

Project Info:

Project Name: WA 02 - Fort Lawton Project Support Services
Owner: Seattle Public Utilities
Date: 12/2/2022
Project PM: Erik Davido, PE & Ben Iddins, PE

Description: Summary of Earthwork, Site Grading, Utilities, Road/Frontage, and SCL Improvement Costs

Opinion of Construction Costs Including Tax w/ No Soft Cost Mark-ups or Contingency								
Development Zone	On-site Earthwork and Roads Options		Stormwater Options		Water Options		Wastewater Options	
	Earthwork incl. detention vault*	Earthwork incl. infiltration vault*	Infiltration vault w/ permeable pavement*	Detention vault w/ non-infiltrating bioretention planters*	Reuse Ex 12" water main segment	Remove and replace Ex 12" water main segment	Reline ex wastewater services	Replace ex wastewater services
Zone 1 Maintenance Building	\$671,246	\$506,270	\$1,028,764	\$1,277,216	\$369,698	\$369,698	\$388,849	\$809,580
Zone 2 Affordable Housing	\$7,886,772	\$4,444,768	\$3,949,402	\$2,639,484	\$1,027,956	\$1,157,001	\$600,463	\$606,579
Zone 3 Multi-purpose Athletic Field	\$3,113,376	\$3,113,376	\$136,076	\$136,076	\$267,169	\$330,563	\$196,472	\$192,116
Zone 4 Cemetery	\$0	\$0	\$0	\$0	\$8,340	\$8,340	\$0	\$0
Subtotal:	\$11,671,394	\$8,064,413	\$5,114,242	\$4,052,777	\$1,673,164	\$1,865,602	\$1,185,784	\$1,608,276

*Note: On-Site Earthwork and Roads Options & Stormwater Options are not mutually exclusive. Options must be packaged together when determining high and low cost.

Opinion of Construction Costs Including Tax w/ No Soft Cost Mark-ups or Contingency								
Development Zone	Road and Frontage (% Based on Development Zone Area)							
	W Lawton St (Cul-de-Sac Option) %	W Lawton St (Cul-de-Sac Option) \$	W Lawton St (Connected Rd Option) %	W Lawton St (Connected Rd Option) \$	36th Ave W %	36th Ave W \$	Texas Way %	Texas Way \$
Zone 1 Maintenance Building	24%	\$550,670	24%	\$721,445	24%	\$831,935	24%	\$3,501,714
Zone 2 Affordable Housing	33%	\$750,914	33%	\$983,789	33%	\$1,134,457	33%	\$4,775,064
Zone 3 Multi-purpose Athletic Field	28%	\$650,792	28%	\$852,617	28%	\$983,196	28%	\$4,138,389
Zone 4 Cemetery	15%	\$350,427	15%	\$459,102	15%	\$529,413	15%	\$2,228,363
Subtotal:		\$2,302,803		\$3,016,953		\$3,479,002		\$14,643,530

Opinion of Construction Costs Including Tax w/ No Soft Cost Mark-ups or Contingency - Costs from SCL				
Development Zone	Power (% Based on Development Zone Area)			
	Overhead Lines %	Overhead Lines \$	Underground %	Underground \$
Zone 1 Maintenance Building	24%	\$1,580,087	24%	\$2,874,414
Zone 2 Affordable Housing	33%	\$2,154,664	33%	\$3,919,656
Zone 3 Multi-purpose Athletic Field	28%	\$1,867,376	28%	\$3,397,035
Zone 4 Cemetery	15%	\$1,005,510	15%	\$1,829,173
Subtotal:		\$6,607,637		\$12,020,277

Development Zone	Subtotal Construction Costs				Subtotal w/ Contingency		Permitting Fees		Design and Other Soft Costs		Subtotal % Costs	
	Low Range	High Range	Low Range	High Range	5%	10%	30%	50%	Low Range	High Range		
	Zone 1 Maintenance Building	\$8,757,986	\$11,057,249	\$10,947,483	\$13,821,561	\$547,374	\$1,382,156	\$3,284,245	\$6,910,781	\$3,831,619	\$8,292,937	
Zone 2 Affordable Housing	\$18,837,689	\$23,102,802	\$23,547,111	\$28,878,502	\$1,177,356	\$2,887,850	\$7,064,133	\$14,439,251	\$8,241,489	\$17,327,101		
Zone 3 Multi-purpose Athletic Field	\$11,352,846	\$13,143,368	\$14,191,058	\$16,429,210	\$709,553	\$1,642,921	\$4,257,317	\$8,214,605	\$4,966,870	\$9,857,526		
Zone 4 Cemetery	\$4,122,053	\$5,054,391	\$5,152,566	\$6,317,988	\$257,628	\$631,799	\$1,545,770	\$3,158,994	\$1,803,398	\$3,790,793		
Subtotal:	\$43,070,575	\$52,357,810	\$53,838,218	\$65,447,262	\$2,691,911	\$6,544,726	\$16,151,465	\$32,723,631	\$18,843,376	\$39,268,357		

Development Zone	Subtotal Pre-Accuracy Range		Accuracy Range		Opinion of Total Construction and Soft Cost		Operations and Maintenance*	
	Low Range	High Range	Low Range	High Range	Low Range	High Range	Low Range	High Range
Zone 1 Maintenance Building	\$14,779,102	\$22,114,498	-\$4,433,731	\$11,057,249	\$10,345,371	\$33,171,748	25%	50%
Zone 2 Affordable Housing	\$31,788,600	\$46,205,604	-\$9,536,580	\$23,102,802	\$22,252,020	\$69,308,406		
Zone 3 Multi-purpose Athletic Field	\$19,157,928	\$26,286,736	-\$5,747,378	\$13,143,368	\$13,410,550	\$39,430,103		
Zone 4 Cemetery	\$6,955,965	\$10,108,782	-\$2,086,789	\$5,054,391	\$4,869,175	\$15,163,172		
Subtotal:	\$72,682,000	\$104,716,000	-\$21,804,000	\$52,358,000	\$50,877,000	\$157,073,000	\$83,938	\$100,725

*Note: operations and maintenance costs are estimated for the first year. If using for cost projecting, utilize yearly inflation costs as well as allowance for increased maintenance over time for aging infrastructure; perhaps 5% every 5 years.

EXTENTS OF NEW PRIVATE ROADWAY AND PARKING LOT. ACCESS TO PRIVATE ROAD OFF TEXAS WAY TO BE FROM CITY OF SEATTLE STANDARD 430A DRIVEWAYS

LENGTH OF IMPROVEMENTS: 2,450 LF

APPROXIMATE LIMITS OF "MULTI-PURPOSE ATHLETIC FIELD" DEVELOPMENT ZONE FOR BUDGETARY ESTIMATE 6.5 ACRES

36TH AVE W

APPROXIMATE LIMITS OF "CEMETARY" DEVELOPMENT ZONE FOR BUDGETARY ESTIMATE 3.5 ACRES

APPROXIMATE LIMITS OF "MAINTENANCE BUILDING" DEVELOPMENT ZONE FOR BUDGETARY ESTIMATE 5.5 ACRES

APPROXIMATE LIMITS OF "AFFORDABLE HOUSING" DEVELOPMENT ZONE FOR BUDGETARY ESTIMATE 7.5 ACRES

TEXAS WAY LENGTH OF IMPROVEMENTS: 3,370 LF

EXTENTS OF ROADWAY RECONSTRUCTION & IMPROVEMENT (TYP)

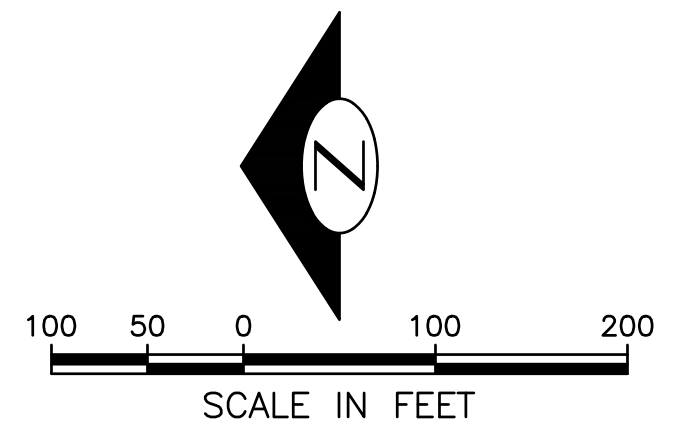
W LAWTON ST LENGTH OF IMPROVEMENTS: 1,300 LF

SHEET INDEX

SHEET NO.	DWG NO.	TITLE
1	C-01	COVER SHEET
2	C-02	EX CONTOUR PLAN & PROPOSED GRADING SECTION
3	C-03	STORM LAYOUT - OPTION 1 (DETENTION VAULT W/ BIORETENTION PLANTERS)
4	C-04	STORM LAYOUT - OPTION 2 (INFILTRATION VAULT W/ PERMEABLE PAVEMENT)
5	C-05	WATER LAYOUT
6	C-06	SEWER LAYOUT - OPTION 1 (RELIN EX WASTEWATER SERVICES)
7	C-07	SEWER LAYOUT - OPTION 2 (REPLACE EX WASTEWATER SERVICES)
8	C-08	ROADWAY SECTIONS

FORT LAWTON REDEVELOPMENT

- ① CATHOLIC HOUSING SERVICES SENIOR SUPPORTIVE HOUSING APARTMENTS
- ② CATHOLIC HOUSING SERVICES SENIOR WORKFORCE HOUSING ROWHOUSES
- ③ HABITAT FOR HUMANITY AFFORDABLE TOWNHOMES
- ④ HABITAT FOR HUMANITY AFFORDABLE ROWHOUSES
- ⑤ SEATTLE PARKS AND RECREATION USES
- ⑥ RE-USE PARKS MAINTENANCE FACILITY



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COVER SHEET



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PURCHASING AND CONTRACTING DIRECTOR

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DRAWN MH	CHECKED BI	RECEIVED	REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

PRELIMINARY

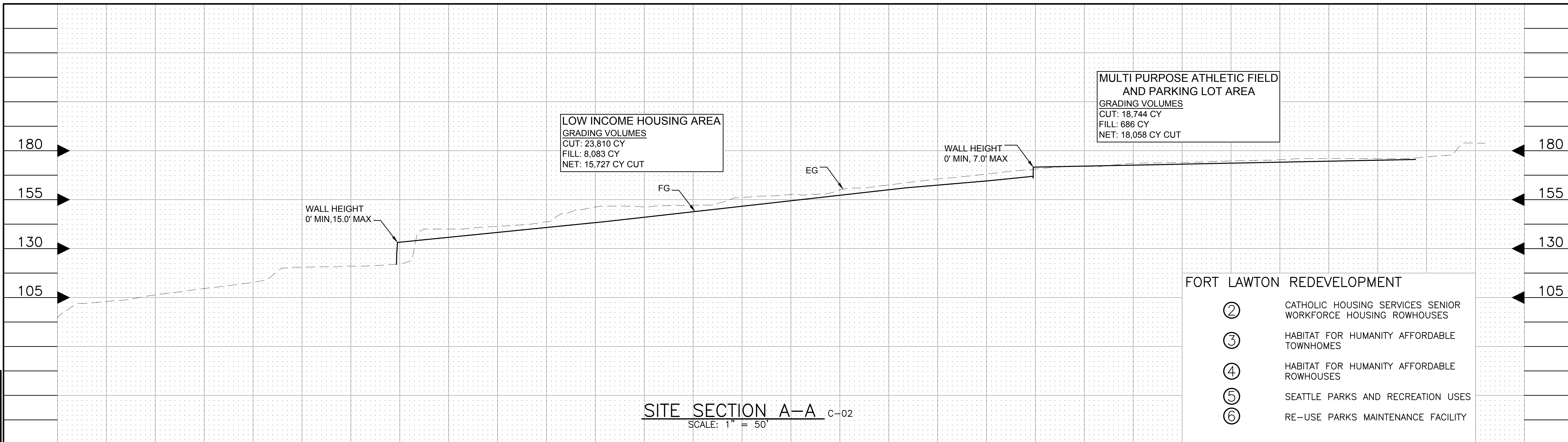
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ORDINANCE NO. PW NO.
SCALE: H. 1"=80'

WA 02 - FORT LAWTON
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PC	CO
VPI #	C-01
SHEET	1 OF 8

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- ② CATHOLIC HOUSING SERVICES SENIOR WORKFORCE HOUSING ROWHOMES
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VAULT SERIAL #	DATE	MARK	NATURE	MADE	CHK'D	REV'D



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EX CONTOUR PLAN & PROPOSED GRADING SECTION



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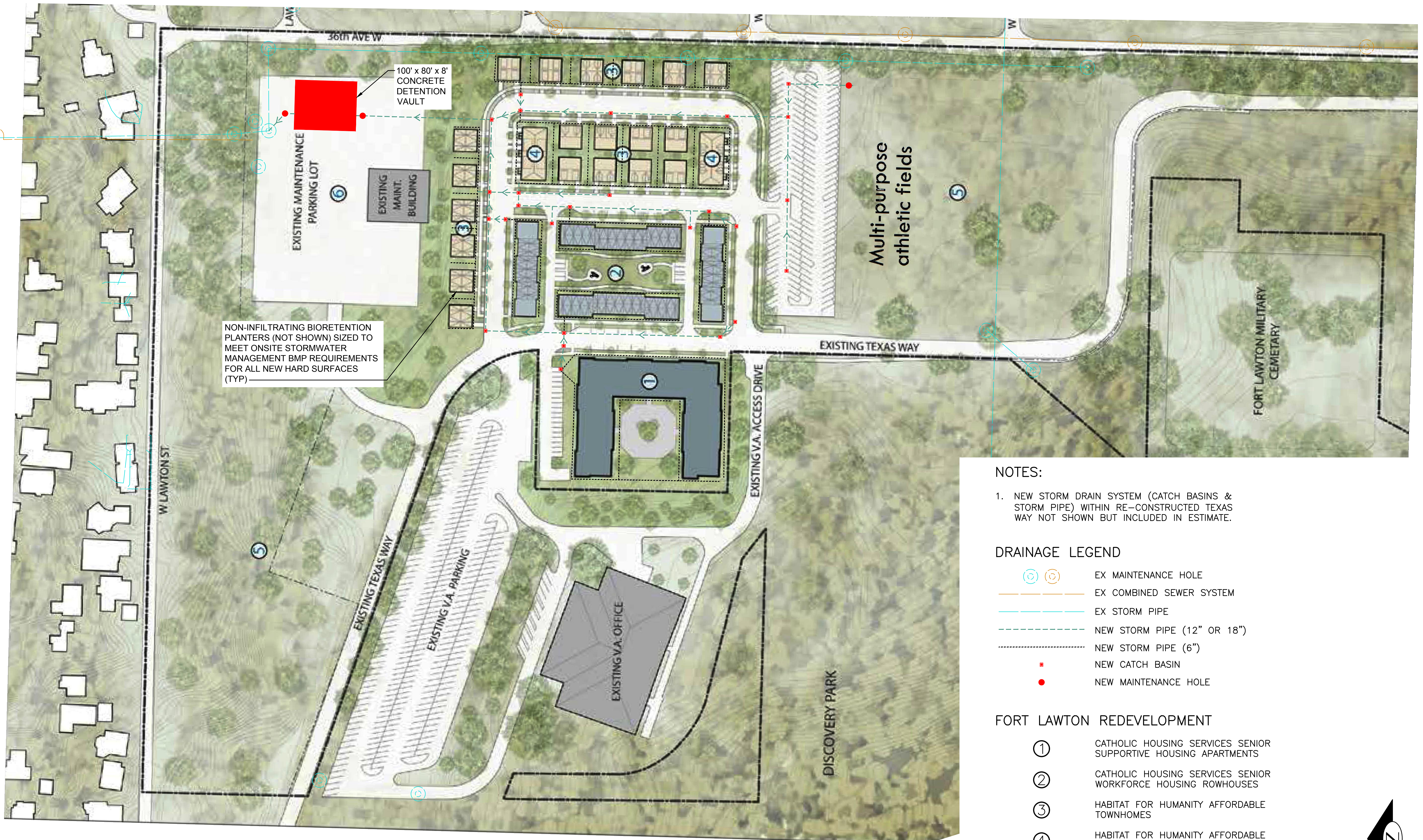
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 ORDINANCE NO. PW NO.
 SCALE: H. 1"=50', V. 1"=25'

WA 02 - FORT LAWTON PROJECT SUPPORT SERVICES

JOB #	PC
	CO
VPI #	
	C-02
SHEET	2 OF 8

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VAULT SERIAL #	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			



NON-INFILTRATING BIORETENTION PLANTERS (NOT SHOWN) SIZED TO MEET ONSITE STORMWATER MANAGEMENT BMP REQUIREMENTS FOR ALL NEW HARD SURFACES (TYP)

100' x 80' x 8' CONCRETE DETENTION VAULT

NOTES:

1. NEW STORM DRAIN SYSTEM (CATCH BASINS & STORM PIPE) WITHIN RE-CONSTRUCTED TEXAS WAY NOT SHOWN BUT INCLUDED IN ESTIMATE.

DRAINAGE LEGEND

- EX MAINTENANCE HOLE
- EX COMBINED SEWER SYSTEM
- EX STORM PIPE
- NEW STORM PIPE (12" OR 18")
- NEW STORM PIPE (6")
- NEW CATCH BASIN
- NEW MAINTENANCE HOLE

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STORM LAYOUT – OPTION 1 (DETENTION VAULT W/ BIORETENTION PLANTERS)



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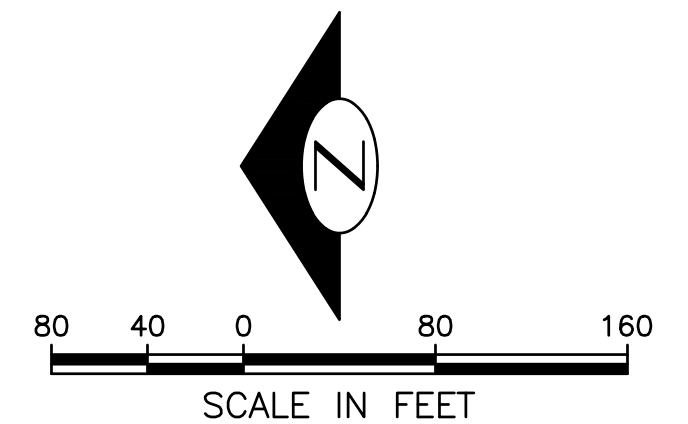
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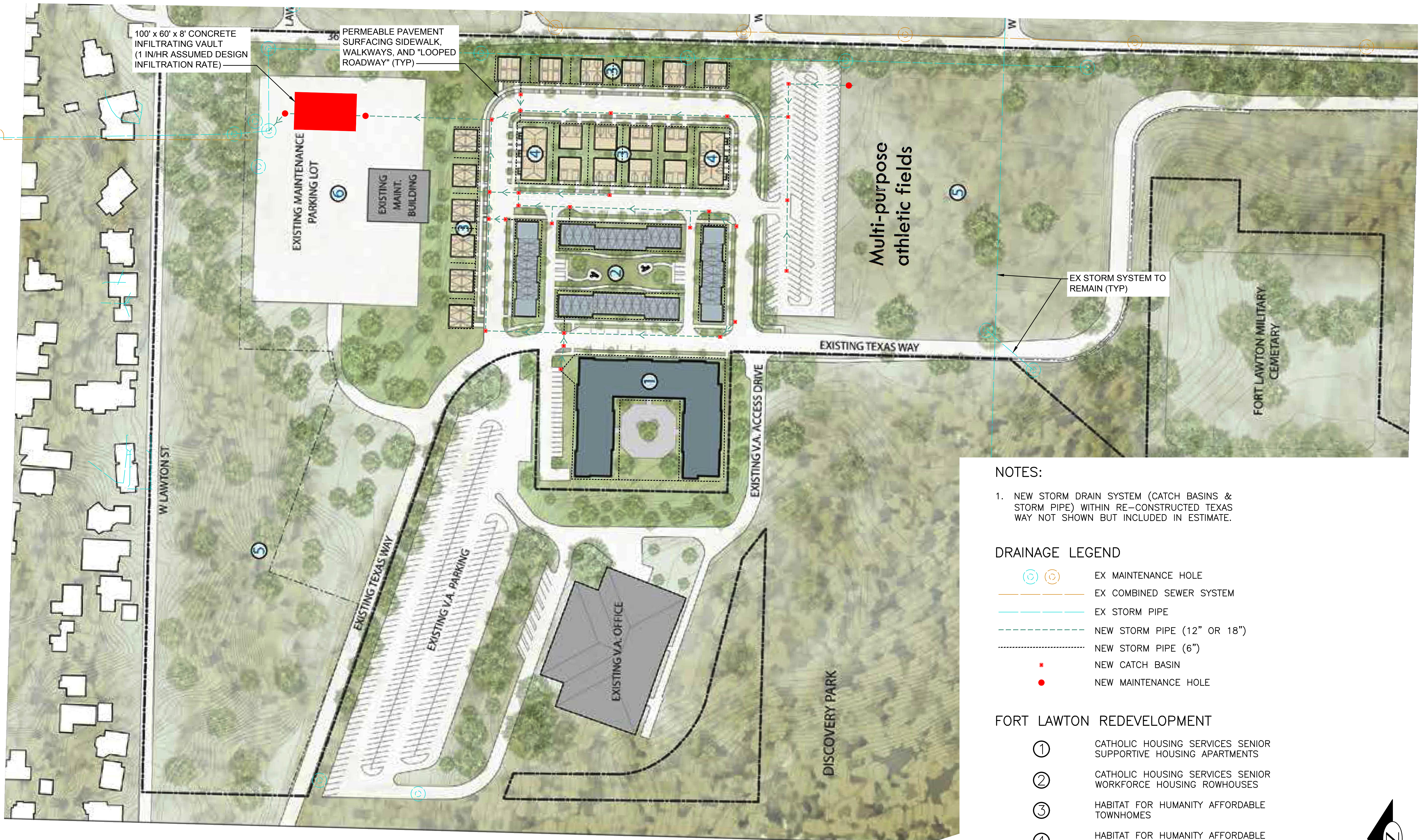
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VPI #	C-03
SHEET	3 OF 8



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Vault Serial #	Date	Mark	Nature	Made	Checked	Revised



100' x 60' x 8' CONCRETE INFILTRATING VAULT (1 IN/HR ASSUMED DESIGN INFILTRATION RATE)

PERMEABLE PAVEMENT SURFACING SIDEWALK, WALKWAYS, AND "LOOPED ROADWAY" (TYP)

EX STORM SYSTEM TO REMAIN (TYP)

NOTES:

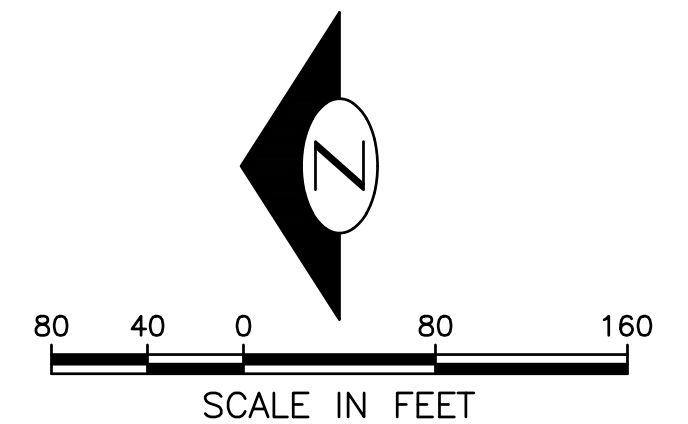
1. NEW STORM DRAIN SYSTEM (CATCH BASINS & STORM PIPE) WITHIN RE-CONSTRUCTED TEXAS WAY NOT SHOWN BUT INCLUDED IN ESTIMATE.

DRAINAGE LEGEND

- EX MAINTENANCE HOLE
- EX COMBINED SEWER SYSTEM
- EX STORM PIPE
- NEW STORM PIPE (12" OR 18")
- NEW STORM PIPE (6")
- NEW CATCH BASIN
- NEW MAINTENANCE HOLE

FORT LAWTON REDEVELOPMENT

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STORM LAYOUT – OPTION 2 (INFILTRATION VAULT W/ PERMEABLE PAVEMENT)



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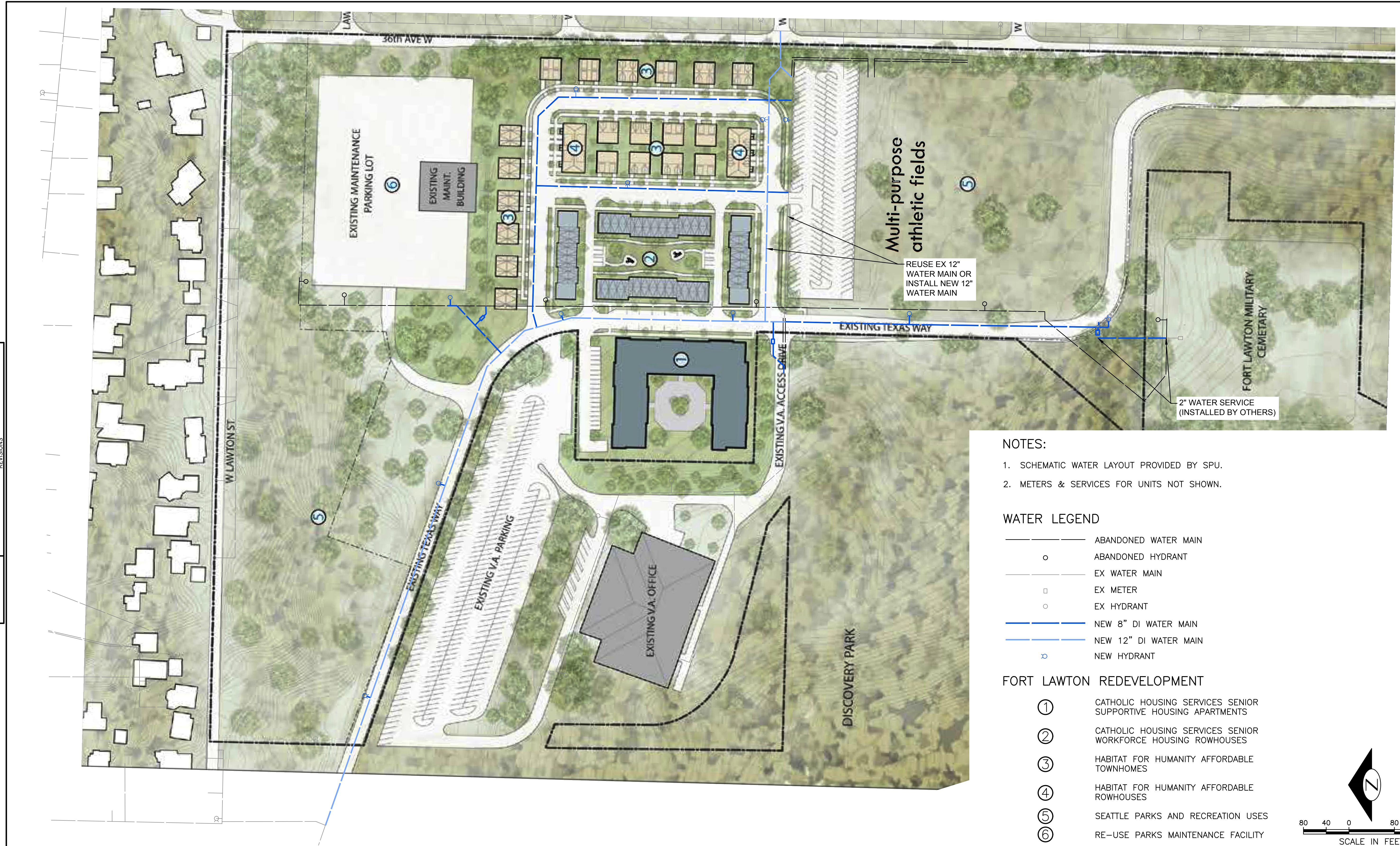
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WA 02 – FORT LAWTON PROJECT SUPPORT SERVICES

JOB #	PC CO
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SHEET	4 OF 8

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NOTES:

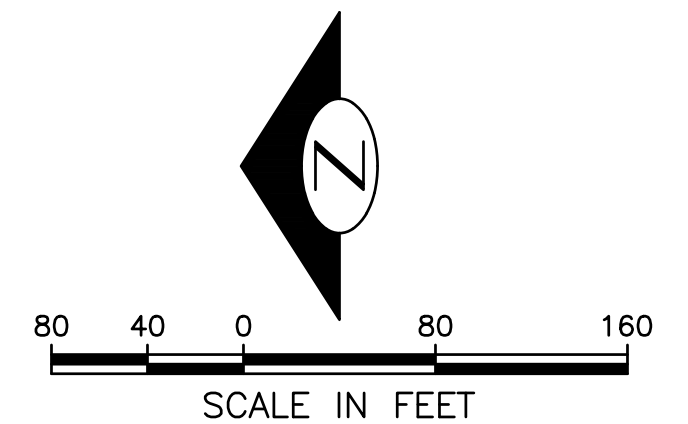
1. SCHEMATIC WATER LAYOUT PROVIDED BY SPU.
2. METERS & SERVICES FOR UNITS NOT SHOWN.

WATER LEGEND

- ABANDONED WATER MAIN
- ABANDONED HYDRANT
- EX WATER MAIN
- EX METER
- EX HYDRANT
- NEW 8" DI WATER MAIN
- NEW 12" DI WATER MAIN
- NEW HYDRANT

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WATER LAYOUT



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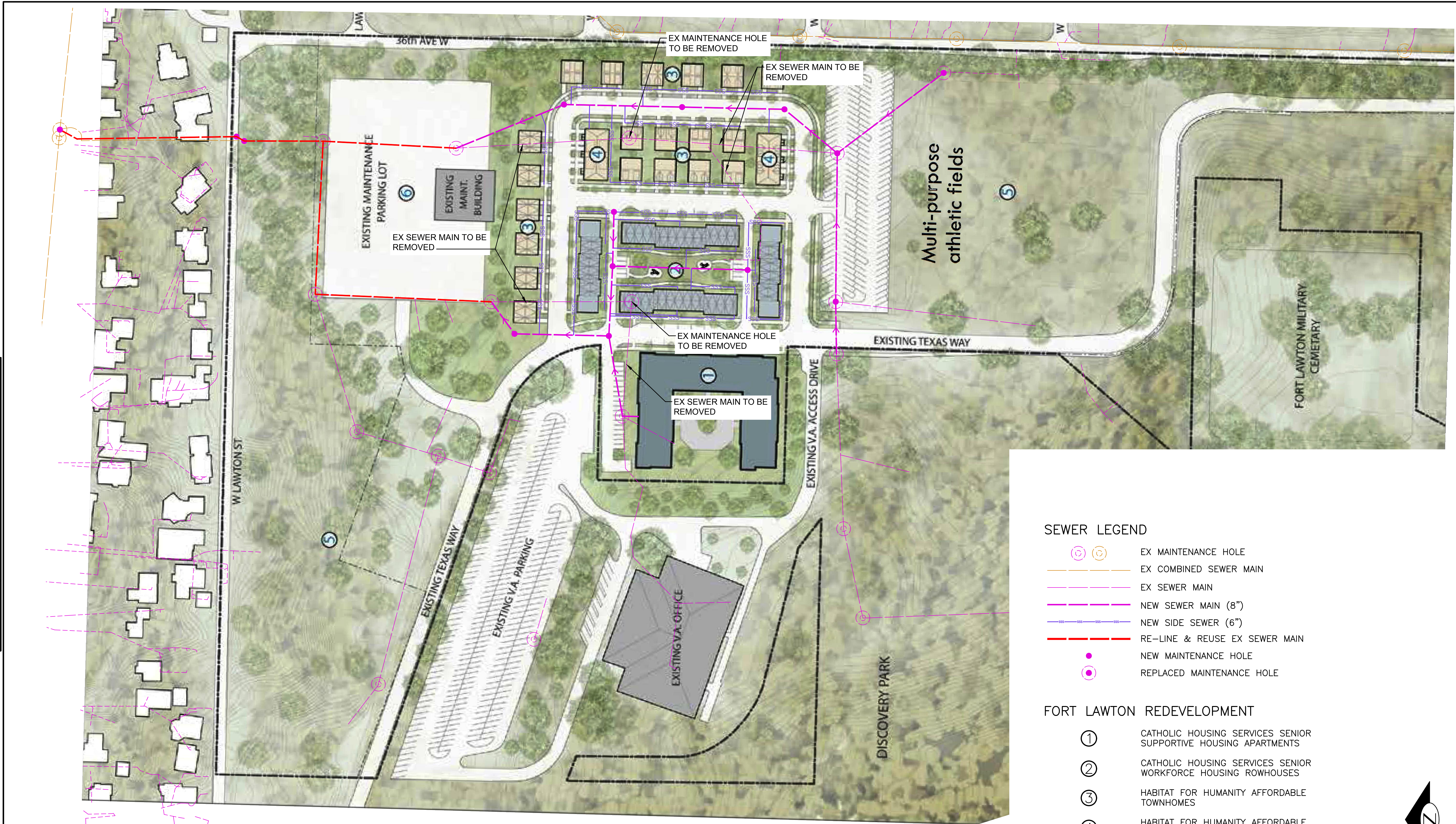
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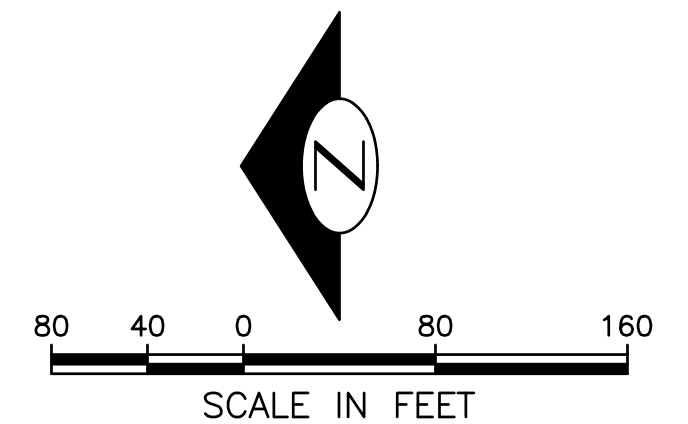


SEWER LEGEND

- EX MAINTENANCE HOLE
- EX COMBINED SEWER MAIN
- EX SEWER MAIN
- NEW SEWER MAIN (8")
- NEW SIDE SEWER (6")
- RE-LINE & REUSE EX SEWER MAIN
- NEW MAINTENANCE HOLE
- REPLACED MAINTENANCE HOLE

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SEWER LAYOUT – OPTION 1 (RELINEX EX WASTEWATER SERVICES)



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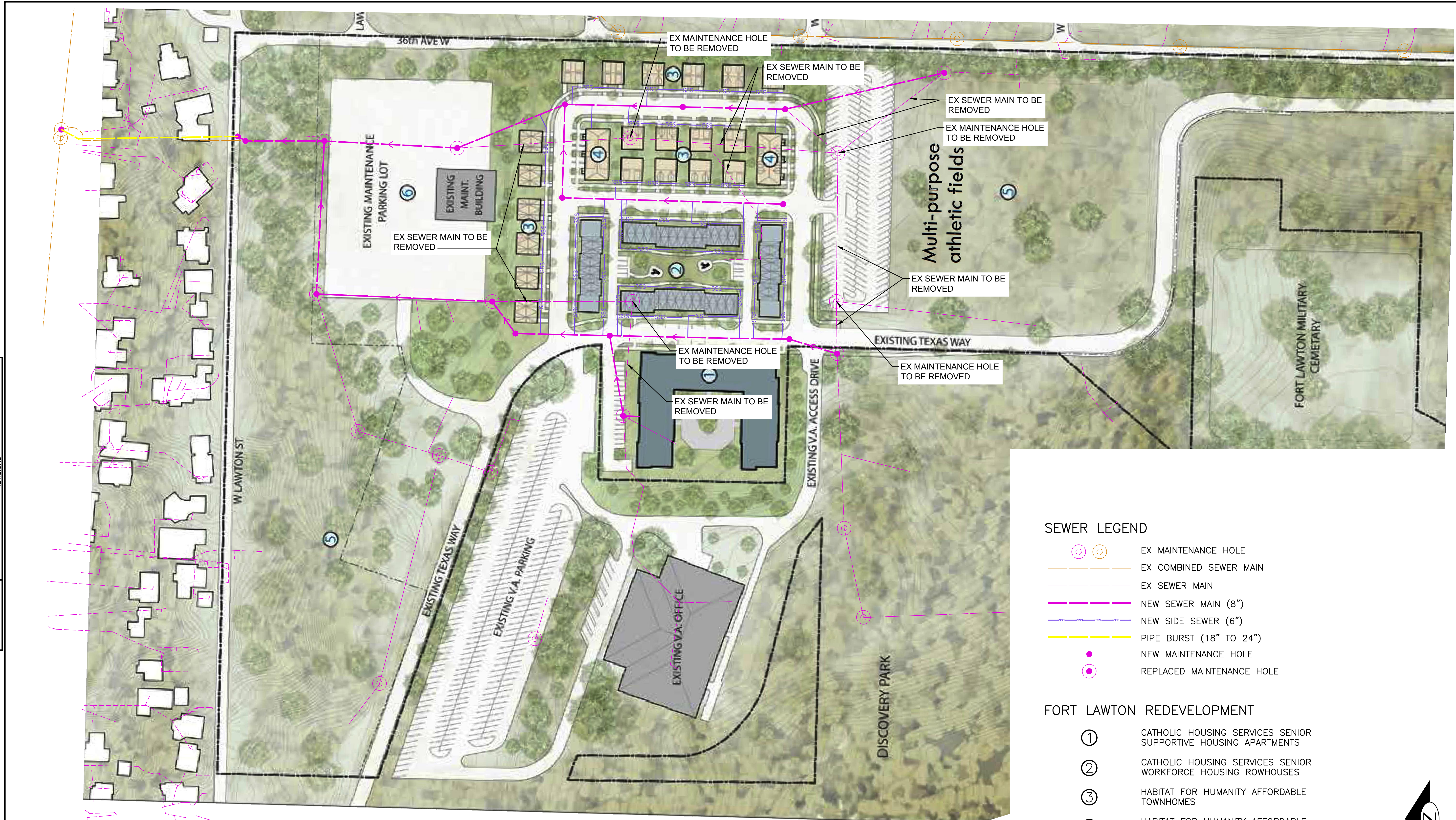
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WA 02 – FORT LAWTON PROJECT SUPPORT SERVICES

JOB #	PC CO
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SHEET	6 OF 8

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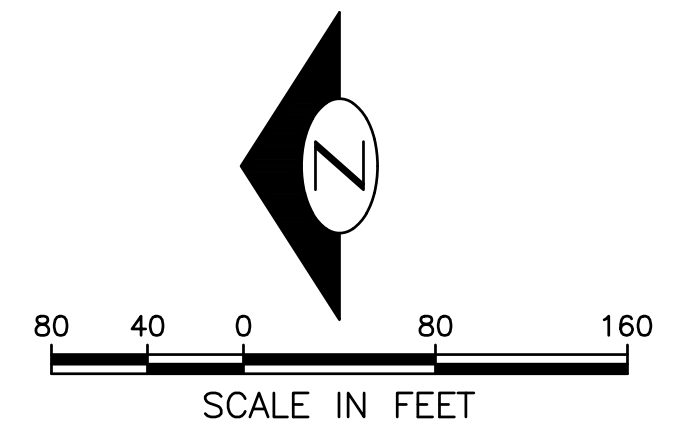


SEWER LEGEND

- EX MAINTENANCE HOLE
- EX COMBINED SEWER MAIN
- EX SEWER MAIN
- NEW SEWER MAIN (8")
- NEW SIDE SEWER (6")
- PIPE BURST (18" TO 24")
- NEW MAINTENANCE HOLE
- REPLACED MAINTENANCE HOLE

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SEWER LAYOUT – OPTION 2 (REPLACE EX WASTEWATER SERVICES)



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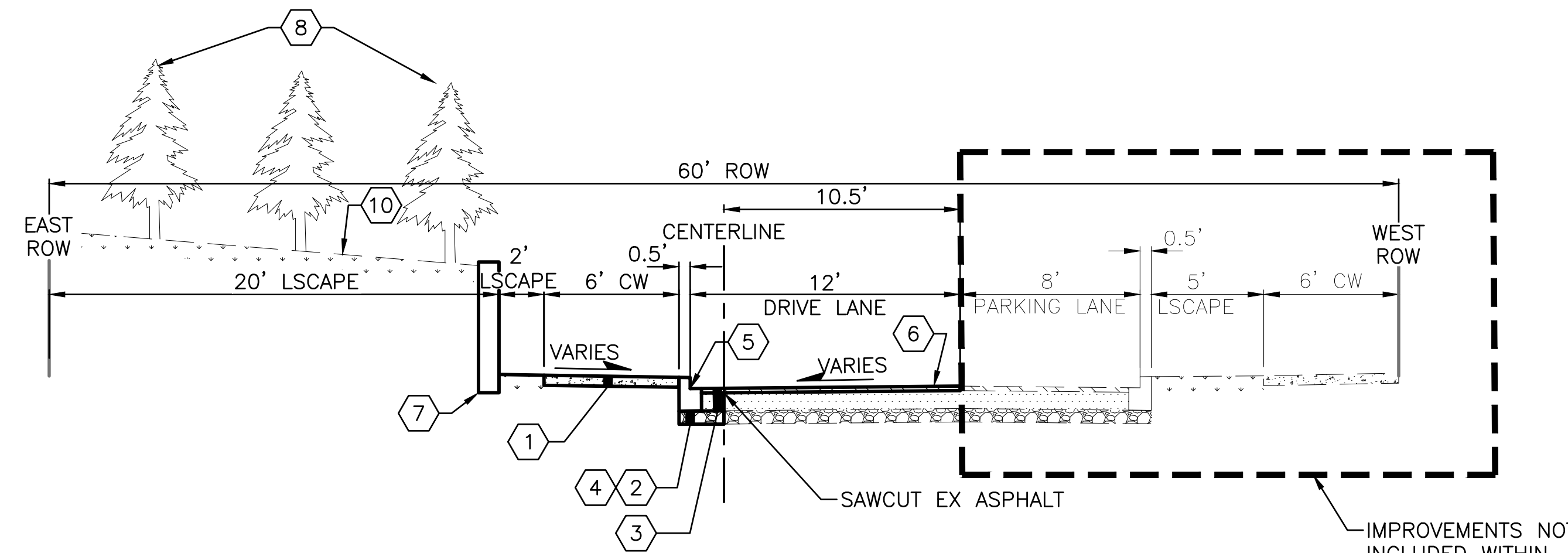
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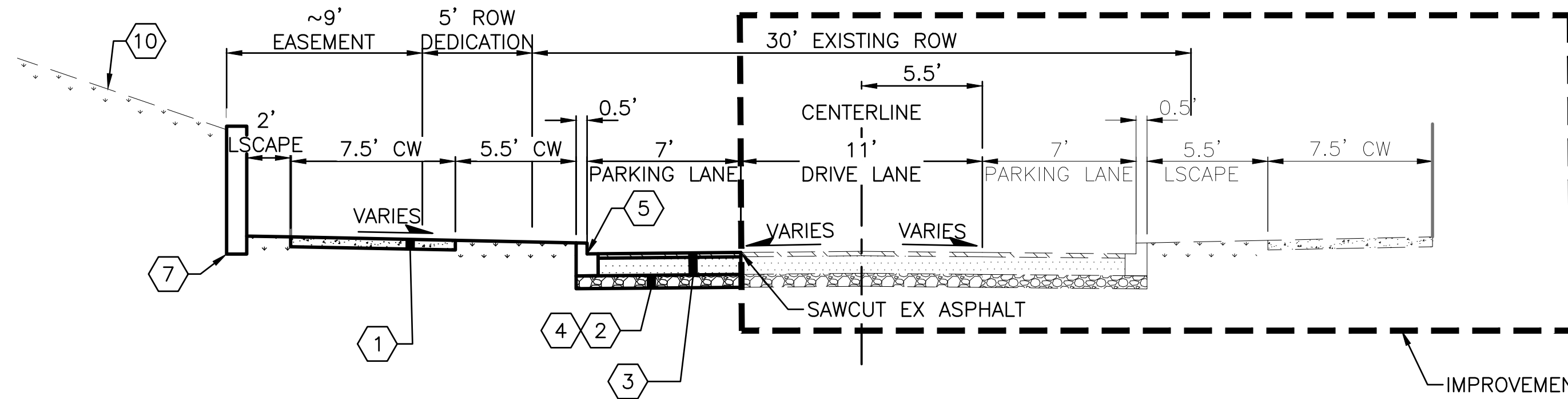
CONSTRUCTION NOTES

- ① CEMENT CONC SIDEWALK PER STD PLAN 420
- ② 6" MNRL AGG TYPE 2
- ③ 2" HMA CL 1/2" OVER 6" HMA CL 1"
- ④ COMMON EXCAVATION AS NECESSARY TO ESTABLISH NEW SUBGRADE
- ⑤ TYPE 410B CURB AND GUTTER
- ⑥ GRIND AND OVERLAY
- ⑦ APPROX 5' HEIGHT WALL. WALL HEIGHT MAY VARY ALONG ROADWAY
- ⑧ PRESERVE EXISTING TREES (TYP)
- ⑨ 2" HMA CL 1/2" OVER 11" HMA CL 1"
- ⑩ APPROX EXISTING GRADE & SLOPE (VARIES)
- ⑪ APPROX 5' HEIGHT WALL. WALL HEIGHT AND LOCATION/NECESSITY MAY VARY ALONG ROADWAY



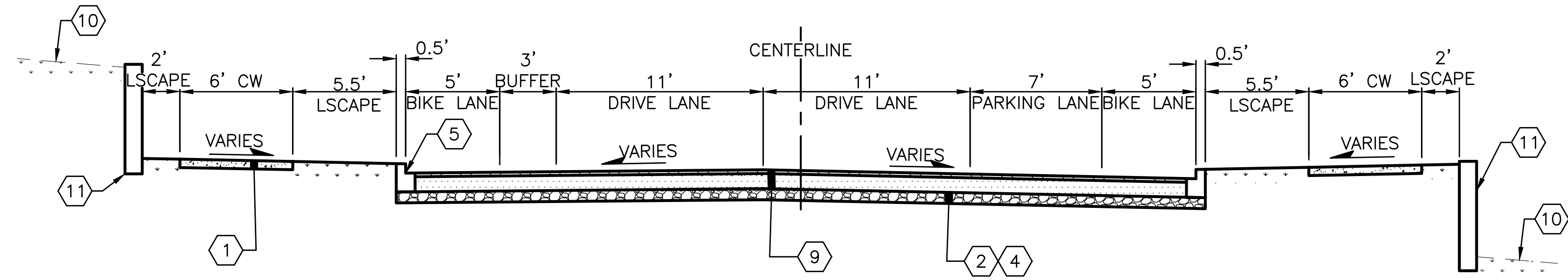
36TH AVE W STREET SECTION DIMENSIONS PROVIDED BY SDOT AND ARE PRELIMINARY. ROADWAY SECTIONS ARE SUBJECT TO STREETS ILLUSTRATED DEVIATION APPROVALS

36TH AVE W ROADWAY SECTION A-A C-01
SCALE: 1" = 5'



W LAWTON ST STREET SECTION DIMENSIONS BASED ON 52'-ROW FOR NEW NON-ARTERIAL STREETS AS PROVIDED BY SDOT AND ARE PRELIMINARY. ROADWAY SECTIONS ARE SUBJECT TO STREETS ILLUSTRATED DEVIATION APPROVALS

W LAWTON ST ROADWAY SECTION B-B C-01
SCALE: 1" = 5'



TEXAS WAY STREET SECTION DIMENSIONS PROVIDED BY SDOT AND ARE PRELIMINARY. ROADWAY SECTIONS ARE SUBJECT TO STREETS ILLUSTRATED DEVIATION APPROVALS

ARTERIAL ROADWAY LIGHT LEVEL STANDARDS ARE REQUIRED TO BE MET. THE NUMBER OF POLES/LUMINAIRES MAY BE MORE THAN CURRENTLY EXIST

TEXAS WAY ROADWAY SECTION C-C C-01
SCALE: 1" = 5'



NOT FOR CONSTRUCTION

ROADWAY SECTIONS



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INITIALS AND DATE		INITIALS AND DATE	
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ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.			

PRELIMINARY

Seattle Public Utilities

ORDINANCE NO. _____ PW NO. _____
SCALE: H. 1"=5'

WA 02 - FORT LAWTON PROJECT SUPPORT SERVICES

PC	CO
VPI #	C-08
SHEET	8 OF 8

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Project Title: WA 02 – Fort Lawton Project Support Services
 Subject: Fort Lawton Memorandum and Basis of Design for Class 5 Budgetary Estimate
 To: Seattle Public Utilities
 From: Davido Consulting Group c/o Erik Davido, PE and Ben Iddins, PE
 Date: November 4, 2022

1 INTRODUCTION

The City of Seattle is facilitating redevelopment of the Fort Lawton Army Reserve Center (Fort Lawton) on Parcel #102503-9334. The Redevelopment plan creates new quality affordable housing for low-income households and people who have experienced homelessness as well as increased lands dedicated to parks and open space on a nearly 32-acre parcel within Discovery Park.

Davido Consulting Group, Inc. (DCG) was tasked with preparing preliminary design layout options, up to two (2) each, for water, stormwater, and wastewater as well as evaluating grading on-site and right-of-way/road improvements for the purpose of creating an American Association for Cost Engineers (AACE) Class 5 budgetary estimate. DCG has years of experience working within Seattle and routinely works with private developers in the Seattle area allowing DCG to be in a unique position for this project by balancing their knowledge of the City of Seattle standard engineering plans, specifications, and guidelines with private development design and cost estimating approaches.

The project parcel is shown in Figure 1 and is bordered by W Lawton St and 36th Ave W to the north and east, respectively, with Texas way spanning through the site along the west portion of the parcel.



Figure 1 Fort Lawton Redevelopment Parcel

2 BASIS OF DESIGN & SITE LAYOUT OPTIONS

The following subsections describe the grading, stormwater, water, wastewater, and roadway improvement options evaluated for the Fort Lawton redevelopment. Please see the accompanying schematic plans attached in Appendix A and the associated budgetary estimates included in Appendix B for additional information.

2.1 ON-SITE EARTHWORK

The existing topography on-site slopes from south to north with an average relief of approximately 6.5%. Geologic hazards including steep slopes and erosion and seismic hazards are present in areas throughout the site. A preliminary geotechnical report previously prepared for the parcel and USGS mapping show that the site generally consists of gravelly, sandy, loam. For the redevelopment, the general approach for grading is separated into two tiers; one area for the multi-purpose athletic fields and associated parking lot, and one area for the new affordable housing. The grading design intent was to generally flatten each tier while maintaining existing grades along Texas way and matching existing grades as much as possible to reduce the cut and fill required. A slight slope (approximately 1.0% to the north and 1.0% to the east) was maintained for the athletic field area. A maximum 7' height wall separates the field and the parking lot area; the parking lot area slopes at approximately 4.0% - 5.0% to the north and 3.5% - 4.0% to the east. A slope of approximately 5.0% to the north and 4.0% to the east was maintained within the low-income housing area. A maximum 15' height wall separates the affordable housing area from the existing maintenance building.

See Appendix A for the proposed grading layout and cut/fill quantities.

2.2 STORMWATER

2.2.1 Applicability of Minimum Requirements

This project is subject to the requirements of the 2021 City of Seattle Code and Stormwater Manual ("Manual"). The proposed project totals approximately 16 acres of new plus replaced hard surfacing within a public combined sewer drainage basin. Therefore, Comprehensive Drainage Review, On-Site Stormwater Management (OSM) Best Management Practices (BMPs), and Peak Flow Control are required. Water quality treatment is not required per Section 4.4.4 of Volume 1 of the Manual.

2.2.2 Stormwater Basis of Design

Existing stormwater infrastructure, including catch basins, maintenance holes and conveyance pipes, are located within the project limits and drain to the north, servicing existing buildings and facilities, and eventually connect to the combined King County service line north of the project site within W Commodore Way via an 18" storm pipe. For the redevelopment, existing drainage infrastructure on-site will be removed and new drainage infrastructure constructed throughout the project site as needed to support the development.

Two stormwater layout options were created, each meeting the minimum requirements described in Section 2.2.1. In the layout option in which infiltration is infeasible (Option 1, below), the On-site List Approach is used to meet OSM BMP requirements. In the layout option in which infiltration is feasible

(Option 2, below), the On-Site Performance Standard is used to meet OSM BMP requirements. In both layouts, Western Washington Hydrology Modeling Software (WWHM2012) was utilized to model the stormwater BMPs and facilities to ensure compliance with the Peak Flow Control standard. The two layouts are described in the following sections. See Appendix A for the storm layout sheets.

2.2.3 Stormwater Site Layout Option 1: Detention Vault with Non-infiltrating Bioretention Planters

This option assumes that infiltration is infeasible at the site and therefore utilizes non-infiltrating bioretention planters (BPs) to meet the OSM BMP requirement for all hard surfaces including roof areas, at-grade pavement areas, and the multi-purpose athletic field area. Using a BP sizing factor of 1.2% of the contributing area as specified in the Manual, the total required BP footprint for the development is 1,152 SF, 2,370 SF, and 1,898 SF for the roof areas, sidewalk & roads, and multi-purpose athletic field area, respectively.

In addition to the BPs, this option includes a traditional detention vault used to meet the Peak Flow Control standard. All overflows from the BPs will be routed to the detention vault prior to stormwater leaving the site. A WWHM2012 model was created and a minimum vault size of 100' L x 80' W x 8' H is required. The detention vault will include a controlled outlet which will ultimately discharge to the combined King County service line within W Commodore Way.

2.2.4 Stormwater Site Layout Option 2: Infiltration Vault with Permeable Pavement

This option assumes a 1 in/hr design infiltration rate is available at the site and therefore utilizes permeable pavement surfacing (PPS) for all pavements (sidewalks, walkways, and roadways/parking lots) within the affordable housing area, for a total area of approximately 6.9 acres (this includes the multi-purpose athletic fields which were modeled as functionally equivalent to PPS in accordance with the Manual). All stormwater collected from the proposed roof and driveway areas onsite will be routed to an infiltration vault which will infiltrate and detain stormwater and will include a controlled outlet which will ultimately discharge to the combined King County service line within W Commodore Way.

The WWHM2012 model was created utilizing the assumed 1 in/hr design infiltration rate. The WWHM2012 model shows that 100% of the rain falling directly onto the PPS will be infiltrated within the native subgrade. Also included in the WWHM2012 model is the resulting size of the infiltration vault in order for the developed site to meet the OSM BMP requirement and Peak Flow Control standard. The required infiltration vault size is approximately 100' L x 60' W x 8' H.

2.3 WATER

2.3.1 Water Basis of Design & Site Layout Options

Existing water infrastructure (water main, pump station, meters, fire hydrants, etc.) is located within the project limits, primarily along Texas Way servicing the existing maintenance building, Veterans Affairs (VA) building, and cemetery. For the redevelopment (preliminary layout provided by Seattle Public Utilities), most existing water infrastructure will be removed and replaced with 12" main within Texas Way, looping and connecting the system between 36th Ave W and the intersection of W Lawton St and 40th Ave W. 8" branches of water main are included to provide fire and domestic capabilities to existing facilities.

The two water layouts are very similar with the exception of one stretch of main, as described in the following bullet points. See Appendix A for the water layout sheet.

- Reuse Existing 12" Water Main Segment – an approximate 430' segment of existing 12" water main that runs between the affordable housing and parking lot will be reused.
- Remove and Replace Existing 12" Water Main Segment – the above mentioned segment will be removed and replaced with new 12" water main.

Further water system investigation and system modeling should be conducted and may result in reduced water system improvements and cost savings (see Section 5.3 for recommendations for additional assessment).

2.4 WASTEWATER

2.4.1 Wastewater Basis of Design

Existing wastewater infrastructure (8" pipe, laterals, maintenance holes etc.) is located within the project limits draining to the north and provides service for existing buildings and facilities on-site. Wastewater from the site is currently conveyed to the combined King County service line within W Commodore Way via an 8" line. For the redevelopment, existing wastewater infrastructure will be removed and new drainage infrastructure constructed throughout the project site as needed to support the development. Some wastewater infrastructure from upstream and off-site areas contribute to the on-site wastewater conveyance system and it is assumed those services would need to remain connected in the redeveloped condition.

Two potential wastewater layouts are described in the following sections. See Appendix A for the sewer layout sheets.

2.4.2 Wastewater Site Layout Option 1: Reline Existing Wastewater Services

This option utilizes existing wastewater infrastructure where possible by relining existing wastewater pipes on the site and reusing existing maintenance holes to the maximum extent feasible. Additionally, this option minimizes the length of new sewer main throughout the site and instead utilizes numerous 6" side sewers which can each accommodate up to 8 townhouse or rowhouse units. Wastewater and collected stormwater discharging from the site will combine at the northern property line and collectively drain to the combined sewer in W Commodore Way via a relined 18" storm pipe; a new maintenance hole will also be installed at the downstream end. The existing 8" sewer line connected to the combined sewer in W Commodore Way will be abandoned.

2.4.3 Wastewater Site Layout Option 2: Replace Existing Wastewater Services

This option assumes all existing wastewater infrastructure on the site is in substandard condition and therefore will need to be replaced. New 8" sewer pipe and new maintenance holes will be installed throughout the project area. Sewer pipe locations in the roadway are more traditionally located (i.e. center of road throughout the development) resulting in shorter stretches of side sewers for each unit. Wastewater and collected stormwater discharging from the site will combine at the northern property line and collectively drain to the combined sewer main in W Commodore Way via a 24" pipe burst (pipe burst the existing 18" pipe to 24"); a new

maintenance hole will also be installed at the downstream end. The existing 8" sewer line connected to the combined sewer main in W Commodore Way will be abandoned.

3 ROW IMPROVEMENTS

3.1 BASIS OF DESIGN

The project triggers half-street right-of-way (ROW) improvements for the sections of public ROW fronting the parcel along with full-width street improvements for Texas Way which spans through the site. The Seattle Department of Transportation (SDOT) provided preliminary roadway cross sections for roads fronting the parcel (36th Ave W and W Lawton St) and for Texas Way. This results in approximately 2,450 LF, 1,300 LF, and 3,370 LF of improvements on 36th Ave W, W Lawton St, and Texas Way, respectively.

See Appendix A for the cross sections provided by SDOT.

3.1.1 36th Ave W

36th Ave W consists of a 60' ROW width and is currently classified as a neighborhood yield street in Seattle's Streets Illustrated mapping. An existing asphalt road runs approximately 2,450 LF along 36th Ave W fronting the project site. Between the existing western roadway edge and western property line (running the entire length of the road) is approximately 22' of landscape area with a dense coverage of existing trees; based on the cross section provided by SDOT, it is assumed that this tree and landscape area is to remain. The proposed project will trigger half street frontage improvements along 36th Ave W (roadway, curb/gutter/sidewalk) following SDOT's Right of Way Opening and Restoration Rules and following Seattle Standard Plan 401 for residential pavement sections. A wall (approximately 5' in height) is included, offset 2' from the back of the sidewalk, in the design and budgetary estimate to separate the proposed sidewalk from the existing landscape area to remain; further structural and geotechnical analysis should be conducted to better determine wall heights. Note that formal streets illustrated review and deviations may be needed for proposed cross section elements (i.e. omittance of landscape strip between roadway and sidewalk). For most of 36th Ave W fronting the site, there is a combined sewer main in the road; ROW drainage collection is included within the budgetary estimate and is assumed to drain to this main. For the northernmost segment of 36th Ave W that intersects with W Lawton (where there is no combined main) it is assumed that drainage can be routed and can connect to the lateral from the project site that drains to the King County Main within W Commodore Way.

3.1.2 W Lawton St

W Lawton St consists of a 30' ROW width and is currently classified as a neighborhood yield street in Seattle's Streets Illustrated mapping. Note that Seattle's Streets Illustrated mapping states that the minimum required ROW width for a neighborhood yield street is 40'. An existing asphalt road runs a total length of approximately 1,300 LF along W Lawton St fronting the project site except for an approximate 160' stretch of road near the western portion of the frontage where there is a gap between two roadways due to elevation differences; this area contains landscape and stairs and is classified as a steep slope and potential slide area within Seattle GIS mapping. From the

intersection of 36th Ave W and W Lawton St to the current edge of pavement, the road is approximately 1,110 LF. SCL power poles with street lighting are also located along the southern edge of the existing roadway and are likely to be impacted by the required street improvements and therefore are assumed to be relocated. Two options were evaluated for this stretch of frontage improvements, as described in the following:

- Provide half-street frontage improvements along the full stretch of W Lawton St frontage, including connecting 36th Ave W to 40th Ave W where the existing landscape and stair climb is located. For this approximately 160' stretch of road, a new two-lane roadway is included along with 8' height walls due to the change in elevation in this area.
- Provide half-street frontage improvements from 36th Ave W to the gap and install a cul-de-sac to provide vehicular turnaround at the end of the dead-end street.

The proposed project will trigger half street frontage improvements along W Lawton St (roadway, curb/gutter/landscape strip/sidewalk) following SDOT Right of Way Opening and Restoration Rules and following Seattle Standard Plan 401 for residential pavement sections. A wall (approximately 5' in height) is included with the design and budgetary estimate separating the proposed sidewalk from the existing landscape area to the south of the improvements; further structural and geotechnical analysis should be conducted to better determine wall heights. Note that for the option that constructs a road throughout the entirety of the frontage, an 8' height wall (approximate average) is included for this segment. Further investigation regarding the soil conditions and stability analysis should be conducted by a geotechnical engineer in the steep slope and potential slide area to further develop costs associated with walls. It is assumed that drainage can be routed to and can connect to the lateral from the project site that drains to the King County Main within W Commodore Way.

Note that the existing ROW width is 30' wide and the SDOT ROW width for improvements is 52' wide. It is assumed that future 5' dedications will be required on the north and south property lines with an additional ~9' easement on either side for sidewalk installation.

3.1.3 Texas Way

Texas Way is not currently mapped within Seattle's Streets Illustrated mapping but consists of an approximately 30' wide section; this road is to be improved into a 66' public arterial road with bicycle lanes and transit use including transit stops and amenities. The existing asphalt road with sidewalk runs approximately 3,370 LF along Texas Way. The proposed project will trigger full street improvements along Texas Way (roadway, curb/gutter/landscape strip/sidewalk) following SDOT Right of Way Opening and Restoration Rules and following Seattle Standard Plan 402 for arterial pavement sections. A wall (approximately 5' in height) is included in the design and budgetary estimate on both sides of the roadway separating the proposed sidewalk from the existing grades; further structural and geotechnical analysis should be conducted to better determine wall heights. Note that with the preliminary building layout image provided by SPU, a proposed 66' cross section will likely require modifications to the proposed building layout. Additionally, note that horizontal and vertical geometry will need to meet requirements for an arterial street. Current horizontal curves may not meet standards for arterial design speed and alignment; the location of the roadway may need adjustment.

4 BUDGETARY ESTIMATE

An AACE Class 5 budgetary estimate was prepared for the summarized preliminary system layout options discussed in the above sections. The estimate includes construction costs with a 25% contingency and a range of soft costs (permitting/design/other) and includes separate operations and maintenance costs. Costs were derived from recent private project experience/contractor coordination, RSMeans construction cost estimating software, and professional judgement. An accuracy range of -30% to +50% was utilized for this level of design.

Electrical supply costs for overhead power lines and underground power lines options were provided by Seattle City Light and pre-marked up electrical supply construction costs inserted in the cost summary. The road and electrical supply construction costs were allocated to each development zone based on the development zone area proportion of the total area.

See Sections 5 for exclusions, assumptions, & recommendations which aid in items covered and excluded by the budgetary estimate. See Appendix B for the budgetary estimate sheets.

5 EXCLUSIONS, ASSUMPTIONS, & RECOMMENDATIONS

The following sections are a comprehensive list of items excluded, assumed in the plan development and budgetary estimate.

5.1 EXCLUSIONS

The following is a list of items excluded from the design and budgetary estimate, including but not limited to:

- Demolition of existing structures (i.e. existing buildings)
- Existing maintenance building refurbishing and parking lot resurfacing
- Hazardous material mitigation (soil or demolished materials)
- Building construction
- Landscaping within private property (i.e. planting/soil amendment of construction disturbed surfaces)
- SCL utility infrastructure layout (although costs have been provided by SCL)
- Drainage and underdrain pipe for the Multi-Purpose Athletic Field
- No restrooms facilities associated/near the Multi-Purpose Athletic Field
- Construction facilities (i.e. portables)
- Bonds & insurance

5.2 ASSUMPTIONS & NOTES

The following is a comprehensive list of assumptions and notes that were used throughout the design and cost estimation which includes but is not limited to:

- Construction budgetary estimate is for 2023 construction. Applicable scaling factors to be used for future construction date

- No public main extensions will be required within the ROW (36th Ave W or W Lawton St)
 - Drainage collected from the majority of road improvements along 36th Ave W will be able to connect to the existing combined main in 36th Ave W.
 - Drainage collected from road improvements along W Lawton St/northernmost area of 36th Ave W will be able to connect to the existing lateral from the project site that connects to the King County main within W Commodore Way.
- King County will approve the relined/burst connection to the King County main in W Commodore Way
 - It is acceptable for storm and sewer to connect at the property line and drain to the King County main
- Although not shown in the project plans, Texas Way includes storm infrastructure installation/facilities
- Project budgetary estimate was prepared/designed as a private development project
 - Prevailing wages, local labor workforce requirements, LEED requirements, and bond/insurance were not included in the budgetary estimate
 - Shop (Union) costs were used to estimate unit prices within the budgetary estimate
- Site excavated soils are to be used for fill on-site including utility trenches
 - Import bedding material/fill is to be used for utility trenches within the ROW
 - Standard excavation for trench/pipe installation (i.e. no hard rock or over excavation)
 - Site soils generally consist of sandy clay/loam
- For construction, Texas Way will be closed from south edge of parcel to westerly edge of parcel.
 - However, there will be temporary road/access to serve the VA Building and maintenance building
- All on-site drainage and wastewater pipe were to be estimated as privately owned and therefore may be PVC. Note that ductile iron pipe will result in approximately 45% increase for associated pipe costs
 - Water pipes/fittings/hydrants were assumed to be ductile iron pipe.
- Sewer pipes that are proposed for relining are in suitable condition for relining
- There is an existing bus stop on Texas Way. The bus is to be rerouted and the temporary traffic control is not included with the estimate
- Construction project haul is within 8-10 miles of project location
- Roadway dedications/easements will be required on W Lawton for the SDOT proposed roadway cross section
- The Texas Way roadway through the project site is 66' wide. Please note the distance between the apartment building and rowhouse apartments measured from face to face is about this same distance
- Project dewatering is not required (i.e. groundwater elevations won't affect construction).
- Erosion and sediment control is estimated for earthwork/road construction costs and the drainage construction costs
- Operations and maintenance was estimated using RSMMeans and professional judgement and is for the first year after construction only. If using for cost projecting, utilize yearly

inflation costs as well as allowance for increased maintenance over time for aging infrastructure; perhaps 5% every 5 years

5.3 RECOMMENDATIONS FOR ADDITIONAL ASSESSMENT

The following is a comprehensive list to aid in the refinement and assessment of further design and cost analyses which includes but is not limited to:

- Utility locator
 - Further analysis on sewer system on-site and from off-site/upstream that may contribute to on-site system
 - Further analysis on storm system on-site and from off-site/upstream that may contribute to on-site system
- Topographic survey compliant with SDOT Street Improvement Permit level of requirements
- Anticipated water demand for all new/existing building units and fire flow
 - Water system modeling to determine minimum water main pipe size
 - Further analysis on layout to determine if connector/branch lines can be eliminated
 - Further analysis on water meter requirements and comparison between individual meters vs. larger master meters
- Geotechnical analysis and associated report
 - Infiltration testing
 - § Infiltration testing results could alter stormwater BMP/flow control approach and sizing
- Additional stormwater modeling:
 - For refinement of vault sizing
 - For pipe conveyance capacity
- Sewer CCTV/evaluation to determine existing pipe condition
- There may be creative alternatives to keeping poles along project frontage (particularly W Lawton St) in their existing locations via “bulbing” curbs. Further SDOT/SCL determination required
- Investigation into existing reported ponding issues around storm/sewer service lines on-site/near site
- Further investigation/grading refinement for abandoning existing DWW on-site (particularly water main) instead of trenching and removing
- Investigation into cost associated with booster pump station removal
- Existing traffic use and proposed traffic use study/evaluation
- ROW Tree/exceptional tree removal and mitigation review and analysis
- Refinement of proposed road cross sections. Streets illustrated review and deviations may be needed for proposed cross sections.
 - A ROW variance request on W Lawton St should be filed and reviewed for the cul-de-sac

- The ROW walls to be constructed along W Lawton, 36th Ave W, and Texas Way may be in tree critical root zones. Further analysis on tree retention/requirements by an arborist is needed

6 REFERENCES

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7 APPENDICES

APPENDIX A – BASIS OF ESTIMATE CIVIL LAYOUTS

APPENDIX B – BUDGETARY ESTIMATE

APPENDIX C – AREA CALCULATIONS & WWHM MODELING REPORT

APPENDIX A – BASIS OF ESTIMATE CIVIL LAYOUTS

APPENDIX B – BUDGETARY ESTIMATE

APPENDIX C – AREA CALCULATIONS & WWHM MODELING REPORT