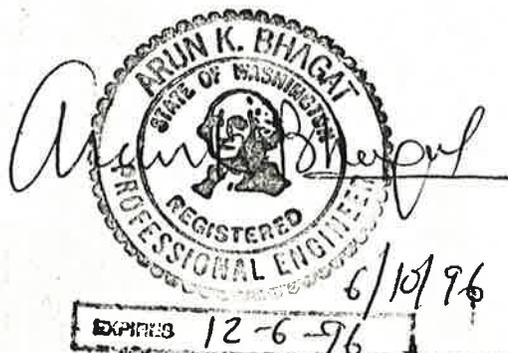


FAMILY COUNSELING SERVICES

ARLINGTON, WASHINGTON

DRAINAGE REPORT

May 22, 1996



96-2084 (H)
RECEIVED

JUN 12 1996

CITY OF ARLINGTON

Prepared By:

AKB Engineers, Inc.
875 140th Ave. NE, Suite 201
Bellevue, WA 98005
PH: (206) 747-3592
Contact: Mr. Shailesh Tatu, P.E.

Prepared For:

Gleason & Associates
2013 4th Ave. Suite #403
Seattle, WA 98121
PH: (206) 441-8830
Contact: Mr. Roger Tucker, A.I.A.

SECTION I

(Project Overview)

1.1 GENERAL PROJECT DESCRIPTION

The subject property is located at 223 Burke Ave. (near the intersection between Burke Avenue and Newberry Street) in Arlington, Washington. The proposed project area is bounded on the north by a gravel alley roadway, on the west and east by existing private residences, and on the south by Burke Avenue. Presently, an abandoned existing residence and garage are located along the north portion of the property. In addition, a concrete walk runs north-south through the existing site. A concrete retaining wall parallels the south, and a portion of the west, property line. The sidewalk along Burke Avenue is approximately 2-3 feet higher than existing site grades along the base of the retaining wall. The existing buildings and concrete walk will be demolished upon development of the property. Due to the close proximity of some of the existing trees to the proposed building, they will be removed during construction.

The total site area comprises of 0.17 acres (7,500 ft²). The existing on-site topography declines towards the south at an average slope of approximately 2.5%. The maximum topographic rise throughout the site is on the order of 3 feet (Hi: 106.90' Low: 103.95').

The on-site vegetation consists of primarily grass, with mature deciduous and coniferous trees along the south and southwest portions of the property.

Under the proposed project, a rectangular-shaped, two-story building with associated areas for parking and landscaping will be constructed. The subject development will serve to provide assisted living housing.

1.2 EXISTING DRAINAGE CONDITIONS

Currently, surface stormwater sheetflows overland towards the south. Since there is no physical hydraulic outlet for the stormwater along the southern portion of the property (i.e. retaining wall), it is anticipated that surface runoff is directly infiltrated into the ground. The geotechnical report prepared by Nelson-Couvrette & Associates describe on-site soils consisting of combinations of sand and gravel. Based on soil test pit observations, the ground water elevation was found to be well below surface grades (8 ft.). However, the geotechnical report noted that the water table may fluctuate seasonally and may rise higher than observed elevations during the wetter periods of the year due to surface and sub-surface flows.

1.3 PROPOSED DRAINAGE SYSTEM

On-site stormwater infiltration is proposed for the project. The infiltration system (trench) will be located underneath the proposed parking area. The infiltration trench consists of a 12 inch diameter perforated PVC pipe with gravel fill. The surface runoff from all impervious areas within the parking lot will be directed to the trench. In addition, the proposed stormwater drainage system will direct rooftop runoff to the infiltration system.

SECTION II

(Infiltration System Analysis and Design)

2.1 INFILTRATION TRENCH SIZING CALCULATIONS

The design calculations for the infiltration trench are based on the criterias outlined in a meeting with Mr. Edward McMillan (P.E.), the City of Arlington's Public Works Director, on May 15, 1996. Under Mr. McMillan's direction, the infiltration system was designed to accommodate storms up to the 50-yr/24-hr event. The design parameters are listed below. The supporting calculations are shown in the following pages.

A. Tributary area to the infiltration trench

- a. Impervious areas (i.e. parking, rooftop, etc.): 0.10 acres
- b. Pervious areas (i.e. lawn, landscaping, etc.): 0.01 acres

B. Total storage volume provided for the infiltration system

1. Design parameters for infiltration trench volume calculations

a. Trench dimensions:

- Length (l_t) = 50 ft
- Width (w_t) = 3 ft
- Depth (d_t) = 3 ft
- Assume 30% void ratio of the drain rock

2. Design parameters for perforated pipe volume calculations

a. Pipe dimensions:

- Length (l_p) = 50 ft
- Diameter (d_p) = 12 inches

3. Design parameters for catch basin volume calculations

a. Catch basin dimensions:

- Length (l_c) = 2 ft
- Diameter (w_c) = 2 ft
- Depth (d_c) = 4 ft

$$\begin{aligned}\text{Total provided vol.} &= (\text{drain rock vol.})(0.30) + \text{pipe vol.} + \text{catch basin vol.} \\ &= [(l_t)(w_t)(d_t)(0.30)] + (3.14)(d_p/2)^2(l_p) + [(l_c)(w_c)(d_c)] \\ &= 159.27 \text{ ft}^3\end{aligned}$$

C. Precipitation

1. 50-yr/24-hr design storm event = 3.50 inches

D. Design infiltration rate

1. $i = 8.27$ inches/hr (per geotechnical report prepared by Nelson Couvrette)

6/5/96 3:37:32 pm

AKB Consulting Engineers
FAMILY COUNSELING SERVICES

page 1

AKB JOB #96044
50-YR STORM INFILTRATION SYSTEM DESIGN

=====

LEVEL POOL TABLE SUMMARY

<-----DESCRIPTION----->	MATCH (cfs)	INFLOW (cfs)	-STO- --id-	-DIS- --id-	<-PEAK-> <-STAGE>	id	STORAGE VOL (cf)
50-YR STORM EVENT	0.03	0.08	1	1	102.35	10	129.96 cf

AKB JOB #96044
50-YR STORM INFILTRATION SYSTEM DESIGN

=====

HYDROGRAPH SUMMARY

HYD NUM	PEAK RUNOFF RATE cfs	TIME OF PEAK min.	VOLUME OF HYDRO cf\AcFt	Contrib Area Acres
1	0.083	490	1225 cf	0.11
10	0.028	480	1225 cf	0.11

AKB JOB #96044
 50-YR STORM INFILTRATION SYSTEM DESIGN

=====

STAGE STORAGE TABLE

CUSTOM STORAGE ID No. 1
 Description: INFILTRATION SYSTEM STORAGE

STAGE <----STORAGE---->											
(ft)	---cf---	--Ac-Ft-									
100.00	0.0000	0.0000	100.80	36.000	0.0008	101.60	86.562	0.0020	102.40	132.27	0.0030
100.10	4.5000	0.0001	100.90	40.500	0.0009	101.70	93.489	0.0021	102.50	136.77	0.0031
100.20	9.0000	0.0002	101.00	45.000	0.0010	101.80	100.42	0.0023	102.60	141.27	0.0032
100.30	13.500	0.0003	101.10	51.927	0.0012	101.90	107.34	0.0025	102.70	145.77	0.0033
100.40	18.000	0.0004	101.20	58.854	0.0014	102.00	114.27	0.0026	102.80	150.27	0.0034
100.50	22.500	0.0005	101.30	65.781	0.0015	102.10	118.77	0.0027	102.90	154.77	0.0036
100.60	27.000	0.0006	101.40	72.708	0.0017	102.20	123.27	0.0028	103.00	159.27	0.0037
100.70	31.500	0.0007	101.50	79.635	0.0018	102.30	127.77	0.0029	103.00	159.27	0.0037

AKB JOB #96044
 50-YR STORM INFILTRATION SYSTEM DESIGN

=====

STAGE DISCHARGE TABLE

DISCHARGE LIST ID No. 1
 Description: INFILT. RATE (i) = 8.27 in/hr

STAGE (ft)	<--DISCHARGE--> ---cfs--	STAGE (ft)	<--DISCHARGE--> ---cfs--	STAGE (ft)	<--DISCHARGE--> ---cfs--	STAGE (ft)	<--DISCHARGE--> ---cfs--
100.00	0.0280	100.80	0.0280	101.60	0.0280	102.40	0.0280
100.10	0.0280	100.90	0.0280	101.70	0.0280	102.50	0.0280
100.20	0.0280	101.00	0.0280	101.80	0.0280	102.60	0.0280
100.30	0.0280	101.10	0.0280	101.90	0.0280	102.70	0.0280
100.40	0.0280	101.20	0.0280	102.00	0.0280	102.80	0.0280
100.50	0.0280	101.30	0.0280	102.10	0.0280	102.90	0.0280
100.60	0.0280	101.40	0.0280	102.20	0.0280	103.00	0.0280
100.70	0.0280	101.50	0.0280	102.30	0.0280	103.00	0.0280

AKB JOB #96044
50-YR STORM INFILTRATION SYSTEM DESIGN

=====

BASIN SUMMARY

BASIN ID: 50DEV	NAME: 50-YR STORM, DEVELOPED SITE		
SCS METHODOLOGY			
TOTAL AREA.....:	0.11 Acres	BASEFLOWS:	0.00 cfs
RAINFALL TYPE.....:	TYPE1A	PERV	IMP
PRECIPITATION.....:	3.50 inches	AREA...:	0.01 Acres 0.10 Acres
TIME INTERVAL.....:	10.00 min	CN.....:	86.00 98.00
		TC.....:	5.00 min 5.00 min
ABSTRACTION COEFF:	0.20		
PEAK RATE:	0.08 cfs	VOL:	0.03 Ac-ft TIME: 490 min ;