Gerald R. Ford International Airport

Grand Rapids, Michigan

Taxilane L Construction

PROJECT NUMBER C-416

ADDENDUM #1

AUGUST 29, 2025

To All Holders of Contract Documents:

Your attention is directed to the following interpretations of, changes in, and additions to the Contract Documents for the above-referenced project. All bid adjustments caused by the content of the Addendum shall include the cost of materials and labor related to the items herein and for any subsequent adjustments to the contract documents to accommodate the work stated herein.

Contractors shall be responsible for the full context of changes, interpretations, and clarifications to both the drawings and specifications and shall take the same into consideration when preparing their bids. Indicate receipt of this Addendum in the space provided within the Proposal.

GENERAL

1. The geotechnical report is attached to this Addendum. The geotechnical report shall not be considered part of the contract documents.
2. Addendum No. 1 addresses miscellaneous corrections to details, keyed notes, and specifications.
3. Note that questions received from August 28, 2025 until September 4, 2025 will be addressed in a future addendum.

QUESTIONS AND ANSWERS

Q: I just downloaded the plans off GRR's website, and I see that you have concrete paving being paid for by the cubic yard versus square yard which is what is listed in the P-501 spec on page 305 of the pdf. Is there a reason for this? I haven't seen that used very often, usually only in situations where it's a concrete overlay and thickness will be variable. Even in those situations, a split bid item is used which includes both square yard and cubic yard items/quantities.

A: We are bidding in cubic yards for FAA funding eligibility purposes as the FAA is only funding a portion of the taxiway width and thickness. Specification P-501 has been updated to read as such, see the specification section of this addendum.

Q: XM501 – A3 notes the No Entry Sign as manufactured by Lumacurve. Is this item sole-sourced, or will other manufacturers be considered?

A: It is not a sole-sourced item and other manufacturers will be considered as long as they meet the FAA requirements.

Q: For the pricing sheet, what are the differences between the Quantity Schedule 1 and Quantity Schedule 2?
A: The schedules are split out for funding purposes. Schedule 1 is for FAA eligible items and Schedule 2 is locally funded.

Q: Can you provide a detail for the A-2 joint?
A: Yes, the updated plan sheet has been provided. Please see the drawing section of this addendum.

Q: Will a batch plant site be allowed? It's about 75 feet in height
A: Yes, please see sheet GC100 of the plans.

Q: How will the CY quantity be measured?
A: The concrete shall be measured by the delivery tickets delivered to the site. Any concrete waste will be subtracted from the daily total. Theoretical concrete yields will be monitored daily by the RPR.

Q: Will the fiber be lowered before the project or during?
A: There are two fiber optic lines referenced with this project. A proposed FAA fiber line will be installed by others prior to the start of Taxilane L construction. The existing fiber line will be lowered as part of this project with a separate line item.

Q: Is there any soil boring information available?
A: Yes, please see the Geotechnical Report with this addendum.

Q: Is there any soil boring information in the borrow area?
A: No.

Q: Is the office trailer needed?
A: Yes, the office trailer will be included with the bid package.

Q: For item P-304 Cement Treated Aggregate Base Course (CTB), will Type IL cement be allowed?
A: Yes, specification P-304 has been updated, please see the specification section of this addendum.

Q: Bid Item C-102 Installation and Removal of Stabilized Construction Entrance and CX-106 Stabilized Construction Entrance; aren't these the same item?
A: Yes, the pay item for Stabilized Construction Entrance will be removed from Specification CX-106. The associated updates have been made to the plan and specification documents as part of this addendum.

Q: In the P-501 spec, lithium nitrate is mentioned, however does not appear to be required. Would a mix design be approved without the use of lithium nitrate?
A: Yes, a mix design without lithium nitrate may be approved given all requirements of P-501 are met.

Q: Can the 6 each 12.5 ft wide panels be poured 2 each at a time eliminating a bulkhead joint for each 12.5 ft lane, resulting in 3 each 25 ft wide each passes with the paver?
A: No. Jointing pattern shall be per plan.

Q: To clarify plan sheet GC101 in the A3 table, Work Area A is 30 days being the work in the existing taxilane and Work Area B is 82 being the work in proposed stations 105+00 to 123+00?
A: Work Area A is 30 days and covers the work located inside the AOA fence. Generally, work area A consists of the work on the existing Taxiway L and Taxiway V pavement as well as the existing apron pavement. Work area B is 82 days and covers the work located outside the AOA fence. Work area B consists of the work located between stations 104+22 to 123+00.

SPECIFICATIONS

1. **REPLACE** Quantity Sheets, in its entirety with the **REVISED** Quantity Sheets provided with this addendum as a separate document. Item CX-106, Stabilized Construction Entrance has been deleted.
2. **REPLACE** Specification CX-106 Safety, Security and Maintenance of Traffic, page 2, with the **REVISED** CX-106 Specification provided with this addendum as a separate document. Pay Item CX-106-3.4, Stabilized Construction Entrance has been deleted.
3. **REPLACE** Specification P-304 Cement-Treated Aggregate Base Course (CTB), page 2, with the **REVISED** P-304 Specification provided with this addendum as a separate document. Changes are **bolded** and **red**.
4. **REPLACE** Specification P-501 Cement Concrete Pavement, page 27, with the **REVISED** P-501 Specification provided with this addendum as a separate document. Changes are **bolded** and **red**.

DRAWINGS

1. **REPLACE** Drawing GI004 with **REVISED** GI004 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
2. **REPLACE** Drawing GC100 with **REVISED** GC100 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
3. **REPLACE** Drawing GC102 with **REVISED** GC102 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
4. **REPLACE** Drawing CD101 with **REVISED** CD101 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
5. **REPLACE** Drawing CD501 with **REVISED** CD501 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
6. **REPLACE** Drawing CS101 with **REVISED** CS101 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
7. **REPLACE** Drawing CG101 with **REVISED** CG101 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
8. **REPLACE** Drawing CP101 with **REVISED** CP101 sheet provided with this addendum as a

separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.

8. **REPLACE** Drawing CP101 with **REVISED** CP101 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
9. **REPLACE** Drawing CU101 with **REVISED** CU101 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
10. **REPLACE** Drawing CU502 with **REVISED** CU502 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
11. **REPLACE** Drawing CU503 with **REVISED** CU503 sheet provided with this addendum as a separate document. Detail C3 has been moved from CU502 to CU503 as denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.
12. **REPLACE** Drawing XM501 with **REVISED** XM501 sheet provided with this addendum as a separate document. Revisions are denoted with a cloud referenced to Revision 1 dated AUGUST 29, 2025.

END OF ADDENDUM NO. 1

C&S ENGINEERS, INC.

Attachment A: Quantity Sheets

(Replaces Pages 10-15 in IFB Specifications Document)

GERALD R. FORD INTERNATIONAL AIRPORT

TAXILANE L CONSTRUCTION

BIDDERS ARE REQUIRED TO COMPLETE THE UNIT PRICE FIELD.
ALL OTHER FIELDS WILL BE AUTOMATICALLY CALCULATED.
AN EXCEL FILE WILL BE PROVIDED AND THESE SHEETS CAN BE FILLED OUT IN EXCEL OR HARD COPY.
ONLY HARD COPIES SHALL BE RETURNED WITH YOUR PROPOSAL.

ITEM NO	SPEC	DESCRIPTION	QUANTITY SCHEDULE 1	QUANTITY SCHEDULE 2	QUANTITY GRAND TOTAL	UNITS	UNIT PRICE	TOTAL SCHEDULE 1*	TOTAL SCHEDULE 2*	GRAND TOTAL
1	C-100	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	1	-	1	LS		$ -	$ -	$ -
2	C-102	INSTALLATION AND REMOVAL OF STORM DRAIN INLET PROTECTION	6	-	6	EA		$ -	$ -	$ -
3	C-102	INSTALLATION AND REMOVAL OF SILT FENCE	8,200	-	8,200	LF		$ -	$ -	$ -
4	C-102	INSTALLATION AND REMOVAL OF STABILIZED CONSTRUCTION ENTRANCE	2	-	2	EACH		$ -	$ -	$ -
5	C-105	MOBILIZATION (10% MAX.)	1	-	1	LS		$ -	$ -	$ -
6	C-105	FIELD OFFICE	1	-	1	LS		$ -	$ -	$ -
7	C-105	FIELD OFFICE EQUIPMENT	1	-	1	LS		$ -	$ -	$ -
8	CX-106	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	-	1	LS		$ -	$ -	$ -
9	CX-106	INSTALLATION AND REMOVAL OF TEMPORARY FENCE ON CONCRETE BARRIER	1,270	-	1,270	LF		$ -	$ -	$ -
10	CX-106	TEMPORARY HAUL ROUTE	360	-	360	SY		$ -	$ -	$ -
11	P-101	CONCRETE PAVEMENT REMOVAL	400	-	400	SY		$ -	$ -	$ -
12	P-101	ASPHALT PAVEMENT REMOVAL	5,000	-	5,000	SY		$ -	$ -	$ -
13	P-101	REMOVAL OF PIPE ALL TYPES AND SIZES	660	-	660	LF		$ -	$ -	$ -
14	P-101	REMOVAL OF STRUCTURE	3	-	3	EACH		$ -	$ -	$ -
15	P-101	REMOVAL OF WATER MAIN	300	-	300	LF		$ -	$ -	$ -

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16	P-101	REMOVAL OF LIGHT POLE AND FOUNDATION	2	-	2	EACH		$ -	$ -	$ -
17	P-101	SPALL REPAIR	50	-	50	SF		$ -	$ -	$ -
18	P-152	UNCLASSIFIED EXCAVATION	13,600	1,300	14,900	CY		$ -	$ -	$ -
19	P-152	BORROW EXCAVATION (OBTAINED ONSITE)	14,600	-	14,600	CY		$ -	$ -	$ -
20	P-152	BORROW EXCAVATION (OBTAINED OFFSITE)	14,600	-	14,600	CY		$ -	$ -	$ -
21	P-154	SUBBASE COURSE	6,600	1,200	7,800	CY		$ -	$ -	$ -
22	P-209	CRUSHED AGGREGATE BASE COURSE	4,200	900	5,100	CY		$ -	$ -	$ -
23	P-304	CEMENT-TREATED BASE COURSE (6")	11,600	5,200	16,800	SY		$ -	$ -	$ -
24	P-501	CONCRETE PAVEMENT (15")	3,900	3,200	7,100	CY		$ -	$ -	$ -
25	P-501	CONCRETE PAVEMENT (10")	230	-	230	CY		$ -	$ -	$ -
26	P-620	MARKING	18,100	-	18,100	SF		$ -	$ -	$ -
27	P-620	MARKING REMOVAL	4,800	-	4,800	SF		$ -	$ -	$ -
28	P-620	REFLECTIVE MEDIA	460	-	460	LB		$ -	$ -	$ -
29	D-701	36 INCH RCP CLASS IV	280	-	280	LF		$ -	$ -	$ -
30	D-701	30 INCH RCP CLASS IV	300	-	300	LF		$ -	$ -	$ -

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31	D-705	6 INCH PERFORATED SMOOTH INTERIOR CORRUGATED PVC COMPLETE, INCLUDING POROUS BACKFILL AND FILTER FABRIC	3,900	-	3,900	LF		$ -	$ -	$ -
32	D-705	6 INCH NON-PERFORATED SMOOTH INTERIOR CORRUGATED PVC COMPLETE, INCLUDING POROUS BACKFILL AND FILTER FABRIC	420	-	420	LF		$ -	$ -	$ -
33	D-751	CLEANOUTS	17	-	17	EACH		$ -	$ -	$ -
34	D-751	CATCH BASINS	3	-	3	EACH		$ -	$ -	$ -
35	D-751	MODIFICATION OF EXISTING STRUCTURE	1	-	1	EACH		$ -	$ -	$ -
36	DX-800	SOFT DIGS	3	-	3	DAYS		$ -	$ -	$ -
37	F-162	REMOVE FENCE AND GATE	630	-	630	LF		$ -	$ -	$ -
38	F-162	CHAIN-LINK FENCE	3,800	-	3,800	LF		$ -	$ -	$ -
39	L-110	FIBER OPTIC CABLE AND CONDUIT LOWERING	220	-	220	LF		$ -	$ -	$ -
40	L-115	ELECTRICAL HANDHOLE	1	-	1	EA		$ -	$ -	$ -
41	L-115	ADJUST ELECTRICAL STRUCTURE TO GRADE	2	-	2	EA		$ -	$ -	$ -
42	L-125	REMOVE TAXIWAY EDGE LIGHT	8	-	8	EA		$ -	$ -	$ -
43	L-125	REMOVE TAXIWAY GUIDANCE SIGN	1	-	1	EA		$ -	$ -	$ -
44	L-125	RETROREFLECTIVE MARKER	21	-	21	EACH		$ -	$ -	$ -
45	L-125	TAXIWAY GUIDANCE SIGN	2	-	2	EACH		$ -	$ -	$ -

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46	L-125	TAXIWAY ENDING MARKER	1	-	1	EACH		$ -	$ -	$ -
47	L-125	STAKE MOUNTED GUIDANCE SIGN	4	-	4	EACH		$ -	$ -	$ -
48	T-901	SEEDING	17		17	ACRE		$ -	$ -	$ -
49	T-905	TOPSOIL (OBTAINED ONSITE OR REMOVED FROM STOCKPILE)	13,000		13,000	CY		$ -	$ -	$ -
50	T-908	MULCHING	17		17	ACRE		$ -	$ -	$ -
51	4.3.001	WATER MAIN, RESTRAINED DI, CL56 12 INCH	300		300	LF		$ -	$ -	$ -
52	4.3.013	VALVE AND BOX 12 INCH	4	-	4	EACH		$ -	$ -	$ -
53	4.3.018	TEE 12 INCH BY 12 INCH BY 12 INCH	2	-	2	EACH		$ -	$ -	$ -
54	4.3.021	HORIZONTAL BEND 45 DEGREE 12 INCH	4	-	4	EACH		$ -	$ -	$ -
55	4.3.021	VERTICAL BEND 45 DEGREE 12 INCH	4	-	4	EACH		$ -	$ -	$ -
56	4.3.023	PLUG, 12 INCH	2	-	2	EACH		$ -	$ -	$ -
							TOTAL	**$ -**	**$ -**	**$ -**

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		LOCALLY FUNDED ADD-ON NO. 1								
1	C-105	MOBILIZATION (6% MAX)	1	-	1	LS			$ -	
2	CX-106	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	-	1	LS			$ -	
3	P-101	CONCRETE PAVEMENT REMOVAL	2,850	-	2,850	SY			$ -	
4	P-101	CONCRETE SPALL REPAIR	100	-	100	SF			$ -	
5	P-101	REMOVAL OF PIPE ALL TYPES AND SIZES	150	-	150	LF			$ -	
6	P-152	UNCLASSIFIED EXCAVATION	800	-	800	CY			$ -	
7	P-209	BASE COURSE	450	-	450	CY			$ -	
8	P-304	CEMENT TREATED BASE 10"	1,900	-	1,900	SY			$ -	
9	P-501	CEMENT CONCRETE PAVEMENT 14"	2,750	-	2,750	CY			$ -	
10	D-702	REMOVE SLOTTED PIPE DRAIN	570	-	570	LF			$ -	
11	D-702	18 INCH SLOTTED PIPE DRAIN	490	-	490	LF			$ -	
12	D-751	MODIFICATION OF EXISTING STRUCTURE	1	-	1	EACH			$ -	
							TOTAL			

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		LOCALLY FUNDED ADD-ON NO. 2								
1	C-105	MOBILIZATION (6% MAX)	1	-	1	LS			$ -	
2	CX-106	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	-	1	LS			$ -	
3	P-101	CONCRETE PAVEMENT REMOVAL	650	-	650	SY			$ -	
4	P-101	CONCRETE SPALL REPAIR	100	-	100	SF			$ -	
5	P-152	UNCLASSIFIED EXCAVATION	300	-	300	CY			$ -	
6	P-209	BASE COURSE	150	-	150	CY			$ -	
7	P-304	CEMENT TREATED BASE 10"	640	-	640	SY			$ -	
8	P-501	CEMENT CONCRETE PAVEMENT 14"	250	-	250	CY			$ -	
							TOTAL			

*AWARD OF CONTRACT WILL BE BASED UPON THE LOW BID OF TOTAL COST OF SCHEDULE 1. COSTS ARE BROKEN OUT INTO SCHEDULE 1 AND 2 FOR FUNDING REQUIREMENTS. BIDS WILL BE CHECKED FOR IRREGULARITIES AND IMBALANCES PER SECTION 20-09.

Attachment B: Technical Specification CX-106

(Replaces page 2 in IFB Specifications Document)

106-2.1 Measurement for payment of safety, security and maintenance of traffic will be made on a lump sum basis. Measurements for partial payment may be made at the discretion of the RPR as the work progresses based on contract time or percent of work completed.

106-2.2 Measurement for payment temporary fence on barrier will be made per linear foot basis.

BASIS OF PAYMENT

106-3.1 The lump sum price bid for safety, security and maintenance of traffic shall include all equipment, materials, labor and incidentals necessary to adequately and safely maintain and protect traffic.

In the event the contract completion date is extended, no additional payment will be made for safety, security and maintenance of traffic.

Partial payments of the lump sum price bid may be made for this item at the discretion of the RPR as the work progresses based on contract time or work completed, less any deductions for unsatisfactory safety, security and maintenance of traffic.

No payment will be made under safety, security and maintenance of traffic for each calendar day during which there are substantial deficiencies in compliance with the Specification requirements of any subsection of this Section as determined by the RPR.

The amount of such calendar day non-payment will be determined by dividing the lump sum amount bid for safety, security and maintenance of traffic by the number of calendar days between the date the Contractor commences work and the date of completion as designated in this proposal, without regard to any extension of time.

If the Contractor fails to maintain and protect traffic adequately and safely for a period of 24 hours, the Owner shall correct the adverse conditions by any means it deems appropriate and shall deduct the cost of the corrective work from any monies due the Contractor. The cost of this work shall be in addition to the liquidated damages and non-payment for safety, security and maintenance of traffic listed above.

However, where major nonconformance with the requirements of this Specification is noted by the RPR and prompt Contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the RPR regardless of whether corrections are made by the Owner as stated in the paragraph above.

106-3.2 Payment for Temporary fence on barrier will be made at the contract unit price per linear foot. The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

CX-106-3.1	Safety, Security and Maintenance of Traffic - per lump sum
CX-106-3.1	Safety, Security and Maintenance of Traffic (Add on No.1) - per lump sum
CX-106-3.1	Safety, Security and Maintenance of Traffic (Add on No.2) - per lump sum
CX-106-3.2	Installation and Removal of Temporary Fence on Concrete Barrier – per linear foot
CX-106-3.3	Temporary haul road – per square yard

END OF ITEM CX-106

Attachment C: Technical Specification P-304

(Replaces page 2 in IFB Specifications Document)

Aggregate Gradation for CTB Material

Sieve Size	Design Range Percentage by Weight Passing	Contractor's Final Gradation	Job Control Grading Band Tolerances for Contractor's Final Gradation 2 Percent
2 inch (50 mm)	100		±0
1 inch (25.0 mm)	90-100		±5
No. 4 (4.75 mm)	45-95		±8
No. 10 (2.00 mm)	37-80		±8
No. 40 (425 µm)	15-50		±5
No. 200 (75 µm)	0–15		±3

For Contractor quality control, sample the aggregate stockpile in accordance with ASTM D75 and perform gradation tests in accordance with ASTM C136 a minimum of once per week during production of CTB.

304-2.3 Sampling and testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base stockpile in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraphs 304-2.1 and 304-2.2. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

304-2.4 Cement. Cement shall conform to the requirements of ASTM C150, Type I or II or ASTM C595, Type IP **or Type IL**.

304-2.5 Cementitious additives. Pozzolanic and slag cement may be added to the CTB mix. If used, each material must meet the following requirements:

a. Pozzolan. Pozzolanic materials must meet the requirements of ASTM C618, Class F, or N with the exception of loss of ignition, where the maximum shall be less than 6%. The supplementary optional physical requirements of Table 3 contained in ASTM C618 shall apply.

b. Slag cement (ground granulated blast furnace (GGBF) slag). Slag shall conform to ASTM C989, Grade 100, or 120.

304-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

304-2.7 Curing materials. Curing material shall be a white-pigmented, liquid membrane-forming compound conforming to ASTM C309, Type 2, Class A or Class B (wax-based).

304-2.8 Bond Breaker. Choke stone shall be an ASTM C33 Number 89 stone.

COMPOSITION OF MIXTURE

304-3.1 General. The CTB material shall be composed of a mixture of aggregate, cementitious material, and water. Fly ash or slag cement may be used as a partial replacement for cement.

304-3.2 Mix design. The mix design shall use a cement content that, when tested in the laboratory per ASTM D1633, produces a 7-day compressive strength between 300 pounds per square inch (2068 kPa)

Attachment D: Technical Specification P-501

(Replaces page 27 in IFB Specifications Document)

(5) Adjustments for repairs

Acceptance for strength, thickness, and grade, will be based on the criteria contained in accordance with paragraph 501-6.6b(1), 501-6.6b(2), and 501-6.6b(3), respectively.

Production quality must achieve 90 PWL or higher to receive full payment.

Strength and thickness will be evaluated for acceptance on a lot basis using the method of estimating PWL. Production quality must achieve 90 PWL or higher to receive full pavement. The PWL will be determined in accordance with procedures specified in Item C-110.

The lower specification tolerance limit (L) for strength and thickness will be:

Lower Specification Tolerance Limit (L)

Strength	0.93 × strength specified in paragraph 501-3.3
Thickness	Lot Plan Thickness in inches, - 0.50 in

b. Acceptance criteria.

(1) Strength. If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(**2) Thickness.** If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(3) Grade. The final finished surface of the pavement of the completed project will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally. The documentation, stamped and signed by a licensed surveyor shall be in accordance with paragraph 501-5.3h. Payment for sublots that do not meet grade for over 25% of the sublot shall reduced by 5% and not be more than 95%.

(4) Profilograph roughness for QA Acceptance. Not used.

(5) Adjustments for repair. Sublots with spall repairs, crack repairs, or partial panel replacement, will be limited to no more than 95% payment.

(6) Adjustment for grinding. For sublots with grinding over 25% of a sublot, payment will be reduced 5%.

METHOD OF MEASUREMENT

501-7.1 Concrete pavement shall be measured by the number of **cubic yards** of pavement as specified in-place, completed and accepted.

BASIS OF PAYMENT

501-8.1 Payment. Payment for concrete pavement meeting all acceptance criteria as specified in paragraph 501-6.6. Acceptance Criteria shall be based on results of strength and thickness tests. Payment for acceptable lots of concrete pavement shall be adjusted in accordance with paragraph 501-8.1a for strength and thickness; 501-8.1b for repairs; 501-8.1c for grinding; and 501-8.1d for smoothness, subject to the limitation that:

The total project payment for concrete pavement shall not exceed 100 percent of the product of the contract unit price and the total number of **cubic yards** of concrete pavement used in the accepted work (See Note 1 under the Price Adjustment Schedule table below).

Attachment E: Contract Drawings

(Replaces GI004, GC100, GC102, CD101, CD501, CS101, CG101, CP101, CU101, CU502, CU503 and XM501)

ITEM NO	SPEC	DESCRIPTION	QUANTITY SCHEDULE 1*	QUANTITY SCHEDULE 2*	QUANTITY GRAND	UNITS
1	C-100	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	1	-	1	LS
2	C-102	INSTALLATION AND REMOVAL OF STORM DRAIN INLET PROTECTION	6	-	6	EA
3	C-102	INSTALLATION AND REMOVAL OF SILT FENCE	8,200	-	8,200	LF
4	C-102	INSTALLATION AND REMOVAL OF STABILIZED CONSTRUCTION ENTRANCE	2	-	2	EACH
5	C-105	MOBILIZATION (10% MAX.)	1	-	1	LS
6	C-105	FIELD OFFICE	1	-	1	LS
7	C-105	FIELD OFFICE EQUIPMENT	1	-	1	LS
8	CX-106	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	-	1	LS
9	CX-106	INSTALLATION AND REMOVAL OF TEMPORARY FENCE ON CONCRETE BARRIER	1,270	-	1,270	LF
10	CX-106	TEMPORARY HAUL ROUTE	360	-	360	SY
1 11	P-101	CONCRETE PAVEMENT REMOVAL	400	-	400	SY
12	P-101	ASPHALT PAVEMENT REMOVAL	5,000	-	5,000	SY
13	P-101	REMOVAL OF PIPE ALL TYPES AND SIZES	660	-	660	LF
14	P-101	REMOVAL OF STRUCTURE	3	-	3	EACH
15	P-101	REMOVAL OF WATER MAIN	300	-	300	LF
16	P-101	REMOVAL OF LIGHT POLE AND FOUNDATION	2	-	2	EACH
17	P-101	SPALL REPAIR	50	-	50	SF
18	P-152	UNCLASSIFIED EXCAVATION	13,600	1,300	14,900	CY
19	P-152	BORROW EXCAVATION (OBTAINED ONSITE)	14,600	-	14,600	CY
20	P-152	BORROW EXCAVATION (OBTAINED OFFSITE)	14,600	-	14,600	CY
21	P-154	SUBBASE COURSE	6,600	1,200	7,800	CY
22	P-209	CRUSHED AGGREGATE BASE COURSE	4,200	900	5,100	CY
23	P-304	CEMENT-TREATED BASE COURSE (6")	11600	5,200	16,800	SY
24	P-501	CONCRETE PAVEMENT (15")	3,900	3,200	7,100	CY
1 25	P-501	CONCRETE PAVEMENT (10")	230	-	230	CY
26	P-620	MARKING	18,100	-	18,100	SF
27	P-620	MARKING REMOVAL	4,800	-	4,800	SF
28	P-620	REFLECTIVE MEDIA	460	-	460	LB
29	D-701	36 INCH RCP CLASS IV	280	-	280	LF
30	D-701	30 INCH RCP CLASS IV	300	-	300	LF
31	D-705	6 INCH PERFORATED SMOOTH INTERIOR CORRUGATED PVC COMPLETE, INCLUDING POROUS BACKFILL AND FILTER FABRIC	3,900	-	3,900	LF
32	D-705	6 INCH NON-PERFORATED SMOOTH INTERIOR CORRUGATED PVC COMPLETE, INCLUDING POROUS BACKFILL AND FILTER FABRIC	420	-	420	LF
33	D-751	CLEANOUTS	17	-	17	EACH
34	D-751	CATCH BASINS	3	-	3	EACH
35	D-751	MODIFICATION OF EXISTING STRUCTURE	1	-	1	EACH
36	DX-800	SOFT DIGS	3	-	3	DAYS
37	F-162	REMOVE FENCE AND GATE	630	-	630	LF
38	F-162	CHAIN-LINK FENCE	3,800	-	3,800	LF
39	L-110	FIBER OPTIC CABLE AND CONDUIT LOWERING	220	-	220	LF
40	L-115	ELECTRICAL HANDHOLE	1	-	1	EA
41	L-115	ADJUST ELECTRICAL STRUCTURE TO GRADE	2	-	2	EA
42	L-125	REMOVE TAXIWAY EDGE LIGHT	8	-	8	EA
43	L-125	REMOVE TAXIWAY GUIDANCE SIGN	1	-	1	EA
44	L-125	RETROREFLECTIVE MARKER	21	-	21	EACH
45	L-125	TAXIWAY GUIDANCE SIGN	2	-	2	EACH
46	L-125	TAXIWAY ENDING MARKER	1	-	1	EACH
47	L-125	STAKE MOUNTED GUIDANCE SIGN	4	-	4	EACH
48	T-901	SEEDING	17	-	17	ACRE
49	T-905	TOPSOIL (OBTAINED ONSITE OR REMOVED FROM STOCKPILE)	13,000	-	13,000	CY
50	T-908	MULCHING	17	-	17	ACRE
51	4.3.001	WATER MAIN, RESTRAINED DI, CL56 12 INCH	300	-	300	LF
52	4.3.013	VALVE AND BOX 12 INCH	4	-	4	EACH
53	4.3.018	TEE 12 INCH BY 12 INCH BY 12 INCH	2	-	2	EACH
54	4.3.021	HORIZONTAL BEND 45 DEGREE 12 INCH	4	-	4	EACH
55	4.3.021	VERTICAL BEND 45 DEGREE 12 INCH	4	-	4	EACH
56	4.3.023	PLUG, 12 INCH	2	-	2	EACH

LOCALLY FUNDED ADD-ON NO. 1

1	C-105	MOBILIZATION (6% MAX.)	-	1	1	LS
2	CX-106	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	-	1	1	LS
3	P-101	CONCRETE PAVEMENT REMOVAL	-	2,850	2,850	SY
1 4	P-101	SPALL REPAIR	-	100	100	SF
5	P-101	REMOVAL OF PIPE ALL TYPES AND SIZES	-	150	150	LF
6	P-152	UNCLASSIFIED EXCAVATION	-	800	800	CY
7	P-209	BASE COURSE	-	450	450	CY
8	P-304	CEMENT TREATED BASE (10")	-	2,750	2,750	SY
1 9	P-501	CEMENT CONCRETE PAVEMENT (14")	-	740	740	CY
10	D-702	REMOVE SLOTTED PIPE DRAIN		570	570	LF
11	D-702	18 INCH SLOTTED PIPE DRAIN	-	490	490	LF
12	D-751	MODIFICATION OF EXISTING STRUCTURE	-	1	1	EACH

LOCALLY FUNDED ADD-ON NO. 2

1	C-105	MOBILIZATION (6% MAX.)	-	1	1	LS
2	CX-106	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	-	1	1	LS
3	P-101	CONCRETE PAVEMENT REMOVAL	-	650	650	SY
4	P-101	SPALL REPAIR	-	100	100	SF
5	P-152	UNCLASSIFIED EXCAVATION		300	300	CY
6	P-209	BASE COURSE	-	150	150	CY
7	P-304	CEMENT TREATED BASE (10")	-	640	640	SY
8	P-501	CEMENT CONCRETE PAVEMENT (14")	-	250	250	CY

*AWARD OF CONTRACT WILL BE BASED UPON THE LOW BID OF TOTAL COST OF SCHEDULE 1. COSTS ARE BROKEN OUT INTO SCHEDULE 1 AND 2 FOR FUNDING REQUIREMENTS. BIDS WILL BE CHECKED FOR IRRELEVANCIES AND IMBALANCES PER SECTION 20-09.

A1 QUANTITIES FOR CANVASS OF BID
SCALE: NOT TO SCALE

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STATE OF MICHIGAN
KELLY J. JOST
6201056345
LICENSED PROFESSIONAL ENGINEER

GERALD R. FORD International Airport

TAXILANE L CONSTRUCTION
GERALD R. FORD INTERNATIONAL AIRPORT GRAND RAPIDS, MI

MARK	DATE	DESCRIPTION
1	08/29/2025	ADDENDUM NO. 1

REVISIONS

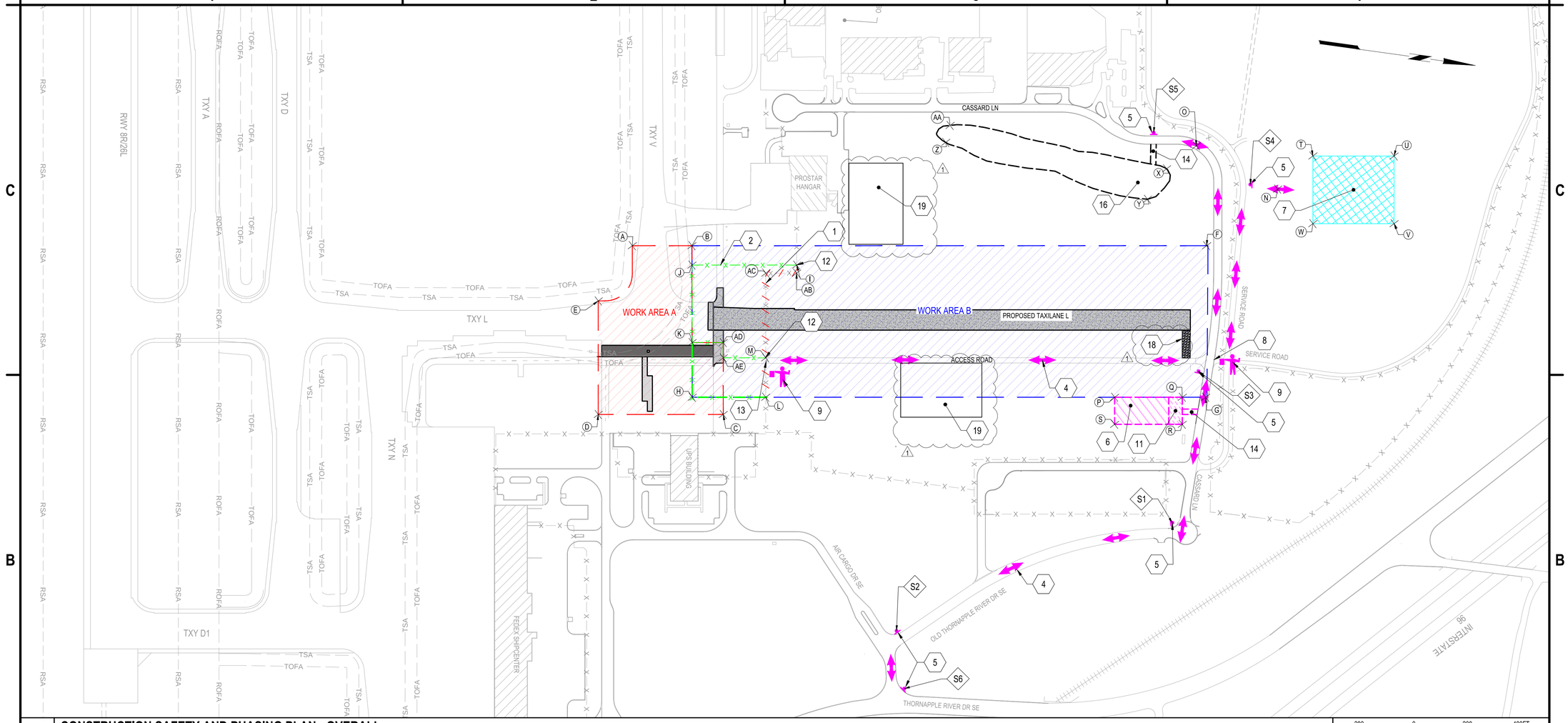
PROJECT NO: K19.025.001
DATE: AUGUST 2025
DRAWN BY: B. COOK
DESIGNED BY: T.J. CORCORAN
CHECKED BY: K.J. JOST

CONTRACTOR SHALL VERIFY ALL CONDITIONS ON JOB SITE & NOTIFY THE OWNER OF ANY VARIATIONS FROM DIMENSIONS SHOWN ON THESE DRAWINGS BEFORE PROCEEDING WITH ANY CONSTRUCTION.

QUANTITIES FOR CANVASS OF BID

GI004

SHEET NO. 4 OF 36



B1 CONSTRUCTION SAFETY AND PHASING PLAN - OVERALL

SCALE: 1" = 200'

1. REMOVE EXISTING AOA FENCE, ITEM F-162
2. INSTALL TEMPORARY FENCE ON CONCRETE BARRIER, ITEM CX-106, SEE DETAIL B1/GC501
4. CONTRACTOR HAUL ROUTE
5. INSTALL CONSTRUCTION ACCESS SIGN PER DETAIL B3/GC501
6. CONTRACTORS STAGING AREA
7. APPROXIMATE LOCATION OF SPOILS AREA TO BE DETERMINED BY THE OWNER, SEE NOTE 10.
8. CONTRACTOR'S ACCESS TO SPOILS LOCATION
9. CONTRACTOR PROVIDED GATE GUARD AT GATE 79 (ONLY REQUIRED DURING CONSTRUCTION ON WORK AREA A)
11. CONTRACTOR'S AND ENGINEERS FIELD OFFICE LOCATION
12. TRANSITION EXISTING FENCE TO TEMPORARY FENCE ON CONCRETE BARRIER, ITEM CX-106, SEE DETAIL B1/GC501.
13. CONTRACTOR'S ACCESS TO WORK AREA A, GATE 72
14. STABILIZED CONSTRUCTION ENTRANCE, SEE DETAIL C3/GC501. CONTRACTOR SHALL PROVIDE RUBBER RAMP AT EXISTING CURB INCIDENTAL TO ITEM C-105
16. BORROW AREA
18. TEMPORARY HAUL ROAD, SEE DETAIL A4/GC501
19. POTENTIAL BATCH PLANT LOCATION WITH WATER METER INSTALLED AT WATER CONNECTION TO TRACK USAGE. FINAL LOCATION TO BE APPROVED BY GRR PRIOR TO THE START OF CONSTRUCTION.

CONTRACTOR STAGING AREA — SPOILS AREA

FIELD OFFICE LOCATION — TEMPORARY FENCE

A1 KEYED NOTES AND LEGEND

SCALE: NOT TO SCALE

A2 GENERAL NOTES AND AIRSPACE COORDINATES

SCALE: NOT TO SCALE

1. THE CONTRACTOR MAY USE THE EXISTING ACCESS ROAD FOR THE DURATION OF THE PROJECT. THE EXISTING ACCESS ROAD SHALL BE REMOVED AT THE END OF THE PROJECT AS SHOWN IN THE CONTRACT DRAWINGS.
2. WORK AREA A SHALL OCCUR CONCURRENTLY WITH WORK AREA B AND SHALL OCCUR WITHIN THE TOFA OF TAXIWAYS V AND L AND WILL RESULT IN TEMPORARY CLOSURES OF THE TAXIWAY PAVEMENTS. WORK SHALL CONSIST OF MARKING, ELECTRICAL MODIFICATION, DRAINAGE, GRADING, AND PAVING ITEMS. WORK AREA A SHALL BE CONCURRENT WITH WORK AREA B AND IS LIMITED TO 30 CALENDAR DAYS.
3. WORK AREA B SHALL OCCUR OUTSIDE OF THE AOA TO MINIMIZE IMPACT ON AIRPORT OPERATIONS. WORK AREA B SHALL CONSIST OF THE EXCAVATION, GRADING, PAVING, AND MARKING OF TAXILANE L. THERE ARE NO ANTICIPATED CLOSURES TO AIRFIELD PAVEMENTS DURING CONSTRUCTION IN WORK AREA B. WORK AREA B IS LIMITED TO 82 CALENDAR DAYS.
4. TEMPORARY FENCE TO BE INSTALLED PRIOR TO REMOVAL OF EXISTING FENCE. ALL WORK REQUIRED TO INSTALL AND REMOVE TEMPORARY AOA FENCE SHALL BE UNDER GRR OPERATIONS ESCORT. TEMPORARY AOA FENCE LIMITS SHALL BE APPROVED BY GRR OPERATIONS AND TSA. AFTER THE TEMPORARY FENCE IS APPROVED THE ENTIRE WORK AREA B WILL BECOME NON-AOA FOR 82 CALENDAR DAYS.
5. THE TEMPORARY FENCING LIMITS SHALL BE SUBMITTED TO TSA AT LEAST 45 DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION. THE PLAN SHALL BE APPROVED BY TSA PRIOR TO CONSTRUCTION COMMENCING. ALL CHANGES TO THE FENCING ALIGNMENT SHALL BE COORDINATED WITH TSA, THE OWNER AND THE ENGINEER.
6. WHILE WORK IS OCCURRING IN WORK AREA A, THE CONTRACTOR SHALL POST A GATE GUARD AT THE GATE DURING ALL WORK HOURS TO MAINTAIN A SECURE AIRPORT PROPERTY.
7. WHILE SPOILING OPERATIONS ARE OCCURRING THE CONTRACTOR SHALL POST A GATE GUARD AT GATE 72 AND 79 DURING ALL WORK HOURS TO MAINTAIN SECURE AIRPORT PROPERTY AND LOCK THE GATE AT THE END OF EACH WORK SHIFT. NO MATERIAL SHALL BE HAULED OFFSITE, ALL MATERIAL SHALL REMAIN ON AIRPORT PROPERTY.
8. CONTRACTOR SHALL RESTORE THE STAGING AREA AND CONSTRUCTION ENTRANCE AREA TO EQUAL OR BETTER THAN ORIGINAL CONDITION FOLLOWING COMPLETION OF THE PROJECT. RESTORATION SHALL BE CONSIDERED INCIDENTAL TO ITEM C-105 MOBILIZATION.
9. PRIOR TO CONSTRUCTION THE CONTRACTOR AND ENGINEER SHALL VIDEOTAPE/PHOTOGRAPH ALL HAUL ROADS TO BE USED DURING THE PROJECT. THE INFORMATION SHALL BE PROVIDED TO THE OWNER PRIOR TO NOTICE TO PROCEED. ANY DAMAGE TO THE PAVEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR, AT THE DISCRETION OF THE RPR. ALL COSTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
10. FINAL SPOILS LOCATION SHALL BE COORDINATED WITH THE RPR AND OWNER. THE CONTRACTOR SHALL PROVIDE A SURVEY FILE AND PROPOSED GRADING PLAN OF THE PROPOSED SPOILS AREA 30 DAYS PRIOR TO CONSTRUCTION STARTING. GRADING OF THE SPOILS AREA SHALL BE CONSIDERED INCIDENTAL TO ITEMS P-152 AND T-905. PRIOR TO STOCKPILING IN THE PROPOSED LOCATION THE TOPSOIL SHALL BE STRIPPED.

POINT TABLE				
POINT NO.	NORTHING	EASTING	ELEV.	DESCRIPTION
A	506,961.90	12,816,457.27	780.90	WORK AREA A
AA	508,063.66	12,815,855.60	781.72	BORROW AREA
AB	507,577.01	12,816,474.22	779.07	TEMP FENCE
AC	507,464.41	12,816,490.00	780.51	TEMP FENCE
AD	507,343.78	12,816,765.64	783.32	TEMP FENCE
AE	507,351.57	12,816,821.53	782.99	TEMP FENCE
B	507,180.09	12,816,426.97	779.00	WORK AREA A & B
C	507,380.36	12,817,028.78	780.00	WORK AREA A
D	506,922.96	12,817,092.31	780.00	WORK AREA A
E	506,865.23	12,816,676.70	783.03	WORK AREA A
F	509,063.86	12,816,165.32	780.63	WORK AREA B
G	509,137.37	12,816,720.53	777.90	WORK AREA B
H	507,258.22	12,816,981.54	780.00	WORK AREA B
I	507,573.21	12,816,444.77	779.00	TEMP FENCE
J	507,189.96	12,816,498.00	778.62	TEMP FENCE
K	507,230.03	12,816,781.48	783.57	TEMP FENCE
L	507,527.01	12,816,944.21	780.00	TEMP FENCE
M	507,507.11	12,816,799.93	782.67	TEMP FENCE

POINT TABLE				
POINT NO.	NORTHING	EASTING	ELEV.	DESCRIPTION
N	509,295.00	12,815,922.30	770.00	HAUL ROUTE
O	508,975.57	12,815,805.17	784.43	HAUL ROUTE
P	508,804.05	12,816,766.83	778.00	STAGING AREA
Q	509,051.67	12,816,732.44	778.00	STAGING AREA
R	509,065.43	12,816,831.49	778.00	STAGING AREA
S	508,817.81	12,816,865.88	778.00	STAGING AREA
T	509,407.24	12,815,783.02	769.00	SPOIL AREA
U	509,704.38	12,815,741.75	769.00	SPOIL AREA
V	509,738.78	12,815,989.37	769.00	SPOIL AREA
W	509,441.63	12,816,030.65	769.00	SPOIL AREA
X	508,877.92	12,815,904.56	781.72	BORROW AREA
Y	508,823.71	12,816,025.52	781.72	BORROW AREA
Z	508,056.28	12,815,919.98	781.72	BORROW AREA

MAX EQUIPMENT HEIGHT AT ALL LOCATIONS SHALL BE 25'

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GERALD R. FORD International Airport

TAXILANE L CONSTRUCTION
GERALD R. FORD INTERNATIONAL AIRPORT GRAND RAPIDS, MI

MARK	DATE	DESCRIPTION
1	08/29/2025	ADDENDUM NO. 1

REVISIONS

PROJECT NO: K19.025.001
DATE: AUGUST 2025
DRAWN BY: B. COOK
DESIGNED BY: T.J. CORCORAN
CHECKED BY: K.J. JOST

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CONSTRUCTION SAFETY AND PHASING PLAN - OVERALL

GC100

SHEET NO. 6 OF 36

Sep 02, 2025, 8:45pm
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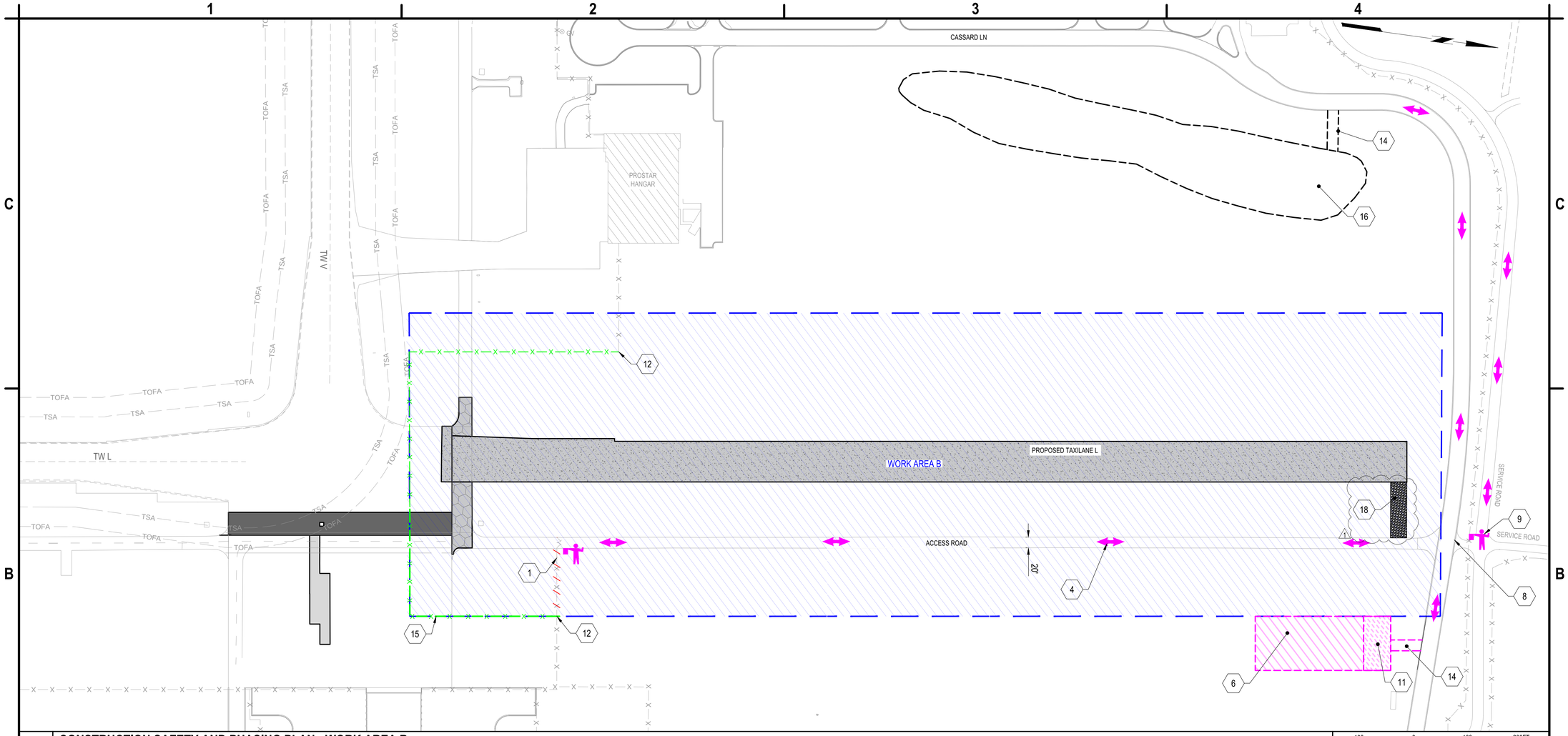


B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B

SCALE: 1" = 100'

1. REMOVE EXISTING AOA FENCE, ITEM F-162
4. CONTRACTOR HAUL ROUTE
6. CONTRACTORS STAGING AREA
8. CONTRACTOR'S ACCESS TO SPOILS LOCATION
9. CONTRACTOR PROVIDED GATE GUARD AT GATE 79 (ONLY REQUIRED DURING CONSTRUCTION ON WORK AREA A)
11. CONTRACTOR'S AND ENGINEERS FIELD OFFICE LOCATION
12. TRANSITION EXISTING FENCE TO TEMPORARY FENCE ON CONCRETE BARRIER, ITEM CX-106, SEE DETAIL B1/GC501.
14. STABILIZED CONSTRUCTION ENTRANCE, SEE DETAIL C3/GC501. CONTRACTOR SHALL PROVIDE RUBBER RAMP AT EXISTING CURB INCIDENTAL TO ITEM C-105
15. RELOCATE TEMPORARY FENCE ON CONCRETE BARRIER TO NEW LOCATION SHOWN ON PLANS. RELOCATION SHALL ONLY OCCUR AFTER WORK AREA A IS COMPLETE. MOVEMENT OF TEMPORARY FENCE SHALL BE INCIDENTAL TO ITEM CX-106.
16. BORROW AREA
18. TEMPORARY HAUL ROAD, SEE DETAIL A4/GC501

WORK AREA B

CONTRACTOR STAGING AREA

FIELD OFFICE LOCATION

TEMPORARY FENCE

A1 KEYED NOTES AND LEGEND

SCALE: NOT TO SCALE

NOTES:

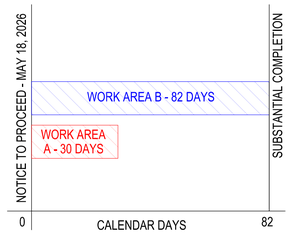
1. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 70, ATTACHMENT A - CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) OF THE GENERAL PROVISIONS.
2. CONTRACTOR SHALL PROVIDE ADEQUATE SIGNAGE FOR ALL CONSTRUCTION ENTRANCES AND HAUL ROUTES.
3. FINAL SPOILS LOCATION SHALL BE COORDINATED WITH THE RPR AND OWNER. THE CONTRACTOR SHALL PROVIDE A SURVEY FILE AND PROPOSED GRADING PLAN OF THE PROPOSED SPOILS AREA 30 DAYS PRIOR TO CONSTRUCTION STARTING. GRADING OF THE SPOILS AREA SHALL BE CONSIDERED INCIDENTAL TO ITEMS P-152 AND T-905.

A2 GENERAL NOTES

SCALE: NOT TO SCALE

ALLOWED CONSTRUCTION TIME (CALENDAR DAYS): 82

WORK AREA A: 82 CALENDAR DAYS
WORK AREA B: 30 CALENDAR DAYS



NOTES

1. WORK AREA A SHALL OCCUR CONCURRENTLY WITH WORK AREA B AND SHALL OCCUR WITHIN THE TOFA OF TAXIWAYS V AND L AND WILL RESULT IN TEMPORARY CLOSURES OF THE TAXIWAY PAVEMENTS. WORK SHALL CONSIST OF MARKING, ELECTRICAL MODIFICATION, AND ANY NECESSARY DRAINAGE, GRADING, AND PAVING ITEMS. WORK AREA A SHALL BE CONCURRENT WITH WORK AREA B AND IS LIMITED TO 30 CALENDAR DAYS.
2. WORK AREA B SHALL OCCUR OUTSIDE OF THE AOA TO MINIMIZE IMPACT ON AIRPORT OPERATIONS. WORK AREA B SHALL CONSIST OF THE EXCAVATION, GRADING, PAVING, AND MARKING OF TAXILANE L. THERE ARE NO ANTICIPATED CLOSURES TO AIRFIELD PAVEMENTS DURING CONSTRUCTION IN WORK AREA B. WORK AREA B IS LIMITED TO 82 CALENDAR DAYS.

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A3 CONSTRUCTION SEQUENCING

SCALE: NOT TO SCALE

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GERALD R. FORD INTERNATIONAL AIRPORT GRAND RAPIDS, MI

MARK	DATE	DESCRIPTION
1	08/29/2025	ADDENDUM NO. 1

REVISIONS

PROJECT NO:	K19.025.001
DATE:	AUGUST 2025
DRAWN BY:	B. COOK
DESIGNED BY:	T.J. CORCORAN
CHECKED BY:	K.J. JOST

CONTRACTOR SHALL VERIFY ALL CONDITIONS ON JOB SITE & NOTIFY THE OWNER OF ANY VARIATIONS FROM DIMENSIONS SHOWN ON THESE DRAWINGS BEFORE PROCEEDING WITH ANY CONSTRUCTION.

CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B

GC102

SHEET NO. 8 OF 36

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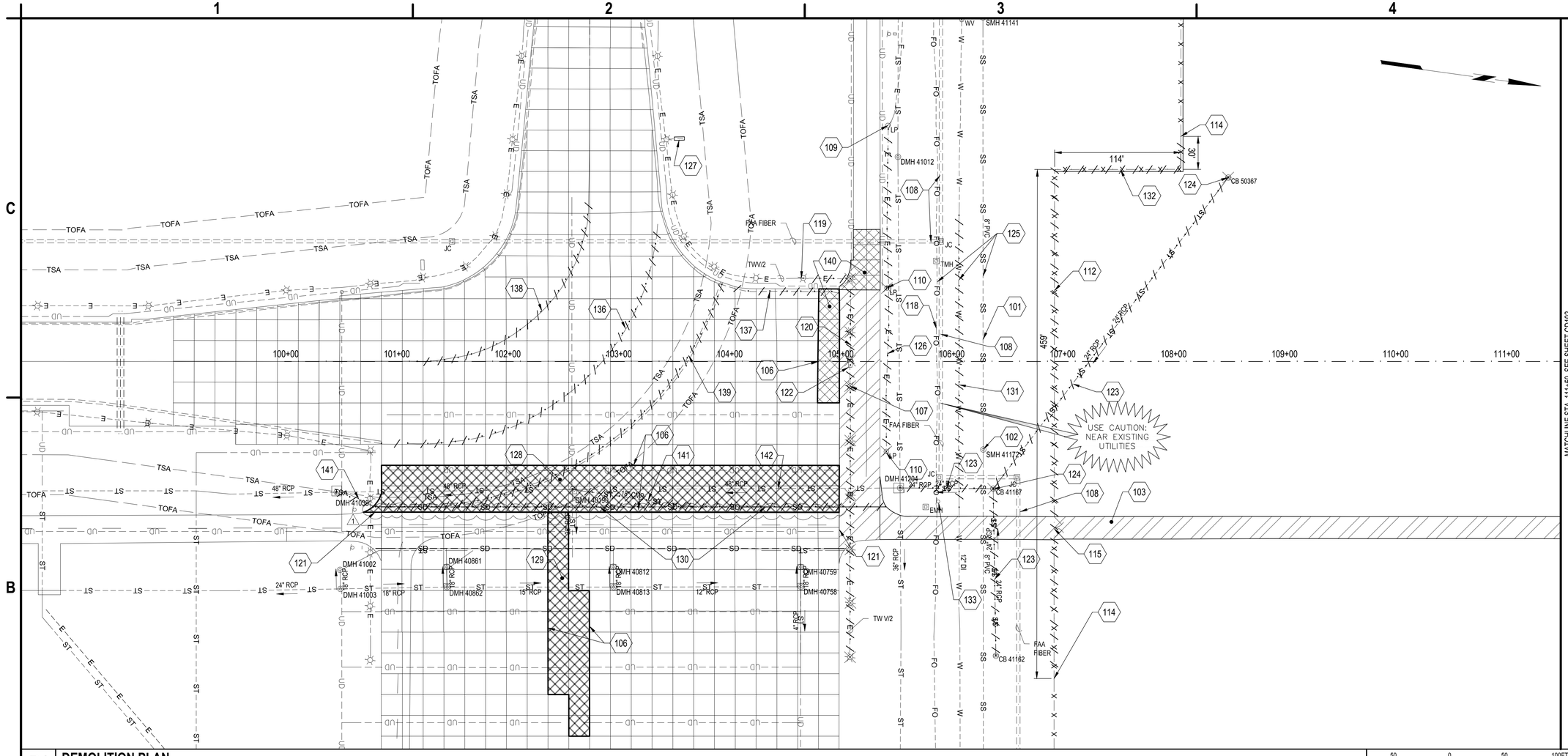

B1 DEMOLITION PLAN

SCALE: 1" = 50'

50 0 50 100FT.
50'

101. PROTECT EXISTING PRIVATE SANITARY SEWER (8" PVC) IN PLACE (TYP.)
102. EXISTING SANITARY MANHOLE TO BE ADJUSTED TO GRADE, ITEM D-751, SEE CG SERIES
103. EXISTING ASPHALT TO BE REMOVED, ITEM P-101, UNDERLAIN BASE COURSE SHALL BE REMOVED AS NEEDED TO MEET PROPOSED GRADE. REMOVAL OF ANY BASE MATERIAL SHALL BE REMOVED PER ITEM P-152, SEE NOTE 2.
106. SAWCUT EXISTING CONCRETE PAVEMENT, INCIDENTAL TO ITEM P-101, SEE DETAIL A4/CD501
107. REMOVE EXISTING STAKE OR BASE MOUNTED LIGHT, ITEM L-125 (TYP.) SALVAGE LIGHT FIXTURES AND TRANSPORT TO A LOCATION DETERMINED BY AIRPORT MAINTENANCE
108. FAA FIBER OPTIC CABLE TO BE INSTALLED BY OTHERS, SEE DETAIL A3/CD501
109. LIMIT OF LIGHT POLE CABLE REMOVAL. SEE NOTE 1
110. EXISTING LIGHT POLE, FIXTURE AND FOUNDATION TO BE REMOVED, ITEM P-101. SEE NOTE 1. CONDUIT SHALL BE ABANDONED IN PLACE AND IF ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED, INCIDENTAL TO ITEM P-152. LIGHT POLES AND FIXTURES SHALL BE SALVAGED AND TRANSPORTED TO A LOCATION DETERMINED BY AIRPORT MAINTENANCE
112. REMOVAL OF EXISTING 10 FOOT FENCE, ITEM F-162, SEE NOTE 4
114. LIMIT OF FENCE REMOVAL
115. REMOVAL OF EXISTING 20 FOOT DOUBLE SWING GATE, ITEM F-162, SEE NOTE 3
118. EXISTING FIBER OPTIC LINE TO BE LOWERED, ITEM L-110 SEE XM SERIES
119. EXISTING EDGE LIGHT TO BE REMAIN, CONTRACTOR SHALL INSTALL FAA APPROVED CONNECTOR KITS TO ENSURE CONTINUITY OF THE TAXIWAY EDGE LIGHT CIRCUIT AND PLUG ABANDONED CONDUIT HUB WATERTIGHT, PER SPECIFICATION L-108, INCIDENTAL TO OTHER WORK ITEMS
120. EXISTING CONDUIT AND CABLE TO BE REMOVED IF ENCOUNTERED, INCIDENTAL TO ITEM P-152
121. SAWCUT EXISTING ASPHALT PAVEMENT, INCIDENTAL TO ITEM P-101
122. EXISTING CONCRETE FOUNDATION TO BE REMOVED INCIDENTAL TO ITEM P-152
123. REMOVAL OF EXISTING 24" RCP STORM SEWER PIPE, ITEM P-101
124. REMOVAL OF EXISTING DRAINAGE STRUCTURE, ITEM P-101
125. SOFT DIG PER SPECIFICATION DX-800 TO IDENTIFY THE DEPTH OF THE EXISTING UTILITY. NO MATERIAL SHALL BE HAULED OFFSITE
126. REMOVAL OF EXISTING LIGHT POLE CABLE AND CONDUIT, INCIDENTAL TO ITEM P-152
127. REMOVAL OF EXISTING SIGN, ITEM L-125
128. REMOVAL OF EXISTING CONCRETE PAVEMENT, ITEM P-101 (ADD ON NO. 1), SEE DETAIL A1/CP503
129. REMOVAL OF EXISTING CONCRETE PAVEMENT, ITEM P-101 (ADD ON NO. 2), SEE DETAIL A1/CP503
130. REMOVAL OF EXISTING SLOT DRAIN, ITEM P-101, (ADD ON NO. 1) SEE DETAIL B4/CD501
131. THE CONTRACTOR SHALL EXPOSE AND VERIFY THE DEPTH OF THE EXISTING WATER MAIN PRIOR TO THE START OF CONSTRUCTION ACTIVITIES VIA SOFT DIGS, ITEM DX-800. RESULTS OF THE DEPTH VERIFICATION SHALL BE PROVIDED TO THE ENGINEER. IF, UPON INSPECTION, THE ENGINEER DETERMINES THAT THE EXISTING WATER MAIN IS AT A SUFFICIENT DEPTH BENEATH THE PROPOSED SURFACE, THE WATER MAIN SHALL REMAIN IN PLACE AND WILL NOT REQUIRE REMOVAL OR LOWERING. IN SUCH A CASE, ALL ASSOCIATED WORK ITEMS RELATED TO THE REMOVAL OR LOWERING OF THE WATER MAIN SHALL BE NON-PERFORMED. IF THE DEPTH VERIFICATION DETERMINES THE WATER MAIN IS AT AN INSIGNIFICANT DEPTH. THE WATERMAIN SHALL BE REMOVED AND LOWERED PER PLAN, SEE THE CU SERIES.
132. SAW CUT AND REMOVE THE EXISTING FENCE CONCRETE APRON, INCIDENTAL TO THE FENCE REMOVAL, ITEM F-162.
133. REMOVE EXISTING ROAD SIGN, INCIDENTAL TO OTHER WORK ITEMS. SIGN SHALL BE SALVAGED AND TRANSPORTED TO A LOCATION DETERMINED BY AIRPORT MAINTENANCE
136. REMOVAL OF EXISTING DASHED TAXIWAY EDGE MARKING
137. REMOVAL OF EXISTING CONTINUOUS TAXIWAY EDGE MARKING
138. REMOVAL OF EXISTING TAXIWAY CENTERLINE MARKING
139. REMOVAL OF EXISTING NON-MOVEMENT MARKING
140. REMOVAL OF EXISTING CONCRETE PAVEMENT, ITEM P-101, SEE DETAIL A1/CP503
141. REMOVAL OF EXISTING 18" CMP STORM SEWER PIPE, ITEM P-101 (ADD ON NO. 1)
142. PROTECT EXISTING 48" RCP STORM SEWER PIPE IN PLACE

A1 KEYED NOTES

SCALE: NOT TO SCALE

NOTES:

1. THE CONTRACTOR SHALL CONDUCT A FIELD VERIFICATION OF ALL EXISTING CIRCUITS PRIOR TO COMMENCING WORK. FOR CIRCUITS WHERE A PORTION IS BEING REMOVED AS PART OF THE DEMOLITION, CONTINUITY MUST BE MAINTAINED FOR THE REMAINING CIRCUIT. ENSURING CONTINUITY SHALL BE CONSIDERED INCIDENTAL TO THE CIRCUIT REMOVAL.
2. THE CONTRACTOR MAY USE THE EXISTING ACCESS ROAD FOR THE DURATION OF THE PROJECT. THE EXISTING ACCESS ROAD SHALL BE REMOVED AT THE END OF THE PROJECT.
3. THE EXISTING 20 FOOT DOUBLE SWING GATE SHALL SERVE AS THE CONTRACTOR'S ACCESS TO WORK AREA B DURING THE PROJECT, SEE THE GC SERIES. THE CONTRACTOR SHALL NOT REMOVE THE ACCESS GATE UNTIL THE WORK AREA B IS COMPLETED AND THE GATE IS NO LONGER NEEDED FOR CONSTRUCTION ACCESS TO THE SITE AND THE PERMANENT FENCE HAS BEEN INSTALLED AND ACCEPTED BY GRR AND TSA.
4. TEMPORARY FENCE PER THE GC SERIES SHALL BE INSTALLED PRIOR TO THE FENCE REMOVAL. REFER TO THE GC SERIES FOR MORE INFORMATION.

A4 GENERAL NOTES

SCALE: NOT TO SCALE

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GERALD R. FORD International Airport

TAXILANE L CONSTRUCTION
GERALD R. FORD INTERNATIONAL AIRPORT GRAND RAPIDS, MI

MARK	DATE	DESCRIPTION
1	08/29/2025	ADDENDUM NO. 1

REVISIONS

PROJECT NO:	K19.025.001
DATE:	AUGUST 2025
DRAWN BY:	B. COOK
DESIGNED BY:	T.J. CORCORAN
CHECKED BY:	K.J. JOST

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DEMOLITION PLAN

CD101

SHEET NO. 15 OF 36

Aug 29, 2025 - 2:13pm
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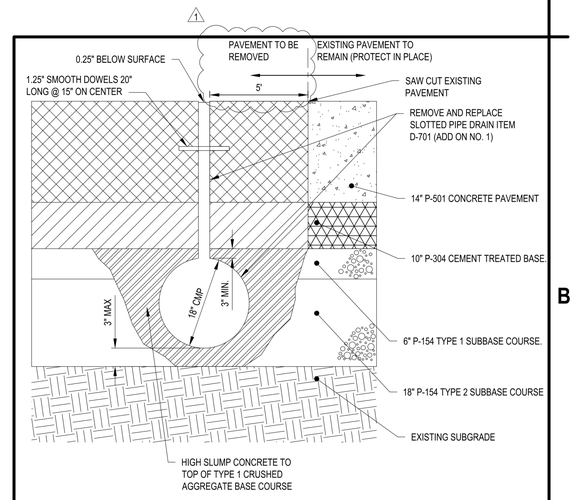
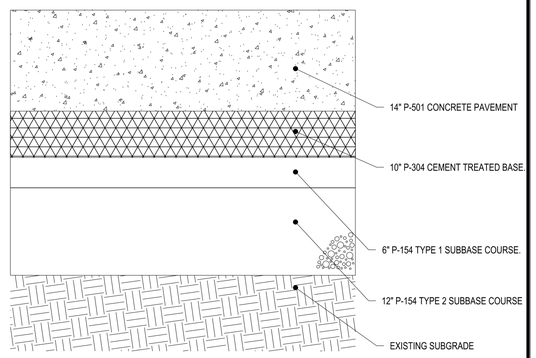
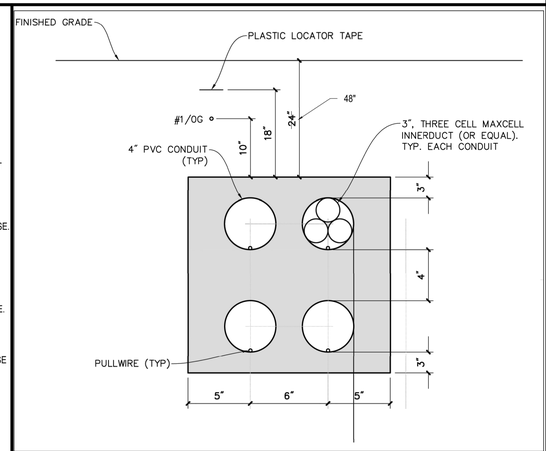


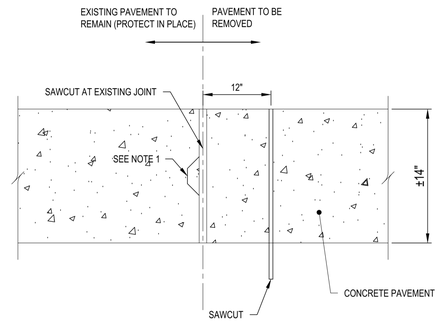
B4 EXISTING SLOT DRAIN
SCALE: NOT TO SCALE



A2 EXISTING TAXIWAY AND APRON PAVEMENT SECTION
SCALE: NOT TO SCALE



A3 FAA DUCT BANK DETAIL (INSTALLED BY OTHERS)
SCALE: NOT TO SCALE



NOTES:
1. ADDITIONAL SAW CUTTING MAY BE NECESSARY IN AREAS WHERE THE PROPOSED CONCRETE TIES INTO AN EXISTING KEYWAY JOINT. THE EXISTING KEYWAY JOINT MUST BE FULLY REMOVED BEFORE PLACING THE PROPOSED CONCRETE. ADDITIONAL SAW CUTTING SHALL BE CONSIDERED INCIDENTAL TO THE CONCRETE REMOVAL, ITEM P-101.

A4 DOUBLE SAW CUT JOINT - PAVEMENT REMOVAL
SCALE: NOT TO SCALE

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REVISIONS

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DESIGNED BY: T.J. CORCORAN
CHECKED BY: K.J. JOST

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DEMOLITION DETAILS

CD501

SHEET NO. 17 OF 36

Aug 29, 2025 - 2:14pm
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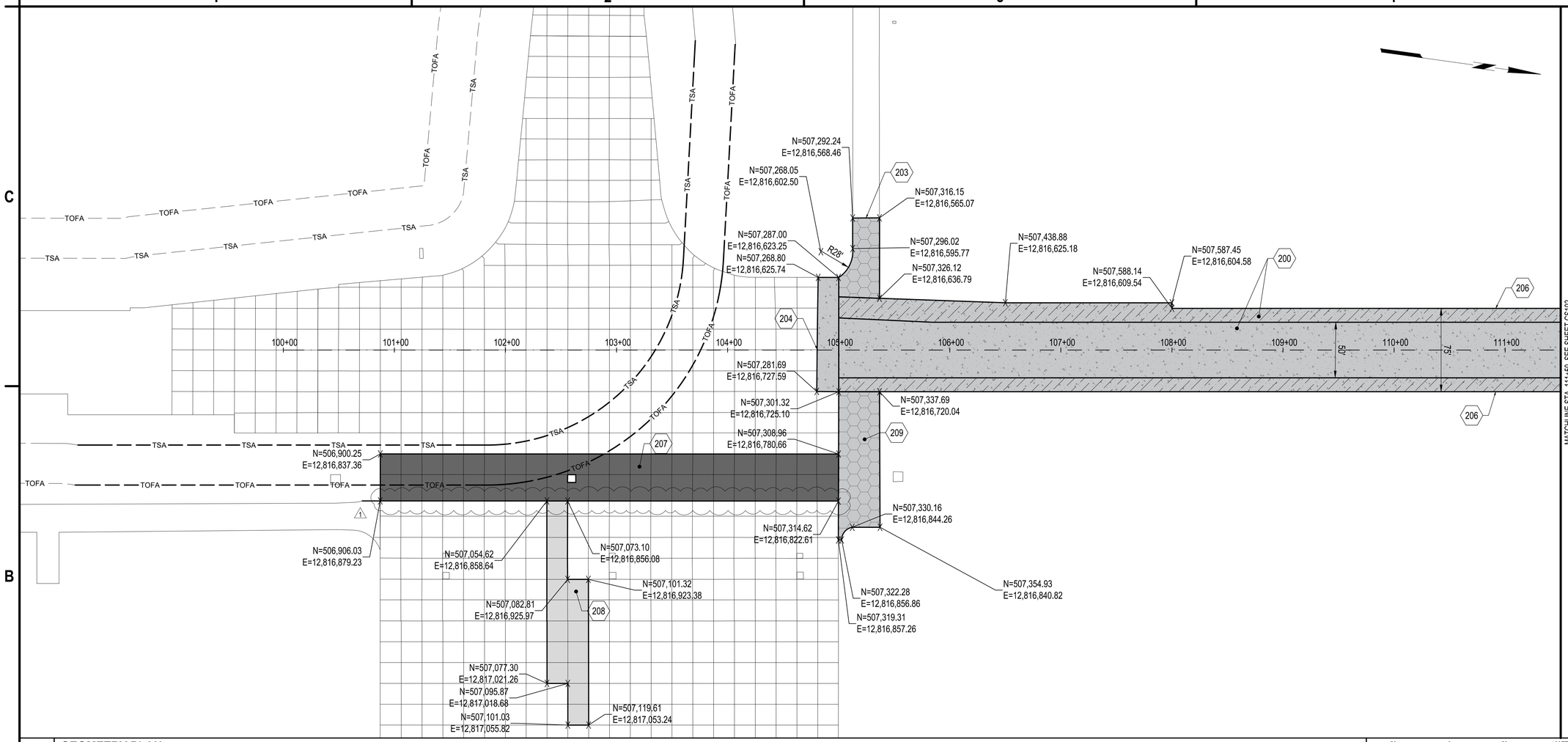

B1 GEOMETRY PLAN

SCALE: 1" = 50'

50 0 50 100FT.
50'

200. FULL STRENGTH CONCRETE PAVEMENT, ITEM P-501, SEE DETAIL C2/CP502
203. MEET EXISTING CONCRETE SERVICE ROAD, SEE DETAIL B1/CP501
204. MEET EXISTING PAVEMENT, SEE CP SERIES
206. EDGE OF PROPOSED PAVEMENT, SEE CG SERIES
207. FULL STRENGTH CONCRETE PANEL REPLACEMENT (ADD ON NO. 1), SEE DETAIL A1/CP503.
208. FULL STRENGTH CONCRETE PANEL REPLACEMENT (ADD ON NO. 2), SEE DETAIL A1/CP503.
209. ACCESS ROAD PAVEMENT, ITEM P-501, SEE DETAIL A3/CP503

- PROPOSED CEMENT CONCRETE ACCESS ROAD PAVEMENT
- PROPOSED CEMENT CONCRETE PAVEMENT - FAA ELIGIBLE
- PROPOSED CEMENT CONCRETE PAVEMENT - NOT FAA ELIGIBLE
- PROPOSED CEMENT CONCRETE PAVEMENT (ADD ON NO. 1)
- PROPOSED CEMENT CONCRETE PAVEMENT (ADD ON NO. 2)

A1 KEYED NOTES AND LEGEND

SCALE: NOT TO SCALE

NOTES:

1. NORTHINGS AND EASTING ARE BASED ON MICHIGAN (MI) NAD83 SOUTH ZONE, INTERNATIONAL FEET.

A2 GENERAL NOTES

SCALE: NOT TO SCALE

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GEOMETRY PLAN

CS101

SHEET NO. 18 OF 36

Aug 28, 2025 - 2:14pm
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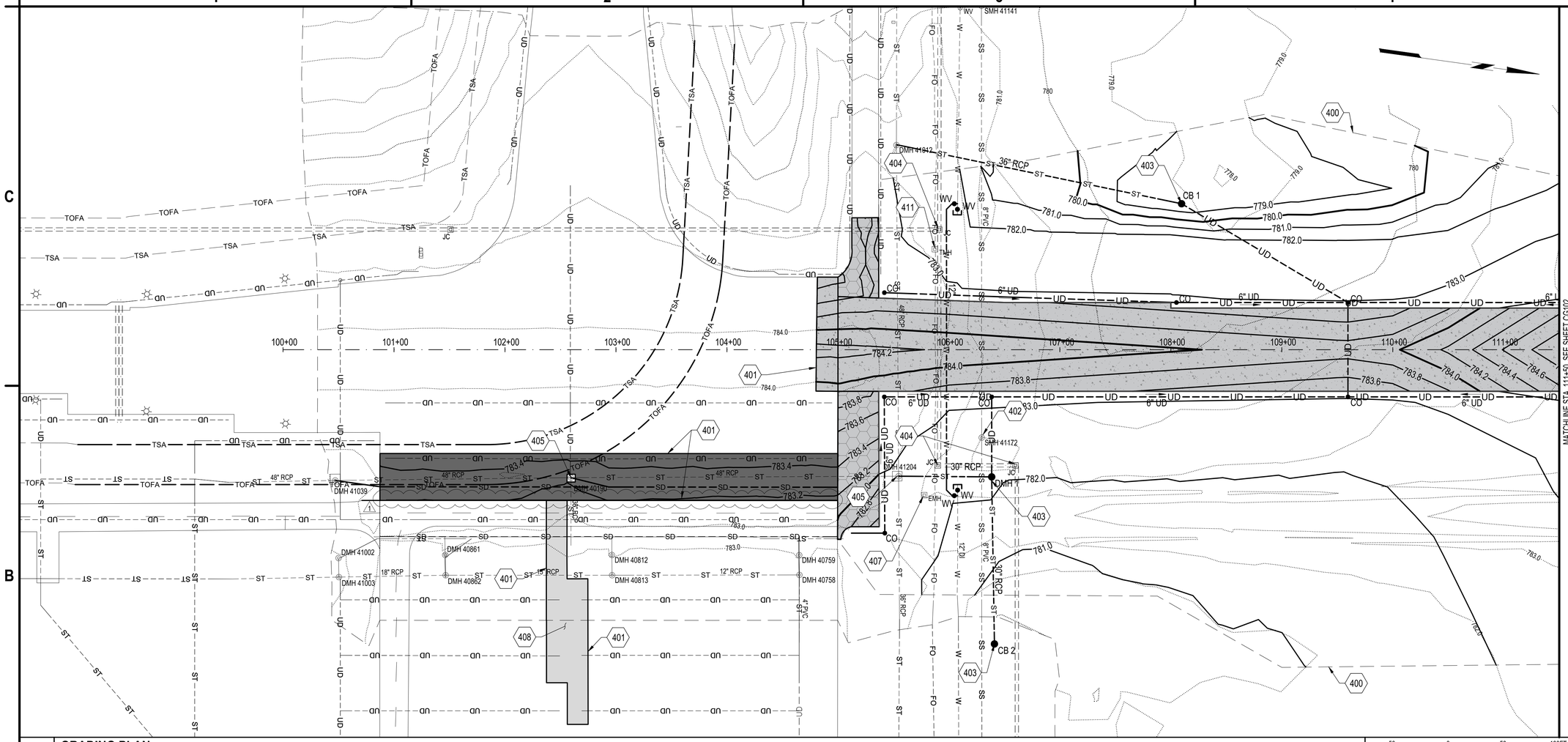

B1 GRADING PLAN

SCALE: 1" = 50'

50' 50 0 50 100FT.

400. GRADING LIMIT LINE (TYP.)
401. MATCH EXISTING CONCRETE PAVEMENT
402. EXISTING STRUCTURE TO BE ADJUSTED TO GRADE, ITEM D-751, SEE DETAIL C1/CU502
403. PROPOSED DRAINAGE STRUCTURE, SEE DETAIL B3/CU501
404. FAA FIBER OPTIC JUNCTION CAN TO BE INSTALLED BY OTHERS PRIOR TO CONSTRUCTION
405. EXISTING DRAINAGE MANHOLE, PROTECT IN PLACE
407. EXISTING ELECTRICAL QUAZITE BOX TO BE ADJUSTED TO GRADE, INCIDENTAL TO ITEM P-152
408. MATCH EXISTING JOINT ELEVATIONS (TYP.)
411. EXISTING TELECOMMUNICATIONS MANHOLE ADJUST TO GRADE, ITEM L-115

A1 KEYED NOTES

SCALE: NOT TO SCALE

NOTES:

1. SEE THE CU SERIES FOR THE PROPOSED DRAINAGE INFRASTRUCTURE

A2 GENERAL NOTES

SCALE: NOT TO SCALE

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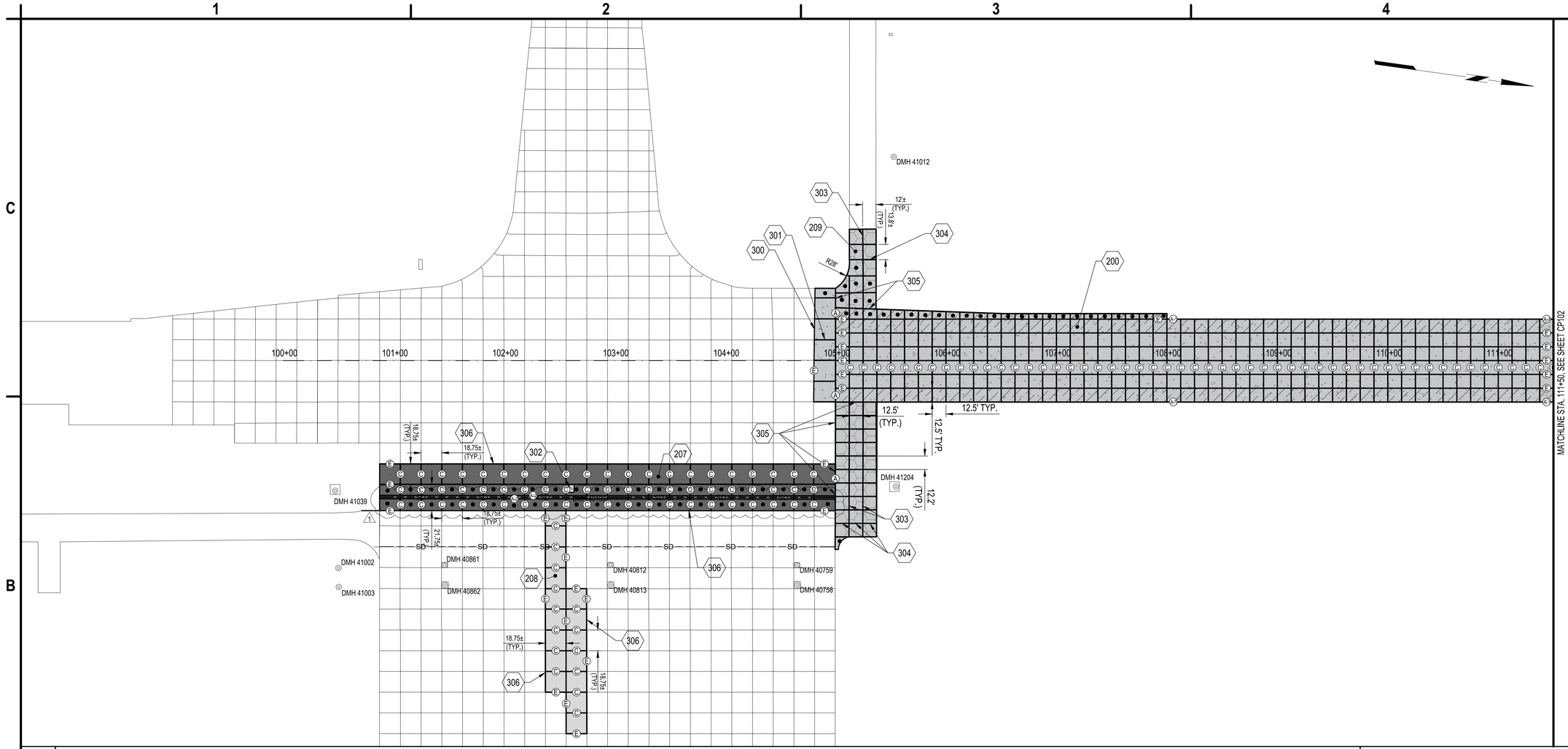
GRADING PLAN

CG101

SHEET NO. 20 OF 36



B1 JOINTING PLAN

SCALE: 1" = 50'

50 0 50 100FT.
50'

200. FULL STRENGTH CONCRETE PAVEMENT, ITEM P-501, SEE DETAIL C2/CP502
207. FULL STRENGTH CONCRETE PANEL REPLACEMENT (ADD ON NO. 1), SEE DETAIL A1/CP503.
208. FULL STRENGTH CONCRETE PANEL REPLACEMENT (ADD ON NO. 2), SEE DETAIL A1/CP503.
209. ACCESS ROAD PAVEMENT, ITEM P-501, SEE DETAIL A3/CP503
300. MATCH EXISTING CONCRETE PAVEMENT, SEE DETAILS A1/CP501 AND A4/CP502
301. PROPOSED JOINTS SHALL MATCH EXISTING JOINTS (TYP.)
302. PROTECT EXISTING STRUCTURE IN PLACE
303. ACCESS ROAD CONSTRUCTION JOINT WITH DOWEL BAR, SEE DETAIL B4/CP503
304. ACCESS ROAD CONTRACTION JOINT WITH DOWEL BAR BASKET, SEE DETAIL C4/CP503
305. ACCESS ROAD JUNCTURE SEE DETAIL A3/CP503
306. MATCH EXISTING CONCRETE PAVEMENT, SEE DETAIL A3/CP502

A1 KEYED NOTES

SCALE: NOT TO SCALE

- (A) THICKENED EDGE ISOLATION JOINT, SEE DETAIL B2/CP501
- (E) CONSTRUCTION JOINT WITH DOWEL BAR, A1/CP501
- (C) CONTRACTION JOINT WITH DOWEL BASKET, SEE DETAIL A2/CP501
- (A-1) THICKENED EDGE ALONG FREE EDGE, SEE DETAIL A4/CP501
- (A-2) THICKENED EDGE ALONG SLOT DRAIN, SEE DETAIL A1/CU502
- IRREGULAR REINFORCED PAVEMENT SLABS, SEE DETAIL B3/CP501

PROPOSED CEMENT CONCRETE ACCESS ROAD PAVEMENT

PROPOSED CEMENT CONCRETE PAVEMENT - FAA ELIGIBLE

PROPOSED CEMENT CONCRETE PAVEMENT - NOT FAA ELIGIBLE

PROPOSED CEMENT CONCRETE PAVEMENT (ADD ON NO. 1)

PROPOSED CEMENT CONCRETE PAVEMENT (ADD ON NO. 2)

A2 LEGEND

SCALE: NOT TO SCALE

NOTES:

1. SEE ADDITIONAL CONCRETE PAVING NOTES ON A1/CP502.
2. SPALLING ALONG EXISTING PAVEMENT SHALL BE REPAIRED PER DETAIL C1/CP503, ITEM P-101 SPALL REPAIR

A3 GENERAL NOTES

SCALE: NOT TO SCALE

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JOINTING PLAN

CP101

SHEET NO. 23 OF 36

Aug 29, 2025 - 2:15pm
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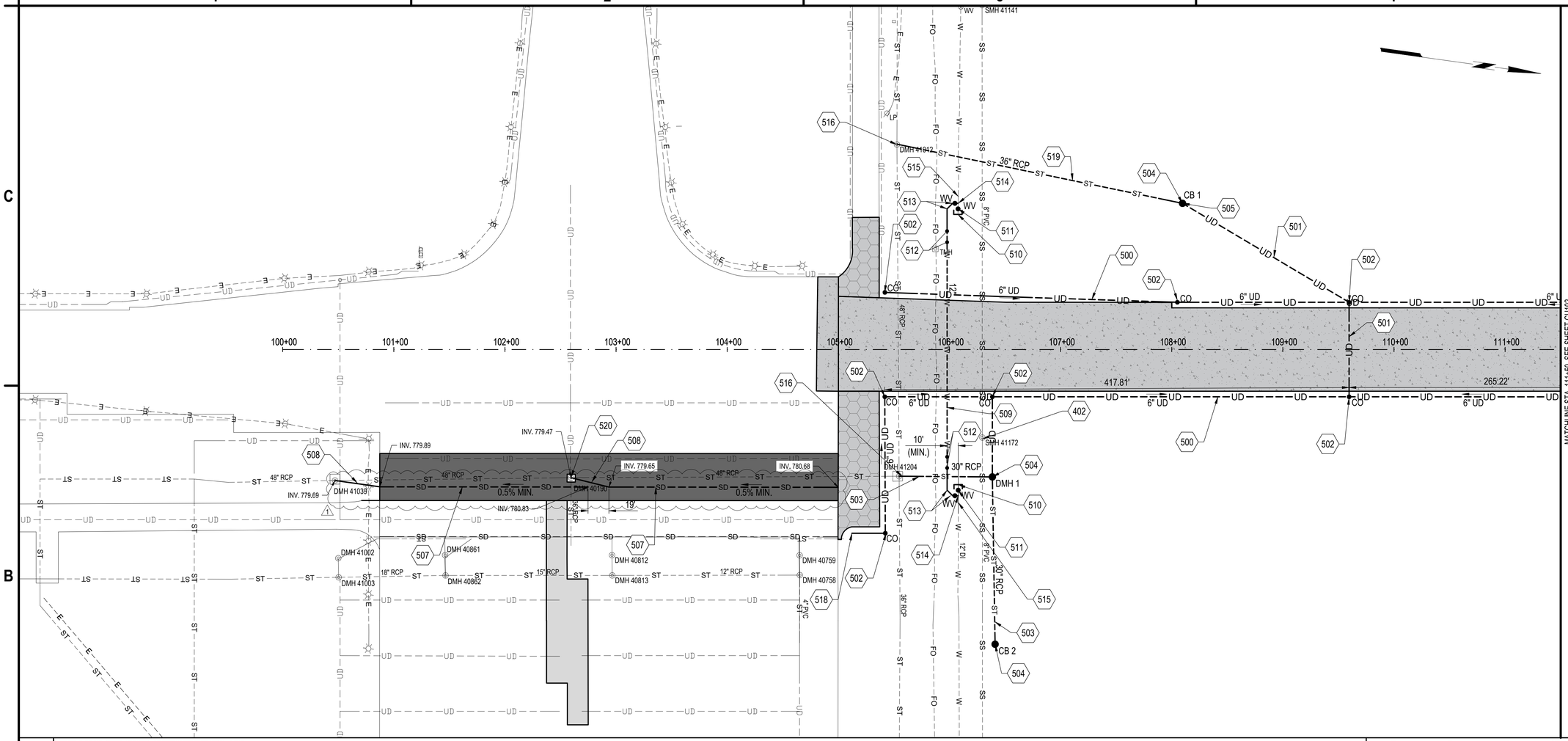


B1 DRAINAGE AND UTILITIES PLAN

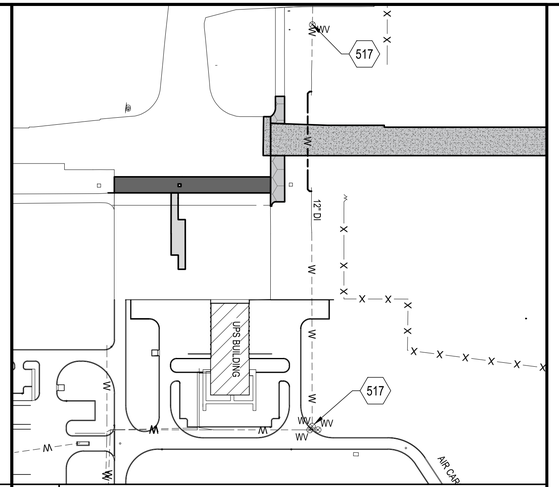
SCALE: 1" = 50'

50 0 50 100FT.
50'

402. EXISTING STRUCTURE TO BE ADJUSTED TO GRADE, ITEM D-751, SEE DETAIL C1/CU502
500. INSTALL UNDERDRAIN AT A 0.5% MIN. SLOPE, ITEM D-705 SEE DETAIL A3/CU501
501. SMOOTH WALL, NON PERFORATED UNDERDRAIN PIPE, ITEM D-705, SEE DETAIL B2/CU501
502. INSTALL CLEANOUT, ITEM D-751, SEE DETAIL A1/CU501
503. INSTALL 30" CLASS IV RCP STORM SEWER PIPE, ITEM D-701, SEE DETAIL C2/CU501
504. INSTALL CYLINDRICAL PRE-CAST STRUCTURE, ITEM D-751 SEE DETAIL B3/CU501
505. CONNECT UNDERDRAIN TO EXISTING OR PROPOSED STRUCUTRE, INCIDENTAL TO ITEM D-705 SEE DETAIL C1/CU501
507. PROPOSED SLOT DRAIN, (ADD ON NO. 1) SEE DETAIL A1/CU502
508. CONNECT PROPOSED SLOT DRAIN TO EXISTING STRUCTURE, INCIDENTAL TO SLOT DRAIN INSTALLATION.
509. WATER MAIN, 12 INCH DIA., RESTRAINED, DI. SEE PROFILE C1/CU201 AND DETAIL B2/CU503. WATERLINE SHALL BE REPLACED IN ACCORDANCE WITH KEYED NOTE 131 ON SHEET CD101
510. 12 INCH WATER MAIN PLUG WITH RESTRAINED JOINTS THRUST BLOCK PER DETAIL A3/CU503
511. GATE VALVE, 12 INCH AND BOX, SEE DETAIL B1/CU503 (TYP.)
512. 12 INCH 45 DEGREE VERTICAL BEND WITH THRUST BLOCK PER DETAIL B3/CU503
513. 12 INCH 45 DEGREE HORIZONTAL BEND WITH THRUST BLOCK PER DETAIL B3/CU503
514. 12 INCH X 12 INCH X 12 INCH TEE
515. SAWCUT AND CONNECT PROPOSED WATER MAIN TO EXISTING, SEE DETAIL C1/CU503
516. CONNECT PROPOSED PIPE TO EXISTING STRUCTURE. MODIFY EXISTING OPENING TO ACCEPT THE NEW PIPE AS REQUIRED. COST INCIDENTAL TO ITEM D-701
517. EXISTING WATERMAIN VALVE, SEE A3 THIS SHEET. WATERMAIN SHUT OFFS SHALL OCCUR FROM 11PM TO 5AM ON DATES APPROVED BY GRR
518. CAP PROPOSED UNDERDRAIN, INCIDENTAL TO UNDERDRAIN INSTALLATION, ITEM D-705
519. INSTALL 36" CLASS IV RCP STORM SEWER PIPE, ITEM D-701, SEE DETAIL C2/CU501
520. EXISTING STRUCTURE TO BE PROTECTED IN PLACE

A1 KEYED NOTES

SCALE: NOT TO SCALE



A3 WATER VALVE LOCATION

SCALE: NOT TO SCALE

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MARK	DATE	DESCRIPTION
1	XX/XX/XX	DESCRIPTION

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DRAINAGE AND UTILITIES PLAN

CU101

SHEET NO. 28 OF 36

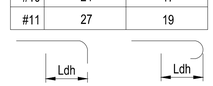
Aug 28, 2025 - 2:16pm
P:\Projects\K19 - Gerald R. Ford Airport\K19025001 - Taxiway L\Design\CADD\Sheet Files\K19025001_CU_PL.dwg

BAR SIZE	F'c = 4000 PSI	
	CLASS A	CLASS B
#3	12	12
#4	12	15
#5	15	19
#6	17	22
#7	28	37
#8	36	47
#9	44	57
#10	54	70
#11	64	84

NOTES:
1. Ld = TENSION DEVELOPMENT LENGTH.
2. ALL SPLICE LENGTHS ARE IN INCHES.
3. FOR TOP BARS, MULTIPLY SPLICE LENGTHS BY 1.30. TOP BARS REQUIRE A MINIMUM OF 12" FRESH CONCRETE BELOW BAR. FOR TOP REINFORCEMENT IN SLABS 12" THICK OR LESS, USE VALUES IN TABLE.
4. FOR EPOXY-COATED BARS, MULTIPLY SPLICE LENGTHS BY 1.5. THE PRODUCT OF THE TOP BAR MULTIPLIER AND THE EPOXY-COATED BAR MULTIPLIER NEED NOT BE MORE THAN 1.7.
5. WHEN LAP SPLICING BARS OF DIFFERENT SIZES, THE LAP LENGTH IS DETERMINED BY THE SMALLER BAR, BUT MAY NOT BE LESS THAN THE CLASS A SPLICE LENGTH OF THE LARGER BAR.
6. SPLICE LENGTHS ARE BASED OFF A MINIMUM OF 1 1/2" OF COVER.

TENSION DEVELOPMENT AND SPLICE LENGTHS-
NORMAL WEIGHT CONCRETE (GRADE 60 REINFORCING BARS)

BAR SIZE	F'c = 4000 PSI	
	Lhb	0.7Lhb
#3	7	6
#4	9	7
#5	12	8
#6	14	10
#7	17	12
#8	19	13
#9	21	15
#10	24	17
#11	27	19



NOTES:
1. Ldh = DEVELOPMENT LENGTH OF STANDARD HOOKS IN TENSION (INCHES).
2. Ldh = Lhb UNLESS CONDITIONS OF ITEM 3 ARE SATISFIED.
3. Ldh = 0.7Lhb WHEN SIDE COVER NORMAL TO PLANE OF HOOK IS NOT LESS THAN 2 1/2 INCHES AND FOR 90 DEGREE HOOKS, COVER ON BAR EXTENSION BEYOND HOOK IS NOT LESS THAN 2 INCHES.
4. HOOKS SHALL NOT BE CONSIDERED EFFECTIVE FOR DEVELOPING BARS IN COMPRESSION.
5. VALUES SHOWN ARE FOR GRADE 60 BARS. MULTIPLY BY 1.25 FOR GRADE 75 BARS.
6. Ldh SHALL BE MULTIPLIED BY 1.2 FOR EPOXY-COATED HOOKED BARS.

TENSION DEVELOPMENT LENGTHS OF STANDARD HOOKS- NORMAL
WEIGHT CONCRETE (GRADE 60 REINFORCING BARS)

B3 CONCRETE REINFORCEMENT TENSION DEVELOPMENT AND SPLICE LENGTHS

SCALE: NOT TO SCALE

B4 GENERAL REINFORCEMENT NOTES

SCALE: NOT TO SCALE

PART I - REINFORCING (SLOT DRAIN ONLY)

1. REINFORCING:
   BARS: ASTM A-615 GRADE 60 - DEFORMED.

2. SPLICES IN REINFORCEMENT: UNLESS OTHERWISE NOTED, ALL SPLICES AND ANCHORAGES SHALL BE PER ACI. STAGGER SPLICES WHEREVER POSSIBLE AND LOCATE SO AS NOT TO IMPAIR STRENGTH OF MEMBERS.

3. REINFORCEMENT WORK OF DETAILING, FABRICATION ,AND ERECTION SHALL CONFORM TO THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318 (, ACI DETAILING MANUAL-2004 (SP 66) CRSI MANUAL OF STANDARD PRACTICE (MSP 2009), AND THE STRUCTURAL WELDING CODE- REINFORCING STEEL (AWS D1.1).

4. PROVIDE AND SCHEDULE ON SHOP DRAWINGS THE NECESSARY ACCESSORIES TO HOLD ALL REINFORCEMENT SECURELY IN POSITION.

5. WHERE CONTINUOUS REINFORCEMENT IS CALLED FOR , IT SHALL BE EXTENDED CONTINUOUSLY AROUND CORNERS AND LAPPED AT SPLICES OR AT DISCONTINUOUS ENDS. LAPS SHALL BE CLASS B TENSION LAP SPLICES UNLESS OTHERWISE NOTED.

6. WHERE REINFORCEMENT IS NOT SHOWN ON DRAWINGS, PROVIDE REINFORCEMENT IN ACCORDANCE WITH APPLICABLE DETAILS AS DETERMINED BY THE ENGINEER. IN NO CASE SHALL THE REINFORCEMENT BE LESS THAN THE MINIMUM PERMITTED BY THE APPLICABLE CODES.

7. WHERE REINFORCEMENT IS REQUIRED IN SECTION, REINFORCEMENT IS CONSIDERED TYPICAL WHEREVER THE SECTION APPLIES.

8. REINFORCEMENT SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS.

9. COLUMN DOWELS SHALL BE SET WITH A TEMPLATE SO AS TO BE ENCLOSED BY THE COLUMN TIES.

10. DOWELS SHALL MATCH BAR SIZES UNLESS OTHERWISE NOTED.

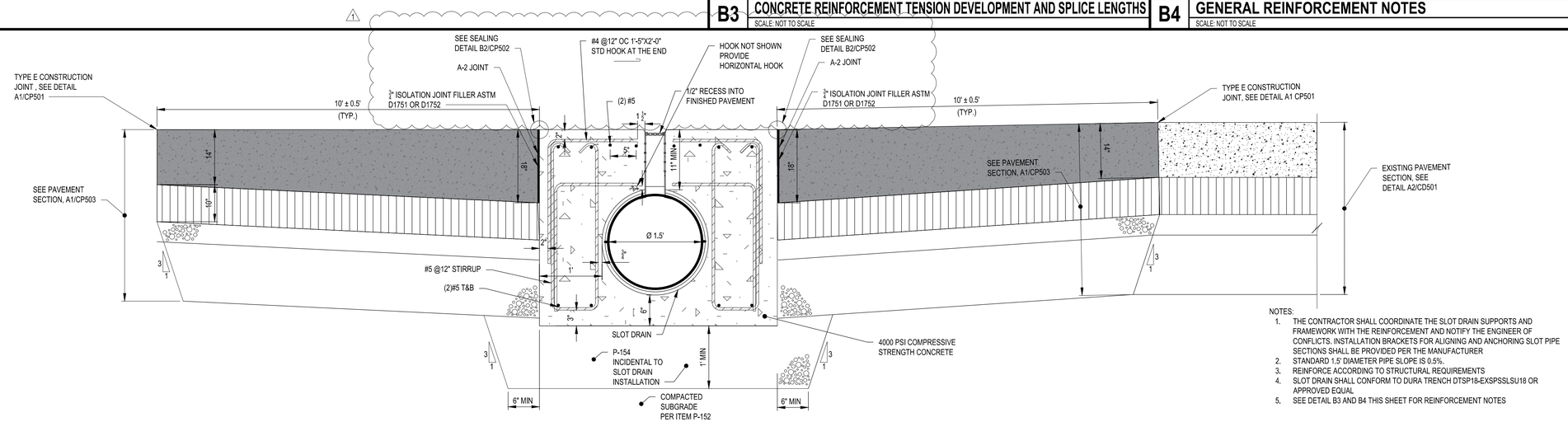
11. WELDED WIRE FABRIC SHALL BE LAPPED 8 INCHES OR 1 1/2 SQUARES WHICHEVER IS LARGER AND SHALL BE WIRED TOGETHER.

12. REINFORCEMENT SHALL NOT BE TACK WELDED. REINFORCING BARS TO BE WELDED SHALL CONFORM TO ASTM A706 FY=60KSI.

13. REINFORCEMENT INSTALLATION SHALL BE COMPLETED AT LEAST 24 HOURS BEFORE A CONCRETE PLACEMENT OR SHALL BE COORDINATED WITH THE OAR TO ENSURE PROPER TIME IS ALLOWED FOR THE INSPECTION OF THE REINFORCING. NOTIFY THE ENGINEER OF COMPLETION.

14. ALL REINFORCEMENT SHALL BE SECURELY TIED IN PLACE AT THE POSITIONS SHOWN ON THE DRAWINGS BEFORE PLACING CONCRETE.

15. UNLESS NOTED OTHERWISE, ALL BARS SHALL BE EMBEDDED TO A MINIMUM DEPTH (Ld OR Ldh)



NOTES:
1. THE CONTRACTOR SHALL COORDINATE THE SLOT DRAIN SUPPORTS AND FRAMEWORK WITH THE REINFORCEMENT AND NOTIFY THE ENGINEER OF CONFLICTS. INSTALLATION BRACKETS FOR ALIGNING AND ANCHORING SLOT PIPE SECTIONS SHALL BE PROVIDED PER THE MANUFACTURER
2. STANDARD 1.5' DIAMETER PIPE SLOPE IS 0.5%.
3. REINFORCE ACCORDING TO STRUCTURAL REQUIREMENTS
4. SLOT DRAIN SHALL CONFORM TO DURA TRENCH DTSP18-EXSPSSLSU18 OR APPROVED EQUAL
5. SEE DETAIL B3 AND B4 THIS SHEET FOR REINFORCEMENT NOTES

A1 SLOT DRAIN DETAIL

SCALE: 1" =1'

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GERALD R. FORD International Airport

TAXILANE L CONSTRUCTION
GERALD R. FORD INTERNATIONAL AIRPORT GRAND RAPIDS, MI

MARK	DATE	DESCRIPTION
1	08/29/2025	ADDENDUM NO. 1

REVISIONS

PROJECT NO:	K19.025.001
DATE:	AUGUST 2025
DRAWN BY:	B. COOK
DESIGNED BY:	T.J. CORCORAN
CHECKED BY:	K.J. JOST

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DRAINAGE DETAILS

CU502

SHEET NO. 32 OF 36

Aug 29, 2025 - 11:18am
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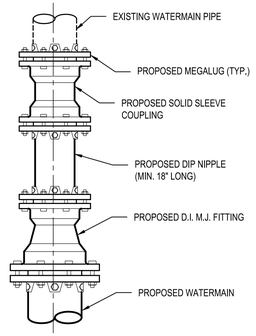
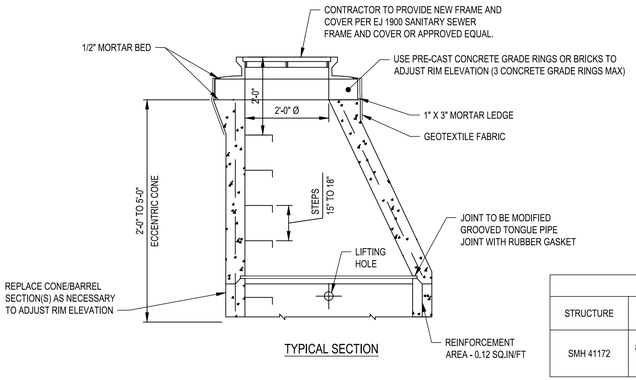


C1 CONNECTION TO EXISTING WATERMAIN DETAIL

SCALE: NOT TO SCALE



TYPICAL SECTION

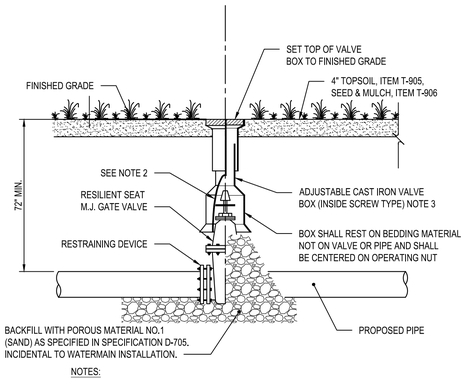
NOTES:

1. PRECAST UNITS SHALL MEET THE REQUIREMENTS OF A.S.T.M. C478 THESE ARE THE MINIMUM REINFORCING REQUIREMENTS
2. M.H. STEPS SHALL HAVE 3" EMBEDMENT MINIMUM (TYP.).
3. THE ADJUSTMENT THICKNESS USING PRECAST ADJUSTING RINGS SHALL BE 2" MINIMUM 9" MAXIMUM UNLESS OTHERWISE INDICATED.
4. A MAJOR ADJUSTMENT IS CONSIDERED TO BE AN ELEVATION CHANGE OF 0.5-FEET OR GREATER CONTRACTOR TO USE A COMBINATION OF ADJUSTING/REPLACE THE GRADE RINGS CONE/BARREL SECTION(S) ETC, AS NECESSARY TO ACHIEVE REQUIRED PROPOSED ELEVATION.

STRUCTURE TABLE				
STRUCTURE	PIPE INVERTS	COORDINATES	STRUCTURE SIZE	STRUCTURE MODIFICATION
SMH 41172	8" PVC W INV. = 763.59' 8" PVC E INV. = 763.64'	RIM = 780.99' NORTHING = 507,435.29' EASTING = 12,816,748.58'	48" DIA.	RAISE STRICTURE RIM TO ELEV. 782.61 (+1.62')

C3 MAJOR ADJUSTMENT TO AN EXISTING STRUCTURE DETAIL

SCALE: NOT TO SCALE

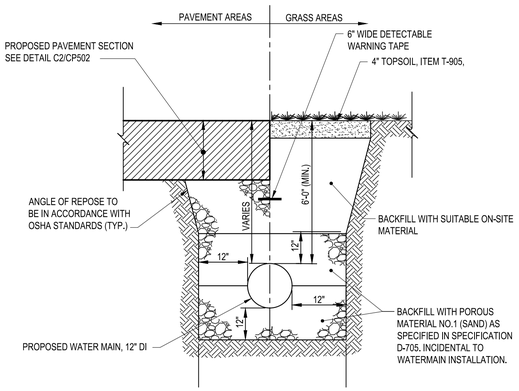


NOTES:

1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
2. THE ACTUATING NUT FOR VALVES SHALL BE EXTENDED TO A MAXIMUM OF 30-INCHES BELOW FINISHED GRADE.
3. ADJUST TO MID-RANGE TO ALLOW FOR FUTURE BOX ADJUSTMENTS.

B1 GATE VALVE DETAIL

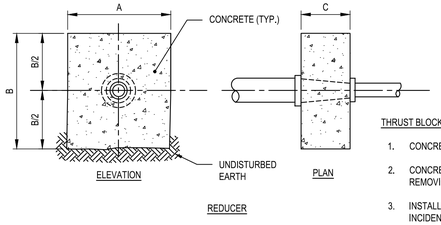
SCALE: NOT TO SCALE



B2 WATER MAIN PIPE TRENCHING DETAIL

SCALE: NOT TO SCALE

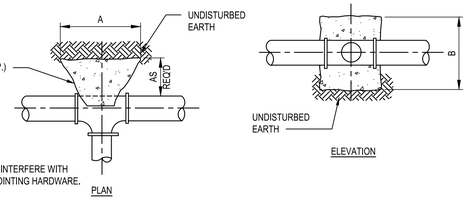
CONCRETE ANCHOR & THRUST BLOCK DIMENSIONS																
SIZE	12"			10"			8"			6"			4"			
DIMENSIONS	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
BEND 90°	3'-6"	3'-6"	----	2'-11"	2'-11"	----	2'-4"	2'-4"	----	1'-6"	1'-6"	----	1'-2"	1'-2"	----	
BEND 45°	2'-6"	2'-6"	----	2'-2"	2'-2"	----	1'-9"	1'-9"	----	1'-2"	1'-2"	----	0'-10"	0'-10"	----	
BEND 22 1/2°	1'-10"	1'-10"	----	1'-6"	1'-6"	----	1'-3"	1'-3"	----	1'-0"	1'-0"	----	1'-0"	1'-0"	----	
BEND 11 1/4°	1'-4"	1'-4"	----	1'-2"	1'-2"	----	0'-11"	0'-11"	----	1'-0"	1'-0"	----	1'-0"	1'-0"	----	
D.I. ANCHOR	7'-0"	5'-0"	1'-0"	7'-0"	4'-0"	1'-0"	6'-0"	3'-0"	1'-0"	5'-4"	2'-6"	1'-0"	4'-6"	2'-0"	1'-0"	
TS&V, TEE BRANCH SIZE	3'-0"	3'-0"	----	2'-6"	2'-6"	----	2'-0"	2'-0"	----	1'-10"	1'-10"	----	1'-0"	1'-0"	----	
REDUCER 12"X	----	----	----	2'-6"	2'-6"	1'-2"	3'-8"	3'-8"	1'-2"	4'-0"	4'-0"	1'-2"	4'-6"	4'-6"	1'-2"	
REDUCER 10"X	----	----	----	----	----	----	2'-6"	2'-6"	1'-0"	2'-6"	2'-6"	1'-0"	4'-0"	4'-0"	1'-0"	
REDUCER 8"X	----	----	----	----	----	----	----	----	----	2'-0"	2'-0"	0'-11"	2'-8"	2'-8"	0'-11"	
REDUCER 6"X	----	----	----	----	----	----	----	----	----	----	----	----	1'-8"	1'-8"	0'-9"	



REDUCER

THRUST BLOCK NOTES:

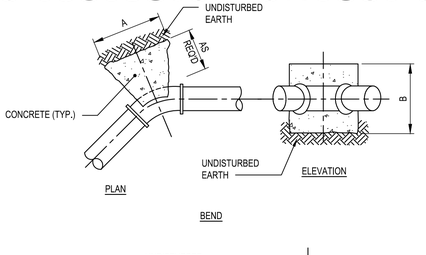
1. CONCRETE NOT TO OVERLAP ANY JOINT.
2. CONCRETE TO BE PLACED SO AS NOT TO INTERFERE WITH REMOVING OR INSTALLING ANY OF THE JOINTING HARDWARE.
3. INSTALLATION OF THRUST BLOCKS SHALL BE CONSIDERED INCIDENTAL TO THE WATER MAIN INSTALLATION



TEE & T.S. & V.

B3 TYPICAL THRUST BLOCK DETAILS

SCALE: NOT TO SCALE

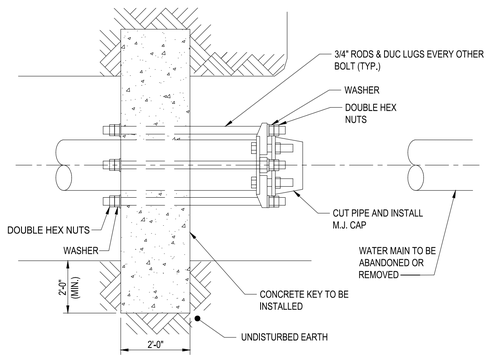


BEND

1. ALL WATER SYSTEM CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND GENERAL SPECIFICATION OF THE CITY OF GRAND RAPIDS OR OTHER AGENCIES HAVING JURISDICTION OF THE WATER SUPPLY SYSTEM AND CONSTRUCTION AREA. THE CONTRACTOR IS RESPONSIBLE TO COMPLY WITH ALL APPLICABLE NATIONAL AND LOCAL CODES. THE CONTRACTOR IS TO NOTIFY THE ENGINEER IMMEDIATELY IF CONTRACT DOCUMENTS CONFLICT WITH ANY SUCH CODES.
2. ALL WATER MAIN SHALL BE DUCTILE IRON, CEMENT LINED, CLASS 56, AND SHALL BE FULLY WRAPPED IN POLYETHYLENE IN ACCORDANCE WITH THE LATEST SPECIFICATION OF AWWA C105. ALL FITTINGS SHALL BE RESTRAINED MECHANICAL JOINT DUCTILE IRON WITH A MINIMUM PRESSURE RATING OF 350 PSI.
3. WATER MAIN CONSTRUCTION SHALL BE COORDINATED WITH THE ENGINEER AND THE GERALD R. FORD INTERNATIONAL AIRPORT AUTHORITY. THE CONTRACTOR SHALL PROVIDE A WORK PLAN WITH SCHEDULE AND MILESTONES, CONSTRUCTION METHODS, AND A RISK ANALYSIS DETAILING POTENTIAL HAZARDS AND PROPOSED HAZARD MITIGATION PROCEDURES. THIS WORK PLAN SHALL BE PRESENTED TO THE ENGINEER AS SOON AS POSSIBLE WITH A MINIMUM OF 30 DAYS PRIOR TO COMMENCEMENT OF SUCH PROCEDURES. THE EXISTING WATER MAIN MAY ONLY BE SHUT DOWN BETWEEN THE HOURS OF 11PM - 5AM DURING CONNECTION TO PROPOSED WATER MAIN.
4. RECORD DRAWINGS FOR EXISTING WATER MAIN ARE NOT AVAILABLE, THUS THE EXACT DEPTH, LOCATION AND TYPE OF EXISTING WATER MAIN IS UNKNOWN.
5. OPERATION OF EXISTING WATER MAIN IS TO BE MAINTAINED UNTIL REPLACEMENT LINE IS PLACED INTO SERVICE. EVERY EFFORT SHALL BE MADE TO PROTECT IN PLACE EXISTING WATER MAIN. IF WATER SERVICE IS COMPROMISED DUE TO WATER MAIN BREAKAGE WITHIN THE CONSTRUCTION AREA, THE CONTRACTOR SHALL IMMEDIATELY REPAIR THE DAMAGE AND IS RESPONSIBLE FOR THE IMPLICATIONS OF ANY NECESSARY SHUT DOWN. NO SEPARATE PAYMENT WILL BE MADE FOR EMERGENCY REPAIR WORK. EMERGENCY REPAIR WORK IS TO COMPLY WITH ANY APPLICABLE NATIONAL AND LOCAL CODES.
6. PROPOSED WATER MAIN IS TO BE INSTALLED AT A MINIMUM DEPTH OF 6 FEET UNLESS OTHERWISE DIRECTED BY THE ENGINEER. WATER MAIN SHALL BE INSTALLED WITH MINIMUM 18 INCHES OF VERTICAL SEPARATION FROM ANY EXISTING OR PROPOSED UTILITY. WATER MAINS SHALL CROSS SEWER MAINS AT HIGHER ELEVATION THAN THE SEWER MAIN UNLESS OTHERWISE DIRECTED BY THE ENGINEER. CROSSINGS SHALL BE ARRANGED SO THAT WATER MAIN JOINTS ARE AS FAR AS POSSIBLE FROM SEWER MAIN JOINTS. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE NATIONAL AND LOCAL CODES.
7. CONNECTION TO EXISTING WATER MAIN SHALL BE MADE ONLY AFTER HYDROSTATIC AND BACTERIOLOGICAL TESTS HAVE BEEN SUCCESSFULLY COMPLETED AND REVIEWED BY THE ENGINEER AND THE GERALD R. FORD INTERNATIONAL AIRPORT AUTHORITY. TESTING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL SURFACE STRUCTURES, SUCH AS HYDRANTS, VALVE PITS AND CURB BOXES SHALL BE SET TO GRADE AS INDICATED ON THE PLANS UNLESS OTHERWISE DIRECTED BY ENGINEER.
9. ALL FITTINGS SHALL CONFORM TO AWWA/ANSI C110/A21.10, ANSI/AWWA C111/A21.11, AND ANSI/AWWA C153/A21.53.
10. ALL GATE VALVES MUST MEET THE REQUIREMENTS OF AWWA C509
11. ALL VALVE BOXES SHALL MEET THE REQUIREMENTS OF ASTM A48/A48M FOR CLASS 30B AND AASHTO M 306. EACH BOX MUST BE A SCREW TYPE AND CONSIST OF FIVE SECTIONS: BASE, CENTER, EXTENSION, TOP, AND COVER. THE COVER MUST BE MARKED "WATER".

A1 WATER MAIN NOTES

SCALE: NOT TO SCALE



A3 CUT AND CAP DETAIL

SCALE: NOT TO SCALE

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GERALD R. FORD International Airport

TAXILANE L CONSTRUCTION
GERALD R. FORD INTERNATIONAL AIRPORT GRAND RAPIDS, MI

MARK	DATE	DESCRIPTION
1	08/29/2025	ADDENDUM NO. 1

REVISIONS

PROJECT NO: K19.025.001
DATE: AUGUST 2025
DRAWN BY: B. COOK
DESIGNED BY: T.J. CORCORAN
CHECKED BY: K.J. JOST

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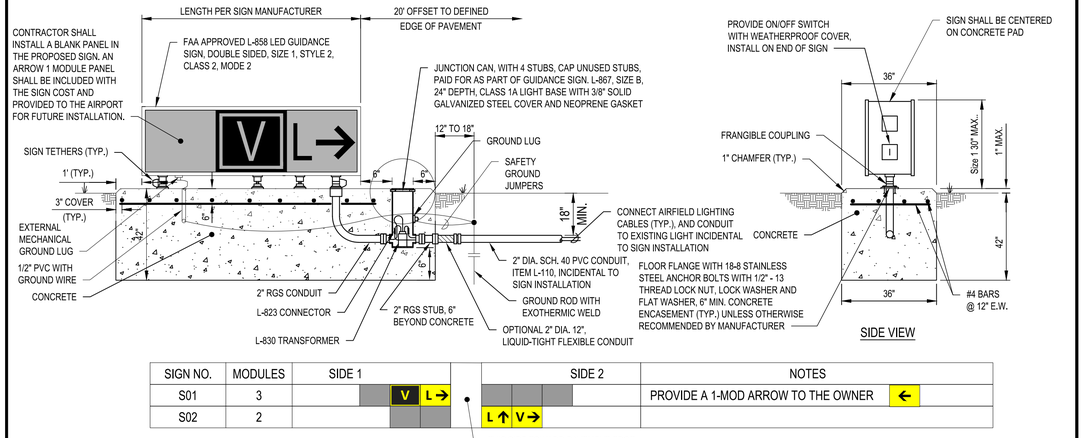
WATER MAIN DETAILS

CU503

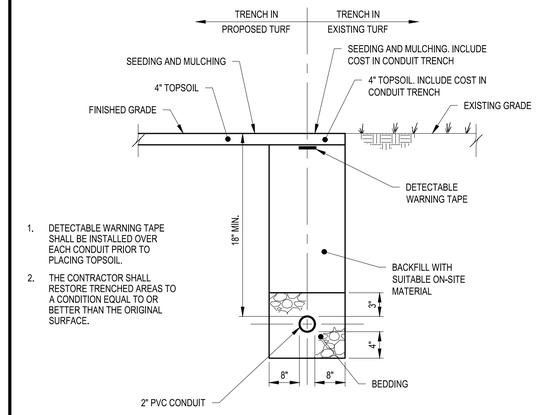
SHEET NO. 33 OF 36



SIGN NO.	MODULES	SIDE 1	SIDE 2	NOTES
S01	3	V L→		PROVIDE A 1-MOD ARROW TO THE OWNER ←
S02	2		L↑ V→	

C1 GUIDANCE SIGN DETAIL

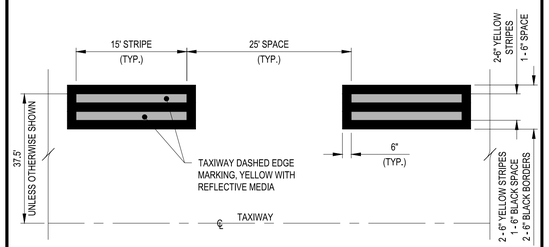
SCALE: NOT TO SCALE



1. DETECTABLE WARNING TAPE SHALL BE INSTALLED OVER EACH CONDUIT PRIOR TO PLACING TOPSOIL.
2. THE CONTRACTOR SHALL RESTORE TRENCHED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE ORIGINAL SURFACE.

C3 CONDUIT TRENCHING DETAIL (IN TURF)

SCALE: NOT TO SCALE

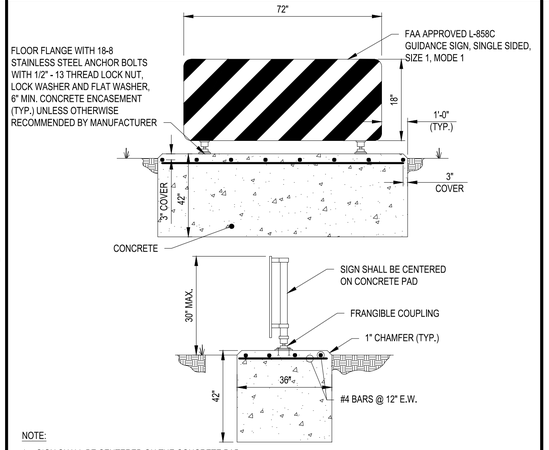


NOTE:

1. REFLECTIVE MEDIA SHALL NEVER BE USED IN BLACK PAINT.

C4 DASHED TAXIWAY EDGE MARKING DETAIL

SCALE: NOT TO SCALE

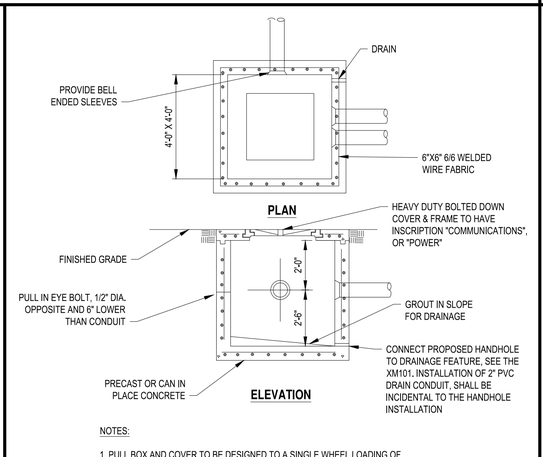


NOTE:

1. SIGN SHALL BE CENTERED ON THE CONCRETE PAD.

B1 TAXIWAY ENDING MARKER SIGN DETAIL (UNLIGHTED)

SCALE: NOT TO SCALE

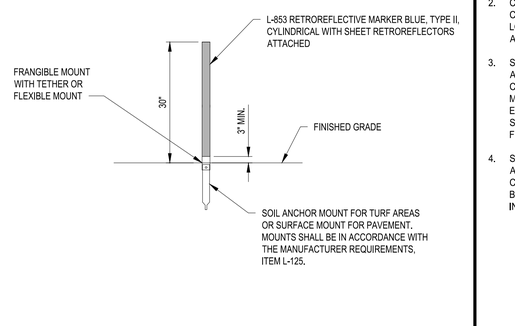


NOTES:

1, PULL BOX AND COVER TO BE DESIGNED TO A SINGLE WHEEL LOADING OF 100,000 POUNDS AND TIRE PRESSURE OF 200 PSI.

B2 ELECTRICAL HAND HOLE DETAIL

SCALE: NOT TO SCALE

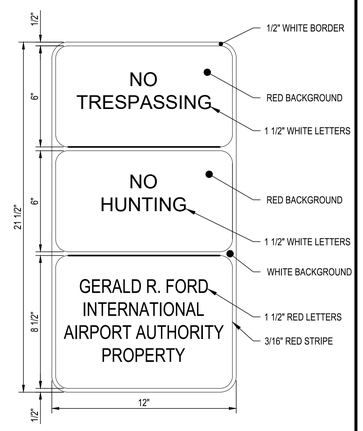


B3 RETROREFLECTIVE MARKER DETAIL

SCALE: NOT TO SCALE

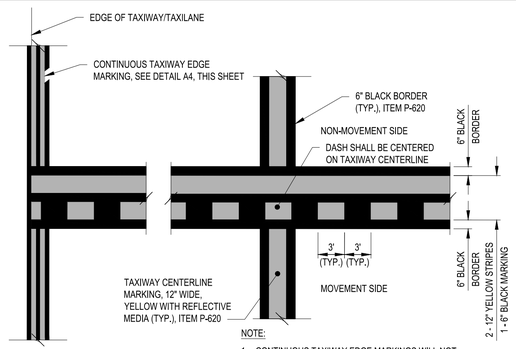
NOTE:

1. CONTRACTOR SHALL FIELD VERIFY PROPOSED SIGN MATCHES EXISTING.
2. CONTRACTOR SHALL COORDINATE EXACT LOCATIONS WITH OWNER WITH A MAXIMUM SPACING OF 200'.
3. SIGNS ARE TO BE SECURELY ATTACHED TO THE FENCE WITH CLIPS OR OTHER MEANS THAT MEET THE APPROVAL OF THE ENGINEER. WARNING SIGNS SHALL BE INCIDENTAL TO FENCE PAY ITEMS.
4. SIGNS TO BE PROVIDED BY AIRPORT, INSTALLED BY CONTRACTOR. PAYMENT WILL BE INCLUDED WITH FENCE INSTALLATION.



B4 WARNING SIGN DETAIL

SCALE: NOT TO SCALE

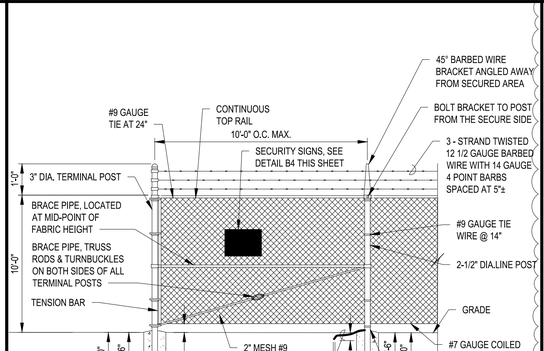


NOTE:

1. CONTINUOUS TAXIWAY EDGE MARKINGS WILL NOT HAVE AN OUTSIDE BLACK BORDER IF THERE IS NO PAVED SHOULDER.
2. ALL NON-MOVEMENT AREA BOUNDARY MARKINGS SHALL BE PAINTED YELLOW WITH REFLECTIVE MEDIA. REFLECTIVE MEDIA SHOULD NEVER BE USED IN BLACK PAINT.
3. ANY EXISTING MARKINGS ENCOUNTERED OR IN CONFLICT WITH NEW MARKINGS SHALL BE REMOVED AS NEEDED PRIOR TO PAINTING THE NON-MOVEMENT AREA BOUNDARY MARKING.

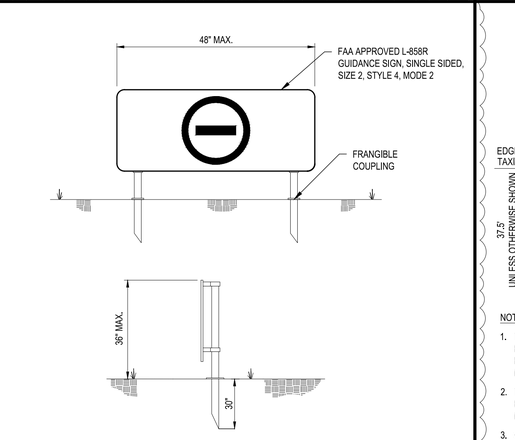
A1 NON-MOVEMENT AREA BOUNDARY MARKING DETAIL

NOT TO SCALE



A2 CHAIN-LINK FENCE DETAIL

SCALE: NOT TO SCALE

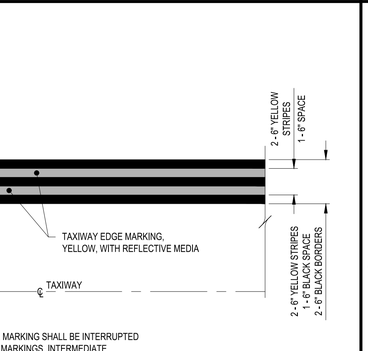


NOTE:

1. SIGN SHALL BE STAKE MOUNTED INTO EXISTING GROUND PER MANUFACTURER REQUIREMENTS.

A3 NO ENTRY SIGN ASSEMBLY DETAIL

SCALE: NOT TO SCALE



NOTES:

1. THE CONTINUOUS TAXIWAY EDGE MARKING SHALL BE INTERRUPTED FOR RUNWAY HOLDING POSITION MARKINGS, INTERMEDIATE HOLDING POSITION MARKINGS, ILS/MLS HOLDING POSITION MARKINGS, AND NON-MOVEMENT AREA MARKINGS.
2. THE CONTINUOUS TAXIWAY EDGE MARKINGS SHALL ABUT THE BLACK BORDER ASSOCIATED WITH THE ABOVE MENTIONED MARKINGS ON BOTH SIDES.
3. CONTINUOUS TAXIWAY EDGE MARKINGS WILL NOT HAVE AN OUTSIDE BLACK BORDER IF THERE IS NO PAVED SHOULDER.
4. REFLECTIVE MEDIA SHALL NEVER BE USED IN BLACK PAINT.

A4 CONTINUOUS TAXIWAY EDGE MARKING DETAIL

SCALE: NOT TO SCALE

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MARKING, FENCING, ELECTRICAL AND COMMUNICATION DETAILS

XM501

SHEET NO. 36 OF 36

Aug 28, 2025 - 3:18pm
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Attachment F: Geotechnical Report

Infrastructure Consulting Engineers

4039 40th Street SE • Suite 4 • Grand Rapids • Michigan • 49512

REPORT ON GEOTECHNICAL INVESTIGATION

TAXIWAY L EXPANSION
GERALD R. FORD INTERNATIONAL AIRPORT
CASCADE TOWNSHIP, MICHIGAN

Owner:

Gerald R. Ford International Airport

Prepared for:

C&S Companies
38777 Six Mile Road, Suite 202
Livonia, Michigan

February 17, 2025
2024130A

Somat Engineering, INCORPORATED

Somat Engineering, INCORPORATED

February 17, 2025
2024130A

Kelly Jost, PE
C&S Companies
38777 Six Mile Road, Suite 202
Livonia, Michigan 48152

RE: Report on Geotechnical Investigation
Taxiway L Expansion
Gerald R. Ford International Airport
Cascade Township, Michigan

Dear Ms. Jost:

We have completed the geotechnical investigation for the proposed Taxiway L expansion at Gerald R. Ford International Airport located in Cascade Township, Michigan. This report presents the results of our observations, geotechnical recommendations, and construction considerations.

The soil samples collected during our field investigation will be retained in our laboratory for 30 days from the date of the final geotechnical report, at which time these samples will be discarded unless otherwise directed by you.

It was a pleasure working with you on this project. If you have any questions regarding this report, please do not hesitate to contact us.

Sincerely,
Somat Engineering, Inc.

Jennifer S. Schmitzer
Project Manager

Corey R. Hostetter, PE
Senior Project Engineer

JSS/CRH/JDH

REPORT ON GEOTECHNICAL INVESTIGATION
TAXIWAY L EXPANSION
GERALD R. FORD INTERNATIONAL AIRPORT
CASCADE TOWNSHIP, MICHIGAN

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1.0 INTRODUCTION

1.1 GENERAL

Upon authorization from C&S Companies, Somat Engineering, Inc. (Somat) has conducted a geotechnical investigation for the proposed expansion of Taxiway L at the Gerald R. Ford International Airport in Cascade Township, Michigan. This investigation was performed in accordance with Somat Proposal No. P240272A, dated November 20, 2024.

The following sections of this report provide our understanding of the project, a description of our field investigation, the results of the field and laboratory tests, the logs of test borings, our interpretation of subsoil and groundwater conditions, recommendations related to the geotechnical aspects for pavement construction, and construction considerations based on the soil and groundwater conditions disclosed by our investigation.

1.2 PROJECT AND SITE INFORMATION

The Gerald R. Ford International Airport is located at 44th Street in Cascade Township. The main airport property is generally bounded by Patterson Avenue, 36th Street, Thornapple River Drive, and M-6.

As part of the overall planning for the development of the airport to the east, a new section of Taxiway L is proposed to be constructed to connect the new development to the runways. The new section of Taxiway L will extend north from the existing Taxiway L, generally from the existing apron at the UPS facility to nearly Cassard Lane. This section measures approximately 1,800 feet.

The site of the proposed expansion is grass covered and has varied elevations due to stockpiling of excess soil from other projects.

2.0 SUBSURFACE INVESTIGATION

2.1 FIELD EXPLORATION

The field exploration program consisted of performing a series of ten (10) soil borings to determine the subsurface conditions along the proposed taxiway expansion, designated as TH-01 through TH-10. Each boring extended to a depth of about 10 feet below existing grade.

The number and locations of the borings were determined jointly by C&S Companies (C&S) and Somat. The borings were staked in the field by Somat. Ground surface elevations and coordinates of the as-drilled boring locations were provided by C&S. A soil boring location diagram is presented in Appendix A for reference.

2.1.1 Drilling Operations

The drilling operations were performed on December 23, 2024. A Geoprobe drill rig (equipped with an automatic SPT hammer) was used to advance 2¼-inch inside diameter hollow stem augers to the explored depth.

The boreholes were backfilled with soil cuttings to the surface.

2.1.2 Sampling

Soil samples were recovered from the soil borings using split-spoon sampling procedures in accordance with ASTM Standard D1586 (“Standard Method for Penetration Tests and Split Barrel Sampling of Soils”). Standard Penetration Test (SPT) sampling was performed using an 18-inch long split-spoon sampler semi-continuously (every 2.5 feet) to the termination depth of the soil borings.

Soil samples collected during the drilling portion of the subsoil exploration were labeled with the soil boring designation and a unique sample number. Soil boring samples were obtained by Standard Penetration Tests in accordance with ASTM D1586 procedures, whereby a conventional 2-inch O.D. split-spoon sampler is driven into the soil with a 140-pound hammer repeatedly

dropped through a free-fall distance of 30 inches. The sampler was generally driven three (3) successive 6-inch increments, with the blows for each 6-inch increment being recorded. The number of blows required to advance the sampler through 12 inches after an initial penetration of 6 inches, is termed the Standard Penetration Test resistance (N-value). The number of blows for each 6-inch increment is also presented on the Logs of Test Borings in Appendix B.

In addition, bulk samples of the subgrade soils were collected at three (3) locations in order to perform the laboratory California Bearing Ratio (CBR) tests.

The SPT samples obtained during drilling were sealed in glass jars in the field to protect the soil and maintain the soil's natural moisture content. All soil samples for the geotechnical investigation were transported to Somat's laboratory for further analysis and testing and will be retained in our laboratory for a period of 30 days from the date of the final report, after which they will be discarded, unless we are notified otherwise.

2.1.3 Groundwater Level Observation Procedures

Whenever possible, groundwater level observations were made during the drilling operations and immediately after completion of drilling, and are shown on the individual Logs of Test Borings. During drilling, the depth at which free water was observed, where drill cuttings became saturated or where saturated samples were collected, was indicated as the groundwater level during drilling. In granular, pervious soils, the indicated water levels are considered relatively reliable when solid or hollow-stem augers are used for drilling. However, in cohesive soils, groundwater observations are not necessarily indicative of the static water table due to the low permeability rates of the soils, and due to the sealing off of natural paths of groundwater flow during drilling operations.

It should be noted that seasonal variations and recent precipitation conditions may influence the level of the groundwater table significantly. Groundwater observation wells are generally used if precise groundwater table information is needed, however the installation of groundwater monitoring wells was not included in the scope of the investigation. Therefore, the discussion and recommendations provided within the report are based on our knowledge of the soil and

groundwater conditions in this area, which should provide for a reasonable approximation of the groundwater level.

2.2 LABORATORY TESTING

All soil samples were classified in accordance with the Unified Soil Classification System (USCS). Select cohesive samples were tested for moisture content and the unconfined compressive strength was estimated using a pocket penetrometer.

In addition, three laboratory CBR tests were performed (in a soaked condition) as well as associated Modified Proctor tests.

The results of the laboratory classification and testing are included in Appendix B on the respective logs of test borings. All laboratory tests were performed in accordance with their applicable ASTM procedures. Graphical results of laboratory testing are presented in Appendix C. Brief descriptions of each test are also included in Appendix C.

2.3 LIMITATIONS

The scope of our services was strictly geotechnical and did not include any environmental assessment, or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around this site.

Some soils have been identified on the Logs of Test Borings as “fill” if a soil deposit is suspected to have been placed by human activity, versus having been deposited by natural means. These designations were based on our professional engineering judgment considering factors such as our visual classification, the presence of foreign materials (i.e. bricks, concrete, plastic, etc.), and/or site topography, among many other possibilities. As such, the “fill” descriptions should be considered as secondary information to the standardized soil classification. Due to the large variation of types of fill, methods of fill placement, potential changes of historical use of the site, and soil sample size, it is difficult to discern whether the subject soil sample is native to this site, or fill material based on visual classification alone. As such, the designation of “fill” may not be

reliable and hence should be considered as informational only. Conversely, where a soil is not designated as "fill" on the boring logs, it does not necessarily mean it is not a fill soil, only that there were no apparent observations indicating a fill material. Therefore, we cannot guarantee that our description of "fill" soils is accurate, or that we have identified all types of fill material encountered with our sampling on the site.

3.0 SUBSURFACE CONDITIONS

3.1 SOIL STRATIFICATION

Soil conditions encountered at the soil boring locations have been evaluated and are presented in the form of Logs of Test Borings. The Logs of Test Borings presented in Appendix B include approximate soil stratification with detailed soil descriptions and selected physical properties for each stratum encountered in the test borings. In addition to the observed subsoil stratigraphy, the boring logs present information relating to sample data, Standard Penetration Test results, groundwater level conditions observed in the boring, personnel involved, and other pertinent data. For information, and to aid in understanding the data as presented on the boring logs, General Notes defining nomenclature used in soil descriptions are presented immediately following the Logs of Test Borings in Appendix B. It should be noted that the Logs of Test Borings included with this report have been prepared on the basis of laboratory classification and testing as well as field logs and observations made during drilling.

A generalized description of the soil encountered in the soil borings beginning at the existing ground surface and proceeding downward, is provided below:

Topsoil. Topsoil was encountered at the surface of all of the soil borings. The thickness ranged between 3 and 6 inches.

Fill. Borings TH-02, TH-05, TH-06, TH-07, and TH-08 encountered fill material below the topsoil. The fill soils consisted of lean clay, sandy lean clay, or sand and extended to

depths of about 3 feet below existing grades. The apparent density of the granular fill soil was very dense. The consistency of the clay fill soils ranged from stiff to hard.

Clay. Lean clay was encountered below the topsoil or below fill soils in all of the soil borings. The lean clay extended to the termination depths of the borings at about 10 feet below existing grades. The consistency of the clay ranged from stiff to hard.

TH-01 encountered clayey sand which was found to have an organic content of 9.3% (by weight). The clayey sand extended to a depth of about 3 feet below existing grades. The apparent density of the clayey sand was medium dense.

Please refer to the individual boring logs for the soil conditions at the specific boring locations. It is emphasized that the stratification lines shown on the Logs of Test Borings are approximate indications of change from one soil type to another at the locations of the boreholes. The actual transition from one stratum to the next may be gradual, and may vary within the area represented by the test boring.

3.2 GROUNDWATER LEVEL OBSERVATIONS

Groundwater was not encountered during drilling or observed upon completion of drilling in any of the soil borings. Based on our experience at this airport, the long-term groundwater in this area of the airport is generally deeper than 10 feet. However, perched groundwater is often found in surficial granular soils over the native clay soils.

It should be noted that the elevation of the natural groundwater table is likely to vary throughout the year depending on the amount of precipitation, runoff, evaporation and percolation in the area, as well as on the water level of surface water bodies in the vicinity affecting the groundwater flow pattern.

4.0 ANALYSIS AND RECOMMENDATIONS

4.1 PAVEMENT RECOMMENDATIONS

For the proposed extension, new pavement will be constructed at the north end of the existing Taxiway L. The new pavement will extend from the existing apron at the UPS facility to nearly Cassard Lane. The length of the taxiway extension measures approximately 1,800 feet. Considering the new pavement will tie-in to existing and that the site to the north varies in elevation, we anticipate some cut and fill will be necessary along the new length of the taxiway. Additionally, we understand existing taxiway pavement in other areas of the airport have section thicknesses of 42 inches (corresponding to the frost depth in this area of Michigan) , and this design will likely be similar.

We have provided geotechnical design considerations in the sections below. The engineer preparing the final pavement design should consider multiple factors when determining the final pavement construction approach, including the intended service life of the pavement, site drainage, and anticipated loading conditions.

4.1.1 Anticipated Subgrade and Subgrade Preparation

For discussion sake, we have presumed the elevation of the new pavement will match the existing Taxiway L pavement at the south end of the extension (elevation 783.5 feet±), though understanding that the final design elevation may be lower at the north end of the extension. Considering site work will need to include accommodating a new pavement section of about 42 inches (3.5 feet), cuts and fills will be required (as shown in the last column in the following table).

Boring No.	Ground Surface Elevation at the Boring location	Estimated Change in Grade (assuming final elevation of 783.5 feet)	Required Cut/Fill (to accommodate pavement section)
TH-01	779.49 feet	+4 feet	+0.5 feet
TH-02	778.69 feet	+5 feet	+1.5 feet
TH-03	775.93 feet	+7.5 feet	+4 feet
TH-04	779.33 feet	+4 feet	+0.5 feet
TH-05	783.35 feet	0	-3.5 feet

Boring No.	Ground Surface Elevation at the Boring location	Estimated Change in Grade (assuming final elevation of 783.5 feet)	Required Cut/Fill (to accommodate pavement section)
TH-06	783.09 feet	+0.5 feet	-3 feet
TH-07	781.43 feet	+2 feet	-1.5 feet
TH-08	781.29 feet	+2 feet	-1.5 feet
TH-09	780.11 feet	+3.5 feet	0
TH-10	783.44 feet	0	-3.5 feet

Based on the borings performed in this area, we anticipate the subgrade soils will predominantly consist of stiff to hard lean clay. Though, based on the information in the table above, the subgrade may also consist of the fill soils placed to raise the existing grades. These soils are considered suitable for support of new pavement section, provided proper drainage is included in the overall design.

It should be noted that boring TH-01 encountered soils containing significant organics to a depth of about 3 feet. At this location, these soils will be completely removed as part of the overall excavation to construct the new pavement. However, this area of the airport has been known to have peat deposits and organic soils. So, it may be possible that these soils will be encountered during construction. New pavement should never be constructed over peat or highly organic soils.

Once rough subgrade has been achieved, the exposed pavement subgrade along the entire section of taxiway expansion should be visually inspected for the presence of debris, organic matter, and other unsuitable materials. If significant organic soils (organic content over 3% by weight) or significant debris or disturbed soils are encountered at subgrade level during earthwork operations, these soils should be removed to full-depth and replaced with engineered fill. The actual conditions should be assessed by the on-site geotechnical engineer to determine the depth and extent of the remediation.

The pavement subgrade areas should be thoroughly compacted before placement of new fill, base material or pavement. The purpose of the compaction is to uniformly compact the subgrade surface. The clay subgrade soils should be compacted to a minimum of 95% of the maximum dry density as determined by a Modified Proctor test (ASTM D1557).

The subgrade should be thoroughly proofrolled before placement of new subbase, base, or pavement layers. The purpose of the proofrolling is to locate overly loose or soft areas as well as to uniformly compact the subgrade surface. Proofrolling should be performed using a fully-loaded, tandem axle dump truck, rubber-tired loader, or other suitable piece of pneumatic-tired construction equipment. Localized areas of loose or soft areas revealed during compaction or during the proofrolling should either be suitably compacted (or aerated if necessary) or removed and replaced with properly compacted granular engineered fill.

Site work performed during the wet spring and fall months may result in loose and unstable surface soils, which will make earthwork operations difficult. On-site clay soils with relatively high moisture contents (more than 4 percent over optimum moisture) may tend to become disturbed by construction traffic and may be difficult to compact. It may be necessary to disc and aerate the clay subgrade soils during earthwork operations to achieve the desired amount of compaction in some areas of the site. This may also require stabilization of the subgrade soils for placement of fill, aggregate base, or for support of paving equipment. This is especially a concern if the soils are wetter than encountered in the borings due to precipitation. Thus, site earthwork should preferably be performed during the typically drier May to August construction season, if possible.

4.1.2 Pavement Drainage Considerations

Both the clayey sand and clay subgrade soils encountered do not provide sufficient drainage. Any areas where water is not allowed to drain freely either due to subsoil conditions, site grades, or other factors, will have a detrimental effect on the pavement condition over time. A new drainage system should be included in the design for the new pavement.

4.1.3 Pavement Design Considerations

Three (3) bulk samples were obtained for soaked CBR tests, one (1) each near TH-02, TH-06, and TH-09 ranging between 3 and 7 feet below existing grades. Each of the samples was attempted to be compacted to 100% of the maximum dry density and within approximately 0.5% of the optimum moisture determined, and then submerged in water and soaked for 96 hours. This

procedure attempts to simulate a saturated subgrade condition (i.e. "worst case" condition). The CBR test results are summarized below:

Laboratory CBR Test Conditions				
Sample/ Boring No.	**Maximum Dry Density**	**Unit Weight of Compacted Sample**	**Optimum Moisture Content**	**In-situ Moisture Content (before soaking)**
TH-02	123.6 pcf	124.9 pcf	11.5%	11.4%
TH-06	119.5 pcf	120.3 pcf	11.9%	11.5%
TH-09	122.6 pcf	124.1 pcf	12.5%	12.0%

Laboratory CBR Test Results		
Sample/Boring No.	**Sample Description**	**CBR Result (%)**
TH-02	Lean clay	7.9
TH-06	Lean clay	1.5
TH-09	Lean clay	4.0

For final pavement design, we recommend the following coefficients of subgrade reactions (k_v), subgrade resilient moduli (M_R) and CBRs for the various new pavement layers. The recommendations for the existing subgrade soils are based on the laboratory CBR test results, previous CBR tests we have performed on soils at this site, as well as our experience with similar soils.

Recommended Pavement Design Soil Parameters			
Soil Type	**Coefficient of Vertical Subgrade Reaction, (K_v)**	**Subgrade Resilient Moduli (M_R)**	**CBR (%)**
Existing clay subgrade soils (encountered in our soil borings)	69 pci	6,000 psi	4

The Item P-152 Specification does not have restrictions on the type of material used to raise the grade (besides no organics), so the actual material used could vary from the existing clay soils to clean, engineered sand fill. As such, we recommend using the worst-case existing clay soil properties for the overall design.

The recommended design values provided above assume the soil conditions encountered in the borings are representative of the soil conditions within the proposed pavement construction areas. If during construction, the subgrade is found to vary from the expected soil conditions, we should be contacted so we may re-evaluate our recommended design parameters. Moreover, if the final grades are expected to differ from our assumptions, then the values presented above may require modifications.

For new bituminous pavements, final pavement elevations should be designed to provide positive surface drainage. The minimum surface slope of should be in accordance with project specification, typically a minimum 1.5 percent is recommended. The pavement surface should be smooth, free of roller marks or depressions, and should not contain any irregularities which would pond or impede water flow.

All new Portland cement concrete pavements should be constructed in accordance with Federal Aviation Administration (FAA) Item P-501 specifications. The Portland cement concrete should be air-entrained and have a flexural strength of 650 psi and a compressive strength of 3,500 psi or greater. The length to width ratio of the joints should not exceed 1.25. Curing compound should be used for curing the concrete pavement.

The engineer preparing the final pavement design should consider other factors in addition to the CBR or subgrade modulus values. These factors may include, but are not limited to, adequate subgrade preparation, adequate placement of engineered fill and pavement layers, and surface and subsurface drainage. Somat's services related to pavement design and construction on this project were limited to preparing general guidelines for subgrade conditions and estimation of modulus values from the surficial soils encountered at the soil boring locations.

Where the new pavement abuts the existing pavement, a joint or supporting geogrid should be considered, since the new pavement may settle/consolidate over time.

4.2 GROUNDWATER CONTROL CONSIDERATIONS

Groundwater was not encountered during our field investigation. Based on the borings and our experience at this airport, we anticipate the long-term groundwater table is likely situated at about 8 feet or deeper below existing grades, which is below any anticipated excavations for this pavement project. As such, we do not anticipate significant issues with groundwater within these excavations. Perched groundwater within the sand and clayey sand layers situated above the less permeable clay layers should be expected during construction. In general, we anticipate the surface water run-off and the groundwater seepage into the excavations may be controlled by standard sump pit and pumping techniques, if any undercutting/excavation is needed for this project.

4.3 ENGINEERED FILL REQUIREMENTS

Any fill used should be an approved, engineered material, free of frozen soil, organics, or other deleterious material. Fill should not be placed on frozen subgrades. Soils containing greater than 3 percent (by weight) organics are considered unsuitable for use as engineered backfill.

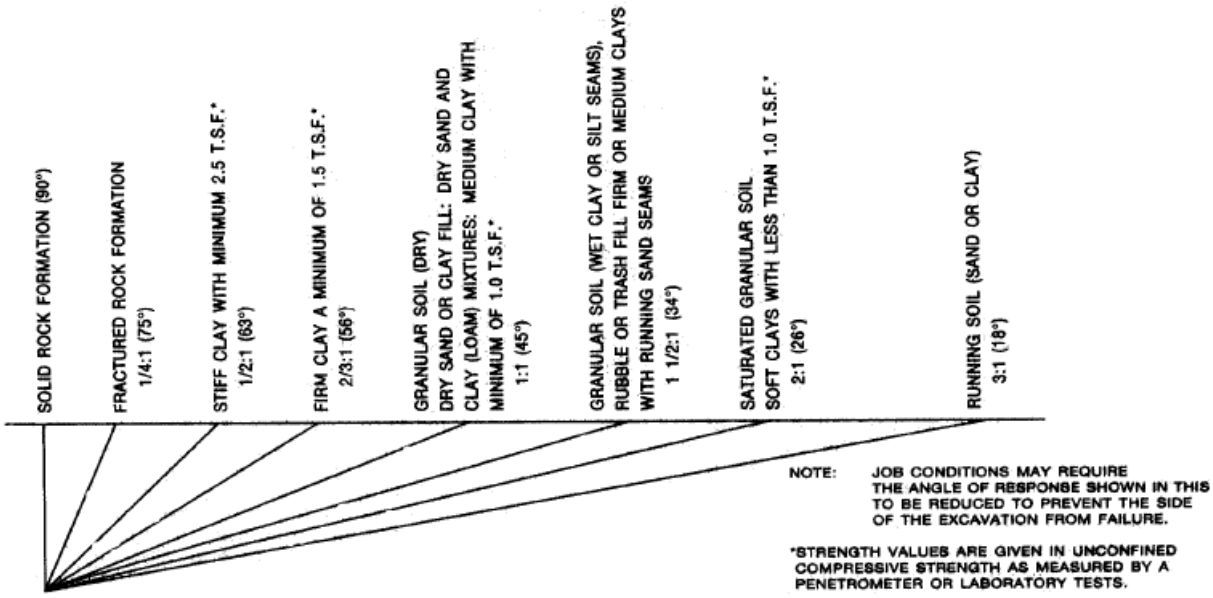
4.4 CONSTRUCTION CONSIDERATIONS

Excavation is recognized as one of the most hazardous construction operations. An excavation is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal. Trenching and excavation hazards are addressed in specific standards for the general industry in Occupational Safety and Health Administration (OSHA) Part 1926 Subpart P “Excavations”, specifically 29 CFR 1926.650, .651, and .652. The project must comply with the most stringent trenching and excavation requirements of these standards, MIOSHA Construction Safety Standard Part 9 “Excavation, Trenching, and Shoring”, or other OSHA approved requirements.

We anticipate excavations in site fill and very loose or loose sand soils will be prone to caving and sloughing of the excavation sidewalls, especially in areas where the soil conditions are in a loose condition (N value of 9 or less). Appropriate measures will be required to maintain the stability of excavation sidewalls. The required measures will depend on the subsurface materials encountered for the full depth of the excavation, the depth and width of excavation, and groundwater conditions at specific locations. In general, excavation walls should be sloped back

to a stable angle in accordance with published MIOSHA guidelines. The side of an excavation more than 5 feet deep shall be sloped as prescribed in the following MIOSHA table (from Part 9), unless the excavation is made entirely in stable rock or supported by a protective system as prescribed in the referenced standards. An excavation less than 5 feet may also require protection if a competent person determines that hazardous earth movement is anticipated.

MAXIMUM ALLOWABLE ANGLE OF REPOSE FOR THE SIDE OF AN EXCAVATION IN EXCESS OF 5' DEPTH



Sloping or benching systems for excavations less than 20 feet deep shall be in accordance with maximum allowable slopes and based on the soil or rock type encountered as prescribed in the standards. If sufficient room is not available for sloping the excavation walls, then shoring, by means such as trench boxes, sliding trench shields or sheeting, will be required to maintain the stability of the sidewalls. The design of support systems, shield systems, and other protective systems shall be in accordance with OSHA 29 CFR 1926.652.

Construction traffic, stockpiles of soil and construction materials should be kept away from the edges of the excavations for a distance equal to the depth of the excavation. If such clearances cannot be maintained, the resulting surcharge loads should be considered in the design of the shoring system. However, no loads shall be placed within 2 feet of an excavation edge for any

unsupported excavation in which a worker is required to enter (unless a proper shoring system is in place).

Care should be exercised when excavating near existing pavement, utilities, and structures that are to remain, to protect them from damage. Mechanical excavations near existing utilities may also pose a physical hazard to workers if the utility is damaged. The contractor should be aware of existing utility locations before excavating and be prepared to expose them for verification and to support or brace them, as required.

5.0 GENERAL QUALIFICATIONS

All earthwork and below grade construction activities, including testing and observation of pavement subgrade and engineered fill should be monitored by a qualified engineering inspector, under the direction of a qualified geotechnical engineer, to verify conditions are as presented in this report. Earthwork operations around the proposed project area and in the vicinity of existing structures should also be closely monitored.

This report and the attached Logs of Test Borings are instruments of service, which have been prepared in accordance with generally accepted soil and foundation engineering practices. We make no warranties either expressed or implied as to the professional advice included in this report.

The contents of this report have been prepared in order to aid in the evaluation of expected subsoil properties to assist the engineer in the design of *this* project at the site specified herein. The contents of this report should not be relied upon for other projects or purposes. In the event that any changes are made in the geotechnically related aspects of this project, however slight, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report are modified in writing by our office.

Since the information obtained from the soil borings is specific to the exact test locations, soil and water conditions could be different from those occurring at other locations of the site. This report

does not reflect variations which may occur between the soil borings. The nature and extent of these variations may not become evident until the time of construction. If significant variations become evident, it may be necessary for us to reevaluate the recommendations provided in this report.

This report and the associated Logs of Test Borings should be made available to bidders prior to submitting their proposals and to the successful contractor and subcontractors for their information only, and to supply them with facts relative to the subsurface investigation, laboratory tests, etc.

Somat is not responsible for failure to provide services that other project participants, apart from our client, have assigned to Somat either directly or indirectly. Somat is not responsible for failing to comply with the requirements of design manuals or other documents specified by other project participants, that impart responsibilities to the geotechnical engineer without our knowledge and written consent. We are not liable for services related to this project that are not outlined in our scope of services, detailed in our project proposal.

The discussions and recommendations submitted in this report are based on the soil information contained in the Logs of Test Borings and test results appended to this report. We expect that the Logs of Test Borings included in this report along with our discussions and conclusions will assist you in the design of the proposed project. If you have any questions regarding this report, please contact us.

Please review the important information regarding geotechnical reports included in Appendix D.

APPENDIX A

SOIL BORING LOCATION DIAGRAM

Adapted from Google Earth satellite imagery

Drawing Scale as noted

Legend:

Approximate Soil Boring Location

SOIL BORING LOCATION DIAGRAM

Taxiway L Expansion
Gerald R. Ford International Airport
Cascade Township, Michigan

Somat Project No.: 2024130A

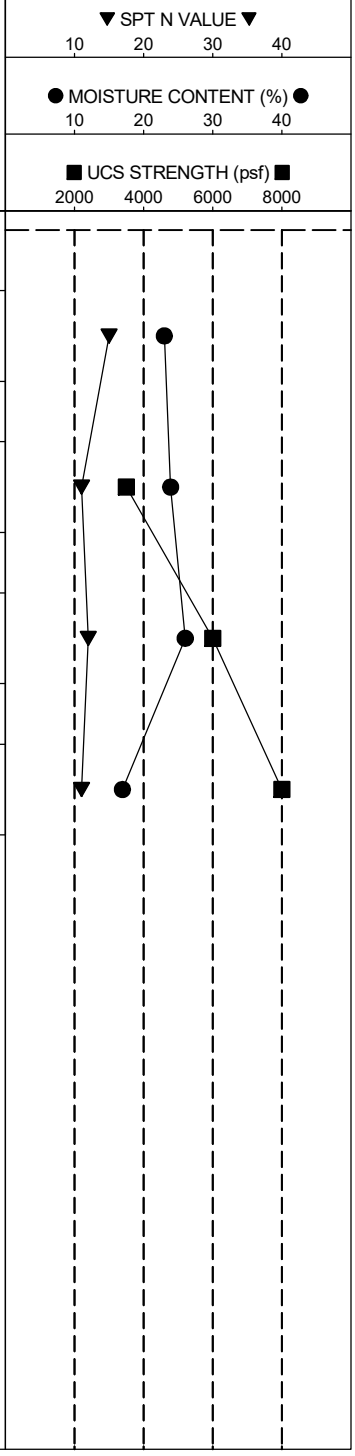
APPENDIX B

LOGS OF TEST BORINGS AND GENERAL NOTES

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-01

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 779.49 ft												
779.2	3 inches of TOPSOIL 0.3	0											
	Medium dense CLAYEY FINE SAND with organics, trace roots, trace wood pieces, dark brown, moist (SC) (organic content = 9.3%)		SS1	15	4-6-9	15	2.5		23.0				
776.5	3.0												
	Stiff to very stiff LEAN CLAY, few sand, trace roots and organics, brownish gray to brown (CL)	5	SS2	16	4-4-7	11	5.0	3500*	23.9				
			SS3	18	3-5-7	12	7.5	6000*	26.0		41	20	89
771.5	8.0												
	Hard LEAN CLAY, trace sand, mottled brown & gray (CL)	10	SS4	18	4-4-7	11	10.0	8000*	16.9				
769.5	10.0												
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 509083.2
Easting: 12816409.2

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

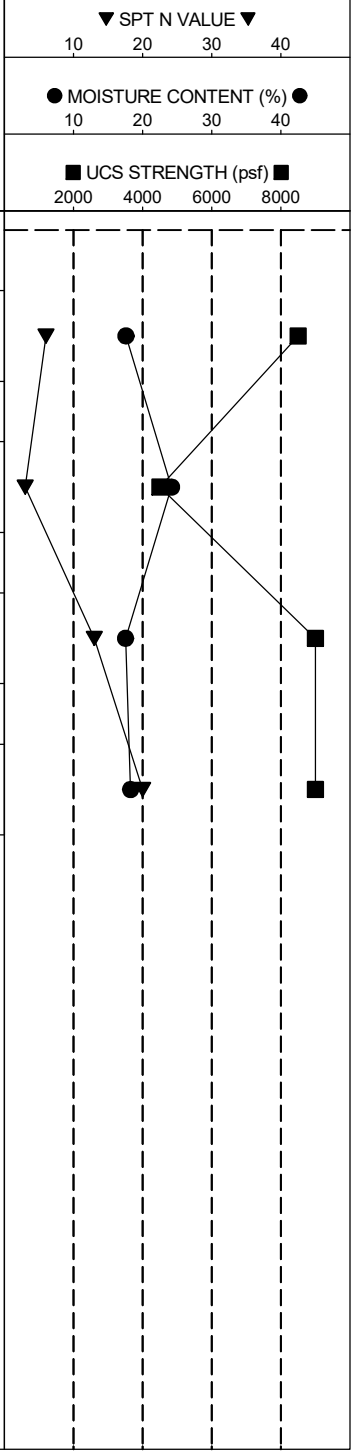
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-02

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 778.69 ft	0											
778.2	6 inches of TOPSOIL 0.5												
	FILL - Hard LEAN CLAY, few sand, trace roots, brown (CL)		SS1	12	2-2-4	6	2.5	8500*	17.6				
775.7	3.0												
	Very stiff LEAN CLAY with sand, trace roots, dark brown to grayish brown (CL)	5	SS2	6	1-2-1	3	5.0	4500*	24.2				
773.2	5.5												
	Hard LEAN CLAY, trace sand, brown (CL)		SS3	16	3-4-9	13	7.5	9000+*	17.5				
			SS4		4-9-11	20	10.0	9000+*	18.3				
768.7	10.0	10											
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 508880.6
Easting: 12816494.7

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

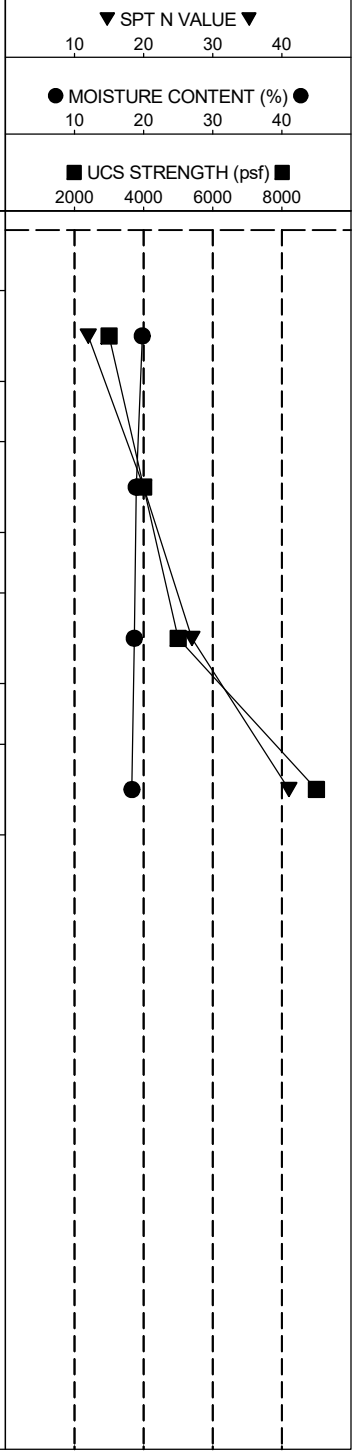
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-03

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 775.93 ft	0											
775.6	3 inches of TOPSOIL 0.3												
	Stiff LEAN CLAY with sand, trace gravel, dark brown (CL)		SS1	14	3-5-7	12	2.5	3000*	19.8				
772.9	3.0												
	Very stiff LEAN CLAY, few sand, trace gravel, occasional silt partings, brown (CL)	5	SS2	15	5-8-12	20	5.0	4000*	18.9				
			SS3	16	7-12-15	27	7.5	5000*	18.6		39	21	92
767.9	8.0												
	Hard LEAN CLAY, few sand, trace gravel, brown (CL)	10	SS4		9-20-21	41	10.0	9000+*	18.3				
765.9	10.0												
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 508673.6
Easting: 12816461.2

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

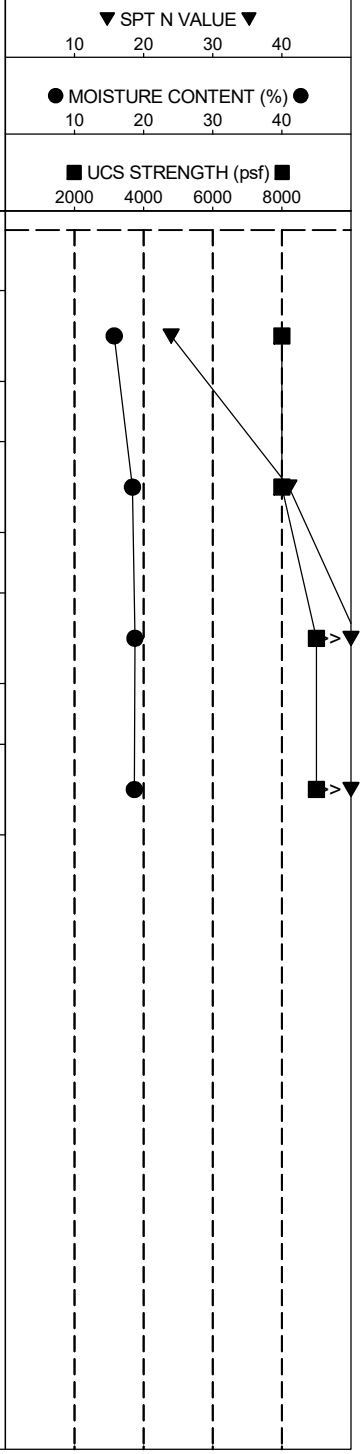
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-04

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 779.33 ft	0											
779.0	3 inches of TOPSOIL 0.3												
	Hard LEAN CLAY, few sand, trace gravel, frequent gray silt partings, brown (CL)		SS1	16	10-10-14	24	2.5	8000*	15.7				
			SS2	13	11-18-23	41	5.0	8000*	18.4				
773.8	5.5	5											
	Hard LEAN CLAY, trace sand, trace gravel, brown (CL)		SS3	15	12-23-28	51	7.5	9000+*	18.7				
			SS4	18	10-21-30	51	10.0	9000+*	18.7				
769.3	10.0	10											
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 508484.0
Easting: 12816546.0

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

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Gerald Ford International Airport
Cascade Township, Michigan

2/8/25

LOG OF TEST BORING GRR TXWY L.GPJ SOMAT.GDT 2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-05

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
783.1	Ground Surface Elevation 783.35 ft 4 inches of TOPSOIL 0.3	0											
780.4	FILL - Very dense poorly graded FINE SAND with silt, trace gravel, brown, moist (SP-SM) 3.0		SS1	18	33-43-30	73	2.5						
			SS2	17	7-6-6	12	5.0	8000*	18.3				
775.4	Hard LEAN CLAY, few sand, trace gravel, frequent gray silt partings, brown (CL) 8.0	5	SS3	16	13-13-16	29	7.5	9000*	18.6				
773.4	Hard LEAN CLAY, few sand, trace gravel, occasional silt partings, brown (CL) 10.0	10	SS4		7-17-26	43	10.0	9000+*	18.7				
	End of Boring at 10 feet	15											
		20											

▼ SPT N VALUE ▼ 10 20 30 40

● MOISTURE CONTENT (%) ● 10 20 30 40

■ UCS STRENGTH (psf) ■ 2000 4000 6000 8000

>>

GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 508284.4
Easting: 12816532.6

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

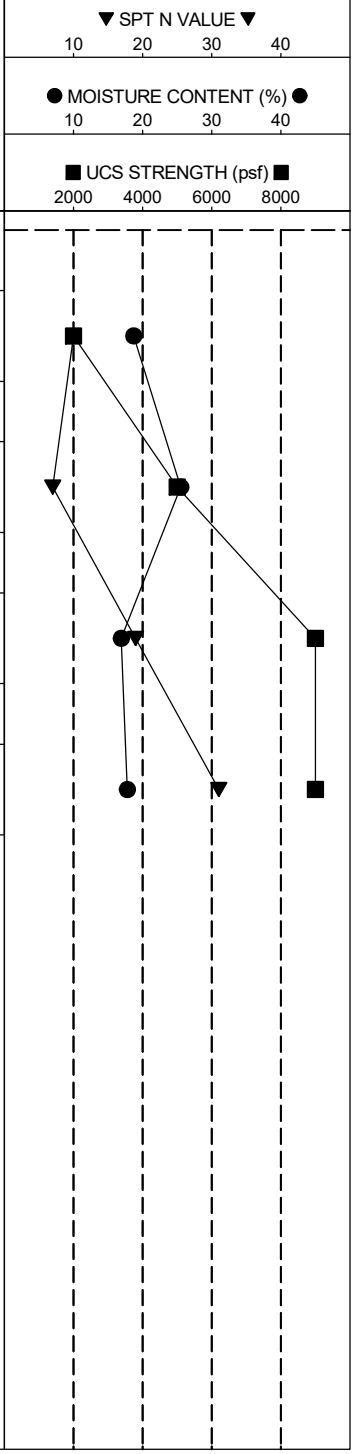
2/8/25

LOG OF TEST BORING GRR TXWY L.GPJ SOMAT.GDT 2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-06

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 783.09 ft	0											
782.7	5 inches of TOPSOIL 0.4												
	FILL - Stiff LEAN CLAY with sand, trace gravel, brown (CL)		SS1	16	3-3-7	10	2.5	2000*	18.7				
780.1	3.0												
	Very stiff LEAN CLAY, few sand, trace gravel, trace organics, brown/dark brown (CL)	5	SS2	18	3-3-4	7	5.0	5000*	25.5				
777.6	5.5												
	Hard LEAN CLAY, few sand, trace gravel, frequent gray silt partings, brown (CL)		SS3	18	3-7-12	19	7.5	9000+*	16.9		43	26	92
			SS4	17	9-12-19	31	10.0	9000+*	17.8				
773.1	10.0	10											
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 508113.4
Easting: 12816607.7

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

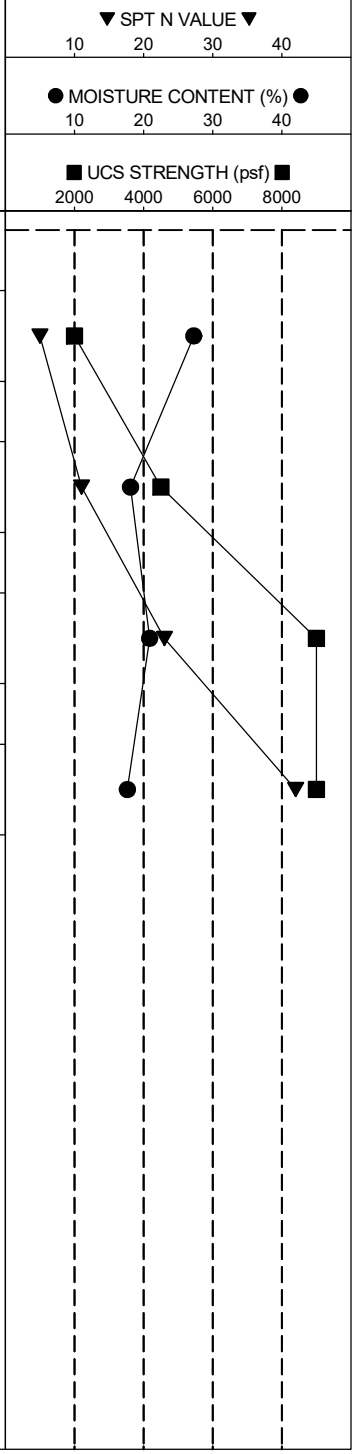
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING TH-07

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 781.43 ft	0											
780.9	6 inches of TOPSOIL 0.5												
	FILL - Stiff LEAN CLAY, few sand, trace gravel, occasional sand pockets, brown (CL)		SS1	13	2-2-3	5	2.5	2000*	27.3				
778.4	3.0												
			SS2	15	2-4-7	11	5.0	4500*	18.1				
	Very stiff to hard LEAN CLAY, few sand, trace gravel, frequent gray silt partings, brown (CL)	5											
			SS3	16	4-10-13	23	7.5	9000+*	20.9				
			SS4	18	6-19-23	42	10.0	9000+*	17.6				
771.4	10.0	10											
	End of Boring at 10 feet												
		15											
		20											



GROUNDWATER READINGS
First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION
Northing: 507911.5
Easting: 12816583.8

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

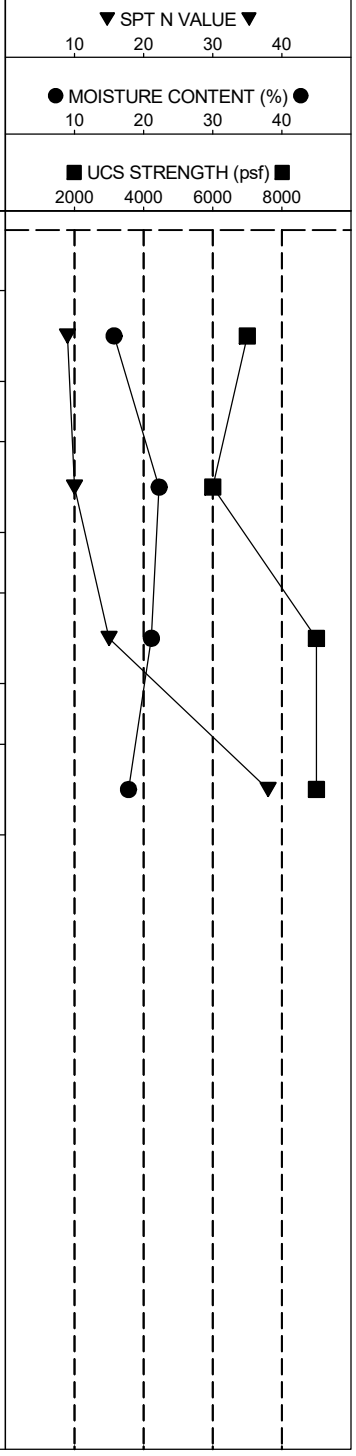
LOG OF TEST BORING GRR TXWY L.GPJ SOMAT.GDT 2/8/25

2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-08

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 781.29 ft	0											
780.8	6 inches of TOPSOIL 0.5												
	FILL - Very stiff SANDY LEAN CLAY, brown (CL)		SS1	12	2-4-5	9	2.5	7000*	15.7				
778.3	3.0												
	Very stiff LEAN CLAY, few sand, trace gravel, trace roots and organics, brown to grayish brown (CL)	5	SS2	14	1-4-6	10	5.0	6000*	22.2				
775.3	6.0												
	Hard LEAN CLAY, trace sand, mottled brown & gray (CL)		SS3	14	5-6-9	15	7.5	9000+*	21.1		40	21	92
			SS4	18	7-17-21	38	10.0	9000+*	17.8				
771.3	10.0	10											
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 507737.5
Easting: 12816654.9

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

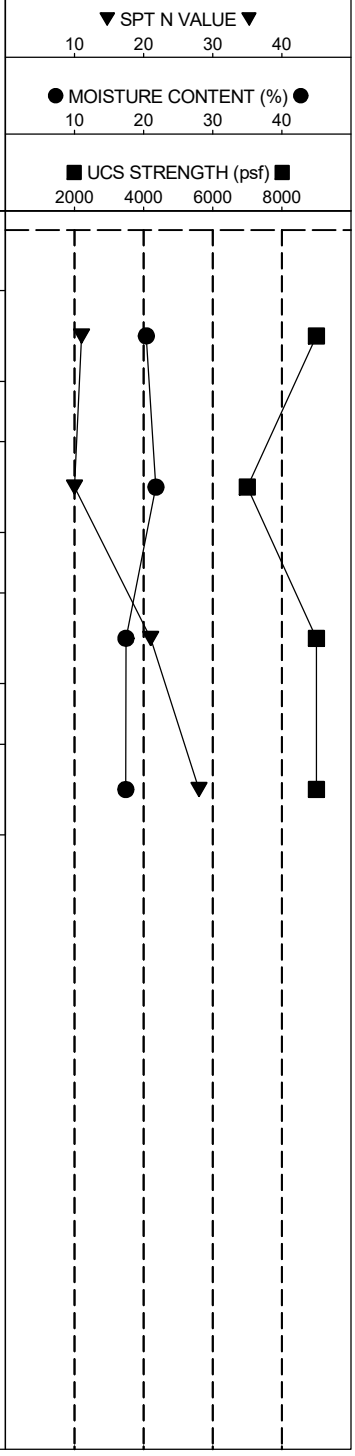
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-09

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 780.11 ft	0											
779.7	5 inches of TOPSOIL 0.4												
	Hard to very stiff LEAN CLAY, trace sand, brown to mottled brown & gray (CL)		SS1	14	3-5-6	11	2.5	9000+*	20.4				
			SS2	17	3-3-7	10	5.0	7000*	21.8				
774.1	6.0	5											
	Hard LEAN CLAY, trace sand, trace gravel, brown (CL)		SS3	15	4-8-13	21	7.5	9000+*	17.4				
			SS4	18	6-13-15	28	10.0	9000+*	17.4				
770.1	10.0	10											
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 507511.1
Easting: 12816638.9

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

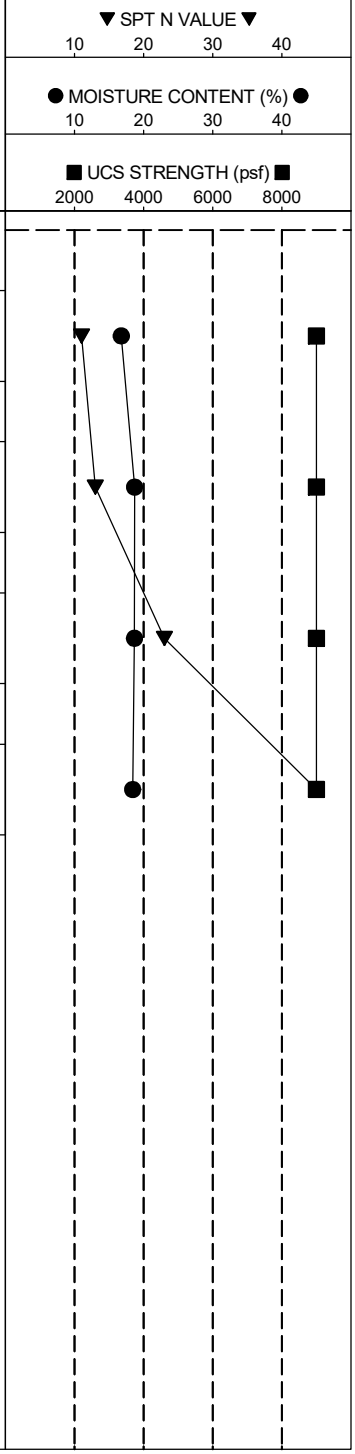
LOG OF TEST BORING GRR TXWY L.GPJ SOMAT.GDT 2/8/25

2/8/25

PROJECT NO. 2024130A **DATE STARTED:** 12/23/2024 **DATE COMPLETED:** 12/23/2024

LOG OF TEST BORING
TH-10

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 783.44 ft	0											
782.9	6 inches of TOPSOIL 0.5												
	Hard LEAN CLAY, few sand, trace gravel, occasional sand pockets, brown (CL)		SS1	10	4-5-6	11	2.5	9000+*	16.8				
			SS2	9	4-6-7	13	5.0	9000+*	18.7				
777.9	5.5	5											
	Hard LEAN CLAY, few sand, trace gravel, frequent gray silt seams, brown (CL)		SS3	13	8-12-11	23	7.5	9000+*	18.7		43	24	93
			SS4	18	6-20-25	45	10.0	9000+*	18.4				
773.4	10.0	10											
	End of Boring at 10 feet	15											
		20											



GROUNDWATER READINGS

First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION

Northing: 507367.4
Easting: 12816705.8

Coordinates/GSE determined by:
Project Surveyor

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: Job Site Services
Drill Rig: Geoprobe
Logged By: E. Karrip
Drilling Method: 2 1/4 inch HSA
Method Notes: ---
Hammer Type: Automatic
Backfilled With: Cuttings
Checked By: JSS
QA/QC By: JDH
Remarks:

Somat Engineering

Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

2/8/25

GENERAL NOTES

Unified Soil Classification System (USCS)
ASTM D2488 (Modified)

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon – 1 3/8" I.D., 2" O.D. (standard)	BS:	Bulk Sample	RC:	Rock Core with diamond bit, NX size, (unless otherwise noted)
S:	Split Spoon – non-standard size, as noted	HSA:	Hollow Stem Auger		
ST:	Thin-Walled Tube – 3" O.D., (unless otherwise noted)	DP:	Direct Push	RB:	Rock Bit/Roller Bit
LS:	Liner Sample	PS:	Piston Sample	WR:	Wash Rotary
PA:	Power Auger	PT:	Pitcher Sample	NR:	No Recovery
HA:	Hand Auger	WS:	Wash Sample	VS:	Vane Shear Test
AU:	Auger Sample			ER:	Hammer Energy Ratio

Standard Penetration Test Resistance, N-Value: Sum of 2nd and 3rd 6-inch increments, in blows per foot of a 140-pound hammer falling 30 inches and driving an 18-inch to 30-inch long, 2-inch OD split spoon.

WATER LEVEL MEASUREMENT:
Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of a groundwater table. In low permeability soils (clays and silts), the accurate determination of groundwater levels may not be possible with only short-term observations. Groundwater levels at times and locations other than when and where individual borings were performed could vary.

DESCRIPTIVE SOIL CLASSIFICATION:
Soil classification is based on the Unified Soil Classification (USC) System and ASTM Standards D-2487 and D-2488. Coarse-grained soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are generally described as: clays, if they are plastic, and silts, if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their apparent in-place density and fine-grained soils on the basis of their apparent in-place density (silty soils) or consistency (clayey soils).

CONSISTENCIES OF COHESIVE SOILS:
The pocket penetrometer, pocket torvane, and in-situ vane shear tests are converted into an estimated unconfined compressive strength, in pounds per square feet (psf), for presentation on the logs. The unconfined compressive strength is estimated to be about two time the shear strength.

DESCRIPTORS OF MINOR CONSTITUENTS

Primary Constituent	Fine-Grained (Silt & Clay)	Coarse-Grained (Sand & Gravel)	
Descriptor of Other Constituents	Relative Portion of Coarse Grained Soils as a % of Dry Weight	Relative Portion of Fine Grained Soils as a % of Dry Weight	Relative Portion of Coarse Grained Soils as a % of Dry Weight
Trace	<5%	<5%	<5%
Few	≥5% - <15%	N/A	≥5% - <15%
With	≥15% - <30%	≥5% - 12%	≥15%
Modifier	≥30%	>12%	N/A

FINE-GRAINED SOILS **COARSE-GRAINED SOILS**

Unconfined Compressive Strength Qu, psf	Consistency	N-Value	Apparent Density
< 500	Very Soft	0 – 4	Very Loose
500 - <1,000	Soft	5 – 9	Loose
1,000 - <2,000	Medium	10 – 29	Medium Dense
2,000 - <4,000	Stiff	30 – 49	Dense
4,000 - <8,000	Very Stiff	50 – 80	Very Dense
≥ 8,000	Hard	>80	Extremely Dense

DEFINITIONS OF PAVEMENT CONDITION

Condition		Description
Good	ACC	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks and transverse cracks (open ¼ inch). No patching or very few patches in excellent condition.
	PCC	Moderate scaling in several locations. A few isolated surface spalls. Shallow reinforcement causing cracks. Several corner cracks, tight or well sealed. Open (¼ inch wide) longitudinal or transverse joints.
Fair	ACC	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (½ inch deep or less).
	PCC	Severe polishing, scaling, map cracking, or spalling over 50% of the area. Joints and cracks show moderate to severe spalling. Pumping and faulting of joints (½ inch with fair ride). Several slabs have multiple transverse or meander cracks with moderate spalling.
Poor	ACC	Alligator cracking (over 25% of surface). Severe distortions (over 2 inches deep) Extensive patching in poor condition. Potholes.
	PCC	Extensive slab cracking, severely spalled and patched. Joints failed. Patching in very poor condition. Severe and extensive settlement or frost heaves.

DEFINITIONS OF STRUCTURAL AND DEPOSITIONAL FEATURES

Term	Definition
Parting	≤ 1/16 inch (1.6 mm) thick
Seam	> 1/16 inch (1.6 mm) → ½ inch (12.7 mm) thick
Layer	> ½ inch (12.7 mm) to ≤ 12 inches (305 mm) thick
Pocket	Small, erratic deposits of limited lateral extent
Lens	Lenticular deposit
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay
Varved	Alternating partings or seams (1 mm – 12 mm) of silt and/or clay and sometimes fine sand
Stratified	Alternating layers of varying material or color with layers ≥ 6 mm thick
Laminated	Alternating layers of varying material or color with layers < 6 mm thick
Fissured	Contains shears or separations along planes of weakness
Slickensided	Shear planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Homogeneous	Same color and appearance throughout
Occasional	One or less per foot (305 mm) of thickness
Frequent	More than one per foot (305 mm) of thickness
Interbedded	Applied to strata of soil lying between or alternating with other strata of a different nature

GRAIN SIZE TERMINOLOGY

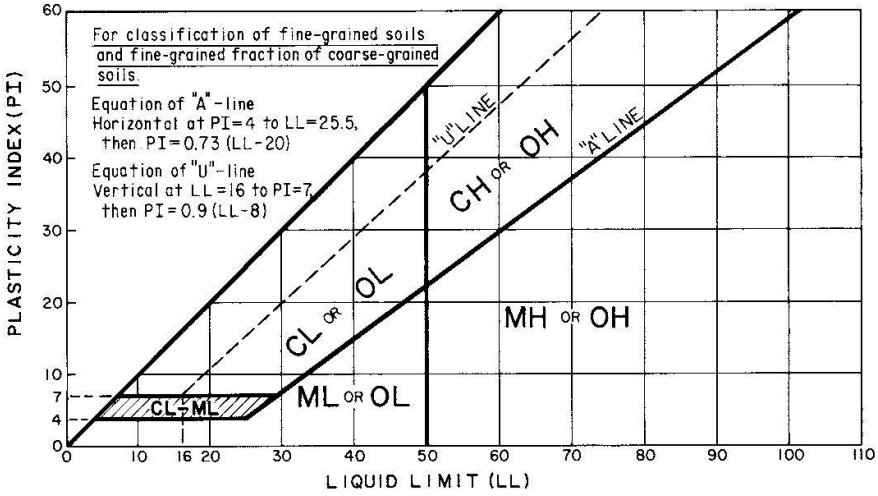
Major Component of Sample	Size Range
Boulders	≥ 12" (300 mm)
Cobbles	< 12" - 3" (300 mm – 75 mm)
Gravel - Coarse	< 3" - ¾" (75 mm – 19 mm)
Gravel – Fine	< ¾" - #4 (19 mm – 4.75 mm)
Sand – Coarse	< #4 - #10 (4.75 mm – 2 mm)
Sand – Medium	< #10 - #40 (2 mm - 0.425 mm)
Sand – Fine	< #40 - #200 (0.425 mm -0 .074 mm)
Silt	< 0.074 mm - 0.005 mm
Clay	<0 .005 mm

GENERAL NOTES

Unified Soil Classification System (USCS)
ASTM D2487

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
COARSE-GRAINED More than 50 % retained on No. 200 sieve	**Gravels** (More than 50 % of coarse fraction retained on No. 4 sieve)	**Clean Gravels**	Cu ≥ 4 and 1 ≤ Cc ≤ 3[D]	GW	Well-graded gravel [E]
		(Less than 5% fines [C])	Cu < 4 and/or [Cc < 1 or Cc > 3][D]	GP	Poorly graded gravel [E]
		Gravels with Fines	Fines classify as ML or MH	GM	Silty gravel [E,F,G]
		(More than 12 % fines [C])	Fines classify as CL or CH	GC	Clayey gravel [E,F,G]
	Sands (50 % or more of coarse fraction passes No. 4 sieve)	**Clean Sands**	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [D]	SW	Well-graded sand [I]
		(Less than 5 % fines [H])	Cu < 6 and/or [Cc < 1 or Cc > 3] [D]	SP	Poorly graded sand [I]
		Sands with Fines	Fines classify as ML or MH	SM	Silty sand [F,G,I]
		(More than 12 % fines [H])	Fines classify as CL or CH	SC	Clayey sand [F,G,I]
FINE-GRAINED SOILS 50 % or more passes the No. 200 sieve	**Silts and Clays** Liquid limit less than 50	**inorganic**	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K,L,M]
		organic	(Liquid Limit - oven dried) / (Liquid Limit - not dried) < 0.75	OL	Organic clay [K,L,M,N]
					Organic silt [K,L,M,O]
	Silts and Clays Liquid limit more than 50	**inorganic**	PI plots on or above "A" line	CH	Fat clay [K,L,M]
			PI plots below "A" line	MH	Elastic silt [K,L,M]
		organic	(Liquid Limit - oven dried) / (Liquid Limit - not dried) < 0.75	OH	Organic clay [K,L,M,P]
					Organic silt [K,L,M,Q]
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor			Pt	Peat

A Based on the material passing the 3-in. (75-mm) sieve.
B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C Gravels with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
D $Cu = D_{60}/D_{10}$ $Cc = (D_{30})^2/(D_{10} \times D_{60})$
E If soil contains ≥15 % sand, add "with sand" to group name.
F If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
G If fines are organic, add "with organic fines" to group name.
H Sands with 5 to 12 % fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
I If soil contains ≥15 % gravel, add "with gravel" to group name.
J If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
K If soil contains 15 to <30 % plus No. 200, add "with sand" or "with gravel," whichever is predominant.
L If soil contains ≥30 % plus No. 200, predominantly sand, add "sandy" to group name.
M If soil contains ≥30 % plus No. 200, predominantly gravel, add "gravelly" to group name.
N PI ≥ 4 and plots on or above "A" line.
O PI < 4 or plots below "A" line.
P PI plots on or above "A" line.
Q PI plots below "A" line.



Order of Classification: 1) Consistency or Apparent Density, 2) Type of Soil, 3) Minor Soil Type(s), 4) Inclusions, 5) Layered Soils, 6) Color, 7) Water Content, 8) USCS Symbol, 9) Geological Name

APPENDIX C

LABORATORY TEST RESULTS

Somat Engineering

Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

SUMMARY OF LABORATORY RESULTS

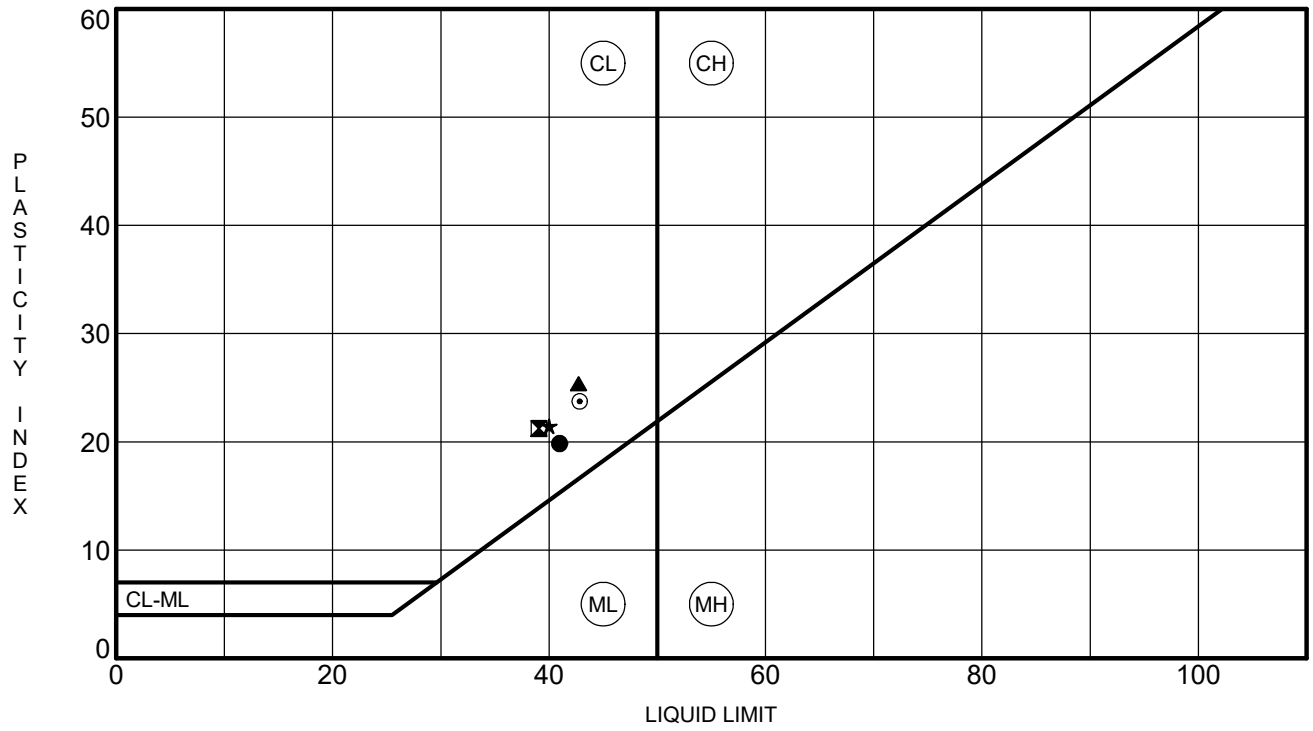
PROJECT NO. 2024130A

Borehole	Top Depth of Test Sample (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	UCS (psf)	Fine Sg
TH-01	1.0							23.0			
TH-01	3.5							23.9		3500*	
TH-01	6.0	41	21	20	9.5	89	CL	26.0		6000*	
TH-01	8.5							16.9		8000*	
TH-02	1.0							17.6		8500*	
TH-02	3.5							24.2		4500*	
TH-02	6.0							17.5		9000+*	
TH-02	8.5							18.3		9000+*	
TH-03	1.0							19.8		3000*	
TH-03	3.5							18.9		4000*	
TH-03	6.0	39	18	21	9.5	92	CL	18.6		5000*	
TH-03	8.5							18.3		9000+*	
TH-04	1.0							15.7		8000*	
TH-04	3.5							18.4		8000*	
TH-04	6.0							18.7		9000+*	
TH-04	8.5							18.7		9000+*	
TH-05	3.5							18.3		8000*	
TH-05	6.0							18.6		9000*	
TH-05	8.5							18.7		9000+*	
TH-06	1.0							18.7		2000*	
TH-06	3.5							25.5		5000*	
TH-06	6.0	43	17	26	9.5	92	CL	16.9		9000+*	
TH-06	8.5							17.8		9000+*	
TH-07	1.0							27.3		2000*	
TH-07	3.5							18.1		4500*	
TH-07	6.0							20.9		9000+*	
TH-07	8.5							17.6		9000+*	
TH-08	1.0							15.7		7000*	
TH-08	3.5							22.2		6000*	
TH-08	6.0	40	19	21	9.5	92	CL	21.1		9000+*	
TH-08	8.5							17.8		9000+*	
TH-09	1.0							20.4		9000+*	
TH-09	3.5							21.8		7000*	
TH-09	6.0							17.4		9000+*	
TH-09	8.5							17.4		9000+*	
TH-10	1.0							16.8		9000+*	
TH-10	3.5							18.7		9000+*	
TH-10	6.0	43	19	24	9.5	93	CL	18.7		9000+*	
TH-10	8.5							18.4		9000+*	

Torvane
* Pocket Penetrometer
NM Not Measured
Sample

Somat Engineering
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

ATTERBERG LIMITS RESULTS
ASTM D4318
PROJECT NO. 2024130A



Specimen Identification		Depth	LL	PL	PI	Fines	Remarks
●	**TH-01**	**6.0**	**41**	**21**	**20**	**89**	
⧓	**TH-03**	**6.0**	**39**	**18**	**21**	**92**	
▲	**TH-06**	**6.0**	**43**	**17**	**26**	**92**	
★	**TH-08**	**6.0**	**40**	**19**	**21**	**92**	
⊙	**TH-10**	**6.0**	**43**	**19**	**24**	**93**	

NP = Nonplastic

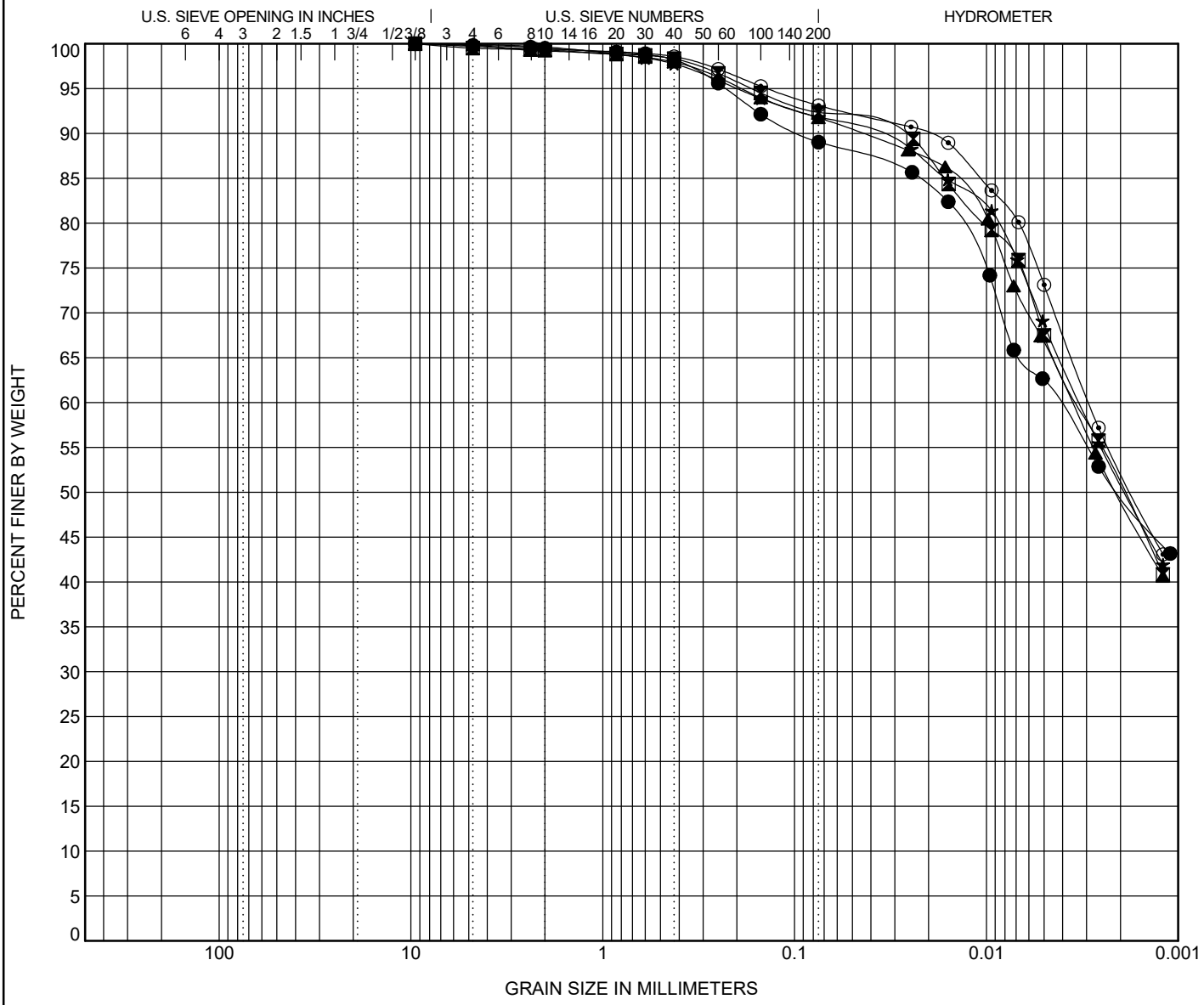
2/8/25

Somat Engineering

Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

GRAIN SIZE DISTRIBUTION

PROJECT NO. 2024130A



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Depth ft.	Remarks	LL	PL	PI	Cc	Cu
● TH-01	6.0		41	21	20		
⊠ TH-03	6.0		39	18	21		
▲ TH-06	6.0		43	17	26		
★ TH-08	6.0		40	19	21		
⊙ TH-10	6.0		43	19	24		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TH-01	6.0	9.5	0.004			0.2	10.8	26.7	62.4
⊠ TH-03	6.0	9.5	0.003			0.5	7.2	24.9	67.5
▲ TH-06	6.0	9.5	0.004			0.1	8.1	25.1	66.6
★ TH-08	6.0	9.5	0.003			0.1	8.1	23.1	68.7
⊙ TH-10	6.0	9.5	0.003			0.3	6.6	20.0	73.1

GRAIN SIZE GRR TXWY L.GPJ SOMAT.GDT 2/8/25

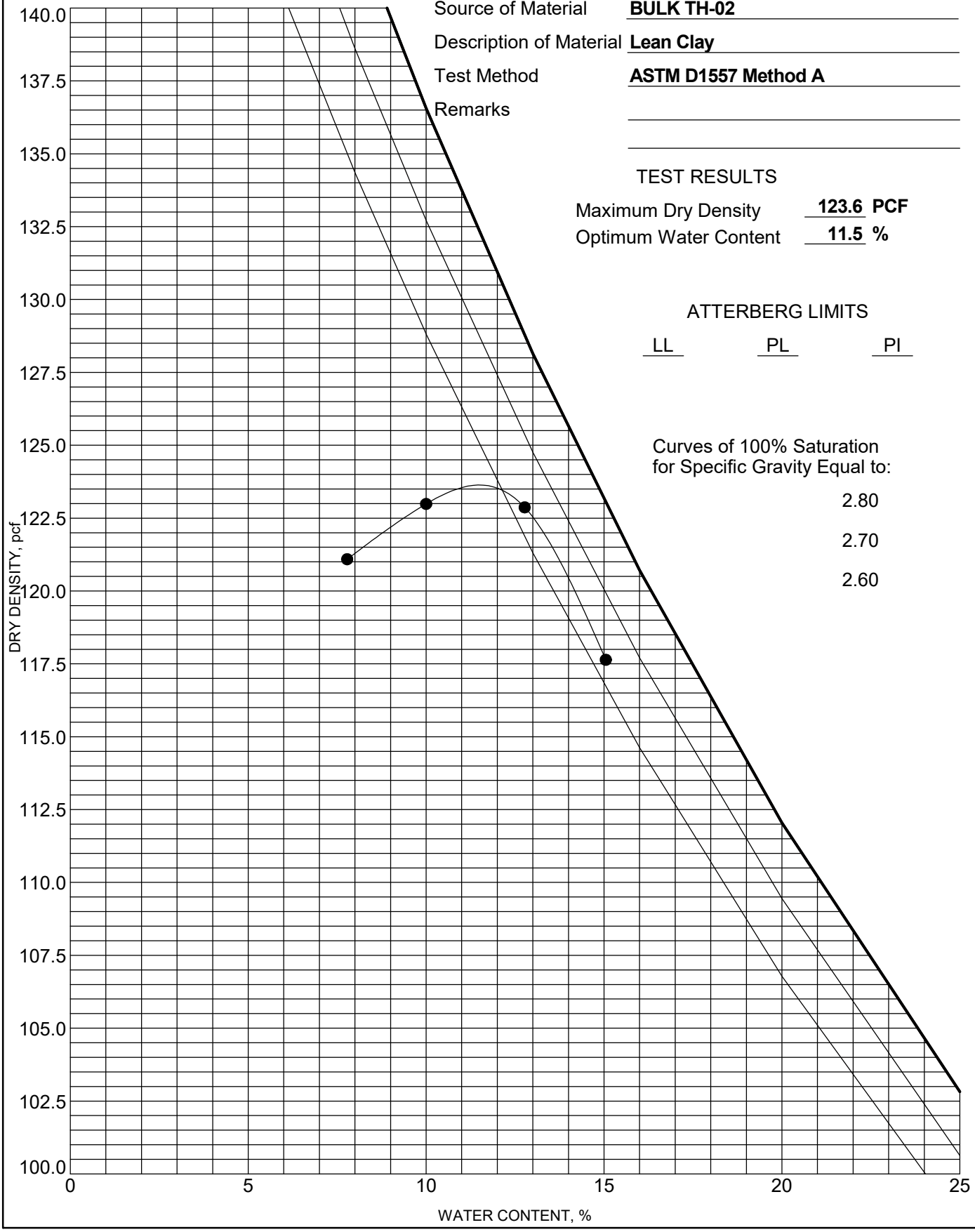
2/8/25

NOT PART OF CONTRACT DOCUMENTS

MOISTURE-DENSITY RELATIONSHIP

Somat Engineering
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

PROJECT NO. 2024130A



Source of Material **BULK TH-02**

Description of Material **Lean Clay**

Test Method **ASTM D1557 Method A**

Remarks

TEST RESULTS

Maximum Dry Density **123.6** **PCF**

Optimum Water Content **11.5** **%**

ATTERBERG LIMITS

LL	PL	PI

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION GRR TXWY L.GPJ SOMAT.GDT 2/8/25

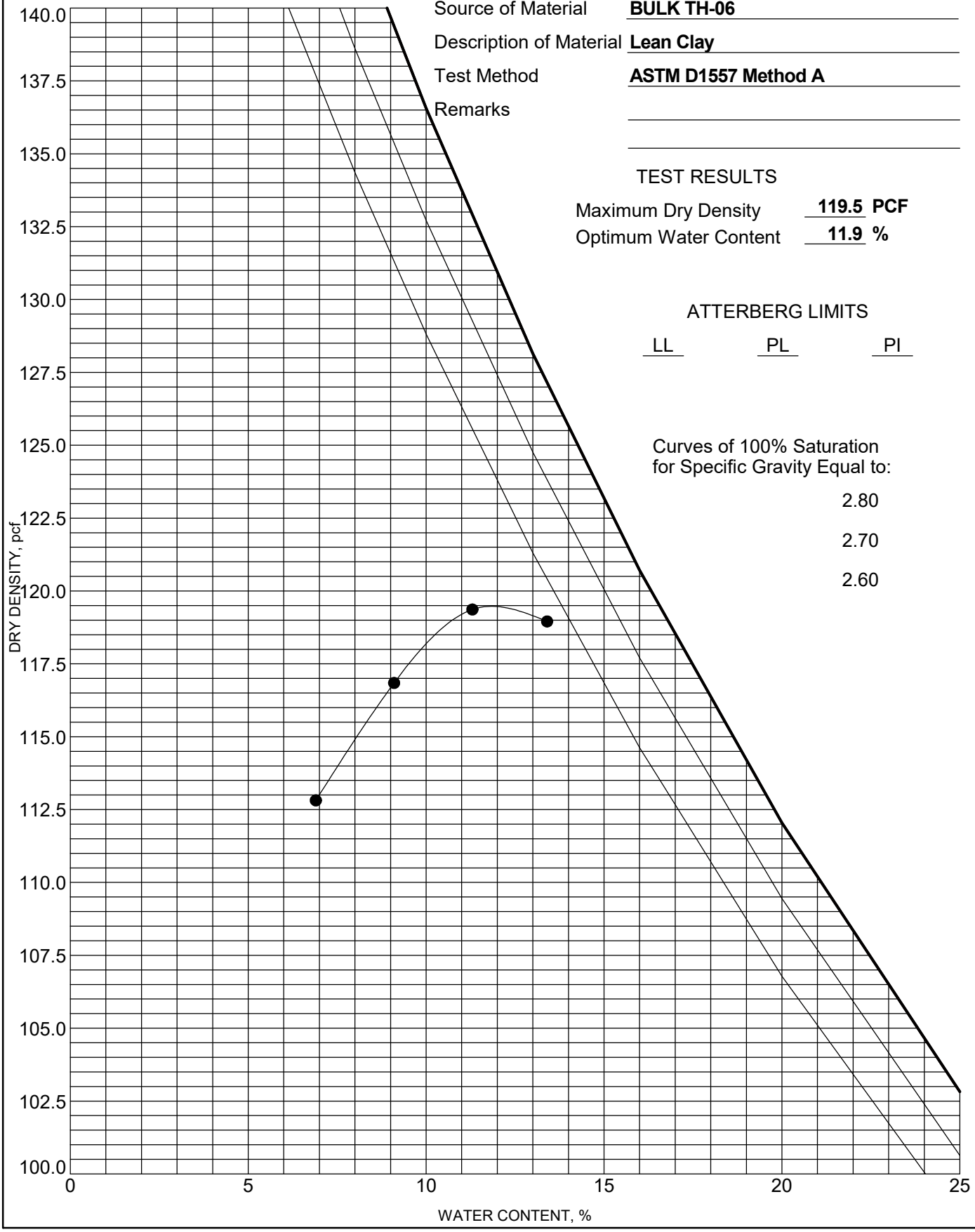
2/8/25

NOT PART OF CONTRACT DOCUMENTS

MOISTURE-DENSITY RELATIONSHIP

Somat Engineering
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

PROJECT NO. 2024130A



Source of Material **BULK TH-06**

Description of Material **Lean Clay**

Test Method **ASTM D1557 Method A**

Remarks

TEST RESULTS

Maximum Dry Density **119.5** **PCF**

Optimum Water Content **11.9** **%**

ATTERBERG LIMITS

LL	PL	PI

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION GRR TXWY L.GPJ SOMAT.GDT 2/8/25

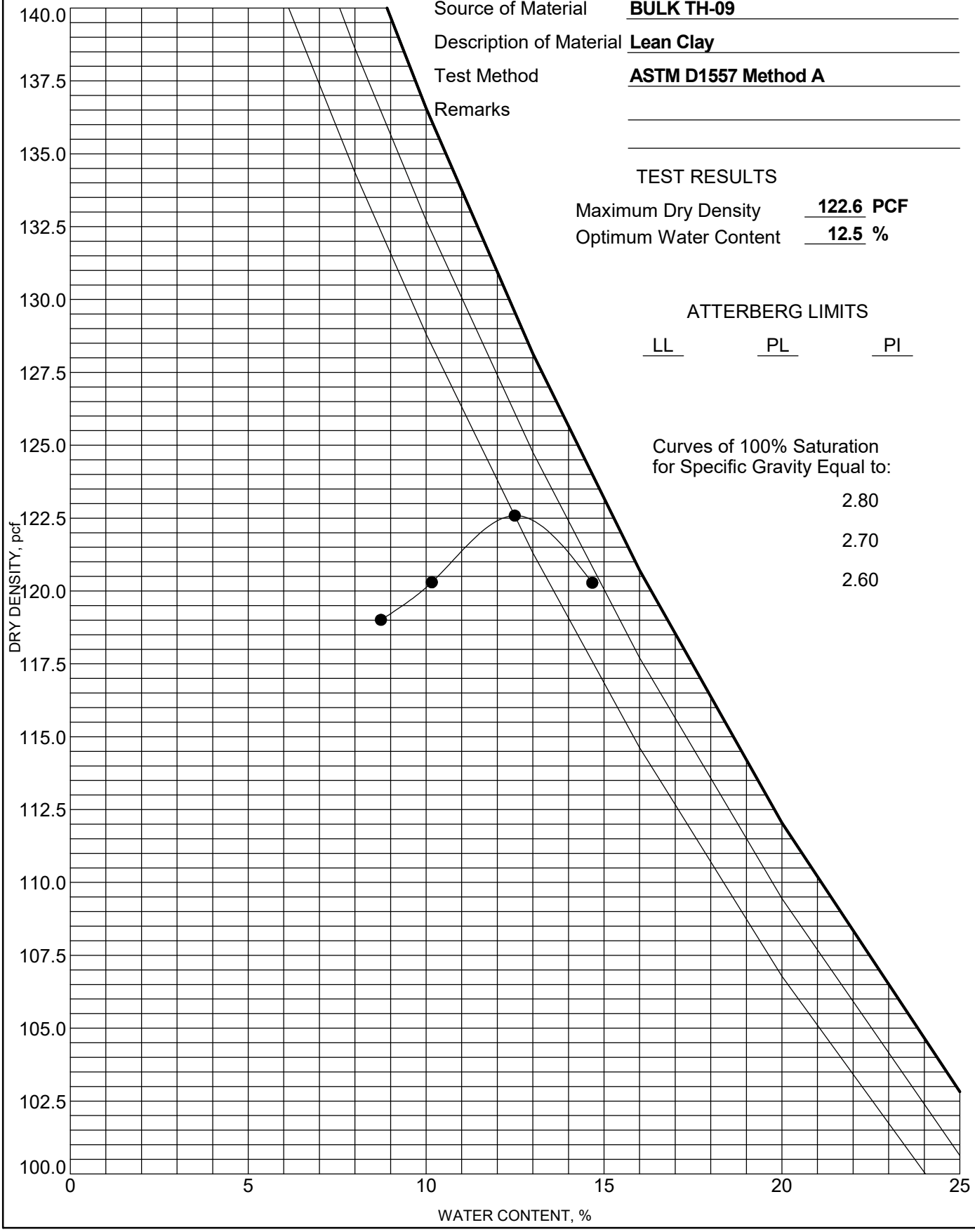
2/8/25

NOT PART OF CONTRACT DOCUMENTS

MOISTURE-DENSITY RELATIONSHIP

Somat Engineering
Taxiway L Expansion
Gerald Ford International Airport
Cascade Township, Michigan

PROJECT NO. 2024130A



Source of Material **BULK TH-09**

Description of Material **Lean Clay**

Test Method **ASTM D1557 Method A**

Remarks

TEST RESULTS

Maximum Dry Density **122.6** **PCF**

Optimum Water Content **12.5** **%**

ATTERBERG LIMITS

LL PL PI

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION GRR TXWY L.GPJ SOMAT.GDT 2/8/25

2/8/25

NOT PART OF CONTRACT DOCUMENTS

Somat Engineering, INCORPORATED

CALIFORNIA BEARING RATIO
ASTM D1883

Project Name: GRR Taxiway L Expansion
Project Location: Cascade Township
Project No.: 2024130A

Sample ID: TH-02 BULK
Description: Lean Clay

Test type: Soaked CBR
Test date: 1/20/2025
Tested by: LM/JDH

Notes: _____

Test Readings

Surcharge Weight: 10 lbs

Penetration Zero Offset:		0.000	
Penetration (in)	Corr. Penet. (in)	Load (lbs)	Pressure (psi)
0.000	0.000	0	0
0.025	0.025	68	23
0.050	0.050	128	43
0.075	0.075	181	60
0.100	0.100	236	79
0.125	0.125	282	94
0.150	0.150	324	108
0.175	0.175	365	122
0.200	0.200	402	134
0.250	0.250	468	156
0.300	0.300	536	179
0.350	0.350	599	200
0.400	0.400	661	220
0.450	0.450	731	244
0.500	0.500	807	269

Test Data

Retained on No. 4 sieve: <2%

Maximum dry density of soil: 123.6 pcf
Optimum water content of soil: 11.5%
(as determined by ASTM D1557)

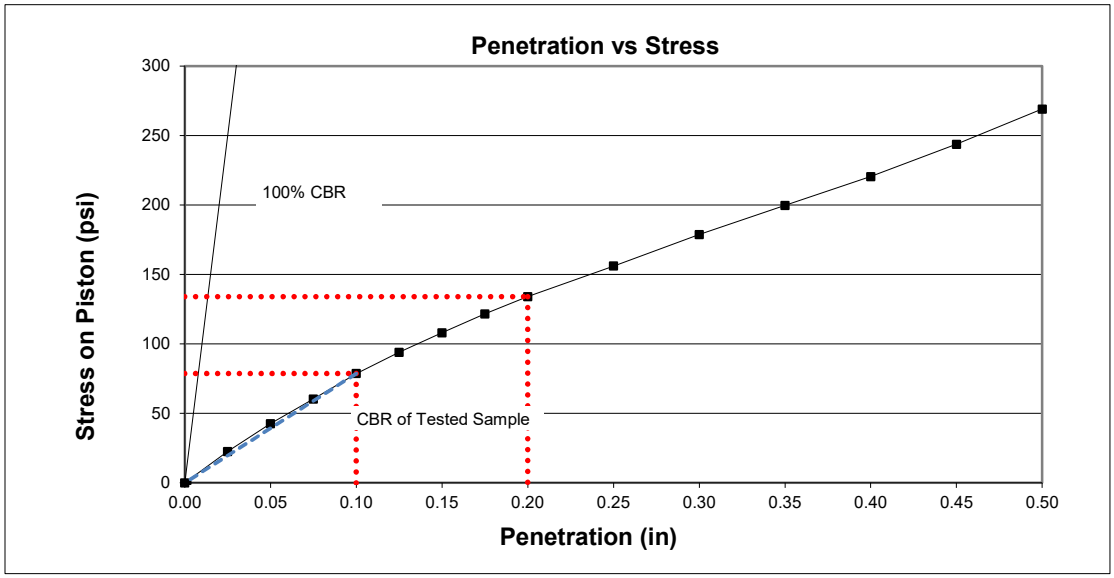
Unit weight of compacted sample: 124.9 pcf
Tested at 101.1% of maximum dry density
Water content before soaking: 11.4%
Water content after soaking: 15.3%
(top 1 inch)

Swell Monitoring

Initial height of sample: 4.586 in
Dial reading before soak: 0.250 in
Dial reading after soak: 0.375 in
Swell (%) 2.7%

CBR Results

Penetration:	**0.100 in**	**CBR Value**	***7.9***
	0.200 in	CBR Value	*8.9*



Somat Engineering, INCORPORATED

CALIFORNIA BEARING RATIO
ASTM D1883

Project Name: GRR Taxiway L Expansion
Project Location: Cascade Township
Project No.: 2024130A

Sample ID: TH-06 BULK
Description: Lean Clay with sand

Test type: Soaked CBR
Test date: 1/20/2025
Tested by: LM

Notes: _____

Test Readings

Surcharge Weight: 10 lbs

Penetration Zero Offset:		0.000	
Penetration (in)	Corr. Penet. (in)	Load (lbs)	Pressure (psi)
0.000	0.000	0	0
0.025	0.025	10	3
0.050	0.050	21	7
0.075	0.075	33	11
0.100	0.100	45	15
0.125	0.125	56	19
0.150	0.150	66	22
0.175	0.175	75	25
0.200	0.200	83	28
0.250	0.250	98	33
0.300	0.300	111	37
0.350	0.350	123	41
0.400	0.400	138	46
0.450	0.450	154	51
0.500	0.500	169	56

Test Data

Retained on No. 4 sieve: <2%

Maximum dry density of soil: 119.5 pcf
Optimum water content of soil: 11.9%
(as determined by ASTM D1557)

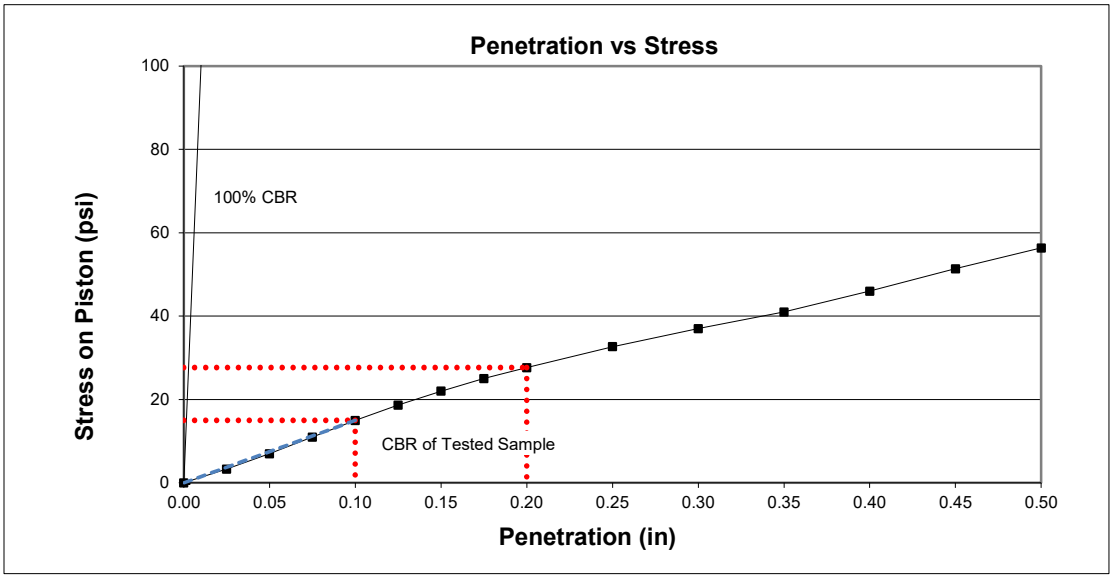
Unit weight of compacted sample: 120.3 pcf
Tested at 100.7% of maximum dry density
Water content before soaking: 11.5%
Water content after soaking: 24.4%
(top 1 inch)

Swell Monitoring

Initial height of sample: 4.582 in
Dial reading before soak: 0.250 in
Dial reading after soak: 0.501 in
Swell (%) 5.5%

CBR Results

Penetration: **0.100 in** **CBR Value** ***1.5***
0.200 in CBR Value *1.8*



Somat Engineering, INCORPORATED

CALIFORNIA BEARING RATIO
ASTM D1883

Project Name: GRR Taxiway L Expansion
Project Location: Cascade Township
Project No.: 2024130A

Sample ID: TH-09 BULK
Description: Lean Clay with sand

Test type: Soaked CBR
Test date: 1/20/2025
Tested by: LM/JDH

Notes: _____

Test Readings

Surcharge Weight: 10 lbs

Penetration Zero Offset:		0.015	
Penetration (in)	Corr. Penet. (in)	Load (lbs)	Pressure (psi)
0.000	-0.015	0	0
0.025	0.010	15	5
0.050	0.035	33	11
0.075	0.060	75	25
0.100	0.085	106	35
0.125	0.110	131	44
0.150	0.135	156	52
0.175	0.160	176	59
0.200	0.185	202	67
0.250	0.235	242	81
0.300	0.285	282	94
0.350	0.335	324	108
0.400	0.385	363	121
0.450	0.435	409	136
0.500	0.485	448	149

Test Data

Retained on No. 4 sieve: <2%

Maximum dry density of soil: 122.6 pcf
Optimum water content of soil: 12.5%
(as determined by ASTM D1557)

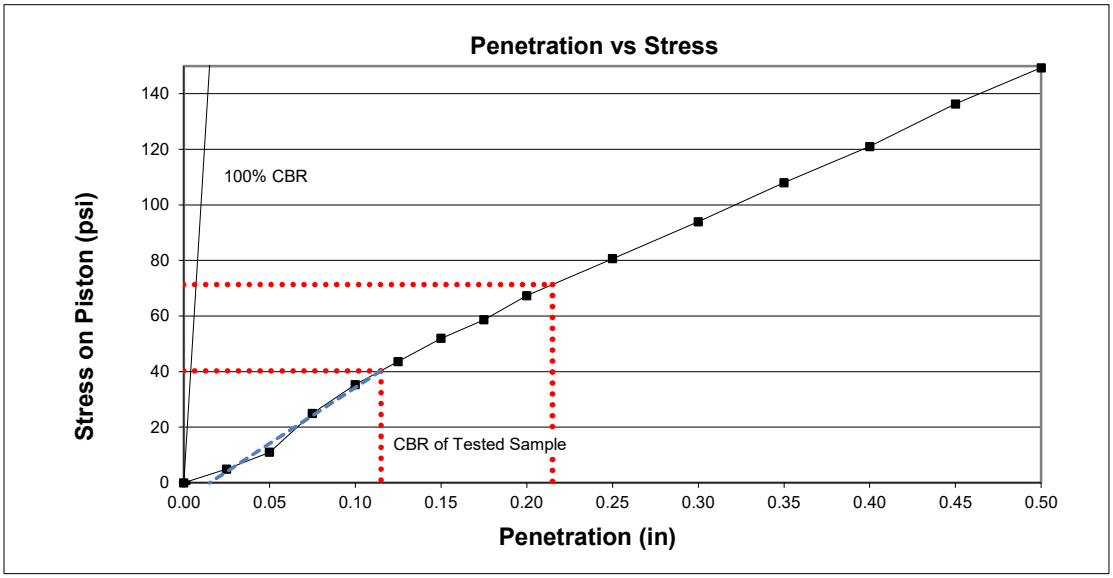
Unit weight of compacted sample: 124.1 pcf
Tested at 101.2% of maximum dry density
Water content before soaking: 12.0%
Water content after soaking: 17.0%
(top 1 inch)

Swell Monitoring

Initial height of sample: 4.587 in
Dial reading before soak: 0.250 in
Dial reading after soak: 0.315 in
Swell (%) 1.4%

CBR Results

Penetration: **0.100 in** **CBR Value** ***4.0***
0.200 in CBR Value *4.8*



Description of Frequently Used Laboratory Testing Procedures

Visual Engineering Classification

Visual classification was performed on all samples (though other means of refining the classification may also be used). The General Notes provided immediately following the Logs of Test Borings include a brief discussion of the general method used to visually classify the soil, which is based on the visual-manual procedure (ASTM D2488). The visual classification is used to assign an appropriate Unified Soil Classification System (USCS) group symbol. The USCS symbol is shown in parentheses following the textural description of the various strata on the boring logs.

Where more laboratory testing is performed (requiring both grain size and Atterberg limit tests), the classification may also be refined further based on USCS ASTM D2487.

Moisture Content (ASTM D2216)

Moisture content determination tests were performed in accordance with ASTM D2216. Samples were sealed in the field to retain the natural moisture content of the soil specimen. Samples were then dried at a constant temperature (approximately 110º C) overnight in an oven. After drying, the samples were weighed to determine the dry weight of the sample (and the loss in weight representing the water contained in the original sample). The moisture content of the specimen is expressed as a percent and is the weight of the water compared to the dry weight of the specimen.

Hand Penetrometer

A hand/pocket penetrometer was used to estimate the unconfined compressive strength of cohesive (clay) samples. In the hand penetrometer test, the shear strength of a cohesive soil sample is estimated by measuring the resistance of the sample to the penetration of a small, calibrated spring-loaded cylinder. The maximum capacity of the penetrometer is 4.5 tons per square foot. The value is reported on the soil boring logs as an estimate of the unconfined compressive strength.

Grain Size Analyses (ASTM D6913, D7928, and/or D422-2017)

Grain size analyses were performed in accordance with ASTM D6913, D7928, and/or D422-2017 on selected soil samples to evaluate the gradation of the soil represented by the sample. The distribution of particle sizes larger than 75 micrometers (retained on the No. 200 sieve) is determined by sieving, while the distribution of particle sizes smaller than 75 micrometers is determined by a sedimentation process using a hydrometer.

Atterberg Limits Tests (ASTM D4318)

Determination of the Liquid Limit, Plastic Limit, and Plasticity Index of cohesive soils (known as Atterberg Limits) were performed in accordance with ASTM D4318. Fine-grained soils are tested to determine the Liquid Limit (LL) and Plastic Limits (PL), which are moisture contents that define boundaries between material consistency states. The LL and PL values define the transitional boundaries between non-plastic, plastic, and viscous fluid states. The plasticity index (PI) defines the complete range in water content for the plastic state.

Organic Content (Loss-On-Ignition) Tests (ASTM D7348)

The organic content of a soil is determined through a Loss-On-Ignition test performed in accordance with ASTM D2974 on soil samples suspected to contain significant organics. After the sample has been oven-dried, the soil sample is super-heated in a 440ºC muffle furnace as a

means to burn off all present organic matter. The weight of the remaining ash is used to calculate the percentage of organic matter as compared to the dry weight of the sample.

Standard or Modified Proctor Test (ASTM D698 and D1557)

Moisture-density relationship tests are performed on bulk soil samples. This test defines the practical maximum density of a soil sample along with the optimum moisture content needed to achieve that density. The test procedures are similar for both the Standard and Modified Proctors, but the laboratory compactive effort of the Modified method is higher.

California Bearing Ratio Test (ASTM D1883)

The CBR test is a penetration test performed to evaluate the mechanical strength of subgrade, subbase, or base course material at the material's optimum water content or a range of water contents from a specified compaction test and a specified dry unit weight. The test is performed by measuring the pressure required to penetrate a soil sample with a plunger of standard area. The measured pressure is then divided by the pressure required to achieve an equal penetration on a standard well-graded crushed rock material having a CBR of 100%.

APPENDIX D

GBA MESSAGE:
"IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT"

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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