

**W. H. Lizer & Associates**

Engineering Consulting and Land Surveying  
576 25 Road, Unit #8  
Grand Junction, Colorado 81505

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Phone (970) 241-1129

May 6, 2008

Joseph Beilman Jr., P.E.  
Mesa County Development Engineer  
Mesa County Planning Dept.  
750 E. Main Street  
Grand Junction, Colorado 81501

RE: Pabco Industrial Park Filing No. 2 Drainage Report Checklist Supplemental Data  
(Table 302)

Dear Mr. Beilman,

The following information is in conjunction with the numbering of the checklist.

Item

- A. 2. There have been no previous reviews by the County.
- C. 1. Only area shown is at Northeast corner of site and is the area of contribution that had to be accounted for for transmitting drainage through the proposed storm drain system.
- I. D. 2. FIRM Original Study Maps used for design.
- II. B. 1. No known master plan.
- II. D. 3, 4. No detention basin is planned.
- II. D. 6, 7. No filtering device is planned unless required by the County. or the City of Fruita.
- II. D. 8. All drainage facilities and piping are in existing recorded easements with the plat of Pabco Industrial Park, Filing No. 2.
- II. E. All maintenance requirements will be provided for in a Lot Owners Association, which will be similar to a Home Owners Association.

Table 302  
Stormwater Management Manual  
Drainage Report Checklist

- Instructions:**
1. Applicant to identify with a "check-mark" if information is provided with report. If applicant believes information is not required, indicate with "n/a" and attach separate sheet with explanation
  2. The reviewer will determine if information labeled "n/a" is required and whether information must be submitted.
  3. Those items noted with an "asterisk" are not required for conceptual report.
  4. Submit three (3) copies of report and include copy of check list bound with report.

**TITLE PAGE**

- A. Type of report (Conceptual/Preliminary or Final Drainage Report).
- B. Project Name.
- C. Preparer name, firm, address, number, and date.
- D. Professional Engineer's seal of preparer.
- E. Certifications (see SWMM Section 303.1)

**I. INTRODUCTION**

✓  
N/A  
✓  
✓  
N/A  
✓  
✓  
N/A

- A. Background
  1. Identify report preparer and purpose.
  2. Identify date of letter with previous County comments.
- B. Project Location
  1. Identify Township, Range, and Section.
  2. Identify adjacent street and subdivision names.
  3. Reference to General Location Map.
- C. Property Description
  1. Identify area in acres of entire contiguous ownership.
  2. Describe existing ground cover, vegetation, soils, topography and slopes.
  3. Describe existing drainage facilities, such as channels, detention areas, or structures.
  4. Describe existing irrigation facilities, such as ditches, head-gates, or diversions.
  5. Identify proposed types of land use and encumbrances.
- D. Previous Investigations
  1. Identify drainage master plans that include the project area, including floodplain studies.
  2. Identify drainage reports for adjacent development.

**II. DRAINAGE SYSTEM DESCRIPTION**

✓  
L  
✓  
N/A  
✓

- A. Existing Drainage Conditions
  1. Describe existing topography and provide map with contours extending a minimum of 100 feet beyond property limits.
  2. Identify major drainageway or outfall drainageway and describe map showing location of proposed development within the drainageways.
  3. Identify pre-developed drainage patterns and describe map showing pre-developed sub-basins and concentrated discharge locations. Provide calculations of pre-developed peak flows entering and leaving the site.
- B. Master Drainage Plan
  1. Describe location of the project relative to a previously prepared master drainage plan, including drainage plans prepared for adjacent development.
- C. Offsite Tributary Area
  1. Identify all offsite drainage basins that are tributary to the project.

✓

✓

✓  
N/A \*

N/A \*

✓  
N/A  
N/A \*

N/A \*

N/A \*  
N/A \*

2. Identify assumptions regarding existing and future land use and effects of offsite detention on peak flows.

D. Proposed Drainage System Description

1. Identify how offsite stormwater is collected and conveyed through the site and ultimately to the receiving water(s).
2. Identify sub-basins and describe, in general terms, how onsite stormwater is collected and conveyed through the site for each location where stormwater is discharged from the site.
3. Describe detention volumes, release rates and pool elevations.
4. Identify the difference in elevation between pond invert and the groundwater table.
5. Describe how stormwater is discharged from the site, including both concentrated and dispersed discharges.
6. Describe stormwater quality facilities.
7. Describe maintenance access aspects of design.
8. Describe easements and tracts for drainage purposes, including limitation on use.

E. Drainage Facility Maintenance

1. Identify responsible parties for maintenance of each drainage and water quality facility.
2. Identify general maintenance activities and schedules.

III. DRAINAGE ANALYSIS AND DESIGN CRITERIA

A. Regulations

1. Identify that analysis and design was prepared in accordance with the provisions of the Manual.
2. Identify other regulations or criteria which have been used to prepare analysis and design.

B. Development Criteria

1. Identify drainage constraints placed on the project, such as by a major drainage study, floodplain study or other drainage reports relevant to the project.
2. Identify drainage constraints placed on the project, such as from major street alignments, utilities, existing structures, and other developments.

C. Hydrologic Criteria

(If Manual was followed without deviation, then a statement to that effect is all that is required. Otherwise provide the following information where the criteria used deviates from the Manual.)

1. Identify how storm runoff peak flows and volumes were determined, including rainfall intensity or design storm.
2. Identify which storm events were used for minor and major flood analysis and design.
3. Identify how and why any other deviations from the Manual occurred.

D. Hydraulic Criteria

(If Manual was followed without deviation, then a statement to that effect is all that is required. Otherwise provide the following information where the criteria used deviates from the Manual.)

1. Identify type(s) of streets within and adjacent to development and source for allowable street capacity.
2. Identify which type(s) of storm inlets were analyzed or designed and source for allowable capacity.
3. Identify which type of storm sewers which were analyzed or designed and Manning's n-values used.

✓

✓

✓

✓

✓

✓  
N/A

✓ \*

✓ \*

✓ \*

N/A \*  
N/A \*  
N/A \*  
N/A \*  
N/A \*

- 4. Identify which method was used to determine detention volume requirements and how allowable release rates were determined.
  - 5. Identify how the capacity of open channels and culverts were determined.
  - 6. Identify any special analysis or design requirements not contained with the Manual.
  - 7. Identify how and why any other deviations from the Manual occurred.
- E. Variance from Criteria
- 1. Identify any provisions of the Manual for which a variance is requested.
  - 2. Identify pre-existing conditions which cause the variance request.

**\*IV. POST CONSTRUCTION STORMWATER MANAGEMENT. See Manual Section 1600 for requirements.**

**Note:** This section of the Final Drainage Report identifies additional information required by Mesa County's, City of Grand Junction's, and Town of Palisade's, Permit for Stormwater Discharges Associated with Municipal Separate Storm Sewer Systems (MS4s), permit No. COR-090000. The Final Drainage Plan and the Construction SWMP (see SWMM Section 1500) meets the requirements of the MS4s Permit. In general, this section identifies permanent BMP practices to control the discharge of pollutants after construction is complete.

✓ \*  
N/A \*  
N/A \*  
N/A \*

- \*A. Stormwater Quality Control Measures
  - 1. Describe the post-construction BMPs to control discharge of pollutants from the project site.
  - 2. If compensating detention is provided, discuss practices to address water quality from area not tributary to detention area.
  - 3. If underground detention is proposed, discuss how water quality facilities will be provided on the surface.
  - 4. If proprietary BMPs are proposed, provide the justification and sizing requirements (see SWMM Section 1603.3).
- \*B. Calculations
  - 1. Provide methods and calculations for WQCV, sediment storage, and water quality outlet structure.

11/A  
V.

**CONCLUSIONS**

✓  
✓  
✓

- A. Compliance with Manual  
Compliance with Manual and other approved documents, such as drainage plans and floodplain studies.
- B. Design Effectiveness  
Effectiveness of drainage design to control impacts of storm runoff.
- C. Areas in Flood Hazard Zone  
Meet requirements of Floodplain Regulations: Mesa County Land Development Code, Section 7.13; City of Grand Junction Zoning and Development Code, Section 7.1.
- D. Variances from Manual  
Applicant shall identify any requested variances and provide basis for approving variance. If no variances are requested, applicant shall state that none are requested.

N/A  
VII.

**REFERENCES**

✓

Provide a reference list of all criteria, master plans, drainage reports, and technical information used.

**TABLES**

✓

Include copy of all tables prepared for report.

**FIGURES**

✓  
✓

- A. General Location Map (See Section 303.2a)
- B. Flood Plain Information

✓  
✓

- C. Drainage Plan (See Section 303.2b)
- D. Other pertinent figures.

**APPENDICIES**

✓

**A. DESIGN CHARTS**

- 1. Provide copy of all design charts (i.e.: tables, figures, charts from other criteria) used for the report.

✓

**B. HYDROLOGIC CALCULATIONS (see Manual Sections 600 and 700)**

- 1. Land use assumptions for off-site runoff calculations.
- 2. Time of concentration and runoff coefficients for pre-existing and post development conditions.
- 3. Pre-developed hydrologic computations.
- 4. Developed conditions hydrologic computations.

✓

✓

✓

**C. HYDRAULIC CALCULATIONS**

- 1. Capacity of existing channels, streets, storm sewers, inlets, culverts and other facilities.
- 2. Calculations for existing storm sewer and open channel.
- 3. Irrigation ditch flows and ditch system capacity.
- 4. Detention pond design (see Manual, Section 1400 for requirements).
  - a. Storage volume, release rates, and pool elevations for 2-year and 100-year storm.
  - b. Outlet structure dimensions, orifice diameter, weir lengths, pipe headwater and other data.
  - c. Outlet velocity and energy dissipation requirements.
  - d. Routing of outlet flows and emergency spillway flows.
- 5. Street capacity calculations, if data in Manual not used (see Section 1100).
- 6. Storm inlet capacity calculations, if data in Manual not used (see Section 1100).
- 7. Storm sewer capacity calculations, if data in Manual not used (see Section 1000).
- 8. Channel capacity calculations, if data in Manual not used (see Section 800).
- 9. Culvert capacity calculations (see Manual, Section 1200).
- 10. Other hydraulic structure calculations (see Manual, Section 900).

✓

✓

N/A

N/A\*

N/A\*

N/A\*

N/A\*

N/A\*

✓\*

✓\*

✓\*

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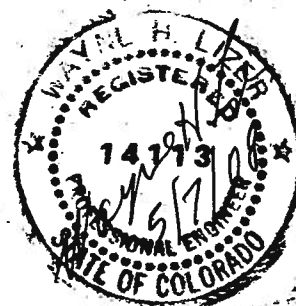
✓\*

**D. STORMWATER QUALITY CALCULATIONS**

- 1. Water Quality Capture Volume (WQCV).
- 2. Storage volume for sediment volume and pool elevations for WQCV.
- 3. Outlet calculations for required area per row, diameter of individual holes, number of holes per row, and number of holes per column.

**CERTIFICATION - PROFESSIONAL ENGINEER'S SEAL AND SIGNATURE  
ACKNOWLEDGEMENTS**

Drainage Report checklist was prepared by: Wayne H. Lizer



**FINAL DRAINAGE REPORT  
FOR  
PABCO INDUSTRIAL PARK FILING NO. 2**

**PART OF THE SE 1/4 OF SECTION 12 AND THE NE 1/4 OF SECTION 13  
T1N, R3W, U.M.  
FRUITA, MESA COUNTY, COLORADO**

**Prepared For:**

**Mesa Grand, LLC  
c/o Don King, Manager  
1110 16 Road  
Fruita, Colorado 81521**

**Prepared By:**

**Wayne H. Lizer  
W.H. Lizer and Associates  
*Engineering Consulting and Land Surveying*  
576 25 Road-Unit 8  
Grand Junction, Colorado 81505**

**December 16, 2007**

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## I. General Location and Description

### A. Site and Major Basin Location

Pabco Industrial Park is located for the most part between River Road and Interstate Highway 70 to the North and South respectfully, and between 15 1/2 Road and 16 Road to the West and to the East respectfully. Pabco Industrial Park Filing No. 2 contains 107.45 acres. The site is also located in part of the SE 1/4 of Section 12 and the NE 1/4 of Section 13, T1N, R3W, U.M. Mesa County, Colorado.

Developments in the area include Pabco Industrial Park Filing No. 1 to the North on the East side of the site which is being used by Halliburton Energy Services and CUDD, and to the North on the West side of the site is CUDD, both companies being in the oil field services. To the East is the Industrial Insulation Group, to the West is undeveloped land, and to the South is Interstate Highway 70 and on the South side of the Interstate is the Colorado River.

### B. Site and Major Basin Description

The site contains 107.45 acres and is located within the Big Salt Wash Drainage Basin. The site is mostly covered with alfalfa, except for Lot 22 which is in the 100 year floodplain of the Colorado River, and also except a 2 acre stub lying North of River Road. Lots 8, 9, and 19 are also partially in the 100 year floodplain.

The site soils are classified as Tr-Turley Clay Loam; Rc-Fruitland Sandy Clay Loam; Ro-Riverwash; and Ba, Sagers Silty Clay Loam.

Soils Tr , Rc are both classified as "B" in the Hydrologic Group. Ba and Ro are classified as "D", however, Ro is all within Lot 22 and is in the 100 year floodplain as described above, and Lot 22 is being developed as a gravel pit by the United Companies. Soil type Tr is the predominant soil type on the site.

## II.. Existing Drainage Conditions.

### A. Major Basin

Reference was made to the Flood Insurance Rate Map (FIRM) Community Panel No's. 080115 0245B and 080115 0265, maps revised July 15, 1992, and the site has areas on the South side of the site which are within the 100 year floodplain of the Colorado River.

The Major Basin at the site location generally drains from Northeast to Southwest. The Union Pacific Railroad intercepts drainage from areas to the North of the railroad, and River Road on the North side of the site and adjacent to the site intercepts drainage from the area between the railroad and the site and diverts it to the West to 15 1/2 Road where it flows South to the Colorado River. New information shows that approximately 29 acres of offsite existing and proposed development on the North will divert water through this proposed development via an existing 12" storm drain that goes South through the development.

There is one drop inlet on the North side of River Road that goes into a 12 inch PVC storm drain which takes some of the stormwater from River Road and conveys it to the South along an existing easement to a Grand Junction Drainage District drain ditch on the Northerly side of Lot 22 of said Pabco Industrial Park Filing No. 2, said drain ditch flows from East to West and drains into the Colorado River. As mentioned above, Interstate Highway 70 is on the South side of the site and the Colorado River is on the South side of said Interstate Highway 70.

This 12" storm sewer will have to be resized in order to carry the runoff from 29 acres of storm runoff that will be channeled through this development.

#### B. Site

Generally, all drainage from the site, except for Lot 22 South of the Grand Junction Drainage District drain ditch will be diverted into said drain ditch, which in turn will drain to the Colorado River. Historically, the site drains from Northeasterly to Southwesterly at approximately 0.7% slope.

### III. Proposed Drainage Conditions

#### A. Changes in Drainage Patterns

Drainage will be picked up from the street system and conveyed to the before mentioned drain ditch via a storm sewer drain system from the streets to the drain ditch or to 15 1/2 Road Right-of-way which will convey the water South to said drain ditch. Part of Cipolla Road will have 1 foot of stormwater above the flowline of the gutter during a major storm event which is allowed by county standards. ✓

#### B. Maintenance Issues

Access to drainage facilities shall either be from existing dedicated street right-of-ways or from existing recorded easements for the purpose of entry and maintenance.

### IV. Design Criteria and Approach

#### A. General Considerations

Part of the Southern portion of the site is within the 100 year floodplain of the Colorado River. If any of that area within the 100 year floodplain is to be built upon, a floodplain permit will be required.

No detention facilities are planned since the property is so close to the Colorado River, and also because the site is located in the lower one-third of the drainage basin.

All individual lots will be required to have a site plan with drainage designed prior to construction on said individual lots.

On site sub-basins (A-1 through A-9) will have runoff from these basins routed via lot grading, streets, and onsite storm sewer systems to the drain ditch to the South which will carry the storm water to the Colorado River.

#### B. Drainage Facility Design

“The City of Grand Junction, Stormwater Management Manual”, SWWM, (Reference 2) was used as the basis for analysis and facility design. “The SCS Hydrograph” method based on a Type II, 24 hour storm distribution was used and based on SCS TR-55 method..

Joseph Beilman Jr., P.E.  
Pabco Industrial Park Filing No. 2  
Drainage Report Checklist Supplement  
May 6, 2008

Page 2

III. A. 1., C. 3. Report generally prepared in accordance with the manual and previous manuals also used.

III. D. 4. No detention basin planned.

III. D. 5, 6. No special analysis required.

III. E. No variance requested.

IV. A. Post construction stormwater management not planned unless required by the County or City of Fruita. No detention is planned.

V. C. Site is partially in a Flood Hazard Zone. Sites within the 100 year flood fringe will require grading plan and establishing finished floor elevation 1 foot above the 100 year floodplain.

V.D. No variances are requested.

Appendices.

C. 3. All existing irrigation ditches to be piped using a minimum pipe size of upstream piping.

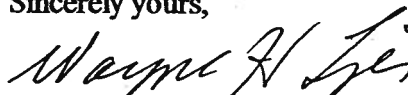
C. 4. No detention is planned.

C. 6. Inlet capacity graph used at low point of street.

D. Storm Water Quality Calculations

No stormwater filtration will be designed unless required by the County or the city of Fruita.

Sincerely yours,



Wayne H. Lizer P.E., P.L.S.

References.

1. Stormwater Management Manual (SWWM), City of Grand Junction, Mesa County, Colorado, 1996.
2. Stormwater Management Manual(SWWM), City of Grand Junction, Mesa County, Colorado, Draft-March 27, 2006.
3. Soil Survey, Mesa County, Colorado, USDA, Natural Resources Conservation Service, January, 2002'

**APPENDIX "A"**

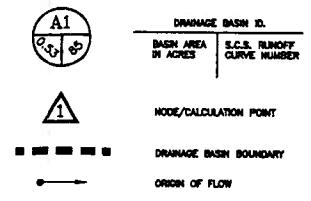
Vicinity Map

Major Basin Map

FIRM Map

Soils Map

**DRAINAGE LEGEND**



**Hydrograph Summary Report**

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time to peak (min)	Volume (cuft)	Inflow (cfs)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	12.30	5	736	94,404	—	—	Outlet of 1
2	SCS Runoff	6.80	5	720	18,120	—	—	Create Sub Basin A1
3	SCS Runoff	5.97	5	733	25,081	—	—	Create Sub Basin A2
4	SCS Runoff	7.44	5	740	42,018	—	—	Create Sub Basin A3
5	SCS Runoff	3.73	5	725	13,828	—	—	Create Sub Basin A4
6	SCS Runoff	6.72	5	740	37,938	—	—	Create Sub Basin A5
7	SCS Runoff	4.24	5	735	20,638	—	—	Create Sub Basin A6
8	SCS Runoff	3.08	5	720	8,467	—	—	Create Sub Basin A7
9	SCS Runoff	2.12	5	720	6,836	—	—	Create Sub Basin A8
10	Combine	12.97	5	755	112,584	1.2	—	Node 1 OF1 A1
11	Combine	18.55	5	750	141,845	1.2, 3	—	Node 2 OF1 A1 A2
12	Combine	23.94	5	746	183,063	1.2, 3, 4	—	Node 3 OF1 A1 A2 A3
13	Combine	25.52	5	740	197,281	1.2, 3, 4, 5	—	Node 4 OF1 A1 A2 A3 A4
14	Combine	7.20	5	740	48,428	6, 6	—	Node 5 AS A7
15	Combine	11.28	5	740	67,084	6, 7, 8	—	Node 6 AS A8 A7
16	Combine	12.10	5	725	72,900	6, 7, 8, 9	—	Node 8 AS A8 A7 A8

PABCO Industrial Park No 2.gpw    Return Period: 100 Year    Sunday, Dec 16 2007, 10:46 AM

CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
**1-800-922-1987**  
OR **534-6700** IN METRO DENVER

CALL 3 BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES

**BENCHMARK**

MCSM No.1277 Site Coordinates Northing=2381.00 Easting  
=1005.03 BM= Elev. 4482.04 (Source, Mesa County  
Department of Public Works) 12/15/95 Datum: NAVD 88  
Lat=39°09'51" Long=108°45'25"



SCALE: 1" = 200'  
SHEET 1 OF 1  
REVISED 04/30/08

ACCEPTED FOR CONSTRUCTION FOR ONE YEAR FROM THIS DATE  
Acceptance of these plans does not relieve the Professional Engineer of Record from  
conformance with the Colorado Revised Statutes for Engineers and Surveyors. Acceptance of  
these plans does not relieve the Developer, Contractor or the Engineer of Record from  
performance with all Mesa County Specifications, Manuals or Policies.

APPROVED FOR CONSTRUCTION FOR ONE YEAR FROM THIS DATE	
Mesa County Development Engineering	Date
CITY OF FRUITA	DATE
INITIAL ACCEPTANCE	
CITY OF FRUITA	DATE

CONSTRUCTION COMPLETION ACCEPTANCE  
Construction completion acceptance does not relieve the Professional Engineer of Record from  
ensuring construction and as-built design conformance with the Colorado Revised Statutes for  
Engineers and Surveyors. Construction completion acceptance of these plans does not relieve  
the Developer, Contractor or the Professional Engineer of Record from construction performance  
and as-built design conformance with all Mesa County Specifications, Manuals or Policies.

Mesa County Development Engineering    Date

ENGINEER'S SEAL

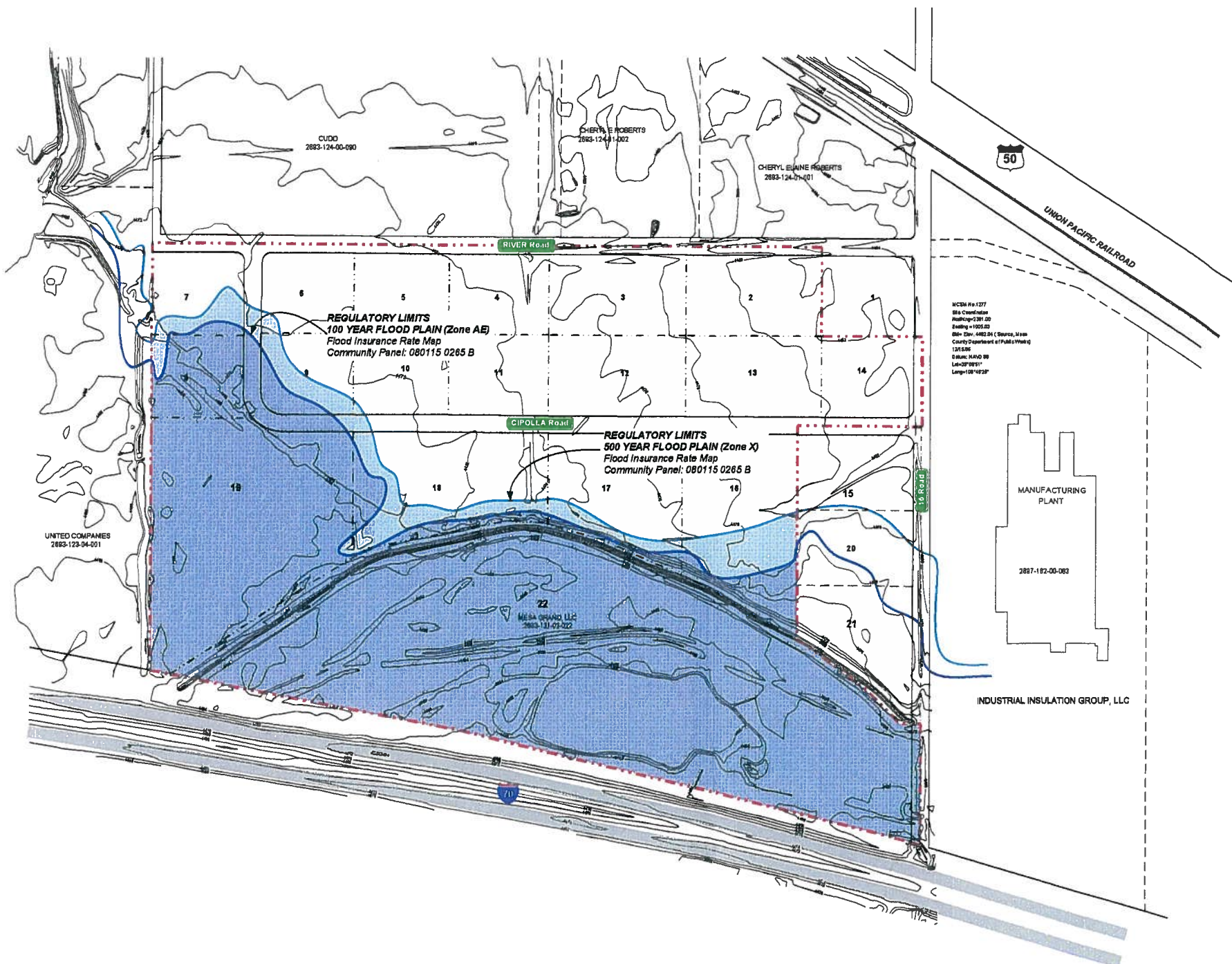
**DRAINAGE STUDY MAP**  
**PABCO INDUSTRIAL PARK, FILING NO. 2**  
FOR MESA GRAND, LLC.  
FRUITA, MESA COUNTY, COLORADO

**W.H. LIZER AND ASSOCIATES**  
ENGINEERING CONSULTING AND LAND SURVEYING  
576 25 ROAD-UNIT 8  
GRAND JUNCTION, COLORADO

DATE:	PROJ. NO.:	SCALE:	FILE NAME:	DRAWN BY:	CHECKED BY:
12/03/07	064085-2	1" = 200'		MDS	W.H.L.

FDR-10

EXHIBIT A1-0



MCCM No. 1277  
BNA Coordinates  
Northings = 1291.00  
Westings = 1000.00  
BNA Date: 4/82 (BNA County Department of Public Works)  
12/15/06  
BNA: MAND 88  
LAW: 08/08/11  
Lamp: 08/04/12

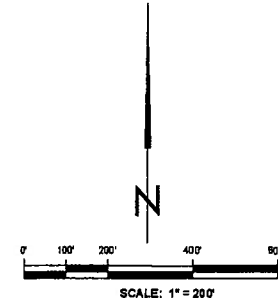


EXHIBIT A3.1

<b>FLOOD PLAIN MAP</b> <b>PABCO INDUSTRIAL PARK, FILING NO. 2</b> <b>FOR MESA GRAND, LLC.</b> 1110 16 ROAD, FRUITA, COLORADO 81521 MESA COUNTY				
<b>W.H. LIZER AND ASSOCIATES</b> ENGINEERING CONSULTING AND LAND SURVEYING 576 25 ROAD, UNIT 8 GRAND JUNCTION, COLORADO				
DATE 12/18/05	PROJ. NO.	SCALE 1" = 200'	FILE NAME MESACIP3	CHECKED BY W.H.L.

ENGINEER'S SEAL

*Exhibit A3.1*



Line No.	Line ID	Known Q (cfs)	Capac Full (cfs)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	Gnd/Rim El Up (ft)	Vel Ave (ft/s)	Rim-Hw (ft)	
1	Discharge to 5700 Stitza Drain to MHA1	12.10	13.36	24	Cir	0.012	434.01	4460.57	4461.86	0.30	4461.80	4463.65	4463.91	4470.18	5.02	6.27	
2	MHA1 to MHA2	9.80	10.68	18	Cir	0.012	301.89	4461.86	4464.52	0.88	4463.91	4465.97	4466.52 i	4469.94	5.58	3.42	
3	MHA2 to MHA3	9.80	8.04	18	Cir	0.012	80.09	4464.52	4464.92	0.50	4466.52	4467.11	4467.47	4469.49	5.55	2.02	
4	MHA3 to MHA4	9.80	8.00	18	Cir	0.012	105.18	4464.92	4465.44	0.49	4467.47	4468.25	4468.73	4469.10	5.55	0.37	
5	MHA4 to Inlet C1	3.08	11.53	18	Cir	0.012	19.50	4465.44	4465.64	1.03	4469.16	4469.17	4469.22	4468.58	1.74	-0.64	
6	MHA4 to Inlet C2	6.72	11.53	18	Cir	0.012	19.50	4465.44	4465.64	1.03	4468.98	4469.05	4469.27	4468.58	3.80	-0.69	
7	MHA1 to MHB1	6.36	12.09	15	Cir	0.012	101.81	4461.86	4464.90	2.99	4463.91	4465.91 j	4466.86 i	4469.67	5.59	2.81	
8	MHB1 to Inlet D1	2.12	7.08	15	Cir	0.012	19.50	4465.87	4466.07	1.02	4466.86	4466.84	4466.95	4469.15	2.37	2.20	
9	MHB1 to Inlet D2	4.24	7.09	15	Cir	0.012	19.50	4464.90	4465.10	1.03	4466.86	4466.93	4467.11	4469.15	3.46	2.04	

PABCO Storm Line A

Number of lines: 9

Date: 04-30-2008

NOTES: i Inlet control; \*\* Critical depth

EXHIBIT E2.0

FDR-79

Line No.	Line ID	Known Q (cfs)	Capac Full (cfs)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	Gnd/Rim EI Up (ft)	Vel Ave (ft/s)	Rim-Hw (ft)
1	Discharge to Drain to Inlet B1 GVDD ditch	25.52	17.37	24	Cir	0.012	302.37	4463.14	4464.66	0.50	4464.92	4468.16	4468.33 i	4471.90	8.39	3.57
2	Inlet B1 to Inlet B2	23.94	17.53	24	Cir	0.012	39.00	4464.66	4464.86	0.51	4468.33	4468.70	4469.15	4471.90	7.62	2.75
3	Inlet B2 to Inlet B3	16.95	24.70	24	Cir	0.012	302.07	4464.86	4467.93	1.02	4469.60	4471.05	4471.28	4473.00	5.40	1.73
4	Inlet B3 to MH 1B	12.97	17.41	21	Cir	0.012	257.42	4467.93	4470.58	1.03	4471.28	4472.75	4473.00	4475.00	5.39	2.00
5	MH 1B to Inlet B4	12.97	17.32	21	Cir	0.012	21.58	4470.58	4470.80	1.02	4473.00	4473.12	4473.58	4473.94	5.39	0.37

H.G.L. 0.37' BELOW GRATE

PABCO Storm Line B

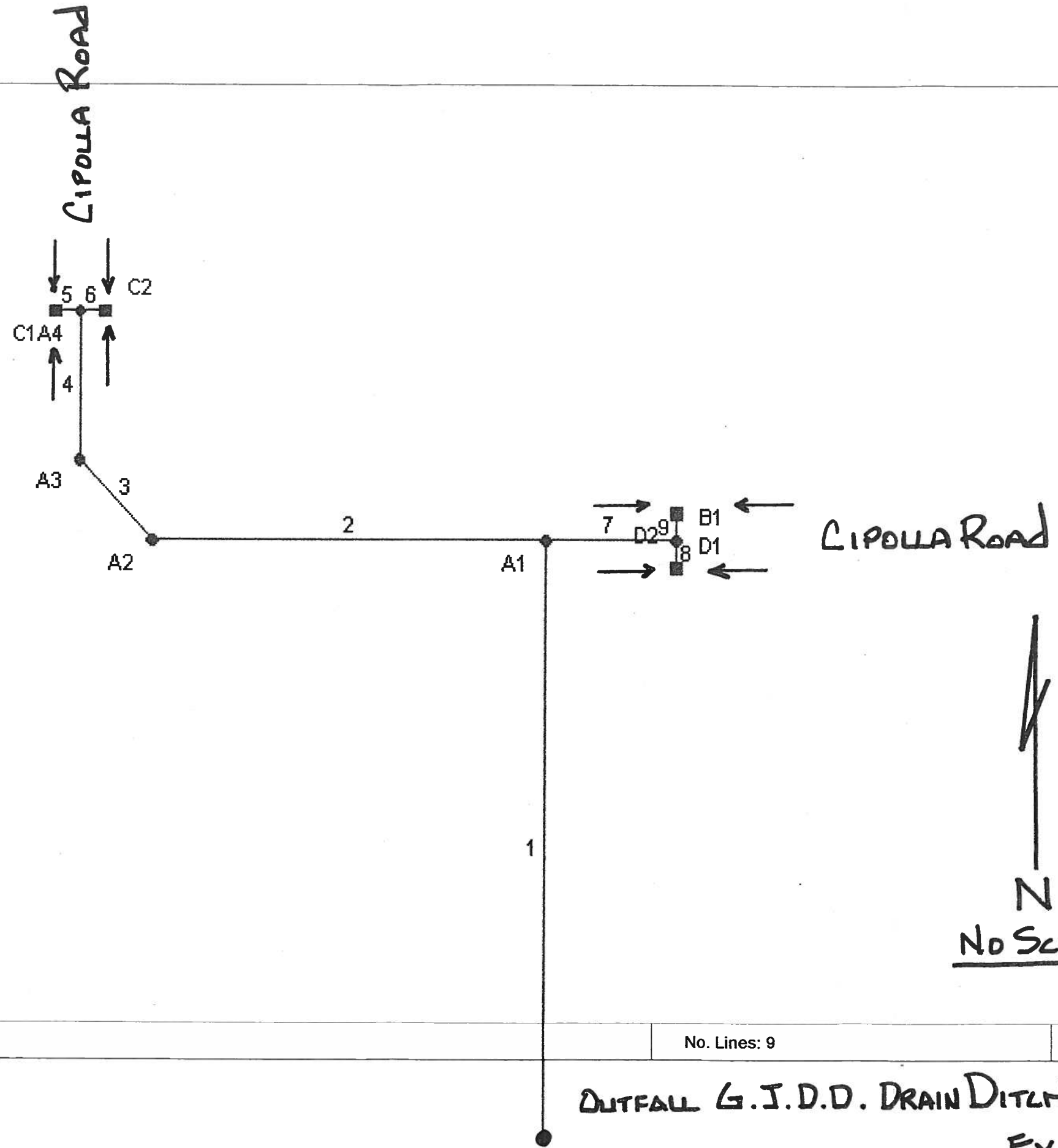
Number of lines: 5

Date: 12-16-2007

NOTES: | Inlet control; \*\* Critical depth

EXHIBIT E 10.0  
FDR-87

Hydraflow Plan View



PABCO Storm Line A

No. Lines: 9

04-30-2008

OUTFALL G.I.D.D. DRAIN DITCH

Hydraflow Storm Sewers 2005

EXHIBIT E 1.0  
FDR-78

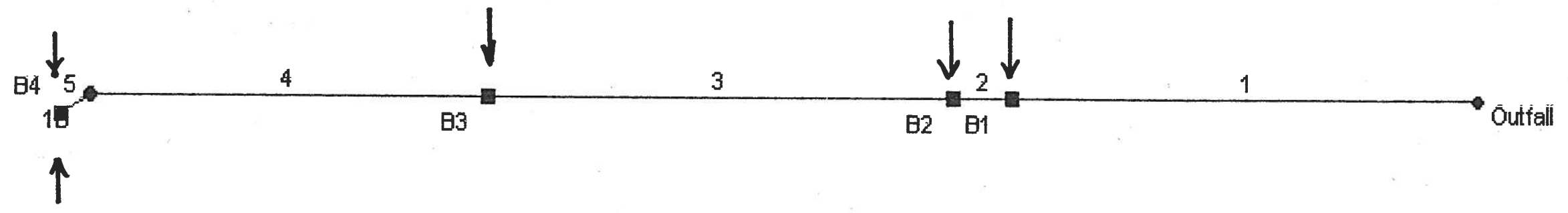
# Hydraflow Plan View LINE B

NO SCALE

RIVER ROAD

LIPOLLA ROAD

6.I.D.D. DRAIN DITCH



PABCO Storm Line B

No. Lines: 5

12-16-2007

Hydraflow Storm Sewers 2005

EXHIBIT E-9.0  
FDR-86