

**MASTER DEVELOPMENT DRAINAGE PLAN FOR DAYBREAK AT WOLF RANCH
And
FINAL DRAINAGE REPORT
For
DAYBREAK AT WOLF RANCH SUBDIVISION FILING 1**

APRIL 2016

Prepared for:

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Project# 14-031

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AUGUST 2015

DRAINAGE PLAN STATEMENTS

ENGINEER'S STATEMENT

The attached drainage plan and report for Daybreak at Wolf Ranch Subdivision Filing 1 were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the City of Colorado Springs Drainage Design and Technical Criteria for the owners of said project. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others.



Kent D. Rockwell, P.E.



CERTIFICATION STATEMENT

Villages at Wolf Ranch, LLC hereby certifies that the drainage facilities for Daybreak at Wolf Ranch Subdivision Filing 1 shall be constructed according to the design presented in this report. I, as the developer, understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the City of Colorado Springs reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of Daybreak at Wolf Ranch Subdivision Filing 1, guarantee that final drainage design review will absolve Villages at Wolf Ranch, LLC and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Villages at Wolf Ranch, LLC

BY:  VP 4/21/16
AUTHORIZED SIGNATURE DATE

TITLE:

ADDRESS:

CITY OF COLORADO SPRINGS

Filed in accordance with Section 7-7-906 of the code of the City of Colorado Springs, 2001, as amended.



FOR THE CITY ENGINEER

4/12/16
DATE

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PURPOSE

The purpose of this report is to identify the existing and proposed runoff patterns and drainage facilities required for the proposed Daybreak at Wolf Ranch Overall Development consisting of 98 single family residential lots, streets and alleys and 3 tracts within approximately 32.51 acres. This report also acts as the Final Drainage Report for Daybreak at Wolf Ranch Filing No. 1 consisting of 30.144 acres, 98 single-family lots, 7 tracts and associated streets. Briargate Parkway right-of-way makes up the other approximately 2.4 acres of land within this development. Briargate Parkway will be platted separately from Filing No. 1.

The Daybreak at Wolf Ranch Development is located northeast of the Valemount Drive and Leon Young Drive intersection in Northeast Colorado Springs, Colorado. The proposed development will be platted as one filing. (See Figure 1-Vicinity Map).

SUMMARY OF DATA

The sources of information used in the development of this study are listed below:

1. City of Colorado Springs "Drainage Criteria Manual", May, 2014.
2. Soil Survey for El Paso County, Colorado, U.S. Department of Agriculture, Soil Conservation Service, June 1980.
3. "Flood Insurance Studies for Colorado Springs and El Paso County, Colorado", prepared by the Federal Emergency Management Agency (FEMA), 1985.
4. "Cottonwood Creek Drainage Basin Planning Study" by URS Consultants, Inc., August 1995.
5. "Cottonwood Creek Prudent Line Study" by Ayres & Associates, 1996.
6. "Preliminary/Final Drainage Report for Power Boulevard (Research Parkway to Woodmen Road" by JR Engineering, July, 2000.
7. "Preliminary/Final Drainage Report for Research Parkway (Scarborough Drive to Powers Blvd.) including Research Parkway Subdivision Filing No. 6, by JR Engineering, April, 2000.
8. "Master Development Drainage Plan for Wolf Ranch, Colorado Springs, Colorado," prepared by Kiowa Engineering, July, 2004.

GENERAL LOCATION AND DESCRIPTION

The Daybreak at Wolf Ranch development is located within the northeastern portion of the City of Colorado Springs, El Paso County, Colorado. (see Vicinity Map - Figure 1). The site is within a portion of the southwest quarter of Sections 25, 30 and 31, Township 13 South, Range 65 West of the 6th P.M. The site is bound on the west by existing residential development (Villages at Wolf Ranch Filings 17 and 18), on the north by future Briargate Parkway, on the north and east by future residential development and on the south by Villages at Wolf Ranch Filing No. 14. An existing gas line within a 50' easement runs along the northeast side of the proposed Daybreak at Wolf Ranch development.

Well-established native grasses exist throughout the proposed development. The topography of the slopes mainly from northeast to southwest at grades of approximately 3%.

SOILS

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the soils underlying the Daybreak at Wolf Ranch Development fall under the Truckton Series (Soil 97). The Truckton soil is classified as a Hydrologic Group "A" soil. However, since bedrock is known to exist just below the surface Hydrologic Group "D" soils were used to determine runoff coefficients.

CLIMATE

This area of El Paso County can be described as the foothills, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall. Thunderstorms are common during the summer months.

FLOODPLAIN STATEMENT

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) #08041C0529F and #08041CO530F, dated March 17, 1997, no portion of the Daybreak at Wolf Ranch Development lies within a designated 100-year floodplain.

DRAINAGE CRITERIA

The current City of Colorado Springs Drainage Criteria was utilized in this report. Peak runoff quantities were determined using the Rational Method for both the 5 year and 100 year storms, as required for drainage basins less than 100 acres.

HISTORIC DRAINAGE BASIN DESCRIPTIONS

A brief description of each historic drainage basin for the site is provided in this section of the report. A summary of peak-developed runoff for the basins is depicted on the Historic Drainage Plan (Exhibit 1) provided in the appendix.

Historic Basin H-1 consists of 12.06 acres along the western side of the proposed development area just east of Valemount Drive. Runoff rates of 6.2 cubic feet per second (cfs) and 13.3 cfs are generated from this basin during the 5 year storm and 100 year storm, respectively. These flows currently enter Valemount Drive.

Historic Basin H-2 comprises the eastern portion of the proposed development site. This 17.76 acre basin generates runoff rates of 9.0 cfs during the 5 year storm and 19.2 cfs during the 100 year storm. These flows currently enter Leon Young Drive as sheet flows.

DEVELOPED DRAINAGE BASIN

A brief description of each developed drainage basin for the site is provided in this section of the report. A summary of peak-developed runoff for the basins is depicted on the Developed Drainage Plan (Exhibit 2) provided in the appendix. All proposed drainage facilities are approximate in size and may vary with actual layout and design.

Within the single-family residential development, side lot line swales will be created on the downstream lots to convey flows from the upstream lots and into the street. Swales will be constructed by the homebuilders and maintained by the homeowner to limit concentrated flows and to disperse the flows as much as possible. Lot Drainage Plans will be prepared on a per filing basis for the residential lots as they are developed and platted.

Individual lot drainage is the responsibility of the lot owner/builder.

Basin OS-1 consists of approximately 20 acres of vacant land which will be developed in the future. Historic flow rates of 8.6 cfs during the 5 year storm and 21.4 cfs during the 100 year storm generated from this basin will flow southerly toward the proposed Daybreak subdivision. These flows will temporarily be routed to the southeast within a temporary swale to be created north of the existing gas line easement. These flows will be directed away from the Daybreak subdivision and toward Tributary 4.

The area northeast of the Briargate Parkway and Valemount Drive intersection (proposed round about) consists of vacant land. Based on the Wolf Ranch MDDP (Ref. 8), the future 100 year storm runoff rate reaching this intersection is 131 cfs. The MDDP called for a 54" RCP under Briargate Parkway which has already been installed. The 54" will connect to the future 48" RCP in Valemount Drive. Due to the increased pipe slope of the 48" RCP, the 48" RCP can convey the equivalent flows as the 54" RCP at a lesser slope.

Basin 1 consists of 1.75 acres along future Briargate Parkway. Runoff rates of 4.0 cfs during the 5year storm and 8.2 cfs during the 100 year storm flow toward a low point in Briargate Parkway. An 8' sump inlet will be installed along the northerly curb line of Briargate to collect these flows. An 18" RCP will convey these flows southerly to the inlet within Basin 2.

Until the area north of Briargate is developed, the existing 54" RCP, currently located in the Briargate Parkway and Valemount Drive intersection will be extend northerly. The area will be graded to create a low point north of Briargate to collect the historic flows generated from the area to the north. The low point will act as a temporary sedimentation pond.

Basin 2 is located along the south side of future Briargate Parkway. This 1.66 acre basin generates runoff rates of 4.8 cfs and 9.3 cfs during the 5 and 100 year storms, respectively. An 8' sump inlet will also collect these flows. The combined runoff rates of $Q_5= 8.8$ cfs and $Q_{100}= 17.5$ cfs from Basins 1 and 2 will be conveyed westerly within a 24" RCP to the proposed system within Valemount Drive.

On-site Basin 3 consists of 3.50 acres along the north side of Cabbage Drive. This basin generates runoff rates of 8.6 cfs during the 5 year storm and 17.8 cfs during the 100 year storm. These runoff rates flow to Cabbage Drive and then flow southeasterly as street flows to a low point at the east end of Basin 3. A 10' sump inlet will collect these flows.

Basin 4 is also located along the north side of Cabbage Drive. This 0.77 acre basin generates runoff rates of 1.9 cfs during the 5 year storm and 4.0 cfs during the 100 year storms. The runoff generated from this basin flows westerly within Cabbage Drive to the aforementioned 10' sump inlet. This inlet will collect a total of 10.5 cfs and 21.8 cfs during the 5 and 100 year storms, respectively, from Basins 3 and 4.

The area north of the Daybreak at Wolf Ranch development and north of the existing gas easement will be graded with a berm and a swale to direct the flows southeasterly to Tributary 4. These flows will reach Tributary 4 and flow southerly within Tributary 4 to the proposed Pond F specified in the MDDP.

Basin 5 consists of 0.11 acres along the south side of Cabbage Drive. A 4' sump inlet will collect the runoff rates of $Q_5 = 0.3$ cfs and $Q_{100} = 0.6$ cfs generated from Basin 5.

A 24" RCP will convey all the collected flows ($Q_5 = 10.7$ cfs and $Q_{100} = 22.2$ cfs) from Basins 3, 4 and 5 westerly to the Cabbage Drive and Awaken Drive intersection and then southerly within Awaken Drive (Design Point #1).

Basin 6 consists of 1.30 acres of the Daybreak development along the west side of Wolf Lake Drive. The runoff rates of 3.3 cfs and 6.9 cfs generated from this basin during the 5 and 100 year storms, respectively, flow southerly in Wolf Lake Drive to an existing 15' on-grade inlet at the northeast corner of Wolf Lake Drive and Leon Young Drive. This existing inlet will collect 2.7 cfs during the 5 year storm and 5.0 cfs during the 100 year storm. Runoff rates of $Q_5 = 0.6$ cfs and $Q_{100} = 1.9$ cfs bypassing this inlet will enter Basin 26 as street flow.

Basin 7 consists of 1.31 acres along the east side of Wolf Lake Drive. Runoff rates of $Q_5 = 4.0$ cfs and $Q_{100} = 8.2$ cfs generated from this basin flow southerly within the east side of Wolf Lake Drive as street flows. These flows were anticipated in the adjacent By the Creek development and will be collected in downstream drainage facilities previously installed.

Basin 8 is south of Cabbage Drive along the proposed north-south alley. This 0.96 acre basin generates runoff rates of $Q_5 = 2.6$ cfs and $Q_{100} = 5.4$ cfs. Runoff from this basin flow southerly within the alley and enters Fresh Air Drive and then continue westerly within the north side of Fresh Air Drive.

Approximately 0.52 acres along the east side of Awaken Drive comprises Basin 9. The runoff rates of 1.5 cfs and 3.2 cfs generated from this basin during the 5 and 100 year storms, respectively, flow southerly to Fresh Air Drive. These flows combine with the runoff generated from Basin 8 and enter Basin 10.

The 1.65 acre Basin 10 is located along the west side of Awaken Drive. The runoff rates of 4.3 cfs during the 5 year storm and 9.0 cfs during the 100 year storm generated from this basin flow southerly within the west side of Awaken Drive and also enter Fresh Air Drive.

Total runoff rates of $Q_5 = 8.4$ cfs and $Q_{100} = 17.6$ cfs generated from Basins 8, 9 and 10 will reach a proposed 12' on-grade inlet along the north side of Fresh Air Drive just west of Awaken Drive. This inlet will collect runoff rates of 4.7 cfs during the 5 year storm and 7.1 cfs during the 100 year storm. Flow rates of $Q_5 = 3.7$ cfs and $Q_{100} = 10.5$ cfs bypassing this inlet will enter Basin 11 as street flows.

A 24" RCP will be installed along the south side of Fresh Air Drive to convey the total collected runoff rates of $Q_5 = 15.4$ cfs and $Q_{100} = 29.3$ cfs from the upstream basins.

Basin 11 is located along the northwest side of Fresh Air Drive. This 1.76 acre basin generates runoff rates of 4.4 cfs during the 5 year storm and 11.1 cfs during the 100 year storms. These flows along with the bypass flows from Basins 8, 9 and 10 reach a proposed 14' sump inlet at the southwest end of this basin. Total flows of $Q_5 = 8.1$ cfs and $Q_{100} = 21.6$ cfs reach the 14' sump inlet from the east. Additional runoff rates generated from Basin 16 reaches this same sump inlet from the north.

Total runoff rates of $Q_5 = 21.5$ cfs and $Q_{100} = 44.7$ cfs reach Design Point #2 from Basins 3 through 5 and 8 through 11.

Basin 12 consists of 0.90 acres along the north side of Radiant Sky Lane, just south of future Briargate Parkway. Runoff rates of 2.4 cfs and 5.1 cfs are generated from this basin. The runoff generated from this basin flows westerly within the north side of Radiant Sky Lane to a proposed 4' sump inlet within the Radiant Sky Lane cul-de-sac. Additional flows generated from Basin 13 reach this same 4' sump inlet.

Basin 13 comprises the south side of Radiant Sky Lane from Fresh Air Drive to the Radiant Sky Lane cul-de-sac. This 0.63 acre basin generates runoff rates of 1.9 cfs during the 5 year storm and 3.9 cfs during the 100 year storm.

Total flow rates of $Q_5 = 4.3$ cfs and $Q_{100} = 9.0$ cfs generated from Basins 12 and 13 will be collected within the proposed 4' sump inlet. These flows will be conveyed within an 18" RCP to the storm sewer system in Valemount Drive.

Basin 14 consists of 1.59 acres at the southeast corner of Radiant Sky Lane and Fresh Air Drive. Runoff rates of 4.3 cfs and 9.0 cfs are generated from this basin during the 5 and 100 year storms, respectively. These runoff rates enter Basin 15 as street flows.

Basin 15 consists of 2.14 acres along the east side of Fresh Air Drive. The runoff rates of 5.7 cfs and 11.9 cfs generated from this basin during the 5 and 100 year storms, respectively, reach the southeast corner of Fergus Drive and Fresh Air Drive along with the flows from Basin 14. A 12' on-grade inlet will be installed at the corner of Fergus and Fresh Air. Total runoff rates of $Q_5 = 10.0$ cfs and $Q_{100} = 20.9$ cfs approach this inlet from the north. The 12' on-grade inlet will collect runoff rates of 4.4 cfs during the 5 year storm and 6.5 cfs during the 100 year storm. Runoff rates of $Q_5 = 5.6$ cfs and $Q_{100} = 14.4$ cfs will bypass this inlet and enter Basin 16 as street flows.

Basin 16 consists of 0.67 acres southeast of the Fergus Drive and Fresh Air Drive intersection. This basin generates runoff rates of 1.9 cfs during the 5 year storm and 4.0 cfs during the 100 year storm. The runoff generated from this basin combines with the bypass flows from Basin 15 and continues southerly as street flows to a 12' on-grade inlet at the south end of Basin 16. This on-grade inlet collects flow rates of 3.7 cfs during the 5 year storm and 6.1 cfs during the 100 year storm. Flow rates of 3.8 cfs and 12.3 cfs during the 5 and 100 year storms, respectively, will bypass this inlet and reach a 14' sump inlet. This inlet will collect a total of 11.9 cfs during the 5 year storm and 33.9 cfs during the 100 year storm.

Total flow rates of $Q_5 = 31.7$ cfs and $Q_{100} = 65.9$ cfs reach Design Point #3 from Basins 3 through 5, 8 through 11 and 14 through 16. A 36" RCP will convey these flows to the proposed 4' sump inlet at the low point of Basins 17 and 18.

Basin 17, consisting of 0.65 acres along the south side of Fresh Air Drive, generates flows of 1.8 cfs during the 5 year storm and 3.8 cfs during the 100 year storm. The runoff generated from this basin flows westerly to a proposed 4' sump inlet at the west end of this basin.

Basin 18 comprises 0.43 acres of park and street along the west side of Fresh Air Drive. Runoff rates of 1.0 cfs and 2.1 cfs generated from this basin during the 5 and 100 year storms, respectively, flow southerly to the proposed 4' sump inlet at the low point of Basins 17 and 18. This inlet will collect total flow rates of 2.8 cfs and 5.9 cfs during the 5 and 100 year storms, respectively.

Total runoff rates of $Q_5 = 34.3$ cfs and $Q_{100} = 71.1$ cfs reach Design Point #4. A 36" RCP will convey these flows southerly to the existing 54" RCP in Leon Young Drive. The 54" RCP has a normal flow capacity of 260 cfs and per the Wolf Ranch MDDP from the contributing upstream basins 151 cfs reaches this point.

Basin 19A is located at the northeast corner of Cabbage Drive and Valemount Drive. This 1.74 acre basin generates runoff rates of 4.2 cfs during the 5 year storm and 8.6 cfs during the 100 year storm. These flows will reach Cabbage Drive and then flow westerly to Valemount Drive. A 10' on-grade inlet will be installed along the north side of Cabbage Drive to collect a portion of these flows. Flow rates of 2.8 cfs during the 5 year storm and 4.7 cfs during the 100 year storm will be collected by this inlet. An 18" RCP will convey the collected flows to the 48" RCP in Valemount. The remaining flows of 1.4 cfs and 3.9 cfs during the 5 and 100 year storms will enter Basin 21B as street flows.

Basin 19B is located along the east side of Valemount Drive. This 0.69 acre basin generates runoff rates of 1.9 cfs during the 5 year storm and 4.0 cfs during the 100 year storm. These flows continue southerly as street flows within the east side of Valemount Drive and enter Basin 21B as street flows.

Basin 20 consists of 0.36 acres along the south side of Cabbage Drive and generates runoff rates of 1.0 cfs during the 5 year storm and 2.2 cfs during the 100 year storm. The runoff from this basin also flows westerly within Cabbage Drive and enters Valemount Drive.

A 10' on-grade inlet will be installed along the east side of Valemount Drive just south of Cabbage Drive to collect flows generated from Basins 19A, 19B and 20. This inlet will collect runoff rates of 2.4 cfs during the 5 year storm and 3.9 cfs during the 100 year storm. Runoff rates of $Q_5 = 1.9$ cfs and $Q_{100} = 6.2$ cfs bypassing this inlet will enter Basin 21B as street flows.

Basin 21A is located at the northeast corner of Fergus Drive and Valemount Drive. This 1.90 acre basin generates runoff rates of $Q_5 = 4.7$ cfs and $Q_{100} = 9.7$ cfs which flow westerly within the north side of Fergus Drive to Valemount Drive. A 10' on-grade inlet will be installed along the north side of Fergus. This inlet will collect flows of 3.0 cfs and 5.0 cfs during the 5 and 100 year storms, respectively. Flow rates of $Q_5 = 1.7$ cfs and $Q_{100} = 4.7$ cfs will bypass this inlet and enter Basin 23 as street flows.

Basin 21B is located along the west side of Valemount Drive. This 0.82 acre basin generates runoff rates of 2.3 cfs during the 5 year storm and 4.8 cfs during the 100 year storm. These flows along with the bypass flows from the upstream inlet continue southerly as street flows within the east side of Valemount Drive.

Basin 22 comprises the south side of Fergus Drive from Valemount to Fresh Air Drive. Runoff rates of 0.8 cfs and 1.7 cfs generated from this basin during the 5 and 100 year storms, respectively also flow westerly within Fergus Drive to Valemount. The combined flows of $Q_5 = 6.7$ cfs and $Q_{100} = 17.4$ cfs flow south in Valemount Drive as street flows.

Total street flows of $Q_5 = 6.7$ cfs and $Q_{100} = 17.4$ cfs reach the southeast corner of Fergus and Valemount. A 10' on-grade inlet will be installed along the east side of Valemount just south of Fergus to collect 3.1 cfs during the 5 year storm and 5.2 cfs during the 100 year storm. The runoff rates of 3.6 cfs during the 5 year storm and 12.2 during the 100 year storm will bypass this inlet and enter Basin 23 as street flows.

Basin 23 is the north half of the proposed park at the southeast corner of Valemount Drive and Fergus Drive. This 1.89 acre basin generates runoff rates of 1.5 cfs during the 5 year storm and 3.6 cfs during the 100 year storm. These flows plus the flows from the upstream basins continue southerly within the east side of Valemount to an existing 15' on-grade inlet. Total street flows of $Q_5 = 5.1$ cfs and $Q_{100} = 15.8$ cfs reach this inlet from the north. This inlet will collect runoff rates of 3.4 cfs during the 5 year storm and 7.4 cfs during the 100 year storm. Bypass flows of $Q_5 = 1.7$ cfs and $Q_{100} = 8.4$ cfs will enter Basin 27 as street flows.

Basin 24 is south portion of the proposed park. This 3.31 acre basin generates runoff rates of 2.5 cfs during the 5 year storm and 6.2 cfs during the 100 year storm. These flows will be conveyed to the existing 54" RCP in Leon Young Drive in the existing 30" RCP stubbed into the park. At this time, there are no proposed plans for the park, but it will mainly consist of areas of sod with little impervious area added to the park. The 30" RCP has a normal capacity of approximately 44 cfs; therefore, the 30" RCP has plenty of capacity to convey runoff from impervious areas if needed. At the time of the park formal development, it will be decided how to convey the flows to the existing 30" RCP. Leon Young Drive has the street capacity to convey the undeveloped flows from the park until such time that the park is fully developed.

Basin 25 consists of approximately 1.47 acres along the north side of the proposed alley paralleling Leon Young Drive. Runoff rates of 4.0 cfs during the 5 year storm and 8.3 cfs during the 100 year storm will enter the alley and flow westerly within the alley to the west end of Basin 22. A 4' sump inlet will be installed at the end of this basin to collect these flows.

Basin 26, located along the north side of Leon Young Drive generates additional flows of $Q_5 = 4.9$ cfs and $Q_{100} = 10.2$ cfs. As stated above, bypass flows from Basin 6 enter this basin from the east resulting in total street flows of 5.5 cfs and 12.1 cfs reaching the existing 15' on-grade inlet along the north side of Leon Young Drive. This existing inlet will collect runoff rates of 4.0 cfs during the 5 year storm and 7.7 cfs during the 100 year storm. Flow rates of $Q_5 = 1.5$ cfs and $Q_{100} = 4.4$ cfs bypassing this inlet will continue westerly as street flows within the north side of Leon Young Drive.

Basin 27 comprises the east half of Valemount Drive from Fergus Drive to Leon Young Drive. This 0.97 acre basin generates runoff rates of 2.9 cfs during the 5 year storm and 5.9 cfs during the 100 year storm. These flows plus bypass flows from Basins 23 and 26 will continue westerly as street flows within the north side of Leon Young Drive.

EROSION CONTROL

Erosion control measures will be installed per the approved grading/erosion control plans.

WATER QUALITY

Pond A has water quality measures for this single-family residential development. Pond A was platted as Tract A, Villages at Wolf Ranch Filing NO. 30. Pond A will be conveyed to the City of Colorado Springs as a public pond.

DRAINAGE, BRIDGE AND POND FEES

The Daybreak at Wolf Ranch Development is within the Cottonwood Creek Drainage Basin. The 2016 Drainage, Bridge and Pond Fees are listed below. Daybreak at Wolf Ranch Filing No. 1 Drainage Fee (\$12,367/Acre Total)

	Area	\$/Acre	Total Fee
Capital Improvements Portion	30.144	\$9,298.00*	\$280,278.91
Land Portion	30.144	\$ 3,069.00*	\$92,511.94
Cash Portion	30.144	\$ 619.00*	\$18,659.14
BRIDGE FEES	30.144	\$ 968.00*	<u>\$29,179.39</u>
			\$420,629.38

- Pending the approval by City Council

DRAINAGE FACILITIES

The following drainage facilities will be required for the Daybreak at Wolf Ranch Subdivisions. The system is divided into public and private and reimbursable and non-reimbursable systems. The 48" and larger reinforced concrete pipes (RCP's) are considered public, reimbursable systems. Drainage facilities within these filings are all part of the overall Wolf Ranch Drainage system presented in the Wolf Ranch Master Development Drainage Plan. Therefore, public drainage facilities will be constructed in lieu of paying fees.

Daybreak at Wolf Ranch Filing No. 1 (Public-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
Existing 48" RCP in Valemount Dr.	730	L.F.	\$ 165.00	\$120,450.00
48" RCP in Valemount Dr.	100	L.F.	\$ 165.00	\$ 16,500.00
54" RCP in Valemount Dr.	455	L.F.	\$200.00	\$ 91,000.00
54" RCP in Leon Young Dr.	360	L.F.	\$200.00	\$ 72,000.00
			Sub-Total	\$ 299,950.00
10% Engineering and Contingency				<u>\$ 29,995.00</u>
			Grand Total	\$ 329,945.00

A 48" storm sewer system (1,285 feet) within Valemount Drive was originally listed in the Villages at Wolf Ranch Filing No. 16, 17 and 18 Final Drainage Report (approved 9-28-06) as a non-reimbursable system. Filings 17 and 18 are located along the west side of Valemount Drive. The re-analysis of the Valemount Drive system has changed a portion of the system to 54" RCP (same overall length). This system, since it conveys the 100 year storm shall be considered a reimbursable system pending City of Colorado Springs Drainage Board approval.

Daybreak at Wolf Ranch Filing No. 1 (Private-Non-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
4' D-10-R Inlets	1	Ea.	\$ 4,400.00	\$ 4,400.00
18" RCP	32	L.F.	\$ 45.00	\$ 1,440.00
			Sub-Total	\$ 5,840.00
10% Engineering and Contingency				\$ 584.00
			Grand Total	\$ 6,424.00

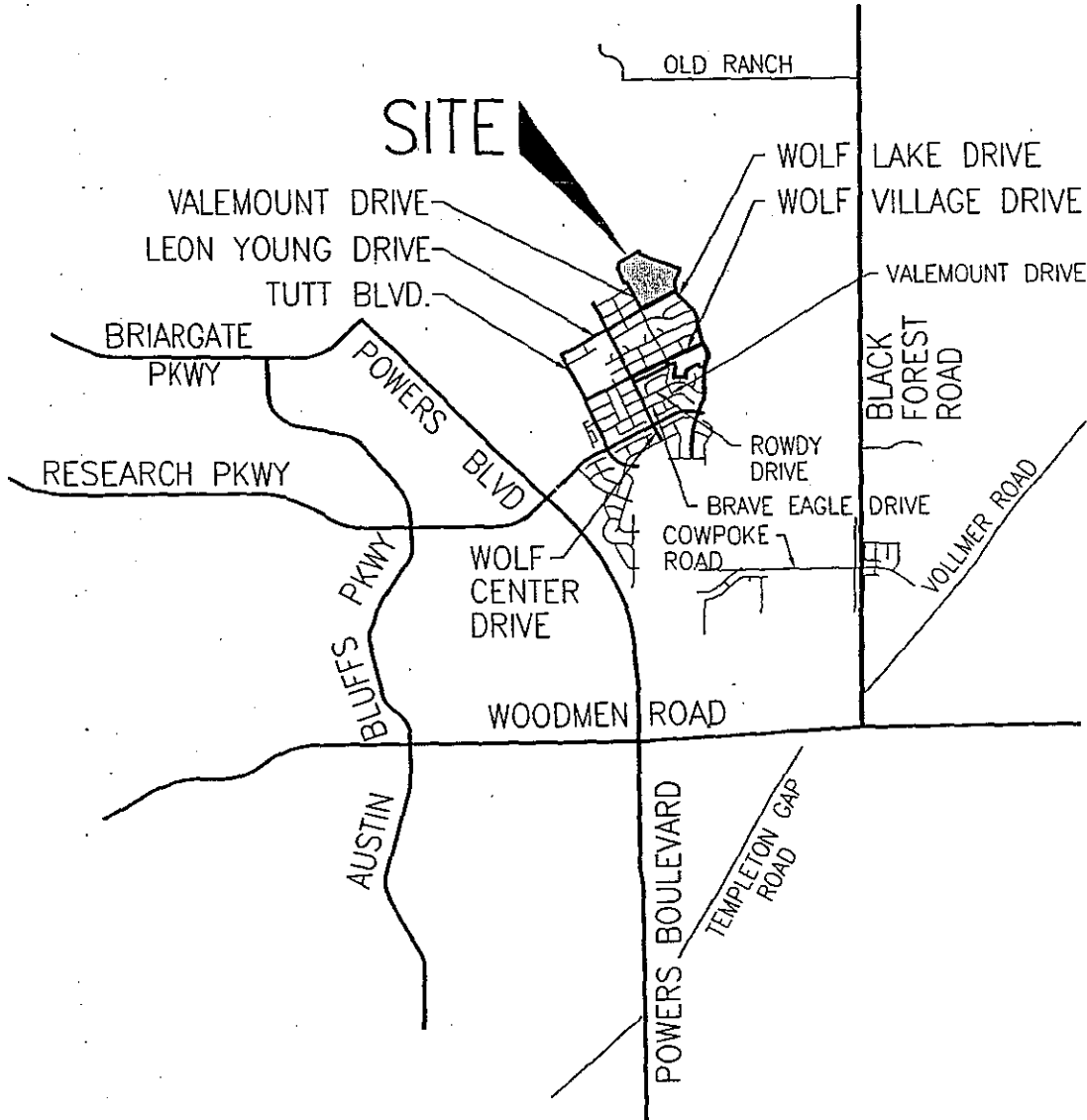
Daybreak at Wolf Ranch Filing No. 1 (Public-Non-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
36" RCP	347	L.F.	\$ 95.00	\$ 32,965.00
24" RCP	1048	L.F.	\$ 65.00	\$ 68,120.00
18" RCP	710	L.F.	\$ 45.00	\$ 31,950.00
4' D-10-R Inlets	3	Ea.	\$ 4,400.00	\$ 13,200.00
10' D-10-R Inlets	4	Ea.	\$ 4,800.00	\$ 19,200.00
12' D-10-R Inlets	3	Ea.	\$ 5,250.00	\$ 5,250.00
14' D-10-R Inlets	1	Ea.	\$ 5,400.00	\$ 5,400.00
			Sub-Total	\$ 175,085.00
10% Engineering and Contingency				\$ 17,508.50
			Grand Total	\$ 192,593.50

Future Daybreak Filings (Briargate Parkway) (Public, Non-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
24" RCP	180	L.F.	\$ 65.00	\$ 11,700.00
18" RCP	53	L.F.	\$ 45.00	\$ 2,385.00
8' D-10-R Inlets	2	Ea.	\$ 4,600.00	\$ 9,200.00
			Sub-Total	\$ 23,285.00
10% Engineering and Contingency				\$ 2,328.50
			Grand Total	\$ 25,613.50

APPENDIX



Vicinity Map

NOT TO SCALE

FIGURE 1

FILE: 14008FP.DWG
DATE: 9/17/14

JOB NO. 14-008



ROCKWELL CONSULTING, Inc.

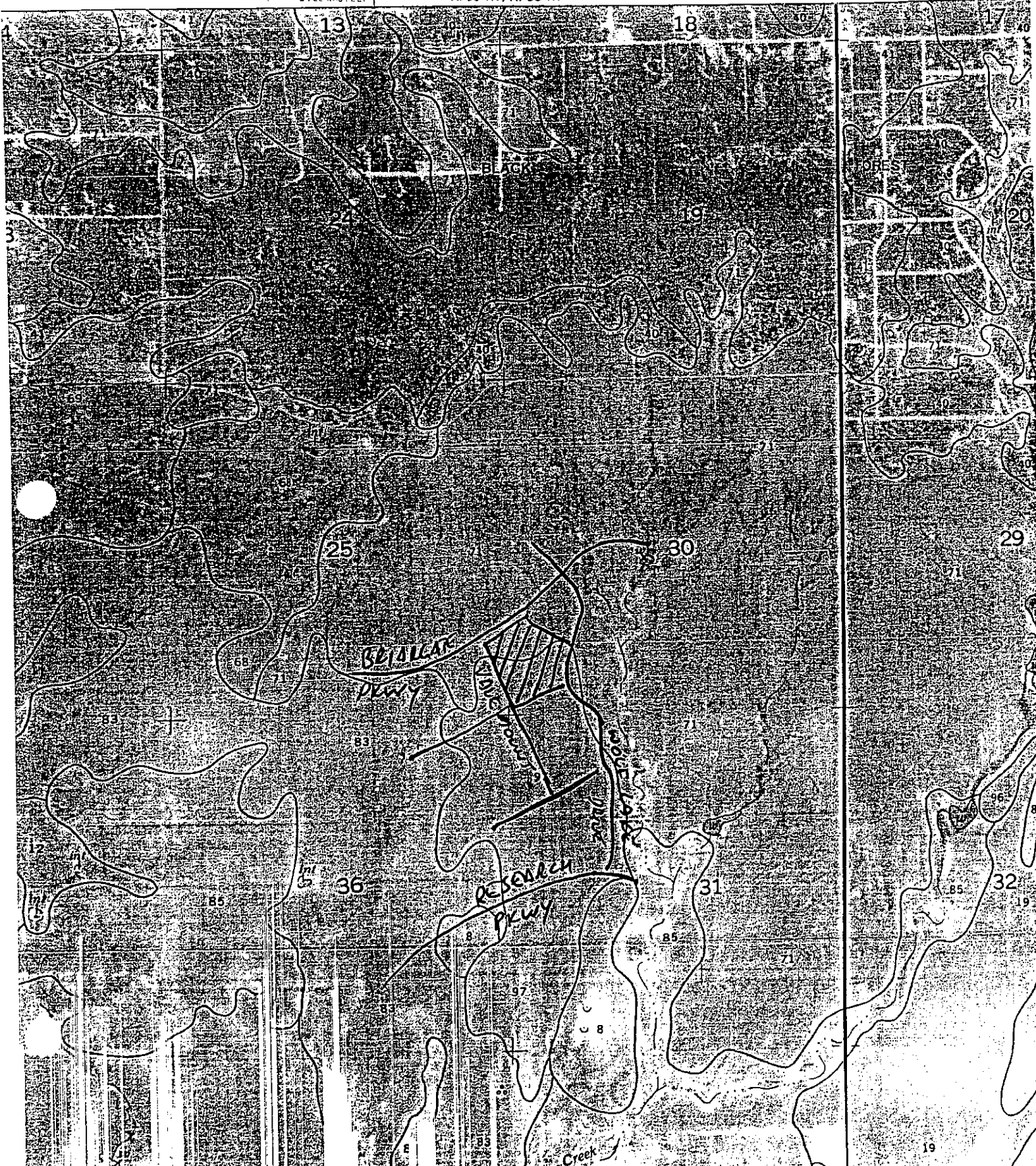
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1355 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80908
(719) 475-2575 • FAX (719) 475-9223

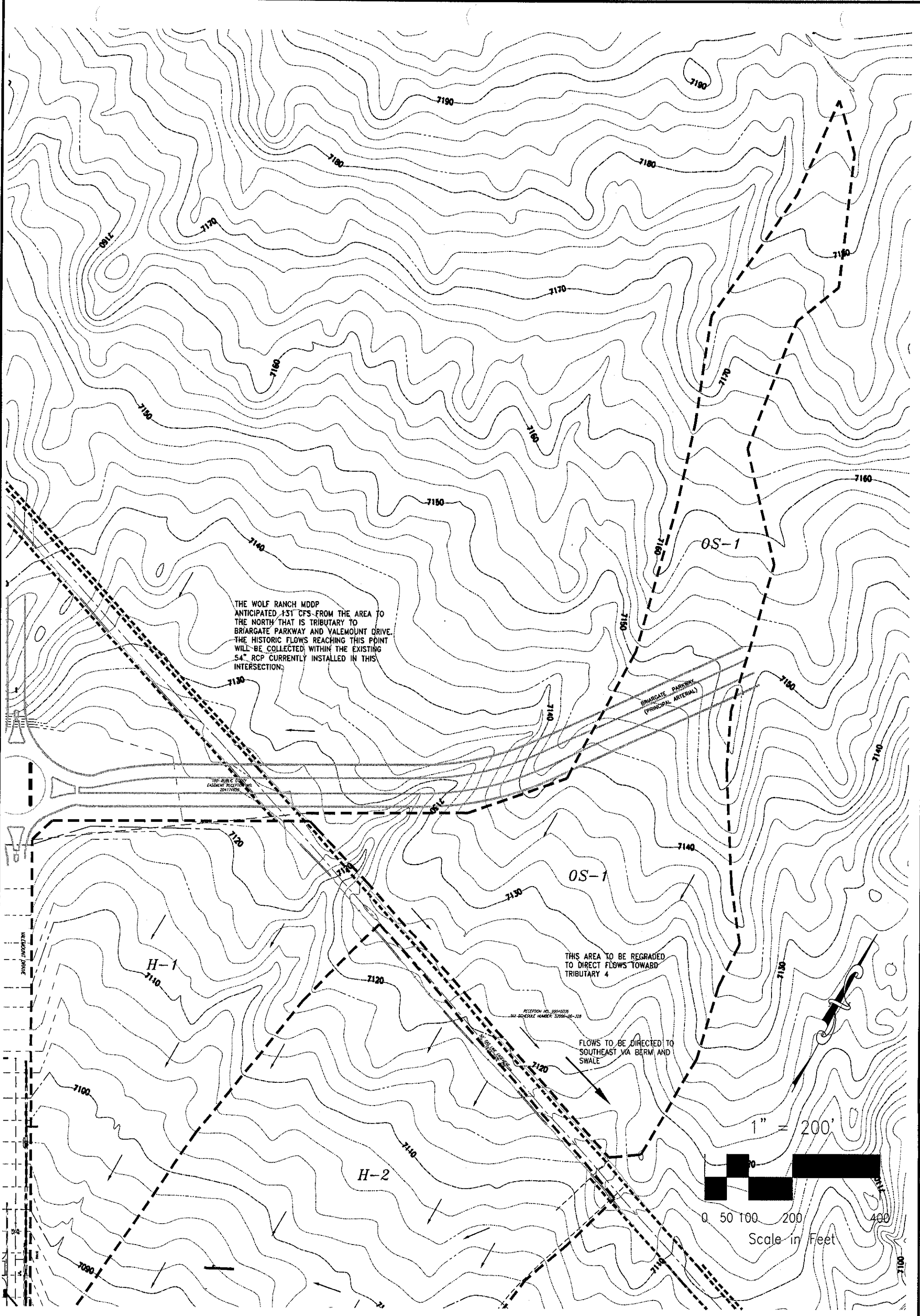
DEPARTMENT OF AGRICULTURE
LAND CONSERVATION SERVICE

2,226-000 FELT

R. 66 W. | R. 65 W.

(Join)

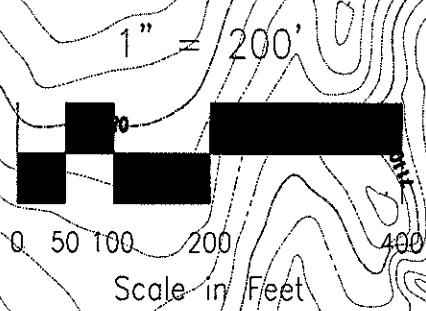




THE WOLF RANCH MDDP ANTICIPATED 131 CFS FROM THE AREA TO THE NORTH THAT IS TRIBUTARY TO BRIARGATE PARKWAY AND VALEMOUNT DRIVE. THE HISTORIC FLOWS REACHING THIS POINT WILL BE COLLECTED WITHIN THE EXISTING 54" RCP CURRENTLY INSTALLED IN THIS INTERSECTION.

THIS AREA TO BE REGRADED TO DIRECT FLOWS TOWARD TRIBUTARY 4

FLOWS TO BE DIRECTED TO SOUTHEAST VIA BERM AND SWALE



HISTORIC DRAINAGE BASIN TABLE

BASIN	AREA (acres)	Q ₅ (cfs)	Q ₁₀₀ (cfs)
H-1	12.056	6.2	13.3
H-2	17.756	9.0	19.2
OS-1	20.00	8.6	21.4

EXHIBIT 1

FILE: 14031bas4.DWG
DATE: 12/28/15

ROCKWELL CONSULTING, Inc.
ENGINEERING • SURVEYING
1955 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223

HYDROLOGY
RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN:	H-1
AREA:	12.056
SOIL TYPE:	C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	12.056	0.25	0.30	100.00%
		0.00	0.00	0.00%
		0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	12.06			100%

COMPOSITE: C5= 0.25 C100= 0.30

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1250	3		39.11		
Swale	0	2	2	0.00		
				39.11		
Tc Total:				39.11		

Intensity, I (inches/hr) from Fig 5-1

I5	I100
2.1 in/hr	3.7 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	Q100
6.2 cfs	13.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: H-2
 AREA: 17.756
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	17.756	0.25	0.30	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	17.76			100%

COMPOSITE: C5= 0.25 C100= 0.30

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1350	3		40.64		
Swale	0	2	2	0.00		
				<u>40.64</u>		
Tc Total:				40.64		

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>2.0 in/hr</u>	<u>3.6 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>9.0 cfs</u>	<u>19.2 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: OS-1
 AREA: 20
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Native Area	20	0.25	0.35	100.00%
	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>20.00</u>			<u>100%</u>

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	2300	3		53.05
Street	0	1.6	2.6	0.00
				<u>53.05</u>
Tc Total:				53.05

Intensity, I (inches/hr) from Fig 5-1

I5 1.7 in/hr I100 3.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 8.6 cfs Q100 21.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 1
 AREA: 1.75
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Street	0.82	0.90	0.95	46.86%
Landscaping	0.93	0.25	0.35	53.14%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>1.75</u>			<u>100%</u>

COMPOSITE: C5= 0.55 C100= 0.63

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	40	3		7.00
Street	450	3	2.8	2.68
				<u>9.67</u>
Tc Total:				9.67

Intensity, I (inches/hr) from Fig 5-1

I5 4.2 in/hr I100 7.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 4.0 cfs Q100 8.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 2
 AREA: 1.66
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Street	1.13	0.90	0.95	68.07%
Landscaping	0.53	0.25	0.35	31.93%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>1.66</u>			<u>100%</u>

COMPOSITE: C5= 0.69 C100= 0.76

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	40	3		7.00
Street	450	3	2.8	2.68
				<u>9.67</u>
Tc Total:				9.67

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.2 in/hr</u>	<u>7.4 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>4.8 cfs</u>	<u>9.3 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 3
 AREA: 3.5
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	3.5	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>3.50</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	150	4.7		6.87
Street	500	2.8	2.5	3.32
				<u>10.19</u>
Tc Total:				10.19

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.1 in/hr</u>	<u>7.2 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>8.6 cfs</u>	<u>17.8 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 4
AREA: 0.77
SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.77	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0.77</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	185	2.7		9.16
Street	50	3	2.6	0.32
				<u>9.48</u>

Tc Total: 9.48

Intensity, I (inches/hr) from Fig 5-1

I5 4.2 in/hr I100 7.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 1.9 cfs Q100 4.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 5
 AREA: 0.11
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.11	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0.11</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	150	4.7		6.87
Street	500	2.8	2.5	3.32
				<u>10.19</u>
Tc Total:				10.19

Intensity, I (inches/hr) from Fig 5-1

I5 4.1 in/hr I100 7.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 0.3 cfs Q100 0.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN:	<u>6</u>
AREA:	<u>1.30</u>
SOIL TYPE:	<u>B</u>

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	1.30	0.60	0.70	100.00%
Open Space	0	0.30	0.45	0.00%
Street	0	0.90	0.95	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	1.30			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	65	2		6.00
Street	550	4.2	3.1	2.98
				<u>8.98</u>
Tc Total:				8.98

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.3 in/hr</u>	<u>7.6 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>3.3 cfs</u>	<u>6.9 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 7
 AREA: 1.31
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.31	0.65	0.75	100.00%
Open Space	0	0.00	0.00	0.00%
Streets	0	0.90	0.95	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	1.31			100%

COMPOSITE: C5= 0.65 C100= 0.75

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	50	3		4.14
Street	500	4.5	3.2	2.62
				<u>6.76</u>
Tc Total:				6.76

Intensity, I (inches/hr) from Fig 5-1

I5 4.7 in/hr I100 8.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 4.0 cfs Q100 8.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 8
 AREA: 0.96
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.96	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
Streets	0	0.90	0.95	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	0.96			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	80	2.5		6.18
Street	250	3.2	2.7	1.55
				<u>7.73</u>
Tc Total:				7.73

Intensity, I (inches/hr) from Fig 5-1

I5 **I100**
4.5 in/hr 8.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 **Q100**
2.6 cfs 5.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 9
 AREA: 0.52
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.52	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.52			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	40	.3		4.12
Street	300	3.3	2.7	1.83
Tc Total:				5.95

Intensity, I (inches/hr) from Fig 5-1

I5 4.9 in/hr I100 8.7 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 1.5 cfs Q100 3.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 10
 AREA: 1.65
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.65	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.65			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3		6.51
Street	300	3.3	2.7	1.83
Tc Total:				8.34

Intensity, I (inches/hr) from Fig 5-1

I5 4.4 in/hr I100 7.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 4.3 cfs Q100 9.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 11
 AREA: 1.76
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.76	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>1.76</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	230	6		7.85
Street	200	1.5	1.8	1.81
				<u>9.66</u>
Tc Total:				9.66

Intensity, I (inches/hr) from Fig 5-1

I5 4.2 in/hr I100 9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 4.4 cfs Q100 11.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 12
 AREA: 0.90
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.90	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.90			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	40	3		4.12
Street	450	2	2.1	3.54
				<u>7.65</u>
Tc Total:				7.65

Intensity, I (inches/hr) from Fig 5-1

I5 4.5 in/hr I100 8.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 2.4 cfs Q100 5.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN:	13
AREA:	0.63
SOIL TYPE:	B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac. Residential	0.63	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0.63</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	30	6.6		2.75
Street	330	1.5	1.8	2.99
				<u>5.74</u>
Tc Total:				5.74

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.9 in/hr</u>	<u>8.8 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>1.9 cfs</u>	<u>3.9 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 14
 AREA: 1.59
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.59	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.59			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	70	3		5.44
Street	340	3.5	2.8	2.02
Tc Total:				7.46

Intensity, I (inches/hr) from Fig 5-1

I5 I100
4.5 in/hr 8.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 Q100
4.3 cfs 9.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 15
 AREA: 2.14
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.14	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	2.14			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	70	3		5.44
Street	410	3.5	2.8	2.44
				<u>7.88</u>
Tc Total:				7.88

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.5 in/hr</u>	<u>8.0 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>5.7 cfs</u>	<u>11.9 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 16
 AREA: 0.67
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.67	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.67			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	10		6.18		
Street	0	1.2	1.6	0.00		
				6.18		
Tc Total:				6.18		

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.8 in/hr</u>	<u>8.6 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>1.9 cfs</u>	<u>4.0 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 17
 AREA: 0.65
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.65	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0.65</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	30	3		3.56
Street	400	2	2.1	3.14
				<u>6.71</u>
Tc Total:				6.71

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.7 in/hr</u>	<u>8.4 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>1.8 cfs</u>	<u>3.8 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch.

BASIN: 18
 AREA: 0.43
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.32	0.60	0.70	74.42%
Park	0.11	0.25	0.35	25.58%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	0.43			100%

COMPOSITE: C5= 0.51 C100= 0.61

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	40	5		5.91
Street	260	4.2	3.1	1.41
				<u>7.32</u>
Tc Total:				7.32

Intensity, I (inches/hr) from Fig 5-1

I5 I100
4.6 in/hr 8.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 Q100
1.0 cfs 2.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 19A
 AREA: 1.74
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.74	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.74			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	200	3		9.20
Street	250	3	2.6	1.60
Tc Total:				10.81

I5

I100

4.0 in/hr

7.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5

Q100

4.2 cfs

8.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN:	19B
AREA:	0.69
SOIL TYPE:	B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.69	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.69			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	60	3		5.04
Street	300	2.8	3.0	1.67
				6.71
Tc Total:				6.71

I5

I100

4.7 in/hr

8.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5

Q100

1.9 cfs

4.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 20
 AREA: 0.36
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Residential	0.36	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	0.36			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	30	3		3.56
Street	300	1.5	1.8	2.72
				<u>6.29</u>
Tc Total:				6.29

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.8 in/hr</u>	<u>8.5 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>1.0 cfs</u>	<u>2.2 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 21A
 AREA: 1.9
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.9	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.90			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	180	5	3.4	7.38
Street	300	1.7	2.0	2.56
				9.93
Tc Total:				9.93

Intensity, I (inches/hr) from Fig 5-1

I5	I100
4.1 in/hr	7.3 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	Q100
4.7 cfs	9.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN:	21B
AREA:	0.82
SOIL TYPE:	B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.82	0.60	0.70	100.00%
Open Space	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.82			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	60	3		5.04
Street	300	2.8	3.0	1.67
				6.71
Tc Total:				6.71

Intensity, I (inches/hr) from Fig 5-1

I5	I100
4.7 in/hr	8.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	Q100
2.3 cfs	4.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 22
 AREA: 0.27
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac. Residential	0.27	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0.27</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	30	3		3.56
Street	0	1.5	1.8	0.00
				<u>3.56</u>
Tc Total:				3.56

Intensity, I (inches/hr) from Fig 5-1

I5 5.2 in/hr I100 9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 0.8 cfs Q100 1.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 23
 AREA: 1.89
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac. Residential	0.00	0.60	0.70	0.00%
Open Space	1.89	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>1.89</u>			<u>100%</u>

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	5		16.19
Swale	260	4	1.5	2.89
				<u>19.08</u>
Tc Total:				19.08

Intensity, I (inches/hr) from Fig 5-1

I5 3.1 in/hr I100 5.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 1.5 cfs Q100 3.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 24
 AREA: 3.31
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac. Residential	0.00	0.60	0.70	0.00%
Open Space	3.31	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	3.31			100%

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	5		16.19
Swale	360	4	1.5	4.00
				<u>20.19</u>
Tc Total:				20.19

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>3.0 in/hr</u>	<u>5.3 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>2.5 cfs</u>	<u>6.2 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 25
 AREA: 1.47
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.47	0.60	0.70	100.00%
	0	0.25	0.35	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>1.47</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	75	5		4.76
Street	360	2.2	2.2	2.70
				<u>7.46</u>

Tc Total: 7.46

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.5 in/hr</u>	<u>8.1 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>4.0 cfs</u>	<u>8.3 cfs</u>

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 26
 AREA: 1.95
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.95	0.60	0.70	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.95			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	120	5		6.02
Street	380	1.5	1.8	3.45
Tc Total:				9.47

Intensity, I (inches/hr) from Fig 5-1

I5 4.2 in/hr I100 7.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 4.9 cfs Q100 10.2 cfs

HYDROLOGY
RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: 27
 AREA: 0.97
 SOIL TYPE: B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Residential	0.97	0.70	0.80	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.97			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	175	3		6.89
Street	250	1.5	1.8	2.27
				9.15
Tc Total:				9.15

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.2 in/hr</u>	<u>7.5 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>2.9 cfs</u>	<u>5.9 cfs</u>

HYDROLOGY
RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: DP #1
 AREA: 4.38
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 3	3.5	0.60	0.70	79.91%
Basin 4	0.77	0.60	0.70	17.58%
Basin 5	0.11	0.60	0.70	2.51%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
		0.00	0.00	0.00%
	<u>4.38</u>			<u>100%</u>

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	150	4.7		6.87
Street	500	2.8	2.5	3.32
				<u>10.19</u>

Tc Total: 10.19

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>4.1 in/hr</u>	<u>7.2 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>10.7 cfs</u>	<u>22.2 cfs</u>

HYDROLOGY
RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: DP #2
 AREA: 9.27
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA	ca
Basin 8	0.96	0.60	0.70	10.36%	0.58
Basin 9	0.52	0.60	0.70	5.61%	0.31
Basin 10	1.65	0.60	0.70	17.80%	0.99
Basin 11	1.76	0.60	0.70	18.99%	1.06
DP#1	4.38	0.60	0.70	47.25%	
		0.00	0.00	0.00%	
	<u>9.27</u>			100%	

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	150	4.7		6.87
Street	500	2.8	2.5	3.32
Pipe	840	2.4	10	1.40
Tc Total:				11.59

Intensity, I (inches/hr) from Fig 5-1

I5 **I100**
3.9 in/hr 6.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 **Q100**
21.5 cfs 44.7 cfs

HYDROLOGY
RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: DP #3
 AREA: 13.67
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 14	1.59	0.60	0.70	11.63%
Basin 15	2.14	0.60	0.70	15.65%
Basin 16	0.67	0.60	0.70	4.90%
	0	0.00	0.70	0.00%
DP#2	9.27	0.60	0.70	67.81%
		0.00	0.00	0.00%
	13.67			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	150	4.7		6.87
Street	500	2.8	2.5	3.32
Pipe	840	2.4	10	1.40
Tc Total:				11.59

Intensity, I (inches/hr) from Fig 5-1

I5

I100

3.9 in/hr

6.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5

Q100

31.7 cfs

65.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Daybreak at Wolf Ranch

BASIN: DP #4
 AREA: 14.75
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA	ca
Basin 17	0.65	0.60	0.70	4.41%	0.39
Basin 18	0.43	0.60	0.70	2.92%	0.26
	0	0.00	0.00	0.00%	0.00
	0	0.00	0.00	0.00%	0.00
DP #3	13.67	0.60	0.70	92.68%	
		0.00	0.00	0.00%	
	14.75			100%	

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	150	4.7		6.87
Street	500	2.8	2.5	3.32
Pipe	840	2.4	10	1.40
				Tc Total: 11.59

Intensity, I (inches/hr) from Fig 5-1

I5	I100
<u>3.9 in/hr</u>	<u>6.9 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>34.3 cfs</u>	<u>71.1 cfs</u>

Daybreak at Wolf Ranch

Sump Inlet	1	5 YEAR	100 YEAR		
APPROACH FLOWS		4	8.2	s(x)=	0.02
(worse case)				s(l)=	0.002
	d =	0.33	0.43	n=	0.016
TOTAL FLOWS		4	8.2	L=	8
	d(max)=	0.09	0.29		

Daybreak at Wolf Ranch

Sump Inlet	2	5 YEAR	100 YEAR		
APPROACH FLOWS (worse case).		4.8	9.3	s(x)=	0.02
	d =	0.35	0.45	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		4.8	9.3	L=	8
	d(max)=	0.13	0.33		

Daybreak at Wolf Ranch

Sump Inlet 3 & 4

	5 YEAR	100 YEAR		
APPROACH FLOWS	8.6	17.8	s(x)=	0.02
(worse case)			s(l)=	0.002
d =	0.44	0.57	n=	0.016
TOTAL FLOWS	10.5	21.8	L=	10
d(max)=	0.33	0.65		

Daybreak at Wolf Ranch

Sump Inlet	5	5 YEAR	100 YEAR		
APPROACH FLOWS		0.3	0.6	s(x)=	0.02
(worse case)	d =	0.12	0.16	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		0.3	0.6	L=	4
	d(max)=	-0.21	-0.15		

Daybreak at Wolf Ranch

INLET BASIN 6

Q5 = 3.3
SL = 0.012

Q100 = 6.9
SO = 0.02

5 YEAR

T 10.90
FW 1.35
L1 11.3
L2 6.8
L3 24.2

100 YEAR

T 14.37
FW 1.42
L1 15.8
L2 9.5
L3 33.8

Li = 15.00

5 YR Q = 3.3

100 YR Q 6.9

5 YR Qi = 2.7

100 YR Qi 5.0

5 YR Qfb = 0.6

100 YR Qfb 1.9

Daybreak at Wolf Ranch

INLET BASIN 8,9 and 10

Q5 =	8.4	Q100 =	17.6
SL =	0.027	SO =	0.02

5 YEAR

T	13.29
FW	2.10
L1	21.5
L2	12.9
L3	46.1

100 YEAR

T	17.54
FW	2.22
L1	30.0
L2	18.0
L3	64.2

Li = 12.00

5 YR Q =	8.4	100 YR Q	17.6
5 YR Qi =	<u>4.7</u>	100 YR Qi	<u>7.1</u>
5 YR Qfb =	3.7	100 YR Qfb	10.5

Daybreak at Wolf Ranch

Sump Inlet 11 and 16

		5 YEAR	100 YEAR		
APPROACH FLOWS		8.1	21.6	s(x)=	0.02
(worse case)	d =	0.43	0.62	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		11.9	33.9	L=	14
	d(max)=	0.30	0.77		

Daybreak at Wolf Ranch

Sump Inlet 12 and 13

	5 YEAR	100 YEAR		
APPROACH FLOWS	2.4	5.1	s(x)=	0.02
(worse case)			s(l)=	0.002
d =	0.27	0.36	n =	0.016
TOTAL FLOWS	4.3	9	L =	4
d(max) =	0.19	0.44		

Daybreak at Wolf Ranch

INLET BASIN 14 and 15

Q5 =	10.0	Q100 =	20.9
SL =	0.05	SO =	0.02

5 YEAR

100 YEAR

T	12.64
FW	2.83
L1	27.6
L2	16.6
L3	59.1

T	16.67
FW	2.99
L1	38.4
L2	23.0
L3	82.2

Li = 12.00

5 YR Q = 10.0

5 YR Qi = 4.4

5 YR Qfb = 5.6

100 YR Q 20.9

100 YR Qi 6.5

100 YR Qfb 14.4

Daybreak at Wolf Ranch

INLET BASIN 16

Q5 =	7.5	Q100 =	18.4
SL =	0.05	SO =	0.02

5 YEAR

T	11.35
FW	2.77
L1	24.2
L2	14.6
L3	51.9

100 YEAR

T	15.89
FW	2.96
L1	36.2
L2	21.8
L3	77.7

Li = 12.00

5 YR Q =	7.5	100 YR Q	18.4
5 YR Qi =	<u>3.7</u>	100 YR Qi	<u>6.1</u>
5 YR Qfb =	3.8	100 YR Qfb	12.3

Daybreak at Wolf Ranch

Sump Inlet 17 and 18

	5 YEAR	100 YEAR		
APPROACH FLOWS	1.8	3.8	s(x)=	0.02
(worse case)			s(l)=	0.002
d =	0.24	0.32	n=	0.016
TOTAL FLOWS	2.8	5.9	L=	4
d(max)=	0.08	0.28		

Daybreak at Wolf Ranch

INLET BASIN 19A

Q5 = 4.2
SL = 0.015

Q100 = 8.6
SO = 0.02

5 YEAR

T 11.44
FW 1.52
L1 13.4
L2 8.1
L3 28.7

100 YEAR

T 14.97
FW 1.60
L1 18.5
L2 11.1
L3 39.6

Li = 10.00

5 YR Q = 4.2

5 YR Qi = 2.8

5 YR Qfb = 1.4

100 YR Q 8.6

100 YR Qi 4.7

100 YR Qfb 3.9

Daybreak at Wolf Ranch

INLET BASIN 21B-North

Q5 = 4.3
SL = 0.04

Q100 = 10.1
SO = 0.02

5 YEAR

T 9.61
FW 2.40
L1 17.7
L2 10.6
L3 38.0

100 YEAR

T 13.23
FW 2.56
L1 26.1
L2 15.6
L3 55.8

Li = 10.00

5 YR Q = 4.3

5 YR Qi = 2.4

5 YR Qfb = 1.9

100 YR Q 10.1

100 YR Qi 3.9

100 YR Qfb 6.2

Daybreak at Wolf Ranch

INLET BASIN 21A

Q5 = 4.7
SL = 0.015

Q100 = 9.7
SO = 0.02

5 YEAR

T 11.94
FW 1.53
L1 14.1
L2 8.5
L3 30.2

100 YEAR

T 15.66
FW 1.62
L1 19.5
L2 11.7
L3 41.8

Li = 10.00

5 YR Q = 4.7

100 YR Q 9.7

5 YR Qi = 3.0

100 YR Qi 5.0

5 YR Qfb = 1.7

100 YR Qfb 4.7

Daybreak at Wolf Ranch

INLET BASIN 23-north

Q5 = 6.7
SL = 0.04

Q100 = 17.4
SO = 0.02

5 YEAR

100 YEAR

T 11.34
FW 2.48
L1 21.7
L2 13.0
L3 46.4

T 16.23
FW 2.66
L1 33.2
L2 20.0
L3 71.2

Li = 10.00

5 YR Q = 6.7

100 YR Q 17.4

5 YR Qi = 3.1

100 YR Qi 5.2

5 YR Qfb = 3.6

100 YR Qfb 12.2

Daybreak at Wolf Ranch

INLET BASIN 23

Q5 =	5.1	Q100 =	15.8
SL =	0.04	SO =	0.02

5 YEAR

T	10.24
FW	2.43
L1	19.2
L2	11.5
L3	41.0

100 YEAR

T	15.65
FW	2.64
L1	31.8
L2	19.1
L3	68.2

Li = 15.00

5 YR Q =	5.1	100 YR Q	15.8
5 YR Qi =	<u>3.4</u>	100 YR Qi	<u>7.4</u>
5 YR Qfb =	1.7	100 YR Qfb	8.4

Daybreak at Wolf Ranch

Sump Inlet 25

	5 YEAR	100 YEAR		
APPROACH FLOWS	4	8.3	s(x)=	0.02
(worse case)			s(l)=	0.002
	d = 0.33	0.43	n =	0.016
TOTAL FLOWS	4	8.3	L =	4
	d(max) = 0.17	0.41		

Daybreak at Wolf Ranch

INLET BASIN 26

Q5 =	5.5	Q100 =	12.1
SL =	0.015	SO =	0.02

5 YEAR

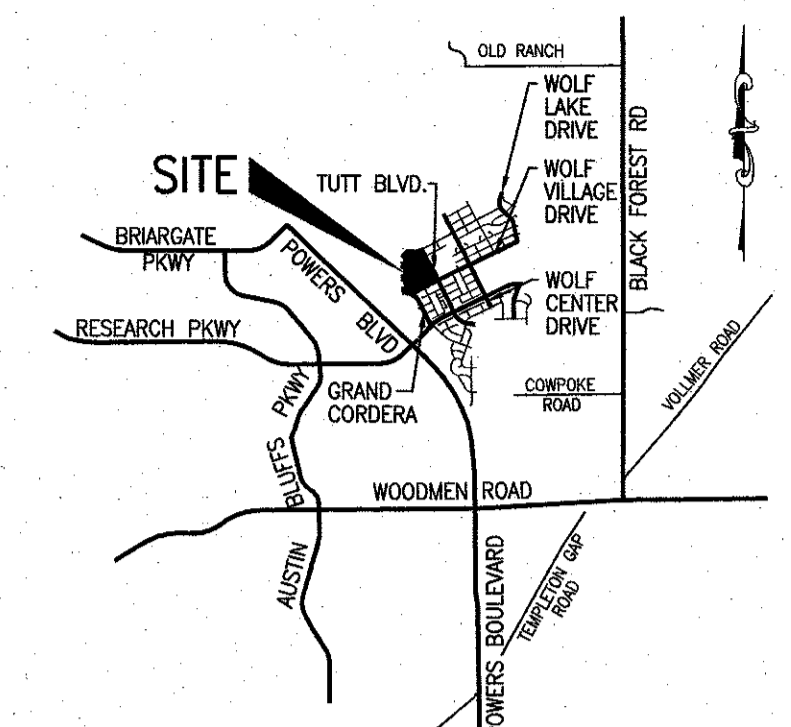
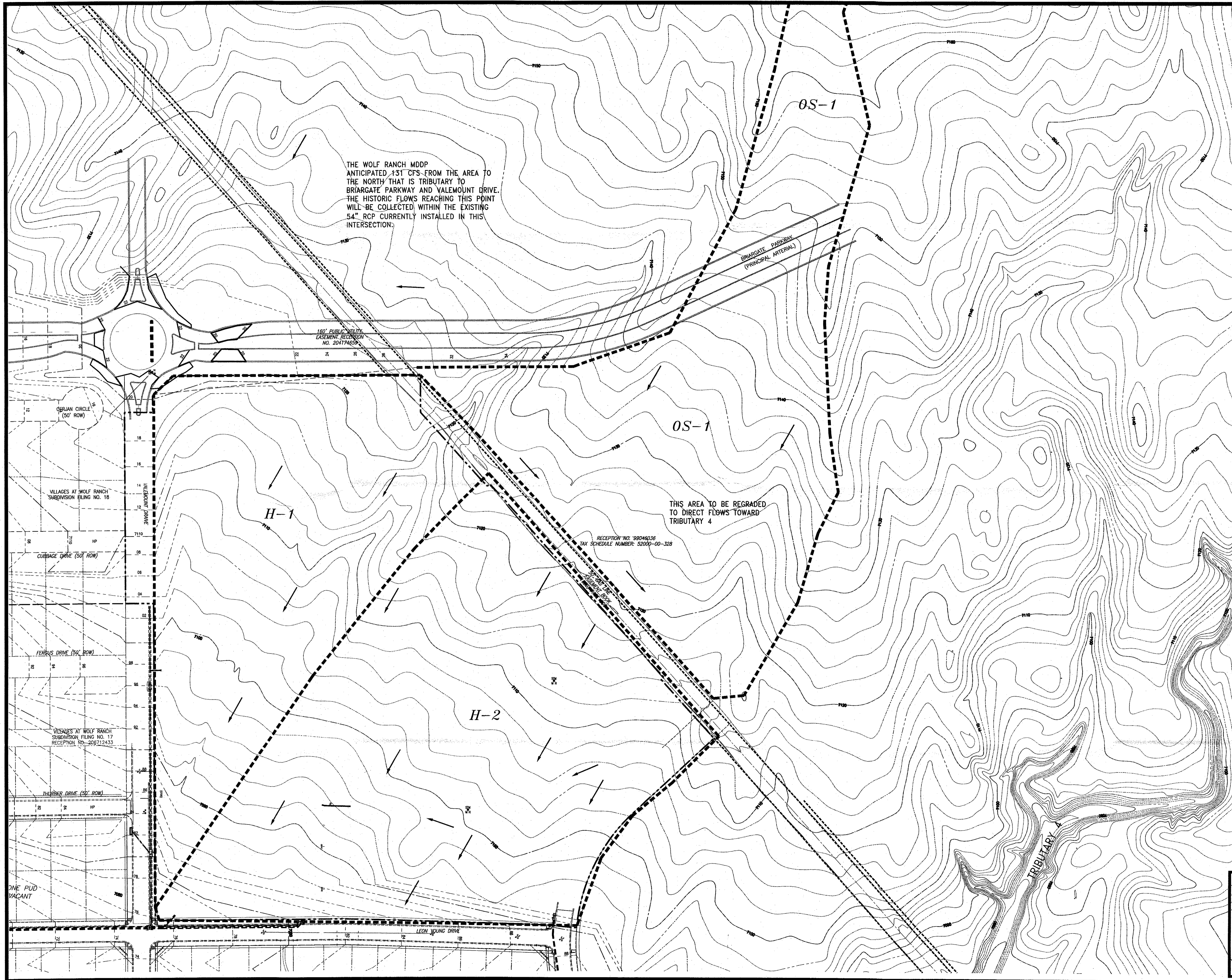
T	12.66
FW	1.55
L1	15.1
L2	9.1
L3	32.4

100 YEAR

T	17.02
FW	1.64
L1	21.5
L2	12.9
L3	46.2

Li = 15.00

5 YR Q =	5.5	100 YR Q	12.1
5 YR Qi =	<u>4.0</u>	100 YR Qi	<u>7.7</u>
5 YR Qfb =	1.5	100 YR Qfb	4.4



Vicinity Map
NOT TO SCALE

HISTORIC DRAINAGE BASIN TABLE

BASIN	AREA (acres)	Q _c (cfs)	Q ₁₀₀ (cfs)
H-1	12.056	6.2	13.3
H-2	17.756	9.0	19.2
OS-1	20.00	8.6	21.4

- LEGEND**
- 6100 EXISTING CONTOURS
 - BASIN BOUNDARIES
 - BASIN DESIGNATOR
 - DIRECTION OF FLOW

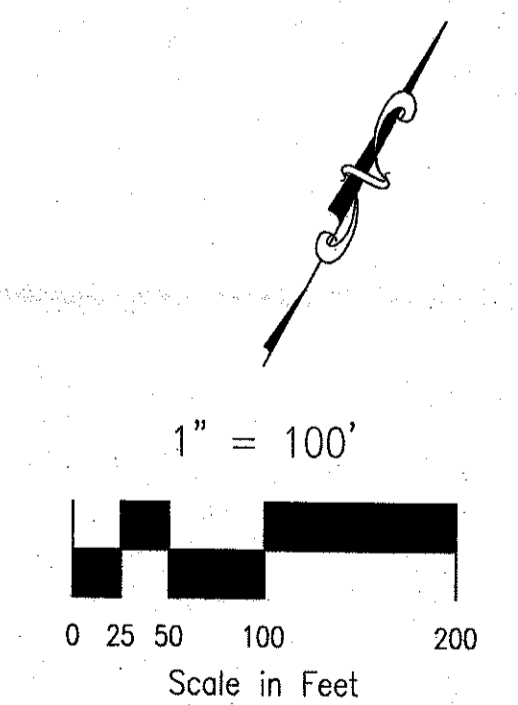


EXHIBIT 1 FILE: 14031bas4.dwg 12/28/15

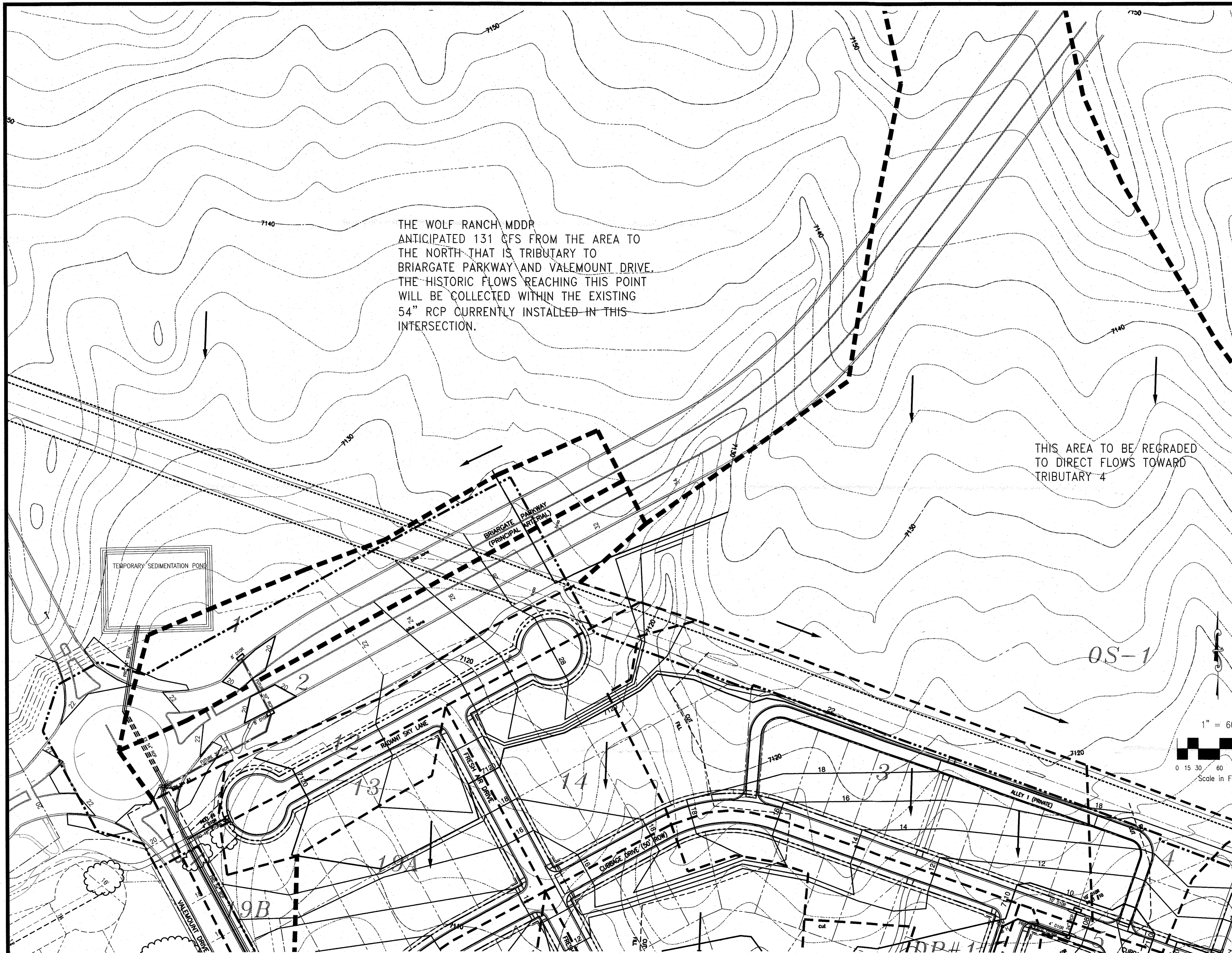
ROCKWELL CONSULTING, Inc. ENGINEERING - SURVEYING
1855 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223

**DAYBREAK AT WOLF RANCH FILING NO. 1
DRAINAGE PLAN - HISTORIC**

TITLE :
SCALE : 1"=100'
DATE : 12/28/15

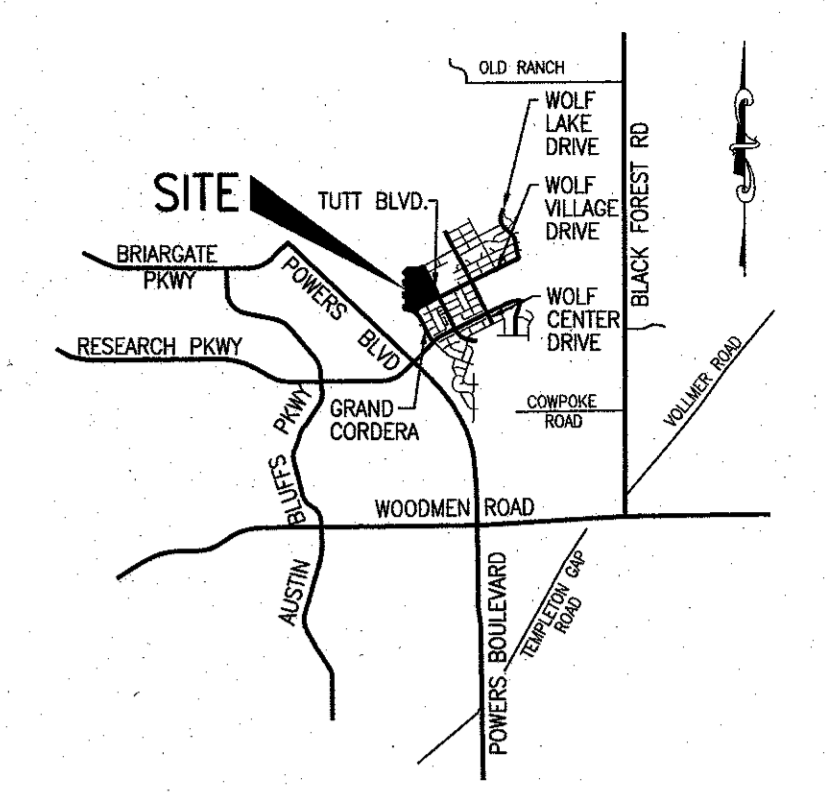
DRAWN BY : MEM
CHECKED BY : KDR

14-031
JOB NO.



THE WOLF RANCH MDDP ANTICIPATED 131 CFS FROM THE AREA TO THE NORTH THAT IS TRIBUTARY TO BRIARGATE PARKWAY AND VALEMOUNT DRIVE. THE HISTORIC FLOWS REACHING THIS POINT WILL BE COLLECTED WITHIN THE EXISTING 54" RCP CURRENTLY INSTALLED IN THIS INTERSECTION.

THIS AREA TO BE REGRADED TO DIRECT FLOWS TOWARD TRIBUTARY 4



Vicinity Map
NOT TO SCALE

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (acres)	Q _s (cfs)	Q ₁₀₀ (cfs)
1	1.75	4.0	8.2
2	1.66	4.8	9.3
3	3.5	8.6	17.8
4	0.77	1.9	4.0
5	0.11	0.3	0.6
6	1.30	3.3	6.9
7	1.31	4.0	8.2
8	0.96	2.6	5.4
9	0.52	1.5	3.2
10	1.65	4.3	9.0
11	1.76	4.4	11.1
12	0.90	2.4	5.1
13	0.63	1.9	3.9
14	1.59	4.3	9.0
15	2.14	5.7	11.9
16	0.67	1.9	4.0
17	0.65	1.8	3.8
18	0.43	1.0	2.1
19A	1.74	4.2	8.6
19B	0.69	1.9	4.0
20	0.36	1.0	2.2
21A	1.9	4.7	9.7
21B	0.82	2.3	4.8
22	0.27	0.8	1.7
23	1.89	1.5	3.6
24	3.31	2.5	6.2
25	1.47	4.0	8.3
26	1.95	4.9	10.2
27	0.97	2.9	5.9
OS-1	20.00	8.6	21.4
DP#1	4.38	10.7	22.2
DP#2	9.27	21.5	44.7
DP#3	13.67	31.7	65.9
DP#4	14.75	34.3	71.1

- LEGEND**
- 6100 EXISTING CONTOURS
 - BASIN BOUNDARIES
 - BASIN DESIGNATOR
 - DESIGN POINT
 - PROPOSED 2' CONTOURS
 - DIRECTION OF FLOW

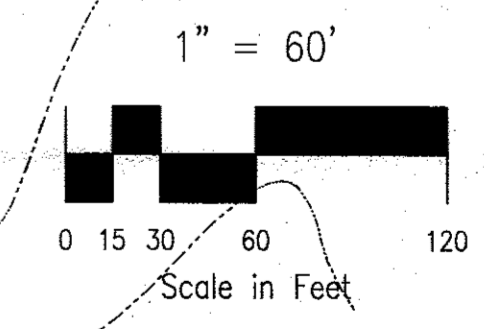
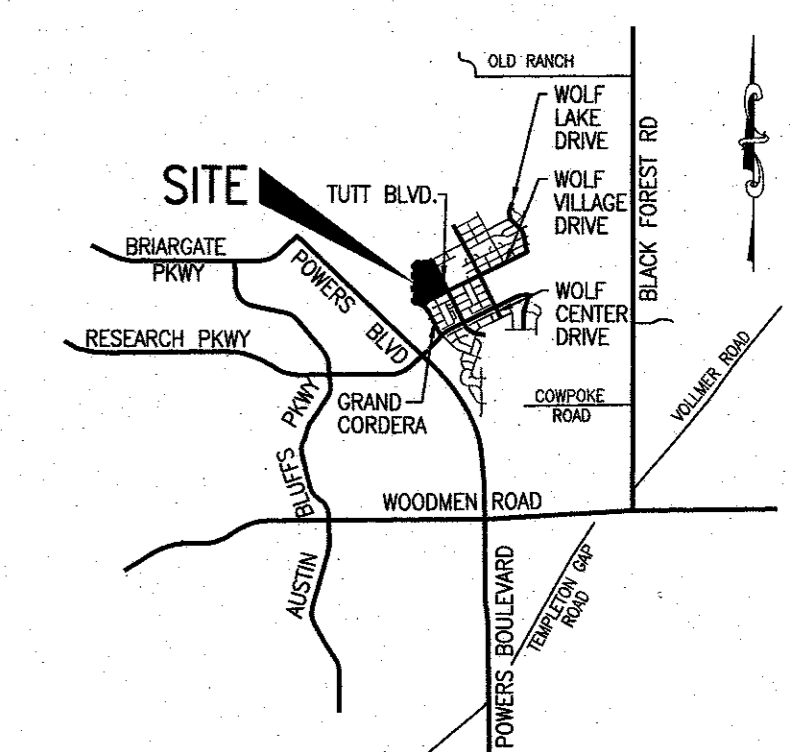


EXHIBIT 2- SHEET 1 FILE: 14031bas4.DWG 12/28/15

ROCKWELL CONSULTING, Inc.
ENGINEERING - SURVEYING
1955 N. LINCOLN BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223

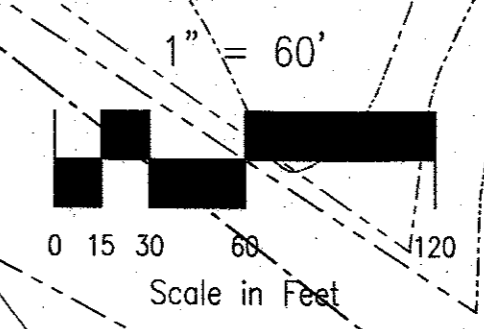
TITLE: DAYBREAK AT WOLF RANCH DRAINAGE PLAN - DEVELOPED
SCALE: 1"=60' DRAWN BY: MEM
DATE: 12/28/15 CHECKED BY: KDR JOB NO. 14-031



Vicinity Map
NOT TO SCALE

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (acres)	Q ₅ (cfs)	Q ₁₀₀ (cfs)
1	1.75	4.0	8.2
2	1.66	4.8	9.3
3	3.5	8.6	17.8
4	0.77	1.9	4.0
5	0.11	0.3	0.6
6	1.30	3.3	6.9
7	1.31	4.0	8.2
8	0.96	2.6	5.4
9	0.52	1.5	3.2
10	1.65	4.3	9.0
11	1.76	4.4	11.1
12	0.90	2.4	5.1
13	0.63	1.9	3.9
14	1.59	4.3	9.0
15	2.14	5.7	11.9
16	0.67	1.9	4.0
17	0.65	1.8	3.8
18	0.43	1.0	2.1
19A	1.74	4.2	8.6
19B	0.69	1.9	4.0
20	0.36	1.0	2.2
21A	1.9	4.7	9.7
21B	0.82	2.3	4.8
22	0.27	0.8	1.7
23	1.89	1.5	3.6
24	3.31	2.5	6.2
25	1.47	4.0	8.3
26	1.95	4.9	10.2
27	0.97	2.9	5.9
OS-1	20.00	8.6	21.4
DP#1	4.38	10.7	22.2
DP#2	9.27	21.5	44.7
DP#3	13.67	31.7	65.9
DP#4	14.75	34.3	71.1



- LEGEND**
- 6100 EXISTING CONTOURS
 - BASIN BOUNDARIES
 - BASIN DESIGNATOR
 - DESIGN POINT
 - PROPOSED 2' CONTOURS
 - DIRECTION OF FLOW

EXHIBIT 2- SHEET 2 FILE: 14031ba04.dwg 12/28/15

ROCKWELL CONSULTING, Inc.
ENGINEERING - SURVEYING
1955 N. LINCOLN BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2515 • FAX (719) 475-9225

TITLE : DAYBREAK AT WOLF RANCH DRAINAGE PLAN - DEVELOPED
SCALE : 1"=60' DRAWN BY : MEM 14-031
DATE : 12/28/15 CHECKED BY : KDR JOB NO.