



10/18/2021

Jacob James  
City Engineer  
City of Lone Tree  
9220 Kimmer Drive  
Lone Tree, CO 80124

**RE: SSCW – Lincoln Ave & S Yosemite – Site Plan**

Dear: Jacob,

The purpose of this letter is to demonstrate that the proposed development, SSCW – Lincoln Ave & S Yosemite conforms the conditions set forth in the Phase III Drainage Report for Safeway Marketplace, Heritage Hills Filing NO. 10C prepared by JR Engineering, LTD. dated October 17, 1997.

**Drainage Conformance Letter**

The proposed development is Lot 6 in Basin Q, of Heritage Hills Filing NO. 1-C., which is currently being provided stormwater detention via existing valley pans and curb and gutter to off-site storm sewers which discharge into existing drainage ways. The existing regional detention pond does not provide water quality for this site. The development will drain northerly towards an unnamed Willow Creek Tributary which discharges into Willow Creek upstream of the existing regional detention facility. This information is in reference to in the Phase III Drainage Report for Safeway Marketplace, Heritage Hills Filing NO. 10C prepared by JR Engineering, LTD. dated October 17, 1997.

Based on the report; existing Basin Q is 2.36 acres and the proposed site makes up approximately 39% of the area as the area od disturbance is 0.91 acres. The initial design of Basin Q had a 5-year design flow of 8.6 CFS. For the 100-yr flow, Basins A, B, C, E, J, N, M, Q, L, and R were combined for a design flow of 80.6 CFS. For Lot 6's portion of the site, the adjusted flows would be 3.32 CFS for the 5-yr storm and 4.79 CFS for the 100-yr storm. The site sheet flows to the internal drive east of the property, then is channelized via curb and gutter to a storm inlet to the north of the site that carries it east, towards Willow Creek. The initial storm infrastructure was designed to include this site at an imperviousness of 95%.

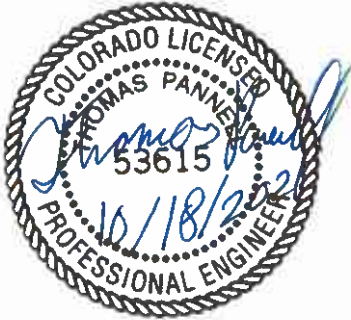
The proposed site has actual imperviousness of 71% and flow rates of 1.94 CFS for the 5-yr storm and 4.50 CFS for the 100-yr storm which is significantly less than the originally designed flows leaving the site, calculations are provided in Appendix A. Since the proposed conditions are less than the initial design flows and the site is disturbing less than 1 acre, it has been determined that no additional on-site water quality or detention is required.

Sincerely,

**Bowman Consulting Group**

Thomas Pannell, PE

Sr. Project Manager



Appendices

APPENDIX A – Hydraulic Computations

APPENDIX B – Drainage Map

APPENDIX C – Final Drainage Study for Heritage Hills, Filing NO. 1-C

APPENDIX A  
HYDRAULIC COMPUTATIONS



**Table 6-3. Recommended percentage imperviousness values**

Land Use or Surface Characteristics	Percentage Imperviousness (%)
<b>Business:</b>	
Downtown Areas	95
Suburban Areas	75
<b>Residential lots (lot area only):</b>	
Single-family	
2.5 acres or larger	12
0.75 – 2.5 acres	20
0.25 – 0.75 acres	30
0.25 acres or less	45
Apartments	75
<b>Industrial:</b>	
Light areas	80
Heavy areas	90
<b>Parks, cemeteries</b>	10
<b>Playgrounds</b>	25
<b>Schools</b>	55
<b>Railroad yard areas</b>	50
<b>Undeveloped Areas:</b>	
Historic flow analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
<b>Streets:</b>	
Paved	100
Gravel (packed)	40
Drive and walks	90
Roofs	90
Lawns, sandy soil	2
Lawns, clayey soil	2

**Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period**

NRCS Soil Group	Storm Return Period						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.84i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i+0.057$	$C_B = 0.63i+0.249$	$C_B = 0.56i+0.328$	$C_B = 0.47i+0.426$	$C_B = 0.37i+0.536$
C/D	$C_{CD} = 0.83i^{1.122}$	$C_{CD} = 0.82i+0.035$	$C_{CD} = 0.74i+0.132$	$C_{CD} = 0.56i+0.319$	$C_{CD} = 0.49i+0.393$	$C_{CD} = 0.41i+0.484$	$C_{CD} = 0.32i+0.588$

Where:

$i$  = % imperviousness (expressed as a decimal)

$C_A$  = Runoff coefficient for Natural Resources Conservation Service (NRCS) HSG A soils

$C_B$  = Runoff coefficient for NRCS HSG B soils

$C_{CD}$  = Runoff coefficient for NRCS HSG C and D soils.

The initial or overland flow time,  $t_i$ , may be calculated using Equation 6-3:

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}} \quad \text{Equation 6-3}$$

Where:

$t_i$  = overland (initial) flow time (minutes)

$C_5$  = runoff coefficient for 5-year frequency (from Table 6-4)

$L_i$  = length of overland flow (ft)

$S_o$  = average slope along the overland flow path (ft/ft).

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

Equation 6-4

Where:

$t_t$  = channelized flow time (travel time, min)

$L_t$  = waterway length (ft)

$S_o$  = waterway slope (ft/ft)

$V_t$  = travel time velocity (ft/sec) =  $K\sqrt{S_o}$

$K$  = NRCS conveyance factor (see Table 6-2).

**Table 6-2. NRCS Conveyance factors, K**

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20















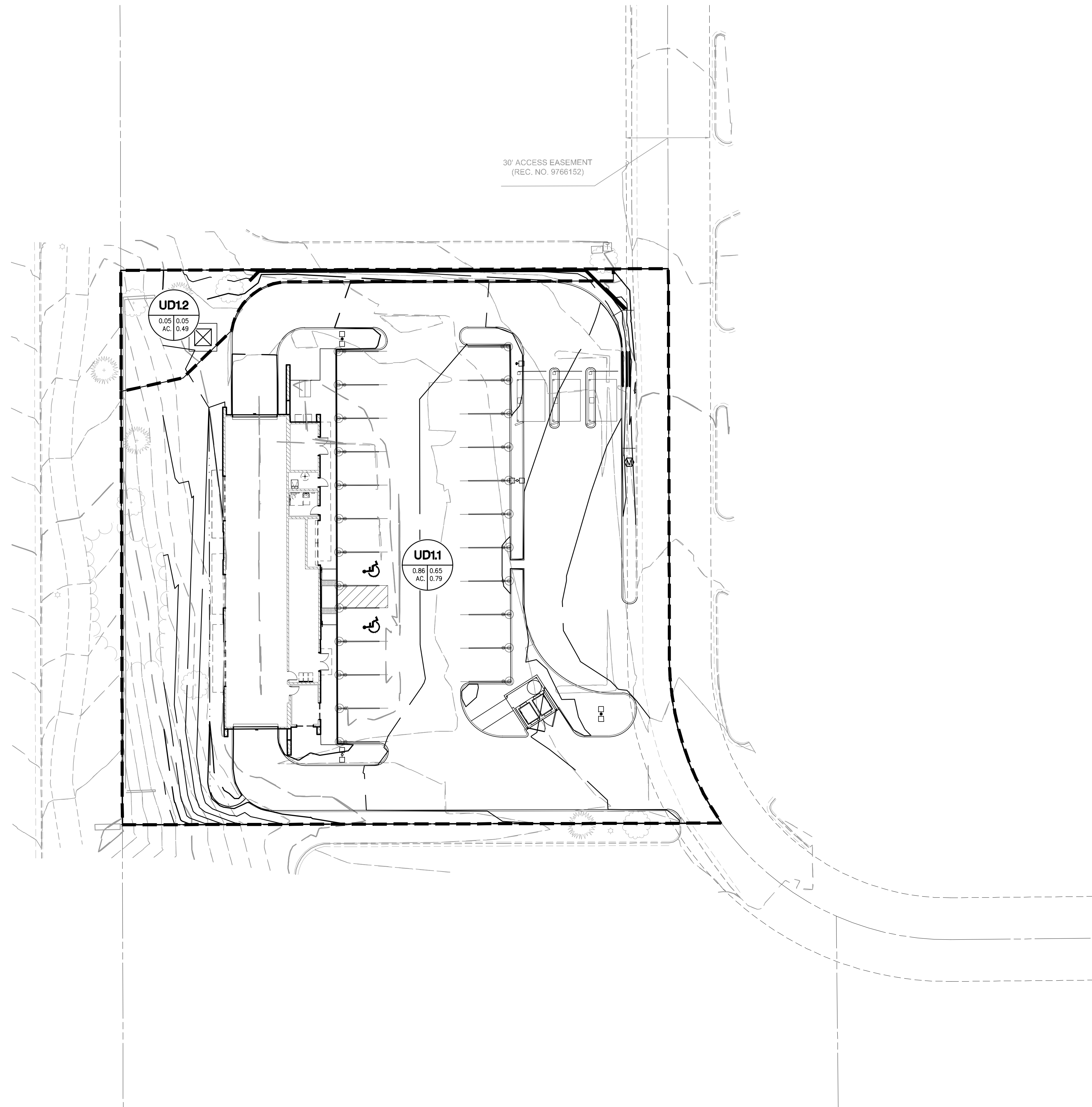




APPENDIX B  
DRAINAGE MAP

# HERITAGE HILLS, FILING NO. 1-C, LOT 6

HERITAGE HILLS PLANNED DEVELOPMENT,  
 PLANNING AREA 11  
 0.9 ACRES  
 SIP #TBD



**LEGEND:**

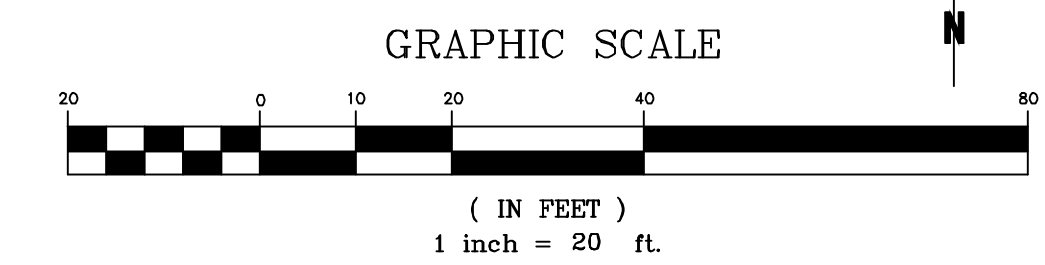
- 5510--- EXISTING GROUND MAJOR CONTOUR
- 5512--- EXISTING GROUND MINOR CONTOUR
- 5510--- PROPOSED GRADE MAJOR CONTOUR
- 5512--- PROPOSED GRADE MINOR CONTOUR
- PROPERTY BOUNDARY
- ▲ DESIGN POINT
- BASIN BOUNDARY
- ← FLOW DIRECTION

BASIN DESIGNATION: **101**

BASIN AREA: 32.14 AC, .26 AC, .36 AC

5-YEAR COEFFICIENT

100-YEAR COEFFICIENT



**Bowman**  
 © 2021 Bowman Consulting Group Ltd  
 1526 Cole Blvd., Suite 100  
 Lakewood, CO 80401  
 Phone: (303) 801-2900  
 www.bowman.com

REVISION	DESCRIPTION	DATE

DRAINAGE MAP  
 SUPER STAR CAR WASH  
 LINCOLN & YOSEMITE  
 CITY OF LONE TREE  
 COLORADO

SEAL

**NOT FOR CONSTRUCTION**

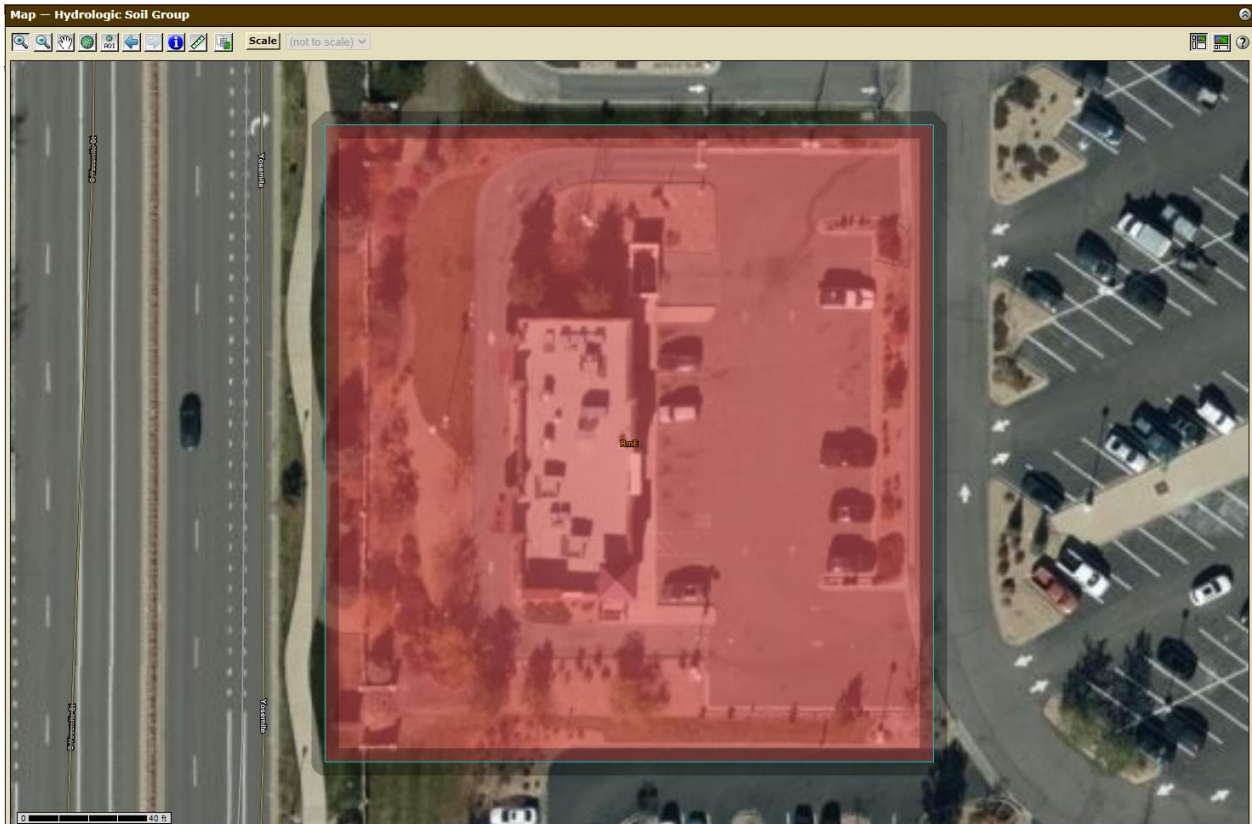
DESIGN	DRAWN	CHKD
DMU	DMU	TOP

SCALE: H: 1" = 20'  
 V: 1" = XXX'

JOB No. 020441-01-012

DATE : 07/12/2021

SHEET  
**5**



**Tables — Hydrologic Soil Group — Summary By Map Unit**

**Summary by Map Unit — Castle Rock Area, Colorado (CO622)**

Summary by Map Unit — Castle Rock Area, Colorado (CO622)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
RmE	Renohill-Buick complex, 5 to 25 percent slopes	D	1.0	100.0%
<b>Totals for Area of Interest</b>			<b>1.0</b>	<b>100.0%</b>

**Description — Hydrologic Soil Group**

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

**Rating Options — Hydrologic Soil Group**

**Aggregation Method:** Dominant Condition  
**Component Percent Cutoff:** None Specified  
**Tie-break Rule:** Higher

APPENDIX C  
FINAL DRAINAGE STUDY FOR HERITAGE HILLS,  
FILING NO. 1-C

**Phase III Drainage Report**  
Safeway Marketplace  
Heritage Hills Filing No. 1-C

Prepared for:

**SAFEWAY, INC.**  
6900 S. Yosemite Street  
Englewood, Colorado 80012

Prepared by:

**JR ENGINEERING, LTD.**  
6110 Greenwood Plaza Boulevard  
Englewood, Colorado 80111  
(303) 740-9393

June 13, 1997  
Revised: August 13, 1997  
Revised: October 17, 1997  
Project No. 3216.50



**JR** 6020 Greenwood Plaza Blvd.  
Englewood, Colorado 80111  
(303) 740-9393 • FAX (303) 721-9019  
www.jring.com

DOUGLAS COUNTY  
NOV 17 1998  
Department of Public Works

RECEIVED  
NOV 13 1998  
Douglas County Planning

November 12, 1998

Mr. Bob Herndon  
Herndon-Architecture  
3900 South Wadsworth Boulevard, Suite #570  
Lakewood, CO 80235

RE: Lot 10, Heritage Hills Filing No. 1-C

Dear Bob:

At your request, we have prepared the grading and drainage plans for the proposed Northwest Bank at Heritage Hills. The grading shown on the site improvement plan is in conformance with the County-approved grading and drainage plan for the overall site of Heritage Hills Filing No. 1-C.

If we can be of further assistance, please give us a call.

Sincerely,

JR Engineering, Ltd.



Ronald R. Sprawls  
Project Manager

X:\321640\WQERD\grading, drainage conformance letter.doc

4935 North 50th Street  
Colorado Springs, Colorado 80919  
(719) 593-2593 • FAX (719) 528-6623

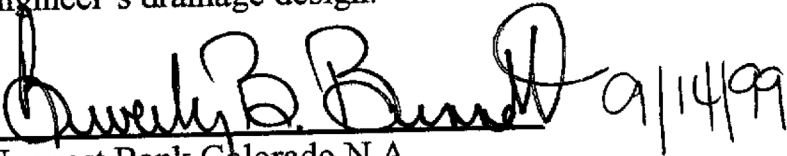
2620 East Prospect Rd. Suite 190  
Fort Collins, Colorado 80525  
(970) 491-9888 • FAX (970) 491-9884

704 Forman Blvd. West  
Pueblo, Colorado 81008  
(719) 583-2575 • FAX (719) 583-8119

**Certification Sheet**

DRAINAGE

Norwest Bank Colorado N.A. hereby certifies that the drainage facilities for Lot 10, Heritage Hills Filing No. 1-C shall be constructed according to the design presented in this report. I understand that Douglas County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that Douglas County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of Norwest Bank Colorado N.A., and/or their successors and/or assigns future liability for improper design. I further understand that approval of the Site Improvement Plan does not imply approval of my engineer's drainage design.

  
Norwest Bank Colorado N.A.

\_\_\_\_\_  
Authorized Signature

May 27, 1999

Mr. Robert Herndon  
Herndon and Associates, Inc.  
3900 South Wadsworth Boulevard, Suite #570  
Lakewood, CO 80235

RE: Heritage Hills Filing No. 1-C, Lot 10, Norwest Bank

Dear Mr. Herndon:

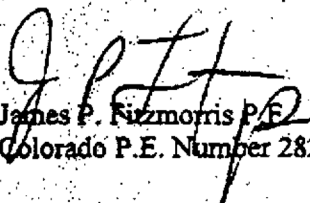
JR Engineering has prepared the grading and drainage plans for the proposed Norwest Bank at Heritage Hills Filing No. 1-C, Lot 10 as part of the Site Improvement Plan package. The grading shown on the site improvement plan is in conformance with the County-approved grading and drainage plan for the overall site of Heritage Hills Filing No. 1-C. Site specific calculations have been provided to Douglas County for the site.

The sediment and erosion control of said Lot 10 was prepared under my direct supervision in accordance with the provision on Douglas County Drainage Design and Technical Criteria for the owners of thereof. I understand that Douglas County does not and will not assume any liability for sediment and erosion measures designated by others.

If we can be of further assistance, please give us a call.

Sincerely,

JR Engineering, Ltd.

  
James P. Fitzmorris P.E.  
Colorado P.E. Number 28211



X:\031640\WORD\grading, drainage conformances letter.doc

4935 North 30th Street  
Colorado Springs, Colorado 80919  
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## **INTRODUCTION**

This report represents a Phase III Drainage Report for the Safeway Marketplace at Heritage Hills Filing No. 1-C and was prepared to meet the regulatory requirements of Douglas County, Colorado. The report was prepared following guidelines and regulations within the Douglas County Storm Drainage Design and Technical Criteria (Reference 1) and the Urban Storm Drainage Criteria Manual, (Reference 2).

This report addresses post-development flood peaks within Safeway Marketplace at Heritage Hills Filing No. 1-C for the 5-year minor storm event and the 100-year major storm event. Final design calculations are provided herein.

## **GENERAL LOCATION AND DESCRIPTION**

### **Location**

The proposed Safeway Marketplace at Heritage Hills Filing No. 1-C (identified as Planning Area 13) located in Section 10, Township 6 South, Range 67 West of the Sixth Principal Meridian in Douglas County (see Vicinity Map in Appendix). The project site is located in the northeast quadrant of South Yosemite Street and Lincoln Avenue intersection and is bordered on the northeast by a proposed school and park site, on the north by a proposed residential multi-family site and on the east by a proposed commercial site.

### **Description of Property**

The Safeway Marketplace at Heritage Hills Filing No. 1-C site consists of ten commercial lots on 21.317 acres of undeveloped ground. The site will be overlotted prior to construction as a part of the overall Heritage Hills development. The site has been used historically for agricultural uses. Existing onsite vegetation consists of native grasses. The Soil Conservation Service "Soil Survey of Castle Rock Area, Colorado" (Reference 3) indicates soils are Hydrologic Soil Group C (Fondis clay loam and Renohill-Buick complex) which have moderately high runoff potential.

## **DRAINAGE BASINS AND SUB-BASINS**

### **Major Basin Description**

The Safeway Marketplace at Heritage Hills Filing No. 1-C lies within the Willow Creek Watershed, a tributary of Little Dry Creek, and is conveyed to the South Platte River through downtown Englewood. The tributary area upstream of Heritage Hills is primarily undeveloped, with some areas being used as pasture land. The basin is covered with natural grasses and vegetation with no significant tree cover. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (Reference 4) does not indicate any designated 100-year floodplains on or immediately adjacent to the site. The areas covered by The Safeway Marketplace at Heritage Hills were previously addressed in the Phase II Drainage Study for Heritage Hills prepared by JR Engineering, Ltd. in April 1995 (Reference 5) and the Phase III Drainage Study for Heritage Hills Filing No. 1 prepared by JR Engineering, Ltd. in August 1995 and revised in December 1995 (Reference 6).

### **Offsite Basins**

Offsite drainage crosses Lincoln Avenue adjacent to the project site to the east in a 96" culvert which was identified in the Phase III study for Heritage Hills Filing No. 1 delineated as Basin 2 draining approximately 202 acres.

## **DRAINAGE DESIGN CRITERIA**

### **Regulations**

Storm drainage analysis and design criteria used for this project were taken from "Douglas County Storm Drainage Design and Technical Criteria" (DCSDDTC) and the "Urban Storm Drainage Criteria Manual" (USDCM) as required by Douglas County.

The drive aisles and lanes within the project will be private and maintained by the owners. The proposed roadways adjacent to the site on the northeast will be dedicated to the public and

maintained by the County. The allowable surface flows for both the interior drive aisles and dedicated roadways were calculated using the criteria given in the Douglas County manual. Detention for the site is provided for in a downstream facility approved in the Phase II study.

### **Development Criteria**

The Heritage Hills site lies within Rainfall Zone I as shown on Figure 501 in the Douglas County Storm Drainage Design and Technical Criteria manual. Rainfall data from this zone was used for all calculations in this report.

The 5-year storm was used as the minor storm event and was used for sizing of onsite storm sewer inlets and collecting pipes. The 100-year storm was used as the major storm event.

The Rational Method was used sizing for the storm sewer system on and off-site.

## **DRAINAGE FACILITY DESIGN**

### **General Concept**

Runoff from the proposed development is conveyed overland to valley pans and curb and gutter. The valley pans and curb and gutter convey the runoff to private, on-site storm sewers which discharge into existing drainage ways.

The northern portion of the site drains northerly toward an unnamed Willow Creek tributary which discharges into Willow Creek upstream of the existing regional detention facility.

The southern portion of the site drains northeasterly into the proposed extension of the existing storm culvert running under Lincoln Avenue at the southeast corner of the site. The proposed storm sewer extension drains into a proposed drainage way, conveying the runoff to Willow Creek upstream of the existing regional detention facility.

### **Design Details**

Stormwater runoff from the site is conveyed by curb and gutter sections within allowable limits of the drainage criteria manual. Erosion control facilities consisting of hay bales or silt fence will be placed during the construction period in accordance with the erosion control plan.

Hydrologic and hydraulic calculations are included in the Appendix.



## CONCLUSIONS

This Phase III Drainage Study for Safeway Marketplace at Heritage Hills Filing No. 1-C complies with the Douglas County Storm Drainage Design and Technical Criteria and the Urban Drainage Flood Control District Storm Drainage Criteria.

# STANDARD FORM SF-2

## TIME OF CONCENTRATION

SUBDIVISION Antietam Hills Filing 1-C

CALCULATED BY KWD

DATE 8/13/97

$$t_c = t_1 + t_2$$

DESIG: (1)	SUB-BASIN DATA		INITIAL/OVERLAND TIME (t <sub>i</sub> )			TRAVEL TIME (t <sub>t</sub> )				t <sub>c</sub> CHECK (URBANIZED BASINS)			FINAL t <sub>c</sub>	REMARKS
	AREA AC (2)	C <sub>s</sub> (3)	LENGTH FT (4)	SLOPE % (5)	t <sub>i</sub> Min (6)	LENGTH FT (7)	SLOPE % (8)	VEL. FPS (9)	t <sub>t</sub> Min (10)	COMP. t <sub>c</sub> (11)	TOTAL LENGTH FT (12)	t <sub>c</sub> = (L/180)+10 Min (13)		
P	1.75	.87	250	2.5	5.0	210	1.5	2.4	2.4	2.4	500	13.6	7.5	
Q	2.36	.87	260	2.0	5.1	380	1.7	2.6	2.4	2.4	640	13.6	7.5	
R	1.28	.87	240	2.5	4.9	30	1.5	2.4	0.2	5.1	270	11.5	5.1	
S	2.33	.05	300	4.0	20.6	200	2.5	1.2	2.8	23.4	500	12.8	12.8	

STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA WRC ENGINEERING, INC.

CALCULATED BY Jones

DATE 6/11/97

CHECKED BY \_\_\_\_\_

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN  
(RATIONAL METHOD PROCEDURE)

JOB NO. 3216.50

PROJECT Safeway

DESIGN STORM 5yr

*Northern basins*

STREET	DESIGN POINT	DIRECT RUNOFF			TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME		REMARKS						
		AREA DESIGN (AC)	AREA (AC)	RUNOFF COEFF	$t_c$ (MIN)	C-A (AC)	I (IN/HR)	O (CFS)	$t_c$ (MIN)	$\Sigma(C-A)$ (AC)	I (IN/HR)	O (CFS)	SLOPE (%)	DESIGN FLOW (CFS)	SLOPE (%)		PIPE SIZE (IN)	LENGTH (FT)	VELOCITY (FPS)	$t$ (MIN)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
1	South Yosemite St	E	1.59	.87	6.5	1.38	4.5	6.2					1.6	6.2				940	2.5	6.3	time to dfall = 12.8 mins	
2		N	1.35	.87	5.0	1.17	4.9	5.7							5.7	1.2	18	260	6.5	0.7	5' Type R Sump	
3		R	2.26	.87	7.5	2.05	4.2	8.6														
4		M	1.65	.87	5.8	1.44	4.7	6.8					3.3	2.3	6.3	3.0	18	120	9.4	0.2	10' Type R on grade	
5															9.1							
6		L	1.66	.87	5.8	1.44	4.7	6.8							21.1	1.0	24	250	8.2	0.5	Basins N, Q, M	
7		*	Design outfall for 100 year												43.1	43.7						time to dfall = 8.1 mins
8		A	0.83	.87	6.6	0.72	4.45	3.2						8.3	24.8	2.6	24	310	12.3	0.4	Include Slow Flow Basin	
9		B	0.57	.87	5.5	0.50	4.75	2.4							43.8							
10		C	2.50	.87	7.0	2.18	4.35	9.5							28.6							
11		F	1.55	.87	7.1	1.34	4.34	5.9							28.6							

CALCULATED BY Jones  
 DATE 6/11/97  
 CHECKED BY \_\_\_\_\_

STANDARD FORM SF-3

JOB NO 3216-50  
 PROJECT Safeway  
 DESIGN STORM 100 year

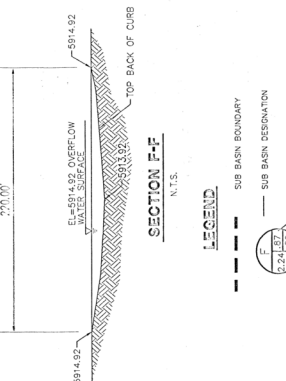
STORM DRAINAGE SYSTEM DESIGN  
 (RATIONAL METHOD PROCEDURE)

STREET	DESIGN POINT	DIRECT RUNOFF				TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME		REMARKS					
		AREA (AC)	RUNOFF COEFF	$t_c$ (MIN)	C.A. (AC)	I IN/HR	$t_c$ (CFS)	$t_c$ (MIN)	Σ(C.A.) (AC)	I (IN/HR)	Q (CFS)	SLOPE (%)	DESIGN FLOW (CFS)	SLOPE (%)	PIPE SIZE	LENGTH (FT)		VELOCITY (FPS)	$t_t$ (MIN)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
1	Surface	N/A	8.30	0.89	-	7.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2	9	✓	1.87	0.89	-	1.66	-	-	-	from dp 3	-	-	-	-	-	-	-	-	-	-	-	
3	11	A,B C,E	5.47	0.89	-	4.87	-	-	15.3	13.91	5.80	80.6	-	-	80.6	-	-	-	-	-	-	
4	4																					
5	10	K	1.04	0.89	5.0	0.93	9.1	8.5														
6	11	I	0.97	0.90	15.3	0.87	5.8	5.1														
7	Undeveloped	S	2.33	0.15	12.8	0.35	6.3	2.2														
8	Lincoln	P	1.75	0.89	7.1	1.55	8.15	13.8														
9	8	O	1.10	0.89	-	0.97	-	-	9.3	2.52	7.25	18.2	1.5	13.8	to dp 1 to dp 9	2.5	300	2.4	2.1			
10	1	F	1.55	0.89	7.1	1.38	-	-	10.5	3.90	6.95	27.1	1.2	13.2	5.0	3.8	150	2.2	1.2			
11	1a	G	1.53	0.89	5.0	1.36	9.1	11.9	10.7	5.26	6.85	36.0	-5.0 to dp 9	22.1	3.2	18	150	14.2	0.2		10' Type 10	

Total time to dp 11 from dp 3 = 15.3 min

100-Year Flow to dp 11



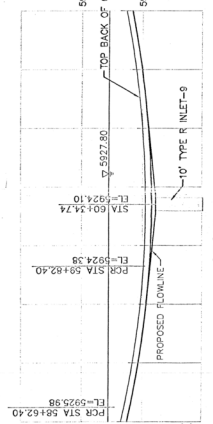
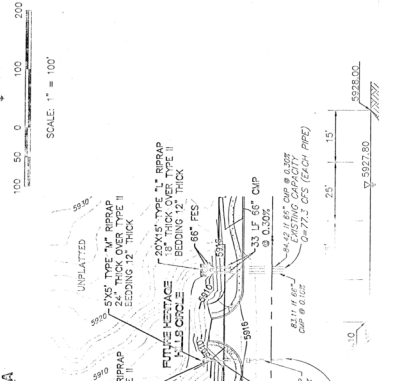
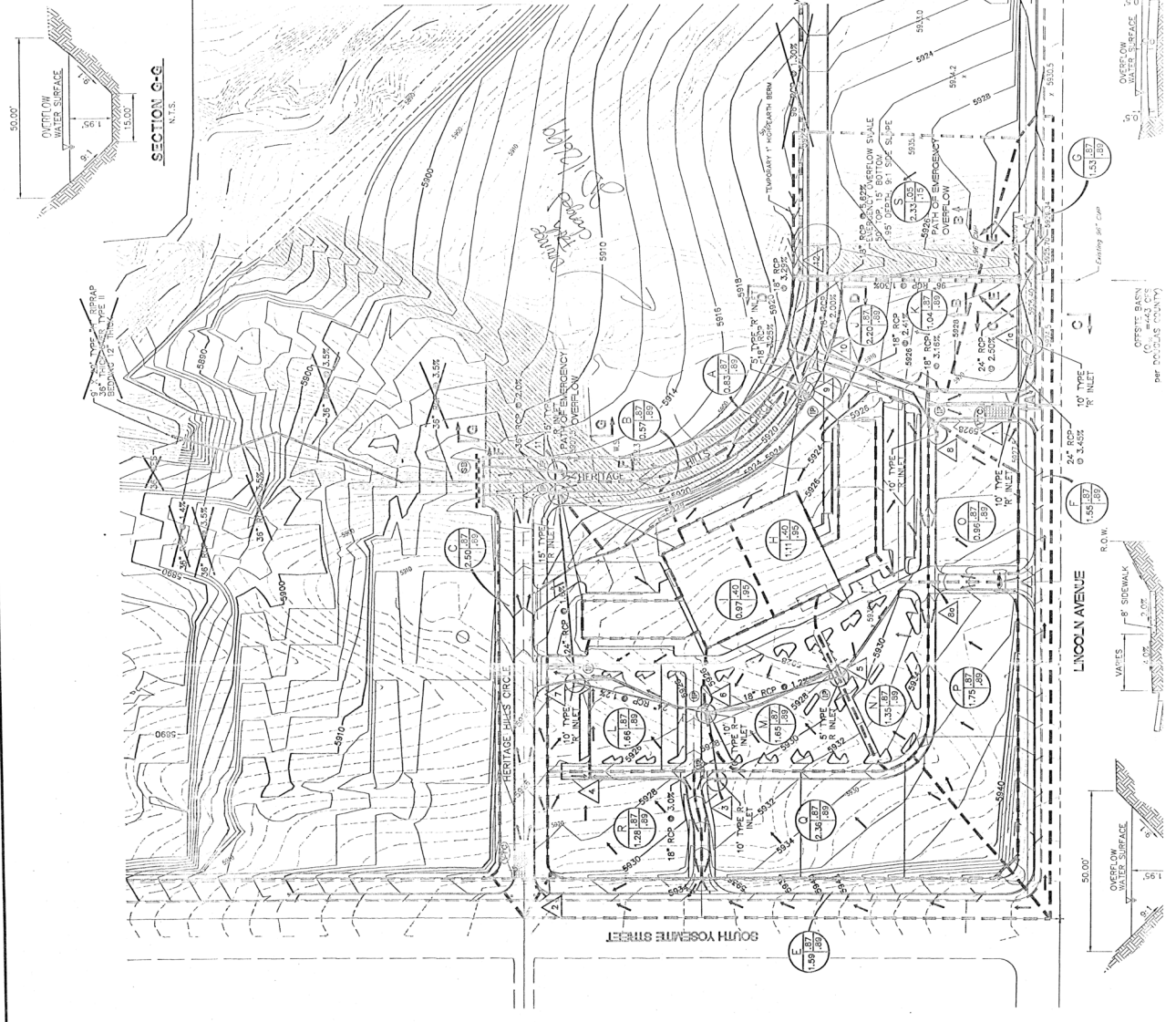
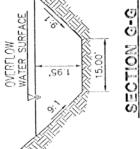


**5-YR SUMMARY RUNOFF TABLE**

BASIN	DESIGN POINT	BASIN AREA (AC)	DISCHARGE(CFS)
A	11	0.83	3.2
B	1	0.57	2.4
C	11	2.50	9.5
E	2	1.59	6.2
F	1	1.55	5.9
G	19	1.53	6.5
H	9	1.11	4.4
I	11	0.97	3.8
J	9	2.20	9.1 (SPLITS)
K	10	1.04	4.4
L	7	1.68	6.8
M	6	1.65	9.1 (COMBINED)
N	5	1.35	5.7
O	8	1.10	7.4 (SPLITS)
P	80	1.75	6.5
<b>Q</b>	<b>3</b>	<b>2.28</b>	<b>8.6</b>
R	4	1.28	5.4
S	12	2.33	0.3

**100-YR SUMMARY RUNOFF TABLE**

BASIN	DESIGN POINT	BASIN AREA (AC)	DISCHARGE(CFS)
A	11	0.83	30.6 (COMBINED)
B	1	0.57	13.8
C	11	2.50	77.2
E	2	1.59	61.2
F	1	1.55	58.5
G	19	1.53	65.9
H	9	1.11	41.4
I	11	0.97	37.8
J	9	2.20	91.2 (SPLITS)
K	10	1.04	41.4
L	7	1.68	68.2
M	6	1.65	91.2 (COMBINED)
N	5	1.35	57.8
O	8	1.10	74.8 (SPLITS)
P	80	1.75	65.9
<b>Q</b>	<b>3</b>	<b>2.28</b>	<b>86.0</b>
R	4	1.28	54.0
S	12	2.33	0.3



1/15 11/28/97, 11/15/97, 11/22/97, 11/29/97, 12/6/97, 12/13/97, 12/20/97, 12/27/97  
 APPROXIMATE EXISTING CAPACITY  
 6-24\"/>