City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 12, 2001

Bruce Stidworthy, PE
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sandia Science & Technology Park Phase 1 Storm Drain Trunk Line
Engineer's Stamp not dated (M21/D7B)

Dear Mr. Stidworthy,

Based upon the additional information provided in your submittal dated 10-18-01, the above addendum is approved for Work Order requirements. I will be inserting it into the report in order to avoid stamping the addendum.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DESIGN ANALYSIS REPORT FOR SOUTHERN STORM DRAIN BACKBONE AT SANDIA SCIENCE AND TECHNOLOGY PARK

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August 8, 2001

PREPARED FOR:

NEW MEXICO DEVELOPMENT FOUNDATION
1110 PENNSYLVANIA NE
ALBUQUERQUE, NM 87110

DESIGN ANALYSIS REPORT
FOR
SOUTHERN STORM DRAIN BACKBONE AT
SANDIA SCIENCE & TECHNOLOGY PARK

AUGUST 8, 2001

Prepared for:

NEW MEXICO DEVELOPMENT FOUNDATION
1110 PENNSYLVANIA NE
ALBUQUERQUE, NM 87110

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON STREET NE
ALBUQUERQUE, NM 87109

PREPARED BY:

Colleen M. Ruiz, E.I Date 8-8-01

UNDER THE SUPERVISION OF:

Bruce J. Stidworthy, P. E. Date 8/8/01

BRUCE J. STIDWORTHY NEW MEXICO 14523 REGISTERED PROFESSIONAL ENGINEER

Table of Contents

TABLE OF CONTENTS

Page

I. SITE LOCATION 1

II. PURPOSE / BACKGROUND 1

III. EXISTING CONDITIONS 2

A. Existing Drainage Infrastructure 2

B. Drainage From Existing Tracts 2

IV. PROPOSED CONDITIONS 3

V. SUMMARY / CONCLUSION 3

FIGURES

FIGURE 1 - VICINITY MAP

APPENDICES

APPENDIX A - TEMPORARY DETENTION / DESILTATION POND DESIGN

APPENDIX B - STORM DRAIN DESIGN – HGL ANALYSIS

EXHIBITS

EXHIBIT 1 - EXISTING CONDITIONS BASIN MAP

EXHIBIT 2 - GRADING PLAN DETAILS (FOR TEMPORARY PONDS AND BERMS)

EXHIBIT 3 - STORM DRAIN PLAN AND PROFILES

I. SITE LOCATION

Sandia Science and Technology Park (SS&TP) is approximately 219 acres located south of Steven Moody Street, east of Eubank Boulevard, north of the Tijeras Arroyo, and west of the existing Willow Wood Subdivision and South Point Mobile Home Park. The site is in Zone Atlas Map No. L-21 and M-21 and is within Precipitation Zone 3 as defined in the DPM Section 22.2. See Figure 1, Vicinity Map.

The Southern Storm Drain Backbone will be developed prior to the majority of the lots within the Sandia Science and Technology Park. The Southern Storm Drain Backbone ties into the EMCORE 48" storm drain in Innovation east of Eubank and primarily borders the west side of the park. 48 or 60 ?

II. PURPOSE / BACKGROUND

There are a number of existing drainage reports, master drainage plans, and drainage studies that address the drainage conditions within the SS&TP vicinity. These governing documents are as follows:

- The South Eubank Storm Drainage Analysis (dated November 1995, prepared by Smith Engineering Company).
- Amendment #2 to the South Eubank Storm Drainage Analysis (dated November 2, 1998, prepared by Smith Engineering Company).
- Master Drainage Report For Sandia Science and Technology Park (dated February 8, 2001, prepared by Bohannan Huston, Inc.). This report was tentatively approved by city hydrology in a letter dated July 9, 2001. The minor comments provided in that letter have been addressed and the final version of the report is being submitted simultaneously with this Design Analysis Report.

This Design Analysis Report and the proposed storm drain conform to these plans.

III. EXISTING CONDITIONS

Existing vegetation on the site consists almost exclusively of a light covering of native grasses. Much of the site has been scarred by vehicular use on existing dirt roads crisscrossing the site.

Typical ground slopes range between 1 and 3 percent from east to west. Based on information from the Soil Conservation Services' Soil Survey of Bernalillo County, the site consists of a number of soil types, primarily: Tijeras gravelly fine sand loam, Embudo gravelly fine sand loam, and Madurez Wink association. These soils are common in the Northeast Heights area and are suitable for development purposes.

A. Existing Drainage Infrastructure

The most important drainage feature for the SS&TP is the existing large-diameter South Eubank Storm Drain. Phase 1 of this storm drainage project, which runs from the Manzano Mesa Park Detention Pond to the Tijeras Arroyo, is complete. Phase 2 is also completed and runs from the Manzano Mesa Park Detention Pond north up Elizabeth Street to a point just north of Southern Avenue. The portion of SS&TP covered by this report currently drains to this existing storm drain.

B. Drainage From Existing Tracts

All of the land within the portion of SS&TP covered by this report drains via surface runoff from east to west. Flows are conveyed across the tracts by natural sheet flow and shallow concentrated flows within existing natural swales. None of the lands within the portion of SS&TP covered by this report are impacted by offsite drainage. Flows from the SS&TP lands drain to Eubank, where they are picked up by the Phase 1 South Eubank Storm Drain.

The western half of the approximately 20-acre SLO tract located north of the existing PNM switching station is the new EMCORE facility. The drainage plan calls for the site to drain to a large pond on the south side of the site. The controlled discharge from the pond drains to a new storm drain constructed with the EMCORE project. The new storm drain ties to the South Eubank Storm Drain and extends east to the edge of the

EMCORE site. The eastern half of the tract drains to a small pond located adjacent to the EMCORE project. That pond also drains to the new storm drain. (See "Drainage Report for EMCORE III" prepared by Brasher and Lorenz Inc. dated September 2000.)

IV. PROPOSED CONDITIONS

The proposed improvements (both temporary and permanent) that are covered by this Design Analysis Report are as follows:

- Tie to 48" storm drain off EMCORE project and extend storm drain system east on Innovation, then north along the west boundary of the Sandia Science and Technology Park, then east back to Innovation.

- The outfall drainage connection to the detention pond for the International Building (Lot 15) designed by Brasher and Lorenz Inc. (BLI has prepared a drainage report for the International Building)

- Temporary drainage ponds and inlet structures on future lots 12, 19, and 38 to collect existing flows in the proposed storm drain system at rates equivalent to the allowable future proposed flows defined in the Master Drainage Plan for Sandia Science and Technology Park.

- Drop Inlets and storm drain in Research Road.

All of the appropriate calculations to support the design of the above improvements are included in the appendices of this report.

V. SUMMARY / CONCLUSION

This Design Analysis provides the required calculations for the final detailed design of the improvements described in Section IV above. The report conforms to the drainage criteria set forth in the South Eubank Storm Drainage Analysis, Amendment #2, and the Master Drainage Report for Sandia Science and Technology Park.

FIGURE 1

VICINITY MAP

VICINITY MAP
L-21-Z , M-21-Z

Figure 1

APPENDICES

APPENDIX A - TEMPORARY DETENTION POND DESIGN

APPENDIX B - STORM DRAIN DESIGN – HGL ANALYSIS

APPENDIX A

TEMPORARY DETENTION POND DESIGN

Detention Pond Volume Calculations

NOTE: Blue shaded cells require user input, all other cells should not be edited.
ASSUMPTIONS:
1. Area less than 40 acres (simplified hydrograph method).
2. 100-year, 6-hour storm event

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Basin Name : 607R4A - PROJECTIONS OF FUTURE LOTS 19, 18, 17
Choose Zone (1 - 4) 3
Basin Area = (acres) 9

Exist Conditions				Proposed Conditions			
Treatment	Percentage	Area	Q (cfs)	Treatment	Percentage	Area	Q (cfs)
A	80.0%	7.20	13.46	A	80.0%	7.20	13.46
B	20.0%	1.80	4.68	B	20.0%	1.80	4.68
C	0.0%	0.00	0.00	C	0.0%	0.00	0.00
D	0.0%	0.00	0.00	D	0.0%	0.00	0.00
		Q Peak - exist.=	**18.14**			Peak Q Developed=	**18.14**

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ?? 1
If No, what is the maximum allowable discharge ? 18.14 *

Excess Precipitation - DPM Section 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.8	1.08	1.46	2.64

*NOTE: The allowable discharge for the temporary detention/desiltation pond is equal to the allowable developed discharge into the northern inlet on Innovation Parkway per the Master Drainage Report for SS&TP.

Determine Developed E (avg excess precipitation for the developed basin)

%A x E = 0.53
%B x E = 0.18
%C x E = 0.00
%D x E = 0.00
Avg E(in) = 0.71

Determine Tb (hours)

Tb = 0.744

Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)

Tc = 0.2

Determine Tp and Duration of Peak (hours)

Tp = 0.273333
Peak Duration = 0

Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2

Time to Control Q (hrs) = 0.090
Time to end of Control Q (hrs)= 0.588449
Duration of Control Q (hrs)= 0.498

Required Detention Volume (CF) = 10887.2 =0.25 AC-FT

Detention Pond Volume Calculations

NOTE: Blue shaded cells require user input, all other cells should not be edited.
ASSUMPTIONS:
1. Area less than 40 acres (simplified hydrograph method).
2. 100-year, 6-hour storm event

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Basin Name : 607R 3A - PORTIONS OF FUTURE LOT 38, 31, 30, & 22
Choose Zone (1 - 4) 3
Basin Area = (acres) 17.6

Exist Conditions				Proposed Conditions			
Treatment	Percentage	Area	Q (cfs)	Treatment	Percentage	Area	Q (cfs)
A	80.0%	14.08	26.33	A	80.0%	14.08	26.33
B	20.0%	3.52	9.15	B	20.0%	3.52	9.15
C	0.0%	0.00	0.00	C	0.0%	0.00	0.00
D	0.0%	0.00	0.00	D	0.0%	0.00	0.00
		Q Peak - exist.=	**35.48**			Peak Q Developed=	**35.48**

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ?? n
If No, what is the maximum allowable discharge ? 6 *

Excess Precipitation - DPM Section 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.8	1.08	1.46	2.64

* NOTE: The allowable discharge for the temporary detention/desiltation pond is equal to the allowable discharge into the future south inlet on Innovation Parkwa per the Master Drainage Report for SS&TP.

Determine Developed E (avg excess precipitation for the developed basin)

%A x E = 0.53
%B x E = 0.18
%C x E = 0.00
%D x E = 0.00
Avg E(in) = 0.71

Determine Tb (hours)

Tb = 0.744

Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)

Tc = 0.25

Determine Tp and Duration of Peak (hours)

Tp = 0.273333
Peak Duration = 0

Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2

Time to Control Q (hrs) = 0.046
Time to end of Control Q (hrs)= 0.664525
Duration of Control Q (hrs)= 0.618

Required Detention Volume (CF) = 32811.4 =0.75 AC-FT

Detention Pond Volume Calculations

NOTE: Blue shaded cells require user input, all other cells should not be edited.
ASSUMPTIONS:
1. Area less than 40 acres (simplified hydrograph method).
2. 100-year, 6-hour storm event

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Basin Name : 606R3A-PORTIONS OF FUTURE LOTS 12, 10, 9
Choose Zone (1 - 4) [redacted]
Basin Area = (acres) [redacted]

Exist Conditions				Proposed Conditions			
Treatment	Percentage	Area	Q (cfs)	Treatment	Percentage	Area	Q (cfs)
A	[redacted]	12.08	22.59	A	[redacted]	12.08	22.59
B		3.02	7.85	B		3.02	7.85
C		0.00	0.00	C		0.00	0.00
D		0.00	0.00	D		0.00	0.00
	Q Peak - exist.=		**30.44**		Peak Q Developed=		**30.44**

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ?? [redacted]
If No, what is the maximum allowable discharge ? [redacted] *

Excess Precipitation - DPM Section 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.8	1.08	1.46	2.64

* NOTE: The allowable discharge for this temporary detention/desiltation pond is equal to the allowable discharge for developed flows from lot 12 per the Master Drainage Report for SS&TP.

Determine Developed E (avg excess precipitation for the developed basin)

%A x E = 0.53
%B x E = 0.18
%C x E = 0.00
%D x E = 0.00
Avg E(in) = 0.71

Determine Tb (hours)

Tb = 0.744

Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)

Tc = [redacted]

Determine Tp and Duration of Peak (hours)

Tp = 0.273333
Peak Duration = 0

Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2

Time to Control Q (hrs) = 0.060
Time to end of Control Q (hrs)= 0.640208
Duration of Control Q (hrs)= 0.580

Required Detention Volume (CF) = 24759.8 =0.57 AC-FT

APPENDIX B

STORM DRAIN DESIGN –HGL ANALYSIS

OUTFALL CONNECTION TO EXISTING 48" SD BUILT WITH EMCORE PROJECT

PNM SWITCHING STATION

FUTURE INNOVATION PARKWAY

FUTURE PROGRESS PLACE

FUTURE RESEARCH ROAD

WESTERN BOUNDARY

P1 P2 P12 48" SD

P15 24" SD P16 18" SD P17 24" SD P18 24" SD P19 18"SD P20 24" SD P21 24" SD P3 36" SD P4 P5 P6 36" SD P7 24" SD P8 P9 P14 36" SD P10 P11 18" SD P12 36" SD P13

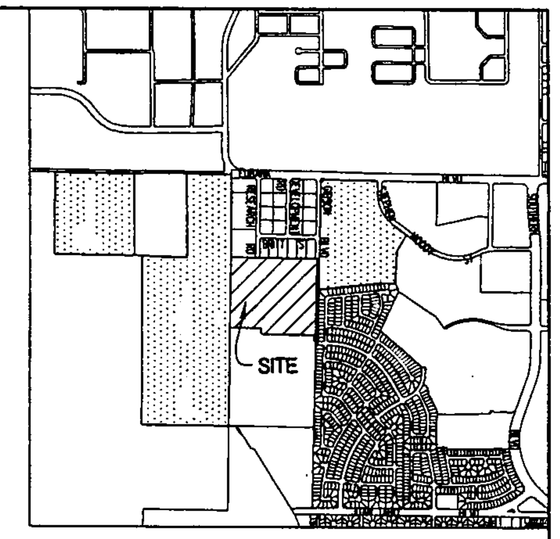
21 20 19 38 18 15 13 14

ALLOWABLE Q'S PER MASTER DRAINAGE PLAN		
PIPE	$Q_{ALLOWABLE}$ (CFS)	DESCRIPTION PER MASTER DRAINAGE REPORT
P1	153.1	P2+42.99 CFS FUTURE DEVELOPED FLOWS @ SUMP
P2	110.1	P3+P17+P18
P3	64.97	P7+P8
P4	64.97	P7+P8
P5	64.97	P7+P8
P6	64.97	P7+P8
P7	6.47	DEVELOPED LOT 15
P8	58.50	P9+P14
P9	38.90	P11+P12
P10	38.90	P11+P12
P11	6.72	DEVELOPED LOT 12 ALLOWABLE DISCHARGE
P12	32.18	ANAL PTS. K & L ON INNOV. @ SUMP INTO INLETS
P13	32.18	ANAL PTS. K & L ON INNOV. @ SUMP INTO INLETS
P14	19.57	LOTS 13, 14, 16 & RESEARCH RD. @ SUMP INTO INLETS
P15	5.84 (FUTURE)	DEVELOPED LOT 37, TEMPORARY LOT 38
P16	5.84 (TEMPORARY)	DEVELOPED LOT 37, TEMPORARY LOT 38
P17	5.84	DEVELOPED LOT 37, TEMPORARY LOT 38
P18	39.29	P19+P20+P21
P19	6.00	LOTS 38 & 1/2 OF INNOV. R/W (6 CFS INTO INLET)
P20	6.00	LOTS 18, 19, & 1/2 OF INNOV. R/W (6 CFS INTO INLET)
P21	27.29	ANAL. PT. D FROM LOT 31, 32, 36, PART OF 35, PROGRESS, & ENTERPRIZE

35

LEGEND

- PROPOSED STORM DRAIN
- EASEMENT
- PROPOSED DROP INLET & PIPE
- PROPOSED SD MH
- EXISTING STORM DRAIN



VICINITY MAP
L-21-Z , M-21-Z

SEE HGL ANALYSYS FOR INDIVIDUAL PIPE DESIGN INFORMATION (Q,V, HGL, SIZE, ECT.)

NOT TO SCALE

STORM DRAIN DESIGN EXHIBIT
SOUTHERN STORM DRAIN BACKBONE

Sandia Science & Technology Park

P:\020047\cdp\general\020047SD_EXH.dwg
Aug 06, 2001 - 10:56am

B-1

Storm & Sanitary SelectCAD Design Log

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Drainage File: M:\My_Files\Projects\020047\020047SD.sdb
Design File: P:\020047\CDP\DESIGN\020047PROF01.DWG
Display Log: P:\020047\CDP\DESIGN\design.log
Date: Wednesday, August 01, 2001 09:29:07 AM

==========

Designing pipe P13
Results:

Total Flow:	32.1800 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.4680 ft	Flow Status:	Partial
Critical Depth:	1.8400 ft	Capacity:	66.6984 cfs
Velocity:	9.3511 ft/s	Headloss:	See Table A
Froude Number:	1.5398	Flow Regime:	SuperCritical

Designing manhole MH9
Results:

Total Flow:	32.1800 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P13
Results:

Total Flow:	32.1800 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.6340 ft	Flow Status:	Partial
Critical Depth:	1.8400 ft	Capacity:	55.8039 cfs
Velocity:	8.1701 ft/s	Headloss:	See Table A
Froude Number:	1.2550	Flow Regime:	SuperCritical

Designing manhole MH25
Results:

Total Flow:	32.1800 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P12
Results:

Total Flow:	32.1800 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0120 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.3930 ft	Flow Status:	Partial
Critical Depth:	1.8400 ft	Capacity:	73.0644 cfs
Velocity:	10.0045 ft/s	Headloss:	See Table A
Froude Number:	1.7020	Flow Regime:	SuperCritical

Designing pipe P11
Results:

Total Flow:	6.7200 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0307 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.6260 ft	Flow Status:	Partial
Critical Depth:	1.0000 ft	Capacity:	18.4191 cfs
Velocity:	9.6013 ft/s	Headloss:	See Table A
Froude Number:	2.4635	Flow Regime:	SuperCritical

Designing manhole MH8
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P10
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.8440 ft	Flow Status:	Partial
Critical Depth:	2.0300 ft	Capacity:	55.8039 cfs
Velocity:	8.5305 ft/s	Headloss:	See Table A
Froude Number:	1.2038	Flow Regime:	SuperCritical

Designing manhole MH27
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P9
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.8440 ft	Flow Status:	Partial
Critical Depth:	2.0300 ft	Capacity:	55.8039 cfs
Velocity:	8.5305 ft/s	Headloss:	See Table A
Froude Number:	1.2038	Flow Regime:	SuperCritical

Designing pipe P14
Results:

Total Flow:	19.5700 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	1.4360 ft	Flow Status:	Partial
Critical Depth:	1.5900 ft	Capacity:	22.6224 cfs
Velocity:	8.0998 ft/s	Headloss:	See Table A
Froude Number:	1.2329	Flow Regime:	SuperCritical

Designing manhole MH24
Results:

Total Flow:	19.5700 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P14
Results:

Total Flow:	19.5700 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0300 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	0.9990 ft	Flow Status:	Partial
Critical Depth:	1.5900 ft	Capacity:	39.1831 cfs
Velocity:	12.4586 ft/s	Headloss:	See Table A
Froude Number:	2.4800	Flow Regime:	SuperCritical

Designing manhole MH28
Results:

Total Flow:	58.4700 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P8
Results:

Total Flow:	58.4700 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	3.0000 ft	Flow Status:	Full
Critical Depth:	2.4700 ft	Capacity:	55.8039 cfs
Velocity:	8.2718 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P7
Results:

Total Flow:	6.4700 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0050 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	0.8850 ft	Flow Status:	Partial
Critical Depth:	0.9000 ft	Capacity:	15.9965 cfs
Velocity:	4.8165 ft/s	Headloss:	See Table A
Froude Number:	1.0334	Flow Regime:	Critical

Designing manhole MH26
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P6
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in

```
      Depth of Flow:     3.0000 ft          Flow Status:       Full
     Critical Depth:     2.5800 ft             Capacity:    55.8039 cfs
           Velocity:     9.1871 ft/s           Headloss:  See Table A
      Froude Number:     0.0000             Flow Regime: Subcritical

 Designing manhole MH7
   Results:
         Total Flow:    64.9400 cfs           Flow From:   Upstream
              Status:      Fixed
      Chamber Width:     4.0000 ft       Chamber Length:     4.0000 ft
           Headloss:  See Table A

Designing pipe P5
   Results:
         Total Flow:    64.9400 cfs           Flow From:   Upstream
              Status:      Fixed                 Slope:     0.0070 ft/ft
         Pipe Width:    36.0000 in         Pipe Height:    36.0000 in
      Depth of Flow:     3.0000 ft          Flow Status:       Full
     Critical Depth:     2.5800 ft             Capacity:    55.8039 cfs
           Velocity:     9.1871 ft/s           Headloss:  See Table A
      Froude Number:     0.0000             Flow Regime: Subcritical

 Designing manhole MH22
   Results:
         Total Flow:    64.9400 cfs           Flow From:   Upstream
              Status:      Fixed
      Chamber Width:     6.0000 ft       Chamber Length:     6.0000 ft
           Headloss:  See Table A

 Designing pipe P4
   Results:
         Total Flow:    64.9400 cfs           Flow From:   Upstream
              Status:      Fixed                 Slope:     0.0070 ft/ft
         Pipe Width:    36.0000 in         Pipe Height:    36.0000 in
      Depth of Flow:     3.0000 ft          Flow Status:       Full
     Critical Depth:     2.5800 ft             Capacity:    55.8039 cfs
           Velocity:     9.1871 ft/s           Headloss:  See Table A
      Froude Number:     0.0000             Flow Regime: Subcritical

Designing manhole MH2
  Results:
         Total Flow:    64.9400 cfs           Flow From:   Upstream
              Status:      Fixed
      Chamber Width:     4.0000 ft       Chamber Length:     4.0000 ft
           Headloss:  See Table A
Designing pipe P3
  Results:
         Total Flow:    64.9400 cfs           Flow From:   Upstream
              Status:      Fixed                 Slope:     0.0070 ft/ft
         Pipe Width:    36 in              Pipe Height:    36.0000 in
      Depth of Flow:     2.3060 ft          Flow Status:    Partial
     Critical Depth:     2.5200 ft             Capacity:    84.1762 cfs
           Velocity:     9.6542 ft/s           Headloss:  See Table A
      Froude Number:     1.1958             Flow Regime: SuperCritical
```

Designing pipe P22
Results:

Total Flow:	27.2900 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.5919 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	0.5350 ft	Flow Status:	Partial
Critical Depth:	1.8100 ft	Capacity:	174.0396 cfs
Velocity:	40.2945 ft/s	Headloss:	See Table A
Froude Number:	11.5013	Flow Regime:	SuperCritical

Designing manhole MH23
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	8.0000 ft	Chamber Length:	8.0000 ft
Headloss:	See Table A		

Designing pipe P22
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	2.0000 ft	Flow Status:	Full
Critical Depth:	1.8100 ft	Capacity:	22.6224 cfs
Velocity:	8.6867 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P22
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	2.0000 ft	Flow Status:	Full
Critical Depth:	1.8100 ft	Capacity:	22.6224 cfs
Velocity:	8.6867 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing manhole MH4
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P21
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	2.0000 ft	Flow Status:	Full
Critical Depth:	1.8100 ft	Capacity:	22.6224 cfs
Velocity:	8.6867 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P21
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	2.0000 ft	Flow Status:	Full

Critical Depth:	1.8100 ft	Capacity:	22.6224 cfs
Velocity:	8.6867 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P10

Results:

Total Flow:	6.0000 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.1024 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.4290 ft	Flow Status:	Partial
Critical Depth:	0.9400 ft	Capacity:	33.6172 cfs
Velocity:	14.3348 ft/s	Headloss:	See Table A
Froude Number:	4.5555	Flow Regime:	SuperCritical

Designing pipe P20

Results

Total Flow:	6.0000 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0200 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.6630 ft	Flow Status:	Partial
Critical Depth:	0.9400 ft	Capacity:	14.8554 cfs
Velocity:	7.9485 ft/s	Headloss:	See Table A
Froude Number:	1.9706	Flow Regime:	SuperCritical

Designing manhole MH21

Results:

Total Flow:	39.2900 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P18

Results:

Total Flow:	39.2900 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0131 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	2.0000 ft	Flow Status:	Full
Critical Depth:	1.9400 ft	Capacity:	25.8800 cfs
Velocity:	12.5064 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P18

Results:

Total Flow:	5.8400 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.1000 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.4250 ft	Flow Status:	Partial
Critical Depth:	0.9300 ft	Capacity:	33.2176 cfs
Velocity:	14.1355 ft/s	Headloss:	See Table A
Froude Number:	4.5153	Flow Regime:	SuperCritical

Designing manhole MH1
Results:

Total Flow:	5.8400 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P17
Results:

Total Flow:	5.8400 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0050 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	0.7120 ft	Flow Status:	Partial
Critical Depth:	0.7500 ft	Capacity:	47.1629 cfs
Velocity:	4.5391 ft/s	Headloss:	See Table A
Froude Number:	1.1283	Flow Regime:	SuperCritical

Designing manhole MH14
Results:

Total Flow:	110.0700 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	8.0000 ft	Chamber Length:	8.0000 ft
Headloss:	See Table A		

Designing pipe P2
Results:

Total Flow:	110.0700 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	48.0000 in	Pipe Height:	48.0000 in
Depth of Flow:	2.6230 ft	Flow Status:	Partial
Critical Depth:	3.1700 ft	Capacity:	143.6433 cfs
Velocity:	12.5966 ft/s	Headloss:	See Table A
Froude Number:	1.4650	Flow Regime:	SuperCritical

Designing manhole MH11
Results:

Total Flow:	153.0600 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	8.0000 ft	Chamber Length:	8.0000 ft
Headloss:	See Table A		

Designing pipe P1
Results:

Total Flow:	153.0600 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	48.0000 in	Pipe Height:	48.0000 in
Depth of Flow:	4.0000 ft	Flow Status:	Full
Critical Depth:	3.6100 ft	Capacity:	143.6433 cfs
Velocity:	12.1801 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

P 1 8

HGL/EGL Computations:
Table A:

Struct ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	2 V /2g (ft)	Sf (ft/ft)	Dnstrm Soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot Loss (ft)	EGLup (ft)	HGLup (ft)	Rim Elev. (ft)
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5462.03	-
(Alternate HGL and EGL Used)													5465.39	5463.09	
P1	48	153.06	216.08	12.18	-	-	2.31	0.0114	5463.28	5465.39	5463.09	2.45	5467.84	5465.54	-
MH11	-	-	-	-	-	-	-	-	-	5467.84	5465.54	0.31	5468.15	5465.85	5479.75
P2	48	110.07	441.72	8.76	-	-	1.19	0.0059	5465.51	5468.15	5465.85	2.59	5470.75	5469.55	-
MH14	-	-	-	-	-	-	-	-	-	5470.75	5469.55	0.43	5471.18	5469.99	5480.90
P3	36	64.94	317.94	6.75	-	-	0.71	0.0042	5469.46	5471.18	5469.99	1.32	5472.50	5471.79	-
MH2	-	-	-	-	-	-	-	-	-	5472.50	5471.79	0.06	5472.56	5471.86	5489.09
P4	36	64.94	317.94	9.19	-	-	1.31	0.0095	5471.24	5472.56	5471.86	3.01	5475.58	5474.27	-
MH22	-	-	-	-	-	-	-	-	-	5475.58	5474.27	0.66	5476.24	5474.93	5488.96
P5	36	64.94	50.70	9.19	-	-	1.31	0.0095	5473.52	5476.24	5474.93	0.48	5476.72	5475.41	-
MH7	-	-	-	-	-	-	-	-	-	5476.72	5475.41	0.73	5477.45	5476.14	5489.40
P6	36	64.94	235.06	9.19	-	-	1.31	0.0095	5473.93	5477.45	5476.14	2.23	5479.68	5478.37	-
MH26	-	-	-	-	-	-	-	-	-	5479.68	5478.37	0.32	5480.00	5478.69	5488.53
P8	36	58.47	146.41	8.27	-	-	1.06	0.0077	5475.63	5480.00	5478.69	1.13	5481.13	5480.06	-
MH28	-	-	-	-	-	-	-	-	-	5481.13	5480.06	0.77	5481.89	5480.83	5489.66
P9	36	38.90	44.03	5.50	-	-	0.47	0.0034	5476.71	5481.89	5480.83	0.15	5482.04	5481.57	-
MH27	-	-	-	-	-	-	-	-	-	5482.04	5481.57	0.40	5482.44	5481.97	5489.25
P10	36	38.90	368.82	5.50	-	-	0.47	0.0034	5477.08	5482.44	5481.97	1.25	5483.70	5483.23	-
MH8	-	-	-	-	-	-	-	-	-	5483.70	5483.23	0.43	5484.12	5483.65	5489.82
P12	36	32.18	252.63	4.55	-	-	0.32	0.0023	5479.72	5484.12	5483.65	0.59	5484.71	5484.39	-
MH25	-	-	-	-	-	-	-	-	-	5484.71	5484.39	0.04	5484.75	5484.43	5491.99
P13	36	32.18	252.62	4.55	-	-	0.32	0.0023	5482.78	5484.75	5484.43	0.59	5485.34	5485.02	-
MH9	-	-	-	-	-	-	-	-	-	5485.34	5485.02	0.26	5485.60	5485.28	5493.48
P43	36	32.18	49.08	4.55	-	-	0.32	0.0023	5484.61	5485.60	5485.28	0.11	5485.71	5485.39	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-
MH14	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-	5470.75	5469.55	5480.90
P18	24	39.29	22.20	12.51	-	-	2.43	0.0302	5468.18	5470.75	5469.55	0.67	5471.42	5468.99	-
MH21	-	-	-	-	-	-	-	-	-	5471.42	5468.99	0.60	5472.02	5469.59	5480.90
P21	24	27.29	131.28	8.69	-	-	1.17	0.0146	5468.48	5472.02	5469.59	1.91	5473.93	5472.76	-
Junction	-	-	-	-	-	-	-	-	-	5473.93	5472.76	0.03	5473.96	5472.79	-
P21	24	27.29	285.39	8.69	-	-	1.17	0.0146	5469.76	5473.96	5472.79	4.19	5478.16	5476.99	-
MH4	-	-	-	-	-	-	-	-	-	5478.16	5476.99	1.91	5480.07	5478.90	5484.72
P22	24	27.29	165.59	8.69	-	-	1.17	0.0146	5472.68	5480.07	5478.90	2.41	5482.48	5481.31	-
Junction	-	-	-	-	-	-	-	-	-	5482.48	5481.31	0.01	5482.50	5481.32	-
P22	24	27.29	99.97	8.69	-	-	1.17	0.0146	5474.31	5482.50	5481.32	1.47	5483.97	5482.80	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-
MH14	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-	5470.75	5469.55	5480.90
P17	24	5.84	102.59	0.83	-	-	0.01	0.0001	5468.96	5470.75	5469.55	0.01	5470.75	5470.74	-
MH1	-	-	-	-	-	-	-	-	-	5470.75	5470.74	0.01	5470.77	5470.75	5478.90
P18	18	5.84	13.48	3.30	-	-	0.17	0.0031	5468.04	5470.77	5470.75	0.04	5470.81	5470.64	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5479.68	5478.37	-
MH26	-	-	-	-	-	-	-	-	-	5479.68	5478.37	-	5479.68	5478.37	5488.53
(Alternate HGL and EGL Used)													5484.86	5483.54	
P7	24	6.47	20.00	4.82	0.89	0.90	0.36	-	5484.09	5483.91	5483.54	-	5483.43	5483.07	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5481.13	5480.06	-
MH28	-	-	-	-	-	-	-	-	-	5481.13	5480.06	-	5481.13	5480.06	5489.66
P14	24	19.57	165.07	6.23	-	-	0.60	0.0075	5475.71	5481.13	5480.06	1.24	5482.36	5481.76	-
MH24	-	-	-	-	-	-	-	-	-	5482.36	5481.76	0.47	5482.83	5482.23	5491.08
P14	24	19.57	18.63	6.23	-	-	0.60	0.0075	5480.58	5482.83	5482.23	0.14	5482.97	5482.37	-

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New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5483.70	5483.23	-
MH8	-	-	-	-	-	-	-	-	-	5483.70	5483.23	-	5483.70	5483.23	5489.82
P11	18	6.72	30.01	3.80	-	-	0.22	0.0041	5478.22	5483.70	5483.23	0.12	5483.82	5483.60	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-
MH21	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-	5471.42	5468.99	5480.90
P19	18	6.00	72.88	14.33	-	-	3.19	0.0033	5467.88	5471.42	5468.99	-	5477.12	5473.93	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-
MH21	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-	5471.42	5468.99	5480.90
P20	18	6.00	85.80	3.40	-	-	0.18	0.0033	5467.98	5471.42	5468.99	0.28	5471.70	5471.52	-

Table B:

	Losses							Loss Coefficients							
Str ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1	2.45	-	-	-	-	-	2.45	-	-	-	-	-	-	-	-
MH11	-	-	0.31	-	-	-	0.31	4.13	0.194	1.000	0.510	1.361	1.000	1.000	0.134
P2	2.59	-	-	-	-	-	2.59	-	-	-	-	-	-	-	-
MH14	-	-	0.43	-	-	-	0.43	3.70	1.553	1.000	0.477	0.488	1.000	1.000	0.361
P3	1.32	-	-	-	-	-	1.32	-	-	-	-	-	-	-	-
MH2	-	-	0.06	-	-	-	0.06	3.66	0.171	1.000	0.513	1.000	1.000	1.000	0.088
P4	3.01	-	-	-	-	-	3.01	-	-	-	-	-	-	-	-
MH22	-	-	0.66	-	-	-	0.66	3.84	0.867	1.000	0.580	1.000	1.000	1.000	0.503
P5	0.48	-	-	-	-	-	0.48	-	-	-	-	-	-	-	-
MH7	-	-	0.73	-	-	-	0.73	4.57	0.867	1.000	0.644	1.000	1.000	1.000	0.559
P6	2.23	-	-	-	-	-	2.23	-	-	-	-	-	-	-	-
MH26	-	-	0.32	-	-	-	0.32	5.84	0.200	1.000	0.745	1.177	1.399	1.000	0.246
P8	1.13	-	-	-	-	-	1.13	-	-	-	-	-	-	-	-
MH28	-	-	0.77	-	-	-	0.77	6.45	0.969	1.000	0.792	0.940	1.000	1.000	0.721
P9	0.15	-	-	-	-	-	0.15	-	-	-	-	-	-	-	-
MH27	-	-	0.40	-	-	-	0.40	7.60	0.969	1.000	0.873	1.000	1.000	1.000	0.846
P10	1.25	-	-	-	-	-	1.25	-	-	-	-	-	-	-	-
MH8	-	-	0.43	-	-	-	0.43	6.61	1.476	1.000	0.803	0.763	1.000	1.000	0.904
P12	0.59	-	-	-	-	-	0.59	-	-	-	-	-	-	-	-
MH25	-	-	0.04	-	-	-	0.04	4.71	0.200	1.000	0.655	1.000	1.000	1.000	0.131
P13	0.59	-	-	-	-	-	0.59	-	-	-	-	-	-	-	-
MH9	-	-	0.26	-	-	-	0.26	3.51	1.461	1.000	0.550	1.000	1.000	1.000	0.803
P13	0.11	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH14	-	-	-	-	-	-	-	3.70	0.200	1.000	0.477	1.718	1.000	1.000	0.164
P18	0.67	-	-	-	-	-	0.67	-	-	-	-	-	-	-	-
MH21	-	-	0.60	-	-	-	0.60	2.60	0.300	1.000	0.586	1.411	1.000	1.000	0.248
P21	1.91	-	-	-	-	-	1.91	-	-	-	-	-	-	-	-
Junction	-	0.03	-	-	-	-	0.03	-	-	-	-	-	-	-	-
P21	4.15	0.04	-	-	-	-	4.19	-	-	-	-	-	-	-	-
MH4	-	-	1.91	-	-	-	1.91	6.40	1.632	1.000	1.000	1.000	1.000	1.000	1.632
P22	2.41	-	-	-	-	-	2.41	-	-	-	-	-	-	-	-
Junction	-	0.01	-	-	-	-	0.01	-	-	-	-	-	-	-	-
P22	1.45	0.02	-	-	-	-	1.47	-	-	-	-	-	-	-	-
MH23	-	-	0.37	-	-	-	0.37	9.52	0.319	1.000	1.000	1.000	1.000	1.000	0.319
P46	0.28	-	-	-	-	-	0.28	-	-	-	-	-	-	-	-

New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH14	-	-	-	-	-	-	-	7.53	0.717	1.000	0.869	1.301	1.000	1.000	0.810
P17	0.01	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-
MH1	-	-	0.01	-	-	-	0.01	4.31	1.553	1.000	0.621	1.000	1.000	1.000	0.965
P18	0.04	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH26	-	-	-	-	-	-	-	5.84	-	-	-	-	-	-	0.500
P7	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH28	-	-	-	-	-	-	-	6.45	1.553	1.000	0.792	0.263	1.000	1.000	0.324
P14	1.24	-	-	-	-	-	1.24	-	-	-	-	-	-	-	-
MH24	-	-	0.47	-	-	-	0.47	3.28	1.156	1.000	0.673	1.000	1.000	1.000	0.778
P14	0.14	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH8	-	-	-	-	-	-	-	6.61	0.464	1.000	0.803	1.529	1.000	1.000	0.570
P11	0.12	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH21	-	-	-	-	-	-	-	2.60	1.538	1.000	0.586	0.264	1.000	1.000	0.238
P19	0.24	-	-	-	-	-	0.24	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH21	-	-	-	-	-	-	-	-8.56	1.333	1.000	-	0.923	1.000	1.000	-
P20	0.28	-	-	-	-	-	0.28	-	-	-	-	-	-	-	-

EXHIBITS

EXHIBIT 1 - EXISTING CONDITIONS MAP

EXHIBIT 2 - GRADING PLAN DETAILS (FOR TEMPORARY PONDS AND BERMS)

EXHIBIT 3 - STORM DRAIN PLAN AND PROFILES

EXHIBIT 1

EXISTING CONDITIONS BASIN MAP

EXHIBIT 2

GRADING PLAN DETAILS

(FOR TEMPORARY PONDS AND BERMS)

Revised 10/17/01

Storm & Sanitary SelectCAD Design Log

Drainage File: M:\My_Files\Projects\020047\020047SD.sdb
Design File: P:\020047\CDP\DESIGN\020047PROF01.DWG
Display Log: P:\020047\CDP\DESIGN\design.log
Date: Wednesday, August 01, 2001 09:29:07 AM

Designing pipe P12B
Results:

Total Flow:	32.1800 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.6340 ft	Flow Status:	Partial
Critical Depth:	1.8400 ft	Capacity:	55.8039 cfs
Velocity:	8.1701 ft/s	Headloss:	See Table A
Froude Number:	1.2550	Flow Regime:	SuperCritical

Designing manhole MH25
Results:

Total Flow:	32.1800 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P12A
Results:

Total Flow:	32.1800 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0120 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.3930 ft	Flow Status:	Partial
Critical Depth:	1.8400 ft	Capacity:	73.0644 cfs
Velocity:	10.0045 ft/s	Headloss:	See Table A
Froude Number:	1.7020	Flow Regime:	SuperCritical

Designing pipe P11
Results:

Total Flow:	6.7200 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0307 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.6260 ft	Flow Status:	Partial
Critical Depth:	1.0000 ft	Capacity:	18.4191 cfs
Velocity:	9.6013 ft/s	Headloss:	See Table A
Froude Number:	2.4635	Flow Regime:	SuperCritical

Designing manhole MH8
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P10
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.8440 ft	Flow Status:	Partial
Critical Depth:	2.0300 ft	Capacity:	55.8039 cfs
Velocity:	8.5305 ft/s	Headloss:	See Table A
Froude Number:	1.2038	Flow Regime:	SuperCritical

Designing manhole MH27
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P9
Results:

Total Flow:	38.9000 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	1.8440 ft	Flow Status:	Partial
Critical Depth:	2.0300 ft	Capacity:	55.8039 cfs
Velocity:	8.5305 ft/s	Headloss:	See Table A
Froude Number:	1.2038	Flow Regime:	SuperCritical

Designing pipe P14
Results:

Total Flow:	19.5700 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	1.4360 ft	Flow Status:	Partial
Critical Depth:	1.5900 ft	Capacity:	22.6224 cfs
Velocity:	8.0998 ft/s	Headloss:	See Table A
Froude Number:	1.2329	Flow Regime:	SuperCritical

Designing manhole MH28
Results:

Total Flow:	58.4700 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P8
Results:

Total Flow:	58.4700 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	3.0000 ft	Flow Status:	Full
Critical Depth:	2.4700 ft	Capacity:	55.8039 cfs
Velocity:	8.2718 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P7
Results:

Total Flow:	6.4700 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0050 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	0.8850 ft	Flow Status:	Partial
Critical Depth:	0.9000 ft	Capacity:	15.9965 cfs
Velocity:	4.8165 ft/s	Headloss:	See Table A
Froude Number:	1.0334	Flow Regime:	Critical

Designing manhole MH26
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P6
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	3.0000 ft	Flow Status:	Full
Critical Depth:	2.5800 ft	Capacity:	55.8039 cfs
Velocity:	9.1871 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing manhole MH7
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P5
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	3.0000 ft	Flow Status:	Full
Critical Depth:	2.5800 ft	Capacity:	55.8039 cfs
Velocity:	9.1871 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing manhole MH22
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P4
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	3.0000 ft	Flow Status:	Full
Critical Depth:	2.5800 ft	Capacity:	55.8039 cfs
Velocity:	9.1871 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing manhole MH2
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P3
Results:

Total Flow:	64.9400 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0070 ft/ft
Pipe Width:	36 in	Pipe Height:	36.0000 in
Depth of Flow:	2.3060 ft	Flow Status:	Partial
Critical Depth:	2.5200 ft	Capacity:	84.1762 cfs
Velocity:	9.6542 ft/s	Headloss:	See Table A
Froude Number:	1.1958	Flow Regime:	SuperCritical

Designing pipe P22
Results:

Total Flow:	27.2900 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.5919 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	0.5350 ft	Flow Status:	Partial
Critical Depth:	1.8100 ft	Capacity:	174.0396 cfs
Velocity:	40.2945 ft/s	Headloss:	See Table A
Froude Number:	11.5013	Flow Regime:	SuperCritical

Designing manhole MH4
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P21
Results:

Total Flow:	27.2900 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	2.0000 ft	Flow Status:	Full
Critical Depth:	1.8100 ft	Capacity:	22.6224 cfs
Velocity:	8.6867 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P19
Results:

Total Flow:	6.0000 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.1024 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.4290 ft	Flow Status:	Partial
Critical Depth:	0.9400 ft	Capacity:	33.6172 cfs
Velocity:	14.3348 ft/s	Headloss:	See Table A
Froude Number:	4.5555	Flow Regime:	SuperCritical

B-5

Designing pipe P20
Results

Total Flow:	6.0000 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.0200 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.6630 ft	Flow Status:	Partial
Critical Depth:	0.9400 ft	Capacity:	14.8554 cfs
Velocity:	7.9485 ft/s	Headloss:	See Table A
Froude Number:	1.9706	Flow Regime:	SuperCritical

Designing manhole MH21
Results:

Total Flow:	39.2900 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	6.0000 ft	Chamber Length:	6.0000 ft
Headloss:	See Table A		

Designing pipe P18
Results:

Total Flow:	39.2900 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0131 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	24.0000 in
Depth of Flow:	2.0000 ft	Flow Status:	Full
Critical Depth:	1.9400 ft	Capacity:	25.8800 cfs
Velocity:	12.5064 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

Designing pipe P16
Results:

Total Flow:	5.8400 cfs	Flow From:	Injected Storm
Status:	Fixed	Slope:	0.1000 ft/ft
Pipe Width:	18.0000 in	Pipe Height:	18.0000 in
Depth of Flow:	0.4250 ft	Flow Status:	Partial
Critical Depth:	0.9300 ft	Capacity:	33.2176 cfs
Velocity:	14.1355 ft/s	Headloss:	See Table A
Froude Number:	4.5153	Flow Regime:	SuperCritical

Designing manhole MH1
Results:

Total Flow:	5.8400 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	4.0000 ft	Chamber Length:	4.0000 ft
Headloss:	See Table A		

Designing pipe P17
Results:

Total Flow:	5.8400 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0050 ft/ft
Pipe Width:	24.0000 in	Pipe Height:	36.0000 in
Depth of Flow:	0.7120 ft	Flow Status:	Partial
Critical Depth:	0.7500 ft	Capacity:	47.1629 cfs
Velocity:	4.5391 ft/s	Headloss:	See Table A
Froude Number:	1.1283	Flow Regime:	SuperCritical

Designing manhole MH14
Results:

Total Flow:	110.0700 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	8.0000 ft	Chamber Length:	8.0000 ft
Headloss:	See Table A		

Designing pipe P2
Results:

Total Flow:	110.0700 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	48.0000 in	Pipe Height:	48.0000 in
Depth of Flow:	2.6230 ft	Flow Status:	Partial
Critical Depth:	3.1700 ft	Capacity:	143.6433 cfs
Velocity:	12.5966 ft/s	Headloss:	See Table A
Froude Number:	1.4650	Flow Regime:	SuperCritical

Designing manhole MH11
Results:

Total Flow:	153.0600 cfs	Flow From:	Upstream
Status:	Fixed		
Chamber Width:	8.0000 ft	Chamber Length:	8.0000 ft
Headloss:	See Table A		

Designing pipe P1
Results:

Total Flow:	153.0600 cfs	Flow From:	Upstream
Status:	Fixed	Slope:	0.0100 ft/ft
Pipe Width:	48.0000 in	Pipe Height:	48.0000 in
Depth of Flow:	4.0000 ft	Flow Status:	Full
Critical Depth:	3.6100 ft	Capacity:	143.6433 cfs
Velocity:	12.1801 ft/s	Headloss:	See Table A
Froude Number:	0.0000	Flow Regime:	Subcritical

B.7

HGL/EGL Computations:
Table A:

Struct ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	2 V /2g (ft)	Sf (ft/ft)	Dnstrm Soffit (ft)	EGLdn (ft)	HGLdn (ft)	Tot Loss (ft)	EGLup (ft)	HGLup (ft)	Rim Elev. (ft)
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	5462.03	-
(Alternate HGL and EGL Used)													5465.39	5463.09	
P1	48	153.06	216.08	12.18	-	-	2.31	0.0114	5463.28	5465.39	5463.09	2.45	5467.84	5465.54	-
MH11	-	-	-	-	-	-	-	-	-	5467.84	5465.54	0.31	5468.15	5465.85	5479.75
P2	48	110.07	441.72	8.76	-	-	1.19	0.0059	5465.51	5468.15	5465.85	2.59	5470.75	5469.55	-
MH14	-	-	-	-	-	-	-	-	-	5470.75	5469.55	0.43	5471.18	5469.99	5480.90
P3	36	64.94	317.94	6.75	-	-	0.71	0.0042	5469.46	5471.18	5469.99	1.32	5472.50	5471.79	-
MH2	-	-	-	-	-	-	-	-	-	5472.50	5471.79	0.06	5472.56	5471.86	5489.09
P4	36	64.94	317.94	9.19	-	-	1.31	0.0095	5471.24	5472.56	5471.86	3.01	5475.58	5474.27	-
MH22	-	-	-	-	-	-	-	-	-	5475.58	5474.27	0.66	5476.24	5474.93	5488.96
P5	36	64.94	50.70	9.19	-	-	1.31	0.0095	5473.52	5476.24	5474.93	0.48	5476.72	5475.41	-
MH7	-	-	-	-	-	-	-	-	-	5476.72	5475.41	0.73	5477.45	5476.14	5489.40
P6	36	64.94	235.06	9.19	-	-	1.31	0.0095	5473.93	5477.45	5476.14	2.23	5479.68	5478.37	-
MH26	-	-	-	-	-	-	-	-	-	5479.68	5478.37	0.32	5480.00	5478.69	5488.53
P8	36	58.47	146.41	8.27	-	-	1.06	0.0077	5475.63	5480.00	5478.69	1.13	5481.13	5480.06	-
MH28	-	-	-	-	-	-	-	-	-	5481.13	5480.06	0.77	5481.89	5480.83	5489.66
P9	36	38.90	44.03	5.50	-	-	0.47	0.0034	5476.71	5481.89	5480.83	0.15	5482.04	5481.57	-
MH27	-	-	-	-	-	-	-	-	-	5482.04	5481.57	0.40	5482.44	5481.97	5489.25
P10	36	38.90	368.82	5.50	-	-	0.47	0.0034	5477.08	5482.44	5481.97	1.25	5483.70	5483.23	-
MH8	-	-	-	-	-	-	-	-	-	5483.70	5483.23	0.43	5484.12	5483.65	5489.82
P12A	36	32.18	252.63	4.55	-	-	0.32	0.0023	5479.72	5484.12	5483.65	0.59	5484.71	5484.39	-
MH25	-	-	-	-	-	-	-	-	-	5484.71	5484.39	0.04	5484.75	5484.43	5491.99
P12B	36	32.18	252.62	4.55	-	-	0.32	0.0023	5482.78	5484.75	5484.43	0.59	5485.34	5485.02	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-
MH14	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-	5470.75	5469.55	5480.90
P18	24	39.29	22.20	12.51	-	-	2.43	0.0302	5468.18	5470.75	5469.55	0.67	5471.42	5468.99	-
MH21	-	-	-	-	-	-	-	-	-	5471.42	5468.99	0.60	5472.02	5469.59	5480.90
P21	24	27.29	131.28	8.69	-	-	1.17	0.0146	5468.48	5472.02	5469.59	1.91	5473.93	5472.76	-
MH4	-	-	-	-	-	-	-	-	-	5478.16	5476.99	1.91	5480.07	5478.90	5484.72
P22	24	27.29	165.59	8.69	-	-	1.17	0.0146	5472.68	5480.07	5478.90	2.41	5482.48	5481.31	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-
MH14	-	-	-	-	-	-	-	-	-	5470.75	5469.55	-	5470.75	5469.55	5480.90
P17	24	5.84	102.59	0.83	-	-	0.01	0.0001	5468.96	5470.75	5469.55	0.01	5470.75	5470.74	-
MH1	-	-	-	-	-	-	-	-	-	5470.75	5470.74	0.01	5470.77	5470.75	5478.90
P16	18	5.84	13.48	3.30	-	-	0.17	0.0031	5468.04	5470.77	5470.75	0.04	5470.81	5470.64	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5479.68	5478.37	-
MH26	-	-	-	-	-	-	-	-	-	5479.68	5478.37	-	5479.68	5478.37	5488.53
(Alternate HGL and EGL Used)													5484.86	5483.54	
P7	24	6.47	20.00	4.82	0.89	0.90	0.36	-	5484.09	5483.91	5483.54	-	5483.43	5483.07	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5481.13	5480.06	-
MH28	-	-	-	-	-	-	-	-	-	5481.13	5480.06	-	5481.13	5480.06	5489.66
P14	24	19.57	165.07	6.23	-	-	0.60	0.0075	5475.71	5481.13	5480.06	1.24	5482.36	5481.76	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5483.70	5483.23	-
MH8	-	-	-	-	-	-	-	-	-	5483.70	5483.23	-	5483.70	5483.23	5489.82
P11	18	6.72	30.01	3.80	-	-	0.22	0.0041	5478.22	5483.70	5483.23	0.12	5483.82	5483.60	-

B.8

New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-
MH21	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-	5471.42	5468.99	5480.90
P19	18	6.00	72.88	14.33	-	-	3.19	0.0033	5467.88	5471.42	5468.99	-	5477.12	5473.93	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-
MH21	-	-	-	-	-	-	-	-	-	5471.42	5468.99	-	5471.42	5468.99	5480.90
P20	18	6.00	85.80	3.40	-	-	0.18	0.0033	5467.98	5471.42	5468.99	0.28	5471.70	5471.52	-

Table B:

	Losses							Loss Coefficients							
Str ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1	2.45	-	-	-	-	-	2.45	-	-	-	-	-	-	-	-
MH11	-	-	0.31	-	-	-	0.31	4.13	0.194	1.000	0.510	1.361	1.000	1.000	0.134
P2	2.59	-	-	-	-	-	2.59	-	-	-	-	-	-	-	-
MH14	-	-	0.43	-	-	-	0.43	3.70	1.553	1.000	0.477	0.488	1.000	1.000	0.361
P3	1.32	-	-	-	-	-	1.32	-	-	-	-	-	-	-	-
MH2	-	-	0.06	-	-	-	0.06	3.66	0.171	1.000	0.513	1.000	1.000	1.000	0.088
P4	3.01	-	-	-	-	-	3.01	-	-	-	-	-	-	-	-
MH22	-	-	0.66	-	-	-	0.66	3.84	0.867	1.000	0.580	1.000	1.000	1.000	0.503
P5	0.48	-	-	-	-	-	0.48	-	-	-	-	-	-	-	-
MH7	-	-	0.73	-	-	-	0.73	4.57	0.867	1.000	0.644	1.000	1.000	1.000	0.559
P6	2.23	-	-	-	-	-	2.23	-	-	-	-	-	-	-	-
MH26	-	-	0.32	-	-	-	0.32	5.84	0.200	1.000	0.745	1.177	1.399	1.000	0.246
P8	1.13	-	-	-	-	-	1.13	-	-	-	-	-	-	-	-
MH28	-	-	0.77	-	-	-	0.77	6.45	0.969	1.000	0.792	0.940	1.000	1.000	0.721
P9	0.15	-	-	-	-	-	0.15	-	-	-	-	-	-	-	-
MH27	-	-	0.40	-	-	-	0.40	7.60	0.969	1.000	0.873	1.000	1.000	1.000	0.846
P10	1.25	-	-	-	-	-	1.25	-	-	-	-	-	-	-	-
MH8	-	-	0.43	-	-	-	0.43	6.61	1.476	1.000	0.803	0.763	1.000	1.000	0.904
P12A	0.59	-	-	-	-	-	0.59	-	-	-	-	-	-	-	-
MH25	-	-	0.04	-	-	-	0.04	4.71	0.200	1.000	0.655	1.000	1.000	1.000	0.131
P12B	0.59	-	-	-	-	-	0.59	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH14	-	-	-	-	-	-	-	3.70	0.200	1.000	0.477	1.718	1.000	1.000	0.164
P18	0.67	-	-	-	-	-	0.67	-	-	-	-	-	-	-	-
MH21	-	-	0.60	-	-	-	0.60	2.60	0.300	1.000	0.586	1.411	1.000	1.000	0.248
P21	1.91	-	-	-	-	-	1.91	-	-	-	-	-	-	-	-
MH4	-	-	1.91	-	-	-	1.91	6.40	1.632	1.000	1.000	1.000	1.000	1.000	1.632
P22	2.41	-	-	-	-	-	2.41	-	-	-	-	-	-	-	-
MH23	-	-	0.37	-	-	-	0.37	9.52	0.319	1.000	1.000	1.000	1.000	1.000	0.319
P46	0.28	-	-	-	-	-	0.28	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH14	-	-	-	-	-	-	-	7.53	0.717	1.000	0.869	1.301	1.000	1.000	0.810
P17	0.01	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-
MH1	-	-	0.01	-	-	-	0.01	4.31	1.553	1.000	0.621	1.000	1.000	1.000	0.965
P16	0.04	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH26	-	-	-	-	-	-	-	5.84	-	-	-	-	-	-	0.500
P7	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-

New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH28	-	-	-	-	-	-	-	6.45	1.553	1.000	0.792	0.263	1.000	1.000	0.324
P14	1.24	-	-	-	-	-	1.24	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH8	-	-	-	-	-	-	-	6.61	0.464	1.000	0.803	1.529	1.000	1.000	0.570
P11	0.12	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH21	-	-	-	-	-	-	-	2.60	1.538	1.000	0.586	0.264	1.000	1.000	0.238
P19	0.24	-	-	-	-	-	0.24	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MH21	-	-	-	-	-	-	-	-8.56	1.333	1.000	-	0.923	1.000	1.000	-
P20	0.28	-	-	-	-	-	0.28	-	-	-	-	-	-	-	-

OUTFALL CONNECTION TO EXISTING 48" SD BUILT WITH EMCORE PROJECT

PNM SWITCHING STATION

FUTURE INNOVATION PARKWAY

48" SD

P1

P2

WESTERN BOUNDARY

P15 FUTURE 24" SD

P16

18" SD

24" SD

P17

24" SD

P18

P3

36" SD

P4

P5

P6

36" SD

P7

P8

24" SD

P9

P10

36" SD

P11

FUTURE 18" SD

P12A

FUTURE 36" SD

P12B

P14

FUTURE RESEARCH ROAD

18" SD

P19

18" SD

24" SD

P20

24" SD

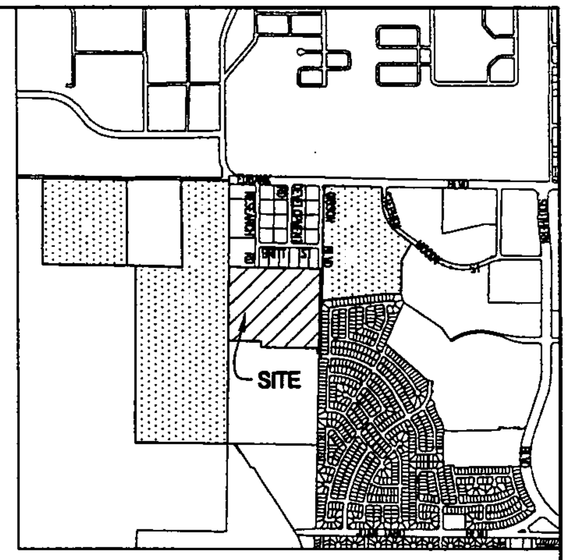
P21

FUTURE PROGRESS PLACE

ALLOWABLE Q'S PER MASTER DRAINAGE PLAN		
PIPE	$Q_{ALLOWABLE}$ (CFS)	DESCRIPTION PER MASTER DRAINAGE REPORT
P1	153.1	P2+42.99 CFS FUTURE DEVELOPED FLOWS @ SUMP
P2	110.1	P3+P17+P18
P3	64.97	P7+P8
P4	64.97	P7+P8
P5	64.97	P7+P8
P6	64.97	P7+P8
P7	6.47	DEVELOPED LOT 15
P8	58.50	P9+P14
P9	38.90	P11+P12
P10	38.90	P11+P12
P11	6.72	DEVELOPED LOT 12 ALLOWABLE DISCHARGE
P12A	32.18	ANAL PTS. K & L ON INNOV. @ SUMP INTO INLETS
P12B	32.18	ANAL PTS. K & L ON INNOV. @ SUMP INTO INLETS
P14	19.57	LOTS 13, 14, 15 & RESEARCH RD. @ SUMP INTO INLETS
P15	5.84 (FUTURE)	DEVELOPED LOT 37, TEMPORARY LOT 38
P16	5.84 (TEMPORARY)	DEVELOPED LOT 37, TEMPORARY LOT 38
P17	5.84	DEVELOPED LOT 37, TEMPORARY LOT 38
P18	39.29	P19+P20+P21
P19	6.00	LOTS 38 & 1/2 OF INNOV. R/W (6 CFS INTO INLET)
P20	6.00	LOTS 18, 19, & 1/2 OF INNOV. R/W (6 CFS INTO INLET)
P21	27.29	ANAL. PT. D FROM LOT 31, 32, 36, PART OF 36, PROGRESS, & ENTERPRIZE

LEGEND

- PROPOSED STORM DRAIN
- EASEMENT
- PROPOSED DROP INLET & PIPE
- PROPOSED SD MH
- EXISTING STORM DRAIN



VICINITY MAP
L-21-Z , M-21-Z

SEE HGL ANALYSYS FOR INDIVIDUAL PIPE DESIGN INFORMATION (Q,V, HGL, SIZE, ECT.)

N

NOT TO SCALE

STORM DRAIN DESIGN EXHIBIT
SOUTHERN STORM DRAIN BACKBONE

Prepared For:
Science and Technology Park Development Corporation
Albuquerque, New Mexico 87120

Prepared By:

Sandia Science & Technology Park

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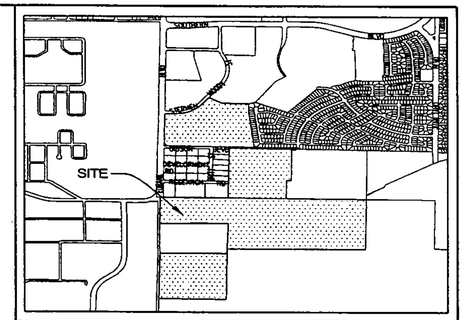
EXHIBIT 3

STORM DRAIN PLAN AND PROFILES

CONSTRUCTION PLANS
FOR
SANDIA SCIENCE AND TECHNOLOGY PARK
SOUTHERN STORM DRAIN BACKBONE
ALBUQUERQUE, NEW MEXICO

INDEX

SHEET NUMBER	DESCRIPTION
1	COVER SHEET
2	PLAT
3	GRADING DETAIL SHEET
4	OVERALL STORM DRAIN PLAN
5-10	PAVING PLAN AND PROFILE SHEETS



VICINITY MAP
ZONE MAP NO.

NOTICE TO CONTRACTORS

1. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN THE CITY RIGHT-OF-WAY.

2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION AS REVISED THROUGH UPDATE #6.

3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM (260-1990) FOR LOCATION OF EXISTING UTILITIES.

4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL OBSTRUCTIONS, SHOULD A CONFLICT EXIST. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

5. FIVE (5) WORKING DAYS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO CONSTRUCTION COORDINATION DIVISION A DETAILED CONSTRUCTION SCHEDULED. TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A BARRICADING PERMIT FROM THE CONSTRUCTION COORDINATION DIVISION, CONTRACTOR SHALL NOTIFY THE CONSTRUCTION COORDINATION ENGINEER (768-2521) PRIOR TO OCCUPYING AN INTERSECTION. REFER TO SECTION 19 OF THE GENERAL CONDITIONS OF THE STANDARD SPECIFICATIONS.

6. ALL WORK EFFECTING ARTERIAL ROADWAYS REQUIRES TWENTY-FOUR HOUR CONSTRUCTION.

7. ALL STREET STRIPING ALTERED OR DESTROYED SHALL BE REPLACED WITH PLASTIC REFLECTORIZED PAVEMENT MARKING BY CONTRACTOR TO THE SAME LOCATION AS WAS EXISTING, OR AS INDICATED BY THIS PLAN SET.

8. CONTRACTOR SHALL NOTIFY THE ENGINEER NOT LESS THAN SEVEN (7) DAYS PRIOR TO STARTING WORK IN ORDER THAT THE CITY SURVEYOR MAY TAKE NECESSARY MEASURES TO INSURE THE PRESERVATION OF SURVEY MONUMENTS. CONTRACTOR SHALL NOT DISTURB PERMANENT SURVEY MONUMENTS WITHOUT THE CONSENT OF THE CITY SURVEYOR AND SHALL NOTIFY THE CITY SURVEYOR AND HEAR THE EXPENSE OF REPLACING ANY THAT MAY BE DISTURBED WITHOUT PERMISSION. REPLACEMENT SHALL BE DONE ONLY BY THE CITY SURVEYOR. WHEN A CHANGE IS MADE IN THE FINISHED ELEVATIONS OF THE PAVEMENT OF ANY ROADWAY IN WHICH A PERMANENT SURVEY MONUMENT IS LOCATED, CONTRACTOR SHALL, AT HIS OWN EXPENSE, ADJUST THE MONUMENT COVER TO THE NEW GRADE UNLESS OTHERWISE SPECIFIED. REFER TO SECTION 4.4 OF THE GENERAL CONDITIONS OF THE STANDARD SPECIFICATIONS.

9. CONTRACTOR SHALL RECORD DATA ON ALL UTILITY LINES AND ACCESSORIES AS REQUIRED BY THE CITY OF ALBUQUERQUE FOR THE PREPARATION OF "AS CONSTRUCTED" DRAWINGS. CONTRACTOR SHALL NOT COVER UTILITY LINES AND ACCESSORIES UNTIL ALL DATA HAS BEEN RECORDED.

10. CONTRACTOR SHALL MAINTAIN A GRAFFITI-FREE WORK SITE. CONTRACTOR SHALL PROMPTLY REMOVE ANY GRAFFITI FROM ALL EQUIPMENT, WHETHER PERMANENT OR TEMPORARY.

11. CONTRACTOR SHALL COORDINATE WITH THE CITY OF ALBUQUERQUE WATER SYSTEMS DIVISION (857-8200) FIVE (5) WORKING DAYS IN ADVANCE OF ANY WORK THAT MAY AFFECT EXISTING PUBLIC WATER OR SEWER UTILITIES. EXISTING VALVES TO BE OPERATED BY CITY PERSONNEL ONLY. CONTRACTOR SHALL CONTACT THE WATER SYSTEMS DIVISION THREE (3) WORKING DAYS PRIOR TO NEEDING VALVES TURNED ON OR OFF.

THE FOLLOWING NOTES ALSO APPLY WHEN CHECKED

- [X] ALL UTILITIES AND UTILITY SERVICE LINES SHALL BE INSTALLED PRIOR TO PAVING.
- [X] BACKFILL COMPACTION SHALL BE ACCORDING TO SPECIFIED STREET USE.
- [X] TACK COAT REQUIREMENTS SHALL BE DETERMINED BY THE CITY ENGINEER.
- [X] SIDEWALKS AND WHEELCHAIR RAMPS WITHIN THE CURB RETURNS SHALL BE CONSTRUCTED WHEREVER A NEW CURB RETURN IS CONSTRUCTED.
- [X] IF CURB IS DEPRESSED FOR A DRIVEPAD, THE DRIVEPAD SHALL BE CONSTRUCTED PRIOR TO ACCEPTANCE OF CURB AND GUTTER.
- [X] ALL STORM DRAINAGE FACILITIES SHALL BE COMPLETED PRIOR TO FINAL ACCEPTANCE.
- [X] THE REQUESTOR OR DEVELOPER SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ALL CURB AND GUTTER OR SIDEWALK DAMAGED AFTER APPROVAL BY THE CITY ENGINEER OF WORK COMPLETED BY THE CONTRACTOR.

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL ABIDE BY ALL LOCAL, STATE, AND FEDERAL LAWS, RULES AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION OF THESE IMPROVEMENTS.

2. PRIOR TO CONSTRUCTION SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OR CONSTRUCTION OBSERVER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

3. ALL ELECTRICAL, TELEPHONE, CABLE TV, GAS AND OTHER UTILITY LINES, CABLES AND APPURTENANCES ENCOUNTERED DURING CONSTRUCTION THAT REQUIRE RELOCATION, SHALL BE COORDINATED WITH THAT UTILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY ADJUSTMENTS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR DELAYS OR INCONVENIENCES CAUSED BY UTILITY COMPANY WORK CREWS. THE CONTRACTOR MAY BE REQUIRED TO RESCHEDULE HIS ACTIVITIES TO ALLOW UTILITY CREWS TO PERFORM THEIR REQUIRED WORK.

4. DISPOSAL SITE FOR ALL EXCESS EXCAVATION MATERIAL, AND UNSUITABLE MATERIAL SHALL BE OBTAINED BY THE CONTRACTOR IN COMPLIANCE WITH APPLICABLE ENVIRONMENTAL REGULATIONS AND APPROVED BY THE CONSTRUCTION OBSERVER. ALL COSTS INCURRED IN OBTAINING A DISPOSAL SITE AND HAUL THERETO SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

5. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE EXISTING UTILITY LINES WITHIN THE CONSTRUCTION AREA. ANY DAMAGE TO EXISTING FACILITIES CAUSED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE AND APPROVED BY THE CONSTRUCTION OBSERVER.

6. CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE PROPERTY AND/OR PROJECT LIMITS. ANY DAMAGE TO ADJACENT PROPERTIES RESULTING FROM THE CONSTRUCTION PROCESS IS THE RESPONSIBILITY OF THE CONTRACTOR. ANY COSTS INCURRED FOR REPAIRS SHALL BE THE COST OF THE CONTRACTOR.

7. OVERNIGHT PARKING OF CONSTRUCTION EQUIPMENT SHALL NOT OBSTRUCT DRIVEWAYS OR DESIGNATED TRAFFIC LANES. THE CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIAL WITHIN THE PUBLIC RIGHT-OF-WAY.

8. THE CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FOR THE PROJECT PRIOR TO COMMENCING CONSTRUCTION (I.E. BARRICADING, SURFACE DISTURBANCE)

9. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE AT HIS EXPENSE ANY AND ALL PROPERTY CORNERS DESTROYED DURING CONSTRUCTION. ALL PROPERTY CORNERS MUST BE RESET BY A REGISTERED LAND SURVEYOR.

10. [illegible]

11. THE CONTRACTOR SHALL FOLLOW THE CONSTRUCTION TRAFFIC CONTROL AND SIGNING PLAN PROVIDED HEREIN. THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF ALBUQUERQUE, TRAFFIC ENGINEERING DEPARTMENT, PRIOR TO BEGINNING ANY CONSTRUCTION WORK ON ADJACENT TO EXISTING STREETS.

12. ALL BARRICADES AND CONSTRUCTION SIGNING SHALL CONFORM TO APPLICABLE SECTIONS OF THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), U.S. DEPARTMENT OF TRANSPORTATION, LATEST EDITION.

13. THE CONTRACTOR SHALL MAINTAIN ALL CONSTRUCTION BARRICADES AND SIGNING AT ALL TIMES. THE CONTRACTOR SHALL VERIFY THE PROPER LOCATION OF ALL BARRICADING AT THE END AND BEGINNING OF EACH DAY.

14. ALL SAWCUT PAVEMENT SHALL HAVE A UNIFORM EDGE AND BE SPRAYED WITH TACK.

15. WHEN ABUTTING NEW CURB AND GUTTER TO EXISTING PAVEMENT, A 1' WIDE SECTION OF EXISTING PAVEMENT ADJACENT TO THE CURB AND GUTTER SHALL BE SAWCUT, REMOVED, AND REPLACED AS PER THE STANDARD SPECIFICATIONS.

16. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ANY DAMAGE TO EXISTING PAVEMENTS, PAVEMENT MARKINGS, CURB & GUTTER, DRIVE PADS, WHEELCHAIR RAMPS, AND SIDEWALK DURING CONSTRUCTION, APART FROM THOSE SECTIONS INDICATED FOR REMOVAL ON THE PLANS AND SHALL REPAIR OR REPLACE PER COA STANDARDS, AT HIS OWN EXPENSE.

REV.	SHEETS	CITY ENGINEER	DATE	USER DEPARTMENT	DATE	USER DEPARTMENT	DATE

ENGINEERS STAMP & SIGNATURE	APPROVALS	ENGINEER	DATE
BRUCE J. STIDWORTHY NEW MEXICO 14523 REGISTERED PROFESSIONAL ENGINEER	ORC Chairman		
	Transportation		
	Water/Wastewater		
	Hydrology		
	Parks		
	Const. Mngmt.		
	NMUI		

APPROVED FOR CONSTRUCTION

City Engineer Date

City Project No. City Project No.

Sheet X Of X

Bohannan Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

BHI JOB NO. 01222

DATE: AUGUST, 2001

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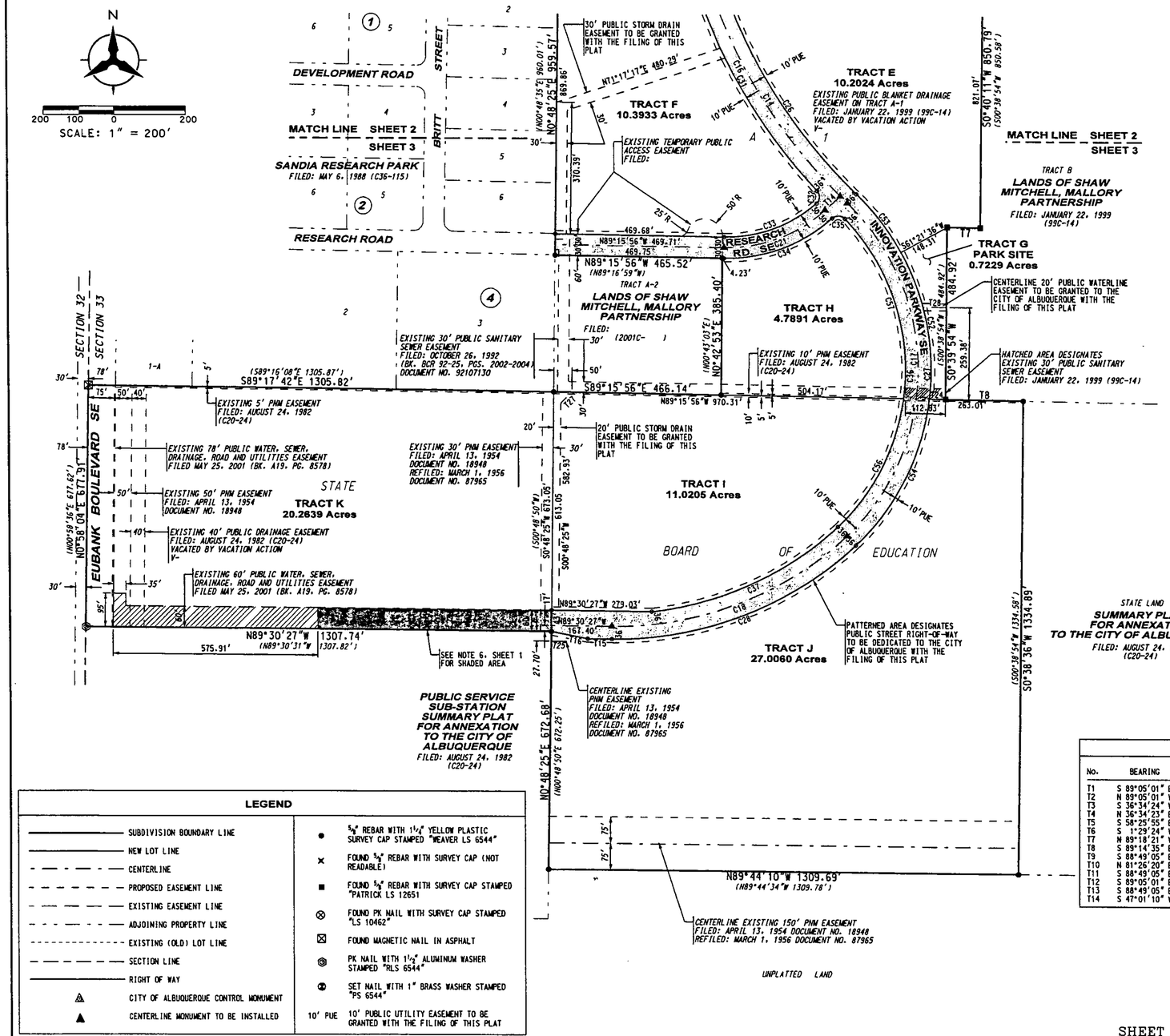

BULK LAND PLAT OF
SANDIA SCIENCE AND TECHNOLOGY PARK

ALBUQUERQUE, NEW MEXICO
MAY, 2001

CURVE DATA

No.	DELTA	TANGENT	ARC	RADIUS	CHORD	CHORD BRG
C1	89°58'58" (89°59'12")	29.99 (29.99)	47.11 (47.12)	30.00 (30.00)	42.42 (42.42)	N 45°55'07" E (N 45°55'24" E)
C2	30°37'25"	169.20	330.30	617.97 (617.97)	326.38	N 75°38'19" E
C3	39°36'39"	198.06	380.21	549.97 (549.97)	372.69	N 56°23'00" E
C4	22°12'28"	65.55	129.45	333.98	128.64	S 25°28'09" W
C5	11°10'26"	2.45	4.88	25.00	4.87	S 19°57'09" W
C6	21°11'15"	115.58	228.52	617.97 (617.97)	227.22	N 47°10'19" E
C7	22°17'52"	79.82	157.61	405.00	156.62	S 80°01'59" W
C8	56°05'30"	13.32	24.47	25.00	23.51	S 70°30'55" E
C9	1°12'54"	15.44	30.88	1456.24	30.88	N 10°05'05" W
C10	89°41'10" (89°40'35")	29.84 (29.83)	46.96 (46.95)	30.00 (30.00)	42.31 (42.31)	N 43°59'33" W (N 43°59'16" W)
C11	2°01'43"	19.21	38.41	1085.00	38.41	S 88°04'09" E
C12	78°29'38"	886.38	1486.42	1085.00	1372.88	S 47°48'29" E
C13	9°11'08"	119.87	239.23	1492.24	238.97	S 13°09'14" E
C14	28°02'47"	372.70	730.45	1492.24	723.18	S 31°46'12" E
C15	80°31'20"	918.88	1524.84	1085.00	1402.41	S 48°49'21" E
C16	37°13'55"	502.66	969.69	1492.24	952.71	S 27°10'38" E
C17	92°05'26"	674.16	1044.73	650.00	935.85	S 0°15'08" W
C18	44°11'42"	378.94	719.92	933.33	702.21	S 68°23'42" W
C19	25°34'17"	85.10	167.36	375.00	165.98	N 78°23'47" W
C20	9°44'36"	83.61	166.82	980.97	166.61	N 86°18'37" E
C21	43°42'54"	160.45	305.19	400.00	297.84	S 68°52'37" W
C22	17°52'20"	47.17	93.58	300.00	93.20	N 12°40'57" E
C23	76°33'04"	19.73	33.40	25.00	30.97	S 52°38'27" W
C24	25°34'17"	78.29	153.98	345.00	152.70	S 78°23'47" W
C25	85°17'10"	23.02	37.21	25.00	33.87	S 22°58'03" W
C26	26°07'03"	337.77	663.81	1456.24	658.08	S 32°44'03" E
C27	92°05'26"	711.50	1102.60	686.00	987.69	S 0°15'08" W
C28	44°11'42"	393.55	741.69	969.33	729.29	S 68°23'42" W
C29	9°44'36"	86.17	171.92	1010.97	171.71	N 86°18'37" E
C30	87°58'15"	24.13	38.38	25.00	34.72	S 54°34'33" E
C31	32°03'19"	439.02	855.01	1528.24	843.90	S 26°37'05" E
C32	90°16'58"	25.12	39.39	25.00	35.44	S 2°29'44" W
C33	43°05'51"	146.11	278.31	370.00	271.80	S 69°11'09" W
C34	43°33'59"	171.84	326.96	430.00	319.14	N 68°57'04" E
C35	89°26'45"	24.76	39.03	25.00	35.18	S 88°06'33" E
C36	89°41'01"	610.62	961.08	614.00	865.93	S 1°27'20" W
C37	37°02'01"	300.54	580.00	897.33	569.95	S 64°48'51" W
C38	25°34'17"	91.91	180.75	405.00	179.26	S 78°23'47" W
C39	99°09'04"	29.35	43.26	25.00	38.06	N 64°48'50" W
C40	5°45'40"	73.27	146.42	1456.24	146.36	N 12°21'28" W
C41	75°07'22"	862.08	1469.79	1121.00	1366.75	N 46°07'21" W
C42	101°59'02"	30.78	44.43	25.00	38.81	N 32°46'01" W
C43	18°25'23"	43.14	85.54	266.02	85.17	N 27°21'42" E
C44	39°30'03"	374.12	718.37	1042.00	704.23	S 69°20'00" E
C45	27°45'19"	259.17	508.16	1049.00	503.20	S 25°31'04" E
C46	93°04'44"	26.38	40.61	25.00	36.29	S 34°53'58" W
C47	9°44'36"	81.05	161.71	950.97	161.52	S 86°18'37" E
C48	0°54'58"	11.64	23.28	1456.24	23.28	N 9°01'09" W
C49	13°21'39"	131.30	261.41	1121.00	260.82	N 15°14'30" W
C50	61°45'42"	670.40	1208.38	1121.00	1150.72	N 52°48'11" W
C51	4°32'46"	57.80	115.54	1456.24	115.51	N 12°57'55" W
C52	35°42'22"	220.95	427.51	686.00	420.62	N 10°47'13" W
C53	17°09'11"	103.46	205.37	686.00	204.61	N 37°12'59" W
C54	39°11'53"	244.48	469.71	686.00	460.59	N 26°40'54" E
C55	14°02'15"	188.15	374.42	1528.24	373.49	S 17°36'33" E
C56	38°29'01"	214.32	412.40	614.00	404.69	N 27°03'20" E
C57	51°12'00"	294.18	548.68	614.00	530.60	N 17°47'10" W

TANGENT DATA

No.	BEARING	DISTANCE	(RECORD)	No.	BEARING	DISTANCE	(RECORD)
T1	S 89°05'01" E	157.15	(S 89°04'44" E) (157.15)	T15	N 89°30'27" W	66.45	
T2	N 89°05'01" W	174.66		T16	N 78°51'31" W	102.82	
T3	S 36°34'24" W	92.40	(N 36°34'40" E)	T17	S 88°49'05" E	3.67	
T4	N 36°34'23" E	238.40	(N 36°34'40" E) (238.40)	T18	N 81°26'20" E	133.05	
T5	S 58°25'55" E	290.33	(S 58°25'38" E) (290.33)	T19	N 36°34'23" E	92.45	
T6	S 1°29'24" W	198.52	(S 1°29'41" W) (198.52)	T20	S 46°38'23" E	185.78	
T7	N 89°18'21" W	93.17	(N 89°21'06" W) (93.00)	T21	S 81°26'20" W	130.60	
T8	S 89°14'35" E	217.19	(S 89°16'59" E) (217.00)	T22	N 88°49'05" W	3.87	
T9	S 88°49'05" E	263.09	(S 88°48'24" E)	T23	N 68°04'40" E	123.35	
T10	N 81°26'20" E	43.62		T24	N 89°14'35" W	45.82	
T11	S 88°49'05" E	77.40	(S 88°48'24" E)	T25	S 89°44'10" E	45.00	(N 89°58' E)
T12	S 89°05'01" E	99.81		T26	N 0°58'04" E	49.19	(N 00°38' E)
T13	S 88°49'05" E	3.87		T27	S 45°44'04" W	42.48	
T14	S 47°01'10" W	57.96		T28	N 89°20'06" W	66.36	

LEGEND

- SUBDIVISION BOUNDARY LINE
- NEW LOT LINE
- CENTERLINE
- PROPOSED EASEMENT LINE
- EXISTING EASEMENT LINE
- ADJOINING PROPERTY LINE
- EXISTING (OLD) LOT LINE
- SECTION LINE
- RIGHT OF WAY
- CITY OF ALBUQUERQUE CONTROL MONUMENT
- CENTERLINE MONUMENT TO BE INSTALLED
- ● 5/8" REBAR WITH 1 1/2" YELLOW PLASTIC SURVEY CAP STAMPED "WEAVER LS 6544"
- × FOUND 5/8" REBAR WITH SURVEY CAP (NOT READABLE)
- ■ FOUND 5/8" REBAR WITH SURVEY CAP STAMPED "PATRICK LS 12651
- ⊗ FOUND PK NAIL WITH SURVEY CAP STAMPED "LS 10462"
- ⊠ FOUND MAGNETIC NAIL IN ASPHALT
- ◎ PK NAIL WITH 1 1/2" ALUMINUM WASHER STAMPED "RLS 6544"
- ⊙ SET NAIL WITH 1" BRASS WASHER STAMPED "PS 6544"
- 10' PUE 10' PUBLIC UTILITY EASEMENT TO BE GRANTED WITH THE FILING OF THIS PLAT

Bohannan ▲ Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

BHMAIN:01222\SURVEY\GRAPHICS\A-06\FINAL PLAT
01222PLAT03.DGN

JOB NO. 01222A 13

Ex. 3-2

BULK LAND PLAT OF
SANDIA SCIENCE AND TECHNOLOGY PARK

ALBUQUERQUE, NEW MEXICO
MAY, 2001

N

SCALE: 1" = 200'

ACS ALUMINUM CAP "6-L21"
GEOGRAPHIC POSITION (NAD 1927)
NM STATE PLANE COORDINATES (CENTRAL ZONE)
X = 417,975.01 Y = 1,481,220.09
GROUND TO GRID FACTOR = 0.99964527
DELTA ALPHA = -0°09'27"
ELEVATION = 5500.669 (SLD 1929)

NOTE: SEE SHEET 3 FOR CURVE AND TANGENT DATA

EUBANK BOULEVARD SE

TRACT G-3
CORRECTED AND AMENDED PLAT OF MANZANO MESA
FILED: AUGUST 21, 1997 (97C-254)

TRACT G-2
CORRECTED AND AMENDED PLAT OF MANZANO MESA
FILED: AUGUST 21, 1997 (97C-254)

STEPHEN MOODY ST. SE

EXISTING 60' R/W
FUTURE 86' R/W
SEE DETAIL "B"

TRACT L
0.2326 Acres

INNOVATION PARKWAY SE (FORMERLY STEPHEN MOODY ST.)

INNOVATION PARKWAY SE

EXISTING 60' UTILITY EASEMENT FILED: JANUARY 7, 1987 (C32-128) VACATED BY VACATION ACTION V-

S88°30'36"E 500.00' (S88°30'19"E 500.00')

(TIE) N1°30'43"E 3664.77'

TRACT A
11.0132 Acres

S89°05'01"E 326.67

EXISTING 10' PUBLIC UTILITY EASEMENT FILED: AUGUST 21, 1997 (97C-254)

EXISTING 30' WIDE EUBANK RIGHT-OF-WAY WITH WATER AND SEWER LINES AND OTHER UTILITIES GRANTED BY GRANT OF EASEMENT FILED: APRIL 9, 1962 (VOLUME R/W143, FOLIO 71 DOCUMENT NO. 77302

EXISTING 100 YEAR FLOOD PLAIN EASEMENT FILED: JUNE 5, 1991 (91C-112) QUITCLAIMED TO THE CITY OF ALBUQUERQUE BY AMAFCA (BK. 96-24, PG. 9128) VACATED BY VACATION ACTION V-

"6-L21" INFORMATION ABOVE

TRACT B
25.9414 Acres

E - 1

(TIE) N68°10'05"E 5251.34'

EXISTING PUBLIC STORM DRAIN EASEMENT FILED: AUGUST 21, 1997 (97C-254)

EXISTING 10' PNM & MOUNTAIN BELL EASEMENT FILED: JANUARY 7, 1987 (C32-128)

CENTERLINE EXISTING ANCHOR EASEMENT FILED: MARCH 19, 1963 (BK. D-287, PGS. 301-304) DOCUMENT NO. 84241

(N00°57'14"E 813.00')
N0°56'57"E 813.00'
S00°56'57"W 595.53'
(S00°57'14"W 595.53')

L=439.19'
R=1390.00'
CH=437.34'
CH BRG=S9°49'22"E

EXISTING 10' SANITARY SEWER EASEMENT FILED: JUNE 23, 1993 (BK. 93-16, PGS. 4743-4746)

T10N SECTION 29
R4E SECTION 32
SECTION 28
SECTION 33
39.50'

1198.24'
N88°49'05"W 1594.14'
(N88°48'48"W)

GIBSON AVENUE SE

EXISTING 30' WIDE PUBLIC ROADWAY EASEMENT FILED: APRIL 30, 1991 (BK. BCR 91-7, PGS. 4414-4417) DOCUMENT NO. 91033359 VACATED BY VACATION ACTION V-

TRACT C
PARK SITE
0.6497 Acres

WILLOW WOOD UNIT 5
FILED: JULY 18, 1996 (96C-317)

EXISTING 30' PNM EASEMENT FILED: MARCH 1, 1956 DOCUMENT NO. 87965 VACATED BY VACATION ACTION V-

S88°49'05"E 412.44'
(S88°48'48"E)
78.24
490.68'

S88°49'05"E 441.81'
288.14'
N88°49'05"W 288.41'

TRACT D
PARK SITE
0.7966 Acres

SEE DETAIL "A"

S65°36'38"W 273.63'
S65°36'38"E 342.83'
S65°36'38"W 287.00'

DEVELOPMENT ROAD

BRITT STREET

30' PUBLIC STORM DRAIN EASEMENT TO BE GRANTED WITH THE FILING OF THIS PLAT

EXISTING PUBLIC BLANKET DRAINAGE EASEMENT ON TRACT A-1 FILED: JANUARY 22, 1999 (99C-14) VACATED BY VACATION ACTION V-

TRACT E
10.2024 Acres

TRACT F
10.3933 Acres

PATTERNED AREA DESIGNATES PUBLIC STREET RIGHT OF WAY TO BE DEDICATED TO THE CITY OF ALBUQUERQUE WITH THE FILING OF THIS PLAT

(N00°48'35"E 960.01')
N0°48'25"E 959.57'
863.86'

N71°17'17"E 480.23'

EXISTING TEMPORARY PUBLIC ACCESS EASEMENT FILED:

MATCH LINE SHEET 2
SHEET 3

SANDIA RESEARCH PARK
FILED: MAY 6, 1988 (C36-115)

EXISTING 30' PUBLIC SANITARY SEWER EASEMENT FILED: OCTOBER 26, 1992 (BK. BCR 92-25, PGS. 2002-2004) DOCUMENT NO. 92107130

RESEARCH ROAD

N89°15'56"W 469.71'
469.75'
N89°15'56"W 465.52'
(N89°16'59"W)

TRACT A-2
LANDS OF SHAW MITCHELL, MALLORY PARTNERSHIP
FILED: (2001C-)

TRACT H
4.7891 Acres

(N00°43'01"E)
N0°42'53"E 385.40'

RESEARCH RD. SE

INNOVATION PARKWAY SE

S61°21'36"W 148.37'

TRACT G
PARK SITE
0.7229 Acres

S0°39'54"W 484.92'
(S00°38'54"W)
259.38'

MATCH LINE SHEET 2
SHEET 3

TRACT B
LANDS OF SHAW MITCHELL, MALLORY PARTNERSHIP
FILED: JANUARY 22, 1999 (99C-14)

TRACT B
25.9414 Acres

TRACT C PARK SITE 0.6497 Acres

HATCHED AREA DESIGNATES 0.2673 Ac. EXISTING GIBSON BOULEVARD R/W VACATED BY VACATION V-

N88°49'05"W 1594.14'

GIBSON AVE. SE

INNOVATION PARKWAY SE

TRACT D
0.7966 Acres

TRACT F
10.3933 Acres

HATCHED AREA DESIGNATES 0.0066 Ac. EXISTING GIBSON BOULEVARD R/W VACATED BY VACATION V-

S65°36'38"W 273.63'
N65°36'38"E 342.83'
S65°36'38"W 287.00'

GIBSON AVENUE SE

TRACT E
10.2024 Acres

DETAIL "A"
NOT TO SCALE

HATCHED AREA DESIGNATES 0.2309 Ac. EXISTING STEPHEN MOODY STREET R/W VACATED BY VACATION ACTION V-
PUBLIC UTILITY EASEMENT TO REMAIN

TRACT L
0.2326 Acres

STEPHEN MOODY STREET SE

INNOVATION PARKWAY SE (FORMERLY STEPHEN MOODY ST.)

INNOVATION PARKWAY SE

S89°05'01"E 326.67'

DETAIL "B"
NOT TO SCALE

LEGEND

- SUBDIVISION BOUNDARY LINE
- NEW LOT LINE
- CENTERLINE
- PROPOSED EASEMENT LINE
- EXISTING EASEMENT LINE
- ADJOINING PROPERTY LINE
- EXISTING (OLD) LOT LINE
- SECTION LINE
- RIGHT OF WAY
- △ CITY OF ALBUQUERQUE CONTROL MONUMENT
- ▲ CENTERLINE MONUMENT TO BE INSTALLED
- ● 5/8" REBAR WITH 1 1/4" YELLOW PLASTIC SURVEY CAP STAMPED "WEAVER LS 6544"
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- ⊠ FOUND MAGNETIC NAIL IN ASPHALT
- ◎ PK NAIL WITH 1 1/2" ALUMINUM WASHER STAMPED "RLS 6544"
- ⊕ SET NAIL WITH 1" BRASS WASHER STAMPED "PS 6544"
- 10' PUE — 10' PUBLIC UTILITY EASEMENT TO BE GRANTED WITH THE FILING OF THIS PLAT

Bohannan ▲ Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

BHMAIN-01222\SURVEY\GRAPHICS\A-06\FINAL PLAT 01222PLAT02.DGN

JOB NO. 01222A 13

Ex. 3-3

OUTFALL
CONNECTION TO EXISTING
48" SD BUILT WITH
EMCORE PROJECT

PNM SWITCHING
STATION

FUTURE INNOVATION PARKWAY

48" SD

WESTERN BOUNDARY

24" SD

18" SD

24" SD

18" SD

42" SD

36" SD

36" SD

24" SD

36" SD

18" SD

24" SD

38" SD

FUTURE RESEARCH ROAD

FUTURE PROGRESS PLACE

21

20

19

15

13

38

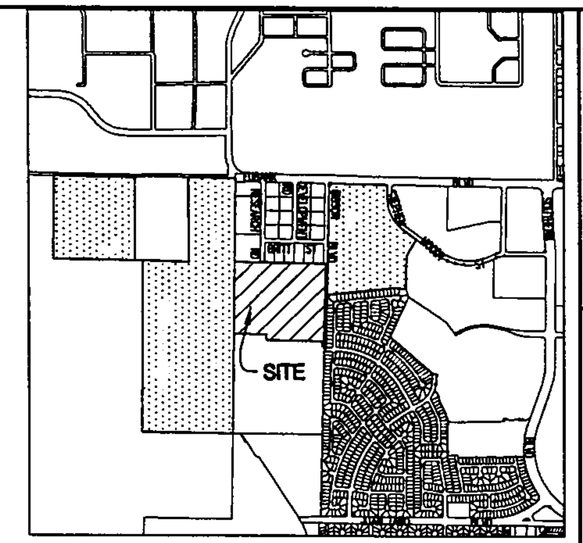
18

14

31

LEGEND

- PROPOSED STORM DRAIN
- EASEMENT
- PROPOSED DROP INLET & PIPE
- PROPOSED SD MH
- EXISTING STORM DRAIN



VICINITY MAP
L-21-Z , M-21-Z

SEE HGL ANALYSYS FOR INDIVIDUAL PIPE DESIGN INFORMATION (Q,V, HGL, SIZE, ECT.)

NOT TO SCALE

AS-BUILT INFORMATION
BENCH MARKS
CONTRACTOR DATE
STAKED BY DATE
INSPECTION & ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
CONNECTED BY DATE
MICRO-FILM INFORMATION
RECORDED BY DATE
MAP NO.

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL

No.	Date	REMARKS	By
		REVISIONS	
		DESIGN	

Designed By: CR DATE: 08/2001
Drawn By: DM DATE: 08/2001
Checked By: BS DATE: 08/2001

Bohannan Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

SOUTHERN STORM DRAIN BACKBONE
OVERALL STORM DRAIN PLAN

Design Review Committee	City Engineer Approval	Cost Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
COA #	L-21-Z, M-21-Z	–	#

BHI JOB #020047

DATE: AUGUST 2001

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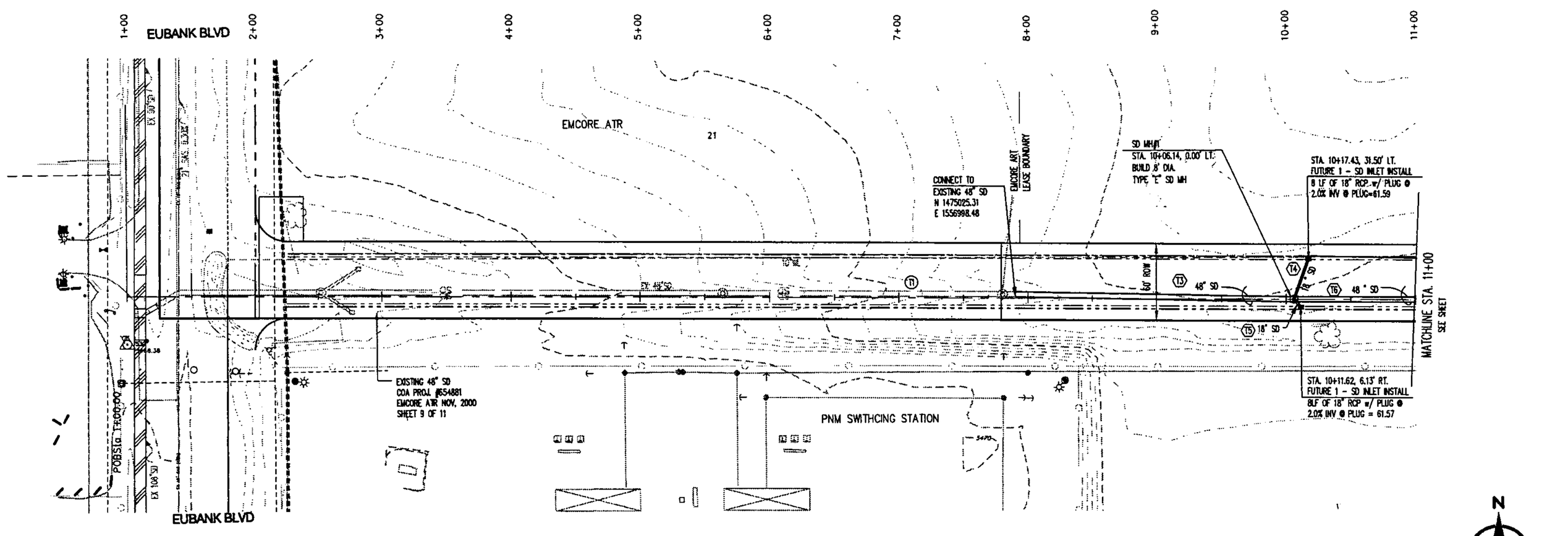
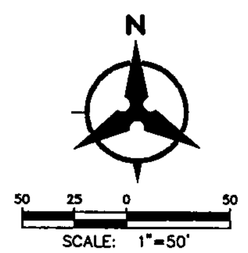
Aug 07, 2001 - 3:48pm

Ex. 3-4



CL TANGENT TABLE		
NUMBER	BEARING	LENGTH
T1	S89°30'27"E	1501.31'

STORM DRAIN TANGENT TABLE						
NUMBER	BEARING	LENGTH	SIZE	Q_{100}(CFS)	VELOCITY (F/S)	SLOPE
T3	N89°00'00"W	215.98	48"			
T4	N89°30'27"W	8.00'	18"			
T5	S20°12'56"W	8.00'	18"			
T6	N41°20'40"W	8.22'	48"	153.06	12.18	1.00



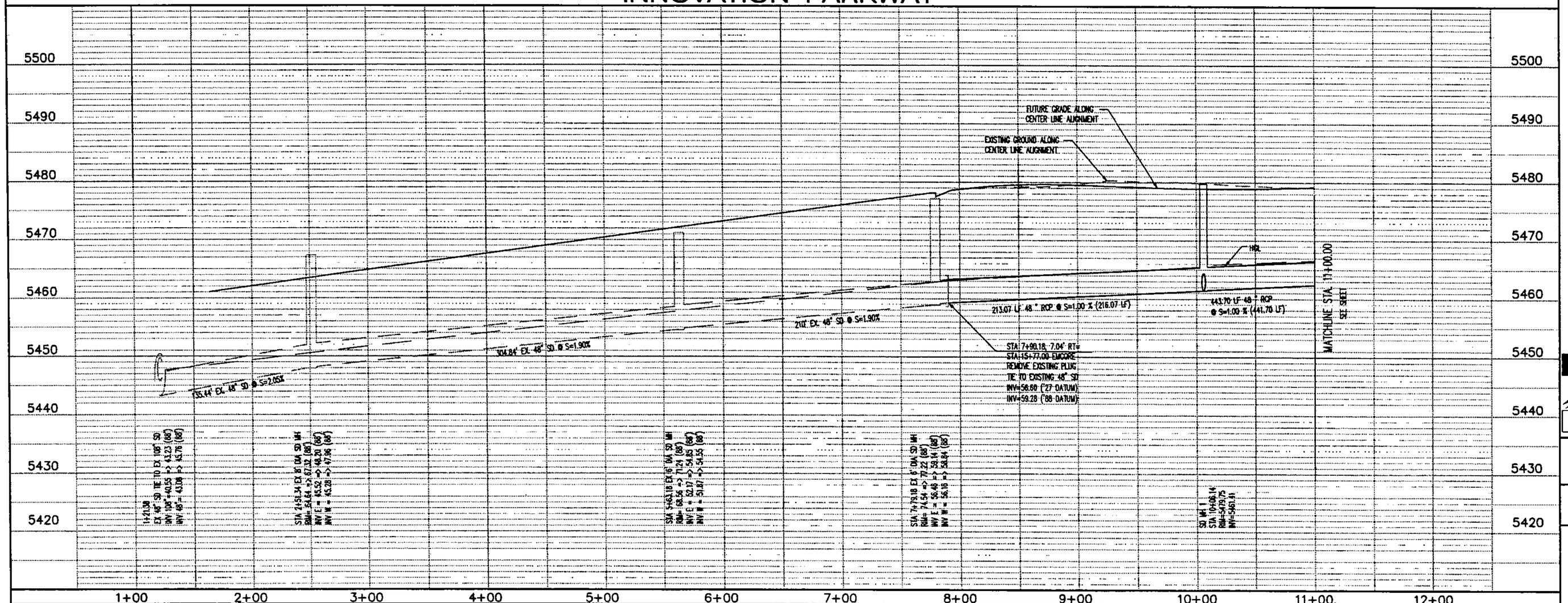
NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR IS RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ALL UTILITY CONDUITS AND EXISTING LINES.
3. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.
4. CONTRACTOR SHALL PROVIDE THE INSPECTORS, (CITY AND PRIVATE) WITH THE PROPOSED HYDROSTATIC TESTING PLAN. THE PLAN MUST BE APPROVED BEFORE TESTING OPERATIONS BEGIN.
5. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.
6. ANY DAMAGE TO THE EXISTING FACILITIES (CURB & GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTORS' EXPENSE.
7. REMOVAL OF THE EXISTING CURB & GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).

KEYED NOTES

1. INSTALL CONCRETE VALLEY GUTTER AS PER STD. DWG. 2420
2. INSTALL WHEELCHAIR RAMP AS PER STD. DWG. 2441, CASE II WITH ALTERNATE SECTION AA
3. STD. CURB & GUTTER AS PER STD. DWG. 2415
4. MEDIAN CURB & GUTTER AS PER STD. DWG. 2415
5. FUTURE 4' SIDEWALK
6. BUILD 4' SIDEWALK

INNOVATION PARKWAY



SCALE: 1" =50' (HORIZ.)
1" =10' (VERT.)

Bohannan ▲ Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

SOUTHERN STORM DRAIN BACK BONE
STORM DRAIN PLAN AND PROFILE
INNOVATION PARKWAY- STA.1+00.00 TO STA. 11+00.00

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
Coa #	L-21-Z, M-21-Z	5	#

BHI JOB NO. 020047

Date: AUGUST 2001

AS-BUILT INFORMATION
CONTRACTOR DATE
WORK PERFORMED BY DATE
INSPECTIONS ACCEPTANCE BY DATE
C.O.A. VERIFICATION BY DATE
CORRECTED BY DATE

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

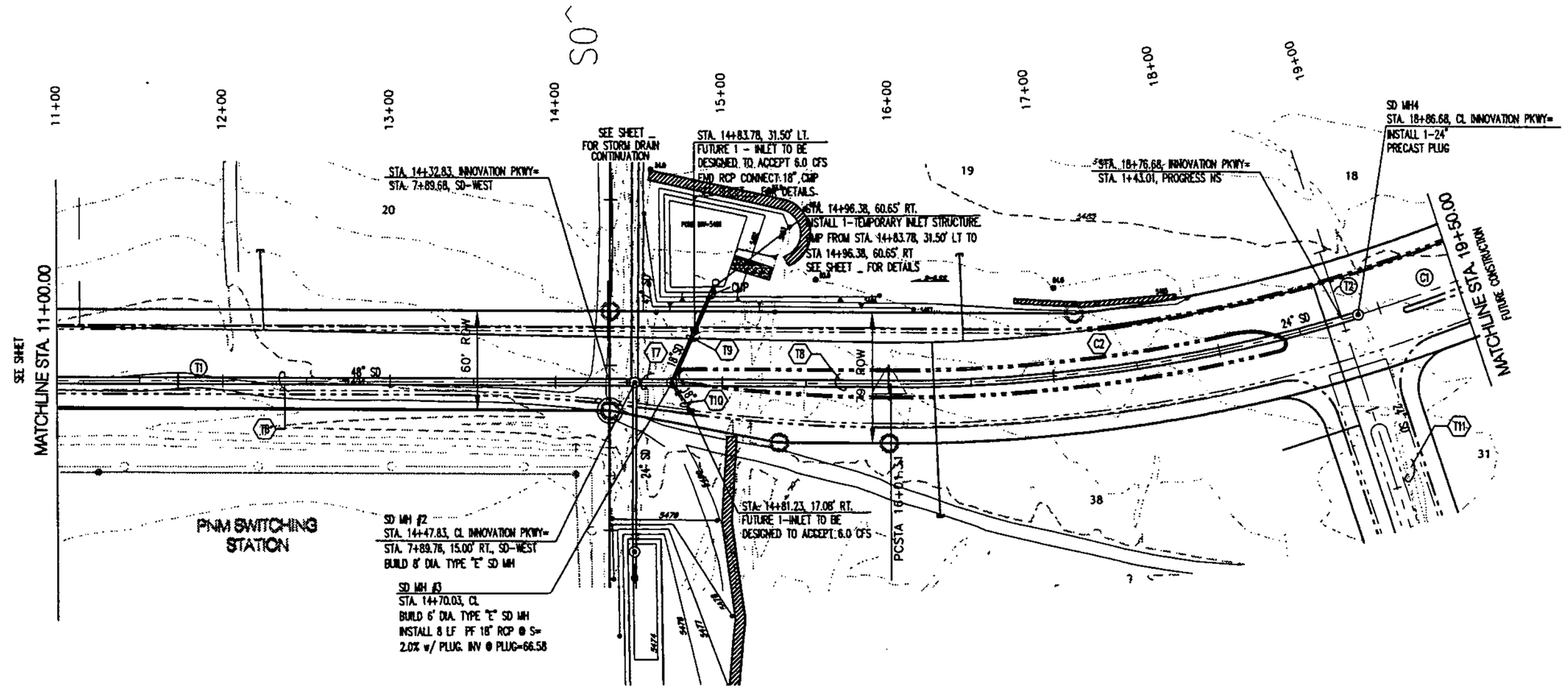
MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

ENGINEER'S SEAL
STEVEN MONTOYA NEW MEXICO 14889 REGISTERED PROFESSIONAL ENGINEER

No.	Date	By	REMARKS
			REVISIONS
			DESIGN
			DATE: XX/XX/XX
			DATE: XX/XX/XX
			DATE: XX/XX/XX

Designed By: X
Drawn By: X
Checked By: X

Ex. 3-5



N

50 25 0 50

SCALE: 1"=50'

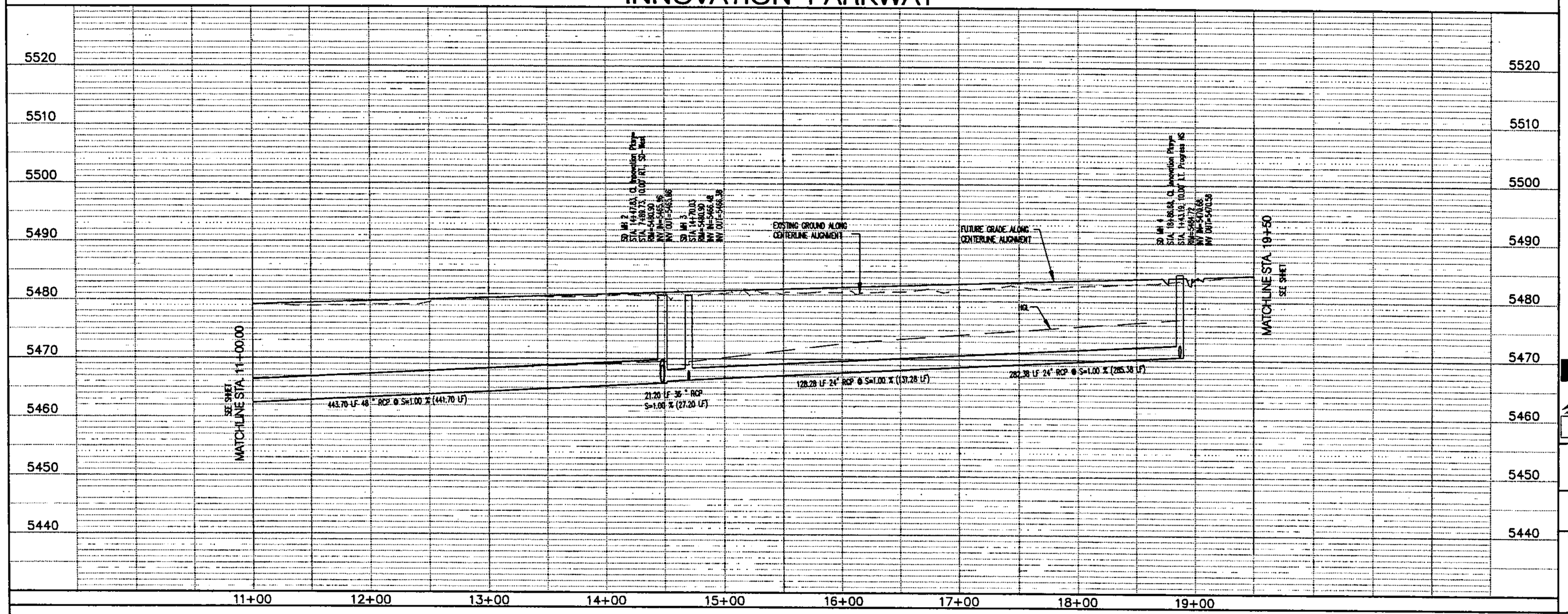
CENTERLINE CURVE TABLE				
NUMBER	ARC	RADIUS	DELTA	TANGENT
C1	718.86'	933.33'	44°07'47"	378.32'

CENTERLINE TANGENT TABLE		
NUMBER	BEARING	LENGTH
T1	S89°30'27"E	1501.31'

STORM DRAIN TANGENT TABLE						
NUMBER	BEARING	LENGTH	SIZE	Qcap(CFS)	VELOCITY (F/S)	SLOPE (%)
T5	N89°30'27"W	441.70'	48"	110.10	8.76	1.00
T7	N89°30'27"W	22.20'	24"	39.29	12.51	1.00
T8	N89°30'27"W	131.28'	36"	27.29	8.69	1.00
T9	N24°04'7"E	63.32'	18"	6.00	3.40	2.00
T10	S32°46'20"E	8.00'	18"	6.00	3.40	2.00
T11	N17°49'42"W	165.58'	36"	27.29	8.69	1.00

STORM DRAIN CURVE TABLE								
NUMBER	ARC	RADIUS	DELTA	TANGENT	SIZE	Qcap(CFS)	VELOCITY (F/S)	SLOPE
C2	285.38'	933.33'	17°31'08"	143.81'	24"	27.29	8.69	1.00%

INNOVATION PARKWAY



SCALE: 1" =50' (HORIZ.)
1" =10' (VERT.)

NOTES

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7. REMOVAL OF THE EXISTING CURB & GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).

KEYED NOTES

1. INSTALL CONCRETE VALLEY GUTTER AS PER STD. DWG. 2420
2. INSTALL WHEELCHAIR RAMP AS PER STD. DWG. 2441, CASE II WITH ALTERNATE SECTION AA
3. STD. CURB & GUTTER AS PER STD. DWG. 2415
4. MEDIAN CURB & GUTTER AS PER STD. DWG. 2415
5. FUTURE 4' SIDEWALK
6. BUILD 4' SIDEWALK

SURVEY INFORMATION
FIELD NOTES
NO. | BY | DATE

BENCH MARKS

AS-BUILT INFORMATION
CONTRACTOR — DATE
NAME — DATE
INSPECTOR'S — DATE
FIELD — DATE
CORRECTED BY — DATE
MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

ENGINEER'S SEAL
BRUCE A. STRONTZER NEW MEXICO 14983 REGISTERED PROFESSIONAL ENGINEER

No.	Date	By	REMARKS
			REVISIONS
			DESIGN

Designed By: X — DATE: XX/XX/XX
Drawn By: X — DATE: XX/XX/XX
Checked By: X — DATE: XX/XX/XX

Bohannan Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

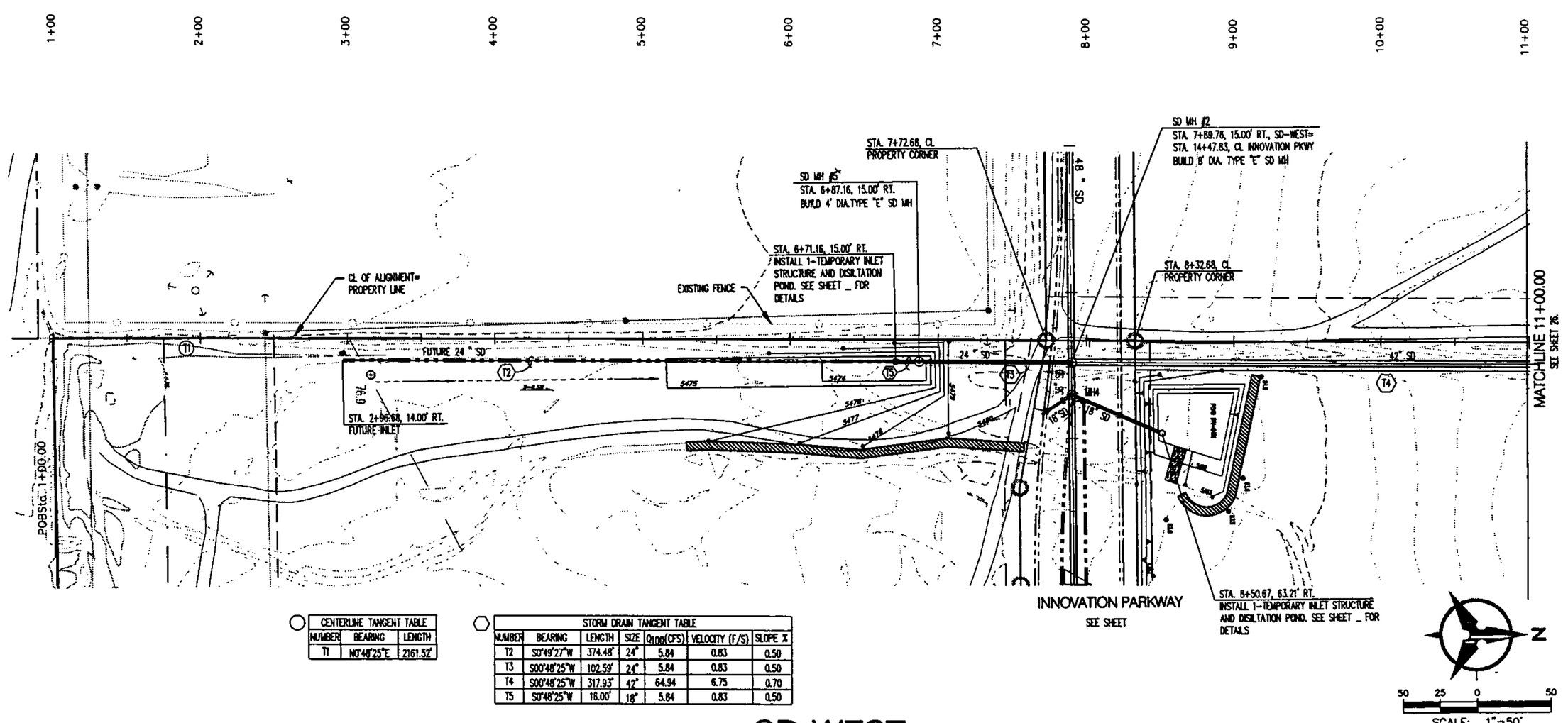
SOUTHERN STORM DRAIN BACK BONE
STORM DRAIN PLAN AND PROFILE
INNOVATION PARKWAY- STA. 11+00.00 TO STA. 19+50.00

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No. Coa #
Zone Map No. L-21-Z, M-21-Z
Sheet 6 Of #

BHI JOB NO. 020047
Date: AUGUST 2001

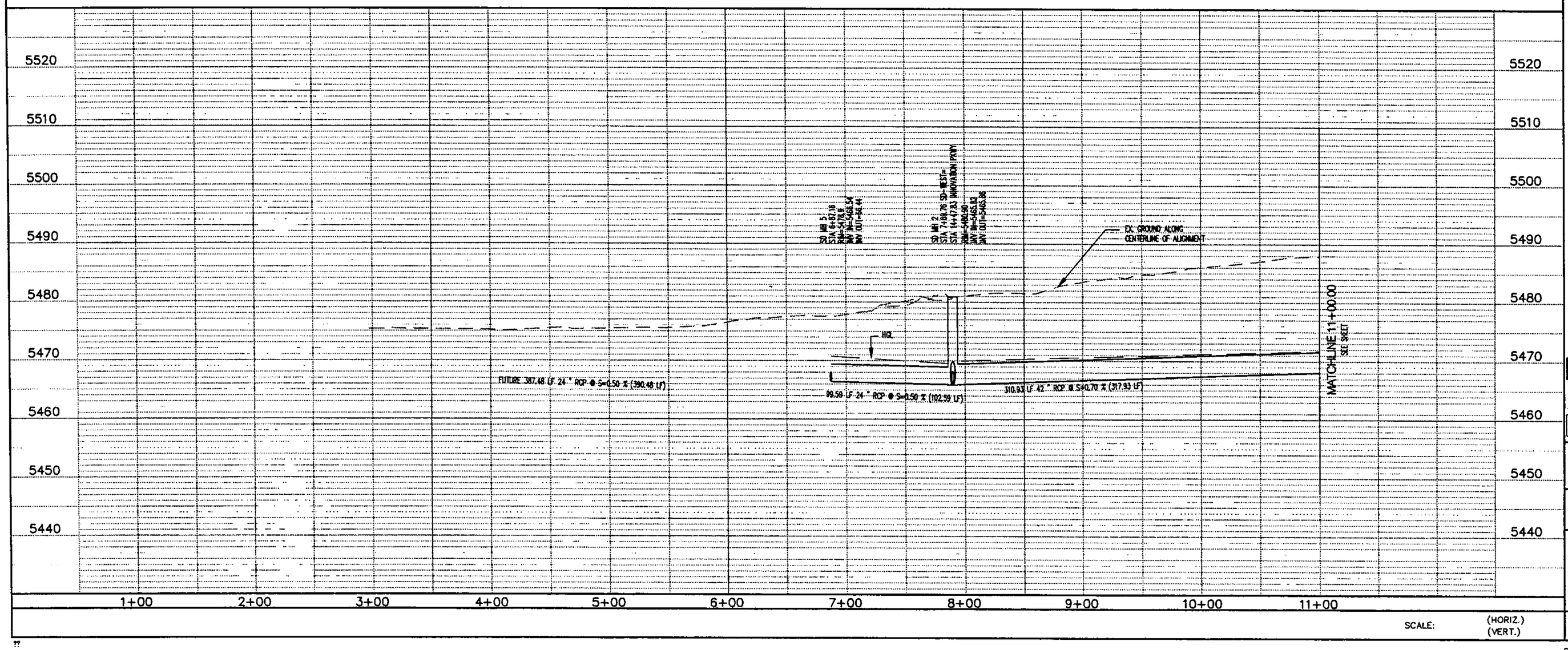
E4.3-6



CENTERLINE TANGENT TABLE		
NUMBER	BEARING	LENGTH
T1	N0°48'25"E	2161.52'

STORM DRAIN TANGENT TABLE						
NUMBER	BEARING	LENGTH	SIZE	Qmax(CFS)	VELOCITY (F/S)	SLOPE %
T2	S0°49'27"W	374.45'	24"	5.84	0.83	0.50
T3	S00°48'25"W	102.59'	24"	5.84	0.83	0.50
T4	S00°48'25"W	317.93'	42"	64.94	6.75	0.70
T5	S0°48'25"W	16.00'	18"	5.84	0.83	0.50

SD-WEST



SCALE: (HORIZ.) (VERT.)

NOTES

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KEYED NOTES

1. INSTALL CONCRETE VALLEY GUTTER AS PER STD. DWG. 2420
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3. STD. CURB & GUTTER AS PER STD. DWG. 2415
4. MEDIAN CURB & GUTTER AS PER STD. DWG. 2415
5. FUTURE 4' SIDEWALK
6. BUILD 4' SIDEWALK

AS-BUILT INFORMATION
CONTRACTOR DATE
BENCH MARKS
SURVEY INFORMATION
FIELD NOTES
NO. BY DATE
STAKED BY DATE
INSPECTOR'S ACCEPTANCE BY DATE
VERIFICATION BY DATE
CORRECTED BY DATE
MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

ENGINEER'S SEAL
STATE OF NEW MEXICO 14683 REGISTERED PROFESSIONAL ENGINEER

No.	Date	REMARKS	By
		REVISIONS	
		DESIGN	

Designed By: GR DATE: 2001
Drawn By: RM DATE: 2001
Checked By: DATE: 2001

Bohannan ▲ Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

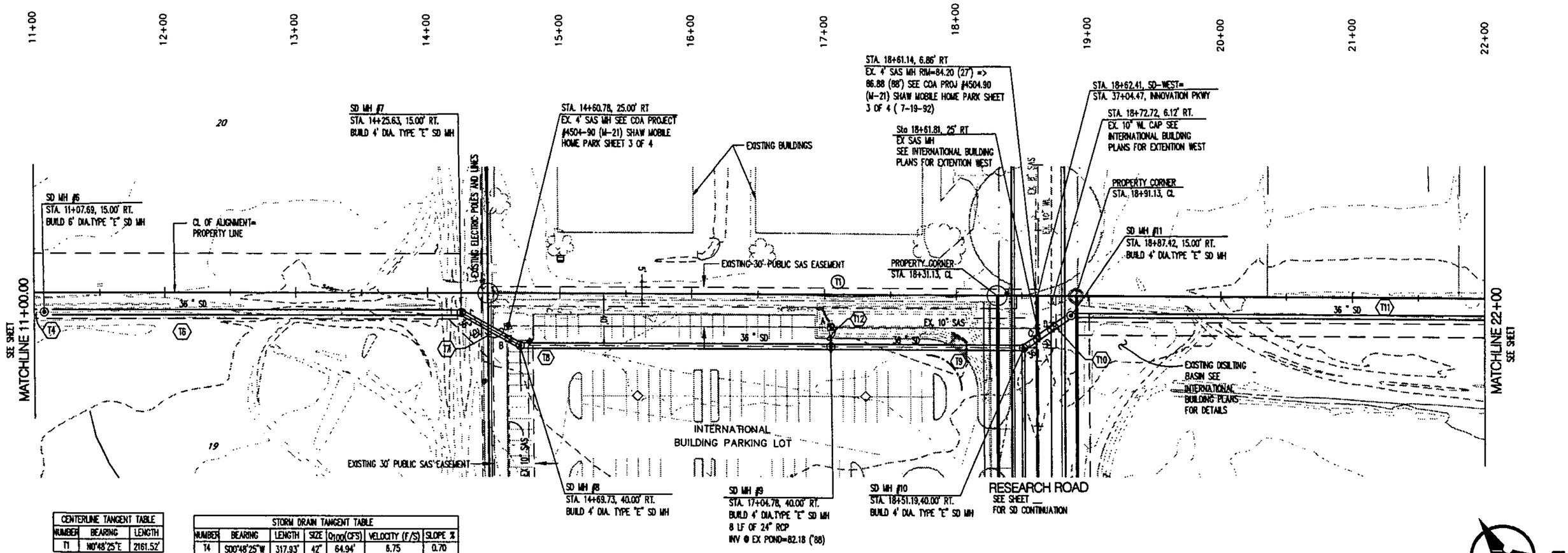
SOUTHERN STORM DRAIN BACK BONE
STORM DRAIN PLAN AND PROFILE
STA 1+00.00 TO STA 11+00.00

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No. Coa #
Zone Map No. L-21-Z, M-21-Z
Sheet 7 Of #

BHI JOB NO. 020047
Date: AUGUST 2001

Ex. 3-7



CENTERLINE TANGENT TABLE		
NUMBER	BEARING	LENGTH
T1	N07°48'25"E	2161.52'

STORM DRAIN TANGENT TABLE						
NUMBER	BEARING	LENGTH	SIZE	Q100(CFS)	VELOCITY (F/S)	SLOPE %
T4	S00°48'25"W	317.93'	42"	64.94'	8.75	0.70
T6	S00°48'25"W	317.93'	36"	64.94'	9.19	0.70
T7	N30°21'22"E	50.69'	36"	64.94'	9.19	0.70
T8	S00°48'24"W	235.05'	36"	64.94'	9.19	0.70
T9	S00°48'52"W	146.41'	36"	58.47	8.27	0.70
T10	N33°49'15"W	44.03'	36"	38.90	5.50	0.70
T11	S00°48'25"W	368.81'	24"	38.90	5.50	0.70
T12	S89°11'35"E	8.00'	24"	6.47	4.82	0.50

STORM DRAIN CROSSING TABLE				
PT	STATION	SD INV	CROSSING UTILITY	CLEARANCE
A	17+04.56, 25.00' RT.	18" SD INV=82.18	EX 10" SAS INV=78.94	1.22'
B	14+60.77, 34.93' RT.	36" SD INV=70.77	EX 10" SAS INV=82.13	7.82'
C	18+61.37, 32.99' RT.	36" SD INV=	8" SAS INV=	
D	18+72.41, 25.37' RT.	36" SD INV=	_" WL TP=	

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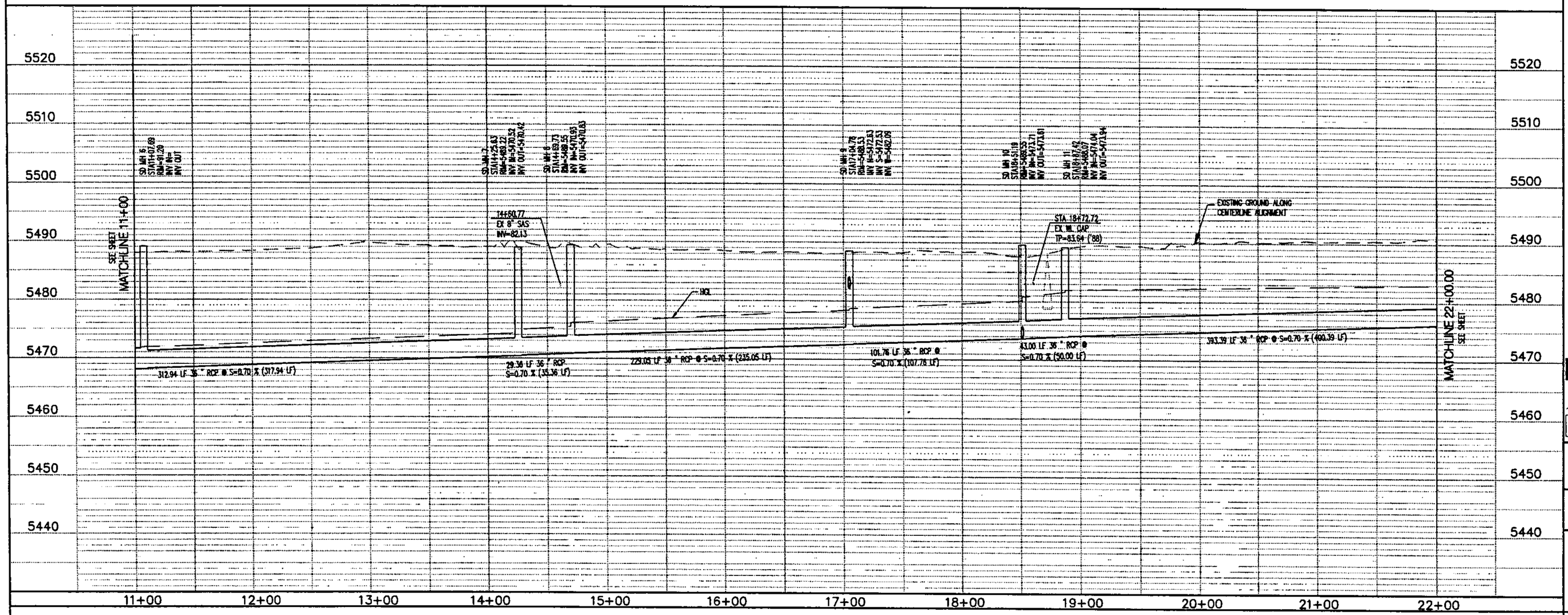


SCALE: (HORIZ.) (VERT.)

AS-BUILT INFORMATION
BENCH MARKS
SURVEY INFORMATION
FIELD NOTES
NO. BY DATE
CONTRACTOR DATE
WORK INSPECTED BY DATE
ACCEPTANCE BY DATE
VERIFICATION BY DATE
CORRECTED BY DATE
MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

ENGINEER'S SEAL
BRUCE A. THOMPSON NEW MEXICO 14835 REGISTERED PROFESSIONAL ENGINEER

No.	Date	By	REMARKS
			REVISIONS
			DESIGN
			Designed By: DATE:
			Drawn By: DATE:
			Checked By: DATE:

Bohannan ▲ Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

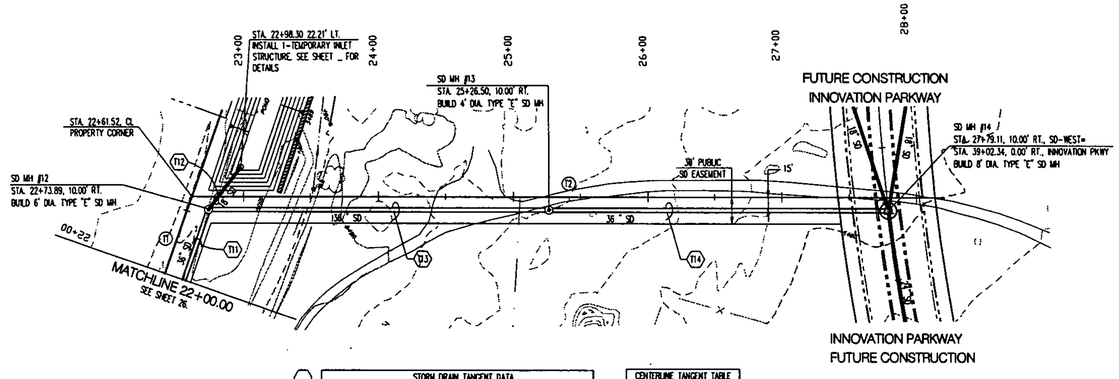
SOUTHERN STORM DRAIN BACK BONE
STORM DRAIN PLAN AND PROFILE
STA 11+00 TO STA 22+00

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
Coa #	L-21-Z, M-21-Z	5	#

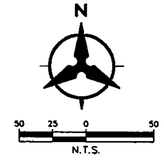
BHI JOB NO. 020047 Date: AUGUST 2001

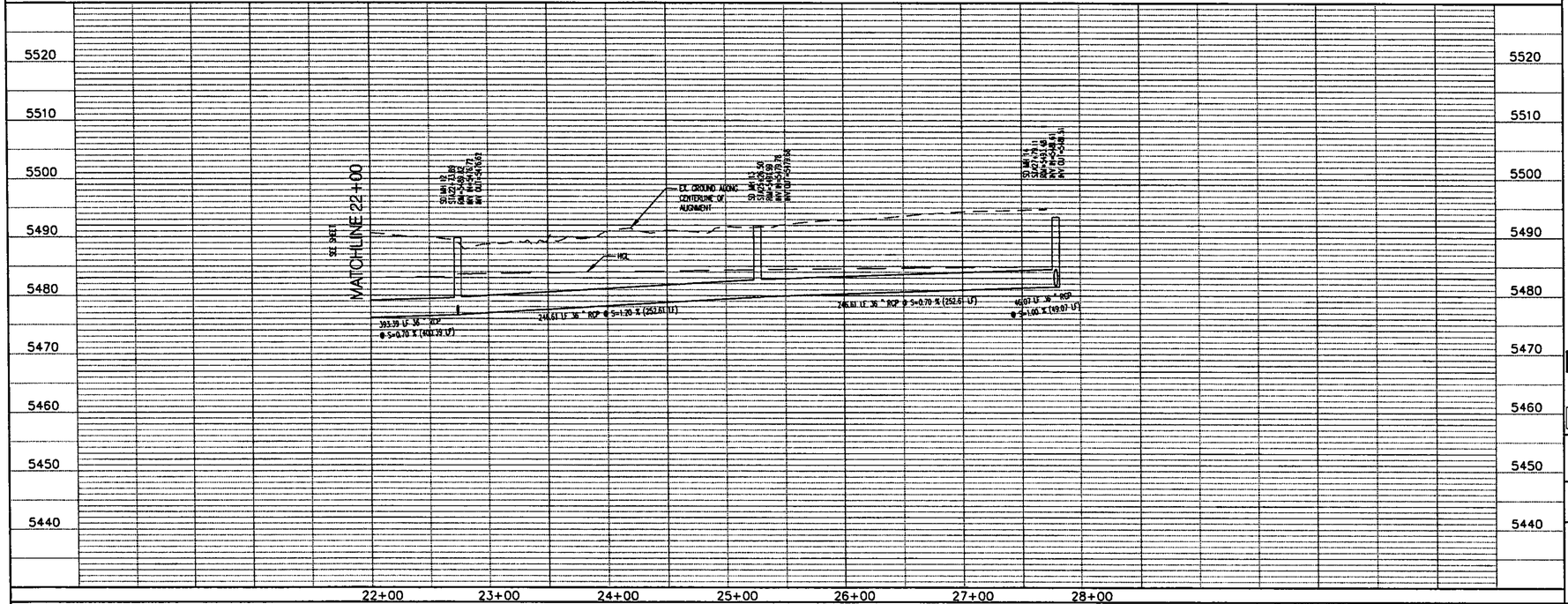
Ex. 3-8



STORM DRAIN TANGENT DATA						
NUMBER	BEARING	LENGTH	SIZE	Qyp(CFS)	VELOCITY (F/S)	SLOPE%
T11	S02°48'25"W	368.61'	36"	38.90	5.50	0.70
T12	N18°26'05"E	40.42'	18"	6.72	3.80	3.07
T13	S71°17'17"W	252.61'	36"	32.18	4.55	1.20
T14	S71°17'17"W	252.61'	36"			

CENTERLINE TANGENT TABLE		
NUMBER	BEARING	LENGTH
T1	N02°48'25"E	2161.52'
T2	N71°17'17"E	559.74'





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[6] BUILD 4' SIDEWALK

AS-BUILT INFORMATION
CONTRACTOR DATE
SIGNED BY DATE
INSPECTOR'S ACCEPTANCE BY DATE
APPLICATION BY DATE
DRAWINGS CORRECTED BY DATE
RECORDED BY DATE

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
NEW MEXICO 14985 REGISTERED PROFESSIONAL ENGINEER

MICRO-FILM INFORMATION
NO.

No.	Date	REMARKS	By
		REVISIONS	
		DESIGN	

Designed By: DATE:
Drawn By: DATE:
Checked By: DATE:

Bohannan Huston
Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

SOUTHERN STORM DRAIN BACK BONE
STORM DRAIN PLAN AND PROFILE
STA. 22+00.00 TO STA. 28+00.00

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet	Of
Coa #	L-21-Z, M-21-Z	9	#

SCALE: (HORIZ.) (VERT.)

P:\020047\cdp\pmp\020047spmp03.dwg
Aug 07, 2001 - 3:23pm

BHI JOB NO. 020047 Date: AUGUST 2001

EK. 3-9

BOHANNAN HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

NEW MEXICO 87109-4335

voice 505.823.1000

fax 505.798.7988

www.bhinc.com

DRAINAGE INFORMATION SHEET

M-21/D7B

PROJECT TITLE: Southern Storm Drain Backbone at Sandia Science & Technology Park, a.k.a. Phase 1 Storm Drain Trunk
ZONE MAP/DRG. FILE: # L-21, M-21
DRB #:_____ EPC#:_____ WORK ORDER#:_____

LEGAL DESCRIPTION: Tracts I, J, H, & F of Sandia Science & Technology Park
CITY ADDRESS: South of Eubank between Research Road and Stephen Moody

ENGINEERING FIRM: Bohannan Huston, Inc. — CONTACT: Bruce Stidworthy
ADDRESS: 7500 Jefferson NE — PHONE: 823-1000
CITY, STATE: Albuquerque, NM — ZIP CODE: 87109

OWNER: New Mexico Development Foundation — CONTACT: James Trump
ADDRESS: 1110 Pennsylvania NE — PHONE: 268-1200
CITY, STATE: Albuquerque, NM — ZIP CODE: 87109

ARCHITECT:_____ — CONTACT:_____
ADDRESS:_____ — PHONE:_____
CITY, STATE:_____ — ZIP CODE:_____

SURVEYOR:_____ — CONTACT:_____
ADDRESS:_____ — PHONE:_____
CITY, STATE:_____ — ZIP CODE:_____

CONTRACTOR:_____ — CONTACT:_____
ADDRESS:_____ — PHONE:_____
CITY, STATE:_____ — ZIP CODE:_____

TYPE OF SUBMITTAL:
- X DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ____ CLOMR/LOMR
- ____ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED:
- ____ YES
- ____ NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:
- ____ SIA / FINANCIAL GUARANTEE RELEASE
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D. APPROVAL
- ____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- X WORK ORDER APPROVAL
- ____ OTHER (SPECIFY)

DATE SUBMITTED: October 17, 2001 — BY: Bruce Stidworthy

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

RECEIVED
OCT 1 3 2001
HYDROLOGY SECTION

October 17, 2001

Brad Bingham, P.E.
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

BOHANNAN-HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

NM 87109-4335

voice 505.823.1000

fax 505.821.0892

Re: Response to Hydrology Comments regarding the Drainage Report for the Southern Storm Drain Backbone at Sandia Science and Tech Park (M-21/D7b), Engineer stamp dated 8/8/2001. The project name has since been revised. The new name is Sandia Science and Technology Park Phase 1 Storm Drain Trunk (Innovation Parkway to Research Road).

Dear Brad:

The following is in response to Loren Meinz's letter dated August 24, 2001.

1. The Sandia Science & Technology Park MDP was approved per your letter dated September 27, 2001.
2. The existing basin map has been revised to show only existing tracts instead of possible future lots as shown previously. Drainage information including area and existing run off rate are labeled on these tracts. The trunk storm drain has been sized for future ultimate flows per the master drainage plan. Exhibit 2-The Drainage Master Plan Basin Map has been added from the master drainage plan to show relevant storm drain and its drainage information.
3. Pipe numbers have been revised to match the master drainage plan for cross-reference.
4. Flow rates for the pipe design now match the Master Drainage Plan per your request as is clearly illustrated in the Storm Drain Design Exhibit.
5. As we discussed at DRC the pond designs will remain in this report, but will be constructed as needed with the development of individual lots that as they increase the run off flows from existing conditions.
6. Please see the revised hydraulic design calculations provided within this letter.

Brad, we would be happy to meet with you to go over any issues or questions you may have regarding this project.

Sincerely,
Bohannan Huston, Inc.

Bruce Stidworthy, P.E.
Community Development
and Planning Group

RECEIVED
OCT 18 2001
HYDROLOGY SECTION

BS/ca
Enclosures

cc: James Topmiller, BHI

P:\020047\cdp\corres\00101-dsgn_analys_rpt\Bingham_Drainage.doc

CLIENT/COURIER TRANSMITTAL

BOHANNAN HUSTON
Courtyard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109
voice 505.823.1000
fax 505.798.7988

To: Brad Bingham
Hydrology/Utility Development
City of Albuquerque
600 2nd Street, 2nd Floor
Albuquerque, NM

Phone: 924-3986

Job No.: 02 0047

Requested By: Colleen Ruiz

Date: October 18, 2001

Time Due: ☒ This A.M. ☐ This P.M.
☐ Rush ___ ☐ By Tomorrow

Job Name: Sandia Science and Tech Park

DELIVERY VIA

☒ Courier ☐ Federal Express
☐ Mail ☐ UPS
☐ Other _____

PICK UP

Item: _____

_____

ITEM NO.	QUANTITY	DESCRIPTION
	1	10/17/01 letter with attachments to Mr. Bingham re: response to hydrology comments on the Drainage Report

COMMENTS / INSTRUCTIONS

RECEIVED
OCT 1 8 2001
PWD/DESIGN REVIEW

REC'D BY: _____ ***DATE:*** _____ ***TIME:*** _____

RECEIVED BHI AUG 2 3 01

FILE 02 0547
EPSD DESIGN ANAL. RPT.
copied 8/29/01 CC COLLEEN KEVIN M. JRT.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 24, 2001

James Topmiller, P.E.
Bruce Stidworthy, P.E.
Bohannan-Huston
7500 Jefferson St. NE
Albuquerque, NM 87109

Re Design Analysis Drainage Report for the Southern Storm Drain Backbone at Sandia Science and Tech Park, (M-21/D7b), Engineer stamp dated 8/8/2001.

Dear Bruce,

The referenced plan is not approved and please address the following comments.

1. The DMP for SSTP needs to be finalized by answering the comments in my letter dated July 9, 2001. This item must be completed before resubmitting this report for final review and approval.
2. The report content needs a table showing information for each lot (area, restricted runoff rate, etc.)
3. The pipe numbers in the design report need to match the pipe numbers in the DMP. If a pipe run in the DMP is split into two sections in the design information, use the same DMP # with subscripts (a,b,c,…) to define the pipe sections.
4. Contributing areas for pipe flows must match the DMP. For instance, pipe 2 should be taking flow from lots 17, 18, 19, 22, 30, 31, 32, 35, 36, 37, & 38, and including pipe 3 flow. The flow in pipe 2 should total 132.3 cfs per my figures. The flow in pipe 21 should include lots 17, 18, 22, 30, 31, 32, 35, & 36, for a total flow of 47.18 cfs.
I suggest a flow chart may help showing which lots drain to what pipes to help in future reference for building permits.
5. The temp. pond volumes appeared to be sufficient.
6. Hydraulic design of pipes will be done after you check the report for matching the DMP and establish final pipe flows.

Regarding the July 9, 2001 letter on the DMP, the references for cfs/acre should remain in the DMP as indicated as it is useful information.

RECEIVED
OCT 1 3 2001
HYDROLOGY SECTION

Please resubmit the design report after correcting the DPM document and making sure that both reports contain comparable references and information.

If you have any questions, contact me at 924-3980.

Sincerely,

Loren D. Meinz, P.E.
Hydrology Development

C: Terri Martin
file

RECEIVED B
FILE C

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 27, 2001

Bruce Stidworthy, PE
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sandia Science & Technology Park Master Drainage Report
Engineer's Stamp dated 9-12-01 (M21/D7A)

Dear Mr. Stidworthy,

Based upon the information provided in your submittal dated 9-12-01, the above referenced report is approved as a Master Plan for the SSTP. All site-specific grading plans must adhere to this plan.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 24, 2001

James Topmiller, P.E.
Bruce Stidworthy, P.E.
Bohannan-Huston
7500 Jefferson St. NE
Albuquerque, NM 87109

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Loren D. Meinz, P.E.
Hydrology Development

C: Terri Martin
file

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 24, 2001

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Bruce Stidworthy, P.E.
Bohannan-Huston
7500 Jefferson St. NE
Albuquerque, NM 87109

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Regarding the July 9, 2001 letter on the DMP, the references for cfs/acre should remain in the DMP as indicated as it is useful information.

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

Please resubmit the design report after correcting the DPM document and making sure that both reports contain comparable references and information.

If you have any questions, contact me at 924-3980.

Sincerely,

Loren D. Meinz, P.E.
Hydrology Development

C: Terri Martin
file

DRAINAGE INFORMATION SHEET

M21/D78

PROJECT TITLE: Southern Storm Drain Backbone at Sandia Science & Technology Park
ZONE MAP/DRG. FILE: # L-21, M-21
DRB #:_____ EPC#:_____ WORK ORDER#:_____

LEGAL DESCRIPTION: Tracts I, J, H, & F of Sandia Science & Technology Park
CITY ADDRESS: South of Eubank between Research Road and Stephen Moody

ENGINEERING FIRM: Bohannan Huston, Inc. CONTACT: Bruce Stidworthy
ADDRESS: 7500 Jefferson NE PHONE: 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: New Mexico Development Foundation CONTACT: James Trump
ADDRESS: 1110 Pennsylvania NE PHONE: 268-1200
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT:_____ CONTACT:_____
ADDRESS: PHONE:
CITY, STATE:_____ ZIP CODE:_____

SURVEYOR:_____ CONTACT:_____
ADDRESS:_____ PHONE:_____
CITY, STATE:_____ ZIP CODE:_____

CONTRACTOR:_____ CONTACT:_____
ADDRESS:_____ PHONE:_____
CITY, STATE:_____ ZIP CODE:_____

TYPE OF SUBMITTAL:
- X DRAINAGE REPORT
- _____ DRAINAGE PLAN
- _____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- _____ EROSION CONTROL PLAN
- _____ ENGINEER'S CERTIFICATION
- _____ CLOMR/LOMR
- _____ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED:
- _____ YES
- _____ NO
- _____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:
- _____ SIA / FINANCIAL GUARANTEE RELEASE
- _____ PRELIMINARY PLAT APPROVAL
- _____ S. DEV. PLAN FOR SUB'D. APPROVAL
- _____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- _____ SECTOR PLAN APPROVAL
- _____ FINAL PLAT APPROVAL
- _____ FOUNDATION PERMIT APPROVAL
- _____ BUILDING PERMIT APPROVAL
- _____ CERTIFICATE OF OCCUPANCY APPROVAL
- _____ GRADING PERMIT APPROVAL
- _____ PAVING PERMIT APPROVAL
- X WORK ORDER APPROVAL
- _____ OTHER (SPECIFY)

DATE SUBMITTED: August 8, 2001 BY:_____

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

Bohannan ▲ Huston

CLIENT/COURIER TRANSMITTAL

BOHANNAN HUSTON
Courtyard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109
voice 505.823.1000
fax 505.798.7988

To: Brad Bingham
Hydrology/Utility Development
City of Albuquerque
600 2nd St., NW, 2nd Floor
Development and Building Services
Albuquerque, NM 87103

Phone: 924-3986

Requested By: Bruce Stidworthy / ca

Date: **August 8, 2001**

Time Due: ☒ **This A.M.** ☐ **This P.M.**
☐ **Rush ____** ☐ **By Tomorrow**

Job No.: 02 0047

Job Name: Sandia Science and Tech Park

DELIVERY VIA

☒ Courier ☐ Federal Express
☐ Mail ☐ UPS
☐ Other _____

PICK UP

Item: _____

_____

ITEM NO.	QUANTITY	DESCRIPTION
	1	Design Analysis Report for Southern Storm Drain Backbone at Sandia Science and Technology Park, August 8, 2001

COMMENTS / INSTRUCTIONS

RECEIVED
AUG 08 2001
HYDROLOGY SECTION

REC'D BY:_____ ***DATE:***_____ ***TIME:***_____