AGENDA

CHARTER TOWNSHIP OF MERIDIAN
PLANNING COMMISSION – REGULAR MEETING
February 10, 2020 7PM

1. CALL MEETING TO ORDER
2. PUBLIC REMARKS
3. APPROVAL OF AGENDA
4. APPROVAL OF MINUTES
   A. January 27, 2020 Regular Meeting

5. COMMUNICATIONS
   1. Darcie Whiddon RE: 5937 Potter Street

6. PUBLIC HEARINGS
   A. Special Use Permit #19141 (The Cured Leaf TC, Inc.), establish commercial medical marihuana provisioning center at 3520 Okemos Road.
   B. Special Use Permit #19131 (The W. Investment Holdings), establish commercial medical marihuana provisioning center at 1614 Grand River Avenue.
   C. Zoning Amendment #20020 (Township Board), amend Section 86-376 of the Code of Ordinances to allow a mix of single family and multiple family dwelling units in the RD, RC, and RCC (Multiple Family) zoning districts.

7. UNFINISHED BUSINESS - None
8. OTHER BUSINESS
   A. Brownfield Redevelopment Authority recommendation
   B. 2020 Planning Commission goals
   C. Form based code meeting - February 18, 2020

9. REPORTS AND ANNOUNCEMENTS
   A. Township Board update.

10. PROJECT UPDATES
   A. New Applications
      1. Site Plan Review #20-01 (Okemos Pointe, LLC), redevelop 15,523 square foot commercial building at 2360 Jolly Road.
      2. Site Plan Review #20-16-05 (GBC Design, Inc.), revisions to existing drive-through lane for Chick-fil-A restaurant at 2075 Grand River Avenue.
   B. Site Plans Received - None
   C. Site Plans Approved - None

11. PUBLIC REMARKS
12. ADJOURNMENT

TENTATIVE PLANNING COMMISSION AGENDA
February 24, 2020

1. PUBLIC HEARINGS - None

2. UNFINISHED BUSINESS
   A. Special Use Permit #19141 (The Cured Leaf TC, Inc.), establish commercial medical marihuana provisioning center at 3520 Okemos Road.
   B. Special Use Permit #19131 (The W. Investment Holdings), establish commercial medical marihuana provisioning center at 1614 Grand River Avenue.
   C. Zoning Amendment #20020 (Township Board), amend Section 86-376 of the Code of Ordinances to allow a mix of single family and multiple family dwelling units in the RD, RC, and RCC (Multiple Family) zoning districts.

3. OTHER BUSINESS
   A. Form based code initiative

DRAFT

CHARTER TOWNSHIP OF MERIDIAN
PLANNING COMMISSION
REGULAR MEETING MINUTES

January 27, 2020
5151 Marsh Road, Okemos, MI 48864-1198
517-853-4560, Town Hall Room, 7:00 P.M.

PRESENT: **Commissioners Lane, Hendrickson, Trezise, Richards, Shrewsbury, Clark, Cordill, and McConnell**
ABSENT: **Commissioner Premoe**
STAFF: **Director of Community Planning & Development Mark Kieselbach, Economic Development Director Chris Buck, and Principal Planner Peter Menser**

1. Call meeting to order

Chair Lane called the regular meeting to order at 7:01 P.M.

2. Public Remarks – None

3. Approval of Agenda

Chair Lane requested to add item 8D, Introduction to 2020 Planning Commission Goals, under Other Business.
Commissioner Richards moved to approve the amended agenda.
Seconded by Commissioner Shrewsbury.
VOICE VOTE: Motion approved unanimously.

4. Approval of Minutes

A. January 13, 2020 Regular Meeting

Commissioner Cordill moved to approve the minutes as written.
Seconded by Commissioner Hendrickson.
VOICE VOTE: Motion approved unanimously.

5. Communications

Chair Lane noted the communication listed in the meeting packet.

6. Public Hearings - None

7. Unfinished Business

A. Special Use Permit #19151 (Haslett Gallery, Inc.), establish commercial medical marihuana provisioning center at 2119 Haslett Road.

Principal Planner Menser provided an overview of the request for a commercial medical marihuana provisioning center and said he was available to answer questions.

Chair Lane noted representatives from the Haslett Gallery, Inc. were available also to answer questions.

Planning Commission Discussion:

- Any future concerns regarding the use would be addressed through ordinance provisions and enforcement actions.
- Concern that the Special Use Permit review criteria numbers (4) and (5) aren't being met with regards to the potential impact to existing neighboring uses and the economic welfare of those businesses.

ROLL CALL VOTE:
YEAS: Commissioners Clark, Shrewsbury, Hendrickson, McConnell, Trezise and Chair Lane.
NAYS: Commissioners Richards and Cordill
MOTION CARRIES: 6-2

8. Other Business

A. March 9, 2020 Planning Commission meeting

Principal Planner Menser reviewed the revised 2020 Planning Commission meeting calendar and asked for a motion for its adoption.

Commissioner Cordill moved to approve the amended 2020 Meeting Calendar
Supported by Commissioner Trezise.

ROLL CALL VOTE:
YEAS: Commissioners Richards, Clark, Shrewsbury, Hendrickson, Cordill, McConnell, Trezise and Chair Lane.
NAYS: None
MOTION CARRIES: 8-0

B. ZBA representative and commission liaison assignments

Chair Lane volunteered to serve as the Planning Commission representative on the Zoning Board of Appeals for 2020.

Commissioner Shrewsbury made a motion to appoint Chair Lane to serve as the Planning Commission Representative on the Zoning Board of Appeals for 2020.
Supported by Commissioner Clark.

ROLL CALL VOTE:
YEAS: Commissioners Richards, Clark, Shrewsbury, Hendrickson, Cordill, McConnell, Trezise and Chair Lane.
NAYS: None
MOTION CARRIES: 8-0

The Planning Commission will continue to have representatives/liaisons serve in the following rolls:

- Commissioner Trezise- Liaison for Downtown Development Authority
- Commissioner Premoe- Liaison for Environmental Commission
- Commissioner Richards- Liaison for Transportation Commission
- Commissioner Hendrickson- Liaison for Corridor Improvement Authority

Chair Lane volunteered to fill the vacant seat as the liaison for the Economic Development Corporation.

Principal Planner Menser said he with the Township Manager regarding the request for a Township Board member liaison to attend Planning Commission meetings and said he will draft a letter for Chair Lane to sign regarding the request.

C. Form based code initiative

Principal Planner Menser updated the draft form based code ordinance noting text changes in red.

Principal Planner Menser announced the opportunity for the Planning Commission to present the Form Base Code initiative to the Township Board at its February 18, 2020 meeting.

Additional items to be worked on for the Form Based Code Initiative involve the knee wall provision, eliminating the special use permit for drive-thru, tweaks to the narrative, adding the applicability table, and adding diagrams to illustrate regulations.

Commissioner McConnell suggested requesting 'micro mobility' planned spaces when site plans are submitted for review.

D. 2020 Goals

Principal Planner Menser provided hard copies of the Township Board Goals, the 2020 Planning Commission Work Plan, and the 2019 Planning Commission Goals for reference and discussion for each Commissioner at their place on the dais. The commissioners were asked to think about 2020 goals and plan to discuss and finalize at the February 10, 2020 meeting.

9. Reports and Announcements

A. Township Board updates.

Principal Planner Menser provided a summary of the January 21, 2020 Township Board meeting and provided a preview of what is on the agenda for the February 4, 2020 Township Board meeting.

Chair Lane welcomed the new Planning Commissioner, Bill McConnell, to the group.

Principal Planner Menser reminded everyone the Annual Meeting of the Boards and Commissions would be January 28, 2020 starting at 6 p.m. to discuss the 2019 accomplishments and 2020 goals. -

10. Project Updates

A. New Applications - None
B. Site Plans Received – None
C. Site Plans Approved - None

11. Public Remarks - None

12. Adjournment

Commissioner Shrewsbury moved to adjourn the meeting.
Supported by Commissioner Cordill.
VOICE VOTE: Motion carried unanimously.

Chair Lane adjourned the regular meeting at 7:40 p.m.

Respectfully Submitted,
Debbie Budzynski, Recording Secretary

DARCIE J. WHIDDON
4090 WABANINGO ROAD
OKEMOS, MI 48864
(517) 927-7806

January 29, 2020

Charter Township of Meridian
Planning Commission
5151 Marsh Road
Okemos, MI 48864

Dear Members of the Planning Commission:

I am writing in regard to 5937 Potter Street in Haslett. 5937 Potter Street is located in the Village of Nemoka. It is an 816 square foot residential 3-bedroom and 1-bathroom house built in 1921. According to Associate Planner Mackenzie Dean in the Meridian Township Zoning Department, 5937 Potter was placed into a C-1 commercial district in the 1960s. Ms. Dean further noted that in 2007, there was an effort by Meridian Township to re-zone the property to RN District (Village of Nemoka Mixed Residential District). However, the property was excluded at the request of then-property owner Darwin D. Hart. Currently, the subject property remains in the C-1 zoning district.

I am requesting that the members of the Planning Commission bring forth an initiative to remove 5937 Potter from the C-1 zone and place it the proper zone, the RN District. 5937 Potter has been continuously used as a residential home for almost a century. It has not been used for any commercial purposes. Furthermore, it does not even meet the standards that apply to all C-1 uses. Specifically, it does not meet the minimum lot width of 50 feet nor the side setback requirements of 50 feet from an adjacent residential structure or 35 foot side setback if a screen of double-row interlocking trees is provided (§86-403(b)(2) and (3)). 5937 Potter is merely 33 feet wide—17 feet short of the minimum width requirement. And, it is not feasible to achieve either side setback that is required next to a residential structure, of which it's closest neighbor is a residential home in the RN district.

As the 5937 Potter Street home stands, it has insignificant value. If this home were to be placed into the correct zone, I would be able to properly renovate and increase the value of the subject property and surrounding areas. As such, I respectfully request that you continue the efforts of previous Township planning members and rectify this ill-zoned property.

Should you have any questions or concerns, please feel free to contact me at (517) 927-7806. I appreciate your time and consideration.

Sincerely,

Darcie J. Whiddon
Owner of 5937 Potter St, LLC

To: **Planning Commission**

From: **Peter Menser, Principal Planner**

Mackenzie Dean, Assistant Planner

Date: **February 7, 2020**

Re: **<u>Special Use Permit #19141 (The Cured Leaf TC, Inc.)</u>, establish a 2,282 square foot commercial medical marihuana provisioning center in an existing commercial center located at 3520 Okemos Road.**

The Cured Leaf TC, Inc. has applied for a special use permit (SUP) to establish a 2,282 square foot commercial medical marihuana provisioning center in an existing commercial center located at 3520 Okemos Road. As proposed the provisioning center would occupy two tenant spaces that are currently occupied by Sprint (Suite 9) and Asian Express (Suite 10). The 0.39 acre project site is zoned C-2 (Commercial). The site is currently developed with a 12,990 square foot multi-tenant building identified as Jolly Oak Center, which was built in 1989. Other tenants in the commercial center include Subway, Royal Nails, Mathnasium, Sport Clips, Biggby, and Baryames Cleaners.

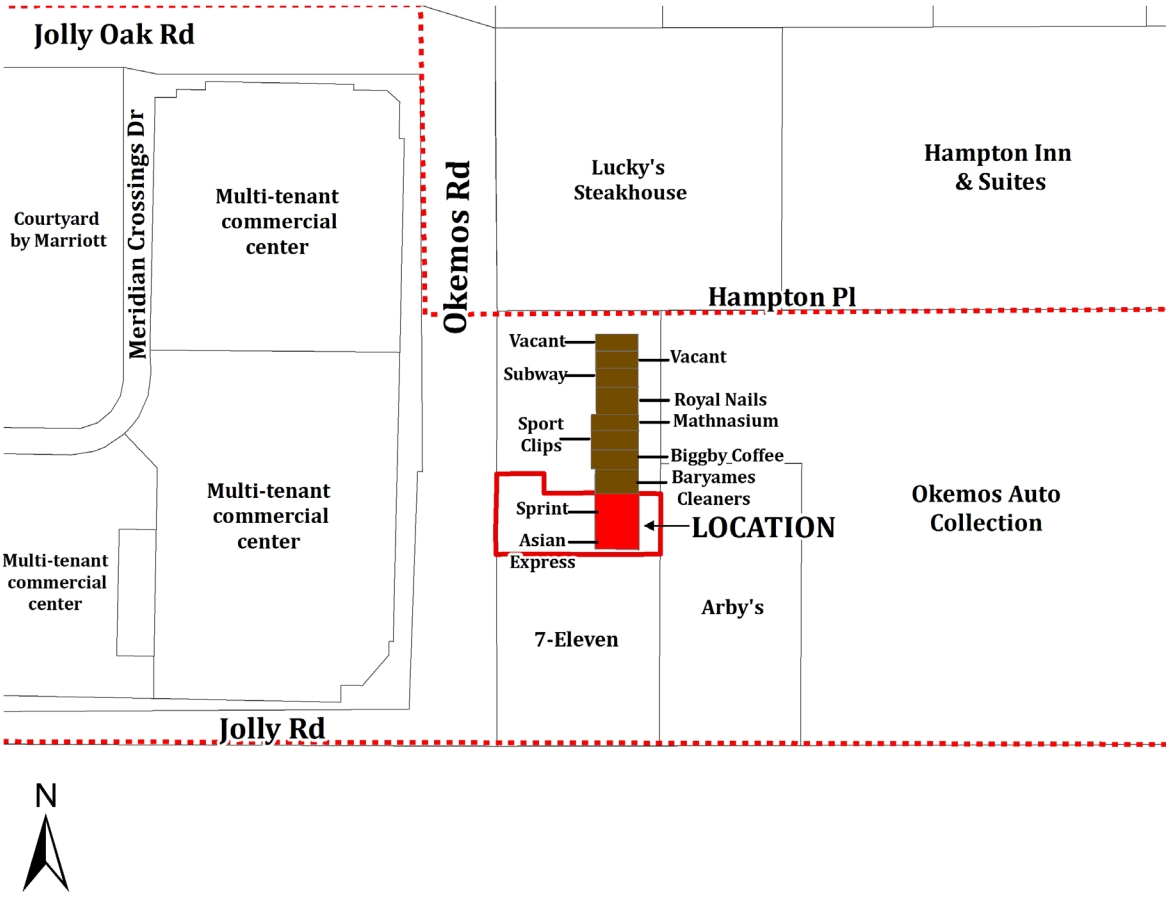
A provisioning center, also referred to a dispensary, is a facility where marihuana, or products derived from marihuana, is sold to registered medical marihuana patients or primary caregivers in accordance with the Michigan Medical Marihuana Act that was approved in 2008. A provisioning center license obtained from the State of Michigan, Department of Licensing and Regulatory Affairs (LARA), authorizes the holder to purchase or transfer marihuana only from growers and processors and to sell or transfer marihuana only to registered qualifying patients or registered primary caregivers. Under current State law consumption or use of marihuana or marihuana products at a provisioning center is prohibited. Provisioning centers are also prohibited from selling or allowing the consumption or use of alcohol or tobacco products on their premises, and from allowing a physician to conduct examinations and issue medical certifications for the purpose of obtaining a registry identification card.

Background

At its meeting on May 21, 2019 the Township Board adopted both zoning and non-zoning ordinances allowing commercial medical marihuana facilities in designated areas in the Township. The non-zoning ordinance established the application process, the facility types allowed, the number of permits, and the general operational standards for the different types of commercial facilities, which include growers, processors, secure transporters, provisioning centers, and safety compliance facilities. The zoning ordinance established seven designated areas in the Township where commercial medical marihuana facilities are permitted and identified the zoning districts in which each of the five types of commercial medical marihuana facilities can locate, as identified in the table on the following page.

Facility type	*Zoning District(s) allowed*	*Overlay Area(s) allowed*
Grower	I (Industrial)	1, 4, 6
Processor	I (Industrial)	1, 4, 6
Provisioning Center	I (Industrial), C-1, C-2, C-3 (Commercial), and RP (Research and Office Park)	1, 2, 3, 4, 5, 6, 7
Safety Compliance Facility	I (Industrial), C-1, C-2, C-3 (Commercial), and RP (Research and Office Park)	1, 2, 3, 5, 6, 7
Secure Transporter	I (Industrial), C-1, C-2, C-3 (Commercial), and RP (Research and Office Park)	1, 2, 3, 5, 6, 7

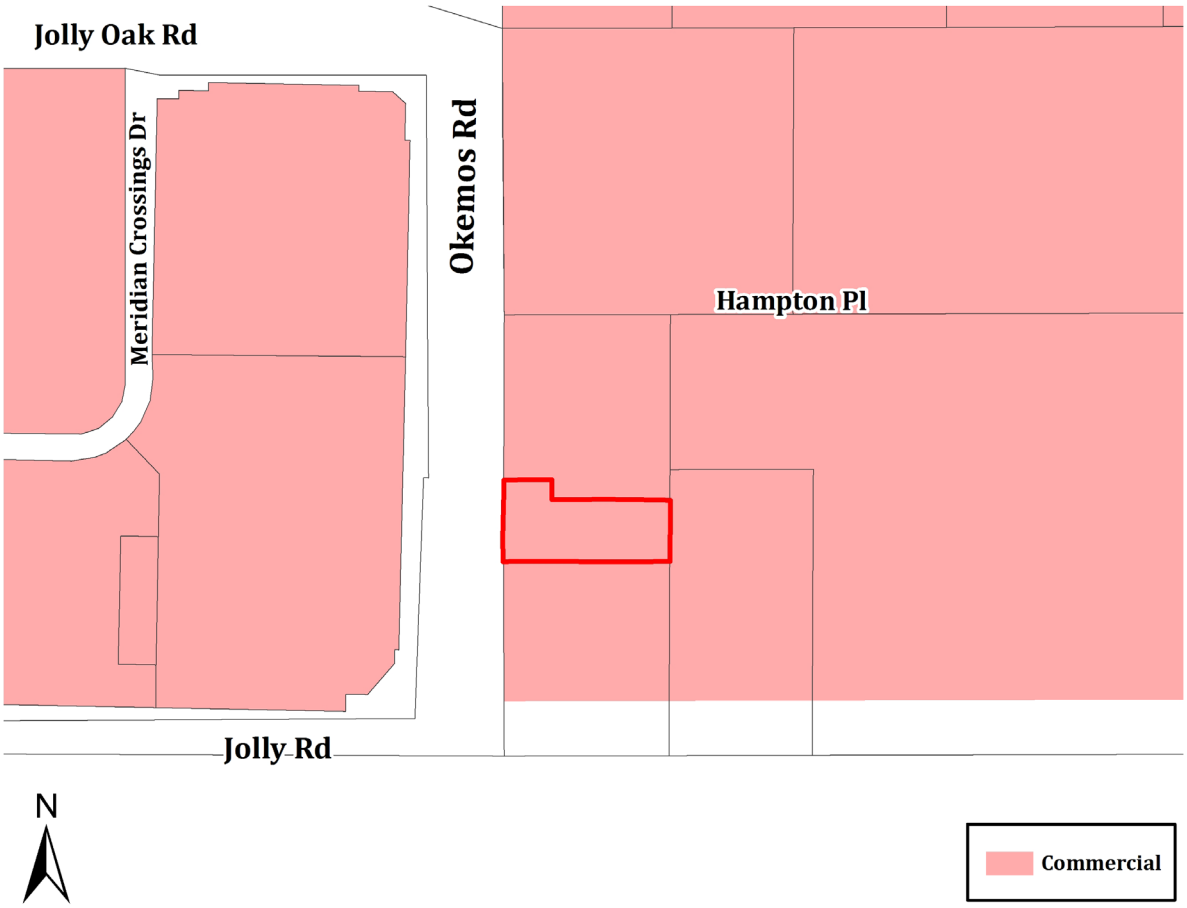
LOCATION MAP



Master Plan

The Future Land Use Map from the 2017 Master Plan designates the subject site in the Commercial category.

FUTURE LAND USE MAP

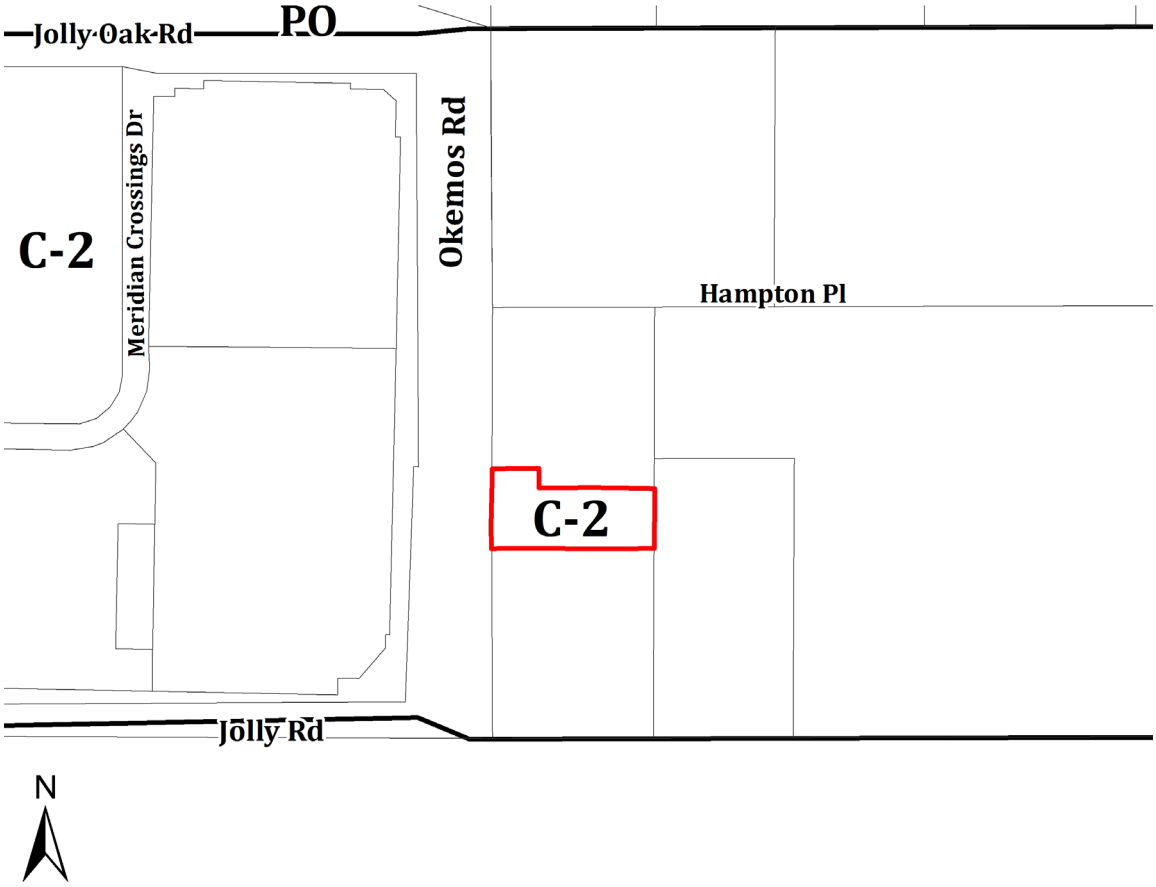


Zoning

The proposed project is located in the C-2 (Commercial) zoning district. A provisioning center is permitted in the C-1, C-2, C-3 (Commercial), I (Industrial), and RP (Research and Office Park) zoning districts subject to approval of a special use permit reviewed by the Planning Commission and approved by the Township Board.

The C-2 district requires a minimum of 100 feet of lot frontage and 4,000 square feet of lot area. The parcel is 0.39 acres in size (16,988 square feet) and has 100 feet of frontage along Okemos Road.

ZONING MAP



Physical Features

The site is currently developed with a 12,990 square foot multi-tenant commercial center identified as Jolly Oak Center, which was constructed in 1989.

The Flood Insurance Rate Map (FIRM) for Meridian Township indicates the property is not located in the floodplain and wetlands are not present on the site. The Township Greenspace Plan shows no special designation on the site.

Streets and Traffic

The approximate 0.39 acre site is located on the east side of Okemos Road, north of Jolly Road. Access to the site is provided from two driveways, one from Okemos Road and one from Hampton Place. A seven foot wide pathway is installed along the Okemos Road frontage. Okemos Road and is a four-lane road with a center turn lane and curb and gutter that is classified as a Principal Arterial street in the Street Setbacks and Service Drive map in Section 86-367 of the Code of Ordinances.

The most recent (2018) traffic count information from the Michigan Department of Transportation (MDOT) showed a total of 21,981 two-way vehicle trips in a 24 hour period on Okemos Road, north of Jolly Road.

A traffic assessment is required for an expansion or change of an existing special use where the increase in intensity would generate an additional 50 to 99 directional trips during morning and afternoon peak hours of traffic. The applicant submitted a traffic assessment prepared by Giffels Webster dated December 16, 2019 that provides information on traffic generated by the proposed provisioning center.

The assessment looks at existing and future level of service (LOS) during the AM (7:30-8:30 a.m.) and PM (4:45-5:45 p.m.) peak hours at the two existing driveway locations located along Okemos Road and Hampton Plaza. The traffic assessment notes existing traffic at the studied locations all operate at an acceptable LOS (LOS C or better) during the AM and PM peak hours. Under future conditions, it is projected all movements will operate at an acceptable level of service (LOS C or better).

The submitted traffic assessment contains a trip generation analysis which estimates future vehicle trips that could be generated by the proposed provisioning center. The Institute of Transportation Engineers (ITE) trip generation rates for a Marijuana Dispensary (Land Use Code 882) were selected to represent the proposed provisioning center. The following table summarizes findings from the trip generation analysis.

Description	Size	AM Peak Hour			PM Peak Hour			Weekday
		In	Out	Total	In	Out	Total	
Marijuana Dispensary, Land Use Code 882	2,400 sq. ft.	14	11	25	26	26	52	606

The findings of the traffic assessment shows traffic generated by the proposed provisioning center would not create a significant impact at the studied locations.

Parking

The Township Code of Ordinances requires five (minimum) to 5.5 (maximum) parking spaces per 1,000 square feet of gross floor area for commercial centers and shopping malls having a gross floor area less than 25,000 square feet. The 12,990 square foot multi-tenant commercial center requires a minimum of 65 parking spaces and a maximum of 71 parking spaces. The shopping center currently has a total of 68 parking spaces, a portion of which the applicant intends to utilize.

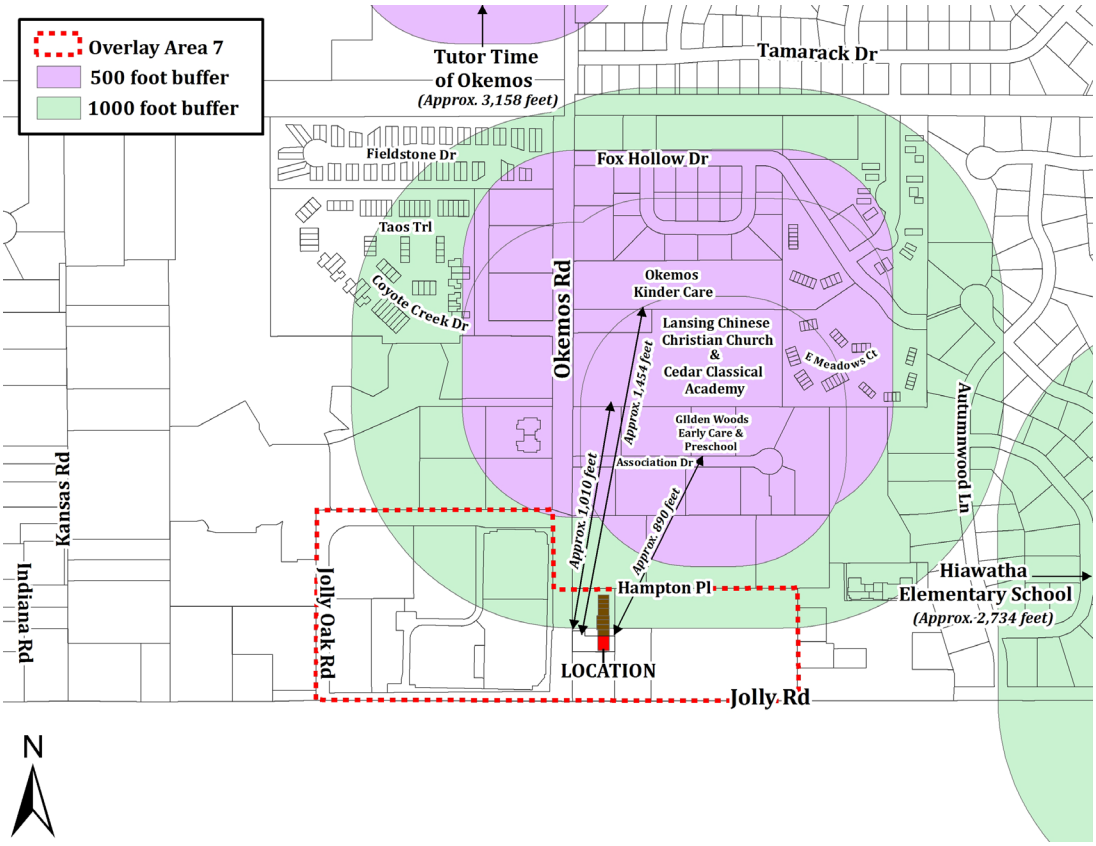
Staff Analysis

The Cured Leaf TC, Inc. has requested special use permit approval to occupy tenant space in the Jolly Oak Center commercial center at 3520 Okemos Road to operate a commercial medical marihuana provisioning center. For commercial medical marihuana facilities the Planning Commission makes a recommendation on the request and the Township Board makes the final decision. The special use permit review criteria found in Section 86-126 of the Code of Ordinances should be used when evaluating the proposed special use permit.

Required Spacing

The non-zoning ordinance adopted by the Township Board requires commercial medical marihuana facilities to be located one-thousand (1,000) feet from any public or private K-12 school, five hundred (500) feet from any church, place of worship or other religious facility, and five hundred (500) feet from any library, preschool, or child care center. The minimum distance between uses is measured horizontally between the nearest property lines. The map on the following page shows the 500 and 1,000 foot buffers near the proposed provisioning center. The closest facility to the proposed provisioning center is Gilden Woods Early Care and Preschool. Gilden Woods is located at 2190 Association Drive which is approximately 890 feet away from the proposed provisioning center.

SETBACKS MAP



Commercial Medical Marihuana Facility Permit Application

Applicants for a commercial medical marihuana facility must go through various steps in order to establish a facility within Meridian Township, including securing local and state approval. The local process begins with the initial application for a Commercial Medical Marihuana Facility Permit. To be eligible for a permit the applicant was required to submit a non-refundable $5,000 dollar application fee and address at least two of the following three requirements: (1) an official statement issued by the Department of Licensing and Regulatory Affairs (LARA) indicating that the applicant has completed state prequalification for a license, (2) proof that the applicant or owners of at least 75% of the applicant are current Township residents and were residents for at least twelve months prior to filing the application, (3) signing of a certification restricting the transfer of the permit for a period of not less than 30 months after issuance. The applications were reviewed internally by Township staff and the Township Attorney. Other important aspects of the permit application process included submittal of documents addressing the organizational structure of the applicant, passing background checks, submitting a security plan for the facility, addressing waste disposal, providing details on staffing, and submitting information on product vendors and transporters.

Once the facility application is deemed complete, the applicant receives conditional approval from the Director of Community Planning and Development. In this initial application period the Township did received only applications for provisioning centers.

Lottery

If multiple applications are received for an overlay area a lottery is held to establish the order applicants can apply for a special use permit. If a conditionally approved applicant fails to submit a SUP application within the required 60 day period after the lottery then the applicant's conditional approval is revoked and the next applicant drawn in the lottery receives an opportunity to submit a SUP application. In the case of the current request, The Cured Leaf TC, Inc. was the only conditionally approved applicant in Overlay Area 7, so a lottery was not required.

State Review and Next Steps

SUP approval must be granted by the Township Board before an application can move forward to the final steps of approval for a Commercial Medical Marihuana Facility Permit. Before operations may begin at the facility the applicant must be granted a permit by the Director of Community Planning and Development and receive final approval from the State of Michigan by completing the License Qualification and Final Approval steps of the state application process. Only when the facility has been inspected and the Township has confirmed all applicable State approvals will a Commercial Medical Marihuana Facility Permit be issued and the facility allowed to open. The commercial medical marihuana facility permit is issued for a period of one year.

Renewal

After one year, the applicant must submit an application to renew the Commercial Medical Marihuana Facility Permit. A $5,000 renewal fee is required at the time of application. Each year, any pending applications for renewal or amendment of valid, unexpired permits are reviewed and granted or denied before applications for new permits are considered. If a renewal is denied or licensure is not granted the permit shall be forfeited and the Director may accept new applicants in the next application period. If the applicant maintains a valid State license and remains in good standing with both the State and Township a renewal will be granted for another one year period.

Planning Commission Options

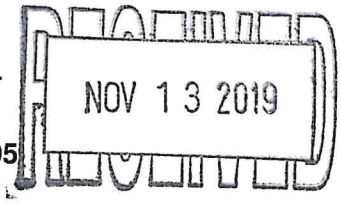
The Planning Commission may recommend approval, approval with conditions, or denial of the proposed special use permit. A resolution will be provided at a future meeting.

Attachments

1. Special use permit application and attachments.
2. Site plan prepared by Kebs, Inc. dated August 5, 2019 and received on November 13, 2019.
3. Floor plans prepared by Serra-Marko & Associates dated August 2019 and received by the Township on November 13, 2019.
4. Traffic Assessment prepared by Giffels Webster dated December 16, 2019 and received by the Township on December 16, 2019.
5. Medical Marihuana Overlay Area Map dated May 16, 2019.

G: Community Planning & Development\Planning\SPECIAL USE PERMITS (SUP)\2019\SUP 19141 (The Cured Leaf TC, Inc.)\SUP 19141.pc1.docx

CHARTER TOWNSHIP OF MERIDIAN
DEPARTMENT OF COMMUNITY PLANNING AND DEVELOPMENT
5151 MARSH ROAD, OKEMOS, MI 48864
PLANNING DIVISION PHONE: (517) 853-4560, FAX: (517) 853-4095



SPECIAL USE PERMIT APPLICATION

Before submitting this application for review, an applicant may meet with the Director of Community Planning and Development to discuss the requirements for a special use permit and/or submit a conceptual plan for review to have preliminary technical deficiencies addressed prior to submittal of the application. If the property or land use is located in the following zoning districts RD, RC, RCC, RN then the applicant must meet with the Planning Director to discuss technical difficulties before filing a formal application.

Part I

A. Applicant The Cured Leaf TC, Inc.
Address of Applicant 108 S. Main Street, Royal Oak, MI. 48067
Telephone - Work 248-939-0525 Home _____ Fax _____ Email Nemer@MGMT10.com
Interest in property (circle one): Owner Tenant Option Other
(Please attach a list of all persons with an ownership interest in the property.)

B. Site address / location / parcel number 3520 Okemos Road, Okemos, MI. 48864, 33-02-02-33-452-010
Legal description (please attach if necessary) (Please See Attached)
Current zoning C-2
Use for which permit is requested / project name Medical Marijuana Provisioning Center
Corresponding ordinance number 2019-01, 5-21-2019

C. Developer (if different than applicant) Hagar I, LLC
Address 108 S. Main Street, Royal Oak, MI. 48067
Telephone – Work 248-802-8118 Home _____ Fax _____

D. Architect, Engineer Planner or Surveyor responsible for design of project if different from applicant:
Name Roman Bonislawski, Ron & Roman, LLC
Address 275 E. Frank Street, Birmingham, MI. 48009
Telephone – Work 248-723-5790 Home _____ Fax _____

E. Acreage of all parcels in the project: Gross 1.28 Net .39

F. Explain the project and development phases: (Please See Attached Development Process)

G. Total number of:
Existing: structures 1 bedrooms____ offices____ parking spaces 68 carports ___ garages____
Proposed: structures 1 bedrooms____ offices____ parking spaces 68 carports ___ garages____

H. Square footage: existing buildings 12,990 proposed buildings____
Usable Floor area: existing buildings 12,990 proposed buildings____

I. If employees will work on the site, state the number of full time and part time employees working per shift and hours of operation: (Please See Attached)

J. Existing Recreation: Type N/A Acreage _____
Proposed Recreation: Type N/A Acreage _____
Existing Open Space: Type N/A Acreage _____
Proposed Open Space: Type N/A Acreage _____

K. If Multiple Housing: No Housing

Total acres of property _____

Acres in floodplain _____ Percent of total _____

Acres in wetland (not in floodplain) _____ Percent of total _____

Total dwelling units _____

Dwelling unit mix:

Number of single family detached:	for Rent _____	Condo _____
Number of duplexes:	for Rent _____	Condo _____
Number of townhouses:	for Rent _____	Condo _____
Number of garden style apartments:	for Rent _____	Condo _____
Number of other dwellings:	for Rent _____	Condo _____

L. The following support materials must be submitted with the application:

1. Nonrefundable Fee. (Paid with MMFLA Application)
2. Legal Description of the property. (Please See Attached)
3. Evidence of fee or other ownership of the property. (Please See Attached Purchase Agreement)
4. Site Plan containing the information listed in the attachment to this application. (Please See Attached Site Plan)
5. Architectural sketches showing all sides and elevations of the proposed buildings or structures, including the project entrance, as they will appear upon completion. The sketches should be accompanied by material samples or a display board of the proposed exterior materials and colors. No structural changes to the building.
6. A Traffic Study, prepared by a qualified traffic engineer, based on the most current edition of *Evaluating Traffic Impact Studies: A Recommended Practice for Michigan Communities*, published by the State Department of Transportation. (Attached Traffic Study Memo)
   a. A traffic assessment will be required for the following:
      1) New special uses which could, or expansion or change of an existing special use where increase in intensity would, generate between 50 to 99 directional trips during a peak hour of traffic.
      2) All other special uses requiring a traffic assessment as specified in the Township Code of Ordinances, Chapter 86, Article IV, Division 2.
   b. A traffic impact study will be required for the following:
      1) New special uses which would, or expansion or change of an existing special use where increase in intensity would, generate over 100 directional trips or more during a peak hour of traffic, or over 750 trips on an average day.
      2) All other special uses requiring a traffic assessment as specified in the Township Code of Ordinances, Chapter 86, Article IV, Division 2.
7. Natural features assessment which includes a written description of the anticipated impacts on the natural features at each phase and at project completion that contains the following: Attached Assessment
   a. An inventory of natural features proposed to be retained, removed, or modified. Natural features shall include, but are not limited to, wetlands, significant stands of trees or individual trees greater than 12 inches dbh, floodways, floodplains, waterbodies, identified groundwater vulnerable areas, slopes greater than 20 percent, ravines, and vegetative cover types with potential to sustain significant or endangered wildlife.
   b. Description of the impacts on natural features.
   c. Description of any proposed efforts to mitigate any negative impacts.

   The natural features assessment may be waived by the Director of Community Planning and Development in certain circumstances.

M. Any other information specified by the Director of Community Planning and Development which is deemed necessary to evaluate the application.

N. In addition to the above requirements, for zoning districts, **RD, RC, RCC, RN, and CV** and **Group Housing Residential Developments** the following is required: Does Not Apply

1. Existing and proposed contours of the property at two foot intervals based on United States Geological Survey (USGS) data.
2. Preliminary engineering reports in accordance with the adopted Township water and sewer standards, together with a letter of review from the Township Engineer.
3. Ten copies of a report on the intent and scope of the project including, but not limited to: Number, size, volume, and dimensions of buildings; number and size of living units; basis of calculations of floor area and density and required parking; number, size, and type of parking spaces; architectural sketches of proposed buildings.
4. Seven copies of the project plans which the Township shall submit to local agencies for review and comments.

O. In addition to the above requirements, a special use application in zoning district **RP** requires the following material as part of the site plan: Does Not Apply

1. A description of the operations proposed in sufficient detail to indicate the effects of those operations in producing traffic congestion, noise, glare, air pollution, water pollution, fire hazards or safety hazards or the emission of any potentially harmful or obnoxious matter or radiation.
2. Engineering and architectural plans for the treatment and disposal of sewerage and industrial waste tailings, or unusable by-products.
3. Engineering and architectural plans for the handling of any excessive traffic congestion, noise, glare, air pollution, or the emission of any potentially harmful or obnoxious matter or radiation.

P. In addition to the above requirements, a special use application for a use in the Floodway Fringe of zoning district **CV** requires the following: Does Not Apply

1. A letter of approval from the State Department of Environmental Quality.
2. A location map including existing topographic data at two-foot interval contours at a scale of one inch representing 100 feet.
3. A map showing proposed grading and drainage plans including the location of all public drainage easements, the limits, extent, and elevations of the proposed fill, excavation, and occupation.
4. A statement from the County Drain Commissioner, County Health Department, and Director of Public Works and Engineering indicating that they have reviewed and approved the proposal.

Q. In addition to the above requirements, a special use application for a use in the Groundwater Recharge area or zoning district **CV** requires the following: Does Not Apply

1. A location map including existing topographic data at two-foot interval contours.
2. A map showing proposed grading and drainage plans including the location of all public drainage easements, the limits and extent of the proposed fill, excavation, and occupation.
3. A statement from the County Drain Commissioner, County Health Department, and Director of Public Works and Engineering indicating that they have reviewed and approved the proposal.

R. In addition to the above requirements, the Township Code of Ordinances, Article VI, should be reviewed for the following special uses: group housing residential developments, mobile home parks, nonresidential structures and uses in residential districts, planned community and regional shopping center developments, sand or gravel pits and quarries, sod farms, junk yards, sewage treatment and disposal installations, camps and clubs for outdoor sports and buildings greater than 25,000 square feet in gross floor area. Does Not Apply

Part II

SUP REQUEST STANDARDS
Township Code of Ordinances, Section 86-126

Applications for Special Land Uses will be reviewed with the standards stated below. An application that complies with the standards stated in the Township Ordinance, conditions imposed pursuant to the Ordinance, other applicable Ordinances, and State and Federal statutes will be approved. Your responses to the questions below will assist the Planning Commission in its review of your application.

(1) The project is consistent with the intent and purposes of this chapter.

(2) The project is consistent with applicable land use policies contained in the Township's Master Plan of current adoption.

(3) The project is designed, constructed, operated, and maintained so as to be harmonious and appropriate in appearance with the existing or intended character of the general vicinity and that such a use will not change the essential character of the same area.

(4) The project will not adversely affect or be hazardous to existing neighboring uses.

(5) The project will not be detrimental to the economic welfare of surrounding properties or the community.

(6) The project is adequately served by public facilities, such as existing roads, schools, stormwater drainage, public safety, public transportation, and public recreation, or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide any such service.

(7) The project is adequately served by public sanitation facilities if so designed. If on-site sanitation facilities for sewage disposal, potable water supply, and storm water are proposed, they shall be properly designed and capable of handling the longterm needs of the proposed project.

(8) The project will not involve uses, activities, processes, materials, and equipment and conditions of operation that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, fumes, glare, or odors.

(9) The project will not directly or indirectly have a substantial adverse impact on the natural resources of the Township, including, but not limited to, prime agricultural soils, water recharge areas, lakes, rivers, streams, major forests, wetlands, and wildlife areas.

Part III

I (we) hereby grant permission for members of the Charter Township of Meridian's Boards and/or Commissions, Township staff member(s) and the Township's representatives or experts the right to enter onto the above described property (or as described in the attached information) in my (our) absence for the purpose of gathering information including but not limited to the taking and the use of photographs.

☑ Yes ☐ No (Please check one)

By the signature(s) attached hereto, I (we) certify that the information provided within this application and accompanying documentation is, to the best of my (our) knowledge, true and accurate

Signature of Applicant

11-12-2019
Date

Nemer Haddad
Type/Print Name

Fee: $500

Received by/Date: Peter Menser 11/13/19

Meridian Township:
Medical Marijuana Provisioning Center (The Cured Leaf TC)

Project: Remodel 2 existing suites within Jolly Oaks Plaza, located at 3520 Okemos road Okemos, MI., into 1, Medical Marijuana Provisioning Center.

Process:

Phase 1: Special use Permit

-Apply for Special Use Permit.
-Complete pre-licensure steps.
-Begin employee recruitment and outreach.
-Select all vehicles, equipment, instruments, tools, and supplies required for year-one operation.
-Introduce the Company to the local government and discuss our plans, including hiring locally, odor control, and site security.

Phase 2: Construction / Recruiting

-Attain Special Use Permit
-Secure necessary construction permits from township
-Prepare site.
-Begin construction
-Continue employee recruitment and outreach.
-Move-in temporary office off site for recruitment.
-Purchase all equipment, instruments, tools, and supplies required for year-one operation.
-Receive Certificate of Occupancy
-Order Phase 2 State Approval Inspection

Phase 3: Final Buildout and Inspection

-Hire employees and remaining Executive Team.
-Staff training.
-Install Security systems
-Install Fire Systems
-Install and test all equipment and instruments.
-Phase 2 State Approval Inspection and Approval
-Facility dry run.
-Grand Opening

Meridian Township	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Store Hours	8am - 8pm	8am - 8pm	8am - 8pm	8am - 8pm	8am - 8pm	8am - 8pm	10am - 6pm	**80**
GM	8am - 6pm	OFF	8am - 6pm	8am - 6pm	8am - 6pm	8am - 6pm	OFF	**50**
ASM	11am - 8pm	8am - 6pm	OFF	11am - 8pm	11am - 8pm	OFF	10am - 6pm	**45**
Lead Bud Tender	11am - 8pm	11am - 8pm	11am - 8pm	OFF	11pm - 8pm	11am - 8pm	OFF	**44**
Bud Tender 2	8am - 4pm	OFF	OFF	8am - 4pm	8am - 4pm	8am - 4pm	10am - 6pm	**40**
Bud Tender 3	12pm - 8pm	8am - 4pm	8am - 4pm	OFF	8am - 4pm	OFF	10am - 6pm	**40**
Bud Tender 4	OFF	12pm - 8pm	12pm - 8pm	12pm - 8pm	12pm - 8pm	12pm - 8pm	OFF	**40**
Lead Reception	8am - 8pm	OFF	8am - 5pm	8am - 5pm	8am - 5pm	8am - 5pm	OFF	**48**
Reception 2	OFF	8am - 8pm	5pm - 8pm	5pm - 8pm	5pm - 8pm	5pm - 8pm	10am - 6pm	**32**
Lead Security	8am - 5pm	OFF	8am - 5pm	8am - 5pm	8am - 5pm	8am - 5pm	OFF	**45**
Security 2	OFF	8am - 5pm	5pm - 8pm	5pm - 8pm	5pm - 8pm	5pm - 8pm	10am - 6pm	**29**
Security 3	5pm - 8pm	5pm - 8pm	OFF	OFF	11am - 6pm	11am - 6pm	OFF	**20**
Employees per shift	**8**	**7**	**8**	**8**	**11**	**9**	**5**	

The hours of operation will be 8AM - 8PM, Monday - Saturday and 10AM - 6PM on Sundays.

The management team will consist of a General Manager, an Assistant Store Manager, and the Lead Bud Tender, all full-time.

We will have 4 full-time bud tenders, 1 full-time lead receptionist, 1 part-time receptionist, 1 full-time security guard and 2 part-time security guards.

Total Employees	11
Full time	8
Part time	3

Legal Description of 3520 Okemos Rd. Okemos, MI. 48864 as pulled from the attached land survey.

CERTIFICATE OF SURVEY:

I hereby certify only to the parties named hereon that we have surveyed and divided into several parcels, at the direction of said parties, a parcel of land previously described as:

(As provided)
Tax ID: 33-02-02-33-452-010
BEG @ THE S 1/4 COR SEC 33 -N 89 DEG 46'40"E ALNG S SEC LN 50 FT -N 0 DEG 04'28"W PLL WITH NS 1/4 LN 217 FT TO POB -N 0 DEG 04'28"W 284.6 FT -N 89 DEG 46'40"E PLL WITH S SEC LN 197.5 FT -S 0 DEG 04'28"E 284.6 FT -S 89 DEG 46'40"W 197.5 FT TO POB ON SE 1/4 OF SEC 33, T4NR1W

and that we have found or set, as noted hereon, permanent markers to all corners and angle points of the boundaries of said parcels and that the more particular legal descriptions of said parcels are as follows:

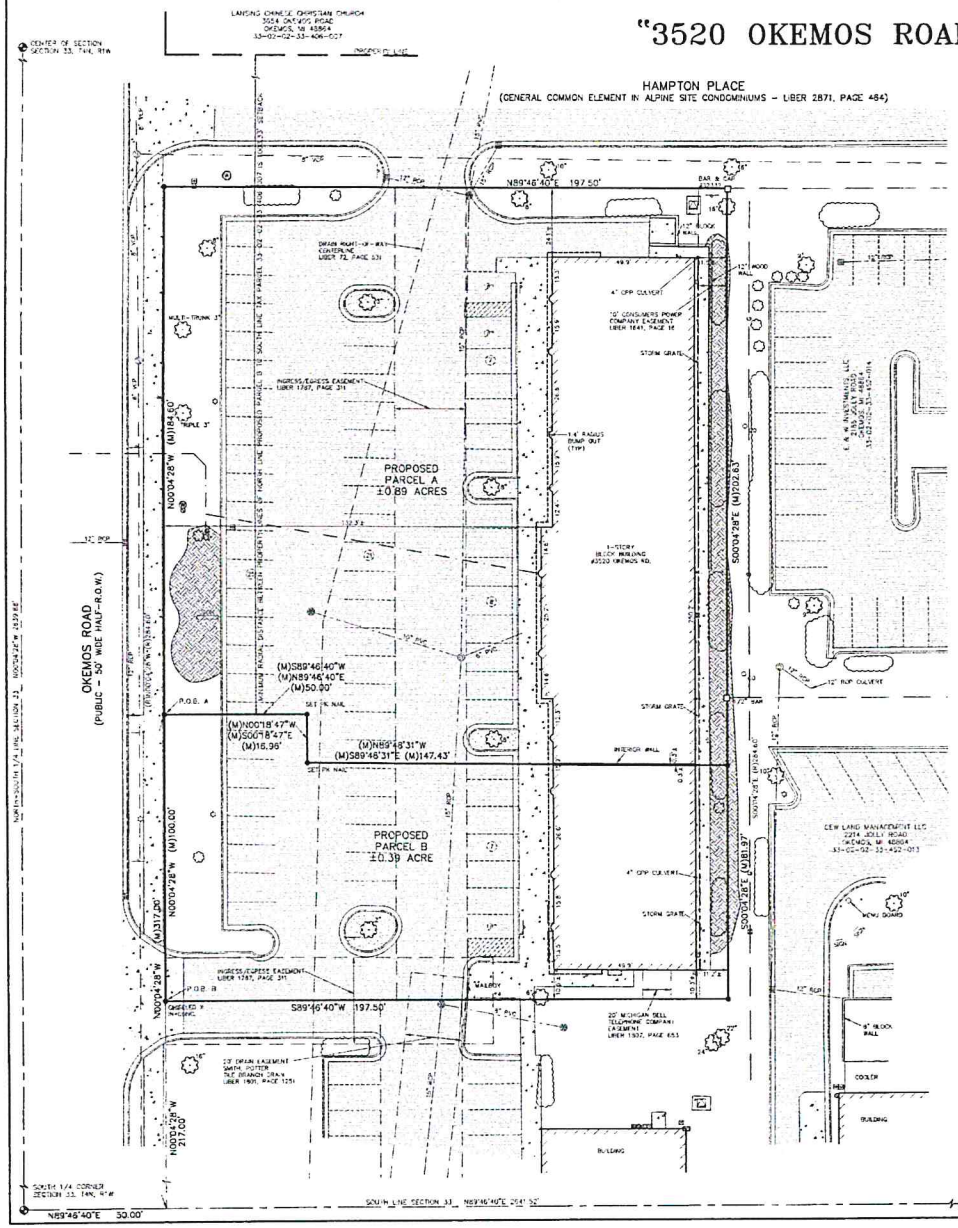
Parcel A:
A parcel of land in the Southeast 1/4 of Section 33, T4N, R1W, Meridian Township, Ingham County, Michigan, the surveyed boundary of said parcel described as: Commencing at the South 1/4 corner of said Section 33; thence N89°46'40"E along the South line of said Section 33 a distance of 50.00 feet; thence N00°04'28"W parallel with the North-South 1/4 line of said Section 33 a distance of 317.00 feet to the point of beginning of this description; thence continuing N00°04'28"W parallel with said North-South 1/4 line 184.60 feet; thence N89°46'40"E parallel with said South section line 197.50 feet; thence S00°04'28"E parallel with said North-South 1/4 line 202.63 feet; thence N89°48'31"W 147.43 feet; thence N00°18'47"W 16.96 feet; thence S89°46'40"W parallel with said South section line 50.00 feet to the point of beginning; said parcel containing 0.89 acre more or less; said parcel subject to all easements and restrictions if any.

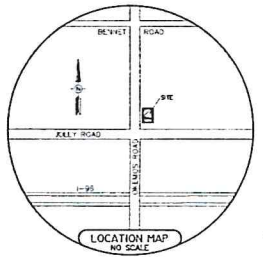
Parcel B:
A parcel of land in the Southeast 1/4 of Section 33, T4N, R1W, Meridian Township, Ingham County, Michigan, the surveyed boundary of said parcel described as: Commencing at the South 1/4 corner of said Section 33; thence N89°46'40"E along the South line of said Section 33 a distance of 50.00 feet; thence N00°04'28"W parallel with the North-South 1/4 line of said Section 33 a distance of 217.00 feet to the point of beginning of this description; thence continuing N00°04'28"W parallel with said North-South 1/4 line 100.00 feet; thence N89°46'40"E parallel with said South section line 50.00 feet; thence S00°18'47"E 16.96 feet; thence S89°48'31"E 147.43. feet; thence S00°04'28"E parallel with said North-South 1/4 line 81.97 feet; thence S89°46'40"W parallel with said South section line 197.50 feet to the point of beginning; said parcel containing 0.39 acre more or less; said parcel subject to all easements and restrictions if any.

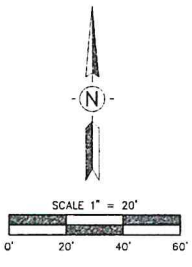
FOR: JOLLY OAK, LLC

SITE PLAN

"3520 OKEMOS ROAD, OKEMOS, MI 48864"







WITNESSES TO SECTION CORNERS:

South 1/4 corner, Section 33, T4N, R1W, Liber 9, Page 511
Found Remon bar and cap in monument box, in C/L of Jolly and Okemos Roads
Found nail and tag #12034, Southwest side power pole, S50°E, 60.51'
C/L sanitary manhole, N39°E, 60.10'
C/L sanitary manhole, S81°W, 72.33'
Southeast bolt in sign base, N43°W, 61.05'

Center of Section 33, T4N, R1W, Liber 3, Page 255
Found iron in monument box in centerline of Jolly Road
Found nail & tag #12034 South side utility pole, S85°W, 33.10'
Found nail & tag #12034 Northeast side utility pole, N40°W, 116.52'
Found nail & tag #12034 Northwest side utility pole, N42°E, 115.00'
Found nail & tag #19383 North side utility pole, N75°E, 52.62'

Southeast corner Section 33, T4N, R1W, Liber 9, Page 517
Found Remon, disk #30093 in man bay centerline of Jolly
Found nail and tag #30390, Northeast side utility Pole, N85°W, 50.07'
Found Southwest corner brick of house, N15°E, 103.1'C'
Found Remon, disk #28414, West, 72.65'
Found Northwest corner Square catch basin at back of curb, N45°E, 33.35'

CERTIFICATE OF SURVEY:

I hereby certify only to the parties named hereon that we have surveyed and divided into several parcels, at the direction of said parties, a parcel of land previously described as:

(As provided)
Tax ID: 33-02-02-33-452-010
BEG @ THE S 1/4 COR SEC 33 –N 89 DEG 46'40"E ALNG S SEC LN 50 FT –N 0 DEG 04'28"W PRL WITH NS 1/4 LN 217 FT TO POB –N 0 DEG 04'28"W 284.6 FT –N 89 DEG 46'40"E PLL WITH S SEC LN 197.5 FT –S 0 DEG 04'28"E 284.6 FT –S 89 DEG 46'40"W 197.5 FT TO POB ON SE 1/4 OF SEC 33, T4NR1W

and that we have found or set, as noted hereon, permanent markers to all corners and angle points of the boundaries of said parcels and that the more particular legal descriptions of said parcels are as follows:

Parcel A:
A parcel of land in the Southeast 1/4 of Section 33, T4N, R1W, Meridian Township, Ingham County, Michigan, the surveyed boundary of said parcel described as: Commencing at the South 1/4 corner of said Section 33; thence N89°46'40"E along the South line of said Section 33 a distance of 50.00 feet; thence N00°04'28"W parallel with the North-South 1/4 line of said Section 33 a distance of 317.00 feet to the point of beginning of this description; thence continuing N00°04'28"W parallel with said North-South 1/4 line 184.60 feet; thence N89°46'40"E parallel with said South section line 197.50 feet; thence S00°04'28"E parallel with said North-South 1/4 line 202.63 feet; thence N89°48'31"W 147.43 feet; thence N00°18'47"W 16.96 feet; thence S89°46'40"W parallel with said South section line 50.00 feet to the point of beginning; said parcel containing 0.89 acre more or less; said parcel subject to all easements and restrictions if any.

Parcel B:
A parcel of land in the Southeast 1/4 of Section 33, T4N, R1W, Meridian Township, Ingham County, Michigan, the surveyed boundary of said parcel described as: Commencing at the South 1/4 corner of said Section 33; thence N89°46'40"E along the South line of said Section 33 a distance of 247.50 feet; thence N00°04'28"W parallel with the North-South 1/4 line of said Section 33 a distance of 217.00 feet to the point of beginning of this description; thence continuing N00°04'28"W parallel with said North-South 1/4 line 100.00 feet; thence N89°46'40"E parallel with said South section line 50.00 feet; thence S00°18'47"E 16.96 feet; thence S89°48'31"E 147.43 feet; thence S00°04'28"E parallel with said North-South 1/4 line 81.97 feet; thence S89°46'40"W parallel with said South section line 197.50 feet to the point of beginning; said parcel containing 0.39 acre more or less; said parcel subject to all easements and restrictions if any.

SCHEDULE B, SECTION II, EXCEPTIONS:
(As provided in Title Commitment No. 280797LANS, Revision No. 1 provided by client)

Item 11: Centerline of route of drain right-of-way as described in Liber 72, Page 531, crosses parcel, is plottable and shown hereon. No width defined.

Item 12: Michigan Bell Telephone Easement as recorded in Liber 1371, Page 810, does not cross parcel therefore not shown hereon.

Item 13: Michigan Bell Telephone Easement as recorded in Liber 1371, Page 811, does not cross parcel therefore not shown hereon.

Item 14: Grant of Easement as recorded in Liber 1545, Page 134, does not cross parcel, therefore not shown hereon.

Item 15: Consumers Energy easement as recorded in Liber 1641, Page 16, crosses parcel, is plottable and shown hereon.

Item 16: Ingress/egress easements as recorded in Liber 1787, Page 311, cross parcel, are plottable and shown hereon.

Item 17: Smith, Potter Tile Branch Drain right-of-way as recorded in Liber 1801, Page 1251, crosses parcel, is plottable and shown hereon. Stormwater detention right-of-way per said document does not cross subject parcel, therefore not shown hereon.

Item 18: Michigan Bell Telephone Company easement as recorded in Liber 1807, Page 653, crosses parcel, is plottable and shown hereon.

Item 19: Location of sanitary easement per 2822, Page 152; legal description in said document describes a centerline starting at a point of commencement and ending at a point of beginning – no real area is described, therefore not shown hereon.

Item 20: Keith Branch Drain of the Potter Tile Branch No. 12 Drain as recorded in Liber 3080, Page 282, does not cross parcel, therefore not shown hereon.

Item 21: Area in crossing permit per document No. 2017-033569 for fiber optic to cross under a 15" pipe within the Smith Consolidated Drain within Hampton Place, approximately 116 feet East of the East curb of Okemos Road; no specific location of fiber optic is plottable, therefore not shown hereon.

Item 22: Area in crossing permit per document No. 2017-033570 does not cross parcel, therefore not shown hereon.

Item 23: Area in crossing permit per document No. 2017-033571 does not cross parcel, therefore not shown hereon.

SURVEYOR'S NOTES:

1. This plan was made at the direction of the parties named hereon and is intended solely for their immediate use. Survey prepared from fieldwork performed in July 2019.

2. All bearings and distances on the survey are record and measured unless otherwise noted. All bearings are based on the South line of Section 33 bearing N89°46'43"E per KEBS, Inc. Survey Job #05-B-77099.

3. All dimensions are in feet and decimals thereof.

4. No building tie dimensions are to be used for establishing the property lines.

5. There are no observable potential encroachments onto the subject property from adjoining lands, or from the subject property onto adjoining lands, except as shown hereon.

6. By scaled map location and graphic plotting only, this property lies entirely within Flood Zone "X", areas outside the 0.2% annual chance floodplain, according to the National Flood Insurance Program, Flood Insurance Rate Map for the Charter Township of Meridian, Ingham County, Michigan, Community Panel No. 260093 0170 D, dated August 16, 2011.

7. Utility information as shown was obtained from available public records and from supporting field observations, where possible, and is subject to verification in the field by the appropriate authorities prior to use for construction. MISS DIG was not contacted to mark utilities on site.

LEGEND

(M) = MEASURED DISTANCE	= SANITARY MANHOLE
(R) = RECORD DISTANCE	= DRAINAGE MANHOLE
• = SET 1/2" BAR WITH CAP	= WATER MANHOLE
□ = FOUND IRON AS NOTED	= ELECTRIC MANHOLE
= DEED LINE	= TELEPHONE MANHOLE
= DISTANCE NOT TO SCALE	= CATCHBASIN
= FENCE	= SANITARY CLEANOUT
= ASPHALT	= FIRE HYDRANT
= CONCRETE	= VALVE
= LANDSCAPING	= UTILITY POLE
= GRAVEL	= LIGHT POLE
= BUILDING OVERHANG	= GUY POLE
= SANITARY SEWER	= GUY WIRE
= STORM SEWER	= UTILITY PEDESTAL
= WATER LINE	= TRANSFORMER
= GAS LINE	= HANDHOLE
= UNDERGROUND TELEPHONE	= ELECTRIC METER
= UNDERGROUND TELEVISION	= GAS METER
= UNDERGROUND ELECTRIC	= WATER METER
= OVERHEAD WIRES	= SOIL BORING
= HEDGE LINE	= SIGN
= DECIDUOUS TREE	= POST
= CONIFEROUS TREE	= AIR CONDITIONING UNIT
= BUSH	= MONITORING WELL

STATE OF MICHIGAN
ERICK R. FRIESTROM
PROFESSIONAL SURVEYOR
53497

ERICK R. FRIESTROM DATE
PROFESSIONAL SURVEYOR NO. 53497

REVISIONS	COMMENTS
08/05/2019	ORIGINAL
09/06/2019	ADDED WORK "OUTBACK"
09/07/2019	ADDED EASEMENTS

KEBS, INC. ENGINEERING AND LAND SURVEYING
2116 HASLETT ROAD, HASLETT, MI 48840
PH. 517-339-1014 FAX 517-339-8047
WWW.KEBS.COM
Warshal Office – Ph. 269-781-9800

DRAWN BY: SSF	SECTION: 33, T4N, R1W
FIELD WORK BY: SW	JOB NUMBER: 95571.BND-1
SHEET 1 OF 1	

PURCHASE AGREEMENT

THIS PURCHASE AGREEMENT (this "Agreement"), is made by and between **JOLLY OAK LLC**, a Michigan limited liability company, ("Seller"), and **HAGER I, LLC**, a Michigan limited liability company ("Buyer") as of the Effective Date, as defined below.

RECITALS:

A. Seller is the owner of improved real property located at 3520 Okemos Road, Charter Township of Meridian, County of Ingham, State of Michigan, more particularity described on **Exhibit A** (the "Real Property").

B. Seller desires to sell, and Buyer desires to purchase, the Property (as defined below), all in accordance with the terms set forth below.

C. THIS AGREEMENT REMAINS VALID UNTIL 11:59 PM ON AUGUST 1, 2019 AND MUST BE EXECUTED AND RETURNED BY AFORESAID TIME, OTHERWISE THIS AGREEMENT IS NULL AND VOID.

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is acknowledged, Seller and Buyer agree as follows:

1. **Sale**. On the terms and subject to the conditions of this Agreement, Seller shall sell, convey and assign to Buyer, on the Closing Date (as defined below), the Real Property. All of Seller's right, title and interest in and to all easements, rights, interests, claims and appurtenances in any way belonging to, appertaining to, or benefiting the Real Property are collectively referred to herein as the "**Property**").

2. **Purchase**. In full consideration for the sale of the Property and the performance by Seller of its covenants and agreements contained in this Agreement, Buyer shall, on the terms and subject to the conditions of this Agreement, purchase the Property from Seller and pay to Seller the Purchase Price.

3. **Purchase Price**. The purchase price (the "Purchase Price") shall be Six Million and 00/100 Dollars ($6,000,000.00).

4. **Payment of Purchase Price**. The Purchase Price shall be payable as follows:

(a) Upon execution of a formal Purchase Agreement, the Buyer shall pay a Twenty-Five Thousand and 0/100 Dollars ($25,000.00) non-refundable deposit directly to the Seller, which shall be applied to the Purchase Price at Closing. In the event Buyer does not wire transfer the Twenty-Five Thousand and 0/100 Dollars ($25,000.00), within Three (3) Business Days, this Agreement shall be deemed null and void.

(b) The balance of the Purchase Price, plus or minus closing prorations and adjustments, shall be paid to Seller at the Closing by wire transfer of immediately available funds.

5. **Conveyance**. Conveyance of title to the Property shall be consummated by delivery at Closing of an executed recordable warranty deed conveying fee simple marketable title to the Property to Buyer, subject only to Permitted Exceptions (as defined below). The warranty deed shall not reflect the Purchase Price, but instead, an executed Real Estate Transfer Tax Valuation Affidavit in the form required by Ingham County and the State of Michigan shall be delivered to Buyer at Closing. The personal property and intangibles contained in the definition of Property shall be conveyed by a bill of sale and assignment, free and clear of any and all liens, liabilities, encumbrances, exceptions and claims. All leases shall be assigned by Seller and assumed by Buyer at Closing. Seller has negotiated termination agreements for approximately 2,200 sf in the Property currently occupied by Asian Express and Preferred Wireless as shown on the attached **Exhibit B**. The termination agreements give the Landlord the option to terminate the subject leases upon sixty (60) days prior written notice and payment of termination fees in the total amount of $75,000.00. These termination agreements shall be assigned to Buyer at closing.

6. **Evidence of Title**. Within ten (10) days after the Effective Date, Seller shall deliver to Buyer a commitment for an Owner's title insurance policy (the "Title Commitment"), a Title Commitment from Transnation Title Agency, 1675 WaterTower Place, Suite 200, East Lansing, MI 48823 or a title company insuring these types of transactions in the State of Michigan (the "Title Company") with standard exceptions, in the amount of the Purchase Price, along with copies of all recorded exceptions to title set forth in the Title Commitment.. At the Closing, Seller shall cause to be issued, at Seller's sole cost and expense, a policy of owner's title insurance pursuant to the Title Commitment (the "Owner's Title Policy").

7. **Objections to Title**. Buyer shall have ten (10) days after receipt of the Title Commitment and all copies of all documents referred to in the Title Commitment, to inspect the state of the title, and to object ("Objections") to any matters shown on the Title Commitment. Any matter shown on the Title Commitment not timely objected to by Buyer shall be considered a "Permitted Exception." If Buyer timely notifies Seller in writing of any Objections, Seller may elect (but shall have no obligation except as set forth in clause (B) below) to cure or remove any of the Objections, provided, that (A) in no event shall Seller be obligated to expend any sum in connection with any such cure, except as provided in the following clause (B), and (B) in any event Seller shall pay, satisfy and remove or cause to be removed Seller's mortgage and any other lien that is dischargeable by the payment of a definite and ascertainable amount (except the lien of any general real estate taxes not due and payable), if any, encumbering the Property (collectively, the "Removable Exceptions"). Subject to the terms of the preceding sentence, if Buyer does give Seller timely written notice of any Objections, Seller agrees to notify Buyer within ten (10) days after receipt of the Objections as to whether Seller will cure such Objections by the Closing Date. If Seller elects to cure an Objection, then Seller shall do so by the Closing Date. If Seller fails to notify Buyer within such 10-day period or Seller timely notifies Buyer that Seller does not intend to attempt to cure any or all of the Objections by the Closing Date, then Buyer shall elect to either (x) waive its Objections hereunder and accept any matters covered by such Objections as Permitted Exceptions hereunder, or (y) terminate this Agreement, whereupon the Deposit shall be returned to Buyer and neither party shall have any further rights or obligations hereunder.

8. **Initial Inspection Period**.

(a) Buyer shall have until on or before September 16, 2019, to complete various inspections and investigations of all aspects of the Property at the Buyer's expense

("Investigation Contingencies"), including, but not limited to, the physical condition and environmental condition of the land and Improvements, and all other aspects of the Property and all documents relating thereto (the "Initial Inspection Period").

i. Buyer may terminate this Agreement by written notice to Seller at any time within the Initial Inspection Period if, for any reason, it is not satisfied in its sole discretion with the results of any of its inspections, investigations or reviews. If Buyer does not terminate the Agreement prior to the expiration of the Initial Inspection Period, all the Investigation Contingencies shall be deemed waived except for the limited purpose of being selected for a Medical Marihuana License for this location by Meridian Township at the lottery ("Lottery") to be held on September 23, 2019, or such other date as may be adjusted by Meridian Township, and obtaining the Township and State license(s) or permits required for Buyer to operate a medical marihuana provisioning center in part of the Property as provided in ¶b below ("Licensing Contingency").

ii. This Agreement shall automatically terminate, on or before September 24, 2019, or the day following the Lottery if it is not held on September 23, 2019, whichever is first to occur ("Licensing Contingency Period") if Buyer's application for a Medical Marihuana License for this location is not selected by Meridian Township at the Lottery, unless otherwise mutually agreed to in writing between the Parties. If Buyer is selected for a Medical Marihuana License for this Property by the Meridian Township Lottery, then Buyer shall make an additional non-refundable deposit of Seventy-Five Thousand and 00/100 ($75,000.00) paid directly to the Seller within Three (3) Business Days, which shall be applied to the Purchase Price at Closing.

iii. Notwithstanding the provisions of subparagraph ii above, the parties acknowledge that, in order to satisfy the Meridian Township 1000 feet "distance" rule to permit a licensed facility at this location, a lot split is required. The Real Property described on **Exhibit A** will be divided into two (2) separate parcels as shown on the diagram attached as **Exhibit A-1**. Seller agrees to proceed with the lot split process in conjunction with Buyer's application for a Medical Marihuana License at the Real Property, and to file such applications and documents required to obtain lot split approval from Meridian Township. Buyer shall be responsible to reimburse Seller at closing for all costs Seller incurs in connection with the lot split e.g. engineering, application and permit fees. The Deposit shall not go "hard" until the Lot Split is granted. Once the lot split is approved, this contingency shall be deemed satisfied and aforesaid Deposit shall be non-refundable.

(b) Buyer shall have three (3) additional thirty (30) day options (the "Extension Option") to extend the Licensing Contingency Period for the sole and limited purpose of obtaining the Township and State license(s) or permits required for Buyer to operate a medical marihuana provisioning center in part of the Property. In the event Buyer elects to exercise its Extension Option, Buyer shall notify the Seller in writing of its intent to do so prior to the expiration of the Initial Inspection Period; provided, however, that Buyer's failure to do so will automatically trigger the Extension Option for this limited purpose upon Seller's receipt of the Option Payment set forth below, unless Buyer expressly terminates the Purchase Agreement in writing. Upon Buyer's exercise of an Extension Option, Buyer shall immediately deliver to Seller the sum of Twenty-Five Thousand Dollars ($25,000) ("Option Payment"). Any Option Payments shall not be applied or credited against the Purchase Price at closing. Buyer may terminate this Agreement at any time within the Extension Period if Buyer does not receive the licensure or permits required to operate a medical marihuana provisioning center in part of the Property upon terms that are acceptable to Buyer, in its sole discretion. If Buyer does not terminate the Purchase Agreement as aforesaid, the Deposits will be applicable to the Purchase Price, and the parties shall proceed to closing.

(c) Buyer agrees to apply for all necessary licenses and permits and process all applications with commercially reasonable dispatch. Buyer shall provide seller with regular written reports on the status of all pending licenses contemporaneous with each Extension Option(s).

(d) Seller shall cooperate with and assist Buyer in obtaining such zoning variations, site plan approvals, sign approvals, engineering data, subdivision approvals and/or governmental approvals and in obtaining any other approvals, certificates or other authorizations required, in Buyer's sole opinion, to permit Buyer's intended use.

(e) Except as is otherwise expressly provided in this Agreement, Seller hereby specifically disclaims any warranty (oral or written) concerning (i) the nature and condition of the Property and the suitability thereof for any and all activities and uses that Buyer may elect to conduct thereon, (ii) the manner, construction, condition and state of repair or lack of repair of any improvements located thereon, (iii) the nature and extent of any right-of-way, lien, encumbrance, license, reservation, condition or otherwise, (ii) the compliance of the Property or its operation with any laws, rules, ordinances or regulations of any government or other body, it being specifically understood that Buyer shall have full opportunity, during the Initial Inspection Period, to determine for itself the condition above ground or below ground of the Property; and (v) any other matter whatsoever except as expressly set forth in this Agreement. Except as otherwise expressly provided in this Agreement, the sale of the Property as provided for herein is made on a strictly "AS IS" "WHERE IS" basis as of the Closing Date. Buyer expressly acknowledges that, in consideration of the agreements of Seller herein, Seller make no warranty or representation, express or implied, or arising by operation of law, including, but in no way limited to, any warranty of quantity, quality, condition,

habitability, merchantability, suitability or fitness for a particular purpose of the Property, any Improvements located thereon or any soil conditions related thereto.

9. **Buyer's Access**. From the Effective Date Seller shall permit Buyer reasonable access to the Property in order to complete its due diligence inspections and reviews. All property inspections and reviews will be conducted at reasonable times agreed upon in advance by Seller and Buyer. Buyer is obligated to repair any damage caused by such tests, investigations and inspections and indemnify and hold Seller harmless from any damages or claims arising out of or related to such entry and inspections.

10. **Documents to Be Delivered**. Seller shall provide Buyer with copies of all existing environmental reports, surveys, drawings, existing contracts and leases, as well as such other written materials specifically itemized and requested by Buyer related to the Property in Seller's possession, such documents to be listed on **Exhibit C** within ten (**10**) days after the execution of the Purchase Agreement.

11. **Representations, Warranties and Covenants of Seller**. Between the Effective Date and the Closing Date, Seller shall, unless otherwise consented to in writing by Buyer or provided in this Agreement:

(a) At Seller's sole cost and expense: (i) maintain and operate the Property in compliance with all laws, ordinances and other requirements of any governmental authority having jurisdiction and substantially in the same manner in which it maintained and operated the Property immediately before entering into this Agreement, and Seller shall not diminish the quality or quantity of maintenance and upkeep services heretofore provided to the Property, (ii) maintain and keep Seller's insurance in full force and effect, and (iii) pay all outstanding taxes, assessments, maintenance and other charges related to the Property.

(b) Pay and satisfy in full or otherwise remove from the Property any and all liens, liabilities and encumbrances placed, or caused to be placed, of record against the Property evidencing a monetary obligation which can be removed by the payment of money, including, without limitation, delinquent real property taxes and assessments, mortgages, construction liens, attachment liens, execution liens, tax liens and judgment liens on or before the Closing Date, provided that Seller may use the proceeds of the sale to do so.

(c) Seller represents, warrants, and covenants to Buyer that except as set forth or otherwise disclosed in this Agreement, or in any Exhibit to this Agreement, or in any schedule of exceptions attached to this Agreement:

(i) This Agreement constitutes a valid and binding agreement of Seller, enforceable in accordance with its terms. Seller has obtained all consents, releases and permissions and given all required notifications related to the transactions herein contemplated and required under any covenant, agreement, encumbrance, law or regulation to which Seller is a party or by which Seller is bound.

(ii) Seller is the fee simple owner of the Property subject to any exceptions shown on that will be discharged at closing and the Permitted Exceptions. Other than this Agreement, Seller is not a party to any contract, agreement or commitment to sell, convey, assign, transfer the fee interest in the Property or otherwise dispose of any portion or portions of the Property except outstanding leasehold interests.

(iii) Seller has not received notice of violation of any applicable law, ordinance, regulation, order or requirement relating to Seller's ownership or use of the Property.

(iv) Seller has not received, or is not under, any outstanding writ, order, injunction, or decree of any court, arbitration panel or governmental agency affecting Seller which would in any manner impede or impair the ability of Seller to sell the Property to Buyer in accordance with the terms of this Agreement.

(v) Seller has not been served with any written notices of intention to claim a construction lien against the whole or any part of the Property.

(d) All representations, warranties and covenants contained in this Agreement shall be deemed remade as of the Closing Date and survive the Closing for a period of one (1) year.

12. **Representations, Warranties and Covenants of Buyer**. Buyer represents and warrants to Seller as of the date hereof (and shall be deemed to represent and warrant to Seller as of the Closing Date) the following:

(a) Buyer's Authority. Buyer has been duly organized and is in good standing in the state in which it was formed. Buyer has the full right and authority and has obtained any and all consents required to enter into this Agreement and to consummate or cause to be consummated the transactions contemplated hereby. This Agreement has been, and all of the documents to be delivered by Buyer at the Closing will be, authorized and executed and constitute, or will constitute, as appropriate, the valid and binding obligation of Buyer.

(b) Embargoed Persons. Buyer represents and warrants that (A) Buyer and each person or entity owning an interest in Buyer is (1) not currently identified on the specially Designated Nationals and Blocked Persons List maintained by the Office of Foreign Assets Control, Department of the Treasury ("**OFAC**") and/or on any other similar list maintained by OFAC pursuant to any authorizing statute, executive order or regulation (collectively, the "**List**"), and (2) not a person or entity with whom a citizen of the United States is prohibited to engage in transactions by any trade embargo, economic sanction, or other prohibition of United States law, regulation, or Executive Order of the President of the United States, (B) none of the funds or other assets of Buyer constitute property of, or are beneficially owned, directly or indirectly, by any Embargoed Person (as hereinafter defined), (C) no Embargoed Person has any interest of any nature whatsoever in Buyer (whether directly or indirectly), and (D) Buyer has implemented procedures, and will consistently apply those procedures, to ensure the foregoing representations and warranties remain

true and correct at all times. The term "Embargoed Person" means any person, entity or government subject to trade restrictions under U.S. law, including, but not limited to, the International Emergency Economic Powers Act, 50 U.S.C. §1701 et seq., The Trading with Enemy Act, 50 U.S.C. App. 1 et. Seq., and any Executive Orders or regulations promulgated thereunder with the result that the investment in Buyer is prohibited by law or Buyer is in violation of law. Buyer also shall require, and shall take reasonable measures to ensure compliance with the requirement, that no person who owns any other direct interest in Buyer is or shall be listed on any of the Lists or is or shall be an Embargoed Person. This Section shall not apply to any person to the extent that such person's interest in the Buyer is through a U.S. Publicly Traded Entity. As used in this Agreement, "U.S. Publicly Trade Entity" means a person (other than an individual) whose securities are listed on a national securities exchange, or quoted on an automated quotation system, in the United States, or a wholly-owned subsidiary of such a person.

(c) All representations, warranties and covenants contained in this Agreement shall be deemed remade as of the Closing Date and survive the Closing for a period of one (1) year.

13. **Conditions Precedent to Buyer's Obligation to Close**. The obligations of Buyer under this Agreement are subject to the occurrence at or prior to the Closing Date of each of the following conditions, any or all of which may be waived in whole or in part by Buyer in writing:

(a) The due performance by Seller of each and every covenant, undertaking and agreement to be performed by it hereunder and the truth of each material representation and warranty made in this Agreement by Seller at the time as of which the same is made and as of the Closing as if made on and as of the Closing.

(b) There shall not have occurred at any time or times on or before the Closing any taking or threatened taking of the Property or any part thereof by eminent domain.

(c) Buyer shall have received a full and complete Municipal Operating License from Meridian Township and a full and complete State Operating License from the State of Michigan for a medical marihuana provisioning center license ("Provisioning Center Licenses") for the Buyer's intended use of a developing a Medical Marihuana Provisioning Center for the Property, including but not limited to a physical license or other licensing verification documentation issued by Meridian Township and the State of Michigan in the name of the Buyer or its designated affiliate.

If any of the conditions set forth in subparagraphs (a)-(b) are not satisfied and such condition is not waived by Buyer by written notice to Seller, then Buyer may terminate this Agreement, whereupon, anything contained in this Agreement to the contrary notwithstanding, the Deposits shall be fully and immediately returned to Buyer, and neither party shall have any further liability to the other, except for such liabilities and obligations that are expressly stated herein to survive termination of this Agreement. If the condition set forth in subparagraph (a) is not satisfied, then Buyer shall have the rights and remedies provided for under Paragraph 20 below.

14. **Conditions Precedent to Seller's Obligation to Close**. The obligations of Seller under this Agreement are subject to the occurrence at or prior to the Closing Date of the following condition, which may be waived in whole or in part by Seller in writing:

(a) The due performance by Buyer of each and every covenant, undertaking and agreement to be performed by it hereunder.

(b) Buyer's compliance with ¶32d below.

If the conditions set forth in subparagraph (a)-(b) are not satisfied or waived by Seller by written notice to Buyer, then Seller shall have the rights and remedies provided in this Agreement.

15. **Closing**.

The closing of the purchase and sale of the Property (the "Closing") shall take place no later than ten (10) days following approval of a full and complete Municipal Operating License by Meridian Township and a full and complete State Operating License by the state of Michigan for a medical marihuana provisioning center, through a customary warranty deed and money escrow at the offices of the Title Company, or at such other time, date and place as the parties may agree.

16. **Possession**. Seller shall deliver to Buyer exclusive possession of the Property at the Closing subject to normal wear and tear excepted and subject to rights of tenants and persons in possession under Leases.

17. **Prorations; Closing Adjustments**.

(a) Seller shall pay all delinquent taxes, assessments, liens and other charges which are a lien against the Property as of the Closing Date. Current real estate taxes and current installments of special assessments, if any, shall be prorated based on calendar year proration as is customary for commercial real estate in Ingham County, as of the date of the Closing. Any prorations to which Buyer may be entitled by reason of the foregoing shall be credited against the balance of the Purchase Price to be paid at closing. Rent and Operating expenses of the Property, if any, shall be prorated as of the midnight before the Closing Date. Buyer shall be responsible for operating expenses of the Property commencing with the Closing Date. Seller shall be responsible for all operating expenses and costs of the Property including, but not limited to, taxes and utility, water, maintenance, insurance, management costs and service contracts, if any, up to the date of the Closing, with Buyer responsible for the Closing Date and thereafter. Seller's non-cancellable service contracts and/or service agreements shall not continue from and after Closing unless Buyer chooses to accept such a service contract or service agreement in writing and, in such an event, Buyer shall only be responsible for fees accrued from and after Closing. Buyer shall be entitled to credit for the security deposits under the Leases. Buyer shall be entitled to credit for any prepaid rent by tenants under the Leases.

18. **Other Costs**. Seller shall pay the cost of recording any curative instruments and for the cost of the Owner's Title Policy. Buyer shall pay the cost of recording the warranty deed conveying title to the Property, transfer taxes, any fees charged by the Title Company or Escrow agent or attorney escrowing or processing any the Earnest Money or holding any funds, all engineering/survey and related costs required for land division application/approval by Meridian Township, and the premium for any additional endorsements to the owner's title policy requested by Buyer. Each party shall pay its own legal fees. Seller shall be entitled to credit for all transferable utility deposits transferred hereunder, if any. All other utility deposits, if any, may be withdrawn by and refunded to Seller and Buyer shall make its own replacement deposits for utilities as may be required by the respective utilities involved. Such other items which are customarily prorated in a purchase and sale of the type contemplated hereunder shall be prorated as of the Closing Date.

19. **Closing Deliveries**. At or prior to the Closing, Seller shall deliver to Buyer, or cause to be delivered to Buyer, all in form and substance satisfactory to Buyer, the instruments of conveyance described in Paragraph 5 above and the Owner's Title Policy (to be delivered in the form of a marked up and signed commitment or signed pro forma format so that upon closing the Title Company is insuring Buyer's title to the Property, as opposed to committing to insure title).

20. **Default**. If Buyer defaults under or breaches this Agreement, which such default or breach is not cured within seven (7) days following written notice from the Seller to the Buyer, then Seller may, as its sole remedy, terminate this Agreement by written notice to Buyer and the Deposits shall be retained by the Seller as liquidated damages and not as a penalty (it being understood that Seller's actual damages may be extremely difficult to calculate), in which event neither party shall have any further rights or obligations hereunder. If Seller defaults under this Agreement and fails to cure such default within seven (7) days after written notice of such default to Seller, at Buyer's option, Buyer shall be entitled to either (i) obtain specific performance of this Agreement or (ii) terminate this Agreement and receive the Deposits. In the event of litigation to enforce this Agreement, the substantially prevailing party shall be entitled to an award of reasonable attorneys' fees and litigation costs.

21. **Notices**. Any notice, demand, request or other communication which either party hereto may be required or may desire to give under this Agreement shall be in writing and shall be deemed to have been properly given (a) if hand delivered (effective upon delivery), (b) if mailed (effective seven (7) days after mailing) by United States registered or certified mail, postage prepaid, return receipt requested, (c) if sent by a nationally recognized overnight delivery service (effective one (1) business day after delivery to such courier) or (d) for the purpose of providing notice pursuant to Section 8 above, if sent by facsimile (effective upon confirmation of transmission) or electronic mail (Adobe Acrobat document) (effective upon sending) in each case addressed as follows:

If to Seller: Jolly Oak LLC
1111 Michigan Ave, Suite 300
East Lansing, MI 48823
Attention: Van W. Martin
Email: van.martin@martincommercial.com

with a copy to:	Grua, Tupper & Young, PLC 2401 E. Grand River Ave Lansing, MI 48912 Attention: Remo Mark Grua Email: grua@wedolawinlansing.com
If to Buyer:	Hager I, LLC 108 S. Main St., Suite A Royal Oak, MI 48067 Email: nemer@mgmt10.com
with a copy to:	Lumberg Freeman Gleeson Hicks & Khalil PLLC 33 Bloomfield Hills Parkway, Suite 135 Bloomfield Hills, MI 48304 Attention: Michael K. Khalil Email: mkhalil@LFGLawFirm.com

22. **Broker**. Seller and Buyer each represent and warrant to the other that it has not dealt with any broker or finder with respect to the transaction contemplated hereby other than Martin Commercial Properties, Inc., whereby the Buyer shall pay Martin Commercial Properties, Inc. One Hundred Thousand and 0/100 ($100,000). Seller and Buyer shall each indemnify, defend and hold the other harmless from and against any claim for brokerage commission or finder's fee asserted by any person, firm or corporation claiming to have been engaged by them.

23. **Foreign Seller Affidavit**. Seller represents and warrants to Buyer that Seller is not a "foreign person" as defined in Section 1445 of the Internal Revenue Code and Seller is, therefore, exempt from the withholding requirements of such Section. Seller shall deliver to Buyer at Closing the exemption certificate described in Section 1445.

24. **Assignment**. This Agreement may be assigned or transferred by Buyer at any time after making the required Deposits to an entity to be formed subject to Seller's prior written consent, which shall not be unreasonably withheld, provided the assignee agrees to be specifically bound by the terms of this Agreement, and is a pre-qualified licensee of the Medical Marihuana Facilities Licensing Act (MMFLA).

25. **Binding Agreement**. This Agreement shall bind and benefit Seller and Buyer and their respective personal representatives, successors and assigns.

26. **Entire Agreement**. This Agreement represents the full and final agreement of the parties with respect to the subject matter hereof. This Agreement may be amended only by a writing signed by both parties. Neither party nor its respective officers, directors, managers, employees, agents, brokers, attorneys or representatives will disclose the subject matter or terms of this Agreement or the possible transactions contemplated hereby without the prior written consent of the other party.

27. **Counterparts**. This Agreement may be executed in one or more counterparts, each of which, when so executed and delivered, shall be deemed an original, but all of which taken together shall constitute but one and the same instrument.

28. **Interpretation**. This Agreement shall be interpreted and enforced in accordance with the laws of the State of Michigan. If any provision of this Agreement shall be unenforceable or invalid, the same shall not affect the remaining provisions of this Agreement. Whenever under the terms of this Agreement the time for performance of a covenant or condition falls on a Saturday, Sunday or legal holiday, such time for performance shall be extended to the next business day. Time is of the essence of this Agreement.

29. **Facsimile**. For the purposes of this Agreement, a signature or signatures delivered via facsimile or e-mail (in portable document format) transmission shall be deemed to be an original signature or signatures when attached to this Agreement or to any other document or notice provided for in this Agreement.

30. **Damage or Destruction**. In the event that the Property shall be damaged or destroyed, whether in whole or part, by fire or any other casualty or act of God between the Effective Date and the Closing Date which, in Buyer's reasonable estimation, exceeds Twenty Five Thousand and 00/100 Dollars ($25,000.00) to repair (a "Casualty"), Buyer shall have the sole option of: (a) terminating this Agreement in which event this Agreement shall thereupon become null and void except for those matters that expressly survive termination hereof, and the Deposit shall be forthwith returned to Buyer; or (b) proceed with this transaction and assume all of Seller's rights, including the right to receive any insurance proceeds. If Buyer elects the option described in clause (b) immediately above, Seller shall not compromise, settle or adjust any claims to such proceeds without Buyer's prior written consent (which will not be unreasonably withheld), it being understood and agreed that Buyer has an interest in all such proceeds. Further, the amount of any deductible that must be paid under any insurance policy shall be credited to Buyer at Closing. Seller shall give immediate written notice to Buyer of any damage or destruction, and Seller shall provide Buyer with complete copies of all policies of insurance covering that portion of the Property so damaged or destroyed. In the event that the Property shall be damaged or destroyed by an event that is not a Casualty, then Buyer shall proceed with this transaction and assume all of Seller's rights, including the right to receive any insurance proceeds. In such an event, the amount of any deductible that must be paid under any insurance policy shall be credited to Buyer at Closing.

31. **Confidentiality**. Buyer and Seller shall keep all information delivered to it confidential (except information: (a) that has entered the public domain through no action or failure to act of Buyer or seller; or (b) prior to disclosure hereunder was already lawfully in Buyer's or Seller's possession without any obligation of confidentiality), and Buyer and Seller shall not disclose the information to third parties, other than its affiliates, officers, directors, shareholders, employees, consultants, advisors, financing sources, co-investors, professional representatives and/or agents, who are evaluating, negotiating, and/or implementing this transaction and/or the financing of this transaction.

32. **Miscellaneous; other Provisions:**

(a) It is understood and agreed between the parties hereto that Seller's intent is to convert this transaction from a purchase and sale to a tax-deferred exchange under Section 1031 of the Internal Revenue Code. The parties agree to fully cooperate,

one with the other, in executing whatever additional documents or amendments that may be reasonably required in order to properly affect a tax-deferred exchange.

(b) Martin Commercial Property, Inc. will have the option to continue to manage and lease the property for five (5) years after the closing and in such event Buyer shall enter into Martin Commercial Property, Inc.'s standard Management and Leasing Agreement and agree to pay a Management Fee of Five percent (5%) of gross receipts and standard leasing fees shown on attached **Exhibit D**.

(c) **BUYER WILL NOT CONTACT OR HAVE ANY COMMUNICATION WITH ANY OF THE TENANTS AT THE PROPERTY UNTIL AFTER THE SALE IS COMPLETED.**

(d) Buyer covenants and agrees to not to submit any other applications to Meridian Township for a Medical Marihuana License at any other location in the "zone" where the Property is located, which is Zone 7. Notwithstanding any other term or provision of the agreement between the parties, it is understood and agreed, if Buyer's submits any other application(s) for a Medical Marihuana License for any other location(s) in Zone 7 where the Property is located regardless of whether or not such application(s) is selected then Buyer shall forfeit the remaining balance of the Earnest Money and the Purchase Agreement shall be terminated and of no further force or effect, and Buyer shall have no interest in the Property.

(e) Time is of the essence of each provision of this Agreement.

(f) This Agreement shall not become a contract until executed and delivered by Buyer and Seller in the manner set forth herein.

(g) If either party institutes a legal action against the other relating to this Agreement or any default hereunder, the unsuccessful party to such action shall reimburse the successful party for the reasonable expenses of prosecuting or defending such action, including without limitation, attorneys' fees and disbursements and court costs.

(h) This Agreement shall not be construed more strictly against one party than against the other merely by virtue of the fact that the Agreement may have been prepared primarily by counsel for one of the parties, it being recognized that both Buyer and Seller have contributed substantially and materially to the preparation of this Agreement.

Signature page follows

IN WITNESS WHEREOF, Seller and Buyer have executed this Agreement on the dates provided below, to be effective as of the last date signed (the "Effective Date").

SELLER:

JOLLY OAK LLC, a Michigan limited liability company

By: _____
Van W. Martin
Its: Manager

Date: August 1, 2019

BUYER:

HAGER I, LLC, a Michigan limited liability company,

By: _____

Name: member
Its: Authorized Signatory

Date: August 1, 2019

EXHIBIT A

LEGAL DESCRIPTION

A parcel of land in the Southeast 1/4 of Section 33, Town 4 North, Range 1 West, Meridian Township, Ingham County, Michigan, the surveyed boundary of said parcel described as: Commencing at the South 1/4 corner of Section 33; thence North 89°46'40" East, along the South line of Section 33, a distance of 50.00 feet; thence North 00°04'28" West, parallel with the North-South 1/4 line of Section 33, a distance of 217.00 feet to the point of beginning of this description; thence North 00°04'28" West, parallel with the North-South 1/4 line, 284.60 feet; thence North 89°46'40" East, parallel with the South Section line, 197.50 feet; thence South 00°04'28" East, parallel with the North-South 1/4 line 284.60 feet; thence South 89°46'40" West, parallel with the South Section line, 197.50 feet to the point of beginning.

Parcel Number: 33-02-02-33-452-010

8/1/19

EXHIBIT A-1

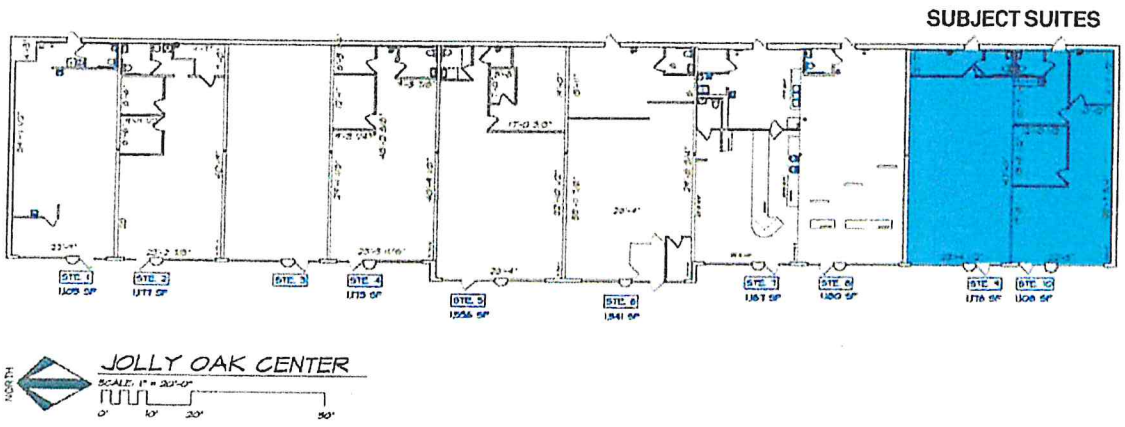
LEGAL DESCRIPTION

[TO BE INSERTED BY THE TITLE COMPANY FOLLOWING LOT SPLIT APPROVAL]

Parcel Number 33-02-02-33-xxx-xxx
Parcel Number 33-02-02-33-xxx-xxx

8/1/19

EXHIBIT B



8/1/19

EXHIBIT C

DUE DILIGENCE ITEMS

1. The most recent Environmental Report (Phase One, Phase Two, if any BEA, etc.) in Seller's possession, if any.

2. Seller's current ALTA survey, if any.

3. All existing Leases, Current Rent Rolls, and Security Deposits on hand.

4. Real and personal tax bills and assessed value for the period from January 1, 2018 through the last invoice received by Seller.

5. Seller's current Owner's Policy of title insurance; if available.

6. All maintenance or service contracts and maintenance plans, if any.

7. Any property site plans, floor plans include square footage, leasing materials, etc., if applicable.

8/1/19

EXHIBIT D

MARTIN COMMERCIAL PROPERTIES, INC.

STANDARD LEASING FEES

If during said period the Property is leased by OWNER, MARTIN or any other party; or if MARTIN produces a lessee ready, willing and able to lease the Property; OWNER agrees to pay to MARTIN a commission as per the following schedule:

Professional fee on any new lease, option, renewal, extension or expansion thereof:

First through fifth lease years:	Six percent (6%) of the gross lease income;
Sixth through tenth lease years:	Four percent (4%) of the gross lease income; and
Over ten years:	Three percent (3%) of the gross lease income.

Minimum commission is one (1) month's rent, but not less than Five Hundred and No/100 ($500.00) Dollars.

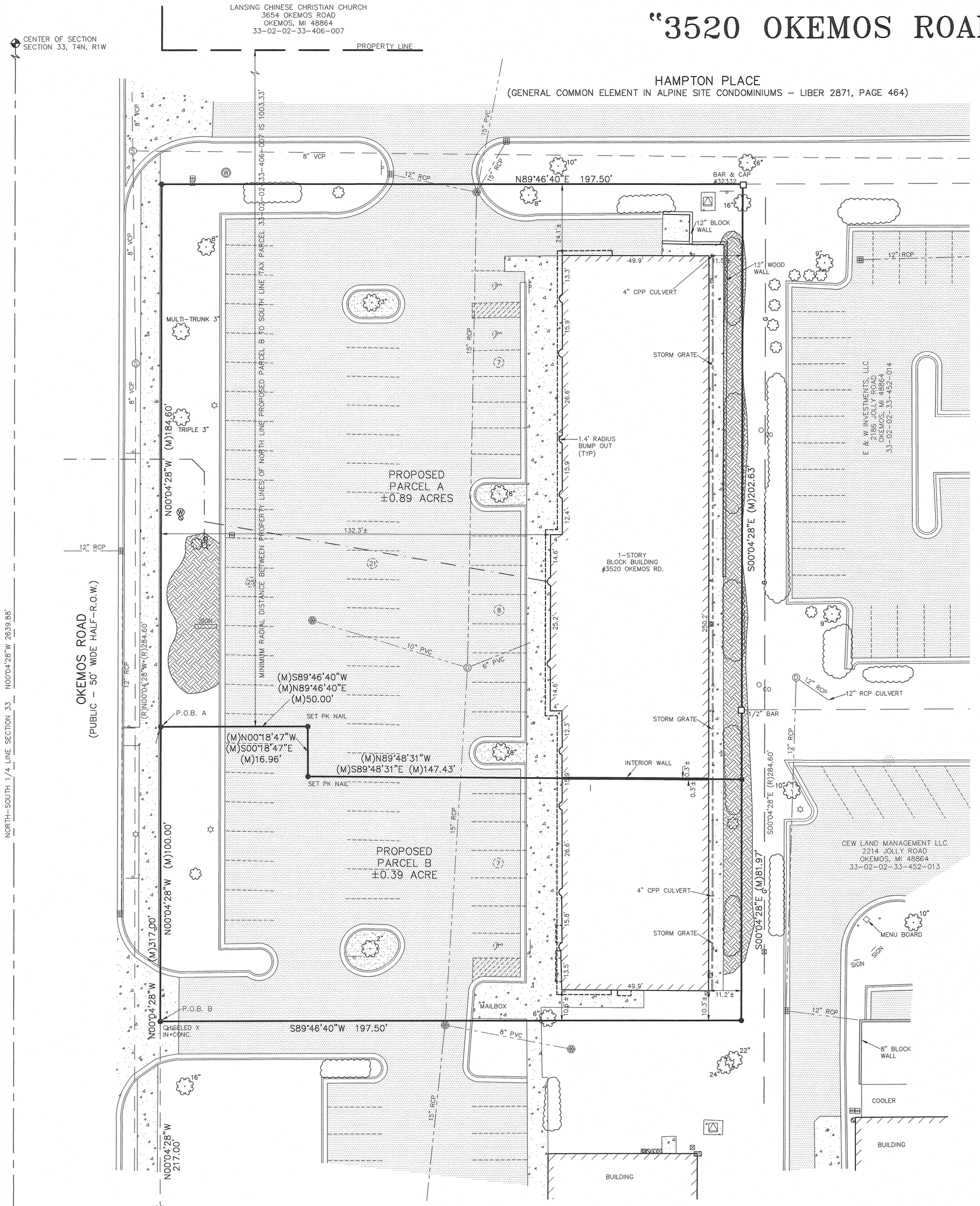
All professional fees shall be paid to MARTIN by OWNER in the following manner: One Hundred Percent (100%) at signing of Lease. Any fee remaining outstanding thirty (30) days after it is due will be billed a late charge at the rate of one and one-quarter percent (1-1/4%) per month or fifteen percent (15%) on an annualized basis.

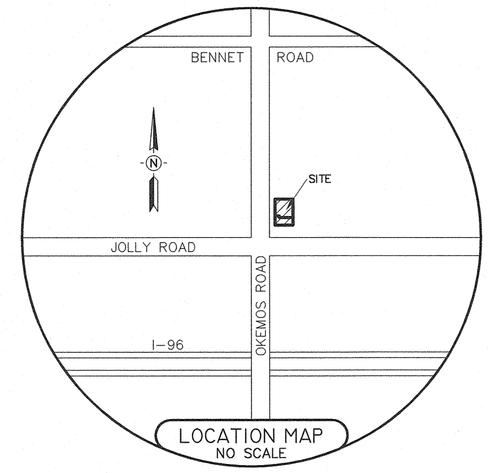
8/1/19

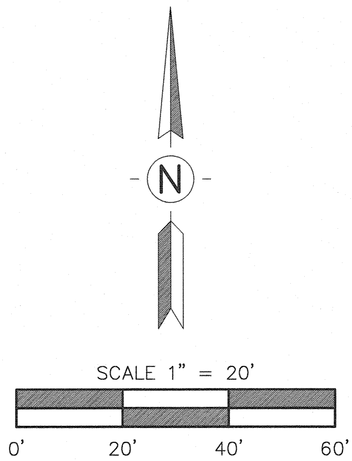
FOR: JOLLY OAK, LLC

SITE PLAN

"3520 OKEMOS ROAD, OKEMOS, MI 48864"







CERTIFICATE OF SURVEY:

I hereby certify only to the parties named hereon that we have surveyed and divided into several parcels, at the direction of said parties, a parcel of land previously described as:

(As provided)
Tax ID: 33-02-02-33-452-010
BEG @ THE S 1/4 COR SEC 33 –N 89 DEG 46'40"E ALNG S SEC LN 50 FT –N 0 DEG 04'28"W PLL WITH NS 1/4 LN 217 FT TO POB –N 0 DEG 04'28"W 284.6 FT –N 89 DEG 46'40"E PLL WITH S SEC LN 197.5 FT –S 0 DEG 04'28"E 284.6 FT –S 89 DEG 46'40"W 197.5 FT TO POB ON SE 1/4 OF SEC 33, T4NR1W

and that we have found or set, as noted hereon, permanent markers to all corners and angle points of the boundaries of said parcels and that the more particular legal descriptions of said parcels are as follows:

Parcel A:
A parcel of land in the Southeast 1/4 of Section 33, T4N, R1W, Meridian Township, Ingham County, Michigan, the surveyed boundary of said parcel described as: Commencing at the South 1/4 corner of said Section 33; thence N89°46'40"E along the South line of said Section 33 a distance of 50.00 feet; thence N00°04'28"W parallel with the North–South 1/4 line of said Section 33 a distance of 317.00 feet to the point of beginning of this description; thence continuing N00°04'28"W parallel with said North–South 1/4 line 184.60 feet; thence N89°46'40"E parallel with said South section line 197.50 feet; thence S00°04'28"E parallel with said North–South 1/4 line 202.63 feet; thence N89°48'31"W 147.43 feet; thence N00°18'47"W 16.96 feet; thence S89°46'40"W parallel with said South section line 50.00 feet to the point of beginning; said parcel containing 0.89 acre more or less; said parcel subject to all easements and restrictions if any.

Parcel B:
A parcel of land in the Southeast 1/4 of Section 33, T4N, R1W, Meridian Township, Ingham County, Michigan, the surveyed boundary of said parcel described as: Commencing at the South 1/4 corner of said Section 33; thence N89°46'40"E along the South line of said Section 33 a distance of 50.00 feet; thence N00°04'28"W parallel with the North–South 1/4 line of said Section 33 a distance of 217.00 feet to the point of beginning of this description; thence continuing N00°04'28"W parallel with said North–South 1/4 line 100.00 feet; thence N89°46'40"E parallel with said South section line 50.00 feet; thence S00°18'47"E 16.96 feet; thence S89°48'31"E 147.43. feet; thence S00°04'28"E parallel with said North–South 1/4 line 81.97 feet; thence S89°46'40"W parallel with said South section line 197.50 feet to the point of beginning; said parcel containing 0.39 acre more or less; said parcel subject to all easements and restrictions if any.

SURVEYOR'S NOTES:

1. This plan was made at the direction of the parties named hereon and is intended solely for their immediate use. Survey prepared from fieldwork performed in July 2019.

2. All bearings and distances on the survey are record and measured unless otherwise noted. All bearings are based on the South line of Section 33 bearing N89°46'40"E per KEBS, Inc. Survey Job #05–B–77099.

3. All dimensions are in feet and decimals thereof.

4. No building tie dimensions are to be used for establishing the property lines.

5. There are no observable potential encroachments onto the subject property from adjoining lands, or from the subject property onto adjoining lands, except as shown hereon.

6. By scaled map location and graphic plotting only, this property lies entirely within Flood Zone "X", areas outside the 0.2% annual chance floodplain, according to the National Flood Insurance Program, Flood Insurance Rate Map for the Charter Township of Meridian, Ingham County, Michigan, Community Panel No. 260093 0170 D, dated August 16, 2011.

7. Utility information as shown was obtained from available public records and from supporting field observations, where possible, and is subject to verification in the field by the appropriate authorities prior to use for construction. MISS DIG was not contacted to mark utilities on site.

8. Easements, if any, not shown.

WITNESSES TO SECTION CORNERS:

South 1/4 corner, Section 33, T4N, R1W, Liber 9, Page 511
Found Remon bar and cap in monument box, in C/L of Jolly and Okemos Roads
Found nail and tag #12034, Southwest side power pole, S50°E, 60.51'
C/L sanitary manhole, N30°E, 60.10'
C/L sanitary manhole, S51°W, 77.33'
Southeast bolt in sign base, N43°W, 61.65'

Center of Section 33, T4N, R1W, Liber 3, Page 255
Found iron in monument box in centerline of Jolly Road
Found nail & tag #12034 South side utility pole, S85°W, 33.10'
Found nail & tag #12034 Northeast side utility pole, N40°W, 116.52'
Found nail & tag #12034 Northwest side utility pole, N40°E, 115.00'
Found nail & tag #18989 North side utility pole, N75°E, 52.62'

Southeast corner Section 33, T4N, R1W, Liber 9, Page 517
Found Remon. disk #30090 in mon box centerline of Jolly
Found nail and tag #30090, Northeast side utility Pole, N55°W, 50.07'
Found Southwest corner brick of house, N15°E, 103.10'
Found Remon. disk #28414, West, 72.65'
Found Northwest corner Square catch basin at back of curb, N45°E, 33.35'

LEGEND

(M)	= MEASURED DISTANCE	(S)	= SANITARY MANHOLE
(R)	= RECORD DISTANCE	(D)	= DRAINAGE MANHOLE
●	= SET 1/2" BAR WITH CAP	(W)	= WATER MANHOLE
□	= FOUND IRON AS NOTED	(E)	= ELECTRIC MANHOLE
———	= DEED LINE	(T)	= TELEPHONE MANHOLE
——\———	= DISTANCE NOT TO SCALE	⊛ ▦	= CATCHBASIN
–x–x–x–	= FENCE	○CO	= SANITARY CLEANOUT
▭	= ASPHALT		= FIRE HYDRANT
▭	= CONCRETE		= VALVE
▭	= LANDSCAPING		= UTILITY POLE
▭	= GRAVEL	☼	= LIGHT POLE
- - - - -	= BUILDING OVERHANG		= GUY POLE
— · — · —	= SANITARY SEWER		= GUY WIRE
— - — - —	= STORM SEWER	⊠	= UTILITY PEDESTAL
— · — · —	= WATER LINE	△	= TRANSFORMER
— —G— —	= GAS LINE	▤	= HANDHOLE
— —TU— —	= UNDERGROUND TELEPHONE	▣	= ELECTRIC METER
— C —	= UNDERGROUND TELEVISION	▣	= GAS METER
— —EU— —	= UNDERGROUND ELECTRIC	▣	= WATER METER
— —EO— —	= OVERHEAD WIRES	⊛	= SOIL BORING
	= HEDGE LINE		= SIGN
	= DECIDUOUS TREE	•	= POST
	= CONIFEROUS TREE	⊠	= AIR CONDITIONING UNIT
	= BUSH	(W)	= MONITORING WELL

STATE OF MICHIGAN
ERICK R. FRIESTROM
PROFESSIONAL SURVEYOR No. 53497
LICENSED PROFESSIONAL SURVEYOR

08/05/19

ERICK R. FRIESTROM DATE
PROFESSIONAL SURVEYOR NO. 53497

REVISIONS	COMMENTS
08/05/2019	ORIGINAL

KEBS, INC. ENGINEERING AND LAND SURVEYING
2116 HASLETT ROAD, HASLETT, MI 48840
PH. 517–339–1014 FAX 517–339–8047
WWW.KEBS.COM
Marshall Office – Ph. 269–781–9800

DRAWN BY SSF	SECTION 33, T4N, R1W
FIELD WORK BY SW	JOB NUMBER: 95571.BND–1
SHEET 1 OF 1	

NOTES: GENERAL DEMOLITION

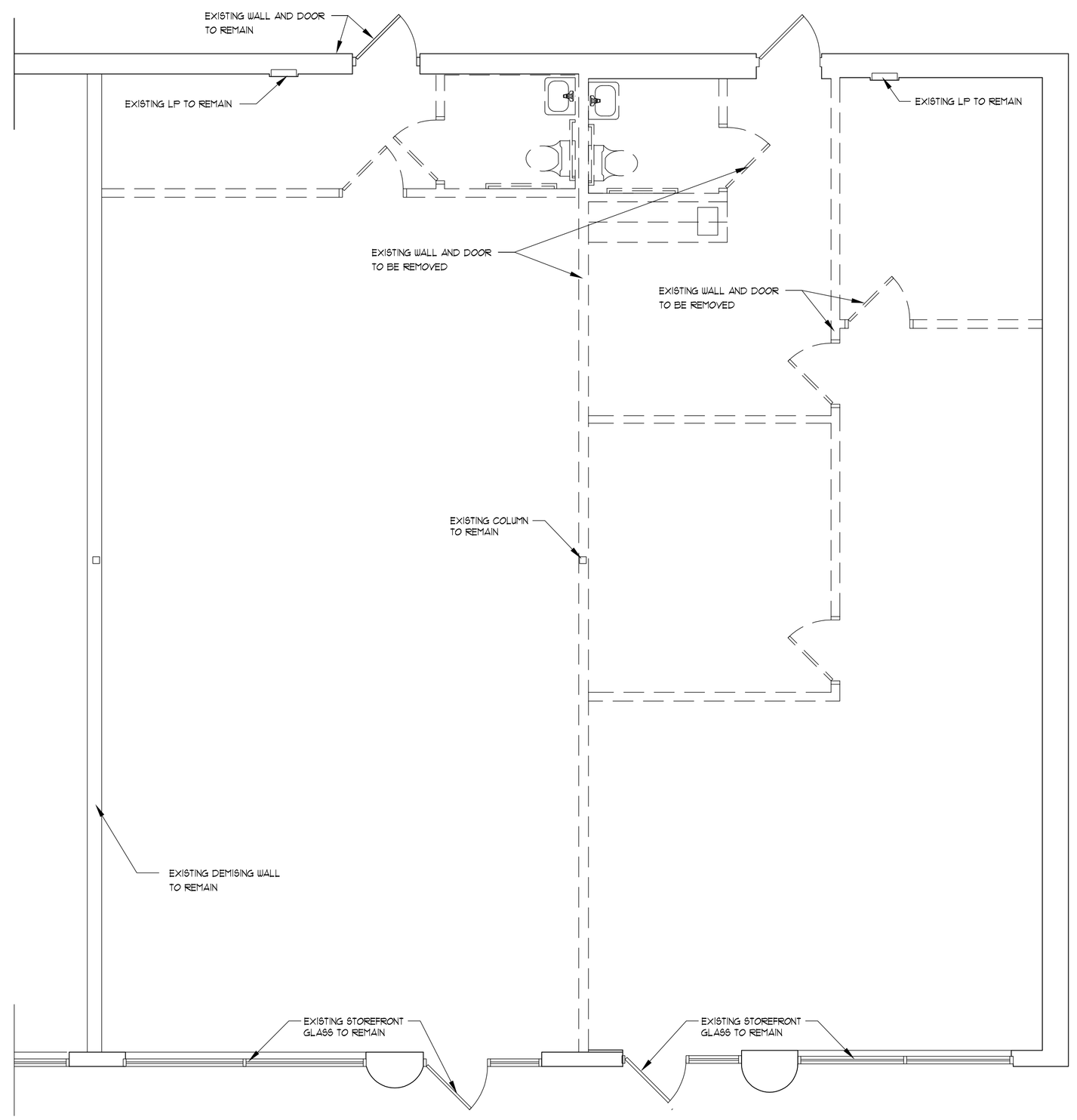
1. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS.
2. PROVIDE APPROPRIATE BARRICADES, SIGNAGE, AND OTHER SAFETY PRECAUTIONS SO AS TO PROTECT VISITORS, TRADESMAN, AND EXISTING REMAINING CONSTRUCTION.
3. COMPLETELY REMOVE ALL WORK AND RELATED WORK IN AREAS DESIGNATED ON THE PLAN.
4. DISCONNECT, REMOVE, AND CAP ALL EXISTING UTILITIES AS INDICATED AND REQUIRED TO PERMIT NEW WORK. ALL WORK TO BE COMPLETED BY APPROPRIATE, EXPERIENCED TRADES (I.E. ELECTRICAL DEMOLITION BY ELECTRICIANS, ETC.)
5. RESTORE EXISTING AREAS WHICH ARE DAMAGED DURING CONSTRUCTION, MATCH EXISTING MATERIAL AND FINISHES.
6. DO NOT USE EXPLOSIVES OR UNSAFE DEMOLITION METHODS.
7. REMOVE ALL DEBRIS FROM THE SITE. DO NOT BURN REFUSE ON SITE. MATERIAL TO BE DISPOSED TO AN APPROVED SITE.
8. COORDINATE SALVAGEABLE ITEMS WITH THE OWNER. STORE SALVAGEABLE ITEMS WITHIN DESIGNATED AREAS.

DEMO WALL LEGEND

- EXISTING WALL TO BE REMOVED
- EXISTING WALL TO REMAIN

DEMO DOOR LEGEND

- NEW DOOR
- EXISTING DOOR TO REMAIN
- EXISTING DOOR TO BE REMOVED



1 / A100 EXISTING / DEMO FLOOR PLAN

SCALE: 1/4" = 1'-0"

NORTH

SIERRA - MARKO & ASSOCIATES
ARCHITECTURAL DESIGNERS
189 E Big Beaver, Suite 106 Troy, MI 48083
Tel: 248.457.6903 Fax: 248.457.6906
Email: info@s-m-associates.com
Website: www.s-m-associates.com

ALL DIMENSIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. THE CONTRACTOR IS SOLEY RESPONSIBLE FOR COORDINATION OF ALL DIMENSIONS.

PREPARED IN COLLABORATION WITH D'ANNA ASSOCIATES, INC.
PROCESSING OKEMOS
Job # 19-0702
Issue Date: 8-2-19

PIETRO D'ALEO ARCHITECT No. 1301055147 08-19-19

PROJECT NAME:
"PROVISIONING CENTER OKEMOS, MI"

PERMIT SUBMISSION
08-06-2019

ADDRESS:
3520 OKEMOS RD. STE #9, #10
OKEMOS, MI 48864

JOB NO.	19-0717		
ISSUANCES			
NO	DESCRIPTION	DATE	BY
1	PERMIT SUBMISSION	08/0619	EM/IM

SHEET TITLE
EXISTING / DEMO FLOOR PLAN

DWG. NO.
A1.0.0
of

TYPICAL NOTES:

1. HARDWARE SELECTED BY OWNER
2. ALL INTERIOR FINISH AND TRIM SHALL COMPLY W/ LOCAL ORDINANCES, CURRENT 2012 MICHIGAN BUILDING CODE SECTION CHAPTER 8
3. CLASS C: FLAME SPREAD 76-200, SMOKE DEVELOPMENT 0-450. CONTRACTOR TO SUBMIT DOC'S AS REQUIRED.

   PRIOR TO INSTALLATION OF ANY PROPOSED APPLICABLE INTERIOR WALL AND CEILING FINISHES, PROVIDE TO THE CITY'S FIELD INSPECTOR DOCUMENTATION SHOWING THEIR CLASS, FLAME SPREAD AND SMOKE DEVELOPED INDEXES.
4. INSULATION FLAME SPREAD INDEX REQUIREMENTS SHALL BE IN ACCORDANCE WITH ASTM E 84.
   A. CONCEALED OR EXPOSED INSTALLATION SHALL HAVE RATING OF NOT MORE THAN 25. INSULATION BETWEEN 2 LAYERS OF NONCOMBUSTILE MATERIALS W/O INTERVENING AIRSPACE SHALL BE ALLOWED TO HAVE A FLAME SPREAD INDEX OF NOT MORE THEN 100.
   B. SMOKE DEVELOPMENT INDEX RATING OF NOT MORE THAN 450.
   C. ALL INSULATION TO BE PROPERLY LABELED
5. CONTRACTOR TO PROVIDE FIRE EXTINGUISHER ON JOB AS REQUIRED BY BUILDING INSPECTOR.
6. PROVIDE MIN. (2) 5# ABC EXTINGUISHERS IN ACCORDANCE WITH NFPA 10 IN EACH TENANT SPACE. LOCATION TO BE VERIFIED WITH BUILDING INSPECTOR.
7. PROVIDE INTERNATIONAL SYMBOL FOR HANDICAPPED SIGNS FOR DIRECTION ON RESTROOM ACCESSIBILITY.
8. ALL GLAZING IN HAZARDOUS AREA SHALL BE SAFETY GLASS AND COMPLY WITH CURRENT M.B.C. SEC 2406.2 LABELS AND GLASS COMP. WITH CPSC 16CFR PART 1201.

GENERAL NOTES:

1. DOOR HANDLES, PULLS, LATCHES, LOCKS, AND OTHER OPERATIONS TO BE AT 48" AFF. MAX AND 34" AFF. MIN.
2. DOORS TO HAZARDOUS AREAS TO HAVE HARDWARE W/ ROUGH FINISH
3. ALL EXIT DOORS TO HAVE PANIC DEVICE CLOSERS AND SHALL NOT LOCK AGAINST EGRESS OR OTHER HARDWARE COMPLYING W/ SEC. 1008.1.8.
4. LOCKING DEVICES TO BE ACTIVATED BY NO MORE THEN ONE-HALF TURN, ACTIVATED BY LEVER TYPE.
5. ALL DOOR HANDLES TO BE LEVER TYPE.
6. ALL VERTICAL CHANGES IN FLOOR ELEVATION, INCLUDING DOOR THRESHOLDS, SHALL BE LIMITED TO 1/4" UNLESS A 1 TO 2 RISE-TO-RUN RATIO PROVIDED IN THE TRANSITION BETWEEN ELEVATIONS+ IN WHICH A 1/2" MAX. DIFFERENCE IS ALLOWED. SAID CHANGES IN ELEVATION SHALL COMPLY WITH ICC/ANSI A117.1-2003.
7. ALL MILLWORK/CASEWORK COUNTERTOPS HAVE A MAXIMUM 34" HEIGHT AFF. UNLESS NOTED OTHERWISE.

Activated Carbon Filters

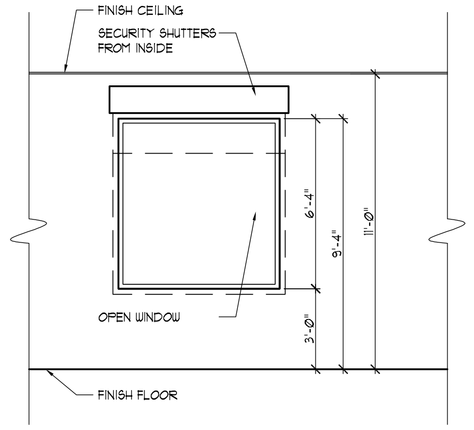
ODOR MITIGATION DEVICES

APPLICANT WILL INSTALL A PHOTOHYDROIONIZATION (PHI) UNIT (SEE SPECIFICATIONS BELOW) AS THE PRIMARY ODOR MITIGATION DEVICES, DESIGNED TO ELIMINATE 99.99% OF ALL ODORS SAFELY AND EFFICIENTLY. IN ROOMS WHERE THE ODOR IS MORE INTENSE, APPLICANT HAS ELECTED TO USE ACTIVATED CARBON FILTERS AS A SECONDARY ODOR REDUCTION METHOD.

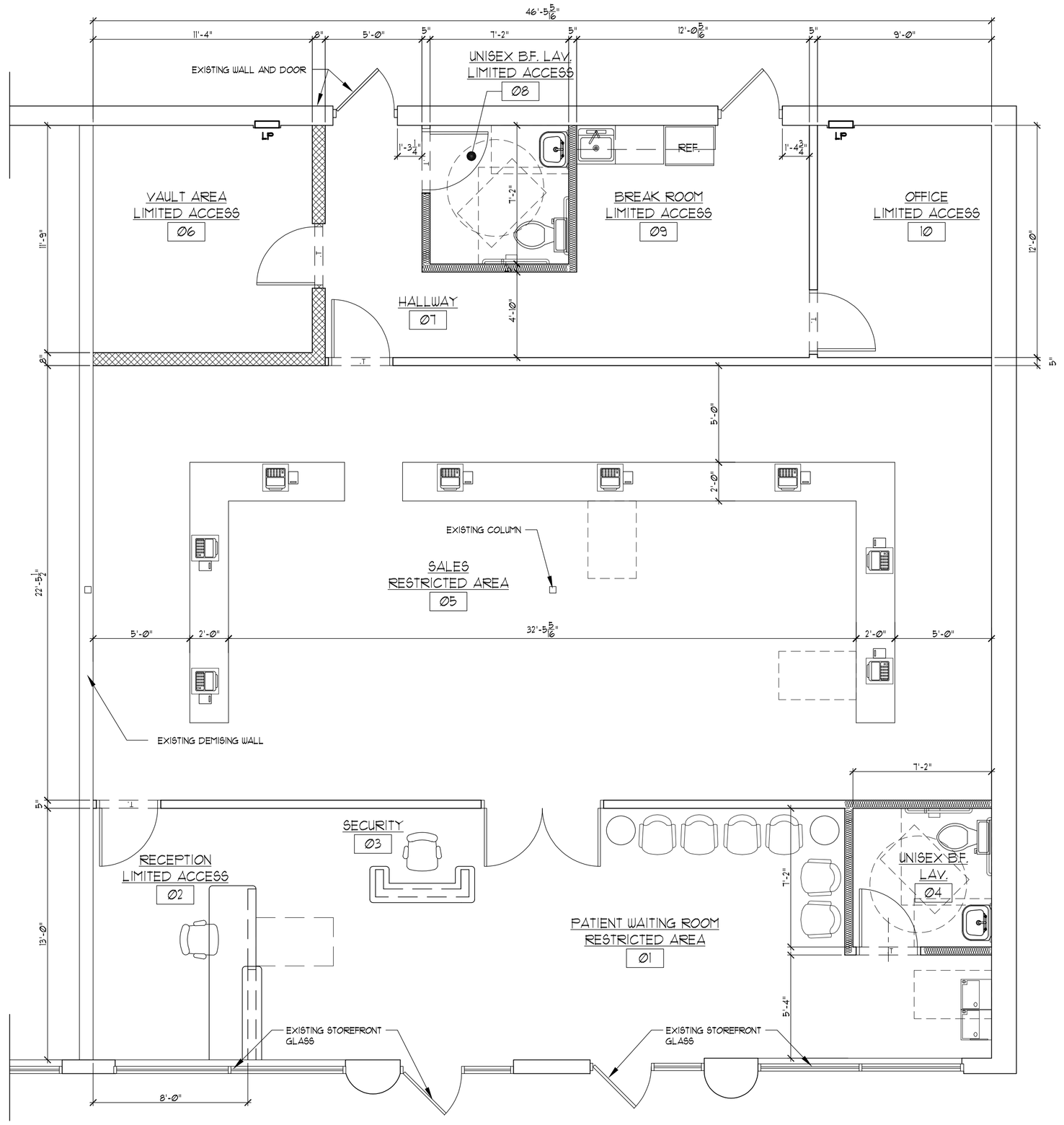
Commercial PHI Unit by RGF®

1 / A101 ODOR DETAILS
N.T.S.

NOTE:
PROVIDE SECURITY SHUTTERS ON THE INSIDE AT ALL WINDOWS AND DOORS.



2 / A101 WINDOW ELEVATION
SCALE: 1/4" = 1'-0"



1 / A102 PROPOSED FLOOR PLAN
SCALE: 1/4" = 1'-0"

NORTH

SIERRA - MARKO & ASSOCIATES
ARCHITECTURAL DESIGNERS
189 E Big Beaver, Suite 106 Troy, MI 48083
Tel: 248.457.6903 Fax: 248.457.6906
Email: info@s-m-associates.com
Website: www.s-m-associates.com

ALL DIMENSIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. THE CONTRACTOR IS SOLEY RESPONSIBLE FOR COORDINATION OF ALL DIMENSIONS.

PREPARED IN COLLABORATION WITH D'ANNA ASSOCIATES, INC.
PROCESSING OKEMOS
Job # 19-0712
Issue Date: 8-2-19

PIETRO D'ALEO ARCHITECT No. 1301055

PROJECT NAME:
"PROVISIONING CENTER OKEMOS, MI"

PERMIT SUBMISSION
08-02-2019

ADDRESS:
1858 W. GRAND RIVER AVENUE
OKEMOS, MI 48864

JOB NO.	19-0712		
ISSUANCES			
NO	DESCRIPTION	DATE	BY
1	PERMIT SUBMISSION	08/02/19	EM/IM

SHEET TITLE
PROPOSED FLOOR PLAN

DWG. NO.
A1.0.1
of

MEMORANDUM

TO: Nemer Haddad

CC: Michael G. Darga, P.E.

FROM: William Stimpson, P.E., Mohamed Aguib, E.I.T

SUBJECT: The Cured Leaf Development Traffic Impact Assessment

DATE: December 16, 2019

This memorandum documents a traffic impact assessment (TIA) for a 2,400 SF outparcel located on the east side of Okemos Road between Jolly Road and Hampton Place (at 3520 Okemos Road). The subject outparcel was previously used as a retail shop and a restaurant which are intended to be replaced by a marijuana dispensary. The site location is shown on **Figure 1**. A traffic impact assessment is being requested for the subject outparcel as part of the permit application. This study assumes that the proposed development would be fully occupied by end of 2020.

The key findings and conclusions of the assessment are summarized below, followed by supporting analyses. Detailed data used in the supporting analyses are provided in the appendix.

Key Findings and Conclusions

- The subject development can be expected to generate about 25 vehicle trips in the AM peak hour (14 entering and 11 exiting) and 52 vehicle trips in the PM peak hour (26 entering and 26 exiting).
- Under existing and future traffic conditions, both study intersections are expected to operate at acceptable levels of service (LOS) of C or better, with acceptable delays during both the AM and PM peak hours. (LOS is assigned on a letter-based grading scale, based on average vehicular delay).
- The simulation models for the existing and future traffic conditions indicated acceptable traffic operations and negligible queues at the study intersections. (The results of the simulation and queue lengths are included in the appendix.)
- Sight distance evaluation indicated no apparent sight distance issues, contingent on keeping the sight distance clear at the site access locations.
- Access management evaluation indicated that there is no conflict with the opposing driveways for the entering or exiting vehicles at the study intersections.
- An evaluation of internal site circulation indicated that, provided the current two two-way lanes in the parking lot and the multiple access points to the plaza, traffic circulation is not of concern.
- The expected impacts of adding site-generated traffic to the site driveways on Okemos Road are negligible.

giffels webster

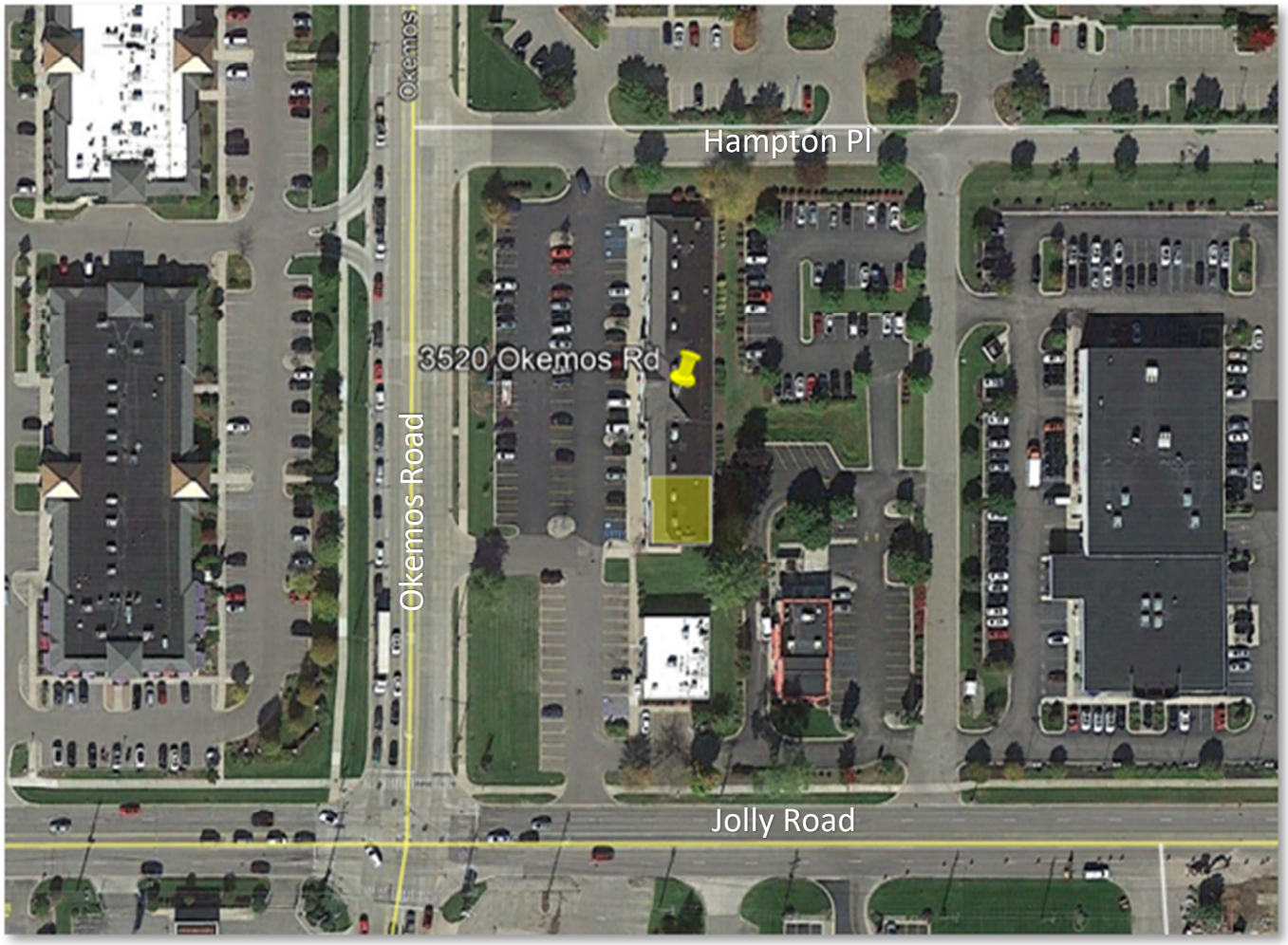


Figure 1. Site Location

Existing Conditions

Roads – Okemos Road between Jolly Road and Hampton Place is classified as a principal arterial and consists of four lanes with a center left-turn lane. The posted speed limit on Okemos Road is 45 mph.

Traffic Volumes – Daily traffic volumes along Okemos Road were obtained from the Michigan Department of Transportation's (MDOT) Transportation Data Management System (TDMS). The study segment has an interpolated Annual Average Daily Traffic volume (AADT 2018) of 21,981 vehicles-per-day.

For this study, Traffic Data Collection, LLC (TDC) was subcontracted to make video-based turning-movement counts during the typical 7-9 a.m. and 4-6 p.m. peak periods of Thursday, December 5, 2019. As approved by the township, these counts were conducted at the following intersections:

- Okemos Road and Hampton Place
- Okemos Road and Site Access

These recent detailed count data are also presented in the appendix. The peak-hour volumes for the study intersections during existing conditions are illustrated in **Figure 2**.

Sight Distance Evaluation – Since the study intersections are not proposed and currently being used, an evaluation of sight distance was deemed unnecessary. However, an evaluation of roadway geometry and obstructions at the study intersections was performed using traffic cameras, Google Earth Aerials, and Google Street View, indicating that no apparent issues would cause sight distance issues, contingent on keeping the sight distance clear.

Access Management and Site Circulation – The nearest opposing driveway on Okemos Road is located between the study intersections, about 80 feet south of Hampton Place, and it is currently a right-in/right-out driveway. This opposing driveway is not anticipated to affect the access to any of the study intersections due to its restricted movements. The second nearest opposing driveway on Okemos Road is located approximately 280 feet north of Hampton Place, and it is not anticipated to impact the Hampton Place site access. A simulation of traffic operations in future conditions indicated negligible vehicle queuing in the center two-way left-turn lane, see appendix for simulation files. Therefore, there will be no conflict with the opposing driveways for the entering or exiting vehicles at the study intersections.

The evaluation of internal site circulation indicated that, provided the current two two-way lanes in the parking lot and the multiple access points to the site, traffic circulation is not anticipated to be of concern.

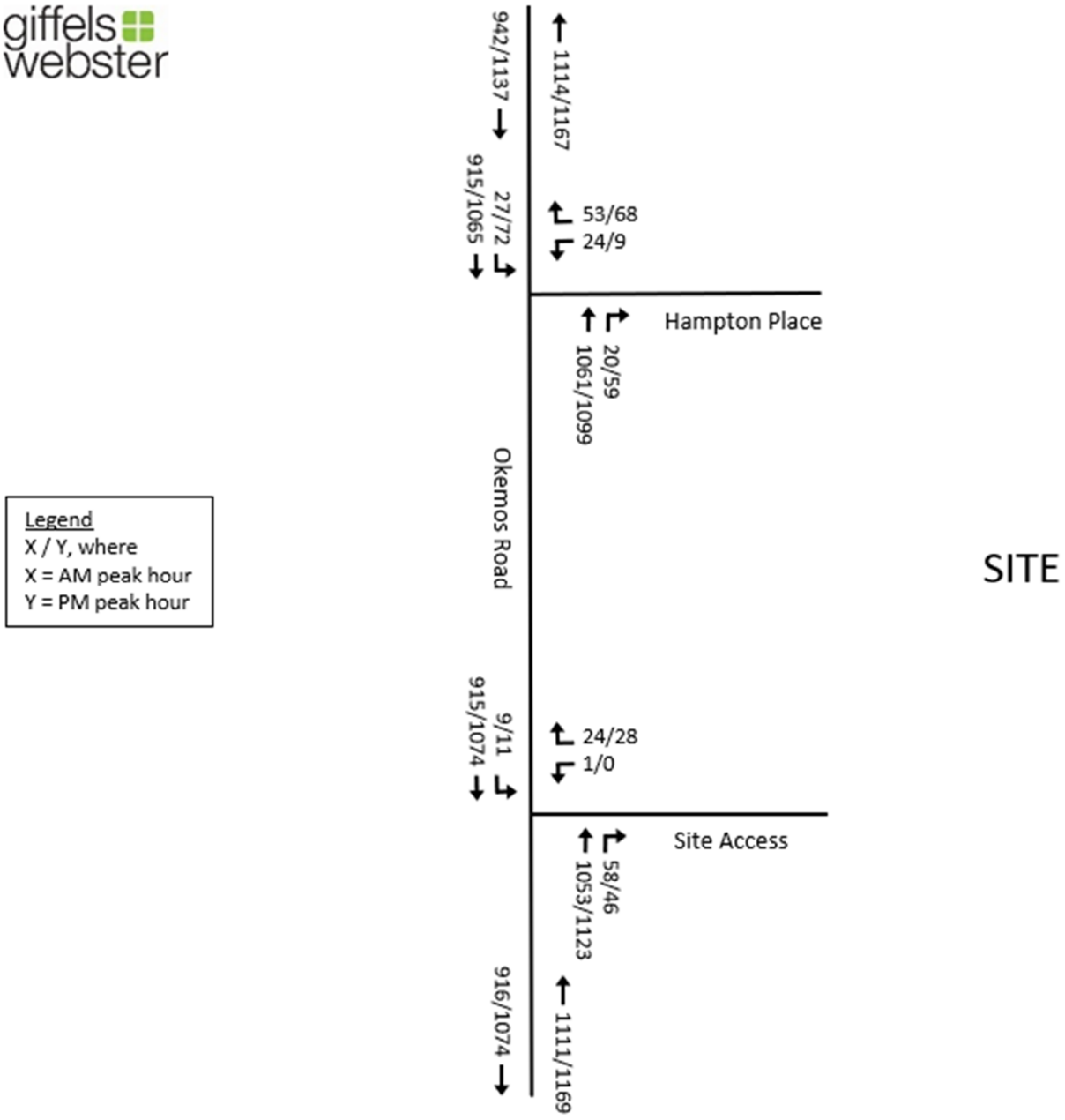


Figure 2. Existing Traffic Volumes

Future Conditions

Roads – This study assumes that no major road improvements will occur in the study area. In addition, improvements were recently completed at the intersection of Jolly Road and Okemos Road.

Background Traffic Volumes – To properly evaluate the traffic impacts of a proposed development, it is generally necessary to anticipate the background volumes at the time of project build-out. Since the subject parcel is planned for occupation within one year of this study, background growth was excluded from the study following industry standards.

Trip Generation – The published daily and peak hour trip generation rates, along with inbound/outbound percentages from the Institute of Transportation Engineer's *Trip Generation Manual (10th Edition),* were used to calculate the number of daily and peak hour trips for the land uses, as shown on **Table 1**.

Table 1. Trip Generation

Land Use		ITE Use	Size	Week-day Trips	AM Peak-Hour Trips			PM Peak-Hour Trips		
					In	Out	Total	In	Out	Total
Existing	High-Turnover (Sit-Down) Restaurant	932	1,200 SF	135	7	5	12	7	5	12
	Shopping Center[1]	820	1,200 SF	45	1	0	1	2	3	5
	Total Existing Trips			**180**	**8**	**5**	**13**	**9**	**8**	**17**
Proposed	Marijuana Dispensary	882	2,400 SF	606	14	11	25	26	26	52
Change in Total Trips				**426**	**6**	**6**	**12**	**17**	**18**	**35**

[1] Potential trip generation if this (now vacant) space were to be re-occupied by a retail use

Trip Distribution and Assignment – Site-generated traffic is commonly assumed to be distributed consistent with existing traffic patterns, subject to professional judgment. Here, the directionality of overall traffic on Okemos Road – 54% southbound and 46% northbound in the AM peak hour and 48% southbound and 52% northbound in the PM peak hour – was a major determinant of this study's trip distribution modeling. The expected distribution of the future additional site traffic between the two access intersections on Okemos Road was estimated by applying professional judgment to the location of the proposed new use within the overall site.

It should be noted that the site has a third access point on Jolly Road which, if included in the study, would provide more distributed site-generated trips and reduce the impacts predicted on the other two access points on Okemos Road. However, per the Township's request and as a conservative approach, only two site access points were considered in this study.

The above directional considerations were combined to develop trip distribution patterns, which were then applied to the trip generation totals in **Table 1** to assign site trips by peak hour; see **Figure 3**. Total peak-hour traffic at build-out is predicted in **Figure 4**; this figure adds the site trips shown in Figure 3 to the existing traffic volumes shown in Figure 2.

Traffic Impacts – Impact (or capacity) analyses for the site access drives were conducted using the *Synchro 10* computerized traffic model, based on methodology contained in the Transportation Research Board's *Highway Capacity Manual (HCM).* The current study applied the latest, most conservative methodology, first appearing in the *HCM 6th Edition.* The primary objective of such analyses is to determine the *level of service,* a qualitative measure of the "ease" of traffic flow based on vehicular delay. Analytical models are

used in *Synchro* to estimate average "control" delay. These models account for lane configuration, grade (if any), type of traffic control, traffic volume and composition, and other traffic flow parameters. At intersections with stop-sign control on the side street, results are provided only for the side street and major street left turns.

Level of service (LOS) is expressed on a letter-based grading scale, with A being the highest level and F being the lowest level. **Table 2** defines LOS in terms of average control delay per vehicle according to HCM methodology. Detailed *Synchro* printouts are presented in the appendix, with the results summarized in **Tables 3 and 4**. Note that the summary results address current traffic and future total (build-out) traffic.

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

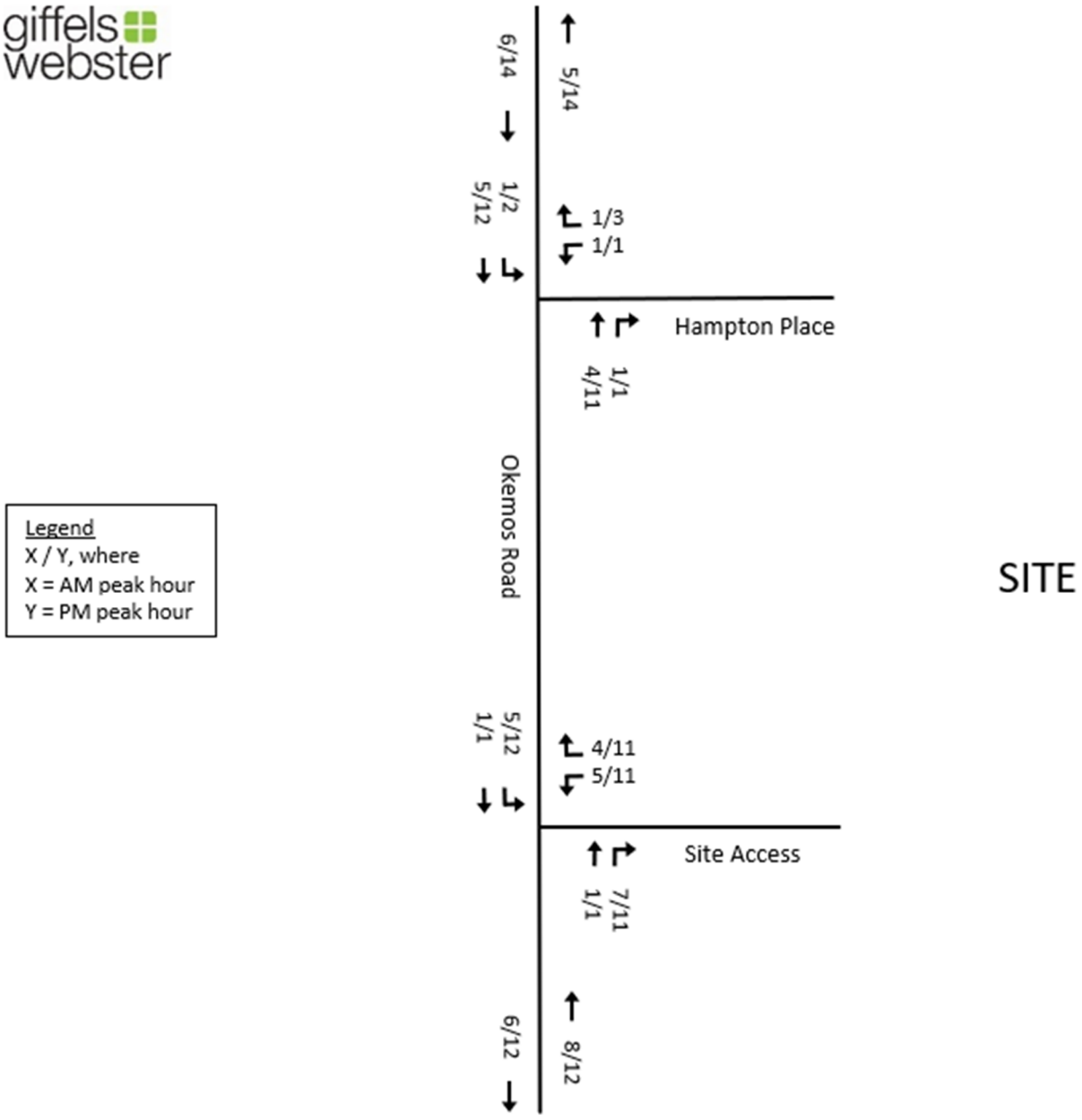


Figure 3. Site Generated Trips

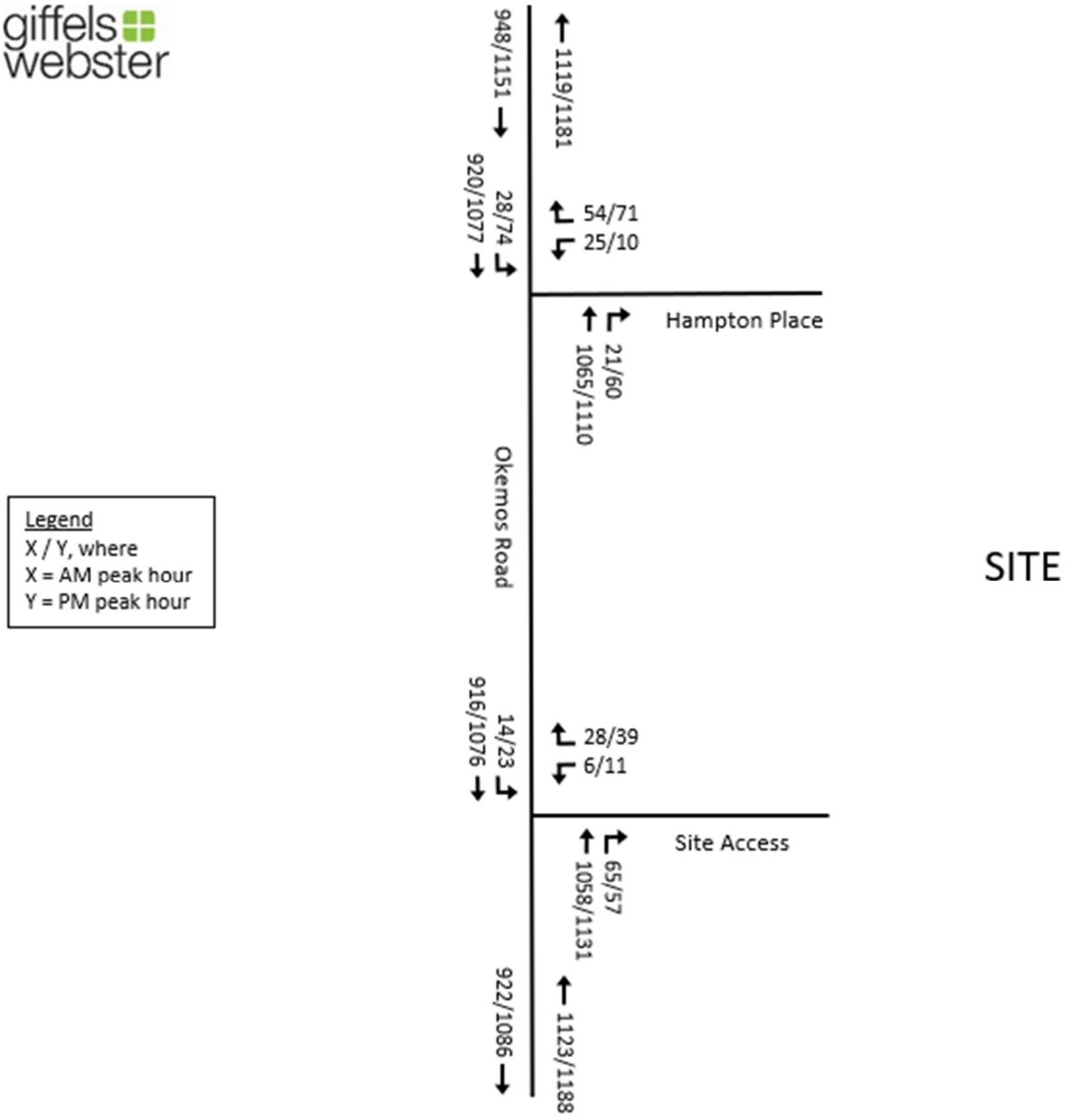


Figure 4. Future Traffic Volumes

The key findings of the *Synchro* analyses are as follows:

- Under the existing traffic condition, both study intersections are showing acceptable LOS of C or better, and acceptable delay during both the AM and PM peak hours.

- Under the future traffic condition, both study intersections are showing acceptable LOS of C or better, and acceptable delay during both the AM and PM peak hours.

- Under the future traffic condition at Okemos and Hampton, the delay on the westbound left-turn movement is 34.7 seconds (LOS D) during the PM peak hour. A simulation model was evaluated at this intersection indicating negligible queues, and vehicles were able to adequately enter Okemos Road.

- It should be noted that a third access to the site on Jolly Road was not included in the study, which is a conservative approach. More distributed site-generated trips (at three access points) would alleviate the operations at the two intersections evaluated.

- The simulation models for the existing and future traffic conditions indicated acceptable traffic operations and negligible queues. The results of the simulation and queue lengths are included in the appendix.

Table 3. Level of Service Criteria at Okemos Road and Site Access

Approach	Movement	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Existing Traffic Conditions					
WB	L + R	14.8	B	15.3	C
SB	L	11.8	B	12.7	B
Future Total Traffic Conditions					
WB	L + R	17.4	C	21.5	C
SB	L	11.9	B	13.0	B

Table 4. Level of Service Criteria at Okemos Road and Hampton Place

Approach	Movement	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Existing Traffic Conditions					
WB	L + R	20.2	C	19.0	C
SB	L	11.7	B	13.8	B
Future Total Traffic Conditions					
WB	L + R	20.5	C	19.5	C
SB	L	11.8	B	14.0	B

Appendix

giffels webster

William A. Stimpson, PE
Senior Traffic Engineer

William Stimpson has 49 years of experience in transportation and traffic engineering, specializing in traffic safety and site planning. His traffic safety work has included applied research, facility safety auditing, and crash litigation support. His site planning work has included plan development and review, parking studies, traffic impact analysis, and access management. He has also dealt with a wide variety of other traffic planning issues, including freight transportation and ridesharing and bicycling incentives.

Mr. Stimpson has performed traffic reviews of hundreds of site plans; prepared shared parking studies, thoroughfare plans, crash data studies, corridor safety evaluations, and access management studies; conducted and reviewed numerous traffic impact studies; and completed signal warrant evaluations and cut-through traffic studies for both public and private clients. He has also investigated individual traffic crashes relative to alleged personal, premises, highway-tort, and auto product liability; conducted crash causation analyses; and provided expert testimony as requested.

YEARS OF EXPERIENCE
49

EDUCATION
Master of Engineering,
Civil Engineering
Texas A&M University

Bachelor of Science in Engineering,
Civil Engineering
University of Michigan

LICENSES/REGISTRATION
Professional Engineer
Michigan

MEMBERSHIPS
Institute of Transportation Engineers,
Fellow-Life Member

AWARDS
DCA Certificate of Achievement, 1974;
ITE Past Presidents' Award, Honorable Mention, 1978;
APA Vernon Deines Awards for Outstanding Small Town Plans, 2007 & 2017 (team member)

SPECIAL EXPERTISE
Traffic Safety Research
Facility Safety Auditing
Crash Litigation Support
Site Plan Traffic Review
Traffic Impact Analysis
Access Management
Shared Parking

Traffic Safety Research
Diagnostic studies of visual communication
Driver Expectancy Concept (co-developer)
National guidelines for Right Turn on Red
Revised national standards for road striping
Timing of yellow traffic signal

Facility Safety Auditing
Proving Ground Safety Consultant (Ford Motor)
Traffic Engineering Supervisor (Ada Co., ID)
FHWA Geometric Design Lab (Program Mgr.)
Interactive Highway Safety Design Model
SEMCOG Traffic Safety Manual (lead author)
Corridor & crash site safety evaluations

Crash Litigation Support
Investigations of over 150 individual crashes
Personal, premises, highway-tort, product liability
Specialization in crash causation analysis
Testimony in both civil & criminal cases

Site Plan Traffic Review
Municipal reviews via nominal pass-through fee
Requested access & circulation improvements
Reductions in impervious parking surfaces
Pedestrian safety improvements

Parking
FHWA study on fringe parking for carpoolers
Permit parking programs in various cities
Shared parking evaluations

Alternative Modes
Bike route planning & implementation (ID)
Complete Streets Ordinance (Lath. Village)
Americans with Disabilities standards

Freight Transportation
FHWA research studies on heavy trucks
Assembly sequencing to reduce delivery costs

Traffic Impact Analysis
Numerous studies, beginning in 1974; e.g.:
Francis Scott Key Mall
The Mall at Partridge Creek
Twelve Oaks Mall
Loves Travel Stop & Country Store
Emagine Theaters
Plymouth High School
South Lyon East High School
Liberty Middle School
Field, Eriksson, & Gallimore E.S.
Perfecting Church
Mt. Zion Church
Kensington Community Church
St. Joseph Mercy Hospital
Mattawan LDFA TIS & interchange design
Croswell TIS & MI Sugar site planning
Catalyst Mixed-Use Building
Brookside Mixed-Use Building
Multifamily residential (Berkley)
Birmingham Boutique Hotel
Peabody Site Development (Birmingham)
Detroit Pistons Performance Center
New TIS policy for several communities
TIS reviews for municipal clients
Cut-through traffic studies

Access Management
Ada Co. traffic engineering supervision
MDOT Access Mgmt. Handbook training
Plan for M-24, Oakland Co. line to I-69
Plan for Allen & West Roads (Woodhaven)
Ordinance policy for Grand Blanc Twp.
Plan for Van Dyke Ave (Shelby Township)
Plan for Orchard Lk Rd (Farmington Hills)

giffels webster

Mohamed Aguib
Traffic Engineer

Mr. Aguib has over 9 years of comprehensive traffic engineering experience. Throughout his career he has been responsible for transportation planning, traffic operations, roadway design, research, and grant applications. He has provided the transportation and traffic engineering services on the private, local municipalities, and state levels. Mohamed has expertise in a wide variety of transportation planning, traffic engineering, and design projects in which he has been responsible for all aspects of the project development. He is responsible for all aspects of the project scoping, analysis, design and delivery. As he is new to Giffels Webster, most of the projects listed below were performed while Mr. Aguib was employed with other firms.

YEARS OF EXPERIENCE
9

EDUCATION
Bachelor of Science
Civil Engineering,
University of Central Florida

CERTIFICATIONS
PSMJ Project Management Bootcamp

FDOT Local Agency Program Design Criteria, Specifications & Construction Checklist Training

Consortium for ITS Training and Education (CITE) Traffic Engineering and Operations

USDOT ITS Professional Capacity Building Program (ITS PCB) ITS Standards Training

National Highway Institute (NHI) ITS Procurement

E.I.T. (Civil) FBPE registration #1100019088

SPECIAL EXPERTISE
Traffic Engineering
Transportation Planning
Roadway Design
Safety Studies
Grants
ITS Planning and Design
Corridor & Intersection

Relevant Experience
American Center for Mobility (ACM) Phase 1A Design Plan - Ypsilanti, Michigan
East Detroit Riverfront Riverwalk Design Plan - Detroit, Michigan
Uniroyal Seawall Rehabilitation Design Plan - Detroit, Michigan
Marathon Petroleum - Melvindale, Michigan
Kalamazoo River Valley Trail - Kalamazoo, Michigan
City Wide Signing and Pavement Marking Program - Kalamazoo, Michigan
County Wide Signal Wattage Inventory Program - Kalamazoo, Michigan
Tower Properties - Troy, Michigan
Four Points by Sheraton Hotel - Novi, Michigan
Private Developments Traffic Impact Studies, Michigan
Wayne County Justice Center Traffic Impact Study - Detroit, Michigan
Ford Field and Detroit Lions Arena Ingress and Egress Study - Detroit, Michigan
Mayberry Homes Traffic Impact Study - Hartland, Michigan
Signal Optimization Study for Lapeer Avenue - St Clair County, Michigan
Signal Optimization Study for Adams Road and Lincoln Street - City of Birmingham, Michigan
University Boulevard and Rouse Road, Intersection Improvements - Orange, Florida
Lake Pickett Road at North Tanner Rd, Intersection Improvements - Orange, Florida
Buck Road, Bridge Replacement - Orange, Florida
Sherry Drive, Bridge Replacement - Orange, Florida
West Bay Parkway Travel Demand Evaluations - Bay County, Florida
Grove Park Residential Development, Parking Demand Analysis, Port St. Lucie, Florida
Traffic Impact Analysis Projects, Florida
City of Orlando, Signal Timing Project - Orlando, Florida
FDOT District 5, Transportation Systems Management and Operations
FDOT District 2, Putnam County 2016 Annual Counts
FDOT District 2, DRI Tracker Application
University of Central Florida, Safety Improvements - Orange, Florida
University of Central Florida, Master Plan Update - Orange County, Florida
Oak Ridge Road Pedestrian and Bike Safety Study - Orange, Florida
Concurrency Management System (CMS) - Orange and Putnam Counties, Florida
Orange County Transportation CMS Application User's Guide, Florida
City of Orlando and FDOT District 3, Smart City Grant and Autonomous Vehicles Research - Orlando, Florida

Land Use: 882
Marijuana Dispensary

Description

A marijuana dispensary is a standalone facility where cannabis is sold to patients or consumers in a legal manner.

Additional Data

Time-of-day distribution data for this land use for a weekday and Saturday are presented in Appendix A. For the four general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:45 a.m. and 12:45 p.m. and 5:45 and 6:45 p.m., respectively.

The sites were surveyed in the 2010s in Colorado and Oregon.

Source Numbers

867, 893, 919

Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

Traffic Study Performed For:

Giffels Webster

Project: Meridian Twp. Traffic Study
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 3CU SW

File Name : TMC_1 Okemos & Hampton Pl_12-5-19
Site Code : TMC_1
Start Date : 12/5/2019
Page No : 1

4 Hour video traffic study was conducted during typical weekday (Thursday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks - Peds

	Okemos Road Southbound				Hampton Place Westbound				Okemos Road Northbound				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
07:00 AM	145	6	0	151	7	5	0	12	0	109	0	109	272
07:15 AM	189	6	0	195	14	6	0	20	13	166	0	179	394
07:30 AM	271	8	0	279	20	8	0	28	4	278	0	282	589
07:45 AM	215	5	0	220	12	5	0	17	5	303	0	308	545
Total	820	25	0	845	53	24	0	77	22	856	0	878	1800
08:00 AM	211	4	0	215	10	7	0	17	7	252	0	259	491
08:15 AM	218	10	0	228	11	4	0	15	4	228	0	232	475
08:30 AM	250	9	0	259	19	4	0	23	4	238	0	242	524
08:45 AM	200	13	0	213	20	2	0	22	9	253	0	262	497
Total	879	36	0	915	60	17	0	77	24	971	0	995	1987
*** BREAK ***													
04:00 PM	268	14	0	282	18	5	0	23	10	240	0	250	555
04:15 PM	257	13	0	270	16	8	3	27	10	256	0	266	563
04:30 PM	239	12	0	251	15	6	1	22	10	217	0	227	500
04:45 PM	243	16	0	259	14	2	2	18	15	242	0	257	534
Total	1007	55	0	1062	63	21	6	90	45	955	0	1000	2152
05:00 PM	290	19	0	309	22	3	0	25	11	299	0	310	644
05:15 PM	291	20	0	311	15	1	0	16	23	326	0	349	676
05:30 PM	241	17	0	258	17	3	0	20	10	232	0	242	520
05:45 PM	216	15	0	231	20	4	0	24	12	236	0	248	503
Total	1038	71	0	1109	74	11	0	85	56	1093	0	1149	2343
Grand Total	3744	187	0	3931	250	73	6	329	147	3875	0	4022	8282
Apprch %	95.2	4.8	0		76	22.2	1.8		3.7	96.3	0		
Total %	45.2	2.3	0	47.5	3	0.9	0.1	4	1.8	46.8	0	48.6	
Pass Cars	3685	185	0	3870	247	73	0	320	146	3821	0	3967	8157
% Pass Cars	98.4	98.9	0	98.4	98.8	100	0	97.3	99.3	98.6	0	98.6	98.5
Single Units	48	2	0	50	1	0	0	1	1	46	0	47	98
% Single Units	1.3	1.1	0	1.3	0.4	0	0	0.3	0.7	1.2	0	1.2	1.2
Heavy Trucks	11	0	0	11	2	0	0	2	0	8	0	8	21
% Heavy Trucks	0.3	0	0	0.3	0.8	0	0	0.6	0	0.2	0	0.2	0.3
Peds	0	0	0	0	0	0	6	6	0	0	0	0	6
% Peds	0	0	0	0	0	0	100	1.8	0	0	0	0	0.1

TDC Traffic Comments: Non-signalized "T" intersection. Video VCU camera was located within SW intersection quadrant. Note: Peds. are excluded from peak hour reports. Traffic study was conducted for Meridian Township Traffic Impact Study for Giffels Webster.

Traffic Data Collection, LLC

www:tdccounts.com

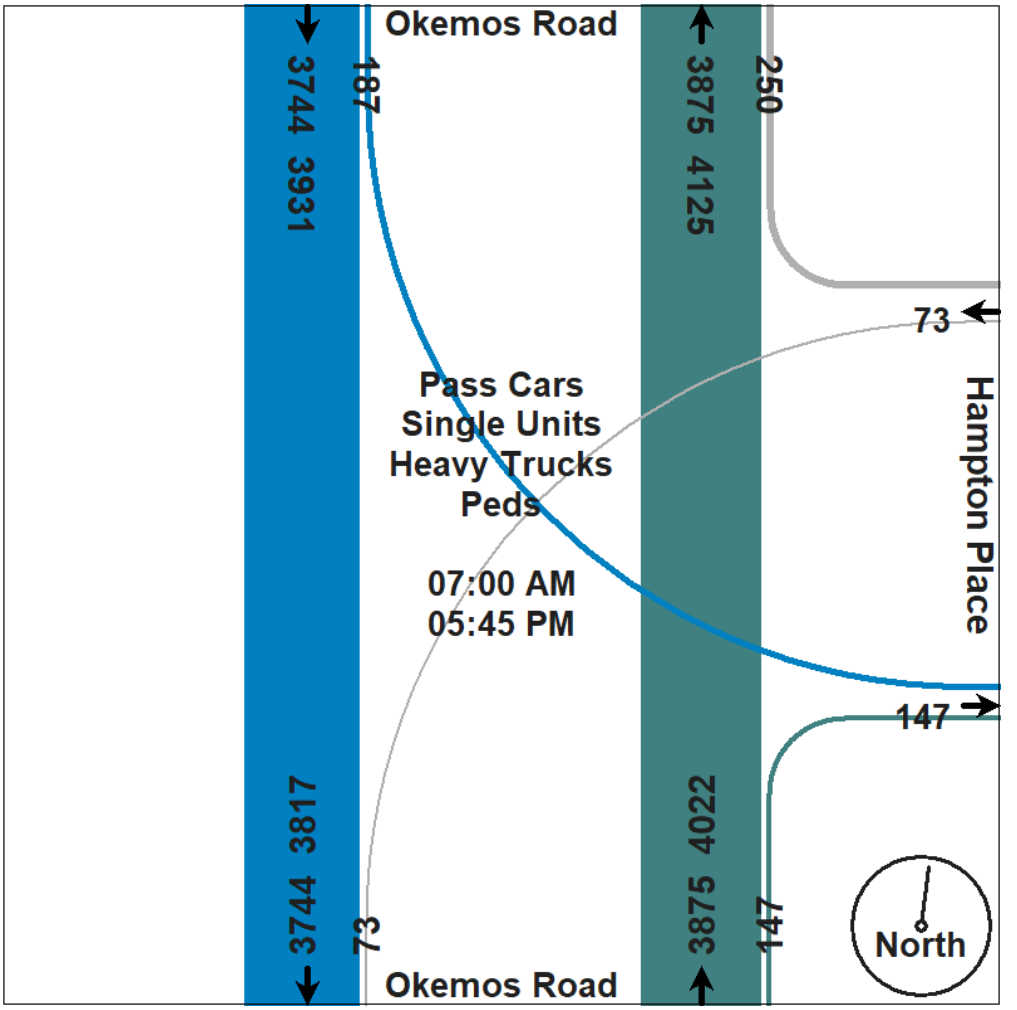
Phone: 586.786-5407

Traffic Study Performed For:

Giffels Webster

Project: Meridian Twp. Traffic Study
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 3CU SW

File Name : TMC_1 Okemos & Hampton Pl_12-5-19
Site Code : TMC_1
Start Date : 12/5/2019
Page No : 2



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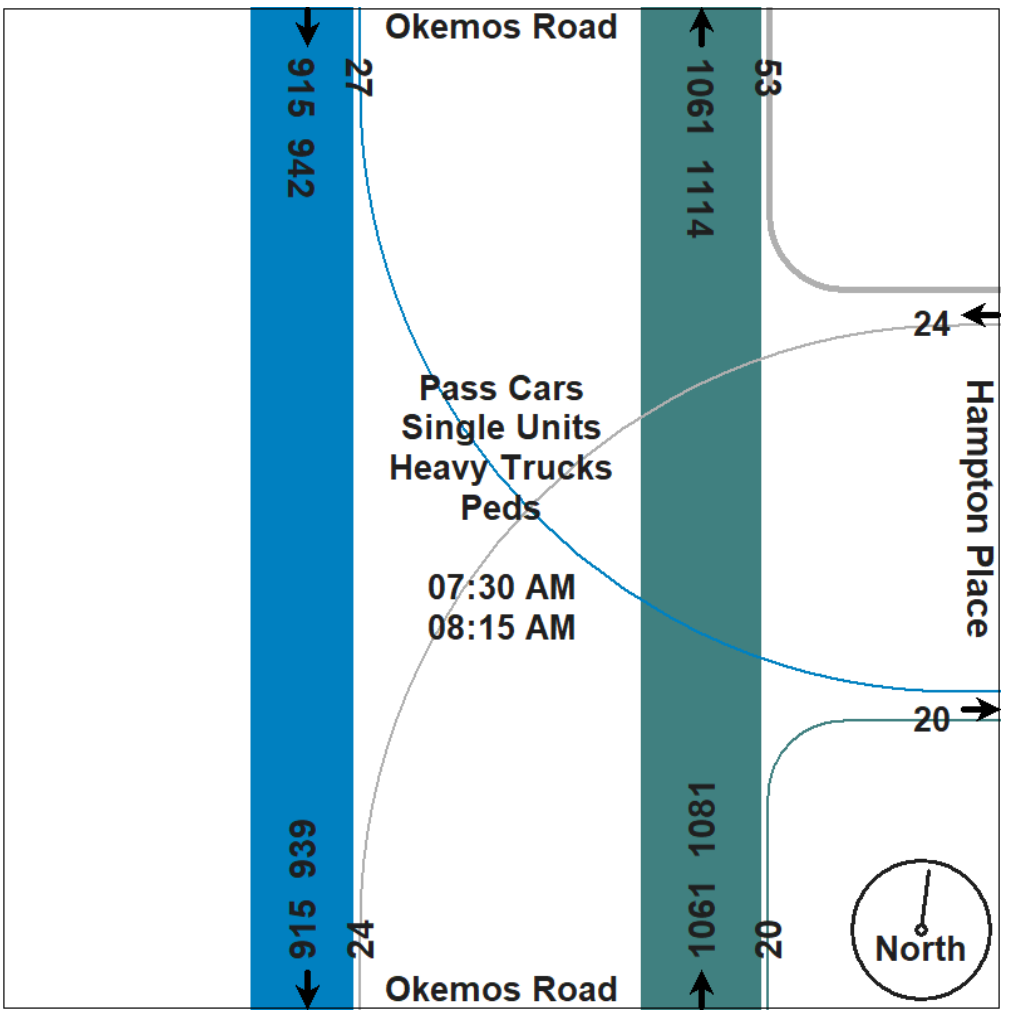
Count By Miovision Video VCU 3CU SW

File Name : TMC_1 Okemos & Hampton Pl_12-5-19
Site Code : TMC_1
Start Date : 12/5/2019
Page No : 3

	Okemos Road Southbound			Hampton Place Westbound			Okemos Road Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**271**	8	**279**	**20**	**8**	**28**	4	278	282	**589**
07:45 AM	215	5	220	12	5	17	5	**303**	**308**	545
08:00 AM	211	4	215	10	7	17	**7**	252	259	491
08:15 AM	218	**10**	228	11	4	15	4	228	232	475
Total Volume	915	27	942	53	24	77	20	1061	1081	2100
% App. Total	97.1	2.9		68.8	31.2		1.9	98.1		
PHF	.844	.675	.844	.663	.750	.688	.714	.875	.877	.891
Pass Cars	906	27	933	51	24	75	19	1043	1062	2070
% Pass Cars	99.0	100	99.0	96.2	100	97.4	95.0	98.3	98.2	98.6
Single Units	7	0	7	0	0	0	1	15	16	23
% Single Units	0.8	0	0.7	0	0	0	5.0	1.4	1.5	1.1
Heavy Trucks	2	0	2	2	0	2	0	3	3	7
% Heavy Trucks	0.2	0	0.2	3.8	0	2.6	0	0.3	0.3	0.3
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



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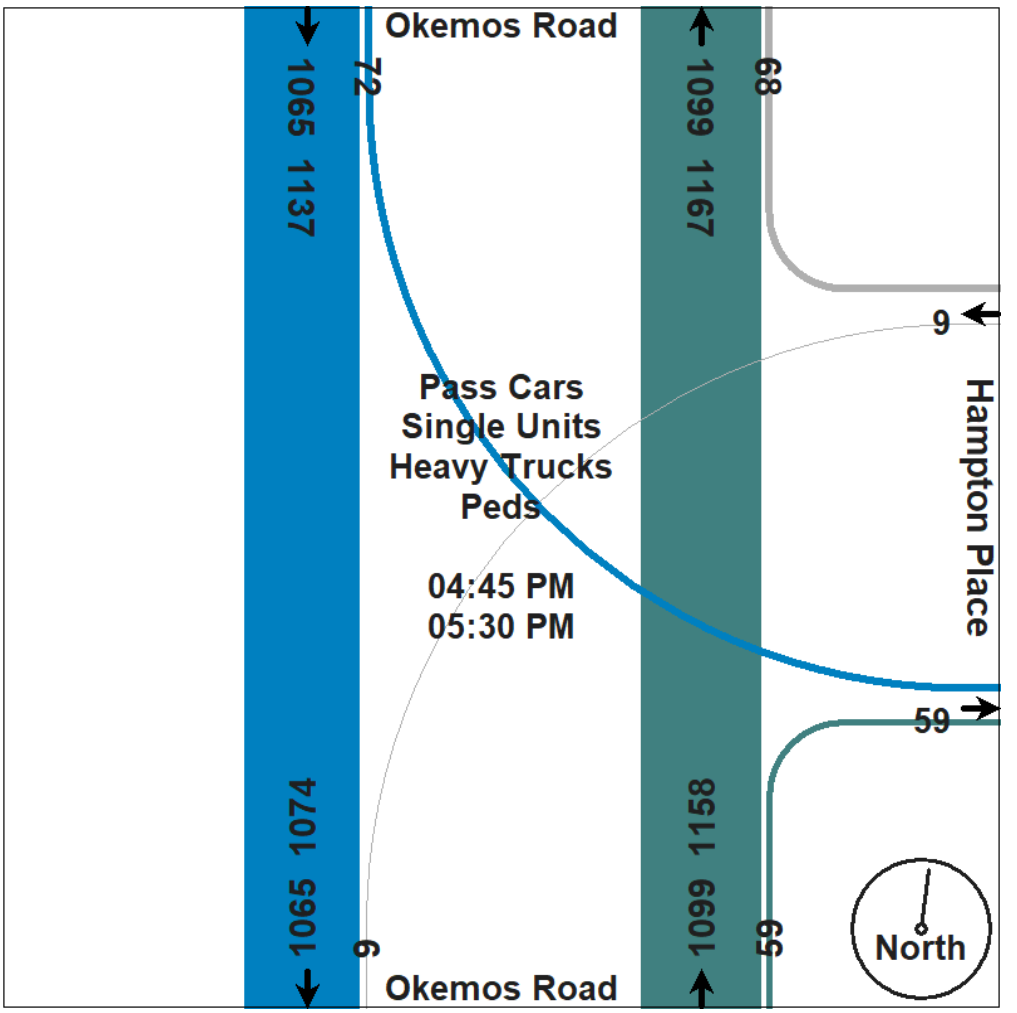
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 3CU SW

File Name : TMC_1 Okemos & Hampton Pl_12-5-19
Site Code : TMC_1
Start Date : 12/5/2019
Page No : 4

	Okemos Road Southbound			Hampton Place Westbound			Okemos Road Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	243	16	259	14	2	16	15	242	257	532
05:00 PM	290	19	309	**22**	**3**	**25**	11	299	310	644
05:15 PM	**291**	**20**	**311**	15	1	16	**23**	**326**	**349**	**676**
05:30 PM	241	17	258	17	3	20	10	232	242	520
Total Volume	1065	72	1137	68	9	77	59	1099	1158	2372
% App. Total	93.7	6.3		88.3	11.7		5.1	94.9		
PHF	.915	.900	.914	.773	.750	.770	.641	.843	.830	.877
Pass Cars	1048	71	1119	68	9	77	59	1095	1154	2350
% Pass Cars	98.4	98.6	98.4	100	100	100	100	99.6	99.7	99.1
Single Units	14	1	15	0	0	0	0	4	4	19
% Single Units	1.3	1.4	1.3	0	0	0	0	0.4	0.3	0.8
Heavy Trucks	3	0	3	0	0	0	0	0	0	3
% Heavy Trucks	0.3	0	0.3	0	0	0	0	0	0	0.1
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



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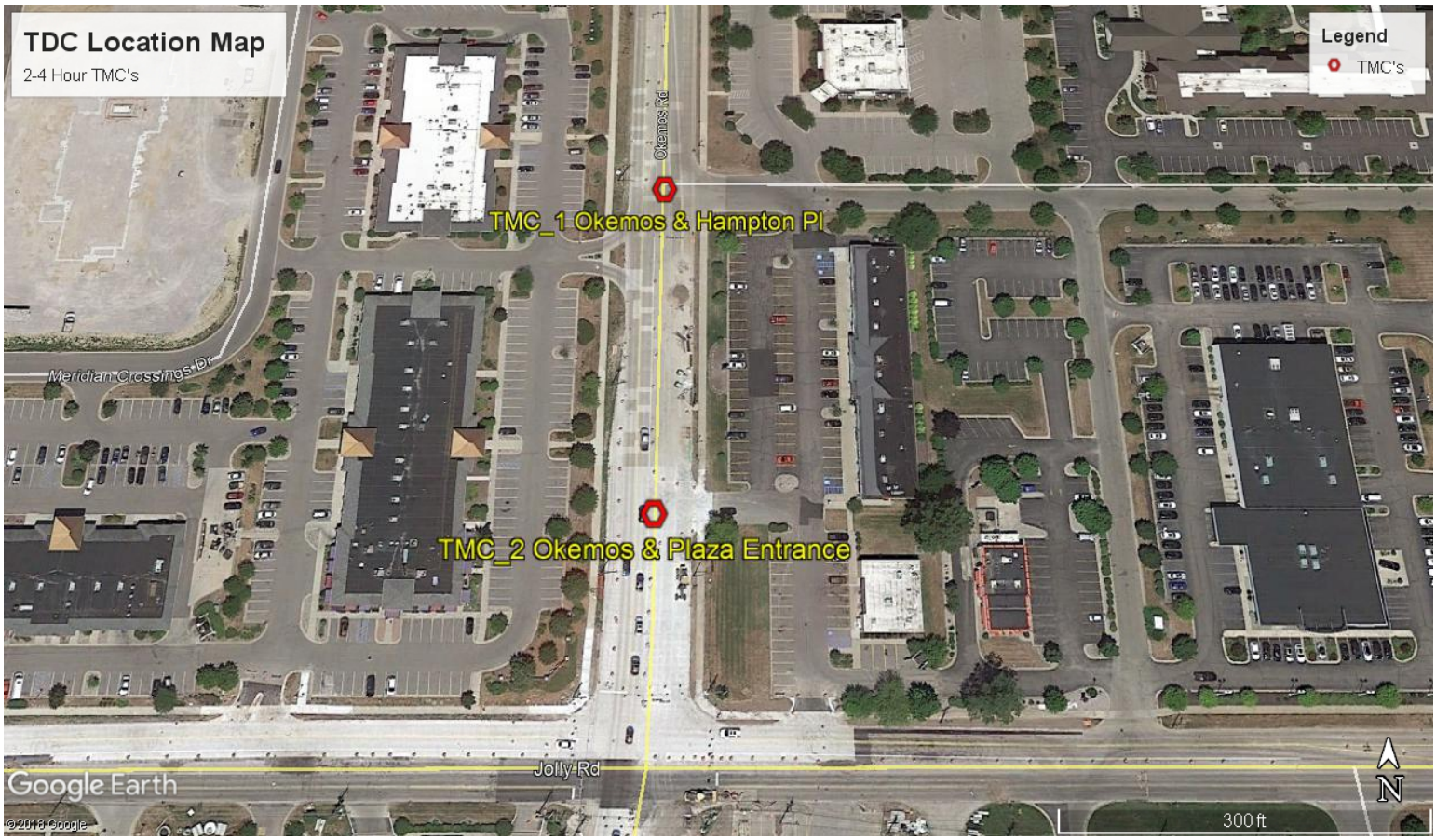
Traffic Study Performed For:

Giffels Webster

Project: Meridian Twp. Traffic Study
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 3CU SW

File Name : TMC_1 Okemos & Hampton Pl_12-5-19
Site Code : TMC_1
Start Date : 12/5/2019
Page No : 5

Aerial Photo



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Phone: 586.786-5407

Traffic Study Performed For:

Giffels Webster

Project: Meridian Twp. Traffic Study
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 24L SW

File Name : TMC_2 Okemos & Plaza Dw_12-5-19
Site Code : TMC_2
Start Date : 12/5/2019
Page No : 1

4 Hour video traffic study was conducted during typical weekday (Thursday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks - Peds

	Okemos Road Southbound				Plaza Driveway Westbound				Okemos Road Northbound				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
07:00 AM	142	4	0	146	4	4	0	8	8	103	0	111	265
07:15 AM	194	2	0	196	2	1	0	3	10	176	0	186	385
07:30 AM	279	1	0	280	8	0	0	8	17	274	0	291	579
07:45 AM	213	3	0	216	6	1	0	7	13	305	0	318	541
Total	828	10	0	838	20	6	0	26	48	858	0	906	1770
08:00 AM	217	2	0	219	6	0	1	7	15	247	0	262	488
08:15 AM	206	3	0	209	4	0	0	4	13	227	0	240	453
08:30 AM	249	4	0	253	4	3	0	7	14	236	0	250	510
08:45 AM	199	3	0	202	2	1	0	3	2	266	0	268	473
Total	871	12	0	883	16	4	1	21	44	976	0	1020	1924
*** BREAK ***													
04:00 PM	257	3	0	260	5	0	0	5	13	244	0	257	522
04:15 PM	274	4	0	278	5	2	0	7	10	263	0	273	558
04:30 PM	238	2	0	240	1	0	2	3	4	233	0	237	480
04:45 PM	235	1	0	236	7	0	2	9	14	238	0	252	497
Total	1004	10	0	1014	18	2	4	24	41	978	0	1019	2057
05:00 PM	288	2	0	290	8	0	1	9	11	304	0	315	614
05:15 PM	307	4	0	311	6	0	0	6	12	340	0	352	669
05:30 PM	244	4	0	248	7	0	0	7	9	241	0	250	505
05:45 PM	221	2	0	223	5	1	0	6	7	244	0	251	480
Total	1060	12	0	1072	26	1	1	28	39	1129	0	1168	2268
Grand Total	3763	44	0	3807	80	13	6	99	172	3941	0	4113	8019
Apprch %	98.8	1.2	0		80.8	13.1	6.1		4.2	95.8	0		
Total %	46.9	0.5	0	47.5	1	0.2	0.1	1.2	2.1	49.1	0	51.3	
Pass Cars	3704	44	0	3748	79	13	0	92	167	3886	0	4053	7893
% Pass Cars	98.4	100	0	98.5	98.8	100	0	92.9	97.1	98.6	0	98.5	98.4
Single Units	48	0	0	48	1	0	0	1	3	47	0	50	99
% Single Units	1.3	0	0	1.3	1.2	0	0	1	1.7	1.2	0	1.2	1.2
Heavy Trucks	11	0	0	11	0	0	0	0	2	8	0	10	21
% Heavy Trucks	0.3	0	0	0.3	0	0	0	0	1.2	0.2	0	0.2	0.3
Peds	0	0	0	0	0	0	6	6	0	0	0	0	6
% Peds	0	0	0	0	0	0	100	6.1	0	0	0	0	0.1

TDC Traffic Comments: Non-signalized "T" intersection. Video VCU camera was located within SW intersection quadrant. Note: Peds. are excluded from peak hour reports. Traffic study was conducted for Meridian Township Traffic Impact Study for Giffels Webster.

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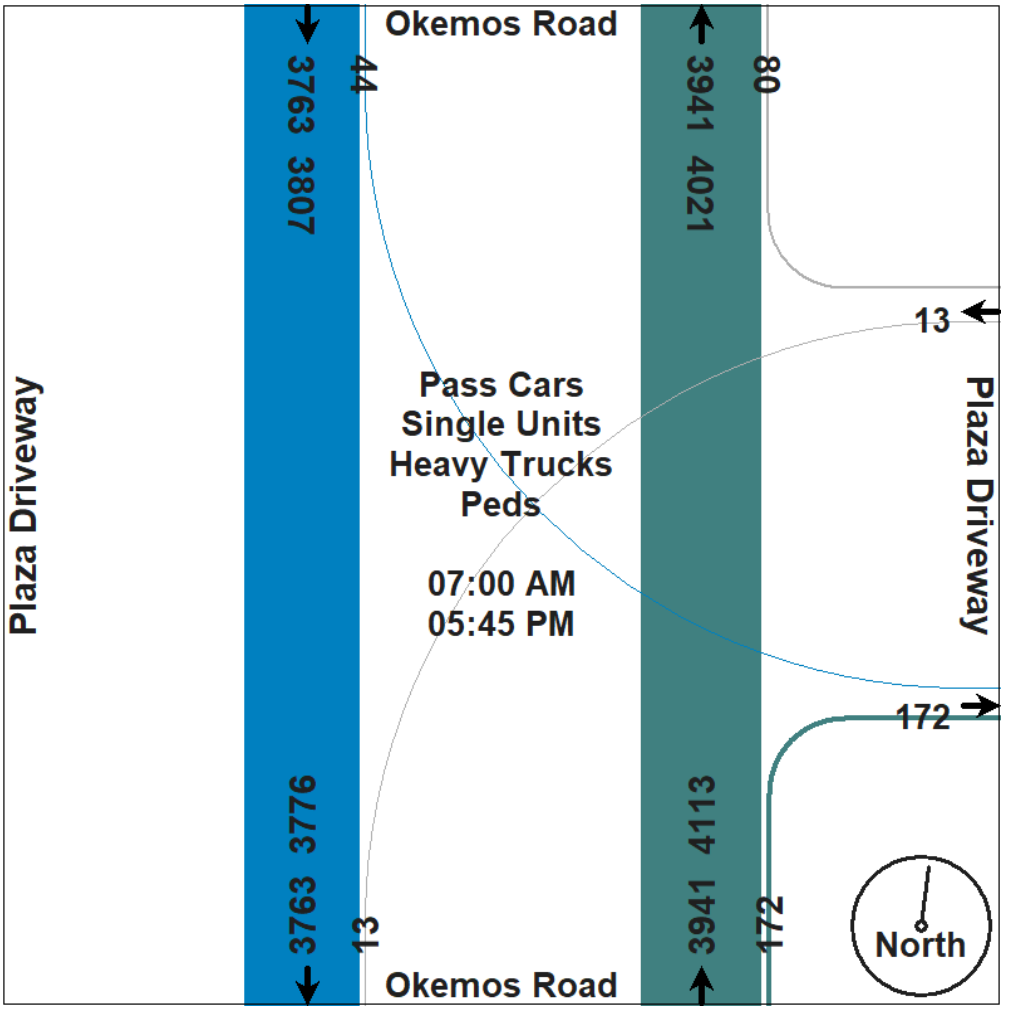
Phone: 586.786-5407

Traffic Study Performed For:

Giffels Webster

Project: Meridian Twp. Traffic Study
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 24L SW

File Name : TMC_2 Okemos & Plaza Dw_12-5-19
Site Code : TMC_2
Start Date : 12/5/2019
Page No : 2



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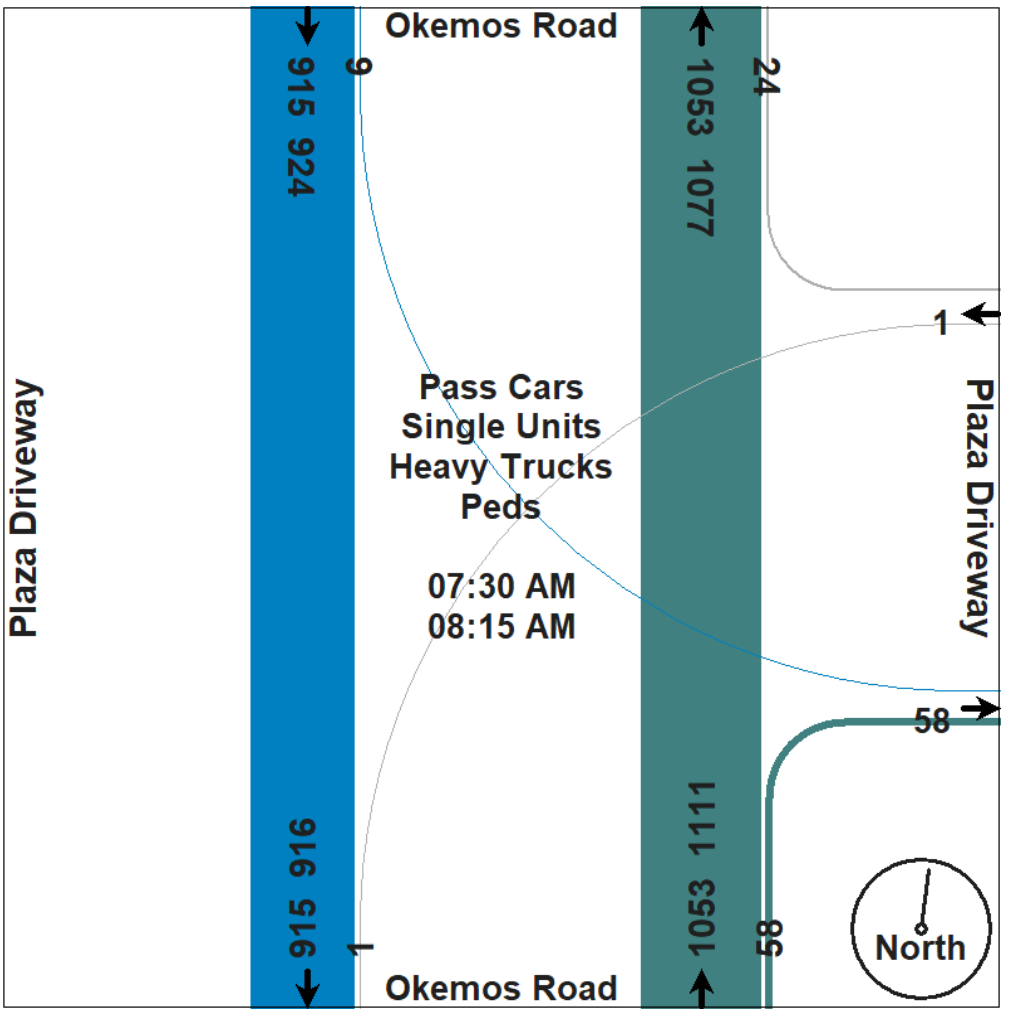
Count By Miovision Video VCU 24L SW

File Name : TMC_2 Okemos & Plaza Dw_12-5-19
Site Code : TMC_2
Start Date : 12/5/2019
Page No : 3

	Okemos Road Southbound			Plaza Driveway Westbound			Okemos Road Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**279**	1	**280**	**8**	0	**8**	**17**	274	291	**579**
07:45 AM	213	**3**	216	6	**1**	7	13	**305**	**318**	541
08:00 AM	217	2	219	6	0	6	15	247	262	487
08:15 AM	206	3	209	4	0	4	13	227	240	453
Total Volume	915	9	924	24	1	25	58	1053	1111	2060
% App. Total	99	1		96	4		5.2	94.8		
PHF	.820	.750	.825	.750	.250	.781	.853	.863	.873	.889
Pass Cars	906	9	915	24	1	25	55	1035	1090	2030
% Pass Cars	99.0	100	99.0	100	100	100	94.8	98.3	98.1	98.5
Single Units	7	0	7	0	0	0	1	15	16	23
% Single Units	0.8	0	0.8	0	0	0	1.7	1.4	1.4	1.1
Heavy Trucks	2	0	2	0	0	0	2	3	5	7
% Heavy Trucks	0.2	0	0.2	0	0	0	3.4	0.3	0.5	0.3
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



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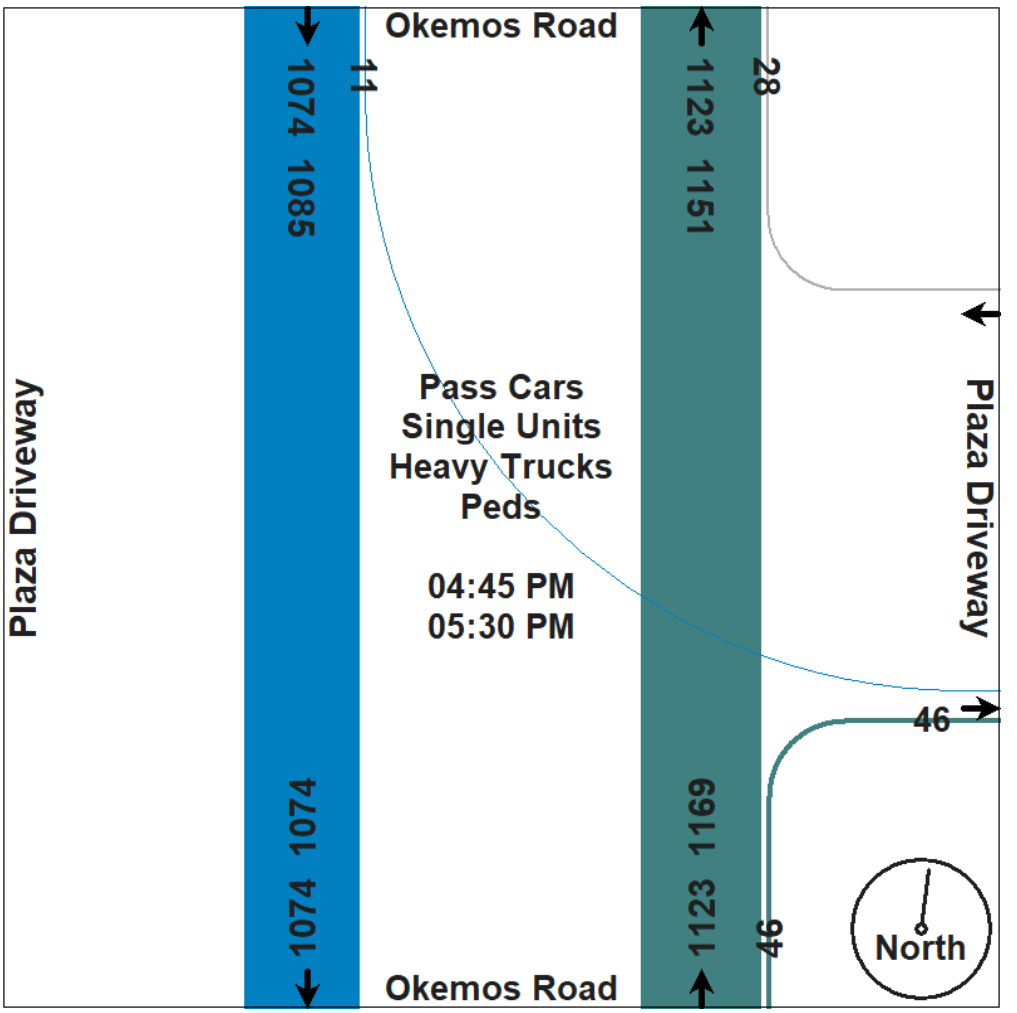
Traffic Study Performed For:

Giffels Webster

Project: Meridian Twp. Traffic Study
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 24L SW

File Name : TMC_2 Okemos & Plaza Dw_12-5-19
Site Code : TMC_2
Start Date : 12/5/2019
Page No : 4

	Okemos Road Southbound			Plaza Driveway Westbound			Okemos Road Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	235	1	236	7	0	7	**14**	238	252	495
05:00 PM	288	2	290	**8**	0	**8**	11	304	315	613
05:15 PM	**307**	**4**	**311**	6	0	6	12	**340**	**352**	**669**
05:30 PM	244	4	248	7	0	7	9	241	250	505
Total Volume	1074	11	1085	28	0	28	46	1123	1169	2282
% App. Total	99	1		100	0		3.9	96.1		
PHF	.875	.688	.872	.875	.000	.875	.821	.826	.830	.853
Pass Cars	1059	11	1070	28	0	28	44	1119	1163	2261
% Pass Cars	98.6	100	98.6	100	0	100	95.7	99.6	99.5	99.1
Single Units	12	0	12	0	0	0	2	4	6	18
% Single Units	1.1	0	1.1	0	0	0	4.3	0.4	0.5	0.8
Heavy Trucks	3	0	3	0	0	0	0	0	0	3
% Heavy Trucks	0.3	0	0.3	0	0	0	0	0	0	0.1
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

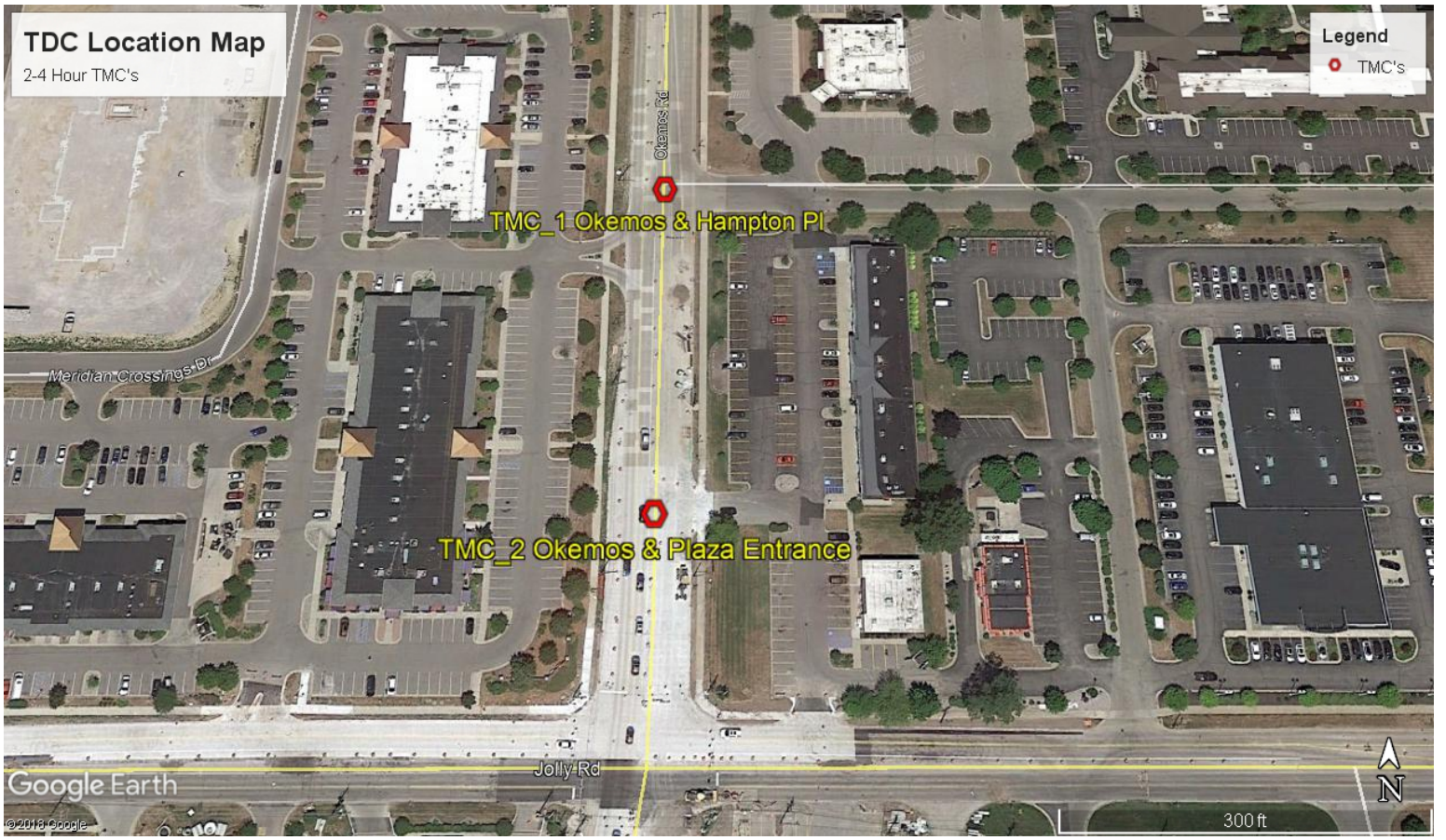
Traffic Study Performed For:

Giffels Webster

Project: Meridian Twp. Traffic Study
Study:4 Hr. Video Turning Movement Count
Weather: Cldy. Dry Deg's 30's
Count By Miovision Video VCU 24L SW

File Name : TMC_2 Okemos & Plaza Dw_12-5-19
Site Code : TMC_2
Start Date : 12/5/2019

Aerial Photo



Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	24	1057	58	9	915
Future Vol, veh/h	1	24	1057	58	9	915
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	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	87	87	83	83
Heavy Vehicles, %	0	0	2	2	1	1
Mvmt Flow	1	31	1215	67	11	1102

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1822	641	0	0	1282	0
Stage 1	1249	-	-	-	-	-
Stage 2	573	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.12	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.21	-
Pot Cap-1 Maneuver	70	422	-	-	543	-
Stage 1	237	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	69	422	-	-	543	-
Mov Cap-2 Maneuver	175	-	-	-	-	-
Stage 1	237	-	-	-	-	-
Stage 2	522	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	399	543	-
HCM Lane V/C Ratio	-	-	0.08	0.02	-
HCM Control Delay (s)	-	-	14.8	11.8	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	53	1061	20	27	915
Future Vol, veh/h	24	53	1061	20	27	915
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	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	88	88	84	84
Heavy Vehicles, %	3	3	2	2	1	1
Mvmt Flow	35	77	1206	23	32	1089

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1827	615	0	0	1229	0
Stage 1	1218	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.12	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.21	-
Pot Cap-1 Maneuver	67	432	-	-	568	-
Stage 1	241	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	63	432	-	-	568	-
Mov Cap-2 Maneuver	171	-	-	-	-	-
Stage 1	241	-	-	-	-	-
Stage 2	475	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.2	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	171	432	568	-
HCM Lane V/C Ratio	-	-	0.203	0.178	0.057	-
HCM Control Delay (s)	-	-	31.4	15.1	11.7	-
HCM Lane LOS	-	-	D	C	B	-
HCM 95th %tile Q(veh)	-	-	0.7	0.6	0.2	-

Intersection: 1: Okemos & Site Access

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	45	31
Average Queue (ft)	16	5
95th Queue (ft)	43	23
Link Distance (ft)	242	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Okemos & Hampton

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	TR	L
Maximum Queue (ft)	65	65	17	9	44
Average Queue (ft)	21	28	1	0	16
95th Queue (ft)	55	55	7	6	43
Link Distance (ft)	503	503	49	49	
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					200
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	28	1130	46	11	1074
Future Vol, veh/h	0	28	1130	46	11	1074
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	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	83	83	87	87
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	33	1361	55	13	1234

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2032	708	0	0	1416	0
Stage 1	1389	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.12	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.21	-
Pot Cap-1 Maneuver	51	382	-	-	482	-
Stage 1	200	-	-	-	-	-
Stage 2	491	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	50	382	-	-	482	-
Mov Cap-2 Maneuver	147	-	-	-	-	-
Stage 1	200	-	-	-	-	-
Stage 2	478	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	382	482	-
HCM Lane V/C Ratio	-	-	0.085	0.026	-
HCM Control Delay (s)	-	-	15.3	12.7	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	68	1099	59	72	1065
Future Vol, veh/h	9	68	1099	59	72	1065
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	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	77	83	83	91	91
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	12	88	1324	71	79	1170

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2103	698	0	0	1395	0
Stage 1	1360	-	-	-	-	-
Stage 2	743	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	45	388	-	-	486	-
Stage 1	207	-	-	-	-	-
Stage 2	436	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	38	388	-	-	486	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	207	-	-	-	-	-
Stage 2	365	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19	0	0.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	136	388	486	-
HCM Lane V/C Ratio	-	-	0.086	0.228	0.163	-
HCM Control Delay (s)	-	-	33.9	17	13.8	-
HCM Lane LOS	-	-	D	C	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0.9	0.6	-

Intersection: 1: Okemos & Site Access

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	36	30
Average Queue (ft)	17	5
95th Queue (ft)	43	22
Link Distance (ft)	242	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Okemos & Hampton

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	TR	L
Maximum Queue (ft)	43	61	23	18	69
Average Queue (ft)	8	31	1	2	30
95th Queue (ft)	32	53	11	11	60
Link Distance (ft)	503	503	49	49	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					200
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	28	1058	65	14	916
Future Vol, veh/h	6	28	1058	65	14	916
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	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	87	87	83	83
Heavy Vehicles, %	0	0	2	2	1	1
Mvmt Flow	8	36	1216	75	17	1104

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1840	646	0	0	1291	0
Stage 1	1254	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.12	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.21	-
Pot Cap-1 Maneuver	68	419	-	-	538	-
Stage 1	236	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	66	419	-	-	538	-
Mov Cap-2 Maneuver	172	-	-	-	-	-
Stage 1	236	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.4	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	334	538	-
HCM Lane V/C Ratio	-	-	0.131	0.031	-
HCM Control Delay (s)	-	-	17.4	11.9	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	54	1065	21	28	920
Future Vol, veh/h	25	54	1065	21	28	920
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	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	88	88	84	84
Heavy Vehicles, %	3	3	2	2	1	1
Mvmt Flow	36	78	1210	24	33	1095

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1836	617	0	0	1234	0
Stage 1	1222	-	-	-	-	-
Stage 2	614	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.12	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.21	-
Pot Cap-1 Maneuver	67	430	-	-	566	-
Stage 1	239	-	-	-	-	-
Stage 2	500	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	63	430	-	-	566	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	239	-	-	-	-	-
Stage 2	471	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.5	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	170	430	566	-
HCM Lane V/C Ratio	-	-	0.213	0.182	0.059	-
HCM Control Delay (s)	-	-	31.8	15.2	11.8	-
HCM Lane LOS	-	-	D	C	B	-
HCM 95th %tile Q(veh)	-	-	0.8	0.7	0.2	-

Intersection: 1: Okemos & Site Access

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	57	10	35
Average Queue (ft)	20	0	7
95th Queue (ft)	48	8	28
Link Distance (ft)	242	193	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Okemos & Hampton

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	TR	L
Maximum Queue (ft)	78	66	29	9	44
Average Queue (ft)	24	29	1	0	16
95th Queue (ft)	60	55	11	6	42
Link Distance (ft)	503	503	49	49	
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					200
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	39	1131	57	23	1076
Future Vol, veh/h	11	39	1131	57	23	1076
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	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	83	83	87	87
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	13	45	1363	69	26	1237

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2069	716	0	0	1432	0
Stage 1	1398	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.12	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.21	-
Pot Cap-1 Maneuver	48	377	-	-	476	-
Stage 1	198	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	45	377	-	-	476	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	198	-	-	-	-	-
Stage 2	449	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.5	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	276	476	-
HCM Lane V/C Ratio	-	-	0.211	0.056	-
HCM Control Delay (s)	-	-	21.5	13	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.8	0.2	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	71	1110	60	74	1077
Future Vol, veh/h	10	71	1110	60	74	1077
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	0	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	77	83	83	91	91
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	13	92	1337	72	81	1184

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2127	705	0	0	1409	0
Stage 1	1373	-	-	-	-	-
Stage 2	754	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.22	-
Pot Cap-1 Maneuver	44	383	-	-	480	-
Stage 1	204	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	37	383	-	-	480	-
Mov Cap-2 Maneuver	134	-	-	-	-	-
Stage 1	204	-	-	-	-	-
Stage 2	358	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.5	0	0.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	134	383	480	-
HCM Lane V/C Ratio	-	-	0.097	0.241	0.169	-
HCM Control Delay (s)	-	-	34.7	17.4	14	-
HCM Lane LOS	-	-	D	C	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0.9	0.6	-

Intersection: 1: Okemos & Site Access

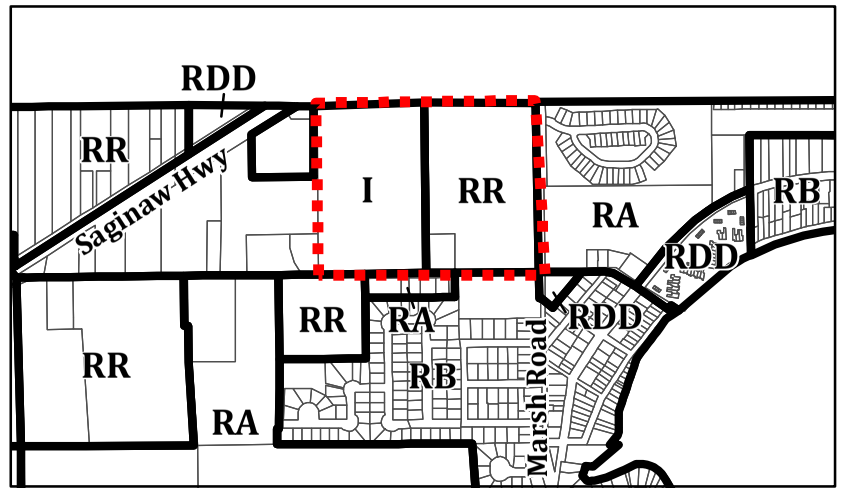
Movement	WB	SB	SB
Directions Served	LR	L	T
Maximum Queue (ft)	62	35	4
Average Queue (ft)	27	10	0
95th Queue (ft)	53	33	2
Link Distance (ft)	242		221
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Okemos & Hampton

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	TR	L
Maximum Queue (ft)	38	66	23	32	66
Average Queue (ft)	9	31	1	2	31
95th Queue (ft)	32	56	11	14	58
Link Distance (ft)	503	503	49	49	
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					200
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 0



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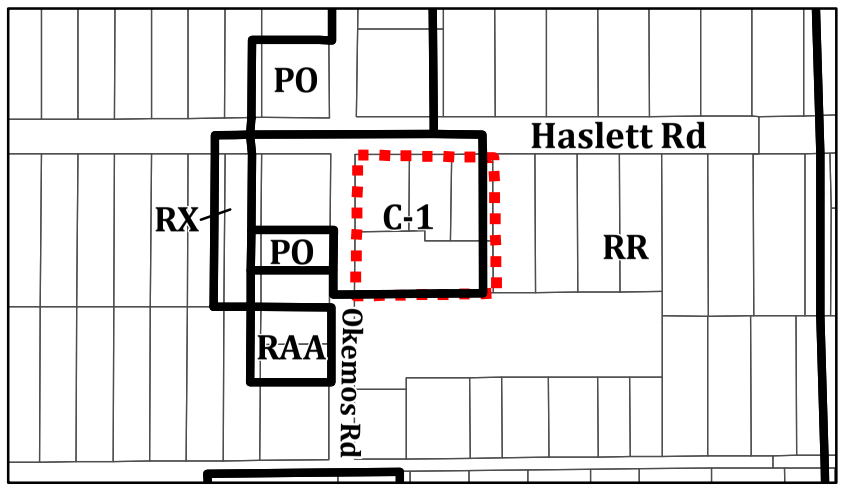

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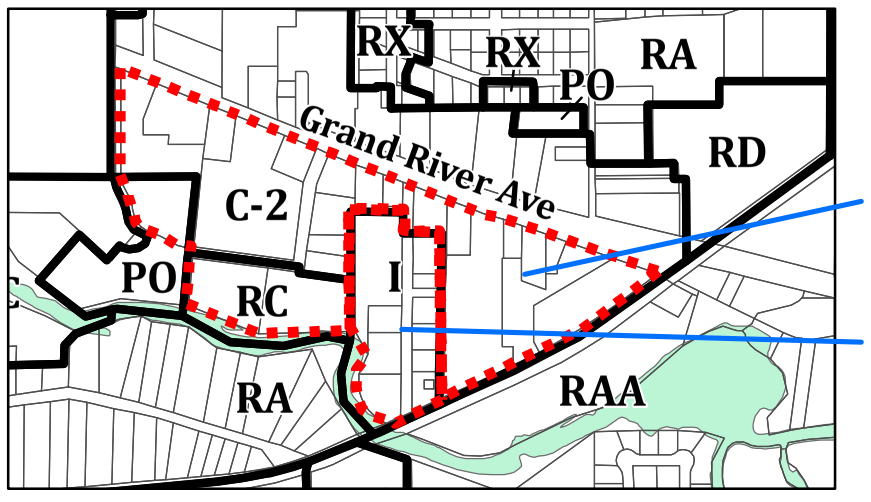

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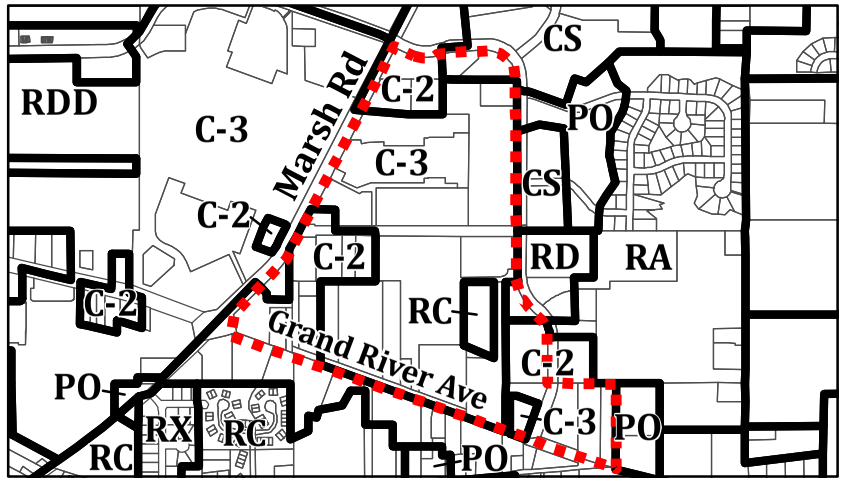

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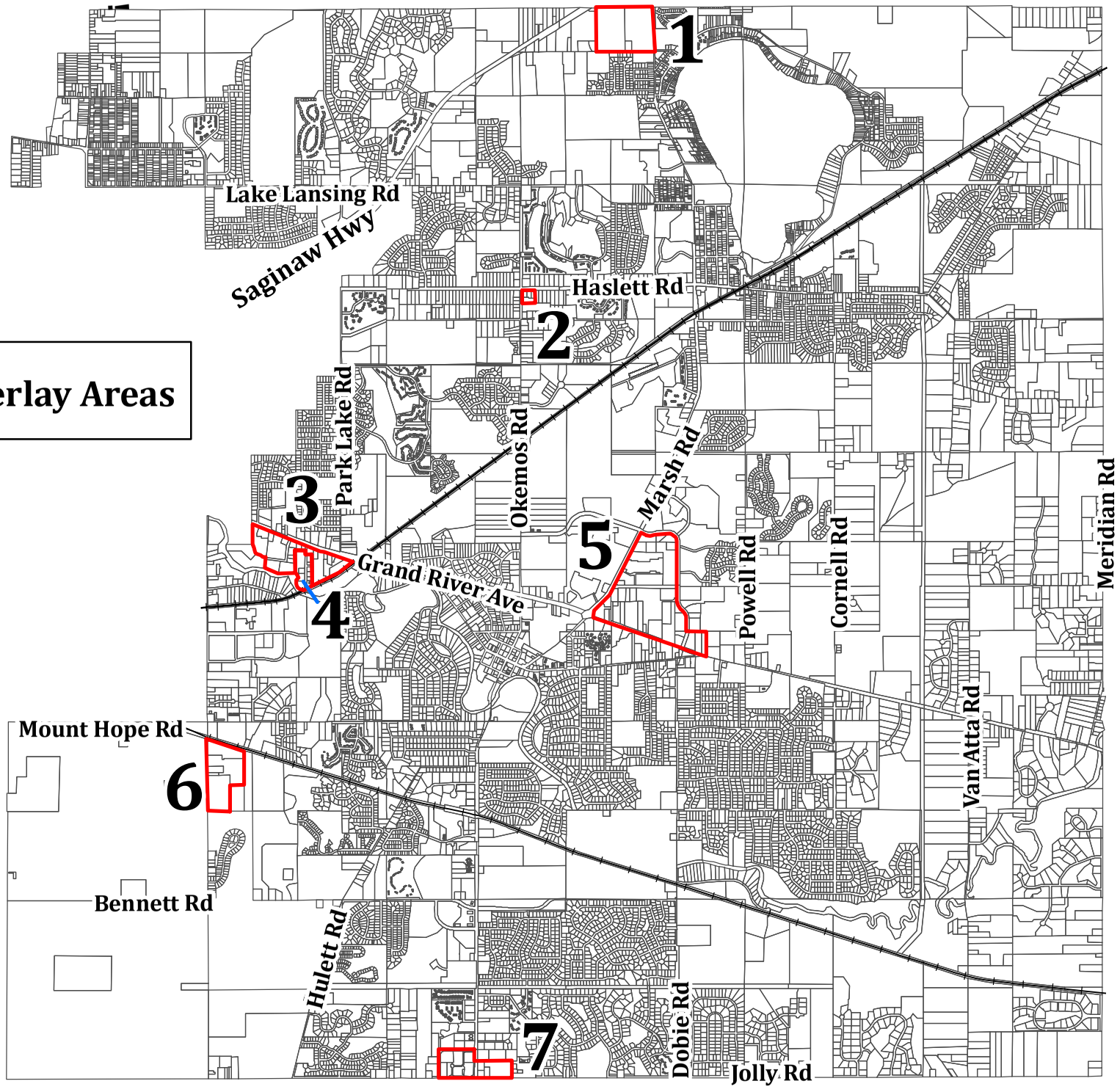
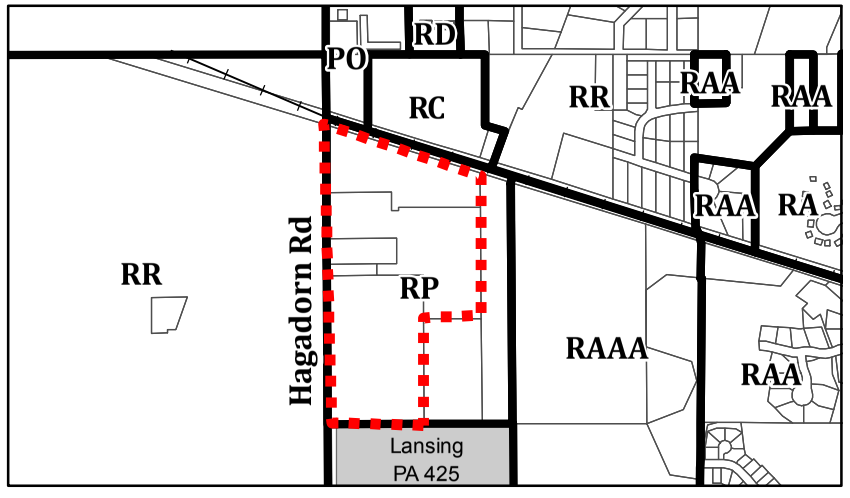


Proposed Overlay Areas



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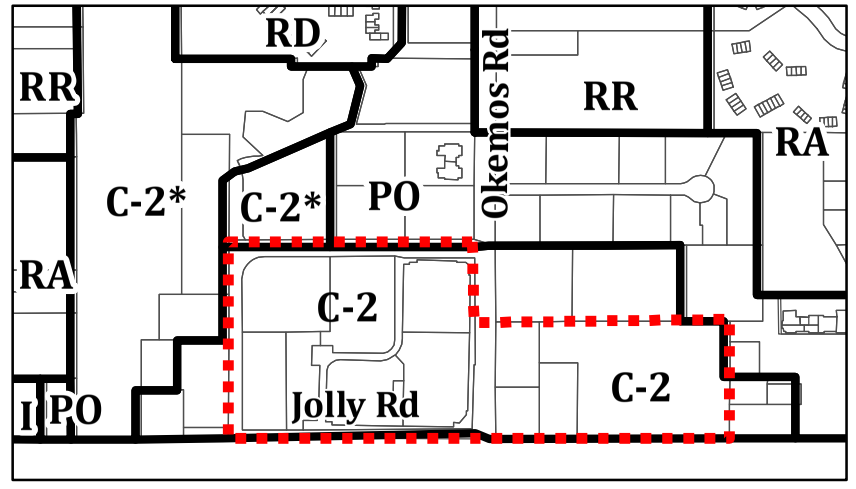


7

Updated: 5/16/19

To: **Planning Commission**

From: **Peter Menser, Principal Planner**

Mackenzie Dean, Assistant Planner

Date: **February 6, 2020**

Re: **<u>Special Use Permit #19131 (The W. Investment Holdings)</u>, construct new freestanding 4,000 square foot commercial medical marihuana provisioning center at 1614 Grand River Avenue.**

The W. Investment Holdings has applied for a special use permit (SUP) to construct a new freestanding 4,000 square foot commercial medical marihuana provisioning center at 1614 Grand River Avenue. The approximate 2.4 acre project site is zoned C-2 (Commercial).

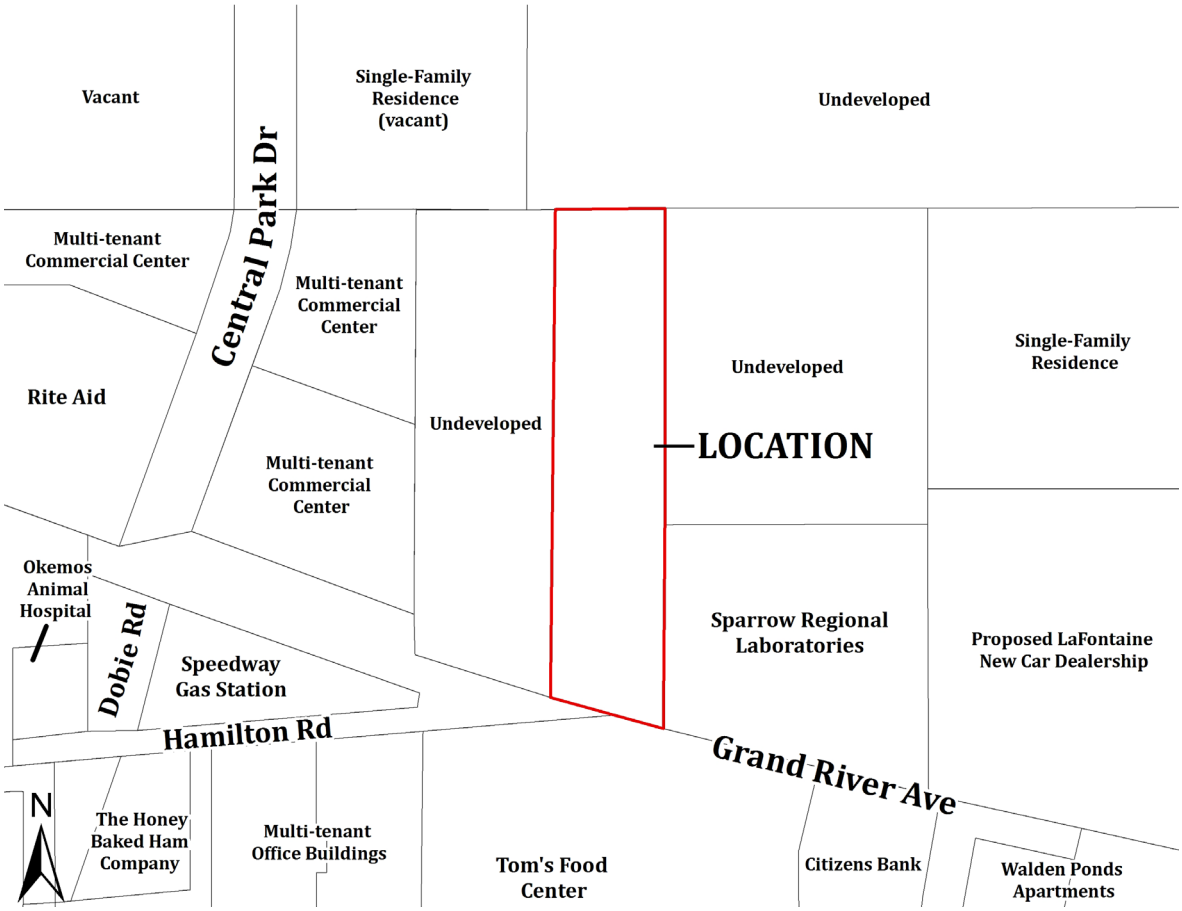
A provisioning center, also referred to a dispensary, is a facility where marihuana, or products derived from marihuana, is sold to registered medical marihuana patients or primary caregivers in accordance with the Michigan Medical Marihuana Act that was approved in 2008. A provisioning center license obtained from the State of Michigan, Department of Licensing and Regulatory Affairs (LARA), authorizes the holder to purchase or transfer marihuana only from growers and processors and to sell or transfer marihuana only to registered qualifying patients or registered primary caregivers. Under current State law consumption or use of marihuana or marihuana products at a provisioning center is prohibited. Provisioning centers are also prohibited from selling or allowing the consumption or use of alcohol or tobacco products on their premises, and from allowing a physician to conduct examinations and issue medical certifications for the purpose of obtaining a registry identification card.

Background

At its meeting on May 21, 2019 the Township Board adopted both zoning and non-zoning ordinances allowing commercial medical marihuana facilities in designated areas in the Township. The non-zoning ordinance established the application process, the facility types allowed, the number of permits, and the general operational standards for the different types of commercial facilities, which include growers, processors, secure transporters, provisioning centers, and safety compliance facilities. The zoning ordinance established seven designated areas in the Township where commercial medical marihuana facilities are permitted and identified the zoning districts in which each of the five types of commercial medical marihuana facilities can locate, as identified in the table on the following page.

Facility type	*Zoning District(s) allowed*	*Overlay Area(s) allowed*
Grower	I (Industrial)	1, 4, 6
Processor	I (Industrial)	1, 4, 6
Provisioning Center	I (Industrial), C-1, C-2, C-3 (Commercial), and RP (Research and Office Park)	1, 2, 3, 4, 5, 6, 7
Safety Compliance Facility	I (Industrial), C-1, C-2, C-3 (Commercial), and RP (Research and Office Park)	1, 2, 3, 5, 6, 7
Secure Transporter	I (Industrial), C-1, C-2, C-3 (Commercial), and RP (Research and Office Park)	1, 2, 3, 5, 6, 7

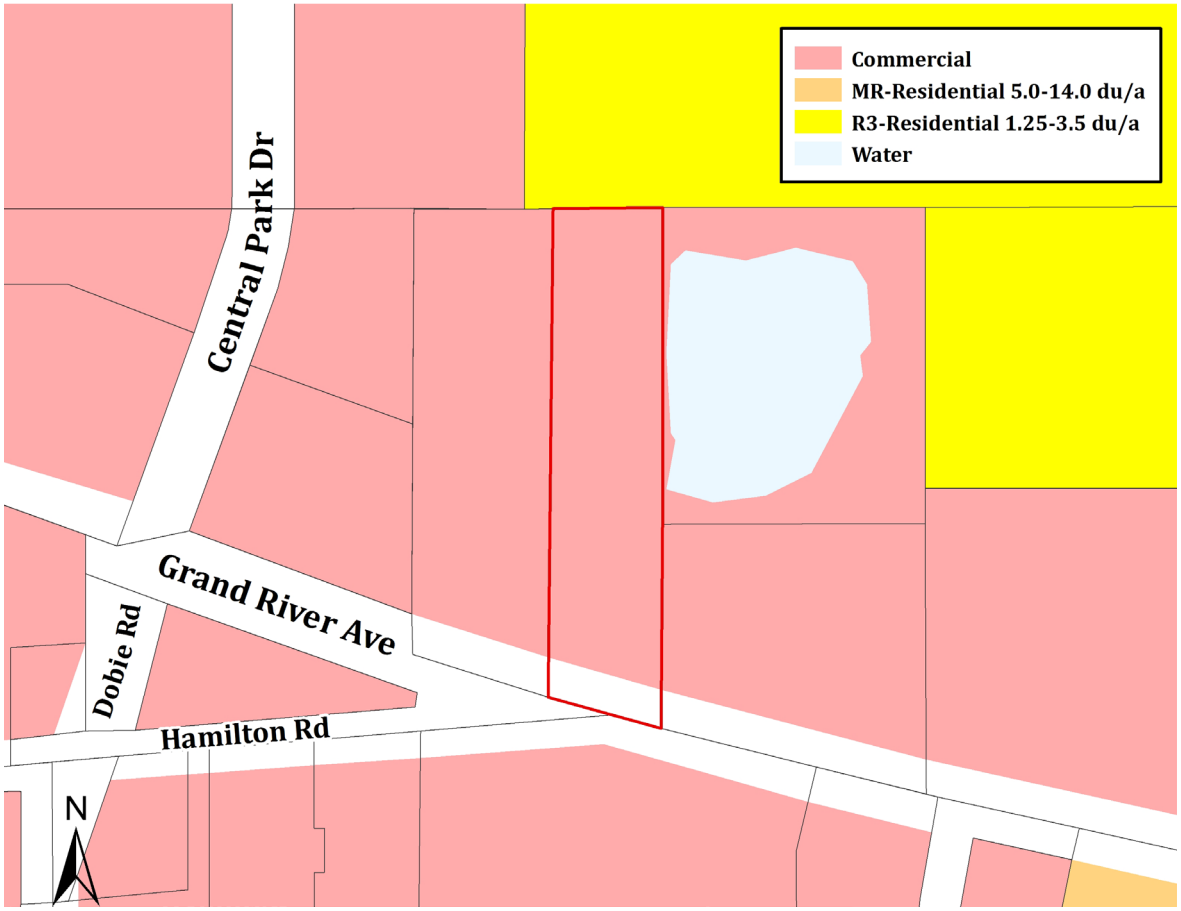
LOCATION MAP



Master Plan

The Future Land Use Map from the 2017 Master Plan designates the subject site in the Commercial category.

FUTURE LAND USE MAP

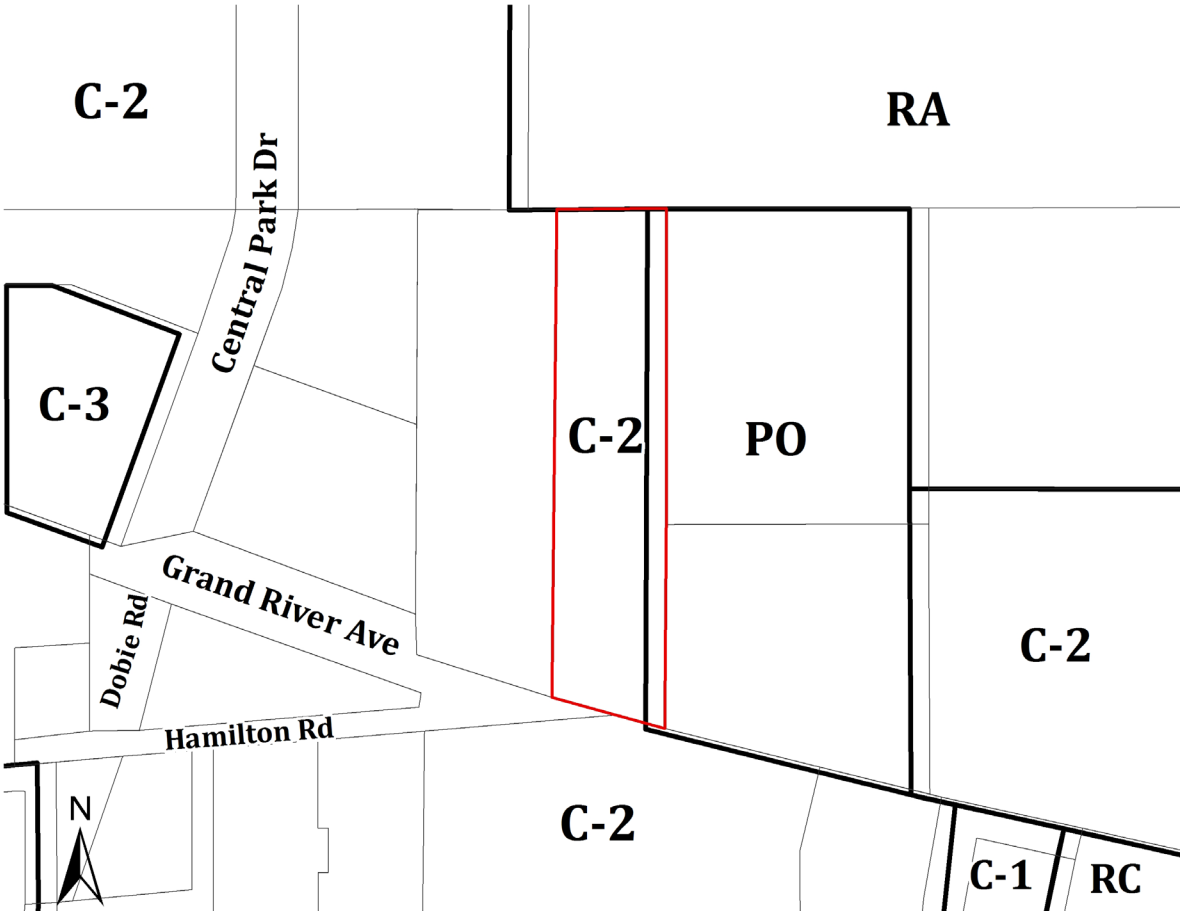


Zoning

The proposed project is located in the C-2 (Commercial) zoning district. A provisioning center is permitted in the C-1, C-2, C-3 (Commercial), I (Industrial), and RP (Research and Office Park) zoning districts subject to approval of a special use permit reviewed by the Planning Commission and approved by the Township Board.

The C-2 district requires a minimum of 100 feet of lot frontage and 4,000 square feet of lot area. The shopping center parcel property is 2.4 acres in size (104,544 square feet) and has 150 feet of frontage along Grand River Avenue.

ZONING MAP



Physical Features

The site is currently undeveloped. The site was previously occupied by a 1,163 square foot single family house built in 1925, a 785 square foot detached garage, and a shed all of which were demolished in early 2019.

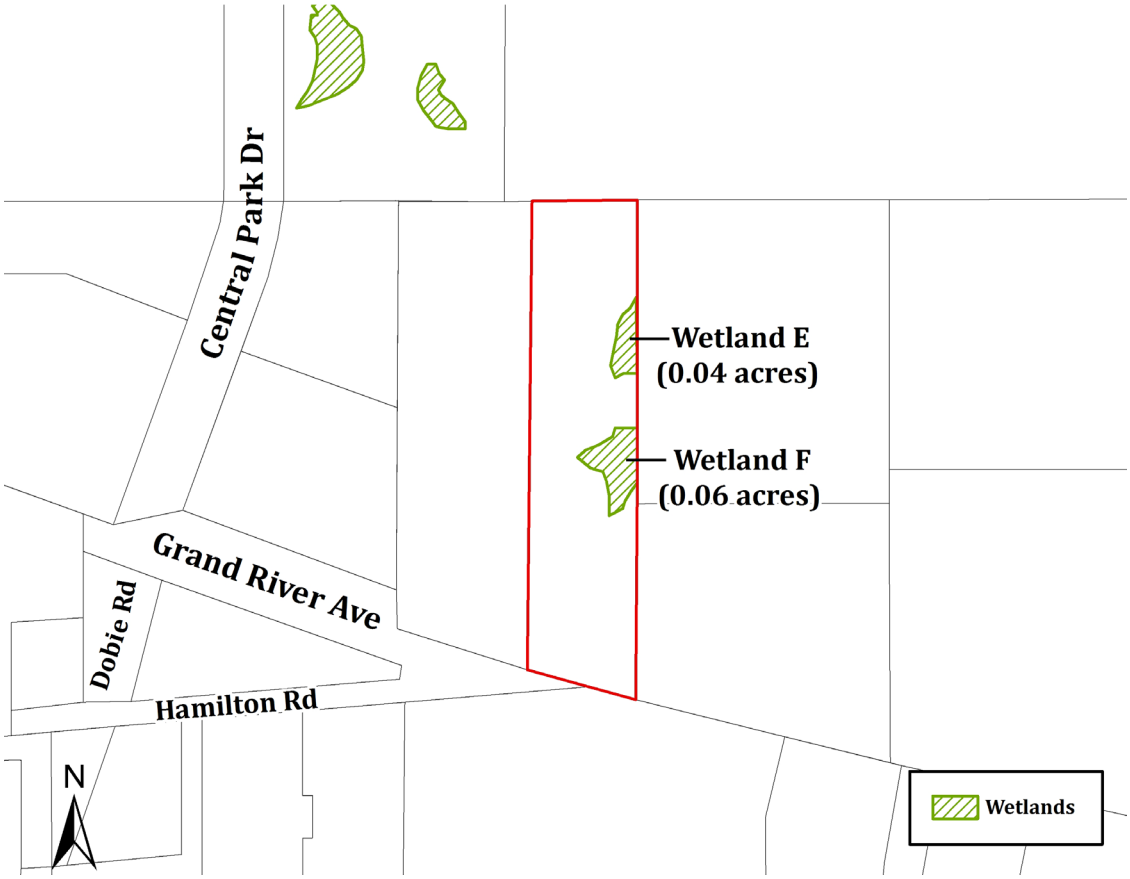
The Flood Insurance Rate Map (FIRM) for Meridian Township indicates the property is not located in a floodplain. The Township Greenspace Plan shows no special designation on the site.

Wetlands

Two wetlands are located on the subject property. A wetland delineation was conducted to determine the boundary, regulatory status, and size of the wetlands. The delineation was verified by the Township's wetland consultant in October 2018. The wetland delineation was conducted to facilitate the development of a Fox Nissan car dealership, which was proposed to be located at 1614 & 1622 Grand River Avenue and Parcel #22-252-003 adjacent to Central Park Drive. The three parcels combined contain six wetlands. Due to the current request to construct a provisioning center at 1614 Grand River Avenue, only the two wetlands located on 1614 Grand River Avenue will be detailed in this report. Wetlands E and F are both located within 30 feet of an approximately 2-acre pond and are therefore regulated by the State of Michigan and Meridian Township. Based on the submitted plans the applicant is not proposing any impacts to wetlands, and where applicable the 20 foot wetland setback is observed.

Section 86-471 of the Code of Ordinances requires all structures and grading activities be set back 20 feet or 40 feet from a delineated wetland boundary depending on the size of the wetland, and that a natural vegetation strip be maintained within 20 feet of the wetland boundary. The site plan shows the 20 foot setback from Wetland E and F.

WETLANDS MAP



Streets and Traffic

The site fronts on Grand River Avenue. Grand River Avenue is a four lane road with curb and gutter and a center turn lane classified as a Principal Arterial street on the Street Setbacks and Service Drives Map in the ordinance. The most recent (2018) traffic count information from the Michigan Department of Transportation (MDOT) for Grand River Avenue, between Dobie Road and Cornell Road, showed a total of 15,980 vehicles in a 24 hour period.

A traffic impact study is required for new special uses which would generate over 100 directional trips during a peak hour of traffic or over 750 trips on an average day. The applicant submitted a traffic impact study prepared by Fleis & Vandenbrink Engineering, Inc. dated January 21, 2020 that provides information on traffic generated by the proposed project. The study looks at existing, background (future traffic volumes without the traffic generated by the proposed development), and future level of service (LOS) during the AM (7:45-8:45 a.m.) and PM (5:00-6:00 p.m.) peak hours at the following three intersections around the project site:

- Grand River Avenue and Central Park Drive/Dobie Road
- Grand River Avenue and Hamilton Road
- Grand River Avenue and proposed site driveway

The traffic study notes that existing traffic at the studied intersections all operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours, with the exception of the southbound left-turn maneuver on Central Park Drive. For future traffic, the study indicates that all studied intersections will continue to operate at an acceptable LOS during the AM and PM peak hours, with the exception of the southbound left-turn movement at Grand River Avenue and Central Park Drive which is expected to operate at a LOS E with 55.9 seconds of vehicle delay, an increase of 17.3 seconds from the background conditions.

The traffic impact study estimated traffic generation for the proposed project based on a 5,430 square foot marijuana dispensary, which is Land Use Code 882 in the Institute of Transportation Engineers (ITE) Trip Generation Manual. The applicant is proposing a 4,000 square foot provisioning center building, therefore the traffic generated by the site may be slightly less than the traffic impact study indicates. The following table summarizes findings from the trip generation analysis.

Description	Size	AM Peak Hour			PM Peak Hour			Weekday
		In	Out	Total	In	Out	Total	
Marijuana Dispensary, Land Use Code 882	5,430 sq. ft.	32	25	57	60	59	119	1,372

The study shows that the proposed new development is expected to generate 57 vehicle trips in the AM peak hour, 119 vehicle trips in the PM peak hour and 1,372 vehicle trips over a 24 hour period.

The applicant's traffic consultant suggested an optimization of traffic signal timing at the intersection of Grand River Avenue and Central Park Drive. The study notes optimizing signal timings improved operations to an acceptable LOS and significantly reduce queue length.

Grand River Avenue Corridor Access Management Overlay District

The applicant is proposing to close an existing driveway and create a new driveway along Grand River Avenue to access the site. In accordance with the Michigan Department of Transportation (MDOT), the Township has developed access management criteria for use in evaluating proposed access driveways along Grand River Avenue. The access management criteria for the proposed driveway is summarized in the study provided by the applicant's traffic consultant. Based on the study, the traffic consultant noted that waivers for the spacing between adjacent driveways will be required to facilitate the development of the proposed provisioning center. This criteria will be reviewed during the site plan review process.

Utilities

Municipal water and sanitary sewer is available in the vicinity to serve the subject site. The location and capacity of utilities will be reviewed in detail during site plan review if the special use permit is approved.

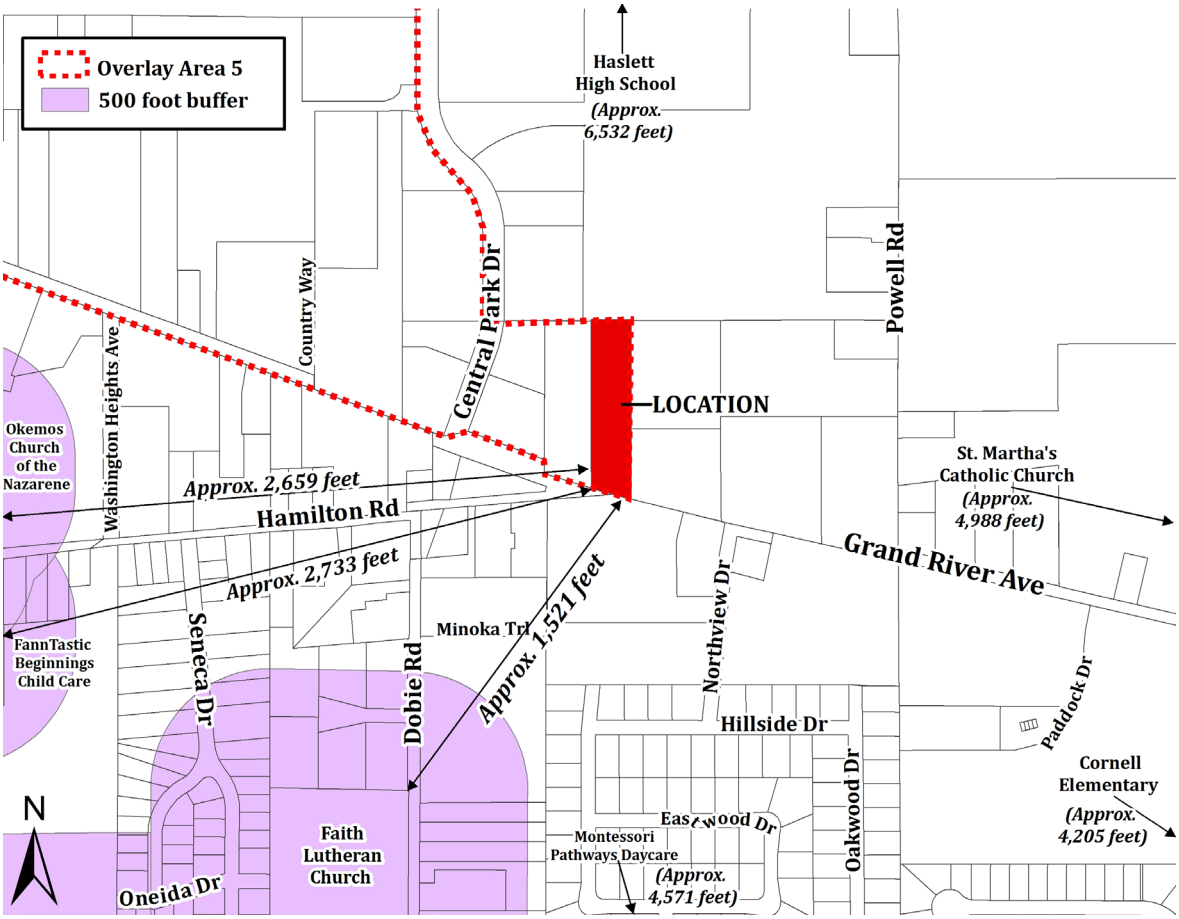
Staff Analysis

The W. Investment Holdings has requested special use permit approval to construct a new 4,000 square foot commercial medical marihuana provisioning center building located at 1614 Grand River Avenue. For commercial medical marihuana facilities the Planning Commission makes a recommendation on the request and the Township Board makes the final decision. The special use permit review criteria found in Section 86-126 of the Code of Ordinances should be used when evaluating special use permit requests.

Required Spacing

The non-zoning ordinance adopted by the Township Board requires commercial medical marihuana facilities to be located one-thousand (1,000) feet from any public or private K-12 school, five hundred (500) feet from any church, place of worship or other religious facility, and five hundred (500) feet from any library, preschool, or child care center. The minimum distance between uses is measured horizontally between the nearest property lines. The map on the following page shows the 500 and 1,000 foot buffers near the proposed provisioning center. The closest facility to the proposed provisioning center is Faith Lutheran Church. Faith Lutheran Church is located at 4515 Dobie Road, which is located approximately 1,521 feet away from the proposed provisioning center.

SETBACKS MAP



Commercial Medical Marihuana Facility Permit Application

Applicants for a commercial medical marihuana facility must go through various steps in order to establish a facility within Meridian Township, including securing local and state approval. The local process begins with the initial application for a Commercial Medical Marihuana Facility Permit. To be eligible for a permit the applicant was required to submit a non-refundable $5,000 dollar application fee and address at least two of the following three requirements: (1) an official statement issued by the Department of Licensing and Regulatory Affairs (LARA) indicating that the applicant has completed state prequalification for a license, (2) proof that the applicant or owners of at least 75% of the applicant are current Township residents and were residents for at least twelve months prior to filing the application, (3) signing of a certification restricting the transfer of the permit for a period of not less than 30 months after issuance. The applications were reviewed internally by Township staff and the Township Attorney. Other important aspects of the permit application process included submittal of documents addressing the organizational structure of the applicant, passing background checks, submitting a security plan for the facility, addressing waste disposal, providing details on staffing, and submitting information on product vendors and transporters.

Once the facility application is deemed complete, the applicant receives conditional approval from the Director of Community Planning and Development. In this initial application period the Township did receive only applications for provisioning centers.

Lottery

If multiple applications are received for an overlay area a lottery is held to establish the order applicants can apply for a special use permit. If a conditionally approved applicant fails to submit a SUP application within the required 60 day period after the lottery then the applicant's conditional approval is revoked and the next applicant drawn in the lottery receives an opportunity to submit a SUP application. In the case of the current request, the applicant was one of ten conditionally approved applicants in Overlay Area 5, so a lottery was required.

State Review and Next Steps

SUP approval must be granted by the Township Board before an application can move forward to the final steps of approval for a Commercial Medical Marihuana Facility Permit. Before operations may begin at the facility the applicant must be granted a permit by the Director of Community Planning and Development and receive final approval from the State of Michigan by completing the License Qualification and Final Approval steps of the state application process. Only when the facility has been inspected and the Township has confirmed all applicable State approvals will a Commercial Medical Marihuana Facility Permit be issued and the facility allowed to open. The commercial medical marihuana facility permit is issued for a period of one year.

Renewal

After one year, the applicant must submit an application to renew the Commercial Medical Marihuana Facility Permit. A $5,000 renewal fee is required at the time of application. Each year, any pending applications for renewal or amendment of valid, unexpired permits are reviewed and granted or denied before applications for new permits are considered. If a renewal is denied or licensure is not granted the permit shall be forfeited and the Director may accept new applicants in the next application period. If the applicant maintains a valid State license and remains in good standing with both the State and Township a renewal will be granted for another one year period.

Development Standards

Additionally, development of the site is subject to all standards for lot coverage, setback areas and landscaping. The following chart summarizes the plan requirements:

Design Objective	Standard	Proposed
Minimum lot width (Grand River Avenue)	100 feet	150 feet
Front yard setback (Grand River Avenue)	100 feet	255.9 feet
Side yard setback (east)	15 feet	65.9 feet
Side yard setback (west)	15 feet	17 feet
Rear yard setback	15 feet	384.6 feet
Setback from a residential district	100 feet	384.6 feet
Maximum building height	35 feet	24 feet
Parking	22 spaces	34 spaces
Bike parking	2 spaces	6 spaces
Vehicle loading space	1 per building	1 loading space
Impervious surfaces	70%	39.8%

Land use: A provisioning center is permitted in the C-2 zoning district subject to approval of a special use permit reviewed by the Planning Commission and approved by the Township Board.

Bicycle parking: One bicycle parking space is required for every ten motor vehicle parking spaces required. There are 22 parking spaces required; therefore the project must have a minimum of two bicycle parking spaces (one rack). Three bicycle parking racks (six bicycle parking spaces) are shown on the submitted site plan near the entrance of the proposed provisioning center. The Township requires the use of an inverted "U" shaped bicycle rack. The site plan indicates the proposed bicycle racks will be the inverted “U” shaped style.

Building materials: Building materials for this project include a mixture of burnished (polished) block, prefinished metal coping, and concrete and metal siding. A sample board of the building materials submitted by the applicant will be displayed at the public hearing.

Landscaping: A landscape plan was submitted and will be reviewed during the site plan review process.

SUP approval must be granted by the Township Board before an application can move forward to the final steps of approval for a Commercial Medical Marihuana Facility Permit. The applicant must also submit for Site Plan Review before work can begin. Site Plan Review is a detailed staff-level analysis of the project which includes reviews of storm water, utilities, lighting, landscaping, grading, and other issues to ensure compliance with all applicable ordinances as well as confirmation of approvals from local agencies such as the Ingham County Drain Commissioner's Office and Road Department. Before operations may begin at the facility the applicant must be granted a permit by the Director of Community Planning and Development and receive final approval from the State of Michigan by completing the License Qualification and Final Approval steps of the state application process. Only when the facility has been inspected and the Township has confirmed all applicable State approvals will a Commercial Medical Marihuana Facility Permit be issued and the facility allowed to open.

Planning Commission Options

The Planning Commission may recommend approval, approval with conditions, or denial of the proposed special use permit. A resolution will be provided at a future meeting.

Attachments

1. Special use permit application and attachments.
2. Site plan prepared by NF Engineers & Surveyors dated November 11, 2019 (revision date January 24, 2020) and received by the Township on January 27, 2020.
3. Floor plan and elevations prepared by ROGVOY Architects dated August 2, 2019 and received by the Township on January 27, 2020.
4. Traffic Impact Study prepared by Fleis & Vandenbrink Engineering, Inc. dated January 21, 2020 and received by the Township on January 21, 2020.
5. Wetland Delineation Report prepared by Marx Wetlands, LLC dated September 24, 2018 and received by the Township on October 19, 2018.
6. Wetland Verification Report prepared by The Township Wetland Consultant dated October 19, 2018 and received by the Township on October 19, 2018.
7. Medical Marihuana Overlay Area Map dated May 16, 2019.

G:\Community Planning & Development\Planning\SPECIAL USE PERMITS (SUP)\2019\SUP 19131 (The W. Investment Holdings)\SUP 19131.pc1.docx

CHARTER TOWNSHIP OF MERIDIAN
DEPARTMENT OF COMMUNITY PLANNING AND DEVELOPMENT
5151 MARSH ROAD, OKEMOS, MI 48864
PLANNING DIVISION PHONE: (517) 853-4560, FAX: (517) 853-4095

SPECIAL USE PERMIT APPLICATION

Before submitting this application for review, an applicant may meet with the Director of Community Planning and Development to discuss the requirements for a special use permit and/or submit a conceptual plan for review to have preliminary technical deficiencies addressed prior to submittal of the application. If the property or land use is located in the following zoning districts RD, RC, RCC, RN then the applicant must meet with the Planning Director to discuss technical difficulties before filing a formal application.

Part I

A. Applicant The W. Investment Holdings - Ammar W. Alkhafji
Address of Applicant 29580 Northwestern Highway
Telephone - Work 248.497.4000 Home _____ Fax _____ Email ammar@winvestorsgroup.com
Interest in property (circle one): (Owner) Tenant Option Other
(Please attach a list of all persons with an ownership interest in the property.)

B. Site address / location / parcel number 1614 W. Grand River / 33-02-22-426-001 / Parcel 3
Legal description (please attach if necessary) Attached
Current zoning C2 - Commercial District
Use for which permit is requested / project name Commercial
Corresponding ordinance number _____

C. Developer (if different than applicant) Same as above
Address _____
Telephone – Work _____ Home _____ Fax _____

D. Architect, Engineer Planner or Surveyor responsible for design of project if different from applicant:
Name Nowak and Fraus Engineers Rogvoy Architects
Address 46777 Woodward, Pontiac, MI 48342 32500 Telegraph, Bingham Farms, MI 48025
Telephone – Work 248.332.7931 Home _____ ~~Fax~~ Tel. 248.540.7700

E. Acreage of all parcels in the project: Gross 2.40 Net _____

F. Explain the project and development phases:

G. Total number of:
Existing: structures 1 bedrooms unknown offices N/A parking spaces N/A carports N/A garages 1
Proposed: structures 1 bedrooms N/A offices N/A parking spaces 34 carports N/A garages N/A

H. Square footage: existing buildings 2,161 proposed buildings 4,000
Usable Floor area: existing buildings 2,161 proposed buildings 4,000

I. If employees will work on the site, state the number of full time and part time employees working per shift and hours of operation: It is expected that there will be 3 employees on site. Hours of operation is anticipated to be from 8 am to 7 pm

J. Existing Recreation: Type N/A Acreage _____
Proposed Recreation: Type N/ Acreage _____
Existing Open Space: Type Residential Lawn Acreage 2.28
Proposed Open Space: Type Commercial Lawn Acreage 1.60

K. If Multiple Housing:

Total acres of property N/A

Acres in floodplain _____ Percent of total _____

Acres in wetland (not in floodplain) _____ Percent of total _____

Total dwelling units _____

Dwelling unit mix:

Number of single family detached:	for Rent _____	Condo _____
Number of duplexes:	for Rent _____	Condo _____
Number of townhouses:	for Rent _____	Condo _____
Number of garden style apartments:	for Rent _____	Condo _____
Number of other dwellings:	for Rent _____	Condo _____

L. The following support materials must be submitted with the application:

1. Nonrefundable Fee.
2. Legal Description of the property.
3. Evidence of fee or other ownership of the property.
4. Site Plan containing the information listed in the attachment to this application.
5. Architectural sketches showing all sides and elevations of the proposed buildings or structures, including the project entrance, as they will appear upon completion. The sketches should be accompanied by material samples or a display board of the proposed exterior materials and colors.
6. A Traffic Study, prepared by a qualified traffic engineer, based on the most current edition of *Evaluating Traffic Impact Studies: A Recommended Practice for Michigan Communities*, published by the State Department of Transportation.
   a. A traffic assessment will be required for the following:
      1) New special uses which could, or expansion or change of an existing special use where increase in intensity would, generate between 50 to 99 directional trips during a peak hour of traffic.
      2) All other special uses requiring a traffic assessment as specified in the Township Code of Ordinances, Chapter 86, Article IV, Division 2.
   b. A traffic impact study will be required for the following:
      1) New special uses which would, or expansion or change of an existing special use where increase in intensity would, generate over 100 directional trips or more during a peak hour of traffic, or over 750 trips on an average day.
      2) All other special uses requiring a traffic assessment as specified in the Township Code of Ordinances, Chapter 86, Article IV, Division 2.
7. Natural features assessment which includes a written description of the anticipated impacts on the natural features at each phase and at project completion that contains the following:
   a. An inventory of natural features proposed to be retained, removed, or modified. Natural features shall include, but are not limited to, wetlands, significant stands of trees or individual trees greater than 12 inches dbh, floodways, floodplains, waterbodies, identified groundwater vulnerable areas, slopes greater than 20 percent, ravines, and vegetative cover types with potential to sustain significant or endangered wildlife.
   b. Description of the impacts on natural features.
   c. Description of any proposed efforts to mitigate any negative impacts.

   The natural features assessment may be waived by the Director of Community Planning and Development in certain circumstances.

M. Any other information specified by the Director of Community Planning and Development which is deemed necessary to evaluate the application.

N. In addition to the above requirements, for zoning districts, **RD, RC, RCC, RN, and CV** and **Group Housing Residential Developments** the following is required:

1. Existing and proposed contours of the property at two foot intervals based on United States Geological Survey (USGS) data.
2. Preliminary engineering reports in accordance with the adopted Township water and sewer standards, together with a letter of review from the Township Engineer.
3. Ten copies of a report on the intent and scope of the project including, but not limited to: Number, size, volume, and dimensions of buildings; number and size of living units; basis of calculations of floor area and density and required parking; number, size, and type of parking spaces; architectural sketches of proposed buildings.
4. Seven copies of the project plans which the Township shall submit to local agencies for review and comments.

O. In addition to the above requirements, a special use application in zoning district **RP** requires the following material as part of the site plan:

1. A description of the operations proposed in sufficient detail to indicate the effects of those operations in producing traffic congestion, noise, glare, air pollution, water pollution, fire hazards or safety hazards or the emission of any potentially harmful or obnoxious matter or radiation.
2. Engineering and architectural plans for the treatment and disposal of sewerage and industrial waste tailings, or unusable by-products.
3. Engineering and architectural plans for the handling of any excessive traffic congestion, noise, glare, air pollution, or the emission of any potentially harmful or obnoxious matter or radiation.

P. In addition to the above requirements, a special use application for a use in the Floodway Fringe of zoning district **CV** requires the following:

1. A letter of approval from the State Department of Environmental Quality.
2. A location map including existing topographic data at two-foot interval contours at a scale of one inch representing 100 feet.
3. A map showing proposed grading and drainage plans including the location of all public drainage easements, the limits, extent, and elevations of the proposed fill, excavation, and occupation.
4. A statement from the County Drain Commissioner, County Health Department, and Director of Public Works and Engineering indicating that they have reviewed and approved the proposal.

Q. In addition to the above requirements, a special use application for a use in the Groundwater Recharge area or zoning district **CV** requires the following:

1. A location map including existing topographic data at two-foot interval contours.
2. A map showing proposed grading and drainage plans including the location of all public drainage easements, the limits and extent of the proposed fill, excavation, and occupation.
3. A statement from the County Drain Commissioner, County Health Department, and Director of Public Works and Engineering indicating that they have reviewed and approved the proposal.

R. In addition to the above requirements, the Township Code of Ordinances, Article VI, should be reviewed for the following special uses: group housing residential developments, mobile home parks, nonresidential structures and uses in residential districts, planned community and regional shopping center developments, sand or gravel pits and quarries, sod farms, junk yards, sewage treatment and disposal installations, camps and clubs for outdoor sports and buildings greater than 25,000 square feet in gross floor area.

Part II

SUP REQUEST STANDARDS
Township Code of Ordinances, Section 86-126

Applications for Special Land Uses will be reviewed with the standards stated below. An application that complies with the standards stated in the Township Ordinance, conditions imposed pursuant to the Ordinance, other applicable Ordinances, and State and Federal statutes will be approved. Your responses to the questions below will assist the Planning Commission in its review of your application.

(1) The project is consistent with the intent and purposes of this chapter.

(2) The project is consistent with applicable land use policies contained in the Township's Master Plan of current adoption.

(3) The project is designed, constructed, operated, and maintained so as to be harmonious and appropriate in appearance with the existing or intended character of the general vicinity and that such a use will not change the essential character of the same area.

(4) The project will not adversely affect or be hazardous to existing neighboring uses.

(5) The project will not be detrimental to the economic welfare of surrounding properties or the community.

(6) The project is adequately served by public facilities, such as existing roads, schools, stormwater drainage, public safety, public transportation, and public recreation, or that the persons or agencies responsible for the establishment of the proposed use shall be able to provide any such service.

(7) The project is adequately served by public sanitation facilities if so designed. If on-site sanitation facilities for sewage disposal, potable water supply, and storm water are proposed, they shall be properly designed and capable of handling the longterm needs of the proposed project.

(8) The project will not involve uses, activities, processes, materials, and equipment and conditions of operation that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, fumes, glare, or odors.

(9) The project will not directly or indirectly have a substantial adverse impact on the natural resources of the Township, including, but not limited to, prime agricultural soils, water recharge areas, lakes, rivers, streams, major forests, wetlands, and wildlife areas.

Part III

I (we) hereby grant permission for members of the Charter Township of Meridian's Boards and/or Commissions, Township staff member(s) and the Township's representatives or experts the right to enter onto the above described property (or as described in the attached information) in my (our) absence for the purpose of gathering information including but not limited to the taking and the use of photographs.

☒ Yes ☐ No (Please check one)

By the signature(s) attached hereto, I (we) certify that the information provided within this application and accompanying documentation is, to the best of my (our) knowledge, true and accurate

Signature of Applicant — Date: 1/27/2020

Ammar Alkhafaji
Type/Print Name

Fee: _____ Received by/Date: _____

CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

January 24, 2020

Meridian Township
5151 Marsh Road
Okemos, Michigan 48864

Attention: **Department of Community Planning and Development**

Regarding: **Parcel 3 – 1614 W. Grand River 33-02-22-426-001**
Special Land Use

To All:

The W. Investment Holdings – Ammar W. Alkhafaji desires to construct a retail business on the referenced parcel/property. Parcel 3 is 2.20 acres of a larger property that will be developed in the future by the Owner listed above. The proposed retail is planned to be a 4,000 square foot building with a total 34 parking spaces.

1. The site noted above is zoned C-2 Commercial District. The minimum lot area is 4,000 square feet. The lot/ parcel 3 is 2.40 acres. The lot width is 144 feet. The proposal meets the setback requirements.

   The proposed use is a provisioning center. At the suggestion of the Township and in accordance with Section 86-404 the applicant is submitting this project for a special use.

2. The Township Master Plan identifies the subject parcel zoned as commercial use. The proposed use as a provisioning center will be harmonious with the surrounding properties. The property to the east of this project is a medical office. The property to the west of the site is commercial. Long term plans are to develop Parcel 2 as a commercial retail site. The provisioning center is consistent with applicable land use policies contained in the Township's Master Plan of current adoption as our property has been chosen via the township's "lottery" for District 5.

3. As provided on the attached plans, the propose development fits seamlessly on the site and has been designed to meet the standards of the Meridian Township Zoning Ordinance. As indicated above the proposed development will be harmonious with the surrounding properties and will serve as a transition between the medical office to the east and the commercial operation to the west. The hours of operation will conform with the township's requirement and will not exceed what is allowed by the township. All precautionary measures will be taken in regard to the security of the operation along with the wellbeing of the community and surrounding vicinity. Building will be constructed following all Township and Michigan building code standards. The design will be appropriate with the existing general vicinity and its intended character and will not change the essential character of that area.

4. The proposed development will be a transition between the surrounding properties and will be harmonious with those properties. It will **not** adversely affect or be hazardous to existing neighboring uses. Our facility will include an odor plan including a carbon filtration system to make sure there is no

smell giving a negative effect to our neighbors and surrounding community. We will also be having full security on the property during business hours to ensure safety to our clientele and the community at large.

5. It is anticipated that the proposed provisioning center will slightly increase the amount of commercial activity in this area. The provisioning center will be replacing existing an existing residential property. It is likely that the patrons for this project will also utilize the other nearby properties. This project will **not** be detrimental to the economic welfare of surrounding properties and community, and in fact will have a positive effect to the economic welfare of surrounding properties and community.

6. The subject parcel has frontage onto West Grand River Avenue. Pedestrian access currently exists along Grand River Avenue. Public utilities such as sewer, water and storm water are available to the site.

7. The site is served by public water and sanitary sewer services. All of which will be properly designed to fit this project and will be adequately capable of handling all long term needs for the proposed project.

8. The proposed project will not involve any uses or activities, processes, materials, equipment or conditions that will be detrimental to any persons, property or general welfare through the excessive generation of traffic, noise, smoke, fumes, glare or odor. A traffic generation report along with traffic study is provided to show support of that. We have also provided an odor plan in the provisioning center application to show all preventative measures of eliminating odor to surrounding area. There will be no conduct in the place of business to create excessive noise, smoke or fumes. All lighting of the property will be conforming to townships ordinance.

9. The proposed provisioning center project will not directly or indirectly have an adverse impact on the natural resources of the Township, the agricultural soils, water recharge areas, lakes, rivers, streams, major forests, wetlands and wildlife areas.

The proposed project is located within the existing commercial area of the Township.

Please call us if there are any questions pertaining to the above.

Respectfully,
Nowak and Fraus Engineers

Michael D. Peterson, P.E.

NF ENGINEERS

CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

LEGAL DESCRIPTION

PARCEL 3

The East 145 feet of the following description: Beginning at a point 1123.75 feet West of the East quarter post of Section 22, Town 4 North, Range 1 West, thence West 351 feet, thence South 748 feet to the center of Grand River Road, thence Easterly along center of said road 351 feet; thence North 746 feet to beginning, Meridian Township, Ingham County, Michigan.

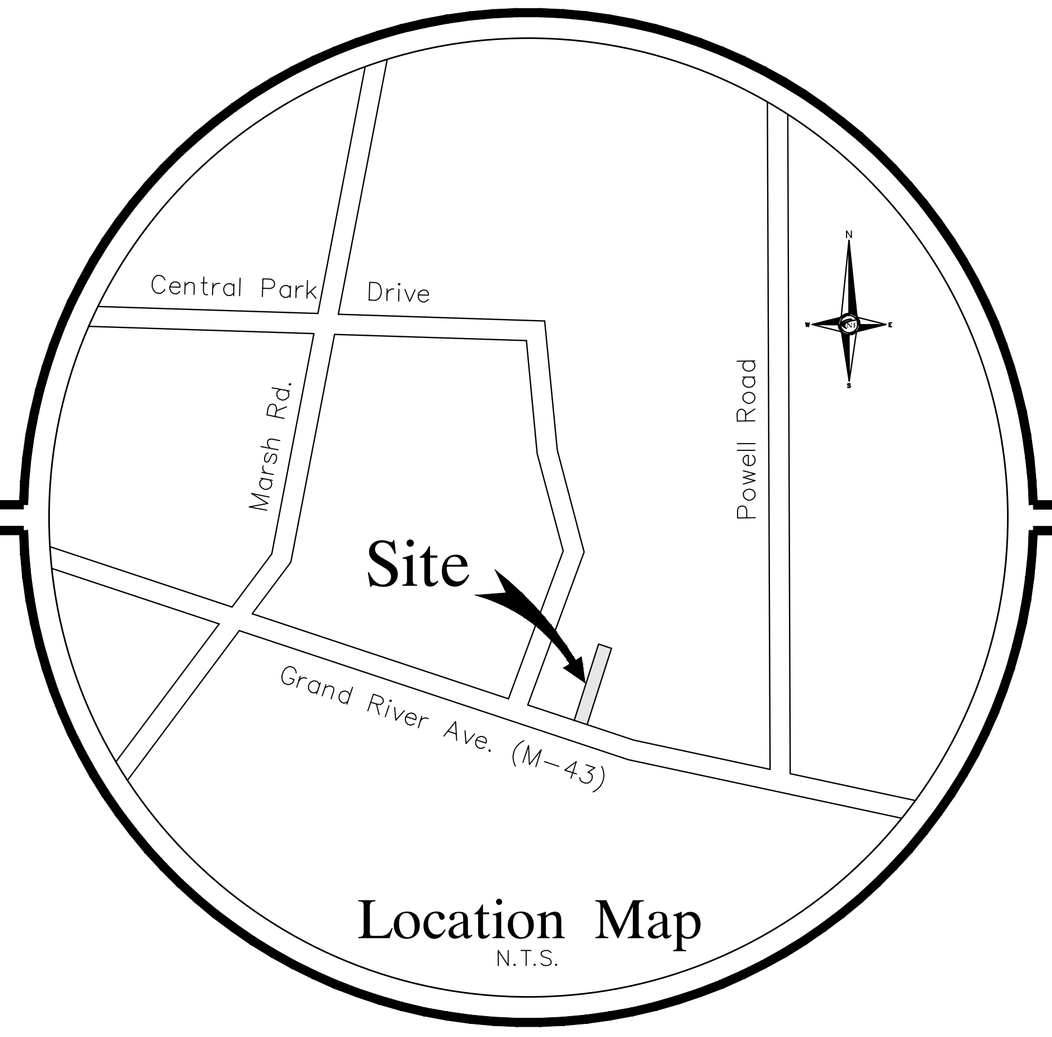
Address: 1614 W. Grand River Avenue
Tax ID No.: 33-02-02-22-426-001

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVENUE
PONTIAC, MI 48342-5032
WWW.NOWAKFRAUS.COM
VOICE: 248.332.7931
FAX: 248.332.8257

Meridian Township,
Ingham County, Michigan

SITE PLAN PACKAGE

Prepared For:
W Investment Holdings



Location Map
N.T.S.

REVISIONS:
2020-01-24 Revise per Meridian Township

O□ner

W INVESTMENT HOLDINGS
29580 NORTHWESTERN HWY.
SUITE 100.
SOUTHFIELD, MI 48034
CONTACT: AMMAR W. ALKHAFAJI
PHONE: (248) 559-5555

□r□i□e□□

ROGVOY ARCHITECTS
32500 TELEGRAPH ROAD
SUITE 250
BINGHAM FARMS, MICHIGAN 48025
CONTACT: MARK DRANE
PHONE: (248) 540-7700

□ivi□Engineer

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVENUE
PONTIAC, MICHIGAN 48342
CONTACT:
MR. JEFFREY J. HUHTA, P.E., P.S.
PHONE: (248) 332-7931
EMAIL: JHUHTA@NFE-ENGR.COM

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NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVENUE
PONTIAC, MICHIGAN 48342
CONTACT:
MR. GEORGE A. OSTROWSKI, R.L.A.
PHONE: (248) 332-7931
EMAIL: GOSTROWSKI@NFE-ENGR.COM

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□□□□ □ □Gr□nd River
□ro□osed □rovisioning □en□er

□EG□□ DES□RI□□IO□ □□R□E□ □ □ER RE□ORDS□

Address: 1622 W. Grand River Avenue
Tax ID No.: 33-02-02-22-401-003

PARCEL 3
The East 145 feet of the following description: Beginning at a point 1123.75 feet West of the East quarter post of Section 22, Town 4 North, Range 1 West, thence West 351 feet, thence South 748 feet to the center of Grand River Road, thence Easterly along center of said road 351 feet; thence North 746 feet to beginning, Meridian Township, Ingham County, Michigan.

Address: 1614 W. Grand River Avenue
Tax ID No.: 33-02-02-22-426-001

NFE JOB # J987-02

MICHAEL D. PETERSON
ENGINEER NO. 049061
LICENSED PROFESSIONAL ENGINEER

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
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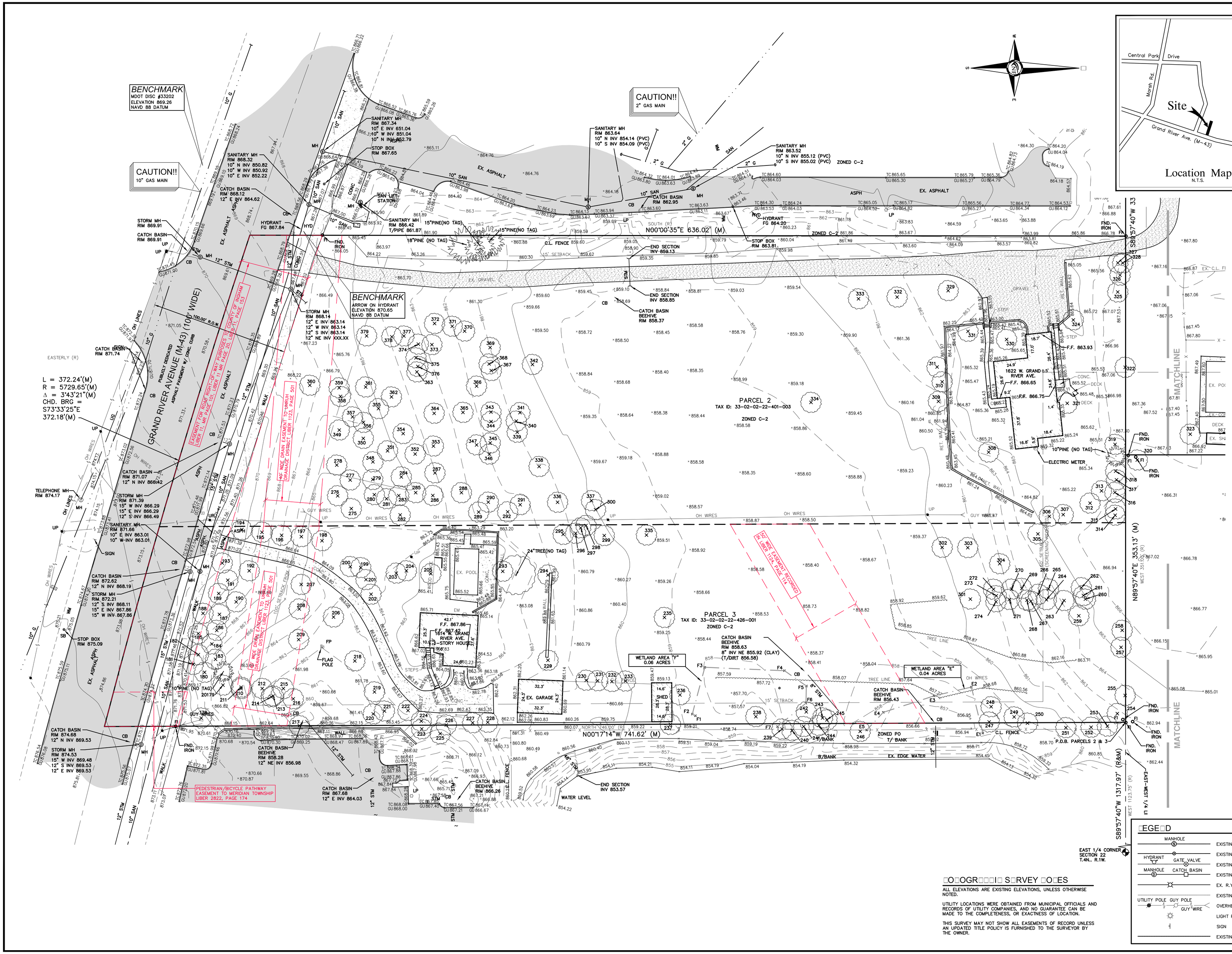

Central Park Drive
Marsh Rd.
Powell Road
Site
Grand River Ave. (M-43)
Location Map
N.T.S.

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
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SEAL

STATE OF MICHIGAN
JEFFREY J. HUHTA
PROFESSIONAL SURVEYOR NO. 52458
LICENSED PROFESSIONAL SURVEYOR

PROJECT
Proposed Provisioning Center

CLIENT
W Investment Holdings
29580 Northwestern Hwy.
Suite 100.
Southfield, MI 48034

Contact: Ammar W. Alkhafaji
Phone: (248) 559-5555

PROJECT LOCATION
No. 1614
W. Grand River Ave.
Part of the NE. 1/4 of Section 22, T4N., R.1W., Township of Meridian, Ingham County, MI

SHEET
Boundary / Topographic / Tree Survey - South

811 Know what's below Call before you dig.

REVISIONS

DRAWN BY:
C. Ellison

DESIGNED BY:

APPROVED BY:
J. Huhta

DATE:
March 5, 2018

SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. J987
SHEET NO. C1

□EGE□D

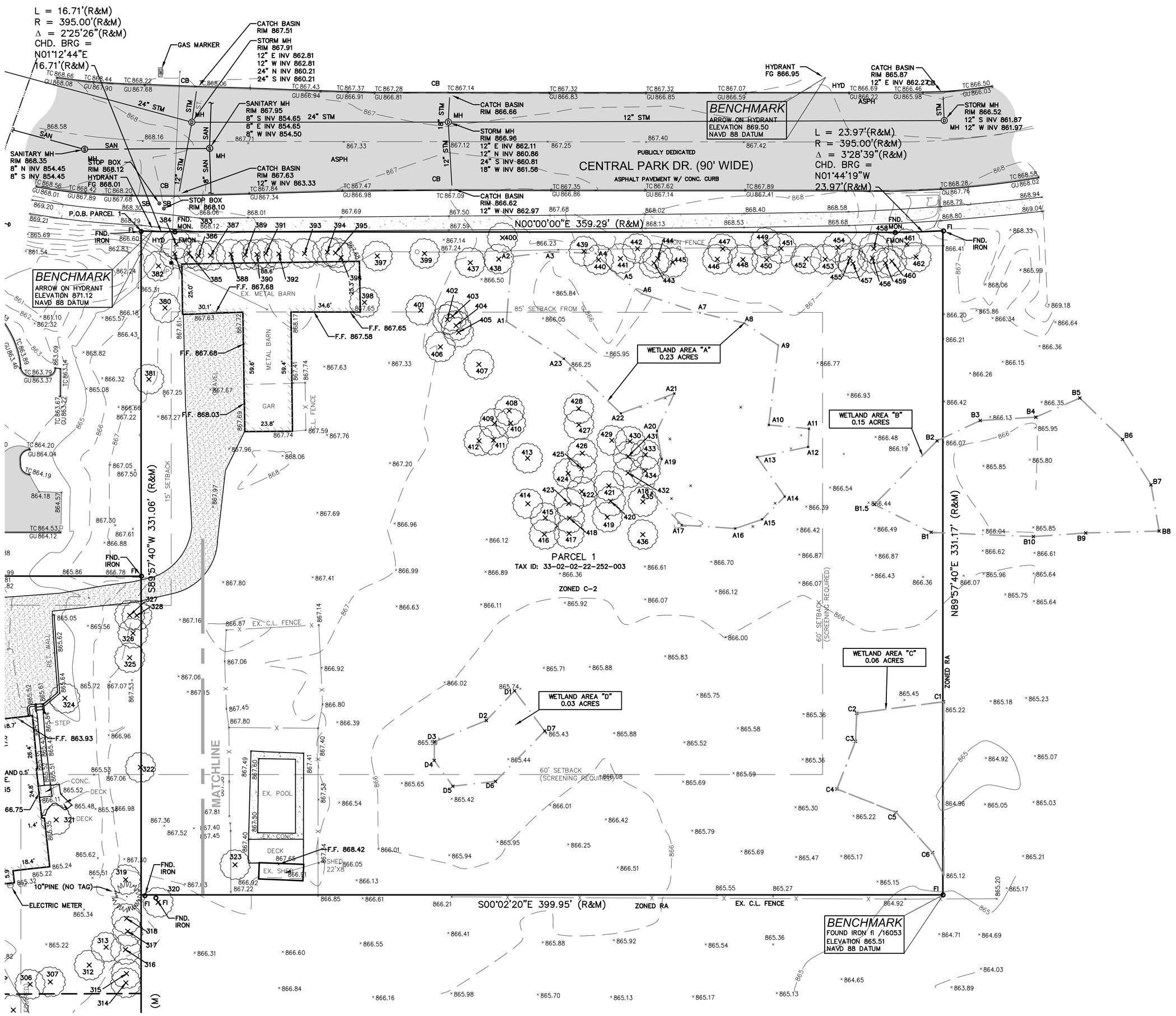
- MANHOLE — EXISTING SANITARY SEWER
- HYDRANT, GATE VALVE — EXISTING SAN. CLEAN OUT
- MANHOLE, CATCH BASIN — EXISTING WATER MAIN
- EXISTING STORM SEWER
- EX. R.Y. CATCH BASIN
- UTILITY POLE, GUY POLE, GUY WIRE — EXISTING BURIED CABLES
- OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN

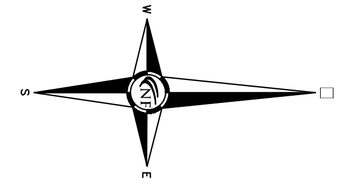
□O□OGR□□□I□ S□RVEY □O□ES

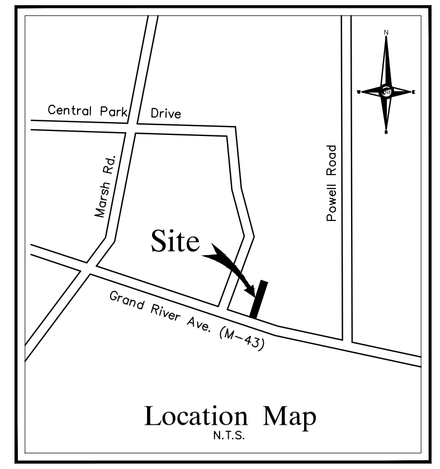
ALL ELEVATIONS ARE EXISTING ELEVATIONS, UNLESS OTHERWISE NOTED.

UTILITY LOCATIONS WERE OBTAINED FROM MUNICIPAL OFFICIALS AND RECORDS OF UTILITY COMPANIES, AND NO GUARANTEE CAN BE MADE TO THE COMPLETENESS, OR EXACTNESS OF LOCATION.

THIS SURVEY MAY NOT SHOW ALL EASEMENTS OF RECORD UNLESS AN UPDATED TITLE POLICY IS FURNISHED TO THE SURVEYOR BY THE OWNER.







Location Map
N.T.S.

LEGAL DESCRIPTION

PARCEL 1
Part of the Northeast 1/4 of Section 22, Town 4 North, Range 1 West, Meridian Township, Ingham County, Michigan, described as: Commencing at the East 1/4 corner of Section 22; thence South 89°57'40" West along the South line of the Northeast 1/4 1317.97 feet to the point of beginning; thence South 89°57'40" West along said South line 331.06 feet to the East line of Central Park Drive, along said East line the following 3 courses: Northeasterly 16.71 feet on a curve to the left, radius of 395 feet, chord bearing North 01°12'44" East; North 359.29 feet and Northwesterly 23.97 feet on a curve to the left, radius of 395 feet, chord bearing North 01°44'19" West; North 89°57'40" East 331.17 feet; thence South 00°02'20" East 399.95 feet to the point of beginning.

Tax ID No.: 33-02-02-22-252-002

PARCEL 2
Beginning at a point 1123.75 feet West of the East 1/4 post of Section 22, Town 4 North, Range 1 West, Meridian Township, Ingham County, Michigan, thence West 351 feet, thence South to the center of the highway, thence Easterly along the center of the highway to a point directly South of the place of beginning, thence North to place of beginning; except the East 145 feet thereof.

Address: 1622 W. Grand River Avenue
Tax ID No.: 33-02-02-22-401-003

PARCEL 3
The East 145 feet of the following description: Beginning at a point 1123.75 feet West of the East quarter post of Section 22, Town 4 North, Range 1 West, thence West 351 feet, thence South 748 feet to the center of Grand River Road, thence Easterly along center of said road 351 feet; thence North 746 feet to beginning, Meridian Township, Ingham County, Michigan.

Address: 1614 W. Grand River Avenue
Tax ID No.: 33-02-02-22-426-001

SITE DATA

Gross Land Area: Parcel #1: 3.04 Acres
Parcel #2: 3.23 Acres
Parcel #3: 2.40 Acres

Zoned: C-2 (Commercial District)
RA (One-Family Medium-Density Residential District)

C-2 Building Setbacks:
Front= 100' from centerline of W. Grand River Avenue
Side and rear setback adjacent to a residential district. No building, parking, access drive, or other structure shall be less than 100 feet from a residential district line, except a sixty-foot setback shall be required if screening that incorporates a double row of interlocking trees, primarily evergreens, or the equivalent in addition to general screening standards.

Max. Building Height permitted: 2.5 stories/35'

The above setback & height requirements were obtained from the Meridian Township Zoning Ordinance.

A surveyor cannot make a certification on the basis of an interpretation or opinion of another party. A zoning endorsement letter should be obtained from Meridian Township to insure conformity as well as make a final determination of the required building setback requirements.

ENCROACHMENT NOTE

Concrete for Township pathway not completely in easement

BASIS OF BEARING NOTE

The basis of bearing for this survey was established by the East–West 1/4 line of Section 22 as described in the recorded legal description. Record Bearing: S.89°57'40"W.

FLOOD HAZARD NOTE

The Property described on this survey does not lie within a Special Flood Hazard Area as defined by the Federal Emergency Management Agency Flood Insurance Rate Map identified as Map No. 26065C0158D bearing an effective date of August 16, 2011.

CEMETERY NOTE

There was no observable evidence of cemeteries or burial grounds within the subject property.

UTILITY NOTE

All utilities are underground unless otherwise noted.

The utilities shown on this survey were determined by field observation. All locations are approximate. The location of any other underground services which may exist can only be depicted if a Utility Plan is furnished to the surveyor.

MISS DIG □□□I□Y DIS□□IMER □O□E

A MISS DIG TICKET NUMBER A72300077–00A, PURSUANT TO MICHIGAN PUBLIC ACT 174 WAS ENTERED FOR THE SURVEYED PROPERTY. DUE TO THE EXTENDED REPORTING PERIOD FOR UNDERGROUND FACILITY OWNERS TO PROVIDE THEIR RECORDS, THE SURVEY MAY NOT REFLECT ALL THE UTILITIES AT THE TIME THE SURVEY WAS ISSUED ON SEPTEMBER 20, 2017. THE SURVEY ONLY REFLECTS THOSE UTILITIES WHICH COULD BE OBSERVED BY THE SURVEYOR IN THE FIELD OR AS DEPICTED BY THE UTILITY COMPANY RECORDS FURNISH PRIOR TO THE DATE THIS SURVEY WAS ISSUED. THE CLIENT AND/OR THEIR AUTHORIZED AGENT SHALL VERIFY WITH THE FACILITY OWNERS AND/OR THEIR AUTHORIZED AGENTS, THE COMPLETENESS AND EXACTNESS OF THE UTILITIES LOCATION.

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- MANHOLE — EXISTING SANITARY SEWER
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- EXISTING WATER MAIN
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- UTILITY POLE, GUY POLE, GUY WIRE — OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN

NF ENGINEERS
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SEAL

STATE OF MICHIGAN
JEFFREY J. HUHTA
PROFESSIONAL SURVEYOR NO. 52458
LICENSED PROFESSIONAL SURVEYOR

PROJECT
Proposed Provisioning Center

CLIENT
W Investment Holdings
29580 Northwestern Hwy.
Suite 100.
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Contact: Ammar W. Alkhafaji
Phone: (248) 559-5555

PROJECT LOCATION
No. 1614
W. Grand River Ave.
Part of the NE. 1/4 of Section 22, T4N., R.1W., Township of Meridian, Ingham County, MI

SHEET
Boundary / Topographic / Tree Survey - North

811 Know what's below Call before you dig.

REVISIONS

DRAWN BY:
C. Ellison

DESIGNED BY:

APPROVED BY:
J. Huhta

DATE:
March 5, 2018

SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. J987
SHEET NO. C2

Tree Inventory List

Job Number: J987 TS
Job Location: 1614 West Grand River, Meridian Twp., Okemos
Client LaFontaine

Condition Description Notes:
"Good" - no observed structural defects*
"Fair" - minor structural defects, marginal form, some insect activity noted*
"Poor" - major structural defects, poor form, insect infested*

**Structural defects may include decayed wood, cracks, root problems, weak branch unions cankers, poor tree architecture, dead/failed branches due to various causes.*

Tree #	Botanical Name	Common Name	Dia.	Type	Other Dia.	Condition	Comments
178	Malus spp.	Crabapple spp.	9	Twin	8	Good	
179	Pinus nigra	Austrian Pine	14			Dead	
180	Pinus sylvestris	Scotch Pine	12			Poor	Insect damage, extensive crown deadwood
181	Picea pungens	Colorado Blue Spruce	10			Poor	90% dead
182	Picea pungens	Colorado Blue Spruce	18			Poor	Unidentified needle disease
183	Picea pungens	Colorado Blue Spruce	13			Poor	Unidentified needle disease
184	Picea pungens	Colorado Blue Spruce	10			Poor	Unidentified needle disease
185	Pinus sylvestris	Scotch Pine	22			Fair	Trunk has been girdled by old fencing
186	Picea pungens	Colorado Blue Spruce	14			Fair	Unidentified needle disease
187	Picea pungens	Colorado Blue Spruce	9			Fair	Unidentified needle disease
188	Pinus sylvestris	Scotch Pine	14			Good	
189	Acer saccharum	Sugar Maple	15			Poor	40% dead
190	Pinus sylvestris	Scotch Pine	12			Good	
191	Picea pungens	Colorado Blue Spruce	8			Good	
192	Acer platanoides	Norway Maple	13			Fair	Delining, low vigor, small branch deadwood
193	Picea pungens	Colorado Blue Spruce	15			Fair	Unidentified needle disease
194	Pinus sylvestris	Scotch Pine	16			Fair	Unidentified needle disease
195	Picea pungens	Colorado Blue Spruce	22			Fair	Unidentified needle disease
196	Acer platanoides	Norway Maple	13			Good	
197	Acer platanoides	Norway Maple	19			Good	
198	Acer platanoides	Norway Maple	9			Good	
199	Pinus strobus	Eastern White Pine	17			Good	
200	Pinus strobus	Eastern White Pine	15			Dead	
201	Pinus strobus	Eastern White Pine	16			Good	
202	Pinus resinosa	Red Pine	18			Good	
203	Pinus strobus	Eastern White Pine	18			Good	
204	Pinus strobus	Eastern White Pine	26			Good	
205	Pinus strobus	Eastern White Pine	24			Poor	Trunk hollow detected
206	Acer platanoides	Norway Maple	21			Fair	Small basal trunk injury, wood exposed, some decay
207	Acer platanoides	Norway Maple	14			Good	
208	Juglans nigra	Black Walnut	22			Good	
209	Juglans nigra	Black Walnut	20			Good	
210	Acer negundo	Boxelder	15			Poor	Excesive trunk lean
211	Picea glauca	White Spruce	8			Poor	Unidentified needle disease
212	Pinus sylvestris	Scotch Pine	14			Fair	Being choked by grape vines
213	Pinus sylvestris	Scotch Pine	15			Poor	Being choked by vines
214	Pinus sylvestris	Scotch Pine	14			Fair	Being choked by vines
215	Pinus sylvestris	Scotch Pine	9			Dead	
216	Pinus sylvestris	Scotch Pine	8			Dead	
217	Ulmus americana	American Elm	10			Good	
218	Pinus sylvestris	Scotch Pine	15			Dead	
219	Acer saccharum	Sugar Maple	14			Fair	Basal trunk injury, wood exposed, some deadwood
220	Platanus occidentalis	Sycamore	26			Good	
221	Acer platanoides	Norway Maple	14			Good	
222	Betula populifolia	Gray Birch	13	Multiple	12, 11	Good	
223	Morus alba	White Mulberry	10			Good	
224	Ulmus americana	American Elm	17			Good	
225	Juglans nigra	Black Walnut	10			Good	
226	Juniperus virginiana	Eastern Red-cedar	8			Good	
227	Juniperus virginiana	Eastern Red-cedar	8			Good	
228	Juniperus virginiana	Eastern Red-cedar	8			Good	
229	Acer platanoides	Norway Maple	26			Poor	Extensive trunk decay
230	Acer platanoides	Norway Maple	15			Good	
231	Acer saccharinum	Silver Maple	30	Twin	8	Good	
232	Acer saccharinum	Silver Maple	30	Multiple	28, 10	Fair	Weak trunk union with included bark, decay suspected
233	Acer saccharinum	Silver Maple	30			Fair	Unbalanced crown, large bow in trunk
234	Acer platanoides	Norway Maple	20	Twin	17	Poor	Basal trunk decay
235	Malus spp.	Crabapple spp.	10	Multiple	6, 4	Good	
236	Salix spp.	Willow spp.	48	Twin	36	Poor	Poor structure
237	Morus alba	White Mulberry	8			Fair	
238	Acer negundo	Boxelder	26			Fair	Limb deadwood, weak branch attachments
239	Acer negundo	Boxelder	8			Poor	Excesive trunk lean
240	Acer negundo	Boxelder	9			Poor	Leaning & growing into cyclone fence
241	Acer negundo	Boxelder	18	Twin	15	Poor	Excesive trunk lean
242	Acer negundo	Boxelder	15			Poor	Excesive trunk lean
243	Picea abies	Norway Spruce	30			Good	
244	Acer negundo	Boxelder	10			Poor	Trunk decay, growing into fence, poor structure
245	Prunus avium	Sweet Black Cherry	9			Good	
246	Celtis occidentalis	Northern Hackberry	17			Good	
247	Rhamnus cathartica	Common Buckthorn	10			Fair	Poor structure, being choked by vines
248	Acer negundo	Boxelder	15			Fair	
249	Juglans nigra	Black Walnut	9			Good	
250	Acer negundo	Boxelder	9			Poor	Basal trunk decay, leaning, poor structure
251	Morus alba	White Mulberry	8	Twin	6	Poor	Weak trunk union, slime flux
252	Acer platanoides	Norway Maple	18			Good	
253	Acer platanoides	Norway Maple	20			Good	
254	Prunus serotina	Black Cherry	9			Good	
255	Prunus serotina	Black Cherry	28			Good	
256	Prunus avium	Sweet Black Cherry	11			Good	
257	Acer platanoides	Norway Maple	13			Good	
258	Acer platanoides	Norway Maple	15			Good	
259	Abies concolor	White Fir	16			Good	
260	Morus alba	White Mulberry	14			Poor	Basal trunk decay, 50% of tree is missing
261	Abies concolor	White Fir	18			Good	
262	Picea pungens	Colorado Blue Spruce	26			Good	
263	Abies concolor	White Fir	12			Good	
264	Pinus sylvestris	Scotch Pine	28	Twin	24	Good	
265	Abies concolor	White Fir	8			Good	
266	Abies concolor	White Fir	14			Good	
267	Abies concolor	White Fir	9			Good	
268	Pinus sylvestris	Scotch Pine	16	Multiple	13, 10	Poor	Insect damage, crown deadwood
269	Abies concolor	White Fir	14			Good	
270	Abies concolor	White Fir	16			Good	
271	Pinus sylvestris	Scotch Pine	18			Poor	90% dead
272	Abies concolor	White Fir	17			Good	
273	Abies concolor	White Fir	9			Good	
274	Pinus sylvestris	Scotch Pine	13			Poor	Limb deadwood, insect damage
275	Pseudotsuga menziesii	Douglas-fir	26			Good	
276	Pseudotsuga menziesii	Douglas-fir	14			Good	
277	Tilia americana	Basswood	8	Twin	6	Good	
278	Picea pungens	Colorado Blue Spruce	18			Good	
279	Acer saccharum	Sugar Maple	9			Good	
280	Malus spp.	Crabapple spp.	12			Fair	
281	Acer platanoides	Norway Maple	12			Good	
282	Gleditisia triacanthos	Honeylocust	20			Good	
283	Gleditisia triacanthos	Honeylocust	14			Good	
284	Acer saccharum	Sugar Maple	16			Good	
285	Ulmus americana	American Elm	14	Twin	9	Good	
286	Acer platanoides	Norway Maple	10			Good	
287	Juglans nigra	Black Walnut	11			Good	
288	Acer platanoides	Norway Maple	11	Multiple	9, 9, 8, 6	Poor	Large in-rolled trunk seam, extensive decay probabable
289	Pseudotsuga menziesii	Douglas-fir	11			Dead	
290	Juniperus virginiana	Eastern Red-cedar	9			Fair	
291	Pseudotsuga menziesii	Douglas-fir	15			Good	
292	Juniperus virginiana	Eastern Red-cedar	9			Good	
293	Acer platanoides	Norway Maple	38			Poor	Some insect damage, basal trunk decay
294	Acer platanoides	Norway Maple	16			Good	
295	Juniperus virginiana	Eastern Red-cedar	9			Dead	
296	Juniperus virginiana	Eastern Red-cedar	9	Twin	8	Fair	
297	Juniperus virginiana	Eastern Red-cedar	14			Fair	
298	Juniperus virginiana	Eastern Red-cedar	15			Fair	
299	Malus spp.	Crabapple spp.	22			Poor	Extensive basal trunk decay
300	Picea pungens	Colorado Blue Spruce	14			Fair	Unidentified needle disease
301	Prunus serotina	Black Cherry	18			Good	
302	Pyrus spp.	Pear	15	Multiple		Good	
303	Pyrus spp.	Pear	15			Good	
304	Malus spp.	Crabapple spp.	8	Multiple		Fair	
305	Malus spp.	Crabapple spp.	9	Multiple		Fair	
306	Pseudotsuga menziesii	Douglas-fir	18			Good	
307	Abies concolor	White Fir	20			Good	
308	Acer saccharum	Sugar Maple	26			Fair	Declining
309	Picea pungens	Colorado Blue Spruce	12			Fair	Unidentified needle disease
310	Malus spp.	Crabapple spp.	15			Fair	
311	Picea pungens	Colorado Blue Spruce	15			Fair	
312	Picea glauca	White Spruce	14			Good	
313	Picea glauca	White Spruce	15			Good	
314	Pseudotsuga menziesii	Douglas-fir	16			Good	
315	Pseudotsuga menziesii	Douglas-fir	15			Good	
316	Pseudotsuga menziesii	Douglas-fir	14			Good	
317	Pseudotsuga menziesii	Douglas-fir	14			Good	
318	Pseudotsuga menziesii	Douglas-fir	16			Good	
319	Pseudotsuga menziesii	Douglas-fir	30			Good	
320	Acer negundo	Boxelder	16			Poor	Poor structure, large bow in strunk
321	Malus spp.	Crabapple spp.	14	Multiple		Fair	
322	Acer saccharinum	Silver Maple	41			Good	
323	Malus spp.	Crabapple spp.	18	Multiple		Fair	
324	Malus spp.	Crabapple spp.	13			Poor	Extensive trunk decay
325	Pinus strobus	Eastern White Pine	34			Fair	Trunk hollow detected
326	Pinus strobus	Eastern White Pine	18			Good	
327	Pinus strobus	Eastern White Pine	15			Good	
328	Pinus strobus	Eastern White Pine	26			Poor	In-rolled trunk seam, extensive basal trunk decay
329	Picea pungens	Colorado Blue Spruce	13			Good	
330	Gleditisia triacanthos	Honeylocust	24			Good	
331	Cercis canadensis	Redbud	16			Poor	Extensive trunk decay
332	Acer saccharum	Sugar Maple	18			Fair	Declining
333	Acer saccharum	Sugar Maple	20			Good	
334	Malus spp.	Crabapple spp.	9	Multiple		Poor	Insect damage, basal trunk decay
335	Acer platanoides	Norway Maple	12			Poor	Limb deadwood, dieback & decay
336	Juniperus virginiana	Eastern Red-cedar	14			Fair	
337	Juniperus virginiana	Eastern Red-cedar	11			Good	
338	Ulmus americana	American Elm	28			Good	
339	Pyrus spp.	Pear	11	Multiple	5, 3	Fair	
340	Pyrus spp.	Pear	10			Poor	Extensive trunk deadwood
341	Pyrus spp.	Pear	12	Twin	5	Fair	
342	Malus spp.	Crabapple spp.	14	Twin	10	Poor	
343	Acer platanoides	Norway Maple	8			Good	
344	Acer platanoides	Norway Maple	8			Good	
345	Acer platanoides	Norway Maple	9			Good	
346	Acer platanoides	Norway Maple	8			Good	
347	Acer platanoides	Norway Maple	8			Good	
348	Acer platanoides	Norway Maple	9			Good	
349	Picea pungens	Colorado Blue Spruce	22			Good	
350	Acer saccharum	Sugar Maple	12			Good	
351	Acer saccharum	Sugar Maple	12			Good	
352	Acer saccharum	Sugar Maple	14			Good	
353	Acer saccharum	Sugar Maple	8			Good	
354	Picea glauca	White Spruce	8			Fair	
355	Pseudotsuga menziesii	Douglas-fir	8			Fair	
356	Acer saccharum	Sugar Maple	12			Good	
357	Acer saccharum	Sugar Maple	14			Good	
358	Picea pungens	Colorado Blue Spruce	9			Fair	Unidentified needle disease
359	Picea pungens	Colorado Blue Spruce	14			Fair	Unidentified needle disease
360	Pseudotsuga menziesii	Douglas-fir	22			Poor	Terminal leader has failed
361	Acer saccharum	Sugar Maple	13			Good	
362	Acer saccharum	Sugar Maple	16			Good	
363	Acer saccharum	Sugar Maple	15			Good	
364	Liquidambar styraciflua	Sweetgum	11			Good	
365	Acer saccharum	Sugar Maple	11			Good	
366	Juglans nigra	Black Walnut	12			Good	
367	Acer platanoides	Norway Maple	11			Good	
368	Acer platanoides	Norway Maple	8			Fair	Small trunk injury, wood exposed, some decay
369	Gleditisia triacanthos	Honeylocust	12			Good	
370	Acer platanoides	Norway Maple	9			Good	
371	Platanus occidentalis	Sycamore	30			Good	
372	Acer platanoides	Norway Maple	28			Good	
373	Picea pungens	Colorado Blue Spruce	8			Fair	
374	Picea pungens	Colorado Blue Spruce	8			Dead	
375	Acer saccharum	Sugar Maple	13			Good	
376	Acer platanoides	Norway Maple	13			Good	
377	Picea pungens	Colorado Blue Spruce	9			Fair	
378	Acer platanoides	Norway Maple	9			Good	
379	Malus spp.	Crabapple spp.	9	Multiple		Fair	
380	Prunus avium	Sweet Black Cherry	9			Good	
381	Robinia pseudoacacia	Black Locust	12			Good	
382	Juglans nigra	Black Walnut	9			Good	
383	Juniperus virginiana	Eastern Red-cedar	13			Good	
384	Robinia pseudoacacia	Black Locust	15			Good	
385	Juniperus virginiana	Eastern Red-cedar	8			Good	
386	Juniperus virginiana	Eastern Red-cedar	14			Good	
387	Juniperus virginiana	Eastern Red-cedar	15			Good	
388	Juniperus virginiana	Eastern Red-cedar	13			Good	
389	Juniperus virginiana	Eastern Red-cedar	14	Twin	8	Good	
390	Juniperus virginiana	Eastern Red-cedar	13	Twin	9	Good	
391	Juniperus virginiana	Eastern Red-cedar	8	Multiple	7, 3	Good	
392	Juniperus virginiana	Eastern Red-cedar	11	Twin	10	Good	
393	Acer saccharum	Sugar Maple	16	Twin	11	Good	
394	Acer saccharum	Sugar Maple	18			Good	
395	Juglans nigra	Black Walnut	12			Good	
396	Celtis occidentalis	Northern Hackberry	8			Good	
397	Acer platanoides	Norway Maple	14	Twin	10	Fair	Weak trunk union, included bark, some decay
398	Acer negundo	Boxelder	12	Multiple	5, 3	Fair	
399	Acer saccharum	Sugar Maple	15			Good	
400	Acer saccharinum	Silver Maple	9	Multiple		Good	
401	Quercus bicolor	Swamp White Oak	8			Good	
402	Populus deltoides	Eastern Cottonwood	13			Good	
403	Populus deltoides	Eastern Cottonwood	9			Good	
404	Populus deltoides	Eastern Cottonwood	12			Good	
405	Populus deltoides	Eastern Cottonwood	16			Good	
406	Pinus sylvestris	Scotch Pine	10			Good	
407	Acer platanoides	Norway Maple	17			Poor	Large in-rolled trunk seam, decay
408	Acer saccharum	Sugar Maple	12			Good	
409	Acer saccharum	Sugar Maple	15			Good	
410	Acer saccharum	Sugar Maple	9			Good	
411	Acer saccharum	Sugar Maple	11			Good	
412	Acer saccharum	Sugar Maple	15			Good	
413	Acer saccharum	Sugar Maple	9			Good	
414	Acer saccharum	Sugar Maple	12			Good	
415	Acer saccharum	Sugar Maple	8			Poor	Extensive trunk decay
416	Gleditisia triacanthos	Honeylocust	20			Good	
417	Gleditisia triacanthos	Honeylocust	16			Good	
418	Gleditisia triacanthos	Honeylocust	12			Good	
419	Pseudotsuga menziesii	Douglas-fir	12			Good	
420	Picea pungens	Colorado Blue Spruce	8			Fair	
421	Picea pungens	Colorado Blue Spruce	9			Fair	
422	Pinus nigra	Austrian Pine	14			Good	
423	Acer saccharum	Sugar Maple	9			Good	
424	Acer saccharum	Sugar Maple	10			Good	
425	Pinus nigra	Austrian Pine	14			Good	
426	Pinus nigra	Austrian Pine	11			Good	
427	Pinus nigra	Austrian Pine	14	Multiple	12, 10	Good	
428	Pinus nigra	Austrian Pine	15	Multiple	13, 7	Good	
429	Picea pungens	Colorado Blue Spruce	9			Poor	Unidentified needle disease
430	Pinus nigra	Austrian Pine	10			Fair	Some diplodia disease
431	Pinus nigra	Austrian Pine	9			Fair	Some diplodia disease
432	Pinus nigra	Austrian Pine	9			Fair	Some diplodia disease
433	Pinus nigra	Austrian Pine	10	Twin	9	Fair	Some diplodia disease
434	Pinus nigra	Austrian Pine	11			Fair	Some diplodia disease
435	Pinus nigra	Austrian Pine	13			Fair	Some diplodia disease
436	Pinus nigra	Austrian Pine	13			Dead	
437	Pinus nigra	Austrian Pine	15			Poor	Some diplodia disease
438	Acer saccharinum	Silver Maple	24			Good	
439	Pinus nigra	Austrian Pine	15			Poor	Some diplodia disease
440	Pinus nigra	Austrian Pine	12			Poor	Some diplodia disease
441	Pinus sylvestris	Scotch Pine	28			Good	
442	Ulmus americana	American Elm	9			Good	
443	Pinus sylvestris	Scotch Pine	14			Good	
444	Acer saccharinum	Silver Maple	18			Good	
445	Pinus sylvestris	Scotch Pine	22			Fair	Insect damage
446	Pinus sylvestris	Scotch Pine	28			Good	
447	Acer saccharinum	Silver Maple	15	Multiple		Good	
448	Pinus sylvestris	Scotch Pine	16			Good	
449	Pinus sylvestris	Scotch Pine	15			Good	
450	Pinus sylvestris	Scotch Pine	16			Good	
451	Acer saccharinum	Silver Maple	8			Good	
452	Pinus sylvestris	Scotch Pine	28			Good	
453	Pinus sylvestris	Scotch Pine	18			Good	
454	Acer saccharinum	Silver Maple	11			Good	
455	Pinus sylvestris	Scotch Pine	15			Good	
456	Pinus sylvestris	Scotch Pine	13			Good	
457	Acer saccharinum	Silver Maple	9			Good	
458	Pinus sylvestris	Scotch Pine	14			Good	
459	Malus spp.	Crabapple spp.	9	Twin	8	Good	

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SEAL

ANTHONY J. DOMBROWSKI
Registered Forester
State of Michigan ID #3301000669

PROJECT
Proposed Provisioning Center

CLIENT
W Investment Holdings
29580 Northwestern Hwy.
Suite 100.
Southfield, MI 48034

Contact: Ammar W. Alkhafaji
Phone: (248) 559-5555

PROJECT LOCATION
No. 1614
W. Grand River Ave.
Part of the NE. 1/4 of
Section 22, T4N., R.1W.,
Township of Meridian,
Ingham County, MI

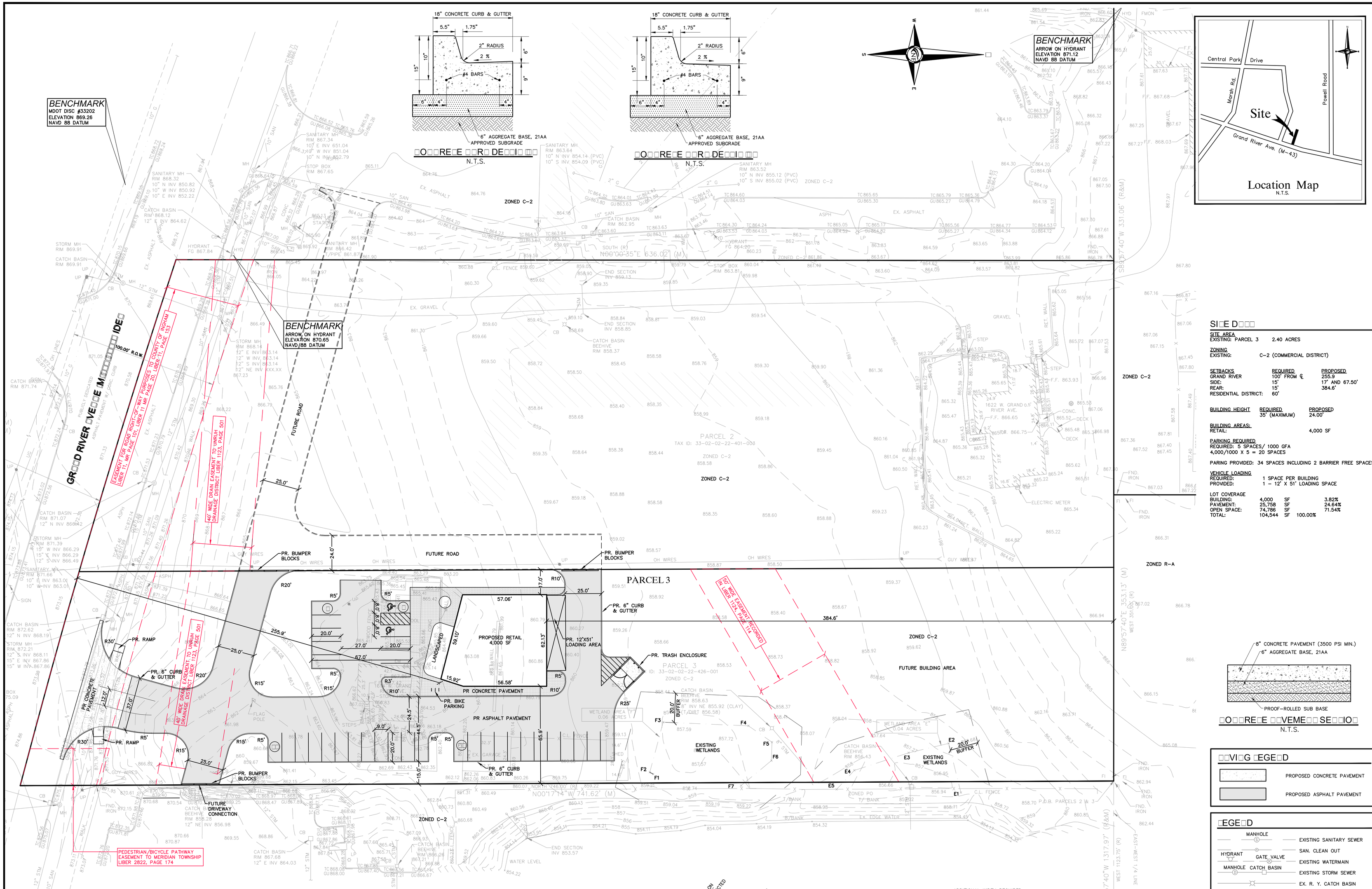
SHEET
Tree Survey

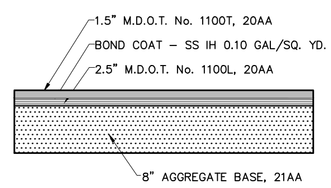
Know what's **below** **Call** before you dig.

REVISIONS

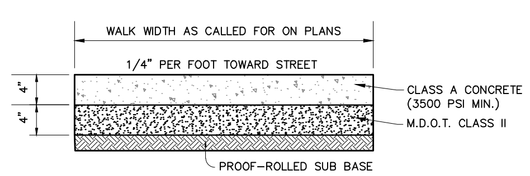
DRAWN BY: C. Ellison
DESIGNED BY:
APPROVED BY: J. Huhta
DATE: March 5, 2018
SCALE: N.T.S.

NFE JOB NO. **J987**
SHEET NO. **C3**

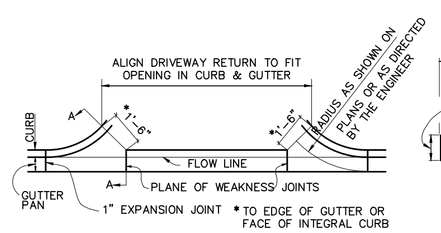




□S□□□□ □□VEME□□ SE□□IO□
(DRIVE AND PARKING)



□O□□RE□E SIDE□ □□□ SE□□IO□
N.T.S.



MDO□ DRIVE□ □Y O□E□I□G DE□□I□ M□
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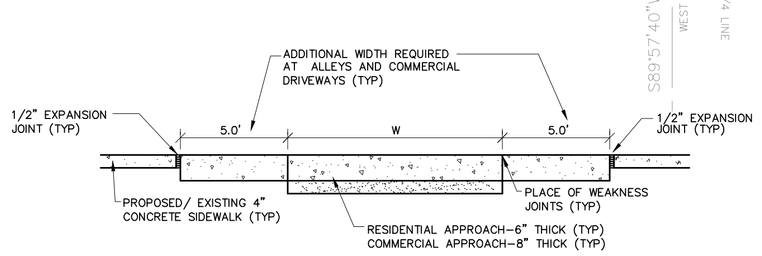

□OMMER□I□□ □O□□RE□E SIDE□ □□□ DE□□I□
N.T.S.

□O□□RE□E □□VEME□□ SE□□IO□
N.T.S.

□□VI□G □EGE□D

PROPOSED CONCRETE PAVEMENT

PROPOSED ASPHALT PAVEMENT

□EGE□D

- MANHOLE — EXISTING SANITARY SEWER
- HYDRANT, GATE VALVE — SAN. CLEAN OUT
- MANHOLE, CATCH BASIN — EXISTING WATERMAIN
- EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- EXISTING BURIED CABLES
- UTILITY POLE, GUY POLE, GUY WIRE — OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- C.O., MANHOLE — PR. SANITARY SEWER
- HYDRANT, GATE VALVE — PR. WATER MAIN
- INLET, C.B., MANHOLE — PR. STORM SEWER
- PR. R. Y. CATCH BASIN
- PROPOSED LIGHT POLE

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SEAL

MICHAEL D. PETERSON
ENGINEER NO. 040904
LICENSED PROFESSIONAL ENGINEER

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29580 Northwestern Hwy.
Suite 100.
Southfield, MI 48034

Contact: Ammar W. Alkhafaji
Phone: (248) 559-5555

PROJECT LOCATION
No. 1614
W. Grand River Ave.
Part of the NE. 1/4 of Section 22, T4N., R.1W., Township of Meridian, Ingham County, MI

SHEET
Site Plan

Know what's below Call before you dig.

REVISIONS
01-24-2020 Revise Per Twp.

DRAWN BY:
N. Naoum

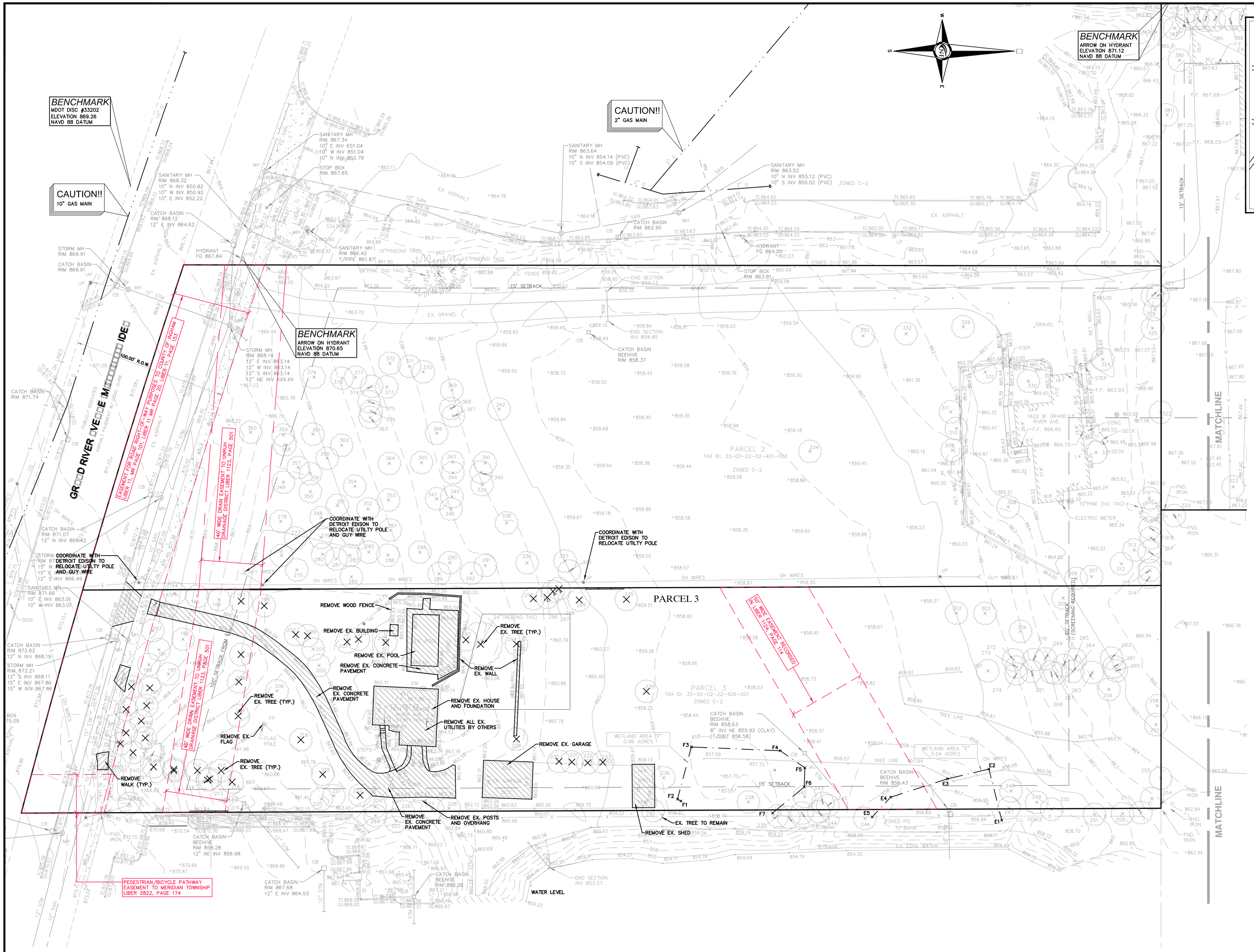
DESIGNED BY:
N. Naoum

APPROVED BY:
M. Peterson

DATE:
11-11-2019

SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. J987-02
SHEET NO. C4



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NO. 040904
REGISTERED PROFESSIONAL ENGINEER

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Contact: Ammar W. Alkhafaji
Phone: (248) 559-5555

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W. Grand River Ave.
Part of the NE. 1/4 of
Section 22, T4N., R.1W.,
Township of Meridian,
Ingham County, MI

SHEET
Demolition Plan

Know what's below
Call before you dig.

REVISIONS
01-24-2020 Revise Per Twp.

DRAWN BY:
N. Naoum

DESIGNED BY:
N. Naoum

APPROVED BY:
M. Peterson

DATE:
11-11-2019

SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. J987-02

SHEET NO. C5

□O□OGR□□□I□ S□RVEY □O□ES

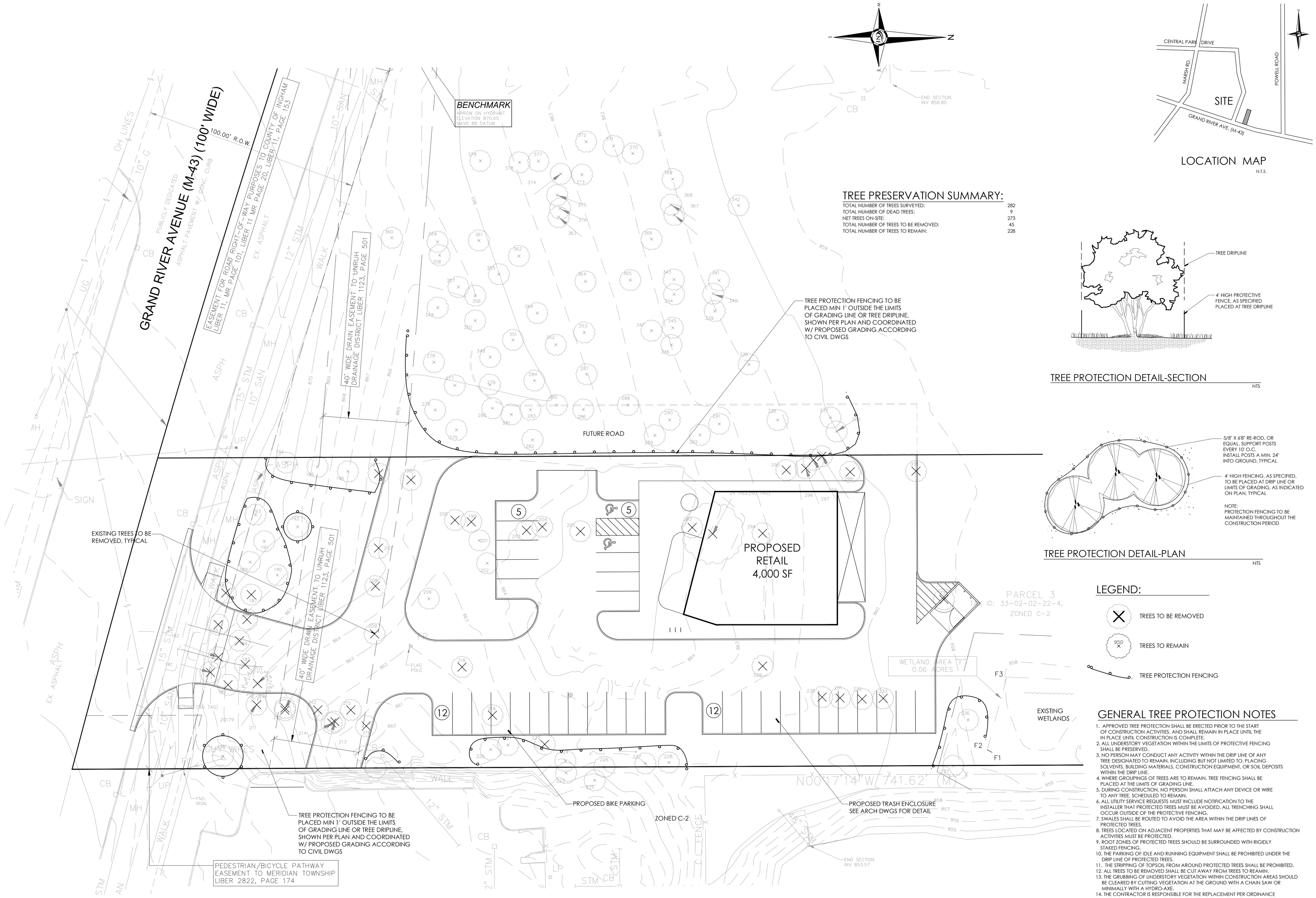
ALL ELEVATIONS ARE EXISTING ELEVATIONS, UNLESS OTHERWISE NOTED.

UTILITY LOCATIONS WERE OBTAINED FROM MUNICIPAL OFFICIALS AND RECORDS OF UTILITY COMPANIES, AND NO GUARANTEE CAN BE MADE TO THE COMPLETENESS, OR EXACTNESS OF LOCATION.

THIS SURVEY MAY NOT SHOW ALL EASEMENTS OF RECORD UNLESS AN UPDATED TITLE POLICY IS FURNISHED TO THE SURVEYOR BY THE OWNER

□EGE□D

- MANHOLE
- HYDRANT
- GATE VALVE
- MANHOLE CATCH BASIN
- UTILITY POLE
- GUY POLE
- GUY WIRE
- 12" MAPLE
- EXISTING SANITARY SEWER
- EXISTING SAN. CLEAN OUT
- EXISTING WATER MAIN
- EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- EXISTING BURIED CABLES
- OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- EXISTING UTILITY TO BE REMOVED
- EXISTING UTILITY TO BE ABANDONED
- INDICATES EXISTING TREE TO BE REMOVED
- INDICATES AREAS OF PAVEMENT, BUILDINGS, ETC. TO BE REMOVED



TREE PRESERVATION SUMMARY:

TOTAL NUMBER OF TREES SURVEYED:	282
TOTAL NUMBER OF DEAD TREES:	9
NET TREES ON-SITE:	273
TOTAL NUMBER OF TREES TO BE REMOVED:	45
TOTAL NUMBER OF TREES TO REMAIN:	228

LOCATION MAP
N.T.S.

TREE PROTECTION DETAIL-SECTION
NTS

TREE PROTECTION DETAIL-PLAN
NTS

LEGEND:

- TREES TO BE REMOVED
- TREES TO REMAIN
- TREE PROTECTION FENCING

GENERAL TREE PROTECTION NOTES

1. APPROVED TREE PROTECTION SHALL BE ERECTED PRIOR TO THE START OF CONSTRUCTION ACTIVITIES, AND SHALL REMAIN IN PLACE UNTIL THE IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
2. ALL UNDERSTORY VEGETATION WITHIN THE LIMITS OF PROTECTIVE FENCING SHALL BE PRESERVED.
3. NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE DRIP LINE OF ANY TREE DESIGNATED TO REMAIN, INCLUDING BUT NOT LIMITED TO, PLACING SOLVENTS, BUILDING MATERIALS, CONSTRUCTION EQUIPMENT, OR SOIL DEPOSITS WITHIN THE DRIP LINE.
4. WHERE GROUPINGS OF TREES ARE TO REMAIN, TREE FENCING SHALL BE PLACED AT THE LIMITS OF GRADING LINE.
5. DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY DEVICE OR WIRE TO ANY TREE, SCHEDULED TO REMAIN.
6. ALL UTILITY SERVICE REQUESTS MUST INCLUDE NOTIFICATION TO THE INSTALLER THAT PROTECTED TREES MUST BE AVOIDED. ALL TRENCHING SHALL OCCUR OUTSIDE OF THE PROTECTIVE FENCING.
7. SWALES SHALL BE ROUTED TO AVOID THE AREA WITHIN THE DRIP LINES OF PROTECTED TREES.
8. TREES LOCATED ON ADJACENT PROPERTIES THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITIES MUST BE PROTECTED.
9. ROOT ZONES OF PROTECTED TREES SHOULD BE SURROUNDED WITH RIGIDLY STAKED FENCING.
10. THE PARKING OF IDLE AND RUNNING EQUIPMENT SHALL BE PROHIBITED UNDER THE DRIP LINE OF PROTECTED TREES.
11. THE STRIPPING OF TOPSOIL FROM AROUND PROTECTED TREES SHALL BE PROHIBITED.
12. ALL TREES TO BE REMOVED SHALL BE CUT AWAY FROM TREES TO REAMIN.
13. THE GRUBBING OF UNDERSTORY VEGETATION WITHIN CONSTRUCTION AREAS SHOULD BE CLEARED BY CUTTING VEGETATION AT THE GROUND WITH A CHAIN SAW OR MINIMALLY WITH A HYDRO-AXE.
14. THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT PER ORDINANCE GUIDELINES, FOR THE DAMAGE OR REMOVAL OF ANY TREE DESIGNATED TO REMAIN.
15. TREES TO BE REMOVED SHALL BE FIELD VERIFIED, EVALUATED AND FLAGGED FOR REMOVAL, BY THE LANDSCAPE ARCHITECT OR FORESTER, ONLY AS DIRECTED BY THE OWNER OR OWNERS REPRESENTATIVE.

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SHEET
Tree Preservation Plan

811 Know what's below Call before you dig.

REVISIONS
01/24/20 REVISED PER TWP.

DRAWN BY:
G. Ostrowski

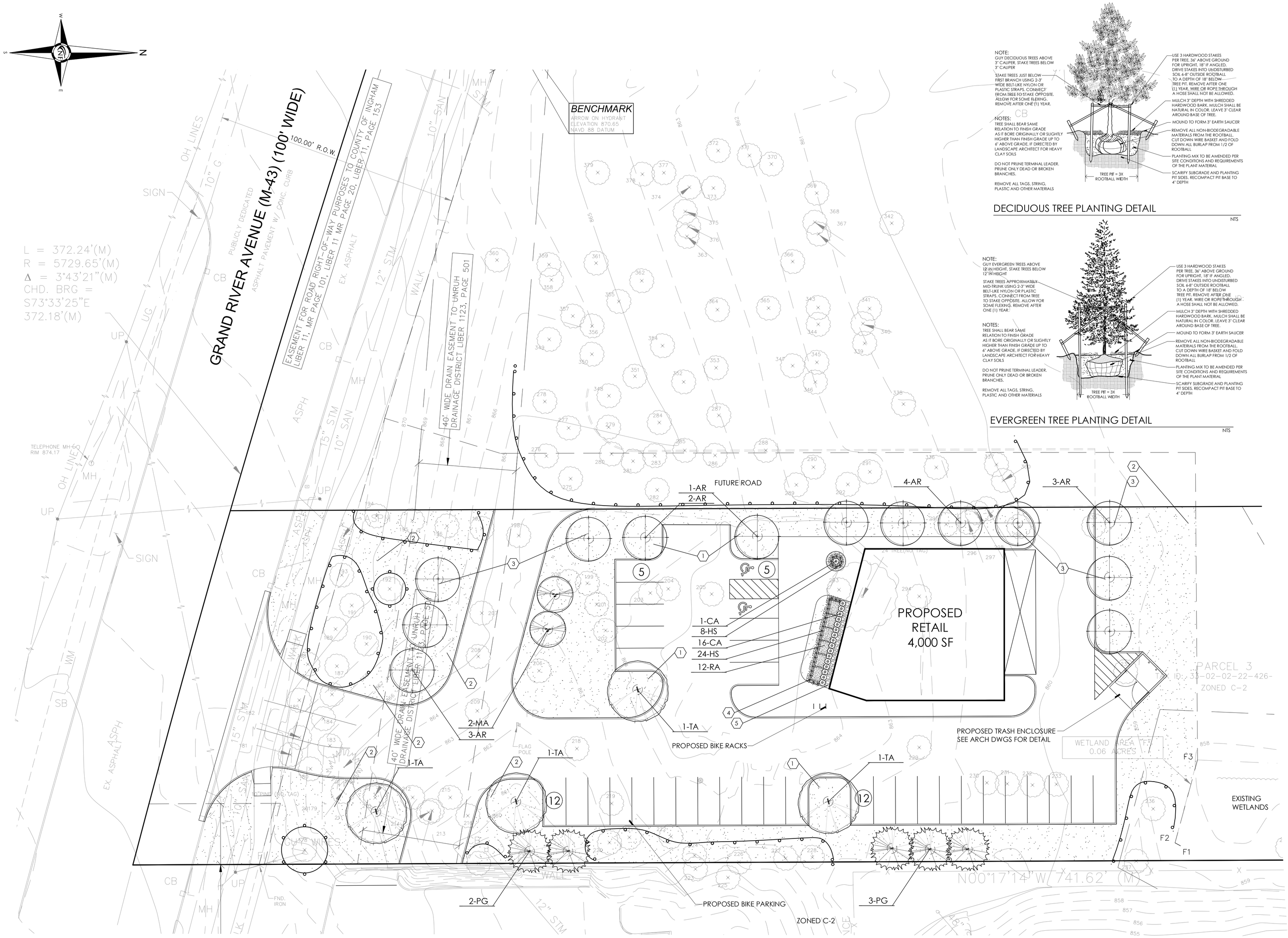
DESIGNED BY:
G. Ostrowski

APPROVED BY:
G. Ostrowski

DATE:
11-08-2019

SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. **J987-02**
SHEET NO. **L1**



NOTE:
GUY DECIDUOUS TREES ABOVE 3" CALIPER. STAKE TREES BELOW 3" CALIPER

STAKE TREES JUST BELOW FIRST BRANCH USING 2-3" WIDE BELT-LIKE NYLON OR PLASTIC STRAPS. CONNECT FROM TREE TO STAKE OPPOSITE, ALLOW FOR SOME FLEXING. REMOVE AFTER ONE (1) YEAR.

NOTES:
TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS IT BORE ORIGINALLY OR SLIGHTLY HIGHER THAN FINISH GRADE UP TO 6" ABOVE GRADE, IF DIRECTED BY LANDSCAPE ARCHITECT FOR HEAVY CLAY SOILS

DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR BROKEN BRANCHES.

REMOVE ALL TAGS, STRING, PLASTIC AND OTHER MATERIALS

USE 3 HARDWOOD STAKES PER TREE, 36" ABOVE GROUND FOR UPRIGHT, 18" IF ANGLED. DRIVE STAKES INTO UNDISTURBED SOIL 6-8" OUTSIDE ROOTBALL TO A DEPTH OF 18" BELOW TREE PIT. REMOVE AFTER ONE (1) YEAR. WIRE OR ROPE THROUGH A HOSE SHALL NOT BE ALLOWED.

MULCH 3" DEPTH WITH SHREDDED HARDWOOD BARK. MULCH SHALL BE NATURAL IN COLOR. LEAVE 3" CLEAR AROUND BASE OF TREE.

MOUND TO FORM 3" EARTH SAUCER

REMOVE ALL NON-BIODEGRADABLE MATERIALS FROM THE ROOTBALL. CUT DOWN WIRE BASKET AND FOLD DOWN ALL BURLAP FROM 1/2 OF ROOTBALL

PLANTING MIX TO BE AMENDED PER SITE CONDITIONS AND REQUIREMENTS OF THE PLANT MATERIAL

SCARIFY SUBGRADE AND PLANTING PIT SIDES. RECOMPACT PIT BASE TO 4" DEPTH

DECIDUOUS TREE PLANTING DETAIL

NTS

NOTE:
GUY EVERGREEN TREES ABOVE 12' IN HEIGHT. STAKE TREES BELOW 12' IN HEIGHT

STAKE TREES APPROXIMATELY MID-TRUNK USING 2-3" WIDE BELT-LIKE NYLON OR PLASTIC STRAPS. CONNECT FROM TREE TO STAKE OPPOSITE. ALLOW FOR SOME FLEXING. REMOVE AFTER ONE (1) YEAR.

NOTES:
TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS IT BORE ORIGINALLY OR SLIGHTLY HIGHER THAN FINISH GRADE UP TO 6" ABOVE GRADE, IF DIRECTED BY LANDSCAPE ARCHITECT FOR HEAVY CLAY SOILS

DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR BROKEN BRANCHES.

REMOVE ALL TAGS, STRING, PLASTIC AND OTHER MATERIALS

USE 3 HARDWOOD STAKES PER TREE, 36" ABOVE GROUND FOR UPRIGHT, 18" IF ANGLED. DRIVE STAKES INTO UNDISTURBED SOIL 6-8" OUTSIDE ROOTBALL TO A DEPTH OF 18" BELOW TREE PIT. REMOVE AFTER ONE (1) YEAR. WIRE OR ROPE THROUGH A HOSE SHALL NOT BE ALLOWED.

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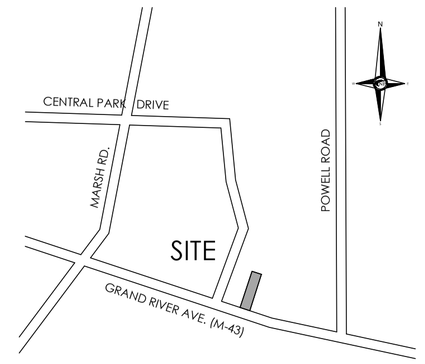
SCARIFY SUBGRADE AND PLANTING PIT SIDES. RECOMPACT PIT BASE TO 4" DEPTH

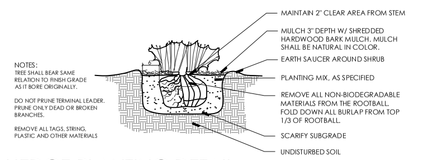
EVERGREEN TREE PLANTING DETAIL

NTS



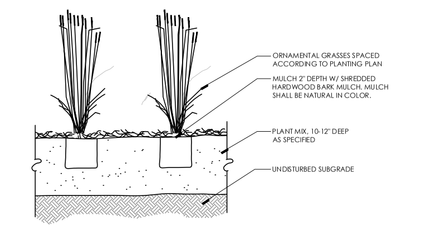
LOCATION MAP

N.T.S.



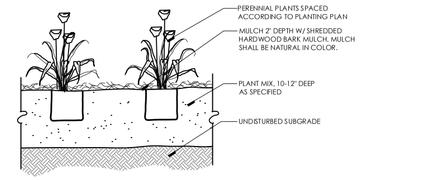
HEDGE PLANTING DETAIL

NTS



ORNAMENTAL GRASS PLANTING DETAIL

NTS



PERENNIAL PLANTING DETAIL

NTS

GENERAL LANDSCAPE NOTES

1. LANDSCAPE CONTRACTOR SHALL VISIT SITE, INSPECT EXISTING CONDITIONS AND REVIEW PROPOSED PLANTING AND RELATED WORK. IN CASE OF DISCREPANCY BETWEEN PLAN AND PLANT LIST, THE PLAN SHALL GOVERN QUANTITIES. CONTACT THE LANDSCAPE ARCHITECT WITH ANY CONCERNS.
2. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL ON-SITE UTILITIES PRIOR TO BEGINNING CONSTRUCTION ON HIS/HER PHASE OF WORK. ANY DAMAGE OR INTERUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE CONTRACTOR SHALL COORDINATE ALL RELATED ACTIVITIES WITH OTHER TRADES, AND SHALL REPORT ANY UNACCEPTACBLE SITE CONDITIONS TO THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCEMENT.
4. PLANTS SHALL BE FULL, WELL-BRANCHED, AND IN HEALTHY VIGOROUS GROWING CONDITION.
5. PLANTS SHALL BE WATERED BEFORE AND AFTER PLANTING IS COMPLETE.
6. ALL TREES MUST BE STAKED, FERTILIZED AND MULCHED AND SHALL BE GUARANTEED TO EXHIBIT A NORMAL GROWTH CYCLE FOR AT LEAST ONE (1) YEAR FOLLOWING PLANTING.
7. ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED IN THE MOST RECENT EDITION OF THE "AMERICAN STANDARDS FOR NURSERY STOCK".
8. CONTRACTOR WILL SUPPLY FINISHED GRADE AND EXCAVATE AS NECESSARY TO SUPPLY PLANT MIX DEPTH IN ALL PLANTING BEDS AS INDICATED IN PLANT DETAILS AND A DEPTH OF 4" IN ALL LAWN AREAS.
9. PROVIDE CLEAN BACKFILL SOIL, USING MATERIAL STOCKPILED ON-SITE. SOIL SHALL BE SCREENED AND FREE OF DEBRIS, FOREIGN MATERIAL, AND STONE.
10. SLOW-RELEASE FERTILIZER SHALL BE ADDED TO THE PLANT PITS BEFORE BEING BACKFILLED. APPLICATION SHALL BE AT THE MANUFACTURERS RECOMMENDED RATES.
11. AMENDED PLANT MIX (PREPARED TOPSOIL) SHALL CONSIST OF 1/3 SCREENED TOPSOIL, 1/3 SAND, AND 1/3 "DAIRY DOO" COMPOST, MIXED WELL AND SPREAD TO A DEPTH AS INDICATED IN PLANTING DETAILS.
12. ALL PLANTINGS SHALL BE MULCHED WITH SHREDDED HARDWOOD BARK, SPREAD TO A DEPTH OF 3" FOR TREES AND SHRUBS, AND 2" ON ANNUALS, PERENNIALS, AND GROUNDCOVER PLANTINGS. MULCH SHALL BE FREE FROM DEBRIS AND FOREIGN MATERIAL, AND PIECES ON INCONSISTENT SIZE.
13. NO SUBSTITUTIONS OR CHANGES OF LOCATION, OR PLANT TYPE SHALL BE MADE WITHOUT THE APPROVAL OF THE LANDSCAPE ARCHITECT OR OWNERS REPRESENTATIVE.
14. THE LANDSCAPE ARCHITECT SHALL BE NOTIFIED OF ANY DISCREPANCIES BETWEEN THE PLANS AND FIELD CONDITIONS PRIOR TO INSTALLATION.
15. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL PLANT MATERIALS IN A VERTICAL CONDITION THROUGHOUT THE GUARANTEED PERIOD.
16. THE LANDSCAPE ARCHITECT OR OWNERS REPRESENTATIVE SHALL HAVE THE RIGHT TO REJECT ANY WORK OR MATERIAL THAT DOES NOT MEET THE REQUIREMENTS OF THE PLANS AND/OR SPECIFICATIONS.
17. THE LANDSCAPE CONTRACTOR SHALL SEED AND MULCH OR SOD (AS INDICATED ON PLANS) ALL AREAS DESIGNATED AS SUCH ON THE PLANS, THROUGHOUT THE CONTRACT LIMITS. FURTHER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING AREAS DISTURBED DURING CONSTRUCTION, NOT IN THE CONTRACT LIMITS, TO EQUAL OR GREATER CONDITION.
18. ALL LANDSCAPE AREAS SHALL HAVE PROPER DRAINAGE THAT PREVENTS EXCESSIVE WATER FROM PONDING ON LAWN AREAS OR AROUND TREES AND SHRUBS.
19. ALL LANDSCAPE AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC UNDERGROUND SYSTEM.

LANDSCAPE REQUIREMENTS

EXISTING SITE ZONING: C-2, COMMERICAL DISTRICT
EXISTING SITE AREA: 104,544 S.F. OR 2.40 ACRES

PARKING LOT LANDSCAPE REQUIREMENTS
2 TREES PER EACH 10 PKG SPACES
34 SPACES PROVIDED / 10 X 2 = 6.8 OR 7 TREES REQUIRED
PROVIDED: 9 TREES PROVIDED

PLANT SCHEDULE

KEY	QTY	BOTANICAL/COMMON NAME	SIZE	SPACING	ROOT	COMMENT
TREES						
AR	13	Acer rubrum 'Bowhall' Bowhall Red Maple	2.5" CAL	SEE PLAN	B&B	FULL, MATCHED HEADS
MA	2	Malus 'Red Jewel' Red Jewel Crabapple	2" CAL	SEE PLAN	B&B	FULL, MATCHED HEADS
PG	5	Picea glauca 'Densata' Black Hills Spruce	8' HT	SEE PLAN	B&B	FULL, MATCHED HEADS
TA	4	Genus species 'McKSentry' American Sentry Linden	3" CAL	SEE PLAN	B&B	FULL, MATCHED HEADS
SHRUBS						
RA	12	Ribes alpinum 'Green Mound' Green Mound Alpine Currant	30" HT	30" OC	B&B	MAINTAIN AS HEDGE
GROUNDCOVERS/PERENNIALS						
CA	17	Calamagrostis a. 'Karl Foerster' Karl Foerster Feather Reed Grass	5 GAL	30" OC	CONT	
HS	32	Hemerocallis 'Stella D'Oro' Stella D'Oro Daylily	2 GAL	24" OC	CONT	

GROUNDCOVER KEY

1. TYPICAL SOD LAWN AREAS, SOWN ON 3" TOPSOIL
2. RESTORE EXISTING LAWN AREAS W/ HYDROSEED AND MULCH
3. 4" DIA SPADE CUT EDGE W/ 3" SHREDDED BARK MULCH
4. 3" DEPTH DOUBLE SHREDDED HARDWOOD BARK MULCH
5. 3/4" - 1 1/2" STONE MULCH, 3-4" DEPTH ON WEED BARRIER

GENERAL SOD NOTE:

ALL LAWN AREAS DESIGNATED TO BE SODDED, SHALL BE SODDED WITH A BLENDED DURABLE BLUEGRASS SOD, TYPICALLY GROWN IN THE REGION. ALL TURF SHALL BE PLACED ON A MINIMUM 3" PREPARED TOPSOIL, AND WATERED DAILY UNTIL ESTABLISHMENT. IN AREAS SUBJECT TO EROSION, SODDED LAWN SHALL BE STABILIZED WHERE NECESSARY, AND LAID PERPENDICULAR TO SLOPES
SOD INSTALLATION SHALL OCCUR ONLY:
SPRING: APRIL1 TO JUNE1
FALL: AUGUST 15 TO OCTOBER 15

GENERAL SEED NOTE:

ALL LAWN AREAS DESIGNATED TO BE SEEDED, SHALL BE HYDRO-SEEDED WITH SPECIFIED BLENDS, AND STABILIZED WITH WOOD CELLULOSE FIBER MULCH (2,000 LBS PER ACRE) . IN AREAS SUBJECT TO EROSION, SEEDED LAWN SHALL BE FURTHER STABILIZED WHERE NECESSARY WITH BIODEGRADABLE EROSION BLANKET AND STAKED UNTIL ESTABLISHED. ALL SEED SHALL BE APPLIED OVER A MINIMUM 3" PREPARED TOPSOIL, AND SHALL BE KEPT MOIST AND WATERED DAILY UNTIL ESTABLISHED.
SEEDING INSTALLATION SHALL OCCUR ONLY:
SPRING: APRIL1 TO JUNE1
FALL: AUGUST 15 TO OCTOBER 15

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257

SEAL

STATE OF MICHIGAN
REGISTERED LANDSCAPE ARCHITECT

PROJECT
Proposed Provisioning Center

CLIENT
W Investment Holdings
29580 Northwestern Hwy.
Suite 100.
Southfield, MI 48034

Contact: Ammar W. Alkhafaji
Phone: (248) 559-5555

PROJECT LOCATION
No. 1614
W. Grand River Ave.
Part of the NE. 1/4 of Section 22, T4N., R.1W.,
Township of Meridian, Ingham County, MI

SHEET
Landscape Plan

811 Know what's below Call before you dig.

REVISIONS
01/24/20 REVISED PER TWP.

DRAWN BY:
G. Ostrowski

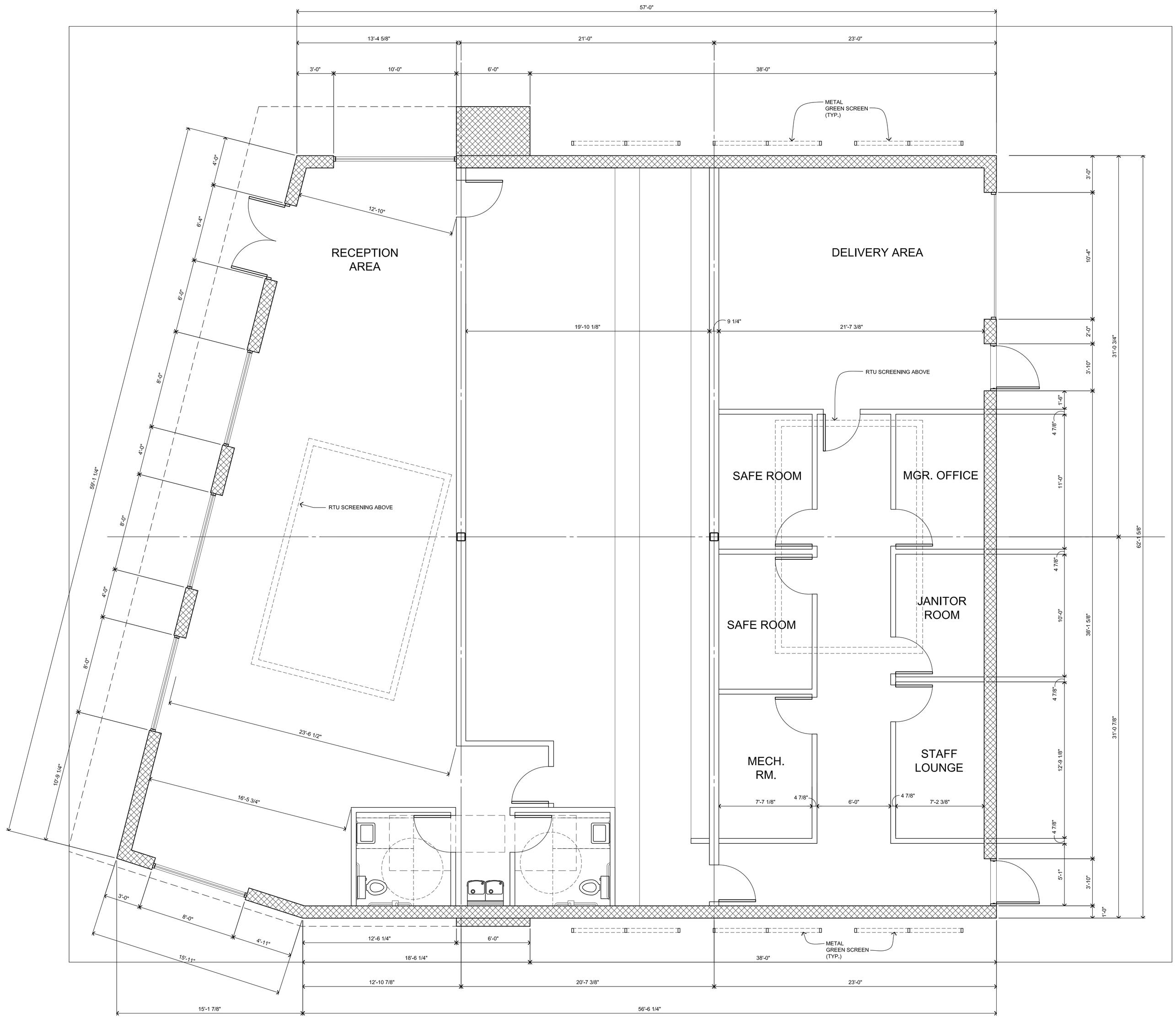
DESIGNED BY:
G. Ostrowski

APPROVED BY:
G. Ostrowski

DATE:
11-08-2019

SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. J987-02
SHEET NO. L2



FLOOR PLAN

PARCEL ID: 33-02-02-22-426-003 SCALE: 1/4" = 1'-0"

issued for:

OWNER REVIEW: 06 AUG, 2019
COMMUNITY REVIEW: 07 AUG, 2019
OWNER REVIEW: 04 NOV, 2019
OWNER REVIEW: 11 NOV, 2019
SPECIAL LAND USE: 11 NOV 2019
OWNER REVIEW: 23 JAN, 2020

project:

Proposed for
Commercial Development
Grand River Ave.
Meridian, MI

ROGVOY ARCHITECTS

32500 TELEGRAPH ROAD
SUITE 250
BINGHAM FARMS, MICHIGAN
48025-2404

PH 248.540.7700 FX 248.540.2710
www.rogvoy.com

drawing:

Conceptual Floor Plan

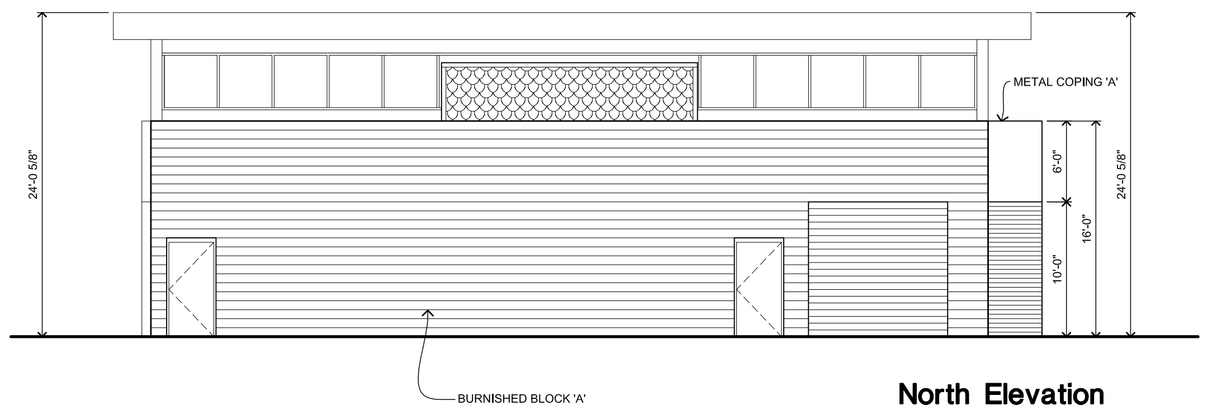
DO NOT SCALE DRAWING

issue date: 02 AUG. 2019
drawn: BDB
checked: MD
approved: MD

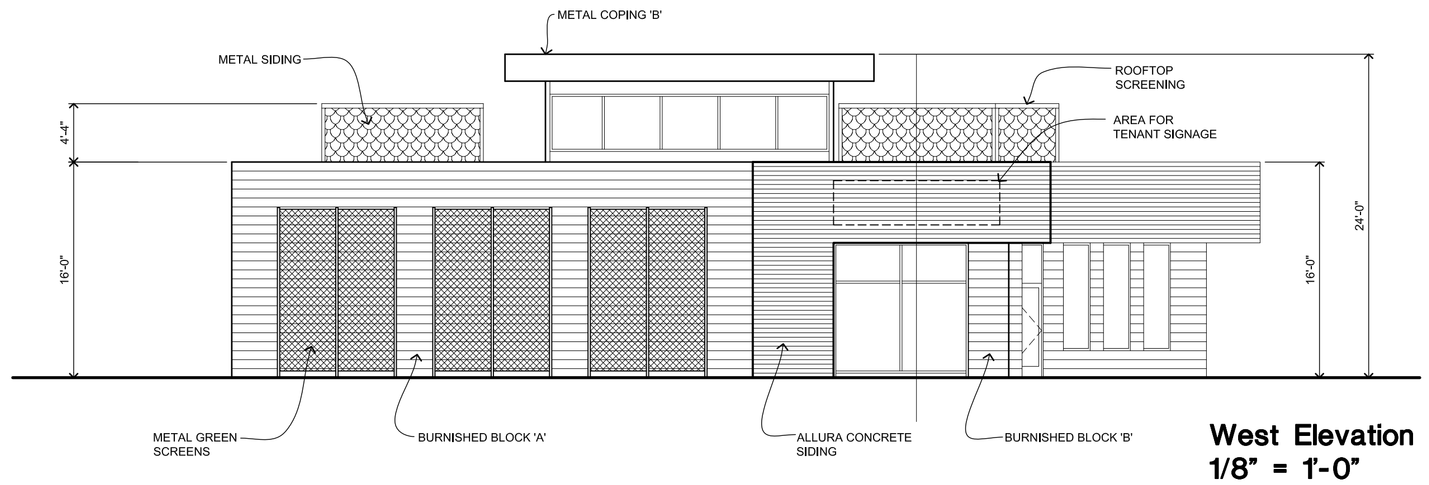
file number: 19030

sheet:

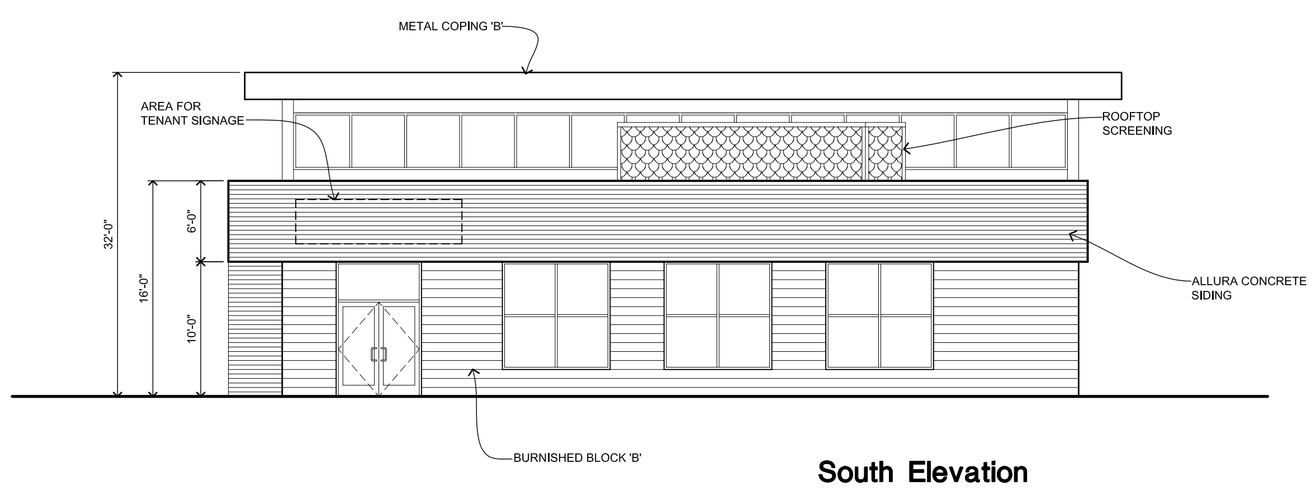
FP-1



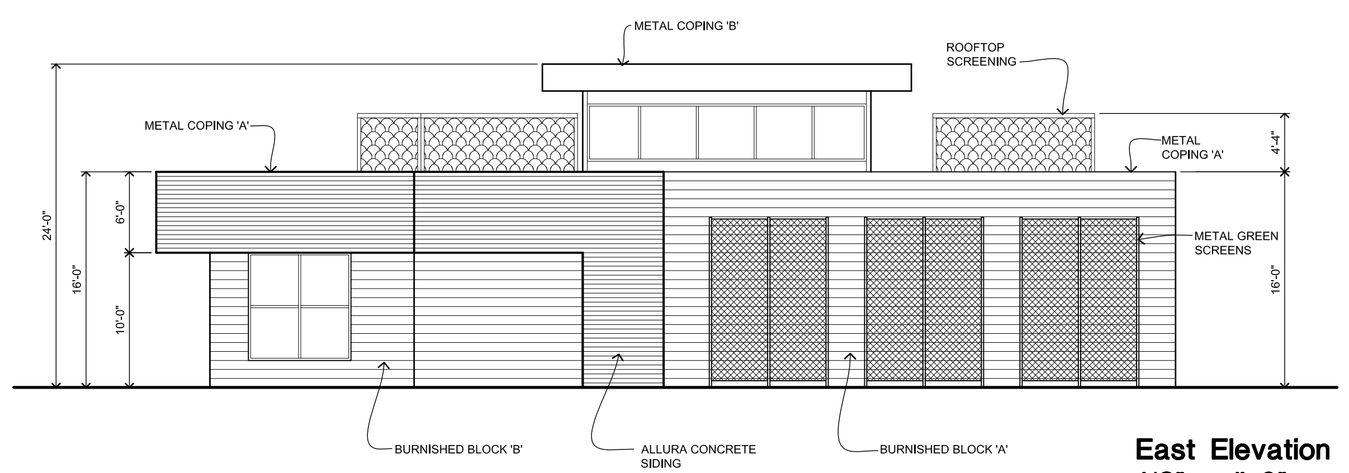
North Elevation
1/8" = 1'-0"



West Elevation
1/8" = 1'-0"



South Elevation
1/8" = 1'-0"



East Elevation
1/8" = 1'-0"

issued for:
OWNER REVIEW: 08 NOVEMBER 2019
OWNER REVIEW: 11 NOVEMBER 2019
SPECIAL LAND USE: 11 NOVEMBER 2019
OWNER REVIEW: 23 JAN. 2020

project:

Proposed for
Commercial Development
Grand River Ave.
Meridian, MI

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drawing:
Conceptual Floor Plan

DO NOT SCALE DRAWING

issue date: 02 AUG. 2019
drawn: BDB
checked: MD
approved: MD

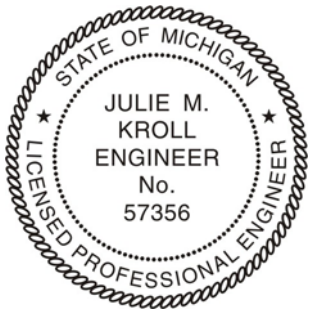
file number: 19030

sheet:
ELEV

PROPOSED PROVISION CENTER TRAFFIC IMPACT STUDY

MERIDIAN TOWNSHIP, MICHIGAN

JANUARY 21, 2020



PREPARED FOR:
W INVESTMENT HOLDINGS, LLC
29580 NORTHWESTERN HWY, SUITE 1000
SOUTHFIELD, MI 48034

PREPARED BY:

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

27725 STANSBURY BLVD., SUITE 195
FARMINGTON HILLS, MI 48834

#842350

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Agency Review	Date	Comments

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References

American Association of State Highway and Transportation Officials (AASHTO). (2018). *A Policy on Geometric Design of Highways and Streets.* Washington DC.

Federal Highway Administration, Michigan Department of Transporation, Michigan State Police. (2011). *Michigan Manual on Uniform Traffic Control Devices.*

Institute of Transportation Engineers. (2017). *Trip Generation Manual, 10th Edition.* Washington DC.

National Research Council (U.S.) Transportation Research Board. (2016). *Highway Capacity Manual, 6th Edition (HCM6).* Washington, D.C.: Transportation Research Board.

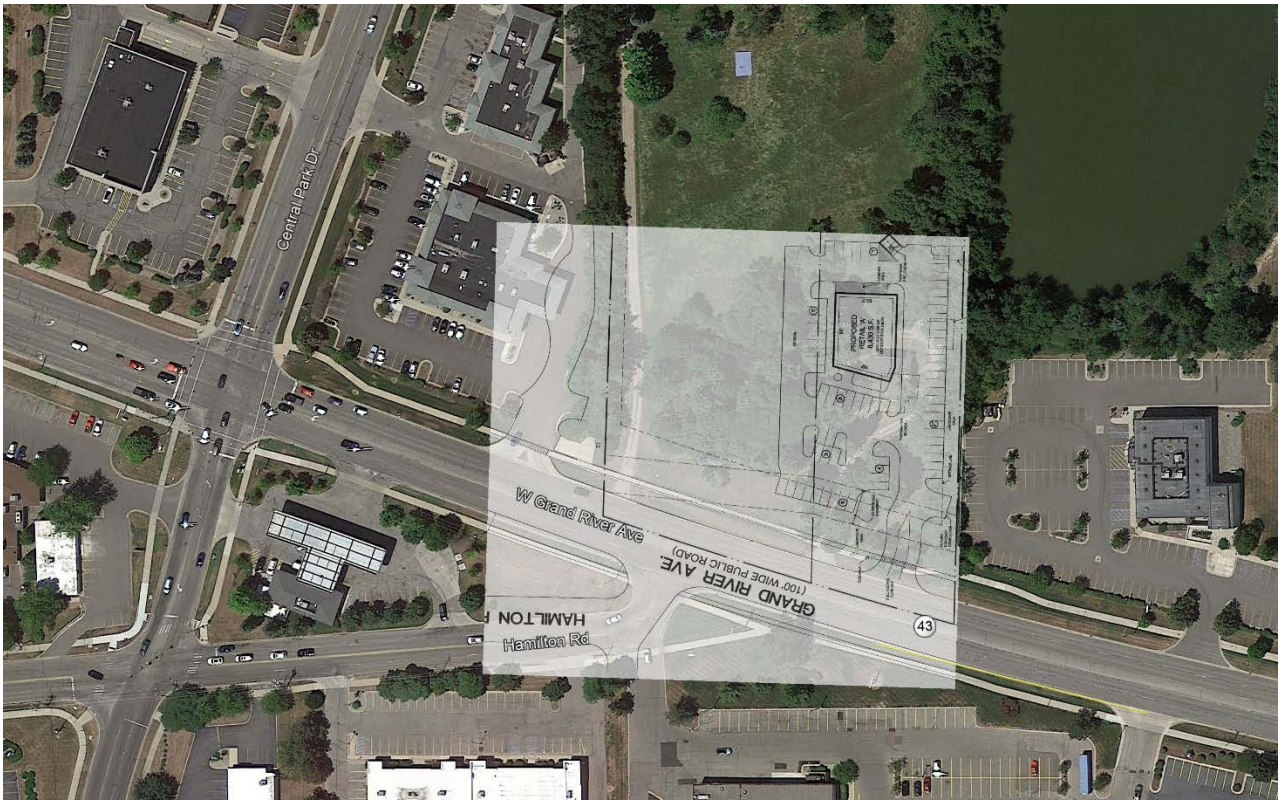
Papacostas, & Prevedouros. (2001). *Transportation Engineering and Planning.*

Stover, V. G., & Koepke, F. J. (2006). *Transportation and Land Development* (Vol. 2nd Edition). Washington DC: Institute of Transportation Engineers (ITE).

EXECUTIVE SUMMARY

This report presents the results of a Traffic Impact Study (TIS) for the proposed provision center development in Meridian Township, Michigan. The project site is located generally in the northeast quadrant of W. Grand River Avenue and Central Park Avenue, adjacent to the north side of W. Grand River Avenue, opposite the intersection with Hamilton Road, as shown on **Figure E1**. The proposed development includes a 5,430 SF marijuana dispensary with site access to be provided via one site driveway to W. Grand River Ave. The Michigan Department of Transportation (MDOT) has jurisdiction over W. Grand River Ave. (M-43).

FIGURE E1: SITE LOCATION



This TIA has been completed at the request of Meridian Township to identify the impacts (if any) of the proposed development on the proposed site access point and the permitting of the site access. The scope of the study was developed based on Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, accepted traffic engineering practice, methodologies published by the Institute of Transportation Engineers (ITE) and the requirements of Meridian Township. Additionally, F&V obtained input regarding the scope of work from Meridian Township Planning Department. In accordance with Township Ordinance, a Traffic Impact Study (TIS) is required for site plan approval.

EXISTING OPERATIONS

The existing conditions analysis included the evaluation of the existing 2020 operations at the study intersections. The results of the existing conditions analysis are summarized below.

Grand River Ave. & Central Park Drive

- During the AM peak hour, the intersection operates well, with an acceptable LOS and queue lengths for all approaches and movements.
- During the PM peak hour, the southbound left-turns on Central Park Drive operate at a LOS E, with excessive queue lengths that extend beyond the existing left-turn lane and impact the southbound through traffic on Central Park Drive.

- In order to improve the existing operations at this intersection mitigation measures were investigated, including signal timing changes and operations.
    - Signal timing optimization **is** recommended.
    - Left-turn phasing *is not* recommended.
- With the signal timing optimization at this intersection the operations improve to acceptable LOS and significantly reduce queue length.

Grand River Ave. & Hamilton Road

- During the both the AM and PM peak hours the intersection operates well, with an acceptable LOS and queue lengths for all approaches and movements.

FUTURE CONDITIONS

The future conditions analysis included the evaluation of the future 2020 operations with the addition of the proposed development traffic at the study intersections. The results of the future conditions analysis are summarized below.

Grand River Ave. & Central Park Drive

- During the AM peak hour the intersection operates well, with acceptable LOS and queue lengths for all approaches and movements.
- During the PM peak hour the southbound left-turns on Central Park Drive operate at a LOS E, with excessive queue lengths that extend beyond the existing left-turn lane and impact the southbound through traffic on Central Park Drive.
    - With the signal timing optimization at this intersection the operations improve to an acceptable LOS and significantly reduce queue length.

Grand River Ave. & Hamilton Road

- During the both the AM and PM peak hours the intersection operates well, with an acceptable LOS and queue lengths for all approaches and movements.

Grand River Ave. & Site Drive

- During both the AM and PM peak hours the intersection operates well, at a LOS B/C during the peak periods with queue lengths of 1-2 vehicles.

ACCESS MANAGEMENT

1. The proposed site driveway meets Grand River Ave. (M-43) Corridor Access Management criterion, provided the exceptions are granted by the Township and MDOT for the following driveways:
    - Tom's Driveway
    - Speedway Driveway
    - Sparrow Driveway
2. There is an existing center left-turn lane adjacent to the site; therefore, only the MDOT right-turn lane criteria was evaluated for the proposed site drive intersection. The results of the analysis show that a right-turn lane or taper is not required.
3. The results of the intersection sight distance analysis show that there will be adequate intersection sight distance at the proposed site driveway on Grand River Ave.

RECOMMENDATIONS

The recommendations of this TIS are as follows:

- MDOT should investigate signal timing optimization at the Grand River & Central Park Drive intersection to improve existing and future PM peak hour operations.

1 INTRODUCTION

This report presents the results of a Traffic Impact Study (TIS) for the proposed provision center development in Meridian Township, Michigan. The project site is located generally in the northeast quadrant of W. Grand River Avenue and Central Park Avenue, adjacent to the north side of W. Grand River Avenue, opposite the intersection with Hamilton Road, as shown on **Figure 1**. The proposed development includes a 5,430 SF marijuana dispensary with site access to be provided via one site driveway to W. Grand River Ave. The Michigan Department of Transportation (MDOT) has jurisdiction over W. Grand River Ave. (M-43).

This TIA has been completed at the request of Meridian Township to identify the impacts (if any) of the proposed development on the proposed site access point and the permitting of the site access. The scope of the study was developed based on Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, accepted traffic engineering practice, methodologies published by the Institute of Transportation Engineers (ITE) and the requirements of Meridian Township. Additionally, F&V obtained input regarding the scope of work from Meridian Township Planning Department. In accordance with Township Ordinance, a Traffic Impact Study (TIS) is required for site plan approval.

The purpose of this study is to identify the traffic related impacts, if any, of the proposed development project on the adjacent road network. Specific tasks undertaken for this study include the following:

1. **Study Area**
    a. Provide a description of the study area including surrounding land uses, intersection and roadway geometries, speed limits, functional classifications and traffic volume data (where available). In addition, a study area site map showing the site location and the study intersections will also be provided.
2. **Proposed Land Use**
    a. Obtain and review the proposed site plan which includes the proposed land uses, densities, and desired site access locations. A description of the current and proposed land use will be accompanied with a complete project site plan (with buildings identified as to proposed use). A schedule for construction of the development will also be provided.
3. **Existing Conditions**
    a. Provide an analysis of the traffic-related impacts of the proposed development at the following study intersections:
        - Grand River Ave. & Central Park Drive/Dobie Road
        - Grand River Ave. & Hamilton Road
        - Grand River Ave. & Proposed Site Drive
    b. Obtain existing AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak period turning movement counts at the study intersections from Meridian Township for use in this study.
    c. Identify the Existing AM and PM peak hour traffic volumes at the study intersections based on turning movement count data provided.
    d. Calculate the **Existing** vehicle delays, LOS, and vehicle queues at the study intersections during the AM and PM. The analysis will be performed at each of the study intersections. Intersection analysis shall include LOS determination for all approaches and movements. The LOS will be based on the procedures outlined in the HCM 6th Edition, the latest edition of Transportation Research Board's Highway Capacity Manual.
    e. Identify improvements (if any) for the study road network that would be required to accommodate the existing traffic volumes.
4. **Future Background Growth**
    a. If the planned completion date for the project or the last phase of the project is beyond one year of the study, an estimate of background traffic growth for the adjacent street network will be made and included in the analysis.
    b. Calculate the future background traffic volumes based on an appropriate traffic growth determined from local or statewide data to the project build-out year and/or any applicable background developments in the vicinity of this project as identified by Meridian Township.

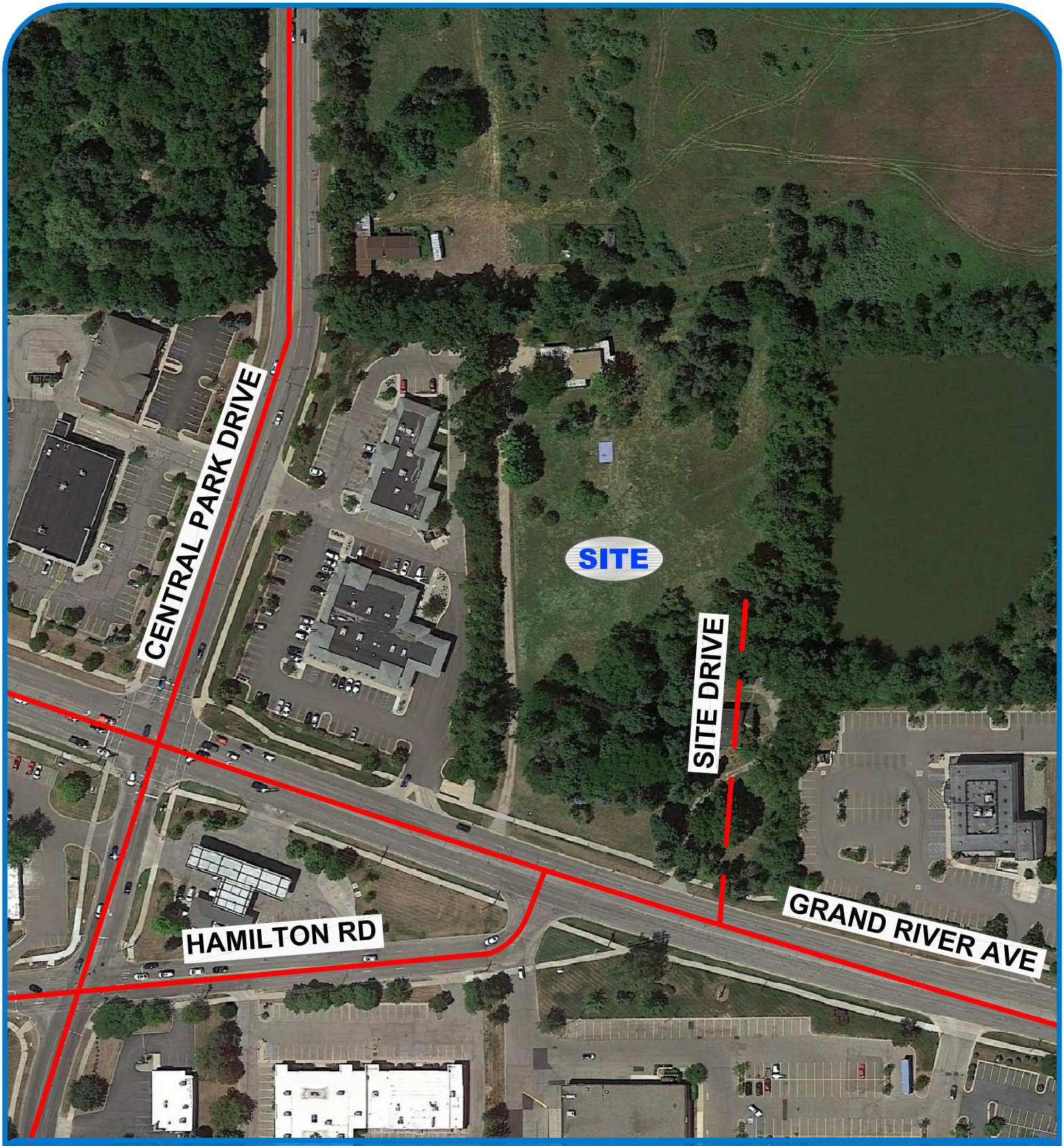


FIGURE 1
SITE LOCATION MAP

PROPOSED PROVISIONING CENTER
MERIDIAN TOWNSHIP, MI

LEGEND

SITE — SITE LOCATION

NORTH
SCALE: NOT TO SCALE

5. Background Conditions (No Build)

a. Calculate the **Background *(without the proposed development)*** vehicle delays, LOS, and vehicle queues at the study intersections during the AM and PM peak periods. Intersection analysis shall include LOS determination for all approaches and movements. The LOS will be based on the procedures outlined in the HCM 6th Edition, the latest edition of Transportation Research Board's Highway Capacity Manual.

b. Any state, local, or private transportation improvement projects in the project study area that will be underway in the build-out year and traffic that is generated by other proposed developments in the study area will be included as background conditions.

c. Identify improvements (if any) for the study road network that would be required to accommodate the background traffic volumes.

6. Trip Generation

a. Forecast the number of AM and PM peak hour trips that would be generated by the proposed development based on data published by the Institute of Transportation Engineers (ITE) in *Trip Generation, 10th Edition*.

b. A table will be provided in the report outlining the categories and quantities of land uses, with the corresponding trip generation rates or equations, and the resulting number of trips.

7. Trip Distribution and Traffic Assignment

a. Assign the trips that would be generated by the proposed development to the adjacent road network based on existing traffic patterns. The distribution of the estimated trip generation to the adjacent street network and nearby intersections shall be included in the report and the basis will be explained. The distribution percentages with the corresponding volumes will be provided in a graphical format.

b. Combine the site-generated traffic assignments with the background traffic forecasts to establish the Future AM and PM peak hour traffic volumes.

8. Future Conditions

a. Calculate the **Future (with the proposed development)** vehicle delays, LOS, and vehicle queues at the study intersections. Intersection analysis shall include LOS determination for all approaches and movements. The LOS will be based on the procedures outlined in the HCM 6th Edition, the latest edition of Transportation Research Board's Highway Capacity Manual.

b. Identify improvements (if any) for the study road network that would be required to accommodate the future traffic volumes.

9. Access Management

a. Evaluate the Meridian Township Access Management criteria for the proposed site driveway on Grand River Ave., including adjacent driveway locations, opposite driveway locations, the location and spacing of the proposed site access in relation to the existing adjacent driveway and intersections.

b. Evaluate the proposed intersection sight distance at the proposed site driveway intersection on Grand River Ave.

The scope of this study was developed based on Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, accepted traffic engineering practice and information published by the Institute of Transportation Engineers (ITE). In addition, Meridian Township provided input regarding the scope of work for this study. The study analyses were completed using Synchro/SimTraffic (Version 10). Sources of data for this study included Traffic Engineering Associates (TEA) and information provided by Meridian Township, MDOT and ITE. All background information is provided in **Appendix A**.

2 BACKGROUND DATA

2.1 EXISTING ROAD NETWORK

Vehicle transportation for the proposed development is provided via Grand River Avenue located adjacent to the south side of the project site location. The lane use and traffic control at the study intersections are shown on **Figure 2** and the study roadways are further described below. For the purpose of this study, all minor streets and driveways are assumed to have an operating speed of 25 miles per hour (mph).

Grand River Avenue (M-43) runs generally in the east and west directions with a posted speed limit of 45 mph. Grand River Ave. is under the jurisdiction of MDOT and is classified a *Minor Arterial* adjacent to the proposed project site. The study segment has an AADT of approximately 13,250 vehicles per day (MDOT 2019). Grand River has a typical five-lane cross section in the vicinity of the site location, with two lanes in each direction and a center left-turn lane. The intersection with Central Park Drive is signalized, the intersection with Hamilton Road is unsignalized.

2.2 EXISTING TRAFFIC VOLUMES

The existing weekday turning movement count data used in this study were obtained from Meridian Township. TEA performed a traffic impact study in the vicinity of this project in 2018 and turning movement count data was collected at the study intersections for that project. The turning movement count data collected in 2018 was compared to the weekday traffic volume data obtained from the MDOT Traffic Data Management System (TDMS). This data included 24-hour traffic volume data collected on March 11-12, 2019 and recorded in 15-minute intervals. This data was used as a baseline to determine if a background growth rate was necessary to calculate the existing 2020 traffic volume for use in this study. The results of this comparison showed that the 2018 traffic volumes were essentially equal to the 2019 traffic volumes; therefore, no background growth was applied to the 2018 traffic volumes to establish the existing 2020 traffic conditions without the proposed development. The 2018 data were used as a baseline to establish the current 2020 peak hour traffic volumes for the analysis of existing traffic conditions. During collection of the turning movement counts, pedestrian data and commercial truck percentages were recorded and used in the traffic analysis. Peak Hour Factors (PHFs) were also calculated for each study intersection approach.

The peak hour volumes for each intersection were utilized for this study and the volumes were balanced upward through the study network, and through volumes were carried along the main study roadways. The peak hour traffic volumes were identified to occur between 7:45 AM to 8:45 AM and 5:00 PM to 6:00 PM. The traffic volume data are included in **Appendix A** and the existing peak hour traffic volumes used in the analysis are summarized on **Figure 3**.

3 ANALYSIS

3.1 EXISTING CONDITIONS

The existing AM and PM peak hour vehicle delays and Levels of Service (LOS) were calculated at the study intersection using Synchro traffic analysis software. The results of the analysis of existing conditions were based on the existing lane use and traffic control shown on **Figure 2**, the existing traffic volumes shown on **Figure 3**, and the methodologies presented in the Highway Capacity Manual 6th Edition (HCM6).

Descriptions of LOS “A” through “F” as defined in the HCM, are provided in **Appendix B** for signalized and unsignalized intersections. Typically, LOS D is considered acceptable, with LOS A representing minimal delay, and LOS F indicating failing conditions. The results of the analysis of existing conditions are presented in **Appendix B** and are summarized in **Table 1**. Microsimulations were also conducted at the study intersections using SimTraffic to further evaluate the network performance.

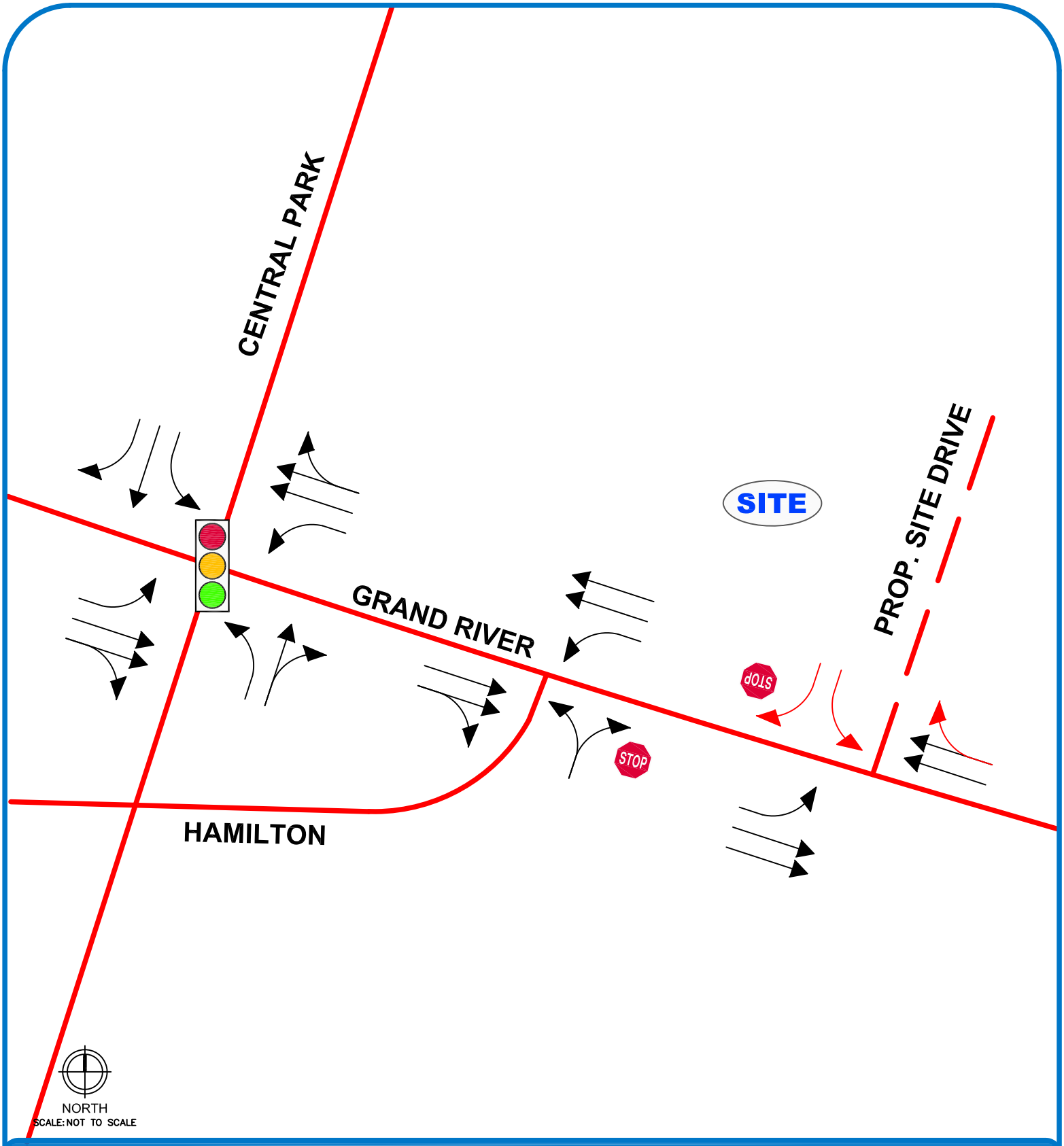


FIGURE 2
LANE USE AND TRAFFIC CONTROL

PROPOSED PROVISIONING CENTER
MERIDIAN TOWNSHIP, MI

LEGEND

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

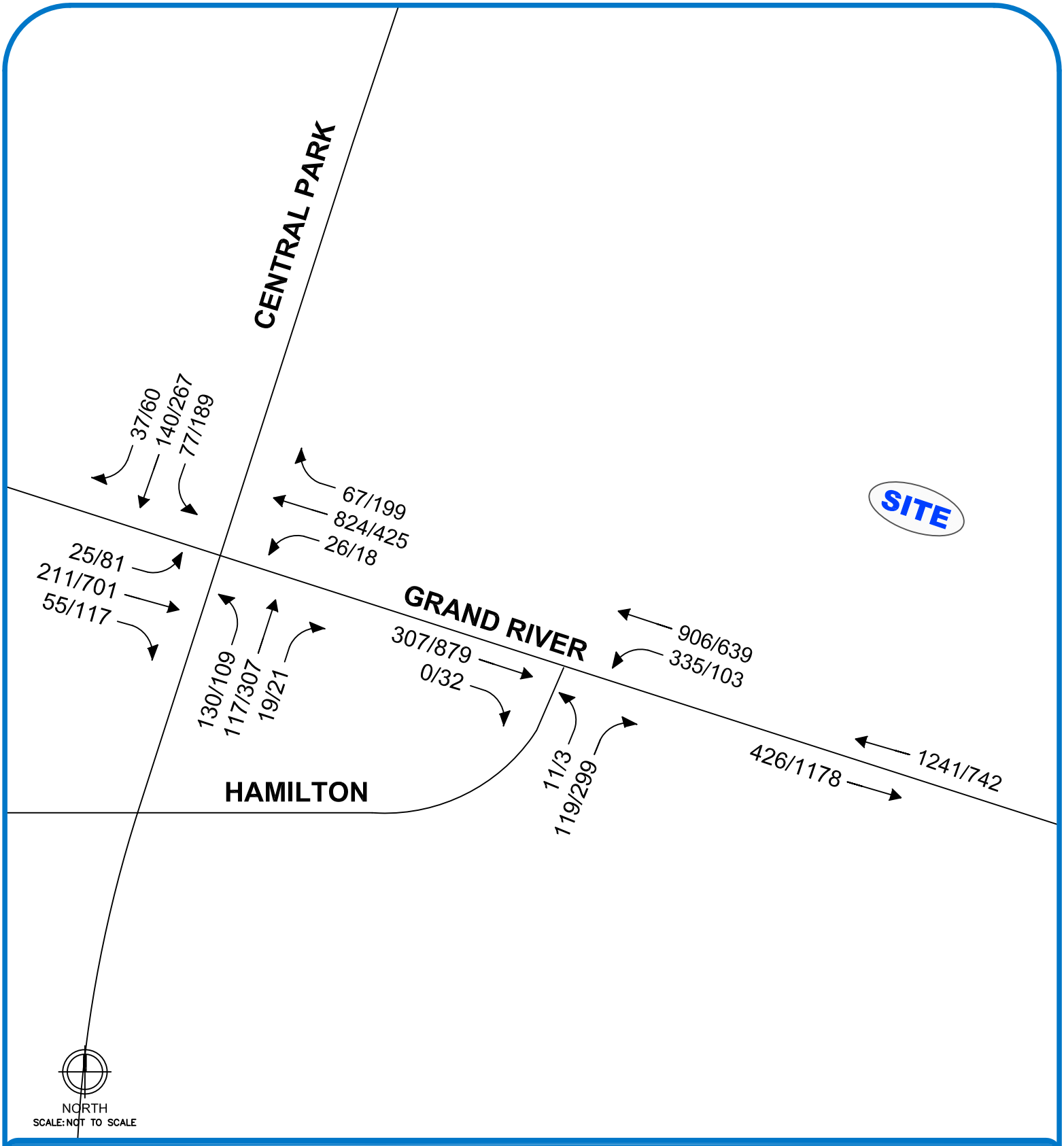


FIGURE 3
EXISTING TRAFFIC VOLUMES

PROPOSED PROVISIONING CENTER
MERIDIAN TOWNSHIP, MI

LEGEND

ROADS

TRAFFIC VOLUMES (AM/PM)

Table 1: Existing Intersection Operations

Intersection		Control	Approach	Existing Conditions							
				AM Peak				PM Peak			
				Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)	Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)
1	Grand River Ave. & Central Park/Dobie	Signalized	NBL	43.6	D	94	170	36.1	D	70	137
			NBTR	32.6	C	65	126	28.8	C	140	240
			SBL	38.6	D	49	95	55.9	E	326	503
			SBT	32.9	C	67	123	27.0	C	441	991
			SBR	30.1	C	17	43	23.3	C	131	647
			EBL	15.8	B	17	48	20.4	C	45	92
			EBT	8.0	A	37	82	14.7	B	95	149
			EBR	7.8	A	8	28	12.6	B	21	53
			WBL	8.9	A	11	42	18.5	B	11	34
			WBTR	11.7	B	125	214	14.8	B	97	162
			Overall	18.4	B			22.4	C		
2	Grand River Ave. & Hamilton Road	STOP (Minor Street)	NB	9.0	A	43	72	26.2	D	67	98
			WBL	9.4	A	40	73	11.1	B	34	76

The results of the existing conditions analysis show that all approaches and movements at the study intersections are currently operating acceptably at a LOS D or better, with the exception of the following:

Grand River Ave. & Central Park Drive

- During the PM peak hour, the southbound left-turns on Central Park Drive operate at a LOS E, with excessive queue lengths that extend beyond the existing left-turn lane and impact the southbound through traffic on Central Park Drive.

3.2 EXISTING IMPROVEMENTS

In order to improve the existing operations at this intersection mitigation measures were investigated, including signal timing changes and operations. The signal timing changes evaluated include optimizing the existing splits, and the amount of green time allocated for N/S and E/W movements. The operations evaluation included a review of the MDOT left-turn phasing calculations to determine if permissive/protected left-turn phasing should be added to the signal operations.

Signal Timing Changes

The signal currently operates during the PM peak hour with the 100 sec cycle length and 60(E/W)/40(N/S) splits. The 40 seconds does not provide adequate time to accommodate the existing southbound left-turn volume on the Central Park Drive approach. Therefore, the splits were optimized to provide 46(E/W)/54(N/S). The results of this change in signal timing are summarized below in **Table 2** and show significant improvement in the existing operations and reductions in queue lengths on the southbound approach. Furthermore, these changes in signal timing did not impact the operations on Grand River Ave.

Left-Turn Phasing

The MDOT left-turn phasing analysis spreadsheet was used to evaluate the existing left-turn volumes at this intersection to determine if separate left-turn phasing should be provided. The results of the analysis are attached and show that permissive/protected left-turns are warranted only on the SB Central Park Drive approach during the PM peak hour. Therefore, left-turn phasing is not recommended at this intersection to mitigate existing left-turn delays.

Table 2: Existing Intersection Operations-With Improvements

Intersection		Control	Approach	PM Peak Period											
				Existing Conditions				Existing with Improvements				Difference			
				Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)	Delay (s/veh	LOS	Avg. Queue (ft)	95th% Queue (ft)	Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)
1	Grand River Ave. & Central Park/Dobie	Signalized	NBL	36.1	D	70	137	30.5	C	62	118	-5.6	D to C	-8	-19
			NBTR	28.8	C	140	240	24.2	C	127	223	-4.6	n/c	-13	-17
			SBL	55.9	E	326	503	39.3	D	119	200	-16.6	E to D	-207	-303
			SBT	27.0	C	441	991	23.0	C	106	186	-4.0	n/c	-335	-805
			SBR	23.3	C	131	647	20.0	B	20	42	-3.3	C to B	-111	-605
			EBL	20.4	C	45	92	25.0	C	47	101	4.6	n/c	2	9
			EBT	14.7	B	95	149	18.0	B	125	199	3.3	n/c	30	50
			EBR	12.6	B	21	53	15.4	B	19	46	2.8	n/c	-2	-7
			WBL	18.5	B	11	34	22.6	C	15	40	4.1	B to C	4	6
			WBTR	14.8	B	97	162	18.3	B	112	183	3.5	n/c	15	21
			Overall	22.4	C			21.8	C			-0.6	n/c		

3.3 BACKGROUND CONDITIONS

Since the proposed development is anticipated to be constructed and completed within the next year, existing conditions were assumed equal to background (no build) conditions with a project buildout year of 2020.

3.4 SITE TRIP GENERATION

The number of Weekday AM and PM peak hour and daily vehicle trips that would be generated by the proposed development was forecast based on data published by ITE in the *Trip Generation Manual, 10th Edition*. The site trip generation forecast is summarized in **Table 3**.

Table 3: Site Trip Generation

Land Use	ITE Code	Amount	Units	Average Daily Traffic (vpd)	AM Peak Hour (vph)			PM Peak Hour (vph)		
					In	Out	Total	In	Out	Total
Marijuana Dispensary	882	5,430	SF	1,372	32	25	57	60	59	119

3.5 SITE TRAFFIC ASSIGNMENT

The vehicular trips that would be generated by the proposed development were assigned to the study roads based on existing peak hour traffic patterns in the adjacent roadway network, the proposed site access points, and the methodologies published by ITE. To determine trip distribution using the adjacent street traffic, it was assumed that the development land uses are trip generators; therefore, the global trip generation is based on trips entering the study network and traveling to the development. The ITE trip distribution methodology also assumes that new trips will return to their direction of origin. The resulting site trip distributions used in the analysis are summarized in **Table 4**.

Table 4: Site Trip Distribution

To / From	Via	AM	PM
West	Grand River Ave.	13%	31%
East	Grand River Ave.	57%	25%
South/West	Hamilton Rd./Dobie Rd.	18%	26%
North	Central Park Drive	12%	18%
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 are shown on **Figure 4** and were added to the future existing traffic volumes shown on **Figure 2** to calculate the future peak hour traffic volumes with the proposed development, as shown on **Figure 5**.

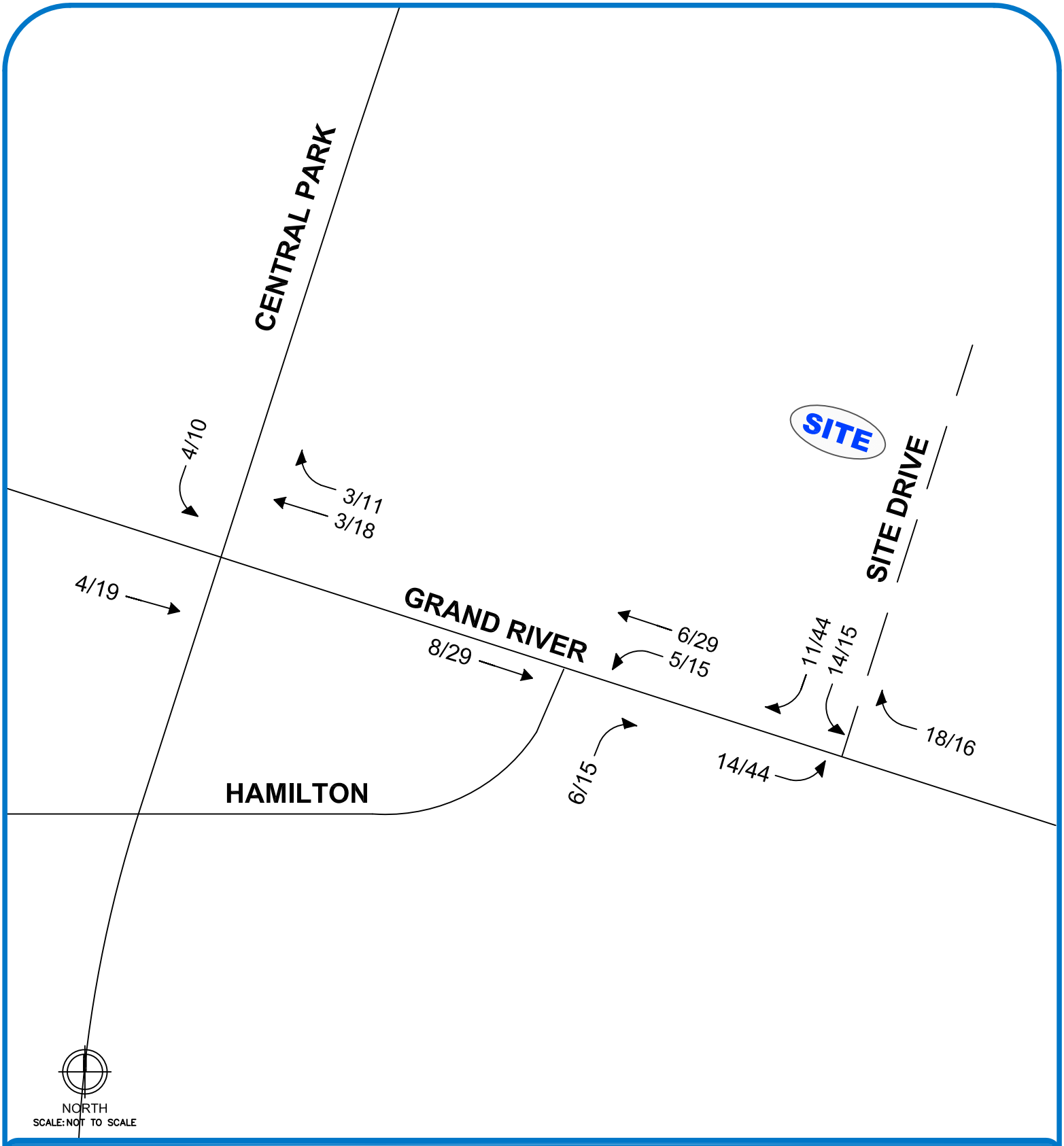


FIGURE 4
SITE-GENERATED TRAFFIC VOLUMES

PROPOSED PROVISIONING CENTER
MERIDIAN TOWNSHIP, MI

LEGEND

ROADS

TRAFFIC VOLUMES (AM/PM)

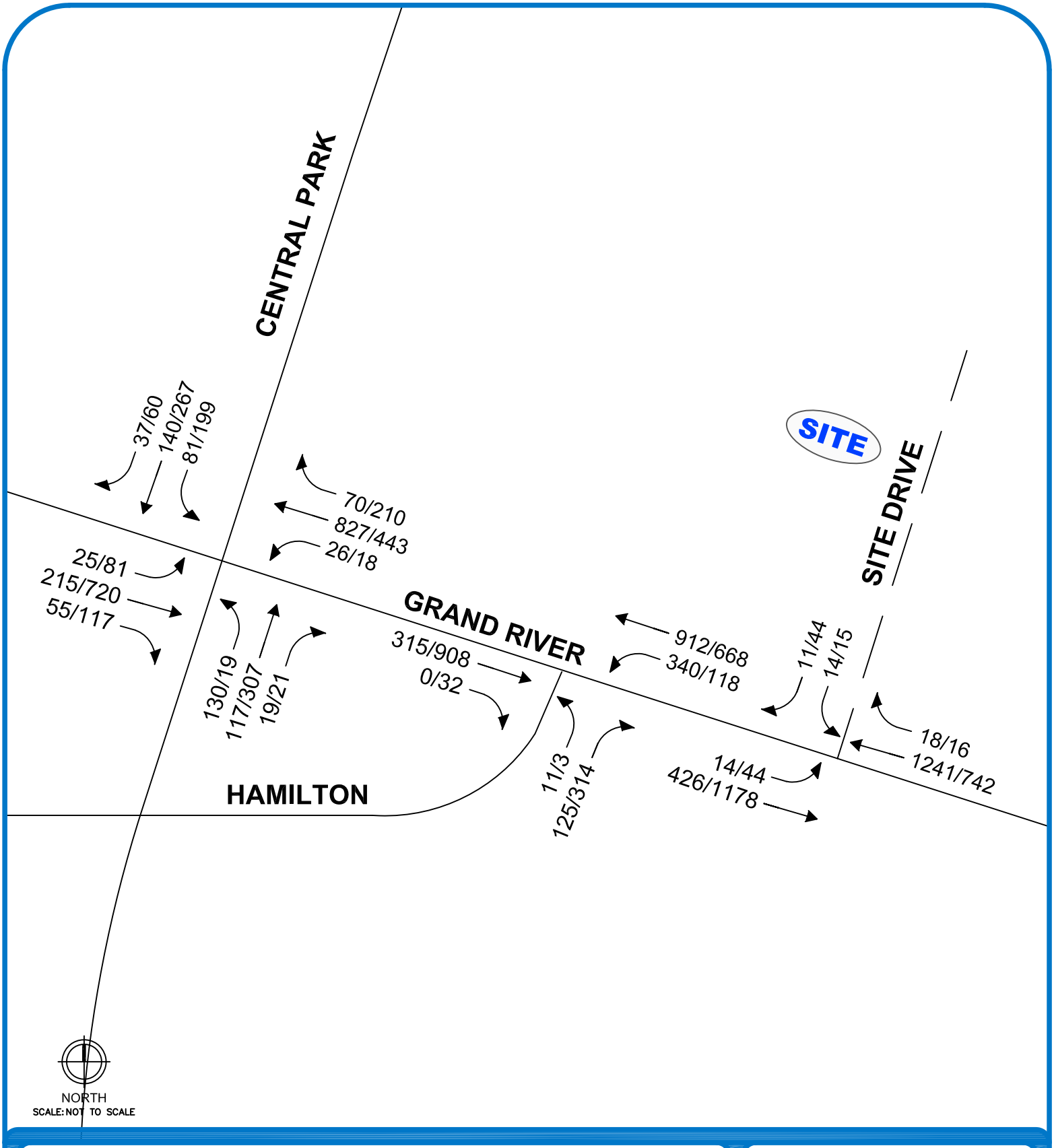


FIGURE 5
FUTURE TRAFFIC VOLUMES

PROPOSED PROVISIONING CENTER
MERIDIAN TOWNSHIP, MI

LEGEND

ROADS

TRAFFIC VOLUMES (AM/PM)

3.6 FUTURE CONDITIONS

The future peak hour vehicle delays and LOS ***with the proposed development*** were calculated based on the existing lane use and traffic control shown on **Figure 2**, the proposed site access plan, the future traffic volumes shown on **Figure 5**, and the methodologies presented in the HCM6. The results of the future conditions analysis are presented in **Appendix C** and are summarized in **Table 5.**

Table 5: Future Intersection Operations

Intersection		Control	Approach	AM Peak Period											
				Existing Conditions				Future Conditions				Difference			
				Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)	Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)	Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)
1	Grand River Ave. & Central Park Drive/Dobie Road	Signalized	NBL	43.6	D	94	170	43.6	D	82	139	0.0	n/c	-12	-31
			NBTR	32.6	C	65	126	32.6	C	67	129	0.0	n/c	2	3
			SBL	38.6	D	49	95	38.9	D	52	101	0.3	n/c	3	6
			SBT	32.9	C	67	123	32.9	C	67	120	0.0	n/c	0	-3
			SBR	30.1	C	17	43	30.1	C	17	44	0.0	n/c	0	1
			EBL	15.8	B	17	48	15.9	B	16	50	0.1	n/c	-1	2
			EBT	8.0	A	37	82	8.0	A	36	74	0.0	n/c	-1	-8
			EBR	7.8	A	8	28	7.8	A	15	24	0.0	n/c	7	-4
			WBL	8.9	A	11	42	8.9	A	12	36	0.0	n/c	1	-6
			WBTR	11.7	B	125	214	11.7	B	126	210	0.0	n/c	1	-4
			Overall	18.4	B			18.4	B			0.0	n/c		
2	Grand River Ave. & Hamilton Road	STOP (Minor Street)	NB	9.0	A	43	72	9.3	A	42	71	0.3	n/c	-1	-1
			WBL	9.4	A	40	73	9.5	A	41	71	0.1	n/c	1	-2
3	Grand River Ave. & Site Drive	STOP (Minor Street)	SBL					28.7	D	15	42	28.7	D	15	42
			SBR					14.5	B	10	33	14.5	B	10	33
			EBL					12.5	B	9	32	12.5	B	9	32

Intersection		Control	Approach	PM Peak Period											
				Existing Conditions				Future Conditions				Difference			
				Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)	Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)	Delay (s/veh)	LOS	Avg. Queue (ft)	95th% Queue (ft)
1	Grand River Ave. & Central Park/Dobie	Signalized	NBL	36.1	D	70	137	36.1	D	62	124	0.0	n/c	-8	-13
			NBTR	28.8	C	140	240	28.8	C	153	258	0.0	n/c	13	18
			SBL	55.9	E	326	503	60.3	E	380	528	4.4	n/c	54	25
			SBT	27.0	C	441	991	27.0	C	695	1276	0.0	n/c	254	285
			SBR	23.3	C	131	647	23.3	C	360	1138	0.0	n/c	229	491
			EBL	20.4	C	45	92	21.0	C	39	84	0.6	n/c	-6	-8
			EBT	14.7	B	95	149	14.9	B	102	159	0.2	n/c	7	10
			EBR	12.6	B	21	53	12.6	B	17	47	0.0	n/c	-4	-6
			WBL	18.5	B	11	34	18.8	B	13	37	0.3	n/c	2	3
			WBTR	14.8	B	97	162	15.2	B	98	164	0.4	n/c	1	2
			Overall	22.4	C			22.8	C			0.4	n/c		
2	Grand River Ave. & Hamilton Road	STOP (Minor Street)	NB	26.2	D	67	98	30.1	D	70	100	3.9	n/c	3	2
			WBL	11.1	B	34	76	11.5	B	42	81	0.4	n/c	8	5
3	Grand River Ave. & Site Drive	STOP (Minor Street)	SBL					22.4	C	13	38	22.4	C	13	38
			SBR					11.6	B	25	53	11.6	B	25	53
			EBL					9.7	A	19	47	9.7	A	19	47

Note: Slight variations (+/-) in the vehicle queuing from existing and future conditions are due to the multiple iterations included in the SimTraffic modeling of the network. Approaches/movements with significant increases in queue lengths were further evaluated for mitigation measures as summarized in Section 3.7.

The results of the future conditions analysis show that all approaches and movements at the study intersections are expected to operate in a manner similar to existing conditions, operating acceptably at a LOS D or better, with the exception of the following:

Grand River Ave. & Central Park Drive

- During the PM peak hour, the southbound left-turns on Central Park Drive will continue to operate at a LOS E, with excessive queue lengths that extend beyond the existing left-turn lane and impact the southbound through traffic on Central Park Drive.

3.7 FUTURE IMPROVEMENTS

In order to improve traffic operations to a LOS D or better for all approaches and movements at the study intersections under future conditions ***with the proposed development***, mitigation measures were investigated. The results of the analyses are summarized in **Table 6** and summarized below.

- Signal timing optimization was evaluated for Grand River Ave. & Central Park Drive and found to adequately mitigate the impact of the proposed development and improve the existing operations.

Table 6: Future Intersection Operations with Improvements

Intersection		Control	Approach	PM Peak Period											
				Future Conditions				Future with Improvements				Difference			
				Delay (s/veh	LOS	Avg. Queue	95th% Queue	Delay (s/veh	LOS	Avg. Queue	95th% Queue	Delay (s/veh)	LOS	Avg. Queue	95th% Queue
1	Grand River Ave. & Central Park/Dobie	Signalized	NBL	36.1	D	62	124	29.7	C	60	122	-6.4	D to C	-2	-2
			NBTR	28.8	C	153	258	23.6	C	119	206	-5.2	n/c	-34	-52
			SBL	60.3	E	380	528	39.1	D	125	207	-21.2	E to D	-255	-321
			SBT	27.0	C	695	1276	22.4	C	105	189	-4.6	n/c	-590	-1087
			SBR	23.3	C	360	1138	19.5	B	17	41	-3.8	C to B	-343	-1097
			EBL	21.0	C	39	84	26.5	C	48	100	5.5	n/c	9	16
			EBT	14.9	B	102	159	18.7	B	126	192	3.8	n/c	24	33
			EBR	12.6	B	17	47	15.8	B	20	45	3.2	n/c	3	-2
			WBL	18.8	B	13	37	23.6	C	14	43	4.8	B to C	1	6
			WBTR	15.2	B	98	164	19.0	B	119	191	3.8	n/c	21	27
			Overall	22.8	C			22.1	C			-0.7	n/c		

3.8 ACCESS MANAGEMENT

3.8.1 Grand River Ave. (M-43) Corridor Access Management

Meridian Township, in coordination with MDOT, has developed access management criteria for use in evaluating proposed site access driveways along this corridor. The access management criteria for the proposed site driveway location are summarized in **Table 7** and shown on **Figure 6**.

Table 7: Intersection/ Driveway Spacing Summary

Adjacent Driveways/ Intersections	Same Side/Opposite	Distance	Meridian Twp. Rec.	Meets Req.
Speedway	Opposite	550	630	NO
Bank of America	Same Side	400	350	YES
Hamilton Road	Opposite-Intersection	225	200	YES
Sparrow (1600 Grand River)	Same Side	317	350	NO
Tom's	Opposite	286	630	YES*

* With exception granted by Meridian Township Planning (minimum 150 ft for non-conflicting left-turns)

In accordance with MDOT guidelines, in the event that a particular parcel lacks sufficient frontage to maintain adequate spacing, the Region/TSC Traffic and Safety and Utility and Permit Engineers have the following options:

1. *Choose the next lowest spacing. For example, on 30 mph roadway requiring 185 ft spacing, the distance may be reduced to no less than 130 ft which is the spacing from 25 mph speed.*

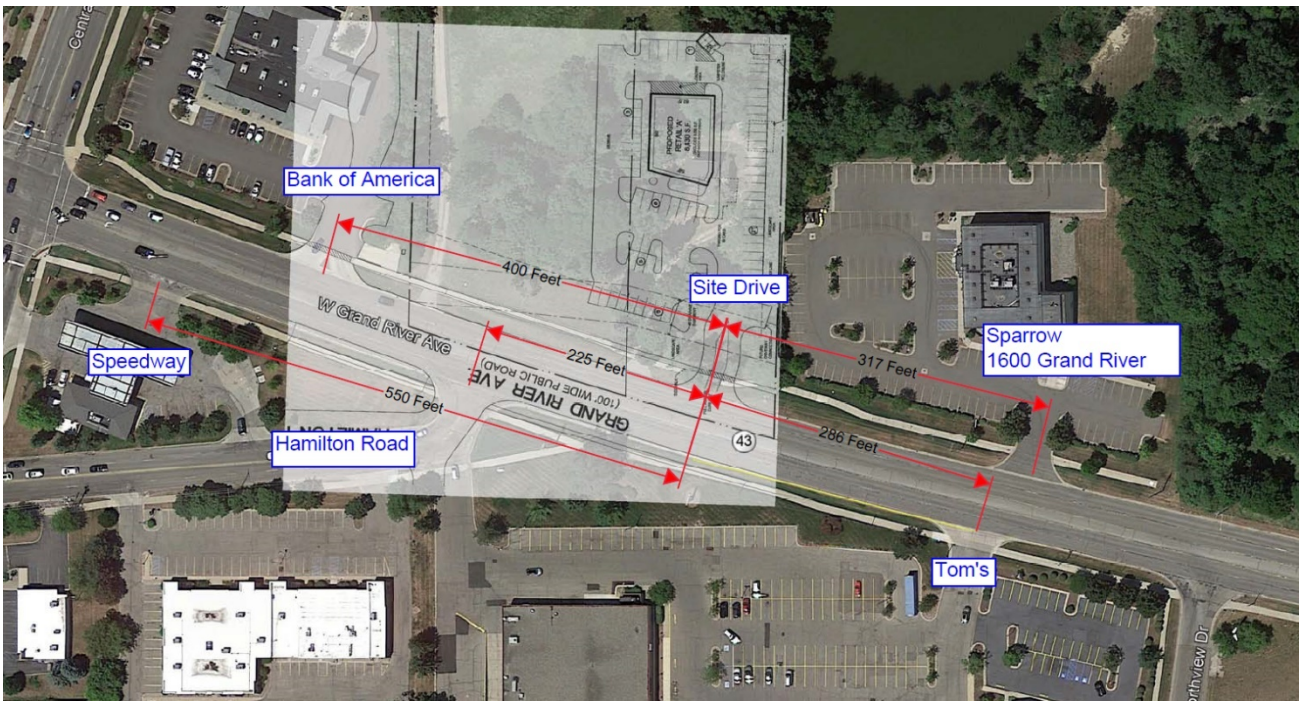
   The next lowest speed was reviewed at the locations that do not meet the minimum spacing requirements. The results of this analysis are summarized in **Table 8** and show that the spacing requirements are still not met at these locations.

Table 8: Intersection/ Driveway Spacing Summary-Alternative Minimums

Adjacent Driveways/ Intersections	Adjacent/Opposite	Distance	Meridian Twp. Rec.	Meets Req.
Speedway	Opposite	550	525	YES
Sparrow (1600 Grand River)	Same Side	317	300	YES

By using the next lowest speed category, all of the driveways and intersections will meet access management spacing criteria. Therefore, none of the further criterion was necessary for consideration for this site driveway.

FIGURE 6: ACCESS MANAGEMENT INTERSECTION SPACING



3.8.2 MDOT Right-Turn Lane Analysis

The MDOT Geometric Design Guidance Sections 1.1.4 (formerly MDOT Traffic & Safety Notes 604A) was utilized in order to determine if a right-turn lane or taper is required at the proposed site driveway. The results of the analysis are provided in **Appendix D** and indicate the following:

- A right-turn radius only is recommended for the proposed Site Drive. No additional right-turn treatment is required.

3.8.3 Intersection Sight Distance Analysis

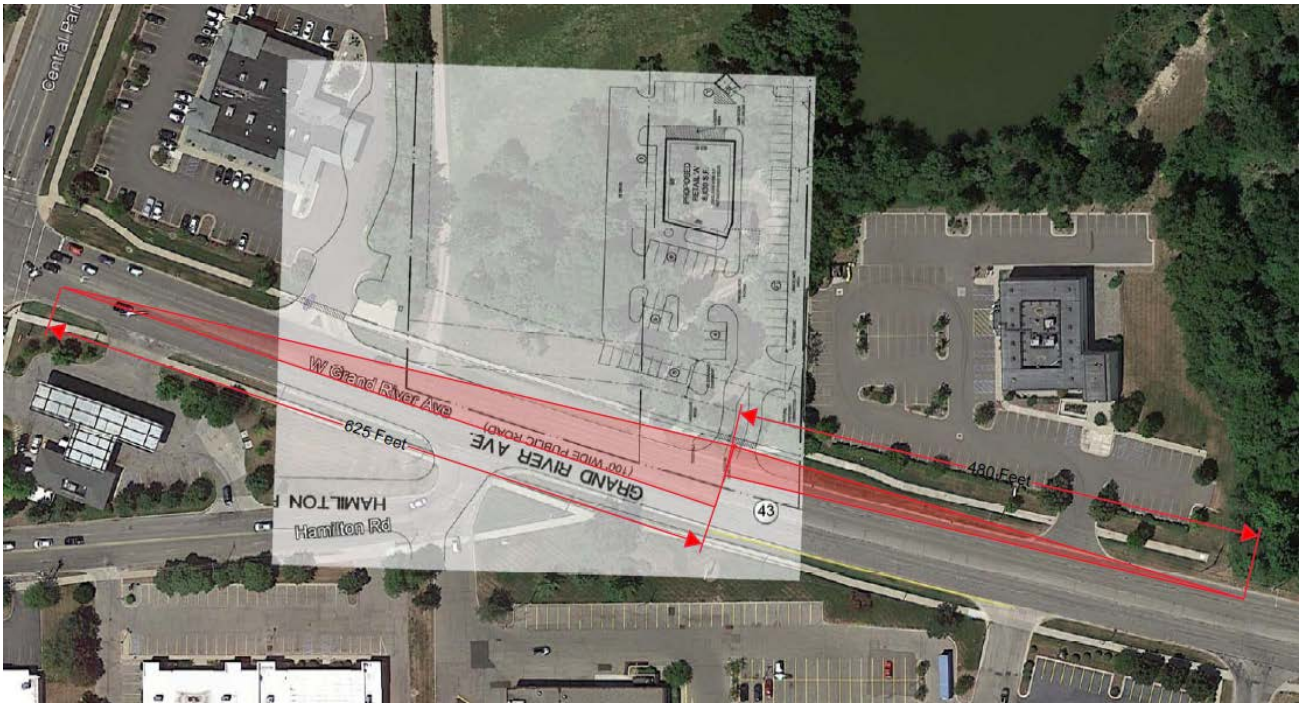
The intersection sight distance was reviewed at the proposed Grand River Ave. & Site Drive intersection. According to *Section 9.5 – Intersection Sight Distance* of the AASHTO design manual *A Policy on Geometric Design of Highways and Streets, 7th Edition (2018),* an intersection sight distance of 625 feet is required for a left turn from a complete stop and a sight distance of 480 feet is required for a right turn from a stopped position at the study intersection based on the existing 45 mph speed limit (50 mph design speed).

The AASHTO manual states that the "vertex (decision point) of the departure sight triangle on the minor road should be 14.5 ft from the edge of the major-road traveled way". This gives an accurate depiction of driver

behavior when making a turn from a minor roadway. The results of the sight distance analysis show that there is adequate sight distance at the proposed intersection location. In addition, this section of Grand River Ave. has very little grade change and vertical distance is not a concern at this location. The intersection sight distance measurements are shown on **Figure 7**.

The results of the intersection sight distance analysis show that there will be adequate intersection sight distance at the proposed site driveway on Grand River Ave. There is the potential for vehicles queued on EB Grand River Ave. at the signalized intersection at Central Park Drive to block the view for egress left-turns; however, based on the vehicle queueing analysis (both with and without recommended signal timing improvements) the peak vehicle queues on this approach will not extend into the sight distance area as shown on **Figure 7**.

FIGURE 7: INTERSECTION SIGHT DISTANCE



4 CONCLUSIONS

The conclusions of this Traffic Impact Study are as follows:

1. The results of the existing conditions analysis show that all approaches and movements at the study intersections are currently operating acceptably at a LOS D or better, with the exception of the Grand River Ave. & Central Park Drive. During the PM peak hour, the southbound left-turns on Central Park Drive operate at a LOS E, with excessive queue lengths that extend beyond the existing left-turn lane and impact the southbound through traffic on Central Park Drive.
2. In order to improve the existing operations at this intersection, mitigation measures were investigated, including signal timing changes and operations.
    a. Signal timing optimization **is** recommended.
    b. Left-turn phasing *is not* recommended.
3. With the addition of site generated traffic volumes, the Grand River Ave. & Central Park Drive intersection is expected to operate similar to existing conditions, with both increased delays and vehicle queue lengths on the southbound approach.
4. In order to improve the future operations at the Grand River Ave. & Central Park Drive intersection, signal timing optimization is recommended.

5. The proposed site driveway is expected to operate well, at LOS B/C during the peak periods with queue lengths of 1-2 vehicles.
6. The proposed site driveway meets Grand River Ave. (M-43) Corridor Access Management criterion, provided the following exceptions are granted by the Township and MDOT.
    a. The Tom's driveway is located opposite the proposed site driveway, approximately 286 feet to the east. The requirement is 630 feet; however, "The Director of Community Planning and Development may reduce this to no less than 150 feet where the offsets are aligned to not create left-turn conflict[1]", as they are in this location.
    b. The Speedway driveway is located opposite the proposed site driveway, approximately 550 feet to the west. The requirement is 630 feet; however, in accordance with MDOT guidelines, in the event that a particular parcel lacks sufficient frontage to maintain adequate spacing, the Region/TSC Traffic and Safety and Utility and Permit Engineers may reduce this and choose the next lowest spacing. The next lowest spacing would be for a design speed of 45 mph, with a spacing criteria of 525 feet. Therefore, the driveway spacing would meet the spacing requirement.
    c. The Sparrow driveway is located on the same side as the proposed site driveway, approximately 317 feet to the east. The requirement is 350 feet; again due to limited frontage, the next lowest spacing is 300 feet. Therefore, the driveway spacing would meet the spacing requirement.
7. There is an existing center left-turn lane adjacent to the site; therefore, only the MDOT right-turn lane criteria was evaluated for the proposed site drive intersection. The results of the analysis show that a right-turn lane or taper is not required.
8. The results of the intersection sight distance analysis show that there will be adequate intersection sight distance at the proposed site driveway on Grand River Ave.

5 RECOMMENDATIONS

The recommendations of this TIS are as follows:

- MDOT should investigate signal timing optimization at the Grand River & Central Park Drive intersection to improve PM peak hour operations.

[1] Ord. No. 2004-06, 9-5-2004, (e) (8)

Appendix A

BACKGROUND INFORMATION

LAND/ BUILDING/ PARKING DATA :

PHASE 1

LAND DATA :

OVERALL LAND AREA :	8.67 ACRES

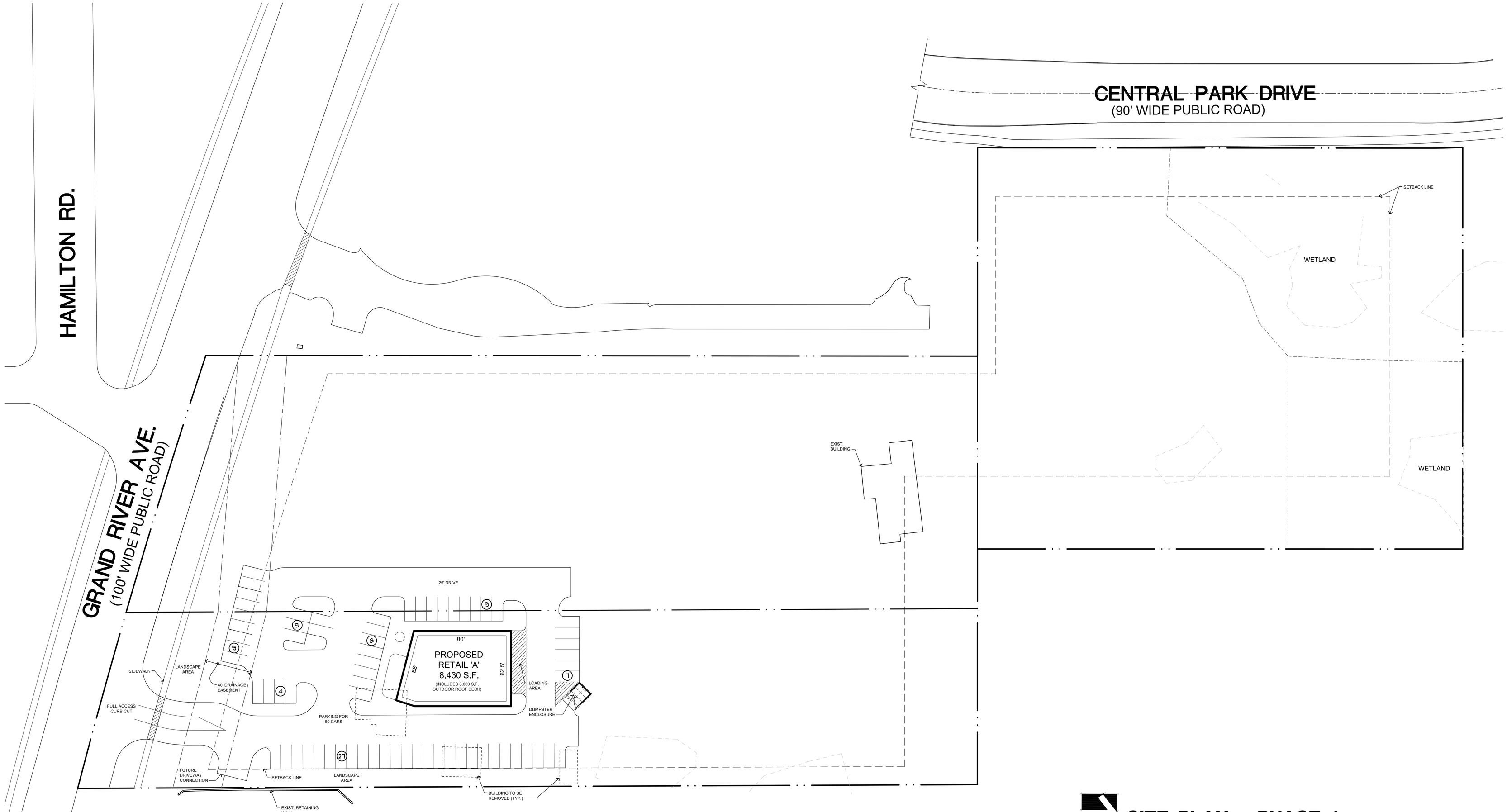
BUILDING DATA :

PROPOSED RETAIL 'A' :	5,430 S.F.
OUTDOOR ROOF DECK :	3,000 S.F.
TOTAL BUILDING AREA :	8,430 S.F.

PARKING REQUIRED : 42 SPACES

RETAIL : 42 SPACES
5 SPACES/ 1,000 GFA
(8,430/ 1000 = 8,43 X 5 = 42 SPACES

PARKING PROVIDED : 69 SPACES



SITE PLAN - PHASE 1

SCALE: 1"=40'-0"

issued for:

- OWNER REVIEW: 17 OCTOBER 2019
- OWNER REVIEW: 21 OCTOBER 2019
- OWNER REVIEW: 23 OCTOBER 2019
- OWNER REVIEW: 28 OCTOBER 2019
- OWNER REVIEW: 31 OCTOBER 2019
- OWNER REVIEW: 15 JAN. 2020

project:

Proposed for
Commercial Development
Grand River Ave.
Meridian Twp., MI

ROGVOY ARCHITECTS
32500 TELEGRAPH ROAD
SUITE 250
BINGHAM FARMS, MICHIGAN
48025-2404
PH 248.540.7700 FX 248.540.2710
www.rogvoy.com

drawing:

Conceptual Site Plan Phase 1

DO NOT SCALE DRAWING

issue date: 02 AUG. 2019
drawn: KS/KL
checked: MD
approved: MD

file number: 19030

sheet:

SP-1A

Traffic Engineering Associates, Inc.
PO Box 100
Saranac, MI 48881
517-627-6028

Location: Grand River & Central Park Dr
County/City: Meridian Twp
Weather: Sunny
Counted By: DES & JJ

File Name : Grand River & Central Park - AM
Site Code : 09201801
Start Date : 9/20/2018
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles - Bicycles

	Central Park Drive From North					Grand River Avenue From East					Dobie Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	9	11	3	0	23	6	102	5	0	113	15	24	4	0	43	3	31	7	0	41	220
07:15 AM	10	20	4	0	34	8	166	13	0	187	20	11	0	0	31	4	35	7	0	46	298
07:30 AM	5	31	5	0	41	8	199	17	1	225	33	13	8	0	54	2	51	9	0	62	382
07:45 AM	17	31	7	0	55	3	233	13	0	249	32	33	8	0	73	11	57	9	0	77	454
Total	41	93	19	0	153	25	700	48	1	774	100	81	20	0	201	20	174	32	0	226	1354
08:00 AM	18	32	6	0	56	7	178	21	1	207	31	32	2	0	65	6	49	15	1	71	399
08:15 AM	19	37	10	0	66	12	166	13	1	192	33	31	5	0	69	5	58	22	0	85	412
08:30 AM	23	40	14	0	77	4	189	20	0	213	34	21	4	0	59	3	47	9	0	59	408
08:45 AM	14	28	8	0	50	7	143	30	0	180	37	52	3	0	92	13	56	13	0	82	404
Total	74	137	38	0	249	30	676	84	2	792	135	136	14	0	285	27	210	59	1	297	1623
Grand Total	115	230	57	0	402	55	1376	132	3	1566	235	217	34	0	486	47	384	91	1	523	2977
Apprch %	28.6	57.2	14.2	0		3.5	87.9	8.4	0.2		48.4	44.7	7	0		9	73.4	17.4	0.2		
Total %	3.9	7.7	1.9	0	13.5	1.8	46.2	4.4	0.1	52.6	7.9	7.3	1.1	0	16.3	1.6	12.9	3.1	0	17.6	
Passenger Vehicles	111	229	57	0	397	55	1367	130	3	1555	230	212	32	0	474	46	355	83	1	485	2911
% Passenger Vehicles	96.5	99.6	100	0	98.8	100	99.3	98.5	100	99.3	97.9	97.7	94.1	0	97.5	97.9	92.4	91.2	100	92.7	97.8
Heavy Vehicles	4	1	0	0	5	0	9	2	0	11	5	5	2	0	12	1	29	8	0	38	66
% Heavy Vehicles	3.5	0.4	0	0	1.2	0	0.7	1.5	0	0.7	2.1	2.3	5.9	0	2.5	2.1	7.6	8.8	0	7.3	2.2
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Central Park Drive From North					Grand River Avenue From East					Dobie Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	17	31	7	0	55	3	**233**	13	0	**249**	32	**33**	**8**	0	**73**	**11**	57	9	0	77	**454**
08:00 AM	18	32	6	0	56	7	178	**21**	**1**	207	31	32	2	0	65	6	49	15	**1**	71	399
08:15 AM	19	37	10	0	66	**12**	166	13	1	192	33	31	5	0	69	5	**58**	**22**	0	**85**	412
08:30 AM	**23**	**40**	**14**	0	**77**	4	189	20	0	213	**34**	21	4	0	59	3	47	9	0	59	408
Total Volume	77	140	37	0	254	26	766	67	2	861	130	117	19	0	266	25	211	55	1	292	1673
% App. Total	30.3	55.1	14.6	0		3	89	7.8	0.2		48.9	44	7.1	0		8.6	72.3	18.8	0.3		
PHF	.837	.875	.661	.000	.825	.542	.822	.798	.500	.864	.956	.886	.594	.000	.911	.568	.909	.625	.250	.859	.921

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File Name : Grand River & Central Park - AM
Site Code : 09201801
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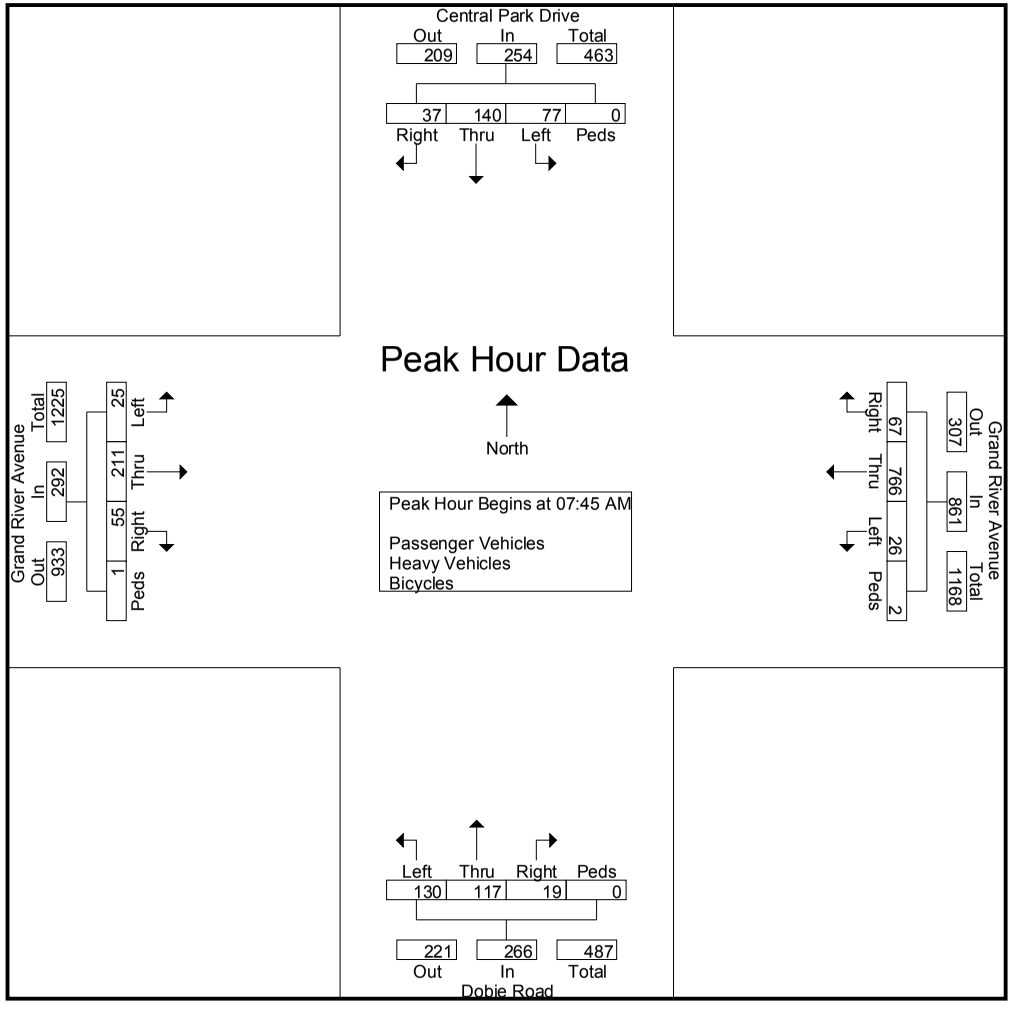
Page No : 2



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File Name : Grand River & Central Park - PM
Site Code : 09201801
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Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles - Bicycles

	Central Park Drive From North					Grand River Avenue From East					Dobie Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	53	32	18	0	103	4	96	38	0	138	16	56	7	0	79	19	123	16	0	158	478
04:15 PM	44	55	16	0	115	6	91	29	0	126	22	72	2	0	96	13	126	20	0	159	496
04:30 PM	42	61	17	0	120	3	97	29	0	129	21	78	5	0	104	12	143	20	1	176	529
04:45 PM	46	60	16	0	122	12	100	42	1	155	20	68	4	0	92	23	161	21	0	205	574
Total	185	208	67	0	460	25	384	138	1	548	79	274	18	0	371	67	553	77	1	698	2077
05:00 PM	53	73	10	0	136	6	90	63	0	159	29	68	5	0	102	15	163	23	1	202	599
05:15 PM	51	75	15	0	141	5	107	47	0	159	18	81	5	0	104	20	185	31	1	237	641
05:30 PM	38	66	15	0	119	1	117	35	0	153	30	74	9	0	113	20	176	35	0	231	616
05:45 PM	47	53	20	1	121	6	111	54	0	171	32	84	2	0	118	26	170	28	1	225	635
Total	189	267	60	1	517	18	425	199	0	642	109	307	21	0	437	81	694	117	3	895	2491
Grand Total	374	475	127	1	977	43	809	337	1	1190	188	581	39	0	808	148	1247	194	4	1593	4568
Apprch %	38.3	48.6	13	0.1		3.6	68	28.3	0.1		23.3	71.9	4.8	0		9.3	78.3	12.2	0.3		
Total %	8.2	10.4	2.8	0	21.4	0.9	17.7	7.4	0	26.1	4.1	12.7	0.9	0	17.7	3.2	27.3	4.2	0.1	34.9	
Passenger Vehicles	372	474	127	1	974	43	805	335	1	1184	183	578	39	0	800	147	1231	191	4	1573	4531
% Passenger Vehicles	99.5	99.8	100	100	99.7	100	99.5	99.4	100	99.5	97.3	99.5	100	0	99	99.3	98.7	98.5	100	98.7	99.2
Heavy Vehicles	2	1	0	0	3	0	4	2	0	6	5	3	0	0	8	1	16	3	0	20	37
% Heavy Vehicles	0.5	0.2	0	0	0.3	0	0.5	0.6	0	0.5	2.7	0.5	0	0	1	0.7	1.3	1.5	0	1.3	0.8
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Central Park Drive From North					Grand River Avenue From East					Dobie Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**53**	73	10	0	136	**6**	90	**63**	0	159	29	68	5	0	102	15	163	23	**1**	202	599
05:15 PM	51	**75**	15	0	**141**	5	107	47	0	159	18	81	5	0	104	20	**185**	31	1	**237**	**641**
05:30 PM	38	66	15	0	119	1	**117**	35	0	153	30	74	**9**	0	113	20	176	**35**	0	231	616
05:45 PM	47	53	**20**	**1**	121	6	111	54	0	**171**	**32**	**84**	2	0	**118**	**26**	170	28	1	225	635
Total Volume	189	267	60	1	517	18	425	199	0	642	109	307	21	0	437	81	694	117	3	895	2491
% App. Total	36.6	51.6	11.6	0.2		2.8	66.2	31	0		24.9	70.3	4.8	0		9.1	77.5	13.1	0.3		
PHF	.892	.890	.750	.250	.917	.750	.908	.790	.000	.939	.852	.914	.583	.000	.926	.779	.938	.836	.750	.944	.972

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File Name : Grand River & Central Park - PM
Site Code : 09201801
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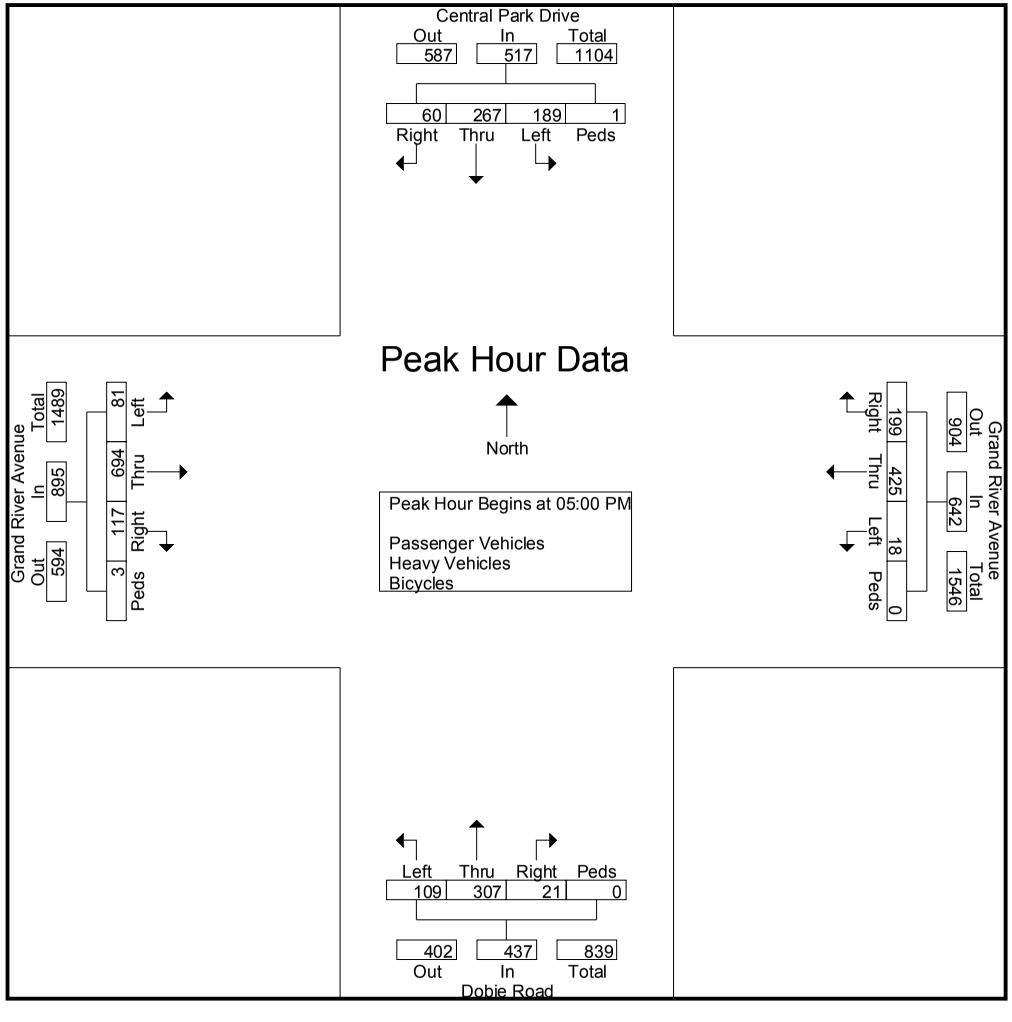
Page No : 2



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517-627-6028

Location: Grand River & Hamilton Rd.
County/City: Meridian Twp.
Weather: Sunny
Counted By: JJ

File Name : Grand River & Hamilton - AM
Site Code : 09181802
Start Date : 9/18/2018
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles - Bicycles

	From North					Grand River Avenue From East					Hamilton Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	41	121	0	0	162	3	0	10	0	13	0	42	3	0	45	220
07:15 AM	0	0	0	0	0	78	197	0	0	275	4	0	14	0	18	0	40	0	0	40	333
07:30 AM	0	0	0	0	0	89	270	0	0	359	4	0	28	0	32	0	74	0	2	76	467
07:45 AM	0	0	0	0	0	103	255	0	0	358	5	0	50	0	55	0	84	0	0	84	497
Total	0	0	0	0	0	311	843	0	0	1154	16	0	102	0	118	0	240	3	2	245	1517
08:00 AM	0	0	0	0	0	78	223	0	0	301	2	0	18	0	20	0	57	0	0	57	378
08:15 AM	0	0	0	0	0	71	227	0	0	298	1	0	20	0	21	0	80	0	1	81	400
08:30 AM	0	0	0	0	0	83	201	0	0	284	3	0	31	0	34	0	81	0	4	85	403
08:45 AM	0	0	0	0	0	69	219	0	0	288	3	0	28	0	31	0	75	1	2	78	397
Total	0	0	0	0	0	301	870	0	0	1171	9	0	97	0	106	0	293	1	7	301	1578
Grand Total	0	0	0	0	0	612	1713	0	0	2325	25	0	199	0	224	0	533	4	9	546	3095
Apprch %	0	0	0	0		26.3	73.7	0	0		11.2	0	88.8	0		0	97.6	0.7	1.6		
Total %	0	0	0	0	0	19.8	55.3	0	0	75.1	0.8	0	6.4	0	7.2	0	17.2	0.1	0.3	17.6	
Passenger Vehicles	0	0	0	0	0	601	1669	0	0	2270	23	0	191	0	214	0	506	4	9	519	3003
% Passenger Vehicles	0	0	0	0	0	98.2	97.4	0	0	97.6	92	0	96	0	95.5	0	94.9	100	100	95.1	97
Heavy Vehicles	0	0	0	0	0	11	44	0	0	55	2	0	8	0	10	0	27	0	0	27	92
% Heavy Vehicles	0	0	0	0	0	1.8	2.6	0	0	2.4	8	0	4	0	4.5	0	5.1	0	0	4.9	3
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	From North					Grand River Avenue From East					Hamilton Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	**103**	**255**	0	0	**358**	**5**	0	**50**	0	**55**	0	**84**	0	0	84	**497**
08:00 AM	0	0	0	0	0	78	223	0	0	301	2	0	18	0	20	0	57	0	0	57	378
08:15 AM	0	0	0	0	0	71	227	0	0	298	1	0	20	0	21	0	80	0	1	81	400
08:30 AM	0	0	0	0	0	83	201	0	0	284	3	0	31	0	34	0	81	0	**4**	**85**	403
Total Volume	0	0	0	0	0	335	906	0	0	1241	11	0	119	0	130	0	302	0	5	307	1678
% App. Total	0	0	0	0		27	73	0	0		8.5	0	91.5	0		0	98.4	0	1.6		
PHF	.000	.000	.000	.000	.000	.813	.888	.000	.000	.867	.550	.000	.595	.000	.591	.000	.899	.000	.313	.903	.844

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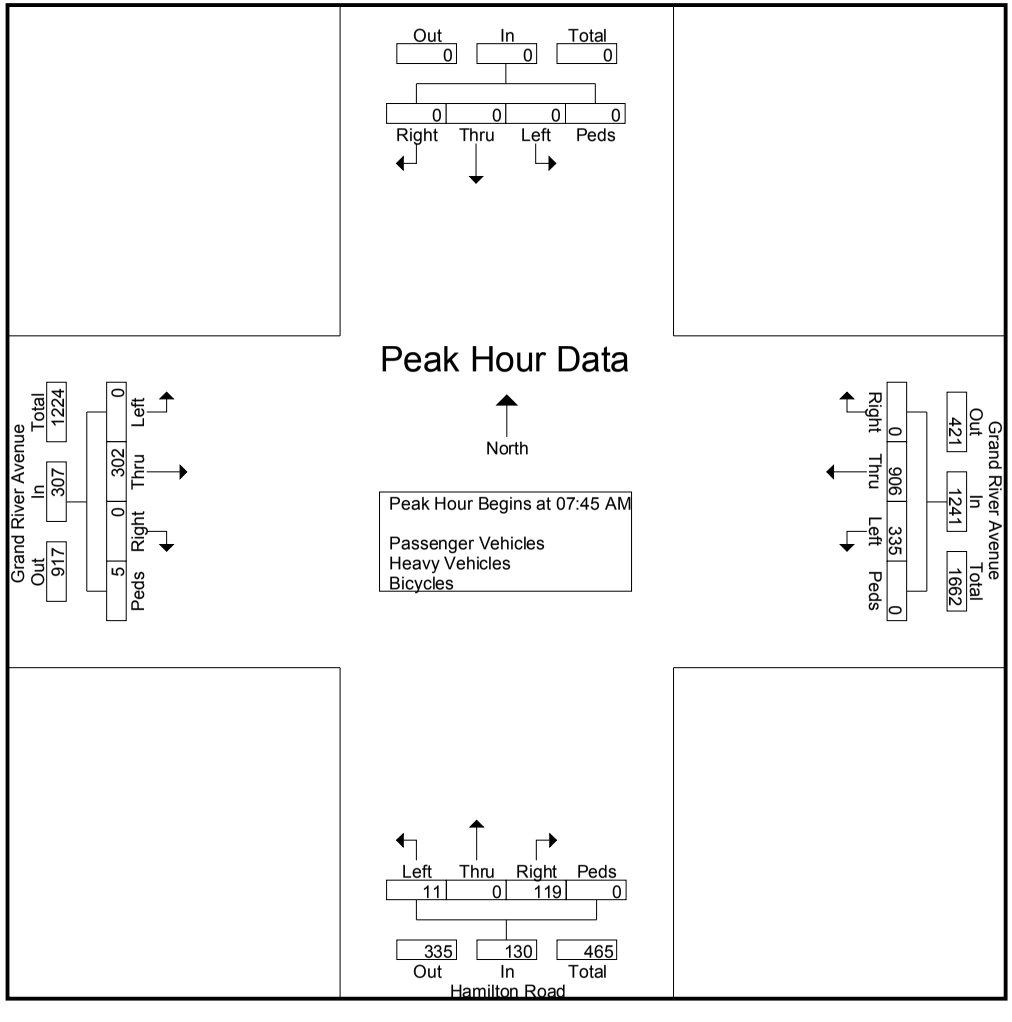

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Groups Printed- Passenger Vehicles - Heavy Vehicles - Bicycles

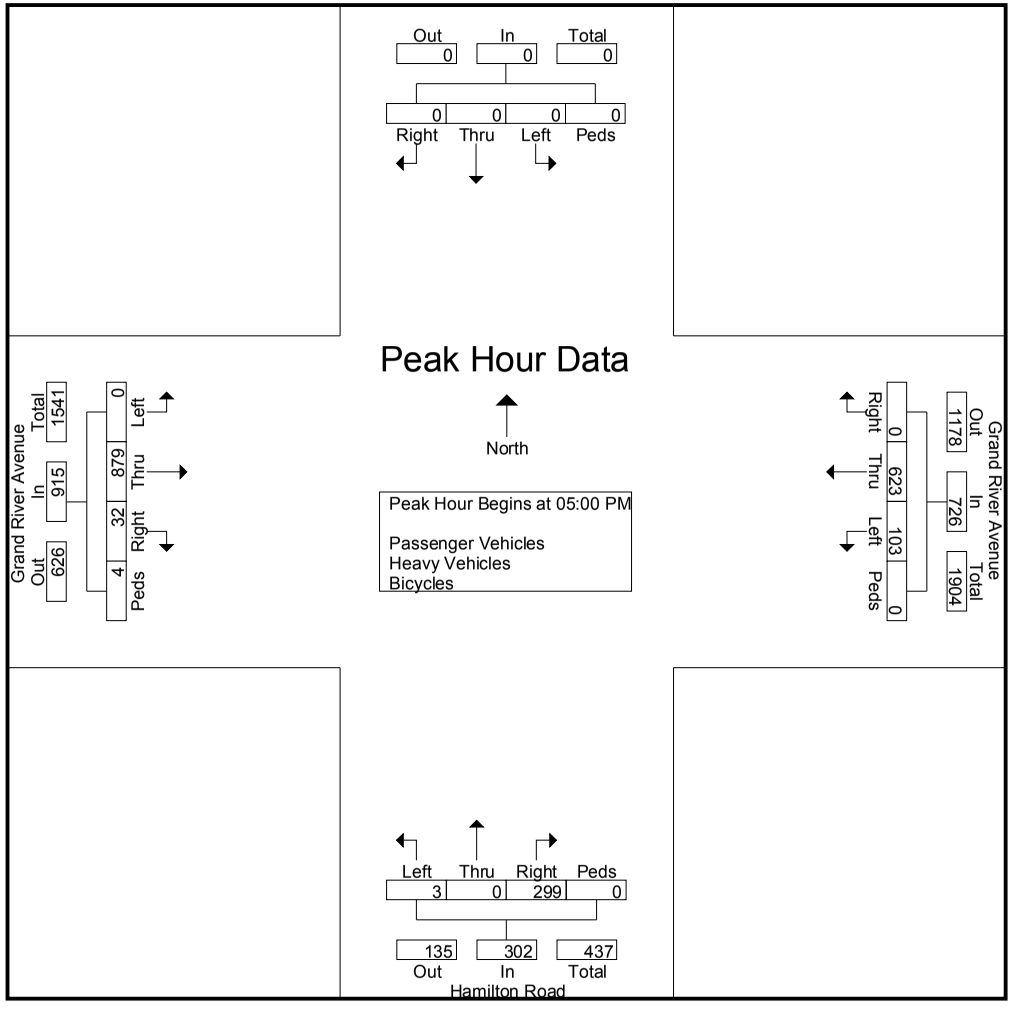
	From North					Grand River Avenue From East					Hamilton Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	37	153	0	0	190	0	0	56	0	56	0	166	3	2	171	417
04:15 PM	0	0	0	0	0	32	129	0	0	161	0	0	67	0	67	0	178	6	0	184	412
04:30 PM	0	0	0	0	0	28	144	0	0	172	11	0	67	0	78	0	188	10	2	200	450
04:45 PM	0	0	0	0	0	46	173	0	0	219	0	0	48	0	48	0	196	6	0	202	469
Total	0	0	0	0	0	143	599	0	0	742	11	0	238	0	249	0	728	25	4	757	1748
05:00 PM	0	0	0	0	0	16	153	0	0	169	0	0	89	0	89	0	203	16	3	222	480
05:15 PM	0	0	0	0	0	29	142	0	0	171	0	0	61	0	61	0	233	9	1	243	475
05:30 PM	0	0	0	0	0	26	164	0	0	190	2	0	80	0	82	0	228	4	0	232	504
05:45 PM	0	0	0	0	0	32	164	0	0	196	1	0	69	0	70	0	215	3	0	218	484
Total	0	0	0	0	0	103	623	0	0	726	3	0	299	0	302	0	879	32	4	915	1943
Grand Total	0	0	0	0	0	246	1222	0	0	1468	14	0	537	0	551	0	1607	57	8	1672	3691
Apprch %	0	0	0	0		16.8	83.2	0	0		2.5	0	97.5	0		0	96.1	3.4	0.5		
Total %	0	0	0	0	0	6.7	33.1	0	0	39.8	0.4	0	14.5	0	14.9	0	43.5	1.5	0.2	45.3	
Passenger Vehicles	0	0	0	0	0	238	1197	0	0	1435	14	0	528	0	542	0	1583	57	8	1648	3625
% Passenger Vehicles	0	0	0	0	0	96.7	98	0	0	97.8	100	0	98.3	0	98.4	0	98.5	100	100	98.6	98.2
Heavy Vehicles	0	0	0	0	0	8	25	0	0	33	0	0	9	0	9	0	24	0	0	24	66
% Heavy Vehicles	0	0	0	0	0	3.3	2	0	0	2.2	0	0	1.7	0	1.6	0	1.5	0	0	1.4	1.8
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	From North					Grand River Avenue From East					Hamilton Road From South					Grand River Avenue From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	0	0	16	153	0	0	169	0	0	**89**	0	**89**	0	203	**16**	**3**	222	480
05:15 PM	0	0	0	0	0	29	142	0	0	171	0	0	61	0	61	0	**233**	9	1	**243**	475
05:30 PM	0	0	0	0	0	26	**164**	0	0	190	**2**	0	80	0	82	0	228	4	0	232	**504**
05:45 PM	0	0	0	0	0	**32**	164	0	0	**196**	1	0	69	0	70	0	215	3	0	218	484
Total Volume	0	0	0	0	0	103	623	0	0	726	3	0	299	0	302	0	879	32	4	915	1943
% App. Total	0	0	0	0		14.2	85.8	0	0		1	0	99	0		0	96.1	3.5	0.4		
PHF	.000	.000	.000	.000	.000	.805	.950	.000	.000	.926	.375	.000	.840	.000	.848	.000	.943	.500	.333	.941	.964

Traffic Engineering Associates, Inc.
PO Box 100
Saranac, MI 48881
517-627-6028

Location: Grand River & Hamilton Rd.
County/City: Meridian Twp.
Weather: Sunny
Counted By: JJ

File Name : Grand River & Hamilton - PM
Site Code : 09181802
Start Date : 9/18/2018
Page No : 2



TRAFFIC SIGNAL TIMING PERMIT

	PHASE	1	2	3	4	5	6	7	8			
APPROACH			EB		NB		WB		SB			
MINIMUM GREEN			10		7		10		7			
PASSAGE			0.0		5.0		0.0		5.0			
MAXIMUM NO. 1			38		30		38		30			
MAXIMUM NO. 2			0		0		0		0			
YELLOW CHANGE			4.7		3.7		4.7		3.7			
RED CLEARANCE			3.0		3.0		3.0		3.0			
WALK			7		7		7		7			
PEDESTRIAN CLEARANCE			17		22		17		22			
EXTENDED PED. CLEARANCE			2		2		2		2			
REST IN WALK			0		0		0		0			
INITIALIZATION			4		1		4		1			
NON-ACT RESPONSE			0		0		0		0			
VEHICLE RECALL			3		0		3		0			
PEDESTRIAN RECALL			2		0		2		0			
NON-LOCK MEMORY			0		1		0		1			
DUAL ENTRY			0		1		0		1			
	CYCLE									O1	O2	O3
DIAL 1 SPLIT 1	100		63		37		63		37	1		
DIAL 2 SPLIT 1	100		50		50		50		50	1		
DIAL 3 SPLIT 1	100		60		40		60		40	10		
DIAL SPLIT												
DIAL SPLIT												
DIAL SPLIT												
	MODE		1		0		1		0			

PHASE

1

2 Eastbound M-43 (Grand River Ave.)

3

4 Northbound Dobie Road

5

6 Westbound M-43 (Grand River Ave.)

7

8 Southbound Dobie Road

D1/S1/O1: Normal
D2/S1/O1: 06:30 - 09:00 Monday - Friday
D3/S1/O1: 15:00 - 18:00 Monday - Friday

OVERLAPS

Overlap Phase	*Load Bays*	*Phases Overlapped*	T.G. (s)	Y (s)	R (s)	-G/Y	+GRN
=							
=							
=							
=							

TIMING INSTALLED

REMARKS

*03/23/2018 Revised timing per TSC request.

Base-Mounted, Epac-Type Controller. D4/S1/O1, D4/S2/O1, and D4/S3/O1 have been removed due to the completion of construction along Okemos Road.

D1/S1/O1, D2/S1/O1, and D3/S1/O1 have been reinstated.

This subject intersection is incorporated within a CLOSED-LOOP system and is equipped with RADIO interconnect. The MASTER controller is located at M-43 (Grand River Avenue) at Okemos Road (33082-01-016).

PREPARED BY: WRS DATE: 03/23/18

FLASH HOURS:

23:00 to 06:00 DAILY ☒ NONE ☐

NIGHT FLASH:

FY = M-43 (GRAND RIVER AVENUE) FR = DOBIE ROAD

CONFLICT FLASH:

FY = M-43 (GRAND RIVER AVENUE) FR = DOBIE ROAD

CONTROLLER TYPE:

☒ EPAC
☐ Other:

PRE-EMPT ☒
COUNTDOWN PEDS ☐

LOCATION:

M-43 (Grand River Avenue) at Dobie Road

CITY/TWP: Meridian Township

COUNTY : Ingham

MILE POINT	CONTROL SECTION-SPOT #
5.14	33082-01-031

Job # (If Applicable):

CLEAR PAGE 1

CLEAR ALL

Page 3 included only if Pre-Empt Checked

ADVANCED TIMING PARAMETERS FORM

SYSTEM INFORMATION

Controller Type:
- [x] EPAC
- [ ] Other:

System Type:
- [x] Closed Loop
  - [x] Stand By
  - [ ] Group 1
  - [ ] Group 2
  - Address: 06
- [ ] TBC
- [ ] TBC/GPS
- [ ] None
- [ ] Other:

If TBC, Synch by:
- [ ] TOD
- [ ] Event

Interconnect Type:
- [ ] Hardwire
- [ ] Fiber-Optic
- [x] Radio
- [ ] Phone Drop
- [ ] None
- [ ] Other:

If Phone Drop, Phone #

Controller Status:
- [ ] Master
- [x] Slave
- [ ] Isolated
- [ ] TBC

If Slave, Master Location:
M-43 at OKEMOS Road

Master Spot # : 33082-01-016

LEFT-TURN PHASING

Phase # / Description	*Permissive-Protected*		*Protected-Only*		
	Lead	Lag	Split	Lead	Lag
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

RING AND BARRIER STRUCTURE

	B1	B2	B3	B4
R1	2	4		
R2	6	8		
R3				
R4				

VEHICULAR AND PEDESTRIAN DETECTION

Approach	*Vehicular Detection* Movements and Call Delay (s) Left	Thru	Right	Type Loop	Video	Other	*Pedestrian Detection* Push-Button Crossing Locations
Northbound DOBIE Road	☒	☒	☐	☒	☐	☐	M-43 (Gd. River) at EAST leg
Southbound DOBIE Road	☒	☒	☒	☒	☐	☐	M-43 (Gd. River) at WEST leg
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	

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	1
Coordination Mode	0
Maximum Mode	0
Correction Mode	3
Offset Mode	0
Force Mode	0
Max Dwell	0
Yield Period	0

REMARKS:

This subject intersection is incorporated within a CLOSED-LOOP system and is equipped with RADIO interconnect.

The MASTER controller is located at the subject intersection of M-43 (Grand River Avenue) at Okemos Road (33082-01-016).

ADDITIONAL OVERLAP DATA

Overlap Phase	*Load Bays*	*Phases Overlapped*	T.G. (s)	Y (s)	R (s)	-G/Y	+GRN
=							
=							
=							
=							

PREPARED BY: WRS DATE: 03/23/18

☒ MDOT ☐ County ☐ City ☐ Consultant

LOCATION:
M-43 (Grand River Avenue) at Dobie Road

CONTROL SECTION-SPOT #
33082-01-031

CLEAR PAGE 2

PREEMPTION INFORMATION FORM

Preemption Description: EASTBOUND M-43 (GRAND RIVER AVENUE) EMERGENCY VEHICLE VIA OPTICOM

Preempt # = 1	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SEL Ped Cl	22	Vehicle	Track																
SEL Yellow	4.7		Dwell		G		R		R		R								
SEL Red Cl	3.0		Cycle		NO		NO		NO		NO								
TRACK Green	0		Exit		1				1										
TRACK Ped Cl	0	Ped	Track																
TRACK Yellow	0.0		Dwell		DW		DW		DW		DW								
TRACK Red CL	0.0		Cycle		NO		NO		NO		NO								
DWELL Green	0		Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
RET Ped Cl	0	Overlap Vehicle	Track																
RET Yellow	4.7		Dwell																
RET Red Cl	3.0		Cycle																

☐ Locking
☒ Non-Locking

Delay (s)	0
Extend (s)	20
Duration (s)	0
Max Call (s)	180
Lockout (s)	0
Link PE #	0

Preemption Description: WESTBOUND M-43 (GRAND RIVER AVENUE) EMERGENCY VEHICLE VIA OPTICOM

Preempt # = 2	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SEL Ped Cl	22	Vehicle	Track																
SEL Yellow	4.7		Dwell		R		R		G		R								
SEL Red Cl	3.0		Cycle		NO		NO		NO		NO								
TRACK Green	0		Exit		1				1										
TRACK Ped Cl	0	Ped	Track																
TRACK Yellow	0.0		Dwell		DW		DW		DW		DW								
TRACK Red CL	0.0		Cycle		NO		NO		NO		NO								
DWELL Green	0		Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
RET Ped Cl	0	Overlap Vehicle	Track																
RET Yellow	4.7		Dwell																
RET Red Cl	3.0		Cycle																

☐ Locking
☒ Non-Locking

Delay (s)	0
Extend (s)	20
Duration (s)	0
Max Call (s)	180
Lockout (s)	0
Link PE #	0

Preemption Description: NORTHBOUND DOBIE ROAD EMERGENCY VEHICLE VIA OPTICOM

Preempt # = 3	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SEL Ped Cl	22	Vehicle	Track																
SEL Yellow	4.7		Dwell		R		G		R		R								
SEL Red Cl	3.0		Cycle		NO		NO		NO		NO								
TRACK Green	0		Exit		1				1										
TRACK Ped Cl	0	Ped	Track																
TRACK Yellow	0.0		Dwell		DW		DW		DW		DW								
TRACK Red CL	0.0		Cycle		NO		NO		NO		NO								
DWELL Green	0		Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
RET Ped Cl	0	Overlap Vehicle	Track																
RET Yellow	3.7		Dwell																
RET Red Cl	3.0		Cycle																

☐ Locking
☒ Non-Locking

Delay (s)	0
Extend (s)	20
Duration (s)	0
Max Call (s)	180
Lockout (s)	0
Link PE #	0

Preemption Description: SOUTHBOUND DOBIE ROAD EMERGENCY VEHICLE VIA OPTICOM

Preempt # = 4	Time (s)	Phases		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SEL Ped Cl	22	Vehicle	Track																
SEL Yellow	4.7		Dwell		R		R		R		G								
SEL Red Cl	3.0		Cycle		NO		NO		NO		NO								
TRACK Green	0		Exit		1				1										
TRACK Ped Cl	0	Ped	Track																
TRACK Yellow	0.0		Dwell		DW		DW		DW		DW								
TRACK Red CL	0.0		Cycle		NO		NO		NO		NO								
DWELL Green	0		Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
RET Ped Cl	0	Overlap Vehicle	Track																
RET Yellow	3.7		Dwell																
RET Red Cl	3.0		Cycle																

☐ Locking
☒ Non-Locking

Delay (s)	0
Extend (s)	20
Duration (s)	0
Max Call (s)	180
Lockout (s)	0
Link PE #	0

Preempt System Data

Ring	1	2	3	4		
MIN GRN/WLK (s)	7.0	7.0				
Priority	PE/FL	PE1/2	PE2/3	PE3/4	PE4/5	PE5/6
Status	0	0	0	0		

REMARKS :

PREPARED BY: WRS DATE: 03/23/18

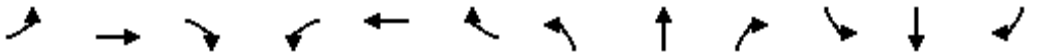
LOCATION:
M-43 (Grand River Avenue) at Dobie Road

CONTROL SECTION-SPOT #
33082-01-031

CLEAR PAGE 3

Appendix B

EXISTING TRAFFIC CONDITIONS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	211	55	26	824	67	130	117	19	77	140	37
Future Volume (veh/h)	25	211	55	26	824	67	130	117	19	77	140	37
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		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	1796	1796	1796	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	29	245	64	30	958	78	143	129	21	93	169	45
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.91	0.91	0.91	0.83	0.83	0.83
Percent Heavy Veh, %	7	7	7	1	1	1	3	3	3	1	1	1
Cap, veh/h	314	2105	938	705	2069	168	262	372	61	284	451	382
Arrive On Green	0.62	0.62	0.62	0.62	0.62	0.62	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	523	3413	1520	1078	3354	273	1158	1557	253	1247	1885	1598
Grp Volume(v), veh/h	29	245	64	30	512	524	143	0	150	93	169	45
Grp Sat Flow(s),veh/h/ln	523	1706	1520	1078	1791	1836	1158	0	1810	1247	1885	1598
Q Serve(g_s), s	3.1	3.0	1.7	1.2	15.3	15.3	11.8	0.0	6.9	6.7	7.5	2.2
Cycle Q Clear(g_c), s	18.5	3.0	1.7	4.1	15.3	15.3	19.3	0.0	6.9	13.6	7.5	2.2
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	314	2105	938	705	1105	1132	262	0	433	284	451	382
V/C Ratio(X)	0.09	0.12	0.07	0.04	0.46	0.46	0.55	0.00	0.35	0.33	0.37	0.12
Avail Cap(c_a), veh/h	314	2105	938	705	1105	1132	487	0	784	526	816	692
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	7.9	7.7	8.8	10.3	10.3	39.9	0.0	31.6	37.2	31.8	29.8
Incr Delay (d2), s/veh	0.6	0.1	0.1	0.1	1.4	1.4	3.7	0.0	1.0	1.4	1.1	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	0.4	1.0	0.5	0.3	5.5	5.6	3.5	0.0	3.1	2.1	3.5	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	8.0	7.8	8.9	11.7	11.6	43.6	0.0	32.6	38.6	32.9	30.1
LnGrp LOS	B	A	A	A	B	B	D	A	C	D	C	C
Approach Vol, veh/h		338			1066			293			307	
Approach Delay, s/veh		8.6			11.6			38.0			34.2	
Approach LOS		A			B			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		69.4		30.6		69.4		30.6				
Change Period (Y+Rc), s		7.7		* 6.7		7.7		* 6.7				
Max Green Setting (Gmax), s		42.3		* 43		42.3		* 43				
Max Q Clear Time (g_c+I1), s		0.0		15.6		0.0		21.3				
Green Ext Time (p_c), s		0.0		2.9		0.0		2.6				

Intersection Summary												
HCM 6th Ctrl Delay			18.4									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	307	0	335	906	11	119
Future Vol, veh/h	307	0	335	906	11	119
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	500	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	87	87	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	341	0	385	1041	18	198

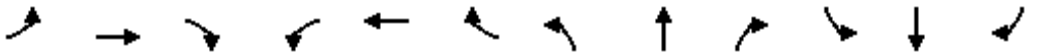
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	346	0	1637	176
Stage 1	-	-	-	-	346	-
Stage 2	-	-	-	-	1291	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1210	-	91	837
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	222	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1204	-	62	833
Mov Cap-2 Maneuver	-	-	-	-	~ -407	-
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	222	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1122	-	-	1204	-
HCM Lane V/C Ratio	0.193	-	-	0.32	-
HCM Control Delay (s)	9	-	-	9.4	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	1.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	701	117	18	425	199	109	307	21	189	267	60
Future Volume (veh/h)	81	701	117	18	425	199	109	307	21	189	267	60
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		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	1984	1984	1984	1984	1984	1984	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	86	746	124	19	452	212	117	330	23	205	290	65
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	0	0	0
Cap, veh/h	396	1972	877	332	1306	607	299	611	43	267	666	564
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	777	3770	1677	641	2497	1161	1034	1833	128	1044	2000	1693
Grp Volume(v), veh/h	86	746	124	19	340	324	117	0	353	205	290	65
Grp Sat Flow(s),veh/h/ln	777	1885	1677	641	1885	1773	1034	0	1961	1044	2000	1693
Q Serve(g_s), s	7.3	11.8	3.8	1.8	10.5	10.7	10.0	0.0	14.6	18.7	11.3	2.7
Cycle Q Clear(g_c), s	17.9	11.8	3.8	13.6	10.5	10.7	21.3	0.0	14.6	33.3	11.3	2.7
Prop In Lane	1.00		1.00	1.00		0.66	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	396	1972	877	332	986	927	299	0	653	267	666	564
V/C Ratio(X)	0.22	0.38	0.14	0.06	0.35	0.35	0.39	0.00	0.54	0.77	0.44	0.12
Avail Cap(c_a), veh/h	396	1972	877	332	986	927	299	0	653	267	666	564
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.1	14.2	12.3	18.2	13.9	13.9	34.3	0.0	27.1	41.1	26.0	23.1
Incr Delay (d2), s/veh	1.3	0.6	0.3	0.3	1.0	1.0	1.8	0.0	1.6	14.7	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	1.4	4.6	1.4	0.3	4.3	4.1	2.6	0.0	6.9	6.1	5.4	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	14.7	12.6	18.5	14.8	15.0	36.1	0.0	28.8	55.9	27.0	23.3
LnGrp LOS	C	B	B	B	B	B	D	A	C	E	C	C
Approach Vol, veh/h		956			683			470			560	
Approach Delay, s/veh		15.0			15.0			30.6			37.1	
Approach LOS		B			B			C			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		60.0		40.0		60.0		40.0				
Change Period (Y+Rc), s		7.7		* 6.7		7.7		* 6.7				
Max Green Setting (Gmax), s		52.3		* 33		52.3		* 33				
Max Q Clear Time (g_c+I1), s		0.0		35.3		0.0		23.3				
Green Ext Time (p_c), s		0.0		0.0		0.0		3.2				

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	879	32	103	639	3	299
Future Vol, veh/h	879	32	103	639	3	299
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	500	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	93	93	85	85
Heavy Vehicles, %	1	1	2	2	2	2
Mvmt Flow	935	34	111	687	4	352

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	973	0	1522	489
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	566	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	704	-	109	525
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	701	-	91	523
Mov Cap-2 Maneuver	-	-	-	-	193	-
Stage 1	-	-	-	-	280	-
Stage 2	-	-	-	-	532	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	26.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	514	-	-	701	-
HCM Lane V/C Ratio	0.691	-	-	0.158	-
HCM Control Delay (s)	26.2	-	-	11.1	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	5.3	-	-	0.6	-

Intersection: 1: Dobie Road/Central Park Drive & Grand River Ave

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	62	102	90	50	61	240	237	204	152	130	153	54
Average Queue (ft)	17	37	18	8	11	114	125	94	65	49	67	17
95th Queue (ft)	48	82	54	28	42	206	214	170	126	95	123	43
Link Distance (ft)		2046	2046			398	398	522	522		1029	1029
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			250	500					400		
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 2: Hamilton Road & Grand River Ave

Movement	WB	NB	B7
Directions Served	L	LR	T
Maximum Queue (ft)	96	82	50
Average Queue (ft)	40	43	3
95th Queue (ft)	73	72	25
Link Distance (ft)		15	400
Upstream Blk Time (%)		17	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)	500		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

Intersection: 1: Dobie Road/Central Park Drive & Grand River Ave

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	113	169	167	74	39	153	201	154	272	424	866	644
Average Queue (ft)	45	95	86	21	11	79	97	70	140	326	441	131
95th Queue (ft)	92	149	147	53	34	130	162	137	240	503	991	647
Link Distance (ft)		2046	2046			398	398	522	522		1029	1029
Upstream Blk Time (%)											8	3
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	500			250	500					400		
Storage Blk Time (%)										31	7	
Queuing Penalty (veh)										83	14	

Intersection: 2: Hamilton Road & Grand River Ave

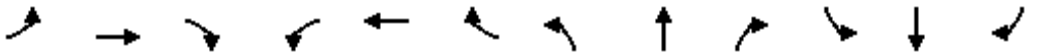
Movement	EB	WB	NB	B7
Directions Served	TR	L	LR	T
Maximum Queue (ft)	9	99	97	144
Average Queue (ft)	0	34	67	17
95th Queue (ft)	4	76	98	71
Link Distance (ft)	398		15	400
Upstream Blk Time (%)			37	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)		500		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Bend

Movement	SB
Directions Served	T
Maximum Queue (ft)	22
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	15
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 96



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	701	117	18	425	199	109	307	21	189	267	60
Future Volume (veh/h)	81	701	117	18	425	199	109	307	21	189	267	60
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		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	1984	1984	1984	1984	1984	1984	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	86	746	124	19	452	212	117	330	23	205	290	65
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	0	0	0
Cap, veh/h	349	1785	794	292	1182	550	359	701	49	330	765	648
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	777	3770	1676	641	2496	1161	1034	1833	128	1044	2000	1694
Grp Volume(v), veh/h	86	746	124	19	340	324	117	0	353	205	290	65
Grp Sat Flow(s),veh/h/ln	777	1885	1676	641	1885	1773	1034	0	1961	1044	2000	1694
Q Serve(g_s), s	8.0	13.0	4.2	2.0	11.6	11.8	9.2	0.0	13.6	18.4	10.5	2.5
Cycle Q Clear(g_c), s	19.8	13.0	4.2	15.0	11.6	11.8	19.7	0.0	13.6	32.0	10.5	2.5
Prop In Lane	1.00		1.00	1.00		0.66	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	349	1785	794	292	893	839	359	0	750	330	765	648
V/C Ratio(X)	0.25	0.42	0.16	0.06	0.38	0.39	0.33	0.00	0.47	0.62	0.38	0.10
Avail Cap(c_a), veh/h	349	1785	794	292	893	839	453	0	928	424	946	801
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.3	17.3	15.0	22.2	16.9	17.0	29.4	0.0	23.2	35.3	22.3	19.8
Incr Delay (d2), s/veh	1.7	0.7	0.4	0.4	1.2	1.3	1.1	0.0	1.0	4.0	0.7	0.1
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	1.5	5.3	1.6	0.3	4.9	4.7	2.3	0.0	6.3	4.9	4.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	18.0	15.4	22.6	18.2	18.3	30.5	0.0	24.2	39.3	23.0	20.0
LnGrp LOS	C	B	B	C	B	B	C	A	C	D	C	B
Approach Vol, veh/h		956			683			470			560	
Approach Delay, s/veh		18.3			18.3			25.8			28.6	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		55.0		45.0		55.0		45.0				
Change Period (Y+Rc), s		7.7		* 6.7		7.7		* 6.7				
Max Green Setting (Gmax), s		38.3		* 47		38.3		* 47				
Max Q Clear Time (g_c+I1), s		0.0		34.0		0.0		21.7				
Green Ext Time (p_c), s		0.0		4.3		0.0		5.3				

Intersection Summary												
HCM 6th Ctrl Delay			21.8									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 1: Dobie Road/Central Park Drive & Grand River Ave

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	133	217	223	73	48	166	200	137	265	215	224	51
Average Queue (ft)	47	125	119	19	15	92	112	62	127	119	106	20
95th Queue (ft)	101	195	199	46	40	148	183	118	223	200	186	42
Link Distance (ft)		2046	2046			398	398	522	522		1029	1029
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			250	500					400		
Storage Blk Time (%)			0									
Queuing Penalty (veh)			0									

Intersection: 2: Hamilton Road & Grand River Ave

Movement	EB	WB	NB	B7
Directions Served	TR	L	LR	T
Maximum Queue (ft)	9	77	101	121
Average Queue (ft)	0	30	67	16
95th Queue (ft)	5	62	98	72
Link Distance (ft)	398		15	400
Upstream Blk Time (%)			37	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)		500		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Bend

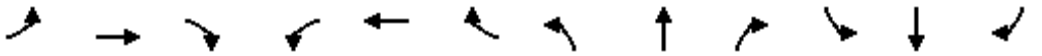
Movement	SB
Directions Served	T
Maximum Queue (ft)	11
Average Queue (ft)	0
95th Queue (ft)	8
Link Distance (ft)	15
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

Appendix C

FUTURE TRAFFIC CONDITIONS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	215	55	26	827	70	130	117	19	81	140	37
Future Volume (veh/h)	25	215	55	26	827	70	130	117	19	81	140	37
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		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	1796	1796	1796	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	29	250	64	30	962	81	143	129	21	98	169	45
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.91	0.91	0.91	0.83	0.83	0.83
Percent Heavy Veh, %	7	7	7	1	1	1	3	3	3	1	1	1
Cap, veh/h	312	2105	938	701	2063	174	262	372	61	284	451	382
Arrive On Green	0.62	0.62	0.62	0.62	0.62	0.62	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	519	3413	1520	1073	3344	282	1158	1557	253	1247	1885	1598
Grp Volume(v), veh/h	29	250	64	30	515	528	143	0	150	98	169	45
Grp Sat Flow(s),veh/h/ln	519	1706	1520	1073	1791	1834	1158	0	1810	1247	1885	1598
Q Serve(g_s), s	3.2	3.0	1.7	1.2	15.5	15.5	11.8	0.0	6.9	7.1	7.5	2.2
Cycle Q Clear(g_c), s	18.7	3.0	1.7	4.2	15.5	15.5	19.3	0.0	6.9	14.0	7.5	2.2
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	312	2105	938	701	1105	1132	262	0	433	284	451	382
V/C Ratio(X)	0.09	0.12	0.07	0.04	0.47	0.47	0.55	0.00	0.35	0.34	0.37	0.12
Avail Cap(c_a), veh/h	312	2105	938	701	1105	1132	487	0	784	526	816	692
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.3	7.9	7.7	8.8	10.3	10.3	39.9	0.0	31.6	37.4	31.8	29.8
Incr Delay (d2), s/veh	0.6	0.1	0.1	0.1	1.4	1.4	3.7	0.0	1.0	1.5	1.1	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	0.4	1.0	0.5	0.3	5.6	5.7	3.5	0.0	3.1	2.2	3.5	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	8.0	7.8	8.9	11.7	11.7	43.6	0.0	32.6	38.9	32.9	30.1
LnGrp LOS	B	A	A	A	B	B	D	A	C	D	C	C
Approach Vol, veh/h		343			1073			293			312	
Approach Delay, s/veh		8.7			11.6			38.0			34.4	
Approach LOS		A			B			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		69.4		30.6		69.4		30.6				
Change Period (Y+Rc), s		7.7		* 6.7		7.7		* 6.7				
Max Green Setting (Gmax), s		42.3		* 43		42.3		* 43				
Max Q Clear Time (g_c+I1), s		0.0		16.0		0.0		21.3				
Green Ext Time (p_c), s		0.0		2.9		0.0		2.6				

Intersection Summary												
HCM 6th Ctrl Delay			18.4									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	315	0	340	912	11	125
Future Vol, veh/h	315	0	340	912	11	125
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	87	87	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	350	0	391	1048	18	208

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	355	0	1661	180
Stage 1	-	-	-	-	355	-
Stage 2	-	-	-	-	1306	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1200	-	88	832
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	218	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1194	-	59	828
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	147	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	15.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	567	-	-	1194	-
HCM Lane V/C Ratio	0.4	-	-	0.327	-
HCM Control Delay (s)	15.5	-	-	9.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.9	-	-	1.4	-

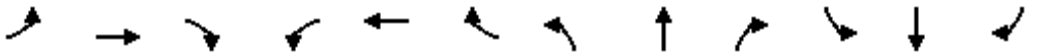
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	426	1241	18	14	11
Future Vol, veh/h	14	426	1241	18	14	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	50	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	463	1349	20	15	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1369	0	-	0	1621	685
Stage 1	-	-	-	-	1359	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	497	-	-	-	94	391
Stage 1	-	-	-	-	204	-
Stage 2	-	-	-	-	758	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	497	-	-	-	91	391
Mov Cap-2 Maneuver	-	-	-	-	167	-
Stage 1	-	-	-	-	198	-
Stage 2	-	-	-	-	758	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	22.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	497	-	-	-	167	391
HCM Lane V/C Ratio	0.031	-	-	-	0.091	0.031
HCM Control Delay (s)	12.5	-	-	-	28.7	14.5
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	0.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	720	117	18	443	210	109	307	21	199	267	60
Future Volume (veh/h)	81	720	117	18	443	210	109	307	21	199	267	60
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		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	1984	1984	1984	1984	1984	1984	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	86	766	124	19	471	223	117	330	23	216	290	65
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	0	0	0
Cap, veh/h	382	1972	877	325	1301	612	299	611	43	267	666	564
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	756	3770	1677	629	2487	1170	1034	1833	128	1044	2000	1693
Grp Volume(v), veh/h	86	766	124	19	356	338	117	0	353	216	290	65
Grp Sat Flow(s),veh/h/ln	756	1885	1677	629	1885	1771	1034	0	1961	1044	2000	1693
Q Serve(g_s), s	7.6	12.2	3.8	1.9	11.1	11.2	10.0	0.0	14.6	18.7	11.3	2.7
Cycle Q Clear(g_c), s	18.8	12.2	3.8	14.0	11.1	11.2	21.3	0.0	14.6	33.3	11.3	2.7
Prop In Lane	1.00		1.00	1.00		0.66	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	382	1972	877	325	986	926	299	0	653	267	666	564
V/C Ratio(X)	0.22	0.39	0.14	0.06	0.36	0.36	0.39	0.00	0.54	0.81	0.44	0.12
Avail Cap(c_a), veh/h	382	1972	877	325	986	926	299	0	653	267	666	564
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.6	14.3	12.3	18.5	14.0	14.1	34.3	0.0	27.1	41.6	26.0	23.1
Incr Delay (d2), s/veh	1.4	0.6	0.3	0.3	1.0	1.1	1.8	0.0	1.6	18.7	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	1.4	4.8	1.4	0.3	4.5	4.3	2.6	0.0	6.9	6.7	5.4	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	14.9	12.6	18.8	15.1	15.2	36.1	0.0	28.8	60.3	27.0	23.3
LnGrp LOS	C	B	B	B	B	B	D	A	C	E	C	C
Approach Vol, veh/h		976			713			470			571	
Approach Delay, s/veh		15.1			15.2			30.6			39.2	
Approach LOS		B			B			C			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		60.0		40.0		60.0		40.0				
Change Period (Y+Rc), s		7.7		* 6.7		7.7		* 6.7				
Max Green Setting (Gmax), s		52.3		* 33		52.3		* 33				
Max Q Clear Time (g_c+I1), s		0.0		35.3		0.0		23.3				
Green Ext Time (p_c), s		0.0		0.0		0.0		3.2				

Intersection Summary												
HCM 6th Ctrl Delay			22.8									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	908	32	118	668	3	314
Future Vol, veh/h	908	32	118	668	3	314
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	500	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	93	93	85	85
Heavy Vehicles, %	1	1	2	2	2	2
Mvmt Flow	966	34	127	718	4	369

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1004	0	1600	504
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	613	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	686	-	97	513
Stage 1	-	-	-	-	322	-
Stage 2	-	-	-	-	503	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	683	-	79	511
Mov Cap-2 Maneuver	-	-	-	-	175	-
Stage 1	-	-	-	-	261	-
Stage 2	-	-	-	-	503	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	30.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	502	-	-	683	-
HCM Lane V/C Ratio	0.743	-	-	0.186	-
HCM Control Delay (s)	30.1	-	-	11.5	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	6.2	-	-	0.7	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	44	1178	742	16	15	44
Future Vol, veh/h	44	1178	742	16	15	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	50	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	93	93	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	1253	798	17	16	48

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	815	0	-	0	1528	408
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	721	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	808	-	-	-	108	593
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	443	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	808	-	-	-	102	593
Mov Cap-2 Maneuver	-	-	-	-	223	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	443	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	808	-	-	-	223	593
HCM Lane V/C Ratio	0.058	-	-	-	0.073	0.081
HCM Control Delay (s)	9.7	-	-	-	22.4	11.6
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2	0.3

Intersection: 1: Dobie Road/Central Park Drive & Grand River Ave

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	67	101	54	33	47	231	228	162	159	131	133	54
Average Queue (ft)	16	36	15	8	12	111	126	82	67	52	67	17
95th Queue (ft)	50	74	44	24	36	194	210	139	129	101	120	44
Link Distance (ft)		2046	2046			398	398	522	522		1029	1029
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			250	500					400		
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 2: Hamilton Road & Grand River Ave

Movement	WB	WB	NB	B7
Directions Served	L	T	LR	T
Maximum Queue (ft)	72	48	82	51
Average Queue (ft)	41	2	42	3
95th Queue (ft)	71	24	71	28
Link Distance (ft)		182	15	400
Upstream Blk Time (%)			14	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	3	0		
Queuing Penalty (veh)	12	0		

Intersection: 3: Grand River Ave & Site Drive

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	41	44	35
Average Queue (ft)	9	15	10
95th Queue (ft)	32	42	33
Link Distance (ft)			271
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	50	50	
Storage Blk Time (%)	1	3	0
Queuing Penalty (veh)	2	0	0

Network Summary

Network wide Queuing Penalty: 14

Intersection: 1: Dobie Road/Central Park Drive & Grand River Ave

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	110	183	164	67	44	144	191	163	287	425	969	845
Average Queue (ft)	39	102	92	17	13	82	98	62	153	380	695	360
95th Queue (ft)	84	159	156	47	37	133	164	124	258	528	1276	1138
Link Distance (ft)		2046	2046			398	398	522	522		1029	1029
Upstream Blk Time (%)											27	11
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	500			250	500					400		
Storage Blk Time (%)										60	16	
Queuing Penalty (veh)										161	31	

Intersection: 2: Hamilton Road & Grand River Ave

Movement	EB	EB	WB	NB	B7
Directions Served	T	TR	L	LR	T
Maximum Queue (ft)	10	22	100	99	117
Average Queue (ft)	0	1	42	70	18
95th Queue (ft)	7	7	81	100	69
Link Distance (ft)	398	398		15	400
Upstream Blk Time (%)				41	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)			500		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Grand River Ave & Site Drive

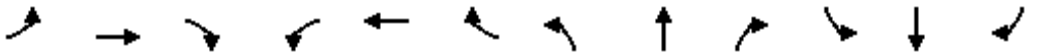
Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	50	17	4	45	62
Average Queue (ft)	19	1	0	13	25
95th Queue (ft)	47	10	3	38	53
Link Distance (ft)		174	1722		270
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	50			50	
Storage Blk Time (%)	1			1	1
Queuing Penalty (veh)	3			0	0

Intersection: 7: Bend

Movement	SB
Directions Served	T
Maximum Queue (ft)	33
Average Queue (ft)	1
95th Queue (ft)	14
Link Distance (ft)	15
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 196



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	720	117	18	443	210	109	307	21	199	267	60
Future Volume (veh/h)	81	720	117	18	443	210	109	307	21	199	267	60
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		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	1984	1984	1984	1984	1984	1984	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	86	766	124	19	471	223	117	330	23	216	290	65
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	0	0	0
Cap, veh/h	329	1757	781	280	1159	545	368	715	50	339	780	661
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	756	3770	1676	629	2487	1170	1034	1833	128	1044	2000	1694
Grp Volume(v), veh/h	86	766	124	19	356	338	117	0	353	216	290	65
Grp Sat Flow(s),veh/h/ln	756	1885	1676	629	1885	1771	1034	0	1961	1044	2000	1694
Q Serve(g_s), s	8.5	13.6	4.3	2.1	12.4	12.6	9.1	0.0	13.4	19.4	10.3	2.4
Cycle Q Clear(g_c), s	21.1	13.6	4.3	15.7	12.4	12.6	19.4	0.0	13.4	32.8	10.3	2.4
Prop In Lane	1.00		1.00	1.00		0.66	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	329	1757	781	280	878	825	368	0	765	339	780	661
V/C Ratio(X)	0.26	0.44	0.16	0.07	0.41	0.41	0.32	0.00	0.46	0.64	0.37	0.10
Avail Cap(c_a), veh/h	329	1757	781	280	878	825	454	0	928	426	946	801
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	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	17.9	15.4	23.2	17.6	17.6	28.7	0.0	22.7	34.9	21.8	19.3
Incr Delay (d2), s/veh	1.9	0.8	0.4	0.5	1.4	1.5	1.0	0.0	0.9	4.2	0.6	0.1
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	1.6	5.6	1.6	0.3	5.3	5.1	2.3	0.0	6.1	5.2	4.8	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.5	18.7	15.8	23.6	19.0	19.1	29.7	0.0	23.6	39.1	22.4	19.5
LnGrp LOS	C	B	B	C	B	B	C	A	C	D	C	B
Approach Vol, veh/h		976			713			470			571	
Approach Delay, s/veh		19.0			19.2			25.1			28.4	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		54.3		45.7		54.3		45.7				
Change Period (Y+Rc), s		7.7		* 6.7		7.7		* 6.7				
Max Green Setting (Gmax), s		38.3		* 47		38.3		* 47				
Max Q Clear Time (g_c+I1), s		0.0		34.8		0.0		21.4				
Green Ext Time (p_c), s		0.0		4.2		0.0		5.3				

Intersection Summary												
HCM 6th Ctrl Delay			22.1									
HCM 6th LOS			C									

Notes

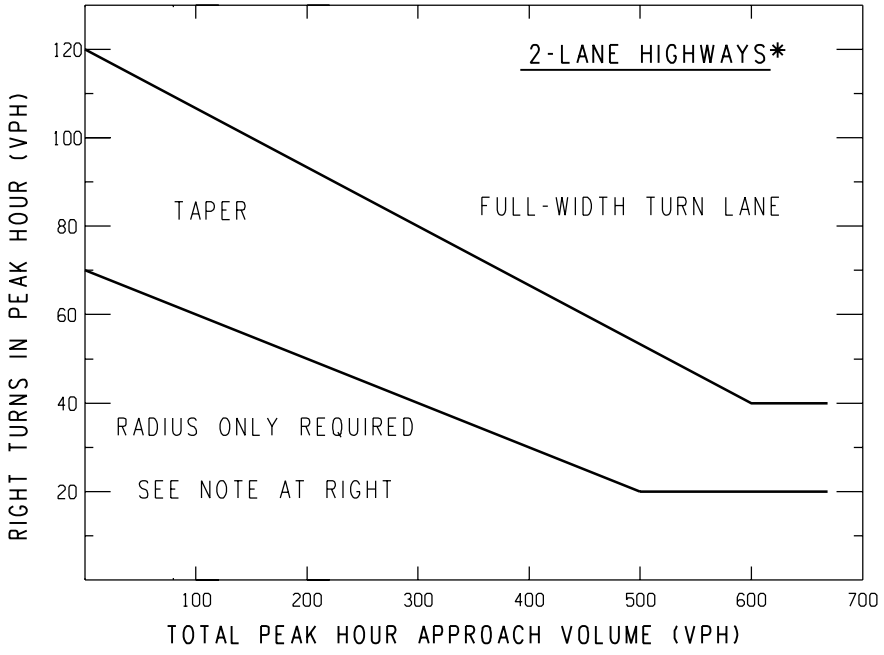
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 1: Dobie Road/Central Park Drive & Grand River Ave

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	131	209	202	59	65	195	229	150	250	242	238	50
Average Queue (ft)	48	126	117	20	14	98	119	60	119	125	105	17
95th Queue (ft)	100	192	188	45	43	163	191	122	206	207	189	41
Link Distance (ft)		2046	2046			398	398	522	522		1029	1029
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500			250	500					400		
Storage Blk Time (%)												
Queuing Penalty (veh)												

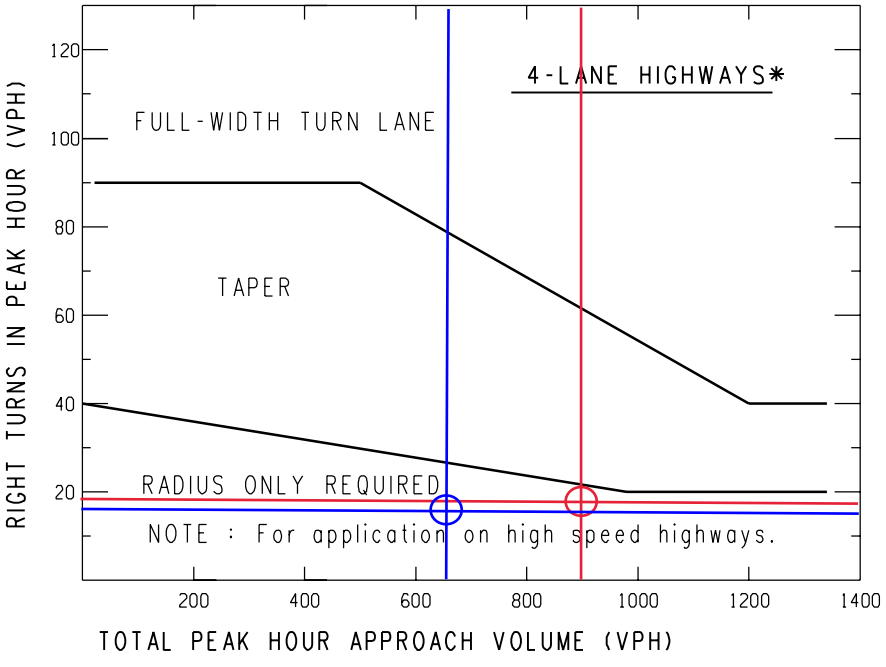
Appendix D

WARRANT SUMMARIES



NOTE:
For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.

Adjust peak hour right turns = Peak hour right turns - 20



*If a center left-turn lane exists(i.e. 3 or 5 lane highway), subtract the number of left turns in approach volume from the total approach volume to get an adjusted total approach volume.

AM
18 Right-turns
906 Approach

PM
16 Right-turns
639 Approach

Sample Problem:
The Design Speed is 55 mph. The Peak Hour Approach Volume is 300 vph. The Number of Right Turns in the Peak Hour is 100 vph. Determine if a right turn lane is recommended.

Solution:
Figure indicates that the intersection of 300 vph and 100 vph is located above the upper trend line; thus,a right-turn lane may be recommended.

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY NOTE

TRAFFIC VOLUME GUIDELINES FOR RIGHT-TURN LANES AND TAPERS

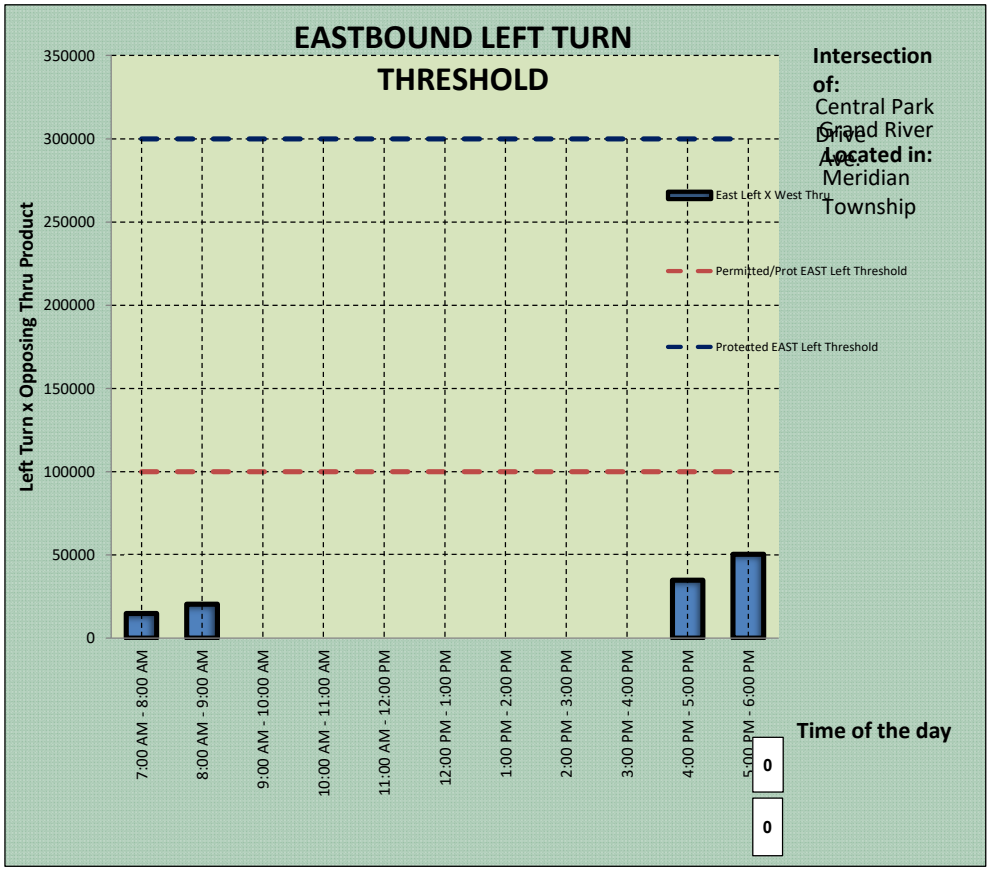
DRAWN BY: MTS	08/05/2004	604A	SHEET 2 OF 2
CHECKED BY: JAT	PLAN DATE:		
FILE: K:/DGN/ts notes/Note604A tsn.dgn		REV. 08/05/2004	

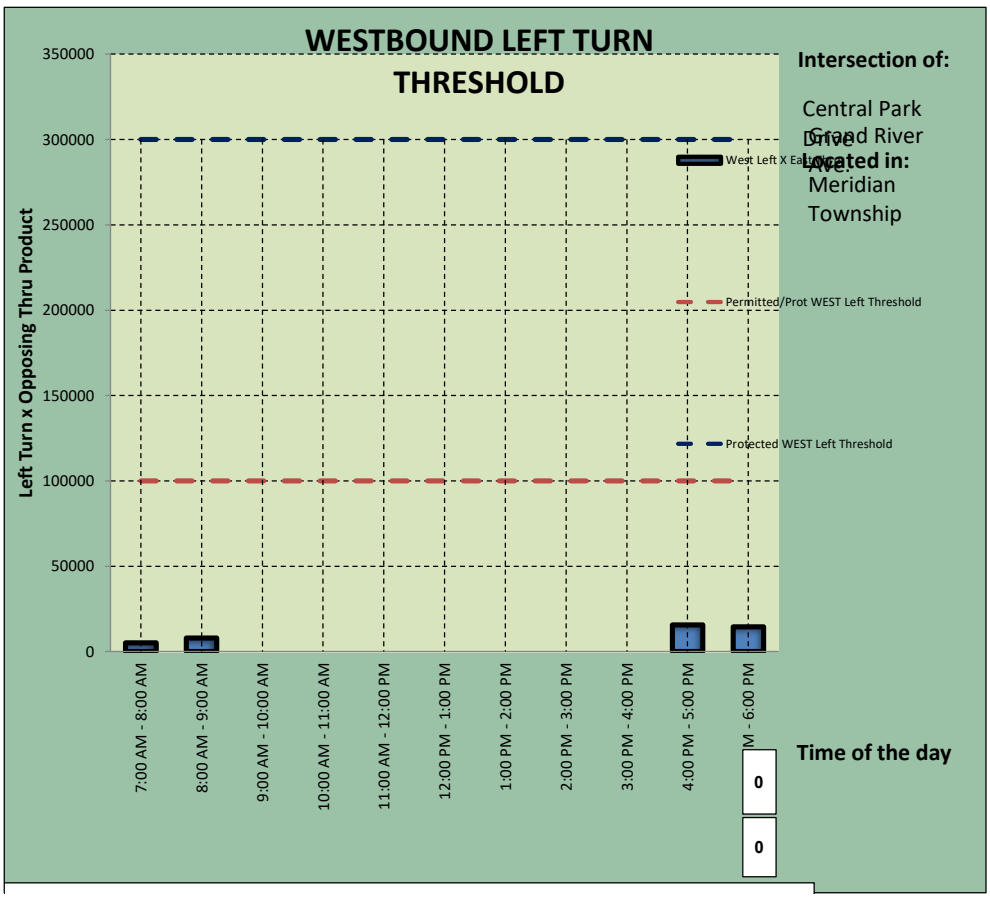
EASTBOUND AND WESTBOUND LEFT TURN PHASE THRESHOLDS

Please enter Data in Yellow Boxes ONLY

CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
EASTBOUND LEFT TURN GEOMETRY			
No. of Opposing WESTbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing WESTbound Right Turn Only Lanes	0		N / A
What is the Opposing WESTbound speed limit or 85%ile? (mph)	45	NO	N / A
No. of EASTbound Left Turning Lanes	1	NO	N / A
What is the EASTbound sight distance in the field? (ft)	500	NO	YES
Minimum Required Sight Distance (ft)	**397**		
WESTBOUND LEFT TURN GEOMETRY			
No. of Opposing EASTbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing EASTbound Right Turn Only Lanes	0		N / A
What is the Opposing EASTbound speed limit or 85%ile? (mph)	45	NO	N / A
No. of WESTbound Left Turning Lanes	1	NO	N / A
What is the WESTbound sight distance in the field? (ft)	500	NO	YES
Minimum Required Sight Distance (ft)	**397**		
TRAFFIC CHARACTERISTICS			
EASTbound Left Turn Vol (vph)	**81**	NO	
WESTbound Left Turn Vol (vph)	**30**	**NO**	
Cross Product of LEFT TURN EAST (See Chart Below)	**50544**	**NO**	**NO**
Cross Product of LEFT TURN WEST (See Chart Below)	**15750**	**NO**	**NO**
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?	**NO**		
Which Approach does the "One Left Turn Movement" crashes correspond to?	**EASTBOUND**		
ONE LEFT TURN MOVEMENT — Crash History for 12 Month Period			
ONE LEFT TURN MOVEMENT — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
ONE LEFT TURN MOVEMENT — Crash History for 24 Month Period			
ONE LEFT TURN MOVEMENT — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
TWO LEFT TURN MOVEMENTS — Crash History for 12 Month Period			
TWO LEFT TURN MOVEMENTS — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
TWO LEFT TURN MOVEMENTS — Crash History for 24 Month Period			
TWO LEFT TURN MOVEMENTS — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
EASTbound Left Turn DELAY per vehicle? Sec. / Veh.	20.4	NO	
EASTbound TOTAL Left Turn DELAY? Veh-Hr	0.46		
WESTbound Left Turn DELAY per vehicle? Sec. / Veh.	55.9	**NO**	
WESTbound TOTAL Left Turn DELAY? Veh-Hr	0.47		

Left-turn phasing should only be approved and installed after a comprehensive engineering study indicates such an operation is necessary for the safe and efficient operation of an intersection. The type of left-turn phasing will be determined based on data from the engineering study which includes the amount of delay experienced by left-turning traffic, crash patterns that may be occurring and available capacity of the intersection.


EASTBOUND LEFT TURN
THRESHOLD
Intersection of:
Central Park Drive
Grand River Ave.
Located in:
Meridian Township
Left Turn x Opposing Thru Product
350000
300000
250000
200000
150000
100000
50000
0
East Left X West Thru
Permitted/Prot EAST Left Threshold
Protected EAST Left Threshold
7:00 AM - 8:00 AM
8:00 AM - 9:00 AM
9:00 AM - 10:00 AM
10:00 AM - 11:00 AM
11:00 AM - 12:00 PM
12:00 PM - 1:00 PM
1:00 PM - 2:00 PM
2:00 PM - 3:00 PM
3:00 PM - 4:00 PM
4:00 PM - 5:00 PM
5:00 PM - 6:00 PM
Time of the day
0
0

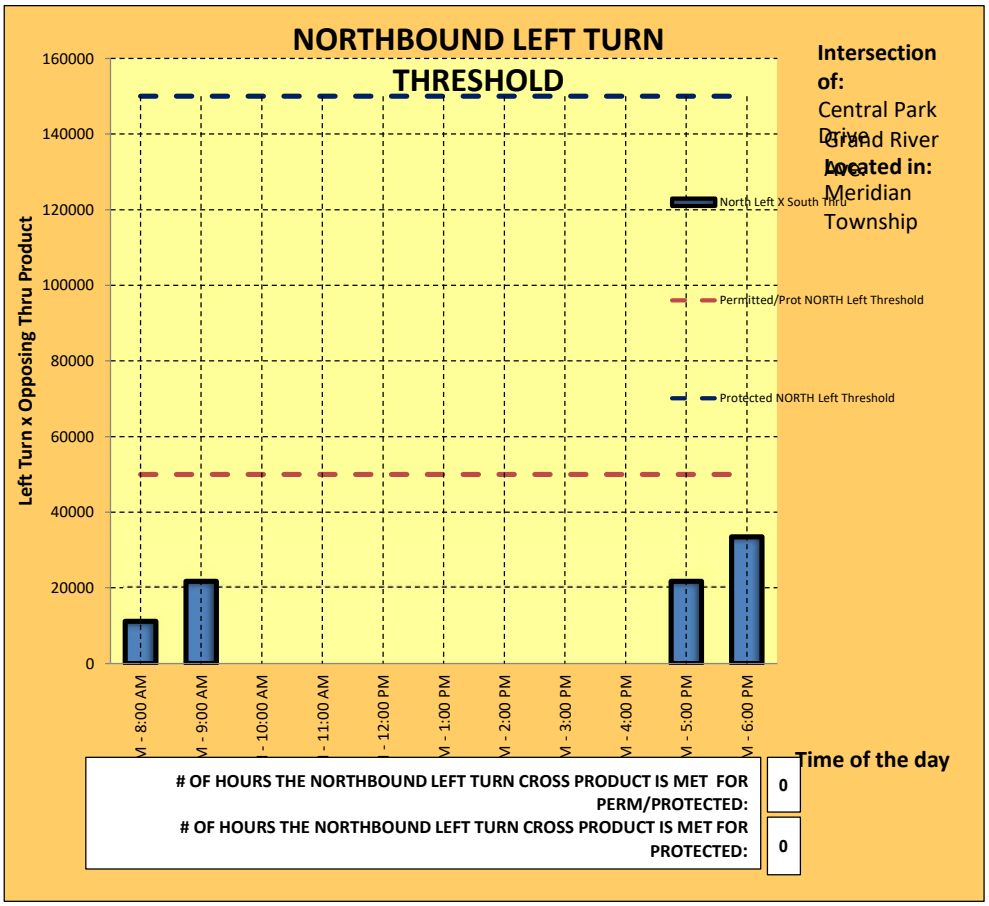

WESTBOUND LEFT TURN
THRESHOLD
Intersection of:
Central Park Drive
Grand River Ave.
Located in:
Meridian Township
Left Turn x Opposing Thru Product
350000
300000
250000
200000
150000
100000
50000
0
Permitted/Prot WEST Left Threshold
Protected WEST Left Threshold
7:00 AM - 8:00 AM
8:00 AM - 9:00 AM
9:00 AM - 10:00 AM
10:00 AM - 11:00 AM
11:00 AM - 12:00 PM
12:00 PM - 1:00 PM
1:00 PM - 2:00 PM
2:00 PM - 3:00 PM
3:00 PM - 4:00 PM
4:00 PM - 5:00 PM
Time of the day
0
0

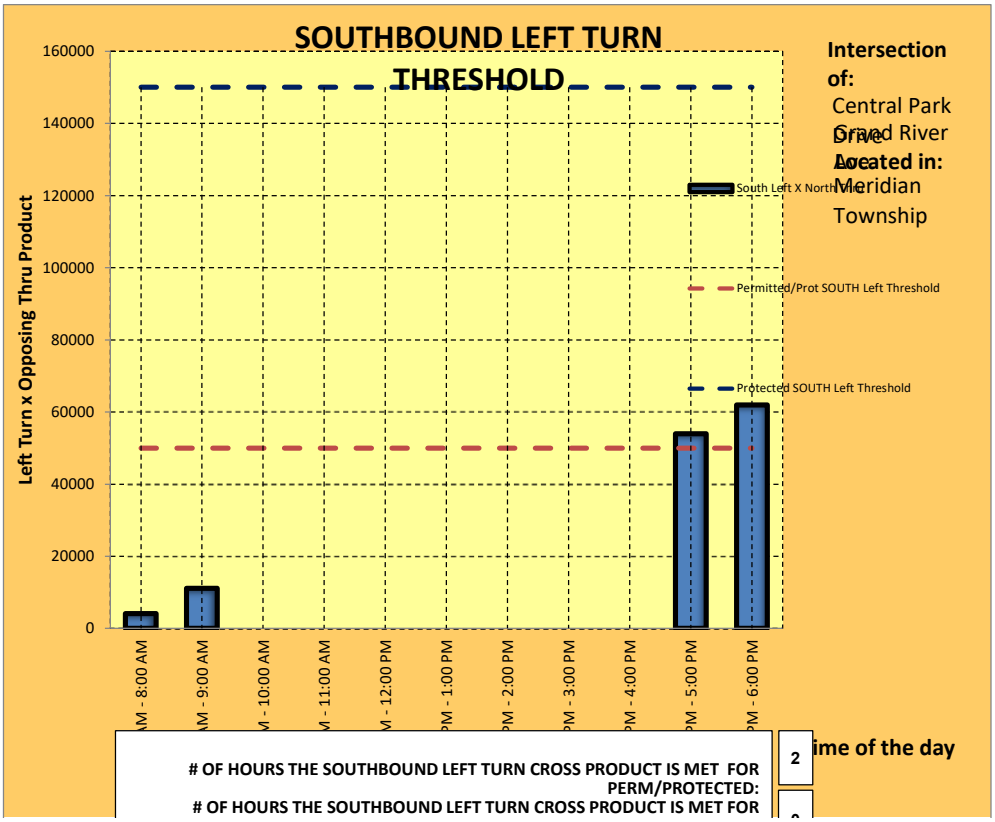
NORTHBOUND AND SOUTHBOUND LEFT TURN PHASE THRESHOLDS

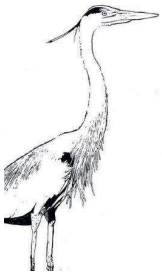
Please enter Data in Yellow Boxes ONLY

CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
NORTHBOUND LEFT TURN GEOMETRY			
No. of Opposing SOUTHbound Thru Lanes (include combination thru lanes)	1	NO	YES
No. of Opposing SOUTHbound Right Turn Only Lanes	1	N / A	
What is the Opposing SOUTHbound speed limit or 85%ile? (mph)	35	NO	N / A
No. of NORTHbound Left Turning Lanes	1	NO	N / A
What is the NORTHbound sight distance in the field? (ft)	500	NO	YES
Minimum Required Sight Distance (ft)	309		
SOUTHBOUND LEFT TURN GEOMETRY			
No. of Opposing NORTHbound Thru Lanes (include combination thru lanes)	1	NO	YES
No. of Opposing NORTHbound Right Turn Only Lanes	0	N / A	
What is the Opposing NORTHbound speed limit or 85%ile? (mph)	35	NO	N / A
No. of SOUTHbound Left Turning Lanes	1	NO	N / A
What is the SOUTHbound sight distance in the field? (ft)	500	NO	YES
Minimum Required Sight Distance (ft)	283		
TRAFFIC CHARACTERISTICS			
NORTHbound Left Turn Vol (vph)	135	YES	
SOUTHbound Left Turn Vol (vph)	189	YES	
Cross Product of LEFT TURN NORTH (See Chart Below)	33463	NO	NO
Cross Product of LEFT TURN SOUTH (See Chart Below)	61992	NO	YES
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?	YES		
Which Approach does the "One Left Turn Movement" crashes correspond to?	SOUTHBOUND		
ONE LEFT TURN MOVEMENT — Crash History for 12 Month Period			
ONE LEFT TURN MOVEMENT — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
ONE LEFT TURN MOVEMENT — Crash History for 24 Month Period			
ONE LEFT TURN MOVEMENT — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
TWO LEFT TURN MOVEMENTS — Crash History for 12 Month Period			
TWO LEFT TURN MOVEMENTS — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
TWO LEFT TURN MOVEMENTS — Crash History for 24 Month Period			
TWO LEFT TURN MOVEMENTS — Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO	NO
NORTHbound Left Turn DELAY per vehicle? Sec. / Veh.	36.1	NO	
NORTHbound TOTAL Left Turn DELAY? Veh-Hr	1.35		
SOUTHbound Left Turn DELAY per vehicle? Sec. / Veh.	55.9	YES	
SOUTHbound TOTAL Left Turn DELAY? Veh-Hr	2.93		

Left-turn phasing should only be approved and installed after a comprehensive engineering study indicates such an operation is necessary for the safe and efficient operation of an intersection. The type of left-turn phasing will be determined based on data from the engineering study which includes the amount of delay experienced by left-turning traffic, crash patterns that may be occurring and available capacity of the intersection.


NORTHBOUND LEFT TURN THRESHOLD
Intersection of:
Central Park Drive
Grand River Ave
Located in:
Meridian Township
Left Turn x Opposing Thru Product
160000
140000
120000
100000
80000
60000
40000
20000
0
North Left X South Thru
Permitted/Prot NORTH Left Threshold
Protected NORTH Left Threshold
M - 8:00 AM
M - 9:00 AM
- 10:00 AM
- 11:00 AM
- 12:00 PM
M - 1:00 PM
M - 2:00 PM
M - 3:00 PM
M - 4:00 PM
M - 5:00 PM
M - 6:00 PM
Time of the day
OF HOURS THE NORTHBOUND LEFT TURN CROSS PRODUCT IS MET FOR PERM/PROTECTED:
0
OF HOURS THE NORTHBOUND LEFT TURN CROSS PRODUCT IS MET FOR PROTECTED:
0


SOUTHBOUND LEFT TURN THRESHOLD
Intersection of:
Central Park Drive
Grand River Ave
Located in:
Meridian Township
Left Turn x Opposing Thru Product
160000
140000
120000
100000
80000
60000
40000
20000
0
South Left X North Thru
Permitted/Prot SOUTH Left Threshold
Protected SOUTH Left Threshold
AM - 8:00 AM
AM - 9:00 AM
M - 10:00 AM
M - 11:00 AM
- 12:00 PM
PM - 1:00 PM
PM - 2:00 PM
PM - 3:00 PM
PM - 4:00 PM
PM - 5:00 PM
PM - 6:00 PM
ime of the day
OF HOURS THE SOUTHBOUND LEFT TURN CROSS PRODUCT IS MET FOR PERM/PROTECTED:
2
OF HOURS THE SOUTHBOUND LEFT TURN CROSS PRODUCT IS MET FOR



MARX
WETLANDS
LLC

September 24, 2018

Mr. Colin Schiefler
DP Fox dba Green Castle Properties, LLC
200 Ottawa Ave., NW #800
Grand Rapids, MI 49506

Re: Wetland Delineation Report: Grand River Avenue & Central Park Dr.
(Approx. 9-acre Property)
Meridian Township, Ingham County, MI

Mr. Schiefler:

Pursuant to your request, Marx Wetlands LLC conducted a wetland determination and delineation for an approximately 9-acre Assessment Area consisting of three (3) parcels (#33-02-02-22-252-003, 33-02-02-22-401-003, and 33-02-02-22-426-001) for the above-referenced ("Project Site"). The Site is located on the east side of Central Park Drive on the north side of Grand River Avenue within Section 22 of Meridian Township (T4N, R1W) of Ingham County, Michigan. The intent of this determination is to provide a report of the character of any wetland areas within the subject parcel and an opinion as to the possible jurisdiction of the Michigan Department of Environmental Quality (MDEQ) and/or local governments over wetland areas identified on-site.

The wetland determination was performed in accordance with the Michigan Department of Environmental Quality Wetland Identification Manual (2001), the Northcentral-Northeast Manual to the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual. The delineation of any wetland depends on three basic parameters. These parameters are: 1) the presence of hydrophytic vegetation (plants adapted to living in saturated soils), 2) hydric soils (distinctive soil types that develop under saturated conditions), and 3) wetland hydrology (the presence of water at or near the surface for a specific period of time). The above parameters are virtually always inter-related and present in wetland systems. The wetland determination consisted of desktop review of available background documentation and mapping followed by two (2) site visits performed on September 17 & 18, 2018. A review of the findings is provided below.

Site Characteristics

Based on review of aerial photographs and the on-site visits, the Site is largely vacant, undeveloped land consisting of areas of upland field, scrub-shrub, forest, mixed deciduous tree lines, and wetland. The Site also contains existing vacated houses, a barn, in-ground pool, and associated lawn, particularly in the central and southern portions of the Site. In addition, existing driveways and mowed paths were also observed. The Site is within a largely commercial and residential region of Meridian Township, Michigan. The Site is bounded by undeveloped land to the north, commercial development/Central Park Drive to the west, W. Grand River Avenue to the south, and undeveloped land/commercial buildings to the east.

3309 Platt Road
Ann Arbor, Michigan
Mobile: 734-478-8277
e-mail
bg.marxwetlands@gmail.com

Cover Type Descriptions
Upland herbaceous species found in the open fields and much of the lawn areas include orchard grass (*Dactylus glomerata*), common milkweed (*Asclepias syriac*a), smooth brome (*Bromus inermis*), Japanese hedge-parsley (*Torilis japonica*), bluegrasses (*Poa pratensis* & *P. compressa*), timothy (*Phleum pratense*), Queen Anne's lace (*Daucus carota*), and thistles (*Cirsium arvense* and *C. vulgare*). In addition, scattered prairie remnant species were also observed such as little bluestem (*Schizachyrium scoparium*), broom-sedge (*Andropogon virginicus*), and goldenrods (*Solidago altissima* and *S. canadensis*). Scattered trees and shrub species observed include: cottonwood (*Populus deltoides*), multi-flora rose (*Rosa multiflora*), autumn-olive (*Elaeagnus umbellata*), blackberry (*Rubus allegheniensis*), and black raspberry (*Rubus occidentalis*).

The upland, scrub-shrub and mixed deciduous forested areas, including the tree lines generally contain the following species: penn sedge (*Carex pennsylvanica*), orchard grass, white vervain (*Verbena urticifolia*), Virginia creeper (*Parthenocissus quinquefolia*), white pine (*Pinus strobus*), black locust (*Robinia pseudoacacia*), Scotch pine (*Pinus sylvestris*), white spruce (*Picea glauca*), blue spruce (*Picea pungens*), crabapple/apple (*Malus spp*.), maples (*Acer platanoides, A. saccharum,* and *Acer saccharinum*), oaks (*Quercus alba* and *Q. rubra),* black walnut (*Juglans nigra*), box-elder (*Acer negundo*), black cherry (*Prunus serotina*), cottonwood, scattered with basswood (*Tilia americana*), white mulberry (*Morus alba*), sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), trembling aspen (*Populus tremuloides*), and ash (*Fraxinus spp*.) trees. Common native and non-native shrub species include autumn-olive, dogwoods (*Cornus amomum* and *C. racemosa*), common buckthorn (*Rhamnus cathartica*), blackberry and black raspberry. The weedy aspect of the Site is likely due to possible previous agricultural land use or another site disturbance. Refer to the enclosed *Photographic Log*.

Wetland Determination & Delineation
Six (6) wetlands (Wetlands A, B, C, D, E, and F) were identified within the Site and/or along the site's perimeters. No ponds or watercourses appear within the Site. Refer to the enclosed Wetland Sketch.

Table 1. Wetland Inventory Table

Feature Name	Wetland Type	Regulatory Status
Wetland A	Emergent (PEM)/Forested-PFO Edge	**Likely MDEQ and Township Non-Regulated**; isolated and < 0.25 ac in size
Wetland B	PEM/PFO edge	**Likely MDEQ and Township Non-Regulated**; isolated and < 0.25 ac in size
Wetland C	Emergent (PEM)	**Likely MDEQ and Township Non-Regulated**; isolated and < 0.25 ac in size
Wetland D	Emergent (PEM)	**Likely MDEQ & Township regulated**; within 500 feet of off-site pond.
Wetland E	Emergent/PFO edge	**Likely MDEQ & Township regulated**; within 500 feet of off-site pond.
Wetland F	Emergent/PFO edge	**Likely MDEQ & Township regulated**; within 500 feet of off-site pond

Wetlands

Wetlands A & B

Wetlands A & B are largely emergent wetlands with a minor forested component observed in the northwest portion of the Site (on parcel 33-02-02-22-252-003). Wetland A is contained entirely within the Site; however, Wetland B extends north off-site. Herbaceous vegetation within these wetlands include: reed canary grass (*Phalaris arundinacea*: FACW), softstem bulrush (*Schoenoplectus tabernaemontani*; OBL), grass-leaved goldenrod (*Euthamia graminifolia*; FACW), Indian-hemp (*Apocynum cannabinum*; FAC), calico American-aster (*Symphyotrichum lateriflorum*; FAC, soft-stemmed rush (*Juncus effusus;* OBL), and scattered sedges (*Carex lupulina, C. scoparia* and *C. vulpinoidea*; OBL-FACW). Woody vines include riverbank grape (*Vitis riparia*; FACW) and poison-ivy (*Toxicodendron radicans*; FAC); and shrub species include: black raspberry and dogwoods. Overhanging trees observed include silver maple (*Acer saccharinum;* FACW*),* white swamp oak (*Quercus bicolor*; FACW), elm (FACW) and cottonwood (FAC). Most of these species range in wetland indicator status from obligate (OBL) to facultative (FAC), indicating species that typically occur in wetlands. Wetland hydrology indicators observed include: microtopographic relief (i.e., hummocks), water-stained leaves, geomorphic position, and FAC Neutral Test. These wetlands appear to receive hydrology from precipitation, runoff from adjacent developed areas, and roadways, resulting in seasonally saturated to seasonally inundated water regimes. Refer to the enclosed *Wetland Sketch*.

Wetlands C & D

Wetlands C & D are primarily emergent wetlands observed in the northwest and north-central portion of the Site (on parcel 33-02-02-22-252-003). Wetland C extends north off-site and Wetland D is entirely within the site boundaries. Common herbaceous vegetation observed include: reed canary grass (FACW), grass-leaved goldenrod (FACW), redtop (*Agrostis gigantea*; FAC), softstem bulrush (OBL), Indian-hemp (FAC), panicled American-aster (*Symphyotrichum lanceolatum*; FACW), soft-stemmed rush (OBL), and sedges (*Carex normalis, C. scoparia,* and *C. vulpinoidea)*. Wetland C also contained: wool grass (*Scirpus cyperinus*; OBL), rush (*Juncus biflorus*), and self-heal (*Prunella vulgaris*; FAC). The species range in wetland indicator status from obligate (OBL) to facultative (FAC), indicating species that typically occur in wetlands. Wetland hydrology indicators observed include microtopographic relief (I.e., hummocks), geomorphic position, and FAC Neutral Test. These wetlands appear to receive hydrology from precipitation, runoff from adjacent developed areas, and roadways, resulting in seasonally saturated to seasonally inundated water regimes. Refer to the enclosed *Wetland Sketch.*

Wetlands E & F

Wetlands E and F are primarily emergent wetlands with overhanging trees observed along the eastern boundary of the Site (on parcel #33-02-02-22-426-001). These wetlands continue slightly off-site; however, do appear to close at an

upland berm along the western edge of the pond (off-site). Dominant herbaceous vegetation observed include: reed canary grass (FACW) and redtop (FAC), scattered species include: calico American-aster (FAC) and ground-ivy (*Glechoma hederacea*; FACU). Overhanging trees and shrubs observed include box-elder (FAC), common buckthorn (FAC), black ash (*Fraxinus nigra*; FACW) saplings, and black willow (*Salix nigra*; FACW). Most of these species range in wetland indicator status from obligate (OBL) to facultative (FAC), indicating species that typically occur in wetlands. Wetland hydrology indicators observed include water-stained leaves, bare soil (sparsely vegetated concave surface in areas), geomorphic position, and FAC Neutral Test. These wetlands appear to receive hydrology from precipitation, runoff from adjacent developed areas, and roadways, resulting in seasonally saturated to seasonally inundated water regimes. Refer to the enclosed *Wetland Sketch.*

Regulations

Part 301, Inland Lakes and Streams, states that a feature is considered a regulated watercourse by the MDEQ if it possesses a defined bed, bank, and evidence of continued flow or a continued occurrence of water. Additionally, Part 301 states that if a pond with a surface area larger than five (5) acres should be considered regulated. Based on the site visit, no watercourses or ponds were observed on-site.

Part 303, Wetlands Protection, of the NREPA states that if a wetland is five acres in size or larger and/or connected to or located within 500 feet of a river, stream, lake, or pond, it is considered regulated by the MDEQ. Marx Wetlands, LLC has the professional opinion that both Wetlands A, B, and C are not likely regulated by the MDEQ because they appear less than 5 acres in size and isolated (i.e., not connected to or located within 500 feet of a regulating feature). However, Wetlands D, E, and F are likely within 500 feet of a regulating feature (i.e., off-site pond east of parcel #33-02-02-22-426-001). Therefore, Marx Wetlands LLC has the professional opinion that Wetlands D, E, and F appear to meet the requirements of Part 303, Wetlands Protection, of the NREPA.

In addition, Meridian Township (Township) has its own wetland protection ordinance. The township's Wetland Protection ordinance (Chapter 22, Article IV) states that wetlands are protected if they are:

- contiguous to any inland lake stream, river, or pond.

- Partially or entirely within 500 feet of the ordinary high-water mark of any inland lake, stream, river or pond.

- Two or more areas of wetland separated only by barriers, such as dikes, roads, berms or other similar features, if any of those wetlands are contiguous to an inland lake, stream, river or pond.

- larger than two acres, even if not contiguous to an inland lake, stream, river or pond.

- not contiguous to any inland lake, stream, river or pond, if the state department of environmental quality determines the protection of the wetland is essential to the preservation of the natural resources of the state from pollution, impairment or destruction.

- wetlands, equal to or greater than one-quarter acre and equal to or less than two acres in size, which are not contiguous to any inland lake, stream, river or pond and are determined to be essential to the preservation of the natural resources of the Township as provided in township code § 22-156. Code § 22-156 provides that a wetland is essential to the preservation of the township's natural resources if it fulfills any of ten criteria.

Therefore, it is the professional opinion of Marx Wetlands LLC that Wetlands D, E, and F are also likely regulated by Meridian Township because they appear within 500 feet of a regulating feature (i.e., pond). Wetlands A, B, and C appear to be isolated and/or less than 0.25 acres in size and may be considered non-regulated by the Township; however, Wetlands A & B may be protected under the Meridian Township's *Chapter 22 Environment, Article IV Wetland Protection,* if it is determined that the protection of these wetland areas is important for the preservation of the local natural resources. (Meridian Township- Code 1974, § 105-3; Ord. No. 2002-02, 3-19-2002; Ord. No. 2003-11, 7-6-2003; Ord. No. 2011-04, 3-15-2011).

It is important to note that the Meridian Township Board has a policy of no net loss of wetlands and impacts to wetlands may require wetland mitigation. A mitigation plan, if required, shall be approved as part of the wetland use permit decision.

A permit or approval is likely required by the Meridian Township for any proposed work (e.g., filling, dredging, construction, and draining and/or other development) that takes place within the boundaries of a regulated wetland. Most construction activities that take place outside of these boundaries do not require a wetland permit from the MDEQ or Meridian Township. Please note that the MDEQ and Township have the final authority on the extent of regulated wetlands, lakes, and streams in the State of Michigan and Meridian Township, respectively.

Please be advised the information provided in this report is a professional opinion. The ultimate decision on wetland boundary locations and jurisdiction thereof rests with the MDEQ or Township and, in some cases, the Federal government. Therefore, there may be adjustments to boundaries based upon review of a regulatory agency. An agency determination can vary, depending on various factors including, but not limited to, experience of the agency representative making the determination and the season of the year. In addition, the physical

characteristics of the site can change with time, depending on the weather, vegetation patterns, drainage, activities on adjacent parcels, or other events. Any of these factors can change the nature / extent of wetlands on the site.

Thank you for the opportunity to provide this wetland determination. If you have any questions, please contact me at your convenience.

Sincerely,

Marx Wetlands LLC
Bryana J. Guevara, PWS 2949
ISA Certified Arborist MI-4204A
Environmental Consultant

Enclosures:
1) Photographic Log
2) Wetland Sketch
3) USACE Wetland Determination Data Forms

PHOTOGRAPHIC LOG

1) An east-facing view of existing dirt driveway.

2) A northeast-facing view of an upland old field with scattered shrubs and trees. In ground pool observed in background of this photograph.

3) View of existing mowed path observed in the western portion of the Site.

4) View of the undeveloped parcel consisting of primarily upland fields and mixed deciduous forest patches.

PHOTOGRAPHIC LOG

5) Another view of upland mixed deciduous forested patches observed in the Site.

6) A west-facing view of an existing barn and open field and grassy lawn areas. Upland tree lines were observed along the western boundary.

7) View of an existing, vacated house observed on the 1614 W. Grand River Avenue property.

8) Another view of the existing house and associated upland field and lawn observed in the south-central portion of the overall Site.

PHOTOGRAPHIC LOG

9) View of Wetland A, a largely emergent wetland with overhanging trees, observed within the northwestern portion of the Site.

10) A north-facing view of Wetland B, another emergent wetland with overhanging trees observed along the northern boundary of the Site.

11) View of an upland break that appears to separate Wetlands A & B in the northwest portion of the site.

12) A north-facing view of Wetland C, an emergent wetland in the northeast corner of the Site. Note upland shrubs (i.e. autumn-olive) in background of this photo.

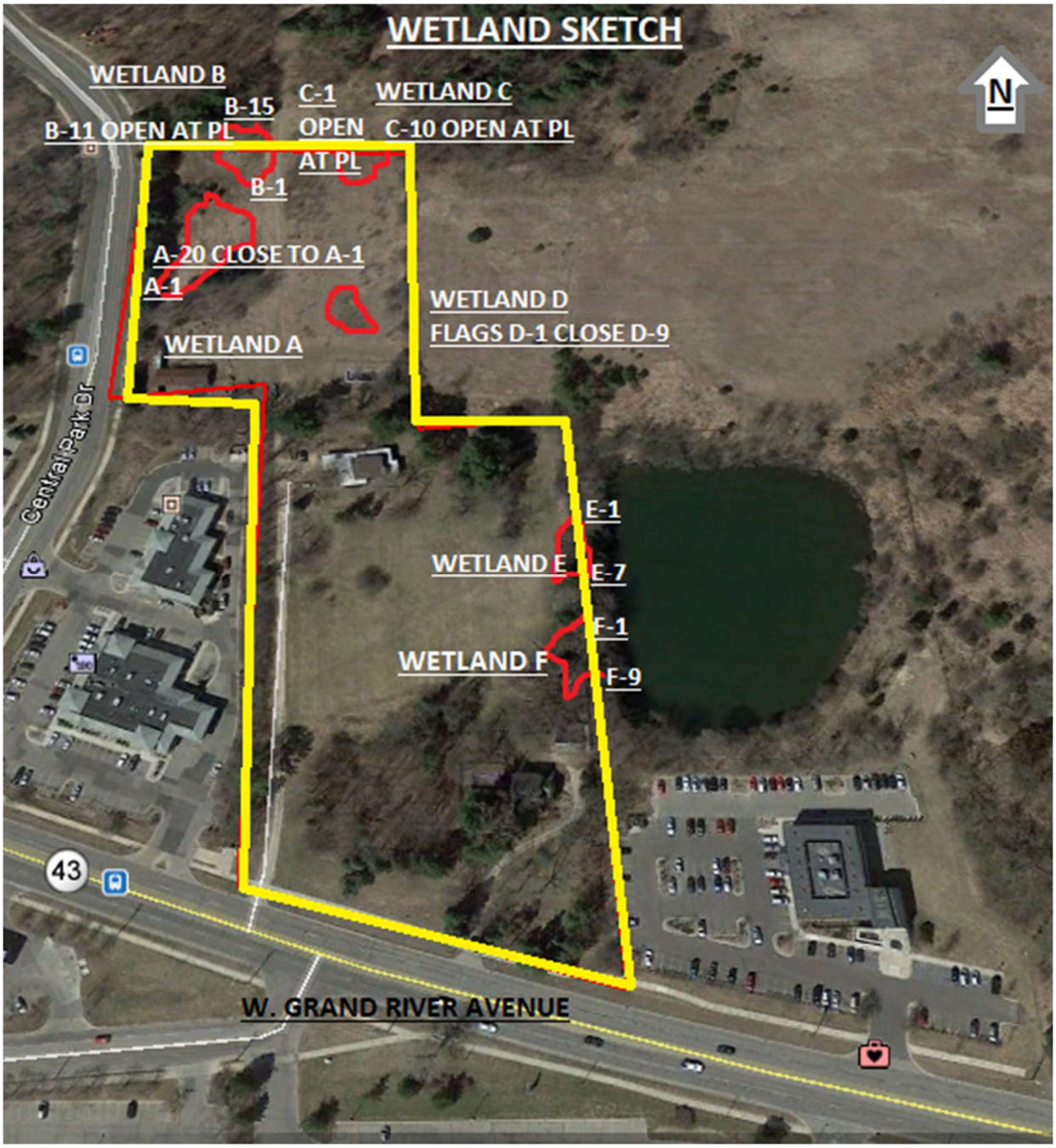
PHOTOGRAPHIC LOG

13) View of Wetland D, an emergent wetland, observed in the northeast portion of the Site.

14) A north-facing view of Wetland E, an emergent wetland with overhanging trees, observed along the eastern boundary of the Site.

15) A south-facing view of Wetland F, an emergent wetland with overhanging trees, along the eastern site boundary.

16) An east-facing view of W. Grand River Avenue along the southern boundary of the Site.



- **Wetland A**: Flags A-1 close to A-20
- **Wetland B:** Flags B-1 continue to B-11 (open at property line-PL); continue B-15 close to B-1
- **Wetland C:** Flags C-1 open at PL; continue to C-10 open at PL
- **Wetland D:** Flags D-1 close to D-9
- **Wetland E:** Flags E-1 continue to E-7; (likely closes off-site)
- **Wetland F:** Flags F-1 continue to F-9; (likely closes off-site)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: W. Grand River Avenue/Central Park Drive City/County: Meridian Twp/Ingham Co. Sampling Date: 9/17/2018

Applicant/Owner: DP Fox dba Green Castle Properties, LLC State: MI Sampling Point: A

Investigator(s): B.Guevara; Marx Wetlands LLC Section, Township, Range: S22, T4N, R1W

Landform (hillside, terrace, etc.): toeslope/depression Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L Lat: 42.71956 Long: -84.40849 Datum: WSG84

Soil Map Unit Name: Kibbie loam, 0 to 3 percent slopes NWI classification: PEM/Minor (PFO) edge

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes x	No ____	**within a Wetland?**	**Yes** x **No** ____
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID:	Wetland A

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland system is observed in the northwest portion of the Site.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No XX	Depth (inches):	____
Water Table Present?	Yes ____	No XX	Depth (inches):	____
Saturation Present? (includes capillary fringe)	Yes ____	No xx	Depth (inches):	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is typical for this wetland type during the driest period of the year.

VEGETATION – Use scientific names of plants. Sampling Point: A

Tree Stratum (Plot size: 30-ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	10	Yes	FACW
2. *Populus deltoides*	10	Yes	FAC
3. *Ulmus americana*	5	No	FACW
4. *Quercus bicolor*	5	No	FACW
5.			
6.			
7.			
	30	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15-ft radius)			
1. *Fraxinus nigra*	20	Yes	FACW
2. *Cornus amomum*	30	Yes	FAC
3. *Rubus allegheniensis*	10	No	FACU
4.			
5.			
6.			
7.			
	60	=Total Cover	
Herb Stratum (Plot size: 5-ft radius)			
1. *Phalaris arundinacea*	45	Yes	FACW
2. *Schoenoplectus tabernaemontani*	10	Yes	OBL
3. *Euthamia graminifolia*	10	Yes	FACW
4. *Carex vulpinoidea*	10	Yes	OBL
5. *Apocynum cannabinum*	10	Yes	FAC
6. *Symphyotrichum lateriflorum*	5	No	FACW
7. *Carex lupulina*	5	No	FACW
8. *Carex scoparia*	5	No	FACW
9. *Juncus effusus*	5	No	OBL
10.			
11.			
12.			
	105	=Total Cover	
Woody Vine Stratum (Plot size: 30-ft radius)			
1. *Toxicodendron radicans*	10	Yes	FAC
2. *Vitis riparia*	10	Yes	FACW
3.			
4.			
	20	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 11 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	120	x 2 =	240
FAC species	60	x 3 =	180
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	215 (A)		485 (B)

Prevalence Index = B/A = 2.26

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	95	7.5YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: W. Grand River Avenue/Central Park Drive City/County: Meridian Twp/Ingham Co. Sampling Date: 9/17/2018

Applicant/Owner: DP Fox dba Green Castle Properties, LLC State: MI Sampling Point: B

Investigator(s): B.Guevara; Marx Wetlands LLC Section, Township, Range: S22, T4N, R1W

Landform (hillside, terrace, etc.): toeslope/depression Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L Lat: 42.72033 Long: -84.40808 Datum: WSG84

Soil Map Unit Name: Kibbie loam, 0 to 3 percent slopes NWI classification: PEM/Minor (PFO) edge

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes x	No ____	**within a Wetland?**	**Yes** x	**No** ____
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID:	Wetland B	

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland system is observed in the northwest portion of the Site, along the northern boundary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- x Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- x Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No XX	Depth (inches): ____	
Water Table Present?	Yes ____	No XX	Depth (inches): ____	
Saturation Present? (includes capillary fringe)	Yes ____	No xx	Depth (inches): ____	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is typical for this wetland type during the driest period of the year.

VEGETATION – Use scientific names of plants. Sampling Point: B

Tree Stratum (Plot size: 30-ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	10	Yes	FACW
2. *Populus deltoides*	10	Yes	FAC
3. *Ulmus americana*	5	No	FACW
4. *Quercus bicolor*	5	No	FACW
5. *Populus tremuloides*	5	No	UPL
6.			
7.			
	35	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15-ft radius)			
1. *Fraxinus nigra*	5	Yes	FACW
2. *Cornus amomum*	15	Yes	FAC
3. *Rubus allegheniensis*	5	Yes	FACU
4.			
5.			
6.			
7.			
	25	=Total Cover	
Herb Stratum (Plot size: 5-ft radius)			
1. *Phalaris arundinacea*	20	Yes	FACW
2. *Schoenoplectus tabernaemontani*	5	No	OBL
3. *Euthamia graminifolia*	15	Yes	FACW
4. *Carex vulpinoidea*	10	No	OBL
5. *Apocynum cannabinum*	10	No	FAC
6. *Symphyotrichum lateriflorum*	10	No	FACW
7. *Carex lupulina*	5	No	FACW
8. *Carex scoparia*	5	No	FACW
9. *Juncus effusus*	20	Yes	OBL
10.			
11.			
12.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 30-ft radius)			
1. *Toxicodendron radicans*	5	Yes	FAC
2. *Vitis riparia*	5	Yes	FACW
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 90.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	85	x 2 =	170
FAC species	40	x 3 =	120
FACU species	5	x 4 =	20
UPL species	5	x 5 =	25
Column Totals:	170 (A)		370 (B)

Prevalence Index = B/A = 2.18

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	95	7.5YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: W. Grand River Avenue/Central Park Drive City/County: Meridian Twp/Ingham Co. Sampling Date: 9/17/2018

Applicant/Owner: DP Fox dba Green Castle Properties, LLC State: MI Sampling Point: C

Investigator(s): B.Guevara; Marx Wetlands LLC Section, Township, Range: S22, T4N, R1W

Landform (hillside, terrace, etc.): toeslope/depression Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L Lat: 42.720321 Long: -84.40785 Datum: WSG84

Soil Map Unit Name: Kibbie loam, 0 to 3 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes x	No ____	**within a Wetland?**	**Yes** x **No** ____
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID:	Wetland C

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland system is observed in the northeast corner of the Site.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No XX	Depth (inches):	____
Water Table Present?	Yes ____	No XX	Depth (inches):	____
Saturation Present? (includes capillary fringe)	Yes ____	No xx	Depth (inches):	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is typical for this wetland type during the driest period of the year.

VEGETATION – Use scientific names of plants. Sampling Point: C

Tree Stratum (Plot size: 30-ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft radius)			
1. *Fraxinus nigra*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10 =Total Cover		
Herb Stratum (Plot size: 5-ft radius)			
1. *Juncus effusus*	20	Yes	OBL
2. *Schoenoplectus tabernaemontani*	20	Yes	OBL
3. *Euthamia graminifolia*	15	No	FACW
4. *Carex vulpinoidea*	20	Yes	OBL
5. *Apocynum cannabinum*	15	No	FAC
6. *Symphyotrichum lanceolatum*	10	No	FACW
7. *Scirpus cyperinus*	5	No	OBL
8. *Prunella vulgaris*	5	No	FAC
9. *Agrostis gigantea*	20	Yes	FAC
10. *Carex scoparia*	5	No	FACW
11. *Carex normalis*	5	No	FACW
12.			
	140 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft radius)			
1. *Toxicodendron radicans*	5	Yes	FAC
2. *Vitis riparia*	5	Yes	FACW
3.			
4.			
	10 =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	50	x 2 =	100
FAC species	45	x 3 =	135
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	160 (A)		300 (B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: C

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/1	95	7.5YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: W. Grand River Avenue/Central Park Drive City/County: Meridian Twp/Ingham Co. Sampling Date: 9/17/2018

Applicant/Owner: DP Fox dba Green Castle Properties, LLC State: MI Sampling Point: E

Investigator(s): B.Guevara; Marx Wetlands LLC Section, Township, Range: S22, T4N, R1W

Landform (hillside, terrace, etc.): lowland Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L Lat: 42.71866 Long: -84.407098 Datum: WSG84

Soil Map Unit Name: Urban land Capac-Colwood Complex, 0 to 4 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes x	No ____	**within a Wetland?** **Yes** x **No** ____
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID: Wetland E

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland system is observed along the eastern boundary line.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- x Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- x Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No XX	Depth (inches): ____
Water Table Present?	Yes ____	No XX	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No xx	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is typical for this wetland type during the driest period of the year.

VEGETATION – Use scientific names of plants. Sampling Point: E

Tree Stratum (Plot size: 30-ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer negundo*	35	Yes	FACW
2. *Salix nigra*	15	Yes	OBL
3.			
4.			
5.			
6.			
7.			
	50	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15-ft radius)			
1. *Fraxinus nigra*	10	Yes	FACW
2. *Rhamnus cathartica*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	
Herb Stratum (Plot size: 5-ft radius)			
1. *Phalaris arundinacea*	65	Yes	OBL
2. *Agrostis gigantea*	10	No	OBL
3. *Glechoma hederoma*	15	No	FACW
4. *Symphyotrichum lateriflorum*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 30-ft radius)			
1. *Toxicodendron radicans*	5	Yes	FAC
2.			
3.			
4.			
	5	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	60	x 2 =	120
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	180 (A)		280 (B)

Prevalence Index = B/A = 1.56

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: E

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	98	10YR 4/6	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: W. Grand River Avenue/Central Park Drive City/County: Meridian Twp/Ingham Co. Sampling Date: 9/17/2018

Applicant/Owner: DP Fox dba Green Castle Properties, LLC State: MI Sampling Point: D

Investigator(s): B.Guevara; Marx Wetlands LLC Section, Township, Range: S22, T4N, R1W

Landform (hillside, terrace, etc.): lowland Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L Lat: 42.7195 Long: -84.40798 Datum: WSG84

Soil Map Unit Name: Kibbie loam, 0 to 3 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes x	No ____	**within a Wetland?**	**Yes** x	**No** ____
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID:	Wetland D	

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland system is observed in the northeast/north-central portion of the Site.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No XX	Depth (inches): ____	
Water Table Present?	Yes ____	No XX	Depth (inches): ____	
Saturation Present? (includes capillary fringe)	Yes ____	No xx	Depth (inches): ____	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is typical for this wetland type during the driest period of the year.

VEGETATION – Use scientific names of plants. Sampling Point: D

Tree Stratum (Plot size: 30-ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5-ft radius)			
1. *Juncus effusus*	15	Yes	OBL
2. *Schoenoplectus tabernaemontani*	15	Yes	OBL
3. *Euthamia graminifolia*	15	Yes	FACW
4. *Carex vulpinoidea*	10	No	OBL
5. *Rumex crispus*	15	Yes	FAC
6. *Symphyotrichum lateriflorum*	25	Yes	FACW
7. *Agrostis gigantea*	30	Yes	OBL
8. *Carex scoparia*	10	No	FAC
9. *Carex normalis*	10	No	FAC
10. *Phalaris arundinacea*	10	No	FACW
11.			
12.			
	155 =Total Cover		
Woody Vine Stratum (Plot size: 30-ft radius)			
1. *Toxicodendron radicans*	5	Yes	FAC
2.			
3.			
4.			
	5 =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	50	x 2 =	100
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	160 (A)		290 (B)

Prevalence Index = B/A = 1.81

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: D

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/1	95	7.5YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: W. Grand River Avenue/Central Park Drive City/County: Meridian Twp/Ingham Co. Sampling Date: 9/17/2018

Applicant/Owner: DP Fox dba Green Castle Properties, LLC State: MI Sampling Point: F

Investigator(s): B.Guevara; Marx Wetlands LLC Section, Township, Range: S22, T4N, R1W

Landform (hillside, terrace, etc.): lowland Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR L Lat: 42.71866 Long: -84.407098 Datum: WSG84

Soil Map Unit Name: Urban land Capac-Colwood Complex, 0 to 4 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes x	No ____	**within a Wetland?**	**Yes** x **No** ____
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID:	Wetland F

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland system is observed along the eastern boundary line.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- x Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- x Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No XX	Depth (inches):	____
Water Table Present?	Yes ____	No XX	Depth (inches):	____
Saturation Present? (includes capillary fringe)	Yes ____	No xx	Depth (inches):	____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is typical for this wetland type during the driest period of the year.

VEGETATION – Use scientific names of plants. Sampling Point: F

Tree Stratum (Plot size: 30-ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer negundo*	35	Yes	FACW
2. *Salix nigra*	15	Yes	OBL
3.			
4.			
5.			
6.			
7.			
	50	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15-ft radius)			
1. *Fraxinus nigra*	10	Yes	FACW
2. *Rhamnus cathartica*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	
Herb Stratum (Plot size: 5-ft radius)			
1. *Phalaris arundinacea*	65	Yes	OBL
2. *Agrostis gigantea*	10	No	OBL
3. *Glechoma hederoma*	15	No	FACW
4. *Symphyotrichum lateriflorum*	10	No	OBL
5. *Rumex crispus*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105	=Total Cover	
Woody Vine Stratum (Plot size: 30-ft radius)			
1. *Toxicodendron radicans*	5	Yes	FAC
2.			
3.			
4.			
	5	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	60	x 2 =	120
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	185 (A)		295 (B)

Prevalence Index = B/A = 1.59

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: F

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	98	10YR 4/6	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

October 19, 2018
Project No. 181577

Mr. Peter Menser
Charter Township of Meridian
5151 Marsh Road
Okemos, MI 48864-1198

Re: Wetland Verification – WDV 18-12
Green Castle Properties, LLC
1614 and 1622 West Grand River Avenue, Okemos, Ingham County, Michigan

Dear Peter:

On October 17, 2018, Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) staff conducted a field investigation and verified wetland boundaries on the following parcels located in Section 22 of Meridian Township (Town 4 North, Range 1 West):

- 1614 West Grand River Avenue, Parcel Number 33-02-02-22-426-001, 2.40 acres of residential property
- 1622 West Grand River Avenue, Parcel Number 33-02-02-22-401-003, 3.23 acres of residential property
- Central Park Drive (no street address), Parcel Number 33-02-02-22-252-003, 3.04 acres of undeveloped property, with a metal barn and in-ground pool.

The wetlands were recently delineated by Marx Wetlands, LLC, as described in its September 24, 2018, report entitled *Wetland Delineation Report: Grand River Avenue & Central Park Drive* (Report).

Site Investigation

FTCH staff met Ms. Bryana Guevara of Marx Wetlands at the site on October 17th and inspected flagged wetland boundaries for six wetlands. Ms. Guevara stated the wetland boundaries noted on the wetland sketch in the wetland report are approximate. She did not know if wetland boundaries have been surveyed by the applicant (Green Castle Properties, LLC). Consequently, the size of the delineated wetlands is not known.

FTCH made minor changes to the wetland boundaries by moving and adding flags as follows:

Wetland A: Flag A10 was moved. In addition, Flag A12 was not present; the wetland boundary extended from Flag A11 to Flag A13.

Wetland B: Flag B3 was moved to the south. Wetland B extended offsite to the north. The northern limit of this wetland was flagged.

Wetland C: Added Flag C5.5 between Flags C5 and C6. Added Flag C6.5 between Flags C6 and C7. Wetland C extends slightly offsite to the north.

Wetland D: No changes.

Wetland E: No changes. Wetland E extends slightly offsite to the east.

Wetland F: No changes. Wetland F extends slightly offsite to the east.

Regulatory Review

The regulatory review was based upon the Report, Google Earth aerial photographs, and site observations. Section 22-116 of the Township's Wetland Protection Ordinance defines "protected wetlands" as any of the following:

> (1) Wetlands, regardless of size, which are contiguous (i.e. within 500 feet of) to any inland lake, stream, river, or pond, whether partially or entirely within the project site.
>
> - Wetlands E and F are located within 30 feet of an approximately 2-acre pond and are therefore regulated by the State of Michigan (State) and the Township. Based upon Google Earth aerial photography, Wetland D is also located within 500 feet of the pond and is therefore regulated by the State and Township. It does not appear that Wetlands A, B, and C are located within 500 feet of a waterbody.
>
> (2) Wetlands, regardless of size, which are partially or entirely within 500 feet of the ordinary high water mark of any inland lake, stream, river, or pond, unless it is determined by the state department of environmental quality that there is no surface or groundwater connection between the wetland and the water body.
>
> - FTCH has no knowledge that the Michigan Department of Environmental Quality (MDEQ) has determined there is no surface or groundwater connection between site wetlands and the pond.
>
> (3) Wetlands which are larger than two acres, whether partially or entirely contained within a lot, and which are not contiguous to any inland lake, stream, river, or pond.
>
> - None of the site wetlands are greater than 2 acres in size, based upon site observations.
>
> (4) Wetlands, regardless of size, which are not contiguous to any inland lake, stream, river, or pond, if the state department of environmental quality determines the protection of the wetland is essential to the preservation of the natural resources of the State from pollution, impairment, or destruction.
>
> - FTCH does not know if the MDEQ has determined the protection of the site wetlands is essential to the preservation of the natural resources of the State from pollution, impairment, or destruction.
>
> (5) Wetlands, equal to or greater than one-quarter acre and equal to or less than two acres in size, which are not contiguous to any inland lake, stream, river or pond and are determined to be essential to the preservation of the natural resources of the Township as provided in § 22-156.
>
> - Wetland boundaries must be surveyed to determine wetland size. If Wetlands A, B, or C are greater than 0.25 acre in size, a determination of essentiality must be completed to determine whether these wetlands are regulated by the Township.

A Wetland Use Permit would be required from the Township for any of the following activities within wetland regulated by the Township:

- Placing fill or permitting the placement of fill in regulated wetland.
- Dredging, removing, or permitting the removal of soil or minerals from regulated wetland.
- Constructing, operating, or maintaining any use or development in regulated wetland.
- Draining surface water from regulated wetland.

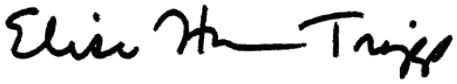
In addition, the Township requires that all structures and grading activities during site development shall be set back 40 feet from the delineated wetland boundary and a natural vegetation strip shall be maintained within

20 feet of the wetland boundary. Wetland mitigation will be required for wetland impacts, creating new wetland at a ratio of 1:1.5.

If you have any questions regarding this letter or any other wetland-related issues, please contact me at 616.464.3738 or ehtripp@ftch.com.

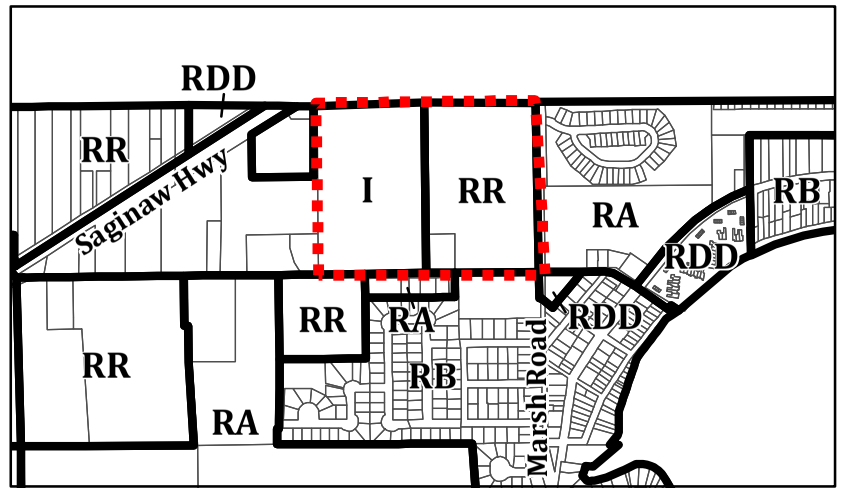
Sincerely,

FISHBECK, THOMPSON, CARR & HUBER, INC.



Elise Hansen Tripp, PWS

pmb
By email
cc: Mr. Mark Kieselbach – Charter Township of Meridian



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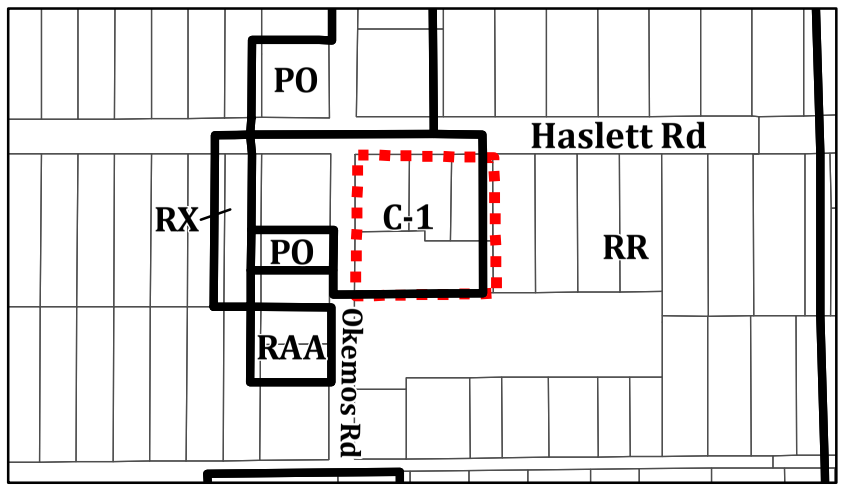

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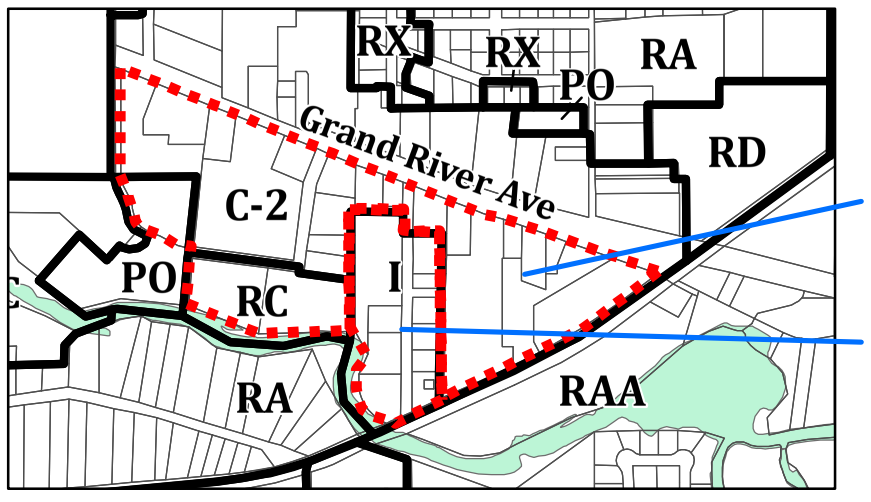

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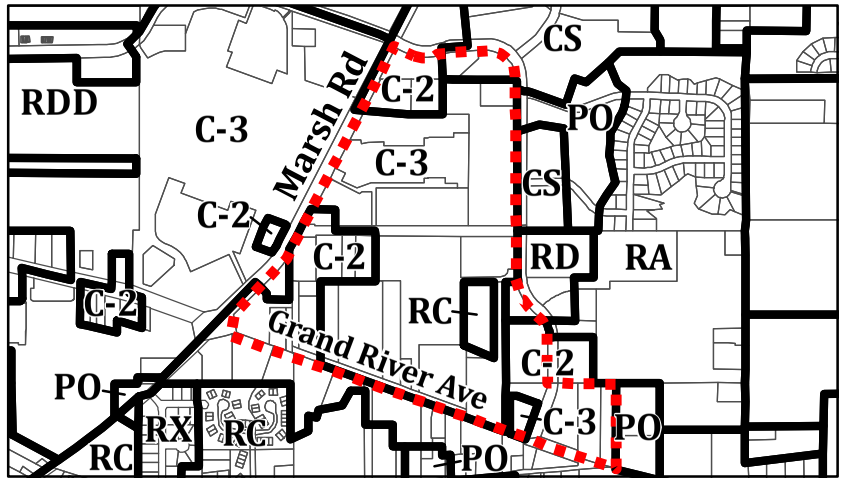

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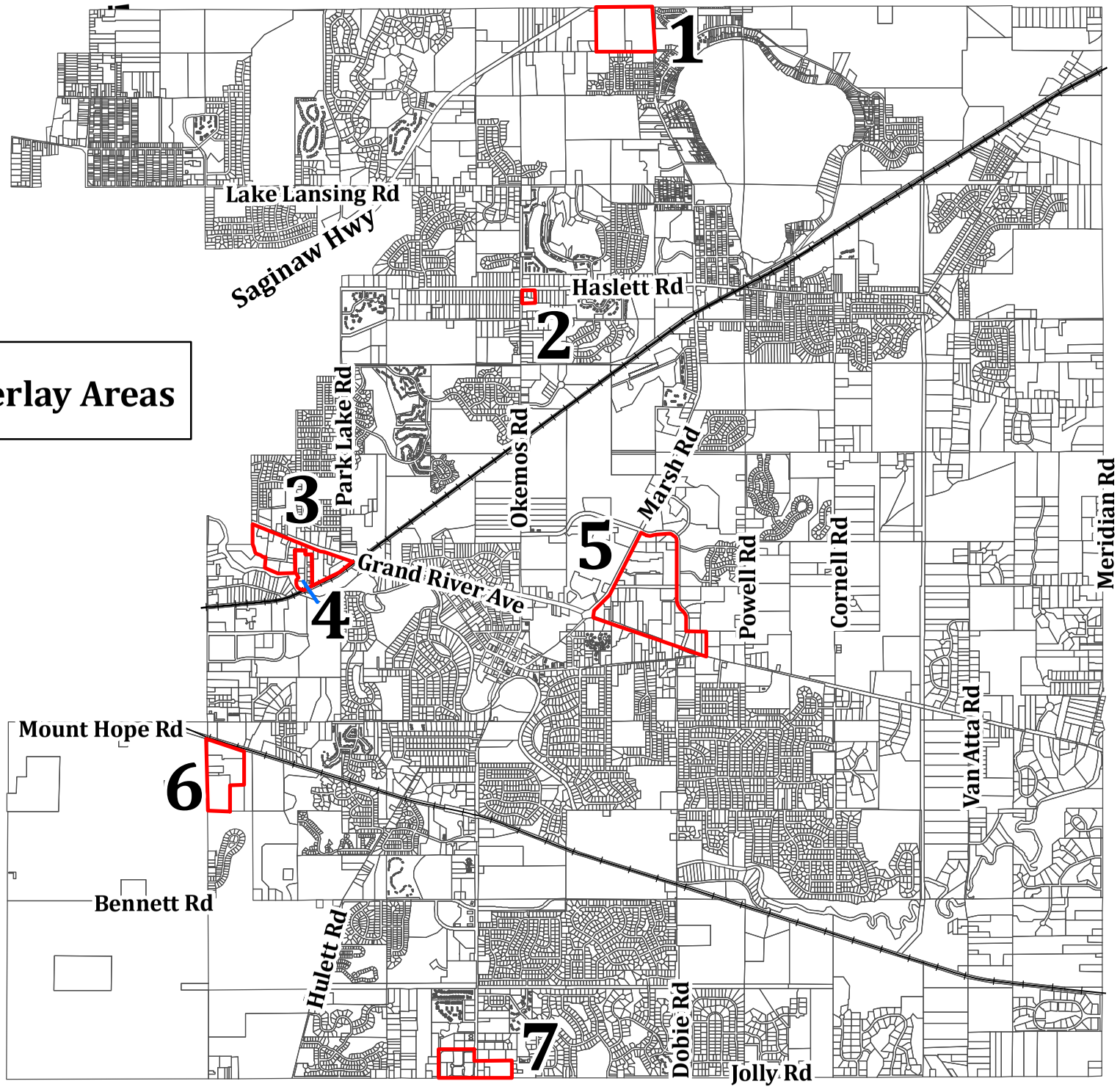
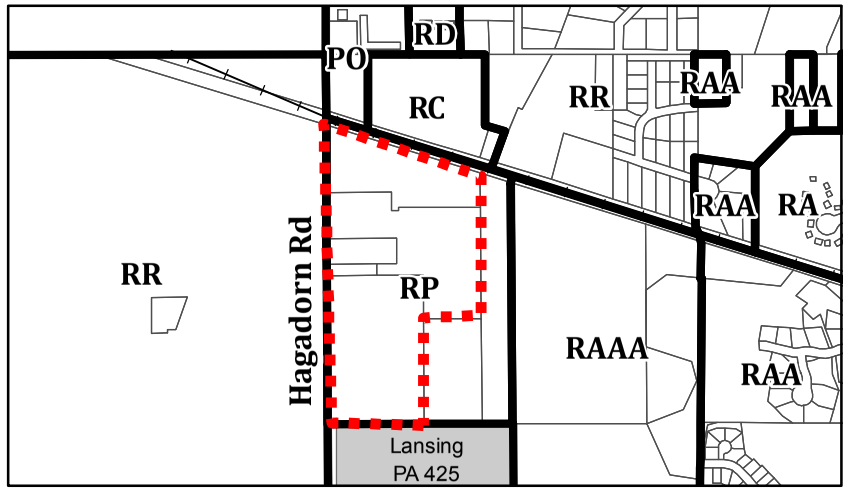


Proposed Overlay Areas



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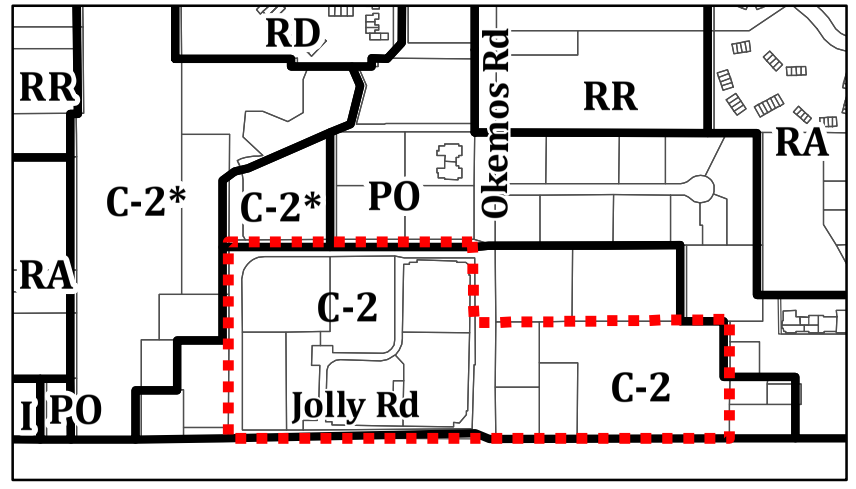

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Updated: 5/16/19

To: **Planning Commission**

From: **Peter Menser, Principal Planner**

Date: **February 6, 2020**

Re: **<u>Zoning Amendment #20020 (Township Board)</u>, amend Section 86-376 of the Code of Ordinances to allow a mix of single family and multiple family dwelling units in the RD, RC, and RCC (Multiple Family) zoning districts.**

Staff has been working with DTN Management over the last year on a potential project called Grand Reserve on the east side of Central Park Drive, north of Grand River Avenue. The Township Board reviewed a concept plan for the development in 2018, which included a mix of multiple family and detached single family dwelling units, similar to DTN's recently approved Newton Park project at the southeast corner of Saginaw Highway and Newton Road (MUPUD #18044). Given its location along Saginaw Highway, the developer felt the commercial component at Newton Park was warranted. For the proposed Grand Reserve, since it is located adjacent to an already well-established commercial area in the Township, DTN would like to make the project strictly multiple family and exclude the commercial component.

The Township's multiple family zoning ordinance (Section 86-376 of the Code of Ordinance) is comprised of four zoning districts, identified as RDD, RD, RC, and RCC. The primary difference between the districts is the density (dwelling units per acre (du/a) allowed in each, which is as follows: RDD (5 du/a), RD (8 du/a), RC (14 du/a), and RCC (34 du/a). The ordinance currently only allows a development to have a mix of multiple family and single family dwelling units in the RDD zoning district. The RDD zoning district allows a mix of multiple and single family dwellings by special use permit, but at five du/a does not provide the density needed for most projects. To accommodate a development like Grand Reserve, which will include a similar unique mix of multiple family and detached single family housing options the Township Board expressed appreciation for in the Newton Park development, a zoning amendment is necessary.

At its meeting on November 19, 2019 the Township Board initiated a zoning amendment to Section 86-376 of the Code of Ordinances to allow a mix of single family detached and multiple family dwellings in the RDD, RD, RC, and RCC (Multiple Family) zoning districts. Staff is suggesting the following changes to the ordinance to address the directive from the Board:

- New provision allowing single-family detached dwelling units in the RD, RC, and RCC, in addition to those already allowed in RDD by special use permit.
- Establishment of a 50 percent maximum standard for the number of single-family dwellings in a multiple-family project.
- Removal of the provision allowing the Planning Commission to delegate review of special use permits for multiple family projects to the Director of Community Planning and Development.
- Reconfiguration of the ordinance language to eliminate duplication.
- Standardization and simplification of the provision requiring a minimum distance between buildings.

- Elimination of the provision requiring a 25 foot setback for an entrance to a multiple-family building from any street, access road, driveway, or parking area.
- Addition of ordinance reference related to construction standards for single-family dwellings.
- Revision to the minimum size of parking spaces in multiple-family projects from 200 square feet to 180 square feet to match the standards for other zoning districts.
- Minor revisions to grammar and terminology.

A draft ordinance with proposed changes to Section 86-376 is attached. The amendment to the ordinance is not intended to address only the potential proposal from DTN; the mixing of different types of residential units is a growing housing trend and expected in future projects. Amending the ordinance now will put the Township in a position to attract diverse housing projects that provide options for those seeking alternatives to the long-term purchase of a home.

Planning Commission Options

The Planning Commission may recommend approval as written, recommend approval of a revised version, or recommend denial of the proposed zoning amendment. A resolution will be provided at a future meeting.

Attachment

1. Draft ordinance language dated January 10, 2020.

Chapter 86 Zoning
Article IV District Regulations
DIVISION 2 Residential Districts
Section 86-376 Multiple-Family Residential Districts: RDD, RD, RC, RCC Districts

(a) Purpose. The RDD, RD, RC, and RCC districts are intended to accommodate multiple-family residential uses at a higher density than any single-family district, but at no lower standards of quality. The primary purposes of these districts are to accommodate multiple-family developments of sustained desirability and stability that will be harmonious to adjacent properties, to promote large parcel, single-owner developments that allow an added degree of flexibility in the placement, bulk, and interrelationship of the buildings and uses within a planned project and adjacent areas, and to maintain the overall intensity of land use, density of population, and required open space specified in this section and in the comprehensive development plan of the Township.

(1) The primary distinction between these districts is density. The RDD zone permits a maximum of five dwelling units per acre, the RD zone permits a maximum of eight dwelling units per acre, the RC zone permits a maximum of 14 dwelling units per acre, and the RCC zone permits variable high density up to a maximum of 34 dwelling units per acre. In addition, single-family detached ~~living units~~ dwellings are permitted in the RDD, RD, RC, and RCC zoning districts~~, but not in the RD, RC, and RCC zoning districts~~.

(b) Uses permitted by right.

~~(1) All uses permitted by right in the RB district, subject to the restrictions and dimensional requirements specified therefor, except that one-family dwellings shall not be permitted in the RD, RC, and RCC zoning districts.~~

(~~2~~1) Two-family dwellings in the RDD, RD, and RC districts; provided that no more than two unrelated persons may occupy a living unit in these districts.

~~(c) Uses permitted by special use permit from the Planning Commission or planning director.~~

~~(1) The Planning Commission, after giving notice and holding a hearing pursuant to the procedures set forth in Article II, Division 4 of this chapter, may approve the following uses by special use permit:~~

~~a. Any single structure on a single parcel of land containing three or more living units.~~

~~b. Group housing developments containing up to 50 dwelling units.~~

~~(2) The Planning Commission may, by formal resolution, delegate the review and approval of special use permits under this subsection to the planning director. The decision of the planning director shall be made after notice and hearing pursuant to the procedures of Article II, Division 4 of this chapter. Any person aggrieved by a decision of the planning director under this~~

~~subsection may appeal the decision within 10 days to the Township Board pursuant to Article II, Division 6 of this chapter.~~

(~~d~~c) Uses permitted by special use permit.

(1) RDD, RD, RC, and RCC districts. The following uses may be permitted by special use permit in the RDD, RD, RC, and RCC districts, provided all requirements of this chapter are met:

a. Any single structure on a single parcel of land containing three or more living units.
b. Single-family detached dwellings when part of a multiple-family development in the RDD, RD, RC, and RCC districts; provided the number of single-family dwellings does not exceed more than 50 percent of the density (dwelling units per acre) allowed for the multiple family development.
c. Development containing a mix of single-family detached dwellings and two-family dwellings; a mix of two-family dwellings and multiple-family dwellings; or a mix of single-family detached dwellings, two-family dwellings, and multiple-family dwellings. In any case the number of single-family dwellings may not exceed more than 50 percent of the density (dwelling units per acre) allowed for the proposed development.
~~a~~d. Group housing developments containing more than 50 dwelling units, in accordance with the requirements of Article VI of this chapter.
~~b~~e. Community center when part of a housing project.
~~c~~f. Incidental commercial services for principal use of the development's occupants, when in conjunction with a housing project identified in subsection (d)(1)a. of this section containing at least 200 units; provided, that:

1. Plans for any advertising signs or window displays shall be submitted to the Planning Commission for approval;
2. There shall be no direct access to the commercial service from any exterior (off-site) road;
3. The architectural appearance of the commercial service building, if a separate structure, shall be harmonious with the appearance of other structures in the development; and
4. Commercial services shall be limited to the following:

i. Grocery stores;
ii. Services such as dry cleaning pickup agencies, shoe repair shops, beauty parlors, or barber shops;
iii. Drug stores; and
iv. Restaurants without dancing or entertainment, but excluding dairy bars and drive-in establishments.

~~d~~g. Functional families as defined by this chapter.
~~e~~h. Nonresidential structures and uses in accordance with § 86-654.

~~(2) RDD districts. The following uses may be permitted by special use permit in the RDD district, provided all requirements of this chapter are met:~~

~~a. Development containing one-family dwellings, each of which is not proposed to be located on a separate recorded lot.~~
~~b. Development containing both one-family dwellings and two-family dwellings, both one-family dwellings and multiple-family dwellings, both two-family dwellings and multiple-family dwellings, or all of the three aforementioned housing types.~~
~~c. Group housing developments containing more than 50 dwelling units in accordance with the requirements of § 86-651.~~
~~d. Community center when part of a housing project.~~
~~e. Incidental commercial services for principal use of the development's occupants when in conjunction with a housing project identified in subsections (2)b or c of this section containing at least 200 units; provided, that:~~

~~1. Plans for any advertising signs or window displays shall be submitted to the Planning Commission for approval;~~
~~2. There shall be no direct access to the commercial services from any exterior (off-site) road;~~
~~3. The architectural appearance of the commercial service building, if a separate structure, shall be harmonious with the appearance of other structures in the development; and~~
~~4. Commercial services shall be limited to the following:~~

~~i. Grocery stores;~~
~~ii. Services such as dry cleaning pickup agencies, shoe repair shops, beauty parlors, and barber shops;~~
~~iii. Drug stores; and~~
~~iv. Restaurants without dancing or entertainment, but excluding dairy bars and drive-in establishments.~~

~~f. Functional families, as defined by this chapter.~~
~~g. Nonresidential structures and uses in accordance with § 86-654.~~

(e~~d~~) Procedure for obtaining special use permits. The following procedure shall be followed for all developments identified in subsections (d)(1) and (2) of this section, in addition to the requirements of Article II, Division 4 of this chapter, relating to special use permits in general.

(1) Preliminary procedures. The applicant shall meet with the planning director to discuss any technical difficulties of a proposed development prior to formal application for a special use permit. The applicant shall provide the planning director preliminary plans of the project and preliminary engineering information on the project.

(2) Application procedures. The applicant shall submit the following information to the Planning Commission via the planning director.

a. A site plan drawn to a readable scale including dimensions and locations of buildings, parking, roads, road names, access, and preliminary landscape design;
b. A legal description of the property in question, together with proof of ownership or a certified letter from the owner agreeing to the request;
c. Existing contours of the property at two foot intervals based on USGS data;
d. Proposed contours of the property at two-foot intervals based on USGS data;
e. Preliminary engineering reports in accordance with the adopted Township water and sewer standards, together with a letter of review from the Township Engineer;
f. Ten copies of a report on the intent and scope of the project including, but not limited to:

1. Number, size, volume, and dimensions of buildings;
2. Number and size of living units;
3. Basis of calculations of floor area and density and required parking;
4. Number, size, and type of parking spaces; and
5. Architectural sketches or rendering of proposed buildings; and

g. If necessary, the planning director may require the applicant to submit selected soil borings taken on the site.

(3) Local agency review. The applicant shall provide the Township copies of the project plans for each local agency. The Township shall transmit plans to the following agencies for review and optional comment within 10 days:

a. The County Road Commission;
b. The County Drain Commissioner;
c. The County Health Department;
d. The appropriate School Board;
e. The Township Engineer;
f. The Township Fire Department; and
g. The Township Board.

(4) Public hearing. The Planning Commission shall set the public hearing date after having received all required information and plans in accordance with this chapter.

(5) Approval of special use permit. After reviewing the proposed project, the Planning Commission shall either approve or deny the special use permit, or approve subject to any conditions they deem appropriate, and shall prepare a report stating its conclusions, the basis for its decision and any conditions relating to approval.

(6) Issuance of special use permit. If the Planning Commission has acted favorably on an application for special use permit, the planning director shall issue such permit after review of construction plans to determine compliance with the terms and conditions of the special use permit, which plans shall include:

a. Detailed site plans, including a landscaping plan drawn by a registered landscape architect;
b. Detailed utility construction plans; and
c. Working plans of all other aspects of the project. If construction plans vary substantially from those approved by the Planning Commission, such variations must be resubmitted to the Planning Commission for approval after notice and public hearing.

(~~f~~e) Duration and validity of permit.

(1) The Planning Commission's approval of a special use permit shall be issued on a site plan and is valid regardless of change of ownership, provided that all terms and conditions are complied with by the new owner. Such permit shall be placed on file with the planning director.

(2) In cases where construction has not been commenced within a one-year period after approval, the permit shall automatically become null and void and all rights thereunder shall terminate. Upon written application filed prior to the termination of the one-year period, the Planning Commission may authorize a single extension of the permit for not more than one year without further notice or hearing.

(3) No permit for occupying any completed residential units shall be granted until all utilities, access drives, parking walkways, pools, screening, drainage, and other improvements indicated on the approved plan have been inspected and approved. If such improvements have not been completed and an occupancy permit is desired, a performance guarantee in the form of a cash deposit, certified check, or irrevocable bank letter of credit acceptable to the Township, covering the estimated cost of improvements associated with the project, shall be deposited with the Township to insure faithful completion of the improvements. Quarterly rebates of any cash deposits shall be made by the Township in reasonable proportion to the ratio of work completed on the required improvements as work progresses.

(~~g~~f) Minimum design standards.

(1) Minimum lot areas.

a. Refer to § 86-366, schedule of regulations for residential districts.
b. Minimum lot area requirements apply to one or more buildings on a particular parcel provided each building has at least two dwelling units in it.

(2) Minimum lot width: 100 feet.

(3) Maximum lot coverage and open space required. All buildings including accessory buildings shall not occupy more than 35% of the net area of land included within the limits of the proposed project or any stage in the development of the proposed project which may receive approval under this chapter. A minimum of 35% of the total land area of the project ~~exclusive of~~ excluding drives and parking areas must be set aside as open space. All land used for open space must be improved for the use of all residents of the development. Open space may be dedicated for public use. Such dedication may be required by the Planning Commission if shown as public open space on the ~~comprehensive development~~ Master ~~p~~Plan.

(4) Minimum yard dimensions.

a. Front yard. No less than 25 feet for one- or two-story buildings with an additional one foot required for each additional one foot the building exceeds 35 feet in height.
b. Side yards.

1. Single-family and ~~T~~two families shall not be less than 10 feet.
2. Three families to 10 families shall not be less than 15 feet.
3. Greater than 10 families shall not be less than 25 feet from the property line for one- or two-story buildings with an additional foot required for each additional foot of height of the building over 35 feet.

c. Rear yard. Building shall not be less than 40 feet from the property line for one- or two-story buildings with an additional foot required for each additional foot of height of the building over 35 feet.

d. Required setbacks. In addition to the foregoing, all buildings shall be located in accordance with the particular setback requirement of Section 86-367.

e. Distance from a single-family district boundary. No single-family, two-family, or multiple-family building designed, erected, or used for three or more families shall be located closer than 50 feet to any single-family residential zone line nor shall any accessory building to a multiple structure containing three or more dwelling units be located closer than 50 feet to any single-family residential zone line. Where commission studies indicate adjoining property will eventually assume similar zoning as property in question, the commission may waive the fifty-foot minimum.

f. Distance between buildings.

~~1. Abutting widest dimension buildings. The minimum horizontal distance between one-story square buildings or one-story buildings, both of whose widest dimensions face each other, shall be 50 feet. This distance shall be increased by five feet for every story added to either building. The minimum distance between buildings may be decreased on one side of a building by not more than 10 feet if the distance on the other side of a building is increased proportionately. If the buildings are staggered in location so as to allow free flow of air and sunlight, the distance between buildings may be decreased by not more than 10 feet.~~

~~2. Abutting narrowest dimension buildings. The minimum distance between one- or two-story buildings, both of whose narrowest dimensions face each other, shall be 25 feet. This distance shall be increased by five feet for every story added to either building over two stories.~~

~~3. Abutting narrowest dimension building to widest dimension building. The minimum horizontal distance between buildings, one of whose narrowest dimension faces the widest dimension of the other building, shall be 30 feet if one or both of such buildings are one story in height. This distance shall increase by five feet for every additional story added to either or both buildings.~~

~~4~~1. Minimum distance. Buildings with two or more dwelling units shall be located no closer than 25 feet to any other building. Detached single-family dwellings shall be located no closer than 10 feet from any other building. ~~In no case shall any building be located closer than 25 feet to any other building.~~

~~5~~2. Closed courts. No courts completely enclosed by building structure shall be permitted; however, screen walls not exceeding six feet in height are permitted to enclose what would otherwise be open court. All dimensional requirements for open courts shall apply to such enclosed courts.

~~6~~3. Open courts.

i. Projecting wings of a building that form a court, enclosed on three sides, shall conform to the following when the court face of either wing contains windows from a living room, bedroom, or dining room.

A. The minimum distance between wings shall be 50 feet for one-story buildings. For any additional stories added to either wing the distance shall be increased five feet for each additional story added to either wing.

B. The maximum distance that a wing can project from the face of a building shall be 1 1/2 times the horizontal distance between wings.

ii. Projecting wings of a building that form a court enclosed on three sides shall conform to the following when neither court face of the wings contains a window from a living room, bedroom, or dining room.

A. The minimum distance between wings shall be 25 feet for one-story buildings. For any additional stories added to either wing the distance shall be increased five feet for each additional story added to either wing.

B. The maximum distance a wing can project from the face of a building shall be 1 1/2 times the horizontal distance between wings.

~~7~~4. Other yard dimensions.

~~i. No entrance to a multiple-family structure containing three or more units shall be located closer to any street, access road, driveway, or parking area than 25 feet.~~

ii. ~~No~~ Any single-family detached dwelling, two-family dwelling, or multiple-family structure containing three or more units shall not be located closer than 20 feet to any street, access road, driveway, or parking area ~~than 20 feet~~.

iii. ~~No~~ Any single building or connected building may not exceed 200 feet in any one dimension. All buildings shall be so arranged as to permit emergency vehicle access, by some practical means, to all sides.

(5) ~~(Reserved)~~ Single-family detached dwellings shall be constructed in accordance with the standards established in Section 86-368(b)(1) a.-l, unless otherwise superseded by provisions of this section.

(6) Maximum building height. Maximum building height shall not exceed 2 1/2 stories or 35 feet, except as noted below. No space below grade level shall be used for dwelling purposes except as follows.

a. When the finished floor grade of the space below grade level is no more than four feet below finished outside ground level at any point on the property of that part of the structure enclosing the below grade dwelling space.

b. On sloping sites when the finished floor grade of the space below grade level is finished outside ground level for at least the length of one wall. In the same instance, such dwelling space have either adequate through or cross ventilation.

c. Building height may be increased to a maximum of 70 feet in the RC zone and 12 stories in the RCC zone; provided, that:

1. The building in question is part of a group housing plan and receives Planning Commission approval.
2. All yard requirements, except distance to parking areas or street, must be increased by one foot for every two feet of building height in excess of 25 feet.
3. No structure in excess of 25 feet in height shall be placed closer to any property line than a distance equal to 1 1/2 times the height of the building, or 50 feet, whichever is greater.

4. Any proposed building in the RCC zone which is to exceed 70 feet in height must be approved by the Township Engineer and fire and building departments for fire protection and water service prior to issuance of a special use permit.

(7) Signs. Identifying any of the permitted uses in this district shall be in accordance with those requirements specified in Article VII of this chapter.

(8) Minimum living space. Minimum gross living space area for multiple-family dwelling units shall be 350 square feet for one room, 500 square feet for two rooms, and 750 square feet for three rooms. An average of 100 additional square feet for each room in excess of three rooms. The term "room" as used in this subsection shall not include kitchenette, dinette, alcove, bathrooms, halls, or patio.

(9) Parking requirements. For motor vehicle and bicycle parking requirements, refer to § 86-366 and Article VIII of this chapter. In addition, every multiple-family structure shall provide motor vehicle parking facilities which:

a. Are appropriately spaced and divided by landscaped areas as opposed to one continuous parking lot.
b. Are screened by landscaping and physical structures and where feasible, depressed below eye level or enclosed.
c. Are served by two points of access to public street when there are 50 or more living units in the project.
d. Are served by access to a public street other than a local street when there are 25 or more ~~living~~ dwelling units in the project.
e. Shall provide a minimum of ~~200~~ 180 square feet in area for each vehicle parking space, each space shall be definitely designated and reserved for parking purposes, and each space shall be accessible separately from a drive.
f. May be allowed within or under any multiple-family structure; however, carports or surface ~~nonself-contained~~ parking shall not be located closer than 20 feet to any multiple-family residential structure.
g. Shall have no parking located farther than 150 feet from one entrance to the multiple-family structure which it is intended to serve.
h. Shall have no commercial repair work, servicing, or selling of any kind conducted on any parking area.

(10) Storage of refuse. All refuse containers, including trash and recycling containers, shall be enclosed on at least three sides by a screening device approved by the planning director, subject to the following provisions:

a. For existing uses receiving a certificate of occupancy prior to the effective date of this section, recycling containers shall be placed adjacent to other refuse containers on-site. If the planning director determines that it is not practical to place the container adjacent to other refuse containers on the site, such containers may be placed in parking areas, provided that the space used for the container shall not occupy required parking spaces and further provided that recycling containers shall be enclosed on three sides by a screening device approved by the planning director.

b. For uses receiving a certificate of occupancy after the effective date of this section, recycling containers shall meet the requirements of this section and the requirements for site plan review under Article II, Division 5 of this chapter.

(11) Landscaping required. Landscaping acceptable to the Planning Commission shall be provided in open spaces, around buildings, and within parking areas. No occupancy permit may be issued until landscaping has been inspected and approved or a performance bond equal to the estimated cost has been posted with the Township.

a. A plan for control of soil erosion which meets the Township's standards for soil erosion and sedimentation control shall be carried out during the construction and completion of the project.

b. When deemed necessary by the Planning Commission, in order to protect surrounding properties, appropriate screening of plant materials, wood, or brick, approved by the Planning Commission, may be required.

(12) Density. The density (dwelling units per acre) in the RDD, RD, RC, RN, and RCC zoned districts shall be in accordance with the table below and the following stipulations:

a. Maximum Density Table.

Zone	Maximum Density (dwelling units per acre)
RDD	5
RD	8
RC	14
RN	14
RCC	34

b. Those sites which contain wetlands and/or floodplains shall be permitted a maximum number of units based on the following formula:

N = A x D x C

Where:

N = Maximum number of units permitted.
A = Area of site outside the floodplain and wetland.
D = Allowable density from Maximum Density Table [Subsection (g)(12)a above].
C = 1+ percent of site in floodplain and wetland expressed as decimal.

For purposes of this chapter, wetland areas are those lands which meet the definition of a wetland set forth in § 30301 of the Natural Resources and Environmental Protection Act (MCL § 324.30301). For purposes of this chapter, floodplain areas are those lands which meet the definition contained in § 86-436(b).

State law reference: State-mandated residential uses, MCL 125.286g.

Chapter 86 Zoning
Article VIII Off-Street Parking and Loading
DIVISION 2 Off-Street Parking
Section 86-756 Design and construction requirements

In addition to general design requirements specified in other sections of this division, the following design and construction requirements shall be satisfied in all of street parking areas, except for single-family parking areas and as noted:

(1) – (2) Remain as written.

(3) Minimum residential parking space size. A minimum of ~~200~~ 180 square feet shall be provided for each vehicle parking space located within a multiple-family residential development.

(4) – (14) Remain as written.

To: **Planning Commission**

From: **Peter Menser, Principal Planner**

Date: **February 6, 2020**

Re: **Brownfield Redevelopment Authority recommendation**

The Township Board established the Meridian Township Brownfield Redevelopment Authority (MTBRA) in 2017. Under the bylaws established by the MTBRA and approved by the Township Board, the MTBRA membership shall consist of the Township Manager and a member each of the Planning Commission, Economic Development Corporation, and Environmental Commission, and three members having an interest or expertise in the fields of engineering, finance, and law. The inaugural representative from the Planning Commission on the MTBRA was former Planning Commissioner John Scott-Craig, who was appointed in 2017 for a three year term expiring December 31, 2020. With Mr. Scott-Craig's resignation from the Planning Commission a new Commissioner is needed to fill the rest of the term on the MTBRA. The Planning Commission recommendation for service on the MTBRA is subject to approval by the Township Board.

The following motion is provided to recommend a member of the Planning Commission to the MTBRA:

- **MOTION TO RECOMMEND _____ TO SERVE AS THE PLANNING COMMISSION REPRESENTATIVE ON THE MERIDIAN TOWNSHIP BROWNFIELD REDEVELOPMENT AUTHORITY FOR THE REMAINDER OF THE TERM EXPIRING DECEMBER 31, 2020.**

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To: **Planning Commission**

From: **Peter Menser, Principal Planner**

Date: **February 6, 2020**

Re: **2020 Planning Commission goals**

In 2019 Planning Commission adopted goals to work on throughout the year. The 2019 goals included the following:

1. Implementation of 2017 Master Plan.
   a. Consider development of form-based code ordinance for Potential Intensity Change Areas (PICAs) and Grand River Avenue corridor.
   b. Address the revisions to the Zoning Ordinance and Zoning Map identified in the Action Plan on Page 15 of the Master Plan.
2. Update the Mixed Use Planned Unit Development ordinance.
3. Identify training opportunities for new and current Planning Commission members.
4. Engage subject matter experts for presentations to the Planning Commission on policy-related topics of interest.
5. Complete a plan for the review and update of the Master Plan in 2020.
6. Revise the sign ordinance so it is content neutral.

The Planning Commission may again choose to consider goals for 2020 and objectives that can be used to accomplish them. The adoption of goals for the year will not preclude the Planning Commission from working on other projects; they simply provide a guide for activities for the year. The Township Board adopted its own set of 2020 goals and the Township Manager assigned a work plan for the Department of Community Planning and Development, both of which are attached. The Planning Commission goals should address both sets of goals whenever possible.

Big Picture Goals

In addition to the typical goals for the year, the Township Board has invited the Planning Commission to draft a list of three big picture, long-term goals for the Township for review during their annual goal setting retreat on Saturday, February 22, 2020. Please come prepared to the February 10, 2020 meeting to share any big picture goals you may have for the Township.

Attachments

1. 2020 Township Board Goals/Action Plan.
2. 2020 Department of Community Planning and Development goals.

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2020

GOALS ACTION PLAN

A. Fulfill our August 2019 promise to allocate, and account for, 100% of the local road bond revenue in an effective and transparent process. At a minimum, we shall complete work on 26.94 miles of local roads and enhance our PASER rating from a 4.48 to 5.08.

B. Serve as an active partner in redeveloping the Village of Okemos and Downtown Haslett.

C. Enhance Township diversity and inclusion initiatives that promote equal opportunity in workforce recruitment, employee retention, flexible work environment and housing opportunities.

D. Fulfill our promises made to voters in 2017 by allocating enhanced pension payments to MERS, maintaining 73 emergency responders and submitting our purchase order for a new ladder truck.

E. Expand our branding efforts to include new community pride signage at the major entry points to Meridian Township. We shall also include welcoming signs at the Marsh Road and Central Park Drive ingress points to our Municipal Building.

F. Open our much-anticipated Meridian Township Marketplace on the Green.

G. Continue progress on the Meridian Township Sustainability Plan by expanding our solar energy capacity through installing two 20KW photovoltaic panels on township property, by joining with Michigan State University on their solar panel project, and by increasing energy efficiency at township facilities by replacing the outdated HVAC system.

H. Complete a thorough cost/benefit analysis for a potential new site to construct an environmentally sound Meridian Township Recycling Center.

I. Be diligent in our efforts to have a successful 2020 Meridian Township Census Count.

J. Continue to work to connect the Township's pathway system, including beginning construction of the MSU to Lake Lansing phase one and two in the fall of 2020.

2020 Work Plan ~ Community Planning & Development

Mark Kieselbach, Director

1. Serve as an active partner in redeveloping the Village of Okemos and Downtown Haslett. (Action Plan B.)
2. Enhance Township diversity and inclusion initiatives that promote equal opportunity in workforce recruitment, employee retention, flexible work environment and housing opportunities. (Action Plan C.)
3. Complete Form Based Code for the western portion of Grand River Avenue.
4. Complete a plan for the review and update of the Master Plan in 2020.
5. Revise the sign ordinance so it is content neutral
6. Update and amend the Mixed Use Planned Unit Development ordinance.
7. Finish updating all applications used by the Department.
8. Continue to discuss the need for a separate ordinance to address short term rentals.
9. Continue the discussion with the City of Mason to provide increased building services and determine the cost for the Township to provide the additional services.
10. Provide rental housing inspectors with tablets and create an interactive inspection checklist to streamline inspection reporting.
11. Evaluate checklists and guides for residential and commercial permit applications to streamline the processes and eliminate unnecessary confusion and questions.
12. Work with the City of East Lansing to decrease the time for an applicant to wait for mechanical, electrical, and plumbing inspections.