ADDENDUM No. 2

ITB No. 4461

Nichols Arboretum Sewer and Siphon Rehabilitation

DUE DATE: November 15, 2016 at 10:00 A.M. (local time)

The following changes, additions, and/or deletions shall be made to the Invitation to Bid for **Nichols Arboretum Sewer and Siphon Rehabilitation, ITB No. 4461**, on which proposals were to be received on/or before November 15, 2016, by 10:00 A.M.

The information contained herein shall take precedence over the original documents and all previous addenda (if any), and is appended thereto. **This Addendum includes 40 page(s) and 0 drawing(s).**

Bidder is to acknowledge receipt of this Addendum No. 2, including all attachments (if any) in its Bid by so indicating on pages 1 and 2 of the Invitation to Bid Form. Bids submitted without acknowledgement of receipt of this addendum will be considered nonconforming.

The following forms provided within the ITB Document must be included in submitted bids at bid opening.

- **City of Ann Arbor Prevailing Wage Declaration of Compliance**
- **City of Ann Arbor Living Wage Ordinance Declaration of Compliance**
- **Vendor Conflict of Interest Disclosure Form**
- **City of Ann Arbor Non-Discrimination Ordinance Declaration of Compliance**

Bids that fail to provide these completed forms listed above upon bid opening will be rejected as non-responsive and will not be considered for award.

I. CORRECTIONS/ADDITIONS/DELETIONS

Changes to the Bid documents which are outlined below are referenced to a page or Section in which they appear conspicuously. The Bidder is to take note in its review of the documents and include these changes as they may affect work or details in other areas not specifically referenced here.

Section/Page(s)	Change
Appendix C	Insert the Property Access Agreement between the Regents of the University of Michigan and the City of Ann Arbor for Installation of an Access Road and a Temporary Sanitary Sewer Bypass System. This document consists of 15 pages shall become Appendix C of the Contract Documents.

Appendix D	Insert a copy of a Geotechnical Report prepared by SME, Inc. dated April 14, 2016 regarding the stability of the existing slope north of Nichols Drive near its intersection with E. Medical Center Drive. The report outlines the current condition of the slope, its stability, and potential for future movement. The City of Ann Arbor has agreed to reimburse the University of Michigan for their on-going slope stability monitoring during the work of this project. This report is being included in this addendum for the purposes of informing all prospective bidders of the conditions in which they will be required to perform their work.

Respondents are responsible for any conclusions that they may draw from the information contained in the Addendum.

APPENDIX C

PROPERTY ACCESS AGREEMENT

BETWEEN THE REGENTS OF THE UNIVERSITY OF MICHIGAN AND THE CITY OF ANN ARBOR FOR INSTALLATION OF AN ACCESS ROAD AND A TEMPORARY SANITARY SEWER BYPASS SYSTEM

THIS PROPERTY ACCESS AGREEMENT ("Agreement") is made and entered into this _____ day of November, 2016, by and between THE REGENTS OF THE UNIVERSITY OF MICHIGAN, a Michigan constitutional corporation, with an address of 326 E. Hoover, AEC - Real Estate Office, Ann Arbor, MI 48109-1002 ("University") and the CITY OF ANN ARBOR, A Michigan municipal corporation, 301 E. Huron Street, Ann Arbor, Michigan 48104 ("City").

BACKGROUND

A. The University is the owner of certain real estate in the areas known as the University Hospital and Nichols Arboretum, in the City of Ann Arbor, Michigan including the two parcels identified on **Exhibit A** as “Parcel A” and “Parcel B” (collectively "University Property").

B. The City has sanitary sewers and appurtenances that cross portions of the University Property, including a siphon, that require periodic inspection and maintenance. The City has an easement for the portion of the sanitary sewer on Parcel A set forth in the Right of Way for Sewers, between the University and the City, dated January 25, 1933.

C. The City has requested permission from University to access the University Property to inspect, line, and repair these sanitary sewers and use a portion of the University Property to install a temporary sanitary sewer bypass system for the City which consists of a 12" above ground pipeline, hydraulic pumps, a generator, monitoring equipment, signage, and a crane; and also to install a gravel road with a gate and a gravel pad to access the siphon (collectively, the "the Permitted Facilities") in the areas depicted on the attached **Exhibit B** (the "Access Area").

D. The University is willing to grant the City permission to enter the University Property and use a portion of the University Property for the purpose of inspecting, lining, and repairing sanitary sewers and installing, maintaining, removing and monitoring the Permitted Facilities in the Access Area. The installation of the temporary sanitary sewer bypass system will begin at manhole number 71-69254 east of the University's helipad and continue along the sanitary sewer pipeline to manhole number 71-69893. The pipeline will be installed along Nichols Drive and under the Caretakers Field Office Road so as not to restrict service or safety vehicles.

E. The University and the City will execute an Easement Agreement for the gravel road, gate and gravel pad to remain on the University Property after the expiration of this Agreement.

NOW, THEREFORE, in consideration of the foregoing, certain valuable non-monetary consideration, and of agreements hereafter contained, the University hereby grants to the City the right to access the University Property and the right to use a portion of the University Property subject to terms and conditions set forth herein.

1. Access Areas and Use.

(a) Area. University grants to City a license for City to access the University Property and use the Access Area (the "License") 24 hours a day, seven days a week (except as set forth in Section 5, below) solely for the purpose(s) of performing inspection, lining, and repair of sanitary sewers and installing, maintaining, and monitoring the Permitted Facilities and also to remove the Permitted Facilities from the Access Area (except the gravel road, gate and pad), as further described in paragraphs C and D, above. The License applies only to the Access Area and not to any other portion of the University's Property except as may be necessary to gain access to the Access Area, including ingress and egress over East Medical Center Drive and Nichols Drive as more specifically detailed in Section 5, below.

(b) Use. No person who is not an employee, contractor, subcontractor, agent or invitee of City shall be permitted on the Access Area. City is strictly prohibited from making any alterations, additions, improvements, modifications or changes to the Access Area except as authorized by this Agreement. City is prohibited from making waste to the Access Area. City is further strictly prohibited from causing any disturbance, including noise or odor, which may unreasonably disturb other occupants of the University Property or users of the Access Area or its environs. City shall keep and maintain the Access Area in good, clean, orderly and safe condition.

2. Term. The term of this Access Agreement (“Term”) shall commence upon the date of execution of this Agreement and shall expire on June 1, 2017.

3. City's Responsibilities. The City shall be responsible for all costs associated with the Permitted Facilities and shall leave the University Property in the condition in which the City, or City's contractors, agents or representatives, found it. The City shall not permit any liens to attach to the Property by reason of the exercise of the City's rights hereunder. All tools, equipment, temporary improvements, and other personal property taken upon or placed upon the University Property by the City shall remain the property of the City and must be removed by the City prior to the expiration of this Agreement.

4. Siphon Access Road, Gate and Pad.

The City may construct a gravel access road and gravel pad to access the sanitary sewer and siphon as shown on **Exhibit C**. The City may remove vegetation, including trees, only as necessary to construct the access road and pad as shown on **Exhibit C**. The City shall install a lockable gate across the access road to prevent unauthorized vehicle access and City shall provide a copy of the key to the University.

5. Access over E. Medical Center Drive, Nichols' Drive and University Parking Lot M29. The City may access the Access Area via the University-owned roads E. Medical Center Drive (paved) and Nichols' Drive (gravel) and the University Parking Lot M29 ("Lot M29") as shown on **Exhibit D** (the "Access Route"); with the following terms and conditions:

(a) There shall be no obstruction of, parking on, or staging of trucks on Nichols Drive, E. Medical Center Drive and Lot M29. At no time will vehicular access be blocked along the Access Route and to the caretaker cottage located on the University Property;

(b) The City and the Contractor shall not use Lot M29 for staging of construction,

(c) Contractor may only drive large trucks along the Access Route from 8:00pm to 8:00am on each Monday – Friday. Contractor may drive large trucks along the Access Route from 4:00pm each Saturday through 8:00am each Monday; provided that if this use of the Access Route causes congestion for University staff and patients using the Access Route the University may adjust the access hours in the section to mitigate the congestion while preserving the ability of the City to complete the project within the term of this Agreement. The City shall provide traffic controls along the Access Route, as needed;

(d) If the Contractor elects to truck water along the Access Route, this work will be limited to 60-hour consecutive periods from 8:00pm Friday through 8:00am Monday; provided that such activity must be coordinated and approved in advance with University. During these periods, the Contractor shall remain in radio contact or communicate via other means with water tanker truck drivers to coordinate use of the Access Route to mitigate congestion and other impacts along the Access Route:

(e) The City will install, at the City's expense, signs along the Access Route indicating that parking is prohibited during the hours set forth above and warning that cars parking during those hours may be towed. The City may have a contractor tow cars that are parking along the Access Routes during the City's access hours.

6. The Slope. There is a slope down from E. Medical Center Drive to the railroad right-of-way below Nichols Drive (the "Slope"), as shown on **Exhibit D**. The

University is concerned that the Work may cause that slope to erode. The University acknowledges that the Slope is experiencing documented sliding/sloughing that began prior to the commencement of this work. The University will engage, at the City's expense, a company to monitor the Slope during the Term. The City will reimburse the University for the third-party monitoring costs up to $5,000.00 and shall pay the University within 30 days of receipt of an invoice from the University. The University shall provide copies of all Slope monitoring reports to the City.

7. Compliance with Law. The City shall perform all work related to the Permitted Facilities (the "Work") at the City's expense and in compliance with all applicable laws, ordinances and regulations and obtain at City's own expense all permits, licenses, certificates and approvals required to perform the work.

8. Crane. Any crane used by City or City's contractor to perform the Work, will not exceed any height limits imposed for University's hospital helicopter use and Federal Aviation Administration regulations and when using any crane shall at all times comply with any applicable local, state and federal regulations.

9. Construction and Access Schedule. Within 5 business days after execution of this Agreement, the City shall provide the University with notice of the commencement, and shall include a description of their construction activities and a schedule for accessing the University Property and the Access Route and an estimated completion date. City shall also provide plans for traffic control sequencing, signage and staging. Any change to the schedule for access of the University Property must be approved in advance with the University. Any requests for changes to the schedule for access of the University Property should be emailed to Mary Krasny at mlkrasny@umich.edu and Judy Kirkdorffer at jkirkdorf@umich.edu at least 5 business days in advance of the effective date any requested change.

10. Security of Property. The City shall include reasonable security measures, to minimize the risk of property damage or bodily injury at or in the vicinity of the University Property as the result of the Work.

11. Restoration. The City shall repair, or cause to be repaired, any damage to University-owned real or personal property (including the Access Route and the Slope), third-party owned real or personal property and the University Property caused by performing the Work and shall leave the University Property in substantially the same condition as existed as of the date of commencement of the work. When restoring the area around the new access road and pad, the City shall use woodland seed. The City shall not remove any trees from the University Property, except as permitted for the access road, pad, and gate.

12. Insurance. City's contractors and any and all subcontractors (hereinafter contractors) shall obtain at their own cost and expense, and keep in full force and effect, during the term of their access upon the University Property, a comprehensive general liability insurance policy in an amount not less than One

Million Dollars ($1,000,000.00) combined single limit for bodily injury, death and property damage arising out of any one occurrence, protecting the University against any and all claims for bodily injury, death or property damage arising directly or indirectly from the contractor's use of the Site. Such policy or policies shall name the University as an additional insured. The policy or policies required hereunder shall be issued by insurance companies qualified to do business in the state and such policy or policies shall provide at least twenty (20) days' notice to the Owner before cancellation or material modification. The City's contactors shall deliver to the University certificates of such insurance evidencing the coverage in force as of the commencement date of this Agreement, as well as any replacement certificates issued during the Term of this Agreement.

13. Default. If the City fails to observe or perform any of its obligations under this Agreement, then the City shall be in default under this Agreement, and University may, at its option, exercise one or more of the following remedies:

(a) After meeting and conferring with the City to resolve the nonperformance, to declare this Agreement terminated;

(b) Obtain specific performance of the covenants and obligations of the City under this Agreement; or

(c) Perform the obligation on behalf of the City in which event the costs and expenses paid or incurred by the University in performing the City's obligations shall be immediately due and payable to the University following receipt of the University's invoice.

14. Nature of License. No legal title, easement or other possessory interest in real estate, including any leasehold interest in the Access Area, or any appurtenances to it, shall be created or deemed or construed to have been created or vested in the City by anything contained in this Access Agreement. This grant of License is personal and not transferable or assignable in whole or in part.

15. Supervision. The City shall be responsible during the term of this Agreement for the supervision of the activities of all of the City's agents, employees, contractors, subcontractors, licensees and invitees in connection with access to and use of the Access Area. The University may remove any person on the Access Area that in any manner violates any aspect of conduct allowed in or around the Access Area. Any interference or delay caused by the City or any of its agents, employees, contractors, subcontractors, licensees and invitees in the University's efforts to remove a person shall be deemed a material breach of this Agreement.

16. Termination. The access and use rights granted pursuant to this Agreement may be terminated by the University or City by providing written notice to the other party. Upon any such termination, the City shall have continued access to the Property for a reasonable and sufficient period of time to permit the City to complete any necessary repairs as set forth in Paragraphs 3 and 11 of this Agreement.

17. Notices. Any notice permitted or required to be given under this Agreement shall be in writing and shall be deemed to be duly given when delivered certified mail, return receipt requested, to the party entitled to such notice at their address set forth hereinabove, with a copy to:

For the City: City of Ann Arbor
Public Services Area
Project Management Services Unit
301 E. Huron Street
Ann Arbor, Michigan 48104

For the University: The Regents of the University of Michigan
AEC - Real Estate Manager
326 E. Hoover, Mail Stop B
Ann Arbor, Ml 48109-1002

18. Third Parties. The access and use rights granted to the City under this Agreement is a personal privilege of the City and shall not be transferred or assigned except as provided in Paragraph 1 hereof. Nothing in this Agreement, whether express or implied, is intended to relieve or discharge the obligation or liability of any third persons to either party to this Agreement, nor will any provision give any third persons any right of subrogation or action over or against either party to this Agreement.

19. Governing Law and Venue. All matters arising out of or related to this Agreement shall be governed by and construed under the laws of the State of Michigan without regard for principles of choice of law and shall be brought in a court of subject matter jurisdiction within the state of Michigan. The Parties and their successors and assigns consent to the jurisdiction of the courts of or within the state of Michigan with respect to any other claims arising under this Agreement.

20. Entire Agreement. This Agreement together with all its Exhibits constitutes the entire agreement between the parties to the Agreement regarding the subject matter of this Agreement and cannot be amended or modified except by a writing signed by all of the parties to this Agreement. The exhibits attached to this Agreement is incorporated into the Agreement and made a part of this Agreement for all purposes.

21. City Contractors and Indemnification by City Contractors.

(a) City shall provide University with a list of all of it contractors and any and all subcontractors who shall access the University Property (hereinafter "City Contractors") pursuant to this Agreement.

(b) All City Contractors shall indemnify and hold University harmless from

and against any and all damage to property or injury or death to persons, and from and against any and all costs, claims, damages, causes of action, liabilities and expenses of any nature whatsoever (including reasonable attorney's fees) arising out of or in connection with the Work. Before any City Contractor accesses the University Property, City shall cause them to execute the attached "Acknowledgment of Access Agreement". City shall promptly provide copies of each signed acknowledgement to University.

22. Environmental.

(a) The Permitted Facilities include a generator. City will take appropriate measures to avoid fuel spills and contain any potential fuel spills.

(b) City will comply with all applicable federal, state, and local environmental laws and regulations in all activities undertaken pursuant to this Agreement, including the operation of any generator or diesel tanks on the University Property. City is solely responsible for the prompt, lawful and proper disposal of any and all waste materials and contamination to the University Property, if any, generated by City's activities and the activities of anyone acting on its behalf (including employees, contractors, vehicles or equipment). If any contamination is released onto the University Property, City shall immediately clean up any such releases and shall ensure no contamination shall be released into any storm drains in the area during the clean-up procedure. If a release occurs that requires a corrective action plan, City shall as soon as possible notify University. If City fails to promptly clean up a release, University may perform such clean up on behalf of City in which event the costs and expenses paid or incurred by University in performing City's obligations shall be immediately due and payable by City to University following City's receipt of invoice with backup documentation of all such costs and expenses.

23. Counterparts. This Agreement may be executed in counterparts, and it shall not be necessary that the signatures of all parties hereto be contained on any one counterpart hereof; each counterpart shall be deemed an original, but all of which together shall constitute one and the same instrument.

24. Third Party Beneficiaries. Nothing in this City Agreement, express or implied, is intended to or will be construed to confer upon any person or party, other than the University and City, any right, remedy, or claim under or with regard to the Agreement.

25. Severability. Whenever possible, each provision of this Agreement will be interpreted in a manner so as to be enforceable, valid, and legal under applicable law. If any provision of this Agreement is held by a court of competent jurisdiction to be unenforceable, invalid, or illegal in any respect under applicable law, the unenforceability, invalidity, or illegality will not affect any other provision of this Agreement and this Agreement will be construed as if the unenforceable, invalid, or

illegal provision had never been contained in this Agreement.

26. No Waiver. No delay or failure on the part of the University in the exercise of any right granted under this Agreement or otherwise available by Agreement, at law, or in equity, shall impair any right, to be construed as a waiver of any default or any acquiescence.

27. Relationship of The Parties. Nothing contained in this Agreement shall be deemed or construed by the parties or by a third party to create the relationship of principal and agent or of a partnership or of a joint venture or of any association whatsoever between the University and the City.

28. Exhibits. The following exhibits are attached to this Agreement and incorporated into this Agreement:

(a) Exhibit A: University Property
(b) Exhibit B: Access Area
(c) Exhibit C: Gravel Access Road, Gate and Pad
(d) Exhibit D: Access Route

IN WITNESS WHEREOF, the parties have executed this Agreement on the date first above written.

UNIVERSITY: The Regents of the University of Michigan, a Michigan constitutional corporation

By: _____
Name: Mary Krasny
Its: Associate Director Real Estate & Leasing-AEC
Date:_____
____

[SIGNATURES CONTINUE ON THE FOLLOWING PAGE]

For City of Ann Arbor, a Michigan municipal corporation

By: _____
Howard S. Lazurus
Its: City Administrator

Approved as to substance:

By: _____
Craig A. Hupy
Its: Public Services Area Administrator

Approved as to form:

By: _____
Stephen K. Postema
Its: City Attorney

ACKNOWLEDGMENT OF ACCESS AGREEMENT

I,_____, confirm that I have read the Property Access Agreement (the "Agreement") entered into by THE REGENTS OF THE UNIVERSITY OF MICHIGAN and the CITY OF ANN ARBOR, dated _____, 2016. I understand the terms of the Agreement and agree to comply with the terms of the Agreement, including the terms regarding indemnification and insurance as if I were an original party to the Agreement.

RECEIPT AND ACCEPTANCE ACKNOWLEDGED

_____ (Name of Contractor)

By: _____

Title: _____

Date: _____

EXHIBIT A
UNIVERSITY PROPERTY

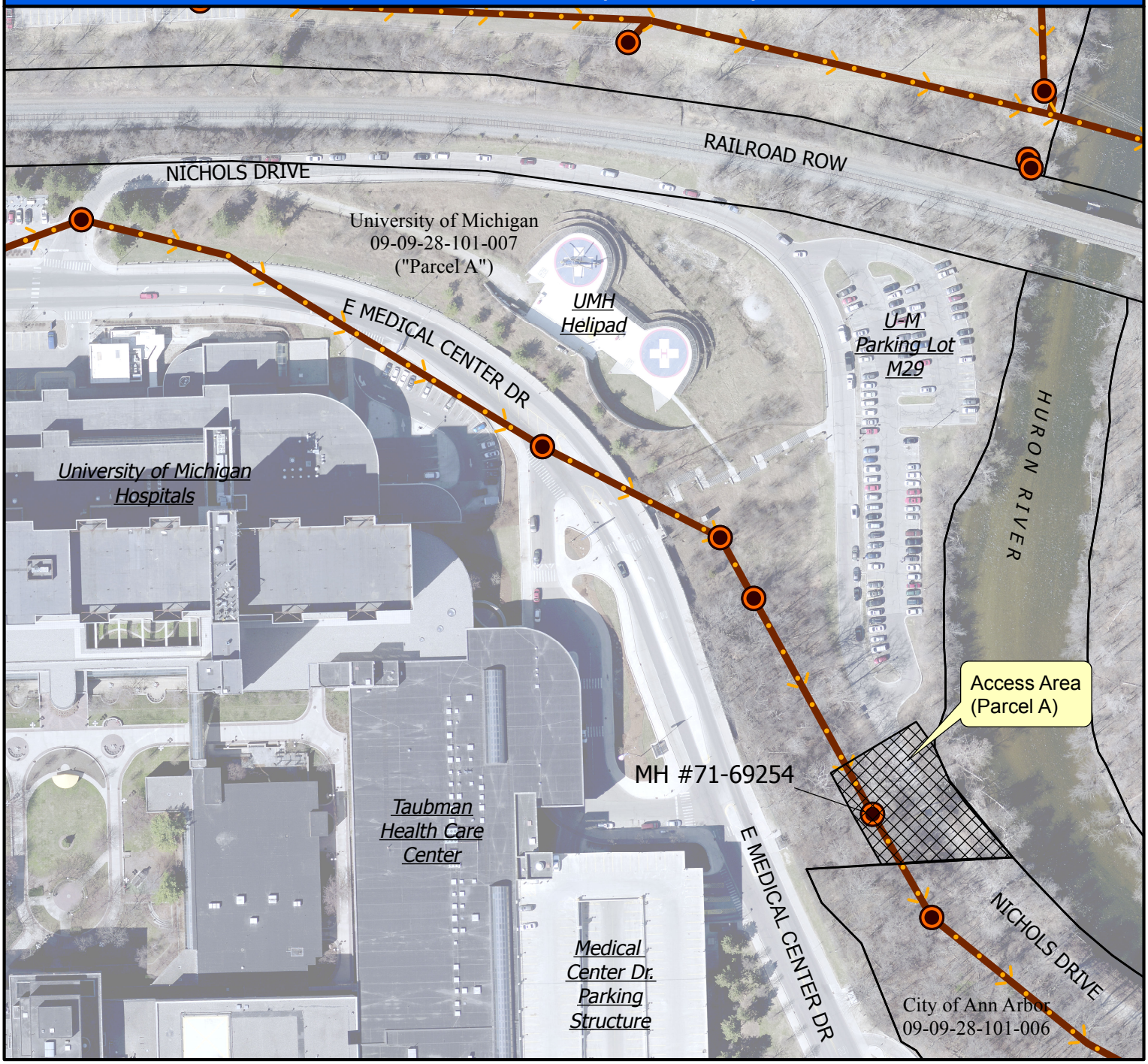
PARCEL A

09-09-28-101-007 (1433 WASHINGTON HEIGHTS)
PRT NE 1/4 SEC 28 T2S R6E BD N BY NYC RR R/W & HURON RIVER E BY CITY OWNED PROPERTY (09-28-101-006) S BY WASHINGTON HTS NL FOREST HILL CEMETERY W BY N & SL SEC 28 & EL FOREST HILL CEMETERY EXC THAT PORTION OWNED BY THE CITY SPLIT ON 02/15/2007 FROM 09-09-28-101-001

PARCEL B

PARCEL 09-09-27-201-001 (FULLER RD VACANT)
PRT W 1/2 SEC 27 T2S R6E BEG CENT SEC 27 TH S 87 DEG 48 MIN 20 SEC W 2179.83 FT TH S 1 DEG 43 MIN E 753.43 FT TH N 88 DEG 43 MIN 30 SEC W 157.38 FT TH N 87 DEG 18 MIN 30 DEX W 153.4 FT TH S 89 DEG 47 MIN 40 SEC W 154.79 FT TH N 0 DEG 56 MIN W 725.03 FT TH N 0 DEG 53 MIN 20 SEC W 1195.28 FT TO NL HURON R TH NE E & SE ALG NL RIV TO N & S 1/4 L SEC 27 TH S 1 DEG 16 MIN 20 SEC E 805.33 FT TO POB EXC HURON RIVER

Exhibit B
ACCESS AREA (PARCEL A)



Legend

- Access Area
- Existing City of Ann Arbor easement area
- City of Ann Arbor Tax Parcel

Sanitary Sewer

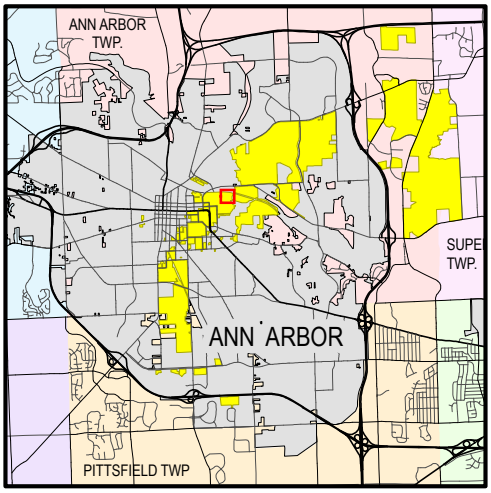
- Sanitary Manhole (Non UM-Owned)
- Sanitary Main (Non UM-Owned)

Feet

0 75 150 300

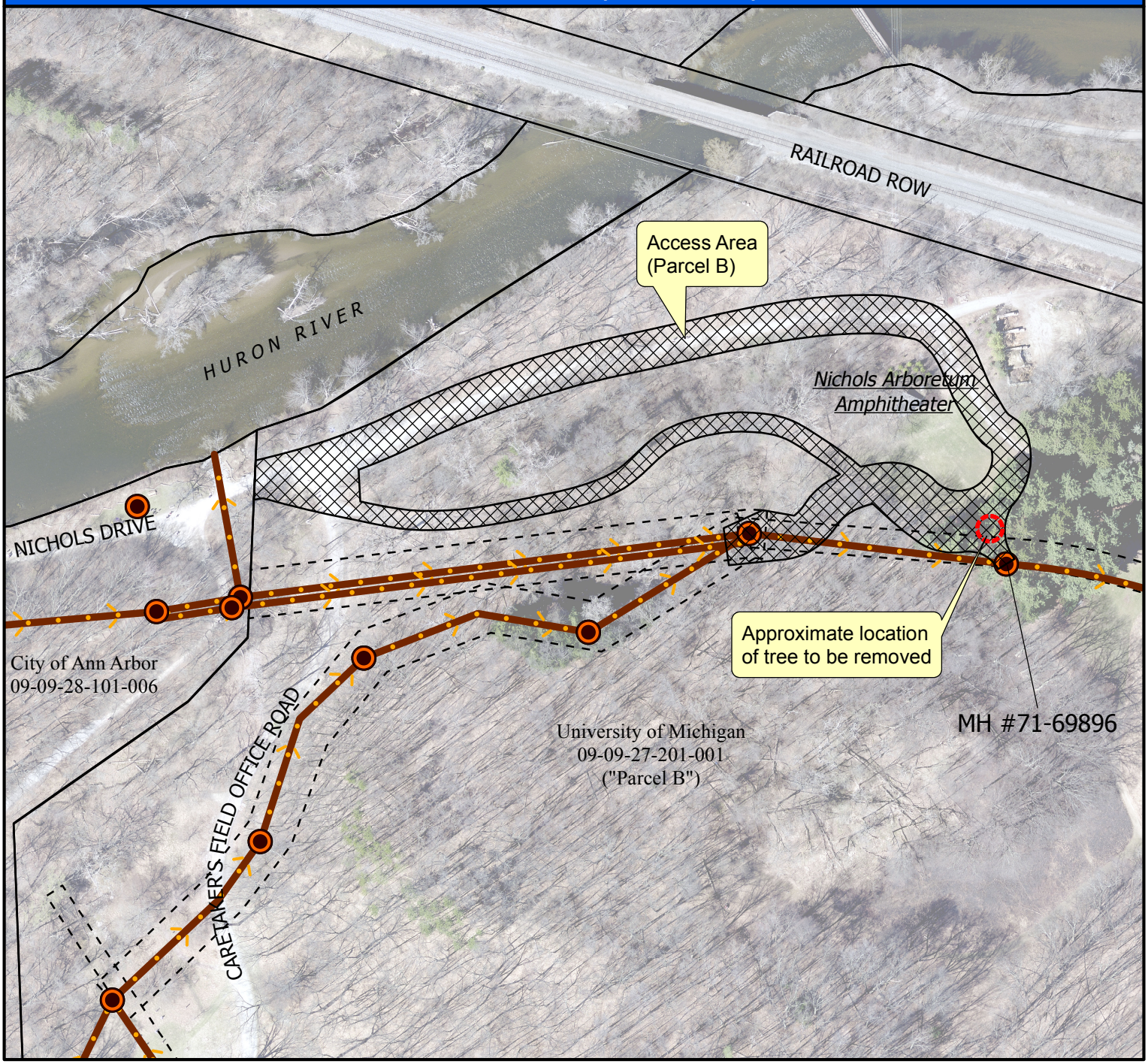
Michigan State Plane Coordinate System, South Zone
Map Units: International Survey Feet
Horizontal Datum: NAD 1983
Digital othophoto images based on 2014 aerial photography

Notes:



UNIVERSITY OF MICHIGAN
ARCHITECTURE, ENGINEERING AND CONSTRUCTION
Real Estate & Leasing

Exhibit B
ACCESS AREA (PARCEL B)



Legend

- Access Area
- Existing City of Ann Arbor easement area
- City of Ann Arbor Tax Parcel

Sanitary Sewer

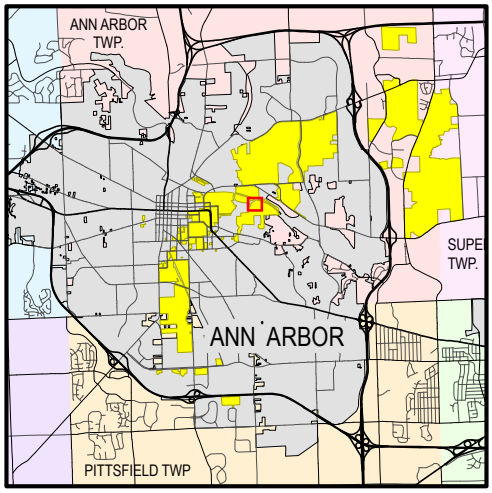
- Sanitary Manhole (Non UM-Owned)
- Sanitary Main (Non UM-Owned)

Feet

0 75 150 300

Michigan State Plane Coordinate System, South Zone
Map Units: International Survey Feet
Horizontal Datum: NAD 1983
Digital othophoto images based on 2014 aerial photography

Notes:



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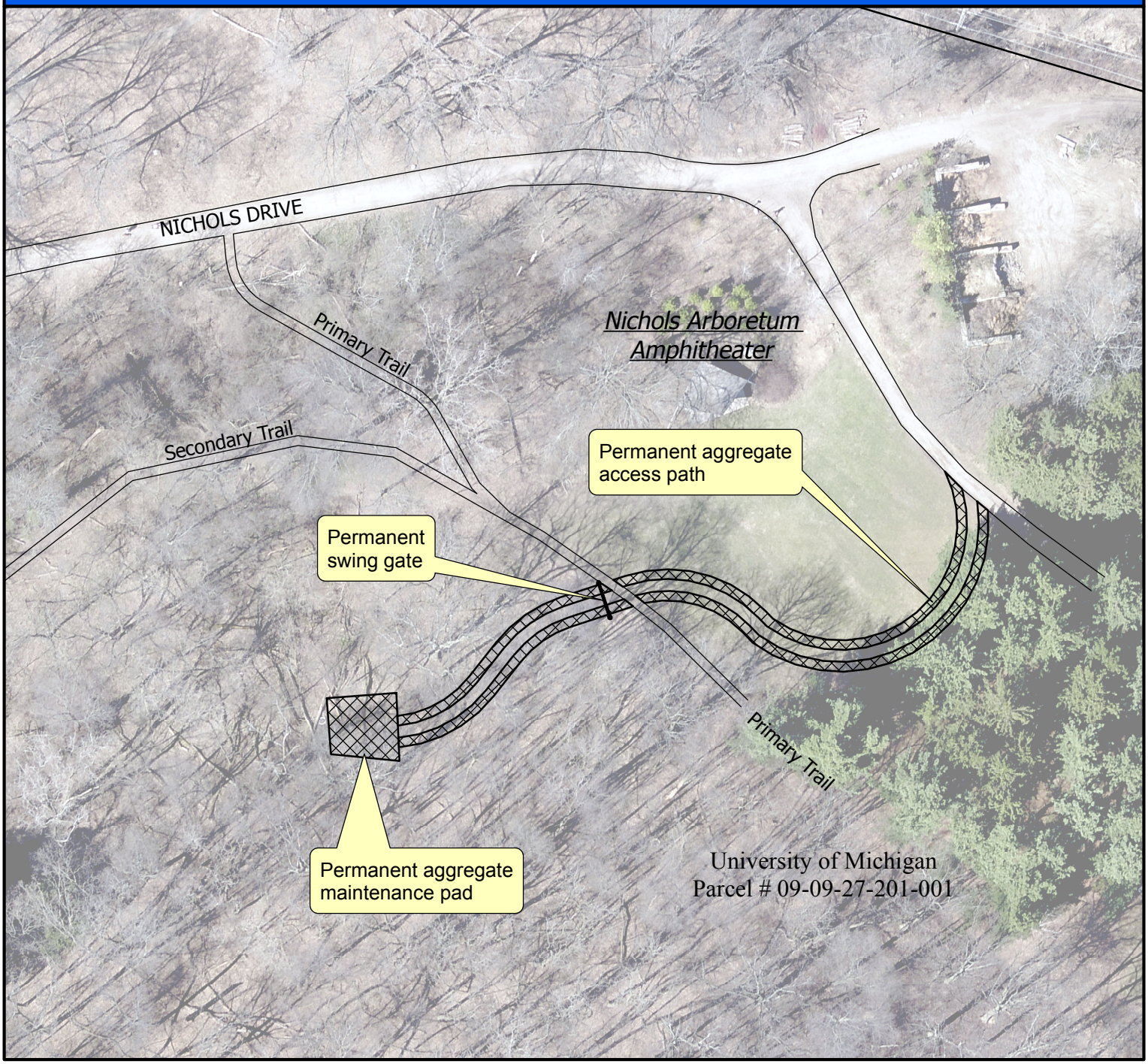
Real Estate & Leasing

Exhibit C
Gravel Access Road, Gate and Pad



Legend

- Aggregate access path and maintenance pad
- Swing gate
- Existing gravel drive/walking path

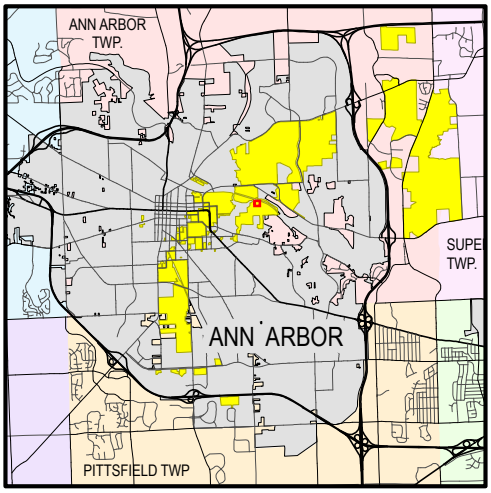
N

Feet

0 30 60 120

Michigan State Plane Coordinate System, South Zone
Map Units: International Survey Feet
Horizontal Datum: NAD 1983
Digital othophoto images based on 2014 aerial photography

Notes:



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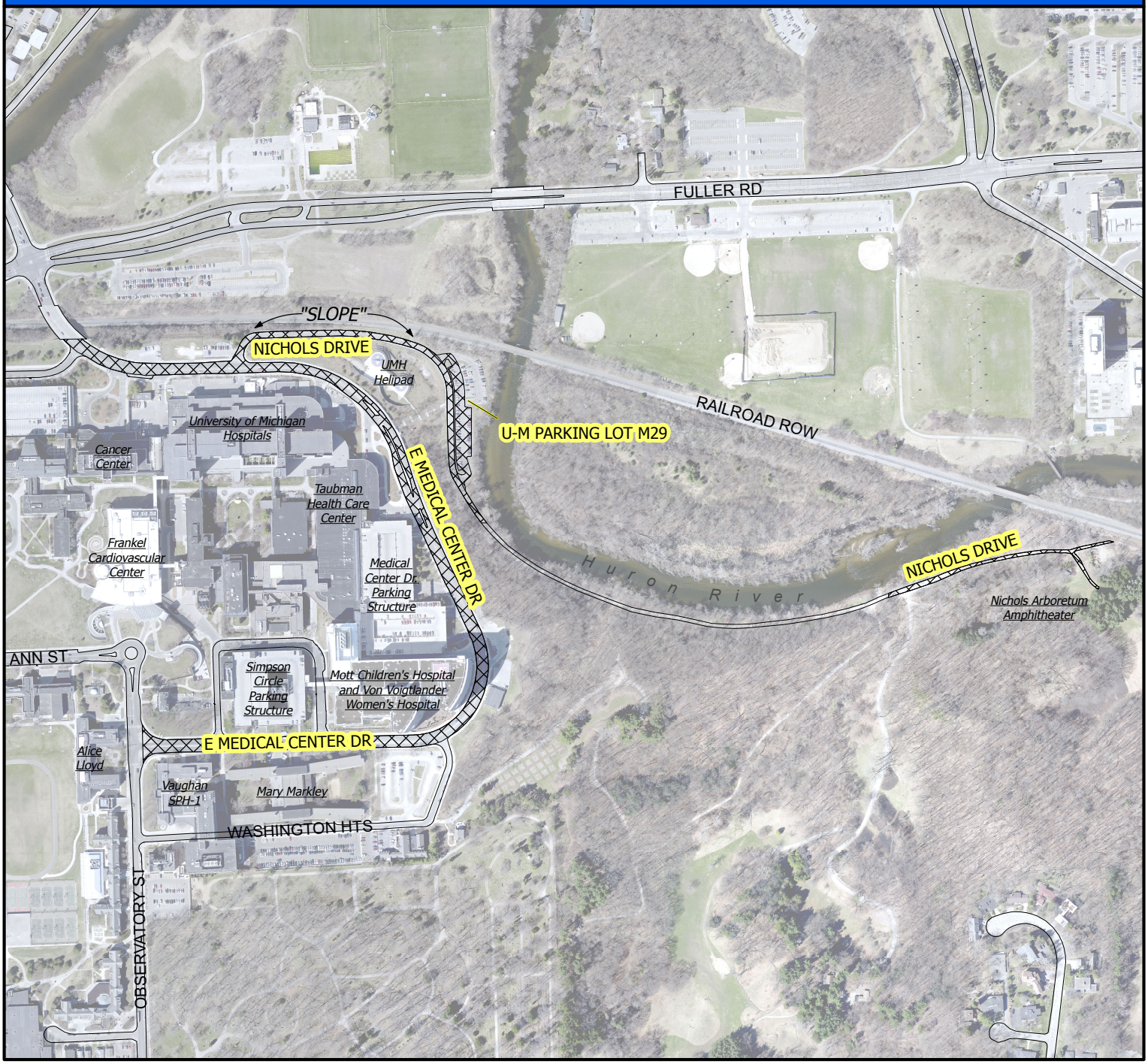
Real Estate & Leasing

Exhibit D
ACCESS ROUTE



Legend

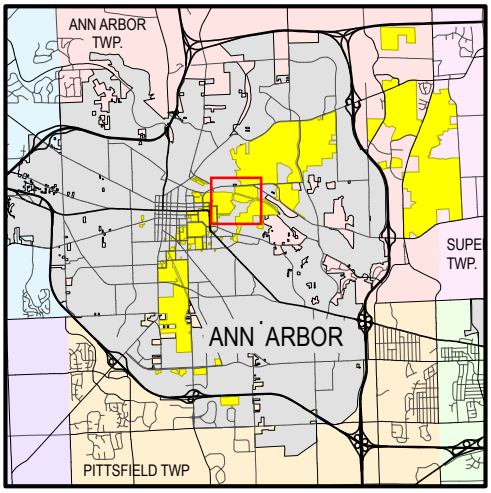
Access Route

Feet

0 275 550 1,100

Michigan State Plane Coordinate System, South Zone
Map Units: International Survey Feet
Horizontal Datum: NAD 1983
Digital othophoto images based on 2014 aerial photography

Notes:



UNIVERSITY OF MICHIGAN
ARCHITECTURE, ENGINEERING AND CONSTRUCTION
Real Estate & Leasing

3301 Tech Circle Drive
Kalamazoo, MI 49008-5611

T (269) 323-3555

www.sme-usa.com

April 14, 2016

Ms. Patti Spence, PE
University of Michigan
Architecture, Engineering and Construction
326 East Hoover Avenue, Mail Stop D
Ann Arbor, Michigan 48109-1002

Via e-mail: paspence@umich.edu (PDF file)

RE: Nichols Drive Slope
UM Medical Campus
Ann Arbor, Michigan
SME Project No. 073412.00

Dear Ms. Spence:

SME has completed a review of the current conditions associated with the slope along Nichols Drive on the University of Michigan (UM) Medical Campus in Ann Arbor, Michigan. Our services were authorized by UM Architecture, Engineering and Construction (AEC) and were performed in general accordance with the scope outlined in SME Proposal No. P00558.15-Final-Rev. dated November 9, 2015.

EXECUTIVE SUMMARY

The current inclinometer data indicate the slope that supports Nichols Drive has continued to move to the north at a relatively slow and steady rate. The most recent inclinometer data do not show a definitive increase in the rate of movement compared to slope movements over the last few years. More rapid slope movement will likely occur before the slope fails, but such movement may occur over a relatively short time frame. Therefore, simply monitoring the inclinometers at discrete intervals does not serve as an advanced warning system for when the slope will fail.

Since the slope has moved and is continuing to do so, the slope is considered unstable and will eventually fail in some manner. An accurate prediction of when the slope will fail cannot be made because slope failure is a complex phenomenon, and the stability of a slope is influenced by many variables. Therefore, the sense of urgency of this project for planning purposes to move forward with stabilization measures cannot be specifically categorized.

Further discussion and our opinions about the slope are presented below under “Analysis and Discussion”. This Executive Summary should not be reviewed without also reading the remainder of this summary report.

PROJECT DESCRIPTION AND BACKGROUND

The project site consists of an existing slope along the north side of Nichols Drive on the UM Hospital Campus. The slope provides grade separation between Nichols Drive and railroad property to the north that is situated at lower elevations than Nichols Drive. Visual evidence of movements along the slope has been noticed by UM since at least 2002. Evidence of movement has included distortion of the guard rail along the north side of Nichols Drive, cracking in the pavement of Nichols Drive, and offsets in the concrete curb along the north side of Nichols Drive. Somat Engineering (Somat) was retained by UM in early 2003 to install two inclinometers near the top of the slope to monitor the magnitude and rate of slope movement.

SME was initially retained by UM for this project in early 2006 to perform a peer review of Somat's preliminary evaluation of the condition of the subject slope. SME's peer review was summarized in a report dated March 30, 2006. SME was subsequently retained by UM to develop schematic concepts for stabilization of the subject slope. Three schematic concepts for potential repair and stabilization of the slope were presented in an SME report dated June 20, 2006. In 2010, UM engaged SME for a preliminary construction cost and schematic design for one of the concepts.

CURRENT EVALUATION OF SLOPE CONDITIONS

INCLINOMETER READINGS

As part of our current scope for the project, SME retained Somat to collect an updated reading of the two inclinometers located at the top of the slope along Nichols Drive. The updated readings of the inclinometers were collected on December 10, 2015. Somat prepared a summary report (dated January 6, 2016) with the updated inclinometer data. A copy of the Somat report is attached for reference. The locations of the two inclinometers (I-1 and I-2) are depicted in a figure included with the Somat report. A brief discussion by SME on the updated inclinometer data is presented below under "Current Inclinometer Data".

SITE RECONNAISSANCE

Mr. Jeff Krusinga, PE, GE, of SME, visited the project site on December 12, 2015. During the visit, Mr. Krusinga visually reviewed the conditions along Nichols Drive at the top of the slope, the conditions along the face of the slope, and the conditions at the toe of the slope. Photographs were collected during the site visit to document the conditions observed.

Select photographs collected on December 12, 2015, were compared to photographs collected from similar vantage points by SME during a site visit performed on June 11, 2010. These photographs (Photo Nos. 1A and 1B through 4A and 4B) are attached to this report. Additional photographs (Photo Nos. 5 through 12) collected by SME during the site visit on December 12, 2015, are also attached to this report to illustrate conditions at the time of the most recent site visit.

ANALYSIS AND DISCUSSION

CURRENT INCLINOMETER DATA

Based on the latest inclinometer data collected in December 2015, the slope has experienced movement to the north since the last inclinometer readings were collected in April 2014. The current rate of movement on an annualized basis is generally consistent with the rates from previous readings. There is not an apparent increase in the rate of movement based on the new data, just a steady progression toward the north. Total movement to the north since the installation of the inclinometers in March 2003 is

about 5 inches at one inclinometer (I-2) and almost 8 inches at the other inclinometer (I-1). The rate of movement at Inclinometer I-1 (located farthest west along the top of the slope) since the last reading in April 2014 is about 0.3-inch per year. The rate of movement at Inclinometer I-2 (located to the east of Inclinometer I-1) since the last reading in April 2014 is less than 0.1-inch per year.

CURRENT OBSERVATIONS OF THE SLOPE

As indicated above, SME performed a visual review of the slope on December 12, 2015. Photograph Nos. 1A and 1B through 4A and 4B (attached) provide a qualitative comparison of the conditions observed on December 12, 2015, to the conditions observed on June 11, 2010. In our opinion, based on our review of these photographs, there is not a well-defined difference in the conditions illustrated in these photographs between the two visit dates, which are separated by a span of 5.5 years. In other words, even though the inclinometers indicate ongoing movement, there has not been a discernable visual change in the conditions at the top of the slope along Nichols Drive.

Photographs Nos. 5 through 12 (attached) provide additional documentation on the conditions observed during the site visit on December 12, 2015. Photograph Nos. 5 through 8 depict conditions along the north curb line of Nichols Drive in the area of the inclinometers where most of the discernable movement has been experienced. Photograph Nos. 9 through 12 depict conditions along the soldier pile retaining wall at the toe of the slope.

DISCUSSION

Our review of the latest inclinometer data indicates the slope is still continuing to move to the north at a relatively constant rate. There is no reason to expect that the movement will stop, although the rate of movement in the future may dissipate or increase compared to the average, long-term rate experienced since the inclinometers were installed in 2003. In general, based on our experience, an increase in the rate of movement would likely be an early indicator of pending slope failure. This rate increase may occur over a relatively short period of time (months, weeks, or even days).

Since a significant amount of movement of the slope along Nichols Drive in the area of the inclinometers has already occurred, the slope is considered only marginally stable and will eventually fail. A subtle increase in the driving forces tending to destabilize the slope (e.g., groundwater in the slope) could trigger more rapid movement of the slope. As we have indicated in our previous analysis of the slope in 2006, we believe the slope is unstable because the slope inclination is too steep. Based on the inclinometer data, the movement appears to be within about the upper 15 feet at the inclinometer locations. Based on this depth, the distress seen in the pavement along Nichols Drive, and on our experience with similar types of slopes, it is our opinion that when the slope fails, the back-scarp of the failure will likely extend somewhere into the parking lane along the north side of Nichols Drive. In our opinion, if this were to occur, a portion of the north side of Nichols Drive would need to be barricaded with Jersey barriers to keep traffic suitably away from the back-scarp until the slope is stabilized.

We cannot accurately predict when the slope will fail because slope failure is a complex phenomenon, and the stability of a slope is influenced by many variables, such as soil shear strength, soil stress history, slope geometry, the presence (or absence) of groundwater, the presence (or absence) of adverse bedding planes, and the presence (or absence) of root reinforcement below the slope face and vegetative cover on the slope face. In addition, many soil properties, such as strength, are non-linear (as compared to materials such as steel), and slopes are non-homogenous, which makes evaluating and accurately predicting the behavior of soil masses, such as slopes, difficult. In an ideal situation, we would be able to predict when an unstable slope would fail, and the slope Owner could then initiate a project such that the design and construction of slope stabilization measures would be completed just in time before failure were to occur. Such an ideal situation is not reality in the practice of geotechnical engineering and soil mechanics. Therefore, we cannot neatly categorize the urgency of this project for planning purposes as “Immediate” (needing attention now), “Priority 1” (needing attention in 1 to 2 years), or “Priority 2” (needing attention in 3 to 5 years).

Our viewpoint on stabilization of the slope is that the project can be executed with either a proactive approach or a reactive approach. A proactive approach would involve moving forward with the project before the slope fails so that appropriate planning, design, and construction can be performed without operating under an emergency situation. A reactive approach would involve waiting too long to move forward with the project such that the slope fails and the stabilization measures need to be planned for, designed, and constructed under potentially an emergency situation. A reactive approach would also require measures to stabilize the slope and/or protect Nichols Drive on a temporary basis if the slope were to fail.

Until the project moves forward with design and construction, we recommend routine inspections by UM staff be performed on a quarterly basis to assess whether visual changes in the conditions at the top of the slope indicate more rapid movement of the slope may be occurring. If discernable movement is noticed, SME should be contacted to observe the slope, and another reading of the inclinometers should be collected to provide a quantitative measure of the movement. We also recommend parking along the north side of Nichols Drive continue to be prohibited within the unstable area until the slope is repaired. Figure No. 1, Restricted Parking Area Diagram, which is attached to this report, provides the approximate area where we believe parking along the north curb lane of Nichols Drive should be prohibited at least until the slope is stabilized.

We appreciate the opportunity to be of service. If you have any questions regarding the information in this report, or if we can be of further assistance, please call.

Sincerely,

SME

Jeffery M. Krusinga, PE, GE
Senior Consultant

Timothy H. Bedenis, PE
Chief Geotechnical Engineer

Attachments: Figure No. 1: Restricted Parking Area Diagram
Site Photograph Nos. 1A and 1B through 4A and 4B
Site Photograph Nos. 5 through 12
Somat Inclinometer Report (dated January 6, 2016)

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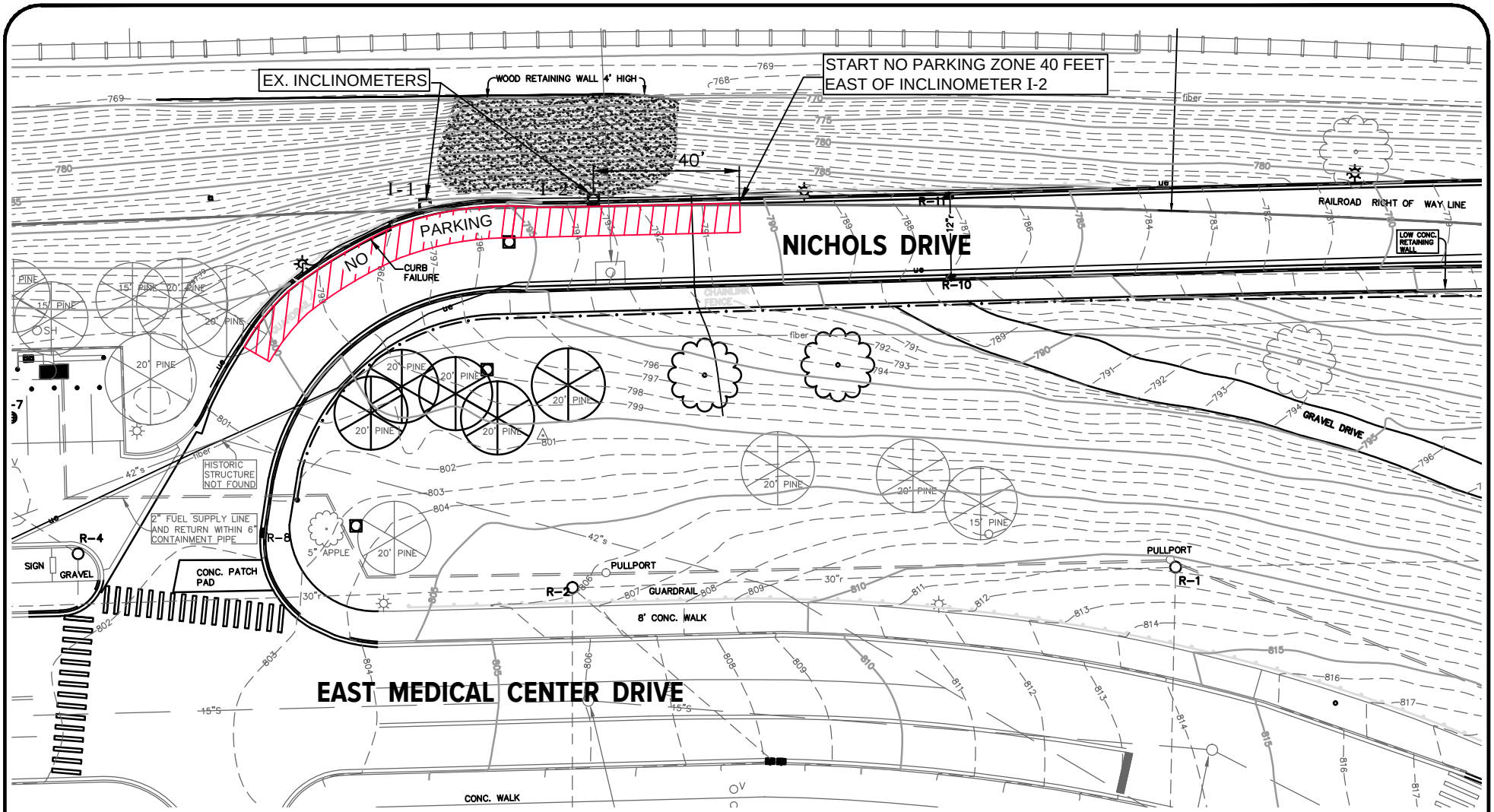


NOTE:
DRAWING INFORMATION TAKEN FROM TOPOGRAPHIC SURVEY PERFORMED BY ARBOR LAND CONSULTANTS, INC. DATED 11–22–2010.

GRAPHIC SCALE: 1" = 40'

No.	Revision Date		
		Date	4-5-16
		Drawn By	JAB
		Designed By	JK
		Scale	1" = 40'
		Project	073412.00

RESTRICTED PARKING AREA DIAGRAM
NICHOLS DRIVE SLOPE
ANN ARBOR, MICHIGAN

SME
www.sme-usa.com

Figure No. 1

Apr 05, 2016 - 11:51am - jblake \\Sme-inc\pz\WIP\073412.00\CAD\DWGS\rev0\073412.00-FIG1.dwg

PHOTO NO. 1A –June 11, 2010: Looking west along the north curb line of Nichols Drive. Inclinometer I-2 is in the right of the photo between the curb and the guardrail.

PHOTO NO. 1B – December 12, 2015: Looking west along the north curb line of Nichols Drive. Inclinometer I-2 is also visible in this photo between the guardrail and the curb line.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	June 11, 2010 and December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

PHOTO NO. 2A - June 11, 2010: Looking east along Nichols Drive.

PHOTO NO. 2B – December 12, 2015: Looking east along Nichols Drive from a similar vantage point as PHOTO NO. 2A.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	June 11, 2010 and December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

PHOTO NO. 3A – June 11, 2010: Looking west along the north curb line of Nichols Drive.

PHOTO NO.3B – December 12, 2015: Looking west along Nichols Drive from a similar vantage point as PHOTO NO. 3A.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	June 11, 2010 and December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

PHOTO NO. 4A – June 11, 2010: Looking at the soldier pile retaining wall at the toe of the slope on the south side of the railroad line.

PHOTO NO. 4B – December 12, 2015: Looking at the soldier pile retaining wall from a similar vantage point as PHOTO NO. 4A.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	June 11, 2010 and December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

PHOTO NO. 5: Looking east along the north curb line of Nichols Drive.

PHOTO NO. 6: Looking east along the north curb line of Nichols Drive.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

PHOTO NO. 7: Close-up of the drop in the pavement surface along the north curb line of Nichols Drive. Inclinometer I-1 is located immediately to the left of this location.

PHOTO NO. 8: Looking west along the north curb line of Nichols Drive. Inclinometer I-2 is in the right of the photo between the curb line and the guardrail.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

PHOTO NO. 9: Looking west at the soldier pile retaining wall at the toe of the slope.

PHOTO NO. 10: Looking west along the top of the solider pile retaining wall at the toe of the slope.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

PHOTO NO. 11: Looking east at the soldier pile retaining wall at the toe of the slope.

PHOTO NO. 12: Looking east along the top of the soldier pile retaining wall at the toe of the slope.

SME Project No.:	073412.00
Photographs by:	Jeffery M. Krusinga, PE, GE
Date:	December 12, 2015
Project:	Nichols Drive Slope
Location:	Ann Arbor, Michigan

Somat Engineering INCORPORATED

January 6, 2016
G03006F

Jeffery M. Krusinga, P.E., G.E.
SME
3301 Tech Circle Drive
Kalamazoo, MI 49008

RE: Measurement of Slope Movement
Nichols Drive Slope Stability Project
University of Michigan
Ann Arbor, Michigan
Ref: SME Project No. 073412.00

Dear Mr. Bedenis:

At the request of the SME, Inc. (SME), Somat Engineering, Inc. (Somat) is providing this letter report subsequent to readings taken from the two (2) inclinometers (I-1 and I-2) located at the top of the existing slope along Nichols Drive, north of the University of Michigan Hospital complex. The most recent data measurements were taken on December 10, 2015.

We understand that in planning for the rehabilitation of the existing slope condition along Nichols Drive, north of the University of Michigan Hospital complex, SME acting as consultant to the university requested an additional reading be taken from these inclinometers. The inclinometers were installed in the spring of 2003. They were monitored periodically from March 2003 thru October 2003 for the first phase of this project. Four supplemental investigations were performed in order to obtain one additional reading at each inclinometer in June 2006, December 2009, March 2011, and April 2014. This letter details the findings of the fifth supplemental investigation. An evaluation of recent data obtained in 2015 will provide an estimate of the criticalness of the proposed slope rehabilitation.

Data Evaluation

Initial readings taken between the spring of 2003 and October 2003 from both inclinometers reflected up to 0.1 inches of lateral movement of the slope towards the north. Subsequent readings from the instruments in June 2006 indicated additional northward movement of the slope of about 1.5 inches since the fall of 2003. The readings from December 23, 2009 indicated additional lateral slope movement towards the north of about 0.9 inches since the summer of 2006. Readings obtained in March 2011 indicated lateral slope movement since winter 2009 towards the north at Inclinometers I-1 and I-2 at depths of 10 feet or less. An additional movement of 0.4 inch was observed at I-1. Minimal additional movement of 0.1 inch was observed at I-2.

Readings obtained in April 2014 indicated lateral slope movement since spring 2011 towards the north at Inclinometers I-1 and I-2 at depths of 10 feet or less. An additional movement of 0.8 inch was observed at I-1 at a depth of 2 feet below the top of casing. This corresponds with a total cumulative displacement of 6.3 inches since installation in 2003. Additional incremental movement of 0.3 inch was observed at I-2 at a depth of 7 feet below the top of the casing. This corresponds with a total cumulative displacement of 4.7 inches since installation in 2003.

Recent readings obtained in December 2015 indicated lateral slope movement since spring 2014 towards the north at Inclinometers I-1 and I-2 at depths of 10 feet or less. An additional movement of 0.5 inches was observed at I-1 at a depth of 2 feet below the top of casing. This corresponds with a total cumulative displacement of 7.6 inches since installation in 2003. Additional incremental movement of 0.1 inch was observed at I-2 at a depth of 7 feet below the top of the casing. This corresponds with a total cumulative displacement of 4.8 inches since installation in 2003. Note the maximum cumulative displacement observed at I-2 since installation in 2003 is 5.0 inches at a depth of 5 feet below the top of the casing.

The data collected between spring of 2014 and winter of 2015 suggested an annual rate of *0.3 inches to 0.06 inches* of slope movement toward the north within this 1.6–year period for inclinometers I-1 and I-2, respectively. The maximum observed annual rate obtained at I-1 is consistent with the previous rate observed during the periods from summer 2006 to spring 2014, as indicated in the table below.

Date of Readings	**Elapsed Time**	**Annual rate of slope movement towards the north**
Spring 2003 to Summer 2006	3 years	0.5 inches/year
Summer 2006 to Winter 2009	3 years	0.3 inches/year
Winter 2009 to Spring 2011	1.25 years	0.3 inches/year to 0.1 inches/year
Spring 2011 to Spring 2014	3 years	0.3 inches/year to 0.1 inches/year
Spring 2014 to Winter 2015	1.6 years	0.3 inches/year to 0.06 inches/year

The accompanying graphical presentations of field readings obtained from inclinometers I-1 and I-2 since the fall of 2003 through April 2014 indicated cumulative possible slope movement of *7.6 to 5.0 inches* towards the north. It appears that the recorded slope movements indicated by both inclinometers has occurred within the upper 15 feet of fill soil below the pavement at the top of the slope.

It is our opinion the slope is continuing to creep downhill at a slow rate. In this condition of slow continuing movement, a heavy rainfall could destabilize the slope and the rate of movement could increase dramatically. Based on the accumulated readings, this is certainly a possibility, but it is definitely not a certainty.

We hope the information in this report will be helpful in planning for the proposed slope rehabilitation project. Should you have any questions or require further information, please do not hesitate to contact us.

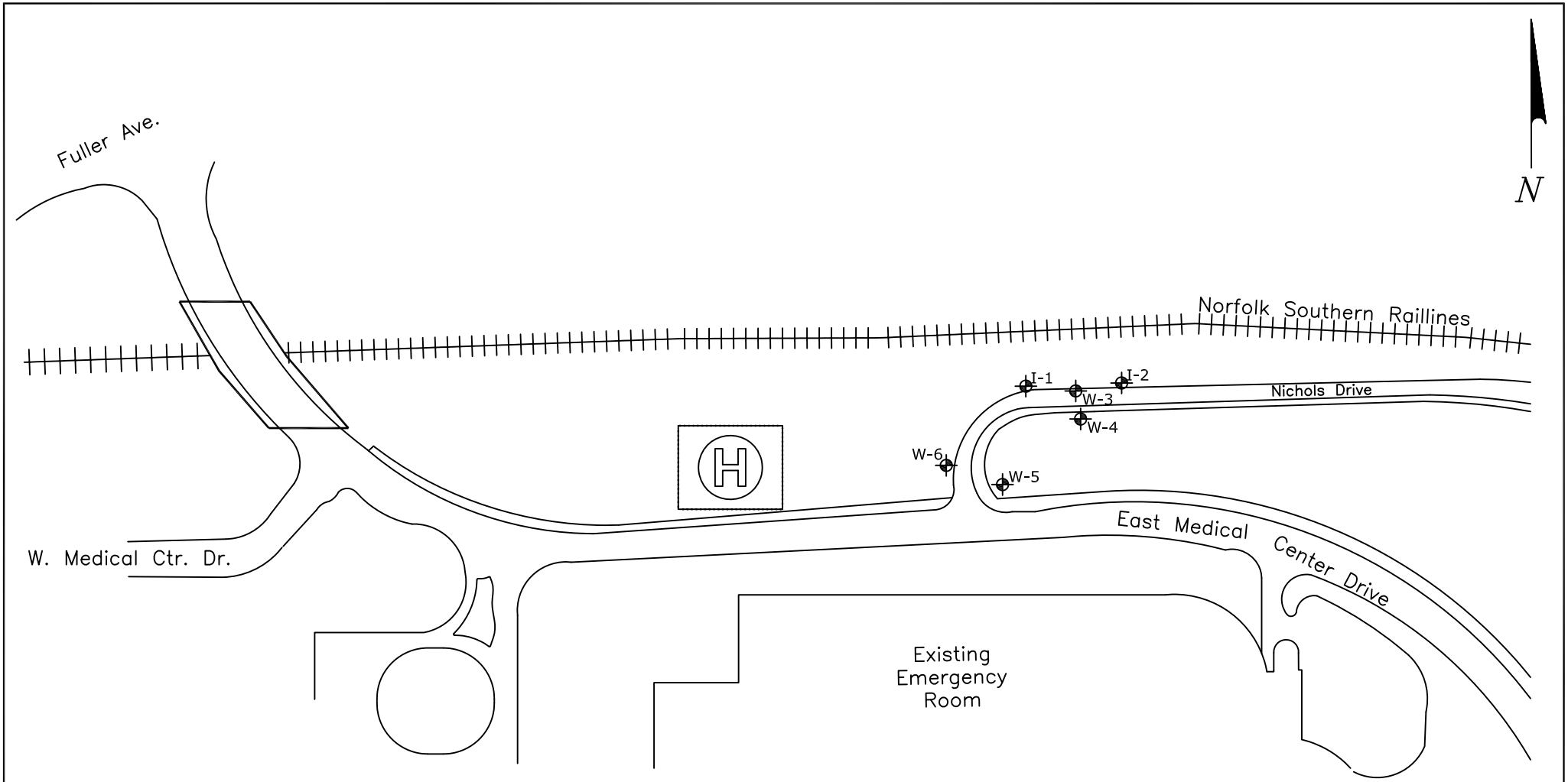
Sincerely yours,
Somat Engineering, Inc.

Catherine J. Weirauch, P.E.
Project Engineer

FOR Jonathan D. Zaremski, P.E.
Project Manager

CJW/JDZ

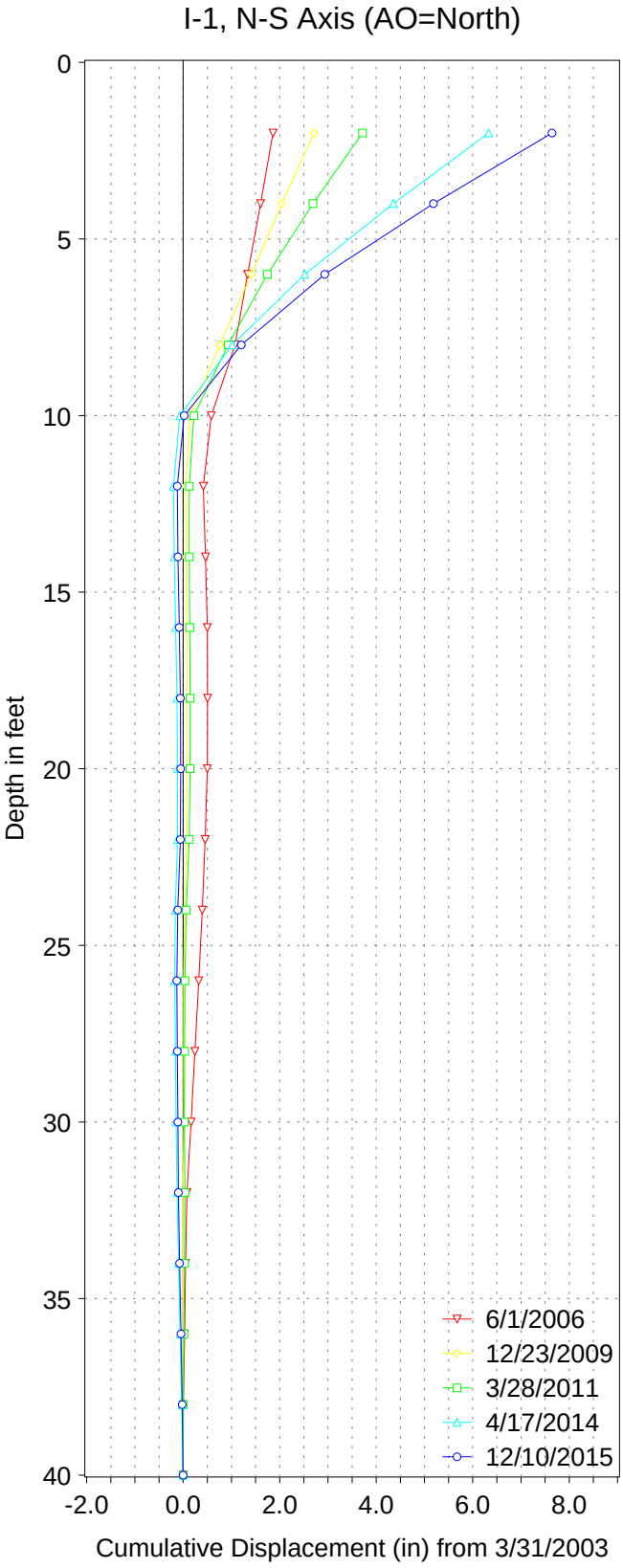
Attachments: Location plan of inclinometers
Cumulative displacement graph for I-1 and I-2
Incremental displacement graph for I-1 and I-2
Photographs

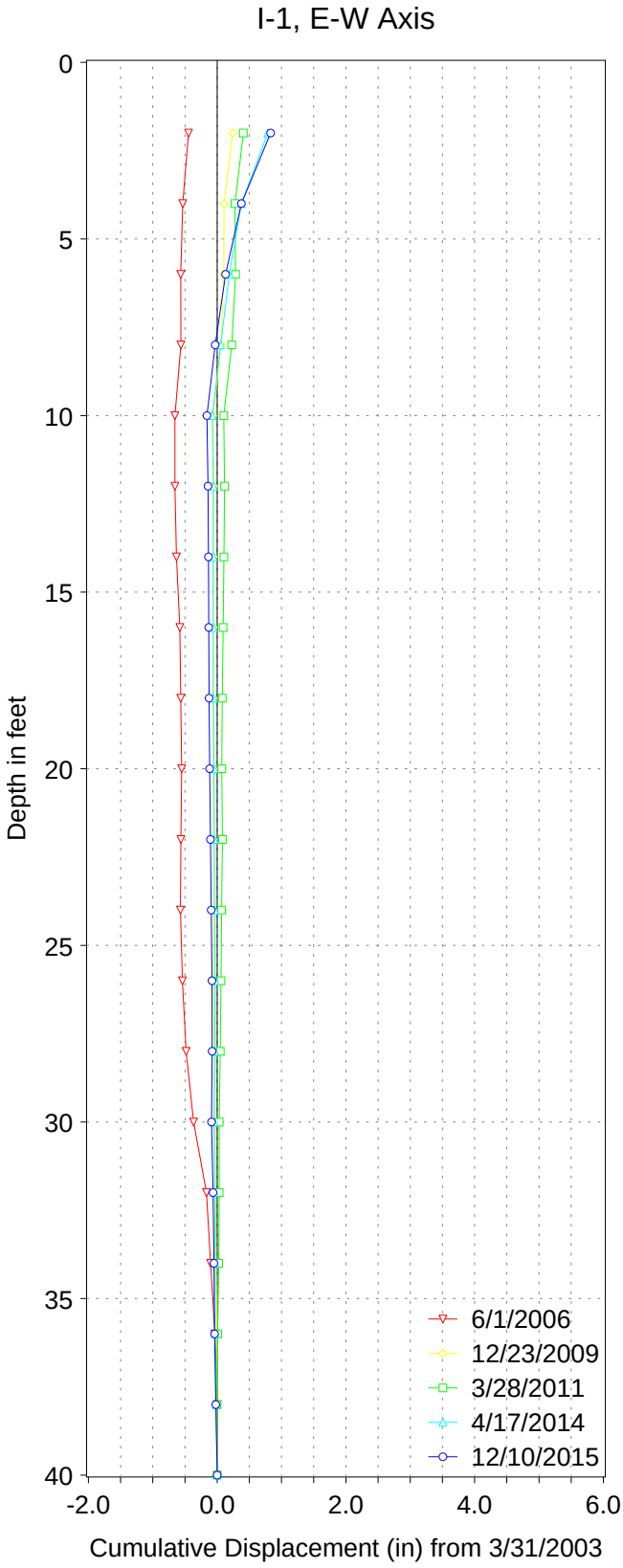


SOIL BORING & INSTRUMENTATION LOCATION DIAGRAM
NICHOLS DRIVE SLOPE STABILITY
UNIVERSITY OF MICHIGAN MEDICAL CENTER
ANN ARBOR, MICHIGAN

SOMAT Engineering, Inc.
Detroit - Taylor

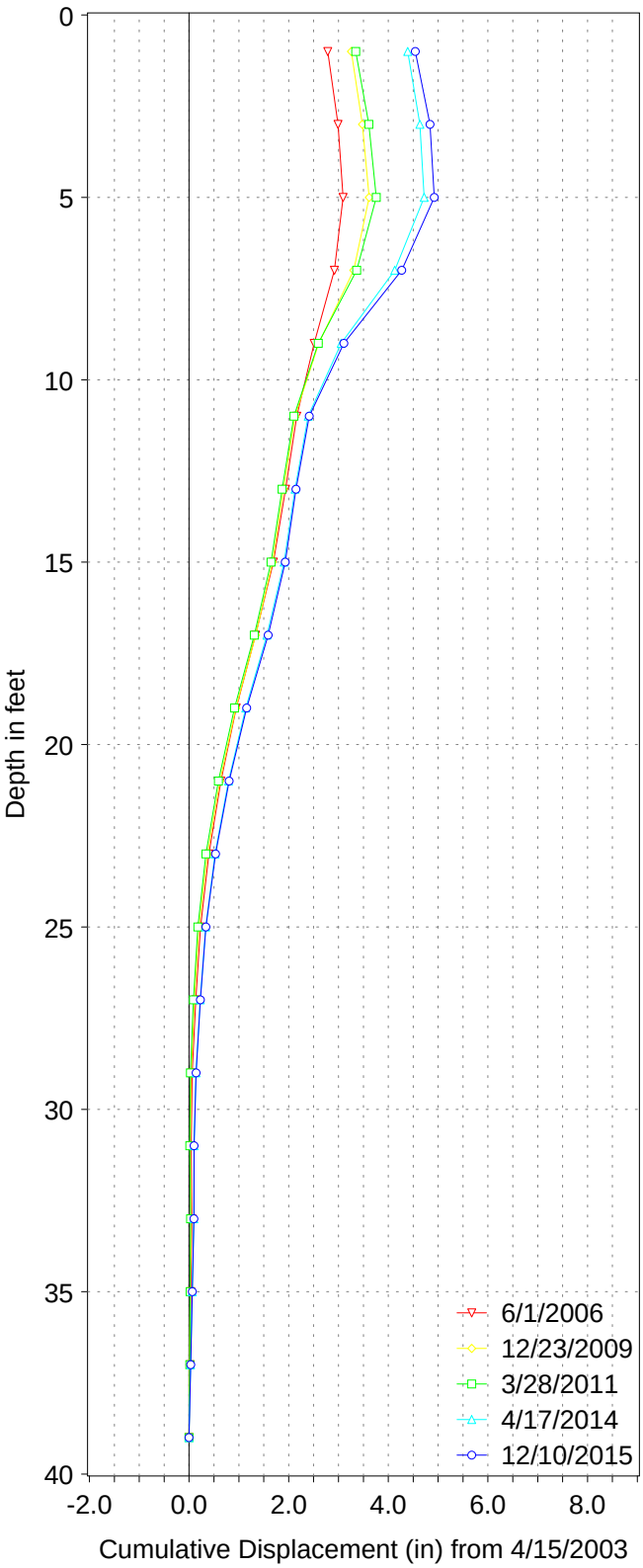
SOMAT Project No. G03006A
February 21, 2003

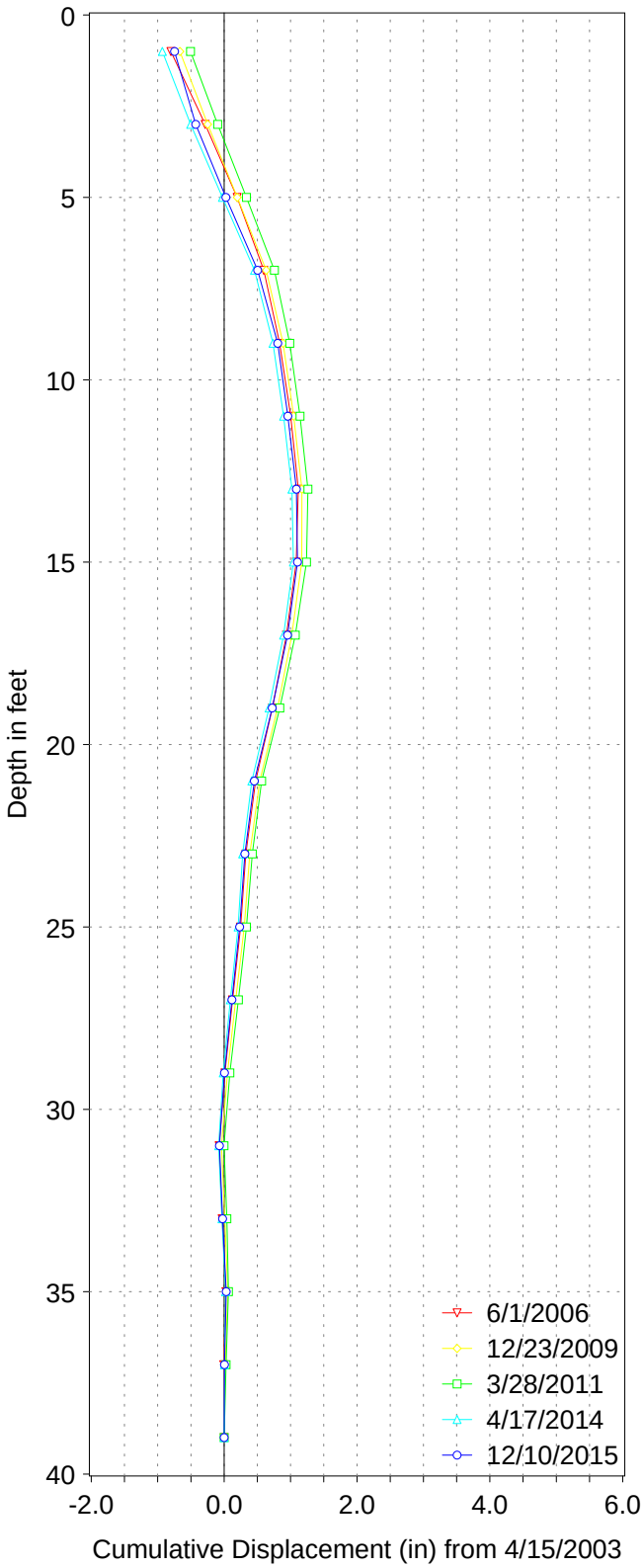




University of Michigan Hospital
Nichols Drive Slope Stablity Study
Somat Engineering
Project No. G03006B

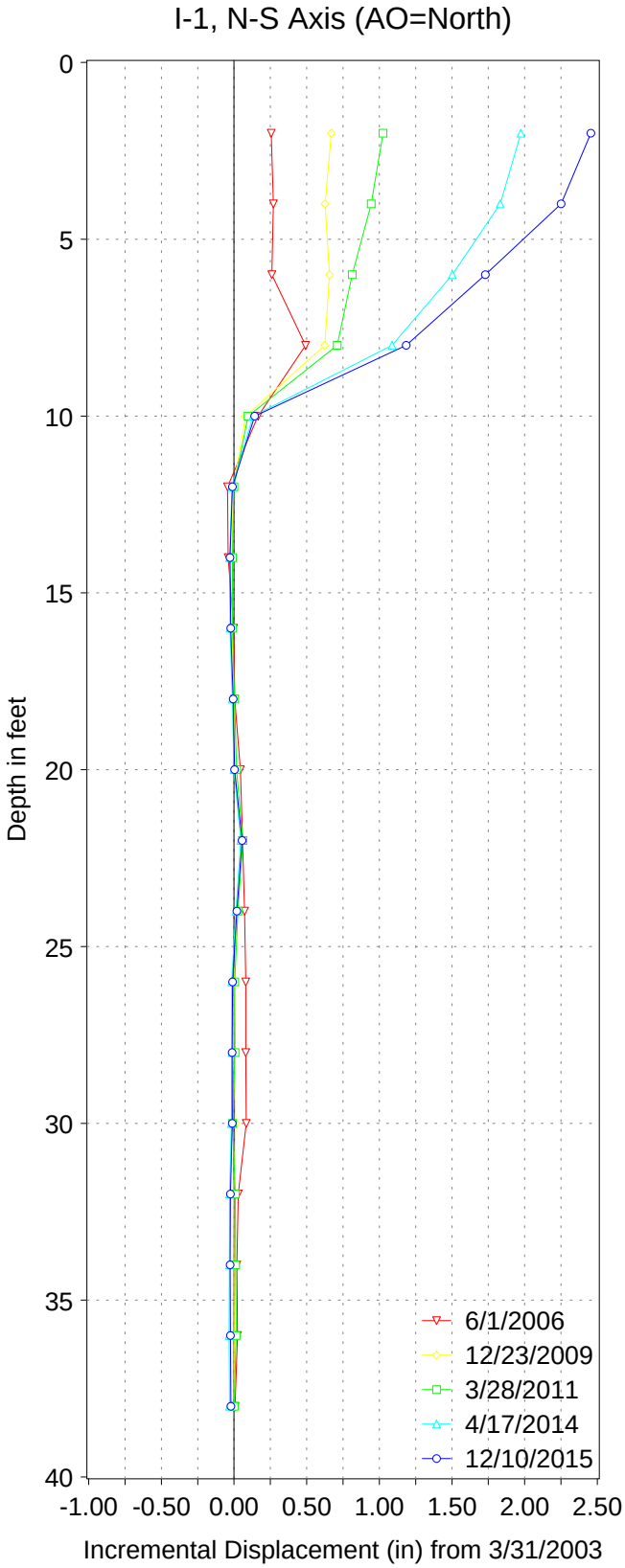
Inclinometer:I-1
Baseline Probe: S/N 28478
Reading Probe: S/N 27599B &
S/N 28478 & S/N 27343B

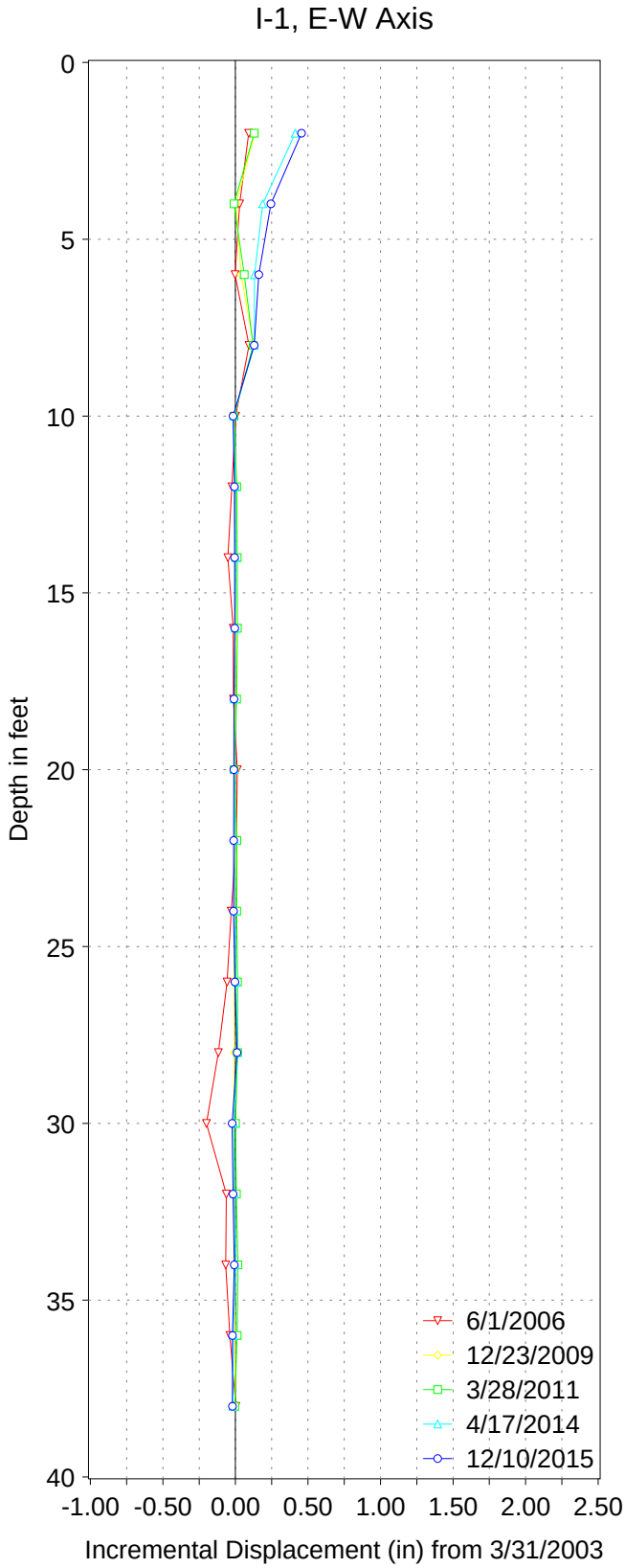




University of Michigan Hospital
Nichols Drive Slope Stablity Study
Somat Engineering
Project No. G03006B

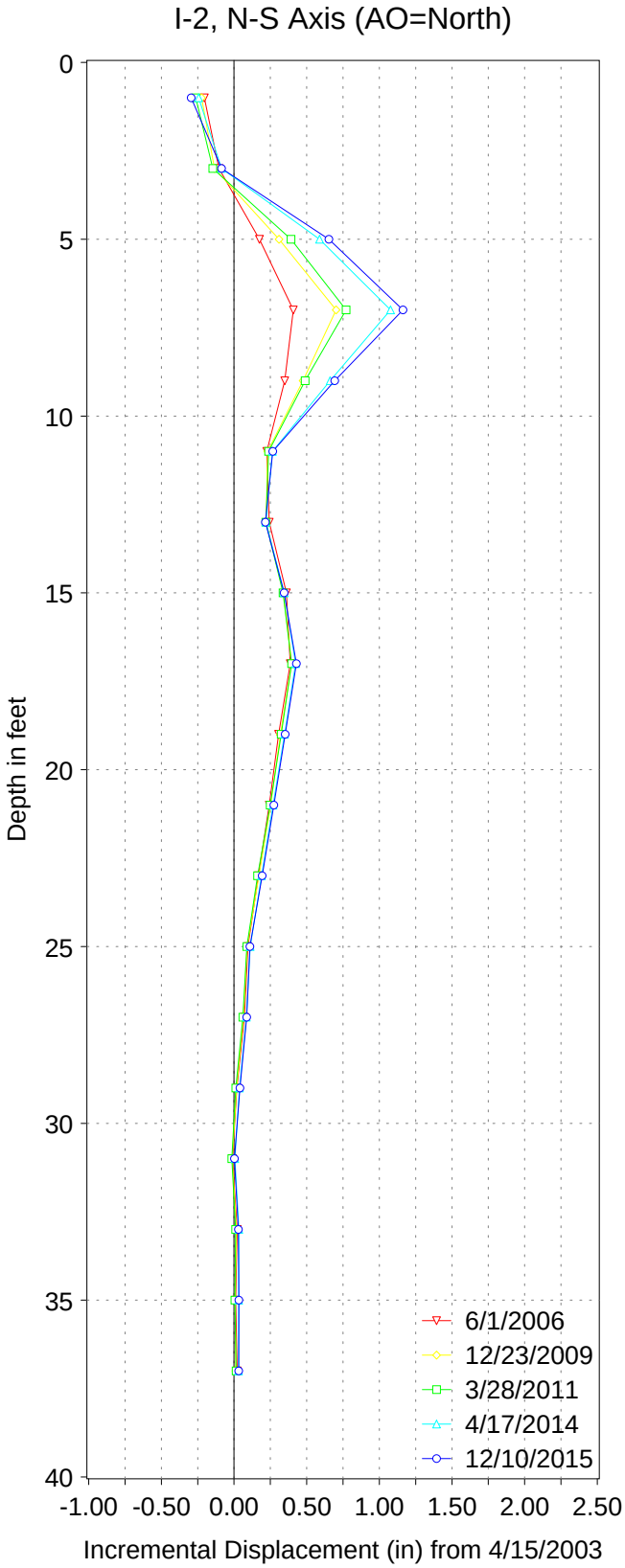
Inclinometer:I-2
Baseline Probe: S/N 28478
Reading Probe: S/N 27599B &
S/N 28478 & S/N 27343B

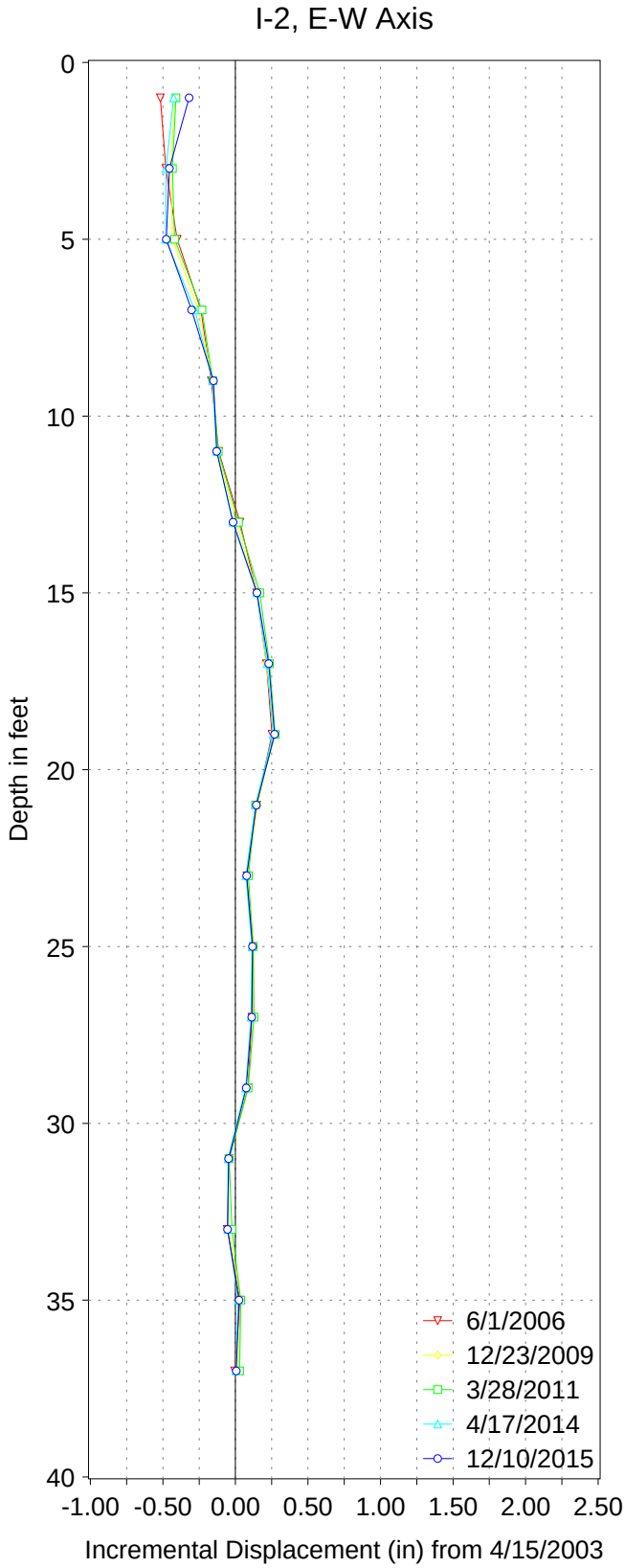




University of Michigan Hospital
Nichols Drive Slope Stablity Study
Somat Engineering
Project No. G03006B

Inclinometer:I-1
Baseline Probe: S/N 28478
Reading Probe: S/N 27599B &
S/N 28478 & S/N 27343B





University of Michigan Hospital
Nichols Drive Slope Stablity Study
Somat Engineering
Project No. G03006B

Inclinometer:I-2
Baseline Probe: S/N 28478
Reading Probe: S/N 27599B &
S/N 28478 & S/N 27343B

2014 Looking west, toward inclinometers I-1 and I-2 [provided for comparison]

2015 Looking west, toward inclinometers I-1 and I-2

2015 Looking east, toward inclinometer I-2

2015 Looking east, toward inclinometers I-1 and I-2