Preliminary Engineering Report

Jones Road and Sunset Trail Street, Drainage and Water Line Improvements

Submitted To:

Ms. Sylvia Carrillo, CPM, ICMA-CM
City Administrator
City of Sunset Valley
3205 Jones Road
Sunset Valley, TX 78745

Date:

March 19, 2021

Prepared By:

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Freeland Turk ENGINEERING GROUP

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Jones Road Drainage Improvements

Background

The City of Sunset Valley has received complaints about stormwater issues from residents of two properties (outlined in green in the graphic below) located on south side of Jones Road, between Sunset Trail and Reese Road.

During significant rainfall events, both residents have observed stormwater runoff from Jones Road flowing over their existing driveways (3 total) and into their property. These conditions reportedly existed prior to completion of the latest improvements to Jones Road (circa 2016) but were not mitigated as expected.

The residents also report ponding water and generally poor drainage conditions along the south property lines of the subject lots and in the west roadside ditch of Sunset Trail.

Assessment of Conditions

Data Collection – We met with the residents on-site, noted their observations and visually observed the condition of their property. FTEG collected information such as city mapping and as-built / engineering plans from various projects surrounding the site. Additionally, we coordinated additional field surveying and utility mapping to augment previous surveying efforts.

Site Observations – Jones Road possesses a 1% +/- grade and drains west to east. The pavement surface has very little crown (less than 0.6%). Jones Road is about 1-2 feet higher than the subject properties. A drainage system exists under the sidewalk on the south side of Jones Road that is designed to drain properties south of Jones Road and a very small amount of runoff from Jones Road via an existing 10' grate inlet. Most of the problematic stormwater originates from a small area (1-2 acres) north of Jones Road.

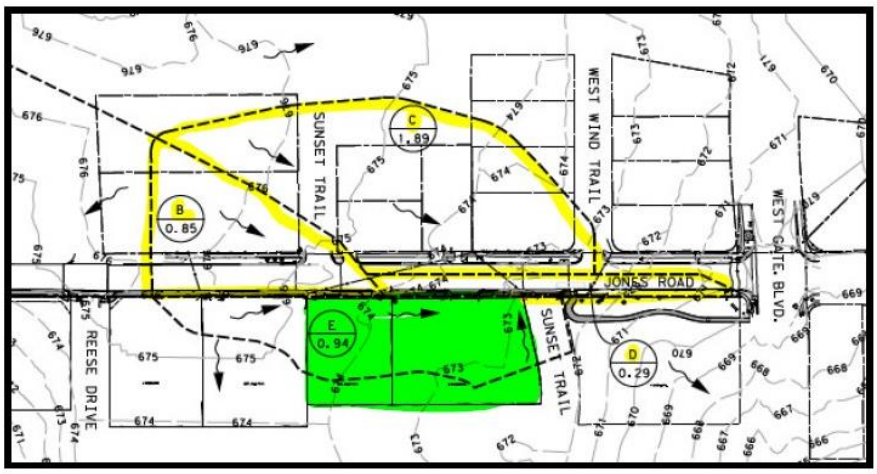
The subject property area is lower than Jones Road and generally drains from west to east with grades just over 1%. However, homesite improvements (slabs, driveways, landscaping, etc.) hinder the flow of runoff and ponding is prevalent. There is approximately 2' of elevation difference along the south property lines of the subject lots. Existing fences, trees, landscaping other features hinder the travel of stormwater, causing water ponding. These conditions are exasperated by stormwater entering the subject properties from Jones Road.

A swale exists at the east end along the south property line that conveys stormwater into the west roadside ditch of Sunset Trail. Stormwater reportedly ponds in this swale and in the roadside ditch and drains off slowly.

Hydrology - A drainage area map was prepared by Klotz Associates in 2015 depicting stormwater flows in and around the project area.

- Stormwater from Drainage Area B flows along the south curb line of Jones Road and along the problematic driveways.
- Some portions of Drainage Area C and D may be contributing stormwater to the problematic driveways on Jones Road due to the flat pavement crown conditions.
- Stormwater from Drainage Area E flows into inlets and a storm drain system draining to the east and does not flow onto the surface of Jones Road.

Drainage Area Map



DRAINAGE AREA SUMMARY

Description	Units	DRAINAGE AREAS			
		B	C	D	E
DRAINAGE AREA	ACRES	0.85	1.89	0.29	0.94
TIME OF CONCENTRATION (Tc)	MIN	5	5	5	5
STORM EVENT	--	25 YR	25 YR	25 YR	25 YR
METHOD	--	RATIONAL	RATIONAL	RATIONAL	RATIONAL
RUNOFF COEFFICIENT (C)	--	0.675	0.625	0.675	0.675
INTENSITY (I)	IN/HR	10.1	10.1	10.1	10.1
WATERSHED DISCHARGE (Q)	CFS	5.83	11.95	1.97	6.41

RATIONAL METHOD PER THE CITY OF AUSTIN DRAINAGE CRITERIA MANUAL

From Klotz Associates Plans dated 6-17-15

Assessment

Based on observations, surveys and other information collected to date:

- Because of flat crown conditions, we believe more stormwater from Drainage Areas C and D are flowing into the south curb line of Jones Road than estimated by Klotz Associates.
- The three driveways constructed in circa 2016 do not appear to have enough crest elevation to contain the stormwater flows within the south curb line of Jones Road during significant events.
- Because of homesite improvements within the subject properties, we believe notable amounts of stormwater from Drainage Area E (west of Sunset Trial) flows east and southeast across the subject lots and does not flow into the existing drainage system (under the sidewalk) as designed.

Jones Road Drainage Approach

Containing stormwater in Jones Road and preventing flows from entering the subject properties is the key to providing drainage relief in the area to the south. Refer to Exhibit A.

West Driveway – We recommend reconstruction of this driveway with a crest elevation high enough (at or above the existing top of curb) to keep stormwater in the curb line, preventing flows from running over the driveway. This driveway is the entry into an easement that provides access to a well owned by the City. Construction beyond the ROW, but within the easement, will be required. Temporary construction easements may be required to accommodate construction.

Middle and East Driveways – Existing curb inlets are situated just upstream of the middle and east driveways. Their openings face south, away from Jones Road. We recommend modifying these two inlet structures to create inlet additional openings in the south curb lines of Jones Road. These proposed two-sided inlets will intercept stormwater flows from the curb line and direct discharge into the existing storm drainage system below the sidewalk.

The work would include removal of sidewalk, removal of the top of the inlet box and structural reconstruction of the inlet top, creating a two-sided inlet box. 5’ to 10’ of temporary construction easement will be required to accommodate this work.

Drainage Approach along Subject Properties South Lot Lines

Constructing swales along the south and east property lines of the subject lots should significantly improve drainage conditions and reduce ponding. Refer to Exhibit A.

We propose a concrete v-swale be constructed within the 10’ utility along the south property lines to convey stormwater to Sunset Trail. This v-swale would maintain the grade needed to convey flows to the east and reduce ponding in the area. Construction of this v-swale will be intrusive and will require grading and some removal of fences, trees, and landscaping. A 10’ wide temporary construction easement and close coordination with the property owners will be required for this work.

A concrete v-swale should also be constructed in the bottom of the existing west roadside of Sunset Trail, within the existing ROW. This v-swale would maintain the grade needed to convey stormwater to the existing storm drain system in Jones Road and provide the relief needed to reduce ponding in the ditch.

South Property Line of Subject Lots

West Roadside Ditch of Sunset

Utility Conflicts

The existing utilities in the proposed construction area on Jones Road and Sunset Trail were substantially mapped. Reconstruction of the west driveway and modification of the two existing inlets should not result in conflicts with existing utilities. Similarly, the two v-swales are shallow (4-6”) and should not result in conflicts with existing utilities during construction. This should be verified during design.

Traffic Control

A 10-12’ wide work zone in front of the driveways is necessary on Jones Road for construction. Two-way traffic can be maintained on Jones Road during construction. Construction of the two v-swales should not impact traffic.

Right-of-Way

Temporary construction easements, as described herein, will be required from the subject property owners to accommodate the work. Close coordination with the residents during construction will be essential.

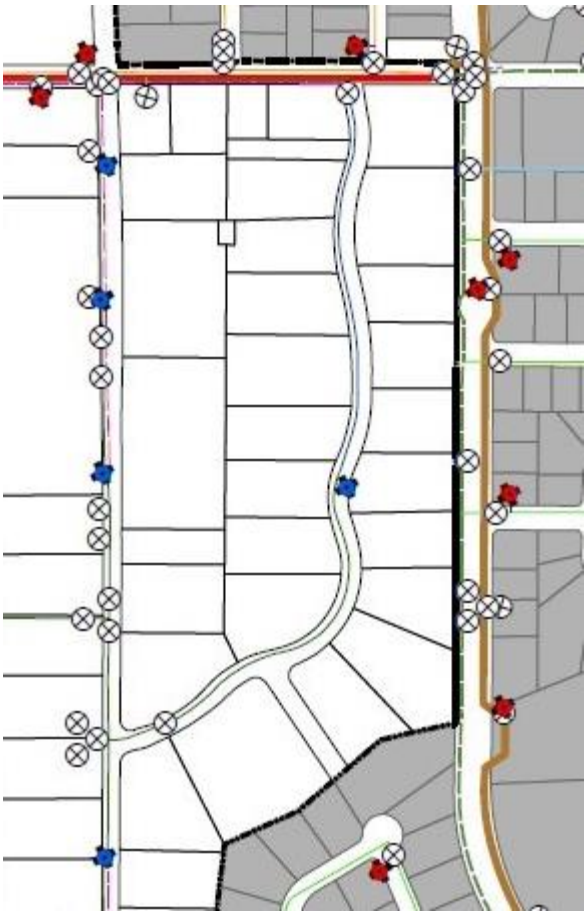
Sunset Trail Water Line Improvements

Background

The City of Sunset Valley desires to explore replacement of the existing water main within Sunset Trail with a larger main. A larger water main would improve domestic and fire flows to homes on Sunset Trail and enhance Sunset Valley's water distribution system in the area.

Existing Conditions

An existing 4" water lines exist on Sunset Trail from Jones Road to a fire hydrant located approximately 900' to the south. From this location, a 6" water line exists to Reese Drive. The water line is generally located within the roadside ditch on the west side of the street. On the west end of Sunset Trail, the water line ties into an existing 8" valve just east of Reese Street. On the north end of Sunset Trial, the water line ties into an existing 8" valve just south of Jones Road. One fire hydrant exists about halfway between Jones Road and Reese Street where the existing mains change size. Please refer to the graphic below.



Area Water Distribution System Flows

At the time of this report, a water distribution model or data is not available. A water distribution model would enable us to consider various planning scenarios on Sunset Trail and in the area. However, the City has provided us with results from the ongoing citywide fire hydrant testing program. In the absence of a model, this information provides us a good gauge of hydraulic conditions in the water distributions in the network. The testing data indicates fire flows (@20 psi) exceed the minimum flow rate of 1,250 gpm (as required in the City of Austin – Fire Criteria Manual). Please refer to the graphic below.

Proposed Sunset Trail Water Main

The City of Austin – Utility Criteria Manual requires water mains to be at least 8" in diameter, which typically provides adequate peak water demand and fire flows in residential neighborhoods. Therefore, we recommend replacing the existing 4"and 6" water mains on Sunset Trail with a new 8" water main. Once constructed, the existing water mains in Sunset Trail can be abandoned in place. Refer to Exhibit B.

Alignment

FTEG made field visits and arranged surveying to locate critical above ground features and underground utilities that would influence the location of the new 8" water main, particularly the existing 8" sanitary sewer line. It was constructed with a curved alignment and its location meanders relative to the existing curb lines. We also reviewed previous construction plans from 1988 and 1999 provided to us by the City.

Based on the information collected, we recommend the new water main be constructed generally 3' inside the existing west curb lines of the street and at a 48" bury (minimum). In one location, the proposed alignment must transition from one side of the street to another to meet TCEQ and City of Austin separation requirements between new water mains and existing sewer mains.

Other alignments outside the pavement were considered. However, they were eliminated from consideration because of potential conflicts with other existing utilities. Furthermore, construction within the roadside ditches of Sunset Trail would be very intrusive, adversely impacting driveways, landscaping, rock walls, trees and other improvements.

Sunset Trail crosses the Sunset Tributary of Williamson Creek where a multiple box culvert exists. At this location, we are recommending the proposed water main be placed outside the ROW in a proposed 15' water line easement to avoid damage to the existing drainage structure and headwalls.

Water Line Appurtenances

Valves - Existing 8' inch valves exist near Jones Road and Reese. In accordance with City of Austin – Utility Criteria Manual valve spacing requirements, FTEG recommends placing a valve mid-way on Sunset Trail. The recommended valve placement should facilitate adequate isolation of mains to facilitate repairs.

Fire Hydrants - We recommend fire hydrants be placed every at the intersection of Reese Drive and Sunset Trail and every 500' +/- on Sunset Trail.

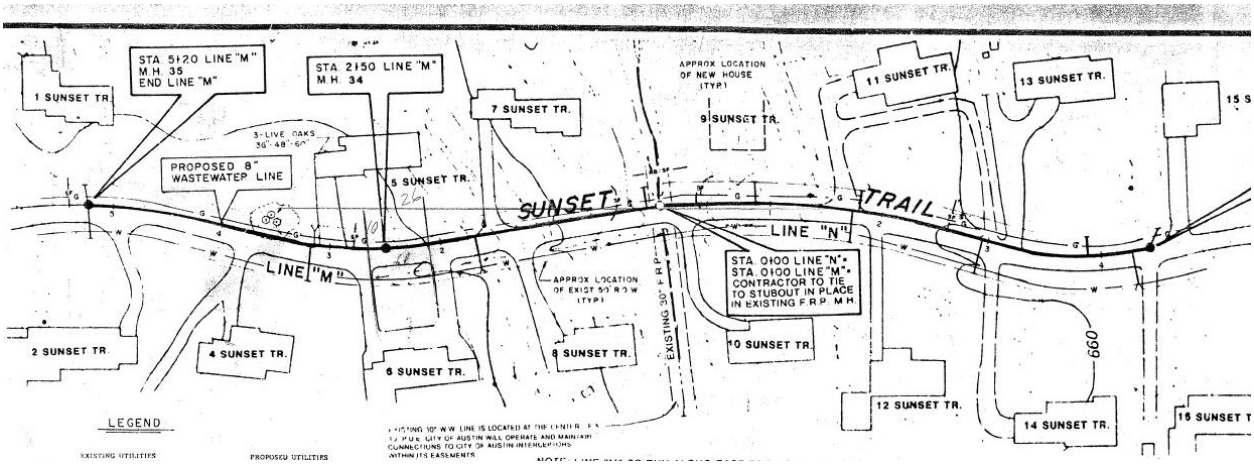
Services - All water services and water meters should be replaced.

Utility Conflicts

Our research indicates conflicts will exist between the proposed water main, existing 2" gas line and the existing 8" sanitary sewer main, including their existing services. These conflicts can be resolved during the project design during the utility coordination process without undue difficulty.

Existing 8" Sanitary Sewer

The existing 8" Sanitary Sewer appears to be in satisfactory condition. The public works staff reports problem free operations in recent memory. This sewer line appears to have substantial serviceable life remaining and should not require replacement at this time.



Traffic Control

Generally, construction of the new water line in Sunset Trail will require closing half of the street to traffic to establish a safe work zone for the contractor. Traffic will be restricted to one-way only from Reese Drive to Jones Road. Southbound traffic on Sunset Trail must use Jones Road and Reese Street as a detour. Other minor short-term closures will be required.

Right-of-Way

A 15' wide water line easement, spanning two properties, will be required to construct the water line in the creek area. The remaining water line work can be accomplished in the existing ROW.

Sunset Trail Street Improvements

Background

Given the pavement condition of Sunset Trail, the City of Sunset Valley believes it would be prudent to consider making street repairs while other drainage and water line improvements are constructed.

Sunset Trail Pavement Condition Assessment

Sunset Trail (between Jones Road and Reese Drive) is a 2,000 +/- asphalt street that was reconstructed circa 2000. According to the original design plans, the pavement consists of 18" header curb, 12" of flexible base material and 1 ½" of HMAC. Stamped concrete pavement exists near the Jones Road intersection and concrete approach aprons exist at the at the multiple box culvert at the Sunset Tributary of Williamson Creek. The posted speed limit is 25 mph. A visual survey of the Sunset Trail pavement as conducted on January 8, 2021. Overall, the pavement is in satisfactory to good condition. A summary of the pavement's distresses and other conditions are provided below.

- Longitudinal Cracking is prevalent throughout the length of the street. A minor amount of transverse exists too. The majority of the cracks are relatively narrow and have been aggressively sealed.
- A handful of utility / pothole repair patches exist within the street limits.
- Pavement depressions have formed around a few of the existing sanitary sewer manholes.
- The surface of the asphalt has experienced normal oxidation for its age.
- The surface of the pavement appears to adequately drain into the existing roadside ditches.
- The street crosses the Sunset Tributary of Williamson Creek and appears to flood during significant rainfall events.
- The header curb, concrete driveways and concrete pavement/aprons appear to be in good condition.
- The ride quality is considered good.

Sunset Trail Near Reese Drive

Sunset Trail Near Jones Road

Street Repair / Maintenance Recommendations

FTEG recommends Sunset Trail (between Jones Road and Reese Drive) be overlayed with new HMAC (Hot Mix Asphalt Concrete) once the water main replacement construction is complete. The recommended construction consists of milling approximately 2" of existing asphalt and crushed limestone material, applying a tack coat, placing 2" of HMAC - Type "D". Also, , some of the base material near Reese Drive should be replaced prior to overlay. The work should also include installing a cross walk at the intersection with Jones Road and a stop bar at the Jones Road intersection.

It appears the proposed water main can be aligned to avoid removal of the existing stamped concrete pavement. However, if removal becomes necessary, it should be saw cut and replaced with a minimum of 6" of reinforced concrete that is stained and stamped to match the appearance of the existing pavement.

Cost

An opinion of probable construction costs for the street, drainage and waterline improvements described in this report is $523,446.00. A detailed estimate is provided herein.

Freeland Turk ENGINEERING GROUP

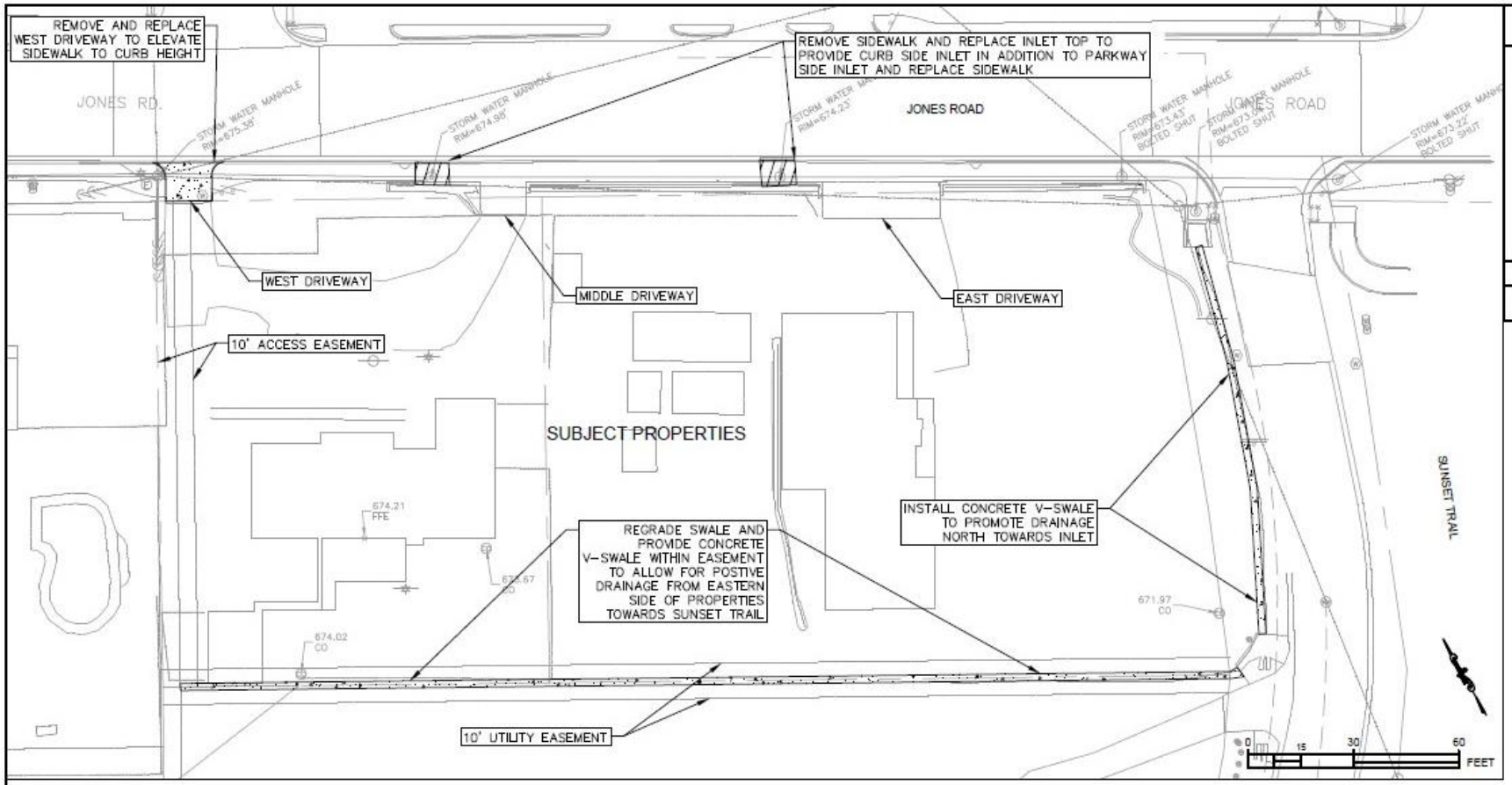
FREELAND TURK ENGINEERING GROUP, LL FIRM F-21047
160 CREEKSIDE PARK RD, STE 200
SPRING BRANCH, TX 78070 830-377-4555

PROJECT JONES ROAD AND SUNSET TRAIL STREET, DRAINAGE, AND WATER LINE IMPROVEMENTS
DATE 3/19/2021

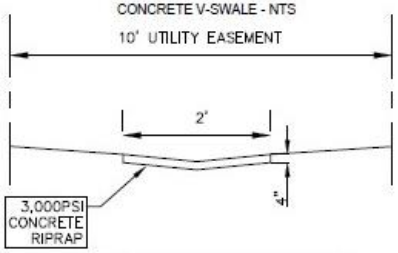
OPINION OF PROBABLE COSTS

SPEC		DESCRIPTION	UNITS	ESTIMATED QUANITITY	UNIT PRICE	TOTAL
101-S-A		PREPARING ROW	STA	20	$ 1,500.00	$30,000.00
700S		MOBILIZATION	LS	1	10%	$43,260.00
603S		BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6	$4,500.00	$27,000.00
						$0.00
					SUBTOTAL	$100,260.00
DRAINAGE IMPROVEMENTS						
433S		CONCRETE DRIVEWAY	SF	200	$ 12.00	$2,400.00
432SR-4		4" SIDEWALK REPLACEMENT (REMOVE AND REPLACE)	SF	100	$ 10.00	$1,000.00
104S-G		REMOVING MISC CONCRETE (DRIVEWAYS/INLET TOPS)	LS	1	$ 2,000.00	$2,000.00
403S		CAST IN PLACE CURB INLET TOP	EA	2	$ 3,250.00	$6,500.00
102S-B		CLEARING AND GRUBBING	STA	5	$ 1,000.00	$5,000.00
436S		CONCRETE VALLEY GUTTER (V-SWALE)	SF	850	$ 7.00	$5,950.00
						$0.00
					SUBTOTAL	$22,850.00
SUNSET TRAIL WATER LINE IMPROVEMENTS						
510-AW		WTR MAIN PIPE (PVC)(RESTRAINED JT) 8IN TEMP PAVE	LF	2,000	$ 75.00	$150,000.00
510-KW		DUCTILE IRON FITTINGS	TON	1.5	$ 6,500.00	$9,750.00
511-S-B		FIRE HYDRANT ASSEMBLY COMP W/VALVE AND LEAD	EA	4	$ 6,000.00	$24,000.00
		TESTING AND CHLORINATION	EA	1	$ 5,000.00	$5,000.00
509-S1		TRENCH PROTECTION	LF	2,000	$ 1.50	$3,000.00
510-JS		WET CONNECTIONS	EA	2	$ 3,500.00	$7,000.00
		NEW WATER SERVICES	EA	22	$ 2,000.00	$44,000.00
		MISC (CURB REPAIR, VEGETATION)	EA	1	$ 5,000.00	$5,000.00
360-SA		CONCRETE PAVEMENT (STAMPED/COLORED)	SY	20	$ 200.00	$4,000.00
						$0.00
					SUBTOTAL	$251,750.00
SUNSET TRAIL STREET IMPROVEMENTS						
315S-A		PLANE ASPH CONC PAV (2")	SY	5,200	$ 2.50	$13,000.00
340S-B		D-GR HMA(SQ) TY-D PG70-22	SY	5,200	$ 15.00	$78,000.00
		POTHOLE/BASE REPAIR	SY	100	$ 75.00	$7,500.00
		CROSSWALK/STOP BAR/MISC STRIPING AND SIGNS	EA	1	$ 2,500.00	$2,500.00
						$0.00
					SUBTOTAL	$101,000.00

CONSTRUCTION SUBTOTAL	$475,860.00
CONTINGENCY (10%)	$47,586.00
CONSTRUCTION GRAND TOTAL	**$523,446.00**

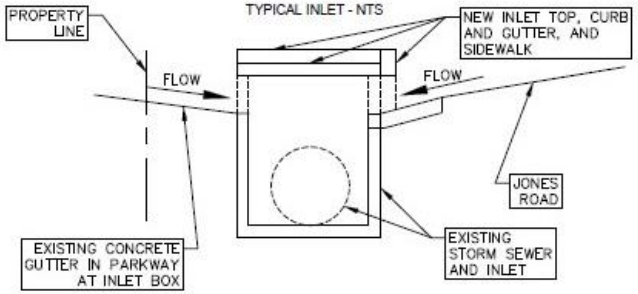


CONCRETE V-SWALE - NTS

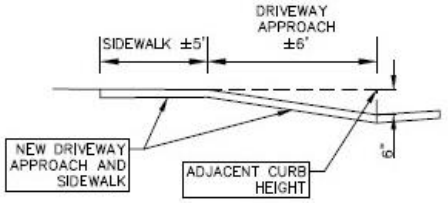


(ALIGNMENT VARIES WITHIN EASEMENT)

TYPICAL INLET - NTS



WEST DRIVEWAY SECTION - NTS
(ACCESS EASEMENT)



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CITY OF SUNSET VALLEY
JONES ROAD AND SUNSET TRAIL
STREET, DRAINAGE, AND WATERLINE IMPROVEMENTS
PRELIMINARY SCHEMATIC

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DRAWN BY: GF
DESIGNED BY: GF
REVIEWED BY: GFTT
PROJECT NO.: 120-105

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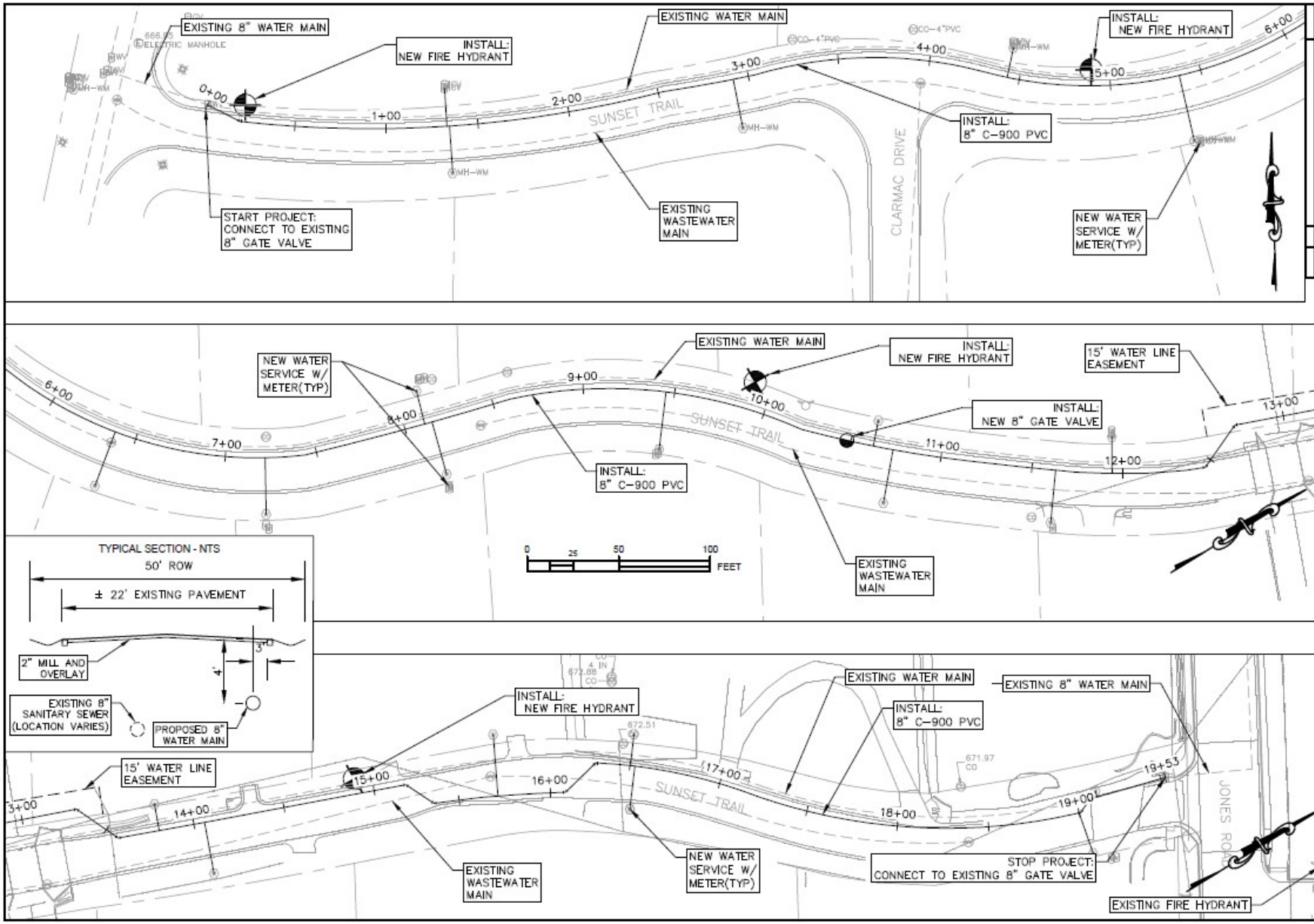

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CITY OF SUNSET VALLEY
JONES ROAD AND SUNSET TRAIL
STREET, DRAINAGE, AND WATERLINE IMPROVEMENTS
PRELIMINARY SCHEMATIC

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DESIGNED BY: GF
REVIEWED BY: GF/TT
PROJECT NO.: 120-106

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