

**Stout Allen Addition No. 2
InterQuest Commercial**

MDDP

December 2003

Prepared for:

Development Management, Inc. (DMI)
4065 N. Sinton Road, #200
Colorado Springs, CO 80907

Prepared by:

Rockwell-Minchow Consultants, Inc.
1873 Austin Bluffs Parkway
Colorado Springs, CO 80918
475-2575

Project #02-016

Stout Allen Addition No. 2 InterQuest Commercial

~~Preliminary Drainage Plan and Report~~
MDDP *MM 12/30/03*

DRAINAGE PLAN STATEMENTS

ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City of Colorado Springs for drainage reports, and said drainage report is in conformity with the Development Basin Planning Study for the drainage basins. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

Kent D. Rockwell, P.E.

Kent D. Rockwell, P.E.



DEVELOPER'S STATEMENT

I, the developer, have read and will comply with all the requirements specified in this drainage report and plan.

Development Management, Inc. (DMI)

BY *David D. Jenkins* DATE _____

David D. Jenkins

TITLE: Vice President

ADDRESS: 4065 N. Sinton Road, #200
Colorado Springs, CO 80907

CITY OF COLORADO SPRINGS

Filed in accordance with Section 15-3-906 of the code of the City of Colorado Springs, 1980, as amended.

Tom M...
CITY ENGINEER

Dec 30, 2003
DATE

Stout Allen Addition No. 2 InterQuest Commercial

VDDP

GENERAL LOCATION AND DESCRIPTION

The proposed InterQuest Commercial development is located within El Paso County, Colorado, at the northwest corner of Federal Drive and Interquest Parkway. The site contains 79.836 acres bound by Interquest Parkway on the south, Air Force Academy property on the west, and undeveloped privately held property on the north and east. The site lies within the north half of Section 20, Township 12 South, Range 66 West of the 6th Principal Meridian (see Exhibit 1).

The site generally drains from east to west at slopes of 2% to 4%, and is currently covered with natural grasses.

Interquest Commercial lies in the Elkhorn Drainage Basin.

The site will be developed as a commercial/retail complex consisting of several restaurant pads, large hub commercial stores with strip mall type retail shops and a hotel complex at the west end of the site together with associated parking and landscaping, etc.

This report gives a general description of the proposed development and base runoff information for the annexation and zoning of the property. Detailed Final Drainage Reports will be provided with the development plan and plat submittals.

SOILS DESCRIPTION

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the soils in the proposed Republic Drive Filing No. 1 fall under the Blakeland & Stapleton classifications (see Exhibit 2). These are referenced as Soil groups 8 and 83; respectively, and fall under Hydrologic Groups A & B. Hydrologic Group B was used for calculation purposes.

FLOOD PLAIN STATEMENT

The site is not located within a designated 100 year flood hazard area, as depicted on FIRM Community Panel Number 08041C506 F, dated March, 1997.

REFERENCES and MAPPING

Listed below are the reports reviewed as part of preparation of this study:

1. "Master Development Drainage Plan Update, Fairlane Technological Park" prepared by Kiowa Engineering Corporation, approved March 11, 2001.

2. "Preliminary Drainage Report for Stout Allen Addition Filing No. 1", prepared by Classic Consulting Engineers & Surveyors, dated September 2001, not yet approved.
3. "Final Hydraulic Report (Phase I) Interstate 25 Fairlane Parkway Interchange", prepared by DMJM, Inc., dated July 24, 1998.
4. Two (2) foot contours are from aerial photography flown April 29, 2002.

DRAINAGE CRITERIA

The current City of Colorado Springs/El Paso County Drainage Criteria was utilized in this report. Calculations were performed to determine runoff quantities during the 5 year and 100 year frequency storms for historic and developed conditions using the Rational Method as required for basins containing less than 100 acres.

EXISTING DRAINAGE STRUCTURES

There are no existing permanent storm sewer facilities on the site. A 16' at-grade inlet is located on the north side of Interquest Parkway just west of Federal Drive. The inlet discharges to the south to an existing 54" RCP that discharges to the existing detention pond in the Interquest Development. A 20' at-grade inlet is located on the north side of Interquest Parkway approximately 600 feet east of the USAFA boundary. This inlet picks up flows from Interquest Parkway and discharges to the south in an existing 24" RCP then west onto USAFA property. A roadside ditch is located along the north side of Interquest Parkway (Old Stout Allen Road) running from Voyager Parkway to Pond "A" at the northeast corner of the Interquest interchange at I-25. There are also existing 24" and 30" CMP crossings under I-25 north of the interchange.

HISTORIC DRAINAGE PATTERNS

This portion of the report analyzes the historic runoff for the proposed development, including off-site runoff entering the site. The drainage basins affecting this site are depicted on the enclosed Historic Drainage Plan. The site, and affected off-site areas, is depicted by two basins on the drainage plan. Following is a description of each Basin and hydrology:

Basin H-I contains 82.9 acres covering most of the south and east end of the proposed site, and a portion of off-site area to the east of the site. Runoff quantities of 36.3cfs (Q5) and 91.4cfs (Q100) will be developed by the basin and sheetflow to the west-south-west to an existing swale along the north side of Interquest Parkway. The majority of the runoff from this Basin will travel to Pond "A" at the northeast corner of the Interquest Parkway.

Basin H-II covers 50.5 acres covering much of the northwest end of the proposed site, and a portion of off-site area to the north. Runoff quantities of 22.1cfs (Q5) and 55.7cfs (Q100) will be developed by the basin and sheetflow to the west towards I-25 and an existing 24" CMP crossing under the Interstate.

DEVELOPED DRAINAGE PATTERNS

This portion of the report analyzes the developed runoff and proposed drainage facilities for the development, including off-site runoff entering the site. The drainage basins affecting this site are depicted on the enclosed Developed Drainage Plan. The site is depicted by two (2) basins on the enclosed Developed Drainage Plan. Following is a description of each Basin and proposed improvements:

Basin I contains 70.9 acres covering the majority of the site, and will be developed as a commercial/retail shopping center and associated pad sites and parking, etc. Runoff quantities of 259.1cfs (Q5) and 472.2cfs (Q100) will be developed by the basin and travel to the southwest corner of the Basin via street and pipe flow to a proposed Detention Pond.

The site to the east of the proposed Interquest Commercial site has been identified as Stout Allen Addition Filing No. 1. Runoff from that site will also be detained to historic levels per the preliminary Drainage Report for that site. Runoff quantities of 19cfs (Q5) and 40cfs (Q100) will be released from this site and travel through the Interquest Commercial site via pipe to the proposed Detention Pond.

The Detention Pond will be sized for the 100 year storm, and to accommodate for Water Quality Capture Volume (WQCV). The 100 year storm detention volume required will be 9.7 acre-feet. The 5 year storm detention volume required will be 6.0 acre-feet, and the WQCV required will be 2.85 acre-feet. Calculations are provided in the appendix. The discharge will be held to at or below historic levels of 36.3cfs (Q5) and 91.4cfs (Q100) from Basin H-I per requirement of the City of Colorado Springs. In addition peak flow release rates for the 2-, 5-, 10-, 50- and 100-year storm frequencies will not be increased over historical "undeveloped" flows per Air Force Academy requirements. These rates will be determined in the Final Drainage Report. The exiting runoff will travel to Pond "A" at the Interquest Parkway interchange.

Basin II covers 5.5 acres at the extreme west end of the site proposed to be developed as a hotel and associated parking, etc. Runoff quantities of 23.8cfs (Q5) and 43.6cfs (Q100) will be developed by the basin and travel to the west end of the Basin via street and pipe flow to a proposed WQCV Pond. The discharge from this Basin will be held to at or below historic levels of 22.1cfs (Q5) and 55.7cfs (Q100) from Basin H-II per requirement of the City of Colorado Springs and the Air Force Academy.

The WQCV Pond will require 0.22 acre-feet. Calculations are provided in the appendix. The WQCV Pond will also reduce the 5 year developed runoff of 23.8 cfs below the historic level of 22.1 cfs. The exiting runoff will travel to an existing 24" CMP crossing under the interstate.

A Final Drainage Plan and Report will be required at the time of plat submittal.

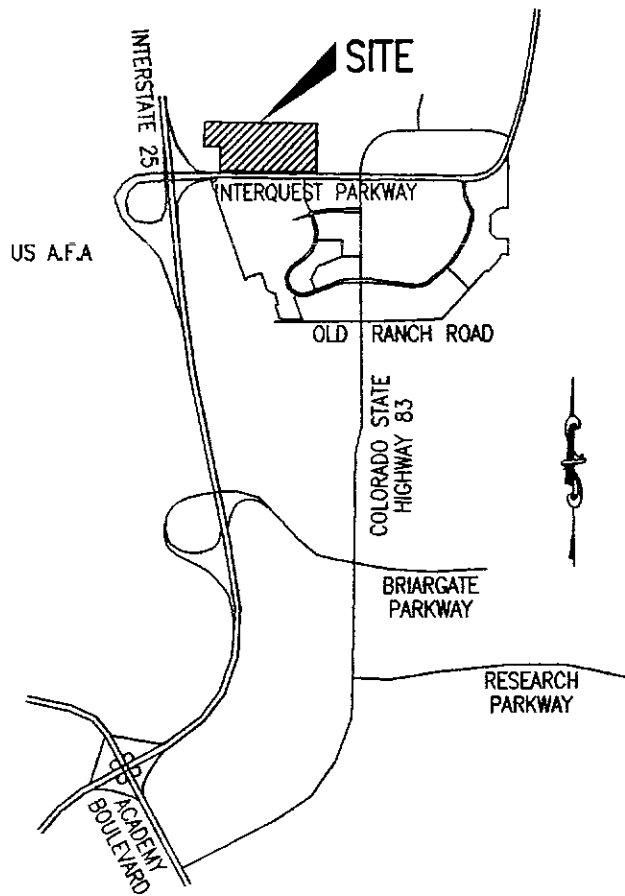
DRAINAGE FACILITIES

The drainage facilities to be installed for the Interquest Commercial site will be detailed in the Final Drainage Plan and Report. All of the facilities will be private and non-reimbursable.

DRAINAGE FEES

Interquest Commercial lies within the Elkhorn Drainage Basin. This is a closed Basin; therefore no fees are due for this development.

APPENDIX



Vicinity Map

NOT TO SCALE

Figure 1

R. 67 W. R. 66 W.

(Joins sheet 1)

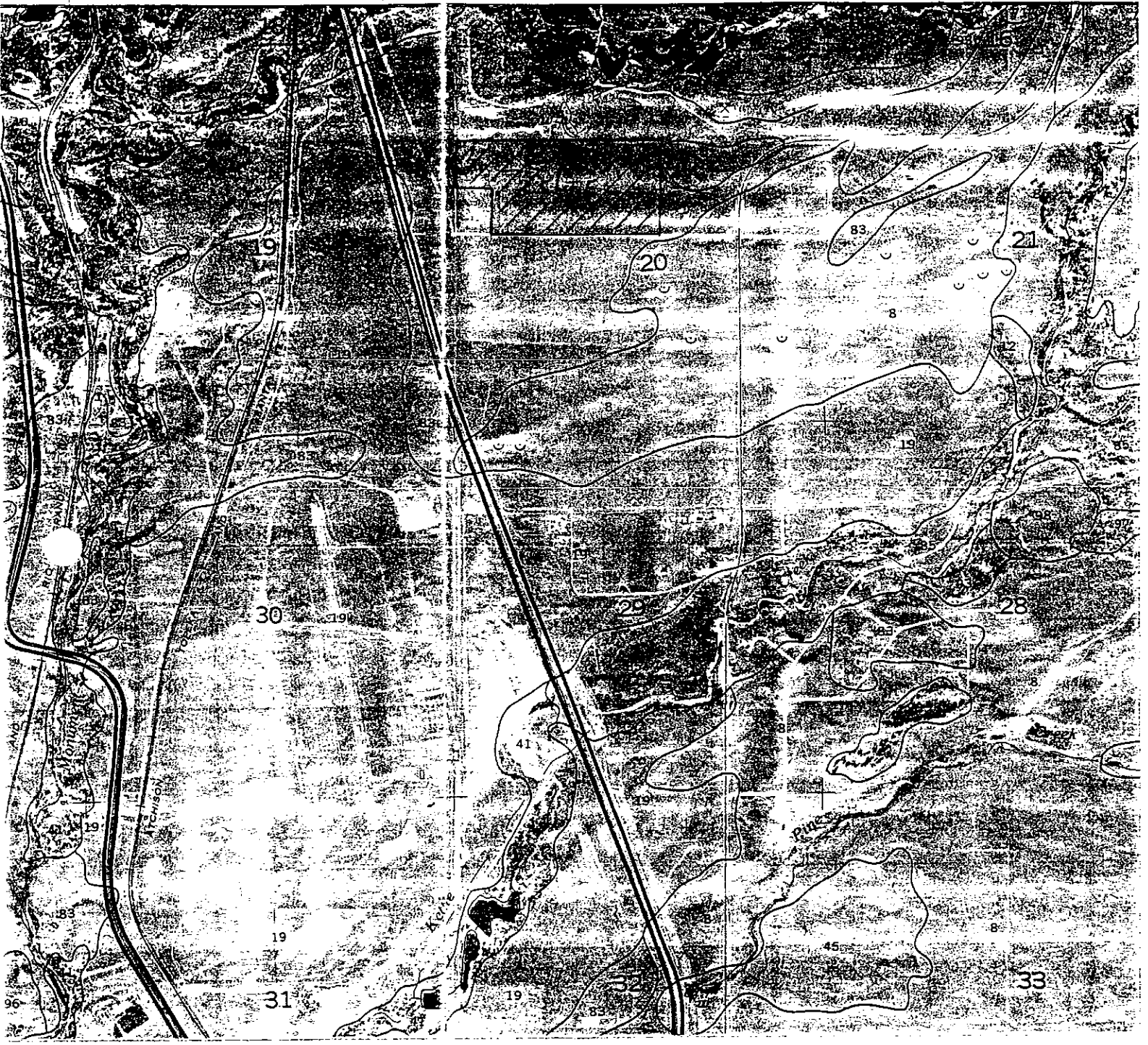


Figure 2

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

**EL PASO COUNTY,
COLORADO AND
INCORPORATED AREAS**

PANEL 506 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:
COMMUNITY

<u>COMMUNITY</u>	<u>NUMBER</u>	<u>PANEL</u>	<u>SUFFIX</u>
COLORADO SPRINGS, CITY OF	080060	0506	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0506	F

**MAP NUMBER
08041C0506 F**

**EFFECTIVE DATE:
MARCH 17, 1997**



Federal Emergency Management Agency

ZONE X

EL PASO COUNTY
UNINCORPORATED AREAS
080059

EL PASO COUNTY

CORPORATE LIMITS

CITY OF COLORADO SPRINGS

U.S. AIR FORCE
ACADEMY

SITE

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN
TOWNSHIP 12 SOUTH, RANGE 66 WEST.

19

20

ZONE D

25



DEPARTMENT OF THE AIR FORCE

10TH CIVIL ENGINEER GROUP
RECEIVED
USAF ACADEMY COLORADO

2000 DEC -5 AM 10: 41

30 NOV 2000

Mr. Thomas M. Mitchell
Deputy Civil Engineer
3120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

PUBLIC WORKS

Mr. David S. Zelenok
Group Support Manager
City of Colorado Springs
PO Box 1575, Mail Code 450
Colorado Springs CO 80901-1575

Dear Mr. Zelenok

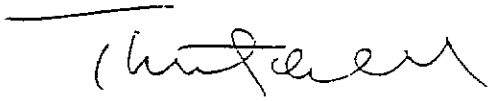
Increased storm water flow from development along tributaries to Monument Creek has the potential to impact the riparian environment and infrastructure on the Academy and downstream neighbors' property. We have tried to get developers to voluntarily detain increased flows to the Academy and limit their discharge to historical levels. This has been unsuccessful. Therefore, to maintain the health of the Monument Creek system, we ask that the city enforce the following criteria for development occurring upstream of the Academy to ensure that developed flows do not adversely affect water quality, riparian habitat or our infrastructure.

Development occurring upstream of the Academy shall ensure that peak flows for the 2-, 5-, 10-, 50- and 100-year storm frequencies are not increased over historical "undeveloped" flows. Proposed development occurring upstream of the Academy must adequately demonstrate that storm water facilities (i.e., detention/retention ponds) will function in conjunction with other facilities within the drainage and not increase peak flows for the frequencies listed above or adversely impact water quality.

We believe that these requirements are consistent with Colorado case law (Docheff v. City of Broomfield, 623 P.2d 69 (Colo. App1980), Hankins v. Borland, 163 Colo. 575 (1967); City of Boulder v. Boulder and White Rock Ditch and Reservoir Co., 73 Colo. 462 (1926)) and with the Academy's Conservation and Management Plan and agreement with the US Fish and Wildlife Service for the Preble's meadow jumping mouse (signed on 6 June 2000 by the Academy's Superintendent and the US Fish and Wildlife Service, Region 6 Director).

Please feel free to contact me or have your staff contact Josh Kellar at 333-6709 if there are any questions regarding this material.

Sincerely


THOMAS M. MITCHELL

MAJOR BASIN	SUB BASIN	AREA		BASIN		TC MIN.	I	SOIL GROUP	DEV. TYPE	C.	BASIN		RETURN PERIOD
		PLANIMETER HEADING	Ac.	LENGTH	HEIGHT						Q	Q	
H-2			82.9	Over 1000' @ 2.5% Slope 2900 @ 5fps	= 37.1 = 9.7	46.8	1.75 3.15			0.25 0.35	36.3 91.4		
H-2			50.5	Over 1000' @ 2.5% Slope 2900 @ 5fps	= 37.1 = 9.7	46.8	1.75 3.15			0.25 0.35	22.1 55.7		
D-1			70.9	Over 50' - 2.5% Slope 500 @ 2fps 11' @ 2000 @ 15fps	2.1 4.2 2.4	8.7	4.3 7.4	"B"		0.85 0.90	259.1 472.2		
D-2			5.5	Over 50' - 2.5% Slope 250 @ 5fps 11' @ 550 @ 5fps	2.1 1.1 1.8	5.3	5.1 8.8	"B"		0.85 0.90	23.8 43.6		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD $Q=CIA$

PAGE ___ OF ___



PROJECT: Stout Allan Addition #2
BY: JDM 02-016 DATE: 10/25/02

Designer: Tim McConnell
 Company: Rockwell Minchow
 Date: October 25, 2002
 Project: Interquest Commercial
 Location: _____

Basin I Pond

<p>1. Basin Storage Volume</p> <p>A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)</p> <p>B) Contributing Watershed Area (Area)</p> <p>C) <u>Water Quality Capture Volume (WQCV)</u> $(WQCV = 1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i))$</p> <p>D) <u>Design Volume</u>: $Vol = (WQCV / 12) * Area * 1.2$</p>	<p>$I_a = 90.00$ %</p> <p>$i = 0.90$</p> <p>Area = 71.00 acres</p> <p>WQCV = 0.40 watershed inches</p> <p>Vol = 2.851 acre-feet</p>
<p>2. Outlet Works</p> <p>A) Outlet Type (Check One)</p> <p>B) Depth at Outlet Above Lowest Perforation (H)</p> <p>C) Required Maximum Outlet Area per Row, (A_o)</p> <p>D) Perforation Dimensions (enter one only): i) Circular Perforation Diameter OR ii) 2" Height Rectangular Perforation Width</p> <p>E) Number of Columns (nc, See Table 6a-1 For Maximum)</p> <p>F) Actual Design Outlet Area per Row (A_o)</p> <p>G) Number of Rows (nr)</p> <p>H) Total Outlet Area (A_{ot})</p>	<p><input checked="" type="checkbox"/> Orifice Plate <input type="checkbox"/> Perforated Riser Pipe <input type="checkbox"/> Other: _____</p> <p>H = 3.00 feet</p> <p>$A_o = 3.51$ square inches</p> <p>D = 1.2500 inches, OR W = _____ inches</p> <p>$nc = 3$ number</p> <p>$A_o = 3.68$ square inches</p> <p>$nr = 9$ number</p> <p>$A_{ot} = 35.13$ square inches</p>
<p>3. Trash Rack</p> <p>A) Needed Open Area: $A_t = 0.5 * (\text{Figure 7 Value}) * A_{ot}$</p> <p>B) Type of Outlet Opening (Check One)</p> <p>C) For 2", or Smaller, Round Opening (Ref.: Figure 6a):</p> <p>i) Width of Trash Rack and Concrete Opening (W_{conc}) from Table 6a-1</p> <p>ii) Height of Trash Rack Screen (H_{TR})</p>	<p>$A_t = 1.092$ square inches</p> <p><input checked="" type="checkbox"/> $\leq 2"$ Diameter Round <input type="checkbox"/> 2" High Rectangular <input type="checkbox"/> Other: _____</p> <p>$W_{conc} = 36$ inches</p> <p>$H_{TR} = 60$ inches</p>

Designer: Tim McConnell
 Company: Rockwell Minchow
 Date: October 25, 2002
 Project: Interquest Commercial
 Location: _____

Basin II Pond

<p>1. Basin Storage Volume</p> <p>A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)</p> <p>B) Contributing Watershed Area (Area)</p> <p>C) <u>Water Quality Capture Volume (WQCV)</u> (WQCV = $1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I)$)</p> <p>D) <u>Design Volume</u>; Vol = (WQCV / 12) * Area * 1.2</p>	<p>$I_a =$ <u>90.00</u> %</p> <p>$i =$ <u>0.90</u></p> <p>Area = <u>5.50</u> acres</p> <p>WQCV = <u>0.40</u> watershed inches</p> <p>Vol = <u>0.221</u> acre-feet</p>
<p>2. Outlet Works</p> <p>A) Outlet Type (Check One)</p> <p>B) Depth at Outlet Above Lowest Perforation (H)</p> <p>C) Required Maximum Outlet Area per Row, (A_o)</p> <p>D) Perforation Dimensions (enter one only): i) Circular Perforation Diameter OR ii) 2" Height Rectangular Perforation Width</p> <p>E) Number of Columns (n_c, See Table 6a-1 For Maximum)</p> <p>F) Actual Design Outlet Area per Row (A_o)</p> <p>G) Number of Rows (n_r)</p> <p>H) Total Outlet Area (A_{ot})</p>	<p><input checked="" type="checkbox"/> Orifice Plate <input type="checkbox"/> Perforated Riser Pipe <input type="checkbox"/> Other: _____</p> <p>H = <u>2.00</u> feet</p> <p>$A_o =$ <u>0.47</u> square inches</p> <p>D = <u>0.7500</u> inches, OR W = _____ inches</p> <p>$n_c =$ <u>1</u> number</p> <p>$A_o =$ <u>0.44</u> square inches</p> <p>$n_r =$ <u>6</u> number</p> <p>$A_{ot} =$ <u>2.65</u> square inches</p>
<p>3. Trash Rack</p> <p>A) Needed Open Area: $A_t = 0.5 * (\text{Figure 7 Value}) * A_{ot}$</p> <p>B) Type of Outlet Opening (Check One)</p> <p>C) For 2", or Smaller, <u>Round Opening</u> (Ref.: Figure 6a):</p> <p>i) Width of Trash Rack and Concrete Opening (W_{conc}) from Table 6a-1</p> <p>ii) Height of Trash Rack Screen (H_{TR})</p>	<p>$A_t =$ <u>93</u> square inches</p> <p><input checked="" type="checkbox"/> <u>< 2" Diameter Round</u> <input type="checkbox"/> <u>2" High Rectangular</u> <input type="checkbox"/> Other: _____</p> <p>$W_{conc} =$ <u>6</u> inches</p> <p>$H_{TR} =$ <u>48</u> inches</p>