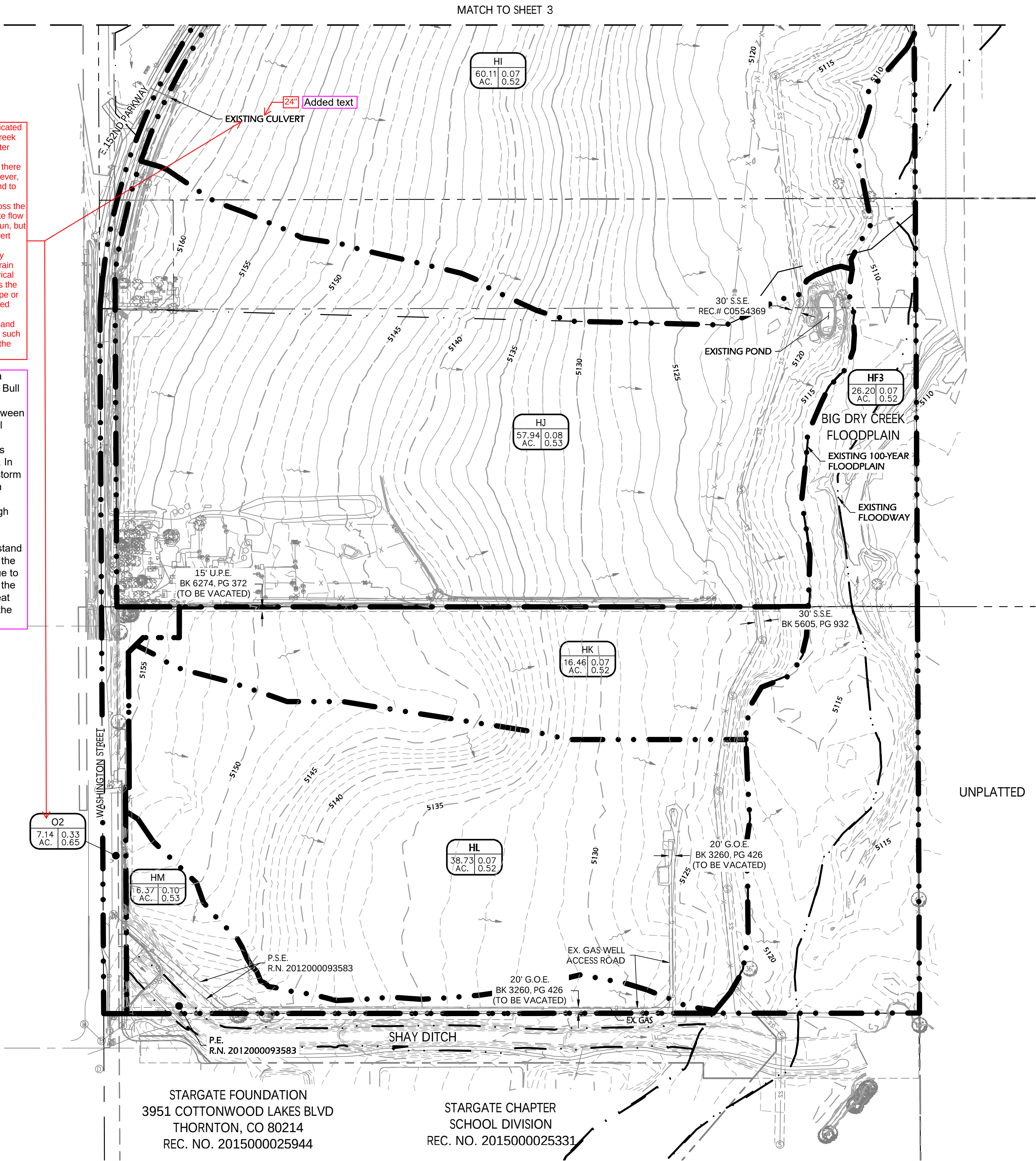


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The existing drainage is more complicated than what is shown here. The City Creek development will need to provide water quality for the ultimate east half of Washington Street, so it is good that there is a basin to define those limits. However, there is a considerable amount of land to the west of the Washington Street centerline that drains to the east across the City Creek project. Much of this offsite flow is via the Shay Ditch and Mustang Run, but not all of it. There is at least one culvert under Washington Street near the intersection with 152nd Parkway. Any offsite basins must be permitted to drain via their historical path, at their historical rates. Offsite basins that drain across the City Creek development via either pipe or sheet flow need to have basins defined accordingly to determine the existing condition flow rates. The Shay Ditch and Mustang Run basins would not need such basin definitions for the purposes of the drainage report.

This existing culvert drains to a ditch along E. 152nd Parkway. Bull Canal currently diverts away stormwater from the parcel between Washington Street and the Bull Canal. The Washington Street Improvements project proposes curb & gutter and storm sewer. In coordination discussions, the storm sewer proposed in Washington Street is not currently conceptualized as going through City Creek. We will remain in coordination with the adjacent projects' engineers. We understand that existing drainage entering the site must be allowed to continue to do so at historic rates and that the project must be prepared to treat the water quality of the half of the street adjacent to the project.



LEGEND

- Property Line
- Easement Line
- SS Ex. Sanitary Sewer Line
- W Ex. Water Line
- STM Ex. Storm Sewer Line
- X Ex. Fence
- Floodplain Line
- Basin Boundary Line
- Existing Major Contour
- Existing Minor Contour
- Ex. Flow Direction Arrow
- Drainage Basin ID

Drainage Basin ID: A (Acre), C5 (C100)

Calculated Historic Runoff					
Design Point	Total Area (Ac.)	Tc (min)	Peak Flow (cfs) Q _s	Q ₁₀₀	
HA	7.75	20.0	1.51	21.31	
HB	36.41	28.9	5.77	81.74	
HC	32.10	17.6	6.79	94.47	
HD	23.61	25.0	3.97	57.56	
HE	17.24	21.1	3.54	45.67	
HF1	8.44	25.4	1.41	20.41	
HF2	4.68	22.3	0.84	12.14	
HF3	26.20	55.4	2.70	39.07	
HG	7.44	18.8	1.46	21.11	
HH	12.64	20.8	2.35	34.07	
HI	60.11	34.5	8.44	121.35	
HJ	57.94	34.8	9.45	117.72	
HK	16.46	33.0	2.36	34.13	
HL	38.73	33.1	5.73	80.38	
HM	6.37	17.2	1.81	19.43	
O1	2.05	5.0	3.43	12.51	
O2	7.14	5.0	11.01	42.62	

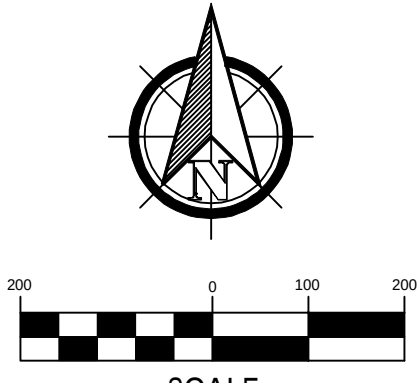
EASEMENT ABBREVIATIONS

U.P.E. = UNITED POWER
U.E. = UTILITY
G.O.E. = GRANT OF
P.S.E. = PERPETUAL SLOPE
P.E. = PERPETUAL
S.S.E. = SANITARY SEWER

PROJECT BENCHMARK:

CITY OF THORNTON BENCHMARK 144-30 (NEAR AZTEC #73)
THE NORTHWEST BOLT, MARKED BY A TRIAD OF PUNCH MARKS, ON THE BASE OF THE POWER TOWER (NO. G-31) IN THE SOUTHEAST QUADRANT OF 144TH AVENUE AND WASHINGTON STREET.

NAVD 88 DATUM ELEVATION OF 5148.24.



12071 Tejon Street, Suite 470
Westminster, CO 80234
303.421.4224
www.innovativelandinc.com

No.	1	2	3	4	5	6
Rev.						
Date:	November 9, 2018					2 of 5
Horiz. Scale:	1" = 200'					Job No.: 1050-04
Vert. Scale:	N/A					

City Creek

City of Thornton, Colorado

Preliminary Drainage Plan

Historic Drainage Pattern - 1

Client: 152nd and Washington, LLC

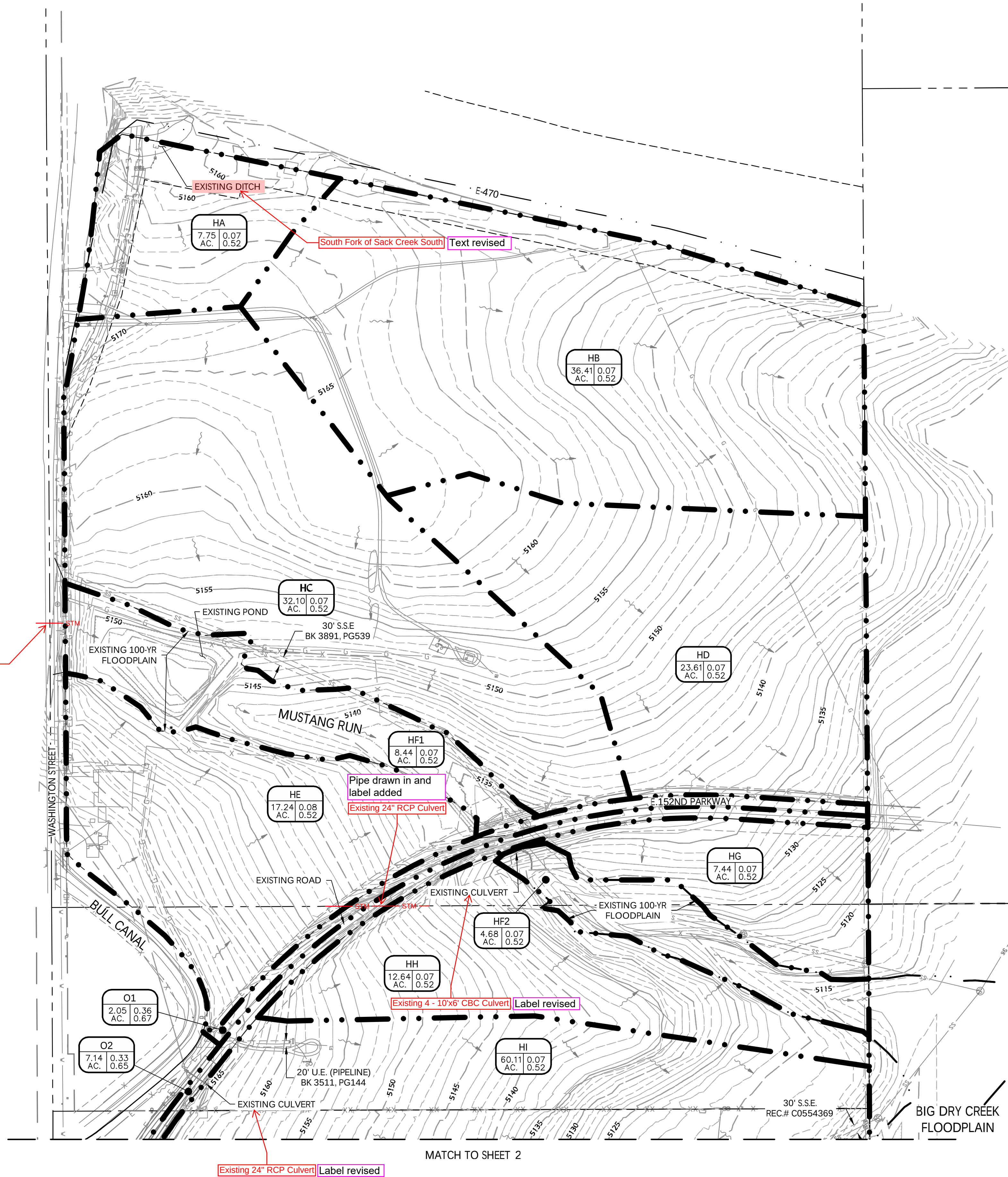
Address: 12460 1st St.
Eastlake, Colorado 80614

Contact: Clarke Carlson (303) 457-2966

Know what's below.
Call before you dig.

Sheet:	2
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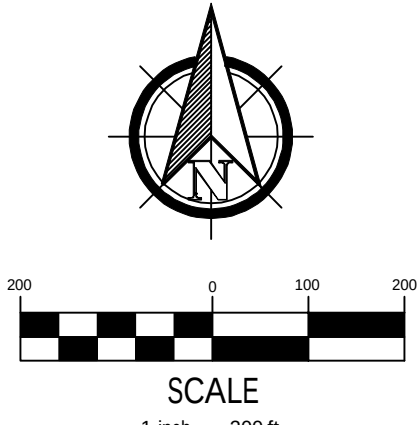
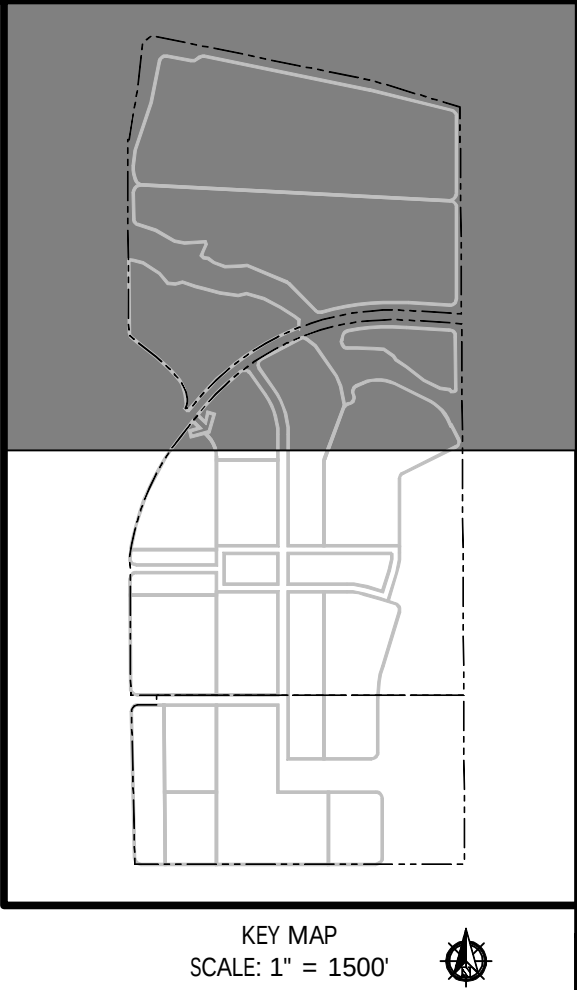


LEGEND	
	Property Line
	Easement Line
	Ex. Sanitary Sewer Line
	Ex. Water Line
	Ex. Storm Sewer Line
	Ex. Fence
	Floodplain Line
	Basin Boundary Line
	Existing Major Contour
	Existing Minor Contour
	Ex. Flow Direction Arrow
	Drainage Basin ID

Calculated Historic Runoff				
Design Point	Total Area (Ac.)	Tc (min)	Peak Flow (cfs)	Q ₁₀₀
HA	7.75	20.0	1.51	21.31
HB	36.41	28.9	5.77	81.74
HC	32.10	17.6	6.79	94.47
HD	23.61	25.0	3.97	57.56
HE	17.24	21.1	3.54	45.67
HF1	8.44	25.4	1.41	20.41
HF2	4.68	22.3	0.84	12.14
HF3	26.20	55.4	2.70	39.07
HG	7.44	18.8	1.46	21.11
HH	12.64	20.8	2.35	34.07
HI	60.11	34.5	8.44	121.35
HJ	57.94	34.8	9.45	117.72
HK	16.46	33.0	2.36	34.13
HL	38.73	33.1	5.73	80.38
HM	6.37	17.2	1.81	19.43
O1	2.05	5.0	3.43	12.51
O2	7.14	5.0	11.01	42.62

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NAVD 88 DATUM ELEVATION OF 5148.24.



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Revision Type:		Revision No.:		Revision Date:	
1		2		3	
4		5		6	

Date: November 9, 2018
Horiz. Scale: 1" = 200'
Vert. Scale: N/A

Designed By: ACS
Prepared By: ACS
Approved By: TRH

City Creek
City of Thornton, Colorado
Preliminary Drainage Plan
Historic Drainage Pattern - 2

Client: 152nd and Washington, LLC
Address: 12460 1st St.
Eastlake, Colorado 80614
Contact: Clarke Carlson (303) 457-2966

Know what's below.
Call before you dig.

Sheet:	3
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Basin boundaries have been updated.

The future layout for Washington Street and 152nd Parkway in this area will be different than shown here. Negotiations are ongoing regarding the layout to be used, but the basins will need to be updated to the new plan either way.

Basin boundaries have been updated.

MATCH TO SHEET 5

WASHINGTON STREET

E. 152ND PARKWAY

EXISTING CULVERT
PA-E
MULTI-FAMILY
± 11 AC

PA-G
SFD-SM/ SFA
± 7 AC

PA-H
SFD-SM/ SFA
± 13 AC

PA-I
SFD
± 20 AC

PA-J
MAIN STREET
COMMERCIAL
± 4.5 AC

PA-K
MULTI-FAMILY
± 12 AC

PA-L
SFD-SM/ SFA
± 9 AC

PA-M
SFD-SM/ SFA
± 8 AC

PA-N
SFD
± 14 AC

PA-O
RETAIL
± 7 AC

PA-P
MULTI-FAMILY/
SENIOR LIVING
± 6 AC

PA-Q
MULTI-FAMILY
± 5 AC

PA-R
SFD-SM/ SFA
± 19 AC

PA-S
SFD
± 6 AC

PA-3
POS
± 2 AC

PA-4
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STARGATE CHAPTER
SCHOOL DIVISION
REC. NO. 2015000025331

	Property Line
	Easement Line
	Planning Area Boundary
	Ex. Sanitary Sewer Line
	Ex. Water Line
	Ex. Storm Sewer Line
	Ex. Gas
	Ex. Underground Electric
	Ex. Overhead Electric
	Ex. Fence
	Floodplain Line
	Basin Boundary Line
	Proposed Major Contour
	Proposed Minor Contour
	Flow Direction Arrow

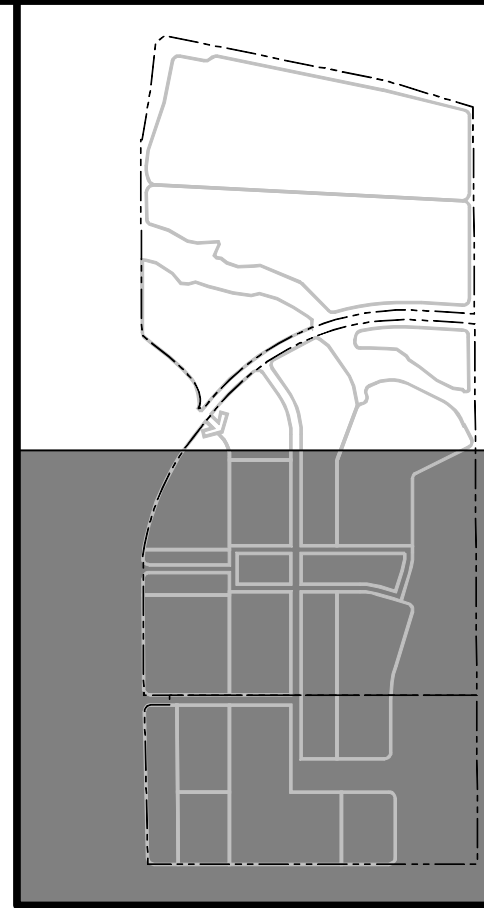
Calculated Proposed Runoff Rates				
Basin ID	Total Area (Ac.)	Tc (min)	Peak Flow (cfs)	Q ₁₀₀
A	0.41	5.0	0.17	1.99
B	46.38	12.8	107.92	246.95
C	32.10	8.7	87.16	199.44
D	21.38	9.6	55.97	128.08
E	17.24	7.3	46.85	111.00
HF1	8.44	25.4	1.41	20.41
HF2	4.68	22.3	0.84	12.14
HF3	26.20	55.4	2.70	39.07
G	7.44	5.4	27.63	57.85
H	4.58	16.6	3.29	15.88
I	66.40	16.7	107.64	286.02
J	59.71	17.2	90.84	250.61
K	17.21	15.9	28.60	76.29
L	38.27	16.1	64.51	168.83
M	6.07	5.0	19.78	45.06
O1	2.05	5.0	3.43	12.51
O2	7.14	5.0	11.01	42.62
Pond I	17.24	7.3	46.85	111.00
Pond II	32.10	8.7	87.16	199.44
Pond III	67.76	12.8	157.67	360.79
Pond IV	7.44	5.4	27.63	57.85
Pond V	66.40	16.7	107.64	286.02
Pond VI	115.19	17.2	180.88	487.66

Storage Table						
Required Storage	Volume (ac-ft)					
	Pond I	Pond II	Pond III	Pond IV	Pond V	Pond VI
WQCV	0.43	0.88	1.85	0.28	1.35	2.27
EURV	1.26	2.52	5.33	0.70	3.96	6.64
Total	1.26	2.52	5.33	0.70	3.96	6.64

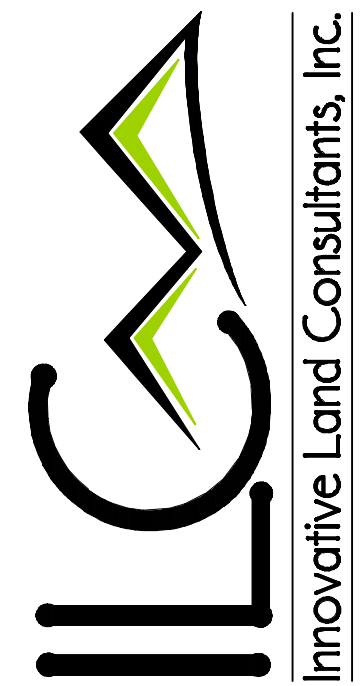
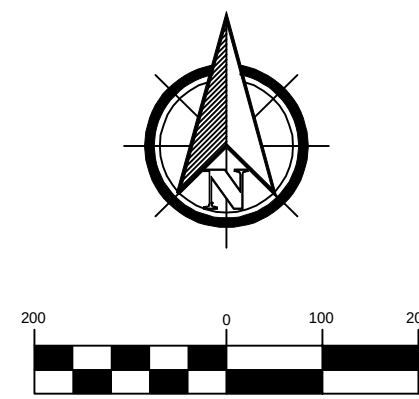
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THE NORTHWEST BOLT, MARKED BY A TRIAD OF PUNCH MARKS, ON THE BASE OF THE POWER TOWER (NO. G-31) IN THE SOUTHEAST QUADRANT OF 144TH AVENUE AND WASHINGTON STREET.

NAVD 88 DATUM ELEVATION OF 5148.24



KEY MAP
SCALE: 1" = 1500'



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No.	Rev.	Date:	Revision Type:	
1				
2				
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Designed By: ACS		Date: November 9, 2018	Sheet: 4 of 5	
Prepared By: ACS		Horiz. Scale: 1" = 200'		
Annotated By: TPH		Vert. Scale: N/A		Job No.: 1050-04

City Creek

City of Thornton, Colorado

Preliminary Drainage Plan

Proposed Drainage Pattern - 1

Proj Name:

152nd and Washington, LLC

Address: _____

12460 1st St.

Contact:



Know what's below.
Call before you dig.

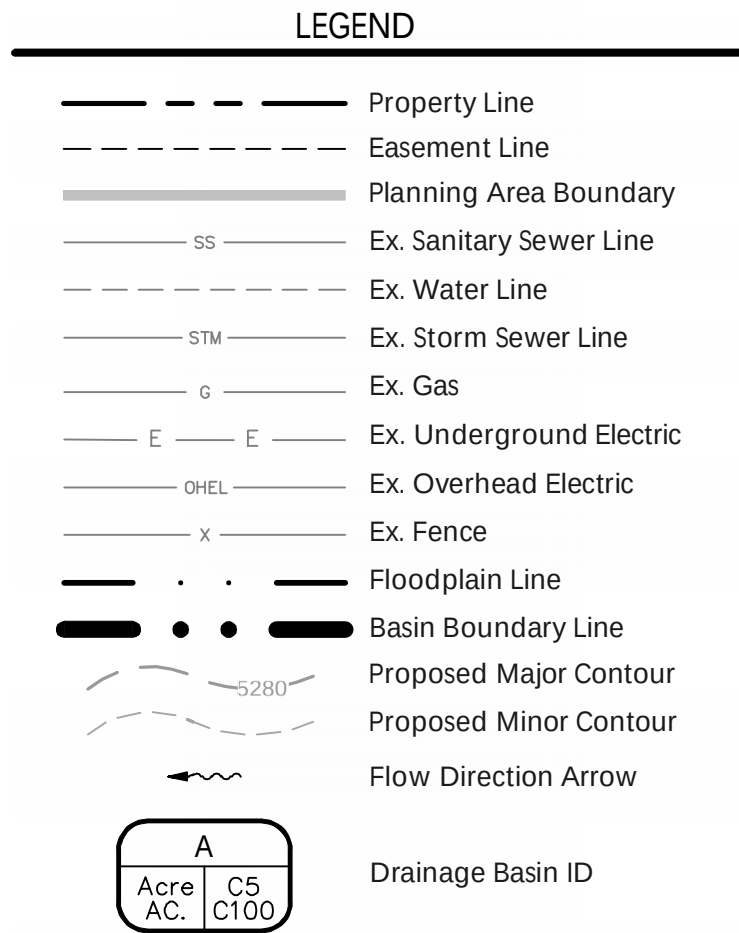
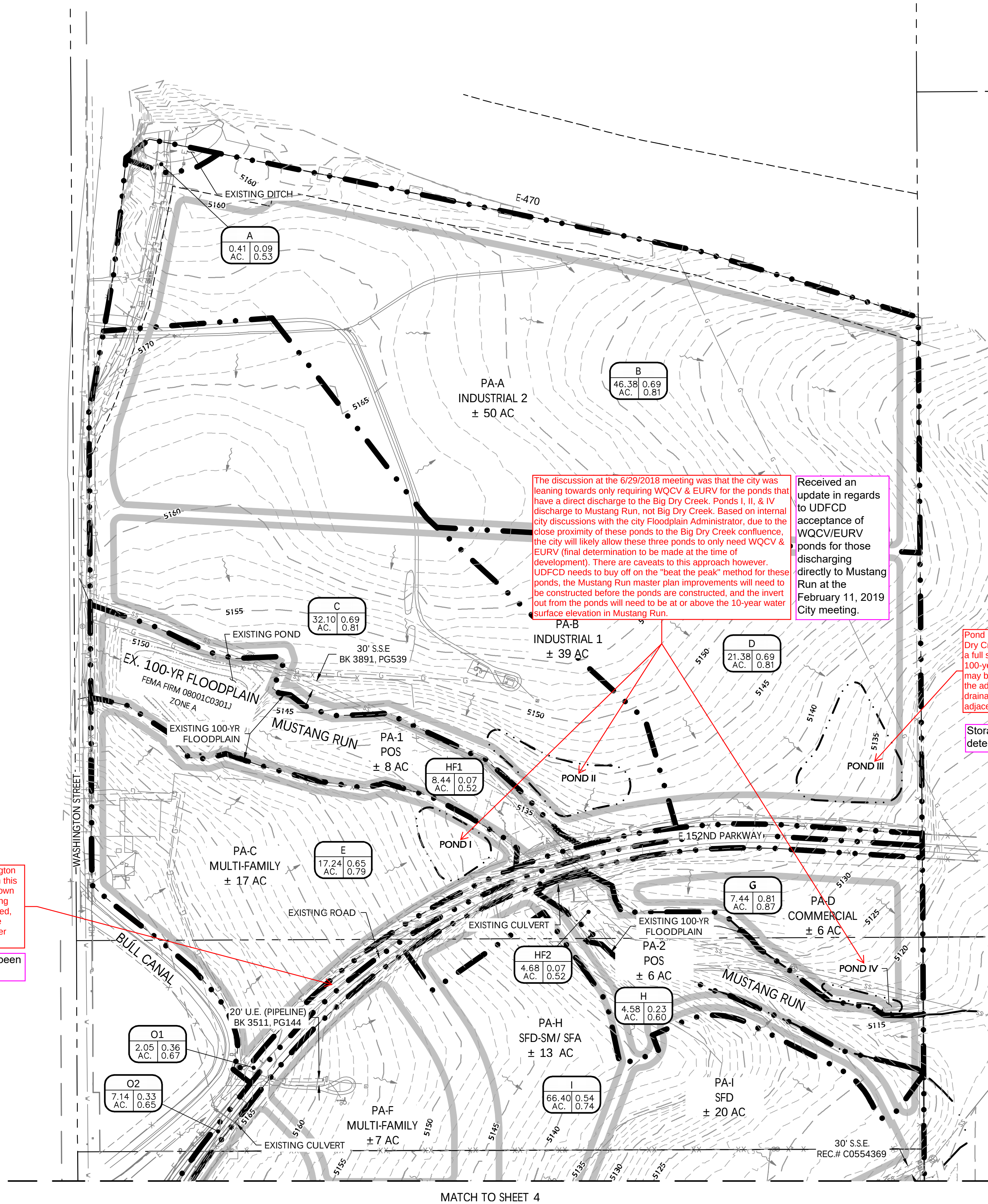
Sheet:

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The future layout for Washington Street and 152nd Parkway in this area will be different than shown here. Negotiations are ongoing regarding the layout to be used, but the basins will need to be updated to the new plan either way.

Basin boundaries have been updated.



Calculated Proposed Runoff Rates					
Basin ID	Total Area (Ac.)	Tc (min)	Peak Flow (cfs)	Q _s	Q ₁₀₀
A	0.41	5.0	0.17	1.99	
B	46.38	12.8	107.92	246.95	
C	32.10	8.7	87.16	199.44	
D	21.38	9.6	55.97	128.08	
E	17.24	7.3	46.85	111.00	
HF1	8.44	25.4	1.41	20.41	
HF2	4.68	22.3	0.84	12.14	
HF3	26.20	55.4	2.70	39.07	
G	7.44	5.4	27.63	57.85	
H	4.58	16.6	3.20	15.88	
I	66.40	16.7	107.64	286.02	
J	59.71	17.2	90.84	250.61	
K	17.21	15.9	28.60	76.29	
L	38.27	16.1	64.51	168.83	
M	6.07	5.0	19.78	45.06	
O1	2.05	5.0	3.43	12.51	
O2	7.14	5.0	11.01	42.62	
Pond I	17.24	7.3	46.85	111.00	
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Pond V	66.40	16.7	107.64	286.02	
Pond VI	115.19	17.2	180.88	487.66	

Required Storage		Volume (ac-ft)					
		Pond I	Pond II	Pond III	Pond IV	Pond V	Pond VI
WQCV	0.43	0.88	1.85	0.28	1.35	2.27	
EURV	1.26	2.52	5.33	0.70	3.96	6.64	
Total		1.26	2.52	5.33	0.70	3.96	6.64

EASEMENT ABBREVIATIONS

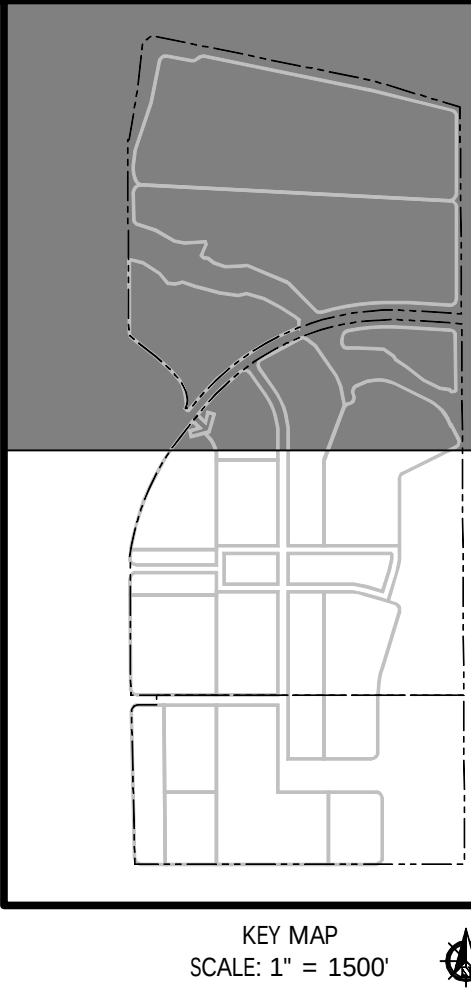
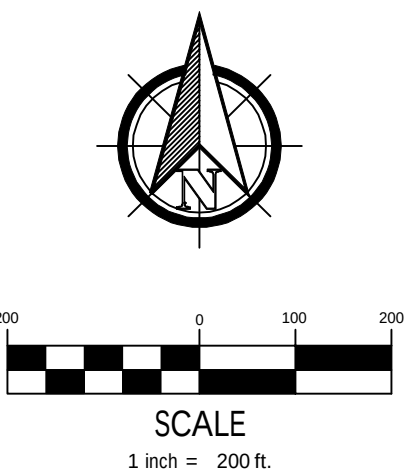
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PROJECT BENCHMARK:

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Rev. Date:						

Date: November 9, 2018
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Sheet: 5 of 5
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City of Thornton, Colorado
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Proposed Drainage Pattern - 2

Client: 152nd and Washington, LLC
Address: 12460 1st St.
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Know what's below.
Call before you dig.

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