**BROWN, ERDMAN & TURNER LTD.**
1409 BEWICKE AVENUE, NORTH VANCOUVER, BRITISH COLUMBIA V7M 3C7
TELEPHONE 986-1657

# HYDROGEOLOGIC EVALUATION

# FOR PHASE 1 OF

# SUBDIVISION ADJOINING

# 238A STREET & 62ND AVENUE

# LANGLEY, BRITISH COLUMBIA

FOR

J.G. NEUFELD

C/O GOODBRAND INTERNATIONAL INC.

Subdivision Application No. 87-111

Legal Description

Lot B of 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

W.L. Brown, P.Eng

July, 1988

## 1.0 INTRODUCTION

1.1 This Hydrogeologic Evaluation of Phase 1 of the subject subdivision is based upon Analyses of:

1.1.1 Two-hour constant rate pumping tests followed by two hours of recovery readings that were run on each of the domestic wells located on the 12 lots of Phase 1 of the subject Subdivision. A well was not drilled on Lot 9.

1.1.2 Existing maps and reports of the general area.

1.1.3 Available records of wells on adjacent properties.

1.1.4 Chemical and bacteriological analyses of water samples collected near the end of the pumping period on each well. Analysis of water samples were conducted by ASL, Consulting Chemists and Analysts, of Vancouver, B.C.

1.2 As such this report is written to fulfill the requirements of Section 2.2.18 "Private Wells" of the Corporation of the Township of Langley subdivision guidelines dated 87.06.09. Corporation forms F-5, 6, 7 and 8 have been completed for each domestic well.

1.3 The wells were designed and constructed by Walsh Well Drilling of Aldergrove, B.C.

## 2.0 HYDROGEOLOGY

2.1 Location - The subdivision is located in the central part of the Township on a terrace that lies above the north bank of the Salmon River Valley. Terrace elevations range between 50 and 60 metres above sea level which is approximately 20 m above the Salmon River Valley floor. Please see attached map Figure 1.

2.2 Geology - The attached Surficial Geology Map, Figure 1a shows that the site is underlain by glacial and deltaic sediments of the Fort Langley Formation. These sediments are composed of deltaic sands and gravels

deposited by rivers flowing off the front of a glacier.

The details of this sedimentary deposit are shown on the geologic sections, Figures 3 and 4. These sections are based upon the driller's logs of the various domestic wells. The lower part of the deposits to a depth of approximately 45 metres is underlain by glacial tills with gravel, sand and clay interbeds. The lower sand and gravel beds that have been screened in the wells are areally extensive beneath the subdivision and have static water levels that lie at an approximate elevation of 30 meters above sea level. Impermeable clay and till units overlie the screened intervals across the site. A deltaic sand and gravel unit caps the section from ground surface downwards to the top of the clay. As can be seen these near surface sands and gravels lie in old buried river channels cut into the clay.

2.3 Hydrology - The pump test data indicate that the aquifers screened in the wells are artesian, areally extensive and moderately productive. Well spacing ranges from 30 to 50 metres. Calculations based upon transmissivity values obtained from the pumping tests, an assumed storativity factor for this artesian system, the general recommended pumping rate of 10 lpm (2.5 U.S. gpm) for each well and an assumed drought of 100 days show that well interference should range from 0.09 to 0.61 metres.

Reference to from F-7 of each well will show that a 2 to 4 meter drop below the static water level measured when the pump tests were run has been assumed in rating the productive capacity (pumping rate) of each well. The pumping rate of each well on this basis will still allow for the 0.09 to 0.61 metres of interference between wells under the stringent 100-day drought conditions used in these calculations.

Precipitation records from the Abbotsford weather station (local Langley stations have been closed) show the following patterns:

| Month 1988 | Precipitation mm | % of 1951-80 Normal |
|---|---|---|
| January | 110.8 | 53 |
| February | 107.5 | 67 |
| March | 154.7 | 110 |
| April | 161.8 | 158 |
| May | 165.6 | 211 |
| June | 49.7 | 77 |

The relatively deep depth of the screened aquifer of generally 30 m (100 feet) and the impervious caps of clay and till indicate that there will be a considerable time lag between the fluctuation of the water level in the aquifer and the fluctuations of the weather. The pump tests were conducted in the latter part of the May and in the first half of June (Well 13 was tested at the end of June). The effect of the "dry" winter of 1987-88 would most probably have caused low water levels in the wells when the pump tests were run.

Available information on neighbouring wells to the north and south-east of the subdivision indicates that the existing wells are either shallow (less than 10 m) or deep (over 50 m). As such these wells are most probably using aquifers that are not directly connected to the aquifer used by the subdivision wells.

Also, the closest neighbouring wells are over 80 m away from the subdivision wells so that even if the aquifers of the wells were interconnected interference would be negligible.

A well summary table is attached for convenience. It will be noted that 8 wells have a recommended pumping rate of 10 Lpm (2.5 U.S. gpm), 2 have a pumping rate of 5 Lpm and 2 have a recommended pumping rate of 2 Lpm. The recommended pumping rates are all above the minimum rate of 1.74 Lpm (2,500 litres per day) set by the Township of Langley Guidelines.

2.4 Water Quality - The laboratory results of the chemical and bacteriological analyses conducted on water samples collected near the end of each pump test are attached. It will be noted that the water meets the acceptable

# W E L L  S U M M A R Y  T A B L E

| Well No. | Depth Metres | Static Water M | Screened Interval M | Available Drawdown M | Recommended Pump Setting M | Recommended Pumping Rate Lpm | U.S. gpm | Chemical Bacteriologic |
|---|---|---|---|---|---|---|---|---|
| 1 | 32.61 106 | 14.4 | 30.94-31.85 | 16.54 | 30 | 10 | (2.6) | OK |
| 2 | 21.64 71 | 15.54 | 20.24-21.64 | 4.70 | 20 | 2 | (0.5) | OK |
| 3 | 45.42 149 | 19.07 | 43.99-45.42 | 24.92 | 30 | 10 | (2.6) | OK |
| 4 | 36.58 120 | 20.10 | 35.15-36.58 | 15.05 | 30 | 10 | (2.6) | OK |
| 5 | 34.11 112 | 20.88 | 32.61-34.14 | 11.73 | 30 | 10 | (2.6) | OK |
| 6 | 24.08 79 | 17.97 | 22.66-24.08 | 4.69 | 22 | 5 | (2.6) | OK |
| 7 | 36.88 121 | 15.61 | 35.46-36.88 | 19.85 | 35 | 10 | (2.6) | OK |
| 8 | 29.57 97 | 15.89 | 27.83-29.26 | 11.94 | 27 | 10 | (2.6) | OK |
| 9 | NOT DRILLED | | | | | | | |
| 10 | 22.86 75 | 18.22 | 21.43-22.86 | 3.21 | 21 | 2 | (1.3) | OK |
| 11 | 25.30 83 | 16.65 | 23.87-25.45 | 7.22 | 23 | 5 | (1.3) | OK |
| 12 | 42.37 139 | 21.23 | 40.94-41.30 | 19.71 | 40 | 10 | (2.6) | OK |
| 13 | 45.42 149 | 20.86 | 43.98-45.42 | 23.12 | 40 | 10 | (2.6) | OK |

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 1 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

R L Brown
Certified By (Name of Professional Engineer)

1909 Beverley Ave
Address

North Vancouver, B.C. V7M 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 108020

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 1 (S.E. Corner) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.61 | 0 - 2 | Soil sandy loam |
| 0.61 - 1.83 | 2 - 6 | Sand, brown |
| 1.83 - 3.66 | 6 - 12 | Sand and gravel silty tight |
| 3.66 - 5.79 | 12 - 19 | Clay, sandy, pebbly |
| 5.79 - 6.71 | 19 - 22 | Sand, silty some water |
| 6.71 - 7.62 | 22 - 25 | Sand, brown, hard packed |
| 7.62 - 8.84 | 25 - 29 | Sand and gravel dry |
| 8.84 - 11.28 | 29 - 37 | Clay, sandy, pebbly |
| 11.28 - 11.89 | 37 - 39 | Sand, silty |
| 11.89 - 14.02 | 39 - 46 | Sand brown dry |
| 14.02 - 15.85 | 46 - 52 | Sand and gravel, water-bearing |
| 15.85 - 29.87 | 52 - 98 | Clay, silty, grey with sand and gravel interbeds |
| 29.87 - 31.88 | 98 - 104.5 | Sand and gravel, water-bearing |
| 31.88 - 32.61 | 104.5 - 107 | Clay, grey |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 30.78 | + 1.5 - 101.0 |
| 152 mm (6-inch) telescopic diameter screen | 30.94 - 31.85 | 101.5 - 104.5 |

Screen - stainless steel, 20 slot with K-packer
Thick Bentonite Slurrey seal around top 3m (10 feet) of casing

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 1 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave. SHEET 1 of 6

Township of Langley TEST NO. 2

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 14.86 | 0 | | | | Static Water Level below MPT |
| 2 | .5 | 16.29 | 1.43 | | | | Measuring Point - Top of |
| 3 | 1.0 | 17.05 | 2.19 | | | | Casing 0.46 m above ground. |
| 4 | 1.5 | .87 | 3.01 | | | | |
| 5 | 2.0 | 18.46 | .60 | | | | Discharge 30 m from well |
| 6 | 2.5 | 19.10 | 4.24 | | | | |
| 7 | 3.0 | .42 | .56 | | | | |
| 8 | 3.5 | .91 | 5.05 | | | | |
| 9 | 4.0 | 20.18 | .32 | 0.5 | 20 | 40 | Water clear and clean |
| 10 | 4.5 | .42 | .56 | | | | |
| 11 | 5.0 | .68 | .82 | | | | |
| 12 | 6.0 | 21.00 | 6.14 | | | | |
| 13 | 7.0 | .15 | .29 | | | | |
| 14 | 8.0 | .39 | .53 | | | | |
| 15 | 9.0 | .46 | 6.60 | | | | |
| 16 | 10 | .62 | .76 | | | | |
| 17 | 12 | .76 | .90 | | | | |
| 18 | 14 | .86 | 7.00 | | | | |
| 19 | 16 | .92 | .06 | | | | |
| 20 | 18 | 22.01 | .15 | | | | |
| 21 | 20 | .01 | .15 | | | | |
| 22 | 25 | .03 | .17 | | | | |
| 23 | 30 | .18 | .32 | | | | |
| 24 | 35 | .21 | .35 | | | | |
| 25 | 40 | .27 | .41 | | | | |
| 26 | 45 | 22.32 | 7.46 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 1 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 2

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | .35 | .49 | | | | |
| 28 | 60 | .41 | .58 | | | | |
| 29 | 70 | .46 | .60 | | | | |
| 30 | 80 | .48 | .62 | | | | |
| 31 | 90 | .56 | .70 | | | | |
| 32 | 100 | .57 | .71 | | | | |
| 33 | 110 | .66 | .80 | | | | Water Samples collected |
| 34 | 120 | .67 | .81 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 1 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 2

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 22.67 | 7.81 | | | | Pump off |
| 2 | .5 | 21.48 | 6.62 | | | | |
| 3 | 1.0 | 20.60 | 5.74 | | | | |
| 4 | 1.5 | 19.80 | 4.94 | | | | |
| 5 | 2.0 | .16 | .30 | | | | |
| 6 | 2.5 | 18.71 | 3.85 | | | | |
| 7 | 3.0 | .29 | .43 | | | | |
| 8 | 3.5 | 17.93 | .07 | | | | |
| 9 | 4.0 | .59 | 2.73 | | | | |
| 10 | 4.5 | .30 | .44 | | | | |
| 11 | 5.0 | .10 | .24 | | | | |
| 12 | 6.0 | 16.82 | 1.96 | | | | |
| 13 | 2.0 | .51 | .65 | | | | |
| 14 | 8.0 | .37 | .51 | | | | |
| 15 | 9.0 | .22 | .36 | | | | |
| 16 | 10 | .07 | .21 | | | | |
| 17 | 12 | 15.92 | .06 | | | | |
| 18 | 14 | .82 | 0.96 | | | | |
| 19 | 16 | .75 | .89 | | | | |
| 20 | 18 | .69 | .83 | | | | |
| 21 | 20 | .64 | .78 | | | | |
| 22 | 25 | .58 | .72 | | | | |
| 23 | 30 | .50 | .64 | | | | |
| 24 | 35 | .44 | .58 | | | | |
| 25 | 40 | .41 | .55 | | | | |
| 26 | 45 | 15.37 | 0.51 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 1 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 2

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | .34 | .48 | | | | |
| 28 | 60 | .29 | .43 | | | | |
| 29 | 70 | .24 | .38 | | | | |
| 30 | 80 | .19 | .33 | | | | |
| 31 | 90 | .17 | .31 | | | | |
| 32 | 100 | .15 | .29 | | | | |
| 33 | 110 | .13 | .27 | | | | |
| 34 | 120 | .11 | .25 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

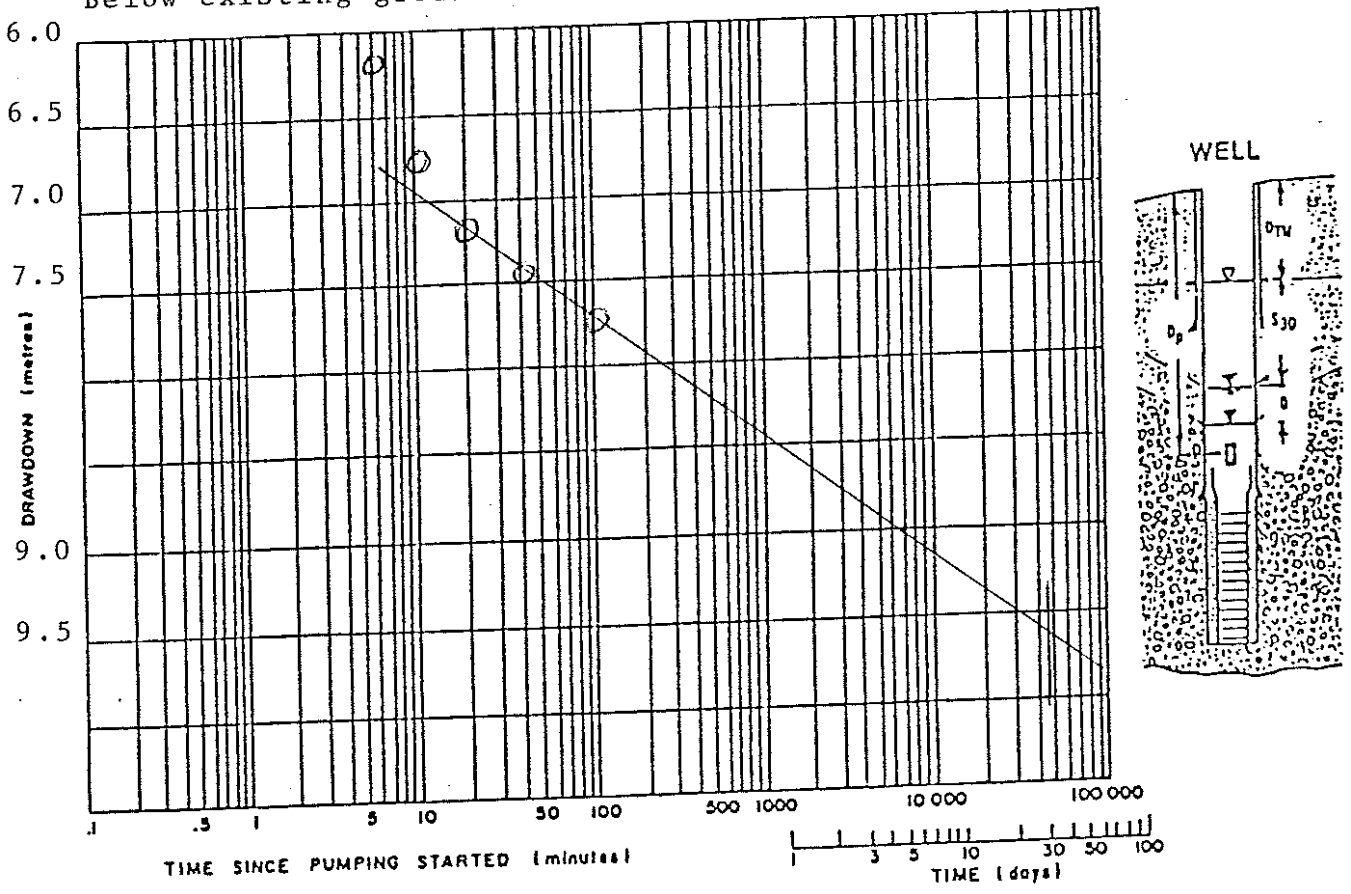
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 1 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 06 16

LOCATION: 238A & 62nd Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 14.40 (m) TEST NO. 2

Below existing ground




Pumping rate 10 Lpm Drawdown at 30 days ($S_{30}$) 9.6 x 10/40 (m) = 2.4

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 30 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D)$ =

30 - ( 14.40 + 2.4 + 4 ) = 9.2

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development  WELL NO. 1 (Phase 1)

APPLICATION NO.: 87-111  DATE: 1988 06 16

LOCATION: 238A & 62nd Ave.  SHEET 6 OF 6

Township of Langley  TEST NO. 2

**WELL COMPLETION DATA**

Depth 32.61 (m)
Diameter 152 (mm)
Static Water Level 14.4 (m)

SCREEN DESIGN (mark one)
☐ Open Hole ☐ Slotted Casing
☒ Screen ☐ Gravel Pack
☐ Other
Screen interval 30.94 m to 31.85 m

DESCRIPTION OF AQUIFER
Sand & Gravel

**PUMP TEST**

Start: Date 16 06 1988 (d/mo/yr)  Time 0855 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift
Other? Describe

Test Pump Set at 30 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape
☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter
☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm  Test duration 2 hours
Initial non-pumping level 14.4 m
Drawdown in well at end of test 7.81 m
Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No
Bacterial Analysis ☒ Yes ☐ No
Water Temperature 9 °C
Any particular gas smells noted None
Comments on clarity of water Clear and Clean
Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 2 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

B. L. Brown
Certified By (Name of Professional Engineer)

1909 Beverly Ave.
Address

North Vancouver, B.C. V7M 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 108021

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 2 (S.E. Corner) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.31 | 0 - 1 | Soil sandy loam |
| 0.31 - 1.83 | 1 - 6 | Sand and gravel, brown |
| 1.83 - 5.18 | 6 - 17 | Sand, brown, silty |
| 5.18 - 11.28 | 17 - 37 | Clay, sandy, pebbly |
| 11.28 - 11.43 | 37 - 37.5 | Sand and gravel, water bearing |
| 11.43 - 18.29 | 37.5 - 60 | Clay, sandy, pebbly |
| 18.29 - 19.81 | 60 - 65 | Sand, silty, grey |
| 19.81 - 21.64 | 65 - 71 | Sand and gravel, water bearing |
| 21.64 - | 71 | Till |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 20.57 | + 1.5 - 67.5 |
| 152 mm (6-inch) telescopic diameter screen | 20.24 - 21.64 | 66.4 - 71 |

Screen - stainless steel, 25 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurrey outside of casing

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 2 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 05 24

LOCATION: 238A St. & 62 Ave. SHEET 1 OF 6

Township of Langley TEST NO. 1

☒ Drawdown ☐ Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 16.00 | 0 | | | | Static Water Level below MPT |
| 2 | .5 | .60 | 0.60 | | | | Measuring Point-Top of casing |
| 3 | 1.0 | .95 | 0.95 | 1 | 20 | 20 | 0.46 m above ground |
| 4 | 1.5 | 17.20 | 1.20 | | | | |
| 5 | 2.0 | .49 | 1.49 | | | | Discharge 40 m from well |
| 6 | 2.5 | .71 | 1.71 | | | | |
| 7 | 3.0 | .82 | 1.82 | | | | |
| 8 | 3.5 | .81 | 1.81 | | | | |
| 9 | 4.0 | .89 | 1.89 | | | | |
| 10 | 4.5 | .92 | 1.92 | | | | |
| 11 | 5.0 | .93 | 1.93 | | | | |
| 12 | 6.0 | .98 | 1.98 | | | | |
| 13 | 7.0 | 18.01 | 2.01 | | | | |
| 14 | 8.0 | .02 | 2.02 | | | | |
| 15 | 9.0 | .03 | 2.03 | | | | |
| 16 | 10 | .04 | 2.04 | | | | |
| 17 | 12 | .05 | 2.05 | | | | |
| 18 | 14 | .07 | 2.07 | | | | |
| 19 | 16 | .07 | 2.07 | | | | |
| 20 | 18 | .08 | 2.08 | 1 | 20 | 20 | Water clear and clean |
| 21 | 20 | .09 | 2.09 | | | | |
| 22 | 25 | .11 | 2.11 | | | | |
| 23 | 30 | .12 | 2.12 | | | | |
| 24 | 35 | .13 | 2.13 | | | | |
| 25 | 40 | .14 | 2.14 | | | | |
| 26 | 45 | .15 | 2.15 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp.

APPLICATION NO.: 87-111

LOCATION: 238 A St. & 62 Ave.
Township of Langley

WELL NO. 2 (Phase 1)

DATE: 1988 05 24

SHEET 2 OF 6

TEST NO. 1

☒ Drawdown ☐ Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 18.16 | 2.16 | | | | |
| 28 | 60 | .17 | 2.17 | | | | |
| 29 | 70 | .18 | 2.18 | | | | |
| 30 | 80 | .19 | 2.19 | | | | |
| 31 | 90 | .18 | 2.18 | | | | |
| 32 | 100 | .20 | 2.20 | 1 | 20 | 20 | Water clear, clean & tasteless |
| 33 | 110 | .21 | 2.21 | | | | Water samples collected |
| 34 | 120 | .21 | 2.21 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 2 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 05 24

LOCATION: 238 A St. & 62 Ave. SHEET 3 OF 6

Township of Langley TEST NO. 1

☐ Drawdown ☒ Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 18.21 | 2.21 | | | | Pump off |
| 2 | .5 | 17.88 | 1.44 | | | | |
| 3 | 1.0 | .38 | 1.38 | | | | |
| 4 | 1.5 | .09 | 1.09 | | | | |
| 5 | 2.0 | 16.88 | .88 | | | | |
| 6 | 2.5 | .72 | .72 | | | | |
| 7 | 3.0 | .59 | .59 | | | | |
| 8 | 3.5 | .50 | .50 | | | | |
| 9 | 4.0 | .44 | .44 | | | | |
| 10 | 4.5 | .38 | .38 | | | | |
| 11 | 5.0 | .35 | .35 | | | | |
| 12 | 6.0 | .28 | .28 | | | | |
| 13 | 7.0 | .26 | .26 | | | | |
| 14 | 8.0 | .22 | .22 | | | | |
| 15 | 9.0 | .20 | .20 | | | | |
| 16 | 10 | .18 | .18 | | | | |
| 17 | 12 | .17 | .17 | | | | |
| 18 | 14 | .16 | .16 | | | | |
| 19 | 16 | .14 | .14 | | | | |
| 20 | 18 | .13 | .13 | | | | |
| 21 | 20 | .12 | .12 | | | | |
| 22 | 25 | .10 | .10 | | | | |
| 23 | 30 | .11 | .11 | | | | |
| 24 | 35 | .08 | .08 | | | | |
| 25 | 40 | .08 | .08 | | | | |
| 26 | 45 | .08 | .08 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 2 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 05 24

LOCATION: 238 A St. & 62 Ave. SHEET 4 OF 6

Township of Langley TEST NO.

☐ Drawdown ☒ Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 16.07 | .07 | | | | |
| 28 | 60 | .07 | .07 | | | | |
| 29 | 70 | .05 | .05 | | | | |
| 30 | 80 | .05 | .05 | | | | |
| 31 | 90 | .05 | .05 | | | | |
| 32 | 100 | .04 | .04 | | | | |
| 33 | 110 | .03 | .03 | | | | |
| 34 | 120 | .03 | .03 | | | | |

# The Corporation of the Township of Langley
SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

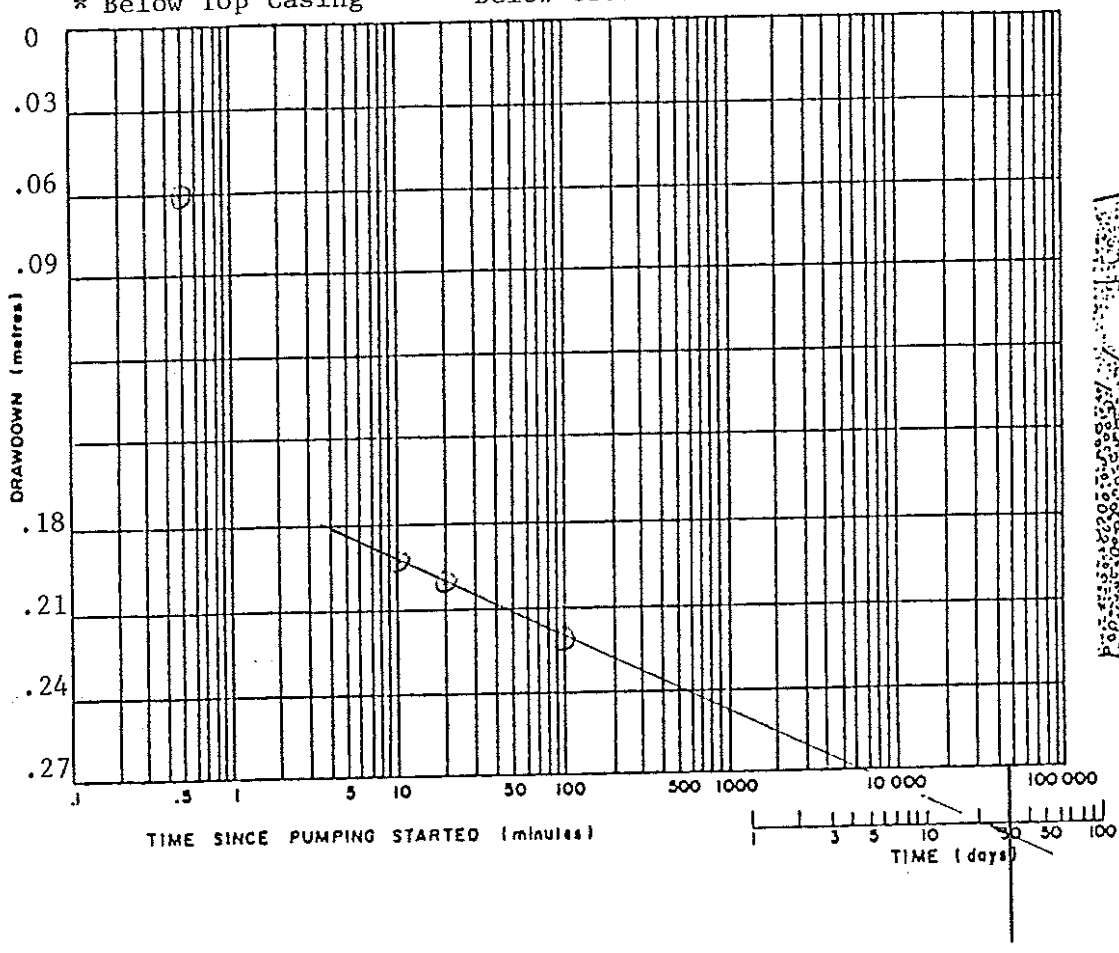
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 2 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 05 24

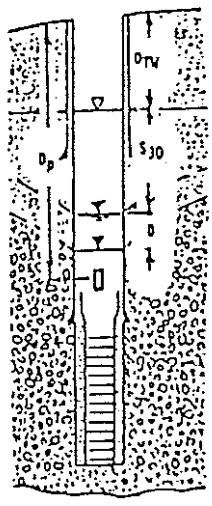
LOCATION: 238 A St. & 62 Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 16.00* or 15.54 (m)** TEST NO.

* Below Top Casing ** Below Ground




WELL




Pumping rate 2 Lpm Drawdown at 30 days ($S_{30}$) .30 (m)

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 20 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D)$ =

20 - ( 15.54 + .30 + 3 ) = 1.16

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 2 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 05 24

LOCATION: 238A St. & 62 Ave. SHEET 6 OF 6

Township of Langley TEST NO. 1

**WELL COMPLETION DATA**

Depth 21.64 (m)

Diameter 152 (mm)

Static Water Level 15.54 (m)

SCREEN DESIGN (mark one)

☐ Open Hole ☐ Slotted Casing

☒ Screen ☐ Gravel Pack

☐ Other

Screen interval 20.24 m to 21.64 m

DESCRIPTION OF AQUIFER: Sand & Gravel

**PUMP TEST**

Start: Date 24 05 1988 (d/mo/yr) Time 1310 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift

Other? Describe

Test Pump Set at 20 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape

☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter

☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 20 Lpm Test duration 2 hours

Initial non-pumping level 15.54 m

Drawdown in well at end of test 2.21 m

Recommended pumping rate 2 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No

Bacterial Analysis ☒ Yes ☐ No

Water Temperature 9 °C

Any particular gas smells noted None

Comments on clarity of water Clear and clean

Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

**LEGAL DESCRIPTION:** Lot 3 (Phase 1)

**PROJECT NO.:** 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

W L Brown
Certified By (Name of Professional Engineer)

1909 Beverley Ave
Address

North Vancouver, BC V7M 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 108022

**GOODBRAND DEVELOPMENT CORPORATION**
**62ND AVE., LANGLEY, BRITISH COLUMBIA**

**Well on Lot 3 (S.E. Corner) (Phase 1)**

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.61 | 0 - 2 | Soil sandy loam |
| 0.61 - 3.66 | 2 - 12 | Sand and gravel, brown |
| 3.66 - 5.49 | 12 - 18 | Sand and gravel, silty, grey little water |
| 5.49 - 11.89 | 18 - 39 | Sand, silty, brown |
| 11.89 - 14.63 | 39 - 48 | Clay, some pebbles, grey |
| 14.63 - 17.98 | 48 - 59 | Sand, silty, some pebbles |
| 17.98 - 20.42 | 59 - 67 | Sand, brown, "dry" |
| 20.42 - 38.40 | 67 - 126 | Till, clayey, some water |
| 38.40 - 40.23 | 126 - 132 | Sand, fine grained, silty, grey |
| 40.23 - 43.59 | 132 - 143 | Clay, grey |
| 43.59 - 45.42 | 143 - 149 | Sand and gravel, water-bearing |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 44.35 | + 1.5 - 145.5 |
| 152 mm (6-inch) telescopic diameter screen | 43.99 - 45.42 | 144.33 - 149 |

Screen - stainless steel, 30 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurrey outside of casing

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp.

APPLICATION NO. 87-111

LOCATION: 238A Street & 62 Ave.
Township of Langley

WELL NO. 3 (Phase 1)

DATE: 1988 05 25

SHEET 1 of 6

TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 19.53 | 0 | | | | Static water level below MPt. |
| 2 | .5 | 20.45 | 0.92 | 0.5 | 20 | 40 | S.W.L. Lot 4 20.52 m |
| 3 | 1.0 | .94 | 1.41 | | | | Measuring point - top of |
| 4 | 1.5 | 21.43 | .90 | | | | casing 0.46 m above ground |
| 5 | 2.0 | .56 | 2.03 | | | | |
| 6 | 2.5 | .72 | .19 | | | | Discharge 30 m away from Well |
| 7 | 3.0 | .79 | .26 | | | | No. 3 |
| 8 | 3.5 | .85 | .32 | | | | |
| 9 | 4.0 | .88 | .35 | | | | |
| 10 | 4.5 | .89 | .36 | | | | Water clean, clear good taste |
| 11 | 5.0 | .91 | .38 | | | | |
| 12 | 6.0 | .92 | .39 | | | | |
| 13 | 7.0 | .92 | .39 | | | | |
| 14 | 8.0 | .93 | .40 | | | | |
| 15 | 9.0 | .93 | .40 | | | | |
| 16 | 10 | .93 | .40 | | | | |
| 17 | 12 | .95 | .41 | | | | |
| 18 | 14 | .95 | .41 | | | | |
| 19 | 16 | .95 | .41 | | | | |
| 20 | 18 | .94 | .41 | | | | |
| 21 | 20 | .94 | .41 | | | | |
| 22 | 25 | .96 | .43 | | | | Water level Lot 4 20.56 m |
| 23 | 30 | .96 | .43 | | | | |
| 24 | 35 | .96 | .43 | | | | |
| 25 | 40 | .96 | .43 | | | | |
| 26 | 45 | .95 | .42 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 3 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 25

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 21.96 | 2.43 | | | | Pump off |
| 2 | .5 | 20.83 | 1.30 | | | | |
| 3 | 1.0 | .37 | 0.84 | | | | |
| 4 | 1.5 | .19 | .66 | | | | |
| 5 | 2.0 | 19.99 | .46 | | | | |
| 6 | 2.5 | .83 | .30 | | | | |
| 7 | 3.0 | .83 | .30 | | | | |
| 8 | 3.5 | .69 | .16 | | | | |
| 9 | 4.0 | .66 | .13 | | | | |
| 10 | 4.5 | .58 | .05 | | | | |
| 11 | 5.0 | .65 | .12 | | | | |
| 12 | 6.0 | .56 | .03 | | | | |
| 13 | 7.0 | .53 | .00 | | | | |
| 14 | 8.0 | .54 | .01 | | | | |
| 15 | 9.0 | .53 | .00 | | | | |
| 16 | 10 | .51 | -.02 | | | | |
| 17 | 12 | .52 | -.01 | | | | |
| 18 | 14 | .53 | .00 | | | | |
| 19 | 16 | .53 | .00 | | | | |
| 20 | 18 | .53 | .00 | | | | |
| 21 | 20 | .53 | 0.00 | | | | |
| 22 | 25 | .52 | -.01 | | | | |
| 23 | 30 | .54 | .01 | | | | |
| 24 | 35 | .53 | .00 | | | | |
| 25 | 40 | .53 | .00 | | | | |
| 26 | 45 | .52 | -.01 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 3 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 25

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 19.50 | -.03 | | | | |
| 28 | 60 | .49 | -.04 | | | | |
| 29 | 70 | .50 | -.03 | | | | Water Level Lot 4 20.44 m |
| 30 | 80 | .49 | -.04 | | | | |
| 31 | 90 | .50 | -.03 | | | | |
| 32 | 100 | .51 | -.02 | | | | |
| 33 | 110 | .50 | -.03 | | | | |
| 34 | 120 | .50 | -.03 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

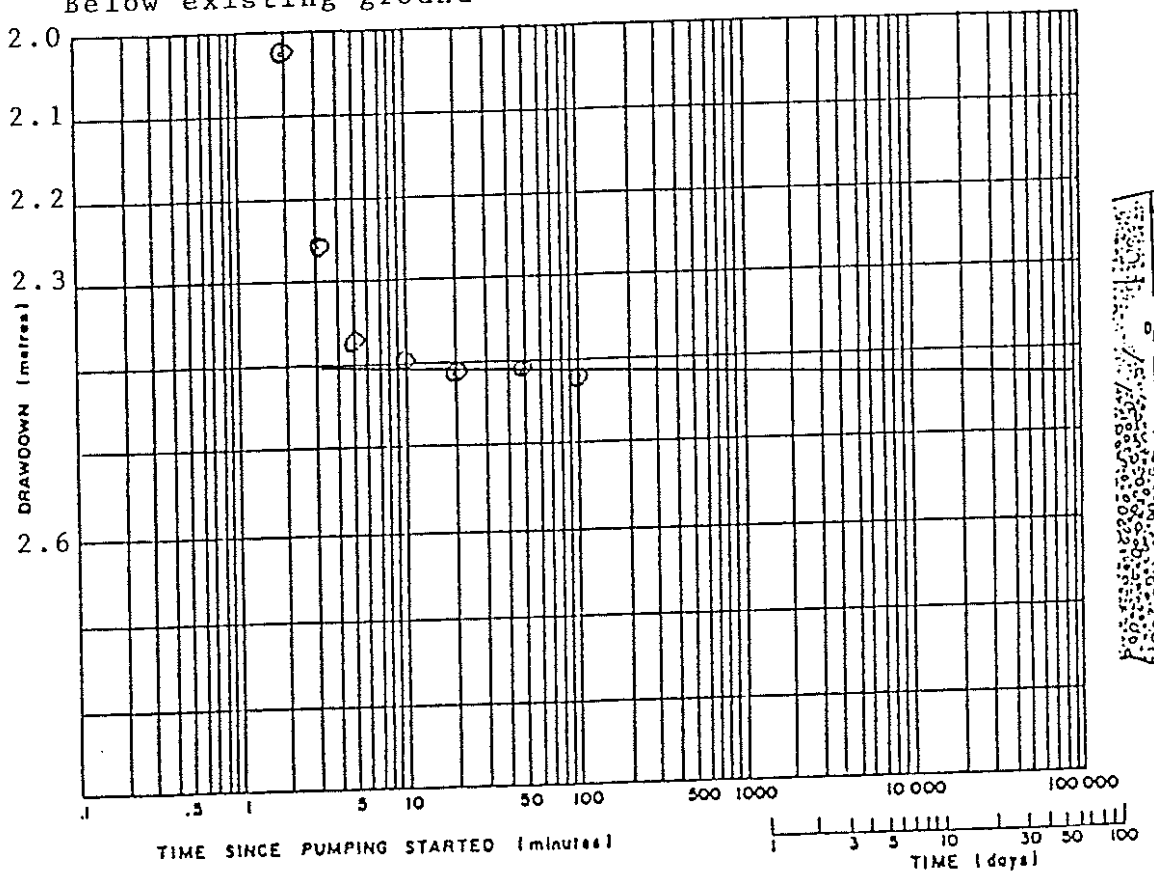
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 3 (Phase 1)

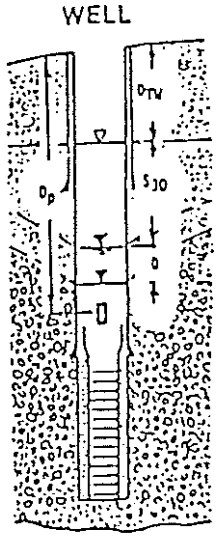
APPLICATION NO.: 87-111 DATE: 1988 05 25

LOCATION: 238A Street & 62nd Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 19.07 (m) TEST NO. 1

Below existing ground




Pumping rate 10 Lpm Drawdown at 30 days ($S_{30}$) 2,44 x 10/40 = 0.61 (m)

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 30 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D)$ =

30 - ( 19.07 + 0.61 + 4 ) = 6.32

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development  WELL NO. 3 (Phase 1)

APPLICATION NO.: 87-111  DATE: 1988 05 25

LOCATION: 238A Street & 62nd Ave.  SHEET 6 OF 6

Township of Langley  TEST NO. 1

**WELL COMPLETION DATA**

Depth 45.42 (m)

Diameter 152 (mm)

Static Water Level 19.0(m)

SCREEN DESIGN (mark one)

☐ Open Hole ☐ Slotted Casing

☒ Screen ☐ Gravel Pack

☐ Other

Screen interval 43.98 m to 45.42 m

DESCRIPTION OF AQUIFER: Sand & Gravel

**PUMP TEST**

Start: Date 25 05 1988 (d/mo/yr)  Time 0810 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift

Other? Describe

Test Pump Set at 40 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape

☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter

☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm  Test duration 2 hours

Initial non-pumping level 19.07 m

Drawdown in well at end of test 2.43 m

Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No

Bacterial Analysis ☒ Yes ☐ No

Water Temperature 9 °C

Any particular gas smells noted None

Comments on clarity of water Clear and Clean

Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 4 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

W L Beam
Certified By (Name of Professional Engineer)

1409 Bewicke Ave
Address

North Vancouver, BC V7M 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WIN 108023

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 4 (S.E. Corner) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.61 | 0 - 2 | Soil sandy loam |
| 0.61 - 6.40 | 2 - 21 | Sand and gravel, silty |
| 6.40 - 9.14 | 21 - 30 | Sand and gravel, clean, loose |
| 9.14 - 10.36 | 30 - 34 | Sandy, silty, brown |
| 10.36 - 11.28 | 34 - 37 | Sand and gravel |
| 11.28 - 11.89 | 37 - 39 | Sand, little water |
| 11.89 - 13.11 | 39 - 43 | Interbedded sand, gravel, clay |
| 13.11 - 16.76 | 43 - 55 | Sand, silty, little water |
| 16.76 - 17.68 | 55 - 58 | Clay, sandy |
| 17.68 - 19.81 | 58 - 65 | Interbedded, sand, gravel, clay |
| 19.81 - 20.73 | 65 - 68 | Clay, pebbly |
| 20.73 - 33.53 | 68 - 110 | Clay, grey (drilled open hole) |
| 33.53 - 35.36 | 110 - 116 | Sand and gravel, silty, "dry" |
| 35.36 - 36.58 | 116 - 120 | Sand and gravel, water-bearing |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 21.03 | + 1.5 - 69 |
| 152 mm (6-inch) telescopic diameter screen | 35.15 - 36.58 | 115.33 - 120 |

Screen - stainless steel, 25 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurrey outside of casing

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp.

WELL NO. 4 (Phase 1)

APPLICATION NO. 87-111

DATE: 1988 05 25

LOCATION: 238A Street & 62 Ave.

SHEET 1 of 6

Township of Langley

TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 20.56 | 0 | | | | Static water level below MPT |
| 2 | .5 | 21.26 | 0.70 | 0.5 | 20 | 40 | Measuring point - top of |
| 3 | 1.0 | .92 | 1.36 | | | | casing 0.46 m above ground |
| 4 | 1.5 | 22.34 | .78 | | | | |
| 5 | 2.0 | .60 | 2.04 | | | | Discharge 35 m away from Well |
| 6 | 2.5 | .75 | .19 | | | | No. 4 |
| 7 | 3.0 | .85 | .29 | | | | |
| 8 | 3.5 | .98 | .32 | | | | |
| 9 | 4.0 | .99 | .43 | | | | |
| 10 | 4.5 | 23.06 | .50 | | | | |
| 11 | 5.0 | .07 | .51 | | | | |
| 12 | 6.0 | .07 | .51 | | | | |
| 13 | 7.0 | .10 | .54 | | | | |
| 14 | 8.0 | .07 | .51 | | | | |
| 15 | 9.0 | .06 | .50 | | | | |
| 16 | 10 | .07 | .51 | | | | |
| 17 | 12 | .09 | .53 | | | | |
| 18 | 14 | .07 | .51 | | | | |
| 19 | 16 | .07 | .51 | | | | |
| 20 | 18 | .05 | .49 | | | | |
| 21 | 20 | .05 | .49 | | | | |
| 22 | 25 | .07 | .51 | | | | |
| 23 | 30 | .06 | .50 | | | | |
| 24 | 35 | .07 | .51 | | | | |
| 25 | 40 | .08 | .52 | | | | Water clear and clean |
| 26 | 45 | .08 | .52 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 4 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 25

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 23.07 | 2.51 | | | | |
| 28 | 60 | .08 | .52 | | | | |
| 29 | 70 | .09 | .53 | | | | |
| 30 | 80 | .08 | .52 | | | | |
| 31 | 90 | .08 | .52 | | | | |
| 32 | 100 | .09 | .53 | 0.5 | 20 | 40 | |
| 33 | 110 | .09 | .53 | | | | Water samples collected |
| 34 | 120 | .09 | .53 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp.

APPLICATION NO. 87-111

LOCATION: 238A Street & 62 Ave.

Township of Langley

WELL NO. 4 (Phase 1)

DATE: 1988 05 25

SHEET 3 of 6

TEST NO. 1

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 23.09 | 2.53 | | | | Pump off |
| 2 | .5 | 22.11 | 1.55 | | | | |
| 3 | 1.0 | 21.56 | 1.00 | | | | |
| 4 | 1.5 | .06 | 0.50 | | | | |
| 5 | 2.0 | 20.86 | .30 | | | | |
| 6 | 2.5 | - | - | | | | |
| 7 | 3.0 | .75 | .19 | | | | |
| 8 | 3.5 | .70 | .14 | | | | |
| 9 | 4.0 | .67 | .11 | | | | |
| 10 | 4.5 | .62 | .06 | | | | |
| 11 | 5.0 | .61 | .05 | | | | |
| 12 | 6.0 | .60 | .04 | | | | |
| 13 | 7.0 | .57 | .01 | | | | |
| 14 | 8.0 | .60 | .04 | | | | |
| 15 | 9.0 | .59 | .03 | | | | |
| 16 | 10 | .60 | .04 | | | | |
| 17 | 12 | .57 | .01 | | | | |
| 18 | 14 | .59 | .03 | | | | |
| 19 | 16 | .59 | .03 | | | | |
| 20 | 18 | .58 | .03 | | | | |
| 21 | 20 | .58 | .02 | | | | |
| 22 | 25 | .58 | .02 | | | | |
| 23 | 30 | .57 | .01 | | | | |
| 24 | 35 | .57 | .01 | | | | |
| 25 | 40 | .56 | .00 | | | | |
| 26 | 45 | .57 | .01 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 4 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 25

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 20.57 | 0.01 | | | | |
| 28 | 60 | .56 | .00 | | | | |
| 29 | 70 | .57 | .01 | | | | |
| 30 | 80 | .56 | .00 | | | | |
| 31 | 90 | .56 | .00 | | | | |
| 32 | 100 | .57 | .01 | | | | |
| 33 | 110 | .58 | .02 | | | | |
| 34 | 120 | .58 | .02 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

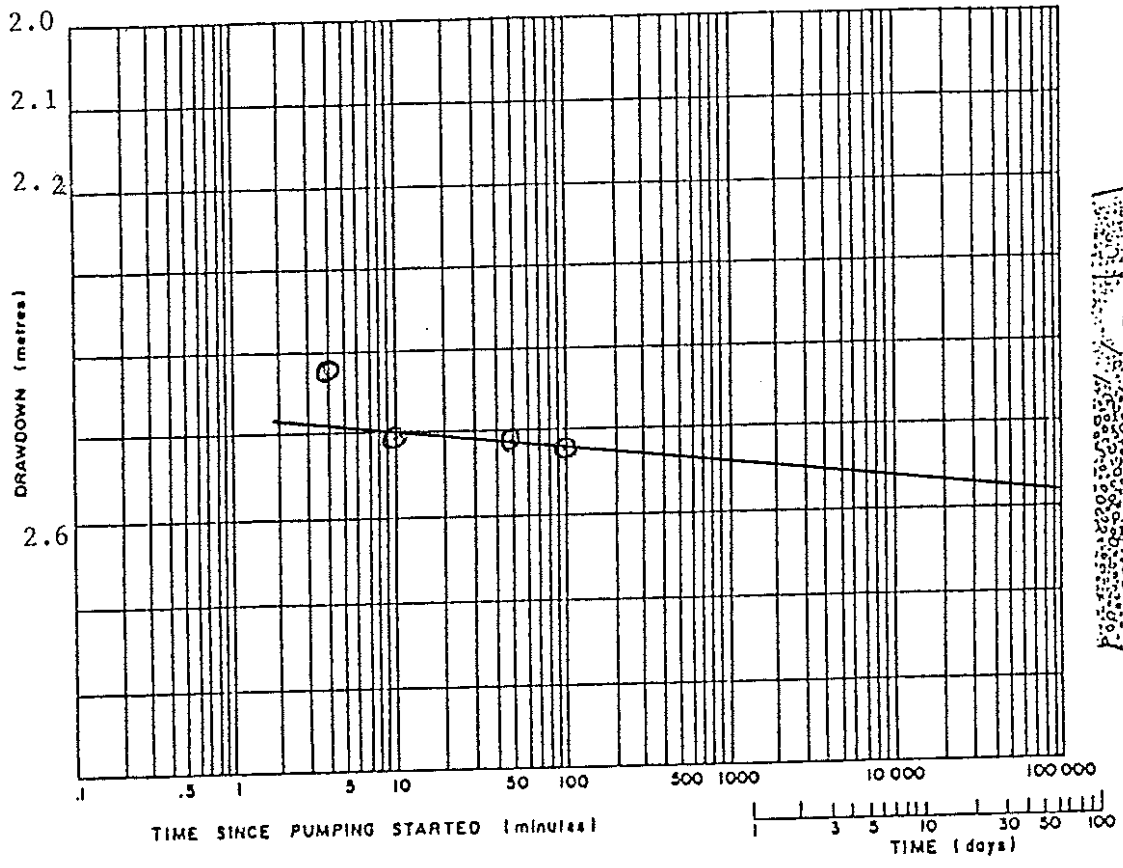
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 4 (Phase 1)

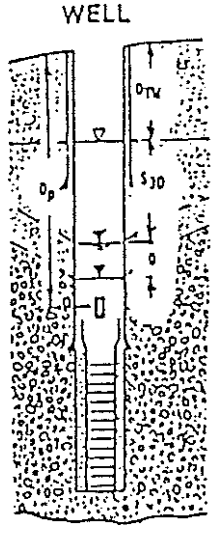
APPLICATION NO.: 87-111 DATE: 1988 05 25

LOCATION: 238A Street & 62nd Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 20.10 (m) TEST NO. 1

Below existing ground




Pumping rate 10 Lpm Drawdown at 30 days ($S_{30}$) $2.58 \times 10/40 = 0.65$ (m)

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 30 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D) =$

$30 - (20.10 + 0.65 + 4) = 5.25$

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 4 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 05 25

LOCATION: 238A Street & 62 Ave. SHEET 6 OF 6

Township of Langley TEST NO. 1

**WELL COMPLETION DATA**

Depth 36.58 (m)

Diameter 152 (mm)

Static Water Level ~~20.10~~ (m)

**SCREEN DESIGN (mark one)**

☐ Open Hole ☐ Slotted Casing

☒ Screen ☐ Gravel Pack

☐ Other

Screen interval 35.15 m to 36.58 m

**DESCRIPTION OF AQUIFER**

Sand & Gravel

**PUMP TEST**

Start: Date 25 05 1988 (d/mo/yr) Time 1330 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift

Other? Describe

Test Pump Set at ____ m below ground

Water level sounded by: ☐ Electric tape ☐ Air bubbler ☐ Steel tape

☐ Other? Describe

Flow measured by: ☒ Container & Watch ☐ Flow meter

☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm Test duration 2 hours

Initial non-pumping level 20.10 m

Drawdown in well at end of test 2.53 m

Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No

Bacterial Analysis ☒ Yes ☐ No

Water Temperature 9 °C

Any particular gas smells noted None

Comments on clarity of water Clear and Clean

Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 5 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

W L Brown

Certified By (Name of Professional Engineer)

1409 Bewicke Ave

Address

North Vancouver, BC V7P 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 108029

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 5 (S.E. Corner) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.30 | 0 - 1 | Soil sandy loam |
| 0.30 - 3.05 | 1 - 10 | Sand and gravel, brown |
| 3.05 - 5.18 | 10 - 17 | Sand and gravel, silty |
| 5.18 - 6.71 | 17 - 22 | Sand and gravel, coarse |
| 6.71 - 8,53 | 22 - 28 | Sand and gravel, silty |
| 8.53 - 11.89 | 28 - 39 | Sand, brown |
| 11.89 - 17.37 | 39 - 57 | Clay, sandy |
| 17.37 - 20.12 | 57 - 66 | Sand, silty dry |
| 20.12 - 21.64 | 66 - 71 | Sand and gravel, water bearing |
| 21.64 - 31.39 | 71 - 103 | Till-like |
| 31.39 - 34.14 | 103 - 112 | Sand and gravel, water bearing |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 33.07 | + 1.5 - 108.5 |
| 152 mm (6-inch) telescopic diameter screen | 32.61 - 34.14 | 107 - 112 |

Screen - stainless steel, 15 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurrey outside of casing

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp.

WELL NO. 5 (Phase 1)

APPLICATION NO. 87-111

DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave.

SHEET 1 of 6

Township of Langley

TEST NO. 2

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 21.34 | 0 | | | | Static Water Level below MPT |
| 2 | .5 | 22.37 | 1.03 | | | | Measuring Point - top of |
| 3 | 1.0 | 23.27 | .93 | | | | Casing 0.46 m above ground |
| 4 | 1.5 | .91 | 2.57 | | | | |
| 5 | 2.0 | 24.38 | 3.04 | | | | Discharge 40 m away from well |
| 6 | 2.5 | .82 | .48 | | | | |
| 7 | 3.0 | 25.12 | .78 | | | | |
| 8 | 3.5 | .32 | .98 | | | | |
| 9 | 4.0 | .58 | 4.24 | | | | |
| 10 | 4.5 | .72 | .38 | | | | |
| 11 | 5.0 | .86 | .52 | | | | |
| 12 | 6 | 26.03 | .69 | .05 | 20 | 40 | |
| 13 | 7 | .15 | .81 | | | | |
| 14 | 8 | .23 | .89 | | | | |
| 15 | 9 | .29 | .95 | | | | |
| 16 | 10 | .31 | .97 | | | | |
| 17 | 12 | .34 | 5.00 | | | | |
| 18 | 14 | .37 | .03 | | | | |
| 19 | 16 | .38 | .04 | | | | |
| 20 | 18 | .38 | .04 | | | | |
| 21 | 20 | .39 | .05 | | | | |
| 22 | 25 | .39 | .05 | | | | |
| 23 | 30 | .40 | .06 | | | | |
| 24 | 35 | .38 | .04 | | | | |
| 25 | 40 | .40 | .06 | | | | |
| 26 | 45 | 26.40 | 5.06 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp.

WELL NO. 5 (Phase 1)

APPLICATION NO. 87-111

DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave.

SHEET 2 of 6

Township of Langley

TEST NO. 2

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | .41 | .07 | | | | |
| 28 | 60 | .43 | .09 | | | | |
| 29 | 70 | .44 | .10 | | | | |
| 30 | 80 | .42 | .08 | | | | |
| 31 | 90 | .42 | .08 | | | | |
| 32 | 100 | .43 | .09 | | | | |
| 33 | 110 | .40 | .06 | | | | Water Samples collected |
| 34 | 120 | .42 | .08 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 5 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 2

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 26.42 | 5.08 | | | | Pump off |
| 2 | .5 | | | | | | |
| 3 | 1.0 | | | | | | |
| 4 | 1.5 | 23.85 | 2.51 | | | | |
| 5 | 2.0 | .31 | 1.97 | | | | |
| 6 | 2.5 | 22.86 | .52 | | | | |
| 7 | 3.0 | .53 | .19 | | | | |
| 8 | 3.5 | .24 | 0.09 | | | | |
| 9 | 4.0 | | | | | | |
| 10 | 4.5 | | | | | | |
| 11 | 5.0 | | | | | | |
| 12 | 6.0 | | | | | | |
| 13 | 7.0 | 21.52 | 0.18 | | | | |
| 14 | 8.0 | .45 | .11 | | | | |
| 15 | 9.0 | .38 | .04 | | | | |
| 16 | 10 | .34 | 0.00 | | | | |
| 17 | 12 | | | | | | |
| 18 | 14 | | | | | | |
| 19 | 16 | | | | | | |
| 20 | 18 | | | | | | |
| 21 | 20 | .34 | .00 | | | | |
| 22 | 25 | | | | | | |
| 23 | 30 | | | | | | |
| 21 | 35 | | | | | | |
| 25 | 40 | .34 | .00 | | | | |
| 26 | 45 | 21.34 | 0.00 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 5 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 16

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 2

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | | | | | | |
| 28 | 60 | | | | | | |
| 29 | 70 | | | | | | |
| 30 | 80 | | | | | | |
| 31 | 90 | .34 | .00 | | | | |
| 32 | 100 | | | | | | |
| 33 | 110 | | | | | | |
| 34 | 120 | .34 | .00 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

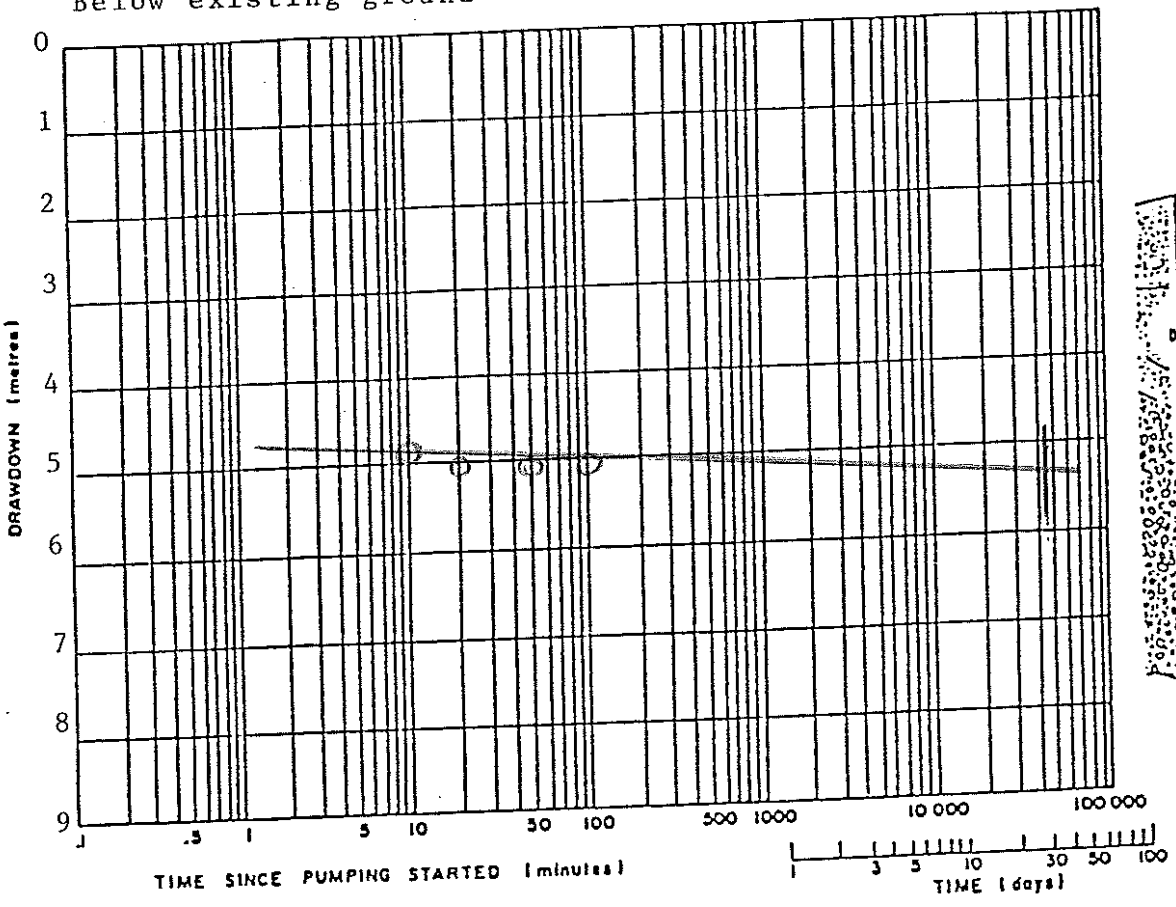
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 5 (Phase 1)

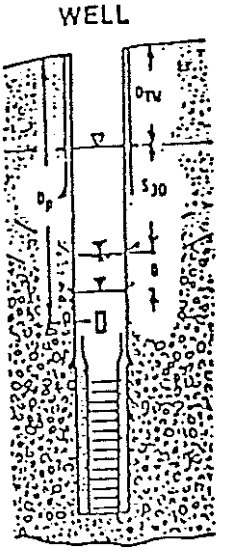
APPLICATION NO.: 87-111 DATE: 1988 06 17

LOCATION: 238A Street & 62nd Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 20.88 (m) TEST NO. 2

Below existing ground




Pumping rate 10 Lpm Drawdown at 30 days ($S_{30}$) $\frac{5.4 \times 10}{40}$ (m) = 1.4

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 30 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D) =$

30 - ( 20.88 + 1.4 + 4 ) = 3.72

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development  WELL NO. 5 (Phase 1)

APPLICATION NO.: 87-111  DATE: 1988 06 17

LOCATION: 238A Street & 62nd Ave.  SHEET 6 OF 6

Township of Langley  TEST NO. 2

**WELL COMPLETION DATA**

Depth 34.14 (m)
Diameter 152 (mm)
Static Water Level 20.88 (m)

SCREEN DESIGN (mark one)

☐ Open Hole ☐ Slotted Casing
☒ Screen ☐ Gravel Pack
☐ Other
Screen interval 32.61 m to 34.14 m

DESCRIPTION OF AQUIFER: Sand & Gravel

**PUMP TEST**

Start: Date 17 06 1988 (d/mo/yr)  Time 0710 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift
Other? Describe

Test Pump Set at 30 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape
☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter
☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm  Test duration 2 hours
Initial non-pumping level 20.88 m
Drawdown in well at end of test 5.08 m
Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No
Bacterial Analysis ☒ Yes ☐ No
Water Temperature 9 °C
Any particular gas smells noted None
Comments on clarity of water Clear and Clean
Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 6 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

B.L. Brown

Certified By (Name of Professional Engineer)

1409 Beaucher Ave

Address

North Vancouver B.C.

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

F-5

WTN 108025

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 6 (S.E. Curve) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.30 | 0 - 1 | Soil sandy loam |
| 0.30 - 3.66 | 1 - 12 | Sand and gravel, silty, brown |
| 3.66 - 4.88 | 12 - 16 | Sand and gravel, grey |
| 4.88 - 7.32 | 16 - 24 | Sand and gravel, brown |
| 7.32 - 8.23 | 24 - 27 | Sand, brown |
| 8.23 - 10.06 | 27 - 33 | Gravel |
| 10.06 - 16.15 | 33 - 53 | Interbedded sand and clay |
| 16.15 - 21.03 | 53 - 69 | Sand and gravel, silty, hard packed |
| 21.03 - 24.08 | 69 - 79 | Sand and gravel, water-bearing |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 23.01 | + 1.5 - 75.5 |
| 152 mm (6-inch) telescopic diameter screen | 22.66 - 24.08 | 74.3 - 79.0 |

Screen - stainless steel, 18 slot with K-packer
Thick Bentonite Slurrey seal around top 3m (10 feet) of casing

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp.

WELL NO. 6 (Phase 1)

APPLICATION NO. 87-111

DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave.

SHEET 1 of 6

Township of Langley

TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 18.43 | 0 | | | | Static Water Level below MPt. |
| 2 | .5 | 19.30 | 0.87 | | | | Measuring Point - top of |
| 3 | 1.0 | .72 | 1.29 | | | | casing 0.46 above ground |
| 4 | 1.5 | .91 | .48 | | | | Water level Lot 10 18.62 m |
| 5 | 2.0 | 20.00 | .57 | | | | Discharge 35 m away from Well |
| 6 | 2.5 | .06 | .63 | | | | |
| 7 | 3.0 | .08 | .65 | | | | |
| 8 | 3.5 | .10 | .67 | | | | |
| 9 | 4.0 | .11 | .68 | | | | |
| 10 | 4.5 | .13 | .70 | | | | |
| 11 | 5.0 | .14 | .71 | | | | |
| 12 | 6.0 | .13 | .70 | | | | |
| 13 | 7.0 | .13 | .70 | | | | |
| 14 | 8.0 | .14 | .71 | | | | |
| 15 | 9.0 | .15 | .72 | | | | |
| 16 | 10 | .15 | .72 | 0.5 | 20 | 40 | |
| 17 | 12 | .14 | .71 | | | | |
| 18 | 14 | .14 | .71 | | | | |
| 19 | 15 | .16 | .73 | | | | |
| 20 | 18 | .14 | .71 | | | | |
| 21 | 20 | .14 | .71 | | | | |
| 22 | 25 | .14 | .71 | | | | |
| 23 | 30 | .14 | .71 | | | | Water Level Lot 10 - 18.62 m |
| 24 | 35 | .15 | .72 | | | | |
| 25 | 40 | .14 | .71 | | | | |
| 26 | 45 | .15 | .72 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 6 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 26

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 20.15 | 1.72 | | | | |
| 28 | 60 | .15 | .72 | | | | Water Level Lot 10 - 18.64 m |
| 29 | 70 | .18 | .75 | | | | |
| 30 | 80 | .18 | .75 | | | | Water Level Lot 10 - 18.64 m |
| 31 | 90 | .19 | .76 | | | | |
| 32 | 100 | .19 | .76 | | | | Water Level Lot 10 18.64 m |
| 33 | 110 | .19 | .76 | | | | Water Samples Collected |
| 34 | 120 | .19 | .76 | | | | Water Level Lot 10 - 18.64 |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 6 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 20.19 | 1.76 | | | | Pump off |
| 2 | .5 | 19.31 | 0.88 | | | | |
| 3 | 1.0 | 18.90 | .47 | | | | |
| 4 | 1.5 | .69 | .26 | | | | |
| 5 | 2.0 | .59 | .16 | | | | |
| 6 | 2.5 | .53 | .10 | | | | |
| 7 | 3.0 | .50 | .07 | | | | |
| 8 | 3.5 | .50 | .07 | | | | |
| 9 | 4.0 | .49 | .06 | | | | |
| 10 | 4.5 | .48 | .05 | | | | |
| 11 | 5.0 | .48 | .05 | | | | |
| 12 | 6.0 | .47 | .04 | | | | |
| 13 | 7.0 | .47 | .04 | | | | |
| 14 | 8.0 | .47 | .04 | | | | |
| 15 | 9.0 | .47 | .04 | | | | |
| 16 | 10 | .47 | .04 | | | | |
| 17 | 12 | .47 | .04 | | | | |
| 18 | 14 | .47 | .04 | | | | |
| 19 | 16 | .47 | .04 | | | | |
| 20 | 18 | .47 | .04 | | | | |
| 21 | 20 | .47 | .04 | | | | |
| 22 | 25 | .47 | .04 | | | | |
| 23 | 30 | .46 | .03 | | | | |
| 24 | 35 | .46 | .03 | | | | |
| 25 | 40 | .46 | .03 | | | | |
| 26 | 45 | .46 | .03 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 6 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 18.46 | 0.03 | | | | |
| 28 | 60 | .45 | .02 | | | | |
| 29 | 70 | .45 | .02 | | | | |
| 30 | 80 | .44 | .01 | | | | |
| 31 | 90 | .44 | .01 | | | | |
| 32 | 100 | .43 | .00 | | | | |
| 33 | 110 | .43 | .00 | | | | |
| 34 | 120 | .43 | .00 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 6 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 6 OF 6

Township of Langley TEST NO. 1

**WELL COMPLETION DATA**

Depth 24.08 (m)

Diameter 152 (mm)

Static Water Level 17.79 (m)

**SCREEN DESIGN** (mark one)

☐ Open Hole ☐ Slotted Casing

☒ Screen ☐ Gravel Pack

☐ Other

Screen interval 22.66 m to 24.08 m

**DESCRIPTION OF AQUIFER**

Sand & Gravel

**PUMP TEST**

Start: Date 27 05 1988 (d/mo/yr) Time 0830 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift

Other? Describe

Test Pump Set at 22 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape

☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter

☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm Test duration 2 hours

Initial non-pumping level 17.79 m

Drawdown in well at end of test 1.76 m

Recommended pumping rate 5 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No

Bacterial Analysis ☒ Yes ☐ No

Water Temperature 9 °C

Any particular gas smells noted None

Comments on clarity of water Clear and Clean

Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 7 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

Certified By (Name of Professional Engineer)

1409 Bewicke Ave
Address

North Vancouver, BC V7M 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN108026

**GOODBRAND DEVELOPMENT CORPORATION**
**62ND AVE., LANGLEY, BRITISH COLUMBIA**

**Well on Lot 7 (South Central Area) (Phase 1)**

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.31 | 0 - 1 | Soil sandy loam |
| 0.31 - 2.13 | 1 - 7 | Sand and gravel, silty |
| 2.13 - 12.80 | 7 - 42 | Sand, silt, minor pebble |
| 12.80 - 17.37 | 42 - 57 | Sand, brown, dry |
| 17.37 - 18.59 | 57 - 61 | Gravel, coarse |
| 18.59 - 19.81 | 61 - 65 | Sand, brown, water-bearing low static water level |
| 19.81 - 22.86 | 65 - 75 | Sand and gravel, water-bearing low static water level |
| 22.86 - 32.00 | 75 - 105 | Clay, sandy some pebble, grey |
| 32.00 - 33.53 | 105 - 110 | Sand and clay, interbedded |
| 33.53 - 35.36 | 110 - 116 | Sand, silty, fine grained |
| 35.36 - 35.66 | 116 - 117 | Clay, grey |
| 35.66 - 36.88 | 117 - 121 | Sand and gravel, water-bearing |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 35.66 | + 1.5 - 117 |
| 152 mm (6-inch) telescopic diameter screen | 35.46 - 36.88 | 116.3 - 121 |

Screen - stainless steel, 20 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurrey outside of casing.

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 7 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 07

LOCATION: 238A Street & 62 Ave. SHEET 1 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 16.07 | 0 | | | | Static Water Level below M Pt. |
| 2 | .5 | 17.11 | 1.04 | | | | Measuring Point - Top of |
| 3 | 1.0 | .91 | 1.84 | | | | casing 0.46 m above ground |
| 4 | 1.5 | 18.44 | 2.37 | | | | |
| 5 | 2.0 | .80 | .73 | | | | |
| 6 | 2.5 | 19.07 | 3.00 | | | | |
| 7 | 3.0 | .25 | .18 | | | | |
| 8 | 3.5 | .42 | .35 | | | | |
| 9 | 4.0 | .53 | .46 | | | | |
| 10 | 4.5 | .61 | .54 | | | | |
| 11 | 5.0 | .67 | .60 | | | | |
| 12 | 6.0 | .72 | .65 | | | | |
| 13 | 7.0 | .74 | .67 | | | | |
| 14 | 8.0 | .76 | .69 | | | | |
| 15 | 9.0 | .77 | .70 | | | | |
| 16 | 10 | .78 | .71 | | | | |
| 17 | 12 | .79 | .72 | | | | |
| 18 | 14 | .80 | .73 | | | | |
| 19 | 16 | .81 | .74 | | | | |
| 20 | 18 | .81 | .74 | | | | |
| 21 | 20 | .81 | .74 | | | | |
| 22 | 25 | .81 | .74 | | | | |
| 23 | 30 | .81 | .74 | | | | |
| 24 | 35 | .81 | .74 | | | | |
| 25 | 40 | .81 | .74 | | | | |
| 26 | 45 | .81 | .74 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 7 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 07

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 19.78 | 3.71 | 0.5 | 20 | 40 | Check Flow |
| 28 | 60 | .80 | .73 | 0.5 | 20 | 40 | |
| 29 | 70 | .81 | .74 | 0.5 | 20 | 40 | |
| 30 | 80 | .80 | .73 | 0.5 | 20 | 40 | |
| 31 | 90 | .83 | .76 | 0.5 | 20 | 40 | |
| 32 | 100 | .82 | .75 | | | | |
| 33 | 110 | .81 | .74 | | | | Water clear and clean |
| 34 | 120 | .81 | .74 | | | | Water Samples Collected |
| | | | | | | | Pump off |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 7 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 07

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 19.81 | 3.74 | | | | Pump off |
| 2 | .5 | 18.90 | 2.83 | | | | |
| 3 | 1.0 | .14 | .07 | | | | |
| 4 | 1.5 | 17.56 | 1.49 | | | | |
| 5 | 2.0 | .13 | .06 | | | | |
| 6 | 2.5 | 16.85 | 0.78 | | | | |
| 7 | 3.0 | .68 | .61 | | | | |
| 8 | 3.5 | .51 | .44 | | | | |
| 9 | 4.0 | .39 | .32 | | | | |
| 10 | 4.5 | .32 | .25 | | | | |
| 11 | 5.0 | .26 | .19 | | | | |
| 12 | 6.0 | .19 | .12 | | | | |
| 13 | 7.0 | .15 | .08 | | | | |
| 14 | 8.0 | .13 | .06 | | | | |
| 15 | 9.0 | .11 | .04 | | | | |
| 16 | 10 | .11 | .04 | | | | |
| 17 | 12 | .09 | .02 | | | | |
| 18 | 14 | .09 | .02 | | | | |
| 19 | 16 | .09 | .02 | | | | |
| 20 | 18 | .09 | .02 | | | | |
| 21 | 20 | .08 | .01 | | | | |
| 22 | 25 | .08 | .01 | | | | |
| 23 | 30 | .08 | .01 | | | | |
| 24 | 35 | .08 | .01 | | | | |
| 25 | 40 | .07 | .00 | | | | |
| 26 | 45 | .08 | .01 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 7 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 07

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 16.08 | 0.01 | | | | |
| 28 | 60 | .07 | .00 | | | | |
| 29 | 70 | .07 | .00 | | | | |
| 30 | 80 | .07 | .00 | | | | |
| 31 | 90 | .07 | .00 | | | | |
| 32 | 100 | .06 | -.01 | | | | |
| 33 | 110 | .07 | .00 | | | | |
| 34 | 120 | .07 | .00 | | | | |

# The Corporation of the Township of Langley
SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

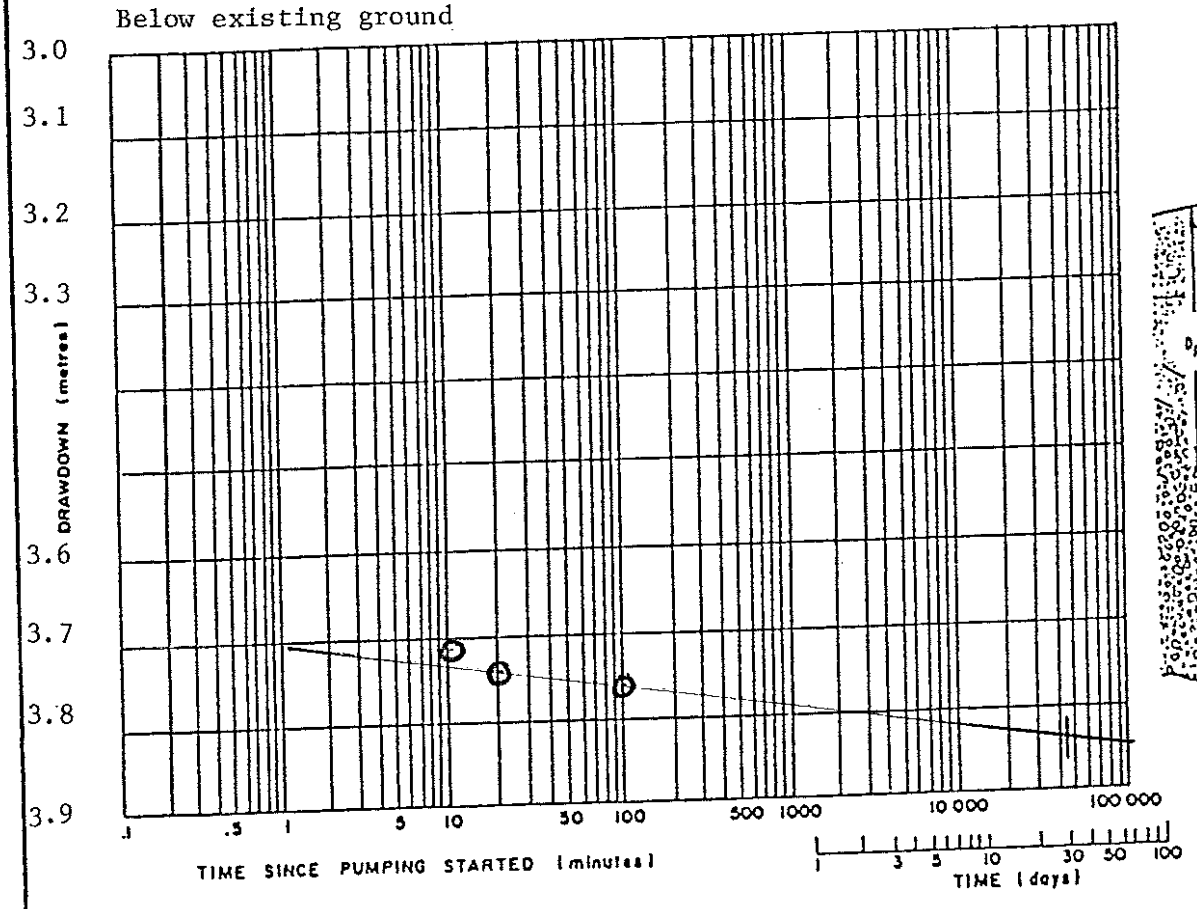
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 7 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 06 07

LOCATION: 238A St. & 62nd Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 15.61 (m) TEST NO. 1

Below existing ground




Pumping rate 10 Lpm Drawdown at 30 days ($S_{30}$) 3.83 x 10/40 (m) = 0.96

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 35 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D)$ =

35 - ( 15.61 + 0.96 + 4 ) = 14.43

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 7 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 06 07

LOCATION: 238A St. & 62nd Ave. SHEET 6 OF 6

Township of Langley TEST NO. 1

**WELL COMPLETION DATA**

Depth 36.88 (m)

Diameter 152 (mm)

Static Water Level 15.6 (m)

SCREEN DESIGN (mark one)

☐ Open Hole ☐ Slotted Casing

☒ Screen ☐ Gravel Pack

☐ Other

Screen interval 38.46 m to 36.88 m

DESCRIPTION OF AQUIFER: Sand and gravel

**PUMP TEST**

Start: Date 07 06 1988 (d/mo/yr) Time 1400 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift

Other? Describe

Test Pump Set at 35 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape

☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter

☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm Test duration 2 hours

Initial non-pumping level 15.61 m

Drawdown in well at end of test 3.74 m

Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No

Bacterial Analysis ☒ Yes ☐ No

Water Temperature 9 °C

Any particular gas smells noted None

Comments on clarity of water Clear and clean

Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 8 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

[signature]
Certified By (Name of Professional Engineer)

1169 Pemberton Ave
Address

North Vancouver, BC V7P 2R7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 108028

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 8 (N.E. Corner) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.31 | 0 - 1 | Soil, sandy loam |
| 0.31 - 1.52 | 1 - 5 | Sand and gravel |
| 1.52 - 6.71 | 5 - 22 | Sand and gravel, silty brown |
| 6.71 - 13.41 | 22 - 44 | Sand and gravel with clay bed |
| 13.41 - 17.07 | 44 - 56 | Soil, Sand packed, open hole |
| 17.07 - 24.08 | 56 - 79 | Clay, sandy, stoney, grey tile-like |
| 24.08 - 27.13 | 79 - 89 | Sand and gravel water-bearing |
| 27.13 - 29.57 | 89 - 97 | Clay, grey |
| 29.57 - | 97 - | |

Construction details - below ground surface

| Metres | Feet | |
|---|---|---|
| 152 mm (6 inch) diameter casing | + 0.46 - 28.50 | + 1.5 - 93.5 |
| 152 mm (6 inch) telescopic screen | 27.83 - 29.26 | 91.3 - 96.0 diameter |

Screen - stainless steel, 20 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurry outside of casing.

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 8 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 07

LOCATION: 238A Street & 62 Ave. SHEET 1 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 16.35 | 0 | | | | Static Water Level below M Pt. |
| 2 | .5 | 17.22 | 0.87 | | | | Measuring Point - Top of |
| 3 | 1.0 | - | | | | | casing 0.46 m above ground |
| 4 | 1.5 | 17.60 | 1.25 | | | | |
| 5 | 2.0 | - | | | | | |
| 6 | 2.5 | 17.86 | 1.51 | 0.5 | 20 | 40 | |
| 7 | 3.0 | 18.19 | .84 | | | | |
| 8 | 3.5 | .20 | .85 | | | | |
| 9 | 4.0 | .23 | .88 | | | | |
| 10 | 4.5 | .23 | .88 | | | | |
| 11 | 5.0 | .26 | .91 | | | | |
| 12 | 6.0 | .29 | .94 | | | | |
| 13 | 7.0 | .23 | .88 | | | | |
| 14 | 8.0 | .31 | .96 | | | | |
| 15 | 9.0 | .32 | .97 | | | | |
| 16 | 10 | .32 | .97 | | | | |
| 17 | 12 | .34 | .99 | | | | |
| 18 | 14 | .40 | 2.05 | | | | |
| 19 | 16 | .43 | .08 | | | | |
| 20 | 18 | .43 | .08 | | | | |
| 21 | 20 | .43 | .08 | | | | |
| 22 | 25 | .49 | .14 | 0.5 | 20 | 40 | Water clear and clean |
| 23 | 30 | .48 | .13 | | | | |
| 24 | 35 | .51 | .16 | | | | |
| 25 | 40 | .53 | .18 | | | | |
| 26 | 45 | .54 | .19 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 8 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 18.56 | 2.21 | | | | |
| 28 | 60 | .58 | .23 | | | | |
| 29 | 70 | .60 | .25 | | | | |
| 30 | 80 | .64 | .29 | | | | |
| 31 | 90 | .65 | .30 | | | | |
| 32 | 100 | .65 | .30 | | | | |
| 33 | 110 | .65 | .30 | | | | |
| 34 | 120 | .67 | .32 | | | | Water Samples Collected |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 8 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 16.47 | 0.12 | | | | |
| 28 | 60 | .45 | .10 | | | | |
| 29 | 70 | .42 | .08 | | | | |
| 30 | 80 | .42 | .07 | | | | |
| 31 | 90 | .42 | .07 | | | | |
| 32 | 100 | .40 | .05 | | | | |
| 33 | 110 | .39 | .04 | | | | |
| 34 | 120 | .39 | .04 | | | | |

# The Corporation of the Township of Langley
SCHEDULE "A"

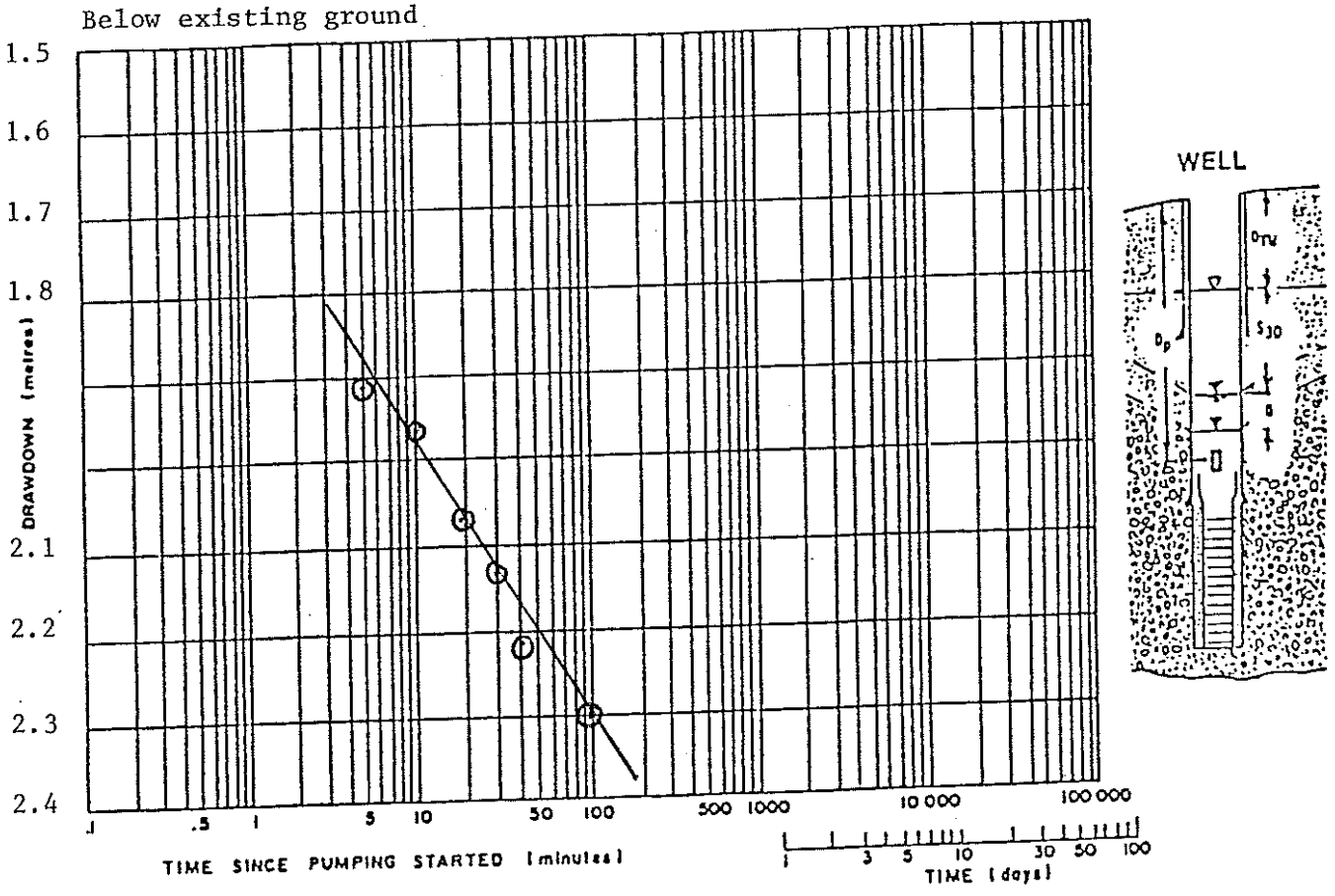
## TIME - DRAWDOWN GRAPH FOR PUMP TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 8 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 06 07

LOCATION: 238A St. & 62 Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 15.89 (m) TEST NO. 1




Pumping rate 10 Lpm Drawdown at 30 days ($S_{30}$) 3.23 x 10/40 = 0.81 (m)

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 27 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D)$ =

27 - ( 15.89 + 0.81 + 4 ) = 6.30

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 8 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 06 07

LOCATION: 238A St. & 62 Ave. SHEET 6 OF 6

Township of Langley TEST NO. 1

**WELL COMPLETION DATA**

Depth 29.57 (m)

Diameter 152 (mm)

Static Water Level 15.89 (m)

**SCREEN DESIGN (mark one)**

☐ Open Hole ☐ Slotted Casing

☒ Screen ☐ Gravel Pack

☐ Other

Screen interval 27.89 to 29.26

**DESCRIPTION OF AQUIFER**

Sand & Gravel

**PUMP TEST**

Start: Date 07 06 1988 (d/mo/yr) Time 0840 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift

Other? Describe

Test Pump Set at 27 m below ground

Water level sounded by: ☐ Electric tape ☐ Air bubbler ☐ Steel tape

☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter

☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm Test duration 2 hours

Initial non-pumping level 15.89 m

Drawdown in well at end of test 2.32 m

Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No

Bacterial Analysis ☒ Yes ☐ No

Water Temperature 9 °C

Any particular gas smells noted None

Comments on clarity of water Clear and Clean

Other

F-8

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 9 (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|

No Well was drilled on Lot 9.

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 10 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

B.L. Bryan
Certified By (Name of Professional Engineer)

1909 Beverly Ave
Address

North Vancouver, BC V7M 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 102029

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 10 (N.W. Corner) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.61 | 0 - 2 | Soil sandy loam |
| 0.61 - 3.66 | 2 - 12 | Sand and gravel, silty |
| 3.66 - 12.80 | 12 - 42 | Sand, hard packed, brown |
| 12.80 - 13.72 | 42 - 45 | Clay, sandy |
| 13.72 - 16.15 | 45 - 53 | Sand and gravel |
| 16.15 - 19.81 | 53 - 65 | Sand, grey, dry |
| 19.81 - 22.86 | 65 - 78 | Sand, grey, water bearing |
| 22.86 - | 75 | Clay, grey, sandy |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.46 - 21.64 | + 1.5 - 71 |
| 152 mm (6-inch) telescopic diameter screen | 21.43 - 22.86 | 70.3 - 75 |

Screen - stainless steel, 30 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurrey outside of casing

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 10 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 1 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 18.68 | 0 | | | | Static Water Level below MPt. |
| 2 | .5 | - | - | | | | Measuring Point - top of |
| 3 | 1.0 | 19.32 | 0.64 | 0.5 | 20 | 40 | casing 0.46 above ground |
| 4 | 1.5 | .43 | .75 | | | | |
| 5 | 2.0 | .43 | .75 | | | | Discharge 40 m away from Well |
| 6 | 2.5 | .43 | .75 | | | | |
| 7 | 3.0 | .44 | .76 | | | | |
| 8 | 3.0 | .44 | .76 | | | | |
| 9 | 4.0 | .44 | .76 | | | | |
| 10 | 4.5 | .44 | .76 | | | | |
| 11 | 5.0 | .44 | .76 | | | | |
| 12 | 6.0 | - | - | | | | |
| 13 | 7.0 | .45 | .77 | | | | |
| 14 | 8.0 | - | - | | | | |
| 15 | 9.0 | .44 | .76 | | | | |
| 16 | 10 | .45 | .77 | | | | |
| 17 | 12 | .46 | .78 | | | | |
| 18 | 14 | .45 | .77 | | | | |
| 19 | 15 | .46 | .78 | | | | |
| 20 | 18 | .47 | .79 | | | | |
| 21 | 20 | .47 | .79 | | | | |
| 22 | 25 | .46 | .78 | | | | |
| 23 | 30 | .47 | .79 | | | | |
| 24 | 35 | .47 | .79 | | | | |
| 25 | 40 | .49 | .81 | | | | |
| 26 | 45 | .49 | .81 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 10 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 19.49 | 0.81 | | | | |
| 28 | 60 | .48 | .80 | | | | |
| 29 | 70 | .48 | .80 | | | | |
| 30 | 80 | .48 | .80 | 0.5 | 20 | 40 | |
| 31 | 90 | .49 | .81 | | | | |
| 32 | 100 | .50 | .82 | | | | Water clear and clean |
| 33 | 110 | .50 | .82 | | | | Water Samples Collected |
| 34 | 120 | .50 | .82 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 10 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 19.50 | 0.82 | | | | Pump off |
| 2 | .5 | 18.89 | .21 | | | | |
| 3 | 1.0 | .77 | .09 | | | | |
| 4 | 1.5 | .75 | .07 | | | | |
| 5 | 2.0 | .74 | .06 | | | | |
| 6 | 2.5 | .74 | .06 | | | | |
| 7 | 3.0 | .74 | .06 | | | | |
| 8 | 3.5 | .74 | .06 | | | | |
| 9 | 4.0 | .74 | .06 | | | | |
| 10 | 4.5 | .73 | .05 | | | | |
| 11 | 5.0 | .73 | .05 | | | | |
| 12 | 6.0 | .73 | .05 | | | | |
| 13 | 7.0 | .73 | .05 | | | | |
| 14 | 8.0 | .73 | .05 | | | | |
| 15 | 9.0 | .73 | .05 | | | | |
| 16 | 10 | .73 | .05 | | | | |
| 17 | 12 | .73 | .05 | | | | |
| 18 | 14 | .72 | .04 | | | | |
| 19 | 16 | .72 | .04 | | | | |
| 20 | 18 | .72 | .04 | | | | |
| 21 | 20 | .72 | .04 | | | | |
| 22 | 25 | .72 | .04 | | | | |
| 23 | 30 | .71 | .03 | | | | |
| 24 | 35 | .71 | .03 | | | | |
| 25 | 40 | .71 | .03 | | | | |
| 26 | 45 | .71 | .03 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 10 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 05 27

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 18.71 | .04 | | | | |
| 28 | 60 | .71 | .03 | | | | |
| 29 | 70 | .70 | .02 | | | | |
| 30 | 80 | .70 | .02 | | | | |
| 31 | 90 | .70 | .02 | | | | |
| 32 | 100 | .70 | .02 | | | | |
| 33 | 110 | .70 | .02 | | | | |
| 34 | 120 | .69 | .01 | | | | |

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 11 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 14

LOCATION: 238A Street & 62 Ave. SHEET 1 of 6

Township of Langley TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 17.11 | 0 | | | | Static Water Level below MPT |
| 2 | .5 | 18.00 | 0.89 | | | | Measuring Point - top of |
| 3 | 1.0 | .61 | 1.50 | | | | casing 0.46 m above ground |
| 4 | 1.5 | .87 | .76 | | | | |
| 5 | 2.0 | 19.02 | .91 | | | | Discharge 30 m away from well |
| 6 | 2.5 | .14 | 2.03 | | | | |
| 7 | 3.0 | .17 | .06 | | | | |
| 8 | 3.5 | .21 | .10 | | | | |
| 9 | 4.0 | .21 | .10 | | | | |
| 10 | 4.5 | .26 | .15 | | | | |
| 11 | 5.0 | .26 | .15 | | | | |
| 12 | 6.0 | .29 | .18 | | | | |
| 13 | 7.0 | .30 | .19 | | | | |
| 14 | 8.0 | .30 | .19 | | | | |
| 15 | 9.0 | .32 | .21 | | | | |
| 16 | 10 | .33 | .22 | | | | |
| 17 | 12 | .35 | .24 | | | | |
| 18 | 14 | .39 | .28 | 0.45 | 20 | 44 | |
| 19 | 16 | .39 | .28 | | | | |
| 20 | 18 | .40 | .29 | | | | |
| 21 | 20 | .42 | .31 | | | | |
| 22 | 25 | .46 | .35 | | | | |
| 23 | 30 | .49 | .38 | | | | |
| 24 | 35 | .51 | .40 | | | | |
| 25 | 40 | .54 | .43 | | | | |
| 26 | 45 | 19.60 | 2.49 | | | | |

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 11 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 14

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | .60 | .49 | | | | |
| 28 | 60 | .65 | .54 | | | | |
| 29 | 70 | .69 | .54 | | | | |
| 30 | 80 | .74 | .63 | | | | |
| 31 | 90 | .79 | .68 | | | | |
| 32 | 100 | .81 | .70 | 0.45 | 20 | 44 | |
| 33 | 110 | .86 | .75 | | | | Water Sample Collected |
| 34 | 120 | .86 | .75 | | | | Temperature 9° C |

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 11 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 14

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | .56 | .45 | | | | |
| 28 | 60 | .56 | .45 | | | | |
| 29 | 70 | .53 | .42 | | | | |
| 30 | 80 | .50 | .39 | | | | |
| 31 | 90 | .47 | .36 | | | | |
| 32 | 100 | .47 | .36 | | | | |
| 33 | 110 | .45 | .34 | | | | |
| 34 | 120 | .43 | .32 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

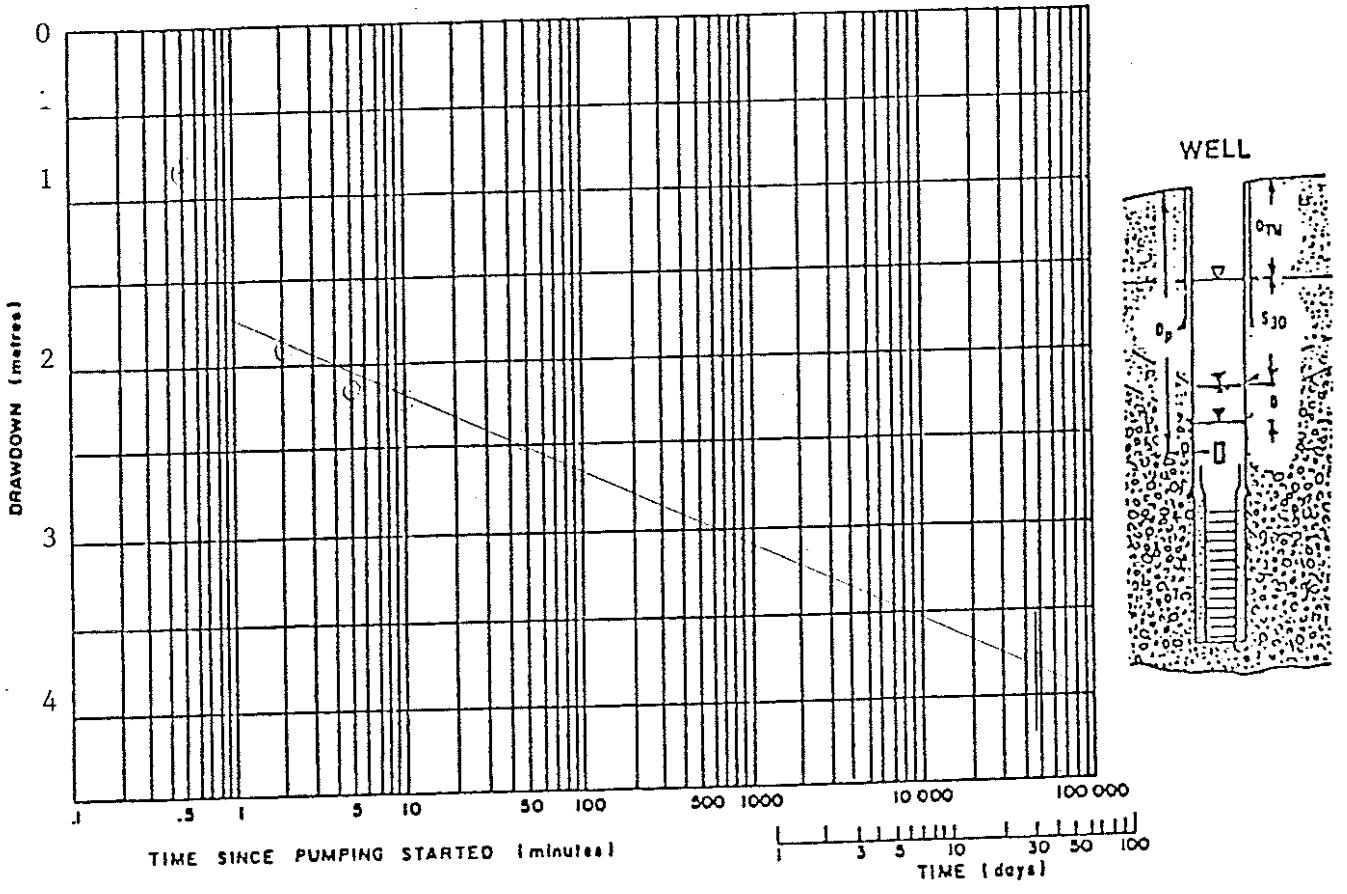
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 11 (Phase 1)

APPLICATION NO.: 87-111 DATE: 1988 06 14

LOCATION: 238A & 62nd Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 16.65 (m) TEST NO. 1

Below existing ground




Pumping rate 5 Lpm Drawdown at 30 days ($S_{30}$) 3.8 5/44 = 0.43 (m)

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 22 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D)$ =

22 - ( 16.65 + .43 + 4 ) = 0.92

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development  WELL NO. 11 (Phase 1)

APPLICATION NO.: 87-111  DATE: 1988 06 14

LOCATION: 238A Street & 62nd Ave.  SHEET 6 OF 6

Township of Langley  TEST NO. 1

**WELL COMPLETION DATA**

Depth 25.30 (m)
Diameter 152 (mm)
Static Water Level 16.65 (m)

SCREEN DESIGN (mark one)
☐ Open Hole ☐ Slotted Casing
☒ Screen ☐ Gravel Pack
☐ Other
Screen interval 23.87 m to 25.45 m

DESCRIPTION OF AQUIFER
Sand & Gravel

**PUMP TEST**

Start: Date 14 06 1988 (d/mo/yr)  Time 1045 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift
Other? Describe

Test Pump Set at 20 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape
☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter
☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 44 Lpm  Test duration 2 hours
Initial non-pumping level 16.65 m
Drawdown in well at end of test 2.75 m
Recommended pumping rate 5 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No
Bacterial Analysis ☒ Yes ☐ No
Water Temperature 9 °C
Any particular gas smells noted None
Comments on clarity of water Clean and Clear
Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 12 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

B L Brown

Certified By (Name of Professional Engineer)

1909 Beverly Cres

Address

North Vancouver BC V7M 3C7

PROFESSIONAL SEAL

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 108031

GOODBRAND DEVELOPMENT CORPORATION
62ND AVE., LANGLEY, BRITISH COLUMBIA

Well on Lot 12 (S.W. Corner) (Phase 1)

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.30 | 0 - 1 | Soil, sandy loam |
| 0.30 - 7.93 | 1 - 26 | Sand and gravel, silty |
| 7.93 - 10.36 | 26 - 34 | Sand, fined grained, silty |
| 10.36 - 11.58 | 34 - 38 | Sand and gravel |
| 11.58 - 14.94 | 38 - 49 | Sand, silty |
| 14.94 - 17.07 | 49 - 56 | Clay, sandy |
| 17.07 - 17.98 | 56 - 59 | Till-like, clayey |
| 17.98 - 37.19 | 59 - 122 | Clay with sand interbeds |
| 37.19 - 39.62 | 122 - 130 | Till-like, clayey |
| 39.62 - 40.54 | 130 - 133 | Sand, silty |
| 40.54 - 42.37 | 133 - 139 | Sand and gravel water-bearing |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6 inch) diameter casing | + 0.46 - 41.30 | + 1.5 - 135.5 |
| 152 mm (6 inch) telescopic diameter screen | 40.94 - 41.30 | 134.3 - 135.5 |

Screen - stainless steel, 20 slot with K-packer
Top 3 m (10 feet) sealed with thick bentonite slurry outside of casing.

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 12 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 13

LOCATION: 238A Street & 62 Ave. SHEET 1 of 6

Township of Langley TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 21.69 | 0 | | | | Static Water Level below MPT |
| 2 | .5 | 22.81 | 1.12 | | | | Measuring Point - top of |
| 3 | 1.0 | 23.94 | 2.25 | | | | casing 0.46 m above ground |
| 4 | 1.5 | 25.06 | 3.37 | | | | |
| 5 | 2.0 | .89 | 4.20 | | | | Discharge 30 m away from well |
| 6 | 2.5 | 26.67 | .98 | | | | |
| 7 | 3.0 | 27.57 | 5.88 | | | | |
| 8 | 3.5 | 28.16 | 6.47 | | | | |
| 9 | 4.0 | .78 | 7.09 | | | | |
| 10 | 4.5 | 29.46 | .77 | | | | |
| 11 | 5.0 | 30.08 | 8.39 | 0.5 | 20 | 40 | |
| 12 | 6.0 | 31.00 | 9.31 | | | | |
| 13 | 7.0 | .83 | 10.14 | | | | |
| 14 | 8.0 | 32.58 | .89 | | | | |
| 15 | 9.0 | 33.25 | 11.56 | | | | |
| 16 | 10 | .81 | 12.12 | | | | |
| 17 | 12 | 34.71 | 13.02 | | | | |
| 18 | 14 | 35.29 | .60 | | | | |
| 19 | 16 | .84 | 14.15 | | | | |
| 20 | 18 | 36.13 | .44 | | | | |
| 21 | 20 | .40 | .71 | | | | |
| 22 | 25 | .77 | 15.08 | | | | |
| 23 | 30 | 37.02 | .33 | | | | |
| 24 | 35 | .10 | .41 | | | | |
| 25 | 40 | .16 | .47 | | | | |
| 26 | 45 | .22 | .53 | | | | |

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 12 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 13

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[X] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | .24 | .55 | | | | |
| 28 | 60 | .32 | .63 | | | | |
| 29 | 70 | .34 | .65 | 0.5 | 20 | 40 | |
| 30 | 80 | .35 | .66 | | | | |
| 31 | 90 | .34 | .65 | | | | |
| 32 | 100 | .32 | .63 | 0.5 | 20 | 40 | |
| 33 | 110 | .32 | .63 | | | | Water Sample Collected |
| 34 | 120 | .32 | .63 | | | | |

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 12 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 13

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 37.32 | 15.63 | | | | Pump Off |
| 2 | .5 | 36.18 | 14.49 | | | | |
| 3 | 1.0 | 35.24 | 13.55 | | | | |
| 4 | 1.5 | 34.36 | 12.67 | | | | |
| 5 | 2.0 | 33.43 | 11.74 | | | | |
| 6 | 2.5 | 32.60 | 10.91 | | | | |
| 7 | 3.0 | 31.74 | .05 | | | | |
| 8 | 3.5 | .15 | 9.46 | | | | |
| 9 | 4.0 | 30.48 | 8.79 | | | | |
| 10 | 4.5 | 29.87 | .18 | | | | |
| 11 | 5.0 | .28 | 7.59 | | | | |
| 12 | 6.0 | 28.28 | 6.59 | | | | |
| 13 | 7.0 | 27.37 | 5.68 | | | | |
| 14 | 8.0 | 26.61 | 4.92 | | | | |
| 15 | 9.0 | 25.93 | .24 | | | | |
| 16 | 10 | .37 | 3.68 | | | | |
| 17 | 12 | 24.41 | 2.72 | | | | |
| 18 | 14 | 23.77 | .08 | | | | |
| 19 | 16 | .26 | 1.57 | | | | |
| 20 | 18 | 22.85 | .16 | | | | |
| 21 | 20 | .51 | 0.82 | | | | |
| 22 | 25 | .02 | .33 | | | | |
| 23 | 30 | 21.85 | .16 | | | | |
| 24 | 35 | .72 | .03 | | | | |
| 25 | 40 | .64 | -0.05 | | | | |
| 26 | 45 | .60 | -0.09 | | | | |

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 12 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 13

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [X] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | .59 | -0.10 | | | | |
| 28 | 60 | .59 | -0.10 | | | | |
| 29 | 70 | .57 | -0.12 | | | | |
| 30 | 80 | .56 | -0.13 | | | | |
| 31 | 90 | .57 | -0.12 | | | | |
| 32 | 100 | .54 | -0.15 | | | | |
| 33 | 110 | .56 | -0.13 | | | | |
| 34 | 120 | .56 | -0.13 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## TIME - DRAWDOWN GRAPH FOR PUMP TEST

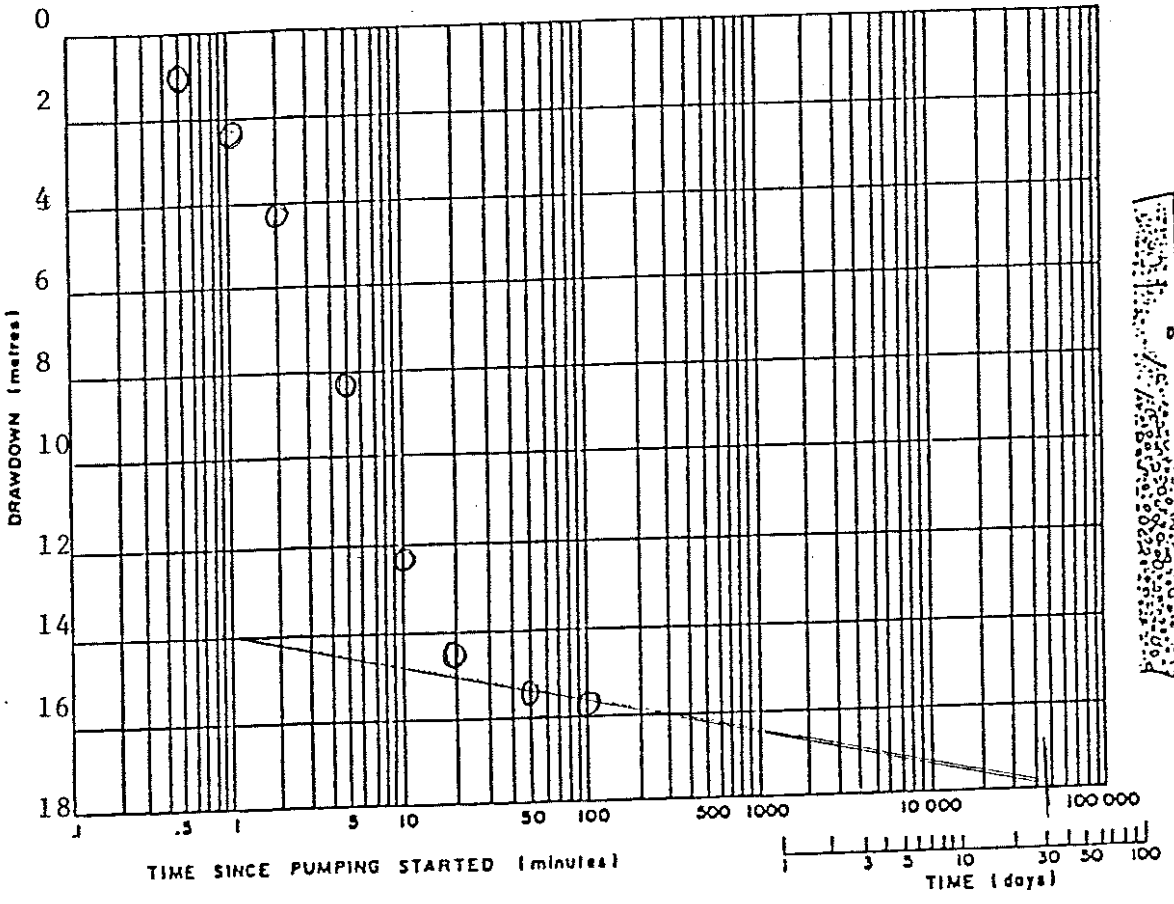
OWNER'S NAME: Goodbrand Development Corp. WELL NO. 12 (Phase 1)

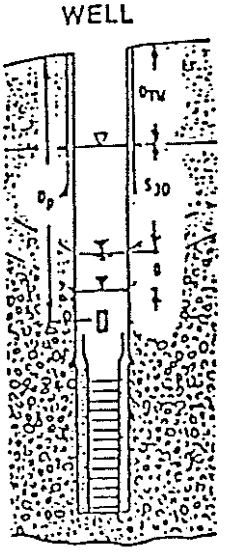
APPLICATION NO.: 87-111 DATE: 1988 06 13

LOCATION: 238A & 62nd Ave. SHEET 5 OF 6

DEPTH TO STATIC WATER LEVEL: 21.23 (m) TEST NO. 1

Below existing ground




Pumping rate 10 Lpm Drawdown at 30 days ($S_{30}$) 18 x 10/40 (m) = 4.5

Estimated minimum adjustment for seasonal decline (D): Use following figures if other local data or hydrogeologist's opinion is not available.

Tests run in summer time: 2 m
Tests run in winter time: 6 m
Tests run in fall and spring: use intermediate values 2 m to 6 m

Depth to proposed pump suction ($D_p$) 40 m

Calculate minimum available drawdown: $D_p - (D_{TW} + S_{30} + D)$ =

40 - ( 21.23 + 4.5 + 4 ) = 10.27

If answer to above calculation is negative, then either the pump has to be set lower or the well is not capable of supplying water for a house.

F-7

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development  WELL NO. 12 (Phase 1)

APPLICATION NO.: 87-111  DATE: 1988 06 13

LOCATION: 238A & 62nd Ave.  SHEET 6 OF 6

Township of Langley  TEST NO. 1

**WELL COMPLETION DATA**

Depth 42.37 (m)
Diameter 152 (mm)
Static Water Level 21.22 (m)

SCREEN DESIGN (mark one)
☐ Open Hole ☐ Slotted Casing
☒ Screen ☐ Gravel Pack
☐ Other
Screen interval 40.94 to 41.30

DESCRIPTION OF AQUIFER
Sand & Gravel

**PUMP TEST**

Start: Date 13 06 1988 (d/mo/yr)  Time 0930 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift
Other? Describe

Test Pump Set at 40 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape
☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter
☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 40 Lpm  Test duration 2 hours
Initial non-pumping level 21.23 m
Drawdown in well at end of test 15.63 m
Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No
Bacterial Analysis ☒ Yes ☐ No
Water Temperature 9 °C
Any particular gas smells noted None
Comments on clarity of water Clear and Clean
Other

# The Corporation of the Township of Langley

SCHEDULE "A"

## PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, I hereby certify that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lot 13 (Phase 1)

PROJECT NO.: 87-111

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

Certified By (Name of Professional Engineer)

PROFESSIONAL SEAL

1909 Beverly Ave
Address

North Vancouver, B.C. V7M 3C7

See attachments as required pursuant to clause 2.2.18 of Schedule "A".

Subdivision Application No. 87-111
Lot B of Lots 2 and 3, Plan 13274 and Parcel A (Reference Plan 8562) of Lots 2, 3 and 4, Except Plan 17067, Plan 23779 and part of Lot 31, Plan 54464, all of North East 1/4 of Section 9, Township 11, N.W.D.

WTN 108032

**GOODBRAND DEVELOPMENT CORPORATION**
**62ND AVE., LANGLEY, BRITISH COLUMBIA**

**Well on Lot 13 (S.E. Corner) (Phase 1)**

| Depth (Below Ground Surface) Metres | Feet | Description |
|---|---|---|
| 0.00 - 0.61 | 0 - 2 | Sandy loam |
| 0.61 - 4.57 | 2 - 15 | Sand and gravel, silty |
| 4.57 - 16.46 | 15 - 54 | Clay |
| 16.46 - 17.68 | 54 - 58 | Till-like |
| 17.68 - 23.47 | 58 - 77 | Gravel, very silty |
| 23.47 - 27.43 | 77 - 90 | Till with gravel beds |
| 27.43 - 28.65 | 90 - 94 | Sand, silty, fine grained |
| 28.65 - 35.05 | 94 - 115 | Till |
| 35.05 - 35.97 | 115 - 118 | Gravel, very silty |
| 35.97 - 36.88 | 118 - 121 | Sand, silty |
| 36.88 - 38.10 | 121 - 125 | Sand and gravel |
| 38.10 - 41.15 | 125 - 135 | Till, sandy |
| 41.15 - 43.28 | 135 - 142 | Till |
| 43.28 - 45.42 | 142 - 149 | Sand and gravel, water-bearing |
| 45.42 | 149 | Gravel, silty |

Construction details - below ground surface

| | Metres | Feet |
|---|---|---|
| 152 mm (6-inch) diameter casing | + 0.61 - 44.20 + | 2 - 145 |
| 152 mm (6-inch) telescopic diameter screen | 43.98 - 45.42 | 144.3 - 149.0 |

Screen - stainless steel, 18 slot with K-packer
Thick Bentonite Slurrey seal around top 3m (10 feet) of casing

THE CORPORATION OF THE TOWNSHIP OF LANGLEY

SCHEDULE "A"

WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 13 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 30

LOCATION: 238A Street & 62 Ave. SHEET 1 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 21.47 | 0 | | | | Static Water Level below MPT |
| 2 | .5 | 22.17 | 0.07 | | | | Measuring Point - top of |
| 3 | 1.0 | - | - | | | | casing 0.61 m above ground |
| 4 | 1.5 | 23.34 | 1.87 | | | | |
| 5 | 2.0 | .91 | 2.44 | | | | Discharge 30 m from well |
| 6 | 2.5 | 24.33 | .86 | | | | |
| 7 | 3.0 | .55 | 3.08 | | | | Shallow 22 foot well at house |
| 8 | 3.5 | 25.13 | .66 | | | | |
| 9 | 4.0 | .48 | 4.01 | | | | |
| 10 | 4.5 | .86 | .39 | | | | |
| 11 | 5.0 | 26.16 | .69 | | | | |
| 12 | 6.0 | .74 | 5.27 | | | | |
| 13 | 7.0 | - | - | | | | |
| 14 | 8.0 | 27.68 | 6.21 | | | | |
| 15 | 9.0 | 28.07 | .60 | | | | |
| 16 | 10 | .17 | .70 | | | | |
| 17 | 12 | .95 | 7.48 | | | | |
| 18 | 14 | - | - | | | | |
| 19 | 16 | 29.95 | 8.48 | | | | |
| 20 | 18 | 30.37 | .90 | | | | |
| 21 | 20 | .60 | 9.13 | 0.83 | 20 | 24.1 | |
| 22 | 25 | 31.08 | .61 | | | | |
| 23 | 30 | - | - | | | | Water turbid |
| 24 | 35 | - | - | | | | |
| 25 | 40 | 32.59 | 11.12 | | | | |
| 26 | 45 | ,96 | .49 | | | | |

THE CORPORATION OF THE TOWNSHIP OF LANGLEY

SCHEDULE "A"

WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 13 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 30

LOCATION: 238A Street & 62 Ave. SHEET 2 of 6

Township of Langley TEST NO. 1

[x] Drawdown [ ] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 33.21 | .74 | | | | Water clear and clean |
| 28 | 60 | ,53 | 12.06 | | | | |
| 29 | 79 | 34.02 | .55 | | | | |
| 30 | 80 | .04 | .57 | | | | |
| 31 | 90 | .28 | .81 | | | | |
| 32 | 100 | .58 | 13.11 | | | | |
| 33 | 110 | .66 | .19 | | | | Water samples collected |
| 34 | 120 | 36.21 | 14.74 | | | | Temp. 10° C |

THE CORPORATION OF THE TOWNSHIP OF LANGLEY

SCHEDULE "A"

WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 13 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 30

LOCATION: 238A Street & 62 Ave. SHEET 3 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 1 | 0 | 36.21 | 14.74 | | | | Pump Off |
| 2 | .5 | 34.10 | 12.63 | | | | |
| 3 | 1.0 | 33.53 | .06 | | | | |
| 4 | 1.5 | .13 | 11.66 | | | | |
| 5 | 2.0 | 32.67 | .20 | | | | |
| 6 | 2.5 | .25 | 10.78 | | | | |
| 7 | 3.0 | 31.90 | .43 | | | | |
| 8 | 3.5 | .56 | .09 | | | | |
| 9 | 4.0 | .17 | 9.70 | | | | |
| 10 | 4.5 | 30.90 | .43 | | | | |
| 11 | 5.0 | .66 | .19 | | | | |
| 12 | 6.0 | 29.97 | 8.50 | | | | |
| 13 | 7.0 | .72 | .25 | | | | |
| 14 | 8.0 | .32 | 7.85 | | | | |
| 15 | 9.0 | 28.92 | .45 | | | | |
| 16 | 10 | .62 | .15 | | | | |
| 17 | 12 | .08 | 6.61 | | | | |
| 18 | 14 | 27.56 | .09 | | | | |
| 19 | 16 | .20 | 5.73 | | | | |
| 20 | 18 | .15 | .68 | | | | |
| 21 | 20 | 26.51 | .04 | | | | |
| 22 | 25 | 28.87 | 4.40 | | | | |
| 23 | 30 | .45 | 3.98 | | | | |
| 24 | 35 | 24.94 | .47 | | | | |
| 25 | 40 | .59 | .12 | | | | |
| 26 | 45 | .20 | 2.73 | | | | |

THE CORPORATION OF THE TOWNSHIP OF LANGLEY

SCHEDULE "A"

WELL PUMP TEST - FIELD TEST

OWNER'S NAME: Goodbrand Development Corp. WELL NO. 13 (Phase 1)

APPLICATION NO. 87-111 DATE: 1988 06 30

LOCATION: 238A Street & 62 Ave. SHEET 4 of 6

Township of Langley TEST NO. 1

[ ] Drawdown [x] Recovery

| Rdg # | Time From Start | Depth To Water | Draw Down | Flow Measurement Data | | | Comments |
|---|---|---|---|---|---|---|---|
| | (Min) | (M) | (M) | (Min) | L | LPM | |
| 27 | 50 | 24.02 | .55 | | | | |
| 28 | 60 | 23.57 | .10 | | | | |
| 29 | 70 | .24 | 1.77 | | | | |
| 30 | 80 | .02 | .55 | | | | |
| 31 | 90 | 22.82 | .35 | | | | |
| 32 | 100 | .61 | .14 | | | | |
| 33 | 110 | .48 | .01 | | | | |
| 34 | 120 | .38 | 0.91 | | | | |

# The Corporation of the Township of Langley

SCHEDULE "A"

## PUMP TEST SUMMARY

OWNER'S NAME: Goodbrand Development  WELL NO. 13 (Phase 1)

APPLICATION NO.: 87-111  DATE: 1988 06 30

LOCATION: 238A Street & 62nd Ave.  SHEET 6 OF 6

Township of Langley  TEST NO. 1

**WELL COMPLETION DATA**

Depth 45.42 (m)

Diameter 152 (mm)

Static Water Level 20.86 (m)

SCREEN DESIGN (mark one)

☐ Open Hole ☐ Slotted Casing

☒ Screen ☐ Gravel Pack

☐ Other

Screen interval 43.98 m to 45.42 m

DESCRIPTION OF AQUIFER: Sand and Gravel

**PUMP TEST**

Start: Date 30 06 1988 (d/mo/yr) Time 0930 (hr/min)

Pump Type: ☒ Electric submersible ☐ Jet ☐ Air Lift

Other? Describe

Test Pump Set at 40 m below ground

Water level sounded by: ☒ Electric tape ☐ Air bubbler ☐ Steel tape

☐ Other? Describe

Flow measured by: ☒ Container & watch ☐ Flow meter

☐ Orifice & tube ☐ Other? Describe

**TEST**

Constant rate of yield 24.1 Lpm  Test duration 2 hours

Initial non-pumping level 20.86 m

Drawdown in well at end of test 14.74 m

Recommended pumping rate 10 Lpm

**WATER SAMPLES TAKEN DURING TEST**

Chemical Analysis ☒ Yes ☐ No

Bacterial Analysis ☒ Yes ☐ No

Water Temperature 10 °C

Any particular gas smells noted None

Comments on clarity of water Clear and Clean

Other

# CHEMICAL ANALYSIS REPORT

Date: June 30, 1988

File No. 5675A AMENDED

Report On: Water Analysis - Goodbrand Property, Langley, B.C.

Report To: Brown Erdman & Turner Ltd.
1409 Bewicke Avenue
North Vancouver, B. C.
V7M 2W0

DATE OF SUBMISSION:

May 27,1988

SAMPLE IDENTIFICATION

Labelled as shown in RESULTS section.

METHODOLOGY

Analysed in accordance with "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, 1985.

RESULTS OF ANALYSIS

Results are presented in the table(s) attached.

analytical service laboratories
CONSULTING CHEMISTS & ANALYSTS
1650 Pandora Street
Vancouver, B.C. • V5L 1L6
(604) 253-4188

Sample I.D. Lot 1

The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization. The water sample met drinking water guidelines for all parameters analysed.

Sample I.D. Lot 2

The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization. The water sample met drinking water guidelines for all parameters analyzed. Total coliform was detected in this sample which should be resampled and confirmed.

Sample I.D. Lot 3

The water as represented by the sample submitted can be characterized as moderately high with respect to dissolved mineralization. The water sample met drinking water guidelines for all parameters analysed except for color and Manganese. These parameters are limited for aesthetic purposes ( i.e., appearance, taste, etc.) rather than health considerations.

Sample I.D. Lot 4

The water as represented by the sample submitted can be characterized as moderately high with respect to dissolved mineralization. The water sample met drinking water guidelines for all parameters analysed except for color and Manganese. These parameters are limited for aesthetic purposes ( i.e., appearance, taste, etc.) rather than health considerations. This sample should be resampled and tested for Total Coliform.

Sample I.D. Lot 5

The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization. The water sample met drinking water guidelines for all parameters analysed. This sample should be resample and tested for Total Coliform.

Sample I.D. Lot 6 and Lot 10

The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization. The water sample met drinking water guidelines for all parameters analysed.

ASL ANALYTICAL SERVICE LABORATORIES LTD.

R. W. Deverall
Senior Partner

Christine M. Smith
Technologist

RWD/lc

ASL

**RESULTS OF ANALYSIS**



| | Lot 1 May 27/88 | Lot 2 May 27/88 | Lot 3 May 27/88 | Lot 4 May 27/88 | Drinking*1 Water Guidelines |
|---|---|---|---|---|---|
| **Physical Tests** | | | | | |
| pH | 7.50 | 8.05 | 8.20 | 8.20 | 6.5-8.5 |
| Conductivity | 118. | 177. | 252. | 263. | - |
| Colour | <5. | <5. | 22. | 28. | 15. |
| Turbidity NTU | <1.0 | 1.6 | 5.2 | 7.0 | 5. |
| Suspended Solids | <1.0 | <1.0 | 3.3 | <1.0 | - |
| Dissolved Solids | 99.3 | 141. | 234. | 238. | - |
| Hardness CaCO3 | 54.1 | 75.4 | 54.9 | 50.2 | -*2 |
| **Anions** | | | | | |
| Alkalinity CaCO3 | 54.5 | 81.7 | 139. | 141. | - |
| Sulphate SO4 | 3.5 | 5.4 | 5.4 | 6.0 | 500. |
| Chloride Cl | 2.6 | 4.3 | 4.8 | 4.8 | 250. |
| Fluoride F | 0.05 | 0.04 | 0.20 | 0.29 | 1.5 |
| Silicate SiO2 | 14.6 | 12.5 | 21.1 | 19.8 | - |
| NO3/NO2 N | 1.80 | 2.80 | <0.005 | <0.005 | 10.0 |
| **Total Metals** | | | | | |
| Iron T Fe | 0.04 | 0.06 | 0.23 | 0.15 | 0.30 |
| Manganese T Mn | 0.026 | 0.042 | 0.076 | 0.075 | 0.05 |
| **Dissolved Metals** | | | | | |
| Arsenic D As | 0.0004 | 0.0014 | 0.010 | 0.012 | 0.05 |
| Barium D Ba | <0.005 | 0.007 | 0.009 | 0.006 | 1.0 |
| Cadmium D Cd | <0.0002 | <0.0002 | <0.0002 | <0.0002 | 0.005 |
| Chromium D Cr | <0.01 | <0.01 | 0.01 | <0.01 | 0.05 |
| Copper D Cu | 0.005 | 0.008 | 0.011 | 0.008 | 1.0 |
| Iron D Fe | <0.03 | <0.03 | <0.03 | <0.03 | - |
| Lead D Pb | <0.001 | <0.001 | <0.001 | <0.001 | 0.05 |
| Manganese D Mn | <0.005 | 0.023 | 0.059 | 0.054 | - |
| Zinc D Zn | 0.005 | <0.005 | <0.005 | <0.005 | 5.0 |
| Calcium D Ca | 12.7 | 19.4 | 13.2 | 12.2 | - |
| Magnesium D Mg | 5.44 | 6.56 | 5.34 | 4.79 | - |
| Potassium D K | 0.85 | 2.07 | 4.77 | 4.86 | - |
| Sodium D Na | 5.15 | 9.50 | 40.3 | 44.5 | -*3 |
| **Microbiological Tests** | | | | | |
| Total Coliform | <2. | 6. | <2 | 21. | - |
| Fecal Coliform | <2. | <2. | <2. | <2. | - |

< = Less than
Results are expressed as milligrams per litre except for pH, Conductivity (µmhos/cm), Turbidity (NTU), Colour, Coliform Bacteria (Colonies/100ml), $NO_3/NO_2$ = nitrate/ nitrite nitrogen.
*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1985 and B.C. Ministry of Health, 1982
*2 Maximum level not established - water supplies with a hardness exceeding 200 mg/L are considered poor but will be tolerated. Not a health consideration
#3 Maximum level not established - of concern to consumers with sodium restricted diet. Levels exceeding 20 mg/L may be of concern in this circumstance.

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RESULTS OF ANALYSIS

File No. 5675A
Page 5 of 5

| | Lot 5 May 27/88 | Lot 6 May 27/88 | Lot 10 May 27/88 | Drinking*1 Water Guidelines |
|---|---|---|---|---|
| **Physical Tests** | | | | |
| pH | 7.93 | 8.11 | 8.11 | 6.5-8.5 |
| Conductivity | 145. | 135. | 131. | - |
| Colour | <5. | <5. | <5. | 15. |
| Turbidity NTU | <1.0 | <1.0 | <1.0 | 5. |
| Suspended Solids | <1.0 | 3.3 | <1.0 | - |
| Dissolved Solids | 109. | 114. | 110. | - |
| Hardness CaCO3 | 61.6 | 34.0 | 37.7 | -*2 |
| **Anions** | | | | |
| Alkalinity CaCO3 | 61.3 | 65.8 | 65.8 | - |
| Sulphate SO4 | 3.8 | 4.7 | 5.1 | 500. |
| Chloride Cl | 4. | 3.3 | 1.9 | 250. |
| Fluoride F | 0.05 | 0.07 | 0.06 | 1.5 |
| Silicate SiO2 | 12.0 | 10.4 | 10.4 | - |
| NO3/NO2 N | 2.70 | 0.013 | <0.005 | 10.0 |
| **Total Metals** | | | | |
| Iron T Fe | 0.04 | 0.06 | 0.05 | 0.30 |
| Manganese T Mn | 0.008 | 0.047 | 0.030 | 0.05 |
| **Dissolved Metals** | | | | |
| Arsenic D As | 0.0051 | 0.0047 | 0.0066 | 0.05 |
| Barium D Ba | 0.006 | <0.005 | 0.006 | 1.0 |
| Cadmium D Cd | <0.0002 | <0.0002 | <0.0002 | 0.005 |
| Chromium D Cr | 0.01 | <0.01 | <0.01 | 0.05 |
| Copper D Cu | 0.007 | 0.006 | 0.005 | 1.0 |
| Iron D Fe | <0.03 | <0.03 | <0.03 | - |
| Lead D Pb | <0.001 | <0.001 | <0.001 | 0.05 |
| Manganese D Mn | <0.005 | <0.005 | 0.016 | - |
| Zinc D Zn | <0.005 | <0.005 | <0.005 | 5.0 |
| Calcium D Ca | 15.9 | 8.56 | 9.83 | - |
| Magnesium D Mg | 5.31 | 3.08 | 3.19 | - |
| Potassium D K | 1.62 | 2.39 | 2.57 | - |
| Sodium D Na | 5.47 | 16.0 | 11.7 | -*3 |
| **Microbiological Tests** | | | | |
| Total Coliform | 17. | <2. | <2. | - |
| Fecal Coliform | <2. | <2. | <2. | - |

< = Less than
Results are expressed as milligrams per litre except for pH, Conductivity (µmhos/cm), Turbidity (NTU), Colour, Coliform Bacteria (Colonies/100ml), $NO_3/NO_2$ = nitrate/ nitrite nitrogen.
*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1985
*2 Maximum level not established - water supplies with a hardness exceeding 200 mg/L are considered poor but will be tolerated. Not a health consideration
*3 Maximum level not established - of concern to consumers with sodium restricted diet. Levels exceeding 20 mg/L may be of concern in this circumstance.

CHEMICAL ANALYSIS REPORT

Date: June 30, 1988

File No. 5738A

Report On: Goodbrand Property, Langley, B.C.

Report To: Brown Erdman & Turner Ltd.
1409 Bewicke Avenue
North Vancouver, B. C.
V7M 2W0

DATE OF SUBMISSION:

June 8, 1988

SAMPLE IDENTIFICATION

Labelled as shown in RESULTS section.

METHODOLOGY

Analysed in accordance with "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, 1985.

RESULTS OF ANALYSIS

Results are presented in the table(s) attached.

REMARKS

Lot #7 and Lot #8

The waters as represented by the samples submitted can be characterized as moderate with respect to dissolved mineralization.

analytical service laboratories
CONSULTING CHEMISTS & ANALYSTS
1650 Pandora Street
Vancouver, B.C. • V5L 1L6
(604) 253-4188

Both water samples met Canadian and British Columbia drinking water guidelines for all parameters analysed with the exception of turbidity.

This parameter is limited for aesthetic purposes (i.e., appearance, taste, etc.) rather than health considerations and is often elevated in newly drilled wells. Continued pumping would result in lower values.

ASL ANALYTICAL SERVICE LABORATORIES LTD.

A. W. Maynard, M.Sc.
Senior Partner

Christine M. Smith
Technologist

CMS/AWM/mm

ASL

RESULTS OF ANALYSIS



| | Goodbrand Lot 7 June 7/88 | Goodbrand Lot 8 June 7/88 | Drinking *1 Water Guidelines |
|---|---|---|---|
| **Physical Tests** | | | |
| pH | 8.36 | 8.21 | 6.5-8.5 |
| Conductivity | 241. | 141. | - |
| Colour | 14. | 7.0 | 15. |
| Turbidity NTU | 6.1 | 19. | 5. |
| Suspended Solids | 6.0 | 24.0 | - |
| Dissolved Solids | 192. | 100. | - |
| Hardness CaCO3 | 17.7 | 54.7 | - *2 |
| **Anions and Nutrients** | | | |
| Alkalinity CaCO3 | 127. | 58.6 | - |
| Sulphate SO4 | <1.0 | 8.7 | 500. |
| Chloride Cl | 5.4 | 4.1 | 250. |
| Fluoride F | 0.33 | 0.05 | 1.5 |
| Silicate SiO2 | 22.8 | 14.8 | - |
| NO3/NO2 N | <0.005 | 1.85 | 10.0 |
| **Total Metals** | | | |
| Iron T Fe | 0.18 | 0.30 | 0.30 |
| Manganese T Mn | 0.039 | 0.019 | 0.05 |
| **Dissolved Metals** | | | |
| Arsenic D As | 0.011 | 0.0025 | 0.05 |
| Barium D Ba | 0.008 | 0.010 | 1.0 |
| Cadmium D Cd | 0.0003 | 0.0004 | 0.005 |
| Chromium D Cr | <0.02 | <0.02 | 0.05 |
| Copper D Cu | 0.011 | 0.007 | 1.0 |
| Iron D Fe | <0.03 | <0.03 | - |
| Lead D Pb | <0.001 | <0.001 | 0.05 |
| Manganese D Mn | 0.017 | 0.015 | - |
| Zinc D Zn | <0.005 | <0.005 | 5.0 |
| Calcium D Ca | 4.49 | 14.9 | - |
| Magnesium D Mg | 1.57 | 4.26 | - |
| Potassium D K | 4.86 | 2.05 | - |
| Sodium D Na | 47.5 | 7.37 | -*3 |
| **Microbiological Tests** | | | |
| Coliform Total | <2. | <2 | - |
| Fecal | <2. | <2. | - |

< = Less than
$NO_3/NO_2$ = Nitrate/nitrite nitrogen
Results expressed as milligrams per litre except for pH, Conductivity (µmhos/cm), Colour (CU) Turbidity (NTU) and Coliform Bacteria (colonies/100 ml)
*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1985
*2 Maximum level not established - water supplies with a hardness exceeding 200 mg/L are considered poor but will be tolerated. Not a health consideration
*3 Maximum level not established - of concern to consumers with sodium restricted diet. Levels exceeding 20 mg/L may be of concern in this circumstance.

# CHEMICAL ANALYSIS REPORT

**Date:** June 30, 1988

**File No.** 5781A AMENDED July 12, 1988

**Report On:** Water Analysis - Goodbrand Property, Langley, B.C.

**Report To:** Brown Erdman & Turner Ltd.
1409 Bewicke Avenue
North Vancouver, B. C.
V7M 2W0

DATE OF SUBMISSION:

June 15, 1988

SAMPLE IDENTIFICATION

Labelled as shown in RESULTS section.

METHODOLOGY

Analysed in accordance with "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, 1985.

RESULTS OF ANALYSIS

Results are presented in the table(s) attached.

REMARKS

analytical service laboratories ltd.
CONSULTING CHEMISTS & ANALYSTS
1650 Pandora Street
Vancouver, B.C. • V5L 1L6
Fax (604) 253-6700 • Tel. (604) 253-4188

**Lot #11**

The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization.

The water sample met Canadian and B. C. drinking water guidelines for all parameters analysed with the exception of colour, turbidity and iron.

These parameters are related and limited for aesthetic purposes (i.e., appearance, taste, etc.) rather than health considerations. They may be high due to the well being insufficiently pumped.

**Lot #12**

The water as represented by the sample submitted can be characterized as moderately high with respect to dissolved mineralization.

The water sample met Canadian and B.C. drinking water guidelines for all parameters analysed.

ASL ANALYTICAL SERVICE LABORATORIES LTD.

A. W. Maynard, M.Sc.
Senior Partner

Christine M. Smith
Technologist

CMS/AWM/mm

ASL

RESULTS OF ANALYSIS

File No. 5781A


| | Lot #11 June 14/88 | Lot #12 June 14/88 | Lot #4 June 14/88 | Drinking*1 Water Guidelines |
|---|---|---|---|---|
| **Physical Tests** | | | | |
| pH | 8.28 | 8.18 | - | 6.5-8.5 |
| Conductivity | 138. | 281. | - | - |
| Colour | 19. | 9. | - | 15. |
| Turbidity NTU | 28.0 | <1.0 | - | 5. |
| Suspended Solids | 12.0 | <1.0 | - | - |
| Dissolved Solids | 120. | 240. | - | - |
| Hardness CaCO3 | 51.6 | 52.2 | - | -#2 |
| **Anions and Nutrients** | | | | |
| Alkalinity CaCO3 | 66.0 | 148. | - | - |
| Sulphate SO4 | 4.79 | 10.4 | - | 500. |
| Chloride Cl | 3.2 | 2.3 | - | 250. |
| Fluoride F | 0.05 | 0.27 | - | 1.5 |
| Silicate SiO2 | 12.1 | 21.5 | - | - |
| NO3/NO2 N | 0.40 | <0.005 | - | 10.0 |
| **Total Metals** | | | | |
| Iron T Fe | 0.40 | <0.03 | - | 0.30 |
| Manganese T Mn | <0.005 | 0.047 | - | 0.05 |
| **Dissolved Metals** | | | | |
| Arsenic D As | 0.0059 | 0.0007 | - | 0.05 |
| Barium D Ba | 0.009 | 0.027 | - | 1.0 |
| Cadmium D Cd | 0.0004 | 0.0005 | - | 0.005 |
| Chromium D Cr | <0.02 | <0.02 | - | 0.05 |
| Copper D Cu | 0.010 | <0.005 | - | 1.0 |
| Iron D Fe | 0.03 | <0.03 | - | - |
| Lead D Pb | <0.001 | <0.001 | - | 0.05 |
| Manganese D Mn | <0.005 | 0.005 | - | - |
| Zinc D Zn | <0.005 | 0.019 | - | 5.0 |
| Calcium D Ca | 11.2 | 19.7 | - | - |
| Magnesium D Mg | 3.69 | 0.73 | - | - |
| Potassium D K | 4.86 | 2.79 | - | - |
| Sodium D Na | 11.3 | 52.1 | - | -*3 |
| **Microbiological Tests** | | | | |
| Total Coliform | <2. | <2. | <2. | - |
| Fecal Coliform | <2. | <2. | <2. | - |

< = Less than
Results expressed as milligrams per litre except for pH, Conductivity (µmhos/cm), Colour (CU) and Turbidity (NTU)
Coliform Bacteria (colonies/100 ml)
*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1985
*2 Maximum level not established - water supplies with a hardness exceeding 200 mg/L are considered poor but will be tolerated. Not a health consideration
*3 Maximum level not established - of concern to consumers with sodium restricted diet. Levels exceeding 20 mg/L may be of concern in this circumstance.

# CHEMICAL ANALYSIS REPORT

ASL

**Date:** June 30, 1988

**File No.** 5800A

**Report On:** Goodbrand Property, Langley, B.C.

**Report To:** Brown Erdman & Turner Ltd.
1409 Bewicke Avenue
North Vancouver, B. C.
V7M 2W0

**DATE OF SUBMISSION:**

June 17, 1988

**SAMPLE IDENTIFICATION**

Labelled as shown in RESULTS section.

**METHODOLOGY**

Analysed in accordance with "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, 1985.

**RESULTS OF ANALYSIS**

Results are presented in the table(s) attached.

**REMARKS**

**Lot #1**

The water as represented by the sample submitted can be characterized as high with respect to dissolved mineralization.

The water sample met Canadian and B.C. drinking water guidelines for all parameters analysed. The pH is slightly outside the guidelines but this would be of no concern.

analytical service laboratories
CONSULTING CHEMISTS & ANALYSTS
1650 Pandora Street
Vancouver, B.C. • V5L 1L6
(604) 253-4188

Lot #5

The water as represented by the sample submitted can be characterized as moderately high with respect to dissolved mineralization.

The water sample met Canadian and B.C. drinking water guidelines for all parameters analysed except for manganese.

This parameter is limited for aesthetic purposes (i.e., appearance, taste, etc.) rather than health considerations.

ASL ANALYTICAL SERVICE LABORATORIES LTD.

A. W. Maynard, M.Sc.
Senior Partner

Christine M. Smith
Technologist

CMS/AWM/mm

ASL

RESULTS OF ANALYSIS

File No. 5800A
Page 3 of 3

| | Lot #1 June 16/88 | Lot #5 June 17/88 | Drinking* Water Guidelines |
|---|---|---|---|
| pH | 8.78 | 8.20 | 6.5-8.5 |
| Conductivity | 371. | 307. | - |
| Colour | 12 | 10. | 15. |
| Turbidity NTU | 4.6 | 8.4 | 5. |
| Suspended Solids | 2.0 | 6.7 | - |
| Dissolved Solids | 324. | 272. | - |
| Hardness CaCO3 | 9.12 | 47.7 | -*2 |
| **Anions and Nutrients** | | | |
| Alkalinity CaCO3 | 185. | 158. | - |
| Sulphate SO4 | 7.49 | 8.68 | 500. |
| Chloride Cl | 8.48 | 8.18 | 250. |
| Fluoride F | 0.37 | 0.40 | 1.5 |
| Silicate SiO2 | 16.9 | 26.8 | - |
| NO3/NO2 N | <0.005 | <0.005 | 10.0 |
| **Total Metals** | | | |
| Iron T Fe | 0.12 | 0.18 | 0.30 |
| Manganese T Mn | 0.011 | 0.067 | 0.05 |
| **Dissolved Metals** | | | |
| Arsenic D As | 0.012 | 0.013 | 0.05 |
| Barium D Ba | 0.005 | 0.014 | 1.0 |
| Cadmium D Cd | 0.0002 | 0.0002 | 0.005 |
| Chromium D Cr | <0.02 | <0.02 | 0.05 |
| Copper D Cu | 0.010 | <0.005 | 1.0 |
| Iron D Fe | <0.03 | <0.03 | - |
| Lead D Pb | <0.001 | <0.001 | 0.05 |
| Manganese D Mn | 0.006 | 0.060 | - |
| Zinc D Zn | 0.007 | <0.005 | 5.0 |
| Calcium D Ca | 1.92 | 11.2 | - |
| Magnesium D Mg | 1.05 | 4.79 | - |
| Potassium D K | 4.11 | 5.21 | - |
| Sodium D Na | 99.1 | 48.7 | -*3 |
| **Microbiological Tests** | | | |
| Coliform Total | <2. | <2. | - |
| Fecal | <2. | <2. | - |

< = Less than
$NO_3/NO_2$ = Nitrate/nitrite nitrogen
Results expressed as milligrams per litre except for pH, Conductivity (µmhos/cm), Colour (CU) Turbidity (NTU) and Coliform Bacteria (colonies/100 ml)
*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1985
*2 Maximum level not established - water supplies with a hardness exceeding 200 mg/L are considered poor but will be tolerated. Not a health consideration
*3 Maximum level not established - of concern to consumers with sodium restricted diet. Levels exceeding 20 mg/L may be of concern in this circumstance.

CHEMICAL ANALYSIS REPORT

**Date:** July 14, 1988

**File No.** 5872A - Report 1

**Report On:** Water Samples - Goodbrand Property, Langley, B.C.

**Report To:** Brown Erdman & Turner Ltd.
1409 Bewicke Avenue
North Vancouver, B. C.
V7M 2W0

DATE OF SUBMISSION:

June 30, 1988

SAMPLE IDENTIFICATION

Labelled as shown in RESULTS section.

METHODOLOGY

Analysed in accordance with "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, 1985.

RESULTS OF ANALYSIS

Results are presented in the table(s) attached.

REMARKS

Lot 13, Phase 1

The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization.

The water sample met B. C. and Canadian drinking water guidelines for all parameters analysed except for Colour and Iron.

analytical service laboratories ltd.
CONSULTING CHEMISTS & ANALYSTS
1650 Pandora Street
Vancouver, B.C. • V5L 1L6
Fax (604) 253-6700 • Tel. (604) 253-4188

These parameters are limited for aesthetic purposes (i.e., appearance, taste, etc.) rather than health considerations.

ASL ANALYTICAL SERVICE LABORATORIES LTD.

A. W. Maynard, M.Sc.
Senior Partner

Christine M. Smith
Technologist

CMS/AWM/mm

ASL

RESULTS OF ANALYSIS



| | Lot 13 Phase #1 Jun 30/88 | Lot 2 Phase #1 Jun 30/88 | Drinking*1 Water Guidelines |
|---|---|---|---|
| **Physical Tests** | | | |
| pH | 8.28 | - | 6.5-8.5 |
| Conductivity | 227. | - | - |
| Colour | 30. | - | 15. |
| Turbidity NTU | 8.6 | - | 5. |
| Suspended Solids | 8.7 | - | - |
| Dissolved Solids | 190. | - | - |
| Hardness CaCO3 | 44.8 | - | -*2 |
| **Anions and Nutrients** | | | |
| Alkalinity CaCO3 | 109. | - | - |
| Sulphate SO4 | 13.1 | - | 500. |
| Chloride Cl | 7.43 | - | 250. |
| Fluoride F | 0.37 | - | 1.5 |
| Silicate SiO2 | 23.3 | - | - |
| NO3/NO2 N | 0.005 | - | 10.0 |
| **Total Metals** | | | |
| Iron T Fe | 0.80 | - | 0.30 |
| Manganese T Mn | 0.039 | - | 0.05 |
| **Dissolved Metals** | | | |
| Arsenic D As | 0.018 | - | 0.05 |
| Barium D Ba | 0.032 | - | 1.0 |
| Cadmium D Cd | <0.001 | - | 0.005 |
| Chromium D Cr | <0.02 | - | 0.05 |
| Copper D Cu | <0.005 | - | 1.0 |
| Iron D Fe | <0.03 | - | - |
| Lead D Pb | <0.001 | - | 0.05 |
| Manganese D Mn | 0.031 | - | - |
| Zinc D Zn | <0.005 | - | 5.0 |
| Calcium D Ca | 9.47 | - | - |
| Magnesium D Mg | 5.15 | - | - |
| Potassium D K | 8.10 | - | - |
| Sodium D Na | 30.6 | - | -*3 |
| **Microbiological Tests** | | | |
| Coliform Total | <2. | <2. | |
| Fecal | <2. | <2. | |

< = Less than
Results expressed as milligrams per litre except for pH, Conductivity (µmhos/cm), Colour (CU), Turbidity (NTU) and Coliform Bacteria (colonies/100 ml)
*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1985
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# NEW WESTMINSTER

## CANADA-UNITED STATES OF AMERICA

FIG 1

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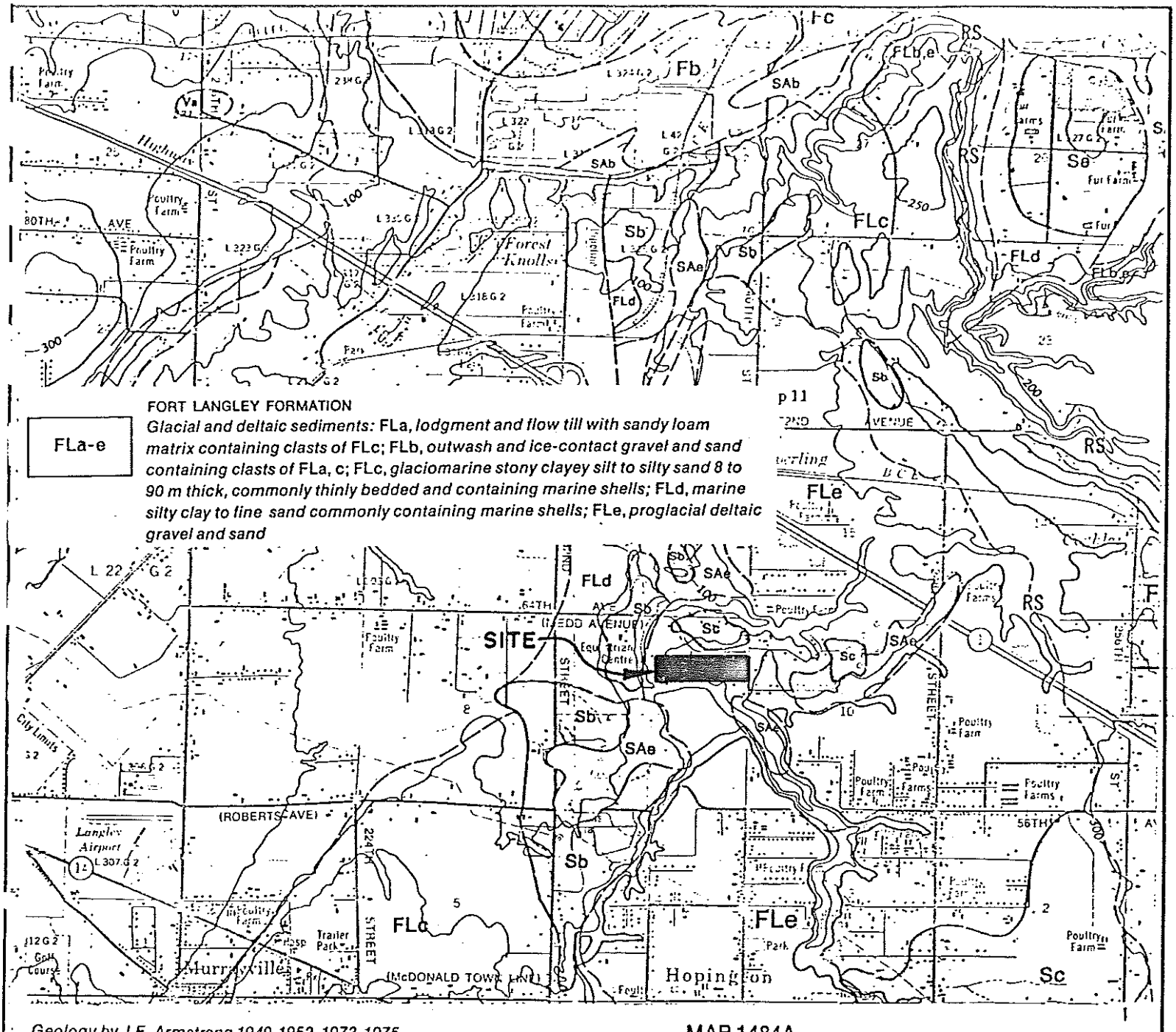


FORT LANGLEY FORMATION

FLa-e

*Glacial and deltaic sediments:* FLa, *lodgment and flow till with sandy loam matrix containing clasts of* FLc; FLb, *outwash and ice-contact gravel and sand containing clasts of* FLa, c; FLc, *glaciomarine stony clayey silt to silty sand 8 to 90 m thick, commonly thinly bedded and containing marine shells;* FLd, *marine silty clay to fine sand commonly containing marine shells;* FLe, *proglacial deltaic gravel and sand*

*Geology by J.E. Armstrong 1949-1952, 1973-1975, W.L. Brown 1949-1950, S.R. Hicock 1974, 1976*

*Additional information from E.C. Halstead 1954-1975; Province of British Columbia Soils Survey 1956-1965*

MAP 1484A

SURFICIAL GEOLOGY

# NEW WESTMINSTER

WEST OF SIXTH MERIDIAN

BRITISH COLUMBIA

Scale 1:50,000

Kilometres 1 0 1 2 3 4 Kilometres

Miles 1 0 1 2 Miles

Universal Transverse Mercator Projection



FIG 12

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