

PROJECT DESCRIPTION

THIS PROJECT INCLUDES A PROPOSED ROUNDABOUT ALONG STATE ROUTE 163 (SR 163), AT THE INTERSECTION WITH ENGLEBECK ROAD AND NORTH SHORE BOULEVARD, IN DANBURY TOWNSHIP, OTTAWA COUNTY, OHIO, DESIGNATED AS OTT-163-33.85.

HISTORIC RECORDS

REVIEW OF ODOT RECORDS FOR THE PROJECT AREA INDICATED HISTORIC BORINGS HAD BEEN PERFORMED ALONG SR 163 IN 1955. EACH OF THESE BORINGS WERE USED IN OUR FINAL ANALYSIS BASED ON THE AVAILABILITY OF GRAIN SIZE DATA, ATTERBERG LIMITS, AND MOISTURE CONTENTS FOR THESE BORINGS, AND ARE INCLUDED THIS SOIL PROFILE. THE HISTORIC BORINGS HAVE BEEN LABELED IN GENERAL ACCORDANCE WITH ODOT PROTOCOL AS BORINGS B-385-0-55 THROUGH B-393-0-55.

THE HISTORIC BORINGS ENCOUNTERED SUBGRADE SOILS CONSISTING OF PREDOMINANTLY COHESIVE SOILS (ODOT A-6B, A-7-6, AND A-6A).

GEOLOGY

PUBLISHED GEOLOGIC MAPS FROM THE OHIO DEPARTMENT OF NATURAL RESOURCES (ODNR) INDICATE THAT THE PROJECT SITE IS LOCATED NEAR THE INTERSECTION OF THE MAUMEE LAKE PLAINS REGION AND THE BELLEVUE-CASTALIA KARST PLAIN DISTRICT OF THE TILL PLAINS SECTION. WITHIN THIS REGION AND DISTRICT, THE GEOLOGIC DEPOSITS CONSIST OF LACUSTRINE DEPOSITS UNDERLAIN BY GLACIAL TILL, THE UPPER PORTION OF WHICH HAS BEEN WAVE-PLANED.

THE LACUSTRINE SOILS CONSIST OF PREDOMINANTLY COHESIVE SOILS, AND OFTEN EXHIBIT ALTERNATING THIN LAYERS OF INTERBEDDED SILTS AND CLAYS KNOWN AS VARVES. VARVED SOILS ARE CHARACTERISTIC OF LACUSTRINE DEPOSITS, AND THE THIN LAYERING IS TYPICALLY ATTRIBUTED TO SEASONAL OR OTHER CYCLIC VARIATIONS OF SEDIMENTATION IN THE LAKE WATERS. IN ADDITION, THIN SAND SEAMS AND PARTINGS MAY BE ENCOUNTERED.

THE GLACIAL TILL, ALSO REFERRED TO AS MORAINE, WAS DEPOSITED BY THE ADVANCE AND RETREAT OF GLACIAL ICE. DUE TO THE WEIGHT OF THE ICE MASS, THE TILL DEPOSITS ARE MODERATELY TO HIGHLY OVER-CONSOLIDATED, THAT IS, THE EXISTING SOIL DEPOSITS HAVE EXPERIENCED A PREVIOUS VERTICAL STRESS SIGNIFICANTLY HIGHER THAN THE PRESENT EFFECTIVE VERTICAL STRESS DUE TO THE REMAINING OVERLYING SOIL STRATA IN THE PROFILE. THE TILL MAY CONTAIN COBBLES AND/OR BOULDERS IN THE SOIL MATRIX. ADDITIONALLY, SEAMS OF GRANULAR SOILS MAY ALSO BE ENCOUNTERED WITHIN GLACIAL TILLS. THESE GRANULAR SEAMS MAY OR MAY NOT BE WATER BEARING. IN THE MAUMEE LAKE PLAINS REGION AND BELLEVUE-CASTALIA KARST PLAIN DISTRICT, THE SURFACE OF THE GLACIAL TILL PLAIN HAS GENERALLY EXPERIENCED SOME REWORKING FROM WAVE ACTION OF THE HISTORIC LAKE.

BEDROCK AT THE SITE IS SILURIAN AGE, BROADLY MAPPED AS MONROE LIMESTONE, AT DEPTHS RANGING FROM APPROXIMATELY 15 FEET TO 45 FEET BELOW EXISTING GRADES, INCREASING IN DEPTH FROM EAST TO WEST.

IT SHOULD BE NOTED THAT THE ROCK FORMATION UNDERLYING THE SITE IS KNOWN TO BE HIGHLY SUSCEPTIBLE TO SOLUTION. AS SUCH, THE SUBSEQUENT DEVELOPMENT OF KARST FEATURES INCLUDING VOIDS AND SINKHOLES MAY OCCUR IN THE OVERBURDEN SOILS. HOWEVER, THE NEAREST KARST FEATURES ARE MAPPED APPROXIMATELY 4 MILES WEST OF THE SITE.

THE USDA NATURAL RESOURCE CONSERVATION SERVICE (NRCS) WEB SOIL SURVEY INDICATES THAT SOILS IN THE PROJECT AREA ARE MAPPED AS PREDOMINANTLY MILLSDALE SILTY CLAY LOAM, NAPPANEE SILTY CLAY LOAM, AND HOYTVILLE SILTY CLAY LOAM, WITH LESSER AREAS OF HASKINS LOAM AND MILTON SILT LOAM. THESE SOILS GENERALLY EXHIBIT VERY LOW TO MODERATELY HIGH PERMEABILITY AND THE PANDORA SILT LOAM SOILS GENERALLY EXHIBIT MODERATELY LOW TO MODERATELY HIGH PERMEABILITY.

THE MILLSDALE SILTY CLAY LOAM SOILS CONSIST OF TILL OVER RESIDUUM WEATHERED FROM LIMESTONE AND DOLOMITE FORMED ON DEPRESSIONS, AND ARE CONSIDERED VERY POORLY DRAINED.

THE NAPPANEE SILTY CLAY LOAM SOILS CONSIST OF TILL FORMED ON LAKE PLAINS, AND ARE CONSIDERED SOMEWHAT POORLY DRAINED

THE HOYTVILLE SILTY CLAY LOAM SOILS CONSIST OF TILL FORMED ON WAVE-WORKED TILL PLAINS AND NEARSHORE ZONES (RELICT), AND ARE CONSIDERED VERY POORLY DRAINED.

THE HASKINS LOAM SOILS CONSIST OF LACUSTRINE DEPOSITS OVER TILL FORMED ON LAKE PLAINS AND TILL PLAINS, AND ARE CONSIDERED SOMEWHAT POORLY DRAINED.

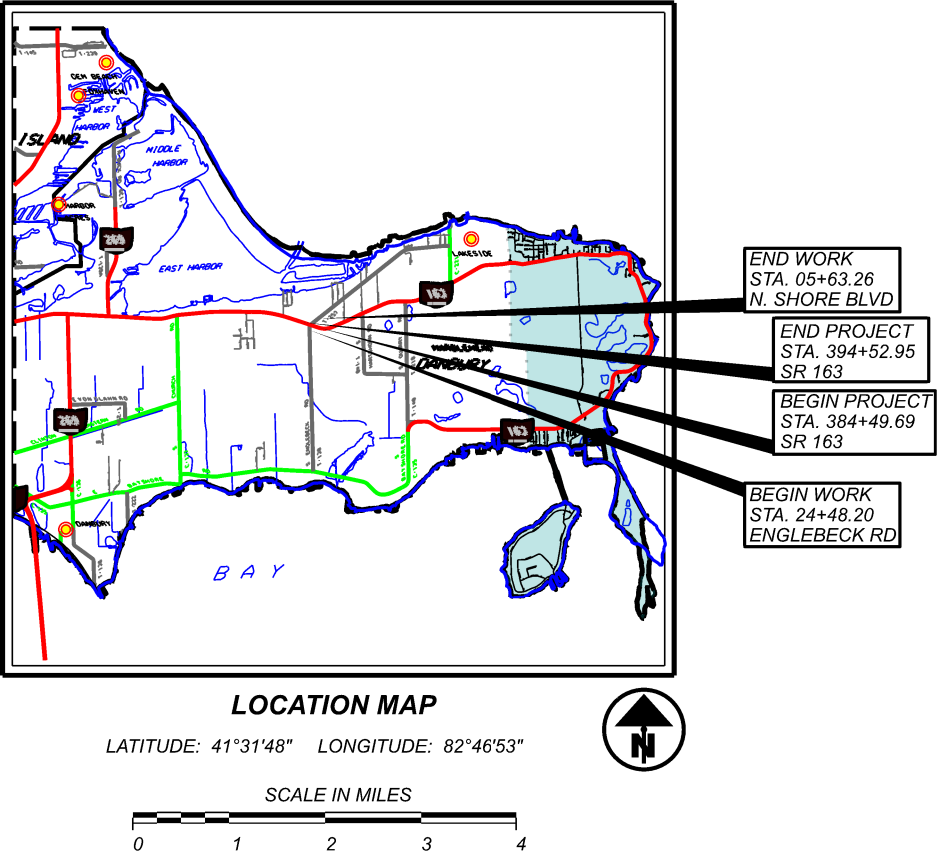
THE MILTON SILT LOAM SOILS CONSIST OF LOESS OVER TILL OVER RESIDUUM WEATHERED FROM LIMESTONE AND DOLOMITE FORMED ON TILL PLAINS, AND ARE CONSIDERED WELL DRAINED.

LEGEND		ODOT CLASS	CLASSIFIED MECH./VISUAL	
DESCRIPTION				
	SANDY SILT	A-4a	1	0
	SILT AND CLAY	A-6a	4	4
	SILTY CLAY	A-6b	7	12
	CLAY	A-7-6	4	0
	TOTAL		16	16
	UNCONTROLLED FILL (UCF)	VISUAL		
	SHALE	VISUAL		
	PAVEMENT OR BASE = X = APPROXIMATE THICKNESS	TOTAL		
	TOPSOIL = X = APPROXIMATE THICKNESS	TOTAL		
	BORING LOCATION - PLAN VIEW.			
	HISTORIC BORING LOCATION - PLAN VIEW - WOO-25-9.70, 1963.			
	DRIVE SAMPLE AND/OR ROCK CORE BORING PLOTTED TO VERTICAL SCALE ONLY. HORIZONTAL BAR INDICATES A CHANGE IN STRATIGRAPHY.			
WC	INDICATES WATER CONTENT IN PERCENT.			
N ₆₀	INDICATES STANDARD PENETRATION RESISTANCE NORMALIZED TO 60% DRILL ROD ENERGY RATIO.			
X/Y/D"	NUMBER OF BLOWS FOR STANDARD PENETRATION TEST (SPT): X= NUMBER OF BLOWS FOR 6 INCHES (UNCORRECTED). Y/D"= NUMBER OF BLOWS (UNCORRECTED) FOR D" OF PENETRATION AT REFUSAL.			
	INDICATES STATIC WATER ELEVATION.			
	INDICATES FREE WATER ELEVATION.			
●	INDICATES A PLASTIC MATERIAL WITH A MOISTURE CONTENT EQUAL TO OR GREATER THAN THE LIQUID LIMIT MINUS 3.			
⊖	INDICATES A NON-PLASTIC MATERIAL WITH A MOISTURE CONTENT GREATER THAN 25 % OR GREATER THAN 19 % WITH A WET APPEARANCE.			
SS	INDICATES A SPLIT SPOON SAMPLE.			
NP	INDICATES A NON-PLASTIC SAMPLE.			
HISTORIC BORING DESCRIPTION		ODOT CLASS	CLASSIFIED MECH./VISUAL	
	SILT AND CLAY	A-6a	1	0
	SILTY CLAY	A-6b	5	0
	CLAY	A-7-6	3	0
	TOTAL		9	0

RECONNAISSANCE

TTL PERFORMED A SITE RECONNAISSANCE ON MAY 11, 2021. EXISTING PAVEMENTS ALONG STATE ROUTE 163 (SR 163), ENGLEBECK ROAD, AND NORTH SHORE BOULEVARD APPEARED TO BE IN GENERALLY FAIR CONDITION. HOWEVER, BOTH SR 163 AND ENGLEBECK ROAD HAD FREQUENT CRACKING. ALONG SR 163, THE CRACKING CONSISTED PREDOMINANTLY OF LATERAL AND OCCASIONAL FATIGUE CRACKING, AND THE LATERAL CRACKING WAS SEALED. ALONG ENGLEBECK ROAD, THE CRACKING CONSISTED OF FREQUENT LATERAL AND TRANSVERSE CRACKING, NONE OF WHICH WERE SEALED. NO MEANINGFUL PAVEMENT DISTRESSES WERE OBSERVED ALONG NORTH SHORE BOULEVARD, WITH THE EXCEPTION OF A FEW TRANSVERSE CRACKS JUST NORTH OF THE INTERSECTION.

SURROUNDING LAND USAGE WAS INCLUDED RURAL RESIDENTIAL DEVELOPMENTS AND AGRICULTURAL FIELDS, WOODED AREAS, AND COMMERCIAL DEVELOPMENTS, WITH FLAT GRADES THAT WHERE GENERALLY LEVEL WITH OR SLIGHTLY BELOW THE TOP OF PAVEMENT.



SHALLOW DITCHES WERE PRESENT AT EACH CORNER OF THE INTERSECTION AND ALL, WITH THE EXCEPTION OF THE DITCH AT THE SOUTHEAST CORNER, WERE OBSERVED TO CONTAIN PONDING WATER ON THE ORDER OF ½TO 1 INCH IN DEPTH.

SUBSURFACE EXPLORATION

EIGHT (8) TEST BORINGS WERE DRILLED BY TTL ON JUNE 21, 2021. THE BORINGS ARE FULLY DESIGNATED AS BORINGS B-001-0-21 THROUGH B-008-0-21 IN ACCORDANCE WITH ODOT PROTOCOL, BUT THE -0-21 PORTION OF THE NOMENCLATURE IS GENERALLY OMITTED IN THE DISCUSSIONS HEREIN.

THE TEST BORINGS PERFORMED DURING THIS EXPLORATION WERE DRILLED WITH A CME 550X DRILLING RIG. DISTURBED (SPLIT-SPOON) DRIVE SAMPLES WERE OBTAINED IN ACCORDANCE WITH THE STANDARD PENETRATION TEST (ASTM D 1586). FOR THE TYPE A SUBGRADE BORINGS, SAMPLES WERE OBTAINED CONTINUOUSLY USING 18-INCH SAMPLE DRIVES. FOR THE TYPE B ROADWAY BORINGS, SAMPLES WERE OBTAINED AT 2½-FOOT INTERVALS.

THE CALIBRATED HAMMER/ROD ENERGY RATIO FOR THE CME 550X DRILLING RIG WAS 78.1 PERCENT, AND WAS LAST CALIBRATED ON MARCH 15, 2021.

EXPLORATION FINDINGS

BORINGS B-001, B-003, B-004, B-005, B-007, AND B-008 WERE PERFORMED IN EXISTING PAVEMENTS. THE ENCOUNTERED SURFACE MATERIALS GENERALLY CONSISTED OF ASPHALT RANGING IN THICKNESS FROM APPROXIMATELY 6 TO 10 INCHES, UNDERLAIN BY AGGREGATE BASE MATERIALS VARYING IN THICKNESS FROM APPROXIMATELY 9 TO 18 INCHES. BORING B-002 WAS PERFORMED WITHIN THE GRAVEL SHOULDER, AND ENCOUNTERED AGGREGATE BASE MATERIAL ON THE ORDER OF 10 INCHES IN THICKNESS. BORING B-006 WAS PERFORMED WITHIN THE GRASSY SHOULDER, AND ENCOUNTERED 6 INCHES OF TOPSOIL UNDERLAIN BY AGGREGATE BASE APPROXIMATELY 8 INCHES IN THICKNESS.

UNDERLYING THE SURFACE MATERIALS IN BORINGS B-001, B-003, AND B-007, COHESIVE EXISTING FILL MATERIALS WERE ENCOUNTERED TO DEPTHS RANGING FROM 3¾TO 5 FEET BELOW EXISTING GRADES (APPROXIMATE ELEV. 599 TO 595).