4.4	[ ]	[ ]	[ ]
8	Hydraulics of pumps and force main	11.4.4	[ ]	[ ]	[ ]
9	Buoyancy calculations	11.4.4	[ ]	[ ]	[ ]
10	Sulfide generation potential (for initial and final phases)	11.4.4	[ ]	[ ]	[ ]
11	Site development (layout)	11.4.4	[ ]	[ ]	[ ]
12	Pump curves and lift station curves (system curves for new and old pipes)	11.4.4	[ ]	[ ]	[ ]
13	Energy calculations (for various pumps, pipe and force main sizes)	11.4.4	[ ]	[ ]	[ ]
<b>SAWS Lift Station Design Guidelines</b>					
		<b>Section</b>			
14	Engineering report is dated, signed and sealed by a Texas Professional Engineer.	A4	[ ]	[ ]	[ ]
15	Access Road is located in the Right-Of-Way or Permanent Easement. Plan, section and profile details are included in the plans.	A8	[ ]	[ ]	[ ]
16	Lift Station is protected from the 100-year flood event. A letter dated, signed and sealed by a Texas Professional Engineer certifying the site is protected from such event is included in the submittal.	A10	[ ]	[ ]	[ ]
17	All the lift station site is completely paved with either concrete or asphalt pavement.	A14	[ ]	[ ]	[ ]
18	Lift Station has a 3/4" water service with vacuum breaker and is freeze proof.	A15	[ ]	[ ]	[ ]
19	Force main plan and profile sheets are included.	F3	[ ]	[ ]	[ ]
20	Electric service is 480Vac, 3-phase	G1	[ ]	[ ]	[ ]

REMARKS

**Reviewed by:** \_\_\_\_\_

**Date Received:** \_\_\_\_\_

**Date Complete:** \_\_\_\_\_

**To Production:** \_\_\_\_\_

# LIFT STATION DESIGN REVIEW

Project/Lift Station: \_\_\_\_\_

Consultant: \_\_\_\_\_

Guidelines Section	Item No.	Description	Yes	No	N/A
<b>A</b>					
<b>General Requirements</b>					
A1	1	Cost analysis comparing a Gravity Main vs a Lift Station plus 30 year of operation & maintenance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A2	2	Lift Station sized for ultimate built out.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A4	3	Engineering Report and Plans are Sealed by a Texas Professional Engineer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A4	4	Proposed grades shown on drawings. Including driveway and site.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A5	5	Lift Station located over EARZ, EACZ or EATZ.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A6	6	Firm pumping capacity with the largest pump out of service.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A7	7	Site provides ample room for maneuvering.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A7	8	The access road allows to the maintenance vehicles to arrive directly to the wet well without the need of maneuvering within the site.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Access Road</b>					
A8	9	Access Road located in a dedicated right-of-way or permanent easement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	10	Minimum width of 16 feet, and all weather conditions road.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	11	Include Plan, Section and Profile sheets, and drain pipes, details and engineering calculations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	12	Provided with soil erosion protection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	13	Minimize turns and achieve the straightest possible alignment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	14	If a straight access road is not provided, an adecuated turn around is provided to allow a55 foot, 18 wheeler tanker truck to freely turn around.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	15	Is it a phased development?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	16	Engineering Report shows calculations for initial and final phase.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	17	Is it a temporary access road?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A8	18	Free of obstacles (vehicles, trash dumpsters, curves, posts, fences, landscapes, parking stalls, stripping, etc...).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A9	19	8-Foot gates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A9	20	Lift Station site is out of the Right-Of-Way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A10	21	Lift Station is protected from the 100-year flood event. A letter dated, signed and sealed by a Texas PE is included in the submittal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A11	22	6 foot fence with 1 foot of barbed wire.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A12	23	Minimum hatch dimensions are 3' x 4' (36" x 48").	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A12	24	Hatch is provided with a safety grate made of aluminum or non corrosive fiberglass reinforced material to provide fall protection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A13	25	Buoyancy calculations in engineering report.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A13	26	Top of the concrete slabs are 4" min / 6" max over the finish grade.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A14	27	All the Lift Station site is completely paved with concrete or asphalt pavement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A15	28	3/4" minimum water service with hose bib and vacuum breaker, located near the wet well, and freeze proof type.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A16	29	Freeze proof type eyewash/shower station, and located near the wet well.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A17	30	Canopy included. 7' vertrical clearance and 3' spans in front and back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A18	31	Calculations for H2S generation in wet well and force main for all phases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A19	32	For exposed pipe, valves, and fittings <b>outside the wet well</b> receive after installation a 100% solids epoxy coating system with a top coat system of urethane (note must be included in drawings) Color Grey Pantone # 431U.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A20	33	For exposed pipe, valves, and fittings <b>within the wet well</b> receive after installation a 100% solids coal tar epoxy coating system (note must be included in drawings) Color Grey Pantone #431U.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A19 & A20	34	Approved manufacturers (Tnemec, Carboline, Sherwing-Williams, PPG, and M.A.B. Paints).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B</b>					
<b>Wet Well Design</b>					
B1	35	Minimum size is 6'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B1	36	Fiberglass Type (if Precast Type, must made arrangements with SAWS to disscuss sections B5 to B8 for coatings, dimensions, etc.). Approved manufacturer is L.F. Manufacturing or Containment Solutions or approved equal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B2	37	Emergency storage calculations in engineering report. 60-min if over EARZ, contributing and transition. 60 min < Power Outage Report < 120 min if not over EARZ. 120-min if no power outage report is available. (Emergency level start at the lead pump on level, and is done using ADF).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B3	38	Detention time is less than 180 min for all phases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B3	39	Odor control (if required) consist of drum scrubber Purafil. It operates at 99.5% gas removal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B9	40	18" of subgrade level at the bottom of the wet well structure and 6" of flexible base for support. Includes the TxDot Test note in the plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B10	41	Concrete subgrade filler around the wet well is 1/3 the depth of the wet well measured from the bottom. The remaining 2/3 is crushed stone.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B11	42	316 stainless screen on goose neck vent. Minimum pipe size is 4", and is made of Stainless Steel 316.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B16	43	Manual lighting/ventilation switch is installed to override the automatic control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B17	44	Adecuate access for hoisting equipment or crane.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B18	45	All chanis, cables, guide rails, fasteners, brackets, bolts, nuts, washers, etc... inside the wet well are 316 stainless steel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B19	46	The distance between the inflow invert and the bottom of the wet well is 5' minimum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C</b>		<b>Pumping Equipment</b>			
C1	47	Alternating duplex station as minimum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C1	48	Pump is centrifugal, non-clog with a throughlet of 3" minimum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C1	49	Minimum suction/discharge size is 4".	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C1	50	Minimum 4-pole motor (around 1750rpm)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C2	51	Minimum pump power is 5 HP, 460 V, 3Φ.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C3	52	Minimum total cycle time is 6 minutes for all flows, all phases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C4	53	Level control device is fully accessible without entering the wet well, and is unaffected by the pumps, pipes, etc...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C6	54	Minimum pump efficiency is 65%.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D</b>		<b>Station Piping</b>			
D1	55	Pipe reducer is eccentric type.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D2	56	Surge relief valve is provided, and is provided with an isolation ball/gate valve of blonze or stainless steel 316. Properly mounted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D5	57	Piping is supported by concrete or metal manufactured supports on the pad, and is 3 feet high.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D6	58	All piping is Ductile Iron, and all is flanged.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>E</b>		<b>Station Valves</b>			
E1	59	Gate valves are either one of Clow F-6102, Mueller A-2360, Kennedy 4561/4701, or American Flow Control - Series 2500.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E2	60	Check Valves are either one of Clow Style 106LW, Mueller #2600-6-01, Kennedy IBBM Swing Check Valve, or American "50" Line with weight and lever.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>F</b>		<b>Force Main</b>			
F1	61	Minimum bury depth is 3 feet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F2	62	Tracer wire is provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F3	63	Plan and profile is provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F4	64	Mechanical restraints along the force main.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F5	65	Gate valve is provided at the end of the header, and is the last valve.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F8	66	The velocity is between 3 and 5 feet per second.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F9	67	Material is HDPE rated 150psi minimum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F9	68	All joints are fused. (Butt-Fussion)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F9	69	Meet the specifications of SAWS Specifications for Construction, Item 900 "Reconstruction of Sanitary Sewer by Bursting/Crushing Replacement Process", Section 900.2.1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>G</b>		<b>Electrical</b>			
G1	70	Electrical service is 480/277 V, 3Φ, 4 wire, and minimum service size is 200 A.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G1	71	General purpose transformer is 10 kVA.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G1	72	All electrical enclosures are NEMA 4X, type 316 stainless steel & Uncoated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G2	73	All mounting hardware is 316 stainless steel, and all the conduits connected to the wet well are properly sealed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G2	74	Panels are lockable with padlock.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G3	75	Main electrical disconnect is equal to Square D, class 3110, 600 V, heavy duty, service rated safety switch, model H36_DS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G3	76	Main protection is either class J time delay fuses or circuit breaker, and are sized according to the load.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G3	77	Surge arrestor is provided, and is installed in a separated enclosure attached to the back of the main enclosure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G4	78	High level float switch is provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G5	79	120 V duplex GFI receptacle in a weather proof box is provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G6	80	Electrical panels conctere pad is 4" minimum (6" max), and is protected from potential flooding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G7	81	Mounting rack is constructed of PVC-coated steel, epoxy coated steel or 316 type stainless steel strut. 1-1/2" minimum, mounted on a 4" galvanized steel pipe. Manufacturer is either UNISTRUT, Kindorf or B-Line.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G7	82	Service pole is within the fence, and is independent from the rack.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

G8	83	Generator connectors are Crouse-Hinds, cam-lok E1016 or E1017 Series, male type. 5 connectors, phases, ground and neutral. Next to the transfer switch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G8	84	Manual transfer switch is equal to Square D, class 3140, 600 V, double throw, non-fused safety switch, NEMA 4X, Model 8234_DS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G8	85	Transfer switch is sized to handle the entire load of the lift station.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G9	86	If the generator is provided, the transfer switch is automatic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G9	87	Generator is fueled by natural gas, and is provided with noise control. Sound level does not exceed 78 dB @ 7 meters (23 ft), 60Hz.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G9	88	4-foot clearance all around the generator.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G10	89	Remote control is provided in the control diagram.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G12	90	All underground electrical conduits are PVC, and are buried 18" to 24".	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G13	91	All exposed conduits are PVC Coated Rigid Metal Type. Metal is not exposed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G14	92	General illumination is provided, 1 foot-candle (average)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G14	93	Task lights are installed under the canopy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G17	94	All electrical components are sized for ultimate built.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G18	95	Soft starter is installed for 50 HP motors or greater, <b>with soft start and soft stop features.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>H</b>		<b>Station Controls, Instrumentation and Monitoring</b>			
H1	96	Primary level monitoring and pump control is Siemens Milltronics HydroRanger 200, Greyline instruments or Drexelbrook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H2	97	SCADA system is provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H2	98	Alarm signals are: Pump ON, Pump Fail, Motor High Temp, Phase Failure, Power Outage, Generator/Utility Power, Force main Pressure, Wet Well Level, Low Water Alarm, High Water Alarm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H3	99	Pressure transmitter is provided, and is located before the last gate valve, and includes an isolation ball valve. Pressure rating exceeds the water hammer psi.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H4	100	Level transducer is located alone in a NEMA 4X stainless steel enclosure on top of the wet well.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H4	101	The high level float switch is located in conjunction with the motor splices on top of the wet well in a NEMA 4X 316 stainless steel box.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H4	102	Nothing blocks the ultrasonic beam.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H6	103	Pressure/Vacuum gauges provided for each pump Discharge/Suction, and are provided with an isolation ball valve. Minimum 4" dial, 5% accuracy, liquid filled. Right psi range.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H7	104	120 V elapsed time meter is provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H7	105	Overload reset button is located on the dead front panel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I</b>		<b>Emergency Provisions</b>			
I2	106	Emergency bypass connection is provided at the header, is flanged, sized according to the pump size, is isolated with a gate valve, and has a "quick-disconnect" male fitting with dust cap.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>J</b>		<b>Submittal Requirements</b>			
J1	107	Includes a detailed cost estimate with updated prices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J1	108	Force main flush time for initial and final phases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J1	109	Includes system curves and pump curves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J1	110	Includes an Energy Analysis comparing different pumps, impellers, and pipe sizes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J1	111	Overall layout map submitted & masterplan (if apply)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2	112	<b>The engineering report have all the following information:</b>			
J2A	113	Project name, date, developer/owner's name, and engineering firm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2B1a	114	Type, location and size of development.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2B1b	115	Lots or buildings to be served.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2B2a	116	Location and type of gravity system the force main will discharge into.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2B2c	117	Stated in the report is: Whether the entire development will be serviced by the proposed phase or if several phases will be involved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2bd	118	State the number of lots will encompass initially and finally if future phases are to be constructed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2C1	119	Incoming flows (ADF, PWWF, MDWF) for all development phases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2C6	120	Total head calculation with C values of 140 & 100.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2C7	121	Net positive suction head (if apply).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2C8	122	Required Wet Well storage volume.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2C9	123	Buyoancy calculations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2C10	124	Water hammer calculations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2D1	125	Average detention time based on Average Daily Flow (ADF) for all phases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2D2	126	Maximum detention time based in Minimum Dry Weather Flow for all phases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2D3	127	Total cycle times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2D4	128	Size, type and length of the force main.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>K</b>		<b>Preferences</b>			
K4	129	All the electrical components are within the fence.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K5	130	Control panels are dead front type.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K6	131	Generator have clear access to the connection pannel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

K7	132	Electrical control diagram is shown.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K8	133	Electrical one line diagram is shown.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B19	134	Wet Well depth is less than 20 feet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K12	135	Located and sent the LS site in the MAPSCO book, and sent it to Alberto Baiza, Daryl Flagg, Tony Alvarez, David Dera, Gary Collins, Jorge Monserrate & Phil McDonald.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K13	136	Send 4 sets of drawings to Eddie Gonzales for Approval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Reviewed by:** Nelson Barrera

**Date Received:** \_\_\_\_\_

**Date Complete:** \_\_\_\_\_

Check List Last Update: 10/13/2007

# LIFT STATION ASSESSMENT CHECK LIST

Lift Station: \_\_\_\_\_

Location: \_\_\_\_\_

Map No. \_\_\_\_\_

Guideline Section	Item No.	Description	Yes	No
<b>A</b>		<b>General Requirements</b>		
A1	1	Cost analysis comparing a Gravity Main vs a Lift Station plus 30 year of operation & maintenance.	<input type="checkbox"/>	<input type="checkbox"/>
A2	2	Lift Station sized for ultimate built out.	<input type="checkbox"/>	<input type="checkbox"/>
A4	3	Engineering Report and Plans are Sealed by a Texas Professional Engineer.	<input type="checkbox"/>	<input type="checkbox"/>
A6	4	Does the lift station have insufficient pumping capacity issues?	<input type="checkbox"/>	<input type="checkbox"/>
A8	5	<b>Access Road</b>		
A8	6	Access Road located in a dedicated right-of-way or permanent easement.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A8	7	Minimum width of 16 feet, and all weather conditions road.	<input type="checkbox"/>	<input type="checkbox"/>
A8	8	Include Plan and Profile sheets, and drain pipes, details and engineering calculations.	<input type="checkbox"/>	<input type="checkbox"/>
A8	9	Provided with soil erosion protection.	<input type="checkbox"/>	<input type="checkbox"/>
A8	10	Minimize turns and achieve the straightest possible alignment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A8	11	Is it a phase development?	<input type="checkbox"/>	<input type="checkbox"/>
A8	12	Is it a temporary access road?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A8	13	Free of obstacles (vehicles, trash dumpsters, curves, posts, fences, landscapes, parking stalls, stripping, etc...).	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A9	14	8-Foot gates.	<input type="checkbox"/>	<input type="checkbox"/>
A9	15	Is a turn around needed? (due to heavily traveled areas).	<input type="checkbox"/>	<input type="checkbox"/>
A10	16	Lift Station is protected from the 100-year flood event.	<input type="checkbox"/>	<input type="checkbox"/>
A11	17	6 foot fence with 1 foot of barbed wire.	<input type="checkbox"/>	<input type="checkbox"/>
A12	18	Minimum hatch dimensions are 3' x 4' (36" x 48").	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A12	19	Hatch is provided with a safety grate made of aluminum or non corrosive fiberglass reinforced material to provide fall protection.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A13	20	Buoyancy calculations in engineering report.	<input type="checkbox"/>	<input type="checkbox"/>
A14	21	All the Lift Station site is completely paved.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A15	22	3/4" minimum water service with hose bib and bacuum breaker, located near the wet well, and freeze proof type.	<input type="checkbox"/>	<input type="checkbox"/>
A16	23	Freeze proof type eyewash station, and are located near the wet well.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A17	24	Is enough space to install the canopy?	<input type="checkbox"/>	<input type="checkbox"/>
A18	25	Calculations for H2S generation in wet well and force main.	<input type="checkbox"/>	<input type="checkbox"/>
A19	26	For exposed pipe, valves, and fittings <b>outside the wet well</b> receive after installation a 100% solids epoxy coating system with a top coat system of urethane (note must be included in drawings) Color Grey Pantone # 431U.	<input type="checkbox"/>	<input type="checkbox"/>
A20	27	For exposed pipe, valves, and fittings <b>within the wet well</b> receive after installation a 100% solids coal tar epoxy coating system (note must be included in drawings) Color Grey Pantone #431U.	<input type="checkbox"/>	<input type="checkbox"/>
	28	Approved manufacturers (Tnemec, Carboline, Sherwing-Williams, PPG, and M.A.B. Paints).	<input type="checkbox"/>	<input type="checkbox"/>
<b>B</b>		<b>Wet Well Design</b>		
B1	29	Minimum size is 6'	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B1	30	Fiberglass Type (if Precast Type, must made arrangements with SAWS to discuss sections B5 to B8 for coatings, dimensions, etc.). Approved manufacturer is L.F. Manufacturing or Containment Solutions or approved equal.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B2	31	Does the wet well have enough emergency storage capacity?	<input type="checkbox"/>	<input type="checkbox"/>
B3	32	Detention time is less than 180 min for all phases	<input type="checkbox"/>	<input type="checkbox"/>
B3	33	Odor control (if required) consist of drum scrubber Purafil. It operates at 99.5% gas removal.	<input type="checkbox"/>	<input type="checkbox"/>

B9	34	18" of subgrade level at the bottom of the wet well structure and 6" of flexible base for support.	<input type="checkbox"/>	<input type="checkbox"/>
B10	35	Gravel subgrade filler around the wet well is 1/3 the depth of the wet well measured from the bottom.	<input type="checkbox"/>	<input type="checkbox"/>
B11	36	316 stainless screen on goose neck vent. Minimum size is 4".	<input type="checkbox"/>	<input type="checkbox"/>
B16	37	Manual lighting/ventilation switch is installed to override the automatic control.	<input type="checkbox"/>	<input type="checkbox"/>
B17	38	Adecuate access for hoisting equipment or crane.	<input type="checkbox"/>	<input type="checkbox"/>
B18	39	All chanis, cables, guide bars, fasteners, brackets, bolts, nuts, washers, anchor bolts etc... inside the wet well are 316 stainless steel.	<input type="checkbox"/>	<input type="checkbox"/>
<b>C</b>		<b>Pumping Equipment</b>		
C1	40	Alternating duplex station as minimum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C1	41	Pump is centrifugal, non-clog, 3" throughlet, and performing well.	<input type="checkbox"/>	<input type="checkbox"/>
C1	42	Minimum suction/discharge size is 4".	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C2	43	Minimum pump power is 5 HP, 460 V, 3Φ.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C3	44	Minimum total cycle time is 6 minutes.	<input type="checkbox"/>	<input type="checkbox"/>
C4	45	Level control device is fully accessible without entering the wet well, and is unaffected by the pumps, pipes, etc...	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C6	46	Minimum hydraulic efficiency is 65%.	<input type="checkbox"/>	<input type="checkbox"/>
<b>D</b>		<b>Station Piping</b>		
D1	47	Pipe reducer is eccentric type.	<input type="checkbox"/>	<input type="checkbox"/>
D2	48	Surge relief valve is provided, and is provided with an isolation ball/gate valve of blonze or stainless steel 316. Properly mounted.	<input type="checkbox"/>	<input type="checkbox"/>
D5	49	Piping is supported by concrete or metal manufactured supports on the pad, and is 3 feet high.	<input type="checkbox"/>	<input type="checkbox"/>
D6	50	All piping is Ductile Iron, and all is flanged.	<input type="checkbox"/>	<input type="checkbox"/>
D8	51	Pressure gauges provided for each pump discharge, and are provided with an isolation ball valve. Minimum 4" dial, 5% accuracy, liquid filled.	<input type="checkbox"/>	<input type="checkbox"/>
<b>E</b>		<b>Station Valves</b>		
E1	52	Gate valves are either one of Clow F-6100, Mueller A-2370, Kennedy 4561/4701, or American Flow Control - Series 2500.	<input type="checkbox"/>	<input type="checkbox"/>
E2	53	Check Valves are either one of Clow F5345, Mueller #2600-6-01, Kennedy IBBM Swing Check Valve, or American "50" Line with weight and lever.	<input type="checkbox"/>	<input type="checkbox"/>
<b>F</b>		<b>Force Main</b>		
F1	54	Minimum bury depth is 3 feet.	<input type="checkbox"/>	<input type="checkbox"/>
F2	55	Tracer wire is provided.	<input type="checkbox"/>	<input type="checkbox"/>
F3	56	Plan and profile is provided.	<input type="checkbox"/>	<input type="checkbox"/>
F4	57	Mechanical restraints along the force main.	<input type="checkbox"/>	<input type="checkbox"/>
F5	58	Gate valve is provided at the end of the header, is provided with an isolation ball valve, and is the last valve.	<input type="checkbox"/>	<input type="checkbox"/>
F8	59	The velocity is between 3 and 6 feet per second.	<input type="checkbox"/>	<input type="checkbox"/>
F9	60	Material is HDPE or PVC.	<input type="checkbox"/>	<input type="checkbox"/>
<b>G</b>		<b>Electrical</b>		
G1	61	Electrical service is 480/277 V, 3Φ, 4 wire, and minimum service size is 200 A.	<input type="checkbox"/>	<input type="checkbox"/>
G1	62	General purpose transformer is 10 kVA.	<input type="checkbox"/>	<input type="checkbox"/>
G1	63	All electrical enclosures are NEMA 4X, NEMA 3R type 316 stainless steel.	<input type="checkbox"/>	<input type="checkbox"/>
G2	64	All mounting hardware is 316 stainless steel, and all the conduits connected to the wet well are properly sealed.	<input type="checkbox"/>	<input type="checkbox"/>
G3	65	Main electrical disconnect is equal to Square D, class 3110, 600 V, heavy duty, service rated safety switch, model H36_DS.	<input type="checkbox"/>	<input type="checkbox"/>
G3	66	Main protection is either class J time delay fuses or circuit breaker, and are sized according to the load.	<input type="checkbox"/>	<input type="checkbox"/>
G3	67	Surge arrestor is provided, and is installed in a separated enclosure attached to the back of the main enclosure.	<input type="checkbox"/>	<input type="checkbox"/>
G4	68	High level float switch is provided.	<input type="checkbox"/>	<input type="checkbox"/>
G5	69	120 V duplex GFI receptacle in a weather proof box is provided.	<input type="checkbox"/>	<input type="checkbox"/>
G6	70	Electrical panels conctere pad is 4" minimum (6" max), and is protected from potential flooding.	<input type="checkbox"/>	<input type="checkbox"/>

G7	71	Mounting rack is constructed of PVC-coated steel, epoxy coated steel or 316 type stainless steel strut. 1-1/2" minimum, mounted on a 4" galvanized steel pipe. Manufacturer is either UNISTRUT, Kindorf or B-Line.	<input type="checkbox"/>	<input type="checkbox"/>
G7	72	Service pole is within the fence, and is independent from the rack.	<input type="checkbox"/>	<input type="checkbox"/>
G8	73	Generator connectors are Crouse-Hinds, cam-lok E1016 or E1017 Series, male type. 5 connectors, phases, ground and neutral. Next to the transfer switch.	<input type="checkbox"/>	<input type="checkbox"/>
G8	74	Manual transfer switch is equal to Square D, class 3140, 600 V, double throw, non-fused safety switch, NEMA 4X, Model 8234_DS.	<input type="checkbox"/>	<input type="checkbox"/>
G8	75	Transfer switch is sized to handle the entire load of the lift station.	<input type="checkbox"/>	<input type="checkbox"/>
G8	76	Generator is fueled by natural gas, and is provided with noise control.	<input type="checkbox"/>	<input type="checkbox"/>
G9	77	Remote control is provided in the control diagram.	<input type="checkbox"/>	<input type="checkbox"/>
G11	78	Rigid PVC coated steel is used in all 90° turn down from lift station slab.	<input type="checkbox"/>	<input type="checkbox"/>
G12	79	All underground electrical conduits are PVC, and are buried 18" to 24".	<input type="checkbox"/>	<input type="checkbox"/>
G14	80	General illumination is provided, 1 foot-candle (average)	<input type="checkbox"/>	<input type="checkbox"/>
G14	81	Task lights are installed under the canopy.	<input type="checkbox"/>	<input type="checkbox"/>
G17	82	All electrical components are sized for ultimate built.	<input type="checkbox"/>	<input type="checkbox"/>
G18	83	Soft starter is installed for 50 HP motors or greater.	<input type="checkbox"/>	<input type="checkbox"/>
G19	84	Flood plain is provided.	<input type="checkbox"/>	<input type="checkbox"/>
<b>H</b>		<b>Station Controls, Instrumentation and Monitoring</b>		
H1	85	Primary level monitoring and pump control is Siemens Milltronics HydroRanger 200, Greyline instruments or Drexelbrook.	<input type="checkbox"/>	<input type="checkbox"/>
H2	86	SCADA system is provided.	<input type="checkbox"/>	<input type="checkbox"/>
H2	87	Alarm signals are: Pump ON, Pump Fail, Motor High Temp, Phase Failure, Power Outage, Generator/Utility Power, Force main Pressure, Wet Well Level, Low Water Alarm, High Water Alarm.	<input type="checkbox"/>	<input type="checkbox"/>
H3	88	Level transducer is located alone in a NEMA 4X stainless steel enclosure on top of the wet well.	<input type="checkbox"/>	<input type="checkbox"/>
H3	89	The high level float switch is located in conjunction with the motor splices on top of the wet well in a NEMA 4X 316 stainless steel. Box.	<input type="checkbox"/>	<input type="checkbox"/>
H6	90	120 V elapsed time meter is provided.	<input type="checkbox"/>	<input type="checkbox"/>
H6	91	Overload reset button is located on the dead front panel.	<input type="checkbox"/>	<input type="checkbox"/>
<b>I</b>		<b>Emergency Provisions</b>		
I2	92	Emergency bypass connection is provided at the header, is flanged, sized according to the pump size, is isolated with a gate valve, and has a "quick-disconnect" male fitting with dust cap.	<input type="checkbox"/>	<input type="checkbox"/>
I2	93	Emergency bypass is provided with a check valve.	<input type="checkbox"/>	<input type="checkbox"/>
<b>J</b>		<b>Submittal Requirements</b>		
J2	94	The engineering report have all the following information:		
J2A	95	Project name, date, developer, owner's name, and engineering firm.	<input type="checkbox"/>	<input type="checkbox"/>
J2B1a	96	Type, location and size of development.	<input type="checkbox"/>	<input type="checkbox"/>
J2B1b	97	Lots or buildings to be served.	<input type="checkbox"/>	<input type="checkbox"/>
J2B2a	98	Location and type of gravity system the force main will discharge into.	<input type="checkbox"/>	<input type="checkbox"/>
J2B2c	99	Stated in the report is: Whether the entire development will be serviced by the proposed phase or if several phases will be involved.	<input type="checkbox"/>	<input type="checkbox"/>
J2bd	100	State the number of lots will encompass initially and finally if future phases are to be constructed.	<input type="checkbox"/>	<input type="checkbox"/>
J2C1	101	Incoming flows (ADF, PWWF, MDWF).	<input type="checkbox"/>	<input type="checkbox"/>
J2C6	102	Total head calculation with C values of 140 & 100.	<input type="checkbox"/>	<input type="checkbox"/>
J2C7	103	Net positive suction head (if apply).	<input type="checkbox"/>	<input type="checkbox"/>
J2C8	104	Required Wet Well storage volume.	<input type="checkbox"/>	<input type="checkbox"/>
J2C9	105	Buyoancy calculations.	<input type="checkbox"/>	<input type="checkbox"/>
J2C10	106	Water hammer calculations.	<input type="checkbox"/>	<input type="checkbox"/>
J2D1	107	Average detention time based on Average Daily Flow (ADF) for all phases.	<input type="checkbox"/>	<input type="checkbox"/>
J2D2	108	Maximum detention time based in Minimum Dry Weather Flow for all phases.	<input type="checkbox"/>	<input type="checkbox"/>
J2D3	109	Total cycle times.	<input type="checkbox"/>	<input type="checkbox"/>
J2D4	110	Size, type and length of the force main.	<input type="checkbox"/>	<input type="checkbox"/>
<b>K</b>		<b>Preferences</b>		

K1	111	Overall layout map submitted.	<input type="checkbox"/>	<input type="checkbox"/>
K2	112	Proposed grades shown on drawings.	<input type="checkbox"/>	<input type="checkbox"/>
K3	113	Proposed elevations of the driveway are shown.	<input type="checkbox"/>	<input type="checkbox"/>
K4	114	Top of the concrete slab is 4" min / 6" max over the finish grade.	<input type="checkbox"/>	<input type="checkbox"/>
K5	115	All the electrical components are within the fence.	<input type="checkbox"/>	<input type="checkbox"/>
K6	116	Control panels are dead front type.	<input type="checkbox"/>	<input type="checkbox"/>
K7	117	Generator have clear access to the connection pannel.	<input type="checkbox"/>	<input type="checkbox"/>
K8	118	Flood plain and required calculations to guarantee that the lift station is out of the 100 year flood event are provided, and are dated, signed and sealed by a Texas Professional Engineer.	<input type="checkbox"/>	<input type="checkbox"/>
K9	119	The site is protected from storm runoffs.	<input type="checkbox"/>	<input type="checkbox"/>
K10	120	Electrical control diagram is shown.	<input type="checkbox"/>	<input type="checkbox"/>
K11	121	Electrical one line diagram is shown.	<input type="checkbox"/>	<input type="checkbox"/>
K12	122	The distance between the inflow invert and the bottom of the wet well is 5' minimum.	<input type="checkbox"/>	<input type="checkbox"/>
K13	123	If a straight access road is not provided, an adecuated turn around is provided to allow a 18 wheeler tanker truck to freely turn around.	<input type="checkbox"/>	<input type="checkbox"/>
K14	124	The access road allows to the maintenance vehicles to arrive directly to the wet well without the need of maneuvering within the site.	<input type="checkbox"/>	<input type="checkbox"/>
K15	125	Wet Well depth is less than 20 feet.	<input type="checkbox"/>	<input type="checkbox"/>
K16	126	Level transducer is located in a maner that nothing will block the ultrasonic beam.	<input type="checkbox"/>	<input type="checkbox"/>
K17	127	Located and sent the LS site in the MAPSCO book, and sent it to Alberto Baiza, Darly Flaggs, Tony Alvarez, David Dera, Gary Collins, Jorge Monserrate & Phil McDonald.	<input type="checkbox"/>	<input type="checkbox"/>
K18	128	Send 4 sets of drawings to Eddie Gonzales for Approval	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments: \_\_\_\_\_  
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**Reviewed by:** Nelson Barrera

**Date Received:** \_\_\_\_\_

**Date Complete:** \_\_\_\_\_

Check List Last Update: 9/13/2007