

CITY OF ALBUQUERQUE

Planning Department
David Campbell, Director



Mayor Timothy M. Keller

May 22, 2019

Scott Eddings, P.E.
Huitt-Zollars
333 Rio Rancho Blvd., Suite 101
Rio Rancho, NM 87124

RE: **Winrock Road Town Center**
2100 Louisiana Blvd NE
Drainage Master Plan- Drainage Implementation Plan
Engineer's Stamp Date: 5/16/19
Hydrology File: J19D058

Dear Mr. Eddings:

PO Box 1293
Albuquerque
NM 87103
www.cabq.gov

Based on submittal received on 5/17/19, the Drainage Implementation Plan cannot be approved for Site Plan for Building Permit until the following are corrected:

1. Exhibits 1-8 minor remarks:
 - a. The existing (Pre-DMP) pipes should all be RCP, not HPPP; this will affect the friction slope.
 - b. On Exhibit 2, pipe 2 appears to be mislabeled in plain view.
 - c. On Exhibit 3,
 - i. pipe 12 is called out as 36" in profile, but is 24" in the table;
 - ii. pipe 18 is called out as 36" in profile, but is 24" in the table;
 - iii. pipe 16 Q is 14.3cfs, but is shown as 22cfs on the exhibit 1 table.
 - d. On Exhibit 4,
 - i. pipe 6 is called out as 48" in profile and on the exhibit 1 table, but is 36" in the table;
 - ii. pipe 6 Q is shown as 24cfs on the table, but is shown as 51cfs on the exhibit 1 table.
 - e. On Exhibit 5, pipe 7a-7e are called out as 30" in profile, but are 24" in the table and 42-30" on the exhibit 1 table
 - f. On Exhibit 6, pipe 6 is called out as 30" in profile and 30" on the exhibit 1 table, but is 24" in the table.
 - g. On Exhibit 7, pipe 8 is called out as 30" in profile, but is 36" in the table and 36" on the exhibit 1 table
 - h. On Exhibit 8, the table and profile and table on Exhibit 1 don't match:
 - i. pipe sizes are inconsistent between the table and profile and the exhibit 1 table;
 - ii. pipe type is shown as HPPP (isn't it RCP here?);
 - iii. manhole labels in the table are inconstant with the profile and exhibit 1 profile

CITY OF ALBUQUERQUE

Planning Department
David Campbell, Director



Mayor Timothy M. Keller

2. Because these corrections are minor, the administrative resubmittal fee of \$40 may be used. Please include a copy of this letter when resubmitting in order to receive the reduced fee.
3. For Information. Include Exhibit 1 in the DRB Master Site Plan. Please check that the phases match the Architect's phases. The remaining exhibits (2-8) can remain in the DIP, so long as the master summary table is provided on Exhibit 1.
4. For Information. Prior to Work Order for each phase, a detailed drainage report will be required to detail many of the hydraulics shown in the DIP as well as address all grading and drainage criteria per the DPM, such as storm water quality and surface flow hydraulics.

If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov



City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Winrock Town Center - DMP

Project Title: Drainage Improvement Plan Building Permit #: _____ Hydrology File #: J19D058G

DRB#: 2018-001579 EPC#: _____ Work Order#: 4553.90

Legal Description: A-1-A-1-A-1 Winrock Town Center

City Address: 2100 Louisiana Blvd NE

Applicant: Winrock Partners LLC Contact: Darin Sand

Address: 100 Sun Avenue

Phone#: 505-881-0100 Fax#: _____ E-mail: seddings@huitt-zollars.com

Other Contact: Huitt-Zollars, Inc. Contact: Scott Eddings

Address: 333 Rio Rancho Blvd, Rio Rancho, NM 87124

Phone#: 505-235-7211 Fax#: _____ E-mail: seddings@huitt-zollars.com

TYPE OF DEVELOPMENT: _____ PLAT (# of lots) _____ RESIDENCE ☒ DRB SITE _____ ADMIN SITE

IS THIS A RESUBMITTAL? ☒ Yes _____ No

DEPARTMENT _____ TRANSPORTATION ☒ HYDROLOGY/DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

- ☐ ENGINEER/ARCHITECT CERTIFICATION
- ☐ PAD CERTIFICATION
- ☐ CONCEPTUAL G & D PLAN
- ☐ GRADING PLAN
- ☒ DRAINAGE REPORT
- ☐ DRAINAGE MASTER PLAN
- ☐ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
- ☐ ELEVATION CERTIFICATE
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ TRAFFIC IMPACT STUDY (TIS)
- ☐ STREET LIGHT LAYOUT
- ☐ OTHER (SPECIFY) _____
- ☐ PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY
- ☐ 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
- ☐ WORK ORDER APPROVAL
- ☐ CLOMR/LOMR
- ☐ FLOODPLAIN DEVELOPMENT PERMIT
- ☐ OTHER (SPECIFY) _____

DATE SUBMITTED: May 16, 2019 By: Scott Eddings

COA STAFF:

ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

May 17, 2019

Mr. Dana Peterson, P.E.
Development Review Services
PO Box 1293
Albuquerque, NM 87103

RE: Winrock Town Center Drainage Implementation Plan
Hydrology File: J19D058

Dear Mr. Peterson,

We are requesting approval of the Drainage Implementation Plan for Winrock Town Center. The Drainage Implementation Plan is attached and has been revised according to comments received.

Below is a list of your comments received on May 7th which are included in *italics* and our responses in **bold** text.

1. *Under Qualifications and Disclaimers, remove or revise the statement that the 2015 DMP governs. Once approved, this DIP will be the governing document. Errors uncovered in the 2015 report mean the hydraulic calculations can no longer be used and this DIP will need to be used as the best available information.*

We have corrected the statement and the DIP will govern regarding the hydraulic design.

2. *Hydraulic calculations need to be made along the Energy Grade Line per the DPM, using Bernoulli's Equation. In several locations in your pipe network, the EGL increases in the downstream direction (notably at junctions), indicating that energy losses are not applied correctly. Programs proven to use Bernoulli's Equation include WSPGW, HydroCAD, and Stormwater Studio. The HEC-22 3rd Edition calculations agree with the DPM but the earlier editions do not use Bernoulli's correctly and that may be the problem here.*

We have corrected the StormCAD hydraulic model to utilize HEC-22 Energy Third Edition methodology at junctions. (AASHTO headloss method was used previously). A statement in the "Qualifications and Disclaimers" section was added regarding the program used to model the hydraulic system. The HGL, EGL, and output tables have been updated in Exhibits 2-8.

3. *Exhibits 2-7 minor remarks:*

- a. *Please label the manholes in plan view and label the pipes in profile view.*
- b. *On Exhibit 2, Pipe 2 appears to be mislabeled in plan view.*
- c. *Exhibit 4, the profile for AP-B 400 is cropped.*
- d. *Storm drain profile/model for AP-A is missing.*

The exhibits have been corrected and updated.

4. *In the output tables, relabel the "Flow" column as "Allowable Flow" or similar. Or remove the "Capacity" column. It needs to be clear that the allowable flow to each pipe is established by the hydraulic model (not Manning's).*

The output tables have been corrected and updated.

5. *Include Exhibit 1 in the DRB Master Site Plan. Please check that the phases match the Architect's phases. The remaining exhibits (2-7) can remain in the DIP, so long as the master summary table is provided on Exhibit 1.*

Exhibit 1 will be included in the DRB Master Site Plan. The DRB Master Site Plan has been coordinated with the Architect's plan.

6. *Site Hydrology needs to reference the 2015 DMP, as this DIP is accepting it as-is.*
A statement in the "Executive Summary" section has been added regarding site hydrology.

7. *Only one paper copy of the submittal is required.*
One paper copy of the revised DIP is included.

8. *Prior to Work Order for each phase, a detailed drainage report will be required to detail many of the hydraulics shown in the DIP as well as address all grading and drainage criteria per the DPM, such as storm water quality and surface flow hydraulics.*

A statement regarding this requirement has been added to the "Infrastructure Requirements by Phase" section.

We greatly appreciate your time and consideration. Please contact me if you have any questions.

Sincerely,



Scott Eddings, P.E.

WINROCK TOWN CENTER DRAINAGE IMPLEMENTATION PLAN

Prepared For



Project Location:

Albuquerque, New Mexico

MAY 2019



Prepared By

HUITT-ZOLLARS

ENGINEERING ARCHITECTURE CONSTRUCTION MANAGEMENT SURVEY

6501 Americas Parkway, NE, Suite 830
Albuquerque, NM 87110
(505) 883-8114, Fax (505) 883-5022
www.huitt-zollars.com



**WINROCK TOWN CENTER
DRAINAGE IMPLEMENTATION PLAN**

**CITY OF ALBUQUERQUE
PROJECT NO. 4553.90**

PREPARED FOR:



PREPARED BY:

HUITT-ZOLIARS
333 RIO RANCHO BLVD., SUITE 101
RIO RANCHO, NEW MEXICO 87124

MAY 2019

HZI Project No. R303699.04



WINROCK TOWN CENTER DRAINAGE IMPLEMENTATION PLAN

I, Scott A. Eddings, being first duly sworn upon my oath, state that I am a registered professional engineer, qualified in civil engineering and that the accompanying report was prepared by me or under my supervision and is true and correct to the best of my knowledge and belief.





Purpose.....	1
Executive Summary	1
Qualification & Disclaimers	1
Special Conditions	2
Infrastructure Requirements by Phase	2
Ownership & Maintenance Responsibilities	2

EXHIBITS

Exhibit 1 – Basin Map and Ultimate Storm Drain Network.....	3
Exhibit 2 – Storm Drain AP-B 100	3
Exhibit 3 – Storm Drain AP-B 200 & 201	3
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Exhibit 8 – Storm Drain AP-A 100.....	3



PURPOSE

The purpose of this Drainage Implementation Plan is to: 1) Provide an overall map of the proposed drainage improvements for Winrock Town Center, 2) Identify the specific components of the drainage improvements, 3) Relate individual development tracts to associated drainage improvements, and 4) Identify the proposed drainage flows at major analysis points.

This Drainage Implementation Plan presents a summary for the “Drainage Master Plan for Winrock Town Center” to facilitate planning and implementation of required storm drainage infrastructure for the development of this project.

This Drainage Implementation Plan is intended to define the overall plan for construction and implementation of drainage improvements, while the “Drainage Master Plan for Winrock Town Center” provides the design requirements for those improvements.

EXECUTIVE SUMMARY

The “Drainage Master Plan for Winrock Town Center” was completed by Isaacson & Arfman, PA with a final revision date of June 26, 2015. The purpose of the Drainage Master Plan was to provide analysis and a drainage framework for Winrock Town Center. All hydrology calculations were completed for the 100-year, 6-hour storm. The Drainage Master Plan defines allowable peak flowrates at major analysis points as shown on Exhibit 1. Site hydrology calculations from the Drainage Master Plan are accepted as-is for use in this Drainage Implementation Plan.

QUALIFICATION & DISCLAIMERS

The calculations and designs in the Drainage Master Plan provides adequate detail to ensure that the overall drainage system is sufficient to safely convey the 100-year storm event. Design of these drainage systems should be considered 50% complete for construction purposes, however, the detail required for construction is not presented in the Drainage Master Plan. Final hydraulic design calculations must be provided for all storm drainage improvements at the time of final engineering design.

This Drainage Implementation Plan utilizes Bentley StormCAD V8i for the hydraulic modeling of the storm drain pipe system. For headloss calculations at junctions, the HEC-22 Energy Method (Third Edition) was chosen to comply with City of Albuquerque DPM requirements.

Upon City of Albuquerque approval of this document, this Drainage Implementation Plan shall be the basis of hydraulic design of future improvement projects in Winrock Town Center.



SPECIAL CONDITIONS

Portions of the storm drain network have changed since the Drainage Master Plan was completed. The proposed changes will be implemented without altering the peak flowrates at the major analysis points. Please refer to Exhibit 2 through Exhibit 8 for detailed information regarding the updated storm drain network.

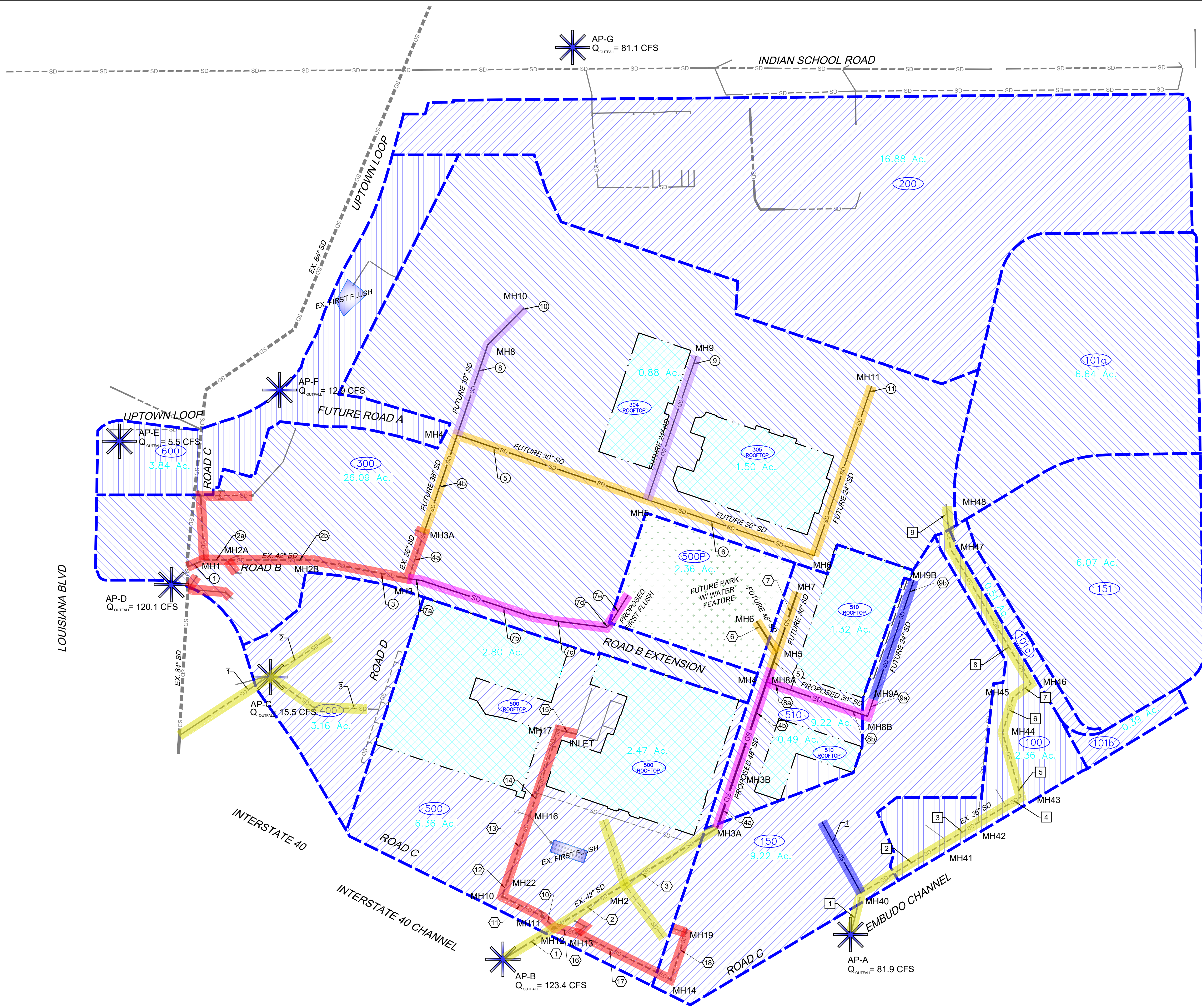
INFRASTRUCTURE REQUIREMENTS BY PHASE

The storm drain systems presented in the Drainage Master Plan are intended to provide overall site storm water management and storm water quality control. The development of each phase will require final design of the onsite drainage system to convey flows to major analysis points. Prior to Work Order for each phase, a detailed drainage report will be required to detail the hydraulics shown in this Drainage Implementation Plan, as well as address all grading and drainage criteria per the City of Albuquerque DPM, such as storm water quality and surface flow hydraulics. Please refer to Exhibit 1 for phasing of the proposed storm drain network.

OWNERSHIP & MAINTENANCE RESPONSIBILITIES

This drainage system, in its entirety, shall be dedicated to the City of Albuquerque. Maintenance of the system will be the responsibility of the developer as part of the TIDD agreement and defined by the TIDD infrastructure MOU.

Plotted: 5/17/2019 10:49:25 AM By: Edging, Scott
H:\proj\RS330999_04 - Phase C Road B Extension TDD05 Design\05 - 2 Drainage\Exhibit\Drainage Exhibit 1.dwg
User: Scott Edging 5/17/2019 10:50:30 AM



BASIN	STORM DRAIN NO.	PIPE DIAMETER (in)	FLOW RATE (cfs)	CONSTRUCTION PHASE
150	1	24	10	E
100	1	36	82	PRE- DMP
100	2	36	71	PRE- DMP
100	3	36	71	PRE- DMP
100	4	36	51	PRE- DMP
100	5	36	51	PRE- DMP
100	6	36	51	PRE- DMP
100	7	36	51	PRE- DMP
100	8	36	49	PRE- DMP
100	9	24	30	PRE- DMP
300	1	42	120	A
300	2	42	113	A
300	3	42	94	A
300	4 a-b	36	70	A
300	5	30	28	C
300	6	30	14	C
300	7 a-e	24-30	24	B
300	8	36	42	C
300	9	24	14	D
300	10	24	18	D
300	11	24	14	D
400	1	24	15	PRE- DMP
400	2	18	7	PRE- DMP
400	3	18	8	PRE- DMP
500	1	42	123	PRE- DMP
500	2	42	85	PRE- DMP
500	3	42	75	PRE- DMP
500	4 a-b	48	75	B
500	5	48	58	B
500	6	48	51	C
500	7	36	8	C
500	8 a-b	30	17	B
500	9 a-b	24	10	B/E
500	10	36	24	A
500	11	36	22	A
500	12	(2) 24	22	A
500	13	36	22	A
500	14	36	22	A
500	15	36	22	A
500	16	36	22	A
500	17	36	10	A
500	18	24	10	A

STORM DRAIN PHASING

PHASE	DESIGNATION
PRE-DMP	
A	
B	
C	
D	
E	

LEGEND

	DRAINAGE BASIN BOUNDARY PER DMP
	DRAINAGE BASIN BOUNDARY PER DMP
	EXISTING STORM DRAIN LINE - PUBLIC
	EXISTING STORM DRAIN LINE - PRIVATE
	PROPOSED STORM DRAIN LINE - PUBLIC
	PROPOSED STORM DRAIN LINE - PRIVATE
	FUTURE STORM DRAIN LINE - PUBLIC
	FUTURE STORM DRAIN LINE - PRIVATE
	REMOVE STORM DRAIN LINE - PRIVATE
	REMOVE STORM DRAIN LINE - PRIVATE (FUTURE PHASE)
	REMOVE STORM DRAIN LINE - PRIVATE PHASE B LIMITS
	EXISTING FIRST FLUSH FACILITY

SCALE: NTS

AS BUILT INFORMATION

CONTRACTOR	DATE

BENCH MARKS

FOUND MONUMENT "20_H18"	DATE
STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)	
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-NAD 1983)	
N=1,483,154.978	
E=1,545,048.210	
PUBLISHED EL=5283.22 (NAD 1988)	
GROUND TO GRID FACTOR=0.999661580	
DELTA ALPHA ANGLE=0°11'00.11"	

SURVEY INFORMATION

FIELD NOTES	DATE

ENGINEER'S SEAL

DESIGNED BY: NV

DATE: MAY 15, 2019

DRAWN BY: SAE

DATE: APR 18, 2019

DWG NAME: DRAINAGE EXHIBIT 1.dwg

PROJ #: R303699.04

CHECKED BY: SAE

DATE: MAY 16, 2019

REVISIONS

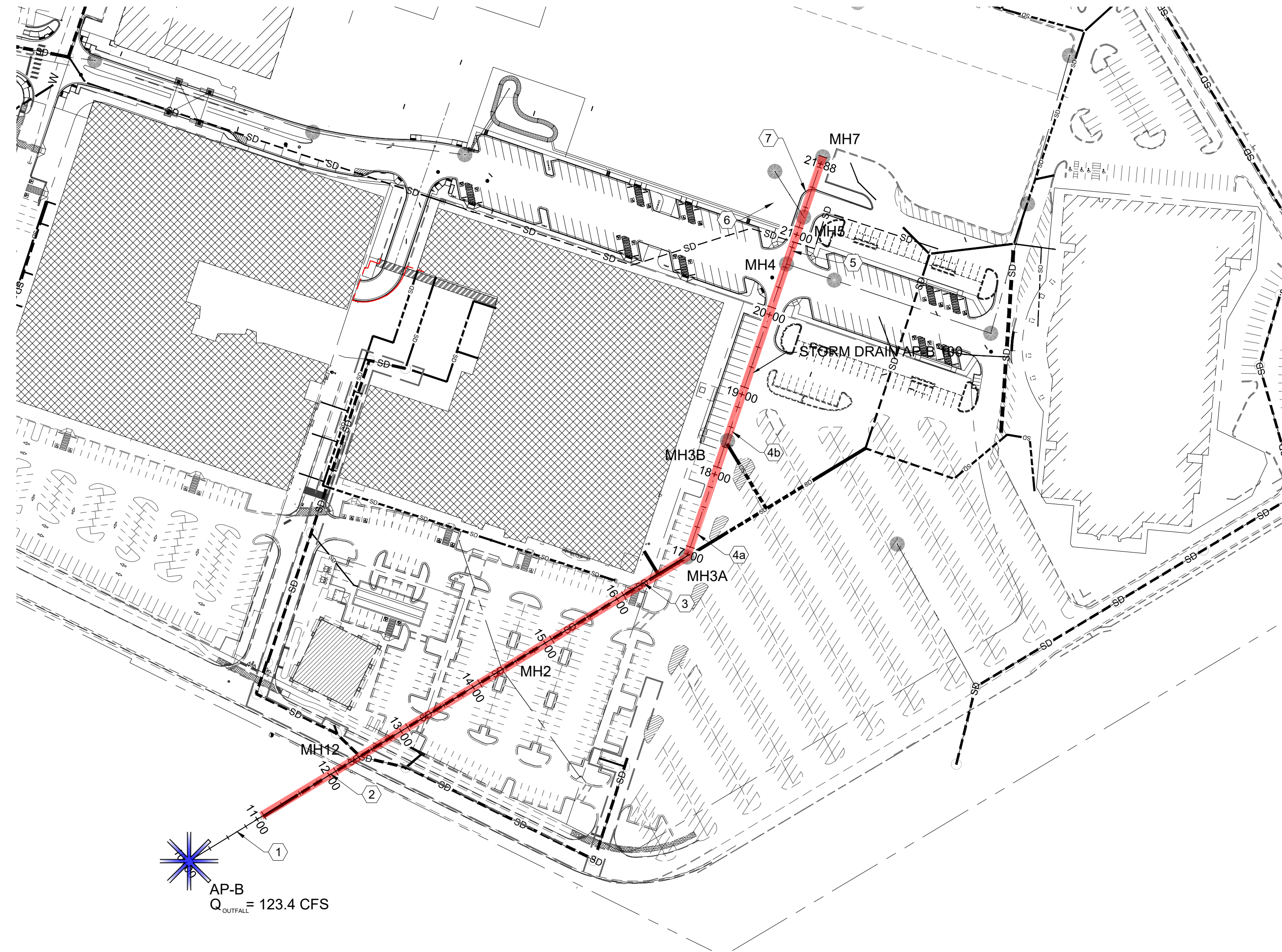
NO.	DATE	REMARKS	BY

WINROCK TOWN CENTER DRAINAGE IMPLEMENTATION PLAN

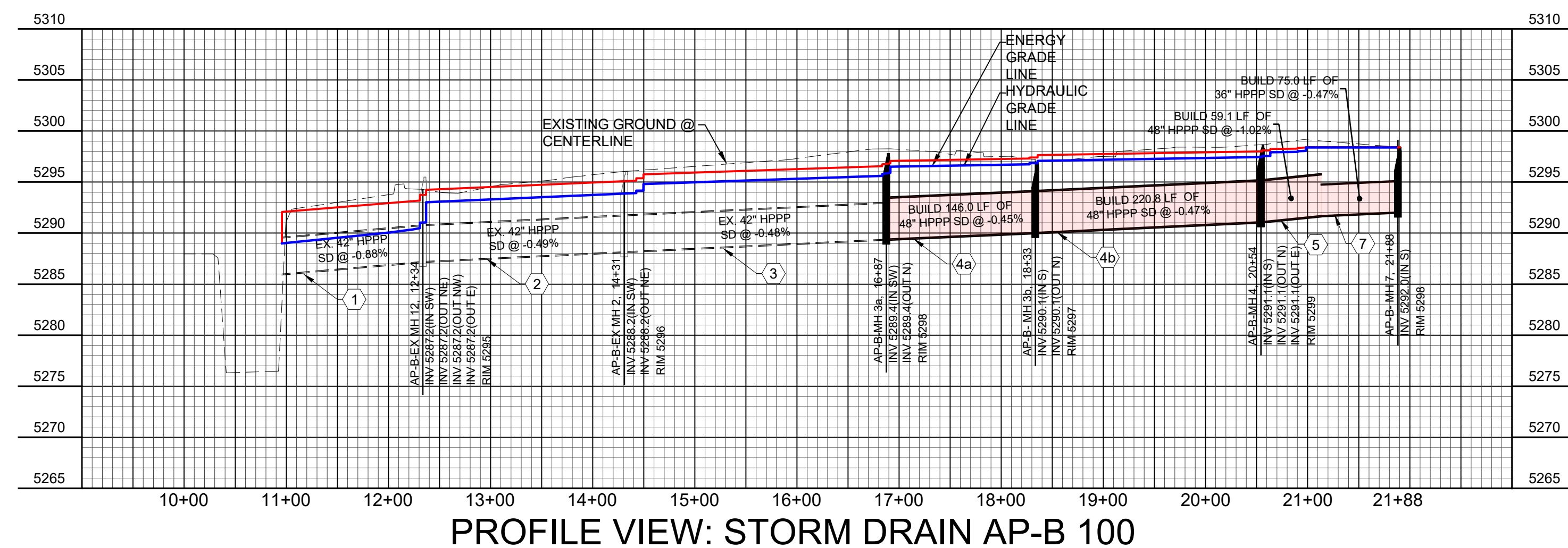
TITLE: BASIN MAP AND ULTIMATE STORM DRAIN NETWORK

Design	Review	Committee	City Engineer

City Project No.	4553.90	Zone Map No.	J-19-Z	Sheet	Of
				EXHIBIT 1	



STORM DRAIN AP-B 100

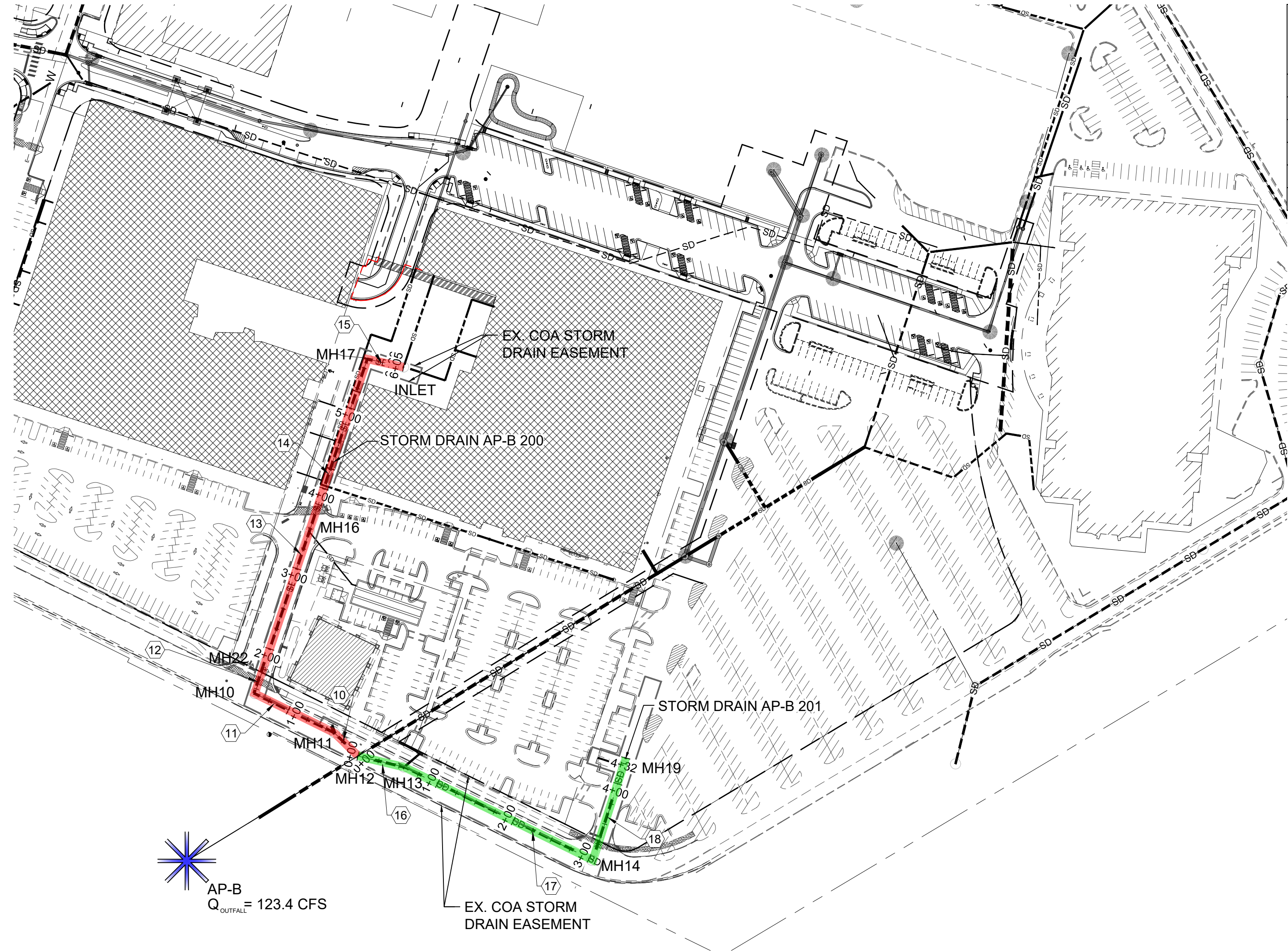


STORM CAD OUTPUT

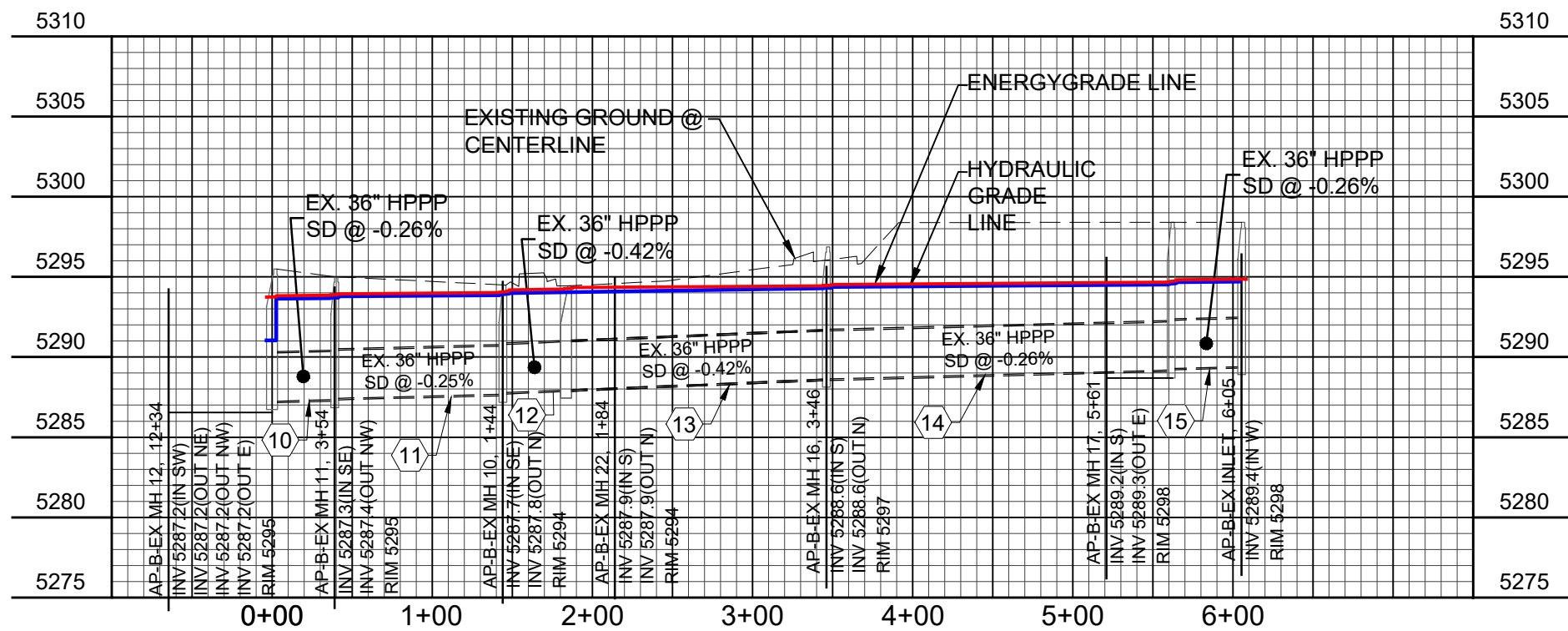
Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 1	MH 12	AP-B	42.0	138.0	123.4	14.57	5,287.22	5,286.00	5,295.61	5,286.00	5,290.49	5,288.99	5,293.20	5,292.08
LINE 2	MH 2	MH 12	42.0	212.3	85.1	8.85	5,288.18	5,287.22	5,296.00	5,295.61	5,293.92	5,293.02	5,295.13	5,294.23
LINE 3	MH 3	MH 2	42.0	241.4	75.1	7.81	5,289.41	5,288.18	5,298.20	5,296.00	5,295.60	5,294.81	5,296.55	5,295.75
LINE 4A	MH 4B	MH 3	48.0	144.1	75.1	5.98	5,290.06	5,289.41	5,298.32	5,298.20	5,296.70	5,296.51	5,297.26	5,297.07
LINE 4B	MH 4	MH 4B	48.0	227.7	75.1	5.98	5,291.10	5,290.06	5,298.50	5,298.32	5,297.44	5,297.04	5,297.99	5,297.59
LINE 5	MH 5	MH 4	48.0	34.9	58.1	4.62	5,291.40	5,291.10	5,298.50	5,298.50	5,297.94	5,297.91	5,298.28	5,298.24
LINE 7	MH 7	MH 5	36.0	94.1	7.5	1.06	5,291.90	5,291.40	5,298.50	5,298.50	5,298.39	5,298.38	5,298.41	5,298.40

ENGINEER'S SEAL		SURVEY INFORMATION		BENCH MARKS		AS BUILT INFORMATION	
		FIELD NOTES		FOUND MONUMENT "20.418"		CONTRACTOR	
		NO.	BY	DATE	STAKED BY	DATE	DATE
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					N=1,493,154.978	FIELD VERIFICATION BY	DATE
					E=1,545,048.210	CORRECTED BY	DATE
DESIGNED BY: NV		DATE: MAY 15, 2019		PUBLISHED EL=5283.22 (NWD, 1988)		MICRO-FILM INFORMATION	
DRAWN BY: SAE		DATE: APR. 18, 2019		GROUND TO GRID FACTOR=0.999661580		RECORDED BY	
DWG NAME: DRAINAGE EXHIBIT 2-9.dwg PROJ #:		R303699.04		DELTA ALPHA ANGLE=0°11'10.11"		NO.	
CHECKED BY: SAE		DATE: MAY 16, 2019					

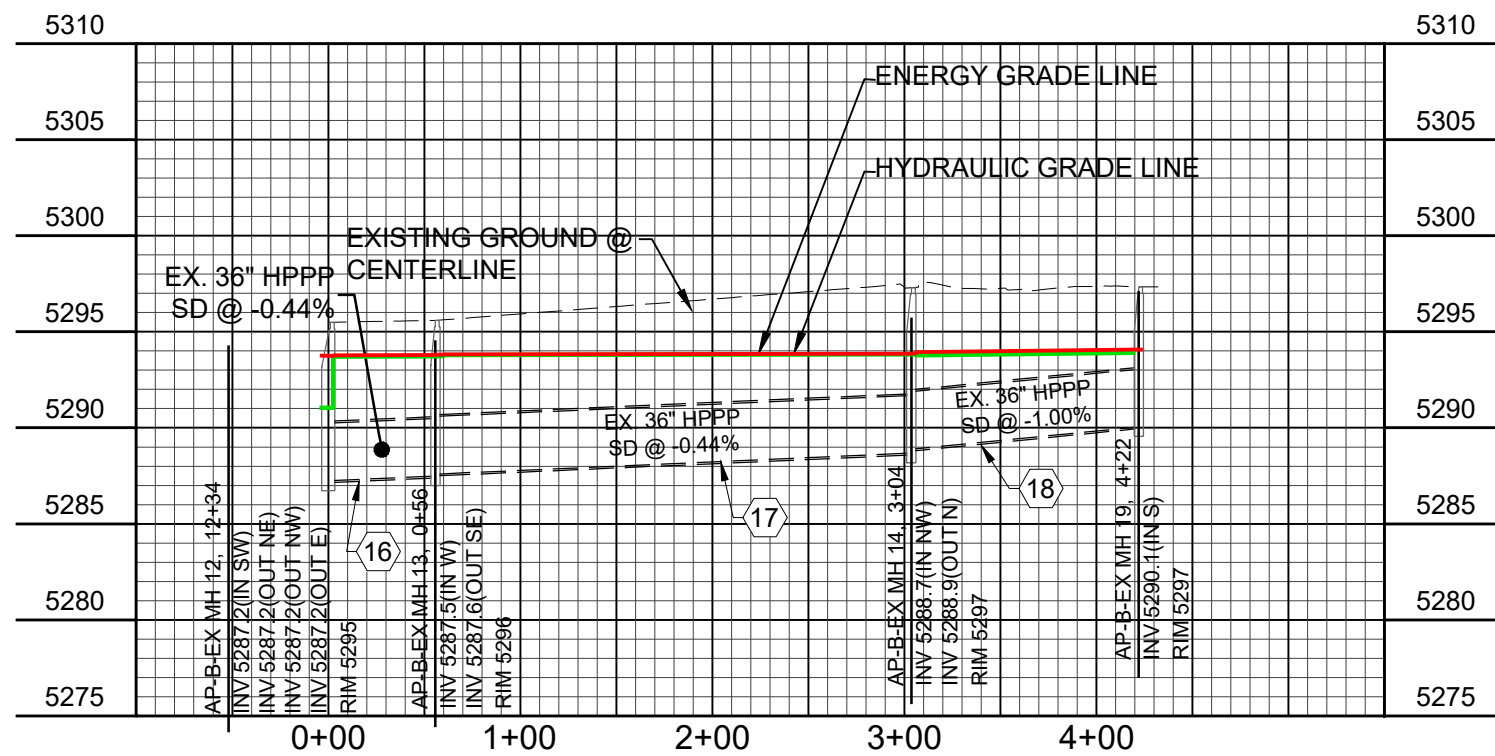
Plotted: 5/17/2019 10:42:20 AM By: Edging, Scott
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User: Scott Edging 5/17/2019 10:51:31 AM



STORM DRAIN AP-B 200 & 201



PROFILE VIEW: STORM DRAIN AP-B 200

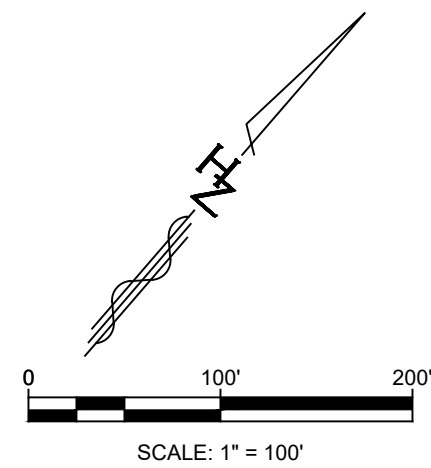


PROFILE VIEW: STORM DRAIN AP-B 201

STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 10	MH 11	MH 12	36.0	39.3	24.0	3.40	5,287.40	5,287.22	5,295.02	5,295.61	5,293.67	5,293.64	5,293.85	5,293.82
LINE 11	MH 10	MH 11	36.0	106.0	22.0	3.11	5,287.68	5,287.40	5,294.68	5,295.02	5,293.86	5,293.79	5,294.01	5,293.95
LINE 12	MH 22	MH 10	24.0	40.0	22.0	3.50	5,287.90	5,287.68	5,294.70	5,294.68	5,294.05	5,293.99	5,294.24	5,294.18
LINE 13	MH 16	MH 22	36.0	162.0	22.0	3.11	5,288.29	5,287.90	5,297.58	5,294.70	5,294.29	5,294.18	5,294.44	5,294.33
LINE 14	MH 17	MH 16	36.0	215.3	22.0	3.11	5,288.93	5,288.29	5,295.17	5,297.58	5,294.52	5,294.38	5,294.67	5,294.53
LINE 15	INLET	MH 17	36.0	44.2	22.0	3.11	5,289.13	5,288.93	5,295.00	5,295.17	5,294.70	5,294.67	5,294.85	5,294.82

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 16	MH 13	MH 12	36.0	57.8	14.3	2.02	5,287.50	5,287.22	5,295.78	5,295.61	5,293.73	5,293.71	5,293.79	5,293.77
LINE 17	MH 14	MH 13	36.0	246.7	10.0	1.41	5,288.80	5,287.50	5,297.81	5,295.78	5,293.82	5,293.78	5,293.85	5,293.81
LINE 18	MH 19	MH 14	24.0	117.0	10.0	3.18	5,289.26	5,288.80	5,297.92	5,297.81	5,293.91	5,293.77	5,294.07	5,293.93

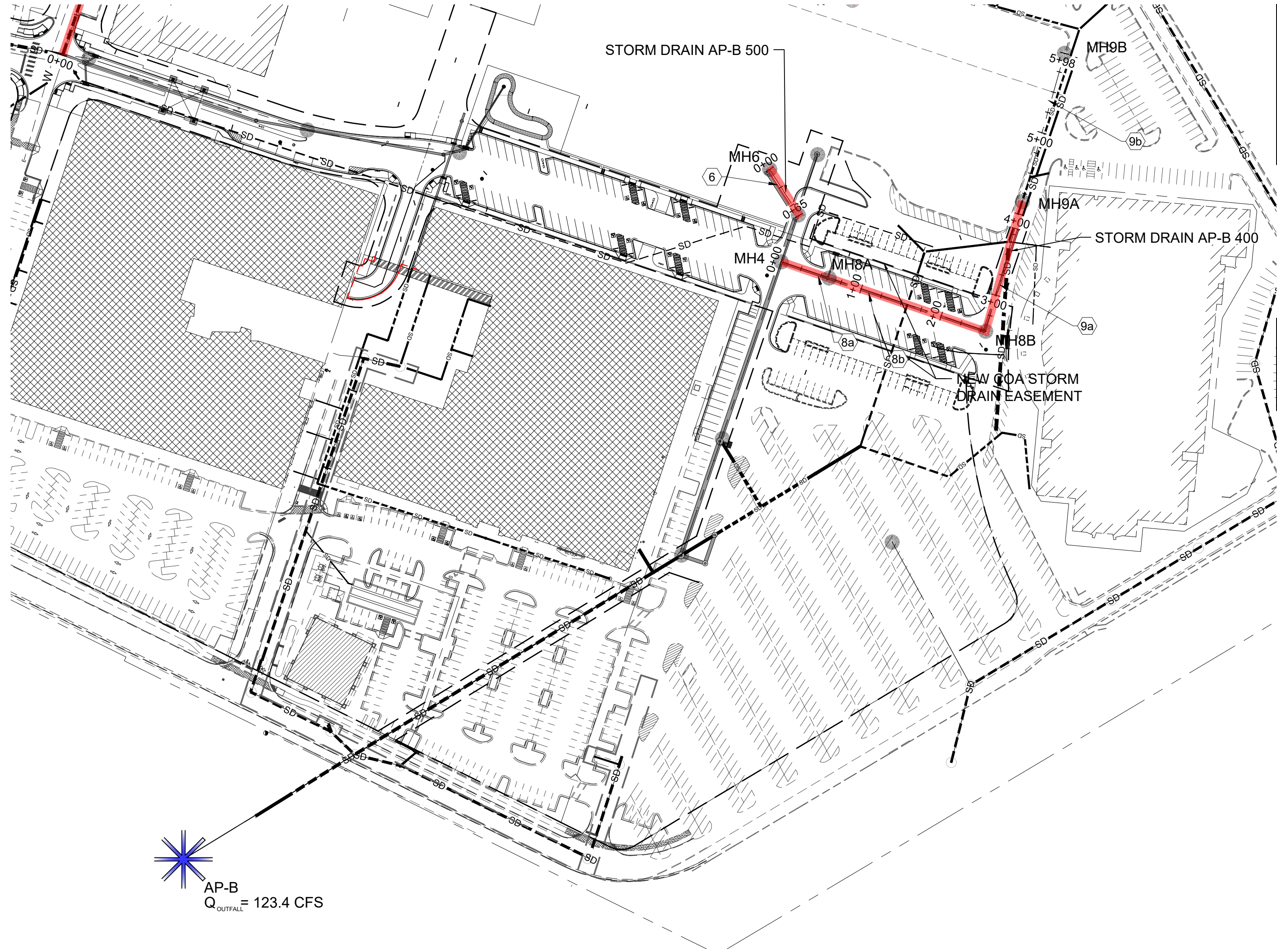


Designed By:
HUITT-ZOLIARS
Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

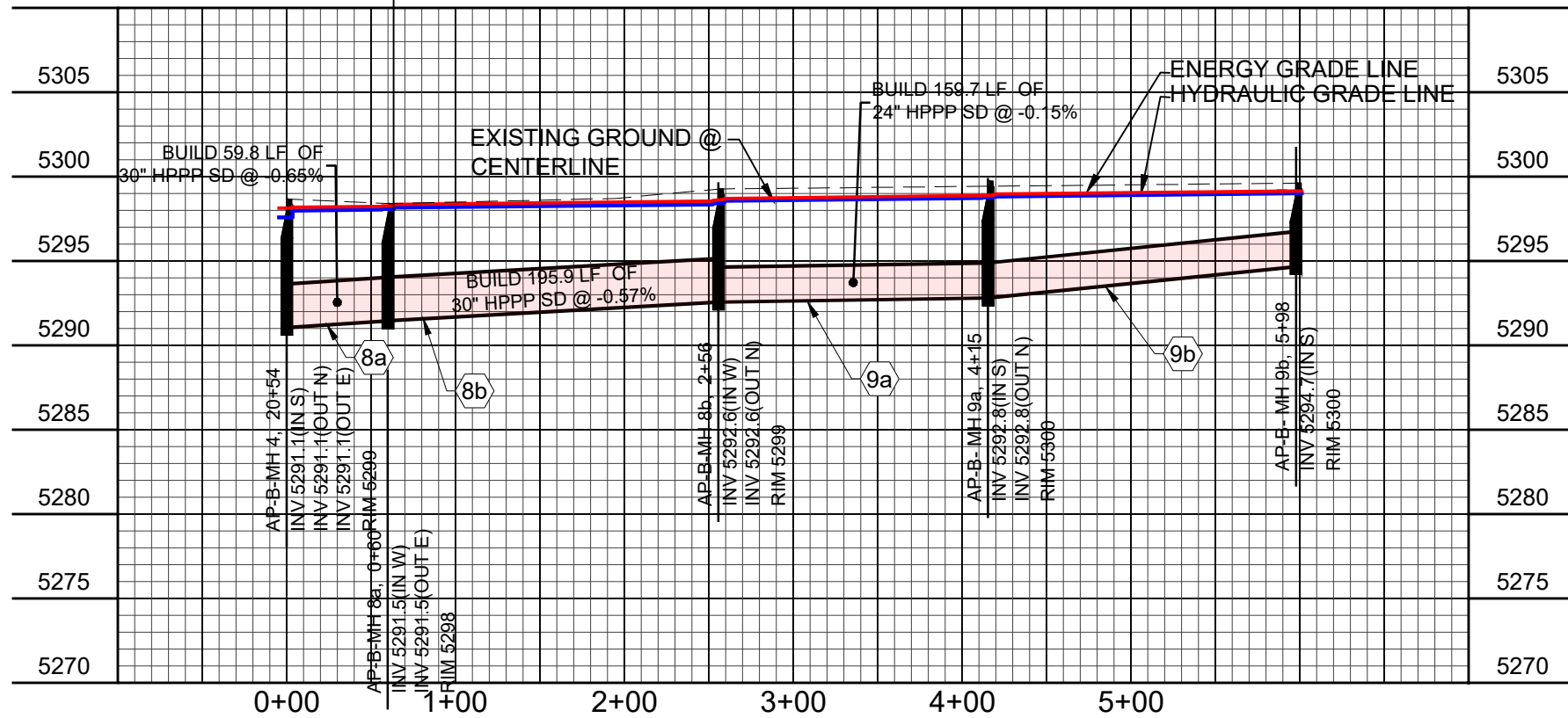
WINROCK TOWN CENTER PHASE B INFRASTRUCTURE IMPROVEMENTS			
TITLE: STORM DRAIN AP-B 200 & 201			
Design Review Committee	City Engineer	Ms./Day/Yr.	
		Last Update	
City Project No.	Zone Map No.	Sheet	Of
4553.90	J-19-Z		EXHIBIT 3

ENGINEER'S SEAL		SURVEY INFORMATION		BENCH MARKS		AS BUILT INFORMATION	
NO.		FIELD NOTES		FOUND MONUMENT "20_H18"		CONTRACTOR	
DATE		BY		STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)		WORK BY	
REMARKS				NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)		INSPECTOR'S	
DESIGN				N=1,483,154.978		ACCEPTANCE BY	
DESIGNED BY: NV				E=1,545,048.210		DATE	
DRAWN BY: SAE				PUBLISHED EL=5293.22 (NAD 1988)		MICRO-FILM INFORMATION	
DWG NAME: DRAINAGE EXHIBIT 2-9.dwg PROJ #:				GROUND TO GRID FACTOR=0.999661580		RECORDED BY	
CHECKED BY: SAE				DELTA ALPHA ANGLE=01100.11"		DATE	
						NO.	

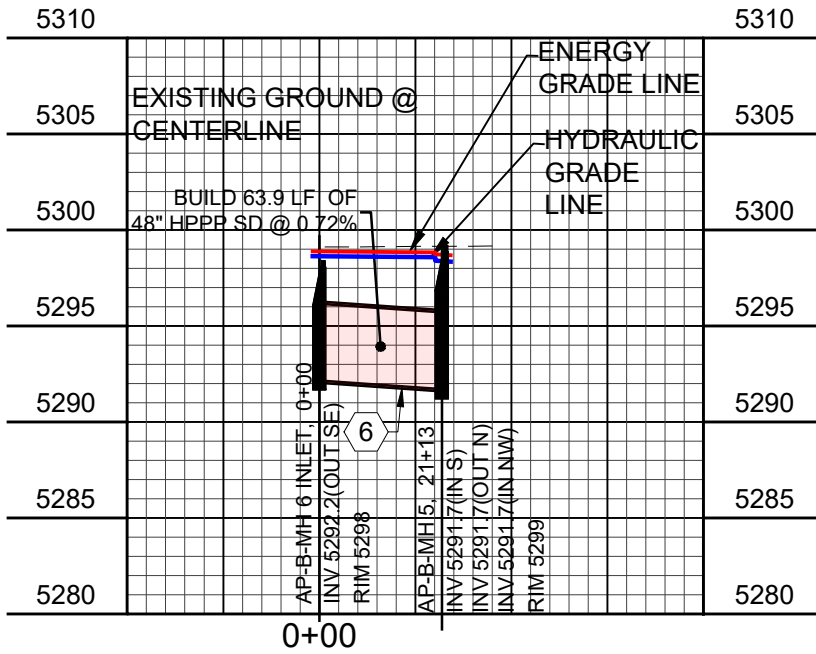
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Last Saved: 5/17/2019 10:51:31 AM Settings



STORM DRAIN AP-B 400 & 500



PROFILE VIEW: STORM DRAIN AP-B 400

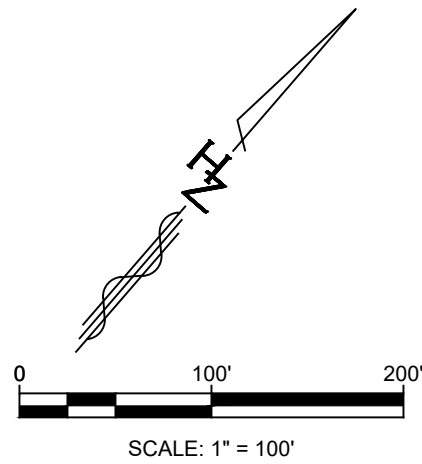


PROFILE VIEW: STORM DRAIN AP-B 500

STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 8A	MH 8A	MH 4	30.0	65.4	17.0	3.46	5,291.49	5,291.10	5,298.68	5,298.50	5,298.05	5,297.99	5,298.24	5,298.18
LINE 8B	MH 8B	MH 8A	30.0	187.9	17.0	3.46	5,292.60	5,291.49	5,299.20	5,298.68	5,298.37	5,298.17	5,298.55	5,298.35
LINE 9A	MH 9A	MH 8B	24.0	38.2	9.5	3.02	5,293.20	5,292.60	5,299.18	5,299.20	5,298.70	5,298.53	5,298.84	5,298.68
LINE 9B	MH 9B	MH 9A	24.0	298.3	9.5	3.02	5,294.70	5,293.20	5,300.00	5,299.18	5,298.98	5,298.78	5,299.12	5,298.93

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 6	MH 11	MH 12	36.0	39.3	24.0	3.40	5,287.40	5,287.22	5,295.02	5,295.61	5,293.67	5,293.64	5,293.85	5,293.82

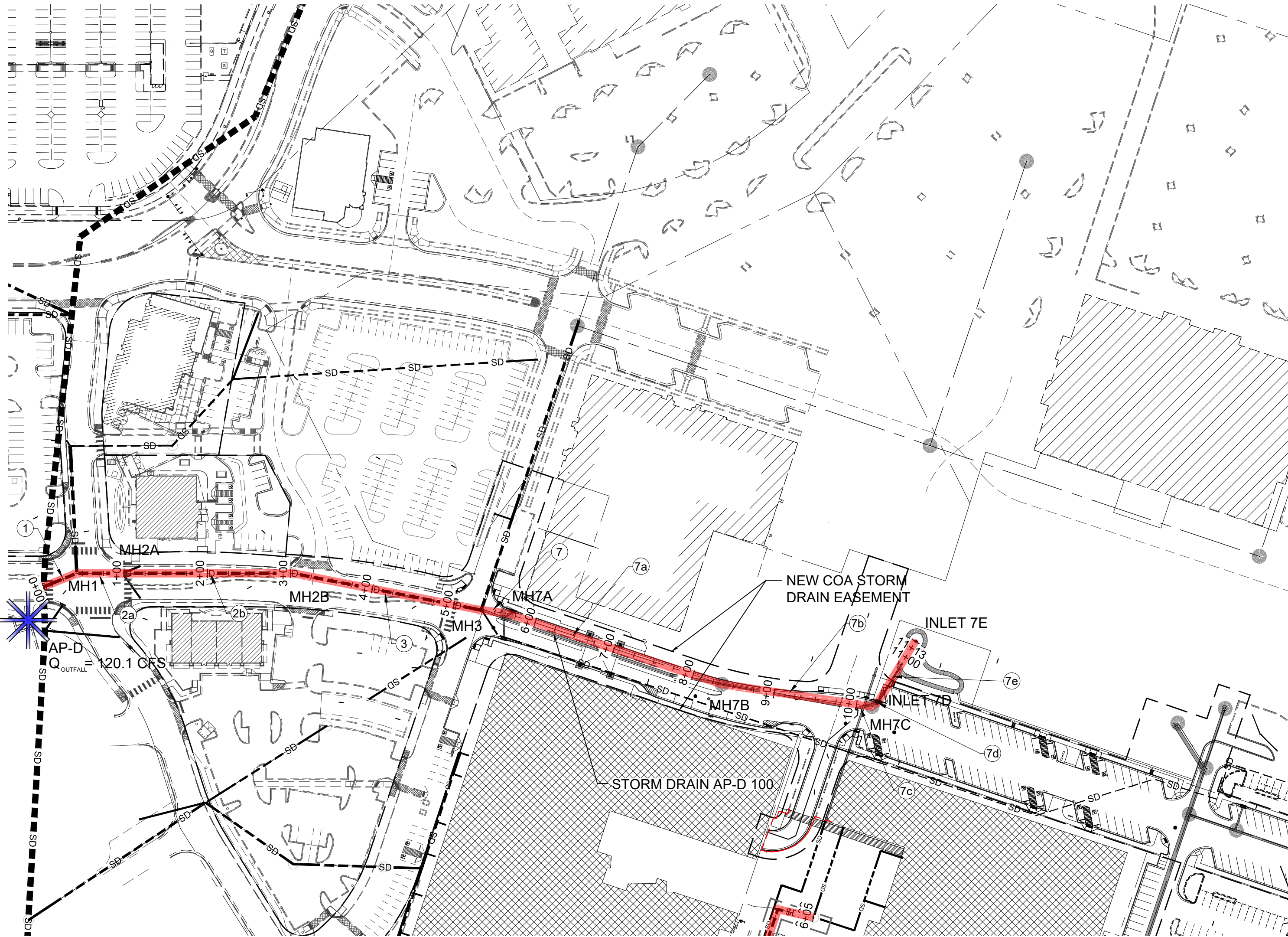


Designed By:
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Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

WINROCK TOWN CENTER			
PHASE B INFRASTRUCTURE IMPROVEMENTS			
TITLE: STORM DRAIN AP-B 400 & 500			
Design	Review	Committee	City Engineer
Last Update		Ms./Day/Yr.	
		Ms./Day/Yr.	
City Project No.		Zone Map No.	Sheet Of
4553.90		J-19-Z	EXHIBIT 4

ENGINEER'S SEAL		SURVEY INFORMATION		BENCH MARKS		AS BUILT INFORMATION	
		FIELD NOTES		FOUND MONUMENT "20_H18"		CONTRACTOR	
		NO.		DATE		DATE	
		BY		DATE		DATE	
		REMARKS		STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)		WORK BY	
		NO.		DATE		DATE	
DESIGNED BY: NV		DATE: MAY 15, 2019		INSPECTOR'S		DATE	
DRAWN BY: SAE		DATE: APR 18, 2019		ACCEPTANCE BY		DATE	
DWG NAME: DRAINAGE EXHIBIT 2.dwg PROJ #:		R304101.01		VERIFICATION BY		DATE	
CHECKED BY: SAE		DATE: MAY 16, 2019		DRAWING NO.		DATE	
				MICRO-FILM INFORMATION		DATE	
				RECORDED BY		DATE	
				NO.		DATE	

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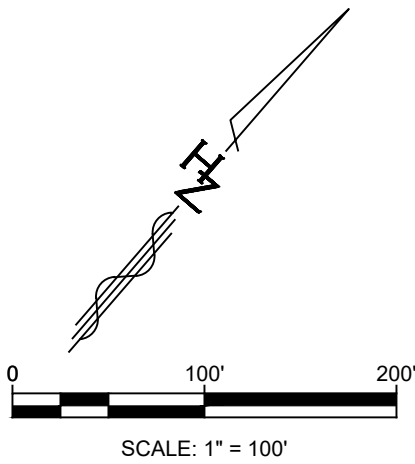
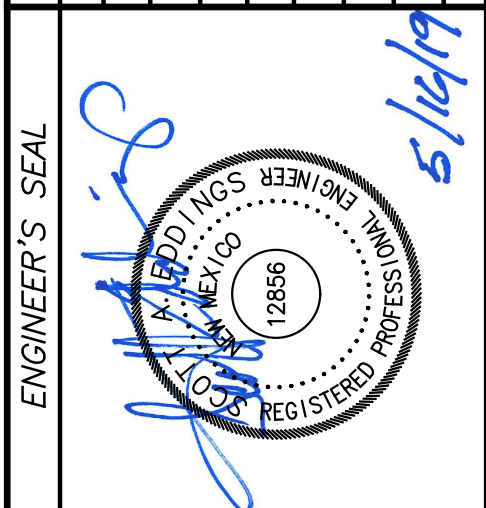


STORM DRAIN AP-D 100

STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 1	MH 1	AP-D	42.0	43.0	120.1	25.88	5,271.10	5,268.40	5,284.10	5,282.94	5,274.35	5,270.61	5,276.93	5,276.06
LINE 2A	MH 2A	MH 1	42.0	55.4	113.4	11.79	5,272.30	5,271.10	5,284.59	5,284.10	5,276.86	5,276.15	5,279.02	5,278.31
LINE 2B	MH 2	MH 2A	42.0	204.4	113.4	11.79	5,274.00	5,272.30	5,290.53	5,284.59	5,280.75	5,278.15	5,282.91	5,280.31
LINE 3	MH 3	MH 2	42.0	228.2	93.8	9.75	5,276.00	5,274.00	5,296.69	5,290.53	5,284.44	5,282.45	5,285.92	5,283.93
LINE 7A	MH 7A	MH 3	24.0	30.4	23.5	7.48	5,278.25	5,276.00	5,297.22	5,296.69	5,286.47	5,286.41	5,286.82	5,286.76
LINE 7B	MH 7B	MH 7A	24.0	213.6	23.5	7.48	5,285.00	5,283.50	5,297.26	5,297.22	5,287.12	5,286.68	5,287.55	5,287.04
LINE 7C	MH 7C	MH 7B	24.0	235.3	23.5	7.48	5,286.50	5,285.00	5,296.00	5,297.26	5,288.15	5,287.43	5,288.88	5,287.78
LINE 7D	MH 7D	MH 7C	24.0	19.7	23.5	7.48	5,287.20	5,286.50	5,296.87	5,296.00	5,288.85	5,289.06	5,289.58	5,289.41
LINE 7E	INLET	MH 7D	24.0	85.0	23.5	7.48	5,289.10	5,287.20	5,294.52	5,296.87	5,290.75	5,289.64	5,291.48	5,290.00

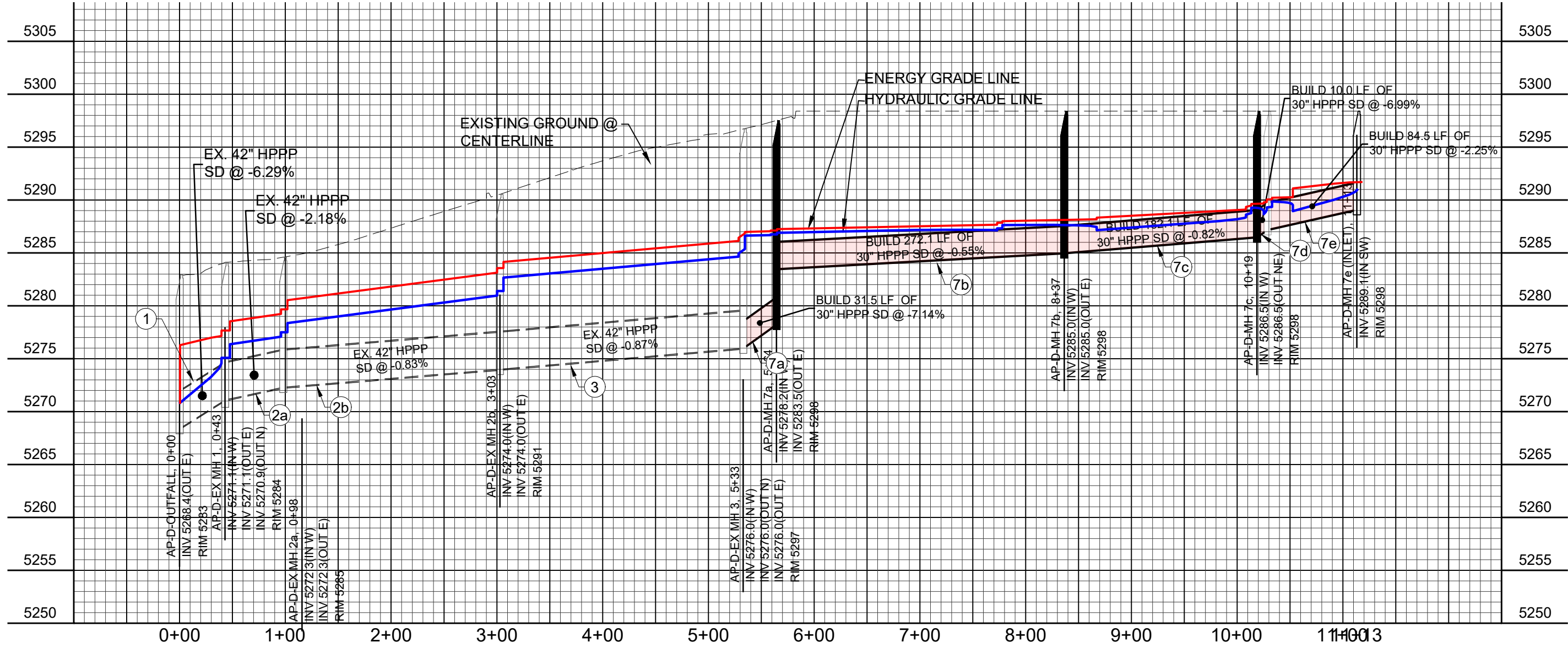
AS BUILT INFORMATION		BENCH MARKS		SURVEY INFORMATION		ENGINEER'S SEAL		REVISIONS		DESIGNED BY: NV		DRAWN BY: SAE		CHECKED BY: SAE	
CONTRACTOR	DATE	FOUND MONUMENT "20_H18"	DATE	NO.	BY	NO.	DATE	NO.	DATE	REMARKS	BY	DATE	DATE	DATE	DATE
WORK BY	DATE	STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)	DATE												
INSPECTOR'S	DATE	NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)	DATE												
ACCEPTANCE BY	DATE	N=1,483,154.978	DATE												
VERIFICATION BY	DATE	E=1,545,048.210	DATE												
DRAWING NO.	DATE	PUBLISHED EL=5283.22 (NAD 1988)	DATE												
PROJECT NAME	DATE	GROUND TO GRID FACTOR=0.999661580	DATE												
RECORDED BY	DATE	DELTA ALPHA ANGLE=0°11'00.11"	DATE												
NO.	DATE		DATE												



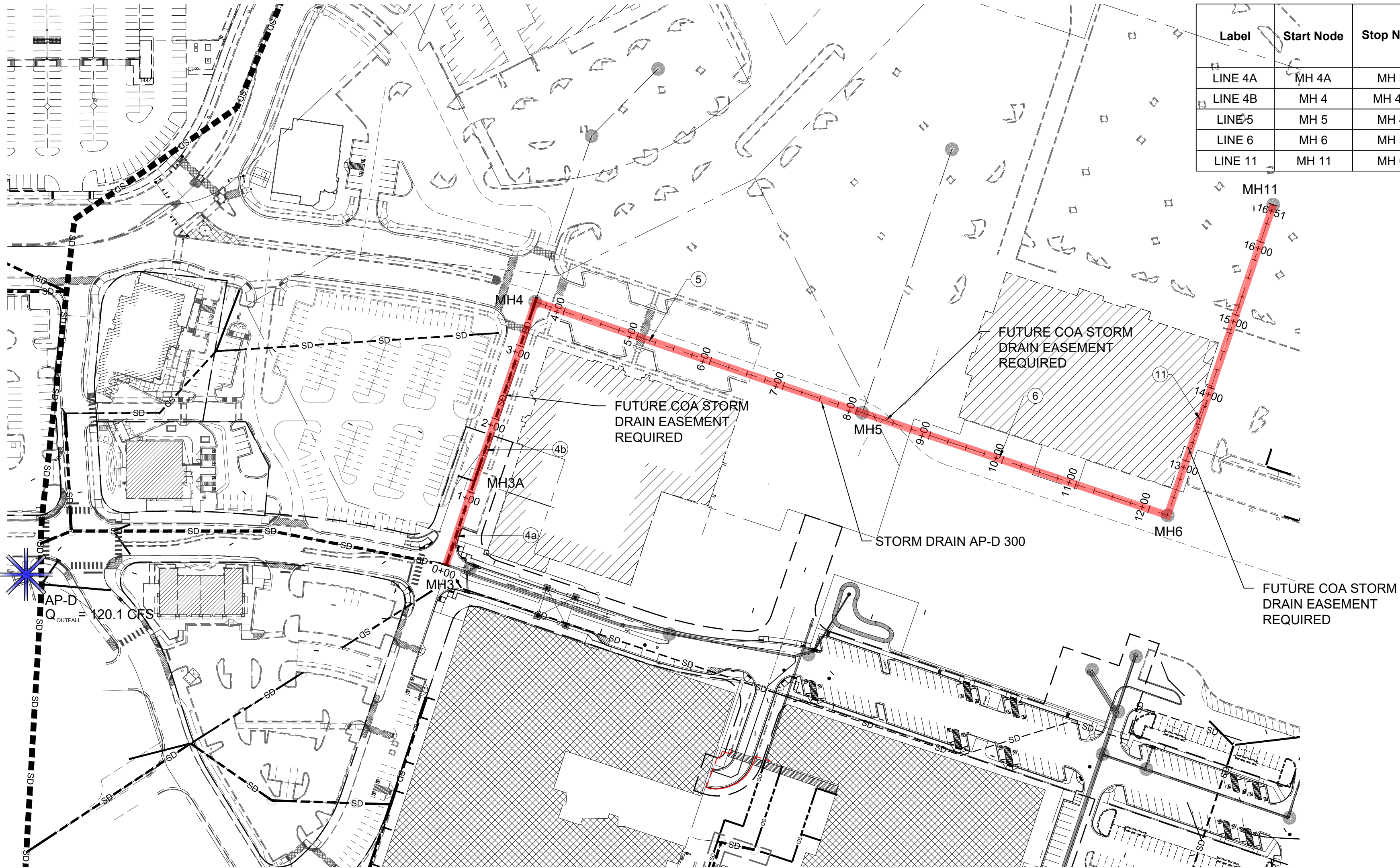
Designed By:
HUITT-ZOLIARS
Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

WINROCK TOWN CENTER PHASE B INFRASTRUCTURE IMPROVEMENTS			
TITLE: STORM DRAIN AP-D 100			
Design Review Committee	City Engineer	Ms./Day/Yr.	Ms./Day/Yr.
City Project No.	Zone Map No.	Sheet	Of
4553.90	J-19-Z		EXHIBIT 5

PROFILE VIEW: STORM DRAIN AP-D 100



Plotted: 5/17/2019 10:47:42 AM By: Edging, Scott
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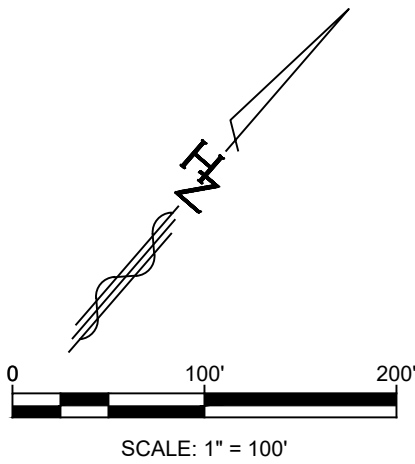
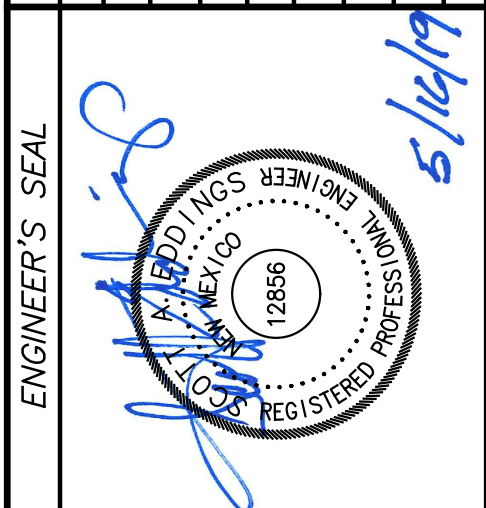


STORM DRAIN AP-D 300

STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 4A	MH 4A	MH 3	36.0	115.0	70.3	9.95	5,278.25	5,276.00	5,296.06	5,296.69	5,286.46	5,285.70	5,287.99	5,287.24
LINE 4B	MH 4	MH 4A	36.0	242.0	70.3	9.95	5,283.00	5,278.25	5,294.74	5,296.06	5,288.97	5,287.38	5,290.51	5,288.92
LINE 5	MH 5	MH 4	30.0	477.5	28.0	5.70	5,288.20	5,283.00	5,298.00	5,294.74	5,291.87	5,290.63	5,292.38	5,291.14
LINE 6	MH 6	MH 5	24.0	417.5	14.0	9.35	5,292.50	5,288.20	5,298.40	5,298.00	5,293.76	5,292.48	5,294.26	5,292.60
LINE 11	MH 11	MH 6	24.0	425.2	14.0	9.38	5,296.92	5,292.50	5,303.80	5,298.40	5,298.27	5,294.39	5,298.87	5,294.70

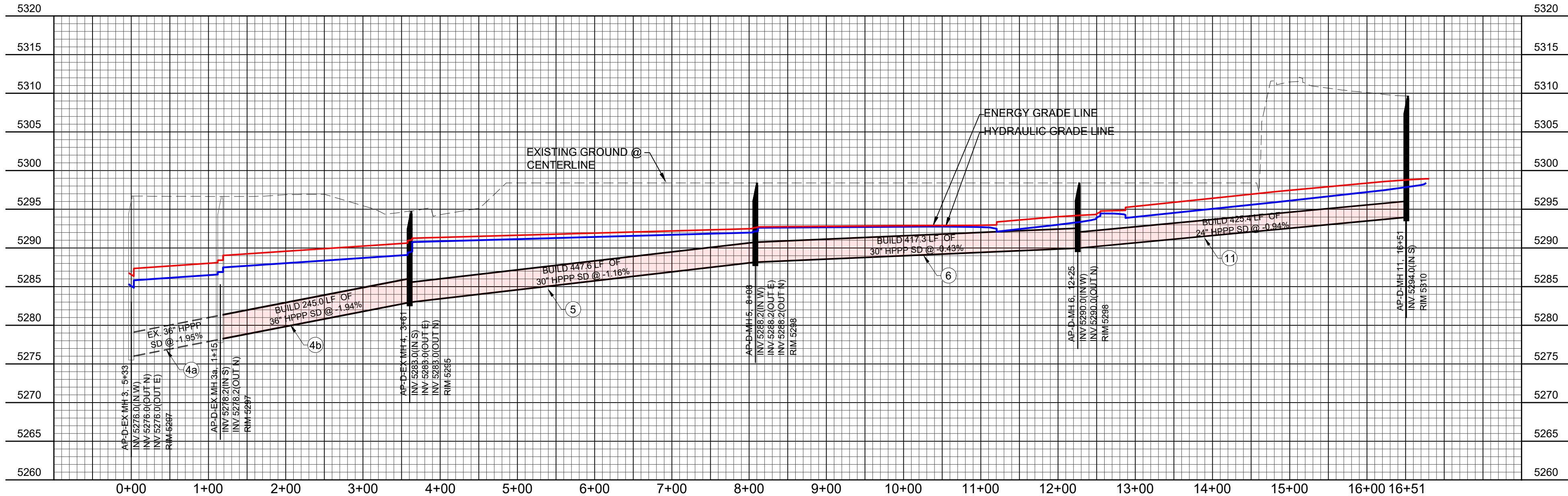
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CONTRACTOR	DATE	FOUND MONUMENT "20_H18"	DATE	NO.	BY	DATE	DATE	NO.	DATE	REMARKS	BY	DATE	DATE	DATE	DATE
WORK BY	DATE	STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)	DATE												
INSPECTOR'S	DATE	NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)	DATE												
ACCEPTANCE BY	DATE	N=1,483,154.978	DATE												
VERIFICATION BY	DATE	E=1,545,048.210	DATE												
PROWERS	DATE	PUBLISHED EL=5283.22 (NAD 1988)	DATE												
DESIGNED BY	DATE	GROUND TO GRID FACTOR=0.999661580	DATE												
RECORDED BY	DATE	DELTA ALPHA ANGLE=0°11'00.11"	DATE												
NO.															



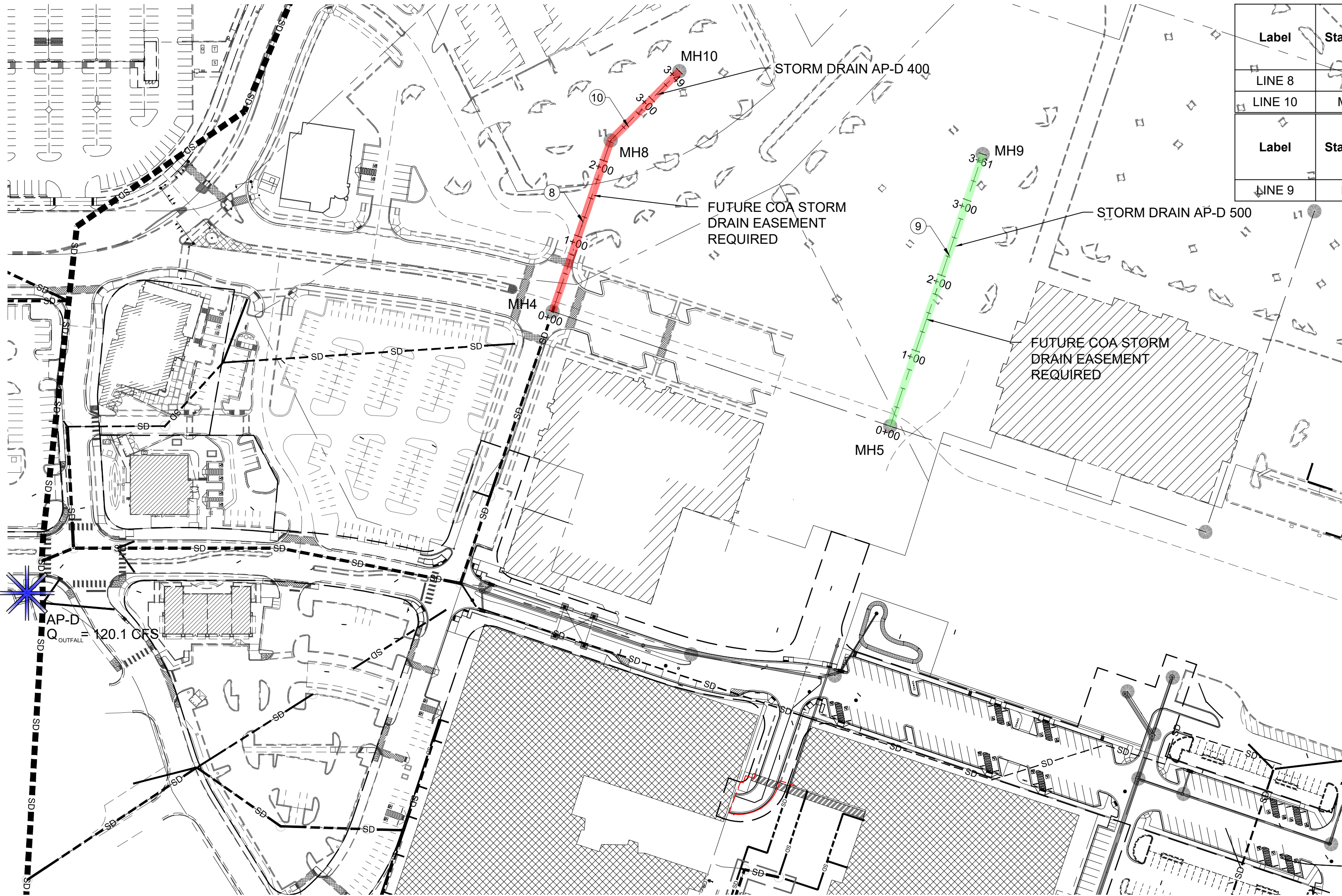
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HUITT-ZOLIARS
Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

WINROCK TOWN CENTER PHASE B INFRASTRUCTURE IMPROVEMENTS			
TITLE: STORM DRAIN AP-D 300			
Design Review Committee	City Engineer	Ms./Day/Yr.	
		Ms./Day/Yr.	
City Project No.	Zone Map No.	Sheet	Of
4553.90	J-19-Z		
		EXHIBIT 6	

PROFILE VIEW: STORM DRAIN AP-D 300



Plotted: 5/17/2019 10:48:16 AM By: Edginga, Scott
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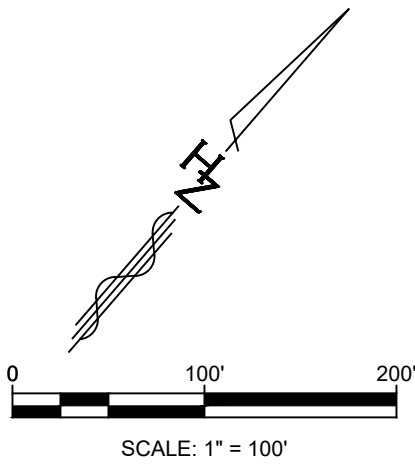
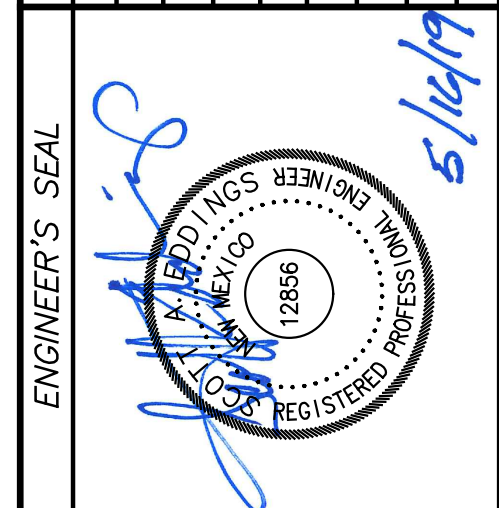


STORM DRAIN AP-D 400 & 500

STORM CAD OUTPUT

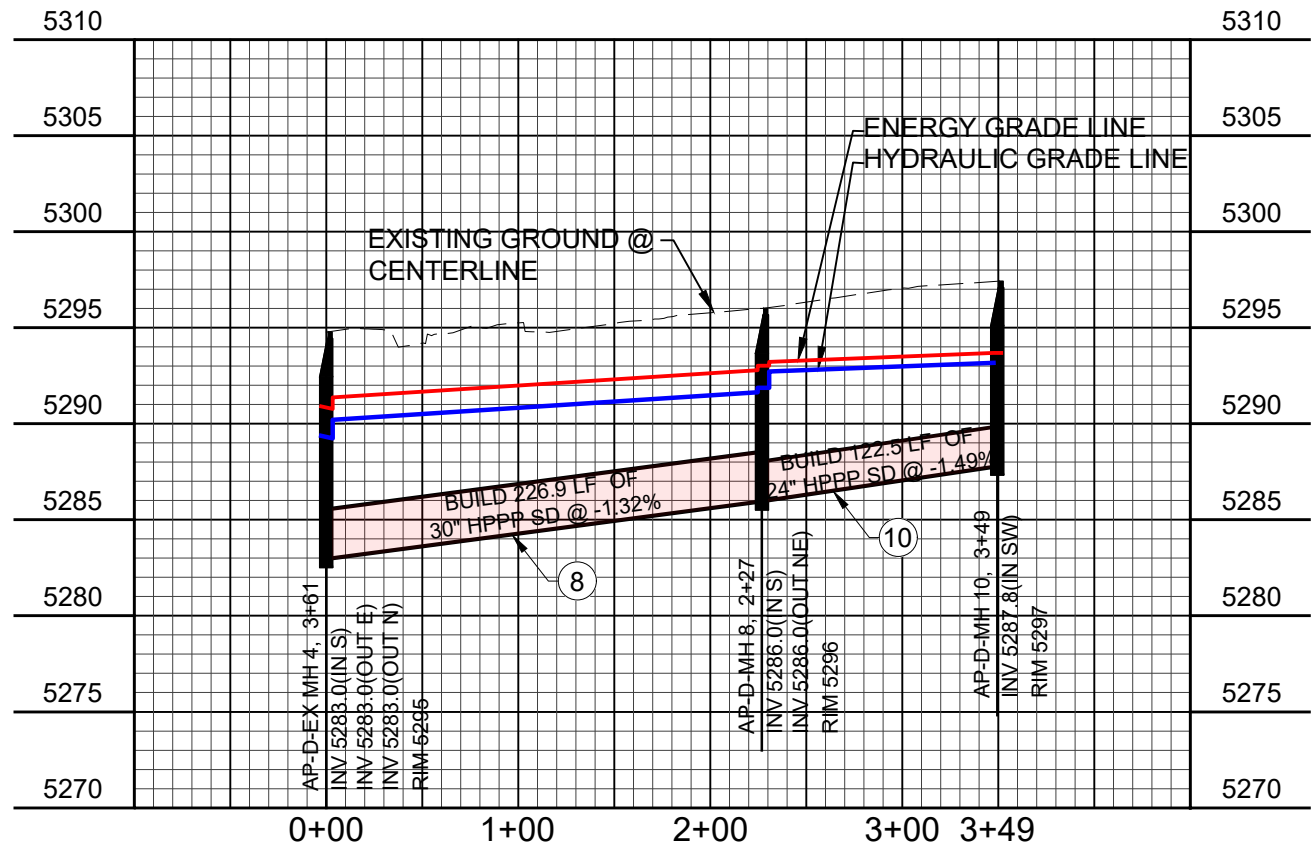
Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 8	MH 8	MH 4	36.0	227.2	42.3	5.98	5,286.00	5,283.00	5,296.00	5,294.74	5,291.68	5,290.25	5,292.83	5,291.40
LINE 10	MH 10	MH 8	24.0	121.8	18.0	5.73	5,287.82	5,286.00	5,297.00	5,296.00	5,293.21	5,292.75	5,293.72	5,293.26
LINE 9	MH 9	MH 5	24.0	361.4	14.0	11.02	5,294.00	5,288.20	5,303.00	5,298.00	5,295.35	5,292.45	5,295.95	5,292.76

AS BUILT INFORMATION		BENCH MARKS		SURVEY INFORMATION		ENGINEER'S SEAL		REVISIONS		DESIGN	
CONTRACTOR	DATE	FOUND MONUMENT "20_H18"	DATE	FIELD NOTES	DATE	NO.	DATE	NO.	DATE	REMARKS	BY
WORK BY	DATE	STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)	DATE	BY	DATE						
INSPECTOR'S	DATE	NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)	DATE								
ACCEPTANCE BY	DATE	N=1,483,154.978	DATE								
VERIFICATION BY	DATE	E=1,545,048.210	DATE								
DRAWN BY	DATE	PUBLISHED EL=5283.22 (NAD 1988)	DATE								
DESIGNED BY	DATE	GROUND TO GRID FACTOR=0.999661580	DATE								
RECORDED BY	DATE	DELTA ALPHA ANGLE=0°11'00.11"	DATE								
NO.											

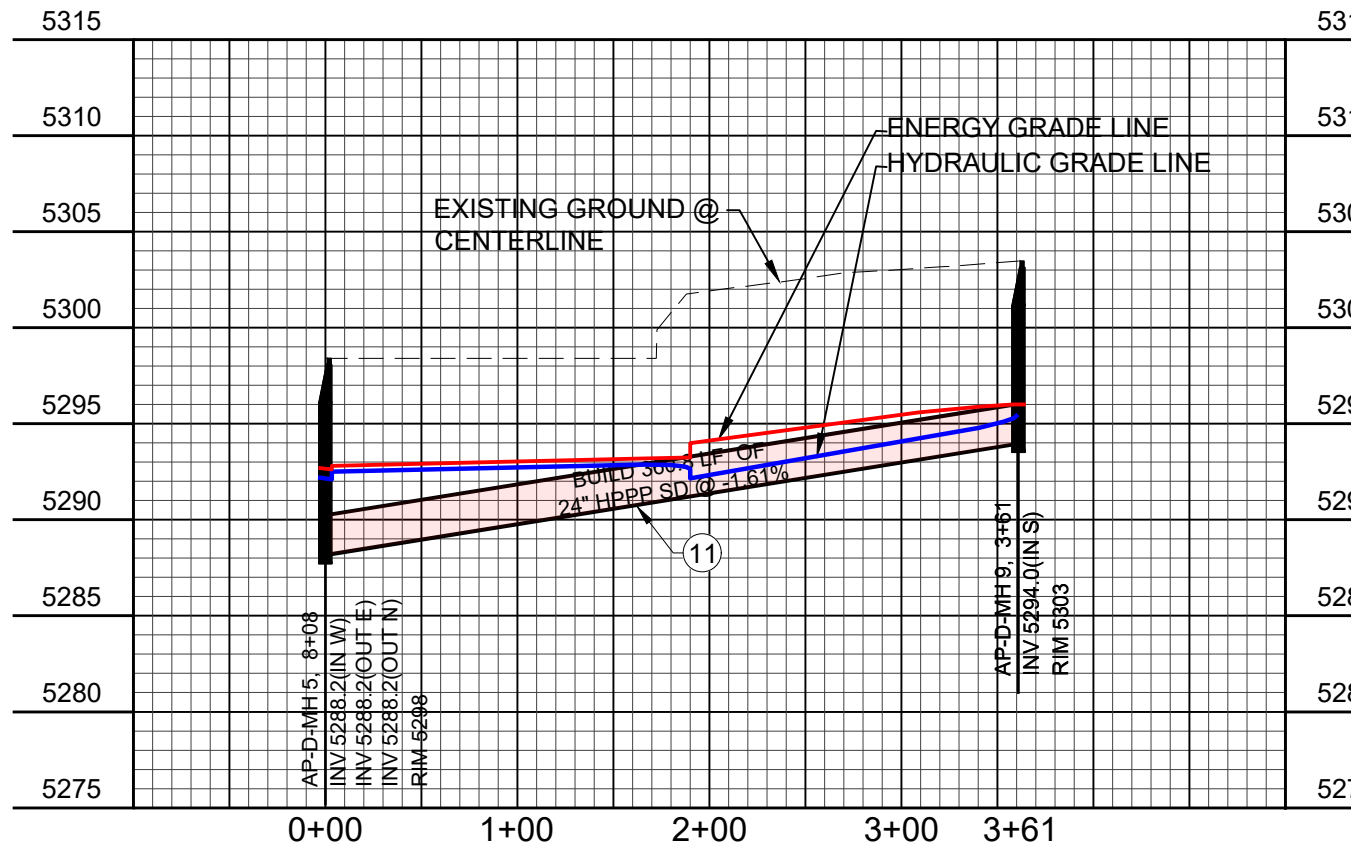


Designed By:
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333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

WINROCK TOWN CENTER			
PHASE B INFRASTRUCTURE IMPROVEMENTS			
TITLE: STORM DRAIN AP-D 400 & 500			
Design Review Committee	City Engineer	Ms./Day/Yr.	Ms./Day/Yr.
Last Update			
City Project No.	Zone Map No.	Sheet	Of
4553.90	J-19-Z		EXHIBIT 7



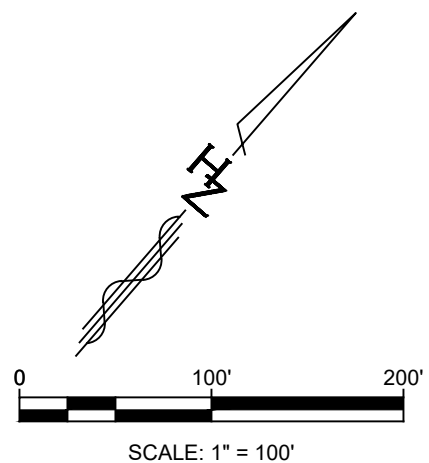
PROFILE VIEW: STORM DRAIN AP-D 400



PROFILE VIEW: STORM DRAIN AP-D 500



Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Allowable Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 1	MH 1	AP-A	42.0	94.6	81.9	11.82	5,293.58	5,293.00	5,305.13	5,302.00	5,296.40	5,295.48	5,297.91	5,297.44
LINE 2	MH 2	MH 1	42.0	198.0	71.4	7.42	5,294.50	5,293.58	5,305.55	5,305.13	5,298.75	5,298.16	5,299.60	5,299.01
LINE 3	MH 3	MH 2	42.0	122.0	71.4	7.42	5,295.00	5,294.50	5,306.53	5,305.55	5,299.63	5,299.26	5,300.48	5,300.12
LINE 4	MH 4	MH 3	36.0	140.0	51.4	7.27	5,296.30	5,295.00	5,308.94	5,306.53	5,300.65	5,300.16	5,301.47	5,300.98
LINE 5	MH 5	MH 4	36.0	158.7	51.4	7.27	5,297.02	5,296.30	5,309.32	5,308.94	5,301.99	5,301.43	5,302.81	5,302.26
LINE 6	MH 6	MH 5	36.0	87.6	51.4	7.27	5,297.59	5,297.02	5,309.34	5,309.32	5,302.83	5,302.53	5,303.66	5,303.35
LINE 7	MH 7	MH 6	36.0	53.4	51.4	7.27	5,298.09	5,297.59	5,309.44	5,309.34	5,303.59	5,303.40	5,304.41	5,304.22
LINE 8	MH 8	MH 7	36.0	373.8	49.4	6.99	5,300.67	5,298.09	5,308.50	5,309.44	5,305.64	5,304.43	5,306.40	5,305.19
LINE 9	MH 9	MH 8	24.0	105.3	30.1	9.58	5,302.10	5,300.67	5,308.62	5,308.50	5,306.80	5,305.70	5,308.23	5,307.12



Designed By:

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WINROCK TOWN CENTER
PHASE B INFRASTRUCTURE IMPROVEMENTS

STORM DRAIN AP-A 100

Design Review Committee	City Engineer	Last Update	Mo./Day/Yr.	Mo./Day/Yr.
City Project No.		Zone Map No.	Sheet	Of
4553.90		J-19-Z		EXHIBIT 8

ENGINEER'S SEAL		SURVEY INFORMATION		BENCH MARKS		AS BUILT INFORMATION	
 5/16/19	FIELD NOTES		FOUND MONUMENT "20-H18"		CONTRACTOR		DATE
	NO.	BY	DATE	STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)	WORK RECORDED BY	DATE	
				NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE--N.A.D. 1983)	INSPECTOR'S ACCEPTANCE BY	DATE	
				N=1,493,154.978	VERIFICATION BY	DATE	
					DRAWINGS CORRECTED BY	DATE	
					E=1,545,048.210	MICRO-FILM INFORMATION	
					PUBLISHED EL=5293.22 (MWD 1988)		
					GROUND TO GRID FACTOR=0.998661580	RECORDED BY	DATE
					DELTA ALPHA ANGLE=-071°00.11"	NO.	
DESIGNED BY: NV		DATE: MAY 15, 2019					
DRAWN BY: SAE		DATE: APR 18, 2019					
DWG NAME: DRAINAGE EXHIBIT 2-a.dwg		PROJ #: R04101.01					
CHECKED BY: SAE		DATE: MAY 16, 2019					

Plotted: 5/17/2019 10:48:43 AM By:Eddings, Scott
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Last Saved: 5/17/2019 10:37:37 AM, seedlings



Office Locations

Albuquerque, New Mexico (505) 883-8114
Austin, Texas (512) 237-1129
Dallas, Texas (214) 871-3311
Denver, Colorado (303) 740-7325
El Paso, Texas (915) 587-4339
Fort Worth, Texas (817) 335-3000
Glendale, California (818-456-1833
Houston (Downtown), Texas (713) 622-1180
Houston (West), Texas (281) 496-0066
Irvine, California (949) 988-5815
Los Angeles, California (310) 820-4600
Oklahoma City, Oklahoma (405) 842-0363
Ontario, California (909) 941-7799
Orlando , Florida (407) 839-0414
Phoenix, Arizona (602) 952-9123
Rio Rancho, New Mexico (505) 892-5141
Seattle, Washington (206) 324-5500
Tacoma, Washington (253) 627-9131
Thousand Oaks, California (805) 418-1802



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