July 25, 2024

1734234 Ontario Ltd. c/o Steve Kapolnas, P. Eng. Project Manager Stantec 100 – 300 Hagey Boulevard Waterloo, ON N2L 0A4

transmitted via email: steve.kapolnas@stantec.com

Re: Karst Assessment, Stage 3A, Lockbridge Development Inc., Smithville, ON

Dear Mr. Kapolnas,

# 1.0 Introduction and Background Information

Lockbridge Development Inc. retained Terra-Dynamics Consulting Inc. (Terra-Dynamics) to assess karst conditions on a property (Block Plan 9 Area) located in southeastern Smithville, Ontario (Figure 1). The Lockbridge Development Inc. Block Plan 9 Area (the Site) is approximately 60.0 hectares in area and the Study Area comprised approximately 40.0 hectares (98.8 acres) in area which is located in the northern section of the Site. The property is referenced herein as the Study Area.

The Town of West Lincoln and the Regional Municipality of Niagara (Niagara Region) recently completed a Subwatershed Study (SWS) as part of the expansion of Smithville's urban boundary, and from that, Official Plan Amendment (OPA) No. 63 was developed. The SWS consisted of three (phased) reports as follows, prepared by Wood PLC (now WSP):

- 1. Wood PLC. 2021, January 29. Subwatershed Study Phase 1 Report: Characterization and Integration, Smithville Subwatershed Study and Stormwater Management Plan, Township of West Lincoln.
- 2. Wood PLC. 2022, March 29. Subwatershed Study Phase 2: Impact Assessment. Smithville Subwatershed Study and Stormwater Management Plan, prepared for the Township of West Lincoln, 88 p and appendices.
- 3. Wood PLC. 2022, September 12. Subwatershed Study Phase 3: Management, Implementation, and Monitoring Plan (Draft), prepared for the Township of West Lincoln, 32 p and appendices.

The SWS identified four karst features in southeastern Smithville, SE 1, SE 2, SE 3 and SE 4 with SE 2 being in the Study Area.

Terra-Dynamics will be using different nomenclature than was used in the SWS. SE 2 as identified by the SWS (Phase 3) will be herein referred to as Sinkhole Southeast No. 1 (SH-SE-1).

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For a time period of September 13, 2023, to April 25, 2024, Terra-Dynamics completed a karst assessment of SH-SE-1 in order to assist with understanding karst conditions of the Study Area and assess if any karst-based limitations or constraints to development pertain to the Study Area.

Karst hazards are identified as "hazardous sites". The Provincial Policy Statement (PPS) (2020) defines "hazardous sites" in Section 6.0 as follows:

"Hazardous sites: means property or lands that could be unsafe for development or site alteration due to naturally occurring hazards. These may include unstable soils (sensitive marine clays [leda], organic soils) or unstable bedrock (karst topography)."

The Niagara Peninsula Conservation Authority (NPCA) regulates karst within their watershed which includes West Lincoln and Smithville. The NPCA's Hazardous Sites Policy is presented herein in Appendix 1.

This is described in Section 7.0, Subsection 7.1.2 *Defining and Assessing Hazardous Site* of the 2022 NPCA Hazard Policy as follows:

"Hazardous sites are considered to be part of the NPCA's regulated areas. The potential for catastrophic failures in some areas of unstable soil and unstable bedrock warrant site-specific studies to determine the extent of these hazardous sites, and therefore the appropriate limits of the hazard and regulation limits. The regulated area will be based on the conclusions and recommendations of such studies, to the satisfaction of the NPCA. Accordingly, the limits for hazardous lands, such as leda clays, organic soils and karst formations, shall be determined on a site-specific basis according to the Ministry of Natural Resources Technical Guide for Hazardous Sites (1996) and Understanding Natural Hazards (2001)."

The *Hazardous Sites Technical Guide* (Ministry of Natural Resources and Forestry (MNRF), 1996) and Brunton (2013) provide specific methodology for identifying and evaluating hazardous sites. Within the Guide, the recommended methodology is summarized into five phases of investigation as follows:

- 1. Information Study;
- 2. Initial Study Area Inspection;
- 3. Reporting of Visual Inspection;
- 4. Subsurface Investigation; and
- 5. Analyses and Reporting.

This karst assessment of the Study Area addresses Phases 1 through 5 of the *Hazardous Sites Technical Guide* (MNRF, 1996), with Phase 4, the subsurface investigation, being addressed through a geotechnical investigation, prepared by Stantec Consulting Ltd. (Stantec), 2024 (draft). The information gathered from this study is described below with specific reference to the subject lands to address natural karst hazards per the definitions in the PPS and the policies of the NPCA (2022).

# 2.0 Methodology

Terra-Dynamics completed this karst-based investigation of the Study Area by completing the following tasks:

1. Performed a review of historic aerial photographs from 1934, 1954, 1965 and 2006;

- 2. Completed an initial field inspection on September 13, 2023, to identify and inspect karst features on and adjacent to the Study Area;
- 3. Installed water level dataloggers on the Study Area within the Sinkhole (SH-SE-1) and off-Study Area at the Rock Street Park Spring, a possible discharge location for the water sinking in SH-SE-1 (Figure 2) to continuously monitor water levels. A barometric datalogger was also installed onsite in order to compensate all water levels for barometric pressure. Multiple data downloads were completed over the monitoring period to prevent significant data gaps resulting from equipment failure or theft;
- 4. Performed numerous site visits during wet weather to inspect the Sinkhole on the Study Area for quantifying flow values into the Sinkhole and gather general flow-based observations;
- 5. Completed a rhodamine dye trace in the spring season of 2024 in order to determine the discharge location for water sinking at SH-SE-1;
- 6. Once the discharge location for SH-SE-1 was determined via dye trace, this location, South Rock Street Park Spring was installed with the datalogger previously instrumented within the Rock Street Park Spring in order to continuously record water levels (Figure 2);
- 7. Performed a review of a draft geotechnical investigation of the Study Area (Stantec, 2024); and
- 8. Completed a karst hazard risk assessment of existing karst conditions and conditions that could potentially be impacted by development.

# 3.0 Physical Setting, Geology and Historic Aerial Photograph Interpretation

# 3.1 Physical Setting

The Study Area in Southeast Smithville, Ontario is located in the centre of the Niagara Peninsula, above the Niagara Escarpment (Figure 1). The Study Area is situated south of Townline Road, east of Port Davidson Road and west of Shurie Road (Figures 1 and 2). The ground surface slopes generally down from east to west from approximately 191 mASL (metres above sea level) to 186 mASL.

Twenty Mile Creek is located north and east of the Study Area (Figure 2) and it flows in an easterly direction to Balls Falls and subsequently Lake Ontario. A tributary of Twenty Mile Creek is present on the northern portions of the Study Area (NPCA and OMAFRA, 2024) (Figures 1 and 2). After flowing north of the Study Area, this tributary passes under Townline Road and flows northwards through Rock Street Park (Figure 1 and 2).

### 3.2 Geology

The Study Area is located on the Haldimand Clay Plain which predominantly consists of poorly drained glaciolacustrine clay to silty clay overlying clay till (Chapman and Putnam, 1984 & Feenstra, 1975). The presence of the clay-based soils creates "flashy" conditions for stormwater flow and especially during the spring season freshet when the clay is saturated. The bedrock at the Site has been mapped as dolostone (Guelph Formation) (Oxtobee and Novakowski, 2002).

Vos (1969) shows the Study Area to be located in an area of variable drift thickness (or overburden thickness) with 12 to 18 feet thickness (3.7 to 5.5 metres) mapped along the northern boundaries of the Study Area and increasing drift thickness in a southward direction to greater than 7.6 m (25 feet) on the

southern portions of the Study Area. These drift thickness values are confirmed by nearby water well records reviewed online from the Ministry of the Environment, Conservation & Parks (MECP) website.

The overburden thickness of the Study Area discussed above is also supported by the geotechnical investigation completed by Stantec (Stantec, 2024). A depth to bedrock of 2.3 metres was recorded at MW-106-24, located in close proximity to the SH SE-1, approximately 15 metres north of SH-SE-1 (Figure 2) with depths to bedrock increasing in a southwards direction and then decreasing again at the very southernmost portions of the Study Area (Figure 4).

Buck et al. (2003) reported that there was no sinkhole or soil pipe development within the Eramosa Karst Conservation Area (an Earth Science Area of Natural Scientific Interest) in Stoney Creek/Hamilton at clay overburden depths greater than 2.8 metres. Conditions within the Study Area where less than 2.8 metres of clay overburden present are likely only in the vicinity of SH-SE-1, with the only geotechnical borehole or monitoring well overburden this shallow was MW-106-24 (Figure 4), immediately northwest of SH-SE-1, with an overburden thickness of 2.3 metres recorded (Stantec, 2024). The overburden thickness at SH-SE-1 was measured to be approximately 1.9 to 2.0 metres (Table 2). Table 1 below, summarizes the geotechnical borehole and monitoring well logs:

Table 1. Depth to Dolostone Bedrock (or thickness of overburden) from Geotechnical Boreholes and Monitoring Wells (Stantec, 2024).

BH/MW ID	Depth to Bedrock (m)	
BH101-24	5.6	
BH102-24	5.8	
BH103-24	3.2	
BH104-24	4.6	
BH105-24	6.4	
BH106-24	6.3	
BH117-24	8.4	
BH118-24	9.5	
BH119-24	7.3	
BH120-24	7.8	
BH121-24	5.0	
MW101-24	8.4	
MW102-24	7.8	
MW103-24	5.5	
MW104-24	5.8	
MW105-24	4.7	
MW106-24	2.3	
MW107-24	7.3	
MW108-24	8.1	
MW109-24	6.3	
MW110-24	5.2	
MW111-24	6.3	
MW112-24	6.4	

AVERAGE	6.3

Notes: BHs not listed above, bedrock was not encountered therefore these BHs were not included in the average value. MW= Monitoring Well, BH= Borehole, m= metres, Bolded cells represent MW adjacent to SH-SE-1.

# 3.3 Historic Aerial Photograph Interpretation

In reviewing aerial photographs from 1934, 1954, 1965 and 2006 (City of Hamilton, 2024), there have been no changes in land use, with agricultural land use dating back to 1934 (Figure 5). On all aerial photographs the northeast flowing watercourses are visible, however, SH-SE-1 can be difficult to identify.

# 4.0 Sinkhole Description, Flows and Continuous Water Level Monitoring Results

# 4.1 Sinkhole Southeast 1 (SH-SE-1)

SH-SE-1 is located on the northern portion of the Study Area, immediately northeast of a hedgerow (Figure 2). Flows enter the sinkhole from the southwest through a well-defined channel in the clay overburden that receives flows from the west and south. When flows into SH-SE-1 are at a greater rate than the infiltration capacity of the sinkhole, water ponds up in the depression of the sinkhole and if water levels become high enough, flows will continue past the sinkhole in an eastward and then northward direction, passing under Townline Rd. and entering Rock Street Park. The following table presents some general information for SH-SE-1:

Table 2. SH-SE-1 General Information

Approximate	Approximate	Approximate	UTM	Approximate
Maximum	Maximum	Maximum	Coordinates	Catchment
Length	Width (m)	Depth (m)		Area (ha)
(m)(NE/SW)	(NW/SE)			
5.1	4.3	1.9-2.0	618270 E,	1.9
			4771862 N	

Notes: NE: Northeast, SW: Southwest, NW: Northwest, SE: Southeast, E: Easting, N: Northing, m: Metres

# 4.1.1 SH-SE-1 Continuous Water Level and Flow Monitoring Results

On September 13, 2023, SH-SE-1 was instrumented with a Heron Instruments LT (level and temperature) water level datalogger, set to continuously record data at 15-minute intervals. The water level datalogger was installed within a stainless steel, perforated drive point in order to ensure a permanent and stable recording location. Water level data for SH-SE-1, along with daily precipitation data from the Grimsby Mountain Weather Station, ID 6133055 (Climate Data Online) from September, 2023 until April, 2024 is plotted and presented on Figure 8.

A barometric datalogger was also installed on a tree near SH-SE-1 in order to compensate the water level data for barometric pressure.

The table below outlines manual flow measurements taken at SH-SE-1 during the monitoring period. Flows were measured mainly volumetrically, with a malleable bucket or jug over time.

Table 3. Field Measurements of Flows at SH-SE-1 (2023/2024)

Date	Flow (Litres/second)	Notes
December 18, 2023	0.4	All flow sinking
January 10, 2024 (#1)	1.8	Sinkhole was inundated, flow
		measured upstream
January 10, 2024 (#2)	1.5	
January 10, 2024 (#3)	1.6	Water level in sinkhole notably
		decreasing
March 15, 2024	0.2	All flow sinking
April 3, 2024 (#1)	0.8	All flow sinking
April 3, 2024 (#2)	1.3	Sinkhole beginning to inundate
April 3, 2024 (#3)	3.8	Sinkhole continuing to inundate
April 3, 2024 (#4)	7.1	Water level at top of DP
April 4, 2024	0.7	All flow sinking
April 11, 2024 (#1)	7.4	Sinkhole inundated, 6.8 L/s
		flowing out of sinkhole
April 11, 2024 (#2)	3.0	Sinkhole inundated, 0.4 L/s
		flowing out of sinkhole, same
		flow measured an hour later,
		however sinkhole no longer
		outletting flow

Note: DP= Drive Point (steel perforated pipe containing water level datalogger)

During flowing conditions resulting from precipitation and/or snow melt in the fall, winter, or early-spring seasons, SH-SE-1 becomes inundated as is apparent from both Table 3 and the datalogger water level plot presented on Figure 8. The measured flow rate of water sinking into SH-SE-1 was approximately 2.5 to 3.0 L/s. Therefore, on Figure 8, water level values of zero do not necessarily represent dry conditions but rather conditions where flows are less than the infiltration capacity of the sinkhole when the flow is not high enough to cause water to begin filling up the sinkhole. At a flow rate greater than 2.5 to 3.0 L/s, the sinkhole becomes inundated and overflows.

The water that does not infiltrate into SH-SE-1 during high flows will inundate SH-SE-1 and then flow in a northeast direction, through a culvert under Townline Road and then through Rock Street Park before discharging into Twenty Mile Creek (Figures 2 and 3).

## 4.2 Rock Street Park Spring

The Rock Street Park Spring is located in the northern portion of the Rock Street Park, west of Carter Drive and discharges into the watercourse that flows north/northeast through the park into Twenty Mile Creek.

This spring was initially instrumented with a water level datalogger on September 13, 2023, because it was deemed the most likely spring to discharge the water sinking into SH-SE-1. However, during the April 2024 dye trace of SH-SE-1, no dye was observed emerging from this spring. Therefore, there was less need to analyze flow values discharging from this spring and flows are not reported on herein. A water level plot is presented on Figure 9.

### 4.3 South Rock Street Park Spring

As is discussed below, in Section 5.0, interconnectivity between SH-SE-1 and a newly discovered spring, South Rock Street Park Spring, was determined during an April, 2024 dye trace. This newly discovered spring is located on the channel-bottom of the watercourse that runs north/northeast through the Rock Street Park, immediately north of Townline Road (Figure 2 and 3). Identifying this spring without completion of the dye trace and during initial site visits was not possible due to the fact that this spring discharges into an existing channel-bottom. Whenever South Rock Street Park Spring was flowing, the watercourse it discharges into was also flowing.

Following discovery of this spring, the water level datalogger continuously recording water levels at the Rock Street Park Spring was moved to the South Rock Street Park Spring. Given this spring was identified on April 4, 2024, and the monitoring associated with this report finished on April 25, 2024, there is not a large water level database for this spring, however, continuous water levels recorded at this spring, along with daily precipitation values from the Grimsby Mountain Environment Canada Weather Station (ID 6133055) are presented on Figure 10. It should be noted that these water level values represent both (i) water discharging directly from South Rock Street Park Spring and (ii) watercourse flows coming from south of Townline Road (Figure 2).

#### 4.3.1 South Rock Street Park Spring Continuous Water Level and Flow Monitoring Results

The continuous water level results from April 4 to April 25, 2024, at this location demonstrate that the watercourse at the spring location did not go dry during this time period with a minimum recorded depth of 0.18 metres. An April 9, 2024 site visit noted that there were ponded conditions with no outflow at the spring location. A maximum depth of 0.64 metres was recorded on April 12, 2024, following 26.8 mm of rainfall on April 11, 2024. Well defined responses to precipitation events are apparent as would be expected.

Given flows directly discharging from South Rock Street Park Spring are unable to be measured with discharge occurring from the channel-bottom of the watercourse, flow values measured in association with South Rock Street Park Spring were completed at the following locations:

- a) The main stormwater culvert immediately north of Townline Road which discharges flows from the watercourse south of Townline Road and under high-flow conditions would include flows going downstream of the inundated SH-SE-1;
- The Rock Street stormwater headwall, located approximately 5 metres northwest of the main stormwater culvert described above. This presumably discharges stormwater flows from along Rock Street; and
- c) A downstream location from a) and b) above as well the South Rock Street Park Spring.

These monitoring locations of these are shown on Figure 3.

The flow values measured on April 4 and 11, 2024, at the above locations did not present any meaningful results with the highest percentage of flows being provided from the culvert running under Townline Road (as would be expected) and smaller percentages of flows being provided by the South Rock Street Park Spring and the Stormwater Headwall (from Rock Street).

Proposed stormwater management for the Study Area would include redirecting the flows currently sinking at SH-SE-1. The stormwater management facilities are proposed to discharge northwards into Rock Street Park (using the existing watercourse). Therefore, by redirecting the relatively small stormwater flows that presently sink into SH-SE-1 towards the stormwater management pond should not decrease flows in this minor tributary of Twenty Mile Creek.

## 5.0 Dye Tracing Results

In order to complete a thorough karst assessment, it is important to have an understanding of the discharge location of stormwater that sinks into karst features to assist in determining the significance of the flows conveyed by the karst system (e.g. does the sinking flow provide an ecological function of important habitat).

On April 4, 2024, ideal conditions to complete a dye trace were observed at SH-SE-1 (the flow entering the sinkhole was entirely sinking). 1 L/s of flow was measured at SH-SE-1. The study area was visited after 28.7 mm of rainfall was recorded over April 2 and 3, 2024 at the Environment Canada Grimsby Mountain Station (ID No. 6133055).

At 8:32 am, 200 mL or 40 grams of rhodamine WT fluorescent dye (20% stock solution) was injected into SH-SE-1 (Photograph 5, Appendix 2). The Ministry of the Environment, Conservation & Parks (MECP) Spills Hot Line was notified of the trace prior to dye injection and a Spill Number was obtained (#1-5DW1WW).

A YSI 600 OMS datalogger sonde was used to continuously monitor rhodamine dye concentrations during the dye trace, in combination with visual monitoring. The sonde was initially installed within the Rock Street Park Spring (Figure 2).

At 11:53 am, rhodamine was visually observed emerging from a spring in the southern portion of the Rock Street Park (Photograph 6, Appendix 2), at the bottom of the channel of the watercourse that flows in a northeastern direction across the park (Figure 2). Following the visual detection of the dye emerging from South Rock Street Park Spring, the rhodamine sonde was transferred to this location from the Rock Street Park Spring.

The following table summarizes details from the successful dye trace of SH-SE-1.

Table 4. SH-SE-1 Dye Trace Results

Dye Emergence Location	Approximate Distance (m)	Time of Travel (hours)	Rate of Flow (m/hour)
South Rock Street Park Spring	282	≤3.35	≥84.2

By 3:11 pm on April 4, 2024, the reddish/pinkish rhodamine dye was no longer visible at South Rock Street Park Spring or within the main channel of the watercourse so the rhodamine sonde was removed. A plot of rhodamine concentrations (in  $\mu g/L$ ) during the April 4<sup>th</sup> dye trace is presented on Figure 7. Following the movement of the rhodamine sonde to the South Rock Street Park Spring, a peak rhodamine concentration of 1,184  $\mu g/L$  was recorded at 12:11 pm, or 12 minutes following the installation of the rhodamine sonde. This peak rhodamine concentration was sustained for 30 minutes before the concentrations began decreasing. When the rhodamine sonde was installed in South Rock Street Park Spring, the rhodamine concentration was immediately recorded at 1,140  $\mu g/L$  so much of the upslope of the rhodamine curve is absent from Figure 7.

Rhodamine dye was not observed at any other known spring or watercourse in the area on April 4 indicating that the entirety of the water sinking within SH-SE-1 discharges to South Rock Street Park Spring.

# 6.0 Assessment of Karst-based Risk

The purpose of this section is to evaluate and document the potential for risk and impact associated with the karst features identified within the proposed development within the subject lands.

#### **6.1 Relevant Policies**

The following policies pertain to the presence of the karst features on the subject property:

- 1. The Provincial Policy Statement (PPS) (MMAH, 2020);
- 2. The Niagara Peninsula Conservation Authority's (NPCA's) Policy Document (Hazardous Sites (Karst) (2022)); and
- 3. Township of West Lincoln's April 20, 2023 Official Plan Amendment 63.

# **6.1.1** The Provincial Policy Statement (PPS)

Karst hazards are identified as "hazardous sites". The PPS (2020) defines "hazardous sites" in Section 6.0 as follows:

"Hazardous sites: means property or lands that could be unsafe for development and site alteration due to naturally occurring hazards. These may include unstable soils (sensitive marine clays [leda], organic soils) or unstable bedrock (karst topography)."

The PPS requires that natural features and areas shall be protected for the long term if they are required for ecological function. Specifically Policy 2.1.8 of the PPS states that:

"Development and site alteration shall not be permitted on adjacent lands to the natural heritage features. . . . unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions."

"Ecological function" is defined by the PPS as "the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions."

# 6.1.2 The Niagara Peninsula Conservation Authority's (NPCA's) Policy Document (Hazardous Sites (Karst) (2022)) (Appendix 1 herein)

The relevant sections of the NPCA's Policy Document (Hazardous Sites (Karst) (2022)) pertaining to karst state the following (Sections 7.1.2 through 7.2.8):

# **Defining and Assessing Hazardous Site**

Hazardous sites are considered to be part of the NPCA's regulated areas. The potential for catastrophic failures in some areas of unstable soil and unstable bedrock warrant site-specific studies to determine the extent of these hazardous sites, and therefore the appropriate limits of the hazard and regulation limits. The regulated area will be based on the conclusions and recommendations of such studies, to the satisfaction of the NPCA. Accordingly, the limits for hazardous lands, such as leda clays, organic soils and karst formations, shall be determined on a site-specific basis according to the Ministry of Natural Resources Technical Guide for Hazardous Sites (1996) and Understanding Natural Hazards (2001).

#### **Karst Formations**

Karst is a landform that develops on or in limestone, dolomite, or gypsum by dissolution and is characterized by the presence of features such as sinkholes, underground (or internal) drainage through solution-enlarged fractures (joints) and caves. Karst formations can be significant geologic hazards. Sudden collapse of an underground opening of a sinkhole can cause surface subsidence that can severely damage overlying structures such as buildings, bridges or highways. Improperly backfilled sinkholes are prone to both gradual and sudden subsidence and similarly threaten overlying structures. Sewage, animal wastes and agriculture, industrial and ice control chemicals entering sinkholes as surface drainage are conducted directly and quickly into the groundwater/surface water systems.

There are at least five known locations within the watershed with Karst formations:

- a) The Stoney Creek "Mountain" Area;
- b) The Smithville Area;
- c) The Gavora Drain and Balls Falls Area in Vineland;
- d) The Brow of the Niagara Escarpment Area; and
- e) The Onondaga Escarpment Area.

(Geologic Hazard Mapping Study, Karst Topography, Phase I, NPCA Watershed Area, Terra-Dynamics, 2006)

# Policies for Planning and Regulating Hazardous Sites

# **Objectives**

The objectives of the hazardous site policies are to:

- a) Prevent the loss of life;
- b) Minimize property damage;
- c) Reduce the potential for incurring public cost associated with the impacts of hazardous sites; and
- d) Manage existing risks and reduce the potential for future risks.

# **Development Regulation on Hazardous Lands**

- 1. Development and site alteration on hazardous lands shall not be permitted except in accordance with the policies in this Chapter.
- 2. Development and site alteration may only be permitted on hazardous lands where the following criteria has been addressed:
- a) A geotechnical study, completed by a qualified professional, demonstrates that all hazards associated with the site can be appropriately mitigated
- b) Applicable provincial standards related to floodproofing, protection works and access can be met and implemented;
- Vehicles and people have a way of safely entering and exiting the area during times of flooding, erosion and other emergencies;
- d) Existing hazards are not aggravated;
- e) New hazards are not created; and
- f) There are no negative impacts on ecological features and functions. This may require the completion of an EIS in accordance with the NPCA Procedural Manual.
- 3. Infrastructure is permitted within hazardous lands subject to the policies of Chapter 10.

# Development Within 50 metres of a Hazardous Site

Development and/or site alteration shall not be permitted within 50 metres of hazardous land unless it can be demonstrated that there are no adverse impacts to the hazard with respect to the control of flooding, erosion, dynamic beaches, pollution and conservation of land.

# **Additional Policies for Karst**

In addition to the Policies in Section 7.2.2., the following Policies apply to hazardous lands that are karst features.

- 1. Development and site alteration on karst or within 50 metres of karst will only be considered where the following concerns are addressed:
- a) Storm water drainage;
- b) Utilities;
- c) Groundwater contamination; and
- d) Flooding.
- Surface water run-off shall not directly enter a sinkhole or closed depression unless that is the
  natural drainage pattern. Drainage plans shall be designed to route surface water run-off through
  vegetated filters or other filtration measures before it enters such features.
- 3. No water wells shall be installed within 50 metres of a karst feature. The NPCA may require an assessment of the draw down impact of the well on the water table and may decline approval where the drawdown has the potential to destabilize karst topography.

# 6.1.3 Township of West Lincoln's April 20, 2023 Official Plan Amendment (OPA) 63

Taking the information from the SWS, the Township of West Lincoln and incorporated the following in the April 20, 2023 Official Plan Amendment 63 pertaining to karst feature Sinkhole SE-1 (defined by the SWS as a low-constraint karst features) on the Study Area property (Wood Environment & Infrastructure Solutions, 2022): Policy 6.11.7.3.17 of OPA 63 pertains to high and medium-constraint karst features in northwest and southwest Smithville and as such, did not include Sinkhole SE-1. Therefore, alterations or remediation (close-out) of Sinkhole SE-1 defaults to the approval of the NPCA, in accordance with NPCA regulations and policies.

## **6.2 Assessment of Karst-based Hazards**

The following is a simplification of assessing karst-based hazards:

# **Hazard Potential**

- Is the sinkhole or associated karst conduit expected to collapse or cause ground subsidence?
- 2. Is the water sinking into the sinkhole causing flooding issues or will it cause flooding issues in the future?
- 3. Are there karst conditions that are a risk to groundwater contamination?

In addition, the following is a simplification of assessing the natural heritage function of karst topography:

# Ecological and Natural Heritage Function

Is the water that is flowing into the sinkhole and through the karst conduit serving the purpose to provide or supply water to an ecosystem that is reliant on the continued supply of that water, and can it

be demonstrated that there will be no negative impacts on the natural features or their ecological function(s)?

# 7.0 Evaluation of Karst-based Policies Pertinent to the Study Area

# 7.1 Evaluation of Potential Ecological Risks to the Discharge of Karst-based Groundwater to Twenty Mile Creek

Figure 2 shows the approximate catchment areas associated with Sinkhole SE-1. The catchment surface area for stormwater sinking into Sinkhole SE-1 is very small at 1.9 hectares. This volume of water is very small and would only occur during significant storm events when Twenty Mile Creek is inundated with flows in the spring season and after large precipitation events when flows are typically greater than 30,000 Litres/second (NPCA Flow Station 02HA020). Therefore, there should be no ecological risk to Twenty Mile Creek or the downstream drainage channel through Rock Street Park if Sinkhole SE-1 is subject to close-out or remediation.

#### 7.2 Evaluation of Hazards

#### 7.2.1 Subsidence

As is referenced herein in Section 6.1.3, it is recommended that this low-constraint sinkhole, as referenced by Wood (2021), be subject to remediation or sinkhole close-out to remove any potential for subsidence in the clay overburden or the dolostone bedrock. A permit for a watercourse alteration from the NPCA will be required for the close-out of this Sinkhole SE-1.

# 7.2.2 Flooding

As is referenced above in Section 7.1, the catchment area for water sinking into Sinkhole SE-1 is very small at 1.9 hectares and the results of the dye tracing showed a karst conduit that is only approximately 300 m long. The main flooding risk could occur if the karst conduit in the bedrock is intercepted during the placement of buried infrastructure in the beneath Townline Road. This potential risk can be alleviated by remediating or closing-out this sinkhole.

### 7.2.3 Groundwater Contamination

In its present state as an open, small active sinkhole (Appendix 2, Photographs 1-3), there is potential for downgradient groundwater contamination if contamination enters the sinkhole when it receives storm water runoff, albeit at low volumes. There is also potential for downgradient groundwater contamination if liquid-based contaminants are poured into the sinkhole or there is a nearby fire and fire-extinguishing water enters the sinkhole. Remediating or closing-out Sinkhole SE-1 will eliminate the risk of contamination entering this sinkhole.

#### 8.0 Conclusions

The following are conclusions based on the findings of this karst assessment:

- 1. A karst assessment was completed of the Study Area within Block Plan 9 Area. One sinkhole, Sinkhole SE-1, was identified.
- 2. Sinkhole SE-1 has a very small catchment area of 1.9 hectares and contributes an insignificant amount of water to aquatic habitat present in Twenty Mile Creek. The maximum inflow rate sinking into Sinkhole SE-1 was measured to be approximately 2.5 to 3.0 Litres/sec.
- 3. A rhodamine dye tracing test showed that water sinks into the bedrock for an approximate distance of 300 m and daylights at a previously unmapped spring immediately north of Townline Road in a drainage channel located in Rock Street Park. This spring was labeled the South Rock Street Park Spring as another previously mapped spring (Rock Street Park Spring) is located downstream of the South Rock Street Park Spring (Figure 2).
- 4. The results of the Karst Hazard Risk Assessment show the following based on the information obtained to-date for Sinkhole SE-1:
  - (i) there is no ecological risk associated with future development to down-gradient habitat such as a cold water spring because of the very low sinking flow rates (maximum of 2.5 to 3.0 Litres/second) caused by the small upstream catchment area of approximately 1.9 hectares for stormwater flow. It is our understanding that the water from the proposed SWM pond northeast of Sinkhole SE-1 will discharge stormwater to this same drainage channel that will flow through Rock Street Park to Twenty Mile Creek;
  - (ii) there is very low, to no, down-gradient flooding risk associated with future development of potentially intercepting the bedrock karst conduit(s) during deep bedrock excavations for buried services along Townline Road based on (a) the very small catchment area referenced above; and (b) minimal observed stormwater sinking flow rates of a maximum of 2.5 to 3.0 Litres per second of ephemeral flow after significant storm events or snow melt event. A karst contingency plan would be needed for the future bedrock excavations in the event higher karst-based flows are encountered.
  - (iii) the risk of subsidence caused by unstable bedrock is likely very low owing to the small size of the karst conduit that transmits stormwater underground in the dolostone bedrock for a distance of approximately 300 m from Sinkhole SE-1 to the South Rock Street Park Spring. Remediating or closing-out Sinkhole SE-1 will further reduce the potential risk of subsidence in the bedrock;
  - (iv) there is no significant risk of people or wildlife falling into deep bedrock crevices or surface voids because of the small size of Sinkhole SE-1; and
  - (v) the risk of contamination is presently low owing to the small catchment area of this agricultural field. Remediation or close-out of Sinkhole SE-1 should eliminate all potential risks of subsurface contamination.
- 5. Based on a review of the Niagara Peninsula Conservation Area Karst Hazard Policy, there are no impediments to remediating or closing-out Sinkhole SE-1 to allow development of this area of the Study Area.

The Smithville Subwatershed Study classified Sinkhole SE-1 as a low constraint karst feature. The results of this karst monitoring program, dye tracing test and Karst Hazard Assessment confirms this classification.

#### 9.0 Recommendations

The following recommendations are provided for your consideration:

- 1. Sinkhole SE-1 should be fenced-off with security or snow fencing to restrict entry into the area of this sinkhole;
- 2. This report should accompany a permit application to the NPCA to remediate or close-out Sinkhole SE-1. The application should be for "Watercourse Alteration: Channels Channel Work Less Than 500 m";
- 3. Remediation should consist of the following tasks by a karst specialist and a geotechnical engineer:
  - (i) redirecting stormwater that presently sinks into Sinkhole SE-1 to the downstream water course that flows beneath Townline Road in a culvert;
  - (ii) excavating away the silty clay overburden around Sinkhole SE-1;
  - (iii) hydro-vacaccing the bedrock inside the sinkhole and around its perimeter to extract all silty clay in the immediate vicinity of the sinkhole;
  - (iv) filling the bottom of the throat of the sinkhole with clear stone (to allow any potential upgradient karstic flows to continue flowing through the bedrock);
  - (v) caping the void in the bedrock above the clear stone with a layer of low slump concrete. The thickness of the concrete should be determined by a geotechnical engineer;
  - (vi) regrading the area of excavation with native silty clay and recompacting the clay to the specifications decided by a geotechnical engineer;
- 4. Excavation into the bedrock should be avoided for the construction of the stormwater management pond (SWM Pond #1 Figure 11) northeast of Sinkhole SE-1 and this stormwater management pond should be lined with recompacted native silty clay;
- 5. In the event that flowing karst conduits are intercepted during the installation of services along the northern portion of the Study Area near Townline Road (where there is a known presence of karstic flows), a karst contingency plan should be developed in order to address the possible flows in the bedrock.
- 6. Karst assessments should be completed on the other properties within the northwestern and eastern sections of the Block Plan 9 Area (Figure 1). These properties should be evaluated at the time of site-specific development.

#### 10.0 Limitations

Karst assessments, by their nature, have inherent limitations and uncertainties primarily due to the presence of vegetation and the placement of fill material that may obscure surface expressions of karst features. It is believed that these uncertainties have been addressed through conservative interpretation

of historic and site-specific data at the places investigated. Conditions may vary in the subsurface at places not investigated. The assessment of karst, including the evaluation of risk, is valid only for the assumptions and conditions outlined in this report and the conditions as they were observed at the time of the investigation. Should knowledge of the site conditions change, the assessments of risks posed by the site may differ from that presented in this report.

This report was prepared by Terra-Dynamics Consulting Inc. for Stantec and Lockbridge Development Inc. The material in it reflects Terra-Dynamics' best judgment in light of the information available to Terra-Dynamics at the time of preparation. Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibility of such third parties. Terra-Dynamics accepts no responsibility for damages, if any, suffered by any third parties as a result of decisions made, or actions taken, based on this report.

We trust this information is sufficient for your present needs. If you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

TERRA-DYNAMICS CONSULTING INC.

Kevin Slaine, B.Sc., P. Geo. Senior Hydrogeologist



## Attachments

Figure 1. Location of Block Plan 9 Area and Study Area

Figure 2. Base Map and Relevant Features with 2024 Dye Trace Results

Figure 3. South Rock Street Park Spring Location

Figure 4. Depth to Bedrock and Bedrock Elevations

Figure 5. Aerial Photograph 1934

Figure 6. Geologic Cross Section A-A'

Figure 7. April 4, 2024, SH-SE-1 Dye Trace: Rock St Park Spring and South Rock Street Park Spring

Figure 8. SH-SE-1 Water Level Elevation and Precipitation, September 13, 2023 to April 25, 2024

Figure 9. Spring Water Level Elevation and Precipitation, September 13, 2023 to April 25, 2024

Figure 10. South Rock Street Park Spring Water Level Elevation and Precipitation, April 4, 2024 to April 25, 2024

Figure 11. Location of Sinkhole SE-1 Relative to Proposed Site Plan

Appendix 1. NPCA Karst Policies

Appendix 2. Photographs

Appendix 3. Borehole and Monitoring Well Logs: Stantec, 2024

#### 11.0 References

Buck, M., Worthington, S.R.H. and D.C. Ford. 2003. Evaluation of the Eramosa Karst in Stoney Creek, Ontario as a Candidate for an Earth Science Area of Natural Scientific Interest. Prepared for the Ontario Ministry of Natural Resources and the Region of Hamilton-Wentworth, 55 p.

Environment and Climate Canada, 2024. Monthly Daily Precipitation and Temperature, Grimsby Mountain Station, ID 6133055.

City of Hamilton, 2024. Open Hamilton Interactive Web Mapping Application

Ministry of the Environment, (Conservation and Parks), 2024. Water Well Records Database.

Niagara Peninsula Conservation Authority. 2022, November 18. NPCA Policy Document: Policies for Planning and Development in the Watersheds of the Niagara Peninsula Conservation Authority, 157 p.

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), 2024. AgMaps Online.

Ontario Ministry of Municipal Affairs and Housing (MMAH). 2020. Provincial Policy Statement. Queen's Printer, Ontario.

Stantec Consulting Ltd. 2024, April 8. Geotechnical Investigation, Smithville 3A/Block Plan 9-Smithville, ON (Draft). Prepared for Lockbridge Development Inc.

Oxtobee, J.P.A. and K. Novakowski. 2002. A field investigation of groundwater/surface water interaction in a fractured bedrock environment; Journal of Hydrology, Vol. 269, p. 169-193.

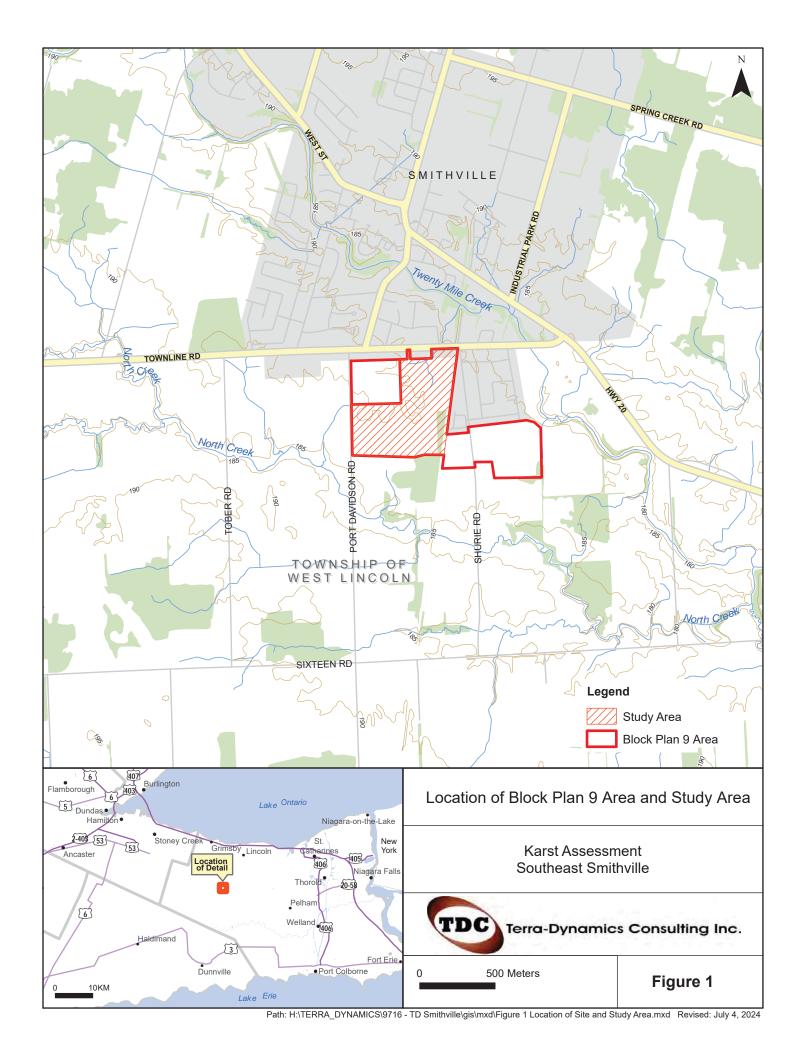
Terra-Dynamics Consulting Inc. 2006, April 12. Geologic Hazard Mapping Study, Karst Topography, Phase I, NPCA Watershed Area. Prepared for the Niagara Peninsula Conservation Authority.

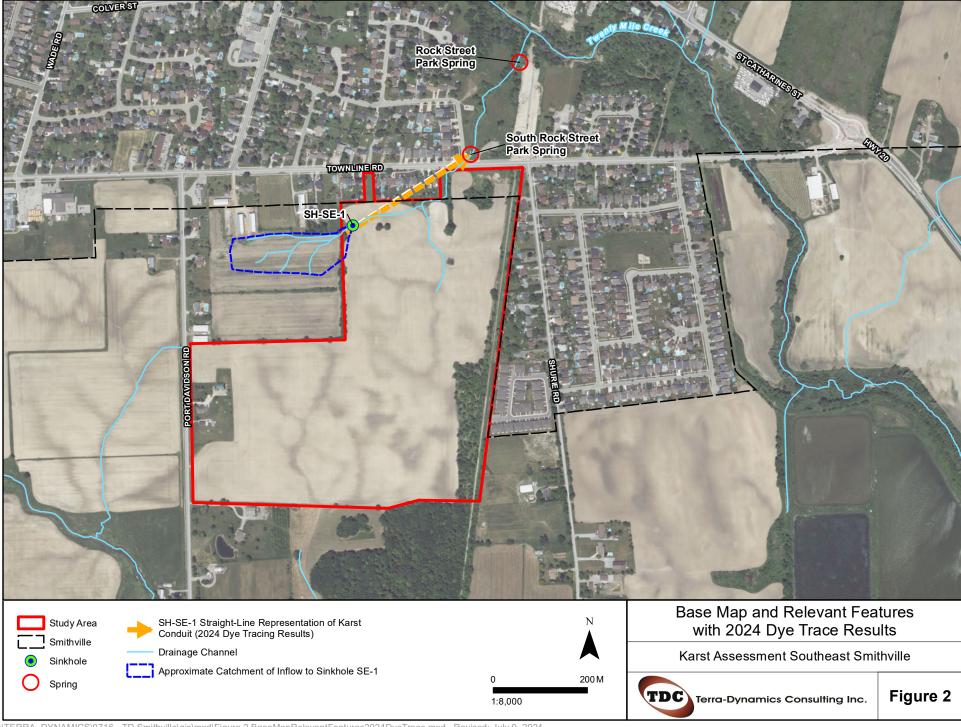
Township of West Lincoln, 2022, April 20. Official Plan Amendment 63.

Wood PLC. 2021, January 29. Subwatershed Study Phase 1 Report: Characterization and Integration, Smithville Subwatershed Study and Stormwater Management Plan, Township of West Lincoln.

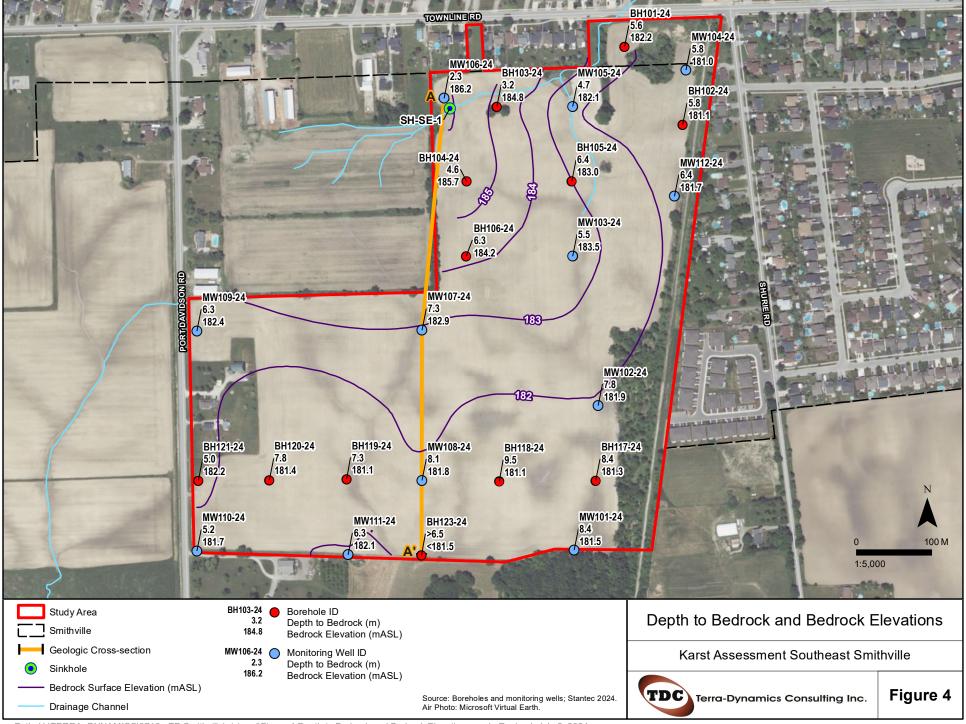
Wood PLC. 2022, March 29. Subwatershed Study – Phase 2: Impact Assessment. Smithville Subwatershed Study and Stormwater Management Plan, prepared for the Township of West Lincoln, 88 p and appendices.

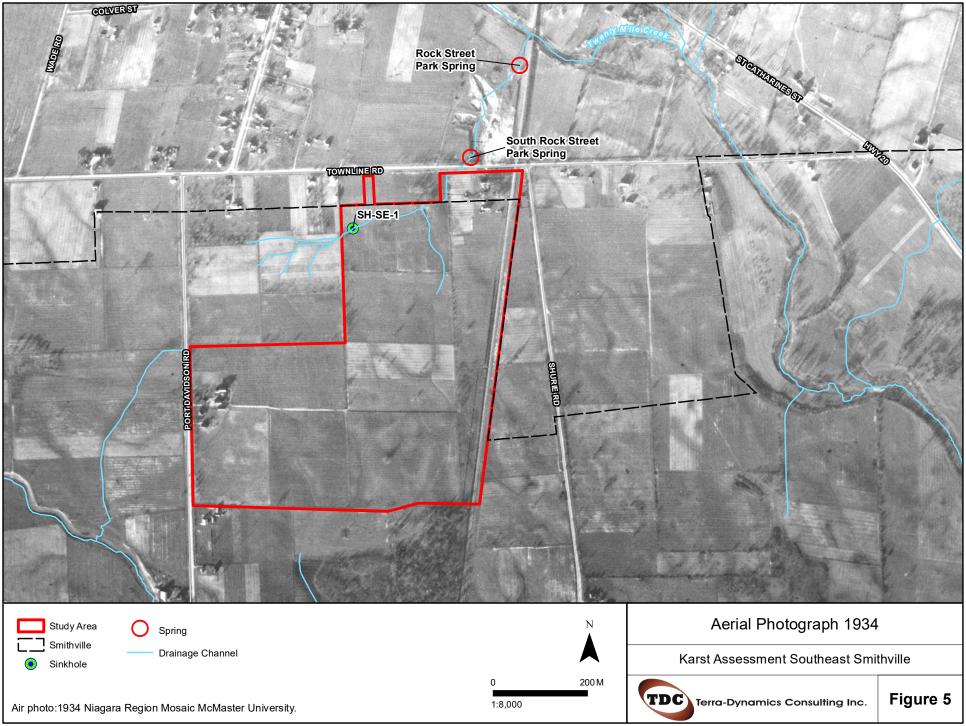
Wood Environment & Infrastructure Solutions. 2022, September 12. Subwatershed Study Phase 3: Management, Implementation, and Monitoring Plan (Draft). Smithville Subwatershed Study and Stormwater Management Plan, prepared for the Township of West Lincoln.

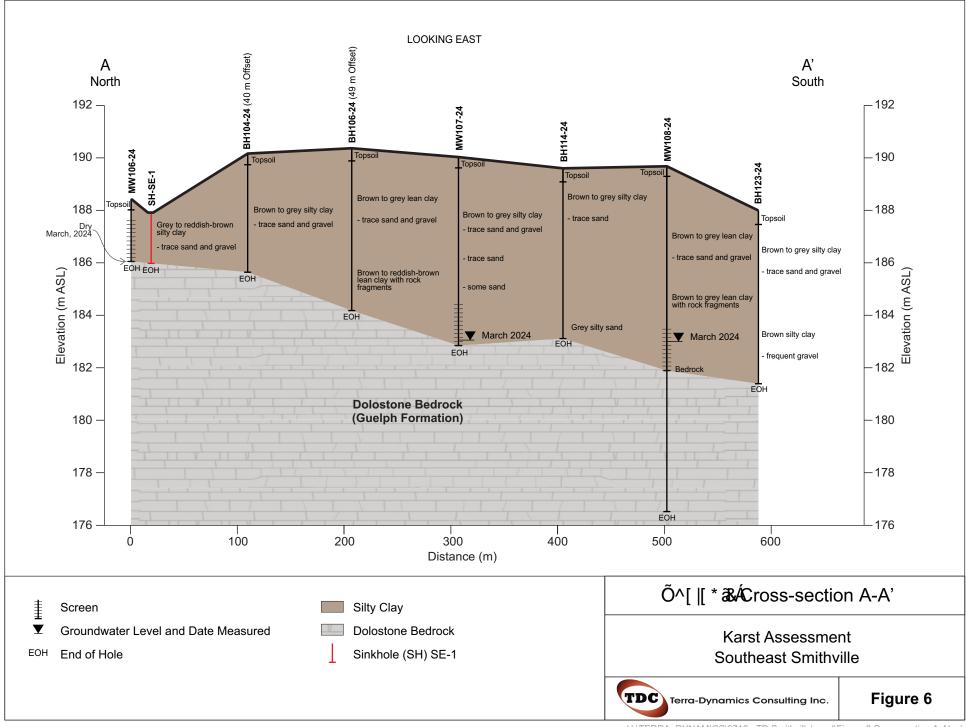


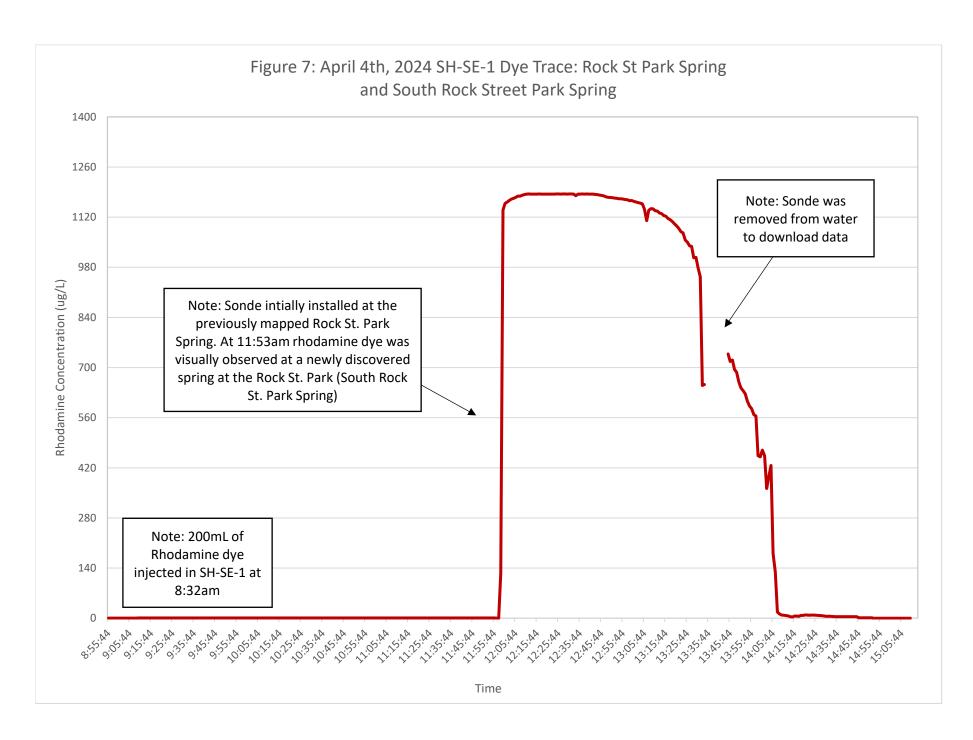


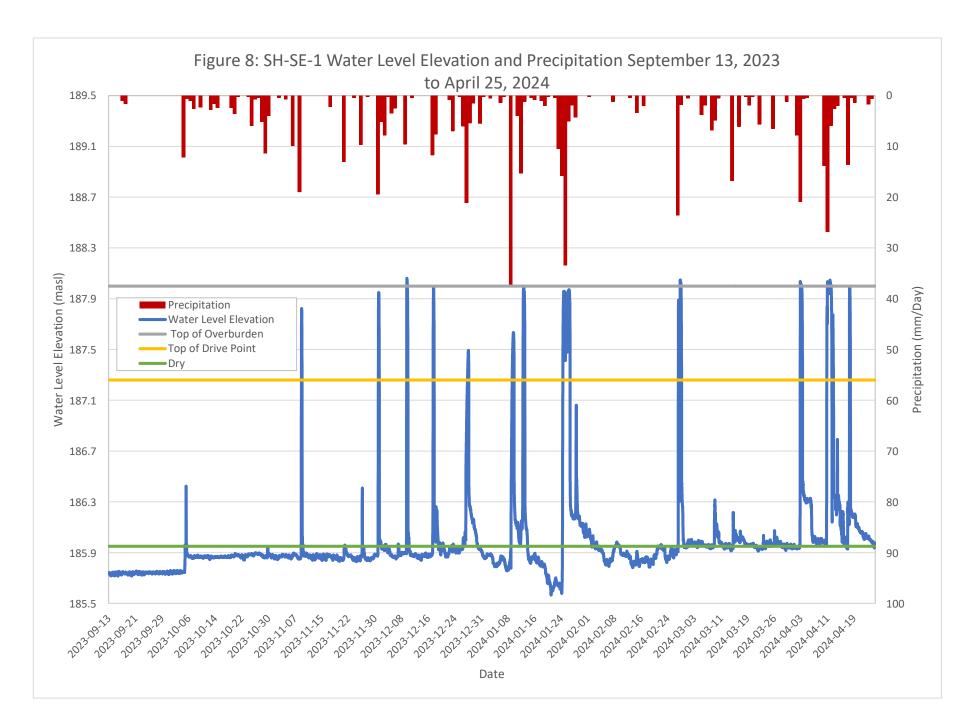


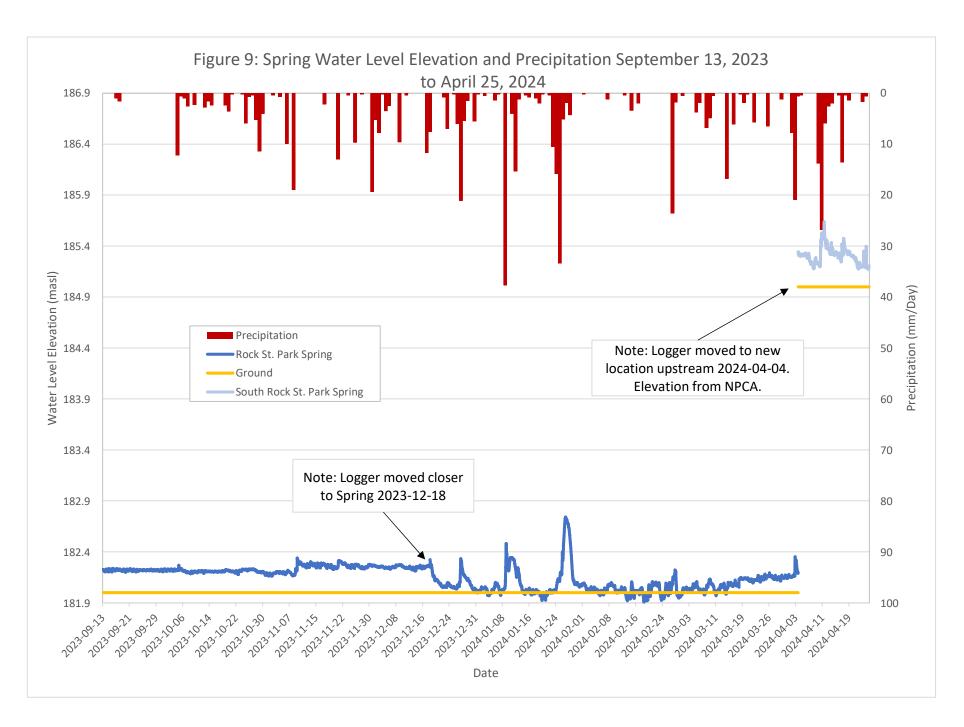


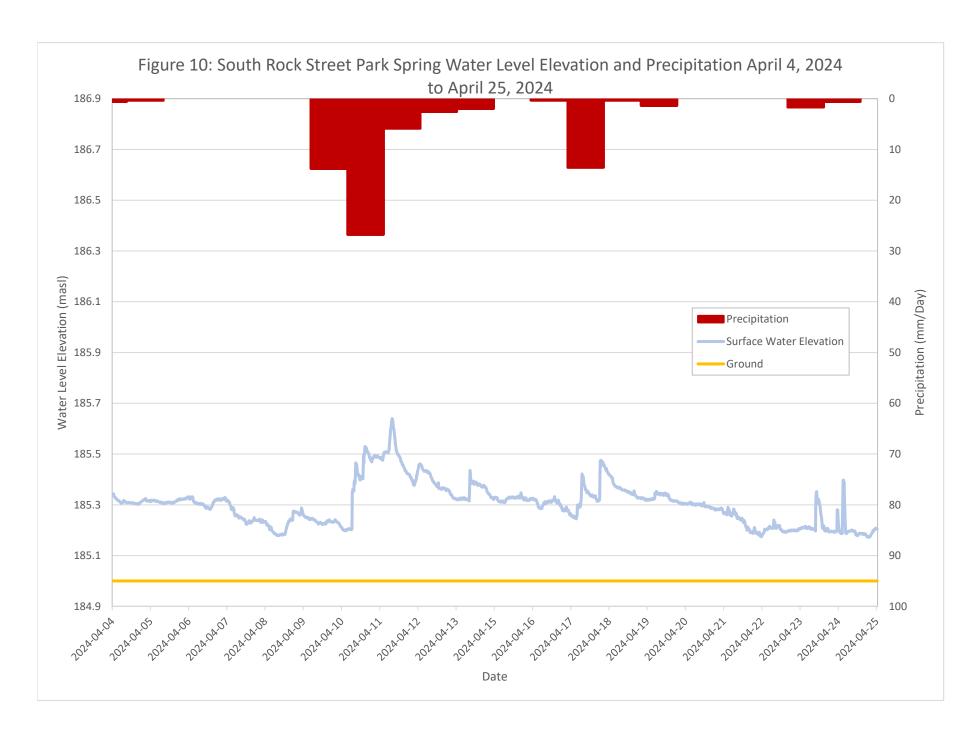


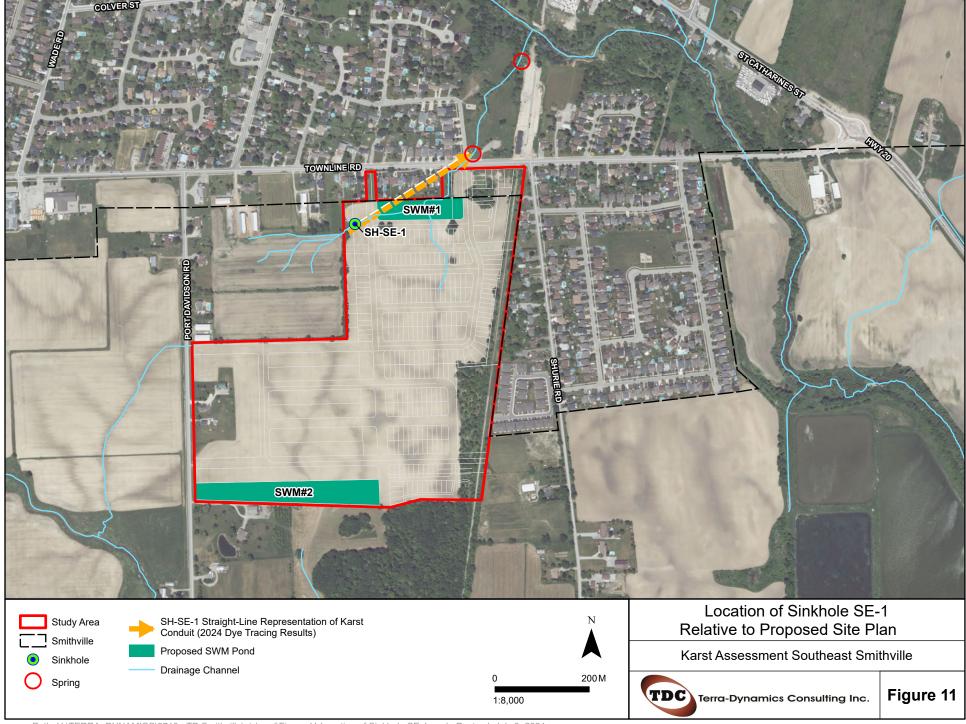












# Appendix 1 NPCA Karst Policies



# **NPCA POLICY DOCUMENT:**

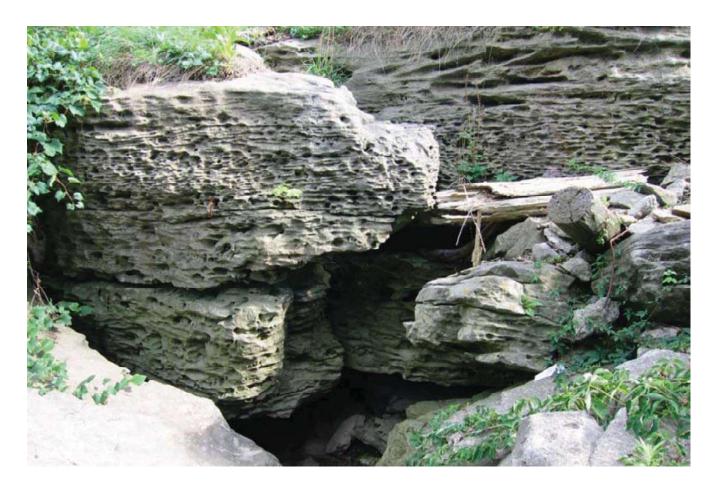
Policies for Planning and Development in the Watersheds of the Niagara Peninsula Conservation Authority

November 18, 2022 Consolidation



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# 7.0 HAZARDOUS LANDS

# 7.1 WHAT ARE HAZARDOUS SITES?

# 7.1.1 Hazardous Sites and Hazardous Lands

The Provincial Policy Statement defines hazardous sites as lands that could be unsafe for development due to naturally occurring hazards. These may include unstable soils (sensitive marine clays [leda], organic soils) or unstable bedrock (karst topography). The Conservation Authorities Act uses a similar term, referring to hazardous lands, which are lands that are unsafe to development due to naturally occurring processes. Naturally occurring processes includes flooding, erosion, dynamic beaches and unstable soils. In the context of the Conservation Authorities Act, the term hazardous lands is used as a general term, referring to a full range of natural hazards (i.e. flooding, erosion, unstable soils). Earlier chapters in this document address hazardous lands associated with dynamic beaches (Chapter 4), erosion and unstable slopes (Chapter 5), and flooding (Chapter 6). The following chapter provides guidance for hazardous lands associated with unstable soils, such as sensitive



marine clays (leda clays), organic soils and unstable bedrock, such as karst formations (such as sinkholes and caves). The term hazardous site is used in this chapter to refer to naturally occurring hazards associated with unstable soils and unstable bedrock (similar in definition to the term *hazardous sites* which is used in the PPS to describe a similar feature). This chapter also provides guidance for unstable soils associated with back-dunes areas.

# 7.1.2 Defining and Assessing Hazardous Sites

Hazardous sites are considered to be part of the NPCA's regulated areas. The potential for catastrophic failures in some areas of unstable soil and unstable bedrock warrant site specific studies to determine the extent of these hazardous sites, and therefore the appropriate limits of the hazard and regulation limits. The regulated area will be based on the conclusions and recommendations of such studies, to the satisfaction of NPCA. Accordingly, the limits for hazardous lands, such as leda clays, organic soils and karst formations, shall be determined on a site-specific basis according to the Ministry of Natural Resources Technical Guide for Hazardous Sites (1996) and Understanding Natural Hazards (2001).

# **7.1.3** Karst Formations

Karst is a landform that develops on or in limestone, dolomite, or gypsum by dissolution and is characterized by the presence of features such as sinkholes, underground (or internal) drainage through solution-enlarged fractures (joints) and caves. Karst formations can be *significant* geologic hazards. Sudden collapse of an underground opening of a sinkhole can cause surface subsidence that can severely damage overlying *structures* such as *buildings*, bridges or highways. Improperly backfilled sinkholes are prone to both gradual and sudden subsidence and similarly threaten overlying *structures*. Sewage, animal wastes and agricultural, industrial and ice control chemicals entering sinkholes as surface drainage are conducted directly and quickly into the groundwater/*surface water* systems.

There are at least five known locations within the watershed with Karst formations:

- a) The Stoney Creek "Mountain" Area;
- b) The Smithville Area;
- c) The Gavora Drain and Balls Falls Area in Vineland,
- d) The Brow of the Niagara Escarpment Area; and
- e) The Onondaga Escarpment Area.

(Geologic Hazard Mapping Study, Karst Topography, Phase I, NPCA Watershed Area, Terra Dynamics, 2006)



# 7.1.4 Back-Dune Areas

There are a number of back-dune areas located in-land from shorelines of Lake Erie. Back dune areas are considered to be a natural hazard, as these are locations which may be susceptible to slope failure and erosion, but may not be part of an *apparent valleyland* or part of the shoreline hazard area (as overtime they receded beyond the extent of the shoreline area). Back dunes form as a result of long-term changes of lake levels and a gradual recession of dune areas from the shoreline area. The NPCA will evaluate the potential risks associated with *development* on back-dunes on a case-by-case basis.

# 7.1.5 Hazard Slopes

There are instances through the *watershed* where steep slopes exist that are not part of a defined valley. These are considered hazard slopes and can be defined as having a vertical height greater than 3 metres and a slope steeper than 3:1 (horizonal to vertical).



# 7.2 POLICIES FOR PLANNING AND REGULATING HAZARDOUS LANDS

# 7.2.1 Objectives

The objectives of the hazardous sites policies are to:

- a) Prevent the loss of life;
- b) Minimize property damage;
- c) Reduce the potential for incurring public cost associated with the impacts of hazardous sites; and,
- d) Manage existing risks and reduce the potential for future risks.

# 7.2.2 Development Regulation on Hazardous Lands

- 1. *Development* and *site alteration* on *hazardous lands* shall not be permitted except in accordance with the policies of this Chapter.
- 2. *Development* and *site alteration* may only be permitted on *hazardous lands* where the following criteria has been addressed:
  - a) A geotechnical study, completed by a qualified professional, demonstrates that all hazards associated with the site can be appropriately mitigated;
  - b) Applicable provincial standards related to floodproofing, protection works and access can be met and are implemented;
  - c) Vehicles and people have a way of safely entering and exiting the area during times of flooding, erosion and other emergencies;
  - d) Existing hazards are not aggravated;
  - e) New hazards are not created; and
  - f) There are no *negative impacts* on ecological features or functions. This may require the completion of an EIS in accordance with the NPCA Procedural Manual.
- 3. Infrastructure is permitted within hazardous lands subject to the policies of Chapter 10.

# 7.2.3 Development within 50 metres of a Hazardous Site

Development and/or site alteration shall not be permitted within 50 metres of hazardous land unless it can be demonstrated that there are no adverse impacts to the hazard with respect to the control of flooding, erosion, dynamic beaches, pollution and conservation of land.

# 7.2.4 Additional Policies for Karst

In addition to the Policies in Section 7.2.2, the following Policies apply to hazardous lands that are karst features.



- 1) Development and site alteration on karst or within 50 metres of karst will only be considered where the following concerns are addressed:
  - a) Storm water drainage;
  - b) Utilities;
  - c) Groundwater contamination; and
  - d) Flooding.
- 2) Surface water run-off shall not directly enter a sinkhole or closed depression unless that is the natural drainage pattern. Drainage plans shall be designed to route surface water run-off through vegetative filters or other filtration measures before it enters such features.
- 3) No water wells shall be installed within 50 metres of a karst feature. The NPCA may require an assessment of the draw down impact of the well on the water table and may decline approval where the draw down has the potential to destabilize karst topography.

Appendix 2

**Photographs** 

## **Photographs**



Photograph 1. Northward view of SH-SE-1 with Drive Point installed (contains water level datalogger) and flagged with orange tape (Photograph as taken on September 13, 2023).



Photograph 2. Southward view of SH-SE-1 when entirely inundated. The Drive Point is under water/not visible (Photograph was taken on January 10, 2024).



Photograph 3. Northward view of SH-SE-1 when nearly entirely inundated. The Drive Point is under water/not visible (Photograph was taken on January 10, 2024).



Photograph 4. Water level datalogger location within the Rock Street Park Spring (Photograph was taken on March 15, 2024).



Photograph 5. Southwest view of rhodamine dye injection at SH-SE-1. 200 mL of rhodamine dye was injected at 8:32 am (Photograph was taken on April 4, 2024).



Photograph 6. Southwest view at 12:00 pm of the rhodamine dye within the watercourse flowing through Rock Street Park. This photograph is northeast of the newly identified "South Rock Street Park Spring" which is located on the channel-bottom, immediately north of the culvert passing under Townline Road, at the intersection with Rock Street. Dye was first observed emerging from "South Rock Street Park Spring" at 11:53 am, and following this observation, the rhodamine sonde installed at "Rock Street Park Spring" was moved to this location (Photograph was taken on April 4, 2024).

## Appendix 3

**Borehole and Monitoring Well Logs: Santec, 2024** 

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DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER	1	N-VALUE or RQD %	OTHER TESTS / REMARKS		LAB PO:	OR, CKE	ATC T PE 50 k — H	RY 1 N. Pa	nt 8	<b>▲ ★</b> 100	) kPa <del> </del> TERBE	FIEL PO	LD V. CKE	ANE T SHI D kPc	EAR	VAN 20	IE I	BACKFILL/	MONITOR WELL/ PIEZOMETER
0	190.3	Topsoil				REC					0	20			er Conf	tent (%) c 40	and Blo		int 60	7	0	80		
0 -		Brown, stiff, dry, silty clay TOPSOIL with rootlets		SS	1	400	11				•													-
- - - -		Brown to grey, stiff to very stiff, moist, SILTY CLAY - trace sand, gravel and rootlets		SS	2	400	19																	
· -																								
- - - 2 -				SS	3	425	25						•											
-		Greyish-brown		SS	4	450	21																	
3 -																								
				SS	5	450	18					•												
4 –				SS	6	450	18					•												
-	185.7																							
- - 5 -		End of Borehole Spoon and Auger Refusal due to inferred bedrock at 4.6 m																						
-																								
- - 6 —																								
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-																								
8 _																								
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<u> </u>	KFILL S ENTON		GR SAI		<i>.</i> ∠	(CO)	NCRE UGH	TE Drilling Me- Completio			41		<i></i>								-		ewed e 1 of	

PR	LIENT:	T: Smithville 3A Block 9							E	NΑ	\D83	3]						ВІ	ΗЕ	LEV.	ATIC	Э. : <sub>.</sub> N:	<u>161</u> 1 <u>89.</u>	4144 429m	73
			9, S	mitl	hvill	e, O	N									.0E		D.	ΑTL	JM:	_G	eo	deti	ic	_
<i>D/</i>	ATE BC	Maich 5, 2024			SAM	PLES			_							NGT	Ή, (	Cu (	kPa	1)					Ē
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	19.5 mithville, ON																						
		Topsoil				REC			S					Water	Conte	ent (%)					•	•			
0 -	189.4 189.0	Brown, stiff, moist, silty clay TOPSOIL with rootlets		SS	1	400	13			10	0 •	20		30_	4	0	50	) ::::::::::::::::::::::::::::::::::::	60		70	80			
-		Brown to grey, stiff to very stiff, moist, SILTY CLAY - trace sand		22	2	405	10																		
- - - -				55	2	425	19																		
- - - 2 -				SS	3	425	23						•												
-				22	4	450	21																		
- - - 3 -				3		1500	-													Pa)  AND TEST  TS SHEAR VANE  D KPa  200 KPa  TS WP  WL  Unit					
-				SS	5	450	15				•		DRDINATES  PROJECT NO.: 16  BH ELEVATION: 185  ON 4771766.0E  DATUM: Geode  LEVEL: 5.79  ED SHEAR STRENGTH, Cu (kPa)  ONY TEST  POCKET SHEAR VANE  DATUM: POCKET SHEAR VANE  ONE 100 kPa 150 kPa 200 kPa  CONTENT & ATTERBERG LIMITS  Worlder Cordent (%) and Blow Count  20 30 40 50 60 70 80  Worlder Cordent (%) and Blow Count  DATUM: Geode  Worlder Cordent (%) and Blow Count  DATUM: Geode  DATUM:												
- - 4 —				SS	6	450	. 13																		
-																									
- - 5 <del>-</del>				SS	7	450	18					•													
-																									
6 <del>-</del> - -	183.3 183.0	Reddish-brown, hard, wet, SILTY CLAY - frequent gravel and rock fragments		SS	8																				
-		End of Borehole Spoon and Auger Refusal due to inferred bedrock at 6.4 m Water level encountered at 5.8 m upon completion of drilling																							
7 — - - - -		Competion of utiling												NATES PROJECT NO.: 16  BH ELEVATION: 189  4771766.0E DATUM: _Geode!  L: 5.79  EAR STRENGTH, Cu (kPa)  TEST											
- - - 8 –																									
					,	1 _		Drilling Co			or:										$\dashv$				_
АC	KFILL S	ymbol Asphalt orthogs s	GRC SANI		D	CO1  SLO	NCRE	TE Drilling Me Completic	thoc	d:												Rev	viewe	ed By:	_

PR	LIENT:	T: Smithville 3A Block 9						OLE RECOI	E	NA		3]										. : <u>16</u>	1106- 14144 0.503m	73
		DN: Smithville 3A / Block Pla	n 9,	<u>Smit</u>	<u>hvill</u>	e, O	N									0E		DA	ATU.	M: .	G	eode	tic	
D/	ATE BC	RED: <u>March 4, 2024</u>			SAM	PLES			_		TER Ra <b>i</b> ni					IGTH	1, C	:u (k	Pa)					$\overline{\top}$
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER	_	N-VALUE or RQD %	OTHER TESTS / REMARKS	F	VAT	ER C	PEN kp +	a TEN	1 T & <i>F</i>	★ 00 k	<pa< th=""><th>PO</th><th>150</th><th>T SH O KP</th><th></th><th>20</th><th>D kPa</th><th>BACKFILL/ MONITOR WELL/ PIEZOMETER</th><th></th></pa<>	PO	150	T SH O KP		20	D kPa	BACKFILL/ MONITOR WELL/ PIEZOMETER	
	190.5	Topsoil	1			REC			S		N-val		١	Vater C	onter	nt (%) a				-	•	00		
0 -		Brown, firm, moist, silty clay TOPSOIL with rootlets		SS	1	325	8			10		20	Ω.	30 	40		50		60	/	0	80		<del> </del>
1 -		Brown, stiff to very stiff, moist, LEAN CLAY (CL) - trace gravel and sand		SS	2	375	24																	
-																								-
2 -				SS	3	425	28	Sieve/Hydro at 1.8 m G S M C 2% 6% 25% 67%				: c	•											-
-				SS	4	450	23						10:											
3 -		Greyish-brown																						-
-				SS	5	450	18						0											-
4 -				SS	6	450	11				D: ::		: : C	) :::										-
-		Brown																						
5 <del>-</del>				SS	7	450	12				•		0	::									_	Ė
-																								-
- - - 6 —	184.4																							-
-	184.3	Brown to reddish-brown, hard, moist, LEAN CLAY (CL) frequent rock fragments End of Borehole		SS	8		50				.O.						•							-
- - 7 –		Spoon and Auger Refusal due to inferred bedrock at 6.3 m																						-
-																								-
- - 8 –																								ļ
_				-				Drilling Cor			r:			•								.ogge		_
BAC	KFILL S ENTON		GR SAI		. <u>/</u>	CO1	NCRE UGH	TE Drilling Me  Completio			ii.	, -									_	Reviev Page	ved By:	

CLIEN		antec Lockbridge Developmen	ıt In	c	E	BOF	REH	OLE RECO		CO	ORD	INA	.TES			PR	(OJI	ECT	NO.		1107- 14144	
		Smithville 3A Block 9							-		-											<u> </u>
		: Smithville 3A / Block Plan	1 <b>9</b> ,	<u>Smit</u>	<u>hvill</u>	e, O	N									DA	ATU <i>l</i>	M: .	Ge	O.: <u>1614</u> DN: 1 <u>90.1</u> Geodetic	tic	
DATE	BORE	D: <u>March 4, 2024</u>							_	ATER PRAINI		_			TH	Culk	(Pa)					=
_   ह					SAM	PLES				ORAT						ELD \		E TES	ST	•	. 1	
DEPTH (m)	5	SOIL DESCRIPTION	PLOT			Ē		OTHER TESTS /	PO	CKET	PEN. ) kPa		10	r 0 kPc			ET SH O kP				CFILL/ OR WE METE	
DEPTH (m) ELEVATION (m)		(USCS)	STRATA PLOT	TYPE	NUMBER	OVERY (m	N-VALUE or RQD %	REMARKS	WA	TER C	+			+			+	W <sub>P</sub>		+	BACKFILL/ MONITOR WELL PIEZOMETER	
		osoil	1			EC.			SPT	(N-val	ue) BI				6) and	Blow Co	ount		•			
0 190		own, firm, moist, silty sand TOPSOIL	1//						1	0	20	30	) ::::	40	5	0   : : :	60		0 (	80   : : : :		F
1	l w	rith rootlets		SS	1	400	7		•													F
189	Bro	own to brownish-grey, stiff to very stiff,																				F
1		noist, SILTY CLAY ace gravel and sand																				F
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1																						F
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185	5.4			66	-	150	1.0															Ė
5 -	Bro	own to reddish-brown, stiff to very stiff, noist, SILTY CLAY		SS	7	450	13					: : <b>.</b> : : <b>*</b>				:::						F
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183	3.6			SS	8		29					•										E
1		d of Borehole at 6.5 m																				ŧ
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ACKFIL	L SYM	nbol Rasphalt 🗵	GR	OUT	· />	]C01	NCRE														ved By:	
BENT		E 🔯 DRILL CUTTINGS 🖸	SAN			SLO	UGH	Completio	n Der	oth:	6.55	m							Р	age	1 of 1	

	IENT:	itantec Lockbridge Developmen	t In	c				OLE RECO		CO	ORD	INA	TES			PR	OJE	СТ	NO.		1108- <u>14144</u>	
		T: Smithville 3A Block 9							-	4D83	-										.851m	1_
		ON: Smithville 3A / Block Plan	ı 9,	<u>Smit</u>	hvill	e, O	N			3531.						DA	ΛUT	۸: <sub>-</sub>	Ge	ode	lic	—
DA T	TE BC	DRED: <u>March 1, 2024</u>							_	ATER RAINI					-u <i>(</i>	211 (k)	Pal					=
	Ē				SAM	PLES				KAINI SORAT						LD V		TES	T	•	<u> </u>	
<u>E</u>	) NC	COU DECORDED	[0]			E				CKET	PEN.		*		PC	OCKE	T SHE	EAR	VANI		FILL/ R WEI	ı
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	ш	E.	E %	LUE D%	OTHER TESTS / REMARKS		50	kPc	1	100	kPc	1	150	kPc +	<b>-</b>	200	kPa 	ACK FIO	
۱ ٔ	ELE		STR/	TYPE	NUMBER	N C	-VA		WA	TER C	ONT	ENT	& AT	TERBI	ERG	: LIMI	TS	W <sub>P</sub>	W	W <sub>L</sub>	BACKFILL/ MONITOR WELL/ PIEZOMETER	l
		Topsoil	-		_	EC C	N-VALUE or RQD %		SPT	(N-va <b>l</b>	ue) B				om al G	Now Cou	unt.		•			l
∘ -	189.9	Brown, firm, wet, silty sand TOPSOIL with	7//						1	0	20	30	l ,	40	50	)	60	7	0 8	30   : : : :		ł
- ]		rootlets	1	SS	1	425	8		•			э: Э:										ŀ
4	189.4	Brown to greyish-brown, stiff to hard,																				ŀ
- 1		moist, SILTY CLAY  - trace gravel, sand and rootlets																				ŀ
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‡		Brown to reddish-brown, very stiff, moist,	텕																			F
	183.3	SILTY CLAY - frequent gravel		SS	8	425	30															F
-		End of Borehole at 6.5 m																				ŧ
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	NTO1		AZ[		Ŀ <i>⊵</i>	SLO	UGH	Completic		oth:	6.55	m							_	age		-

CLI	S ENT:	itantec Lockbridge Developmen	ıt In	c	E	BOF	REH	OLE RECO		CO	ORD	Ina <sup>°</sup>	TES			PR	OJE	ст	NO.		1109- 14144	
		T: Smithville 3A Block 9									-					ВН	ELE	VA	ION:	189	.553m	1_
		ON: <u>Smithville 3A / Block Plan</u>	1 9,	<u>Smit</u>	hvill	e, O	N									DA	NUT	۸: _	Ge	ode	lic	_
DA	TE BC	DRED: <u>March 1, 2024</u>								ATER		_			F1.1. 6						T	=
	<u> </u>				SAM	PLES				ra <b>i</b> n Borat						JU (K ILD V		TEST	г	•	<b> </b>	
Ξ	N N	COU DECORDED	5			E			1	CKET	PEN.		*		PC	CKE	T SHE	EAR	VANE		FILL/ R WEI AETER	į
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	ш	E.	E <sub>%</sub>	3% 2%	OTHER TESTS / REMARKS		50	) kPa		100	kPc	<b>T</b>	150	kPc <del> </del>	<b>T</b>		kPa <del> </del>	BACKFILL/ MONITOR WELL PIEZOMETER	
<u> </u>	E		STR	TYPE	NUMBER	N CE	N-VALUE or RQD %		WA	TER C	ONT	ENT	& AT	TERB	ERG	LIMI	TS	W <sub>P</sub>	W	W <sub>L</sub>	¶ <u>o</u>	
		Topsoil	$\left\{ \ \ \right\}$			REC	- 0		SPT	(N-val	ue) B		S/0.3r ater Con		and B	low Cou	unt		•			
∘∄	189.6	Brown, stiff, dry, silty sand TOPSOIL with	1//						::::	10  ::::	20 :   : :	30		40	50		60   : :	- 70 ::	3 (	80   : : : :		ŧ
4		rootlets		SS	1	375	10			•		0.										Ė
}	189.1	Brown, stiff to very stiff, moist, SILTY CLAY																				ŀ
-		- trace gravel and sand																				ŀ
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1		Brownish-grey, stiff, moist, SILTY CLAY - trace sand		SS	8	450	12			•		: :   : :   c	) 									F
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PR	IENT: OJEC	tantec Lockbridge Developmen Smithville 3A Block 9						OLE RECO	BH [NA	ND83	3]					В	ΗЕ	LEVA	MOIT	: <u>16</u> : 1 <u>90</u>	1110. <u>14144</u> ).135m	173
	OCAT <b>I</b> C ATE BC	DN: <u>Smithville 3A / Block Plar</u> RED: <u>March 4, 2024</u>	<u>ነ                                    </u>	Smit	hvill.	e, O	N		— 618 — WA						)E		ATL	JM:	Ge	ode	tic	_
	n)				SAM	PLES			UND	RA <b>I</b> N ORA								I) NE TE:	ST	•	7	Γ
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER	ERY (mm) CR %	N-VALUE or RQD %	OTHER TESTS / REMARKS	POO	CKET 5	PEN 0 kP	a	10	<b>★</b> D0 kl	P Pa	OCK 1	(ET S 50 k	Pa W.	VAN	kPa <del> </del>	BACKFILL/ MONITOR WELL/ PIEZOMETER	>
	E	Topsoil	SI	-	N	RECOV or 1	o N			TER C N <del>-</del> va		BLOV		3m				ŀ	•	⊣՝	₹	
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-	189.7	with rootlets		SS	1	400	9		•													F
		Brown to greyish-brown, very stiff to hard, dry to moist, SILTY CLAY - trace gravel and sand																				
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3 ]					<u> </u>			Drilling Co	<u> 1::::</u> ntracto	or:	:1:	. : :	1:::	:1:	-::	1::	: : 1	! !	L::::	ogge ogge	d By:	上
4CI	KFILL S	ymbol Rasphalt 🗵	]GR	OUT	./2	<b> </b> C01	NCRE UGH														ved By:	- :

PR	JENT: OJEC	Lockbridge Development  : Smithville 3A Block 9								BH [NA	\D8	3]						E	3H I	ELE	VA <sup>·</sup>	ION	: <u>16</u> : 1 <u>90</u>	14144 ).265m	73
			9,	<u>Smit</u>	<u>hvill</u>	<u>e, O</u>	N										Е	[	DAI	ΓUΛ	1: _	Ge	ode	<u>tic</u>	_
					SAM	PLES			U	ND	RAII	۱ED	SHE	AR	STRE	ENC									Ī
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	RATA PLOT	/PE	MBER	:RY (mm) CR %	ALUE QD %	OTHER TESTS / REMARKS		PO(	CKE	7 PE 50 k	N. Pa		100	O KF	P Pa	°OC	KET 150	SHE kPc	EAR	VANI 200	kPa 	BACKFILL/ MONITOR WELL/ PIEZOMETER	
	⊞		ST	1	Ň	ECOVI	0 Z										BER	G LI	MIT	S	F	•	<b>-1</b>	Š	
0 -	190.3		-1/)			~			<u> </u> ::	1	0	20	) :::								70	) { : : : :	30   : : : :		Į
-	189.8	rootlets		SS	1	375	10																		
1 -		moist to wet, SILTY CLAY - trace gravel and sand		SS	2	425	21						<b>X</b>												
- - - 2 –				SS	3	450	28							•											
-				cc	1	150	10																		
-			Bit   CORDINATES   PROJECT NO. : 16141																						
,		In Cockbridge Development Inc  Itssmithtylie_3A_Block																							
- - - 1 —						450	10										PROJECT NO.: 16 BH ELEVATION: 19 E DATUM: Geode  STH, Cu (kPa)  FIELD VANE TEST POCKET SHEAR VANE BERG LIMITS								
· -				22	•	450	) 12																		
-				SS	7	450	13				•														
-																									
- - - - -																									
5 -	184.2 183.7	<ul> <li>frequent gravel, sand and rock</li> </ul>		SS	8		20					•													
- - - -		End of Borehole at 6.5 m			BH COORDINATES   PROJECT NO : 161414																				
7 — - - -		Lockbridge Development Inc   Shiffville 3A Block 9																							
- - 8 -																									
, –				•					ontro	icto	or:											L	ogge	d By:	_
АC			GR SA1	OUT	D	COI	NCRE UGH	TE Drilling Me Completic														_		ved By: 1 of 1	

PR	IENT: OJEC	Lockbridge Development  : Smithville 3A Block 9							_	BH [N#	4D8	3]						В	НЕ	ELEV	ΆΤΙ	ON:	: <u>16</u> 1 <u>90</u>	14144 .586m	73
			••	JIIII		<u> </u>				WA	TER	LE	VEL	: <u>N</u>	/ <b>A</b>							_			_ <del>_</del>
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER	_	N-VALUE or RQD %	OTHER TESTS / REMARKS		LAB PO(	ORA CKET 5	TOI PEI IO k	RY TI N. Pa NTEN	EST	<b>★</b> 100	kPo   	FI P <sup>(</sup> a	ELD OCI	VA (ET : 50 I	NE T SHEA kPa	AR V	200 W	kPa W <sub>L</sub>	BACKFILL/ MONITOR WELL/ PIEZOMETER	
•	190.6	Topsoil				REC								Wate	r Cont	ent (%					70	• 8	0		
0 -	190.1	with rootlets	]/) [] []	SS	1	400	7			•															E
- - - -		Brown to greyish-brown, stiff to very stiff, dry to moist, SILTY CLAY  - trace sand		SS	2	375	20																		
- - - 2 —				SS	3	400	25			<u> </u>			•												
				22	4	400	20																		
- - - 3 -																									
		Greyish-brown		SS	5	450	15				•														
4 -				SS	6	375	11				•														
	186.0																								
5 -		Grey to reddish-brown, stiff, moist to wet, SILTY CLAY		SS	7	450	14				•														-
-																									
6 -				22.	8		8																		
-	184.1	End of Borehole at 6.5 m												*											
7 -						BH COORDINATES  [NAD83] BH ELEVATION: 190,584 618037.0N 4771568.0E DATUM: Geodefic  WATER LEVEL: N/A  WATER LEVEL: N/A  PLES    March																			
				-																					
8 _				Ц	<u> </u>	1		Drilling Co	ntro	acto	or:	:1		:1:	• • •	1::		1::	::1	•••	:1:	Lc	gge	d By:	_
AC	KFILL S		GR SAN	OUT	D	CO1	NCRE	TE Drilling Me Completio															eview age	ed By:	

	IENT:	<u>-</u>	nt In	С	E	BOF	REH	OLE RECO	BH	I CC		DIN	ATE:	3						:_16	1113- 14144	73
		T: Smithville 3A Block 9  ON: Smithville 3A / Block Plan	າ 9.	Smit	hvill	e. O	N		-		-	4	7714	.68.0	)F					: 1 <u>90</u> ode	<u>.008m</u> lic	1_
	ATE BC		. ,	J11111		<u> </u>				ATER							ΛIC	)/VI.		·ouc		
					SAM	PLES										Cu (						Γ
(E)	ELEVATION (m)		ō			٦				ORA CKE				<b>▲</b> ★		IELD OCK			st R Van	• □	ILL/ Well Eter	
DEРТН (m)	ATIO	SOIL DESCRIPTION (USCS)	STRATA PLOT		雀	E %	<b>3</b> E ≥	OTHER TESTS / REMARKS			50 kF	'a	1	00 k	Ра	1.	50 k	Ра	200	kPa 	IOR IOR ZOMI	l
DE	ELEV	Topsoil	STRA	TYPE	NUMBER	ECOVERY or ICR	N-VALUE or RQD %			TER (N-v					RBER	G LIN	Λ <b>I</b> TS	¥	P W →	W <sub>L</sub>	BACKFILL/ MONITOR WELL PIEZOMETER	
0 -	190.0		-77)			~			<u> </u>	10	20		Water 0	40		d Blow 0	60		70	BO		ļ
-	189.5	Brown, firm, moist, silty sand TOPSOIL with rootlets		SS	1	400	7		•													-
-		Brown to greyish-brown, stiff to very stiff, dry to moist, SILTY CLAY - trace sand																				
] - - -				SS	2	375	21														-	
				SS	3	450	19				•											
2 -																					_	
				SS	4	450	18				•											
3 -																					_	
				SS	5	450	16															
4 -		Greyish-brown		SS	6	450	12			•											_	
						·																
- - - -				SS	7	450	11			•											+	
- - - -																						-
5 -	183.9	Grey, firm, moist, SILTY CLAY		SS	8	450	6			*												ļ
-	183.2																	•				ŀ
7 <del>-</del> - -		End of Borehole at 6.5 m																			_	F
																						F
3 ]									<u> </u>			:::								1::::		ŀ
. ~	/FU	20/4/DOL <b>13</b> /425/447	<b>1</b> 0-		···	100		Drilling Co		or:										ogge		_
	KFILL S ENTON		<b>_</b> GR ]SA1	OUT	₩		NCRE UGH	TE Drilling Me Completio		\th.	۷ ۲	15 ~							-	age age	ved By:	_

CL		tantec Lockbridge Developmen	ıt In	С				OLE RECO		CO	ORD	INA	TES			PR	:OJE	ECT	NO:		1114- 14144	
		T: Smithville 3A Block 9																			7.707m	
LC	CATIO	ON: <u>Smithville 3A / Block Plan</u>	ı 9,	Smit	hvill	e, O	N		618	8235	.0N	477	7146	9.0E	=	DA	4UTA	<b>И:</b> .	Ge	ode	tic	
DA	TE BC	PRED: <u>March 1, 2024</u>							_ WA	ATER	LEV	EL:_	N/A	١								_
					SAM	PLES			UND	RAIN	ED SI	HEAF	R STR	ENG	TH,	Cu (k	(Pa)					Г
ا ء	Ξ		_							ORA <sup>®</sup>			⊺ <b>4</b>			ELD V			ST R VAN	- □	L/ FRL/	
DEPTH (m)	o No I	SOIL DESCRIPTION	15			mm''	ш №	OTHER TESTS /			0 kPc			0 kPd			. 1 311 0 kPc			kPa	S K F I	
	ELEVATION (m)	(USCS)	STRATA PLOT	TYPE	NUMBER	OVERY (	N-VALUE or RQD %	REMARKS		TER C					BERC	3 LIM	ITS	W <sub>F</sub>	. W	W <sub>L</sub>	BACKFILL/ MONITOR WELL/ PIEZOMETER	
		Topsoil	1			REC			SPT	(N <del>-</del> va	lue) B				6) and	Blow Co	unt		•			
0 -	189.7	Brown, firm, moist, silty sand TOPSOIL	-1//						1	10 	20	30	) ::::	40	5		60 :   : :		'0 	80    : : : :		ł
-}		with rootlets		SS	1	425	6		•													E
4	189.2	Duran de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie de la companie																				E
1		Brown to greyish-brown, stiff to very stiff, dry to moist, SILTY CLAY																				Ł
. 1		- trace sand		66		450	,,,															ŧ
' <b>1</b>				SS	2	450	15														1	F
-																						E
+									<b>}</b>													F
1				SS	3	425	25															F
2 -										1											+	F
-																						F
4				SS	4	450	17															F
1				-	,																	F
,										L	<u>:</u>  :	<u>:</u> :	<u>:</u> :::		<u>:</u> :							ŧ
3 <del> </del>		Greyish-brown																			1	F
-				SS	5	450	18				• ::											F
4																						F
‡					4																	F
₄ ┨				SS	6	450	18			1 : : :	•   : :		:::								+	Ē
-																						F
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‡				00	_		1.0															ŀ
, <u> </u>				SS	7	450	18															Ė
´ ]																						E
-																						F
=																						ŧ
- ]																						F
; <del>-</del>	183.6																				†	E
‡		Grey, firm, moist, SILTY CLAY		SS	8	450	18															F
4	183.2	Engl of Developing 17.5 ··					_		: : : :													ŧ
]		End of Borehole at 6.5 m Borehole caved in at 5.8 m upon																				F
7		completion of drilling																			1	F
=																						F
‡																						F
7																						Ė
]																						E
<b>,</b>				Ц	<u> </u>	1	1	Drilling Co	ntract	⊥∷: or:	:1:	::1		: ا	:::	l:::	نيا:		 	ogge	d Bv.	上
Δ (~ l	(FILL S	ymbol Rasphalt	<b>]</b> Ç₽	OUT	<u>                                     </u>		NCRE			<u></u>											ved By:	_
	ENTON		]SAN		Ŀ <i>⊵</i>	SLO	ugh	Completic		oth:	6.55	m							_	age		_

	JENT:	•	t In	c	E	BOF	REH	OLE RECO	вн	COC		NAT	ES						. : <u>16</u>	1115- 141447	73
		T: Smithville 3A Block 9		C :1	االادحا	- 0	NI .		-			177	1470	05						9.366m	
	ATE BC	ON: <u>Smithville 3A / Block Plan</u> DRED: <u>March 1, 2024</u>	17,	<u>Smir</u>	nvill	e, O	'N			ATER L				.UE		DAI	IUM:		<u>eoae</u>	IIC	_
	112 00				SAM	PLES				RAINE		_		NGTH	H, Cu	ı (kP	a)				Ē
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT		85	(mm) %	# # %	OTHER TESTS / REMARKS		ORAT CKET F 50			*		POC	CKET	NE TI SHEA kPa	AR VAN	◆ IE □ 0 kPa	BACKFILL/ MONITOR WELL/ PIEZOMETER	
2	ELEV.	Topsoil	STRAI	TYPE	NUMBER	ECOVERY or TCR	N-VALUE or RQD %			TER C (N <del>-</del> va <b>l</b> u		ows	/0.3m	)				V <sub>P</sub> W	W <sub>L</sub>	BA MONI PIE	
0 -	189.4	·	-1/)			~			1 !	0	20	30		ont (%) a	nd Blow			70	80		L
-	188.9	Brown, stiff, moist, silty sand TOPSOIL with rootlets		SS	1	425	9														-
-		Brown to greyish-brown, stiff to very stiff, dry to moist, SILTY CLAY - trace sand																			-
- I - -				SS	2	400	22														-
-				SS	3	425	22				•										-
2 <del>-</del> - -																				1	-
-				SS	4	450	12			•											
3 <del>-</del> 3 -				SS	5	450	14													-	
-																					
4 — - -				SS	6	450	11			•										_	
-		Greyish-brown																			
- 5 -				SS	7	450	14			•											Ė
																					F
-																					-
6 <del>-</del> - -	183.3	Grey, stiff, moist, SILTY CLAY		cc			10													-	E
-	182.8	End of Borehole at 6.5 m		SS	8		10		: : : : :	<b>7</b>	: :										F
- - - 7 –		ETA OF BOTOTIONS OF U.S. III																			E
-																					E
- - - 0																					E
8 –						*		Drilling Co	ntract	or:				• • • •			•		.ogge	d By:	_
АC	KFILL S		GR SA1	OUT	P	CO1  SLO	NCRE	TE Drilling Me Completic											Reviev	ved By: 1 of 1	

DATE BORED:  (a)  Topsoil  189.7  Brown, stiff with root  189.2	March 1, 2024	STRATA PLOT		SAM						D83 036.		47	771∠	171.	0E							.686m	
Topsoil  Topsoil  Topsoil  Brown, stiff with roof  189.2  Brown, stiff SILTY CLA  2 -	SOIL DESCRIPTION (USCS)	A PLOT		SAM				\	VA	TER	LEV	EL:	N/	Ά					·· -				_ <del>_</del>
189.7 Brown, stiff with root 189.2 Brown, stiff SILTY CL/		STRAI	TYPE	NUMBER		N-VALUE or RQD %	OTHER TESTS / REMARKS	L P	ABC OC	ORAT KET 50	FOR PEN 0 kP 1	Y TE a TEN	ST 1	▲ ★ 00 k		POC	0 VA CKET 150	SHE kPc	EAR	VANE	kPa <del> </del>	BACKFILL/ MONITOR WELL/ PIEZOMETER	
Brown, stif with root  189.2  Brown, stif SILTY CL/					REC				10		20	1			it (%) an	nd Blow 50		nt 50	70	) 8	30		
Brown, stiff SILTY CLA	ff, moist, silty sand TOPSOIL tlets		SS	1	425	12				•													
	ff to very stiff, dry to moist, AY																						
			SS	2	450	23																_	
			SS	3	425	24																	
3 -																						_	
3 -			SS	4	450	16				•													
																						-	
1			SS	5	450	13				•													
4 -			SS	6	425	. 12				• : :													
5 -			SS	7	450	11				•												-	
]																							
3 183.6 Brownish-	grey, firm, moist, SILTY CLAY																						
- Field var	ne max at 6.85 m		SS	8	450	7																	
182.8 End of Bo	orehole at 6.5 m																			•			
1																							
1																							
ACKFILL SYMBOL	ASPHALT [7]			_		NCRE	Drilling Cor TE Drilling Me			r:											ogge	d By: ved By:	_

PR	JENT: OJEC	tantec  Lockbridge Developmen  Smithville 3A Block 9  Smithville 3A / Block Plan						_	BH [N	AD8	33]						В	ΗЕ	ELΕ\	/AT	ION	: <u>16</u> : 1 <u>8</u>	14144 9.65m	7;
	ATE BC								W.	ATEI	R LE	EVE	L:_	N/	A					_				_ <del>_</del>
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	SAMPLES																					
0 -	189.7	Topsoil	-//			2			1	0	. 2	ρ								70	8	30		ļ
-	189.2	Brown, stiff, dry, silty sand TOPSOIL with rootlets - some gravel		SS	1	457	15			•														
-		Brown to brownish-grey, very stiff to hard, dry to moist, SILTY CLAY - trace sand		22	2	457	31																	
- - -				33		43/	31																	
-				SS	3	432	26						•											
2 <del>-</del> - - -																							1	
-				SS	4	406	27						•									D.:_1614] N: 189.6 Reodetic  NE		
3 -				SS	5	457	15				<b>D</b>											Logged B		
-	185.8	Grey, firm, moist to wet, SILTY CLAY			V																			
4 -		- trace gravel		SS	6	102	8																	
-				SS	7	381	7		•															
5 <del>-</del> - -																					•			
-																								
6 -				SS	8	457	5		•															
-																				•				
7 -																								
-				SS	9	457	7		•															
8 _			МП		<u> </u>	BH COORDINATES PROJECT NO.: 161414  [NAD83] BH ELEVATION: 189.65m 618465.0N 4771370.0E DATUM: Geodetic  WATER LEVEL: N/A  WATER LEVEL: N/A  WATER CONTENT & FIELD VANE TEST POCKET PEN. POCKET SHEAR VANE TEST POCKET PEN. POCKET SHEAR VANE TEST POCKET PEN. SPOKET SHEAR VANE TEST POCKET PEN. POCKET SHEAR VANE TEST SFF (N-volke) BLOWS/0.3m 10 20 33 40 50 60 70 80  WATER CONTENT & ATTERBERG LIMITS W. W. W. I. SFF (N-volke) BLOWS/0.3m 10 20 33 40 50 60 70 80  4 405 22  4 405 27  7 381 7  Drilling Contractor: Logged By:	_ _																	
AC	KFILL S		GR SA1		D	COI	NCRE														-			

	IENT:		t In	c					BH			DIN	ATES	5						). : <u>    1  </u>	H117- 314144	173
		T: Smithville 3A Block 9  N: Smithville 3A / Block Plan	۱ 9,	Smit	hvill	e, O						47	7713	70.0	ЭE					√: 1 <u>8</u> eode	89.65m etic	<u> </u>
DA	ATE BC	PRED: <u>February 28, 2024</u>								ATER DRAIN					GTH	Cu	(kPa	7)			<u> </u>	=
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	PLOT		SAM	1		OTHER TESTS /	LA	BORA CKET	TOR	RY TE 1.	ST		F	IELD	VA	ne te Shea	1AV Я	♦ IE □ 0 kPa	BACKFILL/ MONITOR WELL/ PIEZOMETER	MEILI
DEPI	ELEVAI	(USCS)	STRATA PLOT	TYPE	NUMBER	RECOVERY (1	N-VALUE or RQD %	REMARKS		TER (		BLO'	T & A WS/0.	ATTEI .3m		G LI	MITS	S <b>1</b>		W <sub>L</sub>	BAC MONITO	-
8 -	181 4	Grey, firm, moist to wet, SILTY CLAY	24.1							10	20		30   : :	40	1 (%) an	50	60		70   : : :	80	:	ŧ
-	181.3	- frequent rock fragments  End of Borehole		SS	10-	-	50														:	F
-		Spoon and Auger Refusal due to inferred bedrock at 8.4 m																				
9 -																					:	
0 -																						
- 1 —																						
2-																					:	
3 -																						
-																						
4 -																					:	
.																						
5 -																						
-																						
6																						F
								Drilling Co	ntract	or:										ogge	ed By:	

PR	IENT: OJEC	Lockbridge Development Smithville 3A Block 9 N: Smithville 3A / Block Plan						OLE RECOF	_	bh [n <i>a</i>	\D8	3]	RDIN V 4			.0E	Е	SH E	ELEV	ATIC	DN:	: 16	1118- 14144 0.57m tic	73
		DRED: <b>February 28, 2024</b>							_				VEL											_
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER	1	N-VALUE or RQD %	OTHER TESTS / REMARKS	1	-AB	ORA CKE	ATO F PE 50 k — 1	RY T N. :Pa	EST	▲ ★ 100	F kPa H ERBER	POC	VA KET 50 I	NE TE SHEA kPa	R V	ANE 200   W   D	kPa	BACKFILL/ MONITOR WELL/ PIEZOMETER	
0 -	190.6	Topsoil				ž					0	20			Conte	ent (%) an	nd Blow 50	Count		70_	. 8	0		
-	190.1	Brown, stiff, moist, silty sand TOPSOIL with rootlets		SS	1	457	13				•													ŀ
-		Brown to brownish-grey, very stiff, dry to moist, SILTY CLAY - trace sand																						
-    -				SS	2	457	27																	
				SS	3	432	27																	
2 - - -																								
-				SS	4	457	21					•	<b>X</b>											
3 <del>-</del>				SS	5	457	19					•												
-																								
4 <del>-</del>				SS	6	457	17					•												
-		Brownish-grey		22	7	407	15																	
- 5 <del>-</del> -	185.6	Grey, stiff to very stiff, moist to wet, SILTY CLAY		SS	7	406	15																	
- - -		- frequent gravel and rock fragments below 7.6 m																						
- - 6 – -																								
-				SS	8	381	11				•													
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-				SS	9	381	21						)   											
3 –	<u> </u>				<u> </u>	1	1	Drilling Cor	ntro	: Icto	or:					·		. : 1			Lc	gge	d By:	_
	KFILL S ENTON		GR SAN	OUT	D	COI SLO	NCRE	TE Drilling Met															ved By: 1 of 2	_

PR	IENT: OJEC	Lockbridge Developme    Smithville 3A Block 9						OLE RECOI	_	[NA	.D83	]		TES	0.05	ВН	H EL	EVA	ATIO	D. :_ N:	3H11 16141 190.57	1473
	CATION TE BO	DN: <u>Smithville 3A / Block Pla</u> DRED: <u>February 28, 2024</u>		Smil	<u>hvill</u>	e, O	N							7136 <b>N/</b>		D,	ATU	M: .	_ <u>G</u>	eod	detic	
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER		N-VALUE or RQD %	OTHER TESTS / REMARKS		AB(	ORAT CKET I	OR' PEN ) kP	Y TES a	T ▲		FIELD Y POCK 15	VAN ET SH 50 KF	E TES	1AV 9	NE V	ACKEI	PIEZOMETER
8 –						RECC				SPT (		ue) 20			ntent (%) ar	nd Blow Ci	ount 60		• '0	80		_
																						- - - - -
9 -	181.1			SS	10	152	50									•						-
5		End of Borehole Spoon and Auger Refusal due to inferred bedrock at 9.5 m																				
10 -																						
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- 12 - - -							)															
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- 14 <del>-</del> - -																						
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sA∩I	(FIII S	symbol 📆 asphalt 📗	GR	OLIT			NCRE	Drilling Cor Drilling Me			r:										ged By: ewed [	 Sy:

Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Com	1119-2 1414473 3.393m tic	<u>16</u> 1 <u>88</u>	ON:	ATI	LEVA	H EL	ВН		0E		TES '137'			]	83]	ΑD	BH [N/	_	IOLE R						dge Development le 3A Block 9 le 3A / Block Plan	T: Smith	IENT: OJEC	PR
Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier   Lab Carrier										Δ_	N/A	: <u>N</u>	√EL:	LEV	R L	٩TE	W/	_				1 7 1111						
Toppoil   Spri (N-valve) RLOWSO, 3m   Spri (N-valve) RLO	BACKFILL/ MONITOR WELL/ PIEZOMETER	(Pa	200	R V	, NE TE SHEAI	VAN ET SI 50 KF	ELD \ DCKI	FIE PC	<pa< th=""><th><b>▲</b> <b>★</b> 00 k</th><th>± 100</th><th>EST</th><th>RY TE N. Pa</th><th>OR PEN kP</th><th>RATO ET P 50</th><th>SOF CKI</th><th>LAB PO</th><th></th><th>OTHER REM</th><th>VALUE RQD %</th><th></th><th></th><th>TYPE</th><th>TRATA PLOT</th><th>DESCRIPTION (USCS)</th><th>so</th><th>ELEVATION (m)</th><th>DEPTH (m)</th></pa<>	<b>▲</b> <b>★</b> 00 k	± 100	EST	RY TE N. Pa	OR PEN kP	RATO ET P 50	SOF CKI	LAB PO		OTHER REM	VALUE RQD %			TYPE	TRATA PLOT	DESCRIPTION (USCS)	so	ELEVATION (m)	DEPTH (m)
BBA   Brown, stiff, day, silry sand TOPSOIL with roote's		•	•	ı						3m	S/0.3r	)WS,	BLO						5	Ζō	RECO	Z				Topsoil		
Brown, stiff, moist, SILTY CLAY  1	-	)	81	70		60	)	50	)	40		30		20	2	10	1					1	SS		ilty sand TOPSOIL with			0 -
SS 3 432 22  SS 3 432 22  SS 4 457 14  SS 5 457 14  Brown, stiff, moist, SILTY CLAY  184.2  Grey to brownish-grey, firm to stiff, moist, SILTY CLAY  SS 7 457 10																				17	354	2	22		y stiff, moist, SILTY	CLAY		-
184.6 Brown, stiff, moist, SILTY CLAY  184.2 Grey to brownish-grey, firm to stiff, moist, SILTY CLAY  55 7 457 10																				17	330		33					-
3 - 184.6   SS   4   457   16   SS   5   457   14   SS   6   457   13   SS   7   457   10   SS   7   457   10														•						22	432	3	SS					2 -
184.6  Brown, stiff, moist, SILTY CLAY  SS 6 457 13  Grey to brownish-grey, firm to stiff, moist, SILTY CLAY  SS 7 457 10															•					16	457	4	SS					-
Brown, stiff, moist, SILTY CLAY  184.2  Grey to brownish-grey, firm to stiff, moist, SILTY CLAY  SS 6 457 13  SS 7 457 10																												3 -
Brown, stiff, moist, SILTY CLAY  SS 6 457 13  Grey to brownish-grey, firm to stiff, moist, SILTY CLAY  SS 7 457 10															•					14	457	5	SS					-
moist, SILTY CLAY  SS 7 457 10															<b>X</b> : :				_	, 13	457	6	SS					4 -
SS 8 457 7																•				10	457	7	SS					5 <del>-</del>
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7 - 181.1 - SS 9 0 50 - End of Borehole	+							•												-50	0	9	SS					7 – - - -
Spoon and Auger Refusal due to inferred bedrock at 7.3 m																									er Refusal due to sk at 7.3 m	Spoon and Au		-
Drilling Contractor: Logge  ACKFILL SYMBOL ASPHALT GROUT CONCRETE Drilling Method: Revie	d By: ved By:			:		:		1		, 1		:				or:							1			1		-

()		itantec Lockbridge Developmer	nt In	c	E	3OF	REH	OLE RECOI		COC	)RD <b>I</b>	NAT	ΓES			PR	3O I	ECT	. NO			
		T: Smithville 3A Block 9																				
LO	CATIC	ON: <b>Smithville 3A / Block Pla</b> ı	n 9,	Smit	hvill	e, O	N					477	137	1.0E								_
DA	TE BC	PRED: <u>February 27, 2024</u>							_ WA	ATER L	.EVE	L: <u> </u>	N/A	١								_
					SAM	PLES				RAINE						•						
Ē	E) N		ō			٦				ORATI CKET F		1E21	*			ELD \ OCKE				E BYCKIII PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF THE PROCESS OF	ILL/ ETER	
рертн (т)	ATIO	SOIL DESCRIPTION (USCS)	'A PL		<u>ج</u>	m   %	<b>3</b> 8	OTHER TESTS / REMARKS		50	kPa 		100	kPc	<b>a</b>	15	0 kP	'a	200	) kPa	OREI OREI OREI OREI OREI OREI OREI OREI	l
<u> </u>	ELEVATION (m)	(650.5)	STRATA PLOT	TYPE	NUMBER	COVERY	N-VALUE or RQD %			TER CO					ERC	3 LIM	, NTS	W <sub>F</sub>	• W	w <sub>L</sub>	BA MONI PIEZ	
	189.2	Topsoil				2			1	0 :	20	wa 30		tent (%)	) and 1	Blow Co	ount 60	7	70	80		l
° †		Brown, very stiff, dry, silty sand TOPSOIL with rootlets		SS	1	381	18															ŀ
1	188.8	Will Troolions		33		301	10															ŀ
=		Brown to grey, stiff to very stiff, dry to moist, SILTY CLAY																				ŀ
-		- trace sand																				ŀ
1 -				SS	2	406	22				•			1								ŀ
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6 <del> </del>	183.1	Brownish-grey, stiff, moist, SILTY CLAY																			Ť	ŀ
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1	181.5	End of Borehole		SS	9	152	50				: :				•	):::: :::::						f
<sub>8</sub> 1		2.13 01 2010/10/10		Ш				D.::112	1::::	<u> </u>	1			1		:::	: :		L:::::	<u> </u>	-I D: ::	F
۸ 🗢	·	WARDOL MADDIANT	<b>1</b> ~-		<u>  • •                                   </u>	100.	.1055	Drilling Cor		or:												-
	(FILL S INTON		■GR SA1	OUT	. <i>⊵</i>	SLO SLO	NCRE	TE Drilling Me Completio		th.	7 77	m									vea By: 1 of 2	_

	IENT:	Stantec Lockbridge Developmen	t In	c				OLE RECO		НС	:00	DRD	INA	ATES	5			PR	OJE	ECT	NO		1120- 14144	
		T: Smithville 3A Block 9 ON: Smithville 3A / Block Plan	9,	Smit	hvill	e, O	N						47	713	71.	0E						: 1 <u>89</u> eode	7.233m tic	<u>1</u>
		DRED: <b>February 27, 2024</b>								/AT	ER L	.EV	EL:	N/	Α									_
	Œ				SAM	1	1				AINE RATO							u (kl .D V.		E TES	Т	•	, iii /	
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	A PLOT		_	(mm)	, u %	OTHER TESTS / REMARKS	PC	)Ck	ET P 50	EN. kPc			<b>★</b> 00 k		PO		T SH ) kPc			E 🗖 D <sub>.</sub> kPa	CKFILL OR WI	
DEF	ELEVA	(USCS)	STRATA PLOT	TYPE	NUMBER	ECOVERY OF TCR 9	N-VALUE or RQD %	KEMAKKS			R Co -va <b>l</b> u		LOV	VS/0.	.3m					W <sub>P</sub>	w •	W <sub>L</sub>	BACKFILL/ MONITOR WELL/ PIEZOMETER	!
8 –		Spoon and Auger Refusal due to				~				10	:::	20	3	/ater ⊂ 0   : :	40	it (%) ar	50 50	w Cou	int 60   : :	7	0	80		ŧ
-		inferred bedrock at 7.8 m																						F
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ACI	KFILL S ENTON		GR SA1	OUT	D	CO	ncre UGH		thod	:											F		ved By:	:

	JENT:	tantec  Lockbridge Developmen  Smithville 3A Block 9	t In	c		301	REH	OLE RECO	BH			RD	INA	ATES								. : <u>16</u>	1121- 14144 7 21m	173
		DN: Smithville 3A / Block Plan	۱9,	Smit	hvill	e, O	N					N	47	713	70.0	DΕ						: <u>I 8</u> eode	7.21m tic	
DA	ATE BC	PRED: <u>February 27, 2024</u>		<u> </u>					_					N/		CTU		/1-	D\				<u> </u>	=
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER	1	N-VALUE or RQD %	OTHER TESTS / REMARKS	LA PC	BOR OCKI	ATC ET PI 50	ORY EN. kPa H	TES	11 & A	▲ ★ DO k 	F	F <b>I</b> EL PO(	D V	'AN T SH D KP	E TES	200	♦ E □ O kPa	BACKFILL/ MONITOR WELL/ PIEZOMETER	
	187.2	Topsoil				REC						e) BI :0				t (%) ar				-	•	80		
0 -	186.8	Brown, stiff, dry, silty sand TOPSOIL with rootlets - some gravel		SS	1	356	13			10					40		50		60	/	0	00		ŧ
- - - 1 —		Brown to grey, stiff to very stiff, dry to moist, SILTY CLAY - trace sand		SS	2	356	20																	
- - -																								
2 -				SS	3	381	11																_	
-				SS	4	457	14																	
3 -				SS	5	457	14				•													
- - - 4 –	183.4	Brown to grey, firm, moist, SILTY CLAY		SS	6	432	7																	
-	182.6					102																		
5 –	182.2	Brown to grey, firm, moist, SILTY CLAY - frequent rock fragments  End of Borehole		SS	7	381	29						•											
-		Spoon and Auger Refusal due to inferred bedrock at 5.0 m																						
6 —																								
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- - 7 <del>-</del> -																								
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8 _						1		Drilling Co	ntrac	tor:		] : :						:::				ogge	d Bv.	上
	KELL C	ymbol Rasphalt	<b>1</b> _p	OUT	<u> </u>	100	NCRE																ved By:	_

PR	IENT: OJEC	tantec Lockbridge Developmen Smithville 3A Block 9						OLE RECO	BH [N/	COC	]				_	В	ΗE	LEV/	4OITA	. : <u>16</u> I: 1 <u>89</u>	1122- 141447 2.005m
	OCATIO NTE BO	DN: <u>Smithville 3A / Block Plar</u> DRED: <u>February 28, 2024</u>	1 9,	Smit	<u>hvill</u>	e, O	N			3333.0 NTER L					E	D	ATL	JM:	_G	eode	tic
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT		SAM		% %	OTHER TESTS / REMARKS	LAB	RAINE ORAT CKET F 50	ORY	TES <sup>-</sup>	⊺ <b>⊿</b>		FI P	ELD OCK	1AV	, NE TE SHEA	R VAN	♦ E □ O kPa	BACKFILL/ MONITOR WELL/ PIEZOMETER
DE	ELEV.	(6363)	STRAI	TYPE	NUMBER	COVERY or TCR	N-VALUE or RQD %			TER C (N-va <b>l</b> l					BERG	G LIN	∧ITS	W	P W	w <sub>L</sub>	BA MON PIE
0 –	189.0	Topsoil				R			1 1	0 :	20	w. 30		ntent (		Blow C	Count 60		70	80	
J - -	188.5	Brown, stiff, dry, silty sand TOPSOIL with rootlets		SS	1	400	8		•												
1		Brown, stiff to very stiff, dry to moist, SILTY CLAY - trace sand, gravel and rootlets																			
				SS	2	425	18														_
				SS	3	450	18														
2 -																					†
				SS	4	450	16			•											
3 -				SS	5	450	14			•											
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- + - - -				SS	6	450	15														
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1111	182.5	Ford of Donale de Adv Ford		SS	8	450	28					•									
, , ,		End of Borehole at 6.5 m																			_
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		ymbol 🔛 asphalt 🔃	-	OUT	· ·		√CRE	Drilling Col		or:										ogge	d By: ved By:

	IENT:	itantec Lockbridge Developmen	t In	c	E	BOF	REH	OLE RECO		COC	ORD	INA	TES							: <u>16</u>	1123- 14144	73
		T: Smithville 3A Block 9		C 14	االادحا	- 0	NI .		_		-	477	7107	1 0	_						'.983m	1
	ATE BC	DN: <u>Smithville 3A / Block Plan</u> DRED: <u>February 29, 2024</u>	17,	<u>smir</u>	<u>nvilli</u>	e, O	'N			3234. ATER I						D/	ATUI	M: ,	Ge	ode	ric	_
	(12.00				SAM	PLES			_	RAINE		_			TH,	Cu (k	(Pa)					Ē
<u>ت</u>	Έ)		٦			_				ORAT			⊺ <b>4</b>			ELD \			ST R VAN	<b>♦</b>	L/ VELL/	
DEPTH (m)	IION	SOIL DESCRIPTION	A PLC		_	E S	ш %	OTHER TESTS /	10		kPa			o <sub>l</sub> kPo			0 kP			kPa	OR V	
DEP	ELEVATION (m)	(USCS)	STRATA PLOT	TYPE	NUMBER	COVERY (	N-VALUE or RQD %	REMARKS		.TER C (N-va <b>l</b> i					BERC	3 LIM	ITS	W <sub>F</sub>	. W	₩ L <b>H</b>	BACKFILL/ MONITOR WELL PIEZOMETER	
_	188.0	Topsoil				Ä					20		ater Cor			Blow Co	ount 60	7	0	80		
0 -		Brown, stiff, dry, silty sand TOPSOIL with rootlets		SS	1	450	8			Ť	Ĩ			Ĩ						Ī		F
-	187.5	10011013		55		450	8															F
-		Brown to greyish-brown, stiff to hard, dry to moist, SILTY CLAY																				F
		- trace sand and gravel		66		450																E
				SS	2	450	22															F
-																						Ė
-				SS	3	450	20															F
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-																						ŀ
		Greyish-brown																				Ė
<b>,</b>				SS	6	450	12			•												ŀ
-	183.4																					Ē
-	100.4	Brown, stiff to hard, dry to moist, SILTY CLAY (POSSIBLE TILL)		20	_																	ŀ
5 -		- frequent gravel		SS	7	450	14			•						:::						E
- -																						F
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6 -															::					: : : :	1	F
				-	_	6==																E
1	181.5			SS	8	375	55									•						F
		End of Borehole at 6.5 m																: <del>T</del>				F
7 -																				: : : :	1	F
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ACI	KFILL S		GR SAN	OUT	<u> </u>		NCRE UGH	TE Drilling Me Completic											R	eviev	ved By: 1 of 1	

DEPTH (m)		DN: Smithville 3A / Block Plan  PRED: February 29, 2024  SOIL DESCRIPTION	9,	Smit	<u>hvill</u>							3]										.∶ <u>16</u> √: 1 <u>88</u>	3.768n	
OEPTH (m)						e, O	N									3.0E		D	ATL	JM:	_G	eode	tic	_
0 1	ELEVATION (m)	SOIL DESCRIPTION			SAM	PLFS									I/A STRE	NG1	ГН, (	Cu (	kPa	)				Ŧ
		(USCS)	STRATA PLOT	TYPE	NUMBER		N-VALUE or RQD %	OTHER TESTS / REMARKS		PO	CKET	7 PE 50 k	N. Pa		<b>▲ ★</b> 100	kPc	PC a	DCK 1.5	ET S 50 kl		R VAN 20	♦ IE □ O kPa W L	BACKFILL/ MONITOR WELL/ PIEZOMETER	K H
	ا م م	Topsoil				REC								Wate	/0.3n er Cont	ent (%)					•	00		
- 11	88.3	Brown, stiff, dry, silty sand TOPSOIL with rootlets	]/) []	SS	1	450	9				0	20	)	30		.O	50	) : : : : : : : :	60		70	80		
- - - - - - - - - - - - - - - - - - -		Brown to greyish-brown, stiff to very stiff, dry to moist, SILTY CLAY - trace sand		SS	2	400	19																	
2 -				SS	3	450	23						•											
1				SS	4	425	18					•												
3 -									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\															
1 - 1				SS	5	450	17																	
4 -				SS	6	450	18		:			•												
-		Greyish-brown		20	_	150																		
5 <b>-</b>				SS	7	450	12				•													
-																								
6 - - - - - 1	82.2	Brown, stiff, wet, SILTY CLAY - frequent gravel		SS	8	400	15				•													
7 <u>1</u> -		End of Borehole at 6.5 m Borehole caved in at 5.5 m upon completion of drilling	<u> </u>																					
- - - - -																								
Drilling Contractor:									.ogge	d By: ved By:	_													

PROJICA (W) DATE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE (W) NOILE	JECT:Smith ATION:Smith E BORED:	oridge Developmen ville 3A Block 9 ville 3A / Block Plan February 29, 2024								ND83]		IATES							<u> 14144</u>
DATE (W)	ation: <u>Smith</u> Bored: _	ville 3A / Block Plan	1 9, I	Smit	hvill	- 0									1		JIN.	เอง	.876m
189		February 29, 2024				<u>e, o</u>	N			-		771278	3.0E		ATUM				
189	<u>(c</u>											7.3							
189	<b>준</b>				SAM	PLES			UND	RAINE	D SHE.	AR STRE	NGTH,	, Cu (k	(Pa)				
189	<u>د</u>		_					_		ORATO CKET P		ST ▲		FIELD \			A NIE	<b>+</b>	L/ ER
189	SOI SOI	L DESCRIPTION	FIC		_	E.	ш №	OTHER TESTS /			kPa		,kPa		0 kPa		200 k		OR V
	ELEVA	(USCS)	STRATA PLOT	TYPE	NUMBER	RECOVERY (mm) or ICR %	N-VALUI	REMARKS				IT & ATT		RG LIM	IITS	W <sub>P</sub> \	∨ ∨ >		BACKFILL/ MONITOR WELL PIEZOMETER
	Topsoil 39.9					찙			1			Water Cont	ent (%) an	id Blow Co	ount 60	70	- 80	)	
- 189		y, silty sand TOPSOIL with		cc	,	275	9				Ĭ	Ĭ				Ť			
	39.4			SS		375	9												
		ish-brown, stiff to very stiff, LEAN CLAY (CL)																	
	- trace sand											Φ							
				SS	2	400	22				•								
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184	34.8			, 33 		430	12			T::::								<u> </u>	
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CL		itantec Lockbridge Developmen	ıt In	С				OLE RECO		НС	COC	RD	INA	TES			F	PRC	DJEC	CT N			101-  4144	
PR	OJEC	T: Smithville 3A Block 9							[1	JA۱	083]						E	3H (	ELEV	/ATIC	ON:	1 <u>89</u>	.876m	1_
		ON: <u>Smithville 3A / Block Plar</u>	1 9,	<u>Smit</u>	<u>hvill</u>	e, O	N															<u>odet</u>	ic	_
D/	ATE BC	DRED: <u>February 29, 2024</u>							_		ER L AINE									14,	202	24		F
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT		SAM	1	% E	OTHER TESTS / REMARKS	LA	ABC	RATO	ORY	TES	Τ 4		F P	IELD OC	· VA KET	NE T	AR V		<b>♦</b> <b>□</b> kPa	BACKFILL/ MONITOR WELL/ PIEZOMETER	
חם	ELEVA	(USCS)	STRAL	TYPE	NUMBER	RECOVERY or ICR	N-VALUE or RQD %	REMARKS			R C( -va <b>l</b> u		LOW		3m					W <sub>P</sub> \	/ / •	<b>∦</b>	BA( MONI) PIEZ	
8 -	181.5	Spoon and Auger Refusal due to inferred bedrock at 9.6 m								10	2	20	30		40		50	6		70	80	0		ŀ
	101.0	Very poor to good quality grey DOLOSTONE BEDROCK - highly to moderately weathered, flat to vertical orientation, rough irregular undulating to smooth undulating																						
		UCS = 131.4 MPa at 10.1 m		HQ	1	57%	0%																	
0 -																								
				HQ	2	100%	18%1						O:											
1 -				НQ	3	100%	85%																	
	178.5	End of Borehole at 11.4 m Water level encountered at 9.3 m upon completion of drilling			4																			
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6 –	<b>-</b>	lator loval Marrier d'Or Dete te l'elle			1	1	1 1	Drilling Co	ntrac	tor	:	1::	::1		:1:		1::	ا::ا			LO	gged	By:	۰
۸	¥ V\ KFILLS	/ater Level Measured On Date Indicat SYMBOL RASPHALT	ea <b>1</b> GR	OUT		lcoi	NCRE.	E Drilling Me	thod	:											Re	eview	ed By:	

CLIE		tantec Lockbridge Development	t In	c	E	3OF	REH	OLE RECO		НС		)RF	IN.	ATES			F	>R <i>C</i>	).IF(	OT 1			/102 14144	
		: Smithville 3A Block 9											,	1120									7.646n	
		N: Smithville 3A / Block Plan	9,	Smit	hvill	e, O	N						47	714	69.C	DΕ						ode		
DATE	Е ВО	RED: <u>March 1, 2024</u>							_ ٧	VAT	ER L	.EVI	ΞL:_	2.7	7 m	o r	1 <i>N</i>	۱ar	ch	14,	20	24		_
					SAM	PLES								R STF										Τ
٤   ٤	Ξ		L								RAT KET F			ST 4	<b>▲</b>				NE I She		/ANE	•	L/ HELL	<u> </u>
DEPTH (m)		SOIL DESCRIPTION	A PLC		<u>~</u>	E N	ш %	OTHER TESTS / REMARKS				kPc			00 k				kPa			kPa	OR FINANCE	:
	ELEVATION (m)	(USCS)	STRATA PLOT	TYPE	NUMBER	COVERY OF TCR 3	N-VALUE or RQD %	REMARKS						* & A VS/0.		RBER	G LI	MIT	S	W <sub>P</sub>	w O	W <sub>L</sub>	BACKFILL/ MONITOR WELL/	-
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0 +		Brown, stiff, dry, silty sand TOPSOIL with								Ĭ		Ĭ:	::		Ť		Ĭ	::		Ĭ				Ė
]18	39.2	rootlets	IJ	SS	1	425	10			•							: :							ŧ
+		Brown to greyish-brown, stiff to very stiff, dry to moist, SILTY CLAY	A									: :					: :							E
1		- trace sand																						ŀ
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<u> </u>		Greyish-brown		CC	_	450	1,4					: :	::				: :							Ē
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118	32.0 31.9	Grey, firm, wet, SILTY CLAY											::					: :					·. 🗖	‡
8 <u>1</u>		frequent gravel and rock fragments											::					: :						ŀ
	Z W	ater Leve <u>l M</u> easured On Date Indic <u>ate</u>	ed					Drilling Co	ntra	cto	:										Lo	ogge	d By:	
ACKF	ILL S	ymbol 🥁 asphalt 🔃	GR	OUT	D	[COI	NCRE														_		ved By	<u>:</u>
BEN'	TON		1A2	ND		SLO	UGH	Completic	n De	- htl	٦· -	7 77	m								10	700	1 of 2	

	IENT:	Stantec  Lockbridge Developmen  T: Smithville 3A Block 9	t In	С				OLE RECO	BH			RDIN	IATE	ES						NO.	: <u>16</u>	/102- <u>14144</u> ?.646m	73
		ON: Smithville 3A / Block Plan	9,	<u>Smit</u>	hvill	e, O	N														ode	tic	—
	(IE BC	DRED: <u>March 1, 2024</u>			SAM	PLES			_						<b>n o</b> 1GTH				14	, 20	24		Т
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER		N-VALUE or RQD %	OTHER TESTS / REMARKS	PC WA	ATER	T PE 50 k 	Pa	NT &	<b>★</b> 100 ATTE	kPa ERBEF	POC	150	) kPa <del> </del>	AR '	VANE	kPa <del> </del>	BACKFILL/ MONITOR WELL/ PIEZOMETER	
						REC				10	20				nt (%) ar	nd Blo		int 60	70	) 8	30		
8 -		End of Borehole Spoon and Auger Refusal due to inferred bedrock at 7.8 m																					
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16 –	▼ \/	/ Vater Leve <u>l M</u> easured On Date Indic <u>ate</u>	<u>-</u>			-		Drilling Co	ntract	or:								1		Lo	ogge	d By:	_
	KFILL S	Symbol 🔀 asphalt 📃	GR  SA1	OUT	D	CO1	NCRE UGH	Completic												R		ved By: 2 of 2	

CI	JENT:	itantec Lockbridge Developmen	ıt In	c	E	BOF	REH	OLE RECO		COC	ORD	INA	TES			PF	RO.	JECT	NO 1			
PR	OJEC	T: Smithville 3A Block 9							_ [N	4D83	5]											
LC	CATIO		1 9,	<u>Smit</u>	hvill	e, O	N_														tic	_
DA	ATE BC	DRED: <u>March 4, 2024</u>							_										4, 20	24		_
	_				SAM	PLES		DLE RECORD  BH COORDINATES PROJECT NO.: 161414473 [NAD83] BH ELEVATION: 188.976m 618434.0N 4771667.0E DATUM: Geodetic  WATER LEVEL: 5.5 m on March 14, 2024  UNDRAINED SHEAR STRENGTH, Cu (RPd) LABORATORY TEST  POCKET SHEAR VANE DOCKET PEN. POCKET PEN. POCKET SHEAR VANE STYLENGTH, Cu (RPd) WATER CONTENT & ATTERBERG LIMITS WP W W, WATER CONTENT & ATTERBERG LIMITS WP W W, WATER CONTENT & ATTERBERG LIMITS WP W W, WATER CONTENT & ATTERBERG LIMITS WP W W, WATER CONTENT & ATTERBERG LIMITS WP W W, WATER CONTENT & ATTERBERG LIMITS WP W W, WATER CONTENT & ATTERBERG LIMITS WP W W, W, W, W, W, W, W, W, W, W, W, W, W														
Œ	N (T		5			٥			BH COORDINATES  [NAD83]  BH ELEVATION: 188.976m  618434.0N 4771667.0E  DATUM: Geodetic  WATER LEVEL: 5.5 m on March 14, 2024  UNDRAINED SHEAR STRENGTH, CU (kPa)  LABORATORY TEST A FIELD VANE TEST POCKET PEN. POCKET SHEAR VANE SO kPa 100 kPa 150 kPa 200 kPa  WATER CONTENT & ATTERBERG LIMITS PO WOLVEY OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF STREET OF ST													
регін (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	ĕ		<u> </u>	ا اق	<b>3</b> €	OTHER TESTS / REMARKS		50	kPc	נ	10	0 kP	'a	15	50 kl	Pa	200	) kPa	S S S S S	
2	ELEV	(6363)	STRA	TYPE	NUMBI	COVERY or ICR	N-VAL or RQD								BERG	G LIM	^ITS	W	P W →	W <sub>L</sub>	MON	!
•	189.0	Topsoil				2			,	0	20							-	70	80		l
O -		Brown, stiff, moist, silty sand TOPSOIL with rootlets	1/		,	400																ı
-	188.5	Will Toolieis		22		400	8															ı
-		Brown to greyish-brown, stiff to very stiff, moist, SILTY CLAY		BH COORDINATES   PROJECT NO.: 161414473     [NAD83]   BH ELEVATION: 188.976m     618434.0N 4771667.0E   DATUM: Geodetic     WATER LEVEL: 5.5 m on March 14, 2024     UNDRAINED SHEAR STRENGTH, CU (kPa)     LABORATORY TEST   A FIELD VANE TEST     POCKET PEN.   A POCKET SHEAR VANE     SO kPa 100 kPa 150 kPa 200 kPa     WATER CONTENT & ATTERBERG LIMITS   WATER CONTENT & ATTERBERG LIMITS     SS 1 400 8   A 100 kPa 150 kPa 200 kPa     SS 2 425 17     SS 3 425 19     SS 4 450 15     SS 4 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A 450 15     A																		
-		- trace sand - some gravel below 4.6 m	BH COORDINATES   PROJECT NO.: 161414473																			
۱ –			SAMPLES   SAMPLES   SAMPLES   STEEL   S.5 m on March 14, 2024																			
-			## Plan 9, Smithville, ON    Plan 9, Smithville, ON   SAMPLES   SAMPLES   SAMPLES   SO RPa   100 RPa   150 RPa   200 RPa   200 RPa   100 RPa   150 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200 RPa   200																			
-			SAMPLES   SAMPLES   SAMPLES   SS   1																			
-			BH COORDINATES PROJECT NO.: 161414473  BH COORDINATES PROJECT NO.: 161414473  BH COORDINATES PROJECT NO.: 161414473  BH ELEVATION: 188.976m  DATUM: Geodetic  WATER LEVEL: 5.5 m on March 14, 2024  WATER LEVEL: 5.5 m on March 14, 2024  UNDRAINED SHEAR STRENGTH, Cu (kPa)  LaBORATORY TEST A FIELD VANE TEST POCKET PEN. A POCKET SHEAR VANE POCKET SHEAR VANE POCKET SHEAR VANE SPT (N-value) BLOWS/0.3m  WATER CONTENT & ATTERBERG LIMITS POCKET PEN. A POCKET SHEAR VANE SPT (N-value) BLOWS/0.3m  F, moist, silty sand TOPSOIL Let's  SS 1 400 8  SS 2 425 17  SS 3 425 19  SS 3 425 19																			
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٩C	KFILL S	symbol <b>M</b> asphalt Nite <b>X</b> drill cuttings <u>:</u>	]GR ]SA1	OUT	2	[CO1	NCRE UGH	TE Drilling Me Completic											F	Reviev	ved By:	:

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	LIENT:	Lockbridge Developmen  Smithville 3A Block 9	t In	<u>c</u>					_	COC \D83]		IATES						<u>14144</u> 6.81m	
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	ATE BC											5.2							
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	ELEVATION (m)	SOIL DESCRIPTION (USCS)	A PL		<u>e</u>	mm %	   	OTHER TESTS / REMARKS			kPa	100	kPa	150	) kPa	200	) kPa	S S S S	
	ELEV,	, ,	STRATA PLOT	TYPE	NUMBER	COVERY	N-VALUE or RQD %	KEMAKKO				√T & ATT 0WS/0.3r		G LIMI	TS N	V <sub>P</sub> W ●	w <sub>L</sub>	BACKFILL/ MONITOR WELL PIEZOMETER	-
	186.8	Topsoil				22			]	0 2	20	Water Cont				70	80		
-		Brown, stiff, moist, silty clay TOPSOIL with rootlets		SS	1	600	12			•									F
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-		Brown to reddish-brown, stiff to very stiff, moist, SILTY CLAY - trace sand, gravel and rootlets																	ŧ
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PROJECT:   Smithville 3A Block   9	BH COORDIN	JATES [	PROJECT NO.: <b>16</b>	105-2 141447:
DOTE BORED:   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 5, 2024   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025   March 6, 2025	[NAD83]		BH ELEVATION: <b>186</b>	
SOIL DESCRIPTION (USCS)  SOIL DESCRIPTION (USCS)  Topsoil  186.7  Prodefits  186.3  Brown grey, stiff, moist, SILTY CLAY -frace sand, gravel and rootlets  SS 2 450 11  SS 3 450 11  SS 4 400 9  SS 5 275  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  SS 6 375  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  SS 6 375  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  Brown gravel gravel gravel gravel gravel gravel	= =		DATUM: <u>Geodet</u>	
SOIL DESCRIPTION (USCS)  Topsoil  186.7  Brown, stiff, moist, silty clay TOPSOIL with footlets  186.3  Brown grey, stiff, moist, SILTY CLAY - trace sand, gravel and rootlets  SS 2 450 111  SS 4 400 9  SS 5 225  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 5 275  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  Brown grey, stiff, moist, SILTY CLAY - frequent gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gravel gra	WATER LEVEL	: <u>0.5 m on M</u>	Narch 14, 2024	
Topsoil  186.7 Brown, stiff, moist, silty clay TOPSOIL with rootlets  186.3 Brown grey, stiff, moist, SILTY CLAY -trace sand, gravel and rootlets  SS 2 450 11  SS 4 400 9  183.7 Brown grey, stiff, moist, SILTY CLAY -frequent gravel and rock fragments  SS 5 275  Spoon and Auger Refusal due to inferred bedrack at 4.2 m  182.1 Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth unablotting  UCS = 88.2 MPa at 5.6 m  HQ 2 100% 93%		ar strength, Cu	* '	
Topsoil  186.7  Prown, stiff, moist, sitry clay TOPSOIL with proteins and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides and provides	LABORATORY TE POCKET PEN.		O VANE TEST   CKET SHEAR VANE	EEL SEL
Topsoil  186.7 Prown, stiff, moist, slity clay TOPSOIL with rootlets  186.3 Prown grey, stiff, moist, SILTY CLAY - trace sand, gravel and rootlets  SS 2 450 11  SS 3 450 11  SS 4 400 9  183.7 Prown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 5 275  182.1 Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 2 100% 93%	50 kPa		150 kPa 200 kPa	S S S S S S S S S S S S S S S S S S S
Brown, stiff, moist, silty clay TOPSOIL with rootlets	WATER CONTEN	I NT & ATTERBERG LI DWS/0.3m	IMITS WP W WL	BACKFILL/ MONITOR WEI PIEZOMETER
Brown, stiff, moist, silty clay TOPSOIL with footlets  186.3  Brown grey, stiff, moist, SILTY CLAY - trace sand, gravel and rootlets  SS 2 450 111  SS 4 400 9  183.7  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 5 275  SS 6 375  SS 6 375  SS 6 375  SS 6 375  SS 7 1 400 9  Lack trace sand, gravel and rock fragments are said to the same said to the same said to the said trace sand, gravel and rock fragments are said to the said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said trace said	10 20	Water Content (%) and Blow 30 40 50	Count 60 70 80	
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SS 3 450 11  SS 4 400 9  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 5 275  SS 6 375  SS 6 375  Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat arientation, very wide spacing, smooth undulating UCS = 88.2 MPa at 5.6 m  HQ 2 100% 93%				
183.7  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 4 400 9  SS 5 275  182.6  Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1  Foir to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 2 100% 93%				
Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 4 400 9  SS 5 275  SS 6 375  Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1  Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 4 400 9  SS 5 275  SS 6 375  Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1  Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
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Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 5 275  182.6  Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1  Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
183.7  Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 5 275  182.6  Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1  Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
Brown grey, stiff, moist, SILTY CLAY - frequent gravel and rock fragments  SS 5 275  182.6  Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1  Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%	•			
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- frequent gravel and rock fragments  SS 5 275  Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1  Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
182.6 Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1 Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
182.6 Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1 Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
182.6 Spoon and Auger Refusal due to inferred bedrock at 4.2 m  182.1 Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
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Fair to excellent grey DOLOSTONE BEDROCK - highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				
- highly weathered, flat orientation, very wide spacing, smooth undulating  UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				]
UCS = 88.2 MPa at 5.6 m  HQ 1 100% 71%				ļ
HQ 2 100% 93%				
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				<u> </u>
1,700				
179.3				
End of Borehole at 7.4 m				  -
▼ Water Level Measured On Date Indicated Drilling Contract	::::::::::::::::::::::::::::::::::::::	:::::::::::::::::::::::::::::::::::::::	Logged	<b>Г</b> d B∨:

CI	S LIENT:	tantec Lockbridge Developmen	t In	с				OLE RECOI		COC	ord <b>i</b>	nat	ES			PRO	OJE	CT I			/106-	
	OJEC	T: Smithville 3A Block 9																			3.523m	
		ON: <u>Smithville 3A / Block Plan</u>	9,	<u>Smi</u>	hvill	le, C	N											l: _	Ge	<u>ode</u>	tic	—
D/	ATE BC	PRED: <u>March 5, 2024</u>	<u> </u>						_	ter i Raine											T	$\overline{}$
_	(E)				SAM	\PLES			LAB	ORAT	ORY				FIEL	D V	ANE			•	RIL'	
регін (т)	NOI	SOIL DESCRIPTION	PLOT			(min		OTHER TESTS /	PO	CKET F 50	PEN. I kPa		<b>★</b> 100	kPa			r SHE kPa		/ANE 200	<b>□</b> kPa	KFILL, OR WI	
3	ELEVATION (m)	(USCS)	STRATA PLOT	TYPE	NUMBER	COVERY (r	N-VALUE or RQD %	REMARKS		TER C	- Onte	NT 8	k ATT	<del> </del> ERBE			+	W <sub>P</sub>	w O	W⊥ <b>-I</b>	BACKFILL/ MONITOR WELL/ PIEZOMETER	<u> </u>
	188.5	Topsoil				Ä					20		er Conte	ent (%) c	and Blo		nt 30	70	8	0		
-		Brown, stiff, moist, silty clay TOPSOIL with rootlets		SS	1	375	27					•										F
-		Grey to reddish-brown, stiff, dry to moist, SILTY CLAY - trace sand and gravel																				
-				SS	2	450	19															-
-				SS	3	450	21															
-				33	3	430	21															-
-	186.2	End of Borehole Spoon and Auger Refusal due to inferred bedrock at 2.3 m																			<u>  .     .     .     .     .     .     .     .     .     .                                        </u>	‡  -  -
-		mened bedrock dr 2.5 m																				-
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		symbol <b>M</b> asphalt		OUT	-	٦	NCRE	Drilling Cor Drilling Me		or:											d By: ved By:	

PR	IENT: OJEC	Lockbridge Development Smithville 3A Block 9						OLE RECOI	_ BH _ [N#	\D8:	3]						ВН	H EL	EVA	1OIT	).: <u> </u>	W10 614 90.14	144
		DN: <u>Smithville 3A / Block Plan</u> DRED: <u>March 4, 2024</u>	9,	<u>Smit</u>	<u>hvill</u>	e, O	N															<u>etic</u>	
4را	ATE BC	March 4, 2024	T		SAM	PIFS			UND											4, Z	024		
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER	1	N-VALUE or RQD %	OTHER TESTS / REMARKS	PO	TER (	PEN 0 kF - - CON	N. Pa NTEN	IT &	<b>★</b> 100 ATT	kPa   ERBI	PC	15	ET SH O KF	HEAR	20 20	NE C	BACKFILL/	MONITOR WELL/ PIEZOMETER
	100 1	Topsoil				REC				(N <del>-</del> vo			Water	Conte	ent (%)		How Co		-		90		
0 -	189.7	Brown, stiff, moist, silty clay TOPSOIL with rootlets		SS	1	400	8		1		20		30	4	0	50		60	/	0	80		
		Brown to greyish-brown, very stiff, moist, SILTY CLAY - trace sand, gravel and rootlets		SS	2	375	23																
				33	2	3/3	23																
2 -		Greyish-brown		SS	3	425	28					•											
				SS	4	450	29																
- - 3 –	187.1	Brownish-grey, stiff, moist, SILTY CLAY																					
		- trace sand		SS	5	450	15			•													
- 1 —				SS	6	450	12			•													
	185.6	Brown to brownish-grey, very stiff, moist, SILTY CLAY		SS	7	450	18																
		- some sand		, 55		1,30																	
-																							
-		Brownish-grey		SS	8	450	15			•													
- - - - - -																							
	182.8	End of Borehole Spoon and Auger Refusal due to																					
3 -		inferred bedrock at 7.3 m																					
	<b>▼</b> \∧.	ater Level Measured On Date Indicate	d			]C01		Drilling Cor	ntract	or:										l	ogc	ed B	y: I By:

	LIENT:	itantec Lockbridge Developmen	t In	c	ı	O	KEH	OLE RECOF		COC	)RDIN	ATES		PP	O IFC	I NO		/108 <u>14144</u>	
		T: Smithville 3A Block 9							_	\D83]		/ (ILS						.848r	
		ON: Smithville 3A / Block Plan	ı 9,	Smit	hvill	e, O	N			-		771370	).0E		TUM:				
D/	ATE BC	DRED: <u>February 28, 2024</u>							_ WA	TER L	EVEL:	6.8	m oı	n Ma	rch 1	4, 20	24		_
					SAM	PLES						AR STRE							T
	E)		5						1	ORATO CKET F		ST ▲		FIELD V			•	LL/ WELL	빏
	101	SOIL DESCRIPTION	A PL		<u>بم</u>	E  <sub>8</sub>	<u>"</u> "%	OTHER TESTS / REMARKS			kPa	100	kPa	150	) kPa	200	kPa	S S S S	š
	ELEVATION (m)	(USCS)	STRATA PLOT	TYPE	NUMBER	COVERY	N-VALUE or RQD %	REMARKS				IT & ATT WS/0.3n		G LIMI	TS W	W O	w <sub>L</sub>	BACKFILL/ MONITOR WELL	
	189.8	Topsoil				22			1	0 2	20	Water Cont				70	80		
-		Brown, stiff, moist, silty clay TOPSOIL with rootlets		SS	1	356	12				0								
-	189.4				,														
-		Brown to greyish-brown, stiff to very stiff, moist, LEAN CLAY (CL)																	
-		- trace sand, gravel and rootlets					00												
-				SS	2	330	23												
															:::::				
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-				SS	3	356	29				0: 1								
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-				SS	4	381	19												
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_																		1	
-				SS	5	381	12			•									
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-																			
_				SS	6	406	13			•	1:0		1:::::						
-								Sieve/Hydro at 4.0 m G S M C 1% 3% 46% 50%											
_																			
				SS	7	457	14				0:::								
				33		43/	14												
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-	183.8	Brown to greyish-brown, stiff, moist,																	
-		LEAN CLAY (CL) - frequent rock fragments below 7.6 m		SS	8	457	8	Sieve/Hydro at 6.3 m G S M C 3% 1% 50% 46%	•							•			
-								3% 1% 50% 46%											
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-	181.9			SS	9	330	50			} :::::				•					
-								Drilling Con		<u> </u>	1:::			1::::	1::::		1::::	al D	土
_	<b>▼</b> W	/ater Level Measured On Date Indicat SYMBOL ASPHALT    STATE	ed	OUT	_	.]C01		Drilling Cor Drilling Met		١.							ogge	а ву: ved By	_

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		on: Smithville 3A / Block Plan	n 9,	Smit	hvill	e, O			-		_		47	713	70.0	DΕ						ode		_
DA	TE BC	RED: <b>February 28, 2024</b>							^	VAT	ER L	EV	EL:	6.8	8 m	1 01	n M	۱ar	ch	14	, 20	24		
					SAM	PLES			UN	IDR.	AINE	D S	HEA	R STI	REN	GTH,	, Cu	(kP	a)					T
<u>ء</u>	Ξ		5								ORATO KET F				<b>▲</b> ★				ANE She		VANE	•	LL/ WELL TER	إ
DEPTH (m)	Į	SOIL DESCRIPTION	A PLC		_ ~	E N	,     u %	OTHER TESTS / REMARKS		-		kPo			00 k				kPa			kPa	OR JOR JOR JOR JOR JOR JOR JOR JOR JOR J	
	ELEVATION (m)	(USCS)	STRATA PLOT	TYPE	NUMBER	COVERY (	N-VALUE or RQD %	KEMAKKS			ER Co					RBER	RG L	IMIT	S	W <sub>P</sub>	W	w <sub>L</sub> <b>⊢</b>	BACKFILL/ MONITOR WELL/ PIEZOMETER	
						쀭			"	10		20	ν			t (%) an	nd Blow 50		nt 50	70		30		l
8 <del> </del>	181.8	Spoon and Auger Refusal due to		П					1 : : :	:	<del>: : : :</del>	: :			-40		30		::	::T		) 		-
]		Very poor to good guality grev	<sup>1</sup>																					
-		DOLOSTONE BEDROCK  - highly to moderately weathered, flat		НQ	1	100%	47%																	
1		to vertical orientation, very close to close spacina, rough irregular			'	100%	47.70			:														
9 -		undulating to smooth undulating								:		1:							111					
-		UCS = 108.6 MPa at 8.2 m	N/			1	+																	
-				НQ	2	100%	85%																	
]		UCS = 81.9 MPa at 12.9 m								:														
0 =																								
1					_	000	007			$\begin{bmatrix} \vdots \\ \vdots \end{bmatrix}$														
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1	176.5	End of Borehole at 13.3 m	N/	Щ			-																	
-		2.13 31 201011010 01 10.0 111																						
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-	<b>▼</b> W	ater Leve <u>l M</u> easured On Date Indic <u>at</u>	ted					Drilling Co			r:											ogge		_
ACK	FILL S	YMBOL ASPHALT  ITE DRILL CUTTINGS	GR SA1		D	]COI	ncre ugh	TE Drilling Me	thoc on De	l:											R	eview	ved By:	

		itantec  Lockbridge Developmen	+ In	_				OLE RECOF		COC	ים רוע אורוש	1ATE9		DD/	O IECT			/109 <u>14144</u>	
		T: Smithville 3A Block 9	1 111	<u> </u>						\D83		NAILS						<u>14144</u> 8.67m	
		DN: Smithville 3A / Block Plan	۱9,	Smit	hvill	e, O	N		_			77156	8.0E		TUM: .				_
D/	ATE BC	ORED: <u>March 4, 2024</u>							_ WA	TER I	.EVEL	:_0.8	m oı	n Ma	rch 1	4, 20	24		
					SAM	PLES			UND	RAINE	D SHE	ar stre	NGTH.	, Cu (kf	Pa)				Τ
,	(E)		5					1		ORAT CKET F		EST ▲ ★			ane tes I shear		•	L/ NELL/	<u> </u>
	OII	SOIL DESCRIPTION	A PLC		<u>م</u>	(mm)	,     u %	OTHER TESTS /			kPa		, kPa		kPa		kPa	PS-SE	5
	ELEVATION (m)	(USCS)	STRATA PLOT	TYPE	NUMBER	CRY (	N-VALUE or RGD %	REMARKS			0.175	IT 0 4 T			TO We	. W	W <sub>1</sub>	BACKFILL/ MONITOR WELL/ PIEZOMETER	
	ш		S		₹	S g	zō	3				NT & AT DWS/0.3r		G LIMI	13	•	-1	>	
	188.7	Topsoil				2			1	0	20			id Blow Cou		0 8	30		
		Brown, stiff, moist, silty clay TOPSOIL with rootlets		SS	,	350	11												Œ
	188.2	10011013		33	'	330	''				: : C								ŀ
1		Brown to greyish-brown, stiff to very stiff, dry to wet, LEAN CLAY (CL)																	E
		- trace sand, gravel and rootlets - frequent rock fragments below 6.0 m						1											ŀ
1		,		SS	2	400	17				1:0:								ŀ
1								-											F
4																			
1				SS	3	450	20				ullet								ŀ
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1				SS	4	450	15	Sieve/Hydro at 2.5 m		•	Ö								ŀ
-								G S M C -0% 1% 43% 56%											
4																			ı
1				SS	5	450	23												ŀ
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1		Greyish-brown		CC		450	10											100	4
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7	182.4			SS	8			-											4
1	102.4	End of Borehole							1 10						:::::				†
4		Spoon and Auger Refusal due to inferred bedrock at 6.3 m																	Ė
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CI	¥ W	ater Level Measured On Date Indicat	ed		·			Drilling Cor	ntract	or:						Lo	ogge	а Ву:	<u>'</u> :

	JENT:	tantec Lockbridge Development Signification  Tignification  Tignif	t In	c		301	REH	OLE RECOI	BH COORDINATES PROJECT NO. : 1614144	<del>173</del>
		DN: Smithville 3A / Block Plan	9,	Smit	hvill	e, O	N			
DA	ATE BC	PRED: <u>February 28, 2024</u>							WATER LEVEL: 1.1 m on March 14, 2024	
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	TYPE	NUMBER		N-VALUE or RQD %	OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)  LABORATORY TEST	IEL-OMLILI
		Topsoil	ST	=	Ñ	RECOVE	2 2		SPT (N-value) BLOWS/0.3m  Water Content (%) and Blow Count	
0 -	186.9	Brown, stiff, moist, silty clay TOPSOIL with rootlets		SS	1	457	10		10 20 30 40 50 60 70 80 • □	ŧ
-		Brown to reddish-brown, stiff to hard, dry to moist, Sandy SILTY CLAY (CL-ML) - trace sand, gravel and rootlets - frequent rock fragments below 4.6 m		SS	2	457	22			Ē
¥				33	2	45/	22		BH COORDINATES  [NAD83]  [NAD83]  BH ELEVATION: 186.902m  617937.0N 4771277.0E  DATUM: Geodetic  WATER LEVEL: 1.1 m on March 14, 2024  UNDRAINED SHEAR STRENGTH, CU (kPa)  LABORATORY TEST  FIELD VANE TEST  POCKET PEN.  POCKET SHEAR VANE  NO kPa 100 kPa 150 kPa 200 kPa  WATER CONTENT & ATTERBERG LIMITS  PW W W W WATER CONTENT & ATTERBERG LIMITS  PW W W W WATER CONTENT & ATTERBERG LIMITS  PW W W W WATER CONTENT & ATTERBERG LIMITS  PW W W W W W W W W W W W W W W W W W	
2 -				SS	3	457	17	BH COORDINATES [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83] [NAD83]		
-				SS	4	406	18			
3 -										
-				SS	5	279	16		φ. • 	
4 -				SS	6	457	32	Sieve/Hydro at 4.0 m G S M C		
-				SS	7	229	22	17% 30% 35% 26% -		
5 -		End of Borehole		- SS	8	178	23 50			-
-		Spoon and Auger Refusal due to inferred bedrock at 5.2 m Water level encountered at 3.7 m upon completion of drilling								-
6 -										-
- - 7 –										-
-										-
8 -										F
	<b>▼</b> W	ater Level Measured On Date Indicate	ed <b>I</b> o-	01:	ı··	100		Drilling Cor		
	KHILL S ENTON		SA1	OUT	. <i>`⊵</i>		ncre ugh		hod: Reviewed By  n Depth: 5.18 m Page 1 of 1	<u>.                                      </u>

	LIENT:	itantec Lockbridge Developmen	t In	_				OLE RECOI		COC	<b>プロロッ</b> ト	IATES		םם.	O IEC	T NIC		/111- <u>14144</u>	
		T: Smithville 3A Block 9							_	VD83		NAIL3						3.444m	
		ON: Smithville 3A / Block Plan	ı 9,	Smit	hvill	e, O	N					771272	2.0E			_Ge			
D/	ATE BC	DRED: <u>February 29, 2024</u>							_ WA	TER L	.EVEL	: <u>1.7</u>	m or	n Ma	rch 1	4, 20	24		_
					SAM	PLES						AR STRE		•	•	-0.7		,	
Ē	<u>E</u>   <u>z</u>		5			5				OKAT CKET F		EST ▲ ★		OCKE			E 🗖	ILL/ ETER	<u>i</u>
טברוח (ווו)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	TA PL		置	٦	     	OTHER TESTS / REMARKS		50	kPa 	100	kPa 	150	kPa	200	) kPa	S R R	
1	ELEV		STRATA PLOT	TYPE	NUMBER	COVERY	N-VALUE or RQD %					NT & ATT 0WS/0.3r		G LIMI	TS W	V <sub>P</sub> W →	w <sub>L</sub>	BACKFILL/ MONITOR WELL/ PIEZOMETER	•
_	188.4	Topsoil				22			]	0 :	20	Water Cont				70	80		
-		Brown, stiff, dry, silty sand TOPSOIL with rootlets		SS	1	425	10												Ē
-	188.0																		E
		Brown to greyish-brown, stiff to very stiff, moist, SILTY CLAY																	ŧ
-		- trace sand, gravel and rootlets - frequent gravel below 6.1 m		SS	2	425	19												ŀ
				33		720	'												Ē
																			ŧ
. :		Greyish-brown		SS	3	450	19		} : : : : :   : : : : :										Ē
-				33		430	17												ŀ
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-						450	12												ŀ
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	182.2			SS	8			_										T. H.	ŧ
-		End of Borehole Spoon and Auger Refusal due to																	ŀ
		inferred bedrock at 6.3 m																	Ė
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	. <b>.</b> .	/ater Leve <u>l M</u> easured On Date Indic <u>at</u>		-		•		Drilling Cor	ntract	or:							.ogge	d By:	_
С	KFILL S	SYMBOL ASPHALT  WITE DRILL CUTTINGS	]GR	OUT	D	.]COI	ncre UGH	TE Drilling Me	thod:							F	Reviev	ved By:	:

CLIENT: Lockbridge Development Inc PROJECT: Smithville 3A Block 9											_ BH COORDINATES F							<b>MW112-24</b> PROJECT NO.: <u>161414473</u> BH ELEVATION: <u>188.143m</u>						
LC	CATIO	ON: <u>Smithville 3A / Block Plan</u>	ı 9,	Smit	SAMPLES   OTHER TESTS   REMARKS   OTTER TESTS   REMARKS   OTTER TESTS   REMARKS   OTTER TESTS   REMARKS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER TESTS   OTTER											DATUM: <b>Geodetic</b>								
DA	TE BC	BORED: March 5, 2024									WATER LEVEL: 4.7 m on March UNDRAINED SHEAR STRENGTH, CU (kPa)										T	Ŧ		
DEPTH (m)	187.7	SOIL DESCRIPTION (USCS)		TYPE		Т	N-VALUE or RQD %	OTHER TESTS / REMARKS	LABORATORY TEST A FIE POCKET PEN. * PC 50 kPa 100 kPa  WATER CONTENT & ATTERBERG					ELD VANE TEST  OCKET SHEAR VANE  150 kPa 200 kPa				BACKFILL/ MONITOR WELL/ PIEZOMETER						
ļ				SS	1					SPT (N-value) BLOWS/0.3m   Water Content (%) and Blow Count   10						7	0	80						
0 -									•		20			40			60	/		00				
  -  -		Brown to reddish-brown, stiff to very stiff, moist to wet, SILTY CLAY - trace sand, gravel and rootlets - frequent gravel below 6.1 m		SS	2	400	15																	
- - 2 —				SS	3	425	22				•													
				SS	4	450	20																	
3 -				SS	5	450	20				•													
4 -				60	,	450	1,1	<b>Y</b>																
				33	0	450																		
<u>-</u> 5 –				SS	7	425	14			•														
6 -	181.7			SS	8															:::::	•			
7 -		End of Borehole Spoon and Auger Refusal due to inferred bedrock at 6.4 m																						
-																						ŀ		
■ Water Level Measured On Date Indicated Drilling Co									ntract	ntractor:									L	Logged By:				
BACKFILL SYMBOL ASPHALT GROUT CONCRETE Drilling Me BENTONITE DRILL CUTTINGS SAND SLOUGH Completic																			R	Reviewed By:				