City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

Project Title: International District Library Surge Pond **Building Permit #**__________ **Hydrology File #** K19/D005
DRB#____________________ **EPC#**____________________
Legal Description: Tract A, International District Library City Address OR Parcel 7667 Central Ave NE

Applicant/Agent: High Mesa Consulting Group **Contact:** J. Graeme Means, PE
Address: 6010-B Midway Park Blvd NE, ABQ, NM 87109 **Phone:** 505-328-9064
Email: gmeans@highmesacg.com

Applicant/Owner: COA DMD Storm Drainage Section **Contact:** Kathy Verhage
Address: ____________________ **Phone:** 505-768-3654
Email: kverhage@cabq.gov

TYPE OF DEVELOPMENT: ___PLAT (#of lots) __RESIDENCE __DRB SITE ___ ADMIN SITE: X
RE-SUBMITTAL: _____YES X NO

DEPARTMENT: _____TRANSPORTATION X HYDROLOGY/DRAINAGE
Check all that apply:

TYPE OF SUBMITTAL:

- ___ENGINEER/ARCHITECT CERTIFICATION
- ___PAD CERTIFICATION
- ___CONCEPTUAL G&D PLAN
- ___GRADING PLAN
- X DRAINAGE REPORT
- ___DRAINAGE MASTER PLAN
- ___FLOOD PLAN DEVELOPMENT PERMIT APP.
- ___ELEVATION CERTIFICATE
- ___CLOMR/LOMR
- ___TRAFFIC CIRCULATION LAYOUT (TCL) ADMINISTRATIVE
- ___TRAFFIC CIRCULATION LAYOUT FOR DRB APPROVAL
- ___TRAFFIC IMPACT STUDY (TIS)
- ___STREET LIGHT LAYOUT
- ___OTHER (SPECIFY)
- ___PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ___BUILDING PERMIT APPROVAL
- ___CERTIFICATE OF OCCUPANCY
- ___CONCEPTUAL TCL DRB APPROVAL
- ___PRELIMINARY PLAT APPROVAL
- ___SITE PLAN FOR SUB'D APPROVAL
- ___SITE PLAN FOR BLDG PERMIT APPROVAL
- ___FINAL PLAT APPROVAL
- ___SIA/RELEASE OF FINANCIAL GUARANTEE
- ___FOUNDATION PERMIT APPROVAL
- ___GRADING PERMIT APPROVAL
- ___SO-19 APPROVAL
- ___PAVING PERMIT APPROVAL
- ___GRADING PAD CERTIFICATION
- X WORK ORDER APPROVAL
- ___CLOMR/LOMR
- ___FLOOD PLAN DEVELOPMENT PERMIT
- ___OTHER (SPECIFY)____________________

DATE SUBMITTED: 01/28/2023

HIGH MESA Consulting Group

Engineers, Surveyors & Subsurface Utility Consultants

International District Library Surge Pond Drainage Report

City Project # 722596

01/18/2023

EXECUTIVE SUMMARY: This project is located in the City of Albuquerque's International District, northwest of the intersection of Central Avenue NE and Pennsylvania Road NW. The City of Albuquerque project with partial AMAFCA funding will construct a surge / detention pond with a related public storm drain system intended to partially mitigate historic area flooding problems due to undersized existing public drainage infrastructure, including the Dallas Street NW storm drain. Upon completion, the ponding area will be developed as a public City park by a separate project.

In current conditions during larger rainfall events the Dallas storm drain reaches full capacity and can't intercept additional runoff from the east, resulting in surface flow bypass to the west down Central Avenue and Chico Road NE and resulting in downstream flooding. This system will work in tandem with the proposed Zuni-Pennsylvania Detention Pond project to significantly reduce the peak flow rate and volume of stormwater flowing north in the Dallas Street NE storm drain and thereby allowing it to more effectively intercept runoff from the east and convey it to the north, with an eventual outfall at the I-40 channel.

This report is submitted for City Work Order approval.

J. GRAEME MEANS
NEW MEXICO
13676
REGISTERED PROFESSIONAL ENGINEER

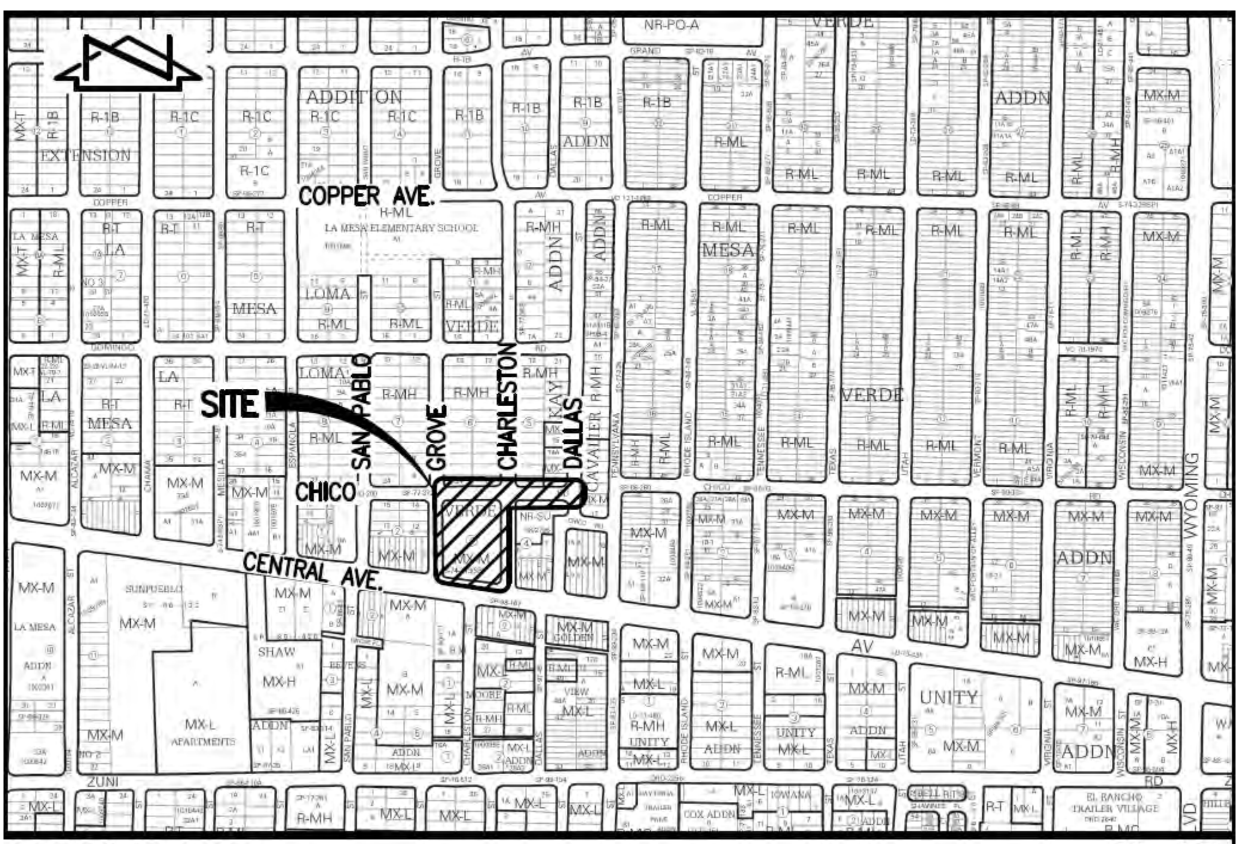
01/28/2022

J. Graeme means, PE Date

New Mexico License # 13676

INTRODUCTION: The project will construct a surge pond on City-owned property immediately east of the recently construction International District Library (IDL). A new storm drain will be constructed in Chico Rd. NE that will operate under pressure flow conditions to relieve the burden on the overtaxed Dallas Street Storm drain by providing an outlet for stormwater to surge back to the proposed IDL pond. The Dallas storm drain currently receives runoff from the Campus Wash Basin to the south of Central, and from the Central Avenue upstream contributing area. An orifice plate will be installed at the Dallas and Chico intersection to promote more frequent surge conditions and to reduce the peak flow rate and volume that can continue north in Dallas from Chico, thereby allowing the Dallas storm drain to more effectively intercept runoff from the east-west streets north of Chico and thereby reduce downstream flooding west of Dallas in those streets. The Chico storm drain will also serve as the outfall for the pond after the peak storm conditions pass and the Dallas system can subsequently receive the discharge. At this point the surge pond will become a detention pond.

The project will also include two new Type "A" inlets and a cattle guard inlet in Chico. Chico Road NE is currently encumbered by mapped floodplain and the contributing drainage basin does not have any inlets to intercept street flow and introduce the stormwater into the Dallas Storm drain at Chico. Downstream flooding in Chico is problematic. In addition to receiving surge flow from the Central Avenue Basin that contributes to the Dallas storm drain, the new IDL pond will also accept street flow intercepted in Chico Road NE by the new inlets, thereby reducing downstream flooding in Chico.



VICINITY MAP

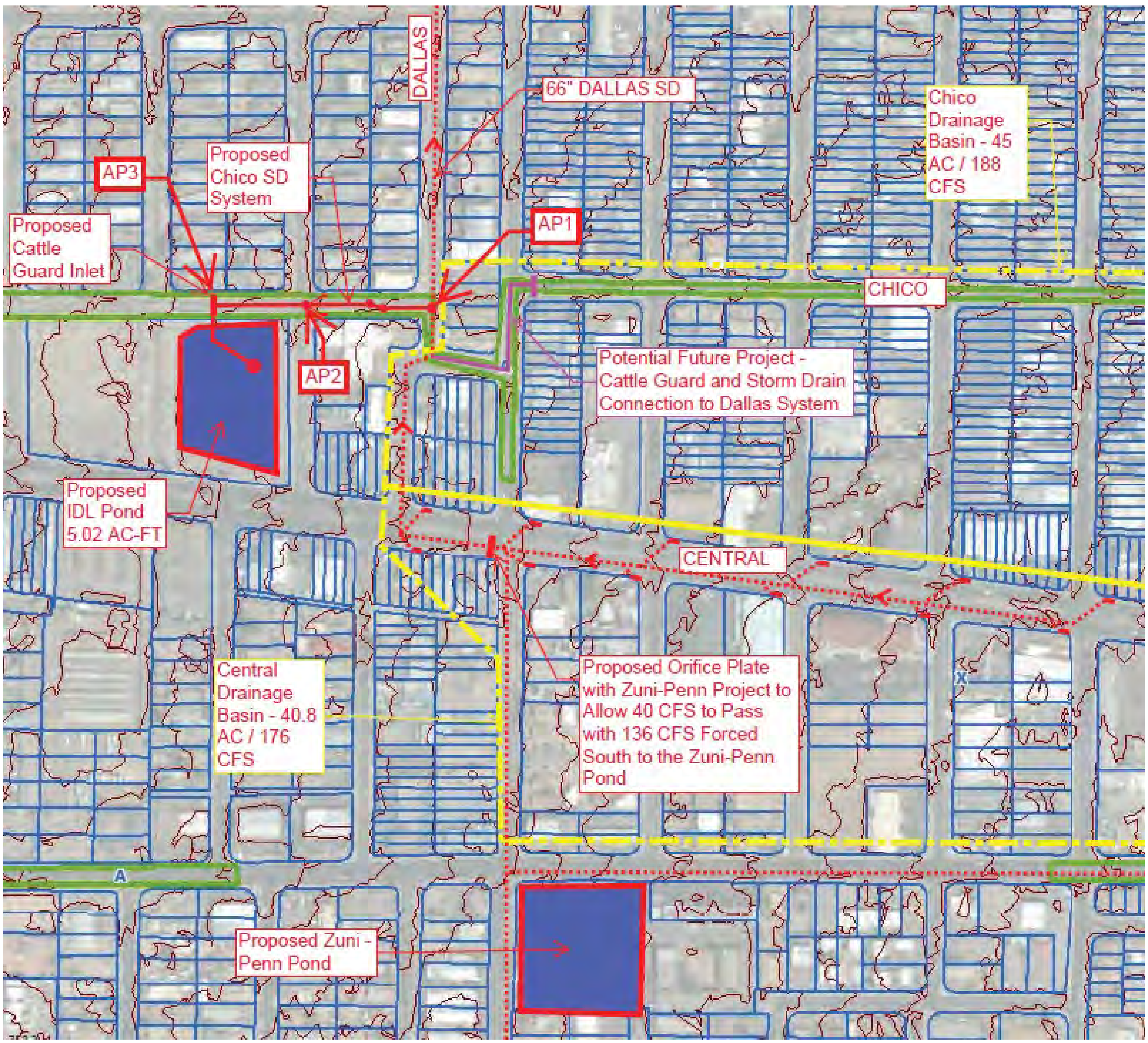
SCALE: 1" = 750'

K-19

This Chico / IDL system will work in tandem with the proposed Zuni-Pennsylvania Detention Pond project that will construct an orifice plate in the Central Avenue storm drain that will limit the peak rate of stormwater flow in the reach of the Dallas Street Storm drain between Central and Chico, with the majority of the Central Avenue Basin runoff being forced up to the Zuni-Penn pond.

The historic flooding issues and larger scale area drainage conditions are more fully described by the Final San Mateo to Moon Mini Drainage Management Plan prepared for AMAFCA by Smith Engineering Company dated November 2017 and by the Draft Zuni Pennsylvania Detention Pond Report prepared for AMAFCA by Parametrix dated October, 2022. The IDL Pond and Zuni-Penn ponds are also described and summarized in the AMAFCA Board Meeting Memo and Technical Memo dated 07/07/2022 (Exhibit B).

The aforementioned IDL and Zuni-Penn projects and contributing drainage basins are shown by Exhibit A attached to this report with an excerpt below to show the two projects in context.



The IDL pond will be constructed on City-owned property – The eastern half of Tract A, International District Library (2020C-0057) located at the southwest corner of Charleston Street NE and Chico Road NE. The related storm drain improvements will be constructed in City rights-of-way for Dallas Street NE and Chico Road NE. Chico Road NE is encumbered by a Flood Hazard Zone (A).

EXISTING CONDITIONS (SITE): The proposed pond site is currently undeveloped and is mostly bare soil as a result of site demolition projects by the City in advance of and as part of the International District Library (IDL) project. The previous use was a paved parking lot and a small commercial building. The pond site generally slopes from east to west at approximately 1.5% where site runoff is intercepted by a temporary shallow retention / sediment pond. No runoff leaves the site from the proposed ponding area. Chico Road NE is a fully improved public street with curb and gutter and sidewalks that slopes from east to west at approximately 1.3%. Chico is encumbered by a Type A Flood Hazard Zone. There are currently no storm drains or drainage facilities serving Tract A or Chico Road NW, and street runoff and runoff from contributing areas flows downhill to the west of the site. As described by the aforementioned Mini Moon DMP, there is significant flooding in the downstream areas.

EXISTING CONDITIONS (UPSTREAM / OFF-SITE): There are three upstream drainage basins that impact this project. As described by the AMAFCA Memo (Exhibit B) and also by the Parametrix Zuni-Penn report, the **Central / Pennsylvania Basin** is roughly bordered by Central on the north, Zuni on the south, Wyoming on the east, and Pennsylvania on the West. This basin currently drains to the Dallas storm drain that is overtaxed. These basins from those reports are as shown by the following:

2.4 Central Pennsylvania Drainage Basin

The drainage basin that enters the storm drain at Pennsylvania and Central is approximately 39.64 acres (See Figure 4 below). Assuming a conservative estimate that this basin consists of 100% impervious area (D land treatment), the basin generates approximately 172 cfs during a 100-year storm and 7.70 acre-feet of runoff volume. The new detention pond will be designed to handle the volume from this basin in addition to the runoff in the Pennsylvania and Zuni storm drains adjacent to the pond site.

Figure 4. Central Pennsylvania Basin

the pond volume to the recommended 40 AF. The sub-basin that enters the storm drain at Central and Pennsylvania is approximately 40 acres. This area generates approximately 180 cfs peak discharge and 9 AF of runoff volume.

1.76 x 10⁶ — 40.8 ac.

The AMAFCA Memo roughly calculated the area to be 40.8 acres with a 100-year peak discharge of 180 cfs and the Parametrix Report calculated the area to be 39.6 acres with a 100-year peak flow rate of 172 cfs.

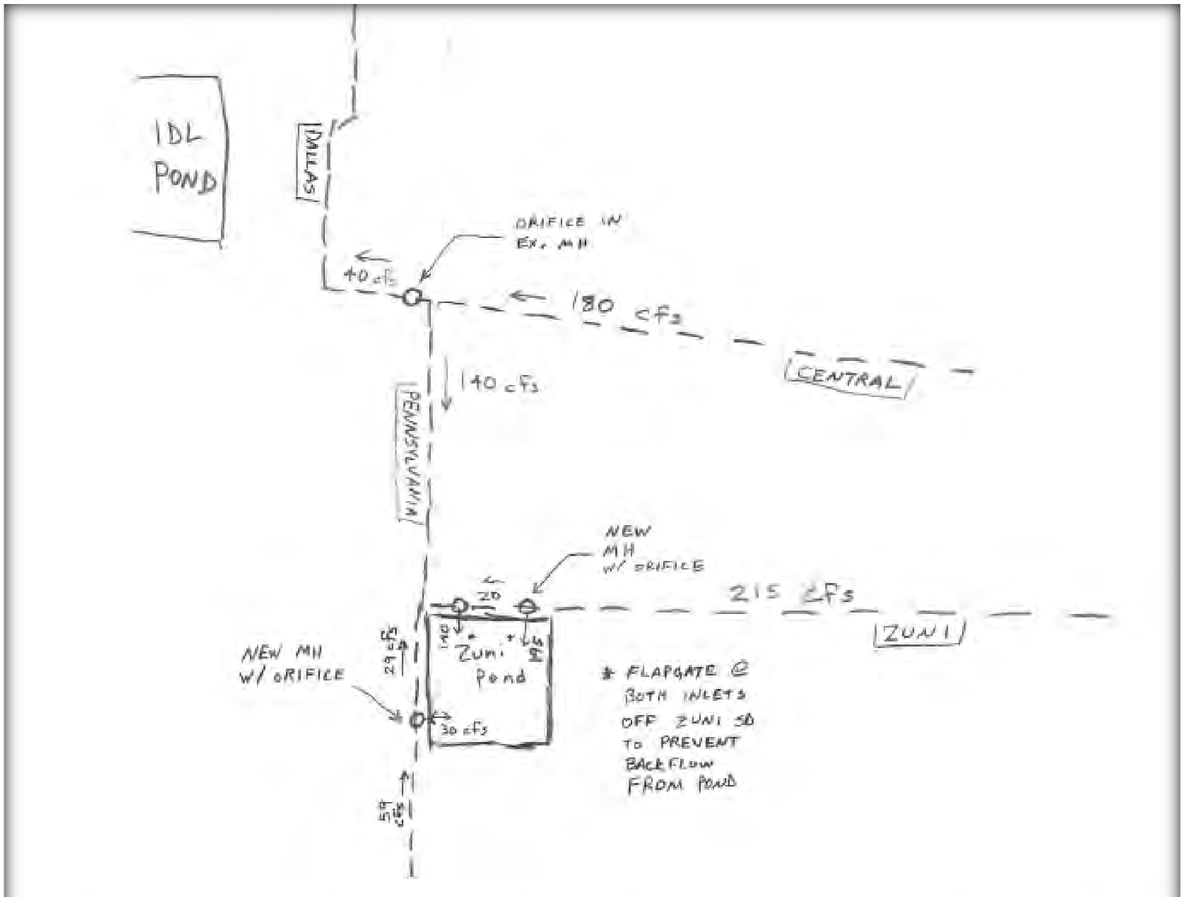
As part of this report the Central / Pennsylvania basin was modeled using AHYMO with the limits shown on Exhibit A as being 40.8 acres and generating a 100-year peak flow rate of 176 cfs. These results compare favorable with the AMAFCA and Parametrix modeling / calculations.

The Chico Basin drains to the intersection of Dallas and Chico (AP1 on Exhibit A and for the purposes of this report). This basin is roughly outlined on the AMAFCA image above, and is as shown on Exhibit A. Neither this office nor AMAFCA have been able to find any record drainage reports for this basin. As part of this report, this basin was modeled using AHYMO as being 45 acres and generating a peak 100-year flow rate of 188 cfs.

As described in with Mini Moon DMP, the **Campus Wash Basin** serves a large area bounded by Central, Gibson, San Mateo, and Wyoming that generates a peak 100-year discharge 274 cfs to the Dallas storm drain. Previous studies have determined that the capacity of the Dallas storm drain at this point is also 274 cfs meaning that there is no capacity in the Dallas storm drain for additional runoff north of Central to enter the system under certain circumstances such as a storm that moves from south to north.

DEVELOPED CONDITIONS: The proposed construction plans are included as Exhibit C. As shown by the plans and Exhibit A, the project will construct a surge / detention pond on Tract A, and a storm drain system in Chico with a cattle guard inlet and two Type "A" inlets. The project will also install an orifice plate in the proposed storm drain manhole at Dallas to restrict the rate of flow north in the Dallas storm drain to free up capacity for the areas north of Chico and east of Dallas.

The Zuni-Penn project will install an orifice plate in the existing Central Avenue storm drain immediately downstream of the intersection with Pennsylvania Street NE. The Zuni-Penn project will also intercept and detain runoff from the Campus Wash Basin. As a result, the Zuni-Penn project will limit flow to the west in Central to 40 cfs for the reach from Pennsylvania to Dallas as described and diagrammatically shown by the excerpt from Exhibit B below:

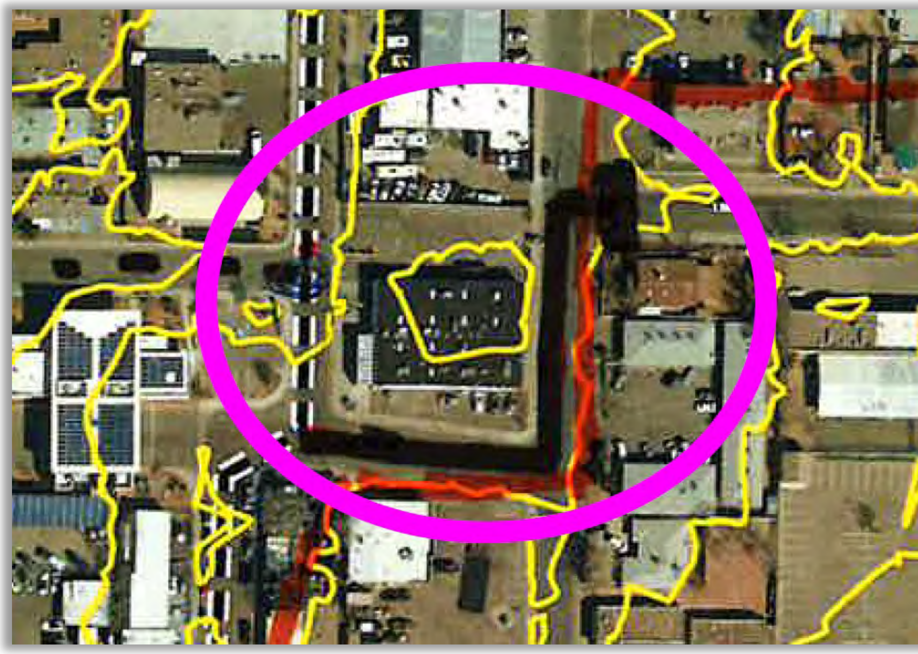


Surface water from the east, which currently bypasses the system, creates floodplain and flooding risk to numerous properties downstream. This proposed modification to the system will provide badly-needed capacity in the Dallas SD system and allow for the removal of many residential properties to be removed from the FEMA floodplain.

At the Central and Dallas intersection, there are two storm inlets that will potentially introduce up to 10 cfs each into the system for a total of 60 cfs then heading north in the Dallas storm drain. For the purposes of this project, it is assumed that the 66" Dallas RCP storm drain will be carrying 60 cfs at the Chico/Dallas intersection (AP1) as described by Exhibit B, and potentially 188 cfs as surface flow as described by the preceding.

As shown by Exhibit C, a 12” orifice plate will be installed at the north/outlet side of SDMH #4 to be constructed on the existing 66” Dallas storm drain at the Chico/Dallas intersection. Based upon orifice calculations with the water level at the rim, the peak rate of discharge to the north will be 14.3 cfs. As a result, the remaining 45.7 cfs in the storm drain at AP1 will surge in the proposed 36” pipe to the west.

Manning’s pressure flow calculations determined that the capacity of the 36” surge pipe from AP1 to AP2 (SDMH #4 to SDMH #1) is 74.8 cfs with the maximum hydraulic grade line limited to the rim elevations. This capacity exceeds the proposed maximum flow rate, leaving additional capacity for a potential future flow interception project that would include a cattle guard inlet at Chico and Pennsylvania as roughly shown by the AMAFCA Memo, Exhibit B below.



The 36” storm drain can’t be extended west of AP-2 due to an existing gravity sanitary sewer line in Charleston Street NE. The storm drain will be extended as a 24” line to AP3 with a pressure flow capacity of 28.3 cfs (again assuming max HGL at rim elevation). To maximize the amount of stormwater that gets to the pond, a second 24” storm drain will be constructed above the surge pipe having a capacity of 28.4 cfs for a total of 56.7 cfs, that exceeds the required flow rate of 45.7 by 11 cfs based upon the orifice plate limitation at AP1. Two type “A” inlets will be constructed immediately upstream of AP2 that will intercept up to 11 cfs of street from the Chico Basin under maximum surge conditions, and qualitatively more than 11 cfs under more frequent events or lesser surge conditions, depending on the timing. The remaining street flow will continue to the west to AP3.

A new cattle guard inlet will be constructed at AP3. This inlet will serve 3 purposes. 1) It will accept large amounts of surface runoff from Chico, 2) It will have a sump and provide water quality benefits, and 3) it will serve as the emergency overflow spillway for the pond with the grate elevation being set at the maximum pond height elevation, thereby eliminating the need for a conventional pond overflow spillway. If the pond is full, then surface and piped runoff will continue down the street to the west matching historic flow patterns. In non-surge conditions such as the initial stages of a storm or for a frequent event, the AP2 Type “A” inlets an the cattle guard will significantly reduce or eliminate downstream street flow in Chico with the pond serving as a detention pond. The amount of Chico Road surface flow intercepted and ponded will be reduced during surge events as a function of the water surface elevation in the pond.

At AP-3 there will be a 36” RCP storm drain discharging into the pond. The elevation of this pipe is set 0.7 ft lower than the elevation of the surge drain on the east side of the cattle guard to encourage runoff to enter the pond and not flow back east to the orifice plate. As determined by Manning’s pressure flow calculations, the capacity of this 36” pipe will vary from 146 cfs with a full cattle guard and empty pond to 59.6 cfs with the pond at 6 ft depth (73% full), and down to no flow when the pond is full to the cattle guard grate/overflow elevation.

The 36” storm drain from AP3 into the pond will also be a surge pipe of sorts as the invert of the pipe at the pond will be 5 feet lower than the bottom of the pond in a storm drain manhole with a 36” diameter beehive grate, requiring pressure flow to surge up into the pond through the grate. This manhole will also have a sump at the bottom that will provide water quality benefits. It will have an open bottom with gravel below to promote infiltration and minimize the time for standing water in the system.

After surge conditions and peak flow rates in the watershed subside, the pond will begin to drain out via the same pipe system, limited to a maximum of 10.1 cfs by the 12” orifice plate at AP1 when the pond is full, and at a rate of 3.6 cfs when the pond is essentially empty at a water surface level of 5344. Averaging the max and min outflows at 6.85 cfs, the pond will drain in less than 8.9 hours.

FUTURE CONDITIONS: As mentioned earlier in this report, a future project has been discussed that would construct a cattle guard inlet at Chico and Pennsylvania, with a connection to the Dallas storm drain south of AP1. The IDL surge system as designed has 29.1 cfs excess capacity from AP1 to AP2 for this additional runoff, and 11 cfs of excess capacity in the pipe from AP2 to AP3 with excess reverting to street flow. This excess capacity will be of great benefit for frequent events as there is no storm drain in Chico at all, but will not address the larger events. As such it is recommended that any future connections to the Dallas system revisit the the sizing of the 12” orifice plate at AP1 and possibly increase it to allow more runoff to the north.

CALCULATIONS: Hydrologic calculations for the Central and Chico basins were performed using AHYMO (Exhibit D, Hydrographs 1 and 6, respectively). Using AHYMO allowed hydrograph division at the orifice plates with the 60 cfs divided out to represent the condition at AP1 resulting from the 40 cfs limitation at the Zuni-Penn project orifice plate at Central and Pennsylvania and the additional 20 cfs from surface inlets between Pennsylvania and Dallas (Hydrograph 2). Hydrograph 2 was then further divided at AP1 to represent the condition where 14.3 cfs flows north through the SDMH#1 orifice plate and the balance (Hydrograph 5) will flow west in the surge pipe. As shown by the output, Hydrograph 5 has a runoff volume of 2.51 acre-feet that will surge to the pond. The pond has a max capacity of 5.02 acre-feet, and therefore has capacity to receive 2.51 acre-feet from the Chico Basin (Hydrograph 6, 7.16 ac-ft). As a result, there will be a 35% reduction (2.51/7.16) in runoff flowing downstream in Chico.

Orifice calculations were performed in accordance with DPM 6-16(B). $Q = CA (2gh)^{0.5}$

- The 12” orifice at AP1 under maximum surge conditions was calculated to be 14.3 cfs with the HGL at rim height of 5357.2, a centerline elevation of 5343.1 (h=14.1 ft), C = 0.6, and A = 0.79 SF.

- The 12” orifice at AP1 under maximum pond draining / outfall conditions was calculated to be 10.1 cfs with the HGL at the maximum pond height of 5350.2, a centerline elevation of 5343.1 (h=7.1 ft), C = 0.6, and A = 0.79 SF.
- The 12” orifice at AP1 under minimum pond draining / outfall conditions was calculated to be 3.6 cfs with the HGL at the minimum pond retention height of 5344, a centerline elevation of 5343.1 (h=0.9 ft), C = 0.6, and A = 0.79 SF.

Hydraulic closed conduit pressure flow calculations were performed using Flowmaster PE 6.0 using the Manning’s Equation for friction losses (Exhibit E).

It should be noted that the hydrologic calculations are conservative as there is very likely significant abstraction, attenuation, flow obstructions, and localized retention in the Central and Chico basins that will reduce the peak flow rates and volumes. The minimum time of concentration was used for the basin hydrology calculations and no routing was applied, thereby rendering the peak flow rates conservative. It is also recognized that the use of orifice plates will impact timing, so the straight addition of basin flow rates calculated herein is conservative. A more complex analysis of the overall watershed with all systems in place is beyond the scope of study and report for this project. The hydraulic and hydrologic calculations contained herein are intended to support the sizing and functionality of the IDL pond and the Chico storm drain, and not to represent a comprehensive analysis.

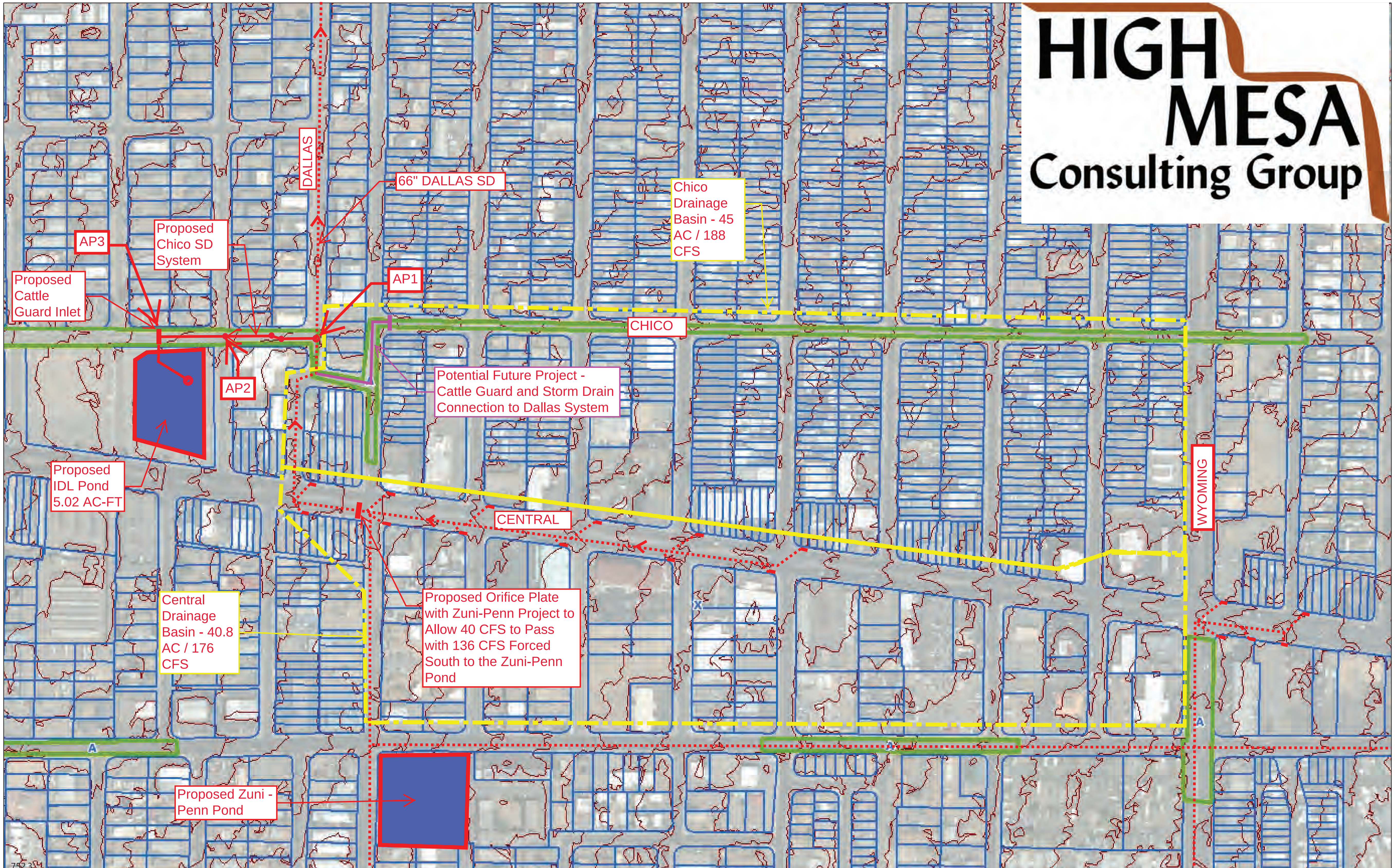
SUMMARY AND CONCLUSION

This project will construct a surge pond and storm drain system that will

1) Work in tandem with the Zuni-Penn project to relieve pressure on the existing overtaxed Dallas storm drain system.
2) Provide for interception and detention of Chico Road runoff, improving the current condition whereby there is no storm drain system or flow interception, and the street is a mapped floodplain with downstream flooding issues.
3) Be further improved as a public park.
4) Include additional capacity for possible future flow interception at Chico and Pennsylvania.
5) Be constructed and maintained by the City of Albuquerque.
6) Provide water quality benefits.

The intent of this project is to provide a qualitative improvement to the overall area drainage conditions. All proposed manhole lids on this project will be vented to allow relief as surface flow to the streets if HGL’s greater than rim height occur. In all cases the runoff will then either flow down to the next interception opportunity, or if the pond is full will continue down the street to the west in Chico consistent with historic patterns, but with reduced rates and volumes, thereby representing a qualitative improvement for all rainfall events.

INTERNATIONAL DISTRICT LIBRARY SURGE POND - EXHIBIT A



Legend

Flood Zones 2012

- 0.2 PCT ANNUAL CHANCE FLOOD HA
- 1 PCT ANNUAL CHANCE FLOOD HAZ/ CHANNEL
- A
- AE
- AH
- AO
- D
- X
- X PROTECTED BY LEVEE

City Parcels

Contour 2ft - 2010

Municipal Limits

- Corrales
- Edgewood
- Los Ranchos
- Rio Rancho
- Tijeras
- UNINCORPORATED

Notes

616 0 308 616 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere

1/5/2023

1: 3,693

THIS MAP IS NOT TO BE USED FOR NAVIGATION

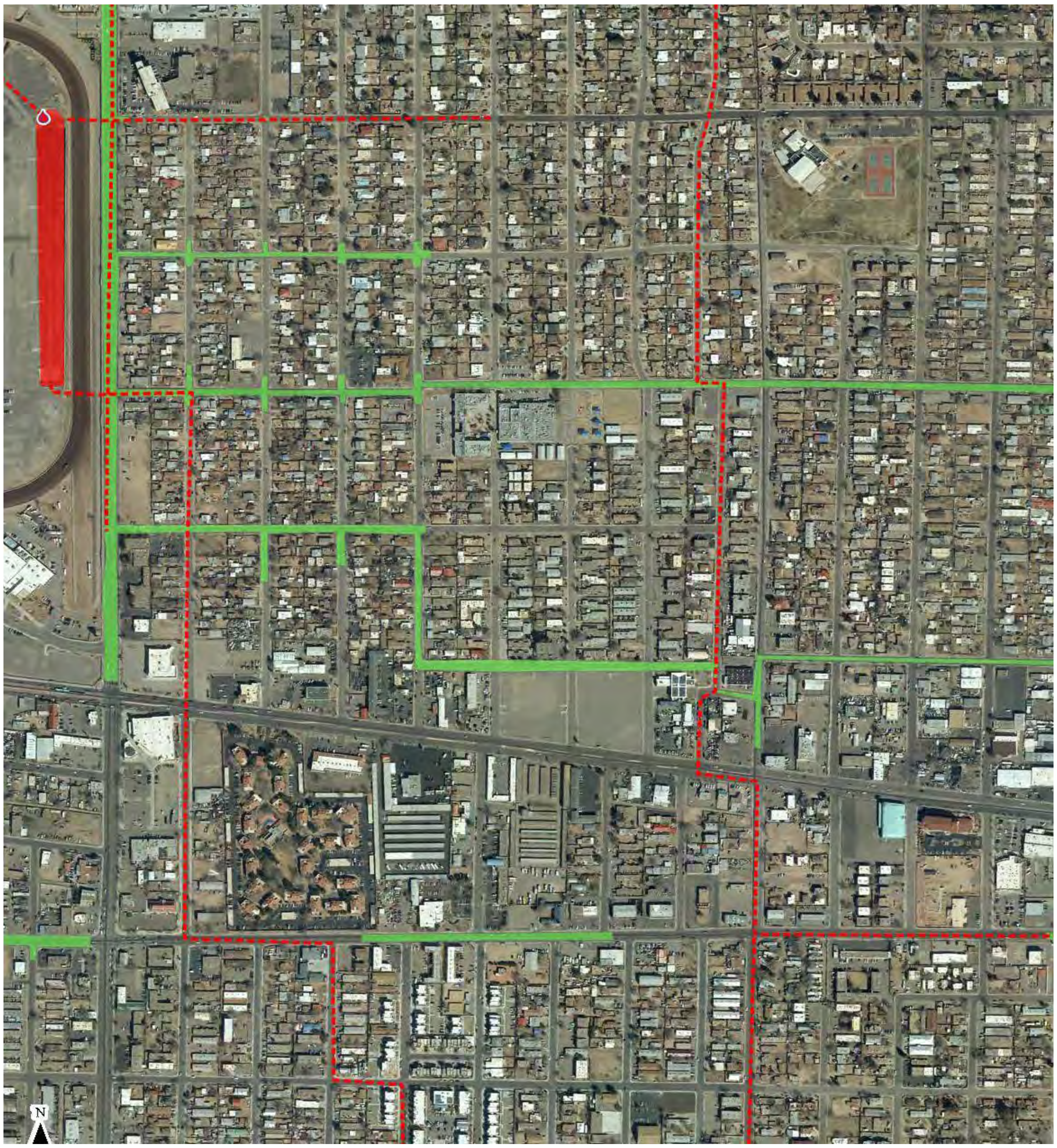
Exhibit B

AMAFCA Board Meeting Memorandum **Agenda Item 13f(ii)**
Information Item

To: AMAFCA Board of Directors
From: Bradley L Bingham, P.E., Drainage Engineer BLB
Date: July 22, 2022

Subject: Dallas Storm Drain Regional Flood Control Facilities - International District Library Pond – Project Update

Action Requested: None



The picture above depicts floodplain (in green) in the area downstream of the Dallas Storm Drain

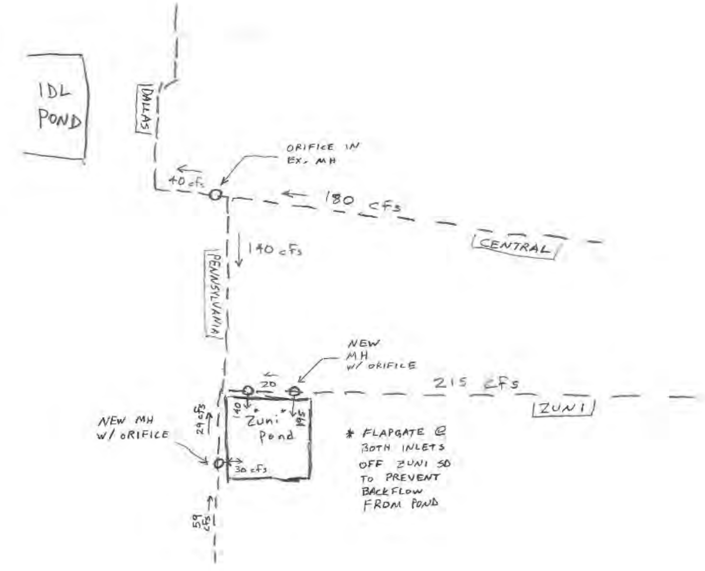
Past Hydrology Studies:
Campus Wash Floodplain Removal Project (Smith) - Identified that runoff from the study area (Central to Gibson, Wyoming to San Mateo) overwhelmed all storm drains serving the area. Specifically, the Dallas Storm Drain receives 274 cfs from south of Central. This is the maximum capacity of the 66" RCP SD and any runoff generated north of Central cannot enter the system.

San Mateo to Moon Mini DMP (Smith) - The study area encompassed Central to I-40, Moon to Washington. Study corroborated that storm drains (which generally run south to north) are full once they cross Central. It also determined that approximately 40 AF of detention storage is needed to mitigate the lack of capacity in the sub-basin that feeds the Dallas Storm Drain.

Zuni Penn Pond
Zuni Penn Pond Feasibility Study (Smith) - The study stated that the sub-basin upstream of the intersection of Zuni and Pennsylvania generates 38 AF total, and that a 22 AF detention pond releasing 48 cfs could be situated on the 2.2-acre site. To achieve 22 AF of storage, the bottom of the pond would have to be below the invert of the storm drain feeding it; therefore, pumping would be necessary. To maximize the benefit of the pond system, staff assessed the option of increasing the pond volume to the recommended 40 AF. The sub-basin that enters the storm drain at Central and Pennsylvania is approximately 40 acres. This area generates approximately 180 cfs peak discharge and 9 AF of runoff volume.

1.76×10^6 – 40.8 ac.

Assessing the system downstream of the proposed Zuni-Penn pond, it was determined that the storm drain would immediately be full again once runoff from Central entered it. Installing an orifice (sized to allow 40 cfs to pass) at this location would essentially divert 140 cfs back to the Zuni Penn pond.



International District Library (IDL) Pond

In October 2019, AMAFCA and the City of Albuquerque entered into an agreement to participate in property acquisition, design, and construction of the International District Library Pond (at the site of the old Caravan Night Club). This property was identified, due to its proximity to the Dallas Storm Drain, as a location for a surge pond to “park” water out of the system until peak flows could pass. Preliminary design estimates identified 4-5 AF of storage volume could be available. Once the Zuni Penn pond is operational, there only be 60 cfs in the Dallas Storm Drain at the location of the IDL surge pond. Staff is recommending routing the sub-basin north of Central to the Dallas Storm Drain (at Chico) to fully maximize the benefit of the surge pond on the system. This will allow surface runoff on the streets north of Chico to enter the storm drain instead of bypassing the system.

Neither the Zuni Penn pond nor the IDL pond by themselves provide the fully-needed benefit to the system because immediately downstream from either of these facilities, the system becomes full again. .AMAFCA has committed $1.25 million (IDL) and $1.4 million (Zuni Penn) to date to help remove floodplain, and mitigate flooding problems in a blighted neighborhood near Louisiana Blvd and Central Ave..

Possible Budget Impact

Zuni Penn Regional Drainage Facility is a Tier 1 project. AMAFCA has paid $850,000 toward the property acquisition and design of the IDL pond. $400,000 will be provided once the construction contract is awarded

Possible Staff Impact

Project Management of the Zuni Penn Regional Drainage Facility design is part of staff normal work load.

Zuni-Penn Pond Project Technical Memorandum

To: AMAFCA Projects File # 2001ZuniPennPond
From: Bradley L. Bingham, P.E. AMAFCA Drainage Engineer
Date: July 7, 2022

Subject: Zuni Penn Pond Design

Summary:

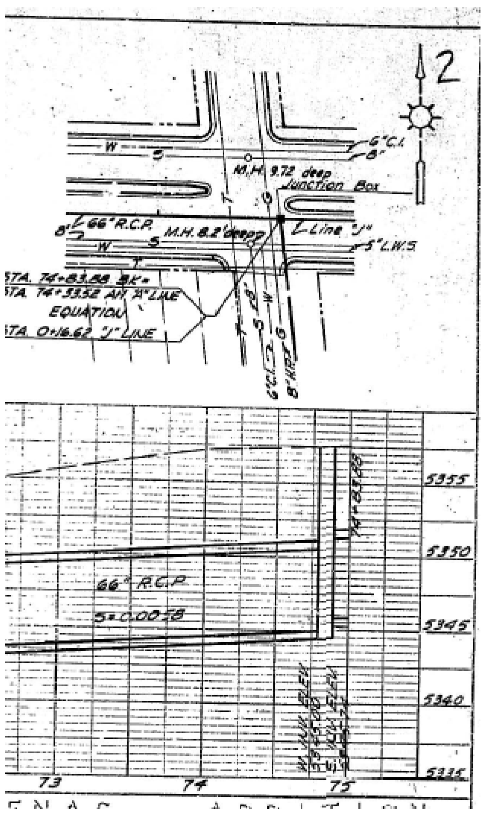
Past Hydrology Studies:
Campus Wash Floodplain Removal Project (Smith) - Identified that runoff from the study area (Central to Gibson, Wyoming to San Mateo) overwhelmed all storm drains serving the area. Specifically, the Dallas Storm Drain receives 274 cfs from south of Central. This is the maximum capacity of the 66" RCP SD and runoff generated north of Central cannot enter the system.

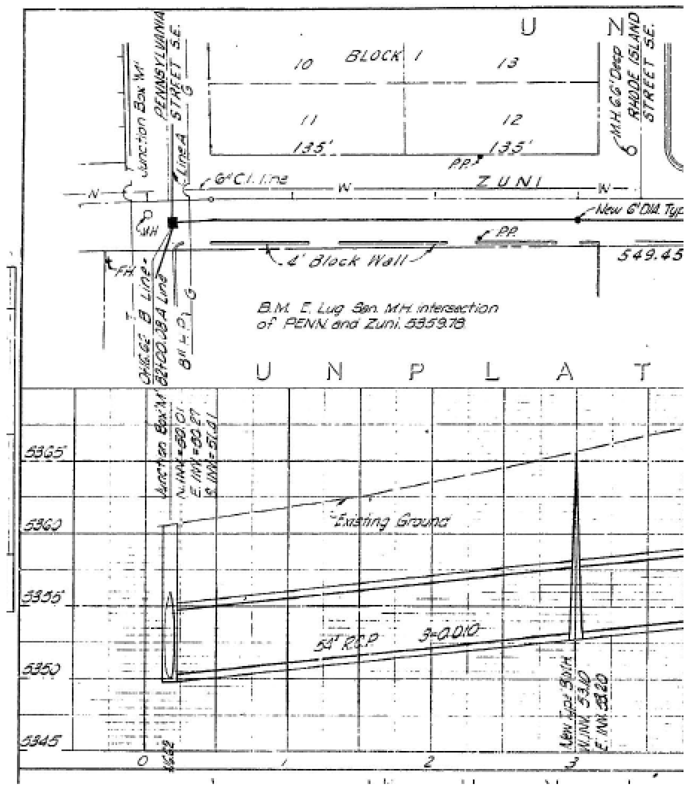
San Mateo to Moon Mini DMP (Smith) - The study area encompassed Central to I-40, Moon to Washington. Study corroborated that storm drains (which generally run south to north) are full once they cross Central. It determined that approximately 40 AF of detention storage is needed to mitigate the lack of capacity in the sub-basin that feeds the Dallas Storm Drain.

Hydrology
Zuni Penn Pond Feasibility Study (Smith) - The study stated that the sub-basin upstream of the intersection of Zuni and Pennsylvania generates 38 AF total, and that a 22 AF detention pond releasing 48 cfs could be situated on the 2.2 acre site. The sub-basin that enters the storm drain at Central and Pennsylvania is approximately 40 acres. The site is located in Zone 3 (Figure 6.2.3, DPM). Using DPM tables 6.2.13 and 6.2.14, this area generates approximately 180 cfs peak discharge and 9 AF of runoff volume. Assessing the system downstream of the proposed Zuni-Penn pond, it became obvious that the storm drain would be "full" again once runoff from Central entered it.

Hydraulics
The Zuni Penn Pond and Pumpstation is at the corner of Zuni and Pennsylvania. A 36" RCP SD (s = 0.65%, Qmax=59cfs) in Pennsylvania and a 54" RCP SD (s = 1.00%, Qmax=215 cfs) in Zuni combine at the intersection and heads north in a 66" RCP SD (s = 0.56%) in Pennsylvania to Central. The system continues west to Dallas, then north in Dallas to the Embudo Arroyo. A 66" RCP at 0.56% has a maximum capacity of 274 cfs.

Per Work Order plans for the Dallas St, Interceptor Storm Sewer (CPN 860460, 1929 datum), the invert of the 66" storm drain at Pennsylvania and Central is noted as 5345.74 and the rim is approximately 5357.5. Adjusting these elevations to 1988 datum (approximately 2.7 feet) yields an invert at 5348.4 and rim at 5360.2.





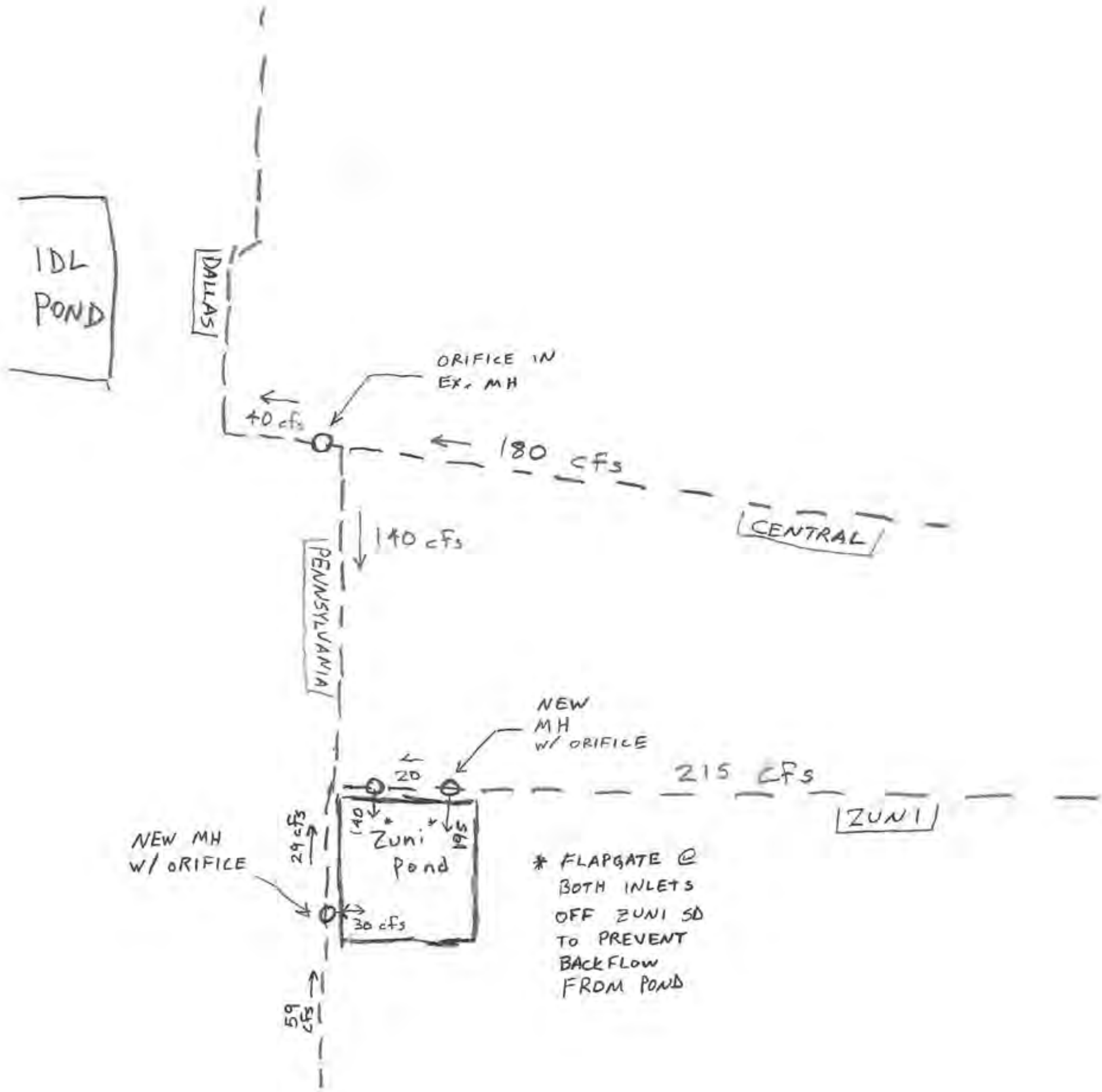
The work order plans show a manhole at Zuni and Pennsylvania with an invert at 5350.7 and rim at approximately 5360 +/-. Adjusted (1988 datum) invert is 5353.4 and 5362.7. Survey recently obtained verifies these adjustments.

Proposed Hydraulics

In order to maximize the benefit of the Zuni-Penn pond (and keep stormwater in the pond from “leaking” out at Central and Pennsylvania), the maximum water surface in the pond must be at or below 5360.2 and provide approximately 30 AF of storage at that elevation.

An orifice placed in the manhole at Central and Pennsylvania, sized to allow a maximum of 40 cfs to pass, will essentially divert the remaining 140 cfs to the Zuni Penn pond. A new 54” inlet into the pond from the Zuni storm drain will allow for this 140 cfs to enter the pond and a flapgate will prevent this 140 cfs flowrate from flowing back into the stormdrain.

A new manhole constructed at the northeast corner of the Zuni Penn pond (with an orifice sized for 20 cfs) will divert 195 cfs into the pond. Another orifice (sized for 40 cfs) placed at an existing manhole at Central and Pennsylvania will divert 140 cfs into the Zuni Penn pond. The outlet from the pond will entail the construction of a new manhole in the Pennsylvania storm drain (with and orifice sized for 30 cfs). See sketch below.



Surface water from the east, which currently bypasses the system, creates floodplain and flooding risk to numerous properties downstream. This proposed modification to the system will provide badly-needed capacity in the Dallas SD system and allow for the removal of many residential properties to be removed from the FEMA floodplain.

FIGURE 6.2.3 **Precipitation Zones**

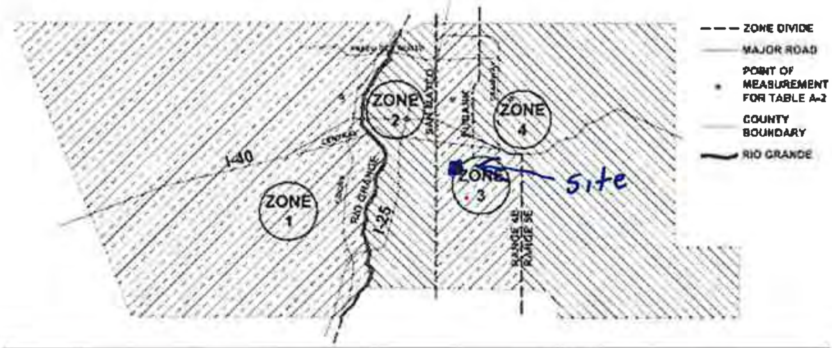
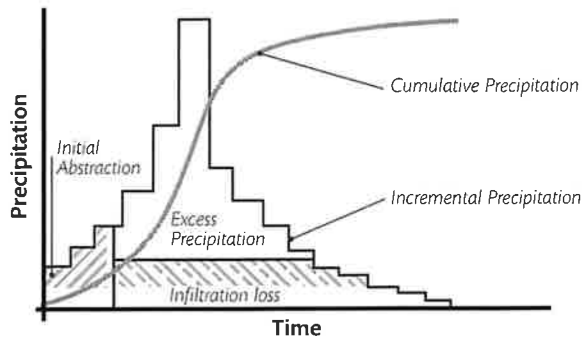


TABLE 6.2.8 **Precipitation for Zones 1-4**

Partial Duration		500 year		100 year		10 year		2 year	
		Depth (in)	Intensity in/hr	Depth (in)	Intensity in/hr	Depth (in)	Intensity in/hr	Depth (in)	Intensity in/hr
ZONE 1									
5	min.	0.701	8.41	0.538	6.46	0.335	4.02	0.207	2.48
10	min.	1.070	6.42	0.819	4.91	0.511	3.07	0.315	1.89
12	min.	-	5.96	-	4.58	-	2.85	-	1.76
15	min.	1.320	5.28	1.020	4.08	0.633	2.53	0.390	1.56
30	min.	1.780	3.56	1.370	2.74	0.852	1.70	0.525	1.05
60	min.	2.200	2.20	1.690	1.69	1.060	1.06	0.650	0.65
2	hr.	2.530	1.27	1.920	0.96	1.190	0.60	0.746	0.37
3	hr.	2.760	0.92	2.000	0.67	1.250	0.42	0.800	0.27
6	hr.	2.780	0.46	2.170	0.36	1.400	0.23	0.920	0.15
24	hr.	3.090	0.13	2.490	0.10	1.680	0.07	1.160	0.05
4	day	3.780	0.04	3.120	0.03	2.190	0.02	1.560	0.02
10	day	4.680	0.02	3.900	0.02	2.760	0.01	1.970	0.01
Zone 2									
5	min.	0.731	8.77	0.565	6.78	0.355	4.26	0.220	2.64
10	min.	1.110	6.66	0.860	5.16	0.540	3.24	0.335	2.01
12	min.	-	6.20	-	4.81	-	3.01	-	1.87
15	min.	1.380	5.52	1.070	4.28	0.669	2.68	0.415	1.66
30	min.	1.860	3.72	1.440	2.88	0.901	1.80	0.559	1.12
60	min.	2.300	2.30	1.780	1.78	1.120	1.12	0.692	0.69
2	hr.	2.660	1.33	2.030	1.02	1.260	0.63	0.797	0.40
3	hr.	2.730	0.91	2.100	0.70	1.320	0.44	0.844	0.28
6	hr.	2.980	0.50	2.290	0.38	1.480	0.25	0.977	0.16

FIGURE 6.2.4 **Precipitation and Time**



The 6-hour excess precipitation, E, by zone and treatment is summarized in TABLE 6.2.13.

TABLE 6.2.13 **6-hour Excess Precipitation, 'E'**				
Zone	**Land Treatment**			
	A	**B**	**C**	**D**
100-YEAR EXCESS PARTICIPATION, E (IN)				
1	0.55	0.73	0.95	2.24
2	0.62	0.80	1.03	2.33
3	0.67	0.86	1.09	2.58
4	0.76	0.95	1.20	3.34
2-YEAR EXCESS PARTICIPATION, E (IN)				
1	0.00	0.01	0.13	0.92
2	0.00	0.02	0.16	0.98
3	0.00	0.05	0.19	1.05
4	0.00	0.28	0.87	1.39
10-YEAR EXCESS PARTICIPATION, E (IN)				
1	0.11	0.26	0.43	1.43
2	0.15	0.30	0.48	1.51
3	0.18	0.34	0.52	1.64
4	0.25	0.41	0.59	2.15

To determine the volume of runoff:

1. Determine the area in each treatment, A_A, A_B, A_C, A_D
2. Compute the weighted excess precipitation, E

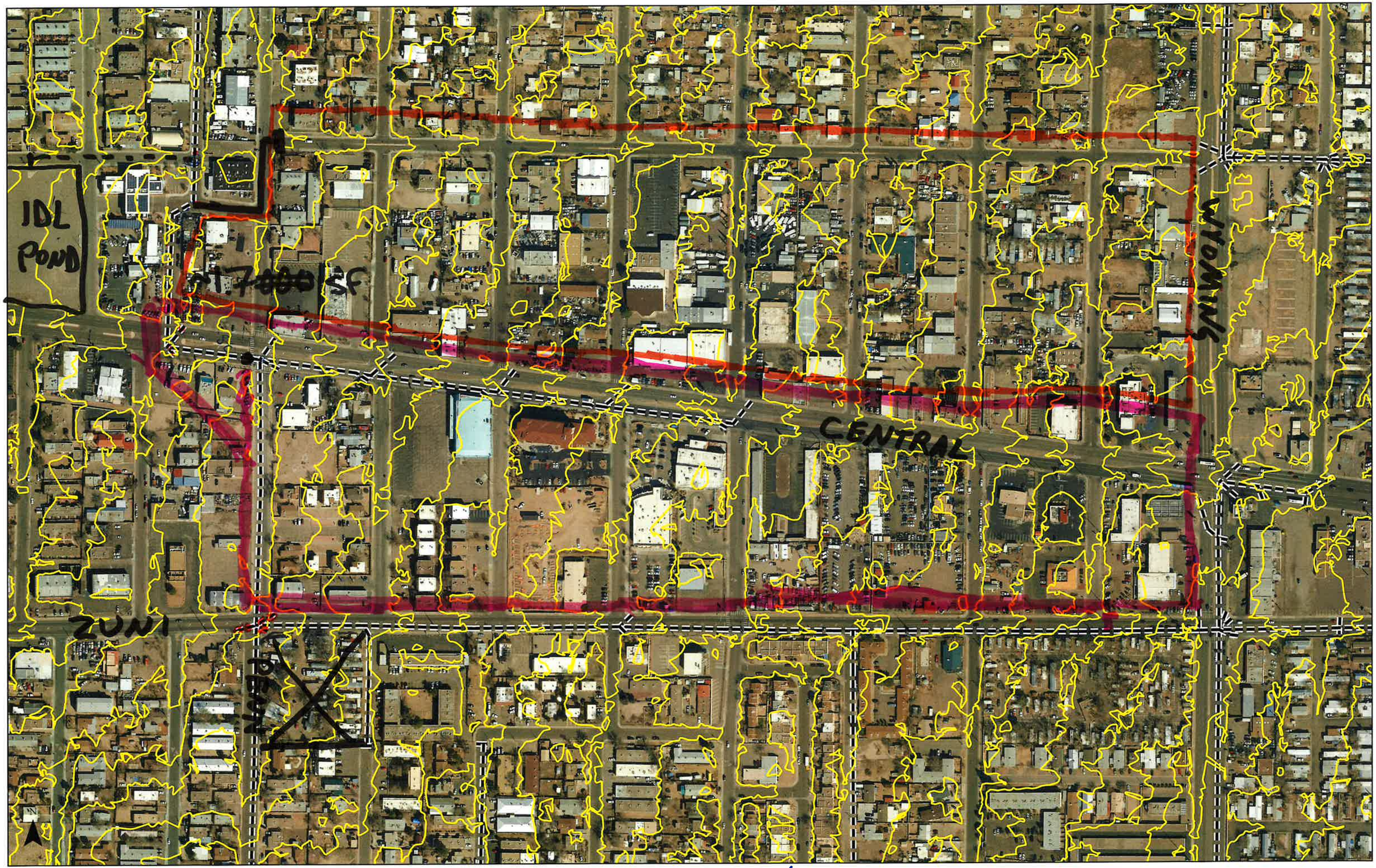
$$V = \frac{2.58}{12} \times 40.8 \text{ ac} = \underline{\underline{8.8 \text{ ac. ft}}}$$

TABLE 6.2.14 **Peak Discharge**

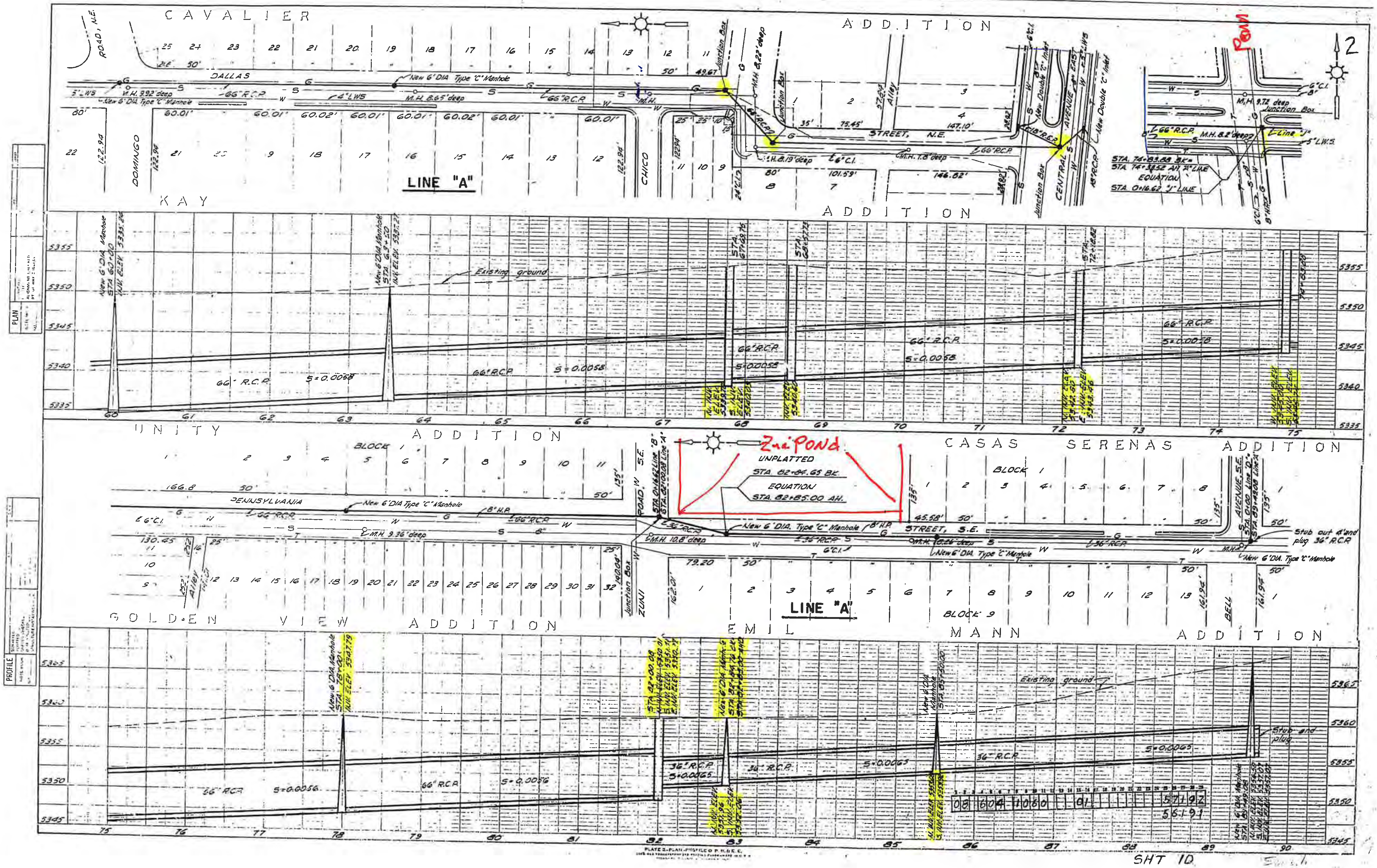
Zone	Land Treatment			
	A	**B**	**C**	**D**
100-YEAR PEAK DISCHARGE (CSF/ACRE)				
1	1.54	2.16	2.87	4.12
2	1.71	2.36	3.05	4.34
3	1.84	2.49	3.17	$\boxed{4.49}$ × 40.8 ≈ 180 cfs
4	2.09	2.73	3.41	4.78
2-YEAR PEAK DISCHARGE (CSF/ACRE)				
1	0.00	0.02	0.50	1.56
2	0.00	0.08	0.61	1.66
3	0.00	0.15	0.71	1.73
4	0.00	0.28	0.87	1.88
10-YEAR PEAK DISCHARGE (CSF/ACRE)				
1	0.30	0.81	1.46	2.57
2	0.41	0.95	1.59	2.71
3	0.51	1.07	1.69	2.81
4	0.70	1.28	1.89	3.04

To determine the peak rate of discharge,

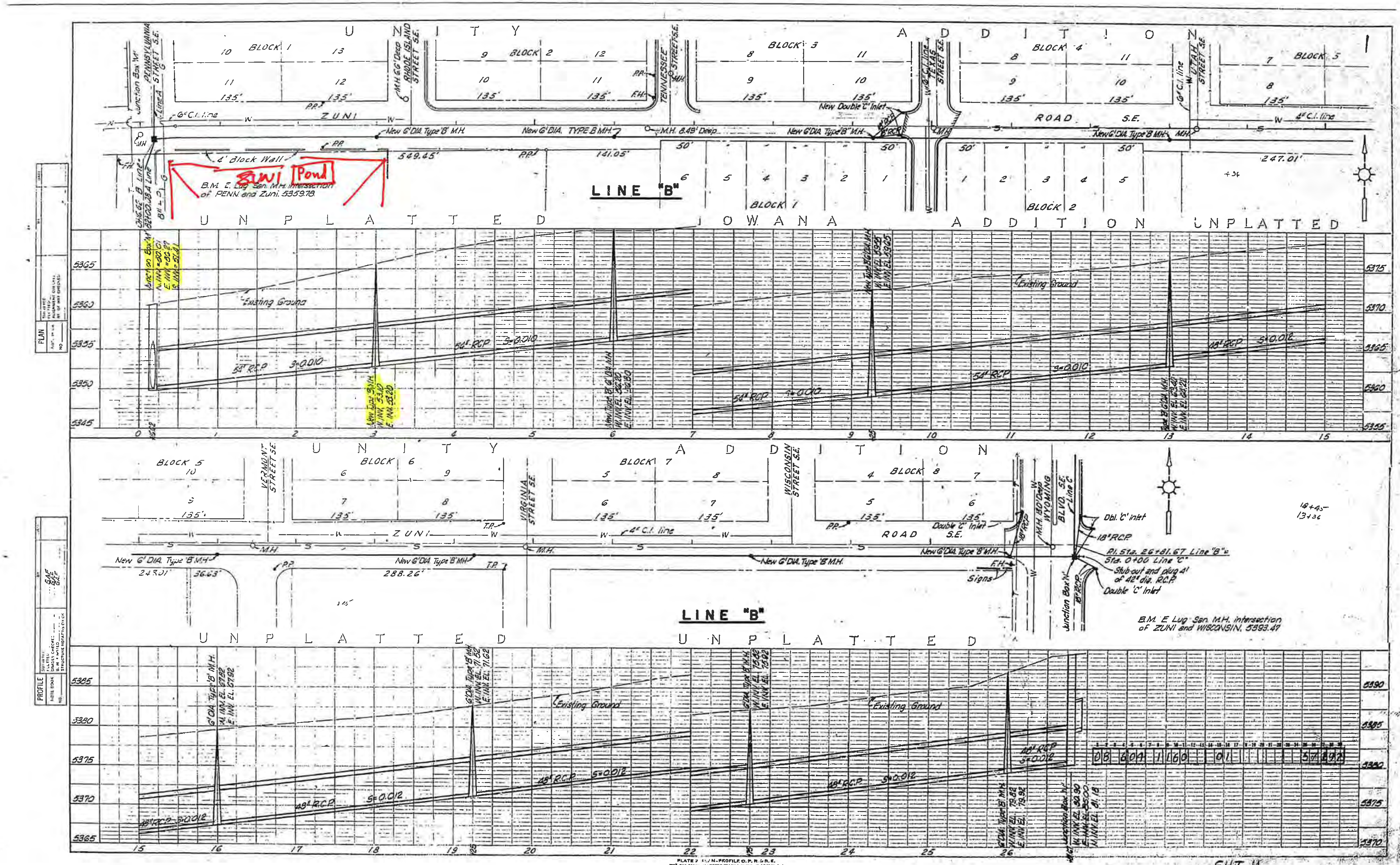
1. Determine the area in each treatment, A_A, A_B, A_C, A_D
2. Multiply the peak rate for each treatment by the respective areas and sum to compute the total Q_p.



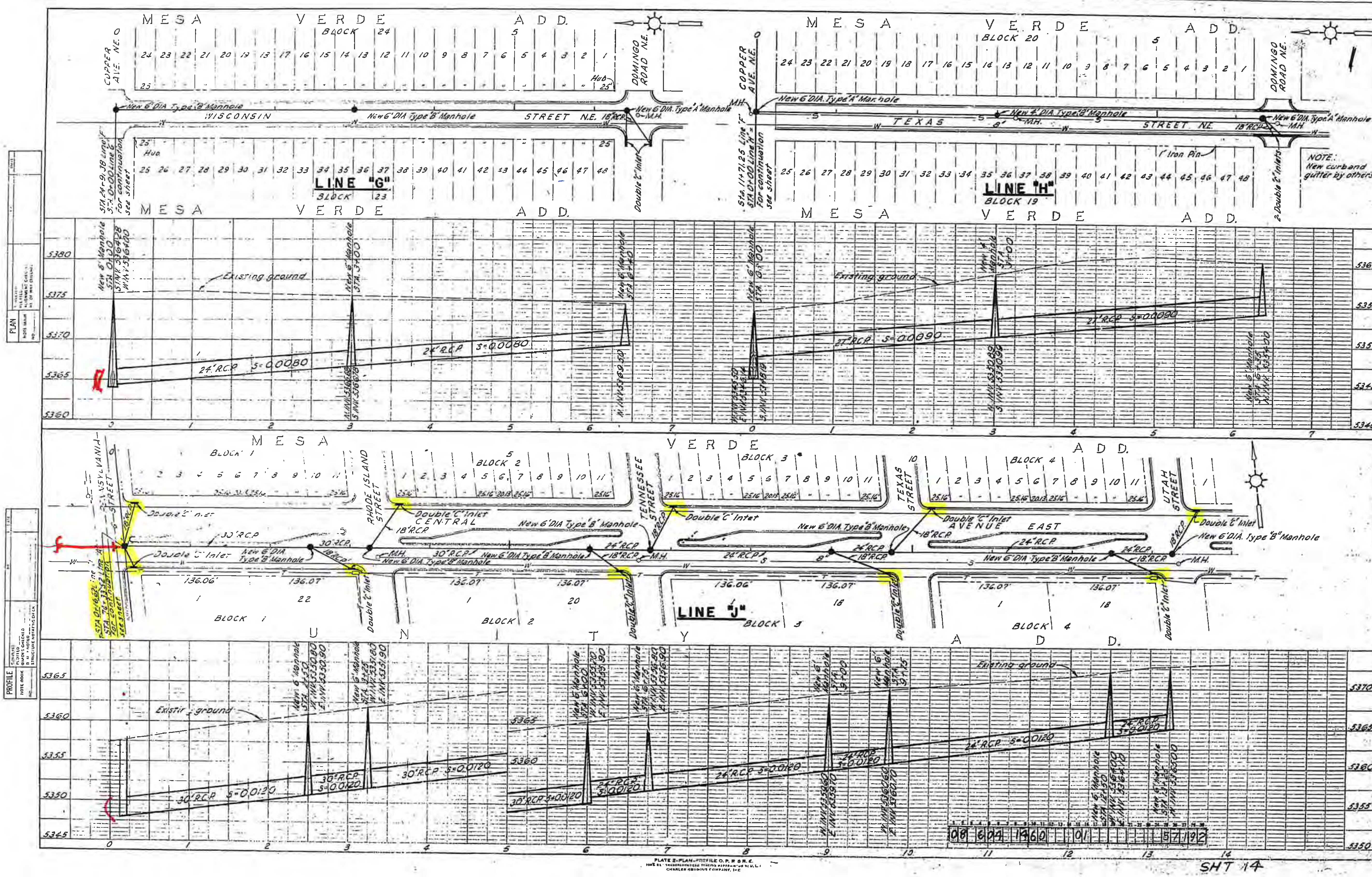
1.76×10^6 — 40.8 ac.

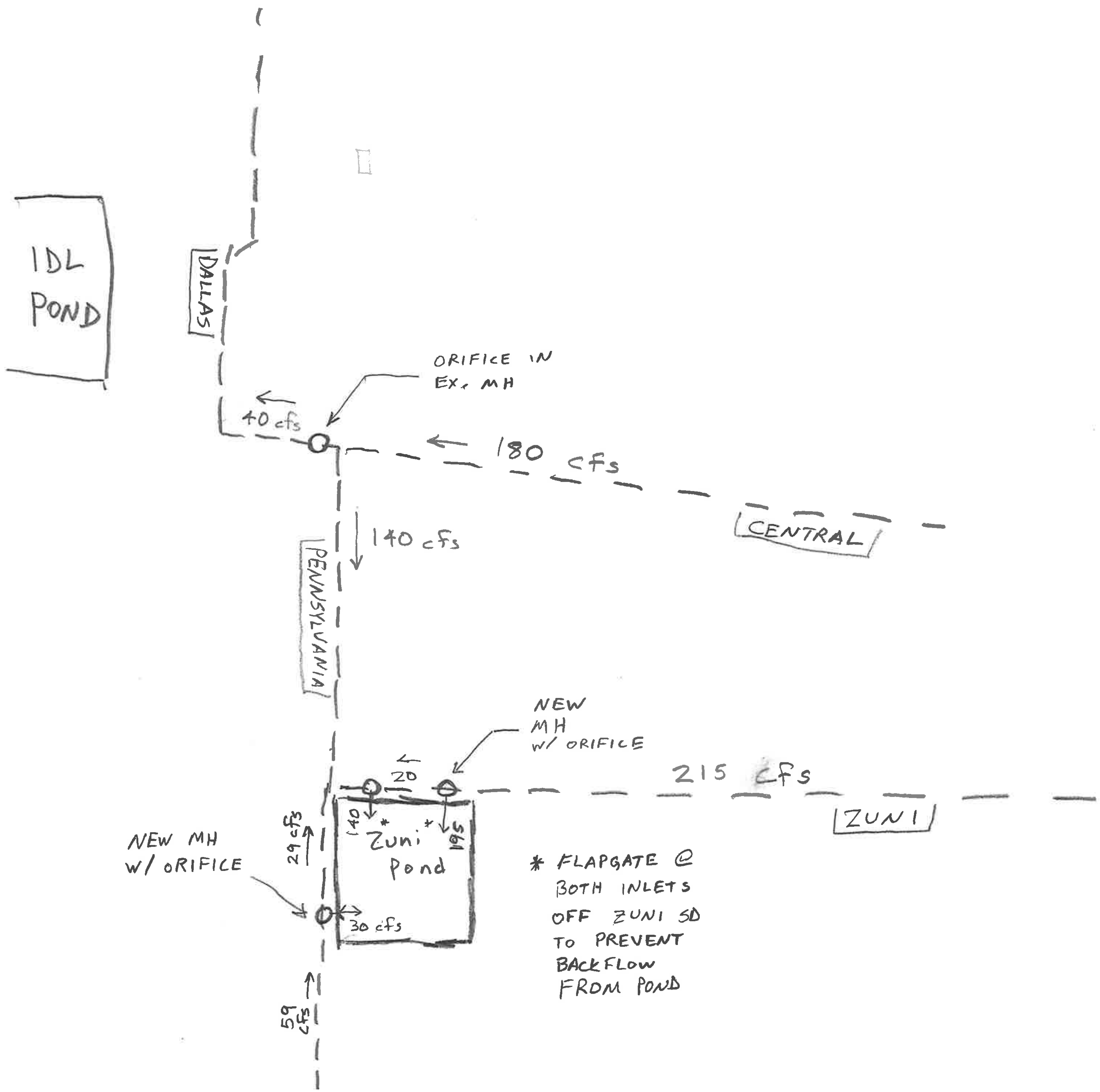


CAVALIER ADDITION
KAY ADDITION
LINE "A"
DALLAS
DOMINGO
CHICO
STREET, N.E.
CENTRAL AVENUE
Pond
New 6' DIA. Type 'C' Manhole
66" R.C.P.
STA. 74+83.88 BK.=
STA. 74+38.52 AH. "A" LINE
EQUATION
STA. 0+16.62 "J" LINE
Existing ground
S=0.0058
UNITY ADDITION
CASAS SERENAS ADDITION
Zuni POND
UNPLATTED
STA. 82+64.65 BK.
EQUATION
STA. 82+85.00 AH.
PENNSYLVANIA
ZUNI ROAD, S.E.
STREET, S.E.
BELL AVENUE S.E.
Stub out 4' and plug 36" R.C.P.
GOLDEN VIEW ADDITION
EMIL MANN ADDITION
BLOCK 1
BLOCK 9
36" R.C.P.
S=0.0065
S=0.0056
Stub and plug
PLAN
PROFILE
SHT 10



UNITY ADDITION
ZUNI ROAD S.E.
PENNSYLVANIA STREET S.E.
RHODE ISLAND STREET S.E.
TENNESSEE STREET S.E.
TEXAS STREET S.E.
UTAH STREET S.E.
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
BLOCK 5
New Double 'C' Inlet
New 6' DIA. Type 'B' M.H.
M.H. 8.48' Deep
4' Block Wall
549.45'
141.05'
247.01'
B.M. E. Lug San. M.H. intersection of PENN. and Zuni. 5359.78
ZUNI Pond
LINE "B"
UNPLATTED
IOWANA ADDITION
Existing Ground
54" RCP S=0.010
48" RCP S=0.012
Junction Box
BLOCK 6
BLOCK 7
BLOCK 8
VERMONT STREET S.E.
VIRGINIA STREET S.E.
WISCONSIN STREET S.E.
WYOMING BLVD. S.E.
4" C.I. line
243.01'
36.63'
288.26'
Dbl. 'C' Inlet
18" RCP
Pl. Sta. 26+81.67 Line "B" = Sta. 0+00 Line "C"
Stub out and plug 4' of 42" dia. RCP
Double 'C' Inlet
Signs
B.M. E Lug San. M.H. intersection of ZUNI and WISCONSIN. 5393.47
PLAN
PROFILE
SHT 11


MESA VERDE ADD.
BLOCK 24
COPPER AVE. NE.
WISCONSIN STREET NE.
DOMINGO ROAD NE.
New 6' DIA Type "B" Manhole
New 6' DIA Type "A" Manhole
Double "C" Inlet
LINE "G"
BLOCK 23
BLOCK 20
TEXAS STREET NE.
New 4' DIA Type "B" Manhole
1" Iron Pin
NOTE: New curb and gutter by others.
2 Double "C" Inlets
LINE "H"
BLOCK 19
Existing ground
24" RCP S=0.0080
27" RCP S=0.0090
PENNSYLVANIA STREET
RHODE ISLAND STREET
TENNESSEE STREET
TEXAS STREET
UTAH STREET
CENTRAL AVENUE EAST
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
LINE "J"
UNITY ADD.
30" RCP S=0.0120
24" RCP S=0.0120
18" RCP
New 6' DIA. Type "B" Manhole
PLAN
PROFILE
SHT 14



IDL POND
DALLAS
ORIFICE IN EX. MH
40 cfs
180 cfs
CENTRAL
140 cfs
PENNSYLVANIA
NEW MH W/ ORIFICE
20
215 cfs
ZUNI
140
195
Zuni Pond
29 cfs
NEW MH W/ ORIFICE
30 cfs
59 cfs
* FLAPGATE @ BOTH INLETS OFF ZUNI SD TO PREVENT BACKFLOW FROM POND

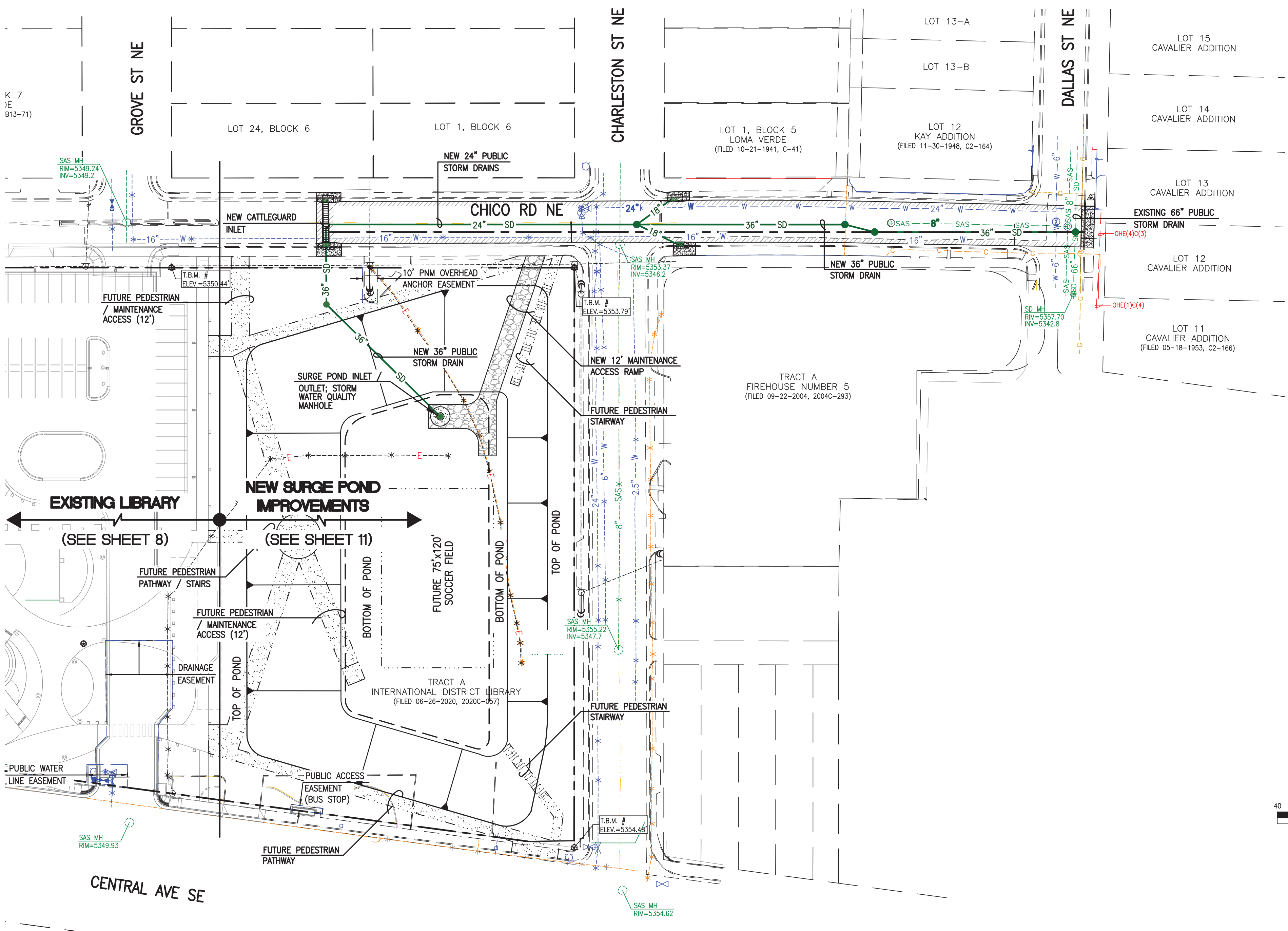
EXHIBIT C

LEGEND

	EXISTING STORM DRAIN MANHOLE		EXISTING WATER SERVICE
	EXISTING FIRE HYDRANT		PROPOSED WATER SERVICE
	PROPOSED FIRE HYDRANT	SD	EXISTING STORM DRAIN
	EXISTING SANITARY SEWER MAN HOLE	SD	PROPOSED STORM DRAIN
	EXISTING VALVE BOX	W	EXISTING WATER LINE
	PROPOSED VALVE BOX	W	PROPOSED WATER LINE
	EXISTING DOUBLE CLEANOUT	SAS	EXISTING SANITARY SEWER LINE
	PROPOSED DOUBLE CLEANOUT	SAS	PROPOSED SANITARY SEWER LINE
	EXISTING SINGLE CLEANOUT	F	EXISTING FIRE LINE
	PROPOSED SINGLE CLEANOUT	F	PROPOSED FIRE LINE
	PUBLIC EASEMENT LINE		RIGHT OF WAY LINE

APWA UTILITY COLOR CODE

YELLOW – GAS, OIL, STEAM, PETROLEUM OR GASEOUS MATERIALS	G
ORANGE – COMMUNICATION, ALARM OR SIGNAL LINES, CABLES OR CONDUIT	C
BLUE – POTABLE WATER	W
GREEN – SANITARY SEWER AND DRAIN LINES	SAS
GREEN – STORM DRAIN LINES	SD
MAGENTA – UNKNOWN UTILITY	



SCALE: 1" = 40'

40 0 20 40 80

TEMPORARY BENCHMARK #1 (T.B.M.)

A MAG NAIL IN ASPHALT PAVEMENT, AS SHOWN ON THIS SHEET.
ELEVATION = 5350.56 FEET (NAVD 1988)

TEMPORARY BENCHMARK #2 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE NORTHWEST PROPERTY CORNER OF BLOCK 2, AS SHOWN ON THIS SHEET.
ELEVATION = 5346.72 FEET (NAVD 1988)

TEMPORARY BENCHMARK #3 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE NORTHWEST PROPERTY CORNER OF BLOCK 3, AS SHOWN ON THIS SHEET.
ELEVATION = 5350.44 FEET (NAVD 1988)

TEMPORARY BENCHMARK #4 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE NORTHEAST PROPERTY CORNER OF BLOCK 3, AS SHOWN ON THIS SHEET.
ELEVATION = 5353.79 FEET (NAVD 1988)

TEMPORARY BENCHMARK #5 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE SOUTHEAST PROPERTY CORNER OF BLOCK 3, AS SHOWN ON THIS SHEET.
ELEVATION = 5354.48 FEET (NAVD 1988)

TEMPORARY BENCHMARK #204 (T.B.M.)

A MAG NAIL W/WASHER IN CONCRETE JOINT, AT THE NORTHEAST QUADRANT OF THE INTERSECTION OF CHICO ROAD AND DALLAS STREET, AS SHOWN ON THIS SHEET.
ELEVATION = 5357.32 FEET (NAVD 1988)

NOTE:
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HIGH MESA Consulting Group
Engineers, Surveyors & Subsurface Utility Consultants
6010-B Midway Park Blvd. NE • Albuquerque, New Mexico 87109
Phone: 505.345.4250 • Fax: 505.345.4254 • www.highmesacg.com

2021.026.2

AS BUILT INFORMATION — CONTRACTOR; WORK STAKED BY / DATE; INSPECTOR'S ACCEPTANCE BY / DATE; FIELD VERIFICATION BY / DATE; DRAWINGS CORRECTED BY / DATE

MICRO-FILM INFORMATION — RECORDED BY / DATE; NO.

BENCH MARKS
AN ACRS BRASS DISK STAMPED "7-K19", SET IN A CONCRETE CYLINDER, ON THE NOSE OF THE ISLAND EAST OF THE INTERSECTION OF CENTRAL AVENUE AND LOUISIANA BOULEVARD.
ELEVATION = 5325.99 FEET (NAVD 1988)

SURVEY INFORMATION

NO.	FIELD NOTES BY	DATE
2017.017.1	HMCG	4/30/18

ENGINEER'S SEAL

REMARKS / Revisions

NO.	DATE	BY

DESIGN

Designed By	J.D.S.	Date 01-2023
Drawn By	J.Y.R.	Date 01-2023
Checked By	G.M.	Date 01-2023

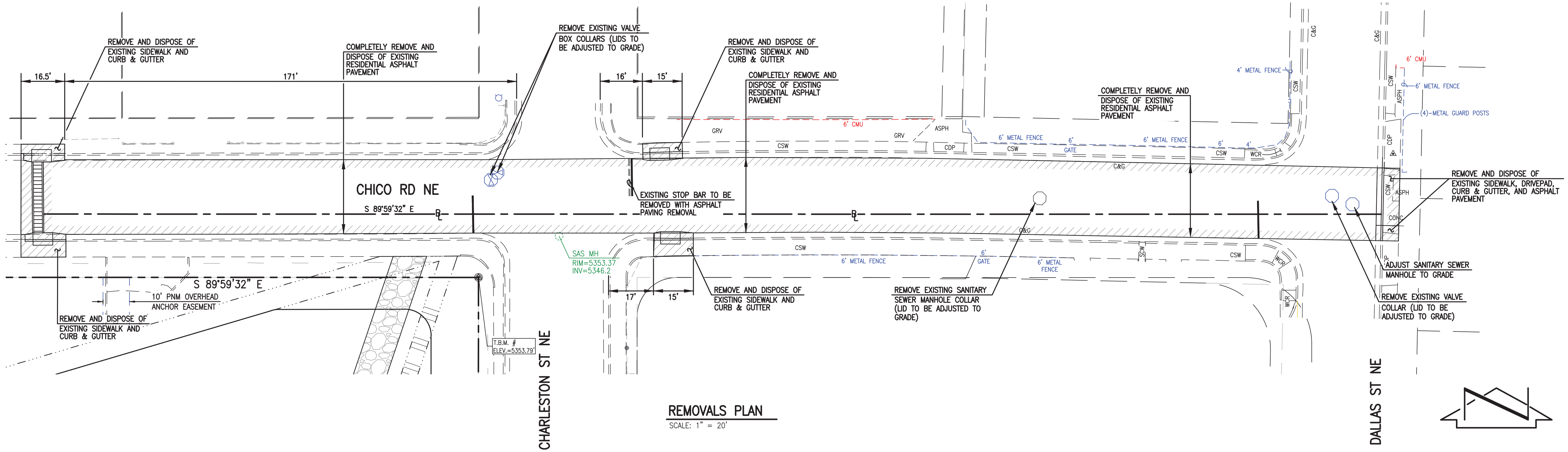
CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

TITLE: INTERNATIONAL DISTRICT LIBRARY SURGE POND OVERALL SITE PLAN

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
		Last Design Update	

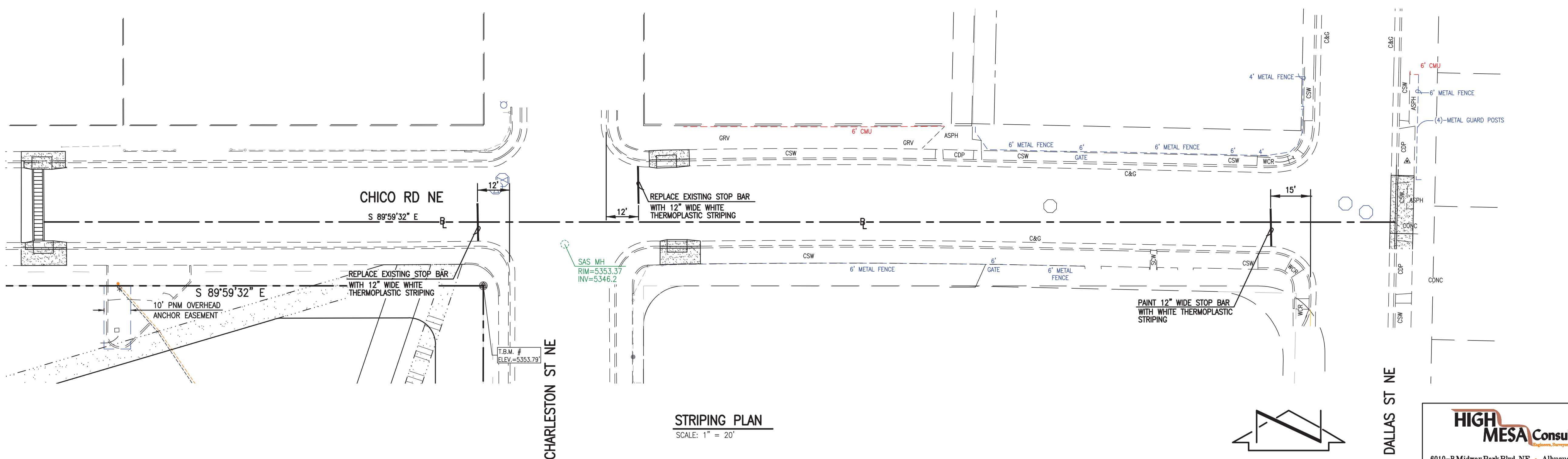
City Project No.	Zone Map No.	Sheet	Of
722596	K-19	9	13

File Name: P:\data\2021\2021.026.2\ENG\210262_DesignBase.dwg - SH 9 Plot Date: 1/23/23 Plot Time: 10:33



REMOVALS PLAN

SCALE: 1" = 20'



STRIPING PLAN

SCALE: 1" = 20'

NOTE:
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AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY — DATE
INSPECTOR'S ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

BENCH MARKS
AN AGRS BRASS DISK STAMPED "7-K19", SET IN A CONCRETE CYLINDER, ON THE NOSE OF THE ISLAND EAST OF THE INTERSECTION OF CENTRAL AVENUE AND LOUISIANA BOULEVARD.
ELEVATION = 5325.99 FEET (NAVD 1988)

SURVEY INFORMATION

FIELD NOTES NO.	BY	DATE
2017.017.1	HMCG	4/30/18

ENGINEER'S SEAL
FOR REVIEW

NO.	DATE	REMARKS	BY
		Revisions	
		DESIGN	

Designed By	J.D.S.	Date 01-2023
Drawn By	J.Y.R.	Date 01-2023
Checked By	G.M.	Date 01-2023

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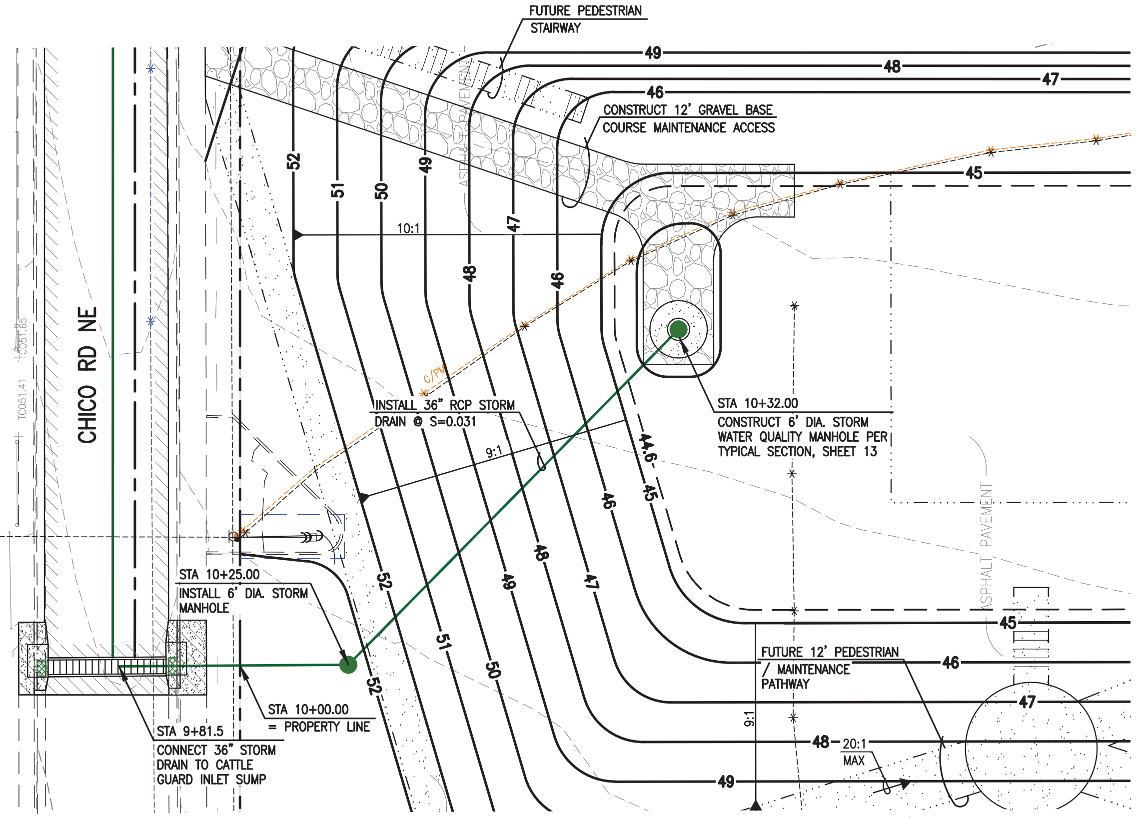
2021.026.2

CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

TITLE: INTERNATIONAL DISTRICT LIBRARY
SURGE POND
CHICO ROAD REMOVALS AND STRIPING PLAN

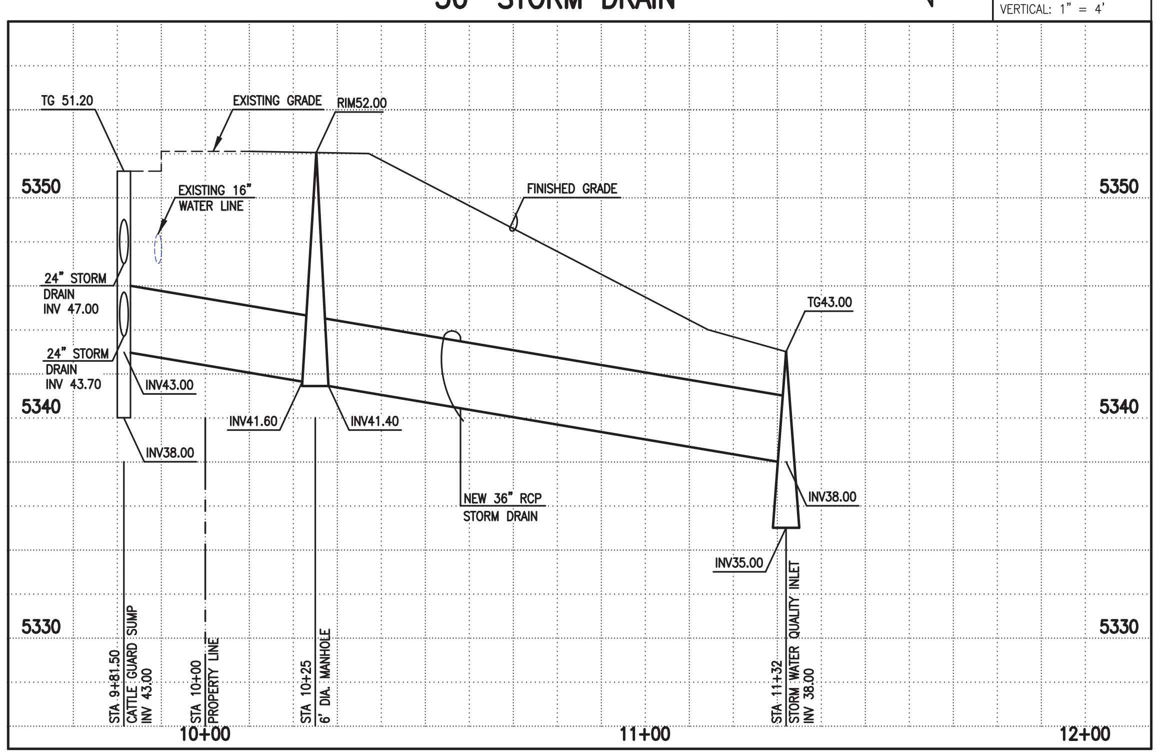
Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
	Last Design Update		

City Project No.	Zone Map No.	Sheet	Of
722596	K-19	10	13



36" STORM DRAIN

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 4'



NOTE:
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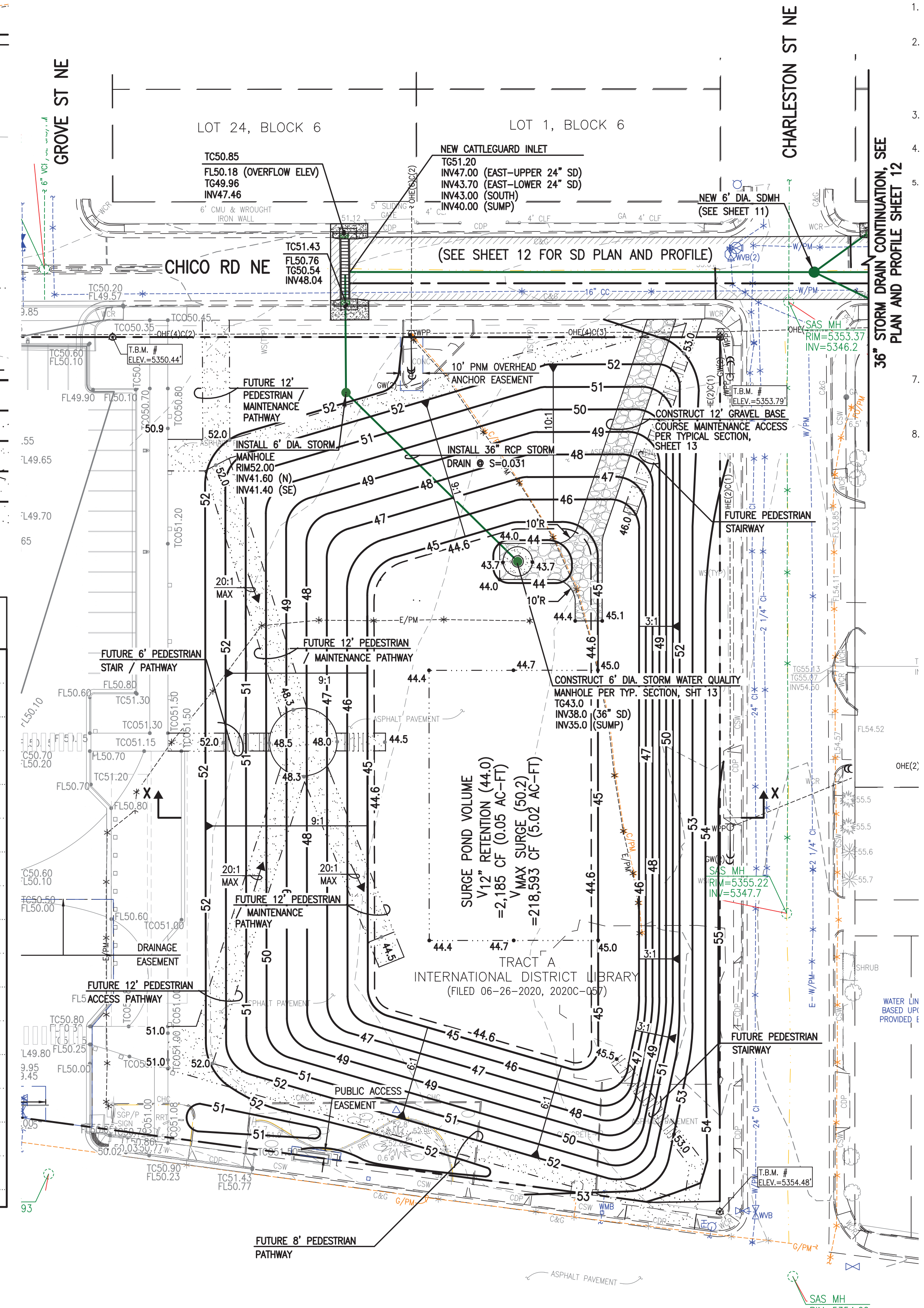


TEMPORARY BENCHMARK #1 (T.B.M.)

A MAG NAIL IN ASPHALT PAVEMENT, AS SHOWN ON THIS SHEET.
ELEVATION = 5350.56 FEET (NAVD 1988)

TEMPORARY BENCHMARK #2 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE NORTHWEST PROPERTY CORNER OF BLOCK 2, AS SHOWN ON THIS SHEET.
ELEVATION = 5346.72 FEET (NAVD 1988)

TEMPORARY BENCHMARK #3 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE NORTHWEST PROPERTY CORNER OF BLOCK 3, AS SHOWN ON THIS SHEET.
ELEVATION = 5350.44 FEET (NAVD 1988)

TEMPORARY BENCHMARK #4 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE NORTHEAST PROPERTY CORNER OF BLOCK 3, AS SHOWN ON THIS SHEET.
ELEVATION = 5353.79 FEET (NAVD 1988)

TEMPORARY BENCHMARK #5 (T.B.M.)

A MAG NAIL W/WASHER STAMPED "CARTESIAN SURVEYS PLS 14271" ALSO BEING THE SOUTHEAST PROPERTY CORNER OF BLOCK 3, AS SHOWN ON THIS SHEET.
ELEVATION = 5354.48 FEET (NAVD 1988)

TEMPORARY BENCHMARK #204 (T.B.M.)

A MAG NAIL W/WASHER IN CONCRETE JOINT, AT THE NORTHEAST QUADRANT OF THE INTERSECTION OF CHICO ROAD AND DALLAS STREET, AS SHOWN ON THIS SHEET.
ELEVATION = 5357.32 FEET (NAVD 1988)

CONSTRUCTION NOTES:

1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM, 811, FOR DESIGNATION (LINE-SPOTTING) OF EXISTING UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INTERPRETATIONS IT MAKES WITHOUT FIRST CONTACTING THE ENGINEER AS REQUIRED ABOVE.
3. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.
4. ALL CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY OF ALBUQUERQUE STANDARDS AND PROCEDURES.
5. UTILITY INFORMATION SHOWN HEREON IS BASED UPON THE TOPOGRAPHIC AND UTILITY SURVEY CONDUCTED BY THIS FIRM DATED 04/30/2018 AND INCLUDED AS SHEETS 3-6 OF THIS PLAN SET. THAT UTILITY SURVEY AND SUBSURFACE UTILITY ENGINEERING EFFORT IS NOT ALL-INCLUSIVE AND MAY NOT REPRESENT UTILITIES/INFRASTRUCTURE THAT HAVE BEEN ABANDONED-IN-PLACE, WERE INACCESSIBLE, OR OTHERWISE UNDETECTABLE DUE TO UNFORESEEN AND UNCONTROLLABLE SITE AND/OR UTILITY CONDITIONS. FURTHER, THAT UTILITY INVESTIGATION MAY BE INCOMPLETE, OR MAY BE OBSOLETE BY THE TIME CONSTRUCTION COMMENCES, THEREFORE, MAKES NO REPRESENTATION PERTAINING THERETO, AND ASSUMES NO RESPONSIBILITY OR LIABILITY THEREFORE. THE PROPERTY OWNER, DEVELOPER, OR CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UNDERGROUND UTILITY LINES. IN PLANNING AND CONDUCTING EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH STATE STATUES, NEW MEXICO EXCAVATION LAWS (NM811), MUNICIPAL AND LOCAL ORDINANCES, SITE SPECIFIC RULES AND REGULATIONS, IF ANY, PERTAINING TO THE LOCATION OF THESE UTILITY LINES AND FACILITIES.
7. ALL UTILITIES WITHIN THE PROJECT LIMITS THAT ARE RENDERED OBSOLETE AND / OR UNUSED AS A RESULT OF THIS PROJECT SHALL NOT BE ABANDONED IN PLACE, BUT SHALL INSTEAD BE COMPLETELY REMOVED WITHIN THE PROJECT AREA AND CAPPED AT THE PROJECT LIMITS, UNLESS OTHERWISE NOTED.
8. THE GRADES INDICATED ON THIS PLAN ARE FINISHED GRADES UNLESS OTHERWISE INDICATED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LEAVING SUBGRADE AT ELEVATIONS THAT SHALL ACCOMMODATE PROPOSED IMPROVEMENTS AS INDICATED ON THE PLANS INCLUDING, BUT NOT LIMITED TO, SURFACE DRAINAGE STRUCTURES, PAVING AND LANDSCAPING SURFACING.

SURGE POND CAPACITY (6:1 MAX SLOPES)

ELEV FT	AREA SF	VOL CF	∑ VOL CF	∑ VOL AC-FT
5343.0	1250	0	**0**	**0.00**
5344.0	3120	2185	**2,185**	**0.05**
5345.0	22950	13035	**15,220**	**0.35**
5346.0	31180	27065	**42,285**	**0.97**
5347.0	36020	33600	**75,885**	**1.74**
5348.0	41170	38595	**114,480**	**2.63**
5349.0	46660	43915	**158,395**	**3.64**
5350.0	52470	49565	**207,960**	**4.77**
5350.2	53860	10633	**218,593**	**5.02**

SCALE: 1" = 30'
30 0 60
15 30

AS BUILT INFORMATION
CONTRACTOR | WORK STAKED BY | INSPECTOR'S ACCEPTANCE BY | FIELD VERIFICATION BY | DRAWINGS CORRECTED BY
DATE | DATE | DATE | DATE | DATE

MICRO-FILM INFORMATION
RECORDED BY | DATE | NO.

BENCH MARKS
AN ACRS BRASS DISK STAMPED "7-K19", SET IN A CONCRETE CYLINDER, ON THE NOSE OF THE ISLAND EAST OF THE INTERSECTION OF CENTRAL AVENUE AND LOUISIANA BOULEVARD.
ELEVATION = 5325.99 FEET (NAVD 1988)

SURVEY INFORMATION
NO.	FIELD NOTES BY	DATE
2017.017.1	HMCG	4/30/18

ENGINEER'S SEAL

HIGH MESA Consulting Group
Engineers, Surveyors & Subsurface Utility Consultants
6010-B Midway Park Blvd. NE • Albuquerque, New Mexico 87109
Phone: 505.345.4250 • Fax: 505.345.4254 • www.highmesacg.com

2021.026.2

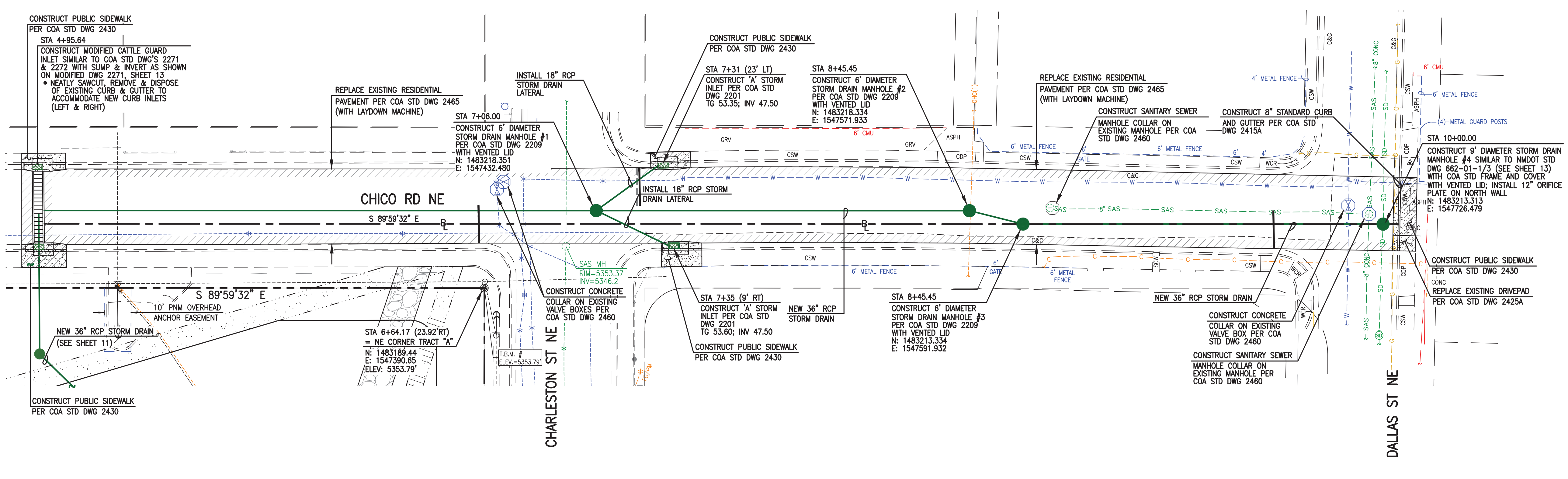
NO.	DATE	REMARKS	BY	
		Revisions		
		DESIGN		
		Designed By	J.D.S.	Date 01-2023
		Drawn By	J.Y.R.	Date 01-2023
		Checked By	G.M.	Date 01-2023

CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

TITLE: INTERNATIONAL DISTRICT LIBRARY SURGE POND GRADING PLAN

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
		Last Design Update	

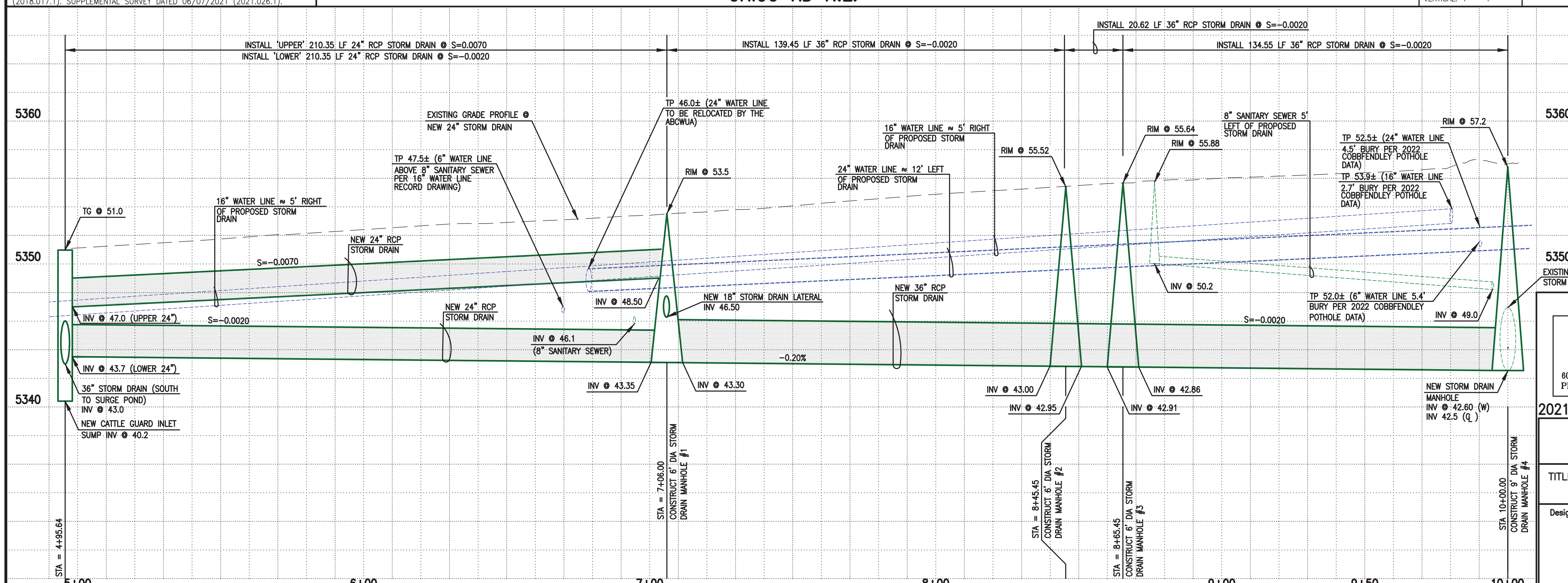
City Project No.	Zone Map No.	Sheet	Of
722596	K-19	11	13



NOTE:
THIS IS NOT A BOUNDARY SURVEY OR A RIGHT OF WAY SURVEY. APPARENT PROPERTY CORNERS, RIGHT OF WAY LINES, PROPERTY LINES AND EASEMENT LINES AS SHOWN ARE DERIVED FROM A RECORDED PLAT DATED 06/26/2020 (DOC#2020057642) PREPARED BY HIGH MESA CONSULTING GROUP, NMPS 11184, DATED 06/2019 (2018.017.2). THE TOPOGRAPHIC INFORMATION DEPICTED HEREON IS BASED UPON THE "TOPOGRAPHIC AND UTILITY SURVEY" PREPARED BY HIGH MESA CONSULTING GROUP, NMPS NO. 11184, DATED 04/30/2018 (2018.017.1). SUPPLEMENTAL SURVEY DATED 06/07/2021 (2021.026.1).

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 4'

CHICO RD N.E.



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AS BUILT INFORMATION	
CONTRACTOR	DATE
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION	
RECORDED BY	DATE
NO.	

BENCH MARKS
AN ACRS BRASS DISK STAMPED "7-K19", SET IN A CONCRETE CYLINDER, ON THE NOSE OF THE ISLAND EAST OF THE INTERSECTION OF CENTRAL AVENUE AND LOUISIANA BOULEVARD. ELEVATION = 5325.99 FEET (NAVD 1988)

SURVEY INFORMATION

FIELD NOTES		
NO.	BY	DATE
2017.017.1	HMCG	4/30/18

ENGINEER'S SEAL

REVIEW

NO.	DATE	REMARKS	BY		
		Revisions			
		DESIGN			
		Designed By	J.D.S.	Date	01-2023
		Drawn By	J.Y.R.	Date	01-2023
		Checked By	G.M.	Date	01-2023

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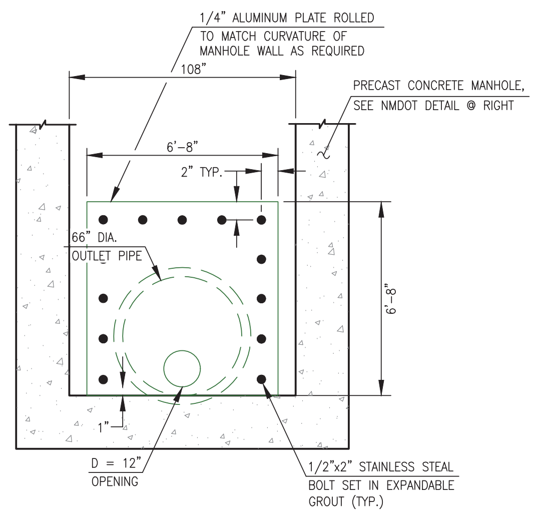
2021.026.2

CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

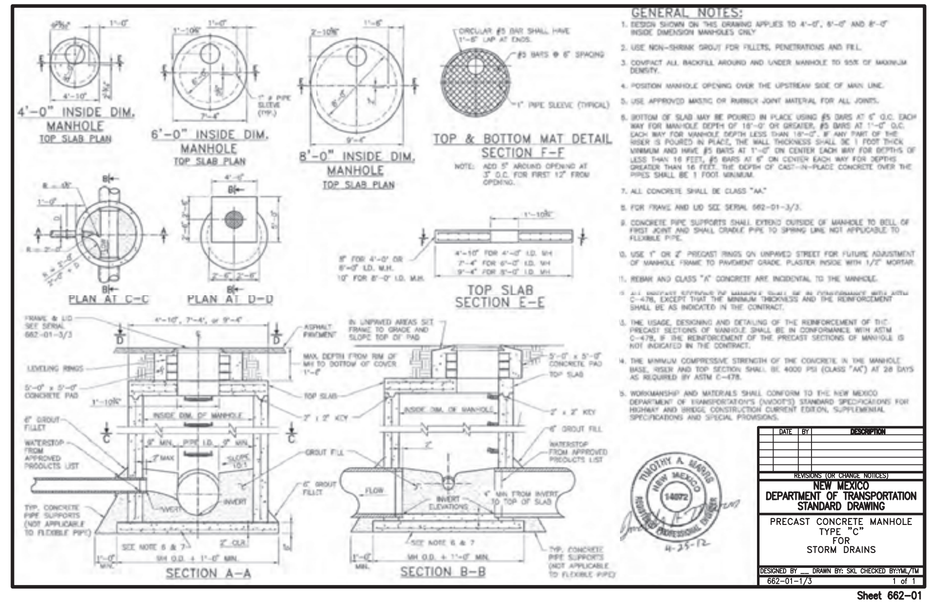
TITLE: INTERNATIONAL DISTRICT LIBRARY SURGE POND STORM DRAIN PLAN AND PROFILE

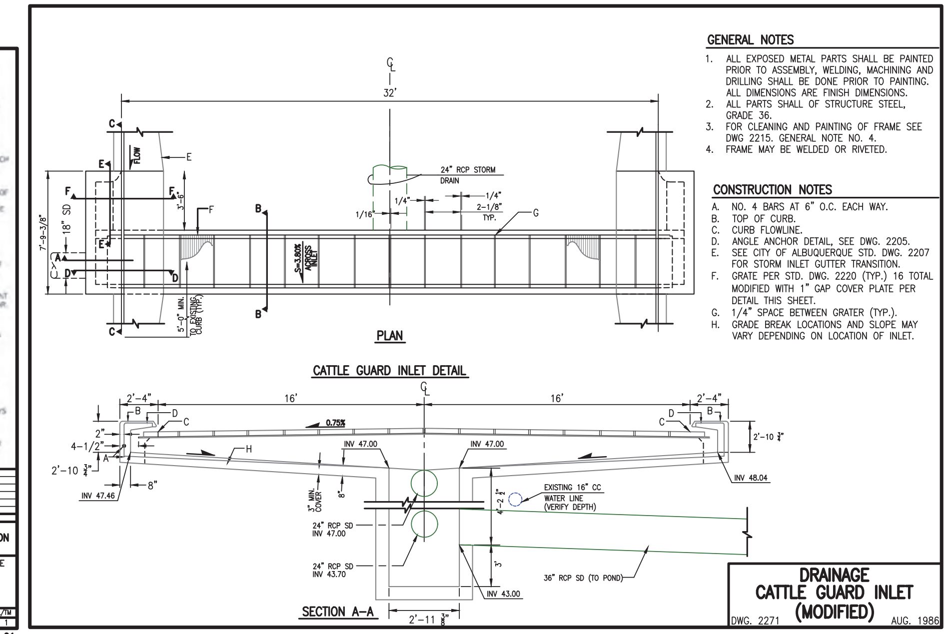
Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
		Last Design Update	

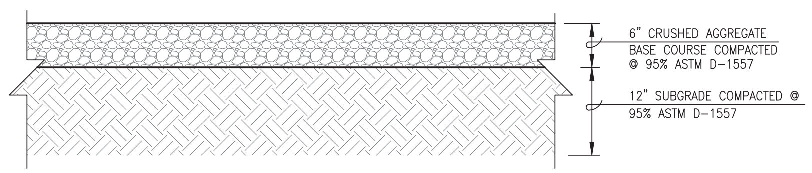
City Project No.	Zone Map No.	Sheet	Of
722596	K-19	12	13



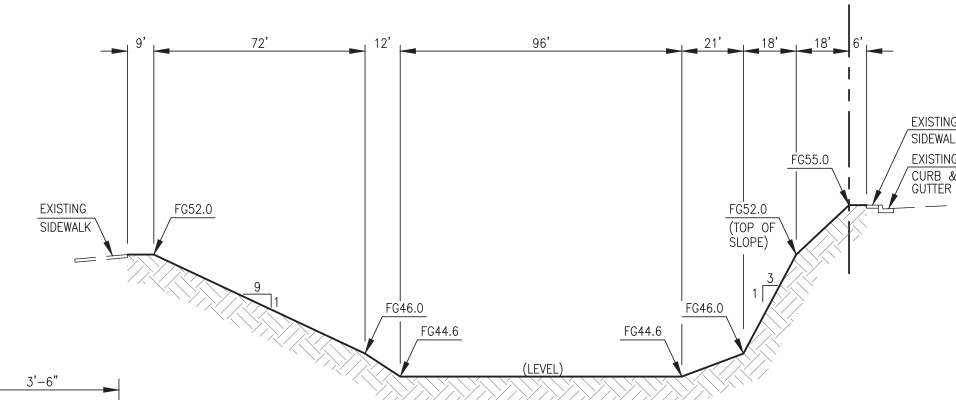
OUTLET CONTROL ORIFICE PLATE DETAIL
N.T.S.



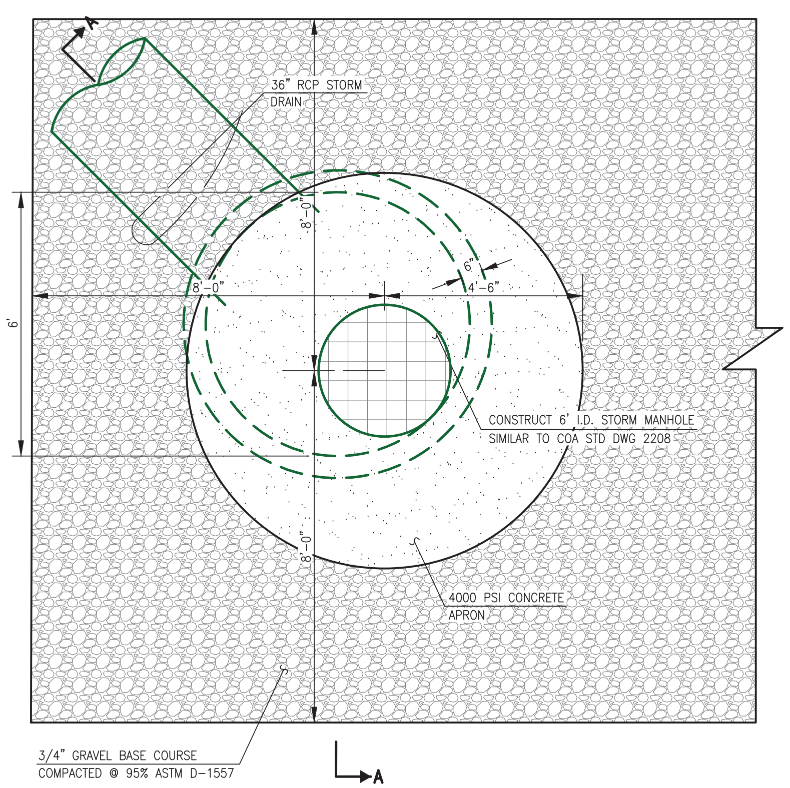




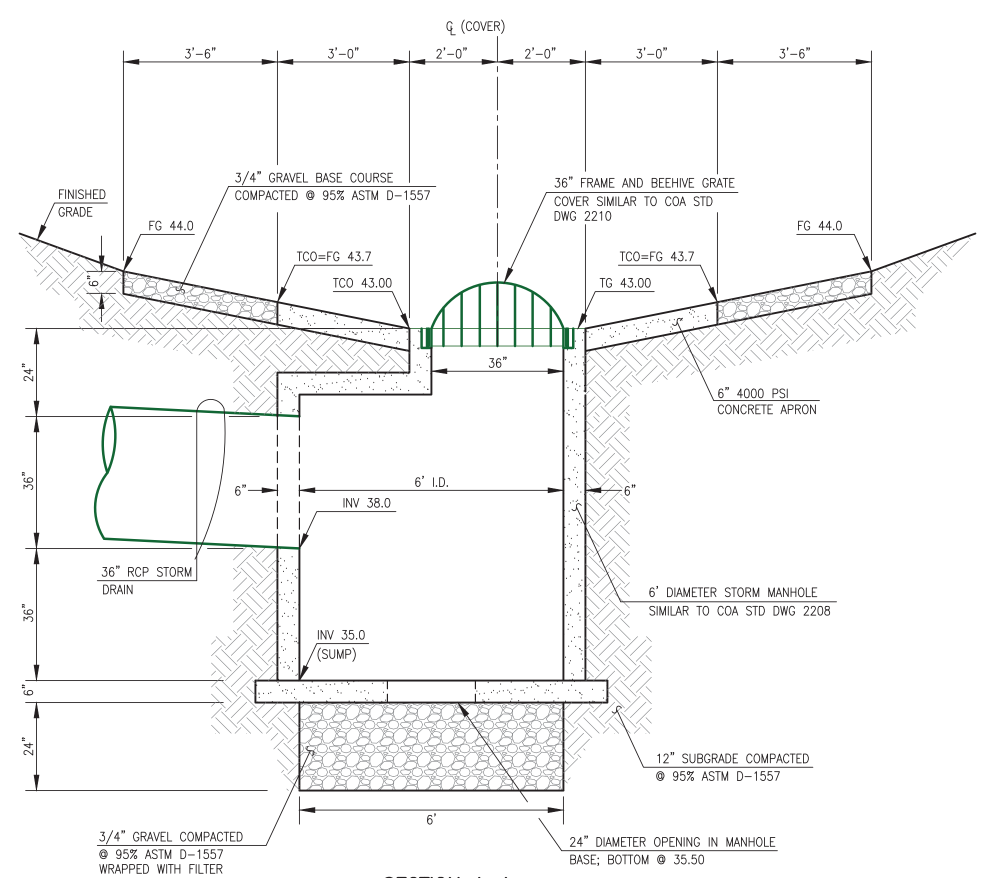
GRAVEL BASE COURSE SECTION
SCALE: 1" = 1'-0"



SECTION X-X (POND)
SCALE: 1" = 30' (HORIZ)
1" = 3' (VERT)



STORM WATER QUALITY MANHOLE (PLAN VIEW)
SCALE: 1" = 2'



SECTION A-A
SCALE: 1" = 2'

AS BUILT INFORMATION

CONTRACTOR	
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

RECORDED BY	DATE
NO.	

BENCH MARKS

AN ACRS BRASS DISK STAMPED "7-K19", SET IN A CONCRETE CYLINDER, ON THE NOSE OF THE ISLAND EAST OF THE INTERSECTION OF CENTRAL AVENUE AND LOUISIANA BOULEVARD.
ELEVATION = 5325.99 FEET (NAVD 1988)

SURVEY INFORMATION

FIELD NOTES		
NO.	BY	DATE
2017.017.1	HMCG	4/30/18

ENGINEER'S SEAL

FOR REVIEW

NO.	DATE	REMARKS Revisions	BY
		DESIGN	

Designed By	J.D.S.	Date 01-2023
Drawn By	J.Y.R.	Date 01-2023
Checked By	G.M.	Date 01-2023

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2021.026.2

CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

TITLE: INTERNATIONAL DISTRICT LIBRARY
SURGE POND
SECTIONS AND DETAILS

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
722596	K-19	13	13

File Name: P:\data\2021\2021.026.2\ENG\210262_DesignBase.dwg - SH 13 Plot Date: 1/23/23 Plot Time: 12:10

EXHIBIT D

```
*2345678901234567890
*
*   HMCG JOB NUMBER 2021.026.2
*   INTERNATIONAL DISTRICT LIBRARY SURGE POND
*
*   100 year, 6 hour storm
*
START              TIME = 0.0 HR  PUNCH CODE = 0  PRINT LINES = -1
*
*   RAINFALL DATA FROM NOAA Atlas 14, Volume 1, Version 5
*
RAINFALL           TYPE = 1  RAIN QUARTER = 0.0
                   RAIN ONE = 1.84 IN  RAIN SIX = 2.37 IN
                   RAIN DAY = 0 IN  DT = 0.03333
*
*   COMPUTE PROPOSED 100-YEAR PEAK RATE AND VOLUME OF RUNOFF
*
*   CENTRAL / DALLAS BASIN - 40.8 ACRES PER AMAFCA TECHNICAL MEMO 07/07/2022
*
*   COMMERCIAL AREA, USE 10% TREATMENT C AND 90% TREATMENT D PER DPM TABLE 6.2.10
*   USE MIN CONSERVATIVE TC 0.2 AND TP = 2/3 8 TC = 0.13333 HRS
*
COMPUTE NM HYD     ID = 1  HYD NO = CENTRAL  AREA = 0.06375 SQ MI
                   PER A = 0 PER B = 0 PER C = 10  PER D = 90
                   TP = -0.13333 HRS  MASS RAIN = -1
PRINT HYD          ID = 1  CODE = 1
*
*   ORIFICE PLATE AT PENNSYLVANIA WILL ALLOW 40 CFS TO PASS AND 20 CFS WILL
*   BE INTRODUCED AT INLETS BETWEEN PENN AND DALLAS RESULTING IN 60 CFS HEADED
*   NORTH IN DALLAS STORM DRAIN PER AMAFCA TECHNICAL MEMO 07/07/2022.
*
*   DIVIDE OUT FIRST 60 CFS FROM HYDROGRAPH
*
DIVIDE HYD         ID = 1  Q = 60  ID = 2  HYD NO = DALLAS.NORTH1
                      ID = 3  HYD NO = PENN.SOUTH
PRINT HYD          ID = 2  CODE = 1
*
*   ORIFICE PLATE AT DALLAS AND CHICO WILL ALLOW 14.3 CFS TO PASS TO NORTH
*   AND REMAINDER WILL SURGE TO THE WEST IN CHICO (AP-1)
*
*   DIVIDE OUT 14.3 CFS FROM DALLAS.NORTH
*
DIVIDE HYD         ID = 2  Q = 14.3 ID = 4  HYD NO = DALLAS.NORTH2
                      ID = 5  HYD NO = CHICO.WEST
PRINT HYD          ID = 4  CODE = 1
PRINT HYD          ID = 5  CODE = 1
*
*   CHICO / DALLAS BASIN - 45 ACRES
*
*   MIXTURE OF HIGH DENSITY RESIDENTIAL AND COMMERCIAL AREA.
*   USE 20% TREATMENT C AND 80% TREATMENT D BASED UPON OBSERVATIONS
*   USE MIN CONSERVATIVE TC 0.2 AND TP = 2/3 8 TC = 0.13333 HRS
*
```

```
COMPUTE NM HYD      ID = 6  HYD NO = CHICO  AREA = 0.070305 SQ MI
                 PER A = 0 PER B = 0 PER C = 20  PER D = 80
                 TP = -0.13333 HRS  MASS RAIN = -1
PRINT HYD           ID = 6  CODE = 1
*
*   2.51 AC-FT GOES TO POND FROM CHICO SURGE PIPE, POND HAS 5.02 AC-FT
*   CAPACITY, THEREFORE POND CAN ACCEPT AN ADDITIONAL 2.51 AC-FT FROM
*   THE CHICO BASIN
*   DIVIDE OUT PORTION OF CHICO BASIN TO POND INTERCEPTED BY CATTLE GUARD
*   AND TYPE "A" INLETS.
*
DIVIDE HYD          ID = 6  Q = 16.5 ID = 7  HYD NO = CHICO.POND
                       ID = 8  HYD NO = CHICO.WEST
PRINT HYD           ID = 7  CODE = 1
PRINT HYD           ID = 8  CODE = 1
*
FINISH
```

□(s16.66H□□□□□□□□□□□□□

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.02a, Rel: 02a RUN DATE (MON/DAY/YR) =01/28/2023

INPUT FILE = P:\data\2021\2021.026.2\ENG\Drainage Report\AHYMO\IDL POND.txt USER NO.= AHYMO-S4TempUser05901704

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= 0.00
RAINFALL TYPE= 1 NOAA 14										RAIN6= 2.370
COMPUTE NM HYD	CENTRAL	-	1	0.06375	175.65	6.842	2.01249	1.500	4.305	PER IMP= 90.00
DIVIDE HYD	DALLAS.NORTH	1	2	0.04495	60.00	4.825	2.01248	1.367	2.086	
	PENN.SOUTH	and	3	0.01880	115.65	2.018	2.01248	1.500	9.613	
DIVIDE HYD	DALLAS.NORTH	2	4	0.02153	14.30	2.311	2.01248	1.067	1.038	
	CHICO.WEST	and	5	0.02342	45.70	2.514	2.01248	1.367	3.049	
COMPUTE NM HYD	CHICO	-	6	0.07031	187.55	7.159	1.90933	1.533	4.168	PER IMP= 80.00
DIVIDE HYD	CHICO.POND	6	7	0.02465	16.50	2.510	1.90933	1.133	1.046	
	CHICO.WEST	and	8	0.04566	171.05	4.649	1.90933	1.533	5.854	
FINISH										

□(s10H□□□□□□□□□□□□□□□

```
(s16.66H

      AHYMO PROGRAM (AHYMO-S4)                     - Version: S4.02a - Rel: 02a
           RUN DATE (MON/DAY/YR) = 01/28/2023
           START TIME (HR:MIN:SEC) = 11:12:36     USER NO.= AHYMO-S4TempUser05901704
           INPUT FILE = P:\data\2021\2021.026.2\ENG\Drainage Report\AHYMO\IDL POND.txt

  *2345678901234567890
  *
  *   HMCG JOB NUMBER 2021.026.2
  *   INTERNATIONAL DISTRICT LIBRARY SURGE POND
  *
  *   100 year, 6 hour storm
  *
  START               TIME = 0.0 HR  PUNCH CODE = 0  PRINT LINES = -1
  *
  *   RAINFALL DATA FROM NOAA Atlas 14, Volume 1, Version 5
  *
  RAINFALL            TYPE = 1  RAIN QUARTER = 0.0
                      RAIN ONE = 1.84 IN  RAIN SIX = 2.37 IN
                      RAIN DAY = 0 IN  DT = 0.03333

               6-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
               DT =   0.033330 HOURS       END TIME =     5.999400 HOURS
                 0.0000  0.0024  0.0047  0.0072  0.0098  0.0124  0.0153
                 0.0182  0.0213  0.0245  0.0278  0.0352  0.0425  0.0502
                 0.0584  0.0665  0.0754  0.0843  0.0933  0.1026  0.1119
                 0.1216  0.1313  0.1415  0.1523  0.1630  0.1751  0.1872
                 0.2021  0.2199  0.2376  0.2613  0.2851  0.3136  0.3468
                 0.3801  0.4300  0.4799  0.5478  0.6340  0.7202  0.9493
                 1.1790  1.3579  1.4851  1.6124  1.6767  1.7406  1.7929
                 1.8332  1.8734  1.9014  1.9294  1.9536  1.9740  1.9945
                 2.0100  2.0255  2.0389  2.0503  2.0617  2.0719  2.0821
                 2.0915  2.1000  2.1085  2.1163  2.1242  2.1319  2.1395
                 2.1471  2.1506  2.1542  2.1576  2.1610  2.1645  2.1676
                 2.1708  2.1739  2.1770  2.1801  2.1831  2.1861  2.1890
                 2.1918  2.1946  2.1974  2.2001  2.2028  2.2055  2.2081
                 2.2106  2.2132  2.2157  2.2181  2.2206  2.2230  2.2254
                 2.2278  2.2301  2.2324  2.2346  2.2369  2.2391  2.2413
                 2.2435  2.2456  2.2478  2.2499  2.2520  2.2541  2.2562
                 2.2583  2.2603  2.2623  2.2643  2.2663  2.2683  2.2703
                 2.2722  2.2742  2.2761  2.2780  2.2799  2.2818  2.2836
                 2.2855  2.2873  2.2892  2.2910  2.2928  2.2946  2.2963
                 2.2981  2.2998  2.3016  2.3033  2.3050  2.3067  2.3084
                 2.3101  2.3118  2.3135  2.3151  2.3168  2.3184  2.3200
                 2.3216  2.3232  2.3248  2.3264  2.3280  2.3295  2.3311
                 2.3326  2.3342  2.3357  2.3372  2.3387  2.3402  2.3417
                 2.3432  2.3447  2.3462  2.3476  2.3491  2.3505  2.3520
                 2.3534  2.3548  2.3562  2.3576  2.3590  2.3604  2.3618
                 2.3632  2.3646  2.3659  2.3673  2.3686  2.3700

  *
  *   COMPUTE PROPOSED 100-YEAR PEAK RATE AND VOLUME OF RUNOFF
  *
  *   CENTRAL / DALLAS BASIN - 40.8 ACRES PER AMAFCA TECHNICAL MEMO 07/07/2022
  *
  *   COMMERCIAL AREA, USE 10% TREATMENT C AND 90% TREATMENT D PER DPM TABLE 6.2.1
  *   USE MIN CONSERVATIVE TC 0.2 AND TP = 2/3 8 TC = 0.13333 HRS
  *
  COMPUTE NM HYD      ID = 1  HYD NO = CENTRAL  AREA = 0.06375 SQ MI
                      PER A = 0 PER B = 0 PER C = 10  PER D = 90
                      TP = -0.13333 HRS  MASS RAIN = -1

       K =  0.072688HR    TP =  0.133330HR    K/TP RATIO =  0.545171     SHAPE CONSTANT, N =  7.103576
       UNIT PEAK =   226.41    CFS   UNIT VOLUME =   0.9993       B =   526.14      P60 = 1.8400
       AREA =     0.057375 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
       RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


       K =  0.105550HR    TP =  0.133330HR    K/TP RATIO =  0.791644     SHAPE CONSTANT, N =  4.530964
       UNIT PEAK =   18.606    CFS   UNIT VOLUME =   0.9997       B =   389.14      P60 = 1.8400
       AREA =     0.006375 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
       RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

  PRINT HYD           ID = 1  CODE = 1

                                            HYDROGRAPH FROM AREA CENTRAL
```

```
    RUNOFF VOLUME =     2.01249 INCHES     =       6.8424 ACRE-FEET
    PEAK DISCHARGE RATE =     175.65 CFS  AT   1.500 HOURS   BASIN AREA =  0.0638 SQ. MI.



*
*   ORIFICE PLATE AT PENNSYLVANIA WILL ALLOW 40 CFS TO PASS AND 20 CFS WILL
*   BE INTRODUCED AT INLETS BETWEEN PENN AND DALLAS RESULTING IN 60 CFS HEADED
*   NORTH IN DALLAS STORM DRAIN PER AMAFCA TECHNICAL MEMO 07/07/2022.
*
*   DIVIDE OUT FIRST 60 CFS FROM HYDROGRAPH
*
DIVIDE HYD          ID = 1  Q = 60  ID = 2  HYD NO = DALLAS.NORTH1
                                    ID = 3  HYD NO = PENN.SOUTH
PRINT HYD           ID = 2  CODE = 1

                                         HYDROGRAPH FROM AREA DALLAS.NORTH1


    RUNOFF VOLUME =     2.01248 INCHES     =       4.8248 ACRE-FEET
    PEAK DISCHARGE RATE =      60.00 CFS  AT   1.367 HOURS   BASIN AREA =  0.0450 SQ. MI.



*
*   ORIFICE PLATE AT DALLAS AND CHICO WILL ALLOW 14.3 CFS TO PASS TO NORTH
*   AND REMAINDER WILL SURGE TO THE WEST IN CHICO (AP-1)
*
*   DIVIDE OUT 14.3 CFS FROM DALLAS.NORTH
*
DIVIDE HYD          ID = 2  Q = 14.3 ID = 4  HYD NO = DALLAS.NORTH2
                                     ID = 5  HYD NO = CHICO.WEST
PRINT HYD           ID = 4  CODE = 1

                                         HYDROGRAPH FROM AREA DALLAS.NORTH2


    RUNOFF VOLUME =     2.01248 INCHES     =       2.3109 ACRE-FEET
    PEAK DISCHARGE RATE =      14.30 CFS  AT   1.067 HOURS   BASIN AREA =  0.0215 SQ. MI.



PRINT HYD           ID = 5  CODE = 1

                                         HYDROGRAPH FROM AREA CHICO.WEST


    RUNOFF VOLUME =     2.01248 INCHES     =       2.5139 ACRE-FEET
    PEAK DISCHARGE RATE =      45.70 CFS  AT   1.367 HOURS   BASIN AREA =  0.0234 SQ. MI.



*
*   CHICO / DALLAS BASIN - 45 ACRES
*
*   MIXTURE OF HIGH DENSITY RESIDENTIAL AND COMMERCIAL AREA.
*   USE 20% TREATMENT C AND 80% TREATMENT D BASED UPON OBSERVATIONS
*   USE MIN CONSERVATIVE TC 0.2 AND TP = 2/3 8 TC = 0.13333 HRS
*
COMPUTE NM HYD      ID = 6  HYD NO = CHICO  AREA = 0.070305 SQ MI
                    PER A = 0 PER B = 0 PER C = 20  PER D = 80
                    TP = -0.13333 HRS  MASS RAIN = -1

     K =  0.072807HR    TP =  0.133330HR    K/TP RATIO =  0.546066     SHAPE CONSTANT, N =  7.088655
     UNIT PEAK =   221.65    CFS   UNIT VOLUME =    0.9993       B =   525.44      P60 = 1.8400
     AREA =     0.056244 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.105538HR    TP =  0.133330HR    K/TP RATIO =  0.791556     SHAPE CONSTANT, N =  4.531529
     UNIT PEAK =   41.043    CFS   UNIT VOLUME =    1.000        B =   389.18      P60 = 1.8400
     AREA =     0.014061 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID = 6  CODE = 1

                                         HYDROGRAPH FROM AREA CHICO
```

```
    RUNOFF VOLUME =     1.90933 INCHES     =       7.1592 ACRE-FEET
    PEAK DISCHARGE RATE =     187.55 CFS  AT   1.533 HOURS   BASIN AREA =  0.0703 SQ. MI.



*
*   2.51 AC-FT GOES TO POND FROM CHICO SURGE PIPE, POND HAS 5.02 AC-FT
*   CAPACITY, THEREFORE POND CAN ACCEPT AN ADDITIONAL 2.51 AC-FT FROM
*   THE CHICO BASIN
*   DIVIDE OUT PORTION OF CHICO BASIN TO POND INTERCEPTED BY CATTLE GUARD
*   AND TYPE "A" INLETS.
*
DIVIDE HYD          ID = 6  Q = 16.5 ID = 7  HYD NO = CHICO.POND
                                     ID = 8  HYD NO = CHICO.WEST
PRINT HYD           ID = 7  CODE = 1

                                         HYDROGRAPH FROM AREA CHICO.POND


    RUNOFF VOLUME =     1.90933 INCHES     =       2.5098 ACRE-FEET
    PEAK DISCHARGE RATE =      16.50 CFS  AT   1.133 HOURS   BASIN AREA =  0.0246 SQ. MI.



PRINT HYD           ID = 8  CODE = 1

                                         HYDROGRAPH FROM AREA CHICO.WEST


    RUNOFF VOLUME =     1.90933 INCHES     =       4.6493 ACRE-FEET
    PEAK DISCHARGE RATE =     171.05 CFS  AT   1.533 HOURS   BASIN AREA =  0.0457 SQ. MI.



*
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 11:12:36
```
□(s10H□□□□□□□□□□□□□□

NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, USA*
Latitude: 35.0737°, Longitude: -106.5559°
Elevation: 5375.74 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.178 (0.153-0.209)	0.231 (0.198-0.270)	0.310 (0.264-0.362)	0.370 (0.315-0.431)	0.453 (0.384-0.527)	0.517 (0.436-0.602)	0.585 (0.489-0.680)	0.656 (0.545-0.762)	0.751 (0.619-0.875)	0.828 (0.678-0.964)
10-min	0.272 (0.233-0.317)	0.351 (0.301-0.411)	0.471 (0.402-0.550)	0.563 (0.479-0.656)	0.689 (0.584-0.802)	0.787 (0.663-0.916)	0.891 (0.744-1.03)	0.998 (0.829-1.16)	1.14 (0.941-1.33)	1.26 (1.03-1.47)
15-min	0.337 (0.289-0.393)	0.436 (0.373-0.509)	0.584 (0.498-0.683)	0.698 (0.593-0.814)	0.854 (0.724-0.994)	0.975 (0.822-1.14)	1.10 (0.923-1.28)	1.24 (1.03-1.44)	1.42 (1.17-1.65)	1.56 (1.28-1.82)
30-min	0.453 (0.389-0.529)	0.587 (0.502-0.686)	0.786 (0.671-0.919)	0.940 (0.799-1.10)	1.15 (0.974-1.34)	1.31 (1.11-1.53)	1.49 (1.24-1.73)	1.67 (1.39-1.94)	1.91 (1.57-2.22)	2.10 (1.72-2.45)
60-min	0.561 (0.481-0.655)	0.726 (0.621-0.848)	0.973 (0.830-1.14)	1.16 (0.989-1.36)	1.42 (1.21-1.66)	1.63 (1.37-1.89)	1.84 (1.54-2.14)	2.06 (1.71-2.40)	2.36 (1.95-2.75)	2.60 (2.13-3.03)
2-hr	0.653 (0.554-0.784)	0.836 (0.709-1.00)	1.11 (0.936-1.33)	1.32 (1.11-1.58)	1.62 (1.35-1.93)	1.86 (1.55-2.21)	2.11 (1.74-2.51)	2.38 (1.95-2.81)	2.75 (2.23-3.25)	3.05 (2.45-3.62)
3-hr	0.695 (0.594-0.829)	0.883 (0.753-1.05)	1.16 (0.986-1.38)	1.37 (1.16-1.63)	1.67 (1.41-1.98)	1.92 (1.61-2.27)	2.17 (1.81-2.57)	2.44 (2.02-2.89)	2.82 (2.31-3.33)	3.13 (2.53-3.70)
6-hr	0.809 (0.696-0.959)	1.02 (0.877-1.21)	1.31 (1.13-1.55)	1.54 (1.32-1.82)	1.86 (1.58-2.19)	2.10 (1.78-2.47)	2.37 (1.99-2.78)	2.63 (2.21-3.09)	3.00 (2.49-3.53)	3.31 (2.72-3.88)
12-hr	0.897 (0.780-1.03)	1.13 (0.985-1.31)	1.43 (1.24-1.65)	1.67 (1.44-1.92)	1.99 (1.72-2.29)	2.24 (1.92-2.57)	2.50 (2.13-2.86)	2.76 (2.34-3.17)	3.12 (2.62-3.59)	3.41 (2.84-3.93)
24-hr	1.03 (0.911-1.18)	1.29 (1.14-1.47)	1.62 (1.43-1.84)	1.88 (1.65-2.13)	2.23 (1.95-2.53)	2.50 (2.18-2.83)	2.78 (2.42-3.15)	3.06 (2.65-3.47)	3.44 (2.96-3.90)	3.75 (3.20-4.24)
2-day	1.09 (0.964-1.23)	1.37 (1.21-1.54)	1.71 (1.51-1.93)	1.98 (1.75-2.23)	2.34 (2.06-2.64)	2.62 (2.30-2.95)	2.91 (2.55-3.28)	3.21 (2.79-3.62)	3.60 (3.12-4.07)	3.91 (3.37-4.42)
3-day	1.19 (1.07-1.31)	1.48 (1.33-1.64)	1.83 (1.65-2.03)	2.11 (1.90-2.34)	2.49 (2.23-2.75)	2.77 (2.48-3.07)	3.07 (2.74-3.40)	3.37 (2.99-3.73)	3.76 (3.33-4.18)	4.07 (3.58-4.52)
4-day	1.28 (1.17-1.40)	1.59 (1.45-1.74)	1.95 (1.78-2.13)	2.24 (2.05-2.44)	2.63 (2.40-2.87)	2.93 (2.66-3.19)	3.23 (2.92-3.52)	3.53 (3.19-3.84)	3.92 (3.53-4.28)	4.23 (3.79-4.62)
7-day	1.47 (1.34-1.59)	1.82 (1.67-1.98)	2.22 (2.04-2.41)	2.53 (2.32-2.75)	2.95 (2.70-3.19)	3.26 (2.97-3.53)	3.57 (3.25-3.86)	3.87 (3.52-4.19)	4.26 (3.86-4.62)	4.55 (4.11-4.95)
10-day	1.62 (1.49-1.76)	2.01 (1.85-2.19)	2.47 (2.28-2.68)	2.83 (2.61-3.06)	3.30 (3.03-3.57)	3.66 (3.35-3.96)	4.02 (3.67-4.35)	4.38 (3.99-4.73)	4.84 (4.39-5.25)	5.19 (4.68-5.63)
20-day	2.06 (1.89-2.24)	2.56 (2.35-2.78)	3.11 (2.86-3.38)	3.53 (3.24-3.82)	4.06 (3.73-4.40)	4.45 (4.08-4.82)	4.83 (4.41-5.22)	5.19 (4.73-5.61)	5.64 (5.13-6.11)	5.96 (5.41-6.47)
30-day	2.47 (2.27-2.67)	3.07 (2.82-3.31)	3.70 (3.40-3.99)	4.17 (3.83-4.50)	4.75 (4.36-5.12)	5.17 (4.74-5.57)	5.57 (5.10-6.00)	5.95 (5.44-6.41)	6.41 (5.84-6.91)	6.74 (6.13-7.27)
45-day	3.02 (2.79-3.26)	3.74 (3.45-4.03)	4.46 (4.12-4.81)	4.98 (4.60-5.36)	5.61 (5.18-6.04)	6.05 (5.58-6.52)	6.45 (5.95-6.95)	6.81 (6.27-7.34)	7.23 (6.65-7.79)	7.50 (6.90-8.08)
60-day	3.47 (3.21-3.76)	4.30 (3.98-4.65)	5.14 (4.76-5.55)	5.74 (5.31-6.19)	6.46 (5.97-6.97)	6.96 (6.43-7.51)	7.42 (6.85-8.01)	7.83 (7.24-8.47)	8.32 (7.68-9.00)	8.63 (7.97-9.34)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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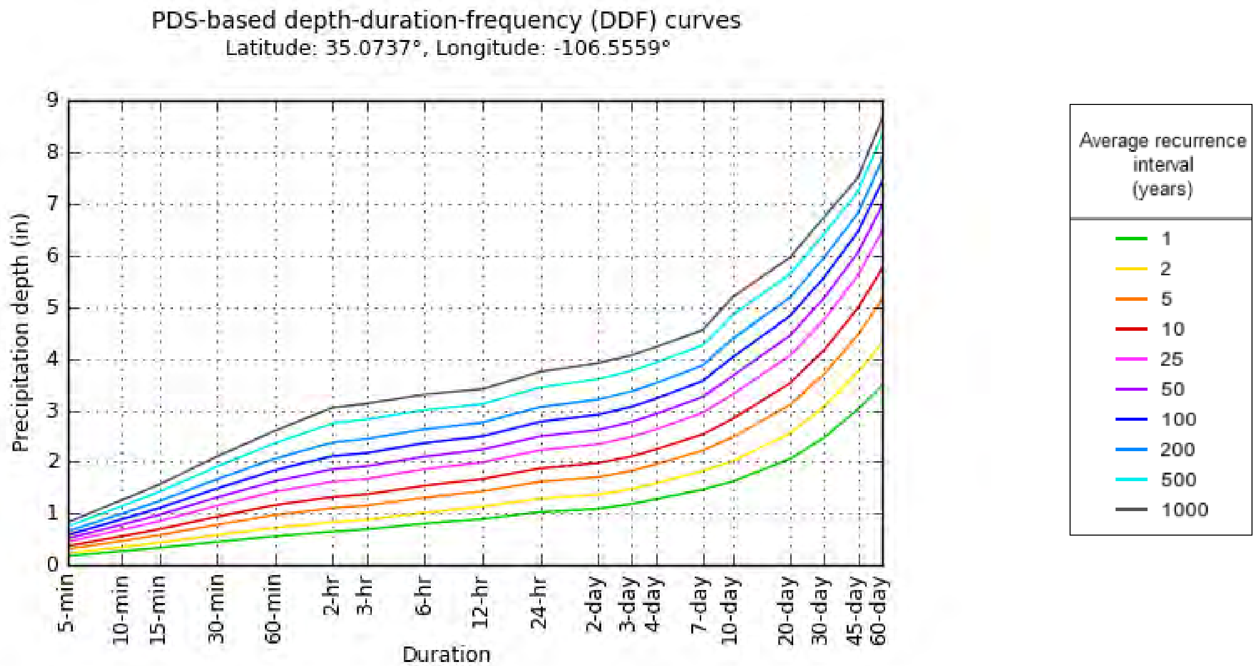
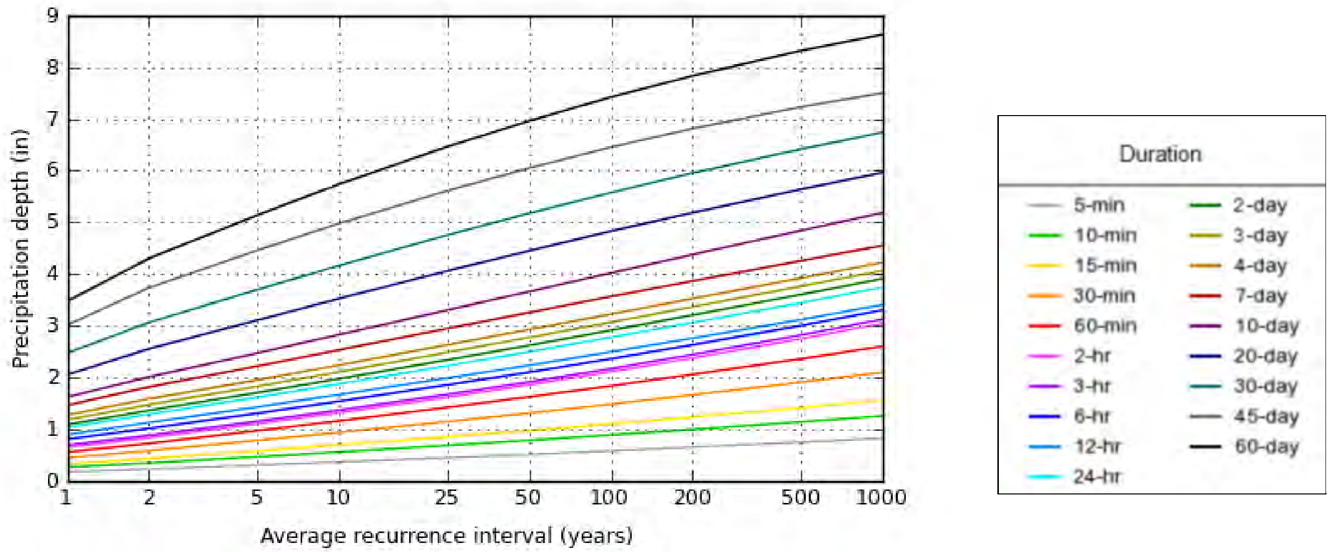
PF graphical





NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Sat Jan 28 17:11:29 2023

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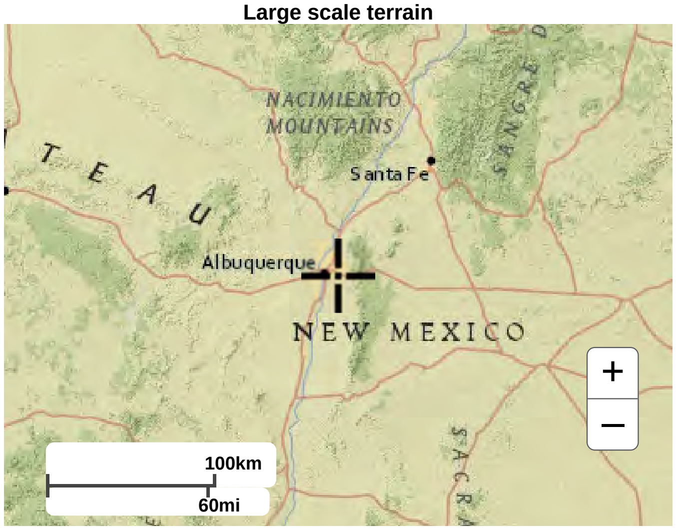
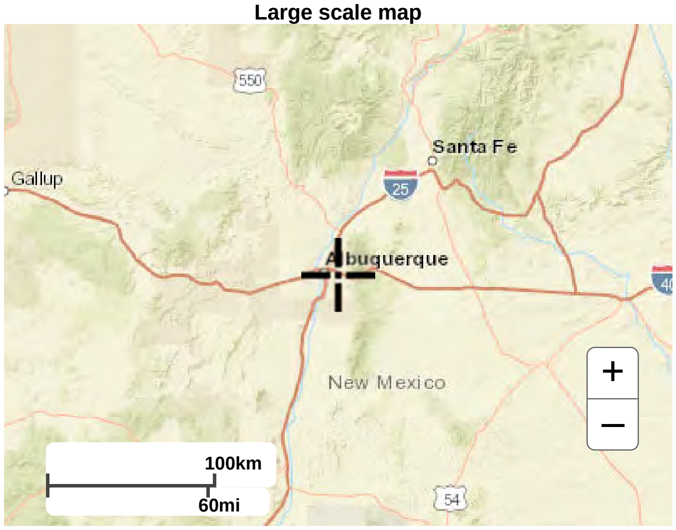
Maps & aerials

Small scale terrain

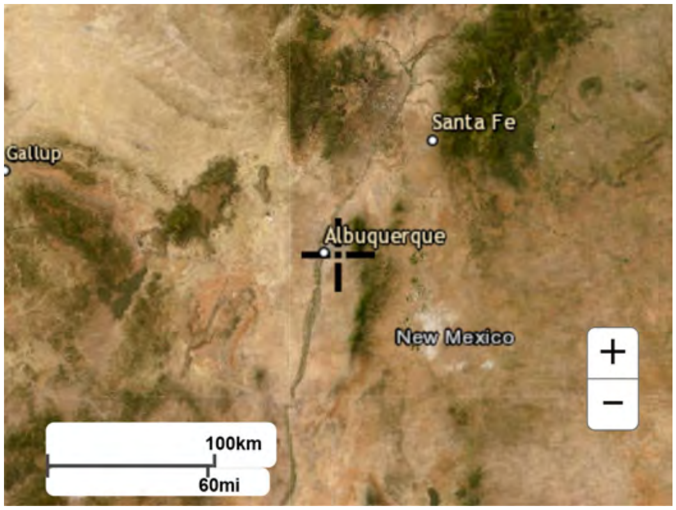
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
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Silver Spring, MD 20910
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Disclaimer

EXHIBIT E

Worksheet
Worksheet for Pressure Pipe

Project Description	
Worksheet	AP-1 to AP-2 - SDMH 4 RIM to SDMI
Flow Element	Pressure Pipe
Method	Manning's Formula
Solve For	Discharge

Input Data		
Pressure at 1	6.33	psi
Pressure at 2	4.42	psi
Elevation at 1	42.60	ft
Elevation at 2	43.30	ft
Length	!95.00	ft
Mannings Coeffic	0.013	
Diameter	36	in

Results		
Discharge	74.75	cfs
Headloss	3.71	ft
Energy Grade at	58.94	ft
Energy Grade at	55.23	ft
Hydraulic Grade ;	57.20	ft
Hydraulic Grade ;	53.50	ft
Flow Area	7.1	ft²
Wetted Perimetei	9.42	ft
Velocity	10.57	ft/s
Velocity Head	1.74	ft
Friction Slope	012561	ft/ft

Worksheet
Worksheet for Pressure Pipe

Project Description	
Worksheet	AP-2 to AP-3 - Lower Pipe - SDMH 1 RIM to CC
Flow Element	Pressure Pipe
Method	Manning's Formula
Solve For	Discharge

Input Data		
Pressure at 1	4.40	psi
Pressure at 2	2.82	psi
Elevation at 1	43.35	ft
Elevation at 2	43.70	ft
Length	:10.00	ft
Mannings Coeffic	0.013	
Diameter	24	in

Results		
Discharge	28.33	cfs
Headloss	3.29	ft
Energy Grade at	54.76	ft
Energy Grade at	51.47	ft
Hydraulic Grade a	53.50	ft
Hydraulic Grade a	50.20	ft
Flow Area	3.1	ft²
Wetted Perimeter	6.28	ft
Velocity	9.02	ft/s
Velocity Head	1.26	ft
Friction Slope	015688	ft/ft

Worksheet
Worksheet for Pressure Pipe

Project Description	
Worksheet	AP-2 to AP-3 Upper Pipe - SDMH 1 RIM to CG
Flow Element	Pressure Pipe
Method	Manning's Formula
Solve For	Discharge

Input Data		
Pressure at 1	2.17	psi
Pressure at 2	1.39	psi
Elevation at 1	48.50	ft
Elevation at 2	47.00	ft
Length	:10.00	ft
Mannings Coeffic	0.013	
Diameter	24	in

Results		
Discharge	28.35	cfs
Headloss	3.30	ft
Energy Grade at	54.77	ft
Energy Grade at	51.47	ft
Hydraulic Grade ;	53.51	ft
Hydraulic Grade ;	50.21	ft
Flow Area	3.1	ft²
Wetted Perimeter	6.28	ft
Velocity	9.03	ft/s
Velocity Head	1.27	ft
Friction Slope	015710	ft/ft

Worksheet
Worksheet for Pressure Pipe

Project Description	
Worksheet	AP-3 to Pond - CG 50.2 - Pond Empty 43.C
Flow Element	Pressure Pipe
Method	Manning's Formula
Solve For	Discharge

Input Data		
Pressure at 1	3.12	psi
Pressure at 2	0.00	psi
Elevation at 1	43.00	ft
Elevation at 2	43.00	ft
Length	50.00	ft
Mannings Coeffic	0.013	
Diameter	36	in

Results		
Discharge	146.09	cfs
Headloss	7.20	ft
Energy Grade at	56.83	ft
Energy Grade at	49.64	ft
Hydraulic Grade a	50.20	ft
Hydraulic Grade a	43.00	ft
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Velocity	20.67	ft/s
Velocity Head	6.64	ft
Friction Slope	047977	ft/ft

Worksheet
Worksheet for Pressure Pipe

Project Description	
Worksheet	AP-3 to Pond - CG 50.2 - Pond at 49 - La
Flow Element	Pressure Pipe
Method	Manning's Formula
Solve For	Discharge

Input Data		
Pressure at 1	3.12	psi
Pressure at 2	0.00	psi
Elevation at 1	43.00	ft
Elevation at 2	49.00	ft
Length	50.00	ft
Mannings Coeffic	0.013	
Diameter	36	in

Results		
Discharge	59.57	cfs
Headloss	1.20	ft
Energy Grade at	51.30	ft
Energy Grade at	50.10	ft
Hydraulic Grade a	50.20	ft
Hydraulic Grade a	49.00	ft
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Velocity	8.43	ft/s
Velocity Head	1.10	ft
Friction Slope	007977	ft/ft