WAGON TRAILS FIL. No 3

WAGON TRAILS
MASTER DEVELOPMENT DRAINAGE PLAN (MDDP)

AUGUST, 1999

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FINAL DRAINAGE REPORT for
WAGON TRAILS FIL. No. 1-4

Prepared for:

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Project# 97-104

WAGON TRAILS (MDDP)
DRAINAGE PLAN STATEMENTS

ENGINEER'S STATEMENT

The attached drainage plan and report 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 criteria established by the City of Colorado Springs for drainage reports, and said drainage report is in conformity with the Master Plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

Kent D. Rockwell, P.E.

COLORADO REGISTERED
KENT D. ROCKWELL
KDR
25086
8/23/99
PROFESSIONAL ENGINEER

DEVELOPER'S STATEMENT

I, the developer, have read and will comply with all the requirements specified in this drainage report and plan.

Development Management, Inc.

BY: ______________________ DATE 8-20-99
Kent Petre

TITLE: President

ADDRESS: 4065 Sinton Road, Suite 200
Colorado Springs, CO 80907

CITY OF COLORADO SPRINGS

Filed in accordance with Section 15-3-906 of the code of the City of Colorado Springs, 1980, as amended.

______________________ 8/24/99
CITY ENGINEER DATE

WAGON TRAILS
MASTER DEVELOPMENT DRAINAGE PLAN (MDDP)
AUGUST, 1999

PURPOSE

The purpose of this MDDP is to identify the existing and proposed runoff patterns, major drainageways and drainage facilities tributary to the Wagon Trails Development and to recommend drainage facilities and improvements required to facilitate the future development of the site. This plan should serve only as a guide for future planning and design. Site specific design should be completed with individual drainage plans and reports at the time of platting/development.

SUMMARY OF DATA

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

1. City of Colorado Springs and El Paso County "Drainage Criteria Manual", October 1987, revised November 1991.

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. "Woodmen Road Drainage Report (Havenwood Drive to Powers Boulevard), by Rockwell Minchow Consultants, Inc., April, 1999.

GENERAL LOCATION AND DESCRIPTION

The Wagon Trails 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 Section 12, Township 13 South, Range 66 West of the 6th P.M. and is bound on the west by future commercial development and Austin Bluffs Parkway, on the south by Dublin Boulevard and on the north and east by undeveloped land which is planned for commercial development. The development contains approximately 250 acres, none of which has been developed to date.

Woodmen Road is located approximately 800 feet north of the proposed Wagon Trails Development. Powers Boulevard is 800 feet east of Wagon Trails. Commercial development is proposed to the north and east of the Wagon Trails development. These commercial areas are included in the drainage analysis for this development. The Wagon Trails development will consist of single family residential development, a school site and open space/park tracts.

Well-established native grasses exists throughout the proposed development. The topography generally slopes from east to west. The entire development lies within the Cottonwood Creek Drainage Basin.

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 in the Sundown North Development fall under one soil classification (see Soils Map - Figure 2). The soils underlying the site consist of the Blakeland Series (Soil 8) and classified under Hydrologic Group "A". A portion of the off-site proposed commercial development located southeast of the Woodmen Road and Austin Bluffs Parkway intersection is underlain by Stapleton (Soil Type 83) which falls under the Hydrologic Group "B" classification. Hydrologic Group "B" was used for calculation purposes.

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) Numbers #08041C0536 F and #08041C0528 F, dated March 17, 1997, none of the site lies in a designated flood plain.

DRAINAGE CRITERIA

The current City of Colorado Springs/El Paso County 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. Although the overall Wagon Trails Development is greater than 100 acres, the Rational Method was still utilized due to the fact that this development basically has 4 major basins. This will also provide a more localized analysis of individual subdivisions within the larger planned Wagon Trails Development and will provide conservative results.

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 historic runoff for the basins is depicted on the Historic Drainage Plan provided in the appendix. The site has been divided into 7 historical drainage basins. Several of the historical basins do not affect the Wagon Trails Development but are included to clarify surrounding drainage patterns.

Basin A consists of 44.95 acres northwest of the proposed Wagon Trails Development. Runoff rates of 21.4 cubic feet per second (cfs) and 51.9 cfs are generated from this basin during the 5 year and 100 year storms, respectively. These runoff rates sheet flow to the northwest toward the Austin Bluffs Parkway and Woodmen Road intersection. An existing 42" reinforced concrete pipe (RCP) currently collects these flows and conveys them to Cottonwood Creek south of Woodmen Road.

Runoff rates of $Q_5 = 8.7$ cfs and $Q_{100} = 21.4$ cfs are generated from the 17.47 acre Basin B located south of Basin A. These flows sheet flow toward the intersection of Austin Bluffs Parkway and future Bridle Pass Drive where an existing 48" RCP collect the flows. These flows are conveyed southerly within Austin Bluffs Parkway within an existing storm sewer system.

Basin C consists of the future commercial area west of the Wagon Trails Development. This 30.69 acre basin generates runoff rates of 13.8 cfs during the 5 year storm and 34.4 cfs during the 100 year storm. These flows reach the northeast corner of Austin Bluffs Parkway and Dublin Boulevard.

The 13.47 acres located southeast of Basin C comprises Basin D. Runoff rates of Q_5 = 8.1 cfs and Q_{100} = 18.9 cfs sheet flow to the southwest toward the intersection of Granite Peak Drive and Dublin Boulevard. These flows currently enter Dublin Boulevard and flows westerly as street flow within Dublin.

Aproximately 50.51 acres along the north side of Dublin Boulevard comprises Basin E. Runoff rates of 32.8 cfs during the 5 year storm and 77.8 cfs during the 100 year storm sheet flow from this basin into the north side of Dublin Boulevard. Existing sump inlets at the northwest and northeast corners of the Wagon Ridge Drive and Dublin Boulevard intersection collects these flows. An existing 54" RCP in Wagon Ridge Drive conveys these flows southerly through the Antelope Creek Filing No. 3 development.

Basins F comprises the majority of the proposed Wagon Trails Development generating historic runoff rates of 57.2 cfs during the 5 year storm and 136.6 cfs during the 100 year storm. These flows sheet flow to the west toward Austin Bluffs Parkway. Additional runoff rates of 60.2 cfs during the 5 year storm and 142.2 cfs during the 100 year storm generated from Basin G combine with the flows generated from Basins C and F. The combined flows of Q_5 = 126.3 cfs and Q_{100} = 298.4 cfs generated from Basins C, F and G reach historic Design Point 1. Several existing pipes stubbed out to the east side of Austin Bluffs Parkway collects these flows. The existing system in Austin Bluffs Parkway conveys these flows southerly to a point approximately 400' south of Dublin where the system discharges to Antelope Creek.

DEVELOPED DRAINAGE BASIN DESCRIPTIONS

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

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 homeowner to limit concentrated flows and to disperse the flows as much as possible. Lot Drainage Plans will be prepared for each individual subdivision area as they are developed and platted.

Basin 1 consists of 4.71 acres along the east side of the proposed development. Runoff rates of 11.9 cfs during the 5 year storm and 23.7 cfs during the 100 year storm are generated from this basin. Runoff generated from this basin reaches Schooner Drive and flows westerly into Basin 2. Schooner Drive at a slope of 2% and a corresponding 5 year street capacity of 15.9 cfs per side has adequate capacity to convey these flows through Basin 1.

The 4.33 acres directly west of Basin 1 comprises Basin 2 which generates runoff rates of Q_5 = 9.9 cfs and Q_{100} = 19.7 cfs. The combined flows from Basin 1 and 2 reach Design Point 1 where the runoff rates are 20.6 cfs and 41.1 cfs during the 5 year and 100 year storms, respectively. Schooner Drive has a 5 year street capacity of 22.5 cfs per side based on a street slope of 4%. This is adequate street capacity to convey the flows generated from Basins 1 and 2 to the Schooner Drive and Duryea Drive intersection.

At this intersection, a 15' on-grade inlet will be installed to collect flows from Basins 1 and 2. Inlet 1 will collect 9.3 cfs during the 5 year storm and 13.7 cfs during the 100 year storm. Runoff rates of 11.3 cfs and 27.4 cfs will bypass this inlet during the 5 year and 100 year storms, respectively, and flow into Basin 10.

Basin 3 is located at the northeast corner of the overall Wagon Trails residential development and generates runoff rates of Q_5 = 9.7 cfs and Q_{100} = 19.3 cfs. These flows reach the north half of Grand Prairie Drive and continue westerly and southerly within Grand Prairie Drive. Grand Prairie Drive, with a minimum slope of 1.5% and a 5 year street capacity of 13.8 cfs per side, will convey these flow to the intersection of Grand Prairie Drive and Duryea Drive. These flows will then enter Basin 4 as street flows.

The 7.21 acres directly south of Basin 3 comprises Basin 4. This basin generates runoff rates of 16.0 cfs during the 5 year storm and 31.8 cfs during the 100 year storm which are conveyed within the south side of Grand Prairie Drive southerly toward the Grand Prairie Drive and Duryea Drive intersection. As stated above, Grand Prairie Drive has a 5 year street capacity of 13.8 cfs per side which is not adequate to convey the total runoff generated from Basin 4. Therefore, a 15' inlet (Inlet 2) will be installed approximately 350 feet north of the Grand Prairie and Duryea Drive intersection along the south side of Grand Prairie. This inlet will collect 8.6 cfs during the 5 year storm and 13.2 cfs during the 100 year storm. The runoff rates bypassing this inlet along with the runoff generated from the remaining portion of Basin 4 continues to the Schooner Drive and Duryea Drive intersection. The total runoff rates of Q_5 = 17.1 and Q_{100} = 37.9 cfs, including the flows generated from Basin 3, reach Inlet 3. Duryea at a slope of 2.4% and a 5 year street capacity of 17.4 cfs per side has adequated capacity to convey these flows to the Schooner Drive and Duryea intersection.

Inlet 3 will be constructed on the west side of Duryea just north of Schooner Drive. Inlet 3 will collect 10.9 cfs during the 5 year storm and 18.6 cfs during the 100 year storm. Runoff rates of 6.2 cfs and 19.3 cfs will bypass this inlet and combine with the flows bypassing Inlet 1. An additional inlet will be constructed just west of the Schooner Drive and Duryea Drive intersection to collect a portion of the combined flows of Q_5 = 17.5 cfs and Q_{100} = 46.7 cfs reaching Inlet 4. Routing these flows to Design Point 2 results in street flows of 16.7 cfs and 44.3 cfs reaching Inlet 4 during the 5 year and 100 year storms. Inlet 4 will collect rates of 9.1 cfs during the 5 year storm and 15.6 cfs during the 100 year storm. The remaining street flows of Q_5 = 7.6 cfs and Q_{100} = 28.7 cfs bypassing this inlet will enter Basin 10 as street flows. A 30" reinforced concrete pipe (RCP) will convey the flows collected within Inlets 1 through 4 southerly within Schooner Drive.

Basin 5 consists of 7.12 acres along the south side of Schooner Drive. Runoff rates of 15.9 cfs and 31.4 cfs reach the south end of Schooner Drive which has a 5 year street capacity of 15.9 cfs. A 15' inlet will be installed toward the south end of Basin 5 to collect a portion of these flows before they enter Pioneer Mesa Drive. Approximately 6.8 cfs during the 5 year storm and 18.2 cfs during the 100 year storm will bypass this inlet and enter Pioneer Mesa Drive as street flow.

Basin 6, located just south of Basin 5, consists of 3.02 acres and generates runoff rates of Q_5 = 6.9 cfs and Q_{100} = 13.7 cfs. These runoff rates reach the north half of Pioneer Mesa Road and continue westerly as street flow to the Pioneer Mesa and Schooner Drive intersection.

Approximately 6.39 acres toward the southeast corner of the development comprises Basin 7 which generates flows of 14.2 cfs during the 5 year storm and 28.2 cfs during the 100 year storm. One-third of these flows reach the north half of Grand Prairie Drive and two-thirds reach the south half of Pioneer Mesa Road. Each of these street have the capacity to convey the flows to the intersection of Pioneer Mesa and Grand Prairie Drive.

Basin 8 located along the south side of Grand Prairie Drive generates additional flows of 14.1 cfs during the 5 year storm and 28.0 cfs during the 100 year storm. These flows are conveyed westerly within the south half of Grand Prairie Drive to the Pioneer Mesa and Grand Prairie Drive intersection. Grand Prairie Drive at a minimum slope of 2% and a corresponding 5 year street capacity of 15.9 cfs per side has adequate capacity to convey these flows to the Pioneer Mesa and Grand Prairie Drive intersection.

However, the combined flows reaching the intersection exceed the street capacity of Pioneer Mesa just downstream of this intersection. Therefore, 2 - 15' inlets and a 10' inlet will be installed just upstream of the intersection to collect flows from Basins 7 and 8. Inlets 7, 8 and 9 will collect a total of 17.5 cfs during the 5 year storm and 26.9 cfs during the 100 year storm. Approximately 10.8 and 29.3 cfs will bypass this inlet during the 5 and 100 year storms, respectively, and continue westerly as street flow, entering Basin 9. A 36" RCP will convey the flows collect at Inlets 7, 8 and 9 along with the flows collected from Basin 17A described below.

Basin 9 consists of 2.73 acres just downstream of Basins 7 and 8. The runoff rates bypassing Inlets 7, 8, and 9 enter Basin 9 and combine with the runoff rates of Q_5 = 5.9 cfs and Q_{100} = 11.7 cfs generated from Basin 9. Routing these flows to Design Point 3 and accounting for upstream collection results in street flows of 14.6 cfs during the 5 year storm and 36.6 cfs during the 100 year storm at Design Point 3. At a slope of 2%, Pioneer Mesa has adequate capacity (5 year Q_{cap} = 15.9 cfs per side) to convey these flows. A 15' inlet will be installed at the downstream end of Basin 9 to reduce the street flows entering Basin 9A. This inlet (Inlet 10) will collect 8.6 cfs during the 5 year storm and 14.4 cfs during the 100 year storm, leaving street flows of Q_5 = 6.0 cfs and Q_{100} = 22.2 cfs entering Basin 9A.

Runoff rates of 6.5 cfs during the 5 year storm and 13.3 cfs during the 100 year storm are generated from the 2.72 acre Basin 9A. These runoff rates combine with the flows of 6.0 cfs and 22.2 cfs bypassing Inlet 10 during the 5 year and 100 year storms, respectively. Runoff rates of Q_5 = 12.0 cfs and Q_{100} = 35.5 cfs flow westerly within the south side of Pioneer Mesa Drive through Basin 9A. Pioneer Mesa at a slope of 2% and a 5 year street capacity of 15.9 cfs per side has the capacity to convey these flows to the Prairie Wind and Pioneer Mesa Road (Design Point 4). An inlet will be constructed just east of Prairie Wind Drive along the south side of Pioneer Mesa to collect a portion of these flows before they cross Prairie Wind Drive.

Based on routed flows of Q_5 = 32.7 cfs and Q_{100} = 66.2 cfs at Design Point 4, this inlet (Inlet 11) will collect 6.7 cfs during the 5 year storm and 13.0 cfs during the 100 year storm. These leaves runoff rates of 3.8 cfs during the 5 year storm and 17.6 cfs during the 100 year storm crossing Prairie Wind Drive into Basin 15.

Basin 10 consists of 3.74 acres and generates runoff rates of Q_5 = 9.2 cfs and Q_{100} = 18.6 cfs. Approximately 1.5 cfs during the 5 year storm and 3.1 cfs during the 100 year storm of the total flows generated from Basin 10 combine with the flows bypassing Inlets 4 and 5. This results in flow rates of Q_5 = 15.9 cfs and Q_{100} = 50.0 cfs reaching the northwest corner of the Schooner and Pioneer Mesa intersection (Inlet 6). This inlet will collect 9.1 cfs during the 5 year storm and 17.1 cfs during the 100 year storm. Approximately 6.8 cfs and 32.9 cfs will bypass Inlet 6 and continue westerly within Pioneer Mesa Road.

Additional runoff rates of Q_5 = 2.7 cfs and Q_{100} = 5.4 cfs will reach Pioneer Mesa Road from Basin 10 and combine with the runoff bypassing Inlet 6 and the flows generated from Basin 6. The total flows just east of Grand Prairie Drive are 16.4 cfs during the 5 year storm and 52.0 cfs during the 100 year storm. A 25' inlet will be installed just east of Schooner Drive to collect a portion of these flows. Inlet 6A will collect 11.8 cfs during the 5 year storm and 29.2 cfs during the 100 year storm. Approximately 4.6 cfs and 22. 8 cfs will bypass Inlet 6A and combine with the remaining flow rates of Q_5 = 5.0 cfs and Q_{100} = 10.1 cfs generated from Basin 10. This results in 9.6 cfs and 32.9 cfs flowing westerly within the north half of Pioneer Mesa Road entering Basin 11.

Basin 11, located just downstream of Basin 10, generates runoff rates of 6.3 cfs during the 5 year storm and 12.8 cfs during the 100 year storm. The routed street flows at Design Point 5 based on upstream collection are 10.7 cfs and 32.4 cfs during the 5 year and 100 year storms, respectively. To reduce the flows crossing Prairie Wind Drive, a 15' inlet will be installed along the north side of Pioneer Mesa just east of Prairie Wind Drive. Inlet 12 will collect 6.8 cfs during the 5 year storm and 13.4 cfs during the 100 year storm. The remaining runoff rates of Q_5 = 3.9 cfs and Q_{100} = 19.0 cfs will cross Prairie Wind Drive and enter Basin 34 as street flow.

Approximately 7 acres located northeast of the Pioneer Mesa and Prairie Wind Drive intersection comprises Basin 12. This basin generates runoff rates of Q_5 = 15.0 cfs and Q_{100} = 29.7 cfs. Prairie Wind Drive at a minimum slope of 3% has adequate capacity (Q_{5cap} = 19.5 cfs) to convey these flows to the Prairie Wind and Pioneer Mesa intersection; however, an additional 15' inlet will be constructed at the northeast corner of this intersection to limit flow crossing Prairie Wind Drive. Inlet 13 will collect 7.8 cfs during the 5 year storm and 11.4 cfs during the 100 year storm. Runoff rates of 7.2 cfs during the 5 year storm and 18.3 cfs during the 100 year storm which bypass Inlet 13 combine with the runoff rates of 3.9 cfs and 19.0 cfs bypassing Inlet 12. These flows along with the flows generated from Basin 13 enter Basin 34 as street flow.

Basin 13 generates an additional 2.2 cfs and 4.4 cfs during the 5 year storm and 100 year storms. Runoff generated from Basin 13 flow southerly within the west half of Prairie Wind Drive which has the capacity to convey these flows to the downstream end of Basin 13. As stated above, these flows will enter Basin 34 as street flow.

The proposed recreation center located southeast of the Prairie Wind Drive and Pioneer Mesa intersection comprise Basin 14. This 4.01 acre basin generates runoff rates of Q_5 = 11.4 cfs and Q_{100} = 21.1 cfs. Prairie Wind Drive with a 5 year street capacity of 19.5 cfs per side conveys these flows northerly to a proposed inlet to be constructed at the southeast corner of the Prairie Wind Drive and Pioneer Mesa intersection. Inlet 14 will collect 6.7 cfs during the 5 year storm and 9.5 cfs during the 100 year storm. The runoff rates of 4.7 cfs during the 5 year storm and 11.6 cfs during the 100 year storm bypassing this inlet will enter Basin 15 as street flow.

Basin 15 consists of 8.70 acres southwest of the Pioneer Mesa Drive and Prairie Wind Drive intersection. Runoff rates of 18.3 cfs and 36.5 cfs are generated from this basin during the 5 year and 100 year storms, respectively. Approximately 50% of the flows generated from Basin 15 including the flows entering Basin 15 from Basins 14 and 9A reach a low point in Pioneer Mesa Drive. The allowable approach flow depths are exceeded prior to reaching the low point. Therefore, an additional 10' inlet will be installed approximately 300 feet east of the low point. This inlet will collect 5.9 cfs during the 5 year storm and 10.7 cfs during the 100 year storm. The remaining flows of Q_5 = 7.3 cfs and Q_{100} = 27.9 cfs will continue as street flow to the low point in Pioneer Mesa Drive. A 25' inlet will be installed at this location to collect the flows reaching this inlet. A 60" RCP will convey these flows northwesterly within the Curricle Court right-of-way.

Approximately 4.4 acres at the extreme southeast corner of the proposed Wagon Trails development comprises Basin 16. This basin generates runoff rates of Q_5 = 10.0 cfs and Q_{100} = 20.0 cfs which are directed toward Bridle Pass Drive. Bridle Pass Drive at a minimum slope of 2% has adequate capacity to convey these flow to Dublin Boulevard. Once these flows reach Dublin Boulevard, they combine with the runoff generated from Basin 26 and flow westerly within Dublin Boulevard as street flow.

Basin 17 is located directly east of Basin 16 and consists of the east half of Bridle Pass Drive and future commercial or multi-family development. Based on the assumption that the area east of Bridle Pass will be developed as commercial, this basin generates runoff rates of 16.5 cfs during the 5 year storm and 29.3 cfs during the 100 year storm. These flows will be directed to the west toward the Dublin and Bridle Pass intersection and then conveyed westerly within Dublin Boulevard.

Basin 17A consists of the east half of Bridle Pass Drive and future commercial development on the east side of Bridle Pass Drive. This basin generates runoff rates of Q_5 = 58.6 cfs and Q_{100} = 102.9 cfs. The Cottonwood Creek Drainage Basin Planning Study depicts this area draining to the west through the proposed Wagon Trail Development. To accomplish this, a low point will be established in Bridle Pass Drive approximately 1100 feet north of Dublin at the intersection of Bridle Pass Drive and Little Field Drive. A 36" RCP will be stubbed to the east side of Bridle Pass at this point to collect flows from Basin 17A. Approach flows to a sump inlet are limited to approximately 12 cfs during the 5 year storm; therefore, approximately 80% of the flows will have to be collected on the east side of Bridle Pass within the future development prior to entering Bridle Pass Drive. A sump inlet will be installed along the east side of Bridle Pass Drive at its intersection with Little Field Drive. It is anticipated that this inlet will be 15' in length.

Runoff rates of 12.1 cfs during the 5 year storm and 24.3 cfs during the 100 year storm are generated from the 5.03 acre Basin 18. These runoff rates flow westerly within Barouche Drive and Spoked Wheel Drive. The minimum street slope and 5 year street capacity of these two streets are 1.5% and 13.8 cfs per side; therefore, there is adequate street capacity to convey these flows to the Barouche Drive and Spoked Wheel Drive intersection.

Basin 19 consists of 2.22 acres south of Basin 18. This basin generates runoff rates of 5.3 cfs during the 5 year storm and 10.9 cfs during the 100 year storm. Barouche Drive conveys these flows westerly to the intersection of Barouche Drive and Spoked Wheel Drive. Barouch Drive at a minimum slope of 1.5 cfs has a 5 year street capacity of 13.8 cfs per side which is adequate to convey the flows generated from Basin 19.

The runoff rates from Basins 18 and 19 combine just west of the Barouche and Spoked Wheel Drive intersection. The Spoked Wheel Drive street capacity is reached at this point, so a 15' inlet will be installed at this point to collect a portion of the combined flows from Basins 18 and 19. Inlet 16 will collect 9.5 cfs during the 5 year storm and 14.1 cfs during the 100 year storm. Runoff rates of 7.8 cfs and 21.1 cfs will bypass this inlet and enter Basin 22. An 18" RCP and a 24" RCP will convey the collected flows westerly within Spoked Wheel Drive to Wagon Ridge Drive.

Basin 20 is located on the north side of Spoked Wheel Drive between Level Land Drive and Wagon Ridge Drive. This 9.62 acre basin generates runoff rates of 19.6 cfs and 39.1 cfs during the 5 year and 100 year storms, respectively. A low point exists at the Spoked Wheel Drive and Wagon Ridge Drive intersection at the downstream end of Basin 20.

Due to decreasing street slope and corresponding street capacity within Basin 20, a 15' on-grade inlet will be installed approximately 250' north of the Spoked Wheel Drive and Wagon Ridge Drive intersection. This inlet will collect 7.7 cfs during the 5 year storm and 11.4 cfs during the 100 year storm. Runoff rates of Q_5 = 11.9 cfs and Q_{100} = 27.7 will reach the low point in Spoked Wheel Drive from the east.

Additional runoff rates of 6.7 cfs during the 5 year storm and 13.4 cfs during the 100 year storm reach this same low point from Basin 21. A 20' sump inlet will be installed in this location to collect the combined flows from Basins 20 and 21. A 30" RCP will convey the collected flows from Basins 18, 19, 20 and 21 southerly within Wagon Ridge Drive to the existing system at the intersection of Dublin Boulevard and Wagon Ridge Road.

Basin 22 is located along the south side of Spoked Wheel Drive and the south and east side of Wagon Ridge Drive. Runoff rates of Q_5 = 5.8 cfs and Q_{100} = 11.5 cfs are generated from Basin 22. Additional flows of 7.8 cfs and 21.1 cfs bypassing Inlet 16 during the 5 year and 100 year storms enter Basin 22 and flow westerly within Spoked Wheel Drive and southerly within Wagon Ridge Drive to Dublin Boulevard. The combined flows of 13.6 cfs and 32.6 cfs reach an existing 20' sump inlet along the north side of Dublin just east of Wagon Ridge Drive. Additional runoff reaches this same inlet from Basins 16 and 26 located east of this inlet.

Basin 23 is located along the north side of Wagon Widge Road between Spoked Wheel Drive and Whereabout Drive. The runoff rates of Q_5 = 8.4 cfs and Q_{100} = 16.6 cfs generated from this basin flow westerly and southerly within Wagon Ridge Drive toward Dublin Boulevard. Wagon Ridge at a minimum slope of 3% and a corresponding 5 year street capacity of 19.5 cfs per side has adequate capacity to convey these flows through Basin 23. These flows combine with the flows generated from Basins 24 and 25 at the Wagon Ridge Drive and Whereabout Drive intersection.

Approximately 7.44 acres northwest of Basin 23 comprises Basin 24. Runoff rates of 15.6 cfs during the 5 year storm and 31.2 cfs during the 100 year storm are generated from Basin 24. These flows reach the north half of Whereabout Drive which has a 5 year street capacity of 22.5 cfs per side. The runoff rates of Q_5 = 2.9 cfs and Q_{100} = 6.0 cfs generated from Basin 25 will combine with the flows generated from Basin 24 at Design Point 6. The total flows reaching Design Point 6 are Q_5 = 17.9 cfs and Q_{100} = 35.8 cfs. A 15' on-grade inlet will be installed at this point to collect 8.6 cfs during the 5 year storm and 12.7 cfs during the 100 year storm. The runoff rates of 9.3 cfs and 23.1 cfs bypassing this inlet combine with the flows generated from Basin 23. Runoff rates of 17.7 cfs during the 5 year storm and 39.7 cfs will reach Inlet 19A located just south of the Wagon Ridge and Whereabout Drive intersection.

Inlet 19A will collect 8.7 cfs during the 5 year storm and 13.6 cfs during the 100 year storm. The flows bypassing Inlet 19A will continue southerly to Dublin Boulevard and then westerly within Dublin Boulevard to an existing 12' sump inlet. This existing sump inlet will collect these flows along with the runoff rates of Q_5 = 6.1 cfs and Q_{100} = 11.8 cfs generated from Basin 27 which is located along the north side of Dublin just west of Wagon Ridge Drive.

Basin 26 is located along the north side of Dublin Boulevard between Wagon Ridge Drive and Bridle Pass Drive. This 10.85 acre basin generates runoff rates of 21.1 cfs during the 5 year storm and 40.6 cfs during the 100 year storm. These runoff rates combine with the runoff rates generated from Basin 16. An existing 20' on-grade inlet is located along the north side of Dublin at the Cloud Dancer intersection. This inlet will collect 10.7 cfs during the 5 year storm and 15.6 cfs during the 100 year storm. An existing 36" RCP will convey these flows along with the runoff rates of Q_5 = 15.1 cfs and Q_{100} = 37.9 cfs collected by the inlet along the south side of Dublin at Cloud Dancer to the Wagon Ridge Drive and Dublin intersection.

An existing 20' sump inlet located at the northeast corner of the Wagon Ridge Drive and Dublin intersection will collect the remaining flows generated from Basin 26; the flows bypassing the inlet at Cloud Dancer and Dublin and flows entering Dublin from Basin 22. The total flows collected at this inlet are 32.5 cfs during the 5 year storm and 74.7 cfs during the 100 year storm.

Basin 28 is located toward the northeast corner of the Wagon Trail Development and consists of 7.27 acres. Runoff rates of 16.1 cfs and 32.1 cfs generated from this basin during the 5 year and 100 year storms reach the Chaise Drive and Butterfield Drive intersection as street flow. The 5 year street capacity of Butterfield Drive is exceeded at the west end of this basin, so a 25' inlet will be installed just east of the Chaise and Butterfield Drive intersection. Inlet 20 will collect 11.6 cfs during the 5 year storm and 20.5 cfs during the 100 year storm. The flow rates of $Q_5 = 4.5$ cfs and $Q_{100} = 11.6$ cfs bypassing this inlet will enter Basin 31 as street flow.

The area just south of Basin 28 comprises Basin 29. This 8.07 acre basin generates runoff rates of 19.9 cfs during the 5 year storm and 40.1 cfs during the 100 year storm. These flows reach the south half of Butterfield Drive at Prairie Wind Drive. Prairie Wind Drive has a 5 year street capacity of 22.5 cfs just downstream of the Butterfield Drive and Prairie Wind Drive intersection. These flows continue westerly within the south half of Butterfield Drive through Basin 30.

Basin 30 consists of a future school and park site and is located south of Butterfield Drive. For the purpose of this report, it is assumed that the majority of the flows generated from Basin 30 will be collected prior to reaching Butterfield Drive. Runoff rates of $Q_5 = 19.5$ cfs and $Q_{100} = 38.1$ cfs reaching Design Point 8 include Basin 29 flows and approximately 6% of the flows generated from Basin 30. Butterfield Drive conveys these flows to the intersection of Butterfield Drive and Range Ranch Drive. A 25' inlet will be installed along the south side of Butterfield Drive just east of Range Ranch to collect runoff rates of 13.0 cfs during the 5 year storm and 21.9 cfs during the 100 year storm. Runoff rates of 6.5 and 16.2 cfs will bypass this inlet during the 5 and 100 year storms, respectively and flow to the low point in Range Ranch Road.

Basin 31 is located along the north side of Butterfield Drive. Runoff rates of $Q_5 = 15.1$ cfs and $Q_{100} = 30.0$ cfs are generated from Basin 31. The flows of $Q_5 = 4.5$ cfs and $Q_{100} = 11.6$ bypassing Inlet 20 combine with these runoff rates and flow westerly within the north half of Butterfield Drive. Butterfield Drive with a 5 year street capacity of 19.5 cfs per side has adequate capacity to convey the combined runoff rates of $Q_5 = 19.5$ cfs and $Q_{100} = 41.6$ cfs through Basin 31. A 15' inlet will be installed along the north side of Butterfield Drive just east of Chaise Drive. This inlet will collect 8.8 cfs during the 5 year storm and 13.4 cfs during the 100 year storm. Runoff rates of 10.8 cfs during the 5 year storm and 28.2 cfs during the 100 year storm will combine with the flows bypassing inlets within Basin 32.

The 8.6 acres just north of Basin 31 comprises Basin 32. Chaise Drive conveys the runoff rates of 18.1 cfs and 36.1 cfs generated from this basin during the 5 year and 100 year storms, respectively, westerly and southerly to the Chaise Drive and Butterfield Drive intersection. Chaise Drive at a minimum slope of 3% and a 5 year street capacity of 19.5 cfs per side has the capacity to convey these flows. However, limited downstream street capacity warrants the installation of additional inlets at the downstream side of Basin 32. Two - 15' inlets will be installed just north of Butterfield along the west side of Chaise to collect flows generated from Basin 32. These two inlets will collect a total of 14.8 cfs during the 5 year storm and 23.8 cfs during the 100 year storm. Runoff rates of $Q_5 = 3.3$ cfs and $Q_{100} = 12.3$ cfs bypassing these two inlets will enter Butterfield and combine with the flows bypassing inlet 20A. Street flows of $Q_5 = 14.1$ cfs and $Q_{100} = 40.5$ cfs reach Inlet 23 which will be constructed along the north side of Butterfield Drive.

Inlet 23 will collect an additional 9.1 cfs during the 5 year storm and 18.1 cfs during the 100 year storm. Runoff rates bypassing this inlet (Q_5 = 5.0 cfs and Q_{100} = 22.4 cfs) will combine with the runoff bypassing Inlet 21 and continue flowing south in Range Ranch Drive to the proposed low point. Runoff rates of 11.5 cfs and 38.6 cfs during the 5 year and 100 year storms, respectively, will reach the proposed 25' sump inlet from the north. Additional flows will reach this same inlet from Basin 34.

The 2.60 acre Basin 33 generates runoff rates of 6.2 cfs during the 5 year storm and 12.6 cfs during the 100 year storm. These flows reach the Curricle and Prairie Wind Drive intersection as street flow and enter Basin 34.

Runoff bypassing Inlets 12 and 13 along with the runoff generated from Basin 13 enter Basin 34 . The total flows just west of Prairie Wind Drive are 13.3 cfs during the 5 year sotrm and 41.7 cfs during the 100 year storm. These flows are still within the street capacities of Pioneer Mesa Drive. However, approximately 250' west of Prairie Wind Drive, the Pioneer Mesa Drive 5 year street capacity is reached (Q_5 = 17.2 cfs and Q_{100} = 50.1 cfs). A 20' inlet will be constructed at this point to collect 11.1 cfs during the 5 year storm and 22.3 cfs during the 100 year storm. Runoff rates of 6.1 cfs and 27.8 cfs bypass this inlet during the 5 year and 100 year storms and continue westerly within Pioneer Mesa Drive.

An additional inlet (Inlet 24B) will be installed just north of the Curricle Drive and Prairie Wind Drive intersection. This inlet will collect runoff rates of Q_5 = 10.7 cfs and Q_{100} = 21.4 cfs. Flow rates of 6.0 cfs during the 5 year storm and 28.4 cfs during the 100 year storm will bypass this inlet and continue northerly in Prairie Wind Drive to the low point in Range Ranch Road.

Both Basins 35 and 36 reach the intersection of Range Ranch Drive and Prairie Wind Drive along the south side of Prairie Wind Drive. Basin 35 generates runoff rates of Q_5 = 13.4 cfs and Q_{100} = 26.7 cfs while Basin 36 generates runoff rates of 7.6 cfs during the 5 year storm and 15.3 cfs during the 100 year storm. The total flows reaching Inlet 25 are 21.0 cfs and 42 cfs during the 5 year and 100 year storms, respectively. Inlet 25 will be a 15' sump inlet and will be drained via a 60" RCP extending northerly within Range Ranch Road.

Basin 36A consists of 1.35 acres along the north half of Prairie Wind and the west half of Range Ranch Drive. This basin generates runoff rates of 3.6 cfs during the 5 year storm and 7.2 cfs during the 100 year storm. A 5' sump inlet will be installed at the low point along the west side of Range Ranch Drive to collect these flows.

The lots along the south side of Sand Hill Drive from Level Land Drive to Whereabout Drive comprise Basin 37. Runoff rates of 9.0 cfs and 17.9 cfs are generated from Basin 37 during the 5 year and 100 year storms, respectively. Sand Hill Drive has a minimum 5 year street capacity of 14.7 cfs per side which is adequate to convey the flows from Basin 37. These flows enter Basin 50 as street flow.

Basin 38 consist of the area north of Sand Hill Drive from Level Land Drive to Spoked Wheel Drive. This 7.39 acre basin generates runoff rates of 14.2 cfs during the 5 year storm and 28.5 cfs during the 100 year storm. Spoked Wheel Drive and Sand Hill Drive has a minimum 5 year storm street capacity of 14.7 cfs per side. These flows reach the Spoked Wheel Drive and Prairie Wind Drive intersection where a 15' inlet will be installed to collect a portion of the flows generated from Basin 38. Inlet 26 will collect 8.8 cfs during the 5 year storm and 13.6 cfs during the 100 year storm. The remaining flows (Q_5 = 5.4 cfs and Q_{100} = 14.9 cfs) generated from Basin 38 which bypass Inlet 26 will enter Basin 39 as street flow.

Runoff rates of 14.0 cfs and 27.8 cfs are generated from Basin 39 during the 5 and 100 year storms, respectively. These flows are split between Sand Hill Drive and Prairie Wind Drive. Including the flows bypassing Inlet 26, runoff rates of Q_5 = 13.1 cfs and Q_{100} = 30.3 cfs will flow westerly within Prairie Wind Drive. Runoff rates of 6.3 cfs during the 5 year storm and 12.4 cfs during the 100 year storm will flow northerly within Granite Peak Drive. The total flows of Q_5 = 19.4 cfs and Q_{100} = 42.7 cfs will reach the intersection of Granite Peak Drive and Prairie Wind Drive.

Basin 40 is located just north of Basin 39 and generates runoff rates of 4.9 cfs and 9.9 cfs during the 5 year and 100 year storms, respectively. Routed flows of Q_5 = 18.4 cfs and Q_{100} = 36.6 cfs generated from Basins 39 and 40 reach Design Point 10 as street flow. Including the flows bypassing Inlet 26, street capacities are exceeded prior to reaching Design Point 10; therefore, a 20' inlet will be installed just east of Granite Peak Drive on Prairie Wind Drive. Inlet 27 will collect 12.0 cfs during the 5 year storm and 18.5 cfs during the 100 year storm. The remaining flows of Q_5 = 11.8 cfs and Q_{100} = 33.0 cfs will continue northerly in Granite Peak to the proposed low point in Basin 40.

These flows will combine with the runoff rates of Q_5 = 14.3 cfs and Q_{100} = 28.8 cfs generated from Basin 41 at a proposed 20' sump inlet located at the low point of Basins 40 and 41. Additional flows from Basins 42 and 43 reach the low point on the opposite side of Granite Peak Drive. Runoff rates of Q_5 = 2.0 cfs and Q_{100} = 4.0 cfs generated from Basin 42 reach the proposed low point from the southwest. Basin 43 contributes additional runoff rates of 3.2 cfs and 6.2 cfs during the 5 year and 100 year storms, respectively, to this low point. An 8' sump inlet will be installed at this point to collect the combined flows from Basins 42 and 43. A 36" RCP will convey the total flows reaching this low point northwesterly to the proposed channel located north of Basin 42.

Basins 44 and 45 comprise the rear portion of residential lots along the west and north sides of Granite Peak Drive. The runoff generated from Basin 44 (Q_5 = 4.2 cfs and Q_{100} = 8.5 cfs) sheet flow onto the vacant land located west of the Wagon Trails Development. Runoff rates of 8.6 cfs during the 5 year storm and 17.1 cfs generated from Basin 45 sheet flow to the north to a proposed drainageway which conveys the majority of the flows generated from the Wagon Trails Development.

Runoff rates of Q_5 = 14.2 cfs and Q_{100} = 28.3 cfs generated from Basin 46 reach a proposed 20' sump inlet located along the northeast side of Butterfield Drive. Butterfield Drive has adequate street capacity to convey these flows to the proposed low point. Additional runoff rates of 5.7 cfs and 11.6 cfs during the 5 year and 100 year storms, generated from Basin 47 reach this same low point.

Basin 48 located south of Basins 46 and 47 generates runoff rates of Q_5 = 5.5 cfs and Q_{100} = 10.9 cfs. These flows reach the low point in the Butterfield cul-de-sac just southwest of Inlet 30. A 8' sump inlet will be installed at this point to collect the flows from Basin 48. A 30" RCP will connect the sump inlets 30 and 31 and convey the total flows generated from Basins 46, 47 and 48 southwesterly to the proposed drainage way located just south of Basin 49. Basin 49 generates runoff rates of Q_5 = 11.2 cfs and Q_{100} = 22.3 cfs which sheet flow toward the proposed channel.

Basin 50 is located at the extreme southwest corner of the proposed Wagon Trails Development. This basin generates runoff rates of Q_5 = 6.5 cfs and Q_{100} = 12.9 cfs. These flows along with the flows generated from Basin 37 reach the intersection of Dublin Boulevard and Granite Peak Drive. Total flows of 13.1 cfs during the 5 year storm and 26.3 cfs during the 100 year storm flow southerly within Granite Peak Drive toward Dublin Boulevard. A 15' inlet will collect 7.3 cfs and 10.7 cfs during the 5 year and 100 year storms, respectively. Runoff rates of Q_5 = 5.8 cfs and Q_{100} = 15.6 cfs bypassing this inlet will continue westerly within Dublin as street flow.

Basin 51, 51A, 53 and 56 are off-site basins located north of Bridle Pass Drive and the proposed Wagon Trails Development (See Exhibit 3). These basins do not contribute flows to the Wagon Trails Development.

Basin 51 is located just southwest of the Powers Boulevard and Woodment Road intersection. An existing 36" RCP stubbed out from the storm sewer system running along the south side of Woodmen Road will collect the runoff rates of $Q_5 = 60.8$ cfs and $Q_{100} = 109.8$ cfs generated from Basin 51.

Runoff rates of 62.5 cfs and 112.9 cfs are generated from Basin 51A during the 5 year and 100 year storms, respectively. These flows reach an existing 42" RCP stub located at the southeast corner of Duryea Drive and Woodmen Road.

The area west of Duryea, south of Woodmen Road and north of Bridle Pass Drive is Basin 53. This 32.70 acre future commercial site generates runoff rates of $Q_5 = 71.4$ cfs and $Q_{100} = 127.9$ cfs. An existing 48" RCP and an existing 60" RCP will collect these flows at the extreme northwest corner of this basin.

Basin 56 is located just southeast of the Austin Bluffs and Woodmen Road intersection. Runoff rates of 81.2 cfs during the 5 year storm and 144.7 cfs during the 100 year storm are generated from this basin. These flows reach an existing 42" RCP stubbed easterly from the Austin Bluffs Parkway and Woodmen Road intersection.

The total flows collected from Basin 51, 51A, 53, and 56 will be conveyed westerly within an existing storm sewer system constructed along the south side of Woodmen Road. This system crosses to the north side of Woodmen Road and discharges the collected flows into Cottonwood Creek on the north side of Woodmen Road.

Basin 52 consists of the north half of Bridle Pass Drive from its high point at the northeast corner of the Wagon Trails Development to the proposed street located approximately 1200 feet east of Duryea. Runoff rates of 11.0 cfs and 19.3 cfs are generated from this basin during the 5 year and 100 year storms, respectively. These flows turn north on the proposed street extending from Bridle Pass Drive to Woodmen Road and will be collected within proposed inlets just south of Woodmen Road.

Basin 54 consists of Bridle Pass Drive from the downstream end of Basin 52 to Austin Bluffs Parkway along with the east half of Austin Bluffs Parkway to a point approximately 1000 feet north. This basin generates runoff rates of $Q_5 = 33.8$ cfs and $Q_5 = 59.3$ cfs. The majority of these flows are generated from the proposed commercial development located northeast of the Austin Bluffs Parkway and Bridle Pass Drive intersection. A 15' sump inlet will be installed just east of Austin Bluffs Parkway along the north side of Bridle Pass Drive to collect approximately 24 cfs during the 5 year storm and 42 cfs during the 100 year strorm. The remaining flows will be collected within the proposed commercial development.

The south side of Bridle Pass Drive from Range Ranch Drive to Austin Bluffs Parkway comprises Basin 55. This 2.48 acre basin generates runoff rates of 8.3 cfs during the 5 year storm and 14.6 cfs during the 100 year storm. These flows reach the southeast corner of Austin Bluffs Parkway and Bridle Pass Drive where a 5' sump inlet will be installed to collect these flows. An existing 48" RCP will convey the flows collected from Basins 54 and 55 southerly within Austin Bluffs Parkway.

Basin 56, consisting of the area southeast of Woodmen Road and Austin Bluffs Parkway, generates runoff rates of 81.2 cfs during the 5 year storm and 144.7 cfs during the 100 year storm. These flows reach an existing 42" RCP stubbed to the east side of Austin Bluffs Parkway and discharged to Cottonwood Creek just south of Woodmen Road.

The overall Wagon Trails Development can be divided into 4 major drainage basins and 4 outfall points. These 4 outfall points are represented by Design Points A, B, C and D. Design Point A, located at the intersection of Bridle Pass Drive and Austin Bluffs Parkway, is the discharge point for Basins 54 and 55. An existing 48" RCP stubbed to the east side of Austin Bluffs acts as the outfall point for these two basins. The total flows at this point are 41.1 cfs during the 5 year storm and 72.2 cfs during the 100 year storm.

Design Point B is located along the west boundary line of the proposed Wagon Trails Development. The majority of the flows generated from the proposed Wagon Trails Development reach this point. Several pipes, including a 60" RCP, a 30" RCP and a 36" RCP, are stubbed out from Austin Bluffs Parkway and serve as the discharge point for the flows reaching Design Point B. The exact routing of the flows reaching Design Point B is dependent on how the area between the Wagon Trails Development and Austin Bluffs Parkway is developed. Runoff rates of $Q_5 = 337.5$ cfs and $Q_{100} = 652.8$ cfs reach Design Point B.

The routing of the outfall system from Wagon Trails at Design Point #B will be determined during the final design phase of Wagon Trails 1 through 4. In all liklihood, the outfall will consists of a pipe which will discharge to the existing system along the east side of Austin Bluffs Parkway.

Design Point C is at the intersection of Granite Peak and Dublin Boulevard. This in the discharge point for Basins 37 and 50. Portions of the flows reaching this point will be collected and pipe westerly along the north side of Dublin. The remaining flows reaching this point ($Q_5 = 5.8$ cfs and $Q_{100} = 15.6$ cfs) will continue as street flow within the north half of Dublin Boulevard.

The fourth discharge point is located at the intersection of Wagon Ridge Drive and Dublin Boulevard. An existing 54" RCP within Wagon Ridge Road will convey the flows rats of $Q_5 = 106.2$ cfs and $Q_{100} = 211.2$ cfs reaching this point southerly to Antelope Creek.

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

EROSION CONTROL

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

DRAINAGE, BRIDGE AND POND FEES

Wagon Trails Filings 1, 2, 3 and 4 are within the Cottonwood Creek Drainage Basin. The 1999 Drainage, Bridge and Pond Fees for these filings are listed below.

Filing No. 1

	Acres	$/Acre	Total Fee
Drainage Fees	6.897	$5,673.00	$39,126.68
Add'l Drainage Fees	6.897	$ 709.00	$ 4,889.97
Bridge Fees	6.897	$ 285.00	$ 1,965.65
Add'l Bridge Fees	6.897	$ 280.00	$ 1,931.16
Pond Fees (Land)	6.897	$ 110.00	$ 758.67
Pond Fees (Facilities)	6.897	$ 344.00	$ 2,372.57
			$51,044.70

Filing No. 2

	Acres	$/Acre	Total Fee
Drainage Fees	10.579	$5,673.00	$60,014.67
Add'l Drainage Fees	10.579	$ 709.00	$ 7,500.51
Bridge Fees	10.579	$ 285.00	$ 3,015.02
Add'l Bridge Fees	10.579	$ 280.00	$ 2,962.12
Pond Fees (Land)	10.579	$ 110.00	$ 1,163.69
Pond Fees (Facilities)	10.579	$ 344.00	$ 3,639.18
			$78,295.19

Filing No. 3

	Acres	$/Acre	Total Fee
Drainage Fees	8.751	$5,673.00	$ 49,644.42
Add'l Drainage Fees	8.751	$ 709.00	$ 6,204.46
Bridge Fees	8.751	$ 285.00	$ 2,494.04
Add'l Bridge Fees	8.751	$ 280.00	$ 2,450.28
Pond Fees (Land)	8.751	$ 110.00	$ 962.61
Pond Fees (Facilities)	8.751	$ 344.00	$ 3,010.34
			$ 64,766.15

Filing No. 4

	Acres	$/Acre	Total Fee
Drainage Fees	9.759	$5,673.00	$ 55,362.81
Add'l Drainage Fees	9.759	$ 709.00	$ 6,919.13
Bridge Fees	9.759	$ 285.00	$ 2,781.32
Add'l Bridge Fees	9.759	$ 280.00	$ 2,732.52
Pond Fees (Land)	9.759	$ 110.00	$ 1,073.49
Pond Fees (Facilities)	9.759	$ 344.00	$ 3,357.10
			$ 72,226.37

DRAINAGE FACILTIES (Public Non Reimbursable)

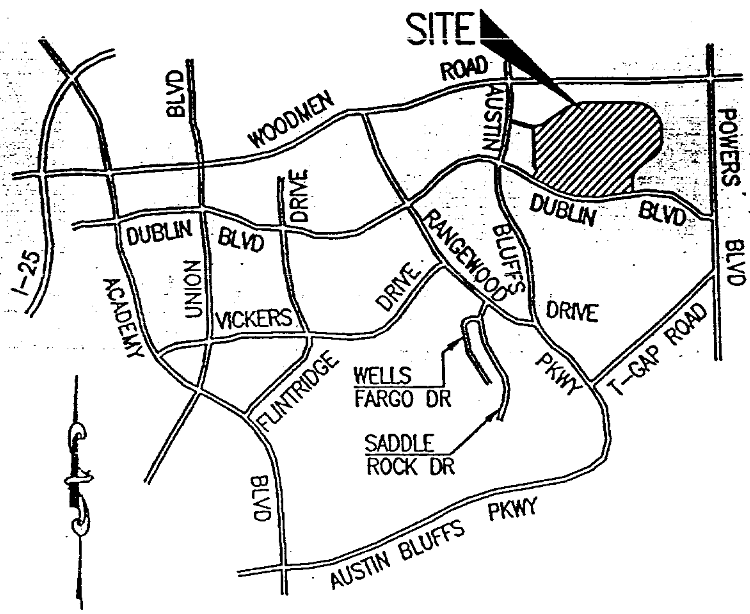
The following drainage facilities will be required for the entire Wagon Trails Development.

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
5' D-10-R Inlets	1	Ea.	$2,900.00	$ 2,900.00
8' D-10-R Inlets	2	Ea.	$3,200.00	$ 6,400.00
10' D-10-R Inlets	2	Ea.	$3,300.00	$ 6,600.00
15' D-10-R Inlets	23	Ea.	$4,000.00	$ 92,000.00
20' D-10-R Inlets	8	Ea.	$5,000.00	$ 40,000.00
25' D-10-R Inlets	3	Ea.	$5,600.00	$ 16,800.00
18" RCP	2,000	L.F.	$22.00	$ 44,000.00
24" RCP	2,100	L.F.	$29.00	$ 60,900.00
30" RCP	1,150	L.F.	$40.00	$ 46,000.00
36" RCP	2,100	L.F.	$50.00	$105,000.00
48" RCP	550	L.F.	$70.00	$ 38,500.00
60" RCP	1,800	L.F.	$120.00	$216,000.00
Type 1 Manholes	21	Ea.	$3,500.00	$ 73,500.00
Channel Excavation	1,200	L.F.	$5.00	$ 6,000.00
Drop Structures	4	Ea.	$8,000.00	$ 32,000.00
			Sub-Total	$786,600.00
			15% Eng. & Contingency	$117,990.00
			Grand Total	$904,590.00

For the purpose of this report, pipe appurtenances such as bends, wyes, etc. were not included in the cost estimate. These items will be further detailed in the Final Drainage Reports for each subdivision.

A major drainage system is depicted across this site in the Cottonwood Creek Drainage Basin Planning Study (DBPS), prepared by URS. A portion of the system shown in the DBPS is depicted as a reimbursable system. At this time, the portion of drainage facilities which qualify as reimbursable is unclear, but will be discussed with City Engineering and resolved prior to final plat approval.

APPENDIX



Vicinity Map

NOT TO SCALE

NORTH

FIGURE 1

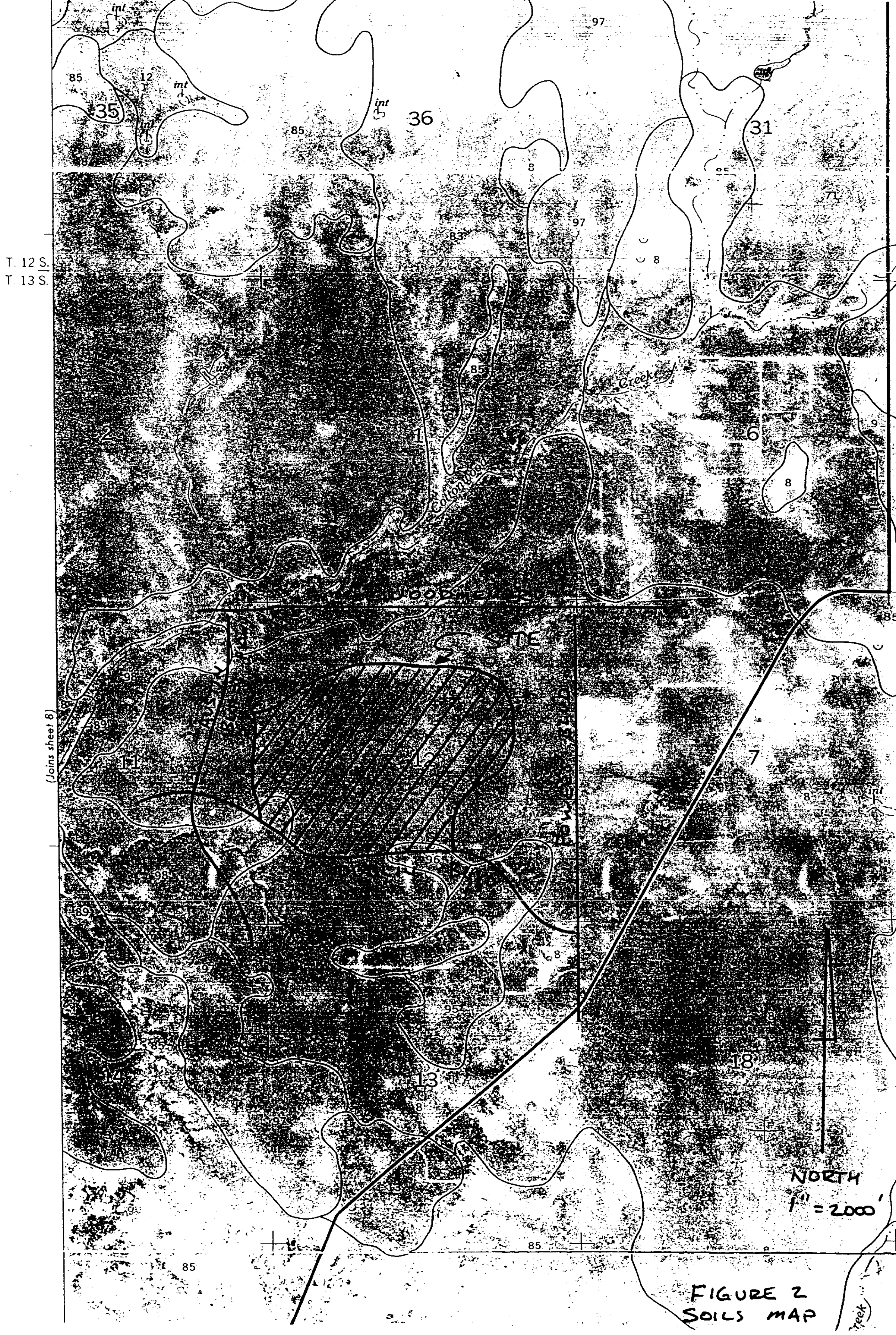
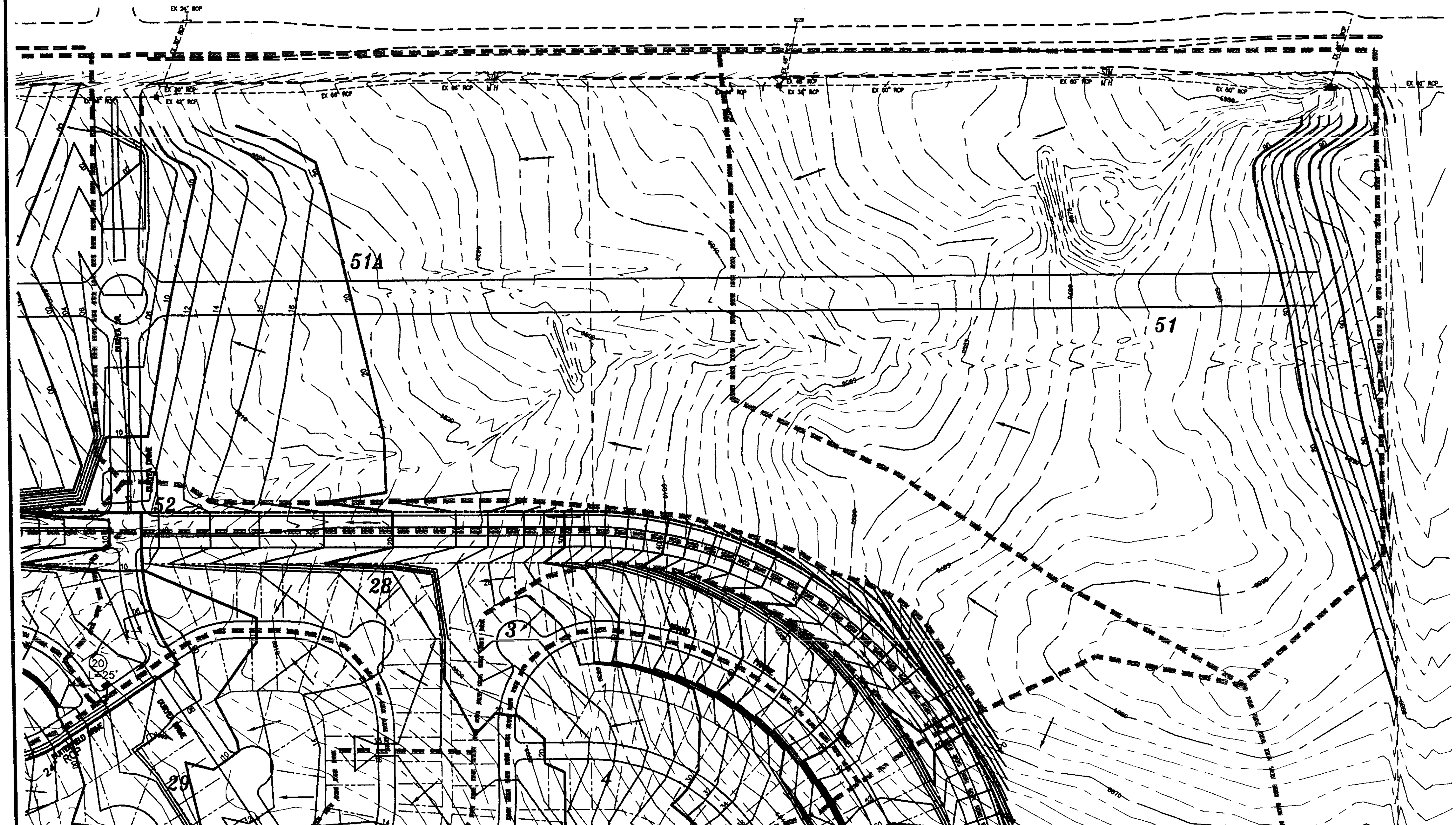


FIGURE 2
SOILS MAP



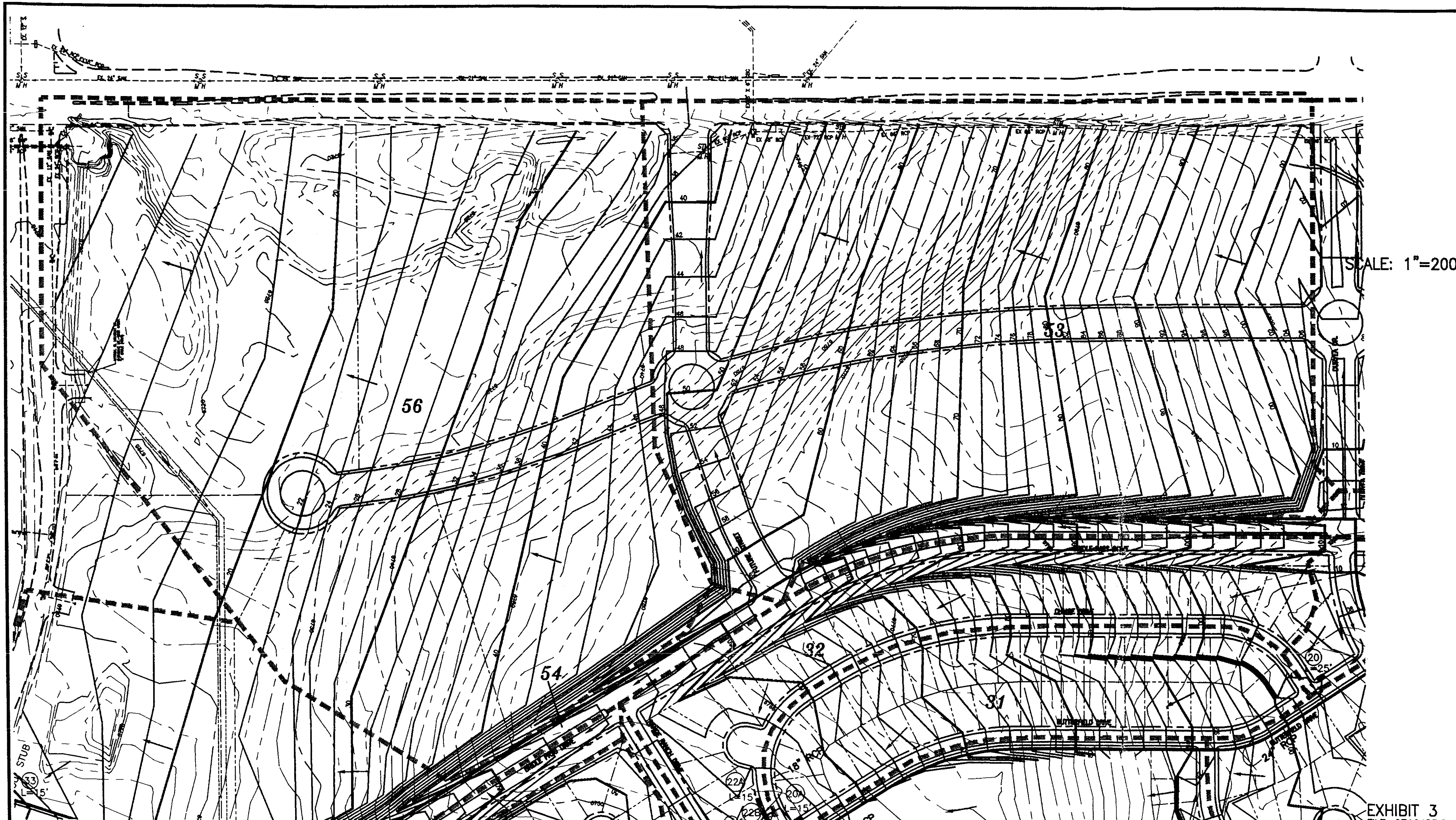
SCALE: 1"=200'

EXHIBIT 3
FILE: 97104DP.DWG
DATE: 6/16/99

JOB NO. 97-104

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2928 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-8223



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BASINS 1

Q_5 = 11.9 Q_{100} = 23.7

5 YR STREET CAPACITY = 112.6 $(S)^{1/2}$

SLOPE	Q_5 CAP / SIDE
1%	11.3
1.5%	13.8
2.0%	15.9
2.5%	17.8
3.0%	19.5
3.5%	21.1
4.0%	22.5

STREET SLOPE THROUGH BASIN I = 2%
∴ ADEQUATE STREET CAPACITY

BASIN 2

Q_5 = 9.9 Q_{100} = 19.7

FLOWS FROM BASINS 1 & 2 COMBINE AT DP #1

Q_5 = 20.6 Q_{100} = 41.1

STREET SLOPE IS 4% UNTIL LOW END OF BASIN II

THEREFORE INSTALL INLET AT LOW PT OF BASIN II

2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

WAGON TRAILS MDDP

INLET 1

Q5 =	20.6	Q100 =	41.1
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	18.2	T	23.64
FW	2.36	FW	2.47
L1	33.1	L1	45.0
L2	19.9	L2	27.0
L3	70.9	L3	96.4

Li = 15.00

5 YR Q =	20.6	100 YR Q	41.1
5 YR Qi =	9.3	100 YR Qi	13.7
5 YR Qfb =	11.3	100 YR Qfb	27.4

THESE FLOWS ENTER BASIN 10 @ INLET (4)

ROCKWELL MINCHOW
CONSULTANTS, INC.

BASIN 3

$Q_5 = 9.7$ $Q_{100} = 19.3$

MIN STREET SLOPE = 1.5%

5 YR STREET CAPACITY = 13.8 cfs/SIDE ∴ OK

FLOWS ENTER BASIN 4 @ END OF BASIN 4

BASIN 4

$Q_5 = 16.0$ $Q_{100} = 31.8$

MIN STREET SLOPE = 1.5%

5 YR STREET CAPACITY = 13.8 cfs/SIDE

∴ INLET IS REQUIRED AT POINT WHERE 86% OF THE BASIN FLOWS COLLECT

INSTALL 15' INLET @ POINT 350' NE OF DURYEA & GRAND PRAIRIE DRIVE INTERSECTION

WAGON TRAILS MDDP

INLET 2

Q5 =	13.8	Q100 =	27.3
Sl =	0.015	Sx =	0.02

5 YEAR		100 YEAR	
T	17.88	T	23.09
FW	1.66	FW	1.74
L1	22.8	L1	30.9
L2	13.7	L2	18.6
L3	48.9	L3	66.3

Li =	15.00		
5 YR Q =	13.8	100 YR Q	27.3
5 YR Qi =	8.6	100 YR Qi	13.2
5 YR Qfb =	5.2	100 YR Qfb	14.1

ROCKWELL MINCHOW
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$Q_5 = 5.2 + (16.0 - 13.8)$ $Q_{100} = 14.1 + (31.8 - 27.3)$

$Q_5 = 7.4$ $Q_{100} = 18.6$

THESE FLOWS COMBINE WITH THE FLOWS GENERATED FROM BASIN 3

$Q_5 = 7.4 + 9.7$ $Q_{100} = 18.6 + 19.3$

$= 17.1$ $= 37.9$

DURYEA STREET SLOPE IS 2.4%

5 YR STREET CAPACITY = 17.4 cfs/SIDE ∴ OK

INSTALL 20' INLET JUST NW OF SCHOONER DRIVE & DURYEA DRIVE INTERSECTION. ASSUME ALL FLOWS REACH SOUTHWEST SIDE OF DURYEA

INSTALL 20' INLET

WAGON TRAILS MDDP

INLET 3

Q5 =	17.1	Q100 =	37.9
SL =	0.024	SO =	0.02

<u>5 YEAR</u>

T	17.74
FW	2.10
L1	28.6
L2	17.2
L3	61.3

<u>100 YEAR</u>

T	23.91
FW	2.21
L1	40.8
L2	24.5
L3	87.4

Li = 20.00

5 YR Q =	17.1	100 YR Q	37.9
5 YR Qi =	<u>10.9</u>	100 YR Qi	<u>18.6</u>
5 YR Qfb =	6.2	100 YR Qfb	19.3

ROCKWELL MINCHOW
CONSULTANTS, INC.

DATE

THESE FLOWS PLUS BYPASS FROM DP #1 (INLET ①)
ENTER BASIN 10

$Q_5 = 6.2 + 11.3$
$= 17.5$

$Q_{100} = 19.3 + 27.4$
$= 46.7$

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BASED ON EQUIVALENT AREAS OF COLLECTED FLOWS
& ROUTING TO DP #2 THESE FLOWS ARE REDUCED

	5 YEAR COLLECTED EQUIV. AREA	100 YEAR COLLECTED EQUIV. AREA
INLET (1)	$\frac{9.3}{0.6(3.8)} = 4.1$	$\frac{13.7}{(0.7)(6.5)} = 3.0$
INLET (2)	$\frac{8.6}{0.6(3.7)} = 3.9$	$\frac{13.2}{(0.7)(6.3)} = 3.0$
INLET (3)	$\frac{10.9}{0.6(3.7)} = 4.9$	$\frac{18.6}{(0.72)(6.2)} = 4.3$
	12.9 ACRES	10.3
	$\frac{12.9}{20.85} = 61.9\%$ COLLECTED	$\frac{10.3}{20.85} = 49.4\%$ COLLECTED

$Q_{C5} = (12.9)(3.5)(0.60)$
$= 27.1$

$Q_{FB} = 43.8 - 27.1$
$= 16.7$

$Q_{C100} = (10.3)(6.0)(0.7)$
$= 43.3$

$Q_{FB} = 87.6 - 43.3$
$= 44.3$

THESE FLOWS ENTER BASIN 10 AS STREET FLOW & PIPE FLOW.
FLOWS REACH SCHOONER DRIVE STREET CAPACITIES AT THIS POINT ∴ INSTALL ADD'L 15' INLET

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WAGON TRAILS MDDP

INLET 4

Q5 =	16.7	Q100 =	44.3
SL =	0.022	SO =	0.02

5 YEAR		100 YEAR	
T	17.87	T	25.77
FW	2.01	FW	2.15
L1	27.6	L1	42.6
L2	16.6	L2	25.6
L3	59.2	L3	91.4

Li =	15.00		
5 YR Q =	16.7	100 YR Q	44.3
5 YR Qi =	9.1	100 YR Qi	15.6
5 YR Qfb =	7.6	100 YR Qfb	28.7

THESE FLOWS COMBINE WITH THE FLOWS GENERATED FROM BASIN 10

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BASIN 5

INLET (5)

$Q_5 = 15.9$ cfs $Q_{100} = 31.4$ cfs

MIN STREET SLOPE = 2%

5 YR STREET CAPACITY = 15.9 cfs

∴ INSTALL INLET @ DOWNSTREAM SIDE OF BASIN 5

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WAGON TRAILS MDDP

INLET 5

Q5 =	15.9	Q100 =	31.4
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	17.86	T	23.06
FW	1.92	FW	2.01
L1	26.3	L1	35.6
L2	15.8	L2	21.4
L3	56.5	L3	76.4

Li =	15.00		
5 YR Q =	15.9	100 YR Q	31.4
5 YR Qi =	9.1	100 YR Qi	13.2
5 YR Qfb =	6.8	100 YR Qfb	18.2

THESE FLOWS ALSO ENTER BASIN 10

BASIN 6

$Q_5 = 6.9$ $Q_{100} = 13.7$

MIN STREET SLOPE = 2%

5 YR STREET CAPACITY = 15.9 cfs/side ∴ OK

FLOWS BYPASSING INLETS (4) & (5) & FLOWS FROM A PORTION OF BASIN 10 REACH THE PIONEER MESA & ECKHOWER INTERSECTION.

$Q_5 = 7.6 + 6.8 + \frac{0.63}{3.74}(9.2)$ $Q_{100} = 28.7 + 18.2 + \frac{0.63}{3.74}(18.6)$

$Q_5 = 15.9$ $Q_{100} = 50.0$

INSTALL 15' INLET

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WAGON TRAILS MDDP

INLET 6

Q5 =	15.9	Q100 =	50
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	17.86	T	27.45
FW	1.92	FW	2.07
L1	26.3	L1	43.8
L2	15.8	L2	26.3
L3	56.5	L3	93.9

Li =	15.00		
5 YR Q =	15.9	100 YR Q	50
5 YR Qi =	9.1	100 YR Qi	17.1
5 YR Qfb =	6.8	100 YR Qfb	32.9

ADD'L FLOWS WILL ENTER PIONEER MESA DRIVE FROM BASIN 10 & BASIN 6

$Q_5 = 6.8 + \frac{1.08}{3.74}(9.2) + 6.9$ $= 16.4$

$Q_{100} = 32.9 + \frac{1.08}{3.74}(18.6) + 13.7$ $= 52.0$

THESE RUNOFF RATES FLOW WESTERLY WITHIN PIONEER MESA DR. STREET CAPACITY IS MET ∴ INSTALL 25' INLET INLET (6A)

THE REMAINING FLOWS GENERATED FROM BASIN 10 FLOW SOUTHERLY WITHIN THE EAST SIDE OF GRAND PRAIRIE & COMBINE WITH FLOWS BYPASSING INLET 6A

$Q_5 = \frac{2.03}{3.74}(9.2) + 4.6$ $= 9.6$

$Q_{100} = \frac{2.03}{3.74}(18.6) + 22.8$ $= 32.9$

MIN STREET SLOPE = 2.9% $Q_{SCAP} = 19.2$ cfs/SIDE

∴ ADEQUATE STREET CAPACITY EXISTS

THIS FLOWS ENTER BASIN 11

WAGON TRAILS MDDP

INLET 6A

Q5 =	16.4	Q100 =	52
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	18.07	T	27.86
FW	1.92	FW	2.08
L1	26.7	L1	44.6
L2	16.0	L2	26.8
L3	57.2	L3	95.5

Li =	25.00		
5 YR Q =	16.4	100 YR Q	52
5 YR Qi =	11.8	100 YR Qi	29.2
5 YR Qfb =	4.6	100 YR Qfb	22.8

BASIN 7

Q_5 = 14.2 Q_{100} = 28.2

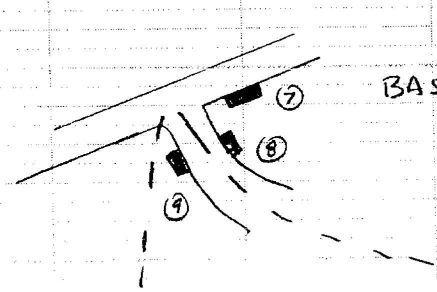
MIN STREET SLOPE IS 2%
5 YR STREET CAP = 15.9 cfs/SIDE ∴ OK
(FLOWS ARE SPLIT BETWEEN 2 STREETS)

BASIN 8

Q_5 = 14.1 Q_{100} = 28.0

MIN STREET SLOPE IS 2%
5 YR STREET CAP = 15.9 cfs/SIDE ∴ OK THROUGH BASIN 8

HOWEVER, ONCE FLOWS FROM BASINS 7 & 8 COMBINE THE STREET CAPACITY OF GREAT PLAINS DRIVE IS EXCEEDED. THEREFORE, INSTALL INLETS AT THE INTERSECTION OF GREAT PLAINS DRIVE AND GRAND PRAIRIE DRIVE TO COLLECT A PORTION OF THESE FLOWS



	Q_5	Q_{100}
INLET 7	$\frac{4.53}{6.39}(14.2) = 10.1$	$\frac{4.53}{6.39}(28.2) = 20.0$
INLET 8	$\frac{1.86}{6.39}(14.2) = 4.1$	$\frac{1.86}{6.39}(28.2) = 8.2$
INLET 9	14.1	28.0

WAGON TRAILS MDDP

INLET 7

Q5 =	10.1	Q100 =	20
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	15.07	T	19.47
FW	1.85	FW	1.95
L1	21.5	L1	29.2
L2	12.9	L2	17.5
L3	46.1	L3	62.5

Li =	15.00		
5 YR Q =	10.1	100 YR Q	20
5 YR Qi =	6.4	100 YR Qi	10.3
5 YR Qfb =	3.7	100 YR Qfb	9.7

WAGON TRAILS MDDP

INLET 8

Q5 =	4.1	Q100 =	8.2
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	10.75	T	13.94
FW	1.73	FW	1.83
L1	14.4	L1	19.6
L2	8.6	L2	11.8
L3	30.7	L3	42.0

Li =	10.00		
5 YR Q =	4.1	100 YR Q	8.2
5 YR Qi =	2.6	100 YR Qi	4.2
5 YR Qfb =	1.5	100 YR Qfb	4.0

WAGON TRAILS MDDP

INLET 9

Q5 =	14.1	Q100 =	28
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	17.08	T	22.09
FW	1.90	FW	1.99
L1	25.0	L1	33.9
L2	15.0	L2	20.3
L3	53.5	L3	72.6

Li =	15.00		
5 YR Q =	14.1	100 YR Q	28
5 YR Qi =	8.5	100 YR Qi	12.4
5 YR Qfb =	5.6	5 YR Qfb	15.6

FLOW BYPASSING INLETS (7), (8) & (9)

$Q_5 = 3.7 + 1.5 + 5.6$ $Q_{100} = 9.7 + 4.0 + 15.6$

$= 10.8$ $= 29.3$

ENTER BASIN 9 AS STREET FLOW

BASIN 9

$Q_5 = 5.9$ $Q_{100} = 11.7$

EQUIVALENT AREAS FOR COLLECTED FLOWS @ INLETS 7, 8 & 9

INLET	5 YR COLLECTED EQUIV AREA	100 YR COLLECTED EQUIV. AREA
(7) & (8)	$\frac{9.0}{3.7(0.6)} = 4.05$	$\frac{14.5}{6.3(0.7)} = 3.30$
(9)	$\frac{8.5}{3.7(0.60)} = 3.83$	$\frac{12.4}{6.3(0.70)} = 2.81$
	7.88	6.11

$\frac{7.88}{12.74} = 61.9\%$ $\frac{6.4}{12.74} = 48.0\%$

DETERMINE FLOWS AT DP #3

$Q_5 = 29.7$ $Q_{100} = 60.6$

COLLECTED UPSTREAM $(0.60)(7.88)(3.2) = 15.1$ $0.70(6.11)(5.6) = 24.0$

$Q_{FB} = 14.6$ $Q_{FB} = 36.6$

INSTALL 15' INLET (INLET (10))

WAGON TRAILS MDDP

INLET 10

Q5 =	14.6	Q100 =	36.6
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	17.30	T	24.42
FW	1.90	FW	2.03
L1	25.4	L1	38.2
L2	15.2	L2	22.9
L3	54.3	L3	81.8

Li =	15.00		
5 YR Q =	14.6	100 YR Q	36.6
5 YR Qi =	8.6	100 YR Qi	14.4
5 YR Qfb =	6.0	100 YR Qfb	22.2

BASIN 9A

$Q_5 = 6.5$ $Q_{100} = 13.3$

FLOWS BYPASSING INLET (10) ALSO ENTER BASIN 9A AS STREET FLOW

$Q_5 = 6.0 + 6.5$
$= 12.5$

$Q_{100} = 22.2 + 13.3$
$= 35.5$

DESIGN PT 4

$Q_5 = 32.7$ $Q_{100} = 66.2$

ALLOWING FOR UPSTREAM COLLECTION DETERMINE STREET FLOWS AT DESIGN PT 4

INLET	5 YR EQUIV AREA	100 YR EQUIV. AREA
7 & 8	4.05 Ac	3.30 Ac
9	3.83 Ac	2.81 Ac
10	$\frac{8.6}{(0.6)(3.2)} = 4.48$ Ac	$\frac{14.4}{(0.70)(5.6)} = 3.67$ Ac
	12.36	9.78

$Q_c = (12.36)(3.0)(0.60)$
$= 22.2$

$Q_c = (9.78)(5.2)(0.70)$
$= 35.6$

$Q_{STREET} = 10.5$ $Q_{STREET} = 30.6$

INSTALL INLET (11) L = 15'

WAGON TRAILS MDDP

INLET 11

Q5 =	10.5	Q100 =	30.6
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	15.29	T	22.83
FW	1.86	FW	2.00
L1	21.9	L1	35.2
L2	13.1	L2	21.2
L3	46.9	L3	75.5

Li =	15.00		
5 YR Q =	10.5	100 YR Q	30.6
5 YR Qi =	6.7	100 YR Qi	13.0
5 YR Qfb =	3.8	100 YR Qfb	17.6

BASIN 11

$Q_5 = 6.3$ $Q_{100} = 12.8$

MIN STREET SLOPE = 2%

5 YR STREET CAPACITY = 15.9 cfs/SIDE ∴ OK

FLOWS BYPASSING INLET 6A & 2.03 ACRES OF BASIN 10 ENTER BASIN 11

$Q_5 = 9.6 + 6.3$ $Q_{100} = 12.8 + 32.9$

$= 15.9$ $= 45.7$

STREET CAPACITY IS REACHED AT WEST END OF BASIN 11

INSTALL ADD'L INLET

DESIGN POINT 5

$Q_5 = 65.0$ $Q_{100} = 130.8$

INLET	5 YR COLLECTED EQUIV. AREA	100 YR COLLECTED EQUIV. AREA
(1)	4.1	3.0
2	3.9	3.0
3	4.9	4.3
4	$\frac{9.1}{(0.6)(3.5)} = 4.3$	$\frac{15.6}{0.7(6.0)} = 3.7$
5	$\frac{9.1}{0.6(3.7)} = 4.1$	$\frac{13.2}{0.7(6.3)} = 3.0$
6	$\frac{9.1}{0.6(3.5)} = 4.3$	$\frac{17.1}{0.7(6.0)} = 4.1$
6A	$\frac{11.8}{0.6(3.5)}$ 5.6	$\frac{29.2}{0.7(6.0)} = 7.0$
	31.2	28.1 ACRES

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COMBINED FLOWS

$Q_5 = 31.2(0.60)(2.9)$

$= 54.3$

COMBINED FLOWS

$Q_{100} = 28.1(0.70)(5.0)$

$= 98.4$

STREET FLOWS $Q_5 = 10.7$

STREET FLOWS $Q_{100} = 32.4$

INSTALL INLET (12) L = 15'

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WAGON TRAILS MDDP

INLET 12

Q5 =	10.7	Q100 =	32.4
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	15.40	T	23.33
FW	1.86	FW	2.01
L1	22.1	L1	36.1
L2	13.3	L2	21.7
L3	47.3	L3	77.5

Li =	15.00		
5 YR Q =	10.7	100 YR Q	32.4
5 YR Qi =	6.8	100 YR Qi	13.4
5 YR Qfb =	3.9	100 YR Qfb	19.0

BASIN 12

$Q_5 = 15.0$ $Q_{100} = 29.7$

MIN SLOPE OF PRAIRIE WIND = 3%

STREET CAPACITY = 19.5 cfs

HOWEVER, TO REDUCE FLOWS ENTERING PIONEER MESA INSTALL 15' INLET ALONG THE EAST SIDE OF PRAIRIE WIND DR

INLET (13)

S = 3%

$Q_{FB} = 7.2$ $Q_{FB} = 18.3$

FLOWS BYPASSING THIS INLET WILL COMBINE WITH FLOWS BYPASSING INLET 12 & ENTER PIONEER MESA DRIVE ALONG WITH FLOWS FROM BASIN 13

BASIN 13

$Q_5 = 2.2$ $Q_{100} = 4.4$

FLOWS FROM BASIN 13 AND FLOWS BYPASSING INLETS (12) & (13) FLOW WESTERLY WITHIN PIONEER MESA DRIVE AS STREET FLOW

$Q_5 = 2.2 + 3.9 + 7.2$ $Q_{100} = 4.4 + 19.0 + 18.3$

$Q_5 = 13.3$ $= 41.7$

THESE FLOWS ENTER BASIN 34

WAGON TRAILS MDDP

INLET 13

Q5 =	15	Q100 =	29.7
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	16.20	T	20.93
FW	2.30	FW	2.42
L1	28.7	L1	38.9
L2	17.2	L2	23.4
L3	61.5	L3	83.4

Li =	15.00		
5 YR Q =	15	100 YR Q	29.7
5 YR Qi =	7.8	100 YR Qi	11.4
5 YR Qfb =	7.2	100 YR Qfb	18.3

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BASIN 14

$Q_5 = 11.4$ $Q_{100} = 21.1$

THESE RUNOFF QUANTITIES FLOW NORTHERLY WITHIN THE EAST SIDE OF PRAIRIE WIND DRIVE

MIN STREET SLOPE = 3%

∴ STREET CAPACITY IS O.K.

HOWEVER, INSTALL INLET ON EAST SIDE OF PRAIRIE WIND DRIVE TO REDUCE FLOWS CROSSING PRAIRIE WIND

INLET (14)

S = 3%

$Q_{FB} = 4.7$ $Q_{FB} = 11.6$

THESE FLOWS ENTER THE SOUTH SIDE OF PIONEER MESA ROAD AS STREET FLOW AND ENTER BASIN 15 AS STREET FLOW

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WAGON TRAILS MDDP

INLET 14

Q5 =	11.4	Q100 =	21.1
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	14.61	T	18.41
FW	2.26	FW	2.36
L1	25.4	L1	33.4
L2	15.3	L2	20.1
L3	54.4	L3	71.7

Li =	15.00		
5 YR Q =	11.4	100 YR Q	21.1
5 YR Qi =	6.7	100 YR Qi	9.5
5 YR Qfb =	4.7	100 YR Qfb	11.6

BASIN 15

$Q_5 = 18.3$ $Q_{100} = 36.5$

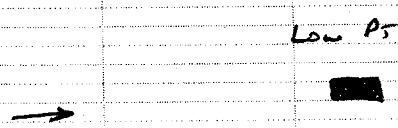
FLOWS FROM BASIN 15 APPROACH THE LOW POINT IN PIONEER MESA FROM 2 DIRECTIONS. OVERFLOW FROM INLETS 14 AND 11 APPROACH THIS LOW FROM FROM THE NORTHEAST BUT STREET CAPACITY IS REACHED BEFORE THE INLET. THEREFORE, INSTALL 300'L INLET 300' EAST OF LOW PT

$Q_5 = 4.7 + 3.8 + 0.57(8.3)$ $Q_{100} = 11.6 + 17.6 + 0.57(16.6)$

$= 13.2$ 10' INLET $= 38.6$

INSTALL

$Q_{FB} = 7.3$ $Q_{FB} = 27.9$



$Q_5 = 10.0$ $Q_5 = 7.3 + 0.43(8.3) = 10.9$

$Q_{100} = 19.9$ $Q_{100} = 27.9 + 0.43(16.6) = 35.0$

APPROACH FLOWS

$$Q = 0.56\left(\frac{1}{0.016(S_x)}\right)(S_o)^{1/2} d^{8/3}$$

$$10.9 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.48$

$$35.0 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.74$

TOTAL FLOWS TRY L = 25

$$Q = 1.7(L + 1.8(W))(d_{max} + 0.33)^{1.85}$$

$$20.9 = 1.7(25 + 1.8(2))(d_{max} + 0.33)^{1.85}$$

$d = 0.28$

$$54.9 = 1.7(25 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$$d_{max} = 0.72$$

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WAGON TRAILS MDDP

INLET 15A

Q5 =	13.2	Q100 =	38.6
SL =	0.015	SO =	0.02

5 YEAR		100 YEAR	
T	17.58	T	26.29
FW	1.65	FW	1.78
L1	22.4	L1	36.1
L2	13.4	L2	21.7
L3	48.0	L3	77.3

Li =	10.00		
5 YR Q =	13.2	100 YR Q	38.6
5 YR Qi =	5.9	100 YR Qi	10.7
5 YR Qfb =	7.3	100 YR Qfb	27.9

BASIN 16

$Q_5 = 10.0$ $Q_{100} = 20.0$

BRIDLE PASS DRIVE MIN SLOPE = 3%
5 YR STREET CAPACITY = 19.5 cfs/SIDE ∴ OK

FLOWS ENTER DUBLIN BLVD & COMBINE WITH FLOWS FROM BASIN 26

BASIN 17

$Q_5 = 19.3$ $Q_{100} = 33.3$

BRIDLE PASS DRIVE MIN SLOPE = 3%
5 YR STREET CAPACITY = 19.5 cfs/SIDE ∴ OK

THESE FLOWS WILL BE DIRECTED EASTERLY WITHIN DUBLIN TO THE LOW POINT IN DUBLIN APPROXIMATELY 400' EAST OF BRIDLE PASS

BASIN 18

$Q_5 = 12.0$ $Q_{100} = 24.3$

THESE RUNOFF QUANTITIES FLOW SOUTHWESTERLY TO THE BAROUCHE DRIVE & SPOKED WHEEL DRIVE INTERSECTION

MIN STREET SLOPE = 1.5%
5 YR STREET CAPACITY = 13.8 cfs ∴ OK

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DATE PAGE 30 of

BASIN 17A

Q_5 = 68.5 Q_{100} = 117.2

THESE FLOWS WILL REACH A LOW POINT IN BRIDLE PASS APPROXIMATELY 1200 FEET NORTH OF DUBLIN. THE MAJORITY OF THESE FLOWS WILL BE COLLECTED ON THE EAST SIDE OF BRIDLE PASS WITHIN FUTURE COMMERCIAL DEVELOPMENT. A 36" PIPE WILL BE STUBBED ACROSS BRIDLE PASS FROM WEST TO EAST AT THE LITTLE FIELD DRIVE AND BRIDLE PASS DRIVE INTERSECTION TO COLLECT THESE FLOWS

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WAGON TRAILS MDDP

INLET 16

Q5 =	17.3	Q100 =	35.2
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	18.44	T	24.06
FW	1.93	FW	2.02
L1	27.4	L1	37.5
L2	16.4	L2	22.5
L3	58.6	L3	80.4

Li =	15.00		
5 YR Q =	17.3	100 YR Q	35.2
5 YR Qi =	9.5	100 YR Qi	14.1
5 YR Qfb =	7.8	100 YR Qfb	21.1

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BASIN 20

$Q_5 = 19.6$ $Q_{100} = 39.1$

MIN STREET SLOPE = 2% JUST PRIOR TO PROPOSED SUMP INLET AT INTERSECTION SPOOKED WHEEL DRIVE & WAGON RIDGE DRIVE

5 YR STREET CAPACITY = 15.9

∴ INSTALL INLET WHERE STREET SLOPE = 3% WHICH IS APPROXIMATELY 250' EAST OF INTERSECTION

$Q_5 = (0.75)(19.6)$ $Q_{100} = (0.75)(39.1)$

$= 14.7$ cfs $= 29.3$ cfs

INLET (17)

$Q_{FB} = 7.0$ $Q_{FB} = 17.9$

FLOW REACHING SUMP INLET FROM EAST

$Q_5 = 7.0 + (0.25)(19.6)$ $Q_{100} = 17.9 + (0.25)(39.1)$

$Q_5 = 11.9$ $Q_{100} = 27.7$

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WAGON TRAILS MDDP

INLET 17

Q5 =	14.7	Q100 =	29.3
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	16.08	T	20.82
FW	2.30	FW	2.41
L1	28.5	L1	38.7
L2	17.1	L2	23.2
L3	61.0	L3	82.9

Li =	15.00		
5 YR Q =	14.7	100 YR Q	29.3
5 YR Qi =	7.7	100 YR Qi	11.4
5 YR Qfb =	7.0	100 YR Qfb	17.9

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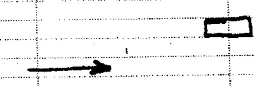
BASIN 21

$Q_5 = 6.7$ $Q_{100} = 13.4$

THESE FLOWS APPROACH SUMP INLET (18) FROM THE WEST



$Q_5 = 6.7$ $Q_5 = 11.9$

$Q_{100} = 13.4$ $Q_{100} = 27.7$

APPROACH FLOWS

$11.9 = 0.56 \left(\frac{1}{(0.016)(0.02)}\right)(0.002)^{1/2} d^{8/3}$

$d = 0.49$ (5 YR)

$27.7 = 0.56 \left(\frac{1}{(0.016)(0.02)}\right)(0.002)^{1/2} d^{8/3}$

$d = 0.68$ (100 YR)

TOTAL FLOWS TRY $L = 20'$

$18.6 = 1.7 (20 + 1.8 (3)) (d_{max} + 0.33)^{1.85}$

$d = 0.30$ (5 YR)

$41.1 = 1.7 (20 + 1.8 (3))(d_{max} + 0.33)^{1.85}$

$d = 0.64$ (100 YR)

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BASIN 22

$Q_5 = 5.8$ $Q_{100} = 11.5$

FLOWS BYPASSING INLET (16) ENTER BASIN 22

$Q_{FB} = 7.8$ $Q_{FB} = 21.1$

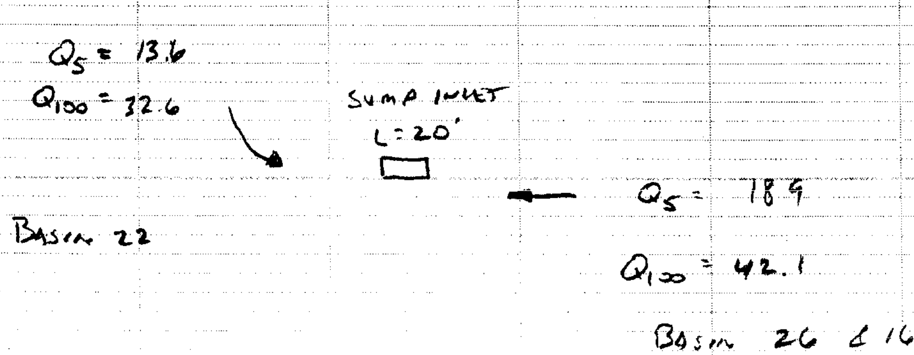
TOTAL STREET FLOW AT SOUTH END OF WAGON TRAILS @ DUBLIN

$Q_5 = 13.6$ $Q_{100} = 32.6$

MIN STREET SLOPE = 2%

5 YR STREET CAPACITY = 15.9 cfs ∴ OK

AN EXISTING 20' INLET AT THE NE CORNER OF DUBLIN BLVD & WAGON RIDGE DRIVE WILL COLLECT THESE FLOWS PLUS THE RUNOFF FLOWING WESTERLY WITHIN DUBLIN BLVD.



BASIN 23

Q_5 = 8.4 Q_{100} = 16.6

MIN STREET SLOPE = 3%

5 YR STREET CAPACITY = 19.5 cfs ∴ OK

BASIN 24

Q_5 = 15.6 Q_{100} = 31.2

MIN STREET SLOPE = 4%

5 YR STREET CAPACITY = 22.5 cfs

ADD BASIN 25 TO BASIN 24 @ DP #6

Q_5 = 17.9 Q_{100} = 35.8

INSTALL 15' INLET ALONG THE SOUTH SIDE OF WHEREABOUT DRIVE. INLET (19) @ 3%

Q_{FB} = 9.3 Q_{FB} = 23.1

FLOWS COMBINE WITH FLOWS FROM BASIN 23

Q_5 = 9.3 + 8.4
= 17.7

Q_{100} = 23.1 + 16.6
= 39.7

INLET 19A

Q_{FB} = 9.0 Q_{FB} = 26.1

THIS FLOWS ENTER DUBLIN BLVD & REACH 12' SUMP INLET ON THE NORTH SIDE OF DUBLIN WEST OF WAGON RIDGE

BASIN 27
Q_5 = 6.1
Q_{100} = 11.8
→ 12' SUMP ← Q_5 = 9.0, Q_{100} = 26.1

WAGON TRAILS MDDP

INLET 19

Q5 =	17.9	Q100 =	35.8
SL =	0.03	SO =	0.02

5 YEAR

T	17.31
FW	2.33
L1	31.1
L2	18.7
L3	66.6

100 YEAR

T	22.44
FW	2.45
L1	42.3
L2	25.4
L3	90.6

Li =	15.00		
5 YR Q =	17.9	100 YR Q	35.8
5 YR Qi =	8.6	100 YR Qi	12.7
5 YR Qfb =	9.3	100 YR Qfb	23.1

WAGON TRAILS MDDP

INLET 19A

Q5 =	17.7	Q100 =	39.7
SL =	0.029	SO =	0.02

5 YEAR		100 YEAR	
T	17.34	T	23.48
FW	2.29	FW	2.43
L1	30.6	L1	43.9
L2	18.4	L2	26.3
L3	65.6	L3	94.0

Li =	15.00		
5 YR Q =	17.7	100 YR Q	39.7
5 YR Qi =	8.7	100 YR Qi	13.6
5 YR Qfb =	9.0	100 YR Qfb	26.1

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Sump Inlet

Approach Flows

$$9.0 = 0.56\left(\frac{1}{0.016(0.12)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.44$ 5 yr O.K

$$26.1 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.66$ 100 yr O.K

Total Flows L = 12'

$$15.1 = 1.7(12 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.37$ 5 yr O.K

$$37.9 = 1.7(12 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.81$ 100 yr O.K

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BASIN 26

$Q_5 = 21.1$ $Q_{100} = 40.6$

ADD'L FLOWS ENTER BASIN 26 FROM BASIN 16
AT THE EXISTING 20' INLET @ CLOUD DANCER
& DUBLIN THE TOTAL FLOWS ARE :

BASIN	AREA	C_5	C_{100}
16	4.40	0.60	0.70
26	6.50	0.59	0.68
	10.90		

$T_c = 17.0$ (INCLUDING BASIN 16)

$I_5 = 3.3$ $I_{100} = 5.5$

$$\text{Comp } C_5 = \frac{(4.40)(0.60) + 6.50(0.59)}{10.90} = 0.59$$

$$\text{Comp } C_{100} = \frac{4.40(0.70) + 6.50(0.68)}{10.90} = 0.69$$

$Q_5 = 10.90(0.59)(3.3) = 21.2$

$Q_{100} = 10.90(0.69)(5.5) = 41.4$

EXISTING 20' INLET

5 YR $Q_{FB} = 10.4$ 100 YR $Q_{FB} = 25.9$

ADD'L FLOWS FROM BASIN 26

$$Q_5 = \frac{(10.85 - 6.50)(21.1)}{10.85} \qquad Q_{100} = \frac{(10.85 - 6.50)(40.6)}{10.85}$$

$Q_5 = 8.5$ $Q_{100} = 16.3$

WAGON TRAILS MDDP

INLET Ex Dublin Inlet at Cloud Dancer

Q5 =	21.1	Q100 =	41.4
SL =	0.019	SO =	0.02

5 YEAR		100 YEAR	
T	20.05	T	25.82
FW	1.91	FW	2.00
L1	29.5	L1	39.7
L2	17.7	L2	23.9
L3	63.1	L3	85.1

Li =	15.00		
5 YR Q =	21.1	100 YR Q	41.4
5 YR Qi =	10.7	100 YR Qi	15.6
5 YR Qfb =	10.4	100 YR Qfb	25.8

TOTAL FLOWS REACHING SUMP INLET @ NE CORNER OF DUBLIN & WAGON RIDGE

$Q_5 = 8.5 + 10.4$ $\qquad$ $Q_{100} = 16.3 + 25.8$

$= 18.9$ $\qquad$ $= 42.1$

20' SUMP

→ $\qquad$ ← $Q_5 = 18.9$

$Q_5 = 13.6$ $\qquad$ $Q_{100} = 42.1$

$Q_{100} = 32.6$

APPROACH FLOWS

$$18.9 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.59$

$$42.1 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.79$

TOTAL FLOWS $L = 20'$

$$32.5 = 1.7(20 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.53$

$$74.7 = 1.7(20 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 1.01$

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BASIN 28

$Q_5 = 16.1$ $Q_{100} = 32.1$

MIN STREET SLOPE = 2%

5 YR STREET CAPACITY = 15.9

∴ STREET CAPACITY IS JUST EXCEEDED AT LOW END OF BASIN 28

INSTALL INLET (20) L = 15'

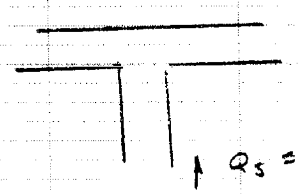
$Q_{FB} = 7.0$ $Q_{FB} = 18.7$

THESE FLOWS ENTER BASIN 31 AS STREET FLOW

BASIN 29

$Q_5 = 19.9$ $Q_{100} = 40.1$

FLOWS ARE SPLIT BETWEEN BUTTERFIELD DRIVE & PRAIRIE WIND DRIVE



← $Q_5 = 12.3$
$Q_{100} = 24.7$ (4.97 ACRES)

↑ $Q_5 = 7.6$
$Q_{100} = 15.4$

(3.10 ACRES)

MIN STREET SLOPE = 1.33%

5 YR STREET CAPACITY = 13.0 / SIDE ∴ OK

JUST DOWNSTREAM OF BUTTERFIELD & PRAIRIE WIND INTERSECTION STREET SLOPE IS 4% & 5 YR STREET CAPACITY IS 22.5 cfs / SIDE ∴ OK

WAGON TRAILS MDDP

INLET 20

Q5 =	16.1	Q100 =	32.1
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	17.95	T	23.25
FW	1.92	FW	2.01
L1	26.5	L1	36.0
L2	15.9	L2	21.6
L3	56.8	L3	77.1

Li =	25.00		
5 YR Q =	16.1	100 YR Q	32.1
5 YR Qi =	11.6	100 YR Qi	20.5
5 YR Qfb =	4.5	100 YR Qfb	11.6

WAGON TRAILS MDDP

INLET 21

Q5 =	19.5	Q100 =	38.1
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	17.87	T	22.98
FW	2.35	FW	2.46
L1	32.3	L1	43.5
L2	19.4	L2	26.1
L3	69.2	L3	93.2

Li =	25.00		
5 YR Q =	19.5	100 YR Q	38.1
5 YR Qi =	13.0	100 YR Qi	21.9
5 YR Qfb =	6.5	100 YR Qfb	16.2

BASIN 30

$Q_5 = 26.3$ $Q_{100} = 54.9$

ASSUME THE MAJORITY OF FLOW (94%) WILL BE HANDLED ON-SITE & WILL NOT ENTER BUTTERFIELD DR.

DESIGN POINT #9

$Q_5 = 19.5$ $Q_{100} = 38.1$

MIN STREET SLOPE OF BUTTERFIELD = 3%
5 YR STREET CAPACITY IS 19.5 cfs/SIDE

∴ INSTALL 25' INLET JUST EAST OF RANGE RANCH ON SOUTH SIDE OF BUTTERFIELD
INLET (21)

$Q_{FB} = 6.5$ (5 yr) $Q_{FB} = 16.2$ (100 yr)

THESE FLOWS TURN SOUTH ON RANGE RANCH TO A SUMP INLET ON THE EAST SIDE OF RANGE RANCH

BASIN 31

$Q_5 = 15.1 + 4.5^{*} = 19.6$ $Q_{100} = 30.0 + 11.6^{*} = 41.6$

THESE FLOWS REACH THE NORTH HALF OF BUTTERFIELD DRIVE WHICH HAS ADEQUATE STREET CAPACITY TO CONVEY THESE FLOWS TO THE BUTTERFIELD & RANGE RANCH INTERSECTION. HOWEVER, INSTALL INLET 20A TO COLLECT A PORTION OF THESE FLOWS.
* FLOWS BYPASSING INLET (20)

WAGON TRAILS MDDP

INLET 20A

Q5 =	19.6	Q100 =	41.6
SL =	0.033	SO =	0.02

5 YEAR		100 YEAR	
T	17.59	T	23.32
FW	2.45	FW	2.58
L1	33.2	L1	46.4
L2	20.0	L2	27.9
L3	71.2	L3	99.5

Li =	15.00		
5 YR Q =	19.6	100 YR Q	41.6
5 YR Qi =	8.8	100 YR Qi	13.4
5 YR Qfb =	10.8	100 YR Qfb	28.2

WAGON TRAILS MDDP

INLET 23

Q5 =	14.1	Q100 =	40.5
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	15.83	T	23.51
FW	2.29	FW	2.47
L1	27.9	L1	44.7
L2	16.8	L2	26.8
L3	59.9	L3	95.7

Li =	20.00		
5 YR Q =	14.1	100 YR Q	40.5
5 YR Qi =	9.1	100 YR Qi	18.1
5 YR Qfb =	5.0	100 YR Qfb	22.4

BASIN 32

Q_5 = 18.1 Q_{100} = 36.1

STREET SLOPE JUST NORTH OF BUTTERFIELD = 2.5%

5 yR STREET CAPACITY = 17.8 cfs

TWO 15' INLETS WILL BE INSTALLED JUST NORTH OF BUTTERFIELD ALONG THE WEST SIDE OF CHAISE

INLETS (22A) & (22B)

Q_{FB} = 9.0 Q_{FB} = 22.7 PAST (22A)

Q_{FB} = 3.3 Q_{FB} = 12.3 PAST (22A)

FLOWS BYPASSING INLET (22B) COMBINE WITH FLOWS BYPASSING INLET 20A & CONTINUE TO BASIN (23)

Q_5 = 10.8 + 3.3 Q_{100} = 28.2 + 12.3

= 14.1 = 40.5

REACH INLET (23)

Q_{FB} = 5.0 Q_{FB} = 22.4

THESE FLOWS COMBINE WITH RUNOFF BYPASSING INLET (21)

Q_5 = 5.0 + 6.5 Q_{100} = 22.4 + 16.2

= 11.5 Q_{100} = 38.6

THESE FLOW REACH THE SAME SUMP INLET AS BASIN 34

WAGON TRAILS MDDP

INLET 22A

Q5 =	18.1	Q100 =	36.1
SL =	0.025	SO =	0.02

5 YEAR		100 YEAR	
T	17.98	T	23.30
FW	2.14	FW	2.25
L1	29.7	L1	40.4
L2	17.8	L2	24.2
L3	63.6	L3	86.5

Li =	15.00		
5 YR Q =	18.1	100 YR Q	36.1
5 YR Qi =	9.1	100 YR Qi	13.4
5 YR Qfb =	9.0	100 YR Qfb	22.7

WAGON TRAILS MDDP

INLET 22B

Q5 =	9	Q100 =	22.7
SL =	0.025	SO =	0.02

<u>5 YEAR</u>

T	13.84
FW	2.04
L1	21.7
L2	13.1
L3	46.6

<u>100 YEAR</u>

T	19.58
FW	2.18
L1	32.8
L2	19.7
L3	70.4

Li = 15.00

5 YR Q =	9	100 YR Q	22.7
5 YR Qi =	<u>5.7</u>	100 YR Qi	<u>10.4</u>
5 YR Qfb =	3.3	100 YR Qfb	12.3

BASIN 33

$Q_5 = 6.2$ $Q_{100} = 12.6$

MIN STREET SLOPE = 3%

5 YR STREET CAPACITY = 19.5 cfs / SIDE

THESE FLOWS ENTER BASIN 34 AS STREET FLOWS

BASIN 34

$Q_5 = 15.6$ $Q_{100} = 33.6$

FLOWS FROM BASIN 13 & FLOWS BYPASSING INLET (12) & (13) ENTER BASIN 34

FLOWS JUST WEST OF PRAIRIE WIND ON NORTH SIDE OF PIONEER MESA

$Q_5 = 2.2 + 3.9 + 7.2 + \frac{2.11}{8.40}(15.6)$ $Q_{100} = 4.4 + 19.0 + 18.3 + \frac{2.41}{8.40}(33.6)$

$Q_5 = 17.2$ $Q_{100} = 50.7$

STREET CAPACITY IS MET A POINT APPROX 250' WEST OF PRAIRIE WIND AND PIONEER MESA INTERSECTION

INLET (24A) S = 2.2% L = 20'

$Q_{FB} = 6.1$ $Q_{FB} = 27.8$

AN ADDITIONAL INLET WILL HAVE TO BE INSTALLED AT THE PRAIRIE WIND DRIVE & CURRICLE CIRCLE INTERSECTION.

$Q_5 = 6.1 + \frac{2.36}{8.40}(15.6) + 6.2$ $Q_{100} = 27.8 + \left(\frac{2.36}{8.40}\right)(33.6) + 12.6$

$Q_5 = 16.7$ $Q_{100} = 49.8$

S = 2.5%

INSTALL INLET JUST NORTHEAST OF PRAIRIE WIND DRIVE & CURRICLE CT ON EAST SIDE OF PRAIRIE WIND INLET 24B

$L = 20'$

$Q_{PB} = 6.0$ $Q_{PB} = 28.4$

FLOW REACHING SUMP INLET

$Q_5 = 6.0 + \frac{3.93}{8.40}(15.6)$

$= 13.3$

$Q_{100} = 28.4 + \left(\frac{3.93}{8.40}\right)(33.6)$

$= 43.7$

THESE FLOWS REACH THE LOW PT IN RANGE RANCH

$Q_5 = 11.5$
$Q_{100} = 38.6$

BASIN 28 THROUGH 32

$Q_5 = 13.3$
$Q_{100} = 43.7$

INLET 24C

APPROACH FLOWS

$13.3 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$

$d = 0.51$

$43.7 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$

$d = 0.80$

TOTAL FLOWS TRY $L = 25'$

$24.8 = 1.7(25 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.34$

$82.3 = 1.7(25 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.96$

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WAGON TRAILS MDDP

INLET 24A

Q5 =	17.2	Q100 =	50.1
SL =	0.022	SO =	0.02

5 YEAR		100 YEAR	
T	18.07	T	26.98
FW	2.01	FW	2.17
L1	28.0	L1	45.0
L2	16.8	L2	27.0
L3	60.0	L3	96.5

Li =	20.00		
5 YR Q =	17.2	100 YR Q	50.1
5 YR Qi =	11.1	100 YR Qi	22.3
5 YR Qfb =	6.1	100 YR Qfb	27.8

WAGON TRAILS MDDP

INLET 24B

Q5 =	16.7	Q100 =	49.8
SL =	0.025	SO =	0.02

5 YEAR		100 YEAR	
T	17.45	T	26.29
FW	2.13	FW	2.30
L1	28.6	L1	46.5
L2	17.2	L2	27.9
L3	61.4	L3	99.7

Li =	20.00		
5 YR Q =	16.7	100 YR Q	49.8
5 YR Qi =	10.7	100 YR Qi	21.4
5 YR Qfb =	6.0	100 YR Qfb	28.4

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BASIN 35 & 36.

BASIN 35 $Q_5 = 13.4$ $Q_{100} = 26.7$

BASIN 36 $Q_5 = 7.6$ $Q_{100} = 15.3$

THESE FLOWS REACH SUMP INLET (25)

APPROACH FLOWS

$13.4 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$

$d = 0.52$ (5 yr)

$26.7 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$

$d = 0.67$ (100 yr)

TOTAL FLOWS TRY L = 15'

$21.0 = 1.7(15 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.43$

$42.0 = 1.7(15 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.78$ INLET 25

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BASIN 36A

$Q_5 = 3.6$ cfs $Q_{100} = 7.2$ cfs

APPROXIMATELY ½ OF THE FLOWS REACH THE SUMP INLET FROM THE NORTH & SOUTH

TOTAL FLOWS (TRY 5')

$3.6 = 1.7(5 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.09$

$7.2 = 1.7(5 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.29$

INLET 25A

WAGON TRAILS MDDP

INLET 26

Q5 =	14.2	Q100 =	28.5
SL =	0.015	SO =	0.02

5 YEAR		100 YEAR	
T	18.07	T	23.47
FW	1.66	FW	1.74
L1	23.1	L1	31.5
L2	13.9	L2	18.9
L3	49.6	L3	67.5

Li =	15.00		
5 YR Q =	14.2	100 YR Q	28.5
5 YR Qi =	8.8	100 YR Qi	13.6
5 YR Qfb =	5.4	100 YR Qfb	14.9

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BASIN 37

Q_5 = 9.0 Q_{100} = 17.9

MIN STREET SLOPE = 1.5% (AT TOP OF BASIN)

∴ ADEQUATE STREET CAPACITY

BASIN 38

Q_5 = 14.2 Q_{100} = 28.5

MIN STREET SLOPE = 1.5%

5 YR STREET CAPACITY = 13.8

INSTALL INLET ALONG EAST SIDE SPOKED WHEEL JUST SOUTH OF PRAIRIE WIND DRIVE

INLET (26) L=15'

Q_{FB} = 5.4 Q_{FB} = 14.9

THESE FLOWS ENTER BASIN 39 AS STREET FLOW

BASIN 39

Q_5 = 14.0 Q_{100} = 27.8

FLOWS ARE SPLIT BETWEEN PRAIRIE WIND & SAND HILL DRIVE REACHING THE PRAIRIE WIND & GRANITE PEAK DRIVE INTERSECTION

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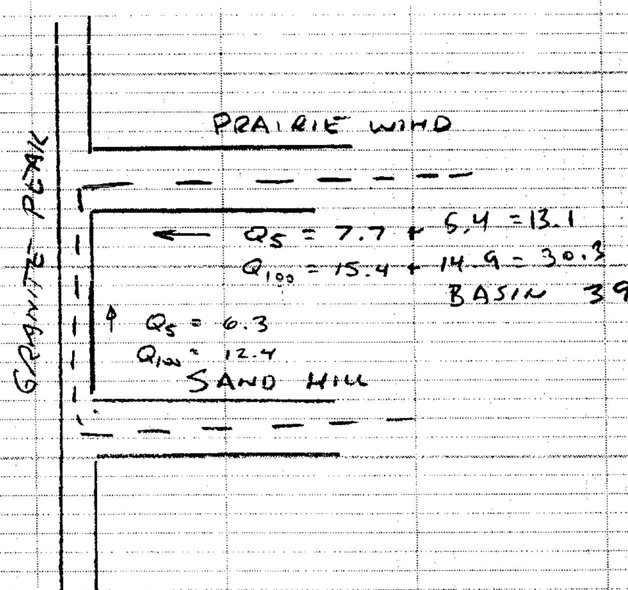

∴ STREET CAPACITIES ARE O.K.

BASIN 40

$Q_5 = 4.9$ $Q_{100} = 9.9$

STREET SLOPE = 4% 5 YR STREET CAPACITY = 22.5 cfs/SIDE

DETERMINE FLOWS AT DP # 10

$Q_5 = 18.4$ $Q_{100} = 36.6$

ASSUME INLET (27) TO BE INSTALLED ON NORTH SIDE OF PRAIRIE WIND JUST EAST OF GRANITE PEAK. INCLUDE FLOWS BYPASSING INLET (26)

7.62 ACRES OF THE TOTAL 8.31 ACRES REACH THIS INLET

$Q_5 = \frac{7.62}{8.31}(18.4) + 5.4$ $Q_{100} = \frac{7.62}{8.31}(36.6) + 14.9$

$Q_5 = 16.9 + 5.4 = 22.3$ $Q_{100} = 33.6 + 14.9 = 48.5$

$Q_{FB} = 10.3 + \frac{0.69}{8.31}(18.4)$ $Q_{FB} = 30.0 + \frac{0.69}{8.31}(36.6)$

$Q_{FB} = 11.8$ $Q_{FB} = 33.0$

WAGON TRAILS MDDP

INLET 27

Q5 =	22.3	Q100 =	48.5
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	17.81	T	23.83
FW	2.71	FW	2.86
L1	37.1	L1	52.4
L2	22.3	L2	31.5
L3	79.5	L3	112.3

Li =	20.00		
5 YR Q =	22.3	100 YR Q	48.5
5 YR Qi =	12.0	100 YR Qi	18.5
5 YR Qfb =	10.3	100 YR Qfb	30.0

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THESE FLOWS CONTINUE NORTHERLY TO THE SUMP INLET AT THE LOW POINT OF GRANITE PEAK WHICH IS ALSO THE COLLECTION POINT FOR BASIN 41

BASIN 41, 42 & 43

BASIN	Q_5	Q_{100}
40 (FLOWBY)	11.8	33.0
41	14.3	28.8
42	2.0	4.0
43	3.2	6.2

Inlet (29): $Q_5 = 2.0$, $Q_{100} = 4.0$ → ← $Q_5 = 3.2$, $Q_{100} = 6.2$

Inlet (28): $Q_5 = 11.8$, $Q_{100} = 33.0$ → ← $Q_5 = 14.3$, $Q_{100} = 28.8$

APPROACH FLOWS

$$14.3 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.53$ SLIGHTLY EXCEEDS 0.50' ALLOWED.

$$33.0 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.72$ & WILL SLIGHTLY BE EXCEEDED

TOTAL FLOWS TRY $L = 20'$

$$26.1 = 1.7(20 + 1.8(3))(d_{max} + 0.33)^{1.85}$$ INLET (28)

$d = 0.43$ 5 YR

$$61.8 = 1.7(20 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.88$* 100 YR

*SOME FLOW WILL OVERTOP & DURING 100 YR STORM

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OVER SIZE INLET (29) TO ACCOMODATE FLOWS CROSSING ℄ DURING 100 YR STORM

TOTAL FLOWS TRY $L = 8'$

$$5.2 = 1.7\left(8 + 1.8(3)\right)\left(d_{max} + 0.33\right)^{1.85}$$

$d = 0.12$

$$10.2 = 1.7\left(8 + 1.8(3)\right)\left(d_{max} + 0.33\right)^{1.85}$$

$d = 0.31$

BASINS 44 & 45 SHEET FLOW TO PROPOSED CHANNEL

BASIN 46

$Q_5 = 14.2$ $Q_{100} = 28.3$

MIN STREET SLOPE = 2%
5 YR STREET CAPACITY = 15.9 cfs ∴ OK

FLOWS REACH SUMP INLET (30) FROM THE NORTH ALONG WITH FLOWS FROM BASIN 47

BASIN 46 → ▭ ← BASIN 47

$Q_5 = 14.2$ $Q_5 = 5.7$

$Q_{100} = 28.3$ $Q_{100} = 11.6$

APPROACH FLOWS

$$14.2 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3} \quad \text{5 YR}$$

$d = 0.53$

$$28.3 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.68$ 100 YR

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TOTAL FLOWS INLET (30) TRY L = 20'

$Q_5 = 19.9 = 1.7(20 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.33$

$Q_{100} = 39.9 = 1.7(20 + 1.8(3))(d_{max} + 0.33)^{1.85}$

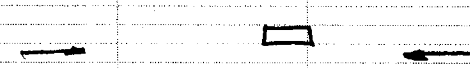
$d = 0.63$

BASIN 48

$Q_5 = 5.5$ $Q_{100} = 10.9$

INSTALL SUMP INLET

APPROXIMATELY 0.72 ACRES APPROACH THIS INLET FROM THE NORTH & 1.45 ACRES FROM THE SOUTH



$Q_5 = \frac{0.72}{2.17}(5.5) = 1.8$ $Q_5 = \frac{1.45}{2.17}(5.5) = 3.7$

$Q_{100} = \frac{0.72}{2.17}(10.9) = 3.6$ $Q_{100} = \frac{1.45}{2.17}(10.9) = 7.3$

APPROACH FLOWS O.K.

TOTAL FLOWS INLET (31) TRY L = 4'

$5.5 = 1.7(4 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.23$

$10.9 = 1.7(4 + 1.8(3))(d_{max} + 0.33)^{1.85}$

$d = 0.48$

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BASIN 50

$Q_5 = 6.5$ $Q_{100} = 12.9$

THESE FLOWS COMBINE WITH FLOWS FROM BASIN 37.
TOTAL FLOWS AT DESIGN PT 11

$Q_5 = 13.1$ $Q_{100} = 26.3$

BASIN 51

$Q_5 = 60.8$ $Q_{100} = 109.8$

EXISTING 36" RCP WILL COLLECT THESE FLOWS

BASIN 51A

$Q_5 = 62.5$ $Q_{100} = 112.9$

AN EXISTING 42" RCP WILL COLLECT THESE FLOWS AT THE DURYEA & WOODMEN INTERSECTION

BASIN 52

$Q_5 = 11.0$ $Q_{100} = 19.3$

THESE RUNOFF RATES CONTINUE WESTERLY WITHIN THE NORTH SIDE OF BRIDLE PASS DRIVE & ENTER BASIN 53

BASIN 53

$Q_5 = 71.4$ $Q_{100} = 127.9$

AN EXISTING 48" & 60" RCP WILL COLLECT THESE FLOWS

WAGON TRAILS MDDP

INLET 32

Q5 =	13.1	Q100 =	26.3
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	15.40	T	19.99
FW	2.28	FW	2.40
L1	27.0	L1	36.9
L2	16.2	L2	22.2
L3	57.9	L3	79.0

Li =	15.00		
5 YR Q =	13.1	100 YR Q	26.3
5 YR Qi =	7.3	100 YR Qi	10.7
5 YR Qfb =	5.8	100 YR Qfb	15.6

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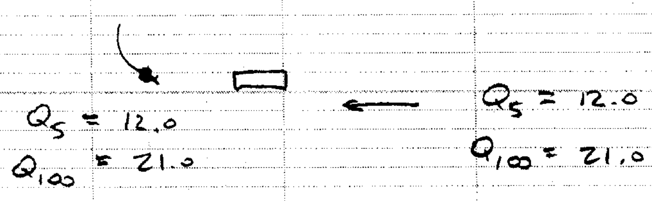
Basin S4

$Q_5 = 33.8$ $Q_{100} = 59.3$

Assume sump inlet to be installed along the north side of Bridle Pass just east of Austin Bluffs Parkway

Total Basin Area = 11.40 acres



Assume 12.0 cfs reaches sump inlet from both direction during 5 yr storm. These means flows of $Q_5 = 9.8$ cfs and $Q_{100} = 17.3$ cfs must be collected within the future commercial development prior to entering Austin Bluffs or Bridle Pass Drive

Approach Flows

$$12.0 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.032)^{1/2} d^{8/3}$$

$d = 0.50$ 5 yr OK

$$21.0 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.032)^{1/2} d^{8/3}$$

$d = 0.61$ 100 yr OK

Total Flows Try L=15'

$$Q_5 = 24.0 = 1.7(15 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.49$ 5 yr OK

$$Q_{100} = 42.0 = 1.7(15 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.78$

A 30" RCP will be stubbed out from this inlet

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BASIN 55

$Q_5 = 8.3$ $Q_{100} = 14.0$

ALL THE RUNOFF GENERATED FROM BASIN 55 REACH THE PROPOSED INLET FROM THE EAST

APPROACH FLOWS

$$8.3 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.43$

$$14.0 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$d = 0.52$

TOTAL FLOWS TRY L = 5'

$$8.3 = 1.7(5 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.33$

$$14.0 = 1.7(5 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.55$

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4 MAJOR OUTFALL POINTS FOR WAGON TRAILS

A - BRIDLE PASS & AUSTIN BLUFFS PARKWAY

B - PROPOSED CHANNEL @ WEST SIDE OF WAGON TRAILS

C - GRANITE PEAK DRIVE @ DUBLIN

D - WAGON RIDGE DRIVE @ DUBLIN

DESIGN PT A

AREA	BASIN	C_5	C_{100}	T_c
11.40	54	0.78	0.80	
2.48	55	0.80	0.82	

COMP $C_5' = \frac{(11.40)(0.78) + 2.48(0.80)}{13.88} = 0.78$

COMP $C_{100} = \frac{11.40(0.80) + 2.48(0.82)}{13.88} = 0.80$

USE $T_c = 11.7$ $I_5 = 3.8$ $I_{100} = 6.5$

$Q_5 = 13.88(3.8)(0.78) = 41.1$ cfs

$Q_{100} = 13.88(6.5)(0.80) = 72.2$ cfs

AN EXISTING 48" STUB WILL DRAIN THIS AREA

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DESIGN PT B

BASIN 1-15; 9A; 17A; 28-36; 38-49; 36A
ALL HAVE RUNOFF COEFFICIENTS OF $C_5 = 0.60$ & $C_{100} = 0.70$
EXCEPT BASIN 17A $C_5 = 0.90$ & $C_{100} = 0.90$

AREA	C_5	C_{100}	
186.02	0.60	0.70	90.3%
20.04	0.90	0.90	9.7%

COMP C_5 = 0.63
COMP C_{100} = 0.72

T_c = DP#5 + STREET FLOW + CHANNEL FLOW

$$T_c = 20.3 + \frac{1500}{16(60)} + \frac{1250}{5(60)}$$

T_c = 20.3 + 1.6 + 4.2

T_c = 26.1

I_5 = 2.6 I_{100} = 4.4

$Q_5 = (206.06)(0.63)(2.6) = 337.5$

$Q_{100} = (206.06)(0.72)(4.4) = 652.8$

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DESIGN PT C IS SAME AS DESIGN PT 11

$Q_5 = 13.1$ $Q_{100} = 26.3$
S = 3%

INSTALL AN INLET ON THE WEST SIDE OF GRANITE PEAK NORTH OF DUBLIN INLET (27)

$Q_{5FB} = 5.8$ $Q_{100FB} = 15.6$

THESE FLOWS WILL BE CONVEYED WESTERLY WITHIN AN 18" RCP NORTH OF DUBLIN BLVD

DESIGN PT D

BASINS 16, 17, 18 THROUGH 27

TOTAL AREA = 58.01

	C_5	C_{100}
39.31	0.60	0.70
2.48	0.60	0.67
10.85	0.59	0.68
5.37	0.77	0.79
58.01		

COMP C_5 = 0.61
COMP C_{100} = 0.70

T_c = BASIN 16 + $\frac{2300}{60(3.0)}$

= 11.4 + 12.8

= 24.2

$I_5 = 3.0$ $I_{100} = 5.2$

$Q_5 = 106.2$ $Q_{100} = 211.2$

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HISTORIC

Hydrology

Location: A
Area: 44.95 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	6.4%		27.2
SWALE	1600	1.3%	1.6	16.6

T_c Total: 43.9

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

I5: 1.9 in/hr I100 3.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 21.4 cfs Q100: 51.9 cfs

Hydrology

Location: B
Area: 17.47 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	3.8%		32.4
SWALE	600	2.3%	1.6	6.3

T_c Total: 38.7

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

I5: 2.0 in/hr I100 3.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 8.7 cfs Q100: 21.4 cfs

Hydrology HISTORIC

Location: C
Area: 30.69 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	4 %		31.8
SWALE	2400	1.3%	3.0	13.3

T_c Total: 45.1

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

I5: 1.8 in/hr I100 3.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 13.8 cfs Q100: 34.4 cfs

Hydrology HISTORIC

Location: D
Area: 13.47 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	4.8 %		30.0
SWALE	375	7.5%	4.0	1.6

T_c Total: 31.6

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

I5: 2.4 in/hr I100 4.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 8.1 cfs Q100: 18.9 cfs

Hydrology — HISTORIC

Location: E
Area: 50.51 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	7.0%		26.4

T_c Total: 26.4

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

I5: 2.6 in/hr I100 4.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 32.8 cfs Q100: 77.8 cfs

Hydrology — HISTORIC

Location: F
Area: 134.62 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	5.6%		28.5
SWALE	4200	2.6%	3.0	23.3

T_c Total: 51.8

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

I5: 1.7 in/hr I100 2.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 57.2 cfs Q100: 136.6 cfs

Hydrology

HISTORIC

Location: G

Area: 150.44 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	4.0%		31.8
SWALE	4800	2.9%	3.0	26.7

T_c Total: 58.5

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

I5: 1.6 in/hr I100 2.7 in/hr

Peak Flow: Q = CIA in cfs

Q5 60.2 cfs Q100: 142.2 cfs

Hydrology

Location:

Area: Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total:

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

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs

HISTORIC

Hydrology

Location: DP #1
Area: 315.75 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
C	30.69	0.25	0.35	
F	134.62			
G	150.44			
	315.75			

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
USE BASIN G				58.5

T_c Total: 58.5

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

I5: 1.6 in/hr I100 2.7 in/hr

Peak Flow: Q = CIA in cfs

Q5 126.3 cfs Q100: 298.4 cfs

Hydrology

Location:
Area: Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total:

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

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs

Hydrology

Location: 1

Area: 4.71 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	100	3%		6.5
Street	600	4%	4.0	2.5

T_c Total: 9.0

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

I5: 4.2 in/hr I100 7.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 11.9 cfs Q100: 23.7 cfs

Hydrology

Location: 2

Area: 4.33 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	150	3%		8.0
Street	700	3%	3.4	3.4

T_c Total: 11.4

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

I5: 3.8 in/hr I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 9.9 cfs Q100: 19.7 cfs

Hydrology

Location: 3
Area: 4.60 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3 %		6.5
STREET	1500	2.8%	3.3	7.6

T_c Total: 14.1

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 9.7 cfs Q100: 19.3 cfs

Hydrology

Location: 4
Area: 7.21 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	1150	2.3%	3.0	6.4

T_c Total: 12.9

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 16.0 cfs Q100: 31.9 cfs

9,15,14

Hydrology

Location: 5
Area: 7.12 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	900	2.7%	3.2	4.7

T_c Total: 12.7

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

I5: 3.7 in/hr   I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.9 cfs   Q100: 31.4 cfs

Hydrology

Location: 6
Area: 3.02 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		6.5
STREET	900	2.2%	3.0	5.0

T_c Total: 11.5

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

I5: 3.8 in/hr   I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.9 cfs   Q100: 13.7 cfs

Hydrology

Location: 7

Area: 6.39 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	900	2.7%	3.2	4.7

T_c Total: 12.7

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.2 cfs Q100: 28.2 cfs

Hydrology

Location: 8

Area: 6.35 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	1200	2.5%	3.1	6.5

T_c Total: 13.0

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.1 cfs Q100: 28.0 cfs

Hydrology

Location: 9
Area: 2.73 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	250	3%		10.3
STREET	500	2%	2.8	3.0

T_c Total: 13.3

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

I5: 3.6 in/hr   I100 6.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.9 cfs   Q100: 11.7 cfs

Hydrology

Location: 10
Area: 3.74 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	700	3.4%	3.6	3.2

T_c Total: 9.7

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

I5: 4.1 in/hr   I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 9.2 cfs   Q100: 18.6 cfs

Hydrology

Location: BASIN 9A
Area: 2.72 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	650	2.2%	3.0	3.6

T_c Total: 10.1

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

I5: 4.0 in/hr I100 7.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.5 cfs Q100: 13.3 cfs

Hydrology

Location:
Area: Ac
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c in minutes.

Travel Type	L(ft)	s%	v(fps)	T

T_c Total:

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

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs

Hydrology

Location: 11

Area: 2.64 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	800	3%	3.4	3.9

T_c Total: 10.4

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

I5: 4.0 in/hr I100 6.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.3 cfs Q100: 12.8 cfs

Hydrology

Location: 12

Area: 6.96 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	1100	2.8%	3.3	5.6

T_c Total: 13.6

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

I5: 3.6 in/hr I100 6.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.0 cfs Q100: 29.7 cfs

Hydrology

Location: 13
Area: 0.77 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	450	3.1%	3.5	2.1

T_c Total: 6.7

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

I5: 4.8 in/hr I100 8.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 2.2 cfs Q100: 4.4 cfs

Hydrology

Location: 14
Area: 4.01 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	25%
Rec Center	0.80	0.85	75%

Composite: C5 0.75 C100 0.81 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	3%		9.2
STREET	450	2.2%	3.0	2.5

T_c Total: 11.7

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

I5: 3.8 in/hr I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 11.4 cfs Q100: 21.1 cfs

Hydrology

Location: 15
Area: 8.70 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	1000	2%	2.8	6.0

T_c Total: 14.0

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 18.3 cfs Q100: 36.5 cfs

Hydrology

Location: 16
Area: 4.40 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	700	3%	3.4	3.4

T_c Total: 11.4

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

I5: 3.8 in/hr I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 10.0 cfs Q100: 20.0 cfs

Hydrology

Location: 17
Area: 5.37 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
COMMERCIAL	0.90	0.95	80%
LANDSCAPING	0.25	0.35	20%

Composite: C5 0.77 C100 0.79 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	300	3%		6.5
STREET	800	3%	3.4	3.9

T_c Total: 10.4

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

I5: 4.0 in/hr I100 6.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 16.5 cfs Q100: 29.3 cfs

Hydrology

Location: 18
Area: 5.03 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac RES	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	800	2.5%	3.1	4.3

T_c Total: 10.8

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

I5: 4.0 in/hr I100 6.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 12.1 cfs Q100: 24.3 cfs

Hydrology

Location: 17A
Area: 20.04 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
Commercial	0.90	0.90	80%
Landscaping	0.25	0.35	20%

Composite: C5 0.77 C100 0.79 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	300	3%		4.5
Street	1450	3%	3.4	7.1

T_c Total: 11.6

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

I5: 3.8 in/hr I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 58.6 cfs Q100: 102.9 cfs

Hydrology

Location:
Area: Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total:

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

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs

Hydrology

Location: 19
Area: 2.22 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	600	2%	2.8	3.6

T_c Total: 10.1

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

I5: 4.0 in/hr I100 7.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.3 cfs Q100: 10.9 cfs

Hydrology

Location: 20
Area: 9.62 Ac
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	1650	2.4%	3.1	8.9

T_c Total: 15.4

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

I5: 3.4 in/hr I100 5.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 19.6 cfs Q100: 39.1 cfs

Hydrology

Location: 21
Area: 3.03 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	3%		9.2
STREET	500	1.6%	2.5	3.3

T_c Total: 12.5

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.7 cfs Q100: 13.4 cfs

Hydrology

Location: 22
Area: 2.60 Ac
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	1700	3.4%	3.6	7.9

T_c Total: 12.5

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.8 cfs Q100: 11.5 cfs

Hydrology

Location: 23

Area: 3.88 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	250	3%		10.3
STREET	700	4%	4.0	2.9

T_c Total: 13.2

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

I5: 3.6 in/hr I100 6.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 8.4 cfs Q100: 16.6 cfs

Hydrology

Location: 24

Area: 7.44 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	250	3%		10.3
STREET	900	3.8%	3.8	3.9

T_c Total: 14.2

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.6 cfs Q100: 31.2 cfs

Hydrology

Location: 25
Area: 1.09 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	600	3.5%	3.8	2.6

T_c Total: 7.2

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

I5: 4.5 in/hr I100 7.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 2.9 cfs Q100: 6.0 cfs

Hydrology

Location: 26
Area: 10.85 Ac
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
1/3 Ac Res	0.60	0.70	64.7%	7.02
STREET	0.90	0.90	18.2%	1.98
LANDSCAPING	0.25	0.35	17.1%	1.85

Composite: C5 0.59 C100 0.68 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	3%		9.2
STREET	1500	2.7%	3.2	7.8

T_c Total: 17.0

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

I5: 3.3 in/hr I100 5.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 21.1 cfs Q100: 40.6 cfs

Hydrology

Location: 27
Area: 2.48 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
1/8 Ac Res	0.60	0.70	55.6%	1.38
Street	0.90	0.90	23.4%	0.58
Landscaping	0.25	0.35	21.0%	0.52

Composite: C5 0.60 C100 0.67 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	120	13%		4.4
Street	600	1%	2.0	5.0

T_c Total: 9.4

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

I5: 4.1 in/hr I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.1 cfs Q100: 11.8 cfs

Hydrology

Location: 28
Area: 7.27 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	100	3%		6.5
Street	1000	2%	2.8	6.0

T_c Total: 12.5

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 16.1 cfs Q100: 32.1 cfs

Hydrology

Location: 29

Area: 8.07 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	100	3%		6.5
Street	650	3%	3.4	3.2

T_c Total: 9.7

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

I5: 4.1 in/hr I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 19.9 cfs Q100: 40.1 cfs

Hydrology

Location: 30

Area: 12.16 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
1/8 Ac Res	0.60	0.70	12.5%	1.52
School/Bldgs	0.90	0.90	43.8%	5.32
Playground	0.30	0.60	43.7%	5.32

Composite: C5 0.60 C100 0.74 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	300	4%		10.2
Street	800	3.5%	3.8	3.5

T_c Total: 13.7

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

I5: 3.6 in/hr I100 6.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 26.3 cfs Q100: 54.9 cfs

Hydrology

Location: 31

Area: 6.80 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	1000	3.8%	3.8	4.4

T_c Total: 12.4

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.1 cfs Q100: 30.0 cfs

Hydrology

Location: 32

Area: 8.60 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	1500	3.6%	3.8	6.6

T_c Total: 14.4

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 18.1 cfs Q100: 36.1 cfs

Hydrology

Location: 33

Area: 2.60 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	550	2.9%	3.4	2.7

T_c Total: 10.7

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

I5: 4.0 in/hr I100 6.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.2 cfs Q100: 12.6 cfs

Hydrology

Location: 34

Area: 8.40 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
School/Bldgs	0.90	0.90	37.4%	3.14
Playground	0.30	0.60	37.4%	3.14
1/8 Ac Res	0.60	0.70	25.2%	2.12

Composite: C5 0.60 C100 0.74 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	300	3%		11.3
STREET	1250	2.5%	3.1	6.7

T_c Total: 18.0

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

I5: 3.1 in/hr I100 5.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.6 cfs Q100: 33.6 cfs

Hydrology

Location: 35

Area: 6.58 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	150	3%		8.0
Street	1550	3%	3.4	7.6

T_c Total: 15.6

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

I5: 3.4 in/hr I100 5.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 13.4 cfs Q100: 26.7 cfs

Hydrology

Location: 36

Area: 3.08 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	100	3%		6.5
Street	600	3%	3.4	2.9

T_c Total: 9.4

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

I5: 4.1 in/hr I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 7.6 cfs Q100: 15.3 cfs

Hydrology

Location: 36A

Area: 1.35 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	200	1%	2.0	1.7

T_c Total: 8.2

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

I5: 4.5 in/hr I100 7.6 in/hr

Peak Flow: Q = CIA in cfs

Q5 3.6 cfs Q100: 7.2 cfs

Hydrology

Location:

Area: Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total:

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

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs

Hydrology

Location: 37
Area: 4.27 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	2000	3%	3.4	9.8

T_c Total: 14.4

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 9.0 cfs Q100: 17.9 cfs

Hydrology

Location: 38
Area: 7.39 Ac
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	1650	2%	2.8	9.8

T_c Total: 17.8

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

I5: 3.2 in/hr I100 5.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.2 cfs Q100: 28.5 cfs

Hydrology

Location: 39

Area: 6.31 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	1000	3.8%	3.3	4.4

T_c Total: 12.4

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.0 cfs Q100: 27.8 cfs

Hydrology

Location: 40

Area: 2.00 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	1050	3.8%	3.8	4.6

T_c Total: 9.2

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

I5: 4.1 in/hr I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 4.9 cfs Q100: 9.9 cfs

Hydrology

Location: 41

Area: 5.96 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	550	3.6%	3.8	2.4

T_c Total: 10.4

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

I5: 4.0 in/hr I100 6.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.3 cfs Q100: 28.8 cfs

Hydrology

Location: 42

Area: 0.74 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	500	2%	2.8	3.0

T_c Total: 7.6

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

I5: 4.5 in/hr I100 7.7 in/hr

Peak Flow: Q = CIA in cfs

Q5 2.0 cfs Q100: 4.0 cfs

Hydrology

Location: 43
Area: 1.17 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	750	3.5%	3.8	3.3

T_c Total: 7.9

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

I5: 4.5 in/hr I100 7.6 in/hr

Peak Flow: Q = CIA in cfs

Q5 3.2 cfs Q100: 6.2 cfs

Hydrology

Location: 44
Area: 1.45 Ac
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5

T_c Total: 6.5

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

I5: 4.9 in/hr I100 8.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 4.2 cfs Q100: 8.5 cfs

Hydrology

Location: 45

Area: 4.22 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
SWALE	750	2%	2.0	7.1

T_c Total: 15.1

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

I5: 3.4 in/hr   I100 5.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 8.6 cfs   Q100: 17.1 cfs

Hydrology

Location: 46

Area: 6.23 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	750	2.4%	3.1	4.0

T_c Total: 12.0

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

I5: 3.9 in/hr   I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.2 cfs   Q100: 28.3 cfs

Hydrology

Location: 47

Area: 2.33 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	100	3%		6.5
Street	600	2.7%	3.2	3.1

T_c Total: 9.6

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

I5: 4.1 in/hr   I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.7 cfs   Q100: 11.6 cfs

Hydrology

Location: 48

Area: 2.17 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	50	3%		4.6
Street	800	2.5%	3.1	4.3

T_c Total: 8.9

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

I5: 4.2 in/hr   I100 7.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.5 cfs   Q100: 10.9 cfs

Hydrology

Location: 49

Area: 5.49 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	100	3%		6.5
Swale	1100	2%	2	9.2

T_c Total: 15.7

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

I5: 3.4 in/hr I100 5.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 11.2 cfs Q100: 22.3 cfs

Hydrology

Location: 50

Area: 2.56 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	150	3%		8.0
Street	200	3%	3.4	1.0

T_c Total: 9.0

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

I5: 4.2 in/hr I100 7.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.5 cfs Q100: 12.9 cfs

Hydrology

Location: S1

Area: 31.59 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
COMMERCIAL	0.90	0.90	80%
LANDSCAPING	0.25	0.35	20%

Composite: C5 0.77 C100 0.79 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	300	3%		19.2
STREET	1200	2%	2.8	7.2

T_c Total: 26.4

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

I5: 2.5 in/hr I100 4.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 60.8 cfs Q100: 109.8 cfs

Hydrology

Location: S1A

Area: 32.48 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
COMMERCIAL	0.90	0.90	80%
LANDSCAPING	0.25	0.35	20%

Composite: C5 0.77 C100 0.79 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	300	3%		19.2
STREET	1200	2%	2.8	7.2

T_c Total: 26.4

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

I5: 2.5 in/hr I100 4.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 62.5 cfs Q100: 112.9 cfs

Hydrology

Location: 52

Area: 4.28 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
STREET	0.90	0.90	85%
LANDSCAPING	0.25	0.35	15%

Composite: C5 0.80 C100 0.82 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	20%		5.9
STREET	2600	3.5%	3.8	11.4

T_c Total: 17.3

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

I5: 3.2 in/hr I100 5.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 11.0 cfs Q100: 19.3 cfs

Hydrology

Location: 53

Area: 32.70 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area AREA
COMMERCIAL	0.90	0.90	90%
LANDSCAPING	0.25	0.35	10%

Composite: C5 0.84 C100 0.85 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	300	3%		19.2
STREET	1200	3.3%	3.6	5.6

T_c Total: 24.8

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

I5: 2.6 in/hr I100 4.6 in/hr

Peak Flow: Q = CIA in cfs

Q5 71.4 cfs Q100: 127.9 cfs

Hydrology

Location: 54
Area: 11.40 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone		C5	C100	%Area
STREET	2.02	0.90	0.90	18%
LANDSCAPING	2.16	0.25	0.35	19%
COMMERCIAL	7.22	0.90	0.90	63%

Composite: C5 0.78 C100 0.80 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	30	17%		3.4
STREET	1700	3.04%	3.4	8.3

T_c Total: 11.7

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

I5: 3.8 in/hr I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 33.8 cfs Q100: 59.3 cfs

Hydrology

Location: 55
Area: 2.48 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
STREET	0.90	0.90	85%
LANDSCAPING	0.25	0.35	15%

Composite: C5 0.80 C100 0.82 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	30	17%		3.4
STREET	1200	3.3%	3.6	5.6

T_c Total: 9.0

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

I5: 4.2 in/hr I100 7.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 8.3 cfs Q100: 14.6 cfs

Hydrology

Location: 56
Area: 38.68 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
Commercial	0.90	0.90	90%
Landscaping	0.25	0.35	10%

Composite: C5 0.84 C100 0.85 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	300	3%		19.2
Street	1400	2%	2.8	8.3

T_c Total: 27.5

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

I5: 2.5 in/hr I100 4.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 81.2 cfs Q100: 149.7 cfs

Hydrology

Location:
Area: Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total:

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

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs

Hydrology

Location: DP #1

Area: ______ Ac.

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
1	4.71			
2	4.33			
	9.04			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
BASIN 1				9.0
STREET	650	3.4%	3.6	3.0

T_c Total: 12.0

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

I5: 3.8 in/hr I100 6.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 20.6 cfs Q100: 41.1 cfs

Hydrology

Location: DP #2

Area: 20.85 Ac

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
1	4.71			
2	4.33			
3	4.60			
4	7.21			
	20.85			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
USE BASIN 3				14.1

T_c Total: ______

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 43.8 cfs Q100: 87.6 cfs

Hydrology

Location: DP #3

Area: ______ Ac.

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	Area	C5	C100	%Area
7	6.39			
8	6.35			
9	2.73			
	15.47			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Basin 8				13.0
Street Flow	600	2%	2.8	3.6

T_c Total: 16.6

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

I5: 3.2 in/hr I100 5.6 in/hr

Peak Flow: Q = CIA in cfs

Q5 29.7 cfs Q100: 60.6 cfs

Hydrology

Location: DP #4

Area: ______ Ac.

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	Area	C5	C100	%Area
DP #3	15.47	0.60	0.70	
9A	2.72	0.60	0.70	
	18.19			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
DP #3				16.6
Street	350	2%	2.8	2.1

T_c Total: 18.7

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

I5: 3.0 in/hr I100 5.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 32.7 cfs Q100: 66.2 cfs

Hydrology

Location: DP #5

Area: ______ Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
DP # 2	20.85			
5	7.12			
6	3.02			
10	3.74			
11	2.64			
	37.37			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
DP # 2				14.1
STREET	1050	2%	2.8	6.2

T_c Total: 20.3

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

I5: 2.9 in/hr I100 5.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 65.0 cfs Q100: 130.8 cfs

Hydrology

Location: DP #6

Area: 8.53 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	% Area
24	7.44	0.60	0.70	
25	1.09	0.60	0.70	
	8.53			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T
BASIN 24				14.2

T_c Total: 14.2

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 17.9 cfs Q100: 35.8 cfs

Hydrology

Location: DP #7

Area: 52.64 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
16	4.40	0.60	0.70	
18	5.03	0.60	0.70	
19	2.22	0.60	0.70	
20	9.62	0.60	0.70	
21	3.03	0.60	0.70	
22	2.60	0.60	0.70	
23	3.88	0.60	0.70	
24	7.44	0.60	0.70	
25	1.09	0.60	0.70	
26	10.85	0.59	0.68	
27	2.48	0.60	0.67	

Composite: C5 0.60 C100 0.69 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
BASIN 16				11.4
STREET	1800	3.2	3.6	8.3

T_c Total: 19.7

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

I5: 3.0 in/hr I100 5.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 94.8 cfs Q100: 188.9 cfs

Hydrology

Location: DP #8

Area: 8.83 Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	% Area
29	8.07	0.60	0.70	91.4%
STREET PORTION OF BASIN 30	0.76	0.90	0.90	8.6%
	8.83			

Composite: C5 0.63 C100 0.72 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
BASIN 29				9.7
STREET	1100	3.5%	3.8	4.8

T_c Total: 14.5

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

I5: 3.5 in/hr I100 6.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 19.5 cfs Q100: 38.1 cfs

Hydrology

Location: DESIGN PT #9
Area: ______ Ac.
Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
BASIN 33	2.60	0.60	0.70	23.6%
BASIN 34	8.40	0.60	0.74	76.4%
	11.0			

Composite: C5 0.60 C100 0.73 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
BASIN 34				18.0

T_c Total: 18.0

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

I5: 3.1 in/hr I100 5.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 20.5 cfs Q100: 43.4 cfs

Hydrology

Location: DESIGN PT #10
Area: 8.31 Ac.
Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
BASIN 39	6.31			
BASIN 40	2.00			
	8.31			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
USE BASIN 39				12.4

T_c Total: 12.4

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

I5: 3.7 in/hr I100 6.3 in/hr

Peak Flow: Q = CIA in cfs

Q5 18.4 cfs Q100: 36.6 cfs

Hydrology

Location: DESIGN PT 11

Area: Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
BASIN 37	4.27	0.60	0.70	
BASIN 50	2.56	0.60	0.70	
	6.83			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
BASIN 37				14.4
STREET FLOW	450	2.7%	3.2	2.3

T_c Total: 17.7

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

I5: 3.2 in/hr I100 5.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 13.1 cfs Q100: 26.3 cfs

Hydrology

Location:

Area: Ac

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c in minutes.

Travel Type	L(ft)	s%	v(fps)	T_c

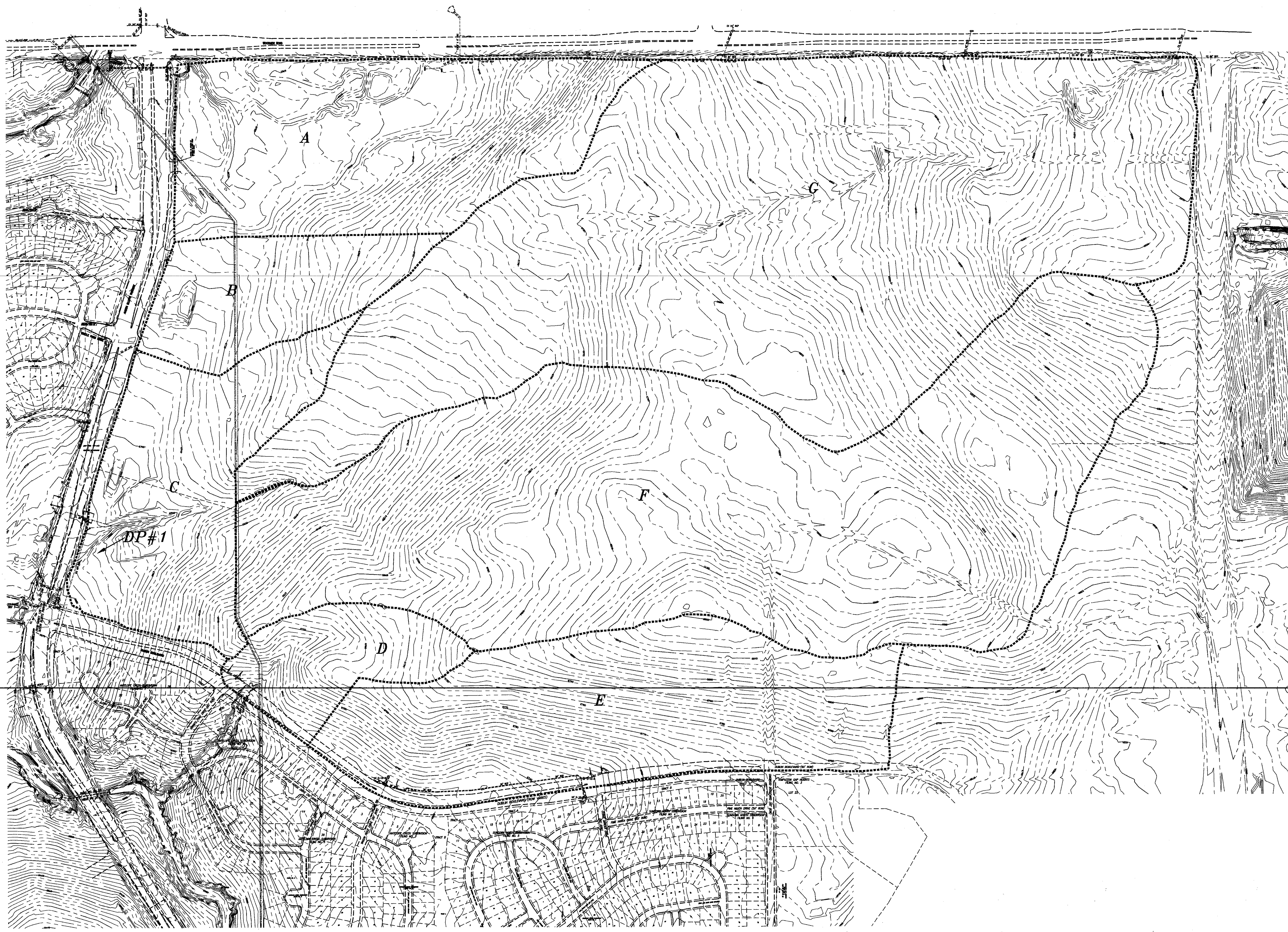
T_c Total:

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

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs



HISTORIC DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
A	44.95	21.4	51.9
B	17.47	8.7	21.4
C	30.69	13.8	34.4
D	13.47	8.1	18.9
E	50.51	32.8	77.8
F	134.62	57.2	136.6
G	150.44	60.2	142.2
DP#1	315.75	126.3	298.4

LEGEND

6100 — EXISTING CONTOURS

BASIN BOUNDARIES

H-1 — BASIN DESIGNATOR

DIRECTION OF FLOW

1" = 200'

0 50 100 200 400
Scale in Feet

FILE: 97140DP.DWG 6/16/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2928 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE : WAGON TRAILS HISTORIC DRAINAGE PLAN

SCALE : 1"=200'	DRAWN BY : FRC	97-104 JOB NO.
DATE : 8/20/99	CHECKED BY : KDR	

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
1	4.71	11.9	23.7
2	4.33	9.9	19.7
3	4.60	9.7	19.3
4	7.21	16.0	31.3
5	7.12	15.9	31.4
6	3.02	6.9	13.7
7	6.39	14.2	28.2
8	6.35	14.1	28.0
9	2.73	5.9	11.7
9A	2.72	6.5	13.3
10	3.74	9.2	18.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
11	2.64	6.3	12.8
12	6.96	15.0	29.7
13	0.77	2.2	4.4
14	4.01	11.4	21.1
15	8.70	18.3	36.5
16	4.40	10.0	20.0
17	5.37	16.5	29.3
17A	20.04	58.6	102.9
18	5.03	12.1	24.3
19	2.22	5.3	10.9

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
20	9.62	19.6	39.1
21	3.03	6.7	13.4
22	2.60	5.8	11.5
23	3.88	8.4	16.6
24	7.44	15.6	31.2
25	1.09	2.9	6.0
26	10.85	21.1	40.6
27	2.48	6.1	11.8
28	7.27	16.1	32.1
29	8.07	19.9	40.1

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
30	12.16	26.3	54.9
31	6.80	15.1	30.0
32	8.60	18.1	36.1
33	2.60	6.2	12.6
34	8.40	15.6	33.6
35	6.58	13.4	26.7
36	3.08	7.6	15.3
36A	1.35	3.6	7.2
37	4.27	9.0	17.9
38	7.39	14.2	28.5
39	6.31	14.0	27.8

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
40	2.00	4.9	9.9
41	5.96	14.3	28.8
42	0.74	2.0	4.0
43	1.17	3.2	6.2
44	1.45	4.2	8.5
45	4.22	8.6	17.1
46	6.23	14.2	28.3
47	2.33	5.7	11.6
48	2.17	5.5	10.9
49	5.49	11.2	22.3

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
50	2.56	6.5	12.9
51	36.45	60.8	109.8
51A	27.62	62.5	112.9
52	4.28	11.0	19.3
53	32.70	71.4	127.9
54	2.38	33.8	59.3
55	2.48	8.3	14.6
56	38.68	81.2	144.7
DP#1	9.04	20.6	41.1
DP#2	20.85	43.8	87.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
DP#3	15.47	29.7	60.6
DP#4	18.19	32.7	66.2
DP#5	37.37	65.0	130.8
DP#6	8.53	17.9	35.8
DP#7	52.64	94.8	188.9
DP#8	8.83	19.5	38.1
DP#9	11.0	20.5	43.4
DP#10	8.31	18.4	36.6
DP#11	6.83	13.1	26.3
.	.	.	.

1" = 100'

0 25 50 100 200

Scale in Feet

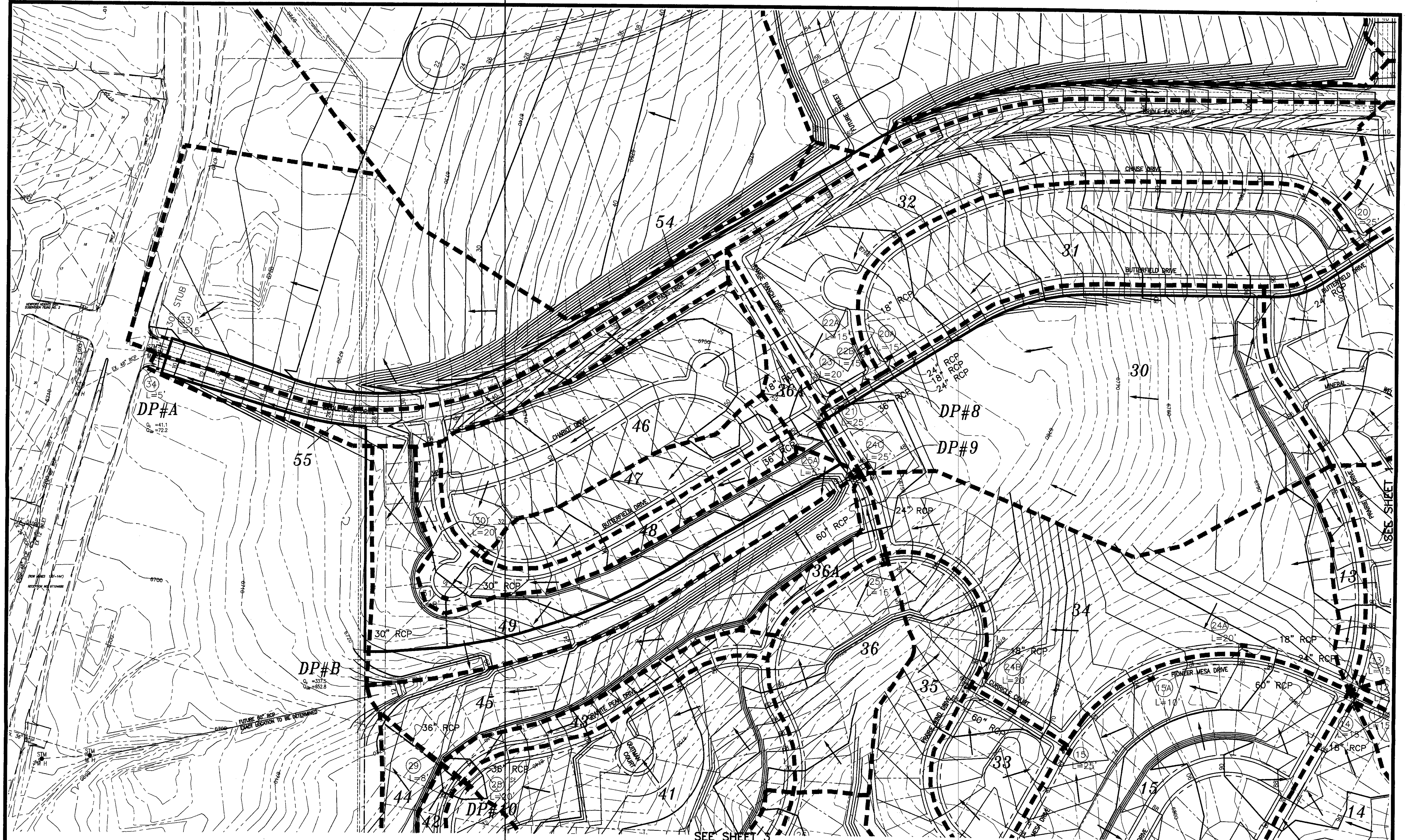
SHEET 3

FILE: 97104DP.DWG 8/17/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2928 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE :	WAGON TRAILS DEVELOPED DRAINAGE PLAN		
SCALE : 1"=100'	DRAWN BY : FRC		97-104 JOB NO.
DATE : 8/17/99	CHECKED BY : KDR		



DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
1	4.71	11.9	23.7
2	4.33	9.9	19.7
3	4.60	9.7	19.3
4	7.21	16.0	31.3
5	7.12	15.9	31.4
6	3.02	6.9	13.7
7	6.39	14.2	28.2
8	6.35	14.1	28.0
9	2.73	5.9	11.7
9A	2.72	6.5	13.3
10	3.74	9.2	18.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
11	2.64	6.3	12.8
12	6.96	15.0	29.7
13	0.77	2.2	4.4
14	4.01	11.4	21.1
15	8.70	18.3	36.5
16	4.40	10.0	20.0
17	5.37	16.5	29.3
17A	20.04	58.6	102.9
18	5.03	12.1	24.3
19	2.22	5.3	10.9

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
20	9.62	19.6	39.1
21	3.03	6.7	13.4
22	2.60	5.8	11.5
23	3.88	8.4	16.6
24	7.44	15.6	31.2
25	1.09	2.9	6.0
26	10.85	21.1	40.6
27	2.48	6.1	11.8
28	7.27	16.1	32.1
29	8.07	19.9	40.1

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
30	12.16	26.3	54.9
31	6.80	15.1	30.0
32	8.60	18.1	36.1
33	2.60	6.2	12.6
34	8.40	5.6	33.6
35	6.58	3.4	26.7
36	3.08	7.6	15.3
36A	1.35	3.6	7.2
37	4.27	9.0	17.9
38	7.39	4.2	28.5
39	6.31	4.0	27.8

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
40	2.00	4.9	9.9
41	5.96	14.3	28.8
42	0.74	2.0	4.0
43	1.17	3.2	6.2
44	1.45	4.2	8.5
45	4.22	8.6	17.1
46	6.23	14.2	28.3
47	2.33	5.7	11.6
48	2.17	5.5	10.9
49	5.49	11.2	22.3

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
50	2.56	6.5	12.9
51	36.45	60.8	109.8
51A	27.62	62.5	112.9
52	4.28	11.0	19.3
53	32.70	71.4	127.9
54	2.38	33.8	59.3
55	2.48	8.3	14.6
56	38.68	81.2	144.7
DP#1	9.04	20.6	41.1
DP#2	20.85	43.8	87.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
DP#3	15.47	29.7	60.6
DP#4	18.19	32.7	66.2
DP#5	37.37	65.0	130.8
DP#6	8.53	17.9	35.8
DP#7	52.64	94.8	188.9
DP#8	8.83	19.5	38.1
DP#9	11.0	20.5	43.4
DP#10	8.31	18.4	36.6
DP#11	6.83	13.1	26.3

1" = 100'

0 25 50 100 200

Scale in Feet

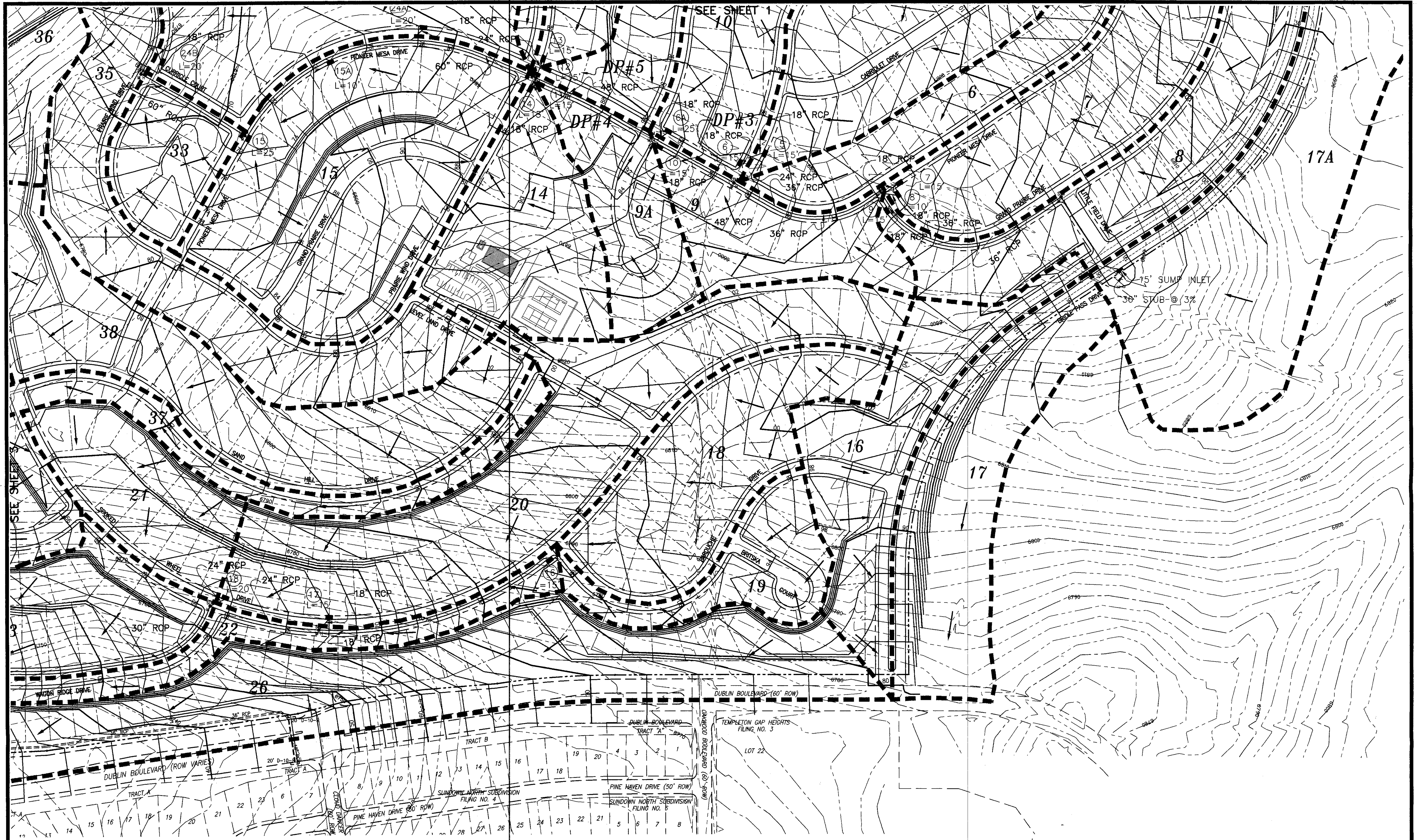
SHEET 4

FILE: 97104DP.DWG 8/17/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2928 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE :	WAGON TRAILS DEVELOPED DRAINAGE PLAN			
SCALE :	1"=100'	DRAWN BY :	FRC	97-104 JOB NO.
DATE :	8/17/99	CHECKED BY :	KDR	



1" = 100'

0 25 50 100 200

Scale in Feet

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
1	4.71	11.9	23.7
2	4.33	9.9	19.7
3	4.60	9.7	19.3
4	7.21	16.0	31.3
5	7.12	15.9	31.4
6	3.02	6.9	13.7
7	6.39	14.2	28.2
8	6.35	14.1	28.0
9	2.73	5.9	11.7
9A	2.72	6.5	13.3
10	3.74	9.2	18.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
11	2.64	6.3	12.8
12	6.96	15.0	29.7
13	0.77	2.2	4.4
14	4.01	11.4	21.1
15	8.70	18.3	36.5
16	4.40	10.0	20.0
17	5.37	16.5	29.3
17A	20.04	58.6	102.9
18	5.03	12.1	24.3
19	2.22	5.3	10.9

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
20	9.62	19.6	39.1
21	3.03	6.7	13.4
22	2.60	5.8	11.5
23	3.88	8.4	16.6
24	7.44	15.6	31.2
25	1.09	2.9	6.0
26	10.85	21.1	40.6
27	2.48	6.1	11.8
28	7.27	16.1	32.1
29	8.07	19.9	40.1

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
30	12.16	26.3	54.9
31	6.80	15.1	30.0
32	8.60	18.1	36.1
33	2.60	6.2	12.6
34	8.40	15.6	33.6
35	6.58	13.4	26.7
36	3.08	7.6	15.3
36A	1.35	3.6	7.2
37	4.27	9.0	17.9
38	7.39	14.2	28.5
39	6.31	14.0	27.8

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
40	2.00	4.9	9.9
41	5.96	14.3	28.8
42	0.74	2.0	4.0
43	1.17	3.2	6.2
44	1.45	4.2	8.5
45	4.22	8.6	17.1
46	6.23	14.2	28.3
47	2.33	5.7	11.6
48	2.17	5.5	10.9
49	5.49	11.2	22.3

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
50	2.56	6.5	12.9
51	36.45	60.8	109.8
51A	27.62	62.5	112.9
52	4.28	11.0	19.3
53	32.70	71.4	127.9
54	2.38	33.8	59.3
55	2.48	8.3	14.6
56	38.68	81.2	144.7
DP#1	9.04	20.6	41.1
DP#2	20.85	43.8	87.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
DP#3	15.47	29.7	60.6
DP#4	18.19	32.7	66.2
DP#5	37.37	65.0	130.8
DP#6	8.53	17.9	35.8
DP#7	52.64	94.8	188.9
DP#8	8.83	19.5	38.1
DP#9	11.0	20.5	43.4
DP#10	8.31	18.4	36.6
DP#11	6.83	13.1	26.3
.	.	.	.

SHEET 2

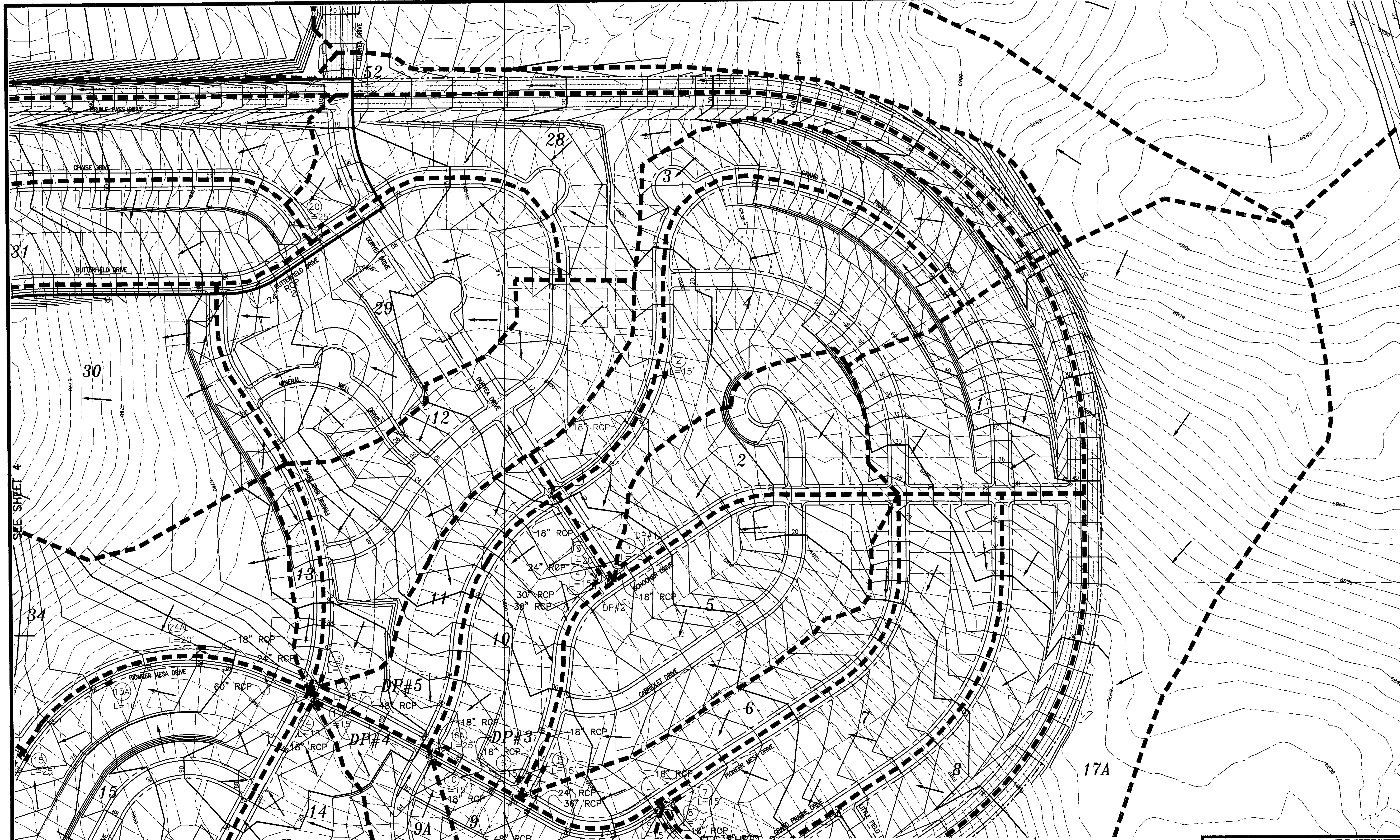
FILE: 97104DP.DWG 8/17/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2928 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE : WAGON TRAILS DEVELOPED DRAINAGE PLAN

SCALE : 1"=100'	DRAWN BY : FRC	97-104
DATE : 8/17/99	CHECKED BY : KDR	JOB NO.



DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
1	4.71	11.9	23.7
2	4.33	9.9	19.7
3	4.60	9.7	19.3
4	7.21	16.0	31.3
5	7.12	15.9	31.4
6	3.02	6.9	13.7
7	6.39	14.2	28.2
8	6.35	14.1	28.0
9	2.73	5.9	11.7
9A	2.72	6.5	13.3
10	3.74	9.2	18.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
11	2.64	6.3	12.8
12	6.96	15.0	29.7
13	0.77	2.2	4.4
14	4.01	11.4	21.1
15	8.70	18.3	36.5
16	4.40	10.0	20.0
17	5.37	16.5	29.3
17A	20.04	58.6	102.9
18	5.03	12.1	24.3
19	2.22	5.3	10.9

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
20	9.62	19.6	39.1
21	3.03	6.7	13.4
22	2.60	5.8	11.5
23	3.88	8.4	16.6
24	7.44	15.6	31.2
25	1.09	2.9	6.0
26	10.85	21.1	40.6
27	2.48	6.1	11.8
28	7.27	16.1	32.1
29	8.07	19.9	40.1

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
30	12.16	26.3	54.9
31	6.80	15.1	30.0
32	8.60	18.1	36.1
33	2.60	6.2	12.6
34	8.40	15.6	33.6
35	6.58	13.4	26.7
36	3.08	7.6	15.3
36A	1.35	3.6	7.2
37	4.27	9.0	17.9
38	7.39	14.2	28.5
39	6.31	14.0	27.8

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
40	2.00	4.9	9.9
41	5.96	14.3	28.8
42	0.74	2.0	4.0
43	1.17	3.2	6.2
44	1.45	4.2	8.5
45	4.22	8.6	17.1
46	6.23	14.2	28.3
47	2.33	5.7	11.6
48	2.17	5.5	10.9
49	5.49	11.2	22.3

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
50	2.56	6.5	12.9
51	36.45	60.8	109.8
51A	27.62	62.5	112.9
52	4.28	11.0	19.3
53	32.70	71.4	127.9
54	2.38	33.8	59.3
55	2.48	8.3	14.6
56	38.68	81.2	144.7
DP#1	9.04	20.6	41.1
DP#2	20.85	43.8	87.6

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
DP#3	15.47	29.7	60.6
DP#4	18.19	32.7	66.2
DP#5	37.37	65.0	130.8
DP#6	8.53	17.9	35.8
DP#7	52.64	94.8	188.9
DP#8	8.83	19.5	38.1
DP#9	11.0	20.5	43.4
DP#10	8.31	18.4	36.6
DP#11	6.83	13.1	26.3
.	.	.	.

1" = 100'

0 25 50 100 200

Scale in Feet

SHEET 1

FILE: 97104DP.DWG 8/17/99

ROCKWELL MINCHOW CONSULTANTS, INC.
ENGINEERING • SURVEYING
2928 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE : WAGON TRAILS DEVELOPED DRAINAGE PLAN

SCALE :	1"=100'	DRAWN BY :	FRC	97-104
DATE :	8/17/99	CHECKED BY :	KDR	JOB NO.