### ADDENDUM #1

**TO** ALL PLAN HOLDERS  
**DATE** March 19, 2018  
**JOB NO.:** 3101-010  
**ATTN** Plan Holders  
**RE** Jack Kelley Drive Lift Station Project

**Clarification Items:**

- The Backup generator is a propane fueled genset (See specification 16230 section 2.02A). The propane services will be set up with a propane supplier and installed by the Contractor.
- D2- Calls out “Casing pipe shall be smooth steel pipe...... with a minimum wall thickness of 3/8-inches.”
- D2- Calls out for “64 linear feet minimum” or as required of steel casing, the bid-form has a quantity of 200 linear feet. This is updated in the bid-form attached to this addendum to 100 linear feet to account for uncertainties with ODOT Requirements.
- Contractors can assume the existing AC on Jack Kelley Drive and WWTP access road has a minimum thickness of 4-inch for your AC quantity calculations. Although, it is the Contractor’s responsibility to match exiting when repairing the AC.
- **Specification 02370-Erosion Control:** A 1200-C permit is required, and it is the Contractors responsibility to obtain the permit.
- The City prefers not to have steps in the manholes, therefore they are not required as shown on plans.
- D1- Calls out for a 2” overlay, this is not required.
- There is a concrete culvert near the wastewater treatment facility running under the access road near the jog over from the 20’ wide sewer easement (not shown on the plans), We anticipate an additional 100’ HDD in this location. The Bid form has been revised to show this. See the attached figure for more clarification.
- Trench backfill compaction testing will be completed at depths of 4’ and 2 feet below grade. If the trench is above a pipe zone in a structural area (road ways, under building, etc.) the relative compaction of 92% is required. For landscaped areas the required relative compaction of 90% is required. The required relative compaction for asphalt concrete is 91% of the material maximum theoretical density per ASTM D2041.
- De-Beading HDPE Pipe will not be required.
- Bid form change: 77 linear feet of 8” PVC sewer installed.
- Bid form change: Traffic Control and Flagging quantity of 1 and unit of lump sum.
- Manholes are measured from rim to invert and pipe is measured from existing ground to top of pipe. This will be measured as often as necessary to confirm quantities.
Addenda Items:

- **Volume 2 – Technical Specifications**
  
  **Section 02535 Manholes and Appurtenances:**
  
  2.01 E.2 “All other manholes shall be seal coated with MS-2C, MS-A2 or EASFS-88 or approved equal”
  
  4.01 D “Payment for manhole Sealant Coating shall be made on a per vertical footage per manhole as stated on the bid form.”

- **Volume 2 – Technical Specification**
  
  **Section 02536 Precast Concrete Wet Well**

Figures:

Respectfully,
Civil West Engineering Services

*Manda Catterlin*

Manda Catterlin

Project Engineer
SECTION 02535 – MANHOLES & APPURTENANCES

PART 1  GENERAL

1.01  SUMMARY

A. This Section covers manholes, frames, covers, adapters, and other manhole appurtenances not specifically paid for in other sections, used in the gravity storm sewer conveyance system. See Standard Detail Drawings.

B. This Section covers manhole(s), frames, covers, adapters and other manhole appurtenances not specifically paid for in other sections.

C. All manholes, frames and covers supplied under this contract shall be from the same manufacturer.

PART 2  PRODUCTS

2.01  MATERIALS

A. Manholes

1. Manhole riser sections shall be pre-cast reinforced concrete with a minimum wall thickness of 6 inches, conforming to ASTM C 478. Concrete used in forming the sections shall have a minimum compressive strength of 4000 psi at 28 days. Reinforcing steel shall be Grade 60.

2. New manholes shall have precast reinforced concrete bases with shelves, channels and slopes as specified. Precast bases shall have same wall thickness and reinforcement as riser sections.

3. Joints between manhole sections as well as base sections shall be tongue and groove with an o-ring gasket or approved equal conforming to ASTM C-443. Preformed gaskets shall be Ram-Nek, Kent-Seal No. 2, or approved equal.

4. Manholes shall have yard permeability tests passing ASTM C497-03 prior to delivery. Manhole steps shall be plastic with ½" grade 60 steel reinforcing bars encapsulated with injection molded copolymer polypropylene with serrated surfaces.

5. Manholes shall be 60” Type 1 Manhole or approved equal.

B. Frames and Covers

1. All frames and covers shall be heavy duty, gray cast iron designed for H20 traffic loading. Metal used in the castings shall conform to ASTM A48 Class 30. All castings shall be manufactured true to pattern, uniform in quality, free from blowholes, shrinkage, distortion or other defects. Component parts shall fit together in a satisfactory manner and shall have continuously machined bearing surfaces to prevent rocking and rattling. Castings shall be smooth and well cleaned by shotblasting at the factory.

2. Frames and covers shall have skid resistant surface of raised knobs or indentations. Cover shall have the letter “S” cast into it. Non-watertight lids shall have two vent holes.
a. Storm drain covers shall have the letter “S” or word “Storm” cast into it.

3. Frames and covers shall be manufactured in accordance with the dimensions shown in the Standard Detail Drawings; Olympic Foundry, or approved equal.

C. Manhole Connections

1. Connections to precast manhole sections shall be accurately core-drilled and shall utilize a properly sized flexible rubber boot providing a watertight seal. Adapter shall be factory tested for watertightness up to 10.8 psi. Kor-N-Seal as manufactured by NPC, Inc. or approved equal.

2. Connections to cast-in-place concrete shall be made with a rubber waterstop grouting ring. Ring shall clamp to pipe with stainless steel clamp and have waterstop ribs. Waterstop Grouting Ring by Press-Seal Gasket Corp., or approved equal.

3. Connections to plastic manholes shall be made using appropriately sized flexible couplings and connecting to preformed pipe stub-outs, provided that stub-outs are not damaged.

D. Grout

1. Non-Shrink Grout. Grout shall be Sika 212, Euco N-S, Five Star, or approved equal nonmetallic cementitious commercial grout exhibiting zero shrinkage per ASTM C827. Grout shall not be amended with cement or sand and shall not be reconditioned with water after initial mixing. Nonshrink grout shall be placed and packed only with the use of an approved commercial bonding agent. Unused grout shall be discarded after 20 minutes.

E. Coating

1. Where specified on plans manholes shall be coated with a corrosion resistant epoxy. Coating shall be solvent free epoxy series Plastic 4500 or approved equal.

2. All other manholes shall be seal coated with MS-2C, MS-A2 or EASFS-88 or approved equal.

PART 3 EXECUTION

3.01 MANHOLE INSTALLATION

A. Prepare native soil and place and compact the crushed rock base to 95% maximum dry density as shown in the Standard Detail Drawings. Backfill material around manholes shall be as specified for trenches in Section 02320.

B. Concrete base shall be carefully placed on the prepared bedding so as to be fully and uniformly supported at true grade and alignment.

C. Pipe penetrations shall be core drilled to the appropriate size for each pipe entering or exiting the manhole. Jackhammering will not be allowed. Install appropriately sized KOR-N-SEAL boot on each pipe and apply non-shrink grout to remainder of wall penetration to provide positive seal. Non-shrink grout shall be as specified.
D. Install transition couplings, per Section 02530, within 2 feet of the outside wall of
manholes on all pipes; or, a pipe bell shall be located a minimum of 1 foot to a maximum
of 2 feet from the outside wall of manholes.

E. All flow channels within precast bases shall be constructed of non-shrink grout with a
minimum depth of three-fourths (¾) the contributing pipe diameter. Inverts shall be true
to line and grade with flow lines having a minimum drop of 0.1 feet from inlet to outlet (0.2
feet for 90 degree flow direction changes) or as shown on the Contract Drawings. Sides
of channels shall be troweled smooth to prevent solids deposition. Ledges or benches
shall be sloped towards channel to drain. Provide fine broom finish on ledges.

F. Clean tongue and grooves of base and wall sections, prime and apply joint sealer prior to
setting in place. Ensure that joint has fully seated. Use approved flexible joint sealant
and same manufacturer’s primer. The height of the lowest wall section shall be at least
three (3) times the inside diameter of the largest sewer pipe entering the manhole and in
no case less than 2-feet. Wall sections shall be plumb vertical.

G. Use eccentric cone top section for manholes greater than 6-feet deep. Use extension
rings in accordance with the standard detail.

H. Frame and covers shall be installed so that the cover is exposed and flush with the
existing surface. In no case will pavement be raised or lowered to meet the grade of
installed manhole frames and covers. Where manholes are installed in sloping areas, the
grade of the slope shall intersect the top rim of the cover on the uphill side. Manhole
frame shall be sealed to the concrete manhole section with a bed of non-shrink grout on
either side of bead of flexible joint sealant. In addition, the frame and cover shall be
grouted to the outside of the concrete manhole section.

I. Manhole installations with tilted or otherwise defective bases, wall sections which are not
plumb, covers which do not match existing grade properly, or are otherwise not in
specification compliance shall be removed by the Contractor and replaced until
acceptable.

J. Where indicated on plans manholes shall be sealed and bolted.

3.02 BENCH AND CHANNEL EXISTING MANHOLE

A. Modify or reconstruct manhole bases as required by hand forming channels with non-
shrink grout to provide smooth flow surfaces from all inlets to the outlet. Non-shrink grout
shall be as specified.

B. All flow channels shall be constructed with a minimum depth of three-fourths (¾) the
contributing pipe diameter. Inverts shall be true to line and grade with flow lines having a
minimum drop of 0.2 feet from inlet to outlet.

C. Shape flow channels to conform to connecting pipe surfaces. Ledges or benches shall
be sloped towards channel to drain.

D. Remove all rough sections or sharp edges that might obstruct flow or cause snags.

E. Form base channels in conformance with the standard detail drawings.

3.03 NEW MANHOLES ON EXISTING SEWER MAINS

A. New manholes constructed along existing sewer mains shall, where feasible, utilize
precast manhole bases as defined in Paragraph 2.01 A. Existing sewer mains shall be
neatly cut or snapped approximately 12 to 18 inches outside the limits of the new manhole base. Pipe stubs, properly cut to length, shall be placed in properly sized cored penetrations and joined to existing sewer mains using appropriate transition couplings as defined in Section 02530.

B. In situations where it is not feasible or practical to cut in new pre-cast manhole bases on existing sewer mains, cast-in-place bases will be allowed. Contractor shall notify Engineer of conditions warranting cast-in-place bases.

**PART 4 SPECIAL PROVISIONS**

4.01 MEASUREMENT AND PAYMENT

A. Payment for Standard Manholes installed at all depths shall be made on a unit price basis per each, at the price stated on the Bid Form. Payment will include all materials and labor required for complete installation, including excavation and backfill around manholes, all precast components, grouting and shaping of base channels, pipe adapters, testing, temporary hard surfacing, and all else related to this item not paid under other sections.

B. Payment for Channeling, Benching and Modification of existing and/or new manhole bases will be made on a unit price bases per each, at the price stated on the Bid Form. Payment will include all materials, labor and equipment required for complete modification of the manhole base including all penetration coring, cleaning, preparation for cementitious grout all as required for a complete manhole base modification.

C. Connection of existing piping to new manholes shall be considered incidental to the work. No additional payment will be allowed.

D. Payment for manhole Sealent Coating shall be made on a per linear foot of depth per manhole as stated on the bid form. Payment shall include material and labor.

END OF SECTION
SECTION 02536 – PRECAST CONCRETE WET WELL

PART 1 GENERAL

1.1 SUMMARY

A. Section includes precast wet well walls, bases, frames, cover and related appurtenances.

B. Wet well materials shall be formed, manufactured and pretested at the factory site. Finished components shall be assembled, sealed at the work location by the Contractor.

C. Wet well sections may require casting according to Engineer’s drawings. Contractor shall make field measurements prior to casting to verify drawings and notify Engineer of any changes required by connections, elevations, mechanical piping, or any other approved appurtenances included as part of the submittals.

1.2 RELATED SECTIONS

A. Section 02535 – Manhole and Appurtenances

B. Section 03110 – Structural Cast-In-Place Concrete Forms

C. Section 03200 – Concrete Reinforcement

1.3 REFERENCES

   1. ASTM A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
   2. ASTM C923 – Resilient Connectors Between Reinforced Concrete Vault Structures and Pipe

B. American Concrete Institute (ACI), latest edition
   1. ACI – 318 – Building Code Requirements for Structural Concrete
   2. ACI – C478 – Precast Reinforced Concrete Manhole Sections


D. Association of State Highway and Transportation Officials (AASHTO), latest edition
   1. AASHTO H-20
   2. AASHTO M-198 – Joints for Circular Concrete Sewers and Culvert Pipe Using Flexible Watertight Gaskets

1.4 SUBMITTALS

A. Manufacturer literature showing all plan and elevation views including all dimensions, reinforcing placement and concrete shall be submitted to the Engineer prior to manufacture.

B. Structural design calculations showing conformance with ACI C478 of walls, base and cover after final shop drawings are coordinated with manufacturers of pump, access hatch and various cover penetrations.
1.5 QUALITY ASSURANCE

A. Precast well manufacturer shall have a minimum of five (5) years of successful experience in the design and assembly of prefabricated concrete structures.

B. Wet well manufacturer shall guarantee all precast members against defective materials and workmanship for a period of 5 years after the date of project completion. If any materials or workmanship prove to be defective within the guarantee period, they shall be repaired or replaced by the manufacturer at no additional cost to owner.

C. Wet well manufacturer conduct concrete strength tests on four by eight inch test cylinders from the same concrete batch used for the precast sections. Two tests for each daily mix batch shall be provided, one at 7 day cure and one at 28 day cure. Tests shall be provided to Engineer.

1.6 DELIVERY, STORAGE AND HANDLING

A. Materials shall be cured and stored in a moist condition for a minimum of 14 days.

B. Materials shall be transported in such a manner to prevent damaging stresses and cracks.

C. Damaged, chipped, or cracked materials shall be repaired and patched to the satisfaction of the Engineer. If the materials cannot be satisfactorily repaired they must be replaced at no-cost to the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete
1. Minimum compressive strength of 4000psi at 28 days.
2. Type II acid resistant cement conforming to ASTM C150.
3. Cover over reinforcing steel, 1” minimum.

B. Walls
1. Walls shall be minimum of 8” thick
2. Tongue and grooved joints with spacing such that pipes piping shall not pass through joints

C. Base
1. Minimum thickness shall be 12”
2. Extend a minimum of 12” beyond walls in all directions

D. Cover
1. Overall dimensions shall conform to those shown in drawings
2. Minimum thickness shall be 12”.
3. Overall reinforcement and around penetrations shall be according to AASHTO H-20 Truck loading.

E. Reinforcement
1. Steel shall be ASTM A615 Grade 60.
2. Area of reinforcement shall be according to ACI C478 or as shown in drawings, whichever is more stringent.
3. No steps shall be provided
4. Thickness shall be a minimum of ½” #4 rebar
F. Joints
1. Joints shall be sealed with butyl rubber sealant rope which meets or exceeds AASHTO M-198.
2. Exterior joint sealant applied in the form of an adhesive wrap. Exterior joint sealant shall be installed according to manufacturer’s instructions including any concrete surface preparation required. EZ-Wrap Butyl Exterior Joint Wrap or approved equal.

G. Connections
1. Connections between walls and ductile iron pipe shall be made using a seal constructed of EPDM rubber links and providing a complete seal between the annular space between the pipe and wall opening. Installation hardware shall be made 316 stainless steel. Manufacturer; Press Seal, Link Seal or approved equal.
2. Gravity connections shall be precast into walls and be formed using an appropriately sized KOR-N-SEAL boot on each pipe and apply non-shrink grout to remainder of wall penetration to provide positive seal.
3. Inside drops shall be as specified in Section 15125.

H. Grout
1. A grout fillet shall be constructed around the circumference of the wet well bottom to direct solids to the pumps. The minimum slope shall be 1:1 and shall conform to the construction drawings.
2. Grout shall be either:
   i. Non-Shrink Grout. Grout shall be Sika 212, Euco N-S, Five Star, or approved equal nonmetallic cementitious commercial grout exhibiting zero shrinkage per ASTM C827. Grout shall not be amended with cement or sand and shall not be reconditioned with water after initial mixing. Nonshrink grout shall be placed and packed only with the use of an approved commercial bonding agent. Unused grout shall be discarded after 20 minutes.
   ii. Or 4000 psi Type II concrete mix with a maximum aggregate size of 3/8”.

I. Anchors
1. Anchors for pumps shall meet requirements of pump manufacturer. Anchors shall be wedge type, drilled and epoxied into wet well base prior to pump installation. Anchors, nuts and washers shall be type 316 stainless steel.
2. Minimum size shall be ¾” diameter and embedded a to a minimum depth of 8”.

J. Covers
1. Hatch cover shall be H20 rated as specified in Section 08305.

K. Vents
1. Wet well shall be provided with an atmospheric vent as shown in drawing. Vent shall be 8” diameter and screened with a stainless steel screen.
2. Vents shall be made of stainless steel and welded joints. Vents shall be constructed in a “gooseneck” inverted style.

L. Suction Tube
1. Provide penetration in cover for Vacuum suction tube.
2. Vacuum tube shall utilize the sloped wet well floor with a tapered vacuum head suction head connected to a vertical pipe and resting on the wet well floor. Vertical pipe shall be constructed from stainless pipe or ABS pipe capable of resisting vacuum without collapse.
3. Suction tube shall have cam-lock style fitting with cap, capable of connecting to City cleaning trucks. Coordinate fitting style with City.
4. Suction tube shall be EZZ Klean as provided by Oldcastle; or approved equal.

2.2 ACCESSORIES

A. Provide all Accessories necessary for proper placement, spacing, installation.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that ground surface is excavated to a minimum of 12” beyond the limits of the wet well.

B. The wet well shall be supported by a minimum of 12” of compacted crushed aggregate. Crushed stone must be level and to the limits shown in the Contract drawings. If further stabilization material is required or greater aggregate depth needed than Contractor shall provide material to depth required.

3.2 PLACEMENT

A. Material sections shall be placed one at a time using lifting hooks cast into the sections.

B. Tolerances shall be
   1. ¼" from Plumb
   2. ¼" from Level
   3. No offsets greater than ¼" at any joint.

C. Install rubber rope sealant and adhesive wrap between sections, taking care to keep joints clean and to make a tight and complete seal.

D. Repair all nicks, chips, depressions and any voids left by removal of lifting devices to satisfaction of the Engineer.

E. Backfill in 6” lifts with Class B aggregate to drawing limits. Protect wetwall during compaction. Place wet well cover last.

F. Vacuum test finished manhole.

3.3 HYDROSTATIC TESTING

A. Hydrostatic test wet well in accordance with manhole procedure in Section 02535. Use formulas in section to determine time and level drop. Hydrostatic testing shall be completed after backfill is complete and material has settled for a minimum of 30 days.

B. Plug all pipes entering precast sections and any required bracing to prevent plug blowouts.

C. If test fails Contractor shall locate leaks and make repairs with grouting material. Contractor shall continue to make repairs until test passes.

3.4 CLEANING
A. After successful completion of testing the wet well shall be thoroughly cleaned of all silt and debris. After approval by Engineer proceed with the installation of wet well mechanical components.

PART 4 SPECIAL PROVISIONS

4.1 MEASUREMENT AND PAYMENT

A. Cost for precast wet well shall be included as a portion of the lump sum or unit price costs for the associated items as stated in the Bid Form. No separate measurement for these quantities will occur.

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