EXHIBIT 9
PAGE 1 OF 2

G.R. (BOB) PARROTT, P.E.
Consulting Civil, Traffic and Transportation Engineering
P.O. Box 2715 Woodinville, WA 98072 Phone/Fax 425-481-3027 Cell 206-406-7899

November 29, 2004

JN: 0412

City of Woodinville
Public Works Department

RE: Georgian Heights: Private Road with 3 Lots at the NE Corner of the Site.

Gentlemen:

The attached storm water runoff and detention sizing computations are a supplement to the Technical Information Report, dated April 2004, previously submitted. Please note that the areas encompassing the private access road section and the proposed 3 lots are included in these computations and the detention facility is sized accordingly.

If you have any questions or require additional data, please call me.

Sincerely,

G.R. (Bob) Parrott, P.E.

G.R. PARROTT
STATE OF WASHINGTON
11205
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 12/2005

RECEIVED
DEC 29 2004
CITY OF WOODINVILLE
PLANNING DEPARTMENT

0412 11-23-04 GEORGIAN HEIGHTS PH IV

EXHIBIT 18
PAGE 2 OF 36

PRELIM RUNOFF / DETENTION SIZING CALCS

3 LOTS @ NE CORNER

EXISTING CONDITIONS

LOT AREA = 15,032 SF

ACCESS RD. AREA = 8,605 SF

TOTAL AREA OF DISTURBANCE = 23,637 SF = 0.54 Ac.

TILL FOREST.

DEVELOPED CONDITIONS

TILL GRASS AREA = 50% OF LOT AREA

= 7,516 SF = 0.17 Ac.

IMPERVIOUS AREA = 50% OF LOT AREA + ACCESS RD. AREA

= 7,516 + 8,605

= 16,121 SF = 0.37 Ac.

RESULTS

YR	PREDEV.	DEV.
100	0.044 cfs	0.211 cfs
25	0.034	0.139
10	0.026	0.126
2	0.015	0.105

USE LEVEL 1 : SEE COMPUTER PRINTOUT FOLLOWING.

W.Q.: BIOSWALE / DISPERSION

EXHIBIT 18
PAGE 30 of 38

Retention/Detention Facility

Type of Facility:	Detention Tank	
Tank Diameter:	7.00	ft
Tank Length:	122.	ft
Effective Storage Depth:	6.50	ft
Stage 0 Elevation:	0.00	ft
Storage Volume:	4531.	cu. ft
Riser Head:	6.50	ft
Riser Diameter:	12.00	inches
Number of orifices:	2	

Orifice #	Height (ft)	Diameter (in)	Full Head Discharge (CFS)	Pipe Diameter (in)
1	0.00	0.51	0.018	
2	5.16	0.51	0.008	4.0

Top Notch Weir: None

Outflow Rating Curve: None

Stage (ft)	Elevation (ft)	Storage (cu. ft)	Storage (ac-ft)	Discharge (cfs)	Percolation (cfs)
0.00	0.00	0.	0.000	0.000	0.00
0.01	0.01	0.	0.000	0.001	0.00
0.02	0.02	0.	0.000	0.001	0.00
0.03	0.03	0.	0.000	0.001	0.00
0.04	0.04	0.	0.000	0.001	0.00
0.15	0.15	0.	0.000	0.003	0.00
0.26	0.26	0.	0.000	0.004	0.00
0.37	0.37	186.	0.004	0.004	0.00
0.48	0.48	250.	0.006	0.005	0.00
0.59	0.59	316.	0.007	0.005	0.00
0.70	0.70	386.	0.009	0.006	0.00
0.81	0.81	457.	0.011	0.006	0.00
0.92	0.92	532.	0.012	0.007	0.00
1.03	1.03	608.	0.014	0.007	0.00
1.14	1.14	686.	0.016	0.008	0.00
1.25	1.25	767.	0.018	0.008	0.00
1.36	1.36	848.	0.019	0.008	0.00
1.47	1.47	932.	0.021	0.009	0.00
1.58	1.58	1017.	0.023	0.009	0.00
1.70	1.70	1111.	0.026	0.009	0.00
1.81	1.81	1198.	0.028	0.009	0.00
1.92	1.92	1287.	0.030	0.010	0.00
2.03	2.03	1376.	0.032	0.010	0.00
2.14	2.14	1467.	0.034	0.010	0.00
2.25	2.25	1558.	0.036	0.011	0.00
2.36	2.36	1650.	0.038	0.011	0.00
2.47	2.47	1742.	0.040	0.011	0.00
2.58	2.58	1835.	0.042	0.011	0.00
2.69	2.69	1928.	0.044	0.012	0.00
2.80	2.80	2021.	0.046	0.012	0.00
2.91	2.91	2115.	0.049	0.012	0.00
3.02	3.02	2208.	0.051	0.012	0.00
3.13	3.13	2302.	0.053	0.012	0.00
3.24	3.24	2395.	0.055	0.013	0.00
3.35	3.35	2489.	0.057	0.013	0.00
3.46	3.46	2582.	0.059	0.013	0.00
3.57	3.57	2674.	0.061	0.013	0.00
3.68	3.68	2766.	0.064	0.014	0.00
3.79	3.79	2858.	0.066	0.014	0.00

EXHIBIT 18
PAGE 4 OF 39

Retention/Detention Facility

Type of Facility:	Detention Tank	
Tank Diameter:	5.00	ft
Tank Length:	242.	ft
Effective Storage Depth:	4.50	ft
Stage 0 Elevation:	0.00	ft
Storage Volume:	4506.	cu. ft
Riser Head:	4.50	ft
Riser Diameter:	12.00	inches
Number of orifices:	2	

Orifice #	Height (ft)	Diameter (in)	Full Head Discharge (CFS)	Pipe Diameter (in)
1	0.00	0.56	0.018	
2	3.17	0.51	0.008	4.0

Top Notch Weir: None
Outflow Rating Curve: None

Stage (ft)	Elevation (ft)	Storage (cu. ft)	Storage (ac-ft)	Discharge (cfs)	Percolation (cfs)
0.00	0.00	0.	0.000	0.000	0.00
0.01	0.01	0.	0.000	0.001	0.00
0.02	0.02	0.	0.000	0.001	0.00
0.03	0.03	0.	0.000	0.002	0.00
0.04	0.04	0.	0.000	0.002	0.00
0.05	0.05	0.	0.000	0.002	0.00
0.15	0.15	0.	0.000	0.003	0.00
0.25	0.25	0.	0.000	0.004	0.00
0.35	0.35	288.	0.007	0.005	0.00
0.45	0.45	381.	0.009	0.006	0.00
0.55	0.55	478.	0.011	0.006	0.00
0.65	0.65	579.	0.013	0.007	0.00
0.75	0.75	682.	0.016	0.007	0.00
0.85	0.85	788.	0.018	0.008	0.00
0.95	0.95	897.	0.021	0.008	0.00
1.05	1.05	1008.	0.023	0.009	0.00
1.15	1.15	1121.	0.026	0.009	0.00
1.25	1.25	1235.	0.028	0.009	0.00
1.35	1.35	1351.	0.031	0.010	0.00
1.45	1.45	1469.	0.034	0.010	0.00
1.55	1.55	1588.	0.036	0.011	0.00
1.65	1.65	1707.	0.039	0.011	0.00
1.75	1.75	1827.	0.042	0.011	0.00
1.85	1.85	1948.	0.045	0.012	0.00
1.95	1.95	2069.	0.047	0.012	0.00
2.05	2.05	2190.	0.050	0.012	0.00
2.15	2.15	2311.	0.053	0.012	0.00
2.25	2.25	2431.	0.056	0.013	0.00
2.35	2.35	2552.	0.059	0.013	0.00
2.45	2.45	2671.	0.061	0.013	0.00
2.55	2.55	2790.	0.064	0.014	0.00
2.65	2.65	2907.	0.067	0.014	0.00
2.75	2.75	3023.	0.069	0.014	0.00

EXHIBIT 18
PAGE 5 OF 20

2.85	2.85	3138.	0.072	0.014	0.00
2.95	2.95	3251.	0.075	0.015	0.00
3.05	3.05	3362.	0.077	0.015	0.00
3.15	3.15	3470.	0.080	0.015	0.00
3.17	3.17	3492.	0.080	0.015	0.00
3.18	3.18	3503.	0.080	0.015	0.00
3.19	3.19	3513.	0.081	0.016	0.00
3.20	3.20	3524.	0.081	0.016	0.00
3.21	3.21	3534.	0.081	0.017	0.00
3.31	3.31	3639.	0.084	0.018	0.00
3.41	3.41	3741.	0.086	0.019	0.00
3.51	3.51	3839.	0.088	0.020	0.00
3.61	3.61	3933.	0.090	0.021	0.00
3.71	3.71	4024.	0.092	0.022	0.00
3.81	3.81	4110.	0.094	0.022	0.00
3.91	3.91	4191.	0.096	0.023	0.00
4.01	4.01	4266.	0.098	0.023	0.00
4.11	4.11	4334.	0.099	0.024	0.00
4.21	4.21	4395.	0.101	0.025	0.00
4.31	4.31	4447.	0.102	0.025	0.00
4.41	4.41	4487.	0.103	0.026	0.00
4.50	4.50	4506.	0.103	0.026	0.00
4.60	4.60	4506.	0.103	0.335	0.00
4.70	4.70	4506.	0.103	0.898	0.00
4.80	4.80	4506.	0.103	1.630	0.00
4.90	4.90	4506.	0.103	2.420	0.00
5.00	5.00	4506.	0.103	2.700	0.00
5.10	5.10	4506.	0.103	2.960	0.00
5.20	5.20	4506.	0.103	3.190	0.00
5.30	5.30	4506.	0.103	3.410	0.00
5.40	5.40	4506.	0.103	3.620	0.00
5.50	5.50	4506.	0.103	3.810	0.00
5.60	5.60	4506.	0.103	4.000	0.00
5.70	5.70	4506.	0.103	4.170	0.00
5.80	5.80	4506.	0.103	4.340	0.00
5.90	5.90	4506.	0.103	4.510	0.00
6.00	6.00	4506.	0.103	4.660	0.00
6.10	6.10	4506.	0.103	4.820	0.00
6.20	6.20	4506.	0.103	4.960	0.00
6.30	6.30	4506.	0.103	5.110	0.00
6.40	6.40	4506.	0.103	5.250	0.00
6.50	6.50	4506.	0.103	5.380	0.00

Hyd	Inflow	Outflow		Peak		Storage	
		Target	Calc	Stage	Elev	(Cu-Ft)	(Ac-Ft)
1	0.21	*******	0.18	4.55	4.55	4506.	0.103
2	0.10	*******	0.09	4.52	4.52	4506.	0.103
3	0.11	0.03	0.03	4.50	4.50	4506.	0.103
4	0.11	*******	0.02	3.73	3.73	4041.	0.093
5	0.13	*******	0.02	3.58	3.58	3903.	0.090
6	0.07	0.01	0.01	2.64	2.64	2890.	0.066
7	0.09	*******	0.01	1.91	1.91	2023.	0.046
8	0.10	*******	0.01	1.65	1.65	1710.	0.039

STORMWATER AND TECHNICAL INFORMATION REPORT

For

GEORGIAN HEIGHTS PHASE III & IV (LAKEWOOD CONSTRUCTION)

CITY OF WOODINVILLE

At

20103 – 136th AVENUE, NE.
SEC 03-26-5

In

THE CITY OF WOODINVILLE

April, 2004

By

G.R. (BOB) PARROTT, P.E.
P.O. BOX 2715 WOODINVILLE, WA 98072-2715
Ph. 425-481-3027 Fax 425-481-3027

EXPIRES 10-03-05

TABLE OF CONTENTS

ATTACHMENTS

EXHIBIT 18
PAGE 2 OF 38

GEORGIAN HEIGHTS

EXHIBIT 18
PAGE 8 OF 38

I PROJECT OVERVIEW

EXISTING CONDITIONS

The subject site consists of 3 separate parcels known as the Northshore School properties. Two of the three parcels are located at 20103 136th Avenue NE. The third parcel fronts NE 205th St., but is contiguous with the 20103 136th Ave NE parcels. The project is currently split into Phase III and Phase IV.

Phase III consists of a rectangular shaped parcel with approximately 370 feet of frontage along the west side of 136th avenue NE. The developable portion of the site encompasses approximately 3.0 acres adjacent to 136th Avenue NE. The area to the west, adjoining the developable area, consists of a seasonal creek, wetland and wetland buffer areas. The topography slopes downward from west to east at relatively gentle to moderate gradients from 5% to 15%. The site is covered with predominantly open/pasture areas. A gravel driveway provides vehicular access to an existing residence located in the eastern portion of the site, outside the study/developable area. See Geotech report.

Phase IV consists of a rectangular parcel plus an irregular shaped parcel having a gross area of 19.22 acres (837,223 s.f.), of which approximately 7.3 acres (317,076 s.f.) is developable. The site is bounded by NE 205th St. on the north, with 600 feet of frontage. The remaining 12 acres consists of two seasonal creeks and creek buffer areas, two wetlands and wetland buffer areas. The topography slopes generally from west to east and north & south at varying percentages. The Phase IV site is covered with mixed forest with moderate to thick underbrush, to open/pasture areas. See attached Geotech report by Associated Earth Sciences, Inc.

Runoff currently sheet flows across onsite wetlands and concentrated uphill offsite flows through seasonal creeks fed by uphill water sources. This water flow occurs from west to east and then exits the site north & south to downstream seasonal creeks. It appears that these onsite wetlands and seasonal creeks are provided surface water by man-made impervious surfaces, such as the paved streets, roof-top drainages, and surface water detention ponds (See attached Construction drawings for Cedar Park North; Attachment A-1). None of the uphill water flow appears to originate from a natural water course or other natural uphill wetland.

These wetlands and seasonal creeks have been named the following for purposes of this Report: "Leckner Creek", "Gonzales Creek", "Boehmer Creek", and "Creekside Drainage", "Church Creek", "Cedar Park Wetland" and "NE202nd Wetland". Aerial photographs from 1936, 1977 and 1999 identify man-made conversion of Upland areas to Wetland areas, currently found on the Phase IV project site (See attached Aerial photographs, named "1936", "1977" and "1999", respectively. Runoff from uphill areas is intercepted and directed through portions of the site via man-made ditch lines, man-made directed outfall pipes and man-made drainage swales. There is very minimal off-site flow entering the subject site development area, because of natural topographical constraints.

The runoff from uphill areas approaching the Phase III project site is concentrated into two separate "un-named creeks that bypass the Phase III project site (see Phase IV site plan {80 scale drawing})"and therefore must bypass the Phase III project site infiltration pond. This concentrated water flow results from natural topographical constraints, thereby projecting the uphill runoff into each of the two "un-named creeks." For purposes of clarity, each of these two "un-named creeks" have been identified as "Leckner Creek" and ""Gonzales Creek" (See Phase IV site plan {80 scale drawing}). As such, the Phase III project site does not create backwater effects to the upstream drainage system; therefore, the evaluation of the upstream drainage system is exempted by KCSWDM 1.2.2 (p.1-19).

Uphill off-site water flows bypass the Phase IV development site via Leckner Creek, Boehmer Creek and Creekside Drainage and exit the site via Leckner Creek, Church Creek and Gonzales Creek. As such, the Phase IV project site does not create backwater effects to the upstream drainage system; therefore, the evaluation of the upstream drainage system is exempted by KCSWDM 1.2.2 (p.1-19).

Site soils are classified as "Everett Gravelly Sandy Loam (EvC)", Hydrologic Soil Group "A" per SCS classification and Soils Survey Map, which is equivalent KCRTS Soil Group "Outwash". However, underlying soils at various depths are till.

PROPOSED POST-DEVELOPMENT CONDITIONS

The project proposes to subdivide Phase III into a total of 19 lots, and Phase IV into a total of 35 lots, for the construction of single-family residences. The project proposes to collect and convey all surface runoff, via tight line, in accordance with the 1998 King County SWM Design Manual, and the City's Conditions of Approval, to a proposed infiltration pond located in Phase III and to two separate in-street detention pipes in Phase IV, with secondary, above-ground, water quality facilities.

To prevent adverse impacts to downstream properties caused by diversion of flow from one flow path to another, and to discharge in a manner that does not significantly impact downhill properties or drainage systems, a level spreader (i.e. flow dispersal trench per 1998 KCSWDM 4.2.2 OUTFALL SYTEMS p.4-31 & 4-32) is designed for the Outfall System for each of the two in-street detention pipes and secondary above-ground detention ponds with appropriately sized Water Quality Grass-lined swales, per Core Requirement #1, Section 1.2.1.

Access to Phase III will be via a newly constructed roadway from 136th Avenue NE, ending in a cul-de-sac. Access to Phase IV will be via a newly constructed roadway from NE 205th St, ending in a cul-de-sac, and from an extension of the Phase III road (see Site plans). Sanitary sewer, water and other utility services will be provided.

3.16	3.16	5315.	0.122	0.000	0.17	2539.
3.26	3.26	5572.	0.128	0.000	0.17	2602.
3.36	3.36	5835.	0.134	0.000	0.17	2665.
3.46	3.46	6105.	0.140	0.000	0.17	2728.
3.56	3.56	6381.	0.146	0.000	0.17	2793.
3.66	3.66	6663.	0.153	0.000	0.17	2858.
3.76	3.76	6952.	0.160	0.000	0.17	2924.
3.86	3.86	7248.	0.166	0.000	0.17	2990.
3.96	3.96	7550.	0.173	0.000	0.17	3057.
4.06	4.06	7859.	0.180	0.000	0.17	3125.
4.16	4.16	8175.	0.188	0.000	0.17	3194.
4.26	4.26	8498.	0.195	0.000	0.17	3263.
4.36	4.36	8828.	0.203	0.000	0.17	3334.
4.46	4.46	9165.	0.210	0.000	0.17	3404.
4.56	4.56	9509.	0.218	0.000	0.17	3476.
4.66	4.66	9860.	0.226	0.000	0.17	3548.
4.76	4.76	10219.	0.235	0.000	0.17	3621.
4.86	4.86	10584.	0.243	0.000	0.17	3695.
4.96	4.96	10958.	0.252	0.000	0.17	3770.
5.00	5.00	11109.	0.255	0.000	0.17	3800.
5.10	5.10	11493.	0.264	0.308	0.17	3875.
5.20	5.20	11884.	0.273	0.871	0.17	3951.
5.30	5.30	12283.	0.282	1.600	0.17	4028.
5.40	5.40	12690.	0.291	2.390	0.17	4106.
5.50	5.50	13104.	0.301	2.670	0.17	4184.
5.60	5.60	13527.	0.311	2.930	0.17	4263.
5.70	5.70	13957.	0.320	3.160	0.17	4343.
5.80	5.80	14395.	0.330	3.380	0.17	4423.
5.90	5.90	14842.	0.341	3.590	0.17	4505.
6.00	6.00	15296.	0.351	3.780	0.17	4587.
6.10	6.10	15759.	0.362	3.970	0.17	4669.
6.20	6.20	16230.	0.373	4.140	0.17	4753.
6.30	6.30	16710.	0.384	4.310	0.17	4837.
6.40	6.40	17197.	0.395	4.470	0.17	4922.
6.50	6.50	17694.	0.406	4.630	0.17	5007.
6.60	6.60	18199.	0.418	4.780	0.17	5093.
6.70	6.70	18713.	0.430	4.930	0.17	5180.
6.80	6.80	19235.	0.442	5.070	0.17	5268.
6.90	6.90	19766.	0.454	5.210	0.17	5357.
7.00	7.00	20306.	0.466	5.350	0.17	5446.

Hyd	Inflow	Outflow		Peak		Storage	
		Target	Calc	Stage	Elev	(Cu-Ft)	(Ac-Ft)
1	0.82	0.00	0.00	5.00	5.00	11109.	0.255
2	0.42	*******	0.00	3.25	3.25	5551.	0.127
3	0.40	0.00	0.00	3.25	3.25	5538.	0.127
4	0.40	*******	0.00	2.77	2.77	4379.	0.101
5	0.51	*******	0.00	2.72	2.72	4259.	0.098
6	0.46	0.00	0.00	1.98	1.98	2724.	0.063
7	0.39	*******	0.00	0.86	0.86	971.	0.022
8	0.33	*******	0.00	0.68	0.68	736.	0.017

5/3/04

0412

GEORGIAN HEIGHTS PH IV

DETENTION FACILITY SIZING

EXHIBIT 18
PAGE 41 OF 38

EXISTING

AREA OF DISTURBANCE/ DEVELOPMENT

= 4.37 Ac

USE T.L.C. FOREST

DEVELOPED

DENSITY = 29 LOTS / 4.37 Ac = 6.64 DU/GA

% IMPERVIOUS = 54.64 %

IMPERVIOUS = 1.98 Ac

PERVIOUS = 2.37 Ac T.L.C. GRASS

LEVEL 1 PEAKS

YR	EXIST	DEVEL
100	0.352 cfs	1.54 cfs
10	0.212	0.909
2	0.121	0.753

USE 28,300 FT³

454' of 9" ø, OR

578' of 8" ø

0412

4-23-04

GEORGIAN HEIGHTS F 'III.
PRELIM.

INFILT. POND CALCS PH III

EXHIBIT 1 X
PAGE 12 OF 38

Ph III

EXISTING

Disturbed / Developable Area = 123,000 SF = 2.82 Ac

Use OUTWASH PASTURE

DEVELOPED

19 LOTS / 2.82 Ac = 6.74 DU/Ac

Imp = 55% (from Table) = 1.55 Ac Imp.

Perv = 45% = 1.27 Ac Outwash grass

Use infilt rate = 8 in/hr = 0.1333 in/m

= 7.50 min/in.

LEVEL 1 Pks

YR	PREDEV	DEV
100	.034	.823
10	0.021	.506
2	0.000	.405

INFILTRATE Q100 developed.

0412

4-23-04

PRELIM

WATER QUALITY Ph II

EXHIBIT 18
PAGE 13 OF 38

Area Pervious = 55482SF outwash grass

Area Imp = 67518 SF

R = 0.47"

$$Vr = (0.9Ai + 0.25A_{tg} + 0.10A_{tf} + 0.01A_o) \times R/12$$

$$= [(0.90 \times 67518) + (0.01 \times 55482)] \times \frac{0.47}{12}$$

$$= 2402 \text{ ft}^3$$

Pool Vol Req'd = $3 \times 2402 = 7206 \text{ ft}^3$

PRELIM

WATER QUALITY PH II

EXHIBIT 1X
PAGE 4 OF 38

Area Pervious = 1.98 Ac = 86,249 SF

Area Impervious = 2.37 Ac = 103,237 SF

R = 0.47"

$$V_T = (0.9\,A_i + 0.25\,A_{tg} + 0.10\,A_{tf} + 0.01\,A_o) \times R/12$$

$$= \left[(0.90 \times 103{,}237) + (0.01 \times 86{,}249)\right] \times \frac{0.47}{12}$$

$$= 3673\ ft^3$$

Vol. Req'd = $3 \times 3673 = 11{,}019\ ft^3$

Perimeter protection (silt fences) shall be installed around the periphery of the designated cleared areas.

A stabilized construction entrance shall be provided.

Storm drain inlet protection shall be provided at all existing and proposed inlets and CB's.

IX BOND QUANTITIES, FACILITY SUMMARIES, AND DECLARATION OF COVENANT

Bond Quantities Worksheets will be completed and will be submitted with construction plans.

The flow Control and Water Quality Facility Summary Sheet and Sketch shall be provided to the City prior to permit issuance, if required.

A Declaration of Covenant will be executed and recorded, and a copy submitted to the City prior to permit issuance, if required.

X OPERATIONS AND MAINTENANCE MANUAL

An O&M Manual will be prepared and submitted along with the Final Corrected Plans and TIR, at project completion.

Special Requirement #3 – Flood Protection Facilities. Not applicable. Development not within a floodplain/floodway.

Special Requirement #4 – Source Control. Not applicable. Project is a single-family residential development.

Special Requirement #5 – Oil Control. Not applicable. Project is a single-family residential development, and is not a high-use site.

To date, we are not aware of any additional conditions or requirements relative to the subject site.

III OFF-SITE ANALYSIS

The runoff from uphill areas approaching the Phase III project site is concentrated into two separate "un-named creeks that bypass the Phase III project site (see Phase IV site plan {80 scale drawing})"and therefore must bypass the Phase III project site infiltration pond. This concentrated water flow results from natural topographical constraints, thereby projecting the uphill runoff into each of the two "un-named creeks." For purposes of clarity, each of these two "un-named creeks" have been identified as "Leckner Creek" and ""Gonzales Creek" (See Phase IV site plan {80 scale drawing}). As such, the Phase III project site does not create backwater effects to the upstream drainage system; therefore, the evaluation of the upstream drainage system is exempted by KCSWDM 1.2.2 (p.1-19).

Uphill off-site water flows bypass the Phase IV development site via Leckner Creek, Boehmer Creek and Creekside Drainage and exit the site via Leckner Creek, Church Creek and Gonzales Creek. As such, the Phase IV project site does not create backwater effects to the upstream drainage system; therefore, the evaluation of the upstream drainage system is exempted by KCSWDM 1.2.2 (p.1-19).

The Phase III and Phase IV project sites do not create backwater effects to the upstream drainage system; therefore, the evaluation of the upstream drainage system is exempted by KCSWDM 1.2.2 (p.1-19).

To prevent adverse impacts to downstream properties caused by diversion of flow from one flowpath to another, and to discharge in a manner that does not significantly impact downhill properties or drainage systems, a level spreader (i.e flow dispersal trench per 1998 KCSWDM 4.2.2 OUTFALL SYTEMS p.4-31 & 4-32) is designed for the Phase IV Outfall System, per Core Requirement #1, Section 1.2.1.

A downstream analysis of the site recognizes the storm water discharge via level spreader into delineated wetlands and wetland buffers and eventually into un-named creeks, per City of Woodinville guidelines (per Adolfson Associates, Inc. report & Raedeke report in City's possession), eventually intercepting Little Bear Creek, for Phase IVonly, for a minimum of 1 mile downstream of the project.

EXHIBIT 18
FILE NO. 038

Core Requirement #2 – Off-site Analysis. Both Phases receive no runoff from upstream areas. Runoff from Phase IV level spreaders travel into the two onsite wetlands and leave the Phase IV site via two seasonal creeks. Eventually, some 1000 lineal feet downstream the Phase IV runoff enters Little Bear Creek. Because of the proposed onsite infiltration, the Phase III project site does not create backwater effects to the upstream drainage system; therefore, the evaluation of the upstream drainage system is exempted by KCSWDM 1.2.2 (p.1-19).

Uphill off-site water flows bypass the Phase IV development site via Leckner Creek, Boehmer Creek and Creekside Drainage and exit the site via Leckner Creek, Church Creek and Gonzales Creek. As such, the Phase IV project site does not create backwater effects to the upstream drainage system; therefore, the evaluation of the upstream drainage system is exempted by KCSWDM 1.2.2 (p.1-19).

Core Requirement #3 – Flow Control. Level 1 flow control for Phase III and for Phase IV.

Core Requirement #4 – Conveyance System Analysis. Design will meet Core requirements.

Core Requirement #5 – Erosion and Sediment Control. ESC facility measures will meet Core requirements. A TESC plan, notes, details, construction sequence, etc. will be submitted with the construction plan set for review and approval.

Core Requirement #6 – Maintenance and Operations. An M & O manual will be provided for proposed facilities, and Declaration of Covenant will be executed prior to project completion, if required.

Core Requirement #7 – Financial Guarantees and Liability. Financial guarantees (i.e. maintenance bond, etc.) and insurance coverage will be provided as required.

Core Requirement #8 – Water Quality. The Phase IV project proposes to tight line all runoff from the roadways and lots and connect the system to the water quality facility (biofiltration swale), and discharge via sheet flow across the buffer and wetland area. An oil/water separator will be provided in line prior to entering the water quality facility. The Phase III project proposes infiltration and associated water quality.

Special Requirement #1 – Other Adopted Requirements. Little Bear Creek Basin Plan. Requirements met. Clearing limits met. Level 2 discharge control proposed for Phase IV. Phase III meets Level 1 discharge control.

Special Requirement #2 – Floodplain/Floodway Delineation. Not applicable. Development not within a floodplain/floodway.

EXHIBIT 18
PAGE 8 OF 36

II. CONDITIONS AND REQUIREMENTS SUMMARY

A. Road Standards – The sites are fronted by 136th Avenue NE and NE 205th St.. Per City of Woodinville specifications, 136th Avenue NE and NE 205th St. are classified as high-density residential streets that require a minimum right-of-way and traveled way width of 60-feet and 36-feet respectively. The existing right-of-way widths are 80 feet and 60 feet, for 136th and 205th respectively, which meets this requirement. 136th Avenue NE and NE 205th St. are two-lane roads with limited shoulders and ditches on the west and south sides, respectively. No curb, gutter or sidewalk improvements exist in the immediate vicinity. The existing asphalt pavement on 136th Ave NE and NE 205th St. is approximately 20 to 22-feet wide. This project provides for construction of half-street frontage improvements along 136th Avenue NE and NE 205th St., consisting of a total of 18 feet of asphalt, curb, gutter and sidewalk as part of the plat improvements.

The internal plat roads will consist of 28-foot asphalt roads, curb and gutter both sides, and sidewalks, within a 40-foot right of way. The stub road for Phase III will consist of a 22-foot asphalt road with curb/gutter and sidewalks. The access road for Phase IV will consist of a 22-foot asphalt road.

B. SWM Requirements – 1998 Manual followed. The project is subject to a Targeted Drainage Review because the sites are located in the Bear Creek drainage area.

C. Zoning – Complies.

D. Health – Public water and sanitary sewer service available from the Woodinville Water District.

E. Fire Code – Fire hydrants will be provided per Fire Marshal requirements.

F. Core Requirements – The project appears to require a Targeted Drainage Review per Section 1.1.2.2 of the 1998 KCSWDM, The issues appear to be applicable under Category 1, which require addressing Core Requirement #'s 1 through 8, and Special Requirements #1 through 5. In addition, the City is requiring a Full Drainage Review addressing Core Requirements 1 through 8, and Special Requirements 1 through 5.

Core Requirement #1 – Discharge at Natural Location – Met. Discharge will be via level spreader above the wetlands in Phase IV and via an infiltration pond in Phase III.

The downstream Study Area is defined per the attached Little Bear Creek basin plan map. An inspection and review of the downstream Study Area was completed. Field observations confirm that some pipes and culverts do exist downstream prior to intercepting Little Bear Creek. An attached review of the downstream pipes and culverts confirm no downstream drainage concerns.

The 100-yr. floodplain for Little Bear Creek will be shown and submitted as a part of the construction plan set, for review and approval. Phase IV Threshold Discharge Maps are presented in this report. Phase III provides for on-site infiltration.

IV FLOW CONTROL AND WATER QUALITY FACILITY ANALYSIS AND DESIGN

A. Flow Control. Level 1 flow control required by definition. Soils are classified as outwash type but are shallow and are underplayed, at various depths, with till soils. The project proposes Level 1 detention and release criteria for Phase IV, and infiltration for Phase III.

B. Water Quality System. The Phase IV project proposes to tight line all runoff from the roadways and lots and connect to an oil/water separator, water quality facility, then sheet flow via level spreader across vegetated buffer and wetland. Phase III proposes infiltration and associated water quality facility.

V CONVEYANCE SYSTEM ANALYSIS AND DESIGN

Design will meet Core requirements. Calculations are not included for the design of the conveyance system because (1) Max. developed Q100=1.54 cfs, (2) capacity of 12" smooth wall pipe @ 0.50% = 2.73 cfs and (3) we will have excess capacity.

VI SPECIAL REPORTS AND STUDIES

We are unaware of any special reports and/or studies being required at the time of this writing.

VII OTHER PERMITS

A Right of Way Use Permit will be required for work required within the right of way. At this time we are unaware of any additional required permits which may affect the drainage plan.

VIII ESC ANALYSIS AND DESIGN

ESC facility measures will meet Core requirements. A TESC plan, notes, details, construction sequence, etc. will be submitted as a part of the construction plan set, for review and approval.

Clearing limits will be depicted on the plans and shall be delineated on the site by employing flagging and/or orange barrier fencing.

Cover measures shall be employed as specified in Sec. 1.2.5.1 and in the ESC Standards (Appendix D).

INFILTRATE Q100 DEVEL

EXHIBIT 18
PAGE 20 OF 38

Retention/Detention Facility

Type of Facility:	Infiltration Pond	
Side Slope:	3.00	H:1V
Pond Bottom Length:	43.45	ft
Pond Bottom Width:	21.73	ft
Pond Bottom Area:	944.	sq. ft
Top Area at 1 ft. FB:	4587.	sq. ft
	0.105	acres
Effective Storage Depth:	5.00	ft
Stage 0 Elevation:	0.00	ft
Storage Volume:	11109.	cu. ft
	0.255	ac-ft
Vertical Permeability:	7.50	min/in
Permeable Surfaces:	Bottom	
Riser Head:	5.00	ft
Riser Diameter:	12.00	inches
Top Notch Weir:	None	
Outflow Rating Curve:	None	

Stage (ft)	Elevation (ft)	Storage (cu. ft)	Storage (ac-ft)	Discharge (cfs)	Percolation (cfs)	Surf Area (sq. ft)
0.00	0.00	0.	0.000	0.000	0.00	944.
0.06	0.06	57.	0.001	0.000	0.17	968.
0.16	0.16	156.	0.004	0.000	0.17	1008.
0.26	0.26	259.	0.006	0.000	0.17	1048.
0.36	0.36	366.	0.008	0.000	0.17	1090.
0.46	0.46	477.	0.011	0.000	0.17	1132.
0.56	0.56	592.	0.014	0.000	0.17	1174.
0.66	0.66	712.	0.016	0.000	0.17	1218.
0.76	0.76	836.	0.019	0.000	0.17	1262.
0.86	0.86	964.	0.022	0.000	0.17	1307.
0.96	0.96	1097.	0.025	0.000	0.17	1353.
1.06	1.06	1235.	0.028	0.000	0.17	1399.
1.16	1.16	1377.	0.032	0.000	0.17	1446.
1.26	1.26	1524.	0.035	0.000	0.17	1494.
1.36	1.36	1676.	0.038	0.000	0.17	1543.
1.46	1.46	1833.	0.042	0.000	0.17	1592.
1.56	1.56	1994.	0.046	0.000	0.17	1642.
1.66	1.66	2161.	0.050	0.000	0.17	1693.
1.76	1.76	2333.	0.054	0.000	0.17	1744.
1.86	1.86	2510.	0.058	0.000	0.17	1796.
1.96	1.96	2692.	0.062	0.000	0.17	1849.
2.06	2.06	2880.	0.066	0.000	0.17	1903.
2.16	2.16	3073.	0.071	0.000	0.17	1957.
2.26	2.26	3271.	0.075	0.000	0.17	2012.
2.36	2.36	3475.	0.080	0.000	0.17	2068.
2.46	2.46	3685.	0.085	0.000	0.17	2124.
2.56	2.56	3900.	0.090	0.000	0.17	2181.
2.66	2.66	4121.	0.095	0.000	0.17	2239.
2.76	2.76	4348.	0.100	0.000	0.17	2298.
2.86	2.86	4580.	0.105	0.000	0.17	2357.
2.96	2.96	4819.	0.111	0.000	0.17	2417.
3.06	3.06	5064.	0.116	0.000	0.17	2478.

EXHIBIT 18
PAGE 21 OF 38

Retention/Detention Facility

Type of Facility:	Detention Tank
Tank Diameter:	9.00 ft
Tank Length:	454. ft
Effective Storage Depth:	8.50 ft
Stage 0 Elevation:	0.00 ft
Storage Volume:	28282. cu. ft
Riser Head:	8.50 ft
Riser Diameter:	12.00 inches
Number of orifices:	2

Orifice #	Height (ft)	Diameter (in)	Full Head Discharge (CFS)	Pipe Diameter (in)
1	0.00	1.43	0.162	
2	5.02	1.00	0.050	4.0

Top Notch Weir: None
Outflow Rating Curve: None

Stage (ft)	Elevation (ft)	Storage (cu. ft)	Storage (ac-ft)	Discharge (cfs)	Percolation (cfs)
0.00	0.00	0.	0.000	0.000	0.00
0.01	0.01	0.	0.000	0.007	0.00
0.03	0.03	0.	0.000	0.010	0.00
0.04	0.04	0.	0.000	0.012	0.00
0.06	0.06	0.	0.000	0.014	0.00
0.07	0.07	0.	0.000	0.015	0.00
0.09	0.09	0.	0.000	0.017	0.00
0.10	0.10	0.	0.000	0.018	0.00
0.12	0.12	0.	0.000	0.019	0.00
0.26	0.26	0.	0.000	0.029	0.00
0.41	0.41	898.	0.021	0.035	0.00
0.55	0.55	1254.	0.029	0.041	0.00
0.70	0.70	1660.	0.038	0.046	0.00
0.84	0.84	2059.	0.047	0.051	0.00
0.98	0.98	2475.	0.057	0.055	0.00
1.13	1.13	2939.	0.067	0.059	0.00
1.27	1.27	3387.	0.078	0.063	0.00
1.42	1.42	3882.	0.089	0.066	0.00
1.56	1.56	4358.	0.100	0.069	0.00
1.70	1.70	4844.	0.111	0.073	0.00
1.85	1.85	5378.	0.123	0.076	0.00
1.99	1.99	5885.	0.135	0.078	0.00
2.14	2.14	6439.	0.148	0.081	0.00
2.28	2.28	6965.	0.160	0.084	0.00
2.42	2.42	7497.	0.172	0.087	0.00
2.57	2.57	8076.	0.185	0.089	0.00
2.71	2.71	8622.	0.198	0.092	0.00
2.86	2.86	9212.	0.211	0.094	0.00
3.00	3.00	9769.	0.224	0.096	0.00
3.14	3.14	10329.	0.237	0.099	0.00
3.29	3.29	10933.	0.251	0.101	0.00
3.43	3.43	11500.	0.264	0.103	0.00
3.58	3.58	12110.	0.278	0.105	0.00
3.72	3.72	12680.	0.291	0.107	0.00
3.87	3.87	13293.	0.305	0.109	0.00
4.01	4.01	13866.	0.318	0.111	0.00
4.15	4.15	14438.	0.331	0.113	0.00
4.30	4.30	15051.	0.346	0.115	0.00
4.44	4.44	15622.	0.359	0.117	0.00
4.59	4.59	16231.	0.373	0.119	0.00
4.73	4.73	16798.	0.386	0.121	0.00
4.87	4.87	17361.	0.399	0.123	0.00
5.02	5.02	17961.	0.412	0.124	0.00
5.03	5.03	18001.	0.413	0.125	0.00
5.04	5.04	18041.	0.414	0.126	0.00
5.05	5.05	18081.	0.415	0.127	0.00
5.06	5.06	18121.	0.416	0.128	0.00

5.07	5.07	18160.	0.417	0.130	0.00
5.08	5.08	18200.	0.418	0.132	0.00
5.09	5.09	18240.	0.419	0.133	0.00
5.10	5.10	18279.	0.420	0.133	0.00
5.11	5.11	18319.	0.421	0.134	0.00
5.26	5.26	18911.	0.434	0.140	0.00
5.40	5.40	19458.	0.447	0.146	0.00
5.55	5.55	20038.	0.460	0.150	0.00
5.69	5.69	20572.	0.472	0.155	0.00
5.83	5.83	21099.	0.484	0.158	0.00
5.98	5.98	21655.	0.497	0.162	0.00
6.12	6.12	22164.	0.509	0.166	0.00
6.27	6.27	22700.	0.521	0.169	0.00
6.41	6.41	23189.	0.532	0.172	0.00
6.55	6.55	23667.	0.543	0.176	0.00
6.70	6.70	24165.	0.555	0.179	0.00
6.84	6.84	24617.	0.565	0.182	0.00
6.99	6.99	25084.	0.576	0.185	0.00
7.13	7.13	25504.	0.585	0.187	0.00
7.27	7.27	25906.	0.595	0.190	0.00
7.42	7.42	26317.	0.604	0.193	0.00
7.56	7.56	26678.	0.612	0.196	0.00
7.71	7.71	27040.	0.621	0.198	0.00
7.85	7.85	27350.	0.628	0.201	0.00
7.99	7.99	27631.	0.634	0.203	0.00
8.14	8.14	27894.	0.640	0.206	0.00
8.28	8.28	28096.	0.645	0.208	0.00
8.43	8.43	28248.	0.648	0.211	0.00
8.50	8.50	28282.	0.649	0.212	0.00
8.60	8.60	28282.	0.649	0.522	0.00
8.70	8.70	28282.	0.649	1.090	0.00
8.80	8.80	28282.	0.649	1.820	0.00
8.90	8.90	28282.	0.649	2.610	0.00
9.00	9.00	28282.	0.649	2.890	0.00
9.10	9.10	28282.	0.649	3.150	0.00
9.20	9.20	28282.	0.649	3.390	0.00
9.30	9.30	28282.	0.649	3.610	0.00
9.40	9.40	28282.	0.649	3.810	0.00
9.50	9.50	28282.	0.649	4.010	0.00
9.60	9.60	28282.	0.649	4.200	0.00
9.70	9.70	28282.	0.649	4.370	0.00
9.80	9.80	28282.	0.649	4.540	0.00
9.90	9.90	28282.	0.649	4.710	0.00
10.00	10.00	28282.	0.649	4.870	0.00
10.10	10.10	28282.	0.649	5.020	0.00
10.20	10.20	28282.	0.649	5.170	0.00
10.30	10.30	28282.	0.649	5.310	0.00

Hyd.	Inflow	Outflow Target	Outflow Calc	Peak Stage	Peak Elev	Storage (Cu-Ft)	Storage (Ac-Ft)
1	1.54	*******	1.34	8.73	8.73	28282.	0.649
2	0.75	*******	0.60	8.61	8.61	28282.	0.649
3	0.91	0.21	0.21	8.49	8.49	28276.	0.649
4	0.80	*******	0.19	7.29	7.29	25971.	0.596
5	0.91	*******	0.18	6.97	6.97	25031.	0.575
6	0.50	0.12	0.12	5.03	5.03	17989.	0.413
7	0.60	*******	0.10	3.51	3.51	11830.	0.272
8	0.63	*******	0.09	2.48	2.48	7712.	0.177

King County Department of Development and Environmental Services

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

EXHIBIT 12
PAGE 23 OF 38

Part 1 PROJECT OWNER AND PROJECT ENGINEER

Project Owner
LAKEWOOD CONSTRUCTION

Address
P.O. BOX 12648 MILL CREEK

Phone
425-481-7949

Project Engineer
BOB PARROTT

Company G.R.(BOB) PARROTT, P.E.

Address/Phone P.O. BOX 2715 WOODINVILLE
425.481-3027

Part 2 PROJECT LOCATION AND DESCRIPTION

Project Name
GEORGIAN HEIGHTS PH III + IV

Location

Township 26

Range 5

Section 03

Part 3 TYPE OF PERMIT APPLICATION

- ✓ Subdivison
- Short Subdivision
- ✓ Grading
- Commercial
- Other _____

Part 4 OTHER REVIEWS AND PERMITS

- ✓ DFW HPA
- COE 404
- DOE Dam Safety
- FEMA Floodplain
- COE Wetlands
- Shoreline Management
- Rockery
- Structural Vaults
- Other

Part 5 SITE COMMUNITY AND DRAINAGE BASIN

Community NORTHSHORE

Drainage Basin BEAR CREEK

Part 6 SITE CHARACTERISTICS

- River _____
- Stream Unamed
- Critical Stream Reach
- Depressions/Swales
- Lake _____
- Steep Slopes < 40%
- Floodplain _____
- ✓ Wetlands YES
- Seeps/Springs
- High Groundwater Table
- Groundwater Recharge
- Other _____

EXHIBIT 18
PAGE 24 OF 38

Part 7 SOILS

Soil Type	Slopes	Erosion Potential	Erosive Velcoties
EvC	see Geotech Report		

Additional Sheets Attached

Part 8 DEVELOPMENT LIMITATIONS

REFERENCE	LIMITATION/SITE CONSTRAINT
Ch. 4 – Downstream Analysis	

Additional Sheets Attached

Part 9 ESC REQUIREMENTS

MINIMUM ESC REQUIREMENTS DURING CONSTRUCTION	MINIMUM ESC REQUIREMENTS AFTER CONSTRUCTION
✓ Sedimentation Facilities	✓ Stabilize Exposed Surface
✓ Stabilized Construction Entrance	✓ Remove and Restore Temporary ESC Facilities
✓ Perimeter Runoff Control	✓ Clean and Remove All Silt and Debris
Clearing and Graing Restrictions	✓ Ensure Operation of Permanent Facilities
✓ Cover Practices	Flag Limits of SAO and open space preservation areas
✓ Construction Sequence	
Other	Other

EXHIBIT 18
PAGE 25 OF 30

Part 10 SURFACE WATER SYSTEM

Grass Lined Channel	✓ Tank	✓ Infiltration	Method of Analysis: KCRTS LEVEL1
✓ Pipe System	Vault	Depression	
Open Channel	Energy Dissapator	✓ Flow Dispersal	Compensation/Mitigation of Eliminated Site Storage:
Dry Pond	Wetland	Waiver	
Wet Pond	Stream	Regional Detention	_____

Brief Description of System Operation: Phase III - Infiltration
Ph IV - Detention Tanks + W.Q.

Facility Related Site Limitations

Reference	Facility	Limitation
N/A		

Part 11 STRUCTURAL ANALYSIS

- Cast in Place Vault
- Retaining Wall
- Rockery > 4' High
- Structural on Steep Slope
- Other

Part 12 EASEMENTS/TRACTS

- Drainage Easement
- Access Easement
- Native Growth Protection Easement
- Tract
- Other

Part 13 SIGNATURE OF PROFESSIONAL ENGINEER

I or a civil engineer under my supervision my supervision have visited the site. Actual site conditions as observed were incorporated into this worksheet and the attachments. To the best of my knowledge the information provided here is accurate.

G.R. Parrott 05-06-04

Signed/Date

EXHIBIT 18
PAGE 26 OF 38

4.50	4.50	18348.	0.421	0.131	0.00
4.51	4.51	18393.	0.422	0.133	0.00
4.52	4.52	18437.	0.423	0.134	0.00
4.54	4.54	18527.	0.425	0.134	0.00
4.66	4.66	19060.	0.438	0.141	0.00
4.79	4.79	19632.	0.451	0.146	0.00
4.92	4.92	20198.	0.464	0.151	0.00
5.04	5.04	20714.	0.476	0.155	0.00
5.17	5.17	21264.	0.488	0.159	0.00
5.30	5.30	21806.	0.501	0.163	0.00
5.43	5.43	22338.	0.513	0.166	0.00
5.55	5.55	22819.	0.524	0.170	0.00
5.68	5.68	23329.	0.536	0.173	0.00
5.81	5.81	23827.	0.547	0.176	0.00
5.93	5.93	24274.	0.557	0.179	0.00
6.06	6.06	24744.	0.568	0.182	0.00
6.19	6.19	25197.	0.578	0.185	0.00
6.32	6.32	25633.	0.588	0.188	0.00
6.44	6.44	26018.	0.597	0.191	0.00
6.57	6.57	26415.	0.606	0.193	0.00
6.70	6.70	26788.	0.615	0.196	0.00
6.82	6.82	27109.	0.622	0.199	0.00
6.95	6.95	27429.	0.630	0.201	0.00
7.08	7.08	27716.	0.636	0.204	0.00
7.21	7.21	27963.	0.642	0.206	0.00
7.33	7.33	28148.	0.646	0.209	0.00
7.46	7.46	28283.	0.649	0.211	0.00
7.50	7.50	28300.	0.650	0.212	0.00
7.60	7.60	28300.	0.650	0.522	0.00
7.70	7.70	28300.	0.650	1.090	0.00
7.80	7.80	28300.	0.650	1.820	0.00
7.90	7.90	28300.	0.650	2.610	0.00
8.00	8.00	28300.	0.650	2.900	0.00
8.10	8.10	28300.	0.650	3.150	0.00
8.20	8.20	28300.	0.650	3.390	0.00
8.30	8.30	28300.	0.650	3.610	0.00
8.40	8.40	28300.	0.650	3.820	0.00
8.50	8.50	28300.	0.650	4.010	0.00
8.60	8.60	28300.	0.650	4.200	0.00
8.70	8.70	28300.	0.650	4.380	0.00
8.80	8.80	28300.	0.650	4.550	0.00
8.90	8.90	28300.	0.650	4.710	0.00
9.00	9.00	28300.	0.650	4.870	0.00
9.10	9.10	28300.	0.650	5.020	0.00
9.20	9.20	28300.	0.650	5.170	0.00
9.30	9.30	28300.	0.650	5.320	0.00
9.40	9.40	28300.	0.650	5.460	0.00

Hyd	Inflow	Outflow		Peak		Storage	
		Target	Calc	Stage	Elev	(Cu-Ft)	(Ac-Ft)
1	1.54	*******	1.34	7.73	7.73	28300.	0.650
2	0.75	*******	0.60	7.61	7.61	28300.	0.650
3	0.91	0.21	0.21	7.50	7.50	28300.	0.650
4	0.80	*******	0.19	6.43	6.43	25990.	0.597
5	0.91	*******	0.18	6.16	6.16	25097.	0.576
6	0.76	0.12	0.12	4.42	4.42	18008.	0.413
7	0.60	*******	0.10	3.09	3.09	11876.	0.273
8	0.63	*******	0.09	2.17	2.17	7753.	0.178

EXHIBIT 18
PAGE 27 OF 36

Retention/Detention Facility

Type of Facility: Detention Tank
Tank Diameter: 8.00 ft
Tank Length: 578. ft
Effective Storage Depth: 7.50 ft
Stage 0 Elevation: 0.00 ft
Storage Volume: 28300. cu. ft
Riser Head: 7.50 ft
Riser Diameter: 12.00 inches
Number of orifices: 2

Orifice #	Height (ft)	Diameter (in)	Full Head Discharge (CFS)	Pipe Diameter (in)
1	0.00	1.48	0.162	
2	4.45	1.03	0.050	4.0

Top Notch Weir: None
Outflow Rating Curve: None

Stage (ft)	Elevation (ft)	Storage (cu. ft)	Storage (ac-ft)	Discharge (cfs)	Percolation (cfs)
0.00	0.00	0.	0.000	0.000	0.00
0.02	0.02	0.	0.000	0.007	0.00
0.03	0.03	0.	0.000	0.010	0.00
0.05	0.05	0.	0.000	0.013	0.00
0.06	0.06	0.	0.000	0.015	0.00
0.08	0.08	0.	0.000	0.016	0.00
0.09	0.09	0.	0.000	0.018	0.00
0.11	0.11	0.	0.000	0.019	0.00
0.12	0.12	0.	0.000	0.021	0.00
0.25	0.25	0.	0.000	0.030	0.00
0.38	0.38	983.	0.023	0.036	0.00
0.50	0.50	1340.	0.031	0.042	0.00
0.63	0.63	1749.	0.040	0.047	0.00
0.76	0.76	2177.	0.050	0.052	0.00
0.89	0.89	2624.	0.060	0.056	0.00
1.01	1.01	3052.	0.070	0.060	0.00
1.14	1.14	3530.	0.081	0.063	0.00
1.27	1.27	4022.	0.092	0.067	0.00
1.39	1.39	4488.	0.103	0.070	0.00
1.52	1.52	5005.	0.115	0.073	0.00
1.65	1.65	5532.	0.127	0.076	0.00
1.78	1.78	6070.	0.139	0.079	0.00
1.90	1.90	6575.	0.151	0.082	0.00
2.03	2.03	7130.	0.164	0.084	0.00
2.16	2.16	7693.	0.177	0.087	0.00
2.28	2.28	8219.	0.189	0.089	0.00
2.41	2.41	8794.	0.202	0.092	0.00
2.54	2.54	9376.	0.215	0.094	0.00
2.67	2.67	9961.	0.229	0.097	0.00
2.79	2.79	10506.	0.241	0.099	0.00
2.92	2.92	11099.	0.255	0.101	0.00
3.05	3.05	11695.	0.268	0.103	0.00
3.17	3.17	12248.	0.281	0.105	0.00
3.30	3.30	12847.	0.295	0.107	0.00
3.43	3.43	13448.	0.309	0.110	0.00
3.56	3.56	14049.	0.323	0.112	0.00
3.68	3.68	14604.	0.335	0.114	0.00
3.81	3.81	15204.	0.349	0.115	0.00
3.94	3.94	15803.	0.363	0.117	0.00
4.06	4.06	16353.	0.375	0.119	0.00
4.19	4.19	16947.	0.389	0.121	0.00
4.32	4.32	17537.	0.403	0.123	0.00
4.45	4.45	18124.	0.416	0.125	0.00
4.46	4.46	18168.	0.417	0.125	0.00
4.47	4.47	18213.	0.418	0.126	0.00
4.48	4.48	18258.	0.419	0.127	0.00
4.49	4.49	18303.	0.420	0.129	0.00

STORMWATER FACILITY SUMMARY SHEET

EXHIBIT 18
PAGE 28 OF 38

Development GEORGIAN HTS. Ph III + IV Date 05-06-04

Location 20103 - 136th AVE. NE, WOODINVILLE, WA 98072

ENGINEER		DEVELOPER	
Name	BOB PARROTT	Name	LAKEWOOD CONSTRUCTION
Firm	G.R.(BOB) PARROTT, P.E.	Firm	
Address	P.O. BOX 2715	Address	P.O. BOX 12648
	WOODINVILLE, WA 98072		MILL CREEK, WA 98082
Phone	425-481-3027	Phone	425-481-7949

Developed Site: Acres_____ Number of lots_____

Number of detention facilities on site:
- _____ ponds
- _____ vaults
- 2 tanks Ph IV

Number of infiltration facilities on site:
- 1 ponds Ph III
- _____ vaults
- _____ tanks

Flow control provided in regional facility (give location) N/A

No flow control required_____ Exemption number_____

Downstream Drainage Basins

	Immediate	Major Basin
Basin A	LITTLE BEAR CREEK	BEAR CREEK
Basin B		
Basin C		
Basin D		

Number & type of water quality facilities on site:
- ✓ biofiltration swale (regular/wet/ or continuous inflow?)
- _____ combined detention/WQ pond (WQ portion basic or large?)
- _____ combined detention/wetvault
- _____ compost filter
- _____ filter strip
- ✓ flow dispersion
- _____ farm management plan
- _____ landscape management plan
- _____ sand filter (basic or large?)
- _____ sand filter, linear (basic or large?)
- _____ sand filter vault (basic or large?)
- _____ stormwater wetland
- _____ wetpond (basic or large?)
- _____ wetvault
- ✓ oil/water separator (baffle or coalescing plate?)
- _____ catch basin inserts: Manufacturer_____
- _____ pre-settling pond
- _____ pre-settling structure: Manufacturer_____
- _____ flow-splitter catchbasin

DESIGN INFORMATION	INDIVIDUAL BASIN			
	A	B	C	D
Water Quality design flow	N/A			
Water Quality treated volume or wetpond Vr	7206 FT³ Ph III 11019 FT³ Ph IV			

DESIGN INFORMATION, cont'd		TOTAL	INDIVIDUAL BASIN			
			Ph III	Ph IV		
Drainage basin(s)			A	B	C	D
Onsite area			2.82 Ac	4.37 Ac.		
Offsite area			0	0		
Type of Storage Facility			INFILT. POND	TANK		
Live Storage Volume			11,109 FT³	28,282 FT³		
Predeveloped Runoff Rate	2-year		0.0	0.121		
	10-year		0.021	0.212		
	100-year		0.034	0.352		
Developed runoff rate	2-year		0.405	0.753		
	10-year		0.506	0.909		
	100-year		0.823	1.54		
Type of restrictor						
Size of orifice/restriction	No. 1 Infilt.		N/A	1.43"Ø		
	No. 2			1.00"Ø		
	No. 3					
	No. 4					

FLOW CONTROL & WATER QUALITY FACILITY SUMMARY SHEET SKETCH

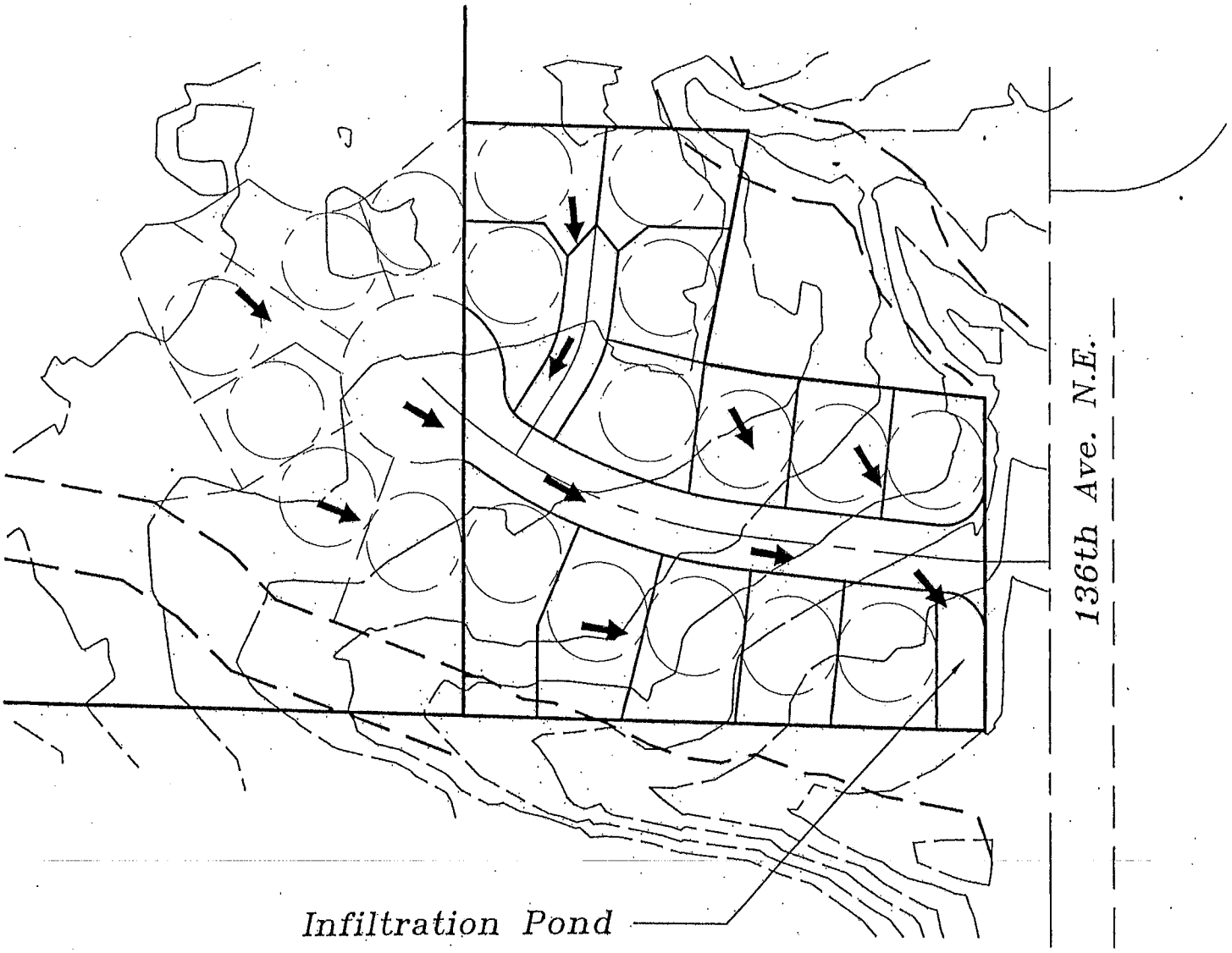
All detention, infiltration and water quality facilities must include a sketch per the following criteria: SEE ATTACHED PLANS.

1. Heading for the drawings should be located at the top of the sketch (top right-hand corner). The heading should contain:
   - North arrow (point up or to left)
   - Plat name or short plat number
   - Date drawn (or updated)
   - D9#_____
   - Address (nearest)
   - Thomas Brothers page, grid number
2. Label CBs and MHs with the plan and profile designation. Label the control structure in writing or abbreviate with C.S. Indicate which structures provide spill control.
3. Pipes-- indicate:
   Pipe size
   Pipe length
   Flow direction
   Use s single heavyweight line
4. Tanks-- use a double, heavyweight line and indicate size (diameter)
5. Access roads
   - Outline the limits of the road
   - Fill the outline with dots if the road is gravel. Label in writing if another surface.
6. Other Standard Symbols:
   - Bollards: ● ●●● ■■■■
   - Rip rap oooooo
     oooooo

   Fences --x---x---x---x---x---x---
   - Ditches --D---->D---->D---->D
7. Label trash racks in writing.
8. Label all streets with the actual street sign designation. If you don't know the actual street name, consult the plat map.
9. Include easements and lot lines or tract limits when possible.
10. Arrange all the labeling or writing to read from left to right or from bottom to top with reference to a properly oriented heading.
11. Indicate driveways or features that may impact access, maintenance or replacement.

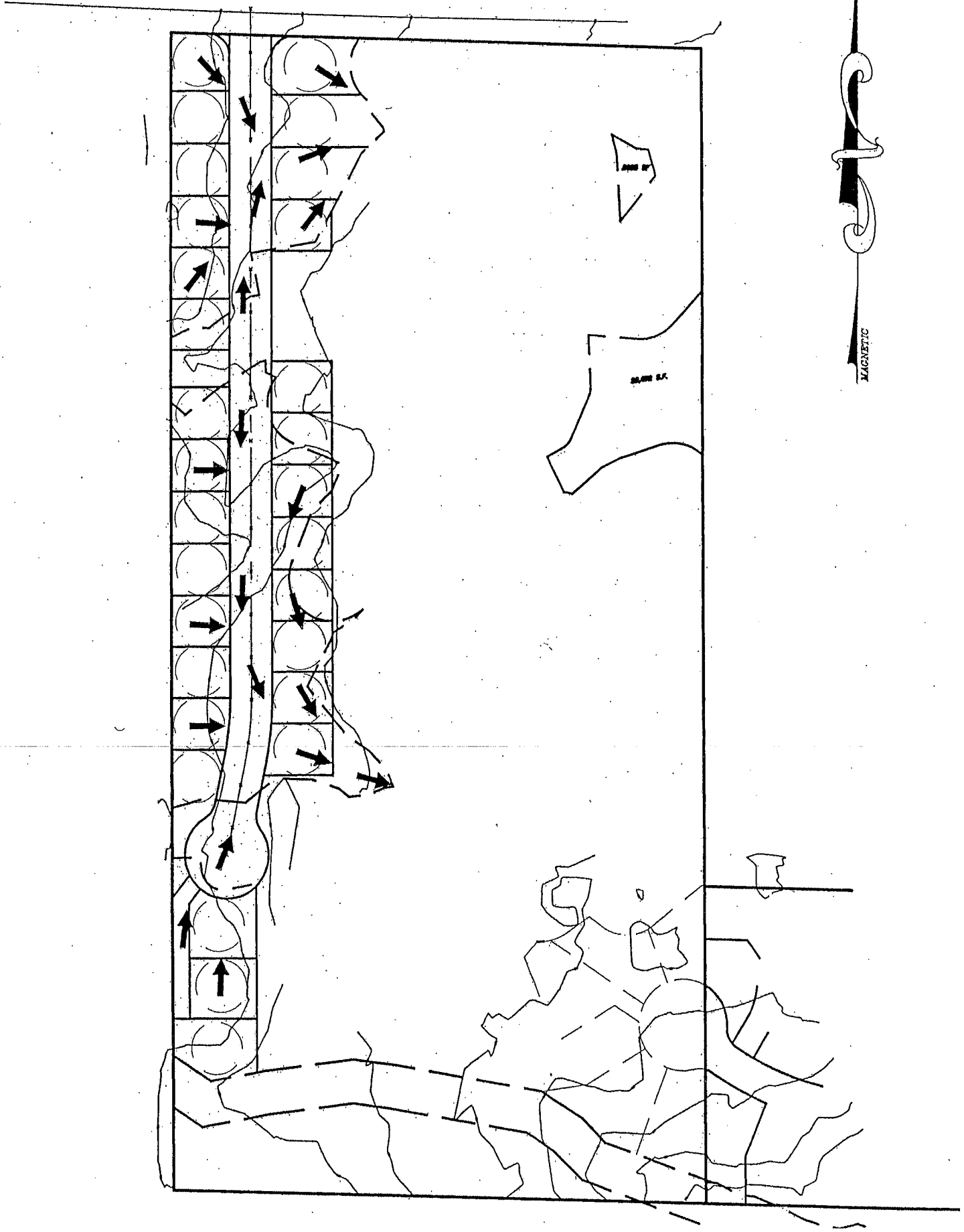
PHASE 3
THRESHOLD DISCHARGE MAP

EXHIBIT 18
PAGE 32 OF 36



PHASE 4
THRESHOLD DISCHARGE MAP

EXHIBIT 18
PAGE 31 OF 38



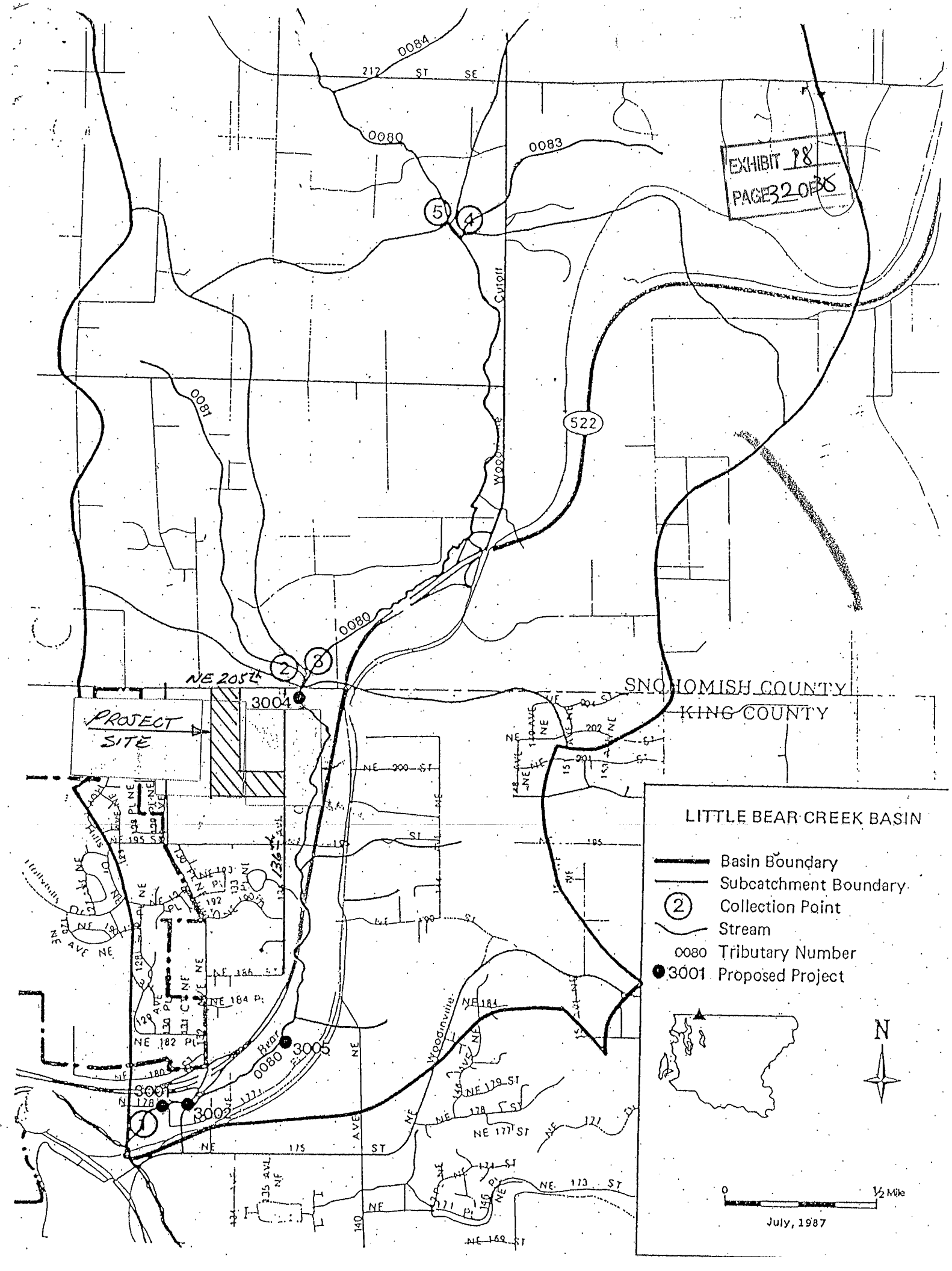


EXHIBIT 18
PAGE 32 OF 36
0084
212 ST SE
0080
0083
0081
0080
522
NE 205TH
3004
PROJECT SITE
SNOHOMISH COUNTY
KING COUNTY
3005
3001
3002
LITTLE BEAR CREEK BASIN
Basin Boundary
Subcatchment Boundary
2 Collection Point
Stream
0080 Tributary Number
3001 Proposed Project
N
0 ½ Mile
July, 1987

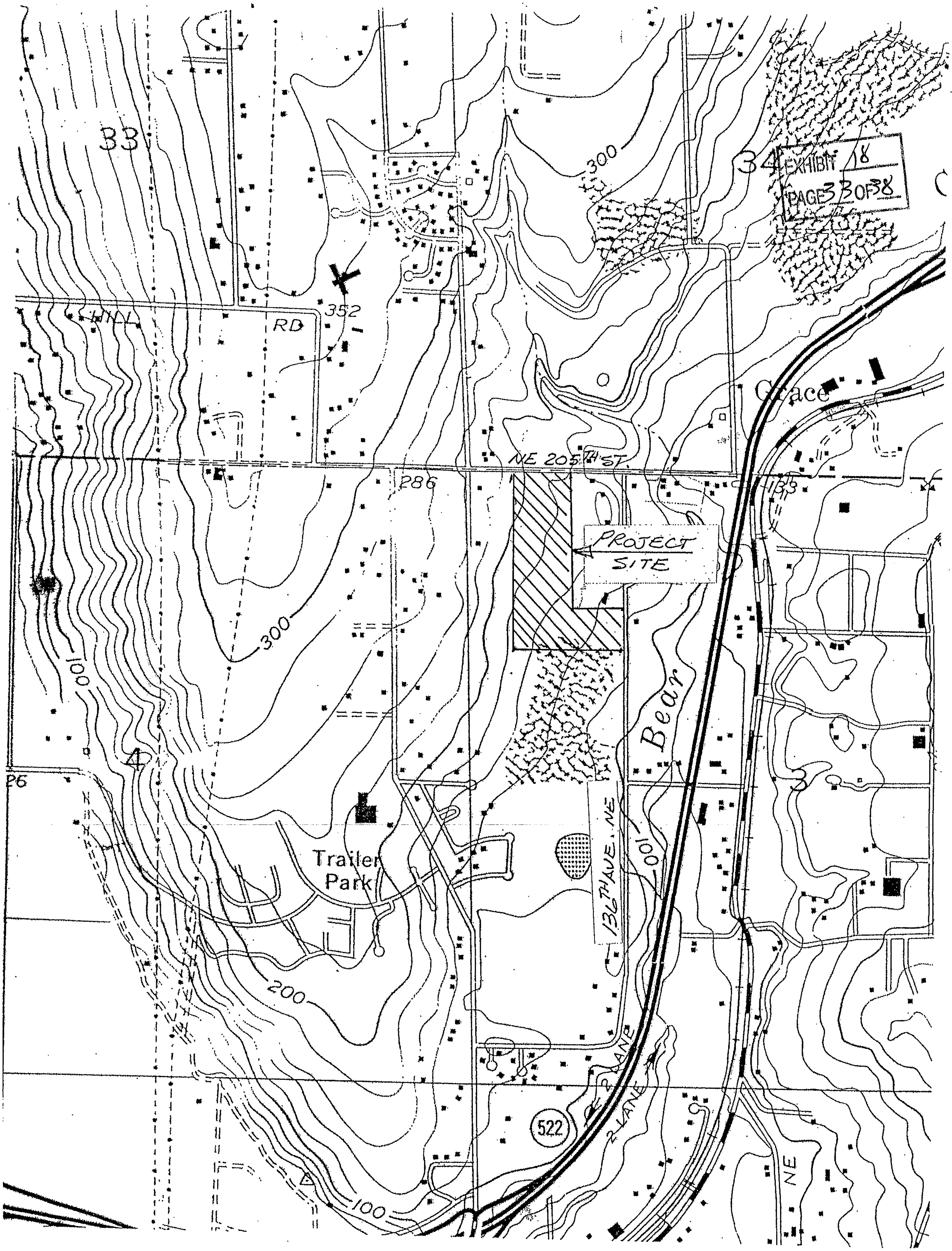

33
34
EXHIBIT 18
PAGE 33 OF 38
300
352
HILL
RD
Grace
NE 205TH ST.
286
135
PROJECT
SITE
300
100
Bear
4
26
3
Trailer
Park
136TH AVE. NE
100
200
2 LANE
2 LANE
522
100
NE

EXHIBIT 16
PAGE 34 OF 38

KING

MAL

SOILS MAP
1" = 1000'

SCS SOIL TYPE EvC (Surface)
See Geotech Report

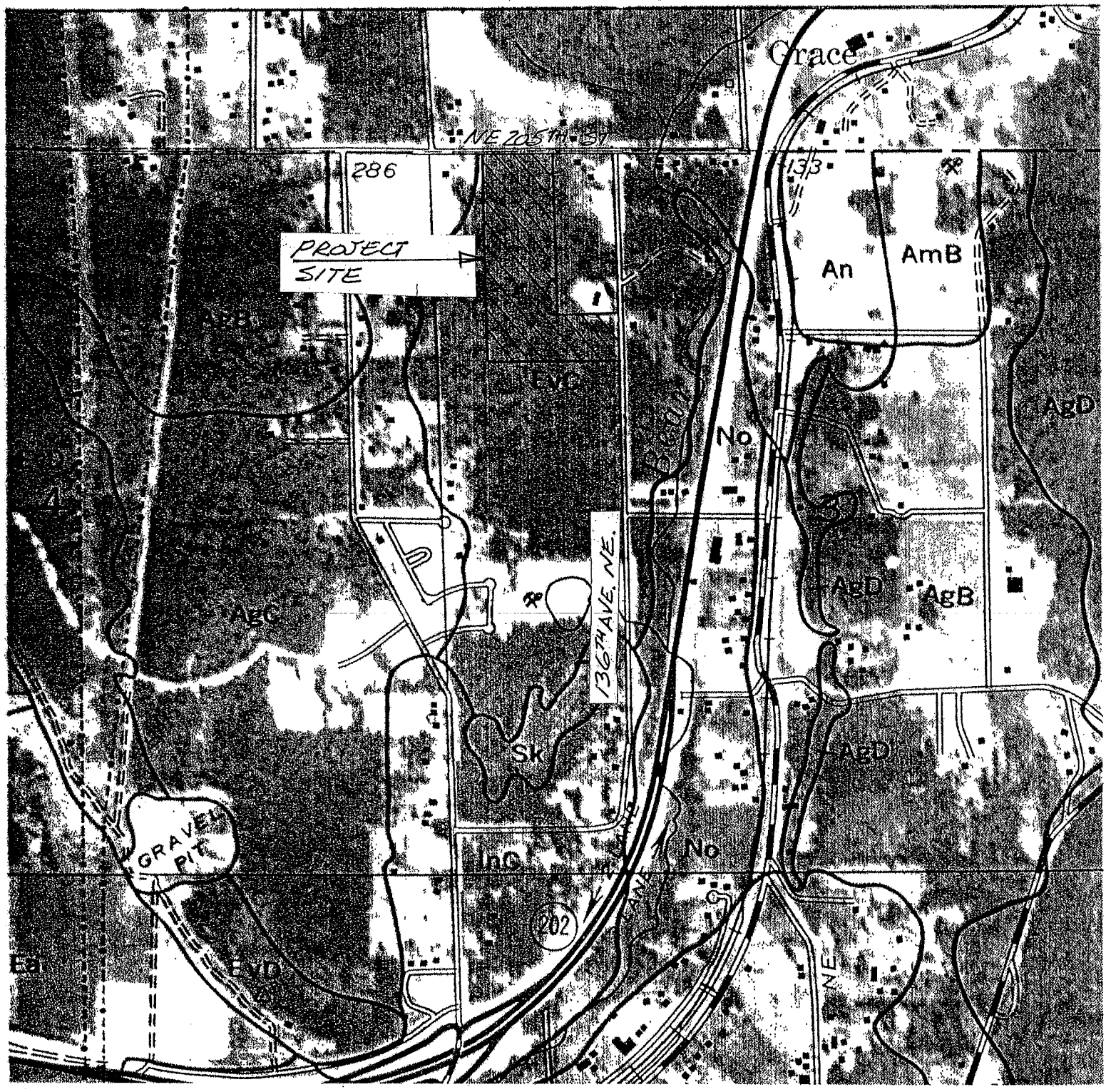


EXHIBIT 18
PAGE 35 OF 38

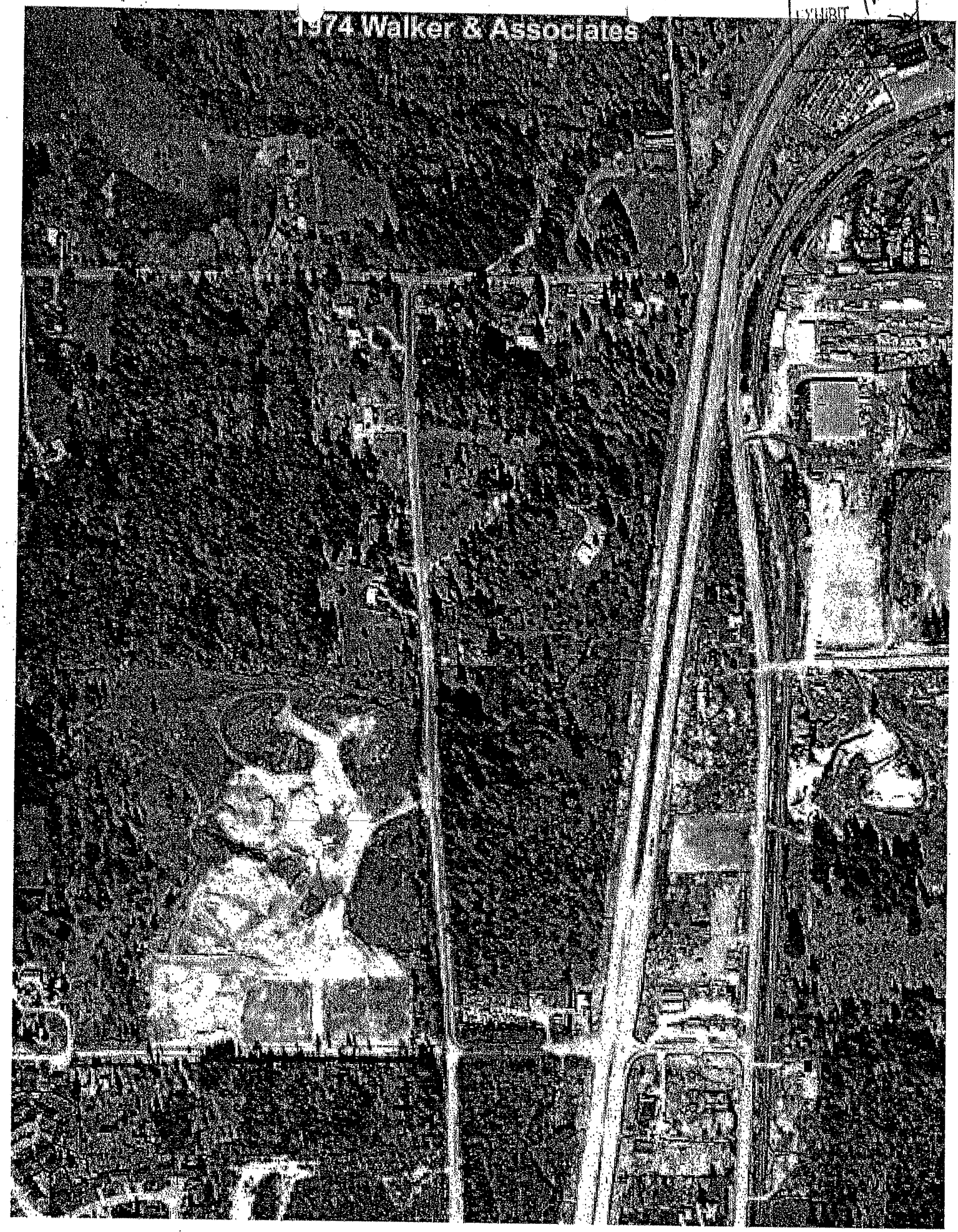

1974 Walker & Associates

EXHIBIT 18
37-38

After Recording return to:

_____
_____
_____

EXHIBIT 18
PAGE 36 OF 38

DECLARATION OF COVENANT

IN CONSIDERATION of the approved City of Woodinville _____

_____Permit for application No. _____

_____

_____

_____.

The undersigned as Grantor(s), declares that the above described property is hereby subject to an easement for a natural or constructed system and hereby dedicates, covenants and agrees as follows:

1. The City of Woodinville shall have the right to ingress and egress over those portions not contained in Exhibit "A" to access such easement area for inspection of and to reasonably monitor the performance, operational flows, or defects in accordance with and (as presented in