City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 25, 2002

Scott McGee, P.E.
Isaacson & Arfman
128 Monroe St. NE
Albuquerque, New Mexico 87108

RE: **KENSINGTON SUBD PHASE 4** **(H-10/D23B)**
Engineers Certification For Release of Financial Guaranty
Engineers Stamp dated 10/25/2001
Engineers Certification dated 3/21/2002

Dear Mr. McGee:

Based upon the information provided in your Engineers Certification dated 3/21/2002, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty for the above referenced project.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin
Hydrology Plan Checker
Public Works Department

BLB

C: Arlene Portillo, PWD – #623182
File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 9, 2001

Scott M. McGee, P.E.
Isaacson & Arfman, P.A.
128 Monroe NE
Albuquerque, New Mexico 87113

RE: Drainage Plan for Kensington Subdivision Phase 4 (H10-D23B) Dated October 25, 2001

Dear Mr. McGee:

The above referenced drainage plan received October 26, 2001 is approved. Based upon the information in your submittal the above referenced Drainage Report is approved for Preliminary Plat action by the DRB.

If you have any questions please call me at 924-3982.

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 27, 2001

Scott M. McGee, P.E.
Isaacson & Arfman, P.A.
128 Monroe NE
Albuquerque, NM 87108

Re: Drainage Report & Grading Plan Submitted for Preliminary & Final Plat Approval and Work Order Approval: Drainage Report for Kensington Subdivision Phase 4, Engineer's stamp dated 01-18-01 (H10/D023B)

Dear Mr. McGee:

Based upon the information provided in your submittal dated Jan. 18, 2001, the above referenced Drainage Report is approved for Preliminary Plat action by the DRB.

If you have any questions, please call me at 924-3988.

Sincerely,

Nancy Musinski, P.E.
Hydrology/Utility Development
City of Albuquerque Public Works

cc: file

DRAINAGE REPORT

FOR

KENSINGTON SUBDIVISION
PHASE FOUR

A 62 LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION

ALBUQUERQUE NEW MEXICO
JANUARY 2001

Prepared by:

ISAACSON & ARFMAN, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
(505) 268-8828

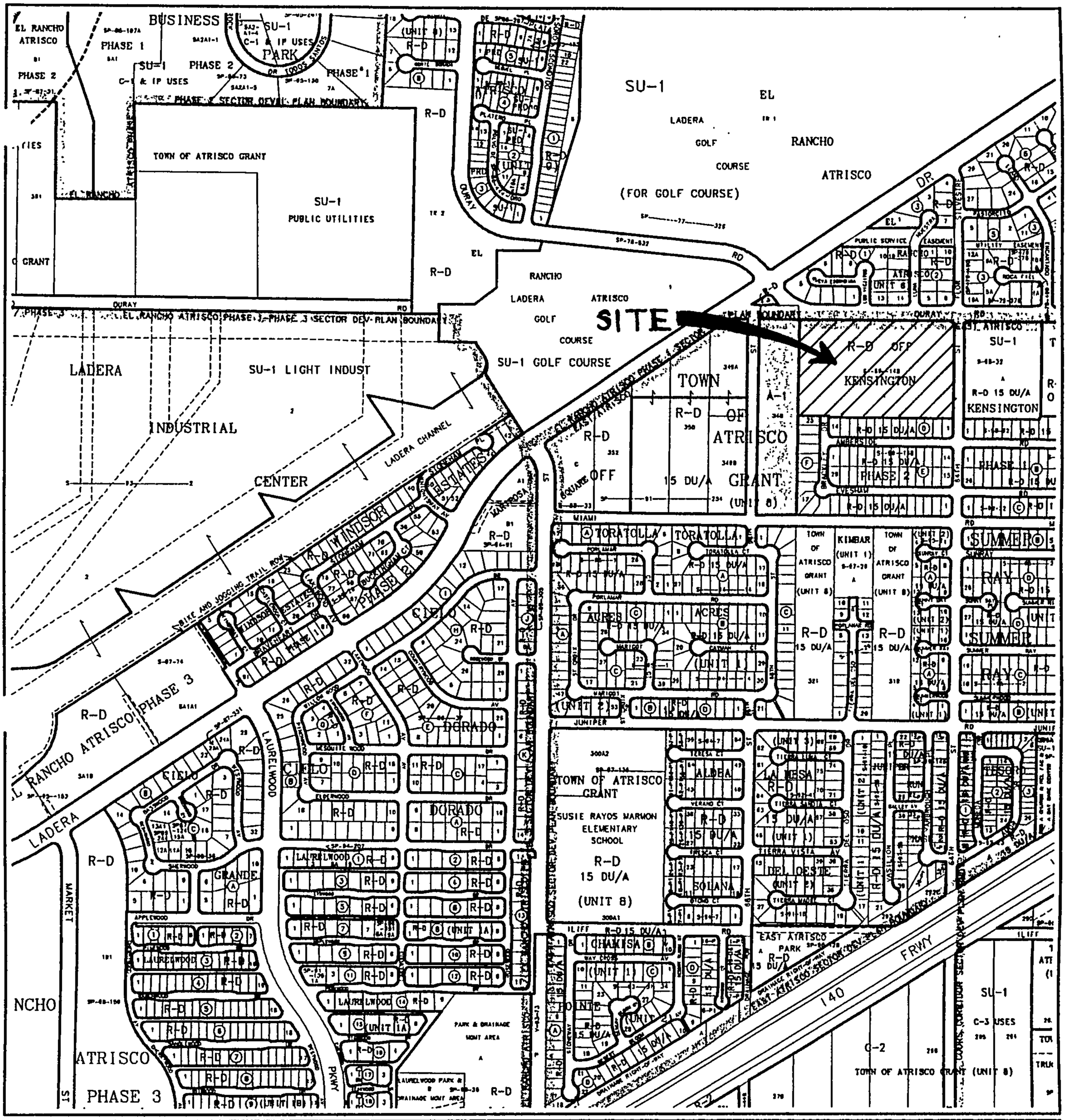
Scott M McGee 01/18/01

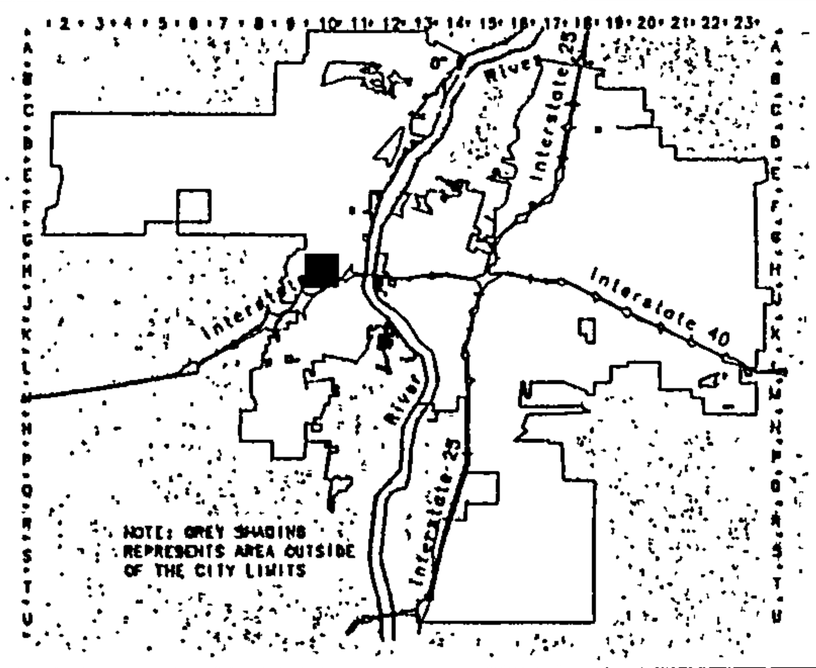
Scott M. McGee, P.E. **Date**

INTRODUCTION

The fourth phase of Kensington Subdivision will be developed as a 62 lot single family residential subdivision. It is bordered on the east by 64th Street and on the north by Ouray Road. The land to the south and east has been developed as Kensington Subdivision Phases One, Two, and Three. To the west is Tract 348 of the Town of Atrisco Grant, Unit 8, an undeveloped parcel of land.

This site was previously addressed in the approved Kensington Subdivision Phases One, Two, and Three Drainage Report (H10/D23). Phase Four was a portion of Phase Three in the initial report, but Phase Three was divided into two separate Phases with the Kensington Subdivision Phase Three submittal. Phase Four was separated because the land west of 64th Street was zoned for office development, and a rezoning request needed to be processed before that area could be approved. Phase Three as addressed in this report is the area located to the east of 64th Street (see attached map).





CITY OF Albuquerque

A lbuquerque G eographic I nformation S ystem

PLANNING DEPARTMENT

GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

H-10-Z

Map Amended through December 08, 2000

I. PROJECT INFORMATION

LEGAL DESCRIPTION: Tract A, Kensington Subdivision Phase Two as filed in the records of the County Clerk of Bernalillo on November 23, 1999 in Book 99C, Page 319.

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
(505) 268-8828
Attn: Scott M. McGee, P.E.

SURVEYOR: Aldrich Land Surveying, Inc.
Attn: Tim Aldrich, NMPLS No. 7719
(505) 884-1990

BENCHMARK: ACS Control Station "2-H10" located at the northwest quadrant of 64th Street and Miami Road NW.
Elevation: 5108.81

ZONING: R-D (15 Du/Ac maximum)

NUMBER OF EXISTING TRACTS: 1

NUMBER OF PROPOSED LOTS: Phase Four: 62

TOTAL AREA: 9.9267 Ac.

II. SITE CHARACTERISTICS

FLOOD HAZARD: Portions of this proposed residential development are identified with a ZONE AH (EL 5110) flood hazard designation as determined by Panel No. 350002-0327 of the September 20, 1996 edition of the F.E.M.A. maps. The following floodplain map shows the ZONE AH encroaching on the northwest corner of the Phase Four area. Upon completion of the project, a LOMR will be requested based on as-built plans of both the site grading and the storm drain proposed to drain the playa area.

huh? more like the western half

ZONE AE
(EL 5109)

ZONE X

ZONE X

ZONE AE
(EL 5109)

ZONE AE
(EL 5124)

ZONE X

ZONE AH
(EL 5110)

ZONE AH
(EL 5109)

SITE

PHASE 4

PHASE 3

PHASE 2

PHASE 1

BERNALILLO COUNTY
UNINCORPORATED AREAS
350001

OURAY ROAD

LOS VIEJITOS

CUEVA ESCONDIDA

OURAY

ROCA FIEL

PASTORCITO

LLANO

LOS TRETOS

NIDO GAVILAN DRIVE

COMPADRES

ENCANTADO

SOL DE VIDA

DRIVE

ROAD

MIAMI

JUNIPER

ILIFF

68TH

64TH

STREET

ESTANCIA

CITY OF AL
350

RM

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 10 NORTH AND RANGE 2 EAST.

FLOOD PLAIN ZONE MAP

FROM FIRM MAP PANEL 327 OF 825

EXISTING CONDITIONS: The site is undeveloped with native vegetative cover typical of the City's west side. It slopes at approximately 1.5% from the northwest to the southeast. A temporary retention pond (constructed with Phase Two), is located along the southern boundary, which captures the undeveloped flows generated within this phase.

64th Street has been improved with standard curb and gutter and 25 feet of permanent pavement along the east side. An existing sump inlet along 64th Street and storm drain to west Tauton Place has been installed. Ouray Road is constructed along the north side with permanent pavement and curb and gutter. The south side will be constructed with this project.

Runoff from the developed portions of 64th Street and Phase Three are collected by the existing storm drain system in 64th Street, and conveyed south to the Miami Road storm drain system. Offsite flows currently enter the site from the playa area to the west.

PROPOSED CONDITIONS: Upon development of Phase Four, the temporary retention pond constructed along the southern property boundary with Phase Two will be removed. The site will be re-graded to direct the developed flows to 64th Street and Brackley Drive.

This site falls within Basins 102 and 103 as defined in the previously approved Kensington Subdivision Drainage Report. which one ?
Basin 101 is an offsite basin to the west, which accounts for portions of the playa floodplain. Additional subbasins were defined for this phase to aid in street flow and sump capacity calculations. (see attached Runoff Calculation Sheet).

Keswick Road will not require any storm drain or inlets (see Table 2 for street flow depths). Street flows up to 8.77 cfs are carried within the streets. Because the maximum 100-year, 6-hour depth is 0.31 ft, the entire flow can be contained with mountable curb & gutter. Approximately half of the flows are directed west to Brackley Drive, the rest is directed east to 64th Street.

Tauton Road will have a 42" storm drain that will carry 36 cfs from offsite Basin 101 to the west, and 23.51 cfs from the sump inlets at Brackley Drive. The storm drain will direct these waters east to the existing 48" pipe in 64th Street, where it will eventually be directed to the Miami Road drain. Up to 13.56 cfs is conveyed within the street on Tauton Road, which is then directed east to the inlets near Tauton Road in 64th Street. Curb & gutter east of

lot 17 shall to be standard 8" curb to carry flow in excess of 10.64 cfs, but west of lot 17, the proposed curb is mountable.

Ouray Road will convey runoff via street flows along Phase Four. The developed flows from the portion of Ouray Road fronting Phase Four will be accepted both at 64th Street and at Brackley Drive. 64th Street will convey these flows plus developed flows from Basin 103 to the existing sump inlet at the intersection of Tauton Place. An additional sump inlet will be added with this Phase along the west side of 64th Street. These combined inlets will capture 43.07 cfs of flows. (Refer to sump capacity calculation sheet and basin map.)

A Letter of Map Revision (LOMR) must be obtained for floodplain areas within Phase Four as part of development. These floodplains will be eliminated by the proposed storm drain system. The offsite floodplain elevation in Basin 101 is 5110', which is lower than lot elevations along the west property line of Phase Four.

In undeveloped conditions, Basin 101 produces 21.0 cfs of flow (refer to runoff calculation sheet.) These stormwaters will be collected by a perforated 36" CMP standpipe inlet at the west end of a 36" storm drain extension to the west property line. (See Offsite Inlet Detail in this report.) This inlet has the capacity to accept up to 24.8 cfs, which exceeds the undeveloped offsite conditions. Upon development in Basin 101, the CMP standpipe

inlet must be removed, and the 36" storm drain extended to allow a maximum of 45 cfs to enter the storm drain system.

CONCLUSIONS & RECOMMENDATIONS

The Drainage Study for revised Kensington Phase Four is consistent with the previously approved Drainage Report for Kensington Subdivision Phases One, Two, and Three that is on file at the Hydrology Division, Public Works Department, City of Albuquerque. Phases One and Two are built, and Phase Three is currently under construction. All conform to the approved plan. The individual recommendations for Phase Four are presented below:

1. Two Type 'A' inlets shall be installed in Brackley Drive and will connect to the 64th Street storm drain system built with Phase One.
2. The temporary pond constructed with Phase Two at the southwest corner of the site is not needed and will be reclaimed as shown on the Grading Plan.
3. One Type "A" inlet will be installed on the west side of 64th Street. It will connect to the existing 64th Street storm drain system built with Phase One.
4. A 36" storm drain will be extended through the drainage right-of-way between Lots 26 and 27 of Block F. A perforated 36" CMP standpipe will collect water from the offsite playa area.
5. A Letter of Map Revision (LOMR) will be required prior to Phase Four financial guarantee release.
6. No rear ponding shall be allowed in this portion of the development.
7. Adjacent lots may share a common lot line drainage swale.

TABLE 1
PHASE FOUR BASIN SUMMARY
(Per Masterplan AHYMO)

Basin ID	Area (Acres)	Contributing Basins	% A	% B	% C	% D	Basin Q (cfs)
101	16.3136		0	20	23	57	53.18
102	6.6176	102a & 102b	0	20	23	57	23.51
*102b	4.1581		0	20	23	57	14.79
103	7.7696	103a, 103b, 103c & 103d	0	20	23	57	43.07
*103c	2.4643		0	20	23	57	8.77
*103d	3.8111		0	20	23	57	13.56

Refer to the attached exhibit for Basin Locations

Show the whole basin, not just part.

*See attached Runoff Calculation sheet for Subbasin calculations

RUNOFF CALCULATIONS FOR Q_{100}

Precip. Zone	Q_{100} Runoff Rates (cfs/ac)			
	A	B	C	D
1	1.29	2.03	2.87	4.37
~~2~~	~~1.56~~	~~2.28~~	~~3.14~~	~~4.70~~
~~3~~	~~1.87~~	~~2.60~~	~~3.45~~	~~5.02~~
~~4~~	~~2.20~~	~~2.92~~	~~3.73~~	~~5.25~~

Analysis Point	Land Treatment Areas (ac)					Q_{100} (cfs)	Remarks
	A_T	A_A	A_B	A_C	A_D		
BASIN 101		100%					
(Undeveloped)	16.3136	16.3136				21.04	Undeveloped off-site flows to the west
BASIN 102		0%	20%	23%	57%		
102b	4.1581		0.8316	0.9564	2.3701	14.79	remainder of Basin 102 after Phase 2
BASIN 103		0%	20%	23%	57%		
103c	2.4643		0.4929	0.5668	1.4047	8.77	Keswick Rd portion of Basin 103
103d	3.8111		0.7622	0.8766	2.1723	13.56	Taunton Rd portion of Basin 103

TABLE 2

STREET FLOW DEPTHS @ KEY LOCATIONS

Street	Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)	EG (ft)
64th Street	@ Tauton Rd	28	std	0.005	43.07	0.67	0.86
Brackley Dr	within Phase 4	28	std	0.006	23.51	0.51	0.64
Tauton Rd	within Phase 4, basin 103	28	std	0.005	13.56	0.44	0.52
Tauton Rd	within Phase 4, basin 103	28	mtbl	0.005	10.64	0.33	0.38
Keswick Rd	within Phase 4, basin 103	28	mtbl	0.005	8.77	0.31	0.36

ANALYZE SUMP INLETS

64TH STREET

DATA:

Q =	43.07	CFS
H =	0.67	FT
C=	0.67	

GRATE OPEN AREA:

GROSS AREA FOR ONE GRATE = 2' - 1 1/2" * 2' - 11 3/8 " =	6.28 SF
LESS BEARING BARS = (0.5")(1/12) * 2.95 * 13 =	1.60 SF
LESS CROSS BARS = (0.5")(1/12) * 2.13 * 7 =	0.62 SF
PLUS THE INTERSECTION COUNTED 2X = (0.5")(1/12) * (0.5")(1/12) *77	0.13 SF
AREA =	**4.2**

*ASSUME 1/2 CLOGGING FACTOR THEREFORE USE AN AREA EQUAL TO 2.1 SF

CALCULATIONS:

FLOW THROUGH THE GRATE = $CA(2gH)^{1/2}$ = 9.24218

FLOW THROUGH DOUBLE THROAT = $CA(2gH)^{1/2}$ = 29.48696

TOTAL CAPACITY= 38.73 EA

RECOMMENDATION:

EXISTING CONDITIONS:

THE FLOWS ALONG 64TH STREET IN THE EXISTING CONDITION TOTAL 23.52 CFS. THIS IS APPROXIMATELY EQUAL TO HALF OF THE ULTIMATE FLOWRATE IN THIS STREET. ONE SUMP INLET WAS INSTALLED ALONG THE EAST SIDE OF 64TH STREET WITH PHASE THREE.

ULTIMATE CONDITIONS:

AN ADDITIONAL TYPE "A" SUMP INLET AT THE INTERSECTION OF TAUTON RD & 64TH STREET WILL BE ADDED TO THE WEST SIDE OF THE ROAD. WITH A TOTAL CAPACITY OF 77.46 CFS. THE TWO INLETS ARE ADEQUATELY SIZED TO HANDLE THE PROPOSED 43.07 CFS OF FLOWS FROM PHASES 3 & 4.

ANALYZE SUMP INLETS

BRACKLEY DRIVE

DATA:

Q =	23.51	CFS
H =	0.51	FT
C=	0.67	

GRATE OPEN AREA:

GROSS AREA FOR ONE GRATE = 2' - 1 1/2" * 2' - 11 3/8 " =	6.28 SF
LESS BEARING BARS = (0.5")(1/12) * 2.95 * 13 =	1.60 SF
LESS CROSS BARS = (0.5")(1/12) * 2.13 * 7 =	0.62 SF
PLUS THE INTERSECTION COUNTED 2X = (0.5")(1/12) * (0.5")(1/12) *77	0.13 SF
AREA =	**4.2**

*ASSUME 1/2 CLOGGING FACTOR THEREFORE USE AN AREA EQUAL TO 2.1 SF

CALCULATIONS:

FLOW THROUGH THE GRATE = $CA(2gH)^{1/2}$ = 8.063473

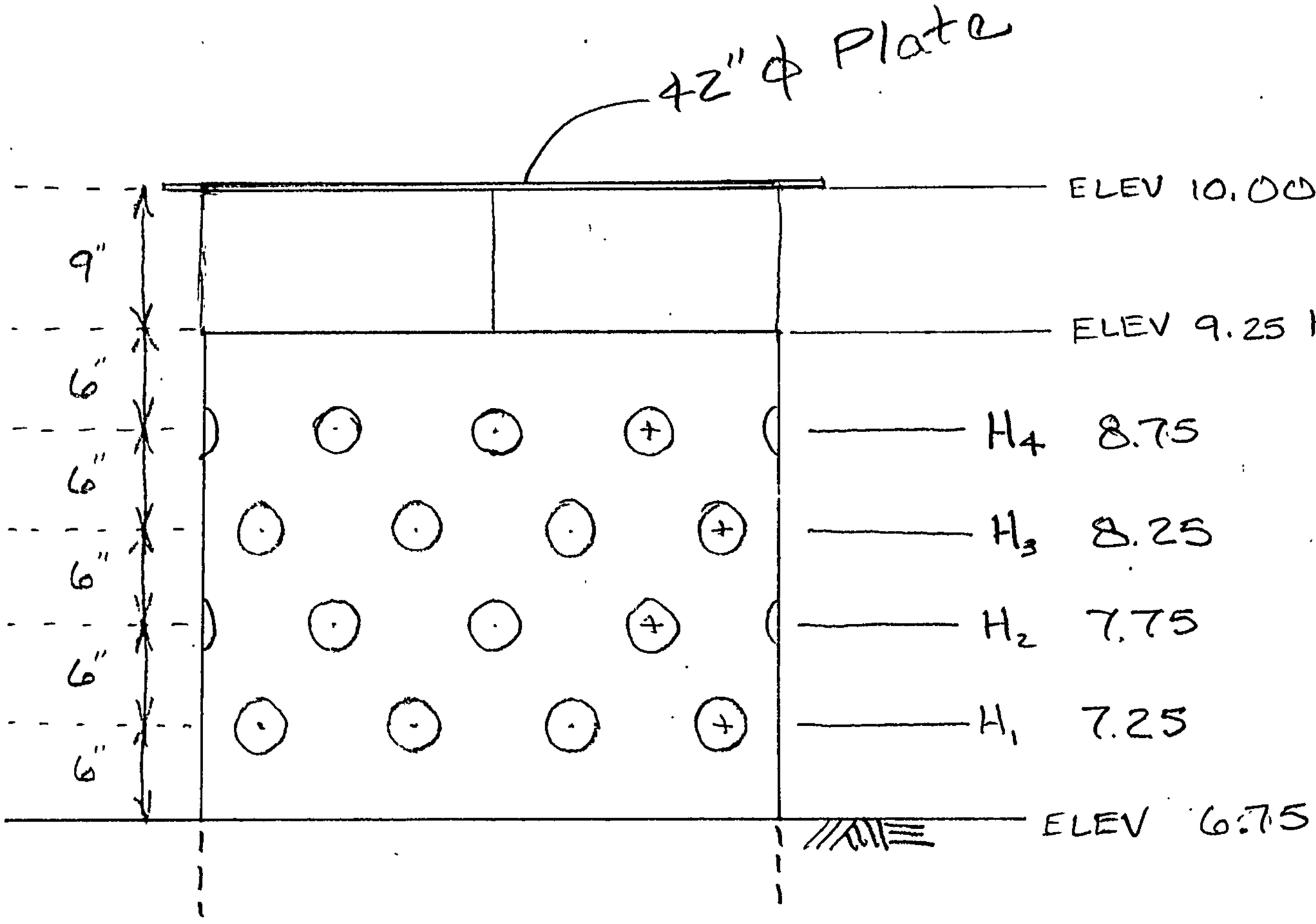
FLOW THROUGH DOUBLE THROAT = $CA(2gH)^{1/2}$ = 25.72632

TOTAL CAPACITY= 33.79 EA

RECOMMENDATION:

ULTIMATE CONDITIONS:

A TYPE "A" SINGLE GRATE SUMP INLET WILL BE ADDED TO EITHER SIDE OF BRACKLEY DRIVE BETWEEN KESWICK RD & TAUTON RD. THE TWO INLETS ARE ADEQUATELY SIZED TO HANDLE THE PROPOSED 23.51 CFS OF FLOWS FROM PHASES 2 & 4.



8-3" ϕ perforations each level
36" ϕ Standpipe - CMP

OFFSITE INLET

ISAACSON & ARFMAN, P.A.

SUBJECT KENSINGTON 4 JOB NO. 1156
BY GLD DATE 1/16/01 SHEET NO. 1 OF 3

Perforations:

ORIFICE EQUATION.

$$Q = CA\sqrt{2gH}$$

Assume $C = 0.60$ $g = 32.2\ ft/s^2$

$$A_e = \frac{\pi}{4}d^2 = \frac{\pi}{4}\left(\frac{3}{12}\right)^2 = 0.049\ ft^2$$

$$A_{level} = 8(0.049\ ft^2) = 0.3927\ ft^2$$

$$Q = 0.6(0.3927 ft^2)\sqrt{2(32.2)H}$$

$$= \underline{1.8908\sqrt{H}}$$

MAX CAPACITY AT WSEL = 9.85 :

$$Q_1 = 1.8908\sqrt{9.85-7.25} = 3.05\ cfs$$

$$Q_2 = 1.8908\sqrt{9.85-7.75} = 2.74\ cfs$$

$$Q_3 = 1.8908\sqrt{9.85-8.25} = 2.39\ cfs$$

$$Q_4 = 1.8908\sqrt{9.85-8.75} = 1.98\ cfs$$

$$\Sigma Q_p = 10.16\ cfs$$

TOP OF STANDPIPE:

WEIR EQUATION

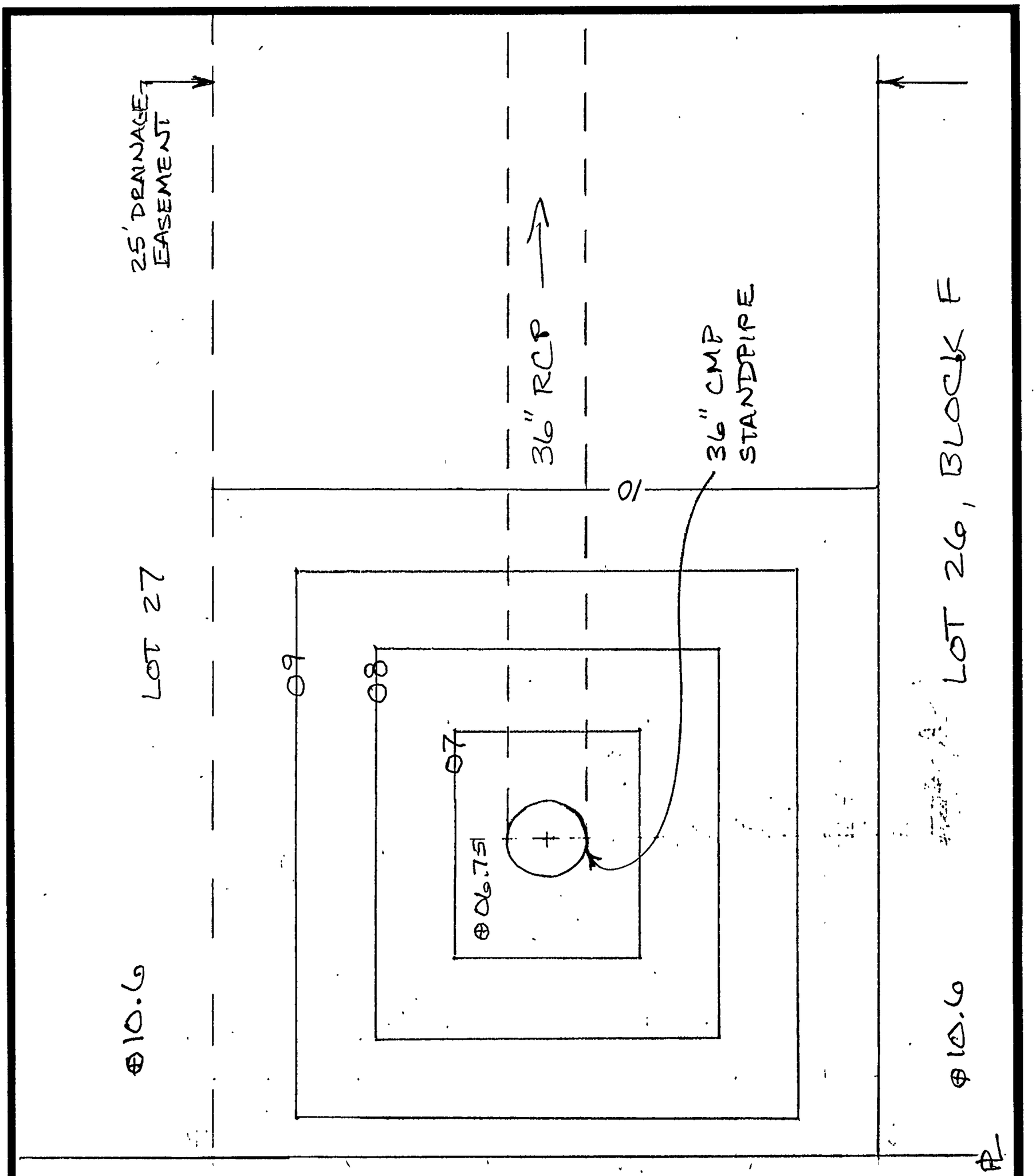
$$Q = CLH^{3/2}$$

Assume $C = 3.33$ L = parimeter

$$Q_{Top} = 3.33(\pi)(3')(0.60')^{3/2} = 14.59\ cfs$$

$$Q_{TOTAL} = 14.59 + 10.16 = \boxed{24.75\ cfs}$$

$> Q_{101}$ (undeveloped) $= 21.04$ cfs $\therefore$ OK



OFFSITE INLET DETAIL