

ITEM SUPPL	22
MANAGER'S REPORT NO.	44
COUNCIL MEETING	94/07/25

TO: CITY MANAGER 1994 JULY 22

FROM: DIRECTOR PLANNING AND BUILDING OUR FILE: 02.120.3

SUBJECT: **APPROVAL TO AN APPLICATION TO PLACE FILL
IN THE AGRICULTURAL LAND RESERVE
PURSUANT TO THE SOIL CONSERVATION ACT**

PURPOSE: To provide Council with information regarding an application to place soil in the Agricultural Land Reserve

RECOMMENDATIONS:

1. **THAT** Council authorize the issuance of a landfill permit to place fill on 8678 Royal Oak Avenue and 8708 Royal Oak Avenue subject to the terms and conditions outlined herein, and the receipt and review by the Enforcement Officer of further geotechnical information to be provided by HBT AGRA Limited as noted herein. Any further terms and conditions deemed appropriate as a consequence of the receipt and review of this further information are to be included in the proposed landfill permit.
2. **THAT** a copy of this report be forwarded to:

Colin J. Fry
Administrator
Soil Conservation Act and Enforcements
Provincial Agricultural Land Commission
133-4940 Canada Way
Burnaby, B.C.
V5G 4K6

REPORT

1.0 BACKGROUND

We are in receipt of an application from 373446 B.C. Ltd. to place soil on the subject properties pursuant to the Soil Conservation Act. These properties are within the Agricultural Land Reserve (ALR) as shown on Figure 1 **attached** They are designated for A3 Market Garden Use in the Big Bend Development Plan (Figure 2 **attached**).

ITEM	Suppl	22
MANAGER'S REPORT NO.		44
COUNCIL MEETING		94/07/25

The purpose of the Soil Conservation Act is to preserve, maintain and in some cases, enhance the quality of soil within the ALR. The Act prohibits the removal of soil from or the deposition of fill material on ALR lands without a permit issued by the local authority (City of Burnaby) and approved in writing by the Provincial Agricultural Land Commission. The local authority appoints an Enforcement Officer who is given the power to enforce the Act and to enter on land in the course of enforcement and administration of the Act. In the case of Burnaby, the Director Planning and Building has been designated to be the Enforcement Officer.

2.0 APPLICATION TO PLACE FILL

The subject application has been submitted by a contractor on behalf of the property owners. It is his intention to prepare the land and construct approximately 52 greenhouses on the 8708 Royal Oak Avenue property. The landfill operation on the adjacent 8678 Royal Oak Avenue property is limited to the placement of landfill on the front portion from the property line east for approximately 225 feet in order to provide for the construction of a single family residence, garage and driveway access. This front 225 foot portion is also intended to be used to gain access to the adjacent property during the course of the landfill operation. The balance of this 2 acre property is to be left vacant.

As noted above, the subject application relates primarily to 8708 Royal Oak Avenue. It is a 7.4 acre parcel which currently contains an older single family residence. A portion of the property is under cultivation with blueberries and this area is to remain in its existing condition as referenced on Figure 3 *attached*. It is the balance of this property (approximately 4.7 acres) which is proposed to be prepared for greenhouses for a market gardening operation.

3.0 GEOTECHNICAL GUIDELINES FOR LANDFILL OPERATION

The applicant has submitted a report (copy *attached*) from HBT AGRA Limited, (HBT) Engineering and Environmental Services, establishing preliminary guidelines for the landfill operation. These guidelines will be expanded upon following completion of geotechnical exploration on site planned for the week of July 25, 1994.

The HBT report notes that an objective of the development is the excavation and the reuse of peat materials for the preparation of soil mixtures to be used inside the greenhouses. These soil mixtures will be used at the floor (ground) level in the greenhouses. It has been determined that an excavation to a 3 foot depth will provide an appropriate amount of peat for the preparation of the soil mixtures.

The greenhouse units will measure approximately 20 ft. by 50 ft. and are to be constructed of an aluminum frame with glazing sides and roof panels. They will be situated on a concrete foundation. Prior to the construction of these greenhouses the applicant will need to apply for and receive a Building Permit. The Ministry of Agriculture, Fisheries and Forests' B.C. Environmental Guidelines for Greenhouse Growers in British Columbia will also need to be adhered to.

ITEM	Suppl	22
MANAGER'S REPORT NO.		44
COUNCIL MEETING		94/07/25

The fill used at the site is intended to be a till material. The HBT report provides specific directions on the excavation and fill placement and monitoring procedures to be followed to ensure that the operation respects the fragile soils in this area and to control drainage impacts, etc. These specifications and any others flowing from additional geotechnical exploration are to be strictly observed.

4.0 DISCUSSION

Staff have reviewed the proposal to conduct a landfill operation on the subject properties and have concluded that a permit should be issued subject to adherence to the preliminary guidelines established by HBT AGRA Limited in its July 19, 1994 report. As these guidelines are to be expanded upon following completion of geotechnical exploration on site planned for the week of July 25, 1994, any recommendations arising from this further work will also need to be addressed in the permit.

It is further proposed that, the applicant be required to provide weekly certification reports to HBT ensuring that all fill materials comply with the Ministry of Environment's Level B criteria or better for residential and/or agricultural lands. HBT would then be required to submit monthly letters of assurance to the Enforcement Officer attesting to the fact that the applicant is, or is not, adhering to the terms of the landfill permit.

Non-compliance would result in the suspension or cancellation of the permit.

It is further proposed that a 20 metre wide buffer be retained along the Marine Way frontage to preserve the existing vegetation along the roadway.

It is customary that a bond be placed by the applicant to guarantee adherence to the terms of the permit. Land Commission staff have advised that a bond in the amount of \$15,000 per acre is a standard amount. In the subject case the area to be filled is approximately 4.7 acres which equates to a bond in the amount of \$70,500. The bond may be by an irrevocable Bank Letter of Credit or by certified cheque.

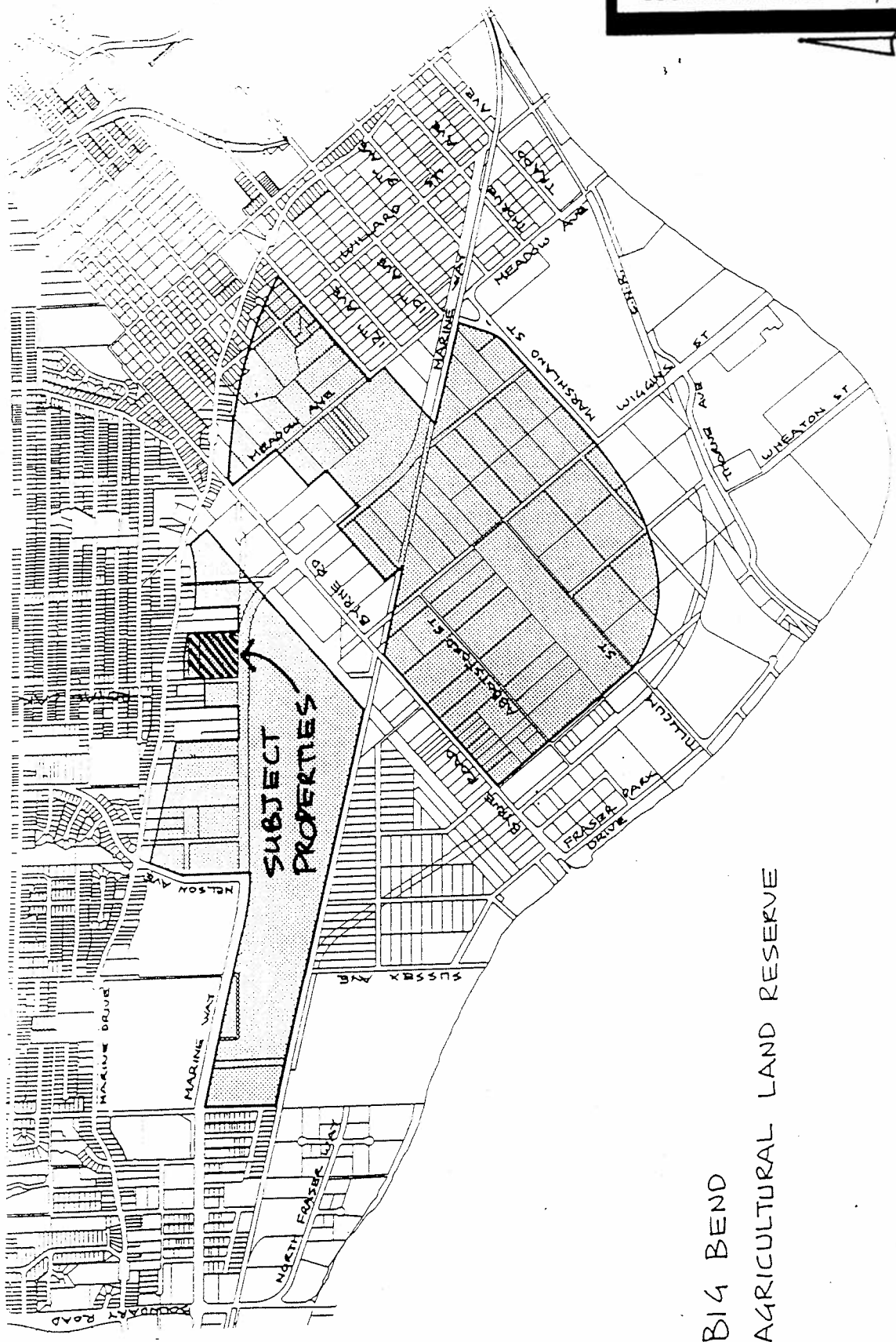
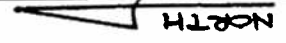
5.0 CONCLUSION

It is recommended that a permit be issued for the placement of landfill to prepare the subject lands for the construction of greenhouses. The permit will establish specific conditions which will need to be adhered to as noted herein. Any additional conditions established by the Agricultural Land Commission will also be addressed in the permit.


D.G. Stenson, Director
PLANNING AND BUILDING

PB/gl
Attachments
cc: Director Engineering
Chief Environmental Health Officer

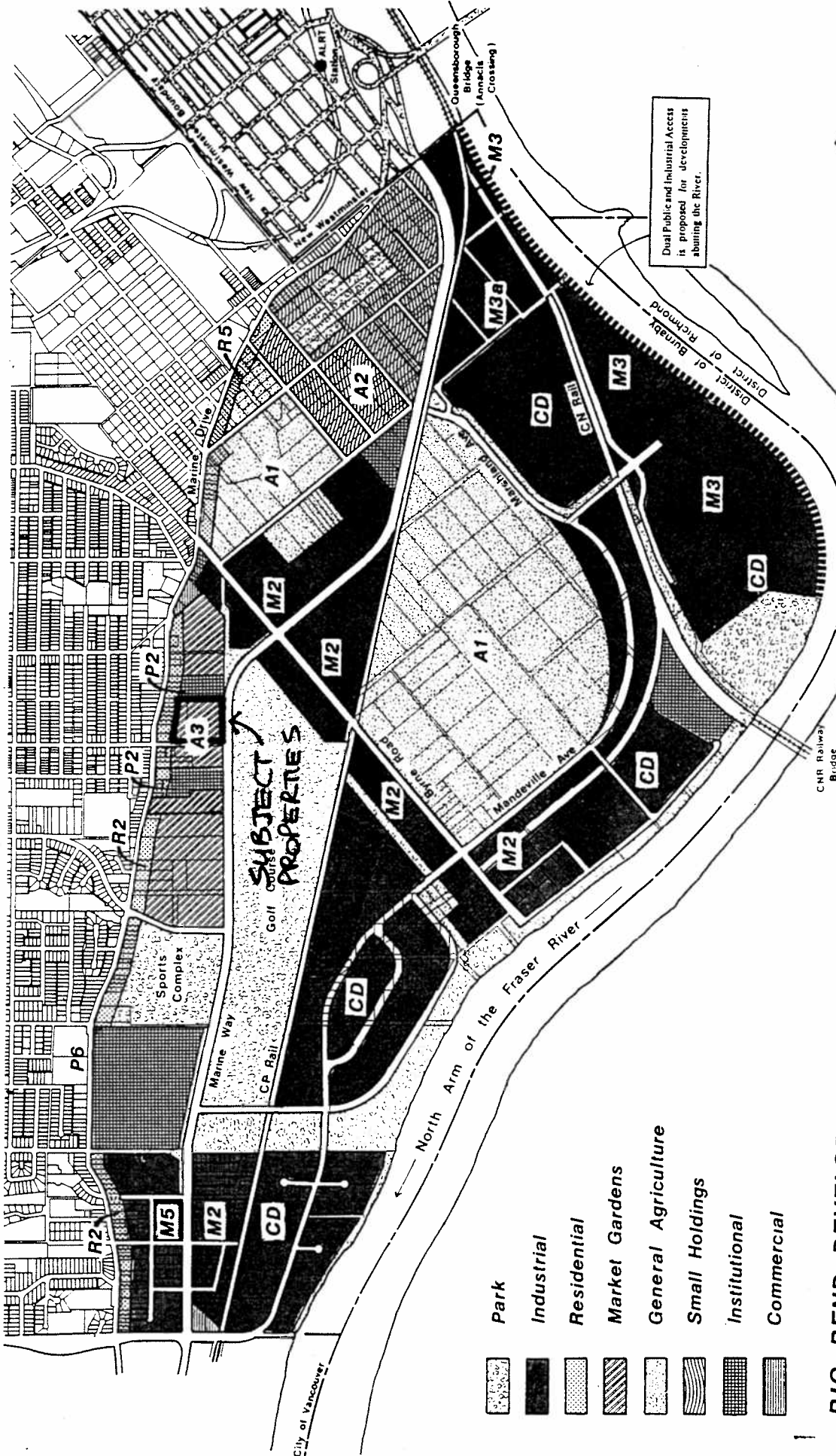
ITEM	Suppl	22
MANAGER'S REPORT NO.		44
COUNCIL MEETING	94/07/25	



BIG BEND
 AGRICULTURAL LAND RESERVE

Figure 1
 94 JULY 22

APPLICATION TO PLACE FILL ON
 8678 & 8708 ROYAL OAK AVENUE



Dual Public and Industrial Access is proposed for developments abutting the River.

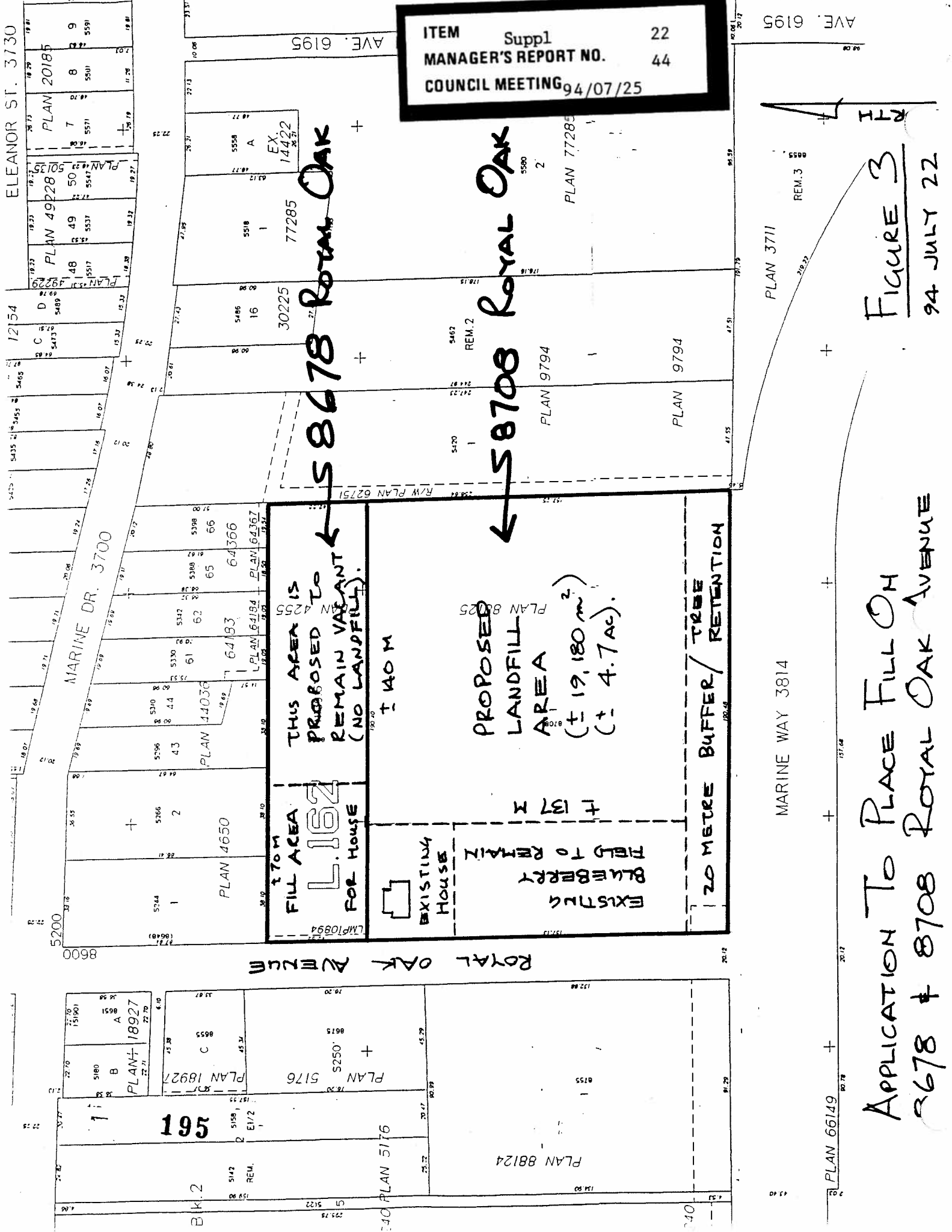
ITEM	Suppl	22
MANAGER'S REPORT NO.	44	
COUNCIL MEETING	94/07/25	

BIG BEND DEVELOPMENT PLAN

Revised to 1994 July

Application To Place Fill On
8678 & 8708 Royal Oak Avenue

FIGURE 2
94 JULY 22



ITEM	Suppl	22
MANAGER'S REPORT NO.		44
COUNCIL MEETING 94/07/25		

← 8678 Royal Oak

← 8708 Royal Oak

THIS AREA IS PROPOSED TO REMAIN VALEANT (NO LANDFILL).

PROPOSED LANDFILL AREA (± 19,180 m²) (± 4.7 ac).

20 METRE BUFFER / TREE RETENTION

IF
FIGURE 3
 94 JULY 22

APPLICATION TO PLACE FILL ON
 8678 & 8708 ROYAL OAK AVENUE

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5517	5537	5547	5557	5567	5577	5587	5597	5607	5617	5627	5637

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HBT AGRA Limited

Engineering & Environmental Services

2227 Douglas Road
Burnaby, B.C.
V5C 5A9
Tel: (604) 294-3811
Fax: (604) 294-4664

19 July 1994
VG-06648

ITEM	Suppl	22
MANAGER'S REPORT NO.		44
COUNCIL MEETING		94/07/25

Bagh Enterprises Company Ltd.
8708 Royal Oak Avenue
Burnaby, B.C.
V5J 4L7

Attention: James C.J. Lin

Ladies and/or Gentlemen:

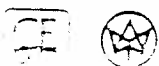
**RE: Geotechnical Guidelines - Greenhouse Development
8708 Royal Oak Avenue, Burnaby**

Further to our site meeting of June 27, 1994, at the above-noted site, this letter confirms that HBT AGRA have been retained as Geotechnical Engineering Consultants, and expands upon preliminary geotechnical guidelines that were provided in memo form at the site. It is understood that a 7.4 acre parcel of land is intended to be developed for greenhouse construction for a market gardening operation. Essentially the entire site would be occupied by greenhouses and access roadways. The layout of these facilities has not been determined, and the development geotechnical guidelines assume that greenhouses may be positioned anywhere on site. These preliminary guidelines will be expanded upon following completion of geotechnical exploration on site planned for the week of July 25, 1994.

The site has been cleared, and some initial peat excavation and filling had taken place at the time of our site review. An objective of the development is the excavation and reuse of peat materials for the preparation of soil mixtures to be used inside the greenhouses. After some discussion on site, it was concluded by the contractor, Mr. Mathews and others, that excavation to a 3-ft. depth would provide an appropriate amount of peat for the preparation of these soil mixtures. These soil mixtures will be used at the floor (ground) level in the greenhouses.

It is understood that individual greenhouse units are constructed of an aluminum frame with glazing sides and roof panels. The greenhouse units will measure approximately 20 ft by 50 ft in plan and perimeter walls are to be constructed on a concrete foundation. A portion of the structural design drawing for the greenhouse, prepared by B.C. Greenhouse Builders Ltd., shows the foundation to consist of a reinforced concrete grade beam, 2'6" high by 8" thick and extending 1'6" into the ground. No footing is shown. Stanley Smith, P.Eng., the

196



A G R A

Earth & Environmental Group

structural engineer responsible for the design of the greenhouses, indicated that the structure loads are comparatively small (approximately equivalent to 5 psf) relative to the design snow load of 40 psf. He estimated that the structure can tolerate differential settlements of the order of 1 to 2 inches.

The contractor (Bob Mathews) who had been carrying out the initial excavation and filling on this site indicated that a number of test pits had been excavated on the property and that peat depths exceeded 15 feet at all of the locations excavated. Until HBT AGRA completes geotechnical exploration on this site, the guidelines subsequently outlined herein are based on the assumption that peat depths throughout this site will exceed 15 feet. Our experience in this general area of Burnaby would indicate that peat deposits exist in an abandoned river channel which once existed near the base of the slope. Peat depths in this general area are typically expected to be deeper in the region of the base of the slope (generally in the vicinity of this site) and likely decrease in thickness towards the Fraser River. HBT AGRA has been involved in development and construction of the Riverway Golf Course to the south of this site across Marine Way, and peat mining has been undertaken on that site, i.e. peat has been removed and replaced with various types of fills.

When developing on peat deposits in general, based on our experience, there are a number of guidelines which usually apply.

- It is preferable not to excavate the peat, but to place fill directly on the undisturbed root mat at the peat surface. At this site, it has been decided that some excavated peat is required to prepare soil mixtures and some excavation is therefore desirable for this reason.
- The initial thickness of fill placed on the undisturbed peat should not exceed 8 ft or a peat foundation failure is likely to occur. When the peat mat is removed, the thickness that may be placed in a single lift safely is less than 8 ft and is very strongly dependent upon the nature of the peat at that location, the proximity to adjacent cuts or other interruptions in the peat surface, and other factors. In general, a single lift should be maintained below about 5 ft.
- After the initial lift is placed, some period of time is required to allow the peat to consolidate and gain in strength before an additional lift is placed.
- The amount of settlement which will occur is a direct function of two primary factors - the peat moisture content and the peat thickness.

ITEM	SUPPL	22
MANAGER'S REPORT NO.		44
COUNCIL MEETING		94/07/25

- Where moisture contents are high and thicknesses are large, the amount of settlement can approach the thickness of fill placed on the surface. Typically, and for average conditions, the amount of settlement may range from 40 to 70% of the thickness of fill.

The fill used at this site is intended to be a till material, initially all taken from a major excavation from a nearby site. It is intended that a long strip would be initially excavated and filled (generally in an east-west direction) starting from near the northwest corner of the site. Subsequent strips would be excavated and filled, each strip south of the preceding strip. The ultimate objective is to achieve a grade which is generally near existing grade. We understand that final site grade is neither dictated, nor intended to comply with, design flood proofing elevations which apply to habitable building projects in this area of Burnaby.

It is understood that the buildings can tolerate some differential settlements, however, it is desirable to undertake some site preparation which would keep differential settlements within a greenhouse facility to some 2 inches. In initial discussions, it was suggested by others on site that differential settlements up to 6 inches may be tolerable. It was HBT AGRA's recommendation that a 2 ft minimum effective preload be achieved for this purpose and preferably a somewhat higher preload. We recommend that 3 to 4 ft of effective preload be achieved to be more assured of the lesser differential settlement objective. The terms "3 ft effective preload" means that a minimum of 3 ft of fill is removed after primary settlement has occurred under the preload fill to achieve a 3 ft effective preload. Determination of the achieved effective preload must take into account the depth of soil mixture that will be placed for growth medium after the till fill preload has been removed. We are able to define primary settlement by observing the rate of settlement versus time. Primary settlement normally includes the largest proportion of the settlement which is expected to occur under a given load. It is followed by secondary settlement which occurs at a different rate and is able to be defined by plotting the settlement versus time on graphs. Completion of primary settlement may take several months to more than a year depending upon many factors. Available upward and lateral drainage is a particularly important factor, and the use of a till fill will tend to extend the time required for primary compression as compared to the use of a more granular material. The latter would permit water egress upward through the fill as the peat compresses.

An observational approach to filling and settlement may be followed to control the work until completion of the geotechnical exploration and report. The following guidelines, discussed on site, are re-presented here:

1. Excavate the peat to a depth of 3 ft in a strip of practical width (say 20 to 25 ft) and sidecast the excavated peat on the preceding strip or place in an appropriate stockpile.

2. Place settlement gauges on the excavated peat surface about every 150 ft or more frequently. For settlement gauges use a 10 ft riser pipe attached with a pipe flange on a 2 ft by 2 ft plywood base. Obtain elevations of the top of the pipe before any fill is placed and then weekly after that. At the same time as pipe observations are taken, obtain soil fill elevations at the settlement gauge locations. Report the data weekly to HBT AGRA. It is very important to monitor these settlement gauges and to impress upon the construction personnel that they are not to be damaged. They should be marked with flagging and protected with wooden tripods so that they are easily seen.
3. Place about 4 ft of soil fill in the excavated area. The quality of the fill from an environmental view point is the responsibility of others.
4. Compact this soil layer by travelling on the surface with loaded trucks as the fill placement advances from the Royal Oak side of the site towards the east.
5. Place a second 3 to 4 ft layer of soil on the northerly half of the initial lift and have trucks travelling on the top of the second lift.
6. Excavate the peat from the adjacent strip with the excavator working on the initial lift of soil fill. The excavated peat would be placed as an additional surcharge on the northerly double lift of fill in place.
7. As the second strip is being excavated, fill may be placed to 4 ft thickness on the newly excavated peat surface, coincident with placing the second (half width) lift of fill on the first strip.

As noted earlier, the fill thickness described above will be 7 to 8 ft, and the amount of settlement that will occur under this fill load may be 4 ft or more. The excavated peat will add a small surcharge to the total fill load applied. If settlements greater than 2 ft are experienced, it will be necessary to apply an additional lift of fill in the greenhouse areas, and this would entail moving the peat spoil that had been deposited. This should be considered a real possibility and other options considered. To this end, initial observations of settlement rates and amounts are very important. Further geotechnical exploration will be very beneficial in predicting settlements and refining preload requirements.

The excavation work completed to date indicates that excavation to 3 ft depth does not encounter the water table. Surface drainage and runoff control should be established to accommodate water "squeezed" out of the peat during consolidation and to direct rainfall runoff to ditches off site. Sediment control is recommended at exit points from the site and

Bagh Enterprises Company Ltd.
Geotechnical Guidelines
Greenhouse Development

ITEM	Suppl	22
MANAGER'S REPORT NO.		44
COUNCIL MEETING		94/07/25

VG-06648
Page 5

at interior points in ditches to prevent silt transport off site. HBT AGRA will provide specific designs for sediment control measures and will conduct field reviews of the installations.

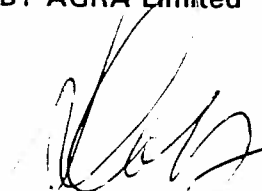
There is currently no specific phased construction plan for the greenhouses. The timing of construction will be dictated by the time required for completion of primary settlement under preload. Monitoring of settlement is therefore imperative to permit timely decisions about preload removal.

At the time of greenhouse construction, the footing/grade beam excavation bases should be recompacted before placement of the foundations. The quality of fill brought onto the site and the compaction achieved during filling will have a significant impact on the performance of the greenhouse foundation (as well as peat settlement). Inorganic soil fill that will support construction traffic (not overwet or soft) is most desirable. The perimeter grade beam should be provided with a footing.

We suggest a further site meeting with you once operations are restarted and geotechnical exploration is complete to discuss procedures and observations and be certain that everyone has a clear understanding of the development guidelines finally chosen.

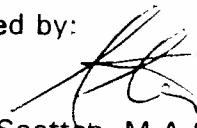
Sincerely yours,

HBT AGRA Limited


A.E. Dahlman, P.Eng.
Manager - Geotechnical Division



Reviewed by:


Steven Scotton, M.A.Sc., P.Eng.
Senior Geotechnical Engineer

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200

