CITY OF ALBUQUERQUE

Planning Department
Suzanne Lubar, Director

Richard J. Berry, Mayor

November 29, 2017

Mark Burak, PE
Burak Consulting
1512 Sagebrush Trail NE
Albuquerque, NM 87123

RE: **Melendres Residence**
15535 Elena Gallegos Pl NE
Grading and Drainage Plan
Engineer's Stamp Date 11/03/17 (E23D003R)

Dear Mr. Burak;

Based upon the information provided in your submittal received 11-27-2017, the above referenced submittal is accepted for building permit.

Once the home is completed and your approval for the home, according to the home owners association, a letter of agreement for Certificate of Occupancy will be released by the hydrology department.

If you have any questions, you can contact me at 924-3986.

Sincerely,

James D Hughes

James D. Hughes, P.E.
Principal Engineer, Hydrology
Planning Department

RR/JDH
Copy; pdf

PO Box 1293

Albuquerque

NM 87103

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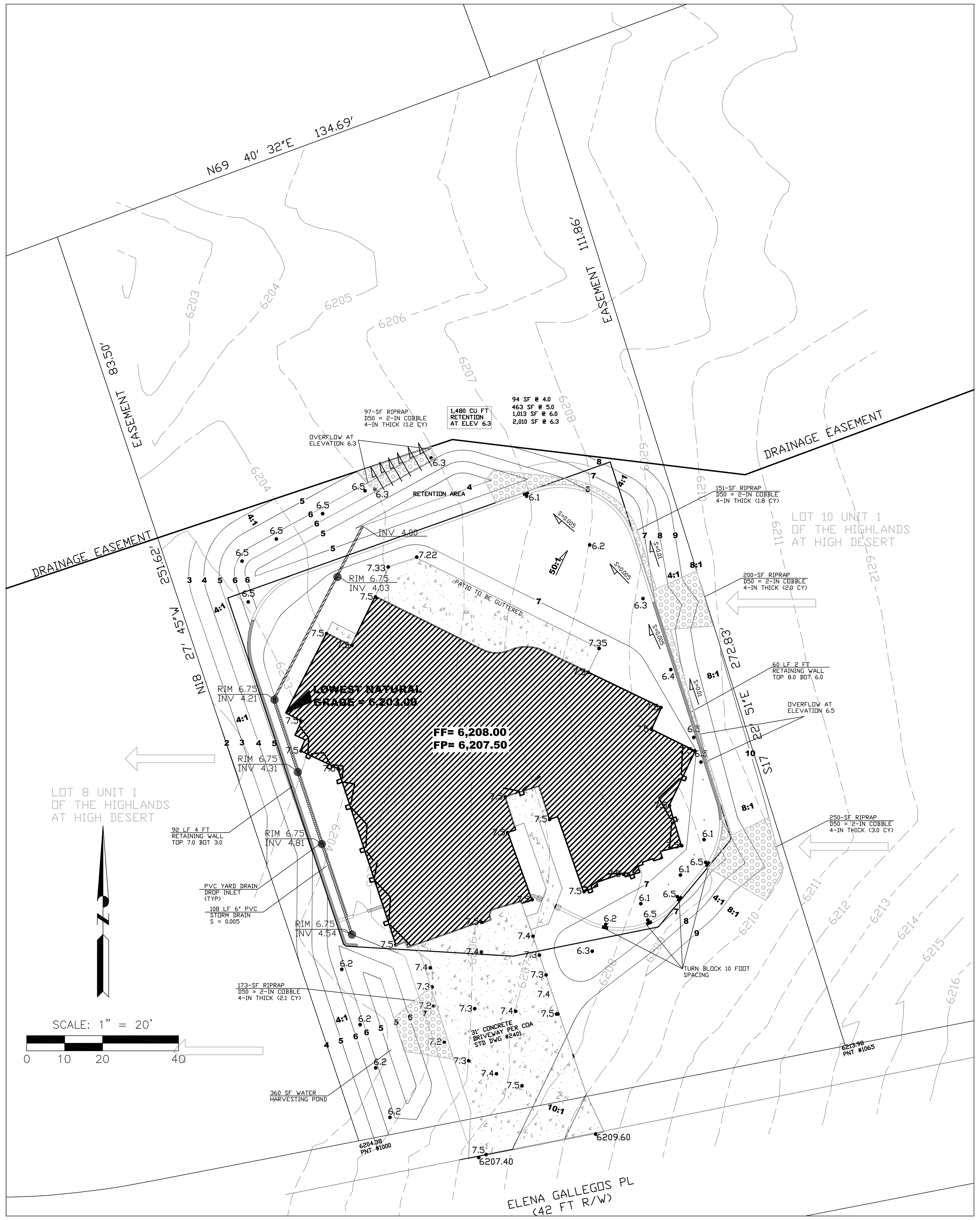

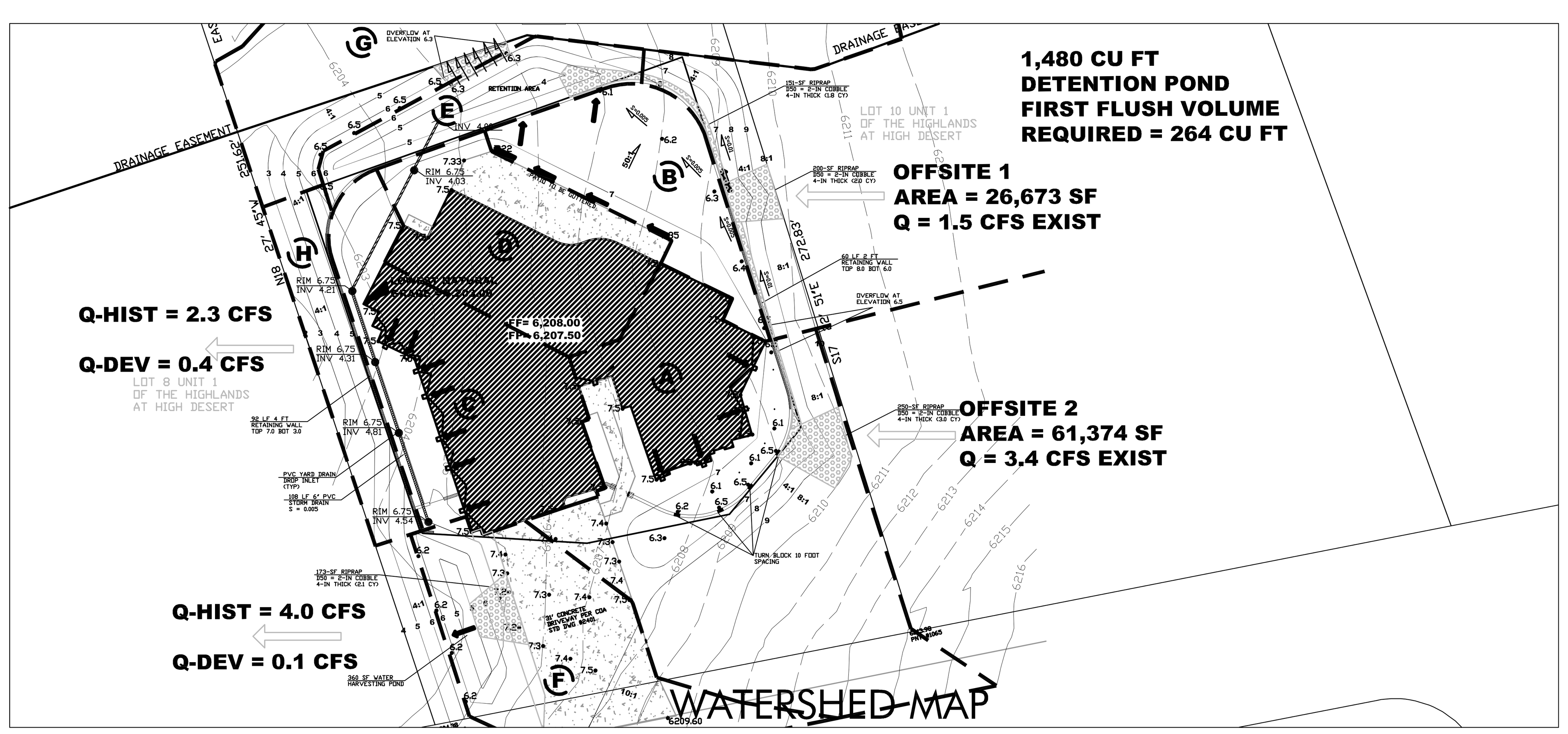

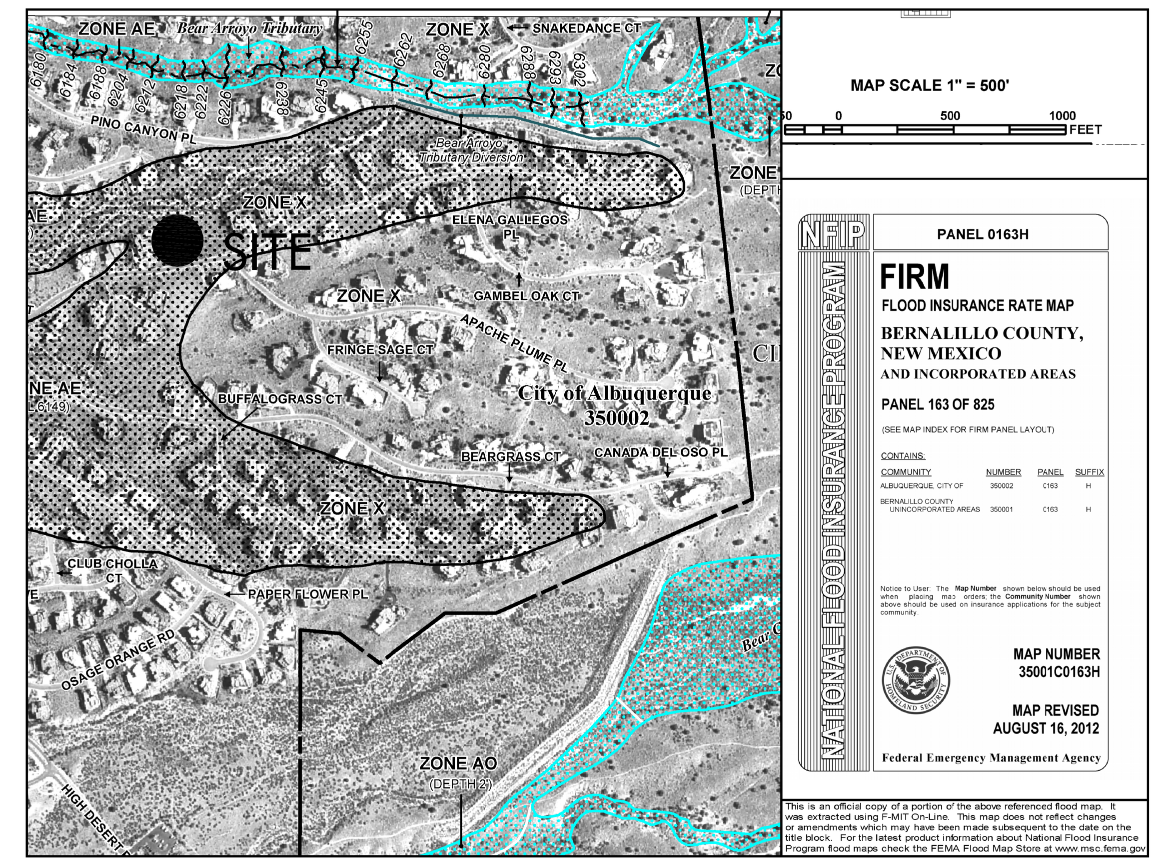

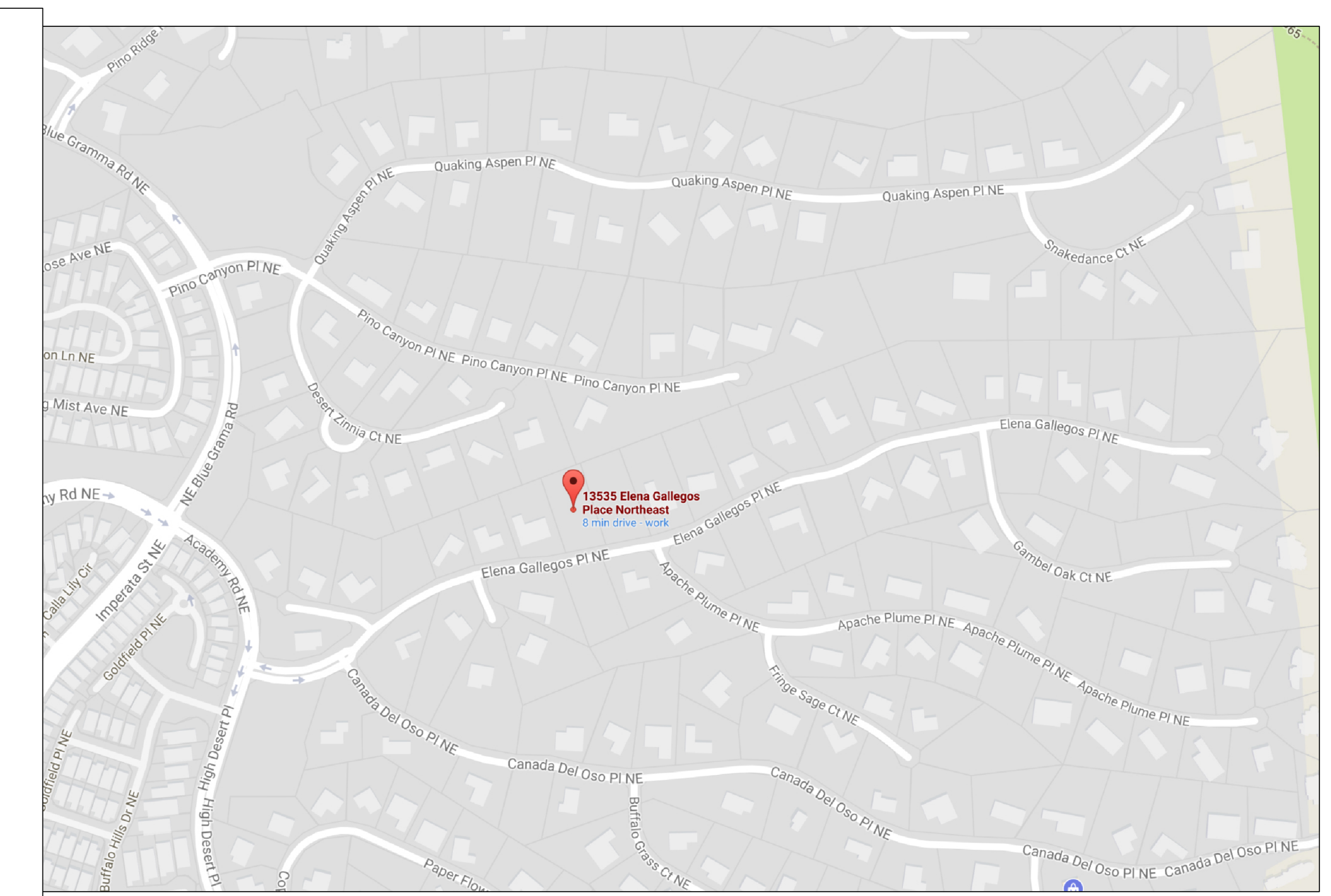

TRAPEZOIDAL CHANNEL

Normal depth and critical depth parameters

Eastern Swale

Input variables:			Output Parameters:		
Discharge	1.5	cfs	**Normal depth**	**0.67**	ft
Channel slope	0.01000	ft/ft	Normal velocity	1.67	fps
Manning's n	0.035		Froude number	0.51	
Bottom width	0	ft	Critical Depth	0.52	ft
Left side slope	0	H:1	EGL Depth	0.71	ft
Right side slope	4	H:1	Scour Depth	0.81	ft
			Superelevation	0.00	ft
Curve Radius	1000	ft	Freeboard	2.04	ft
			Channel Depth	2.71	ft
			Sequent Depth	**0.46**	ft

Note: Freeboard = (2+0.025(velocity)(depth)^(1/3)) BURAK

RECTANGULAR GRATE DROP INLET

SUMP CONDITION

6"x6" Grated Yard Drop Inlet

Flow depth, y.........	0.20	feet	Weir flow.......	0.27	cfs
Grate open area, A.....	0.25	sq.ft.	Orifice flow......	0.30	cfs
Grate Perimeter, P...	2.00	feet			
Clogging percentage...	50	%			

1. Orifice condition depends on bar config., grate size, depth.
2. Equations from FHWA HEC-12 dated March, 1984. BURAK

PARTIALLY FULL PIPE

Manning's Equation for flow capacity in a circular pipe.

12-Inch Storm Drain Pipe

Input variables:			Output variables:		
			Capacity at d	1.66	cfs
Normal depth, d	10	in	Normal velocity	2.38	fps
Pipe slope	0.0050	ft/ft	Critical depth	7.47	in
Pipe diameter	12	in	Critical velocity	2.26	fps
Manning's n	0.020		Critical slope	0.005	ft/ft

BURAK

Hydrologic Calculations - COA DPM 22.2

13535 Elena Gallegos Pl NE — October 2017

Precipitation (inches)	P60	P360	P1440	P4days	P10days
Zone 4	2.14	2.6	3.1	3.95	4.9

	A	B	C	D	A	B	C	D
Excess Precipitation (inches)	0.66	0.92	1.29	2.36	0.66	0.92	1.29	2.36
Peak Discharge (cfs/acre)	2.2	2.92	3.73	5.25	2.2	2.92	3.73	5.25

Drainage Areas — Land Treatments - Existing Conditions

Drainage Areas	A		B		C		D		Area (sf)
Offsite 1	0.46	75%	0.15	25%	0.00	0%	0.00	0%	26,673
Offsite 2	1.06	75%	0.35	25%	0.00	0%	0.00	0%	61,374
Basin A	0.14	75%	0.05	25%	0.00	0%	0.00	0%	7,842
Basin B	0.04	75%	0.01	25%	0.00	0%	0.00	0%	2,034
Basin C	0.06	75%	0.02	25%	0.00	0%	0.00	0%	3,538
Basin D	0.05	75%	0.02	25%	0.00	0%	0.00	0%	2,769
Basin E	0.02	75%	0.01	25%	0.00	0%	0.00	0%	1,327
Basin F	0.06	75%	0.02	25%	0.00	0%	0.00	0%	3,411
Basin G	0.10	75%	0.03	25%	0.00	0%	0.00	0%	5,849
Basin H	0.02	75%	0.01	25%	0.00	0%	0.00	0%	1,333

Fully Developed Conditions

Drainage Areas	A		B		C		D		Area (sf)
Offsite 1	0.00	0%	0.20	32%	0.20	33%	0.21	35%	26,673
Offsite 2	0.00	0%	0.45	32%	0.46	33%	0.49	35%	61,374
Basin A	0.06	32%	0.03	19%	0.03	14%	0.06	35%	7,842
Basin B	0.00	0%	0.05	100%	0.00	0%	0.00	0%	2,034
Basin C	0.00	0%	0.00	0%	0.02	30%	0.06	70%	3,538
Basin D	0.00	0%	0.01	13%	0.00	0%	0.06	87%	2,769
Basin E	0.00	0%	0.00	0%	0.03	100%	0.00	0%	1,327
Basin F	0.00	0%	0.00	0%	0.03	35%	0.05	65%	3,411
Basin G	0.12	89%	0.00	0%	0.01	11%	0.00	0%	5,849
Basin H	0.00	0%	0.00	0%	0.03	100%	0.00	0%	1,333

Discharge — Peak Flow Rate - Existing Conditions / Peak Flow Rate - Developed Conditions

Discharge	A	B	C	D	100 yr Q (cfs)	A	B	C	D	100 yr Q (cfs)
Offsite 1	1.01	0.45	0.00	0.00	1.5	0.00	0.57	0.75	1.13	2.5
Offsite 2	2.32	1.03	0.00	0.00	3.4	0.00	1.32	1.73	2.59	5.6
Basin A	0.30	0.13	0.00	0.00	0.4	0.13	0.10	0.10	0.33	0.7
Basin B	0.08	0.03	0.00	0.00	0.1	0.00	0.14	0.00	0.00	0.1
Basin C	0.13	0.06	0.00	0.00	0.2	0.00	0.00	0.09	0.30	0.4
Basin D	0.10	0.05	0.00	0.00	0.2	0.00	0.02	0.00	0.29	0.3
Basin E	0.05	0.02	0.00	0.00	0.1	0.00	0.00	0.11	0.00	0.1
Basin F	0.13	0.06	0.00	0.00	0.2	0.00	0.00	0.10	0.27	0.4
Basin G	0.22	0.10	0.00	0.00	0.3	0.26	0.00	0.06	0.00	0.3
Basin H	0.05	0.02	0.00	0.00	0.1	0.00	0.00	0.11	0.00	0.1

Existing		Developed	
Offsite 2	3.35	Offsite 2 (existing)	3.35
Basin A	0.43	Basin A	0.65
Basin F	0.19	Offsite 1 (existing)	1.46
	3.97	Basin B	0.14
		Basin C	0.39
Offsite 1	1.46	Basin D	0.31
Basin B	0.11	Basin E	0.11
Basin C	0.19	Discharge to Pond.....	**6.42**
Basin D	0.15		
Basin G	0.32		
Basin H	0.07		
	2.31		
Existing Discharge From Site:	**6.27**	Proposed Discharge From Site:	**0.50**

Volume Six Hour — Runoff Volume - Existing Conditions, Six Hour Storm / Runoff Volume - Developed Conditions, Six Hour Storm

Volume Six Hour	A	B	C	D	100 yr V (cu-ft)	A	B	C	D	100 yr V (cu-ft)
Offsite 1	1,100	511	0	0	1,611	0	654	946	1,836	3,437
Offsite 2	2,532	1,176	0	0	3,708	0	1,506	2,177	4,225	7,908
Basin A	323	150	0	0	474	139	114	120	537	910
Basin B	84	39	0	0	123	0	156	0	0	156
Basin C	146	68	0	0	214	0	0	115	487	602
Basin D	114	53	0	0	167	0	28	0	474	501
Basin E	55	25	0	0	80	0	0	143	0	143
Basin F	141	65	0	0	206	0	0	129	436	565
Basin G	241	112	0	0	353	286	0	70	0	356
Basin H	55	26	0	0	81	0	0	143	0	143

Volume Ten Day — Runoff Volume - Existing Conditions, Ten Day Storm Event / Runoff Volume - Developed Conditions, Ten Day Storm Event

Volume Ten Day	Existing 100 yr V (cu-ft)	Developed 100 yr V (cu-ft)
Offsite 1	1,612	5,226
Offsite 2	3,708	12,025
Basin A	474	1,433
Basin B	123	156
Basin C	214	1,076
Basin D	167	963
Basin E	80	143
Basin F	206	990
Basin G	353	356
Basin H	81	143
	1,698	**5,260**

Ten Day Storm Event

	exist.	developed	
Basin A	474	1,433	960
Basin B	123	156	33
Basin C	214	1,076	863
Basin D	167	963	796
Basin E	80	143	62
			2,714
Basin F	206	990	783

Six Hour Storm Event

	exist.	developed	
Basin A	474	910	436
Basin B	123	156	33
Basin C	214	602	388
Basin D	167	501	334
Basin E	80	143	62
			1,254
Basin F	206	565	359

Site Location - As shown by the Vicinity Map, the 0.79-acre site is located on Elena Gallegos Place NE, approximately 150 feet east of Apache Plume Place. At present, the site is undeveloped and drains roughly from east to west to an adjacent developed lot then northwest to an existing arroyo / drainage easement. The purpose of this project is to develop the property to construct a residential structure.

Legal Description - 13535 Elena Gallegos Place, NE. Lot 9, Unit 1 of the Highlands at High Desert, Albuquerque, New Mexico.

Flood Zone - As shown by Panel 163 of 825 of the National Flood Insurance Program Flood Insurance Rate Maps (FIRM) for Bernalillo County, New Mexico, dated August 16, 2012, this site does not lie within a designated flood hazard zone.

Existing Conditions – Currently, the site is undeveloped. No grading has been conducted on the property and it is in historical conditions covered in native vegetation. Runoff from upstream comprises approximately two acres of undeveloped property. The offsite runoff impacts the subject property in two distinct locations. The northern drainage basin (No.2) crosses the east boundary of the property then crosses to discharge onto the property to the west just south of the existing drainage easement boundary. The southern drainage basin (No.1) crosses the property and continues westward across the adjacent driveway of the property to the west. The offsite upstream watersheds are about one-half acre and 1.25 acres in size and currently discharge approximately 1.4-cfs and 3.4-cfs onto the property from the east. The subject property currently discharges 0.65-cfs and 0.71-cfs onto the property to the west.

Hydrologic Methods - The drainage calculations estimate the potential runoff from the project site to assess the peak flow rate at the outfall of the project site culminating at the western property boundary. The calculations which appear hereon analyze both the existing and fully developed conditions for the 100-year, 6-hour rainfall event. Two offsite basins and eight on-site basins were assessed. See attached spreadsheet for calculations.

First Flush Management – The first flush has been mitigated based on 9,300 sf of the project site to be impervious. This equates to an area of 9,300*0.34/12 or 264 cubic feet. This storage has been provided on the plan by implementing a shallow retention basin into the front landscaped area of the property and an additional larger basin north of the garden wall. Offsite Basins 1 and 2 and Basins A-E all drain into these retention areas with a total available retention volume of 1,480 cubic feet.

Proposed Conditions – The residence to be constructed has a finished floor elevation of 6,208 feet. To provide a usable pad and rear yard, the eastern portion needs to be cut approximately three to four feet to provide for drainage. The western portion of the property needs to be filled up to six feet. To maintain the proscribed 4:1 maximum cut and fill slopes, retaining walls will need to be installed along the eastern and western building envelopes as shown on the plan. All cut and fill slopes are to have a maximum slope of 4:1 and are to be revegetated with native planting (High Desert Mix and High Desert Guidelines for Sustainability). The front drive will be concrete and will gain access to the front entrance of the home from Elena Gallegos Place. The landscaped area east and adjacent to the driveway will be depressed almost one foot to obtain a maximum retention capacity of 200 cubic feet of runoff volume. This depressed area will be landscaped and the front portion of the property and Offsite Area 2 will discharge into this area. The ponding area will overflow north to the rear of the property along the western side of the proposed garden wall at elevation 6,206.5 feet for a maximum storage depth of one-half foot. The overflow runoff will continue north across the grassed rear yard at a slope of 0.5% to discharge through a turned block on the northern garden wall.

A swale along the eastern side of the eastern garden/retaining wall will intercept Offsite Area 1. It will be sloped at one percent and will be lined with cobble. The runoff (1.5-cfs) impacting the swale will generate a depth of 0.67-feet and a velocity of only 1.67-fps.

The rear patio will be guttered to a single point at the northwest corner. The rear and side yards are to be graded at a 2% to 5% slope away from the house. The rear yard within the garden wall will be sodded. The side yard areas are to be graveled and landscaped with native plantings. All graded and disturbed areas within the property are to be reseeded and vegetated in accordance with the High Desert Guidelines for Sustainability.

A 12-inch HDPE pipe is to be installed along the westerly garden wall to intercept the developed runoff from the roof canals. At the slope shown on the plan, the capacity of the pipe was estimated at 1.66-cfs. Five small yard drain drop inlets are to be installed as shown on the plan to intercept the sheet flow runoff from the canales. Each of the inlets should have a capacity of about one-half cfs each. The storm drain pipe will extend to the northern retention area. All of the inlets are to be installed with a minimum sump of two to three inches in depth. The runoff from the canales will sheet flow across the graveled western yard to the west to be intercepted by the canales. Distinct swales are not recommended as long as positive slope is developed between the finished pad and the western wall and drop inlets.

The concept of this development is to blend harmoniously into the existing environment. The area within the garden wall will be graded to a minimum slope to ensure that any runoff impacting the area will be spread into sheet flow to minimize discharge, depths and velocities associated with the design rainfall event.

REVISION	BY	DATE	MARK

DESIGNED BY:

DRAWN BY:

CHECKED BY:

MARK H. BURAK — NEW MEXICO — 10987 — REGISTERED PROFESSIONAL ENGINEER

11/03/2017

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1512 Sagebrush Trail SE
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(505) 296-0461

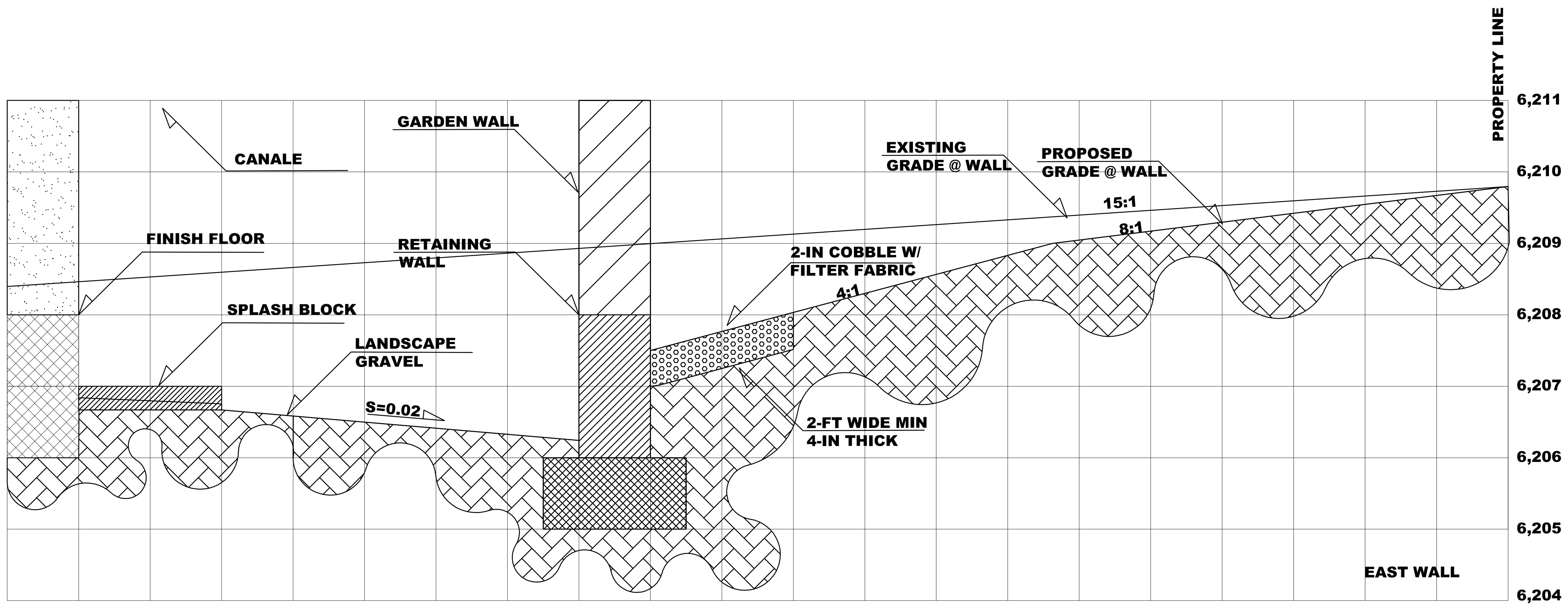
Civil Engineering
BURAK Consulting
Development and Design Services

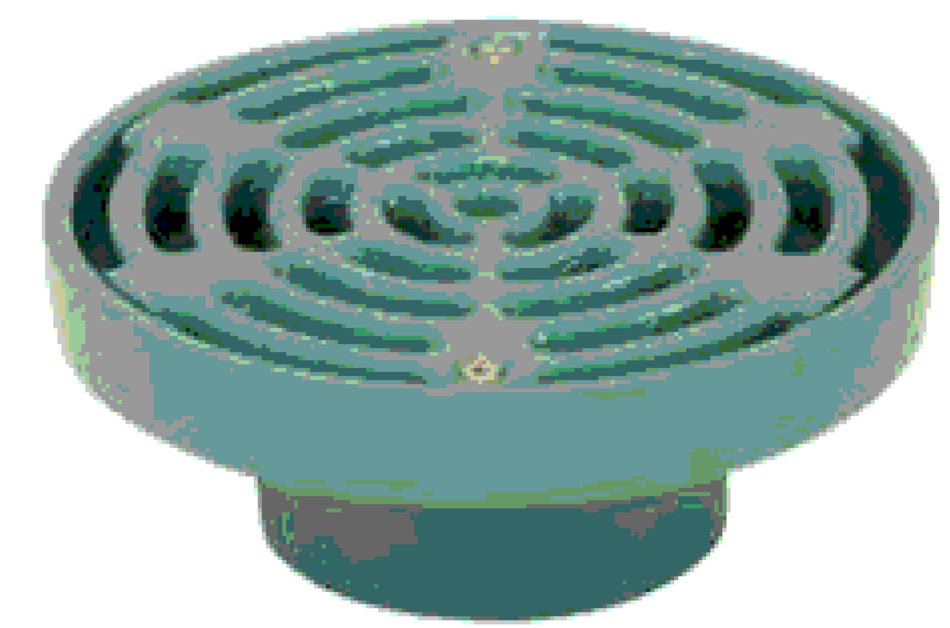
Scott Patrick Homes

13535 Elena Gallegos Pl. NE

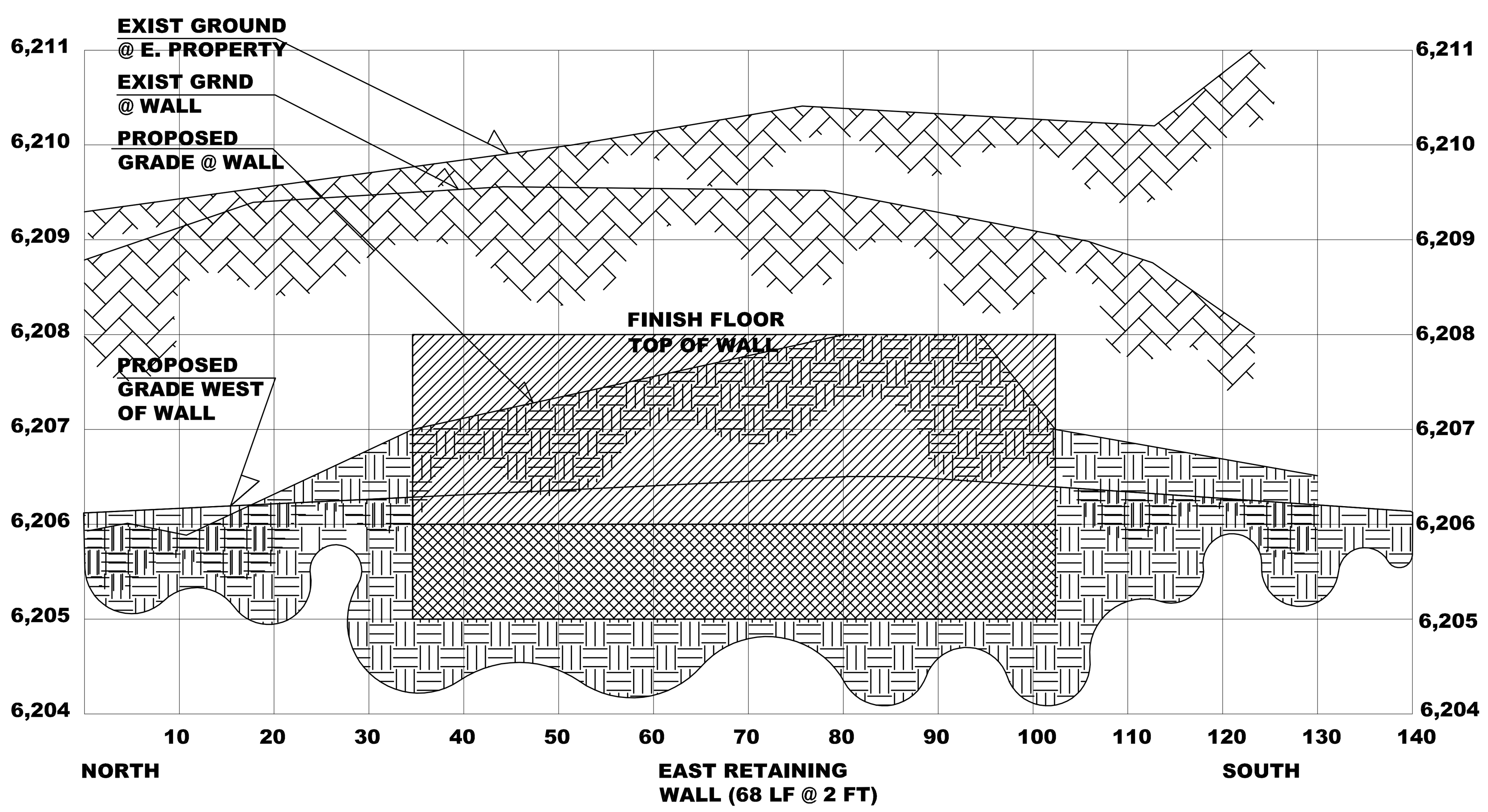
DRAWING NUMBER

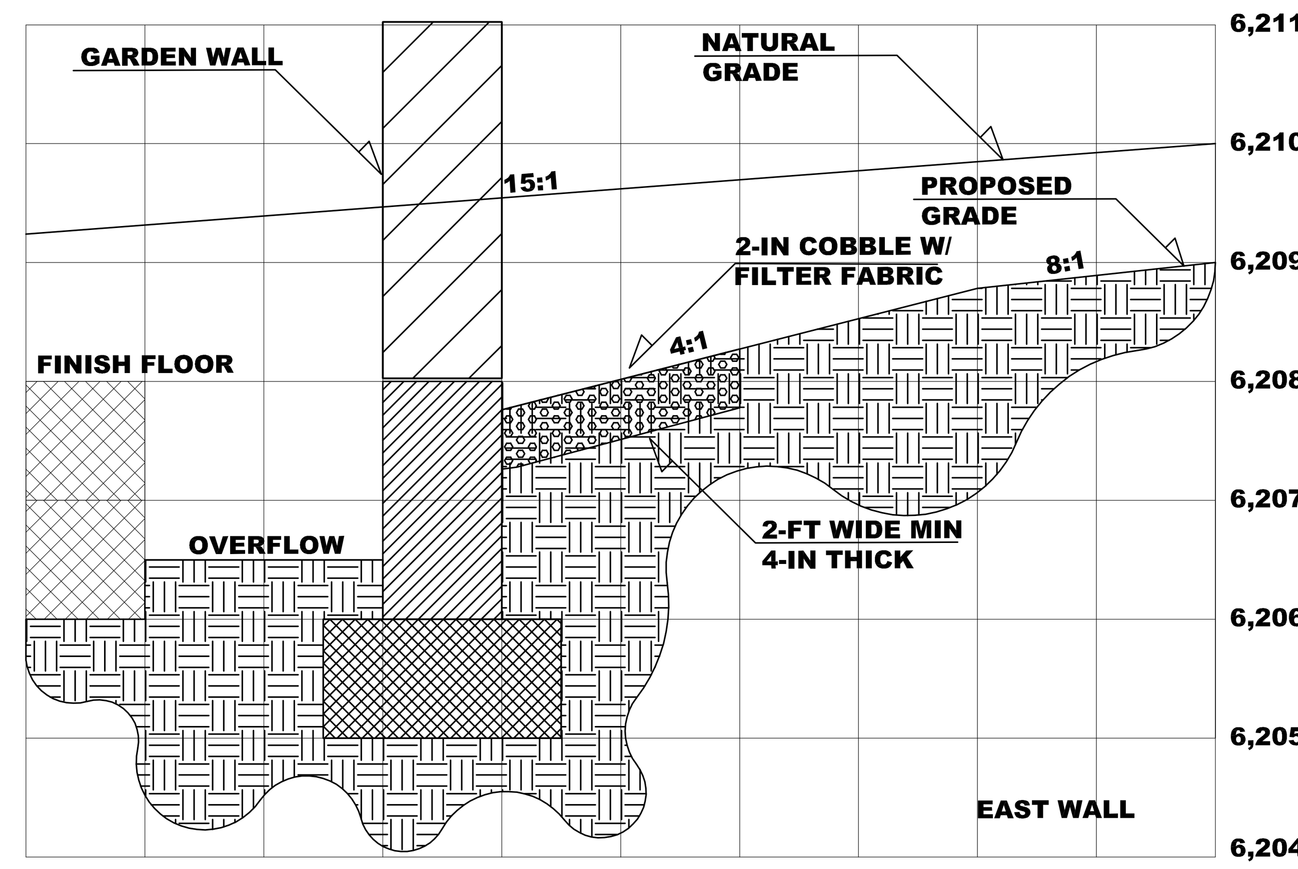
1 OF 2

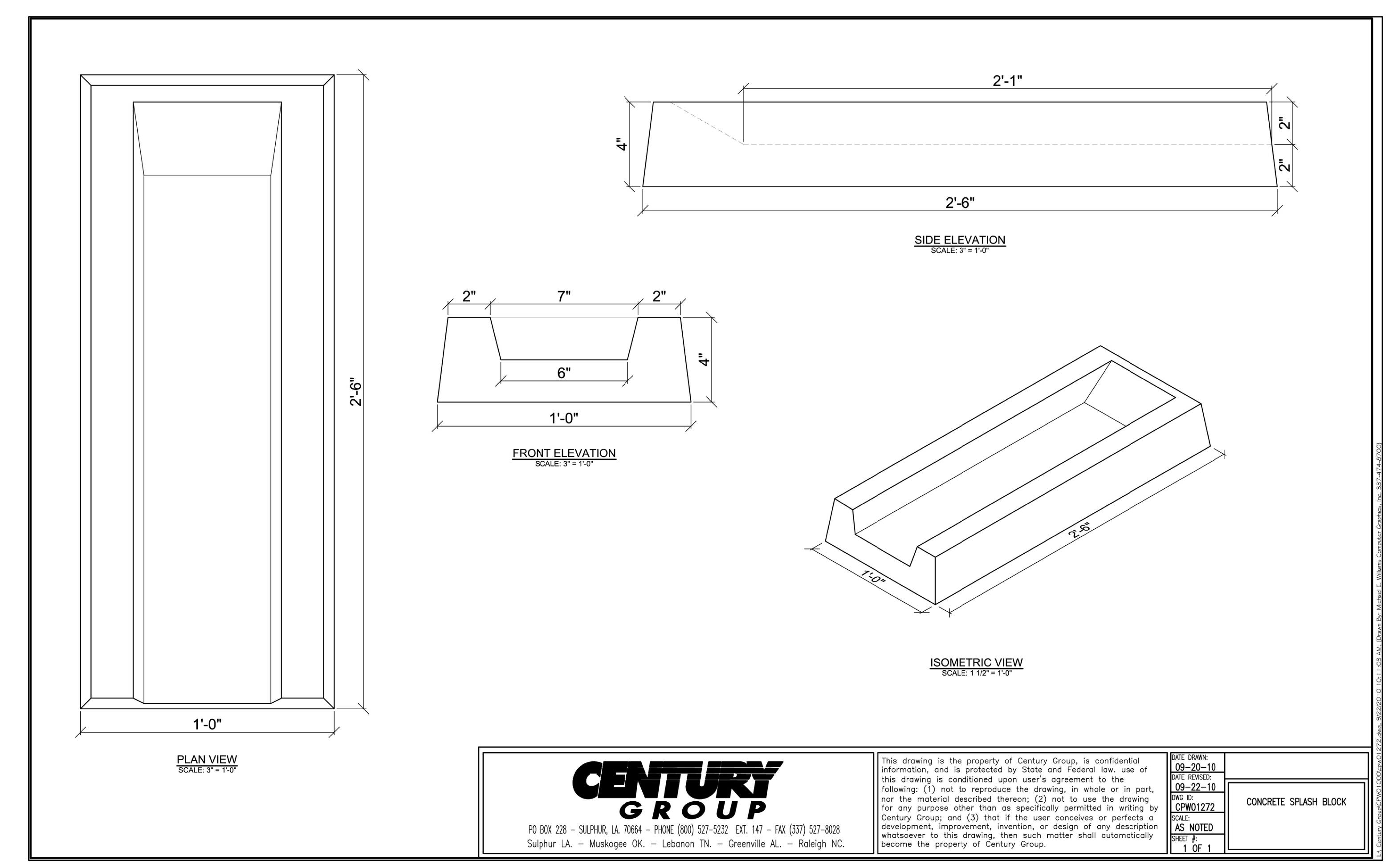




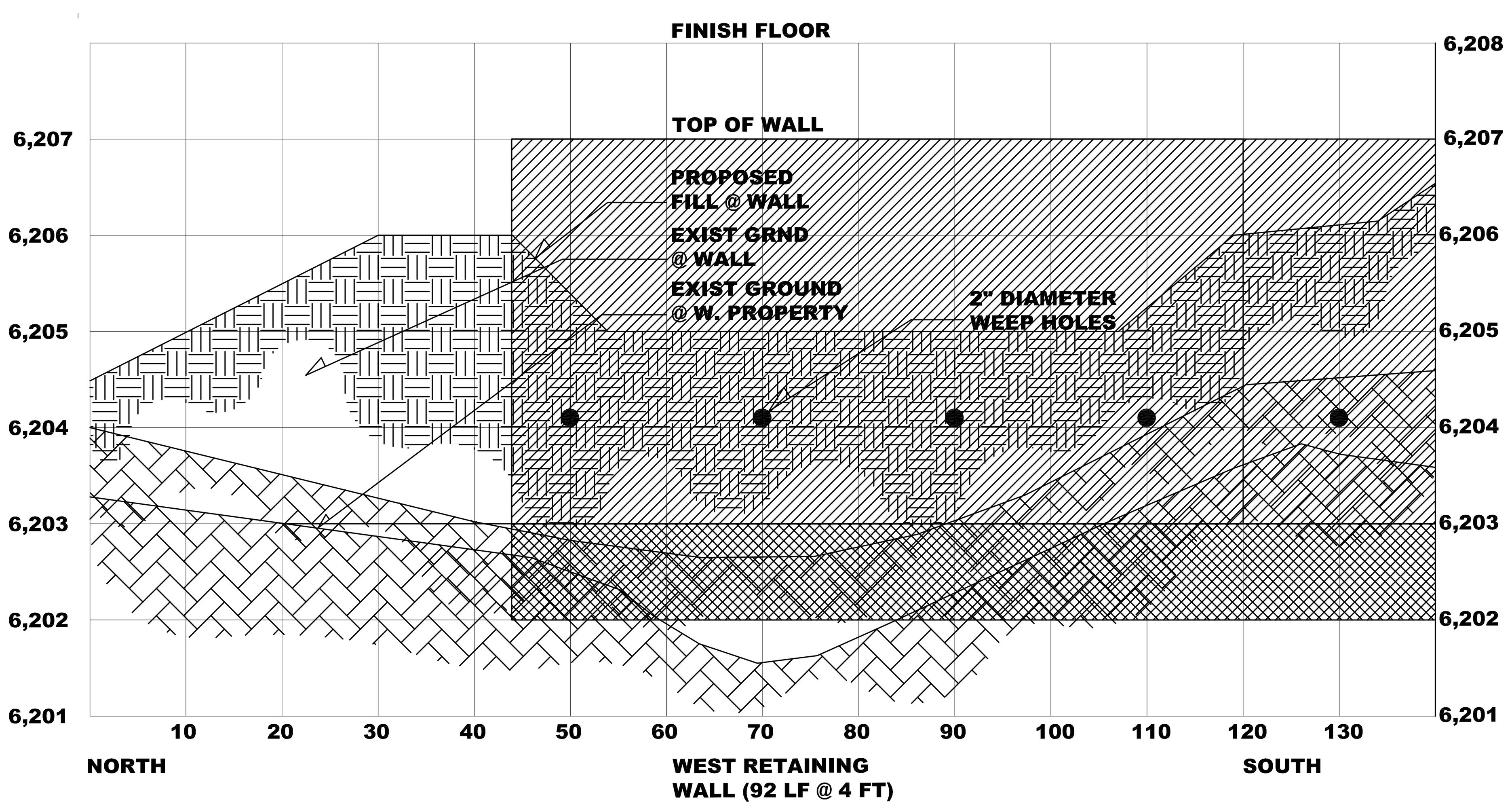
TYPICAL DROP INLET

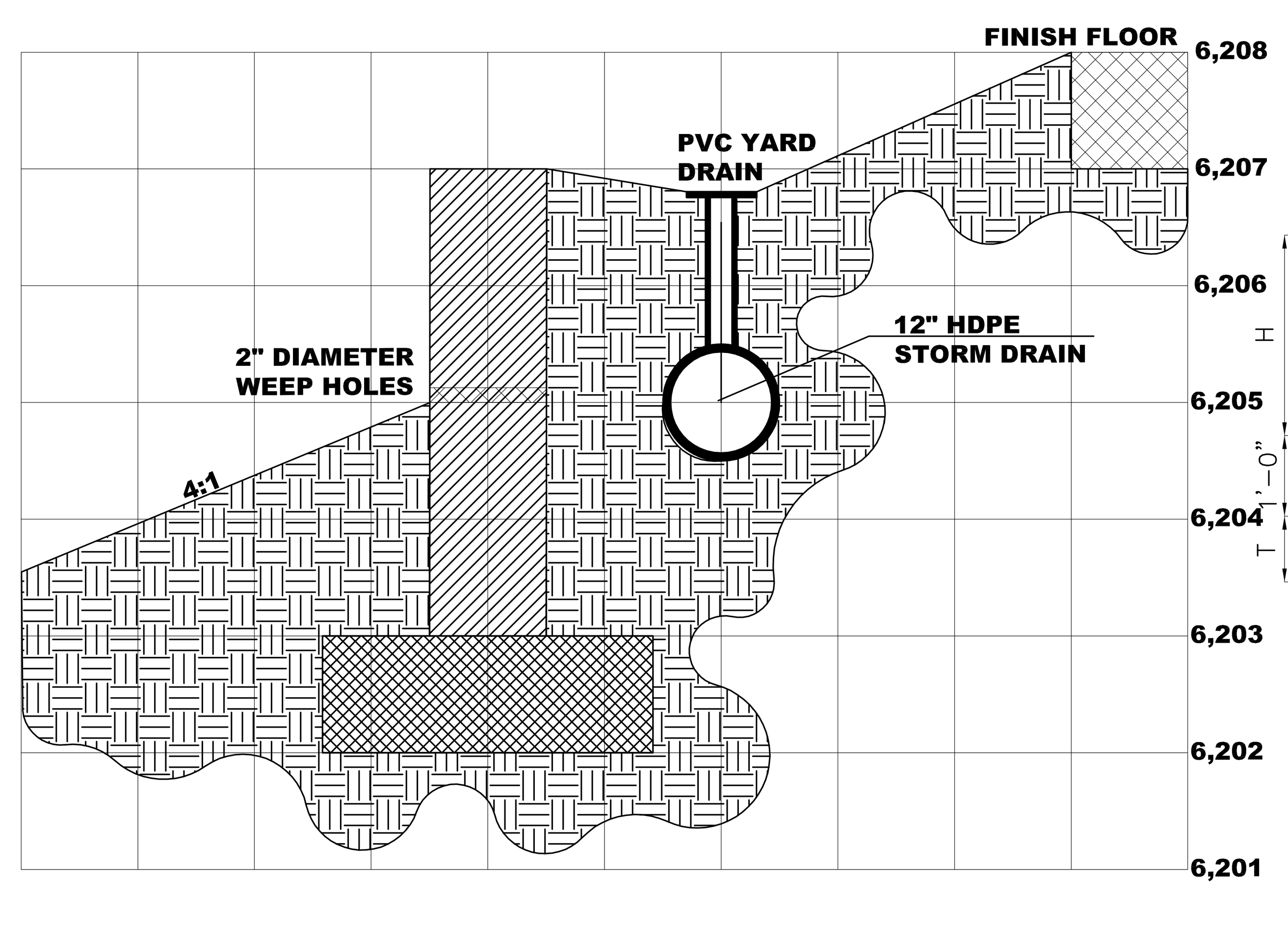


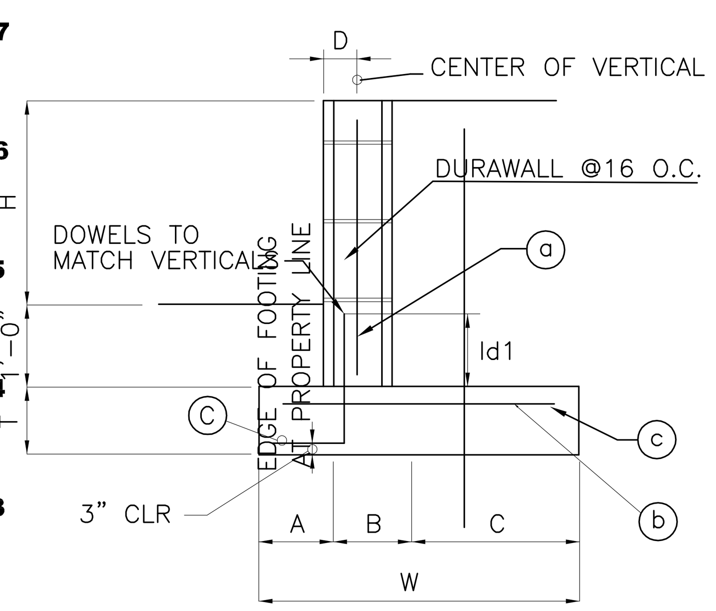




TYPICAL SPLASH BLOCK







RETAINING WALL DIMENSIONS & REINFORCEMENT										
MIN. DIMENSIONS							STEEL REINFORCEMENT			
H	T	A	B	C	D	W	a	b	c	ld1
2'	1'–0"	0'–6"	0'–8"	0'–10"	5 1/4"	2'–0"	#5@24" o.c.	#5@16"	#4@16"	1'–6"
3'	1'–0"	0'–6"	0'–8"	1'–3"	5 1/4"	2'–5"	#5@16" o.c.	#5@16"	#4@16"	1'–6"
4'	1'–0"	1'–0"	0'–8"	1'–2"	6 1/4"	2'–10"	#5@16" o.c.	#5@16"	#4@16"	1'–6"
5'	1'–0"	1'–0"	0'–8"	1'–9"	6 1/4"	3'–5"	#5@8" o.c.	#5@16"	#4@16"	1'–6"
6'	1'–0"	1'–0"	0'–8"	2'–6"	6 1/4"	4'–2"	#5@8" o.c.	#5@16"	#4@16"	1'–6"

RETAINING WALL DETAILS

REVISION	BY	DATE	MARK

DESIGNED BY:

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CHECKED BY:

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2 OF 2