Environment Act Proposal Form

Manitoba

Name of the development:
Stephenfield Lake Resort Inc.

Type of development per Classes of Development Regulation (Manitoba Regulation 164/88):
Class 2 Development - OWMS

Legal name of the applicant:
Stephenfield Lake Resort Inc.

Mailing address of the applicant: 34084 Road 37W

Contact Person: Normand Rheault

City: Stephenfield Province: Manitoba Postal Code: R0G 2R0

Phone Number: (204) 825-0175 Fax: email: normrheault@hotmail.com

Location of the development: Stephenfield Lake Resort

Contact Person: Normand Rheault

Street Address: 34084 Road 37W

Legal Description: NE 1/4 26-6-7W

City/Town: Stephenfield Province: Manitoba Postal Code: R0G 2R0

Phone Number: (204) 825-0175 Fax: email: normrheault@hotmail.com

Name of proponent contact person for purposes of the environmental assessment:
Kevin B Steckley, STECKLEY Consulting Engineers Inc.

Phone: (204) 325-5114
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Date: 2023-05-05

Signature of proponent, or corporate principal of corporate proponent:
[redacted]

Printed name: Norm Rheault

PRINT RESET

STECKLEY CONSULTING ENGINEERS INC.
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April 18, 2023 File No. 22E12

Director
Environmental Approvals Branch
Manitoba Environment, Climate and Parks
Box 36, 14 Fultz Boulevard
Winnipeg MB R3Y 0L6

RE: STEPHENFIELD LAKE RESORT OWMS

We are submitting an Environmental Application for the above noted Class II facility for your review and approval. A PDF sealed version of the report and drawings was submitted on 2023 04 17 via email.

A summary of the application is as follows:

- The Stephenfield resort is privately owned and services 169 RV sites.
- The existing Total Area Field was exposed on November 3, 2022, and found to be flooded. It requires replacement.
- Data was collected in 2022 to determine occupancy rates and water usage.
- Water is supplied by the RM of Dufferin municipal system and is metered.
- Collected data indicated a usage of 253 liters per day per site which exceeds Manitoba published volume of 180 liters per day.
- The system was modelled in a spreadsheet based upon recorded occupancy rates increased by 10% to determine the required treatment capacity.
- Modelling indicated that a system with a capacity of 12,000 liters per day is sufficient.
- The system is designed for future expansion up to 18,000 liters per day which would be 1.6 times the measured occupancy rate. An occupancy of 2 times the recorded values would service an occupancy reaching 169 on long weekends.
- Proposed system is tanks on each site (1800 capacity with 900 liters useable storage, Haul Tank (9092 liters), Receiving Tank (12,000 liters), Primary Tank train (15,000 + 10,000 + 10000 future, liters) with filters in second primary and future primary tanks, Pump Manhole for Secondary Chamber (6,000 liters), two initial mounds with 6,000 capacity each. One future 6,000 liter capacity mound if required.
- Receiving manhole will pump into first Primary Tank in 1,000 liter doses 12 times per day spread through the entire 24 hour day.
- After treatment tank train, Pump manhole will contain two pumps with one pumping to the north half of each mound and the other to the south half.
- Pressure activated switching valves will alternate between mounds in doses of 500 liters spread over the entire 24 hour day.

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- Mounds will be constructed with ASTM C33 sand at an elevation of 1.51 above measured ground water levels measured in May of 2022.
- Mound area sized is based upon soil sample of Sand Loam with application rate of 22.02 liter per day per square meter.
- Chambers will be used with 32mm piping supported on chairs and 4.8mm orifices spaced at approximately 0.900 for ARC 36 chamber and 0.944 for Quick 4 Plus chamber.
- Mounds to be covered with Sandy Loam and finishes with topsoil.
- Mounds will be separated by 7.5m.
- Control system will be digital to enable proper dosing control and data collection of daily volume discharged to mounds. Pump control, as an option, could be timed.
- The owner shall record data such as occupancy, water usage, Haul Tank load volumes and number.
- Site preparation and system installation has been detailed on the drawings and is to be under the site observation of the Engineer.

If you require additional information, please contact the undersigned.

Yours truly,

STECKLEY Consulting Engineers Inc.

[redacted]

Kevin B Steckley, P.Eng.

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May 11, 2023 (Updated) File No. 22E12

Director
Environmental Approvals Branch
Manitoba Environment, Climate and Parks
Box 36, 14 Fultz Boulevard
Winnipeg MB R3Y 0L6

RE: STEPHENFIELD LAKE RESORT OWMS

Introduction and Background
The Stephenfield Lake Resort is in the RM of Dufferin and provides 169 sites for RV's. This facility is open from the middle of April to the middle of October of each year. An OWMS is in place which was installed based upon a design by Cochrane Engineering in 2006. This existing system is composed of three major parts:

1) Holding tanks on each site each with a capacity of 1800 liters (Appendix A, Photo A)

2) A 9,092 liter Haul Tank which pumps out each site tank and transfers to the Receiving Pipe location (Photo B). This current system relies on the operator to ensure controlled or cycled discharge to the system to enable the switching valve to function. Human error is possible and could overload one run of existing chambers.

3) A system of flow through tanks with primary and secondary chambers and a Total Area Field to treat the effluent (Photo C).

The Total Area Field has shown signs of distress and the peak flow which it is required to manage is under question. The field was exposed on November 3, 2022, and found to be flooded (Photo D). A new treatment system is required, and a mound system is proposed with the peak flow to be determined based upon occupancy rates and water usage records. The system treats residential effluent.

Proposed Development
The OWMS will be located on the lands owned by the Stephenfield Lake Resort Inc., which is Title #1962765. It is the NE ¼ 26-6-7W excepting the southerly 400 feet of the westerly 300 feet and excepting Plans 30308 and 49013. The site specific location of the OWMS will be in the location of the existing tanks and an adjacent area which is currently cultivated.

It is proposed that construction of the system would commence immediately after environmental approval which is anticipated to be the spring of 2023. Details of the OWMS system are on Drawings 22E12 P1 – Septic System Plan, Key Plan, and Location Plan, Drawing 22E12-P2 – Septic System Schematic Plan and Details and Notes, and Drawing 22E12-P3 – Pump Manhole, Chamber, And Orifice Details.

Socio Economic Effects

Construction will be funded by the Stephenfield Lake Resort Inc. The proposed OWMS will provide a positive economic effect for the resort as it will allow it to manage solids and wastewater on site without the need to transport waste to the RM of Dufferin facility. Local treatment reduces the pressure on the RM of Dufferin facility and eliminates the greenhouse gas emissions from waste hauler truck traffic.

Existing Environment in the Project Area

The land owned by the resort is immediately south of Stephenfield Provincial Park. Approximately 50% of the lands are tree covered with the balance being grass covered, cultivated or maintenance areas. The proposed system tank train will be installed in the same area as the existing tanks, which will be removed. This current tank area is grass covered and will be re-seeded upon completion of the project. The proposed mounds will be constructed in the adjacent cultivated field. This area and 7.5m beyond the mounds will also be seeded. The grass cover of the area will minimize erosion and allow for increased nutrient removal. The existing Total Area Field will be decommissioned and remain in place. Construction impacts will be minimal and short term.

The resort is serviced with treated water from the RM of Dufferin water supply system and no wells are present on the site. The OWMS will have no negative impact on the potable water system in the resort.

A ditch traverses the cultivated area and is 76m from the future mound. The mounds will be surface drained by a shallow graded swale between the mounds which drains to the shallow swale along the gravel service road. Ground surface is generally flat with slopes less than 1% in the area of the proposed OWMS. Surface runoff will be reduced with the seeding of the installation area and to 7.5m beyond the toe of the mounds.

Ground Water level levels were measured at two locations on 2022 07 22. These test holes are adjacent to the cultivated field upon which the mounds will be constructed. This places the mounds approximately 104m from the south property line and approximately 105m from the closest onsite single residence. Water levels were recorded at elevation 300.91m (north test hole) and 300.97m (south test hole). Elevations taken on the cultivated field range from 302.19m to 301.87m. This places the water level at 1.06 below the cultivated field elevation. Monitoring Wells are proposed for the north end and south ends of Mound #2. Distance of the OWMS from buildings, property line, and to ground water exceed the minimum required setbacks in Schedule A of *THE ENVIRONMENT ACT (C.C.S.M. c. E125) Onsite Wastewater Management Systems Regulation* and therefore will have no negative impact.

Two soil samples were obtained at 1.0m below grade in the same general area as the test holes. The samples were analyzed by Farmer's Edge Laboratories and were both Sandy Loam (Appendix E). Prior to the construction of the mounds, an additional four samples will be required at the corners of the mound footprint. Should these samples vary from a Sandy Loam classification (22.02 liters per square meter per day), the field design will have to be re-evaluated.

Public Safety

The site is remote from the RV sites. Open excavations will be fenced during construction and all construction traffic will be along the maintenance road access on the south edge of the property. The resort entrance is separate and further north. Upon completion, signage will be in place indicating the presence of the OWMS and the need to stay away. All structures are below ground and will have locked covers. Any potential odors will be minimal and its separation from the RV sites will eliminate any impact upon people using the facility. The installer and the operator will be licensed, which will operate in compliance with environmental standards and thereby provide safety for both residents and the environment. The use of a digital control panel with specific alarms and record keeping capability will provide ongoing information to ensure that the facility is operating in accordance with its license and provide accurate volumes for evaluation of system capacity and the need for future expansion or the ability to expand the number of RV sites, even though there are no plans to do so.

Mitigation Measures

The use of a Receiving Tank coupled with the capacity of the Hauling Tank provide a short term buffer should flows exceed that derived from recorded occupancy and water usage rates. A licensed hauler can then remove waste from the site and discharge it at the RM of Dufferin facility in an emergency. During the construction phase, the RM of Dufferin facility will be used to allow the resort to continue operation. The measured rate of water usage, which exceeds the published data in the *Manitoba Minimum Expected Volume of Sewage Per Day – Typical Wastewater Flow Rates* dated July 10, 2010, has been used in the design. System capacity design has been based upon an applied factor of 1.1 to the volumes and a future mound has been incorporated into the design should it be shown to be necessary from future data, thus applying additional safety factors to the system.

Detailed Design Parameters and System Components:

Occupancy of Facility and Peak Discharge

During the 2022 season, occupancy numbers were recorded to determine the probable fluctuation in occupancy over time and water usage was recorded for weekdays and for the September long weekend (Appendix B). Utilizing these values, the total system, taking into consideration the buffering which occurs from having holding tanks on each site, was modelled over time with the use of a spreadsheet. The average daily water demand was measured at 55.7 Imp. Gallons or 253 liters per day per site and was used in the model. This value is 1.41 times the 180 liters per day per site as contained in the *Manitoba Minimum Expected Volume of Sewage Per Day – Typical Wastewater Flow Rates* dated July 10, 2010. Occupancy rates were derived from the data and set based upon Table 1 - Occupancy – RV Sites Occupied of 169 Sites.

Table 1: Measured Occupancy - RV Sites Occupied of 169 Sites

Month	Weekdays	Weekends	Long Weekend
April	10	15	20
May	25	50	70
June	30	30	---
July	45	60	85
August	35	50	85
September	10	25	85
October	10	15	25

Utilizing the above occupancy rates with an increase of 10%, the measured water demand of 253 liters per day per RV site, and a multiple mound waste management system capable of 12,000 liters per day, the system model indicated that, when combined with the buffering capability of the RV site storage capacity, the 12,000 liters per day was adequate. See Appendix C for the data used in the model and a graph of the same. The system at this facility is complicated as it uses holding tanks on each of the 169 sites. Each tank has a capacity of 1800 liters and is pumped out to approximately 900 liter storage capacity. The presence of these tanks provides a storage buffer of 152,100 liters. The actual OWMS will only receive the wastewater once it is hauled to the OWMS with the 9,092 liter portable tank.

Occupancy of the facility fluctuates over time, and it must be recognized that use could increase. Therefore, records must be kept for:

1) Occupancy Rates each day while the facility is open.
2) Date, number, and volume of Haul Tank loads discharged to Receiving Tank.
3) Daily volume measurement for amount of effluent being pumped to the mounds.

These records shall be reviewed to predict occupancy trends and if there is a need for additional treatment capacity or short term offsite emergency discharges to the Carman wastewater facility. Such records may also indicate consistent occupancy rates from year to year and thereby show that the 12,000 liter per day peak is more than adequate and that additional sites could be added though none are planned.

The system was also modelled with a mound capacity of 18,000 liters per day to determine what occupancy rates this capacity could service. See Appendix D for the data used in the model and a graph of the same. This model indicated that an occupancy rate increase to 1.6 times the measured rates as listed in Table 2, could be serviced with a capacity of 18,000 liters per day. The system has been designed to allow for an expansion to 18,000 with one additional mound.

Table 2: Occupancy For 18,000 Liter Per Day System
RV Sites Occupied of 169 Sites

Month	Weekdays	Weekends	Long Weekend
April	16	24	32
May	40	80	112
June	48	80	---
July	72	96	136
August	56	80	136
September	16	40	136
October	16	24	40

If the occupancy were to reach 169 sites on long weekends and the relative day to day ratio remains the same as that recorded during the summer of 2022, the peak flow of the system is estimated to be 24,000 liters per day.

Proposed System Components

The following components are proposed for the replacement system:

1) Existing RV site tanks with capacity of 1800 liters each with tanks only pumped down to half of their total volume. Effective storage of 900 liters per RV site.
2) Existing Haul Tank with a capacity of 9,092 liters will discharge into a proposed Receiving Tank.
3) Receiving Tank (Tank #1) which has a capacity of 12,000 liters in one compartment. The Receiving Tank shall be CSA approved and have an inlet tee manifold to reduce turbulence. This Receiving Tank allows for an uncontrolled discharge from the Haul Tank.
4) A pump (Pump #1) capable of 100mm solids will pump from the Receiving Tank (Tank #1) into the first Primary Tank (Tank #2) which has a capacity of 15,000 liters in one compartment and is CSA approved. Pump #1 will have a controlled discharge into the new Primary Tank (Tank #2) to spread pump cycles throughout the entire day. Primary Tank (Tank #2) will not have an effluent filter.
5) Second Primary flow through tank (Tank #3) with a capacity of 10,000 liters in one compartment. Tank shall be CSA approved and tank shall have an effluent filter.
6) Third *future* Primary flow through tank (Tank #4) with a capacity of 10,000 liters in one compartment. Tank shall be CSA approved and tank shall have an effluent filter.
7) Pump Manhole (Secondary Chamber) with a volume of 6,000 liters and two pumps (Pump #2 and Pump #3).
8) A Switching Manhole for each pump/forcemain which will alternate effluent discharge to two initial mounds and one future mound.
9) Two initial mounds and one future mound, each with a capacity of 6,000 liters per day, will receive the effluent. Each mound is split into north and south portions with the north portions being fed by one of the pumps, and the south portion by the second pump.

Tank Sizing and Filters

The system is based upon a total daily capacity of 12,000 liters per day. The Primary compartment is contained in proposed Tank #2 and Tank #3 for the initial installation. The initial primary capacity of 25,000 liters (15,000 + 10,000) provides 2.08 times the 12,000 liter peak daily design flow. With the future primary tank in place, the total primary capacity is 35,000 liters (15,000 + 10,000 + 10,000). This is approximately 1.94 times the 18,000 liter peak daily design flow of the future expanded system. These both exceed the current regulation which requires a capacity of 1.4 times (140%) of the peak daily flow per *The Environment Act (C.C.S.M. c. E125) Onsite Wastewater Management Systems Regulation*.

The secondary chamber is contained in the Pump Manhole which has a capacity of 6,000 liters. This volume is 0.5 times the peak daily flow for the initial installation and 0.33 times with the future third primary tank, if required. These both exceed current regulation which requires a capacity of 0.20 times (20%) of the peak daily flow per *The Environment Act (C.C.S.M. c. E125) Onsite Wastewater Management Systems Regulation*. All tanks shall be CSA approved with hatches, secondary safety device in risers, and lockable covers.

All tanks and pump manhole shall be ballasted in accordance with manufacturers recommendations, complete with hold down straps and precast concrete ballast by tank supplier.

Filters will be present in Tank #3 and *future* Tank #4 to trap 3.2mm particles and larger effluent. This is smaller than the 4.8mm orifice sizing in the lateral piping. The filter in Tank #3 shall be Polylok PL-525 or approved equal filter with a capacity of 37,800 liters per day. The filter in the future Tank #4 shall have a capacity of 11,356 liters per day (Polylok PL-122 or approved equal).

The effluent filters shall be installed and maintained in accordance with the manufacturers' recommendations. Filters shall be equipped with alarms to indicate when the filter needs servicing.

Pump Controls

Control shall be accomplished using flow meter control and/or timed discharges coupled with low level, high level, and alarm floats in the Receiving Tank and the Pump Manhole at the end of the treatment train. The control system shall be digital to enable data collection.

Level Control Floats for the Receiving Tank Pump (Pump #1) will be:

1) Pump start at 3,000 liter level in the Pump Manhole
2) Pump stop at 6,000 liter level in the Pump Manhole
3) Pump stop for low level in the Receiving Tank
4) High level alarm in Receiving Tank

The Receiving Tank Pump will be cycled in 500 liter volumes every hour which will space them equally throughout the entire day.

Level Control Floats for the Pump Manhole (Pump #2 and #3) will be:

1) Pump off at low level in the Pump Manhole
2) Low level alarm in Pump Manhole indicating pump stop failure
3) Pump on at 3,000 liter level
4) High level alarm in Pump Manhole

The pump cycles in the Pump Manhole will be controlled by either time discharge or flow meter control of 500 liter doses. Each pump will be cycled in 500 liter doses which will spread equally through the entire day. A flow meter would be required in the Pump Manhole for each of the forcemains.

Timed discharge, if used, shall be based upon measured 500 liter volumes of the installed system and draw down tests.

Mound Design

The mounds will be constructed with Quick 4 Plus Standard or ARC 36 Standard chambers. These chambers have a width of 0.86m and installed length of 1.524m for the Quick 4 Plus Standard chambers and 1.219m for the ARC 36 Standard chambers. Total installed length will be 17 chambers (20.72m) for the Quick 4 Plus chambers and 13 (19.81m) chambers for the ARC 36 chambers. Mound sand layer width will be the maximum 3.0m permitted. This will accommodate three chambers placed side to side and a sand projection on each side of 0.21m at the base of the chambers and 0.30m past the ends. Lateral piping length as measured from the header to the last orifice will be 20.48m for the Quick 4 Plus chambers and 19.57m for the ARC 36 chambers. The mounds will have a north portion and south portion each with the above noted number of chambers separated by 1.5m. Adjacent mounds berms will be separated toe to toe from each other and the cultivated field by a 7.5m topsoiled and seeded buffer to allow for seepage and to enhance evapotranspiration in the area.

Piping for laterals in the chambers will be 32mm diameter PVC supported on 150mm chairs spaced at 1.2m. Orifices will be spaced at 0.900m for the ARC 36 chamber and 0.944 for the Quick 4 Plus chamber. Every third orifice will point down to drain the pipe after each cycle. The down facing orifices will have a shield. The first and last orifices will be 0.45m from the ends of the chamber run.

Mound capacity and dimensions were established using the Sand Treatment Mound Design Work Sheet dated 2010 04 (Appendix F – for ARC 36 chambers). Each mound will have a sand bed of ASTM C33 sand. The sand layer under the chambers was designed at 0.45m thick to place the bottom of the chambers at 1.51m above the water level measured in May of 2022. This elevation will provide a buffer for seasonal variations in the water thereby exceeding the 0.90m required by Figure 1a of the *Supplementary Information for Onsite Wastewater Management Systems Installations* dated July 2010.

The finished topsoiled berm dimensions will be 12.13m wide by 52.68m in length for the Quick 4 Plus chambers and 12.28m wide by 51.00m for the ARC 36 chambers. Cleanouts are located at the ends (north and south) of the mound. Chambers have been shown on the drawings as starting at the same location but, the centre run of chambers could be staggered during construction by 0.45m to provide more uniform coverage to the sand layer. This would increase the total mound length by 0.90m.

Mound Installation
Detailed mound site preparation and installation details have been provided on Drawing 22E12-P2. Mound layout, scarification, construction, and squirt test shall be carried out with periodic site observations by the Engineer. Sand placement shall be nominally greater than design to allow for settlement of the sand and scarified surface.

Flow Control through System
Flow into the Receiving Tank will be uncontrolled from the haul tank. It is recommended that the haul tank be fitted with a flow meter for recording the individual load volume by effluent discharged to the Receiving Tank. Flow from the Receiving Tank to the first Primary tank will be with a pump which is capable of pumping solids. This pump will be time controlled along with a pump off float at high level in the Pump Manhole and pump on at 3,000 liter volume in the Pump Manhole. It will be timed to cycle every 1.5 hours with a maximum number of cycles of 12 per day. This sequence will need to be adjusted should the additional Primary tank be required.

The effluent will gravity flow through the Primary Tank train and into the Pump Manhole.

The Pump Manhole will contain two pumps each with a flow meter (or timed function) to control pump operation. One of the pumps will pump to the north portion of each mound and the other will pump to the south portion of each mound. Each pump will alternate to north and south mound portions via a pressure activated switching valve in a Switching Manhole. Dosing is proposed at 500 liters per pump cycle. A total mound capacity of 12,000 liters per day requires each pump to cycle a maximum of 12 times per day or every 2 hours to provide 6,000 liters to the respective portions of the mounds. Pump operation alternating between the portions of the mounds every 1.75 hours is proposed. The north portion of each of the two mounds will receive 6 doses and the south portion of each of the two mounds will receive 6 doses (3,000 liters).

Two pumps will be drawing from the 6,000 liter pump manhole. The pumps will be controlled by flow meter volumes or timers with a pump ON float at a volume of 3,000 liters and pump OFF at low level.

Each north portion and each south portion of the mound will have a total of 63 orifices. At 1.5m squirt, the required flow is 221 liters per minute per mound and 73.7 liters per minute for each lateral. For a dose of 500 liters the pump run time would be 2.4 minutes. The desired pipe velocity is a minimum of 0.6m/s and a maximum of 1.5m/s where the system includes a fast closing valve. The proposed system will not have any fast closing valves. Velocities are estimated at 1.74m/s in the forcemains and distribution pipes, 1.31m/s in the laterals which both exceed the required scouring velocity of 0.6m/s.

The volume of one lateral is 19.7 liters with each of the south and south portions having 3 runs for a total of 59.1 liters per portion. To achieve a dose volume greater than 5 times the total volume in the 3 laterals per north portion of the mound or south portion of the mound, the minimum dose is 295 liters. The proposed dose of 500 liters exceeds the minimum required dose of 295 liters.

Maintenance and Operation

This system will require a Certified Wastewater Operator. This operator shall have in place an emergency plan addressing action required with items such as pump failure, excessive volume requiring effluent being hauled to Carman by licensed sewage hauler, monitoring of system RV site tanks for required pump out. If system capacity is exceeded, the Environment officer shall be notified.

Ongoing Maintenance will be:

Mow mounds.

Conduct site observation for prairie dogs. Eliminate if present.

Maintain records:

1) Daily occupancy rates.
2) Daily water meter readings.
3) Daily Haul Tank number and volume of loads discharged to Receiving Tank.
4) Daily volume discharged to south portion of mounds.
5) Daily volume discharged to north portion of mounds.

Periodic checking of switching valves for proper operation. This can be combined with the squirt height check.

Check that hatches are secure.

Clean filter per manufacturers recommendations and immediately upon alarm notification.

Measure and record ground water in monitoring wells at the start of June and during prolonged wet period.

At end of RV season:

Flush laterals by pressure washing.

Squirt height check by utilizing screw cap with 4.8mm orifice.

Confirm RV site tanks, Primary Tanks, and Pump Manhole at 50% full.

Pull pumps where Receiving Tank or Pump Manhole could experience freezing temperatures.

Drain switching valves.

Drain or blow out all pipes.

Confirm all tank hatches are in place and secure.

Confirm signage is in place.

Every Two Years:

Sludge measurement.

We trust this is sufficient for your use. If you require additional information, please contact the undersigned.

Yours truly,

STECKLEY Consulting Engineers Inc.

Kevin B Steckley, P.Eng.

Attach.

Appendix ‘A’

Photos

Photo A - RV Site Holding Tank

Photo B - Haul Tank

Photo C - Receiving Pipe, 4500 Liter Tank, 3500/1000 Liter Tank, Switching MH, Mound in Distance

Photo D - Exposed North End of Mound 2022 11 03

Appendix B

Occupancy Rates
And
Water Usage

Stephenfield Reosrt Sewage Flows Based Upon Water Meter Readings (Imp Gallons)

40 Imp Gallons = 180 litres

Date	Occupancy	Meter Reading	Usage	Shower Meter	Shower Usage	Field Total	Per RV Site
2022 06 05		852211				0	
2022 06 07		854434	2223			2223	
2022 06 08		856073	1639	60	60	1579	
2022 06 09		858104	2031	250	190	1841	
2022 06 13		871035	12931	1080	830	12101	
2022 06 14		871940	905	1160	80	825	
2022 06 15		872661	721	1200	40	681	
2022 06 16		874003	1342	1410	210	1132	
2022 06 20		886699	12696	2240	830	11866	
2022 06 21		888329	1630	2430	190	1440	
2022 06 22	19	889139	810	2480	50	760	40.0
2022 06 23	28	890550	1411	2600	120	1291	46.1
2022 07 04	56	928174	37624	6590	3990	33634	
2022 07 05	45	930194	2020	6910	320	1700	37.8
2022 07 06	44	932156	1962	7150	240	1722	39.1
2022 07 07	44	933838	1682	7380	230	1452	33.0
2022 07 11	41	953193	19355	9150	1770	17585	
2022 07 12	30	955131	1938	9360	210	1728	57.6
2022 07 13	37	956977	1846	9590	230	1616	43.7
2022 07 14	44	958645	1668	9810	220	1448	32.9
2022 07 18	39	975091	16446	11310	1500	14946	
2022 07 19	35	977219	2128	11670	360	1768	50.5
2022 07 20	34	978513	1294	11750	80	1214	35.7
2022 07 21	47	981013	2500	11980	230	2270	48.3
2022 07 25	49	994259	13246	13650	1670	11576	
2022 07 26	45	996482	2223	13970	320	1903	42.3
2022 07 27	37	998428	1946	14460	490	1456	39.4
2022 07 28	45	1000791	2363	14850	390	1973	43.8
2022 08 02	45	1019534	18743	17750	2900	15843	
2022 08 03	39	1021568	2034	17960	210	1824	46.8
2022 08 04	46	1024082	2514	18260	300	2214	48.1
2022 08 08	39	1038581	14499	20240	1980	12519	
2022 08 09	31	1042032	3451	20310	70	3381	109.1
2022 08 10	31	1043153	1121	20470	160	961	31.0
2022 08 11	41	1045397	2244	20700	230	2014	49.1
2022 08 15	36	1061477	16080	22000	1300	14780	
2022 08 16	30	1063594	2117	22240	240	1877	62.6
2022 08 17	33	1065560	1966	22450	210	1756	53.2
2022 08 18	36	1067262	1702	22620	170	1532	42.6
2022 08 29	32	1100914	33652	25980	3360	30292	
2022 08 30	20	1102952	2038	26110	130	1908	95.4
2022 08 31	19	1104482	1530	26180	70	1460	76.8
2022 09 01	28	1107836	3354	26280	100	3254	116.2
2022 09 06	25	1131888	24052	28940	2660	21392	
2022 09 07	26	1133501	1613	29010	70	1543	59.3
2022 09 08	23	1136487	2986	29160	150	2836	123.3
					Imp Gallons:		55.7 **Average**

Appendix C

Occupancy Rate Times 1.1 And Effluent Volume Model Treating 12,000 Liters Per Day Data

Graph of Data

STECKLEY Consulting Engineers Inc
Stephenfield Lake Resort OWMS

Occupancy Rates And Effluent Volume Model

Volume to Mounds Per Day	12000	Litres			
Haul Tank Volume	9092	Litres	2000 Imp Gallons	Percent Volume Available:	Opens April 15th
Discharge Tank Volume	12000	Litres	(Requires Ballast to Keep From Floating For Full Capacity)	1) if greater than 100% less pumping required	Closes mid October
Total RV Site Volume	152100	Litres	169 Sites at 50% of 1800 Litres each	2) If approaching 0% more pumping required	
Volume of Sewage Per Day	253	Litres	per site		
Occupancy Multiplier	1.10				

Occupancy Assumptions:		Weekdays	Weekends	Long Weekend
	April	11	16.5	22
	May	27.5	55	77
	June	33	55	None
	July	49.5	66	93.5
	August	38.5	55	93.5
	September	11	27.5	93.5
	October	11	16.5	27.5

April

Aprily Occupancy (Sites)															11	16.5	16.5	11	11	11	11	11	16.5	16.5	11	11	11	11	11	15
Daily Site Volume Used															2783	4175	4175	2783	2783	2783	2783	2783	4175	4175	2783	2783	2783	2783	2783	3795
Hauled to Discharge Tank																									12000					
Site Volume Available After Pumpout														152100	149317	145143	140968	138185	135402	132619	129836	127053	122879	118704	127921	125138	122355	119572	116789	112994
Percent Volume Available														100.0%	98.2%	95.4%	92.7%	90.9%	89.0%	87.2%	85.4%	83.5%	80.8%	78.0%	84.1%	82.3%	80.4%	78.6%	76.8%	74.3%
Date	**1**	2	**3**	4	**5**	6	**7**	8	**9**	10	**11**	12	**13**	14	**15**	16	**17**	18	**19**	20	**21**	22	**23**	24	**25**	26	**27**	28	**29**	30
Day of Week	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

April

May

May Occupancy (Sites)	28	28	28	28	28	28	55	55	28	28	28	28	28	55	55	28	28	28	28	28	77	77	77	28	28	28	28	55	55	28	28
Site Volume Used	6958	6958	6958	6958	6958	6958	13915	13915	6958	6958	6958	6958	6958	13915	13915	6958	6958	6958	6958	6958	19481	19481	19481	6958	6958	6958	6958	13915	13915	6958	6958
Hauled to Discharge Tank		12000	12000	12000	12000	12000			12000	12000	12000	12000	12000			12000	12000	12000	12000	12000				12000	12000	12000	12000			12000	12000
Site Volume Available After Pumpout	106037	111079	116122	121164	126207	131249	117334	103419	108462	113504	118547	123589	128632	114717	100802	105844	110887	115929	120972	126014	106533	87052	67571	72614	77656	82699	87741	73826	59911	64954	69996
Percent Volume Available	69.7%	73.0%	76.3%	79.7%	83.0%	86.3%	77.1%	68.0%	71.3%	74.6%	77.9%	81.3%	84.6%	75.4%	66.3%	69.6%	72.9%	76.2%	79.5%	82.8%	70.0%	57.2%	44.4%	47.7%	51.1%	54.4%	57.7%	48.5%	39.4%	42.7%	46.0%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**

May

June

June Occupancy (Sites)	33	33	33	55	55	33	33	33	33	33	55	55	33	33	33	33	33	55	55	33	33	33	33	33	55	55	33	33	33	33
Site Volume Used	8349	8349	8349	13915	13915	8349	8349	8349	8349	8349	13915	13915	8349	8349	8349	8349	8349	13915	13915	8349	8349	8349	8349	8349	13915	13915	8349	8349	8349	8349
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000
Site Volume Available After Pumpout	73647	77298	80949	79034	77119	80770	84421	88072	91723	95374	93459	91544	95195	98846	102497	106148	109799	107884	105969	109620	113271	116922	120573	124224	122309	120394	124045	127696	131347	134998
Percent Volume Available	48.4%	50.8%	53.2%	52.0%	50.7%	53.1%	55.5%	57.9%	60.3%	62.7%	61.4%	60.2%	62.6%	65.0%	67.4%	69.8%	72.2%	70.9%	69.7%	72.1%	74.5%	76.9%	79.3%	81.7%	80.4%	79.2%	81.6%	84.0%	86.4%	88.8%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Day of Week	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**

June

July

July Occupancy (Sites)	93.5	93.5	93.5	49.5	49.5	49.5	49.5	49.5	66	66	49.5	49.5	49.5	49.5	49.5	66	66	49.5	49.5	49.5	49.5	49.5	66	66	49.5	49.5	49.5	49.5	49.5	66	66
Site Volume Used	23655.5	23655.5	23655.5	12523.5	12523.5	12523.5	12523.5	12523.5	16698	16698	12523.5	12523.5	12523.5	12523.5	12523.5	16698	16698	12523.5	12523.5	12523.5	12523.5	12523.5	16698	16698	12523.5	12523.5	12523.5	12523.5	12523.5	16698	16698
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000
Site Volume Available After Pumpout	123342.5	111687	100031.5	99508	98984.5	98461	97937.5	97414	92716	88018	87494.5	86971	86447.5	85924	85400.5	80702.5	76004.5	75481	74957.5	74434	73910.5	73387	68689	63991	63467.5	62944	62420.5	61897	61373.5	56675.5	51977.5
Percent Volume Available	81.1%	73.4%	65.8%	65.4%	65.1%	64.7%	64.4%	64.0%	61.0%	57.9%	57.5%	57.2%	56.8%	56.5%	56.1%	53.1%	50.0%	49.6%	49.3%	48.9%	48.6%	48.2%	45.2%	42.1%	41.7%	41.4%	41.0%	40.7%	40.4%	37.3%	34.2%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**

July

August

August Occupancy (Sites)	38.5	38.5	38.5	38.5	38.5	55	55	38.5	38.5	38.5	38.5	38.5	55	55	38.5	38.5	38.5	38.5	38.5	55	55	38.5	38.5	38.5	38.5	38.5	55	55	38.5	38.5	38.5
Site Volume Used	9740.5	9740.5	9740.5	9740.5	9740.5	13915	13915	9740.5	9740.5	9740.5	9740.5	9740.5	13915	13915	9740.5	9740.5	9740.5	9740.5	9740.5	13915	13915	9740.5	9740.5	9740.5	9740.5	9740.5	13915	13915	9740.5	9740.5	9740.5
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	10000	10000	10000	12000	12000	12000	12000	12000	12000	12000	12000			12000	12000	12000
Site Volume Available After Pumpout	54237	56496.5	58756	61015.5	63275	61360	59445	61704.5	63964	66223.5	68483	70742.5	68827.5	66912.5	69172	69431.5	69691	69950.5	72210	70295	68380	70639.5	72899	75158.5	77418	79677.5	65762.5	51847.5	54107	56366.5	58626
Percent Volume Available	35.7%	37.1%	38.6%	40.1%	41.6%	40.3%	39.1%	40.6%	42.1%	43.5%	45.0%	46.5%	45.3%	44.0%	45.5%	45.6%	45.8%	46.0%	47.5%	46.2%	45.0%	46.4%	47.9%	49.4%	50.9%	52.4%	43.2%	34.1%	35.6%	37.1%	38.5%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**

August

September

September Occupancy (Sites)	11	11	93.5	93.5	93.5	11	11	11	11	27.5	27.5	11	11	11	11	11	27.5	27.5	11	11	11	11	11	27.5	27.5	11	11	11	11	11
Site Volume Used	2783	2783	23655.5	23655.5	23655.5	2783	2783	2783	2783	6957.5	6957.5	2783	2783	2783	2783	2783	6957.5	6957.5	2783	2783	2783	2783	2783	6957.5	6957.5	2783	2783	2783	2783	2783
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000			12000	12000	12000	12000				12000	12000	12000	12000				12000	12000	12000			
Site Volume Available After Pumpout	67843	77060	65404.5	53749	42093.5	51310.5	60527.5	69744.5	78961.5	72004	65046.5	74263.5	83480.5	92697.5	101914.5	99131.5	92174	85216.5	94433.5	103650.5	112867.5	122084.5	119301.5	112344	105386.5	114603.5	123820.5	133037.5	130254.5	127471.5
Percent Volume Available	44.6%	50.7%	43.0%	35.3%	27.7%	33.7%	39.8%	45.9%	51.9%	47.3%	42.8%	48.8%	54.9%	60.9%	67.0%	65.2%	60.6%	56.0%	62.1%	68.1%	74.2%	80.3%	78.4%	73.9%	69.3%	75.3%	81.4%	87.5%	85.6%	83.8%	
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	
Day of Week	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	

September

October

October Occupancy (Sites)	16.5	16.5	11	11	11	11	11	27.5	27.5	27.5	11	11	11	11	16.5	16.5															
Site Volume Used	4174.5	4174.5	2783	2783	2783	2783	2783	6957.5	6957.5	6957.5	2783	2783	2783	2783	4174.5	4174.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauled to Discharge Tank			12000	12000							12000	12000	12000				12000	12000	3200												
Site Volume Available After Pumpout	123297	119122.5	128339.5	137556.5	134773.5	131990.5	129207.5	122250	115292.5	108335	117552	126769	135986	133203	129028.5	124854	136854	148854	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054
Percent Volume Available	81.1%	78.3%	84.4%	90.4%	88.6%	86.8%	84.9%	80.4%	75.8%	71.2%	77.3%	83.3%	89.4%	87.6%	84.8%	82.1%	90.0%	97.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**

October

STECKLEY Consulting Engineers Inc
Stephenfield Lake Resort OWMS

Cummulative Site Volume Used less Hauled	2783	6958	11132	13915	16698	19481	22264	25047	29222	33396	24179	26962	29745	32528	35311	39106
Daily Site Volume Used	2783	4175	4175	2783	2783	2783	2783	2783	4175	4175	2783	2783	2783	2783	2783	3795
Hauled to Discharge Tank	0	0	0	0	0	0	0	0	0	0	12000	0	0	0	0	0
Site Volume Available After Pumpout	149317	145143	140968	138185	135402	132619	129836	127053	122879	118704	127921	125138	122355	119572	116789	112994
Date	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
								April								

Cummulative Site Volume Used less Hauled	46064	41021	35979	30936	25894	20851	34766	48681	43639	38596	33554	28511	23469	37384	51299	46256	41214	36171	31129	26086	45567	65048	84529	79487	74444	69402	64359	78274	92189	87147	82104
Daily Site Volume Used	6958	6958	6958	6958	6958	6958	13915	13915	6958	6958	6958	6958	6958	13915	13915	6958	6958	6958	6958	6958	19481	19481	19481	6958	6958	6958	6958	13915	13915	6958	6958
Hauled to Discharge Tank	0	12000	12000	12000	12000	12000	0	0	12000	12000	12000	12000	12000	0	0	12000	12000	12000	12000	12000	0	0	0	12000	12000	12000	12000	0	0	12000	12000
Site Volume Available After Pumpout	106037	111079	116122	121164	126207	131249	117334	103419	108462	113504	118547	123589	128632	114717	100802	105844	110887	115929	120972	126014	106533	87052	67571	72614	77656	82699	87741	73826	59911	64954	69996
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
																May															

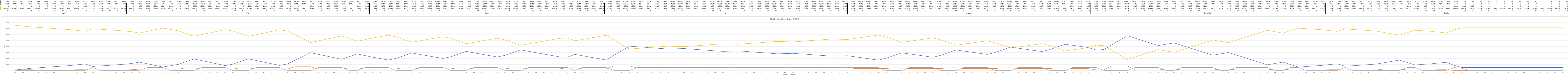
Cummulative Site Volume Used less Hauled	78453	74802	71151	73066	74981	71330	67679	64028	60377	56726	58641	60556	56905	53254	49603	45952	42301	44216	46131	42480	38829	35178	31527	27876	29791	31706	28055	24404	20753	17102
Daily Site Volume Used	8349	8349	8349	13915	13915	8349	8349	8349	8349	8349	13915	13915	8349	8349	8349	8349	8349	13915	13915	8349	8349	8349	8349	8349	13915	13915	8349	8349	8349	8349
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000
Site Volume Available After Pumpout	73647	77298	80949	79034	77119	80770	84421	88072	91723	95374	93459	91544	95195	98846	102497	106148	109799	107884	105969	109620	113271	116922	120573	124224	122309	120394	124045	127696	131347	134998
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
															June															

Cummulative Site Volume Used less Hauled	28758	40413	52069	52592	53116	53639	54163	54686	59384	64082	64606	65129	65653	66176	66700	71398	76096	76619	77143	77666	78190	78713	83411	88109	88633	89156	89680	90203	90727	95425	100123
Daily Site Volume Used	23656	23656	23656	12524	12524	12524	12524	12524	16698	16698	12524	12524	12524	12524	12524	16698	16698	12524	12524	12524	12524	12524	16698	16698	12524	12524	12524	12524	12524	16698	16698
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000
Site Volume Available After Pumpout	123343	111687	100032	99508	98985	98461	97938	97414	92716	88018	87495	86971	86448	85924	85401	80703	76005	75481	74958	74434	73911	73387	68689	63991	63468	62944	62421	61897	61374	56676	51978
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
																July															

Cummulative Site Volume Used less Hauled	97863	95604	93344	91085	88825	90740	92655	90396	88136	85877	83617	81358	83273	85188	82928	82669	82409	82150	79890	81805	83720	81461	79201	76942	74682	72423	86338	100253	97993	95734	93474
Daily Site Volume Used	9741	9741	9741	9741	9741	13915	13915	9741	9741	9741	9741	9741	13915	13915	9741	9741	9741	9741	9741	13915	13915	9741	9741	9741	9741	9741	13915	13915	9741	9741	9741
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	10000	10000	10000	12000	12000	12000	12000	12000	12000	12000	12000	0	0	12000	12000	12000
Site Volume Available After Pumpout	54237	56497	58756	61016	63275	61360	59445	61705	63964	66224	68483	70743	68828	66913	69172	69432	69691	69951	72210	70295	68380	70640	72899	75159	77418	79678	65763	51848	54107	56367	58626
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
																August															

Cummulative Site Volume Used less Hauled	84257	75040	86696	98351	110007	100790	91573	82356	73139	80096	87054	77837	68620	59403	50186	52969	59926	66884	57667	48450	39233	30016	32799	39756	46714	37497	28280	19063	21846	24629
Daily Site Volume Used	2783	2783	23656	23656	23656	2783	2783	2783	2783	6958	6958	2783	2783	2783	2783	2783	6958	6958	2783	2783	2783	2783	2783	6958	6958	2783	2783	2783	2783	2783
Hauled to Discharge Tank	12000	12000	12000	12000	12000	12000	12000	12000	12000	0	0	12000	12000	12000	12000	0	0	0	12000	12000	12000	12000	0	0	0	12000	12000	12000	0	0
Site Volume Available After Pumpout	67843	77060	65405	53749	42094	51311	60528	69745	78962	72004	65047	74264	83481	92698	101915	99132	92174	85217	94434	103651	112868	122085	119302	112344	105387	114604	123821	133038	130255	127472
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
															September															

Cummulative Site Volume Used less Hauled	28803	32978	23761	14544	17327	20110	22893	29850	36808	43765	34548	25331	16114	18897	23072	27246	15246	3246	46	46	46	46	46	46	46	46	46	46	46	46	46
Daily Site Volume Used	4175	4175	2783	2783	2783	2783	2783	6958	6958	6958	2783	2783	2783	2783	4175	4175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauled to Discharge Tank	0	0	12000	12000	0	0	0	0	0	0	12000	12000	12000	0	0	0	12000	12000	3200	0	0	0	0	0	0	0	0	0	0	0	0
Site Volume Available After Pumpout	123297	119123	128340	137557	134774	131991	129208	122250	115293	108335	117552	126769	135986	133203	129029	124854	136854	148854	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054	152054
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
															October																



Appendix D

Occupancy Rate Times 1.6 And Effluent Volume Model Treating 18,000 Liters Per Day Data

Graph of Data

STECKLEY Consulting Engineers Inc
Stephenfield Lake Resort OWMS

Occupancy Rates And Effluent Volume Model

Volume to Mounds Per Day	18000	Litres	
Haul Tank Volume	9092	Litres	2000 Imp Gallons
Discharge Tank Volume	12000	Litres	(Requires Ballast to Keep From Floating For Full Capacity)
Total RV Site Volume	152100	Litres	169 Sites at 50% of 1800 Litres each
Volume of Sewage Per Day	253	Litres	per site
Occupancy Multiplier	1.60		

Percent Volume Available:
1) if greater than 100% less pumping required
2) If approaching 0% more pumping required

Opens April 15th
Closes mid October

110.00% Site Volume Exceeded - Reduce Pumped Days

-9.00% Increase Pumping Days

Occupancy Assumptions:	Weekdays	Weekends	Long Weekend
April	16	24	32
May	40	80	112
June	48	80	None
July	72	96	136
August	56	80	136
September	16	40	136
October	16	24	40

April

Aprily Occupancy (Sites)														16	24	24	16	16	16	16	16	24	24	16	16	16	16	16	15
Daily Site Volume Used														4048	6072	6072	4048	4048	4048	4048	4048	6072	6072	4048	4048	4048	4048	4048	3795
Hauled to Discharge Tank																								18000					
Site Volume Available After Pumpout														152100	148052	141980	135908	131860	127812	123764	119716	115668	109596	103524	117476	113428	109380	105332	101284	97489
Percent Volume Available														100.0%	97.3%	93.3%	89.4%	86.7%	84.0%	81.4%	78.7%	76.0%	72.1%	68.1%	77.2%	74.6%	71.9%	69.3%	66.6%	64.1%
Date	**1**	2	**3**	4	**5**	6	**7**	8	**9**	10	**11**	12	**13**	14	**15**	16	**17**	18	**19**	20	**21**	22	**23**	24	**25**	26	**27**	28	**29**	30
Day of Week	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

April

May

May Occupancy (Sites)	40	40	40	40	40	40	80	80	40	40	40	40	40	80	80	40	40	40	40	40	112	112	112	40	40	40	40	80	80	40	40
Site Volume Used	10120	10120	10120	10120	10120	10120	20240	20240	10120	10120	10120	10120	10120	20240	20240	10120	10120	10120	10120	10120	28336	28336	28336	10120	10120	10120	10120	20240	20240	10120	10120
Hauled to Discharge Tank		18000	18000	18000	18000	18000			18000	18000	18000	18000	18000	18000			18000	18000	18000	18000	18000			18000	18000	18000	18000			18000	18000
Site Volume Available After Pumpout	87369	95249	103129	111009	118889	126769	106529	86289	94169	102049	109929	117809	125689	105449	85209	93089	100969	108849	116729	124609	96273	67937	39601	47481	55361	63241	71121	50881	30641	38521	46401
Percent Volume Available	57.4%	62.6%	67.8%	73.0%	78.2%	83.3%	70.0%	56.7%	61.9%	67.1%	72.3%	77.5%	82.6%	69.3%	56.0%	61.2%	66.4%	71.6%	76.7%	81.9%	63.3%	44.7%	26.0%	31.2%	36.4%	41.6%	46.8%	33.5%	20.1%	25.3%	30.5%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**

May

June

June Occupancy (Sites)	48	48	48	80	80	48	48	48	48	48	80	80	48	48	48	48	48	80	80	48	48	48	48	48	80	80	48	48	48	48
Site Volume Used	12144	12144	12144	20240	20240	12144	12144	12144	12144	12144	20240	20240	12144	12144	12144	12144	12144	20240	20240	12144	12144	12144	12144	12144	20240	20240	12144	12144	12144	12144
Hauled to Discharge Tank	18000	18000	18000		18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000
Site Volume Available After Pumpout	52257	58113	63969	43729	41489	47345	53201	59057	64913	70769	68529	66289	72145	78001	83857	89713	95569	93329	91089	96945	102801	108657	114513	120369	118129	115889	121745	127601	133457	139313
Percent Volume Available	34.4%	38.2%	42.1%	28.8%	27.3%	31.1%	35.0%	38.8%	42.7%	46.5%	45.1%	43.6%	47.4%	51.3%	55.1%	59.0%	62.8%	61.4%	59.9%	63.7%	67.6%	71.4%	75.3%	79.1%	77.7%	76.2%	80.0%	83.9%	87.7%	91.6%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Day of Week	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**

June

July

July Occupancy (Sites)	136	136	136	72	72	72	72	72	96	96	72	72	72	72	72	96	96	72	72	72	72	72	96	96	72	72	72	72	72	96	96
Site Volume Used	34408	34408	34408	18216	18216	18216	18216	18216	24288	24288	18216	18216	18216	18216	18216	24288	24288	18216	18216	18216	18216	18216	24288	24288	18216	18216	18216	18216	18216	24288	24288
Hauled to Discharge Tank	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000
Site Volume Available After Pumpout	122905	106497	90089	89873	89657	89441	89225	89009	82721	76433	76217	76001	75785	75569	75353	69065	62777	62561	62345	62129	61913	61697	55409	49121	48905	48689	48473	48257	48041	41753	35465
Percent Volume Available	80.8%	70.0%	59.2%	59.1%	58.9%	58.8%	58.7%	58.5%	54.4%	50.3%	50.1%	50.0%	49.8%	49.7%	49.5%	45.4%	41.3%	41.1%	41.0%	40.8%	40.7%	40.6%	36.4%	32.3%	32.2%	32.0%	31.9%	31.7%	31.6%	27.5%	23.3%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**

July

August

August Occupancy (Sites)	56	56	56	56	56	80	80	56	56	56	56	56	80	80	56	56	56	56	56	80	80	56	56	56	56	56	80	80	56	56	56
Site Volume Used	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168
Hauled to Discharge Tank	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000			18000	18000	18000
Site Volume Available After Pumpout	39297	43129	46961	50793	54625	52385	50145	53977	57809	61641	65473	69305	67065	64825	68657	72489	76321	80153	83985	81745	79505	83337	87169	91001	94833	98665	78425	58185	62017	65849	69681
Percent Volume Available	25.8%	28.4%	30.9%	33.4%	35.9%	34.4%	33.0%	35.5%	38.0%	40.5%	43.0%	45.6%	44.1%	42.6%	45.1%	47.7%	50.2%	52.7%	55.2%	53.7%	52.3%	54.8%	57.3%	59.8%	62.3%	64.9%	51.6%	38.3%	40.8%	43.3%	45.8%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**

August

September

September Occupancy (Sites)	16	16	136	136	136	16	16	16	16	40	40	16	16	16	16	16	40	40	16	16	16	16	16	40	40	16	16	16	16	16
Site Volume Used	4048	4048	34408	34408	34408	4048	4048	4048	4048	10120	10120	4048	4048	4048	4048	4048	10120	10120	4048	4048	4048	4048	4048	10120	10120	4048	4048	4048	4048	4048
Hauled to Discharge Tank	18000	18000	18000	18000		18000	18000	18000	18000			18000	18000	18000	18000				18000	18000						18000	18000			
Site Volume Available After Pumpout	83633	97585	81177	64769	30361	44313	58265	72217	86169	76049	65929	79881	93833	107785	121737	117689	107569	97449	111401	125353	121305	117257	113209	103089	92969	106921	120873	116825	112777	108729
Percent Volume Available	55.0%	64.2%	53.4%	42.6%	20.0%	29.1%	38.3%	47.5%	56.7%	50.0%	43.3%	52.5%	61.7%	70.9%	80.0%	77.4%	70.7%	64.1%	73.2%	82.4%	79.8%	77.1%	74.4%	67.8%	61.1%	70.3%	79.5%	76.8%	74.1%	71.5%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Day of Week	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**

September

October

October Occupancy (Sites)	24	24	16	16	16	16	16	40	40	40	16	16	16	16	24	24														
Site Volume Used	6072	6072	4048	4048	4048	4048	4048	10120	10120	10120	4048	4048	4048	4048	6072	6072	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauled to Discharge Tank			18000								18000	18000	18000				18000	18000	3200	3200										
Site Volume Available After Pumpout	102657	96585	110537	106489	102441	98393	94345	84225	74105	63985	77937	91889	105841	101793	95721	89649	107649	125649	128849	132049	132049	132049	132049	132049	132049	132049	132049	132049	132049	132049
Percent Volume Available	67.5%	63.5%	72.7%	70.0%	67.4%	64.7%	62.0%	55.4%	48.7%	42.1%	51.2%	60.4%	69.6%	66.9%	62.9%	58.9%	70.8%	82.6%	84.7%	86.8%	86.8%	86.8%	86.8%	86.8%	86.8%	86.8%	86.8%	86.8%	86.8%	86.8%
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Day of Week	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Monday**

October

STECKLEY Consulting Engineers Inc
Stephenfield Lake Resort OWMS

April

Date	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Cummulative Site Volume Used less Hauled	4048	10120	16192	20240	24288	28336	32384	36432	42504	48576	34624	38672	42720	46768	50816	54611
Daily Site Volume Used	4048	6072	6072	4048	4048	4048	4048	4048	6072	6072	4048	4048	4048	4048	4048	3795
Hauled to Discharge Tank	0	0	0	0	0	0	0	0	0	0	18000	0	0	0	0	0
Site Volume Available After Pumpout	148052	141980	135908	131860	127812	123764	119716	115668	109596	103524	117476	113428	109380	105332	101284	97489

May

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cummulative Site Volume Used less Hauled	64731	56851	48971	41091	33211	25331	45571	65811	57931	50051	42171	34291	26411	46651	66891	59011	51131	43251	35371	27491	55827	84163	112499	104619	96739	88859	80979	101219	121459	113579	105699
Daily Site Volume Used	10120	10120	10120	10120	10120	10120	20240	20240	10120	10120	10120	10120	10120	20240	20240	10120	10120	10120	10120	10120	28336	28336	28336	10120	10120	10120	10120	20240	20240	10120	10120
Hauled to Discharge Tank	0	18000	18000	18000	18000	18000	0	0	18000	18000	18000	18000	18000	0	0	18000	18000	18000	18000	18000	0	0	0	18000	18000	18000	18000	0	0	18000	18000
Site Volume Available After Pumpout	87369	95249	103129	111009	118889	126769	106529	86289	94169	102049	109929	117809	125689	105449	85209	93089	100969	108849	116729	124609	96273	67937	39601	47481	55361	63241	71121	50881	30641	38521	46401

June

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Cummulative Site Volume Used less Hauled	99843	93987	88131	108371	110611	104755	98899	93043	87187	81331	83571	85811	79955	74099	68243	62387	56531	58771	61011	55155	49299	43443	37587	31731	33971	36211	30355	24499	18643	12787
Daily Site Volume Used	12144	12144	12144	20240	20240	12144	12144	12144	12144	12144	20240	20240	12144	12144	12144	12144	12144	20240	20240	12144	12144	12144	12144	12144	20240	20240	12144	12144	12144	12144
Hauled to Discharge Tank	18000	18000	18000	0	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000
Site Volume Available After Pumpout	52257	58113	63969	43729	41489	47345	53201	59057	64913	70769	68529	66289	72145	78001	83857	89713	95569	93329	91089	96945	102801	108657	114513	120369	118129	115889	121745	127601	133457	139313

July

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cummulative Site Volume Used less Hauled	29195	45603	62011	62227	62443	62659	62875	63091	69379	75667	75883	76099	76315	76531	76747	83035	89323	89539	89755	89971	90187	90403	96691	102979	103195	103411	103627	103843	104059	110347	116635
Daily Site Volume Used	34408	34408	34408	18216	18216	18216	18216	18216	24288	24288	18216	18216	18216	18216	18216	24288	24288	18216	18216	18216	18216	18216	24288	24288	18216	18216	18216	18216	18216	24288	24288
Hauled to Discharge Tank	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000
Site Volume Available After Pumpout	122905	106497	90089	89873	89657	89441	89225	89009	82721	76433	76217	76001	75785	75569	75353	69065	62777	62561	62345	62129	61913	61697	55409	49121	48905	48689	48473	48257	48041	41753	35465

August

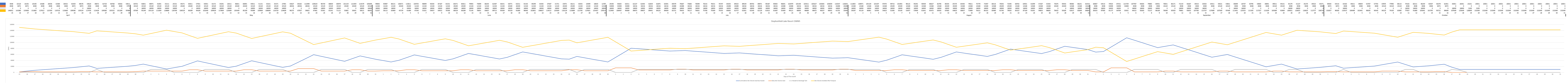
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cummulative Site Volume Used less Hauled	112803	108971	105139	101307	97475	99715	101955	98123	94291	90459	86627	82795	85035	87275	83443	79611	75779	71947	68115	70355	72595	68763	64931	61099	57267	53435	73675	93915	90083	86251	82419
Daily Site Volume Used	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168	14168	14168	20240	20240	14168	14168	14168
Hauled to Discharge Tank	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	0	0	18000	18000	18000
Site Volume Available After Pumpout	39297	43129	46961	50793	54625	52385	50145	53977	57809	61641	65473	69305	67065	64825	68657	72489	76321	80153	83985	81745	79505	83337	87169	91001	94833	98665	78425	58185	62017	65849	69681

September

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Cummulative Site Volume Used less Hauled	68467	54515	70923	87331	121739	107787	93835	79883	65931	76051	86171	72219	58267	44315	30363	34411	44531	54651	40699	26747	30795	34843	38891	49011	59131	45179	31227	35275	39323	43371
Daily Site Volume Used	4048	4048	34408	34408	34408	4048	4048	4048	4048	10120	10120	4048	4048	4048	4048	4048	10120	10120	4048	4048	4048	4048	4048	10120	10120	4048	4048	4048	4048	4048
Hauled to Discharge Tank	18000	18000	18000	18000	0	18000	18000	18000	18000	0	0	18000	18000	18000	18000	0	0	0	18000	18000	0	0	0	0	0	18000	18000	0	0	0
Site Volume Available After Pumpout	83633	97585	81177	64769	30361	44313	58265	72217	86169	76049	65929	79881	93833	107785	121737	117689	107569	97449	111401	125353	121305	117257	113209	103089	92969	106921	120873	116825	112777	108729

October

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cummulative Site Volume Used less Hauled	49443	55515	41563	45611	49659	53707	57755	67875	77995	88115	74163	60211	46259	50307	56379	62451	44451	26451	23251	20051	20051	20051	20051	20051	20051	20051	20051	20051	20051	20051	20051
Daily Site Volume Used	6072	6072	4048	4048	4048	4048	4048	10120	10120	10120	4048	4048	4048	4048	6072	6072	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hauled to Discharge Tank	0	0	18000	0	0	0	0	0	0	0	18000	18000	18000	0	0	0	18000	18000	3200	3200	0	0	0	0	0	0	0	0	0	0	0
Site Volume Available After Pumpout	102657	96585	110537	106489	102441	98393	94345	84225	74105	63985	77937	91889	105841	101793	95721	89649	107649	125649	128849	132049	132049	132049	132049	132049	132049	132049	132049	132049	132049	132049	132049



Appendix E

Soil Sample Classification

Farmers Edge Laboratories
1357 Dugald Road
Winnipeg, Manitoba Canada
R2J 0H3
Phone: 1 204 233 4099

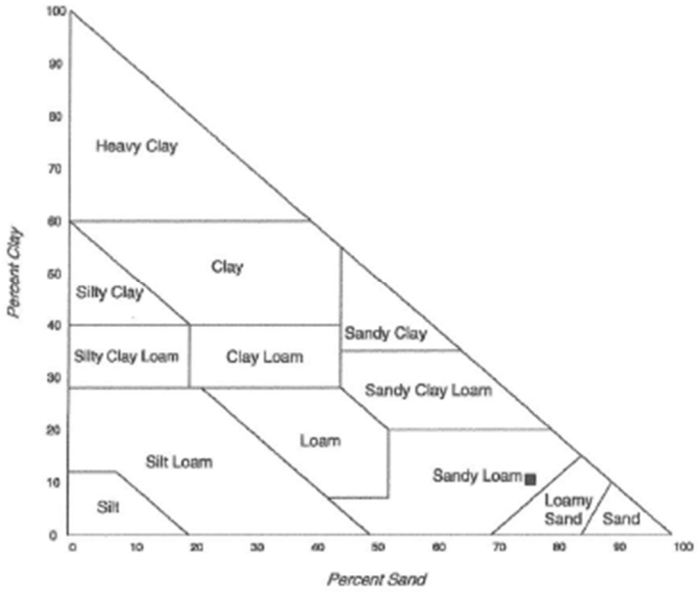
Soil Particle Size Report

Client: Cash Account - East
Address: Box 5023
St. Leon, MB R0G 2E0
Attn: Roy Toupin

Client: Stephenfield Resort
Sample ID: South #2
Sample Date: Jun 16, 2022

Lab Lot ID: 220616_011
Lab Sample ID: 220616_011-01
Matrix: Env Soil
Date Received: Jun 16, 2022
Date Reported: Jun 22, 2022

Parameter	Result	Units
% Gravel (>4.5mm)	0	%
% Sand (4.5mm - 0.075mm)	77.4	%
% Silt (0.075mm - 0.005mm)	12.6	%
% Clay (<0.005mm)	10	%
Texture	Sandy Loam	



[redacted]
Dmitri Ermak BSc.
Lab Manager

Analysis performed by and particle size classes determined according to test method ASTM D 422 - 63.
Texture class and triangle plot determined by using clay fractions and combined sand and gravel fractions.

June 22, 2022 Page 1 of 1

Farmers Edge Laboratories
1357 Dugald Road
Winnipeg, Manitoba Canada
R2J 0H3
Phone: 1 204 233 4099

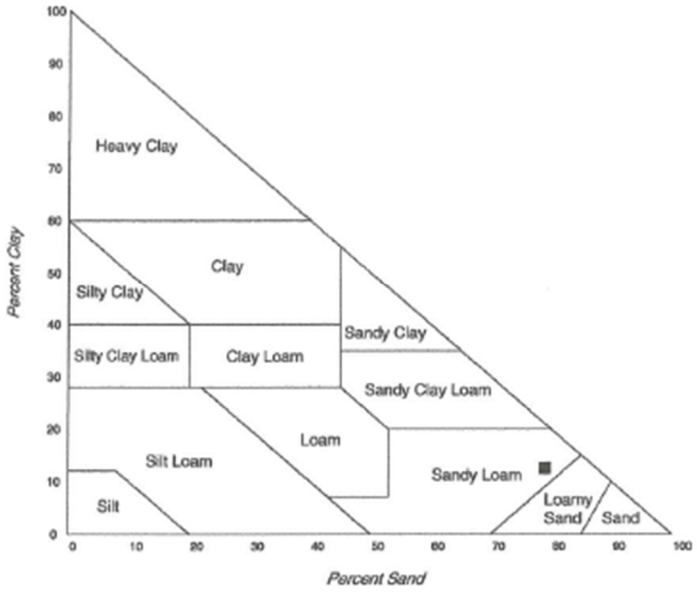
Soil Particle Size Report

Client: Cash Account - East
Address: Box 5023
St. Leon, MB R0G 2E0
Attn: Roy Toupin

Client: Stephenfield Resort
Sample ID: North #1
Sample Date: Jun 16, 2022

Lab Lot ID: 220616_010
Lab Sample ID: 220616_010-01
Matrix: Env Soil
Date Received: Jun 16, 2022
Date Reported: Jun 22, 2022

Parameter	Result	Units
% Gravel (>4.5mm)	0	%
% Sand (4.5mm - 0.075mm)	79.9	%
% Silt (0.075mm - 0.005mm)	8.1	%
% Clay (<0.005mm)	12	%
Texture	Sandy Loam	



[redacted]
Dmitri Ermak BSc.
Lab Manager

Analysis performed by and particle size classes determined according to test method ASTM D 422 - 63.
Texture class and triangle plot determined by using clay fractions and combined sand and gravel fractions.

June 22, 2022 Page 1 of 1

Appendix F

Sand Treatment Mound Design Work Sheet

Sand Treatment Mound Design – Worksheet (page 1 of 7)

Treatment Mound: Area Sizing

This form is to be completed and submitted with the OWMS application to register form.

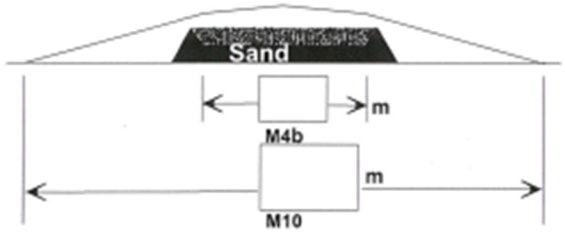
This worksheet is for use in Manitoba to: size the sand layer, mound base area, and berm dimensions as required in the construction of a treatment mound. **It can be used for:** design of a treatment mound.

Use only metric units of measurement throughout (cm, metres, litres)

Use the following Worksheet to determine the minimum required dimensions for a treatment mound and fill in the blanks on the appropriate diagram below for a level site or a sloping site of over 1%.

Treatment Mound Dimensions

Level

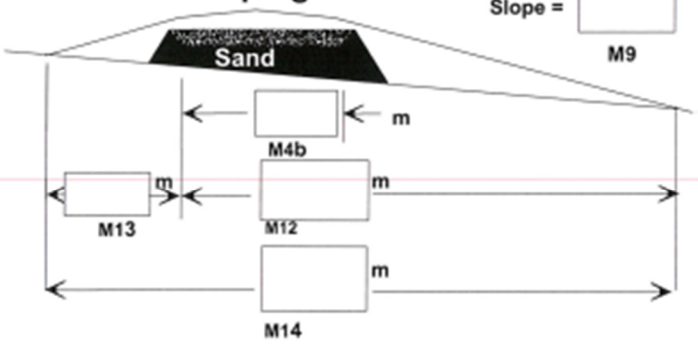


Sand Layer Length (m)	41.72
Overall Length of Mound (m)	51.00

For ARC 36 chambers

Sloping Site

Slope = M9



Manitoba Sand Treatment Mound Design Worksheet
January 2009, revised April 2010

Page 1

Sand Treatment Mound Design – Worksheet (page 2 of 7)

Treatment Mound: Area Sizing

The completed installation is to comply with MR 83/2003

STEP 1: Determine the expected volume of sewage per day:

Note: Use Manitoba Minimum Expected Volume of Sewage Per Day as a guide to determine expected volume of sewage per day. Provide allowance for additional load factors.

Assure that the sewage strength does not exceed the requirements of Residential Strength Sewage.

Expected Volume of Sewage per Day	
6,000 L/day.	M1

STEP 2: Calculate the treatment area of the sand layer:

Expected Volume of Sewage per Day		Sand Layer Effluent Loading Rate		Treatment Area Required for Sand Layer	
6,000 L/day.	÷	50 L/m² per day	=	120 m	M2

*From **M1** this worksheet*

STEP 3: Determine the minimum allowable sand layer area:

Minimum Sand Layer Area		Area of Sand Layer for Treatment		Area of Sand Layer	
37.16 m²	or	120 m²		120 m²	M3
The minimum area of the sand layer Is 37.16 m².		*From **M2** this worksheet*		*The greater of 37.16 or **M2***	

STEP 4: Calculate the length of the sand layer:

Area of Sand Layer		Width of Sand Layer		Length of Sand Layer	
120 m²	÷	3.0 m	=	40.0 m	M4
M4a *From **M3** this worksheet*		**M4b** *Select a width to a maximum of 3 metres.*			

Note: The width of the sand layer will influence the total width of the treatment mound and the amount of fill material required. The lowest cost configuration is often to make the sand layer as wide as allowed, however, on sloping sites, a narrower and longer sand layer design can reduce the amount of fill required.

Sand Treatment Mound Design – Worksheet (page 3 of 7)

Treatment Mound: Area Sizing

The completed installation is to comply with MR 83/2003

STEP 5: Determine the (design) soil effluent loading rate:

Note: Effluent loading rate can be determined from soil texture classification **or** from percolation test results.

Attachment 1 provides the effluent loading rates for various soil classifications between 5 and 120 minute per inch perc rates.

Soil Effluent Loading Rate	
22.02 L/m² per day	M5

STEP 6: Calculate the preliminary infiltration area of the soil BEFORE area reduction factors:

Expected Volume of Sewage per Day		Soil Effluent Loading Rate		Primary Infiltration Area	
6,000 L/day.	÷	22.02 L/m² per day.	=	272.5 m²	M6
*From **M1** this worksheet*		*From **M5** this worksheet*		*(Required for Soil. Before Reduction Factors.)*	

STEP 7: Calculate the required infiltration area INCLUDING allowed area reduction factors:

Infiltration Area Required for Soil		Reduced Area Factor		Required Infiltration Area	
272.5 m²	X	0.75	=	204.4 m²	M7
*(Before Reduction Factors.) From **M6** this worksheet*		*A reduction of up to 25% (0.75) can be applied to treatment Mounds.*		*(Including Reduction Factors.)*	

SDS Design – Worksheet "M" v1.3 (page 4 of 7)

Treatment Mound: Area Sizing

The completed installation is to comply with MR 83/2003

STEP 8: Calculate the required width of the infiltration area:

Required Infiltration Area		Length of Sand Layer		Width of Required Infiltration Area		
204.4 m²	÷	40.0 m	=	5.11 m		M8
*(Including Reduction Factors.) From **M7** this worksheet*		*From **M4** this worksheet*				

STEP 9: Determine the slope criteria of the installation:

If the slope of the installation site exceeds 1%, proceed to Step 12.
If the slope is 1% or less, proceed to Step 10.

Slope of Installation Site: 0 % **M9**

Note: The following calculations apply ONLY to the minimum height configuration of a mound unless a value is entered above. If it is necessary to raise the sand layer, (for example to provide clearance to the water table) the following calculations are NOT adequate for the design.

For slopes of 1% or less, use **STEPS 10 - 11**

STEP 10: Calculate the required infiltration area INCLUDING allowed area reduction factors:

Toe to Toe Width Based on 4:1 Slope Requirement		Width of Required Infiltration Area within Berms		Toe to Toe Width of Mound	
12.13 m	or	5.11 m	=	12.13 m	M10
M10a *4:1 Slope Requirement Refer to Berm Dimensions Diagram this worksheet, or determine by calculation*		**M10b** *From **M8** this worksheet*		*The greater of **M10a** or **M10b***	

STEP 11: Proceed to STEP 16:

STEPS 12-15 are used only for installations where the slope exceeds 1%

STEP 15: **Proceed to STEP 16:**

Sand Treatment Mound Design – Worksheet (page 6 of 7)

Treatment Mound: Area Sizing

The completed installation is to comply with the MR 83/2003

STEP 16: **Summerize the information:**

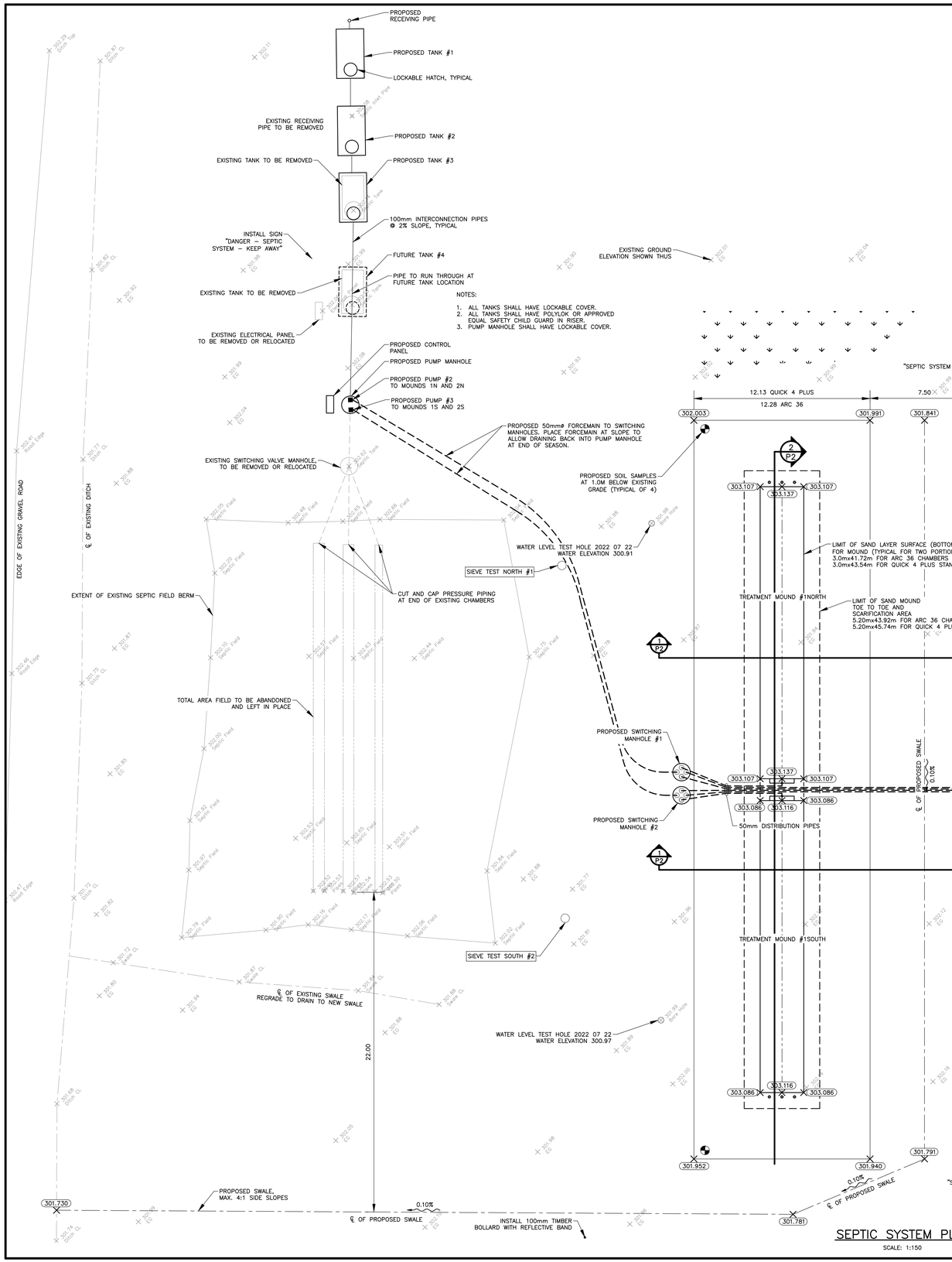
Width of Sand Layer	(from **M4b** this worksheet)	3.0	m
Length of Sand Layer	(from **M4** this worksheet)	40.0	m
Slope of Installation Site	(from **M9** this worksheet)	0	%
Toe to Toe Width of Mound	(from **M10** or **M14** this worksheet)	12.13	m

STEP 17: **Proceed to STEP 16:**

Fill in the appropriate diagram on the first page with the numbers calculated in this worksheet.

STEP 18: **Proceed to STEP 16:**

This worksheet does NOT consider all the requirements of the Manditory Standard.
Please work safely and follow safe practices near trenches and open excavations.

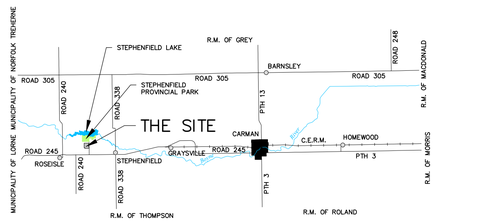


SEPTIC SYSTEM PLAN

SCALE: 1:150

KEY PLAN

SCALE: NTS



LOCATION PLAN

SCALE: NTS

6	ENVIRONMENTAL ACT SUBMISSION	2023 04 17
REVISION	ISSUED FOR	DATE

STECKLEY
CONSULTING ENGINEERS INC.
1-915 Navigator Road Winkler, MB R6W 0L7
Tel: 204.325.5114
ksteckley@steckley.ca
Fax: 204.325.0618

[redacted]

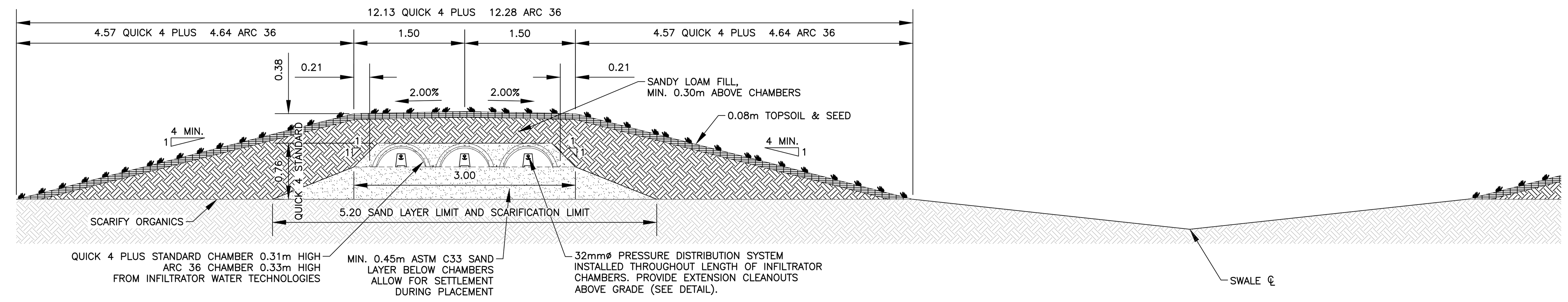
CLIENT

STEPHENFIELD LAKE RESORT
SEPTIC SYSTEM MODIFICATIONS

TITLE

SEPTIC SYSTEM PLAN, KEY PLAN & LOCATION PLAN

FIELD BOOK	DATE	DRAWN	DWG. NO.
N/A	2022 09 30	W.M.	22E12–P1
DESIGN	CHECKED	SHEET	
K.B.S.	K.B.S.	1 OF 3	

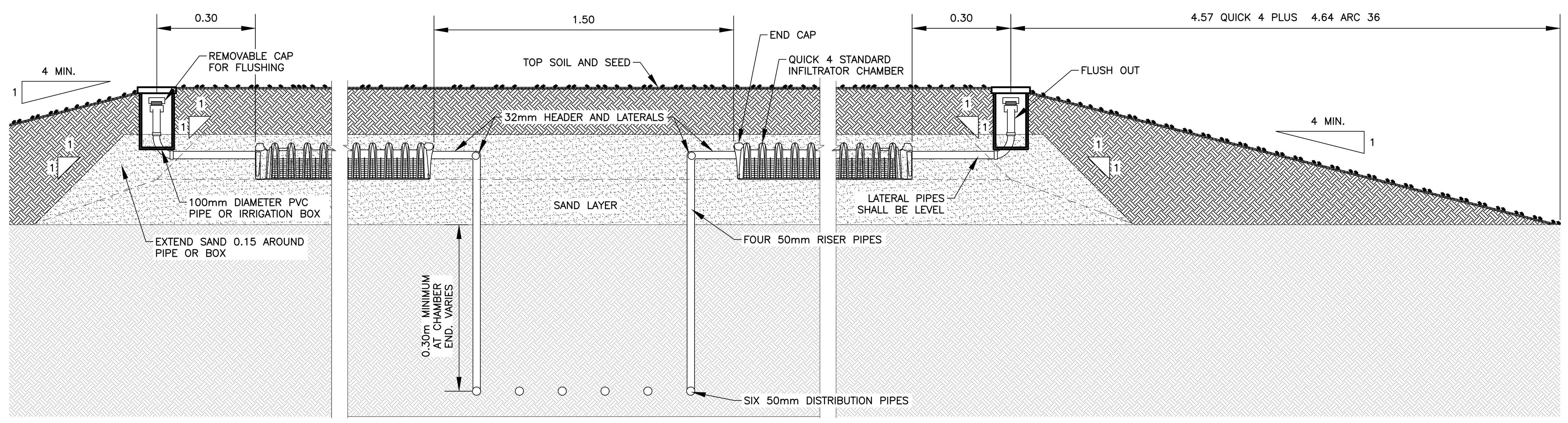


1/P2 TYPICAL MOUND CROSS-SECTION

SCALE: 1:50

NOTES:

1. SCARIFY TO A DEPTH OF 0.18m TO 0.20m
2. ALL PIPES SHALL BE PVC 40, PVC SDR 41, PE DR17, OR HDPE DR17



2/P2 CHAMBER CLEANOUT DETAIL

SCALE: NTS

MOUND SITE PREPARATION AND INSTALLATION

1) CHECK THE MOISTURE CONTENT OF THE SOIL AT 0.20m DEPTH. IF IT IS TOO WET, SMEARING AND COMPACTION WILL RESULT, REDUCING THE INFILTRATION CAPACITY OF THE SOIL. SOIL MOISTURE CAN BE DETERMINED BY ROLLING A SOIL SAMPLE BETWEEN THE HANDS. IF IT ROLLS INTO A WIRE, THE SITE IS TOO WET TO PREPARE. IF IT CRUMBLES, SITE PREPARATION CAN PROCEED.

2) STAKE OUT THE MOUND AREA ON THE SITE ACCORDING TO THE SYSTEM DESIGN. REFERENCE STAKE OFFSET FROM THE CORNER STAKES ARE RECOMMENDED IN CASE CORNER STAKES ARE DISTRIBUTED DURING CONSTRUCTION.

3) MEASURE THE AVERAGE GROUND ELEVATION ALONG THE HIGHER EDGE OF THE BED AND REFERENCE THIS TO A BENCHMARK FOR FUTURE USE. THIS IS USED TO DETERMINE THE BOTTOM ELEVATION OF THE BED.

4) DETERMINE WHERE THE DISTRIBUTION PIPES FROM THE SWITCHING MANHOLE CONNECT TO THE DISTRIBUTION SYSTEM IN THE FILTER MEDIA FOR EACH OF THE NORTH AND SOUTH PORTION OF MOUNDS.

5) TRENCH AND LAY THE FORCEMAIN PIPES FROM THE PUMP CHAMBER TO THE SWITCHING MANHOLES AND THE DISTRIBUTION PIPES FROM THE SWITCHING MANHOLE TO INLINE WITH THE CENTRE OF THE HEADER LOCATION FOR EACH MOUND SECTION. CUT AND CAP 0.30m BENEATH THE EXISTING GROUND SURFACE. LAY DISTRIBUTION PIPE AND FORCEMAIN PIPES SLOPING UNIFORMLY BACK TO THE PUMP MANHOLE AND PUMP CHAMBER RESPECTIVELY SO THAT THEY DRAIN AFTER DOSING OR CAN BE EASILY BLOWN OUT IN PREPARATION FOR FALL SHUTDOWN.

6) BACKFILL AND COMPACT THE SOIL AROUND THE PIPES TO PREVENT EFFLUENT SEEPING BACK ALONG THE PIPE. BACKFILL AROUND THE PIPE BEFORE PLOWING, TO AVOID COMPACTING AND DISTRIBUTING OF THE GROUND SURFACE.

7) PREPARE THE AREA UNDER THE SAND LAYER IN THE EXISTING CULTIVATED FIELD USING A SPRING–LOADED AGRICULTURAL CHISEL PLOW AND PLOWING PARALLEL TO THE CHAMBER RUNS. IF THERE IS A COMPACTED SOIL LAYER SUCH AS A PLOW PAN, CONSULT ENGINEER AS DEEP RIPPING TO LOOSEN THIS LAYER MAY BE REQUIRED. THE FUNCTION OF THIS PREPARATION IS TO PROVIDE A CLEARED GROUND SURFACE WITH A SERIES OF VERTICAL CHANNELS TO ENHANCE TRANSFER OF MOISTURE FROM THE SAND FILL TO THE ORIGINAL SOIL, WHILE INHIBITING LATERAL MOVEMENT AT THE SAND–SOIL INTERFACE. IN ADDITION, THE VERTICAL FURROWS AID IN STABILIZING THE SAND AT THE SAND–SOIL INTERFACE IN AN INTERLOCKING FASHION. THIS SITE SHOULD BE PLOWED USING A SPRING–LOADED AGRICULTURAL CHISEL PLOW, OTHER ACCEPTABLE APPARATUS OR METHOD TO PREPARE THE SOIL BEFORE CONSTRUCTING THE MOUND SYSTEM. ROTOTILLING IS NOT AN ACCEPTABLE SUBSTITUTE. DO NOT COMPACT THE INFILTRATIVE AREA. THE IMPORTANT POINT IS THAT A ROUGH, UN–SMEARED SURFACE SHOULD BE LEFT. CAREFUL OBSERVATION IS REQUIRED TO ASSURE THAT THE SOIL MOISTURE CONTENT IS NOT SO HIGH THAT THE SOIL SURFACE IS SMEARED BY THE ACTION OF THE PLOW. PLOWING SHOULD NOT PROCEED UNTIL THE SOIL IS SUFFICIENTLY DRY SO AS NOT TO SMEAR IN THE PLOWING PROCESS. IMMEDIATE CONSTRUCTION AFTER PLOWING IS DESIRABLE. AVOID RUTTING AND COMPACTION OF THE PLOWED AREA BY TRAFFIC. IF IT RAINS AFTER THE PLOWING IS COMPLETED, WAIT UNTIL THE SOIL DRIES OUT BEFORE CONTINUING CONSTRUCTION.

8) RESET THE CORNER STAKES, IF NECESSARY, USING THE OFFSET REFERENCE STAKES AND LOCATE THE BED OR TRENCH AREAS BY STAKING THEIR BOUNDARIES.

9) EXTEND THE ENDS OF THE DISTRIBUTION PIPES FROM THE PUMP CHAMBER (WITH THE EXCEPTION OF THE FUTURE MOUND #3 PIPES) WHICH HAD PREVIOUSLY BEEN CUT OFF TO SEVERAL FEET ABOVE THE GROUND SURFACE.

10) INSTALL THE TWO MONITORING WELLS. USE REBAR TO STABILIZE THE PIPE. PLACE GRAVEL AROUND THE PERFORATIONS. PLACE MONITORING WELLS WITH THE BOTTOM AT THE ORIGINAL GROUND SURFACE, AT THE TOP EXTENDING ABOVE FINAL GRADE WHERE IT CAN BE FITTED WITH A REMOVABLE CAP. THE MAINTENANCE PROVIDER CAN USE THESE OBSERVE WATER LEVELS.

11) PLACE THE ASTM C33 SAND AROUND THE EDGE OF THE PLOWED AREA. KEEP THE WHEELS OF TRUCKS OFF PLOWED AREAS WHICH ARE UNDER THE AREA TO RECEIVE SAND. MINIMIZE TRAFFIC IN THE BERM AREA OF THE MOUND SYSTEM. WORK FROM THE ENDS OF THE MOUNDS. THIS WILL AVOID COMPACTING THE SOILS IN THE BERM AREAS, WHICH, IF COMPACTED, WOULD AFFECT LATERAL MOVEMENT AWAY FROM THE MOUND AND POSSIBLY CAUSE SURFACE SEEPAGE AT THE TOE OF THE MOUND.

12) MOVE THE FILTER MEDIA INTO PLACE USING A SMALL TRACK–TYPE TRACTOR WITH BLADE, AN EXCAVATOR, OR A SLINGER. DO NOT USE A TRACTOR/BACKHOE HAVING RUBBER–TIRED WHEELS. ALWAYS KEEP A MINIMUM OF 150mm OF FILTER MEDIA BENEATH TRACKS TO PREVENT COMPACTION OF THE NATURAL SOIL. ENSURE PLACED SAND IS SETTLED TO A UNIFORM DENSITY BUT DO NOT OVER COMPACT THE SAND.

13) PLACE THE FILTER MEDIA TO THE TOP OF THE BED. SHAPE SIDES TO THE REQUIRED SLOPE.

14) WITH THE BLADE OF THE TRACTOR, FORM THE INFILTRATION BED. HAND LEVEL THE SAND WHICH IS AT THE LEVEL OF THE BOTTOM OF THE CHAMBERS TO WITHIN 12mm. FINAL LEVEL IS SET BY THE HIGH END OF THE EXISTING GROUND SURFACE.

15) PLACE THE DISTRIBUTION PIPES ON THE SAND BED AND CONNECT THE NORTH AND SOUTH MANIFOLDS TO THEIR PREVIOUSLY CAPPED DISTRIBUTION PIPE. PLACE THE HEADER MANIFOLD PIPE THROUGH A CHAMBER END CAP AND LAY LATERALS COMPLETE WITH CLEANOUTS LEVEL ON CHAIRS, REMOVING RISES AND DIPS.

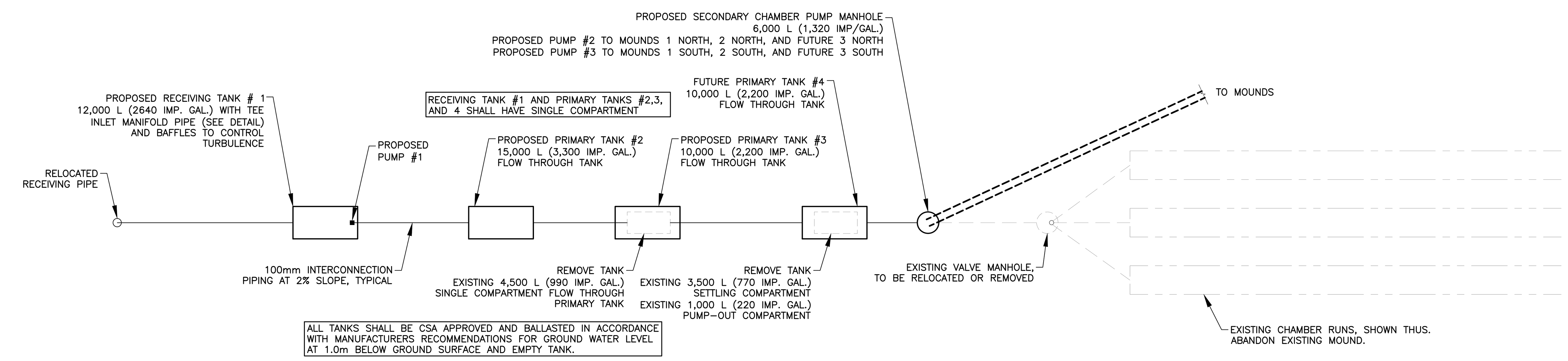
16) PRESSURE TEST THE DISTRIBUTION SYSTEM IN NORTH AND SOUTH PORTIONS OF EACH MOUND FOR UNIFORM SQUIRT OF 1.5m.

17) PLACE SAND FROM 0.30m BEYOND AT THE BASE OF THE CHAMBER SLOPED UP AT 1:1 TO TOP OF CHAMBERS ON SIDES AND ENDS. TOP OF SAND TO BE LEVEL BETWEEN NORTH AND SOUTH PORTIONS OF MOUNDS. BED BOTTOM OF THE CLEAN OUT ELBOW TO 150mm ABOVE AND 150mm BELOW IN SAND, OR TO BOTTOM OF IRRIGATION BOX, IF USED.

18) PLACE THE SOIL FOR THE BERM. THIS SHALL BE SANDY LOAM. PLACE SOIL AT A DEPTH OF 0.30m OVER THE TOP OF THE CHAMBERS IN LINE WITH THE 3.0m WIDE EDGE OF THE SAND LAYER SLOPED UP TO THE CENTRE AT 2%. THIS CREATES A SLOPE THAT ASSISTS THE SURFACE RUN–OFF OF PRECIPITATION. ALSO, THIS LAYER PROVIDES SOME FROST PROTECTION. DO NOT DRIVE OVER THE TOP OF THE BED AS THE DISTRIBUTION SYSTEM MAY BE DAMAGED. USE SANDY LOAM FOR BERM WHICH WILL ENSURE OXYGEN CAN GET IN. FINAL GRADE SLOPES TO 4 HORIZONTAL TO 1 VERTICAL TO TOE OF BERM TO ENSURE POSITIVE DRAINAGE FROM MOUND SURFACE AND A SLOPE WHICH CAN BE MAINTAINED WHEN CUTTING GRASS COVER.

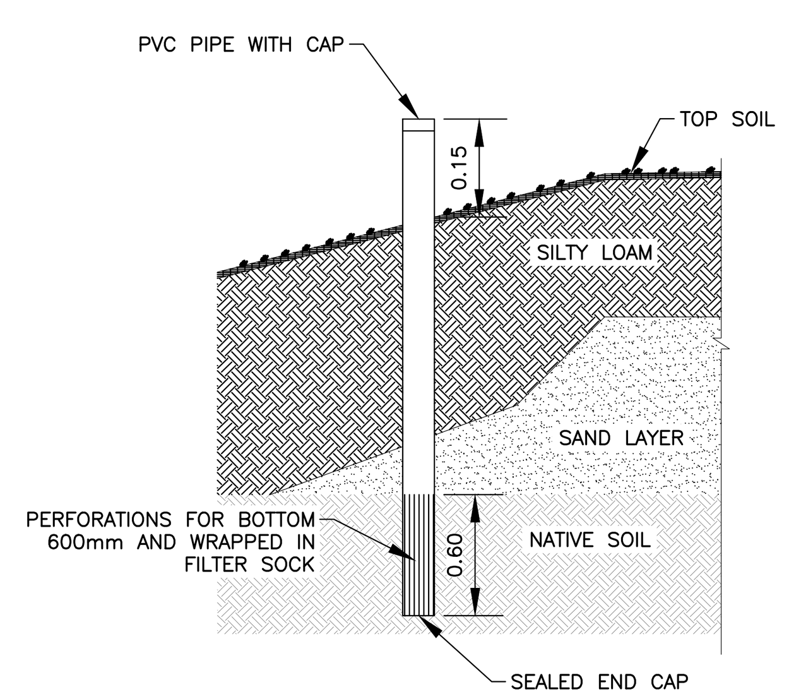
19) TOPSOIL THE MOUND TO A THICKNESS OF 0.08m AND SEED INCLUDING TO 7.5m BEYOND THE TOE OF EACH MOUND ON ALL SIDES TO ENHANCE EVAPOTRANSPIRATION.

20) PROTECT THE RECEIVING AREA WHICH IS 7.5m FROM THE TOE OF THE MOUNDS AGAINST DISTURBANCE AND COMPACTION.



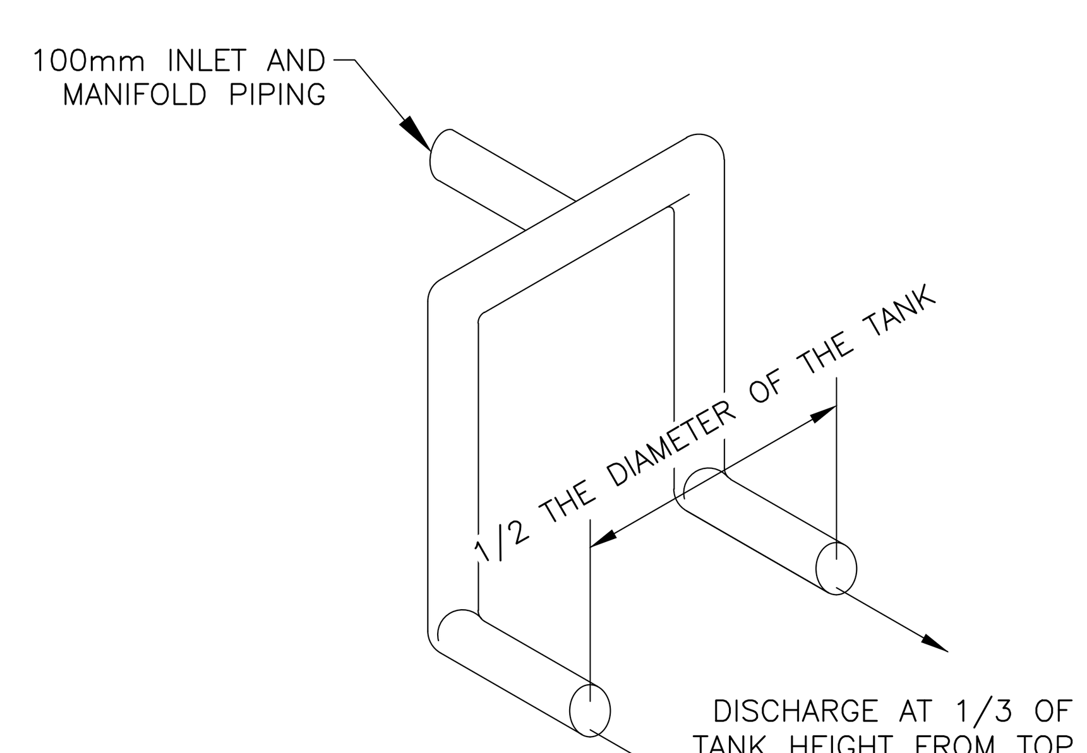
SEPTIC SYSTEM SCHEMATIC PLAN

SCALE: NTS



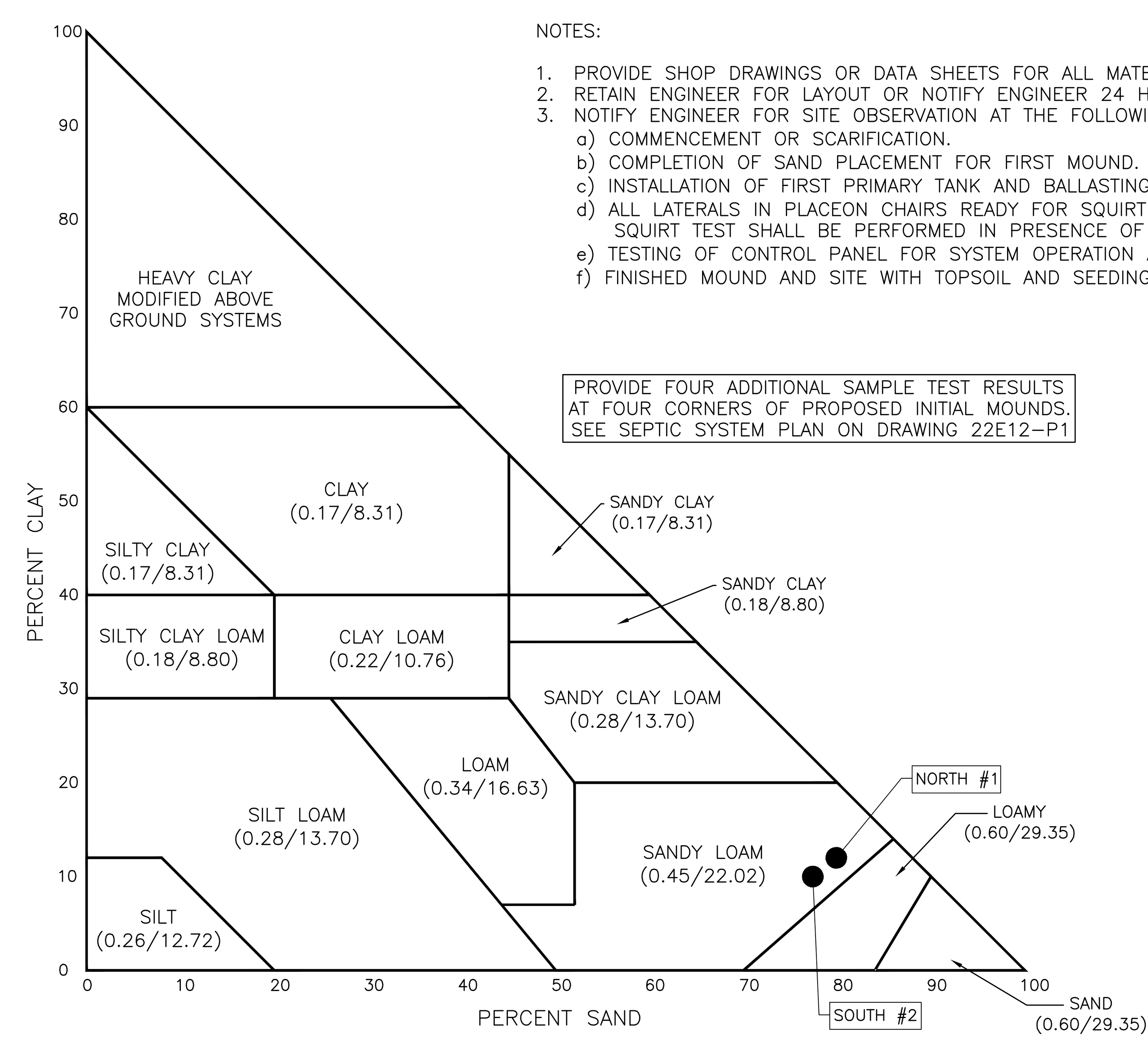
GROUND MONITORING WELL DETAIL

SCALE: NTS



RECEIVING TANK INLET TEE MANIFOLD

SCALE: NTS



NOTES:

1. PROVIDE SHOP DRAWINGS OR DATA SHEETS FOR ALL MATERILAS FOR REVIEW BY ENGINEER.
2. RETAIN ENGINEER FOR LAYOUT OR NOTIFY ENGINEER 24 HOURS PRIOR TO LAYOUT FOR SITE OBSERVATION.
3. NOTIFY ENGINEER FOR SITE OBSERVATION AT THE FOLLOWING STAGES:
   a) COMMENCEMENT OR SCARIFICATION.
   b) COMPLETION OF SAND PLACEMENT FOR FIRST MOUND.
   c) INSTALLATION OF FIRST PRIMARY TANK AND BALLASTING.
   d) ALL LATERALS IN PLACEON CHAIRS READY FOR SQUIRT TEST OF EACH PORTION OF BOTH MOUNDS. SQUIRT TEST SHALL BE PERFORMED IN PRESENCE OF MB CONSERVATION OFFICER.
   e) TESTING OF CONTROL PANEL FOR SYSTEM OPERATION AND RECORDING OF DATA.
   f) FINISHED MOUND AND SITE WITH TOPSOIL AND SEEDING COMPLETED.

NOTE:
(0.45/22.02) – INDICATES APPLICATION RATES: GALLONS PER DAY PER SQUARE FOOT/LITRES PER DAY PER SQUARE METERS

SIEVE TESTS

SCALE: NTS

REVISION	ISSUED FOR	DATE
6	ENVIRONMENTAL ACT SUBMISSION	2023 04 17

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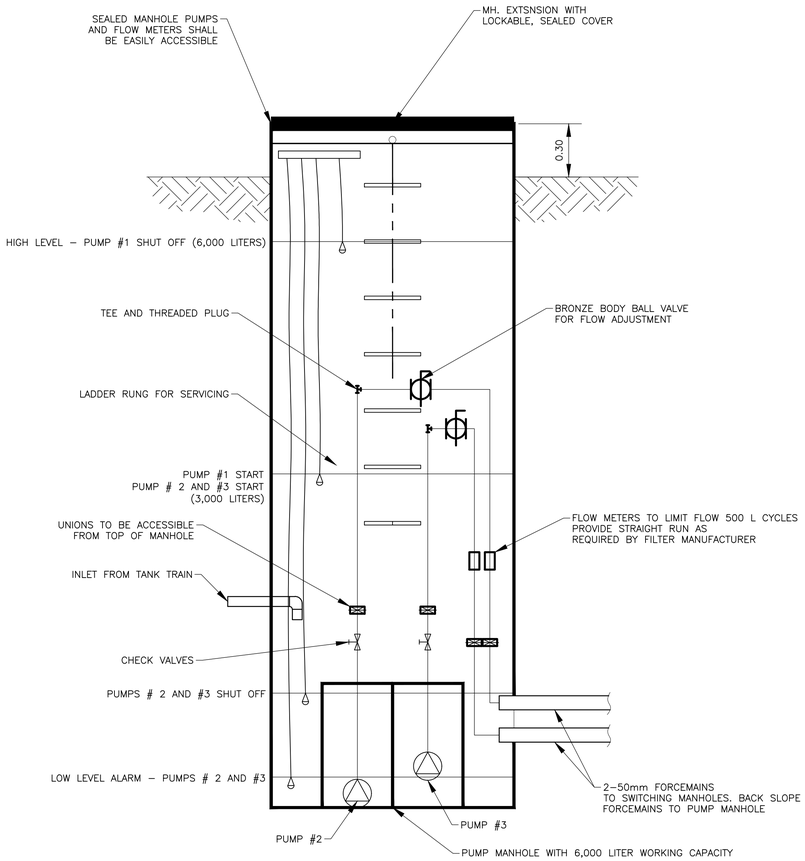
[redacted]

CLIENT
STEPHENFIELD LAKE RESORT
SEPTIC FIELD MODIFICATIONS

TITLE
SEPTIC SYSTEM SCHEMATIC PLAN, DETAILS & NOTES

FIELD BOOK	DATE	DRAWN	DWG. NO.
N/A	2022 09 30	W.M.	22E12–P2
DESIGN: K.B.S.	CHECKED: K.B.S.	SHEET: 2 OF 3	

PLOT SIZE: 36" x 24"
M:\E Other\2022\22E12 – Toupin Plumbing & Heating, Stephenfield Resort Septic System\22E12 – Acad Data\22E12 – R6.dwg Apr 17, 2023 17:04:29

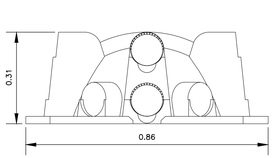


PUMP MANHOLE DETAIL

SCALE: NTS

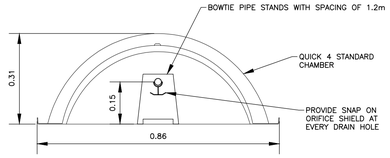
DRAWING NOTES:

1. UNIONS TO BE ACCESSIBLE FROM TOP OF MANHOLE.
2. PUMPED SANITARY LINES TO SEPTIC FIELD. REFER TO ALL PLANS. PROVIDE 3M COVER ON PIPES.
3. VALVE TO BE INSIDE MANHOLE.



CHAMBER END CAP VIEW

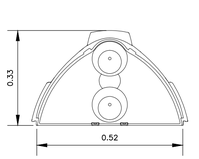
SCALE: NTS



CHAMBER SECTION

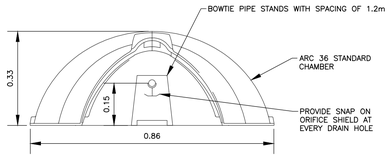
SCALE: NTS

QUICK 4 PLUS STANDARD CHAMBER



CHAMBER END CAP VIEW

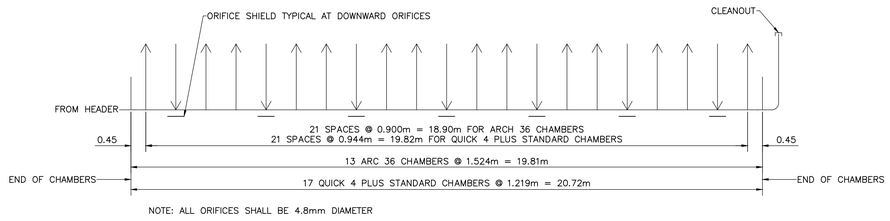
SCALE: NTS



CHAMBER SECTION

SCALE: NTS

ARC 36 STANDARD CHAMBER



NOTE: ALL ORIFICES SHALL BE 4.8mm DIAMETER

TYPICAL LATERAL ORIFICE SPACING

SCALE: NTS

6	ENVIRONMENTAL ACT SUBMISSION	2023 04 17
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STEPHENFIELD LAKE RESORT

SEPTIC FIELD MODIFICATIONS

TITLE

PUMP MANHOLE, CHAMBER, AND ORIFICE DETAILS

FIELD BOOK	DATE	DRAWN	DWG. NO.
N/A	2022 09 30	W.M.	22E12–P3
DESIGN	CHECKED	SHEET	
K.B.S.	K.B.S.	3 OF 3	