

Sewage System Design Only

Refer to Owner's site and grading plan for detailed overall site grading, except in the area of the septic system, as detailed here-in.

Note:

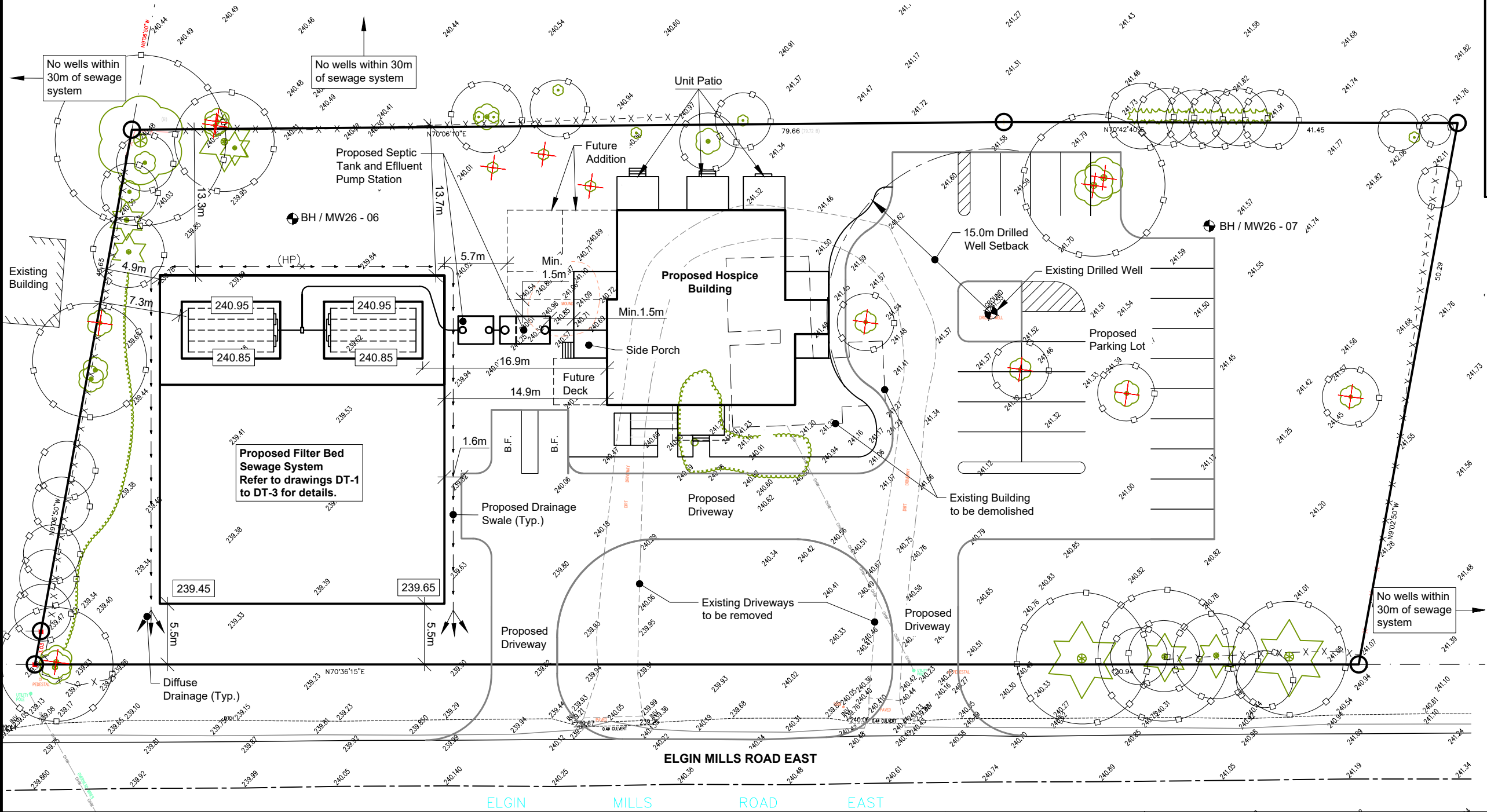
1. All services including sewer, water, hydro, cable, telephone, and gas should be staked out prior to construction and appropriate pre-cautions taken to protect the existing services.
2. Soil and groundwater conditions may be variable across the site. If soil and underground water conditions, other than those used to prepare this design, are encountered during the installation, Gunnell Engineering Ltd. should be contacted to determine the effect on the proposed sewage system.
3. Contractor to verify location of neighbouring wells, if any, prior to septic system installation. Any conflict between wells and septic system, i.e. less than 30 metre clearance, should be discussed with Gunnell Engineering Ltd. prior to septic system installation.

Notes:

1. All landscaped areas to be reinstated with 150mm topsoil and sod or seed, except septic field to be provided with 200/300mm of topsoil & be sodded.
2. Existing elevations as noted, ie. 221.84
3. Proposed swale elevations as noted, ie. (221.95)
4. Proposed elevations as noted, ie. 220.40
5. Existing slopes shown, ie. (2.2%)
6. Maintain maximum slopes at 3 horizontal to 1 vertical, except slopes to be maximum 4:1 at septic field.
7. Provide new swales as detailed.
8. All site grading to be in accordance with OBC & the City of Markham.

Note:

It is understood from the owner that there will not be any strong medications use for the Hospice patients.



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LEGEND

-  Tree Identified for Removal
-  Tree Protection Fencing

Rev. No.	Date	Description	CAD
Rev. 1	15-JUN-2026	Site Plan Update	DB

Proposed Hospice
7672 Elgin Mills Rd E
City of Markham

Part Site & Grading Plan
Sewage System Design

Scale: 1:400	Designed By: DB
Date: 05-JUN-2026	Drawn By: DB
Project No.:	Checked By: EG
	Drawing No.:

D3920 **SP-1**

Note: Pump tank to be provided with high level alarm. Locate control panel & alarm on building wall.

Electrical Note: Pump and control panel / alarm, to be installed on separate electrical circuits

ELEVATIONS: FILTER BED @ PIPE	
Base cut:	239.20
Top of imported septic sand:	236.60
Top of Filter Medium:	240.35
Pipe invert at header:	240.50
Top of stone:	240.65
Top of Landscaping:	Varies 240.85 to 240.95

All distribution piping to be a minimum of:
- 17.8m from drilled wells
- 32.8m from dug wells
- 5.8m from property lines
- 7.8m from residence

Note: Top of septic field raised 1.4m above existing grades. Therefore increase setbacks by 2.8m to the distribution piping

Sewage System Details: Class IV Filter Bed Sewage System Ontario Building Code Compliance Analysis

Daily Design Sewage Flow Assessment:

Proposed Hospice : 3,750 L/Day (3 Patient / Hospice rooms + 2 Future Patient / Hospice rooms @ 750 L/Day per bed)[Based on Hospitals (per bed with laundry facilities) : OBC Table 8.2.1.3.B]
 $Q_1 = 3,750 \text{ L/Day}$
* No medication use (i.e chemotherapy medications)
* 2 Future bedrooms as contingency

Office Use: - 5 employees @ 75 L/Day = 375 L/Day
 $Q_2 = 375 \text{ L/Day}$

$Q_{TOT} = 4,200 \text{ L / day rounded } (Q_1 + Q_2 = 4,125 \text{ L/Day})$ - Daily Design Sewage Flow

Septic Tank: $[3 \times Q = 3 \times 4,125 \text{ L/day}] = 12,600 \text{ L}$. Provide 13,500 L (3,000 gal.), two-compartment septic concrete tank, with effluent filter and gravity-flow to Pump Station

Pump Station: Provide pump tank = 7,000 L (1,550 gal.), c/w timed dosing to Filter Bed.

Soil Percolation: $T = 50 \text{ min/cm}$. Test pit investigation carried out by Gunnell Engineering Ltd. on March 23, 2026 identified silty clay soils.

Filter Bed (based on $Q_{TOT} = 4,200 \text{ L/day}$ and $T = 50 \text{ min/cm}$):
Filter Area: Maximum loading = 50 L/m^2 (i.e.: $3,000 < Q \leq 5,000 \text{ L/day}$); $4,200 / 50 = 84.0\text{m}^2$. Provide Filter Medium Area: 93.6m^2 $[(5.2\text{m} \times 9.0\text{m}) \times 2 \text{ Pods}]$

Base of Filter Medium, extending 300mm thickness, over Area = $Q_{TOT} \times T / 850 = 4,200 \times 50 / 850 = 247.1\text{m}^2$. Provide Extended Base Contact area = 260.0m^2 $(10.0\text{m} \times 26.0\text{m})$.

Loading Requirements - Reference: Table 8.7.4.1.A
Based on a loading rate of $6 \text{ L/m}^2\text{/day}$ (i.e. $35 < T \leq 50$): Area = $4,200 / 6 = 700.0\text{m}^2$. Provide Loading Area = 780.0m^2 $(26.0\text{m} \times 30.0\text{m})$

Mantle - 22.4m, extending from stone layer.

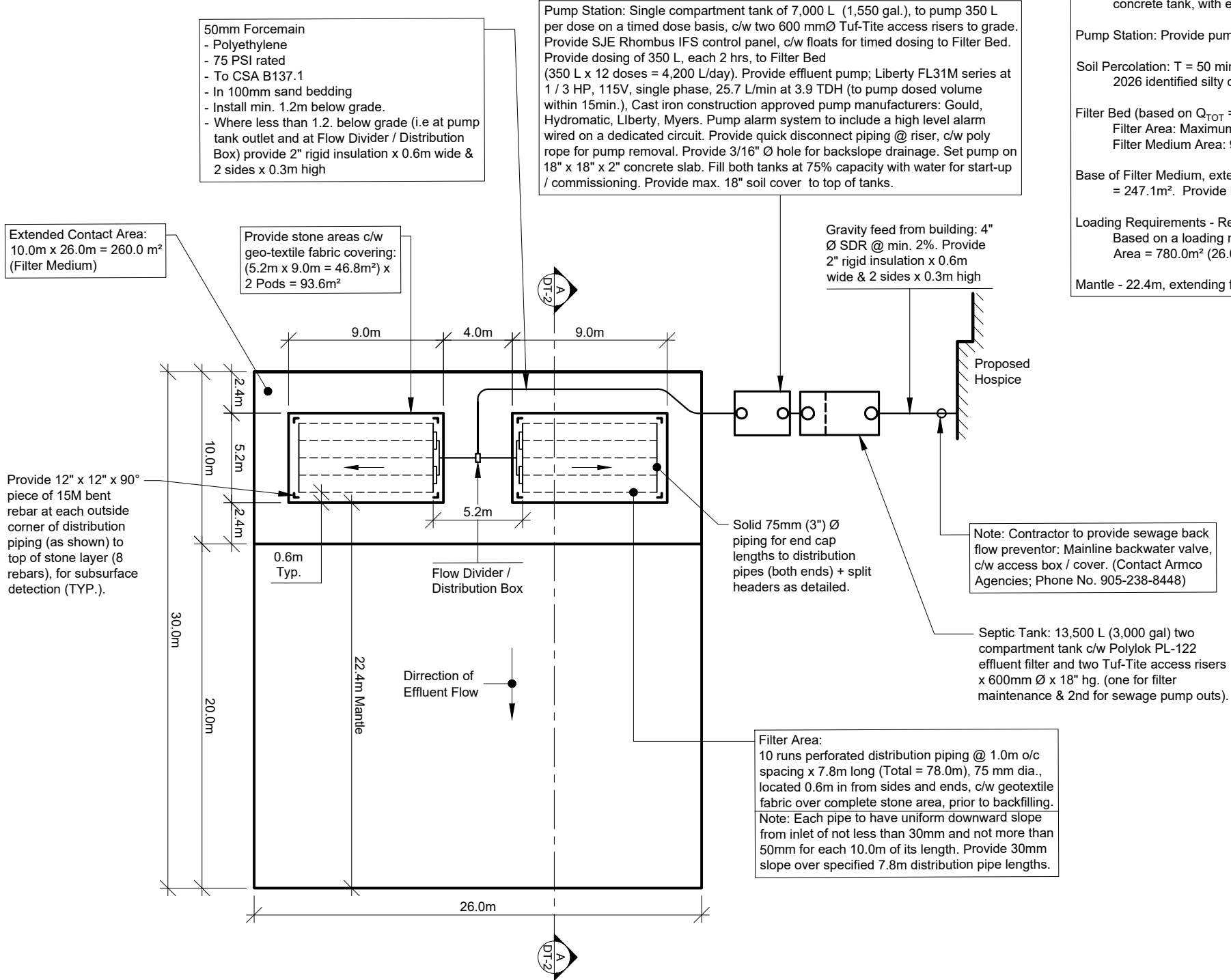
Note: Imported septic sand to have percolation time of "T" of $6 \text{ min/cm} \leq T \leq 10\text{min/cm}$, with less than 5% fines passing a No. 200 sieve. See drawing DT-3 for filter medium, septic sand & full specifications & notes.

Schematic Layout of septic system, setback distances as specified on drawing SP-1

See drawing DT-3 for specifications & standard notes

The septic & pump tank to be installed to provide 18" soil / topsoil cover on top of tanks (grading to suit this requirement).

Septic / Pump tanks to be a minimum of 1.5m from buildings, 3m from property lines & 15m from wells.



Filter Bed Sewage System: Plan View



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Sewage System Details

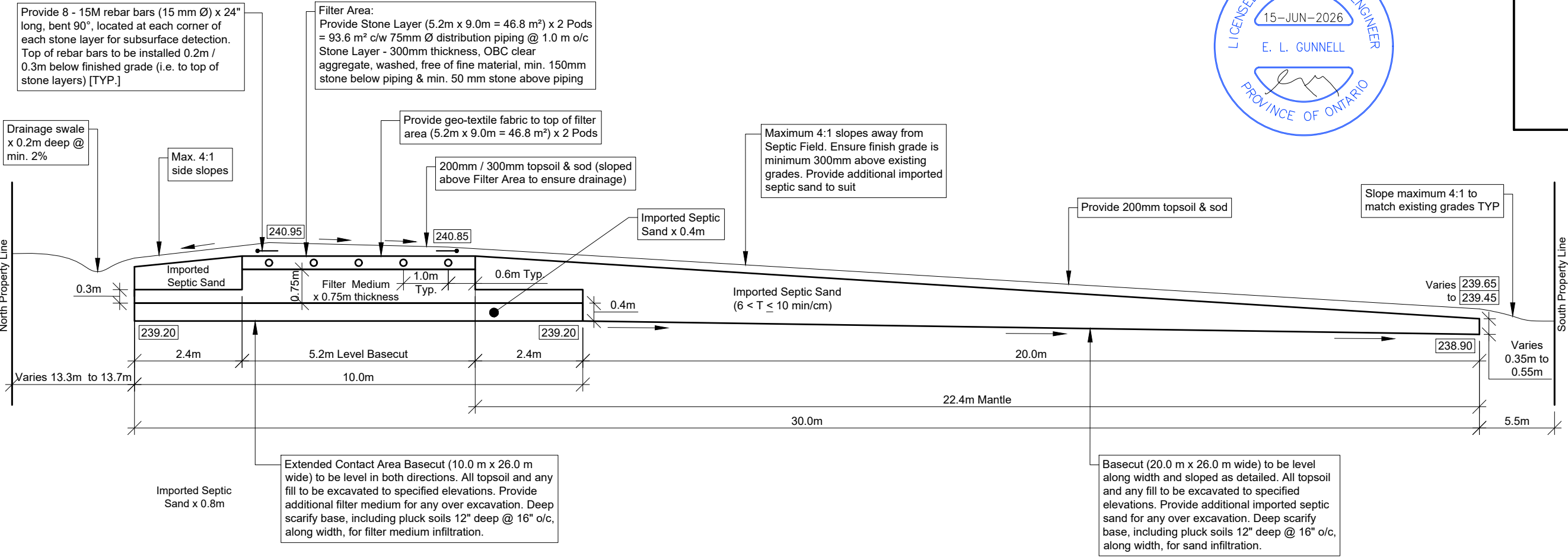
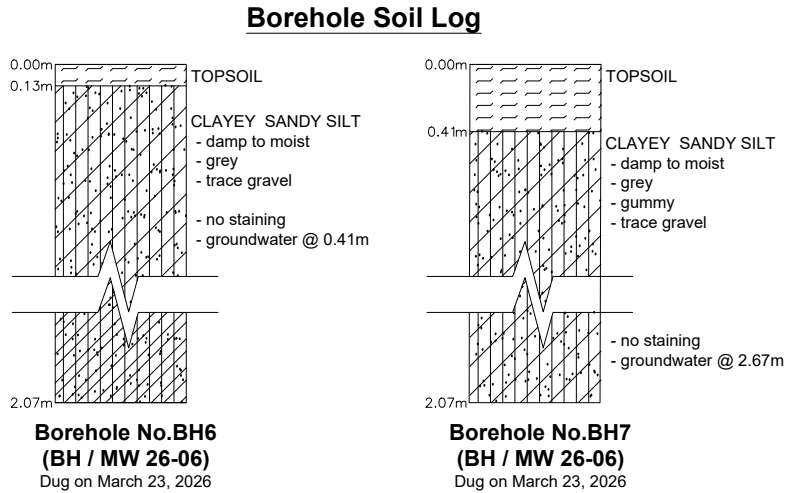
Scale: 1:300	Designed By: DB
Date: 05-JUN-2026	Drawn By: DB
Project No.: D3920	Checked By: EG
	Drawing No.: DT-1

Note: All topsoil to be removed and stockpiled for re-use. Any fill materials to be excavated and all excavated clayey sand soils to be removed from site. Provide additional topsoil to suit.

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**Proposed Hospice
7672 Elgin Mills Rd E
City of Markham**

Sewage System Details

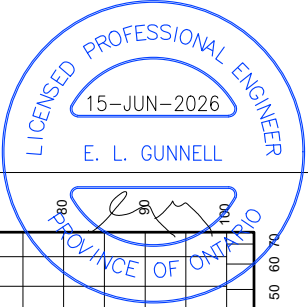
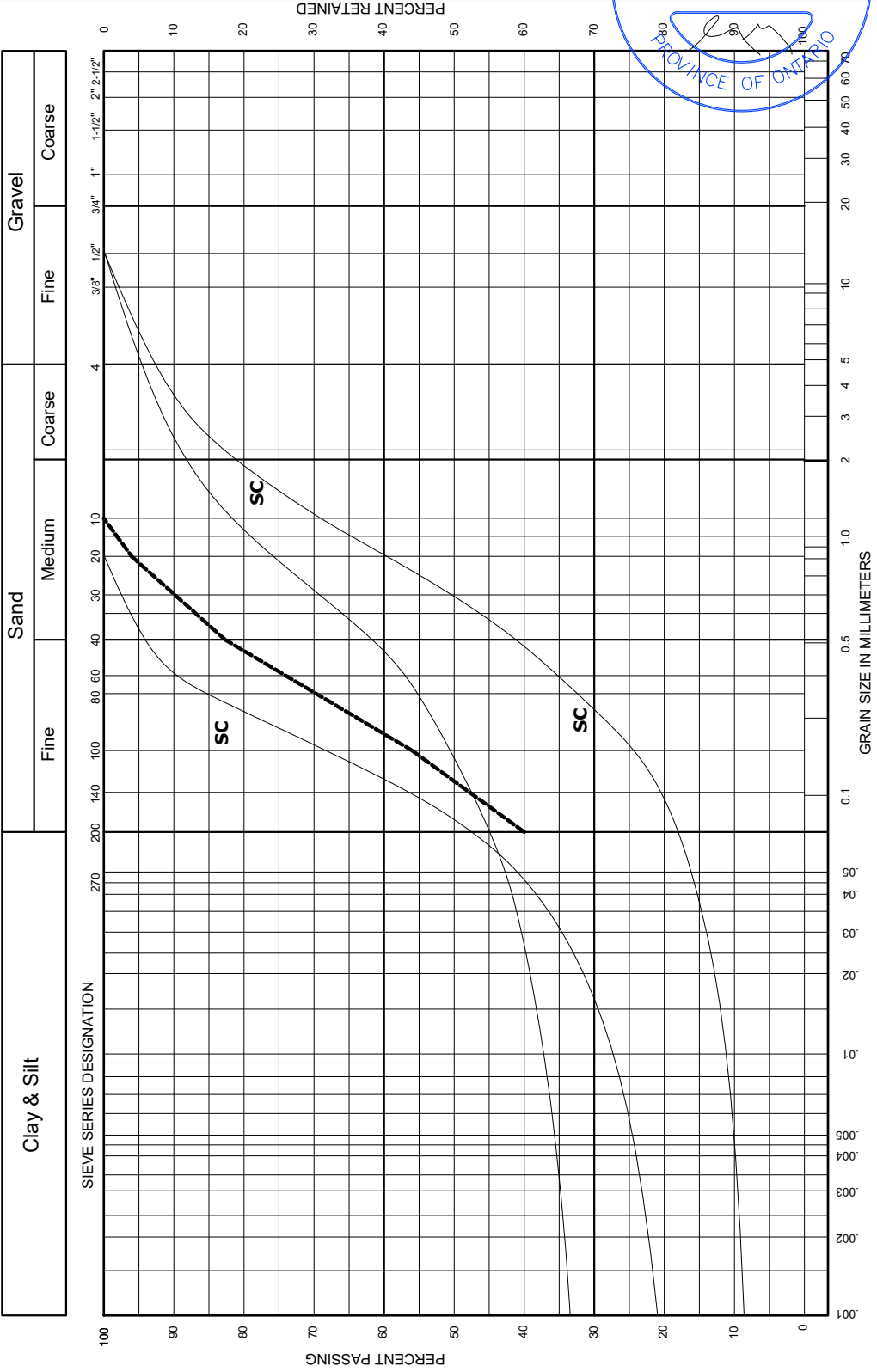
Scale: N.T.S.	Designed By: DB
Date: 05-JUN-2026	Drawn By: DB
Project No.: D3920	Checked By: EG Drawing No.: DT-2

Raised Filter Bed: Longitudinal Section A- A

Standard Notes - Private Waste System, Class IV Filter Bed, City of Markham

- 1.0 All components and construction shall be in accordance with Part 8 of the Ontario Building Code, for Class IV Sewage Systems, and all governing legislation. All works and excavations to be in accordance with the Ministry of Labour and Occupational Health & Safety requirements.
- 2.0 Only liquid wastes defined as 'sanitary sewage' in Part 2 of the OBC shall be discharged to a private waste disposal system.
- 3.0 The septic system shall be constructed by one licensed BCIN contractor and all imported sand fill and topsoil shall be placed under the direction of the contractor.
- 4.0 The septic system shall be installed after substantial completion of the new building, and the area of the septic system shall be protected by barriers during construction of the building.
- 5.0 Septic tank and pump tank shall:
- 5.1 Conform to Canadian Standards Association Standard B66-21 'Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks';
- 5.2 Be bedded on 200 mm of compacted sand or crushed stone,
- 6.0 The contractor shall provide reasonable notice to the City of Markham and Gunnell Engineering (where Gunnell Engineering is engaged by the owner) to conduct site inspections as follows;
- 6.1 The basecut excavation,
- 6.2 The installation of imported septic sand, and filter medium
- 6.3 The installation of septic tanks, and distribution pipe.
- 6.4 Backfilling shall not proceed until each stage has been approved by the City of Markham,
- 6.5 Start-up and commissioning.
- 7.0 Filter sand medium shall be clean sand comprised of particles ranging in size, between the limits
- 7.1 an effective size of 0.25mm, with a uniformity coefficient not less than 3.5,
- 7.2 an effective size of 2.5mm, with a uniformity coefficient not greater than 1.5,
- 7.3 and having a uniformity coefficient not greater than 4.5
- 7.4. Septic contractor to provide laboratory soil analysis for filter medium and written confirmation from the gravel pit supplier that the filter medium meets OBC 8.7.5.3.(3) requirements.
- 8.0 Imported septic sand to be clean sand having a percolation time of 'T' of: $6 \text{ min/cm} \leq T \leq 10 \text{ min/cm}$, and having less than 5% fines (passing the #200 sieve).
- 9.0 Imported stone shall be 'septic' stone as detailed in 2024 Building code, Sentence 8.7.3.3.(5) and Table 8.7.3.3
- 10.0 Electrical & Mechanical Equipment
- 10.1 The contractor to supply the pump and floats, as required and position them, as specified, in the tanks. The contractor to supply all alarm panels, timer control panels, junction boxes and conduit and wiring from the junction box to the building electrical room.
- 10.2 All pumps to be submersible, 50 millimetre effluent-handling pump, with a 110 volt, single phase motors. All pumps will be protected from running dry by a float attached to the pump or control panel. Balancing pumps shall be controlled by electronic timers set at specified times. Pump / balancing pumps shall be controlled by a float switch set to produce to produce the specified dose. All pumps to be on individual / dedicated electrical circuits.
- 10.3 Water-tight junction boxes to be mounted on the exterior wall. The bottom of the box will be located at least 900mm above the ground surface. The conduit containing the wires from the tank will be sufficiently large to permit the pump wire and plug to pass through the conduit. The conduit will be sealed to prevent the movement of gas and moisture from the tank into the box. The conduit to the building will extend through the building wall and will be grouted through the wall. The conduit will be sealed at the building end. Wiring conduits to be extended to electrical room.
- 10.4 The alarm panel, to be mounted on the exterior building wall, will be powered by a separate, independently supplied circuit with its own breaker switch to avoid loss of power (and alarm) in the event that the pump circuit fails. All float switches & alarm to be field tested.
- 10.5 All electrical installations and connections will be made by an experienced electrician and will meet current Electrical Safety Authority (ESA) specifications and requirements. Obtain required ESA permit and arrange for electrical inspections prior to completion.
- 11.0 Filter Bed area shall be sodded to control erosion and mowed regularly during the growing season.
- 12.0 Use of low volume plumbing fixtures recommended.
- 13.0 Sump pump, hot tub / swimming pool, floor drains and water softener systems not to be connected to septic system. No kitchen food grinder (garborator) to be connected to plumbing system or septic system.
- 14.0 Sand fill materials shall be placed in layers of 200 to 300 mm depth and shall be track compacted.
- 15.0 None of the following shall be permitted in a septic tank or filter bed area,
- 15.1 Landscaping involving decks, berms, foundations, patios, walkways, driveways, or trees,
- 15.2 Structures, including antenna foundations, swimming pools, accessory buildings, heat pumps, heat pump exchange grids, or tennis courts,
- 15.3 Extraneous sources of water including automatic sprinklers, roof downspouts, sump discharges, soakaway pits, or infiltration systems.
- 16.0 Septic tank additives / starters may be harmful to septic systems and are not necessary to begin or continue septic tank operation.
- 17.0 Never put the following items or substances into a septic tank system: fats, oils and grease; prescription medications, gasoline, antifreeze, varnishes, paints and solvents; caustic drain & toilet bowl cleaners; photographic solutions, bleach, pesticides, nail polish remover; cat box litter; tampons, sanitary napkins, diapers, paper towels, facial tissues, condoms; plastics; coffee grounds, egg shells and other kitchen waste, or cigarette filters.
- 18.0 Ensure septic tanks are inspected at least every two years by a qualified person and pump tanks out at least every 3 to 5 years (or sooner since frequency depends on tank / household use).
- 19.0 Septic Systems to be installed in such a way that the distribution piping within the leaching bed can be detected by: magnetic means, magnetic tracer wire or other means of subsurface detection (as per OBC 8.7.2.2). Refer to drawings DT-1 and DT-2.

UNIFIED SOIL CLASSIFICATION SYSTEM



Prepared for Gunnell Engineering Ltd.	USCS	Sand-clay mixtures More than 12% finer than No. 200 sieve (0.074mm)	Percolation Time : T = 35 mins/cm Adjusted to T = 50 mins/cm Due to Soil Compaction
Project: D3920 Sample: TP26-7 Depth: 1.7m Date Sampled: Mar 23, 2026	Coarse Grained Soils Clayey Sands (SC)		

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**Proposed Hospice
7672 Elgin Mills Rd E
City of Markham**

**Specifications and Notes
Laboratory Soil Analysis**

Scale: N.T.S.	Designed By: DB
Date: 29-MAY-2026	Drawn By: DB
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	Drawing No.:

D3920

DT-3