

Lead and Coal Avenues
Storm Drain Improvements



Drainage Report

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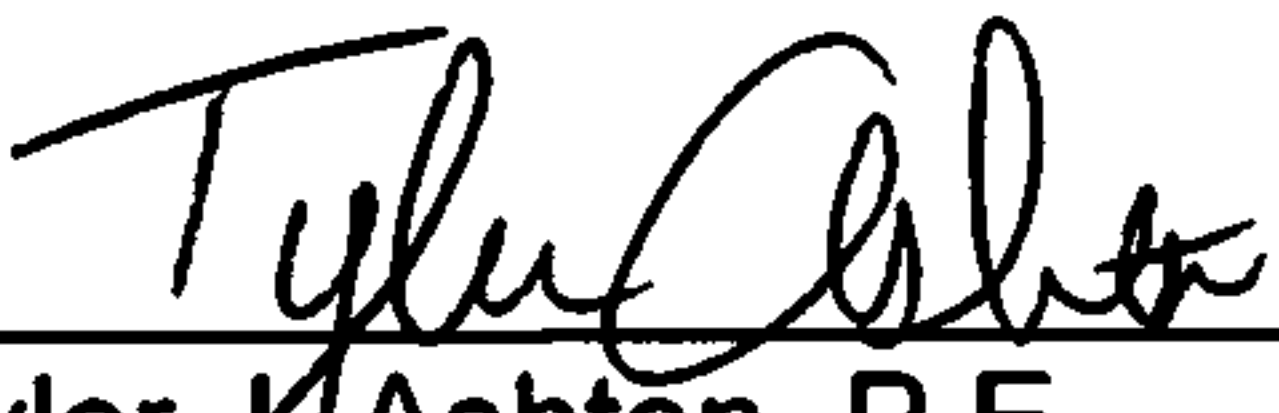
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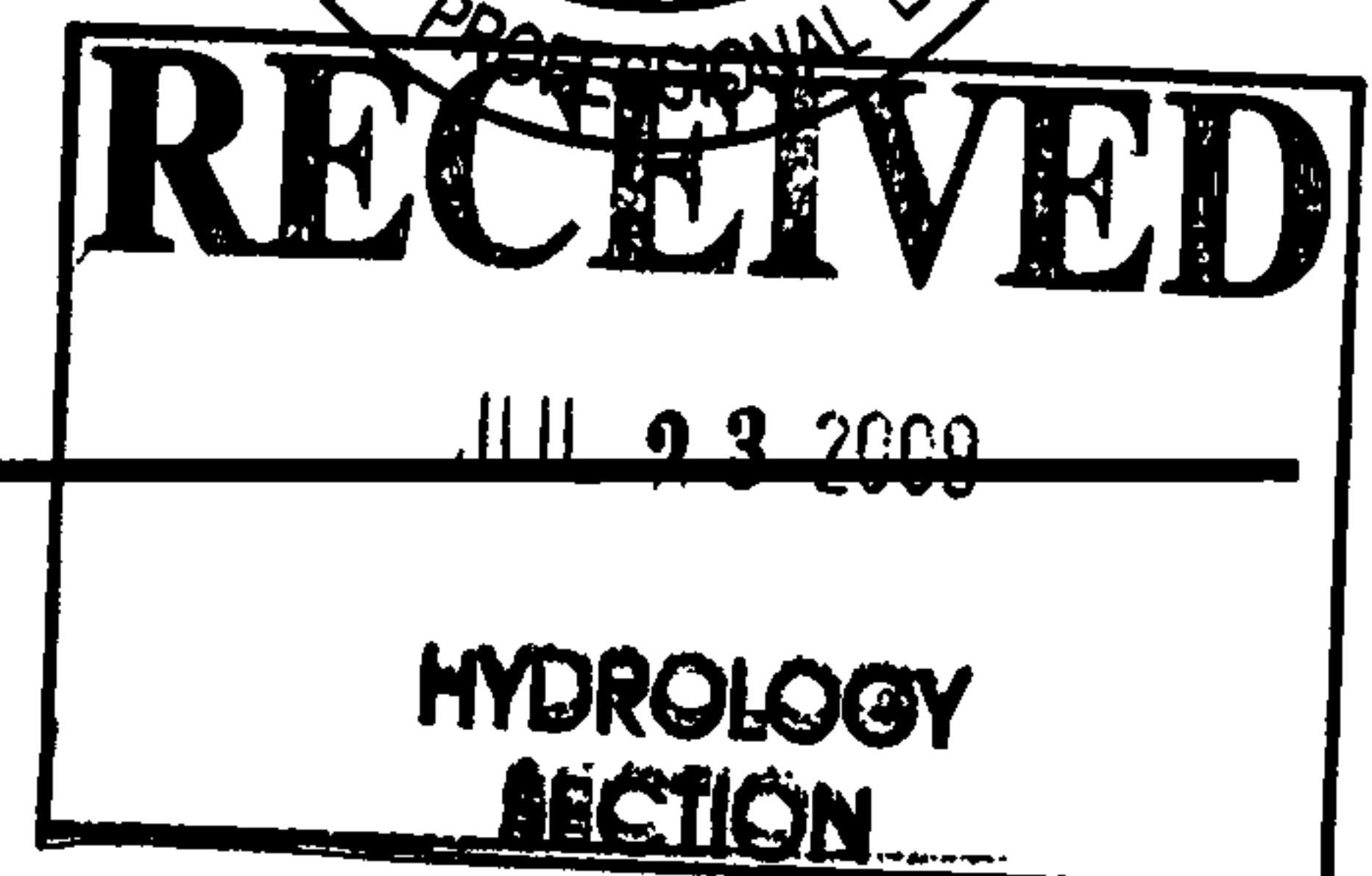
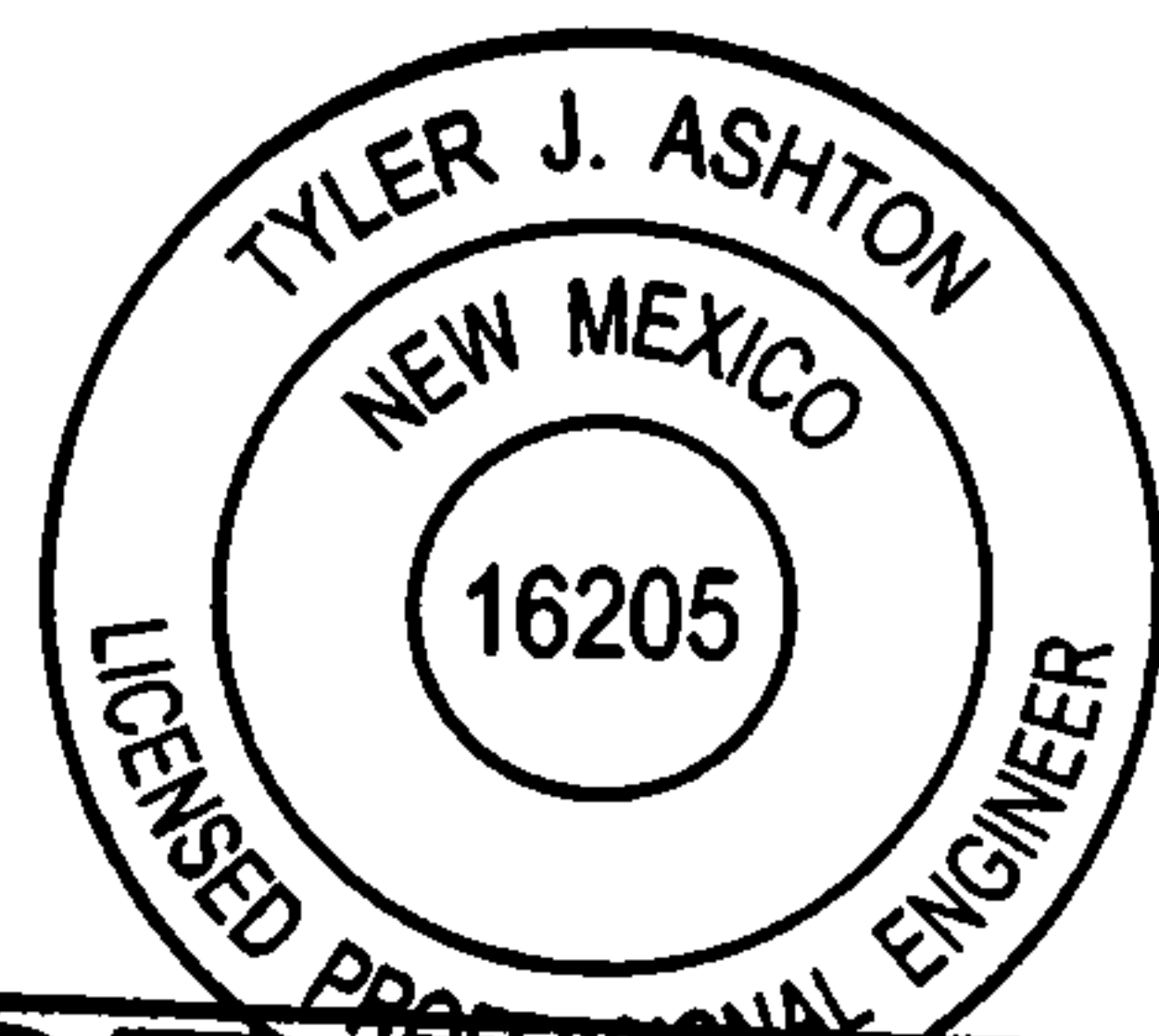
LEAD & COAL AVENUES STORM DRAIN IMPROVEMENTS

DRAINAGE REPORT

JULY 2009

I, Tyler J. Ashton, do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.


Tyler J. Ashton, P.E.
NMPE No. 16205
7-23-09
Date



WILSON
& COMPANY

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1 Introduction

Many concerns on the functionality of Lead and Coal Avenues, from Broadway Avenue to Washington Street, have been expressed over the years from local residents. The major's office in late 2005, asked Wilson & Company, Inc. (WCI) to assess the corridor. Along with WCI, the Lead and Coal project team includes the City of Albuquerque (COA) and the Lead & Coal Avenues Task Force (LCATF). After review of many alternatives of the proposed corridors, the final design for each roadway includes two driving lanes, on-street bicycle lane, pedestrian amenities, and ADA accessible facilities. The intent of this project is to make the livability better for the surrounding residents and the Lead and Coal commuters. This drainage report and its recommendations ensure the safety of the public. The proposed storm drain follows the criteria in Section 2 and utilizes various existing storm drain systems in the project area.

Thompson Engineering Consultants, Inc. (TEC) submitted a drainage report to the City of Albuquerque for storm drain improvements on Coal Ave. between Harvard Dr. and Yale Blvd. Refer to TEC's drainage report for the storm drain analysis on Coal Ave. between Harvard Dr. and Yale Blvd. Runoff from the project area discharges to one of four existing storm drain systems. A ridge in the project area runs along Carlisle Blvd. The runoff east of the Carlisle Blvd. reaches the North Diversion Channel (NDC) by NDC1 system. Runoff between Carlisle Blvd. and I-25 reaches the South Diversion Channel (SDC) by SDC1 and SDC2 systems. Runoff between I-25 and Broadway Blvd. reaches Commercial Pond (CPD) by the CPD1 System. Refer to Exhibit 1 for existing storm drain systems.

Proposed storm drain improvements include laterals, upsizing existing laterals, and modifying inlet configurations. Watersheds for the proposed condition help analyze the amount of runoff needed to be intercepted and conveyed by existing and proposed laterals. The existing condition diverts surface runoff to its intersecting streets. Proposed storm drain captures runoff in the corridors and runoff is only diverted by existing storm systems.

1.1 Purpose

This report seeks permit approval for the proposed storm drain on Lead & Coal Avenue.

1.2 Existing Reports

Previous reports in the project site were used to help aid in hydrologic and hydraulic analyses.

"Study Phase Letter Report For Coal Avenue Storm Drain Rehabilitation Project City Project No. 4522.91", dated July 2008, by Thompson Engineering Consultants, Inc.

"Engineering Feasibility Report For Lead Coal Improvements Broadway Boulevard to I-25", dated August 2000, by Chavez Grieves Consulting Engineers, Inc.

1.3 Site Location

The project corridor for Lead and Coal Avenue improvements extend from Broadway Avenue to Washington Street.



Figure 1: Vicinity Map

1.4 Project Description

The projects focus is to improve the neighborhood's livability by protecting motorists, bicyclists, pedestrians, and surrounding residents. Many accidents on the corridors have occurred due to a mixture of the existing transportation arrangement of varying cross-section, traffic control devices (signs, signals, and markings), and traffic management devices (curbs, medians, diverters). The project also includes drainage improvements. This report analyzes the corridor's watershed, existing storm drain, and recommends drainage improvements.

The existing storm drain systems within the project limits were analyzed for possible utilization. If the system has adequate capacity and/or helps divert runoff from the proposed system, the existing storm drain system is incorporated with the proposed storm drain system. Thompson Engineering Consultants, Inc (TEC) completed a drainage study on Coal's corridor between Harvard Dr. and Carlisle Blvd. in 2008. It examined alternatives for increasing Yale Blvd. capacity south of Coal Ave. and it proposed a storm drain system on Coal Ave. TEC's recommended drainage improvements on Coal Ave., are being integrated in the Lead & Coal Improvement Project.

The Proposed Basin Map provided in Appendix C, delineates watershed's for each proposed system. The objective of each storm drain system is to capture the watershed's runoff and discharge it into an existing mainline. The design does not allow diverting runoff from the corridors to adjoining streets. This report describes the design criteria, hydrologic analysis, and hydraulic analysis for the proposed storm drain systems.

2 Design Criteria and Analysis Software

2.1 General Criteria

The drainage criteria used in this report establishes the minimum standards for the hydraulic system design. The hydraulic design criterion for closed conduits is referenced in Albuquerque's Development Process Manual, Volume 2, Chapter 22, Section 3. Section 3.1.1 of this report summarizes the hydraulic criteria.

2.1.1 Hydrology Criteria

Listed below are the design criteria for the hydrologic analysis.

1. The design storm event is the 100-year, 6-hour event.
2. The AHYMO computer program was used to calculate peak flows and volumetric runoff.
3. The minimum Time of Concentration (T_c) is 12 minutes.
4. Precipitation values obtained from Table A-2, Chapter 22, DPM.
5. Land Treatment Type D obtained from Equation A-4, Table A-5, Chapter 22, DPM.
6. Pipe Capacities were calculated to determine the amount of runoff discharging into a proposed storm drain system from an existing system.
7. Pipe Capacities of existing systems were calculated to determine the amount of runoff diverted from the proposed system to an existing system.
8. TEC's watershed overflows approximately 81 cfs to Coal/Buena Vista Storm drain.

2.1.2 Hydraulic Criteria

Listed below are the design criteria for the hydraulic analysis.

1. Maximum linear spacing of manhole is 450'.
2. Minimum pipe slope is 0.5%.
3. Minimum diameter for main line conduit is 24" or equivalent hydraulic capacity.
4. Minimum lateral pipe diameter size is 18".
5. Modeling program used for storm drain capacity is Stormcad.
6. Model conduit with a Manning's $n=0.013$.
7. Minimum cover is 2' to top of subgrade.
8. Maximum Hydraulic Grade Line is finish grade for storm drain.
9. Runoff from watershed's are conveyed through the existing or proposed storm drain systems.
10. Type 'A' Inlets to be utilized on-grade condition.
11. Type "C" Inlets to be utilized in sump condition.

2.2 Applicable Standards and References

The following standards listed in this section are in accordance for the design of the drainage improvements.

2.2.1 Standards

- City of Albuquerque Development Process Manual (July 1997).
- City of Albuquerque Standard Specifications For Public Works Construction (Updated Version of July 2003).

3 Hydrologic Analysis

Local neighborhoods within the project limits include Huning Highland Historic District, University Heights, and the Southeast Heights. Since these areas are well established and nearly fully developed, the existing and proposed land treatment conditions are the same. Runoff discharged to the project's corridors is ultimately conveyed to the SDC, CPD, or the NDC. Carlisle Blvd. is the high point in Lead Ave. and Coal Ave. The watersheds west of Carlisle Blvd. ultimately discharge to the SDC. The watersheds east of Carlisle Blvd. between Carlisle Blvd. and I-25 ultimately discharge to the NDC, and the basins between I-25 and Broadway Blvd ultimately discharge to CPD. The CPD is located on Commercial St. northeast of Broadway Blvd and Santa Fe Ave intersection. Runoff discharging from the CPD reaches storm drain systems west of the rail road by a pump and then drains to the Rio Grande.

Federal Emergency Management Agency (FEMA) provides Flood Insurance Rate Map (FIRM), which designates areas of flooding for the 0.2% and 1% annual chance flood. The FIRM has identified two segments in the corridors that is inundated by the 1% annual chance flood. The first segment is within TEC project limits. This segment is on Coal Ave. from Yale Blvd. to Columbia Dr. and is designated Zone AO with a flood depth of 1'. The second segment is on Lead Ave. from Morningside Dr. to Washington St. and is designated Zone A (No Base Flood Elevations Determined). The remainder of the corridors is designated Zone X (Areas determined to be outside the 0.2% annual chance floodplain. Flood maps for the project area are attached in Appendix A.

Land treatment percentage for Land Treatment Type D was calculated using Table A-5, Chapter 22, DPM. The remainder of the land treatment was split equally between Land Treatment Type B and Type C. The computer program AHYMO was used to compute basins peak flow and volume. Sub-basins were routed in AHYMO to accumulate the total peak runoff at each intersection of the corridor.

3.1 Methodology

The AHYMO Computer Program follows the procedures outlined in Chapter 22 of the City of Albuquerque Development Process Manual (DPM), July 1997. The program's input parameters were created by Albuquerque Metropolitan Arroyo and Flood Control Authority (AMAFCA), in conjunction with the City of Albuquerque. The design storm is the 100-year, 6-hour event.

3.2 Design Storm Precipitation

Precipitation values are defined by the NOAA Atlas 2, Precipitation-Frequency Atlas of the Western United States, Vol. IV – New Mexico. Table A-2, Chapter 22, DPM summarizes the precipitation values for the Albuquerque Area. The project site is located in Zone 2.

3.3 Land Treatments

Four land treatments are classified by the DPM. Table A-4 of Section 22.2 of Albuquerque's DPM describes land conditions for each treatment. Each subarea analyzed in this report contained a mixture of land treatments. Land treatment percentages may be found in Appendix A.

3.4 Time of Concentration

The time of concentration (t_c) is equal to 1.5 times the time to peak (t_p). Sub-basins in the watershed range from 1.80 acres to 21.37 acres. Due to the small size of the sub-basin the time to peak was set to 0.1333 hrs (8 minutes).

3.5 Peak Discharge Rate

Peak discharge rates (cfs/ac) are calculated based on precipitation, land use, t_c , and initial infiltration. AHYMO computes the peak discharge rate as outlined in the DPM, Chapter 22.

3.6 Basin Delineation

The basin boundaries for existing and proposed condition are the same. No land treatment changes are anticipated in the project site due to its fully developed state. The criteria used to determine the basin's boundary is listed below.

- No cross drainage permitted on residential lots.
- Residential lots drain to the street or alley.
- Alleys convey runoff to the intersecting streets.
- Intersections of the corridor bound the basin at the corridors.
- County wide contours of 1998 (2' Interval Contours) were used.
- 2004 Orthoimagery provided by Bernalillo County were used.

3.6.1 Existing Condition

Six watersheds have been delineated in the existing condition (Lead Broadway, Coal Broadway, Lead West, Coal West, Lead East, and Coal East). The existing watersheds represent the basins that discharge to Lead and Coal. The basins discharging to Lead Ave. between Broadway Blvd. and I-25 are in the Lead Broadway Watershed. The basins discharging to Lead Ave. between I-25 and Carlisle Blvd. are in the Lead West Watershed. Lead East Watershed contains the basins that discharge to Lead Ave. from Carlisle Blvd. to Washington St. The basins discharging to Coal Ave. between Broadway Blvd. and I-25

are in the Coal Broadway Watershed. The basins discharging to Coal Ave. between I-25 to Yale Blvd. are in the Coal West Watershed. Coal East Watershed contains the basins that discharge to Coal Ave. from Solano Dr. to Washington St.

Three watersheds drain to Lead (Lead Broadway, Lead West, and Lead East). Lead Broadway is 38 acres and approximately one-half of the lots are residential and the other half is commercial. The average unit/acre for the residential areas is four. The Lead West Watershed contains 109 acres. Approximately a quarter of the watershed is commercial, while the remaining is single family residential. The average unit/acre for the residential lots is four. Lead East Watershed contains a flood plain in Lead Ave. from Morningside Dr. to Washington St. where Lead Ave. and Coal Ave. intersect at Zuni Rd. This floodplain extends on Zuni Rd. passed Wyoming Blvd. The watershed size of 68 acres is composed of approximately half commercial and half residential lots. The average size of the residential lots is three units/acre.

There are three watersheds discharging to Coal (Coal Broadway, Coal West, and Coal East). Coal Broadway is mostly composed of residential and contains 88 acres. The average unit/acre is four. Approximately three-quarters of Coal West Watershed is commercial. The total area of the watershed is 51 acres. Most of the residential lots are on the eastern edge of the watershed. The average size of the residential lots is 4 units/acre. Coal East Watershed covers 100% residential lots. Montclair Dr., Sierra Dr., Graceland Dr., and Valverde Dr. collect runoff from basins south of Coal and discharge into Coal's corridor. The watershed is 165 acres and the residential lots average 3 units/acre.

Appendix A list tables for each watershed and includes the area, du/acre, and land treatment percentages. Refer to Exhibit 1 in Appendix C for the existing watersheds. Approximate watershed of the Coal Project by TEC is outlined in Exhibit 1.

3.6.2 Proposed Condition

Nine watersheds have been delineated in the proposed conditions. Each watershed represents the runoff area for a storm drain system. The watershed's names are configured by street names at the point of discharge. Proposed basins do not differ from existing basins due to the current fully developed site; however, proposed basins are routed based on the proposed storm drain and Lead & Coal surface flow. Unlike the existing condition, all surface runoff in the corridors will remain within the corridor or diverted by storm drain.

A proposed AHYMO model was developed for each watershed except for Lead East and Coal East. The models included a series of commands that route, divide, and add hydrographs to obtain a peak discharge at each intersection of the corridors. For a conservative approach, the hydrographs were routed through a pipe by using the compute rating curve command followed by the compute travel time command. Existing systems tie into some of the proposed systems. The divide hyd command is used when an existing systems alleviates flow from a proposed system. An artificial basin is added to the

watershed when an existing system conveys flow to a proposed system. The artificial basin is manipulated so that the peak discharge equals the existing system's pipe capacity.

The following watershed have been delineated:

- Lead / Broadway
- Lead/ Mulberry
- Coal/ Broadway
- Coal/ Mulberry
- Coal/ Sycamore
- University
- Coal/University
- Lead East
- Coal East

The TEC project area, outlined in the Proposed Basin Exhibit, approximates the watershed for the proposed system on Coal Ave. Per TEC's analyses, 81 cfs bypasses the intersection of Coal Ave. and Yale Blvd. The bypassed runoff enters Coal/University Watershed. The Lead/Mulberry Watershed accepts and releases runoff from its watershed by connecting the proposed storm drain system to existing systems. Table 2 below summarizes the adjusted runoff in Lead/ Mulberry and Coal/ Broadway Watershed.

Table 2: Altered Flow			
Watershed	Intersection Location of Adjusted Flow	Contributed Flow (cfs)	Subtracted Flow (cfs)
Lead/ Mulberry	Lead / Vassar	NA	20
	Lead / Yale	NA	35
	Lead / Sycamore	NA	75
	Lead / University	48	NA
Coal/ Broadway	Coal / Yale	81	NA

The AHYMO models account for the altered flows from Table 2. Table 3 list the watersheds area and peak discharge.

Table 3: Watershed's Peak Discharge		
Watershed	Area (acre)	Peak Discharge (cfs)
Lead / Broadway	34.6	129
Lead / Mulberry	109.3	289
Coal / Broadway	12.9	45
Coal / Mulberry	11.6	50
Coal / Sycamore	11.9	52
Coal / University	13.1	101
University	12.6	85
Lead East	67.7	266
Coal East	164.9	559

4 Hydraulic Analysis

4.1 Methodology

Hydraulic calculations have been performed to obtain street, pipe, and storm drain system capacities. FlowMaster by Bentley was used to calculate street capacities. Pipe and storm drain system capacities were performed using StormCad by Bentley. Refer to Appendix B for model outputs.

4.1.1 Street Flow Analysis

The computer program FlowMaster was used to determine the street capacities. Energy losses in FlowMaster are based on friction losses. Common headloss equations such as: Darcy-Weisbach, Manning's, Kutter's, and Hazen-Williams computes flow and pressure in both conduits and channels. Manning's formula was selected as the friction method. Refer to Appendix B for the capacities of each section, and for the typical roadway sections.

Lead and Coal Ave. each have multiple typical roadway sections. The sections depend on the configuration of bike lane, driving lane, and turn lanes. The widths of the lanes and the centerline of construction vary from sections. A few of the typical roadway sections of Lead and Coal add an extra parking lane or turn lane at certain station segment. Capacities were modeled for the constraining typical section; however, the typical sections with turn lanes were not modeled. Capacities for modeled typical roadway section were determined for every 0.50%. The proposed profile grade has a minimum slope of 0.3% and a maximum slope of 7%. The maximum water surface elevation was set to the top of curb to determine the capacity of the section with its respective slope.

Table 4: Proposed Street Capacities For Lead Ave.				
Slope (%)	Typical Roadway Section			
	"A"	"B"	"C"	"H"
0.5	45.9	44.9	42.5	38.8
1	64.9	63.5	60.1	54.8
1.5	79.5	77.8	73.6	67.2
2	91.8	89.8	85.0	77.6
2.5	102.7	100.4	95.0	86.7
3	112.5	110.0	104.0	95
3.5	121.5	118.8	112.4	102.6
4	129.9	127.0	120.1	109.7
4.5	137.8	134.7	127.4	116.3
5	145.2	142.0	134.3	122.6
5.5	152.3	148.9	140.9	128.6
6	159.1	155.5	147.1	134.3
6.5	165.6	161.9	153.1	139.8
7	171.8	168.0	158.9	145.1

Table 5: Proposed Street Capacities For Coal Ave.

Slope (%)	Typical Roadway Section
	"A", "B" & "C"
0.5	42.5
1	60.1
1.5	73.6
2	85.0
2.5	95.0
3	104.0
3.5	112.4
4	120.1
4.5	127.4
5	134.3
5.5	140.9
6	147.1
6.5	153.1
7	158.9

4.1.2 Inlet Analysis

Albuquerque's standard inlets Type "A" and Type "C" are proposed. Runoffs from the watersheds are proposed to be intercepted and conveyed to an existing storm drain mainline. The total runoff from the site is 1,616 cfs. A detailed analyzes of the proposed inlets is not feasible due to the size of the project; therefore, an average intercepted flow was determined for each inlet. Table 6 below summarizes the intercepted flow for a Single Type "A" and a Single Type "C" with the respective slope.

Table 6: Proposed Inlet Capacities

Slope (%)	Intercepted Flow with a 13' Spread	
	Single Type "A"	Single Type "C"
0.5	3.5	3.0
1	4.4	4.1
2	5.4	5.1
3	5.8	5.5
4	6.1	5.8
5	6.2	5.9
6	6.3	5.8
7	6.4	5.8

FlowMaster was used to determine the inlet capacities. The above results are for a Single Type "A" and Single Type "C" inlet on grade. The input parameters include the geometry of the inlet, transverse slope, and discharge. Results were obtained by manipulating the discharge until a spread of 13.0' was achieved. From the typical roadway sections, the 13.0' spread is the smallest width from gutter flow line to profile grade. The 13' spread will

pertain to all sections, which is conservative for sections that have a wider distance from gutter flow line to profile grade.

Table 6 does not portray the intercepted flow for inlets in a sump. Type "C" inlets are placed in sump conditions. Capacity for Single Type 'C' and Double Type 'C' in a sump condition were calculated. The input parameters include the geometry of inlet and discharge. Results were obtained by manipulating the discharge until the depth of water was below the top of curb (0.66'). Single Type 'C' and Double Type 'D' have a capacity of 12 cfs and 18 cfs, respectively.

4.1.3 Closed Conduit Analysis

Hydraulic modeling for closed conduits was performed by StormCad. The headloss method selected in StormCad for each junction is HEC-22 Energy, which is based on data adapted from FHWA HEC No. 22.

4.2 System Description

Runoff from the project area drains to the SDC, NDC, or CPD by four main storm drain systems (NDC1, SDC1, SDC2, and CPD1). Refer to Exhibit 1 in Appendix C for the existing mainlines. The pipe material in the existing storm drain is reinforced concrete with pipe sizes ranging from 18" to 108". The SDC begins northeast of I-25 and Avenida Cesar Chavez. The NDC begins northeast of University Blvd. and Lomas Blvd. CPD is located northwest of Broadway Blvd. and Santa Fe Ave. Six storm drain laterals are proposed (two laterals in Lead's corridor and four in Coal's corridor) to tie into the existing systems. Section 2.1.2 list the criteria for the proposed storm drain.

4.2.1 Existing Storm Drain

Runoff from the project area discharges to the NDC, SDC, or CPD by four storm drain systems. A naming convention helps identify the storm drain and lateral. The systems prefix depends on the discharge point of the system. The suffix identifies the systems lateral location. The CPD1 discharges to CPD and is pumped to storm drain systems west of the railroad tracks. Two storm drain systems (SDC1 and SDC2) discharge to the SDC. The final storm drain system (NDC1) discharges to the NDC. Refer to Exhibit 1 for the existing systems and the identified laterals. The routing of basins change in the proposed condition; therefore, Section 4.2.2 (Proposed Storm Drain) describes the existing systems and its relation to the proposed laterals.

4.2.2 Proposed Storm Drain

The proposed watersheds as described in Section 3.6.2 delineate the surface area to the storm drain laterals. The objective of the proposed storm drain is to keep all runoff in Lead and Coal corridors without diverting runoff to intersecting streets. Analyses included routing basins to each intersection to precisely model existing and proposed laterals. Capacities of two existing storm drain laterals (SDC1-Coal1, CPD1-Coal) have capacity to

convey runoff from its proposed watershed. CPD1-Coal does not need to be upsized, but will be extended to reduce runoff in Coal. Proposed curb and gutter does not align with the existing inlets. The existing inlets are replaced with proposed inlets, which are aligned with the proposed curb and gutter. A 42" dia. in the existing SDC1-Coal1 has capacity to carry runoff from Coal/Mulberry Watershed. Under existing conditions runoff in Lead Ave. diverts surface runoff south on Sycamore St., Spruce St., and Cedar St. Runoff conveyed by this storm drain system is reduced under proposed conditions, since Lead Ave. does not divert surface runoff to intersecting streets.

Two existing laterals do not have capacity to convey the proposed peak discharge. CPD1-Lead and SDC1-Lead will be replaced in its entity. CPD1-Lead begins east of I-25 and ties into CPD1-Broadway. A 30" NMDOT lateral ties into the northwest inlet at the intersection of Oak and Lead. The proposed system will continue to accept runoff from this lateral. The peak discharge in the NMDOT lateral is unknown. Proposed SDC1-Lead begins at Carlisle St. and ties into SDC1-Mulberry. The existing 48" dia. in SDC1-Lead will be removed. As under the existing condition, SDC1-University discharges to the SDC1-Lead. SDC1-Sycamore diverts 75 cfs from SDC1-Lead. Another 20 cfs will be diverted from SDC1-Lead by SDC2-Vassar.

Three storm drain laterals on Coal Ave. tie into laterals of SDC1 and SDC2. SDC1-Coal2 conveys runoff from Coal/Sycamore Watershed to SDC1-Sycamore. From the TEC analysis 81 cfs bypasses the intersection of Yale Blvd. and Coal Ave., which enters Coal/University Watershed. SDC2-Coal1 and SDC2-Coal2 intercepts the bypass flow of 81 cfs and runoff from Coal/University Watershed. TEC's proposed storm drain on Coal Ave. stretches from Carlisle Blvd. to Harvard Dr. Refer to TEC's drainage report for analyses.

5 Conclusion

Proposed corridors of Lead and Coal include consistent cross-sections that vary to accommodate driving lanes, on-street bicycle lanes, and pedestrian amenities. This report analyzed the runoff draining to the corridors and proposed drainage infrastructure to prevent the proposed corridors from flooding.

TEC produced a drainage report for Coal Ave. storm drain rehabilitation project in July 2008, which is located between Harvard Dr. and Carlisle Blvd. A total flow of 81 cfs bypasses TEC's project site and enters Coal / University Watershed. All runoff draining to Lead and Coal is proposed to remain on the corridors until it is conveyed by a storm drain system. Hydrologic and hydraulic criteria have been established for the bases of the proposed storm drain design. The City of Albuquerque Standard Specifications are implemented for the construction of the storm drain. The AHYMO Computer Program computed hydrographs based on procedures outlined in Chapter 22 of the City of Albuquerque DPM. Routing in the hydrologic models helped reduce the peak discharge, therefore minimizing pipe sizes.

Six watersheds delineate the existing condition. The existing watersheds outline basins that discharge to Lead and Coal. A ridge along Carlisle Blvd. separates runoff from the west, which drains to the SDC and CPD, and runoff from the east, which drains to the NDC. Nine watersheds delineate the proposed condition. Each proposed watershed identifies the basins that drain to either existing or proposed storm drain systems. Hydrologic model diagrams in Appendix A accompany the AHYMO printouts. Existing laterals tie into some of the proposed storm drain systems. The laterals either help divert runoff from the proposed system or discharge into the proposed system. The capacity of the connecting pipe determines the amount of runoff diverted or discharged into the proposed storm drain system.

Street capacities were determined for each proposed typical roadway section in Lead and Coal. The minimum capacity for each corridor governs the overall capacity. An inlet analysis determined the capacities for Single Type "A" and Single Type "C" inlets on grade and in sump. The median capacity for Single Type "A" and Single Type "C" inlets on grade is 6.0 cfs and 5.7 cfs, respectively. The median capacity for Single Type "A" and Single Type "C" inlets in sump is 12 cfs and 18 cfs, respectively.

Three storm drain systems (SDC1, SDC2, & CPD1) in the project site discharge to the SDC or CPD. One storm drain system (NDC1) discharges to the NDC. The proposed storm drain systems are named based on the storm drain systems it ties into and its location. This report seeks approval of the proposed storm drain systems in Lead and Coals corridors.

**A
P
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X

A**

LEGEND



SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.



FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.



OTHER FLOOD AREAS

- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.



OTHER AREAS

- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.



COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS



OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

MAP SCALE 1" = 500'



NIP

PANEL 0334G

FIRM

**FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS**

PANEL 334 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0334	G

Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.



**MAP NUMBER
35001C0334G**

**MAP REVISED
SEPTEMBER 26, 2008**

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.mec.fema.gov

- 1% annual chance floodplain boundary
 0.2% annual chance floodplain boundary
 Floodway boundary
 Zone D Boundary
 CBRS and OPA Boundary
 Boundary dividing Special Flood Hazard Areas of different
 Base Flood Elevations, flood depths or flood velocities.
 Base Flood Elevation line and value; elevation in feet*
 Base Flood Elevation value where uniform within zone;
 elevation in feet*

*Referenced to the North American Vertical Datum of 1988

 Cross section line

 Transect line

Geographic coordinates referenced to the North American
 Datum of 1983 (NAD 83), Western Hemisphere

1000-meter Universal Transverse Mercator grid values, zone 13

5000-foot grid ticks: New Mexico State Plane coordinate system,
 Central zone (FIPZONE 3002), Transverse Mercator

Bench mark (see explanation in Notes to Users section of this
 FIRM panel)

River Mile

MAP REPOSITORIES

Refer to Map Repositories list on Map Index.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP PANEL

SEPTEMBER 20, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

April 2, 2002 - to update corporate limits, to change Base Flood Elevations and Special Flood
 Hazard Areas, to add roads and road names, to reflect updated topographic information, and to
 incorporate previously issued Letters of Map Revision.

November 19, 2003 - to update corporate limits and to incorporate previously issued Letters of
 Map Revision.

September 26, 2008 - to update corporate limits, to change Special Flood Hazard Areas, to add
 roads and road names, to incorporate previously issued Letters of Map Revision, to reflect
 updated topographic information, to change Base Flood Elevations, to add Base Flood Elevations.

For community map revision history prior to countywide mapping, refer to the Community
 Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance
 agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'



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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0334G

FIRM

FLOOD INSURANCE RATE MAP
 BERNALILLO COUNTY,
 NEW MEXICO
 AND INCORPORATED AREAS

PANEL 334 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE CITY OF	350002	0334	G

Notice to User: The Map Number shown below should be used
 when placing map orders, the Community Number shown
 above should be used on insurance applications for the subject
 community



MAP NUMBER
 35001C0334G

MAP REVISED
 SEPTEMBER 26, 2008

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.mec.fema.gov



JOINS PANEL 0353

3483

MAP SCALE 1" = 500'



NRIP

PANEL 0334G

FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS

PANEL 334 OF 825

SEE MAP INDEX FOR FIRM PANEL LAYOUT

CONTAINS:
COMMUNITY
ALBUQUERQUE CITY OF
HARRIS PLANS
REVENUE
30000
000
0

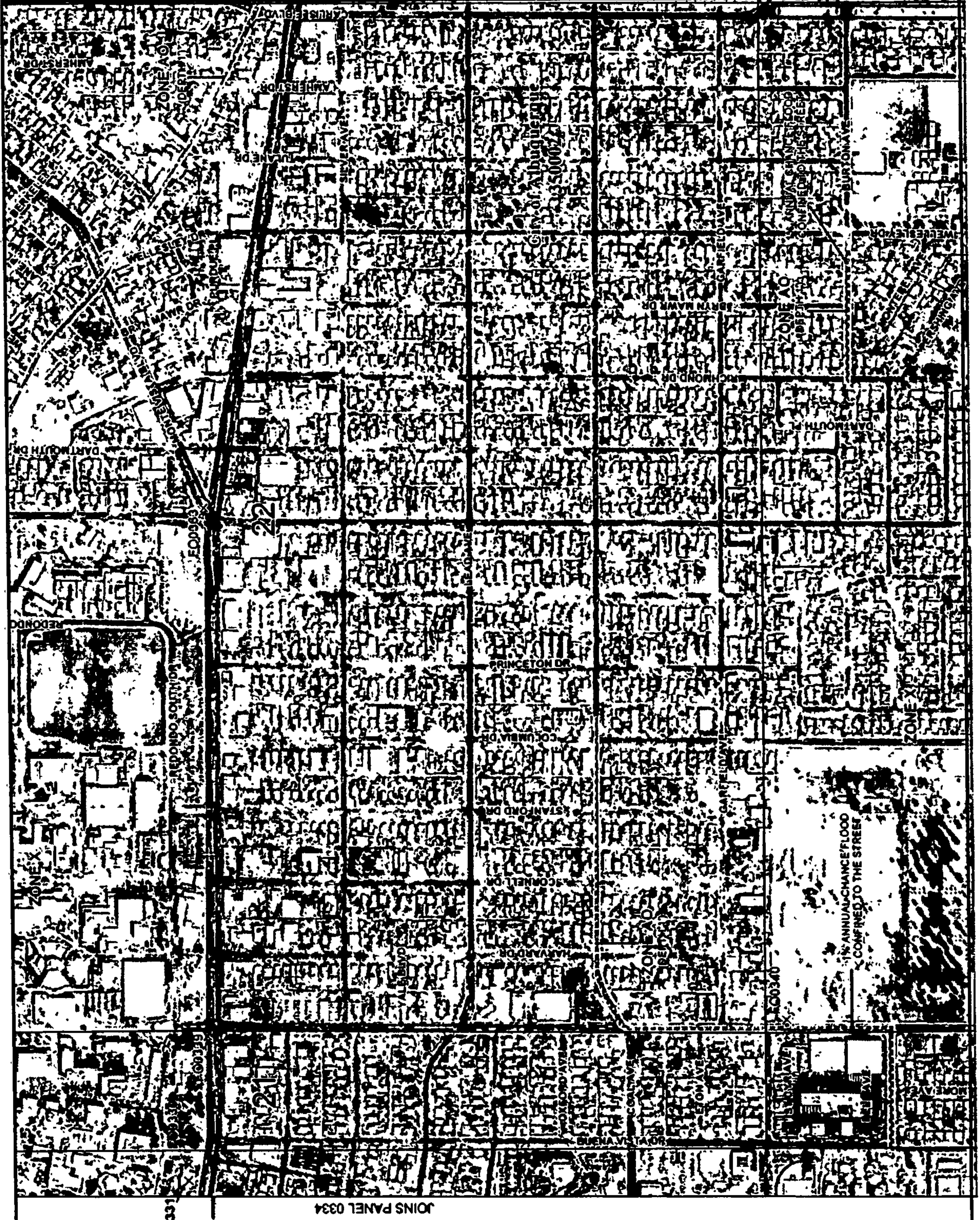
FEDERAL EMBLEM

MAP NUMBER
35097C0334G

MAP REVISED
SEPTEMBER 26, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was submitted using FIRM On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the map. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Date at www.mda.fema.gov



MAP SCALE 1" = 500'

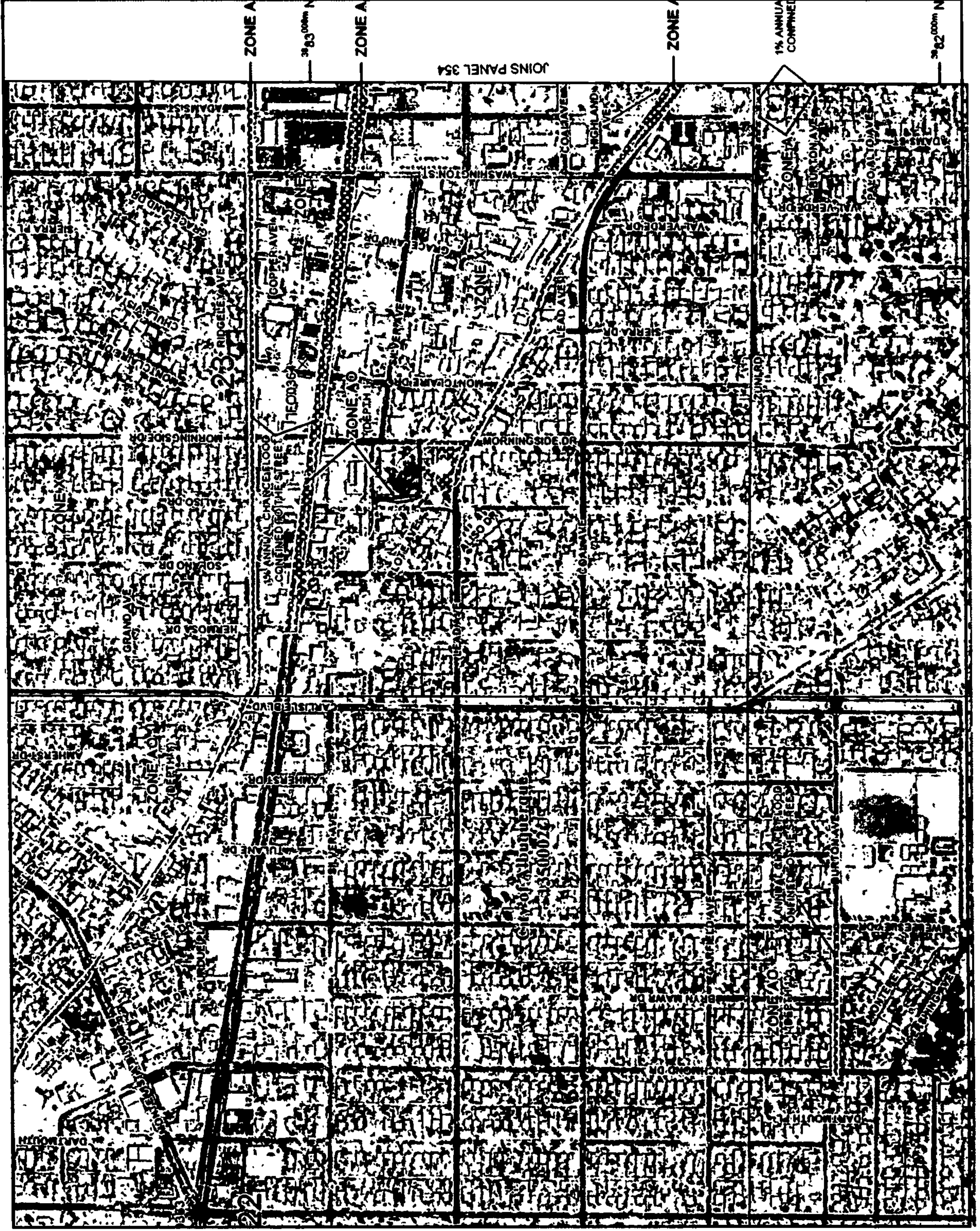


NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0334G
FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS
PANEL 333 OF 825
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY: CITY OF ALBUQUERQUE
HAZARD: 30000
DAMAGE: 0
REF: 0

MAP NUMBER
30001C0334G
MAP REVISED
SEPTEMBER 26, 2008
Federal Emergency Management Agency

This is an official copy of a portion of the more detailed Flood Risk Map. It was prepared using FIRM 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, visit the FEMA Flood Risk Map Program Web site at www.fema.gov.



MAP SCALE 1" = 500'



NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0363G
FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS
PANEL 353 OF 825
SEE MAP INDEX FOR FIRM PANEL LAYOUT

CONTAINS:
COMMUNITY
CITY OF ALBUQUERQUE
FIRM NUMBER
35001C0363G
MAP REVISION
SEPTEMBER 28, 2006
FEDERAL EMERGENCY MANAGEMENT AGENCY

This is an official copy of a portion of the above referenced flood map. It was prepared using FIRM On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the map sheet. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

EXISTING HYDROLOGY

Existing Watersheds

LEAD BROADWAY BASINS

Basin	Area sq. ft.	Area(ac)	Area(sq miles)	number of houses	du/acre	from table	%A	%B	%C	%D
126	118936	2.73	0.0043				0	0	5	95
127	105699	2.43	0.0038				0	93	0	7
128	448696	10.30	0.0161				0	5	0	95
129	238298	5.47	0.0085	21	3.84	41	0	30	30	41
130	260190	5.97	0.0093	31	5.19	51	0	25	25	50
131	336763	7.73	0.0121	23	2.98	34	0	33	33	34
143	153771	3.53	0.0055				0	25	25	50
Total Area		38.16			4.00					

LEAD WEST BASINS

Basin	Area sq. ft.	Area(ac)	Area(sq miles)	number of houses	du/acre	from table	%A	%B	%C	%D
101	239540	5.50	0.0086	18	3.27	36	0	32	32	36
102	235813	5.41	0.0085	24	4.43	45	0	27	27	45
103	249854	5.74	0.0090	19	3.31	37	0	32	32	37
104	241796	5.55	0.0087	24	4.32	44	0	28	28	44
105	248288	5.70	0.0089	24	4.21	44	0	28	28	44
106	251366	5.77	0.0090	23	3.99	42	0	29	29	42
107	141903	3.26	0.0051	12	3.68	40	0	30	30	40
108	189657	4.35	0.0068	18	4.13	43	0	28	28	43
109	173956	3.99	0.0062	16	4.01	42	0	29	29	42
110	151392	3.48	0.0054	11	3.17	36	0	32	32	36
111	78480	1.80	0.0028	6	3.33	37	0	32	32	37
112	166128	3.81	0.0060	15	3.93	41	0	29	29	41
113	359643	8.26	0.0129	30	3.63	39	0	30	30	39
114	288881	6.63	0.0104	27	4.07	43	0	29	29	43
115	179783	4.13	0.0064				0	13	13	75
116	239066	5.49	0.0086	25	4.56	46	0	27	27	46
117	161191	3.70	0.0058	20	5.40	52	0	24	24	52
118	149808	3.44	0.0054				0	20	20	60
119	143096	3.29	0.0051	19	5.78	55	0	22	22	55
120	218003	5.00	0.0078	17	3.40	37	0	31	31	37
121	184290	4.23	0.0066				0	25	25	50
122	100734	2.31	0.0036	8	3.46	38	0	31	31	38
123	113853	2.61	0.0041				0	5	5	90
124	125113	2.87	0.0045				0	5	0	95
125	130864	3.00	0.0047				0	5	0	95
Total Area		109.33			4.01					

LEAD EAST BASINS

Basin	Area sq. ft.	Area(ac)	Area(sq miles)	number of houses	du/acre	from table	%A	%B	%C	%D
132	242013	5.56	0.0087	12	2.16	28	0	36	36	28
133	221269	5.08	0.0079	13	2.56	31	0	35	35	30
134	238207	5.47	0.0085	17	3.11	35	0	32	32	36
135	318245	7.31	0.0114	25	3.42	38	0	31	31	38
136	309541	7.11	0.0111	19	2.67	32	0	34	34	32
137	184698	4.24	0.0066					5	5	90
138	243222	5.58	0.0087					5	5	90
139	180095	4.13	0.0065					5	5	90
140	248225	5.70	0.0089					5	5	90
141	420884	9.66	0.0151					10	10	80
142	340842	7.82	0.0122					7	8	85
Total Area		67.66			2.78					

COAL BROADWAY BASINS

Basin	Area sq. ft.	Area(ac)	Area(sq miles)	number of houses	du/acre	from table	%A	%B	%C	%D
228	53214	1.22	0.0019		0.00	0	0	5	0	95
229	158755	3.64	0.0057	14	3.84	41	0	30	30	41
230	130228	2.99	0.0047	17	5.69	55	0	23	23	55
231	127131	2.92	0.0046	8	2.74	32	0	34	34	32
232	92880	2.13	0.0033	6	2.81	33	0	34	34	33
Total Area		88.39			3.77					

COAL WEST BASINS

Basin	Area sq. ft.	Area(ac)	Area(sq miles)	number of houses	du/acre	from table	%A	%B	%C	%D
201	103286	2.37	0.0037		0.00	0	0	5	5	90
202	185750	4.26	0.0067		0.00	0	0	8	8	85
203	138361	3.18	0.0050		0.00	0	0	15	15	70
204	160971	3.70	0.0058		0.00	0	0	5	5	90
205	124534	2.86	0.0045		0.00	0	0	20	20	60
206	96175	2.21	0.0034		0.00	0	0	5	5	90
207	108066	2.48	0.0039		0.00	0	0	5	5	90
208	176277	4.05	0.0063		0.00	0	0	5	0	95
209	176883	4.06	0.0063	20	4.93	49	0	26	25	49
210	270513	6.21	0.0097	20	3.22	36	0	32	32	36
211	659765	15.15	0.0237		0.00	0		10	30	60
Total Area		50.52			4.07					

COAL EAST BASINS

Basin	Area sq. ft.	Area(ac)	Area(sq miles)	number of houses	du/acre	from table	%A	%B	%C	%D
212	884252	20.30	0.0317	39	1.92	26	0	37	37	26
213	463927	10.65	0.0166	23	2.16	28	0	36	36	28
214	356143	8.18	0.0128	24	2.94	34	0	33	33	34
215	332941	7.64	0.0119	22	2.88	33	0	33	33	33
216	424538	9.75	0.0152	30	3.08	35	0	33	33	35
217	420709	9.66	0.0151	37	3.83	41	0	30	30	41
218	223531	5.13	0.0080	13	2.53	31	0	35	35	31
219	233408	5.36	0.0084	16	2.99	34	0	33	33	34
220	454693	10.44	0.0163	41	3.93	41	0	29	29	41
221	255809	5.87	0.0092	27	4.60	46	0	27	27	46
222	243188	5.58	0.0087	27	4.84	48	0	26	26	48
223	235108	5.40	0.0084	24	4.45	45	0	27	27	45
224	217859	5.00	0.0078	22	4.40	45	0	27	27	45
225	930690	21.37	0.0334	48	2.25	28	0	36	36	28
226	620409	14.24	0.0223	35	2.46	30	0	35	35	30
227	883990	20.29	0.0317	75	3.70	40	0	30	30	40
Total Area		164.86			3.31					

LeadEast.txt

* Lead Drainage Analysis
* DRAINAGE BASIN ANALYSIS
* EXISTING & PROPOSED CONDITIONS MODEL FOR THE BASINS DRAINING TO Lead Between Carlisle and Washington.
* 100 YR 6 HR STORM EVENT
* DATE: May 2009
* FILE: M:\TRN\08-100-207-00\COA6442\Proposed\Drainage\AE_DATA\AHYMO\LeadEast.TXT

*S*****
*S
*S 100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING
*S ULTIMATELY TO LEAD AND COAL
*S RAINFALL DATA FROM DPM Chapter 22 - ZONE 2
*S
*S*****

START 0.0 HOURS
RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=2.01IN RAIN SIX=2.35 IN
RAIN DAY=0.0IN DT=0.033333 HR

*
*
*
*S*****
*S LEAD BASINS
*S*****

*
*

* COMPUTE HYD FOR SUB-BASIN 132

*

COMPUTE NM HYD ID=1 HYD NO=132 DA=0.0087 SQ MI
PER A=0 PER B=36 PER C=36 PER D=28
TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5
*
*
*

* COMPUTE HYD FOR SUB-BASIN 133

*

COMPUTE NM HYD ID=1 HYD NO=133 DA=0.0079 SQ MI
PER A=0 PER B=35 PER C=35 PER D=30
TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5
*
*
*

* COMPUTE HYD FOR SUB-BASIN 134

*

COMPUTE NM HYD ID=2 HYD NO=134 DA=0.0085 SQ MI
PER A=0 PER B=32 PER C=32 PER D=36
TP=0.1333 MASS RAIN=-1

PRINT HYD ID=2 CODE=5
*
*
*

* COMPUTE HYD FOR SUB-BASIN 135

*

COMPUTE NM HYD ID=1 HYD NO=135 DA=0.0114 SQ MI
PER A=0 PER B=31 PER C=31 PER D=38
TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5
*
*
*

* COMPUTE HYD FOR SUB-BASIN 136

*

COMPUTE NM HYD ID=1 HYD NO=136 DA=0.0111 SQ MI
PER A=0 PER B=34 PER C=34 PER D=32
TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5
*
*
*

LeadEast.txt

```

*
*****
*
  COMPUTE HYD FOR SUB-BASIN 137
*****
*
COMPUTE NM HYD  ID=1    HYD NO=137    DA=0.0066 SQ MI
                  PER A=0    PER B=5    PER C=5    PER D=90
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*
  COMPUTE HYD FOR SUB-BASIN 138
*****
*
COMPUTE NM HYD  ID=1    HYD NO=138    DA=0.0087 SQ MI
                  PER A=0    PER B=5    PER C=5    PER D=90
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*
  COMPUTE HYD FOR SUB-BASIN 139
*****
*
COMPUTE NM HYD  ID=1    HYD NO=139    DA=0.0065 SQ MI
                  PER A=0    PER B=5    PER C=5    PER D=90
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*
  COMPUTE HYD FOR SUB-BASIN 140
*****
*
COMPUTE NM HYD  ID=1    HYD NO=140    DA=0.0089 SQ MI
                  PER A=0    PER B=5    PER C=5    PER D=90
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*
  COMPUTE HYD FOR SUB-BASIN 141
*****
*
COMPUTE NM HYD  ID=1    HYD NO=141    DA=0.0151 SQ MI
                  PER A=0    PER B=10   PER C=10   PER D=80
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*
  COMPUTE HYD FOR SUB-BASIN 142
*****
*
COMPUTE NM HYD  ID=1    HYD NO=142    DA=0.0122 SQ MI
                  PER A=0    PER B=7    PER C=8    PER D=85
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*
*
*
*
FINISH

```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = leadeast.txt

Lead East Watershed.SUM
- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =07/23/2009
USER NO.= AHYMO-C-9803c01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION

*S										
*S	100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING									
*S	ULTIMATELY TO LEAD AND COAL									
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 2									
*S	*****									
START									TIME=	.00
RAINFALL TYPE= 1									RAIN6=	2.350
*S	*****									
*S	LEAD BASINS									
*S	*****									
COMPUTE NM HYD	132.00	-	1	.00870	18.14	.588	1.26670	1.500	3.257 PER IMP=	28.00
COMPUTE NM HYD	133.00	-	1	.00790	16.67	.544	1.29027	1.500	3.298 PER IMP=	30.00
COMPUTE NM HYD	134.00	-	2	.00850	18.59	.617	1.36100	1.500	3.418 PER IMP=	36.00
COMPUTE NM HYD	135.00	-	1	.01140	25.22	.842	1.38457	1.500	3.457 PER IMP=	38.00
COMPUTE NM HYD	136.00	-	1	.01110	23.71	.778	1.31385	1.500	3.337 PER IMP=	32.00
COMPUTE NM HYD	137.00	-	1	.00660	19.02	.703	1.99749	1.500	4.503 PER IMP=	90.00
COMPUTE NM HYD	138.00	-	1	.00870	25.07	.927	1.99748	1.500	4.502 PER IMP=	90.00
COMPUTE NM HYD	139.00	-	1	.00650	18.73	.692	1.99749	1.500	4.503 PER IMP=	90.00
COMPUTE NM HYD	140.00	-	1	.00890	25.64	.948	1.99749	1.500	4.502 PER IMP=	90.00
COMPUTE NM HYD	141.00	-	1	.01510	41.55	1.514	1.87962	1.500	4.300 PER IMP=	80.00
COMPUTE NM HYD	142.00	-	1	.01220	34.39	1.262	1.94030	1.500	4.405 PER IMP=	85.00
FINISH										

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = leadeast.txt

Lead East Watershed.SUM
- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =07/23/2009
USER NO.= AHYMO-C-9803c01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION

*S										
*S										
*S	100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING									
*S	ULTIMATELY TO LEAD AND COAL									
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 2									
*S	*****									
*S										
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
*S	*****									
*S	LEAD BASINS									
*S	*****									
COMPUTE NM HYD	132.00	-	1	.00870	18.14	.588	1.26670	1.500	3.257 PER IMP=	28.00
COMPUTE NM HYD	133.00	-	1	.00790	16.67	.544	1.29027	1.500	3.298 PER IMP=	30.00
COMPUTE NM HYD	134.00	-	2	.00850	18.59	.617	1.36100	1.500	3.418 PER IMP=	36.00
COMPUTE NM HYD	135.00	-	1	.01140	25.22	.842	1.38457	1.500	3.457 PER IMP=	38.00
COMPUTE NM HYD	136.00	-	1	.01110	23.71	.778	1.31385	1.500	3.337 PER IMP=	32.00
COMPUTE NM HYD	137.00	-	1	.00660	19.02	.703	1.99749	1.500	4.503 PER IMP=	90.00
COMPUTE NM HYD	138.00	-	1	.00870	25.07	.927	1.99748	1.500	4.502 PER IMP=	90.00
COMPUTE NM HYD	139.00	-	1	.00650	18.73	.692	1.99749	1.500	4.503 PER IMP=	90.00
COMPUTE NM HYD	140.00	-	1	.00890	25.64	.948	1.99749	1.500	4.502 PER IMP=	90.00
COMPUTE NM HYD	141.00	-	1	.01510	41.55	1.514	1.87962	1.500	4.300 PER IMP=	80.00
COMPUTE NM HYD	142.00	-	1	.01220	34.39	1.262	1.94030	1.500	4.405 PER IMP=	85.00
FINISH										

CoalEast.txt

* Coal Drainage Analysis
 * DRAINAGE BASIN ANALYSIS
 * EXISTING & PROPOSED CONDITIONS MODEL FOR THE BASINS DRAINING TO Coal Between Carlisle and Washington.
 * 100 YR 6 HR STORM EVENT
 * DATE: JULY 2009
 * FILE: M:\TRN\08-100-207-00\COA6442\Proposed\Drainage\AE_DATA\AHYMO\Existing.TXT

*S*****
 *S
 *S 100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING
 *S ULTIMATELY TO LEAD AND COAL
 *S RAINFALL DATA FROM DPM Chapter 22 - ZONE 2
 *S
 *S*****

START 0.0 HOURS
 RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01IN RAIN SIX=2.35 IN
 RAIN DAY=0.0IN DT=0.033333 HR

*
 *
 *
 *

*S*****
 *S COAL BASINS
 *S*****
 *

 * COMPUTE HYD FOR SUB-BASIN 212

 *

COMPUTE NM HYD ID=1 HYD NO=212 DA=0.0317 SQ MI
 PER A=0 PER B=37 PER C=37 PER D=26
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *

 * COMPUTE HYD FOR SUB-BASIN 213

 *

COMPUTE NM HYD ID=1 HYD NO=213 DA=0.0166 SQ MI
 PER A=0 PER B=36 PER C=36 PER D=28
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *

 * COMPUTE HYD FOR SUB-BASIN 214

 *

COMPUTE NM HYD ID=1 HYD NO=214 DA=0.0128 SQ MI
 PER A=0 PER B=33 PER C=33 PER D=34
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *

 * COMPUTE HYD FOR SUB-BASIN 215

 *

COMPUTE NM HYD ID=1 HYD NO=215 DA=0.0119 SQ MI
 PER A=0 PER B=33 PER C=33 PER D=34
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *

 * COMPUTE HYD FOR SUB-BASIN 216

 *

COMPUTE NM HYD ID=1 HYD NO=216 DA=0.0152 SQ MI
 PER A=0 PER B=33 PER C=33 PER D=34
 TP=0.1333 MASS RAIN=-1

CoalEast.txt

```

PRINT HYD      ID=1      CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 217
*****
*
COMPUTE NM HYD  ID=1      HYD NO=217      DA=0.0151 SQ MI
                  PER A=0    PER B=30    PER C=30    PER D=40
                  TP=0.1333      MASS RAIN=-1

PRINT HYD      ID=1      CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 218
*****
*
COMPUTE NM HYD  ID=1      HYD NO=218      DA=0.0080 SQ MI
                  PER A=0    PER B=35    PER C=35    PER D=30
                  TP=0.1333      MASS RAIN=-1

PRINT HYD      ID=1      CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 219
*****
*
COMPUTE NM HYD  ID=2      HYD NO=219      DA=0.0084 SQ MI
                  PER A=0    PER B=33    PER C=33    PER D=34
                  TP=0.1333      MASS RAIN=-1

PRINT HYD      ID=2      CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 220
*****
*
COMPUTE NM HYD  ID=1      HYD NO=220      DA=0.0163 SQ MI
                  PER A=0    PER B=29    PER C=29    PER D=42
                  TP=0.1333      MASS RAIN=-1

PRINT HYD      ID=1      CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 221
*****
*
COMPUTE NM HYD  ID=1      HYD NO=221      DA=0.0092 SQ MI
                  PER A=0    PER B=27    PER C=27    PER D=46
                  TP=0.1333      MASS RAIN=-1

PRINT HYD      ID=1      CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 222
*****
*
COMPUTE NM HYD  ID=1      HYD NO=222      DA=0.0087 SQ MI
                  PER A=0    PER B=26    PER C=26    PER D=48
                  TP=0.1333      MASS RAIN=-1

PRINT HYD      ID=1      CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 223
*****
*
COMPUTE NM HYD  ID=1      HYD NO=223      DA=0.0084 SQ MI
                  PER A=0    PER B=27    PER C=27    PER D=46
                  TP=0.1333      MASS RAIN=-1

PRINT HYD      ID=1      CODE=5

```

```

*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 224
*****
*
COMPUTE NM HYD  ID=1    HYD NO=224    DA=0.0078 SQ MI
                  PER A=0    PER B=27    PER C=27    PER D=46
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 225
*****
*
COMPUTE NM HYD  ID=1    HYD NO=225    DA=0.0334 SQ MI
                  PER A=0    PER B=36    PER C=36    PER D=28
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 226
*****
*
COMPUTE NM HYD  ID=1    HYD NO=226    DA=0.0223 SQ MI
                  PER A=0    PER B=35    PER C=35    PER D=30
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 227
*****
*
COMPUTE NM HYD  ID=1    HYD NO=227    DA=0.0317 SQ MI
                  PER A=0    PER B=30    PER C=30    PER D=40
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*
FINISH

```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = coaleast.txt

Coal East Watershed.SUM
- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =07/23/2009
USER NO.= AHYMO-C-9803c01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1	NOTATION

*S	100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING										
*S	ULTIMATELY TO LEAD AND COAL										
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 2										
*S	*****										
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.350
*S	*****										
*S	COAL BASINS										
*S	*****										
COMPUTE NM HYD	212.00	-	1	.03170	65.22	2.102	1.24313	1.500	3.215	PER IMP=	26.00
COMPUTE NM HYD	213.00	-	1	.01660	34.59	1.121	1.26670	1.500	3.256	PER IMP=	28.00
COMPUTE NM HYD	214.00	-	1	.01280	27.66	.913	1.33742	1.500	3.377	PER IMP=	34.00
COMPUTE NM HYD	215.00	-	1	.01190	25.72	.849	1.33742	1.500	3.377	PER IMP=	34.00
COMPUTE NM HYD	216.00	-	1	.01520	32.85	1.084	1.33742	1.500	3.376	PER IMP=	34.00
COMPUTE NM HYD	217.00	-	1	.01510	33.79	1.134	1.40814	1.500	3.497	PER IMP=	40.00
COMPUTE NM HYD	218.00	-	1	.00800	16.88	.551	1.29027	1.500	3.298	PER IMP=	30.00
COMPUTE NM HYD	219.00	-	2	.00840	18.16	.599	1.33742	1.500	3.378	PER IMP=	34.00
COMPUTE NM HYD	220.00	-	1	.01630	36.90	1.245	1.43172	1.500	3.537	PER IMP=	42.00
COMPUTE NM HYD	221.00	-	1	.00920	21.31	.726	1.47886	1.500	3.618	PER IMP=	46.00
COMPUTE NM HYD	222.00	-	1	.00870	20.37	.697	1.50244	1.500	3.659	PER IMP=	48.00
COMPUTE NM HYD	223.00	-	1	.00840	19.45	.663	1.47886	1.500	3.619	PER IMP=	46.00
COMPUTE NM HYD	224.00	-	1	.00780	18.07	.615	1.47886	1.500	3.619	PER IMP=	46.00
COMPUTE NM HYD	225.00	-	1	.03340	69.58	2.256	1.26670	1.500	3.255	PER IMP=	28.00
COMPUTE NM HYD	226.00	-	1	.02230	47.03	1.535	1.29028	1.500	3.296	PER IMP=	30.00
COMPUTE NM HYD	227.00	-	1	.03170	70.92	2.381	1.40814	1.500	3.496	PER IMP=	40.00
FINISH											

Existing Watersheds

Lead / West Watershed

- See Proposed Watershed for Basin Results
- Lead / Mulberry Watershed

Lead / Broadway Watershed

- See Proposed Watershed for Basin Results
- Lead Broadway Watershed

Coal / West Watershed

- See Proposed Watersheds for Basin Results
 - Coal / Mulberry Watershed
 - Coal / Sycamore Watershed
 - Coal / University Watershed
 - University Watershed

Coal / Broadway Watershed

- See Proposed Watershed for Basin Results
- Coal / Broadway

PROPOSED HYDROLOGY

Proposed Watersheds

LEAD / MULBERRY BASINS

basin	Area sq. ft.	Area(ac)	Area(sq miles)	number of houses	du/acre	from table	%A	%B	%C	%D
101	239540	5.50	0.0086	18	3.27	36	0	32	32	36
102	235813	5.41	0.0085	24	4.43	45	0	27	27	45
103	249854	5.74	0.0090	19	3.31	37	0	32	32	37
104	241796	5.55	0.0087	24	4.32	44	0	28	28	44
105	248288	5.70	0.0089	24	4.21	44	0	28	28	44
106	251366	5.77	0.0090	23	3.99	42	0	29	29	42
107	141903	3.26	0.0051	12	3.68	40	0	30	30	40
108	189657	4.35	0.0068	18	4.13	43	0	28	28	43
109	173956	3.99	0.0062	16	4.01	42	0	29	29	42
110	151392	3.48	0.0054	11	3.17	36	0	32	32	36
111	78480	1.80	0.0028	6	3.33	37	0	32	32	37
112	166128	3.81	0.0060	15	3.93	41	0	29	29	41
113	359643	8.26	0.0129	30	3.63	39	0	30	30	39
114	288881	6.63	0.0104	27	4.07	43	0	29	29	43
115	179783	4.13	0.0064				0	13	13	75
116	239066	5.49	0.0086	25	4.56	46	0	27	27	46
117	161191	3.70	0.0058	20	5.40	52	0	24	24	52
118	149808	3.44	0.0054				0	20	20	60
119	143096	3.29	0.0051	19	5.78	55	0	22	22	55
120	218003	5.00	0.0078	17	3.40	37	0	31	31	37
121	184290	4.23	0.0066				0	25	25	50
122	100734	2.31	0.0036	8	3.46	38	0	31	31	38
123	113853	2.61	0.0041				0	5	5	90
124	125113	2.87	0.0045				0	5	0	95
125	130864	3.00	0.0047				0	5	0	95
Total Area		109.33								

LEAD / BROADWAY BASINS

143	153771	3.53	0.0055				0	0	20	80
126	118936	2.73	0.0043				0	0	5	95
127	105699	2.43	0.0038				0	93	0	7
128	448696	10.30	0.0161				0	5	0	95
129	238298	5.47	0.0085	21	3.84	41	0	30	30	41
130	260190	5.97	0.0093	31	5.19	51	0	25	25	50
131	336763	7.73	0.0121	23	2.98	34	0	33	33	34
Total Area		34.63								

LEAD EAST BASINS

132	242013	5.56	0.0087	12	2.16	28	0	36	36	28
133	221269	5.08	0.0079	13	2.56	31	0	35	35	30
134	238207	5.47	0.0085	17	3.11	35	0	32	32	36
135	318245	7.31	0.0114	25	3.42	38	0	31	31	38
136	309541	7.11	0.0111	19	2.67	32	0	34	34	32
137	184698	4.24	0.0066					5	5	90
138	243222	5.58	0.0087					5	5	90
139	180095	4.13	0.0065					5	5	90
140	248225	5.70	0.0089					5	5	90
141	420884	9.66	0.0151					10	10	80
142	340842	7.82	0.0122					7	8	85
Total Area		67.66								

COAL / BROADWAY BASINS

228	53214	1.22	0.0019		0.00	0	0	5	0	95
229	158755	3.64	0.0057	14	3.84	41	0	30	30	41
230	130228	2.99	0.0047	17	5.69	55	0	23	23	55
231	127131	2.92	0.0046	8	2.74	32	0	34	34	32
232	92880	2.13	0.0033	6	2.81	33	0	34	34	33
Total Area		12.91								

COAL / MULBERRY BASINS

205	124534	2.86	0.0045		0.00	0	0	20	20	60
206	96175	2.21	0.0034		0.00	0	0	5	5	90
207	108066	2.48	0.0039		0.00	0	0	5	5	90
208	176277	4.05	0.0063		0.00	0	0	5	0	95
Total Area		11.59								

COAL / SYCAMORE BASINS

202	218980	5.03	0.0079		0.00	0	0	8	8	85
203	138361	3.18	0.0050		0.00	0	0	29	29	70
204	160971	3.70	0.0058		0.00	0	0	5	5	90
Total Area		11.90								

UNIVERSITY BASINS

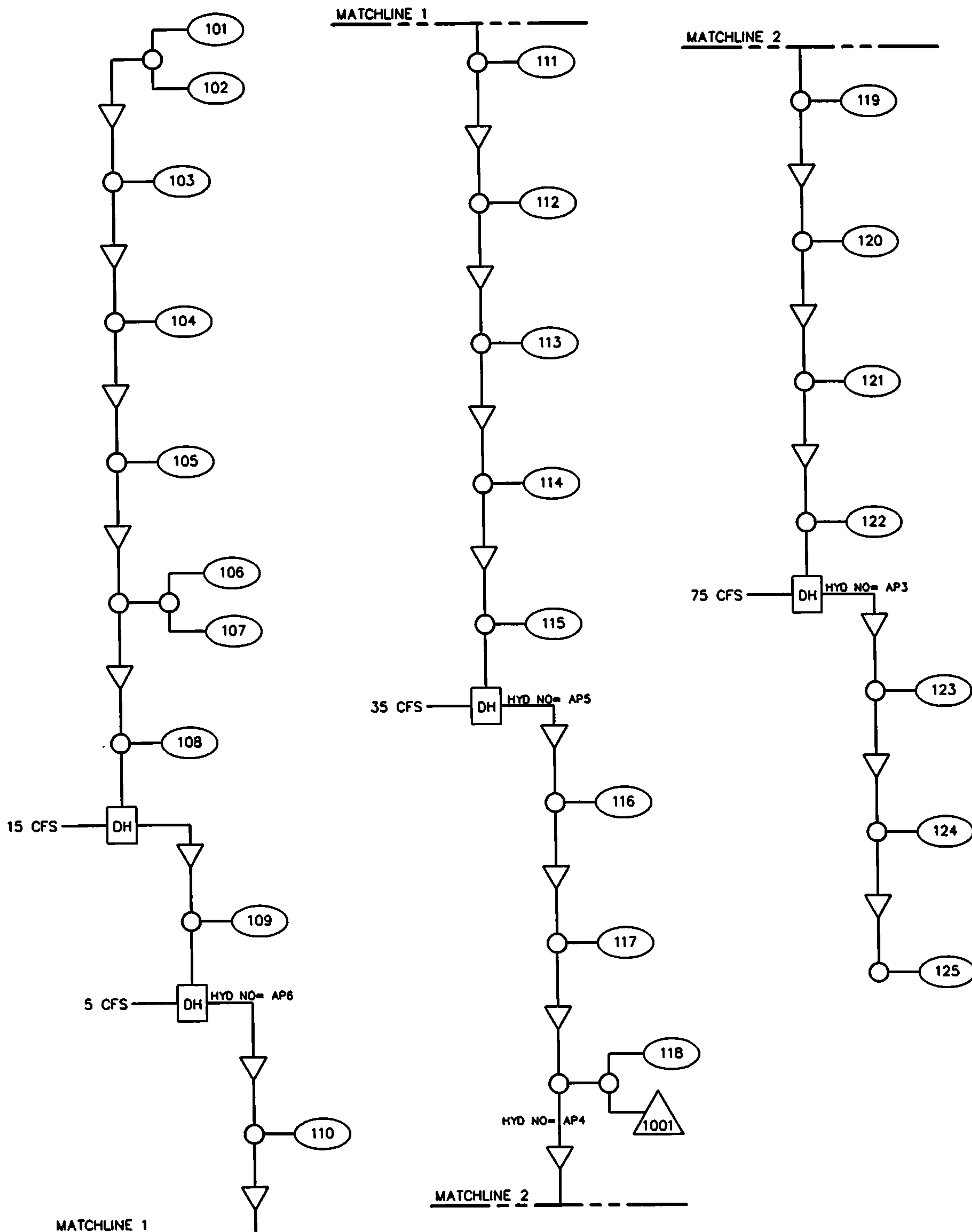
201	548425	12.59	0.0197		0.00	0	0	5	5	90
209	344933	7.92	0.0124	31	3.91	41	0	29	29	41
Total Area		12.59								

COAL / UNIVERSITY BASINS

210	102848	2.36	0.0037	9	3.81	41	0	30	30	41
211	468457	10.75	0.0168		0.00	0	0	30	30	40
Total Area		13.12								

COAL EAST BASINS

212	884252	20.30	0.0317	39	1.92	26	0	37	37	26
213	463927	10.65	0.0166	23	2.16	28	0	36	36	28
214	356143	8.18	0.0128	24	2.94	34	0	33	33	34
215	332941	7.64	0.0119	22	2.88	33	0	33	33	33
216	424538	9.75	0.0152	30	3.08	35	0	33	33	35
217	420709	9.66	0.0151	37	3.83	41	0	30	30	41
218	223531	5.13	0.0080	13	2.53	31	0	35	35	31
219	233408	5.36	0.0084	16	2.99	34	0	33	33	34
220	454693	10.44	0.0163	41	3.93	41	0	29	29	41
221	255809	5.87	0.0092	27	4.60	46	0	27	27	46
222	243188	5.58	0.0087	27	4.84	48	0	26	26	48
223	235108	5.40	0.0084	24	4.45	45	0	27	27	45
224	217859	5.00	0.0078	22	4.40	45	0	27	27	45
225	930690	21.37	0.0334	48	2.25	28	0	36	36	28
226	620409	14.24	0.0223	35	2.46	30	0	35	35	30
227	883990	20.29	0.0317	75	3.70	40	0	30	30	40
Total Area		164.86								



LEGEND

- 100 BASIN NUMBER
- XXXXXXX XXXXXXXX BASIN
- ADD HYDROGRAPH
- ROUTE HYDROGRAPH
- DH DIVIDE HYDROGRAPH

**PROPOSED HYDROLOGIC MODEL DIAGRAM
LEAD / MULBERRY WATERSHED**

**WILSON
& COMPANY**
4900 LANG AVENUE N.E.
ALBUQUERQUE, NEW MEXICO
87109
(505) 348-4000
FAX (505) 348-4072
www.wilsonco.com

LeadMulb.txt

* Lead/Coal Drainage Analysis
 * DRAINAGE BASIN ANALYSIS
 * PROPOSED CONDITIONS MODEL FOR LEAD/MULBERRY WATERSHED "BASINS DRAINING TO Lead from Carlisle to I-25".
 * 100 YR 6 HR STORM EVENT
 * DATE: JULY 2009
 * FILE: M:\TRN\08-100-207-00\COA6442\Proposed\Drainage\Calcs\AHYMO\LEADMULB.TXT

 *S
 *S
 *S 100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING
 *S ULTIMATELY TO LEAD AND COAL
 *S RAINFALL DATA FROM DPM Chapter 22 - ZONE 2
 *S
 *S*****

START 0.0 HOURS
 RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01IN RAIN SIX=2.35 IN
 RAIN DAY=0.0IN DT=0.033333 HR

 *

 *
 * COMPUTE HYD FOR SUB-BASIN 101

COMPUTE NM HYD ID=1 HYD NO=101 DA=0.0086 SQ MI
 PER A=0 PER B=32 PER C=32 PER D=36
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *
 ****Route 101 to Basin 102 Through a Pipe

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.020
 DIA=24 IN N=0.013

COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=365 FT
 SLP=0.020
 ROUTE ID=2 HYD NO=101Rt INFLOW ID=1 DT=0.005
 *

 *
 * COMPUTE HYD FOR SUB-BASIN 102

COMPUTE NM HYD ID=1 HYD NO=102 DA=0.0085 SQ MI
 PER A=0 PER B=27 PER C=27 PER D=45
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *
 * Total Flow from Basin (101Rt + 102)
 ADD HYD ID=1 HYD NO=102sum ID I=2 ID II=1
 PRINT HYD ID=1 CODE=1
 *

****Route HYD 102sum to Basin 103 Through a Pipe
 COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.020
 DIA=30 IN N=0.013

*
 COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=365 FT
 SLP=0.020
 ROUTE ID=2 HYD NO=102sumRt INFLOW ID=1 DT=0.005
 *
 PRINT HYD ID=2 CODE=1
 *

 *
 * COMPUTE HYD FOR SUB-BASIN 103

COMPUTE NM HYD ID=1 HYD NO=103 DA=0.0090 SQ MI
 PER A=0 PER B=32 PER C=32 PER D=37
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 * Total Flow from Basin (102sumRt + 103)
 ADD HYD ID=1 HYD NO=103sum ID I=2 ID II=1

```

PRINT HYD          ID=1  CODE=1
*
*
****Route HYD 103sum to Basin 104 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.020
                      DIA=30 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=365 FT
                      SLP=0.020
ROUTE               ID=2  HYD NO=103sumRt INFLOW ID=1  DT=0.005
*
PRINT HYD          ID=2  CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 104
*****
*
COMPUTE NM HYD  ID=1  HYD NO=104  DA=0.0087 SQ MI
                PER A=0  PER B=28  PER C=28  PER D=44
                TP=0.1333  MASS RAIN=-1

PRINT HYD          ID=1  CODE=5
*
* Total Flow from Basin (103sumRt + 104)
ADD HYD          ID=1  HYD NO=104sum  ID I=2  ID II=1
PRINT HYD        ID=1  CODE=1
*
*
****Route HYD 104sum to Basin 105 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.020
                      DIA=36 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=365 FT
                      SLP=0.020
ROUTE               ID=2  HYD NO=104sumRt INFLOW ID=1  DT=0.005
*
PRINT HYD          ID=2  CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 105
*****
*
COMPUTE NM HYD  ID=1  HYD NO=105  DA=0.0089 SQ MI
                PER A=0  PER B=28  PER C=28  PER D=44
                TP=0.1333  MASS RAIN=-1

PRINT HYD          ID=1  CODE=5
*
* Total Flow from Basin (104sumRt + 105)
ADD HYD          ID=1  HYD NO=105sum  ID I=2  ID II=1
PRINT HYD        ID=1  CODE=1
*
*
****Route HYD 105sum to Basin 106 and Basin 107 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.020
                      DIA=36 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=377 FT
                      SLP=0.020
ROUTE               ID=2  HYD NO=105sumRt INFLOW ID=1  DT=0.005
*
PRINT HYD          ID=2  CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 106
*****
*
COMPUTE NM HYD  ID=1  HYD NO=106  DA=0.0090 SQ MI
                PER A=0  PER B=29  PER C=29  PER D=42
                TP=0.1333  MASS RAIN=-1

PRINT HYD          ID=1  CODE=5
*
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 107
*****
*
COMPUTE NM HYD  ID=3  HYD NO=107  DA=0.0051 SQ MI

```

```

                                LeadMulb.txt
PER A=0   PER B=30   PER C=30   PER D=40
TP=0.1333   MASS RAIN=-1

PRINT HYD      ID=3      CODE=5
*
* Total Flow from Basin (106 + 107)
ADD HYD      ID=1   HYD NO=107suma   ID I=1   ID II=3
PRINT HYD      ID=1   CODE=1
*
*
* Total Flow from Basin (105sumRt + 107suma)
ADD HYD      ID=1   HYD NO=107sumb   ID I=2   ID II=1
PRINT HYD      ID=1   CODE=1
*
*
****Route HYD 107sumb to Basin 108 Through a Pipe
COMPUTE RATING CURVE   CID=1   VS NO=1 CODE=-1   SLP=0.020
                        DIA=42 IN   N=0.013
*

COMPUTE TRAVEL TIME      ID=2      REACH NO=1      NO VS=1 LENGTH=365 FT
                        SLP=0.020
ROUTE      ID=2      HYD NO=107sumRt INFLOW ID=1      DT=0.005

PRINT HYD      ID=2      CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 108
*****
COMPUTE NM HYD   ID=1      HYD NO=108      DA=0.0068 SQ MI
                  PER A=0   PER B=28   PER C=28   PER D=43
                  TP=0.1333   MASS RAIN=-1

PRINT HYD      ID=1      CODE=5
*
* Total Flow from Basin (107sumRt + 108)
ADD HYD      ID=1   HYD NO=108suma   ID I=2   ID II=1
PRINT HYD      ID=1   CODE=1
*
*
DIVIDE HYD      ID=1      Q=15.0      ID I=50      HYD NO=Vassar.A
                  ID II=2      HYD NO=108sumb
*
*
****Route HYD 108sumb to Basin 109 Through a Pipe
COMPUTE RATING CURVE   CID=1   VS NO=1 CODE=-1   SLP=0.020
                        DIA=42 IN   N=0.013
*
COMPUTE TRAVEL TIME      ID=1      REACH NO=1      NO VS=1 LENGTH=372 FT
                        SLP=0.020
ROUTE      ID=1      HYD NO=108sumRt INFLOW ID=2      DT=0.005
*
PRINT HYD      ID=1      CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 109
*****
COMPUTE NM HYD   ID=2      HYD NO=109      DA=0.0062 SQ MI
                  PER A=0   PER B=29   PER C=29   PER D=42
                  TP=0.1333   MASS RAIN=-1

PRINT HYD      ID=2      CODE=5
*
* Total Flow from Basin (108sumRt + 109)
ADD HYD      ID=1   HYD NO=109suma   ID I=1   ID II=2
PRINT HYD      ID=1   CODE=1
*
*
DIVIDE HYD      ID=1      Q=5.0      ID I=5      HYD NO=Vassar.B
                  ID II=2      HYD NO=AP6
*
****Route HYD AP6 to Basin 110 Through a Pipe
COMPUTE RATING CURVE   CID=1   VS NO=1 CODE=-1   SLP=0.020

```

```

                                LeadMulb.txt
DIA=48 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=1    REACH NO=1    NO VS=1 LENGTH=387 FT
                        SLP=0.020
ROUTE                  ID=1    HYD NO=109sumRt INFLOW ID=2    DT=0.005
*
PRINT HYD              ID=1    CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 110
*****
*
COMPUTE NM HYD    ID=2    HYD NO=110    DA=0.0054 SQ MI
                  PER A=0    PER B=32    PER C=32    PER D=36
                  TP=0.1333    MASS RAIN=-1

PRINT HYD          ID=2    CODE=5
*
*
* Total Flow from Basin (109sumRt + 110)
ADD HYD            ID=1    HYD NO=110sum    ID I=1    ID II=2
PRINT HYD          ID=1    CODE=1
*
*
****Route HYD 110sum to Basin 111 Through a Pipe
COMPUTE RATING CURVE    CID=1    VS NO=1 CODE=-1    SLP=0.020
                        DIA=48 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1    NO VS=1 LENGTH=387 FT
                        SLP=0.020
ROUTE                  ID=2    HYD NO=110sumRt INFLOW ID=1    DT=0.005

PRINT HYD              ID=2    CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 111
*****
*
COMPUTE NM HYD    ID=1    HYD NO=111    DA=0.0028 SQ MI
                  PER A=0    PER B=32    PER C=32    PER D=36
                  TP=0.1333    MASS RAIN=-1

PRINT HYD          ID=1    CODE=5
*
* Total Flow from Basin (110sumRt + 111)
ADD HYD            ID=1    HYD NO=111sum    ID I=2    ID II=1
PRINT HYD          ID=1    CODE=1
*
*
****Route HYD 111sum to Basin 112 Through a Pipe
COMPUTE RATING CURVE    CID=1    VS NO=1 CODE=-1    SLP=0.020
                        DIA=48 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1    NO VS=1 LENGTH=359 FT
                        SLP=0.020
ROUTE                  ID=2    HYD NO=111sumRt INFLOW ID=1    DT=0.005

PRINT HYD              ID=2    CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 112
*****
*
COMPUTE NM HYD    ID=1    HYD NO=112    DA=0.0060 SQ MI
                  PER A=0    PER B=29    PER C=29    PER D=42
                  TP=0.1333    MASS RAIN=-1

PRINT HYD          ID=1    CODE=5
*
* Total Flow from Basin (111sumRt + 112)
ADD HYD            ID=1    HYD NO=112sum    ID I=2    ID II=1
PRINT HYD          ID=1    CODE=1
*
*
****Route HYD 112sum to Basin 113 Through a Pipe
COMPUTE RATING CURVE    CID=1    VS NO=1 CODE=-1    SLP=0.020
                        DIA=48 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1    NO VS=1 LENGTH=380 FT
                        SLP=0.020
ROUTE                  ID=2    HYD NO=112sumRt INFLOW ID=1    DT=0.005
*
PRINT HYD              ID=2    CODE=1

```

LeadMulb.txt

```

*
*****
*      COMPUTE HYD FOR SUB-BASIN 113
*****
*
COMPUTE NM HYD  ID=1    HYD NO=113    DA=0.0129 SQ MI
                  PER A=0    PER B=30    PER C=30    PER D=40
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5

*
* Total Flow from Basin (112sumRt + 113)
ADD HYD      ID=1    HYD NO=113sum    ID I=2    ID II=1
PRINT HYD    ID=1    CODE=1
*
****Route HYD 113sum to Basin 114 Through a Pipe
COMPUTE RATING CURVE  CID=1    VS NO=1 CODE=-1    SLP=0.020
                      DIA=54 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1    NO VS=1 LENGTH=380 FT
                      SLP=0.020
ROUTE                  ID=2    HYD NO=113sumRt INFLOW ID=1    DT=0.005
*
*
PRINT HYD              ID=2    CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 114
*****
*
COMPUTE NM HYD  ID=1    HYD NO=114    DA=0.0104 SQ MI
                  PER A=0    PER B=29    PER C=29    PER D=42
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5

*
* Total Flow from Basin (113sumRt + 114)
ADD HYD      ID=1    HYD NO=114sum    ID I=2    ID II=1
PRINT HYD    ID=1    CODE=1
*
****Route HYD 114sum to Basin 115 Through a Pipe
COMPUTE RATING CURVE  CID=1    VS NO=1 CODE=-1    SLP=0.020
                      DIA=54 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1    NO VS=1 LENGTH=426 FT
                      SLP=0.020
ROUTE                  ID=2    HYD NO=114sumRt INFLOW ID=1    DT=0.005
*
*
PRINT HYD              ID=2    CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 115
*****
*
COMPUTE NM HYD  ID=1    HYD NO=115    DA=0.0064 SQ MI
                  PER A=0    PER B=13    PER C=13    PER D=74
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5

*
* Total Flow from Basin (114sumRt + 115)
ADD HYD      ID=1    HYD NO=115suma    ID I=2    ID II=1
PRINT HYD    ID=1    CODE=1
*
*
DIVIDE HYD      ID=1    Q=35.0    ID I=50    HYD NO=YALE
                  ID II=2    HYD NO=AP5
*
*
****Route HYD AP5 to Basin 116 Through a Pipe
COMPUTE RATING CURVE  CID=1    VS NO=1 CODE=-1    SLP=0.020
                      DIA=54 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=1    REACH NO=1    NO VS=1 LENGTH=735 FT
                      SLP=0.020
ROUTE                  ID=1    HYD NO=115sumRt INFLOW ID=2    DT=0.005
*
*
PRINT HYD              ID=1    CODE=1
*

```

LeadMulb.txt

```

*
*****
*      COMPUTE HYD FOR SUB-BASIN 116
*****
*
COMPUTE NM HYD  ID=2    HYD NO=116    DA=0.0086 SQ MI
                  PER A=0    PER B=27    PER C=27    PER D=46
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=2    CODE=5
*
*
* Total Flow from Basin (115sumbRt + 116)
ADD HYD      ID=1    HYD NO=116sum    ID I=1    ID II=2
PRINT HYD    ID=1    CODE=1
*
*
****Route HYD 116sum to Basin 117 Through a Pipe
COMPUTE RATING CURVE  CID=2    VS NO=1 CODE=-1    SLP=0.020
                      DIA=54 IN    N=0.013
*
COMPUTE TRAVEL TIME  ID=2    REACH NO=1    NO VS=1 LENGTH=594 FT
                      SLP=0.020
ROUTE              ID=2    HYD NO=116sumRt INFLOW ID=1    DT=0.005
*
*
PRINT HYD          ID=2    CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 117
*****
*
COMPUTE NM HYD  ID=1    HYD NO=117    DA=0.0058 SQ MI
                  PER A=0    PER B=24    PER C=24    PER D=52
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
* Total Flow from Basin (116sumRt + 117)
ADD HYD      ID=1    HYD NO=117sum    ID I=2    ID II=1
PRINT HYD    ID=1    CODE=1
*
*
****Route HYD 117sum to Basin 118 Through a Pipe
COMPUTE RATING CURVE  CID=1    VS NO=1 CODE=-1    SLP=0.020
                      DIA=54 IN    N=0.013
*
COMPUTE TRAVEL TIME  ID=2    REACH NO=1    NO VS=1 LENGTH=352 FT
                      SLP=0.020
ROUTE              ID=2    HYD NO=117sumRt INFLOW ID=1    DT=0.005
*
*
PRINT HYD          ID=2    CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 118
*****
*
COMPUTE NM HYD  ID=1    HYD NO=118    DA=0.0054 SQ MI
                  PER A=0    PER B=0    PER C=32    PER D=36
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 1001
*****
*
COMPUTE NM HYD  ID=3    HYD NO=1001    DA=0.01596 SQ MI
                  PER A=0    PER B=0    PER C=0    PER D=100
                  TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=3    CODE=5
*
*
* Total Flow from Basin (118 + 1001)
ADD HYD      ID=1    HYD NO=118suma    ID I=1    ID II=3
PRINT HYD    ID=1    CODE=1
*

```

LeadMulb.txt

```

*
* Total Flow from Basin (117sumRt + 118suma)
ADD HYD          ID=1  HYD NO=AP4  ID I=2  ID II=1
PRINT HYD        ID=1  CODE=1
*
*
****Route HYD AP4 to Basin 119 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.020
                      DIA=54 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=346 FT
                      SLP=0.020
ROUTE              ID=2  HYD NO=118sumbRt  INFLOW ID=1  DT=0.005
*

PRINT HYD          ID=2  CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 119
*****
*
COMPUTE NM HYD  ID=1  HYD NO=119  DA=0.0051 SQ MI
                PER A=0  PER B=22  PER C=22  PER D=56
                TP=0.1333  MASS RAIN=-1

PRINT HYD        ID=1  CODE=5

*
* Total Flow from Basin (118sumRt + 119)
ADD HYD          ID=1  HYD NO=119sum  ID I=2  ID II=1
PRINT HYD        ID=1  CODE=1
*
*
****Route HYD 119sum to Basin 120 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.020
                      DIA=60 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=355 FT
                      SLP=0.020
ROUTE              ID=2  HYD NO=119sumRt  INFLOW ID=1  DT=0.005
*

PRINT HYD          ID=2  CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 120
*****
*
COMPUTE NM HYD  ID=1  HYD NO=120  DA=0.0078 SQ MI
                PER A=0  PER B=31  PER C=31  PER D=38
                TP=0.1333  MASS RAIN=-1

PRINT HYD        ID=1  CODE=5

*
* Total Flow from Basin (119sumRt + 120)
ADD HYD          ID=1  HYD NO=120sum  ID I=2  ID II=1
PRINT HYD        ID=1  CODE=1
*
*
****Route HYD 120sum to Basin 121 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.020
                      DIA=60 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=429 FT
                      SLP=0.020
ROUTE              ID=2  HYD NO=120sumRt  INFLOW ID=1  DT=0.005
*

PRINT HYD          ID=2  CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 121
*****
*
COMPUTE NM HYD  ID=1  HYD NO=121  DA=0.0066 SQ MI
                PER A=0  PER B=25  PER C=25  PER D=50
                TP=0.1333  MASS RAIN=-1

PRINT HYD        ID=1  CODE=5
*
*

```

LeadMulb.txt

```

* Total Flow from Basin (120sumRt + 121)
ADD HYD ID=1 HYD NO=121sum ID I=2 ID II=1
PRINT HYD ID=1 CODE=1
*
*
****Route HYD 121sum to Basin 122 Through a Pipe
COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.020
DIA=60 IN N=0.013
*
COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=321 FT
SLP=0.020
ROUTE ID=2 HYD NO=121sumRt INFLOW ID=1 DT=0.005
*
PRINT HYD ID=2 CODE=1
*
*****
* COMPUTE HYD FOR SUB-BASIN 122
*****
COMPUTE NM HYD ID=1 HYD NO=122 DA=0.0036 SQ MI
PER A=0 PER B=53 PER C=31 PER D=38
TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5
*
*
* Total Flow from Basin (121sumRt + 122)
ADD HYD ID=1 HYD NO=122suma ID I=2 ID II=1
PRINT HYD ID=1 CODE=1
*
*
DIVIDE HYD ID=1 Q=75.0 ID I=50 HYD NO=SYCAMORE
ID II=2 HYD NO=AP3
*
*
****Route HYD AP3 to Basin 123 Through a Pipe
COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.020
DIA=60 IN N=0.013
*
COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 LENGTH=321 FT
SLP=0.020
ROUTE ID=1 HYD NO=122sumRt INFLOW ID=2 DT=0.005
*
PRINT HYD ID=1 CODE=1
*
*****
* COMPUTE HYD FOR SUB-BASIN 123
*****
COMPUTE NM HYD ID=2 HYD NO=123 DA=0.0041 SQ MI
PER A=0 PER B=5 PER C=5 PER D=90
TP=0.1333 MASS RAIN=-1

PRINT HYD ID=2 CODE=5
*
*
* Total Flow from Basin (122sumbRt + 123)
ADD HYD ID=1 HYD NO=123sum ID I=1 ID II=2
PRINT HYD ID=1 CODE=1
*
*
****Route HYD 123sum to Basin 124 Through a Pipe
COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.020
DIA=60 IN N=0.013
*
COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=323 FT
SLP=0.020
ROUTE ID=2 HYD NO=123sumRt INFLOW ID=1 DT=0.005
*
PRINT HYD ID=2 CODE=1
*
*****
* COMPUTE HYD FOR SUB-BASIN 124
*****
COMPUTE NM HYD ID=1 HYD NO=124 DA=0.0045 SQ MI

```

```

                                LeadMulb.txt
PER A=0   PER B=5   PER C=0   PER D=95
TP=0.1333   MASS RAIN=-1

PRINT HYD      ID=1      CODE=5

*
*
* Total Flow from Basin (123sumRt + 124)
ADD HYD      ID=1   HYD NO=124sum   ID I=2   ID II=1
PRINT HYD      ID=1   CODE=1
*
*
****Route HYD 124sum to Basin 125 Through a Pipe
COMPUTE RATING CURVE   CID=1   VS NO=1 CODE=-1   SLP=0.020
                        DIA=60 IN   N=0.013
*
COMPUTE TRAVEL TIME   ID=2   REACH NO=1   NO VS=1 LENGTH=357 FT
                        SLP=0.020
ROUTE      ID=2   HYD NO=124sumRt INFLOW ID=1   DT=0.005
*
PRINT HYD      ID=2   CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 125
*****
*
COMPUTE NM HYD   ID=1   HYD NO=125   DA=0.0078 SQ MI
PER A=0   PER B=5   PER C=0   PER D=95
TP=0.1333   MASS RAIN=-1

PRINT HYD      ID=1   CODE=5
*
*
* Total Flow from Basin (124sumRt + 125)
ADD HYD      ID=1   HYD NO=AP2   ID I=2   ID II=1
PRINT HYD      ID=1   CODE=1
*
*
Finish

```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = LEADMULB.TXT

Lead_Mulberry watershed.SUM
- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =07/12/2009
USER NO.= AHYMO-C-9803c01UNMLIB-AH

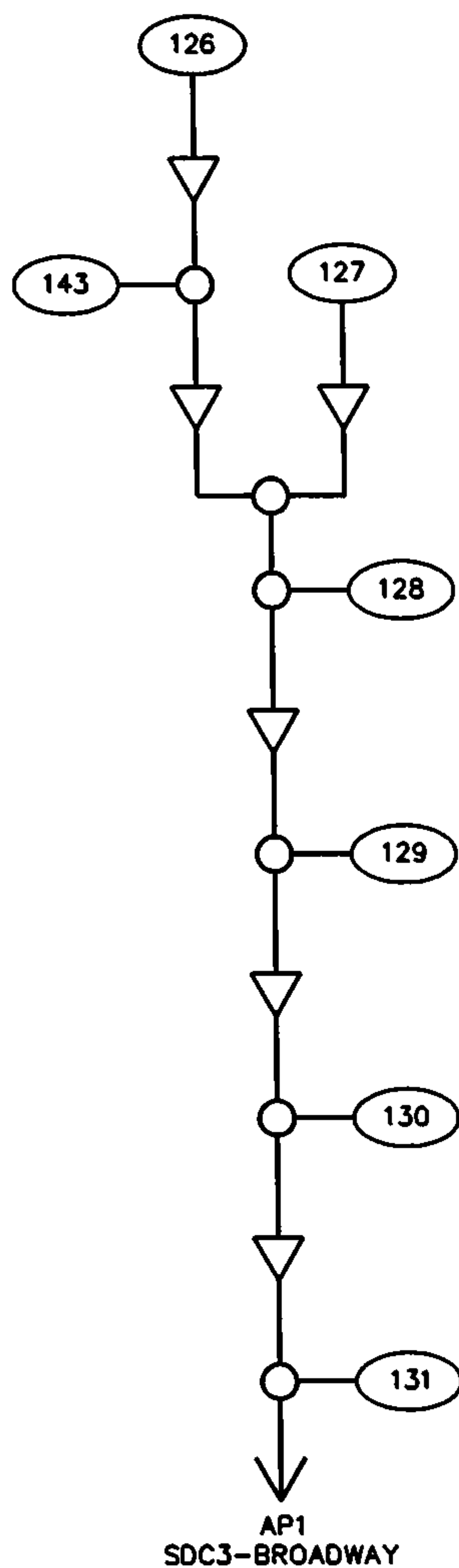
COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION

*S										
*S	100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING									
*S	ULTIMATELY TO LEAD AND COAL									
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 2									
*S	*****									
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
COMPUTE NM HYD	101.00	-	1	.00860	18.81	.624	1.36100	1.500	3.418	PER IMP= 36.00
ROUTE	101Rt	1	2	.00860	18.62	.606	1.32176	1.510	3.382	
COMPUTE NM HYD	102.00	-	1	.00850	19.63	.668	1.47243	1.500	3.608	PER IMP= 45.45
ADD HYD	102sum	2& 1	1	.01710	38.10	1.253	1.37339	1.505	3.482	
ROUTE	102sumRt	1	2	.01710	37.93	1.252	1.37233	1.515	3.466	
COMPUTE NM HYD	103.00	-	1	.00900	19.76	.657	1.36846	1.500	3.430	PER IMP= 36.63
ADD HYD	103sum	2& 1	1	.02610	57.47	1.890	1.35764	1.510	3.441	
ROUTE	103sumRt	1	2	.02610	57.22	1.888	1.35666	1.520	3.426	
COMPUTE NM HYD	104.00	-	1	.00870	19.92	.675	1.45529	1.500	3.578	PER IMP= 44.00
ADD HYD	104sum	2& 1	1	.03480	76.78	2.543	1.36993	1.515	3.448	
ROUTE	104sumRt	1	2	.03480	76.63	2.541	1.36900	1.525	3.441	
COMPUTE NM HYD	105.00	-	1	.00890	20.38	.691	1.45529	1.500	3.578	PER IMP= 44.00
ADD HYD	105sum	2& 1	1	.04370	96.58	3.210	1.37729	1.520	3.453	
ROUTE	105sumRt	1	2	.04370	96.28	3.208	1.37637	1.530	3.443	
COMPUTE NM HYD	106.00	-	1	.00900	20.38	.687	1.43172	1.500	3.538	PER IMP= 42.00
COMPUTE NM HYD	107.00	-	3	.00510	11.42	.383	1.40814	1.500	3.500	PER IMP= 40.00
ADD HYD	107suma	1& 3	1	.01410	31.80	1.070	1.42315	1.500	3.524	
ADD HYD	107sumb	2& 1	1	.05780	127.28	4.246	1.37733	1.525	3.441	
ROUTE	107sumRt	1	2	.05780	127.13	4.243	1.37650	1.530	3.437	
COMPUTE NM HYD	108.00	-	1	.00680	15.53	.525	1.44862	1.500	3.568	PER IMP= 43.43
ADD HYD	108suma	2& 1	1	.06460	142.19	4.752	1.37936	1.530	3.439	
DIVIDE HYD	Vassar.A	1	50	.01949	15.00	1.433	1.37936	1.320	1.203	
	108sumb	and	2	.04511	127.19	3.319	1.37936	1.530	4.405	
ROUTE	108sumRt	2	1	.04511	126.99	3.319	1.37938	1.535	4.398	
COMPUTE NM HYD	109.00	-	2	.00620	14.05	.473	1.43172	1.500	3.540	PER IMP= 42.00
ADD HYD	109suma	1& 2	1	.05131	140.60	3.778	1.38047	1.530	4.281	
DIVIDE HYD	Vassar.B	1	5	.00525	5.00	.386	1.38047	1.335	1.488	
	AP6	and	2	.04606	135.60	3.392	1.38047	1.530	4.600	
ROUTE	109sumRt	2	1	.04606	135.42	3.392	1.38048	1.535	4.594	
COMPUTE NM HYD	110.00	-	2	.00540	11.82	.392	1.36099	1.500	3.420	PER IMP= 36.00
ADD HYD	110sum	1& 2	1	.05146	146.82	3.773	1.37449	1.535	4.458	
ROUTE	110sumRt	1	2	.05146	146.57	3.772	1.37441	1.540	4.450	
COMPUTE NM HYD	111.00	-	1	.00280	6.14	.203	1.36100	1.500	3.424	PER IMP= 36.00
ADD HYD	111sum	2& 1	1	.05426	152.45	3.970	1.37182	1.535	4.390	
ROUTE	111sumRt	1	2	.05426	152.24	3.970	1.37171	1.540	4.384	
COMPUTE NM HYD	112.00	-	1	.00600	13.59	.458	1.43172	1.500	3.540	PER IMP= 42.00
ADD HYD	112sum	2& 1	1	.06026	165.08	4.414	1.37337	1.540	4.280	
ROUTE	112sumRt	1	2	.06026	164.81	4.414	1.37318	1.545	4.273	
COMPUTE NM HYD	113.00	-	1	.01290	28.87	.969	1.40814	1.500	3.497	PER IMP= 40.00
ADD HYD	113sum	2& 1	1	.07316	192.02	5.353	1.37193	1.540	4.101	

♀

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 2 NOTATION
---------	------------------------------	-------------------	-----------------	-----------------	----------------------------	-----------------------------	--------------------	----------------------------	--------------------	----------------------

Lead_Mulberry watershed.SUM										
ROUTE	113sumRt	1	2	.07316	191.76	5.352	1.37165	1.545	4.095	
COMPUTE NM HYD	114.00	-	1	.01040	23.55	.794	1.43172	1.500	3.538	PER IMP= 42.00
ADD HYD	114sum	2& 1	1	.08356	213.97	6.122	1.37367	1.540	4.001	
ROUTE	114sumRt	1	2	.08356	213.57	6.120	1.37328	1.545	3.993	
COMPUTE NM HYD	115.00	-	1	.00640	17.13	.617	1.80890	1.500	4.182	PER IMP= 74.00
ADD HYD	115suma	2& 1	1	.08996	229.29	6.713	1.39908	1.540	3.982	
DIVIDE HYD	YALE	1	50	.03391	35.00	2.530	1.39908	1.385	1.613	
	AP5	and	2	.05606	194.29	4.183	1.39908	1.540	5.415	
ROUTE	115sumRt	2	1	.05606	193.18	4.183	1.39908	1.550	5.384	
COMPUTE NM HYD	116.00	-	2	.00860	19.92	.678	1.47886	1.500	3.619	PER IMP= 46.00
ADD HYD	116sum	1& 2	1	.06466	211.28	4.840	1.40340	1.550	5.106	
ROUTE	116sumRt	1	2	.06466	210.55	4.839	1.40324	1.555	5.088	
COMPUTE NM HYD	117.00	-	1	.00580	13.89	.479	1.54958	1.500	3.741	PER IMP= 52.00
ADD HYD	117sum	2& 1	1	.07046	222.88	5.302	1.41096	1.555	4.943	
ROUTE	117sumRt	1	2	.07046	222.57	5.302	1.41080	1.560	4.936	
COMPUTE NM HYD	118.00	-	1	.00540	13.73	.475	1.65065	1.500	3.972	PER IMP= 52.94
COMPUTE NM HYD	1001.00	-	3	.01596	48.01	1.801	2.11535	1.500	4.700	PER IMP= 100.00
ADD HYD	118suma	1& 3	1	.02136	61.74	2.276	1.99785	1.500	4.516	
ADD HYD	AP4	2& 1	1	.09182	276.78	7.479	1.52722	1.550	4.710	
ROUTE	118sumbRt	1	2	.09182	276.27	7.477	1.52685	1.555	4.701	
COMPUTE NM HYD	119.00	-	1	.00510	12.47	.434	1.59673	1.500	3.822	PER IMP= 56.00
ADD HYD	119sum	2& 1	1	.09692	287.45	7.896	1.52757	1.550	4.634	
ROUTE	119sumRt	1	2	.09692	287.21	7.894	1.52719	1.555	4.630	
COMPUTE NM HYD	120.00	-	1	.00780	17.26	.576	1.38457	1.500	3.458	PER IMP= 38.00
ADD HYD	120sum	2& 1	1	.10472	302.70	8.453	1.51358	1.555	4.517	
ROUTE	120sumRt	1	2	.10472	302.24	8.451	1.51308	1.560	4.510	
COMPUTE NM HYD	121.00	-	1	.00660	15.63	.537	1.52601	1.500	3.700	PER IMP= 50.00
ADD HYD	121sum	2& 1	1	.11132	316.01	8.970	1.51082	1.555	4.436	
ROUTE	121sumRt	1	2	.11132	315.77	8.967	1.51042	1.560	4.432	
COMPUTE NM HYD	122.00	-	1	.00360	7.49	.245	1.27351	1.500	3.250	PER IMP= 31.15
ADD HYD	122suma	2& 1	1	.11492	322.42	9.206	1.50195	1.560	4.384	
DIVIDE HYD	SYCAMORE	1	50	.05795	75.00	4.642	1.50195	1.415	2.022	
	AP3	and	2	.05697	247.42	4.564	1.50195	1.560	6.786	
ROUTE	122sumRt	2	1	.05697	247.14	4.564	1.50197	1.565	6.778	
COMPUTE NM HYD	123.00	-	2	.00410	11.82	.437	1.99749	1.500	4.506	PER IMP= 90.00
ADD HYD	123sum	1& 2	1	.06107	257.13	4.981	1.52935	1.560	6.579	
ROUTE	123sumRt	1	2	.06107	256.93	4.981	1.52929	1.565	6.573	
COMPUTE NM HYD	124.00	-	1	.00450	13.20	.492	2.04850	1.500	4.584	PER IMP= 95.00
ADD HYD	124sum	2& 1	1	.06557	267.86	5.450	1.55856	1.565	6.383	
ROUTE	124sumRt	1	2	.06557	267.53	5.450	1.55842	1.565	6.375	
COMPUTE NM HYD	125.00	-	1	.00780	22.87	.852	2.04850	1.500	4.582	PER IMP= 95.00
ADD HYD	AP2	2& 1	1	.07337	286.47	6.264	1.60065	1.565	6.101	
FINISH										



LEGEND

100	BASIN NUMBER
1000	XXXXXXX BASIN
○	ADD HYDROGRAPH
▽	ROUTE HYDROGRAPH
DH	DIVIDE HYDROGRAPH

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PROPOSED HYDROLOGIC MODEL DIAGRAM LEAD / BROADWAY WATERSHED

LeadBdwy.txt

* Lead/Coal Drainage Analysis
 * DRAINAGE BASIN ANALYSIS
 * PROPOSED CONDITIONS MODEL FOR LEAD/BROADWAY WATERSHED "BASINS DRAINING TO Lead from I-25 to Broadway.
 * 100 YR 6 HR STORM EVENT
 * DATE: JULY 2009
 * FILE: M:\TRN\08-100-207-00\COA6442\Proposed\Drainage\Calcs\AHYMO\LeadBdwy.TXT

*S*****
 *S
 *S 100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING
 *S ULTIMATELY TO LEAD AND COAL
 *S RAINFALL DATA FROM DPM Chapter 22 - ZONE 2
 *S
 *S*****

START 0.0 HOURS
 RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01IN RAIN SIX=2.35 IN
 RAIN DAY=0.0IN DT=0.033333 HR

*

 *

 * COMPUTE HYD FOR SUB-BASIN 126

 *

COMPUTE NM HYD ID=1 HYD NO=126 DA=0.0043 SQ MI
 PER A=0 PER B=5 PER C=0 PER D=95
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *
 ****Route 126 to Basin 143 Through a Pipe

COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.015
 DIA=24 IN N=0.013

COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=370 FT
 SLP=0.015
 ROUTE ID=2 HYD NO=126Rt INFLOW ID=1 DT=0.005

PRINT HYD ID=2 CODE=1

*
 *

 * COMPUTE HYD FOR SUB-BASIN 143

 *

COMPUTE NM HYD ID=1 HYD NO=143 DA=0.0055 SQ MI
 PER A=0 PER B=25 PER C=25 PER D=50
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *
 * Total Flow from Basin 126Rt and 143
 ADD HYD ID=1 HYD NO=143sum ID I=2 ID II=1
 PRINT HYD ID=1 CODE=1
 *

****Route 143sum to Basin 128 Through a Pipe

*
 COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.015
 DIA=30 IN N=0.013

COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=700 FT
 SLP=0.015
 ROUTE ID=2 HYD NO=143sumRt INFLOW ID=1 DT=0.005

PRINT HYD ID=2 CODE=1

*
 *
 ****Basin 127 is also routed to Basin 128
 *

 * COMPUTE HYD FOR SUB-BASIN 127

 *

COMPUTE NM HYD ID=1 HYD NO=127 DA=0.0038 SQ MI
 PER A=0 PER B=93 PER C=0 PER D=7
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

```

*
*
****Route 127 to Basin 128 Through a Pipe
*
COMPUTE RATING CURVE    CID=1  VS NO=1 CODE=-1  SLP=0.015
                        DIA=24 IN  N=0.013

COMPUTE TRAVEL TIME    ID=3    REACH NO=1      NO VS=1 LENGTH=370 FT
                        SLP=0.015
ROUTE                  ID=3    HYD NO=127Rt    INFLOW ID=1    DT=0.005
*
PRINT HYD              ID=3    CODE=1
*
* Total Flow from Basin 143sumRt and 127Rt
ADD HYD                ID=1    HYD NO=128suma  ID I=2    ID II=3
PRINT HYD              ID=1    CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 128
*****
*
COMPUTE NM HYD    ID=2    HYD NO=128      DA=0.0161 SQ MI
                  PER A=0  PER B=5    PER C=0    PER D=95
                  TP=0.1333    MASS RAIN=-1

PRINT HYD        ID=2    CODE=5
*
*
* Total Flow from Basins (128suma + 128)
ADD HYD          ID=1    HYD NO=128sumb  ID I=1    ID II=2
PRINT HYD        ID=1    CODE=1
*
*
****Route HYD 128sumb to Basin 129 Through a Pipe
COMPUTE RATING CURVE    CID=1  VS NO=1 CODE=-1  SLP=0.015
                        DIA=36 IN  N=0.013

*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1      NO VS=1 LENGTH=355 FT
                        SLP=0.015
ROUTE                  ID=2    HYD NO=128sumRt INFLOW ID=1    DT=0.005
*
PRINT HYD              ID=2    CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 129
*****
*
COMPUTE NM HYD    ID=1    HYD NO=129      DA=0.0085 SQ MI
                  PER A=0  PER B=30   PER C=30   PER D=40
                  TP=0.1333    MASS RAIN=-1

PRINT HYD        ID=1    CODE=5
*
*
* Total Flow from Basin (128sumRt + 129)
ADD HYD          ID=1    HYD NO=129sum  ID I=2    ID II=1
PRINT HYD        ID=1    CODE=1
*
*
****Route HYD 129sum to Basin 130 Through a Pipe
COMPUTE RATING CURVE    CID=1  VS NO=1 CODE=-1  SLP=0.015
                        DIA=36 IN  N=0.013

*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1      NO VS=1 LENGTH=520 FT
                        SLP=0.015
ROUTE                  ID=2    HYD NO=129sumRt INFLOW ID=1    DT=0.005
*
PRINT HYD              ID=2    CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 130
*****
*
COMPUTE NM HYD    ID=1    HYD NO=130      DA=0.0093 SQ MI
                  PER A=0  PER B=25   PER C=25   PER D=50
                  TP=0.1333    MASS RAIN=-1

PRINT HYD        ID=1    CODE=5
*
*
* Total Flow from Basin (129sumRt + 130)
ADD HYD          ID=1    HYD NO=130sum  ID I=2    ID II=1
PRINT HYD        ID=1    CODE=1

```

LeadBdwy.txt

```

*
*
****Route HYD 130sum to Basin 131 Through a Pipe
COMPUTE RATING CURVE    CID=1    VS NO=1 CODE=-1    SLP=0.015
                        DIA=48 IN    N=0.013
*
COMPUTE TRAVEL TIME    ID=2    REACH NO=1    NO VS=1 LENGTH=527 FT
                        SLP=0.015
ROUTE                  ID=2    HYD NO=130sumRt INFLOW ID=1    DT=0.005
*
PRINT HYD              ID=2    CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 131
*****
*
COMPUTE NM HYD    ID=1    HYD NO=131    DA=0.0121 SQ MI
                  PER A=0    PER B=33    PER C=33    PER D=34
                  TP=0.1333    MASS RAIN=-1

PRINT HYD        ID=1    CODE=5

*
* Total Flow from Basin (130sumRt + 131)
ADD HYD          ID=1    HYD NO=AP1    ID I=2    ID II=1
PRINT HYD        ID=1    CODE=1
*
*
*
*
FINISH

```

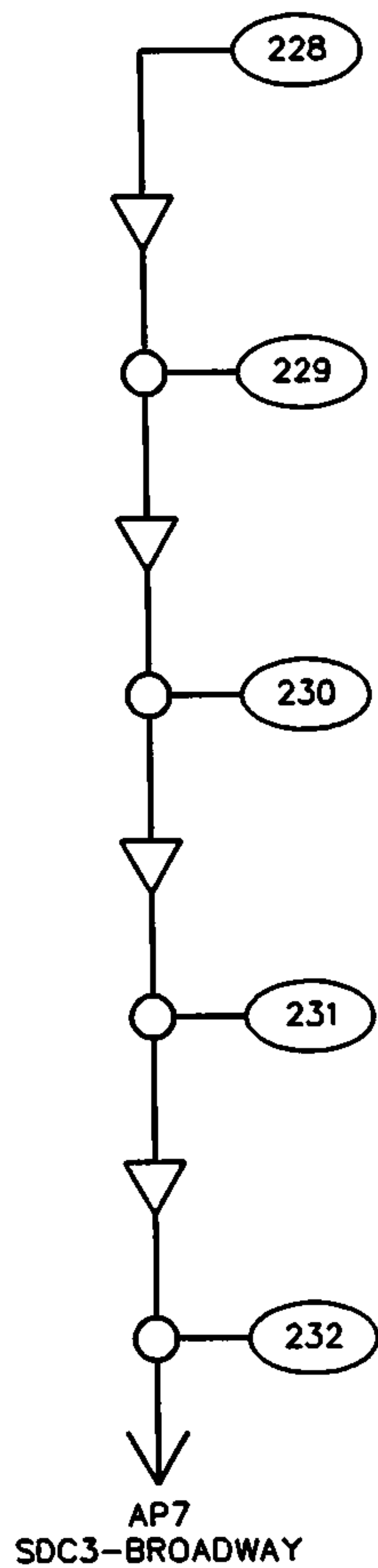
AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = leadbdwy.txt

Lead_Broadway watershed.SUM
- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =07/20/2009
USER NO.= AHYMO-C-9803c01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION

*S										
*S										
*S	100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING									
*S	ULTIMATELY TO LEAD AND COAL									
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 2									
*S										
*S	*****									
START									TIME=	.00
RAINFALL TYPE= 1									RAIN6=	2.350
COMPUTE NM HYD	126.00	-	1	.00430	12.62	.470	2.04850	1.500	4.585	PER IMP= 95.00
ROUTE	126Rt	1	2	.00430	12.44	.448	1.95347	1.510	4.519	
COMPUTE NM HYD	143.00	-	1	.00550	13.03	.448	1.52601	1.500	3.700	PER IMP= 50.00
ADD HYD	143sum	2& 1	1	.00980	25.38	.881	1.68513	1.505	4.047	
ROUTE	143sumRt	1	2	.00980	24.92	.879	1.68172	1.525	3.973	
COMPUTE NM HYD	127.00	-	1	.00380	5.96	.177	.87184	1.500	2.452	PER IMP= 7.00
ROUTE	127Rt	1	3	.00380	5.92	.174	.85925	1.530	2.435	
ADD HYD	128suma	2& 3	1	.01360	30.83	1.053	1.45191	1.525	3.542	
COMPUTE NM HYD	128.00	-	2	.01610	47.19	1.759	2.04850	1.500	4.580	PER IMP= 95.00
ADD HYD	128sumb	1& 2	1	.02970	77.14	2.732	1.72478	1.505	4.058	
ROUTE	128sumRt	1	2	.02970	76.76	2.730	1.72340	1.515	4.039	
COMPUTE NM HYD	129.00	-	1	.00850	19.03	.638	1.40814	1.500	3.498	PER IMP= 40.00
ADD HYD	129sum	2& 1	1	.03820	95.52	3.349	1.64393	1.515	3.907	
ROUTE	129sumRt	1	2	.03820	94.93	3.346	1.64213	1.530	3.883	
COMPUTE NM HYD	130.00	-	1	.00930	22.01	.757	1.52601	1.500	3.699	PER IMP= 50.00
ADD HYD	130sum	2& 1	1	.04750	116.35	4.077	1.60938	1.525	3.827	
ROUTE	130sumRt	1	2	.04750	115.94	4.073	1.60765	1.535	3.814	
COMPUTE NM HYD	131.00	-	1	.01210	26.15	.863	1.33742	1.500	3.377	PER IMP= 34.00
ADD HYD	AP1	2& 1	1	.05960	141.38	4.912	1.54536	1.530	3.706	
FINISH										



LEGEND

100	BASIN NUMBER
1000	XXXXXXX BASIN
○	ADD HYDROGRAPH
▽	ROUTE HYDROGRAPH
DH	DIVIDE HYDROGRAPH

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PROPOSED HYDROLOGIC MODEL DIAGRAM COAL / BROADWAY WATERSHED

CoalBdwy.txt

* Lead/Coal Drainage Analysis
 * DRAINAGE BASIN ANALYSIS
 * PROPOSED CONDITIONS MODEL FOR COAL/BROADWAY WATERSHED "BASINS DRAINING TO COAL from I-25 to Broadway.
 * 100 YR 6 HR STORM EVENT
 * DATE: JULY 2009
 * FILE: M:\TRN\08-100-207-00\COA6442\Proposed\Drainage\Calcs\AHYMO\LeadBdwy.TXT

*S*****
 *S
 *S 100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING
 *S ULTIMATELY TO LEAD AND COAL
 *S RAINFALL DATA FROM DPM Chapter 22 - ZONE 2
 *S
 *S*****

START 0.0 HOURS
 RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01IN RAIN SIX=2.35 IN
 RAIN DAY=0.0IN DT=0.033333 HR

*

 *

 *

 * COMPUTE HYD FOR SUB-BASIN 228

 *

COMPUTE NM HYD ID=1 HYD NO=228 DA=0.0019 SQ MI
 PER A=0 PER B=5 PER C=0 PER D=95
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 *
 ****Route HYD 228 to Basin 229 Through a Pipe
 COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.015
 DIA=30 IN N=0.013

*
 COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=696 FT
 SLP=0.015
 ROUTE ID=2 HYD NO=228Rt INFLOW ID=1 DT=0.005
 *
 PRINT HYD ID=2 CODE=1

 * COMPUTE HYD FOR SUB-BASIN 229

 *

COMPUTE NM HYD ID=1 HYD NO=229 DA=0.0057 SQ MI
 PER A=0 PER B=30 PER C=30 PER D=40
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 * Total Flow from Basin (228Rt + 229)
 ADD HYD ID=1 HYD NO=229sum ID I=2 ID II=1
 PRINT HYD ID=1 CODE=1

*
 ****Route HYD 229sum to Basin 230 Through a Pipe
 COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLP=0.015
 DIA=30 IN N=0.013

*
 COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 LENGTH=375 FT
 SLP=0.015
 ROUTE ID=2 HYD NO=229sumRt INFLOW ID=1 DT=0.005
 PRINT HYD ID=2 CODE=1

 * COMPUTE HYD FOR SUB-BASIN 230

 *

COMPUTE NM HYD ID=1 HYD NO=230 DA=0.0047 SQ MI
 PER A=0 PER B=23 PER C=23 PER D=54
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

*
 * Total Flow from Basin (229sumRt + 230)
 ADD HYD ID=1 HYD NO=230sum ID I=2 ID II=1

```

CoalBdwy.txt

PRINT HYD          ID=1  CODE=1

****Route HYD 230sum to Basin 231 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.015
                      DIA=36 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=381 FT
                      SLP=0.015
ROUTE                ID=2  HYD NO=230sumRt INFLOW ID=1  DT=0.005

*
PRINT HYD          ID=2  CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 231
*****
*
COMPUTE NM HYD  ID=1  HYD NO=231  DA=0.0046 SQ MI
                PER A=0  PER B=34  PER C=34  PER D=32
                TP=0.1333  MASS RAIN=-1

PRINT HYD          ID=1  CODE=5
*
* Total Flow from Basin (230sumRt + 231)
ADD HYD            ID=1  HYD NO=231sum  ID I=2  ID II=1
PRINT HYD          ID=1  CODE=1
*
*
****Route HYD 231sum to Basin 232 Through a Pipe
COMPUTE RATING CURVE  CID=1  VS NO=1 CODE=-1  SLP=0.015
                      DIA=36 IN  N=0.013
*
COMPUTE TRAVEL TIME  ID=2  REACH NO=1  NO VS=1 LENGTH=391 FT
                      SLP=0.015
ROUTE                ID=2  HYD NO=231sumRt INFLOW ID=1  DT=0.005

*
PRINT HYD          ID=2  CODE=1
*
*****
*      COMPUTE HYD FOR SUB-BASIN 232
*****
*
COMPUTE NM HYD  ID=1  HYD NO=232  DA=0.0033 SQ MI
                PER A=0  PER B=34  PER C=34  PER D=32
                TP=0.1333  MASS RAIN=-1

PRINT HYD          ID=1  CODE=5
*
*
* Total Flow from Basin (231sumRt + 232)
ADD HYD            ID=1  HYD NO=AP7  ID I=2  ID II=1
PRINT HYD          ID=1  CODE=1
*
*
FINISH

```

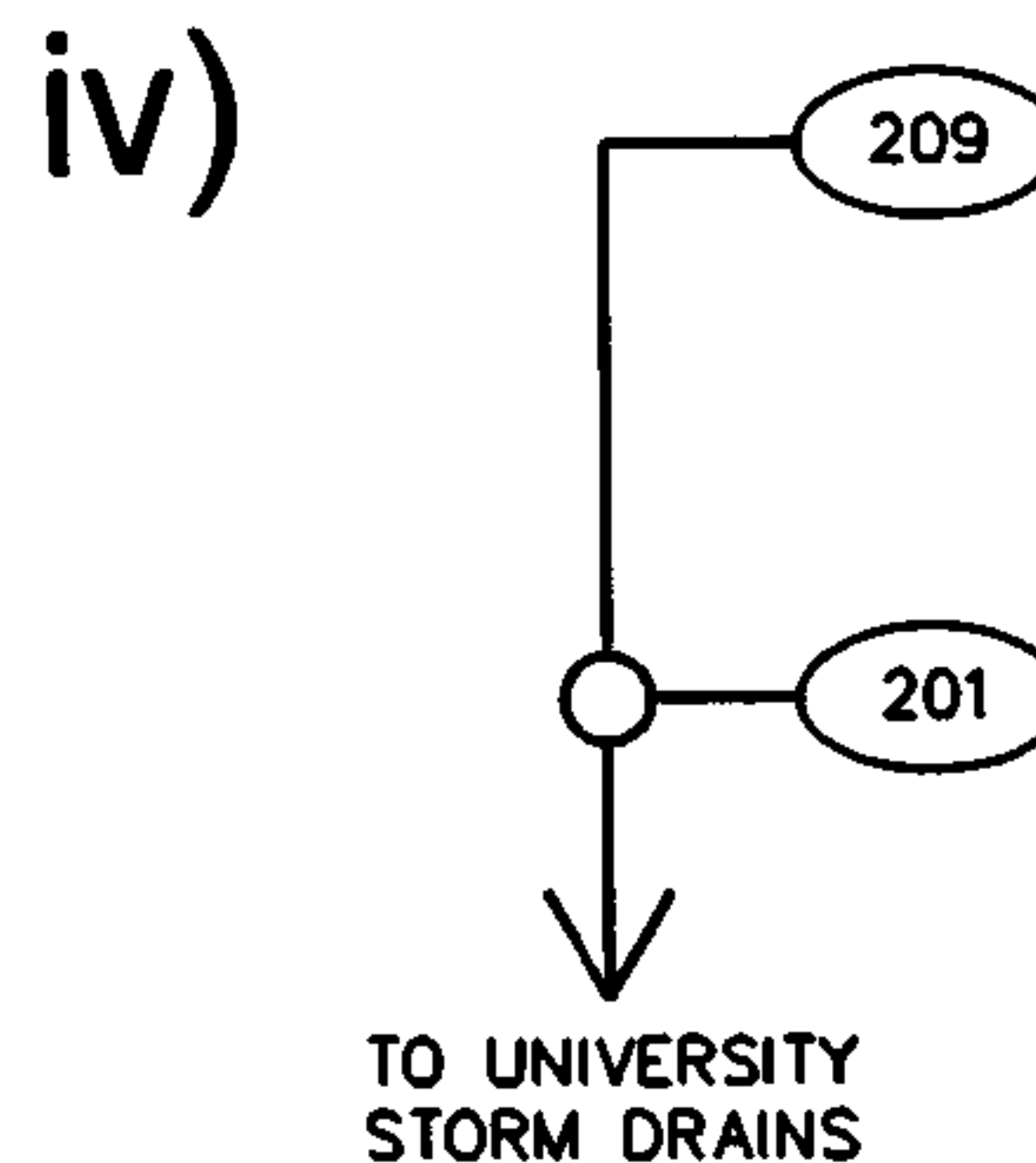
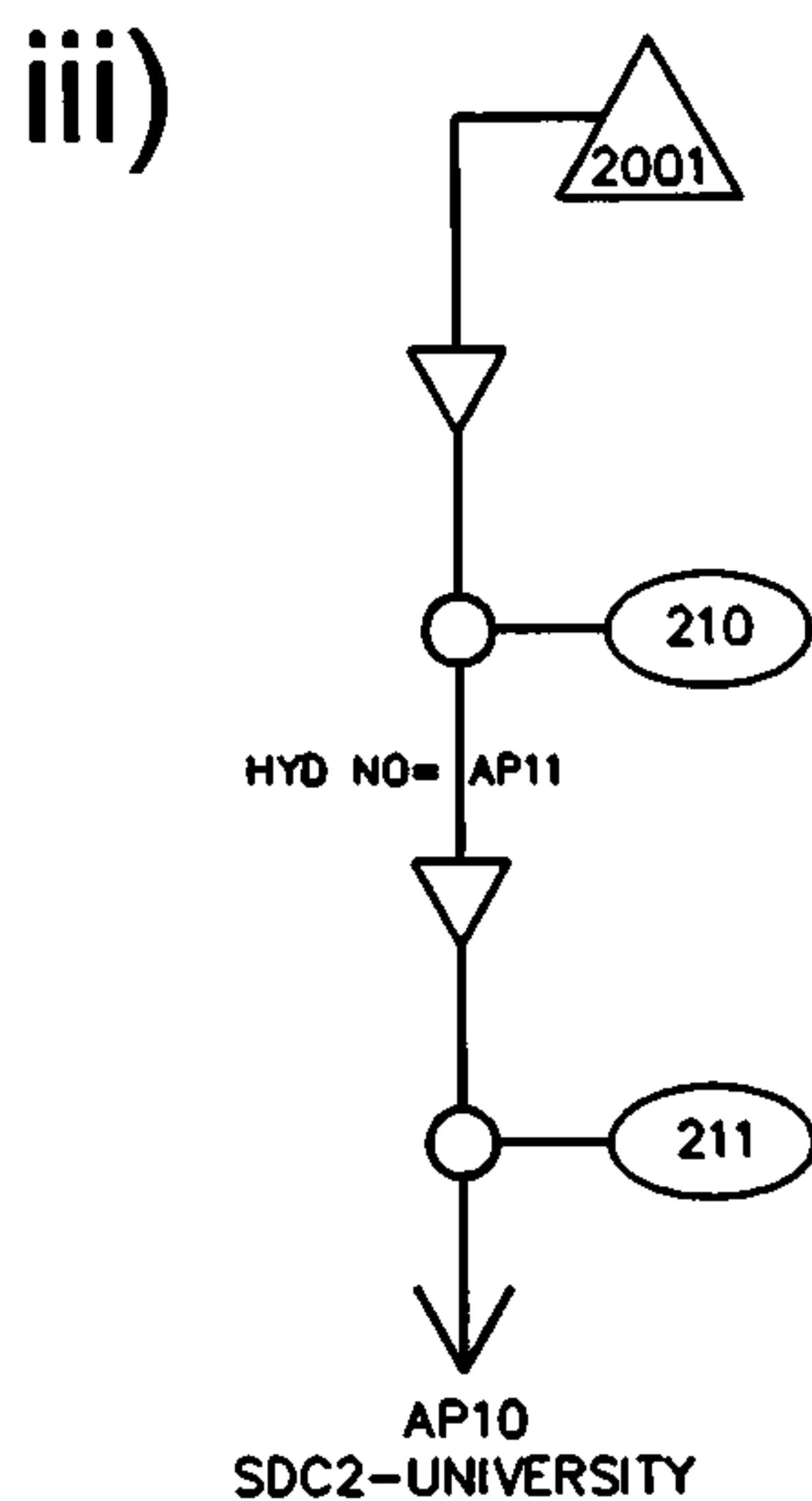
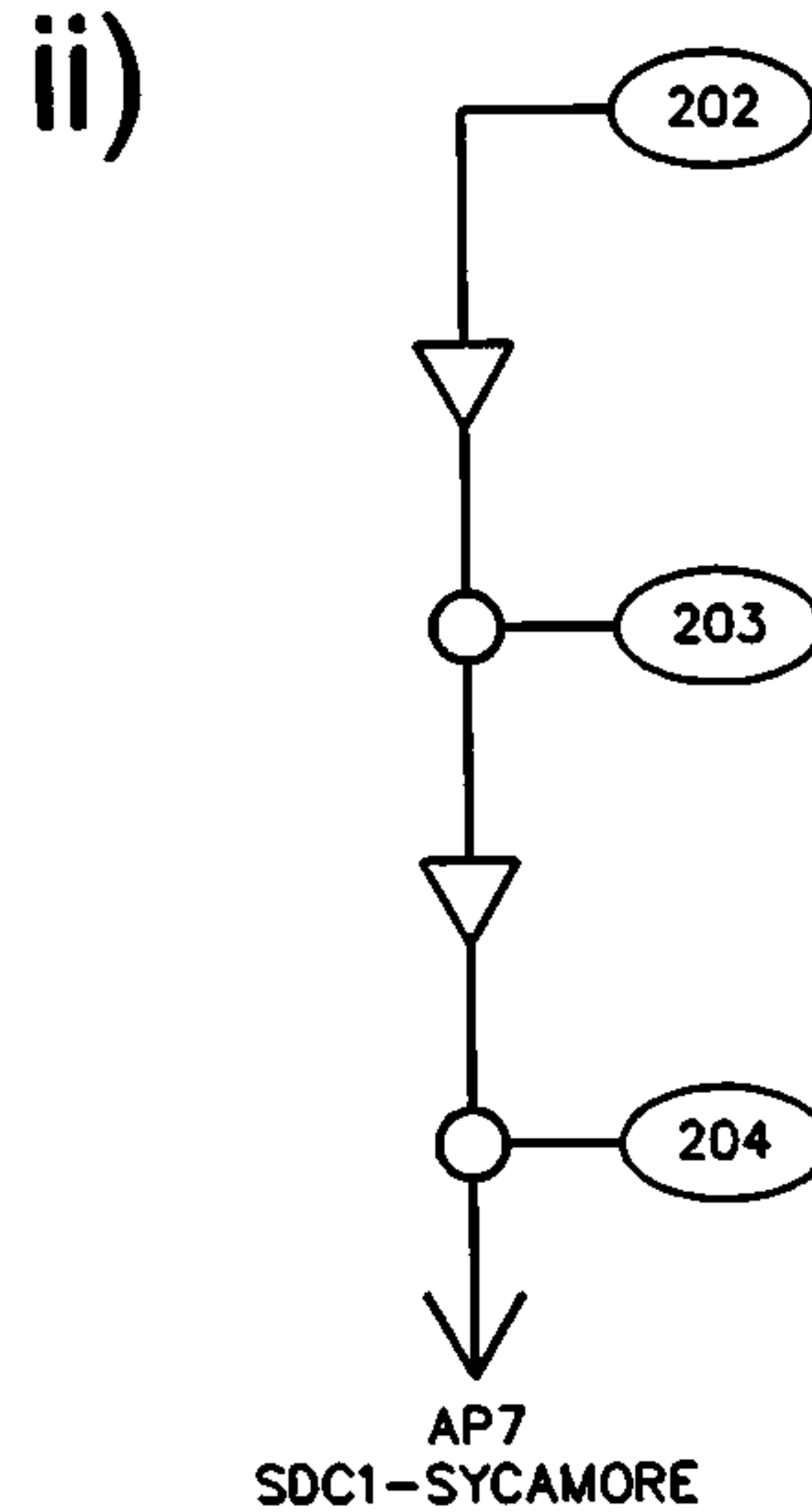
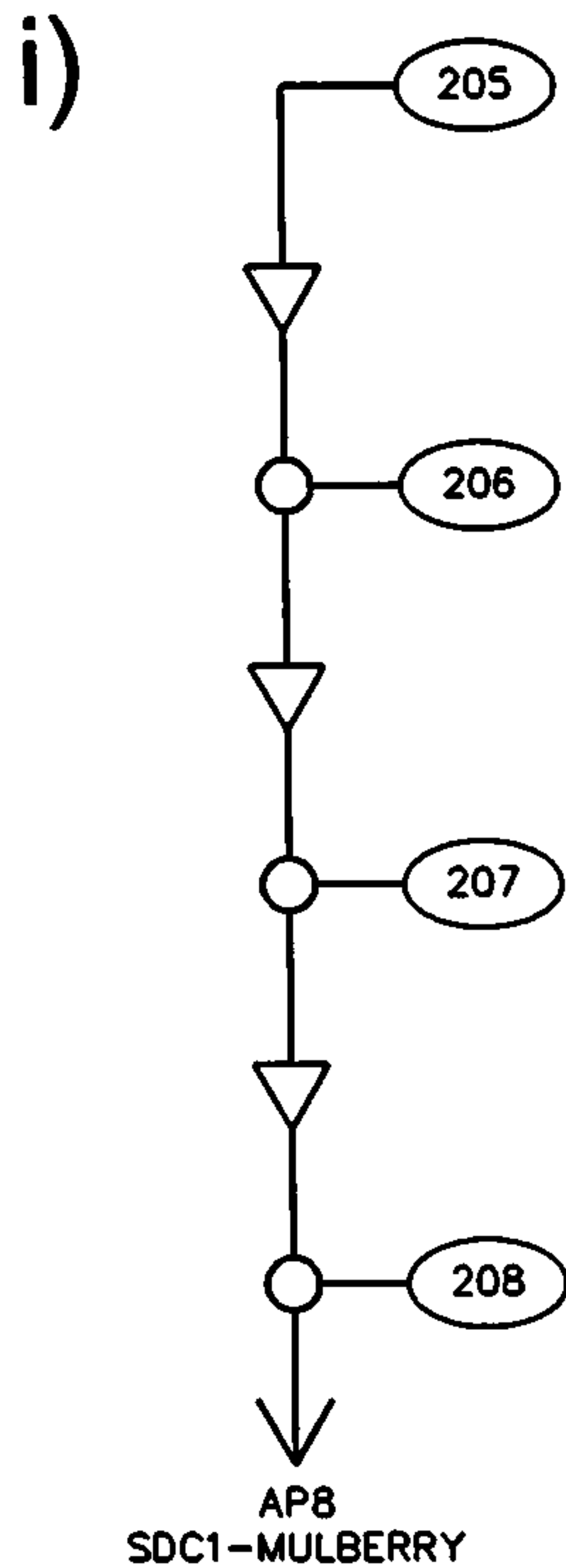
AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = coalbdwy.txt

Coal_Broadway Watershed.SUM
- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =07/12/2009
USER NO.= AHYMO-C-9803c01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION

*S										
*S	100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING									
*S	ULTIMATELY TO LEAD AND COAL									
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 2									
*S	*****									
START										
RAINFALL TYPE= 1										
COMPUTE NM HYD	228.00	-	1	.00190	5.58	.208	2.04850	1.500	4.593	TIME= .00 RAIN6= 2.350 PER IMP= 95.00
ROUTE	228Rt	1	2	.00190	5.35	.198	1.95217	1.525	4.400	
COMPUTE NM HYD	229.00	-	1	.00570	12.77	.428	1.40814	1.500	3.500	PER IMP= 40.00
ADD HYD	229sum	2& 1	1	.00760	17.97	.613	1.51308	1.505	3.695	
ROUTE	229sumRt	1	2	.00760	17.87	.613	1.51156	1.520	3.674	
COMPUTE NM HYD	230.00	-	1	.00470	11.38	.394	1.57316	1.500	3.782	PER IMP= 54.00
ADD HYD	230sum	2& 1	1	.01230	29.07	.993	1.51440	1.510	3.693	
ROUTE	230sumRt	1	2	.01230	28.96	.993	1.51301	1.520	3.679	
COMPUTE NM HYD	231.00	-	1	.00460	9.83	.322	1.31385	1.500	3.341	PER IMP= 32.00
ADD HYD	231sum	2& 1	1	.01690	38.63	1.307	1.44958	1.515	3.571	
ROUTE	231sumRt	1	2	.01690	38.51	1.305	1.44819	1.525	3.560	
COMPUTE NM HYD	232.00	-	1	.00330	7.06	.231	1.31385	1.500	3.343	PER IMP= 32.00
ADD HYD	AP7	2& 1	1	.02020	45.42	1.531	1.42078	1.525	3.513	
FINISH										



LEGEND

100	BASIN NUMBER
1000	XXXXXXX BASIN
○	ADD HYDROGRAPH
▽	ROUTE HYDROGRAPH
DH	DIVIDE HYDROGRAPH

PROPOSED HYDROLOGIC MODEL DIAGRAM

- i) COAL / MULBERRY WATERSHED
- ii) COAL / SYCAMORE WATERSHED
- iii) COAL / UNIVERSITY WATERSHED
- iv) UNIVERSITY WATERSHED

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CoalI25.txt

* Lead/Coal Drainage Analysis
 * DRAINAGE BASIN ANALYSIS
 * PROPOSED CONDITIONS MODEL FOR THE BASINS DRAINING TO Coal Between University and I-25.
 * 100 YR 6 HR STORM EVENT
 * DATE: July 2009
 * FILE: M:\TRN\08-100-207-00\COA6442\Proposed\Drainage\Calcs\AHYMO\CoalI25.txt

 *S
 *S
 *S 100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING
 *S ULTIMATELY TO LEAD AND COAL
 *S RAINFALL DATA FROM DPM Chapter 22 - ZONE 2
 *S
 *S*****

START 0.0 HOURS
 RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.01IN RAIN SIX=2.35 IN
 RAIN DAY=0.0IN DT=0.03333 HR

*
 *
 *S
 *S coal/mulberry watershed
 *
 *

 * COMPUTE HYD FOR SUB-BASIN 205

 *

COMPUTE NM HYD ID=1 HYD NO=205 DA=0.0045 SQ MI
 PER A=0 PER B=20 PER C=20 PER D=60
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=1 CODE=5

 * COMPUTE HYD FOR SUB-BASIN 206

 *

COMPUTE NM HYD ID=2 HYD NO=206 DA=0.0034 SQ MI
 PER A=0 PER B=5 PER C=5 PER D=90
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=2 CODE=5

*
 * Total Flow from Basin (205 + 206)
 ADD HYD ID=1 HYD NO=206sum ID I=1 ID II=2
 PRINT HYD ID=1 CODE=1
 *
 *

 * COMPUTE HYD FOR SUB-BASIN 207

 *

COMPUTE NM HYD ID=2 HYD NO=207 DA=0.0039 SQ MI
 PER A=0 PER B=5 PER C=5 PER D=90
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=2 CODE=5

*
 * Total Flow from Basin (206sum + 207)
 ADD HYD ID=1 HYD NO=207sum ID I=1 ID II=2
 PRINT HYD ID=1 CODE=1
 *
 *

 * COMPUTE HYD FOR SUB-BASIN 208

 *

COMPUTE NM HYD ID=2 HYD NO=208 DA=0.0063 SQ MI
 PER A=0 PER B=5 PER C=5 PER D=90
 TP=0.1333 MASS RAIN=-1

PRINT HYD ID=2 CODE=5

*
 * Total Flow from Basin (207sum + 208)
 ADD HYD ID=50 HYD NO=AP8 ID I=1 ID II=2
 PRINT HYD ID=50 CODE=1
 *
 *
 *

coal125.txt

```

*****
*****
*
*S
*S      coal/sycamore watershed
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 202
*****
*
COMPUTE NM HYD  ID=1    HYD NO=202    DA=0.0079 SQ MI
                PER A=0    PER B=8    PER C=8    PER D=84
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5

*****
*      COMPUTE HYD FOR SUB-BASIN 203
*****
*
COMPUTE NM HYD  ID=2    HYD NO=203    DA=0.0050 SQ MI
                PER A=0    PER B=15    PER C=15    PER D=70
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=2    CODE=5

*
* Total Flow from Basin (202 + 203)
ADD HYD      ID=1    HYD NO=203sum  ID I=1    ID II=2
PRINT HYD    ID=1    CODE=1
*

*****
*      COMPUTE HYD FOR SUB-BASIN 204
*****
*
COMPUTE NM HYD  ID=2    HYD NO=204    DA=0.0058 SQ MI
                PER A=0    PER B=5    PER C=5    PER D=90
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=2    CODE=5

*
* Total Flow from Basin (203sum + 204)
ADD HYD      ID=50    HYD NO=AP9  ID I=1    ID II=2
PRINT HYD    ID=50    CODE=1
*
*
*****
**
*****
*****
*
*
*S
*S      coal/universtiy watershed
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 2001
*****
*
COMPUTE NM HYD  ID=1    HYD NO=1002    DA=0.03424 SQ MI
                PER A=0    PER B=25    PER C=25    PER D=50
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5

*
****Route Basin 2001 to Basin 210 discharge through a Street
COMPUTE RATING CURVE  CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=0.5 FT MAX ELEV=1.2 FT
                     CH SLP=0.020  FP SLP=0.020 N=0.016
                     DIST=32 FT

                     DIST  ELEV
                       0.0   1.0
                       0.2   0.5
                       1.5   0.5
                      16.0   0.8
                      30.5   0.5
                      31.8   0.5

```

```

                                coalI25.txt
                                32.0    1.0
*
ROUTE MCUNGE                    ID=2  HYD NO=2001rt  INFLOW ID=1
                                DT=0  HR  LENGTH=3000 FT
                                NS=0  SLOPE=0.020
*
PRINT HYD                        ID=2  CODE=1
*

*****
*      COMPUTE HYD FOR SUB-BASIN 210
*****
*
COMPUTE NM HYD  ID=1    HYD NO=210    DA=0.0037 SQ MI
                PER A=0    PER B=30    PER C=30    PER D=40
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
* Total Flow from Basin (2001rt + 210)
ADD HYD        ID=1  HYD NO=AP11  ID I=2    ID II=1
PRINT HYD      ID=1    CODE=1
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 211
*****
*
COMPUTE NM HYD  ID=2    HYD NO=211    DA=0.0168 SQ MI
                PER A=0    PER B=30    PER C=30    PER D=40
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=2    CODE=5
*
*
* Total Flow from Basin (AP11 + 211)
ADD HYD        ID=50  HYD NO=AP10  ID I=1    ID II=2
PRINT HYD      ID=50    CODE=1
*
*
*****
**
*****
*****
*****
*
*
*S
*S      University Watershed
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 209
*****
*
COMPUTE NM HYD  ID=1    HYD NO=209    DA=0.0124 SQ MI
                PER A=0    PER B=29    PER C=29    PER D=41
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=1    CODE=5
*
*
*****
*      COMPUTE HYD FOR SUB-BASIN 201
*****
*
COMPUTE NM HYD  ID=2    HYD NO=201    DA=0.0197 SQ MI
                PER A=0    PER B=5    PER C=5    PER D=90
                TP=0.1333    MASS RAIN=-1

PRINT HYD      ID=2    CODE=5
*
*
* Total Flow from Basin (209 + 201)
ADD HYD        ID=50  HYD NO=201sum  ID I=1    ID II=2
PRINT HYD      ID=50    CODE=1
*
*
*
*****
FINISH

```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = coalI25.txt

Coal watersheds.SUM
- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =07/12/2009
USER NO.= AHYMO-C-9803c01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION

*S										
*S	100 YEAR 6 HOUR STORM - RUNOFF ANALYSIS FOR BASINS DRAINING									
*S	ULTIMATELY TO LEAD AND COAL									
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 2									
*S	*****									
START									TIME=	.00
RAINFALL TYPE= 1									RAIN6=	2.350
*S										
*S	Coal/Mulberry watershed									
COMPUTE NM HYD	205.00	-	1	.00450	11.24	.395	1.64387	1.500	3.903	PER IMP= 60.00
COMPUTE NM HYD	206.00	-	2	.00340	9.81	.362	1.99749	1.500	4.507	PER IMP= 90.00
ADD HYD	206sum	1& 2	1	.00790	21.05	.757	1.79599	1.500	4.163	
COMPUTE NM HYD	207.00	-	2	.00390	11.25	.415	1.99749	1.500	4.506	PER IMP= 90.00
ADD HYD	207sum	1& 2	1	.01180	32.29	1.172	1.86257	1.500	4.276	
COMPUTE NM HYD	208.00	-	2	.00630	18.16	.671	1.99749	1.500	4.503	PER IMP= 90.00
ADD HYD	AP8	1& 2	50	.01810	50.45	1.843	1.90951	1.500	4.355	
*S										
*S	Coal/Sycamore watershed									
COMPUTE NM HYD	202.00	-	1	.00790	22.15	.812	1.92677	1.500	4.382	PER IMP= 84.00
COMPUTE NM HYD	203.00	-	2	.00500	13.13	.470	1.76175	1.500	4.103	PER IMP= 70.00
ADD HYD	203sum	1& 2	1	.01290	35.28	1.282	1.86276	1.500	4.274	
COMPUTE NM HYD	204.00	-	2	.00580	16.72	.618	1.99749	1.500	4.503	PER IMP= 90.00
ADD HYD	AP9	1& 2	50	.01870	52.00	1.899	1.90454	1.500	4.345	
*S										
*S	Coal/Universtiy watershed									
COMPUTE NM HYD	1002.00	-	1	.03424	81.00	2.787	1.52600	1.500	3.696	PER IMP= 50.00
ROUTE MCUNGE	2001rt	1	2	.03424	79.86	2.780	1.52226	1.700	3.644	CCODE = .1
COMPUTE NM HYD	210.00	-	1	.00370	8.29	.278	1.40813	1.500	3.503	PER IMP= 40.00
ADD HYD	AP11	2& 1	1	.03794	83.68	3.058	1.51111	1.700	3.446	
COMPUTE NM HYD	211.00	-	2	.01680	37.59	1.262	1.40813	1.500	3.496	PER IMP= 40.00
ADD HYD	AP10	1& 2	50	.05474	101.00	4.319	1.47950	1.700	2.883	
*S										
*S	University watershed									
COMPUTE NM HYD	209.00	-	1	.01240	27.98	.942	1.42480	1.500	3.525	PER IMP= 41.41
COMPUTE NM HYD	201.00	-	2	.01970	56.74	2.099	1.99749	1.500	4.500	PER IMP= 90.00
ADD HYD	201sum	1& 2	50	.03210	84.71	3.041	1.77625	1.500	4.124	
FINISH										

**A
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D
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X

B**

INLET CAPACITIES

Single Type "A" @ 0.5%

Project Description

Solve For

Efficiency

Input Data

Discharge	4.05	ft ³ /s
Slope	0.0050	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	86.79	%
Intercepted Flow	3.5	ft ³ /s
Bypass Flow	0.53	ft ³ /s
Spread	13.01	ft
Depth	0.35	ft
Flow Area	1.78	ft ²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	2.28	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.10	
Grate Flow Ratio	0.43	
Equivalent Cross Slope	0.09129	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.41	
Total Interception Length	11.51	ft

Single Type "A" @ 1%

Project Description

Solve For

Efficiency

Input Data

Discharge	5.70	ft³/s
Slope	0.0100	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	76.65	%
Intercepted Flow	4.4	ft³/s
Bypass Flow	1.33	ft³/s
Spread	12.99	ft
Depth	0.34	ft
Flow Area	1.77	ft²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	3.22	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.05	
Grate Flow Ratio	0.43	
Equivalent Cross Slope	0.09142	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.29	
Total Interception Length	16.34	ft

Single Type "A" @ 2%

Project Description

Solve For

Efficiency

Input Data

Discharge	8.10	ft ³ /s
Slope	0.0200	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	66.36	%
Intercepted Flow	5.4	ft ³ /s
Bypass Flow	2.73	ft ³ /s
Spread	13.01	ft
Depth	0.35	ft
Flow Area	1.78	ft ²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	4.55	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.93	
Side Flow Factor	0.03	
Grate Flow Ratio	0.43	
Equivalent Cross Slope	0.09129	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.20	
Total Interception Length	23.34	ft

Single Type "A" @ 3%

Project Description

Solve For

Efficiency

Input Data

Discharge	9.90	ft³/s
Slope	0.0300	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	58.82	%
Intercepted Flow	5.8	ft³/s
Bypass Flow	4.08	ft³/s
Spread	13.00	ft
Depth	0.35	ft
Flow Area	1.78	ft²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	5.58	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.83	
Side Flow Factor	0.02	
Grate Flow Ratio	0.43	
Equivalent Cross Slope	0.09134	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.16	
Total Interception Length	28.67	ft

Single Type "A" @ 4%

Project Description

Solve For

Efficiency

Input Data

1

Discharge	11.50	ft³/s
Slope	0.0400	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	53.08	%
Intercepted Flow	6.1	ft³/s
Bypass Flow	5.40	ft³/s
Spread	13.03	ft
Depth	0.35	ft
Flow Area	1.78	ft²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	6.45	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.76	
Side Flow Factor	0.02	
Grate Flow Ratio	0.42	
Equivalent Cross Slope	0.09118	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.14	
Total Interception Length	33.32	ft

Single Type "A" @ 5%

Project Description

Solve For

Efficiency

Input Data

Discharge	12.80	ft ³ /s
Slope	0.0500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	48.69	%
Intercepted Flow	6.2	ft ³ /s
Bypass Flow	6.57	ft ³ /s
Spread	13.01	ft
Depth	0.35	ft
Flow Area	1.78	ft ²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	7.20	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.69	
Side Flow Factor	0.01	
Grate Flow Ratio	0.43	
Equivalent Cross Slope	0.09130	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.13	
Total Interception Length	37.23	ft

Single Type "A" @ 6%

Project Description

Solve For

Efficiency

Input Data

Discharge	14.00	ft³/s
Slope	0.0600	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	44.90	%
Intercepted Flow	6.3	ft³/s
Bypass Flow	7.71	ft³/s
Spread	13.00	ft
Depth	0.35	ft
Flow Area	1.78	ft²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	7.88	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.63	
Side Flow Factor	0.01	
Grate Flow Ratio	0.43	
Equivalent Cross Slope	0.09134	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.12	
Total Interception Length	40.82	ft

Single Type "A" @ 7%

Project Description

Solve For

Efficiency

Input Data

Discharge	15.10	ft³/s
Slope	0.0700	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	3.00	in
Local Depression Width	2.00	ft
Grate Width	2.00	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	6.45	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	41.58	%
Intercepted Flow	6.3	ft³/s
Bypass Flow	8.82	ft³/s
Spread	13.00	ft
Depth	0.34	ft
Flow Area	1.77	ft²
Gutter Depression	0.09	ft
Total Depression	0.34	ft
Velocity	8.51	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.57	
Side Flow Factor	0.01	
Grate Flow Ratio	0.43	
Equivalent Cross Slope	0.09138	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.11	
Total Interception Length	44.12	ft

Single Type "C" @ 0.5%

Project Description

Solve For

Efficiency

Input Data

Discharge	4.30	ft ³ /s
Slope	0.0050	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	73.59	%
Intercepted Flow	3.2	ft ³ /s
Bypass Flow	1.14	ft ³ /s
Spread	13.02	ft
Depth	0.37	ft
Flow Area	1.83	ft ²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	2.35	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.09	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07685	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.17	
Total Interception Length	13.09	ft

Single Type "C" @ 1%

Project Description

Solve For

Efficiency

Input Data

Discharge	6.10	ft³/s
Slope	0.0100	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	67.35	%
Intercepted Flow	4.1	ft³/s
Bypass Flow	1.99	ft³/s
Spread	13.04	ft
Depth	0.37	ft
Flow Area	1.83	ft²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	3.33	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.05	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07679	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.12	
Total Interception Length	18.67	ft

Single Type "C" @ 2%

Project Description

Solve For

Efficiency

Input Data

Discharge	8.60	ft ³ /s
Slope	0.0200	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	59.38	%
Intercepted Flow	5.1	ft ³ /s
Bypass Flow	3.49	ft ³ /s
Spread	13.02	ft
Depth	0.37	ft
Flow Area	1.83	ft ²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	4.70	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.91	
Side Flow Factor	0.03	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07685	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.08	
Total Interception Length	26.54	ft

Single Type "C" @ 3%

Project Description

Solve For

Efficiency

Input Data

Discharge	10.50	ft³/s
Slope	0.0300	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	52.77	%
Intercepted Flow	5.5	ft³/s
Bypass Flow	4.96	ft³/s
Spread	13.01	ft
Depth	0.37	ft
Flow Area	1.82	ft²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	5.76	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.82	
Side Flow Factor	0.02	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07692	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.07	
Total Interception Length	32.58	ft

Single Type "C" @ 4%

Project Description

Solve For

Efficiency

Input Data

Discharge	12.20	ft³/s
Slope	0.0400	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	47.41	%
Intercepted Flow	5.8	ft³/s
Bypass Flow	6.42	ft³/s
Spread	13.04	ft
Depth	0.37	ft
Flow Area	1.83	ft²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	6.65	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.74	
Side Flow Factor	0.02	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07679	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.06	
Total Interception Length	37.86	ft

Single Type "C" @ 5%

Project Description

Solve For

Efficiency

Input Data

Discharge	13.50	ft³/s
Slope	0.0500	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	43.28	%
Intercepted Flow	5.8	ft³/s
Bypass Flow	7.66	ft³/s
Spread	12.98	ft
Depth	0.37	ft
Flow Area	1.82	ft²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	7.42	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.67	
Side Flow Factor	0.01	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07700	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.05	
Total Interception Length	42.17	ft

Single Type "C" @ 6%

Project Description

Solve For

Efficiency

Input Data

Discharge	14.90	ft ³ /s
Slope	0.0600	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	39.26	%
Intercepted Flow	5.8	ft ³ /s
Bypass Flow	9.05	ft ³ /s
Spread	13.03	ft
Depth	0.37	ft
Flow Area	1.83	ft ²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	8.15	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.60	
Side Flow Factor	0.01	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07685	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.05	
Total Interception Length	46.48	ft

Single Type "C" @ 7%

Project Description

Solve For

Efficiency

Input Data

Discharge	16.10	ft³/s
Slope	0.0700	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	Reticuline	
Clogging	50.00	%
Curb Opening Length	3.95	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	35.79	%
Intercepted Flow	5.8	ft³/s
Bypass Flow	10.34	ft³/s
Spread	13.03	ft
Depth	0.37	ft
Flow Area	1.83	ft²
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Velocity	8.80	ft/s
Splash Over Velocity	3.73	ft/s
Frontal Flow Factor	0.54	
Side Flow Factor	0.01	
Grate Flow Ratio	0.52	
Equivalent Cross Slope	0.07684	ft/ft
Active Grate Length	1.73	ft
Length Factor	0.04	
Total Interception Length	50.30	ft

Single Type "C" in Sump Condition

Project Description

Solve For Spread

Input Data

Discharge	12.00	ft³/s
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0150	ft/ft
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	3.45	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	3.95	ft
Opening Height	0.50	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option Use Both

Results

Spread	35.24	ft
Depth	0.65	ft
Gutter Depression	0.12	ft
Total Depression	0.29	ft
Open Grate Area	3.88	ft²
Active Grate Weir Length	5.95	ft

Double Type "C" in Sump Condition

Project Description

Solve For

Spread

Input Data

Discharge	18.00	ft³/s
Gutter Width	2.50	ft
Gutter Cross Slope	0.0625	ft/ft
Road Cross Slope	0.0200	ft/ft
Local Depression	2.00	in
Local Depression Width	2.50	ft
Grate Width	2.50	ft
Grate Length	6.45	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	6.50	ft
Opening Height	0.50	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option

Use Both

Results

Spread	28.14	ft
Depth	0.67	ft
Gutter Depression	0.11	ft
Total Depression	0.27	ft
Open Grate Area	7.26	ft²
Active Grate Weir Length	8.95	ft

STREET CAPACITIES

Worksheet for Lead - Typical "A"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+16.200	0.409
0+28.400	0.165
0+30.400	0.040
0+31.030	0.707

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+28.400, 0.165)	0.017
(0+28.400, 0.165)	(0+31.030, 0.707)	0.013

Results

Discharge 45.9 ft³/s
Elevation Range 0.000 to 0.707 ft
Flow Area 13.05 ft²
Wetted Perimeter 32.190 ft
Top Width 31.617 ft
Normal Depth 0.67 ft
Critical Depth 0.66 ft
Critical Slope 0.00540 ft/ft
Velocity 3.52 ft/s

Worksheet for Lead - Typical "A"

Results

Velocity Head	0.19	ft
Specific Energy	0.86	ft
Froude Number	0.97	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.66	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00540	ft/ft

Rating Table for Lead - Typical "A"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
--------------	----------------

-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+16.200	0.409
0+28.400	0.165
0+30.400	0.040
0+31.030	0.707

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
---------------	----------------	-----------------------

(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+28.400, 0.165)	0.017
(0+28.400, 0.165)	(0+31.030, 0.707)	0.013

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	45.9	3.52	13.05	32.19	31.62
0.01000	64.9	4.98	13.05	32.19	31.62
0.01500	79.5	6.10	13.05	32.19	31.62
0.02000	91.8	7.04	13.05	32.19	31.62
0.02500	102.7	7.87	13.05	32.19	31.62

Rating Table for Lead - Typical "A"

Input Data:

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.03000	112.5	8.62	13.05	32.19	31.62
0.03500	121.5	9.31	13.05	32.19	31.62
0.04000	129.9	9.95	13.05	32.19	31.62
0.04500	137.8	10.56	13.05	32.19	31.62
0.05000	145.2	11.13	13.05	32.19	31.62
0.05500	152.3	11.67	13.05	32.19	31.62
0.06000	159.1	12.19	13.05	32.19	31.62
0.06500	165.6	12.69	13.05	32.19	31.62
0.07000	171.8	13.17	13.05	32.19	31.62

Worksheet for Lead - Typical "B"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+17.000	0.405
0+28.000	0.185
0+30.000	0.060
0+30.630	0.727

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+28.000, 0.185)	0.017
(0+28.000, 0.185)	(0+30.630, 0.727)	0.013

Results

Discharge 44.9 ft³/s
Elevation Range 0.00 to 0.73 ft
Flow Area 12.80 ft²
Wetted Perimeter 31.762 ft
Top Width 31.198 ft
Normal Depth 0.67 ft
Critical Depth 0.66 ft
Critical Slope 0.00541 ft/ft
Velocity 3.51 ft/s

Worksheet for Lead - Typical "B"

Results

Velocity Head	0.19	ft
Specific Energy	0.86	ft
Froude Number	0.97	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.66	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00541	ft/ft

Rating Table for Lead - Typical "B"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
--------------	----------------

-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+17.000	0.405
0+28.000	0.185
0+30.000	0.060
0+30.630	0.727

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
---------------	----------------	-----------------------

(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+28.000, 0.185)	0.017
(0+28.000, 0.185)	(0+30.630, 0.727)	0.013

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	44.9	3.51	12.80	31.76	31.20
0.01000	63.5	4.96	12.80	31.76	31.20
0.01500	77.8	6.07	12.80	31.76	31.20
0.02000	89.8	7.01	12.80	31.76	31.20
0.02500	100.4	7.84	12.80	31.76	31.20

Rating Table for Lead - Typical "B"

Input Data

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.03000	110.0	8.59	12.80	31.76	31.20
0.03500	118.8	9.28	12.80	31.76	31.20
0.04000	127.0	9.92	12.80	31.76	31.20
0.04500	134.7	10.52	12.80	31.76	31.20
0.05000	142.0	11.09	12.80	31.76	31.20
0.05500	148.9	11.63	12.80	31.76	31.20
0.06000	155.5	12.15	12.80	31.76	31.20
0.06500	161.9	12.65	12.80	31.76	31.20
0.07000	168.0	13.12	12.80	31.76	31.20

Worksheet for Lead - Typical "C"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+17.000	0.425
0+28.000	0.205
0+30.000	0.080
0+30.625	0.747

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+28.000, 0.205)	0.017
(0+28.000, 0.205)	(0+30.625, 0.747)	0.013

Results

Discharge 42.5 ft³/s
Elevation Range 0.00 to 0.75 ft
Flow Area 12.38 ft²
Wetted Perimeter 31.732 ft
Top Width 31.175 ft
Normal Depth 0.67 ft
Critical Depth 0.66 ft
Critical Slope 0.00547 ft/ft
Velocity 3.43 ft/s

Worksheet for Lead - Typical "C"

Results

Velocity Head	0.18	ft
Specific Energy	0.85	ft
Froude Number	0.96	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.66	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00547	ft/ft

Rating Table for Lead - Typical "C"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
--------------	----------------

-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+17.000	0.425
0+28.000	0.205
0+30.000	0.080
0+30.625	0.747

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+28.000, 0.205)	0.017
(0+28.000, 0.205)	(0+30.625, 0.747)	0.013

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	42.5	3.43	12.38	31.73	31.18
0.01000	60.1	4.85	12.38	31.73	31.18
0.01500	73.6	5.94	12.38	31.73	31.18
0.02000	85.0	6.86	12.38	31.73	31.18
0.02500	95.0	7.67	12.38	31.73	31.18

Rating Table for Lead - Typical "C"

Input Data

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.03000	104.0	8.40	12.38	31.73	31.18
0.03500	112.4	9.08	12.38	31.73	31.18
0.04000	120.1	9.70	12.38	31.73	31.18
0.04500	127.4	10.29	12.38	31.73	31.18
0.05000	134.3	10.85	12.38	31.73	31.18
0.05500	140.9	11.38	12.38	31.73	31.18
0.06000	147.1	11.89	12.38	31.73	31.18
0.06500	153.1	12.37	12.38	31.73	31.18
0.07000	158.9	12.84	12.38	31.73	31.18

Worksheet for Lead - Typical "H"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+17.000	0.425
0+26.000	0.245
0+28.000	0.120
0+28.630	0.790

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+26.000, 0.245)	0.017
(0+26.000, 0.245)	(0+28.630, 0.790)	0.013

Results

Discharge 38.8 ft³/s
Elevation Range 0.000 to 0.790 ft
Flow Area 11.40 ft²
Wetted Perimeter 29.678 ft
Top Width 29.139 ft
Normal Depth 0.67 ft
Critical Depth 0.66 ft
Critical Slope 0.00548 ft/ft
Velocity 3.40 ft/s

Worksheet for Lead - Typical "H"

Results

Velocity Head	0.18	ft
Specific Energy	0.85	ft
Froude Number	0.96	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF-Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.66	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00548	ft/ft

Rating Table for Lead - Typical "H"

Project Description

Friction Method Manning Formula
Solve For Discharge

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.67 ft
Section Definitions

Station (ft)	Elevation (ft)
--------------	----------------

-0+00.625	0.667
0+00.000	0.000
0+02.000	0.125
0+17.000	0.425
0+26.000	0.245
0+28.000	0.120
0+28.630	0.790

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+00.625, 0.667)	(0+02.000, 0.125)	0.013
(0+02.000, 0.125)	(0+26.000, 0.245)	0.017
(0+26.000, 0.245)	(0+28.630, 0.790)	0.013

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	38.8	3.40	11.40	29.68	29.14
0.01000	54.8	4.81	11.40	29.68	29.14
0.01500	67.2	5.89	11.40	29.68	29.14
0.02000	77.6	6.81	11.40	29.68	29.14
0.02500	86.7	7.61	11.40	29.68	29.14

Rating Table for Lead - Typical "H"

Input Data

Channel Slope (ft/ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Area (ft ²)	Wetted Perimeter (ft)	Top Width (ft)
0.03000	95.0	8.34	11.40	29.68	29.14
0.03500	102.6	9.00	11.40	29.68	29.14
0.04000	109.7	9.62	11.40	29.68	29.14
0.04500	116.3	10.21	11.40	29.68	29.14
0.05000	122.6	10.76	11.40	29.68	29.14
0.05500	128.6	11.29	11.40	29.68	29.14
0.06000	134.3	11.79	11.40	29.68	29.14
0.06500	139.8	12.27	11.40	29.68	29.14
0.07000	145.1	12.73	11.40	29.68	29.14

EXISTING PIPE CAPACITIES

Culvert Calculator Report

SDC1- University South (24" dia.)

Solve For: Discharge

Culvert Summary

Allowable HW Elevation	5,136.01 ft	Headwater Depth/Height	1.00
Computed Headwater Elev.	5,136.01 ft	Discharge	13.27 cfs
Inlet Control HW Elev.	5,135.94 ft	Tailwater Elevation	5,133.45 ft
Outlet Control HW Elev.	5,136.01 ft	Control Type	Entrance Control

Grades

Upstream Invert	5,134.01 ft	Downstream Invert	5,131.45 ft
Length	320.00 ft	Constructed Slope	0.008000 ft/ft

Hydraulic Profile

Profile	CompositeS1S2	Depth, Downstream	2.00 ft
Slope Type	Steep	Normal Depth	1.18 ft
Flow Regime	N/A	Critical Depth	1.31 ft
Velocity Downstream	4.22 ft/s	Critical Slope	0.005866 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	5,136.01 ft	Upstream Velocity Head	0.57 ft
Ke	0.20	Entrance Loss	0.11 ft

Inlet Control Properties

Inlet Control HW Elev.	5,135.94 ft	Flow Control	N/A
Inlet Type	Beveled ring, 45° bevels	Area Full	3.1 ft ²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	A
C	0.03000	Equation Form	1
Y	0.74000		

Culvert Calculator Report

SDC1- University North (36" dia.)

Solve For: Discharge

Culvert Summary

Allowable HW Elevation	5,128.22 ft	Headwater Depth/Height	1.00
Computed Headwater Elev.	5,128.22 ft	Discharge	36.56 cfs
Inlet Control HW Elev.	5,128.15 ft	Tailwater Elevation	5,124.82 ft
Outlet Control HW Elev.	5,128.22 ft	Control Type	Entrance Control

Grades

Upstream Invert	5,125.22 ft	Downstream Invert	5,121.82 ft
Length	353.00 ft	Constructed Slope	0.009632 ft/ft

Hydraulic Profile

Profile	CompositeS1S2	Depth, Downstream	3.00 ft
Slope Type	Steep	Normal Depth	1.60 ft
Flow Regime	N/A	Critical Depth	1.97 ft
Velocity Downstream	5.17 ft/s	Critical Slope	0.005126 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	5,128.22 ft	Upstream Velocity Head	0.86 ft
Ke	0.20	Entrance Loss	0.17 ft

Inlet Control Properties

Inlet Control HW Elev.	5,128.15 ft	Flow Control	N/A
Inlet Type	Groove end projecting	Area Full	7.1 ft2
K	0.00450	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	3
C	0.03170	Equation Form	1
Y	0.69000		

Culvert Calculator Report

SDC1-Sycamore Capacity (48" dia.)

Solve For: Discharge

Culvert Summary

Allowable HW Elevation	5,092.69 ft	Headwater Depth/Height	1.00
Computed Headwater Elev.	5,092.69 ft	Discharge	75.05 cfs
Inlet Control HW Elev.	5,092.54 ft	Tailwater Elevation	5,089.87 ft
Outlet Control HW Elev.	5,092.69 ft	Control Type	Entrance Control

Grades

Upstream Invert	5,088.69 ft	Downstream Invert	5,085.87 ft
Length	173.00 ft	Constructed Slope	0.016301 ft/ft

Hydraulic Profile

Profile	CompositeS1S2	Depth, Downstream	4.00 ft
Slope Type	Steep	Normal Depth	1.78 ft
Flow Regime	N/A	Critical Depth	2.62 ft
Velocity Downstream	5.97 ft/s	Critical Slope	0.004658 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	5,092.69 ft	Upstream Velocity Head	1.15 ft
Ke	0.20	Entrance Loss	0.23 ft

Inlet Control Properties

Inlet Control HW Elev.	5,092.54 ft	Flow Control	N/A
Inlet Type	Beveled ring, 45° bevels	Area Full	12.6 ft2
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	A
C	0.03000	Equation Form	1
Y	0.74000		

Culvert Calculator Report

SDC2- Yale Capacity (36" dia.)

Solve For: Discharge

Culvert Summary

Allowable HW Elevation	2,003.00 ft	Headwater Depth/Height	1.00
Computed Headwater Elev.	2,003.00 ft	Discharge	36.56 cfs
Inlet Control HW Elev.	2,002.88 ft	Tailwater Elevation	1,999.46 ft
Outlet Control HW Elev.	2,003.00 ft	Control Type	Entrance Control

Grades

Upstream Invert	2,000.00 ft	Downstream Invert	1,996.46 ft
Length	177.00 ft	Constructed Slope	0.020000 ft/ft

Hydraulic Profile

Profile	CompositeS1S2	Depth, Downstream	3.00 ft
Slope Type	Steep	Normal Depth	1.30 ft
Flow Regime	N/A	Critical Depth	1.97 ft
Velocity Downstream	5.17 ft/s	Critical Slope	0.005126 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	2,003.00 ft	Upstream Velocity Head	0.86 ft
Ke	0.20	Entrance Loss	0.17 ft

Inlet Control Properties

Inlet Control HW Elev.	2,002.88 ft	Flow Control	N/A
Inlet Type	Beveled ring, 33.7° bevels	Area Full	7.1 ft2
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

PROPOSED STORM DRAIN SYSTEMS

FlexTable: Catch Basin Table (CPD1_Lead.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Set Rim to Ground Elevation?	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Flow (Total Out) (ft ³ /s)
CB-1	4,968.00	4,968.00	4,959.83	True	HEC-22 Energy	Depressed	0.90	136.29
CB-3	4,968.23	4,968.23	4,960.07	True	HEC-22 Energy	Depressed	1.12	132.59
CB-5	4,972.55	4,972.55	4,964.61	True	HEC-22 Energy	Depressed	0.13	125.19
CB-6	4,974.91	4,974.91	4,967.03	True	HEC-22 Energy	Depressed	0.13	121.49
CB-7	4,975.95	4,975.95	4,968.09	True	HEC-22 Energy	Depressed	0.13	117.79
CB-8	4,977.82	4,977.82	4,970.01	True	HEC-22 Energy	Depressed	0.11	114.09
CB-9	4,980.49	4,980.49	4,971.98	True	HEC-22 Energy	Depressed	0.10	110.39
CB-10	4,983.04	4,983.04	4,973.87	True	HEC-22 Energy	Depressed	0.35	104.95
CB-11	4,984.07	4,984.07	4,974.26	True	HEC-22 Energy	Depressed	0.72	99.51
CB-12	4,985.73	4,985.73	4,974.89	True	HEC-22 Energy	Depressed	0.23	94.07
CB-13	4,994.66	4,994.66	4,988.83	True	HEC-22 Energy	Depressed	0.15	88.63
CB-14	5,004.56	5,004.56	4,999.40	True	HEC-22 Energy	Depressed	0.10	69.80
CB-16	5,031.65	5,031.65	5,025.65	True	HEC-22 Energy	Depressed	0.04	40.63
CB-17	5,045.95	5,045.95	5,034.31	True	HEC-22 Energy	Depressed	0.02	17.41
CB-15	5,031.65	5,031.65	5,013.73	True	HEC-22 Energy	Depressed	0.05	46.58
CB-19	5,052.15	5,052.15	5,047.24	True	HEC-22 Energy	Depressed	0.02	12.41
CB-20	5,054.91	5,054.91	5,049.53	True	HEC-22 Energy	Depressed	0.00	12.41

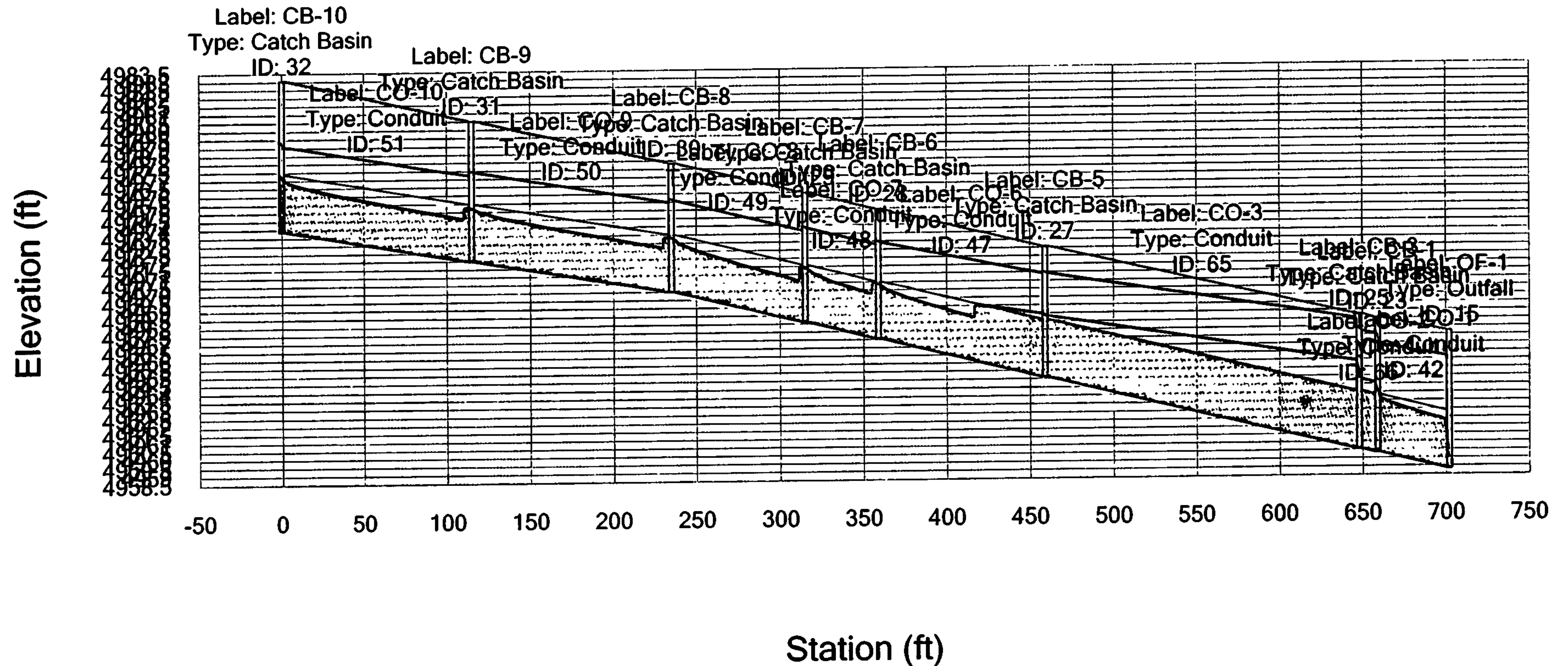
FlexTable: Conduit Table (CPD1_Lead.stc)

Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Flow (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)
CO-1	CB-1	OF-1	4,959.83	4,958.84	42.0	136.29	152.65
CO-6	CB-6	CB-5	4,967.03	4,964.61	42.0	121.49	156.50
CO-7	CB-7	CB-6	4,968.09	4,967.03	42.0	117.79	156.15
CO-8	CB-8	CB-7	4,970.01	4,968.09	42.0	114.09	155.86
CO-9	CB-9	CB-8	4,971.98	4,970.01	42.0	110.39	128.90
CO-10	CB-10	CB-9	4,973.87	4,971.98	42.0	104.95	128.97
CO-11	CB-11	CB-10	4,974.26	4,973.87	36.0	99.51	60.75
CO-12	CB-12	CB-11	4,974.89	4,974.26	36.0	94.07	61.13
CO-13	MH-5	CB-12	4,986.48	4,974.89	36.0	88.63	133.56
CO-14	CB-13	MH-5	4,988.83	4,986.48	36.0	88.63	120.49
CO-15	MH-6	CB-13	4,992.31	4,988.83	36.0	69.80	120.84
CO-16	CB-14	MH-6	4,999.40	4,992.31	36.0	69.80	132.74
CO-17	CB-15	CB-14	5,013.73	4,999.40	36.0	46.58	132.88
CO-18	CB-16	CB-15	5,025.65	5,020.93	36.0	40.63	166.21
CO-19	CB-17	CB-16	5,034.31	5,025.65	36.0	17.41	116.26
CO-20	MH-7	CB-17	5,039.17	5,034.31	36.0	12.41	212.22
CO-21	CB-19	MH-7	5,047.24	5,039.17	36.0	12.41	121.54
CO-22	CB-20	CB-19	5,049.53	5,047.24	36.0	12.41	122.39
CO-3	CB-5	CB-3	4,964.61	4,960.07	42.0	125.19	155.92
CO-2	CB-3	CB-1	4,960.07	4,959.83	42.0	132.59	148.60

Profile Report **Profile: Profile - 1**

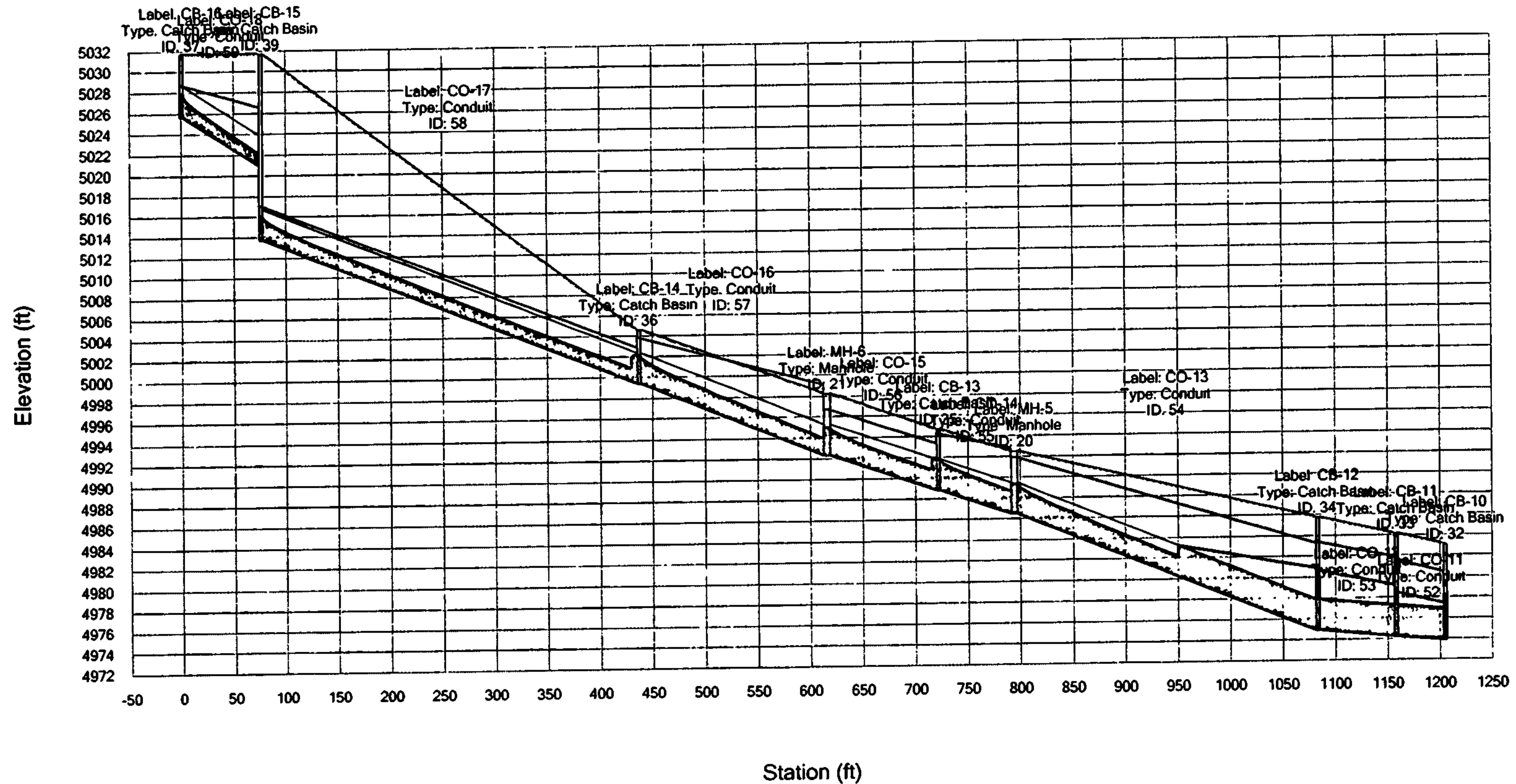
Profile - 1 - Base



Profile Report

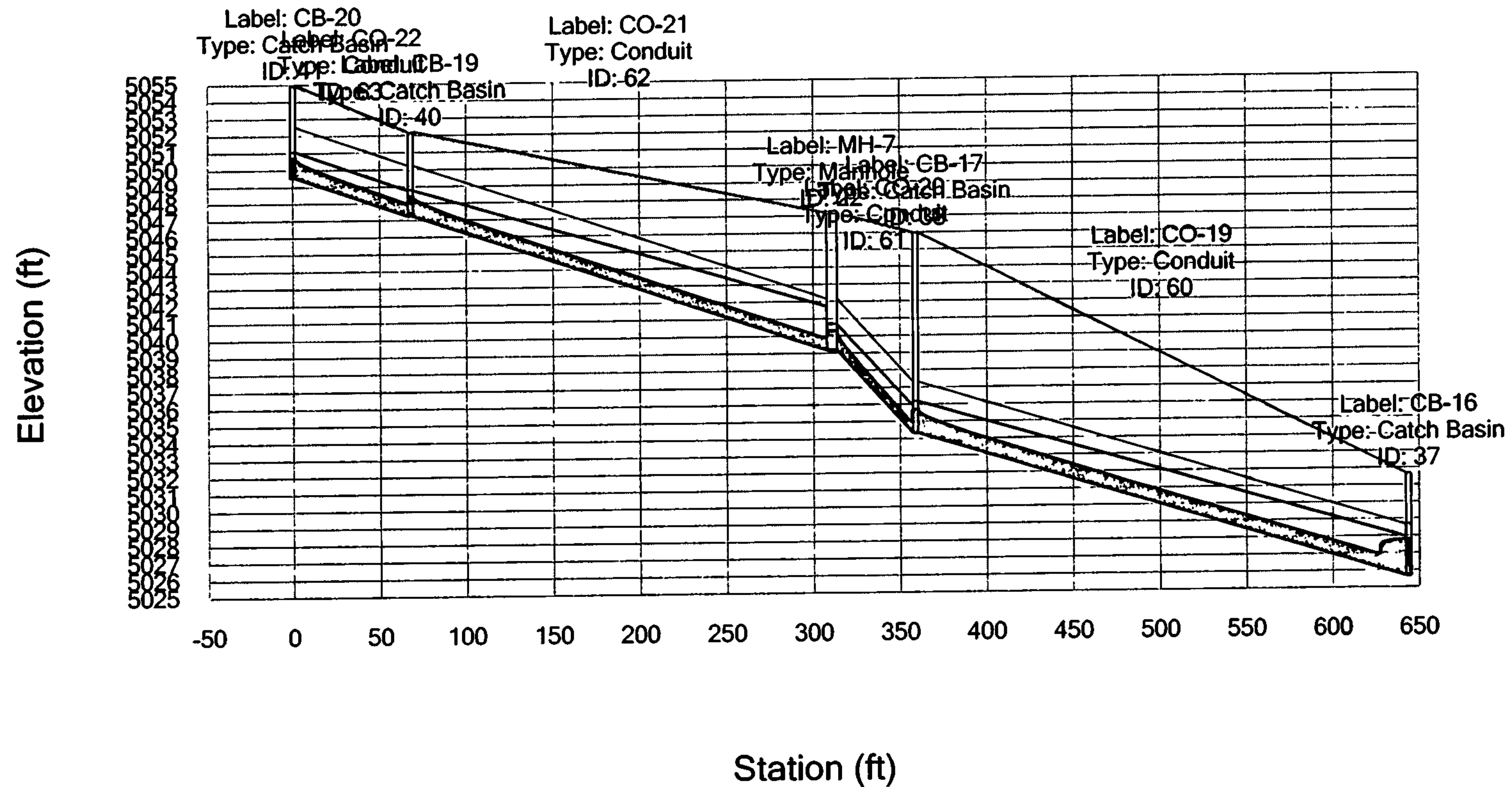
Profile: Profile - 2

Profile - 2 - Base



Profile Report **Profile: Profile - 3**

Profile - 3 - Base



FlexTable: Catch Basin Table (CPD1_Coal.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Set Rim to Ground Elevation?	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Flow (Total Out) (ft³/s)
CB-55	4,972.43	4,972.43	4,963.33	True	HEC-22 Energy	Depressed	0.21	46.65
CB-56	4,974.63	4,974.63	4,965.83	True	HEC-22 Energy	Depressed	0.10	46.65
CB-57	4,979.56	4,979.56	4,970.11	True	HEC-22 Energy	Depressed	0.11	46.65
CB-58	4,981.02	4,981.02	4,972.90	True	HEC-22 Energy	Depressed	0.11	46.65
CB-59	4,987.64	4,987.64	4,978.74	True	HEC-22 Energy	Depressed	0.10	46.65
CB-60	4,990.88	4,990.88	4,980.56	True	HEC-22 Energy	Depressed	0.08	39.59
CB-61	4,991.75	4,991.75	4,985.65	True	HEC-22 Energy	Depressed	0.22	39.59
CB-62	5,001.89	5,001.89	4,996.14	True	HEC-22 Energy	Depressed	0.12	29.76
CB-63	5,007.90	5,007.90	5,001.96	True	HEC-22 Energy	Depressed	0.06	18.38
CB-66	5,035.04	5,035.04	5,029.00	True	HEC-22 Energy	Depressed	0.03	11.98
CB-67	5,039.70	5,039.70	5,032.00	True	HEC-22 Energy	Depressed	0.02	5.58
CB-68	5,041.61	5,041.61	5,035.05	True	HEC-22 Energy	Depressed	0.02	5.58
CB-69	5,041.84	5,041.84	5,035.88	True	HEC-22 Energy	Depressed	0.00	5.58

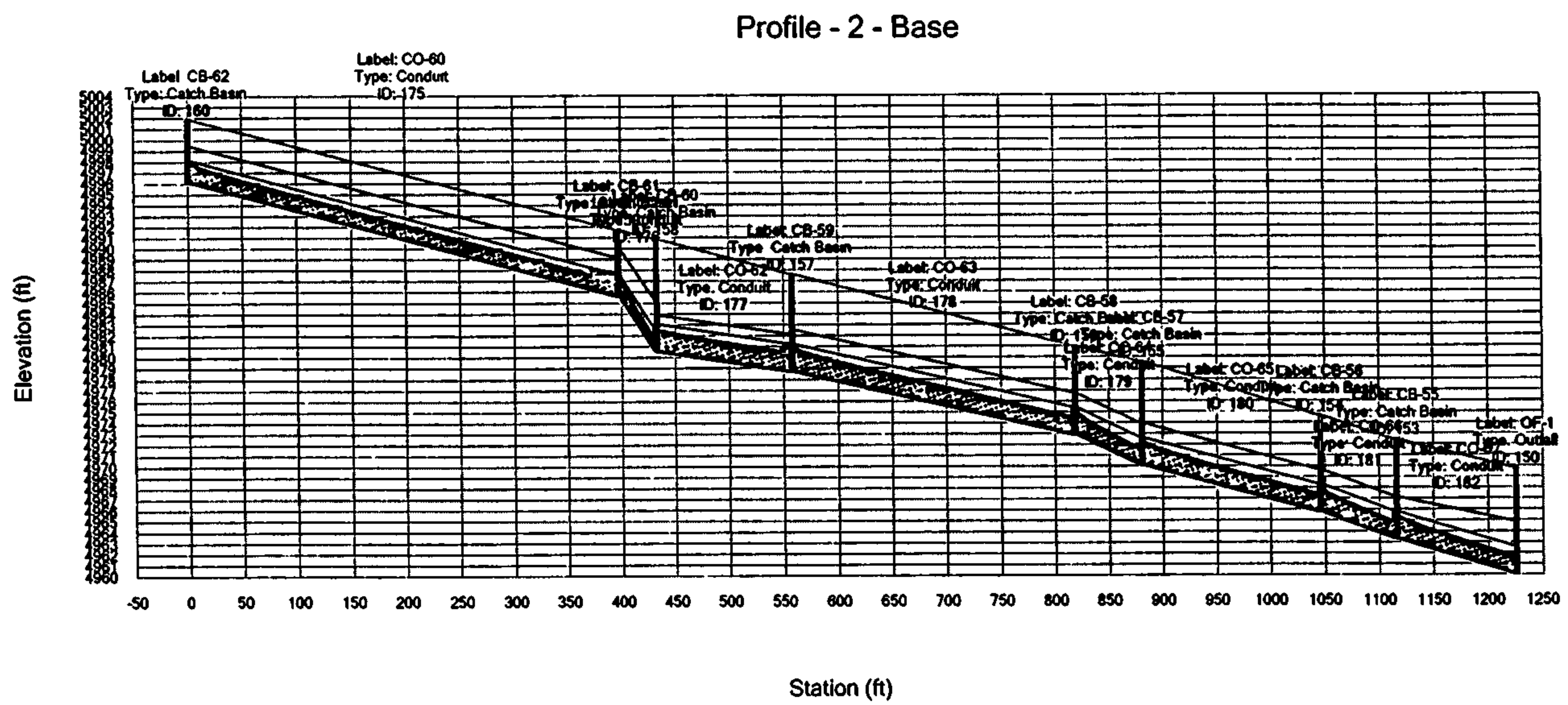
FlexTable: Conduit Table (CPD1_Coal.stc)

Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Flow (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)
CO-53	CB-69	CB-68	5,035.88	5,035.05	24.0	5.58	33.43
CO-54	CB-68	CB-67	5,035.05	5,032.00	24.0	5.58	34.26
CO-55	CB-67	CB-66	5,032.00	5,029.00	24.0	5.58	32.32
CO-56	CB-66	MH-29	5,029.00	5,021.95	24.0	11.98	57.01
CO-57	MH-29	MH-30	5,021.95	5,021.53	24.0	11.98	46.36
CO-58	MH-30	CB-63	5,021.53	5,001.96	24.0	11.98	69.06
CO-59	CB-63	CB-62	5,001.96	4,996.14	24.0	18.38	30.51
CO-60	CB-62	CB-61	4,996.14	4,985.65	24.0	29.76	36.77
CO-61	CB-61	CB-60	4,985.65	4,980.56	24.0	39.59	85.06
CO-62	CB-60	CB-59	4,980.56	4,978.74	30.0	39.59	49.49
CO-63	CB-59	CB-58	4,978.74	4,972.90	30.0	46.65	61.35
CO-64	CB-58	CB-57	4,972.90	4,970.11	30.0	46.65	87.01
CO-65	CB-57	CB-56	4,970.11	4,965.83	30.0	46.65	66.06
CO-66	CB-56	CB-55	4,965.83	4,963.33	30.0	46.65	77.51
CO-67	CB-55	OF-1	4,963.33	4,960.09	30.0	46.65	70.39

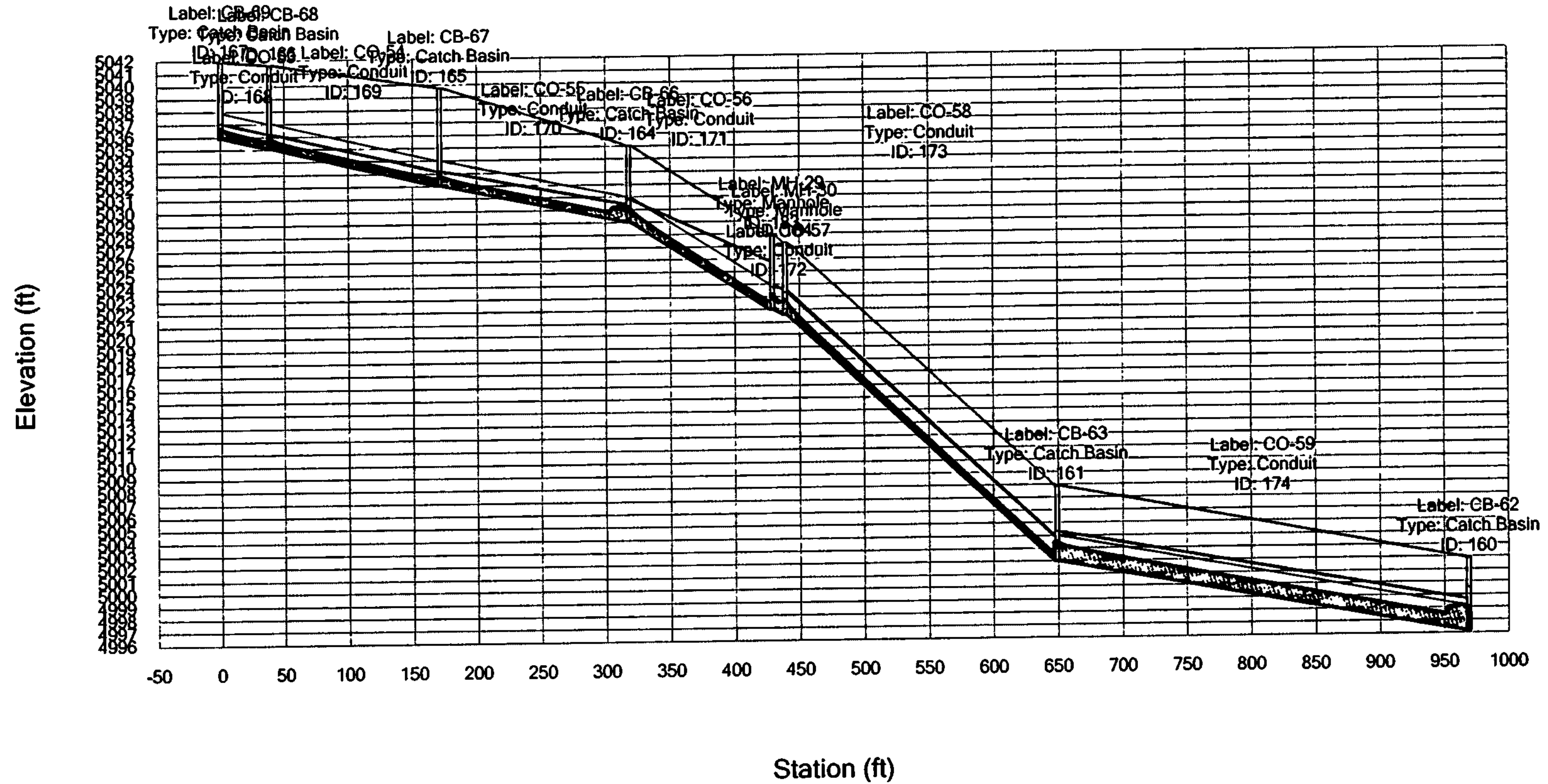
Profile Report

Profile: Profile - 2



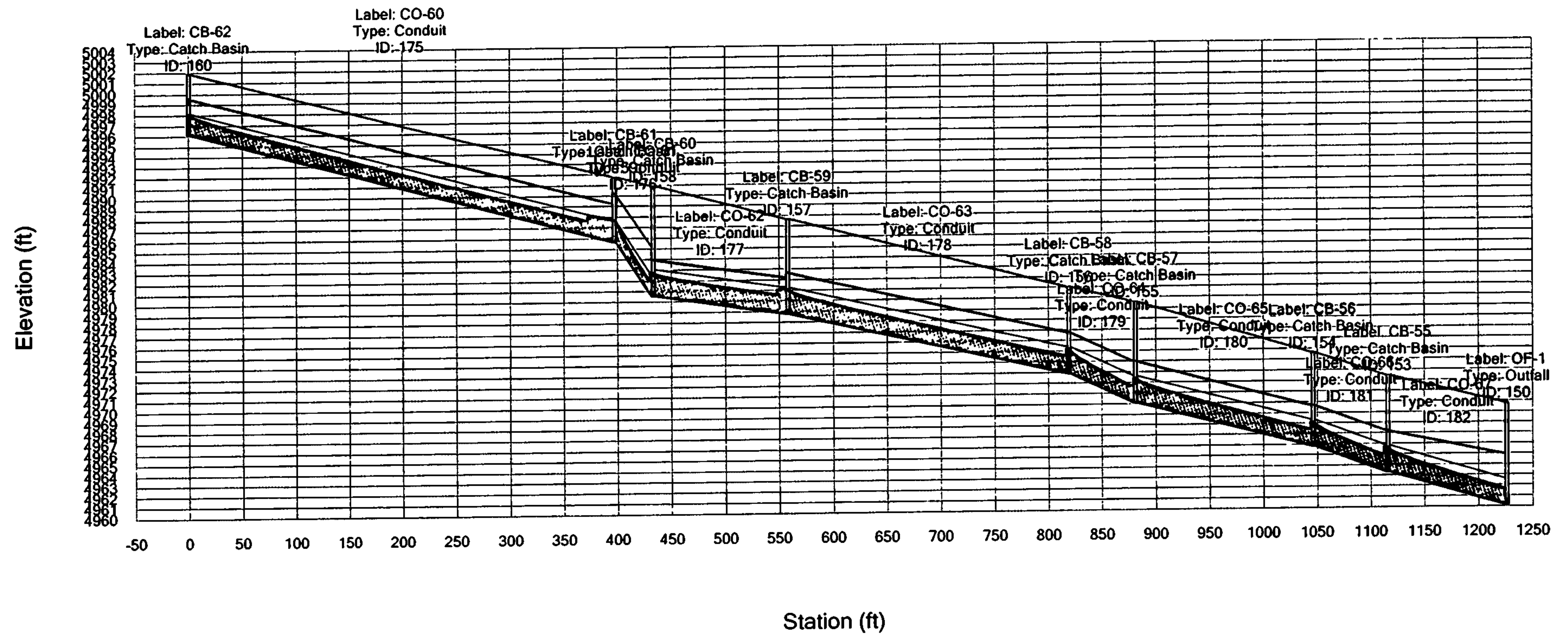
Profile Report **Profile: Profile - 3**

Profile - 3 - Base



Profile Report **Profile: Profile - 2**

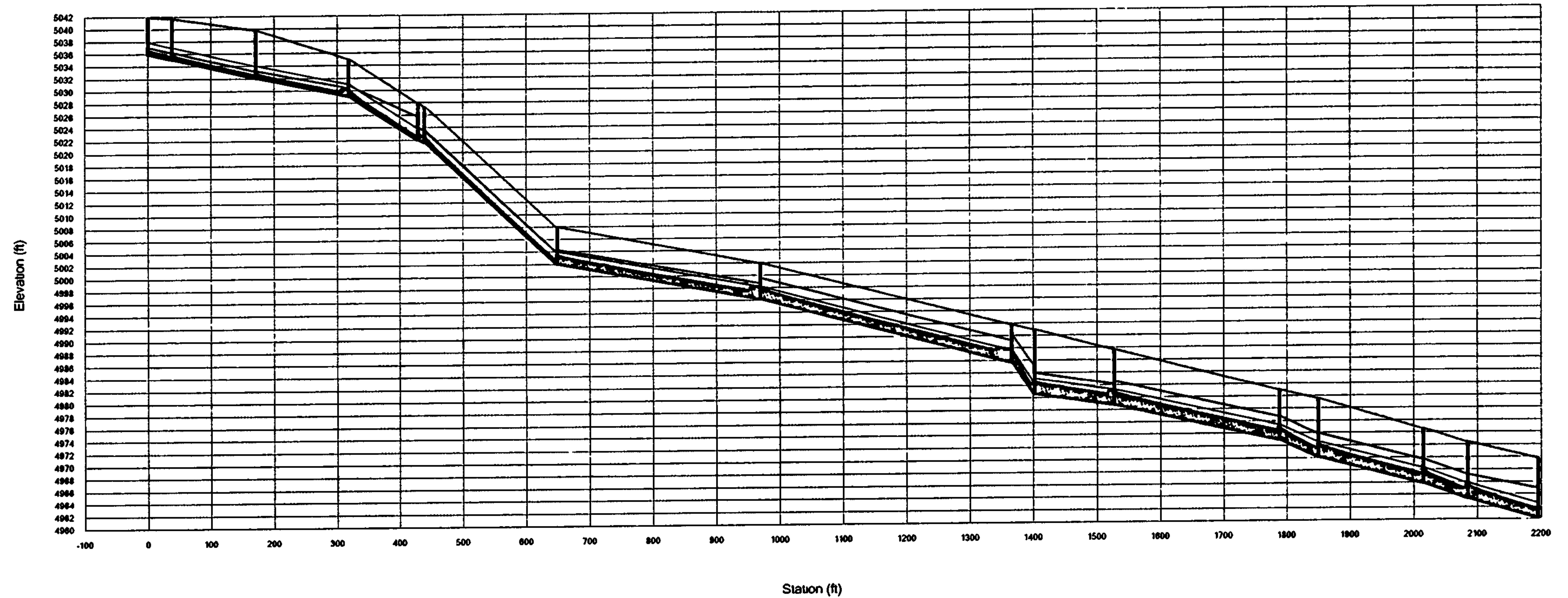
Profile - 2 - Base



Profile Report

Profile: Profile - 1

Profile - 1 - Base



FlexTable: Catch Basin Table (SDC1_Lead.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Headloss Method	HEC-22 Benching Method	Set Rim to Ground Elevation?	Headloss (ft)	System Known Flow (ft³/s)
CB-1	5,251.59	5,251.59	5,246.59	Absolute	Flat	True	0.00	18.62
CB-2	5,229.52	5,229.52	5,224.52	HEC-22 Energy	Flat	True	0.19	38.10
CB-3	5,218.31	5,218.31	5,211.31	HEC-22 Energy	Flat	True	0.15	57.47
CB-4	5,209.38	5,209.38	5,203.30	HEC-22 Energy	Flat	True	0.11	76.78
CB-5	5,200.94	5,200.94	5,195.30	HEC-22 Energy	Flat	True	0.25	96.58
CB-6	5,196.82	5,196.82	5,190.64	HEC-22 Energy	Flat	True	1.74	96.58
CB-7	5,196.29	5,196.29	5,190.04	HEC-22 Energy	Flat	True	1.71	96.58
CB-8	5,193.44	5,193.44	5,187.13	HEC-22 Energy	Flat	True	0.20	127.28
CB-9	5,189.73	5,189.73	5,182.26	HEC-22 Energy	Flat	True	0.09	127.19
CB-10	5,186.51	5,186.51	5,179.51	HEC-22 Energy	Flat	True	0.10	135.60
CB-11	5,185.87	5,185.87	5,178.85	HEC-22 Energy	Flat	True	0.72	135.60
CB-12	5,185.56	5,185.56	5,178.47	HEC-22 Energy	Flat	True	0.67	135.60
CB-13	5,183.63	5,183.63	5,176.75	HEC-22 Energy	Flat	True	0.09	146.82
CB-14	5,178.83	5,178.83	5,171.55	HEC-22 Energy	Flat	True	0.10	152.45
CB-15	5,173.18	5,173.18	5,166.74	HEC-22 Energy	Flat	True	0.12	165.08
CB-17	5,169.46	5,169.46	5,155.39	HEC-22 Energy	Flat	True	0.15	192.02
CB-18	5,167.43	5,167.43	5,151.56	HEC-22 Energy	Flat	True	0.18	213.97
CB-19	5,165.47	5,165.47	5,149.64	HEC-22 Energy	Flat	True	0.18	213.97
CB-20	5,164.35	5,164.35	5,148.87	HEC-22 Energy	Flat	True	0.94	213.97
CB-22	5,162.84	5,162.84	5,147.84	HEC-22 Energy	Flat	True	0.12	194.00
CB-25	5,157.02	5,157.02	5,141.24	HEC-22 Energy	Flat	True	0.13	211.00
CB-27	5,155.86	5,155.86	5,138.91	HEC-22 Energy	Flat	True	0.12	211.00
CB-28	5,153.19	5,153.19	5,135.17	HEC-22 Energy	Flat	True	0.13	223.00
CB-29	5,142.23	5,142.23	5,131.80	HEC-22 Energy	Flat	True	0.18	276.00
CB-30	5,137.73	5,137.73	5,127.10	HEC-22 Energy	Flat	True	0.18	276.00
CB-31	5,128.01	5,128.01	5,116.22	HEC-22 Energy	Flat	True	0.19	287.00
CB-32	5,118.17	5,118.17	5,108.73	HEC-22 Energy	Flat	True	0.20	287.00
CB-33	5,116.38	5,116.38	5,107.22	HEC-22 Energy	Flat	True	0.13	302.00
CB-34	5,113.32	5,113.32	5,105.05	HEC-22 Energy	Flat	True	0.13	302.00
CB-35	5,109.52	5,109.52	5,100.02	HEC-22 Energy	Flat	True	0.14	316.00

FlexTable: Catch Basin Table (SDC1_Lead.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Headloss Method	HEC-22 Benching Method	Set Rim to Ground Elevation?	Headloss (ft)	System Known Flow (ft ³ /s)
CB-36	5,108.70	5,108.70	5,097.26	HEC-22 Energy	Flat	True	0.14	316.00
CB-37	5,107.96	5,107.96	5,089.33	HEC-22 Energy	Flat	True	0.17	247.00
CB-38	5,107.39	5,107.39	5,088.69	HEC-22 Energy	Flat	True	0.21	247.00
CB-39	5,098.45	5,098.45	5,084.42	HEC-22 Energy	Flat	True	0.37	257.00
CB-40	5,083.56	5,083.56	5,073.56	HEC-22 Energy	Flat	True	0.30	267.00

Flow (Known) (ft ³ /s)
18.62
38.10
57.47
76.78
96.58
96.58
96.58
127.28
127.19
135.60
135.60
135.60
146.82
152.45
165.08
192.02
213.97
0.00
0.00
194.00
211.00
0.00
223.00

FlexTable: Catch Basin Table (SDC1_Lead.stc)

Current Time: 0.000 min

Flow (Known) (ft ³ /s)
276.00
0.00
287.00
0.00
302.00
0.00
316.00
0.00
247.00
0.00
257.00
267.00

FlexTable: Conduit Table (SDC1_Lead.stc)

Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Flow (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)
CO-1	CB-1	CB-2	5,246.59	5,224.52	18.0	18.62	25.52
CO-2	CB-2	CB-3	5,224.52	5,211.31	24.0	38.10	42.46
CO-3	CB-3	CB-4	5,211.31	5,203.30	30.0	57.47	60.10
CO-4	CB-4	CB-5	5,203.30	5,195.30	36.0	76.78	97.41
CO-5	CB-5	CB-6	5,195.30	5,190.64	36.0	96.58	97.51
CO-6	CB-6	CB-7	5,190.64	5,190.04	36.0	96.58	92.79
CO-7	CB-7	CB-8	5,190.04	5,187.13	36.0	96.58	99.79
CO-8	CB-8	CB-9	5,187.13	5,182.26	42.0	127.28	118.50
CO-9	CB-9	CB-10	5,182.26	5,179.51	48.0	127.19	122.51
CO-10	CB-10	CB-11	5,179.51	5,178.85	48.0	135.60	158.79
CO-11	CB-11	CB-12	5,178.85	5,178.47	48.0	135.60	151.85
CO-12	CB-12	CB-13	5,178.47	5,176.75	48.0	135.60	106.65
CO-13	CB-13	CB-14	5,176.75	5,171.55	48.0	146.82	169.14
CO-14	CB-14	CB-15	5,171.55	5,166.74	48.0	152.45	162.67
CO-15	CB-15	MH-16	5,166.74	5,157.56	48.0	165.08	340.89
CO-16	MH-16	CB-17	5,157.56	5,155.39	54.0	165.08	199.00
CO-17	CB-17	CB-18	5,155.39	5,151.56	54.0	192.02	198.72
CO-18	CB-18	CB-19	5,151.56	5,149.64	54.0	213.97	198.72
CO-19	CB-19	CB-20	5,149.64	5,148.87	54.0	213.97	196.64
CO-20	CB-20	MH-21	5,148.87	5,148.26	54.0	213.97	196.64
CO-21	MH-21	CB-22	5,148.26	5,147.84	54.0	213.97	196.64
CO-22	CB-22	MH-23	5,147.84	5,145.92	54.0	194.00	198.72
CO-23	MH-23	MH-24	5,145.92	5,144.32	54.0	194.00	198.51
CO-24	MH-24	CB-25	5,144.32	5,141.24	54.0	194.00	198.58
CO-25	CB-25	MH-26	5,141.24	5,140.26	54.0	211.00	197.65
CO-26	MH-26	CB-27	5,140.26	5,138.91	54.0	211.00	198.86
CO-27	CB-27	CB-28	5,138.91	5,135.17	54.0	211.00	198.50
CO-28	CB-28	CB-29	5,135.17	5,131.80	54.0	223.00	198.71
CO-29	CB-29	CB-30	5,131.80	5,127.10	54.0	276.00	406.46
CO-30	CB-30	CB-31	5,127.10	5,116.22	54.0	276.00	406.97
CO-31	CB-31	CB-32	5,116.22	5,108.73	54.0	287.00	300.37

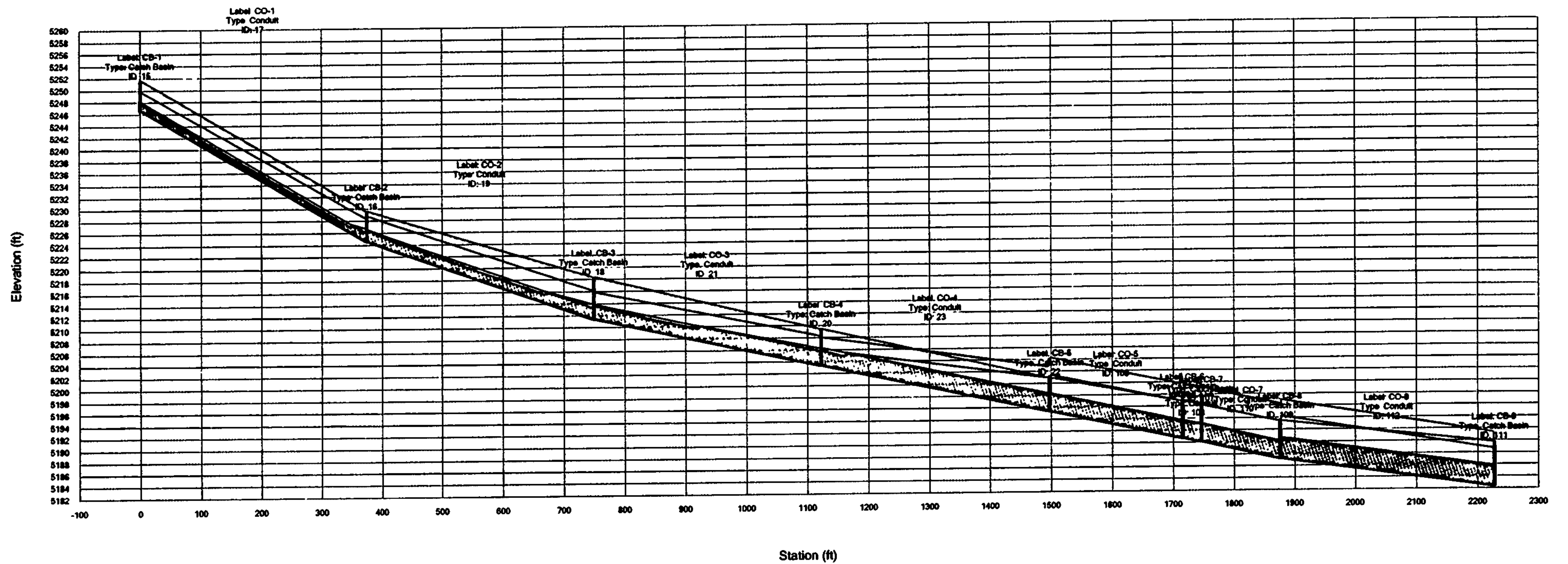
FlexTable: Conduit Table (SDC1_Lead.stc)

Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Flow (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)
CO-32	CB-32	CB-33	5,108.73	5,107.22	54.0	287.00	299.71
CO-33	CB-33	CB-34	5,107.22	5,105.05	60.0	302.00	350.21
CO-34	CB-34	CB-35	5,105.05	5,100.02	60.0	302.00	350.94
CO-35	CB-35	CB-36	5,100.02	5,097.26	60.0	316.00	474.90
CO-36	CB-36	CB-37	5,097.26	5,089.33	60.0	316.00	423.41
CO-37	CB-37	CB-38	5,089.33	5,088.69	54.0	247.00	335.39
CO-38	CB-38	CB-39	5,088.69	5,084.42	54.0	247.00	226.79
CO-39	CB-39	CB-40	5,084.42	5,073.56	48.0	257.00	249.47
CO-40	CB-40	OF-1	5,073.56	5,057.54	48.0	267.00	291.11

Profile Report **Profile: CO 1-8**

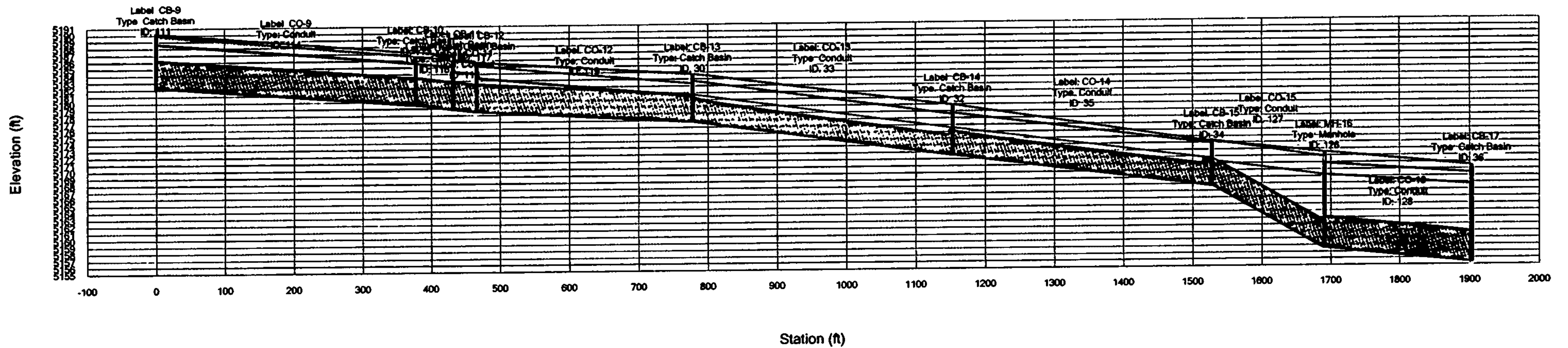
CO 1-8 - Base



Profile Report

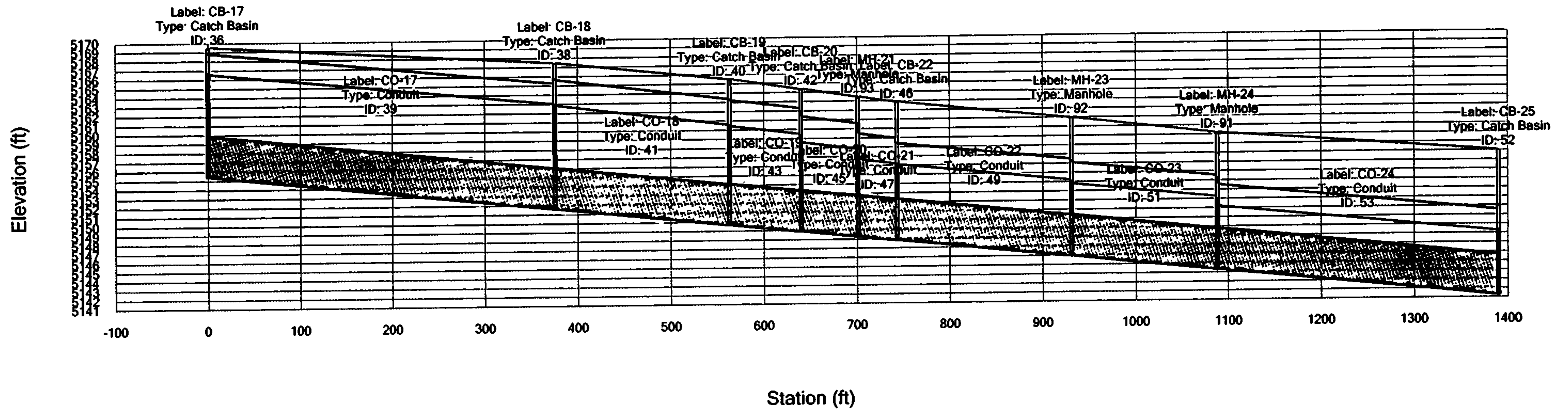
Profile: CO 9-16

CO 9-16 - Base



Profile Report **Profile: CO 17-24**

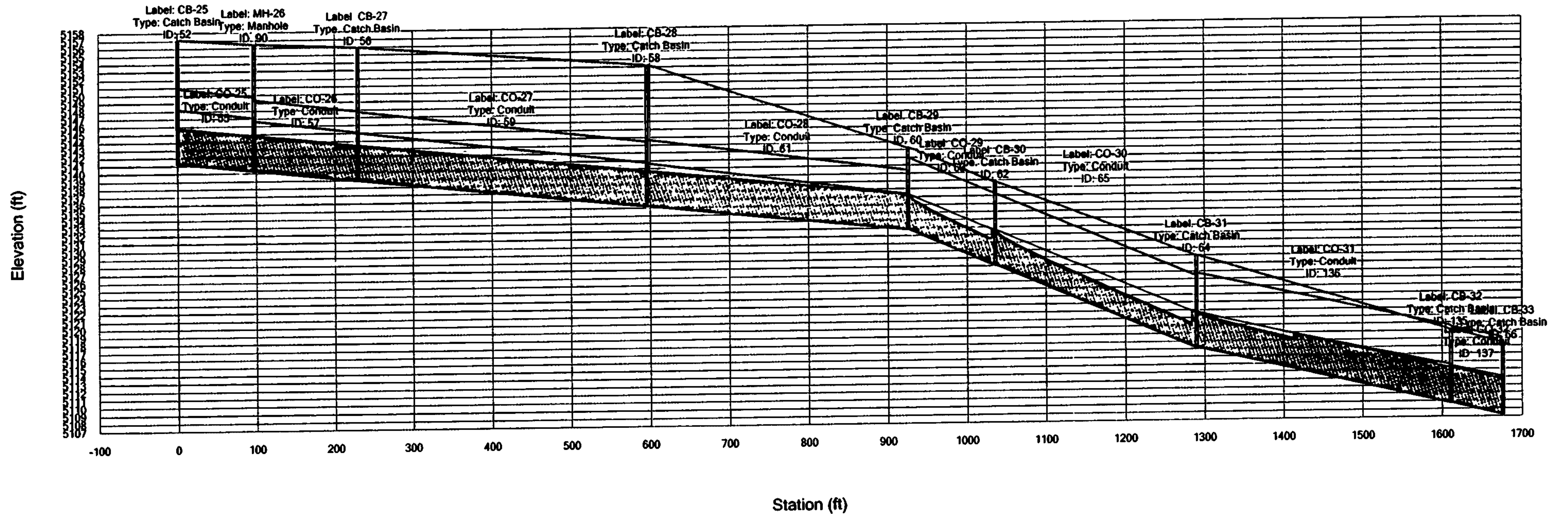
CO 17-24 - Base



Profile Report

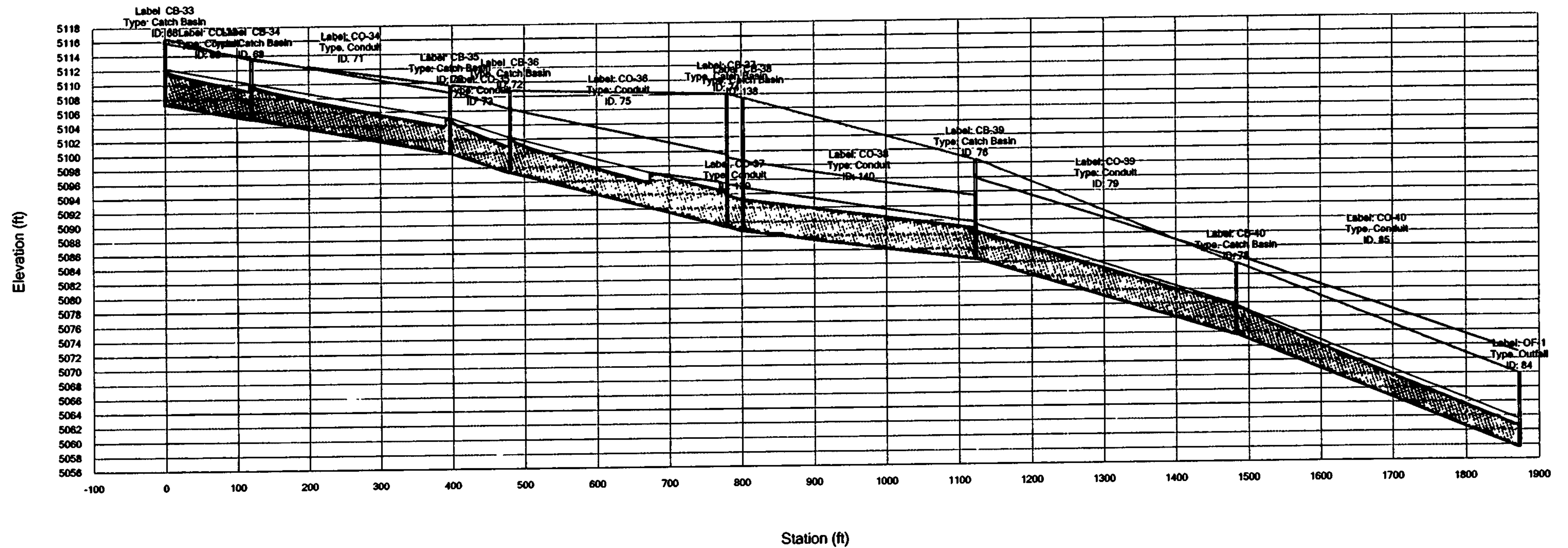
Profile: CO 18-32

CO 18-32 - Base



Profile Report Profile: CO 33-40

CO 33-40 - Base



FlexTable: Catch Basin Table (SDC1_Coal1.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Set Rim to Ground Elevation?	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Flow (Total Out) (ft ³ /s)
CB-46	5,080.33	5,080.33	5,074.83	True	HEC-22 Energy	Depressed	0.00	18.60
CB-47	5,078.60	5,078.60	5,069.90	True	HEC-22 Energy	Depressed	0.06	37.20
CB-48	5,076.42	5,076.42	5,069.48	True	HEC-22 Energy	Depressed	0.09	40.42
CB-49	5,071.12	5,071.12	5,063.07	True	HEC-22 Energy	Depressed	0.06	43.64
CB-50	5,067.37	5,067.37	5,058.37	True	HEC-22 Energy	Depressed	0.08	46.86
CB-51	5,065.09	5,065.09	5,056.24	True	HEC-22 Energy	Depressed	0.11	52.40
CB-52	5,062.61	5,062.61	5,052.91	True	HEC-22 Energy	Depressed	0.08	57.94

FlexTable: Conduit Table (SDC1_Coal1.stc)

Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (In)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)
CO-46	CB-52	OF-1	5,052.91	5,041.79	54.0	57.94	448.33
CO-47	CB-51	CB-52	5,056.24	5,052.91	42.0	52.40	200.21
CO-48	CB-50	CB-51	5,058.37	5,056.24	42.0	46.86	182.17
CO-49	CB-49	CB-50	5,063.07	5,058.37	42.0	43.64	187.17
CO-50	CB-48	CB-49	5,069.48	5,063.07	36.0	40.42	128.78
CO-51	CB-47	CB-48	5,069.90	5,069.48	36.0	37.20	37.65
CO-52	CB-46	CB-47	5,074.83	5,069.90	36.0	18.60	148.30

Profile - 1 - Base



FlexTable: Catch Basin Table (SDC1_Coal2.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Set Rim to Ground Elevation?	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Flow (Total Out) (ft ³ /s)
56+04.66	5,086.31	5,086.31	5,080.31	True	HEC-22 Energy	Depressed	0.55	62.96
57+27.44	5,093.14	5,093.14	5,087.14	True	HEC-22 Energy	Depressed	0.38	51.96
59+96.08	5,105.21	5,105.21	5,099.21	True	HEC-22 Energy	Depressed	0.29	46.46
63+90.10	5,118.20	5,118.20	5,112.20	True	HEC-22 Energy	Depressed	0.15	33.51
CB-5	5,124.75	5,124.75	5,121.75	True	HEC-22 Energy	Depressed	0.00	15.00

FlexTable: Conduit Table (SDC1_Coal2.stc)

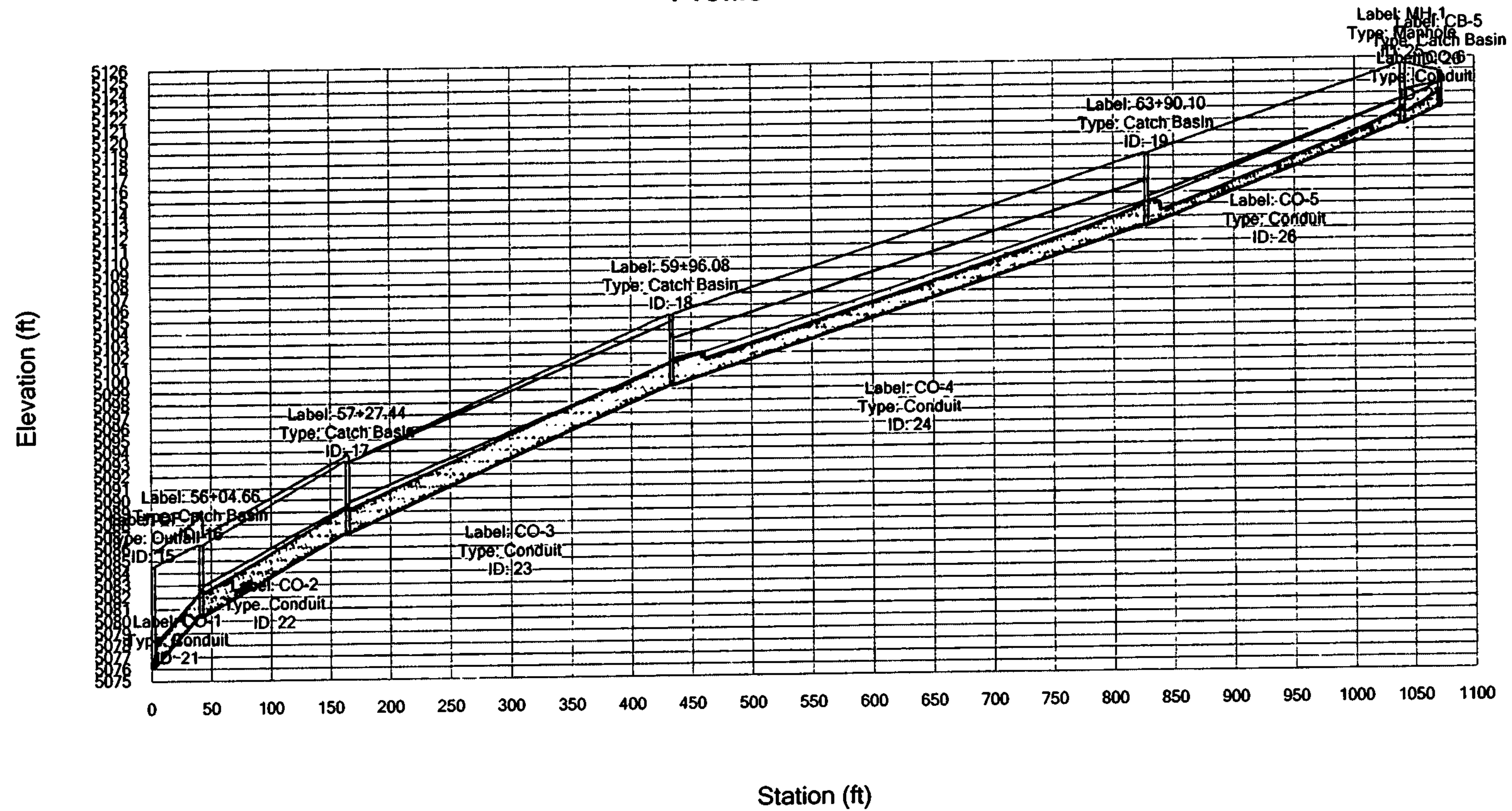
Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Flow (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)
CO-1	56+04.66	OF-1	5,080.31	5,076.10	24.0	62.96	73.39
CO-2	57+27.44	56+04.66	5,087.14	5,080.31	24.0	51.96	53.31
CO-3	59+96.08	57+27.44	5,099.21	5,087.14	24.0	46.46	47.92
CO-4	63+90.10	59+96.08	5,112.20	5,099.21	24.0	33.51	41.07
CO-5	MH-1	63+90.10	5,120.42	5,112.20	24.0	15.00	44.44
CO-6	CB-5	MH-1	5,121.75	5,120.42	24.0	15.00	46.86

Profile Report

Profile: Profile - 1

Profile - 1 - Base



FlexTable: Catch Basin Table (SDC2-Coal1.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Set Rim to Ground Elevation?	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Flow (Total Out) (ft ³ /s)
CB-7	5,151.16	5,151.16	5,140.58	True	HEC-22 Energy	Depressed	0.00	40.00
CB-8	5,128.43	5,128.43	5,120.31	True	HEC-22 Energy	Depressed	0.16	60.00

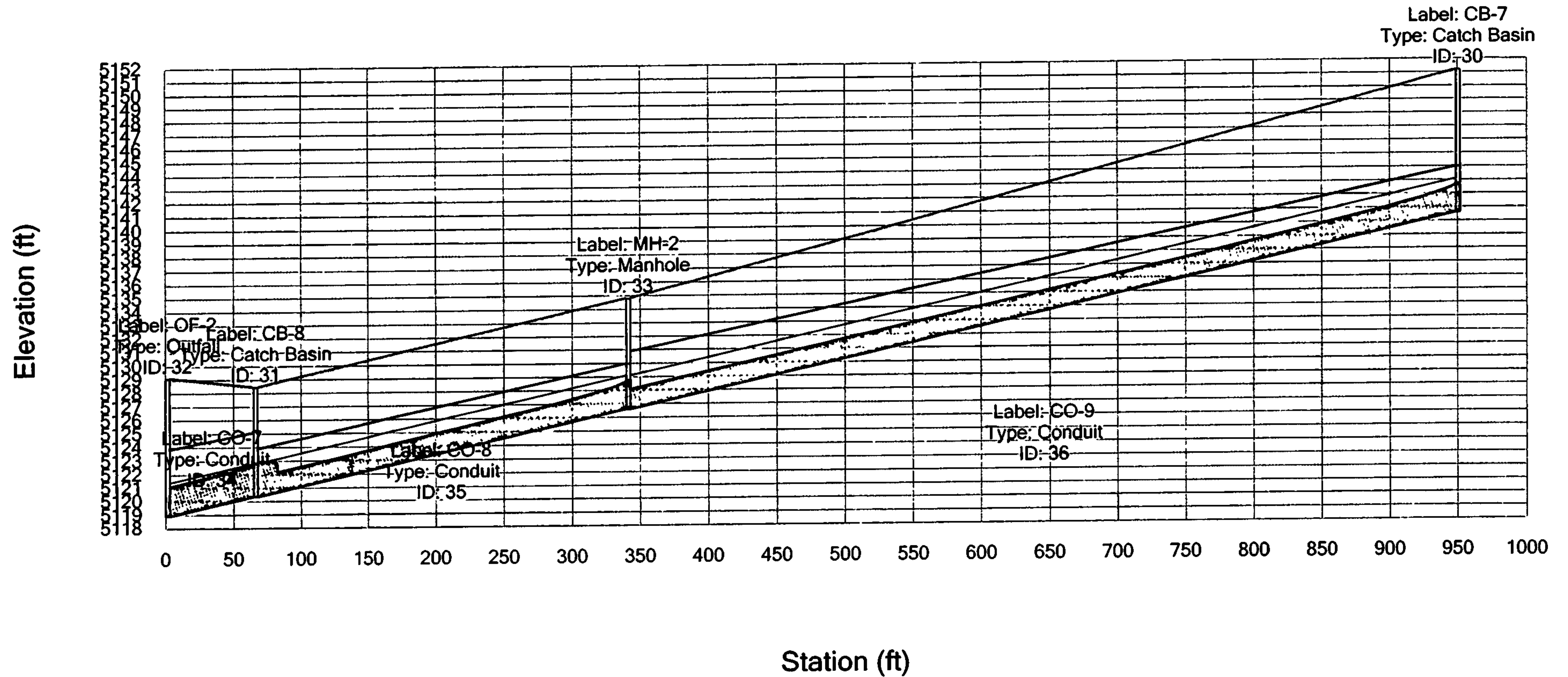
FlexTable: Conduit Table (SDC2-Coal1.stc)

Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Flow (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)
CO-7	CB-8	OF-2	5,120.31	5,118.91	30.0	60.00	60.19
CO-8	MH-2	CB-8	5,126.59	5,120.31	30.0	40.00	61.98
CO-9	CB-7	MH-2	5,140.58	5,126.59	30.0	40.00	62.16

Profile Report **Profile: Profile - 1**

Profile - 1 - Base



FlexTable: Catch Basin Table (SDC2_Coal2.stc)

Current Time: 0.000 min

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Set Rim to Ground Elevation?	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Flow (Total Out) (ft³/s)
CB-7	5,164.76	5,164.76	5,158.76	True	HEC-22 Energy	Depressed	0.00	20.00
CB-8	5,160.97	5,160.97	5,150.92	True	HEC-22 Energy	Depressed	0.04	40.00

FlexTable: Conduit Table (SDC2_Coal2.stc)

Current Time: 0.000 min

Label	Start Node	Stop Node	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Flow (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)
CO-7	CB-8	OF-2	5,150.92	5,149.77	36.0	40.00	93.91
CO-8	CB-7	CB-8	5,158.76	5,150.92	36.0	20.00	94.20

Profile Report
Profile: Profile - 1

Profile - 1 - Base

