

# **LAKEWAY MUD (LMUD) CONSTRUCTION NOTES**

## **GENERAL NOTES**

1. WATER AND WASTEWATER UTILITIES SHALL BE INSTALLED BY EXPERIENCED PERSONNEL FAMILIAR WITH THE WORK AND SUPERVISED BY A QUALIFIED FOREMAN.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND IN KIND REPLACEMENT OF ALL EXISTING BERMS, DRIVEWAYS, SIDEWALKS, ROADWAYS, PIPE CULVERTS, CULVERT HEADWALLS, FENCES, AND MISCELLANEOUS ITEMS WHERE REQUIRED TO COMPLETE CONSTRUCTION.
3. UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE AND HAVE NOT BEEN INDEPENDENTLY VERIFIED. CONTRACTOR SHALL CONTACT THE AUSTIN AREA "ONE CALL" SYSTEM AT "811" (1-800-344-8377) FOR EXISTING UTILITY LOCATIONS A MINIMUM OF 48 HOURS PRIOR TO EXCAVATION AND VERIFY LOCATIONS SUBJECT TO DAMAGE OR ALTERATION BY THE CONSTRUCTION WORK. NOTE THAT "ONE CALL" DOES NOT APPLY TO ALL UTILITIES IN LAKEWAY. CONTACT LMUD FOR ASSISTANCE IN OBTAINING EXISTING WATER AND WASTEWATER LOCATIONS. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING WORK AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES.
4. ALL WATER SERVICE, WASTEWATER SERVICE AND VALVE LOCATIONS SHALL BE APPROPRIATELY MARKED AS FOLLOWS:

WATER SERVICE	"W" ON TOP OF CURB (BLUE COLOR)
WASTEWATER SERVICE	"S" ON TOP OF CURB
VALVE	"V" ON FACE OF CURB

TOOLS FOR MARKING THE CURB SHALL BE PROVIDED BY THE CONTRACTOR. OTHER APPROPRIATE MEANS OF MARKING SERVICE AND VALVE LOCATIONS SHALL BE PROVIDED IN AREAS WITHOUT CURBS, SUCH MEANS OF MARKING SHALL BE AS SPECIFIED BY THE ENGINEER AND ACCEPTED BY LMUD.

5. THE CONTRACTOR SHALL PROVIDE LMUD NO LESS THAN 48 HOURS NOTICE PRIOR TO CONNECTING TO EXISTING PIPELINES OR PERFORMING DISINFECTION (CHLORINATION), DECHLORINATION, QUALITY TESTING OR PRESSURE TESTING. LINE FLUSHING OR ANY ACTIVITY USING A LARGE QUANTITY OF WATER MUST BE SCHEDULED A MINIMUM 10 DAYS IN ADVANCE WITH LMUD.
6. THE CONTRACTOR SHALL NOT OPEN OR CLOSE ANY LMUD SYSTEM VALVES UNLESS AUTHORIZED BY LMUD.
7. BEFORE ANY PIPE IS LAID, SUBGRADE MUST BE ESTABLISHED AND CURB AND FINISHED GRADE STAKES INSTALLED.
8. NO DRY UTILITIES (I.E. ELECTRIC, GAS, TELEPHONE) SHALL BE LOCATED NEARER THAN 5- FEET (5') HORIZONTALLY AND 2- FEET (2') VERTICALLY OF WATER AND WASTEWATER FACILITIES.
9. NO TREES SHALL BE PLANTED WITHIN 7- FEET (7') OF A WATER OR WASTEWATER LINE OR SERVICE.
10. DEWATERING OF TRENCHES, AS REQUIRED, IS THE RESPONSIBILITY OF THE CONTRACTOR.

11. SAND SHALL NOT BE USED FOR PIPE BEDDING. ACCEPTABLE BEDDING MATERIAL FOR WATER AND WASTEWATER LINES INCLUDES PIPE BEDDING STONE, PEA GRAVEL, OR STONE MATERIAL CONFORMING TO ASTM C33 FOR STONE QUALITY, MEETING THE FOLLOWING GRADATION SPECIFICATION:

<u>SIEVE SIZE</u>	<u>PERCENT RETAINED BY WEIGHT</u>
1/2"	0
3/8"	0-2
#4	40-85
#10	95-100

12. IF CONSTRUCTION WATER WILL BE FURNISHED BY LMUD, CONTRACTOR SHALL COORDINATE WITH LMUD TO IDENTIFY AN APPROPRIATE LOCATION FOR INSTALLATION OF A BULK WATER CONSTRUCTION METER VIA REFUNDABLE DEPOSIT TO LMUD. INSTALLATION OF THE METER AND THE COST OF WATER FOR CONSTRUCTION WILL BE AT CONTRACTOR'S EXPENSE.

**PIPING/VALVES**

1. UNLESS OTHERWISE APPROVED BY LMUD, PIPE MATERIAL FOR WATER MAINS SHALL BE PVC (AWWA C-900, MIN. CLASS 200), OR DUCTILE IRON (AWWA C-100, MIN. CLASS 200). WATER SERVICES (2" OR LESS) SHALL BE POLYETHYLENE TUBING (BLACK, 200 PSI, DR9).
2. UNLESS OTHERWISE APPROVED BY LMUD, PIPE MATERIAL FOR WASTEWATER FORCE MAINS SHALL BE PVC (AWWA C-900, MIN. CLASS 150), SDR26 (HIGHER PRESSURE RATING, 160 PSI), OR DUCTILE IRON (AWWA C-100, MIN. CLASS 200). PIPE MATERIAL FOR GRAVITY WASTEWATER MAINS SHALL BE SDR26 PVC, PVC (ASTM D2241 OR D3034 MAX DR-26), DUCTILE IRON (AWWA C-100, MIN. CLASS 200).
3. ALL FIRE HYDRANT LEADS SHALL BE DUCTILE IRON PIPE (AWWA C-100, MIN CLASS 200).
4. UNLESS OTHERWISE DIRECTED BY LMUD, DEPTH OF COVER FOR ALL LINES SHALL BE A MINIMUM OF 48-INCH (48") BELOW SUBGRADE. CREEK CROSSINGS SHALL BE A MINIMUM 6- FEET (6') DEEP AND CONCRETE ENCASED.
5. ALL VALVE BOXES AND COVERS SHALL BE CAST IRON, ADJUSTABLE SCREW TYPE, UNLESS OTHERWISE NOTED.
6. ALL IRON PIPE AND FITTINGS SHALL BE WRAPPED WITH MINIMUM 8-MIL POLYETHYLENE AND SEALED WITH DUCTAPE OR EQUAL ACCEPTED BY LMUD.
7. ALL PIPES SHALL BE MARKED WITH 12-INCH (12") DETECTABLE TAPE FOR EASE OF IDENTIFICATION.
8. ALL GRAVITY WASTEWATER MAINS MUST BE 8-INCH (8") MINIMUM.
9. ALL WATER AND WASTEWATER CONTRUCTION SHALL BE IN ACCORDANCE WITH TCEQ REGULATIONS 30 TAC §290 AND §217, RESPECTIVELY. WHENEVER TCEQ AND LMUD SPECIFICATIONS CONFLICT, THE MORE STRINGENT SHALL APPLY.
10. PIPE JOINT DEFLECTIONS SHALL BE NO GREATER THAN 50% OF THE MANUFACTURER'S RECOMMENDED MAXIMUM DEFLECTION, UNLESS OTHERWISE NOTED ON THE PLANS. THE CONTRACTOR SHALL PROVIDE APPROPRIATE JOINTS OR FITTINGS WHEREVER REQUIRED FOR

THE PARTICULAR TYPE OF PIPE MATERIAL PROPOSED EVEN IF THEY ARE NOT CALLED OUT ON THE PLANS.

11. ALL PI'S, TEES, TIE-INS AND FIRE HYDRANTS SHALL BE THRUST BLOCKED AS PER THE DETAILS, AND MECHANICALLY RESTRAINED. ALL VALVES AND FITTINGS SHALL BE MEGA LUGGED OR FACTORY RESTRAINED. JOINT RESTRAINT ADAPTERS WILL NOT BE ALLOWED WITHOUT PRIOR APPROVAL BY LMUD AND ANY USE OF JOINT RESTRAINT ADAPTERS WOULD REQUIRE INSTALLATION WITH THRUST BLOCKING.
12. WATER LINES WHICH ARE STUBBED OUT SHALL BE REQUIRED TO PASS DRIVEWAYS AND HAVE A VALVE AND A 20-FOOT SECTION INSTALLED FOR FUTURE USE.
13. IF A VALVE OPERATING NUT IS TO BE DEEPER THAN 36-INCHES (36"), AN EXTENSION MUST BE ADDED TO BRING THE NUT TO WITHIN 24-INCHES (24") OF FINISHED GRADE.
14. IF A VALVE IS TO BE LOCATED OUTSIDE OF PAVEMENT AREA, THE CONTRACTOR WILL MARK THE VALVE LOCATION WITH A "V" MARKER. VALVES WILL BE RAISED TO FINISHED GRADE PRIOR TO PAVING.
15. IF ANY MAIN OR SERVICE LINE IS INTENDED TO BE CONSTRUCTED UNDER A WALL OR OTHER STRUCTURE WHICH WOULD RENDER THE LINE INACCESSIBLE FOR REPAIR, THAT LINE SHALL BE SLEEVED FOR TEN FEET (10') ON EITHER SIDE OF THE STRUCTURE. THE SLEEVE SHALL ALLOW FOR THE REMOVAL OF THE LENGTH OF LINE UNDER THE WALL.
16. NO VALVES WILL BE OPENED WHICH CONNECT NEW SERVICES TO THE EXISTING SYSTEM WITHOUT PRIOR LMUD APPROVAL AND A LMUD REPRESENTATIVE PRESENT. SEWER LINES SHALL BE FLUSHED AND WATER LINES PROPERLY DISINFECTED AND TESTED PRIOR TO CONNECTING TO THE EXISTING SYSTEM. CONTRACTOR IS RESPONSIBLE FOR ALL ASSOCIATED WORK.
17. ALL WATER LINES WHICH ARE DEAD-ENDED SHALL HAVE FIRE HYDRANTS OR APPROVED 2-FOOT BLOW OFF VALVES INSTALLED FOR FLUSHING.

### **FLUSHING, TESTING AND INSPECTION**

1. WASTEWATER LINES SHALL BE MANDREL TESTED. MANHOLES OR WASTEWATER LINES UNABLE TO PASS A MANDREL SHALL BE REPAIRED AT CONTRACTOR EXPENSE.
2. WASTEWATER LINES AND MANHOLES SHALL PASS LOW PRESSURE AND VACUUM TESTS, RESPECTIVELY, PRIOR TO ACCEPTANCE.
3. ALL WASTEWATER LINES SHALL BE CAMERA TESTED AFTER INSTALLATION, BUT ONLY AFTER CASTINGS ARE RAISED, MANHOLES COATED AND HYDRO JETTING COMPLETED.
4. AIR PRESSURE TESTS ON WET TAPS SHALL BE 100 PSI (POUNDS PER SQUARE INCH) FOR TEN (10) MINUTES.
5. WATER LINE TESTING AND DISINFECTION SHALL BE PERFORMED IN ACCORDANCE WITH AWWA STANDARDS AND TCEQ RULES. CONTRACTOR WILL PROVIDE ANY FITTINGS, VALVES AND OTHER APPURTENANCES NECESSARY FOR DISINFECTION AND FLUSHING, AS NEEDED. ALL MAINS WILL BE CHLORINATED FOR 24-HOURS AT 50 PPM (PARTS PER MILLION) CHLORINE USING PRE-DISSOLVED INJECTION SYSTEMS ONLY. THE STERILIZATION PROCEDURE SHALL BE MONITORED BY LMUD PERSONNEL.

6. THE CONTRACTOR, AT HIS EXPENSE, SHALL PERFORM QUALITY AND HYDROSTATIC TESTING FOR ALL PIPE INSTALLED AND SHALL PROVIDE ALL SUPPLIES AND LABOR NECESSARY TO PERFORM THE TESTS. QUALITY AND PRESSURE TESTING SHALL BE MONITORED BY LMUD PERSONNEL. HYDROSTATIC AND BACTERIOLOGICAL TESTS SHALL BE CONDUCTED EVERY 1500 FEET, AT MINIMUM.
7. ALL FORCE MAINS AND WATER MAINS SHALL BE PRESSURE TESTED AT A MINIMUM 200 PSI FOR 10 MINUTES AND 150 PSI FOR 60 MINUTES WITH ZERO PRESSURE LOSS, UNLESS OTHERWISE SPECIFIED BY LMUD. [SITE CONDITIONS MAY REQUIRE VARIATION OF TEST PROCEDURES.]
8. SAMPLING TAPS SHALL BE BROUGHT UP TO 3-FEET (3') ABOVE GRADE AND SHALL BE EASILY ACCESSIBLE. SAMPLES FOR BACTERIOLOGICAL TESTING WILL BE COLLECTED NOT LESS THAN 24 HOURS AFTER THE TREATED LINE HAS BEEN FLUSHED OF THE CONCENTRATED CHLORINE SOLUTION AND CHARGED WITH WATER APPROVED BY LMUD.
9. ALL MATERIAL TESTS, INCLUDING SOIL DENSITY TESTS AND RELATED SOIL ANALYSIS, SHALL BE ACCOMPLISHED BY A QUALIFIED INDEPENDENT LABORATORY.
10. THE CONTRACTOR SHALL PROVIDE LMUD COPIES OF ALL RELEVANT TEST RESULTS PRIOR TO ACCEPTANCE OF THIS PROJECT.

#### **WASTEWATER**

1. ALL MANHOLE LIDS SHALL BE CAST IRON WITH WORDS "SANITARY SEWER." NO CITY OF AUSTIN MANHOLE LIDS WILL BE ACCEPTED.
2. HDPE OR COMPOSITE RINGS FOR MANHOLES ARE ACCEPTABLE. ALL MANHOLE COVERS SHALL BE THE BOLT DOWN TYPE REGARDLESS OF LOCATION.
3. ALL FORCE MAINS SHALL BE WHITE WITH BROWN POLY WRAP STATING "FORCE MAIN". "FORCE MAIN" 12-INCH (12") WIDE MAGNETIC TAPE SHALL BE PLACED 18-INCHES (18") BELOW FINISHED GRADE.
4. LIFT STATIONS WHICH ARE NOT COMPOSITE OR FIBERGLASS WILL BE COATED INSIDE WITH SELF-PRIMING POLYURETHANE LINING ("SPRAYWALL") BY FUQUAY TO MANUFACTURER RECOMMENDED THICKNESS, MINIMUM.
5. PENETRATIONS TO EXISTING CONCRETE MANHOLES AND LIFT STATIONS SHALL BE VIA PRECISE CORING, WITH LINK-SEAL APPROPRIATE FOR THE PENETRATION INSTALLED AND BOTH SIDES OF THE PENETRATION FINISHED WITH HYDRAULIC GROUT. A REPAIR COATING OF SELF-PRIMING POLYURETHANE LINING ("SPRAYWALL") BY FUQUAY SHALL BE APPLIED ON THE INTERIOR SURFACE DAMAGED BY CORING. COORDINATE WITH LMUD FOR APPROVED APPLICATOR.
6. EXISTING MANHOLES TO BE TIED INTO AND MODIFIED WETWELLS MUST BE REFURBISHED TO NEW CONDITION. REFURBISHMENT INCLUDES RECOATING WITH SELF-PRIMING POLYURETHANE LINING ("SPRAYWALL") BY FUQUAY TO MANUFACTURER RECOMMENDED THICKNESS, MINIMUM.
7. MANHOLE FRAMES AND COVERS SHALL BE RAISED TO FINISHED PAVEMENT GRADE BY THE CONTRACTOR PRIOR TO FINAL CONSTRUCTION/PAVING.

8. MANHOLES NOT IN THE PAVEMENT MUST BE 1-FOOT (1') ABOVE GRADE.

### **REQUIREMENTS FOR GPS LOCATION OF IMPROVEMENT AND AS-BUILT DOCUMENTATION**

IMPROVEMENTS SHALL BE LOCATED USING GLOBAL POSITIONING SYSTEM (GPS) AS THEY ARE INSTALLED AND USED TO PRODUCE THE AS-BUILT DRAWINGS FOR EACH PROJECT. DIGITAL AND HARD COPIES OF THESE AND OTHER PROJECT DOCUMENTS SHALL BE SUPPLIED TO AND APPROVED BY LMUD PRIOR TO PROJECT ACCEPTANCE.

#### **A. GPS REQUIREMENTS**

1. GPS LOCATIONS SHALL BE TAKEN WITH A MINIMUM ACCURACY OF:
  - i. HORIZONTAL +/- 4"
  - ii. VERTICAL +/- 6"
2. GPS LOCATION SHALL BE TAKEN, AND THE RESULTING DRAWING PREPARED IN STATE PLANE COORDINATE SYSTEM (NAD 1983 STATE PLANE TEXAS CENTRAL FIPS 4203 FEET).
3. GPS POINTS SHALL BE DELIVERED IN THREE DIMENSIONS (X, Y AND Z COORDINATES).
4. GPS POINTS SHALL BE TAKEN FOR ALL CHANGES IN ALIGNMENT OF THE PIPING AND AT ALL APPURTENANCES AND IMPROVEMENTS, INCLUDING:
  - i. WATER LINES AND FORCE MAINS – ALL FITTINGS, VALVES, FIRE HYDRANTS (GPS LOCATION AT BOTTOM FLANGE); SERVICES & FORCE MAIN CLEANOUTS (GPS ON CENTER OF LID),
  - ii. GRAVITY LINES – MANHOLES (GPS LOCATIONS ON CENTER OF THE TOP COVER AND THE FLOWLINES).

#### **B. DRAWING REQUIREMENTS**

1. AS-BUILT PLANS SHALL BE PREPARED USING THE GPS LOCATIONS OF THE UTILITIES.
2. THE AS-BUILT DRAWING SHALL BE DELIVERED IN DWG FORMAT AND IN MODEL SPACE.
3. DRAWINGS SHALL BE DRAWN IN U.S. SURVEY FEET AT A 1:1 SCALE AND IN THE STATE PLANE COORDINATE SYSTEM (NAD 1983 STATE PLANE TEXAS CENTRAL FIPS 4203 FEET).
4. IMPROVEMENTS SHALL BE ON DISTINCT AND SEPARATE LAYERS, WITH DESCRIPTIVE LAYER NAMES THAT INDICATE THE TYPE OF IMPROVEMENT. PIPELINE LAYERS SHALL ALSO INDICATE THE NOMINAL SIZE OF THE PIPELINES.
5. THE AS-BUILT DRAWING SHALL BE DELIVERED WITH LINES THAT ARE SOLID, CONTINUOUS AND SNAPPED AT ALL INTERSECTIONS.
  - i. WATER LINES AND FORCE MAINS SHALL BE SPLIT AND SNAPPED AT ALL SYSTEM VALVES, FITTINGS AND APPURTENANCES.
  - ii. GRAVITY WASTEWATER LINES SHALL BE STRAIGHT TWO-POINT LINES THAT ARE SPLIT AND SNAPPED AT MANHOLES AND SHALL BE DRAWN IN THE DIRECTION OF THEIR PHYSICAL FLOW. THE BEGINNING POINT OF THE LINE SHALL BE ITS UPSTREAM END.

C. SUBMISSION PROCEDURE

1. THE FOLLOWING SHALL BE SUBMITTED TO LMUD:
  - i. AS-BUILT DRAWING IN DWG FORMAT,
  - ii. FULL-SIZE PAPER COPY OF THE FULL AS-BUILT PLANS, STAMPED OR NOTED AS SUCH,
  - iii. DIGITAL COPY IN PDF FORMAT OF THE FULL AS-BUILT PLANS,
  - iv. DIGITAL COPY IN PDF FORMAT OF THE PROJECT'S DESIGN/ENGINEERING REPORT, SUBMITTALS AND OPERATION & MAINTENANCE MANUAL(S).
2. DIGITAL FILES SHALL BE SUBMITTED ON A USB FLASH DRIVE, OR OTHER MEDIUM APPROVED BY LMUD.
3. ALL PLANS, FILES AND INFORMATION SUBMITTED SHALL BE THE PROPERTY OF LMUD UPON DELIVERY.