Brighton City Council Meeting

200 N First St ● City Hall Council Chambers ● Brighton, Michigan 48116
(810) 227-1911 ● www.brightoncity.org

Regular Meeting
February 16, 2023 – 6:30 p.m.

AGENDA

1. Call to order
2. Pledge of Allegiance
3. Roll call
4. Consider approval of the agenda
5. Consider approval of consent agenda items

Consent Agenda Items

a. Approval of Minutes: special retreat meeting of January 21 and 22, 2023
b. Approval of Minutes: regular meeting of February 2, 2023

Correspondence

6. Call to the public
7. Staff updates
8. Officer of the Year
9. Swear in of Sergeant Sliwa
10. Updates from Councilmember liaisons to various boards and commissions

Public Hearing

11. Conduct a public hearing and consider approval of rezoning #22-01, proposed rezoning of 8251 and 8265 Cross Street from C1 – Community Shopping Center, to C2 – General Business
12. Conduct a public hearing for proposed Ordinance 601: Amendment to the Downtown Development Plan and Tax Increment Financing of the Downtown Development Authority

Discussion Items

13. Consider finalization and approval of revised City Vision and Goals
14. Consider draft of Brighton Area Fire Authority Fire Station Lease Agreement

New Business

15. Consider approval of site plan #22-11 Auto Wash to be located at 8680 West Grand River
16. Consider approval of a contract to revise and upgrade the City's website

Other Business

17. Call to the public
18. Adjournment

Brighton City Council Retreat

Greater Brighton Area Chamber of Commerce ● 218 E. Grand River ● Brighton, Michigan 48116
(810) 227-1911 ● www.brightoncity.org

MINUTES OF THE SPECIAL RETREAT MEETING OF THE BRIGHTON CITY COUNCIL HELD ON JANUARY 21, 2023

1. **Call to Order**

Mayor Tobbe called the meeting to order at 9:00 a.m.

2. **Roll Call**

Present were Mayor Tobbe, Mayor Pro Tem Bohn, Councilmembers: Emaus, Gardner, Gipson, and Pettengill. Councilmember Albert was absent.

Staff Present: City Manager Gretchen Gomolka, City Clerk Tara Brown, DPW Director Marcel Goch, Community Development Manager Michael Caruso, Attorney Sarah Gabis, and Chief Brent Pirochta. There were three people in the audience.

Motion by Mayor Pro Tem Bohn, seconded by Councilmember Gipson to excuse Councilmember Albert for personal reasons. **The motion carried, 5-1. Councilmember Emaus voted no.**

3. **Consider Approval of the Agenda**

Motion by Councilmember Gipson, seconded by Councilmember Gardner to approve the agenda as presented. **The motion carried, 6-0.**

4. **Call to the Public**

Mayor Tobbe opened the call to the public at 9:02 a.m.

Susan Bakhaus spoke regarding boards and commissions.

Seeing and hearing no further comment, the call to the public was closed at 9:03 a.m.

5. **Workshop: Develop Revised Vision, Mission, and Goals**
6. **Discussion: Boards and Commissions**
    a. **City Council Appointed Positions to Boards and Commissions**
    b. **City Council Liaison's to Boards and Commissions**
    c. **Technology Access – Email and Electronic Devices**
    d. **Training Materials/Classes**
7. **Discussion: Upcoming Capital Needs and Economic Development**
    a. **List of needs**
    b. **Sources of Revenue**
8. **Election Changes – Michigan Proposal 2 of 2022**
9. **Call to the Public**

Mayor Tobbe opened the call to the public at 3:37 p.m.

Todd Buckley spoke regarding recent Downtown Development Authority meetings.

Hearing and seeing no further comment, the call to the public was closed at 3:37 p.m.

10. Adjournment

Motion by Councilmember Gipson, seconded by Councilmember Emaus to adjourn the meeting at 3:38 p.m. **The motion carried (6-0).**

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Tara Brown, City Clerk

Brighton City Council Retreat

City of Brighton Police Department Conference Room ● 440 S 3rd Street ● Brighton, Michigan 48116
(810) 227-1911 ● www.brightoncity.org

MINUTES OF THE SPECIAL RETREAT MEETING OF THE BRIGHTON CITY COUNCIL HELD ON JANUARY 22, 2023

1. **Call to Order**
   Mayor Tobbe called the meeting to order at 9:00 a.m.

2. **Roll Call**

Present were Mayor Tobbe, Mayor Pro Tem Bohn, Councilmembers: Emaus, Gardner, Gipson, and Pettengill. Councilmember Albert was absent.

Staff Present: City Manager Gretchen Gomolka, City Clerk Tara Brown, DPW Director Marcel Goch, Community Development Manager Michael Caruso, Attorney Sarah Gabis, and Chief Brent Pirochta. There were three people in the audience.

Motion by Councilmember Gipson, seconded by Councilmember Emaus to excuse Councilmember Albert for personal reasons. **The motion carried, 5-1. Councilmember Emaus voted no.**

Motion by Mayor Tobbe, seconded by Councilmember Emaus to add the Pledge of Allegiance as item 3a. **The motion carried, 6-0.**

3. **Consider Approval of the Agenda**

Motion by Councilmember Gipson, seconded by Councilmember Emaus to approve the amended agenda. **The motion carried, 6-0.**

3a. Pledge of Allegiance

4. **Call to the Public**

Mayor Tobbe opened the call to the public at 9:01 a.m.

Todd Buckley spoke regarding the upcoming streetscape project, noting there was a two hour wait at Brighton Bar and Grill during the past weekend. However, he stresses the importance of messaging that businesses are open during the beatification.

Michelle Roy from Grace and Whimsy spoke regarding parking during the streetscape project and asked that it be possible to allow left turns onto Grand River from Main Street.

Seeing and hearing no further comment, the call to the public was closed at 9:09 a.m.

5. **Discussion: Police Capital Millage Renewal**

6. **Discussion: Community Engagement**

   a. **Forums/Open Houses**
   b. **Resident/Business Recognition**
   c. **Video Education Series**
   d. **Use of social media**
   e. **Website**
   f. **City App**

7. **Streetscape**
    a. **Messaging**
    b. **Expectations**
    c. **Points of Contact**

8. **Call to the Public**

Mayor Tobbe opened the call to the public at 12:02 p.m.

Ken Larschied spoke regarding media and marketing during the streetscape project.

Michelle Roy thanked City Council for the retreat and dedicating time to discuss important topics.

Hearing and seeing no further comment, the call to the public was closed at 12:05 p.m.

9. **Adjournment**

Motion by Councilmember Gipson, seconded by Councilmember Gardner to adjourn the meeting at 12:005 p.m. **The motion carried (6-0).**

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Tara Brown, City Clerk

Brighton City Council Meeting

200 N First St ● City Hall Council Chambers ● Brighton, Michigan 48116
(810) 227-1911 ● www.brightoncity.org

MINUTES OF THE REGULAR MEETING OF THE BRIGHTON CITY COUNCIL HELD ON FEBRUARY 2, 2023

1. **Call to order**

Mayor Tobbe called the meeting to order at 6:30 p.m.

2. **Pledge of Allegiance**

3. **Roll call**

Present were Mayor Tobbe, Mayor Pro Tem Bohn, Councilmembers: Albert, Emaus, Gardner, Gipson, and Pettengill.

Staff Present: City Manager Gretchen Gomolka, City Clerk Tara Brown, DPW Director Marcel Goch, Attorney Sarah Gabis, and Chief Brent Pirochta. There were thirty-five people in the audience.

4. **Consider approval of the agenda**

Motion by Councilmember Emaus, seconded by Councilmember Gipson to add the Rosa Parks Transit Equity Day Proclamation to the agenda as 18a. **The motion carried, 7-0.**

Motion by Councilmember Gardner, seconded by Councilmember Gipson to approve the agenda as amended. **The motion carried**, **7-0.**

5. **Consider approval of consent agenda items**

Motion by Councilmember Emaus, seconded by Councilmember Albert to approve the consent agenda as presented. **The motion carried, 7-0.**

Consent Agenda Items

a. **Approval of Minutes: regular meeting of January 19, 2023**

Correspondence

6. **Call to the public**

Mayor Tobbe opened the call to the public at 6:41 p.m.

Collin Miller, Artisans Bench, spoke regarding the Streetscape project.

Jennifer Marks, Brighton Area School Board member, spoke regarding the dangers of fentanyl and invited all to an awareness presentation held on March 6, 2023, at 2|24 Church.

Hearing and seeing no further comment, Mayor Tobbe closed the call to the public 6:45 p.m.

7. **Staff updates**

Clerk Brown noted the recently passed Senate Bill 13 which will move the Presidential Primary to the fourth Tuesday in February. If there are enough votes in favor, the bill will take immediate effect for 2024.

Chief Pirochta provided updates on several traffic detours. He also noted that drivers should not attempt to make a left into the CSX parking lot on Main Street since the street is closed west of the parking lot.

Director Goch provided updates on the watermain project on Main Street.

Manager Gomolka noted that City parking lots have been added to Google Maps and already has construction detours included.

8. **Swearing in of new Brighton City Police Officer Ashely Esposito**

9. Announcement of Snowplow fleet winning names

Manager Gomolka announced the winning names that will be displayed on the city snowplows, they are Scoop Dogg, Ctrl+Salt+Delete, Plowy McPlowerson, Snowbegone Kenobi, and Plowasaurus Rex.

10. Updates from Councilmember liaisons to various boards and commissions

Councilmember Gipson noted that Punxsutawney Phil has predicated another six more weeks of winter.

Mayor Pro Tem Bohn and the Planning Commission met on January 23, 2023, to consider a site plan for a carwash that is will part of a public hearing on February 16, 2023.

Councilmember Gardner happily reported the Brighton Arts and Culture Commission has gained two new members after several years of only three members and they are all looking forward to revising the sculpture list and reviewing current sculpture contracts while the streetscape project is underway and especially bringing back some of the much-loved events to the AMP.

Councilmember Emaus stated the Downtown Development Authority met early February 2, 2023, to discuss the streetscape bids. Councilmember Emaus also pointed out the flags by the Brighton Veteran Memorial will be refreshed with new.

Discussion

11. Downtown Streetscape – Bids and Funding

Motion by Councilmember Gipson, seconded by Councilmember Emaus to approve of $500,000 from the Utilities Fund to be applied to the watermain portion of the Downtown Streetscape project, and all related budget amendments. **The motion carried, 6-1.**

Motion by Councilmember Gipson, seconded by Councilmember Gardner to approve a contribution of $680,000 to fund the contract contingency for the Downtown Streetscape project such funding contingent upon the reinsertion of the Grand River and Hyne Street sidewalks previously eliminated from the scope of the project and all related budget amendments. **The motion carried by roll call vote, 5-2.**

12. City Council and Planning Commission Recommended Device

Motion by Councilmember Gipson, seconded by Councilmember Pettengill to authorize the City Manager to finalize the purchase of 15 Lenovo IdeaPad Flex 5i Chromebook laptop computers at a price of $299.99 each, totaling $4,499.85, and 15 Lenovo laptop bags at a price of $14.97 each, totaling $220.05 for use by City Council and Planning Commission members. **The motion carried, 7-0.**

New Business

Motion by Councilmember Emaus, seconded by Councilmember Pettengill to table items 13 and 14 until the February 16, 2023, City Council meeting. **The motion carried, 7-0.**

13. Consider approval of revised City vision and goals (tabled until February 16, 2023)

14. Consider approval of a contract to revise and upgrade the City's website (tabled until February 16, 2023

15. Consider approval of an additional $42,000 funding request from Tetra Tech Engineering Services to complete construction phase engineering of the Northwest Neighborhood Project

Motion by Councilmember Gardner, seconded by Councilmember Gipson to approve of an additional $42,000 funding request from Tetra Tech Engineering Services to complete construction phase engineering of the Northwest Neighborhood Project. **The motion carried, 7-0.**

16. Consider awarding the bid for the installation of a new Gorman Rupp Sewer Pump Station at the Brighton

Cove Apartments to Comprehensive Contracting in an amount not to exceed $397,270.

Motion by Mayor Pro Tem Bohn, seconded by Councilmember Emaus to award the bid for the installation of a new Gorman Rupp sewer pump station at the Brighton Cove Apartments to Comprehensive Contracting in an amount not to exceed $397,270. **The motion carried, 7-0.**

17. Approval of a Resolution #2023-01 to Enter into a Facility Encroachment Agreement with CSX Transportation, Inc. for the Crossing on Main Street

Motion by Councilmember Gardner, seconded to approve of resolution #2023-01 to enter into a facility encroachment agreement with CSX Transportation, Inc. for the crossing on Main Street. **The motion carried, 7-0.**

18. Consider authorizing the development of a City of Brighton GoGov Application

Motion by Councilmember Pettengill, seconded by Councilmember Gardner to authorize the City Manager to execute the GoGov agreement in the amount of $4,260 for a 12-month subscription to the GoNotify application and to name the application My Brighton MI in the app store. **The motion carried, 7-0.**

18a. Mayoral Proclamation: Rosa Parks Transit Equity Day recognition

Other Business

19. Call to the public

Mayor Tobbe opened the call to the public at 10:24 p.m.

Susan Bakhaus spoke regarding utility contracts that the City of Brighton service.

Hearing and seeing no further comment, Mayor Tobbe closed the call to the public 10:26 p.m.

20. Adjournment

Motion by Councilmember Albert, seconded by Councilmember Gipson to adjourn the meeting at 10:26 p.m. **The motion carried (7-0).**

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Tara Brown, City Clerk

City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

SUBJECT: **CONDUCT A PUBLIC HEARING AND CONSIDER APPROVAL OF REZONING #22-01.**

A PROPOSED REZONING OF 8251 AND 8265 CROSS STREET FROM C1 - COMMUNITY SHOPPING CENTER, TO C2 - GENERAL BUSINESS.

ADMINISTRATIVE REVIEW

An application for a rezoning request was submitted by Alrig-USA Development. The request is to amend the zoning of the subject parcels, as a step towards facilitating a parcel combination and future development of the site. A site plan application was also submitted by Alrig-USA for the proposed development of an auto wash facility at this location. (www.alrigusa.com)

Alrig-USA owns the parcel located at 8680 W. Grand River, which is zoned C2 - General Business and is adjacent to the Cross Street parcels currently owned by Meijer, that are zoned C1 - Community Shopping. They have a purchase agreement with Meijer to obtain the two parcels and combine them, creating one new parcel for the proposed development. **(See attached GIS location map)**

STAFF SUMMARY

The Community Development staff does periodical reviews of the city's zoning districts to determine if any areas or properties may need adjustments. Prior to the Alrig-USA development submittal, the Cross Street Parcels were noted as properties that should be researched for possible rezoning due to the following:

- The current and future development landscape is not conducive to larger shopping centers and strip malls that are typically found and described within the C1 zoning designation.

- It appears the subject parcels were originally zoned C1 with the thought of adjacent properties along Grand River being combined. This could create a larger C1 parcel that would eventually encompass the northwest corner of Cross Street and Grand River. Although a larger corner development may have been envisioned at the time, the chance of this occurring today is unlikely due to Meijer's restrictive non-compete clauses.

- The current zoning of C1 incorporates development regulations that are better suited for much larger parcels than the two subject properties, such as the following:
    - C1 requires a minimum building size of 10,000 square feet and a minimum of three tenant spaces in a structure.
    - A minimum building setback of 50 feet is required on any C1 zoned property line which is the edge of the district (adjacent to another zoning district).
    - The parking requirements for a 10,000 square-foot building potentially cannot be met on parcels of this size.

City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

Rezoning the subject parcels to the C2 designation makes this proposed development, or any other future developments for this site, more manageable from a zoning perspective. The planned lot combination is not based on the use factor, as the proposed development for the site is a permitted use within both the C1 and C2 zoning districts.

- The Planning Commission conducted a public hearing and granted a recommendation of approval at the regular meeting held on December 19, 2022.

- City Council conducted a first reading at their January 19, 2023 meeting.

RECOMMENDATION

Staff recommends City Council conduct a public hearing and consider a motion to approve Rezoning #22-01 as presented.

Prepared by: Michael Caruso, Community Development Manager

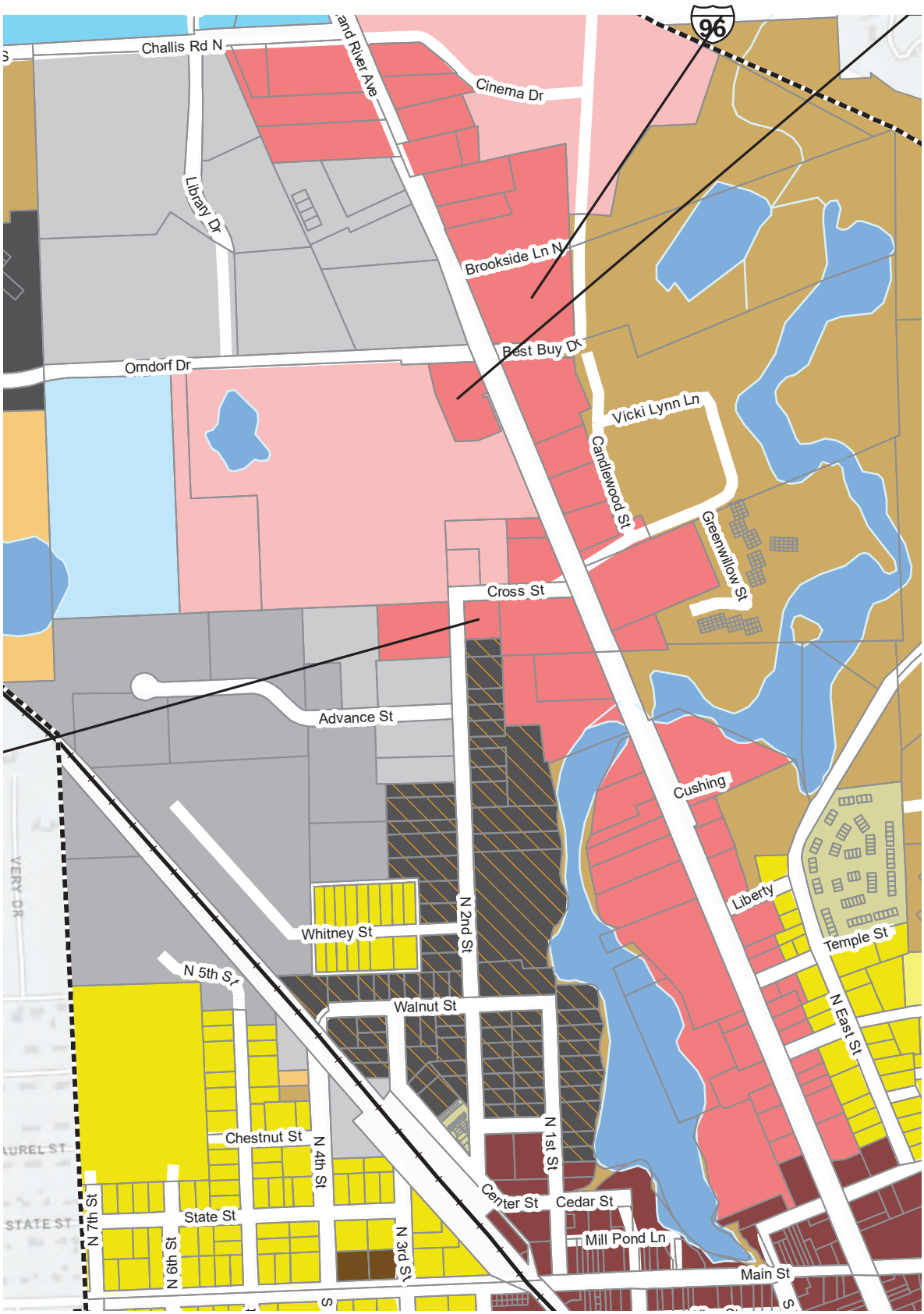
Approved by: Gretchen Gomolka, City Manager

Attachments:
1. GIS Location Map
2. Area Zoning Designations
3. Planning Commission Minutes - 12.19.2022

8251 and 8265 Cross Street: C1 Zoning (Blue Highlight)
8680 W Grand River: C2 Zoning (Orange Boundary)

C1 - Community Shopping (Light Pink Shade)

C2 - General Business (Red Shade)



City of Brighton
City Hall Council Chambers
200 N. First St. Brighton, MI 48116
Planning Commission
Regular Meeting Minutes
December 19, 2022

1. **Call to Order/Roll Call**

Commissioner Smith called the meeting to order at 7:00 p.m.

Commissioners Present: Ken Schmenk, Susan Gardner, Dave Petrak, Jim Bohn, Matt Smith, Chris Passeri, Chuck Hundley, and Steve Monet.

Commissioners Absent: Mike Schutz

Others present: Michael Caruso, Community Development Manager; Kelly Haataja, Executive Assistant to Community Development; and an audience of six (6) persons.

Motion by Commissioner Gardner, seconded by Commissioner Hundley to excuse Commissioner Schutz for personal reasons. **The motion carried without objection.**

2. **Consider Approval of Consent Agenda Items**

Consent Agenda Items

a. **Approval of the November 21, 2022, Regular Meeting Minutes**
b. **Approval of the December 19, 2022, Agenda**

Motion by Commissioner Passeri, seconded by Commissioner Petrak to approve the Consent Agenda as presented**. The motion carried without objection.**

3. **Call to the Public**

Commissioner Smith opened the Call to the Public at 7:01 p.m. Hearing and seeing no comments, the Call to the Public closed at 7:01 p.m.

Public Hearing

4. **Rezoning 22-01, Consider Recommendation of Approval 8251 and 8265 Cross Street**

Mr. Caruso offered an overview of the current parcels, noting the C-1 zoning is not favorable for these sites as they do not meet the development regulations and the landscape is not conducive to a larger shopping center or strip mall. The request to rezone the parcels would be a step in facilitating parcel combinations with an adjacent C-2 lot, and future development of the site. Mr. Caruso mentioned these parcels have been on the radar for rezoning, prior to learning of a potential development.

The Commissioners discussed concerns with ingress and egress at the Meijer private drive and gas station entrance on Grand River.

Commissioner Gardner commented that a traffic study should help in addressing those concerns, and a development would be an opportunity to improve the area.

Commissioner Petrak commented the rezoning would create continuity with the surrounding zones.

Commissioner Smith opened the Public Hearing at 7:25 p.m.

Susan Walters spoke about the green space near Meijer.

Hearing and seeing no further comments, Commissioner Smith closed the Public Hearing at 7:27 p.m.

Mr. Caruso clarified that the greenspace mentioned in the Public Hearing did have a home on it, which has been demolished.

Mr. Mitchell Harvey, Stonefield Engineering

Motion by

Other Business

5. Staff Updates

Commissioner Report

6. Call to the Public:

Commissioner Smith opened the Call to the Public at

10. Adjournment

Motion by Commissioner to adjourn the meeting. **The motion carried without objection.** The meeting adjourned at 7:45 p.m.

Kelly Haataja, Executive Assistant to Community Development

City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

SUBJECT: **CONDUCT A PUBLIC HEARING AND CONSIDER ADOPTION OF ORDINANCE NUMBER 601. AMENDMENT TO THE DEVELOPMENT PLAN AND TAX INCREMENT FINANCING OF THE DOWNTOWN DEVELOPMENT AUTHORITY (DDA)**

ADMINISTRATIVE REVIEW

- The city has received a site plan review application that proposes a new development to be located at the property known as 8680 W. Grand River. The commercial building at this location is vacant, in a state of blight, and will be demolished.
- This proposal if approved, would combine the two adjacent vacant lots known as 8251 and 8265 Cross Street, creating a larger site for the development.
- The DDA has three development districts within their plan. Districts 1 and 2 have tax Increment revenue capture, while District 3 is a non-capture area.
- The Grand River parcel is located within the DDA Development District 2, which captures tax increment revenues.
- The two vacant Cross Street parcels proposed for lot combination are located within the DDA Development District 3, the non-capture district.
- The proposed ordinance amendment will change the DDA Development Plan and Tax Increment Financing, moving the two vacant parcels into DDA District 2.
- This will allow the DDA to capture tax increment revenues from the entire proposed development.
- The DDA passed a resolution recommending the adoption of Ordinance 601 at their January 17, 2023 meeting.
- All notices have been issued and City Council conducted a first reading at their January 19, 2023 meeting.

STAFF SUMMARY

The DDA continues to assist the city by directing funds to upgrade and repair deteriorating infrastructure, constructing quality public spaces, secure public parking for the downtown, and promote growth and development that helps halt property value deterioration while increasing property tax valuation. This ordinance will allow the entire development site to have tax revenue capture, as opposed to the property having a split calculated amount where only a portion is captured.

RECOMMENDATION

Staff recommends City Council conduct a public hearing and consider a **motion to adopt Ordinance 601 as presented.**

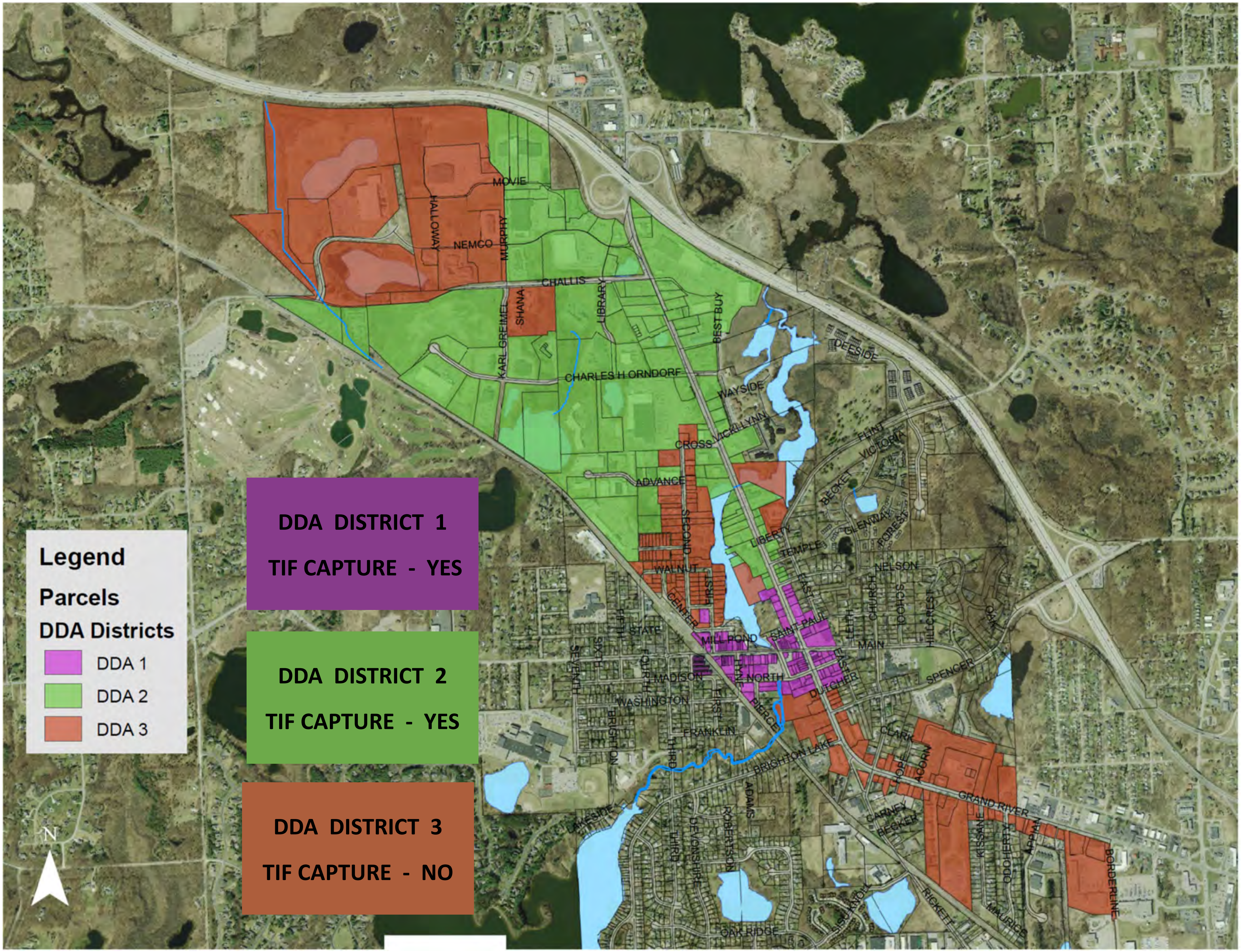
Prepared by: Michael Caruso, Community Development Manager

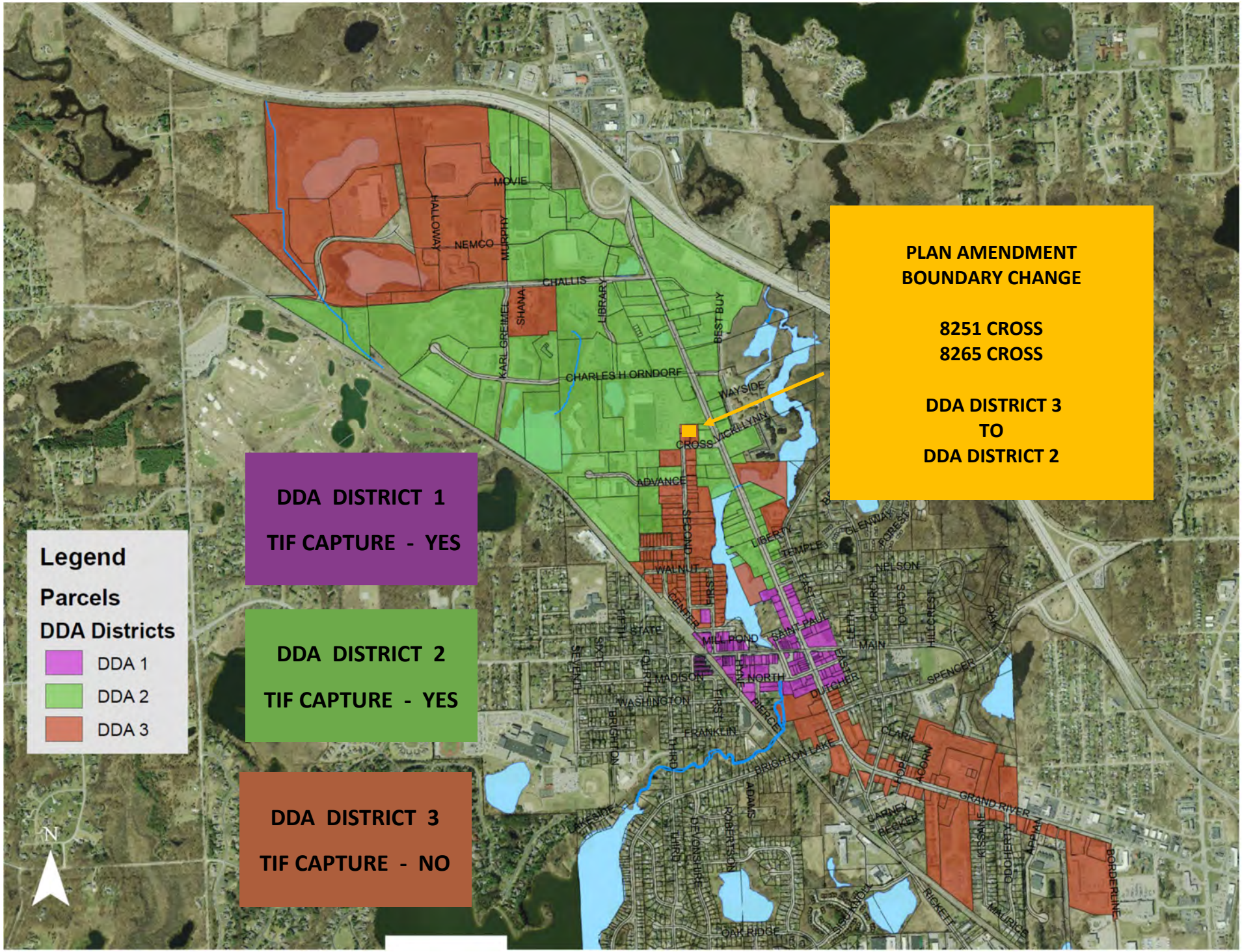
Approved by: Gretchen Gomolka, City Manager

Attachments:
1. GIS Location Map (showing subject properties)
2. DDA District Map (showing current tax capture)
3. DDA District Map (showing proposed changes)
3. Ordinance No. 601 (Draft)

8251 CROSS STREET - 4718-30-100-023

8265 CROSS STREET - 4718-30-100-024


DDA DISTRICT 1
TIF CAPTURE - YES
DDA DISTRICT 2
TIF CAPTURE - YES
DDA DISTRICT 3
TIF CAPTURE - NO
Legend
Parcels
DDA Districts
DDA 1
DDA 2
DDA 3
N
MOVIE
HALLOWAY
NEMCO
MURPHY
CHALLIS
SHANA
KARL GREIMEL
LIBRARY
BEST BUY
CHARLES H ORNDORF
WAYSIDE
DEERSIDE
CROSS
VICKI LYNN
ADVANCE
SECOND
WALNUT
FIRST
CENTER
LIBERTY
TEMPLE
EAST
FLINT
VICTORIA
BECKET
GLENWAY
FOREST
NELSON
CHURCH
SCHOOL
HILLCREST
OAK
LEITH
MAIN
SAINT PAUL
MILL POND
STATE
NORTH
MADISON
WASHINGTON
FRANKLIN
DUTCHER
PIERCE
SPENCER
CLARK
HOPE
ACORN
GRAND RIVER
BRIGHTON LAKE
SEVENTH
SIXTH
FIFTH
FOURTH
THIRD
BRIGHTON
ADAMS
ROBERTSON
DEVONSHIRE
LAKESIDE
CARNEY
BECKER
KISSANE
ODOHERTY
MAURICE
RICKETT
BORDERLINE
OAK RIDGE


PLAN AMENDMENT
BOUNDARY CHANGE
8251 CROSS
8265 CROSS
DDA DISTRICT 3
TO
DDA DISTRICT 2
DDA DISTRICT 1
TIF CAPTURE - YES
DDA DISTRICT 2
TIF CAPTURE - YES
DDA DISTRICT 3
TIF CAPTURE - NO
Legend
Parcels
DDA Districts
DDA 1
DDA 2
DDA 3
N
MOVIE
HALLOWAY
NEMCO
MURPHY
CHALLIS
SHANA
KARL GREIMEL
LIBRARY
BEST BUY
CHARLES H ORNDORF
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CROSS
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SCHOOL
HILLCREST
OAK
EAST
SAINT PAUL
MILL POND
MAIN
STATE
MADISON
NORTH
DUTCHER
SPENCER
WASHINGTON
FRANKLIN
PIERCE
CLARK
HOPE
ACORN
BRIGHTON LAKE
GRAND RIVER
GARNEY
BECKER
KISSANE
MAURICE
BORDERLINE
RICKETT
OAK RIDGE
LAKESIDE
ADAMS
ROBERTSON
GEVAUDAN
BRETTON
SIXTH
FOURTH
THIRD

ORDINANCE NO. 601

AMENDMENT TO THE
DEVELOPMENT PLAN AND TAX INCREMENT FINANCING OF THE
DOWNTOWN DEVELOPMENT AUTHORITY OF THE CITY OF BRIGHTON

WHEREAS, pursuant to Act 197, Public Acts of Michigan, 1975, as amended, the City Council of the City of Brighton, County of Livingston, Michigan (the "City") has previously established the Downtown Development Authority of the City of Brighton (the "Authority"); and

WHEREAS, the Authority has previously prepared and recommended for approval a Development Plan and Tax Increment Financing Plan (the "Original Plan") which was approved by the City Council of the City of Brighton (the "City") pursuant to Ordinance 327 adopted on December 15, 1988; and

WHEREAS, the City Council has approved amendments to the Original Plan pursuant to Ordinance No. 379 adopted on May 5, 1994, Ordinance No. 536 adopted on December 6, 2007 and Ordinance No. ___ adopted on February 4, 2010 (together with the Original Plan, the "Amended Plan"); and

WHEREAS, in accordance with the provisions of Act 57, Public Acts of Michigan, 2018, as amended (the "Act"), the Authority has prepared and recommended for approval further amendments to the Amended Plan for the Development Area in the Downtown District within the City and has filed said amendments with the City Clerk, a copy of which is attached hereto as Exhibit A (the "Plan Amendment"); and

WHEREAS, on February 16, 2023, the City Council held a public hearing on the Plan Amendment pursuant to the Act; and

WHEREAS, the City Council has given the taxing jurisdictions in which the Development Area is located an opportunity to meet with the City Council and to express their views and recommendations regarding the Plan Amendment, as required by the Act; and

WHEREAS, after consideration of the Plan Amendment, the City Council has determined to approve the Plan Amendment.

NOW, THEREFORE, THE CITY OF BRIGHTON ORDAINS:

1. Findings.

   (a) The Plan Amendment meets the requirements set forth in Part 2 of the Act.

   (b) The proposed method of financing the development is feasible and the Authority has the ability to arrange the financing.

(c) The development is reasonable and necessary to carry out the purposes of Part 2 of the Act.

(d) The land included within the Development Area to be acquired, if any, is reasonably necessary to carry out the purposes of the Plan Amendment and the purposes of Part 2 of the Act in an efficient and economically satisfactory manner.

(e) The development Plan is in reasonable accord with the master plan of the City.

(f) Public services, such as fire and police protection and utilities, are or will be adequate to service the project area.

(g) Changes in zoning, streets, street levels, intersections, and utilities, to the extent required by the Plan Amendment, are reasonably necessary for the project and for the City.

2. Public Purpose. The City Council hereby determines that the Plan Amendment constitutes a public purpose.

3. Best Interest of the Public. The City Council hereby determines that it is in the best interests of the public to proceed with the Plan Amendment in order to halt property value deterioration, to increase property tax valuation, to eliminate the causes of the deterioration in property values, and to promote growth in the Downtown District.

4. Approval and Adoption of Plan Amendment. The Plan Amendment is hereby approved and adopted. A copy of the Plan Amendment and all later amendments thereto shall be maintained on file in the City Clerk's office.

5. Amendment to Ordinance Nos. 327, 379, 536 and 548. Conflict and Severability. Ordinance Nos. 327, 379, 536 and 548 are hereby amended by this Ordinance. All ordinances, resolutions and orders or parts thereof in conflict with the provisions of the Ordinance are to the extent of such conflict hereby repealed, and each section of the Ordinance and each subdivision of any section thereof is hereby declared to be independent, and the finding or holding of any section or subdivision thereof to be invalid or void shall not be deemed or held to affect the validity of any other section or subdivision of the Ordinance.

6. Paragraph Headings. The paragraph headings in this Ordinance are furnished for convenience of reference only and shall not be considered to be a part of the Ordinance.

7. Publication and Recordation. The Ordinance shall be published in full promptly after its adoption in a newspaper of general circulation in the City, qualified under State law to publish legal notices, and shall be recorded in the Ordinance Book of the City, which recording shall be authenticated by the signature of the City Clerk.

8. Effective Date. The Ordinance is hereby determined by the City Council to be immediately necessary for the interests of the City and shall be in full force and effect from and after its passage and publication.

CERTIFICATES

I hereby certify that the foregoing is a true and complete copy of Ordinance No. 601, duly adopted by the City Council of the City of Brighton, County of Livingston, State of Michigan, at a regular meeting held on _____, 2023, and that said meeting was conducted and public notice of said meeting was given pursuant to and in full compliance with the Open Meetings Act, being Act 267, Public Acts of Michigan, 1976, as amended, and that the minutes of said meeting were kept and will be or have been made available as required by such Act.

I further certify that the following Members were present at said meeting;

_____,

and that the following Members were absent;

_____.

I further certify that Member _____ moved adoption of said Ordinance

and Member _____ supported said motion.

I further certify that the following Members voted for adoption of said Ordinance;

_____,

And that the following Members voted against adoption of said Ordinance;

_____.

I further certify that the following publications were made;

First Reading: _____

Brief Publication: _____

Public Hearing: _____

Adoption: _____

Full Publication: _____

_____
Tara Brown, City Clerk

City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

SUBJECT: CONSIDER FINALIZATION AND APPROVAL OF REVISED CITY VISION AND GOALS

BACKGROUND

Since the City's vision and goals were last adopted there are two new City Council members, a new City Manager and other changes in the management team. A workshop was held at the City Council retreat on January 21, 2023, to develop updated vision and goals.

ADMINISTRATIVE SUMMARY

During the retreat workshop after much brainstorming and productive discussion a new vision was realized – *A welcoming small town community valuing innovation, growth, and collaboration.*

Additionally, a list of 5 overarching goals were determined as follows:
Fiscal Responsibility
Public Safety
Welcoming
Environmental Stewardship
Service-Minded

It was discussed that all of these goals hold equal value and weight, and it was determined to express them in a circular wheel format rather than a numbered list. Staff was tasked with bringing fully fleshed out goals statements to support each of the five goals identified by council. Attached you will a copy of the new "Goals Wheel" and our initial stab at the goals statement. We would like to discuss these statements and incorporate any changes agreed upon by City Council at the meeting.

RECOMMENDATION

After making any agreed upon changes to the goals statement, staff recommends that City Council approve the Vision and Goals as presented along with any changes as discussed.

Prepared by: Gretchen Gomolka, City Manager

Reviewed by: Tara Brown, City Clerk

Reviewed &
Approved by: Gretchen Gomolka, City Manager

Attachment: Vision and Goals Statements

City of Brighton Vision

A welcoming small town community valuing innovation, growth, and collaboration

City Council Goals

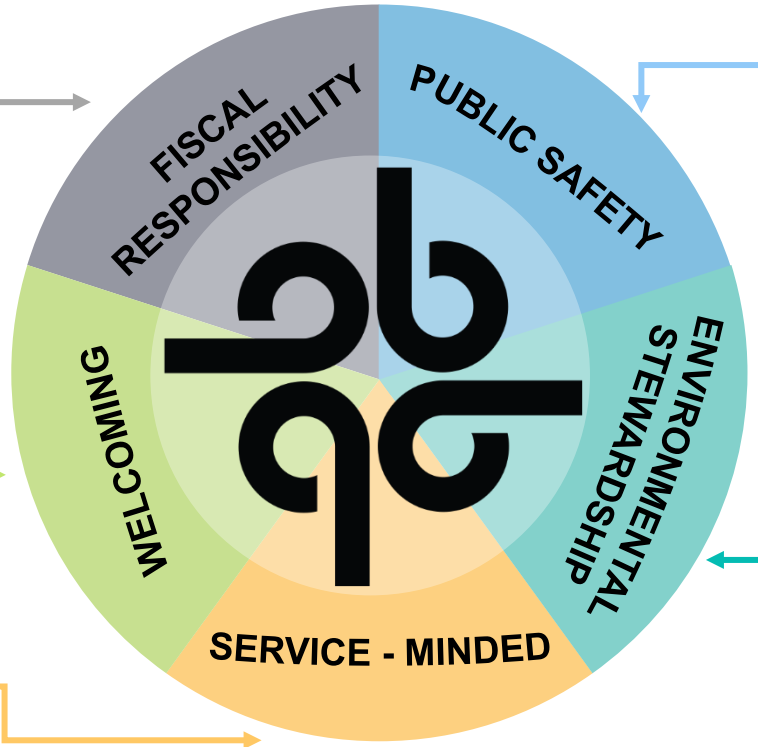
Strategic management of City finances for a sustainable community with a balanced budget, smart spending and investment in the future

Exemplary service in all aspects of public safety related to police, streets and sidewalks, water and sewer, and public spaces

Investment in the City's future and reputation resulting in a community with a sense of belonging that is desirable to residents, business owners, and visitors

Responsible use and protection of the City's natural environment for long-term preservation and enjoyment

Commitment of City Council and staff to be responsive, professional, and collaborative while balancing community priorities



City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

SUBJECT: CONSIDER DRAFT OF BRIGHTON AREA FIRE AUTHROITY FIRE STATION LEASE AGREEMENT

BACKGROUND

In October of 2016 City Council, under Article 3B of the Fire Station Lease to the Brighton Area Fire Authority, (BAFA) approved the option to extend the lease for additional five (5) year period following the ending date of September 30, 2015. This resulted in a new expiration date of September 30, 2020,

The existing lease only had an option for one fire-year renewal. As that was exercised already, we need to enter into a new lease.

Chief O'Brian reached out to request getting a new lease put in place.

With the pandemic and subsequent changes in administration at the city it appears the expiration of this lease was an unintentional oversight.

After discussions with Chief O'Brian, Attorney Gabis, and Manager Gomolka, the attached draft lease agreement was put together to start the discussion with council.

We would like to get the draft finalized and over BAFA for review by their board and counsel.

RECOMMENDATION

Council to provide recommended edits for the City Attorney to incorporate into the draft lease agreement.

Prepared by: Gretchen Gomolka, City Manager

Attachment: Draft Lease Agreement

City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

SUBJECT: **CONSIDER APPROVAL OF SITE PLAN 22-11.**
PROPOSED DEVELOPMENT OF A NEW AUTO WASH FACILITY LOCATED AT 8680 W. GRAND RIVER.

ADMINISTRATIVE SUMMARY

A site plan review application has been submitted by Alrig-USA, for construction of a commercial auto wash facility located at 8680 W. Grand River. The property is owned by the applicant and contains an old vacant structure that is displaying signs of deterioration and disrepair. The building previously was used for a medical office but has been vacant for more than two years.

The site plan calls for a larger development site to be created through a purchase agreement with Meijer, that combines the adjacent two vacant parcels to the west, known as 8351 and 8265 Cross Street. The applicant has submitted a rezoning application to change these adjacent properties from C1-Commercial Shopping to C2-General Business, which will conform with the C2 designation of the applicant's Grand River parcel.

The proposed development will consist of a 4,010 square-foot structure and include twenty-seven vacuum and cleaning stations. A sub-grade stormwater detention system is proposed for the site. Access and exits for the facility are from the Meijer service drive. A reconstructed access drive connecting Grand River with Meijer drive, replaces the current right-in only entry from southbound Grand River. The new access will consist of a right-in / right-out only entrance and exit. To prevent left-hand turns exiting onto northbound Grand River, a channelized island will be utilized. This island will also prohibit vehicles from making a left-hand turn into the access drive from northbound Grand River.

ADMINSTRATIVE REVIEW

- The proposed development meets the intent and is consistent with the permitted uses of the C1-Community Shopping District, and with the proposed rezoning designation of C2-General Business.
- Livingston County Planning Department has recommended approval of the final site plan.
- The final site plan complies with the Brighton Fire Authority review comments.
- Compliance with all Tetra Tech's comments has been accomplished.
- The reconstructed access connecting Grand River to Meijer drive will help alleviate traffic on Orndorf and Cross Streets, by offering motorists another option to enter and exit the proposed auto wash, bank, and Meijer businesses.
- The proposed development also eliminates the current driveway to the subject property that is located 22 feet from the adjacent strip mall's access. With the current development's driveways having left and right turn capability onto Grand River, a safety concern from years past can now be lessened, due to the new access drive being farther away and prevents left turns to Grand River.
- The Planning Commission granted a recommendation of approval at their January 23, 2023 meeting.

City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

RECOMMENDATION

Staff recommends City Council consider a **motion to approve site plan 22-11 as presented**, or with any contingencies deemed necessary.

Prepared by: Michael Caruso, Community Development Manager

Approved by: Gretchen Gomolka, City Manager

Attachments:
1. Application
2. Site Plan
3. Architectural Plan
4. Consultant Comment Letters
5. Traffic Impact Study
6. Geotechnical Report
7. Planning Commission Minutes, 01.23.2023 (Unapproved)

CITY OF BRIGHTON SITE PLAN REVIEW APPLICATION

200 N. First Street - Brighton, MI 48116 - commdev@brightoncity.org - 810.844.5149

☐	Conceptual Site Plan – $300	☐	Administrative Review - $400
☒	New Site Plan – $3,800	☐	Exterior Building Review - $675
☐	Amended Site Plan – $675	☐	Change of Use Review - $675

*Application fee is due at time of submittal. Payment does not include possible consulting fees.

PROJECT LOCATION

Project Address: 8680 W Grand River Avenue

Parcel Tax ID # 4718 - 30-100-026, 30-100-024 & 30-100-023

Current Zoning Classification: C-2 & C-1

Adjacent Property Zoning Classification: C-2 & C-1

RECEIVED NOV 18 2022 CITY OF BRIGHTON

PETITIONER

Name: Samantha Burgner Phone: 413-464-2267

Company: Alrig/El Car Wash Brighton

Address: 30200 Telegraph Road, Suite 205, Bingham Farms, MI 48025

Email: sburgner@alrigusa.com

PROPOSED DEVELOPMENT DESCRIPTION: Consolidation of existing parcels to accomdate a new car wash development and improvement f the Meijer circulation drives.

PAID NOV 18 2022 CITY OF BRIGHTON

If Residential, Number of Units: _____ Number of Buildings: 1

CITY OF BRIGHTON
COMMUNITY DEVELOPMENT/PLANNING DEPARTMENT

Warranty of Petitioner (MUST BE COMPLETED BY PETITIONER):

I understand that the proposed site plan will not be considered by the Planning Commission until such time that the plan contains at least the minimum amount of information required by the city, per **Section 98-6.1(D)** of the City of Brighton Zoning Ordinance.

I understand that if the Planning Commission and/or City Council approve the approved site plan, it will be effective for one (1) year following the date of final approval, and that I am bound to construct the project in strict compliance with the approved plan.

Samantha Burgner Date: 2022.11.03 12:59:12 -04'00'
Signature of Petitioner

Samantha Burgner
Printed Name of Petitioner

Date: 11/3/2022

Address: 30200 Telegraph Road, Suite 205, Bingham Farms, MI 48025

Phone: 413-464-2267

Email: sburgner@alrigusa.com

I, the property owner, authorize the petitioner to submit this application for review by the Planning Commission.

Matthew Levitt
Signature of Property Owner

Matthew Levitt, Real Estate Manager
Printed Name of Property Owner

Date: November 4, 2022

Address: 2929 Walker Ave NW, Grand Rapids, MI 49544

Phone: 616-791-3909

Email: matt.levitt@meijer.com

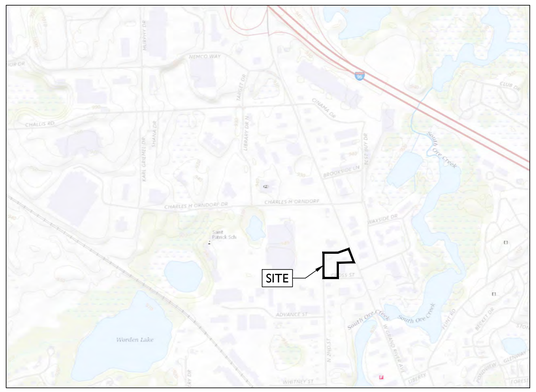
SITE DEVELOPMENT PLANS

FOR

WEST GRAND & CROSS CARWASH

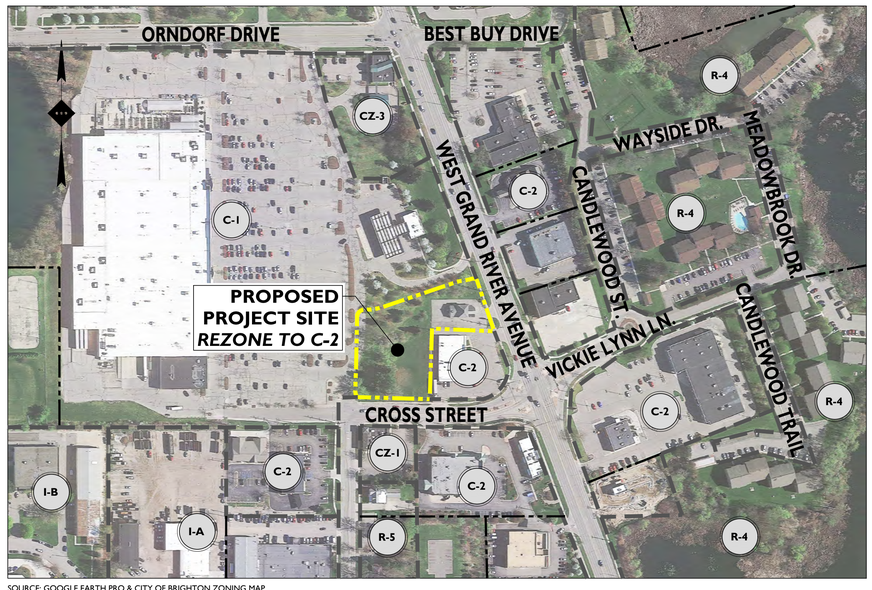
PROPOSED AUTOMOBILE CARWASH

PARCEL IDs: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON, LIVINGSTON COUNTY, MICHIGAN 48116



SOURCE: USGS ONLINE MAPPER

LOCATION MAP
SCALE: 1" = ±1,000'



SOURCE: GOOGLE EARTH PRO & CITY OF BRIGHTON ZONING MAP

AERIAL MAP
SCALE: 1" = ±200'

PLANS PREPARED BY:

STONEFIELD engineering & design

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Princeton, NJ · Tampa, FL · Rutherford, NJ
www.stonefieldeng.com

607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

811 Know what's **below** **Call** before you dig.

APPLICANT

EL CAR WASH BRIGHTON, LLC
30200 TELEGRAPH ROAD, SUITE 205
BINGHAM FARMS, MICHIGAN 48025
248-646-9999

PLAN REFERENCE MATERIALS:

1. THIS PLAN SET REFERENCES THE FOLLOWING DOCUMENTS INCLUDING, BUT NOT LIMITED TO:
   - ARCHITECTURAL SURVEY PREPARED BY CORE LAND CONSULTING, DATED 10/18/2020
   - ARCHITECTURAL PLANS PREPARED BY FANJUL & ASSOCIATES, LLC, DATED 08/18/2022
   - GEOTECHNICAL REPORT PREPARED BY TESTING ENGINEERS & CONSULTANTS, INC, DATED 09/07/2022
   - AERIAL MAP OBTAINED FROM GOOGLE EARTH PRO
   - LOCATION MAP OBTAINED FROM USGS ONLINE MAPPER
2. ALL REFERENCE MATERIAL LISTED ABOVE SHALL BE CONSIDERED A PART OF THIS PLAN SET AND ALL INFORMATION CONTAINED WITHIN THESE MATERIALS SHALL BE UTILIZED IN CONJUNCTION WITH THIS PLAN SET. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN A COPY OF EACH REFERENCE AND REVIEW IT THOROUGHLY PRIOR TO THE START OF CONSTRUCTION.

SHEET INDEX

DRAWING TITLE	SHEET #
COVER SHEET	C-1
DEMOLITION PLAN	C-2
SITE PLAN	C-3
GRADING PLAN	C-4
STORMWATER MANAGEMENT PLAN	C-5
UTILITY PLAN	C-6
LIGHTING PLAN	C-7
LANDSCAPING PLAN	C-8
SOIL EROSION & SEDIMENT CONTROL PLAN	C-9
CONSTRUCTION DETAILS	C-10 TO C-13
FIRE TRUCK TURNING & COVERAGE EXHIBIT	EX-1

ADDITIONAL SHEET INDEX

DRAWING TITLE	SHEET #
ARCHITECTURAL SURVEY	1 OF 1
TRAFFIC CONTROL PLAN	TC-1
CITY OF BRIGHTON STANDARD DETAILS	1 TO 5
LIVINGSTON COUNTY SEWER DETAILS	SD-2

ISSUE	DATE	BY	DESCRIPTION
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1	11/03/2022	MG	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

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SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STATE OF MICHIGAN
JONATHAN REID COOKSEY
ENGINEER
LICENSED PROFESSIONAL ENGINEER

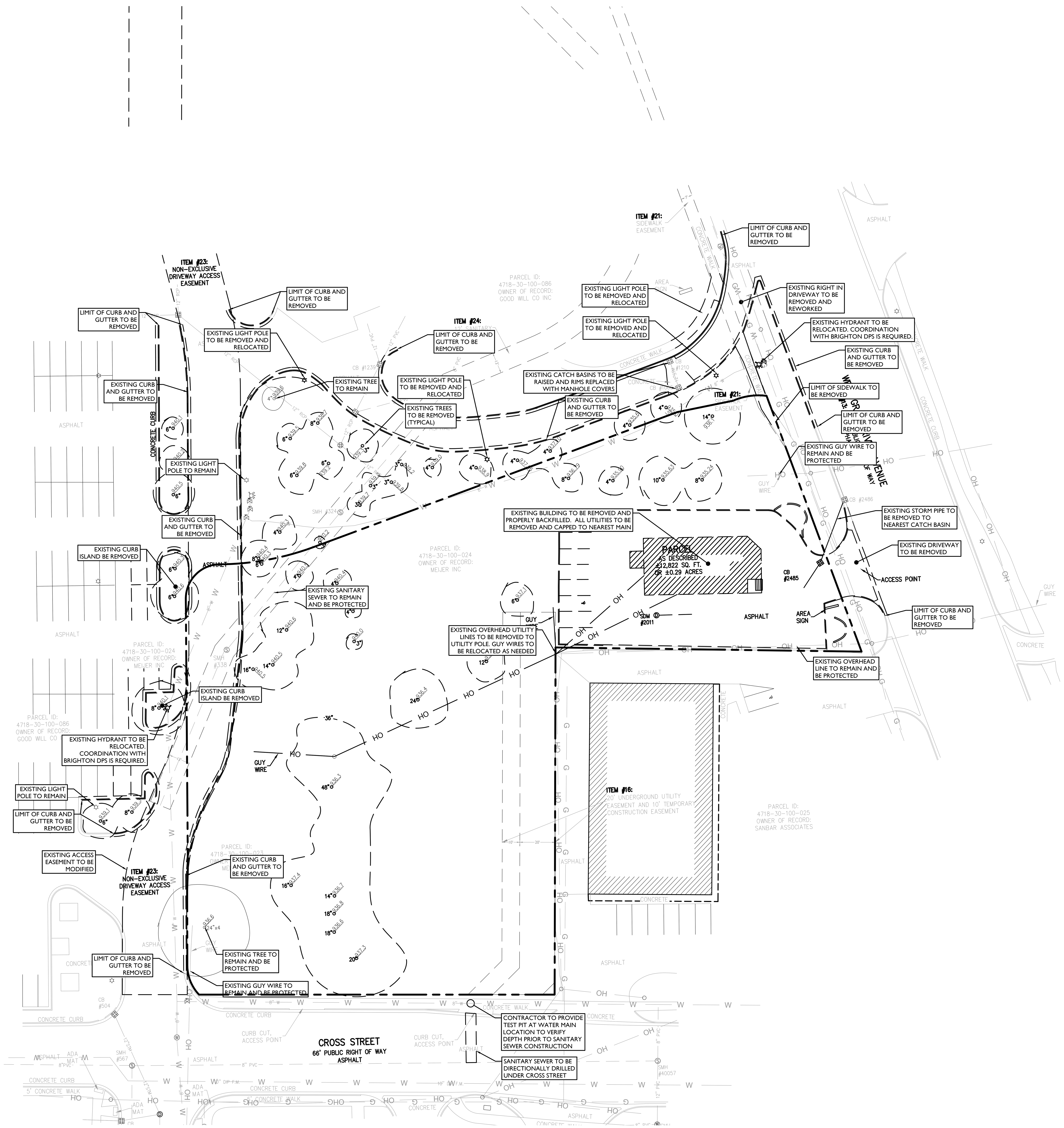
STONEFIELD engineering & design

SCALE: AS SHOWN | PROJECT ID: DET-200128

TITLE: COVER SHEET

DRAWING: C-1

V:\DET\2020\DET-200128 ALRIC-BARI WEST GRAND RIVER, BRIGHTON, MI\CAD\CP\DET-SDP-A1 (COVER).DWG



SYMBOL	DESCRIPTION
— — — — —	FEATURE TO BE REMOVED / DEMOLISHED
—— LOD ——	LIMIT OF DISTURBANCE

ALL SITE FEATURES WITHIN THE PROPERTY LIMIT INDICATED ON THIS PLAN ARE TO BE REMOVED / DEMOLISHED UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IF SIGNIFICANT DISCREPANCIES ARE DISCERNED BETWEEN THIS PLAN AND FIELD CONDITIONS

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DEMOLITION NOTES

1. THE WORK REFLECTED ON THE DEMOLITION PLAN IS TO PROVIDE GENERAL INFORMATION TOWARDS THE EXISTING ITEMS TO BE DEMOLISHED AND/OR REMOVED. THE CONTRACTOR IS RESPONSIBLE TO REVIEW THE ENTIRE PLAN SET AND ASSOCIATED REPORTS/REFERENCE DOCUMENTS INCLUDING ALL DEMOLITION ACTIVITIES AND INCIDENTAL TASKS NECESSARY TO COMPLETE THE SITE IMPROVEMENTS.
2. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF DEMOLITION ACTIVITIES.
3. EXPLOSIVES SHALL NOT BE USED UNLESS WRITTEN CONSENT FROM BOTH THE OWNER AND ANY APPLICABLE GOVERNING AGENCY IS OBTAINED. BEFORE THE START OF ANY EXPLOSIVE PROGRAM, THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL LOCAL, STATE, AND FEDERAL PERMITS. ADDITIONALLY, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL SEISMIC TESTING AS REQUIRED AND ANY DAMAGES AS THE RESULT OF SAID DEMOLITION PRACTICES.
4. ALL DEMOLITION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL CODES. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING ALL UTILITIES ARE DISCONNECTED IN ACCORDANCE WITH THE UTILITY AUTHORITY'S REQUIREMENTS PRIOR TO STARTING THE DEMOLITION OF ANY STRUCTURE. ALL EXCAVATIONS ASSOCIATED WITH DEMOLISHED STRUCTURES OR REMOVED TANKS SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO SUPPORT SITE AND BUILDING IMPROVEMENTS. A GEOTECHNICAL ENGINEER SHOULD BE PRESENT DURING BACKFILLING ACTIVITIES TO OBSERVE AND CERTIFY THAT BACKFILL MATERIAL WAS COMPACTED TO A SUITABLE CONDITION.
5. DEMOLISHED DEBRIS SHALL NOT BE BURIED ON SITE. ALL WASTE/DEBRIS GENERATED FROM DEMOLITION ACTIVITIES SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN ALL RECORDS OF THE DISPOSAL TO DEMONSTRATE COMPLIANCE WITH THE ABOVE REGULATIONS.
6. MEIJER'S EXISTING LIGHT POLES TO BE REMOVED AND RELOCATED WHERE NOTED. IF RELOCATION IS NOT FEASIBLE, A NEW POLE AND FIXTURE IS TO BE PROVIDED.
7. CONTRACTOR TO PROVIDE PRIVATE UTILITY LOCATING SERVICES PRIOR TO CONSTRUCTION.

GRAPHIC SCALE IN FEET
1" = 30'

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STATE OF MICHIGAN · JONATHAN REID COOKSEY ENGINEER · LICENSED PROFESSIONAL ENGINEER
J. REID COOKSEY, P.E.
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

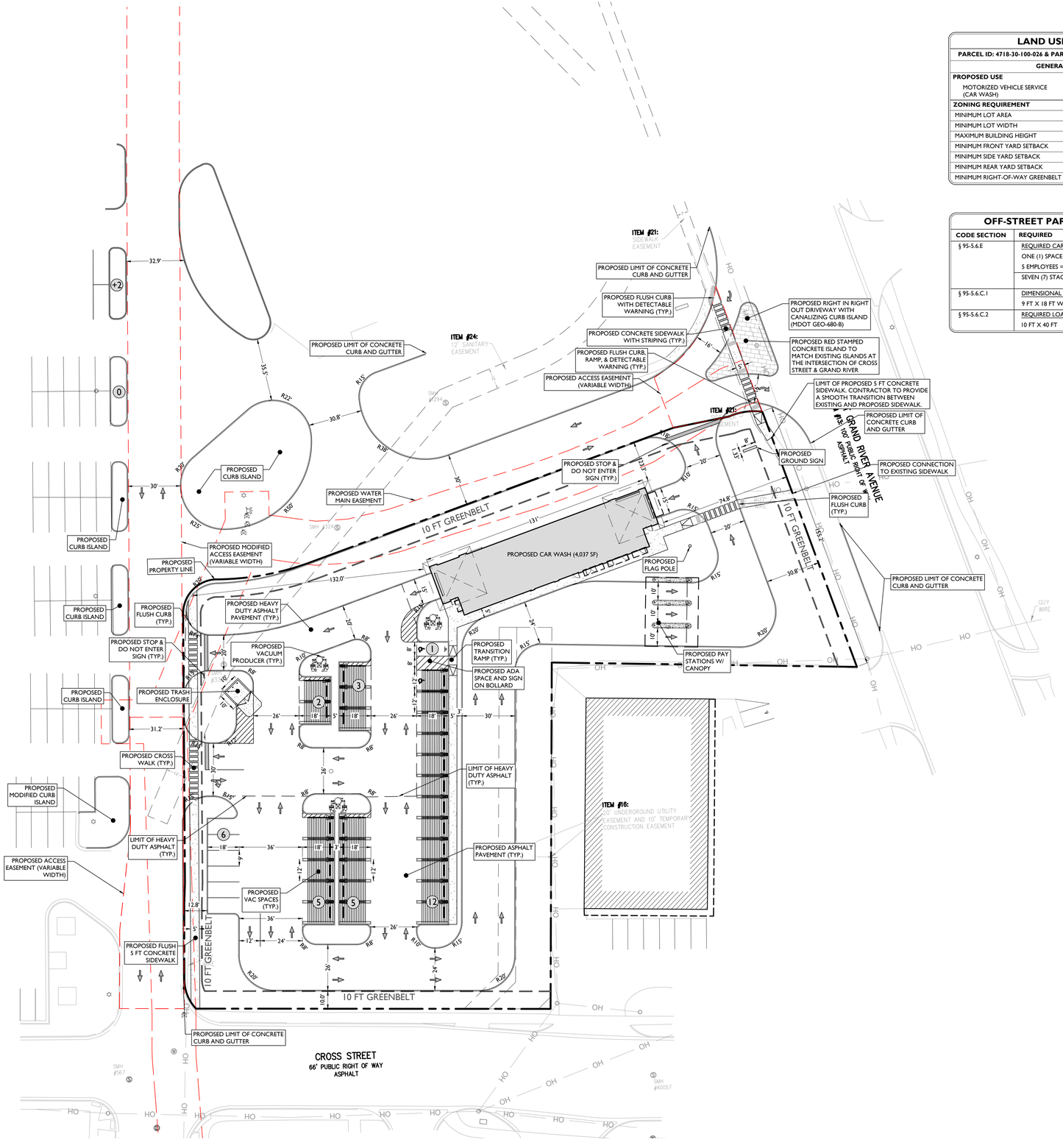
SCALE: 1" = 30' | PROJECT ID: DET-200128

TITLE:

DEMOLITION PLAN

DRAWING:

C-2



LAND USE AND ZONING

PARCEL ID: 4718-30-100-026 & PART OF PARCELS: 4718-30-00-023, -024, & -086

GENERAL BUSINESS (C-2)

PROPOSED USE

MOTORIZED VEHICLE SERVICE (CAR WASH) — PERMITTED USE

ZONING REQUIREMENT	REQUIRED	PROPOSED
MINIMUM LOT AREA	2,000 SF	75,542 SF (1.73 AC)
MINIMUM LOT WIDTH	66 FT	155.2 FT
MAXIMUM BUILDING HEIGHT	3 STORIES / 50 FT	1 STORY / <50 FT
MINIMUM FRONT YARD SETBACK	0 FT	74.8 FT
MINIMUM SIDE YARD SETBACK	0 FT	23.3 FT
MINIMUM REAR YARD SETBACK	0 FT	132.0 FT
MINIMUM RIGHT-OF-WAY GREENBELT	10 FT	30.8 FT

OFF-STREET PARKING REQUIREMENTS

CODE SECTION	REQUIRED	PROPOSED
§ 95-5.6.E	REQUIRED CAR WASH PARKING: ONE (1) SPACE PER EMPLOYEE 5 EMPLOYEES = 5 SPACES SEVEN (7) STACKING SPACES	7 SPACES > 7 STACKING SPACES
§ 95-5.6.C.1	DIMENSIONAL REQUIREMENTS (90°): 9 FT X 18 FT W/ 24 FT AISLE	9 FT X 18 FT W/ 24 FT AISLE
§ 95-5.6.C.2	REQUIRED LOADING: 10 FT X 40 FT	OFF-HOURS LOADING

SYMBOL	DESCRIPTION
	PROPERTY LINE
	SETBACK LINE
	SAWCUT LINE
	PROPOSED CURB
	PROPOSED FLUSH CURB
	PROPOSED SIGNS / BOLLARDS
	PROPOSED BUILDING
	PROPOSED CONCRETE
	PROPOSED BUILDING DOORS

ALL WORKMANSHIP, DESIGN, CONSTRUCTION AND MATERIALS SHALL BE IN ACCORANCE WITH THE CITY OF BRIGHTON AND MDOT STANDARDS

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY AND FAMILIARIZE THEMSELVES WITH THE EXISTING SITE CONDITIONS AND THE PROPOSED SCOPE OF WORK (INCLUDING DIMENSIONS, LAYOUT, ETC.) PRIOR TO INITIATING THE IMPROVEMENTS IDENTIFIED WITHIN THESE DOCUMENTS. SHOULD ANY DISCREPANCY BE FOUND BETWEEN THE EXISTING SITE CONDITIONS AND THE PROPOSED WORK THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. PRIOR TO THE START OF CONSTRUCTION.
2. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND ENSURE THAT ALL REQUIRED APPROVALS HAVE BEEN OBTAINED PRIOR TO THE START OF CONSTRUCTION. COPIES OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS STONEFIELD ENGINEERING & DESIGN, LLC. AND IT'S SUB-CONSULTANTS FROM AND AGAINST ANY DAMAGES AND LIABILITIES INCLUDING ATTORNEY'S FEES ARISING OUT OF CLAIMS BY EMPLOYEES OF THE CONTRACTOR IN ADDITION TO CLAIMS CONNECTED TO THE PROJECT AS A RESULT OF NOT CARRYING THE PROPER INSURANCE FOR WORKERS COMPENSATION, LIABILITY INSURANCE, AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE.
4. THE CONTRACTOR SHALL NOT DEVIATE FROM THE PROPOSED IMPROVEMENTS IDENTIFIED WITHIN THIS PLAN SET UNLESS APPROVAL IS PROVIDED IN WRITING BY STONEFIELD ENGINEERING & DESIGN, LLC.
5. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
6. THE CONTRACTOR SHALL NOT PERFORM ANY WORK OR CAUSE DISTURBANCE ON A PRIVATE PROPERTY NOT CONTROLLED BY THE PERSON OR ENTITY WHO HAS AUTHORIZED THE WORK WITHOUT PRIOR WRITTEN CONSENT FROM THE OWNER OF THE PRIVATE PROPERTY.
7. THE CONTRACTOR IS RESPONSIBLE TO RESTORE ANY DAMAGED OR UNDERMINED STRUCTURE OR SITE FEATURE THAT IS IDENTIFIED TO REMAIN ON THE PLAN SET. ALL REPAIRS SHALL USE NEW MATERIALS TO RESTORE THE FEATURE TO ITS EXISTING CONDITION AT THE CONTRACTORS EXPENSE.
8. CONTRACTOR IS RESPONSIBLE TO PROVIDE THE APPROPRIATE SHOP DRAWINGS, PRODUCT DATA, AND OTHER REQUIRED SUBMITTALS FOR REVIEW. STONEFIELD ENGINEERING & DESIGN, LLC. WILL REVIEW THE SUBMITTALS IN ACCORDANCE WITH THE DESIGN INTENT AS REFLECTED WITHIN THE PLAN SET.
9. THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
10. THE CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN THE PUBLIC RIGHT-OF-WAY IN ACCORDANCE WITH THE APPROPRIATE GOVERNING AUTHORITY AND SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF STREET OPENING PERMITS.
11. THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
12. SHOULD AN EMPLOYEE OF STONEFIELD ENGINEERING & DESIGN, LLC. BE PRESENT ON SITE AT ANY TIME DURING CONSTRUCTION, IT DOES NOT RELIEVE THE CONTRACTOR OF ANY OF THE RESPONSIBILITIES AND REQUIREMENTS LISTED IN THE NOTES WITHIN THIS PLAN SET.

30' 0' 30' 60'

GRAPHIC SCALE IN FEET

1" = 30'

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NOT APPROVED FOR CONSTRUCTION

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STATE OF MICHIGAN
JONATHAN D. COOKSEY
ENGINEER
LICENSED PROFESSIONAL ENGINEER

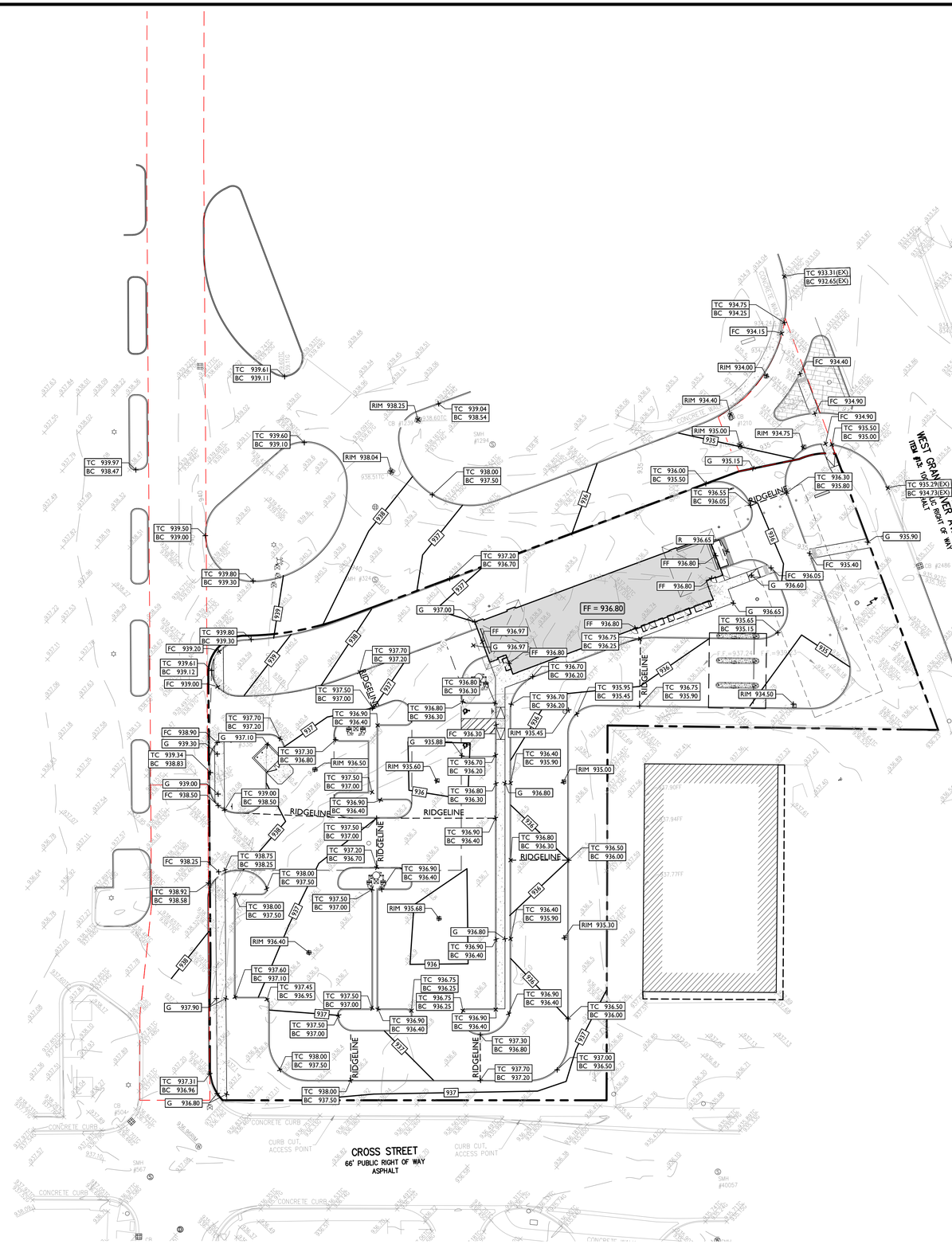
STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: DET-200128

TITLE: SITE PLAN

DRAWING: C-3

V:\DET\2020\DET-200128-AUTO-8400 WEST GRAND RIVER, BRIGHTON, MI\CAD\DET\DISPLAYS\SITE.DWG



SYMBOL / DESCRIPTION

SYMBOL	DESCRIPTION
	PROPERTY LINE
100	PROPOSED GRADING CONTOUR
RIDGELINE	PROPOSED GRADING RIDGELINE
	PROPOSED DIRECTION OF DRAINAGE FLOW
G 100.00	PROPOSED GRADE SPOT SHOT
TC 100.50 / BC 100.00	PROPOSED TOP OF CURB / BOTTOM OF CURB SPOT SHOT
FC 100.00	PROPOSED FLUSH CURB SPOT SHOT

GRADING NOTES

1. ALL SOIL AND MATERIAL REMOVED FROM THE SITE SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS. ANY GROUNDWATER DE-WATERING PRACTICES SHALL BE PERFORMED UNDER THE SUPERVISION OF A QUALIFIED PROFESSIONAL. THE CONTRACTOR IS REQUIRED TO OBTAIN ALL NECESSARY PERMITS FOR THE DISCHARGE OF DE-WATERED GROUNDWATER. ALL SOIL IMPORTED TO THE SITE SHALL BE CERTIFIED CLEAN FILL. CONTRACTOR SHALL MAINTAIN RECORDS OF ALL FILL MATERIALS BROUGHT TO THE SITE.
2. THE CONTRACTOR IS REQUIRED TO PROVIDE TEMPORARY AND/OR PERMANENT SHORING WHERE REQUIRED DURING EXCAVATION ACTIVITIES, INCLUDING BUT NOT LIMITED TO UTILITY TRENCHES, TO ENSURE THE STRUCTURAL INTEGRITY OF NEARBY STRUCTURES AND STABILITY OF THE SURROUNDING SOILS.
3. PROPOSED TOP OF CURB ELEVATIONS ARE GENERALLY 4 INCHES TO 7 INCHES ABOVE EXISTING GRADES UNLESS OTHERWISE NOTED. THE CONTRACTOR WILL SUPPLY ALL STAKEOUT CURB GRADE SHEETS TO STONEFIELD ENGINEERING & DESIGN, LLC. FOR REVIEW AND APPROVAL PRIOR TO POURING CURBS.
4. THE CONTRACTOR IS RESPONSIBLE TO SET ALL PROPOSED UTILITY COVERS AND RESET ALL EXISTING UTILITY COVERS WITHIN THE PROJECT LIMITS TO PROPOSED GRADE IN ACCORDANCE WITH ANY APPLICABLE MUNICIPAL, COUNTY, STATE AND/OR UTILITY AUTHORITY REGULATIONS.
5. MINIMUM SLOPE REQUIREMENTS TO PREVENT PONDING SHALL BE AS FOLLOWS:
   - CURB GUTTER: 0.50%
   - CONCRETE SURFACES: 1.00%
   - ASPHALT SURFACES: 1.00%
6. A MINIMUM SLOPE OF 1.00% SHALL BE PROVIDED AWAY FROM ALL BUILDINGS. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE FROM THE BUILDING IS ACHIEVED AND SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IF THIS CONDITION CANNOT BE MET.
7. FOR PROJECTS WHERE BASEMENTS ARE PROPOSED, THE DEVELOPER IS RESPONSIBLE TO DETERMINE THE DEPTH TO GROUNDWATER AT THE LOCATION OF THE PROPOSED STRUCTURE. IF GROUNDWATER IS ENCOUNTERED WITHIN THE BASEMENT AREA, SPECIAL CONSTRUCTION METHODS SHALL BE UTILIZED AND REVIEWED/APPROVED BY THE CONSTRUCTION CODE OFFICIAL. IF SUMP PUMPS ARE UTILIZED, ALL DISCHARGES SHALL BE CONNECTED DIRECTLY TO THE PUBLIC STORM SEWER SYSTEM WITH APPROVAL FROM THE GOVERNING STORM SEWER SYSTEM AUTHORITY.

ADA NOTES

1. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 2.00% SLOPE IN ANY DIRECTION WITHIN THE ADA PARKING SPACES AND ACCESS AISLES.
2. THE CONTRACTOR SHALL PROVIDE COMPLIANT SIGNAGE AT ALL ADA PARKING AREAS IN ACCORDANCE WITH STATE GUIDELINES.
3. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 5.00% RUNNING SLOPE AND A MAXIMUM OF 2.00% CROSS SLOPE ALONG WALKWAYS WITHIN THE ACCESSIBLE PATH OF TRAVEL (SEE THE SITE PLAN FOR THE LOCATION OF THE ACCESSIBLE PATH). THE CONTRACTOR IS RESPONSIBLE TO ENSURE THE ACCESSIBLE PATH OF TRAVEL IS 36 INCHES WIDE OR GREATER UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
4. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 2.00% SLOPE IN ANY DIRECTION AT ALL LANDINGS. LANDINGS INCLUDE, BUT ARE NOT LIMITED TO, THE TOP AND BOTTOM OF AN ACCESSIBLE RAMP, AT ACCESSIBLE BUILDING ENTRANCES, AT AN AREA IN FRONT OF A WALK-UP ATM, AND AT TURNING SPACES ALONG THE ACCESSIBLE PATH OF TRAVEL. THE LANDING AREA SHALL HAVE A MINIMUM CLEAR AREA OF 60 INCHES BY 60 INCHES UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
5. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 8.33% RUNNING SLOPE AND A MAXIMUM 2.00% CROSS SLOPE ON ANY CURB RAMPS ALONG THE ACCESSIBLE PATH OF TRAVEL. WHERE PROVIDED, CURB RAMP FLARES SHALL NOT HAVE A SLOPE GREATER THAN 10.00% IF A LANDING AREA IS PROVIDED AT THE TOP OF THE RAMP. FOR ALTERATIONS, A CURB RAMP FLARES SHALL NOT HAVE A SLOPE GREATER THAN 8.33% IF A LANDING AREA IS NOT PROVIDED AT THE TOP OF THE RAMP. CURBS RAMPS SHALL NOT RISE MORE THAN 6 INCHES IN ELEVATION WITHOUT A HANDRAIL. THE CLEAR WIDTH OF A CURB RAMP SHALL BE NO LESS THAN 36 INCHES WIDE.
6. ACCESSIBLE RAMPS WITH A RISE GREATER THAN 6 INCHES SHALL CONTAIN COMPLIANT HANDRAILS ON BOTH SIDES OF THE RAMP AND SHALL NOT RISE MORE THAN 30" IN ELEVATION WITHOUT A LANDING AREA IN BETWEEN RAMP RUNS. LANDING AREAS SHALL ALSO BE PROVIDED AT THE TOP AND BOTTOM OF THE RAMP.
7. A SLIP RESISTANT SURFACE SHALL BE CONSTRUCTED ALONG THE ACCESSIBLE PATH AND WITHIN ADA PARKING AREAS.
8. THE CONTRACTOR SHALL ENSURE A MAXIMUM OF ¼ INCHES VERTICAL CHANGE IN LEVEL ALONG THE ACCESSIBLE PATH. WHERE A CHANGE IN LEVEL BETWEEN ¼ INCHES AND ½ INCHES EXISTS, CONTRACTOR SHALL ENSURE THAT THE TOP ¼ INCH CHANGE IN LEVEL IS BEVELED WITH A SLOPE NOT STEEPER THAN 1 UNIT VERTICAL AND 2 UNITS HORIZONTAL (2:1 SLOPE).
9. THE CONTRACTOR SHALL ENSURE THAT ANY OPENINGS (GAPS OR HORIZONTAL SEPARATION) ALONG THE ACCESSIBLE PATH SHALL NOT ALLOW PASSAGE OF A SPHERE GREATER THAN ½ INCH.

30' 0' 30' 60'
GRAPHIC SCALE IN FEET
1" = 30'

ISSUE	DATE	BY	DESCRIPTION
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7	02/01/2023	MPH	FOR CITY COUNCIL APPROVAL
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5	01/23/2023	MPH	PER FIRE MARSHALL COMMENTS
4	01/11/2023	MPH	PER FIRE MARSHALL COMMENTS
3	12/21/2022	MG	FOR SITE PLAN APPROVAL
2	11/7/2022	MG	FOR SITE PLAN & REZONING APPROVAL
1	11/03/2022	MG	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Detroit, MI · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Rutherford, NJ
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607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STATE OF MICHIGAN
JONATHAN FRED COOKSEY
ENGINEER
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: DET-200128

TITLE: **GRADING PLAN**

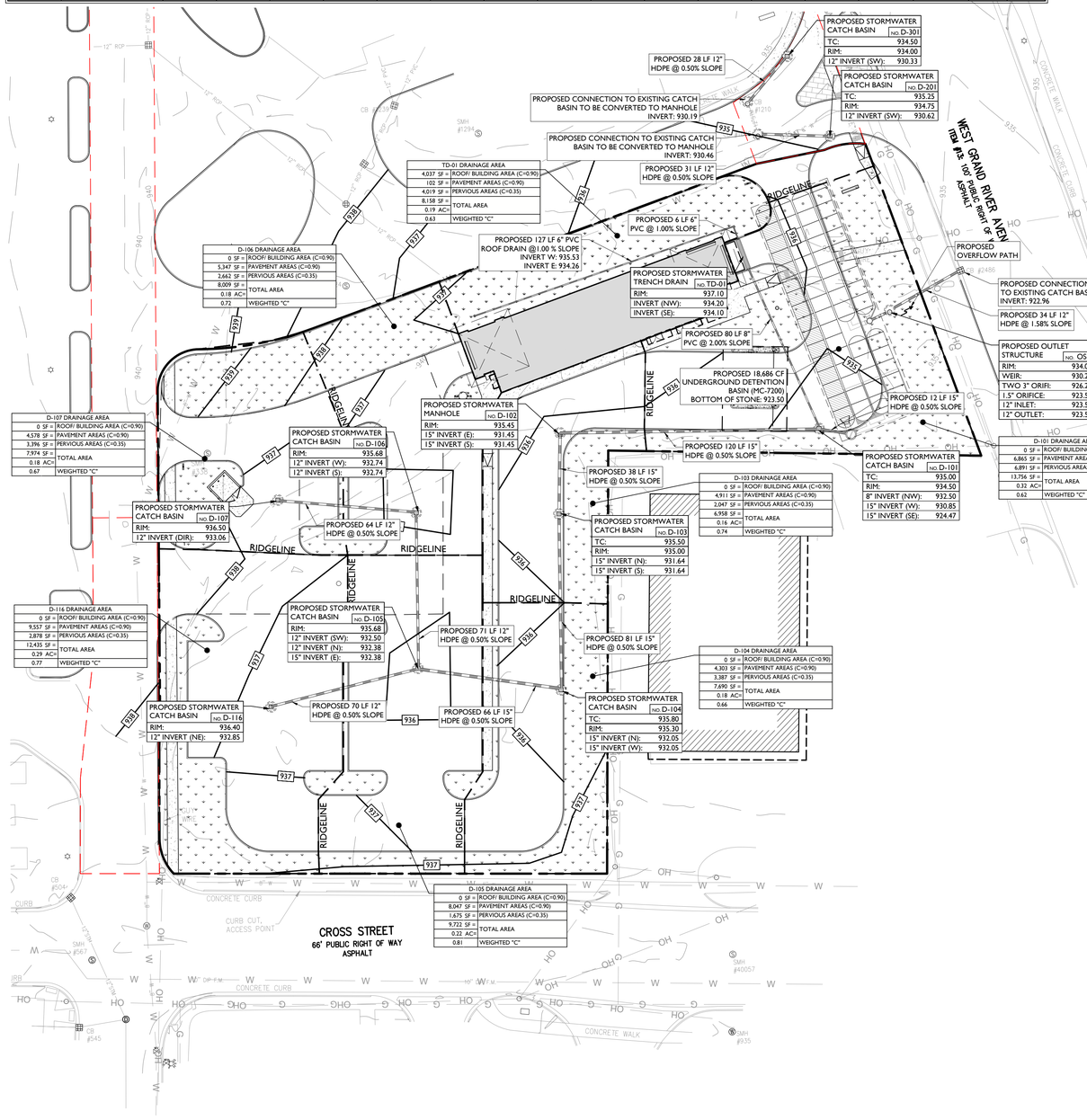
DRAWING: **C-4**

V:\DET\2020\DET-200128-ALAGIC-BARB WEST GRAND RIVER, BRIGHTON, MI\CAD\DWG\PLOT\DET-24-GRADING.DWG

10-YR STORMWATER SYSTEM DESIGN

Rainfall Intensity = I = 175/(T+25)

Line #	Line ID	Rim Elevation Downstream (FT)	Rim Elevation Upstream (FT)	Invert Downstream (FT)	Invert Upstream (FT)	Pipe Size (IN)	Pipe Length (FT)	Pipe Slope (%)	Q Required (CFS)	Pipe Capacity (CFS)	Velocity Downstream (FPS)	HGL Downstream (FT)	HGL Upstream (FT)	Drainage Area (AC)	Runoff Coefficient	Time of Concentration (MIN)	Rainfall Intensity (IN/HR)	Rim to HGL (FT)
1	UG BASIN TO D-101	935.25	935.00	924.41	924.47	15	12	0.50	4.80	4.57	3.91	925.66	925.72	0.32	0.62	18.70	4.00	8.98
2	D-101 TO D-102	935.00	935.45	930.85	931.45	15	120	0.50	3.57	4.57	4.12	931.68	932.28	0.00	0.00	18.20	4.05	2.91
3	D-102 TO D-103	935.45	935.00	931.45	931.64	15	38	0.50	3.59	4.57	3.14	932.61	932.69	0.16	0.74	18.00	4.07	2.23
4	D-103 TO D-104	935.00	935.30	931.64	932.05	15	81	0.50	3.14	4.59	2.9	932.84	932.98	0.18	0.66	17.50	4.11	2.08
5	D-104 TO D-105	935.30	935.68	932.05	932.38	15	66	0.50	2.68	4.57	2.49	933.23	933.31	0.22	0.81	17.10	4.16	2.20
6	D-105 TO D-106	935.68	935.68	932.38	932.74	12	71	0.50	1.06	2.54	1.4	933.57	933.62	0.18	0.72	16.30	4.24	2.01
7	D-106 TO D-107	935.68	935.50	932.74	933.06	12	64	0.50	0.53	2.52	0.85	933.68	933.69	0.18	0.67	15.00	4.38	1.79
8	D-101 TO TD-01	935.00	937.10	932.50	934.10	8	80	2.00	0.52	1.71	3.62	932.75	934.44	0.19	0.63	15.00	4.38	2.66
9	D-105 TO D-116	935.68	936.40	932.50	932.85	12	70	0.50	0.94	2.52	1.36	933.55	933.59	0.28	0.77	15.00	4.38	2.77



STORMWATER MANAGEMENT CALCULATIONS

(Based on Livingston County Procedures & Design Criteria for Stormwater Management Systems dated March 2022)

Project: Brighton - EL Carwash | **Date:** 12/21/2022
Location: 8680 W. Grand River Ave, Brighton, MI | **PE License #:** -
Designer: MG | **Signature:** -

POST-DEVELOPED LANDCOVER BREAKDOWN & COMPOSITE C VALUE

Landcover	Area (SF)		C Value*		Weighted Value
Roof	4,037	x	0.90	=	3,633
Asphalt / Concrete Pavements	44,300	x	0.90	=	39,870
Lawns (HSG D, <4%)	27,205	x	0.35	=	9,522
Subtotals	75,542				53,025

Total Site Area, A: 1.73 AC
Composite C Value, C: 0.70

C-values Obtained from LCDC Procedures & Design Criteria for Stormwater Management Systems Appendix G

WATER QUALITY CONTROL (Section 2.2.1.1)

Design Storm, P*: 1.00 in
Time of Concentration, Tc:** 15 min

$Q_{WQ} = C \times I_1 \times A_{WQ}$ — **Water Quality Flow 1, Q_{WQ1}:** 2.81 cfs

$I_1 = 30.2033 \times P^{0.7359} / (T_C + 9.1743)^{0.8869}$ — **Intensity, I:** 2.311

$V_{WQ} = 3,630 \times 1.0 \times C \times A$ — **Water Quality Volume, V_{WQ}:** 4,419 cf

Rainfall depth based on LCDC Procedures & Design Criteria for Stormwater Management Systems Section 2.2.1.1

CHANNEL PROTECTION VOLUME CONTROL (Section 2.2.1.2)

Design Storm, p*: 1.30 in

$V_{CP-R} = 4,719 \times C \times A$ — **Channel Protection Volume, V_{CP-R}:** 5,744 CF

Rainfall depth based on LCDC Procedures & Design Criteria for Stormwater Management Systems Section 2.2.1.2
***If adequate infiltration is not available, this requirement is waived and Maximum Extent Practicable of UD practices is required*

CHANNEL PROTECTION RATE CONTROL (CPRC) EXTENDED DETENTION VOLUME (Section 2.2.1.3)

Design Storm, p*: 1.90 in

$V_{ED} = 6,897 \times C \times A$ — **Extended Detention Volume Required, V_{ED}:** 8,396 CF

Rainfall depth based on LCDC Procedures & Design Criteria for Stormwater Management Systems Section 2.2.1.3

DETENTION & FLOOD CONTROL (DFC) (Section 2.2.1.4)

Design Storm, p*: 5.23 in

$Q_{VR01} = 1.1055 - 0.206 \times Ln(A)$ — **Variable Release Rate, Q_{VR01}:** 0.99 CFS / AC

$Q_{100P} = Q_{VR01} \times A$ — **100-YR Allowable Outlet Rate, Q_{100P}:** 1.72 CFS

$V_{100A} = 18,985 \times C \times A$ — **Runoff Volume, V_{100R}:** 23,110 CF

$Q_{100DV} = C \times (83.3 / Tc + 9.17)^{0.81} \times A$ — **Post Development Inflow Rate, Q_{100DV}:** 7.68 CFS

$R = 0.206 - 0.15Ln\,(Q_{100R} / Q_{100DV})$ — **Storage Curve Factor, R:** 0.43

$V_{100DET} = V_{100RUN} \times R - V_{CPR}$ ** — **Required 100-YR Detention Volume, V_{100DET}:** 9,948 CF

Rainfall depth based on NOAA Rainfall Data
***See below for V_{CP-R} (if provided)*

UNDERGROUND DETENTION REQUIRED

$V_R = V_{100DET} \vee V_{ED}$ — **Required Detention Volume, V_{RD}:** 9,948 CF

**Required Detention Volume is the greater of the 100-Year or Extended Detention Requirement*

UNDERGROUND BASIN VOLUME PROVIDED

Chamber Model - MC-7200 — **Chamber Footprint:** 30.1 SF
Number of chambers - 60 — **Treatment Rate per Isolator Chamber:** 0.28 CFS
Voids in the stone (porosity) - 40 %
Base of Stone Elevation - 923.50 FT — *Isolator Chambers Required = Q_{WQ} / Treatment Rate*
Amount of Stone Above Chambers - 12 IN
Amount of Stone Below Chambers - 9 IN — **Water Quality Flow 1, Q_{WQ1}:** 2.81 cfs
Area of system - 4470 SF — **Isolator Chamber Required:** 10
Total Volume Provided, V_{T-UG}: 18,686 CF* — **Total Isolator Chambers Provided:** 16

**See ADS Stage Storage Calculations*

Outlet Structure Design Parameters

Weir Elevation, H_W: 930.25 FT — **Weir Height, H_{WT}:** 0.20 FT
Extended Detention Elevation, H_{ED}: 926.22 FT — **Extended Detention Height, H_{ED}:** 2.72 FT
Bottom of System: 923.50 FT
Flood Control Elevation, H_{FC}: 930.05 FT — **Flood Control Height, H_{FC}:** 4.03 FT

CHANNEL PROTECTION RATE CONTROL - EXTENDED DETENTION (CPRC) DEWATERING

Outlet Diameter, d: 1.50 IN
Number of Holes, n: 1 Holes
Orifice Area, A: 0.0123 SF
Gravity, g: 32.2 FT/s²
$Q_{CPRC} = 0.62 \times A \times (2 \times g \times 0.4 \times (H_{ED} - H_{WT}))^{0.5}$ — **CPRC Discharge Rate, Q_{CPRC}:** 0.0637 CFS
Extended Detention Dewater Time, T_{ED-D}: 43.39 HRS

**Outlet Structure must dewater Channel Protection Rate Control - Extended Detention storm capacity within 48 hours*

DETENTION AND FLOOD CONTROL (DFC) DEWATERING AT Q_{ED}

Outlet Diameter, d: 3.00 IN
Number of Holes, n: 2 Holes
Orifice Area, A: 0.0982 SF
Gravity, g: 32.2 FT/s²
$Q_{ED} = 0.62 \times A \times (2 \times g \times H_W)^{0.5}$ — **DFC Discharge Rate at Extended Detention, Q_{ED}:** 0.2184 CFS

STORMWATER DETENTION CALCULATIONS

SYMBOL / DESCRIPTION

- PROPERTY LINE
- 100 — PROPOSED GRADING CONTOUR
- RIDGELINE — PROPOSED GRADING RIDGELINE
- PROPOSED STORMWATER STRUCTURES
- PROPOSED STORMWATER PIPING
- PROPOSED UNDERGROUND OUTLET STRUCTURE

DRAINAGE AND UTILITY NOTES

1. THE CONTRACTOR TO PERFORM A TEST PIT PRIOR TO CONSTRUCTION (RECOMMEND 30 DAYS PRIOR) AT LOCATIONS OF EXISTING UTILITY CROSSINGS FOR STORMWATER IMPROVEMENTS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IN WRITING.
2. CONTRACTOR SHALL START CONSTRUCTION OF STORM LINES AT THE LOWEST INVERT AND WORK UP-GRADIENT.
3. THE CONTRACTOR IS REQUIRED TO CALL THE APPROPRIATE AUTHORITY FOR NOTICE OF CONSTRUCTIONEXCAVATION AND UTILITY MARK OUT PRIOR TO THE START OF CONSTRUCTION IN ACCORDANCE WITH STATE LAW. CONTRACTOR IS REQUIRED TO CONFIRM THE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES IN THE FIELD. SHOULD A DISCREPANCY EXIST BETWEEN THE FIELD LOCATION OF A UTILITY AND THE LOCATION SHOWN ON THE PLAN SET OR SURVEY, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IMMEDIATELY IN WRITING.
4. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN A RECORD OF THE AS-BUILT LOCATIONS OF ALL PROPOSED UNDERGROUND INFRASTRUCTURE. THE CONTRACTOR SHALL NOTE ANY DISCREPANCIES BETWEEN THE AS-BUILT LOCATIONS AND THE LOCATIONS DEPICTED WITHIN THE PLAN SET. THIS RECORD SHALL BE PROVIDED TO THE OWNER FOLLOWING COMPLETION OF WORK.

EXCAVATION, SOIL PREPARATION, AND DEWATERING NOTES

1. THE CONTRACTOR IS REQUIRED TO REVIEW THE REFERENCED GEOTECHNICAL DOCUMENTS PRIOR TO CONSTRUCTION. THESE DOCUMENTS SHALL BE CONSIDERED A PART OF THE PLAN SET.
2. THE CONTRACTOR IS REQUIRED TO PREPARE SUBGRADE SOILS BENEATH ALL PROPOSED IMPROVEMENTS AND BACKFILL ALL EXCAVATIONS IN ACCORDANCE WITH RECOMMENDATIONS BY THE GEOTECHNICAL ENGINEER OF RECORD.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SHORING FOR ALL EXCAVATIONS AS REQUIRED. CONTRACTOR SHALL HAVE THE SHORING DESIGN PREPARED BY A QUALIFIED PROFESSIONAL. SHORING DESIGNS SHALL BE SUBMITTED TO STONEFIELD ENGINEERING & DESIGN, LLC. AND THE OWNER PRIOR TO THE START OF CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL OPEN EXCAVATIONS ARE PERFORMED AND PROTECTED IN ACCORDANCE WITH THE LATEST OSHA REGULATIONS.
5. THE CONTRACTOR IS RESPONSIBLE FOR ANY DEWATERING DESIGN AND OPERATIONS, AS REQUIRED, TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS FOR DEWATERING OPERATIONS AND GROUNDWATER DISPOSAL.

STORMWATER INFILTRATION BMP CONSTRUCTION NOTES

1. PRIOR TO THE START OF CONSTRUCTION, ANY AREA DESIGNATED TO BE USED FOR AN INFILTRATION BMP (E.G. BASIN, BIORETENTION AREA, ETC.) SHALL BE FENCED OFF AND SHALL NOT BE UTILIZED AS STORAGE FOR CONSTRUCTION EQUIPMENT OR AS A STOCKPILE AREA FOR CONSTRUCTION MATERIALS. NO ACTIVITY SHALL BE PERMITTED WITHIN THE INFILTRATION BASIN AREA UNLESS RELATED TO THE CONSTRUCTION OF THE INFILTRATION BASIN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ALL SUBCONTRACTORS OF BASIN AREA RESTRICTIONS.
2. THE CONTRACTOR SHALL MAKE EVERY EFFORT, WHERE PRACTICAL, TO AVOID SUBGRADE SOIL COMPACTION IN THE AREAS DESIGNATED TO BE USED FOR AN INFILTRATION BMP.
3. ALL EXCAVATION WITHIN THE LIMITS OF ANY INFILTRATION BMP SHALL BE PERFORMED WITH THE LIGHTEST PRACTICAL EXCAVATION EQUIPMENT. ALL EXCAVATION EQUIPMENT SHALL BE PLACED OUTSIDE THE LIMITS OF THE BASIN WHERE FEASIBLE. THE USE OF LIGHT-WEIGHT, RUBBER-TIRED EQUIPMENT (LESS THAN 8 PSI APPLIED TO THE GROUND SURFACE) IS RECOMMENDED WITHIN THE BASIN LIMITS.
4. THE SEQUENCE OF SITE CONSTRUCTION SHALL BE COORDINATED WITH BASIN CONSTRUCTION TO ADHERE TO SEQUENCING LIMITATIONS.
5. DURING THE FINAL GRADING OF AN INFILTRATION BASIN, THE BOTTOM OF THE BASIN SHALL BE DEEPLY TILLED WITH A ROTARY TILLER OR DISC HARROW AND THEN SMOOTHED OUT WITH A LEVELING DRAW OR EQUIVALENT GRADING EQUIPMENT. ALL GRADING EQUIPMENT SHALL BE LOCATED OUTSIDE OF THE BASIN BOTTOM WHERE FEASIBLE.
6. FOLLOWING CONSTRUCTION OF AN INFILTRATION BASIN, SOIL INFILTRATION TESTING BY A LICENSED GEOTECHNICAL ENGINEER IS REQUIRED TO CERTIFY COMPLIANCE WITH THE DESIGN INFILTRATION RATES IN ACCORDANCE WITH APPENDIX E OF THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION'S BEST MANAGEMENT PRACTICES MANUAL, LATEST EDITION. IF THE FIELD INFILTRATION RATES ARE LOWER THAN THE RATE USED DURING DESIGN, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IN WRITING IMMEDIATELY TO DETERMINE THE APPROPRIATE COURSE OF ACTION.
7. THE CONTRACTOR SHALL NOTIFY THE MUNICIPALITY TO DETERMINE IF WITNESS TESTING IS REQUIRED DURING INFILTRATION BASIN EXCAVATION AND/OR SOIL INFILTRATION TESTING.

STORMWATER UNDERGROUND BMP CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL INSTALL AND BACKFILL THE UNDERGROUND BMP IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
2. UNDERGROUND BASINS SHALL UTILIZE A STONE BACKFILL WITH A MINIMUM VOID RATIO OF 40%.
3. NO CONSTRUCTION LOADING OVER UNDERGROUND BASINS IS PERMITTED UNTIL BACKFILL IS COMPLETE PER THE MANUFACTURER'S SPECIFICATIONS. NO VEHICLES SHALL BE STAGED OR OPERATE FROM A FIXED POSITION OVER THE BASIN.

30' 0' 30' 60'
GRAPHIC SCALE IN FEET
1" = 30'

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SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4710-30-100-023, 4710-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

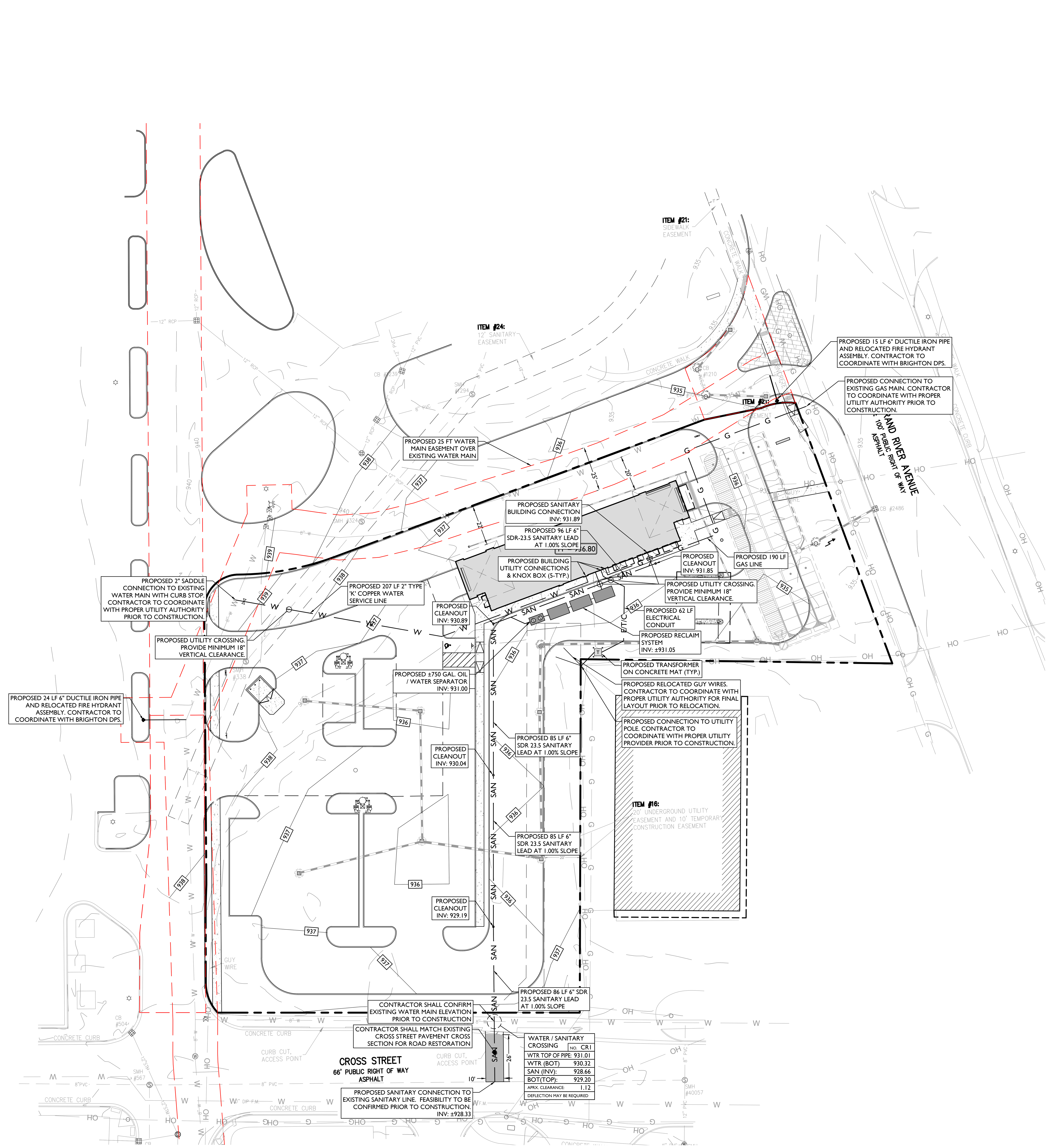
STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: DET-200128

TITLE: STORMWATER MANAGEMENT PLAN

DRAWING: C-5

V:\DET\2020\DET-200128 ALNIC-BMP WEST GRAND RIVER, BRIGHTON, MI\CAD\DWG\PDF\DA.PLSTM DWG



SYMBOL	DESCRIPTION
— — — (dashed)	PROPERTY LINE
— SAN —	PROPOSED SANITARY LATERAL
— W —	PROPOSED DOMESTIC WATER SERVICE
— E/T/C —	PROPOSED ELECTRICAL/DATA CONDUITS
— G —	PROPOSED GAS LINE
◦	PROPOSED SANITARY STRUCTURE
T	PROPOSED TRANSFORMER ON CONCRETE PAD WITH BOLLARDS

DRAINAGE AND UTILITY NOTES

1. THE CONTRACTOR IS REQUIRED TO CALL THE APPROPRIATE AUTHORITY FOR NOTICE OF CONSTRUCTION/EXCAVATION AND UTILITY MARK OUT PRIOR TO THE START OF CONSTRUCTION IN ACCORDANCE WITH STATE LAW. CONTRACTOR IS REQUIRED TO CONFIRM THE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES IN THE FIELD. SHOULD A DISCREPANCY EXIST BETWEEN THE FIELD LOCATION OF A UTILITY AND THE LOCATION SHOWN ON THE PLAN SET OR SURVEY, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IMMEDIATELY IN WRITING.
2. THE CONTRACTOR IS RESPONSIBLE TO PROTECT AND MAINTAIN IN OPERATION ALL UTILITIES NOT DESIGNATED TO BE REMOVED.
3. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE TO ANY EXISTING UTILITY IDENTIFIED TO REMAIN WITHIN THE LIMITS OF THE PROPOSED WORK DURING CONSTRUCTION.
4. A MINIMUM HORIZONTAL SEPARATION OF 10 FEET IS REQUIRED BETWEEN ANY SANITARY SEWER SERVICE AND ANY WATER LINES. IF THIS SEPARATION CANNOT BE PROVIDED, A CONCRETE ENCASEMENT SHALL BE UTILIZED FOR THE SANITARY SEWER SERVICE AS APPROVED BY STONEFIELD ENGINEERING & DESIGN, LLC.
5. ALL WATER LINES SHALL BE VERTICALLY SEPARATED ABOVE SANITARY SEWER LINES BY A MINIMUM DISTANCE OF 18 INCHES. IF THIS SEPARATION CANNOT BE PROVIDED, A CONCRETE ENCASEMENT SHALL BE UTILIZED FOR THE SANITARY SEWER SERVICE AS APPROVED BY STONEFIELD ENGINEERING & DESIGN, LLC.
6. THE CONTRACTOR TO PERFORM A TEST PIT PRIOR TO CONSTRUCTION (RECOMMEND 30 DAYS PRIOR) AT LOCATIONS OF EXISTING UTILITY CROSSINGS FOR WATER AND SANITARY SEWER CONNECTION IMPROVEMENTS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IN WRITING.
7. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING GAS, ELECTRIC AND TELECOMMUNICATION CONNECTIONS WITH THE APPROPRIATE GOVERNING AUTHORITY.
8. CONTRACTOR SHALL START CONSTRUCTION OF ANY GRAVITY SEWER AT THE LOWEST INVERT AND WORK UP-GRADIENT.
9. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN A RECORD SET OF PLANS REFLECTING THE LOCATION OF EXISTING UTILITIES THAT HAVE BEEN CAPPED, ABANDONED, OR RELOCATED BASED ON THE DEMOLITION/REMOVAL ACTIVITIES REQUIRED IN THIS PLAN SET. THIS DOCUMENT SHALL BE PROVIDED TO THE OWNER FOLLOWING COMPLETION OF WORK.
10. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN A RECORD OF THE AS-BUILT LOCATIONS OF ALL PROPOSED UNDERGROUND INFRASTRUCTURE. THE CONTRACTOR SHALL NOTE ANY DISCREPANCIES BETWEEN THE AS-BUILT LOCATIONS AND THE LOCATIONS DEPICTED WITHIN THE PLAN SET. THIS RECORD SHALL BE PROVIDED TO THE OWNER FOLLOWING COMPLETION OF WORK.
11. CONTRACTOR TO PROVIDE PRIVATE UTILITY LOCATING SERVICES PRIOR TO CONSTRUCTION.

30' 0' 30' 60'
GRAPHIC SCALE IN FEET
1" = 30'

ISSUE	DATE	BY	DESCRIPTION
8	02/09/2023	MPH	FOR CITY COUNCIL APPROVAL
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4	01/11/2023	MPH	PER FIRE MARSHALL COMMENTS
3	12/21/2022	MG	FOR SITE PLAN APPROVAL
2	11/17/2022	MG	FOR SITE PLAN & REZONING APPROVAL
1	11/03/2022	MG	FOR CLIENT REVIEW

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SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STATE OF MICHIGAN
JONATHAN REID COOKSEY
ENGINEER
REID COOKSEY, P.E.
LICENSED PROFESSIONAL ENGINEER

STONEFIELD
engineering & design

SCALE: 1" = 30' PROJECT ID: DET-200128

TITLE:

UTILITY PLAN

DRAWING:

C-6

V:\DET\2020\DET-200128-ALRIG-8680 WEST GRAND RIVER, BRIGHTON, MI\CADD\PLOT\SDP-06-UTIL.DWG

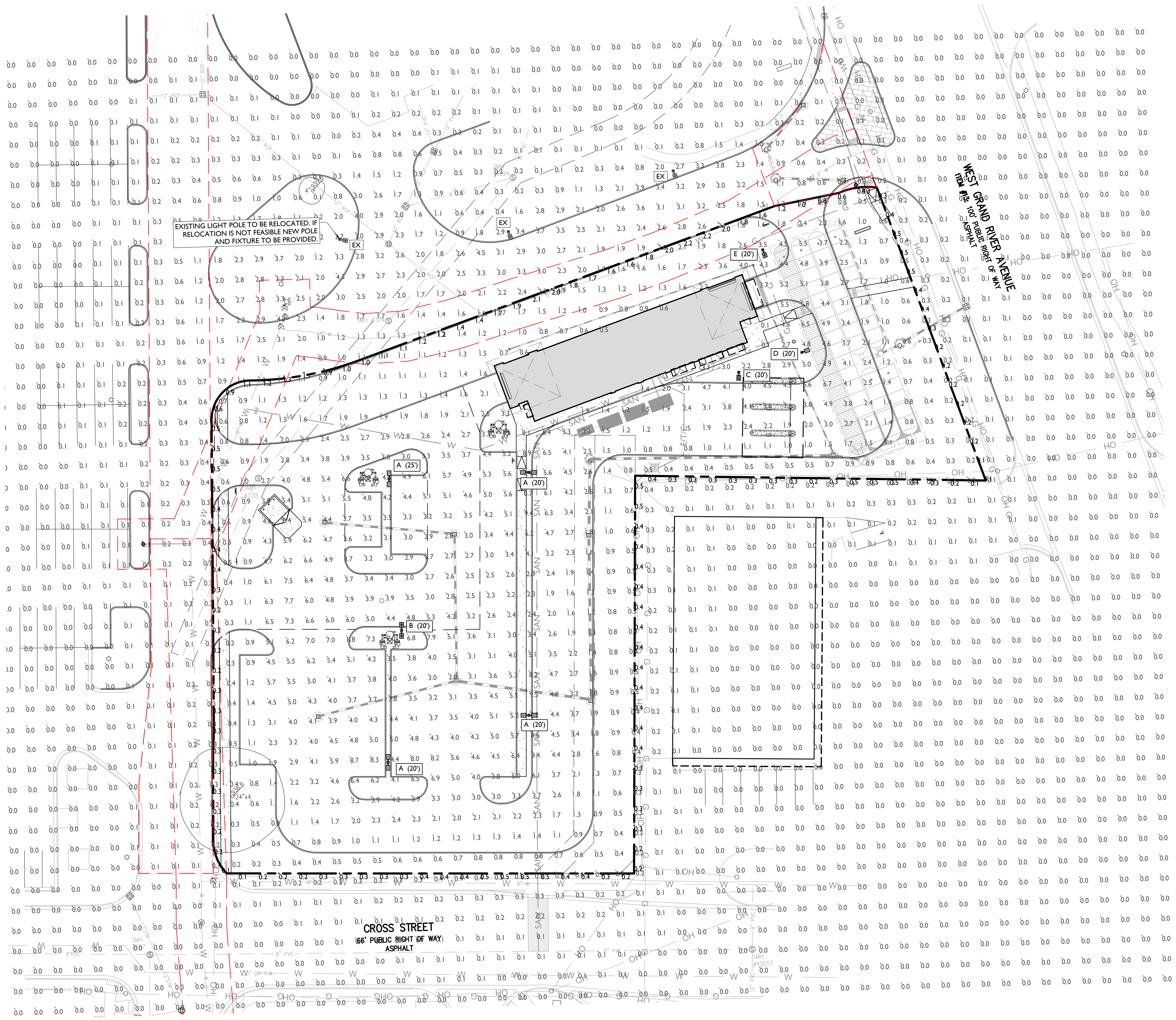
LIGHTING REQUIREMENTS

CODE SECTION	REQUIRED	PROPOSED
§ 95-5.4.2	ONLY DOWNWARD-DIRECTED, FULLY SHIELDED, FULL CUT-OFF LIGHTING SHALL BE PERMITTED	PROVIDED
§ 95-5.4.6	**AVERAGE TO MINIMUM PARKING LIGHTING RATIO:** 4:1 (1)	PROVIDED
§ 95-5.4.6	**MAXIMUM PROPERTY LINE ILLUMINATION:** 0.5 FC	0.5 FC
§ 95-5.4.6	**MAXIMUM ILLUMINATION AT ANY POINT:** 10 FC	9.5 FC
§ 95-5.4.7	**MAXIMUM FIXTURE HEIGHT:** 30 FT	25 FT

(1) IN CASES WHERE THE MINIMUM LIGHTING IS LESS THAN 0.5 FOOT CANDLES, 0.5 SHALL BE USED AS THE MINIMUM LEVEL FOR PURPOSES OF CALCULATING THE 4:1 RATIO.

PROPOSED LUMINAIRE SCHEDULE

SYMBOL	LABEL	QUANTITY		DISTRIBUTION	LLF	MANUFACTURER	IES FILE
	A	4	EATON LUMARK PREVAIL AND FIXTURE COMBO WITH HOUSE SIDE SHIELD (2 FIXTURES @ 180°)	TYPE III	0.9	EATON	PRV-C40-D-UNV-T3-BZ-7030-HSS
	B	1	EATON LUMARK PREVAIL AND FIXTURE COMBO WITH HOUSE SIDE SHIELD (2 FIXTURES @ 180°)	TYPE IV	0.9	EATON	PRV-C40-D-UNV-T4-BZ-7030-HSS
	C	1	EATON LUMARK PREVAIL AND FIXTURE COMBO WITH HOUSE SIDE SHIELD	TYPE II	0.9	EATON	PRV-C40-D-UNV-T2-BZ-7030-HSS
	D	1	EATON LUMARK PREVAIL AND FIXTURE COMBO WITH HOUSE SIDE SHIELD	TYPE III	0.9	EATON	PRV-C40-D-UNV-T3-BZ-7030-HSS
	E	1	EATON LUMARK PREVAIL AND FIXTURE COMBO WITH HOUSE SIDE SHIELD	TYPE IV	0.9	EATON	PRV-C40-D-UNV-T4-BZ-7030-HSS



SYMBOL	DESCRIPTION
A (XX')	PROPOSED LIGHTING FIXTURE (MOUNTING HEIGHT)
X.X	PROPOSED LIGHTING INTENSITY (FOOTCANDLES)
	PROPOSED AREA LIGHT
	EXISTING RELOCATED AREA LIGHT

GENERAL LIGHTING NOTES

1. THE LIGHTING LEVELS DEPICTED WITHIN THE PLAN SET ARE CALCULATED UTILIZING DATA OBTAINED FROM THE LISTED MANUFACTURER. ACTUAL ILLUMINATION LEVELS AND PERFORMANCE OF ANY PROPOSED LIGHTING FIXTURE MAY VARY DUE TO UNCONTROLLABLE VARIABLES SUCH ARE WEATHER, VOLTAGE SUPPLY, LAMP TOLERANCE, EQUIPMENT SERVICE LIFE AND OTHER VARIABLE FIELD CONDITIONS.
2. WHERE APPLICABLE, THE EXISTING LIGHT LEVELS DEPICTED WITHIN THE PLAN SET SHALL BE CONSIDERED APPROXIMATE. THE EXISTING LIGHT LEVELS ARE BASED ON FIELD OBSERVATIONS AND THE MANUFACTURER'S DATA OF THE ASSUMED OR MOST SIMILAR LIGHTING FIXTURE MODEL.
3. UNLESS NOTED ELSEWHERE WITHIN THIS PLAN SET, THE LIGHT LOSS FACTORS USED IN THE LIGHTING ANALYSIS ARE AS FOLLOWS:
   - LIGHT EMITTING DIODES (LED): 0.90
   - HIGH PRESSURE SODIUM: 0.72
   - METAL HALIDE: 0.72
4. THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IN WRITING, PRIOR TO THE START OF CONSTRUCTION, OF ANY PROPOSED LIGHTING LOCATIONS THAT CONFLICT WITH EXISTING/ PROPOSED DRAINAGE, UTILITY, OR OTHER IMPROVEMENTS.
5. THE CONTRACTOR IS RESPONSIBLE TO PREPARE A WIRING PLAN AND PROVIDE ELECTRIC SERVICE TO ALL PROPOSED LIGHTING FIXTURES. THE CONTRACTOR IS REQUIRED TO PREPARE AN AS-BUILT PLAN OF WIRING AND PROVIDE COPIES TO THE OWNER AND STONEFIELD ENGINEERING & DESIGN, LLC.
6. MEIJER'S EXISTING LIGHT POLES TO BE REMOVED AND RELOCATED WHERE NOTED. IF RELOCATION IS NOT FEASIBLE, A NEW POLE AND FIXTURE IS TO BE PROVIDED.

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LIVINGSTON COUNTY, MICHIGAN 48116

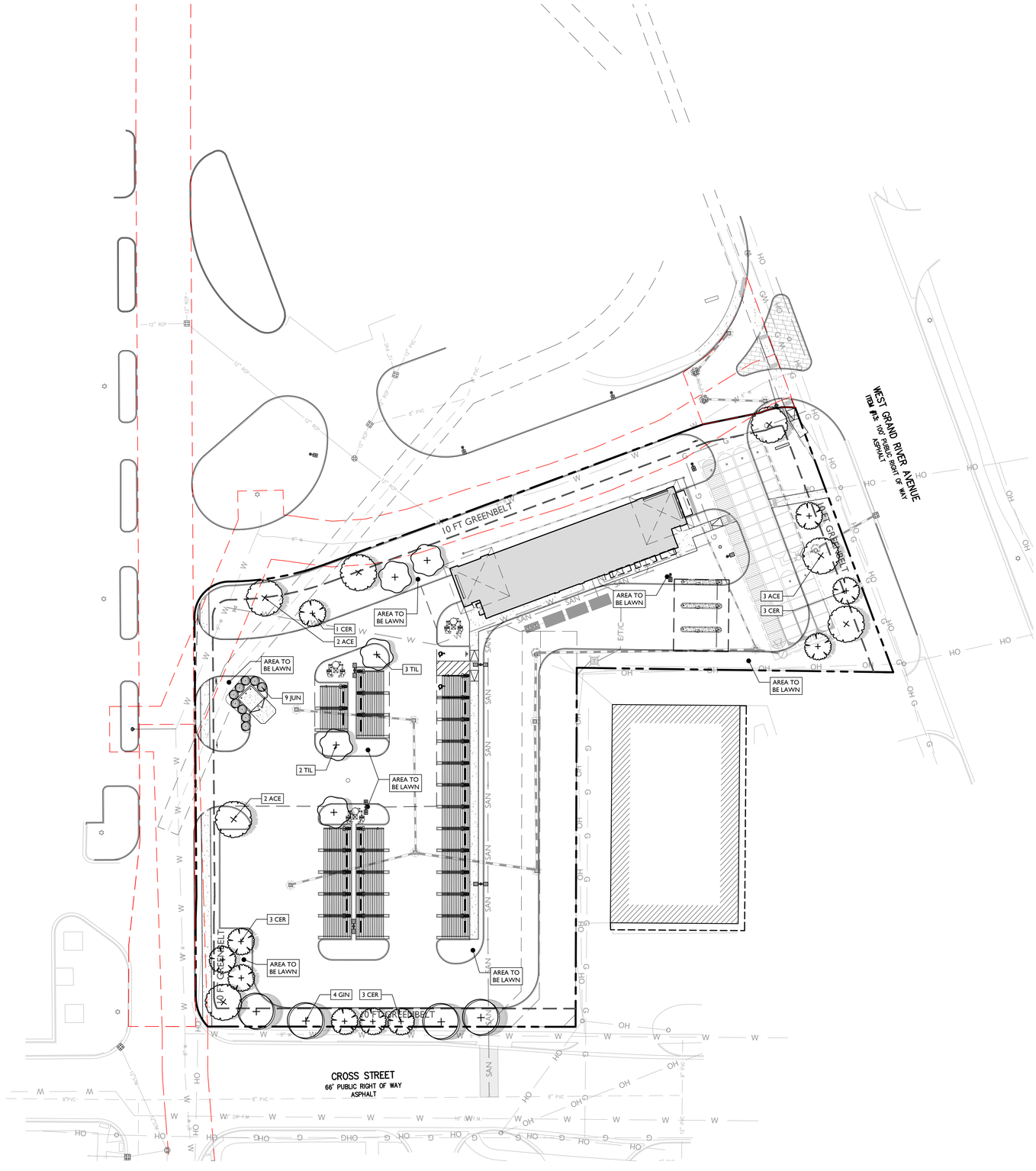
STATE OF MICHIGAN · JONATHAN REID COOKSEY · ENGINEER · LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: DET-200128

TITLE: LIGHTING PLAN

DRAWING: C-7



LANDSCAPING AND BUFFER REQUIREMENTS

CODE SECTION	REQUIRED	PROPOSED
	GREENBELT REQUIREMENTS	
§ 98-5.7.C.	A GREENBELT SHALL BE PLANTED ALONG THE RIGHT-OF-WAY OF ANY PUBLIC STREET	10 FT GREENBELT PROPOSED
§ 98-5.7.C.2.	1 CANOPY TREE FOR EVERY 30 LF OF FRONTAGE	
	WEST GRAND RIVER AVENUE: 155 FT	
	(87 FT) * (1 TREE / 30 FT FRONTAGE) = 6 TREES	6 TREES PROPOSED
	CROSS STREET: 202 FT	
	(202 FT) * (1 TREE / 30 FT FRONTAGE) = 7 TREES	7 TREES PROPOSED
	NORTH 2ND STREET: 238 FT	
	(238 FT) * (1 TREE / 30 FT FRONTAGE) = 8 TREES	8 TREES PROPOSED
	PARKING LOT LANDSCAPING	
§ 98-5.7.E.1.a.	LANDSCAPING SHALL BE PROVIDED AT THE PERIMETER OF PARKING LOTS	COMPLIES
§ 98-5.7.E.1.b.	LANDSCAPING SHALL BE PROVIDED IN THE INTERIOR OF PARKING LOTS	COMPLIES
§ 98-5.7.E.2.b.	LANDSCAPED ISLANDS SHALL BE MINIMUM 275 SF IN AREA AND 10 FT IN WIDTH	COMPLIES
	LANDSCAPED ISLANDS SHALL INCLUDE MINIMUM (1) SHADE TREE AND GROUNDCOVER SUCH AS GRASS, PERENNIALS, AND/OR SHRUBS	COMPLIES
§ 98-5.7.E.2.c.(1)	3% OF THE TOTAL PARKING AREA SHALL BE LANDSCAPED AND PERMEABLE	
	PARKING AREA: 35,088 SF	
	(35,088 SF) * (0.03) = 1,053 SF	5,501 SF (16%) PROPOSED
§ 98-5.7.E.2.c.(3)	1 DECIDUOUS OR EVERGREEN TREE FOR EVERY 250 SF OF LANDSCAPED AREA	
	(1,053 SF) * (1 TREE / 250 SF) = 5 TREES	5 TREES PROPOSED
	LANDSCAPE STANDARDS	
§ 98-5.7.F.2.	MINIMUM 5% OF THE SITE, EXCLUSIVE OF BUILDINGS AND REQUIRED YARDS, SHALL BE LANDSCAPED	
	SITE AREA: 75,524 SF	
	(75,524 SF) * (0.05) = 3,776 SF	27,442 SF (36%) PROPOSED

PLANT SCHEDULE

DECIDUOUS TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
	CER	10	CERCIS CANADENSIS	EASTERN REDBUD	2.5" - 3" CAL	B&B
	ACE	7	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	2.5" - 3" CAL	B&B
	GIN	4	GINKGO BILOBA 'AUTUMN GOLD'	AUTUMN GOLD MAIDENHAIR TREE	2.5" - 3" CAL	B&B
	TIL	5	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LITTLELEAF LINDEN	2.5" - 3" CAL	B&B
EVERGREEN TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
	JUN	9	JUNIPERUS VIRGINIANA 'J.N. SELECT GREEN'	EMERALD FEATHER EASTERN REDCEDAR	6' - 7' HT	B&B

NOTE: IF ANY DISCREPANCIES OCCUR BETWEEN AMOUNTS SHOWN ON THE LANDSCAPE PLAN AND WITHIN THE PLANT LIST, THE PLAN SHALL DICTATE.

Know what's **below**
Call before you dig.

IRRIGATION NOTE:

IRRIGATION CONTRACTOR TO PROVIDE A DESIGN FOR AN IRRIGATION SYSTEM SEPARATING PLANTING BEDS FROM LAWN AREA. PRIOR TO CONSTRUCTION, DESIGN IS TO BE SUBMITTED TO THE PROJECT LANDSCAPE DESIGNER FOR REVIEW AND APPROVAL. WHERE POSSIBLE, DRIP IRRIGATION AND OTHER WATER CONSERVATION TECHNIQUES SUCH AS RAIN SENSORS SHALL BE IMPLEMENTED. CONTRACTOR TO VERIFY MAXIMUM ON SITE DYNAMIC WATER PRESSURE AVAILABLE MEASURED IN PSI. PRESSURE REDUCING DEVICES OR BOOSTER PUMPS SHALL BE PROVIDED TO MEET SYSTEM PRESSURE REQUIREMENTS. DESIGN TO SHOW ALL VALVES, PIPING, HEADS, BACKFLOW PREVENTION, METERS, CONTROLLERS, AND SLEEVES WITHIN HARDSCAPE AREAS.

LANDSCAPING NOTES

1. THE CONTRACTOR SHALL RESTORE ALL DISTURBED GRASS AND LANDSCAPED AREAS TO MATCH EXISTING CONDITIONS UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
2. THE CONTRACTOR SHALL RESTORE ALL DISTURBED LAWN AREAS WITH A MINIMUM 4 INCH LAYER OF TOPSOIL AND SEED.
3. THE CONTRACTOR SHALL RESTORE MULCH AREAS WITH A MINIMUM 3 INCH LAYER OF MULCH .
4. THE MAXIMUM SLOPE ALLOWABLE IN LANDSCAPE RESTORATION AREAS SHALL BE 3 FEET HORIZONTAL TO 1 FOOT VERTICAL (3:1 SLOPE) UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
5. THE CONTRACTOR IS REQUIRED TO LOCATE ALL SPRINKLER HEADS IN AREA OF LANDSCAPING DISTURBANCE PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL RELOCATE SPRINKLER HEADS AND LINES IN ACCORDANCE WITH OWNER'S DIRECTION WITHIN AREAS OF DISTURBANCE.
6. THE CONTRACTOR SHALL ENSURE THAT ALL DISTURBED LANDSCAPED AREAS ARE GRADED TO MEET FLUSH AT THE ELEVATION OF WALKWAYS AND TOP OF CURB ELEVATIONS EXCEPT UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET. NO ABRUPT CHANGES IN GRADE ARE PERMITTED IN DISTURBED LANDSCAPING AREAS.

30' 0' 30' 60'
GRAPHIC SCALE IN FEET
1" = 30'

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SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

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8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: DET-200128

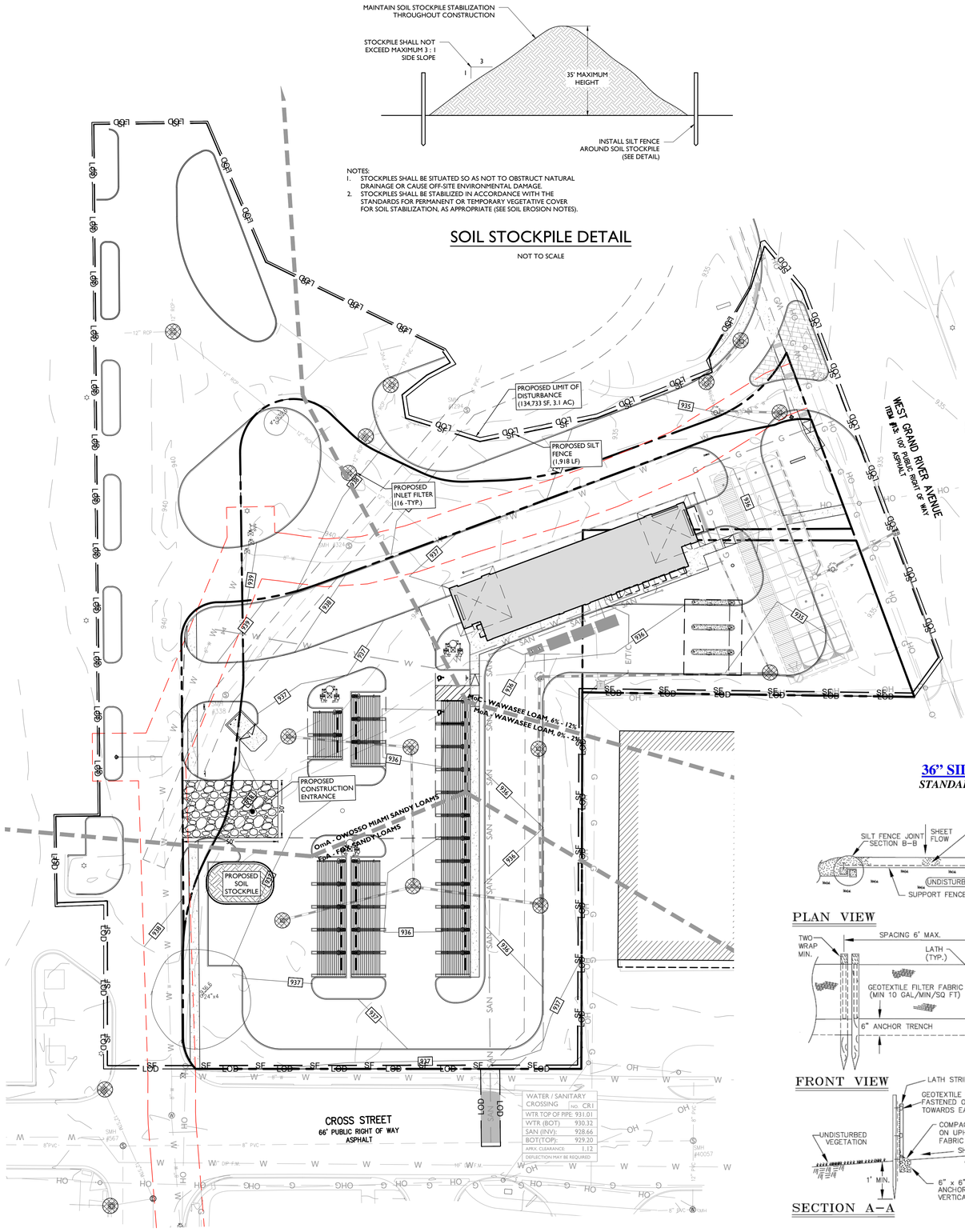
TITLE:

LANDSCAPING PLAN

DRAWING:

C-8

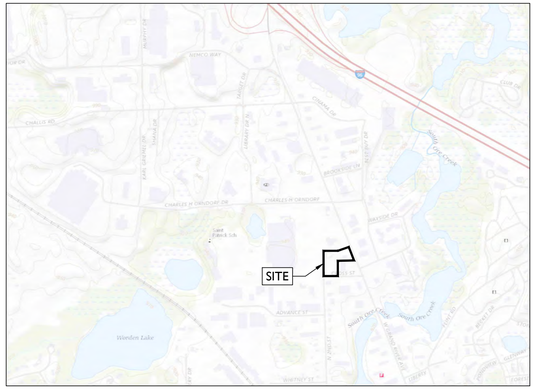
V:\DET\2020\DET-200128-ALAN\CAD\WEST GRAND RIVER - BRIGHTON, MI\CAD\PLOTS\DP-08-LAND.DWG



SOIL STOCKPILE DETAIL

NOT TO SCALE

NOTES:
1. STOCKPILES SHALL BE SITUATED SO AS NOT TO OBSTRUCT NATURAL DRAINAGE OR CAUSE OFF-SITE ENVIRONMENTAL DAMAGE.
2. STOCKPILES SHALL BE STABILIZED IN ACCORDANCE WITH THE STANDARDS FOR PERMANENT OR TEMPORARY VEGETATIVE COVER FOR SOIL STABILIZATION, AS APPROPRIATE (SEE SOIL EROSION NOTES).

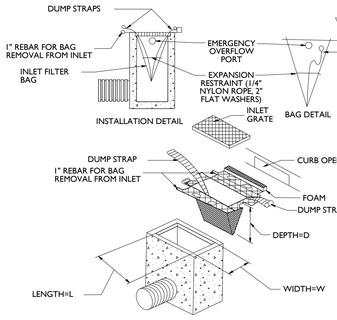


SOURCE: USGS ONLINE MAPPER

LOCATION MAP

SCALE: 1" = ±1,000'

SYMBOL	DESCRIPTION
	PROPERTY BOUNDARY
	ADJACENT PROPERTY BOUNDARY
LOD	PROPOSED LIMIT OF DISTURBANCE
SF	PROPOSED SILT FENCE
	PROPOSED STOCKPILE & EQUIPMENT STORAGE
	PROPOSED STABILIZED CONSTRUCTION ENTRANCE
	PROPOSED INLET PROTECTION FILTER



INLET FILTER BAG DETAIL

NOT TO SCALE

NOTES:
1. THE FILTER BAG SHALL SAFELY PASS FLOWS GREATER THAN THE 1-YEAR 24-HOUR STORM EVENT.
2. SEDIMENT REMOVAL AND MAINTENANCE SHALL BE PERFORMED FREQUENTLY AND AFTER EVERY STORM EVENT.

SOIL EROSION AND SEDIMENT CONTROL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR SOIL EROSION AND SEDIMENT CONTROL IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL AIR QUALITY STANDARDS.
3. THE CONTRACTOR IS RESPONSIBLE TO INSPECT ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES WEEKLY AND AFTER A PRECIPITATION EVENT GREATER THAN 1 INCH. THE CONTRACTOR SHALL MAINTAIN AN INSPECTION LOG ON SITE AND DOCUMENT CORRECTIVE ACTION TAKEN THROUGHOUT THE COURSE OF CONSTRUCTION AS REQUIRED.

SOIL CHARACTERISTICS CHART	
TYPE OF SOIL	WAWASEE LOAM (6%-12%) (MoC)
HYDROLOGIC SOIL GROUP	C
DEPTH TO RESTRICTIVE LAYER	> 80 INCHES
SOIL PERMEABILITY	0.09 IN / HR
DEPTH TO WATER TABLE	> 80 INCHES

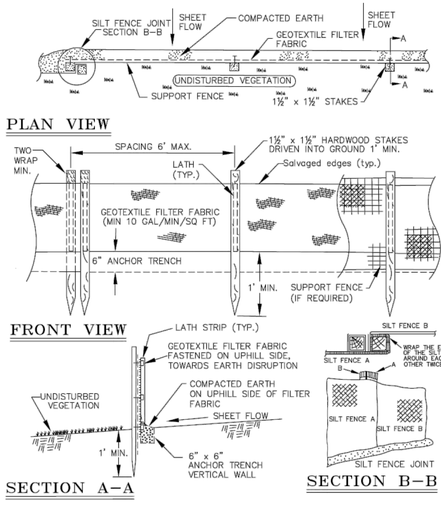
SOIL CHARACTERISTICS CHART	
TYPE OF SOIL	FOX SANDY LOAM (FoA)
HYDROLOGIC SOIL GROUP	C
DEPTH TO RESTRICTIVE LAYER	> 80 INCHES
SOIL PERMEABILITY	10 IN / HR
DEPTH TO WATER TABLE	> 80 INCHES

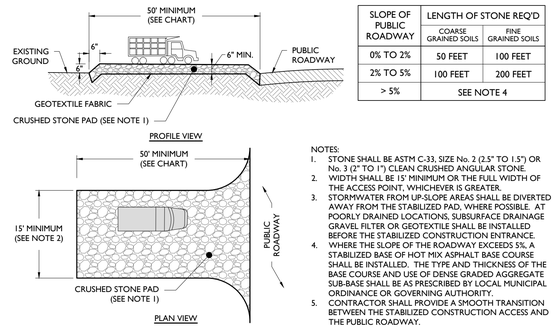
SOIL CHARACTERISTICS CHART	
TYPE OF SOIL	OWOSSA-MIAMI SANDY LOAM (OmA)
HYDROLOGIC SOIL GROUP	C
DEPTH TO RESTRICTIVE LAYER	> 80 INCHES
SOIL PERMEABILITY	2.0 IN / HR
DEPTH TO WATER TABLE	> 80 INCHES

SOIL CHARACTERISTICS CHART	
TYPE OF SOIL	WAWASEE LOAM (0%-2%) (MoA)
HYDROLOGIC SOIL GROUP	C
DEPTH TO RESTRICTIVE LAYER	> 80 INCHES
SOIL PERMEABILITY	0.09 IN / HR
DEPTH TO WATER TABLE	> 80 INCHES

36" SILT FENCE

STANDARD CONTROL





SLOPE OF PUBLIC ROADWAY	LENGTH OF STONE REQ'D	
	COARSE GRAINED SOILS	FINE GRAINED SOILS
0% TO 2%	50 FEET	100 FEET
2% TO 5%	100 FEET	200 FEET
> 5%	SEE NOTE 4	

NOTES:
1. STONE SHALL BE ASTM C-33, SIZE No. 2 (2.5" TO 1.5") OR No. 3 (2" TO 1") CLEAN CRUSHED ANGULAR STONE.
2. WIDTH SHALL BE 15' MINIMUM OR THE FULL WIDTH OF THE ACCESS POINT, WHICHEVER IS GREATER.
3. STORMWATER FROM UP-SLOPE AREAS SHALL BE DIVERTED AWAY FROM THE STABILIZED PAD, WHERE POSSIBLE. AT POORLY DRAINED LOCATIONS, SUBSURFACE DRAINAGE GRAVEL FILTER OR GEOTEXTILE SHALL BE INSTALLED BEFORE THE STABILIZED CONSTRUCTION ENTRANCE.
4. WHERE THE SLOPE OF THE ROADWAY EXCEEDS 5%, A STABILIZED BASE OF HOT MIX ASPHALT BASE COURSE SHALL BE INSTALLED. THE TYPE AND THICKNESS OF THE BASE COURSE AND USE OF DENSE GRADED AGGREGATE SUB-BASE SHALL BE AS PRESCRIBED BY LOCAL MUNICIPAL ORDINANCE OR GOVERNING AUTHORITY.
5. CONTRACTOR SHALL PROVIDE A SMOOTH TRANSITION BETWEEN THE STABILIZED CONSTRUCTION ACCESS AND THE PUBLIC ROADWAY.

STABILIZED CONSTRUCTION ACCESS DETAIL

NOT TO SCALE

30' 0' 30' 60'

GRAPHIC SCALE IN FEET

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CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: DET-200128

TITLE: SOIL EROSION & SEDIMENT CONTROL PLAN

DRAWING: C-9

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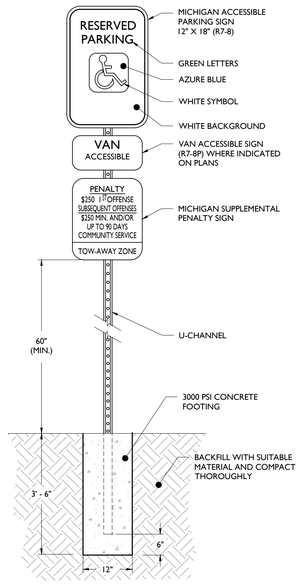
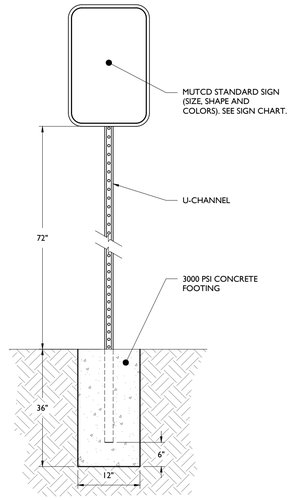


ACCESSIBLE PARKING SIGN DETAIL

NOT TO SCALE

1



SIGN POST DETAIL

NOT TO SCALE

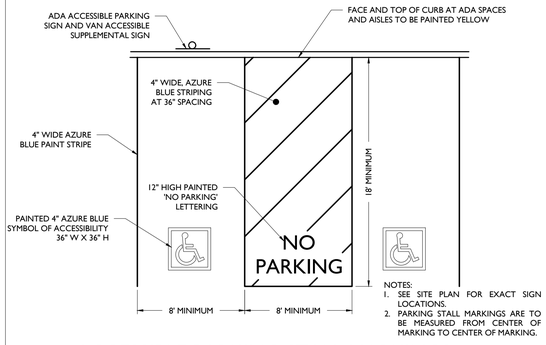
M.U.T.C.D. NUMBER	TEXT	COLOR		SIZE OF SIGN (WIDTH X HEIGHT)	TYPE OF MOUNT
		LEGEND	BACKGROUND		
STOP SIGN (R1-1)	STOP	WHITE	RED	36"x36"	GROUND

NOTE:
1. ALL SIGNS SHALL BE IN ACCORDANCE WITH THE FEDERAL HIGHWAY ADMINISTRATION (FHWA) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), EXCEPT AS NOTED.
2. ALL SIGNS SHALL BE MOUNTED AS TO NOT OBSTRUCT THE SHAPE OF "STOP" (R1-1) AND "YIELD" (R1-2) SIGNS.

SIGN DATA TABLE

NOT TO SCALE

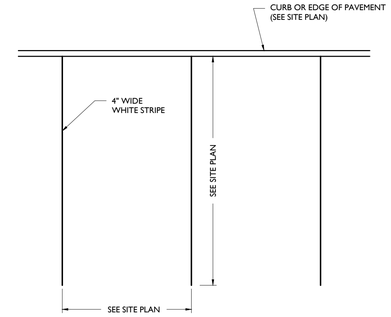
2



ACCESSIBLE PARKING STALL MARKINGS

NOT TO SCALE

3



PARKING STALL MARKINGS

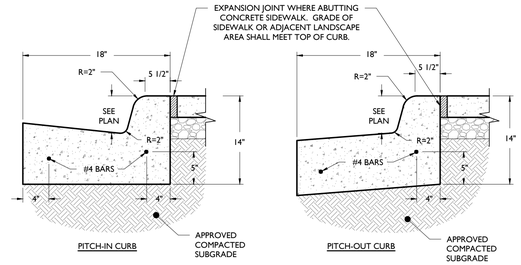
NOT TO SCALE

4

PAVEMENT STRIPING & MARKINGS NOTES:

1. ALL SIGNING AND STRIPING IN EXISTING CONDITION IN CONFLICT WITH THE PROPOSED DESIGN PLAN SHALL BE REMOVED.
2. ALL PROPOSED SIGNING AND STRIPING SHALL CONFORM TO THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION.
3. PAVEMENT STRIPING AND MARKINGS SHALL BE INSTALLED IN CONFORMANCE WITH ALL APPLICABLE LOCAL, COUNTY AND STATE REQUIREMENTS.
4. UNLESS OTHERWISE SPECIFIED, ALL STRIPING AND MARKINGS IN THE PUBLIC RIGHT-OF-WAY SHALL BE OF THERMOPLASTIC PAINT OR PREFORMED THERMOPLASTIC MARKINGS.
5. UNLESS OTHERWISE SPECIFIED, ON SITE PARKING STALL STRIPING, FIRE LANE STRIPING AND DIRECTIONAL ARROWS SHALL BE EPOXY PAINT. ON SITE STOP BARS, "DO NOT ENTER" BARS, AND ASSOCIATED LETTERING SHALL BE THERMOPLASTIC PAINT OR PREFORMED THERMOPLASTIC MARKINGS.

5

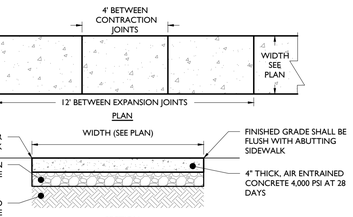


CONCRETE CURB AND GUTTER DETAIL

NOT TO SCALE

NOTES:
1. CONCRETE SHALL BE 3500 PSI AT 28 DAYS, AIR-ENTRAINED.
2. TRANSVERSE EXPANSION JOINTS SHALL BE PROVIDED AT 20 FOOT INTERVALS WITH PRE-MOLDED, BITUMINOUS JOINT FILLER, RECESSED ½" FROM SURFACE.
3. HALF DEPTH CONTRACTION JOINTS SHALL BE PROVIDED AT 10 FOOT INTERVALS.
4. 14" CURB DEPTH SHALL BE MAINTAINED AT DEPRESSED OR FLUSH CURBED AREAS.

6

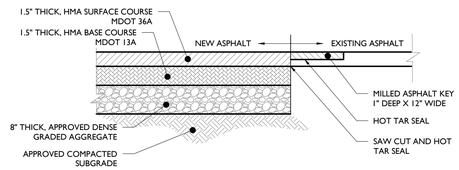


CONCRETE WALKWAY DETAIL

NOT TO SCALE

NOTES:
1. MAXIMUM CROSS SLOPE SHALL BE ¼" PER FOOT.
2. ½" EXPANSION JOINTS SHALL BE PROVIDED AT 12' INTERVALS WITH PRE-MOLDED, BITUMINOUS JOINT FILLER, RECESSED ½" FROM THE SURFACE.
3. 1" DEEP BY ¼" WIDE, TOOLED CONTRACTION JOINTS SHALL BE PROVIDED AT 4' INTERVALS.
4. EXPANSION JOIN SHALL BE PROVIDED WHERE ADJACENT TO A BUILDING.

7

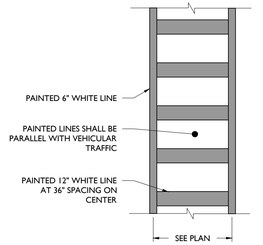


FULL DEPTH ASPHALT PAVEMENT DETAIL

NOT TO SCALE

NOTE:
HMA MIX AND DENSE GRADED AGGREGATE SHALL CONFORM TO STATE DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.

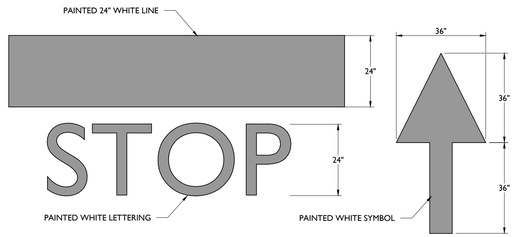
8



CROSSWALK DETAIL

NOT TO SCALE

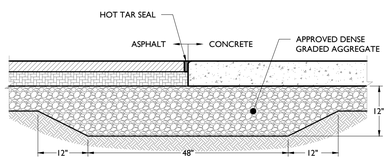
9



STOP BAR & ARROW DETAILS

NOT TO SCALE

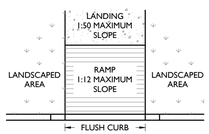
10



CONCRETE TO ASPHALT TRANSITION DETAIL

NOT TO SCALE

11

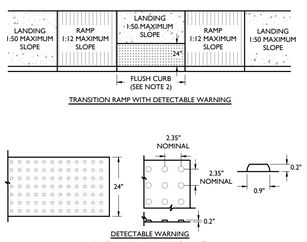


CURB RAMP DETAIL

NOT TO SCALE

NOTES:
1. CROSS SLOPE ON RAMP SHALL NOT EXCEED 2%
2. A FLUSH CURB SHALL HAVE A MINIMUM WIDTH OF 36". SEE PLAN FOR EXACT WIDTH.
3. RAMP SHALL HAVE A MAXIMUM RISE OF 6" WITHOUT A HANDRAIL

12



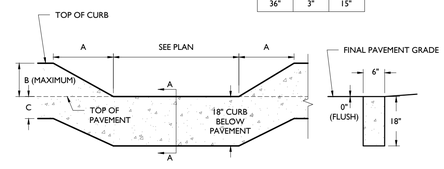
RAMP DETAILS

NOT TO SCALE

NOTES:
1. CROSS SLOPE ON RAMP SHALL NOT EXCEED 2%
2. A FLUSH CURB SHALL HAVE A MINIMUM WIDTH OF 36". SEE PLAN FOR EXACT WIDTH.
3. DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF TRAVEL TO PERMIT WHEELS TO ROLL BETWEEN DOMES.
4. VISUAL CONTRAST: THERE SHALL BE A MINIMUM OF 70% CONTRAST IN LIGHT REFLECTANCE BETWEEN THE DETECTABLE WARNING AND AN ADJOINING SURFACE.
5. DETECTABLE WARNING STRIP REQUIRED WHERE RAMP DIRECTS PEDESTRIAN TRAFFIC TOWARDS VEHICLE TRAVEL WAY. WARNING STRIP SHALL BE CAST-IN-PLACE.
6. RAMP SHALL HAVE A MAXIMUM RISE OF 6" WITHOUT A HANDRAIL.
7. WHERE A 60" X 60" LANDING EXISTS AT THE TOP OF RAMP, RAMP FLARE SHALL NOT EXCEED 1:10 SLOPE. WHERE LANDING IS NOT PROVIDED RAMP FLARE SHALL NOT EXCEED 1:12 SLOPE.

13

FLUSH CURB DIMENSIONS		
A	B	C
72"	6"	12"
60"	5"	13"
48"	4"	14"
36"	3"	15"



FLUSH CURB DETAIL

NOT TO SCALE

14

ISSUE	DATE	BY	DESCRIPTION
8	02/09/2023	MPH	FOR CITY COUNCIL APPROVAL
7	02/01/2023	MPH	FOR CITY COUNCIL APPROVAL
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4	01/11/2023	MPH	PER FIRE MARSHALL COMMENTS
3	12/21/2022	MG	FOR SITE PLAN APPROVAL
2	11/7/2022	MG	FOR SITE PLAN & REZONING APPROVAL
1	11/03/2022	MG	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

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www.stonefieldeng.com
607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8480 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STATE OF MICHIGAN
JONATHAN FRED COOKSEY
ENGINEER
LICENSED PROFESSIONAL ENGINEER

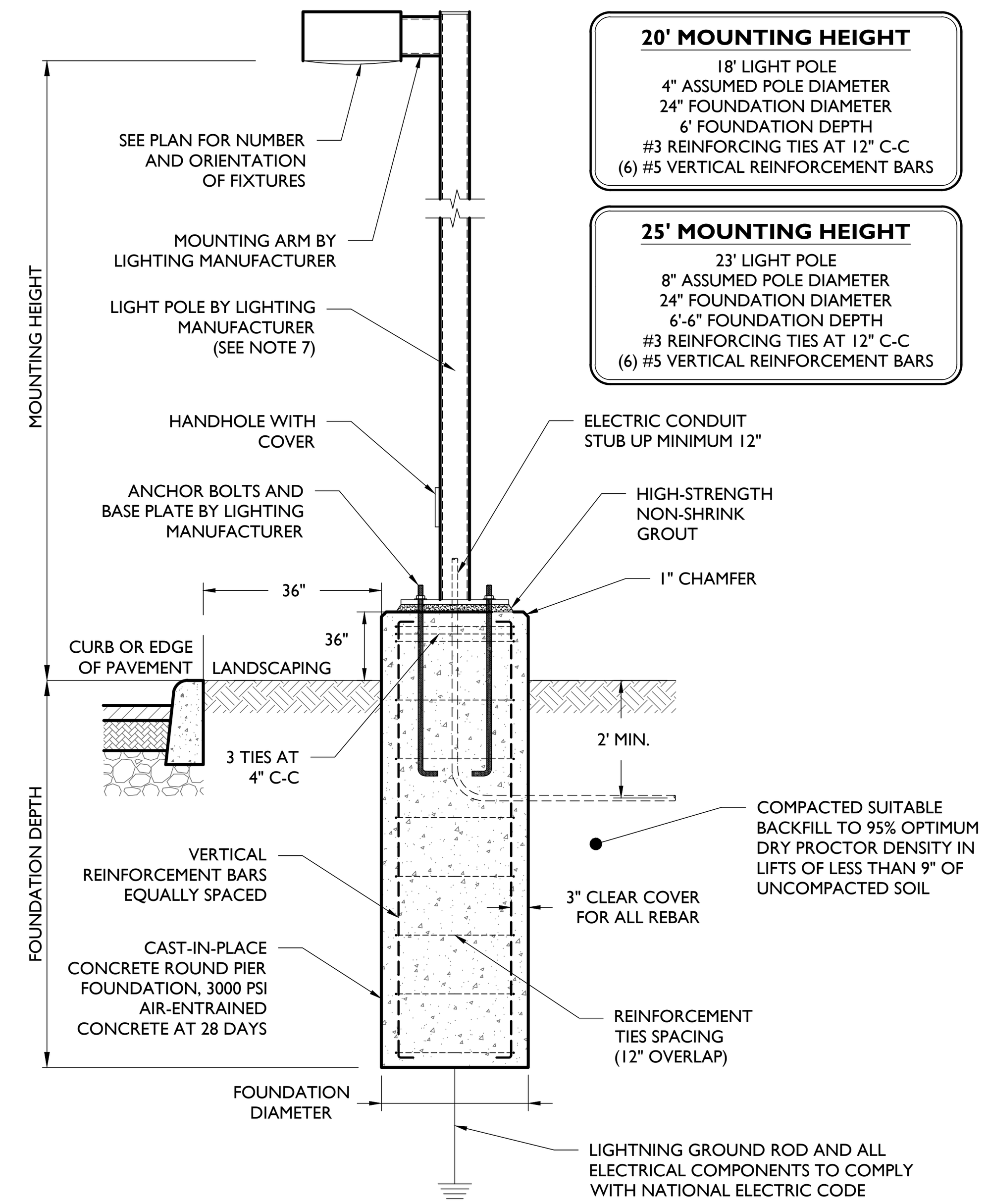
STONEFIELD engineering & design

SCALE: AS SHOWN | PROJECT ID: DET-200128

TITLE:
CONSTRUCTION DETAILS

DRAWING:
C-10

V:\DET\2020\DET-200128-ALAN\C-8480 WEST GRAND RIVER, BRIGHTON, MICHIGAN\PLOTS\DP-10-11-23-DETS.DWG



LIGHT POLE INSTALLATION DETAIL

NOT TO SCALE

NOTES:

1. MINIMUM SOIL BEARING PRESSURE OF 1500 PSF, SOIL FRICTION ANGLE OF 30 DEGREES, AND SOIL DRY UNIT WEIGHT OF 120 PCF SHALL BE CONFIRMED IN THE FIELD BY A QUALIFIED PROFESSIONAL.
2. CAST-IN-PLACE CONCRETE SHALL BE CONSOLIDATED USING VIBRATOR.
3. ALL REBAR TO BE NEW GRADE 60 STEEL.
4. PRE-CAST PIERS ACCEPTABLE UPON WRITTEN APPROVAL OF SHOP DRAWING BY ENGINEER.
5. CONCRETE TO BE INSTALLED A MINIMUM OF 7 DAYS PRIOR TO INSTALLING LIGHT POLE. POURED CONCRETE MIX REQUIRED TO OBTAIN 80% OF DESIGN STRENGTH PRIOR TO INSTALLING LIGHT POLE.
6. CONCRETE SHALL HAVE A MAXIMUM SLUMP OF 4" (WITHIN 1" TOLERANCE).
7. POLE SHALL BE RATED FOR 10 MPH HIGHER THAN MAXIMUM WIND SPEED 33FT ABOVE GROUND FOR THE AREA BASED ON ANSI/ASCE 7-93.
8. POUR TO BE TERMINATED AT A FORM.
9. WORK SHALL CONFORM TO ACI BEST PRACTICES FOR APPROPRIATE TEMPERATURE AND WEATHER CONDITIONS.
10. CONTRACTOR TO TEMPORARILY SUPPORT ADJACENT SOIL AND STRUCTURES DURING EXCAVATION IF REQUIRED.

1

Lumark

DESCRIPTION

The Prevail™ LED pole and fixture combination makes selection and installation of poles and fixtures simple. Included is the die-cast Prevail area, site and roadway luminaire with standard mounting arm, square straight steel pole, anchor bolts, base cover, template and hardware. Stock configurations are available in single and dual fixture combinations. The Prevail luminaire delivers a new level of versatility and value in patent pending, architectural design that delivers energy savings greater than 85% and replaces 150-450W metal halide fixtures. The Prevail fixture and pole combo is ideal for general area/site lighting applications.

Catalog #		Type
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Construction
Construction is comprised of a heavy-duty, single-piece die-cast aluminum housing in dark bronze polyester powder paint. The die-cast aluminum door is tethered to provide easy access to the driver if replacement is required. The optics is mounted on a versatile, aluminum plate that dissipates heat from the LEDs resulting in longer life of the fixture. The fixture is IP66 and 3G vibration rated (ANSI C136.31).

Optics
Available in Type III and IV distributions with lumen packages ranging from 7,000 to 20,000 nominal lumens. Light engine configurations consist of 1 or 2 high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L91/50,000 hours at 25°C) per IESNA TM-21. For the ultimate level of spill light control, an optional house side shield accessory can be field or factory installed.

Electrical
Available in 120-277V 50/60Hz. 10kV/10kA surge protection standard. 0-10V dimming driver is standard with leads external to the fixture to accommodate controls capability such as dimming and occupancy. Suitable for ambient temperatures from -40°C to 40°C.

Mounting
The versatile, patent pending, standard mount arm accommodates multiple drill patterns ranging from 1-1/2" to 4-7/8". Removal of the door on the standard mounting arm enables wiring of the fixture without having to access the driver compartment. A knock-out on the standard mounting arm enables round pole mounting.

Pole
Shaft is one-piece construction ASTM A500 grade "B" steel, shot blasted and finished in dark bronze polyester powder coat. Anchor base is fabricated from ASTM grade steel. ASTM A366 steel full base cover is provided to enclose base plate and anchor bolts. Anchor bolts are per ASTM A576 with two nuts, two flat washers, and one lock washer. Hardware and threaded portion of bolt are hot dip galvanized. 3" hook for 3/4" bolt. 4" hook for 1" bolt.

Finish
Housing and cast parts finished in five-stage super TGIC polyester bronze powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear.

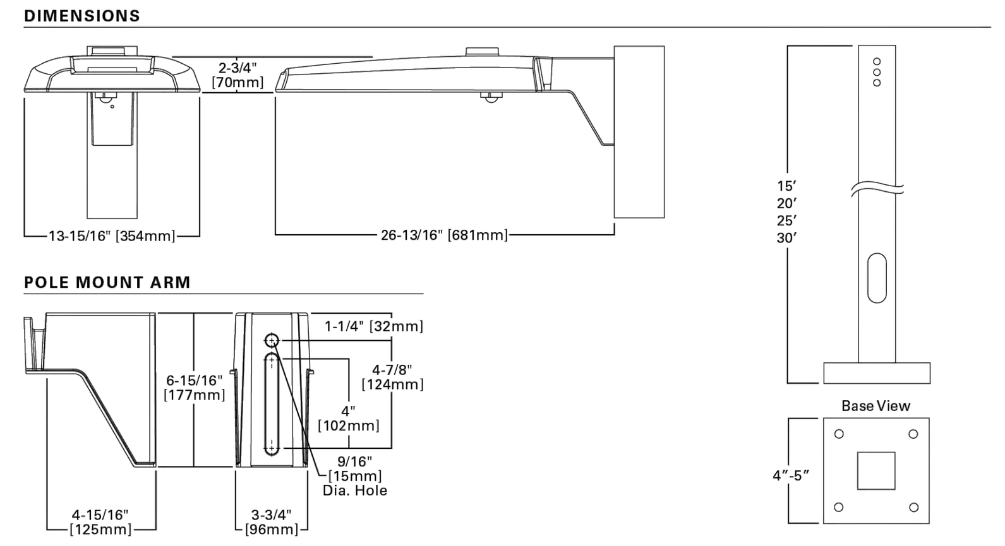
Warranty
Five-year warranty.

PFPRV PREVAIL POLE AND FIXTURE COMBO

LED

POLE AND FIXTURE COMBO

DIMENSIONS



CERTIFICATION DATA
UL and cUL Wet Location Listed
IP66-Rated
3G Vibration Rated
ISO 9001

ENERGY DATA
Electronic LED Driver
0.9 Power Factor
<20% Total Harmonic Distortion
120-277V/50 and 60Hz,
347V/60Hz, 480V/60Hz
-40°C Minimum Temperature Rating
+40°C Ambient Temperature Rating

EPA
Effective Projected Area (Sq. Ft.): 0.75 (1 fixture)

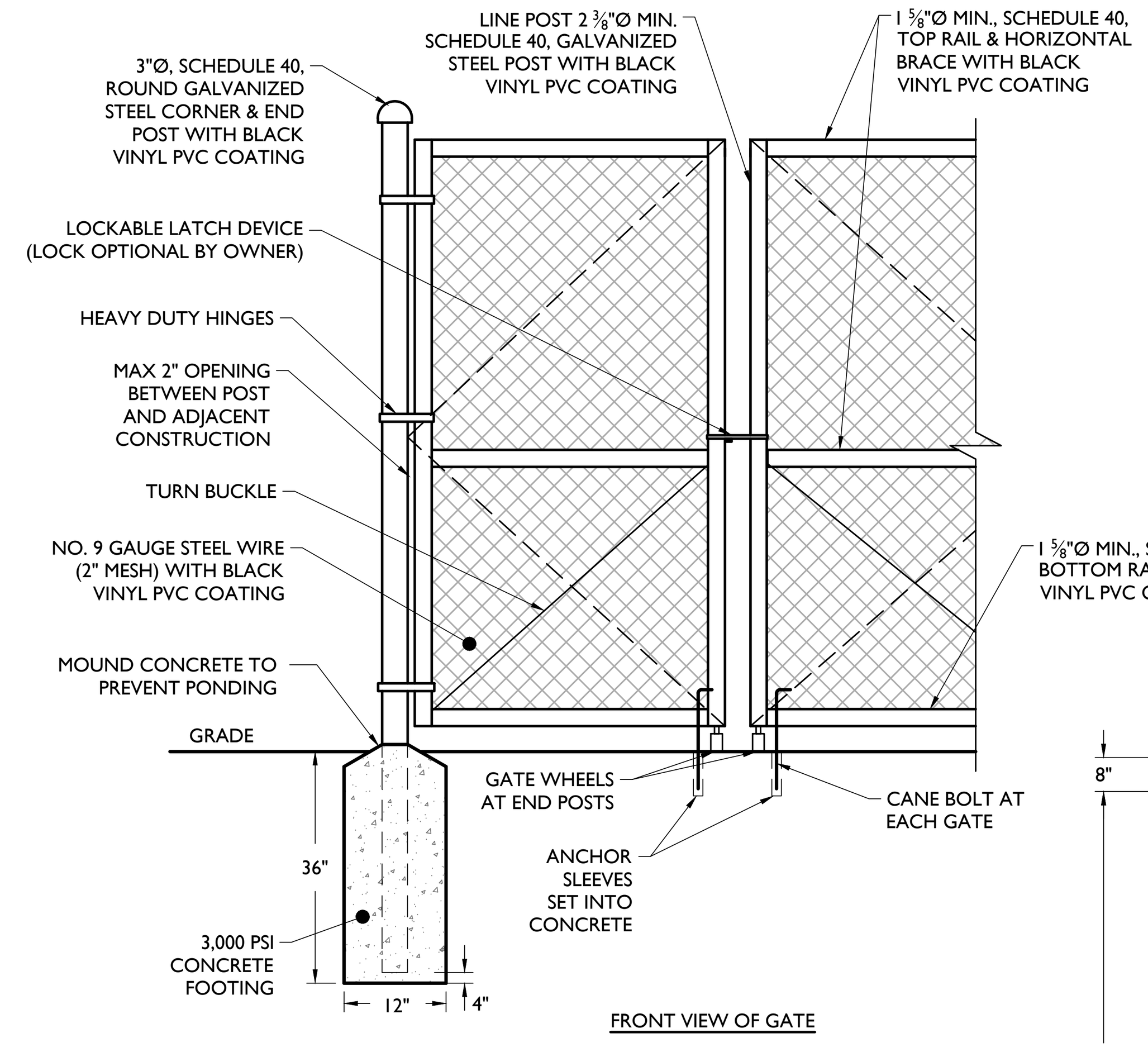
SHIPPING DATA
Approximate Net Weight:
20lbs. [9.09 kgs.] **(1 fixture)**

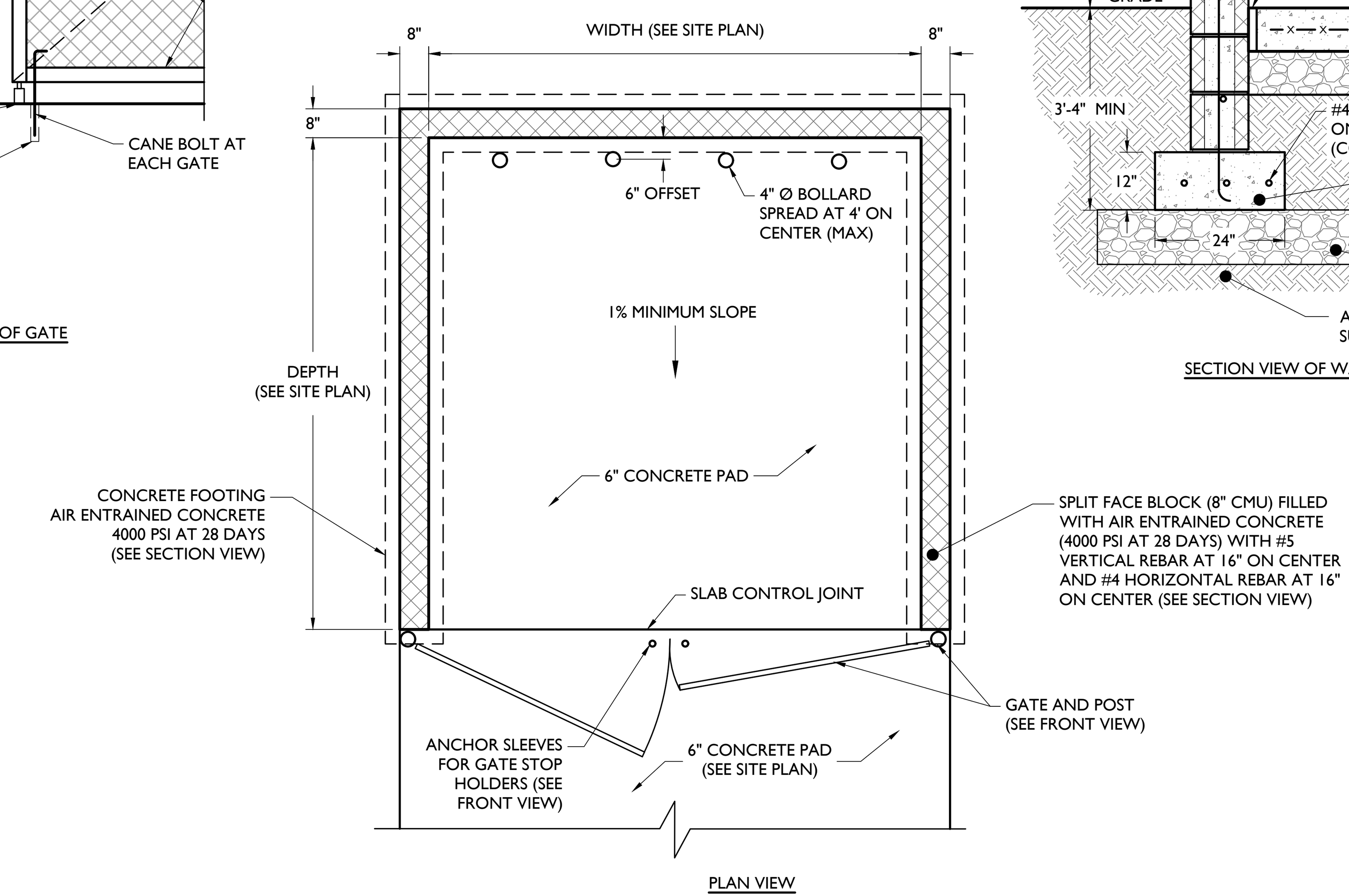
EATON
Powering Business Worldwide

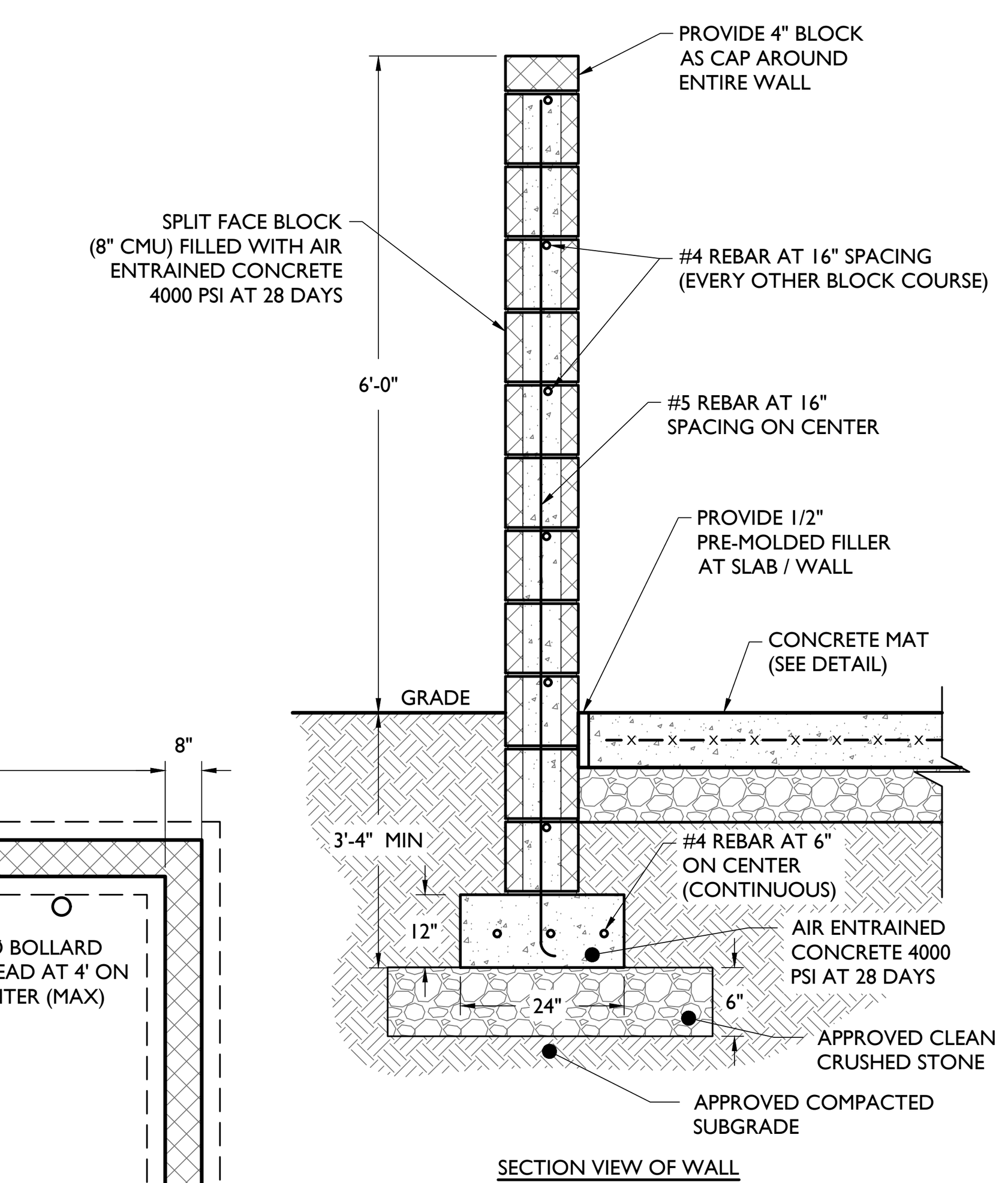
TD500029EN
October 15, 2019 11:09 AM

LIGHTING SPECIFICATIONS 'A' TO 'E'

2





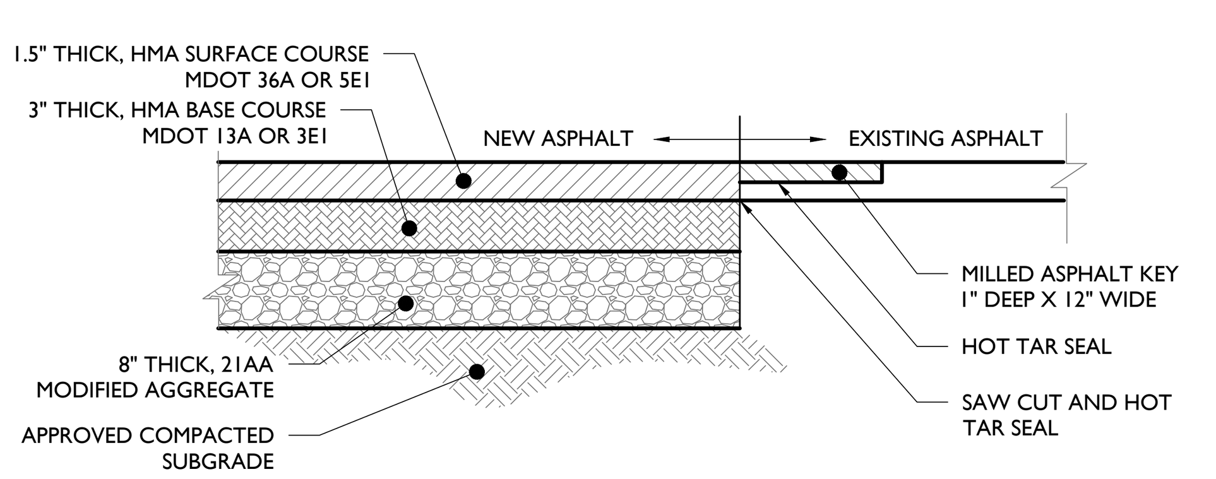


NOTE:
BLOCK COLOR TO MATCH BUILDING OR AS SPECIFIED BY OWNER

TRASH / RECYCLE ENCLOSURE DETAIL

NOT TO SCALE

3

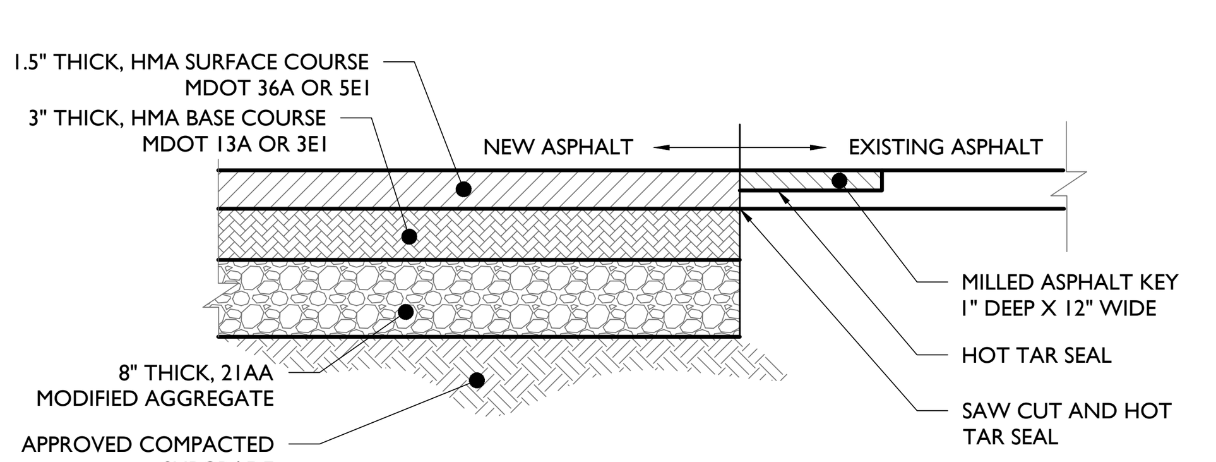


HEAVY DUTY ASPHALT DETAIL

NOT TO SCALE

NOTE:
HMA MIX AND DENSE GRADED AGGREGATE SHALL CONFORM TO STATE DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.

4

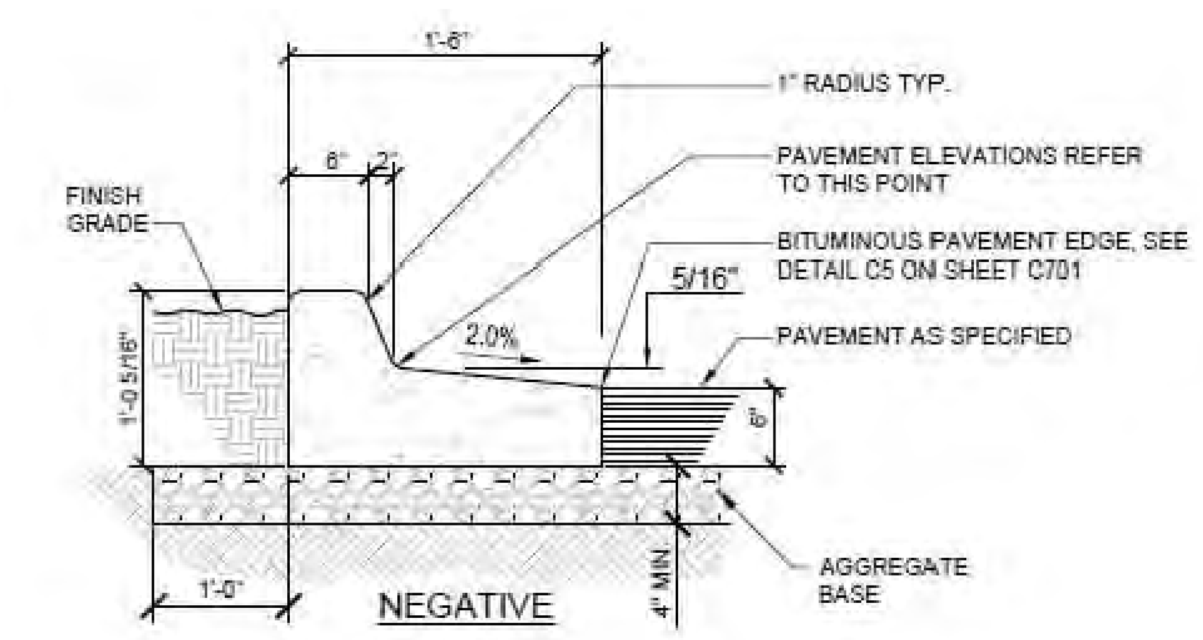


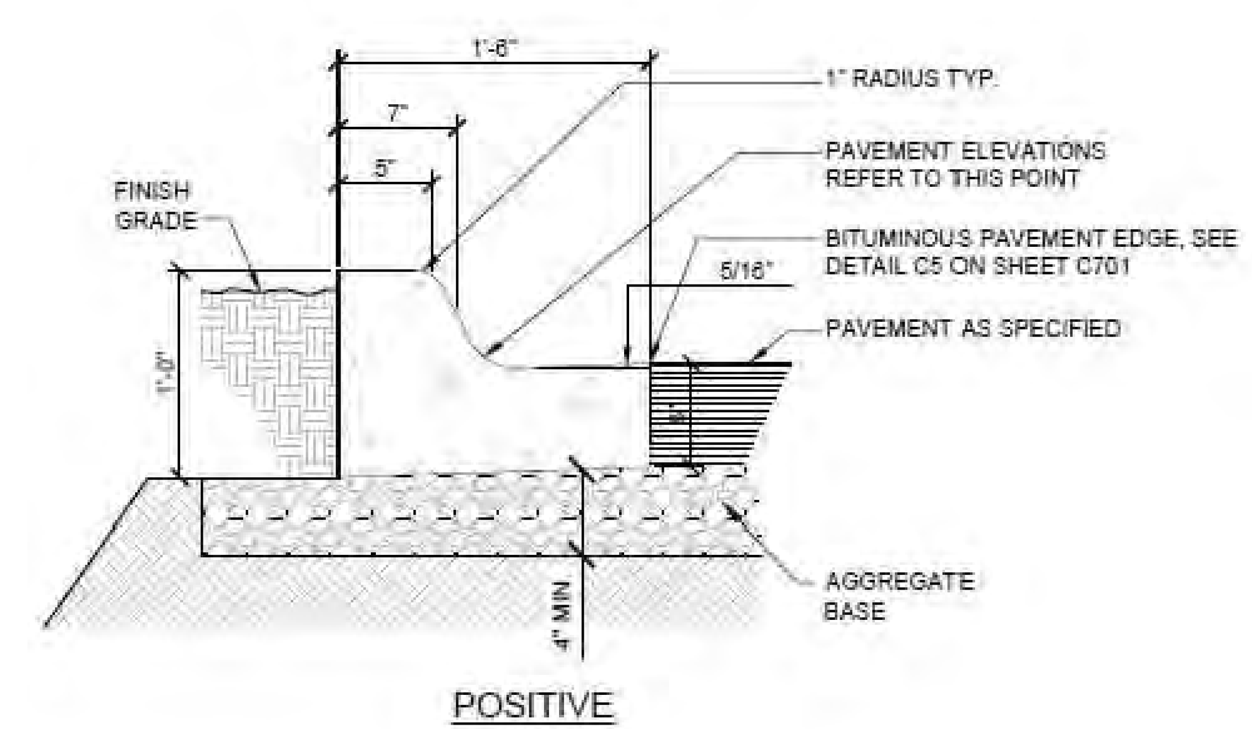
MEIJER DRIVE ASPHALT DETAIL

NOT TO SCALE

NOTE:
HMA MIX AND DENSE GRADED AGGREGATE SHALL CONFORM TO STATE DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.

5

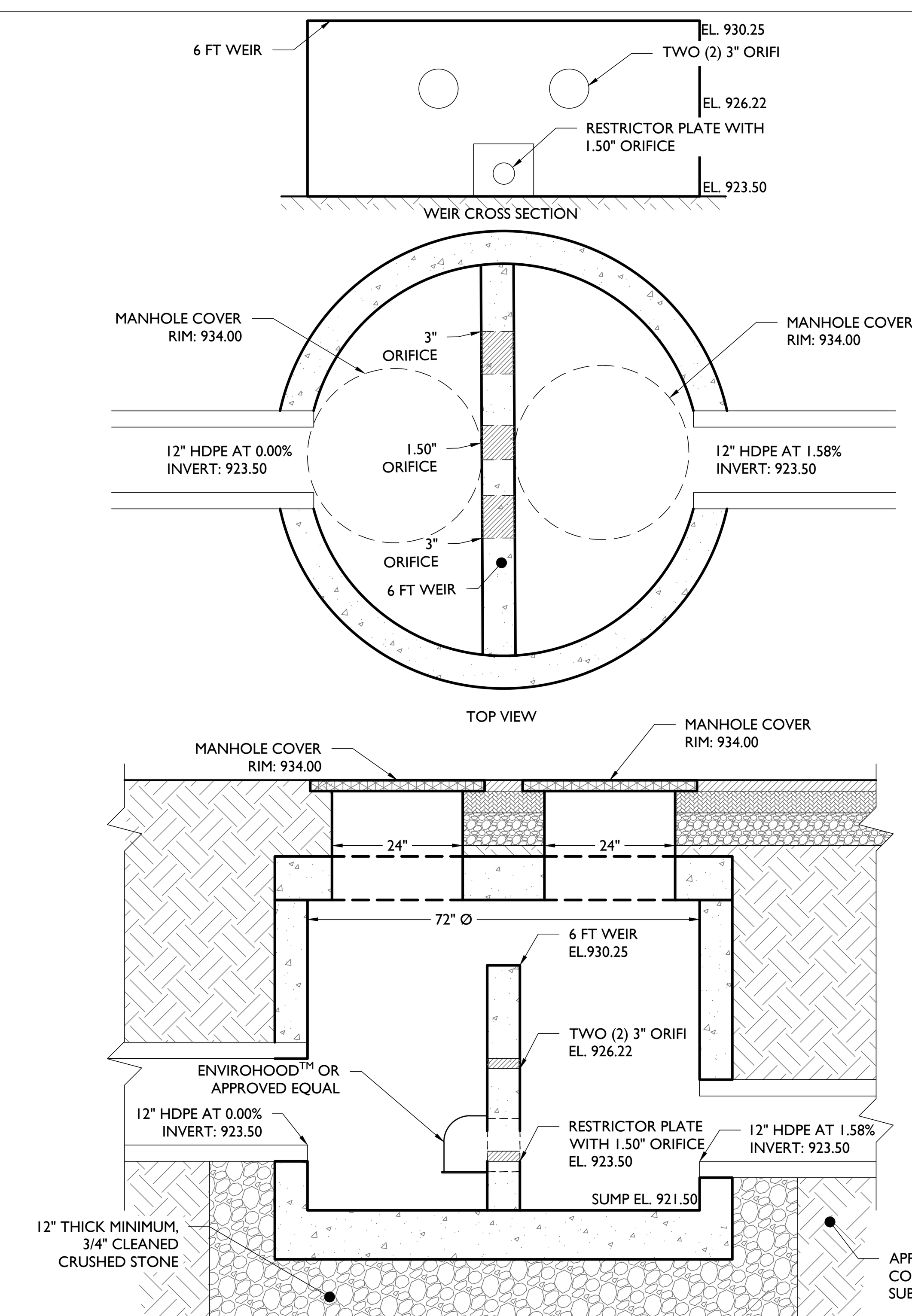




MEIJER DRIVE CONCRETE CURB & GUTTER DETAIL

NOT TO SCALE

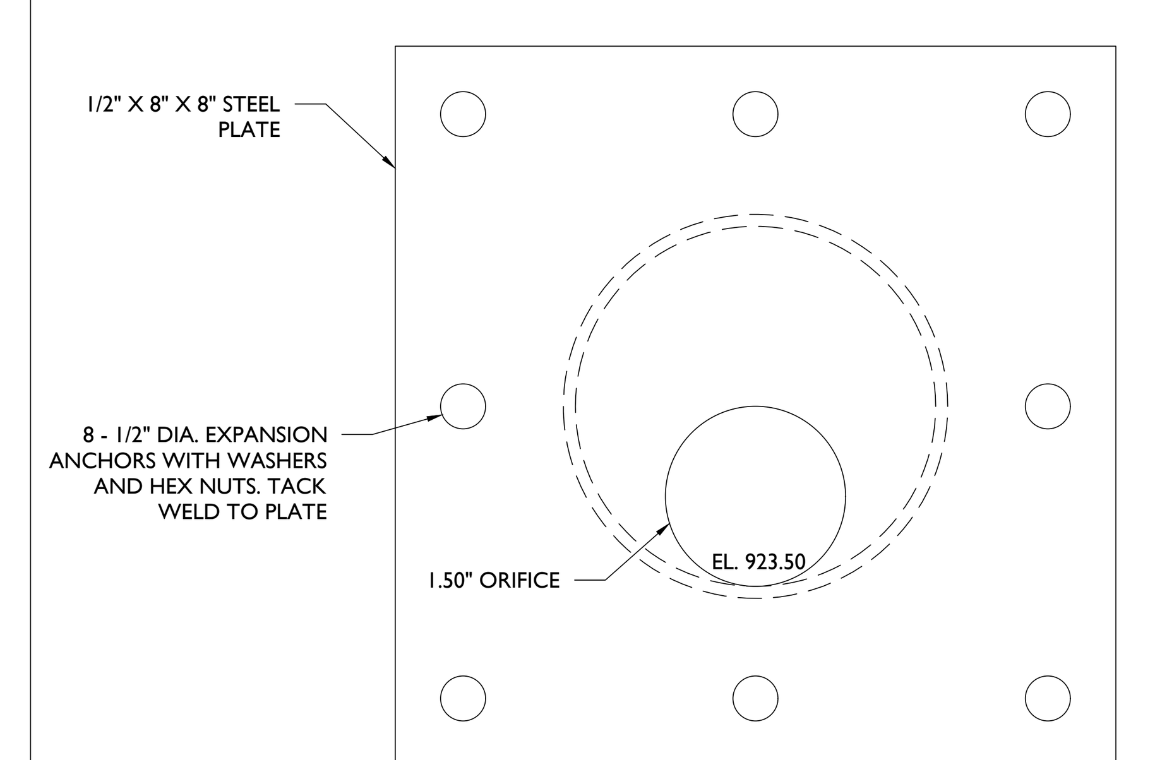
6



UNDERGROUND OUTLET STRUCTURE (OS-1) DETAIL

NOTES:
1. WATER TIGHT CONNECTIONS WHERE INLET & OUTLET PIPES PENETRATE OUTLET STRUCTURE
2. ALL WALL JOINTS AND WALL-TO STRUCTURE JOINTS SHALL BE WATERTIGHT ALONG WEIR WALL

7



NOTES:
1. RESTRICTORS LESS THAN 4" DIAMETER PROVIDE HOOD / SNOUT OR WIRE MESH
2. ANCHOR EMBEDMENT TO BE 3" MINIMUM
3. SEAL AROUND PLATE WITH EPOXY SEALANT

RESTRICTOR PLATE DETAIL

NOT TO SCALE

8

ISSUE	DATE	BY	DESCRIPTION
8	02/09/2023	MPH	FOR CITY COUNCIL APPROVAL
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607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STATE OF MICHIGAN
JONATHAN REID COOKSEY
ENGINEER
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: AS SHOWN | PROJECT ID: DET-200128

TITLE:
CONSTRUCTION DETAILS

DRAWING:
C-11

V:\DET\2020\DET-200128-ALRG-8680 WEST GRAND RIVER, BRIGHTON, MI\CADD\PLOTS\DP-15-11-13-DETL.DWG

Project: EL Carwash - Brighton

ADS StormTech

Chamber Model -	MC-7200	
Units -	Imperial	
Number of Chambers -	60	
Number of End Caps -	12	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	923.50	ft
Amount of Stone Above Chambers -	12	in
Amount of Stone Below Chambers -	9	in
	6	
Area of system -	4470	sf Min. Area - 3999 sf min. area

StormTech MC-7200 Cumulative Storage Volumes

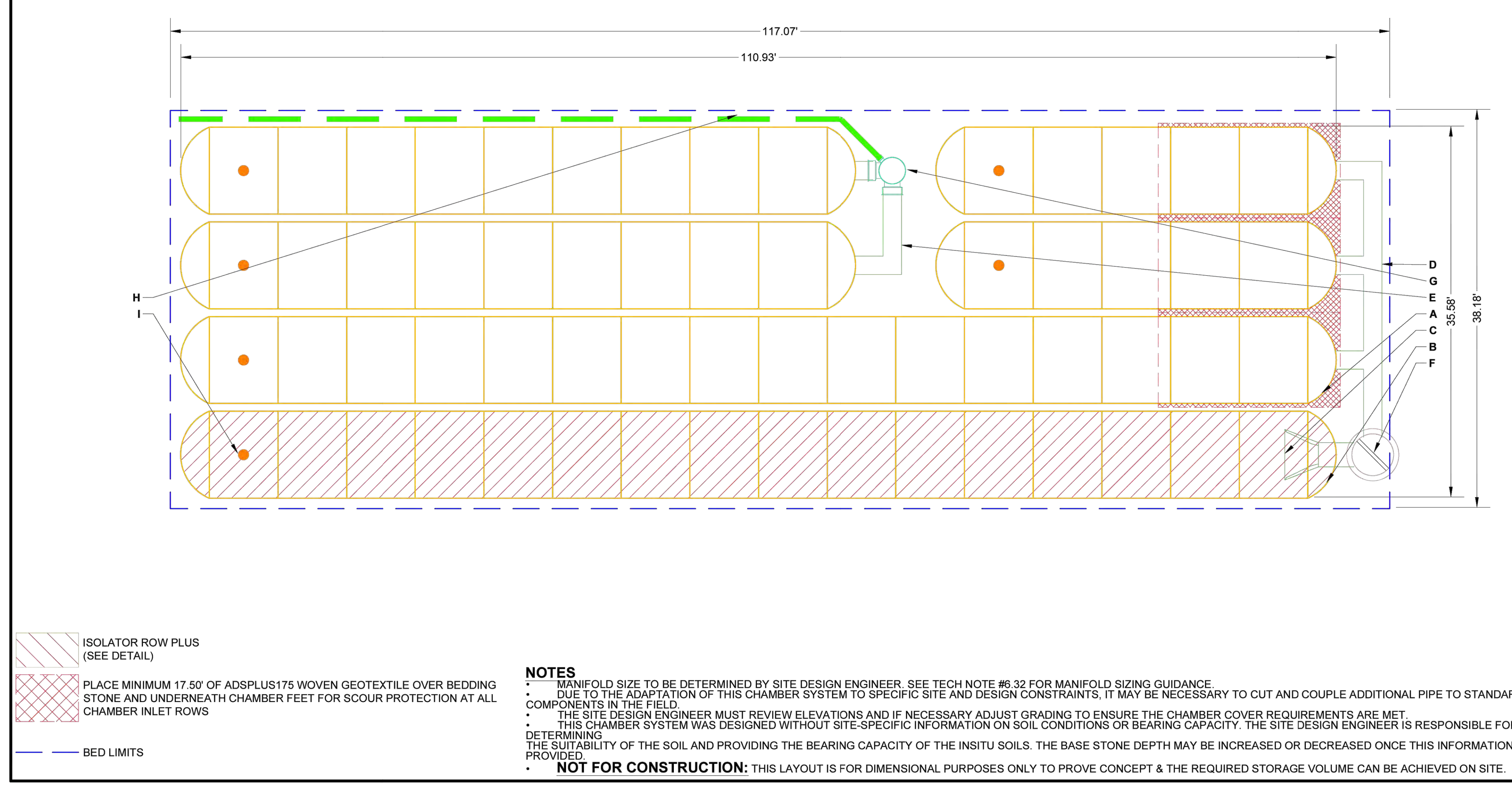
Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Single End Cap (cubic feet)	Incremental Chambers (cubic feet)	Incremental End Cap (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch, EC and Stone (cubic feet)	Cumulative System	Elevation
81	0.00	0.00	0.00	0.00	149.00	149.00	18686.19	930.25
80	0.00	0.00	0.00	0.00	149.00	149.00	18537.19	930.17
79	0.00	0.00	0.00	0.00	149.00	149.00	18388.19	930.08
78	0.00	0.00	0.00	0.00	149.00	149.00	18239.19	930.00
77	0.00	0.00	0.00	0.00	149.00	149.00	18090.19	929.92
76	0.00	0.00	0.00	0.00	149.00	149.00	17941.19	929.83
75	0.00	0.00	0.00	0.00	149.00	149.00	17792.19	929.75
74	0.00	0.00	0.00	0.00	149.00	149.00	17643.19	929.67
73	0.00	0.00	0.00	0.00	149.00	149.00	17494.19	929.58
72	0.00	0.00	0.00	0.00	149.00	149.00	17345.19	929.50
71	0.00	0.00	0.00	0.00	149.00	149.00	17196.19	929.42
70	0.00	0.00	0.00	0.00	149.00	149.00	17047.19	929.33
69	0.06	0.01	3.56	0.16	147.51	151.23	16898.19	929.25
68	0.19	0.03	11.41	0.41	144.27	156.09	16746.96	929.17
67	0.28	0.05	16.51	0.62	142.15	159.28	16590.87	929.08
66	0.36	0.07	21.44	0.79	140.11	162.34	16431.59	929.00
65	0.46	0.08	27.50	1.00	137.60	166.10	16269.25	928.92
64	0.74	0.11	44.50	1.26	130.70	176.46	16103.15	928.83
63	1.10	0.13	65.78	1.59	122.05	189.42	15926.69	928.75
62	1.32	0.16	79.11	1.93	116.58	197.62	15737.27	928.67
61	1.50	0.19	89.89	2.26	112.14	204.29	15539.65	928.58
60	1.65	0.22	99.27	2.62	108.24	210.14	15335.35	928.50
59	1.79	0.25	107.64	2.96	104.76	215.36	15125.22	928.42
58	1.92	0.28	115.18	3.30	101.61	220.09	14909.86	928.33
57	2.04	0.30	122.25	3.62	98.65	224.52	14689.77	928.25
56	2.15	0.33	128.72	3.93	95.94	228.59	14465.25	928.17
55	2.25	0.35	134.86	4.25	93.35	232.47	14236.66	928.08
54	2.34	0.38	140.59	4.60	90.92	236.12	14004.19	928.00
53	2.43	0.41	146.01	4.91	88.63	239.55	13768.07	927.92
52	2.52	0.44	151.14	5.29	86.43	242.86	13528.52	927.83
51	2.60	0.47	156.03	5.63	84.34	246.00	13285.66	927.75
50	2.68	0.50	160.70	5.94	82.34	248.99	13039.66	927.67
49	2.75	0.52	165.15	6.25	80.44	251.84	12790.68	927.58
48	2.82	0.54	169.41	6.53	78.62	254.56	12538.83	927.50
47	2.89	0.57	173.48	6.80	76.89	257.17	12284.27	927.42
46	2.96	0.59	177.38	7.06	75.22	259.67	12027.10	927.33
45	3.02	0.61	181.13	7.32	73.62	262.07	11767.43	927.25
44	3.08	0.63	184.72	7.59	72.08	264.38	11505.36	927.17
43	3.14	0.64	188.18	7.72	70.64	266.54	11240.98	927.08
42	3.19	0.68	191.51	8.13	69.15	268.78	10974.45	927.00
41	3.25	0.70	194.70	8.40	67.76	270.86	10705.67	926.92
40	3.30	0.72	197.78	8.67	66.42	272.87	10434.81	926.83
39	3.35	0.74	200.74	8.92	65.14	274.80	10161.94	926.75
38	3.39	0.76	203.59	9.17	63.90	276.66	9887.14	926.67
37	3.44	0.79	206.33	9.43	62.70	278.45	9610.48	926.58
36	3.48	0.80	208.97	9.63	61.56	280.16	9332.03	926.50
35	3.53	0.82	211.52	9.84	60.46	281.82	9051.87	926.42
34	3.57	0.84	213.97	10.06	59.39	283.42	8770.05	926.33
33	3.61	0.85	216.34	10.22	58.38	284.93	8486.63	926.25
32	3.64	0.86	218.61	10.31	57.43	286.35	8201.70	926.17
31	3.68	0.89	220.80	10.67	56.41	287.88	7915.35	926.08
30	3.71	0.90	222.90	10.85	55.50	289.25	7627.47	926.00
29	3.75	0.92	224.92	11.01	54.63	290.56	7338.21	925.92
28	3.78	0.92	226.86	11.04	53.84	291.74	7047.66	925.83
27	3.81	0.94	228.72	11.32	52.98	293.03	6755.92	925.75
26	3.84	0.96	230.50	11.48	52.21	294.19	6462.89	925.67
25	3.87	0.97	232.21	11.62	51.47	295.30	6168.71	925.58
24	3.90	0.98	233.84	11.78	50.75	296.37	5873.41	925.50
23	3.92	0.97	235.41	11.65	50.18	297.24	5577.03	925.42
22	3.95	1.00	236.90	12.04	49.43	298.36	5279.80	925.33
21	3.97	1.01	238.32	12.13	48.82	299.27	4981.44	925.25
20	3.99	1.02	239.67	12.24	48.23	300.15	4682.17	925.17
19	4.02	1.03	240.96	12.36	47.67	300.99	4382.02	925.08
18	4.04	1.04	242.17	12.46	47.15	301.78	4081.02	925.00
17	4.06	1.05	243.33	12.56	46.65	302.53	3779.24	924.92
16	4.07	1.05	244.41	12.65	46.18	303.24	3476.71	924.83
15	4.09	1.05	245.43	12.61	45.79	303.82	3173.48	924.75
14	4.11	1.06	246.40	12.68	45.37	304.45	2869.65	924.67
13	4.12	1.08	247.33	12.91	44.91	305.14	2565.21	924.58
12	4.14	1.08	248.19	12.99	44.53	305.71	2260.07	924.50
11	4.15	1.09	249.00	13.06	44.18	306.23	1954.36	924.42
10	4.17	1.11	250.26	13.28	43.59	307.12	1648.12	924.33
9	0.00	0.00	0.00	0.00	149.00	149.00	1341.00	924.25
8	0.00	0.00	0.00	0.00	149.00	149.00	1192.00	924.17
7	0.00	0.00	0.00	0.00	149.00	149.00	1043.00	924.08
6	0.00	0.00	0.00	0.00	149.00	149.00	894.00	924.00
5	0.00	0.00	0.00	0.00	149.00	149.00	745.00	923.92
4	0.00	0.00	0.00	0.00	149.00	149.00	596.00	923.83
3	0.00	0.00	0.00	0.00	149.00	149.00	447.00	923.75
2	0.00	0.00	0.00	0.00	149.00	149.00	298.00	923.67
1	0.00	0.00	0.00	0.00	149.00	149.00	149.00	923.58

PROPOSED LAYOUT	
60	STORMTECH MC-7200 CHAMBERS
12	STORMTECH MC-7200 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
18686	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
4470	SYSTEM AREA (SF)
310.5	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	936.25
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	931.75
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	931.25
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	931.25
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	931.25
TOP OF STONE:	930.25
TOP OF MC-7200 CHAMBER:	929.25
24" ISOLATOR ROW PLUS INVERT:	924.44
18" x 18" BOTTOM MANIFOLD INVERT:	924.41
18" x 18" BOTTOM MANIFOLD INVERT:	924.41
18" BOTTOM CONNECTION INVERT:	924.41
BOTTOM OF MC-7200 CHAMBER:	924.25
UNDERDRAIN INVERT:	923.50
BOTTOM OF STONE:	923.50

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	18" BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP18B / TYP OF ALL 18" BOTTOM CONNECTIONS	1.97"	
PREFABRICATED END CAP	B	24" BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	C	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC720024RAMP		
MANIFOLD	D	18" x 18" BOTTOM MANIFOLD, ADS N-12	1.97"	
MANIFOLD	E	18" x 18" BOTTOM MANIFOLD, ADS N-12	1.97"	
CONCRETE STRUCTURE W/WEIR	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		16.5 CFS IN
NYLOPLAST (OUTLET)	G	30" DIAMETER (DESIGN BY ENGINEER)		8.0 CFS OUT
UNDERDRAIN	H	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
INSPECTION PORT	I	4" SEE DETAIL (TYP 6 PLACES)		



NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

EL CARWASH
BRIGHTON, MI, USA
DATE: DRAWN: MG PROJECT #: CHECKED: N/A

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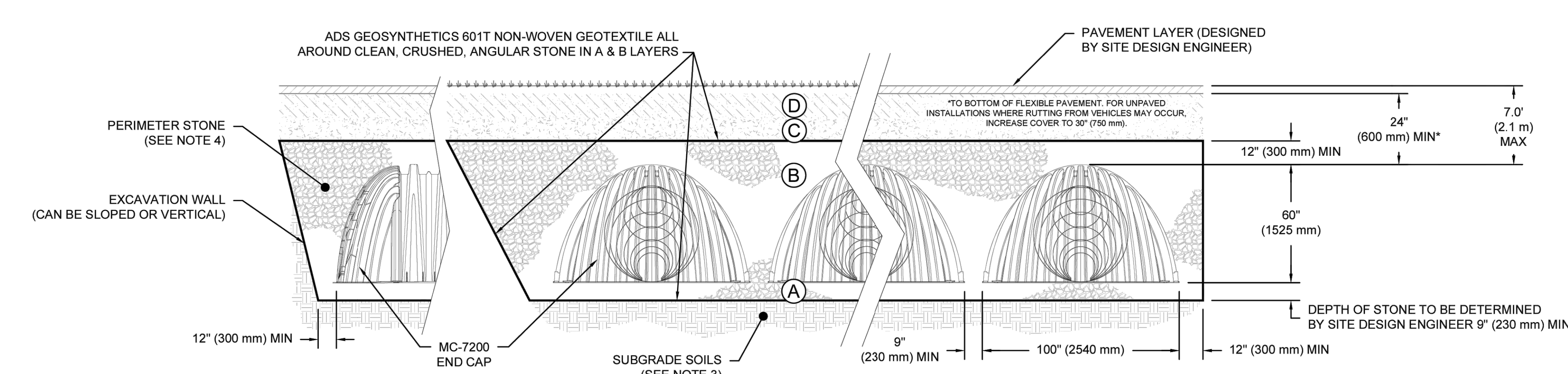
SHEET 2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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BRIGHTON, MI, USA
DATE: DRAWN: MG PROJECT #: CHECKED: N/A

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SHEET 3 OF 6

ISSUE	DATE	BY	DESCRIPTION
8	02/09/2023	MPH	FOR CITY COUNCIL APPROVAL
7	02/01/2023	MPH	FOR CITY COUNCIL APPROVAL
6	01/23/2023	MPH	UPDATE PER FIELD WATER MAIN LOCATION
5	01/23/2023	MPH	PER FIRE MARSHALL COMMENTS
4	01/11/2023	MPH	PER FIRE MARSHALL COMMENTS
3	12/21/2022	MG	FOR SITE PLAN APPROVAL
2	11/17/2022	MG	FOR SITE PLAN & REZONING APPROVAL
1	11/02/2022	MG	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

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Phone 248.247.1115

SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

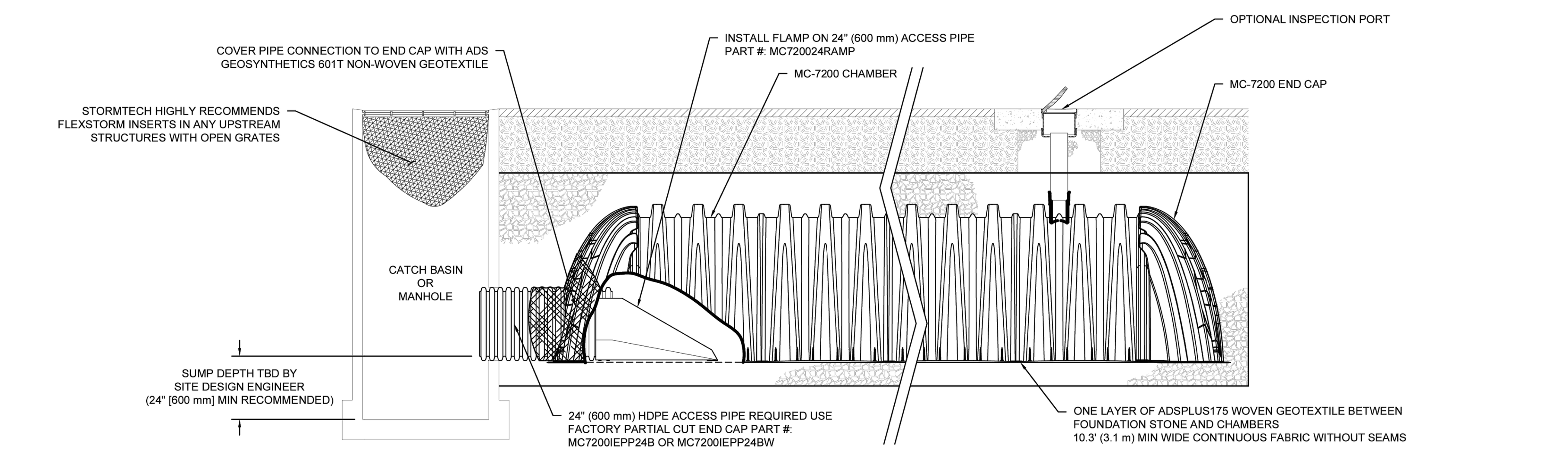
STATE OF MICHIGAN — JONATHAN REID COOKSEY — ENGINEER — LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: AS SHOWN | PROJECT ID: DET-200128

TITLE: CONSTRUCTION DETAILS

DRAWING: C-12



COVER PIPE CONNECTION TO END CAP WITH ADS GEOSYNTHETICS 601T NON-WOVEN GEOTEXTILE
STORMTECH HIGHLY RECOMMENDS FLEXSTORM INSERTS IN ANY UPSTREAM STRUCTURES WITH OPEN GRATES
INSTALL FLAMP ON 24" (600 mm) ACCESS PIPE PART #: MC720024RAMP
MC-7200 CHAMBER
OPTIONAL INSPECTION PORT
MC-7200 END CAP
CATCH BASIN OR MANHOLE
SUMP DEPTH TBD BY SITE DESIGN ENGINEER (24" [600 mm] MIN RECOMMENDED)
24" (600 mm) HDPE ACCESS PIPE REQUIRED USE FACTORY PARTIAL CUT END CAP PART #: MC7200IEPP24B OR MC7200IEPP24BW
ONE LAYER OF ADSPLUS175 WOVEN GEOTEXTILE BETWEEN FOUNDATION STONE AND CHAMBERS 10.3' (3.1 m) MIN WIDE CONTINUOUS FABRIC WITHOUT SEAMS

MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

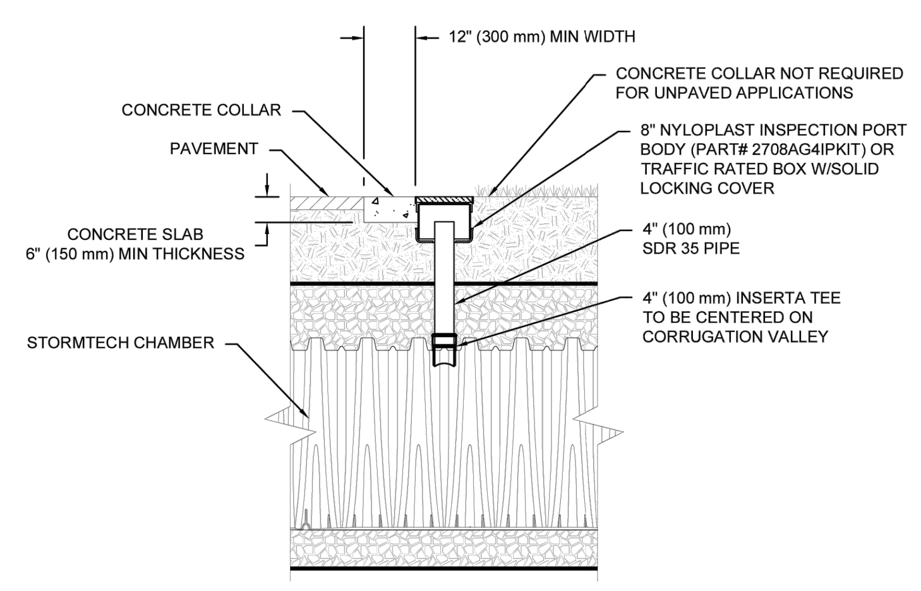
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



12" (300 mm) MIN WIDTH
CONCRETE COLLAR
PAVEMENT
CONCRETE COLLAR NOT REQUIRED FOR UNPAVED APPLICATIONS
8" NYLOPLAST INSPECTION PORT BODY (PART# 2708AG4IPKIT) OR TRAFFIC RATED BOX W/SOLID LOCKING COVER
CONCRETE SLAB 6" (150 mm) MIN THICKNESS
4" (100 mm) SDR 35 PIPE
4" (100 mm) INSERTA TEE TO BE CENTERED ON CORRUGATION VALLEY
STORMTECH CHAMBER

NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL (MC SERIES CHAMBER)
NTS

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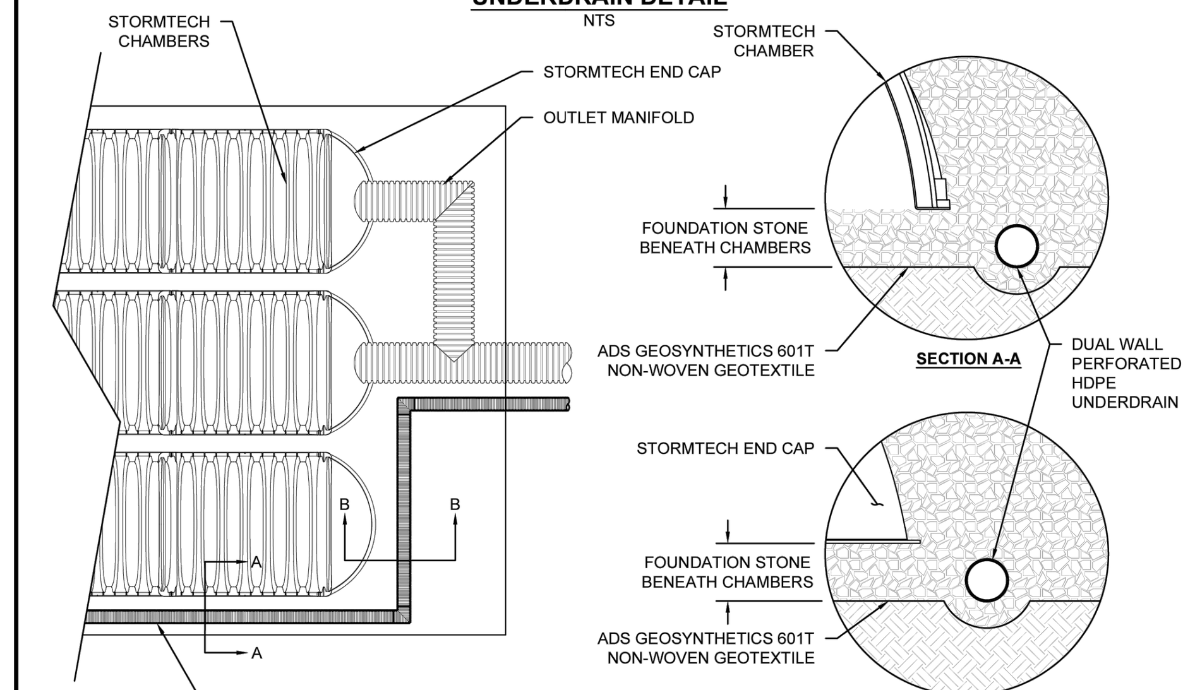
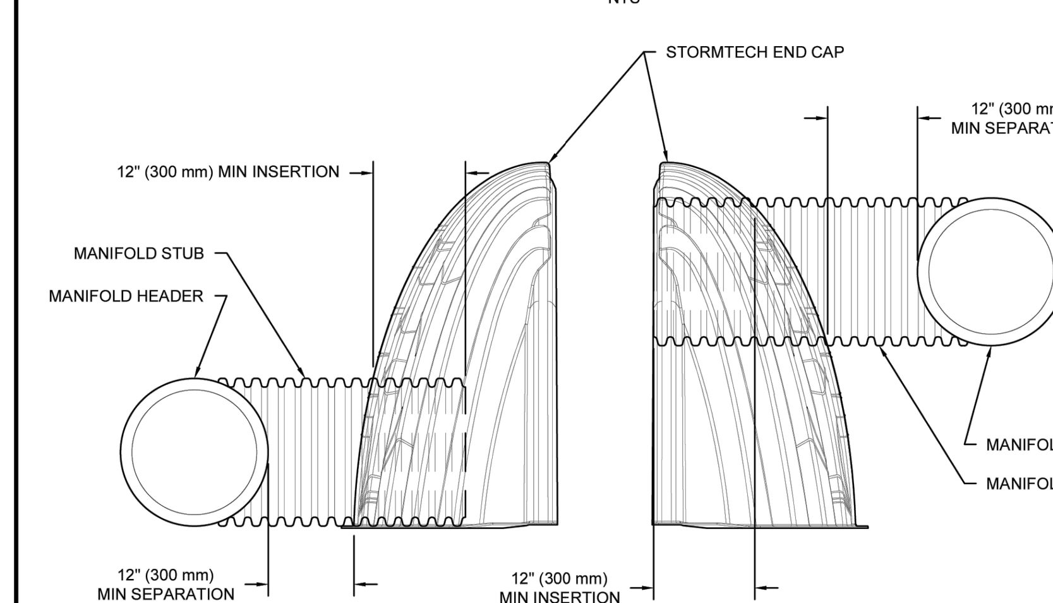
SHEET 4 OF 6

UNDERDRAIN DETAIL
NTS



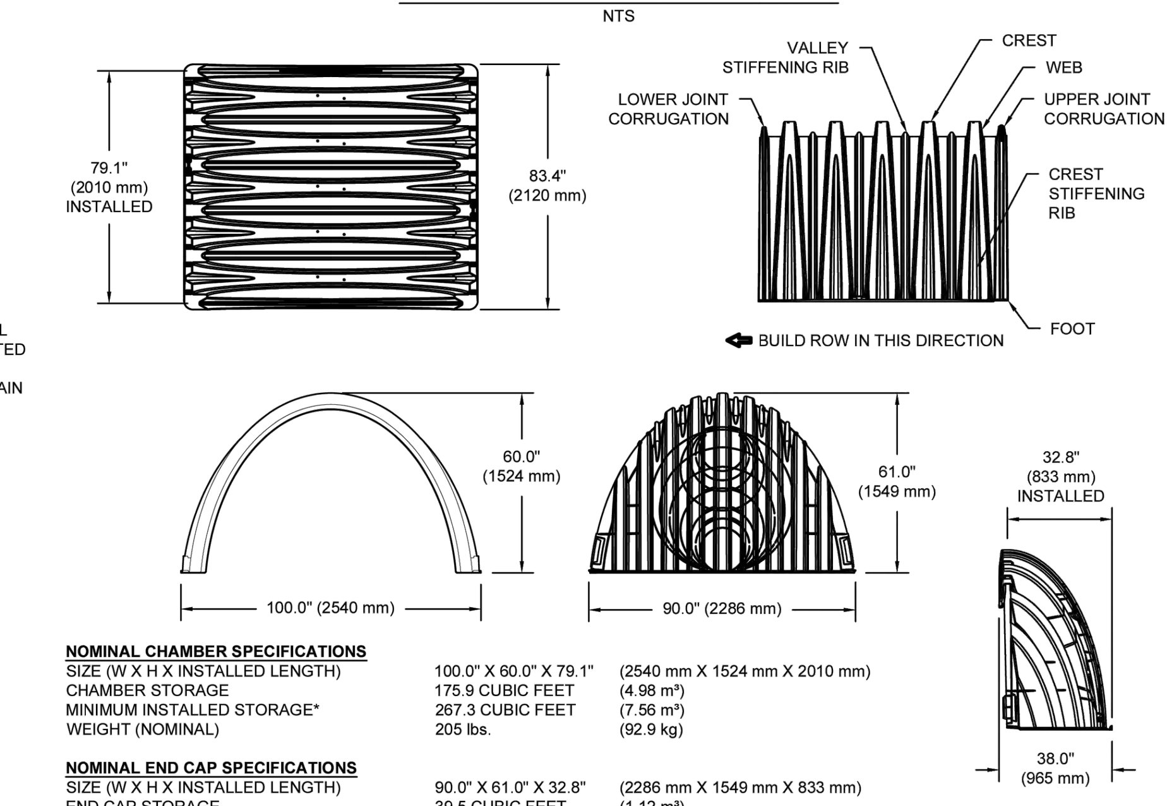
NUMBER AND SIZE OF UNDERDRAINS PER SITE DESIGN ENGINEER
4" (100 mm) TYP FOR SC-310 & SC-160LP SYSTEMS
6" (150 mm) TYP FOR SC-740, DC-780, MC-3500, MC-4500 & MC-7200 SYSTEMS

MC-SERIES END CAP INSERTION DETAIL
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-7200 TECHNICAL SPECIFICATION
NTS



79.1" (2010 mm) INSTALLED
83.4" (2120 mm)
LOWER JOINT CORRUGATION
VALLEY STIFFENING RIB
CREST
WEB
UPPER JOINT CORRUGATION
CREST STIFFENING RIB
FOOT
BUILD ROW IN THIS DIRECTION
60.0" (1524 mm)
100.0" (2540 mm)
61.0" (1549 mm)
90.0" (2286 mm)
32.8" (833 mm) INSTALLED
38.0" (965 mm)

NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

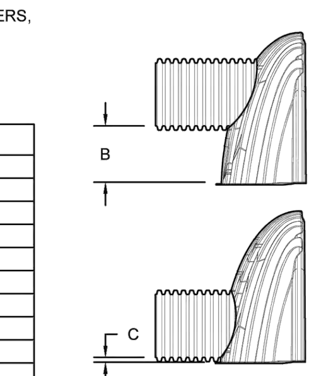
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B		---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B		---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B		---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B		---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B		---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW			
MC7200IEPP18B		---	1.97" (50 mm)
MC7200IEPP18BW			
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW			
MC7200IEPP24B		---	2.26" (57 mm)
MC7200IEPP24BW			
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

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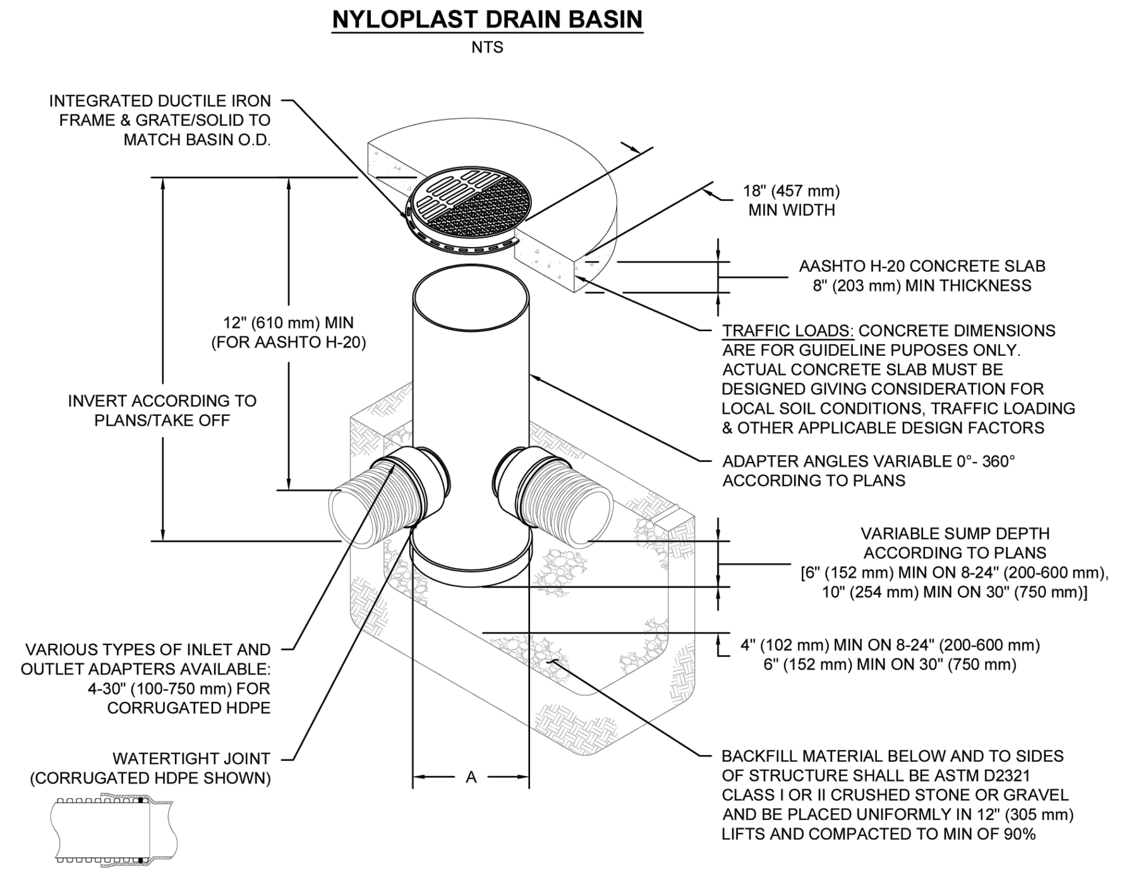
NYLOPLAST DRAIN BASIN
NTS



INTEGRATED DUCTILE IRON FRAME & GRATE/SOLID TO MATCH BASIN O.D.
18" (457 mm) MIN WIDTH
AASHTO H-20 CONCRETE SLAB 8" (203 mm) MIN THICKNESS
12" (610 mm) MIN (FOR AASHTO H-20)
TRAFFIC LOADS: CONCRETE DIMENSIONS ARE FOR GUIDELINE PUPOSES ONLY. ACTUAL CONCRETE SLAB MUST BE DESIGNED GIVING CONSIDERATION FOR LOCAL SOIL CONDITIONS, TRAFFIC LOADING & OTHER APPLICABLE DESIGN FACTORS
INVERT ACCORDING TO PLANS/TAKE OFF
ADAPTER ANGLES VARIABLE 0°- 360° ACCORDING TO PLANS
VARIABLE SUMP DEPTH ACCORDING TO PLANS [6" (152 mm) MIN ON 8-24" (200-600 mm), 10" (254 mm) MIN ON 30" (750 mm)]
4" (102 mm) MIN ON 8-24" (200-600 mm) 6" (152 mm) MIN ON 30" (750 mm)
VARIOUS TYPES OF INLET AND OUTLET ADAPTERS AVAILABLE: 4-30" (100-750 mm) FOR CORRUGATED HDPE
WATERTIGHT JOINT (CORRUGATED HDPE SHOWN)
A
BACKFILL MATERIAL BELOW AND TO SIDES OF STRUCTURE SHALL BE ASTM D2321 CLASS I OR II CRUSHED STONE OR GRAVEL AND BE PLACED UNIFORMLY IN 12" (305 mm) LIFTS AND COMPACTED TO MIN OF 90%

NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

EL CARWASH
BRIGHTON, MI, USA

Nyloplast®
4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473
770-932-2443 | WWW.NYLOPLAST-US.COM

SHEET 6 OF 6

ISSUE	DATE	BY	DESCRIPTION
8	02/09/2023	MPH	FOR CITY COUNCIL APPROVAL
7	02/01/2023	MPH	FOR CITY COUNCIL APPROVAL
6	01/23/2023	MPH	UPDATE PER FIELD WATER MAIN LOCATION
5	01/23/2023	MPH	PER FIRE MARSHALL COMMENTS
4	01/11/2023	MPH	PER FIRE MARSHALL COMMENTS
3	12/21/2022	MG	FOR SITE PLAN APPROVAL
2	11/17/2022	MG	FOR SITE PLAN & REZONING APPROVAL
1	11/03/2022	MG	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

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www.stonefieldeng.com
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Phone 248.247.1115

SITE DEVELOPMENT PLANS
WEST GRAND & CROSS CARWASH
PROPOSED AUTOMOBILE CARWASH
PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

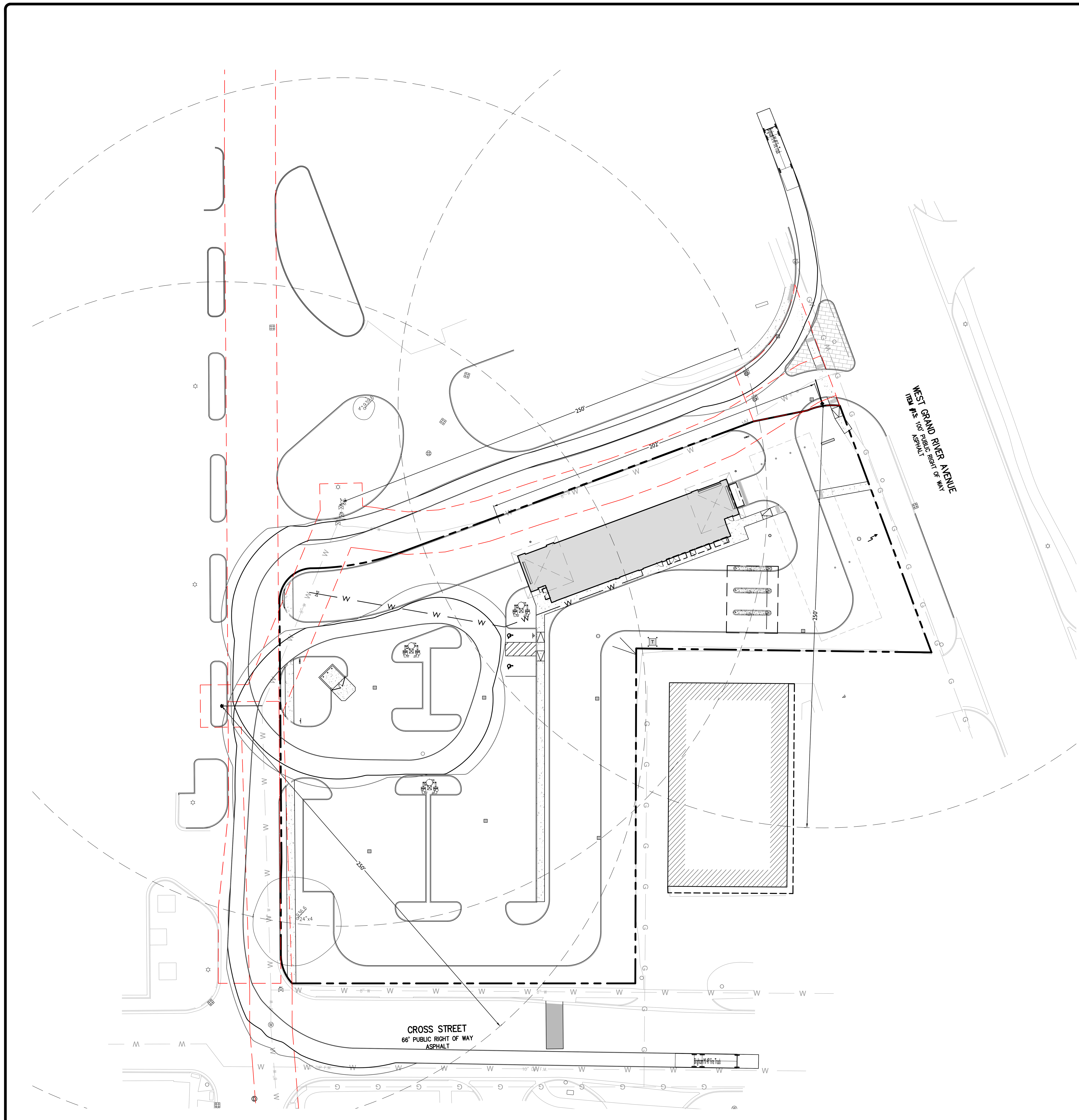
STATE OF MICHIGAN JONATHAN REID COOKSEY ENGINEER PROFESSIONAL ENGINEER

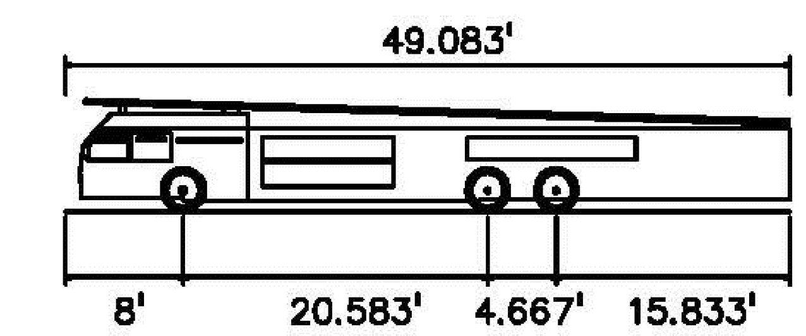
STONEFIELD engineering & design

SCALE: AS SHOWN | PROJECT ID: DET-200128

TITLE: CONSTRUCTION DETAILS

DRAWING: C-13

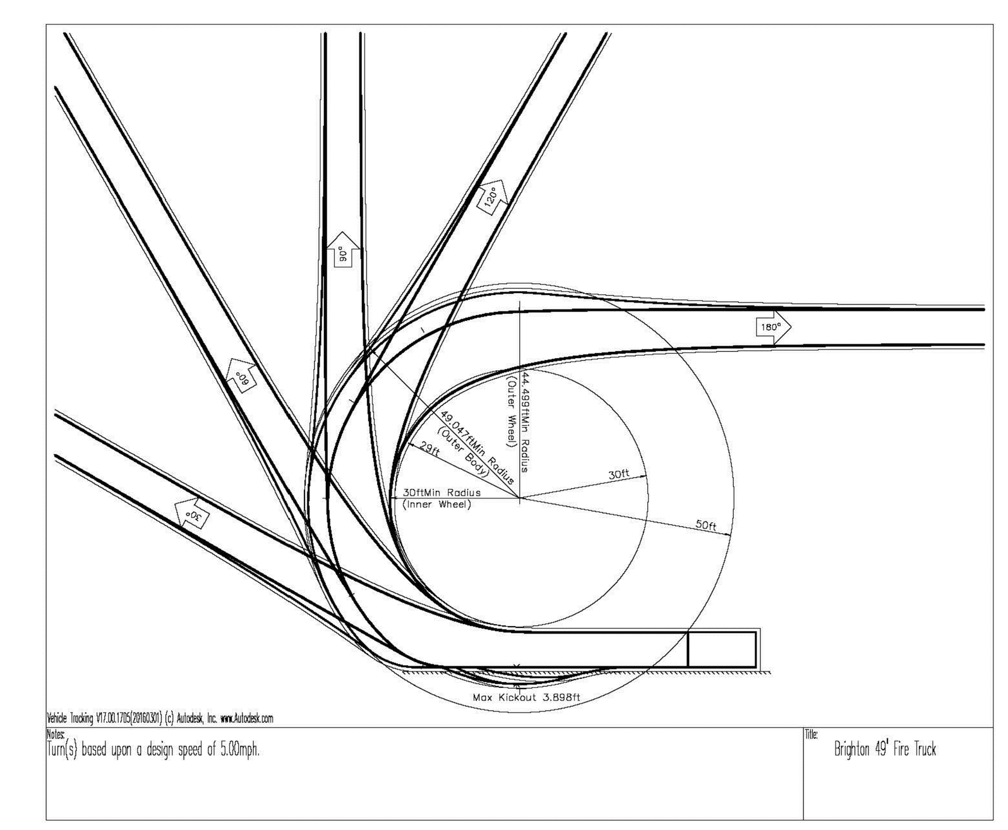




Brighton 49' Fire Truck	
Overall Length	49.083ft
Overall Width	8.167ft
Overall Body Height	7.500ft
Min Body Ground Clearance	0.750ft
Track Width	8.167ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°

FIRE TRUCK DETAIL

NOT TO SCALE



FIRE TRUCK TURNING RADII

1"=30'

202 FT MAXIMUM HOSE LENGTH FOR BUILDING COVERAGE FROM EXISTING HYDRANT

GRAPHIC SCALE IN FEET
30' 0' 30' 60'
1" = 30'

ISSUE	DATE	BY	DESCRIPTION
8	02/09/2023	MPH	FOR CITY COUNCIL APPROVAL
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1	11/03/2022	MG	FOR CLIENT REVIEW

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SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

STATE OF MICHIGAN
JONATHAN REID COOKSEY
ENGINEER
J. REID COOKSEY, P.E.
LICENSED PROFESSIONAL ENGINEER

STONEFIELD
engineering & design

SCALE: 1" = 30'
PROJECT ID: DET-200128

TITLE:
FIRE TRUCK TURNING & COVERAGE EXHIBIT

DRAWING:
EX-1

TITLE REPORT EXCEPTIONS:

ONLY THOSE EXCEPTIONS CONTAINED WITHIN FIDELITY NATIONAL TITLE INSURANCE COMPANY TITLE COMMITMENT NUMBER GLT2200608, REVISION 1, AND RE-LISTED BELOW WERE CONSIDERED FOR THIS SURVEY. NO OTHER RECORDS RESEARCH WAS PERFORMED BY THE CERTIFYING SURVEYOR.

11. RIGHT(S) OF WAY AND/OR EASEMENT(S) AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN DOCUMENT;
IN FAVOR OF: COUNTY OF LIVINGSTON
RECORDING NO.: LIBER 153, PAGE 116; LIBER 153, PAGE 117 AND LIBER 153, PAGE 118. (GRAND RIVER RIGHT OF WAY, AS SHOWN)

12. RIGHT(S) OF WAY AND/OR EASEMENT(S) AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: DETROIT EDISON COMPANY AND MICHIGAN BELL TELEPHONE COMPANY
RECORDING NO.: LIBER 789, PAGE 236
(DOES NOT AFFECT SUBJECT PARCEL)

13. CROSS EASEMENT AGREEMENT FOR STORM WATER DRAINAGE
RECORDING NO.: LIBER 1168, PAGE 821
AMENDMENT TO CROSS EASEMENT AGREEMENT
RECORDING NO.: LIBER 1226, PAGE 168.
(DOES NOT AFFECT SUBJECT PARCEL)

14. NON-EXCLUSIVE UNDERGROUND UTILITY EASEMENT
RECORDING NO.: LIBER 1305, PAGE 988.
(AS SHOWN)

15. COVENATS, CONDITIONS, RESTRICTIONS AND EASEMENTS BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN THE DOCUMENT
RECORDING NO.: LIBER 2536, PAGE 190 AND INSTRUMENT NO. 2008R-004507
(DECLARATION OF RESTRICTIONS BETWEEN ORIGINALLY THRIFTY OWNED PARCEL AND SKATE PARK PARCEL. PART OF SUBJECT PARCEL IS PART OF THRIFTY OWNED PARCEL. NO EASEMENTS LISTED. SEE DOCUMENT)

16. STORM WATER EASEMENT
RECORDING NO.: LIBER 2536, PAGE 214
(DOES NOT AFFECT SUBJECT PARCEL)

17. STORM WATER/SEWER EASEMENT
RECORDING NO.: LIBER 2536, PAGE 223.
(DOES NOT AFFECT SUBJECT PARCEL)

18. UTILITY EASEMENT
RECORDEDING NO.: LIBER 2536, PAGE 232.
(SUBJECT PARCEL IS PART OF GRANTEE PARCEL, AS DESCRIBED. NO SPECIFIC EASEMENT IS DESCRIBED, THEREFORE SAID EASEMENT IS NOT SHOWN HEREON)

19. AGREEMENT
RECORDING NO.: LIBER 2764, PAGE 257
(AGREEMENT BETWEEN ORIGINALLY THRIFTY OWNED PARCEL AND SKATE PARK PARCEL PART OF SUBJECT PARCEL IS PART OF THRIFTY OWNED PARCEL. ALL EASEMENTS REFERENCED IN DOCUMENT ARE PART OF SCHEDULE B, PART II IN TITLE COMMITMENT. SEE DOCUMENT)

20. NON-EXCLUSIVE SIDEWALK EASEMENT WITH THE CITY OF BRIGHTON
RECORDING NO.: LIBER 3174, PAGE 66.
(AS SHOWN)

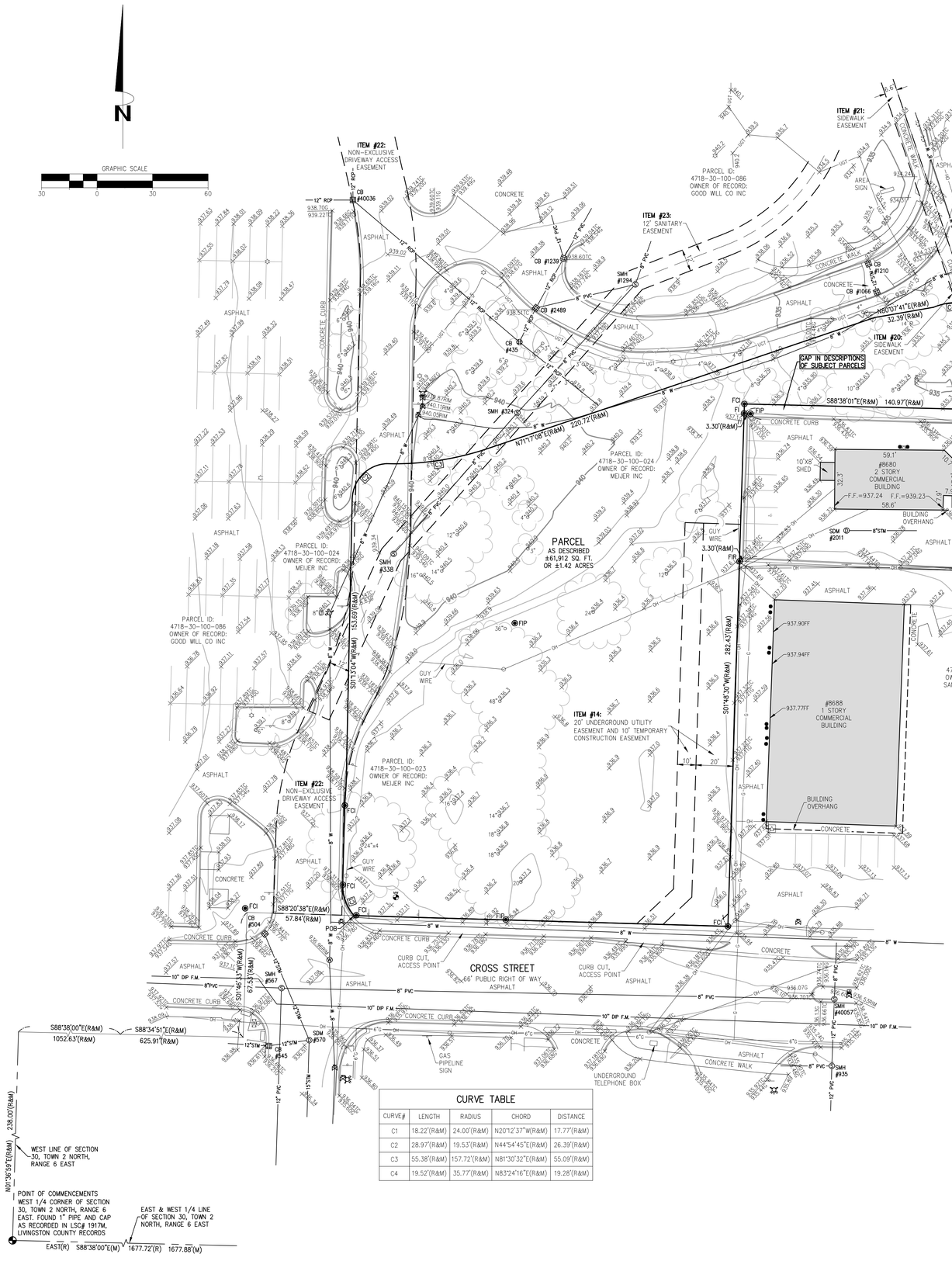
21. CONDITIONAL ZONING AGREEMENT
RECORDING NO.: INSTRUMENT NO. 2008R-003044.
(DOES NO AFFECT SUBJECT PARCEL)

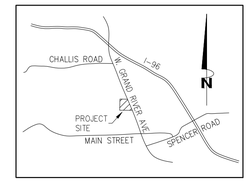
22. NON-EXCLUSIVE DRIVEWAY ACCESS EASEMENT AGREEMENT AND EASEMENT
RECORDING NO.: INSTRUMENT NO. 2008R-004508.
(AS SHOWN, LIES ADJACENT TO AND CROSSES SUBJECT PARCEL)

23. NON-EXCLUSIVE SANITARY EASEMENT AGREEMENT AND EASEMENT
RECORDING NO.: INSTRUMENT NO. 2008R-022866.
(AS SHOWN)

LEGEND:

- SECTION CORNER
- FOUND MONUMENT (AS NOTED)
- FI — FOUND IRON
- FIR — FOUND 1/2" REBAR
- FCI — FOUND 1/2" REBAR & CAP
- FIP — FOUND IRON PIPE
- FCC — FOUND CHISELED CUT CROSS
- FPK — FOUND PK NAIL
- POB — POINT OF BEGINNING
- PROPERTY CORNER
- SQUARE CATCH BASIN
- STORM MANHOLE
- ROUND CATCH BASIN
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- WATER MANHOLE
- SEWER MANHOLE
- UNKNOWN MANHOLE
- 120.00 — EXISTING ELEVATION
- TREE
- LIGHT POLE
- UTILITY POLE
- TELEVISION BOX
- ELECTRIC MANHOLE
- ELECTRIC TRANSFORMER
- BOLLARD
- SINGLE POST SIGN
- GAS VALVE
- GAS METER
- HANDICAP PARKING
- MONITORING WELL
- TRAFFIC MANHOLE
- ADJOINING BOUNDARY LINE
- EDGE OF ASPHALT
- ASPHALT CURB
- BOUNDARY LINE
- BUILDING
- BUILDING OVERHANG
- UGT — UNDERGROUND TELEVISION
- EDGE OF CONCRETE
- 800 — CONTOUR MAJOR
- CONTOUR MINOR
- CONCRETE CURB
- EASEMENT
- EASEMENT CENTERLINE
- EDGE OF METAL
- UGE — UNDERGROUND ELECTRIC
- OH — OVERHEAD UTILITY LINE
- G — GAS LINE
- PARKING STRIPE
- SECTION LINE
- SAN — SEWER LINE
- EDGE OF SIDEWALK
- STM — STORM DRAIN LINE
- WALL (AS NOTED)
- TREE CANOPY





LOCATION MAP
(NOT TO SCALE)

LEGAL DESCRIPTION OF PROPOSED SUBJECT PARCEL

LAND SITUATED IN THE CITY OF BRIGHTON, COUNTY OF LIVINGSTON, STATE OF MICHIGAN AND DESCRIBED AS:

PART OF THE NORTHWEST 1/4 OF SECTION 30, TOWN 2 NORTH, RANGE 6 EAST, CITY OF BRIGHTON, LIVINGSTON COUNTY, MICHIGAN, DESCRIBED AS FOLLOWS: COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 30; THENCE ALONG THE WEST LINE OF SAID SECTION 30, N01°36'59"E, 238.00 FEET TO THE WESTWARD EXTENSION OF "ADVANCE STREET INDUSTRIAL PARK NO. 1" AS RECORDED IN LIBER 13 OF PLATS, PAGES 31 AND 32, LIVINGSTON COUNTY RECORDS; THENCE S88°38'00"E, 1052.63 FEET; THENCE S88°34'51"E, 625.91 FEET; THENCE N01°46'33"E, 67.53 FEET; THENCE S88°20'38"E, 57.84 FEET TO THE POINT OF BEGINNING OF THE PARCEL TO BE DESCRIBED; THENCE 18.22 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 24.00 FEET, A CENTRAL ANGLE OF 43°27'48" AND A LONG CHORD WHICH BEARS N20°12'37"W, 17.77 FEET; THENCE N01°31'17"E, 42.84 FEET; THENCE N03°30'25"E, 12.35 FEET; THENCE N01°13'04"E, 153.69 FEET; THENCE 28.97 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 19.53 FEET, A CENTRAL ANGLE OF 85°01'09" AND A LONG CHORD WHICH BEARS N44°54'45"E, 26.39 FEET; THENCE 55.38 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 157.72 FEET, A CENTRAL ANGLE OF 20°07'04" AND A LONG CHORD WHICH BEARS N81°30'32"E, 55.09 FEET; THENCE N71°17'08"E, 220.72 FEET; THENCE N80°07'41"E, 32.39 FEET; THENCE 19.52' ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 35.77' FEET, A CENTRAL ANGLE OF 31°16'09" AND A LONG CHORD WHICH BEARS N83°24'16"E, 19.28 FEET TO A POINT ON THE WESTERLY RIGHT OF WAY OF GRAND RIVER AVENUE (100 FEET WIDE PUBLIC RIGHT OF WAY); THENCE ALONG THE WESTERLY RIGHT OF WAY LINE OF SAID GRAND RIVER AVENUE, S18°43'13"E, 61.05 FEET; THENCE N88°38'00"W, 140.97 FEET; THENCE S01°48'30"W, 282.43 FEET; THENCE N88°20'38"W, 202.09 FEET TO THE POINT OF BEGINNING.

NOTES:

1. SURVEY IN ACCORDANCE WITH TITLE COMMITMENT NO. GLT2200608, REVISION 2, PREPARED BY FIDELITY NATIONAL TITLE INSURANCE COMPANY, DATED OCTOBER 17, 2022.
2. THE BASIS OF BEARING IS THE WEST LINE OF SECTION 30, TOWN 2 NORTH, RANGE 6 EAST, CITY OF BRIGHTON, LIVINGSTON COUNTY, MICHIGAN.
3. BY GRAPHIC PLOTTING ONLY, THESE PARCELS ARE LOCATED WITHIN A FEDERALLY DESIGNATED FLOOD HAZARD AREA ZONE X – OTHER AREAS (AREAS DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN) OF THE FLOOD INSURANCE RATE MAP, MAP NUMBER 26093C0345D, EFFECTIVE DATE OF SEPTEMBER 17, 2008. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THE ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
4. SUBJECT PARCEL, AS DESCRIBED, CONTAINS ±61,912 SQUARE FEET OF LAND BEING ±1.42 ACRES OF LAND.
5. THERE ARE NO REGULAR OR HANDICAP PARKING SPACES WITHIN THE SUBJECT PARCEL.
6. AT THE TIME OF SURVEY THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK OR BUILDING CONSTRUCTION WITHIN RECENT MONTHS.
7. AT THE TIME OF SURVEY THERE WERE NO CHANGES IN THE STREET RIGHT OF WAY LINES EITHER COMPLETED OR PROPOSED AND AVAILABLE FROM THE CONTROLLING JURISDICTION OR OBSERVABLE EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION REPAIRS.
8. AT THE TIME OF SURVEY, THERE WAS NO EVIDENCE OF FIELD DELINEATED WETLAND MARKERS PRESENT UPON SUBJECT PARCELS.
9. AT THE TIME OF SURVEY THERE WAS NO OBSERVABLE EVIDENCE OF CEMETERIES, BURIAL GROUNDS OR ISOLATED GRAVESITES WITHIN THE SUBJECT PARCELS.
10. AT THE TIME OF SURVEY, SUBJECT PARCEL, AS DESCRIBED IN TITLE COMMITMENT NO. GLT1800427 HAS ACCESS TO CROSS STREET, A PUBLIC RIGHT OF WAY.
11. AT THE TIME OF SURVEY THERE WAS NO OBSERVABLE EVIDENCE OF SITES USED AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.

UTILITY NOTE:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.

BENCHMARK DATA:

SITE BENCHMARK:
NAIL IN UTILITY POLE LOCATED ON THE SOUTHWEST SIDE OF WEST GRAND RIVER AVENUE NEAR THE SOUTHEAST PROPERTY CORNER.
ELEVATION = 937.21 NAVD88

MANHOLE SCHEDULE:

SANITARY MANHOLE (SMH #324)
RIM=940.20
8" PVC, SOUTHWEST, 933.30I.E.

SANITARY MANHOLE (SMH #338)
RIM=939.36
8" PVC, NORTHEAST, 931.99I.E.

BEEHIVE CATCH BASIN (CB #435)
RIM=938.58
12" RCP, NORTHEAST, 933.78I.E.
12" RCP, NORTHWEST, 929.78I.E.
12" RCP, SOUTHEAST, 929.48I.E.

SQUARE CATCH BASIN (CB #504)
RIM=936.56
12" RCP, SOUTHEAST, 931.56I.E.

SQUARE CATCH BASIN (CB #545)
RIM=936.34
12" RCP, WEST, 931.54I.E.
12" RCP, EAST, 931.44I.E.

MANHOLE SCHEDULE:

SANITARY MANHOLE (SMH #567)
RIM=936.93
8" PIPE, WEST, 927.78I.E.
12" PIPE, SOUTH, 927.78I.E.
8" PIPE, EAST, 927.93I.E.

STORM DRAIN MANHOLE (SDM #570)
RIM=936.46
12" RCP, NORTHWEST, 931.36I.E.
12" RCP, WEST, 931.46I.E.
15" RCP, SOUTH, 31.26I.E.

SANITARY MANHOLE (SMH #935)
RIM=936.07
12" PVC, NORTH, 928.87I.E.
12" PVC, SOUTH, 928.97I.E.
8" PVC, WEST, 929.87I.E.

SQUARE CATCH BASIN (CB #1066)
RIM=932.96
12" RCP, NORTH, 930.46I.E.

SQUARE CATCH BASIN (CB #1210)
RIM=933.19
12" RCP, SOUTH, 930.19I.E.

MANHOLE SCHEDULE:

SQUARE CATCH BASIN (CB #1239)
RIM=938.10
12" PVC, NORTHWEST, 934.40I.E.
12" PVC, NORTHEAST, 934.00I.E.
12" RCP, SOUTHWEST, 932.80I.E.

SANITARY MANHOLE (SMH #1294)
RIM=938.80
8" PVC, SOUTHWEST, 933.20I.E.
8" PVC, SOUTHWEST, 933.20I.E.
8" PVC, NORTHEAST, 933.30I.E.

STORM DRAIN MANHOLE (SDM #2011)
RIM=936.00
8" PVC, EAST, 933.40I.E.

SQUARE CATCH BASIN (CB #2485)
RIM=934.72
8" PVC, WEST, 932.42I.E.
15" RCP, NORTHEAST, 931.62I.E.

MANHOLE SCHEDULE:

SQUARE CATCH BASIN (CB #2486)
RIM=935.15
15" RCP, SOUTHWEST, 930.00I.E.
PIPE, NORTHWEST, 920.72I.E.
PIPE, SOUTHEAST, 920.72I.E.

SQUARE CATCH BASIN (CB #2489)
RIM=938.04
12" RCP, SOUTHWEST, 934.14I.E.
12" RCP, NORTHEAST, 934.54I.E.
8" PVC, EAST, 934.74I.E.

SQUARE CATCH BASIN (CB #40036)
RIM=938.68
12" RCP, NORTH, 932.58I.E.
12" RCP SOUTHEAST, 929.38I.E.
12" RCP, WEST, 931.18I.E.
INSIDE DROPPED SYSTEM – PVC, SOUTH, CAPPED

SANITARY MANHOLE (SMH #40057)
RIM=936.65
8" PVC, NORTH, 928.75I.E.
12" PVC, SOUTH, 928.85I.E.
8" PVC, WEST, 928.55I.E.

SURVEYORS CERTIFICATION:

TO TRAM–BRIGHTON LLC, ALRIG USA DEVELOPMENT LLC, TITLE CONNECT, BRIGHTON RETAIL MANAGEMENT II LLC, FIRST AMERICAN TITLE INSURANCE COMPANY AND FIDELITY NATIONAL TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 4, 7(A), 8, 11, 16, AND 18 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON AUGUST 24, 2020.

MARK D. LAYMAN, P.S. #46674 DATE

REVISION	DATE	BY	DESCRIPTION
4	01/19/2023	MEB	REVISED WATERMANNON NORTH SIDE OF PROPERTY PER FLAGGING
3	12/07/2022	MEB	REVISED SANITARY AND STORM, ADDED WATERLINE PER CITY OF BRIGHTON GIS
2	11/28/2022	MEB	REVISED PER UPDATED TITLE WORK AND FIELD VERIFICATION OF STRUCTURE
1	10/26/2020	MDL	REVISED PER CITY COMMENTS

CORE LAND CONSULTING
30445 Northwestern Hwy., Suite 145, Farmington Hills, MI 48334
Phone: (248) 932-7120 • Fax: (248) 932-7124
Email: info@corelandconsulting.com • www.corelandconsulting.com

CLIENT:

ALRIG USA DEVELOPMENT, LLC
30200 TELEGRAPH ROAD SUIT 205,
BINGHAM FARMS, MI 48025

PROJECT LOCATION:

8680 WEST GRAND RIVER AVENUE,
CITY OF BRIGHTON,
LIVINGSTON COUNTY, MICHIGAN

DRAWN BY: CLG/NEM
CHECKED BY: NEM/MDL
FIELD WORK BY: MDL/RTG

Know what's below. Call before you dig.

SHEET:

ARCHITECTURAL SURVEY

DATE: 08/31/2020
SCALE: 1" = 30'
PROJECT NO: 3264-355

1
SHEET 1 OF 1

KEY

- WORK AREA
- WORK ZONE SIGN
- TRAFFIC FLOW
- DRUMS
- FLAGGER
- LIGHTED ARROW PANEL (CAUTION MODE)

50' 0' 50' 100'

GRAPHIC SCALE IN FEET
1" = 50'

ISSUE	DATE	BY	DESCRIPTION
1	01/25/2023	JK	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design

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Princeton, NJ · Tampa, FL · Rutherford, NJ
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607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

SITE DEVELOPMENT PLANS

WEST GRAND & CROSS CARWASH

PROPOSED AUTOMOBILE CARWASH

PARCEL ID: 4718-30-100-023, 4718-30-100-024, 4718-30-100-026, & 4718-30-100-086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

J. REID COOKSEY, P.E.
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: (H) 1" = 50' | PROJECT ID: DET-200128

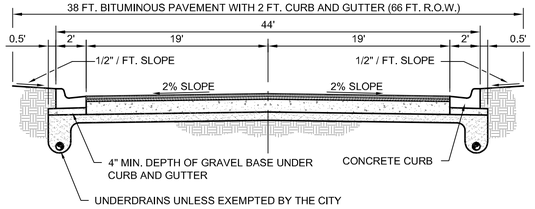
TITLE:

TRAFFIC CONTROL PLAN

DRAWING:

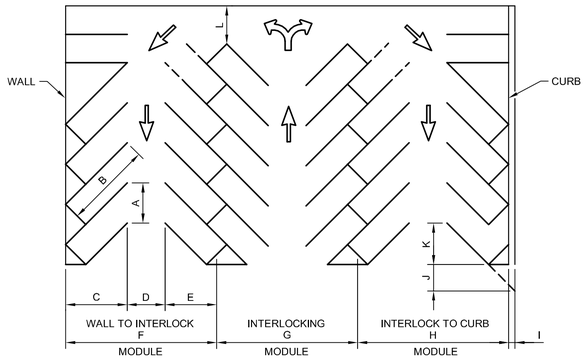
TC-1

Z:\PROJS\DET\200128\DET 200128 AUG\8680 WEST GRAND RIVER, BRIGHTON, MI\CAD\PLAN\TRAFFIC\TC-1.DWG



1-1/2" BITUMINOUS AGGREGATE WEARING COURSE M.D.O.T. MIX 36A.
USE 0.10 GAL/SY SS-1h BOND COAT BETWEEN COURSES.
5" BITUMINOUS AGGREGATE LEVELING COURSE M.D.O.T. MIX 11A (2 COURSES).
10" GRAVEL BASE, M.D.O.T. SPECIFICATION NO. 22A.
12" CLASS II SUBBASE (DEPENDING ON SOILS) PREPARED, COMPACTED SUBGRADE.

TYPICAL COLLECTOR OR INDUSTRIAL PAVEMENT CROSS-SECTION

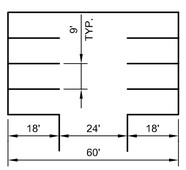


X = STALL NOT ACCESSIBLE IN CERTAIN LAYOUTS

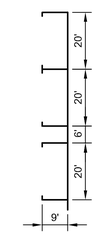
PARKING LOT DIMENSIONS					
DIMENSION	ON DIAGRAM	45°	60°	75°	90°
STALL WIDTH PARALLEL TO AISLE	A	12.7	10.4	9.3	9.0
STALL LENGTH OF LINE	B	25.0	22.0	20.0	18.5
STALL DEPTH TO WALL	C	17.5	19.0	19.5	18.5
AISLE WIDTH BETWEEN STALL LINES	D	12.0	16.0	23.0	26.0
STALL DEPTH, INTERLOCK	E	15.3	17.5	18.8	18.5
MODULE, WALL TO INTERLOCK	F	44.8	52.5	61.3	63.0
MODULE, INTERLOCKING	G	42.6	51.0	61.0	63.0
MODULE, INTERLOCK TO CURB FACE	H	42.8	50.2	58.8	60.5
BUMPER OVERHANG (TYPICAL)	I	2.0	2.3	2.5	2.5
OFFSET	J	6.3	2.7	0.5	0.0
SETBACK	K	11.0	8.3	5.0	0.0
CROSS AISLE, ONE-WAY	L	14.0	14.0	14.0	14.0
CROSS AISLE, TWO-WAY	M	24.0	24.0	24.0	24.0

TYPICAL ANGLED PARKING LAYOUT

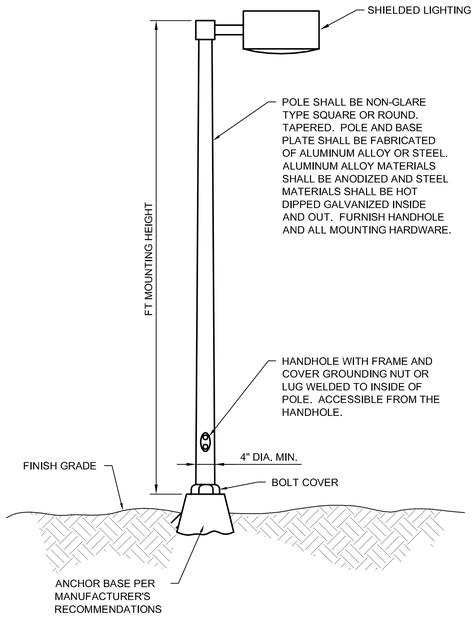
NOTE: PARKING DIMENSIONS ARE FOR 9 FOOT WIDE STALLS



TYPICAL 90° PARKING LAYOUT

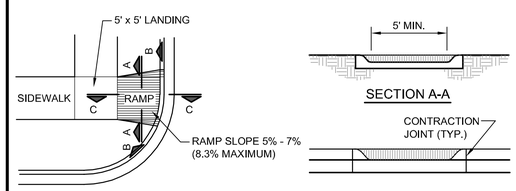


TYPICAL PARALLEL PARKING



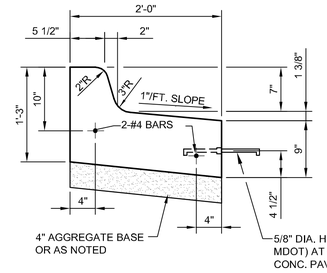
NOTES:
1. NO LIGHT STANDARD SHALL BE MORE THAN 20 FEET IN HEIGHT.
2. PARKING LOT LIGHTING SHALL MEET THE LUMINAIRE REQUIREMENTS OF SECTION 98-83 OF THE ZONING ORDINANCE.

TYPICAL PARKING AREA LIGHTING

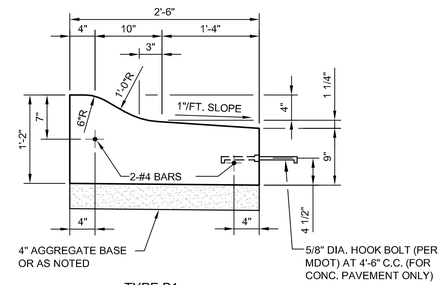


NOTE: SEE MDOT R-28-F SIDEWALK RAMP AND DETECTABLE WARNING DETAILS FOR ADDITIONAL INFORMATION.

SIDEWALK RAMP

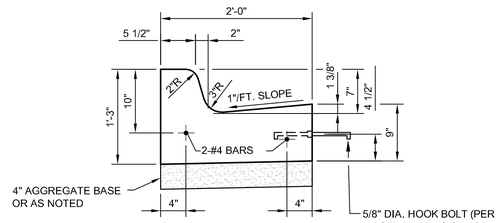


TYPE A1
MDOT DETAIL R-30-E - TYPE C - MODIFIED

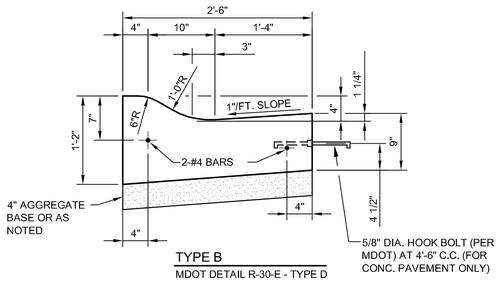


TYPE B1
MDOT DETAIL R-30-E - TYPE D - MODIFIED

CONCRETE CURB SPILLOUT

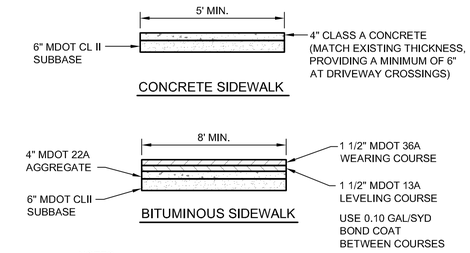


TYPE A
MDOT DETAIL R-30-E - TYPE C



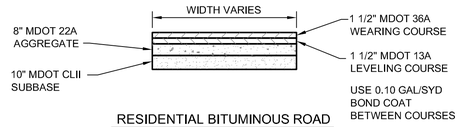
TYPE B
MDOT DETAIL R-30-E - TYPE D

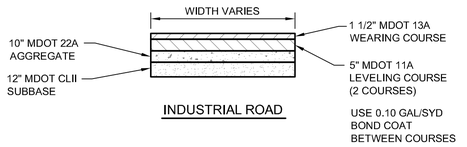
CONCRETE CURB AND GUTTER

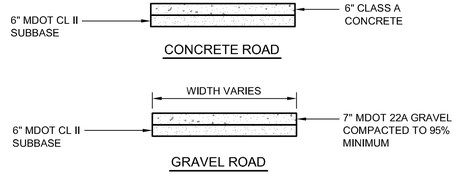


NOTES:
1. SIDEWALKS WITHIN THE DOWNTOWN BUSINESS DISTRICT ARE SUBJECT TO SPECIAL REQUIREMENTS.
2. CONCRETE SIDEWALKS TO BE PROVIDED ACROSS COMMERCIAL AND INDUSTRIAL DRIVEWAY ENTRANCES/ EXITS.

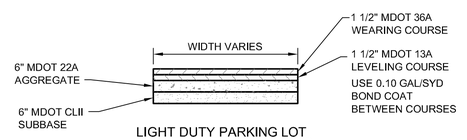
TYPICAL SIDEWALK SECTIONS

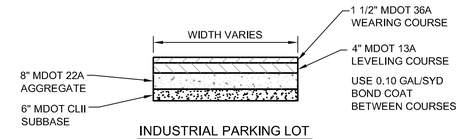


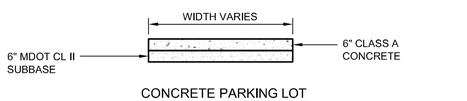




ROADWAY CROSS SECTIONS





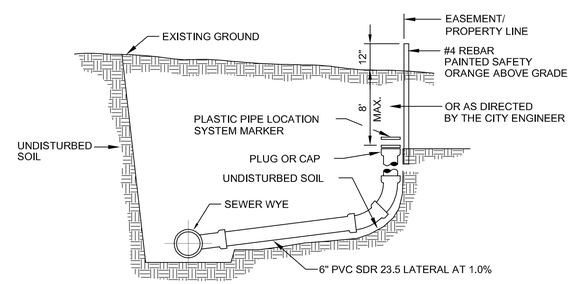


PARKING LOT CROSS SECTIONS

CITY OF BRIGHTON

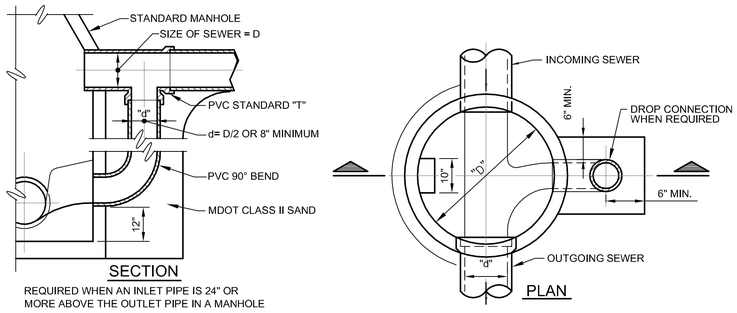
ROADWAY, PARKING & SIDEWALK STANDARD DETAILS

Scale: NONE
Issued Date MAY - 2014



NOTE:
RISER PIPE MAY NOT BE REQUIRED FOR SHALLOW SEWERS AS SHOWN.

SANITARY SEWER LATERAL

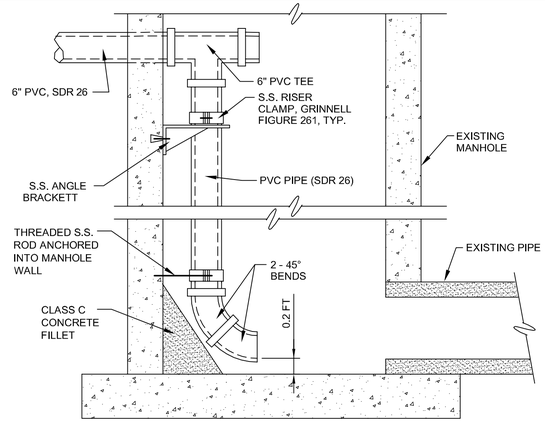


SECTION

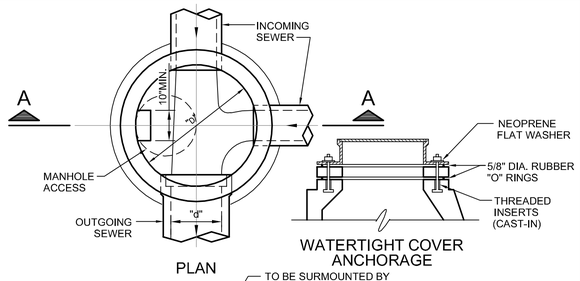
PLAN

REQUIRED WHEN AN INLET PIPE IS 24" OR MORE ABOVE THE OUTLET PIPE IN A MANHOLE

EXTERIOR DROP CONNECTION

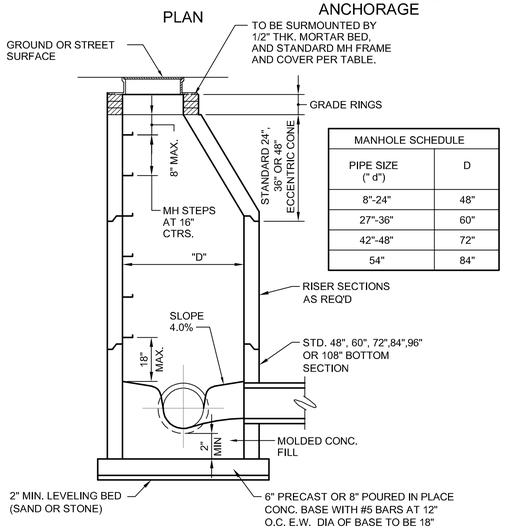


INTERIOR SEWER LATERAL DROP CONNECTION



PLAN

WATERTIGHT COVER ANCHORAGE



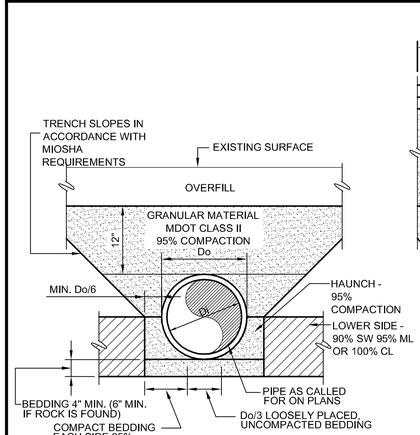
MANHOLE SCHEDULE	
PIPE SIZE (" d")	D
8"-24"	48"
27"-36"	60"
42"-48"	72"
54"	84"

SECTION A-A

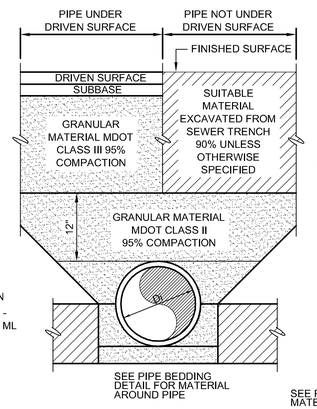
NOTES:
1. ALL SANITARY MANHOLES TO BE PRECAST REINFORCED CONCRETE WITH PREMIUM JOINTS. SEE SPECIFICATIONS FOR BASE SLAB AND PIPE OPENINGS AND CONNECTIONS.
2. MANHOLE CONES SHALL BE THE ECCENTRIC TYPE.
3. PROVIDE 6" OF COMPACTED GRANULAR MATERIAL UNDER ALL PRECAST CONCRETE BASE SLABS.
4. FORCE MAINS CONNECT DIRECTLY TO A MANHOLE SHALL BE INSTALLED SO THAT THE ELEVATION OF THE PIPE CROWNS MATCH. THE FORCE MAIN SHALL BE DIRECTED DOWNWARD INTO THE FLOW CHANNEL.
5. FOR SANITARY SEWERS ALL PIPES SHALL ENTER MANHOLE THROUGH RUBBER BOOTED CONNECTION.

FRAME & COVER FOR SANITARY SEWER MANHOLES			
		MANUFACTURER OR EQUAL	
TYPE	TYPE OF COVER	EAST JORDAN	NEENAH
MH	SANITARY - SOLID SELF-SEALING	1040.0000	R-1642
MH	SANITARY - SOLID WATERTIGHT	1040-APT	R-1916-F
CO	SOLID	1574A	R-1973-A

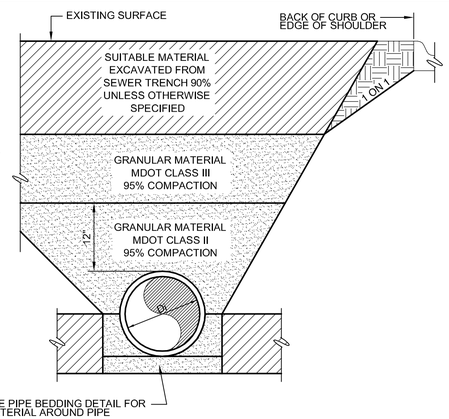
STANDARD MANHOLE



PIPE BEDDING



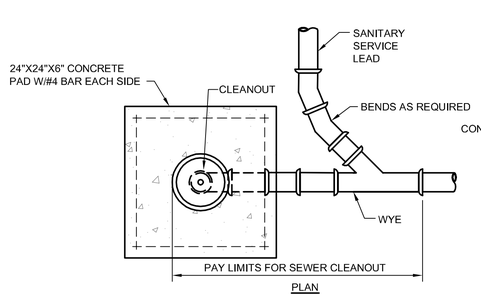
PIPE UNDER/NOT UNDER DRIVEN SURFACE



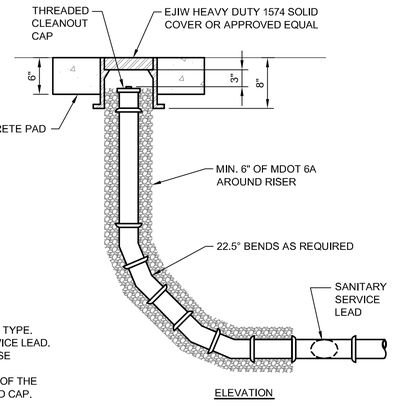
PIPE WITHIN INFLUENCE OF DRIVEN SURFACE

NOTES:
1. COMPACTION PRESENTED AS MINIMUM STANDARD PROCTOR VALUES.
2. MATERIALS AROUND THERMOPLASTIC PIPE WITH DIAMETER < 6 INCHES SHALL PASS 0.5 INCH SIEVE, MATERIALS AROUND OTHER PIPES SHALL PASS 1.5 INCH SIEVE.
3. MATERIALS AROUND HDPE PIPE TO BE MDOT 6A OR 21AA.
4. DRIVEN SURFACE IS DRIVEWAY, PARKING AREA, ROAD BED OR SHOULDER.
5. UTILITY TRENCHES LOCATED WITHIN A MDOT ROW SHALL CONFORM TO MDOT STANDARD DETAIL R-83.
6. TRACER WIRE IS REQUIRED ON FORCE MAIN ONLY AND SHALL BE BROUGHT TO GRADE AT A MINIMUM EVERY 1000 FEET IN A APPROVED CAST IRON TRACER WIRE BOX ENCASED IN CONCRETE OR WITH AN APPROVED GREEN MARKER POST.

TRENCH EXCAVATION & PIPE BEDDING



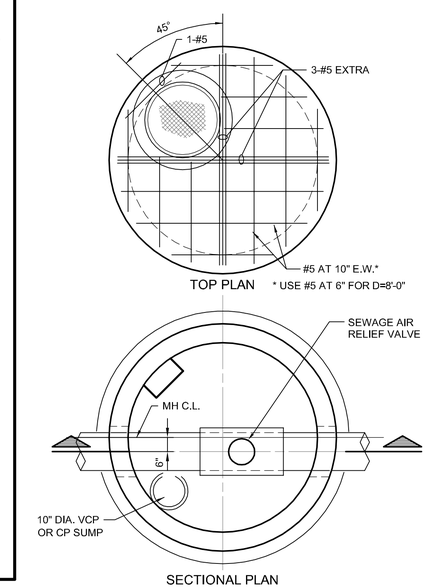
PLAN



ELEVATION

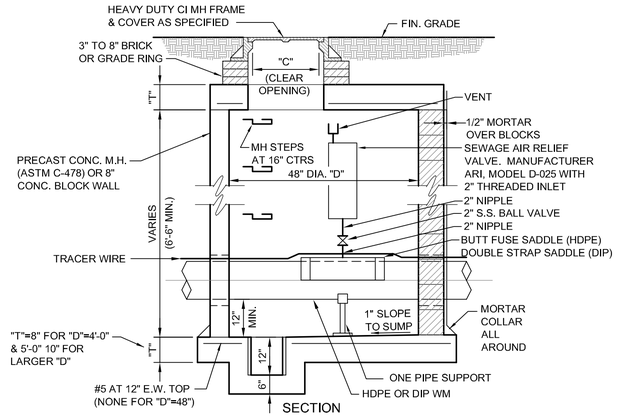
NOTES:
1. ALL CONNECTION SHALL BE BELL AND SPIGOT TYPE.
2. CLEANOUT IS TO BE SAME DIAMETER AS SERVICE LEAD.
3. CONCRETE PAD REQUIRED UNLESS OTHERWISE DETERMINED BY THE CITY.
4. THERE MUST BE A 3" GAP FROM THE BOTTOM OF THE CLEAN OUT LID TO THE TOP OF THE THREADED CAP.

SEWER CLEANOUT DETAIL



TOP PLAN * USE #5 AT 6" FOR D=8'-0"

SECTIONAL PLAN



SECTION

NOTE: ALL PLUMBING MATERIALS TO BE NON-CORROSIVE, ALL FITTINGS SHALL BE STAINLESS STEEL.

AIR RELIEF STRUCTURE

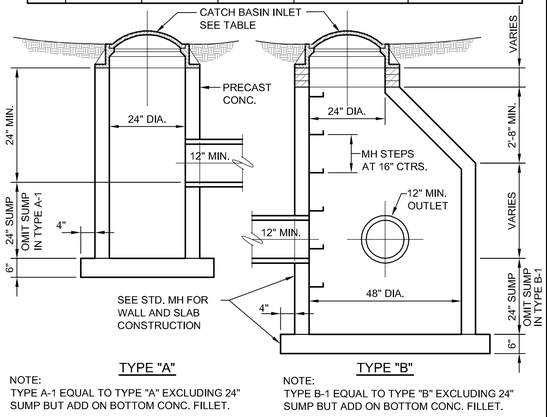
CITY OF BRIGHTON

SANITARY SEWER
STANDARD DETAILS

Scale: NONE
Issued Date MAY - 2014

Thursday, October 02, 2014 10:33:13 AM DRAWING: O:\Projects\Lansing\IER\12766\200-12766-00-000\CAD\SheetFiles\Standards\Brighton-std.DWG

MANHOLE FRAME & COVER & CATCH BASIN INLETS					
TYPE	LOCATION	MANUFACTURER OR EQUAL		TYPE OF COVER OR INLET	MAXIMUM DRAINAGE AREA (ACRES)
		EAST JORDAN	NEENAH		
MH	ALL	1040	R-1916 F1	SANITARY-SOLID SELF-SEALING STORM-VENTED	N/A
CB	TYPE A CURB	7000-T1-M1	R-3070	FLAT GRATE WITH VERT. OPEN BACK	0.71
CB	TYPE B CURB	7065-T1-M1	R-3034-B	FLAT GRATE WITH ROLL BACK	0.87
CB	PAVEMENT/ SHOULDER	1020-M1	R-2060-D	FLAT GRATE	0.66
CB	OPEN AREA	1020-01	R-2560-D	BEEHIVE GRATE 4" HIGH	0.63
CB	GUTTER	5100	R-3238	CONCAVE INLET	0.96



TYPE "A"

NOTE:
TYPE A-1 EQUAL TO TYPE "A" EXCLUDING 24" SUMP BUT ADD ON BOTTOM CONC. FILLET.

TYPE "B"

NOTE:
TYPE B-1 EQUAL TO TYPE "B" EXCLUDING 24" SUMP BUT ADD ON BOTTOM CONC. FILLET.

CATCH BASIN

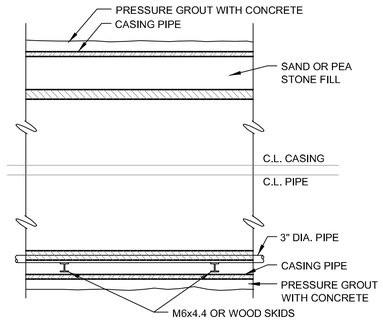
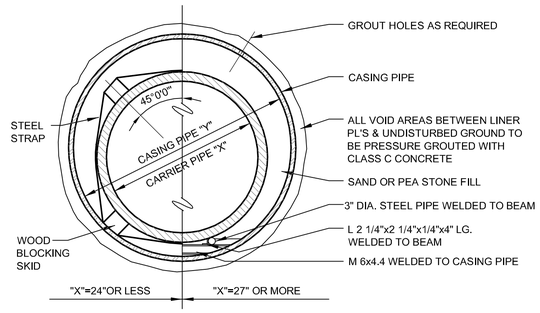


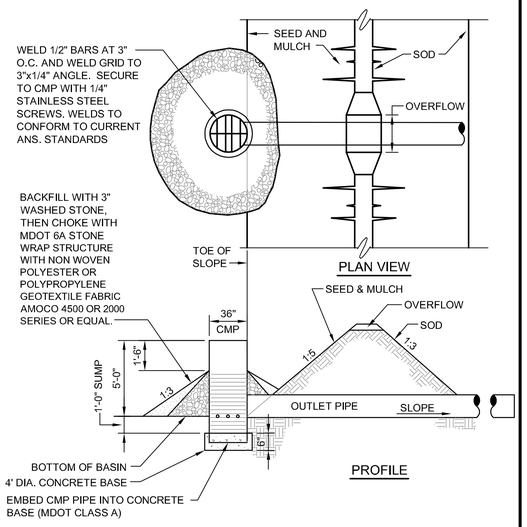
TABLE	
"X"	"Y"(MIN)
6"	20"
8"-12"	24"
14"-15"	30"
18"-21"	36"
24"	42"
27"-30"	48"
33"-36"	60"
42"	66"
48"	72"
54"	84"
60"	90"
66"	96"
72"	108"
78"	114"



NOTES:
1. SEE SPECIFICATIONS FOR ALTERNATE CONSTRUCTION METHODS.
2. BORING SHALL BE AT 90 DEGREES TO ALL CROSSINGS UNLESS OTHERWISE APPROVED. THE BORING OF THE HOLE AND INSTALLATION OF THE CASING PIPE SHALL BE SIMULTANEOUS. BORE HOLE DIAMETER SHALL ESSENTIALLY BE THE SAME AS THE OUTSIDE DIAMETER OF THE CASING PIPE TO BE INSTALLED.
3. BORING TO EXTEND A MINIMUM OF 10' OUTSIDE THE EDGE OF PAVEMENT.
4. CASING SPACERS SHALL BE RESTRAINED-TYPE BOLTED SPACERS AND SHALL HAVE A MAXIMUM SPACING AS NOTED BELOW OR AS RECOMMENDED BY MANUFACTURER, WHICHEVER IS CLOSER. PIPE CASING SPACERS SHALL BE EQUIVALENT TO RANGER PLASTIC CASING SPACERS AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC, OR APPROVED EQUAL.
   4.1. SPACER SHALL BE PLACED MAXIMUM 1' ON EACH SIDE OF CARRIER PIPE JOINT.
   4.2. TYPICAL 6' MAXIMUM SPACING BETWEEN SPACERS.
   4.3. MINIMUM ONE CASING SPACER WITHIN 1' OF EACH END OF CASING.
5. INSTALL STEEL ASSEMBLY FOR CARRIER PIPE SUPPORT AS SHOWN IN DRAWING AND DETAILED IN SPECIFICATIONS. SKIDS ARE REQUIRED TO EXTEND TO FULL LENGTH OF THE CASING.
6. CASING END SEALS SHALL BE SYNTHETIC NEOPRENE RUBBER PULL-ON TYPE END SEALS WITH STAINLESS STEEL BANDS, AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC, OR APPROVED EQUAL.

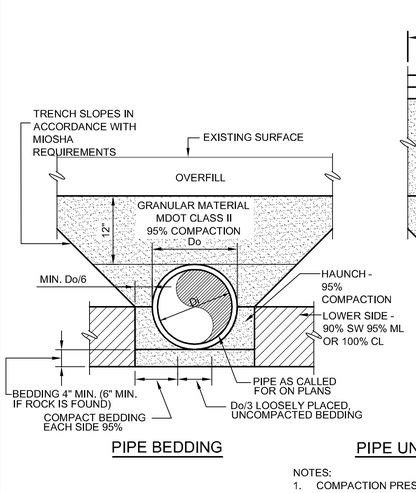
CASING PIPE AT HIGHWAY AND RAILROAD CROSSING

NO SCALE

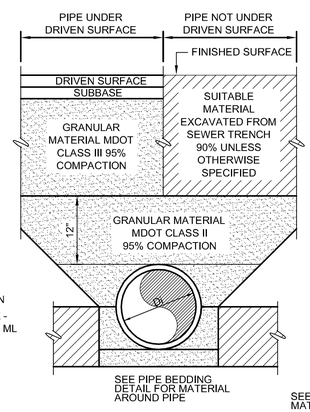


PROFILE

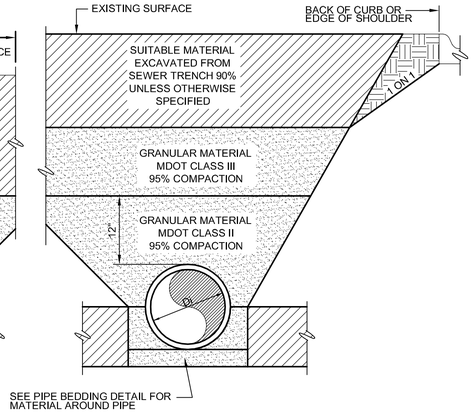
OUTLET CONTROL STRUCTURE



PIPE BEDDING



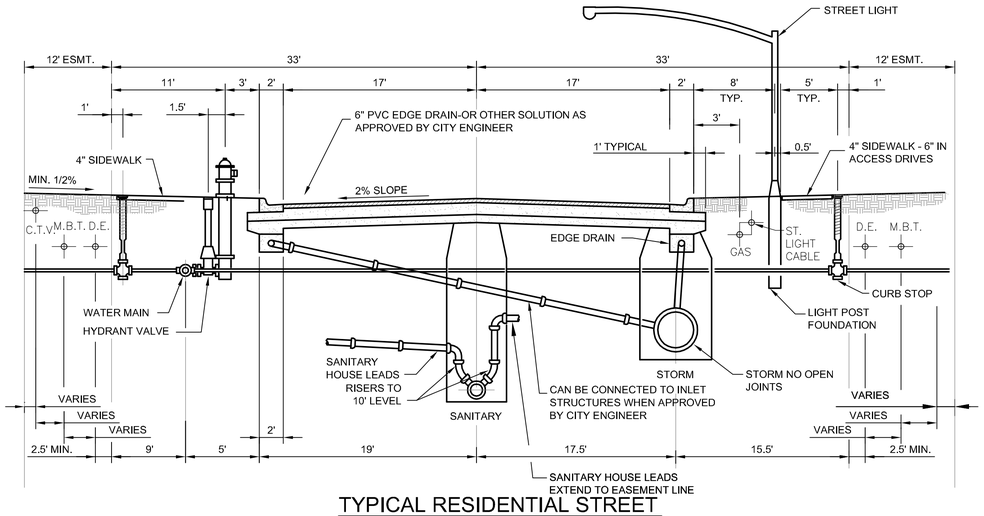
PIPE UNDER/NOT UNDER DRIVEN SURFACE



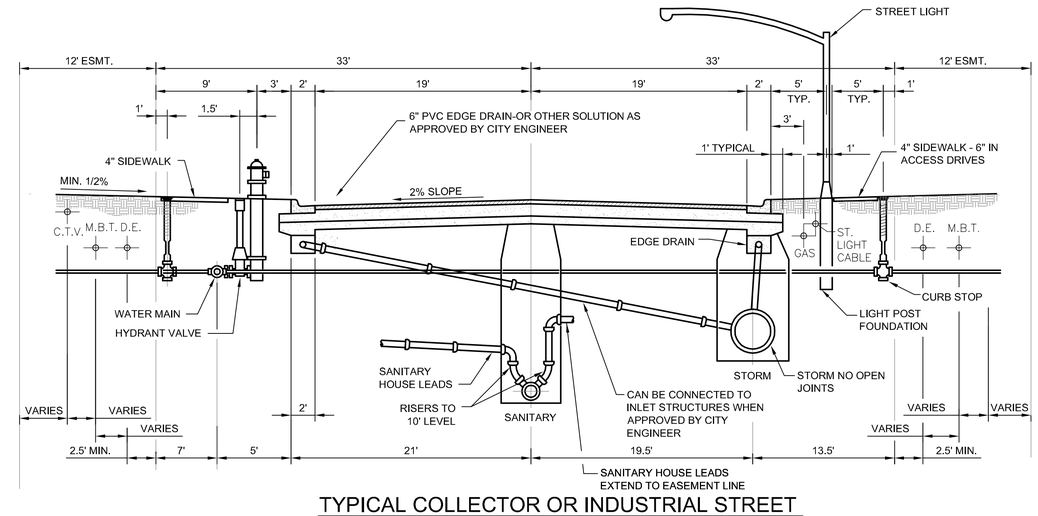
PIPE WITHIN INFLUENCE OF DRIVEN SURFACE

NOTES:
1. COMPACTION PRESENTED AS MINIMUM STANDARD PROCTOR VALUES.
2. MATERIALS AROUND THERMOPLASTIC PIPE WITH DIAMETER < 6 INCHES SHALL PASS 0.5 INCH SIEVE, MATERIALS AROUND OTHER PIPES SHALL PASS 1.5 INCH SIEVE.
3. MATERIALS AROUND HDPE PIPE TO BE MDOT 6A OR 21AA.
4. DRIVEN SURFACE IS DRIVEWAY, PARKING AREA, ROAD BED OR SHOULDER.
5. UTILITY TRENCHES LOCATED WITHIN A MDOT ROW SHALL CONFORM TO MDOT STANDARD DETAIL R-83.

TRENCH EXCAVATION & PIPE BEDDING



TYPICAL RESIDENTIAL STREET



TYPICAL COLLECTOR OR INDUSTRIAL STREET

CITY OF BRIGHTON

STORM SEWER & STREET DETAILS
STANDARD DETAILS

Scale:	PARKING
Issued Date	MAY - 2014

PIPE RESTRAINT SCHEDULE

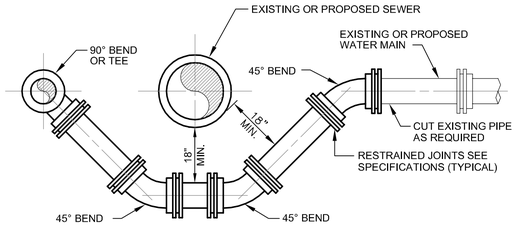
GROUND BURIED PRESSURE PIPE - POLYETHYLENE ENCASED DUCTILE IRON PIPE

PIPE DIAMETER	TEES, 90° BENDS	45° BENDS	22-1/2° BENDS	11-1/4° BENDS	DEAD ENDS	REDUCERS (ONE SIZE REDUCTION)*	REDUCERS (TWO SIZE REDUCTIION)*
4	13	5	3	1	40	--	--
6	19	8	4	2	58	31	--
8	24	10	5	2	75	30	70
12	34	14	7	3	107	57	116
16	43	18	9	4	139	59	137
20	52	22	10	5	169	59	134
24	61	25	12	6	199	60	132
30	73	30	15	7	242	85	168
36	84	35	17	8	281	84	168

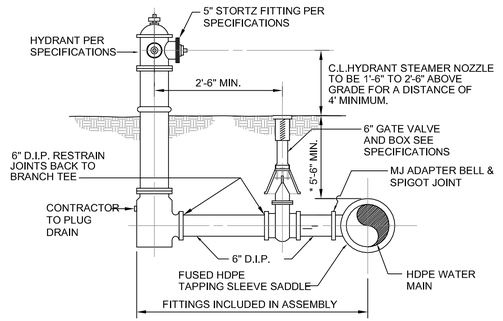
1. LENGTHS OF PIPE RESTRAINT ARE GIVEN IN FEET.
2. IF REQUIRED PIPE DIAMETER IS NOT LISTED IN THIS TABLE, THE NEXT LARGEST PIPE DIAMETER SHALL BE USED.
3. THIS TABLE IS BASED ON A TEST PRESSURE OF 180 PSI (OPERATING PRESSURE PLUS WATER HAMMER. FOR OTHER TEST PRESSURES, ALL VALUES TO BE INCREASED OR DECREASED PROPORTIONALLY.
4. THE VALUES PROVIDED OF RESTRAINT LENGTH ARE IN EACH DIRECTION FROM THE POINT OF DEFLECTION OR TERMINATION EXCEPT FOR TEES, AT WHICH ONLY THE BRANCH IN THE DIRECTION OF THE STEM.
5. IF TIE RODS ARE USED, USE FOUR RODS MINIMUM AND ADD 1/8-INCH TO BAR DIAMETER AS CORROSION ALLOWANCE.

* SIZE REDUCTION IS BASED UPON THE PIPE DIAMETER SHOWN IN THIS TABLE.

BASED UPON:
INTERNAL PRESSURE: 180
PIPE DEPTH: 5
BEDDING CLASS: TYPE 4
SOIL TYPE: GOOD SAND
SAFETY FACTOR: 2

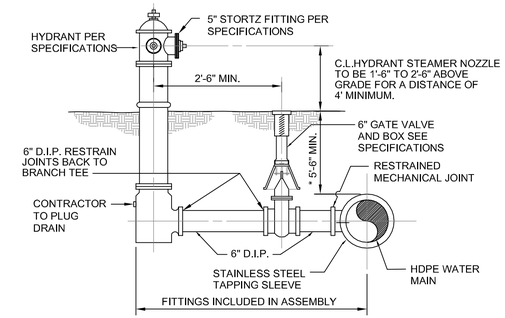


WATER MAIN UTILITY OFFSET



* SEE WATER MAIN PROFILE FOR DEPTH

WITH FUSED HDPE SADDLE



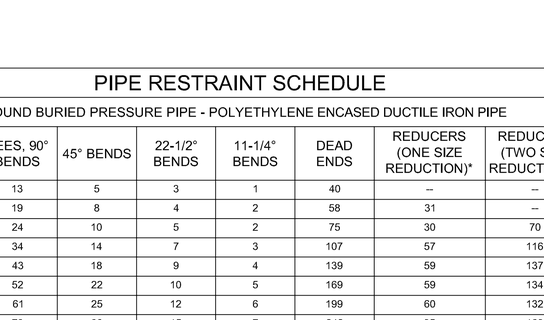
* SEE WATER MAIN PROFILE FOR DEPTH

WITH STAINLESS STEEL SADDLE

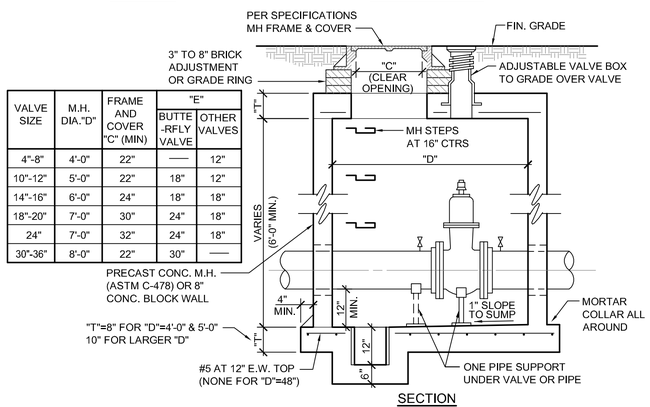
NOTE: USE OF HDPE FOR WATER MAIN APPLICATION REQUIRES SPECIAL APPROVAL FROM THE CITY OF BRIGHTON.

FIRE HYDRANT ASSEMBLY CONNECTION TO HDPE WATER MAIN

NO SCALE



TOP PLAN SECTIONAL PLAN

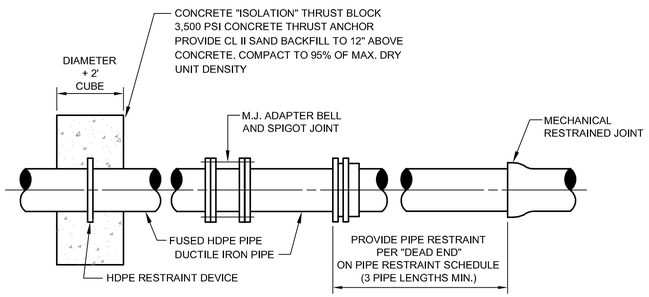


VALVE SIZE	M.H. DIA."D"	FRAME AND COVER "C" (MIN)	"E" BUTTE -RFLY VALVE	"E" OTHER VALVES
4"-8"	4'-0"	22"	——	12"
10"-12"	5'-0"	22"	18"	12"
14"-16"	6'-0"	24"	18"	18"
18"-20"	7'-0"	30"	24"	18"
24"	7'-0"	32"	24"	18"
30"-36"	8'-0"	22"	30"	——

SECTION

VALVE MANHOLE

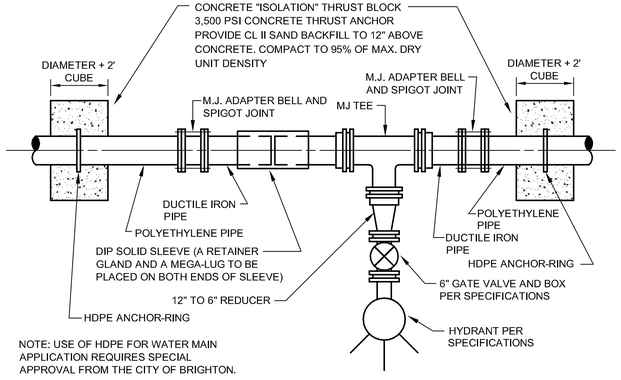
NO SCALE



NOTE: USE OF HDPE FOR WATER MAIN APPLICATION REQUIRES SPECIAL APPROVAL FROM THE CITY OF BRIGHTON.

HDPE TO DIP PIPE CONNECTION DETAIL

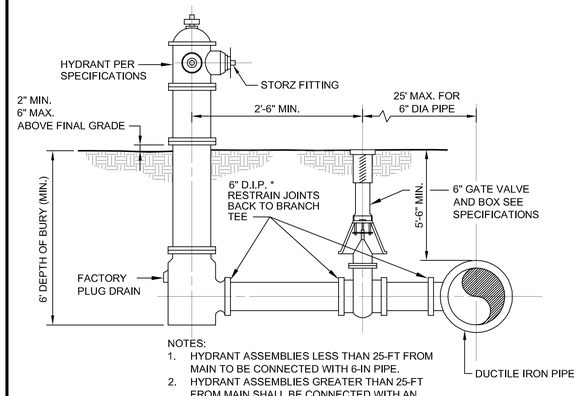
NO SCALE



NOTE: USE OF HDPE FOR WATER MAIN APPLICATION REQUIRES SPECIAL APPROVAL FROM THE CITY OF BRIGHTON.

FIRE HYDRANT ASSEMBLY DIP TEE CONNECTION TO HDPE WATER MAIN

NO SCALE



NOTES:
1. HYDRANT ASSEMBLIES LESS THAN 25-FT FROM MAIN TO BE CONNECTED WITH 6-IN PIPE.
2. HYDRANT ASSEMBLIES GREATER THAN 25-FT FROM MAIN SHALL BE CONNECTED WITH AN 8-IN PIPE. THIS 8-IN PIPE MAY BE REDUCED TO 6-IN PIPE WITHIN 25-FT FROM THE HYDRANT.

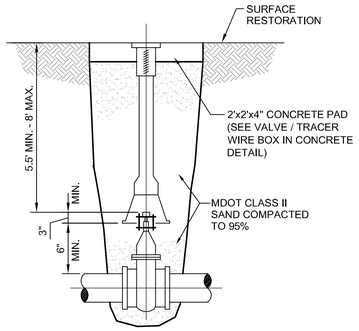
FIRE HYDRANT ASSEMBLY

NO SCALE

CITY OF BRIGHTON

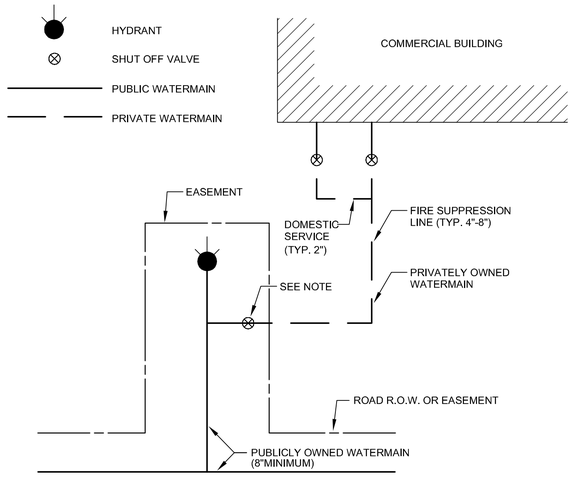
WATER MAIN - SHEET 1 OF 2
STANDARD DETAILS

Scale: NONE
Issued Date MAY - 2014



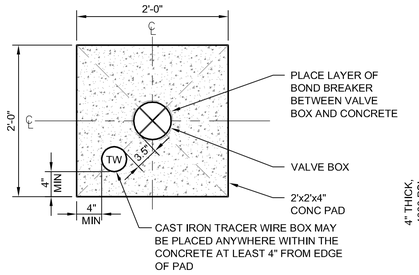
NOTES:
1. VALVE BOX SHALL NOT REST ON VALVE OR MAIN LINE PIPE.
2. A VALVE STEM EXTENSION WITH CENTERING RING IS REQUIRED FOR VALVES BURIED DEEPER THAN 6'.

GATE VALVE AND BOX



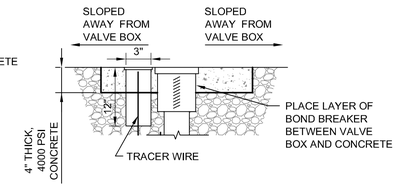
NOTE: PUBLICLY OWNED SHUT OFF VALVE TO BE LOCATED IN EASEMENT.

COMMERCIAL BUILDING WATER SERVICE LAYOUT



NOTE: ALL BOXES & ADJOINING TW BOXES SHALL BE ENCASED IN A CONC. PAD UNLESS OTHERWISE DETERMINED BY THE CITY.

PLAN

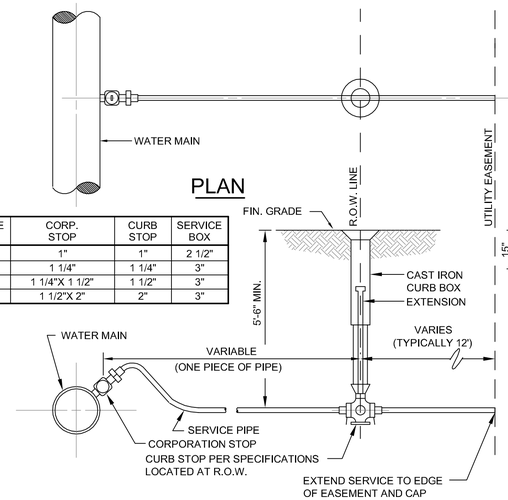


NOTE:
1. TRACER WIRE BOXES LOCATED WITHOUT A VALVE BOX ONLY REQUIRE AN 18" X 18" CONCRETE PAD.
2. TRACER WIRE BOX SHALL HAVE A LOCKING LID W/STANDARD AWWA PENTAGON KEY.

SECTION

GATE VALVE/TRACER WIRE BOX IN CONCRETE DETAIL

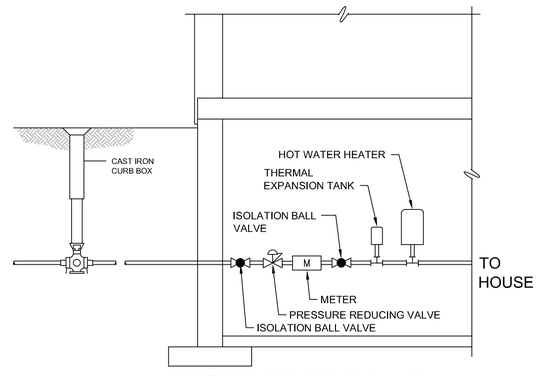
NO SCALE



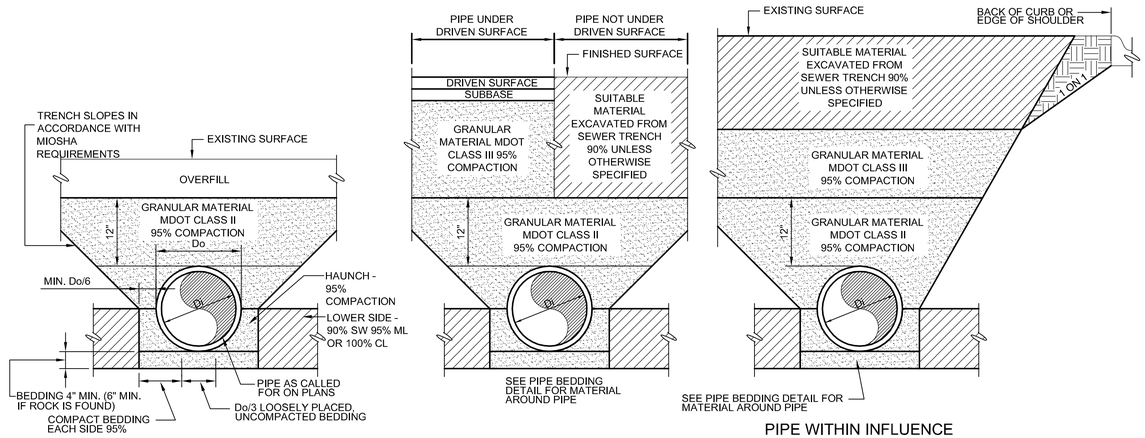
SERVICE PIPE	CORP. STOP	CURB STOP	SERVICE BOX
1"	1"	1"	2 1/2"
1 1/4"	1 1/4"	1 1/4"	3"
1 1/2"	1 1/4"X 1 1/2"	1 1/2"	3"
2"	1 1/2"X 2"	2"	3"

CURB STOP IN PAVEMENT

SECTION
WATER SERVICE LATERAL



PRIVATE RESIDENCE
PRESSURE REDUCING VALVE (PRV)



PIPE BEDDING | PIPE UNDER/NOT UNDER DRIVEN SURFACE | PIPE WITHIN INFLUENCE OF DRIVEN SURFACE

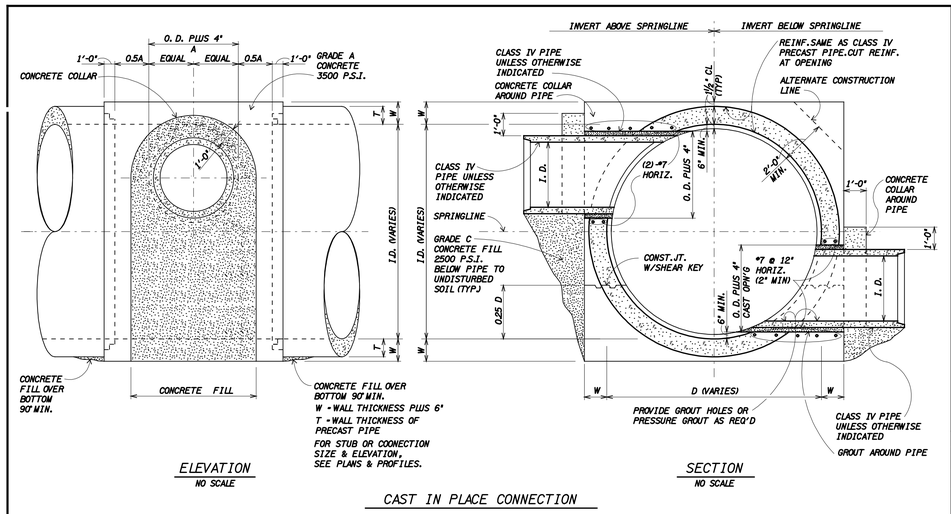
NOTES:
1. COMPACTION PRESENTED AS MINIMUM STANDARD PROCTOR VALUES.
2. MATERIALS AROUND THERMOPLASTIC PIPE WITH DIAMETER < 6 INCHES SHALL PASS 0.5 INCH SIEVE, MATERIALS AROUND OTHER PIPES SHALL PASS 1.5 INCH SIEVE.
3. MATERIALS AROUND HDPE PIPE TO BE MDOT 6A OR 21AA.
4. DRIVEN SURFACE IS DRIVEWAY, PARKING AREA, ROAD BED OR SHOULDER.
5. UTILITY TRENCHES LOCATED WITHIN A MDOT ROW SHALL CONFORM TO MDOT STANDARD DETAIL R-83.

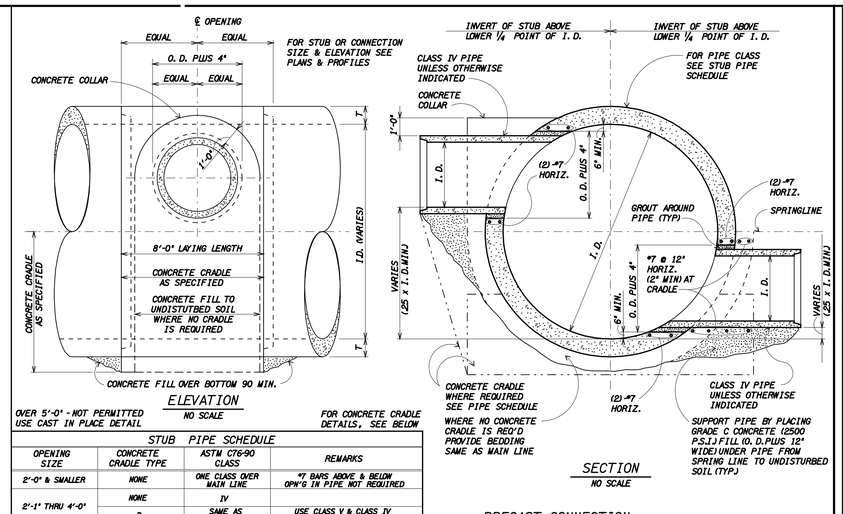
TRENCH EXCAVATION & PIPE BEDDING

CITY OF BRIGHTON

WATER MAIN - SHEET 2 OF 2
STANDARD DETAILS

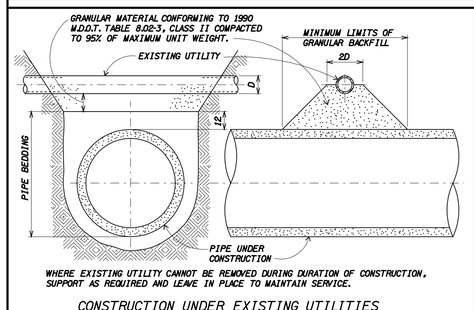
Scale: NONE
Issued Date MAY - 2014





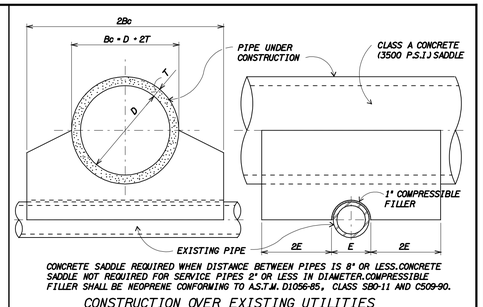
STUB PIPE SCHEDULE			
OPENING SIZE	CONCRETE CRADLE TYPE	ASTM C76-90 CLASS	REMARKS
2'-0" & SMALLER	NONE	ONE CLASS OVER MAIN LINE	#7 BARS ABOVE & BELOW OPN'G IN PIPE NOT REQUIRED
2'-1" THRU 4'-0"	NONE	IV	
	B	SAME AS MAIN LINE	USE CLASS V & CLASS IV MAIN LINE
4'-1" THRU 5'-0"	B	IV	USE CLASS V & CLASS IV MAIN LINE

STANDARD STUBS & CONECTIONS TO SEWERS



WHERE EXISTING UTILITY CANNOT BE REMOVED DURING DURATION OF CONSTRUCTION, SUPPORT AS REQUIRED AND LEAVE IN PLACE TO MAINTAIN SERVICE.

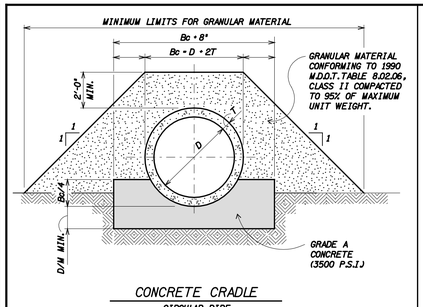
CONSTRUCTION UNDER EXISTING UTILITIES



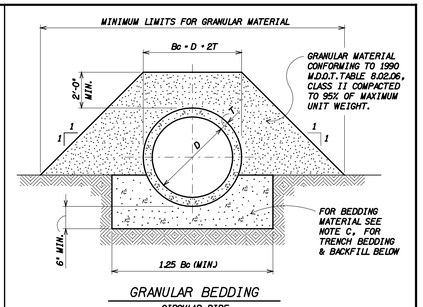
CONCRETE SADDLE REQUIRED WHEN DISTANCE BETWEEN PIPES IS 8" OR LESS.CONCRETE SADDLE NOT REQUIRED FOR SERVICE PIPES 2" OR LESS IN DIAMETER.COMPRESSIBLE FILLER SHALL BE NEOPRENE CONFORMING TO A.S.T.M. D1056-85, CLASS SB0-11 AND C509-90.

CONSTRUCTION OVER EXISTING UTILITIES

METHOD OF CROSSING EXISTING UTILITIES WITH NEW CONSTRUCTION

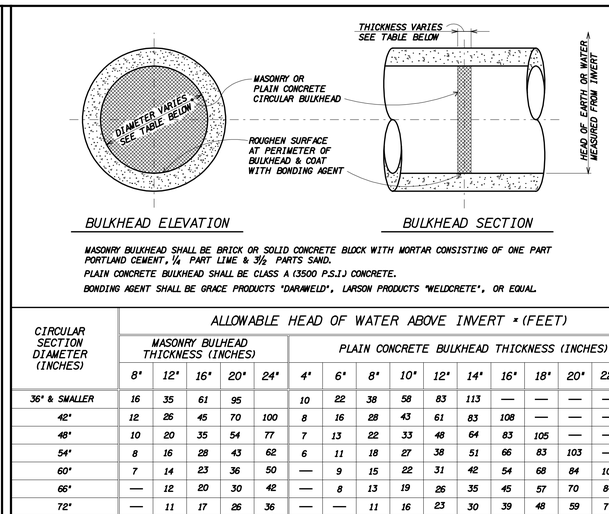


CONCRETE CRADLE
CIRCULAR PIPE



GRANULAR BEDDING
CIRCULAR PIPE

EMBANKMENT BEDDING & FILL



MASONRY BULKHEAD SHALL BE BRICK OR SOLID CONCRETE BLOCK WITH MORTAR CONSISTING OF ONE PART PORTLAND CEMENT, ¼ PART LIME & 3½ PARTS SAND.

PLAIN CONCRETE BULKHEAD SHALL BE CLASS A (3500 P.S.I.) CONCRETE.

BONDING AGENT SHALL BE GRACE PRODUCTS "DARAWELD", LARSON PRODUCTS "WELDCRETE", OR EQUAL.

CIRCULAR SECTION DIAMETER (INCHES)	ALLOWABLE HEAD OF WATER ABOVE INVERT * (FEET)													
	MASONRY BULKHEAD THICKNESS (INCHES)					PLAIN CONCRETE BULKHEAD THICKNESS (INCHES)								
	8"	12"	16"	20"	24"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
36" & SMALLER	16	35	61	95		10	22	38	58	83	113	—	—	—	—	—
42"	12	26	45	70	100	8	16	28	43	61	83	108	—	—	—	—
48"	10	20	35	54	77	7	13	22	33	48	64	83	105	—	—	—
54"	8	16	28	43	62	6	11	18	27	38	51	66	83	103	—	—
60"	7	14	23	36	50	—	9	15	22	31	42	54	68	84	101	—
66"	—	12	20	30	42	—	8	13	19	26	35	45	57	70	84	100
72"	—	11	17	26	36	—	—	11	16	23	30	39	48	59	71	84
78"	—	10	15	22	31	—	—	9	14	20	26	33	42	51	61	72
84"	—	9	14	20	27	—	—	—	13	18	23	29	36	44	53	63
90"	—	—	12	18	24	—	—	—	12	16	21	26	32	39	47	55
96"	—	—	11	16	22	—	—	—	11	14	19	23	29	35	42	49
102"	—	—	10	15	20	—	—	—	10	13	17	21	26	31	37	44
108"	—	—	—	14	18	—	—	—	—	12	16	20	24	29	34	40
114"	—	—	—	13	17	—	—	—	—	11	15	18	22	26	31	36
120"	—	—	—	12	16	—	—	—	—	—	14	17	20	24	29	33
126"	—	—	—	—	15	—	—	—	—	—	13	16	19	23	26	31
132"	—	—	—	—	14	—	—	—	—	—	—	15	18	21	25	29
144"	—	—	—	—	—	—	—	—	—	—	—	—	14	16	22	25

* CONDITIONS BEYOND TABLE VALUES REQUIRE SPECIAL BULKHEADS AS SHOWN ON PLANS

STANDARD MASONRY & PLAIN CONCRETE BULKHEADS

GENERAL CONCRETE NOTES

1. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS & MEASUREMENTS AT THE SITE & SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER PROCEEDING WITH THE WORK.
2. CONCRETE SHALL BE GRADE A WITH A MINIMUM COMPRESSION STRENGTH OF 3500 P.S.I. AT 28 DAYS UNLESS OTHERWISE NOTED.
3. REINFORCEMENT STEEL SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A615-90, GRADE 60, INCLUDING SUPPLEMENTARY REQM'TS S1, REINF. FOR TIES & STIRRUPS MAY BE NEW BILLET STEEL CONFORMING TO ASTM A615-90, GRADE 40.
4. REINFORCEMENT BAR DETAILING & PLACING SHALL CONFORM TO ACI 318-89 "BUILDING CODE", & TO DETAILS & DETAILING OF CONCRETE REINFORCEMENT ACI 315-80, & MANUAL OF ENGINEERING & PLACING DRAWINGS FOR REINFORCED CONC. STRUCT. ACI 315R-SP-66 (88) PLACE (2) #5 BARS, 4'-0" LONGER THAN OPENING, EACH FACE AROUND ALL OPENINGS IN WALLS & SLABS.
5. PROVIDE (1) #5 DIAGONAL x 3'-0" LONG, TOP & BOTTOM, EACH CORNER OF OPENING.
6. WALLS SHALL BE ADEQUATELY BRACED UNTIL SUPPORTING SLABS HAVE REACHED THEIR DESIGN STRENGTH.
7. PROVIDE CORNER BARS SAME SIZE & SPACING AS HORIZONTAL REINFORCEMENT ON OUTSIDE FACE OF ALL CORNERS.
8. MINIMUM COVER TO REINFORCEMENT SHALL BE AS FOLLOWS: A) 3" FOR CONCRETE POURED AGAINTS GROUND; B) WHERE FORMS ARE USED, MINIMUM COVER SHALL BE 2" FOR BARS LARGER THAN #5 & 1½" FOR BARS #5 & SMALLER.
9. MINIMUM LAP OF REINFORCEMENT SHALL BE CLASS C, AS CALLED FOR IN TABLE 20.2 OF SP-17A (78).
10. KEYWAYS SHALL BE 2"x4", UNLESS OTHERWISE NOTED.
11. PROVIDE ¾"x 45° CHAMFER AT EXPOSED EDGES UNLESS OTHERWISE NOTED.

TRENCH	TRENCH BACKFILL
TRENCH "A" (SPECIAL)	BANK RUN SAND MEETING THE REQUIREMENTS OF 1990 M.D.O.T. 8.02.06 "GRANULAR MATERIALS FOR FILL & SUBBASE". CLASS II MATERIALS SHALL BE PLACED IN ACCORDANCE WITH 1990 M.D.O.T. 2.08.10-d-1 "CONTROLLED DENSITY METHOD" WITH EACH LAYER COMPACTED TO 95 PERCENT OF MAXIMUM UNIT WEIGHT.
TRENCH "B" (STANDARD)	SUITABLE EXCAVATED MATERIAL (EXCLUDING BLUE CLAY) PLACED IN ONE FOOT LAYERS WITH EACH LAYER COMPACTED BY APPROVED MECHANICAL METHODS TO A DENSITY EQUIVALENT TO THE UNDISTURBED ADJACENT SOIL.

TRENCH BACKFILL NOTES:

SPECIAL BACKFILL FOR TRENCHES (TRENCH "A") SHALL BE USED AT ALL LOCATIONS CALLED FOR ON THE PLANS & REQUIRED IN THE SPECIFICATIONS

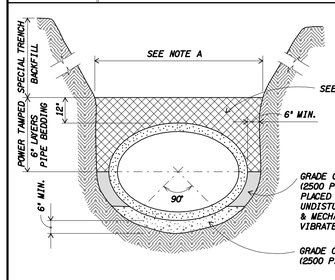
WHERE NOTED ON THE PLANS OR PROFILES THUS : TRENCH "A" TRENCH "A" SHALL BE USED AT LOCATIONS REQUIRED BY THE SPECIFICATIONS. TRENCH "B" SHALL BE USED FOR THE BALANCE OF THE WORK.

WHERE TRENCH IS IN SAND OR GRAVEL THE MAXIMUM TRENCH WIDTH AT THE TOP OF PIPE SHALL NOT EXCEED O.D. PLUS 24".

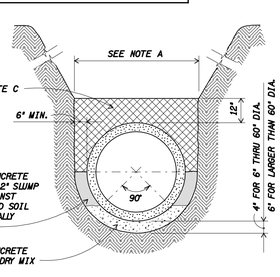
TYPES OF BEDDING

STANDARD PIPE BEDDING SHALL BE USED EXCEPT WHERE THE OTHER TYPES OF PIPE BEDDING ARE CALLED FOR ON THE PLANS & PROFILES

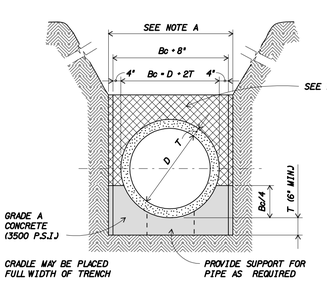
MAXIMUM TRENCH WIDTH TABLE (IN)	
PIPE I.D.	TRENCH WIDTH
4 -12	32
15	36
18	39
21	43
24	46
27	50
30	53
36	68
42	75
48	82
54	89
60	96
66	103
72	110
78	117
84	124
90	136
96	143
102	149
108	156
114	163
120	170
132	184
144	198
156	212
168 & LARGER	O.D. PLUS 30



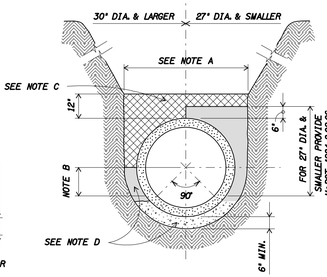
CONCRETE CRADLE
HORIZONTAL ELLIPTICAL PIPE



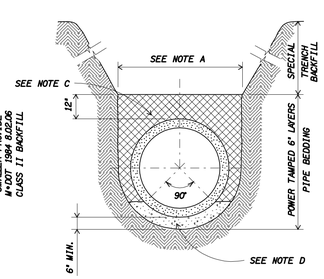
CONCRETE CRADLE - TYPE A
CIRCULAR PIPE



CONCRETE CRADLE - TYPE B
CIRCULAR PIPE



STONE BEDDING
CIRCULAR PIPE



STANDARD BEDDING
CIRCULAR PIPE

NOTE A: BELOW A POINT 12" ABOVE THE TOP OF THE PIPE, THE TRENCH WIDTH SHALL PROVIDE A CLEARANCE OF NOT LESS THAN 6" BETWEEN PIPE & TRENCH. TRENCH WIDTH SHALL NOT EXCEED THAT SHOWN IN THE MAXIMUM TRENCH WIDTH TABLE.

NOTE B: FOR 30" DIA. AND LARGER PIPE, MATERIAL SHOWN THUS [ ] SHALL BE PEASTONE.

NOTE C: PIPE BEDDING MATERIALS SHOWN THUS [ ] SHALL BE SELECTED EXCAVATED MATERIAL (EXCEPT BLUE CLAY). WHERE TRENCH "A" IS SPECIFIED, SPECIAL TRENCH "A" BACKFILL MATERIAL SHALL BE USED FOR PIPE BEDDING BACKFILL.

NOTE D: PIPE BEDDING CUSHION MATERIALS SHOWN THUS [ ] SHALL CONSIST OF MEETING THE GRADING REQUIREMENTS OF 1990 M DOT, TABLE 8.02-1, COARSE AGGREGATE 6A, BLAST FURNACE SLAG OR CRUSHED STONE CONTAINING SUFFICIENT SMALLER SIZED AGGREGATE TO PREVENT MIGRATION OF EARTH OR BACKFILL MATERIAL INTO BEDDING MATERIAL & CAREFULLY PREPARED SO THAT THE ENTIRE BOTTOM ¼ OF THE PIPE WILL BEAR AGAINST THE CUSHION. THE TYPE & THICKNESS OF THE BEDDING SHALL BE AS REQUIRED TO MAINTAIN CORRECT ALIGNMENT & GRADE & SHALL NOT BE LESS THAN 6". (THIS BEDDING CUSHION SUPERCEDES CUSHION REQUIRED BY THE SPECIFICATIONS)

TRENCH BEDDING & BACKFILL

TYPES OF PIPES & JOINTS

PIPE					JOINT	
MATERIAL	SIZE (ROUND)	SPEC.	CLASS	REMARKS	DESCRIPTION	SPEC.
PLAIN CONCRETE	4" - 26"	A.S.T.M. C14 - 90	1, 2 & 3			
REINFORCED CONCRETE	12" - 144"	A.S.T.M. C76 - 90	I -V		MODIFIED GROOVE TONGUE WITH RUBBER GASKET.	A.S.T.M C443 - 85A *
	12" - 144"	1990 M.D.O.T. 8.08.03	I -V	SPECIAL DESIGNS SUPPLEMENT A.S.T.M. C-76	INSIDE CEMENT POINTING FOR 42" & LARGER PIPE.	
	156" - 204"	A.S.T.M. C76 - 90	I -V	SPECIAL DESIGN		
	EQUIVALENT ROUND 18" - 144"	A.S.T.M. C507 - 90	HE - I THRU HE -IV	ELLIPTICAL PIPE	TONGUE & GROOVE BITUMINOUS JOINT WITH INSIDE CEMENT POINTING.	
	18" - 144"	A.W.W.A. C305 - 74	C76 - 83 EQUIVALENT I -V	PRESSURE PIPE, NON-CYLINDER TYPE	STEEL RINGS & RUBBER JOINTS	A.W.W.A. C302 - 74
VITRIFIED CLAY	4" - 26"	N.C.P.I. ER4 - 67	EXTRA STRENGTH		*AWIT* *O-RING* *AWIT-A-RING* *STRE-TITE* *DEFLEC/TITE* *TYLOX* *LDIXON* *UNILOC* *NOBEL* *WEDGELOCK*	A.S.T.M. C - 425 - 90a *

* EXCEPT AS SUCH SPECIFICATIONS RELATE TO INFILTRATION LIMITATION.

STANDARD SEWER DETAILS

BRIAN JONCKHEERE

LIVINGSTON COUNTY DRAIN COMMISSIONER

LIVINGSTON COUNTY — MICHIGAN

DATE	ADDITIONS AND/OR REVISIONS
2-24-97	ISSUED FOR BIDS

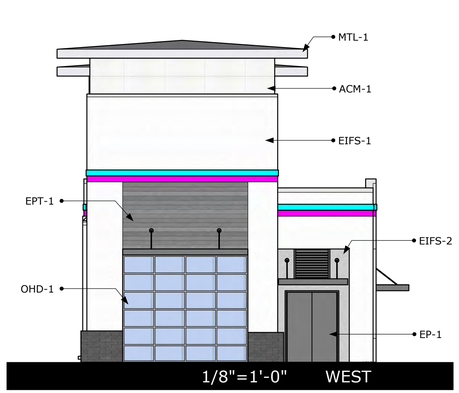
DRAWER	SCALE	DR.	CK.	APP.
		K.G.B.	E.P.D.	W.H.A.

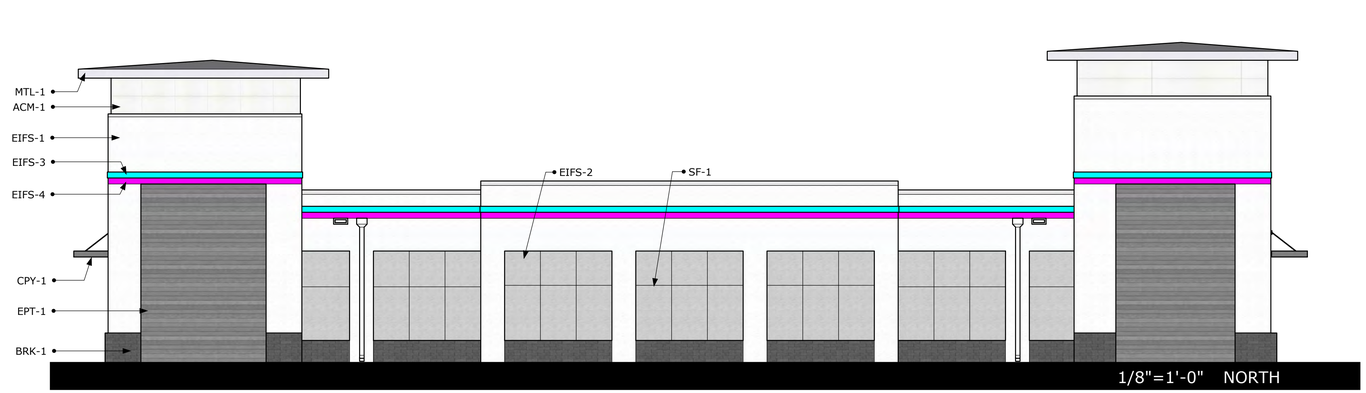
JOB NO. 970785 — DATE

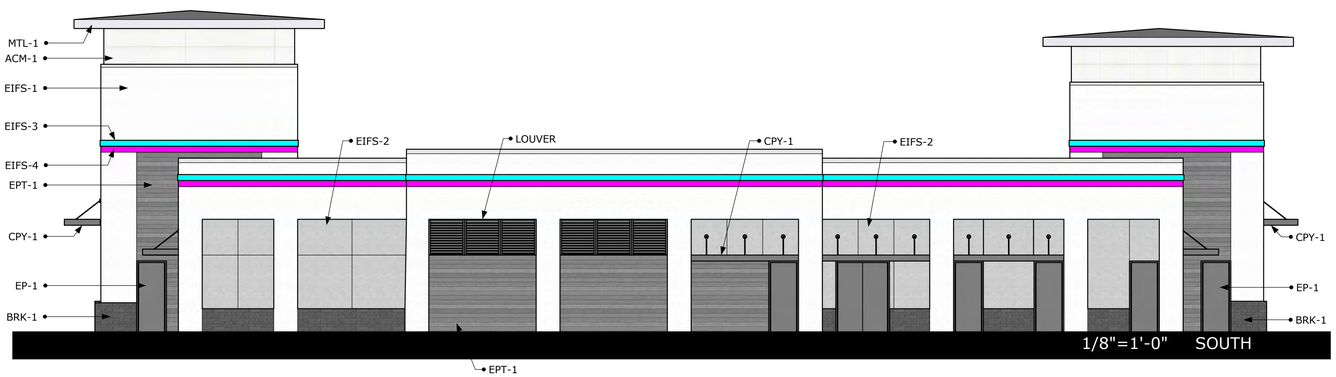
HUBBELL, ROTH & CLARK, INC.
CONSULTING ENGINEERS
555 HULET DRIVE, BLOOMFIELD HILLS, MICH. — P.O. BOX 824, 48303-0824

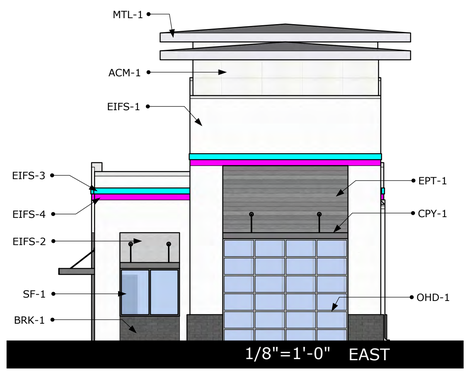
SHEET NO. SD-2 OF

EXTERIOR FINISH SELECTIONS		
Masonry	BRK-1	STRUCTURAL BRICK, DARK GREY
EIFS	EIFS-1	2" DRYVIT SYSTEM, HIGH REFLECTIVE WHITE SW 7757 (WHITE)
	EIFS-2	2" DRYVIT SYSTEM, EVENING SHADOW SW 7662 (MEDIUM GREY)
	EIFS-3	3" DRYVIT SYSTEM, PANTONE 3252 (CYAN)
	EIFS-4	1.5" DRYVIT SYSTEM, PAINTED LOGO COLOR (MAGENTA)
METAL	MTL-1	PAC CLAD BRIGHT SILVER
	ACM-1	HIGH TOWER CLERSTORY RECESS ALUCOBOND WHITE
PORCELAIN TILE	EPT-1	DALTILE RESEMBLENCE RB12 MEDIUM GREY
EXTERIOR PAINT	EP-1	SW 7019 GAUNTLET GREY
CANOPY	CPY-1	METAL CANOPY
STOREFRONT SYSTEM	SF-1	ALUMINUM STOREFRONT SYSTEM, CLEAR ANODIZED FINISH
OVERHEAD DOOR	OHD-1	AIRLIFT DOOR OR SIMILAR









A PLUS DESIGN GROUP
ARCHITECTURE
INTERIORS
CONSTRUCTION
972-724-4440
972-691-7731 FAX
APDG.US

Trent W. Clark Architect
TX Registration # 17084

PRELIMINARY
NOT FOR
CONSTRUCTION

These Drawings are incomplete and may not be used for regulatory approval, permit, or construction

EL CAR WASH

A NEW FACILITY FOR: .

8680 GRAND RIVER RD. BRIGHTON MI

Project No. 22-1201
Date 01-20-23

A3.1

BRIGHTON AREA FIRE AUTHORITY
615 W. Grand River Ave.
Brighton, MI 48116
o: 810-229-6640 f: 810-229-1619

January 11, 2023

Mike Caruso
Building/Zoning Dept.
City of Brighton
200 North First Street
Brighton, MI 48116

RE: West Grand & Cross St. Carwash
8680 W. Grand River
Brighton, MI 48116
Site Plan Review

Dear Mike:

The Brighton Area Fire Authority has reviewed the above-mentioned site plan. The plans were received for review on November 21, 2022 and the drawings are dated December 21, 2022. The project is based on the proposed construction of a new 4,037 square foot, Type IIB, B-use car wash on an the existing parcels totalling 1.99-acres. The plan review is based on the requirements of the International Fire Code (IFC) 2021 edition.

1. The building shall include the building address on the building. The address shall be a **minimum of 6"** high letters of contrasting colors and be clearly visible from the street. The location and size shall be verified prior to installation. **(Complies)**

   IFC 505.1

2. Two-way emergency vehicle access roads shall be a minimum of 26-feet wide. This only applies to the circulation drives adjacent to the realigned Second St. marked as 24-feet Access roads to the site shall be provided and maintained during construction. Access roads shall be constructed to be capable of supporting the imposed load of fire apparatus weighing at least 84,000 pounds. **(Complies)**

   IFC D 102.1
   IFC D 103.1

3. Access around the building shall provide emergency vehicles with a turning radius of 50-feet outside and 30-feet inside. Vehicle circulation shall account for non-emergency traffic and maintain the vehicle within the boundary of lanes of travel. **(Complies)**

   IFC 503.2.4
   IFC D103.3

4. The location of a Knox Box shall be indicated on future submittals. The Knox box shall be located adjacent to the main entrance of the structure, in a location coordinated with the fire authority. **(Complies)**

   IFC 506.1

5. During the construction process, the building will be evaluated for emergency responder radio signal strength. If coverage is found to be questionable or inadequate; the contractor or the building owner shall hire an approved contractor to conduct a grid test of the facility. If the signal strength coverage is found to be non-compliant, an approved emergency responder radio coverage system shall be provided in the building. **(Noted)**

   IFC 510

6. Provide a Fire Hydrant Coverage Plan showing the Brighton Area Fire Authority large fire truck movement throughout the vacuum area drive aisles. **(Complies)**

IFC 503.2.4

7. Hose lay coverage less than 400 feet, and the building being covered within250 feet of a fire hydrant. Hose length measured to all parts of the structure must be measured along theapparatus access drive where the hose will lay from the truck. **(Complies)**

IFC 507.5.1

8. Provide names, addresses, phone numbers, emails of owner or owner's agent, contractor, architect, on-site project supervisor. **(Noted)**

Additional comments will be given during the building plan review process (specific to the building plans and occupancy). The applicant is reminded that the fire authority must review the fire protection systems submittals (sprinkler & alarm) prior to permit issuance by the Building Department and that the authority will also review the building plans for life safety requirements in conjunction with the Building Department.

If you have any questions about the comments on this plan review please contact me at 810-229-6640.

Cordially,

Rick Boisvert, FM, CFPS
Fire Marshal

cc: Sbarb@livgov.com
kari.jozwik@tetratech.com

Livingston County Department of Planning

MEMORANDUM

Kathleen J. Kline-Hudson
AICP, PEM
Director

Robert A. Stanford
AICP, PEM
Principal Planner

Scott Barb
AICP, PEM
Principal Planner

TO: City of Brighton Planning Commission

FROM: Scott Barb, Principal Planner

DATE: November 23, 2022

SUBJECT: West Grand & Cross Car Wash – Site Plan Review #1

A site plan has been submitted for your consideration by Stonefield Engineering for the construction of a new 4,037 SF drive through automobile car wash that will be located near the corner of Cross Street and Grand River Avenue. The proposed car wash will include twenty-seven vacuum spaces, 6 on-site parking spaces for employees, on-site refuse collection, and landscaping as required. The property is currently zoned C-2 (General Business District) and may be developed as a car wash in the C-2 District as one of the many similar uses listed. Per Table 98-6.1. B, the proposed development requires a site plan and planning commission review per the Ordinance standards.

Based on the City of Brighton Ordinance and sound planning principles, we have reviewed the site plan according to the following standards:

Article 3 – Zoning Districts

Article 4 – Use Standards

Article 5 – Site Standards

Article 6 – Development Procedures

Our comments regarding any regulations that need to be met for compliance with the City Ordinance will be written in red.

Department Information

Administration Building
04 E. Grand River Avenue
Suite 206
Howell, MI 48843-2323

(517) 546-7555
Fax (517) 552-2347

Web Site
www.livgov.com

General Site Characteristics

Site Address:	near corner of Cross Street and Grand River Avenue
Parcel Number:	4718-30-023, 4718-30-024, 4718-30-100-026, 4718-30-100-086
Access Roads:	Primary ingress/egress point is from service drive at Meijer
Lot Size:	2 acres
Existing Zoning:	C-2, General Business
Site Description:	The proposed development will be the site of the West Grand and Cross Car Wash.

Article 6, Section 98-6.1 Site Plan Review

98-6.1. B Uses Requiring Site Plan Review
Based on Table 98-6.1.B, a site plan review is required for the proposed car wash. The site is located in the General Business District and is not exempted from the site plan review process.

98-6.1.D Required Site Plan Contents
Table 98-6.1.D.1 details all required information for site plan submittal. The applicant has provided sufficient information on the plan for the initial review.

98-6.1.E Site Plan Review Standards
(E.1) Dimensional Standards in the C-2 District:

Minimum lot size: 2,000 sq. ft.
Maximum lot width: 66 ft.
Min. Front Yard Setback: 0 ft.
Min. Rear Yard Setback 0 ft. (abutting residential – 20 ft.)
Min. Side Yard Setback: 0 ft. (abutting residential – 10 ft.)
Max. Building Height: 3 stories, not to exceed 50 ft.

The proposed car wash meets all of the dimensional standards.

(E.2) Impact on surrounding land use and zoning: The proposed car wash is a permitted use in the zoning district and is compatible with surrounding uses in the C-2 District.

(E.3) Views and building elevations: The provided architectural plans illustrate a maximum height of 32 feet for the structure and this meets the district requirements.

(E.4) Preservation of natural features: The proposed car wash should not interfere with any natural features on or around the site in the C-2 District.

(E.5) Use Standards: The site will be reviewed to ensure compliance of all sections of the City of Brighton Zoning Ordinance and other standards established by the City.

(E.6) Site Standards: Site standards will be reviewed as part of Article 5 Site Standards later in this review. Internal circulation is provided on-site with parking and sidewalks shown on the site plan. All sidewalks on the site plan are a minimum of 5 feet wide. Flush curbs and crosswalks are proposed at each point of ingress/egress into the site.

Article 3, Section 98-3.11 C-2 General Business District Regulations

All development in the C-2 District is subject to the following regulations:

(98-3.39) C-2 General Regulations: The proposed car wash is connected to both city water and sewer and will meet the necessary regulations administered by the City of Brighton.

Article 5, Section 98-5.2 Refuse Disposal

The car wash will have an approximate 10 x 10 dumpster pad enclosure measuring six (6) feet high located near the north exit. The enclosure will be constructed with masonry blocks and have

lockable gates/doors and is compliant with the Ordinance. Eastern Redcedar evergreen trees will provide screening for the proposed trash receptacle.

Article 5, Section 98-5.3 Stormwater Management Systems

The development is required to comply with the City of Brighton storm water management standards. We will defer approval of these requirements to Tetra Tech, the City of Brighton's professional engineering firm.

Article 5, Section 98-5.4 Exterior Lighting

A total of 8 Eaton Lumark outdoor pole lights will be placed at various locations around the proposed car wash site. All fixtures are indicated as being fully shielded, fully cut-off, and down directed as required by the Ordinance. Mounting heights for all fixtures are designated as being twenty-five feet and are under the allowable thirty feet in height for commercial districts. The included photometric plan illustrates compliance with the .5 foot-candle measurements that are required by the City Zoning Ordinance.

Article 5, Section 98-5.6 Off-Street Parking and Loading Regulations

Parking regulations for the proposed site are as follows:

General Parking Requirements

B.3. Shared parking: All off-street parking must be located on the same lot as the building or use the parking is intended to serve.

B.5. Signage for off-street parking shall be in accordance with Chapter 66 of the Ordinance.

B.9. All parking spaces and lots shall have defined access to a public or private street with no more than two (2) curb cuts accessing the parking lot.

Specific Parking Requirements

C.1. All parking stalls shall be nine (9) feet in width and eighteen (18) feet deep. Parking stall sizes are compliant.

C.2. No loading spaces are required on site as the proposed building will be less than 5,000 sq. ft. Any loading activities are designated to occur after business hours according to the developer and are labeled as "off hours loading" on the proposed site plan.

C.3. Barrier-free parking spaces: The proposed car wash will have 6 designated spaces for employee parking with an additional twenty-seven spaces for customer use at the vacuum and detailing areas. Seven stacking spaces have been provided as required per automatic car wash bay. The applicant has included one required ADA compliant parking space with an 8 ft. wide loading zone per Ordinance requirements.

C.4. Driveway/Isle width is variable throughout the site. All one-way drives appear to be compliant at twenty (20) ft. minimum width with a minimum of twenty-four (24) for all two-way access points.

C.7. Surfacing and curbing: All drives and parking areas are surfaced and curbed.

C.8. Drainage: Tetra Tech, the City's professional engineer, will evaluate these standards.

Determination of Required Spaces
Table 98-5.6.E establishes the minimum parking space requirement based on use of the property. For automatic or self-service car washes, the following standards are required and have been met:

1 space for each employee on the largest shift = 6
7 spaces for each automatic bay = 7 stacking spaces
27 additional spaces for use by customers in vacuum and detailing areas
1 ADA compliant space with and 8 ft. loading zone

Article 5, Section 98-5.7 Landscaping and Screening Requirements

Landscaping requirements for the proposed hotel site are as follows:

C. Required Greenbelts along and within rights-of-way: Greenbelts along the ROW of any public or private street must include one (1) canopy tree for every thirty (30) linear feet of frontage. The applicant has met these requirements with a mix of Eastern Redbud, Red Maple, Maidenhair, and Linden trees.

Parking Lot Landscaping
E.1. General Requirements: Landscaping of the perimeter of the parking areas is required in addition to interior landscaping and has been provided with lawn and required greenbelts.

E.2. Design Requirements: Landscaped end caps have been provided to the extent possible based on parking design. A combination of Red Maple and Linden will compliment the parking lot.

E.6. Irrigation and Maintenance: All new landscaping on-site must be irrigated and is noted on the site plan as being the responsibility of the irrigation contractor.

Recommendation

We believe the site plan has addressed any outstanding concerns noted at the pre-development meeting with the applicant and are recommending approval of the proposed West Grand & Cross Car Wash. Should you have any concerns or comments regarding our review, please do not hesitate to contact me at any time, and at your convenience.

Respectfully,

Scott Barb, AICP, PEM

TETRA TECH

MEMO

To:	Michael Caruso, City of Brighton
Cc:	Mitchell Harvey, Stonefield Engineering
From:	Kari Jozwik, P.E. and Kyle Ramakers, P.E., PTOE
Date:	12/08/2022
Subject:	Traffic Impact Study Review Proposed Brighton Carwash - 8680 W. Grand River

A traffic impact assessment, dated November 11, 2022, was prepared by Fleis and Vandenbrink for proposed car wash located on 8680 West Grand River Avenue. We offer the following comments for the City's consideration.

1) Section 2.2 lists the intersections of Cross Street with Grand River Avenue and 2nd Street as the locations of the traffic counts, while Figure 3 indicates that Grand River Avenue and the Meijer driveway was counted. Please clarify.
2) Please confirm a 2024 build-out is accurate.
3) While ITE does provide information for automated car washes on Saturdays, it is very limited information. The methodology used in the study for Saturday peak hour trip generation is conservative and acceptable for use.
4) The 50% pass-by rate for both the weekday PM peak hour and Saturday peak hour seems high, and no supporting information was provided in the report. Since the *Trip Generation Handbook* does not provide a rate, supporting information for this rate, such as other traffic studies, should be provided and approved before analysis of intersections.
5) It would be preferrable to split out background traffic and the Vista traffic in Figure 4, rather than providing just the combined volume.
6) Figure 5 Site-Generated Traffic Volumes does not carry outbound new volumes along Cross Street, nor inbound and outbound pass-by trips. Please update accordingly.
7) Based on the comments above regarding trip generation and volumes, a review of the operational reports was not performed.
8) The discussion regarding internal site operations with potential queues from Grand River, discussed during the kick-off meeting and mentioned in traffic study scope emails, was not included in the report. Please update the report to include this analysis.

Recommendation

Based on the comments above, including the trip generation and volume/figure comments, the report trip generation, volumes, operational analyses, and report should be revised and resubmitted for further review.

If you have any questions or would like to discuss any of the items above, please feel contact Kyle Ramaker at (313) 819-9593 or kyle.ramakers@tetratech.com.

TETRA TECH

February 9, 2023

Mr. Michael Caruso
City of Brighton
200 North First Street
Brighton, MI 48116

Re: Automobile Carwash
Site Plan Review No. 5

Dear Mr. Caruso:

Tetra Tech has reviewed the revised site plan for the proposed Automobile Carwash located near the corner of Cross Street and Grand River Avenue. The site plan, dated February 9, 2023, has been prepared by Stonefield Engineering & Design and was submitted in response to our February 7, 2023, review letter. The applicant has addressed our previous concerns. We have no further engineering objections to the approval of the West Grand and Cross Carwash site development plans dated February 9, 2023.

Please call me at 810.225.8439 if you have any questions or comments.

Sincerely,

Kari Jozwik, P.E.
Project Engineer

Tetra Tech
7927 Nemco Way, Suite 100, Brighton, MI 48116
Tel 810.220.2112 Fax 810.220.0094 www.tetratech.com

Alrig USA
30200 Telegraph Road, Suite 205
Bingham Farms, Michigan 48025

GEOTECHNICAL INVESTIGATION

FOR

Proposed Car Wash Development
8680, 8650, 8251 &
8265 W. Grand River Avenue
Brighton, Michigan

TEC Report: 62886

By:

Testing Engineers & Consultants, Inc.
1343 Rochester Road
P.O. Box 249
Troy, Michigan 48099-0249
(248) 588-6200

September 7, 2022

Testing Engineers & Consultants, Inc.
1343 Rochester Road • PO Box 249 • Troy, Michigan 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G • Fax (248) 588-6232
www.testingengineers.com

Engineering Client Success

TEC Report: 62886
Date Issued: September 7, 2022

Mr. Jordan Chapman
Alrig USA
30200 Telegraph Road, Suite 205
Bingham Farms, Michigan 48025

Re: Geotechnical Investigation For
Proposed Car Wash Development
8680, 8650, 8251 &
8265 W. Grand River Avenue
Brighton, Michigan

Dear Mr. Chapman:

Please find enclosed the results of a geotechnical investigation performed at the above referenced site. This geotechnical report presents our field and laboratory results; engineering analysis; and our recommendations for design of foundation and slabs, as well as important construction considerations.

As you may know, Testing Engineers & Consultants, Inc. (TEC) has fifty-six years of experience in Quality Control Testing and Construction Inspection. We would be pleased to provide these services on this project.

Should you have any questions regarding this report, please let us know. It has been a pleasure to be of service to you.

Respectfully submitted,

TESTING ENGINEERS & CONSULTANTS, INC.

Carey J. Suhan, P.E.,
Vice President, Geotechnical
& Environmental Services

CJS/ln
Enclosure

Testing Engineers & Consultants, Inc.

Mr. Jordan Chapman
Alrig USA
September 7, 2022

TEC Report: 62886

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APPENDIX

TEST BORING LOCATION PLAN
LOGS OF TEST BORINGS
SIEVE ANALYSIS RESULTS
GENERAL NOTES FOR SOIL CLASSIFICATION

Mr. Jordan Chapman
Alrig USA
September 7, 2022

TEC Report: 62886

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed building at 8680, 8650, 8251 and 8265 W. Grand River Avenue in Brighton, Michigan. Authorization to perform this investigation was given with a contract for engineering services. The scope of services was outlined in TEC Proposal 060-22-140.

The purpose of this investigation was to obtain information necessary to determine basic engineering properties of soils at the site through a series of test borings and laboratory tests performed on the soil samples obtained during the field investigation. This information has been evaluated to provide the general recommendations for site development preparations, foundation requirements, floor slab designs and other geotechnical information.

2.0 FIELD INVESTIGATION

Eight test borings were drilled on the site at the locations shown on the Test Boring Location Plan. The locations are accurate to within a short distance of the locations shown on the location plan included in the appendix. The test borings were drilled on August 6, 2022 with truck-mounted auger equipment to depths of 10 and 20 feet below the existing grade.

Drilling methods and standard penetration tests were performed in general accordance with the current ASTM D1452 and D1586 procedures, respectively. These procedures specify that a standard 2-inch O.D. split-barrel sampler be driven by a 140-pound hammer with a free fall of 30 inches. The number of hammer blows required to drive the split-barrel sampler through three successive 6-inch increments is recorded on the Test Boring Log. The first 6-inch increment is used for setting the sampler firmly in the soil and the sum of the hammer blows for the second and third increments is referred to as the “Standard Penetration Index” (N). N values were obtained with an automatic trip hammer.

From the standard penetration test a soil sample is recovered in the liner sampler tubes that are located inside the split-barrel sampler. Upon recovery of a soil sample, the liner tubes are removed from the split-barrel sampler and placed in a container which is sealed to minimize moisture losses during transportation to the laboratory. Standard penetration tests are usually made at depths of 2 ½, 5, 7 ½ and 10 feet and at 5-foot depth intervals thereafter. These parameters may vary for a given project depending on the nature of the subsoils and the geotechnical information required.

3.0 LABORATORY TESTING

The laboratory testing consisted of determining the unconfined compressive strength, the natural bulk density and the natural moisture content of the soil samples recovered in the liner sampler tubes. In the unconfined compression tests, the compressive strength of the soil is determined by axially loading a soil sample until failure is observed or 15% strain, whichever occurs first. The above referenced test data are recorded on the boring logs. Some test results may deviate from the norm because of variations in texture, imperfect samples, presence of pebbles and/or sand streaks, etc. The results are still reported although they may not be relevant.

The particle size distribution of two granular soil samples was also determined. The distribution provides soil classification information, structural support parameters and estimates of the permeability and permeability-related behavior of the granular soils. The results are included in the appendix.

In addition to the above tests, one laboratory falling head permeability test was performed on a soil sample. The test result is presented in Section 5.6.

Samples taken in the field are retained in our laboratory for 60 days and are then destroyed unless special disposition is requested by the client. Samples retained over a long period of time are subject to moisture loss and are then no longer representative of the conditions initially encountered.

4.0 GENERAL SUBSURFACE CONDITIONS

4.1 Subsoil Conditions

The soil conditions encountered in the borings are presented on the individual boring logs. Each log presents the soil types encountered at that location as well as laboratory test data, ground water data, and other pertinent information. Descriptions of the various soil consistencies, relative densities and particle sizes are given in the Appendix. Definitions of the terms and symbols utilized in this report may be found in ASTM D653.

The ground surface was covered with 5 to 9 inches of sandy topsoil. At four of the borings fill was encountered below the topsoil extending to 3 feet below the existing ground surface. The fill is primarily brown sand with a trace of gravel. At two boring locations it contained a trace of asphalt.

4.1 Subsoil Conditions (Cont'd)

The underlying native soil below the fill and topsoil was mainly very loose to compact sand that typically extended to the terminal depth of the borings. The very loose sand was encountered at Boring No. 3 below 12 foot depth. A trace to some gravel was encountered in some of the sand layers. An upper clay layer was encountered at every boring except Boring No. 4. The clay layer was found between approximate depths of 3 and 6, however, at Boring Nos. 7 and 8 the clay was encountered beneath the topsoil and extended to 3 feet below existing grade. A layer of clayey silt was encountered in Boring No. 3 extending to a depth of 3 feet.

Standard penetration values range from 5 blows per foot to 45 blows per foot. Moisture contents ranged from 2.6 to 20.7 percent of the dry weight of the soil with bulk densities of 128 to 141 pounds per cubic foot (pcf).

4.2 Ground Water Observations

Water level readings were taken in the bore holes during and after the completion of drilling. These observations are noted on the respective Test Boring Logs. Ground water was first encountered during drilling at Boring Nos. 3 and 4 at depths of 17 feet below existing ground surface. After completion of drilling and removal of the augers, water was measured at a depth of 17 feet in the same boreholes. No water was encountered in the remaining borings during drilling or after completion of drilling.

5.0 ANALYSIS AND RECOMMENDATIONS

5.1 Proposed Development

The proposed development is to consist of the construction of a single story, slab on grade car wash building. The building will encompass an area of 5,038 square feet. Associated parking and drives will be constructed.

5.2 Ground Water Conditions

The position of water levels found in test borings may vary somewhat depending on seasonal precipitation. At the level encountered in the borings, it should present no significant problems for design or construction of foundations and utilities.

Any ground water encountered should be controllable by pumping from excavations or from properly prepared sumps as needed.

5.3 Recommended Earthwork Operations

Within the limits of areas to be developed, the surface vegetation and topsoil, should be removed prior to the site being graded. Close field observation of the subgrade should be performed. Any large debris or asphalt should be removed. The site should then be rolled with a vibrating roller to densify any loose sand. This should be followed by a proofroll to identify soft or yielding areas. It may be possible to stabilize soft areas with crushed stone or concrete. Soft spots that cannot be stabilized should be removed and replaced with compacted engineered fill. We recommend that the site preparation extend 10 feet beyond the building limits and 5 feet beyond pavement limits.

The exposed subgrade is mostly loose to medium compact sand with some areas of clay. The moisture contents at the time of drilling were near the anticipated optimum moisture content. Consequently, the subgrade should remain stable under proofroll operations and construction traffic.

Engineered backfill required for construction excavations or fill required to achieve desired grades should preferably consist of clean and well graded granular soils. On-site granular material should be satisfactory for use, particularly for balancing and grading the site. Fill should be placed in uniform layers not more than 9 inches in thickness with the soils in each layer compacted to a minimum of 95% of the maximum density as determined by ASTM D1557. Fill should be at approximately the optimum moisture content during placement and compaction. Furthermore, frozen material must not be used as fill and fill should not be placed on frozen ground.

Since the soils are primarily sands, lateral support structure or side sloping with a minimum 1H:1V ratio will be required for anticipated excavations. After subgrade preparation it appears that trenched foundations may be stable. We recommend budgeting a contingency for formed foundations as needed. Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in conditions such as from disturbances, rain or freezing. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, all footing concrete should be placed the same day the excavation is made. If this is not possible, the footing excavations should be adequately protected.

5.4 Foundation Recommendations

Foundations should bear on soil deposits that have adequate strength to develop bearing capacity and sufficient stiffness to limit settlement for reasonably-sized footings with the anticipated loads. Local building codes and climatic conditions require that exterior foundations be placed at a minimum depth of 3 ½ feet below finished grade to provide for

5.4 Foundation Recommendations (Cont'd)

adequate frost protection. Interior foundations may be below the floor at a lesser depth if not exposed to frost penetration. Regardless of the loads, the foundations must be larger than the superstructure they support along with construction tolerances.

The native site soils are acceptable for support of the proposed structure on shallow foundations. Any sand at foundation bearing depth should be thoroughly compacted prior to foundation construction. At minimum depths, foundations can be designed for a net allowable bearing pressure of 2,000 psf. The recommended design bearing pressure should provide a factor of safety of about 2.5 to 3 against shear failure and limit differential settlements between adjacent columns to less than ¾ inch.

From a review of the borings and assumptions made about the lower lying soils a seismic site class of D is recommended for design. It is assumed that the lower lying soils below the bottom of the borings have an average N value between 15 and 50 and shear strengths between 1000 psf and 2000 psf. This appears to be a reasonable assumption from general geology of the area. This is based off of the Michigan Building Code, which incorporates the International Building Code.

5.5 Floor Slabs and Pavements

The subgrade resulting from the site preparation, as outlined in the recommended earthwork operations section, will provide a fair subgrade for support of pavements and floor slabs. Key concerns for the design and construction of floor slabs are structural support of the slab, stability of the subgrade during construction, and drainage of the cross-section in service.

Floor slabs and other concrete pavements should be placed on a minimum of 4 inches of clean compacted sand meeting MDOT Class II specifications or MDOT 21AA which will remain more stable during concrete placement.

For automobile drives and minimal truck traffic the following section is recommended:

1 ½ inch bituminous concrete wearing course (MDOT 5E1 or 4E1)
2 ½ inch bituminous concrete leveling course (MDOT 4E1)
10 inches untreated aggregate base (MDOT 21AA)

The aggregate base may be reduced to 8 inches in automobile parking areas.

5.5 Floor Slabs and Pavements (Cont'd)

Given the anticipated loading and proposed building usage Portland cement concrete is recommended for areas of sustained loads such as the proposed dumpster pads and the approach to the pad for the front wheels of the refuse truck.

Air entrained MDOT P1 grade concrete with partial slag cement replacement is recommended for new curb and gutter, mainline pavement at intersections & drive approaches or miscellaneous flatwork. If a high-performance concrete pavement is desired, MDOT P1M concrete is recommended. TEC recommends that the proposed concrete mixes effectively mitigate the potential for ASR reactivity utilizing a combination of methods such as partial slag cement substitution, use of low alkali Portland cement, and verification testing of the ASR expansion potential of the proposed fine aggregates and/or combinations of cementitious materials.

The pavement should be properly crowned and shaped in order to provide effective surface drainage and prevent water ponding. A 1.5 percent slope is recommended. Edge drains along the perimeter of the pavement and finger drains around catch basins are recommended to prevent water from infiltrating the subgrade. All drains should be connected to storm sewer or other outlets.

The pavement recommendations presented above are intended to provide a serviceable pavement for an extended period of time. However, all pavements show deterioration with time and require regular maintenance such as occasional repairs of cracks and pot holes. The need for such maintenance efforts is not necessarily indicative of premature pavement failure. The serviceable life of the pavement can be substantially reduced if maintenance and minor repair is not performed in a timely manner.

5.6 Permeability Test Results

Laboratory Falling Head Permeability Tests were performed as per ASTM D-5084 on one sample taken from Boring No. 6. The sample was taken from a depth of 7 ½ feet. The test results are presented below:

Boring No.	Depth (Feet)	Permeability Inches per Hour
6	7.5	0.23

No particular information was provided to us regarding storm water infiltration locations on the site, however, the sandy soils with minimal clay content found at depths of about 5 ½ feet below existing grade should provide relatively good infiltration.

6.0 DESIGN REVIEW AND FIELD MONITORING

The evaluations and recommendations presented in this report relative to site preparation and building foundations have been formulated on the basis of assumed and provided data relating to the location, type and finished grades for the proposed structure and adjacent areas. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsoil conditions.

When the building and foundation plans are finalized, a consultation should be arranged with us for a review to verify that the evaluations and recommendations have been properly interpreted.

Soil conditions at the site could vary from those generalized on the basis of test borings made at specific locations. It is therefore recommended that Testing Engineers & Consultants, Inc. be retained to provide soil engineering services during the site preparation, excavation and foundation phases of the proposed project. This is to observe compliance with the design concepts, specifications and recommendations. Also, this provides opportunity for design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Carey J. Suhan, P.E.
Vice President, Geotechnical
& Environmental Services

CJS/ln

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Testing Engineers & Consultants, Inc.

Mr. Jordan Chapman
Alrig USA
September 7, 2022

TEC Report: 62886

APPENDIX

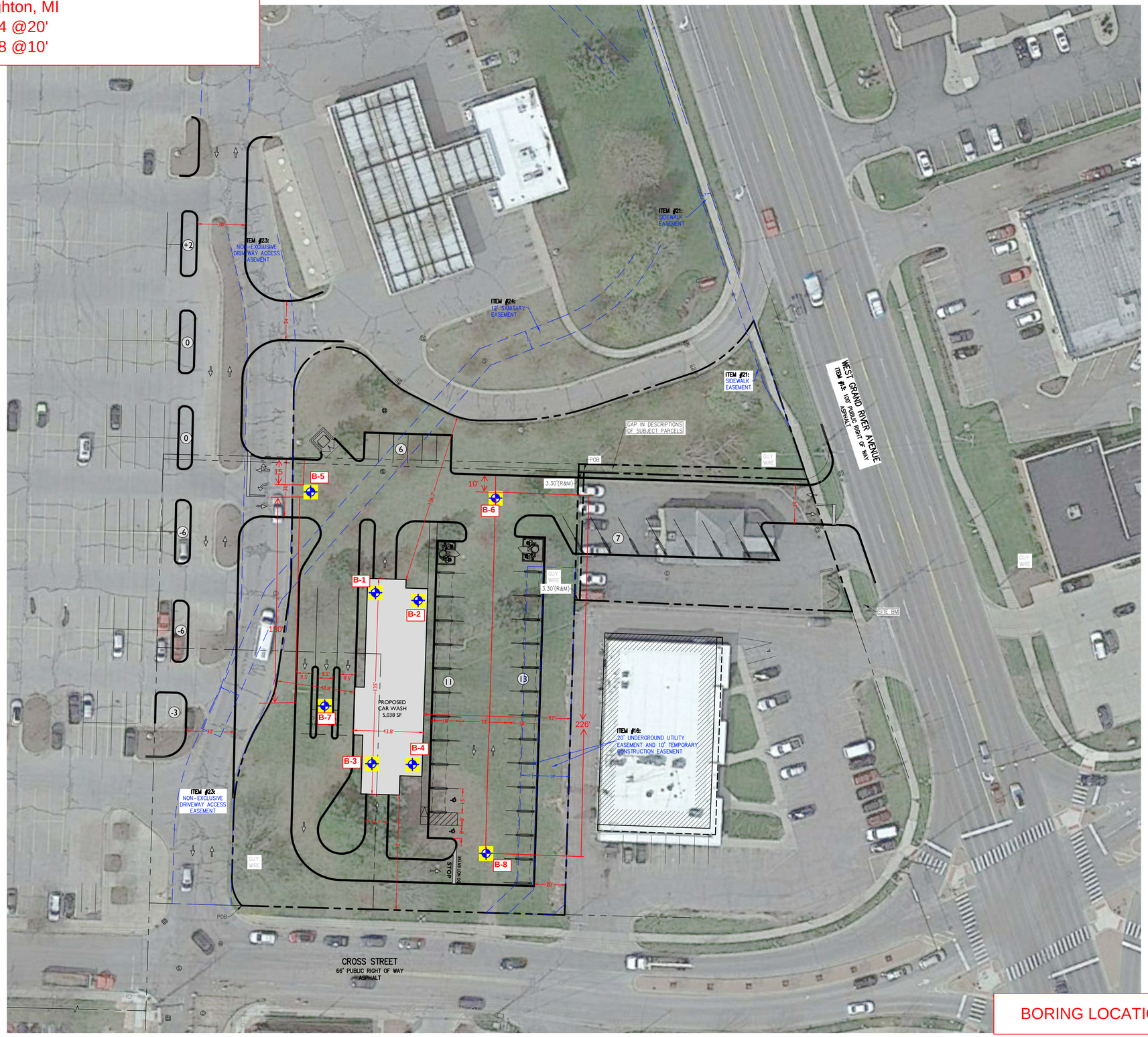
Test Boring Location Plan

Logs Of Test Borings

Sieve Analysis Results

General Notes For Soil Classification

8680 W Grand Blive Rd
Brighton, MI
B1-4 @20'
B5-8 @10'



BORING LOCATION PLAN

SYMBOL	DESCRIPTION
	PROPERTY LINE
	SETBACK LINE
	SAWCUT LINE
	PROPOSED CURB
	PROPOSED FLUSH CURB
	PROPOSED SIGNS / BOLLARDS
	PROPOSED BUILDING
	PROPOSED CONCRETE
	PROPOSED AREA LIGHT
	PROPOSED BUILDING DOORS

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY AND FAMILIARIZE THEMSELVES WITH THE EXISTING SITE CONDITIONS AND THE PROPOSED SCOPE OF WORK (INCLUDING DIMENSIONS, LAYOUT, ETC.) PRIOR TO INITIATING THE IMPROVEMENTS IDENTIFIED WITHIN THESE DOCUMENTS. SHOULD ANY DISCREPANCY BE FOUND BETWEEN THE EXISTING SITE CONDITIONS AND THE PROPOSED WORK THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. PRIOR TO THE START OF CONSTRUCTION.
2. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND ENSURE THAT ALL REQUIRED APPROVALS HAVE BEEN OBTAINED PRIOR TO THE START OF CONSTRUCTION. COPIES OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS STONEFIELD ENGINEERING & DESIGN, LLC. AND IT'S SUB-CONSULTANTS FROM AND AGAINST ANY DAMAGES AND LIABILITIES INCLUDING ATTORNEY'S FEES ARISING OUT OF CLAIMS BY EMPLOYEES OF THE CONTRACTOR IN ADDITION TO CLAIMS CONNECTED TO THE PROJECT AS A RESULT OF NOT CARRYING THE PROPER INSURANCE FOR WORKERS COMPENSATION, LIABILITY INSURANCE, AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE.
4. THE CONTRACTOR SHALL NOT DEVIATE FROM THE PROPOSED IMPROVEMENTS IDENTIFIED WITHIN THIS PLAN SET UNLESS APPROVAL IS PROVIDED IN WRITING BY STONEFIELD ENGINEERING & DESIGN, LLC.
5. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
6. THE CONTRACTOR SHALL NOT PERFORM ANY WORK OR CAUSE DISTURBANCE ON A PRIVATE PROPERTY NOT CONTROLLED BY THE PERSON OR ENTITY WHO HAS AUTHORIZED THE WORK WITHOUT PRIOR WRITTEN CONSENT FROM THE OWNER OF THE PRIVATE PROPERTY.
7. THE CONTRACTOR IS RESPONSIBLE TO RESTORE ANY DAMAGED OR UNDERMINED STRUCTURE OR SITE FEATURE THAT IS IDENTIFIED TO REMAIN ON THE PLAN SET. ALL REPAIRS SHALL USE NEW MATERIALS TO RESTORE THE FEATURE TO ITS EXISTING CONDITION AT THE CONTRACTORS EXPENSE.
8. CONTRACTOR IS RESPONSIBLE TO PROVIDE THE APPROPRIATE SHOP DRAWINGS, PRODUCT DATA, AND OTHER REQUIRED SUBMITTALS FOR REVIEW. STONEFIELD ENGINEERING & DESIGN, LLC. WILL REVIEW THE SUBMITTALS IN ACCORDANCE WITH THE DESIGN INTENT AS REFLECTED WITHIN THE PLAN SET.
9. THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
10. THE CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN THE PUBLIC RIGHT-OF-WAY IN ACCORDANCE WITH THE APPROPRIATE GOVERNING AUTHORITY AND SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF STREET OPENING PERMITS.
11. THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
12. SHOULD AN EMPLOYEE OF STONEFIELD ENGINEERING & DESIGN, LLC. BE PRESENT ON SITE AT ANY TIME DURING CONSTRUCTION, IT DOES NOT RELIEVE THE CONTRACTOR OF ANY OF THE RESPONSIBILITIES AND REQUIREMENTS LISTED IN THE NOTES WITHIN THIS PLAN SET.

N 0' N E
GRAPHIC SCALE IN FEET
N.T.S.

ISSUE	DATE	BY	DESCRIPTION
1	06/22/2022	MPH	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Detroit, MI · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Rutherford, NJ
www.stonefieldeng.com
607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

PLAN SET CLASSIFICATION

PROPOSED CAR WASH

PARCEL ID: 1820-100-023, 024, 026 & 086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

J. REID COOKSEY, P.E.
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = XX' | PROJECT ID: DET-200128

TITLE: SITE PLAN

DRAWING: C-3

V:\DET\2020\DET-200128-ALIG-8680 WEST GRAND RIVER, BRIGHTON, MI\CAD\PLOT\DP-03 SITE.DWG

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 1 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/6/2022

Completed: 8/6/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.75	Moist Dark Brown Sandy TOPSOIL (9")			
	LS	5			5.6	138	
		14					
2.5		18	3	Medium Compact Moist Brown Sand With Trace Of Gravel & Asphalt-FILL			
	LS	3		Firm Moist Brown CLAY With Some Silt	17.1	132	
		5					
5.0		6					
			6				
	LS	4		Loose Moist Brown Fine SAND	5.0	131	
		4					
7.5		5					
	LS	3			8.3	133	
		4					
10.0		4					
			12				
12.5				Compact Moist Brown Medium SAND With Trace Of Gravel			
	LS	12			2.6	135	
		12					
15.0		21					
			17				
17.5				Medium Compact Moist Brown Clayey SAND With Trace Of Gravel			
	LS	9	19.5		9.9	140	
		19	20				
20.0		26		Compact Moist Brown Fine SAND			
				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 1

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 2 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/6/2022

Completed: 8/6/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.75	Moist Dark Brown Sandy TOPSOIL (9")			
	LS	5 5 3			4.8	134	
2.5			3	Loose Moist Brown Sand With Trace Of Gravel-FILL			
	LS	2 6 7		Firm Moist Brown CLAY With Some Silt	20.4	128	
5.0			5.5				
	LS	3 2 3		Loose Moist Brown Fine SAND	8.3	133	
7.5			8				
	LS	3 6 9		Medium Compact Moist Brown Fine SAND	5.1	139	
10.0			11				
12.5				Loose Moist Brown Medium SAND With Trace Of Gravel			
	LS	7 5 5			3.8	139	
15.0			16				
17.5				Medium Compact Moist Brown Medium SAND With Trace Of Gravel			
	LS	4 5 7			5.6	138	
20.0			20				
				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 2

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 3 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/5/2022

Completed: 8/5/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.5	Moist Dark Brown Sandy TOPSOIL (6")			
	LS	6 7 7			10.9	138	
2.5			3	Medium Compact Moist Brown Clayey SILT With Very Fine Sand			
	LS	4 6 10		Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	20.7	128	
5.0			5.5				
	LS	3 3 3		Loose Moist Brown Fine SAND	10.0	131	
7.5							
	LS	3 3 3			4.8	131	
10.0							
			12				
12.5				Medium Compact Moist Brown Medium SAND With Trace Of Gravel & Clayey Seam			
	LS	6 6 7			7.4	135	
15.0							
			17				
17.5				Very Loose Wet Brown Fine SAND			
	LS	2 1 1			13.9	126	
20.0			20				
				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 17'0"

At Completion: Caved In 17'0"

Boring No. 3

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 4 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/5/2022

Completed: 8/5/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.5	Moist Dark Brown Sandy TOPSOIL (6")			
	LS	4			15.0	133	
		8					
2.5		11	3	Medium Compact Moist Brown Clayey Very Fine SAND			
	LS	3		Medium Compact Moist Brown Fine SAND With Some Silt & Trace Of Gravel	3.2	129	
		5					
5.0		6	5.5				
	LS	4		Loose Moist Brown Fine SAND	10.1	131	
		4					
7.5		5					
	LS	2	9		7.3	127	
		2					
10.0		3		Loose Moist Brown Medium SAND			
			12				
12.5				Loose Moist Brown Clayey SAND With Trace Of Gravel			
	LS	3			10.2	131	
		4					
15.0		5					
			17				
17.5				Loose Wet Brown Fine SAND			
	LS	2			18.6	121	
		2					
20.0		3	20				
				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 17'0"

At Completion: Caved In 17'0"

Boring No. 4

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 5 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/6/2022

Completed: 8/6/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.42	Moist Dark Brown Sandy TOPSOIL (5")			
	LS	3			8.5	133	
		3					
2.5		3	3	Loose Moist Brown Sand With Trace Of Gravel & Asphalt-FILL			
	LS	3		Firm Moist Brown CLAY With Some Silt & Sand Seams-Possible Fill	10.3	141	
		6					
5.0		5	5.5				
	LS	3		Medium Compact Moist Brown Fine SAND	5.2	139	
		5					
7.5		8					
	LS	7			3.1	138	
		9					
10.0		8	10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 5

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 6 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/6/2022

Completed: 8/6/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.58	Moist Dark Brown Sandy TOPSOIL (7")			
	LS	4			11.5	129	
		4					
2.5		6	3	Loose Moist Brown Sand With Trace Of Gravel-FILL			
	LS	3		Firm Moist Brown CLAY With Some Silt & Sand Seams-Possible Fill	11.3	139	
		5					
5.0		5	5.5				
	LS	4		Loose Moist Brown Fine SAND	12.5	128	
		3					
7.5		3	8				
	LS	4		Medium Compact Moist Brown Gravelly Well Graded SAND With Trace Of Silt	4.2	140	
		6					
10.0		11	10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 6

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 7 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/5/2022

Completed: 8/5/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.75	Moist Dark Brown Clayey TOPSOIL (9")			
	LS	5 7 9			7.7	135	
2.5			3	Stiff Moist Brown CLAY With Some Silt			
	LS	4 4 4		Loose Moist Brown Fine SAND With Some Silt & Trace Of Gravel	6.6	128	
5.0			6				
	LS	3 3 3		Loose Moist Brown Fine To Medium SAND With Trace Of Gravel	7.9	134	
7.5							
	LS	3 3 4			11.0	130	
10.0			10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 7

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 8 **Job No.:** 62886

Client: Alrig USA

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Proposed Development, 8680, 8650, 8251, 8265 W. Grand River Ave.

Location: Brighton, Michigan

Drilled By: I. Mickle

Started: 8/5/2022

Completed: 8/5/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.58	Moist Dark Brown Sandy TOPSOIL (7")			
	LS	3			8.1	143	
		6					
2.5		7	3	Firm Moist Brown CLAY With Some Silt & Sand			
	LS	3		Loose Moist Brown Clayey Fine SAND	6.3	128	
		2					
5.0		3	5.5				
	LS	6		Medium Compact Moist Brown Gravelly Well Graded SAND With Trace Of Silt	3.6	129	
		9					
7.5		11					
	LS	7			3.0	133	
		9					
10.0		14	10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2").D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 8

Testing Engineers and Consultants, Inc.

1343 Rochester Road PO Box 249 Troy, Michigan 48099-0249
248-588-6200 or 313 T-E-S-T-I-N-G
Fax 248-588-6232

SIEVE ANALYSIS RESULTS

PROJECT: Proposed Car Wash Development
8680,8650,8251 & 8265 Grand River Avenue
LOCATION: Brighton, Michigan
CLIENT: Alrig USA

TEC REPORT NUMBER: 62886
DATE: 9/12/2022

Material Description: Brown Gravely Well Graded Sand With Trace of Silt
Sample Source / Depth: B-6 @ 10'
Sample Location:
Intended Use:

Date Sampled: 8/6/22
Sampled By: I. Mickle
TEC Lab Sample Number: 1474
Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"		0.0	100.0	
3/4"	8.5	3.1	96.9	
1/2"	34.6	12.5	87.5	
3/8"	42.8	15.5	84.5	
#4	73.5	26.6	73.4	
#10	127.5	46.2	53.8	
#20	172.5	62.5	37.5	
#30	188.9	68.4	31.6	
#40	206.0	74.6	25.4	
#100	247.1	89.5	10.5	
#200	254.7	92.2	7.8	
Total Sample	276.1	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	276.1
Weight After Wash (g)	254.7
Loss in Weight (g)	21.4
Loss by Wash (%)	7.8%

Tested By: A. McLeod
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
Testing Engineers and Consultants, Inc.

Testing Engineers and Consultants, Inc.

1343 Rochester Road PO Box 249 Troy, Michigan 48099-0249
248-588-6200 or 313 T-E-S-T-I-N-G
Fax 248-588-6232

SIEVE ANALYSIS RESULTS

PROJECT: Proposed Car Wash Development
8680,8650,8251 & 8265 Grand River Avenue
LOCATION: Brighton, Michigan
CLIENT: Alrig USA

TEC REPORT NUMBER: 62886
DATE: 9/12/2022

Material Description: Brown Fine Sand With Some Silt & Trace of Gravel
Sample Source / Depth: B-7 @ 5'
Sample Location:
Intended Use:

Date Sampled: 8/5/22
Sampled By: I. Mickle
TEC Lab Sample Number: 1475
Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"				
1/2"				
3/8"		0.0	100.0	
#4	2.2	1.2	98.8	
#10	3.2	1.7	98.3	
#20	4.8	2.6	97.4	
#30	8.2	4.5	95.5	
#40	21.0	11.4	88.6	
#100	139.4	76.0	24.0	
#200	157.7	85.9	14.1	
Total Sample	183.5	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	183.5
Weight After Wash (g)	157.7
Loss in Weight (g)	25.8
Loss by Wash (%)	14.1%

Tested By: A. McLeod
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
Testing Engineers and Consultants, Inc.

Testing Engineers & Consultants, Inc.

Mr. Jordan Chapman
Alrig USA
September 7, 2022

TEC Report: 62886

SOIL DESCRIPTIONS

In order to provide uniformity throughout our projects, the following nomenclature has been adopted to describe soil characteristics:

CONSISTENCY AND RELATIVE DENSITY

COHESIVE SOILS			GRANULAR SOILS	
UNCONFINED COMPRESSIVE STRENGTH, PSF	**"N" VALUES**	**CONSISTENCY**	**"N" VALUES**	**RELATIVE DENSITY**
Below 500	0 – 2	Very Soft	0 – 4	Very Loose
500 – 1,000	3 – 4	Soft	5 – 10	Loose
1,000 – 2,000	5 – 8	Plastic	11 – 30	Medium Compact
2,000 – 4,000	9 – 15	Firm	31 – 50	Compact
4,000 – 8,000	16 – 30	Stiff	50+	Dense
8,000 – 16,000	31 – 50	Ex. Stiff		
Over 16,000	51+	Hard		

Material Types By Particle Size	**ASTM D2487**
BOULDERS	Stones Over 12" In Diameter
COBBLES	Stones 3" To 12" In Diameter
GRAVEL	#4 To 3" Diameter
COARSE SAND	#10 To #4 Sieves
MEDIUM SAND	#40 To #10 Sieves

Mr. Jordan Chapman
Alrig USA
September 7, 2022

TEC Report: 62886

SOIL DESCRIPTIONS (Cont'd)

Material Types By Particle Size	**ASTM D2487**
FINE SAND	#200 To #40 Sieves
SILT	Minus #200 Sieve Material, Fairly Non-Plastic, Falls Below "A"-Line
CLAY	Minus #200 Sieve Material Plastic Material That Has A Tendency To Stick Together, Can Be Rolled Into Fine Rods When Moistened; Falls Above "A"-Line
PEAT	Black Organic Material Containing Partially Decayed Vegetable Matter
MARL	Fresh Water Deposits Of Calcium Carbonate, Often Containing Percentages Of Peat, Clay & Fine Sand
SWAMP BOTTOM DEPOSITS	Mixtures Of Peat, Marl, Vegetation & Fine Sand Containing Large Amounts Of Decayable Organic Material

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

MEMO

VIA EMAIL sburgner@alrigusa.com

To: **EI Car Wash**

From: **Jacob Swanson, PE**
Mary Ollis, EIT
Fleis & VandenBrink

Date: **Revised January 11, 2023**

Re: **Proposed Car Wash Development**
Brighton, Michigan
Traffic Impact Study

1 INTRODUCTION

This memorandum presents the results of the Traffic Impact Study (TIS) for the proposed development in Brighton, Michigan. The project site is located at 8680 W. Grand River Avenue, generally in the northwest quadrant of the Grand River Avenue & Cross Street intersection, as shown on the attached **Figure 1**. The proposed development includes the construction of an automatic car wash with one (1) tunnel; in addition, vacuum stations are provided. Site access is proposed via a shared access driveway with the existing Meijer Gas Station on Grand River Avenue, proposed as Right-In/Right-Out (RIRO) only access point; additional access provided internal to the Meijer site. Grand River Avenue is under the jurisdiction of the City of Brighton, which has required the completion of a Traffic Impact Study (TIS) as part of the site plan approval process.

The scope of work for this study was developed based on the requirements and input provided by the City of Brighton and their engineering consultant (Tetra Tech), Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, accepted traffic engineering practices, and information published by the Institute of Transportation Engineers (ITE). The study analyses were completed using Synchro and SimTraffic (Version 11). Sources of data for this study include F&V subconsultant Gewalt Hamilton Associates, INC. (GHA), City of Brighton, MDOT, and ITE.

2 BACKGROUND

2.1 EXISTING ROAD NETWORK

The lane uses and traffic control at the study intersections are shown on the attached **Figure 2** and the study roadways are further described below. For the purposes of this study site driveways and residential streets were assumed to have an operating speed of 25 miles per hour (mph), unless otherwise noted.

Grand River Avenue generally runs in the northwest and southeast directions, is adjacent to the east side of the project site, and is classified as *Other Principal Arterial*. The study section of Grand River Avenue has a posted speed limit of 35 mph with a typical five-lane cross-section, with two (2) lanes in each direction and a center two-way left-turn lane (TWLTL). At the intersection with Cross Street, Grand River Avenue widens to provide channelized northbound and southbound right-turns. Grand River Avenue, adjacent to the project site, has an Average Annual Daily Traffic (AADT) of approximately 29,000 vehicles per day (MDOT 2018).

Cross Street generally runs in the east and west directions, adjacent to the south side of the project site. No site access is proposed via Cross Street. The study section of Cross Street is classified as a *Local Road* and is under the jurisdiction of the City of Brighton. At the signalized intersection with Grand River Avenue, Cross

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Street provides exclusive left-turn, through, and right-turn lanes. At the all-way stop-controlled intersection with 2nd Street, eastbound Cross Street provides a shared through/left lane and shared through/right lane; additionally, westbound Cross Street provides an exclusive left-turn lane and a shared through/right lane.

2nd Street runs in the north and south directions, south of the project site, and is classified as a *Local Road*. South of the project site, 2nd Street is under the jurisdiction of the City of Brighton and has a posted speed limit of 25 mph. The 2nd Street extension to the north, adjacent to the project site, is a private access roadway for the Meijer site. Access for the project site is proposed via this private roadway. The study section of 2nd Street has a typical two-lane cross-section, with one (1) lane in each direction. As it intersects with Cross Street, 2nd Street widens to provide an exclusive northbound left-turn lane.

2.2 Existing Traffic Volumes

F&V subconsultant Gewalt Hamilton Associates, INC. (GHA) collected existing Turning Movement Count (TMC) data on Thursday June 9th and Saturday June 11th, at the following study intersections:

- Grand River Avenue & Cross Street
- Cross Street & 2nd Street
- Grand River Avenue & Meijer Gas Station (ingress only)

During collection of the turning movement counts, Peak Hour Factors (PHFs), pedestrian and bike volumes, and commercial truck percentages were recorded and used in the traffic analysis. Through volumes were carried through the roadway network and balanced at the proposed site driveway locations. The weekday PM and Saturday peak hours for the adjacent roadway network were observed to generally occur between 4:00 to 5:00 PM on weekdays and 11:45 AM to 12:45 PM on Saturdays. F&V collected an inventory of existing lane use and traffic controls, as shown on the attached **Figure 2**. Additionally, F&V obtained the current signal timing permits for the signalized intersection of Grand River Avenue & Cross Street from the City of Brighton. The existing 2022 peak hour traffic volumes used in the analysis are shown on the attached **Figure 3**. All applicable background data referenced in this memorandum is attached.

3 Existing Conditions

Existing peak hour vehicle delays and Levels of Service (LOS) were calculated at the study intersections using Synchro/SimTraffic (Version 11) traffic analysis software. This analysis was based on the existing lane use and traffic control shown on the attached **Figure 2**, the existing peak hour traffic volumes shown on the attached **Figure 3**, and the methodologies presented in the Highway Capacity Manual, 6th Edition (HCM6). Typically, LOS D is considered acceptable, with LOS A representing minimal delay and LOS F indicating failing conditions. The results of the existing conditions analysis are attached and summarized in **Table 1**.

Table 1: Existing Intersection Operations

	Intersection	Control	Approach	Existing Conditions			
				PM Peak		SAT Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Grand River Avenue & Cross Street	Signalized	EBL	40.2	D	35.8	D
			EBT	32.9	C	30.4	C
			EBR	73.3	E	40.2	D
			WBL	34.6	C	33.0	C
			WBT	32.8	C	30.6	C
			WBR	33.8	C	32.4	C
			NBL	53.4	D	44.2	D
			NBT	14.8	B	27.9	C
			NBR	10.6	B	17.6	B
			SBL	34.4	C	20.0	B
			SBT	13.2	B	11.3	B
			SBR	9.1	A	8.1	A
			Overall	**23.1**	**C**	**23.3**	**C**

Intersection		Control	Approach	Existing Conditions			
				PM Peak		SAT Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS
2	2nd Street & Cross Street	Stop (All-way)	EBTL	10.2	B	9.7	A
			EBTR	10.1	B	9.4	A
			WBL	11.7	B	11.5	B
			WBTR	10.7	B	9.7	A
			NBL	9.5	A	9.2	A
			NBTR	13.2	B	10.7	B
			SB	19.1	C	16.0	C

The results of the existing conditions analysis indicates that all approaches and movements at the study intersections are currently operating acceptably, at LOS D or better during both the weekday PM and SAT peak hours, with the exception of the following:

Grand River Avenue & Cross Street

- During the PM peak hour: The eastbound right-turn movement currently operates at LOS E.

Although the intersection LOS analysis indicates poor operations, a review of SimTraffic network simulations indicates acceptable operations during the PM peak period. Microsimulations indicate that eastbound vehicles are adequately processed through this intersection, without experiencing significant delays. The 95th percentile vehicle queue length reported for the eastbound right-turn movement was approximately 56 feet (2-3 vehicles), during the PM peak hour, which is not significant.

4 Background Conditions (2024)

The proposed development is anticipated to be open and operational in 2024, therefore a growth rate **0.5%** per year was provided by the City of Brighton and applied to the existing peak hour traffic volumes to forecast the background 2024 traffic volume ***without the proposed development***. In addition to background growth, it is important to account for traffic that will be generated by approved developments within the vicinity of the study area that have yet to be constructed or are currently under construction.

Additionally, the proposed Vista at Uptown development located on 2nd Street, south of Cross Street, was included as background traffic. The site-generated trips from this development were included in the background traffic volumes, in the TIS prepared for this site. The site-generated background development trips shown on the attached **Figure 4B** were added to the background growth traffic volumes shown on the attached **Figure 4A**, in order to calculate the background peak hour traffic volumes, as shown on the attached **Figure 4**.

Background peak hour vehicle delays and LOS ***without the proposed development*** were calculated at the study intersections based on the existing lane use and traffic control shown on the attached **Figure 2**, the background traffic volumes shown on the attached **Figure 4**, and the methodologies presented in the HCM6. The results of the background conditions analysis are attached and summarized in **Table 2**.

The results of the background conditions analysis indicates that all approaches and movements at the study intersections will continue to operate in an acceptable manner, at LOS D or better, similar to the existing conditions analysis, with the exception of the following:

Grand River Avenue & Cross Street

- During the PM peak hour: the northbound left-turn movement is expected to operate at LOS E.

Although the intersection LOS analysis indicates poor operations, a review of SimTraffic network simulations indicates acceptable operations during the PM peak period. Microsimulations indicate that all northbound left-turn vehicle queues are processed within each cycle length, without experiencing significant delays. The 95th percentile vehicle queue length reported for the northbound left turn movement during the PM peak hour was approximately 172 feet (6-7 vehicles).

Note: Several of the intersection movements improved with the addition of background traffic. This is due to increased lane utilization which decreased the delay on certain movements.

Table 2: Background Intersection Operations

	Intersection	Control	Approach	Existing Conditions				Background Conditions				Difference			
				PM Peak		SAT Peak		PM Peak		SAT Peak		PM Peak		SAT Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Grand River Avenue & Cross Street	Signalized	EBL	40.2	D	35.8	D	40.7	D	35.3	D	0.5	-	-0.5	-
			EBT	32.9	C	30.4	C	31.8	C	29.3	C	-1.1	-	-1.1	-
			EBR	73.3	E	40.2	D	76.7	E	39.8	D	3.4	-	-0.6	-
			WBL	34.6	C	33.0	C	33.5	C	31.8	C	-1.1	-	-1.2	-
			WBT	32.8	C	30.6	C	31.7	C	29.4	C	-1.1	-	-1.2	-
			WBR	33.8	C	32.4	C	32.6	C	31.1	C	-1.2	-	-1.3	-
			NBL	53.4	D	44.2	D	57.4	E	43.0	D	4.0	D→E	-1.2	-
			NBT	14.8	B	27.9	C	14.9	B	28.2	C	0.1	-	0.3	-
			NBR	10.6	B	17.6	B	10.6	B	17.6	B	0.0	-	0.0	-
			SBL	34.4	C	20.0	B	35.6	D	20.9	C	1.2	C→D	0.9	B→C
			SBT	13.2	B	11.3	B	15.2	B	13.1	B	2.0	-	1.8	-
			SBR	9.1	A	8.1	A	10.7	B	9.5	A	1.6	A→B	1.4	-
			Overall	**23.1**	**C**	**23.3**	**C**	**25.1**	**C**	**24.2**	**C**	**2.0**	**-**	**0.9**	**-**
2	2nd Street & Cross Street	Stop (All-way)	EBTL	10.2	B	9.7	A	10.6	B	10.0	A	0.4	-	0.3	-
			EBTR	10.1	B	9.4	A	10.5	B	9.8	B	0.4	-	0.4	A→B
			WBL	11.7	B	11.5	B	13.5	B	13.1	B	1.8	-	1.6	-
			WBTR	10.7	B	9.7	A	11.1	B	10.0	A	0.4	-	0.3	-
			NBL	9.5	A	9.2	A	9.8	A	9.5	A	0.3	-	0.3	-
			NBTR	13.2	B	10.7	B	15.8	C	12.1	B	2.6	B→C	1.4	-
			SB	19.1	C	16.0	C	21.2	C	17.5	C	2.1	-	1.5	-

5 SITE TRIP GENERATION

The number of peak hour (weekday PM and Saturday) and daily vehicle trips that would be generated by the proposed car wash development was forecast based on data published by ITE in the *Trip Generation Manual, 11th Edition*. The ITE does not provide trip generation information for the SAT peak hour; therefore, the PM peak hour trip generation was applied to the SAT peak hour, in order to provide a conservative analysis.

Table 3: Trip Generation Summary

Land Use	ITE Code	Amount	Units	Average Daily Traffic (vpd)	PM Peak Hour (vph)			SAT Peak Hour (vph)		
					In	Out	Total	In	Out	Total
Automated Car Wash	948	1	Tunnel	780	39	39	78	39	39	78

As is typical of commercial developments, a portion of the trips generated are from vehicles on the adjacent roadway and will pass the site on their way from an origin to their ultimate destination. Therefore, not all traffic at the site driveways is necessarily new traffic added to the street system. This percentage of the trips generated by the development are considered "pass-by" trips and do not add new traffic to the adjacent street system. These trips are therefore reduced from the total external trips generated by a study site. Car washes and similar type land uses generally cater to adjacent street traffic volumes. However, there is no published data is available for calculating pass-by trips for this land uses by ITE in the *Trip Generation Manual, 11th Edition*; therefore, in order to provide a conservative analysis, no pass-by trip reduction was applied to this land use. The site trip generation forecast utilized for the proposed development is summarized in **Table 3**.

6 SITE TRIP DISTRIBUTION

The vehicular trips that would be generated by the proposed development were assigned to the study roads based on the proposed site access plan and driveway configurations, the existing peak hour traffic patterns in the adjacent roadway network, and the methodologies published by ITE. The ITE trip distribution methodology assumes that new trips will enter the network and access the development, then leave the development and return to their direction of origin. The site trip distributions utilized in the analysis are summarized in **Table 4**.

Table 4: Site Trip Distribution

New Trips			
Via	**Direction**	**PM**	**SAT**
Grand River Avenue	North	46%	45%
Grand River Avenue	South	44%	46%
2nd Street	South	10%	9%
Total		**100%**	**100%**

The vehicular traffic volumes shown in **Table 3** were distributed to the roadway network according to the distribution shown in **Table 4**. The site-generated trips shown on the attached **Figure 5** were added to the background traffic volumes shown on the attached **Figure 4**, in order to calculate the future peak hour traffic volumes with the addition of the proposed development, as shown on the attached **Figure 6**.

7 FUTURE CONDITIONS (2024)

Future peak hour vehicle delays and LOS ***with the proposed development*** were calculated based on the proposed lane use shown on the attached **Figure 2**, future traffic volumes shown on the attached **Figure 6**, and the methodologies presented in the HCM6. The results of the future conditions analysis are attached and are summarized in **Table 5**.

The results of the future conditions analysis indicates that all approaches and movements at the study intersections will continue to operate in a manner similar to the background conditions analysis. Additionally, review of SimTraffic microsimulations indicates acceptable operations during both peak periods, similar to those observed during background conditions. *Note: Several of the intersection movements improved with the addition of site generated traffic. This is due to increased lane utilization and improved progression, which decreased the delay on certain movements.*

Table 5: Future Intersection Operations

	Intersection	Control	Approach	Background Conditions				Future Conditions				Difference			
				PM Peak		SAT Peak		PM Peak		SAT Peak		PM Peak		SAT Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Grand River Avenue & Cross Street	Signalized	EBL	40.7	D	35.3	D	41.5	D	34.7	C	0.8	-	-0.6	D→C
			EBT	31.8	C	29.3	C	30.5	C	28.1	C	-1.3	-	-1.2	-
			EBR	76.7	E	39.8	D	58.4	E	35.7	D	-18.3	-	-4.1	-
			WBL	33.5	C	31.8	C	32.1	C	30.5	C	-1.4	-	-1.3	-
			WBT	31.7	C	29.4	C	30.4	C	28.3	C	-1.3	-	-1.1	-
			WBR	32.6	C	31.1	C	31.2	C	29.7	C	-1.4	-	-1.4	-
			NBL	57.4	E	43.0	D	60.0	E	42.8	D	2.6	-	-0.2	-
			NBT	14.9	B	28.2	C	14.9	B	28.2	C	0.0	-	0.0	-
			NBR	10.6	B	17.6	B	10.6	B	17.6	B	0.0	-	0.0	-
			SBL	35.6	D	20.9	C	37.1	D	21.9	C	1.5	-	1.0	-
			SBT	15.2	B	13.1	B	17.3	B	14.9	B	2.1	-	1.8	-
			SBR	10.7	B	9.5	A	12.0	B	10.7	B	1.3	-	1.2	A→B
			Overall	**25.1**	**C**	**24.2**	**C**	**24.9**	**C**	**24.6**	**C**	**-0.2**	**-**	**0.4**	**-**

	Intersection	Control	Approach	Background Conditions				Future Conditions				Difference			
				PM Peak		SAT Peak		PM Peak		SAT Peak		PM Peak		SAT Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
2	2nd Street & Cross Street	Stop (All-way)	EBTL	10.6	B	10.0	A	10.9	B	10.2	B	0.3	-	0.2	A→B
			EBTR	10.5	B	9.8	B	10.8	B	10.0	A	0.3	-	0.2	B→A
			WBL	13.5	B	13.1	B	13.8	B	13.4	B	0.3	-	0.3	-
			WBTR	11.1	B	10.0	A	11.7	B	10.6	B	0.6	-	0.6	A→B
			NBL	9.8	A	9.5	A	9.9	A	9.6	A	0.1	-	0.1	-
			NBTR	15.8	C	12.1	B	16.8	C	12.6	B	1.0	-	0.5	-
			SB	21.2	C	17.5	C	25.4	C	19.7	C	4.2	-	2.2	-
3	Grand River Avenue & RIRO Driveway	Stop (Minor)	EBR	N/A				14.1	B	13.4	B	N/A			
			NB					Free							
			SB					Free							

8 FUTURE CONDITIONS WITH IMPROVEMENTS

Mitigation measures were investigated in order to improve the projected future traffic operations at the study intersections. Signal timing adjustments, geometric improvements, and traffic control modifications were investigated at the signalized intersection of Grand River Avenue & Cross Street. The results of the evaluation indicates that signal timing optimizations alone will reduce delay and improve operations to acceptable levels. Therefore, the recommended improvement at the signalized intersection of Grand River Avenue & Cross Street is as follows:

- Optimize signal timings during the PM peak period, by providing additional green time for the protected northbound left-turn movement phase and the eastbound through/right phase.

With the implementation of the recommended improvements, all intersection approaches and movements in the study network are expected to operate acceptably, at LOS D or better during both peak periods,. Additionally, review of SimTraffic network simulations indicates acceptable operations, with the majority of vehicle queues observed to be processed through the signalized intersection within each cycle length. The results of the improvements analysis are summarized in **Table 6**.

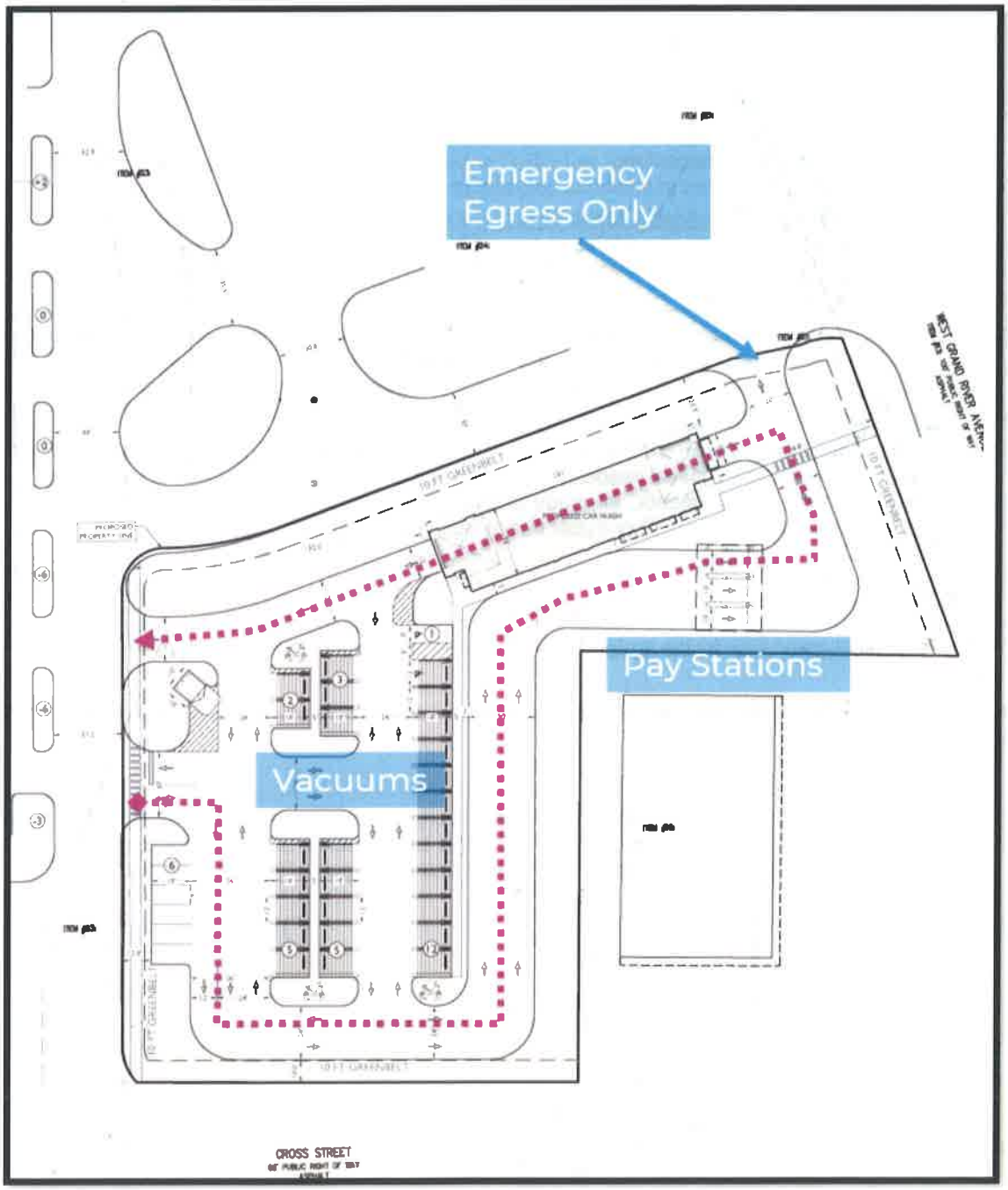
Table 6: Future Intersection Operations with Improvements

	Intersection	Control	Approach	Future Conditions		Future w/ IMP		Difference	
				PM Peak		PM Peak		PM Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Grand River Avenue & Cross Street	Signalized	EBL	41.5	D	38.5	D	-3.0	-
			EBT	30.5	C	30.4	C	-0.1	-
			EBR	58.4	E	43.4	D	-15.0	E→D
			WBL	32.1	C	31.9	C	-0.2	-
			WBT	30.4	C	30.3	C	-0.1	-
			WBR	31.2	C	31.1	C	-0.1	-
			NBL	60.0	E	52.6	D	-7.4	E→D
			NBT	14.9	B	20.4	C	5.5	B→C
			NBR	10.6	B	14.3	B	3.7	-
			SBL	37.1	D	30.8	C	-6.3	D→C
			SBT	17.3	B	17.6	B	0.3	-
			SBR	12.0	B	12.1	B	0.1	-
			Overall	**24.9**	**C**	**24.8**	**C**	**-0.1**	-

9 SITE CIRCULATION

The proposed site access is provided via the Meijer parking lot circulation roadway. The existing Meijer Gas Station driveway that currently operates as a right-in only driveway will be converted to a right-in/right-out (RIRO) only driveway. The proposed car wash will have emergency access to this right-in/right-out driveway, but the access will be limited to emergency egress only. No ingress movements will be permitted at this access driveway. No impacts to Grand River Avenue or Cross Street are anticipated with the proposed site access and circulation plan as proposed for this project.

Exhibit 1: Site Circulation Plan



10 CONCLUSIONS

The conclusions of this TIS are as follows:

1. **Existing Conditions (2022)**
   - The results of the existing conditions analysis indicates that all approaches and movements at the study intersections are currently operating acceptably, at LOS D or better during both peak periods, with the exception of the following:
     - Grand River Avenue & Cross Street: The eastbound right-turn movement currently operates at LOS E during the PM peak hour. Review of the SimTraffic network simulations indicates acceptable operations, with a 95th percentile queue length of approximately 56-feet (2-3 vehicles), which is not significant.
2. **Background Conditions (2024)**
   - The results of the background conditions analysis indicates that the study intersections are expected to continue operating acceptably, at LOS D or better during both peak periods, in a manner similar to existing conditions, with the additional impacts to LOS:
     - Grand River Avenue & Cross Street: The northbound left-turn movement is expected to operate at LOS E during the PM peak hour. Review of the SimTraffic network simulations indicates acceptable operations, with the majority of vehicles observed to be serviced each cycle length.
3. **Future Conditions (2024)**
   - The results of the future conditions analysis indicates that, with the site generated traffic volumes, the study intersections are expected to continue operating similar to background conditions. Review of SimTraffic microsimulations also indicates operations similar to the background conditions analysis.
4. **Future Conditions with Improvements (2024)**
   - Signal timing optimization were investigated at the Grand River Avenue & Cross Street intersection, in order to mitigate the impacts associated with the site generated traffic. With the implementation of the recommended improvements, all study intersection approaches and movements are expected to operate acceptably, at LOS D or better during both peak periods.

11 RECOMMENDATIONS

- Grand River Avenue & Cross Street: Optimize signal timings during the PM peak period, by providing additional green time for the protected northbound left-turn movement and the eastbound through/right.

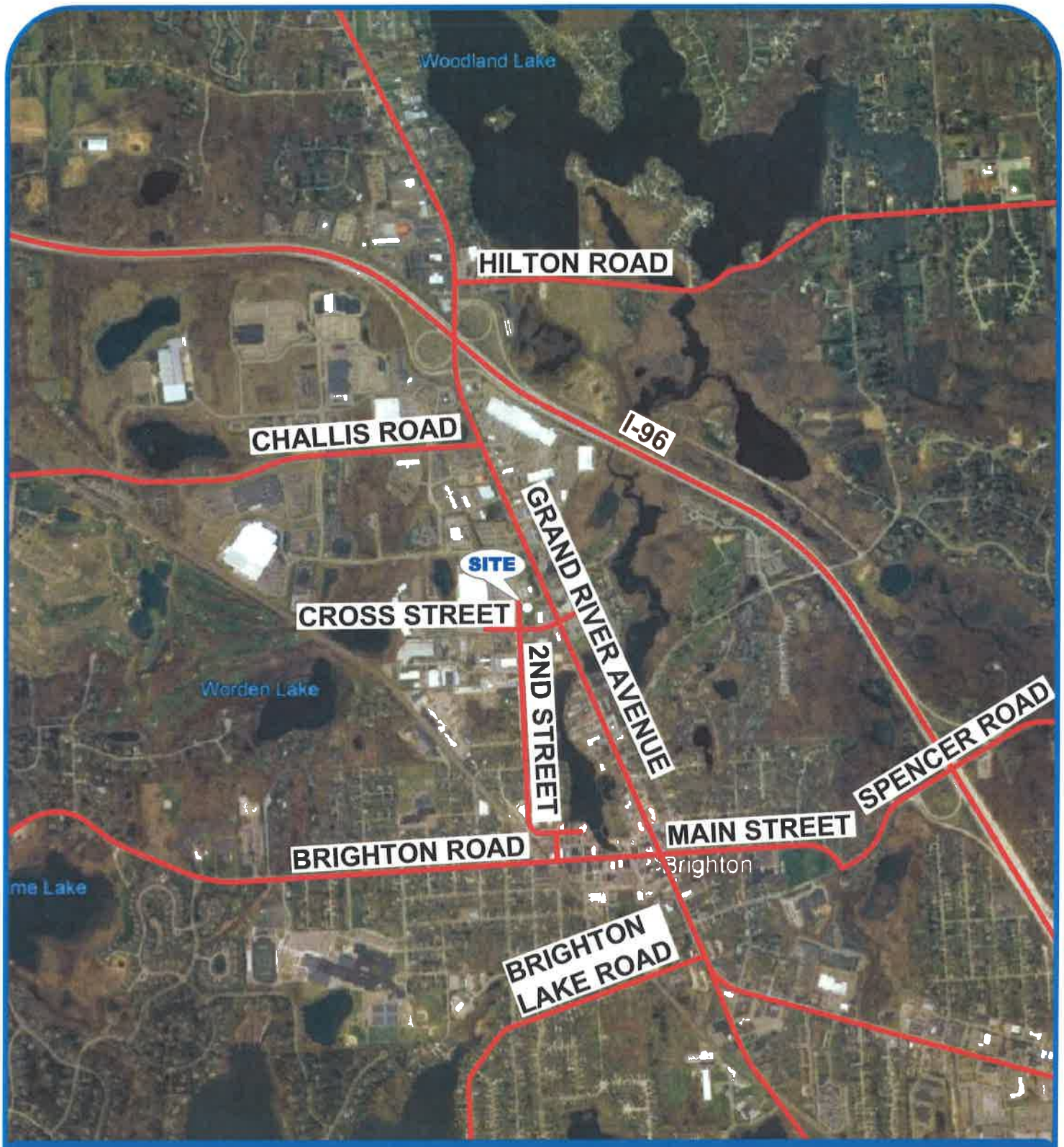
Any questions related to this memorandum, study, analysis, and results should be addressed to Fleis & VandenBrink.

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Michigan.

Jacob Swanson

Digitally signed by Jacob Swanson
Date: 2023.01.11 10:56:20 -05'00'

Attached:
Figures 1-6
Proposed Site Plan
Traffic Volume Data
Signal Timing Permit
Synchro / SimTraffic Results



F&V

FIGURE 1

SITE LOCATION MAP

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

SITE — SITE LOCATION

NORTH

SCALE: NOT TO SCALE

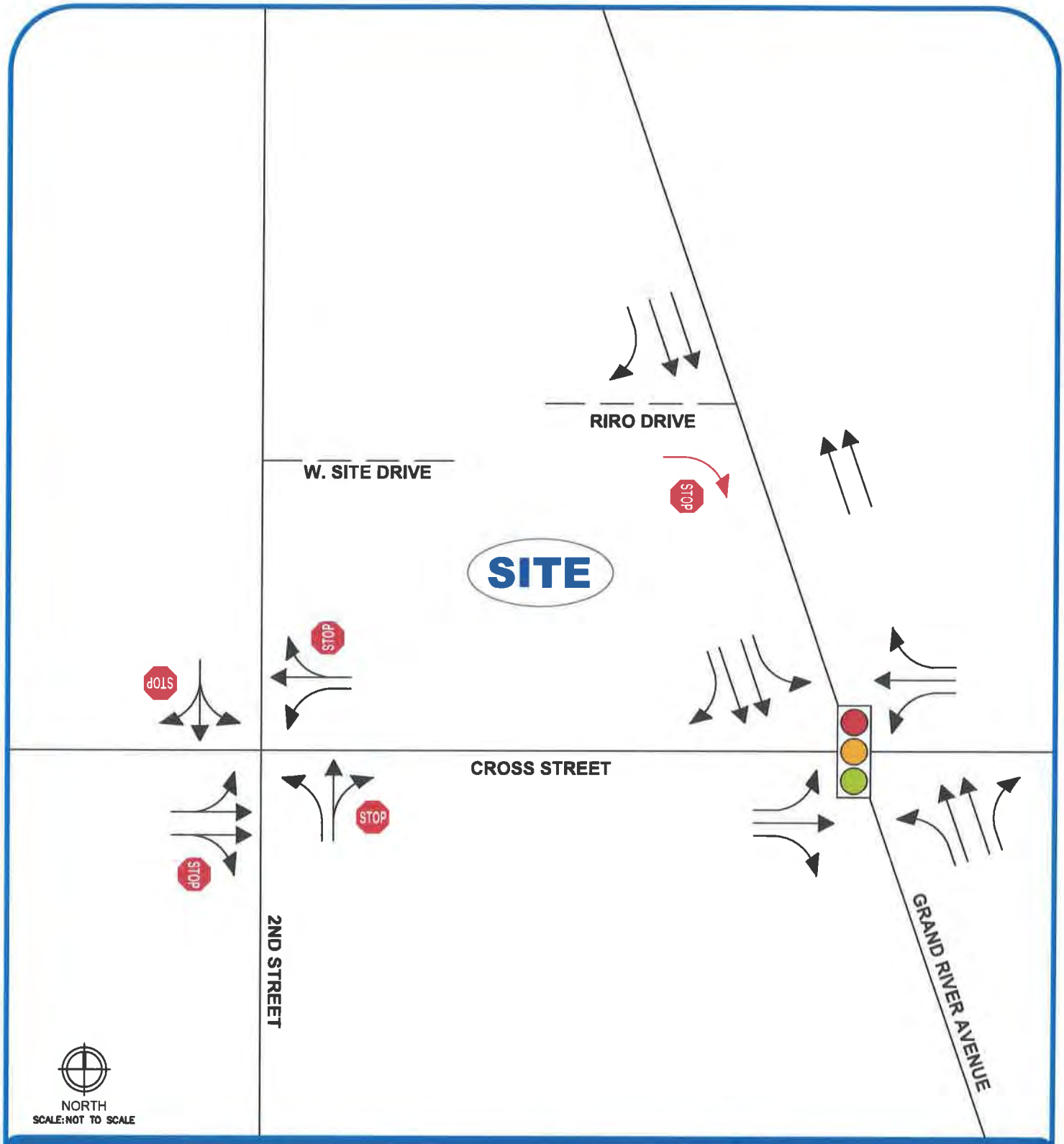


FIGURE 2
LANE USE AND TRAFFIC CONTROL

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

- ROADS
- PROPOSED ROADS
- LANE USE
- PROPOSED LANE USE
- SIGNALIZED INTERSECTION
- UNSIGNALIZED INTERSECTION

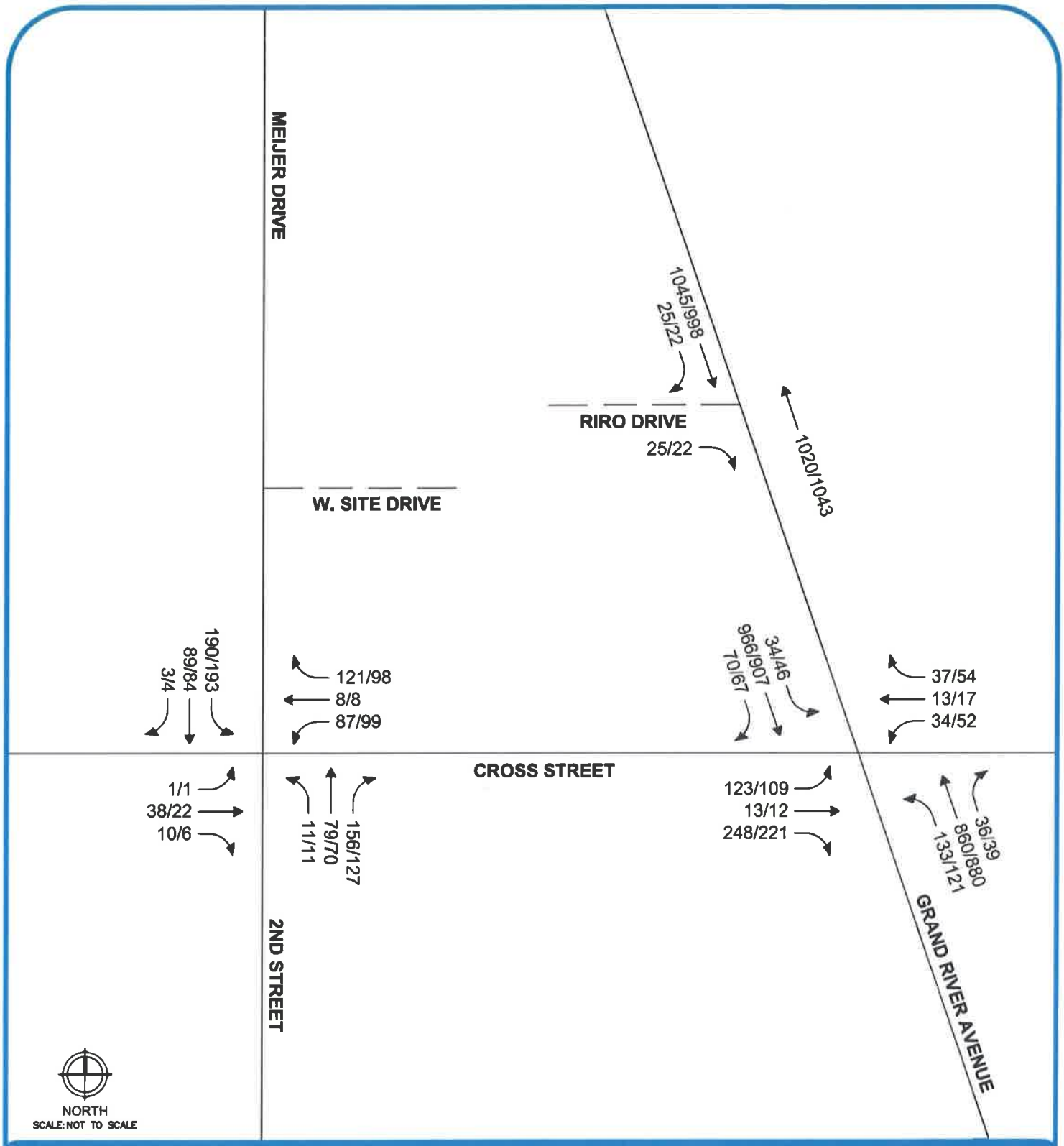


FIGURE 3

EXISTING TRAFFIC VOLUMES

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

- ROADS
- PROPOSED ROADS
- TRAFFIC VOLUMES (PM/SAT)

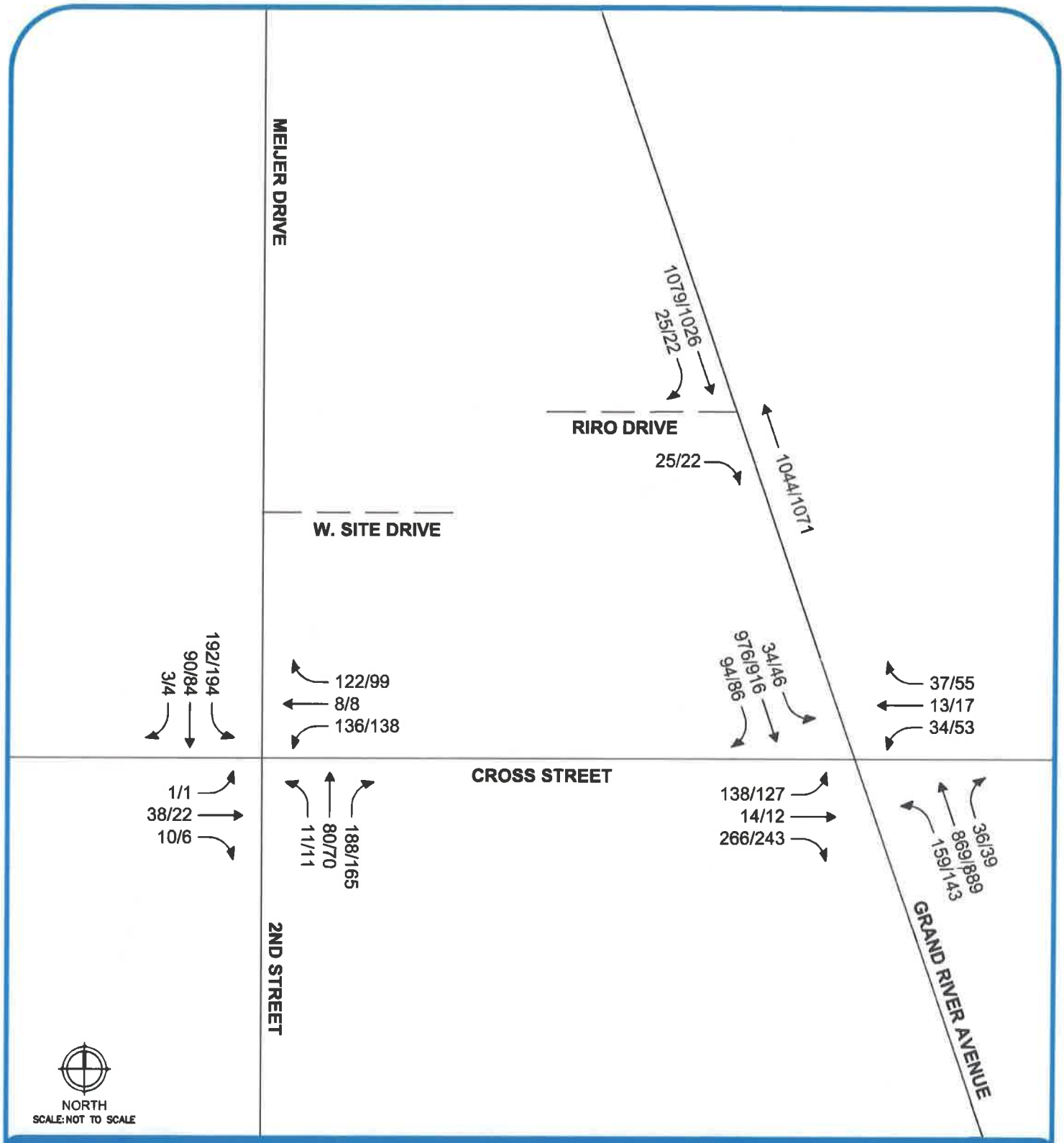


FIGURE 4

BACKGROUND TRAFFIC VOLUMES

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

- ROADS
- PROPOSED ROADS
- TRAFFIC VOLUMES (PM/SAT)

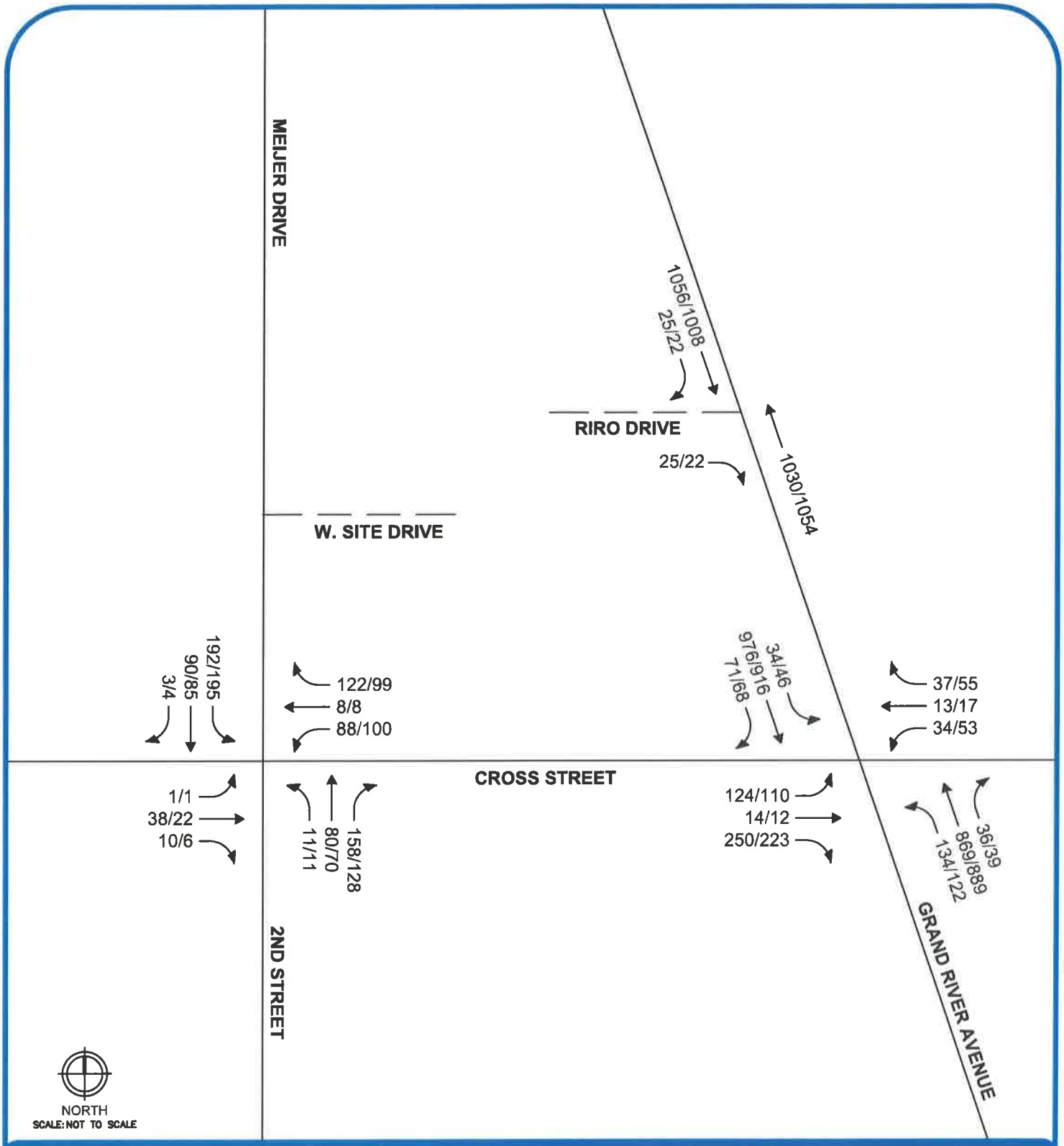


FIGURE 4A
BACKGROUND GROWTH TRAFFIC VOLUMES

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

- ROADS
- PROPOSED ROADS
- TRAFFIC VOLUMES (PM/SAT)

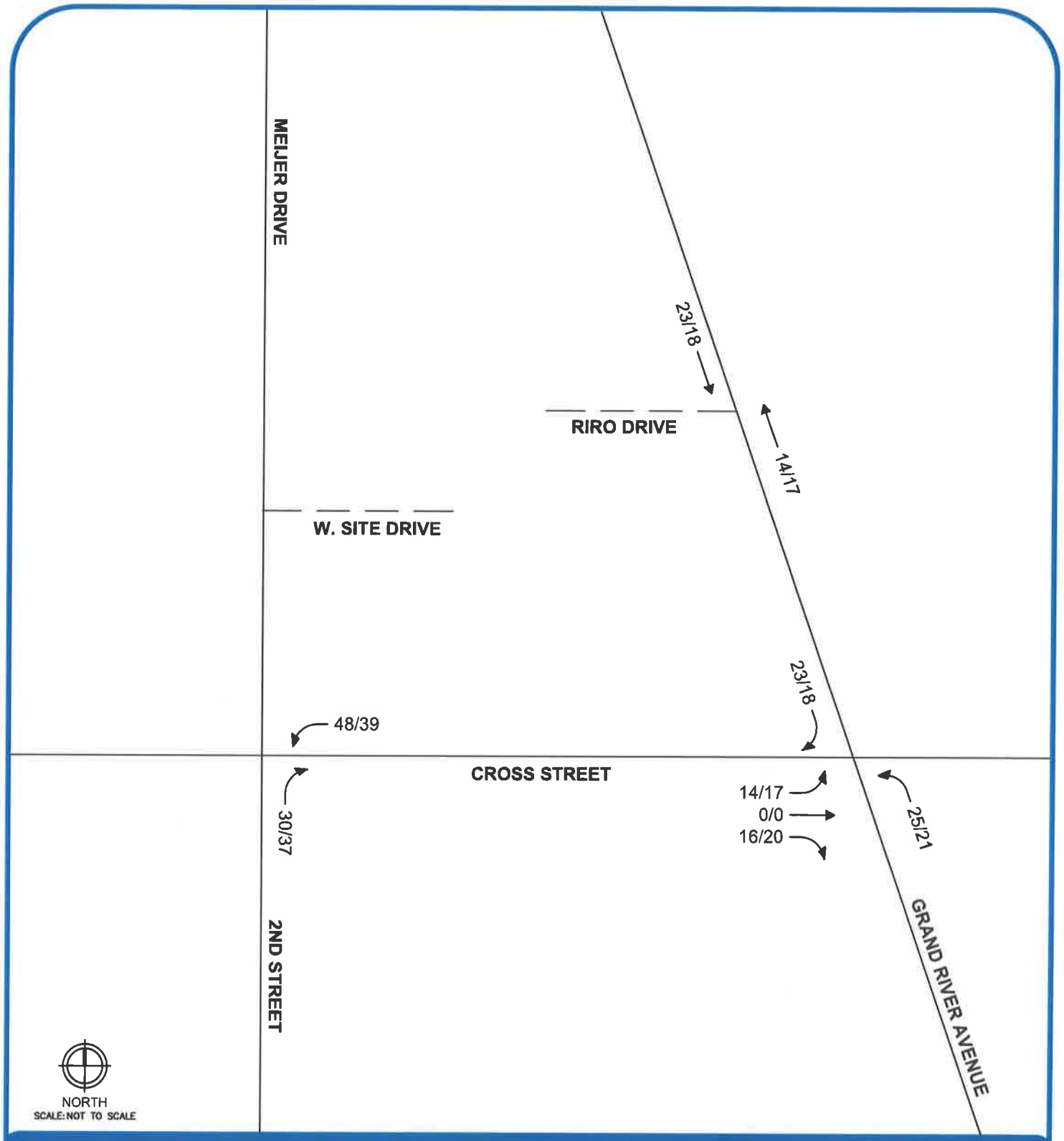


FIGURE 4B
BACKGROUND DEVELOPMENT TRAFFIC VOLUMES

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

- ROADS
- PROPOSED ROADS
- TRAFFIC VOLUMES (PM/SAT)

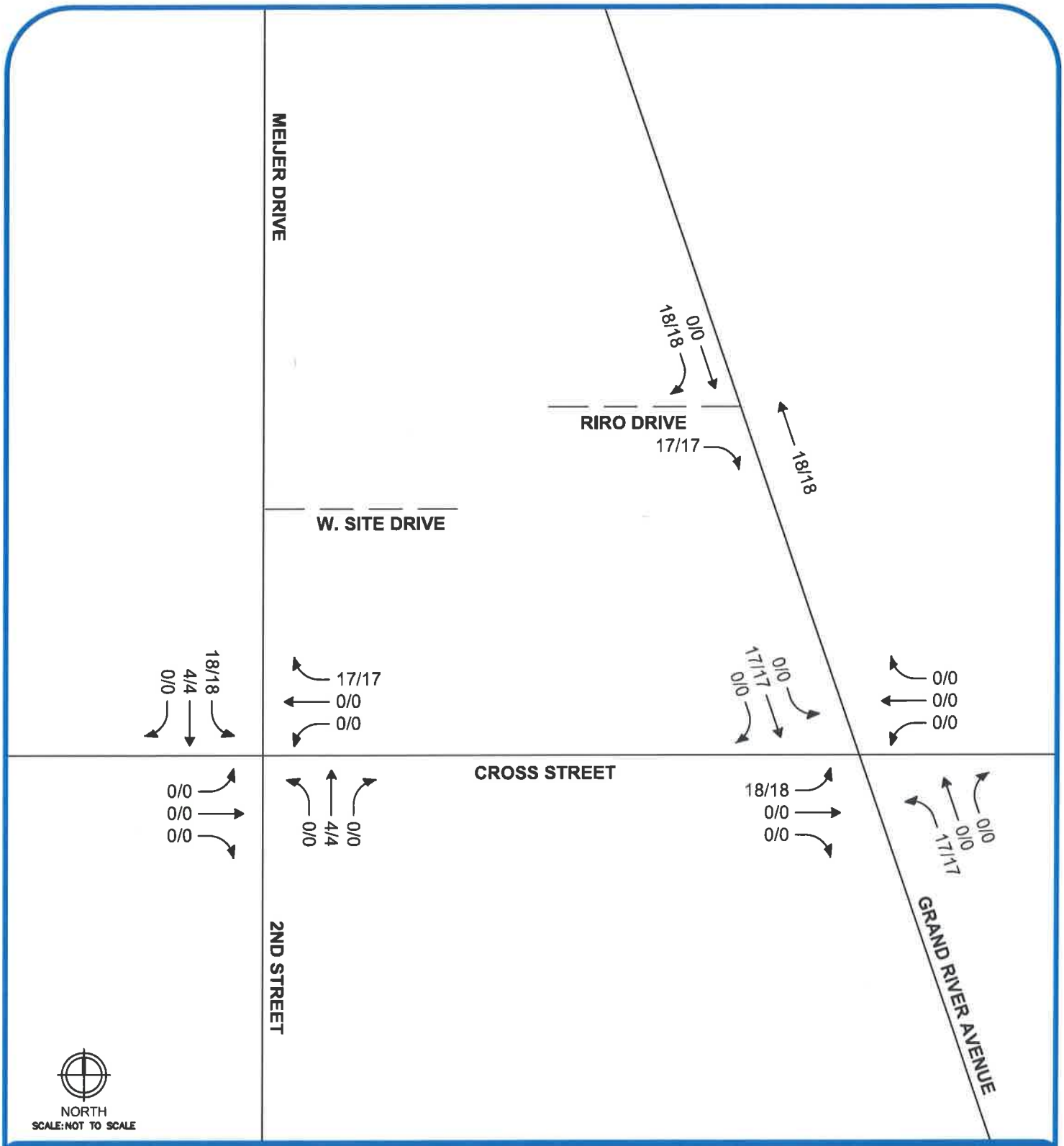


FIGURE 5
SITE-GENERATED TRAFFIC VOLUMES

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

- ROADS
- PROPOSED ROADS
- TRAFFIC VOLUMES (PM/SAT) +/-[000/000] PASS-BY

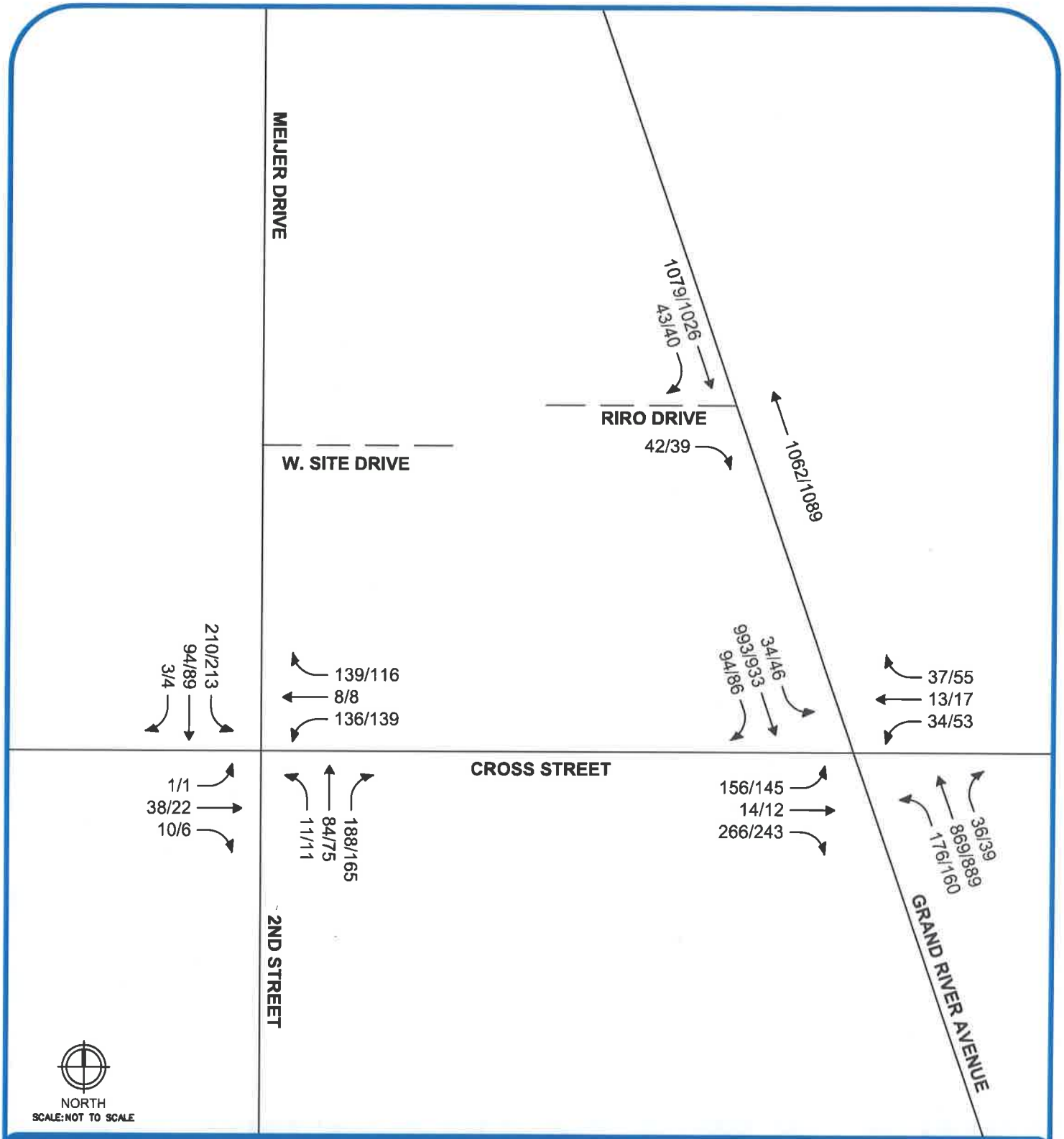
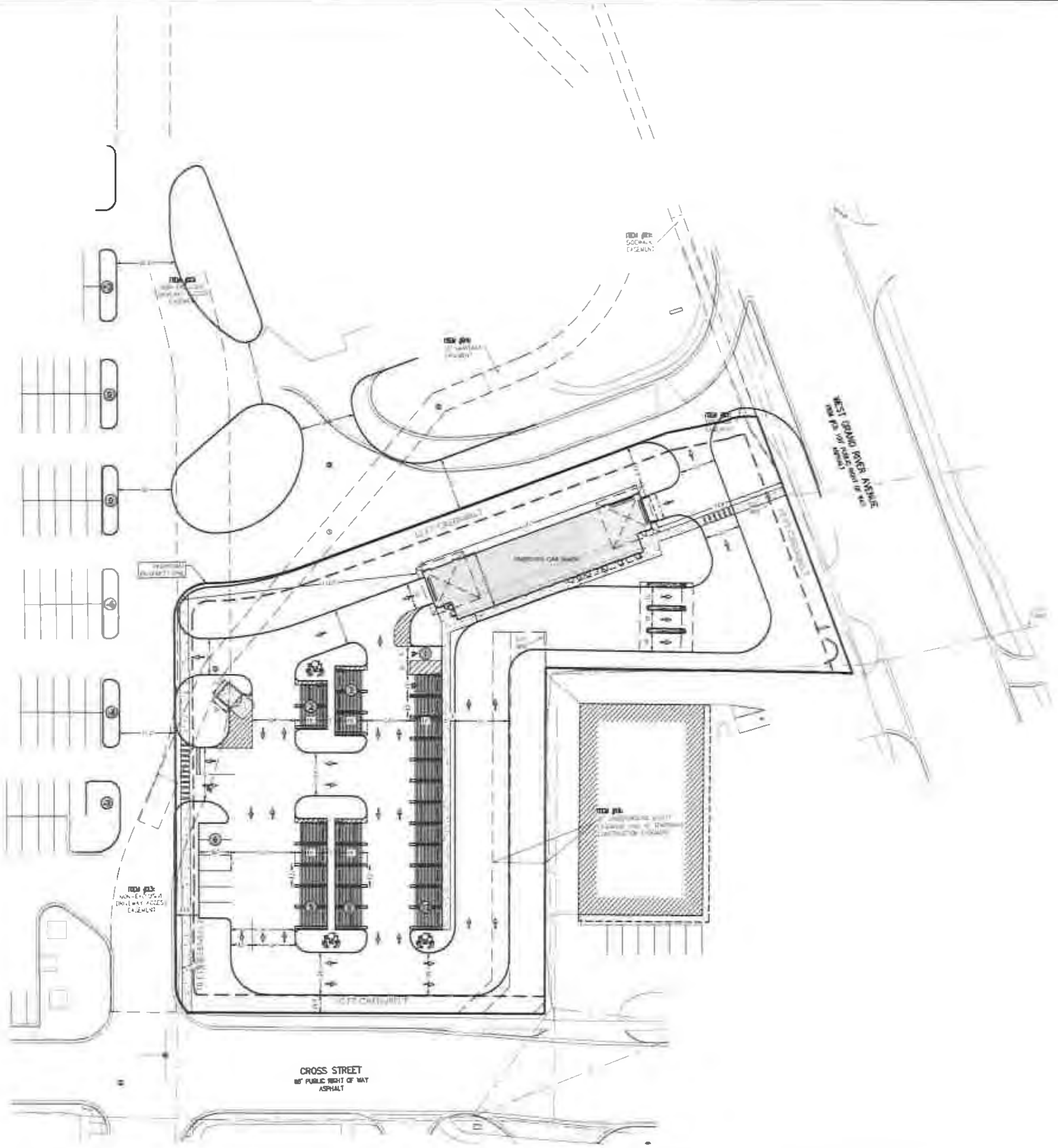


FIGURE 6
FUTURE TRAFFIC VOLUMES

EI CAR WASH TIS - BRIGHTON, MI

LEGEND

- ROADS
- PROPOSED ROADS
- TRAFFIC VOLUMES (PM/SAT)



SYMBOL	DESCRIPTION
	PROPERTY LINE
	SETBACK LINE
	SAWCUT LINE
	PROPOSED CURB
	PROPOSED FLUSH CURB
	[illegible]
	PROPOSED BUILDING
	PROPOSED CONCRETE
	[illegible]

GENERAL NOTES

- THE CONTRACTOR SHALL VERIFY AND FAMILIARIZE THEMSELVES WITH THE EXISTING SITE CONDITIONS AND THE PROPOSED SCOPE OF WORK (INCLUDING DIMENSIONS, LAYOUT, ETC.) PRIOR TO INITIATING THE IMPROVEMENTS IDENTIFIED WITHIN THESE DOCUMENTS. SHOULD ANY DISCREPANCY BE FOUND BETWEEN THE EXISTING SITE CONDITIONS AND THE PROPOSED WORK THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC PRIOR TO THE START OF CONSTRUCTION.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND ENSURE THAT ALL REQUIRED APPROVALS HAVE BEEN OBTAINED PRIOR TO THE START OF CONSTRUCTION. COPIES OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES DURING CONSTRUCTION.
- ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS STONEFIELD ENGINEERING & DESIGN, LLC AND ITS SUB-CONSULTANTS FROM AND AGAINST ANY DAMAGES AND LIABILITIES INCLUDING ATTORNEY'S FEES ARISING OUT OF CLAIMS BY EMPLOYEES OF THE CONTRACTOR IN ADDITION TO CLAIMS CONNECTED TO THE PROJECT AS A RESULT OF NOT CARRYING THE PROPER INSURANCE FOR WORKERS COMPENSATION, LIABILITY INSURANCE, AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE.
- THE CONTRACTOR SHALL NOT DEVIATE FROM THE PROPOSED IMPROVEMENTS IDENTIFIED WITHIN THIS PLAN SET UNLESS APPROVAL IS PROVIDED IN WRITING BY STONEFIELD ENGINEERING & DESIGN, LLC.
- THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
- THE CONTRACTOR SHALL NOT PERFORM ANY WORK OR CAUSE DISTURBANCE ON A PRIVATE PROPERTY NOT CONTROLLED BY THE PERSON OR ENTITY WHO HAS AUTHORIZED THE WORK WITHOUT PRIOR WRITTEN CONSENT FROM THE OWNER OF THE PRIVATE PROPERTY.
- THE CONTRACTOR IS RESPONSIBLE TO RESTORE ANY DAMAGED OR UNDERMINED STRUCTURE OR SITE FEATURE THAT IS IDENTIFIED TO REMAIN ON THE PLAN SET. ALL REPAIRS SHALL USE NEW MATERIALS TO RESTORE THE FEATURE TO ITS EXISTING CONDITION AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR IS RESPONSIBLE TO PROVIDE THE APPROPRIATE SHOP DRAWINGS, PRODUCT DATA, AND OTHER REQUIRED SUBMITTALS FOR REVIEW. STONEFIELD ENGINEERING & DESIGN, LLC WILL REVIEW THE SUBMITTALS IN ACCORDANCE WITH THE DESIGN INTENT AS REFLECTED WITHIN THE PLAN SET.
- THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
- THE CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN THE PUBLIC RIGHT-OF-WAY IN ACCORDANCE WITH THE APPROPRIATE GOVERNING AUTHORITY AND SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF STREET OPENING PERMITS.
- THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
- SHOULD AN EMPLOYEE OF STONEFIELD ENGINEERING & DESIGN, LLC BE PRESENT ON SITE AT ANY TIME DURING CONSTRUCTION, IT DOES NOT RELIEVE THE CONTRACTOR OF ANY OF THE RESPONSIBILITIES AND REQUIREMENTS LISTED IN THE NOTES WITHIN THIS PLAN SET.

GRAPHIC SCALE IN FEET

ISSUE	DATE	BY	DESCRIPTION
1	[illegible]	[illegible]	FOR CLIENT REVIEW

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design

Detroit, MI · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Rutherford, NJ
www.stonefieldeng.com

607 Shelby Suite 200 Detroit, MI 48226
Phone 248 247 1115

PLAN SET CLASSIFICATION

PROPOSED CAR WASH

PARCEL ID: 1830-100-023, 024, 026 & 086
8680 WEST GRAND RIVER
CITY OF BRIGHTON
LIVINGSTON COUNTY, MICHIGAN 48116

J. REID COOKSEY, P.E.

STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: DET-[illegible]

TITLE: SITE PLAN

DRAWING: C-3

SEMCOG | Southeast Michigan Council of Governments

Community Profiles

YOU ARE VIEWING DATA FOR:

City of Brighton

200 N 1st St
Brighton, MI 48116-1593
http://www.brightoncity.org

SEMCOG MEMBER

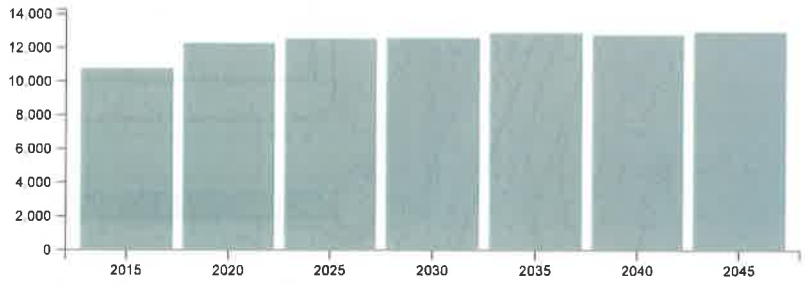
Census 2010 Population: 7,444
Area: 3.7 square miles

VIEW COMMUNITY EXPLORER MAP

Economy & Jobs

Link to American Community Survey (ACS) Profiles: **Select a Year** 2014-2018 ▾ Economic

Forecasted Jobs



Source: SEMCOG 2045 Regional Development Forecast

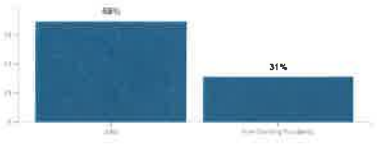
Forecasted Jobs by Industry Sector

Forecasted Jobs By Industry Sector	2015	2020	2025	2030	2035	2040	2045	Change 2015-2045	Pct Change 2015-2045
Natural Resources, Mining, & Construction	405	652	647	635	648	647	677	272	67.2%
Manufacturing	929	1,069	1,034	988	969	959	933	4	0.4%
Wholesale Trade	152	248	241	207	216	219	199	47	30.9%
Retail Trade	1,604	1,830	1,840	1,774	1,738	1,431	1,345	-259	-16.1%
Transportation, Warehousing, & Utilities	141	165	178	203	225	227	246	105	74.5%
Information & Financial Activities	1,476	1,577	1,651	1,736	1,782	1,845	1,930	454	30.8%
Professional and Technical Services & Corporate HQ	894	1,015	971	1,008	1,020	1,044	1,068	174	19.5%
Administrative, Support, & Waste Services	552	558	561	530	566	572	601	49	8.9%
Education Services	583	619	631	637	653	663	667	84	14.4%
Healthcare Services	1,239	1,657	1,804	1,833	1,913	1,936	2,006	767	61.9%
Leisure & Hospitality	1,924	1,926	2,067	2,138	2,226	2,251	2,308	384	20%
Other Services	584	664	642	614	644	671	676	92	15.8%
Public Administration	289	302	309	314	319	325	330	41	14.2%
Total Employment Numbers	10,772	12,282	12,576	12,617	12,919	12,790	12,986	2,214	20.6%

Source: **SEMCOG 2045 Regional Development Forecast**

Daytime Population

Daytime Population	ACS 2016
Jobs	8,283
Non-Working Residents	3,724
Age 15 and under	1,092
Not in labor force	2,476
Unemployed	156
Daytime Population	12,007



Source: **2012-2016 American Community Survey 5-Year Estimates** and **2012-2016 Census Transportation Planning Products Program (CTPP)**. For additional information, visit SEMCOG's **Interactive Commuting Patterns Map**

Note: The number of residents attending school outside Southeast Michigan is not available. Likewise, the number of students commuting into Southeast Michigan to attend school is also not known.

United States Census

QuickFacts

Brighton city, Michigan

QuickFacts provides statistics for all states and counties, and for cities and towns with a ***population of 5,000 or more***.

Table

Population	Brighton city, Michigan
Population Estimates, July 1 2021, (V2021)	⚠ 7,461
PEOPLE	
Population	
Population Estimates, July 1 2021, (V2021)	⚠ 7,461
Population estimates base, April 1, 2020, (V2021)	⚠ 7,442
Population, percent change - April 1, 2020 (estimates base) to July 1, 2021, (V2021)	⚠ 0.3%
Population, Census, April 1, 2020	7,446
Population, Census, April 1, 2010	7,444

About datasets used in this table

Value Notes

⚠ Estimates are not comparable to other geographic levels due to methodology differences that may exist between different data sources.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info ⓘ icon to th row in TABLE view to learn about sampling error.

The vintage year (e.g., V2021) refers to the final year of the series (2020 thru 2021). Different vintage years of estimates are not comparable.

Users should exercise caution when comparing 2016-2020 ACS 5-year estimates to other ACS estimates. For more information, please visit the 2020 5-year ACS Comparison Guidance page.

Fact Notes

(a) Includes persons reporting only one race
(c) Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data
(b) Hispanics may be of any race, so also are included in applicable race categories

Value Flags

- Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or upper in open ended distribution.
F Fewer than 25 firms
D Suppressed to avoid disclosure of confidential information
N Data for this geographic area cannot be displayed because the number of sample cases is too small.
FN Footnote on this item in place of data
X Not applicable
S Suppressed; does not meet publication standards
NA Not available
Z Value greater than zero but less than half unit of measure shown

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and P Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

Grand River & Cross Street - TMC

Thu Jun 9, 2022
Full Length (4 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959808, Location: 42.537739, -83.784781

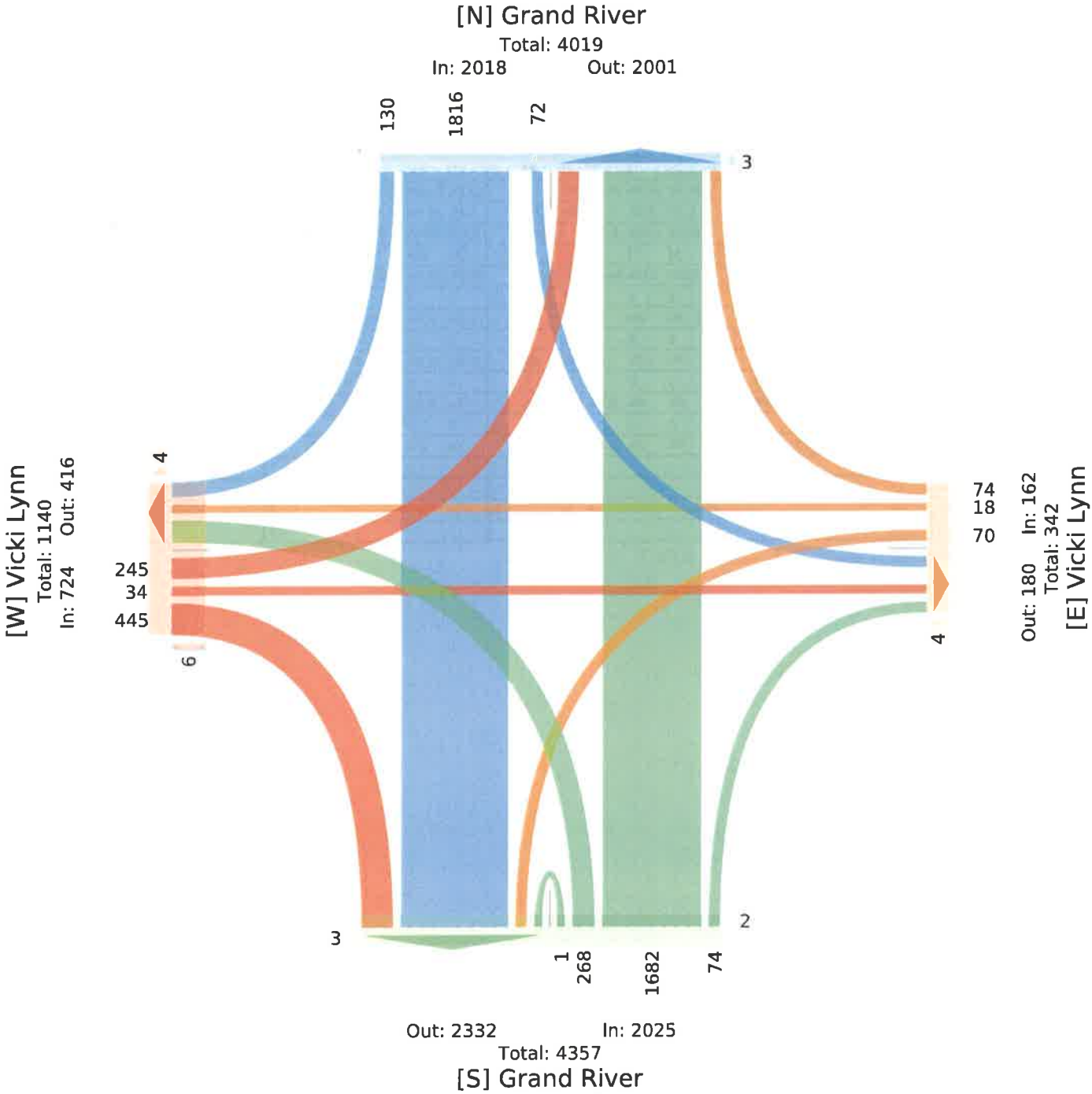
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Vicki Lynn						Vicki Lynn						Grand River						Grand River						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-09 4:00PM	50	6	74	0	**130**	1	7	5	7	0	**19**	0	39	234	7	0	**280**	0	8	279	13	0	**300**	0	**729**
4:15PM	22	2	61	0	**85**	2	5	1	13	0	**19**	0	26	224	11	0	**261**	0	8	198	20	0	**226**	0	**591**
4:30PM	29	1	52	0	**82**	0	9	3	10	0	**22**	0	33	215	9	0	**257**	2	9	257	17	0	**283**	0	**644**
4:45PM	22	4	61	0	**87**	3	13	4	7	0	**24**	0	35	187	9	0	**231**	1	9	232	20	0	**261**	3	**603**
Hourly Total	123	13	248	0	**384**	6	34	13	37	0	**84**	0	133	860	36	0	**1029**	3	34	966	70	0	**1070**	3	**2567**
5:00PM	44	4	58	0	**106**	1	7	2	7	0	**16**	1	36	212	16	0	**264**	0	5	237	12	0	**254**	0	**640**
5:15PM	23	9	53	0	**85**	0	7	0	8	0	**15**	0	39	220	4	0	**263**	0	12	194	16	0	**222**	0	**585**
5:30PM	28	5	49	0	**82**	1	11	0	8	0	**19**	3	30	200	12	1	**243**	0	10	215	18	0	**243**	0	**587**
5:45PM	27	3	37	0	**67**	2	11	3	14	0	**28**	0	30	190	6	0	**226**	2	11	204	14	0	**229**	0	**550**
Hourly Total	122	21	197	0	**340**	4	36	5	37	0	**78**	4	135	822	38	1	**996**	2	38	850	60	0	**948**	0	**2362**
Total	245	34	445	0	**724**	10	70	18	74	0	**162**	4	268	1682	74	1	**2025**	5	72	1816	130	0	**2018**	3	**4929**
% Approach	33.8%	4.7%	61.5%	0%	-	-	43.2%	11.1%	45.7%	0%	-	-	13.2%	83.1%	3.7%	0%	-	-	3.6%	90.0%	6.4%	0%	-	-	-
% Total	5.0%	0.7%	9.0%	0%	**14.7%**	-	1.4%	0.4%	1.5%	0%	**3.3%**	-	5.4%	34.1%	1.5%	0%	**41.1%**	-	1.5%	36.8%	2.6%	0%	**40.9%**	-	-
Lights	234	34	443	0	**711**	-	69	18	72	0	**159**	-	258	1671	73	1	**2003**	-	71	1809	115	0	**1995**	-	4868
% Lights	95.5%	100%	99.6%	0%	**98.2%**	-	98.6%	100%	97.3%	0%	**98.1%**	-	96.3%	99.3%	98.6%	100%	**98.9%**	-	98.6%	99.6%	88.5%	0%	**98.9%**	-	98.8%
Single-Unit Trucks	3	0	1	0	**4**	-	0	0	0	0	**0**	-	3	9	0	0	**12**	-	0	4	4	0	**8**	-	24
% Single-Unit Trucks	1.2%	0%	0.2%	0%	**0.6%**	-	0%	0%	0%	0%	**0%**	-	1.1%	0.5%	0%	0%	**0.6%**	-	0%	0.2%	3.1%	0%	**0.4%**	-	0.5%
Articulated Trucks	5	0	1	0	**6**	-	0	0	0	0	**0**	-	6	1	0	0	**7**	-	0	1	9	0	**10**	-	23
% Articulated Trucks	2.0%	0%	0.2%	0%	**0.8%**	-	0%	0%	0%	0%	**0%**	-	2.2%	0.1%	0%	0%	**0.3%**	-	0%	0.1%	6.9%	0%	**0.5%**	-	0.5%
Buses	3	0	0	0	**3**	-	0	0	1	0	**1**	-	1	1	0	0	**2**	-	1	2	2	0	**5**	-	11
% Buses	1.2%	0%	0%	0%	**0.4%**	-	0%	0%	1.4%	0%	**0.6%**	-	0.4%	0.1%	0%	0%	**0.1%**	-	1.4%	0.1%	1.5%	0%	**0.2%**	-	0.2%
Bicycles on Road	0	0	0	0	**0**	-	1	0	1	0	**2**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	3
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	1.4%	0%	1.4%	0%	**1.2%**	-	0%	0%	1.4%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Pedestrians	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	60.0%	-	-	-	-	-	0%	-	-	-	-	-	100%	-	-	-	-	-	0%	-
Bicycles on Crosswalk	-	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	3	
% Bicycles on Crosswalk	-	-	-	-	-	40.0%	-	-	-	-	-	100%	-	-	-	-	-	0%	-	-	-	-	-	100%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Grand River & Cross Street - TMC
Thu Jun 9, 2022
Full Length (4 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959808, Location: 42.537739, -83.784781

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Grand River & Cross Street - TMC

Thu Jun 9, 2022
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959808, Location: 42.537739, -83.784781

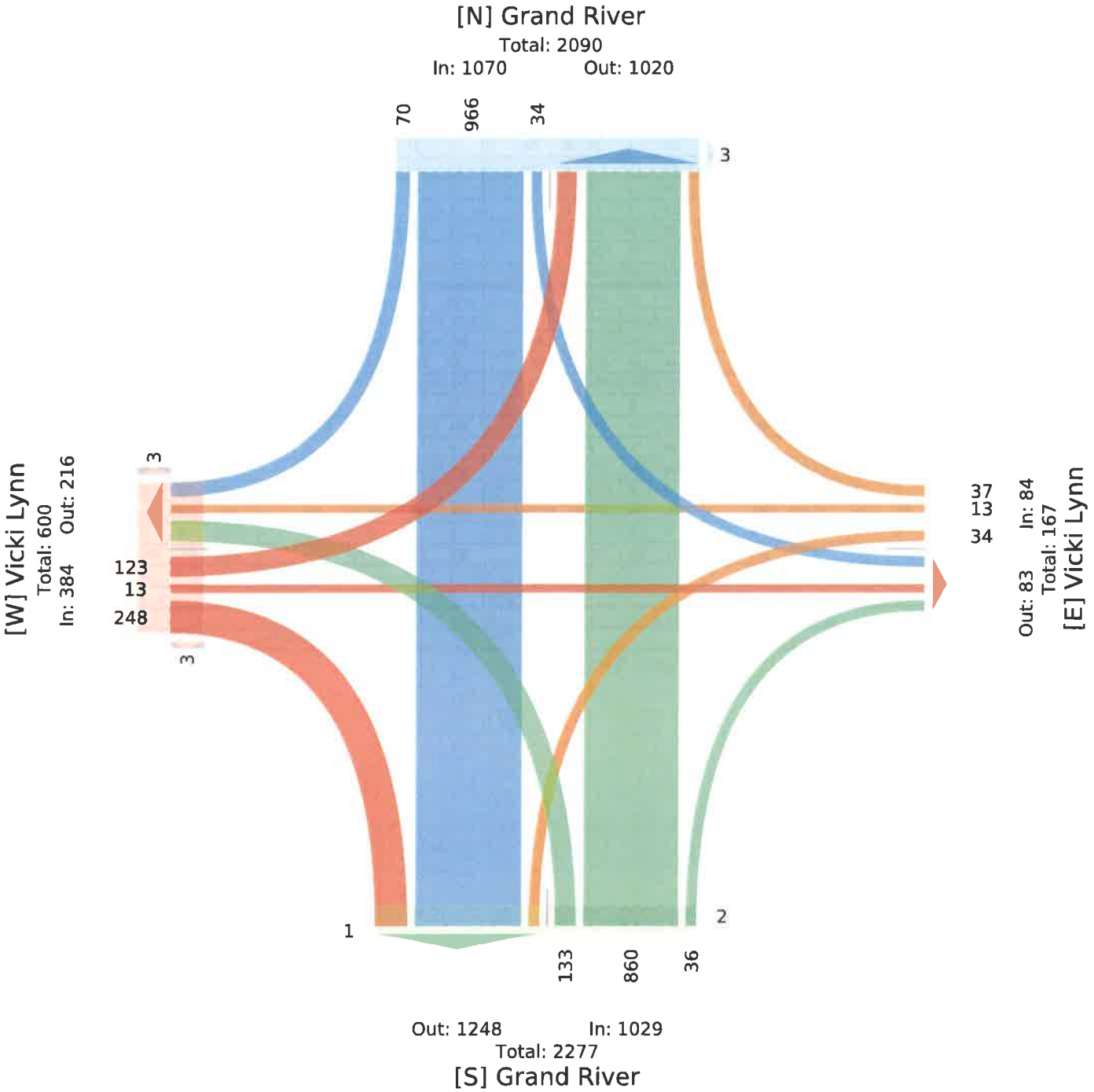
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Vicki Lynn						Vicki Lynn						Grand River						Grand River						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-09 4:00PM	50	6	74	0	**130**	1	7	5	7	0	**19**	0	39	234	7	0	**280**	0	8	279	13	0	**300**	0	**729**
4:15PM	22	2	61	0	**85**	2	5	1	13	0	**19**	0	26	224	11	0	**261**	0	8	198	20	0	**226**	0	**591**
4:30PM	29	1	52	0	**82**	0	9	3	10	0	**22**	0	33	215	9	0	**257**	2	9	257	17	0	**283**	0	**644**
4:45PM	22	4	61	0	**87**	3	13	4	7	0	**24**	0	35	187	9	0	**231**	1	9	232	20	0	**261**	3	**603**
Total	123	13	248	0	**384**	6	34	13	37	0	**84**	0	133	860	36	0	**1029**	3	34	966	70	0	**1070**	3	**2567**
% Approach	32.0%	3.4%	64.6%	0%	-	-	40.5%	15.5%	44.0%	0%	-	-	12.9%	83.6%	3.5%	0%	-	-	3.2%	90.3%	6.5%	0%	-	-	-
% Total	4.8%	0.5%	9.7%	0%	**15.0%**	-	1.3%	0.5%	1.4%	0%	**3.3%**	-	5.2%	33.5%	1.4%	0%	**40.1%**	-	1.3%	37.6%	2.7%	0%	**41.7%**	-	-
PHF	0.615	0.542	0.838	-	**0.738**	-	0.654	0.650	0.750	-	**0.865**	-	0.853	0.919	0.795	-	**0.921**	-	0.944	0.866	0.875	-	**0.892**	-	0.881
Lights	119	13	248	0	**380**	-	34	13	35	0	**82**	-	128	854	35	0	**1017**	-	33	960	64	0	**1057**	-	2536
% Lights	96.7%	100%	100%	0%	**99.0%**	-	100%	100%	94.6%	0%	**97.6%**	-	96.2%	99.3%	97.2%	0%	**98.8%**	-	97.1%	99.4%	91.4%	0%	**98.8%**	-	98.8%
Single-Unit Trucks	2	0	0	0	**2**	-	0	**0**	0	0	**0**	-	2	4	0	0	**6**	-	0	4	2	0	**6**	-	14
% Single-Unit Trucks	1.6%	0%	0%	0%	**0.5%**	-	0%	0%	0%	0%	**0%**	-	1.5%	0.5%	0%	0%	**0.6%**	-	0%	0.4%	2.9%	0%	**0.6%**	-	0.5%
Articulated Trucks	1	0	0	0	**1**	-	0	0	0	0	**0**	-	3	1	0	0	**4**	-	0	0	3	0	**3**	-	8
% Articulated Trucks	0.8%	0%	0%	0%	**0.3%**	-	0%	0%	0%	0%	**0%**	-	2.3%	0.1%	0%	0%	**0.4%**	-	0%	0%	4.3%	0%	**0.3%**	-	0.3%
Buses	1	0	0	0	**1**	-	0	0	1	0	**1**	-	0	1	0	0	**1**	-	1	2	1	0	**4**	-	7
% Buses	0.8%	0%	0%	0%	**0.3%**	-	0%	0%	2.7%	0%	**1.2%**	-	0%	0.1%	0%	0%	**0.1%**	-	2.9%	0.2%	1.4%	0%	**0.4%**	-	0.3%
Bicycles on Road	0	0	0	0	**0**	-	0	0	1	0	**1**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	2
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	2.7%	0%	**1.2%**	-	0%	0%	2.8%	0%	**0.1%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	33.3%	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	0%	-
Bicycles on Crosswalk	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	
% Bicycles on Crosswalk	-	-	-	-	-	66.7%	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	100%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Grand River & Cross Street - TMC
Thu Jun 9, 2022
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959808, Location: 42.537739, -83.784781

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Cross & 2nd Street - TMC

Thu Jun 9, 2022
Full Length (4 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959809, Location: 42.537546, -83.786685

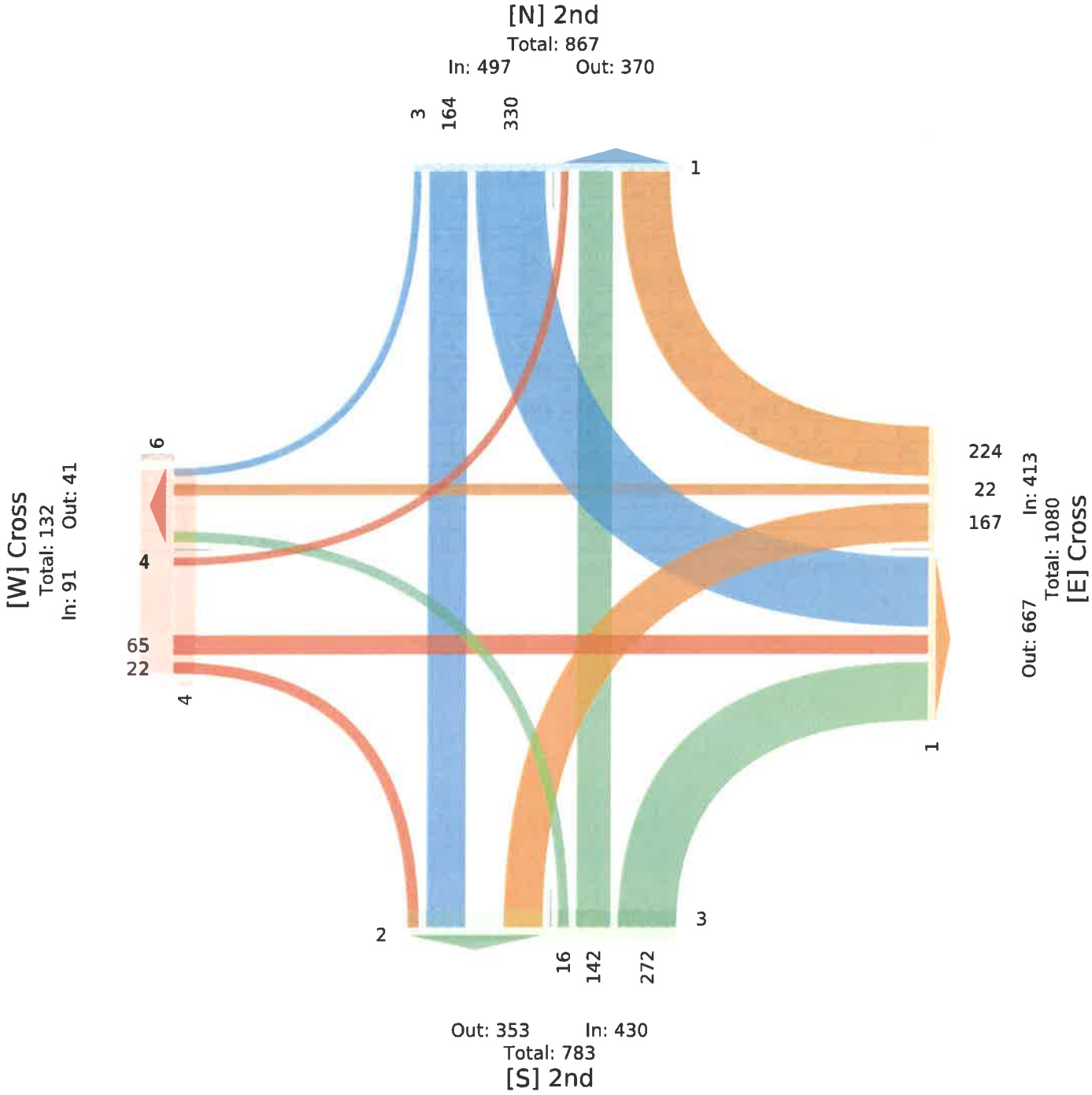
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Cross						Cross						2nd						2nd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-09 4:00PM	0	12	4	0	**16**	3	19	1	37	0	**57**	0	3	24	50	0	**77**	1	63	27	1	0	**91**	0	**241**
4:15PM	1	10	3	0	**14**	1	20	3	22	0	**45**	0	2	17	36	0	**55**	0	36	20	0	0	**56**	0	**170**
4:30PM	0	6	1	0	**7**	0	23	3	28	0	**54**	0	4	17	39	0	**60**	0	36	23	1	0	**60**	0	**181**
4:45PM	0	8	2	0	**10**	1	22	1	31	0	**54**	0	2	21	22	0	**45**	0	45	19	1	0	**65**	0	**174**
Hourly Total	1	36	10	0	**47**	5	**84**	**8**	118	0	**210**	0	11	79	147	0	**237**	1	180	89	3	0	**272**	0	**766**
5:00PM	0	10	1	0	**11**	1	24	5	26	0	**55**	0	2	22	45	0	**69**	1	46	17	0	0	**63**	0	**198**
5:15PM	0	8	7	0	**15**	2	22	3	27	0	**52**	0	1	17	28	0	**46**	2	39	18	0	0	**57**	0	**170**
5:30PM	3	4	1	0	**8**	1	22	4	27	0	**53**	0	1	14	26	0	**41**	0	36	23	0	0	**59**	0	**161**
5:45PM	0	7	3	0	**10**	1	15	**2**	26	0	**43**	1	1	10	26	0	**37**	1	29	17	0	0	**46**	1	**136**
Hourly Total	3	29	12	0	**44**	5	83	14	106	0	**203**	1	5	63	125	0	**193**	4	150	75	0	0	**225**	1	**665**
Total	4	65	22	0	**91**	10	167	22	224	0	**413**	1	16	142	272	0	**430**	5	330	164	3	0	**497**	1	**1431**
% Approach	4.4%	71.4%	24.2%	0%	-	-	40.4%	5.3%	54.2%	0%	-	-	3.7%	33.0%	63.3%	0%	-	-	66.4%	33.0%	0.6%	0%	-	-	-
% Total	0.3%	4.5%	1.5%	0%	**6.4%**	-	11.7%	1.5%	15.7%	0%	**28.9%**	-	1.1%	9.9%	19.0%	0%	**30.0%**	-	23.1%	11.5%	0.2%	0%	**34.7%**	-	-
Lights	4	62	22	0	**88**	-	144	22	221	0	**387**	-	16	139	264	0	**419**	-	329	164	3	0	**496**	-	1390
% Lights	100%	95.4%	100%	0%	**96.7%**	-	86.2%	100%	98.7%	0%	**93.7%**	-	100%	97.9%	97.1%	0%	**97.4%**	-	99.7%	100%	100%	0%	**99.8%**	-	97.1%
Single-Unit Trucks	0	0	0	0	**0**	-	7	0	0	0	**7**	-	0	2	3	0	**5**	-	1	0	0	0	**1**	-	13
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	4.2%	0%	0%	0%	**1.7%**	-	0%	1.4%	1.1%	0%	**1.2%**	-	0.3%	0%	0%	0%	**0.2%**	-	0.9%
Articulated Trucks	0	0	0	0	**0**	-	16	0	0	0	**16**	-	0	1	5	0	**6**	-	0	0	0	0	**0**	-	22
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	9.6%	0%	0%	0%	**3.9%**	-	0%	0.7%	1.8%	0%	**1.4%**	-	0%	0%	0%	0%	**0%**	-	1.5%
Buses	0	3	0	0	**3**	-	0	0	3	0	**3**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	6
% Buses	0%	4.6%	0%	0%	**3.3%**	-	0%	0%	1.3%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.4%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	8	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	- 80.0%		-	-	-	-	- 100%		-	-	-	-	- 80.0%		-	-	-	-	- 100%		
Bicycles on Crosswalk	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	- 20.0%		-	-	-	-	-	0%	-	-	-	-	- 20.0%		-	-	-	-	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Cross & 2nd Street - TMC
Thu Jun 9, 2022
Full Length (4 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959809, Location: 42.537546, -83.786685

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Cross & 2nd Street - TMC

Thu Jun 9, 2022
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959809, Location: 42.537546, -83.786685

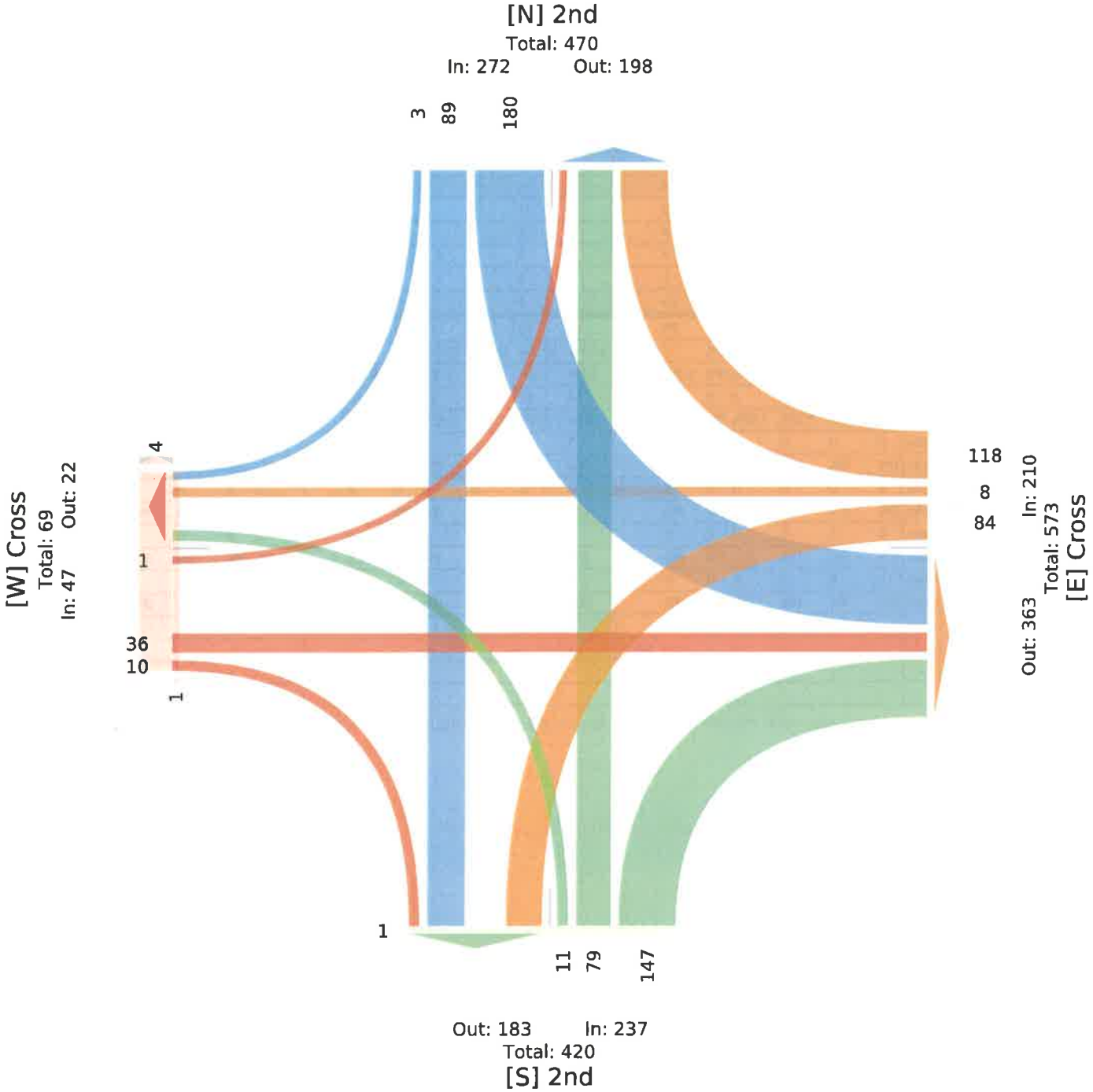
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Cross						Cross						2nd						2nd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-09 4:00PM	0	12	4	0	**16**	3	19	1	37	0	**57**	0	3	24	50	0	**77**	1	63	27	1	0	**91**	0	**241**
4:15PM	1	10	3	0	**14**	1	20	3	22	0	**45**	0	2	17	36	0	**55**	0	36	20	0	0	**56**	0	**170**
4:30PM	0	6	1	0	**7**	0	23	3	28	0	**54**	0	4	17	39	0	**60**	0	36	23	1	0	**60**	0	**181**
4:45PM	0	8	2	0	**10**	1	22	1	31	0	**54**	0	2	21	22	0	**45**	0	45	19	1	0	**65**	0	**174**
Total	1	36	10	0	**47**	5	84	8	118	0	**210**	0	11	79	147	0	**237**	1	180	89	3	0	**272**	0	**766**
% Approach	2.1%	76.6%	21.3%	0%	-	-	40.0%	3.8%	56.2%	0%	-	-	4.6%	33.3%	62.0%	0%	-	-	66.2%	32.7%	1.1%	0%	-	-	-
% Total	0.1%	4.7%	1.3%	0%	**6.1%**	-	11.0%	1.0%	15.4%	0%	**27.4%**	-	1.4%	10.3%	19.2%	0%	**30.9%**	-	23.5%	11.6%	0.4%	0%	**35.5%**	-	-
PHF	0.250	0.750	0.625	-	**0.734**	-	0.913	0.667	0.797	-	**0.921**	-	0.688	0.823	0.735	-	**0.769**	-	0.714	0.824	0.750	-	**0.747**	-	0.795
Lights	1	35	10	0	**46**	-	73	8	117	0	**198**	-	11	77	145	0	**233**	-	180	89	3	0	**272**	-	749
% Lights	100%	97.2%	100%	0%	**97.9%**	-	86.9%	100%	99.2%	0%	**94.3%**	-	100%	97.5%	98.6%	0%	**98.3%**	-	100%	100%	100%	0%	**100%**	-	97.8%
Single-Unit Trucks	0	0	0	0	**0**	-	5	0	0	0	**5**	-	0	1	2	0	**3**	-	0	0	0	0	**0**	-	8
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	6.0%	0%	0%	0%	**2.4%**	-	0%	1.3%	1.4%	0%	**1.3%**	-	0%	0%	0%	0%	**0%**	-	1.0%
Articulated Trucks	0	0	0	0	**0**	-	6	0	0	0	**6**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	7
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	7.1%	0%	0%	0%	**2.9%**	-	0%	1.3%	0%	0%	**0.4%**	-	0%	0%	0%	0%	**0%**	-	0.9%
Buses	0	1	0	0	**1**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	2
% Buses	0%	2.8%	0%	0%	**2.1%**	-	0%	0%	0.8%	0%	**0.5%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	60.0%	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	40.0%	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Cross & 2nd Street - TMC
Thu Jun 9, 2022
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959809, Location: 42.537546, -83.786685

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Meijer Gas Station Drive-One Way - TMC

Thu Jun 9, 2022
Full Length (4 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959810, Location: 42.538616, -83.78635

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Gas Station							Access							Gas Station						
Direction	Westbound							Northbound							Southbound						
Time	L	BL	BR	R	U	App	Ped*	HL	BL	T	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*
2022-06-09 4:00PM	0	3	0	0	0	**3**	0	3	2	2	0	0	**7**	0	2	0	0	0	0	**2**	0
4:15PM	0	2	2	0	0	**4**	0	1	0	0	1	0	**2**	0	1	0	0	0	0	**1**	1
4:30PM	0	2	0	0	0	**2**	0	2	0	1	2	0	**5**	0	0	0	2	0	0	**2**	1
4:45PM	0	3	0	2	0	**5**	2	2	2	2	5	0	**11**	0	1	0	2	0	0	**3**	0
Hourly Total	0	10	2	2	0	**14**	2	8	4	5	8	0	**25**	0	4	0	4	0	0	**8**	2
5:00PM	0	3	0	0	0	**3**	0	3	2	4	1	0	**10**	0	3	0	5	0	0	**8**	0
5:15PM	0	4	0	0	0	**4**	0	0	1	3	2	0	**6**	0	1	0	0	1	0	**2**	0
5:30PM	0	5	1	1	0	**7**	0	1	0	3	0	0	**4**	0	1	0	3	1	0	**5**	0
5:45PM	0	1	0	0	0	**1**	0	2	3	1	3	0	**9**	0	0	0	0	0	0	**0**	0
Hourly Total	0	13	1	1	0	**15**	0	6	6	11	6	0	**29**	0	5	0	8	2	0	**15**	0
Total	0	23	3	3	0	**29**	2	14	10	16	14	0	**54**	0	9	0	12	2	0	**23**	2
% Approach	0%	79.3%	10.3%	10.3%	0%	-	-	25.9%	18.5%	29.6%	25.9%	0%	-	-	39.1%	0%	52.2%	8.7%	0%	-	-
% Total	0%	3.0%	0.4%	0.4%	0%	**3.7%**	-	1.8%	1.3%	2.1%	1.8%	0%	**6.9%**	-	1.2%	0%	1.5%	0.3%	0%	**3.0%**	-
Lights	0	23	3	3	0	**29**	-	14	10	15	14	0	**53**	-	9	0	12	2	0	**23**	-
% Lights	0%	100%	100%	100%	0%	**100%**	-	100%	100%	93.8%	100%	0%	**98.1%**	-	100%	0%	100%	100%	0%	**100%**	-
Single-Unit Trucks	0	0	0	0	0	**0**	-	0	0	1	0	0	**1**	-	0	0	0	0	0	**0**	-
% Single-Unit Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	6.3%	0%	0%	**1.9%**	-	0%	0%	0%	0%	0%	**0%**	-
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Buses	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Pedestrians	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	2
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC

Thu Jun 9, 2022
Full Length (4 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959810, Location: 42.538616, -83.78635

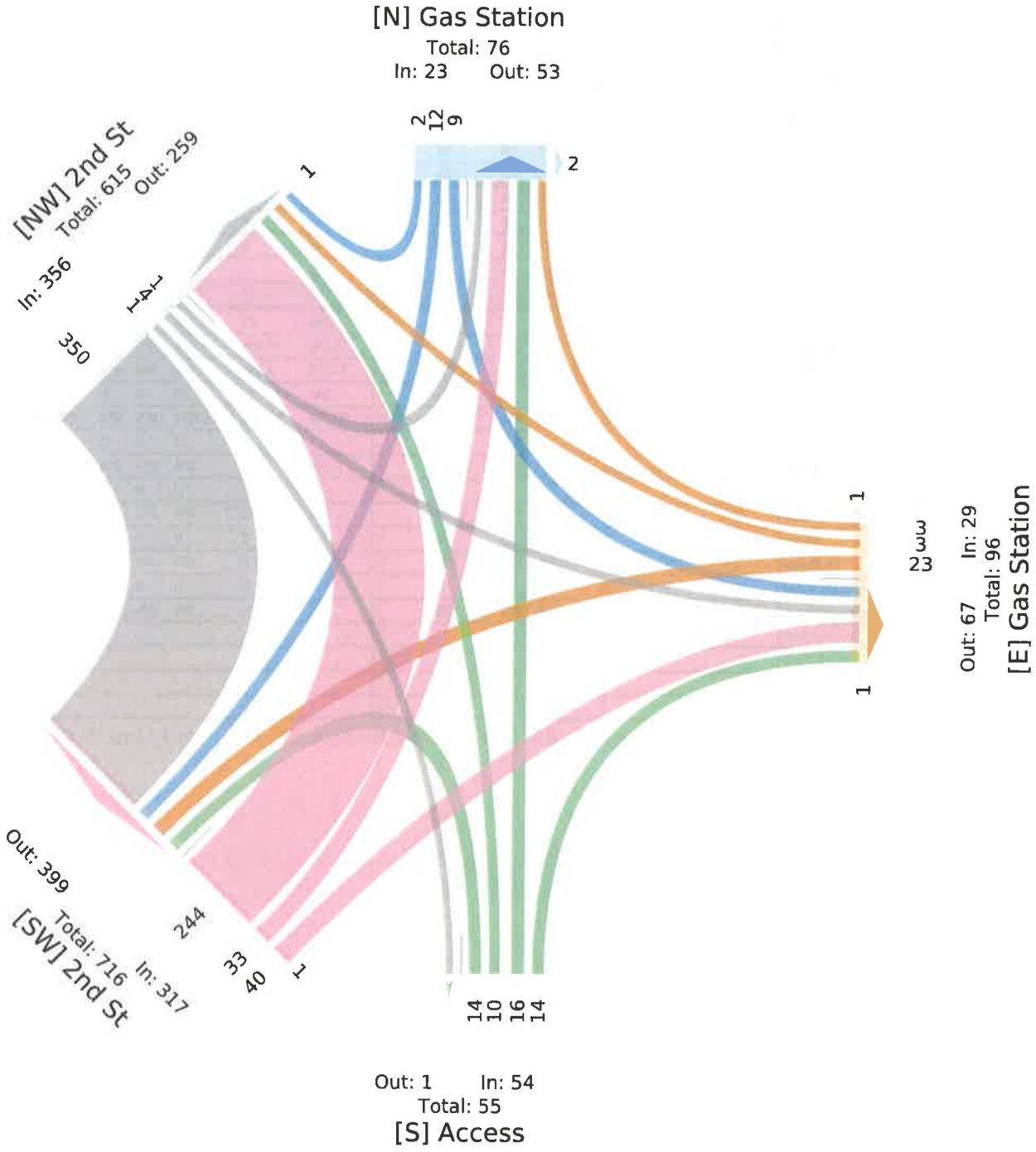
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	2nd St							2nd St							
Direction	Southeastbound							Northeastbound							
Time	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	Int
2022-06-09 4:00PM	0	1	0	73	0	**74**	0	45	1	6	0	0	**52**	0	**138**
4:15PM	0	1	0	41	0	**42**	0	25	4	2	0	0	**31**	1	**80**
4:30PM	0	0	1	46	0	**47**	1	28	6	3	0	0	**37**	0	**93**
4:45PM	0	0	0	41	0	**41**	0	30	3	9	0	0	**42**	0	**102**
Hourly Total	0	2	1	201	0	**204**	1	128	14	20	0	0	**162**	1	**413**
5:00PM	0	0	0	36	0	**36**	0	29	5	3	0	0	**37**	0	**94**
5:15PM	0	0	0	43	0	**43**	0	28	6	9	0	0	**43**	0	**98**
5:30PM	0	0	0	31	0	**31**	0	34	3	3	0	0	**40**	0	**87**
5:45PM	1	2	0	39	0	**42**	0	25	5	5	0	0	**35**	0	**87**
Hourly Total	1	2	0	149	0	**152**	0	116	19	20	0	0	**155**	0	**366**
Total	1	4	1	350	0	**356**	1	244	33	40	0	0	**317**	1	**779**
% Approach	0.3%	1.1%	0.3%	98.3%	0%	-	-	77.0%	10.4%	12.6%	0%	0%	-	-	-
% Total	0.1%	0.5%	0.1%	44.9%	0%	**45.7%**	-	31.3%	4.2%	5.1%	0%	0%	**40.7%**	-	-
Lights	1	4	1	349	0	**355**	-	243	32	40	0	0	**315**	-	775
% Lights	100%	100%	100%	99.7%	0%	**99.7%**	-	99.6%	97.0%	100%	0%	0%	**99.4%**	-	99.5%
Single-Unit Trucks	0	0	0	1	0	**1**	-	1	1	0	0	0	**2**	-	4
% Single-Unit Trucks	0%	0%	0%	0.3%	0%	**0.3%**	-	0.4%	3.0%	0%	0%	0%	**0.6%**	-	0.5%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	-	1	-	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC
Thu Jun 9, 2022
Full Length (4 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959810, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Meijer Gas Station Drive-One Way - TMC

Thu Jun 9, 2022
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959810, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Gas Station							Access							Gas Station						
Direction	Westbound							Northbound							Southbound						
Time	L	BL	BR	R	U	App	Ped*	HL	BL	T	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*
2022-06-09 4:00PM	0	3	0	0	0	**3**	0	3	2	2	0	0	**7**	0	2	0	0	0	0	**2**	0
4:15PM	0	2	2	0	0	**4**	0	1	0	0	1	0	**2**	0	1	0	0	0	0	**1**	1
4:30PM	0	2	0	0	0	**2**	0	2	0	1	2	0	**5**	0	0	0	2	0	0	**2**	1
4:45PM	0	3	0	2	0	**5**	2	2	2	2	5	0	**11**	0	1	0	2	0	0	**3**	0
Total	0	10	2	2	0	**14**	2	8	4	5	8	0	**25**	0	4	0	4	0	0	**8**	2
% Approach	0%	71.4%	14.3%	14.3%	0%	-	-	32.0%	16.0%	20.0%	32.0%	0%	-	-	50.0%	0%	50.0%	0%	0%	-	-
% Total	0%	2.4%	0.5%	0.5%	0%	**3.4%**	-	1.9%	1.0%	1.2%	1.9%	0%	**6.1%**	-	1.0%	0%	1.0%	0%	0%	**1.9%**	-
PHF	-	0.833	0.250	0.250	-	**0.700**	-	0.667	0.500	0.625	0.400	-	**0.568**	-	0.500	-	0.500	-	-	**0.667**	-
Lights	0	10	2	2	0	**14**	-	8	4	5	8	0	**25**	-	4	0	4	0	0	**8**	-
% Lights	0%	100%	100%	100%	0%	**100%**	-	100%	100%	100%	100%	0%	**100%**	-	100%	0%	100%	0%	0%	**100%**	-
Single-Unit Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Single-Unit Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Buses	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Pedestrians	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	2
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC

Thu Jun 9, 2022
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959810, Location: 42.538616, -83.78635

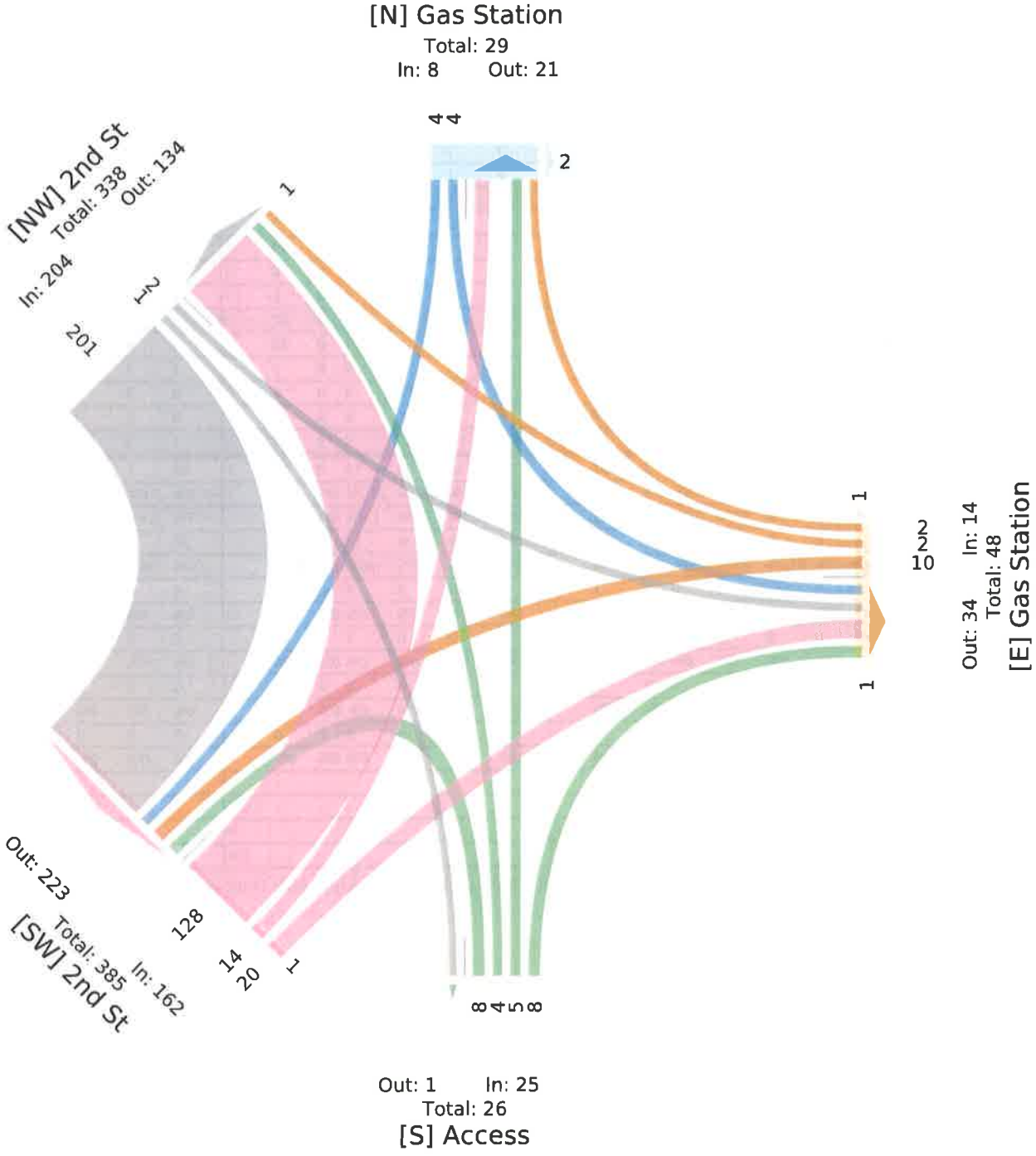
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	2nd St							2nd St							
Direction	Southeastbound							Northeastbound							
Time	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	Int
2022-06-09 4:00PM	0	1	0	73	0	**74**	0	45	1	6	0	0	**52**	0	**138**
4:15PM	0	1	0	41	0	**42**	0	25	4	2	0	0	**31**	1	**80**
4:30PM	0	0	1	46	0	**47**	1	28	6	3	0	0	**37**	0	**93**
4:45PM	0	0	0	41	0	**41**	0	30	3	9	0	0	**42**	0	**102**
Total	0	2	1	201	0	**204**	1	128	14	20	0	0	**162**	1	**413**
% Approach	0%	1.0%	0.5%	98.5%	0%	-	-	79.0%	8.6%	12.3%	0%	0%	-	-	-
% Total	0%	0.5%	0.2%	48.7%	0%	**49.4%**	-	31.0%	3.4%	4.8%	0%	0%	**39.2%**	-	-
PHF	-	0.500	0.250	0.688	-	**0.689**	-	0.711	0.583	0.556	-	-	**0.779**	-	0.748
Lights	0	2	1	201	0	**204**	-	127	13	20	0	0	**160**	-	411
% Lights	0%	100%	100%	100%	0%	**100%**	-	99.2%	92.9%	100%	0%	0%	**98.8%**	-	99.5%
Single-Unit Trucks	0	0	0	0	0	**0**	-	1	1	0	0	0	**2**	-	2
% Single-Unit Trucks	0%	0%	0%	0%	0%	**0%**	-	0.8%	7.1%	0%	0%	0%	**1.2%**	-	0.5%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	-	1	-	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC
Thu Jun 9, 2022
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959810, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Meijer Gas Station Drive-One Way - TMC

Sat Jun 11, 2022
Full Length (11 AM-2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Gas Station							Access							Gas Station						
Direction	Westbound							Northbound							Southbound						
Time	L	BL	BR	R	U	App	Ped*	HL	BL	T	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*
2022-06-11 11:00AM	0	4	1	1	0	**6**	0	0	1	3	0	0	**4**	0	4	1	2	0	0	**7**	0
11:15AM	0	5	2	0	0	**7**	0	3	2	1	3	0	**9**	0	2	0	2	1	0	**5**	0
11:30AM	0	5	1	0	0	**6**	0	0	1	2	1	0	**4**	0	1	0	1	1	0	**3**	0
11:45AM	0	7	0	0	0	**7**	0	0	1	2	2	0	**5**	1	4	0	0	0	0	**4**	0
Hourly Total	0	21	4	1	0	**26**	0	3	5	8	6	0	**22**	1	11	1	5	2	0	**19**	0
12:00PM	0	1	1	0	0	**2**	0	2	0	1	2	0	**5**	0	0	0	5	0	0	**5**	0
12:15PM	0	1	1	0	0	**2**	0	3	1	3	3	0	**10**	0	0	0	1	0	0	**1**	0
12:30PM	0	1	0	0	0	**1**	0	1	0	3	2	0	**6**	0	5	0	1	0	0	**6**	1
12:45PM	0	4	0	0	0	**4**	0	0	0	2	4	0	**6**	0	3	0	2	1	0	**6**	0
Hourly Total	0	7	2	0	0	**9**	0	6	1	9	11	0	**27**	0	8	0	9	1	0	**18**	1
1:00PM	0	3	1	0	0	**4**	0	2	2	7	1	0	**12**	0	0	0	1	2	0	**3**	0
1:15PM	0	3	2	0	0	**5**	0	0	3	4	0	0	**7**	0	1	0	1	1	0	**3**	0
1:30PM	0	0	2	2	0	**4**	0	1	0	5	0	0	**6**	0	0	0	2	0	0	**2**	0
1:45PM	0	3	0	0	0	**3**	0	2	4	1	0	0	**7**	0	0	0	0	4	0	**4**	0
Hourly Total	0	9	5	2	0	**16**	0	5	9	17	1	0	**32**	0	1	0	4	7	0	**12**	0
Total	0	37	11	3	0	**51**	0	14	15	34	18	0	**81**	1	20	1	18	10	0	**49**	1
% Approach	0%	72.5%	21.6%	5.9%	0%	-	-	17.3%	18.5%	42.0%	22.2%	0%	-	-	40.8%	2.0%	36.7%	20.4%	0%	-	-
% Total	0%	3.2%	0.9%	0.3%	0%	**4.4%**	-	1.2%	1.3%	2.9%	1.6%	0%	**7.0%**	-	1.7%	0.1%	1.6%	0.9%	0%	**4.2%**	-
Lights	0	36	11	3	0	**50**	-	14	15	34	18	0	**81**	-	20	1	18	10	0	**49**	-
% Lights	0%	97.3%	100%	100%	0%	**98.0%**	-	100%	100%	100%	100%	0%	**100%**	-	100%	100%	100%	100%	0%	**100%**	-
Single-Unit Trucks	0	1	0	0	0	**1**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Single-Unit Trucks	0%	2.7%	0%	0%	0%	**2.0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Buses	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Pedestrians	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	1
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC

Sat Jun 11, 2022
Full Length (11 AM-2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

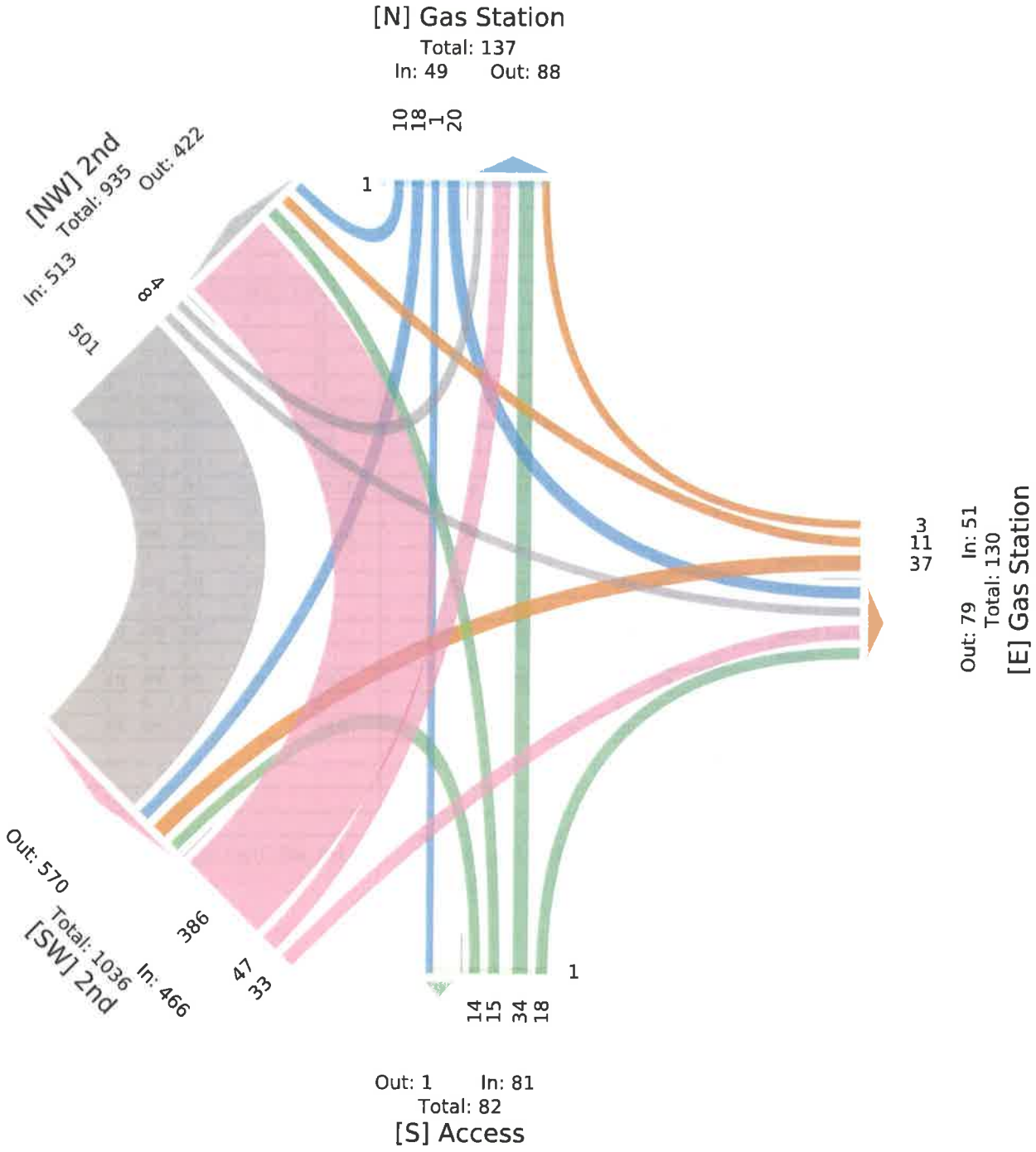
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	2nd							2nd							
Direction	Southeastbound							Northeastbound							
Time	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	Int
2022-06-11 11:00AM	1	1	0	42	0	**44**	0	28	4	3	0	0	**35**	0	**96**
11:15AM	1	1	0	60	0	**62**	0	29	3	1	0	0	**33**	0	**116**
11:30AM	0	2	0	45	0	**47**	0	45	2	0	0	0	**47**	0	**107**
11:45AM	0	0	0	45	0	**45**	0	46	4	5	0	0	**55**	0	**116**
Hourly Total	2	4	0	192	0	**198**	0	148	13	9	0	0	**170**	0	**435**
12:00PM	0	0	0	32	0	**32**	0	43	5	3	0	0	**51**	0	**95**
12:15PM	1	0	0	54	0	**55**	0	36	2	2	0	0	**40**	0	**108**
12:30PM	0	0	0	37	0	**37**	0	20	2	4	0	0	**26**	0	**76**
12:45PM	0	2	0	37	0	**39**	0	28	5	1	0	0	**34**	0	**89**
Hourly Total	1	2	0	160	0	**163**	0	127	14	10	0	0	**151**	0	**368**
1:00PM	0	0	0	37	0	**37**	0	23	3	5	0	0	**31**	0	**87**
1:15PM	1	2	0	38	0	**41**	0	37	5	5	0	0	**47**	0	**103**
1:30PM	0	0	0	41	0	**41**	0	28	6	3	0	0	**37**	0	**90**
1:45PM	0	0	0	33	0	**33**	0	23	6	1	0	0	**30**	0	**77**
Hourly Total	1	2	0	149	0	**152**	0	111	20	14	0	0	**145**	0	**357**
Total	**4**	**8**	**0**	501	**0**	**513**	0	386	47	33	**0**	**0**	**466**	0	**1160**
% Approach	0.8%	1.6%	0%	97.7%	0%	-	-	82.8%	10.1%	7.1%	0%	0%	-	-	-
% Total	0.3%	0.7%	0%	43.2%	0%	**44.2%**	-	33.3%	4.1%	2.8%	0%	0%	**40.2%**	-	-
Lights	4	8	0	498	0	**510**	-	381	46	33	0	0	**460**	-	1150
% Lights	100%	100%	0%	99.4%	0%	**99.4%**	-	98.7%	97.9%	100%	0%	0%	**98.7%**	-	99.1%
Single-Unit Trucks	0	0	0	1	0	**1**	-	0	1	0	0	0	**1**	-	3
% Single-Unit Trucks	0%	0%	0%	0.2%	0%	**0.2%**	-	0%	2.1%	0%	0%	0%	**0.2%**	-	0.3%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	1	0	**1**	-	3	0	0	0	0	**3**	-	4
% Buses	0%	0%	0%	0.2%	0%	**0.2%**	-	0.8%	0%	0%	0%	0%	**0.6%**	-	0.3%
Bicycles on Road	0	0	0	1	0	**1**	-	2	0	0	0	0	**2**	-	3
% Bicycles on Road	0%	0%	0%	0.2%	0%	**0.2%**	-	0.5%	0%	0%	0%	0%	**0.4%**	-	0.3%
Pedestrians	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC
Sat Jun 11, 2022
Full Length (11 AM-2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Meijer Gas Station Drive-One Way - TMC

Sat Jun 11, 2022
Midday Peak (WKND) (11 AM - 12 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Gas Station							Access							Gas Station						
Direction	Westbound							Northbound							Southbound						
Time	L	BL	BR	R	U	App	Ped*	HL	BL	T	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*
2022-06-11 11:00AM	0	4	1	1	0	**6**	0	0	1	3	0	0	**4**	0	4	1	2	0	0	**7**	0
11:15AM	0	5	2	0	0	**7**	0	3	2	1	3	0	**9**	0	2	0	2	1	0	**5**	0
11:30AM	0	5	1	0	0	**6**	0	0	1	2	1	0	**4**	0	1	0	1	1	0	**3**	0
11:45AM	0	7	0	0	0	**7**	0	0	1	2	2	0	**5**	1	4	0	0	0	0	**4**	0
Total	0	21	4	1	0	**26**	0	3	5	8	6	0	**22**	1	11	1	5	2	0	**19**	0
% Approach	0%	80.8%	15.4%	3.8%	0%	-	-	13.6%	22.7%	36.4%	27.3%	0%	-	-	57.9%	5.3%	26.3%	10.5%	0%	-	-
% Total	0%	4.8%	0.9%	0.2%	0%	**6.0%**	-	0.7%	1.1%	1.8%	1.4%	0%	**5.1%**	-	2.5%	0.2%	1.1%	0.5%	0%	**4.4%**	-
PHF	-	0.750	0.500	0.250	-	**0.929**	-	0.250	0.625	0.667	0.500	-	**0.611**	-	0.688	0.250	0.625	0.500	-	**0.679**	-
Lights	0	20	4	1	0	**25**	-	3	5	8	6	0	**22**	-	11	1	5	2	0	**19**	-
% Lights	0%	95.2%	100%	100%	0%	**96.2%**	-	100%	100%	100%	100%	0%	**100%**	-	100%	100%	100%	100%	0%	**100%**	-
Single-Unit Trucks	0	1	0	0	0	**1**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Single-Unit Trucks	0%	4.8%	0%	0%	0%	**3.8%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Buses	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Pedestrians	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC

Sat Jun 11, 2022
Midday Peak (WKND) (11 AM - 12 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

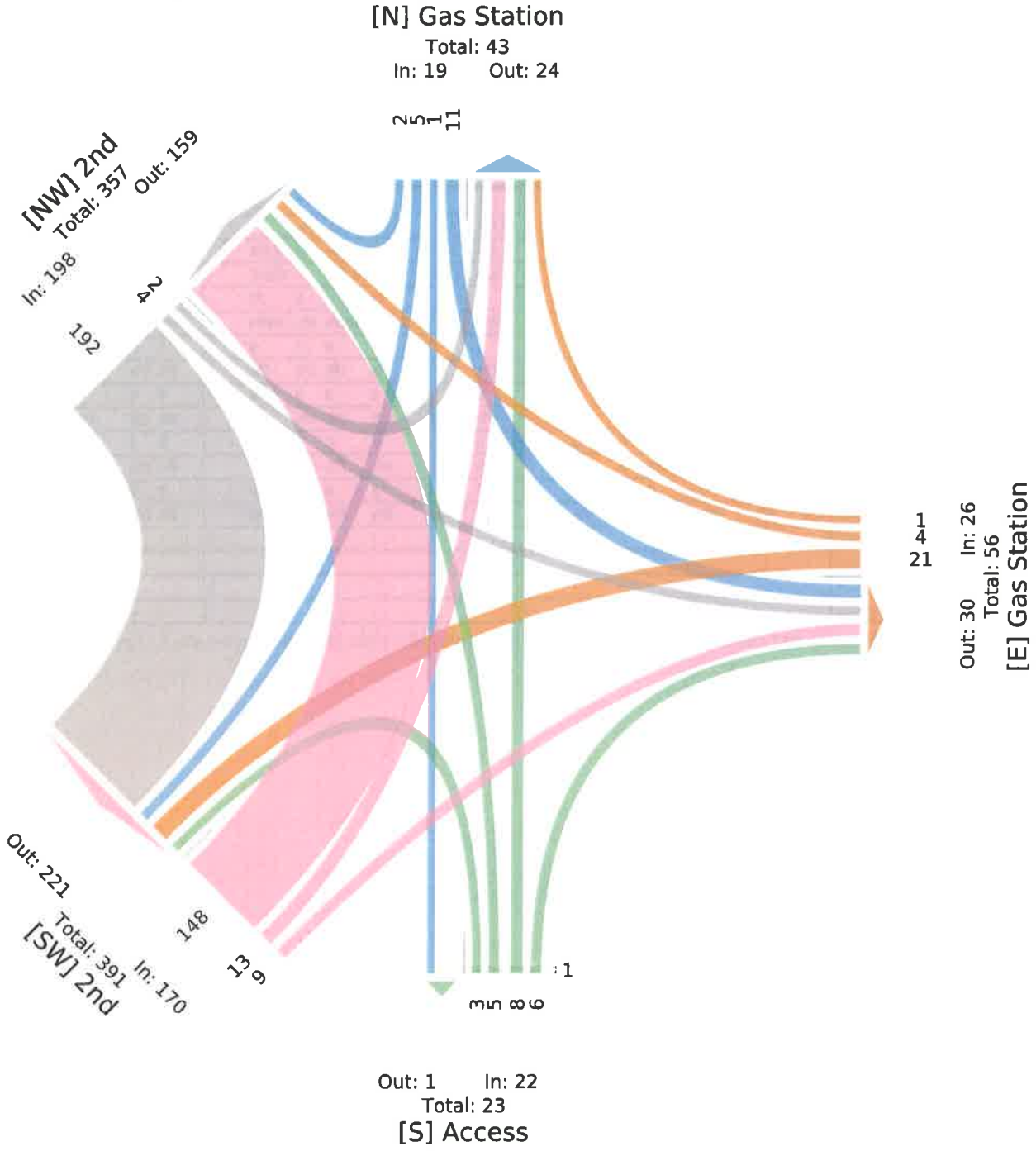
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	2nd							2nd							
Direction	Southeastbound							Northeastbound							
Time	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	Int
2022-06-11 11:00AM	1	1	0	42	0	**44**	0	28	4	3	0	0	**35**	0	**96**
11:15AM	1	1	0	60	0	**62**	0	29	3	1	0	0	**33**	0	**116**
11:30AM	0	2	0	45	0	**47**	0	45	2	0	0	0	**47**	0	**107**
11:45AM	0	0	0	45	0	**45**	0	46	4	5	0	0	**55**	0	**116**
Total	2	4	0	192	0	**198**	0	148	13	9	0	0	**170**	0	**435**
% Approach	1.0%	2.0%	0%	97.0%	0%	-	-	87.1%	7.6%	5.3%	0%	0%	-	-	-
% Total	0.5%	0.9%	0%	44.1%	0%	**45.5%**	-	34.0%	3.0%	2.1%	0%	0%	**39.1%**	-	-
PHF	0.500	0.500	-	0.800	-	**0.798**	-	0.799	0.813	0.450	-	-	**0.768**	-	0.935
Lights	2	4	0	191	0	**197**	-	146	12	9	0	0	**167**	-	430
% Lights	100%	100%	0%	99.5%	0%	**99.5%**	-	98.6%	92.3%	100%	0%	0%	**98.2%**	-	98.9%
Single-Unit Trucks	0	0	0	1	0	**1**	-	0	1	0	0	0	**1**	-	3
% Single-Unit Trucks	0%	0%	0%	0.5%	0%	**0.5%**	-	0%	7.7%	0%	0%	0%	**0.6%**	-	0.7%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	0	0	**0**	-	1	0	0	0	0	**1**	-	1
% Buses	0%	0%	0%	0%	0%	**0%**	-	0.7%	0%	0%	0%	0%	**0.6%**	-	0.2%
Bicycles on Road	0	0	0	0	0	**0**	-	1	0	0	0	0	**1**	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0.7%	0%	0%	0%	0%	**0.6%**	-	0.2%
Pedestrians	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC
Sat Jun 11, 2022
Midday Peak (WKND) (11 AM - 12 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Meijer Gas Station Drive-One Way - TMC

Sat Jun 11, 2022
PM Peak (WKND) (1 PM - 2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Gas Station							Access							Gas Station						
Direction	Westbound							Northbound							Southbound						
Time	L	BL	BR	R	U	App	Ped*	HL	BL	T	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*
2022-06-11 1:00PM	0	3	1	0	0	**4**	0	2	2	7	1	0	**12**	0	0	0	1	2	0	**3**	0
1:15PM	0	3	2	0	0	**5**	0	0	3	4	0	0	**7**	0	1	0	1	1	0	**3**	0
1:30PM	0	0	2	2	0	**4**	0	1	0	5	0	0	**6**	0	0	0	2	0	0	**2**	0
1:45PM	0	3	0	0	0	**3**	0	2	4	1	0	0	**7**	0	0	0	0	4	0	**4**	0
Total	0	9	5	2	0	**16**	0	5	9	17	1	0	**32**	0	1	0	4	7	0	**12**	0
% Approach	0%	56.3%	31.3%	12.5%	0%	-	-	15.6%	28.1%	53.1%	3.1%	0%	-	-	8.3%	0%	33.3%	58.3%	0%	-	-
% Total	0%	2.5%	1.4%	0.6%	0%	**4.5%**	-	1.4%	2.5%	4.8%	0.3%	0%	**9.0%**	-	0.3%	0%	1.1%	2.0%	0%	**3.4%**	-
PHF	-	0.750	0.625	0.250	-	**0.800**	-	0.625	0.563	0.607	0.250	-	**0.667**	-	0.250	-	0.500	0.438	-	**0.750**	-
Lights	0	9	5	2	0	**16**	-	5	9	17	1	0	**32**	-	1	0	4	7	0	**12**	-
% Lights	0%	100%	100%	100%	0%	**100%**	-	100%	100%	100%	100%	0%	**100%**	-	100%	0%	100%	100%	0%	**100%**	-
Single-Unit Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Single-Unit Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Buses	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-
Pedestrians	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC

Sat Jun 11, 2022
PM Peak (WKND) (1 PM - 2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

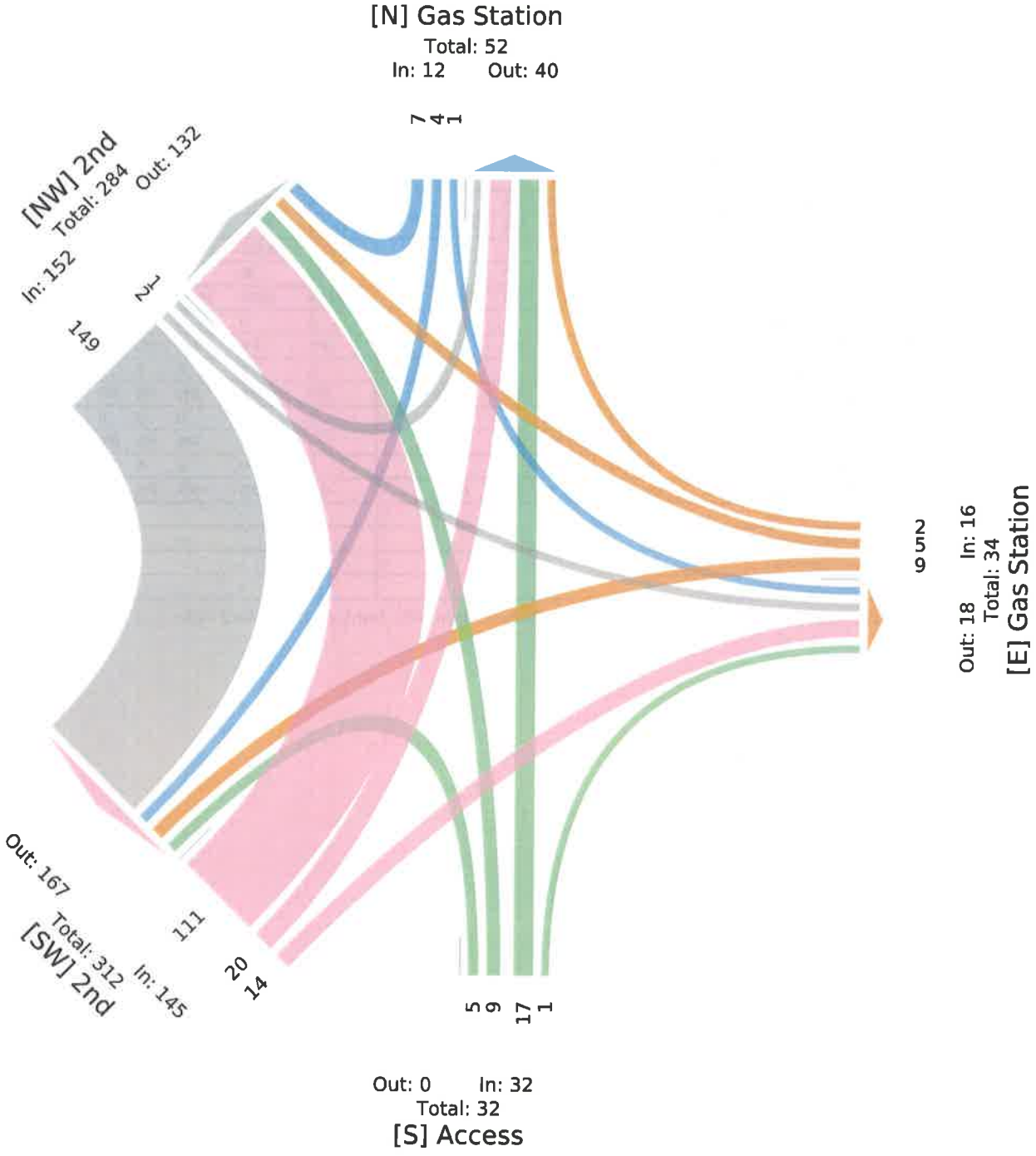
GHA GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	2nd							2nd							
Direction	Southeastbound							Northeastbound							
Time	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	Int
2022-06-11 1:00PM	0	0	0	37	0	**37**	0	23	3	5	0	0	**31**	0	**87**
1:15PM	1	2	0	38	0	**41**	0	37	5	5	0	0	**47**	0	**103**
1:30PM	0	0	0	41	0	**41**	0	28	6	3	0	0	**37**	0	**90**
1:45PM	0	0	0	33	0	**33**	0	23	6	1	0	0	**30**	0	**77**
Total	1	2	0	149	0	**152**	0	111	20	14	0	0	**145**	0	**357**
% Approach	0.7%	1.3%	0%	98.0%	0%	-	-	76.6%	13.8%	9.7%	0%	0%	-	-	-
% Total	0.3%	0.6%	0%	41.7%	0%	**42.6%**	-	31.1%	5.6%	3.9%	0%	0%	**40.6%**	-	-
PHF	0.250	0.250	-	0.902	-	**0.921**	-	0.750	0.833	0.700	-	-	**0.771**	-	0.864
Lights	1	2	0	147	0	**150**	-	111	20	14	0	0	**145**	-	355
% Lights	100%	100%	0%	98.7%	0%	**98.7%**	-	100%	100%	100%	0%	0%	**100%**	-	99.4%
Single-Unit Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Single-Unit Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	1	0	**1**	-	0	0	0	0	0	**0**	-	1
% Buses	0%	0%	0%	0.7%	0%	**0.7%**	-	0%	0%	0%	0%	0%	**0%**	-	0.3%
Bicycles on Road	0	0	0	1	0	**1**	-	0	0	0	0	0	**0**	-	1
% Bicycles on Road	0%	0%	0%	0.7%	0%	**0.7%**	-	0%	0%	0%	0%	0%	**0%**	-	0.3%
Pedestrians	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Meijer Gas Station Drive-One Way - TMC
Sat Jun 11, 2022
PM Peak (WKND) (1 PM - 2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959811, Location: 42.538616, -83.78635

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Cross & 2nd Street - TMC

Sat Jun 11, 2022
Full Length (11 AM-2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959812, Location: 42.537546, -83.786685

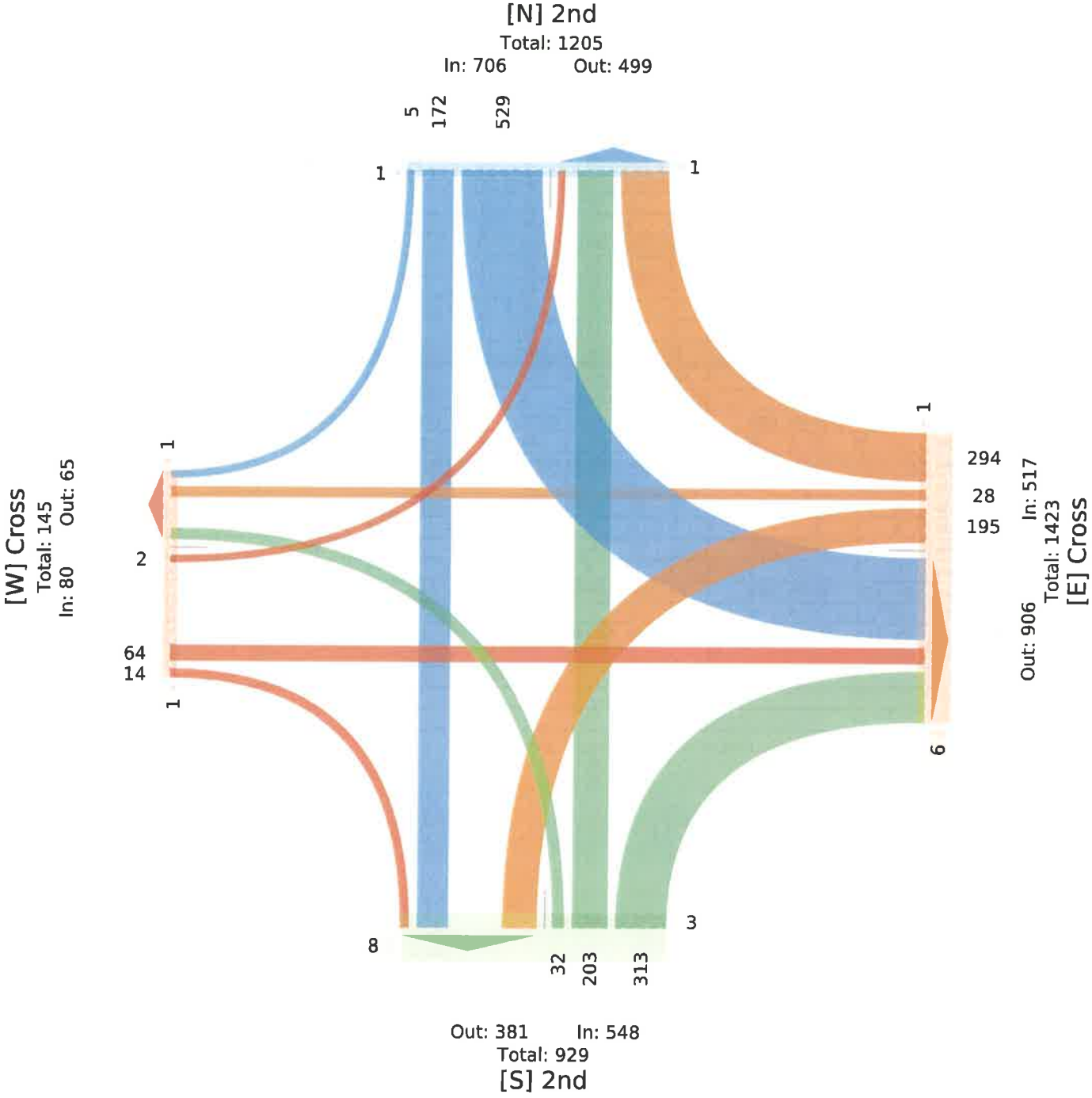
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Cross						Cross						2nd						2nd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-11 11:00AM	0	6	1	0	7	0	38	2	2	0	42	1	3	15	38	0	56	3	40	17	1	0	58	0	163
11:15AM	0	9	0	0	9	0	22	2	26	0	50	2	4	19	28	0	51	1	51	33	0	0	84	0	194
11:30AM	0	1	2	0	3	1	22	1	41	0	64	0	4	17	25	0	46	2	47	18	0	0	65	1	178
11:45AM	1	5	3	0	9	0	17	3	29	0	49	0	0	19	32	0	51	1	49	16	3	0	68	0	177
Hourly Total	1	21	6	0	28	1	99	8	98	0	205	3	11	70	123	0	204	7	187	84	4	0	275	1	712
12:00PM	1	2	4	0	7	0	13	2	28	0	43	0	0	26	29	0	55	0	34	9	0	0	43	0	148
12:15PM	0	6	0	0	6	0	13	1	21	0	35	1	5	19	39	0	63	0	48	16	0	0	64	0	168
12:30PM	0	6	0	0	6	0	15	2	18	0	35	2	7	12	21	0	40	3	44	8	0	0	52	0	133
12:45PM	0	3	0	0	3	0	20	5	33	0	58	0	1	9	13	0	23	1	47	12	0	0	59	0	143
Hourly Total	1	17	4	0	22	0	61	10	100	0	171	3	13	66	102	0	181	4	173	45	0	0	218	0	592
1:00PM	0	8	0	0	8	0	13	3	19	0	35	0	2	16	24	0	42	0	44	11	1	0	56	0	141
1:15PM	0	5	0	0	5	0	9	3	30	0	42	0	0	21	27	0	48	0	46	8	0	0	54	0	149
1:30PM	0	7	2	0	9	0	5	1	28	0	34	0	4	15	18	0	37	0	38	13	0	0	51	0	131
1:45PM	0	6	2	0	8	1	8	3	19	0	30	1	2	15	19	0	36	0	41	11	0	0	52	1	126
Hourly Total	0	26	4	0	30	1	35	10	96	0	141	1	8	67	88	0	163	0	169	43	1	0	213	1	547
Total	2	64	14	0	**80**	2	195	28	294	0	**517**	7	32	203	313	0	**548**	11	529	172	5	0	**706**	2	**1851**
% Approach	2.5%	80.0%	17.5%	0%	-	-	37.7%	5.4%	56.9%	0%	-	-	5.8%	37.0%	57.1%	0%	-	-	74.9%	24.4%	0.7%	0%	-	-	-
% Total	0.1%	3.5%	0.8%	0%	**4.3%**	-	10.5%	1.5%	15.9%	0%	**27.9%**	-	1.7%	11.0%	16.9%	0%	**29.6%**	-	28.6%	9.3%	0.3%	0%	**38.1%**	-	-
Lights	2	59	13	0	**74**	-	184	27	290	0	**501**	-	32	202	308	0	**542**	-	528	170	5	0	**703**	-	1820
% Lights	100%	92.2%	92.9%	0%	**92.5%**	-	94.4%	96.4%	98.6%	0%	**96.9%**	-	100%	99.5%	98.4%	0%	**98.9%**	-	99.8%	98.8%	100%	0%	**99.6%**	-	98.3%
Single-Unit Trucks	0	0	0	0	**0**	-	6	0	0	0	**6**	-	0	1	3	0	**4**	-	1	1	0	0	**2**	-	12
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	3.1%	0%	0%	0%	**1.2%**	-	0%	0.5%	1.0%	0%	**0.7%**	-	0.2%	0.6%	0%	0%	**0.3%**	-	0.6%
Articulated Trucks	0	1	0	0	**1**	-	5	0	0	0	**5**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	6
% Articulated Trucks	0%	1.6%	0%	0%	**1.3%**	-	2.6%	0%	0%	0%	**1.0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Buses	0	3	0	0	**3**	-	0	1	3	0	**4**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	8
% Buses	0%	4.7%	0%	0%	**3.8%**	-	0%	3.6%	1.0%	0%	**0.8%**	-	0%	0%	0.3%	0%	**0.2%**	-	0%	0%	0%	0%	**0%**	-	0.4%
Bicycles on Road	0	1	1	0	**2**	-	0	0	1	0	**1**	-	0	0	1	0	**1**	-	0	1	0	0	**1**	-	5
% Bicycles on Road	0%	1.6%	7.1%	0%	**2.5%**	-	0%	0%	0.3%	0%	**0.2%**	-	0%	0%	0.3%	0%	**0.2%**	-	0%	0.6%	0%	0%	**0.1%**	-	0.3%
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	7	-	-	-	-	-	9	-	-	-	-	-	2	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	81.8%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	18.2%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Cross & 2nd Street - TMC
Sat Jun 11, 2022
Full Length (11 AM-2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959812, Location: 42.537546, -83.786685

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Cross & 2nd Street - TMC

Sat Jun 11, 2022
Midday Peak (WKND) (11 AM - 12 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959812, Location: 42.537546, -83.786685

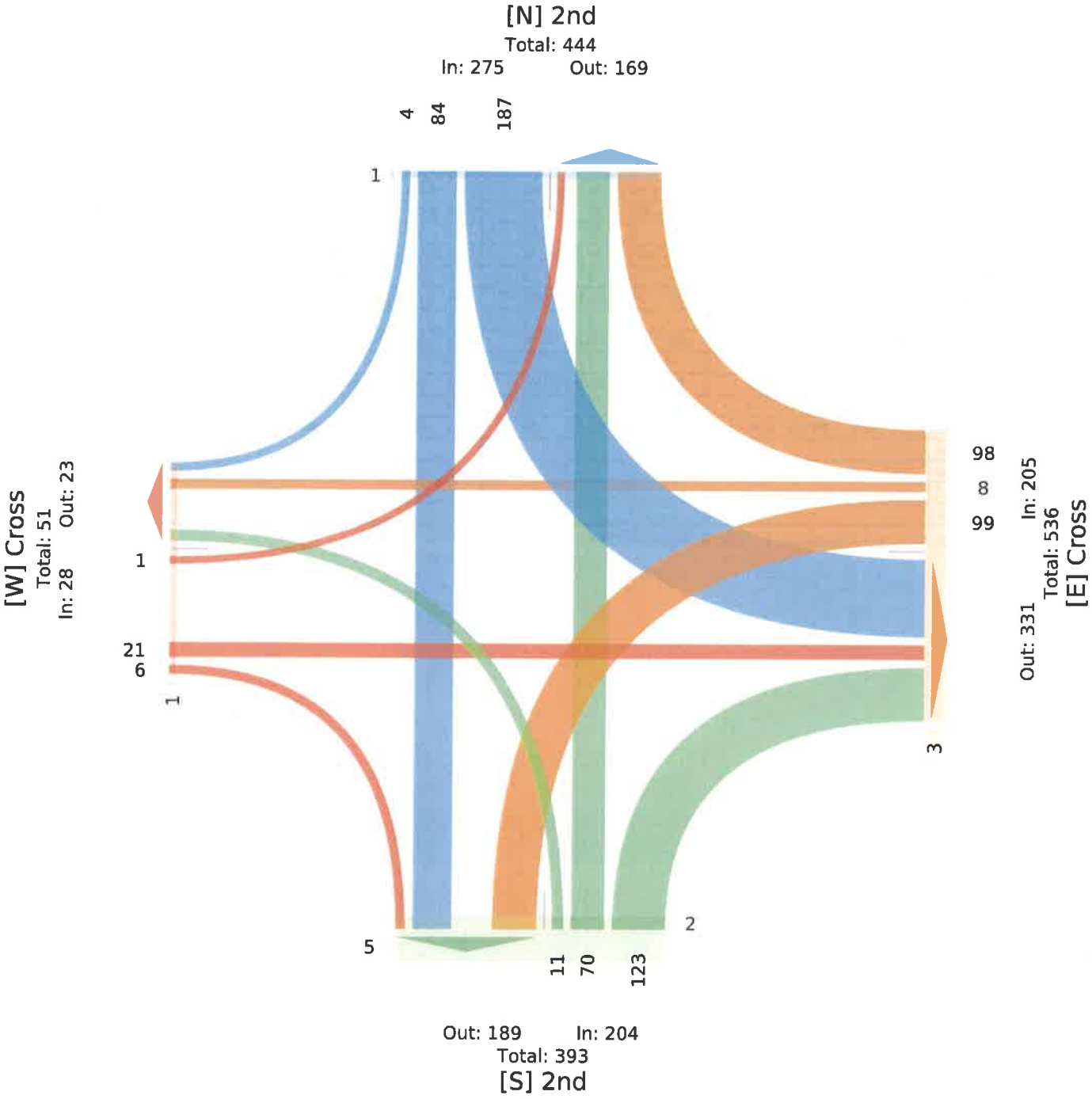
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Cross						Cross						2nd						2nd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-11 11:00AM	0	6	1	0	**7**	0	38	2	2	0	**42**	1	3	15	38	0	**56**	3	40	17	1	0	**58**	0	**163**
11:15AM	0	9	0	0	**9**	0	22	2	26	0	**50**	2	4	19	28	0	**51**	1	51	33	0	0	**84**	0	**194**
11:30AM	0	1	2	0	**3**	1	22	1	41	0	**64**	0	4	17	25	0	**46**	2	47	18	0	0	**65**	1	**178**
11:45AM	1	5	3	0	**9**	0	17	3	29	0	**49**	0	0	19	32	0	**51**	1	49	16	3	0	**68**	0	**177**
Total	1	21	6	0	**28**	1	99	8	98	0	**205**	3	11	70	123	0	**204**	7	187	84	4	0	**275**	1	**712**
% Approach	3.6%	75.0%	21.4%	0%	-	-	48.3%	3.9%	47.8%	0%	-	-	5.4%	34.3%	60.3%	0%	-	-	68.0%	30.5%	1.5%	0%	-	-	-
% Total	0.1%	2.9%	0.8%	0%	**3.9%**	-	13.9%	1.1%	13.8%	0%	**28.8%**	-	1.5%	9.8%	17.3%	0%	**28.7%**	-	26.3%	11.8%	0.6%	0%	**38.6%**	-	-
PHF	0.250	0.556	0.500	-	**0.750**	-	0.651	0.667	0.598	-	**0.801**	-	0.688	0.921	0.809	-	**0.911**	-	0.917	0.636	0.333	-	**0.818**	-	0.916
Lights	1	19	6	0	**26**	-	97	8	97	0	**202**	-	11	69	122	0	**202**	-	186	83	4	0	**273**	-	703
% Lights	100%	90.5%	100%	0%	**92.9%**	-	98.0%	100%	99.0%	0%	**98.5%**	-	100%	98.6%	99.2%	0%	**99.0%**	-	99.5%	98.8%	100%	0%	**99.3%**	-	98.7%
Single-Unit Trucks	0	0	0	0	**0**	-	1	0	0	0	**1**	-	0	1	1	0	**2**	-	1	1	0	0	**2**	-	5
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	1.0%	0%	0%	0%	**0.5%**	-	0%	1.4%	0.8%	0%	**1.0%**	-	0.5%	1.2%	0%	0%	**0.7%**	-	0.7%
Articulated Trucks	0	1	0	0	**1**	-	1	0	0	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	2
% Articulated Trucks	0%	4.8%	0%	0%	**3.6%**	-	1.0%	0%	0%	0%	**0.5%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Buses	0	0	0	0	**0**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1
% Buses	0%	0%	0%	0%	**0%**	-	0%	0%	1.0%	0%	**0.5%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Bicycles on Road	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1
% Bicycles on Road	0%	4.8%	0%	0%	**3.6%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	7	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Cross & 2nd Street - TMC
Sat Jun 11, 2022
Midday Peak (WKND) (11 AM - 12 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959812, Location: 42.537546, -83.786685

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Cross & 2nd Street - TMC

Sat Jun 11, 2022
PM Peak (WKND) (1 PM - 2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959812, Location: 42.537546, -83.786685

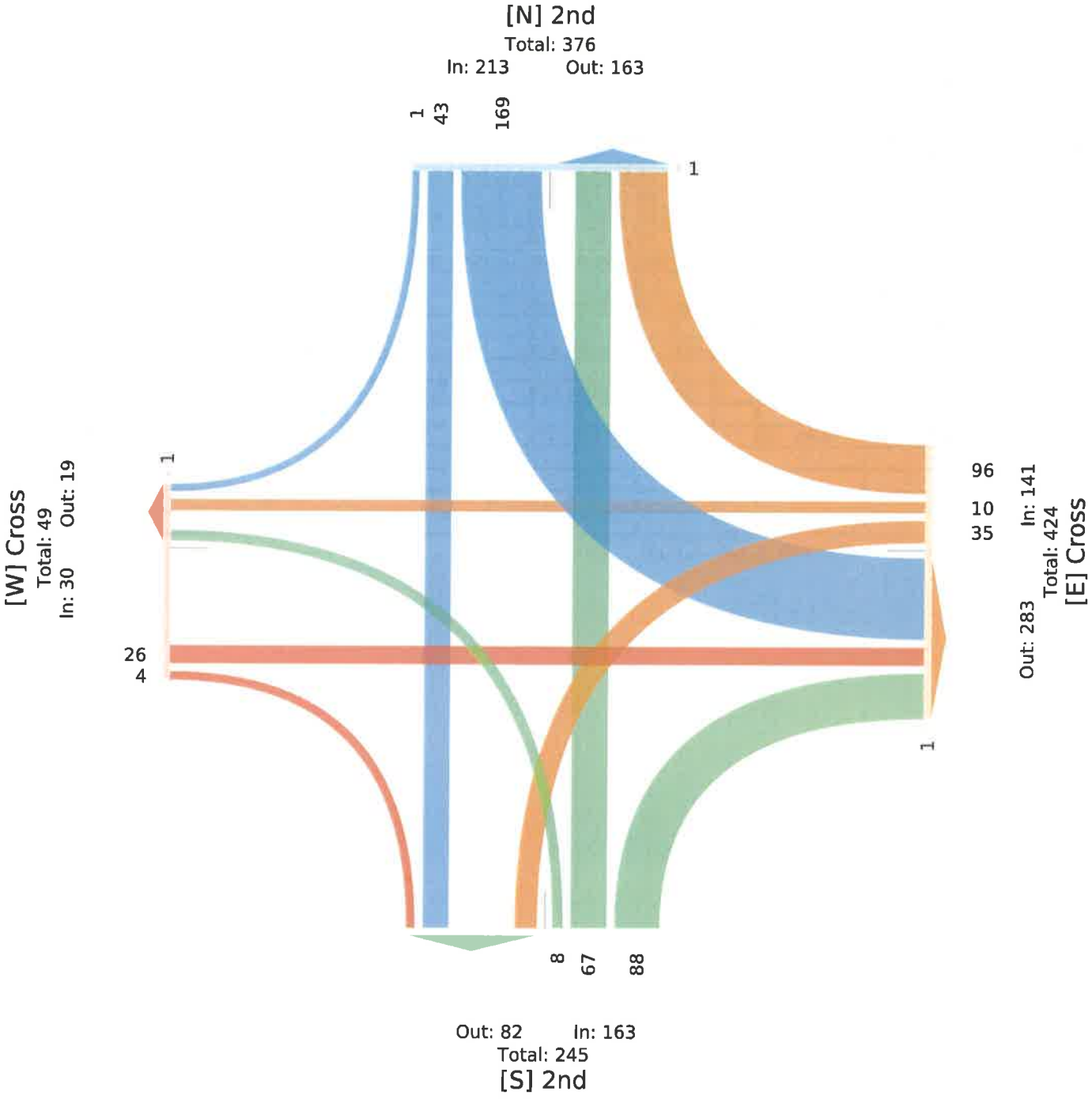
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Cross						Cross						2nd						2nd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-11 1:00PM	0	8	0	0	**8**	0	13	3	19	0	**35**	0	2	16	24	0	**42**	0	44	11	1	0	**56**	0	**141**
1:15PM	0	5	0	0	**5**	0	9	3	30	0	**42**	0	0	21	27	0	**48**	0	46	8	0	0	**54**	0	**149**
1:30PM	0	7	2	0	**9**	0	5	1	28	0	**34**	0	4	15	18	0	**37**	0	38	13	0	0	**51**	0	**131**
1:45PM	0	6	2	0	**8**	1	8	3	19	0	**30**	1	2	15	19	0	**36**	0	41	11	0	0	**52**	1	**126**
Total	0	26	4	0	**30**	1	35	10	96	0	**141**	1	8	67	88	0	**163**	0	169	43	1	0	**213**	1	**547**
% Approach	0%	86.7%	13.3%	0%	-	-	24.8%	7.1%	68.1%	0%	-	-	4.9%	41.1%	54.0%	0%	-	-	79.3%	20.2%	0.5%	0%	-	-	-
% Total	0%	4.8%	0.7%	0%	**5.5%**	-	6.4%	1.8%	17.6%	0%	**25.8%**	-	1.5%	12.2%	16.1%	0%	**29.8%**	-	30.9%	7.9%	0.2%	0%	**38.9%**	-	-
PHF	-	0.813	0.500	-	**0.833**	-	0.673	0.833	0.792	-	**0.833**	-	0.500	0.798	0.815	-	**0.849**	-	0.918	0.808	0.250	-	**0.946**	-	0.914
Lights	0	24	4	0	**28**	-	29	10	94	0	**133**	-	8	67	85	0	**160**	-	169	42	1	0	**212**	-	533
% Lights	0%	92.3%	100%	0%	**93.3%**	-	82.9%	100%	97.9%	0%	**94.3%**	-	100%	100%	96.6%	0%	**98.2%**	-	100%	97.7%	100%	0%	**99.5%**	-	97.4%
Single-Unit Trucks	0	0	0	0	**0**	-	3	0	0	0	**3**	-	0	0	2	0	**2**	-	0	0	0	0	**0**	-	5
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	8.6%	0%	0%	0%	**2.1%**	-	0%	0%	2.3%	0%	**1.2%**	-	0%	0%	0%	0%	**0%**	-	0.9%
Articulated Trucks	0	0	0	0	**0**	-	3	0	0	0	**3**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	3
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	8.6%	0%	0%	0%	**2.1%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.5%
Buses	0	2	0	0	**2**	-	0	0	1	0	**1**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	4
% Buses	0%	7.7%	0%	0%	**6.7%**	-	0%	0%	1.0%	0%	**0.7%**	-	0%	0%	1.1%	0%	**0.6%**	-	0%	0%	0%	0%	**0%**	-	0.7%
Bicycles on Road	0	0	0	0	**0**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	2
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	1.0%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	0%	2.3%	0%	0%	**0.5%**	-	0.4%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	100%	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Cross & 2nd Street - TMC
Sat Jun 11, 2022
PM Peak (WKND) (1 PM - 2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959812, Location: 42.537546, -83.786685

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Grand River & Cross Street - TMC

Sat Jun 11, 2022
Full Length (11 AM-2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959813, Location: 42.537739, -83.784781

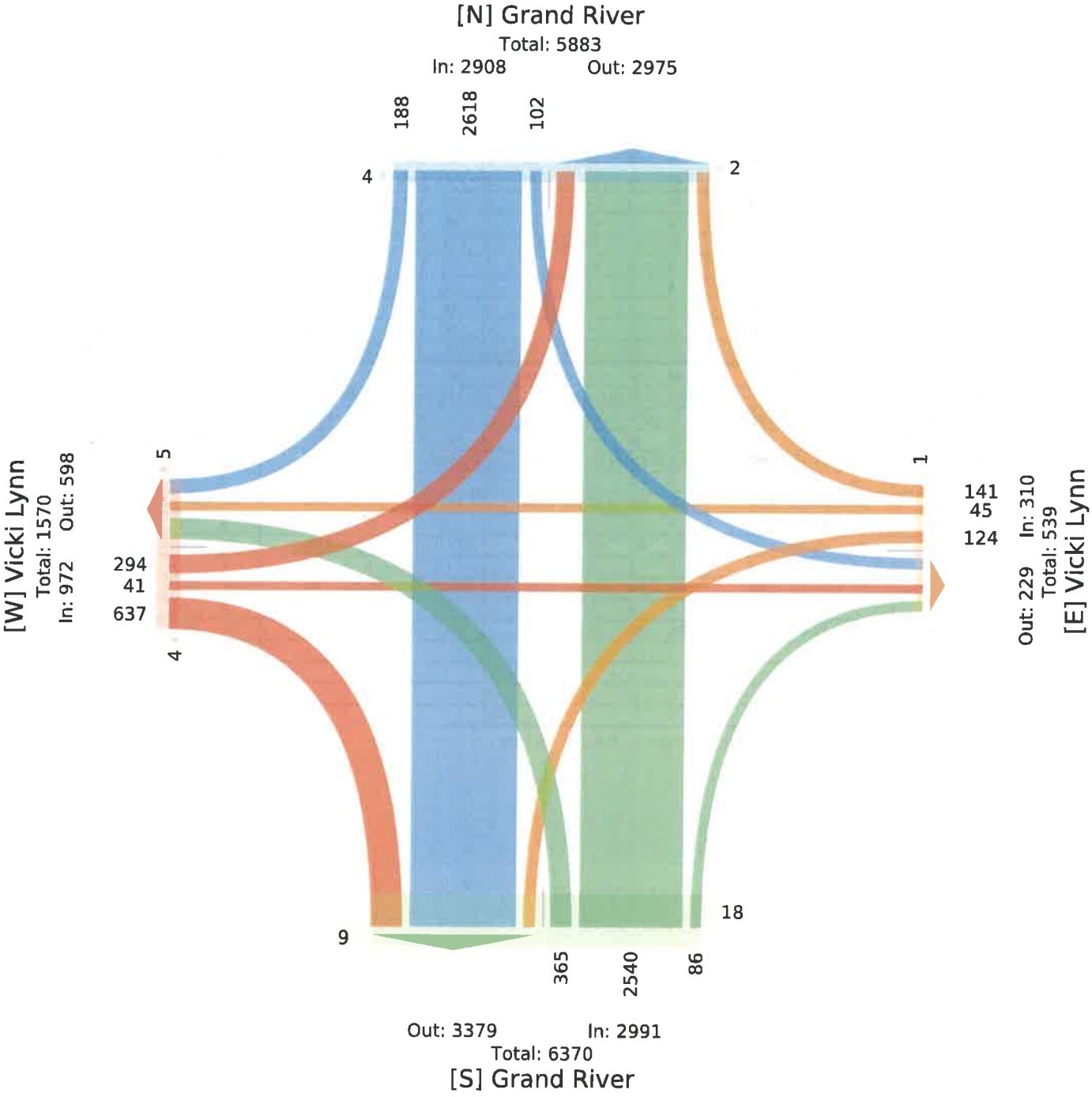
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Vicki Lynn						Vicki Lynn						Grand River						Grand River						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-11 11:00AM	20	4	48	0	**72**	0	10	3	7	0	**20**	0	36	213	2	0	**251**	3	6	219	28	0	**253**	0	**596**
11:15AM	29	5	71	0	**105**	1	7	5	14	0	**26**	1	29	191	6	0	**226**	0	2	228	17	0	**247**	2	**604**
11:30AM	20	4	59	0	**83**	0	10	4	9	0	**23**	0	46	218	7	0	**271**	6	8	213	25	0	**246**	1	**623**
11:45AM	26	4	59	0	**89**	0	10	6	12	0	**28**	0	33	219	9	0	**261**	1	12	220	15	0	**247**	1	**625**
Hourly Total	95	17	237	0	**349**	1	37	18	42	0	**97**	1	144	841	24	0	**1009**	10	28	880	85	0	**993**	4	**2448**
12:00PM	23	6	36	0	**65**	2	19	2	18	0	**39**	0	32	247	8	0	**287**	2	10	219	15	0	**244**	0	**635**
12:15PM	38	1	61	0	**100**	0	13	5	12	0	**30**	0	19	186	11	0	**216**	1	11	221	16	0	**248**	1	**594**
12:30PM	22	1	65	0	**88**	0	10	3	12	0	**25**	0	27	228	11	0	**266**	4	13	247	15	0	**275**	1	**654**
12:45PM	16	3	47	0	**66**	0	16	4	16	0	**36**	0	39	193	9	0	**241**	1	13	231	15	0	**259**	0	**602**
Hourly Total	99	11	209	0	**319**	2	58	14	58	0	**130**	0	117	854	39	0	**1010**	8	47	918	61	0	**1026**	2	**2485**
1:00PM	27	4	52	0	**83**	5	8	4	10	0	**22**	0	27	207	8	0	**242**	5	9	204	9	0	**222**	0	**569**
1:15PM	25	4	58	0	**87**	0	8	5	10	0	**23**	0	32	204	8	0	**244**	0	5	199	9	0	**213**	0	**567**
1:30PM	27	4	39	0	**70**	1	9	2	7	0	**18**	0	23	201	2	0	**226**	1	10	207	12	0	**229**	0	**543**
1:45PM	21	1	42	0	**64**	0	4	2	14	0	**20**	0	22	233	5	0	**260**	3	3	210	12	0	**225**	0	**569**
Hourly Total	100	13	191	0	**304**	6	29	13	41	0	**83**	0	104	845	23	0	**972**	9	27	820	42	0	**889**	0	**2248**
Total	294	41	637	0	**972**	9	124	45	141	0	**310**	1	365	2540	86	0	**2991**	27	102	2618	188	0	**2908**	6	**7181**
% Approach	30.2%	4.2%	65.5%	0%	-	-	40.0%	14.5%	45.5%	0%	-	-	12.2%	84.9%	2.9%	0%	-	-	3.5%	90.0%	6.5%	0%	-	-	-
% Total	4.1%	0.6%	8.9%	0%	**13.5%**	-	1.7%	0.6%	2.0%	0%	**4.3%**	-	5.1%	35.4%	1.2%	0%	**41.7%**	-	1.4%	36.5%	2.6%	0%	**40.5%**	-	-
Lights	291	41	629	0	**961**	-	124	44	140	0	**308**	-	360	2526	86	0	**2972**	-	101	2604	177	0	**2882**	-	7123
% Lights	99.0%	100%	98.7%	0%	**98.9%**	-	100%	97.8%	99.3%	0%	**99.4%**	-	98.6%	99.4%	100%	0%	**99.4%**	-	99.0%	99.5%	94.1%	0%	**99.1%**	-	99.2%
Single-Unit Trucks	0	0	5	0	**5**	-	0	0	1	0	**1**	-	3	12	0	0	**15**	-	0	10	5	0	**15**	-	36
% Single-Unit Trucks	0%	0%	0.8%	0%	**0.5%**	-	0%	0%	0.7%	0%	**0.3%**	-	0.8%	0.5%	0%	0%	**0.5%**	-	0%	0.4%	2.7%	0%	**0.5%**	-	0.5%
Articulated Trucks	1	0	0	0	**1**	-	0	0	0	0	**0**	-	1	2	0	0	**3**	-	0	3	4	0	**7**	-	11
% Articulated Trucks	0.3%	0%	0%	0%	**0.1%**	-	0%	0%	0%	0%	**0%**	-	0.3%	0.1%	0%	0%	**0.1%**	-	0%	0.1%	2.1%	0%	**0.2%**	-	0.2%
Buses	2	0	2	0	**4**	-	0	1	0	0	**1**	-	1	0	0	0	**1**	-	1	1	2	0	**4**	-	10
% Buses	0.7%	0%	0.3%	0%	**0.4%**	-	0%	2.2%	0%	0%	**0.3%**	-	0.3%	0%	0%	0%	**0%**	-	1.0%	0%	1.1%	0%	**0.1%**	-	0.1%
Bicycles on Road	0	0	1	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1
% Bicycles on Road	0%	0%	0.2%	0%	**0.1%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	9	-	-	-	-	-	1	-	-	-	-	-	25	-	-	-	-	-	6	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	92.6%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	7.4%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Grand River & Cross Street - TMC
Sat Jun 11, 2022
Full Length (11 AM-2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959813, Location: 42.537739, -83.784781

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Grand River & Cross Street - TMC

Sat Jun 11, 2022
Midday Peak (WKND) (11:45 AM - 12:45 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959813, Location: 42.537739, -83.784781

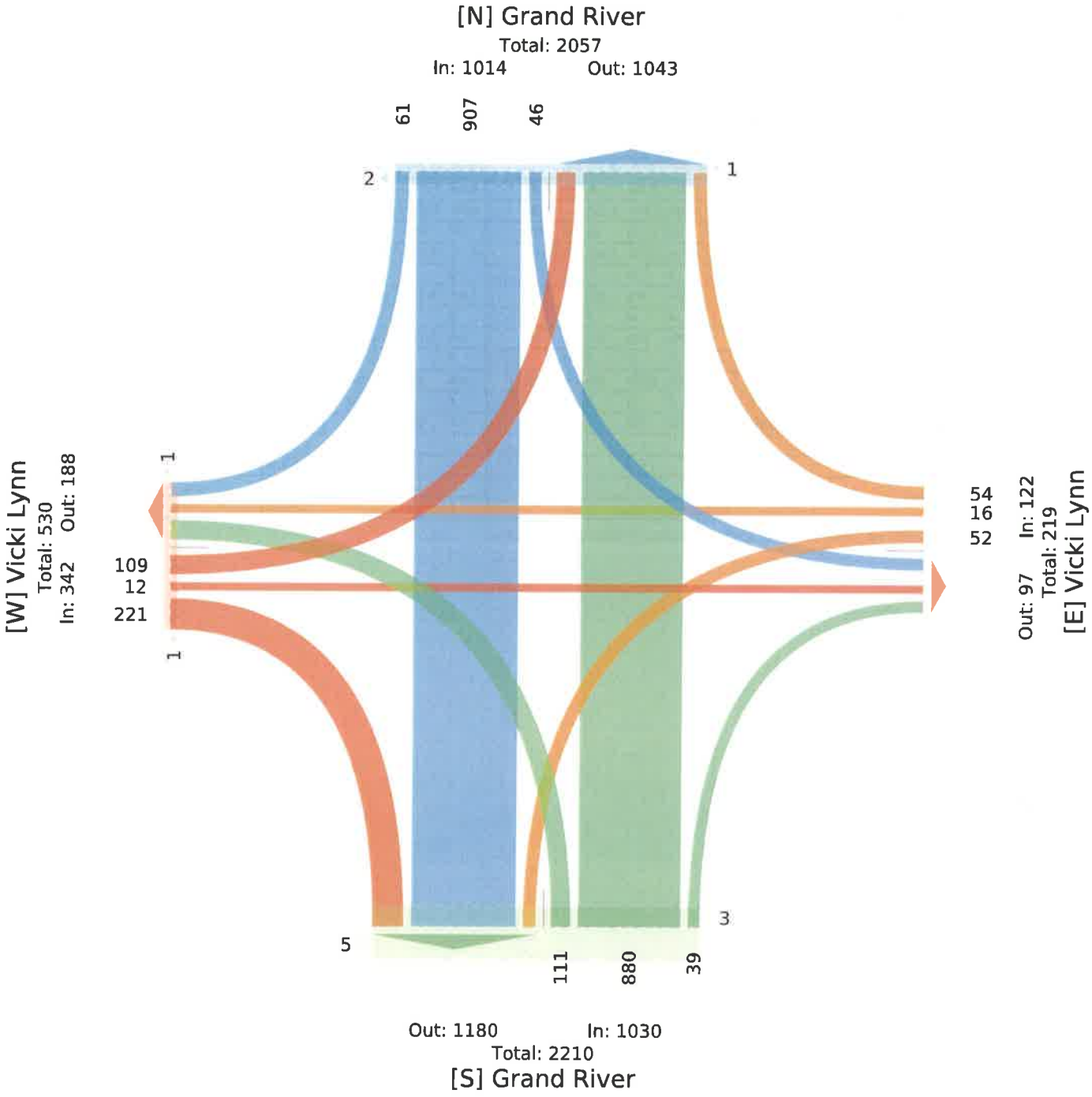
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Vicki Lynn						Vicki Lynn						Grand River						Grand River						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-11 11:45AM	26	4	59	0	**89**	0	10	6	12	0	**28**	0	33	219	9	0	**261**	1	12	220	15	0	**247**	1	**625**
12:00PM	23	6	36	0	**65**	2	19	2	18	0	**39**	0	32	247	8	0	**287**	2	10	219	15	0	**244**	0	**635**
12:15PM	38	1	61	0	**100**	0	13	5	12	0	**30**	0	19	186	11	0	**216**	1	11	221	16	0	**248**	1	**594**
12:30PM	22	1	65	0	**88**	0	10	3	12	0	**25**	0	27	228	11	0	**266**	4	13	247	15	0	**275**	1	**654**
Total	109	12	221	0	**342**	2	52	16	54	0	**122**	0	111	880	39	0	**1030**	8	46	907	61	0	**1014**	3	**2508**
% Approach	31.9%	3.5%	64.6%	0%	-	-	42.6%	13.1%	44.3%	0%	-	-	10.8%	85.4%	3.8%	0%	-	-	4.5%	89.4%	6.0%	0%	-	-	-
% Total	4.3%	0.5%	8.8%	0%	**13.6%**	-	2.1%	0.6%	2.2%	0%	**4.9%**	-	4.4%	35.1%	1.6%	0%	**41.1%**	-	1.8%	36.2%	2.4%	0%	**40.4%**	-	-
PHF	0.717	0.500	0.859	-	**0.853**	-	0.684	0.667	0.750	-	**0.782**	-	0.841	0.891	0.886	-	**0.897**	-	0.885	0.918	0.953	-	**0.922**	-	0.960
Lights	109	12	218	0	**339**	-	52	15	54	0	**121**	-	109	876	39	0	**1024**	-	45	901	59	0	**1005**	-	2489
% Lights	100%	100%	98.6%	0%	**99.1%**	-	100%	93.8%	100%	0%	**99.2%**	-	98.2%	99.5%	100%	0%	**99.4%**	-	97.8%	99.3%	96.7%	0%	**99.1%**	-	99.2%
Single-Unit Trucks	0	0	1	0	**1**	-	0	0	0	0	**0**	-	2	3	0	0	**5**	-	0	5	0	0	**5**	-	11
% Single-Unit Trucks	0%	0%	0.5%	0%	**0.3%**	-	0%	0%	0%	0%	**0%**	-	1.8%	0.3%	0%	0%	**0.5%**	-	0%	0.6%	0%	0%	**0.5%**	-	0.4%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	1	1	0	**2**	-	3
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.1%	0%	0%	**0.1%**	-	0%	0.1%	1.6%	0%	**0.2%**	-	0.1%
Buses	0	0	1	0	**1**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	1	0	1	0	**2**	-	4
% Buses	0%	0%	0.5%	0%	**0.3%**	-	0%	6.3%	0%	0%	**0.8%**	-	0%	0%	0%	0%	**0%**	-	2.2%	0%	1.6%	0%	**0.2%**	-	0.2%
Bicycles on Road	0	0	1	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1
% Bicycles on Road	0%	0%	0.5%	0%	**0.3%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	3	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	75.0%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	25.0%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Grand River & Cross Street - TMC
Sat Jun 11, 2022
Midday Peak (WKND) (11:45 AM - 12:45 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959813, Location: 42.537739, -83.784781

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Grand River & Cross Street - TMC

Sat Jun 11, 2022
PM Peak (WKND) (1 PM - 2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959813, Location: 42.537739, -83.784781

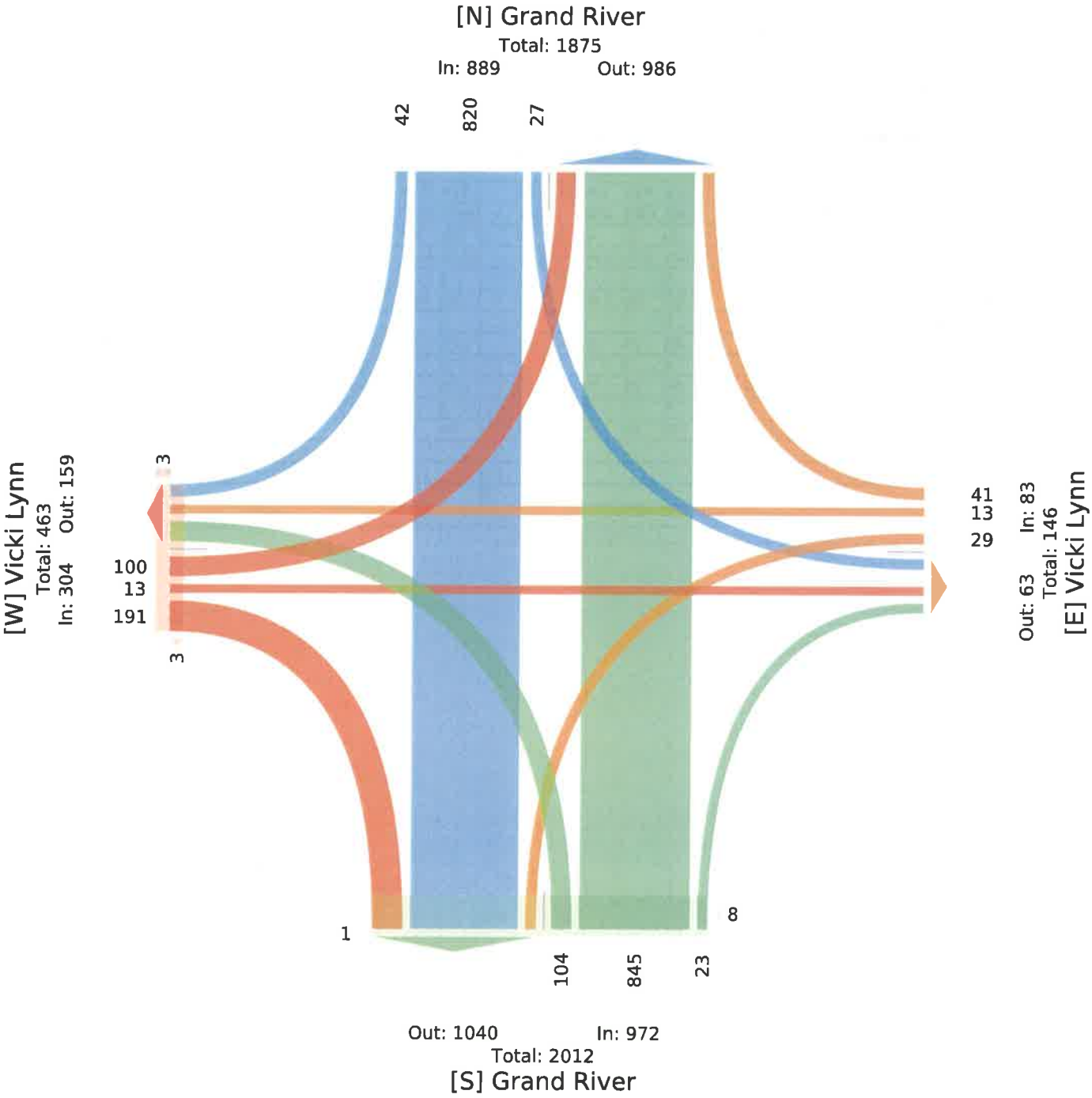
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Vicki Lynn						Vicki Lynn						Grand River						Grand River						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-06-11 1:00PM	27	4	52	0	**83**	5	8	4	10	0	**22**	0	27	207	8	0	**242**	5	9	204	9	0	**222**	0	**569**
1:15PM	25	4	58	0	**87**	0	8	5	10	0	**23**	0	32	204	8	0	**244**	0	5	199	9	0	**213**	0	**567**
1:30PM	27	4	39	0	**70**	1	9	2	7	0	**18**	0	23	201	2	0	**226**	1	10	207	12	0	**229**	0	**543**
1:45PM	21	1	42	0	**64**	0	4	2	14	0	**20**	0	22	233	5	0	**260**	3	3	210	12	0	**225**	0	**569**
Total	100	13	191	0	**304**	6	29	13	41	0	**83**	0	104	845	23	0	**972**	9	27	820	42	0	**889**	0	**2248**
% Approach	32.9%	4.3%	62.8%	0%	-	-	34.9%	15.7%	49.4%	0%	-	-	10.7%	86.9%	2.4%	0%	-	-	3.0%	92.2%	4.7%	0%	-	-	-
% Total	4.4%	0.6%	8.5%	0%	**13.5%**	-	1.3%	0.6%	1.8%	0%	**3.7%**	-	4.6%	37.6%	1.0%	0%	**43.2%**	-	1.2%	36.5%	1.9%	0%	**39.5%**	-	-
PHF	0.926	0.813	0.823	-	**0.874**	-	0.806	0.650	0.732	-	**0.902**	-	0.813	0.907	0.719	-	**0.935**	-	0.675	0.976	0.875	-	**0.971**	-	0.988
Lights	98	13	188	0	**299**	-	29	13	40	0	**82**	-	101	840	23	0	**964**	-	27	815	37	0	**879**	-	2224
% Lights	98.0%	100%	98.4%	0%	**98.4%**	-	100%	100%	97.6%	0%	**98.8%**	-	97.1%	99.4%	100%	0%	**99.2%**	-	100%	99.4%	88.1%	0%	**98.9%**	-	98.9%
Single-Unit Trucks	0	0	2	0	**2**	-	0	0	1	0	**1**	-	1	5	0	0	**6**	-	0	4	3	0	**7**	-	16
% Single-Unit Trucks	0%	0%	1.0%	0%	**0.7%**	-	0%	0%	2.4%	0%	**1.2%**	-	1.0%	0.6%	0%	0%	**0.6%**	-	0%	0.5%	7.1%	0%	**0.8%**	-	0.7%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	0	0	2	0	**2**	-	3
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	1.0%	0%	0%	0%	**0.1%**	-	0%	0%	4.8%	0%	**0.2%**	-	0.1%
Buses	2	0	1	0	**3**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	0	1	0	0	**1**	-	5
% Buses	2.0%	0%	0.5%	0%	**1.0%**	-	0%	0%	0%	0%	**0%**	-	1.0%	0%	0%	0%	**0.1%**	-	0%	0.1%	0%	0%	**0.1%**	-	0.2%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	9	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Grand River & Cross Street - TMC
Sat Jun 11, 2022
PM Peak (WKND) (1 PM - 2 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 959813, Location: 42.537739, -83.784781

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



MDOT 1500B (06/07)

TRAFFIC SIGNAL TIMING PERMIT

	PHASE	1	2	3	4	5	6	7	8				
APPROACH		NBLT	SB		EB WB	SBLT	NB						
MINIMUM GREEN		5	10		5	5	10						
PASSAGE		3.5	3.0		3.0	3.0	3.0						
MAXIMUM NO. 1		18	56		22	15	56						
MAXIMUM NO. 2													
YELLOW CHANGE		3.6	3.6		3.6	3.6	4.0						
RED CLEARANCE		1.9	1.9		1.9	1.9	1.9						
WALK			5		5		5						
PEDESTRIAN CLEARANCE			11		11		11						
EXTENDED PED. CLEARANCE			1		1		1						
REST IN WALK													
INITIALIZATION		1	4		1	1	4						
NON-ACT RESPONSE													
VEHICLE RECALL			3				3						
PEDESTRIAN RECALL													
NON-LOCK MEMORY													
DUAL ENTRY													
	CYCLE									O1	O2	O3	
DIAL 1 SPLIT 1		80	21	30		29	17	34			20		
DIAL 1 SPLIT 2		80	14	45		21	13	45			28		
DIAL 1 SPLIT 3		90	12	57		21	12	57			4		
DIAL 1 SPLIT 4		90	18	50		22	15	53			9		
DIAL SPLIT													
DIAL SPLIT													
	MODE		1				1						

PHASE

1 NBLT

2 SB

3

4 EB WB

5 SBLT

6 NB

7

8

OVERLAPS

Overlap Phase	Load Bays	Phases Overlapped	T.G. (s)	Y (s)	R (s)	-G/Y	+GRN
=							
=							
=							
=							

TIMING INSTALLED

REMARKS

SAT AND SUN 1/1/1

MON-FRI
1/2/1 6:30 AM - 10:30 PM
1/3/1 10:30 AM - 2:30 PM
1/4/1 2:30 PM - 6:00 PM
1/1/1 6:00 PM - 11:00 PM

PREPARED BY: DATE:

FLASH HOURS:

11 PM to 6:30 AM DAILY ☒ NONE ☐

NIGHT FLASH:

FY = NB SB FR = EB WB

CONFLICT FLASH:

FY = FR =

CONTROLLER TYPE:

☒ EPAC
☐ Other:

PRE-EMPT ☐

COUNTDOWN PEDS ☐

LOCATION:

GRAND RIVER AND CROSS

CITY/TWP: BRIGHTON

COUNTY : LIVINGSTON

MILE POINT	CONTROL SECTION-SPOT #

Job # (If Applicable):

Page 3 included only if Pre-Empt Checked

MDOT 1500B (06/07)

ADVANCED TIMING PARAMETERS FORM

SYSTEM INFORMATION

Controller Type:
☒ EPAC
☐ Other:

System Type:
☐ Closed Loop
  ☐ Stand By
  ☐ Group 1
  ☐ Group 2
  Address:
☐ TBC
☐ None
☐ Other:

If TBC, Synch by:
☐ TOD
☐ Event

Interconnect Type:
☐ Hardwire
☐ Fiber-Optic
☐ Radio
☐ Phone Drop
☐ None
☐ Other:

If Phone Drop,
Phone #

Controller Status:
☐ Master
☐ Slave
☐ Isolated
☐ TBC

If Slave,
Master Location:

Master
Spot #

LEFT-TURN PHASING

Phase # / Description	*Permissive-Protected*		*Protected-Only*		
	Lead	Lag	Split	Lead	Lag
1 NBLT	☐	☐	☐	☒	☐
5 SBLT	☐	☐	☐	☐	☒
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

RING AND BARRIER STRUCTURE

	B1				B2				B3				B4			
R1			1	2	4											
R2			6	5	8											
R3																
R4																

VEHICULAR AND PEDESTRIAN DETECTION

Approach	*Vehicular Detection*						*Pedestrian Detection*
	Movements and Call Delay (s)			Type			Push-Button Crossing Locations
	Left	Thru	Right	Loop	Video	Other	
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	

DISAPPEARING LEGEND CASE SIGNS

ADDITIONAL DIAL SPLIT DATA

		PHASE	1	2	3	4	5	6	7	8	O1	O2	O3
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											
DIAL	SPLIT	CYCLE											

COORDINATION DATA

Operation Mode	
Coordination Mode	
Maximum Mode	
Correction Mode	
Offset Mode	
Force Mode	
Max Dwell	
Yield Period	

REMARKS:

ADDITIONAL OVERLAP DATA

Overlap Phase	*Load Bays*	*Phases Overlapped*	T.G. (s)	Y (s)	R (s)	-G/Y	+GRN
=							
=							
=							
=							

PREPARED BY: DATE:

☐ MDOT ☐ County ☐ City ☐ Consultant

LOCATION:
GRAND RIVER AND CROSS

CONTROL SECTION-SPOT #

CLEAR PAGE 2

MDOT 1500B (06/07)

PREEMPTION INFORMATION FORM

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green			Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl		Overlap Vehicle	Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green			Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl		Overlap Vehicle	Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green			Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl		Overlap Vehicle	Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preemption Description:

Preempt # =	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
SEL Ped Cl		Vehicle	Track																	☐ Locking	
SEL Yellow			Dwell																		
SEL Red Cl			Cycle																	☐ Non-Locking	
TRACK Green			Exit																		
TRACK Ped Cl		Ped	Track																	Delay (s)	
TRACK Yellow			Dwell																	Extend (s)	
TRACK Red CL			Cycle																	Duration (s)	
DWELL Green			Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Max Call (s)	
RET Ped Cl		Overlap Vehicle	Track																	Lockout (s)	
RET Yellow			Dwell																	Link PE #	
RET Red Cl			Cycle																		

Preempt System Data

Ring	1	2	3	4		
MIN GRN/WLK (s)						
Priority	PE/FL	PE1/2	PE2/3	PE3/4	PE4/5	PE5/6
Status						

REMARKS:

PREPARED BY: DATE:

LOCATION:

GRAND RIVER AND CROSS

CONTROL SECTION-SPOT #

CLEAR PAGE 3

Level of Service Criteria for Stop Sign Controlled Intersections

The level of service criteria are given in Exhibit 20-2. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

The average total delay for any particular controlled movement is a function three (capacity) factors: distribution of gaps in the major-street traffic stream, driver judgment in selecting gaps through which to execute the desired maneuvers, and the follow-up headways required by each driver in a queue.

The basic capacity model assumes gaps in the conflicting movements are randomly distributed. When traffic signals are present on the major street, upstream of the subject intersection, flows may not be random but will likely have some platoon structure. Although the procedures in this chapter provide a method for approximating the operations of a TWSC intersection with an upstream signal, the operations of such an intersection is arguably best handled by including it in a complete simulation

Exhibit 20-2. Level of Service Criteria for Stop-Controlled Intersections (Motor Vehciles)

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (sec/veh)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Average total delay less than 10 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions. A total delay of 50 sec/veh is assumed as the break point between LOS E and F.

The LOS criteria for TWSC intersections differ somewhat from the criteria used in Chapter 19 for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection.

LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queueing on the minor approaches. The method, however, is based on a constant critical gap size - that is, the critical gap remains constant, no matter how long the side street motorist waits. LOS F may also appear in the form of side street vehicles' selecting smaller-than-usual gaps. In such cases, safety may be a problem and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior. The latter is more difficult to observe on the field than queueing, which is more obvious.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council

Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle. The criteria are given in Exhibit 19-8. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

LOS A describes operations with a control delay of 10 s/veh or less. This level is typically assigned when the volume-to-capacity ratio is low and either progression is extremely favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during a green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

Exhibit 19.8. Level-of-Service Criteria for Signalized Intersections (Motorized Vehicles)

LEVEL OF SERVICE	STOPPED DELAY PER VEHICLE (SEC)
A	≤10.0
B	> 10.0 and ≤20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	>80.0

1. If the v/c ratio for a lane group exceeds 1.0, a LOS F is assigned to the individual lane group. LOS for approach-based and intersection-wide assessments are determined solely by the control delay.

LOS C describes operations with control delay between 20 and 35 s/veh. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e. one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number if vehicle stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh. This level is typically assigned when when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80 s/veh. This level is typically assigned when when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level, considered to be unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of the intersection. This level is typically assigned when the volume-to-capacity ratio is high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	123	13	248	34	13	37	133	860	36	34	966	70
Future Volume (veh/h)	123	13	248	34	13	37	133	860	36	34	966	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	166	18	226	39	15	43	145	935	39	38	1085	79
Peak Hour Factor	0.74	0.74	0.74	0.87	0.87	0.87	0.92	0.92	0.92	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	273	283	239	242	283	239	180	1874	831	249	2029	900
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.10	0.52	0.52	0.14	0.57	0.57
Sat Flow, veh/h	1348	1885	1588	1140	1885	1588	1795	3582	1588	1795	3582	1589
Grp Volume(v), veh/h	166	18	226	39	15	43	145	935	39	38	1085	79
Grp Sat Flow(s),veh/h/ln	1348	1885	1588	1140	1885	1588	1795	1791	1588	1795	1791	1589
Q Serve(g_s), s	10.8	0.7	12.7	2.7	0.6	2.1	7.1	15.2	1.1	1.7	17.0	2.0
Cycle Q Clear(g_c), s	11.4	0.7	12.7	3.5	0.6	2.1	7.1	15.2	1.1	1.7	17.0	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	273	283	239	242	283	239	180	1874	831	249	2029	900
V/C Ratio(X)	0.61	0.06	0.95	0.16	0.05	0.18	0.81	0.50	0.05	0.15	0.53	0.09
Avail Cap(c_a), veh/h	318	346	291	280	346	291	249	1874	831	249	2029	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.7	32.8	37.9	34.3	32.8	33.4	39.6	13.8	10.5	34.1	12.1	8.9
Incr Delay (d2), s/veh	2.5	0.1	35.4	0.3	0.1	0.4	13.8	1.0	0.1	0.3	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.3	7.2	0.8	0.3	0.8	3.7	5.8	0.4	0.7	6.3	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	32.9	73.3	34.6	32.8	33.8	53.4	14.8	10.6	34.4	13.2	9.1
LnGrp LOS	D	C	E	C	C	C	D	B	B	C	B	A
Approach Vol, veh/h		410			97			1119			1202	
Approach Delay, s/veh		58.1			34.0			19.6			13.6	
Approach LOS		E			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.5	56.5		19.0	18.0	53.0		19.0				
Change Period (Y+Rc), s	* 5.5	* 5.5		* 5.5	* 5.5	* 5.9		* 5.5				
Max Green Setting (Gmax), s	* 13	* 45		* 17	* 9.5	* 47		* 17				
Max Q Clear Time (g_c+I1), s	9.1	19.0		13.4	3.7	17.2		5.5				
Green Ext Time (p_c), s	0.1	4.2		0.1	0.0	3.7		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	23.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	14.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	38	10	87	8	121	11	79	156	190	89	3
Future Vol, veh/h	1	38	10	87	8	121	11	79	156	190	89	3
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.77	0.77	0.77	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	6	6	6	2	2	2	0	0	0
Mvmt Flow	1	52	14	95	9	132	14	103	203	253	119	4
Number of Lanes	0	2	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	10.1	11.1	13	19.1
HCM LOS	B	B	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	5%	0%	100%	0%	67%
Vol Thru, %	0%	34%	95%	66%	0%	6%	32%
Vol Right, %	0%	66%	0%	34%	0%	94%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	235	20	29	87	129	282
LT Vol	11	0	1	0	87	0	190
Through Vol	0	79	19	19	0	8	89
RT Vol	0	156	0	10	0	121	3
Lane Flow Rate	14	305	27	40	95	140	376
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.026	0.472	0.054	0.075	0.19	0.235	0.633
Departure Headway (Hd)	6.54	5.562	7.033	6.76	7.223	6.043	6.064
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	546	647	507	527	496	592	594
Service Time	4.291	3.313	4.81	4.537	4.985	3.805	4.112
HCM Lane V/C Ratio	0.026	0.471	0.053	0.076	0.192	0.236	0.633
HCM Control Delay	9.5	13.2	10.2	10.1	11.7	10.7	19.1
HCM Lane LOS	A	B	B	B	B	B	C
HCM 95th-tile Q	0.1	2.5	0.2	0.2	0.7	0.9	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	12	221	52	17	54	121	880	39	46	907	67
Future Volume (veh/h)	109	12	221	52	17	54	121	880	39	46	907	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	128	14	165	67	22	69	134	978	43	50	986	73
Peak Hour Factor	0.85	0.85	0.85	0.78	0.78	0.78	0.90	0.90	0.90	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	249	251	209	241	251	209	172	1258	560	547	2024	901
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.35	0.35	0.30	0.57	0.57
Sat Flow, veh/h	1296	1885	1569	1198	1885	1569	1795	3582	1593	1795	3582	1595
Grp Volume(v), veh/h	128	14	165	67	22	69	134	978	43	50	986	73
Grp Sat Flow(s),veh/h/ln	1296	1885	1569	1198	1885	1569	1795	1791	1593	1795	1791	1595
Q Serve(g_s), s	7.7	0.5	8.2	4.1	0.8	3.2	5.8	19.5	1.4	1.6	13.2	1.7
Cycle Q Clear(g_c), s	8.5	0.5	8.2	4.7	0.8	3.2	5.8	19.5	1.4	1.6	13.2	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	249	251	209	241	251	209	172	1258	560	547	2024	901
V/C Ratio(X)	0.51	0.06	0.79	0.28	0.09	0.33	0.78	0.78	0.08	0.09	0.49	0.08
Avail Cap(c_a), veh/h	457	554	461	434	554	461	348	1258	560	547	2024	901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.2	30.3	33.6	32.3	30.4	31.5	35.3	23.2	17.3	19.9	10.4	7.9
Incr Delay (d2), s/veh	1.6	0.1	6.6	0.6	0.1	0.9	8.8	4.8	0.3	0.1	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.2	3.4	1.2	0.4	1.2	2.9	8.4	0.5	0.6	4.7	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	30.4	40.2	33.0	30.6	32.4	44.2	27.9	17.6	20.0	11.3	8.1
LnGrp LOS	D	C	D	C	C	C	D	C	B	B	B	A
Approach Vol, veh/h		307			158			1155			1109	
Approach Delay, s/veh		37.9			32.4			29.4			11.5	
Approach LOS		D			C			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.2	50.7		16.1	29.9	34.0		16.1				
Change Period (Y+Rc), s	* 5.5	* 5.5		* 5.5	* 5.5	* 5.9		* 5.5				
Max Green Setting (Gmax), s	* 16	* 25		* 24	* 12	* 28		* 24				
Max Q Clear Time (g_c+I1), s	7.8	15.2		10.5	3.6	21.5		6.7				
Green Ext Time (p_c), s	0.2	2.7		0.1	0.0	2.3		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	22	6	99	8	98	11	70	127	193	84	4
Future Vol, veh/h	1	22	6	99	8	98	11	70	127	193	84	4
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.91	0.91	0.91	0.82	0.82	0.82
Heavy Vehicles, %	4	4	4	2	2	2	1	1	1	1	1	1
Mvmt Flow	1	29	8	124	10	123	12	77	140	235	102	5
Number of Lanes	0	2	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	9.5	10.6	10.6	16
HCM LOS	A	B	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	8%	0%	100%	0%	69%
Vol Thru, %	0%	36%	92%	65%	0%	8%	30%
Vol Right, %	0%	64%	0%	35%	0%	92%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	197	12	17	99	106	281
LT Vol	11	0	1	0	99	0	193
Through Vol	0	70	11	11	0	8	84
RT Vol	0	127	0	6	0	98	4
Lane Flow Rate	12	216	16	23	124	132	343
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.021	0.325	0.03	0.04	0.231	0.205	0.557
Departure Headway (Hd)	6.372	5.41	6.703	6.408	6.727	5.562	5.848
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	562	665	534	558	535	645	617
Service Time	4.103	3.14	4.448	4.153	4.46	3.295	3.874
HCM Lane V/C Ratio	0.021	0.325	0.03	0.041	0.232	0.205	0.556
HCM Control Delay	9.2	10.7	9.7	9.4	11.5	9.7	16
HCM Lane LOS	A	B	A	A	B	A	C
HCM 95th-tile Q	0.1	1.4	0.1	0.1	0.9	0.8	3.4

Intersection: 1: Grand River Avenue & Cross Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	192	182	58	71	39	58	199	208	210	57	79	246
Average Queue (ft)	83	71	49	25	8	21	93	78	94	9	29	130
95th Queue (ft)	150	148	56	59	32	49	165	165	184	38	64	209
Link Distance (ft)	435	435		356	356			3025	3025			305
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			25			25	500			35	500	
Storage Blk Time (%)		7	44		8	7			18	0		
Queuing Penalty (veh)		18	6		3	1			7	1		

Intersection: 1: Grand River Avenue & Cross Street

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	220	44
Average Queue (ft)	117	21
95th Queue (ft)	200	49
Link Distance (ft)	305	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		15
Storage Blk Time (%)	29	3
Queuing Penalty (veh)	20	15

Intersection: 2: 2nd Street & Cross Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	32	43	78	91	31	108	97
Average Queue (ft)	10	20	41	49	10	58	49
95th Queue (ft)	33	46	72	80	34	92	77
Link Distance (ft)	535			435		1635	113
Upstream Blk Time (%)							0
Queuing Penalty (veh)							0
Storage Bay Dist (ft)		125	175		500		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 70

Intersection: 1: Grand River Avenue & Cross Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	158	158	59	107	77	68	144	301	304	60	82	226
Average Queue (ft)	68	57	48	40	14	28	70	106	124	14	31	122
95th Queue (ft)	124	121	57	80	45	57	126	225	247	48	69	202
Link Distance (ft)	435	435		356	356			3025	3025			305
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			25			25	500			35	500	
Storage Blk Time (%)		7	38		11	12		0	25	0		0
Queuing Penalty (veh)		15	5		6	2		0	10	1		0

Intersection: 1: Grand River Avenue & Cross Street

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	228	47
Average Queue (ft)	114	20
95th Queue (ft)	206	48
Link Distance (ft)	305	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		15
Storage Blk Time (%)	31	2
Queuing Penalty (veh)	21	11

Intersection: 2: 2nd Street & Cross Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	33	52	95	79	31	103	98
Average Queue (ft)	6	15	40	40	10	52	52
95th Queue (ft)	25	42	73	67	33	81	83
Link Distance (ft)	535			435		1635	113
Upstream Blk Time (%)							0
Queuing Penalty (veh)							0
Storage Bay Dist (ft)		125	175		500		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 71

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	14	266	34	13	37	159	869	36	34	976	94
Future Volume (veh/h)	138	14	266	34	13	37	159	869	36	34	976	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	186	19	250	39	15	43	173	945	39	38	1097	106
Peak Hour Factor	0.74	0.74	0.74	0.87	0.87	0.87	0.92	0.92	0.92	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	293	310	261	254	310	261	209	1874	831	224	1920	852
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.12	0.52	0.52	0.12	0.54	0.54
Sat Flow, veh/h	1349	1885	1589	1115	1885	1589	1795	3582	1588	1795	3582	1589
Grp Volume(v), veh/h	186	19	250	39	15	43	173	945	39	38	1097	106
Grp Sat Flow(s),veh/h/ln	1349	1885	1589	1115	1885	1589	1795	1791	1588	1795	1791	1589
Q Serve(g_s), s	12.1	0.8	14.0	2.8	0.6	2.1	8.5	15.4	1.1	1.7	18.4	3.0
Cycle Q Clear(g_c), s	12.7	0.8	14.0	3.5	0.6	2.1	8.5	15.4	1.1	1.7	18.4	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	293	310	261	254	310	261	209	1874	831	224	1920	852
V/C Ratio(X)	0.64	0.06	0.96	0.15	0.05	0.16	0.83	0.50	0.05	0.17	0.57	0.12
Avail Cap(c_a), veh/h	318	346	291	275	346	291	249	1874	831	224	1920	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.0	31.7	37.3	33.2	31.7	32.3	38.9	13.9	10.5	35.2	14.0	10.4
Incr Delay (d2), s/veh	3.7	0.1	39.4	0.3	0.1	0.3	18.5	1.0	0.1	0.4	1.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.4	8.3	0.8	0.3	0.8	4.7	5.9	0.4	0.8	7.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	31.8	76.7	33.5	31.7	32.6	57.4	14.9	10.6	35.6	15.2	10.7
LnGrp LOS	D	C	E	C	C	C	E	B	B	D	B	B
Approach Vol, veh/h		455			97			1157			1241	
Approach Delay, s/veh		60.1			32.8			21.1			15.4	
Approach LOS		E			C			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.0	53.8		20.3	16.7	53.0		20.3				
Change Period (Y+Rc), s	* 5.5	* 5.5		* 5.5	* 5.5	* 5.9		* 5.5				
Max Green Setting (Gmax), s	* 13	* 45		* 17	* 9.5	* 47		* 17				
Max Q Clear Time (g_c+I1), s	10.5	20.4		14.7	3.7	17.4		5.5				
Green Ext Time (p_c), s	0.1	4.2		0.1	0.0	3.7		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	38	10	136	8	122	11	80	188	192	90	3
Future Vol, veh/h	1	38	10	136	8	122	11	80	188	192	90	3
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.77	0.77	0.77	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	6	6	6	2	2	2	0	0	0
Mvmt Flow	1	52	14	148	9	133	14	104	244	256	120	4
Number of Lanes	0	2	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	10.5	12.3	15.6	21.6
HCM LOS	B	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	5%	0%	100%	0%	67%
Vol Thru, %	0%	30%	95%	66%	0%	6%	32%
Vol Right, %	0%	70%	0%	34%	0%	94%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	268	20	29	136	130	285
LT Vol	11	0	1	0	136	0	192
Through Vol	0	80	19	19	0	8	90
RT Vol	0	188	0	10	0	122	3
Lane Flow Rate	14	348	27	40	148	141	380
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.027	0.56	0.057	0.08	0.305	0.245	0.671
Departure Headway (Hd)	6.802	5.795	7.495	7.221	7.42	6.237	6.358
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	524	620	481	499	482	572	566
Service Time	4.579	3.571	5.195	4.921	5.205	4.021	4.432
HCM Lane V/C Ratio	0.027	0.561	0.056	0.08	0.307	0.247	0.671
HCM Control Delay	9.8	15.8	10.6	10.5	13.5	11.1	21.6
HCM Lane LOS	A	C	B	B	B	B	C
HCM 95th-tile Q	0.1	3.5	0.2	0.3	1.3	1	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	12	243	53	17	55	143	889	39	46	916	86
Future Volume (veh/h)	127	12	243	53	17	55	143	889	39	46	916	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	149	14	191	68	22	71	159	988	43	50	996	93
Peak Hour Factor	0.85	0.85	0.85	0.78	0.78	0.78	0.90	0.90	0.90	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	270	281	234	257	281	234	200	1258	560	518	1911	851
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.11	0.35	0.35	0.29	0.53	0.53
Sat Flow, veh/h	1295	1885	1572	1172	1885	1572	1795	3582	1593	1795	3582	1595
Grp Volume(v), veh/h	149	14	191	68	22	71	159	988	43	50	996	93
Grp Sat Flow(s),veh/h/ln	1295	1885	1572	1172	1885	1572	1795	1791	1593	1795	1791	1595
Q Serve(g_s), s	9.0	0.5	9.4	4.2	0.8	3.2	6.9	19.8	1.4	1.6	14.4	2.3
Cycle Q Clear(g_c), s	9.8	0.5	9.4	4.7	0.8	3.2	6.9	19.8	1.4	1.6	14.4	2.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	270	281	234	257	281	234	200	1258	560	518	1911	851
V/C Ratio(X)	0.55	0.05	0.82	0.26	0.08	0.30	0.79	0.79	0.08	0.10	0.52	0.11
Avail Cap(c_a), veh/h	458	554	462	427	554	462	348	1258	560	518	1911	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	29.2	33.0	31.2	29.3	30.4	34.7	23.2	17.3	20.8	12.1	9.2
Incr Delay (d2), s/veh	1.8	0.1	6.8	0.5	0.1	0.7	8.3	5.0	0.3	0.1	1.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.2	4.0	1.2	0.4	1.3	3.4	8.6	0.5	0.7	5.3	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	29.3	39.8	31.8	29.4	31.1	43.0	28.2	17.6	20.9	13.1	9.5
LnGrp LOS	D	C	D	C	C	C	D	C	B	C	B	A
Approach Vol, veh/h		354			161			1190			1139	
Approach Delay, s/veh		37.5			31.1			29.8			13.1	
Approach LOS		D			C			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.4	48.2		17.4	28.6	34.0		17.4				
Change Period (Y+Rc), s	* 5.5	* 5.5		* 5.5	* 5.5	* 5.9		* 5.5				
Max Green Setting (Gmax), s	* 16	* 25		* 24	* 12	* 28		* 24				
Max Q Clear Time (g_c+I1), s	8.9	16.4		11.8	3.6	21.8		6.7				
Green Ext Time (p_c), s	0.3	2.5		0.2	0.0	2.2		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	22	6	139	8	99	11	71	165	195	85	4
Future Vol, veh/h	1	22	6	139	8	99	11	71	165	195	85	4
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.91	0.91	0.91	0.82	0.82	0.82
Heavy Vehicles, %	4	4	4	2	2	2	1	1	1	1	1	1
Mvmt Flow	1	29	8	174	10	124	12	78	181	238	104	5
Number of Lanes	0	2	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	9.9	11.8	12	17.5
HCM LOS	A	B	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	8%	0%	100%	0%	69%
Vol Thru, %	0%	30%	92%	65%	0%	7%	30%
Vol Right, %	0%	70%	0%	35%	0%	93%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	236	12	17	139	107	284
LT Vol	11	0	1	0	139	0	195
Through Vol	0	71	11	11	0	8	85
RT Vol	0	165	0	6	0	99	4
Lane Flow Rate	12	259	16	23	174	134	346
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.022	0.403	0.031	0.042	0.333	0.213	0.587
Departure Headway (Hd)	6.602	5.599	7.012	6.716	6.9	5.732	6.104
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	542	641	509	531	521	625	592
Service Time	4.348	3.345	4.778	4.482	4.645	3.477	4.144
HCM Lane V/C Ratio	0.022	0.404	0.031	0.043	0.334	0.214	0.584
HCM Control Delay	9.5	12.1	10	9.8	13.1	10	17.5
HCM Lane LOS	A	B	A	A	B	A	C
HCM 95th-tile Q	0.1	1.9	0.1	0.1	1.4	0.8	3.8

Intersection: 1: Grand River Avenue & Cross Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	180	236	69	82	51	46	203	176	190	60	70	242
Average Queue (ft)	86	86	49	29	15	19	95	80	99	11	24	142
95th Queue (ft)	148	178	58	66	42	46	172	148	169	46	58	231
Link Distance (ft)	435	435		356	356			3025	3025			305
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			25			25	500			35	500	
Storage Blk Time (%)		11	46		16	6			19	0		
Queuing Penalty (veh)		30	7		6	1			7	1		

Intersection: 1: Grand River Avenue & Cross Street

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	235	45
Average Queue (ft)	136	25
95th Queue (ft)	228	51
Link Distance (ft)	305	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		15
Storage Blk Time (%)	32	4
Queuing Penalty (veh)	30	17

Intersection: 2: 2nd Street & Cross Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	41	51	94	80	36	141	108
Average Queue (ft)	11	23	49	44	10	65	55
95th Queue (ft)	36	47	81	74	34	105	89
Link Distance (ft)	535			435		1635	113
Upstream Blk Time (%)							0
Queuing Penalty (veh)							1
Storage Bay Dist (ft)		125	175		500		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 99

Intersection: 1: Grand River Avenue & Cross Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	149	154	51	93	55	65	154	198	222	60	101	241
Average Queue (ft)	79	67	48	37	12	31	79	100	118	14	30	138
95th Queue (ft)	136	129	55	76	39	57	132	182	209	51	72	207
Link Distance (ft)	435	435		356	356			3025	3025			305
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			25			25	500			35	500	
Storage Blk Time (%)		8	42		10	12			24	0		
Queuing Penalty (veh)		19	5		5	2			10	1		

Intersection: 1: Grand River Avenue & Cross Street

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	223	46
Average Queue (ft)	132	25
95th Queue (ft)	212	52
Link Distance (ft)	305	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		15
Storage Blk Time (%)	35	4
Queuing Penalty (veh)	30	18

Intersection: 2: 2nd Street & Cross Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	46	34	107	73	35	117	117
Average Queue (ft)	9	16	49	38	9	60	57
95th Queue (ft)	33	41	86	61	32	99	94
Link Distance (ft)	535			435		1635	113
Upstream Blk Time (%)							0
Queuing Penalty (veh)							1
Storage Bay Dist (ft)		125	175		500		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 92

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	14	266	34	13	37	176	869	36	34	993	94
Future Volume (veh/h)	156	14	266	34	13	37	176	869	36	34	993	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	211	19	250	39	15	43	191	945	39	38	1116	106
Peak Hour Factor	0.74	0.74	0.74	0.87	0.87	0.87	0.92	0.92	0.92	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	316	343	289	273	343	289	226	1874	831	192	1823	808
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.13	0.52	0.52	0.11	0.51	0.51
Sat Flow, veh/h	1350	1885	1590	1115	1885	1590	1795	3582	1588	1795	3582	1588
Grp Volume(v), veh/h	211	19	250	39	15	43	191	945	39	38	1116	106
Grp Sat Flow(s),veh/h/ln	1350	1885	1590	1115	1885	1590	1795	1791	1588	1795	1791	1588
Q Serve(g_s), s	13.8	0.7	13.7	2.7	0.6	2.0	9.4	15.4	1.1	1.7	20.0	3.2
Cycle Q Clear(g_c), s	14.3	0.7	13.7	3.4	0.6	2.0	9.4	15.4	1.1	1.7	20.0	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	316	343	289	273	343	289	226	1874	831	192	1823	808
V/C Ratio(X)	0.67	0.06	0.87	0.14	0.04	0.15	0.84	0.50	0.05	0.20	0.61	0.13
Avail Cap(c_a), veh/h	319	346	291	275	346	291	249	1874	831	192	1823	808
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.3	30.4	35.8	31.9	30.4	31.0	38.5	13.9	10.5	36.6	15.8	11.6
Incr Delay (d2), s/veh	5.2	0.1	22.7	0.2	0.1	0.2	21.5	1.0	0.1	0.5	1.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.3	7.1	0.7	0.3	0.8	5.4	5.9	0.4	0.8	7.8	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.5	30.5	58.4	32.1	30.4	31.2	60.0	14.9	10.6	37.1	17.3	12.0
LnGrp LOS	D	C	E	C	C	C	E	B	B	D	B	B
Approach Vol, veh/h		480			97			1175			1260	
Approach Delay, s/veh		49.9			31.4			22.1			17.5	
Approach LOS		D			C			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.8	51.3		21.9	15.1	53.0		21.9				
Change Period (Y+Rc), s	* 5.5	* 5.5		* 5.5	* 5.5	* 5.9		* 5.5				
Max Green Setting (Gmax), s	* 13	* 45		* 17	* 9.5	* 47		* 17				
Max Q Clear Time (g_c+I1), s	11.4	22.0		16.3	3.7	17.4		5.4				
Green Ext Time (p_c), s	0.1	4.2		0.0	0.0	3.7		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	24.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	38	10	136	8	139	11	84	188	210	94	3
Future Vol, veh/h	1	38	10	136	8	139	11	84	188	210	94	3
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.77	0.77	0.77	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	6	6	6	2	2	2	0	0	0
Mvmt Flow	1	52	14	148	9	151	14	109	244	280	125	4
Number of Lanes	0	2	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	10.8	12.7	16.5	25.4
HCM LOS	B	B	C	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	5%	0%	100%	0%	68%
Vol Thru, %	0%	31%	95%	66%	0%	5%	31%
Vol Right, %	0%	69%	0%	34%	0%	95%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	272	20	29	136	147	307
LT Vol	11	0	1	0	136	0	210
Through Vol	0	84	19	19	0	8	94
RT Vol	0	188	0	10	0	139	3
Lane Flow Rate	14	353	27	40	148	160	409
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.028	0.582	0.059	0.082	0.31	0.282	0.733
Departure Headway (Hd)	6.936	5.935	7.706	7.431	7.554	6.364	6.45
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	513	604	468	485	473	559	557
Service Time	4.724	3.722	5.406	5.131	5.351	4.16	4.532
HCM Lane V/C Ratio	0.027	0.584	0.058	0.082	0.313	0.286	0.734
HCM Control Delay	9.9	16.8	10.9	10.8	13.8	11.7	25.4
HCM Lane LOS	A	C	B	B	B	B	D
HCM 95th-tile Q	0.1	3.7	0.2	0.3	1.3	1.2	6.2

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑↑	↱
Traffic Vol, veh/h	0	42	0	1062	1079	43
Future Vol, veh/h	0	42	0	1062	1079	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	89	89
Heavy Vehicles, %	2	2	1	1	1	1
Mvmt Flow	0	46	0	1154	1212	48

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	606	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	440	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	440	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	440	-	-
HCM Lane V/C Ratio	-	0.104	-	-
HCM Control Delay (s)	-	14.1	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	12	243	53	17	55	160	889	39	46	933	86
Future Volume (veh/h)	145	12	243	53	17	55	160	889	39	46	933	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	171	14	191	68	22	71	178	988	43	50	1014	93
Peak Hour Factor	0.85	0.85	0.85	0.78	0.78	0.78	0.90	0.90	0.90	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	292	312	260	277	312	260	220	1258	560	489	1811	806
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.12	0.35	0.35	0.27	0.51	0.51
Sat Flow, veh/h	1297	1885	1574	1174	1885	1574	1795	3582	1593	1795	3582	1594
Grp Volume(v), veh/h	171	14	191	68	22	71	178	988	43	50	1014	93
Grp Sat Flow(s),veh/h/ln	1297	1885	1574	1174	1885	1574	1795	1791	1593	1795	1791	1594
Q Serve(g_s), s	10.3	0.5	9.2	4.1	0.8	3.2	7.7	19.8	1.4	1.7	15.6	2.4
Cycle Q Clear(g_c), s	11.0	0.5	9.2	4.6	0.8	3.2	7.7	19.8	1.4	1.7	15.6	2.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	292	312	260	277	312	260	220	1258	560	489	1811	806
V/C Ratio(X)	0.59	0.04	0.73	0.25	0.07	0.27	0.81	0.79	0.08	0.10	0.56	0.12
Avail Cap(c_a), veh/h	458	554	462	427	554	462	348	1258	560	489	1811	806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.9	28.1	31.7	30.0	28.2	29.2	34.2	23.2	17.3	21.8	13.6	10.4
Incr Delay (d2), s/veh	1.9	0.1	4.0	0.5	0.1	0.6	8.7	5.0	0.3	0.1	1.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.2	3.7	1.2	0.4	1.2	3.8	8.6	0.5	0.7	5.9	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	28.1	35.7	30.5	28.3	29.7	42.8	28.2	17.6	21.9	14.9	10.7
LnGrp LOS	C	C	D	C	C	C	D	C	B	C	B	B
Approach Vol, veh/h		376			161			1209			1157	
Approach Delay, s/veh		35.0			29.9			30.0			14.9	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.3	45.9		18.7	27.3	34.0		18.7				
Change Period (Y+Rc), s	* 5.5	* 5.5		* 5.5	* 5.5	* 5.9		* 5.5				
Max Green Setting (Gmax), s	* 16	* 25		* 24	* 12	* 28		* 24				
Max Q Clear Time (g_c+I1), s	9.7	17.6		13.0	3.7	21.8		6.6				
Green Ext Time (p_c), s	0.3	2.3		0.2	0.0	2.2		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	14.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	22	6	139	8	116	11	75	165	213	89	4
Future Vol, veh/h	1	22	6	139	8	116	11	75	165	213	89	4
Peak Hour Factor	0.75	0.75	0.75	0.80	0.80	0.80	0.91	0.91	0.91	0.82	0.82	0.82
Heavy Vehicles, %	4	4	4	2	2	2	1	1	1	1	1	1
Mvmt Flow	1	29	8	174	10	145	12	82	181	260	109	5
Number of Lanes	0	2	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Righ	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	10.1	12.1	12.5	19.7
HCM LOS	B	B	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	8%	0%	100%	0%	70%
Vol Thru, %	0%	31%	92%	65%	0%	6%	29%
Vol Right, %	0%	69%	0%	35%	0%	94%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	240	12	17	139	124	306
LT Vol	11	0	1	0	139	0	213
Through Vol	0	75	11	11	0	8	89
RT Vol	0	165	0	6	0	116	4
Lane Flow Rate	12	264	16	23	174	155	373
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.023	0.42	0.032	0.043	0.339	0.251	0.641
Departure Headway (Hd)	6.727	5.731	7.186	6.889	7.014	5.838	6.186
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	531	628	496	517	513	614	582
Service Time	4.48	3.483	4.968	4.671	4.77	3.593	4.233
HCM Lane V/C Ratio	0.023	0.42	0.032	0.044	0.339	0.252	0.641
HCM Control Delay	9.6	12.6	10.2	10	13.4	10.6	19.7
HCM Lane LOS	A	B	B	A	B	B	C
HCM 95th-tile Q	0.1	2.1	0.1	0.1	1.5	1	4.6

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑↑	↱
Traffic Vol, veh/h	0	39	0	1089	1026	40
Future Vol, veh/h	0	39	0	1089	1026	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	90	90	92	92
Heavy Vehicles, %	2	2	1	1	1	1
Mvmt Flow	0	42	0	1210	1115	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	558	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	473	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	473	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	473	-	-
HCM Lane V/C Ratio	-	0.09	-	-
HCM Control Delay (s)	-	13.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Intersection: 1: Grand River Avenue & Cross Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	196	197	55	84	48	55	232	200	213	60	80	246
Average Queue (ft)	101	79	49	29	13	23	111	80	99	13	28	143
95th Queue (ft)	166	161	55	67	42	52	193	156	180	48	59	218
Link Distance (ft)	435	435		356	356			3025	3025			305
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			25			25	500			35	500	
Storage Blk Time (%)		11	45		12	8			20	0		0
Queuing Penalty (veh)		29	6		4	1			7	1		0

Intersection: 1: Grand River Avenue & Cross Street

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	255	43
Average Queue (ft)	135	27
95th Queue (ft)	212	52
Link Distance (ft)	305	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		15
Storage Blk Time (%)	32	5
Queuing Penalty (veh)	30	25

Intersection: 2: 2nd Street & Cross Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	37	51	92	90	36	126	111
Average Queue (ft)	10	21	47	49	11	63	57
95th Queue (ft)	34	47	79	79	36	101	91
Link Distance (ft)	535			435		1635	113
Upstream Blk Time (%)							0
Queuing Penalty (veh)							1
Storage Bay Dist (ft)		125	175		500		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Grand River Avenue & RIRO Drive

Movement	EB	SB
Directions Served	R	T
Maximum Queue (ft)	47	6
Average Queue (ft)	21	0
95th Queue (ft)	41	5
Link Distance (ft)	188	1178
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 105

Intersection: 1: Grand River Avenue & Cross Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	169	156	51	85	68	64	179	251	270	60	78	282
Average Queue (ft)	91	64	48	38	12	31	89	98	117	16	26	145
95th Queue (ft)	154	129	55	74	42	57	156	186	213	56	60	244
Link Distance (ft)	435	435		356	356			3025	3025			305
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			25			25	500			35	500	
Storage Blk Time (%)		7	42		10	11			26	0		0
Queuing Penalty (veh)		16	5		6	2			10	2		0

Intersection: 1: Grand River Avenue & Cross Street

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	279	40
Average Queue (ft)	137	26
95th Queue (ft)	241	50
Link Distance (ft)	305	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		15
Storage Blk Time (%)	37	4
Queuing Penalty (veh)	32	20

Intersection: 2: 2nd Street & Cross Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	32	35	110	78	31	116	108
Average Queue (ft)	8	15	51	39	9	57	58
95th Queue (ft)	29	41	86	65	32	89	91
Link Distance (ft)	535			435		1635	113
Upstream Blk Time (%)							0
Queuing Penalty (veh)							1
Storage Bay Dist (ft)		125	175		500		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Grand River Avenue & RIRO Drive

Movement	EB	SB	SB
Directions Served	R	T	T
Maximum Queue (ft)	59	17	15
Average Queue (ft)	18	1	1
95th Queue (ft)	43	11	12
Link Distance (ft)	188	1178	1178
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 95

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	14	266	34	13	37	176	869	36	34	993	94
Future Volume (veh/h)	156	14	266	34	13	37	176	869	36	34	993	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	211	19	250	39	15	43	191	945	39	38	1116	106
Peak Hour Factor	0.74	0.74	0.74	0.87	0.87	0.87	0.92	0.92	0.92	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	319	346	292	276	346	292	229	1596	707	329	1810	802
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.13	0.45	0.45	0.18	0.51	0.51
Sat Flow, veh/h	1350	1885	1590	1115	1885	1590	1795	3582	1587	1795	3582	1588
Grp Volume(v), veh/h	211	19	250	39	15	43	191	945	39	38	1116	106
Grp Sat Flow(s),veh/h/ln	1350	1885	1590	1115	1885	1590	1795	1791	1587	1795	1791	1588
Q Serve(g_s), s	13.7	0.7	13.7	2.7	0.6	2.0	9.3	17.9	1.3	1.6	20.2	3.2
Cycle Q Clear(g_c), s	14.3	0.7	13.7	3.4	0.6	2.0	9.3	17.9	1.3	1.6	20.2	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	319	346	292	276	346	292	229	1596	707	329	1810	802
V/C Ratio(X)	0.66	0.05	0.86	0.14	0.04	0.15	0.83	0.59	0.06	0.12	0.62	0.13
Avail Cap(c_a), veh/h	484	576	486	412	576	486	309	1596	707	329	1810	802
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	30.3	35.6	31.7	30.2	30.8	38.3	18.8	14.2	30.7	16.0	11.8
Incr Delay (d2), s/veh	2.3	0.1	7.8	0.2	0.1	0.2	14.3	1.6	0.1	0.2	1.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.3	5.9	0.7	0.3	0.8	4.9	7.3	0.5	0.7	7.9	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	30.4	43.4	31.9	30.3	31.1	52.6	20.4	14.3	30.8	17.6	12.1
LnGrp LOS	D	C	D	C	C	C	D	C	B	C	B	B
Approach Vol, veh/h		480			97			1175			1260	
Approach Delay, s/veh		40.7			31.3			25.4			17.5	
Approach LOS		D			C			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.0	51.0		22.0	22.0	46.0		22.0				
Change Period (Y+Rc), s	* 5.5	* 5.5		* 5.5	* 5.5	* 5.9		* 5.5				
Max Green Setting (Gmax), s	* 16	* 31		* 28	* 5.5	* 40		* 28				
Max Q Clear Time (g_c+I1), s	11.3	22.2		16.3	3.6	19.9		5.4				
Green Ext Time (p_c), s	0.2	2.9		0.2	0.0	3.5		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	24.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 1: Grand River Avenue & Cross Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	181	199	58	85	60	57	225	198	215	60	62	289
Average Queue (ft)	87	77	49	28	13	22	107	78	95	13	24	151
95th Queue (ft)	153	161	56	65	41	49	183	147	175	49	51	241
Link Distance (ft)	435	435		356	356			3025	3025			305
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)			25			25	500			35	500	
Storage Blk Time (%)		12	44		12	7			18	0		0
Queuing Penalty (veh)		33	6		5	1			6	1		0

Intersection: 1: Grand River Avenue & Cross Street

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	282	40
Average Queue (ft)	144	26
95th Queue (ft)	241	51
Link Distance (ft)	305	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		15
Storage Blk Time (%)	35	4
Queuing Penalty (veh)	33	19

City of Brighton
City Hall Council Chambers
200 N. First St. Brighton, MI 48116
Planning Commission
Regular Meeting Minutes
January 23, 2023

1. **Call to Order/Roll Call**

Commissioner Smith called the meeting to order at 7:00 p.m.

Commissioners Present: Susan Gardner, Steve Monet, Chris Passeri, Ken Schmenk, Chuck Hundley, Mike Schutz, Matt Smith, and Jim Bohn.
Commissioners Absent: Dave Petrak
Others present: Kari Jozwik, Tetra Tech; Michael Caruso, Community Development Manager; Kelly Haataja, Executive Assistant to Community Development; and an audience of four persons.

Motion by Commissioner Gardner, seconded by Commissioner Schutz to excuse Commissioner Petrak for personal reasons. **The motion carried without objection.**

2. **Consider Approval of Consent Agenda Items**

Consent Agenda Items

a. **Approval of the December 19, 2022, Regular Meeting Minutes**
b. **Approval of the January 23, 2023, Agenda**

Motion by Commissioner Gardner, seconded by Commissioner Monet to approve the Consent Agenda as presented**. The motion carried without objection.**

3. **Call to the Public**

Commissioner Smith opened the Call to the Public at 7:00 p.m. Hearing and seeing no comments, the Call to the Public closed.

Unfinished Business

None

New Business

4. **Site Plan 22-11, Consider Recommendation of Approval for an Auto Wash Facility, 8680 W. Grand River**

Mr. Caruso provided an overview of the property and two adjacent properties chosen for lot combination. He mentioned City Council will be reviewing the Planning Commission's recommendation for rezoning the two adjacent properties from C-1 to C-2 at their next meeting. He then offered staff's findings concerning ingress and egress agreements in relation to Grand River, mentioned last meeting. Documentation of an agreement was not found, rather there was a site plan submitted that included an extension of Second Street, which was initially tabled. Later the Commission approved the site plan with a right turn in, and right turn out to Grand River. Ultimately, City Council approved the site plan with elimination of the right turn out. Lastly, Mr. Caruso described the proposed reconstructed access drive in relation to Grand River, which includes the elimination of one driveway, replacing the current one-way entry from Grand River, and the addition of a channelized island to prevent left turns.

Mitchell Harvey, Stonefield Engineering presented the proposed auto wash development, which comprises thirty-four parking spaces, and twenty-seven of those spaces will be for vacuums. He reiterated the proposed ingress and egress, and mentioned the Meijer Drive will be straightened, and sidewalks will be extended. There will be an addition of thirty-five trees and approximately 30% of the site will be landscaped, which exceeds requirements.

Ms. Julie Kroll, Fleis & Vanderbrink offered a summary of the traffic study highlights, noting any impacts could be mitigated through traffic signal timing. She also described the emergency access and egress.

Commissioners discussed Meijer Drive and island improvements at Meijer.

Commissioner Monet stated there is no need for reconfiguration to and from Grand River.

Commissioner Smith clarified the proposal is for a right in and right out only on Grand River and commented its utilization is not exclusive to car wash traffic.

Mr. Caruso stated he believes implementing more options will alleviate extra traffic from Cross Street and Charles Orndorf.

Commissioner Bohn commented with the amount of left hand turns onto Cross Street being reduced, makes it safer.

Commissioner Gardner agreed having more options could be an improvement.

Commissioner Passeri asked if the impact of the DTN development was considered in the traffic study.

Ms. Kroll replied yes.

Commissioner Hundley asked if there will be screening on both sides of the roof.

Mr. Harvey replied yes.

Commissioner Monet commented he doesn't find value of a right turn out onto Grand River and believes there will be problems with traffic.

Motion by Commissioner Bohn, seconded by Commissioner Hundley to recommend approval for Site Plan 22-11, for an auto wash facility to be located at 8680 W. Grand River, with conditions of Tetra Tech comments being met and for a channelized island with a right in and right out only. **The motion carried, 6-1, Commissioner Monet voted no.**

Other Business
None

5. Staff Updates
Mr. Caruso provided construction updates; spoke about the possibility of recording meetings; and mentioned bringing back beautification awards.

6. Commissioner Report
None

7. **Call to the Public**
Commissioner Smith opened the Call to the Public at 7:56 p.m. Hearing and seeing none, the Call to the Public closed.

8. Adjournment

Motion by Commissioner Gardner, seconded by Commissioner Schmenk to adjourn the meeting. **The motion carried without objection and the meeting adjourned at 7:57 p.m.**

Drafted by:
Kelly Haataja, Executive Assistant to Community Development

City of Brighton

REPORT FROM THE CITY MANAGER TO CITY COUNCIL
FEBRUARY 16, 2023

SUBJECT: CONSIDER APPROVAL OF A CONTRACT TO REVISE AND UPGRADE THE CITY'S WEBSITE

BACKGROUND

From time to time, it is necessary to revise and refresh websites based on look, function, and how people access and utilize the information provided. The City first entered into contract with Revize in 2017, with great reviews on the new feel and function; however, after five years, a refresh addition of a few new features is necessary.

ADMINISTRATIVE SUMMARY

City staff has worked closely with the team at Revize to review the current city website and looked a metrics to determine how best to shape the website. End users need information to be easy to find, and the proposed new features and refreshed look will offer more information on the home screen. The current process of having to drill down into data will be minimized. An addition we are looking to add keeps up with newer websites, that have removed email addresses, replacing them with fillable forms that are sent directly to the staff member. Additionally, we would like to add a new curated search that is more dynamic and intuitive for users.

Revision of the site can take from 3-6 months depending on the amount of change requests.

Under our previous contract we paid $2,400 per year for 5 years. The fee covered the annual software subscription, tech support, CMS updates, web hosting, storage, bandwidth, and an SSL certificate. This renewal bumps that annual fee to $2,640 per year, a 10% increase after 5 years of no increase. Additionally, the changes we are requesting for fillable forms and curated search will cost and additional $1,000 per year, for an annual cost of $3,640. Year one does have some additional implementation costs totaling $3,150 for a total year one cost of $6,790.

BUDGET INFORMATION

As we work on the budget for 2023/24 and the six-year forecast these costs will be built in to future years. The cost for the current year can be absorbed by existing savings within the General Fund IT budget.

RECOMMENDATION

Authorize the City Manager to execute the Revize contract to revise and upgrade the City's website.

Prepared by: Tara Brown, City Clerk

Reviewed by: City Attorney (Required for all agreements, ordinances, etc.)
- ☒ Acceptable Form and Ready to Execute
- ☐ Other _____

Elizabeth Gaines, Finance Director

☐ Within Budget

☐ Budget Amendment Necessary and In Proper Form

☒ Other – Can be accommodated in the current budget

Reviewed &
Approved by: Gretchen Gomolka, City Manager

Attachment: Revize Agreement

The Following Applications & Features will be integrated into Your Website Project

- **Citizen's Communication Center Apps**
- **Citizen's Engagement Center Apps**
- **Staff Productivity Apps**
- **Site Administration and Security Features**
- **Mobile Device and Accessibility Features**

Citizen's Communication Center Apps:

- ✓ Notification Center with Text/Email Alerts
- ✓ Bid Posting
- ✓ Document Center
- ✓ Email Notify
- ✓ FAQs
- ✓ Job Posting
- ✓ Multi use Business Directory
- ✓ News Center with Facebook/Twitter Integration
- ✓ Online Forms
- ✓ Photo Gallery
- ✓ Quick Link Buttons
- ✓ Revize Web Calendar
- ✓ "Share This" Social Media Flyout App
- ✓ Sliding Feature Bar
- ✓ Language Translator

Citizen's Engagement Center Apps:

- ✓ Citizen Request Center with Captcha
- ✓ Citizen Connect (Community Blog)
- ✓ Online Bill Pay
- ✓ RSS Feed

Staff Productivity Apps:

- ✓ Agenda Posting Center
- ✓ Job Posting App
- ✓ Image Manager
- ✓ Link Checker
- ✓ Menu Manager
- ✓ Online Form Builder
- ✓ Staff Directory
- ✓ Website Content Archiving

- ✓ Website Content Scheduling
- ✓ Newsletter App

Site Administration and Security Features:

- ✓ Audit Trail
- ✓ Auto Site Map Generator
- ✓ History Log
- ✓ URL Redirect Setup
- ✓ Roles and Permission-based Security Mode
- ✓ Secure Site Gateway
- ✓ Unique Login/Password for each Content Editor
- ✓ Web Statistics and Analytics
- ✓ Workflows by Department

Mobile Device and Accessibility Features

- Font Size Adjustment
- **ADA Accessibility Button**
- Alt-Tags
- Responsive Website Design (RWD)

PROFESSIONAL SERVICES AGREEMENT

This Professional Services Agreement ("Agreement') is made this _____ day of _____ by and between the City of Brighton, whose address is 200 North First Street, Brighton, Michigan ("City") and Revize LLC ("Contractor"), whose address is 150 Kirts Blvd, Troy, MI 48084. All of the parties to this Agreement may be collectively referred to herein as the "Parties".

WHEREAS the parties entered into a Professional Services Agreement dated May 29, 2018, which expires on May 29, 2023; and

WHEREAS, the parties which to enter into another 5 year agreement upon the terms and conditions stated herein.

NOW, THEREFORE, for the good and valuable consideration set forth below, the Parties agree as follows:

1. PROJECT DESCRIPTION AND COMPENSATION.

a. The work and pricing of the work to be provided under this Agreement (the "Work") shall be as follows:

Quantity	Description	Set-up Price	Annual
1	**Discovery & Design from Scratch:** • 1 mockup with up to 3 rounds of changes • Home page template and inner page design and layout. • Includes Responsive Web Design •	**Included**	-
1	**Revize Template Development:** • Set-up all CMS modules listed in this agreement • Integration with all 3rd party web applications • New Calendar	**Included**	-
1	Curated Search*	$1,200	
1	Interactive Fillable Forms* • Set up • Training • Support and Hosting (Annual)	$1,950	$1,000
1	**Revize Annual Software Subscription, Tech Support, CMS Updates, Website Hosting, 50GB website storage, 100GB/Month Bandwidth, SSL Certificate pre-paid annual fee, 5-year agreement, free redesign year 5, locked in rate:**		**$2,640**
1	**GRAND TOTAL (Including Add On Features)**	**$3,150**	**$3,640**

b. The Two Thousand, Six Hundred Forty Dollar ($2,640.00) fee for the annual subscription, technical support, CMS updates, website hosting, unlimited users, unlimited GB website storage shall be paid for each year, in advance, by the month and date this Agreement was executed.

c. By its signature hereon, Contractor acknowledges receipt of the first Six Thousand, Seven Hundred Ninety Dollars ($6,790.00) payable under this Agreement to commence work ("First Payment"). Work performed will be credited against the First Payment until such time as it is exhausted. Subsequent work will be invoiced to the City, in writing, at the address set forth above, and such invoices are due within 30 days of receipt.

d. In year five of this Agreement, and in addition to the work set forth above in paragraph 1.a., Contractor agrees to provide, free of charge, a complete website redesign repeating all work, with the exception of any features no longer supported by Contractor.

e. Contractor agrees to incorporate applications and features into the City's website and the Downtown Development Authority's ("DDA") website which will include, but not be limited to, those set forth on Exhibit A, attached hereto.

f. The parties shall hold a "kickoff meeting" within ___ days of the execution of this Agreement. The annual services to be provided under this Agreement shall commence at the kickoff meeting.

g. The "round of changes" set forth above shall be defined as a single list of design request changes to the mockup provided by Contractor. The list of changes may contain as many mockup changes as City wishes. Contractor agrees to make all reasonable mockup changes requested, which shall not include a complete redesign of the mockup.

h. Contractor anticipates that small changes may be necessary and these are incorporated in the price set forth above.

i. The technical support to be provided under this Agreement includes unlimited technical support to all authorized users for regular support issues. Authorized users are editors of the website that have previously participated in a Contractor training session. Regular support issues include, but is not limited to, issues that deny usability of the City's existing system, failure of a feature, password resets, retraining on the site, or workflow approval setup/tweaks. For issues

beyond regular support, including, but not limited to, subsequent redesign of sections of the website or creation of a new function, Contractor will provide a written estimate of costs and time before performing work.

j. As a part of the consideration for the compensation set forth above, Contractor will provide the City with one (1) full Enterprise Revize CMS Software license (the "License"). The City agrees that the License shall be used only to maintain the websites which are the subject of this Agreement, and shall not be assignable to or usable by any other entity. Upon the termination of this Agreement by any means, Contractor will provide the latest version of the Revize CMS to the City for their use for any period desired. Contractor will provide the technical support necessary to establish the Revize CMS on the City's hosting architecture.

2. TERM OF AGREEMENT. The term of this Agreement shall be for five (5) years, commencing on the date of execution of this Agreement.

3. TERMINATION OF AGREEMENT. During the term of this Agreement, any Party shall have the right to terminate this Agreement upon thirty (30) days written notice.

4. STANDARD OF CARE. All services performed by Contractor will be conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar circumstances at the same time and in the locality.

5. INSURANCE. Contractor, or any of their subcontractors, shall not commence work under this contract until they have obtained the insurance required under this paragraph, and shall keep such insurance in force during the entire life of this contract. All coverage shall be with insurance companies licensed and admitted to do business in the State of Michigan and acceptable to The City of Brighton. The requirements below should not be interpreted to limit the liability of the Contractor. All deductibles and SIR's arc the responsibility of the Contractor. The Contractor shall procure and maintain the following insurance coverage:

a. Worker's Compensation Insurance including Employers' Liability Coverage, in accordance with all applicable statutes of the State of Michigan.

b. Commercial General Liability Insurance on an "Occurrence Basis" with limits of liability not less than $1,000,000.00 per occurrence and aggregate. Coverage shall include the following extensions: (A) Contractual Liability; (B) Products and Completed Operations; (C) Independent Contractors Coverage; (D) Broad Form General

Liability Extensions or equivalent, if not already included.

c. Automobile Liability including Michigan No-Fault Coverages, with limits of liability not less than $1,000,000.00 per occurrence, combined single limit for Bodily Injury, and Property Damage. Coverage shall include all owned vehicles, all non-owned vehicles, and all hired vehicles.

d. Professional liability, with limits of liability of not less than $1,000,000.00 per occurrence and aggregate. Contractor's professional liability insurance shall cover claims if and to the extent that the insured causes damage to others, including but not limited to the City, in the rendering of its professional services.

e. Additional Insured: Commercial General Liability and Automobile Liability, as described above, shall include an endorsement stating the following shall be Additional Insureds: The City of Brighton, all elected and appointed officials, all employees and volunteers, all boards, commissions, and/or authorities and board members, including employees and volunteers thereof. It is understood and agreed by naming The City of Brighton as additional insured, coverage afforded is considered to be primary and any other insurance The City of Brighton may have in effect shall be considered secondary and/or excess.

f. Cancellation Notice: All policies, as described above, shall include an endorsement stating that is it understood and agreed Thirty (30) days, Ten (10) days for non-payment of premium, Advance Written Notice of Cancellation, Non-Renewal, Reduction, and/or Material Change shall be sent to: The City of Brighton, Attention Finance Director, 200 North First Street, Brighton, MI, 48116.

g. Proof of Insurance Coverage: The Contractor shall provide The City of Brighton, at the time that the contracts are returned by him/her for execution, a Certificate of Insurance as well as the required endorsements. In lieu of required endorsements, if applicable, a copy of the policy sections where coverage is provided for additional insured and cancellation notice would be acceptable. Copies or certified copies of all policies mentioned above shall be furnished, if so requested.

h. If any of the above coverages expire during the term of this contract, the Contractor shall deliver renewal certificates and endorsements to

The City of Brighton at least ten (10) days prior to the expiration date.

6. **INFRINGEMENTS AND INDEMNIFICATIONS.** Contractor agrees to protect, defend, and save the City, its officials, employees, departments and agents harmless against; any demand for payment for the use of any patented material, process, or device that may enter into the manufacture, construction, or from a part of the work covered by either order or contract; and from suits or a charge of every nature and description brought against if for, or on account of, any injuries or damages received or sustained by the parties by or from any of the facts of the contractor, the contractor's employees, or agents; from all liability claims, demands, judgments and expenses to persons or property occasioned, wholly, or in part, by the acts or omissions of the respondent, contractor, agents or employee. The Contractor shall release, indemnify and hold the City, its officers, agents and employees harmless from liability of any kind or nature, including the Contractor's use of any copyrighted or un-copyrighted composition, secret process, patented or unpatented invention, article or appliance furnished or used in the performance of this contract.

7. **DEFAULT AND REMEDIES.** Any of the following events shall constitute cause for the City of Brighton to declare Contractor in default of the contract:

a. Nonperformance of contractual requirements;

b.. A material breach of any term or condition of this contract;

Please note, The City of Brighton shall issue a written notice of default providing a period in which Contractor shall have an opportunity to cure. Time allowed for cure shall not diminish or eliminate Contractor's liability for liquidated or other damages. If the default remains, after Contractor has been provided the opportunity to cure, the City of Brighton may do one or more of the following:

a. Exercise any remedy provided by law;

b. Terminate this contract and any related contracts or portions thereof; or

c. Suspend contractor from receiving future proposal solicitations.

8. LAWS AND REGULATIONS. Any and all supplies, services and equipment offered shall comply fully with all applicable Federal, State and local laws and regulations, including, but not limited to, compliance with the Americans with Disabilities Act.

9. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the laws of the State of Michigan. Venue for any claim, dispute or action concerning this Agreement shall be in Livingston County Circuit Court.

10. ASSIGNMENT/SUBCONTRACT. Contractor shall not assign, sell, transfer,

subcontract or sublet rights, or delegate responsibilities under this contract, in whole or in part, without the prior written approval of the City of Brighton.

11. OWNERSHIP OF ALL MATERIALS All digital and print materials created as a result of this Agreement arc the property of the City, including any and all intellectual property rights to those materials and/or their designs including, but not limited to, any and all trademark, copyright and patent rights.

12. NONDISCRIMINATION. The offeror agrees to abide by the provisions of Title VI and Title VII of the Civil Rights Act of 1964 (42 USC 2000c), which prohibit discrimination against any employee or applicant for employment, or any applicant or recipient of services, on the basis of race, religion, color, or national origin; and further agrees to abide by Executive Order No. 11246, as amended, which prohibits discrimination on basis of sex; 45 CFR 90 which prohibits discrimination on the basis of age, and Section 504 of the Rehabilitation Act of 1973, or the Americans with Disabilities Act of 1990 which prohibits discrimination on the basis of disabilities. The offeror further agrees to furnish information and reports to requesting agencies, upon request, for the purpose of determining compliance with these statutes. Offeror agrees to comply with each individual agency's certification requirements, if any as stated in the additional terms and conditions listed in the solicitation. This contract may be canceled if the offeror fails to comply with the provisions of these laws and regulations. The offeror must include this provision in every subcontract relating to purchases by the agencies to insure that subcontractors and contractors are bound by this provision.

13. SEVERABILITY. If any provision of this contract is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected; and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the particular provision held to be invalid.

14. FORCE MAJEURE. Neither party to this contract shall be held responsible for delay or default caused by fire, riot, acts of God and/or war which is beyond that party's reasonable control. The City of Brighton may terminate this contract after determining such delay or default will reasonably prevent successful performance of the contract.

15. INDEPENDENT CONTRACTOR. The contractor shall be an independent contractor, and as such shall have no authorization, express or implied to bind the City of Brighton or the respective agencies to any agreements, settlements, liability or understanding whatsoever, and agrees not to perform any acts as agent for the City of Brighton or participating agencies, except as expressly set forth herein.

16. AMENDMENT. This Agreement may not be modified, replaced or amended without prior written approval of the City of Brighton City Council and Contractor.

17. ENTIRE AGREEMENT. This Agreement supersedes any and all

understandings and agreements and constitutes the entire agreement between the parties and no oral representations or statements shall be considered a part hereof.

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement as of the Date of Execution first written above.

CITY OF BRIGHTON

_____
By: _____
Its: _____

REVIZE, LLC

_____
By:_____
Its: _____