MASTER DEVELOPMENT DRAINAGE PLAN (MDDP) AND PRELIMINARY DRAINAGE REPORT ADDENDUM NO. 1

for

WALDEN PRESERVE 2 PUD

Prepared for:

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I. GENERAL

A. Background

Walden Preserve is a residential subdivision located in the Walden community of northeastern El Paso County, Colorado. The Walden Preserve 2 PUD area is located south and west of Woodhaven Drive, north of Pond View Place, and east of Walden Way, as shown in Figure A1 (Appendix F). The currently approved 2014 Walden Preserve 2 PUD includes phased development of 116 new residential lots (1-acre typical lot size), resulting in a total of 211 lots in the Walden Preserve development (including both previously platted lots and proposed lots).

Walden Preserve 2 Filings No. 1-3 have been completed. These filings comprise 43 lots on the south side of the Walden Preserve 2 PUD area.

The proposed Walden Preserve 2 Filing No. 4 consists of 23 residential lots on 45.3 acres within the previously approved Walden Preserve 2 PUD (part of El Paso County Assessor's Parcel Number 61230-01-023), consisting of the existing meadow area located along the proposed extension of Pinehurst Circle on the east side of Walden Way. In conjunction with the final plat for Filing No. 4, Amendments to the Walden Preserve 2 PUD and Preliminary Plan are being processed to update the alignment of Pinehurst Circle and the corresponding overall lot layout, while remaining consistent with the general road circulation pattern and previously approved total number of residential lots.

B. Scope

JPS Engineering prepared the "Master Development Drainage Plan and Preliminary Drainage Report for Walden Preserve 2 PUD" dated September 17, 2014 and the "Final Drainage Report for Walden Preserve 2 - Filings No. 1 and 2" dated November 13, 2014.

This report serves as an Addendum to the previously approved Master Development Drainage Plan (MDDP) for the Walden Preserve 2 PUD. The purpose of this Addendum is to provide an update to the developed drainage basins and general description of developed drainage patterns consistent with the current revisions to the subdivision lot layout.

This Addendum also serves to clarify water quality provisions for the future development areas. The original MDDP identified proposed Grass Buffer Strips along the east side of the future northeasterly residential development area. The updated Master Development Drainage Plan (enclosed in Appendix B), has been revised to include a proposed Water Quality Pond C12 to serve as a permanent Water Quality BMP in accordance with current County MS4 permit requirements. Specific details for future water quality facilities will be provided with future Final Drainage Reports for each development area.

II. DEVELOPED DRAINAGE CONDITIONS

The developed drainage basins and projected flows are shown in Figures D1 and D1.01-D1.04 (Appendix B). In general, the revised alignment of Pinehurst Circle and associated lot layout revisions extending north through the Walden Preserve 2 PUD area does not result in any significant change in the overall drainage plan. In accordance with current County requirements for water quality, developed flows from all residential areas will be routed through water quality treatment facilities.

Appendix A of this Addendum includes updated Rational Method hydrology for the revised Sub-Basin areas. The adjustment in sub-basin areas has no significant impact on the previous major basin hydrology (refer to current SCS model calculations in Appendix B1 of WP2 Filing No. 4 FDR).

As discussed in the approved MDDP, developed Sub-basins A1-A6 are located in the south and southeasterly areas previously developed as Walden Preserve Filings No. 1 and No. 2. Walden Preserve 2 Filings No. 1-3 included development of the areas within Sub-Basins A7-A9 on the north side of Pond View Place between the main drainage channel and Walden Way.

Sub-basins A1-A9 will continue to flow northerly towards the main tributary channel, combining at the existing southerly stock pond (Pond A) with developed peak flows calculated as Q_5 = 99.6 cfs and Q_{100} = 285.5 cfs (SCS Method) at Design Point #1. While the existing Stock Pond A is not planned for use as a drainage detention pond, the pond will be maintained as an aesthetic feature within the subdivision. The pond was previously upgraded with an engineered overflow spillway during development of Walden Preserve Filing No. 1.

Walden Preserve Filing No. 1 included development of the areas within Sub-basins B1-B4 on the east side of the main drainage channel. Sub-basins B5-B10 include the remaining areas developed as 1-acre lots along the west side of the drainage channel.

Developed Sub-basins B1-B10 will continue to flow northerly towards the main tributary channel, combining at the existing northerly stock pond (Pond B) with developed peak flows of Q_5 = 189.1 cfs and Q_{100} = 508.9 cfs (SCS Method) at Design Point #2.

The existing stock pond (Pond B) has been upgraded to serve as a sub-regional stormwater detention and water quality pond for the remaining phases of the Walden Preserve Subdivision. Construction plans for Walden Preserve 2 Filing No. 1 included addition of a water quality orifice plate on the Pond B outlet structure, but the outlet structure improvements have not yet been completed. The County has now requested additional improvements to the Pond B outlet structure to meet current full-spectrum detention design standards. The proposed improvements to the Pond B outlet structure are detailed in the Walden Preserve 2 Filing No. 4 Final Drainage Report (enclosed in Appendix D1).

The pond has been designed to "over-detain" to allow for discharges of developed flows from downstream sub-basins, while ensuring that discharges downstream of Walker Road remain below historic levels. An energy dissipation structure has been constructed at the discharge point from Pond B to reduce erosion concerns in the downstream channel.

Sub-basins C1-C4 include areas north of Pond B which will be developed as 1-acre lots. Runoff from these basins will flow northeasterly to the main drainage channel.

Water Quality Rain Garden C2 will be constructed on the east side of Basin C2 to provide water quality enhancement for combined Basins C1 and C2.

Water Quality Pond C4 will be constructed on the east side of Basin C4 to provide water quality enhancement for combined Basins C3 and C4.

While Water Quality Ponds C2 and C4 are not needed for stormwater detention in the overall drainage analysis, these small water quality ponds (or rain gardens) will encourage infiltration of developed drainage and provide water quality mitigation of developed drainage impacts, consistent with an overall low-impact development approach.

Sub-basins C5-C8 include additional areas to be developed as 1-acre lots. These basins will flow northeasterly to the future Detention Pond C8, which will mitigate developed flow impacts prior to discharging through Basin C9 into the main channel upstream of the proposed emergency access and trail crossing at Highview Drive. Total undetained developed peak flows at Design Point #3 are calculated as Q_5 = 295.8 cfs and Q_{100} = 764.9 cfs (SCS Method).

Sub-basins C10-C12 include additional 1-acre lot areas to be developed in the northwest part of Walden Preserve, and Sub-basin C13 covers the existing Walden Wastewater Treatment Facility at the northwest corner of the Walden property. Water Quality Pond C12 will be constructed in the northeast corner of the future residential development area to mitigate developed flow impacts from Sub-Basins C10-C12. Developed flows from Sub-basins C10-C13 will flow northeasterly, combining with flows in the main tributary channel, and ultimately reaching the existing culvert crossing Walker Road.

Flows from Basins OC1-OC2 on the east side of the channel, along with flows from Basins OD1 and D in vicinity of the Walden Pines Subdivision drain northwesterly across Woodhaven Drive, contributing to the total flow in the main channel. Flows from Basins OA1-OD1 and A1-D1 combine at Design Point #4, with total undetained developed flows calculated as Q_5 = 324.4 cfs and Q_{100} = 845.4 cfs (SCS Method).

As detailed in the latest hydrologic modeling (Appendix B1, WP2 Filing No. 4 FDR), SCS hydrologic models were developed using the HEC-HMS software package to evaluate the comparison of historic and developed flow conditions, and confirm sizing of the proposed stormwater detention ponds. The detained flow analysis shows that the combination of Pond B and Pond C8 results in detained flows at Design Point #4 calculated as Q_5 = 226.7 cfs and Q_{100} = 601.4 cfs, which achieves the goal of remaining below historic flows at the downstream boundary of the subdivision.

III. SUMMARY

The proposed amendments to the Walden Preserve 2 PUD and Preliminary Plan conform to the general drainage patterns described in the previously approved MDDP. The overall drainage plans have been updated for consistency with the current subdivision road and lot layout.

Developed drainage impacts from the Walden Preserve 2 PUD will be mitigated through existing and proposed on-site stormwater detention and water quality facilities. The proposed drainage patterns will remain consistent with historic conditions, and new drainage facilities constructed to El Paso County standards will safely convey runoff to suitable outfalls.

The existing and proposed detention ponds have been designed to maintain historic peak flows downstream of the Walden Preserve Subdivision. Proper construction and maintenance of the proposed drainage and erosion control facilities will ensure that this subdivision has no significant adverse drainage impact on downstream or surrounding areas.

APPENDIX A

HYDROLOGIC CALCULATIONS

WALDEN PRESERVE

IMPERVIOUS AREA CALCULATIONS

BASIN	TOTAL AREA (AC)	SOIL TYPE	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	% IMP.	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	% IMP.	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	% IMP.	WEIGHTED PERCENT IMPERVIOUS
OA1,A1-A9	341.96	B										6.20
OB1,B1-B4	90.90	B										25.00
B5	4.78	B	4.78	2.5-AC. LOTS	11.0							11.00
B6	7.91	B	7.91	2.5-AC. LOTS	11.0							11.00
B5,B6	12.69	B										11.00
B7	3.24	B	3.24	1-AC LOTS	20.0							20.00
B8	28.74	B	28.74	1-AC LOTS	20.0							20.00
B5-B8	44.67	B										17.44
B9	10.23	B	10.23	1-AC LOTS	20.0							20.00
B10	16.90	B	71.17	1-AC LOTS	20.0							20.00
B5-B10	71.80	B										18.41
OB1,B1-B10	162.70	B										22.09
OA1,OB1,A,B	504.66	B										11.32
OC1	128.95	B	128.95	1/2-AC. LOTS	25.0							25.00
C1	11.75	B	5.0	1-AC. LOTS	20.0	6.8	5-AC. LOTS	7.0				12.53
C2	11.02	B	11.02	1-AC LOTS	20.0							20.00
C1-C2	**22.77**	**B**										**16.15**
C3	2.04	B	2.04	1-AC LOTS	20.0							20.00
C4	15.59	B	15.59	1-AC LOTS	20.0							20.00
C1-C4	40.40	B										17.83
C5	41.43	B	41.43	1-AC LOTS	20.0							20.00
C6	1.32	B	1.32	1-AC LOTS	20.0							20.00
C8	12.44	B	12.44	1-AC LOTS	20.0							20.00
C5,C6,C8	**55.19**	**B**										**20.00**
C9	4.50	B	4.5	1-AC LOTS	20.0							20.00
OC1,C1-C9	229.04	B										22.43
OA1-OC1,A1-C9	733.70	B										14.79
OC2	81.72	B	81.72	1/2-AC. LOTS	25.0							25.00
C10	2.86	B	2.86	1-AC LOTS	20.0							20.00
C11	8.63	B	8.63	1-AC LOTS	20.0							20.00
C12	17.77	B	17.77	1-AC LOTS	20.0							20.00
C10-C12	**29.26**	**B**										**18.05**
C13	22.44	B	22.44	MEADOW	0.0							0.00
OC2,C11-C13	133.42	B										19.27
OD1	3.30	B	3.30	1-AC LOTS	20.0							20.00
OD2	4.50	B	4.50	FOREST	0.0							0.00
OD3	10.30	B	10.30	FOREST	0.0							0.00
OD4	6.00	B	6.00	FOREST	0.0							0.00
D	10.27	B	10.27	1-AC LOTS	20.0							20.00
OD1-OD4, D	34.37	B										7.90
OA1-OD1,A-D	901.49	B										15.19

WALDEN PRESERVE
COMPOSITE RUNOFF COEFFICIENTS

DEVELOPED CONDITIONS

5-YEAR C VALUES

BASIN	TOTAL AREA (AC)	SOIL TYPE	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
OA1,A1-A9	341.96	B										0.266
OB1,B1-B4	90.90	B										0.350
B5	4.78	B	4.78	2.5-AC. LOTS	0.3							0.300
B6	7.91	B	7.91	2.5-AC. LOTS	0.3							0.300
B5,B6	12.69	B										0.300
B7	3.24	B	3.24	1-AC LOTS	0.3							0.300
B8	28.74	B	28.74	1-AC LOTS	0.3							0.300
B5-B8	44.67	B										0.300
B9	10.23	B	10.23	1-AC LOTS	0.3							0.300
B10	16.90	B	71.17	1-AC LOTS	0.3							0.300
B5-B10	71.80	B										0.300
OB1,B1-B10	162.70	B										0.328
OA1,OB1,A,B	504.66	B										0.286
OC1	128.95	B	128.95	1/2-AC. LOTS	0.35							0.350
C1-C4	40.40	B	40.4	1-AC LOTS	0.3							0.300
C5	41.43	B	41.43	1-AC LOTS	0.3							0.300
C6	1.32	B	1.32	1-AC LOTS	0.3							0.300
C8	12.44	B	12.44	1-AC LOTS	0.3							0.300
C5,C6,C8	55.19	B										0.300
C9	4.50	B	4.5	1-AC LOTS	0.3							0.300
OC1,C1-C9	229.04	B										0.328
OA1-OC1,A1-C9	733.70	B										0.299
OC2	81.72	B	81.72	1/2-AC. LOTS	0.35							0.350
C10	2.86	B	2.86	1-AC LOTS	0.3							0.300
C11	8.63	B	8.63	1-AC LOTS	0.3							0.300
C10-C11	11.49	B										0.300
C12	17.77	B	17.77	1-AC LOTS	0.3							0.300
C10-C12	29.26	B										0.300
C13	22.44	B	22.44	MEADOW	0.25							0.250
OC2,C10-C13	133.42	B										0.322
OD1	3.30	B	3.30	1-AC LOTS	0.3							0.300
OD2	4.50	B	4.50	FOREST	0.1							0.100
OD3	10.30	B	10.30	FOREST	0.1							0.100
OD4	6.00	B	6.00	FOREST	0.1							0.100
D	10.27	B	10.27	1-AC LOTS	0.3							0.300
OD1-OD4, D	34.37	B										0.179
OA1-OD1,A-D	901.49	B										0.298

WALDEN PRESERVE
COMPOSITE RUNOFF COEFFICIENTS

DEVELOPED CONDITIONS

100-YEAR C VALUES

BASIN	TOTAL AREA (AC)	SOIL TYPE	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
OA1,A1-A9	341.96	B										0.366
OB1,B1-B4	90.90	B										0.450
B5	4.78	B	4.78	2.5-AC. LOTS	0.4							0.400
B6	7.91	B	7.91	2.5-AC. LOTS	0.4							0.400
B5,B6	12.69	B										0.400
B7	3.24	B	3.24	1-AC LOTS	0.4							0.400
B8	28.74	B	28.74	1-AC LOTS	0.4							0.400
B5-B8	44.67	B										0.400
B9	10.23	B	10.23	1-AC LOTS	0.4							0.400
B10	16.90	B	71.17	1-AC LOTS	0.4							0.400
B5-B10	71.80	B										0.400
OB1,B1-B10	162.70	B										0.428
OA1,OB1,A,B	504.66	B										0.386
OC1	128.95	B	128.95	1/2-AC. LOTS	0.45							0.450
C1-C4	40.40	B	40.4	1-AC LOTS	0.4							0.400
C5	41.43	B	41.43	1-AC LOTS	0.4							0.400
C6	1.32	B	1.32	1-AC LOTS	0.4							0.400
C8	12.44	B	12.44	1-AC LOTS	0.4							0.400
C5,C6,C8	55.19	B										0.400
C9	4.50	B	4.5	1-AC LOTS	0.4							0.400
OC1,C1-C9	229.04	B										0.428
OA1-OC1,A1-C9	733.70	B										0.399
OC2	81.72	B	81.72	1/2-AC. LOTS	0.45							0.450
C10	2.86	B	2.86	1-AC LOTS	0.4							0.400
C11	8.63	B	8.63	1-AC LOTS	0.4							0.400
C10-C11	11.49	B										0.400
C12	17.77	B	17.77	1-AC LOTS	0.4							0.400
C10-C12	29.26	B										0.400
C13	22.44	B	22.44	MEADOW	0.35							0.350
OC2,C10-C13	133.42	B										0.422
OD1	3.30	B	3.30	1-AC LOTS	0.4							0.400
OD2	4.50	B	4.50	FOREST	0.15							0.150
OD3	10.30	B	10.30	FOREST	0.15							0.150
OD4	6.00	B	6.00	FOREST	0.15							0.150
D	10.27	B	10.27	1-AC LOTS	0.4							0.400
OD1-OD4, D	34.37	B										0.249
OA1-OD1,A-D	901.49	B										0.397

RATIONAL METHOD - DRAINAGE CALCULATIONS
DEVELOPED FLOWS

BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR[7]	C 100-YEAR[7]	OVERLAND LENGTH (FT)	SLOPE (%)	Tco[1] (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT K	SLOPE (%)	SCS[2] VELOCITY (FT/S)	Tt[3] (MIN)	TOTAL Tc[4] (MIN)	TOTAL Tc[4] (MIN)	INTENSITY[5] 5-YR (IN/HR)	INTENSITY[5] 100-YR (IN/HR)	PEAK FLOW Q5[6] (CFS)	PEAK FLOW Q100[6] (CFS)
OA1,A1-A9	**1**	**341.96**	**0.266**	**0.366**									**55.8**	**55.8**	1.66	2.95	**150.94**	**369.67**
OB1,B1-B4	B4	90.90	0.350	0.450									21.1	21.1	2.93	5.22	93.31	213.54
B5	B5	4.78	0.300	0.400	300	3.7	16.1	270	1.50	5.6	3.55	1.3	17.4	17.4	3.23	5.75	4.63	10.99
B6		7.91	0.300	0.400			0.0	380	1.50	10.0	4.74	1.3	1.3	5.0	5.10	9.09	12.11	28.75
B5,B6	B6	12.69	0.300	0.400									18.7	18.7	3.11	5.54	11.86	28.14
B7	B7	3.24	0.300	0.400	300	6.7	13.2	150	1.50	8	4.24	0.6	13.8	13.8	3.59	6.39	3.49	8.28
WP2 FILING 4:																		
B8		28.74	0.300	0.400			0.0	1250	1.50	4.8	3.29	6.3	6.3	6.3	4.78	8.51	41.24	97.88
B5-B8	B8	44.67	0.300	0.400									25.1	25.1	2.68	4.76	35.87	85.13
B9	B9	10.23	0.300	0.400	300	4.7	14.9	540	1.50	7.4	4.08	2.2	17.1	17.1	3.26	5.80	9.99	23.72
B10		16.90	0.300	0.400			0.0	600	1.50	3.3	2.72	3.7	3.7	5.0	5.10	9.09	25.88	61.42
B5-B10	B10	71.80	0.300	0.400									28.7	28.7	2.48	4.42	53.46	126.87
Tt from DP1 to DP2								1900	1.50	2.4	2.31	13.7	13.7					
OB1,B1-B10		162.70	0.328	0.428									25.1	25.1	2.68	4.76	142.84	331.77
OA1,OB1,A,B	**2**	**504.66**	**0.286**	**0.386**									**69.5**	**69.5**	1.50	2.65	**216.50**	**516.22**
OC1.1		121.57	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	149.86	342.97
OC1.2		7.38	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	9.10	20.82
OC1.1,OC1.2	OC1	**128.95**	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	158.96	363.79
WP2 FILING 5:																		
C1	C1	11.75	0.300	0.400	300	4.0	15.7	550	1.50	8.2	4.30	2.1	17.9	17.9	3.19	5.68	11.24	26.68
C2		11.02	0.300	0.400			0.0	820	1.50	5.5	3.52	3.9	3.9	5.0	5.10	9.09	16.88	40.05
C1,C2	C2	22.77	0.300	0.400									21.7	21.7	2.89	5.14	19.73	46.82
C3	C3	2.04	0.300	0.400	100	2.0	11.4	500	1.50	3.6	2.85	2.9	14.4	14.4	3.53	6.29	2.16	5.13
C4		15.59	0.300	0.400	100	2.0	11.4	900	1.50	6.9	3.94	3.8	15.2	15.2	3.44	6.12	16.08	38.15
C3,C4	C4A	17.63	0.300	0.400									15.2	15.2	3.44	6.12	18.18	43.15
C1-C4	C4	**40.40**	0.300	0.400									21.7	21.7	2.89	5.14	35.00	83.07
WP2 FILINGS 6-7:																		
C5	C5	41.43	0.300	0.400	100	4.0	9.1	1800	1.50	4.6	3.22	9.3	18.4	18.4	3.14	5.59	39.06	92.69
C6	C6	1.32	0.300	0.400	100	6.0	7.9	250	1.50	8	4.24	1.0	8.9	8.9	4.28	7.62	1.70	4.02
C8		12.44	0.300	0.400	100	8.0	7.2	1200	1.50	5.5	3.52	5.7	12.9	12.9	3.70	6.59	13.82	32.79
Tt from C5 to C8								550	1.50	3.6	2.85	3.2	3.2					
C5,C6,C8 (POND C8)	C8	55.19	0.300	0.400									21.6	21.6	2.90	5.15	47.95	113.80
C9		4.50	0.300	0.400			0.0	360	1.50	3.6	2.85	2.1	2.1	5.0	5.10	9.09	6.89	16.36
Tt from DP2 to DP3								2700	1.50	1.9	2.04	22.1	22.1					
OC1,C1-C9	**3**	**733.70**	**0.299**	**0.399**									**91.6**	**91.6**	1.50	2.65	**329.06**	**775.78**

BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR[7]	C 100-YEAR[7]	OVERLAND LENGTH (FT)	SLOPE (%)	Tco[1] (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT K	SLOPE (%)	SCS[2] VELOCITY (FT/S)	Tt[3] (MIN)	TOTAL Tc[4] (MIN)	TOTAL Tc[4] (MIN)	INTENSITY[5] 5-YR (IN/HR)	INTENSITY[5] 100-YR (IN/HR)	PEAK FLOW Q5[6] (CFS)	PEAK FLOW Q100[6] (CFS)
OC2.1		62.48	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	77.02	176.26
OC2.2		19.24	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	23.72	54.28
OC2.1,OC2.2		81.72	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	100.74	230.54
C10	C10	2.86	0.300	0.400	100	6.0	7.9	600	1.50	4.0	3.00	3.3	11.3	11.3	3.92	6.97	3.36	7.97
C11		8.63	0.300	0.400	100	6.0	7.9	600	1.50	6.7	3.88	2.6	10.5	10.5	4.03	7.16	10.42	24.73
Tt from C10 to C11								400	1.50	2.5	2.37	2.8	2.8					
C11-C12	C11	11.49	0.300	0.400									14.1	14.1	3.56	6.34	12.28	29.15
C12		17.77	0.300	0.400	100	10.0	6.7	1300	1.50	3.1	2.64	8.2	14.9	14.9	3.47	6.18	18.52	43.95
C10-C12	C12	29.26	0.300	0.400									14.9	14.9	3.47	6.18	30.49	72.36
C13	C13	22.44	0.250	0.350	300	7.3	13.7	430	1.50	8.6	4.40	1.6	15.3	15.3	3.43	6.11	19.25	47.97
OC1,OC2,C1-C13		867.12	0.323	0.423									106.5	106.5	1.50	2.65	420.12	972.00
OD1		3.30	0.300	0.400	370	5.4	15.8	450	1.50	4.4	3.15	2.4	18.2	18.2	3.16	5.63	3.13	7.43
OD2		4.50	0.100	0.150	525	8.2	20.5	0				0.0	20.5	20.5	2.98	5.30	1.34	3.58
OD3		10.30	0.100	0.150	700	5.7	26.7	580	1.50	3.1	2.64	3.7	30.3	30.3	2.41	4.28	2.48	6.62
OD4		6.00	0.100	0.150	630	5.6	25.5	340	1.50	0.9	1.42	4.0	29.4	29.4	2.45	4.36	1.47	3.92
OD1-OD4		**24.10**											30.3	30.3				
D		**10.27**	0.300	0.400			0.0	750	1.50	3.5	2.81	4.5	5.0	5.0	5.10	9.09	15.73	37.33
OD1-OD4, D	D	**34.37**	0.179	0.249									34.8	34.8	2.22	3.96	13.67	33.86
G1	G1	3.28	0.300	0.400	100	6.0	7.9	300	1.50	6.7	3.88	1.3	9.2	9.2	4.23	7.53	4.16	9.88
Tt from DP3 to DP4								2750	1.50	1.5	1.81	25.4	25.4					
OA1-OD1,A-D	**4**	**901.49**	**0.298**	**0.397**									**116.9**	**116.9**	1.50	2.65	**402.97**	**948.41**

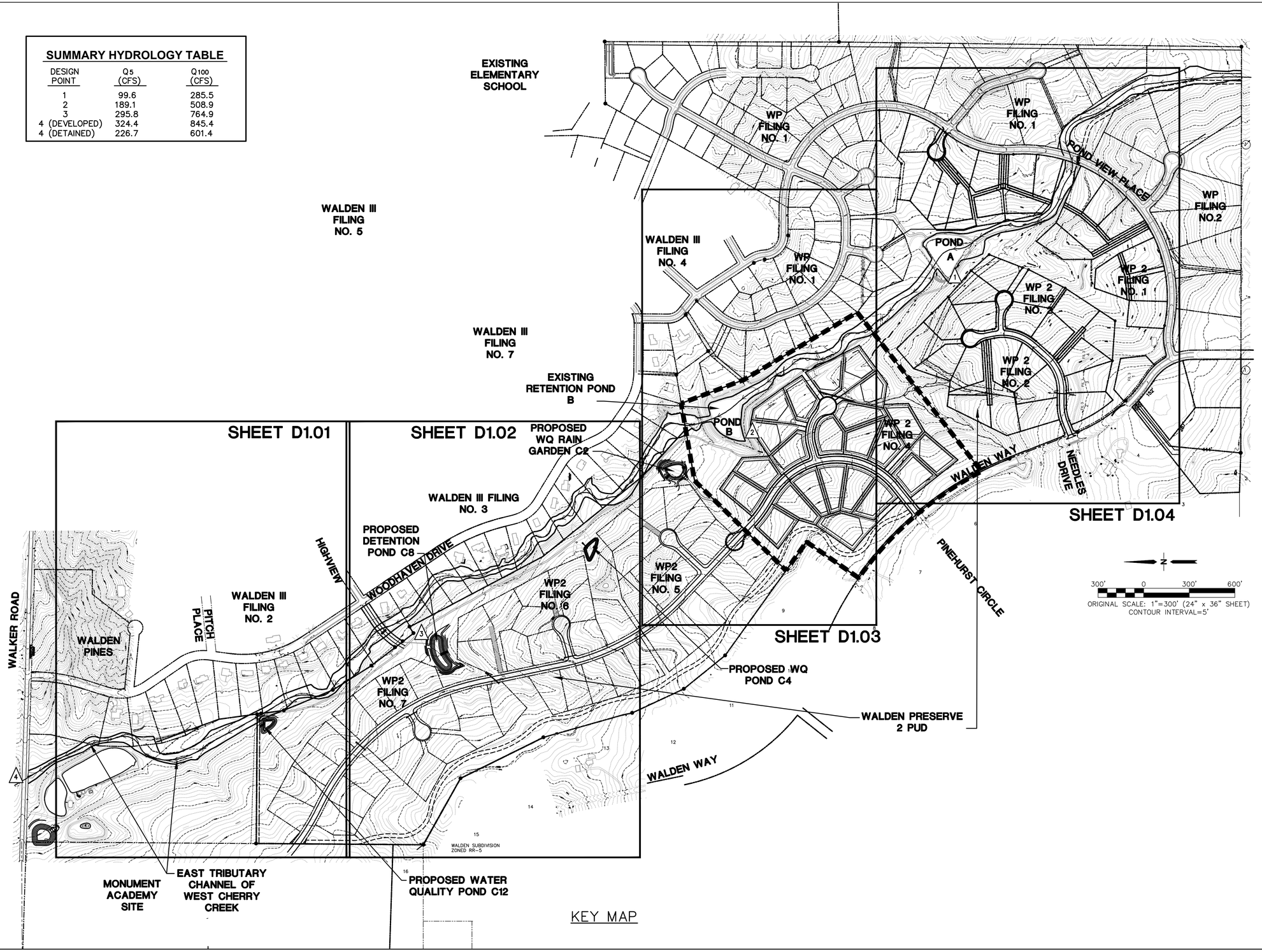
1) OVERLAND FLOW Tco = (1.87*(1.1-RUNOFF COEFFICIENT)*(OVERLAND FLOW LENGTH^(0.5)/(SLOPE^(0.333))
2) SCS VELOCITY = K * ((SLOPE(%))^0.5)
   K = 0.70 FOR MEADOW / FOREST
   K = 1.0 FOR BARE SOIL
   K = 1.5 FOR GRASS CHANNEL
   K = 2.0 FOR PAVEMENT
3) GUTTER/SWALE FLOW, TRAVEL TIME, Tt = (CHANNEL LENGTH/ SCS VELOCITY) / 60 SEC
4) Tc = Tco + Tt
*** IF TOTAL TIME OF CONCENTRATION IS LESS THAN 5 MINUTES, THEN 5 MINUTES IS USED
5) INTENSITY BASED ON I-D-F CURVE IN EL PASO COUNTY DRAINAGE CRITERIA MANUAL, REVISED BY CITY OF COLORADO SPRINGS 1/1/03
   I = (A * P) / B + Td)^C
   5-YEAR VALUES: A = 26.65; P1 = 1.5 IN (1-HOUR DEPTH); B = 10.0; C = 0.76
   100-YEAR VALUES: A = 26.65; P = 2.67 IN (1-HOUR DEPTH); B = 10.0; C = 0.76
6) Q = CiA
7) WEIGHTED AVERAGE C VALUES FOR COMBINED BASINS

APPENDIX B

FIGURES

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1	99.6	285.5
2	189.1	508.9
3	295.8	764.9
4 (DEVELOPED)	324.4	845.4
4 (DETAINED)	226.7	601.4



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WALDEN PRESERVE

MASTER DEVELOPMENT DRAINAGE PLAN

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE

HORZ. SCALE: 1"=300'	DRAWN: MJP
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: RAMPART	CHECKED: JPS
CREATED: 10/04/11	LAST MODIFIED: 10/03/19
PROJECT NO: 040201	MODIFIED BY: BJJ

SHEET:
D1

EXISTING 42"x26" HECMP CULVERT (CROSSING WALKER ROAD)

EXISTING 30" CMP CULVERT

PROPOSED DETENTION POND C14 (MA SITE)

EXISTING WASTEWATER TREATMENT FACILITY

APPROXIMATE EDGE OF POND

D
10.27
AC.

OD3
10.3
AC.

OD2
4.5
AC.

OD1
3.3
AC.

OC2.2
19.24
AC.

C13
22.44
AC.

C12
17.77
AC.

OC2.1
62.48
AC.

WALDEN PINES

KAPPEL

WRIGHT

BALCERZAK

CONNORS

PATE

POHLOD

BROWN

SILVA

KIZLYK

CALLOWAY

VERRIE

POPE

CONECREST LANE

WOODHAVEN DRIVE

EXISTING TRAIL

CHANNEL C6

PROPOSED WQ POND C12

EDB

GB

PARCEL
#61150-00-005
WALDEN
CORPORATION
20.29 AC.

FILING NO. 7

WALDEN III
FILING NO. 2

N

100' 0 100' 200'

ORIGINAL SCALE: 1"=100' (24"x36" SHEET)
CONTOUR INTERVAL=2'

LEGEND

- FILING LIMITS
- DRAINAGE BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- 6520 EXISTING CONTOUR
- PROPOSED CULVERT
- FLOW DIRECTION ARROW
- FLOWLINE
- 5 DESIGN POINT
- C14 / 23.21 AC. DEVELOPED BASIN DESIGNATION
- BASIN AREA (ACRES)
- RR RIPRAP APRON
- GB GRASS BUFFER STRIP
- EDB EXTENDED DETENTION BASIN

MATCH LINE - SEE SHEET D1.02

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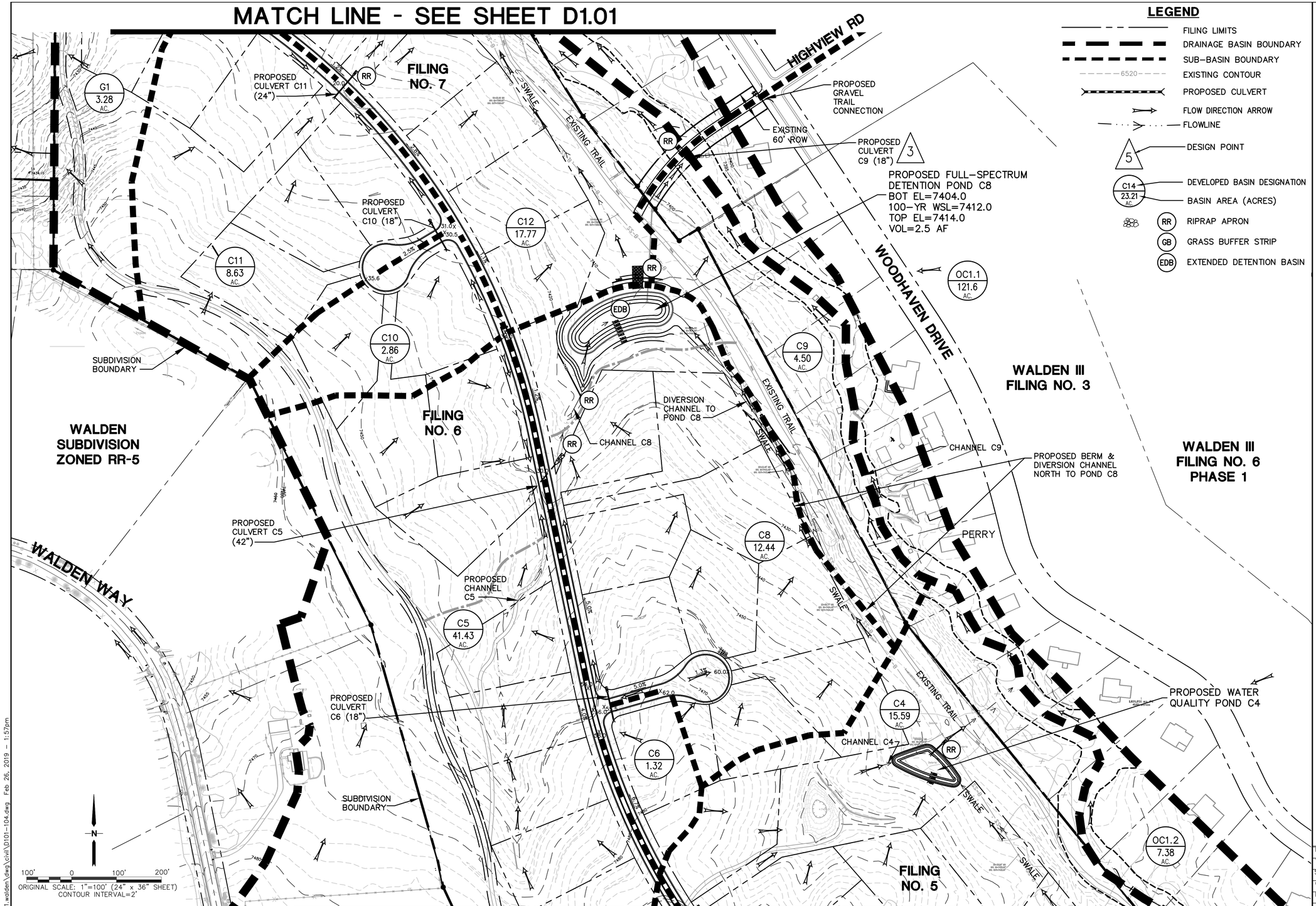
No.	REVISION	BY	DATE

HORZ. SCALE: 1"=100'	DRAWN: MJP
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: PINNACLE	CHECKED: JPS
CREATED: 10/03/11	LAST MODIFIED: 2/25/19
PROJECT NO: 040201	MODIFIED BY: BJJ

SHEET: D1.01

MATCH LINE - SEE SHEET D1.01



MATCH LINE - SEE SHEET D1.03

LEGEND

- FILING LIMITS
- DRAINAGE BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- 6520 EXISTING CONTOUR
- PROPOSED CULVERT
- FLOW DIRECTION ARROW
- FLOWLINE
- 5 DESIGN POINT
- C14 / 23.21 AC. DEVELOPED BASIN DESIGNATION / BASIN AREA (ACRES)
- RR RIPRAP APRON
- GB GRASS BUFFER STRIP
- EDB EXTENDED DETENTION BASIN

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Colorado Springs, CO
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www.jpsengr.com

REVISION	BY	DATE
No.		

WALDEN PRESERVE

DEVELOPED DRAINAGE & EROSION CONTROL PLAN

HORZ. SCALE: 1"=100'	DRAWN: MJP
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: PINNACLE	CHECKED: JPS
CREATED: 10/03/11	LAST MODIFIED: 2/25/19
PROJECT NO: 040201	MODIFIED BY: BJJ

SHEET: D1.02

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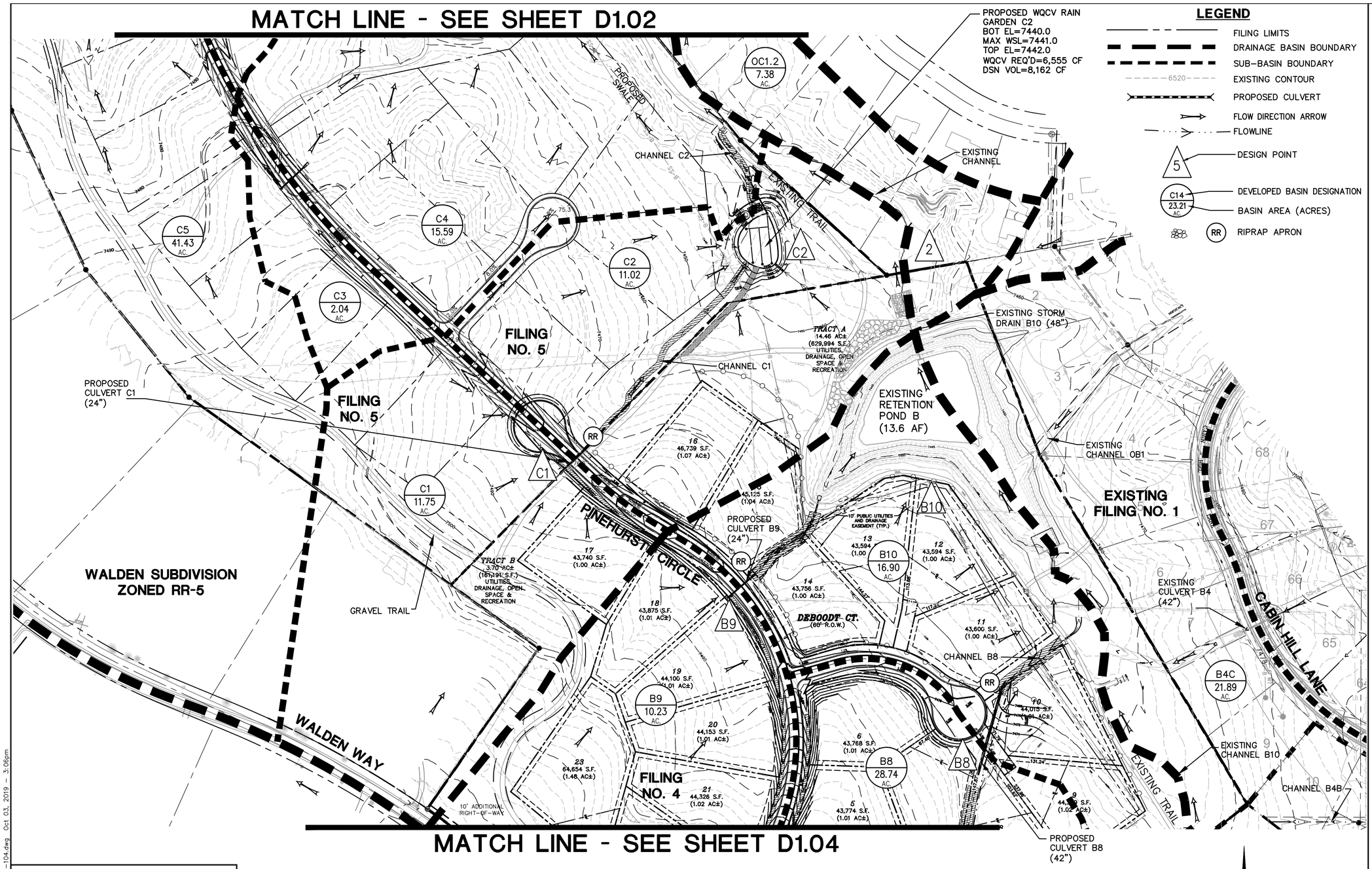

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
B8	35.9	85.1
B9	10.0	23.7
B10	53.5	126.9
C1	11.2	26.7
C2	19.7	46.8

WALDEN PRESERVE

DEVELOPED DRAINAGE & EROSION CONTROL PLAN

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No.	REVISION	BY	DATE

HORZ. SCALE:	1"=100'
VERT. SCALE:	N/A
SURVEYED:	PINNACLE
CREATED:	10/02/13
PROJECT NO:	040201
DRAWN:	BJJ
DESIGNED:	JPS
CHECKED:	JPS
LAST MODIFIED:	10/03/19
MODIFIED BY:	BJJ
SHEET:	D1.03

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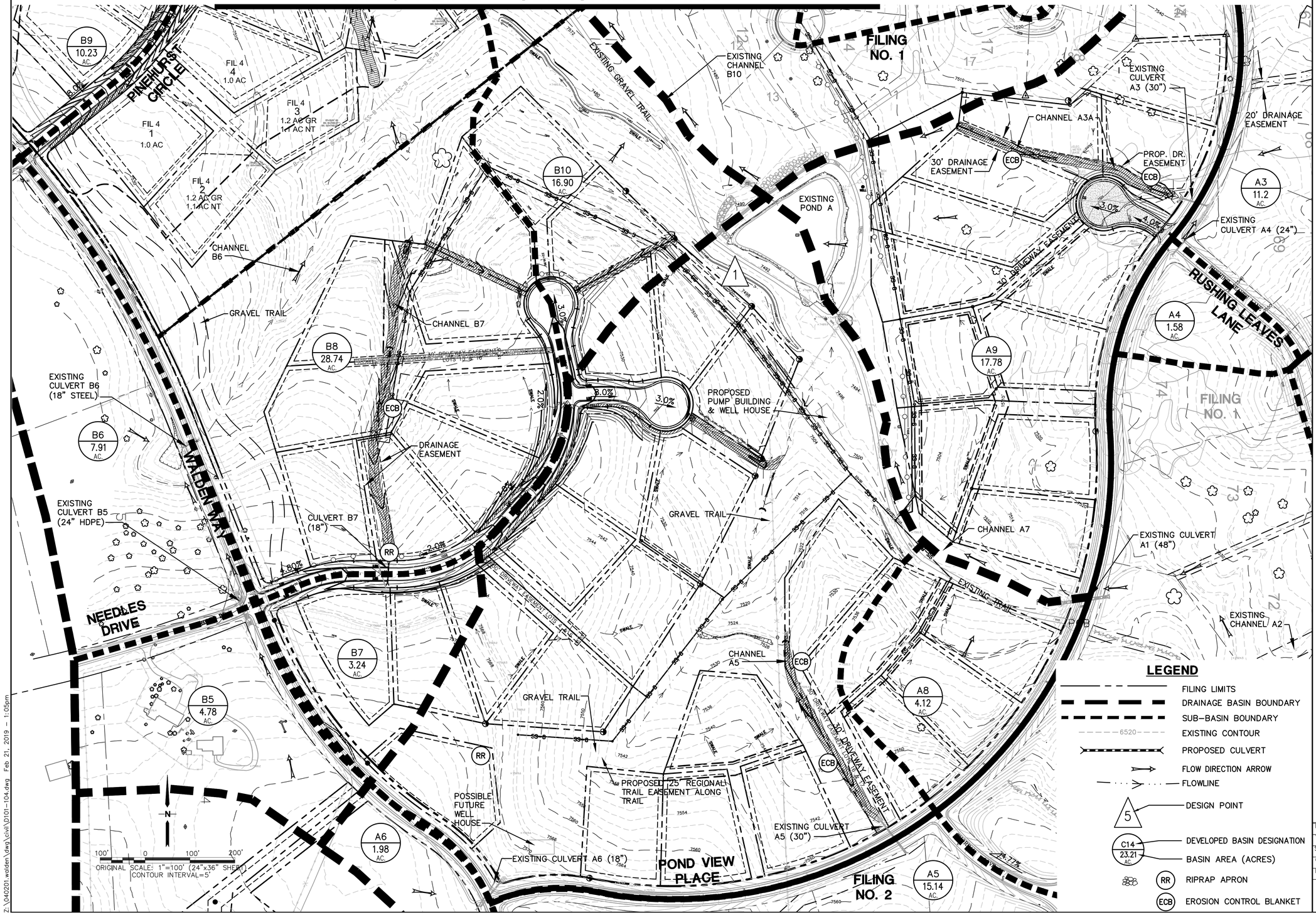
MATCH LINE - SEE SHEET D1.03



LEGEND

- FILING LIMITS
- DRAINAGE BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- 6520 EXISTING CONTOUR
- PROPOSED CULVERT
- FLOW DIRECTION ARROW
- FLOWLINE
- 5 DESIGN POINT
- C14 / 23.21 AC. DEVELOPED BASIN DESIGNATION
- BASIN AREA (ACRES)
- RR RIPRAP APRON
- ECB EROSION CONTROL BLANKET

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No.	REVISION	BY	DATE

HORZ. SCALE:	1"=100'	DRAWN:	BJJ
VERT. SCALE:	N/A	DESIGNED:	JPS
SURVEYED:	PINNACLE	CHECKED:	JPS
CREATED:	10/03/11	LAST MODIFIED:	2/15/19
PROJECT NO:	040201	MODIFIED BY:	BJJ

SHEET: D1.04

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