



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 6, 2003

Guy Jackson, PE  
BPLW Architects & Engineers, Inc.  
6200 Uptown Blvd., Suite 400  
Albuquerque, NM 87110

**RE: St. Joseph's Hospital West Mesa Emergency Room Expansion  
Drainage Report (A-12/D5)  
Engineer's Stamp Dated April 18, 2003**

Dear Mr. Jackson:

The above referenced drainage report received April 18, 2003 is approved for Building Permit and Grading Permit. Please attach a copy of the approved plan to the construction set. Prior to Certificate of Occupancy approval, an Engineer's Certification per the Development Process Manual is required.

If you have any questions please call me at 924-3986.

Sincerely,

Bradley L. Bingham, PE  
Sr. Engineer, Planning Dept.  
Development and Building Services

C: File

# DRAINAGE REPORT

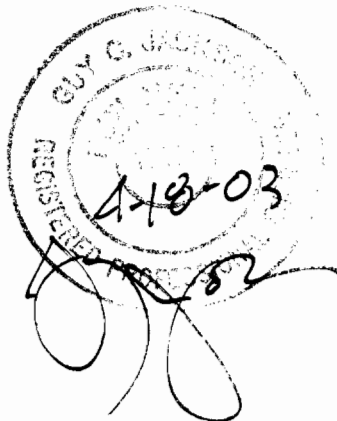
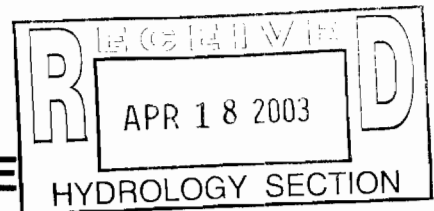
FOR

## SANDIA HEALTH SYSTEM – WEST SIDE MEDICAL CENTER EXPANSION ALBUQUERQUE, NM

BPLW PROJECT NUMBER: 22085

BY:

GUY C. JACKSON, PE  
April 2003



# **BPLW ARCHITECTS & ENGINEERS, INC.**

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# **Drainage Report**

## **General Information**

The following items pertaining to the Sandia Health System – West Side Medical Center Expansion Drainage Plan are contained herein: 1) Vicinity Map; 2) Flood Hazard Map 3) Calculations.

## **Existing Conditions**

As shown by the Vicinity Map, the site is located northwest corner of Golf Course Road, N.W. and McMahan Boulevard, N.W. intersection at 10501 Golf Course Road, N.W. The parcel is a portion of Tract 1-A St. Joseph West Mesa Hospital, Paradise Heights – Unit 1. The property is bounded on the north and west by Unit 1 of Paradise Heights, to the east by Golf Course Road and to the south by McMahan Boulevard. Per the flood insurance rate maps 108 of 825 for Bernalillo County, dated September 1996, the site is not in a flood hazard zone area. See the Flood Hazard Map included in this report.

The existing Basin Boundary and Master Drainage Plan (C2.0) shows that the existing site has 3 basins (A, B, and C) and 3 existing buildings. Basin “A” has been further subdivided into sub-basin “A-1” through “A-6”. There are access roads leading from McMahan Road to the Sandia Health System – West Side Medical Center main building and to the Maintenance/Operations building at the northwest corner of the site, as well as, the Medical Arts Building to the southwest of the hospital. The runoff from the existing site is currently being removed via an existing storm drain and sheet flow runoff.

## **Proposed Conditions**

The proposed Enlarged Basin Boundary Plan (C2.1) and Enlarged MRI Basin Boundary Plan (C2.2) show existing contours at 1'-0" intervals, basin limits, sub-basin limits, proposed improvements and existing conditions. As shown by the Enlarged Basin Boundary Plan, the proposed construction consists of remodeling the existing pre-engineered emergency room portion of the building, construction of an emergency room addition, construction of a radiology room addition, reconstruction and rerouting of the existing on-site storm drain system, the connection of new roof drain pipes to the new storm drain, the creation of an additional handicapped parking area to the southeast of the existing hospital building, covered canopies, walkways, and landscaping.

The existing site is divided to three sub-basins, Basins "A," "B," and "C". Basin "A" is the main basin and contains the project sight within its boundary. Basin "A" generates 12.42 cfs in an existing condition without the proposed emergency room addition. Basin "A" will generate 12.03 cfs once construction of the emergency room addition has been completed. Basin "A" was further subdivided into Sub-basins "A-1" through "A-7." Sub-basin "A-1" generates 2.50 cfs, which is intercepted by an existing inlet noted as "Existing Inlet #2." Sub-basin "A-2" generates 0.81 cfs, which is intercepted by a new inlet noted as "Inlet #2." Sub-basin "A-3" generates 0.15 cfs, which is intercepted by a new inlet noted as "Inlet #5." Sub-basin "A-4" generates 0.78 cfs, which is intercepted by a new inlet noted as "Inlet #3." Sub-basin "A-5" generates 0.35 cfs, which is intercepted by an existing inlet noted as "Inlet #2." Sub-basin "A-6" generates 0.42 cfs, which is intercepted by an existing inlet noted as "Inlet #1." Finally, Sub-basin "A-7" generates 1.18 cfs, which is intercepted by an existing inlet noted as "Existing Inlet #1." A portion of the

overall flow, 1.36 cfs, will be collected in roof drains and conveyed to the 18" reconstructed storm drain system via 4" PVC pipes. The remainder of roof runoff, 4.55 cfs, is collected in roof drains and connected to an existing 10" storm drain and removed from the site via Basin "C." The overall total basin runoff is lower as a result of removing several impervious areas and replacing them with landscaped areas. Basin "B" consists of an existing parking lot and an access road. Basin "B," in both the existing and proposed condition, will generate 4.94 cfs. The existing drainage pattern will not be affected by the proposed construction. Although Basin "B" is located at slightly lower elevations than those encountered in Basin "A," a series of storm drain inlets intercept runoff thus not adding to the existing flows of Basin "B". Since it is anticipated that runoff flows will be lower in Basin "A" post-construction it is assumed that Basin "A" will continue to have no impact on Basin "B." Basin "C" consists of the existing parking lot to the northwest of the existing hospital building, as well as, the west side of the hospital itself. Basin "C," in the existing condition, will generate 13.24 cfs. Basin "C" will generate 13.46 cfs once construction of the mobile MRI pad and associated drive and sidewalk has been completed. Basin "C" was further subdivided into a single Sub-basin "C-1" since the MRI pad construction is the only construction within Basin "C". Sub-basin "C-1" generates 1.19 cfs, which is intercepted by an existing inlet noted as "Existing Inlet #3." The existing drainage path will not be affected by the current construction unless the capacity of the on-site storm drain has been exceeded. At which point, the existing parking lot will convey any excess flows discharged by the storm drain overflow. These flows are expected to be minimal and will not significantly affect the current runoff rates. Since Basin "C" is also located at elevations lower than those of Basin "A" and currently drains away from the existing building/site, it is unlikely the existing drainage patterns within Basin "C" or Basin "A" will be affected significantly by the

new construction. This historic runoff discharge is unknown as the existing drainage report and drawing file were being placed on microfiche by the City of Albuquerque.

A riprap rundown will be installed at the mouth of the overflow pipe, which daylights at the parking lot to the northwest of the existing hospital (Basin "C") to reduce flow velocity. This rundown will only be used if developed flows exceed the capacity of the new storm drain system; thus it is only an overflow spillway.

### **Conclusions**

The existing drainage patterns within Basins "B" and "C" have not been significantly changed despite the fact that the hospital has added an emergency room expansion, a radiology room expansion, and mobile MRI pad, driveway and sidewalk. Roof flows have been diverted into an 18" storm drain system. Flow has also been reduced as a result of previously impervious areas being converted to landscape areas.

The calculations contained in this report analyze the proposed and developed conditions for the 2-year, 10-year and 100-year events. The 100-year, 6-hour rainfall event was utilized to determine the peak discharge rates. The procedure for 40 acre or smaller basins set by section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, dated 1997, has been used to quantify the peak rate of discharge and volume of runoff generated.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	3.28	A 0
2		B 30
3		C 0
4		D 70

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.139		10-YR	3.910
		4-day	0.227		100-YR	7.383
		10-day	0.227			12.031
		10-day	0.244			
	10-YR	6-hr	0.255			
		24-hr	0.343			
		4-day	0.343			
		10-day	0.361			
	100-YR	6-hr	0.432			
		24-hr	0.520			
		4-day	0.608			
		10-day	0.713			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.



**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Existing and Proposed Conditions - Basin B

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	1.23	A 0
2		B 15
3		C 0
4		D 85

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.103		10-YR	3.162
		4-day	0.103		100-YR	4.943
		10-day	0.111			
	10-YR	6-hr	0.111			
		24-hr	0.151			
		4-day	0.151			
		10-day	0.159			
	100-YR	6-hr	0.182			
		24-hr	0.222			
		4-day	0.262			
		10-day	0.310			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin C

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	3.20	A 0
2		B 7
3		C 0
4		D 93

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.179		10-YR	5.036
		4-day	0.293		100-YR	8.771
		10-day	0.293			13.460
	10-YR	6-hr	0.312			
		24-hr	0.426			
		4-day	0.426			
		10-day	0.448			
	100-YR	6-hr	0.501			
		24-hr	0.615			
		4-day	0.729			
		10-day	0.866			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A-7 Into Existing Inlet #1

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.29	A 0
2		B 15
3		C 0
4		D 85

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.015		10-YR	0.423
		4-day	0.025		100-YR	0.754
		10-day	0.025			1.180
	10-YR	6-hr	0.027			
		24-hr	0.036			
		4-day	0.036			
		10-day	0.038			
	100-YR	6-hr	0.043			
		24-hr	0.053			
		4-day	0.063			
		10-day	0.074			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A-6 Into Proposed Inlet #1

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.14	A 0
2		B 60
3		C 0
4		D 40

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.003		10-YR	0.098
		4-day	0.006		100-YR	0.227
		10-day	0.006			0.418
	10-YR	6-hr	0.007			
		24-hr	0.010			
		4-day	0.010			
		10-day	0.010			
	100-YR	6-hr	0.014			
		24-hr	0.016			
		4-day	0.018			
		10-day	0.021			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A-5 Into Proposed Inlet #2

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.11	A 0
2		B 45
3		C 0
4		D 55

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.004		10-YR	0.101
		4-day	0.006		100-YR	0.206
		10-day	0.006			0.354
	10-YR	6-hr	0.007			
		24-hr	0.009			
		4-day	0.009			
		10-day	0.010			
	100-YR	6-hr	0.012			
		24-hr	0.015			
		4-day	0.017			
		10-day	0.020			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A-4 Into Proposed Inlet #3

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.25	A 0
2		B 55
3		C 0
4		D 45

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.011		10-YR	0.432
		4-day	0.011		100-YR	0.776
		10-day	0.012			
	10-YR	6-hr	0.014			
		24-hr	0.019			
		4-day	0.019			
		10-day	0.019			
	100-YR	6-hr	0.026			
		24-hr	0.031			
		4-day	0.035			
		10-day	0.040			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A-3 Into Proposed Inlet #5

**Part A -- Procedure for 40 Acre and Smaller Basins\***



**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.06	A 0
2		B 80
3		C 0
4		D 20



**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.001		10-YR	0.071
		4-day	0.001		100-YR	0.150
		10-day	0.001			
	10-YR	6-hr	0.002			
		24-hr	0.003			
		4-day	0.003			
		10-day	0.003			
	100-YR	6-hr	0.005			
		24-hr	0.005			
		4-day	0.006			
		10-day	0.006			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A-2 Into Proposed Inlet #4

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.22	A 0
2		B 30
3		C 0
4		D 70

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.009		10-YR	0.262
		4-day	0.015		100-YR	0.495
		10-day	0.016			0.807
	10-YR	6-hr	0.017			
		24-hr	0.023			
		4-day	0.023			
		10-day	0.024			
	100-YR	6-hr	0.029			
		24-hr	0.035			
		4-day	0.041			
		10-day	0.048			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.



**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin A-1 Into Existing Inlet #2

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.81	A 0
2		B 55
3		C 0
4		D 45

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.022		10-YR	0.629
		4-day	0.036		100-YR	1.392
		10-day	0.036			2.497
	10-YR	6-hr	0.046			
		24-hr	0.060			
		4-day	0.060			
		10-day	0.063			
	100-YR	6-hr	0.085			
		24-hr	0.099			
		4-day	0.113			
		10-day	0.129			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Proposed Conditions - Basin C-1 into Existing Inlet #3

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.29	A 0
2		B 10
3		C 0
4		D 90

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.016		10-YR	0.440
		4-day	0.026		100-YR	0.773
		10-day	0.026			1.194
	10-YR	6-hr	0.027			
		24-hr	0.037			
		4-day	0.037			
		10-day	0.039			
	100-YR	6-hr	0.044			
		24-hr	0.054			
		4-day	0.064			
		10-day	0.076			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Existing Conditions - Basin C-1 into Existing Inlet #3

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.29	A 0
2		B 40
3		C 0
4		D 60

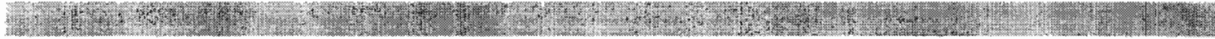
**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.010		10-YR	0.294
		4-day	0.017		100-YR	0.584
		10-day	0.017			0.984
	10-YR	6-hr	0.020			
		24-hr	0.026			
		4-day	0.026			
		10-day	0.028			
	100-YR	6-hr	0.035			
		24-hr	0.041			
		4-day	0.048			
		10-day	0.056			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Roof Drain Hydrology for the New Portion of the Hospital

**Part A -- Procedure for 40 Acre and Smaller Basins\***



**Input**

zone (x)	area (acres)	land treatment (%)
1 x	0.32	A 0
2		B 5
3		C 0
4		D 95



**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.018		10-YR	0.514
		4-day	0.030		100-YR	0.891
		10-day	0.030			1.361
	10-YR	6-hr	0.032			
		24-hr	0.043			
		4-day	0.043			
		10-day	0.046			
	100-YR	6-hr	0.051			
		24-hr	0.062			
		4-day	0.074			
		10-day	0.088			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

**PROJECT:** Sandia Health System -West Side Medical Center Expansion  
**BASIN :**  
**CONDITION:** Roof Drain Hydrology For The Existing Portion of the Hospital  
 (Does Not Drain To Project Site Nor Affect Project Site Hydrology)

**Part A -- Procedure for 40 Acre and Smaller Basins\***

**Input**

zone (x)	area (acres)	land treatment (%)
1 x	1.07	A 0
2		B 5
3		C 0
4		D 95

**Output**

Volume	2-YR	6-hr	(ac-ft)	Q-Peak	2-YR	(cfs)
		24-hr	0.100		10-YR	2.978
		4-day	0.100		100-YR	4.551
		10-day	0.108			
	10-YR	6-hr	0.106			
		24-hr	0.145			
		4-day	0.145			
		10-day	0.153			
	100-YR	6-hr	0.170			
		24-hr	0.209			
		4-day	0.248			
		10-day	0.294			

\* City of Albuquerque Development Process Manual, Volume 1, 1997 Revision, pages 22-7 to 22-16.

# Worksheet

## Worksheet for Circular Channel

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### Project Description

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Worksheet	Storm Drain Calculations
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

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### Input Data

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Mannings Coefficient	0.013
Slope	0.027600 ft/ft
Diameter	18 in

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### Results

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Depth	1.50 ft
Discharge	17.45 cfs
Flow Area	1.8 ft <sup>2</sup>
Wetted Perimeter	4.71 ft
Top Width	0.00 ft
Critical Depth	1.45 ft
Percent Full	100.0 %
Critical Slope	0.024117 ft/ft
Velocity	9.87 ft/s
Velocity Head	1.52 ft
Specific Energy	3.02 ft
Froude Number	0.00
Maximum Dischar	18.77 cfs
Discharge Full	17.45 cfs
Slope Full	0.027600 ft/ft
Flow Type	N/A

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