In response to comments from attendees of the City's meetings to discuss the new proposed Drainage Criteria Manual (DCM), the City has evaluated the potential cost impact to some typical developments. The storm sewer designs for six projects (5 residential and 1 commercial) were evaluated to see what, if any, cost impacts would result from the implementation of the new DCM. In addition, six detention pond designs for six projects were evaluated to determine the impacts of the implementation of the requirements of the revised ordinance. The summary table of the results of the analysis is presented below:

SUMMARY OF STORM SEWER DESIGN COMPARISON		
	Design Meets Requirements Under	
	Current Drainage Ordinance (minimum 10-year storm event)	**Revised Drainage Ordinance (minimum 25-year storm event)**
Project No. 1	Yes	Yes
Project No. 2	Yes	Yes
Project No. 3	Yes	Yes
Project No. 4	Yes	Yes
Project No. 5	Yes	Yes
Project No. 6	Yes	No

SUMMARY OF DETENTION DESIGN COMPARISON				
	Design Meets Requirements Under			
	Current Drainage Ordinance		**Revised Drainage Ordinance**	
	Release Rates	**Freeboard**	**Release Rates**	**Freeboard**
Project No. 1	Yes	Yes	Yes	Yes
Project No. 2	Yes	Yes	Yes	No
Project No. 3	Yes	Yes	Yes	Yes
Project No. 4	Yes	Yes	Yes	Yes
Project No. 5	Yes	Yes	Yes	No
Project No. 6	Yes	Yes	Yes	No

A brief description of the projects selected for the design and cost comparison is included below. For the detention pond designs that would require modification under the revised ordinance, an estimated cost of the modifications is included with the project description.

STORM SEWER

Project No. 1 – This project consists of 82 residential lots as the second phase of a subdivision in Canadian County in northwest Oklahoma City, designed in 2020. Storm sewer improvements included 143 LF 42" RCP, 456 LF 36" RCP, 548 LF 30" RCP, 266 LF 24" RCP, 189 LF 18" RCP, 8 DES 2-2 Curb Inlets, 8 DES 2-0 Curb Inlets, Junction Boxes, Headwalls, and miscellaneous items. A review of the approved Drainage Report shows that no changes in the storm sewer system would be required to comply with the new requirements contained in the proposed Drainage Criteria Manual (DCM).

Project No. 2 – This project consists of 50 larger residential lots in northeast Oklahoma City. The larger lots will be served by individual well and private sewage septic systems. This project was designed in 2018. Storm sewer improvements included 72 LF 6' x 5' RCB, 163 LF 60" RCP, 555 LF 36" RCP, 228 LF 30" RCP, 673 LF 24" RCP, 78 LF 18" RCP, 3 DES 2-3 Curb Inlets, 3 DES 2-2 Curb Inlets, 10 DES 2-1 Curb Inlets, 1 DES 2-0 Curb Inlet, Junction Boxes, Manholes, End Sections, and miscellaneous items. A review of the approved Drainage Report shows that no changes in the storm sewer system would be required to comply with the new requirements contained in the proposed Drainage Criteria Manual (DCM).

Project No. 3 – This project consists of 190 residential lots as the first phase of an overall subdivision project. This project was designed in 2020. Storm sewer improvements included 256 LF 65" x 40" ARCP, 539 LF 48" RCP, 138 LF 36" RCP, 315 LF 30" RCP, 770 LF 24" RCP, 466 LF 18" RCP, 4 DES 2-4 Curb Inlets, 7 DES 2-2 Curb Inlets, 9 DES 2-1 Curb Inlets, 4 DES 2-0 Curb Inlets, Junction Boxes, Headwalls, and miscellaneous items. A review of the approved Drainage Report shows that no changes in the storm sewer system would be required to comply with the new requirements contained in the proposed Drainage Criteria Manual (DCM).

Project No. 4 – This project consists of 65 residential lots on a 7-acre tract in northwest Oklahoma City. The project was designed in 2019. Storm sewer improvements included 172 LF 58-1/2" x 36" RCPA, 350 LF 51-1/8" 31-5/16" RCPA, 101 LF 43-3/4" x 26-5/8" RCPA, 103 LF 36-1/4" x 22-1/2" RCPA, 2 DES 2-2 Curb Inlets, 4 DES 2-1 Curb Inlets, Junction Boxes, End Sections, and miscellaneous items. A review of the approved Drainage Report shows that no changes in the storm sewer system would be required to comply with the new requirements contained in the proposed Drainage Criteria Manual (DCM).

Project No. 5 – This project consists of improvements to existing football/baseball facilities, including new parking and storm sewer improvements. The project is located in west Oklahoma City and was designed in 2016. Storm sewer improvements included 441 LF 30" RCP, 609 LF 24" RCP, 118 LF 18" RCP, 3 DES #'s Inlets, 4 DES 2-0 Curb Inlets, Manholes, Junction Boxes, and miscellaneous items. A review of the approved Drainage Report shows that no changes in the storm sewer system would be required to comply with the new requirements contained in the proposed Drainage Criteria Manual (DCM).

Project No. 6 – This project consists of 76 residential lots on a 25-acre tract in northwest Oklahoma City. This project was designed in 2020. A review of the approved Drainage Report shows that at grade inlets and storm sewer were designed to accommodate run-off from a 10-year storm event in accordance with the requirements of the current Drainage Ordinance. The proposed DCM would require that these portions be designed to accommodate run-off from a 25 year storm event. As such, portions of the storm sewer plans, as approved, would have to be revised to comply with the proposed DCM. Inlets and storm sewer in sump condition as shown in the approved storm sewer plans were in compliance with the proposed DCM.
The plans were evaluated based on the requirements of the proposed DCM. Quantities were then computed for the existing approved plans and the revised plans per the proposed DCM. Unit costs were applied to the quantities and construction costs were estimated for both scenarios. The cost estimates are detailed in Exhibit A. The total estimated for the work per the approved plans is $285,091.00. The total estimated

cost for the work in accordance with the plans per the proposed DCM is $301,530.00, representing a 5.7% increase.

STORM WATER DETENTION

Project No. 1 – This project is the first phase of a residential subdivision in southwest Oklahoma City. The detention pond serves the portion of the site in a drainage basin that requires storm water detention. The drainage area to the detention pond is approximately 23.60 acres with 5.80 acres of bypass area. The pond as designed would not require any revisions to comply with the proposed DCM requirements for pond release rate, freeboard, and emergency overflow structure requirements.

Project No. 2 – This project is a residential/commercial development in southwest Oklahoma City. The drainage area to the detention pond is approximately 32.13 acres with 7.66 acres of bypass area. The pond as designed would comply with the proposed DCM requirements for pond release rate and emergency overflow structure requirements. However, minor grading adjustments would be necessary to comply with the new freeboard requirements. The estimated cost for the required grading revisions is $1,000.00.

Project No. 3 – This project is a residential development in southwest Oklahoma City. The drainage area to the detention pond is approximately 18.56 acres with 11.99 acres of bypass area. The pond as designed would comply with the proposed DCM for pond release rates and freeboard requirements.

Project No. 4 – This project is a residential development in southwest Oklahoma City. The drainage area to the detention pond is approximately 14.34 acres with 5.50 acres of bypass area. The pond as designed would comply with the proposed DCM for pond release rate, freeboard, and emergency overflow structure requirements.

Project No. 5 – This project is a commercial development in northeast Oklahoma City. The drainage area to the detention pond is approximately 0.94 acres with 0.36 acres of bypass area. The pond as designed would comply with the proposed DCM pond release rate and emergency overflow structure requirements. However minor grading adjustments would be required to comply with the new freeboard requirements. The estimated cost for the required grading revisions is $1,000.00.

Project No. 6 – This project is a commercial development in northwest Oklahoma City. The drainage area to the pond is approximately 7.55 acres, including 4.53 acres of off-site area, with 0.17 acres of bypass area. The pond as designed would comply with the proposed DCM pond release requirements. Minor grading revisions would be required to comply with the new freeboard requirements. The estimated cost for the required grading revisions is $1,000.00.

EXHIBIT A

DC-0316 DRAINAGE CRITERIA MANUAL
SUBDIVISION - NORTHWEST OKLAHOMA CITY

March 25, 2021

ESTIMATED CONSTRUCTION COSTS

		EXISTING ORDINANCE			PROPOSED ORDINANCE		
ITEM	UNIT	QUANTITY	UNIT COST	TOTAL PRICE	QUANTITY	UNIT COST	TOTAL PRICE
STD DES. 2-0 INLET	EA	4	$ 3,625.00	$ 14,500.00	4	$ 3,625.00	$ 14,500.00
STD DES 2-1 INLET	EA	6	$ 4,200.00	$ 25,200.00	4	$ 4,200.00	$ 16,800.00
STD DES 2-2 INLET	EA	0	$ -	$ -	2	$ 5,000.00	$ 10,000.00
STD DES 2-3 INLET	EA	2	$ 5,950.00	$ 11,900.00	2	$ 5,950.00	$ 11,900.00
5' DIA. MANHOLE	EA	5	$ 2,750.00	$ 13,750.00	5	$ 2,750.00	$ 13,750.00
6' DIA MANHOLE	EA	1	$ 4,000.00	$ 4,000.00	1	$ 4,000.00	$ 4,000.00
4'X4' REINF. CONC JCTN. BOX	EA	1	$ 5,000.00	$ 5,000.00	1	$ 5,000.00	$ 5,000.00
5'X4' REINF. CONC JCTN. BOX	EA	1	$ 6,000.00	$ 6,000.00	1	$ 6,000.00	$ 6,000.00
18" RCP w/O-RING	LF	61	$ 64.00	$ 3,904.00	61	$ 64.00	$ 3,904.00
24" RCP w/O-RING	LF	319	$ 80.00	$ 25,520.00	319	$ 80.00	$ 25,520.00
30" RCP w/O-RING	LF	520	$ 88.00	$ 45,760.00	331	$ 88.00	$ 29,128.00
36" RCP w/O-RING	LF	144	$ 139.00	$ 20,016.00	333	$ 139.00	$ 46,287.00
42" RCP w/O-RING	LF	149	$ 144.00	$ 21,456.00	149	$ 144.00	$ 21,456.00
24" CONCRETE HEADWALL	EA	1	$ 2,500.00	$ 2,500.00	1	$ 2,500.00	$ 2,500.00
36" CONCRETE HEADWALL	EA	1	$ 3,500.00	$ 3,500.00	1	$ 3,500.00	$ 3,500.00
42" CONCRETE HEADWALL	EA	1	$ 4,500.00	$ 4,500.00	1	$ 4,500.00	$ 4,500.00
CONCRETE CUT-OFF WALL	LF	23	$ 50.00	$ 1,125.00	23	$ 50.00	$ 1,125.00
FLEX-A-MAT	SY	128	$ 120.00	$ 15,360.00	128	$ 120.00	$ 15,360.00
CRUSHED ROCK BACKFILL	CY	105	$ 130.00	$ 13,650.00	105	$ 130.00	$ 13,650.00
CRUSHED ROCK BEDDING	CY	260	$ 130.00	$ 33,800.00	300	$ 130.00	$ 39,000.00
CONCRETE FLUME	SY	225	$ 88.00	$ 13,650.00	225	$ 88.00	$ 13,650.00

ESTIMATED CONSTRUCTION COSTS **TOTAL EXISTING ORDINANCE** **$ 285,091.00** **TOTAL PROPOSED ORDINANCE** **$ 301,530.00**