Riverside Parkway

CITY OF Grand Junction COLORADO

FINAL DRAINAGE & IRRIGATION DESIGN REPORT: EAST SECTION

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I. LOCATION AND DESCRIPTION OF PROJECT

A. Location

The City of Grand Junction proposes to build a new Riverside Parkway on the south side of the city to address both local and regional transportation needs. The Parkway is part of a larger loop road system being jointly developed by the City and Mesa County.

In general, the Riverside Parkway project area lies within the City bounded by 24 Road (Redlands Parkway) on the west, 29 Road on the east, the Union Pacific Railroad tracks on the north, and the Colorado River on the south (see **Figure 1: Project Location Map**). The project includes a proposed interchange with US 50 and modifications to the existing US 50 bridge spans over the Colorado River, resulting in a narrow extension of the project area across the river. The land within the project area is a mixture of open space, vacant lands, and residential, commercial, and industrial development. The proposed roadway traverses all or portions of Sections 8, 9, 10, 15, 22, 23 and 24, Township 1 South, Range 1 West, of the Ute Principle Meridian, in a northwesterly to southeasterly direction, more or less parallel to the Union Pacific Railroad. The Parkway then follows the Section line between Sections 18 and 19, and 17 and 20, Township 1 South, Range 1 East, of the Ute Principle Meridian, along the alignment of existing D Road.

In addition to Riverside Parkway, this project will include reconstruction of a portion of 29 Road from north of the intersection with D Road south to the approach to the bridge over the Colorado River. The 29 Road alignment is along the Section line between Sections 20 and 21, Township 1 South, Range 1 East of the Ute Principle Meridian.

B. Description

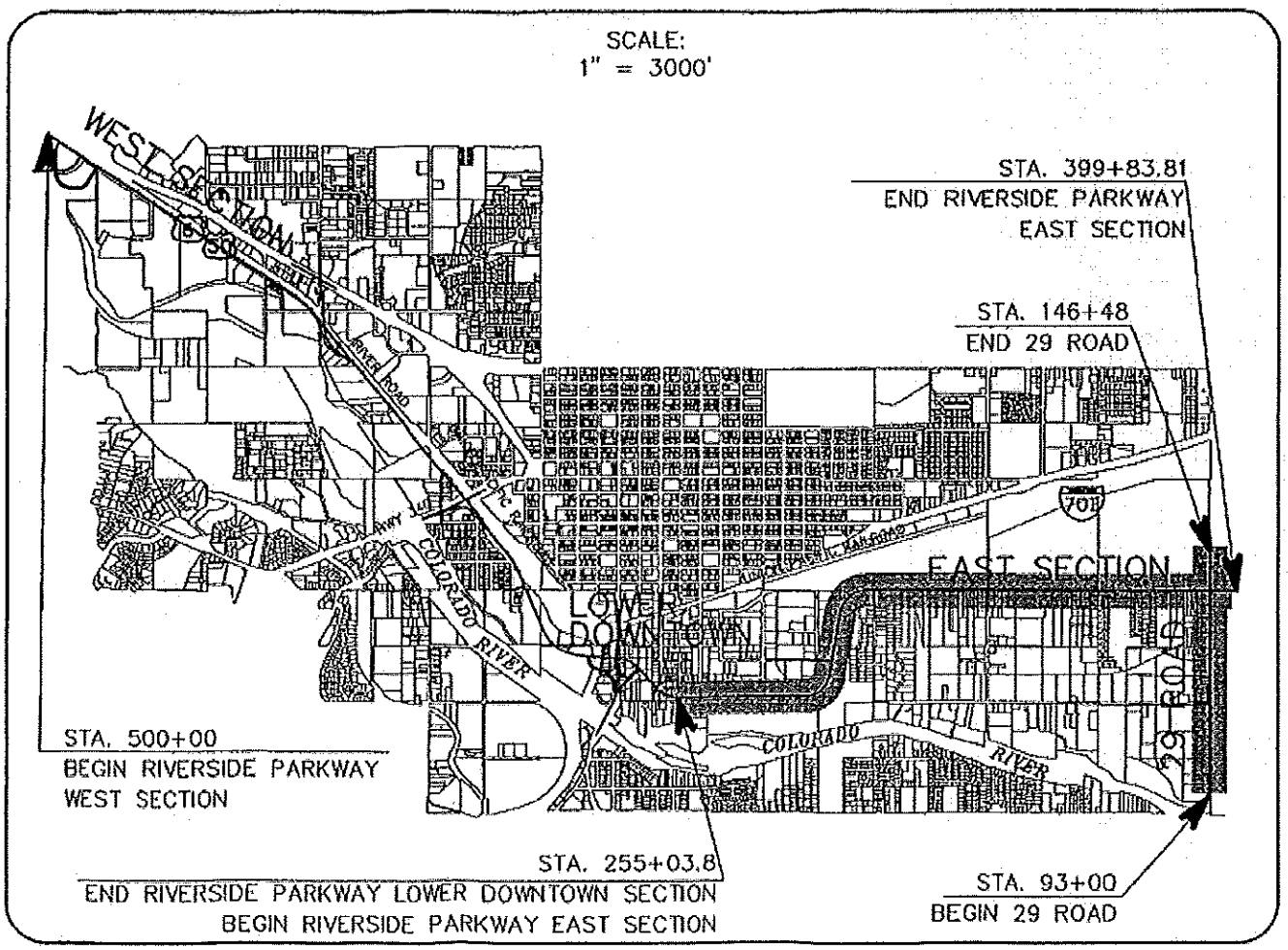
The Riverside Parkway project is divided into three Sections, labeled A, B and C for convenience, which shall be hence forth known as the West Section, Lower Downtown Section and East Section, respectively.

The East Section, or Section C, extends 2.7 miles from the approximate intersection of S. 9th Street and Struthers. The alignment bends north at 12th Street and then east again along D Road to 29 Road. The typical section has two through lanes, a center turn lane, bike lanes, curb and gutter, and a detached sidewalk on the south. The majority of this Section is in Mesa County. Major drainageway crossings include the HumpYard Drain, Indian Wash, the State Home Drain and the No Name Drain.

Also included in the East Section is approximately 1 mile of 29 Road. The 29 Road typical section consists of two through lanes, a center turn lane, bike lanes, curb and gutter, and sidewalk on each side. This roadway is completely within Mesa County. The only major drainageway crossing of 29 Road in this vicinity is the Odelburg Drain. In addition, the portion of 29 Road south of C-1/2 Road is historically within the floodplain of the Colorado River.

Throughout the length of Sections A and C there are agricultural irrigation laterals and drains owned by the Grand Valley Irrigation Company and the D Road Mutual Irrigation Company. Occasionally the systems cross under the roadway to serve users on the south side of the Parkway. This Project will include replacing existing irrigation crossings with new pipe and relocating headgates, ditches, pump sets, and pipelines on adjacent properties.

FIGURE 1
Project Location Map East Section



II. DRAINAGE BASINS AND SUB-BASINS LOCATION AND EVALUATION

A. Major Basin Description

The major drainage basins of Riverside Parkway are all tributary to the Colorado River. The Riverside Parkway project will replace and/or relocate portions of the Buthorn Drain, the Ligrani Drain, the Humpyard Drain, the State Home Drain, the No Name Drain and the Odelburg Drain within the project area. The major drainage basins affecting this project encompass a large portion of the City as well as areas that are located within Mesa County. The major drainage basin areas range in size from 48 acres to over 12 square miles. Most of these basins have been master planned by the City.

Land uses include commercial, residential, and light industry. In general, the major basins slope from northeast to southwest toward the Colorado River although, much of the runoff is conveyed within the washes and drains that cross the proposed Riverside Parkway alignment at nearly perpendicular angles.

In the East Section of the project, the Colorado River is the only FEMA regulated 100-year floodplain. While Indian Wash is FEMA regulated within the City of Grand Junction, in Mesa County it is not. For this reason, the northern panel is referenced. The flood insurance rate map (FIRM) for Indian Wash is Community Panel Number 080117 0007E. The map panel is included in the Appendix B as "Firmette", created through the FEMA online map store.

There are also numerous irrigation ditches and pipelines located throughout the entire project. The East Section of the Riverside Parkway project will replace and/or relocate the Humpyard Drain, the State Home Drain, the Indian Wash Drain, and the Odelburg Drain.

B. Sub-Basin Description

Sub-basins were delineated based on contour mapping prepared for this project as well as 2-foot contour mapping provided by the City. Sub-basins are shown on the drainage basin maps in Appendix B at the back of this report. Each basin map depicts the proposed alignment of Riverside Parkway and the associated basin boundaries resulting from the typical section and proposed roadway profile. Aerial photography is overlain with the base file for reference.

In general, the topography along the Parkway alignment is quite flat and the roadway profile has been designed with a minimum 0.5% grade, which causes some undulation of the profile. Roadway sub-basins are also flat and drain to inlets located in sags. The typical section includes curb and gutter and sidewalks along with a small landscaping barrier located intermittently along the roadway. Because the amount of impervious area is greatly increased for the roadway projects, the corresponding runoff coefficients should be high as discussed later in the hydrologic criteria.

The offsite basins are comprised of various land uses but in general contain mostly commercial, residential, and light industry properties. Offsite flows are intercepted by the proposed roadway drainage system to be conveyed to the nearest drainage culvert.

III. DRAINAGE DESIGN CRITERIA

The basis for analysis of the storm drainage system is the City of Grand Junction / Mesa County Stormwater Management Manual (**SWMM**) (Reference 1). Where necessary guidance was not provided, the Urban Storm Drainage Criteria Manual was used (Reference 2). The following are a summary of several of the more notable parameters:

1. Minor Storm – 2-year storm.
2. Major Storm – 100-year storm.
3. Maximum gutter depth for the minor storm is 6".
4. Maximum gutter depth for the major storm is 12".
5. Arterial roads (Riverside Parkway) shall have at least one 8-foot wide traffic lane in each direction and the center turning lane free of ponding during the minor event.
6. Minimum pipe diameter is 12".
7. All pipe is to be reinforced concrete.
8. Minimum pipe velocity is 2.5 fps.

A. Project References

Several prior studies exist regarding offsite drainage. The prior studies mainly involve portions of the West and Lower Downtown sections of this project. Those studies are listed in the References Section. Recommendations and design flows were adhered to where appropriate.

B. Hydrologic Criteria

The minor drainage system analyzed by this study is a result of the 2-year recurrent storm event. The major drainage system (cross culverts) is designed to convey runoff generated by the 100-year storm event.

The for runoff calculation method used for onsite and offsite basins is the Rational Method. The Rational Formula is:

$$Q = CIA$$

Q = storm runoff in CFS;
C = runoff coefficient based on surface impermeability;
I = rainfall intensity in inches per hour; and
A = drainage basin area in acres.

Rainfall intensities were obtained from the Intensity-Duration-Frequency curves in the SWMM, Appendix A, Table A-1a. This figure is included in the Appendix A of this report for reference.

The Time of Concentration, T_c , is the sum of overland flow (T_o) and shallow concentrated flow (T_s) :

$$T_o = \frac{1.8(1.1-C)L^{0.5}}{S^{0.33}}$$

Where: C = Rational method runoff coefficient
L = Length of the flow plane in feet (300 feet maximum); and
S = Average percent slope of the overland plane.

$$T_s = \frac{L}{60V}$$

Where: L = Length of flowline in feet; and
V = velocity in feet per second.

The Rational Method runoff coefficients, or C factors, were computed using the techniques described in the Mesa County SWMM, Appendix B – Rational Method C Values. A summary of the coefficients distributed by hydrologic soil type was used to weight a final "basin-average" runoff coefficient for each basin. These calculations are included in Appendix B in the HEC-12 inlet calculations. For the most part the basins can be considered 100% impervious.

C. Hydraulic Criteria, Discussion and Method Reference

The proposed storm sewer system was designed using StormCAD software developed by Haestad Methods. Street capacity calculations are included in Appendix B with the HEC-12 inlet calculations. The gutter section algorithm uses FHWA HEC-12 methodology to compute capacity. Finally, StormCAD input and output listings are also located Appendix B.

The culverts were designed to convey the 100-year storm without overtopping the roadway. All relevant charts, nomographs and tables used in the analysis and design of the storm drainage system were obtained from the SWMM and are included Appendix B.

IV. DRAINAGE FACILITY DESIGN

A. General Concept

The Riverside Parkway and 29 Road storm sewer systems will outfall into existing roadside ditches or drains, major drainage crossings, or existing or proposed drainage outfall systems. Roadway runoff is intercepted by inlets located at roadway low points and curb returns. In some locations, offsite runoff enters the proposed storm sewer system through inlets or

culverts connected to the roadway storm sewer system, as shown on the preliminary plans. At these locations the receiving storm sewer has been sized to receive the additional runoff.

On-grade inlets are provided at roadway intersections, and at superelevation transitions. Intermediate inlets are placed to meet project criteria, such as spread and ponding depths.

B. Specific Details

The roadways and accompanying offsite basins can be divided based on the major drainageway they contribute to. The far western portions of the East Section of Riverside Parkway drain to the IDI Drain where a proposed manhole will connect the two systems. Moving east, drainage begins to collect around the existing Water Quality Pond and outfall. Three 7' x 3' concrete box culverts are proposed for the Water Quality Pond and outfall. Drainage extends north to 27 ½ Road where the direction is split by a high point in the intersection.

Once Riverside Parkway connects to existing D Road, roadway drainage patterns vary according to grades before draining to the Colorado River. The first several storm lines drain east to the Humpyard Drain, a 6' x 2' CBC. The sizing of the Humpyard Drain was based on a utility conflict with a proposed 24" sanitary sewer. In this case the sewer line crosses above the storm. Clearance between the utilities is minimal so that the crossing shall be encased.

Moving east, the next storm lines drain into Indian Wash, which crosses the roadway through a 20' x 8' 3-sided box culvert. This pattern extends just beyond the intersection of 28 Road. All drainage systems between 28 Road and 29 Road drain directly to the State Home Drain which sub sequentially outfalls into the Indian Wash. The State Home Drain is assumed to convey 7 cfs as a base flow condition. This assumption accounts for irrigation waste flows returning to that system.

The last system to cross Riverside Parkway is the No Name Drain. The No Name drain intercepts runoff from the intersection of Riverside Parkway and 29 Road to the eastern end of project limits. Also connected to the No Name Drain is an existing 12" storm pipe which intercepts approximately 2 cfs of irrigation base flows. Design flows for this system have been acquired from the Leigh & Whitehead Preliminary Drainage Report for 29 Road (Reference 10). Based on this study the proposed sewer will receive 12 cfs of runoff during the 2-yr event.

Finally, the 1-mile reach of 29 Road to be constructed as part of this project drains to the Odelburg Drain from both the north and the south. Runoff from the Odelburg eventually drains into the Colorado River.

The Odelburg Drain is located just south of C-1/2 Road. Offsite basin OS-2 (basins 20, 21, 23, 25 and 26 of the Leigh & Whitehead Preliminary Drainage Report Reference 10) is tributary to the Odelburg Drain. However, the Odelburg Drain culvert has been sized to provide relief from backwater effects of the 100-year flood in the Colorado River. The size of the culvert is

controlled by 2 - 12" irrigation crossings along the west side of the roadway and the invert elevations of the existing system. The proximity of the two pipes requires the Odelburg Drain Culvert to be an 36" RCP pipe to provide clearance between the two utilities.

South of C-1/2 Road, the 29 Road centerline profile is set at a minimum of 1.5 feet above the FEMA 100-year water surface elevation of the Colorado River. The 29 Road bridge design performed by Leigh Whitehead & Associates (Reference 10) reports a 100-year water surface elevation of 4587.5' (NAVD29 Datum). The City of Grand Junction GIS webpage reports a datum correction of 0.99 meters to get to NAVD88. However, reference marker RM45 listed on the FEMA map shows an elevation of 4587.36', but surveyed data for this same marker gives an elevation of 4592.98'. This is greater than the 0.99-meter datum correction. According to the surveyed shot on RM45, the datum correction is actually 1.71 meters, or 5.62 feet. Applying this correction to the 100-year water surface elevation reported on the Leigh Whitehead & Associates bridge plans of 4587.5 gives an adjusted elevation of 4593.12. When this elevation is plotted on the City's 2-foot mapping, it very closely matches the 100-year FEMA floodplain mapping. Therefore, the design 100-year elevation for 29 Road is 4593.12.

Cross culvert and major drainage outfall design information is listed for all major drainage outfalls in Table 1.

TABLE 1
Cross Culvert Outfall Summary

DESIGN POINT	ROADWAY STATION	DESIGN FLOW (CFS)	STRUCTURE (SIZE, TYPE)	END TREATMENT	LENGTH (FT)	REFERENCE	ALLOWABLE HW ELEV.
175	Humpyard Drain 324+30	107	2' x 6' CBC	CONNECT TO EXISTING PIPE WITH 12'x4' JUNCTION BOX	124	CESP-Basin 14 Drainage District Facility	4588.4
176	Indian Wash 340+59	1030	20'x8' CBC	W/HEADWALLS & WINGWALLS RIPRAP AT OUTLET	75	FEMA FIS plus LOCAL FLOWS Match Existing Channel	4595.3
177	Indian Wash Access Driveway to 28 Rd	1030	2-10'x8' CBC	W/HEADWALLS & WINGWALLS RIPRAP AT OUTLET	32	FEMA FIS plus LOCAL FLOWS Match Existing Channel	4595.0
178	State Home Drain 354+00	7	24" RCP	EXISTING DITCH TO BE DRAINED AND FILLED PUT IN NEW PIPELINE	725	Drainage District Facility Verify irrigation & storm flows	-
179	No Name Drain 390+60	12	24" RCP	REPLACE EXISTING CMP WITH RCP	146	29 Rd Drainage Report, June 1998 Hydrograph from DP 22-C	-
180	Odelburg Drain 109+80	47	36" RCP	NEW CULVERT W/RIPRAP SLOPE PROTECTION	115	29 Rd Drainage Report, June 1998 Hydrograph from DP 21-B	4593.12

The City Flood Insurance Study (FIS), as prepared by the Federal Emergency Management Agency (FEMA), tabulates peak discharges for Indian Wash.

The FIS documents a 100-year peak discharge of 890 cfs below the confluence of the 29-1/2 Road Channel. The corresponding drainage area is 15.3 square miles. Approximately 0.71 square miles of additional drainage area, below the 29-1/2 Road, was estimated to contribute to the Indian Wash Crossings. Using the SCS Method of analysis, a peak flow for this area was estimated to be 220 cfs. The soils in this area consists of BcS-Sagers Silty Clay Loam and is estimated to be a Type C Soil. As with the preliminary report, this flow was added to the flow of 890 cfs for a total flow of 1110 cfs. However, this value is very conservative because the additional area would increase the time of concentration, which would likely produce a lower peak than the 1110 cfs.

A second method was evaluated from the United States Geological Survey (USGS) publication, Analysis of the Magnitude & Frequency of Floods in Colorado. The method used from this publication estimates peak flow rates based on a ratio of the drainage areas with a known flow rate on the same stream. Results from this analysis produced a peak discharge of 916 cfs. This value reflected peak discharge rates from the FIS Report. For example, upstream from the Confluence with 29-1/2 Road, at U.S. Highway 6 and 24, a peak discharge of 820 cfs was determined from the FEMA Study. The corresponding drainage area for this peak is 13.5 cfs, a difference in drainage area of nearly 2 square miles when compared with the design point below the confluence of 29-1/2 Road. A comparison with these two locations indicates that there is roughly an additional 35 cfs added to the peak for every one square mile of additional area. The majority of the tributaries that contribute flow to Indian Wash are upstream from these locations, so this magnitude of additional flow would appear to be normal. When comparing this ratio to the additional 0.71 square miles of drainage added to the Indian Wash Crossings, an estimated additional flow rate added to the crossings would be 0.71(35 cfs) or 25 cfs. The estimated peak of 916 cfs produces an increase of 26 cfs, which compares well with the FEMA Study. For analysis, however, the two peak discharge rates of 1136 cfs and 927 cfs were averaged to produce a design peak discharge of 1013 cfs. The average peak was rounded to 1030 cfs. Averaging the two peak discharge estimates produces a conservative estimate and provides a small safety factor.

Indian Wash comprises two crossings. One at Riverside Parkway and a short distance downstream from the Riverside Crossing under a private driveway access. The crossings were analyzed using HY-8. For the Riverside Crossing, a 20' x 8' concrete box culvert with a grouted riprap flowline is proposed that will be placed on concrete pipe caps. Concrete pipe caps were chosen to provide access for a sanitary sewer through the structure, without compromising the sanitary sewer or the proposed structure. The caps also reflect the poor foundational soils in the area. At the private driveway access, 2 – 10' x 8' concrete boxes will be placed to convey the peak discharge of 1030 cfs. For each crossing, outlet control governed the hydraulics. Outlet control appears to be a function of the fairly flat grade on Indian Wash, roughly 0.0031 feet per foot.

Riprap basins were incorporated at the outfall locations of the proposed concrete box culverts. A D_{50} of 9 inches was sized for these locations with a riprap depth of 1.5 feet.

Also in Section C, a new culvert will be placed under the roadway at the Humpyard Drain in accordance with the City Master Plan (Reference 5). The proposed culvert is a dual 29" x 45" elliptical pipe. The culvert was sized to avoid a 24" sewer line crossing in the roadway. The cover between the two utilities is minimal, therefore the 24" sewer line will be encased over the Humpyard Drain culverts.

The culvert outlets into a large junction box structure. A detail of this structure can be found in Appendix B. At this time this structure will release to an existing 15" storm sewer however, future provisions are such that a 48" outlet shall be added to the structure. The invert of the proposed 48" line shall be one foot higher than the 15" pipe invert to ensure that pipe flows full on occasion.

The final improvement to be made in Section C is to the State Home Drain. All open channel sections of the State Home Drain on the south side of the roadway east of 28 Road will be replaced with concrete pipe as part of the project. In addition, all portions of the drain that cross Riverside Parkway are improved to RCP.

Hydraulic calculations for each of the major drainageways is located in Appendix B.

V. CONCLUSIONS

A. Compliance with Standards

This report was prepared in accordance with the procedures and concepts outlined in the City of Grand Junction / Mesa County Stormwater Management Manual. Hydraulic Criteria as defined in the SWMM was adhered to, and no variances are required.

B. Drainage Concept

The drainage design allows the 2-year minor storm to be collected before adversely impacting street capacity. The roadway storm design conveys the minor storm event and the cross culvert design conveys the major storm event in a safe manner to protect adjacent property from damage.

VI. IRRIGATION CONVEYANCE

A. Overview

Irrigation conveyance along the project corridor is a predominant feature to the proposed project. Irrigation conveyance is distributed by a number of headgates located on the Grand Valley Canal. The following headgate designations convey flow to share holders along the proposed project corridor.

- MC075
- MC072
- MC070
- MC060
- MC050
- MCO45
- MCO41

Conveyance from these headgates is a mixture of earth ditch flow, concrete ditch flow, and pipeline conveyance. Proposed construction will place the major ditch conveyances into a closed conduit. Where possible, existing pipelines will be maintained and corresponding structures adjusted to compensate for proposed fill elevations.

B. Irrigation Flow & Analysis

Flow for each lateral is quantified in terms of shares. Each recipient of irrigation flow owns a certain number of shares, which translates into a flow rate. The number of shares varies with each landowner depending on the amount of capital invested. Shares are converted to a volumetric quantity by the following two conversion factors:

- 1 share is equal to 4.48 gallons per minute.
- 1 gallon is equal to 0.134 cubic feet per second (cfs).

For analysis purposes, shares were converted to cubic feet per second. Conversion from share to cubic feet per second requires multiplying the share by 0.01 cfs.

Each lateral has a set number of shares that can be converted to a flow. However, this volume of water is often times smaller than historical flows taken from the canal. Flow information from the individual headgate locations was supplied from The Grand Valley Irrigation Company (GVIC). Flow rates are periodically measured at the turnout location on the canal for record keeping purposes. For design purposes, flow from the individual laterals was estimated, based on the number of shares. This flow rate was then compared to the GVIC value and the higher of the two was used for design. The Natural Resources Conservation Service (NRCS) recently designed the main conveyance for MC075. Flow, based on the number of shares, is 62 cfs.

The peak flow from this headgate, measured by the Grand Valley Irrigation Company, was 1.50 cfs. Consequently, the NRCS designed the system to convey the flow rate of 1.50 cfs.

Table 2 summarizes the flow rates associated with the different headgates.

TABLE 2
Irrigation Headgate Flow Rate Summary

HEADGATE	SHARE FLOW	GVIC FLOW	DESIGN FLOW
MC072	2.62	2.10	2.62
MC070	2.16	2.61	2.61
MC060	1.68	2.16	2.16
MC050	0.45	2.00	2.00
MC045	1.45	1.80	1.80

Irrigation laterals were analyzed using the Hydraulic Program EPANet. EPANet computes hydraulic grade lines for pipes under high-pressure and low-pressure conditions. For each lateral, the required head was computed that would satisfactorily meet the delivery elevations. Typically, head elevations greater than 2 feet at the beginning of the system were considered to great. Analysis focused on providing an adequate hydraulic grade line with minimal energy input. Most of the lateral systems have the necessary elevation head to meet the delivery elevations, since they are currently being conveyed in existing ditches.

C. Irrigation Lateral Summary

LATERAL NO: 75

DESCRIPTION: Flow from MC075 is conveyed in a pipe that transports flow to D-Road (Approximate Station 340+13). Flow is redirected west until it crosses D-Road at Station 314+67. The Natural Resources Conservation Service designed this section of pipe for the D-Road Mutual Irrigation Company. Lateral crossings are located at Stations 314+67, 322+79, 327+89, 334+12, and 337+72.

At each crossing, flow is diverted from the main pipe via a gate valve that feeds a 45-degree dogleg pipe section that rises roughly 2 to 3 feet higher than the mainline flow elevation. The actual elevation varies based on the elevation of the existing pipe that the lateral connects to. At the end of the 45-degree dogleg section is an air vent to release air that might build at this high point and inhibit flow (*See Figure 2: MC075 TAKEOUT SECTION*).

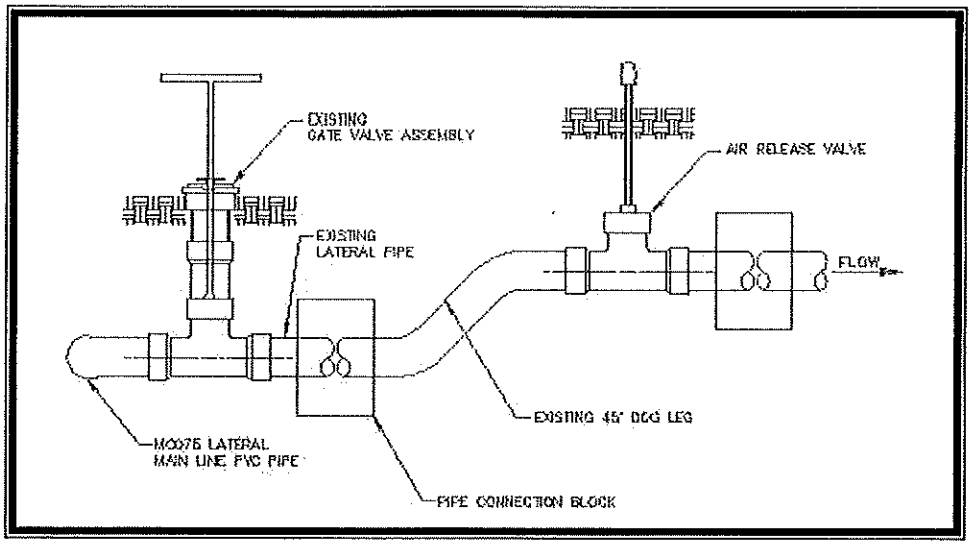


FIGURE 2
MC075 Takeout Section

At each crossing, an attempt was made to match the existing alignment with new pipe. However, at certain locations, the road template was close to the main irrigation pipe. Consequently, if the air release valve were extended to the surface it would intersect the pavement section of the roadway. For these locations, the 45-degree dog leg and air release valve were moved to the other side of the road near the location where the proposed pipe connects to the existing pipe. Existing valves were maintained in their present location.

Flow in this lateral was modeled to determine if the existing system produced a hydraulic grade line that would meet the delivery elevations. Analysis indicates that there is sufficient energy to deliver the water to the existing locations. The D-Road Mutual Irrigation Company has indicated that the system has adequate pressure.

LATERAL NO: 72

DESCRIPTION: Flow from Headgate MC072 is conveyed to the State of Colorado Grand Junction Regional Center. The number of shares supplied from this lateral equals 262 or 2.62 cfs. All of these 262 shares belong to the Regional Center and are utilized for supplying water to irrigation sprinkler heads for lawn watering purposes. Water is pumped from a sump at Station 348+51.

From Headgate MC072, flow is transported south along the east boundary of the Regional Center. At approximate Station 359+18 (LT.), flow enters an existing irrigation access box and is redirected west through a 12 inch irrigation PVC Pipe, which parallels D-Road. Located along the existing 12-inch pipeline are concrete irrigation access boxes that are used as air vents. Near the end of the pipeline at approximate Station 348+51, flow enters a concrete access structure that provides a sump for a pump to draw flow from. Excess water flows out of

the access box and flows under D-Road. A new irrigation access box is proposed. The existing structure is relatively large and would be difficult to reset. The proposed structure incorporates a standpipe to transport water from the inlet chamber to the pump out chamber. The existing pump will need to be reset.

Table 3 summarizes the existing and proposed components of Lateral 72.

TABLE 3
Lateral 70 - Summary

STATION	OWNER	SHARES	EXISTING	PROPOSED	DESCRIPTION
348+51.47	Regional Center	262	Access Box	Irr. Access Box	Irr. access box is 7'x4' and provides a place for pump to draw water from.
349+64.65	Regional Center	262	Concrete Air Vent	2" Air Vent	
352+33.48	Regional Center	262	Access Box	Irr. Access Box	Provides access to system
357+30.92	Regional Center	262	Access Box	2" Air Vent	
359+18.07	Regional Center	262	Access Box	Irr. Access Box	Redirects flow to the west.

LATERAL NO: 70-W & 70-S

DESCRIPTION: Flow from Headgate 70 encompasses 216 shares. Flow is conveyed in a southerly direction within a concrete ditch to Station 367+40$^{+/-}$. Flow enters a diversion structure that diverts approximately 50 shares across D-Road and west within a concrete ditch. The remaining 166 shares is diverted across D-Road, where it enters a concrete ditch and flows south to C ½ Road (Lateral 70-S). Conveyance along D-Road is transported in a concrete ditch. Proposed for this lateral is to place the flow into a pipe with irrigation diversion boxes and irrigation access boxes placed where necessary to provide turnout for existing irrigation flow.

Lateral 70-W, as shown on the plans, conveys flow west. Proposed conveyance consists of a 12-inch PVC SDR-26 irrigation pipe. The proposed pipe will connect to the existing diversion box at Station 376+40. The existing irrigation diversion box is complex in function, therefore it was determined to not remove this structure, but rather utilize it for the proposed design. The condition of the structure appears to be in good condition and should function well over the life of the project. Upon crossing the proposed Riverside Parkway alignment, water enters an irrigation diversion box. Twenty shares (20) are diverted south to a 4-foot diameter sump that provides irrigation water for residences on 398 and 399 Evergreen Road. The remaining 30 shares are diverted west. It should be noted that there are occasions when the 20 shares are not diverted south to the 4-foot sump, but rather conveyed west in the 12-inch pipe.

Table 4 summarizes the existing and proposed components of Lateral 70.

TABLE 4
Lateral 70- Summary

STATION	OWNER	SHARES	EXISTING	PROPOSED	DESCRIPTION
354+84.79	Darter LLC	8	6" Slide Gate Off of Concrete Ditch	Irr. Diversion Box w/ 6" access to existing pipe.	Irr. Diversion Box will divert flow south to Darter LLC and allow flow to enter existing concrete ditch to the west for Cooper & Tucker. Dry Well Drain proposed.
356+89.76	Darter LLC	8	Assume 6" Slide Gate	Irr. Diversion Box	At present, feeds a disconnected pump set, but may be used in future.
358+86.43	Farley	4	Assume 6" Slide Gate	Irr. Diversion Box	Existing gate plugged field inspection.
360+51.07	Farley	4	Assume 6" Slide Gate	Irr. Access Box	Reset Pump
363+12.28	Cardin	1	Sump for Pump	Irr. Access Box	Reset Pump
361+31.50	Cardin	1	Slide Gate	Need to Add Irr. Diversion Box	Add To Plans
367+30.30	398 & 399 Evergreen	20	Slide Gate	Irr. Diversion Box	Allows flow to be diverted south to 4" diameter sump. Feeds Pine Estates.

LATERAL NO: 60

DESCRIPTION: Flow from Headgate 60 encompasses 168 shares. Flow is conveyed in a southerly direction within an earth lined ditch to Station 387+25.62$^{+/-}$. Flow enters a concrete access structure and is directed under D-Road. Upon crossing D-Road, flow is directed west where shareholders draw water from the concrete irrigation ditch. Proposed for Lateral 60 is to place the current concrete ditch conveyance into a pipeline.

Table 5 summarizes the existing and proposed components of Lateral 60.

TABLE 5
Lateral 60- Summary

STATION	OWNER	SHARES	EXISTING	PROPOSED	DESCRIPTION
377+37.48	White Willow Subdivision	10	Irr. Diversion Box w/ 10" pipe diversion south. Excess water is wasted west along earth ditch.	Irr. Diversion Box w/ 10" access to existing pipe. 12" outfall to the west for waste.	Proposed earth ditch to tie into existing waste ditch.
380+53.79	Skyler Subdivision	25	4" Slide Gate	Irr. Diversion Box	Connect existing 4" pipe that feeds sump for pump.
383+95.00	Jenson	14	Siphon Irrigation	Turnout Section	May replace with Irr. Diversion Box so Owner has greater control of diversion to gated pipe. (See Note 1)
385+54.34	Jenson		Siphon Irrigation	Turnout Section	May replace with Irr. Diversion Box so Owner has greater control of diversion to gated pipe. (See Note 2)
386+30.00	Powell	3	Pump set	Irr. Access Box	Reset Pump: Owner can pump from Irr. Access Box
387+17.74	Powell		Concrete pan/sump	Irr. Diversion Box	Flow is diverted south to 6" gated pipe. Remaining flow is diverted west.

Note 1: Owner will connect to 10" gated irrigation pipe (320 L.F.) to be furnished as part of r/w negotiation.
Note 2: Owner will connect to 8" gated irrigation pipe (130 L.F.) to be furnished as part of r/w negotiation.

LATERAL NO: 50-S & 50-W

DESCRIPTION: Flow from Headgate 50 encompasses 44 shares. Flow is conveyed in a southerly direction within an earth-lined ditch to Station 393+22.27$^{+/-}$, where flow is split between southerly and westerly conveyance.

Table 6 summarizes the existing and proposed components of Lateral 50.

TABLE 6
Lateral 50- Summary

STATION	OWNER	SHARES	EXISTING	PROPOSED	DESCRIPTION
143+28.86	---	---	Ditch	15" Headwall w/ Trash Guard. Begin pipe conveyance	Existing conveyance is earth ditch. Proposed will be to have ditch flow transition to pipe flow.
138+05.83 = 393+22.27	---	44	Diversion plate	Irr. Diversion Box	Irr. Diversion Box will Divert flow west (50-W) and south (50-S).
Lateral 50-S					
134+75.06	Berry	9	Diversion plate	Irr. Diversion Box	Divert flow from Irr. Diversion Box to field. At Stations 131+75.58 & 128+33.87, 12"x8" Tees & 8" End Cap Plug for future use.
125+41.78		18	Ditch	Lateral Outfall w/ Dry Well Drain	Flow will transition from pipe conveyance to ditch conveyance.
Lateral 50-W					
390+59.41	Grillos	2	Irr. Diversion Structure feeds Ditch (12" Pipe)	Irr. Diversion Box	Flow is diverted into a 12" PVC SDR 26 (Approximately 160 L.F.) Will connect to existing ditch.
390+04.17	Johnson	1	Irr. Diversion Structure	Irr. Diversion Box	Flow is diverted south and west. Also placed approximately 4 yard taps to water.
388+56.94	Ijams	1	Irr. Access Box	Irr. Access Box	Reset pump.
388+06.80	Rodriguez	0	Ditch	Yard Tap	Tree Watering

LATERAL NO: 45

DESCRIPTION: Flow from Headgate 45 encompasses 149 shares. Flow is conveyed in a southerly direction within an earth lined ditch to Station 144+99.33, where flow transitions from ditch flow to pipe flow.

Table 7 summarizes the existing and proposed components of Lateral 45.

TABLE 7
Lateral 45- Summary

STATION	OWNER	SHARES	EXISTING	PROPOSED	DESCRIPTION
144+94.26	Stephens	---	Irr. Access Box	Irr. Access Box	
143+52.85	Oakes	---	Ditch Inlet	Small Area Inlet	Intake ditch runoff
142+74.45	Oakes	---	Irr. Access Box	Irr. Access Box	Reset pump
139+52.00	Feuerborn	---	Irr. Access Box	Irr. Access Box	Pump outlet
124+73.5		93	Irr. Diversion	Irr. Diversion Box	Divert 43 shares west and 50 shares south.
124+59.48		50		Irr. Diversion Box	Divert 50 shares cross 29 road. Also provide waste runoff.
118+92.50		50	Irr. Diversion Box	Connect to existing diversion box	

LATERAL NO: 40

DESCRIPTION: Flow along MC040 is conveyed from the east to west, intersecting 29 Road at approximate Station 98+90. Water is conveyed west under 29 Road or south, along the east side of 29 Road. Water that is conveyed west under 29-Road enters a ditch and flows south to a pump. Flow continues south along the ditch to approximately Station 93+04, where the ditch changes in direction to the west.

Flow that is not diverted west at Station 98+90 is diverted south along 29 Road to Station 95+20, where it crosses 29 Road and enters a ditch where it is conveyed south and eventually west.

Proposed changes to this existing system include connecting to the existing 8" irrigation pipe at Station 98+90, approximately 21 feet east of the existing pipe that parallels 29 Road. The existing pipe was within the proposed road template, so it needed to be relocated. At station 96+49.08 an 8" pipe is connected into the main line and feeds an irrigation access box located at station 96+47.15. The existing pump will be reset to this location. Valve boxes and flow meters will be reset to the new pipe location.

D. Summary

Within the proposed irrigation diversion boxes, gates and weirs will require adjustments to correlate the demand with existing diversion. Irrigation diversion boxes have a headgate for adjusting as well as wood planks to develop water surface elevations within the structure to meet turnout elevations. The planks also act as weir flow. Rather than design a system that was fixed with no adjustments, it was determined to provide a dynamic system that provides a means of regulating and adjusting the flow to meet share holder needs.

At the end of laterals, where flow transitions from pipe flow to ditch flow, an alfalfa valve will be installed, which will provide access to the surface. There will be a dry well drain installed at these locations, so the pipe can be drained during the winter.

VII. REFERENCES

1. *Stormwater Management Manual;* City of Grand Junction/Mesa County; May, 1996.

2. *Urban Storm Drainage Criteria Manual;* Vol. 1, 2& 3, DRCOG, Denver, Colorado, June 2001 (with revisions).

3. *Drainage Design Manual;* Colorado Department of Transportation; 1995.

4. *Grand Valley Stormwater Management Master Plan;* Grand Junction Drainage District, Mesa County, City of Grand Junction; Dec. 1998 (Updated May 2000).

5. *Combined Sewer Separation & Stormwater Management Master Plan;* City of Grand Junction; Dec. 1998 (Updated May 2001).

6. *Final Drainage Report for the Grand Mesa Center;* G.R. Williams Engineering, Inc.; March 2001.

7. *Final Drainage Report for the Rimrock Marketplace, Grand Junction, Colorado;* Rolland Engineering, Inc.; Jan. 15, 2002 (Rev. May 9, 2002).

8. *Final Drainage Report (for the) Charlene Giebler Community Ice Facility, 2515 River Road;* Blythe Design & Co.; Aug. 2003.

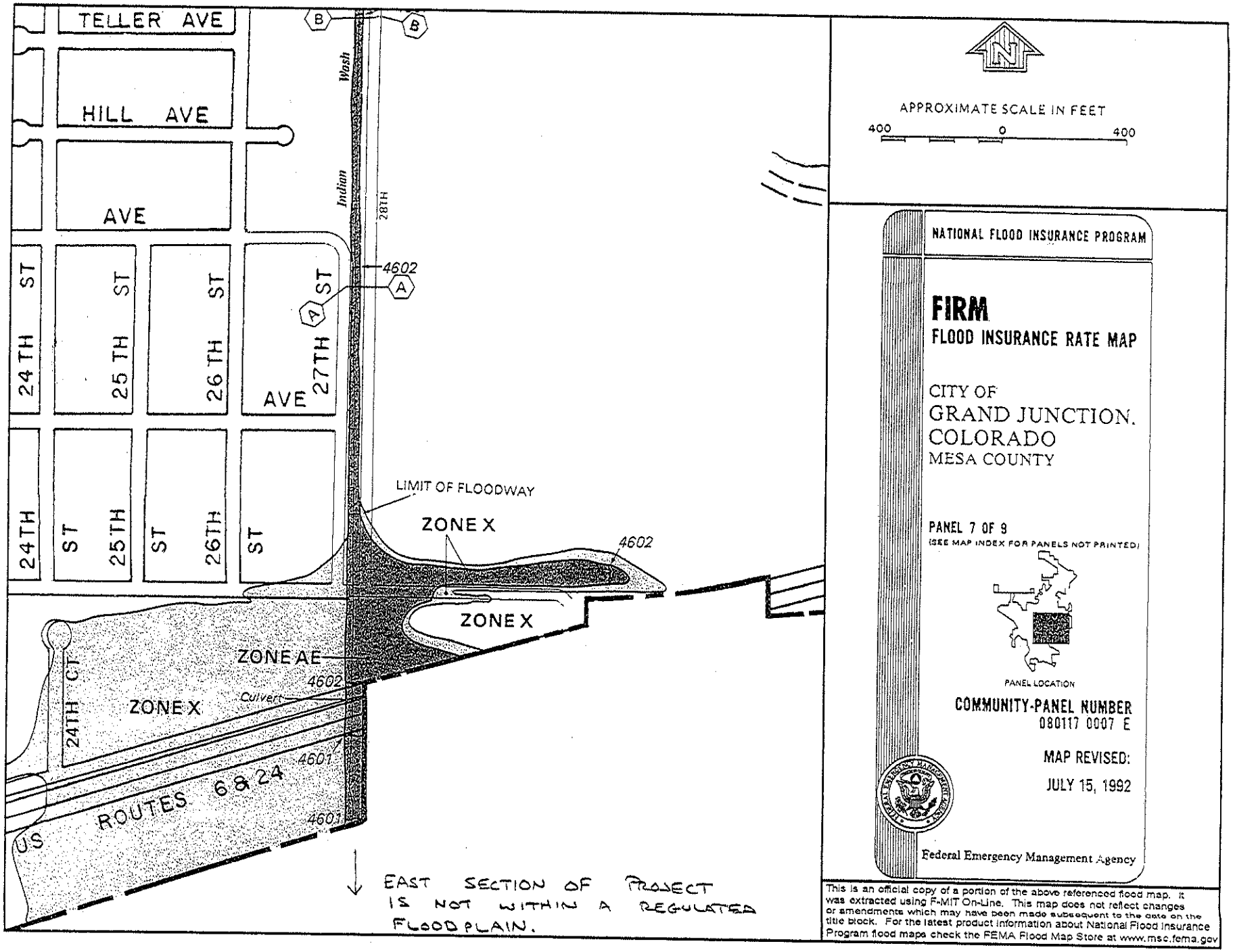
9. *Flood Insurance Study, City of Grand Junction, Colorado;* Federal Emergency Management Agency; Revised July 1992.

10. *Preliminary Drainage Report and Plan and Hydraulics Study for 29 Road;* Leigh, Whitehead & Assoc.; June 1998.

11. *Analysis of the Magnitude and Frequency of Floods in Colorado;* Water Resrouces Investigation Report 99-4190, United States Geological Survey, 2000.

Appendix A

Hydrologic Computation Summary


TELLER AVE
HILL AVE
AVE
24 TH ST
25 TH ST
26 TH ST
AVE 27TH ST
24TH ST
25TH ST
26TH ST
ST
Wash
Indian
28TH
B
B
4602
A
A
LIMIT OF FLOODWAY
ZONE X
4602
ZONE X
ZONE AE
4602
Culvert
ZONE X
24TH CT
4601
US ROUTES 6 & 24
4601
EAST SECTION OF PROJECT IS NOT WITHIN A REGULATED FLOOD PLAIN.
APPROXIMATE SCALE IN FEET
400
0
400
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
CITY OF
GRAND JUNCTION,
COLORADO
MESA COUNTY
PANEL 7 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)
PANEL LOCATION
COMMUNITY-PANEL NUMBER
080117 0007 E
MAP REVISED:
JULY 15, 1992
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

2-YR HYDROLOGY

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-100		
Station:	25+14.00	Grate Elevation:	4588.01
Offset:	48.00 Lt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	0.53	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.53	Ac	C_{comp}:	0.93	
Overland Length:	44.0	ft	S_{over}:	2.00%	
Channel Length:	472.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.61	minutes	t_t =	12.50	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.41	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.41	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-101		
Station:	25+14.00	Grate Elevation:	4588.01
Offset:	48.00 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	0.53	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.53	Ac	C_{comp}:	0.93	
Overland Length:	65.0	ft	S_{over}:	2.00%	
Channel Length:	463.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.96	minutes	t_t =	12.22	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.41	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.41	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	21I-1		
Station:	21+09.50	Grade Elevation:	4590.55
Offset:	22.00 Rt	WS El @ Grate:	4590.64

Inlet Hydrology:

Area Paved:	0.23	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.23	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	186.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_t =	4.26	minutes
t_c =	5.9	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.07	in/hr			
Discharge:	0.23	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.23	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	4.74	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.09	ft		
Actual Velocity:	1.02	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.64

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	8.25
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	L	4	Eo:	0.64
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.14
Blockage:	63%		E:	68.85%
Vo:	3.9	fps	Q caught:	0.16 cfs
E_{net} =	68.85%		Q flowby:	0.07 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	21I-2		
Station:	21+50.80	Grade Elevation:	4590.55
Offset:	78.00 Lt	WS El @ Grate:	4590.66

Inlet Hydrology:

Area Paved:	0.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.32	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	186.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_i =	4.26	minutes
t_c =	5.9	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.07	in/hr			
Discharge:	0.32	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.32	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.37 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.11 ft		
Actual Velocity:	1.11 ft/s		

Inlet Hydraulics:

Class:	G	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4590.66	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	9.48
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	L 4		Eo:	0.58
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.12
Blockage:	63%		E:	63.46%
Vo:	3.9	fps	Q caught:	0.20 cfs
E_{net} =	63.46%		Q flowby:	0.12 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	22I-1		
Station:	22+75.50	Grate Elevation:	4590.55
Offset:	11.80 Lt	WS El @ Grate:	4590.62

Inlet Hydrology:

Area Paved:	0.10	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.10	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	186.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_t =	4.26	minutes
t_c =	5.9	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.07	in/hr			
Discharge:	0.10	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.10	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	3.47	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.07	ft		
Actual Velocity:	0.83	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.62

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	5.82
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	L	4	Eo:	0.78
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.19
Blockage:	63%		E:	82.16%
Vo:	3.9	fps	Q caught:	0.08 cfs
E_{net} =	82.16%		Q flowby:	0.02 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	22I-2		
Station:	22+75.50	Grade Elevation:	4590.55
Offset:	23.90 Lt	WS El @ Grate:	4590.63

Inlet Hydrology:

Area Paved:	0.15	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.15	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	217.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	5.09	minutes
t_c =	6.5	minutes	t_{c_check} =	11.4	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.05	in/hr			
Discharge:	0.15	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.15	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	4.00 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.08 ft		
Actual Velocity:	0.91 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.63

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	6.82
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.71
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.17
Blockage:	63%	E:	76.21%
Vo:	3.9 fps	Q caught:	0.11 cfs
E_{net} =	76.21%	Q flowby:	0.03 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	256I-1		
Station:	256+22.10	Grade Elevation:	4573.46
Offset:	24.50 Lt	WS El @ Grate:	4573.56

Inlet Hydrology:

Area Paved:	0.34	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.34	Ac	C_{comp}:	0.93	
Overland Length:	39.0	ft	S_{over}:	2.00%	
Channel Length:	531.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.52	minutes	t_t =	14.32	minutes
t_c =	13.2	minutes	t_{c_check} =	13.2	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.83	in/hr			
Discharge:	0.26	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.26	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	4.99 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.10 ft		
Actual Velocity:	1.06 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4573.56

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	8.73
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.62
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	63%	E:	66.67%
Vo:	3.9 fps	Q caught:	0.17 cfs
E_{net} =	66.67%	Q flowby:	0.09 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	256I-2		
Station:	256+22.10	Grate Elevation:	4573.51
Offset:	35.50 Rt	WS El @ Grate:	4573.65

Inlet Hydrology:

Area Paved:	0.79	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.79	Ac	C_{comp}:	0.93	
Overland Length:	46.0	ft	S_{over}:	2.00%	
Channel Length:	523.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.65	minutes	t_t =	14.07	minutes
t_c =	13.2	minutes	t_{c_check} =	13.2	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.83	in/hr			
Discharge:	0.61	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.61	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.84 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.14 ft		
Actual Velocity:	1.31 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4573.65

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	12.43
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.48
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.09
Blockage:	63%	E:	53.29%
Vo:	3.9 fps	Q caught:	0.33 cfs
E_{net} =	53.29%	Q flowby:	0.28 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	265I-1		
Station:	265+51.00	Grade Elevation:	4575.10
Offset:	24.50 Lt	WS El @ Grate:	4575.22

Inlet Hydrology:

Area Paved:	0.47	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.47	Ac	C_{comp}:	0.93	
Overland Length:	37.0	ft	S_{over}:	2.00%	
Channel Length:	343.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.48	minutes	t_t =	8.64	minutes
t_c =	10.1	minutes	t_{c_check} =	12.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.92	in/hr			
Discharge:	0.40	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.40	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.84 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.17 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.22

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	10.42
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.55
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.14
Blockage:	59%	E:	60.99%
Vo:	3.9 fps	Q caught:	0.24 cfs
E_{net} =	60.99%	Q flowby:	0.16 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	267I-2		
Station:	265+51.00	Grade Elevation:	4575.10
Offset:	24.50 Rt	WS El @ Grate:	4575.23

Inlet Hydrology:

Area Paved:	0.62	Ac	C_{paved}:	0.93	
Area Unpaved:	0.52	Ac	C_{unpav}:	0.20	
Total Area:	1.14	Ac	C_{comp}:	0.60	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	338.0	ft	H:	0.5	
Overland C (5-yr):	0.60		Channel Type:	1	
t_i =	4.71	minutes	t_i =	8.50	minutes
t_c =	12.1	minutes	t_{c_check} =	12.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.86	in/hr			
Discharge:	0.58	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.58	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.73 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.13 ft		
Actual Velocity:	1.29 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.23

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	12.21
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.49
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.12
Blockage:	59%	E:	55.10%
Vo:	3.9 fps	Q caught:	0.32 cfs
E_{net} =	55.10%	Q flowby:	0.26 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	274I-1		
Station:	274+80	Grade Elevation:	4575.27
Offset:	24.50 Lt	WS El @ Grate:	4575.39

Inlet Hydrology:

Area Paved:	0.61 Ac	C_{paved}:	0.93
Area Unpaved:	0.00 Ac	C_{unpav}:	0
Total Area:	0.61 Ac	C_{comp}:	0.93
Overland Length:	37.0 ft	S_{over}:	2.00%
Channel Length:	504.0 ft	H:	0.5
Overland C (5-yr):	0.93	Channel Type:	1
t_i =	1.48 minutes	t_t =	13.48 minutes
t_c =	13.0 minutes	t_{c_check} =	13.0 minutes
One-hour Rainfall	0.34 inches	Freq.	2 yr.
Rainfall Intensity	0.83 in/hr		
Discharge:	0.47 cfs		
Upstream Flowby:	0.00 cfs		
Total Inlet Q:	0.47 cfs		

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.22 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.22 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.39

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	11.18
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.52
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	59%	E:	58.36%
Vo:	3.9 fps	Q caught:	0.28 cfs
E_{net} =	58.36%	Q flowby:	0.20 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	274I-2		
Station:	274+80	Grade Elevation:	4575.28
Offset:	24.50 Rt	WS El @ Grate:	4575.43

Inlet Hydrology:

Area Paved:	0.86	Ac	C_{paved}:	0.93	
Area Unpaved:	0.74	Ac	C_{unpav}:	0.20	
Total Area:	1.60	Ac	C_{comp}:	0.59	
Overland Length:	37.0	ft	S_{over}:	2.00%	
Channel Length:	503.0	ft	H:	0.5	
Overland C (5-yr):	0.59		Channel Type:	1	
t_i =	4.41	minutes	t_t =	13.45	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.83	in/hr			
Discharge:	0.79	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.79	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	7.54	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.15	ft		
Actual Velocity:	1.39	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.43

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	13.87
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.45
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.11
Blockage:	59%	E:	50.56%
Vo:	3.9 fps	Q caught:	0.40 cfs
E_{net} =	50.56%	Q flowby:	0.39 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	283I-1		
Station:	283+05.00	Grate Elevation:	4575.32
Offset:	24.50 Lt	WS El @ Grate:	4575.53

Inlet Hydrology:

Area Paved:	0.91	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.91	Ac	C_{comp}:	0.93	
Overland Length:	125.0	ft	S_{over}:	2.00%	
Channel Length:	883.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.72	minutes	t_t =	25.77	minutes
t_c =	15.6	minutes	t_{c_check} =	15.6	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.77	in/hr			
Discharge:	0.65	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.65	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	6.00%	Spread (allowable):	5.00	ft
		Actual Spread:	3.53	ft
Gutter Capacity:	1.66	cfs		
Actual Depth:	0.21	ft		
Actual Velocity:	1.75	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.53

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	6.62
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.77
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.19
Blockage:	59%	E:	81.54%
Vo:	3.9 fps	Q caught:	0.53 cfs
E_{net} =	81.54%	Q flowby:	0.12 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	283I-2		
Station:	283+05.00	Grate Elevation:	4576.20
Offset:	5.00 Rt	WS El @ Grate:	4576.44

Inlet Hydrology:

Area Paved:	0.85	Ac	C_{paved}:	0.93	
Area Unpaved:	0.75	Ac	C_{unpav}:	0.20	
Total Area:	1.60	Ac	C_{comp}:	0.59	
Overland Length:	10.0	ft	S_{over}:	2.00%	
Channel Length:	699.0	ft	H:	0.5	
Overland C (5-yr):	0.59		Channel Type:	1	
t_i =	2.31	minutes	t_t =	19.67	minutes
t_c =	13.9	minutes	t_{c_check} =	13.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.81	in/hr			
Discharge:	0.76	cfs			
Upstream Flowby:	0.15	cfs			
Total Inlet Q:	0.91	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	6.00%	Spread (allowable):	9.50	ft
		Actual Spread:	4.00	ft
Gutter Capacity:	9.20	cfs		
Actual Depth:	0.24	ft		
Actual Velocity:	1.90	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4576.44

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	7.62
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.54
Width:	1.0 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.17
Blockage:	59%	E:	61.43%
Vo:	3.9 fps	Q caught:	0.56 cfs
E_{net} =	61.43%	Q flowby:	0.35 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	290I-1		
Station:	290+26.80	Grate Elevation:	4581.53
Offset:	26.50 Rt	WS El @ Grate:	4581.64

Inlet Hydrology:

Area Paved:	0.37	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.37	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	304.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	7.52	minutes
t_c =	8.9	minutes	t_{c_check} =	11.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.96	in/hr			
Discharge:	0.33	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.33	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	1.90%	Spread (allowable):	9.50 ft
		Actual Spread:	5.60 ft
Gutter Capacity:	1.35 cfs		
Actual Depth:	0.11 ft		
Actual Velocity:	1.10 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4581.64

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	9.89
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.56
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.12
Blockage:	63%	E:	61.65%
Vo:	3.9 fps	Q caught:	0.20 cfs
E_{net} =	61.65%	Q flowby:	0.13 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements". HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	295I-1		
Station:	295+65.90	Grade Elevation:	4589.63
Offset:	24.50 Lt	WS El @ Grate:	4589.76

Inlet Hydrology:

Area Paved:	0.62	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.62	Ac	C_{comp}:	0.93	
Overland Length:	48.0	ft	S_{over}:	2.00%	
Channel Length:	728.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.68	minutes	t_t =	20.62	minutes
t_c =	14.3	minutes	t_{c_check} =	14.3	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.80	in/hr			
Discharge:	0.46	cfs			
Upstream Flowby:	0.02	cfs			
Total Inlet Q:	0.48	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.26 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.13 ft		
Actual Velocity:	1.23 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4589.76

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	11.26
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.52
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	59%	E:	58.07%
Vo:	3.9 fps	Q caught:	0.28 cfs
E_{net} =	58.07%	Q flowby:	0.20 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	295I-2		
Station:	295+65.90	Grade Elevation:	4583.81
Offset:	24.50 Rt	WS El @ Grate:	4583.99

Inlet Hydrology:

Area Paved:	1.26	Ac	C_{paved}:	0.93	
Area Unpaved:	0.21	Ac	C_{unpav}:	0.20	
Total Area:	1.47	Ac	C_{comp}:	0.83	
Overland Length:	31.0	ft	S_{over}:	2.00%	
Channel Length:	851.0	ft	H:	0.5	
Overland C (5-yr):	0.83		Channel Type:	1	
t_i =	2.18	minutes	t_t =	24.69	minutes
t_c =	14.9	minutes	t_{c_check} =	14.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.79	in/hr			
Discharge:	0.96	cfs			
Upstream Flowby:	0.28	cfs			
Total Inlet Q:	1.24	cfs			

Gutter Hydraulics:

Slope:	0.50%		Street Roughness:	0.016	
Cross-Slope:	2.00%		Spread (allowable):	9.50	ft
			Actual Spread:	8.91	ft
Gutter Capacity:	1.47	cfs			
Actual Depth:	0.18	ft			
Actual Velocity:	1.56	ft/s			

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4583.99

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	16.73
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.39
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.09
Blockage:	59%		E:	44.27%
Vo:	3.9	fps	Q caught:	0.55 cfs
E_{net} =	44.27%		Q flowby:	0.69 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	295P-1		
Station:	295+94.00	Grade Elevation:	4588.01
Offset:	42.50 Rt	WS El @ Grade:	0.00

Inlet Hydrology:

Area Paved:	1.72	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	1.72	Ac	C_{comp}:	0.93	
Overland Length:	241.0	ft	S_{over}:	2.00%	
Channel Length:	272.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	3.77	minutes	t_i =	6.61	minutes
t_c =	10.4	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.91	in/hr			
Discharge:	1.45	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.45	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	299P-1		
Station:	299+76.80	Grade Elevation:	4588.01
Offset:	42.50 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	1.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	1.32	Ac	C_{comp}:	0.93	
Overland Length:	227.0	ft	S_{over}:	2.00%	
Channel Length:	211.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	3.66	minutes	t_t =	4.93	minutes
t_c =	8.6	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.97	in/hr			
Discharge:	1.19	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.19	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	302P-1		
Station:	302+97.50	Grade Elevation:	4588.01
Offset:	42.50 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	2.47	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	2.47	Ac	C_{comp}:	0.93	
Overland Length:	120.0	ft	S_{over}:	2.00%	
Channel Length:	612.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.66	minutes	t_t =	16.87	minutes
t_c =	14.1	minutes	t_{c_check} =	14.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.81	in/hr			
Discharge:	1.85	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.85	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	303I-1		
Station:	303+50.00	Grate Elevation:	4588.01
Offset:	7.00 Lt	WS El @ Grate:	4588.06

Inlet Hydrology:

Area Paved:	0.06	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.06	Ac	C_{comp}:	0.93	
Overland Length:	27.0	ft	S_{over}:	2.00%	
Channel Length:	100.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.26	minutes	t_t =	2.08	minutes
t_c =	5.0	minutes	t_{c_check} =	10.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.11	in/hr			
Discharge:	0.06	cfs			
Upstream Flowby:	0.02	cfs			
Total Inlet Q:	0.08	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	1.00%	Spread (allowable):	5.00 ft
		Actual Spread:	4.98 ft
Gutter Capacity:	0.08 cfs		
Actual Depth:	0.05 ft		
Actual Velocity:	0.66 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4588.06

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	6.0 ft	Lt:	8.12
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.45
Width:	1.0 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.15
Blockage:	63%	E:	53.35%
Vo:	3.9 fps	Q caught:	0.04 cfs
E_{net} =	53.35%	Q flowby:	0.04 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	304I-1		
Station:	304+41.70	Grade Elevation:	4588.01
Offset:	24.50 Rt	WS El @ Grate:	4588.15

Inlet Hydrology:

Area Paved:	0.97	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.97	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	987.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_t =	29.30	minutes
t_c =	15.7	minutes	t_{c_check} =	15.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.77	in/hr			
Discharge:	0.69	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.69	cfs			

Gutter Hydraulics:

Slope:	2.00%	Street Roughness:	0.016	
Cross-Slope:	4.00%	Spread (allowable):	9.50	ft
		Actual Spread:	3.59	ft
Gutter Capacity:	9.34	cfs		
Actual Depth:	0.14	ft		
Actual Velocity:	2.70	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4588.15

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	13.12
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.58
Width:	1.0 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.05
Blockage:	63%	E:	60.46%
Vo:	3.9 fps	Q caught:	0.42 cfs
E_{net} =	60.46%	Q flowby:	0.27 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	304I-2		
Station:	304+50.00	Grade Elevation:	4588.01
Offset:	7.20 Lt	WS El @ Grate:	4588.14

Inlet Hydrology:

Area Paved:	0.66	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.66	Ac	C_{comp}:	0.93	
Overland Length:	34.0	ft	S_{over}:	2.00%	
Channel Length:	952.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.42	minutes	t_t =	28.11	minutes
t_c =	15.5	minutes	t_{c_check} =	15.5	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.77	in/hr			
Discharge:	0.48	cfs			
Upstream Flowby:	0.02	cfs			
Total Inlet Q:	0.50	cfs			

Gutter Hydraulics:

Slope:	2.00%	Street Roughness:	0.016
Cross-Slope:	4.00%	Spread (allowable):	5.00 ft
		Actual Spread:	3.16 ft
Gutter Capacity:	1.68 cfs		
Actual Depth:	0.13 ft		
Actual Velocity:	2.48 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4588.14

Combined:

Type: Triple Standard

U/S Curb Opening:

Length:	9.0 ft	Lt:	11.39
Blockage:	33%	E:	67.00%

D/S Grate:

Grate:	L 4	Eo:	0.64
Width:	1.0 ft	Rf:	1.00
Length:	9.0 ft	Rs:	0.45
Blockage:	63%	E:	80.18%
Vo:	7.5 fps	Q caught:	0.46 cfs
E_{net} =	93.46%	Q flowby:	0.03 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	314I-1		
Station:	314+25.00	Grate Elevation:	4590.55
Offset:	22.00 Lt	WS El @ Grate:	4590.60

Inlet Hydrology:

Area Paved:	0.07	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.07	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	96.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_i =	1.99	minutes
t_c =	5.0	minutes	t_{c_check} =	10.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.11	in/hr			
Discharge:	0.07	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.07	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	0.88%	Spread (allowable):	9.50 ft
		Actual Spread:	5.14 ft
Gutter Capacity:	0.37 cfs		
Actual Depth:	0.05 ft		
Actual Velocity:	0.62 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.60

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	8.31
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.60
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.15
Blockage:	63%	E:	66.11%
Vo:	3.9 fps	Q caught:	0.05 cfs
E_{net} =	66.11%	Q flowby:	0.02 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	319I-1		
Station:	319+00	Grade Elevation:	4590.55
Offset:	Rt	WS El @ Grate:	4590.65

Inlet Hydrology:

Area Paved:	0.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.32	Ac	C_{comp}:	0.93	
Overland Length:	31.0	ft	S_{over}:	2.00%	
Channel Length:	341.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.35	minutes	t_t =	8.59	minutes
t_c =	9.9	minutes	t_{c_check} =	12.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.92	in/hr			
Discharge:	0.27	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.27	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.07 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.10 ft		
Actual Velocity:	1.07 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.65

Combined:

Type:	Single Standard		
U/S Curb Opening:			
Length:	3.0 ft	Lt:	8.89
Blockage:	100%	E:	0.00%
D/S Grate:			
Grate:	L 4	Eo:	0.61
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	63%	E:	65.93%
Vo:	3.9 fps	Q caught:	0.18 cfs
E_{net} =	65.93%	Q flowby:	0.09 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	323I-1		
Station:	323+30.00	Grate Elevation:	4590.55
Offset:	22.00 Lt	WS El @ Grate:	4590.69

Inlet Hydrology:

Area Paved:	0.88	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.88	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	807.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_i =	23.22	minutes
t_c =	14.7	minutes	t_{c_check} =	14.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.79	in/hr			
Discharge:	0.65	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.65	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	7.00	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.14	ft		
Actual Velocity:	1.33	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.69

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	12.76
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.47
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.11
Blockage:	59%	E:	53.50%
Vo:	3.9 fps	Q caught:	0.35 cfs
E_{net} =	53.50%	Q flowby:	0.30 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	323I-2		
Station:	323+30.00	Grate Elevation:	4590.55
Offset:	22.00 Lt	WS El @ Grate:	4590.71

Inlet Hydrology:

Area Paved:	1.18	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	1.18	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	807.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	23.22	minutes
t_c =	14.7	minutes	t_{c_check} =	14.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.79	in/hr			
Discharge:	0.87	cfs			
Upstream Flowby:	0.09	cfs			
Total Inlet Q:	0.96	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	8.10 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.16 ft		
Actual Velocity:	1.46 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.71

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	15.04
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.42
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	59%	E:	47.76%
Vo:	3.9 fps	Q caught:	0.46 cfs
E_{net} =	47.76%	Q flowby:	0.50 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	334I-1		
Station:	334+10.00	Grade Elevation:	4593.45
Offset:	21.50 Rt	WS El @ Grate:	4593.59

Inlet Hydrology:

Area Paved:	0.82	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.82	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	641.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	17.80	minutes
t_c =	13.7	minutes	t_{c_check} =	13.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.82	in/hr			
Discharge:	0.62	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.62	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	6.89	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.14	ft		
Actual Velocity:	1.31	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4593.59	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	12.53
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.48
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.12
Blockage:	59%		E:	54.15%
Vo:	3.9	fps	Q caught:	0.34 cfs
E_{net} =	54.15%		Q flowby:	0.29 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	334I-2		
Station:	334+10.00	Grade Elevation:	4593.45
Offset:	21.50 Lt	WS El @ Grate:	4593.59

Inlet Hydrology:

Area Paved:	0.82	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.82	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	641.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	17.80	minutes
t_c =	13.7	minutes	t_{c_check} =	13.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.82	in/hr			
Discharge:	0.62	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.62	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.89 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.14 ft		
Actual Velocity:	1.31 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.59

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	12.53
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.48
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.12
Blockage:	59%	E:	54.15%
Vo:	3.9 fps	Q caught:	0.34 cfs
E_{net} =	54.15%	Q flowby:	0.29 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	340I-1		
Station:	340+90.86	Grade Elevation:	4596.29
Offset:	58.65 Lt	WS El @ Grade:	4596.37

Inlet Hydrology:

Area Paved:	0.16	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0.00	
Total Area:	0.16	Ac	C_{comp}:	0.93	
Overland Length:	101.0	ft	S_{over}:	2.00%	
Channel Length:	370.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.44	minutes	t_t =	9.44	minutes
t_c =	11.9	minutes	t_{c_check} =	12.6	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.86	in/hr			
Discharge:	0.13	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.13	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	3.82 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.08 ft		
Actual Velocity:	0.88 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.37

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	6.47
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.74
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.21
Blockage:	59%	E:	79.21%
Vo:	3.9 fps	Q caught:	0.10 cfs
E_{net} =	79.21%	Q flowby:	0.03 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	340I-2		
Station:	341+92.3	Grate Elevation:	4596.29
Offset:	75.50 Rt	WS El @ Grate:	4596.36

Inlet Hydrology:

Area Paved:	0.11	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0.00	
Total Area:	0.11	Ac	C_{comp}:	0.93	
Overland Length:	62.0	ft	S_{over}:	2.00%	
Channel Length:	127.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.91	minutes	t_t =	2.74	minutes
t_c =	5.0	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.11	in/hr			
Discharge:	0.11	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.11	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	3.65	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.07	ft		
Actual Velocity:	0.86	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.36

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	6.14
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.76
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.22
Blockage:	59%		E:	81.09%
Vo:	3.9	fps	Q caught:	0.09 cfs
E_{net} =	81.09%		Q flowby:	0.02 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	341I-1		
Station:	341+26.8	Grate Elevation:	4596.29
Offset:	56.70 Lt	WS El @ Grate:	4596.37

Inlet Hydrology:

Area Paved:	0.18	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0.00	
Total Area:	0.18	Ac	C_{comp}:	0.93	
Overland Length:	101.0	ft	S_{over}:	2.00%	
Channel Length:	434.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.44	minutes	t_t =	11.34	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.14	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.14	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	3.94 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.08 ft		
Actual Velocity:	0.90 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.37

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	6.70
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.72
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.21
Blockage:	59%	E:	77.92%
Vo:	3.9 fps	Q caught:	0.11 cfs
E_{net} =	77.92%	Q flowby:	0.03 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	341I-2		
Station:	341+47.90	Grade Elevation:	4596.29
Offset:	56.30 Lt	WS El @ Grade:	4596.37

Inlet Hydrology:

Area Paved:		Ac	C_{paved}:		
Area Unpaved:	0.95	Ac	C_{unpav}:	0.20	
Total Area:	0.95	Ac	C_{comp}:	0.20	
Overland Length:	114.0	ft	S_{over}:	2.00%	
Channel Length:	299.0	ft	H:	0.5	
Overland C (5-yr):	0.20		Channel Type:	1	
t_i =	13.73	minutes	t_t =	7.38	minutes
t_c =	12.3	minutes	t_{c_check} =	12.3	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.85	in/hr			
Discharge:	0.16	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.16	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	4.16 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.08 ft		
Actual Velocity:	0.94 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: G (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.37

Grate:

Type:	Large	Cw :	3.0
Width	2.0 ft	Co:	0.67
Length	3.0 ft		
Blockage:	59%	est. % bar	64%
Inlet Side Restriction:	no		
Weir:			
d=	0.07 ft		
Orifice:			
d=	0.00 ft		

Weir Controls, d = 0.07 ft
If the Inlet is in the gutter, the spread equals 3.5 ft

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	341I-3		
Station:	341+28.3	Grade Elevation:	4596.29
Offset:	75.00 Rt	WS El @ Grade:	4596.36

Inlet Hydrology:

Area Paved:	0.10	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0.00	
Total Area:	0.10	Ac	C_{comp}:	0.93	
Overland Length:	97.0	ft	S_{over}:	2.00%	
Channel Length:	100.2	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.39	minutes	t_t =	2.09	minutes
t_c =	5.0	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.11	in/hr			
Discharge:	0.10	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.10	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	3.52 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.07 ft		
Actual Velocity:	0.84 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.36

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	5.90
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.77
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.23
Blockage:	59%	E:	82.51%
Vo:	3.9 fps	Q caught:	0.09 cfs
E_{net} =	82.51%	Q flowby:	0.02 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	346I-2		
Station:	346+50.00	Grade Elevation:	4594.62
Offset:	22.00 Lt	WS El @ Grate:	4594.77

Inlet Hydrology:

Area Paved:	1.03 Ac	C_{paved}:	0.93
Area Unpaved:	0.00 Ac	C_{unpav}:	0
Total Area:	1.03 Ac	C_{comp}:	0.93
Overland Length:	33.0 ft	S_{over}:	2.00%
Channel Length:	827.0 ft	H:	0.5
Overland C (5-yr):	0.93	Channel Type:	1
t_i =	1.40 minutes	t_t =	23.89 minutes
t_c =	14.8 minutes	t_{c_check} =	14.8 minutes
One-hour Rainfall	0.34 inches	Freq.	2 yr.
Rainfall Intensity	0.79 in/hr		
Discharge:	0.76 cfs		
Upstream Flowby:	0.00 cfs		
Total Inlet Q:	0.76 cfs		

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	7.41 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.15 ft		
Actual Velocity:	1.38 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4594.77

Combined:

Type:	Single Standard		
U/S Curb Opening:			
Length:	3.0 ft	Lt:	13.62
Blockage:	100%	E:	0.00%
D/S Grate:			
Grate:	C 4	Eo:	0.45
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.11
Blockage:	59%	E:	51.20%
Vo:	3.9 fps	Q caught:	0.39
E_{net} =	51.20%	Q flowby:	0.37

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	346I-3		
Station:	346+50.00	Grade Elevation:	4593.99
Offset:	22.00 Rt	WS El @ Grade:	4594.15

Inlet Hydrology:

Area Paved:	1.23	Ac	C_{paved}:	0.93	
Area Unpaved:	0.08	Ac	C_{unpav}:	0	
Total Area:	1.31	Ac	C_{comp}:	0.87	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	827.0	ft	H:	0.5	
Overland C (5-yr):	0.87		Channel Type:	1	
t_i =	1.86	minutes	t_t =	23.89	minutes
t_c =	14.8	minutes	t_{c_check} =	14.8	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.79	in/hr			
Discharge:	0.90	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.90	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	7.92	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.16	ft		
Actual Velocity:	1.44	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4594.15

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	14.67
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.43
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	59%	E:	48.62%
Vo:	3.9 fps	Q caught:	0.44 cfs
E_{net} =	48.62%	Q flowby:	0.46 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	346I-4		
Station:	346+50.00	Grate Elevation:	4593.99
Offset:	61.10 Rt	WS El @ Grate:	4594.06

Inlet Hydrology:

Area Paved:		Ac	C_{paved}:	
Area Unpaved:	0.57	Ac	C_{unpav}:	0.2
Total Area:	0.57	Ac	C_{comp}:	0.20
Overland Length:	94.0	ft	S_{over}:	2.00%
Channel Length:	128.0	ft	H:	0.5
Overland C (5-yr):	0.20		Channel Type:	1
t_i =	12.47	minutes	t_t =	2.77 minutes
t_c =	11.2	minutes	t_{c_check} =	11.2 minutes
One-hour Rainfall	0.34	inches	Freq.	2 yr.
Rainfall Intensity	0.88	in/hr		
Discharge:	0.10	cfs		
Upstream Flowby:	0.00	cfs		
Total Inlet Q:	0.10	cfs		

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	3.48 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.07 ft		
Actual Velocity:	0.83 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: G (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4594.06

Grate:

Type:	Large	Cw :	3.0
Width	2.0 ft	Co:	0.67
Length	3.0 ft		
Blockage:	59%	est. % bar	33%
Inlet Side Restriction:	no		

Weir:
d= 0.05 ft
Orifice:
d= 0.00 ft

Weir Controls, d = 0.05 ft
If the Inlet is in the gutter, the spread equals 2.6 ft

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	356I-1		
Station:	356+43.80	Grade Elevation:	4597.36
Offset:	22.00 Lt	WS El @ Grade:	4597.48

Inlet Hydrology:

Area Paved:	0.26	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.26	Ac	C_{comp}:	0.93	
Overland Length:	35.0	ft	S_{over}:	2.00%	
Channel Length:	174.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.44	minutes	t_t =	3.95	minutes
t_c =	5.4	minutes	t_{c_check} =	11.2	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.09	in/hr			
Discharge:	0.26	cfs			
Upstream Flowby:	0.12	cfs			
Total Inlet Q:	0.38	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	5.75	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.12	ft		
Actual Velocity:	1.16	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4597.48	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	10.25
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.55
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.14
Blockage:	59%		E:	61.64%
Vo:	3.9	fps	Q caught:	0.24 cfs
E_{net} =	61.64%		Q flowby:	0.15 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	356I-2		
Station:	356+43.90	Grate Elevation:	4597.38
Offset:	22.00 Rt	WS El @ Grate:	4597.50

Inlet Hydrology:

Area Paved:	0.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.32	Ac	C_{comp}:	0.93	
Overland Length:	37.0	ft	S_{over}:	2.00%	
Channel Length:	182.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.48	minutes	t_t =	4.16	minutes
t_c =	5.6	minutes	t_{c_check} =	11.2	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.08	in/hr			
Discharge:	0.32	cfs			
Upstream Flowby:	0.13	cfs			
Total Inlet Q:	0.45	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.11 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.21 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4597.50

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	10.97
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.53
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	59%	E:	59.07%
Vo:	3.9 fps	Q caught:	0.27 cfs
E_{net} =	59.07%	Q flowby:	0.19 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	358I-1		
Station:	358+49.2	Grade Elevation:	4601.63
Offset:	22.00 Lt	WS El @ Grate:	4601.74

Inlet Hydrology:

Area Paved:	0.42	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.42	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	505.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	13.51	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.83	in/hr			
Discharge:	0.33	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.33	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	5.41	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.11	ft		
Actual Velocity:	1.12	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.74

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	9.56
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.58
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.12
Blockage:	63%	E:	63.14%
Vo:	3.9 fps	Q caught:	0.21 cfs
E_{net} =	63.14%	Q flowby:	0.12 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	358I-2		
Station:	358+51.1	Grade Elevation:	4601.63
Offset:	22.00 Rt	WS El @ Grate:	4601.74

Inlet Hydrology:

Area Paved:	0.45	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.45	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	490.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	13.05	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.35	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.35	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.55 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.11 ft		
Actual Velocity:	1.14 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.74

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	9.85
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.57
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.12
Blockage:	63%	E:	61.98%
Vo:	3.9 fps	Q caught:	0.22 cfs
E_{net} =	61.98%	Q flowby:	0.13 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	364I-1		
Station:	364+42	Grade Elevation:	4601.12
Offset:	32.50 Lt	WS El @ Grate:	4601.22

Inlet Hydrology:

Area Paved:	0.36	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.36	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	459.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_i =	12.10	minutes
t_c =	12.7	minutes	t_{c_check} =	12.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.28	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.28	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	20.00 ft
		Actual Spread:	5.12 ft
Gutter Capacity:	10.72 cfs		
Actual Depth:	0.10 ft		
Actual Velocity:	1.08 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.22

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	8.99
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.60
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.16
Blockage:	59%	E:	66.66%
Vo:	3.9 fps	Q caught:	0.19 cfs
E_{net} =	66.66%	Q flowby:	0.09 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	364I-2		
Station:	364+42	Grate Elevation:	4601.10
Offset:	32.50 Rt	WS El @ Grate:	4601.21

Inlet Hydrology:

Area Paved:	0.22	Ac	C_{paved}:	0.93	
Area Unpaved:	0.06	Ac	C_{unpav}:	0.2	
Total Area:	0.28	Ac	C_{comp}:	0.77	
Overland Length:	68.0	ft	S_{over}:	2.00%	
Channel Length:	142.0	ft	H:	0.5	
Overland C (5-yr):	0.77		Channel Type:	1	
t_i =	3.85	minutes	t_t =	3.12	minutes
t_c =	7.0	minutes	t_{c_check} =	11.2	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.03	in/hr			
Discharge:	0.22	cfs			
Upstream Flowby:	0.09	cfs			
Total Inlet Q:	0.31	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	20.00 ft
		Actual Spread:	5.32 ft
Gutter Capacity:	10.72 cfs		
Actual Depth:	0.11 ft		
Actual Velocity:	1.10 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.21

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	9.39
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.59
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.15
Blockage:	59%	E:	64.97%
Vo:	3.9 fps	Q caught:	0.20 cfs
E_{net} =	64.97%	Q flowby:	0.11 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	365I-1		
Station:	366+00	Grade Elevation:	4601.63
Offset:	22.00 Rt	WS El @ Grate:	4601.73

Inlet Hydrology:

Area Paved:	0.29	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.29	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	302.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	7.46	minutes
t_c =	8.9	minutes	t_{c_check} =	11.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.96	in/hr			
Discharge:	0.26	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.26	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	4.96	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.10	ft		
Actual Velocity:	1.05	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.73

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	8.67
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.62
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	63%	E:	66.92%
Vo:	3.9 fps	Q caught:	0.17 cfs
E_{net} =	66.92%	Q flowby:	0.09 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	371I-1		
Station:	371+44.7	Grade Elevation:	4601.63
Offset:	22.00 Rt	WS El @ Grate:	4601.72

Inlet Hydrology:

Area Paved:	0.19	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.19	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	202.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	4.69	minutes
t_c =	6.1	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.06	in/hr			
Discharge:	0.19	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.19	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	4.40	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.09	ft		
Actual Velocity:	0.97	ft/s		

Inlet Hydraulics:

Class:	G	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4601.72	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	7.59
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	L	4	Eo:	0.67
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.15
Blockage:	63%		E:	72.12%
Vo:	3.9	fps	Q caught:	0.14 cfs
E_{net} =	72.12%		Q flowby:	0.05 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	373I-1		
Station:	373+00	Grade Elevation:	4601.63
Offset:	42.00 Rt	WS El @ Grate:	4601.70

Inlet Hydrology:

Area Paved:		Ac	C_{paved}:		
Area Unpaved:	0.44	Ac	C_{unpav}:	0.32	
Total Area:	0.44	Ac	C_{comp}:	0.32	
Overland Length:	34.0	ft	S_{over}:	2.00%	
Channel Length:	391.0	ft	H:	0.5	
Overland C (5-yr):	0.32		Channel Type:	4	
t_i =	6.50	minutes	t_i =	10.06	minutes
t_c =	12.4	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.85	in/hr			
Discharge:	0.12	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.12	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	3.72	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.07	ft		
Actual Velocity:	0.87	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: G (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.70

Grate:

Type:	Large	Cw :	3.0
Width	2.0 ft	Co:	0.67
Length	3.0 ft		
Blockage:	59%	est. % bar	64%
Inlet Side Restriction:	no		

Weir:
d= 0.06 ft
Orifice:
d= 0.00 ft

Weir Controls, d = 0.06 ft
If the Inlet is in the gutter, the spread equals 2.9 ft

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	373I-2		
Station:	373+00	Grade Elevation:	4575.32
Offset:	22.00 Rt	WS El @ Grate:	4575.47

Inlet Hydrology:

Area Paved:	0.82	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.82	Ac	C_{comp}:	0.93	
Overland Length:	34.0	ft	S_{over}:	2.00%	
Channel Length:	1177.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.42	minutes	t_i =	35.91	minutes
t_c =	16.7	minutes	t_{c_check} =	16.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.75	in/hr			
Discharge:	0.57	cfs			
Upstream Flowby:	0.19	cfs			
Total Inlet Q:	0.76	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	7.42	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.15	ft		
Actual Velocity:	1.38	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.47

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	13.64
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.45
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.11
Blockage:	59%		E:	51.15%
Vo:	3.9	fps	Q caught:	0.39 cfs
E_{net} =	51.15%		Q flowby:	0.37 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	373I-3		
Station:	373+00	Grade Elevation:	4601.63
Offset:	22.00 Lt	WS El @ Grade:	4601.77

Inlet Hydrology:

Area Paved:	0.86	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.86	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	1177.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	35.91	minutes
t_c =	16.7	minutes	t_{c_check} =	16.7	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.75	in/hr			
Discharge:	0.60	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.60	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.79 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.14 ft		
Actual Velocity:	1.30 ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4601.77	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0 ft		Lt:	12.33
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.49
Width:	1.5 ft		Rf:	1.00
Length:	3.0 ft		Rs:	0.12
Blockage:	59%		E:	54.75%
Vo:	3.9 fps		Q caught:	0.33 cfs
E_{net} =	54.75%		Q flowby:	0.27 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	388I-1		
Station:	379+78.9	Grade Elevation:	4606.66
Offset:	22.00 Rt	WS El @ Grate:	4606.77

Inlet Hydrology:

Area Paved:	0.46	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.46	Ac	C_{comp}:	0.93	
Overland Length:	34.0	ft	S_{over}:	0.50%	
Channel Length:	500.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.25	minutes	t_t =	13.36	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.36	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.36	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.60 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.11 ft		
Actual Velocity:	1.14 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.77

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	9.93
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.57
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.12
Blockage:	63%	E:	61.66%
Vo:	3.9 fps	Q caught:	0.22 cfs
E_{net} =	61.66%	Q flowby:	0.14 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	388I-1		
Station:	388+50	Grade Elevation:	4606.66
Offset:	22.00 Lt	WS El @ Grate:	4606.77

Inlet Hydrology:

Area Paved:	0.37	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.37	Ac	C_{comp}:	0.93	
Overland Length:	31.0	ft	S_{over}:	2.00%	
Channel Length:	329.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.35	minutes	t_t =	8.24	minutes
t_c =	9.6	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.93	in/hr			
Discharge:	0.32	cfs			
Upstream Flowby:	0.05	cfs			
Total Inlet Q:	0.37	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	5.68	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.11	ft		
Actual Velocity:	1.15	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.77

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	10.09
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.56
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.14
Blockage:	59%		E:	62.21%
Vo:	3.9	fps	Q caught:	0.23 cfs
E_{net} =	62.21%		Q flowby:	0.14 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	388I-2		
Station:	388+50	Grade Elevation:	4606.58
Offset:	22.00 Rt	WS El @ Grate:	4606.70

Inlet Hydrology:

Area Paved:	0.46	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.46	Ac	C_{comp}:	0.93	
Overland Length:	36.0	ft	S_{over}:	2.00%	
Channel Length:	325.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.46	minutes	t_t =	8.12	minutes
t_c =	9.6	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.93	in/hr			
Discharge:	0.40	cfs			
Upstream Flowby:	0.07	cfs			
Total Inlet Q:	0.47	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.20 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.22 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.70

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	11.14
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.52
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	59%	E:	58.48%
Vo:	3.9 fps	Q caught:	0.27 cfs
E_{net} =	58.48%	Q flowby:	0.19 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	391I-1		
Station:	391+00	Grade Elevation:	4606.03
Offset:	34.00 Lt	WS El @ Grate:	4606.12

Inlet Hydrology:

Area Paved:	0.20	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.20	Ac	C_{comp}:	0.93	
Overland Length:	54.0	ft	S_{over}:	2.00%	
Channel Length:	213.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.79	minutes	t_i =	4.99	minutes
t_c =	6.8	minutes	t_{c_check} =	11.5	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.04	in/hr			
Discharge:	0.19	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.19	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	21.50	ft
		Actual Spread:	4.44	ft
Gutter Capacity:	13.00	cfs		
Actual Depth:	0.09	ft		
Actual Velocity:	0.98	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.12

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	7.66
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	L	4	Eo:	0.67
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.15
Blockage:	63%		E:	71.73%
Vo:	3.9	fps	Q caught:	0.14 cfs
E_{net} =	71.73%		Q flowby:	0.05 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	391I-1		
Station:	391+00	Grade Elevation:	4606.11
Offset:	32.84 Rt	WS El @ Grate:	4606.21

Inlet Hydrology:

Area Paved:	0.24	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.24	Ac	C_{comp}:	0.93	
Overland Length:	49.0	ft	S_{over}:	2.00%	
Channel Length:	217.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.70	minutes	t_t =	5.09	minutes
t_c =	6.8	minutes	t_{c_check} =	11.5	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.04	in/hr			
Discharge:	0.23	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.23	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	20.30 ft
		Actual Spread:	4.75 ft
Gutter Capacity:	11.15 cfs		
Actual Depth:	0.10 ft		
Actual Velocity:	1.02 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.21

Combined:

Type:	Single Standard		
U/S Curb Opening:			
Length:	3.0 ft	Lt:	8.27
Blockage:	100%	E:	0.00%
D/S Grate:			
Grate:	L 4	Eo:	0.64
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.14
Blockage:	63%	E:	68.76%
Vo:	3.9 fps	Q caught:	0.16 cfs
E_{net} =	68.76%	Q flowby:	0.07 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	395I-1		
Station:	395+93	Grade Elevation:	4606.66
Offset:	34.00 Lt	WS El @ Grate:	4606.78

Inlet Hydrology:

Area Paved:	0.43	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.43	Ac	C_{comp}:	0.93	
Overland Length:	160.0	ft	S_{over}:	2.00%	
Channel Length:	182.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	3.07	minutes	t_i =	4.16	minutes
t_c =	7.2	minutes	t_{c_check} =	11.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.02	in/hr			
Discharge:	0.41	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.41	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	21.50	ft
		Actual Spread:	5.88	ft
Gutter Capacity:	13.00	cfs		
Actual Depth:	0.12	ft		
Actual Velocity:	1.18	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.78

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	10.49
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.54
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.14
Blockage:	59%		E:	60.74%
Vo:	3.9	fps	Q caught:	0.25 cfs
E_{net} =	60.74%		Q flowby:	0.16 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	395I-2		
Station:	395+93	Grade Elevation:	4606.66
Offset:	22.00 Rt	WS El @ Grate:	4606.76

Inlet Hydrology:

Area Paved:	0.34	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.34	Ac	C_{comp}:	0.93	
Overland Length:	23.0	ft	S_{over}:	2.00%	
Channel Length:	712.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.17	minutes	t_t =	20.10	minutes
t_c =	14.1	minutes	t_{c_check} =	14.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.81	in/hr			
Discharge:	0.26	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.26	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	4.93 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.10 ft		
Actual Velocity:	1.05 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.76

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	8.62
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.62
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.16
Blockage:	59%	E:	68.26%
Vo:	3.9 fps	Q caught:	0.17 cfs
E_{net} =	68.26%	Q flowby:	0.08 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE, Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	139I-1		
Station:	139+65	Grade Elevation:	4599.82
Offset:	46.00 Lt	WS El @ Grate:	4599.94

Inlet Hydrology:

Area Paved:	0.57	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.57	Ac	C_{comp}:	0.93	
Overland Length:	22.0	ft	S_{over}:	2.00%	
Channel Length:	500.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.14	minutes	t_t =	13.36	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.44	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.44	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.07 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.20 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4599.94

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	10.88
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.53
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	59%	E:	59.38%
Vo:	3.9 fps	Q caught:	0.26 cfs
E_{net} =	59.38%	Q flowby:	0.18 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	139I-2		
Station:	139+65	Grate Elevation:	4599.74
Offset:	34.00 Rt	WS El @ Grate:	4599.86

Inlet Hydrology:

Area Paved:	0.57	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.57	Ac	C_{comp}:	0.93	
Overland Length:	22.0	ft	S_{over}:	2.00%	
Channel Length:	500.7	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.14	minutes	t_t =	13.38	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.44	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.44	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.07 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.20 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4599.86

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	10.88
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.53
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	59%	E:	59.38%
Vo:	3.9 fps	Q caught:	0.26 cfs
E_{net} =	59.38%	Q flowby:	0.18 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	137I-1		
Station:	137+40	Grade Elevation:	4606.31
Offset:	34.00 Lt	WS El @ Grade:	4606.42

Inlet Hydrology:

Area Paved:	0.30	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.30	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	154.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_t =	3.43	minutes
t_c =	5.1	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.11	in/hr			
Discharge:	0.31	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.31	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.30 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.11 ft		
Actual Velocity:	1.10 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.42

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	9.34
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.59
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.15
Blockage:	59%	E:	65.19%
Vo:	3.9 fps	Q caught:	0.20 cfs
E_{net} =	65.19%	Q flowby:	0.11 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	137I-2		
Station:	137+40	Grade Elevation:	4606.31
Offset:	34.00 Rt	WS El @ Grate:	4606.41

Inlet Hydrology:

Area Paved:	0.28	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.28	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	154.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_i =	3.43	minutes
t_c =	5.1	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	1.11	in/hr			
Discharge:	0.29	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.29	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	5.16	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.10	ft		
Actual Velocity:	1.08	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.41

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	9.07
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.60
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.16
Blockage:	59%		E:	66.31%
Vo:	3.9	fps	Q caught:	0.19 cfs
E_{net} =	66.31%		Q flowby:	0.10 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	125I-1		
Station:	125+56.50	Grade Elevation:	4595.80
Offset:	21.00 Lt	WS El @ Grade:	4595.93

Inlet Hydrology:

Area Paved:	0.75	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.75	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	956.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_t =	28.24	minutes
t_c =	15.6	minutes	t_{c_check} =	15.6	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.77	in/hr			
Discharge:	0.54	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.54	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.52 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.13 ft		
Actual Velocity:	1.26 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4595.93

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	11.80
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.50
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	63%	E:	55.19%
Vo:	3.9 fps	Q caught:	0.30 cfs
E_{net} =	55.19%	Q flowby:	0.24 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	125I-2		
Station:	125+56.50	Grade Elevation:	4595.80
Offset:	21.00 Rt	WS El @ Grate:	4595.94

Inlet Hydrology:

Area Paved:	0.83	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.83	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	958.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_t =	28.31	minutes
t_c =	15.6	minutes	t_{c_check} =	15.6	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.77	in/hr			
Discharge:	0.60	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.60	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.78 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.14 ft		
Actual Velocity:	1.30 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4595.94

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	12.31
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.49
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	63%	E:	53.65%
Vo:	3.9 fps	Q caught:	0.32 cfs
E_{net} =	53.65%	Q flowby:	0.28 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	112I-1		
Station:	112+54	Grade Elevation:	4595.80
Offset:	21.00 Rt	WS El @ Grate:	4595.95

Inlet Hydrology:

Area Paved:	0.86	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.86	Ac	C_{comp}:	0.93	
Overland Length:	38.0	ft	S_{over}:	2.00%	
Channel Length:	1261.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.50	minutes	t_t =	38.89	minutes
t_c =	17.2	minutes	t_{c_check} =	17.2	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.74	in/hr			
Discharge:	0.59	cfs			
Upstream Flowby:	0.24	cfs			
Total Inlet Q:	0.83	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	7.67	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.15	ft		
Actual Velocity:	1.41	ft/s		

Inlet Hydraulics:

Class: C (G - on grade or S - sag)
Inlet Type: G (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4595.95

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	14.15
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.44
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	63%	E:	48.74%
Vo:	3.9 fps	Q caught:	0.40 cfs
E_{net} =	48.74%	Q flowby:	0.43 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	112I-2		
Station:	112+54	Grade Elevation:	4595.80
Offset:	21.00 Rt	WS El @ Grate:	4595.96

Inlet Hydrology:

Area Paved:	0.84	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.84	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	1262.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	38.92	minutes
t_c =	17.2	minutes	t_{c_check} =	17.2	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.74	in/hr			
Discharge:	0.58	cfs			
Upstream Flowby:	0.28	cfs			
Total Inlet Q:	0.86	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	7.76 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.16 ft		
Actual Velocity:	1.42 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4595.96

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	14.34
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.44
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	63%	E:	48.29%
Vo:	3.9 fps	Q caught:	0.41 cfs
E_{net} =	48.29%	Q flowby:	0.44 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	108I-1		
Station:	108+47	Grade Elevation:	4593.39
Offset:	21.00 Lt	WS El @ Grate:	4593.55

Inlet Hydrology:

Area Paved:	0.66	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.66	Ac	C_{comp}:	0.93	
Overland Length:	36.0	ft	S_{over}:	2.00%	
Channel Length:	440.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.46	minutes	t_i =	11.53	minutes
t_c =	12.6	minutes	t_{c_check} =	12.6	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.52	cfs			
Upstream Flowby:	0.43	cfs			
Total Inlet Q:	0.95	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	8.06 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.16 ft		
Actual Velocity:	1.46 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.55

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	14.96
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.42
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	59%	E:	47.95%
Vo:	3.9 fps	Q caught:	0.45 cfs
E_{net} =	47.95%	Q flowby:	0.49 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	108I-2		
Station:	108+47	Grade Elevation:	4593.23
Offset:	21.00 Rt	WS El @ Grade:	4593.39

Inlet Hydrology:

Area Paved:	0.56	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.56	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	440.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	11.53	minutes
t_c =	12.6	minutes	t_{c_check} =	12.6	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.84	in/hr			
Discharge:	0.44	cfs			
Upstream Flowby:	0.44	cfs			
Total Inlet Q:	0.88	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	7.84	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.16	ft		
Actual Velocity:	1.43	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.39

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	14.50
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.43
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.10
Blockage:	59%		E:	49.01%
Vo:	3.9	fps	Q caught:	0.43 cfs
E_{net} =	49.01%		Q flowby:	0.45 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	100I-1		
Station:	100+51	Grade Elevation:	4593.45
Offset:	21.00 Lt	WS El @ Grate:	4593.57

Inlet Hydrology:

Area Paved:	0.50	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.50	Ac	C_{comp}:	0.93	
Overland Length:	32.0	ft	S_{over}:	2.00%	
Channel Length:	392.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.37	minutes	t_i =	10.09	minutes
t_c =	11.5	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.88	in/hr			
Discharge:	0.41	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.41	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	5.88	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.12	ft		
Actual Velocity:	1.18	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.57

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	10.50
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.54
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.14
Blockage:	59%	E:	60.72%
Vo:	3.9 fps	Q caught:	0.25 cfs
E_{net} =	60.72%	Q flowby:	0.16 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements", HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 30-Jun-05

Inlet Location:

ID No.:	100I-2		
Station:	100+51	Grate Elevation:	4593.44
Offset:	21.00 Rt	WS El @ Grate:	4593.56

Inlet Hydrology:

Area Paved:	0.49	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.49	Ac	C_{comp}:	0.93	
Overland Length:	32.0	ft	S_{over}:	2.00%	
Channel Length:	394.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.37	minutes	t_t =	10.15	minutes
t_c =	11.5	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.87	in/hr			
Discharge:	0.40	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.40	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.83 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.17 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.56

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	10.40
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.55
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.14
Blockage:	59%		E:	61.07%
Vo:	3.9	fps	Q caught:	0.24 cfs
E_{net} =	61.07%		Q flowby:	0.16 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-172		
Station:	93+00.00	Grate Elevation:	4588.01
Offset:	29.00 Lt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	0.22	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.22	Ac	C_{comp}:	0.93	
Overland Length:	35.0	ft	S_{over}:	2.00%	
Channel Length:	322.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.44	minutes	t_t =	8.04	minutes
t_c =	9.5	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.94	in/hr			
Discharge:	0.19	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.19	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-173		
Station:	93+00.00	Grate Elevation:	4588.01
Offset:	29.00 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	0.22	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.22	Ac	C_{comp}:	0.93	
Overland Length:	32.0	ft	S_{over}:	2.00%	
Channel Length:	323.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.37	minutes	t_t =	8.07	minutes
t_c =	9.4	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	0.34	inches	Freq.	2	yr.
Rainfall Intensity	0.94	in/hr			
Discharge:	0.19	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	0.19	cfs			

100-YR HYDROLOGY

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-100		
Station:	25+14.00	Grate Elevation:	4588.01
Offset:	48.00 Lt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	0.53	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.53	Ac	C_{comp}:	0.93	
Overland Length:	44.0	ft	S_{over}:	2.00%	
Channel Length:	472.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.61	minutes	t_i =	12.50	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.31	in/hr			
Discharge:	1.63	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.63	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-101		
Station:	25+14.00	Grate Elevation:	4588.01
Offset:	48.00 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	0.53	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.53	Ac	C_{comp}:	0.93	
Overland Length:	44.0	ft	S_{over}:	2.00%	
Channel Length:	472.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.61	minutes	t_t =	12.50	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.31	in/hr			
Discharge:	1.63	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.63	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-21I-1		
Station:	21+09.50	Grade Elevation:	4590.55
Offset:	22.00 Rt	WS El @ Grade:	4590.71

Inlet Hydrology:

Area Paved:	0.23	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.23	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	186.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_t =	4.26	minutes
t_c =	5.9	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.26	in/hr			
Discharge:	0.91	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.91	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	7.94 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.16 ft		
Actual Velocity:	1.44 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.71

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	14.71
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.43
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	63%	E:	47.42%
Vo:	3.9 fps	Q caught:	0.43 cfs
E_{net} =	47.42%	Q flowby:	0.48 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-21I-2		
Station:	21+50.80	Grate Elevation:	4590.55
Offset:	78.00 Lt	WS El @ Grate:	4590.73

Inlet Hydrology:

Area Paved:	0.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.32	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	186.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_t =	4.26	minutes
t_c =	5.9	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.26	in/hr			
Discharge:	1.27	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.27	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	8.99	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.18	ft		
Actual Velocity:	1.57	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.73

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	16.90
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.39
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	63%	E:	42.89%
Vo:	3.9 fps	Q caught:	0.54 cfs
E_{net} =	42.89%	Q flowby:	0.72 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-22I-1		
Station:	22+75.50	Grade Elevation:	4590.55
Offset:	11.80 Lt	WS El @ Grade:	4590.67

Inlet Hydrology:

Area Paved:	0.10	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.10	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	186.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_t =	4.26	minutes
t_c =	5.9	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.26	in/hr			
Discharge:	0.40	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.40	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.81 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.17 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.67

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	10.37
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.55
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.11
Blockage:	63%	E:	60.02%
Vo:	3.9 fps	Q caught:	0.24 cfs
E_{net} =	60.02%	Q flowby:	0.16 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-22I-2		
Station:	22+75.50	Grate Elevation:	4590.55
Offset:	23.90 Lt	WS El @ Grate:	4590.68

Inlet Hydrology:

Area Paved:	0.15 Ac	C_{paved}:	0.93
Area Unpaved:	0.00 Ac	C_{unpav}:	0
Total Area:	0.15 Ac	C_{comp}:	0.93
Overland Length:	33.0 ft	S_{over}:	2.00%
Channel Length:	217.0 ft	H:	0.5
Overland C (5-yr):	0.93	Channel Type:	1
t_i =	1.40 minutes	t_t =	5.09 minutes
t_c =	6.5 minutes	t_{c_check} =	11.4 minutes
One-hour Rainfall	1.33 inches	Freq.	100 yr.
Rainfall Intensity	4.15 in/hr		
Discharge:	0.58 cfs		
Upstream Flowby:	0.00 cfs		
Total Inlet Q:	0.58 cfs		

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.70 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.13 ft		
Actual Velocity:	1.29 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.68

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	12.16
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.49
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	63%	E:	54.08%
Vo:	3.9 fps	Q caught:	0.31 cfs
E_{net} =	54.08%	Q flowby:	0.27 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-256I-1		
Station:	256+22.10	Grade Elevation:	4573.46
Offset:	24.50 Lt	WS El @ Grate:	4573.63

Inlet Hydrology:

Area Paved:	0.34 Ac	C_{paved}:	0.93
Area Unpaved:	0.00 Ac	C_{unpav}:	0
Total Area:	0.34 Ac	C_{comp}:	0.93
Overland Length:	39.0 ft	S_{over}:	2.00%
Channel Length:	531.0 ft	H:	0.5
Overland C (5-yr):	0.93	Channel Type:	1
t_i =	1.52 minutes	t_t =	14.32 minutes
t_c =	13.2 minutes	t_{c_check} =	13.2 minutes
One-hour Rainfall	1.33 inches	Freq.	100 yr.
Rainfall Intensity	3.28 in/hr		
Discharge:	1.04 cfs		
Upstream Flowby:	0.00 cfs		
Total Inlet Q:	1.04 cfs		

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	8.34 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.17 ft		
Actual Velocity:	1.49 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4573.63

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	15.54
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.41
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	63%	E:	45.58%
Vo:	3.9 fps	Q caught:	0.47 cfs
E_{net} =	45.58%	Q flowby:	0.56 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-256I-2		
Station:	256+22.10	Grate Elevation:	4573.51
Offset:	35.50 Rt	WS El @ Grate:	4573.74

Inlet Hydrology:

Area Paved:	0.79	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.79	Ac	C_{comp}:	0.93	
Overland Length:	46.0	ft	S_{over}:	2.00%	
Channel Length:	523.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.65	minutes	t_i =	14.07	minutes
t_c =	13.2	minutes	t_{c_check} =	13.2	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.28	in/hr			
Discharge:	2.41	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.41	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	11.44	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.23	ft		
Actual Velocity:	1.84	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4573.74

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	22.15
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.31
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.05
Blockage:	63%	E:	34.95%
Vo:	3.9 fps	Q caught:	0.84 cfs
E_{net} =	34.95%	Q flowby:	1.57 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-265I-1		
Station:	265+51.00	Grade Elevation:	4575.10
Offset:	24.50 Lt	WS El @ Grade:	4575.30

Inlet Hydrology:

Area Paved:	0.47	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.47	Ac	C_{comp}:	0.93	
Overland Length:	37.0	ft	S_{over}:	2.00%	
Channel Length:	343.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.48	minutes	t_t =	8.64	minutes
t_c =	10.1	minutes	t_{c_check} =	12.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.63	in/hr			
Discharge:	1.59	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.59	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	9.78 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.20 ft		
Actual Velocity:	1.66 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.30

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	18.57
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.36
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	59%	E:	40.99%
Vo:	3.9 fps	Q caught:	0.65 cfs
E_{net} =	40.99%	Q flowby:	0.94 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-267I-2		
Station:	265+51.00	Grade Elevation:	4575.10
Offset:	24.50 Rt	WS El @ Grade:	4575.33

Inlet Hydrology:

Area Paved:	0.62	Ac	C_{paved}:	0.93	
Area Unpaved:	0.52	Ac	C_{unpav}:	0.20	
Total Area:	1.14	Ac	C_{comp}:	0.60	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	338.0	ft	H:	0.5	
Overland C (5-yr):	0.60		Channel Type:	1	
t_i =	4.71	minutes	t_t =	8.50	minutes
t_c =	12.1	minutes	t_{c_check} =	12.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.39	in/hr			
Discharge:	2.31	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.31	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	11.26	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.23	ft		
Actual Velocity:	1.82	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.33

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	21.75
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.32
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	59%	E:	36.37%
Vo:	3.9 fps	Q caught:	0.84 cfs
E_{net} =	36.37%	Q flowby:	1.47 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-274I-1		
Station:	274+80	Grate Elevation:	4575.27
Offset:	24.50 Lt	WS El @ Grate:	4575.48

Inlet Hydrology:

Area Paved:	0.61	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.61	Ac	C_{comp}:	0.93	
Overland Length:	37.0	ft	S_{over}:	2.00%	
Channel Length:	504.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.48	minutes	t_i =	13.48	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.30	in/hr			
Discharge:	1.87	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.87	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	10.40	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.21	ft		
Actual Velocity:	1.73	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.48

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	19.91
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.34
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.07
Blockage:	59%		E:	38.90%
Vo:	3.9	fps	Q caught:	0.73 cfs
E_{net} =	38.90%		Q flowby:	1.14 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Colton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-274I-2		
Station:	274+80	Grade Elevation:	4575.28
Offset:	24.50 Rt	WS El @ Grate:	4575.53

Inlet Hydrology:

Area Paved:	0.86	Ac	C_{paved}:	0.93	
Area Unpaved:	0.74	Ac	C_{unpav}:	0.20	
Total Area:	1.60	Ac	C_{comp}:	0.59	
Overland Length:	37.0	ft	S_{over}:	2.00%	
Channel Length:	503.0	ft	H:	0.5	
Overland C (5-yr):	0.59		Channel Type:	1	
t_i =	4.41	minutes	t_t =	13.45	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.30	in/hr			
Discharge:	3.13	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	3.13	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	12.61	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.25	ft		
Actual Velocity:	1.97	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4575.53	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	24.70
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.29
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.06
Blockage:	59%		E:	32.95%
Vo:	3.9	fps	Q caught:	1.03 cfs
E_{net} =	32.95%		Q flowby:	2.10 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-283I-1		
Station:	283+05.00	Grate Elevation:	4575.32
Offset:	24.50 Lt	WS El @ Grate:	4575.67

Inlet Hydrology:

Area Paved:	0.91	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.91	Ac	C_{comp}:	0.93	
Overland Length:	125.0	ft	S_{over}:	2.00%	
Channel Length:	883.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.72	minutes	t_t =	25.77	minutes
t_c =	15.6	minutes	t_{c_check} =	15.6	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.05	in/hr			
Discharge:	2.58	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.58	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	6.00%	Spread (allowable):	5.00	ft
		Actual Spread:	5.90	ft
Gutter Capacity:	1.66	cfs		
Actual Depth:	0.35	ft		
Actual Velocity:	2.47	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4575.67

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	11.79
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.54
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.11
Blockage:	59%		E:	59.42%
Vo:	3.9	fps	Q caught:	1.53 cfs
E_{net} =	59.42%		Q flowby:	1.05 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-283I-2		
Station:	283+05.00	Grate Elevation:	4576.20
Offset:	5.00 Rt	WS El @ Grate:	4576.61

Inlet Hydrology:

Area Paved:	0.85	Ac	C_{paved}:	0.93	
Area Unpaved:	0.75	Ac	C_{unpav}:	0.20	
Total Area:	1.60	Ac	C_{comp}:	0.59	
Overland Length:	10.0	ft	S_{over}:	2.00%	
Channel Length:	699.0	ft	H:	0.5	
Overland C (5-yr):	0.59		Channel Type:	1	
t_i =	2.31	minutes	t_t =	19.67	minutes
t_c =	13.9	minutes	t_{c_check} =	13.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.21	in/hr			
Discharge:	3.01	cfs			
Upstream Flowby:	0.76	cfs			
Total Inlet Q:	3.77	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	6.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.81 ft
Gutter Capacity:	9.20 cfs		
Actual Depth:	0.41 ft		
Actual Velocity:	2.72 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4576.61

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	13.83
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.35
Width:	1.0 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	59%	E:	40.88%
Vo:	3.9 fps	Q caught:	1.54 cfs
E_{net} =	40.88%	Q flowby:	2.23 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-290I-1		
Station:	290+26.80	Grade Elevation:	4581.53
Offset:	26.50 Rt	WS El @ Grate:	4581.71

Inlet Hydrology:

Area Paved:	0.37	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.37	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	304.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	7.52	minutes
t_c =	8.9	minutes	t_{c_check} =	11.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.79	in/hr			
Discharge:	1.30	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.30	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	1.90%	Spread (allowable):	9.50 ft
		Actual Spread:	9.38 ft
Gutter Capacity:	1.35 cfs		
Actual Depth:	0.18 ft		
Actual Velocity:	1.56 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4581.71

Combined:

Type:	Single Standard		
U/S Curb Opening:			
Length:	3.0 ft	Lt:	17.64
Blockage:	100%	E:	0.00%
D/S Grate:			
Grate:	L 4	Eo:	0.37
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	63%	E:	41.44%
Vo:	3.9 fps	Q caught:	0.54 cfs
E_{net} =	41.44%	Q flowby:	0.76 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-295I-1		
Station:	295+65.90	Grate Elevation:	4589.63
Offset:	24.50 Lt	WS El @ Grate:	4589.85

Inlet Hydrology:

Area Paved:	0.62	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.62	Ac	C_{comp}:	0.93	
Overland Length:	48.0	ft	S_{over}:	2.00%	
Channel Length:	728.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.68	minutes	t_t =	20.62	minutes
t_c =	14.3	minutes	t_{c_check} =	14.3	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.17	in/hr			
Discharge:	1.83	cfs			
Upstream Flowby:	0.36	cfs			
Total Inlet Q:	2.19	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	11.03	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.22	ft		
Actual Velocity:	1.80	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4589.85

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	21.26
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.32
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	59%	E:	37.02%
Vo:	3.9 fps	Q caught:	0.81 cfs
E_{net} =	37.02%	Q flowby:	1.38 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-295I-2		
Station:	295+65.90	Grade Elevation:	4583.81
Offset:	24.50 Rt	WS El @ Grade:	4584.12

Inlet Hydrology:

Area Paved:	1.26	Ac	C_{paved}:	0.93	
Area Unpaved:	0.21	Ac	C_{unpav}:	0.20	
Total Area:	1.47	Ac	C_{comp}:	0.83	
Overland Length:	31.0	ft	S_{over}:	2.00%	
Channel Length:	851.0	ft	H:	0.5	
Overland C (5-yr):	0.83		Channel Type:	1	
t_i =	2.18	minutes	t_t =	24.69	minutes
t_c =	14.9	minutes	t_{c_check} =	14.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.11	in/hr			
Discharge:	3.78	cfs			
Upstream Flowby:	1.64	cfs			
Total Inlet Q:	5.42	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	15.49	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.31	ft		
Actual Velocity:	2.26	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4584.12	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	31.12
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.24
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.05
Blockage:	59%		E:	27.40%
Vo:	3.9	fps	Q caught:	1.49 cfs
E_{net} =	27.40%		Q flowby:	3.93 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-295P-1		
Station:	295+94.00	Grate Elevation:	4588.01
Offset:	42.50 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	1.72	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	1.72	Ac	C_{comp}:	0.93	
Overland Length:	241.0	ft	S_{over}:	2.00%	
Channel Length:	272.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	3.77	minutes	t_t =	6.61	minutes
t_c =	10.4	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.60	in/hr			
Discharge:	5.75	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	5.75	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-299P-1		
Station:	299+76.80	Grate Elevation:	4588.01
Offset:	42.50 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	1.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	1.32	Ac	C_{comp}:	0.93	
Overland Length:	227.0	ft	S_{over}:	2.00%	
Channel Length:	211.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	3.66	minutes	t_t =	4.93	minutes
t_c =	8.6	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.83	in/hr			
Discharge:	4.70	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	4.70	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-302P-1		
Station:	302+97.50	Grate Elevation:	4588.01
Offset:	42.50 Rt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	2.47	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	2.47	Ac	C_{comp}:	0.93	
Overland Length:	120.0	ft	S_{over}:	2.00%	
Channel Length:	612.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.66	minutes	t_t =	16.87	minutes
t_c =	14.1	minutes	t_{c_check} =	14.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.19	in/hr			
Discharge:	7.33	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	7.33	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-303I-1		
Station:	303+50.00	Grade Elevation:	4588.01
Offset:	7.00 Lt	WS El @ Grade:	4588.11

Inlet Hydrology:

Area Paved:	0.06	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.06	Ac	C_{comp}:	0.93	
Overland Length:	27.0	ft	S_{over}:	2.00%	
Channel Length:	100.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.26	minutes	t_t =	2.08	minutes
t_c =	5.0	minutes	t_{c_check} =	10.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.41	in/hr			
Discharge:	0.25	cfs			
Upstream Flowby:	0.27	cfs			
Total Inlet Q:	0.52	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	1.00%	Spread (allowable):	5.00 ft
		Actual Spread:	9.91 ft
Gutter Capacity:	0.08 cfs		
Actual Depth:	0.10 ft		
Actual Velocity:	1.05 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4588.11

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	6.0 ft	Lt:	17.57
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.25
Width:	1.0 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	63%	E:	30.14%
Vo:	3.9 fps	Q caught:	0.16 cfs
E_{net} =	30.14%	Q flowby:	0.36 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-304I-1		
Station:	304+41.70	Grate Elevation:	4588.01
Offset:	24.50 Rt	WS El @ Grate:	4588.25

Inlet Hydrology:

Area Paved:	0.97	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.97	Ac	C_{comp}:	0.93	
Overland Length:	43.0	ft	S_{over}:	2.00%	
Channel Length:	987.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.59	minutes	t_t =	29.30	minutes
t_c =	15.7	minutes	t_{c_check} =	15.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.04	in/hr			
Discharge:	2.74	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	2.74	cfs			

Gutter Hydraulics:

Slope:	2.00%	Street Roughness:	0.016	
Cross-Slope:	4.00%	Spread (allowable):	9.50	ft
		Actual Spread:	6.00	ft
Gutter Capacity:	9.34	cfs		
Actual Depth:	0.24	ft		
Actual Velocity:	3.81	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4588.25

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	23.38
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	L	4	Eo:	0.39
Width:	1.0	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.03
Blockage:	63%		E:	40.35%
Vo:	3.9	fps	Q caught:	1.11 cfs
E_{net} =	40.35%		Q flowby:	1.64 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-304I-2		
Station:	304+50.00	Grate Elevation:	4588.01
Offset:	7.20 Lt	WS El @ Grate:	4588.22

Inlet Hydrology:

Area Paved:	0.66 Ac	C_{paved}:	0.93
Area Unpaved:	0.00 Ac	C_{unpav}:	0
Total Area:	0.66 Ac	C_{comp}:	0.93
Overland Length:	34.0 ft	S_{over}:	2.00%
Channel Length:	952.0 ft	H:	0.5
Overland C (5-yr):	0.93	Channel Type:	1
t_i =	1.42 minutes	t_t =	28.11 minutes
t_c =	15.5 minutes	t_{c_check} =	15.5 minutes
One-hour Rainfall	1.33 inches	Freq.	100 yr.
Rainfall Intensity	3.06 in/hr		
Discharge:	1.88 cfs		
Upstream Flowby:	0.16 cfs		
Total Inlet Q:	2.04 cfs		

Gutter Hydraulics:

Slope:	2.00%	Street Roughness:	0.016
Cross-Slope:	4.00%	Spread (allowable):	5.00 ft
		Actual Spread:	5.37 ft
Gutter Capacity:	1.68 cfs		
Actual Depth:	0.21 ft		
Actual Velocity:	3.53 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4588.22

Combined:

Type: Triple Standard

U/S Curb Opening:

Length:	9.0 ft	Lt:	20.64
Blockage:	33%	E:	67.00%

D/S Grate:

Grate:	L 4	Eo:	0.42
Width:	1.0 ft	Rf:	1.00
Length:	9.0 ft	Rs:	0.30
Blockage:	63%	E:	59.86%
Vo:	7.5 fps	Q caught:	1.77 cfs
E_{net} =	86.75%	Q flowby:	0.27 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-314I-1		
Station:	314+25.00	Grade Elevation:	4590.55
Offset:	22.00 Lt	WS El @ Grade:	4590.63

Inlet Hydrology:

Area Paved:	0.07	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.07	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	96.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	1.99	minutes
t_c =	5.0	minutes	t_{c_check} =	10.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.41	in/hr			
Discharge:	0.29	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.29	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	0.88%	Spread (allowable):	9.50	ft
		Actual Spread:	8.61	ft
Gutter Capacity:	0.37	cfs		
Actual Depth:	0.08	ft		
Actual Velocity:	0.88	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.63

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	14.83
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.40
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.09
Blockage:	63%	E:	45.16%
Vo:	3.9 fps	Q caught:	0.13 cfs
E_{net} =	45.16%	Q flowby:	0.16 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-319I-1		
Station:	319+00	Grade Elevation:	4590.55
Offset:	Rt	WS El @ Grate:	4590.72

Inlet Hydrology:

Area Paved:	0.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.32	Ac	C_{comp}:	0.93	
Overland Length:	31.0	ft	S_{over}:	2.00%	
Channel Length:	341.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.35	minutes	t_t =	8.59	minutes
t_c =	9.9	minutes	t_{c_check} =	12.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.65	in/hr			
Discharge:	1.09	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.09	cfs			

Gutter Hydraulics:

Slope:	0.50%		Street Roughness:	0.016	
Cross-Slope:	2.00%		Spread (allowable):	9.50	ft
			Actual Spread:	8.49	ft
Gutter Capacity:	1.47	cfs			
Actual Depth:	0.17	ft			
Actual Velocity:	1.51	ft/s			

Inlet Hydraulics:

Class:	G	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4590.72	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	15.85
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	L 4		Eo:	0.41
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.07
Blockage:	63%		E:	44.95%
Vo:	3.9	fps	Q caught:	0.49 cfs
E_{net} =	44.95%		Q flowby:	0.60 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-323I-1		
Station:	323+30.00	Grate Elevation:	4590.55
Offset:	22.00 Lt	WS El @ Grate:	4590.78

Inlet Hydrology:

Area Paved:	0.88	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.88	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	807.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	23.22	minutes
t_c =	14.7	minutes	t_{c_check} =	14.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.14	in/hr			
Discharge:	2.57	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.57	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	11.71	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.23	ft		
Actual Velocity:	1.87	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.78

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	22.73
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.31
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.06
Blockage:	59%		E:	35.15%
Vo:	3.9	fps	Q caught:	0.90 cfs
E_{net} =	35.15%		Q flowby:	1.66 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-323I-2		
Station:	323+30.00	Grate Elevation:	4590.55
Offset:	22.00 Lt	WS El @ Grate:	4590.83

Inlet Hydrology:

Area Paved:	1.18	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	1.18	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	807.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	23.22	minutes
t_c =	14.7	minutes	t_{c_check} =	14.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.14	in/hr			
Discharge:	3.44	cfs			
Upstream Flowby:	0.60	cfs			
Total Inlet Q:	4.04	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	13.88	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.28	ft		
Actual Velocity:	2.10	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4590.83

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	27.51
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.26
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.05
Blockage:	59%		E:	30.26%
Vo:	3.9	fps	Q caught:	1.22 cfs
E_{net} =	30.26%		Q flowby:	2.82 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-334I-1		
Station:	334+10.00	Grate Elevation:	4593.45
Offset:	21.50 Rt	WS El @ Grate:	4593.68

Inlet Hydrology:

Area Paved:	0.82	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.82	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	641.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	17.80	minutes
t_c =	13.7	minutes	t_{c_check} =	13.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.22	in/hr			
Discharge:	2.46	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.46	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	11.52 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.23 ft		
Actual Velocity:	1.85 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.68

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	22.33
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.31
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	59%	E:	35.64%
Vo:	3.9 fps	Q caught:	0.88 cfs
E_{net} =	35.64%	Q flowby:	1.58 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-334I-2		
Station:	334+10.00	Grade Elevation:	4593.45
Offset:	21.50 Lt	WS El @ Grade:	4593.68

Inlet Hydrology:

Area Paved:	0.82	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.82	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	641.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	17.80	minutes
t_c =	13.7	minutes	t_{c_check} =	13.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.22	in/hr			
Discharge:	2.46	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.46	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	11.52 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.23 ft		
Actual Velocity:	1.85 ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4593.68	

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	22.33
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.31
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	59%	E:	35.64%
Vo:	3.9 fps	Q caught:	0.88 cfs
E_{net} =	35.64%	Q flowby:	1.58 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-340I-1		
Station:	340+90.86	Grate Elevation:	4596.29
Offset:	56.65 Lt	WS El @ Grate:	4596.42

Inlet Hydrology:

Area Paved:	0.16	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0.00	
Total Area:	0.16	Ac	C_{comp}:	0.93	
Overland Length:	101.0	ft	S_{over}:	2.00%	
Channel Length:	370.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.44	minutes	t_t =	9.44	minutes
t_c =	11.9	minutes	t_{c_check} =	12.6	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.42	in/hr			
Discharge:	0.51	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.51	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	6.39	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.13	ft		
Actual Velocity:	1.25	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.42

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	11.52
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.51
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.13
Blockage:	59%	E:	57.23%
Vo:	3.9 fps	Q caught:	0.29 cfs
E_{net} =	57.23%	Q flowby:	0.22 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-340I-2		
Station:	341+92.3	Grade Elevation:	4596.29
Offset:	75.50 Rt	WS El @ Grade:	4596.41

Inlet Hydrology:

Area Paved:	0.11	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0.00	
Total Area:	0.11	Ac	C_{comp}:	0.93	
Overland Length:	62.0	ft	S_{over}:	2.00%	
Channel Length:	127.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.91	minutes	t_t =	2.74	minutes
t_c =	5.0	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.41	in/hr			
Discharge:	0.45	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.45	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	6.11	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.12	ft		
Actual Velocity:	1.21	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4596.41	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	10.95
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.53
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.13
Blockage:	59%		E:	59.12%
Vo:	3.9	fps	Q caught:	0.27 cfs
E_{net} =	59.12%		Q flowby:	0.18 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-341I-1		
Station:	341+26.8	Grade Elevation:	4596.29
Offset:	56.70 Lt	WS El @ Grate:	4596.42

Inlet Hydrology:

Area Paved:	0.18 Ac	C_{paved}:	0.93
Area Unpaved:	0.00 Ac	C_{unpav}:	0.00
Total Area:	0.18 Ac	C_{comp}:	0.93
Overland Length:	101.0 ft	S_{over}:	2.00%
Channel Length:	434.0 ft	H:	0.5
Overland C (5-yr):	0.93	Channel Type:	1
t_i =	2.44 minutes	t_t =	11.34 minutes
t_c =	13.0 minutes	t_{c_check} =	13.0 minutes
One-hour Rainfall	1.33 inches	Freq.	100 yr.
Rainfall Intensity	3.30 in/hr		
Discharge:	0.55 cfs		
Upstream Flowby:	0.00 cfs		
Total Inlet Q:	0.55 cfs		

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.59 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.13 ft		
Actual Velocity:	1.27 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.42

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	11.93
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.50
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.12
Blockage:	59%	E:	55.95%
Vo:	3.9 fps	Q caught:	0.31 cfs
E_{net} =	55.95%	Q flowby:	0.24 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-341I-2		
Station:	341+47.90	Grade Elevation:	4596.29
Offset:	56.30 Lt	WS El @ Grade:	4596.43

Inlet Hydrology:

Area Paved:		Ac	C_{paved}:		
Area Unpaved:	0.95	Ac	C_{unpav}:	0.20	
Total Area:	0.95	Ac	C_{comp}:	0.20	
Overland Length:	114.0	ft	S_{over}:	2.00%	
Channel Length:	299.0	ft	H:	0.5	
Overland C (5-yr):	0.20		Channel Type:	1	
t_i =	13.73	minutes	t_t =	7.38	minutes
t_c =	12.3	minutes	t_{c_check} =	12.3	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.37	in/hr			
Discharge:	0.64	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.64	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.97 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.14 ft		
Actual Velocity:	1.32 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: G (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.43

Grate:

Type:	Large	Cw :	3.0
Width	2.0 ft	Co:	0.67
Length	3.0 ft		
Blockage:	59%	est. % bar	64%
Inlet Side Restriction:	no		

Weir:
d= 0.18 ft
Orifice:
d= 0.00 ft

Weir Controls, d = 0.18 ft
If the Inlet is in the gutter, the spread equals 8.9 ft

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-341I-3		
Station:	341+28.3	Grate Elevation:	4596.29
Offset:	75.00 Rt	WS El @ Grate:	4596.41

Inlet Hydrology:

Area Paved:	0.10	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0.00	
Total Area:	0.10	Ac	C_{comp}:	0.93	
Overland Length:	97.0	ft	S_{over}:	2.00%	
Channel Length:	100.2	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.39	minutes	t_t =	2.09	minutes
t_c =	5.0	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.41	in/hr			
Discharge:	0.41	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.41	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	5.89	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.12	ft		
Actual Velocity:	1.18	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4596.41	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	10.52
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.54
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.14
Blockage:	59%		E:	60.63%
Vo:	3.9	fps	Q caught:	0.25 cfs
E_{net} =	60.63%		Q flowby:	0.16 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-346I-2		
Station:	346+50.00	Grate Elevation:	4594.62
Offset:	22.00 Lt	WS El @ Grate:	4594.87

Inlet Hydrology:

Area Paved:	1.03	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	1.03	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	827.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	23.89	minutes
t_c =	14.8	minutes	t_{c_check} =	14.8	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.13	in/hr			
Discharge:	2.99	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.99	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	12.41	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.25	ft		
Actual Velocity:	1.95	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4594.87	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	24.25
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.29
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.06
Blockage:	59%		E:	33.43%
Vo:	3.9	fps	Q caught:	1.00
E_{net} =	33.43%		Q flowby:	1.99

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-346I-3		
Station:	346+50.00	Grade Elevation:	4593.99
Offset:	22.00 Rt	WS El @ Grade:	4594.26

Inlet Hydrology:

Area Paved:	1.23	Ac	C_{paved}:	0.93	
Area Unpaved:	0.08	Ac	C_{unpav}:	0	
Total Area:	1.31	Ac	C_{comp}:	0.87	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	827.0	ft	H:	0.5	
Overland C (5-yr):	0.87		Channel Type:	1	
t_i =	1.86	minutes	t_t =	23.89	minutes
t_c =	14.8	minutes	t_{c_check} =	14.8	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.13	in/hr			
Discharge:	3.58	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	3.58	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	13.26	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.27	ft		
Actual Velocity:	2.03	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4594.26

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	26.13
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.27
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.06
Blockage:	59%	E:	31.52%
Vo:	3.9 fps	Q caught:	1.13 cfs
E_{net} =	31.52%	Q flowby:	2.45 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-346I-4		
Station:	346+50.00	Grate Elevation:	4593.99
Offset:	61.10 Rt	WS El @ Grate:	4594.11

Inlet Hydrology:

Area Paved:		Ac	C_{paved}:		
Area Unpaved:	0.57	Ac	C_{unpav}:	0.2	
Total Area:	0.57	Ac	C_{comp}:	0.20	
Overland Length:	94.0	ft	S_{over}:	2.00%	
Channel Length:	128.0	ft	H:	0.5	
Overland C (5-yr):	0.20		Channel Type:	1	
t_i =	12.47	minutes	t_t =	2.77	minutes
t_c =	11.2	minutes	t_{c_check} =	11.2	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.49	in/hr			
Discharge:	0.40	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.40	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	5.83 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.17 ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	G	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4594.11	

Grate:

Type:	Large	Cw :	3.0
Width	2.0 ft	Co:	0.67
Length	3.0 ft		
Blockage:	59%	est. % bar	33%
Inlet Side Restriction:	no		
Weir:			
d=	0.13 ft		
Orifice:			
d=	0.00 ft		

Weir Controls, d = 0.13 ft
If the Inlet is in the gutter, the spread equals 6.4 ft

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-356I-1		
Station:	356+43.90	Grate Elevation:	4597.36
Offset:	22.00 Lt	WS El @ Grate:	4597.56

Inlet Hydrology:

Area Paved:	0.26	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.26	Ac	C_{comp}:	0.93	
Overland Length:	35.0	ft	S_{over}:	2.00%	
Channel Length:	174.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.44	minutes	t_t =	3.95	minutes
t_c =	5.4	minutes	t_{c_check} =	11.2	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.34	in/hr			
Discharge:	1.05	cfs			
Upstream Flowby:	0.74	cfs			
Total Inlet Q:	1.79	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	10.23	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.20	ft		
Actual Velocity:	1.71	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4597.56	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	19.54
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.35
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.08
Blockage:	59%		E:	39.46%
Vo:	3.9	fps	Q caught:	0.71 cfs
E_{net} =	39.46%		Q flowby:	1.08 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Colton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-356I-2		
Station:	356+43.90	Grate Elevation:	4597.38
Offset:	22.00 Rt	WS El @ Grate:	4597.60

Inlet Hydrology:

Area Paved:	0.32	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.32	Ac	C_{comp}:	0.93	
Overland Length:	37.0	ft	S_{over}:	2.00%	
Channel Length:	182.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.48	minutes	t_t =	4.16	minutes
t_c =	5.6	minutes	t_{c_check} =	11.2	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.29	in/hr			
Discharge:	1.28	cfs			
Upstream Flowby:	0.81	cfs			
Total Inlet Q:	2.09	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	10.84	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.22	ft		
Actual Velocity:	1.78	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4597.60	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	20.85
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.33
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.07
Blockage:	59%		E:	37.57%
Vo:	3.9	fps	Q caught:	0.78 cfs
E_{net} =	37.57%		Q flowby:	1.30 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-358I-1		
Station:	358+49.2	Grate Elevation:	4601.63
Offset:	22.00 Lt	WS El @ Grate:	4601.81

Inlet Hydrology:

Area Paved:	0.42	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.42	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	505.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	13.51	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.30	in/hr			
Discharge:	1.29	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.29	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	9.05	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.18	ft		
Actual Velocity:	1.57	ft/s		

Inlet Hydraulics:

Class:	G	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4601.81	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	17.03
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	L	4	Eo:	0.38
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.07
Blockage:	63%		E:	42.66%
Vo:	3.9	fps	Q caught:	0.55 cfs
E_{net} =	42.66%		Q flowby:	0.74 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-358I-2		
Station:	358+51.1	Grade Elevation:	4601.63
Offset:	22.00 Rt	WS El @ Grate:	4601.82

Inlet Hydrology:

Area Paved:	0.45	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.45	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	490.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	13.05	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.31	in/hr			
Discharge:	1.39	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.39	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	9.30 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.19 ft		
Actual Velocity:	1.60 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.82

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	17.55
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.37
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	63%	E:	41.72%
Vo:	3.9 fps	Q caught:	0.58 cfs
E_{net} =	41.72%	Q flowby:	0.81 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-364I-1		
Station:	364+42	Grate Elevation:	4601.12
Offset:	32.50 Lt	WS El @ Grate:	4601.29

Inlet Hydrology:

Area Paved:	0.36 Ac	C_{paved}:	0.93
Area Unpaved:	0.00 Ac	C_{unpav}:	0
Total Area:	0.36 Ac	C_{comp}:	0.93
Overland Length:	33.0 ft	S_{over}:	2.00%
Channel Length:	459.0 ft	H:	0.5
Overland C (5-yr):	0.93	Channel Type:	1
t_i =	1.40 minutes	t_t =	12.10 minutes
t_c =	12.7 minutes	t_{c_check} =	12.7 minutes
One-hour Rainfall	1.33 inches	Freq.	100 yr.
Rainfall Intensity	3.33 in/hr		
Discharge:	1.11 cfs		
Upstream Flowby:	0.00 cfs		
Total Inlet Q:	1.11 cfs		

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	20.00 ft
		Actual Spread:	8.57 ft
Gutter Capacity:	10.72 cfs		
Actual Depth:	0.17 ft		
Actual Velocity:	1.52 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.29

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	16.01
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.40
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.09
Blockage:	59%	E:	45.68%
Vo:	3.9 fps	Q caught:	0.51 cfs
E_{net} =	45.68%	Q flowby:	0.61 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-364I-2		
Station:	364+42	Grate Elevation:	4601.10
Offset:	32.50 Rt	WS El @ Grate:	4601.29

Inlet Hydrology:

Area Paved:	0.22	Ac	C_{paved}:	0.93	
Area Unpaved:	0.06	Ac	C_{unpav}:	0.2	
Total Area:	0.28	Ac	C_{comp}:	0.77	
Overland Length:	68.0	ft	S_{over}:	2.00%	
Channel Length:	142.0	ft	H:	0.5	
Overland C (5-yr):	0.77		Channel Type:	1	
t_i =	3.85	minutes	t_t =	3.12	minutes
t_c =	7.0	minutes	t_{c_check} =	11.2	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.07	in/hr			
Discharge:	0.88	cfs			
Upstream Flowby:	0.55	cfs			
Total Inlet Q:	1.43	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	20.00 ft
		Actual Spread:	9.41 ft
Gutter Capacity:	10.72 cfs		
Actual Depth:	0.19 ft		
Actual Velocity:	1.62 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.29

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	17.79
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.37
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	59%	E:	42.31%
Vo:	3.9 fps	Q caught:	0.61 cfs
E_{net} =	42.31%	Q flowby:	0.83 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-365I-1		
Station:	366+00	Grate Elevation:	4601.63
Offset:	22.00 Rt	WS El @ Grate:	4601.80

Inlet Hydrology:

Area Paved:	0.29	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.29	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	302.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	7.46	minutes
t_c =	8.9	minutes	t_{c_check} =	11.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.79	in/hr			
Discharge:	1.02	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.02	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	8.30	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.17	ft		
Actual Velocity:	1.49	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.80

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	15.45
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.41
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	63%	E:	45.78%
Vo:	3.9 fps	Q caught:	0.47 cfs
E_{net} =	45.78%	Q flowby:	0.55 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-371I-1		
Station:	371+44.7	Grate Elevation:	4601.63
Offset:	22.00 Rt	WS El @ Grate:	4601.78

Inlet Hydrology:

Area Paved:	0.19	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.19	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	202.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	4.69	minutes
t_c =	6.1	minutes	t_{c_check} =	11.3	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.22	in/hr			
Discharge:	0.75	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.75	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	7.37	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.15	ft		
Actual Velocity:	1.37	ft/s		

Inlet Hydraulics:

Class:	G	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4601.78	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	13.52
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	L	4	Eo:	0.46
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.09
Blockage:	63%		E:	50.31%
Vo:	3.9	fps	Q caught:	0.37 cfs
E_{net} =	50.31%		Q flowby:	0.37 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-373I-1		
Station:	373+00	Grate Elevation:	4601.63
Offset:	42.00 Rt	WS El @ Grate:	4601.75

Inlet Hydrology:

Area Paved:		Ac	C_{paved}:		
Area Unpaved:	0.44	Ac	C_{unpav}:	0.32	
Total Area:	0.44	Ac	C_{comp}:	0.32	
Overland Length:	34.0	ft	S_{over}:	2.00%	
Channel Length:	391.0	ft	H:	0.5	
Overland C (5-yr):	0.32		Channel Type:	4	
t_i =	6.50	minutes	t_t =	10.06	minutes
t_c =	12.4	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.37	in/hr			
Discharge:	0.47	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.47	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	6.22 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.12 ft		
Actual Velocity:	1.23 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: G (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4601.75

Grate:

Type:	Large	Cw :	3.0
Width	2.0 ft	Co:	0.67
Length	3.0 ft		
Blockage:	59%	est. % bar	64%
Inlet Side Restriction:	no		
Weir:			
d=	0.14 ft		
Orifice:			
d=	0.00 ft		

Weir Controls, d = 0.14 ft
If the Inlet is in the gutter, the spread equals 7.2 ft

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-373I-2		
Station:	373+00	Grade Elevation:	4575.32
Offset:	22.00 Rt	WS El @ Grate:	4575.58

Inlet Hydrology:

Area Paved:	0.82	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.82	Ac	C_{comp}:	0.93	
Overland Length:	34.0	ft	S_{over}:	2.00%	
Channel Length:	1177.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.42	minutes	t_t =	35.91	minutes
t_c =	16.7	minutes	t_{c_check} =	16.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	2.95	in/hr			
Discharge:	2.25	cfs			
Upstream Flowby:	1.20	cfs			
Total Inlet Q:	3.45	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	13.09 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.26 ft		
Actual Velocity:	2.02 ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4575.58	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0 ft		Lt:	25.75
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.28
Width:	1.5 ft		Rf:	1.00
Length:	3.0 ft		Rs:	0.06
Blockage:	59%		E:	31.89%
Vo:	3.9 fps		Q caught:	1.10 cfs
E_{net} =	31.89%		Q flowby:	2.35 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-373I-3		
Station:	373+00	Grate Elevation:	4601.63
Offset:	22.00 Lt	WS El @ Grate:	4601.86

Inlet Hydrology:

Area Paved:	0.86	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.86	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	1177.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	35.91	minutes
t_c =	16.7	minutes	t_{c_check} =	16.7	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	2.95	in/hr			
Discharge:	2.36	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.36	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	11.35	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.23	ft		
Actual Velocity:	1.83	ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4601.86	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	21.96
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C 4		Eo:	0.32
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.07
Blockage:	59%		E:	36.11%
Vo:	3.9	fps	Q caught:	0.85 cfs
E_{net} =	36.11%		Q flowby:	1.51 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-388I-1		
Station:	379+78.9	Grade Elevation:	4606.66
Offset:	22.00 Rt	WS El @ Grate:	4606.85

Inlet Hydrology:

Area Paved:	0.46	Ac	C_{paved}:	0.93	
Area Unpaved:		Ac	C_{unpav}:		
Total Area:	0.46	Ac	C_{comp}:	0.93	
Overland Length:	34.0	ft	S_{over}:	0.50%	
Channel Length:	500.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	2.25	minutes	t_t =	13.36	minutes
t_c =	13.0	minutes	t_{c_check} =	13.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.30	in/hr			
Discharge:	1.41	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.41	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	9.37	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.19	ft		
Actual Velocity:	1.61	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.85

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	17.69
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.37
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	63%	E:	41.46%
Vo:	3.9 fps	Q caught:	0.59 cfs
E_{net} =	41.46%	Q flowby:	0.83 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-388I-1		
Station:	388+50	Grate Elevation:	4606.66
Offset:	22.00 Lt	WS El @ Grate:	4606.86

Inlet Hydrology:

Area Paved:	0.37	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.37	Ac	C_{comp}:	0.93	
Overland Length:	31.0	ft	S_{over}:	2.00%	
Channel Length:	329.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.35	minutes	t_t =	8.24	minutes
t_c =	9.6	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.70	in/hr			
Discharge:	1.27	cfs			
Upstream Flowby:	0.38	cfs			
Total Inlet Q:	1.65	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	9.93	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.20	ft		
Actual Velocity:	1.68	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.86

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	18.89
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.35
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	59%	E:	40.47%
Vo:	3.9 fps	Q caught:	0.67 cfs
E_{net} =	40.47%	Q flowby:	0.98 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-388I-2		
Station:	388+50	Grate Elevation:	4606.58
Offset:	22.00 Rt	WS El @ Grate:	4606.80

Inlet Hydrology:

Area Paved:	0.46	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.46	Ac	C_{comp}:	0.93	
Overland Length:	36.0	ft	S_{over}:	2.00%	
Channel Length:	325.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.46	minutes	t_t =	8.12	minutes
t_c =	9.6	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.70	in/hr			
Discharge:	1.58	cfs			
Upstream Flowby:	0.48	cfs			
Total Inlet Q:	2.06	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	10.79 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.22 ft		
Actual Velocity:	1.77 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.80

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	20.74
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.33
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.07
Blockage:	59%	E:	37.72%
Vo:	3.9 fps	Q caught:	0.78 cfs
E_{net} =	37.72%	Q flowby:	1.28 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-391I-1		
Station:	391+00	Grate Elevation:	4606.03
Offset:	34.00 Lt	WS El @ Grate:	4606.18

Inlet Hydrology:

Area Paved:	0.20	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.20	Ac	C_{comp}:	0.93	
Overland Length:	54.0	ft	S_{over}:	2.00%	
Channel Length:	213.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.79	minutes	t_t =	4.99	minutes
t_c =	6.8	minutes	t_{c_check} =	11.5	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.10	in/hr			
Discharge:	0.76	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.76	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	21.50	ft
		Actual Spread:	7.44	ft
Gutter Capacity:	13.00	cfs		
Actual Depth:	0.15	ft		
Actual Velocity:	1.38	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.18

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	13.66
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	L	4	Eo:	0.45
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.09
Blockage:	63%		E:	49.95%
Vo:	3.9	fps	Q caught:	0.38 cfs
E_{net} =	49.95%		Q flowby:	0.38 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-391I-1		
Station:	391+00	Grade Elevation:	4606.11
Offset:	32.84 Rt	WS El @ Grade:	4606.27

Inlet Hydrology:

Area Paved:	0.24	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.24	Ac	C_{comp}:	0.93	
Overland Length:	49.0	ft	S_{over}:	2.00%	
Channel Length:	217.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.70	minutes	t_i =	5.09	minutes
t_c =	6.8	minutes	t_{c_check} =	11.5	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.10	in/hr			
Discharge:	0.92	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	0.92	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	20.30 ft
		Actual Spread:	7.96 ft
Gutter Capacity:	11.15 cfs		
Actual Depth:	0.16 ft		
Actual Velocity:	1.44 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.27

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	14.74
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.43
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	63%	E:	47.34%
Vo:	3.9 fps	Q caught:	0.43 cfs
E_{net} =	47.34%	Q flowby:	0.48 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-395I-1		
Station:	395+93	Grade Elevation:	4606.66
Offset:	34.00 Lt	WS El @ Grate:	4606.86

Inlet Hydrology:

Area Paved:	0.43	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.43	Ac	C_{comp}:	0.93	
Overland Length:	160.0	ft	S_{over}:	2.00%	
Channel Length:	182.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	3.07	minutes	t_t =	4.16	minutes
t_c =	7.2	minutes	t_{c_check} =	11.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.03	in/hr			
Discharge:	1.61	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.61	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	21.50 ft
		Actual Spread:	9.84 ft
Gutter Capacity:	13.00 cfs		
Actual Depth:	0.20 ft		
Actual Velocity:	1.67 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.86

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	18.70
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.36
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	59%	E:	40.78%
Vo:	3.9 fps	Q caught:	0.66 cfs
E_{net} =	40.78%	Q flowby:	0.95 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-395I-2		
Station:	395+93	Grade Elevation:	4606.66
Offset:	22.00 Rt	WS El @ Grade:	4606.83

Inlet Hydrology:

Area Paved:	0.34	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.34	Ac	C_{comp}:	0.93	
Overland Length:	23.0	ft	S_{over}:	2.00%	
Channel Length:	712.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	I	
t_i =	1.17	minutes	t_t =	20.10	minutes
t_c =	14.1	minutes	t_{c_check} =	14.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.19	in/hr			
Discharge:	1.01	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.01	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	8.26 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.17 ft		
Actual Velocity:	1.48 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.83

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	15.36
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.41
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.10
Blockage:	59%	E:	47.06%
Vo:	3.9 fps	Q caught:	0.47 cfs
E_{net} =	47.06%	Q flowby:	0.53 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-139I-1		
Station:	139+65	Grade Elevation:	4599.82
Offset:	46.00 Lt	WS El @ Grade:	4600.02

Inlet Hydrology:

Area Paved:	0.57	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.57	Ac	C_{comp}:	0.93	
Overland Length:	22.0	ft	S_{over}:	2.00%	
Channel Length:	500.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.14	minutes	t_t =	13.36	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.31	in/hr			
Discharge:	1.75	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.75	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	10.16	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.20	ft		
Actual Velocity:	1.70	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4600.02

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	19.38
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.35
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	59%	E:	39.71%
Vo:	3.9 fps	Q caught:	0.70 cfs
E_{net} =	39.71%	Q flowby:	1.06 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-139I-2		
Station:	139+65	Grade Elevation:	4599.74
Offset:	34.00 Rt	WS El @ Grate:	4599.94

Inlet Hydrology:

Area Paved:	0.57	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.57	Ac	C_{comp}:	0.93	
Overland Length:	22.0	ft	S_{over}:	2.00%	
Channel Length:	500.7	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.14	minutes	t_t =	13.38	minutes
t_c =	12.9	minutes	t_{c_check} =	12.9	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.31	in/hr			
Discharge:	1.75	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.75	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	10.16 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.20 ft		
Actual Velocity:	1.70 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4599.94

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	19.38
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.35
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	59%	E:	39.71%
Vo:	3.9 fps	Q caught:	0.70 cfs
E_{net} =	39.71%	Q flowby:	1.06 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-137I-1		
Station:	137+40	Grate Elevation:	4606.31
Offset:	34.00 Lt	WS El @ Grate:	4606.49

Inlet Hydrology:

Area Paved:	0.30	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.30	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	154.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_i =	3.43	minutes
t_c =	5.1	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.38	in/hr			
Discharge:	1.22	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.22	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	8.87	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.18	ft		
Actual Velocity:	1.55	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.49

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	16.65
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.39
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.09
Blockage:	59%	E:	44.42%
Vo:	3.9 fps	Q caught:	0.54 cfs
E_{net} =	44.42%	Q flowby:	0.68 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-137I-2		
Station:	137+40	Grade Elevation:	4606.31
Offset:	34.00 Rt	WS El @ Grade:	4606.48

Inlet Hydrology:

Area Paved:	0.28	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.28	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	154.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_t =	3.43	minutes
t_c =	5.1	minutes	t_{c_check} =	11.1	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	4.38	in/hr			
Discharge:	1.14	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.14	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	8.64 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.17 ft		
Actual Velocity:	1.53 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4606.48

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	16.17
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.40
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.09
Blockage:	59%	E:	45.36%
Vo:	3.9 fps	Q caught:	0.52 cfs
E_{net} =	45.36%	Q flowby:	0.62 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-125I-1		
Station:	125+56.50	Grade Elevation:	4595.80
Offset:	21.00 Lt	WS El @ Grade:	4596.02

Inlet Hydrology:

Area Paved:	0.75	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.75	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	956.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_t =	28.24	minutes
t_c =	15.6	minutes	t_{c_check} =	15.6	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.05	in/hr			
Discharge:	2.13	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.13	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	10.92 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.22 ft		
Actual Velocity:	1.79 ft/s		

Inlet Hydraulics:

Class:	G	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4596.02	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0	ft	Lt:	21.02
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	L	4	Eo:	0.33
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.06
Blockage:	63%		E:	36.40%
Vo:	3.9	fps	Q caught:	0.77 cfs
E_{net} =	36.40%		Q flowby:	1.35 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-125I-2		
Station:	125+56.50	Grade Elevation:	4595.80
Offset:	21.00 Rt	WS El @ Grate:	4596.03

Inlet Hydrology:

Area Paved:	0.83	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.83	Ac	C_{comp}:	0.93	
Overland Length:	50.0	ft	S_{over}:	2.00%	
Channel Length:	958.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.72	minutes	t_t =	28.31	minutes
t_c =	15.6	minutes	t_{c_check} =	15.6	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.05	in/hr			
Discharge:	2.35	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	2.35	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	11.34 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.23 ft		
Actual Velocity:	1.83 ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.03

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	21.93
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.32
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.05
Blockage:	63%	E:	35.23%
Vo:	3.9 fps	Q caught:	0.83 cfs
E_{net} =	35.23%	Q flowby:	1.53 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-112I-1		
Station:	112+54	Grade Elevation:	4595.80
Offset:	21.00 Rt	WS El @ Grade:	4596.03

Inlet Hydrology:

Area Paved:	0.86	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.86	Ac	C_{comp}:	0.93	
Overland Length:	38.0	ft	S_{over}:	2.00%	
Channel Length:	1261.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.50	minutes	t_t =	38.89	minutes
t_c =	17.2	minutes	t_{c_check} =	17.2	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	2.91	in/hr			
Discharge:	2.33	cfs			
Upstream Flowby:	0.24	cfs			
Total Inlet Q:	2.57	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	11.72 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.23 ft		
Actual Velocity:	1.87 ft/s		

Inlet Hydraulics:

Class: C (G - on grade or S - sag)
Inlet Type: G (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.03

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	22.75
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	L 4	Eo:	0.31
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.05
Blockage:	63%	E:	34.24%
Vo:	3.9 fps	Q caught:	0.88 cfs
E_{net} =	34.24%	Q flowby:	1.69 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-112I-2		
Station:	112+54	Grate Elevation:	4595.80
Offset:	21.00 Rt	WS El @ Grate:	4596.03

Inlet Hydrology:

Area Paved:	0.84	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.84	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	1262.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_t =	38.92	minutes
t_c =	17.2	minutes	t_{c_check} =	17.2	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	2.92	in/hr			
Discharge:	2.28	cfs			
Upstream Flowby:	0.28	cfs			
Total Inlet Q:	2.56	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	11.69	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.23	ft		
Actual Velocity:	1.87	ft/s		

Inlet Hydraulics:

Class: G (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4596.03

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	22.70
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	L	4	Eo:	0.31
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.05
Blockage:	63%		E:	34.29%
Vo:	3.9	fps	Q caught:	0.88 cfs
E_{net} =	34.29%		Q flowby:	1.68 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-108I-1		
Station:	108+47	Grate Elevation:	4593.39
Offset:	21.00 Lt	WS El @ Grate:	4593.66

Inlet Hydrology:

Area Paved:	0.66	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.66	Ac	C_{comp}:	0.93	
Overland Length:	36.0	ft	S_{over}:	2.00%	
Channel Length:	440.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.46	minutes	t_t =	11.53	minutes
t_c =	12.6	minutes	t_{c_check} =	12.6	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.34	in/hr			
Discharge:	2.05	cfs			
Upstream Flowby:	1.69	cfs			
Total Inlet Q:	3.74	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	13.48 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.27 ft		
Actual Velocity:	2.06 ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4593.66	

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	26.62
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.27
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.06
Blockage:	59%	E:	31.06%
Vo:	3.9 fps	Q caught:	1.16 cfs
E_{net} =	31.06%	Q flowby:	2.58 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-108I-2		
Station:	108+47	Grate Elevation:	4593.23
Offset:	21.00 Rt	WS El @ Grate:	4593.49

Inlet Hydrology:

Area Paved:	0.56	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.56	Ac	C_{comp}:	0.93	
Overland Length:	33.0	ft	S_{over}:	2.00%	
Channel Length:	440.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.40	minutes	t_i =	11.53	minutes
t_c =	12.6	minutes	t_{c_check} =	12.6	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.34	in/hr			
Discharge:	1.74	cfs			
Upstream Flowby:	1.68	cfs			
Total Inlet Q:	3.42	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	13.04 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.26 ft		
Actual Velocity:	2.01 ft/s		

Inlet Hydraulics:

Class:	S	(G - on grade or S - sag)
Inlet Type:	C	(G - grate, O - curb opening, C - combined)
WSEL @ Grate:	4593.49	

Combined:

Type:	Single Standard			
U/S Curb Opening:				
Length:	3.0 ft		Lt:	25.64
Blockage:	100%		E:	0.00%
D/S Grate:				
Grate:	C	4	Eo:	0.28
Width:	1.5 ft		Rf:	1.00
Length:	3.0 ft		Rs:	0.06
Blockage:	59%		E:	31.99%
Vo:	3.9 fps		Q caught:	1.09 cfs
E_{net} =	31.99%		Q flowby:	2.33 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-100I-1		
Station:	100+51	Grate Elevation:	4593.45
Offset:	21.00 Lt	WS El @ Grate:	4593.65

Inlet Hydrology:

Area Paved:	0.50	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.50	Ac	C_{comp}:	0.93	
Overland Length:	32.0	ft	S_{over}:	2.00%	
Channel Length:	392.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.37	minutes	t_t =	10.09	minutes
t_c =	11.5	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.47	in/hr			
Discharge:	1.61	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.61	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016	
Cross-Slope:	2.00%	Spread (allowable):	9.50	ft
		Actual Spread:	9.84	ft
Gutter Capacity:	1.47	cfs		
Actual Depth:	0.20	ft		
Actual Velocity:	1.67	ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.65

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0	ft	Lt:	18.70
Blockage:	100%		E:	0.00%

D/S Grate:

Grate:	C	4	Eo:	0.36
Width:	1.5	ft	Rf:	1.00
Length:	3.0	ft	Rs:	0.08
Blockage:	59%		E:	40.78%
Vo:	3.9	fps	Q caught:	0.66 cfs
E_{net} =	40.78%		Q flowby:	0.96 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 29-Jun-05

Inlet Location:

ID No.:	ST-100I-2		
Station:	100+51	Grade Elevation:	4593.44
Offset:	21.00 Rt	WS El @ Grate:	4593.64

Inlet Hydrology:

Area Paved:	0.49	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.49	Ac	C_{comp}:	0.93	
Overland Length:	32.0	ft	S_{over}:	2.00%	
Channel Length:	394.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.37	minutes	t_t =	10.15	minutes
t_c =	11.5	minutes	t_{c_check} =	12.4	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.46	in/hr			
Discharge:	1.58	cfs			
Upstream Flowby:	0.00	cfs			
Total Inlet Q:	1.58	cfs			

Gutter Hydraulics:

Slope:	0.50%	Street Roughness:	0.016
Cross-Slope:	2.00%	Spread (allowable):	9.50 ft
		Actual Spread:	9.76 ft
Gutter Capacity:	1.47 cfs		
Actual Depth:	0.20 ft		
Actual Velocity:	1.66 ft/s		

Inlet Hydraulics:

Class: S (G - on grade or S - sag)
Inlet Type: C (G - grate, O - curb opening, C - combined)
WSEL @ Grate: 4593.64

Combined:

Type: Single Standard

U/S Curb Opening:

Length:	3.0 ft	Lt:	18.53
Blockage:	100%	E:	0.00%

D/S Grate:

Grate:	C 4	Eo:	0.36
Width:	1.5 ft	Rf:	1.00
Length:	3.0 ft	Rs:	0.08
Blockage:	59%	E:	41.06%
Vo:	3.9 fps	Q caught:	0.65 cfs
E_{net} =	41.06%	Q flowby:	0.93 cfs

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
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Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-172		
Station:	93+00.00	Grate Elevation:	4588.01
Offset:	29.00 Lt	WS El @ Grate:	0.00

Inlet Hydrology:

Area Paved:	0.53	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.53	Ac	C_{comp}:	0.93	
Overland Length:	35.0	ft	S_{over}:	2.00%	
Channel Length:	322.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.44	minutes	t_t =	8.04	minutes
t_c =	9.5	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.71	in/hr			
Discharge:	1.83	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.83	cfs			

INLET DESIGN CALCULATION

Description: Inlet Hydrology and Capacity Analysis
for City of Grand Junction Inlet Types
Methodology: UDFCD Rational Method (1984), and
FHWA "Drainage of Highway Pavements" HEC No. 12
Template by: George K. Cotton, PE
Carter & Burgess, Inc.
Last Revised: 1-Jul-05

Inlet Location:

ID No.:	DP-173		
Station:	93+00.00	Grade Elevation:	4588.01
Offset:	29.00 Rt	WS El @ Grade:	0.00

Inlet Hydrology:

Area Paved:	0.53	Ac	C_{paved}:	0.93	
Area Unpaved:	0.00	Ac	C_{unpav}:	0	
Total Area:	0.53	Ac	C_{comp}:	0.93	
Overland Length:	32.0	ft	S_{over}:	2.00%	
Channel Length:	323.0	ft	H:	0.5	
Overland C (5-yr):	0.93		Channel Type:	1	
t_i =	1.37	minutes	t_t =	8.07	minutes
t_c =	9.4	minutes	t_{c_check} =	12.0	minutes
One-hour Rainfall	1.33	inches	Freq.	100	yr.
Rainfall Intensity	3.72	in/hr			
Discharge:	1.83	cfs			
Upstream Flowby:		cfs			
Total Inlet Q:	1.83	cfs			