

ACME TOWNSHIP PLANNING COMMISSION ACME TOWNSHIP HALL 6042 Acme Road Williamsburg, MI 49690 April 10, 2023 7:00 p.m.

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE 7:00 pm

ROLL CALL: Present: Dan Rosa, Dan VanHouten, Steve Feringa, Karly Wentzloff, Marcie Timmins, Jean Aukerman

Excused: Jack Challender

Staff Present: John Iacoangeli, Planner, Beckett and Raeder; Lindsey Wolf, Acme Township Planning and Zoning Administrator; Marcie Timmins, Acme Township recording secretary.

A. LIMITED PUBLIC COMMENT: Members of the public may address the Commission regarding any subject of community interest during public comment periods by filling out a Public Comment Card and submitting it to the Secretary. Public comments are limited to three minutes per individual. Comments during other portions of the agenda may or may not be entertained at the moderator's discretion.

Opened at 7:01pm

Brian Kelley-¹Discussed the mandatory forebays in Acme's ordinance and how the Acme Village Flats site doesn't have them. Felt that Gosling Czubak's explanation that the sediment would be localized and collected in the spillways entering the wetlands is "twisted logic". The ordinance has forebays for the very specific reason of stopping the spread of sediment throughout the basin. Went on to read parts from the stormwater ordinance including that the part about capacity of the forebays shall be equivalent to 5% of a twenty year flood control volume. Says the plan will need extensive changes to meet that requirement. Worried about the slopes on the east and west side of the building sites. Looks like they are building right up to the wetland buffer and the 35% slope. He saw that they logged 40 feet along the right-of-way. There is a wetland there, it is on the national wetland inventory. The wetland drains down Mt. Hope Rd. and regularly floods two hotel parking lots and ends up in an MDOT basin that drains directly into Grand Traverse Bay. Public comment closed at 7:05

- B. APPROVAL OF AGENDA: Motion by Rosa, support by Timmins to approve the agenda with the addition of G.2.-Kelley Motion carries unanimously
- C. INQUIRY AS TO CONFLICTS OF INTEREST: None
- D. SPECIAL PRESENTATIONS: None
- **E. RECEIVE AND FILE:**
 - 1. **RECEIVE AND FILE**
 - a. Unapproved Township Board Meeting Minutes 3.7.23
 Motion by Feringa, support by Timmins to receive and file the Township Board Meeting Minutes from 3/7/23
 Motion carries unanimously

F. APPROVAL OF MINUTES:

a. Approve Draft Planning Commission Meeting Minutes 3.13.23

Motion by Feringa, support by Timmins to approve the Draft Planning Commission Meeting minutes from 3/13/23 with edits: spelling of Timmins; change under old business, scenario two, picture A should be labeled picture B; correct the spelling to Sara Kopriva's name under old business.

Motion carries

G. CORRESPONDENCE:

- 1. Elk Rapids PC- notification from the Township of Elk Rapids that they will be preparing to revise their Master Plan.
- 2. Kelley- Outlining four issues from Acme Village Flats, phase one. The four issues are, 1)

stormwater issues that do not comply with the Acme ordinances. 2) Wetland clear cutting along Mt.Hope Rd. April 5th and 6th. 3) Construction as close as possible to the wetlands and the flooding risks. 4) Traffic concerns regarding the 55 mph road and the two million dollar new tart trail route.

H. PUBLIC HEARINGS:

1. None

I. OLD BUSINESS:

Wolf- Based on previous discussion the Planning Commission decided that the future land use map was part of a larger discussion to have during the Master Plan five year update. Wolf notified the applicant and spoke with counsel. Jeff said that the letter the applicant had written was sufficient to withdraw the requests. The planning commission doesn't have to take any further action on the two rezonings.

- 1. Formal withdrawal of Rezoning Amendment 001
- 2. Formal withdrawal of Rezoning Amendment 002

J. NEW BUSINESS:

1. SPR 2023-01 Acme Village Flats -

John I.- The area in question for the site plan is zoned for neighborhood, mixed use housing under the M72/US31 zoning amendment that was made several years ago. Project density is estimated at 5.75 the density in this district can go up to 12 units an acre. It meets density and parking requirements for the district. Development provides 8,880 sq. feet of snow storage, per the ordinance. The project meets all the setbacks and landscape requirements. Observations, they are providing a 5' sidewalk along Mt.Hope as required in the ordinance. They only show a sidewalk on one side of the development, recommending a sidewalk on both sides of the street. As per the ordinance it says that all development in this district will be a walkable neighborhood with walkable sidewalks. With the option for on street parking. Another concern is that the sidewalk is adjacent to the street and when they clear the snow the sidewalk will be completely covered. Recommended that the right in, right out on the drives be eliminated, didn't think it was necessary. This was confirmed by the traffic study, that there wasn't sufficient traffic to warrant the right in, right out. Also noted a 25' setback from the adjacent wetlands, due to the topography that additional plantings, particularly native grasses, be installed in order to slow the water down and increase the filtration. Noticed that the emergency drain overflow between buildings one and two and at the southwest corner of the property drains directly into the wetlands. There should be some type of mitigation in terms of additional plantings there in order to reduce the blossoming of the stormwater and to create additional filtration before it gets into the wetland area. The monument sign detail was too large according to the ordinance. Illuminated signs can only be 6' in height with an area of twenty-four square feet. Recommended that they install pole lighting less than 22 feet in height: LED at the entrance and exit off Mt. Hope, at the mailbox cluster, and at the two crosswalks at the end of the development.

Wolf- Talked with Bob Verschaeve, same situation as horse shows. Confirmed that they didn't drill 2 test holes and they didn't meet the five foot depth minimum. Jeff responded in a meeting that it needs to meet the ordinance. The Planning Commission approved horse shows with a condition based upon it meeting the stormwater standards of drilling the 2 holes and meeting the five-foot depth standards in the ordinance. Per Wolf, Verschaeve said that this is outdated and needs to be revised when we do our rewrite. The Planning Commission is not at that point yet. To be consistent with how we have treated

other applicants it is important we treat this the same.

Wentzloff- just to address the sediment forebay?

Ryan Cox- from GTEC. There is a lot of elevation on Mt. Hope Rd. Talked with Verschaeve. There is a treatment forebay that is for an industrial site, not one like this. Then there is a sediment forebay. They are proposing a bio retention basin that will have planting that will help accumulate sediment and also uptake things for the basins themselves. Where they have any overflow they have quite a bit of volume before an overflow can happen. Looked at two scenarios for the basins and did infiltration testing. The reason for that is they were going to do infiltration basins, based on a 100 year volume minus what the capacity of the infiltration of the soil was. They didn't do that but did prove they had infiltration. The reason they didn't do it at five feet, is because there is a layer of clay down there. So they did it elevated at four feet above what they thought would be the bottom separating the groundwater table. The reason for that is it is similar to an onsite wastewater treatment system. Half the site is hard surface and half is not. The buildings themselves have a stone drain behind them that will catch runoff from the roof. The rest of the site has an enormous amount of stormwater volume, including taking on water from 6 acres that runs off the hill that comes down to it. The overflow locations are where the natural drainage would run off this site. Bob and I came up with an agreement that would be bio infiltration basins, very very large areas of the ponds that we are ok with the stormwater sitting there. Thinks that most of the stormwater that hits the wetlands is actually from Mt. Hope Rd. Confirmed that they have good infiltration on site, so they don't actually need a slow release into the wetland.

Discussion followed about what is needed to meet the ordinance on this site. They need to bore the correct number per basin and to the correct depths.

Wolf- Explained that Verschaeve had felt that doing more than 1 boring in a basin would give the same result because it is in the same basin with the same soil.

Wentzloff- That is where Jeff (Jocks) would say we have to still comply with our own ordinance .

Ryan Cox- Believes they met the ordinance because of how they worked it out with Bob (Verschaeve). We have three borings drilled to some pretty deep depths on the site. Then we did three hand-auger borings. They all show the same thing: there is sand and a layer of clay. So we brought the basins up to pretty much a matching grade. With the bottom of the basins established at about four feet where they saw the groundwater when they did some hand augers out there. The requirement is an infiltration basin which we initially proposed but ended up changing it to the design we now see. Would be happy to talk to Bob further if the PC feels the project isn't meeting the ordinance.

Wentzloff- Stated she doesn't know enough to have an opinion on the design, only knows that legally the township has to follow our guiding document.

Discussion followed

John I. - Told Ryan to check appendix 9; percolation test. There has to be a minimum of two holes, 4-6 inches in diameter to a depth of five feet below the bottom elevation of the proposed stormwater infiltration basin.

Wolf- What Bob's(Verschaeve) report is showing is a series of linked infiltration and bioretention basins so it's calling out two different types of stormwater systems.

Ryan Cox- Will be happy to work with Bob to solve this problem.

James Sharba- Works with Spaceworks, Granger and GTEC

Sharba stated that, early on in their diligence, they did three borings, twenty feet down. He said the township is getting rid of this in the ordinance but, because the township hasn't done that yet, the Township expects them to comply with it. He said they will complete the additional borings and whatever they have to do to get that done. He doesn't want the PC to have any issues. He wants this to be successful.

Aukerman- Said she has been through this on the board for Horse Shows and now with this discussion. Explained she has no idea what the stormwater ordinance rewrite will look like and what it will entail. Doesn't know what will go away or what will lessen. Emphasized that, right now this is the ordinance so we need to adhere to it.

Sharba- Said he doesn't understand why this wasn't addressed with Bob (Verschaeve). When Sharba reviewed all Bob's comments, this wasn't mentioned.

Wentzloff- I can't tell you why Bob didn't catch it.

Sharba- Went over the bioretention basins, 5 foot sidewalk, and the current location of the TART Trail along Mt. Hope Rd. Discussed the set back of the facade. They also have recessed porches on the backs of the buildings. Went over how the process started in 2022. On parts of the site there is a 38' fall from Mt. Hope down to the wetland area. Discussed speed limit along Mt. Hope Rd. They originally thought it was 35 mph. After sitting down with the road commission they found out the 35 mph was just a suggested speed for the curves, because it is not posted, it is 55 mph along Mt.Hope Rd. They started talking to Lindsey and Doug, the fire chief, the sheriff and TART Trails. There is a lot of support to lower the speed limit. Worked with Doug, and the board voted to submit the request for lowering the speed to 35 mph to the County. The County has sent it down to Lansing. The state police have it now and will be doing their analysis. Our hope is it gets reduced down to 35 mph. They see the speed limit as a safety issue. Because they don't know if the speed limit change will happen they have designed the project without it being 35 mph. Found out there was a PD on this property that stuck with the dirt. Nothing had been built on it since the hotels. Reached out to the landowners to see if they could get rid of the PD. When they started this project early on Acme had a different ordinance. There was a hold out on getting rid of the PD, so they had to work with it. As a result they applied for a minor amendment which the planning commission granted. This allowed us to move forward on phase one, the project they are here presenting tonight. As well as the other portion of the site they own that they are referring to phase two. They have a water agreement as a draft tonight.

The project they are bringing are three different style flats. They have a zero entrance off the driveway through the front door that makes them very manageable from a handicap standpoint if need be. All of them have two car garages. There are two, 2 bedrooms and one 3 bedroom. They range from 1300-1400 square feet. They were able to create private balconies on the front of the building and every unit also has a rear patio as well. Talking with TART to improve on the path and make it part of their project. They show it along the railroad and through their project and back down. They would very much like to see the trail go along the project and get the right of way along the railroad.

Addressed John I.'s issues. The first observations 1-6 are pretty straight forward.

Nothing in there to take issue with. The garages and having some articulation in their design. I feel like with our rendering we have achieved that. Driveways are 24', helps with the grade and gives plenty of room. In this development you don't see front doors as they are set back. Comment number 4 had to do with landscaping on the west side of the development. Our property is outside of the 25' set back. There is a 12' easement for the sewer then there is another 10' after that before we get to the building. They are sitting 45-50' away from the wetland. The comment talked about adding some landscaping in there to help with the filtration. They are happy to look at that. There is additional landscaping they are proposing to do, around the foundations and some other areas. What we are seeing on the plan is what is required by Acme's ordinance. They put a tree in front of each of the units, it just turns out there are 60 trees. They will look at putting additional grasses, to make this lush.

Feringa- Down below building B2, calls for a grass swale or a grass retention area, the smaller one. Wanted to clarify that was what it was going to be?

Cox- We did change it to a bioswale, because that was the final release from the site if we ever get a whopper of a storm. That flows back into the ditch.

Sharba- Let's talk about sidewalks. Showing sidewalks around the interior, they are 5' as called for. Pointed out crosswalks and where a road extended further for connecting a future project. In hopes, I'm indicating the TART trail, where he pointed out the dotted line. Then the connection would come back into our development. Can't find any information that the sidewalk should be anywhere other than where Sharba would like to put it. Has talked to the fire chief, Brian Belcher, about the space needed for turning around. They had 4' planned, and the fire chief asked for 5'. Do we need to put sidewalks on both sides? If so, that will cause a major redo of our plan.

John I.- The sidewalks were pointed out about 10 months ago, the response I got from Lindsey is that you would wait and make your pitch to the planning commission. Two months ago I gave you some of my initial observations. You certainly had time to talk to me about it.

Sharba- Apologized, didn't know he could reach out to John I. and have a conversation. Lindsey has been his contact.

John I.- The ordinance says that the community should be walkable. The PC has to decide if they think one sidewalk adjacent to a paved road makes it a walkable neighborhood.

Discussion followed

John I. asked about off street parking

Sharba- pointed out the areas of parking throughout the development for off street parking.

Aukerman- asked about people adhering to the correct use of parking areas and not parking on the streets.

Sharba- They enforce the parking, especially because of snow removal. They don't want to be towing cars.

Wentzloff- asked about garbage, does each unit have their own or is it collective? And Where are the bike racks?

Sharba- each unit has their own garbage can, and we forgot to add bike racks but we will. Would want bike racks near the CBU area.

Discussion followed about the number and location of bike racks.

Sharba- Asked that the condition give the flexibility to work with Lindsey administratively to come up with the number and locations of the bike racks.

Sharba- discussed the access roads off Mt. Hope and onto the development. If the speed limit remains at 55 mph, 610'- line of sight is needed from the road over to the development driveway. The blue line on the plan represents the line of sight needed if the speed limit drops to 35 mph. It improves from a sight line stand point. The second access road is needed due to the tightness of the site. Without it they couldn't get a firetruck back out without getting rid of a building or two at the end and creating an area for a truck to turn around. The Brian, the fire chief, preferred to have the ability to get back out to Mt. Hope.

John I.- Wanted to clarify that by getting rid of the right in/ right out, wasn't to get rid of the whole driveway. Just make it a normal driveway.

Discussion followed

Wentzloff clarified that if the speed limit remains 55 mph the driveway would remain right in/ right out due to the sight lines, but if the speed limit gets dropped to 35 mph then it will function as a normal driveway.

Discussion followed to clarify the road commissions report and comments showing that it has to be right in/right out at a higher speed. Also discussed what would happen if they get the land use permit and then the speed gets changed. A request for an amendment would have to be filed.

Wentzloff- Seems everyone wants it to be a traditional intersection not the right in/right out.

John I- recommends putting it in as a condition.

Discussion followed on why MDOT and not the County Road Commission was weighing in.

Sharba- Had gotten the dimension wrong on the sign. It is just under 24 square feet after adjusted measurements.

Photometrics- Wall sconces on the side of the garage door and one at the front entry of each unit. Those will all be on a timer. Will take John's comments into consideration and look at the locations for lighting at the pedestrian scale. Would like to make them even lower than 22'.

Wolf- will these be rental units or will they be available for purchase?

Sharba- They will be rentals.

Rosa- asked about the width of the sidewalks on the inside of the development.

Sharba- They will be 5'

Rosa- Will the sidewalk have a concrete curb, or will it be flush with the pavement?

Cox- It will be flush with the pavement.

Wentzloff- Is it color delineated?

Sharba- Yes the roads are asphalt and the sidewalks are concrete. Done so that the whole area can be plowed.

Rosa- asked where the snow would go when removed or if it would be pushed into the yards?

Sharba- There are maintenance contracts in place for snow removal for the roads and the driveways.

Wentzloff- asked what the PC thought of having the sidewalk on one side of the road versus two.

Discussion followed.

VanHouten- asked about a covered bus stop for kids.

Sharba -asked why the buses wouldn't come into the development

Wentzloff- explained TC bussing issues.

Wentzloff- took a strawpoll about having sidewalks on just one side. PC members were ok with having sidewalks on just one side of the development. Aukerman and Timmins both support having more native grasses between the wetlands and the development.

Motion by Feringa, support by Timmins to approve SPR 2023-01 Acme Village Flats, with these five conditions.

1) site includes additional lighting at the entrances, mailboxes and crosswalks. Not to exceed 22' and they will be LED lights.

2) Soil borings would be done to a depth and quantity as required by the stormwater ordinance, prior to issuance of a land use permit and reviewed administratively.

3) The site will include three bike rack locations with a minimum of three racks at each location.

4) The right in/ right out, will turn to a standard intersection if the speed limit is reduced to 35 mph. This will be reviewed administratively.

5) Additional native plants will be included along the west boundary adjacent to the

wetland. To be reviewed administratively by a landscape architect.

Motion carries unanimously

K. PUBLIC COMMENT & OTHER PC BUSINESS

Public comment opened at 8:42 pm

Brian Kelley- No issues with this project per se, just adamant about some stormwater issues. Discussed the Koti site and the solar site as examples of stormwater run off into the stream as well as basins built too close to wetlands and creeks. Discussed the clay bands that run throughout the township and how they may vary in depth just a few feet away. Loves bioswales but worries that the bioswale they have by the road will get clogged with sediment from the road. Disappointed the PC didn't put a condition on to address the forebays. He thinks it will be hard to get the sediment out of the bioswales. Disappointed that flint fields are still struggling to get infiltration tests done. Wetland and basin cleaning is more expensive than just implementing forebays. Wondering where the open space is on this development?

Closed at 8:46

1. Planning & Zoning Administrator Report – Wentzloff asked if the updated bylaws were up on the website.

Wolf- they are not up on the website, made a note to put them up.

Next week is the MTA conference a few from Acme will be attending. Wolf is going specifically to a workshop on affordable housing. Would like to work with Beckett & Raeder on discussing doing a housing inventory. Also attending a workshop on increased park usage, as they get ready to update the Park and trails master plan. Monday they are reviewing the next survey, Beckett & Raeder are hosting.

Reaching out to Trailside Solar, EGLE, soil erosion, stormwater inspector plus Lindsey and Doug are scheduling an inspection prior to spring construction operations beginning.

- 2. Township Board Report Jean Aukerman- The Board is continuing to discuss the sewer line replacement along Parsons. Looking for funding, two million was awarded from the County due to ARPA funds. Continuing to work on the due diligence for the Bertha Voss project
- **3.** Parks & Trails Committee Report –

ADJOURN: Motion by Timmins, support by Rosa to adjourn. Motion carries unanimously.

From: Brian Kelley To: Acme Planning Commission April 10, 2023

Re: Acme Village Flats Phase 1

Good evening,

I am particularly interested in the Storm water portion of this project. Unfortunately there are multiple issues that render the project currently noncompliant with Acme ordinances.

- 1. Stormwater issues that do not comply with Acme ordinances
- 2. Wetland clear cutting along Mt Hope Road on April 5th and 6th
- 4. Construction as close as possible to wetlands, flooding risks
- 3. Traffic concerns 55mph road, and \$2 million new TART trail route

1. Storm water

Numerous aspects of the storm water system as presented do not comply with Acme's storm water ordinance in substantial ways. As we recently heard at a self storage site plan review, the PC cannot grant non-compliance waivers of ordinances - even for things as apparently minor as shrubs.

Time does not allow me to document all of the issues - thank you for the new 2:00PM deadline, you are doing wonderful things for public engagement and water quality protection.

The basins on this project push the envelope of ordinance compliance by locating the infiltration floor to within just 4' of groundwater. That makes determinations regarding the system very critical.

Wetland and Lack of infiltration tests

This project borders on the west side by an extensive regulated wetland that is in the national inventory. The project proposes to construct structures as close as possible to the wetlands - right up against the 25' setback.

<u>PC should clarify with a Condition that no disturbance or activity is allowed within the 25' buffer.</u>

Any discharge into that wetland will food adjacent properties and concourses in violation of Acme ordinances, and contrary to the uninformed claims by the applicant.

These flows are regularly seen on Mt Hope road, when water floods the Holiday Inn property, and continues to flow into the parking lot of Comfort Inn. Other flows emerge from the wetland along Mt Hope road and travel down via the ditch to the MDOT basin, which regularly overflows. That basin drains into East Bay. The numerous basin outlets on the infiltration basins of this project are unusual. And they are sending their overflow storm water into the wetland, and Grand Traverse bay. More protections should be added here.

Also, the PC can increase the buffer distance from the wetland and should

Insufficient Infiltration testing does not comply with ordinance

The Acme Storm water (SW) ordinance requires 2 infiltration tests in each basin footprint. This project has only submitted 2 infiltration tests for the entire development. They have not performed an infiltration test in each major basin. **This does not meet the ordinance requirement.**

The two provided tests were in the NW corner of the project and middle west side. No data has been provided for the critical southwest basin that is located in close proximity to the wetland.

Pushing envelope with depth of ground water

The two Infiltration test results provided by the applicant indicate the "depth to the bottom of the hole" of only 13 inches. The ordinance requires a test of 5 feet below the elevation of the basin floor. The depth of the hole must be at least 5 feet. **DOES NOT MEET THE ORDINANCE, CANNOT BE APPROVED.**

Location #1 test:

	#1
Percolation Test Data Form	N
Location: <u>#1</u> Test Hole Number: <u>Adj</u> to SB#1	
Test By: TAC	
Date of Test: $10/1072$ Depth to Bottom of Hole: $13''$ Diameter of Hole: $4''$	

Location #2 test:

Percolation Test Data Form

Location: $\#2$	
Test Hole Number:Adg, to	38-2
Test By: <u>RAC</u>	
Date of Test: 10/19/2022	_
Depth to Bottom of Hole: 13^{17}	Diameter of Hole: 4

Sediment forebays missing

The Acme SW ordinance requires sediment forebays. Numerous basin inlets omit this requirement. The GZ review mentions this but does not explain why or how a waiver is being granted, especially so close to wetlands.

11

Discharge into wetlands.

insufficent erosion controls

flood runoff wetlands discharge to bay and tend to flood ajoining business.

PHOTOS - wetland, overflow basin. clearcut.

infil should have hit water. not noted in report.

Right Turn requirement and wetland clear cutting on April 6th and 7th 2023

Many developments are anticipated on Mt Hope road and it is envisioned as a major

corridor for development. Your decision regarding turns will set a precedent for future development on this road. Restrictions can be loosened in the future, but probably not tightened.

TART and Acme just spent \$2 million dollars on a major TART connector. Mt Hope is a 55 mph road. The township and county cannot change that. The state police can only adjust the speed limit to the 85th percentile of a speed survey. However, YOU, in the approval process, have a key role in the safety of traffic flow on Mt Hope road. People drive fast on that road, many from out of the area, and it has curves and hills. Left turns create conflicts. For the time being, consider restricting left turns for all new driveways on Mt Hope.

The violation of our ordinance last week by clear cutting trees substantially in a wetland and all in the restricted wetland buffer, in a 40 foot wide swath that is entirely outside the road right of way.

f way, in violation of our ordinance, all before project approval or permitting, should not be allowed to enable traffic flow changes that change the safety of all road users.

There are underground utilities along the road near the wetland, but they are all within the road right of way.

Thank you, Brian Kelley



ACME TOWNSHIP PLANNING COMMISSION ACME TOWNSHIP HALL 6042 Acme Road Williamsburg, MI 49690 April 10, 2023 7:00 p.m.

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE

ROLL CALL:

- A. LIMITED PUBLIC COMMENT: Members of the public may address the Commission regarding any subject of community interest during public comment periods by filling out a Public Comment Card and submitting it to the Secretary. Public comments are limited to three minutes per individual. Comments during other portions of the agenda may or may not be entertained at the moderator's discretion
- **B.** APPROVAL OF AGENDA:
- C. INQUIRY AS TO CONFLICTS OF INTEREST:
- **D. SPECIAL PRESENTATIONS:**

E. RECEIVE AND FILE:

- 1. **RECEIVE AND FILE**
 - a. Unapproved Township Board Meeting Minutes 3.7.23

F. APPROVAL OF MINUTES:

- a. Approve Draft Planning Commission Meeting Minutes 3.13.23
- G. CORRESPONDENCE:
 - 1. Elk Rapids PC

H. PUBLIC HEARINGS:

1. None

I. OLD BUSINESS:

- 1. Formal withdrawal of Rezoning Amendment 001
- 2. Formal withdrawal of Rezoning Amendment 002

J. NEW BUSINESS:

1. SPR 2023-01 Acme Village Flats

K. PUBLIC COMMENT & OTHER PC BUSINESS

- 1. Planning & Zoning Administrator Report Lindsey Wolf
- 2. Township Board Report Jean Aukerman
- 3. Parks & Trails Committee Report –

ADJOURN:



ACME TOWNSHIP REGULAR BOARD MEETING ACME TOWNSHIP HALL 6042 Acme Road, Williamsburg MI 49690 Tuesday, March 7, 2023, 7:00 p.m.

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE at 7:00 p.m. ROLL CALL: Members present: J. Aukerman, D. Hoxsie, A. Jenema, P. Scott, D. Stevens, L. Swanson, D. White Members excused: None Staff present: Lindsey Wolf, Planning & Zoning Administrator, Jeff Jocks, Cristy Danca, Recording Secretary

A. LIMITED PUBLIC COMMENT:

Limited Public Comment was opened at 7:02 p.m.

Brian Kelley, Acme resident

Limited Public Comment closed at 7:05 p.m.

B. APPROVAL OF AGENDA:

Motion by Jenema, supported by Swanson, to approve the agenda as presented with the modification of adding *Creation of #2 Nakwema trailway fund Resolution budget* under Agenda item K. 7 (New Business). Voice vote. Motion carried unanimously.

C. APPROVAL OF BOARD MINUTES: Regular meeting 02/07/2023

Motion by Swanson, supported by Aukerman, to approve the minutes as presented. Voice vote. Motion carried unanimously.

D. INQUIRY AS TO CONFLICTS OF INTEREST: None

E. **REPORTS**:

a. Clerk – Clerk's office is awaiting more information from the Bureau of Elections for direction regarding the 2024 election cycle. Acme has no elections in 2023. Clerks currently working on internal auditing and preparing for the upcoming budget cycle. The township hall logos will be changed to look more like the signage at Bayside Park and the cemeteries.

b. Parks – March 20, 2023, will be the first Parks and Trails meeting of the year to begin updating the Parks Master Plan. Iron Belle money (\$300,000) has been received.

c. Legal Counsel – Written update provided regarding the Engle case and the Acme Strong case.

d. Sheriff – For the month of February Officer Abbring reported 12 citations, 16 crashes and 3 arrests. The mobile speed sign is currently in use on Greenwood Drive. Upon completion of that speed study, he can move the sign to another location as requested.

e. County – Darryl Nelson, County Commissioner, District 6, spoke of attending the National Association of Counties conference in Washington D.C. He was pleased with the information and collaboration and the primary focus was on broadband and mental health related topics. The federal government's stated goal is fixed wired internet to every home in the country. Nelson said there will be more to come on this topic. There is a Michigan High-Speed Internet

(MIHI) listening session this Saturday from 4:00 - 6:00 p.m. at the Michigan Works center. Anyone is welcome and attendance was recommended by Senator Damoose. Nelson and Supervisor White attended a meeting at the Emergency Operations Center today regarding emergency response and coordination. He spoke highly of the EOC program in Grand Traverse County. Tomorrow there is a Special Meeting with the BATA board which is looking to expand their board to nine members and have the ability to appoint their own members rather than have members appointed by Grand Traverse and Leelanau counties. Nelson voiced concern of lack of oversight in the event this happens. Board discussion occurred.

f. Supervisor – Supervisor White attended the Capital Conference and spoke with Senator Damoose regarding funding for sewer line repair. He continues working on the Bertha Vos project.

g. Planning and Zoning – Wolf provided the following information and updates: she is awaiting a quote for horse show's traffic impact study – expects to have more information at the next meeting; new Acme Township retailer Truly Free expects to open soon and she will share the date when she has it; an amendment was submitted to the DNR and an extension was granted by the trust fund until 2/28/2024, allowing time to close projects including the KOTI development's end of the trail; and assistant Cristy Danca will be attending a planning and zoning training in March.

h. MMR – February 2023 report included in packet. Supervisor White has a meeting with them tomorrow. Board discussion occurred.

F. SPECIAL PRESENTATIONS: Traverse City – Garfield Urban Area Metropolitan Planning Organization (MPO) Presented by Networks Northwest

Rob Carson, Regional Director of Community Development, and Hannah Yurk, Community Planner, both of Networks Northwest, gave a slideshow presentation. (Handout included in packet). Board discussion occurred. There will be more information/meetings in the future.

G. CONSENT CALENDAR:

- **1. RECEIVE AND FILE:**
 - a. Treasurer's Report
 - b. Clerk's Revenue/Expenditure Report
 - c. Draft Planning Commission minutes 02/13/2023

2. APPROVAL:

1. Accounts Payable prepaid of \$949,538.36 and No Current to be approved (Recommend approval: Clerk, L. Swanson)

H. ITEMS REMOVED FROM THE CONSENT CALENDAR: None

Motion by Scott, approved by Hoxsie, to approve the Consent Calendar as presented. Roll call vote. Motion carried unanimously.

I. CORRESPONDENCE:

Brian Kelley, Acme resident, regarding Bertha Vos and ARPA funds

J. PUBLIC HEARING: None

K. NEW BUSINESS:

1. Acme Township Waste Water Rate Study

Mark Hurley and Tim Korson from Gosling Czubak Engineering presented an updated water rate study (included in packet), a previous study was completed four years ago. Board discussion occurred during the presentation. Supervisor White requested the board agree to a rate increase of \$5.00. The last rate

increase was in 2019.

Motion by Jenema, supported by Aukerman to increase the sewer rates from \$30.00 to \$35.00 and then we look at our ordinance and discuss a percentage rate to build into it at a later time. Board discussion occurred. Roll call vote. Yes: Jenema, Aukerman, Hoxsie, Swanson, Stevens, White. No: Scott. Motion carried.

Discussion regarding a future flow study occurred.

Board agreed to move L. Old Business #1 ahead of K. New Business #2.

L. OLD BUSINESS

1. Farmland Preservation update/Cherries R Da Berries, L.L.C. PDR

Laura Rigan, Farmland Program Manager, Grand Traverse Regional Land Conservancy, provided an update. The Cherries R Da Berries board met last week and agreed to the township's offer. Rigan asked the board for a resolution to approve the purchase of the conservation easement on the Cherries R Da Berries property and to move to close that project. Brief board discussion occurred. regarding the Cherries R Da Berries conservation easement purchase. She asked the Board for guidance on whether to make an official offer. She noted that if they were to accept the official offer, then at the next board meeting, she would suggest passing a resolution to purchase the easement. Board discussion occurred.

Motion by Jenema, supported by Scott, to approve the purchase of Cherries R Da Berries 73 acre easement as presented in the memorandum dated March 7, 2023, and Acme's portion being \$351,500 along with the contribution of the landowner at 25% which is \$275,750 and MDARD's portion being \$475,750 for a total value of the development rights at \$1,103,000. Roll call vote. Motion carried unanimously.

The board resumed K. New Business #2.

K. NEW BUSINESS:

2. Resolution on establishing Budget new accounts/Various fund moves adjustments

Per Supervisor White, this is regarding the Bertha Vos building, moving funds in and establishing a budget for it. Board discussion occurred. A typo was corrected in the Planner Services line under New Balance changing \$5,00.00 to \$5,000.00.

Motion by Jenema, supported by White, to pass Resolution 2023-06 for transferring funds to establish a budget for a new capital improvement account (407) moving \$40,000 out of Fund Balance and creating a budget for the allocation of those funds on the recent purchase. Roll call vote. Motion carried unanimously.

Stevens was excused from the meeting and departed at 8:59 p.m.

3. Short-Term Rental Ordinance Amendment 2023-01

Wolf summarized proposed amendments.

Motion by Jenema, supported by Scott, to adopt police power ordinance amendment #2023-01 to the Acme Township Short-Term Rental Ordinance #2017-01 with the following edits as presented. Roll call vote. Motion carried unanimously.

4. Medical Marijuana Ordinance Amendment 2023-02 Wolf summarized proposed amendments.

Motion by Jenema, supported by Scott, to adopt police power ordinance amendment #2023-02 to the Acme Township Medical Marihuana Licensing Ordinance #2017-02 with the following edits as presented. Roll call vote. Motion carried unanimously.

5. Mobile Food Vending Ordinance Amendment 2023-03 Wolf summarized proposed amendments.

Motion by Aukerman, supported by Hoxsie, to adopt police power ordinance amendment #2023-03 to the Acme Township Mobile Food Vending Ordinance #2016-02 with the following edits as presented. Roll call vote. Motion carried unanimously.

6. Discussion on lower speed limit on Mt Hope Rd

Supervisor White began discussion. The current speed limit on Mt Hope Rd is 55 miles per hour. Letters from TART and Acme Flats in support of lowering the speed limit were added to the packet.

Motion by Scott, supported by Swanson, to approve Resolution #R-2023-07 asking for the speed study to be done on Mt. Hope Road. Roll call vote. Motion carried unanimously.

7. Establishing budget for #2 Nakwema trailway fund

The township applied for a grant from the Tribe for engineering services relative to the Deepwater Connector section of the trailway and received \$25,000. A budget has to be created for that amount. Brief board discussion occurred.

Motion by Jenema, supported by Scott, to approve Resolution #R-2023-08 to create a budget for the Deepwater Connector section on the Nakwema trailway system as presented. Roll call vote. Motion carried unanimously.

L. OLD BUSINESS:

2. Updated Parks & Recreation Plan

Wolf gave an overview of the updated proposed timeline included in the packet. She is waiting on a quote from Beckett & Raeder for a cost estimate for their services. She contacted a drone service and discussed with the board the cost, some cost sharing ideas, and possible locations within the township. Drone photos could be used for both the Parks Master Plan and Township Master Plan. Wolf will work with Supervisor White on feasibility regarding the budget once a quote for services is received from Beckett & Raeder. Board discussion occurred.

PUBLIC COMMENT and OTHER BUSINESS:

Aukerman inquired about the Cherry Capital Cycling Club grant and safe crossing for bicyclists at the Lautner/M72 roundabout. Board discussion occurred. Aukerman stated she wants to take on the effort to find some solution for cyclists and invited anyone to join her. Hoxsie offered to work on this as well.

Public comment opened at 9:39 p.m.

Brian Kelley, Acme resident

Motion by Scott, supported by Jenema, to adjourn the meeting. Voice vote. Motion carried unanimously.

The meeting was adjourned at 9:42 p.m.



ACME TOWNSHIP PLANNING COMMISSION ACME TOWNSHIP HALL 6042 Acme Road Williamsburg, MI 49690 March 13, 2023 7:00 p.m.

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE 7:01

ROLL CALL: Present: Dan Rosa, Dan VanHouten, Steve Feringa, Jack Challender, Karly Wentzloff, Marcie Timmins Excused: Jean Aukerman

Staff Present: Lindsey Wolf; Acme Township Planning and Zoning; Marcie Timmisns; Recording Secretary

- A. LIMITED PUBLIC COMMENT: Members of the public may address the Commission regarding any subject of community interest during public comment periods by filling out a Public Comment Card and submitting it to the Secretary. Public comments are limited to three minutes per individual. Comments during other portions of the agenda may or may not be entertained at the moderator's discretion Opened at 7:02 Closed at 7:03
- B. APPROVAL OF AGENDA: Motion by Feringa, support by Challender with the addition of J.1 Planning Commision Rules, F.a approve draft PC minutes from 1-9-23 and G.2 correspondence from Kelley. Motion carries unanimously
- C. INQUIRY AS TO CONFLICTS OF INTEREST: none
- **D.** SPECIAL PRESENTATIONS: none
- **E. RECEIVE AND FILE:**
 - 1. **RECEIVE AND FILE**
 - Approved Township Board Meeting Minutes 2.7.23
 Motion by Timmins Support by Challender to approve the Township Board meeting minutes from 2-7-23
 Motion carries unanimously

F. APPROVAL OF MINUTES:

a. Approve Draft Planning Commission Meeting Minutes 1.9.23
 Motion by Feringa, support by Rosa to approve the pc draft minutes from 1-9-23
 with the removal of the question mark on page 7.
 Motion carries unanimously

Wentzloff- read Brian Kelley's comments from correspondence as they had to do with the meeting minutes from 2/13/23

Discussion followed

Wolf- pointed out that all the images will be in the packet with the minutes as were turned in as part of correspondence.

- b. Approve Draft Planning Commission Meeting Minutes 2.13.23
 Motion by Feringa, support by VanHouten with the change of 120 years to 20 years. Motion carries unanimously
- G. CORRESPONDENCE:
 - 1. Garvey- Read into record. Garvey was wondering if more can be done to protect water quality in Acme.

Wentzloff- responded to Garvey that one of the top priorities is to look at the Townships stormwater ordinance and also mentioned that we pulled a section of the shoreline and waterfront to later review.

2. Kelley - Read into record. Kelley wrote concerning suggested corrections to the Feb. 13, 2023 PC meeting minutes.

H. PUBLIC HEARINGS:

 Zoning Ordinance Amendment 003 – Nonconforming Structures Opened at 7:16 Closed at 7:17

I. OLD BUSINESS:

1. Zoning Ordinance Amendment 003 – Nonconforming Structures

Wolf- went over the memo that was worked on with Jeff Jocks and Sarah Kapriva. Brought to her attention when someone came in with a request to expand one of their structures. There are two pending applications.

Wolf- read the new language vs. the old.

Discussed the idea of allowing non-conforming structures to future expand outside of the conforming area of the property and within the conforming area of the property. Also talked about allowing administrative staff the authority to approve such requests as long as they meet the ordinance.

Wentzloff took a straw poll of picture <u>A</u> and picture <u>B</u> to see who believes it should be allowed with zoning administrator approval and not ZBA.

Picture A- no hands raised

Picture B- all hands raised

Scenario Two- Who thinks this should be allowed, picture A

no hands raised.

Everyone agreed that requests like picture <u>A</u> should go to the ZBA for approval, as the owners would have to prove they have a hardship inorder to have it allowed.

Motion by Timmins, support by VanHouten to recommend that the Board of Trustees adopt Zoning Ordinance Amendment 003 Nonconforming Structures in the text under 5.33.5, 5.33.5A, and 5.33.D Motion carries unanimously

J. NEW BUSINESS:

1. Acme Township Planning Rules

Wentzloff addressed the issue of a 2:00pm cut off time in making sure that staff and committee members would have plenty of time before the meeting to get it printed out and read.

Discussion followed - will be adding a page to next month's PC meeting packet to make the public aware.

Rosa- brought up that under 2.7 the agenda order is off.

Changes- under 2.7 change it to match the order of the current agenda

Add- 2:12 All written correspondence received by 2:00 pm the day of the meeting will be

included in that day's meeting packet. All correspondence received after 2:00 pm will be included in the next scheduled meeting packet.

Motion by Timmins, support by Challender to change the Acme township planning commission bylaws. To include the new order of business under 2.7 and to include 2:12, all written correspondence received by 2:00pm will be included in the current day's meeting. All correspondence received after 2:00 will be included in the next scheduled meeting.

Motion carries unanimously

K. PUBLIC COMMENT & OTHER PC BUSINESS Open public comment at 7:38 Closed at 7:39

- 1. Planning & Zoning Administrator Report Lindsey Wolf There are open applications for rezoning requests, as they were waiting to see the outcome of the PC's discussion. The development on Mt.Hope has signed a contract with the GTB for water. Finalizing the last of the stormwater items. Discussed special meeting dates before April. Too many PC members are heading out for spring break.
- 2. Monday April 24th. At 10:30 am on zoom is the court proceedings concerning the former Kmart and Tom's property.
- **3.** Township Board Report Jean Aukerman- absent
- 4. Parks & Trails Committee Report Wolf- They are meeting on 3/20 to discuss the park plan rewrite due in Feb. 2024

ADJOURN: Motion by VanHouten, support by Chanllender to adjourn. Motion carries unanimously.

Township of Elk Rapids

315 Bridge Street • P.O. Box 365 • Elk Rapids, Michigan 49629 Telephone 231-264-9333 • Fax 231-264-6676

March 20, 2023

Acme Township Planning Commission 6042 Acme Road Williamsburg, MI 49690

Re: Elk Rapids Township Master Plan Review

The Township of Elk Rapids is preparing to undertake a planning effort to review and potentially revise the Township Master Plan. The purpose of this letter is to advise you of this activity and to invite your cooperation, comments, and participation in our process in accordance with MCL 125.3839 of Public Act 33 of 2008, as amended.

Once any amendments to the Master Plan have been prepared and approved for distribution, we will forward you a copy for your review and comment. The draft plan will be forwarded to you in electronic form unless you specifically request a hard copy.

If you have any questions or comments on our process, please feel free to contact the Township at (231) 264-9333.

Thank you for your interest.

Sincerely,

Elk Rapids Township Planning Commission





Subject: Withdrawing Petitions for Zoning Change

March 22, 2023

Lindsey Wolf Planning & Zoning Administrator Acme Township 6042 Acme Road Williamsburg, MI 49690

Dear Lindsey,

On behalf of land-owning entities 5555 Arnold LLC and Walter36 LLC, I would like to formally withdraw both petitions for rezoning.

Please let me know if any further action is required on my part and if there are any funds left paid in escrow.

Best regards,

Mujolim

Mark Johnson Member of 5555 Arnold LLC and Walter36 LLC 231-620-6020 Mark@Milocalhops.com

planning review

Beckett&Raeder

Landscape Architecture Planning, Engineering & Environmental Services

Date: 03.30.2023

From: John Iacoangeli, FAICP To: Lindsey Wolf Planning and Zoning Administrator Acme Township 6042 Acme Road Williamsburg, MI 49690

Project: Acme Village Flats Site Plan Review

Remarks:

I wanted to get back some preliminary observations on the proposed project.

- 1. The project density of 5.75 units/acre is within the MHN limits of 12 units/acre.
- 2. Any dwelling with five or more units is required to have 1 parking space per unit. The development has 10 buildings with 6 attached units. They provide 60 interior spaces and 18 on-street for a total of 78 parking spaces. Four (4) of the on-street parking spaces would be handicap parking.
- 3. The development is providing 8,880 square feet of snow storage.
- 4. Project appears to meet setbacks.
- 5. Outdoor patios are internalized within the building envelop and would not encroach into the setback.
- 6. Project meets the landscaping requirements.

The photo below is an approximate image of what the proposed would look like. Some of the same features apparent in the photo are included in the proposed development. These include sidewalk adjacent to the road, short driveway, and one tree per lot. However, the development in the photo has articulated facades where the garage is pulled forward from the entry door. In the Acme Flats proposal, the facades are flat.



Beckett&Raeder

Landscape Architecture Planning, Engineering & Environmental Services



Observations

- 1. The frontage sidewalk along Mt. Hope Road is 5 feet wide as required.
- 2. The proposed cross-section shows one sidewalk on the east side of the street as an extension of the street which isn't acceptable in a community with winter snow conditions. The road cross section could have a rolled curb on both sides of the street with a 4 feet wide sidewalk on both sides of the roadway. As noted in Section 2.2.4 "All development in this district will be designed as walkable neighborhoods with sidewalks and the option for on-street parking."¹
- 3. Remove the Right-In Right-Out (RIRO) onto Mt. Hope Road. It isn't required and the volumes on Mt. Hope are sufficient to warrant this traffic device. Further, MDOT studies have noted that drivers don't always abide by them.
- 4. Although there is a 25-foot setback to the wetlands consider adding additional plantings (native grasses) along that property line to serve as filtering system, and especially at the emergency drainage overflow between buildings 1 and 2, and at the southwest corner where these will drain into the wetlands.
- 5. The monument sign is too large. An illuminated sign can be 6 feet in height with an area of 24 square feet in the MHN zone.²
- 6. Recommending pole LED down lighting, not to exceed 22 feet in height, at each entrance/exit, mailbox cluster, and at two crosswalks.

¹ Acme Township Zoning Ordinance, adopted July 5, 2022, Page 4

² Acme Township Zoning Ordinance, adopted July 5, 2022, Page 80

Application Number:_



Special Use Permit/Site Plan Review Application

Township of Acme, Grand Traverse County, Michigan

6042 Acme Road, Williamsburg, MI 49690

Phone: (231) 938-1350 Fax: (231) 938-1510 Web: <u>www.acmetownship.org</u> Planning & Zoning Administrator: Lindsey Wolf Email: <u>zoning@acmetownship.org</u>

Owner Information	(please type	or print	clearly):
--------------------------	--------------	----------	-----------

Name: Johnson Family Partnership LTD Phone¹ (616) 550-2129

Mailing Address: ___445 W 22nd. Street

City: Holland

State:_______MI.

State: MI.

_ Zip:___484423

49519

Zip:

Email Address: carlheideman@gmail.com

Applicant Information (please type or print clearly):

Name: Acme Village Land Co. LLC (DBA Granger Acquisition LLC) Phone: (616) 248-3566

Mailing Address: 2380 Health Dr. SW Suite 210

City: Wyoming, MI.

Email Address: twolter@grangergroup.us

A. Property Information:

1. Address: Has not been assigned Part of Sec. 2 & 3, Town 27 North, Range 10 West Acme Twp., Grand Traverse Co., MI

2. Parcel Number/Property Description:

01-103-069-06; 01-102-016-02

3. Current Zoning of Property:

Acme Village PD (MHN)

4. If this project is one phase of a larger development and/or property subject to an existing/previous Site Plan Review, Special Use Permit, or Variance, what is/are the applicable permit number(s)?

No.-92-3P (8-3-1992) Permit # 2000-11P Amendment

5. **Provide proof of current property ownership**. If applicant is not the current property owner, also provide written permission to act as agent of, and complete contact information for the current property owner. See Attachment

(Updated 01/04/2016 SW)

Page 1 of 2

Application Number:_____

- 6. **Proposed Use/Change to Property** Residential - Minor Amendment Approved - December 19, 2022
- 7. Estimated Start and Completion Dates: Spring 2023 - Fall 2023
- B. Application Packet Requirements: REFER TO ACME TOWNSHIP ZONING ORDINANCE AND COMPLETE ATTACHED CHECKLIST Completeness Meeting Scheduled
- **C. Fees**: Include initial fee as required by the Acme Township Ordinance #2004-01 Will provide chk. once fee is established
- **D. Fee Escrow Policy Acknowledgement**: Provide completed and signed form with initial escrow fee deposit.

\$2500.00 Escrow submitted - see attachment

E. Affidavit: The undersigned affirms that he/she is the <u>Aqcut</u> (owner, agent, lessee, or other interested party) involved in this petition and that the foregoing answers, statements and information are in all respects true and, to the best of his/her knowledge, correct. By making this application, the undersigned grants all officials, staff and consultants of Acme Township access to the subject property as required and appropriate to assess site conditions in support of a determination as to the suitability of the proposed project and/or current or future Special Use Permit and Zoning Ordinance compliance.

Signed: Trun Wolto Date: 1-19-23

FOR TOWNSHIP USE ONLY

Application Number:_____

Public Hearing/Meeting:_____

Date of Advertising:_____

T&A Account:_____

Date Received:_____

NOTES:

(Updated 01/04/2016 SW)

Page 2 of 2

January 23, 2023

Acme Township C/O Doug White 6042 Acme Road Williamsburg, MI 48690

RE: Siteplan Approval for Phase 1 Planned Unit Development No. 92-3P (the "PUD")

Mr. White:

This letter is in regard to the PUD that was approved at the August 3, 1992 Acme Township Board (the "Board") meeting as and subsequently authorized by Gerry Harsch, Acting Zoning Administrator on March 28, 1994 with all amendments.

JOHNSON FAMILY LTD PARTNERSHIP (the "Owner") is the real property owner of the following tax parcel (the "Property"):

 1. Tax Parcel No.:
 01-103-069-06 and 01-102-016-02

 2. Address:
 US 31 North and E M 72

 Williamsburg, MI 49690

This letter shall constitute written approval for the Planning Commission to review and approve the siteplan approval for Phase 1 of the existing PUD that the Property is currently zoned.

Signed:

120/2023

Date

Carl Heideman, Manager JOHNSON FAMILY LIMITED PARTNERSHIP 445 W 22nd Holland, MI 49423

Subscribed and sworn before me this 20 day of January, 2023.

Notary Public Name: In the County and State of: My Commission Expires: Megan Lubbers Ottawa, Michigan 4/19/26



Application Number:



Special Use Permit/Site Plan Review Application

Township of Acme, Grand Traverse County, Michigan

6042 Acme Road, Williamsburg, MI 49690

Phone: (231) 938-1350 Fax: (231) 938-1510 Web: <u>www.acmetownship.org</u> Planning & Zoning Administrator: Lindsey Wolf Email: <u>zoning@acmetownship.org</u>

Owner Information (please type or print of	learly):		
Name: Johnson Family Partnership LTD	<u> </u>	Phone: (616) 550-2129
Mailing Address:445 W 22nd. Street			
City: Holland	State:	MI.	Zip: 484423
Email Address: carlheideman@gmail.com			· ·

Applicant Information (please type or print clearly):

Name: Acme Village Land Co. LLC (DBA Granger Acquisition LLC)	Phone:	(616) 248-3566
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Mailing Address: 2380 Health Dr. SW Suite 210

City:_____Wyoming, MI.

_____ State: <u>MI.</u> Zip: <u>49519</u>

Email Address: _____twolter@grangergroup.us

A. Property Information:

1. Address: Has not been assigned Part of Sec. 2 & 3, Town 27 North, Range 10 West Acme Twp., Grand Traverse Co., MI

2. Parcel Number/Property Description:

01-103-069-06; 01-102-016-02

3. Current Zoning of Property:

Acme Village PD (MHN)

4. If this project is one phase of a larger development and/or property subject to an existing/previous Site Plan Review, Special Use Permit, or Variance, what is/are the applicable permit number(s)?

No.-92-3P (8-3-1992) Permit # 2000-11P Amendment

5. **Provide proof of current property ownership.** If applicant is not the current property owner, also provide written permission to act as agent of, and complete contact information for the current property owner. See Attachment

(Updated 01/04/2016 SW)

Application Number:_____

6. Proposed Use/Change to Property Residential - Minor Amendment Approved - December 19, 2022

- 7. Estimated Start and Completion Dates: Spring 2023 - Fall 2023
- B. Application Packet Requirements: REFER TO ACME TOWNSHIP ZONING ORDINANCE AND COMPLETE ATTACHED CHECKLIST Completeness Meeting Scheduled

C. Fees: Include initial fee as required by the Acme Township Ordinance #2004-01 Will provide chk. once fee is established

D. Fee Escrow Policy Acknowledgement: Provide completed and signed form with initial escrow fee deposit.

\$2500.00 Escrow submitted - see attachment

E. Affidavit: The undersigned affirms that he/she is the $\underline{dych} + \underline{dych}$ (owner, agent, lessee, or other interested party) involved in this petition and that the foregoing answers, statements and information are in all respects true and, to the best of his/her knowledge, correct. By making this application, the undersigned grants all officials, staff and consultants of Acme Township access to the subject property as required and appropriate to assess site conditions in support of a determination as to the suitability of the proposed project and/or current or future Special Use Permit and Zoning Ordinance compliance.

Signed:)	Date: 1/20/2023
	GRL HEIDEMAN	

FOR TOWNSHIP USE ONLY

Application Number:_____

Public Hearing/Meeting:_____

Date of Advertising:_____

T&A Account:_____

Date Received:

NOTES:

(Updated 81/04/2016 SW)

ACME VILLAGE FLATS

SECTIONS 2&3 – ACME TOWNSHIP GRAND TRAVERSE COUNTY, MICHIGAN

SITE PLAN REVIEW

JANUARY 23, 2023



CONTENTS

- Product Narrative
- Proposed Residential Product
- Material & Exterior Finishes
- Site Plan
- Regulatory Agency Correspondences
- Traffic Impact Study



PROJECT NARRATIVE

The Granger Group is pleased to present this formal request for Site Plan Review of the Acme Village Flats. The development is located along Mt. Hope Rd., within the Acme Village PD. A minor amendment to the PD was approved on December 19th, 2022, to allow residential use at the location. The development utilized the underlining District type, Mixed Housing Neighborhood (MHN), The Acme Shores Placemaking Plan and Community Masterplan, including the US-31 / M-72 Mixed Use Overlay District for the site development.

The proposed development will be nestled into an existing (10) acre field with access off Mt. Hope Rd. We are excited for this development because of all the elements it has going for it. The fantastic location with views to the bay, access to shoreline parks, commerce, and beyond. The serene northern feel, abundant with nature, wetlands, and trails are sure to inspire the market to embrace it.



The areas within the development include provisions for walkability, and connectivity to adjacent developments and neighborhoods using sidewalks and shared-use paths. This will allow people to seamlessly move to off-site parks and commerce while promoting health and wellness. Special attention has been given to implement low impact storm water practices, including bioretention gardens and swales.

The removal of the invasive plants and the integration of native species will create a landscaping appearance and character, that will enhance the feeling of connectedness to the surrounding areas for the community at large, while also creating a comfortable sense of security. Further, the proposed development does not affect the character or intensity of the adjacent uses, vehicular or pedestrian circulation, drainage patterns, demand for public services, or create any vulnerability to hazards.

This is a residential rental product type with various unit layouts and sizes ranging from approximately 1300-1600sf. The project includes both 2-bed/2-bath & 3-bed/3-bath units. There are (10) single-story buildings with (6) units per building. (see product page).

To ensure adequate capacity of water and sanitary sewer services, a capacity analysis study was complete and in summary, the existing sanitary sewer capacity is adequate for the proposed build-out. and there is capacity for water with the Grand Traverse Band of Ottawa and Chippewa Indians.



RESIDENTIAL PRODUCT







INTERIOR PERSPECTIVES



UNIT TYPE B - 1,463 SF 2RD/2RTH

UNIT TYPE A - 1,348 SF 2BD/2BTH

UNIT TYPE A UNIT TYPE B UNIT TYPE C

FRONT ELEVATIONS



GRA





VINYL SIDING COLORS - WHITE TRIM

PROPOSED DOUBLE SIDED PROJECT GROUND SIGN



ROOF SHINGELS - NOIRE'



PORCH RAILING - WHITE Note: Architectural elevations represented depict the proposed finishes at the time these documents were completed. Pending unforeseen conditions in the market and/or supply chain, changes in materials/finishes may be necessary to maintain the construction process. Any modifications necessary will be brought to the attention of the stakeholders as timely as possible.

WINDOWS -WHITE

023

EXTEROR WALL

SCONCE . BLACK

ທ



COMMON NAME	SIZE	CONTAINER TYPE
COMMEMORATION OF LEGACY		
SUGAR MAPLE	2.5"	B&B
TULIP TREE	2.5"	B&B
EASTERN WHITE PINE	6' HT.	B&B
BLUE FLAG IRIS	-	NO.1
PURPLE CONE FLOWER	-	NO.1
CUT LEAF CONEFLOWER	-	NO.1
MARSH BLAZING STAR	-	NO.1
SWITCH GRASS	-	NO.1
RED DOGWOOD	-	NO.1
	COMMON NAME COMMEMORATION OF LEGACY SUGAR MAPLE TULIP TREE EASTERN WHITE PINE BLUE FLAG IRIS PURPLE CONE FLOWER CUT LEAF COMEFLOWER MARSH BLAZING STAR SWITCH GRASS RED DOGWOOD	COMMON NAME SIZE COMMEMORATION OF LEGACY 2.5" SUGAR MAPLE 2.5" TULIP TREE 2.5" BLUE FLAG IRIS 6"HT. BLUE FLAG IRIS - PURPLE CONEFLOWER - CUT LEAF CONEFLOWER - MARSH BLAZING STAR - SWITCH GRASS - RED DOGWODD -


To whom it may concern,

It is my understanding that a development is coming in Acme township on Mt. Hope Road that has the potential to bring in several hundred new residents. This development and driveways will be located on Mt. Hope Road on a curve with a hill. The current speed limit to my knowledge is 55 mph since it is unposted.

I would support a study for the reduction of the speed limit on this road between U.S. 31 and M-72 due to the motels, bike traffic, businesses, and future development of residential condo's, townhouses, and apartments.

I have also had the opportunity to meet with the development team and reviewed the proposed plan for the Acme Village Flats. There are no other concerns observed at this time in review of the development regarding the health, safety, and welfare of the citizens and visitors of Acme Township within the scope of responsibility for the Sheriff's Office.

Respectfully,

and Binder

Lt. Brandon Brinks

To:Lindsey WolfSubject:FW: Acme Twp Multi-Family Development UpdateAttachments:Acme Village Flats on Mount Hope Road.pdf

For your use; find below the EGLE response regarding their review. James

From: "Crane, Joshua (EGLE)" <<u>CraneJ3@michigan.gov</u>>
Date: Wednesday, January 25, 2023 at 10:31 AM
To: Terry Wolter <<u>twolter@grangergroup.us</u>>
Cc: Ryan Cox <<u>Ryan.cox@gtecusa.com</u>>
Subject: RE: Acme Twp Multi-Family Development Update

RECEIVED FROM EXTERNAL SENDER Hello Terry and Ryan,

I have reviewed all documents and all of my questions have been answered. Since there are no impacts to wetlands onsite and no new utility lines are being installed through wetland areas, no EGLE permit is required under Part 303, Wetlands Protection, of NREPA for the attached project. Please let me know if you have any additional questions.

Joshua Crane

Department of Environment, Great Lakes, and Energy (EGLE) Senior Environmental Quality Analyst Water Resources Division Cadillac District Office 120 W. Chapin Street Cadillac, Michigan 49601 (231)-577-8112 <u>CraneJ3@michigan.gov</u> Please note the new number: (231)-577-8112

From: Terry Wolter <<u>twolter@grangergroup.us</u>>
Sent: Wednesday, January 18, 2023 3:47 PM
To: Crane, Joshua (EGLE) <<u>CraneJ3@michigan.gov</u>>
Cc: Ryan Cox <<u>Ryan.cox@gtecusa.com</u>>
Subject: Acme Twp Multi-Family Development Update

CAUTION: This is an External email. Please send suspicious emails to <u>abuse@michigan.gov</u>

From:	James Sharba
Sent:	Tuesday, January 24, 2023 4:36 PM
То:	Terry Wolter
Subject:	Hope Road

Response from GTCRC.

From: <u>Wayne Schoonover</u> Sent: Tuesday, January 24, 2023 4:14 PM To: <u>Ryan Cox</u> Cc: <u>Steve Barry</u> Subject: RE: Acme Village Flats on Mount Hope Road

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Good afternoon Ryan,

GTCRC input at this point is limited as the proposed looks generally acceptable provided the adequate sight distance for the driveways meet the necessary minimum sight distances as identified in Table 6.1 of our specifications. Please note that there exists identified bike lanes in the area and those need to be identified and called out for in the drawings.

Wayne A. Schoonover, PE

Wayne A. Schoonover, PE Manager of Engineering/County Highway Engineer Grand Traverse County Road Commission 1881 LaFranier Road Traverse City MI 49696 231-922-4848, ext 216 231-929-1836 FAX www.gtcrc.org Find us on Facebook



From: <u>Ryan Cox</u> Sent: Friday, January 20, 2023 12:05 PM To: <u>Wayne Schoonover</u> Subject: Acme Village Flats on Mount Hope Road

Hello Wayne,

From:	Ryan Cox <ryan.cox@gtecusa.com></ryan.cox@gtecusa.com>
Sent:	Monday, January 23, 2023 12:22 PM
То:	James Sharba
Subject:	FW: Acme Village Flats

RECEIVED FROM EXTERNAL SENDER

From: Brian Belcher <bbelcher@gtmetrofire.org>
Sent: Monday, January 23, 2023 12:03 PM
To: Lindsey Wolf <Zoning@acmetownship.org>
Cc: Ryan Cox <Ryan.cox@gtecusa.com>; Kathy Fordyce <kfordyce@gtmetrofire.org>
Subject: Acme Village Flats

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Lindsey,

Good morning. Per our phone conversation this morning, Metro has received submittals for formal site plan review for the Acme Village Flats project and will complete the review yet this week and well before the deadline of February 6th.

If you have any questions please let me know.

Brian Belcher

Asst. Chief & Fire Marshal CFPS, IAAI –CFI Grand Traverse Metro Fire Department 897 Parsons Ave Traverse City, MI 49686 Phone 231-947-3000 ext. 1232 Website: <u>www.gtmetrofire.org</u>

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From:Lindsey Wolf <Zoning@acmetownship.org>Sent:Monday, January 23, 2023 11:47 AMTo:James SharbaSubject:FW: Granger Group

RECEIVED FROM EXTERNAL SENDER Hi James,

This is what I received from the Tribe.

Lindsey Wolf Planning & Zoning Administrator Acme Township 6042 Acme Road Williamsburg, MI 49690

(231)938-1350 ext. 106 zoning@acmetownship.org

From: Huhn, Joe <Joe.Huhn@gtb-nsn.gov>
Sent: Friday, January 20, 2023 2:33 PM
To: Lindsey Wolf <Zoning@acmetownship.org>
Cc: Steve Feringa.old <Steve.Feringa@gtbindians.com>
Subject: Granger Group

Dear Acme Township Planning Commission, I am the Director of the GTB Public Utilities and in my capacity as Director, I have engaged in informal nonbinding discussions as the Director with the Grainger Group on GTB Public Utilities providing water services for a project in Acme Township. No commitments have been made incident to the discussions.

Joseph R. Huhn The Grand Traverse Band of Ottawa and Chippewa Indians Director of Public Works P: 231.499.4235 | F: 231.534.7498 Joe.huhn@gtb-nsn.gov

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 To:
 Terry Wolter

 Cc:
 Jason Granger

 Subject:
 FW: [EXTERNAL SENDER] Acme Village Flats on Mount Hope Road

To whom it may concern,

Per meeting on 12/29 regarding the preliminary review of the proposed project located on Mount Hope Rd, in Acme Township, the Grand Traverse County Health Department would approve a soil erosion control permit based on the information reviewed.

Fred Morse Grand Traverse Environmental Health Dept. 2650 LaFranier Rd. Traverse City, MI 49686 (231) 995-6057 (office)

Ryan Cox

From:	John J. Divozzo <jdivozzo@gtcountymi.gov></jdivozzo@gtcountymi.gov>				
Sent:	Wednesday, January 25, 2023 4:56 PM				
То:	Ryan Cox				
Subject:	Re: [EXTERNAL SENDER] Acme Village Flats Mount Hope Road PUD Phase I				

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders. Ryan, thanks for sending the plans.

I did look at the Utility Plan and have no objections to the proposed plan.

John Divozzo, Director

Grand Traverse County DPW 2650 LaFranier Road Traverse City, MI 49686 (231) 995-6039 (231) 929-7226 fax

PLEASE NOTE MY NEW EMAIL ADDRESS: jdivozzo@gtcountymi.gov

*

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From: Ryan Cox <Ryan.cox@gtecusa.com>
Sent: Wednesday, January 25, 2023 4:41 PM
To: John J. Divozzo <jdivozzo@gtcountymi.gov>
Subject: [EXTERNAL SENDER] Acme Village Flats Mount Hope Road PUD Phase I

John,

Thanks for taking the time to discuss the project with me this afternoon.

This phase includes 10 each 6-unit apartment buildings. There is an existing 15 inch sanitary sewer main on the west edge of this site that flows to the south along the railroad towards East Bay Township. The developers are also currently working towards and agreement to secure municipal water from the Grand Traverse Band.

Pe the meeting that we had at your office, two of the buildings (BLD No. 1 and BLD No. 2) are proposed to connect to the existing 15 inch main with a 6 inch sanitary sewer lead that will be cut in to the main.

The other 8 buildings (48 apartments) are proposed to connect to a new 8 inch sanitary sewer main extension that would require new infrastructure and an EGLE permit.

The total estimated flow is based on 60 apartments at 300 GPD = 18,000 GPD = 12.5 GPM with a peak of 37.5 GPM (peaking factor of 3).

Please give me a call or write back to discuss any questions, comments or concerns with this phase of the project.

Ryan A. Cox, PE Project Engineer T: 231.941.8505 | M: 231.218.0590 ryan.cox@gtecusa.com www.gtecusa.com



3147 logan Valley Rd. - Traverse City, MI 49684

GRAND TRAVERSE METRO FIRE DEPARTMENT



FIRE PREVENTION BUREAU

897 Parsons Road ~ Traverse City, MI 49686 Phone: (231) 922-2077 Fax: (231) 922-4918 ~ Website: <u>www.gtfire.org</u> Email: <u>Info@gtfire.org</u>

SITE PLAN REVIEW RECORD

 ID # M7332-P1302
 DATE: 1/24/2023

 PROJECT NAME: Acme Village Flats

 PROJECT ADDRESS: 0000 Mt. Hope Rd.

 TOWNSHIP: Acme

 APPLICANT NAME: Terry Wolter

 APPLICANT COMPANY:

 Acme Village Land Development Co., LLC

 APPLICANT ADDRESS:

 2380 Health Dr. SW, Suite 210

 APPLICANT CITY:
 Wyoming

 STATE: MI
 ZIP: 49519

 APPLICANT PHONE:
 616-248-3566
 FAX #

 REVIEW FEE:
 \$75.00

Reviewed By: Kathy Fordyce, Plan Reviewer

This review is based solely on the materials submitted for review and does not encompass any outstanding information. Compliance with all applicable code provisions is required and is the responsibility of the permit holder. Items not listed on the review do not negate any requirements of the code nor the compliance with same. Inspection requests must be made a minimum of 48 hours prior to needed inspection. This plan review is based on the 2015 International Fire Code, as adopted.

GRAND TRAVERSE METRO FIRE DEPARTMENT FIRE PREVENTION BUREAU



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SITE PLAN REVIEW

ID # M7332-P-1302

DATE: 1/24/2023

1. 505.1 Address identification.

New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 4 inches (102 mm) high with a minimum stroke width of 1/2 inch (12.7 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained. **-Provide address and unit numbers on the street side of the building using numbers that are a minimum height of 4 inches.**

2. 505.2 Street or road signs.

Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an approved size, weather resistant and be maintained until replaced by permanent signs.

3. 507.1 Required water supply.

An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

4. B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses.

The minimum fire-flow and flow duration requirements for one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses shall be as specified in Tables B105.1(1) and B105.1(2).

- Per table B105.1 (1) the minimum required fire flow for 0-3600 sq ft. is 1,000 gallons per minute for a 1 hour duration.

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- Per the development team this project will be provided with firefighting water from the Grand Traverse Band Water Utility, however per the GTB there is no guarantee of that at this time. If water is not extended to the property other alternative methods of fire protection shall be provided, such as: NFPA 13D compliant fire sprinkler systems installed throughout the buildings and/or NFPA 72 compliant fire alarm/detection systems installed and monitored by a UL listed central station service 24/7. No part of this project may be occupied or receive any type of occupancy permit until a resolution to this issue and installation of any system is completed and 100% functional.

May proceed with township approval process.



The Grand Traverse Band of Ottawa and Chippewa Indians

2605 N. West Bay Shore Drive • Peshawbestown, MI 49682-9275 • (231) 534-7750

Certification of Tribal Council Action Special Session of February 22, 2023

I hereby certify as the Tribal Council Secretary that the foregoing Motion was Approved and Adopted at the Special Session of the Grand Traverse Band of Ottawa & Chippewa Indians Tribal Council

Granger Group Water Sales Agreement

Motion made by Tribal Council Member Rohl and Supported by Tribal Council Member Napont to approve Resolution #23-41.3527.

4-FOR; 2-AGAINST (Kewaygoshkum, Marshall); 0-ABSENT; 0-ABSTAINING **Motion Carries**

Theresa M. Marshall, GTB Tribal Council Secretary

CC: John Petoskey; Steve Feringa; Joe Huhn; Ken Ockert

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The Grand Traverse Band of Ottawa and Chippewa Indians

2605 N. West Bay Shore Drive • Peshawbestown, MI 49682-9275 • (231) 534-7750

TRIBAL COUNCIL RESOLUTION Resolution #23-41.3527

Granger Group Water Sales Agreement

- WHEREAS: The Grand Traverse Band of Ottawa and Chippewa Indians (GTBOCI hereafter) became a federally recognized Indian Tribe having a government-to-government relationship with the United States effective May 27, 1980 (see 45 Fed. Reg. 18321-322 (March 25, 1980)) and GTB is organized under a Tribal Constitution approved by the Secretary of the Interior on March 29, 1988; and
- WHEREAS: GTB has a full Tribal Council currently consisting of David M. Arroyo, Tribal Chairman; Robert Kewaygoshkum, Vice Chair; Theresa M. Marshall, Secretary; Donna M. Swallows, Treasurer; Jane Rohl, Councilor; Tina A. Frankenberger, Councilor; and Brian S. Napont, Councilor; and
- WHEREAS: Article IV, Section (1)(h) of the Tribal Constitution provides that a power of the Tribal Council is "[t]o manage and control the economic affairs, enterprises, property, and all other interests of the Band; and
- WHEREAS: GTB has established a Department of Public Works for the distribution of sewer and water, (12 GTBC Chapters 1-7); and
- WHEREAS: 12 GTBC, Chapter 4 and Chapter 5 govern the disposition of water to tribal members on trust land and tribal members on non-trust land; and
- WHEREAS: The GTB Public Works for East Bay Water Works currently has water capacity available after meeting all the residential and commercial needs of the GTBOIC as established at the Turtle Creek Casino, the Grand Traverse Resort and related developments; and
- WHEREAS: The GTB Public Works Department is provided authority to enter into intergovernmental agreements for the delivery of water (12 GTBC Chapter 8); and
- WHEREAS: The Tribal Council upon independent application of the GTB Public Works Department has authorized commercial water service contracts on terms and conditions that did not meet a commercial reasonable standard given the market condition; and
- **WHEREAS:** The Tribal Council has directed that the GTB Public Works Department to contract with a reputable engineering firm to conduct an area wide study for northwest Michigan to determine commercial reasonable rates for the services of the GTB

GRAND TRAVERSE

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Public Works Department when providing water services to a commercial enterprise; and

- WHEREAS: The water market study will not be completed until the spring of 2023; and
- WHEREAS: The Granger Group, a for-profit commercial development entity, has solicited and retained GTEC LLC, A GTBOCI owned subsidiary LLC of the GTB LLC, d/b/a GTED LLC, to prepare the preliminary site plans for the Granger Group development; and
- WHEREAS: The Granger Group, a for-profit commercial development entity, has solicited the GTB Public Works Department and the GTEC LLC to seek a legal commitment from GTBOCI to provide water service to the Granger Group's for-profit development containing, among other amenities, residential high-end homes, retail stores and a hotel in the Acme Township area as show by Exhibit "A" attached hereto; and
- WHEREAS: Some of the for-profit facilities of the Granger Group would be in direct competition with the enterprises of GTB EDC d/b/a Grand Traverse Resort and Spa and GTB EDC d/b/a Turtle Creek Casino and Turtle Creek Hotel; and
- WHEREAS: The nature and scope of the Granger Group competitive impact, if any, is open to subjective and objective interpretation based upon pro-forma financial projections of the Granger Group because of the lack of Granger Group historical financial information; and
- NOW THEREFORE BE IT RESOLVED that the Tribal Council directs the Department of Public Works, the Legal Department, the tribal architect, GTEC LLC personnel, Board member John Anderson (retired IHS water engineer) to develop a water contract with the Granger Group that reflects reasonable market standards, on an interim basis, to be reset in the spring of 2023 when the market survey is completed that will confirm and set reasonable commercial rates for water services provided by the GTB Public Works Department.
- NOW THEREFORE BE IT RESOLVED that the controlling commercial principle of the water services agreement with the Granger Group is, that to the extent it is not contrary to law, the water services agreement should protect the current enterprise developments of the GTBOCI as established at the Grand Traverse Resort and Spa, the Turtle Creek Casino and Turtle Creek Hotel and any retail commercial development to be completed at the trust land property located on M-72 across from the Grand Traverse Resort and directly west of the current Meijer development.

NOW THEREFORE BE IT RESOLVED that the water sales agreement is predicated on the consent of the Granger Group recognizing and accommodating the financial commercial interest of the Tribe in the water sales agreement.

APPROVED:

David M. Arroyo, Chairman

ADOPTED:

<u>Theresa M. Marshall</u> Theresa M. Marshall, Secretary

CERTIFICATION

As Secretary of the Tribal Council of the Grand Traverse Band of Ottawa and Chippewa Indians, I hereby certify that the above resolution was approved and adopted at a Special Session of the Tribal Council held in Peshawbestown, Michigan, on February 22, 2023, by a vote of:

 $\underline{4}$ FOR, $\underline{2}$ AGAINST, $\underline{0}$ ABSTAINING, and $\underline{0}$ ABSENT.

ATTEST:

<u>Theresa M. Marshall</u>, Secretary

TRIBAL COUNC The Grand Traverse Band	L AGENDA RE	EQUEST hippewa Indians
This Original agenda request must ha	e all original materials	s pertaining to it attached.
Agenda Topic/Title: Granger Group Wa	er Sales Agreeme	ent- Approval of 1 of 2 resolutions
Requested/Presented by: John Petoskey & John P	e Huhn returned to the above appropriate offices at	ve individual who is responsible to GTB.
Regular Session Specia Date: Date:	Il Session □ Er 2/22/23 D	mergency Session ate:
Placement on Agenda:		
□ Unfinished Business X New Business	ness	Closed Session
Approval by Motion		Information Only
□ Resolution Approval #		Other (please specify)
Was a Work Session held for this Agenda	a Request? (date) 2/1	5/23
Do you have a past resolution: X No	□ Yes, (please atta	ich)
Do you have a past motion: X No	'es, (please attach)	
Rationale/Explanation: (use second sheet materials prior to submission to the Tribal Manag	as needed for clarifica er's Office.	tion and attach all appropriate
Purpose:	The energy the request	
Two options are being presented 1) Res #23-41.352		st to supply water to the development
or 2) Res #23.41-3528 to deny the request to	supply water to the	development.
Outcome Requested: To chose one of the two resolutions for	approval.	
Attached signed legal review form	signed CFO review form	Legal/CFO review not applicable
Signatures:		Date:
Supervisor:	Data: Ich	
Please ensure that ALL proper and correct decim	Date:	r_{1}
Tribel Menonen	ients are attached prio	a containing the TM signatures.
Signature of TM needed be	fore this Agenda Reques	Date: 2/10/2023 It can be added to the TC Agenda
Tribal Council Directive Issued: It is the directive of the Tribal Council that any topics that ha	ve not been included on the	e POSTED agenda must be brought to the

attention of the Tribal Council PRIOR to the meeting. This information must be presented in written form. Please note that the agenda is posted one (1) week prior to Regular & Special sessions, and completed agenda items are due at 10:00 a.m. to the Tribal Manager Office 9 days before each session. Please plan accordingly. rev 9/07 – MP 1/11 – 5/11 TMO 4/12 TMO 5/12 TMO 2/15 TMO GTB Forms\Tribal Council\ Tribal Council Agenda Request Form



Traffic Impact Study Acme Village Flats Acme Township, Michigan

Prepared for:

Spacewerks 2380 Health Drive Suite 210 Wyoming, MI 49519

Prepared by:

Progressive AE 1811 4 Mile Road NE Grand Rapids, MI 49525

January 2023 Project No. 77180004

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EXECUTIVE SUMMARY

Introduction

Spacewerks is proposing the development of a 60-unit multifamily residential site located on the south side of Mt. Hope Road in Acme Township, Michigan. Primary site access will be via two site driveways to Mt. Hope Road. The eastern driveway will initially be restricted to a right-in/right-out configuration as the sight distance is limited at the proposed location. Full build-out of the site is expected to be completed within the next two years.

As part of the project approval process, Acme Township (Township) has requested a traffic impact study be prepared to quantify the impacts the project may have on the surrounding roadway network.

The purpose of this traffic impact study was to analyze the potential impacts of the planned development and to identify what physical and/or operational roadway system improvements may be necessary to mitigate existing or anticipated background issues and/or impacts created by this development's traffic.

Pre-study coordination was completed with the Grand Traverse County Road Commission and Township staff to help identify the required study area, study parameters, and any specific areas of concern. The following chapters outline the results of analyses completed during the study process.

Study Area

The study area includes two existing unsignalized intersections as listed below:

- US-31 at Mt. Hope Road
- M-72 at Mt. Hope Road

Data Collection

24-hour turning movement counts at the study area intersections were collected in August 2022 on a typical weekday. As the counts were performed during the peak summer time period, no seasonal adjustments were made to the traffic data.

Analysis

Two analysis scenarios were completed for the weekday morning and afternoon peak hours as part of the study as follows:

- Existing Conditions
- Future (2024) Conditions

An annual background traffic growth rate of 1.00 percent was applied to the existing volumes based on historical growth in the area to help reflect anticipated non-development traffic increases by the 2024 horizon year.

Trip generation for the site was calculated for the typical weekday, weekday morning, and weekday afternoon peak hours based on the methods of the ITE Trip Generation Manual, 11th Edition, published by the Institute of Transportation Engineers (ITE). The site is expected to generate approximately 460 daily vehicle trips (230 inbound, 230 outbound), 41 new weekday morning peak hour vehicle trips (10 inbound, 31 outbound), and 46 new weekday afternoon peak hour trips (29 inbound, 17 outbound) onto the street system.

For the existing and future (2024) conditions, capacity and queuing analyses were performed to determine the impacts the site would have on the roadways and intersections within the study area.

Conclusions

Based on the analyses performed as part of this study, the proposed development will have little to no impact on the surrounding roadway network. The findings of this study are as follows:

Existing Conditions

The existing conditions analyses show all controlled movements at the study area unsignalized intersections are currently operating at LoS "D" or better during the morning and afternoon peak hours, except for the movement listed below.

• The westbound left-turn movement at the US-31/Mt. Hope Road intersection currently operates at LoS "F" during the afternoon peak hour with a 95th percentile queue of 1.1 vehicles. This would be considered acceptable, particularly during the summer months, given it is a low volume movement with a short queue.

Future (2024) Conditions

The trip generation estimates show the proposed development will add minimal traffic to the surrounding roadway network during the morning and afternoon peak hours.

The future (2024) conditions are similar to the existing conditions, with all controlled movements at the study area unsignalized intersections and the site driveways anticipated to operate at LoS "D" or better during the morning and afternoon peak hours, except for the movement listed below.

• The westbound left-turn movement at the US-31/Mt. Hope Road intersection is anticipated to continue operating at LoS "F" during the afternoon peak hour with a 95th percentile queue of 1.9 vehicles. As with existing conditions, this would be considered acceptable, particularly during the summer months, given it is a low volume movement with a short queue.

Converting the eastern driveway from the proposed right-in/right-out configuration to a full access driveway in the future would have little to no impact on operations at the two site driveways.

Recommendations

No improvements to the study area intersections were found necessary to mitigate the impact of the proposed Acme Village Flats development site.

CHAPTER 1

INTRODUCTION

Spacewerks is proposing the development of a 60-unit multifamily residential site located on the south side of Mt. Hope Road in Acme Township, Michigan. Primary site access will be via two site driveways to Mt. Hope Road. The eastern driveway will initially be restricted to a right-in/right-out configuration as the sight distance is limited at the proposed location. Full build-out of the site is expected to be completed within the next two years.

As part of the project approval process, Acme Township (Township) has requested a traffic impact study be prepared to quantify the impacts the project may have on the surrounding roadway network.

The purpose of this traffic impact study was to analyze the potential impacts of the planned development and to identify what physical and/or operational roadway system improvements may be necessary to mitigate existing or anticipated background issues and/or impacts created by this development's traffic. Tasks undertaken to complete the analyses include:

- 1. **Data Collection.** Morning and afternoon peak hour turning movement counts were completed at the study area intersections in August 2022. Information regarding lane configurations, speed limits, traffic controls, and other related data for the study area roadways was also collected.
- 2. **Background Growth.** An annual background traffic growth rate of 1.00 percent was applied to the existing volumes based on historical growth in the area to help reflect anticipated non-development traffic increases by the 2024 horizon year.
- 3. **Trip Generation/Distribution.** The number of trips the proposed development is expected to generate during peak hours was identified. These trips were then assigned to the adjacent street system based upon the patterns followed by existing traffic and engineering judgment.



Figure 1. Location Map and Study Area

- 4. *Levels of Service.* Capacity calculations were completed at the study area intersections and the proposed site driveways to identify existing and anticipated future peak hour operational characteristics.
- 5. *Mitigation.* Roadway/intersection improvements were identified, when applicable, that will enable the adjacent roadways and study area intersections to maintain equal and/or acceptable levels of operation under future conditions upon the addition of background traffic growth and/or due to development traffic.

Pre-study coordination was completed with the Grand Traverse County Road Commission and Township staff to help identify the required study area, study parameters, and any specific areas of concern. The following chapters outline the results of analyses completed during the study process.

CHAPTER 2

EXISTING CONDITIONS

The first step in the identification of potential traffic impacts is to determine how well the adjacent streets are operating under current conditions. This chapter summarizes the data collection and existing operating conditions analysis procedures.

Key Study Area Roadways

US Highway 31

US-31 is a major north-south arterial roadway within the study area under Michigan Department of Transportation (MDOT) operational jurisdiction. Within the study area, it generally has a five-lane cross section with a speed limit of 45 miles per hour (mph). Weekday 24-hour traffic volumes along US-31 in the vicinity of the site vary by season, but average approximately 30,300 vehicles per day south of M-72.

<u>M-72</u>

M-72 is a major east-west arterial roadway within the study area under MDOT operational jurisdiction. At Mt. Hope Road, M-72 has a five-lane cross section with a speed limit of 55 mph. To the east of Mt. Hope Road, M-72 narrows to an unbalanced three-lane cross section with one westbound lane and two eastbound lanes. Weekday 24-hour traffic volumes along M-72 in the vicinity of the site vary by season, but average approximately 16,800 vehicles per day.

Existing Intersections

The study area includes two existing unsignalized intersections as listed in Table 1.

Table 1. Existing Intersections

Intersection	Traffic Control
US-31 / Mt. Hope Road	Two-Way Stop
M-72 / Mt. Hope Road	Two-Way Stop

Source: Progressive AE, January 2023

Data Collection

24-hour turning movement counts at the study area intersections were collected in August 2022 on a typical weekday. As the counts were performed during the peak summer time period, no seasonal adjustments were made to the traffic data. This results in a conservative analysis as the summer month volumes are typically much higher compared to other times of the year.

Figure 2 shows the existing morning and afternoon peak hour volumes at the study area intersections. Detailed printouts of the count reports are included in the Appendix.

These counts indicated that the typical weekday morning peak hour generally occurs between 8:00 a.m. to 9:00 a.m. and the typical afternoon peak hour occurs between 4:45 p.m. to 5:45 p.m.



Mt. Hope Road at US-31 (Facing East)



Existing Conditions Capacity Analysis

Intersection level of service calculations were completed to evaluate the current operational efficiency of the study area intersections. These calculations were completed using techniques outlined in the Highway Capacity Manual, published by the Transportation Research Board. *Synchro*[®] traffic analysis software, version 11, based on the Highway Capacity Manual methodologies, was used in the analysis.

Level of service at signalized and unsignalized intersections relates to the delay, traffic volumes, and intersection geometry. Level of service are expressed in a range from "A" to "F", with "A" denoting the highest or best, operating conditions. Generally, a LoS "D" rating is considered the minimum acceptable service level for signalized and unsignalized intersections in most areas, although a LoS "E" or LoS "F" can be deemed as acceptable during the peak hours. The criteria for determining the level of service at signalized and unsignalized intersections are outlined in the Appendix of this report.

The existing morning and afternoon peak hours were analyzed at the study area intersections. Table 2 and Figure 2 show the levels of service for the study area intersections. Copies of the *Synchro*[®] analyses are included in the Appendix.

Table 2.	Existina	Levels	of Service	and Delav	!
			0.0000	ana 201ay	

	Existing Conditions						
Intersection/ Movement		٩.М .	P.M.				
	LoS	Delay(s)	LoS	Delay(s)			
US-31 / Mt. Hope Roa	ad ¹						
WBL	D	27.1	F	50.5			
WBR	В	13.5	С	17.0			
SBL	В	11.2	В	14.7			
M-72 / Mt. Hope Road	d ¹						
NBL	С	15.3	С	23.6			
NBR	В	10.0	В	12.1			
EBL	А	9.0	А	9.4			
WBL	Α	8.5	В	10.1			
SB	В	10.6	С	16.3			

¹Unsignalized intersection, controlled movements shown Source: Progressive AE, January 2023

All controlled movements at the study area unsignalized intersections are currently operating at LoS "D" or better during the morning and afternoon peak hours, except for the movement listed below.

• The westbound left-turn movement at the US-31/Mt. Hope Road intersection currently operates at LoS "F" during the afternoon peak hour with a 95th percentile queue of 1.1 vehicles. This would be considered acceptable, particularly during the summer months, given it is a low volume movement with a short queue.



CHAPTER 3

FUTURE (2024) CONDITIONS

The purpose of this chapter is to summarize the anticipated future (2024) traffic conditions within the study area with background traffic growth and the proposed development traffic in place. These analyses provide the before/after comparison of future conditions and helps define the timing and applicability of any potential roadway improvements necessary to mitigate the impact of the proposed development.

Background Traffic Growth

An annual background traffic growth rate of 1.00 percent was applied to the existing volumes based on historical growth in the area to help reflect anticipated non-development traffic increases by the 2024 horizon year. A separate analysis of the background traffic volumes was not completed as the results would largely be the same as the existing conditions.

Proposed Development and Site Access

Spacewerks is proposing the development of a 60-unit multifamily residential site located on the south side of Mt. Hope Road in Acme Township, Michigan. The proposed site includes 10 buildings with 50 two-bedroom units and 10 three-bedroom units. A copy of the proposed site plan is included in the Appendix.

Site access will be via two site driveways to Mt. Hope Road. The eastern driveway will initially be restricted to a right-in/right-out configuration as the sight distance is limited at the proposed location. This driveway may ultimately be reconfigured as a full access driveway if the existing 55 mph speed limit along Mt. Hope Road is reduced in the future.

Full build-out of the site is expected to be completed within the next two years.



Trip Generation

The Trip Generation Manual, Eleventh Edition, by the Institute of Transportation Engineers (ITE) was used to calculate the anticipated traffic that may be generated by the proposed site. Trips are measured individually for inbound and outbound movements; therefore, a visit to the site by an employee or visitor, for instance, generates two trips – one inbound and one outbound.

Based on the land use descriptions provided within the ITE Trip Generation Manual, the most applicable land use for the proposed site would be Multifamily Housing (Low-Rise), Land Use Code 220.

Trips for the site were calculated for the typical weekday, weekday morning, and weekday afternoon peak hours. Table 3 shows the daily and peak hour trips anticipated to be generated by the proposed development after full completion of the site.

Table 3. Future (2024) Trip Generation Summary

	ITE	0:	A.M.			P.M.			Daily
	Code		Total	Enter	Exit	Total	Enter	Exit	Trips
Multifamily Housing (Low-Rise)	220	60 Units	41	10	31	46	29	17	460

Source: ITE Trip Generation Manual, 11th Edition

As shown in Table 3, the site is expected to generate approximately 460 daily vehicle trips (230 inbound, 230 outbound), 41 new weekday morning peak hour vehicle trips (10 inbound, 31 outbound), and 46 new weekday afternoon peak hour trips (29 inbound, 17 outbound) onto the street system.

Trip Distribution

The directional distribution of the site generated new trips was based upon existing travel patterns and engineering judgment. Directional distribution to/from the proposed development for site generated new trips is expected to be approximately as follows:

To/from US-31 north	25%	To/from M-72 east	25%
To/from US-31 south	50%		

Based upon the above distribution patterns for new trips and engineering judgment, the anticipated peak hour project traffic was assigned to the proposed site access driveways and the other study area intersections. Figure 3 shows the total anticipated morning and afternoon peak hour trips for site generated traffic upon full completion and occupancy of the proposed site.

The anticipated site trips were added to the background (2024) peak hour volumes to depict the estimated total future (2024) volumes during the morning and afternoon peak hours. Figure 4 shows the total anticipated future (2024) volumes.

Future (2024) Capacity Analysis

Intersection level of service calculations were completed to evaluate the future (2024) morning and afternoon peak hour conditions at the site access driveways and study area intersections assuming the completion of the site. The results of the level of service analyses are shown in Table 4. Copies of the *Synchro*[®] analyses are included in the Appendix.

The future (2024) conditions are similar to the existing conditions, with all controlled movements at the study area unsignalized intersections and the site driveways anticipated to operate at LoS "D" or better during the morning and afternoon peak hours, except for the movement listed below.

• The westbound left-turn movement at the US-31/Mt. Hope Road intersection is anticipated to continue operating at LoS "F" during the afternoon peak hour with a 95th percentile queue of 1.9 vehicles. As with existing conditions, this would be considered acceptable, particularly during the summer months, given it is a low volume movement with a short queue.

Intersection/ Movement	Existing Conditions				Future (2024) Conditions				
	A.M.		P.M.		A.M.		P.M.		
	LoS	Delay(s)	LoS	Delay(s)	LoS	Delay(s)	LoS	Delay(s)	
US-31 / Mt. Hope Road ¹									
WBL	D	27.1	F	50.5	D	31.8	F	64.6	
WBR	В	13.5	С	17.0	В	13.9	С	17.8	
SBL	В	11.2	В	14.7	В	11.4	С	15.3	
NBL	С	15.3	С	23.6	С	15.6	С	24.4	
NBR	В	10.0	В	12.1	В	10.1	В	12.3	
EBL	А	9.0	А	9.4	А	9.1	А	9.4	
WBL	А	8.5	В	10.1	А	8.6	В	10.2	
SB	В	10.6	С	16.3	В	10.6	С	16.7	
Mt. Hope Road / Proposed West Driveway ¹									
NB	-	-	-	-	А	8.9	А	9.1	
WBL	-	-	-	-	А	7.3	А	7.4	
Mt. Hope Road / Proposed East Driveway ¹									
NBR	-	-	-	-	A	8.4	A	8.6	

Table 4. Future (2024) Levels of Service and Delay

¹Unsignalized intersection, controlled movements shown Source: Progressive AE, January 2023





CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the results of the analyses performed as part of the study. Recommendations to improve the surrounding roadway network are also presented.

Conclusions

Based on the analyses performed as part of this study, the proposed development will have little to no impact on the surrounding roadway network. The findings of this study are as follows:

Existing Conditions

The existing conditions analyses show All controlled movements at the study area unsignalized intersections are currently operating at LoS "D" or better during the morning and afternoon peak hours, except for the movement listed below.

• The westbound left-turn movement at the US-31/Mt. Hope Road intersection currently operates at LoS "F" during the afternoon peak hour with a 95th percentile queue of 1.1 vehicles. This would be considered acceptable, particularly during the summer months, given it is a low volume movement with a short queue.

Future (2024) Conditions

The trip generation estimates show the proposed development will add minimal traffic to the surrounding roadway network during the morning and afternoon peak hours.

The future (2024) conditions are similar to the existing conditions, with all controlled movements at the study area unsignalized intersections and the site driveways anticipated to operate at LoS "D" or better during the morning and afternoon peak hours, except for the movement listed below.

• The westbound left-turn movement at the US-31/Mt. Hope Road intersection is anticipated to continue operating at LoS "F" during the afternoon peak hour with a 95th percentile queue of 1.9 vehicles. As with existing conditions, this would be considered acceptable, particularly during the summer months, given it is a low volume movement with a short queue.

Converting the eastern driveway from the proposed right-in/right-out configuration to a full access driveway in the future would have little to no impact on operations at the two site driveways.

Recommendations

No improvements to the study area intersections were found necessary to mitigate the impact of the proposed Acme Village Flats development site.

progressive ae

Technical Appendix

Acme Village Flats TIS

- Level of Service Definitions
- Glossary
- Site Plan
- Traffic Count Data
- Synchro Analyses Results

Level of Service Definitions Signalized Intersections

- Level of Service A: Describes operations with very low average stopped delay, i.e., less than 10.0 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
- Level of Service B: Describes operations with an average stopped delay in the range of 10.0 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
- Level of Service C: Describes operations with an average stopped delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- Level of Service D: Describes operations with an average stopped delay in the range of 35.1 to 55.0 seconds per vehicle. At Level of Service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c (volume/capacity) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
- Level of Service E: Describes operations with an average stopped delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay in many cases. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
- Level of Service F: Describes operations with an average stopped delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Level of Service Definitions <u>Unsignalized</u> Intersections

Level of Service A:	Average delay per vehicles for impeded movements is less than 10 seconds. There is little or no delay with typically low side street and/or main street traffic.		
Level of Service B:	Average stopped delays from 10.1 seconds to 15.0 seconds. Short delays, many acceptable gaps in main street traffic stream.		
Level of Service C:	Average delay per vehicle ranges from 15.1 to 25.0 seconds. Average traffic delays with frequent gaps in main street traffic.		
Level of Service D:	Average delays from 25.1 to 35.0 seconds for impeded movements. Long traffic delays for impeded movements due in part to a limited number of acceptable gaps.		
Level of Service E:	Average delays in the 35.1 to 50.0 second range. May experience very long delays for impeded movements with a very small number of acceptable gaps in the traffic stream.		
Level of Service F:	Average vehicle delays of over 50.0 seconds. Extreme traffi delays with virtually no acceptable gaps in main street traffic.		

Glossary

Approach: A set of lanes accommodating all left-turn, through, and right-turn movements arriving at an intersection from a given direction.

Arterial: Signalized streets that serve primarily through traffic and provide access to abutting properties as a secondary function.

Average Stopped Delay: The total time vehicles are stopped in an intersection approach or lane group during a specified time interval divided by the volume departing from the approach or lane group during the same time period, in seconds per vehicle.

Background Traffic: Traffic volumes that will be on the roadway network without the presence of the proposed development.

Bypass Lane: A one-lane widening on a two-lane roadway that allows through traffic to pass by waiting left-turn traffic.

Capacity: The maximum rate of flow at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions; usually expressed as vehicles per hour or persons per hour.

Conflicting Traffic Volume: The volume of traffic which conflicts with a specific movement at an intersection.

Corridor: A lineal study area aligned with a roadway facility in which traffic, land use, right-ofway, environmental, and other factors are evaluated to determine future transportation facility needs.

Cycle: Any complete sequence of traffic signal indications.

Cycle Length: The total time for a traffic signal to complete one cycle.

Design Hour Volume: The traffic volume for the design hour, usually a forecast of the relevant peak hour volume, in vehicles per hour.

Diverted Linked Trips: Trips from the traffic volume on roadways within the vicinity of the generator but which requires a diversion from that roadway to another roadway to gain access to the site.

Driveway Offset: Distance between driveways on opposite sides of a roadway, measured parallel to roadway.

Freeway: A multi-lane divided highway having a minimum of two lanes for exclusive use of traffic in each direction and full control of access and egress.

Gaps (Critical Gap): The median time headway between vehicles in a major traffic stream which will permit side-street vehicles to cross through or merge with the major traffic stream.

Green Time: The actual length of the "green" indication for a given movement at a signalized intersection.
Level of Service: A qualitative measure describing operational conditions within a traffic stream; generally described in terms of such factors as speed and travel time, delay, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Operational Analysis: A use of capacity analysis to determine the prevailing level of service on an existing or projected facility, with known or projected traffic, roadway, and control conditions. This analysis can involve a particular location, such as an intersection or a corridor.

Pass-by Trips: Trips made as intermediate stops on the way from an origin to a primary trip destination.

Peak Hour (AM): The one hour period in the morning representing the highest hourly volume of traffic flow on the adjacent public street system.

Peak Hour (PM): The one hour period in the afternoon or evening representing the highest hourly volume of traffic flow on the adjacent public street system.

Peak Hour Factor: The hourly volume during the maximum volume hour of the day divided by four times the peak 15-minute flow within the peak hour; a measure of traffic demand fluctuation within the peak hour.

Phase: The part of the signal cycle allocated to any combination of traffic movements receiving the right-of-way simultaneously during one or more intervals.

Roadway Conditions: Geometric characteristics of a street or highway, including the type of facility, number and width of lanes (by direction), shoulder widths and lateral clearances, design speed, etc.

Service Drive: A roadway (usually private) that provides internal access to two or more uses.

Site Traffic: Existing or projected vehicular traffic generated by the development.

Study Area: The geographic area containing site access points and critical intersections (and connecting highway segments) which are impacted by the site-traffic generated by the development, and should be evaluated.

System Improvements: Added lanes, signal improvements, and other roadway improvements not considered site-related improvements.

Traffic Impact: The adverse impact on intersection Level of Service and/or street and highway safety and operations as determined by the criteria and procedures set forth in this handbook.

Trip (Directional Trip): A single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site.

Trip Distribution: The distribution or assignment of site traffic into site driveways and study area roadways/intersections based upon expected direction of approach and departure.

Unsignalized Intersection: Any intersection not controlled by traffic signals.

Volume: The number of persons or vehicles passing a point on a lane or roadway during some time interval, such as one hour or during an average day.

Volume-to-Capacity Ratio (V/C): The ratio of demand flow rate to capacity for a traffic facility.

Site Plan





Traffic Count Data

Progressive AE 1811 4 Mile Rd NE

Grand Rapids, Michigan, United States 49525 (616) 361-2664 Count Name: M-72 & Mt Hope Rd Site Code: Start Date: 08/16/2022 Page No: 1

Turning Movement Data

Ibort Train Weissbard Weissbard Ibort Mage Mage <t< th=""><th></th><th></th><th>M</th><th>-72</th><th></th><th></th><th>M</th><th>-72</th><th></th><th></th><th>Mt Ho</th><th>ope Rd</th><th></th><th></th><th>Hol</th><th>t Rd</th><th></th><th></th></t<>			M	-72			M	-72			Mt Ho	ope Rd			Hol	t Rd		
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A35 AM 0 6 0 1 17 0 18 0<	4:15 AM	0	4	0	4	0	15	0	15	0	0	0	0	0	0	0	0	19
A45 AM 0 11 0 35 0 35 0	4:30 AM	0	6	0	6	1	17	0	18	0	0	0	0	0	0	0	0	24
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500 AM 0 20 0 23 0 23 0	Hourly Total	0	28	0	28	1	77	0	78	0	0	0	0	0	0	0	0	106
5:15 AM 0 36 0 44 0 1 1 0 0 0 1	5:00 AM	0	20	0	20	0	23	0	23	0	0	0	0	0	0	0	0	43
535 AM 0 33 0 60 1 112 Hourly Total 0 130 0 130 1 193 0 194 0 0 3 3 1 0 0 1 122 6:00 AM 0 46 0 43 1 92 0 3 3 1 0 0 1 1 2 122 122 1 0 0 0 0 0 0 0 1 1 1 2 1 0 0 0 1 1 2 2 1 0 0 0 0 1 1 2 2 1 0 0 1 1 2 2 1 1 1 1 1 1 1 1 1 1	5:15 AM	0	36	0	36	0	44	0	44	0	0	0	0	0	0	0	0	80
553 AM 0 41 0 41 1 166 0 67 0 0 3 3 1 0 0 1 112 Houry Total 0 130 1 193 0 194 0 0 3 3 1 0 0 1 122 6:15 AM 0 43 0 43 1 92 1 94 0 0 4 4 0 0 0 1 141 6:30 AM 0 70 0 121 0 121 0 0 1 1 0	5:30 AM	0	33	0	33	0	60	0	60	0	0	0	0	0	0	0	0	93
Houry Total 0 130 0 133 0 194 0 0 3 3 1 0 0 1 328 600 AM 0 46 0 70 0 71 129 0 130 0 0 4 4 0 0 0 0 141 630 AM 0 70 0 70 1 129 0 130 0 0 1 1 0 0 0 0 0 0 0 0 0 0 1 1 0 1 1 2 0 1 1 2 0 1 1 2 0 1 1 2 0 1 <td>5:45 AM</td> <td>0</td> <td>41</td> <td></td> <td>41</td> <td>1</td> <td>66</td> <td>0</td> <td>67</td> <td>0</td> <td>0</td> <td>3</td> <td>3</td> <td>1</td> <td>0</td> <td></td> <td>1</td> <td>112</td>	5:45 AM	0	41		41	1	66	0	67	0	0	3	3	1	0		1	112
Book Am C </td <td></td> <td>0</td> <td>130</td> <td></td> <td>130</td> <td>1</td> <td>70</td> <td>0</td> <td>71</td> <td>0</td> <td>0</td> <td></td> <td>3</td> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>328</td>		0	130		130	1	70	0	71	0	0		3	1	0	1	1	328
6:3 AM 0 4:3 1 3:2 1 3:4 0 0 4 4 0 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 0 1 1 2 0 1 1 2 0 1 1 2 0 1 1 <t></t> 2 0 1 1 2 0 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 </td <td>6:00 AM</td> <td>0</td> <td>40</td> <td></td> <td>40</td> <td>1</td> <td></td> <td>1</td> <td>01</td> <td>0</td> <td>0</td> <td>- 3</td> <td>3</td> <td>0</td> <td>0</td> <td></td> <td>2</td> <td>141</td>	6:00 AM	0	40		40	1		1	01	0	0	- 3	3	0	0		2	141
G.S. AM 0 170 0 1 125 0 120 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 0 0 1 1 1 1 0 0 1 1 2 0 1 1 2 0 1 1 2 0 1 1 2 0 1 1 2 0 1 1 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 <th1< th=""> 1 1 <!--</td--><td>6:30 AM</td><td>0</td><td></td><td></td><td>70</td><td>1</td><td>120</td><td></td><td>130</td><td>0</td><td>0</td><td></td><td>4</td><td>0</td><td>0</td><td></td><td>0</td><td>201</td></th1<>	6:30 AM	0			70	1	120		130	0	0		4	0	0		0	201
Houry Total 0 248 0 248 3 412 1 416 0 0 9 9 1 0 1 2 675 7:00 AM 0 77 0 122 0 122 1 0 1 2 675 7:00 AM 0 89 0 155 0 152 0 0 0 0 1 2 675 7:30 AM 0 110 0 10 1 183 1 165 0 0 1 1 2 0 1 3 292 7:45 AM 1 136 0 137 2 172 1 175 0 0 3 3 0 0 0 2 5 101 1 2 0 0 1 2 1 1 1 1 1 1 1 1 15 106 1 1 <td>6:45 AM</td> <td>0</td> <td>89</td> <td>0</td> <td>89</td> <td>0</td> <td>123</td> <td>0</td> <td>121</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>211</td>	6:45 AM	0	89	0	89	0	123	0	121	0	0	1	1	0	0	0	0	211
7:00 AM 0 77 0 77 0 122 0 122 1 0 1 2 1 0 0 1 1 2 1 0 0 1 1 2 1 0 0 1 1 2 1 0 0 1 1 2 1 1 1 1 2 1 1 1 2 1 1 1 1 1 2 1 1 1 1 2 2 1 1 1 2 1 1 1 2 1 1 1 2 1 <	Hourly Total	0	248	0	248	3	412	1	416	0	0	9	9	1	0	1	2	675
7:15 AM 0 89 0 155 0 155 0 0 0 0 1 1 245 7:30 AM 0 110 0 110 1 183 1 185 0 0 1 1 2 0 1 3 299 7:45 AM 1 136 0 137 2 172 1 175 0 0 3 3 0 0 0 0 315 Houry Total 1 412 0 413 3 632 2 637 1 0 5 6 3 0 0 1 1 271 1 178 1 0 0 1 1 271 1 178 1 0 1 1 1 20 0 1 1 20 0 1 1 309 33 3 1 1 2 1 1 1 309 33 3 1 1 1 309 34 1 1	7:00 AM	0	77	0	77	0	122	0	122	1	0	1	2	1	0	0	1	202
7:30 AM 0 110 0 110 1 183 1 185 0 0 1 1 2 0 1 3 299 7:45 AM 1 136 0 137 2 172 1 175 0 0 3 3 0 0 0 0 315 Hourly Total 1 412 0 413 3 632 2 637 1 0 5 6 3 0 2 5 1061 8:00 AM 0 98 0 98 1 169 0 170 0 2 2 0 0 1 1 271 3 309 8:45 AM 1 140 2 143 3 164 2 169 2 0 0 1 1 309 315 Hourly Total 1 487 3 491 12 655 3 670 3 3 3 1 2 6 320 9:00 A	7:15 AM	0	89	0	89	0	155	0	155	0	0	0	0	0	0	1	1	245
7:45 AM 1 136 0 137 2 172 1 175 0 0 3 3 0 0 0 315 Hourly Total 1 412 0 413 3 632 2 637 1 0 5 6 3 0 2 5 1061 8:00 AM 0 98 0 98 1 169 0 170 0 0 2 2 0 0 1 1 2711 8:15 AM 0 122 0 122 3 150 0 15 1 0 1 2 0 0 1 1 309 8:45 AM 1 140 2 143 3 164 2 169 2 0 0 2 1 1 1 309 9:0 AM 0 123 0 159 0 59 0 0 3 3 1 2 6 30 9:15 AM 2 152	7:30 AM	0	110	0	110	1	183	1	185	0	0	1	1	2	0	1	3	299
Hourty Total 1 412 0 413 3 632 2 637 1 0 5 6 3 0 2 5 1061 8:00 AM 0 98 0 98 1 169 0 170 0 0 2 2 0 0 1 1 271 8:15 AM 0 122 0 122 3 150 0 133 0 0 1 1 0 0 0 0 276 8:45 AM 1 140 2 143 3 164 2 169 2 0 0 2 1 0 0 1 1 309 8:45 AM 1 1407 2 143 3 164 2 169 0 0 2 1 0 1 1 309 9:00 AM 0 123 0 156 1 157	7:45 AM	1	136	0	137	2	172	1	175	0	0	3	3	0	0	0	0	315
8:00 AM 0 98 0 98 1 169 0 170 0 0 2 2 0 0 1 1 271 8:15 AM 0 122 0 122 3 150 0 153 0 0 1 1 0 0 0 0 276 8:30 AM 0 127 1 128 5 172 1 178 1 0 1 2 0 0 1 1 309 8:45 AM 1 1407 2 143 3 164 2 169 2 0 0 2 3 1171 9:00 AM 0 123 0 159 0 159 0 0 2 2 0 0 1 1 285 9:15 AM 2 152 0 156 1 157 0 0 3 3 3	Hourly Total	1	412	0	413	3	632	2	637	1	0	5	6	3	0	2	5	1061
8:15 AM 0 122 0 122 3 150 0 153 0 0 1 1 0 0 0 0 276 8:30 AM 0 127 1 128 5 172 1 178 1 0 1 2 0 0 1 1 309 8:45 AM 1 140 2 143 3 164 2 169 2 0 0 2 1 0 0 1 315 Hourly Total 1 487 3 491 12 655 3 670 3 0 4 7 1 0 2 3 1171 9:00 AM 0 123 0 156 1 157 0 0 3 3 3 1 2 6 320 9:30 AM 0 129 2 131 1 162 2 165 <td>8:00 AM</td> <td>0</td> <td>98</td> <td>0</td> <td>98</td> <td>1</td> <td>169</td> <td>0</td> <td>170</td> <td>0</td> <td>0</td> <td>2</td> <td>2</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>271</td>	8:00 AM	0	98	0	98	1	169	0	170	0	0	2	2	0	0	1	1	271
8:30 AM 0 127 1 128 5 172 1 178 1 0 1 2 0 0 1 1 309 8:45 AM 1 140 2 143 3 164 2 169 2 0 0 2 1 0 0 1 315 Hourly Total 1 487 3 491 12 655 3 670 3 0 4 7 1 0 2 3 1171 9:00 AM 0 123 0 123 0 159 0 5 3 0 2 2 0 0 1 1 285 9:15 AM 2 152 0 156 1 157 0 0 3 3 3 1 2 6 320 9:45 AM 1 166 0 167 1 162 2 165	8:15 AM	0	122	0	122	3	150	0	153	0	0	1	1	0	0	0	0	276
8:45 AM 1 140 2 143 3 164 2 169 2 0 0 2 1 0 0 1 315 Hourly Total 1 487 3 491 12 655 3 670 3 0 4 7 1 0 2 3 1171 9:00 AM 0 123 0 123 0 159 0 0 2 2 0 0 1 1 285 9:15 AM 2 152 0 154 0 156 1 157 0 0 3 3 1 2 6 320 9:30 AM 0 129 2 131 1 154 0 155 3 0 3 6 0 0 1 2 336 Hourly Total 3 570 2 575 2 631 3 6 10	8:30 AM	0	127	1	128	5	172	1	178	1	0	1	2	0	0	1	1	309
Hourly Total 1 487 3 491 12 655 3 670 3 0 4 7 1 0 2 3 1171 9:00 AM 0 123 0 159 0 159 0 0 2 2 0 0 1 1 285 9:15 AM 2 152 0 154 0 156 1 157 0 0 3 3 1 2 6 320 9:30 AM 0 129 2 131 1 154 0 155 3 0 3 6 0 0 1 1 293 9:45 AM 1 166 0 167 1 162 2 165 0 0 2 1 0 1 1 2 3 10 1 1 2 3 2 1 1 1 2 1 1	8:45 AM	1	140	2	143	3	164	2	169	2	0	0	2	1	0	0	1	315
9:00 AM 0 123 0 159 0 159 0 0 2 2 0 0 1 1 285 9:15 AM 2 152 0 154 0 156 1 157 0 0 3 3 3 1 2 6 320 9:30 AM 0 129 2 131 1 156 0 155 3 0 3 6 0 0 1 1 293 9:45 AM 1 166 0 167 1 162 2 165 0 0 2 2 1 0 1 2 336 Hourly Total 3 570 2 575 2 631 3 636 3 0 10 13 4 1 5 10 1234 10:00 AM 0 135 1 136 2 152 1 155 1 0 1 1 327 10:30 AM 2 162 0 </td <td>Hourly Total</td> <td>1</td> <td>487</td> <td>3</td> <td>491</td> <td>12</td> <td>655</td> <td>3</td> <td>670</td> <td>3</td> <td>0</td> <td>4</td> <td>7</td> <td>1</td> <td>0</td> <td>2</td> <td>3</td> <td>1171</td>	Hourly Total	1	487	3	491	12	655	3	670	3	0	4	7	1	0	2	3	1171
9:15 AM 2 152 0 154 0 156 1 157 0 0 3 3 1 2 6 320 9:30 AM 0 129 2 131 1 154 0 155 3 0 3 6 0 0 1 1 293 9:45 AM 1 166 0 167 1 162 2 165 0 0 2 2 1 0 1 2 336 Hourly Total 3 570 2 575 2 631 3 636 3 0 10 13 4 1 5 10 1234 10:00 AM 0 135 1 136 2 152 1 155 1 0 2 3 1 0 2 3 297 10:00 AM 1 134 0 135 2 188 190 0 0 1 1 4 358 10:30 AM 2 16	9:00 AM	0	123	0	123	0	159	0	159	0	0	2	2	0	0	1	1	285
9:30 AM 0 129 2 131 1 154 0 155 3 0 3 6 0 0 1 1 293 9:45 AM 1 166 0 167 1 162 2 165 0 0 2 2 1 0 1 2 336 Hourly Total 3 570 2 575 2 631 3 636 3 0 10 13 4 1 5 10 1234 10:00 AM 0 135 1 136 2 152 1 155 1 0 2 3 1 0 2 3 297 10:15 AM 1 134 0 135 2 188 0 190 0 0 1 1 1 327 10:30 AM 2 162 0 164 1 188 189 1 0 0 1 2 3 323 10:30 AM 2 140 <td< td=""><td>9:15 AM</td><td>2</td><td>152</td><td>0</td><td>154</td><td>0</td><td>156</td><td>1</td><td>157</td><td>0</td><td>0</td><td>3</td><td>3</td><td>3</td><td>1</td><td>2</td><td>6</td><td>320</td></td<>	9:15 AM	2	152	0	154	0	156	1	157	0	0	3	3	3	1	2	6	320
9:45 AM 1 166 0 167 1 162 2 165 0 0 2 2 1 0 1 2 336 Hourly Total 3 570 2 575 2 631 3 636 3 0 10 13 4 1 5 10 1234 10:00 AM 0 135 1 136 2 152 1 155 1 0 2 3 1 0 2 3 297 10:15 AM 1 134 0 135 2 188 0 190 0 0 1 1 1 0 0 1 327 10:30 AM 2 162 0 164 1 188 189 1 0 0 1 2 3 323 10:45 AM 0 140 1 174 1 176 2 0 2 4 1 0 2 3 323 10:45 AM 0 14	9:30 AM	0	129	2	131	1	154	0	155	3	0	3	6	0	0	1	1	293
Induity Total 3 570 2 573 2 631 3 636 3 0 10 13 4 1 5 10 1234 10:00 AM 0 135 1 136 2 152 1 155 1 0 2 3 1 0 2 3 297 10:15 AM 1 134 0 135 2 188 0 190 0 0 1 1 1 0 0 1 327 10:30 AM 2 162 0 164 1 188 0 189 1 0 0 1 2 1 1 4 358 10:45 AM 0 140 1 174 1 176 2 0 2 4 1 0 2 3 323 Hourly Total 3 571 1 575 6 702 2	9:45 AM	1	166	0	167	1	162	2	165	0	0	2	2	1	0	1 F	2	336
10:00 ANM 0 133 1 130 2 152 1 155 1 0 2 3 1 0 2 3 120 1 100 2 3 120 1 100 2 3 120 2 3 120 2 3 120 2 3 120 2 3 120 2 3 11 0 2 3 120 2 3 120 2 3 11 0 0 1 327 10:30 AM 2 162 0 164 1 188 0 189 1 0 0 1 1 4 358 10:45 AM 0 140 1 174 1 176 2 0 2 4 1 0 2 3 323 Hourly Total 3 571 1 575 6 702 2 710 4 0 5 9 5 1 5 11 1305 11 1305		3	570		5/5	2	150	3	030	3	0	10	13	4	0	5	10	1234
1 134 0 153 2 100 0 190 0 0 1 1 1 1 0 0 1 327 10:30 AM 2 162 0 164 1 188 0 189 1 0 0 1 2 1 1 4 358 10:30 AM 0 140 0 140 1 174 1 176 2 0 2 4 1 0 2 3 323 Hourly Total 3 571 1 575 6 702 2 710 4 0 5 9 5 1 5 11 1305 11:00 AM 3 134 1 138 2 176 1 179 0 0 2 2 3 0 0 3 322 11:15 AM 1 136 4 141 2 185 2 189 2 0 1 3 1 0 2 3 33	10:00 AM	1	135	0	130	2	100		100	0	0		3	1	0		3	297
10:45 AM 0 140 0 140 1 174 1 176 2 0 2 4 1 0 2 3 323 Hourly Total 3 571 1 575 6 702 2 710 4 0 5 9 5 1 5 11 1305 Hourly Total 3 571 1 575 6 702 2 710 4 0 5 9 5 1 5 11 1305 11:00 AM 3 134 1 138 2 176 1 179 0 0 2 2 3 0 0 3 322 11:15 AM 1 136 4 141 2 185 2 189 2 0 1 3 1 0 2 3 336 11:30 AM 2 146 1 149 1 201 1 203 1 0 3 4 2 0 2 4	10.10 AM	2	162	0	100	1	188	0	190	1	0	0	1	2	1	1	1	358
Hourly Total 3 571 1 575 6 702 2 710 4 0 5 9 5 1 5 11 1305 Hourly Total 3 571 1 575 6 702 2 710 4 0 5 9 5 1 5 11 1305 11:00 AM 3 134 1 138 2 176 1 179 0 0 2 2 3 0 0 3 322 11:15 AM 1 136 4 141 2 185 2 189 2 0 1 3 1 0 2 3 336 11:30 AM 2 146 1 149 1 201 1 203 1 0 3 4 2 0 2 4 360 11:45 AM 0 148 0 148 1 176 1 178 1 0 7 8 0 0 2 2	10:45 AM		140		140	1	17/	1	176	2	0	2	4	1	0	2	3	323
11:00 AM 3 134 1 138 2 176 1 179 0 0 2 2 3 0 0 3 322 11:100 AM 3 134 1 138 2 176 1 179 0 0 2 2 3 0 0 3 322 11:15 AM 1 136 4 141 2 185 2 189 2 0 1 3 1 0 2 3 336 11:30 AM 2 146 1 149 1 201 1 203 1 0 3 4 2 0 2 4 360 11:45 AM 0 148 0 148 1 176 1 178 1 0 7 8 0 0 2 2 336 Hourly Total 6 564 6 576 6 738 5 749 4 0 13 17 6 0 6 12	Hourly Total	3	571	1	575	6	702	2	710	4	0	5	9	5	1	5	11	1305
11:15 AM 1 136 4 141 2 185 2 189 2 0 1 3 1 0 2 3 336 11:15 AM 1 136 4 141 2 185 2 189 2 0 1 3 1 0 2 3 336 11:30 AM 2 146 1 149 1 201 1 203 1 0 3 4 2 0 2 4 360 11:45 AM 0 148 0 148 1 176 1 178 1 0 7 8 0 0 2 2 336 Hourly Total 6 564 6 576 6 738 5 749 4 0 13 17 6 0 6 12 1354	11:00 AM	3	134	1	138	2	176	1	179	0	0	2	2	3	0	0	3	322
11:30 AM 2 146 1 149 1 201 1 203 1 0 3 4 2 0 2 4 360 11:45 AM 0 148 0 148 1 176 1 178 1 0 7 8 0 0 2 2 336 Hourly Total 6 564 6 576 6 738 5 749 4 0 13 17 6 0 6 12 1354	11:15 AM	1	136	4	141	2	185	2	189	2	0	1	3	1	0	2	3	336
11:45 AM 0 148 0 148 1 176 1 178 1 0 7 8 0 0 2 2 336 Hourly Total 6 564 6 576 6 738 5 749 4 0 13 17 6 0 6 12 1354	11:30 AM	2	146	1	149	1	201		203	1	0	3	4	2	0	2	4	360
Hourly Total 6 564 6 576 6 738 5 749 4 0 13 17 6 0 6 12 1354	11:45 AM	0	148	0	148	1	176	1	178	1	0	7	8	0	0	2	2	336
	Hourly Total	6	564	6	576	6	738	5	749	4	0	13	17	6	0	6	12	1354

12:00 PM	2	158	1	161	1	208	0	209	0	0	0	0	0	0	1	1	371
12:15 PM	1	171	1	173	3	214	1	218	1	0	3	4	0	0	0	0	395
12:30 PM	1	178	4	183	3	176	3	182	2	0	3	5	2	0	3	5	375
12:45 PM	0	166	4	170	2	181	2	185	0	1	5	6	0	0	1	1	362
Hourly Total	4	673	10	687	9	779	6	794	3	1	11	15	2	0	5	7	1503
1:00 PM	0	188	0	188	1	182	2	185	3	0	3	6	2	0	0	2	381
1:15 PM	0	187	0	187	0	182	0	182	1	0	8	9	1	0	0	1	379
1:30 PM	1	163	3	167	1	164	0	165	1	0	1	2	0	0	0	0	334
1:45 PM	2	174	0	176	1	170	0	171	1	0	0	1	1	0	1	2	350
Hourly Total	3	712	3	718	3	698	2	703	6	0	12	18	4	0	1	5	1444
2:00 PM	1	186	0	187	1	191	0	192	0	0	2	2	0	2	2	4	385
2:15 PM	1	159	1	161	2	187	1	190	0	0	2	2	1	0	0	1	354
2:30 PM	1	183	1	185	3	183	0	186	1	0	2	3	2	1	0	3	377
2:45 PM	1	170	0	171	0	175	0	175	1	0	5	6	1	0	1	2	354
Hourly Total	4	698	2	704	6	736	1	743	2	0	11	13	4	3	3	10	1470
3:00 PM	2	208	0	210	2	174	0	176	1	0	4	5	0	1	2	3	394
3:15 PM	0	211		213	0	174	0	174	0	0	4	4	0	0	1	1	392
3:30 PM	0	230	0	230	2	196	1	199	1	0	3	4	5	0	0	5	438
3:45 PM	1	226	0	227	1	191	2	194	2	0	8	10	2	0	0	2	433
Hourly Total	3	875	2	088	5	/35	3	/43	4	0	19	23	/	1	3	11	1657
4:00 PM	5	232	0	237	0	197	2	199	2	0		3	2	0	3	5	444
4:15 PM	0	243	0	243	1	185	2	188	2	0	5	/	3	0	2	5	443
4:30 PM	2	102		240	3	179	2	104		0		3	2	0	0	2	3/5
4.45 PIVI	7	240	0	240	5	134	0	706	7	0	9	10	7	0	- 2	2	307
	1	097		906	2	190	0	101	1	0	E	23	2	0	1	14	1049
5:15 PM	2	225		221	- 2	170	1	172	1	0		3	2		2	2	427
5.10 FW	2	201	1	233	1	150	1	161	0	0	 	5	1	0		2	277
5:45 PM	4	103	0	10/	1	1/1	0	142	1	0	0	10	0	0	0	0	346
Hourly Total	8	854	2	864	5	659	2	666	3	0	21	24	3	0	3	6	1560
6:00 PM	0	178	2	180	1	146	2	1/0	2	0		6	0	0	0	0	335
6:15 PM	1	161		162	0	139	0	139	0	0	2	2	1	0	2	3	306
6:30 PM	1	157	1	159	1	129	0	130	0	0	1	1	0	0	0	0	290
6:45 PM	0	127	0	127	2	99	1	102	0	0		1	1	0	2	3	233
Hourly Total	2	623	3	628	4	513	3	520	2	0	8	10	2	0	4	6	1164
7:00 PM	0	130	0	130	1	72	0	73	0	0	0	0	0	0	0	0	203
7:15 PM	2	108	0	110	0	81	0	81	0	0	1	1	0	0	0	0	192
7:30 PM	1	125	1	127	1	74	0	75	0	0	3	3	1	0	0	1	206
7:45 PM	0	93	0	93	1	89	0	90	1	0	1	2	0	0	0	0	185
Hourly Total	3	456	1	460	3	316	0	319	1	0	5	6	1	0	0	1	786
8:00 PM	0	112	0	112	0	92	0	92	0	0	2	2	0	0	2	2	208
8:15 PM	0	103	1	104	0	75	0	75	0	0	0	0	0	0	1	1	180
8:30 PM	0	71	1	72	1	60	0	61	0	0	0	0	1	0	1	2	135
8:45 PM	0	79	0	79	1	68	2	71	1	0	3	4	0	0	0	0	154
Hourly Total	0	365	2	367	2	295	2	299	1	0	5	6	1	0	4	5	677
9:00 PM	1	100	1	102	2	64	0	66	0	0	1	1	1	0	2	3	172
9:15 PM	1	71	0	72	0	64	0	64	0	0	0	0	1	0	0	1	137
9:30 PM	0	60	0	60	0	66	0	66	0	0	1	1	2	0	0	2	129
9:45 PM	0	60	0	60	2	49	0	51	0	0	1	1	0	0	0	0	112
Hourly Total	2	291	1	294	4	243	0	247	0	0	3	3	4	0	2	6	550
10:00 PM	0	42	0	42	0	38	0	38	0	0	0	0	1	0	0	1	81
10:15 PM	0	51	0	51	0	43	0	43	0	0	0	0	0	1	0	1	95
10:30 PM	0	31	0	31	1	38	0	39	0	0	0	0	0	0	1	1	71
10:45 PM	0	36	0	36	1	22	1	24	0	0	1	1	0	0	0	0	61
Hourly Total	0	160	0	160	2	141	1	144	0	0	1	1	1	1	1	3	308
11:00 PM	0	31	0	31	0	36	0	36	1	0	0	1	0	0	0	0	68
11:15 PM	1	32	0	33	0	29	0	29	0	0	0	0	0	0	0	0	62
11:30 PM	0	20	0	20	1	19	0	20	0	0	1	1	0	0	0	0	41
11:45 PM	0	16	0	16	0	16	0	16	0	0	1	1	0	0	0	0	33
Hourly Total	1	99	0	100	1	100	0	101	1	0	2	3	0	0	0	0	204
Grand Total	52	9838	43	9933	84	10075	42	10201	45	1	163	209	58	7	54	119	20462
Approach %	0.5	99.0	0.4	-	0.8	98.8	0.4	-	21.5	0.5	78.0	-	48.7	5.9	45.4	-	-
Total %	0.3	48.1	0.2	48.5	0.4	49.2	0.2	49.9	0.2	0.0	0.8	1.0	0.3	0.0	0.3	0.6	-
Lights	51	9458	39	9548	82	9703	38	9823	43	0	159	202	52	6	53	111	19684
% Lights	98.1	96.1	90.7	96.1	97.6	96.3	90.5	96.3	95.6	0.0	97.5	96.7	89.7	85.7	98.1	93.3	96.2
Mediums	1	244	2	247	2	215	4	221	2	1	4	7	3	1	1	5	480
		244						-									
% Mediums	1.9	2.5	4.7	2.5	2.4	2.1	9.5	2.2	4.4	100.0	2.5	3.3	5.2	14.3	1.9	4.2	2.3
% Mediums Articulated Trucks	1.9 0	2.5 136	4.7 2	2.5 138	2.4 0	2.1 157	9.5 0	2.2 157	4.4 0	100.0 0	2.5 0	3.3 0	5.2 3	14.3 0	1.9 0	4.2 3	2.3 298

Progressive AE 1811 4 Mile Rd NE

Grand Rapids, Michigan, United States 49525 (616) 361-2664

Count Name: M-72 & Mt Hope Rd Site Code: Start Date: 08/16/2022 Page No: 3

Turning Movement Peak Hour Data (7:45 AM)

								001111			(
		M	-72			M-	-72			Mt Ho	pe Rd			Hol	t Rd		
		East	oound			West	bound			North	bound			South	bound		
Start Time	Left	Thru	Right	App. Total	Int. Total												
7:45 AM	1	136	0	137	2	172	1	175	0	0	3	3	0	0	0	0	315
8:00 AM	0	98	0	98	1	169	0	170	0	0	2	2	0	0	1	1	271
8:15 AM	0	122	0	122	3	150	0	153	0	0	1	1	0	0	0	0	276
8:30 AM	0	127	1	128	5	172	1	178	1	0	1	2	0	0	1	1	309
Total	1	483	1	485	11	663	2	676	1	0	7	8	0	0	2	2	1171
Approach %	0.2	99.6	0.2	-	1.6	98.1	0.3	-	12.5	0.0	87.5	-	0.0	0.0	100.0	-	-
Total %	0.1	41.2	0.1	41.4	0.9	56.6	0.2	57.7	0.1	0.0	0.6	0.7	0.0	0.0	0.2	0.2	-
PHF	0.250	0.888	0.250	0.885	0.550	0.964	0.500	0.949	0.250	0.000	0.583	0.667	0.000	0.000	0.500	0.500	0.929
Lights	1	450	1	452	11	645	2	658	0	0	6	6	0	0	2	2	1118
% Lights	100.0	93.2	100.0	93.2	100.0	97.3	100.0	97.3	0.0	-	85.7	75.0	-	-	100.0	100.0	95.5
Mediums	0	28	0	28	0	9	0	9	1	0	1	2	0	0	0	0	39
% Mediums	0.0	5.8	0.0	5.8	0.0	1.4	0.0	1.3	100.0	-	14.3	25.0	-	-	0.0	0.0	3.3
Articulated Trucks	0	5	0	5	0	9	0	9	0	0	0	0	0	0	0	0	14
% Articulated Trucks	0.0	1.0	0.0	1.0	0.0	1.4	0.0	1.3	0.0	-	0.0	0.0	-	-	0.0	0.0	1.2

Turning Movement Peak Hour Data (12:00 PM)

		M- Eastt	-72 bound			M- Westl	-72 bound			Mt Ho Northl	pe Rd bound			Hol [:] South	t Rd bound		
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	2	158	1	161	1	208	0	209	0	0	0	0	0	0	1	1	371
12:15 PM	1	171	1	173	3	214	1	218	1	0	3	4	0	0	0	0	395
12:30 PM	1	178	4	183	3	176	3	182	2	0	3	5	2	0	3	5	375
12:45 PM	0	166	4	170	2	181	2	185	0	1	5	6	0	0	1	1	362
Total	4	673	10	687	9	779	6	794	3	1	11	15	2	0	5	7	1503
Approach %	0.6	98.0	1.5	-	1.1	98.1	0.8	-	20.0	6.7	73.3	-	28.6	0.0	71.4	-	-
Total %	0.3	44.8	0.7	45.7	0.6	51.8	0.4	52.8	0.2	0.1	0.7	1.0	0.1	0.0	0.3	0.5	-
PHF	0.500	0.945	0.625	0.939	0.750	0.910	0.500	0.911	0.375	0.250	0.550	0.625	0.250	0.000	0.417	0.350	0.951
Lights	4	651	10	665	9	744	6	759	3	0	11	14	1	0	5	6	1444
% Lights	100.0	96.7	100.0	96.8	100.0	95.5	100.0	95.6	100.0	0.0	100.0	93.3	50.0	-	100.0	85.7	96.1
Mediums	0	14	0	14	0	20	0	20	0	1	0	1	0	0	0	0	35
% Mediums	0.0	2.1	0.0	2.0	0.0	2.6	0.0	2.5	0.0	100.0	0.0	6.7	0.0	-	0.0	0.0	2.3
Articulated Trucks	0	8	0	8	0	15	0	15	0	0	0	0	1	0	0	1	24
% Articulated Trucks	0.0	1.2	0.0	1.2	0.0	1.9	0.0	1.9	0.0	0.0	0.0	0.0	50.0	-	0.0	14.3	1.6

Turning Movement Peak Hour Data (4:00 PM)

		M- Eastt	-72 bound			M- Westl	-72 bound			Mt Ho North	ppe Rd bound	,		Hol [:] South	t Rd bound		
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
4:00 PM	5	232	0	237	0	197	2	199	2	0	1	3	2	0	3	5	444
4:15 PM	0	243	0	243	1	185	2	188	2	0	5	7	3	0	2	5	443
4:30 PM	2	182	2	186	3	179	2	184	2	0	1	3	2	0	0	2	375
4:45 PM	0	240	0	240	1	134	0	135	1	0	9	10	0	0	2	2	387
Total	7	897	2	906	5	695	6	706	7	0	16	23	7	0	7	14	1649
Approach %	0.8	99.0	0.2	-	0.7	98.4	0.8	-	30.4	0.0	69.6	-	50.0	0.0	50.0	-	-
Total %	0.4	54.4	0.1	54.9	0.3	42.1	0.4	42.8	0.4	0.0	1.0	1.4	0.4	0.0	0.4	0.8	-
PHF	0.350	0.923	0.250	0.932	0.417	0.882	0.750	0.887	0.875	0.000	0.444	0.575	0.583	0.000	0.583	0.700	0.928
Lights	7	877	2	886	5	675	6	686	7	0	16	23	7	0	7	14	1609
% Lights	100.0	97.8	100.0	97.8	100.0	97.1	100.0	97.2	100.0	-	100.0	100.0	100.0	-	100.0	100.0	97.6
Mediums	0	11	0	11	0	17	0	17	0	0	0	0	0	0	0	0	28
% Mediums	0.0	1.2	0.0	1.2	0.0	2.4	0.0	2.4	0.0	-	0.0	0.0	0.0	-	0.0	0.0	1.7
Articulated Trucks	0	9	0	9	0	3	0	3	0	0	0	0	0	0	0	0	12
% Articulated Trucks	0.0	1.0	0.0	1.0	0.0	0.4	0.0	0.4	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.7

Progressive AE 1811 4 Mile Rd NE

Grand Rapids, Michigan, United States 49525 (616) 361-2664 Count Name: US-31 & Mt Hope Rd Site Code: Start Date: 08/16/2022 Page No: 1

Turning Movement Data

		Mt Hope Rd		_	US-	-31			US-31		
Start Time		Westbound			Northb	ound			Southbound		
	Left	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
12:00 AM	0	0	0	0	23	0	23	0	45	45	68
12:15 AM	1	0	1	0	33	1	34	1	22	23	58
12:30 AM	0	0	0	0	22	0	22	0	9	9	31
12:45 AM	1	0	1	0	7	0	7	0	12	12	20
Hourly Total	2	0	2	0	85	1	86	1	88	89	177
1:00 AM	0	0	0	0	12	0	12	0	2	2	14
1:15 AM	0	0	0	0	6	0	6	0	11	11	17
1:30 AM	0	0	0	0	5	0	5	0	10	10	15
1:45 AM	0	0	0	0	8	0	8	0	4	4	12
Hourly Total	0	0	0	0	31	0	31	0	27	27	58
2:00 AM	0	0	0	0	11	0	11	0	5	5	16
2:15 AM	0	0	0	0	8	0	8	0	4	4	12
2:30 AM	0	0	0	0	5	0	5	0	6	6	11
2:45 AM	0	0	0	0	9	0	9	0	8	8	17
Hourly Total	0	0	0	0	33	0	33	0	23	23	56
3:00 AM	0	0	0	0	11	0	11	0	7	7	18
3:15 AM	0	0	0	0	7	0	7	0	7	7	14
3:30 AM	0	2	2	0	7	0	7	0	8	8	17
3:45 AM	0	0	0	0	10	1	11	0	15	15	26
Hourly Total	0	2	2	0	35	1	36	0	37	37	75
4:00 AM	0	0	0	0	11	0	11	0	13	13	24
4:15 AM	0	2	2	0	3	2	5	0	16	16	23
4:30 AM	0	0	0	0	11	0	11	0	24	24	35
4:45 AM	0	0	0	0	18	0	18	0	44	44	62
Hourly Total	0	2	2	0	43	2	45	0	97	97	144
5:00 AM	0	0	0	0	37	0	37	0	34	34	71
5:15 AM	0	1	1	0	53	0	53	0	63	63	117
5:30 AM	0	0	0	0	65	0	65	0	82	82	147
5:45 AM	0	1	1	0	74	0	74	0	94	94	169
Hourly Total	0	2	2	0	229	0	229	0	273	273	504
6:00 AM	0	1	1	0	79	1	80	0	102	102	183
6:15 AM	2	3	5	0	88	3	91	0	126	126	222
6:30 AM	2	1	3	0	121	0	121	0	183	183	307
6:45 AM	4	0	4	0	165	3	168	0	175	175	347
Hourly Total	8	5	13	0	453	7	460	0	586	586	1059
7:00 AM	3	2	5	0	140	1	141	0	195	195	341
7:15 AM	4	1	5	0	147	3	150	0	239	239	394
7:30 AM	3	3	6	0	237	1	238	1	291	292	536
7:45 AM	4	0	4	0	227	2	229	0	279	279	512
Hourly Total	14	6	20	0	751	7	758	1	1004	1005	1783
8:00 AM	5	2	7	0	189	3	192	1	233	234	433
8:15 AM	3	2	5	0	264	6	270	0	244	244	519
8:30 AM	3	4	7	0	281	2	283	1	285	286	576
8:45 AM	4	7	11	0	299	4	303	1	252	253	567
Hourly Total	15	15	30	0	1033	15	1048	3	1014	1017	2095
9:00 AM	7	3	10	0	252	3	255	0	249	249	514
9:15 AM	4	4	8	0	248	3	251	1	282	283	542
9:30 AM	6	1	7	0	220	4	224	2	264	266	497
9:45 AM	2	5	7	0	267	3	270	0	271	271	548
Hourly Total	19	13	32	0	987	13	1000	3	1066	1069	2101
10:00 AM	14	1	15	0	229	2	231	0	266	266	512
10:15 AM	7	2	9	0	245	2	247	0	311	311	567
10:30 AM	4	1	5	0	286	4	290	1	307	308	603
10:45 AM	2	3	5	0	239	6	245	1	301	302	552
Hourly Total	27	7	34	0	999	14	1013	2	1185	1187	2234
11:00 AM	8	5	13	0	222	5	227	0	317	317	557
11:15 AM	0	6	6	0	257	5	262	4	292	296	564
11:30 AM	2	3	5	0	254	6	260	0	330	330	595
11:45 AM	7	0	7	0	267	4	271	2	305	307	585
Hourly Total	17	14	31	0	1000	20	1020	6	1244	1250	2301
12:00 PM	4	5	9	0	290	7	297	0	382	382	688

12:15 PM	4	2	6	0	295	4	299	0	. 343	343	648
12:30 PM	0	1	1	0	306	6	312	2	324	326	639
12:45 PM	2	4	6	0	348	6	354	0	319	319	679
Hourly Total	10	12	22	0	1239	23	1262	2	1368	1370	2654
1:00 PM	3	0	3	0	344	8	352	0	315	315	670
1:15 PM	3	1	4	0	296	4	300	2	299	301	605
1:30 PM	3	2	5	0	304	8	312	1	273	274	591
1:45 PM	1	0	1	0	283	2	285	0	326	326	612
Hourly Total	10	3	13	0	1227	22	1249	3	1213	1216	2478
2:00 PM	5	1	6	0	343	5	348	1	305	306	660
2:15 PM	2	2	4	0	304	5	309	0	339	339	652
2:30 PM	5	0	5	0	284	2	286	1	306	307	598
2:45 PM	1	1	2	0	305	6	311	3	302	305	618
Hourly Total	13	4	17	0	1236	18	1254	5	1252	1257	2528
3:00 PM	6	4	10	0	331	6	337	4	358	362	709
3:15 PM	2	1	3	1	385	8	394	2	313	315	712
3:30 PM	4	1	5	0	318	10	328	2	379	381	714
3:45 PM	1	1	2	0	368	8	376	4	313	317	695
Hourly Total	13	7	20	1	1402	32	1/35	12	1363	1375	2830
4:00 PM	10		6	0	373	8	381	3	335	338	725
4:00 FM	4	2	7	0	204	6	200	2	300	200	725
4.15 FM	4 F		7	0	304	0	390	2	300	308	703
4:30 PM	5	2	12	0	336	12	344	2	330	332	670
4:45 PW	0	4	12	0		13	397	4	205	209	070
Hourly I otal	21		32	0	1479	33	1512	11	1236	1247	2791
5:00 PM	4	2	6	0	398	7	405	2	314	316	727
5:15 PM	2	4	6	0	414	3	417	2	292	294	/1/
5:30 PM	6	0	6	0	362	5	367	4	325	329	702
5:45 PM	7	3	10	0	348	11	359	1	280	281	650
Hourly Total	19	9	28	0	1522	26	1548	9	1211	1220	2796
6:00 PM	2	2	4	0	298	10	308	7	269	276	588
6:15 PM	9	5	14	0	267	10	277	2	224	226	517
6:30 PM	5	2	7	0	246	6	252	5	219	224	483
6:45 PM	2	1	3	0	198	7	205	5	200	205	413
Hourly Total	18	10	28	0	1009	33	1042	19	912	931	2001
7:00 PM	8	2	10	0	224	6	230	0	159	159	399
7:15 PM	3	0	3	0	186	4	190	4	161	165	358
7:30 PM	4	1	5	0	204	7	211	3	125	128	344
7:45 PM	4	1	5	0	150	7	157	2	147	149	311
Hourly Total	19	4	23	0	764	24	788	9	592	601	1412
8:00 PM	6	3	9	0	202	6	208	3	149	152	369
8:15 PM	2	0	2	0	194	2	196	4	134	138	336
8:30 PM	2	0	2	0	143	1	144	1	108	109	255
8:45 PM	2	0	2	0	140	5	145	5	144	149	296
Hourly Total	12	3	15	0	679	14	693	13	535	548	1256
9:00 PM	1	2	3	0	153	9	162	2	112	114	279
9:15 PM	1	0	1	0	125	7	132	2	136	138	271
9:30 PM	0	0	0	0	105	3	108	1	105	106	214
9:45 PM	1	0	1	0	99	3	102	1	83	84	187
Hourly Total	3	2	5	0	482	22	504	6	436	442	951
10:00 PM	5	1	6	0	86	7	93	0	82	82	181
10.15 PM	3	1	4	0	98	5	103	2	62	64	171
10:30 PM	1	0	1	0	59	6	65	0	70	70	136
10:45 PM	0	0	0	0	54	0	54	1	40	41	95
Hourly Total	9	2	11	0	207	18	315	3	254	257	583
11:00 PM	1		1	0		0	44	1	38	30	84
11:15 PM	0	0	0	0	53	1	54	0			95
11:20 DM	2	0	2	0		0	32	0		32	55
11.30 FM	2	0	2	0		0		0			54
Hourby Total	0	0	0	0	20	2	157	1	120	120	200
	3	100	3	0	104	3	10/	100	130	139	299
	252	- 133	300			340	1/310	109		1/203	00100
Approach %	00.5	34.5	-	0.0	98.0	2.0	-	0.6	99.4	-	-
I otal %	0.7	0.4	1.1	0.0	48.8	1.0	49.8	0.3	48.8	49.1	-
Lights	250	119	369	1	16506	339	16846	104	16509	16613	33828
% Lights	99.2	89.5	95.8	100.0	96.1	97.4	96.2	95.4	96.2	96.2	96.2
Mediums	2	12	14	0	455	7	462	5	443	448	924
% Mediums	0.8	9.0	3.6	0.0	2.7	2.0	2.6	4.6	2.6	2.6	2.6
Articulated Trucks	0	2	2	0	208	2	210	0	202	202	414
% Articulated Trucks	0.0	1.5	0.5	0.0	1.2	0.6	1.2	0.0	1.2	1.2	1.2

Progressive AE 1811 4 Mile Rd NE Count Name: US-31 & Mt Hope Rd Site Code: Start Date: 08/16/2022 Page No: 3

Grand Rapids, Michigan, United States 49525 (616) 361-2664

Turning Movement Peak Hour Data (8:00 AM)

		Mt Hope Rd			US	-31			US-31		
Ctart Time		Westbound			North	bound			Southbound		
Start Time	Left	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
8:00 AM	5	2	7	0	189	3	192	1	233	234	433
8:15 AM	3	2	5	0	264	6	270	0	244	244	519
8:30 AM	3	4	7	0	281	2	283	1	285	286	576
8:45 AM	4	7	11	0	299	4	303	1	252	253	567
Total	15	15	30	0	1033	15	1048	3	1014	1017	2095
Approach %	50.0	50.0	-	0.0	98.6	1.4	-	0.3	99.7	-	-
Total %	0.7	0.7	1.4	0.0	49.3	0.7	50.0	0.1	48.4	48.5	-
PHF	0.750	0.536	0.682	0.000	0.864	0.625	0.865	0.750	0.889	0.889	0.909
Lights	14	15	29	0	965	14	979	2	981	983	1991
% Lights	93.3	100.0	96.7	-	93.4	93.3	93.4	66.7	96.7	96.7	95.0
Mediums	1	0	1	0	53	1	54	1	20	21	76
% Mediums	6.7	0.0	3.3	-	5.1	6.7	5.2	33.3	2.0	2.1	3.6
Articulated Trucks	0	0	0	0	15	0	15	0	13	13	28
% Articulated Trucks	0.0	0.0	0.0	-	1.5	0.0	1.4	0.0	1.3	1.3	1.3

Turning Movement Peak Hour Data (12:00 PM)

		Mt Hope Rd	U		US	-31	,	,	US-31		
Ctart Time		Westbound			North	bound			Southbound		
Start Time	Left	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
12:00 PM	4	5	9	0	290	7	297	0	382	382	688
12:15 PM	4	2	6	0	295	4	299	0	343	343	648
12:30 PM	0	1	1	0	306	6	312	2	324	326	639
12:45 PM	2	4	6	0	348	6	354	0	319	319	679
Total	10	12	22	0	1239	23	1262	2	1368	1370	2654
Approach %	45.5	54.5	-	0.0	98.2	1.8	-	0.1	99.9	-	-
Total %	0.4	0.5	0.8	0.0	46.7	0.9	47.6	0.1	51.5	51.6	-
PHF	0.625	0.600	0.611	0.000	0.890	0.821	0.891	0.250	0.895	0.897	0.964
Lights	10	12	22	0	1186	22	1208	1	1302	1303	2533
% Lights	100.0	100.0	100.0	-	95.7	95.7	95.7	50.0	95.2	95.1	95.4
Mediums	0	0	0	0	37	0	37	1	44	45	82
% Mediums	0.0	0.0	0.0	-	3.0	0.0	2.9	50.0	3.2	3.3	3.1
Articulated Trucks	0	0	0	0	16	1	17	0	22	22	39
% Articulated Trucks	0.0	0.0	0.0	-	1.3	4.3	1.3	0.0	1.6	1.6	1.5

Turning Movement Peak Hour Data (4:45 PM)

			•				•	,			
		Mt Hope Rd			US	-31			US-31		
Ctart Time		Westbound			North	bound			Southbound		
Start Time	Left	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
4:45 PM	8	4	12	0	384	13	397	4	265	269	678
5:00 PM	4	2	6	0	398	7	405	2	314	316	727
5:15 PM	2	4	6	0	414	3	417	2	292	294	717
5:30 PM	6	0	6	0	362	5	367	4	325	329	702
Total	20	10	30	0	1558	28	1586	12	1196	1208	2824
Approach %	66.7	33.3	-	0.0	98.2	1.8	-	1.0	99.0	-	-
Total %	0.7	0.4	1.1	0.0	55.2	1.0	56.2	0.4	42.4	42.8	-
PHF	0.625	0.625	0.625	0.000	0.941	0.538	0.951	0.750	0.920	0.918	0.971
Lights	20	10	30	0	1540	28	1568	11	1165	1176	2774
% Lights	100.0	100.0	100.0	-	98.8	100.0	98.9	91.7	97.4	97.4	98.2
Mediums	0	0	0	0	15	0	15	1	28	29	44
% Mediums	0.0	0.0	0.0	-	1.0	0.0	0.9	8.3	2.3	2.4	1.6
Articulated Trucks	0	0	0	0	3	0	3	0	3	3	6
% Articulated Trucks	0.0	0.0	0.0	-	0.2	0.0	0.2	0.0	0.3	0.2	0.2



Synchro Analysis Results

ntersection
THEISELIUT

Int Delay, s/veh	0.4						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	Γ
Lane Configurations	٦	1	_ ≜ î≽		٦	^	•
Traffic Vol, veh/h	15	15	1033	15	3	1014	1
Future Vol, veh/h	15	15	1033	15	3	1014	1
Conflicting Peds, #/hr	0	0	0	0	0	0)
Sign Control	Stop	Stop	Free	Free	Free	Free)
RT Channelized	-	None	-	None	-	None	9
Storage Length	150	0	-	-	250	-	-
Veh in Median Storage	, # 1	-	0	-	-	0)
Grade, %	0	-	0	-	-	0)
Peak Hour Factor	68	68	87	87	89	89)
Heavy Vehicles, %	0	0	1	1	1	1	1
Mvmt Flow	22	22	1187	17	3	1139)

Major/Minor	Minor1	М	lajor1	Ν	lajor2		
Conflicting Flow All	1772	602	0	0	1204	0	
Stage 1	1196	-	-	-	-	-	
Stage 2	576	-	-	-	-	-	
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	76	448	-	-	581	-	
Stage 1	253	-	-	-	-	-	
Stage 2	531	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	76	448	-	-	581	-	
Mov Cap-2 Maneuver	185	-	-	-	-	-	
Stage 1	253	-	-	-	-	-	
Stage 2	528	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	20.3	0	0
HCM LOS	С		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	NBLn2	SBL	SBT	
Capacity (veh/h)	-	- 185	448	581	-	
HCM Lane V/C Ratio	-	- 0.119	0.049	0.006	-	
HCM Control Delay (s)	-	- 27.1	13.5	11.2	-	
HCM Lane LOS	-	- D	В	В	-	
HCM 95th %tile Q(veh)	-	- 0.4	0.2	0	-	

Intersection													
Int Delay, s/veh	0.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	A		۲.	∱ î,		۳	et -			\$		
Traffic Vol, veh/h	1	483	1	11	663	2	1	0	7	0	0	2	
Future Vol, veh/h	1	483	1	11	663	2	1	0	7	0	0	2	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	250	-	-	250	-	-	150	-	-	-	-	-	
Veh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	89	89	89	95	95	95	67	67	67	60	60	60	
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0	
Mvmt Flow	1	543	1	12	698	2	1	0	10	0	0	3	

Major/Minor	Major1		Ν	/lajor2		Ν	1inor1		Ν	linor2			
Conflicting Flow All	700	0	0	544	0	0	919	1270	272	997	1269	350	
Stage 1	-	-	-	-	-	-	546	546	-	723	723	-	
Stage 2	-	-	-	-	-	-	373	724	-	274	546	-	
Critical Hdwy	4.12	-	-	4.12	-	-	7.5	6.5	6.9	7.5	6.5	6.9	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	899	-	-	1028	-	-	229	170	732	201	170	652	
Stage 1	-	-	-	-	-	-	495	521	-	388	434	-	
Stage 2	-	-	-	-	-	-	625	433	-	714	521	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	899	-	-	1028	-	-	226	168	732	196	168	652	
Mov Cap-2 Maneuver	• -	-	-	-	-	-	351	290	-	305	288	-	
Stage 1	-	-	-	-	-	-	495	520	-	388	429	-	
Stage 2	-	-	-	-	-	-	615	428	-	703	520	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	0	0.1	10.7	10.6	
HCM LOS			В	В	

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR SBLn
Capacity (veh/h)	351	732	899	-	-	1028	-	- 65
HCM Lane V/C Ratio	0.004	0.014	0.001	-	-	0.011	-	- 0.00
HCM Control Delay (s)	15.3	10	9	-	-	8.5	-	- 10.
HCM Lane LOS	С	В	А	-	-	А	-	-
HCM 95th %tile Q(veh)	0	0	0	-	-	0	-	-

Int Delay, s/veh

0.7						
WBL	WBR	NBT	NBR	SBL	SBT	
٦	1			۲.	^	
20	10	1558	28	12	1196	
20	10	1558	28	12	1196	
0	0	0	0	0	0	
Stop	Stop	Free	Free	Free	Free	
-	None	-	None	-	None	
150	0	-	-	250	-	
, # 1	-	0	-	-	0	
0	-	0	-	-	0	
63	63	95	95	92	92	
0	0	1	1	1	1	
32	16	1640	29	13	1300	
	0.7 WBL 20 20 Stop - 150 , # 1 0 63 0 32	0.7 WBL WBR 20 10 20 10 20 0 10 500 Stop Stop - None 150 0 ,# 1 - 0 - 63 63 0 0 32 16	0.7 WBL WBR NBT 20 10 1558 20 10 1558 20 10 1558 0 0 0 Stop Stop Free - None - 150 0 - , # 1 - 0 0 - , # 1 - 0 63 63 95 0 0 1 32 16 1640	0.7 NBT NBR WBL VBR NBT NBR 1 1558 28 20 10 1558 28 20 10 1558 28 20 10 1558 28 0 0 0 0 Stop Stop Free Free None - None - 150 0 - - 150 0 - - 150 0 - - 150 0 - - 150 0 - - 150 0 - - 150 0 - - 150 0 - - 150 0 - - 150 0 1 1 151 16 1640 29	0.7 NBR NBR SBL WBL WBR NBT NBR SBL 1 1 1 1 1 20 10 1558 28 12 20 10 1558 28 12 20 0 0 0 0 Stop Stop Free Free Free None - None - 10 150 0 - - 250 ,# 1 - 0 - - 0 - 0 - - 63 63 95 92 - 0 0 1 1 1 32 16 1640 29 13	0.7 NBR NBR SBL SBT WBL WBR NBT NBR SBL SBT 1 1* 1* 1* 1* 1* 20 10 1558 28 12 1196 20 10 1558 28 12 1196 20 10 1558 28 12 1196 20 10 1558 28 12 1196 20 10 1558 28 12 1196 20 10 1558 28 12 1196 0 0 0 0 0 0 0 Stop Stop Free Free Free Free Free 150 0 - None - None 10 10 150 0 - 0 - 250 - . . ,# 1 - 0 - - . . . 0 0 1

Major/Minor	Minor1	Μ	ajor1	Μ	lajor2					
Conflicting Flow All	2331	835	0	0	1669	0				
Stage 1	1655	-	-	-	-	-				
Stage 2	676	-	-	-	-	-				
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	32	315	-	-	386	-				
Stage 1	144	-	-	-	-	-				
Stage 2	472	-	-	-	-	-				
Platoon blocked, %			-	-		-				
Mov Cap-1 Maneuver	~ 31	315	-	-	386	-				
Mov Cap-2 Maneuver	110	-	-	-	-	-				
Stage 1	144	-	-	-	-	-				
Stage 2	456	-	-	-	-	-				

Approach	WB	NB	SB	
HCM Control Delay, s	39.3	0	0.1	
HCM LOS	Е			

Minor Lane/Major Mvmt	NBT	NBRWBLn1V	VBLn2	SBL	SBT	
Capacity (veh/h)	-	- 110	315	386	-	
HCM Lane V/C Ratio	-	- 0.289	0.05	0.034	-	
HCM Control Delay (s)	-	- 50.5	17	14.7	-	
HCM Lane LOS	-	- F	С	В	-	
HCM 95th %tile Q(veh)	-	- 1.1	0.2	0.1	-	
Notes						

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

0.6

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	- † 1-		ľ	∱î ∌		1	el el			÷	
Traffic Vol, veh/h	7	897	2	5	695	6	7	0	16	7	0	7
Future Vol, veh/h	7	897	2	5	695	6	7	0	16	7	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	250	-	-	150	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	89	89	89	60	60	60	70	70	70
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	8	965	2	6	781	7	12	0	27	10	0	10

Major/Minor	Major1		Ν	lajor2		Ν	/linor1		ľ	/linor2			
Conflicting Flow All	788	0	0	967	0	0	1385	1782	484	1296	1780	394	
Stage 1	-	-	-	-	-	-	982	982	-	797	797	-	
Stage 2	-	-	-	-	-	-	403	800	-	499	983	-	
Critical Hdwy	4.12	-	-	4.12	-	-	7.5	6.5	6.9	7.5	6.5	6.9	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	834	-	-	714	-	-	105	83	534	122	83	611	
Stage 1	-	-	-	-	-	-	271	330	-	351	401	-	
Stage 2	-	-	-	-	-	-	601	400	-	527	329	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	834	-	-	714	-	-	102	82	534	114	82	611	
Mov Cap-2 Maneuver	• -	-	-	-	-	-	205	199	-	235	199	-	
Stage 1	-	-	-	-	-	-	268	327	-	347	398	-	
Stage 2	-	-	-	-	-	-	586	397	-	496	326	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	0.1	0.1	15.6	16.3	
HCM LOS			С	С	

Minor Lane/Major Mvmt	NBLn1 N	IBLn2	EBL	EBT	EBR	WBL	WBT	WBR SBLn1
Capacity (veh/h)	205	534	834	-	-	714	-	- 339
HCM Lane V/C Ratio	0.057	0.05	0.009	-	-	0.008	-	- 0.059
HCM Control Delay (s)	23.6	12.1	9.4	-	-	10.1	-	- 16.3
HCM Lane LOS	С	В	А	-	-	В	-	- C
HCM 95th %tile Q(veh)	0.2	0.2	0	-	-	0	-	- 0.2

Int Delay, s/veh	0.8						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	Г
Lane Configurations	- ሽ	1	∱ β		<u>۲</u>	- 11	<u>۲</u>
Traffic Vol, veh/h	30	23	1054	19	6	1034	ŧ
Future Vol, veh/h	30	23	1054	19	6	1034	1
Conflicting Peds, #/hr	0	0	0	0	0	0)
Sign Control	Stop	Stop	Free	Free	Free	Free	3
RT Channelized	-	None	-	None	-	None	÷
Storage Length	150	0	-	-	250	-	-
Veh in Median Storage	, # 1	-	0	-	-	0)
Grade, %	0	-	0	-	-	0)
Peak Hour Factor	68	68	87	87	89	89)
Heavy Vehicles, %	0	0	1	1	1	1	1
Mvmt Flow	44	34	1211	22	7	1162	2

Major/Minor	Minor1	М	ajor1	Ν	1ajor2		
Conflicting Flow All	1817	617	0	0	1233	0	
Stage 1	1222	-	-	-	-	-	
Stage 2	595	-	-	-	-	-	
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	71	438	-	-	566	-	
Stage 1	245	-	-	-	-	-	
Stage 2	519	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	70	438	-	-	566	-	
Mov Cap-2 Maneuver	178	-	-	-	-	-	
Stage 1	245	-	-	-	-	-	
Stage 2	513	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	24	0	0.1
HCM LOS	С		

Minor Lane/Major Mvmt	NBT	NBRWE	3Ln1V	VBLn2	SBL	SBT	
Capacity (veh/h)	-	-	178	438	566	-	
HCM Lane V/C Ratio	-	- 0	.248	0.077	0.012	-	
HCM Control Delay (s)	-	-	31.8	13.9	11.4	-	
HCM Lane LOS	-	-	D	В	В	-	
HCM 95th %tile Q(veh)	-	-	0.9	0.2	0	-	

0.3

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	∱ î≽		ľ	∱ î,		1	et F			÷	
Traffic Vol, veh/h	1	493	1	14	676	2	1	0	15	0	0	2
Future Vol, veh/h	1	493	1	14	676	2	1	0	15	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	250	-	-	150	-	-	-	-	-
Veh in Median Storage,	,# -	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	95	95	95	67	67	67	60	60	60
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
M∨mt Flow	1	554	1	15	712	2	1	0	22	0	0	3

Major/Minor	Major1		Μ	lajor2		Ν	1inor1		ľ	Minor2			
Conflicting Flow All	714	0	0	555	0	0	943	1301	278	1022	1300	357	
Stage 1	-	-	-	-	-	-	557	557	-	743	743	-	
Stage 2	-	-	-	-	-	-	386	744	-	279	557	-	
Critical Hdwy	4.12	-	-	4.12	-	-	7.5	6.5	6.9	7.5	6.5	6.9	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	889	-	-	1018	-	-	220	162	725	193	163	645	
Stage 1	-	-	-	-	-	-	487	515	-	378	425	-	
Stage 2	-	-	-	-	-	-	614	424	-	710	515	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	889	-	-	1018	-	-	216	159	725	185	160	645	
Mov Cap-2 Maneuver	• -	-	-	-	-	-	342	282	-	295	280	-	
Stage 1	-	-	-	-	-	-	487	514	-	378	419	-	
Stage 2	-	-	-	-	-	-	602	418	-	687	514	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	0	0.2	10.4	10.6	
HCM LOS			В	В	

Minor Lane/Major Mvmt	NBLn11	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR SBLn
Capacity (veh/h)	342	725	889	-	-	1018	-	- 64
HCM Lane V/C Ratio	0.004	0.031	0.001	-	-	0.014	-	- 0.00
HCM Control Delay (s)	15.6	10.1	9.1	-	-	8.6	-	- 10.
HCM Lane LOS	С	В	А	-	-	А	-	-
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-

Int Delay, s/veh	3						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	et -			÷	Y		
Traffic Vol, veh/h	21	4	3	31	23	4	
Future Vol, veh/h	21	4	3	31	23	4	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	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	
M∨mt Flow	23	4	3	34	25	4	

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	27	0	65	25	
Stage 1	-	-	-	-	25	-	
Stage 2	-	-	-	-	40	-	
Critical Hdwy	-	-	4.12	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	-	-	2.218	-	3.518	3.318	
Pot Cap-1 Maneuver	-	-	1587	-	941	1051	
Stage 1	-	-	-	-	998	-	
Stage 2	-	-	-	-	982	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuve	r -	-	1587	-	939	1051	
Mov Cap-2 Maneuve	r -	-	-	-	939	-	
Stage 1	-	-	-	-	998	-	
Stage 2	-	-	-	-	980	-	

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	8.9
HCM LOS			А

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	954	-	-	1587	-
HCM Lane V/C Ratio	0.031	-	-	0.002	-
HCM Control Delay (s)	8.9	-	-	7.3	0
HCM Lane LOS	А	-	-	А	Α
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Int Delay, s/veh	0.5						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	ef 👘			↑		1	
Traffic Vol, veh/h	22	3	0	34	0	4	
Future Vol, veh/h	22	3	0	34	0	4	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	-	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	24	3	0	37	0	4	

Major/Minor	Major1	Ma	ajor2	Min	or1		
Conflicting Flow All	0	0	-	-	-	26	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	
Critical Hdwy	-	-	-	-	-	6.22	
Critical Hdwy Stg 1	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	-	-	-	-	3.318	
Pot Cap-1 Maneuver	-	-	0	-	0	1050	
Stage 1	-	-	0	-	0	-	
Stage 2	-	-	0	-	0	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	r -	-	-	-	-	1050	
Mov Cap-2 Maneuver	r -	-	-	-	-	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	0	8.4	
HCM LOS			А	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	1050	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-
HCM Control Delay (s)	8.4	-	-	-
HCM Lane LOS	А	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Int Delay, s/veh	1.2						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	-
Lane Configurations		1	∱ î≽		<u>۲</u>	- 11	۱
Traffic Vol, veh/h	29	14	1589	44	19	1220)
Future Vol, veh/h	29	14	1589	44	19	1220)
Conflicting Peds, #/hr	0	0	0	0	0	0)
Sign Control	Stop	Stop	Free	Free	Free	Free	;
RT Channelized	-	None	-	None	-	None	;
Storage Length	150	0	-	-	250	-	-
Veh in Median Storage	, # 1	-	0	-	-	0)
Grade, %	0	-	0	-	-	0)
Peak Hour Factor	63	63	95	95	92	92)
Heavy Vehicles, %	0	0	1	1	1	1	
Mvmt Flow	46	22	1673	46	21	1326	6

Major/Minor	Minor1	М	ajor1	Ν	lajor2					
Conflicting Flow All	2401	860	0	0	1719	0				
Stage 1	1696	-	-	-	-	-				
Stage 2	705	-	-	-	-	-				
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	~ 29	303	-	-	369	-				
Stage 1	137	-	-	-	-	-				
Stage 2	456	-	-	-	-	-				
Platoon blocked, %			-	-		-				
Mov Cap-1 Maneuver	~ 27	303	-	-	369	-				
Mov Cap-2 Maneuver	104	-	-	-	-	-				
Stage 1	137	-	-	-	-	-				
Stage 2	430	-	-	-	-	-				

Approach	WB	NB	SB
HCM Control Delay, s	49.4	0	0.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)	-	- 104	303	369	-	
HCM Lane V/C Ratio	-	- 0.443	0.073	0.056	-	
HCM Control Delay (s)	-	- 64.6	17.8	15.3	-	
HCM Lane LOS	-	- F	С	С	-	
HCM 95th %tile Q(veh)	-	- 1.9	0.2	0.2	-	
Notes						

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

0.7

	n	to	rc	2	\sim	-	^	n		
			1.5	_						
. 8				v	•		v			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	↑ ĵ≽		ľ	∱î ∌		1	et F			\$	
Traffic Vol, veh/h	7	915	2	12	709	6	7	0	20	7	0	7
Future Vol, veh/h	7	915	2	12	709	6	7	0	20	7	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	250	-	-	150	-	-	-	-	-
Veh in Median Storage,	,# -	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	89	89	89	60	60	60	70	70	70
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
M∨mt Flow	8	984	2	13	797	7	12	0	33	10	0	10

Major/Minor	Major1		N	lajor2		Ν	/linor1		ľ	Minor2			
Conflicting Flow All	804	0	0	986	0	0	1426	1831	493	1335	1829	402	
Stage 1	-	-	-	-	-	-	1001	1001	-	827	827	-	
Stage 2	-	-	-	-	-	-	425	830	-	508	1002	-	
Critical Hdwy	4.12	-	-	4.12	-	-	7.5	6.5	6.9	7.5	6.5	6.9	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-	
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	822	-	-	703	-	-	97	77	527	114	77	604	
Stage 1	-	-	-	-	-	-	264	323	-	336	389	-	
Stage 2	-	-	-	-	-	-	583	388	-	521	323	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	822	-	-	703	-	-	93	75	527	105	75	604	
Mov Cap-2 Maneuver	r -	-	-	-	-	-	197	191	-	224	189	-	
Stage 1	-	-	-	-	-	-	261	320	-	333	382	-	
Stage 2	-	-	-	-	-	-	563	381	-	483	320	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	0.1	0.2	15.4	16.7	
HCM LOS			С	С	

Minor Lane/Major Mvmt	NBLn11	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR SBLn1
Capacity (veh/h)	197	527	822	-	-	703	-	- 327
HCM Lane V/C Ratio	0.059	0.063	0.009	-	-	0.019	-	- 0.061
HCM Control Delay (s)	24.4	12.3	9.4	-	-	10.2	-	- 16.7
HCM Lane LOS	С	В	А	-	-	В	-	- C
HCM 95th %tile Q(veh)	0.2	0.2	0	-	-	0.1	-	- 0.2

Int Delay, s/veh	1.6						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	۹î -			्र	۰¥		
Traffic Vol, veh/h	52	11	7	31	13	2	
Future Vol, veh/h	52	11	7	31	13	2	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	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	57	12	8	34	14	2	

Major/Minor	Major1	Ν	/lajor2		Minor1		
Conflicting Flow All	0	0	69	0	113	63	
Stage 1	-	-	-	-	63	-	
Stage 2	-	-	-	-	50	-	
Critical Hdwy	-	-	4.12	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	-	-	2.218	-	3.518	3.318	
Pot Cap-1 Maneuver	-	-	1532	-	884	1002	
Stage 1	-	-	-	-	960	-	
Stage 2	-	-	-	-	972	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	r -	-	1532	-	880	1002	
Mov Cap-2 Maneuver	r -	-	-	-	880	-	
Stage 1	-	-	-	-	960	-	
Stage 2	-	-	-	-	967	-	

Approach	EB	WB	NB	
HCM Control Delay, s	0	1.4	9.1	
HCM LOS			А	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	895	-	-	1532	-		
HCM Lane V/C Ratio	0.018	-	-	0.005	-		
HCM Control Delay (s)	9.1	-	-	7.4	0		
HCM Lane LOS	А	-	-	А	А		
HCM 95th %tile Q(veh)	0.1	-	-	0	-		

Int Delay, s/veh	0.2							
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	f			↑		1		
Traffic Vol, veh/h	43	11	0	38	0	2		
Future Vol, veh/h	43	11	0	38	0	2		
Conflicting Peds, #/hr	0	0	0	0	0	0		
Sign Control	Free	Free	Free	Free	Stop	Stop		
RT Channelized	-	None	-	None	-	None		
Storage Length	-	-	-	-	-	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	47	12	0	41	0	2		

Major/Minor	Major1	Ma	ajor2	Min	or1			
Conflicting Flow All	0	0	-	-	-	53		
Stage 1	-	-	-	-	-	-		
Stage 2	-	-	-	-	-	-		
Critical Hdwy	-	-	-	-	-	6.22		
Critical Hdwy Stg 1	-	-	-	-	-	-		
Critical Hdwy Stg 2	-	-	-	-	-	-		
Follow-up Hdwy	-	-	-	-	-	3.318		
Pot Cap-1 Maneuver	-	-	0	-	0	1014		
Stage 1	-	-	0	-	0	-		
Stage 2	-	-	0	-	0	-		
Platoon blocked, %	-	-		-				
Mov Cap-1 Maneuver	r -	-	-	-	-	1014		
Mov Cap-2 Maneuver	r -	-	-	-	-	-		
Stage 1	-	-	-	-	-	-		
Stage 2	-	-	-	-	-	-		

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			А

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	1014	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-
HCM Control Delay (s)	8.6	-	-	-
HCM Lane LOS	А	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

ACME VILLAGE FLATS - MOUNT HOPE ROAD PUD PHASE I

PROJECT CONTACTS

OWNER

CONTACT: MR. JASON GRANGER THE GRANGER GROUP 2380 HEALTH DRIVE SW, SUITE 210 WYOMING, MI 49519 Phone: (616) 299-3092

PROJECT DIRECTOR

CONTACT: MR. TERRY WOLTER, COO THE GRANGER GROUP 2380 HEALTH DRIVE SW, SUITE 210 WYOMING, MI 49519 Phone: (616) 248-3566

PROJECT REPRESENTATIVE CONTACT: MR. JAMES SHARBA, DESIGN DIRECTOR

THE GRANGER GROUP 2380 HEALTH DRIVE SW, SUITE 210 WYOMING, MI 49519 Phone: (616) 248-3566

ARCHITECT OF RECORD

CONTACT: MR. DAN C. COLELLA, AIA LAND MANAGEMENT MICHIGAN, LLC **REAL ESTATE, DESIGN & CONSTRUCTION** Phone: (616) 446-3969

CONTRACTOR

CONTACT: JEFF SMIGIELSKI, V.P. CONSTRUCTION & LOGISTICS ORION CONSTRUCTION INC. 32 MARKET AVE. SW, SUITE 200 GRAND RAPIDS, MI 49503 Phone: (616) 464-1740

PLANNING/SEWER UTILITY

ACME TOWNSHIP 6042 ACME RD. WILLIAMSBURG, MI 49690 Contact: LINDSEY WOLF, ZA Phone: (231) 938-1350 Contact: MARK HURLEY, PE Phone: (231) 946-9191

SANITARY SEWER

GRAND TRAVERSE COUNTY DPW 2650 LAFRANIER ROAD TRAVERSE CITY, MI 49686 Contact: Mr. JOHN DIVOZZO, DIRECTOR Phone: (231) 995-6039

SANITARY SEWER

EGLE, Cadillac District Office Sewer Contact: Mr. Don Brady, PE Phone: (231) 876 - 4478

WATER UTILITY

GRAND TRAVERSE BAND PUBLIC WORKS 2605 N. WEST BAY SHORE DR PESHAWBESTOWN, MI 49682 Contact: Mr. JOE HUHN Phone: (231) 499-4235

STORM DRAINAGE ACME TOWNSHIP 6042 ACME RD. WILLIAMSBURG, MI 49690 Phone: (231) 938-1350

ROADS AND STREETS GRAND TRAVERSE COUNTY ROAD COMMISSION 1881 LAFRANIER ROAD TRAVERSE CITY, MI 49684 Phone: (231) 922-4848

FIRE CODE GRAND TRAVERSE METRO FIRE DEPARTMENT 897 PARSONS STREET TRAVERSE CITY, MI 49686 Contact: Mr. BRIAN BELCHER, FIRE MARSHALL Phone: (231) 922-4840

ELECTRIC CONSUMERS ENERGY

821 HASTINGS STREET TRAVERSE CITY, MI 49686 Contact: ROB DURANCZYK Phone: (231) 486-9228

CABLE TELEVISION

CHARTER COMMUNICATIONS 5955 CEDAR RUN ROAD TRAVERSE CITY, MI 49684 Contact: ERIC BROWN Phone: (231) 932-8130

TELEPHONE AT&T

142 E. STATE ST. FLOOR 2W TRAVERSE CITY, MI 49684 Contact: KATHY DOHM-BEISER Phone: (231) 941-2707

NATURAL GAS

DTE ENERGY 700 E. HAMMOND ROAD TRAVERSE CITY, MI 49686 Contact: SANDRA O'NEIL Phone: (231) 932-2829

ENGINEER

GTEC - GRAND TRAVERSE ENGINEERING & CONSTRUCTION TRAVERSE CITY, MI 49684 Contact: RYAN COX, P.E. Phone: (231) 218-0590

EMERGENCIES

POLICE DEPARTMENTS - 911 FIRE DEPARTMENTS - 911 AMBULANCE - 911



below. Know what's Call before you dig.

LOCATION OF EXISTING UTILITIES

1. EXISTING PUBLIC AND KNOWN UNDERGROUND STRUCTURES ARE SHOWN ON THE PLANS. THE INFORMATION SHOWN IS BELIEVED TO BE REASONABLY CORRECT AND COMPLETE. HOWEVER, NEITHER THE CORRECTNESS OR THE COMPLETENESS OF SUCH INFORMATION IS GUARANTEED. PRIOR TO THE START OF ANY CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY "MISSDIG" AND REQUEST THE UTILITY COMPANIES TO MARK ALL OF THE UTILITIES IN QUESTION.

2. SPECIAL CARE SHALL BE TAKEN IN EXCAVATING IN THE PROXIMITY OF ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL PROVIDE SUPPORT FOR ANY UTILITIES WITHIN THE EXCAVATION, PROVIDE PROPER COMPACTION UNDER ANY UNDERMINED UTILITY STRUCTURE AND IF NECESSARY, INSTALL TEMPORARY SHEETING OR USE A TRENCH BOX TO MINIMIZE THE EXCAVATION. CONTRACTOR SHALL PROTECT AND SAVE HARMLESS FROM DAMAGE ALL UTILITIES, ABOVE OR BELOW THE GROUND SURFACE, WHICH MAY BE ENCOUNTERED DURING CONSTRUCTION.

GRAND TRAVERSE COUNTY, MICHIGAN



PHASE I - ACME FLATS SITE LOCATION MAP

PLAN LEGEND

RING LOCATION
. SEWER MAIN
ER MAIN
RM SEWER
NE
ELECTRIC
;
FLAND
DF WAY
OR CONTOUR

SAN SAN
w w
ST ST
T T T
UE UE UE
GAS GAS GAS GAS
WETLAND
RW
610

SANITARY SEWER MAIN
WATER MAIN
STORM SEWER
STORM SEWER MANHOLE
6" PVC SAN. SEWER LEAD
4" WATER SERV.
FIRE HYDRANT ASSEMBLY
GATE VALVE
PROPOSED 4" AND 6" CONDUIT
DRAINAGE DIRECTION
SETBACK
RIP RAP
PROPOSED CONTOUR
SNOW STORAGE AREA
ASPHALT DRIVE
CONCRETE SIDEWALK



SHEET	SHEET TITLE
C1.0	COVER SHEET
C1.1	EXISTING CONDITIONS
C1.2	SITE PLAN
C1.3	OVERALL UTILITY PLAN
C1.4	SESC AND STORMWATER PLAN
C1.5	SUMMIT WAY PLAN AND PROFILE STA. 0+00 - 6+50
C1.6	EVEREST DR. PLAN AND PROFILE STA.6+50 - P.O.E
C1.7	MATTERHORN DR.PLAN AND PROFILE STA. 0+00 - P.O.E.
C1.8	EVEREST DR. SANITARY SEWER STA. 0+00 - P.O.E
C1.9	WATER MAIN DETAILS
C1.10	SANITARY DETAILS
C1.11	SITE DETAILS
C1.12	SITE DETAILS
A1.B	BUILDING FLOOR AND ROOF PLAN
A2.B	UNIT A, B AND C - FLOOR PLANS
A3.B	BUILDING ELEVATIONS
LS 1.0	LANDSCAPING PLAN
P 1	PHOTOMETRIC PLAN







SITE DATA

PARCEL TAX ID No.: 28-01-102-016-02 OWNER: JOHNSON FAMILY LTD PARTNERSHIF E M-72 WILLIAMSBURG, MI 49690

PARENT PARCEL ACREAGE: 109.33 ACRES +/-

PROPOSED ACREAGE - PHASE I - 479,629 SQ FT. (INCLUDING ROW) NET ACREAGE (NOT INCL. ROW) PHASE I - 455,445 SQ. FT. = 10.456 ACRES

TBACKS:	FRONT = 25 FEET (BUILT TO) ATTACHED GARAGES = 10' BEHIND BUILT TO LINE SIDE = 8 FEET REAR = 20 FEET
JILDING DATA:	MAX HEIGHT - 4 STORIES = 60 FEET MINIMUM FLOOR AREA = 400 SQ. FT.
TE CRITERIA:	MINIMUM LOT WIDTH = 50 FEET MINIMUM LOT COVERAGE = 3,630 SQ. FT. MAXIMUM LOT COVERAGE = 60% MAXIMUM IMPERVIOUS SURFACE = 65% BASE DENSITY = 12 UNITS/ACRE
TE DATA:	PROPOSED IMPERVIOUS AREAS CONCRETE SIDEWALK = 8,889 SQ. FT. ASPHALT = 38,030 SQ. FT. ROOF AREA = 127,540 SQ. FT. APHALT DRIVEWAYS AND LANDING = 25,200 SQ. FT.
	TOTAL IMPERVIOUS = 199,569 SQ. FT.
	PERCENT IMPERVIOUS = 42.93%

DRAWING LEGEND SOIL BORING LOCATION

SUIL BURING LUCATION	
EX. SAN. SEWER MAIN	SAN SAN
EX. WATER MAIN	w w
EX. STORM SEWER	ST ST
EX. PHONE	T T T T
EX. UG ELECTRIC	UE UE UE UE
EX. GAS	GAS GAS GAS
EX. WETLAND	WETLAND
RIGHT OF WAY	RW
EX. MAJOR CONTOUR	
EX MINOR CONTOUR	

SANITARY SEWER MAIN WATER MAIN STORM SEWER STORM SEWER MANHOLE 6" PVC SAN. SEWER LEAD 4" WATER SERV. FIRE HYDRANT ASSEMBLY GATE VALVE PROPOSED 4" AND 6" CONDUIT DRAINAGE DIRECTION SETBACK RIP RAP PROPOSED CONTOUR SNOW STORAGE AREA ASPHALT DRIVE CONCRETE SIDEWALK

LEGAL DESCRIOTION - PHASE I PARCEL

PROPOSED PROJECT PARCEL (PRELIMINARY)

That part of Government Lots 2 and 3, Section 3, Town 27 North, Range 10 West, Acme Township, Grand Traverse County, Michigan, more fully described as:

Commencing at the East ¹/₄ corner of said Section 3, thence South 00°18'51" East, 592.74 feet along the East line of said Section 3 to the North line of the existing Railroad corridor; thence North 88°30'16" West, 456.33 feet along said North line to the POINT OF BEGINNING: thence continuing North 88°30'16" West, 16.42 feet along said North line; thence 788.88 feet along said North line and the arc of a 5392.00 foot radius curve to the left, (long chord bears South 87°14'22" West, 788.18 feet; thence North 26°23'39" East, 286.07 feet; thence North 17°43'32" East, 197.00 feet; thence North 08°33'13" East, 417.34 feet to the centerline of Mt. Hope Road; thence South 74°26'05" East, 240.81 feet along said centerline; thence 234.15 feet along said centerline and the arc of a 450.00 foot radius curve to the left, (long chord bears South 13°13'39" East, 373.89 feet; thence South 00°48'06" East, 387.84 feet to said North line of the existing Railroad corridor and the POINT OF BEGINNING.

Containing 11.01 acres, more or less.

Subject to the Right-of-Way of Mt. Hope Road.

Together with and subject to agreements, covenants easements and restrictions of record.

PRICE.

TIME.

SA WA

FIR GA DR

CON

SNO

GTC DP

DETAILS KNOWN AS THE 2017 GTC STANDARD SPECIFICATIONS AND CONSTRUCTION DETAILS. THESE ARE INCLUDED WITH THE PLANS AND SPECIFICATIONS FOR THIS PROJECT AND MUST BE FOLLOWED. 3. TESTING OF THE INSTALLED UNDERGROUND UTILITIES WILL BE REQUIRED. TESTING AND INSTALLATION OF WATER MAINS SHALL BE DONE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND TRIBAL WATER UTILITIES STANDARDS. TESTING FOR SEWER MAIN AND APPURTENANCES SHALL BE DONE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND THE GTC DPW 2017 STANDARD SPECIFICATIONS FOR CONSTRUCTION. TEMPORARY BLOW-OFF ASSEMBLIES INCLUDING GATE VALVES AND FLUSHING RISERS WILL BE REQUIRED AT THE END OF EACH WATER MAIN STUB AND SHALL BE INCLUDED IN THE COST FOR CONSTRUCTION.

INFRASTRUCTURE. 2. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO ACME TOWNSHIPS CURRENT STANDARDS, SPECIFICATIONS AND

THESE SPECIFICATIONS AND DETAILS ON HAND FULL TIME, DURING CONSTRUCTION AND INSTALLATION OF SEWER AND WATER

EX. RE.

SE 1. SEW

LEGEND			
EX. SAN. SEWER MAIN	SAN SAN		
EX. WATER MAIN	w w		TRUC
EX. STORM SEWER	ST ST		
EX. PHONE	T T T T		VG & (nomic
EX. UG ELECTRIC	UE UE		
EX. GAS	GAS GAS GAS GAS		NGIN
EX. WETLAND		U.	SE E and T
RIGHT OF WAY	RW		
EX. MAJOR CONTOUR		SCALE: 1" = 50' CONTOURS SHOWN ARE AT ONE FOOT INTERVALS	ID TR
REX MINOR CONTOUR		ELEVATIONS ARE ON AN NAVD 88 DATUM	Subs
		0' 50' 100'	
SANITARY SEWER MAIN	SAN		
WATER MAIN	W W W		
STORM SEVVER	SI SI		
6" PVC SAN. SEVVER LEAD	SAN SAN		
2" WATER SERV.	M		
FIRE HYDRANT ASSEMBLY			
GATE VALVE	٢		
PROPOSED 4" AND 6" CONDUIT			<u>IS</u>
DRAINAGE DIRECTION	~~~		
SETBACK			M CON
RIP RAP			STOR
PROPOSED CONTOUR	643		2023
ASPHALT DRIVE			- 3-27-,
CONCRETE SIDEWALK			vision:
SNOW STORAGE AREA			
EWER & WATE	R SPECIFICAT	FIONS	
SEWER MAINS AND SEWER INFRASTRUCTURE	TO BE CONSTRUCTED IN STRICT ACCORD. S AND CONSTRUCTION DETAILS 2017. THE	ANCE WITH THE THE ACME TOWNSHIP, CONTRACTOR SHALL HAVE A COPY OF	-2023 RAC

4. THE ENDS OF THE INSTALLED UNDERGROUND UTILITIES SHALL BE PROPERTY PLUGGED OR CAPPED AND MARKED IN ACCORDANCE WITH STANDARD UTILITY DETAILS AND SPECIFICATIONS PRIOR TO BACKFILLING. WATER SERVICE LEADS SHALL BE INSTALLED WITH A CURB STOP AND BOX PLACED AT THE RIGHT OF WAY LINE WITHIN THE DEVELOPMENT. THE SERVICE LEADS SHALL BE SHALL BE MARKED IN ACCORDANCE WITH TRIBAL WATER UTILITY STANDARDS.

5. IF INDICATED ON THE PLANS, 4"Ø FIRE SUPPRESSION LINES W/ 4" GATE VALVE AND POST INDICATOR VALVES SHALL BE INSTALLED TO WITHIN 5 FEET FROM THE PROPOSED BUILDING FOUNDATIONS. VERIFY FINAL LOCATION OF PIV WITH OWNER AND LOCAL FIRE DEPARTMENT PRIOR TO INSTALLATION. WATER SERVICE LEADS SHALLALSO TERMINATE WITHIN 5 FEET FROM THE BUILDING FOUNDATIONS. THE MECHANICAL CONTRACTOR IS RESPONSIBLE TO EXTEND THE INTERIOR SERVICE LEADS TO THIS POINT AND MAKE THE FINAL CONNECTION FROM WITHIN 5 FEET OF THE BUILDING FOUNDATION.

6. ALL WATER SYSTEM ISOLATION VALVES AND CURB STOPS MUST BE LOCATED WITHIN A DEDICATED UTILITY EASEMENT TO ALLOW ACCESS BY THE GTB WATER UTILITIES DEPARTMENT.

7. WATER MAIN FITTINGS THAT ARE NECESSARY TO MAINTAIN HORIZONTAL AND VERTICAL SEPARATION OR ALIGNMENT THAT ARE NOT SPECIFICALLY CALLED OUT ON THE PLANS SHALL BE INCLUDED IN THE LINEAL FOOT PRICE OF WATER MAIN PIPE TO BE INSTALLED AND SHALL BE INCIDENTAL TO THE PROJECT.

8. SANITARY SEWER MANHOLE RIMS SHALL NOT BE GROUTED TO THE MANHOLE STRUCTURE UNTIL FINAL GRADES ARE ESTABLISHED AND APPROVED BY THE ENGINEER. FINAL ADJUSTMENT TO THE RIM ELEVATIONS OF EACH IPP AND STANDARD SANITARY MANHOLE SHALL BE INCIDENTAL AND INCLUDED IN THE COST TO INSTALL THESE STRUCTURES.

9. INSTALLATION OF WATER MAIN AND SEWER MAIN IN PERCHED GROUNDWATER CONDITIONS IS ANTICIPATED. SEE SOIL BORINGS THAT HAVE BEEN COMPLETED FOR THIS PROJECT TO VERIFY AND ESTIMATE GROUND WATER DEPTHS AND CONDITIONS IN THIS AREA OF THE SITE. ANY ANTICIPATED COST FOR DEWATERING SHALL BE INCLUDED IN THE LINEAL FOOT COST FOR THE INSTALLATION OF THE SEWER AND WATER MAINS. THE COST ESTIMATE IS A LUMP SUM FEE BUT SHALL BE BROKEN DOWN INTO A UNIT PRICE PER STATION OR 100 FEET OF MAIN. IF DEWATERING IS NOT NECESSARY, THE COST UNIT COST FOR DEWATERING WILL BE REMOVED ON A PER STATION (100 FEET) PRICE THAT IS PROVIDED IN THE BIDDING DOCUMENTS.

10. MAINTAIN A MINIMUM VERTICAL SEPARATION OF 18" BETWEEN WATER AND SEWER MAINS AND SERVICES. MAINTAIN A MINIMUM HORIZONTAL SEPARATION DISTANCE OF 10 FEET BETWEEN MAINS. ISOLATION DISTANCES SHALL BE MEASURED FROM THE OUTSIDE WALL OF THE PIPING. WATER MAIN AND SEWER MAIN CROSSINGS SHALL BE COMPLETED IN ACCORDANCE WITH COUNTY AND STATE STANDARDS INCLUDED IN THE PROJECT SPECIFICATIONS.

11. FIRE HYDRANT ASSEMBLIES SHALL BE PAID FOR AS A LUMP SUM ITEM FOR EACH HYDRANT ASSEMBLY INSTALLED. THE ASSEMBLY INCLUDES THE BRANCH OR REDUCING TEE, GATE VALVE, HYDRANT AND ALL ASSOCIATED FITTINGS, RODS, THRUST BLOCKING, MARKER SIGNS AND APPURTENANCES NECESSARY FOR THE INSTALLATION OF THE HYDRANT.

12. WATER SERVICE LEAD MATERIAL SHALL BE EITHER PE 3048, SDR 9 OR TYPE "k" COPPER FOR 1" AND 2" WATER SERVICES. SERVICES SHALL BE COMPLETE AND INCLUDE TAPPING SADDLE, CORP. STOP, CURB STOP AND BOX AND SHALL INCLUDE ANY AND ALL APPURTENANCES OUTLINED I THE PROJECT SPECIFICATIONS AND STANDARD DETAILS.

13. SEWER LEADS SHALL BE 6" SCHEDULE 40 PVC AND SHALL INCLUDE THE COST FOR EACH WYE AND ALL NECESSARY CLEAN OUTS AND MARKER POSTS SHOWN IN THE STANDARD DETAIL IN THE LINEAL FOOT PRICE FOR INSTALLATION. ON DEEP LEADS, THE COST FOR THE 45 AND RISER TO 4' BELOW GRADE SHALL BE INCIDENTAL AND INCLUDED IN THE COST FOR INSTALLATION.

14. SANITARY SEWER MAIN SHALL BE PVC CLASS SDR 35 WHEN COVER IS LESS THAN 16 FEET AND CLASS SDR 26 WHEN DEPTH OF COVER EXCEEDS 16 FEET. MAINTAIN 5' MIN. COVER OVER SEWER MAIN IN ALL LOCATIONS.

15. PVC WATERMAN SHALL BE PVC C-900, PRESSURE CLASS 235 PSI, DR 18. INSTALL 2' WIDE 2" RIGID FOAM INSULATION OVER TOP OF MAIN IN LOCATIONS WHERE STORM SEWER PASSES OVER TOP OF PIPE.

16. MAINTAIN A MINIMUM OF 6 FEET OF COVER OVER WATER MAIN IN ALL LOCATIONS. PROVIDE FITTINGS AS NECESSARY TO MAINTAIN THIS STANDARD. THE COST FOR ADDITIONAL FITTINGS SHALL BE INCLUDED IN THE WATER MAIN LINEAL FOOT BASE

17. ALL SANITARY SEWER AND WATER MAINS SHALL BE INSTALLED WITHIN A 20' WIDE PUBLIC UTILITY EASEMENT. FINAL EASEMENTS SHALL BE PREPARED INCLUDING EASEMENT DESCRIPTIONS ONCE THE UTILITIES ARE INSTALLED AND THE FINAL LOCATIONS ARE FIELD VERIFIED.

18. NO CONNECTION RECEIVING GROUND WATER OR STORM WATER SHALL BE MADE TO THE SANITARY SEWER MAINS AT ANY

19. PROPOSED DRIVEWAY RIGHT OF WAYS AND UTILITY EASEMENTS ARE PROPOSED TO BE PUBLIC.

20. ALL SANITARY SEWER MAIN STUBS SHALL BE PLUGGED AND MARKED WITH A 4x4 POST CUT TO GRADE.

21. ALL WATER MAIN STUBS WITH PERMANENT BLOW OFF ASSEMBLIES SHALL BE CUT BELOW GRADE AND SHALL INCLUDE A 2" SERVICE LINE WITH CORPORATION STOP AND BOX TO ALLOW FOR FLUSHING AND SAMPLING.

SOIL EROSION DATA

KE	Y	DETAIL	CHARACTERISTICS		
2		Selective Grading & Shaping	Water can be diverted to minimize erosion Flatter slopes ease erosion problems		
4	ŀ	Vegetative Stabilization w/ w/ w/ w/ w/ w/ w/ w/	May utilize a variety of plant material Stabilizes soil Slows runoff velocity Filters sediment from runoff		
6	Seeding with Mulch Blanket and/or Matting		Facilitates establishment of vegetative cover Effective for drainageways with low velocity Easily placed in small quantities by inexperienced personnel Should include prepared topsoil bed		
1	3	Riprap, Rubble, Gabions	Used where vegetation is not easily established Effective for high velocities or high concentrations Permits runoff to infiltrate soil Dissipates energy flow at system outlets		
1	5	Paving	Protects areas which cannot otherwise be protected, but increases runoff volume and velocity Irregular surface will help slow velocity		
3	4	Sediment Basin	Traps sediment Releases runoff at non-erosive rates Controls runoff at system outlets Can be visual amenities		
5	4	Silt Fence	Inexpensive and easy to construct Can be located as necessary to collect sediment Snow fence may be added for additional stability		

SOIL EROSION CONTROL NOTES

1. THIS PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH PART 91, SOIL EROSION AND SEDIMENTATION CONTROL OF THE NREPA, 1994 PA 451, AS AMENDED.

EROSION AND ANY SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED AND NOT ALLOWED TO DISCHARGE FROM THE SITE TO ANY OFF SITE LOW AREAS OR WATERWAYS. WATERWAYS INCLUDE NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.

3. STAGING THE WORK SHALL BE DONE BY THE CONTRACTOR AS DIRECTED AND AS REQUIRED BY THE PROJECT ENGINEER OR SESC OFFICER TO ENSURE AGGRESSIVE STABILIZATION OF STEEP SLOPES AND DISTURBED AREAS.

THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN SOIL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS BEFORE AND AT ALL TIMES DURING CONSTRUCTION OF THIS PROJECT. ANY MODIFICATIONS OR ADDITIONS TO SOIL EROSION CONTROL MEASURES DUE TO CONSTRUCTION OR CHANGED CONDITIONS SHALL BE COMPLIED WITH AS REQUIRED OR DIRECTED BY THE ENGINEER OR LOCAL SOIL CONSERVATION DISTRICT. ADDITIONAL SOIL EROSION MEASURES THAT MAY BE NECESSARY DUE TO DISTURBED AREAS WILL BE PAID FOR BY THE CONTRACTOR AND SHALL BE INCLUDED IN THE BASE BID FOR THIS PROJECT.

IF ANY OF THE SESC MEASURES INSTALLED ON THE SITE ARE DEEMED INADEQUATE OR INEFFECTIVE. THE ENGINEER OR SESC OFFICER HAS THE RIGHT TO REQUIRE ADDITIONAL SESC MEASURES AT NO ADDITIONAL COST TO THE OWNER.

INSTALL SILT FENCE AS INDICATED ON THE PLANS AND AT ALL OTHER LOCATIONS DEEMED NECESSARY TO ENSURE NO OFF SITE EROSION TAKES PLACE. SILT FENCE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND DETAILS. BUILT UP SEDIMENT SHALL BE REMOVED WHEN IT EXEED'S 1/3 THE HEIGHT OF THE FENCE. SILT FENCE SHALL BE REPLACED IF IT DECOMPOSES OR BECOMES INEFFECTIVE. SILT FENCE SHALL BE INSPECTED WEEKLY, WITHIN 24 HOURS OF ANY RAIN EVENT AND THROUGHOUT THE DAY DURING PROLONGED STORM EVENTS.

7. ALL STOCKPILED SOILS SHALL BE MAINTAINED IN SUCH A WAY AS TO PREVENT EROSION. IF THE STOCKPILE AREA WILL REMAIN ON THE SITE FOR MORE THAN 30 DAYS IT SHALL BE SEEDED AND STABILIZED. SILT FENCE MUST BE INSTALLED AROUND THE PERIMETER OF ANY STOCKPILE AREAS.

IMMEDIATELY AFTER SEEDING, MULCH ALL SEEDED AREAS WITH UNWEATHERED SMALL GRAIN STRAW. SPREAD UNIFORMLY AT A UNIT OF 2 TONS/ACRE OR 100 LBS (2-3 BAILS) PER 1,000 S.F. THE MULCH SHOULD BE ANCHORED WITH A DISC TYPE MULCH ANCHORING TOOL OR OTHER MEANS AS APPROVED BY THE PROJECT ENGINEER.

9. ALL SOIL OR DIRT ON ANY ROAD OR OTHER PAVEMENT SHALL BE REMOVED IMMEDIATELY. STREETS AND OR PARKING AREAS SHALL BE CLEANED ON A DAILY BASIS AND SWEPT AT A MINIMUM OF ONCE PER WEEK BY THE CONTRACTOR.

10. DURING DRY PERIODS, DISTURBED AREAS SHALL BE WATERED FOR DUST CONTROL AS NEEDED OR AS DIRECTED BY THE ENGINEER

11. REMOVE ALL TEMPORARY EROSION CONT. DEVISES ONCE SITE IS STABILIZED AND APPROVED BY THE ENGINEER.

12. THE CONTRACTOR SHALL REPAIR ALL WASHOUTS AND EROSION DURING THE GUARANTEE PERIOD OF ONE (1) YEAR AFTER THE PROJECT HAS BEEN CLOSED OUT AT NO ADDITIONAL COST TO THE OWNER.

13. THE CONTRACTOR SHALL FOLLOW LOCAL RULES AND REGULATIONS FOR SOIL EROSION AND SEDIMENTATION CONTROL FOR ALL MATERIALS THAT ARE DISPOSED OF OFF THE PROJECT SITE.

CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL AVOID HEAVY COMPACTION WITHIN THE BOTTOM OF THE BASINS DURING CONSTRUCTION WITH THE USE OF LOW EARTH PRESSURE EQUIPMENT.

2. EROSION AND ANY SEDIMENT DEPOSITED WITHIN THE BASINS DURING CONSTRUCTION SHALL BE REMOVED FROM THE BASIN BOTTOMS PRIOR TO FINAL GRADING AND APPLICATION OF TOPSOIL AND FINAL SEEDING. THE CONTRACTOR SHALL SECURE APPROVAL FROM THE PROJECT ENGINEER PRIOR TO FINAL RESTORATION OF THE BASINS.

3. SEDIMENT SHALL BE REMOVED FROM ALL STONE CHECK DAMS AND ENERGY DISSIPATORS ONCE THE SITE IS STABILIZED AND NOT FURTHER EROSION IS ANTICIPATED.

4. STRAW MULCH BLANKET STAKED IN PLACE SHALL BE INSTALLED ON ALL SLOPES GREATER THEN 1:4. HIGH VELOCITY MULCH BLANKET SHALL BE INSTALLED ON ALL SLOPES EXCEEDING 1:3.

5. IF ANY OF THE SESC MEASURES INSTALLED ON THE SITE ARE DEEMED INADEQUATE OR INEFFECTIVE, THE ENGINEER OR SESC OFFICER HAS THE RIGHT TO REQUIRE ADDITIONAL SESC MEASURES AT NO ADDITIONAL COST TO THE OWNER.

6. INSTALL SILT FENCE AS INDICATED ON THE PLANS AND AT ALL OTHER LOCATIONS DEEMED NECESSARY TO ENSURE NO OFF SITE EROSION TAKES PLACE. SILT FENCE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND DETAILS. BUILT UP SEDIMENT SHALL BE REMOVED WHEN IT EXEED'S 1/3 THE HEIGHT OF THE FENCE. SILT FENCE SHALL BE REPLACED IF IT DECOMPOSES OR BECOMES INEFFECTIVE. SILT FENCE SHALL BE INSPECTED WEEKLY, WITHIN 24 HOURS OF ANY RAIN EVENT AND THROUGHOUT THE DAY DURING PROLONGED STORM EVENTS.

CONSTRUCTION SEQUENCE

INSTALL SILT FENCE, GRAVEL ENTRANCES AND ANY OTHER TEMPORARY SOIL EROSION CONTROL MEASURES IDENTIFIED IN PLANS

- GRADE AND BALANCE SITE, INSTALL SOIL EROSION MEASURES ON STEEP SLOPES - INSTALL UNDERGROUND UTILITIES AND STORM SEWER

- ROUGH GRADE SAND SUBBASE

- PLACE ALL CONCRETE AND CONCRETE WALKS

PAVE DRIVES AND PARKING AREAS CLEAN AND FINAL GRADE BASINS, TOPSOIL SEED AND MULCH REMAINING DISTURBED AREAS

REMOVE AND SILT AND SEDIMENT THAT IS COLLECTED IN BASINS AND LOW AREAS UNTIL SITE IS VEGETATED AND STABILIZED REMOVE TEMPORARY EROSION CONTROL DEVISES ONCE SITE IS SIGNED OFF AND APPROVED BY ENGINEER AND SESC OFFICE

STORM WATER MAINTENANCE PLAN

1. EACH SPRING THE ONER SHALL WALK THE SITE TO INSPECT FOR SEDIMENT OR EROSION OR ANY DAMAGED FEATURES WITHIN THE STORM WATER SYSTEM. THE STORM WATER SYSTEM SHALL ALSO BE INSPECTED AFTER ANY LARGE RAIN EVENTS TO VERIFY THE CONDITION OF THE SYSTEM

2. IF THERE IS SEDIMENT ACCUMULATION OR DAMAGE TO THE SYSTEM, THIS SHOULD BE REMOVED OR REPAIRED ANY EROSION SHALL BE RE-ESTABLISHED. ANY STONE SPILLWAYS SHALL BE CLEANED AND RE-ESTABLISHED IF COMPROMISED 4. STORM WATER BASINS, DITCHES AND OTHER STORM WATER FEATURES SHALL BE INSPECTED AT LEAST ONCE DURING THE SUMMER 5. DITCHES AND STORM WATER BASINS SHALL BE MAINTAINED THROUGHOUT THE GROWING SEASON. THESE FEATURES SHALL BE MOWED AS NECESSARY TO ENSURE PROPER STORM CONVEYANCE THROUGH THE STORM WATER SYSTEM.

PROFILE VIEW EVEREST DRIVE - STA. 6+50 TO P.O.E.

HORIZ. SCALE: 1" = 30' VERT. SCALE: 1" = 3'

RECORD DRAWING SHALL BE CONVERTED TO NGVD 29 DATUM. THE CONVERSION FROM NAVD 88 AT THIS LATITUDE AND LONGITUDE IS +0.34'

PLAN VIEW MATTERHORN DR. - STA. 0+00 TO P.O.E.

NOTE:

RECORD DRAWING SHALL BE CONVERTED TO NGVD 29 DATUM. THE CONVERSION FROM NAVD 88 AT THIS LATITUDE AND LONGITUDE IS +0.34'

WATER MAIN DETAILS

SEWER MAIN DETAILS

PRECAST CONCRETE MANHOLE

THIS DROP CONNECTION DETAIL APPLIES WHERE INVERT DROPS ARE GREATER THAN 2'-0" OR AS INDICATED ON PLANS.

MANHOLE WATERSTOP

PRE-CAST 4' Ø MH. W/ DOGHOUSE OPENINGS OVER EXISTING SEWER - GROUT PERIMETER OF BOTTOM

REINFORCED CONCRETE COOKIE MIN. 8" THICKNESS

	GRAND TRAVERSE ENGINEERING & CONSTRUCTION A Subsidiary Of Grand Traverse Economic Development
Revision: <u>REVISION - 3-27-2023 STORM COMMENTS</u>	
Date: 1-9-2023 Scale: N/A Drawn By: RAC	Checked By:
Client: THE GRANGER GROUP 2380 HEALTH DRIVE SW, SUITE 210	W I UMIING, MIT 49919
heet Title: SEWER DETAILS "Oject: ACME VIT ACE ET ATS - MOTINE HODE BOAD DID DHAGE I SITTE INFRAGED I FOTT IRF	ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN
Project N	
2022-1	Io. 9

W = WIDTH	D = DEPTH	T = S.S. LENGTH	ELEV. WEIR
9 FT.	12"	3.0' MIN.	615.00'
9 FT.	12"	3.0' MIN.	615.00'
W = WIDTH	D = DEPTH	T = S.S. LENGTH	ELEV. WEIR

	D = DEPTH	I = 3.3. LENGIN	ELEV. WEIR	
6 FT.	12"	3' MIN.	615.00'	
8 FT.	12"	3' MIN.	615.00'	





A FLOOR PLAN SCALE 1/8"=1'-0"

BUILDING INFO:

(5) buildings shown @ 11,063sf per building (5) mirrored orientation, refer to CIVIL Site Plan - Total area 110,630sf

(6) units per building – (60) units total:
 ●(40) Type "A" units – 2bed/2bath 1,348sf / unit

- •(10) Type "B" units 1bed/2ath 1,463sf / unit ■(10) Type "C" Units – 3bed/3 bath 1,635sf/unit



GROSS BUILDING AREA

11063 sq. ft.







PROJECT



Acme Township, MI



TITLE

6 UNIT BUILDING FLOOR AND **ROOF PLAN**

REV.

REVIEW **REVISION 1** SCHEMATIC DESIGN SPA & PRICING

DESCRIPTION



GRANGER® LILLE INVESTMENT | MANAGEMENT | DEVELOPMENT



UNIT C FLOOR PLAN (SLAB ON GRADE) SCALE 3/16"=1'-0" 1635 sq. ft.



50'-3 1/2"

5'-9 1/2"

21'-0"

13'-6"



PROJECT

ACME VILLAGE FLATS

1'-3"

120

D

4

PHASE 1 Acme Township, MI

CONCRETE PATIO -3660 <u>Bedroom</u> **A 02** <u>garage</u> A 01 CJ. TYP. 445 sq. ft. 9'-3 1/4" 2'-5" 3'-7 1/2" -0 5'-7 3/4" 5'-7" 1 <u>WIC</u> 2 **A 03** LAUNDRY A 04 6'-1" 3680 ----- C 3312 W3315 o2'-1" 6'-11" 4812 2412 3'-1 3/ | ||2'-7 1/4" 3'-1/2" ← BATH A O9 UC1893 U VB1821 VB1 -VB182 B1224 2412 4812 B4224 VSB3621 VB3621 W4215

 ○
 KITCHEN

 ▲ O8

 SB3624

 3'-0"

 3'-4"

 B3624

 B3624

 یں۔ 10 <u>LIVING</u> 10 **A 12** ----5'-1 3/4" 3'-2 1/2" 3'-1/2" 15'-7" 36x48 2412 4812 _____ 3080 u MAIN LEVEL 7280 🛥 <u>Bedroom</u> A 13 <u>DINING</u> A 14 CONCRETE PATIO 7260 ▶ 3660-4 <mark>≪3'-0"</mark> 3'-0" EQ EQ EQ EQ 11'-9[']1/2" 14'-9" 10'-0" 36'-6 1/2" UNIT A FLOOR PLAN (SLAB ON GRADE) SCALE 3/16"=1'-0" 1348 sq. ft. A

36'-6 1/2"

5'-9 1/2"

EQ 📋 EQ

10'-0"

EQ

EQ

20'-9"

EQ

10'-0"

EQ

TITLE

UNIT A, B, AND C ENLARGED UNIT PLANS

REV.

DESCRIPTION REVIEW REVIEW SCHEMATIC DESIGN SPA & PRICING

6/29/22 7/5/22 8/26/22







SCALE 1/8"=1'-0" D



SIDE ELEVATION SCALE 1/8"=1'-0" C



B REAR ELEVATION SCALE 1/8"=1'-0"

UNIT TYPE "C"

UNIT TYPE "A"





UNIT TYPE "A"

UNIT TYPE "A"

UNIT TYPE "A"



PROJECT



PHASE 1 Acme Township, MI

NOTE:

⁷ UNIT TYPE "B"

Architectural elevations represented depict the proposed finishes at the time these documents were completed. Pending unforeseen conditions in the market and/or supply chain, changes in materials/finishes may be necessary to maintain the construction process. Any modifications necessary will be brought to the attention of the stakeholders as timely as possible.

MATERIALS LEGEND: Coord. w/ Owner's Outline Specification

- 1 HORIZONTAL VINYL SIDING (3) COLOR COMBINATIONS
- 2 OUTSIDE CORNER VINYL TRIM (WHITE)
- 3 PREFINISHED CLADDING AT EXPOSED POSTS & BEAMS (WHITE)
- 4 ASPHALT SHINGLES (DARK GRAY)
- 5 PERFORATED VINYL SOFFIT (WHITE)
- 6 PREFINISHED GUTTER (WHITE)
- 7 PREFINISHED DOWNSPOUT (WHITE)
- 8 RIDGE VENT (MATCH SHINGLE COLOR)
- 9 ROOF VENT (MATCH SHINGLE COLOR
- SINGLE HUNG WINDOW (WHITE)
- 10 WINDOW TRIM TYP. (WHITE)
- 11 12 WALL SCONCE LED w/PHOTOCELL (BLACK)
- 13 PREFINISHED RAILING (WHITE)
- 14 FRONT SWING DOOR w/ KEYLESS PAD (WHITE)
- 15 PATIO SLIDING DOOR (WHITE)
- 16 DOOR TRIM TYP. (WHITE
- 17 DECORATIVE CLAD TRIM (WHITE)
- 18 FIRE RETARDENT TREATED WOOD
- 19 BUILDING NUMBERS
- 20 GARAGE DOOR NON-INSULATED w/ OPENER



TITLE

REV.

REVIEW **REVISION 1** SCHEMATIC DESIGN SPA & PRICING

DESCRIPTION



6 UNIT BUILDING ELEVATIONS



ACME TOWNSHIP PLANTING REQUIREMENTS

SEC. 6.4.5 RIGHT-OF-WAY LANDSCAPING BUFFER A. (1) TREE AND (6) SHRUBS PER 30' OF FRONTAGE

A.A. MT. HOPE ROAD LENGTH 500' LF / 30' = (17) TREES AND (100) SHRUBS

A. UNPAVED AREAS SHALL BE PLANTED WITH GRASS, GROUND COVER, OR SHRUBS AS INDICATED B. (1) TREE PER 4,000SF OF FIRST 24,000SF OF UNPAVED / UNDEVELOPED LOT AREA AND (1) TREE PER 6,000SF OF REMAINING (345,871SF OF UNPAVED/UNDEVELOPED AREA)

• SITE AREA HAS NO QUALIFYING VEGETATION - NO CREDITS ARE BEING PURSUED

BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER TYPE
ACER SACCHARUM	COMMEMORATION OF LEGACY		
'COMMEMORATION' OR 'LEGACY'	SUGAR MAPLE	2.5"	B&B
LIRIODENDRON TULIPIFERA	TULIP TREE	2.5"	B&B
PINUS STROBUS	EASTERN WHITE PINE	6' HT.	B&B
IRIS VIRGINICA	BLUE FLAG IRIS	-	NO.1
ECHINACEA PALLIDA	PURPLE CONE FLOWER	-	NO.1
RUDBECKIA LACINIATA	CUT LEAF CONEFLOWER	-	NO.1
LIATRIS SPICATA	MARSH BLAZING STAR	-	NO.1
PANICUM VIRGATUM	SWITCH GRASS	-	NO.1
COMUS	RED DOGWOOD	-	NO.1

ALL LANDSCAPING AREAS AND LAWNS ADJACENT TO PAVED AREAS AND/OR STREETS TO BE FULLY IRRIGATED. IRRIGATION SYSTEM TO INCLUDE ALL SPRAY HEADS, VALVES AND CONTROLLERS.

A SEPERATE METER AND BAKFLOW PREVENTER WILL BE REQUIRED.

LOCATE HEADS A MINIMUM OF 2'-0" FROM EDGE OF PAVEMENT / CURB. COORDINATE CONTROL BOX LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION.

1. ALL LAWN AREAS SHALL BE SEEDED AND MULCHED WITH THE FOLLOWING MIXTURE: 20% IMPROVED PERENNIAL RYEGRASS, 40% FINE FESCUE, AND 40% KENTUCKY BLUEGRASS AT A RATE OF 8-10 LBS / 1000SF. PROVIDE 19-19-19 STARTER FERTILIZER AT A RATE OF 5-7 LBS / 1000SF

2. ALL EDGING SHALL BE STANDARD COMMERCIAL GRADE BLACK DIAMOND POLYETHYLENE EDGING. EDGING TO BE 5.5" BY 20' SECTIONS WITH 4 METAL STAKES PER SECTION.

3. PROVIDE QUALITY, SIZE, GENUS, SPECIES, AND VARIETY OF EXTERIOR PLANTS INDICATED, COMPLYING WITH APPLICABLE REQUIREMENTS IN ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK." MEASURE ACCORDING

4. WARRANT TREES, SHRUBS, AND PERENNIALS FOR ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH. 5. REMOVE AND REPLACE DEAD PLANTS IMMEDIATELY. REPLACE PLANTS THAT ARE MORE THAN 25% DEAD OR IN AN UNHEALTHY CONDITION PRIOR TO END OF WARRANTY PERIOD. EXCEPT FOR LOSSES OR REPLACEMENTS DUE TO

FAILURE TO COMPLY WITH REQUIREMENTS 6. MAINTAIN TREES, SHRUBS, AND PERENNIALS FOR ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION BY PRUNING, CULTIVATING, WATERING, WEEDING, FERTILIZING, RESTORING, PLANTING SAUCERS, TIGHTENING AND REPAIRING STAKES AND GUY SUPPORTS, AND RESETTING TO PROPER GRADES OR VERTICAL POSITION, AS

REQUIRED TO ESTABLISH HEALTHY VIABLE PLANTINGS. SPRAY AS REQUIRED TO KEEP TREES AND SHRUBS FREE 7. BEGIN LAWN MAINTENANCE IMMEDIATELY AFTER EACH AREA IS PLANTED AND CONTINUE UNTIL ACCEPTABLE LAWN IS ESTABLISHED: A MINIMUM OF 60 DAYS AFTER SUBSTANTIAL COMPLETION.

8. MAINTAIN AND ESTABLISH LAWN BY WATERING, FERTILIZING, WEEDING, USING CHEMICAL TREATMENT TO ELIMINATE BROADLEAF AND NOXIOUS WEEDS, MOWNING, TRIMMING, REPLANTINGAND OTHER OPERATIONS. ROLL, REGRADE, AND REPLANT BARE AND ERODED AREAS AND REMULCH TO PRODUCE A UNIFORMLY SMOOTH LAWN. 9. PROTECT ADJACENT AND ADJOINGING STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENTS, AND PLANTINGS FROM HYDROSEED OVER-SPRAY AND DAMAGE CAUSED BY PLANTING OPERATIONS.

10. REMOVE STONES LARGER THAN ONE FOOT IN ANY DIMENSION AND REMOVE STICKS, ROOTS, RUBBISH, AND OTHER EXTRANEOUS MATTER FROM SITE.

11. MAINTAIN LAWN UNTIL A HEALTHY, UNIFORM, CLOSE STAND OF GRASS HAS BEEN ESTABLISHED, FREE OF WEEDS AND SURFACE IRREGULARITIES, WITH COVERAGE EXCEEDING 90% OVER ANY 10SF AND BARE SPOTS DO NOT

12. APPLY PRE-EMERGENT HERBICIDE TO ALL PLANTING BEDS ACCORDING TO MANUFACTURER'S RECOMMENDATION REAPPLY AS RECOMMENDED BY PRODUCT DURING ONE YEAR WARRANTY PERIOD. 13. PROVIDE INVASIVE SPECIES MANAGEMENT/REMOVAL PLAN.

1. ALL PERENNIAL AND GRASS PLANTINGS SHALL BE SUPPLIED IN POTTED FORM IN #1 CONTAINERS AND SPACED APPROXIMATELY 1.5' O.C. SEEDING SHALL NOT BE USED TO ESTABLISH PLANTINGS. 2. SELECTION AND INSTALLATION OF PLANT MATERIAL INCLUDING SITE PREPARATION. PLANTING, PRUNING, WATERING AND CULTIVATING SHALL BE IN ACCORDANCE WITH THE AMERICAN ASSOCIATION OF NURSERYMEN STANDARDS. 3. PLANT LOCATIONS AND QUANTITIES HAVE BEEN FIGURED AS CLOSELY AS POSSIBLE. HOWEVER, PLANT MATERIAL AND LOCATIONS MAY BE ADJUSTED ON SITE IF NECESSARY. IT REMAINS THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR TO COMPLETE THE PROJECT AS INDICATED ON THE DRAWING. IT IS THE INTENT OF THIS PLAN TO UTILIZE ONLY MICHIGAN NATIVE SPECIES. ANY ADJUSTMENTS IN THE PLANT SPECIES MUST MEET THIS INTENT. 4. PLANTINGS SHALL RECIEVE WATER EVERY OTHER DAY AS A MINIMUM FOR THE FIRST TWO WEEKS AND THEN RECIEVE A MINIMUM OF 1" OF WATER PER WEEK UNTIL HEALTHY GROWTH HAS BEEN ESTABLISHED. 5. THE BIORETENTION AREA SHALL BE KEPT FREE OF REFUSE AND DEBRIS AND KEPT IN A HEALTHY GROWING CONDITION. CHECKING FOR AND CONTROL OF INVASIVE SPECIES SHALL BE PART OF THE MAINTENANCE PROGRAM.

01-18-2023 SPR ISSUES/DATES





NAME & LOCATION





DATE ISSUED

JJS

DRAWN BY

P22301

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3" AGED HARDWOOD MULCH 24" PLANTING SOIL BED 40% COMPOST 35% SAND 25% TOPSOIL 4" WASHED SAND BED </K/K/K/K/V/ IN-SITU SOILS 4" WASHED PEA GRAVEL CHOKING STONE

6" PERFORATED UNDER DRAIN ELEV. 757.0

B1 BIO RETENTION AREA DETAIL LS1.0 SCALE - NOT TO SCALE

(ASTM NO. 8 OR EQUIVALENT) VARIABLE DEPTH WASHED GRAVEL UNDERDRAIN BEDDING (ASTM NO. 57 OR EQUIVALENT)

5' MIN.

6%



1. RESIDENTIAL BUILDING LIGHTING HAS 100% CUT OFF SHIELDING PREVENTING LIGHT FROM EMITTING ABOVE HORIZONTAL PLANE. 2. (2) COACH WALL SCONCES LOCATED ON EITHER SIDE OF THE GARAGE DOOR WILL BE ON PHOTOCELL. 3. PROPOSED FIXTURE BRIGHTNESS IS 1426 LUMENS. (EXCEEDS 800 ALLOWED FIXTURE, MANUF. WILL MODIFY IF DEEMED NECESSARY).

talog	Description	Number Lamps	Lamp Output	LLF	Input Power	Polar Plot
5-W17214	Surface-mounted Luminaires	1	365	1	16.4312	Max: 193cd
_		·				

Statistics						
Description	Symbol	Avg	Мах	Min	Max/Min	Avg/Min
BLD. 2	+	0.4 fc	1.9 fc	0.0 fc	N/A	N/A
BLD. 3	+	0.6 fc	4.4 fc	0.0 fc	N/A	N/A
BLD. 4	+	0.6 fc	4.9 fc	0.0 fc	N/A	N/A
BLD. 5	+	0.5 fc	1.9 fc	0.0 fc	N/A	N/A
BLD. 6	+	0.3 fc	1.9 fc	0.0 fc	N/A	N/A
BLD. 7	+	0.6 fc	5.6 fc	0.0 fc	N/A	N/A
BLD. 8	+	0.4 fc	2.2 fc	0.0 fc	N/A	N/A
BLD. 9	+	0.4 fc	1.9 fc	0.0 fc	N/A	N/A
BLD. 10	+	0.4 fc	1.9 fc	0.0 fc	N/A	N/A
BLD. 1	+	0.5 fc	1.8 fc	0.0 fc	N/A	N/A

Fixture Type:

WAC LIGHTING

				Catalo	g Number:	
				Projec	t:	
				Locatio	on:	
Sco	once 3000k	<				
1''	Color Temp	Finish BK Black	LED Watts	LED Lumens	Delivered Lumer	15
T	50001	Did Didek	1000	1420	500	
2 14- ts pl	BK lease contact cu	stoms@waclighting.con	n			
ant pen	ern meets mode bottom for eas	ern LED technology with y maintenance.	a clear seeded		ALC: NO.	
atio ease tech	n e of maintenanc inology	e				
	3000K					
	120 VAC,50/60	Hz				
	90					
	ELV: 100-10% ,	TRIAC: 100-10%				
	50000 Hours					
	Can be mount	ed on wall in all orientat	tions			
	ETL, cETL,IP65		1	FINISHES:		
	Wet Location L	isted				
	Aluminum boo	ly, seeded clear glass di	ffuser			
RTS				Black		
las	s		_L	INE DRAWING:		
				5"	\rightarrow \vdash	6 5%"
						- 6 ½"
				14"		10 3/4"
				%"I - 4 1/2		

WS-W17214







To:	Lindsey Wolf, Planning & Zoning Administrator	Date:	March 7, 2023 March 23, 2023
From:	Robert Verschaeve, P.E.	Re:	Stormwater Review: Acme Village Flats PUD Phase 1
CC:	Doug White, Supervisor		

This review is being provided as requested by Acme Township and is limited to storm water control measures only for the referenced project in accordance with Ordinance No. 2007-01 Acme Township Storm Water Control Ordinance. Other items such as soil erosion and sedimentation controls will need to be reviewed and permitted through the appropriate agency having jurisdiction.

The project plans submitted are for phase 1 of a (10) building PUD development on Mount Hope Road. Each of the ten buildings in phase 1 has (6) dwelling units. Grand Traverse Engineering and Construction (GTEC) is the design engineer for the project. Plans submitted for review dated 1-20-2023 were sealed by Ryan Cox. An additional sheet, D1, dated 3-1-2023 was also provided with additional information and calculations for review.

The project plans show two north-south paved drives off Mount Hope Road connected by an east-west paved drive towards the south end of the site. Four buildings are located along each north-south drive and two buildings are located along the south side of the east-west drive. A paved driveway to each unit's garage is provided from the roadway it adjoins. Overall impervious areas identified on the plans are: 125,096 sft of building roof; 8,757 sft sidewalk; 40,450 sft of asphalt; and 24,840 sft of driveway. Areas scaled from the plans are consistent with the noted areas.

Stormwater control is proposed as a series of linked infiltration and bio-retention basins within the site over three drainage districts. There are also stone trench drains located along buildings 1, 2, and 6 that collect roof water and direct it to basins. The existing topography shows the site sloping from the higher east side to the lower west side. Stormwater basins are located in the general center of the site and at appropriate points along the west boundary. Plans also identify a wetland area further to the west off the site. Areas and volumes scaled from the plans related to the stormwater controls were consistent with areas and volumes noted on the plans and in provided calculations.

Plans include soil test pit data and USCS soils survey information. The USCS soils present on site are identified as Au Gres-Saugatuck Sands and Croswell Loamy Sand. Both of the soils series are noted as having high to very high infiltration rates between 5.95 and 19.98 inches per hour. Infiltration test results completed by the engineer are also noted on the plans and show infiltration rates from 8 to 14 inches per hour.

Since the proposed plans indicate infiltration basins to handle storm water, this review is thus completed with respect to the Infiltration/Retention System section of the Ordinance. The items listed and reviewed from this section are as follows:

Stormwater Control – Infiltration / Retention System				
Ordinance Standard	Review Finding			
 a. PHYSICAL FEASIBILITY Infiltration systems will be required at all sites with soil permeability greater than 1 inch per hour. The bottom of the infiltration system shall be a minimum of 4 feet above the highest known water table elevation. 	The plan information provided identifies soils tested with infiltration rates between 8 and 11 inches per hour. This standard is met. Soil borings 1, 2, and 3 identified water at elevations 609, 608.9, and 609 respectively. The bottoms of the basins located near these borings are 613, 613.5, and 613 respectively. This standard is met.			
 b. DESIGN CRITERIA i. VOLUME The volume of the infiltration system shall be calculated by comparing the volume of runoff of the undeveloped site during a 2-year, 24-hour duration storm versus the volume of runoff from the developed site during a 25-year, 24-hour duration storm. The infiltration system volume shall be designed to store the runoff from back-to-back 100-year, 24-hour rainfall events from the entire contributing area for retention systems or if the discharge will cause downstream flooding. Certification that an adequate outlet for infiltration systems is available shall be provided by a licensed professional engineer. Infiltration of runoff within the basin may be used to reduce the required storage volume subject to the following provisions: 	Volume calculations for the three districts based on the 25-yr developed – 2-yr undeveloped are: District 1 required volume: 18,617 cft District 1 provided volume: 19,436 cft (total 4 basins and stone trenches) District 2 required volume: 49,550 cft District 2 provided volume: 34,300 cft (15,520 cft overflow to district 3) District 3 required volume: 16,320 cft + 15,520 cft overflow = 31,570 cft. District 3 provided volume: 31,732 cft (total 2 basins and stone trenches) This standard is met. Engineer is showing the back-to-back 100 year criteria is met by utilizing the infiltration capacity of the systems over the 24 hours allowed. The tested infiltration rates are noted on the plans. Copies of the test reports have been provided. This standard is met.			
ii. MAXIMUM DRAIN TIME The infiltration basin shall be designed to drain completely within 72 hours. A design infiltration rate of 0.5 times the infiltration rate determined by geotechnical investigation (not to exceed 1 in/hr for underground systems), or an infiltration rate of 0.52 in/hr shall be used to astimute the maximum time to	Drain time calculations for the 2' deep basins at .52 in/hr have been provided indicating 46.1 hours to drain. This standard is met.			
drain by the equation: 72> 12D/I				



iii. UNDERGROUND INFILTRATION AND RETENTION SYSTEMS	
Underground infiltration or retention systems are discouraged and will be allowed only when adequate space for an aboveground system is not available. The site grading shall provide for parking lot storage of excess runoff should the underground infiltration or retention system fail to function adequately.	No underground system is proposed. This standard is not applicable.
iv. CONSTRUCTION	
The contractor shall avoid compacting the soil in the infiltration or retention basin area during excavation and grading. Use of equipment with low earth pressure loading is required. The final 2 feet of depth shall be removed by excavating to finished grade.	The applicant is advised of this general requirement.
v. SNOW STORAGE	
Snow storage in the infiltration or retention system shall not displace more than 50% of the available storage volume and shall not impede drainage through the system.	Snow storage areas are noted on plans. Identified areas within each district are less than 50% of the basin areas. This standard is met.
c. TREATMENT CRITERIA	
<u>General</u> A treatment forebay or equivalent storm water filter shall be used to treat storm water runoff prior to an infiltration or retention system for all sites with a significant potential of exposing storm water to oil, grease, toxic chemicals, or other polluting materials. A list of representative sites is included in Appendix 1.	This site is not a significant risk of exposing stormwater to oil, grease, toxic chemicals, or other polluting materials. This standard is not applicable.
iv. SEDIMENT FOREBAY	
Sediment forebays or equivalent upstream treatment shall be used to provide energy dissipation and to trap and localize incoming sediment.	Sediment which could come from site roads will be localized at areas where they are accessible for maintenance at the ends of spillways. Bio-retention basins are also incorporated into the site to provide low impact treatment. This standard is met.
d. CONTROLS	
Detention basin design criteria for inlets and the emergency overflow shall also apply to the design of infiltration basins.	Riprap energy dissipators are provided at pipe and spillway inlets into basins. This standard is met.
e. EROSION CONTROL	
Upland construction areas shall be completely stabilized prior to final infiltration basin construction. All accumulated sediment shall be removed prior to final acceptance.	A soil erosion control plan is included in the plan set. The Grand Traverse County Health Department is the local agency that will review and issue a soil erosion permit from this plan.



Overflow spillways shall be protected with riprap or a permanent erosion control blanket to prevent erosion of the structure.	The plans show overflow spillways with 7-10" stone riprap over geotextile fabric. This standard is met.
Inlets and outlets require energy dissipation and transition from outlet to open channel based on the maximum velocities given in Section II - Grassed Waterways.	Riprap energy dissipators are provided at pipe and spillway inlets into basins. This standard is met.
f. GEOMETRY	
The floor of the infiltration basin shall be flat to encourage uniform ponding and infiltration.	Basin floors are shown as a large flat area. This standard is met.
The floor of the basin shall be scarified to a depth of 4 to 6 inches after final grading has been established.	The applicant is advised of this item.
g. PUBLIC SAFETY	
Side slopes shall not be steeper than 3:1 (H:V).	Side slopes are measured at 3:1. This standard is met.
A minimum 5-foot-wide safety ledge with a maximum slope of 6% shall be provided around the perimeter of open basins with water depths over 5 feet. The safety ledge shall be located 3 feet above the bottom of the infiltration basin at open dry basins, or 1 foot below the normal water level. Fencing to prevent unauthorized access may be provided in lieu of the safety ledge.	Basins are less than 5 feet deep. This standard is not applicable.
h. MAINTENANCE	
A minimum 15-foot-wide maintenance access route from a public or private right-of-way to the basin shall be provided. The access way shall have a slope of no greater than 5:1 (H:V), and shall be stabilized to withstand the passage of heavy equipment. Direct access to the forebay, control structures, and the overflow shall be provided.	Basins are generally accessible from the development drives and parking areas. This standard is met.
Infiltration basin maintenance plans will require that sediment be removed from the treatment forebay when it reaches a depth equal to 50% of the depth of the forebay or 12 inches, whichever is less.	The plans include stormwater maintenance plan notes indicating removal of accumulated sediment. This standard is met.

The storm water controls for this site are typical for similar sites that can be found in Acme Township and Grand Traverse County and found to generally meet the ordinance as detailed in the review items above. It is recommended that approval of the stormwater control plan be conditioned on receipt of the infiltration test reports noted in item b., and verification that the complete construction plans include items as presented on sheet D1. *The requested information has been provided and approval of the stormwater control plan is recommended*.



Acme Village Flats on Mount Hope Road

Storm Water Calculations 2-3-2023

Volume Required based on Acme Township Stormwater Ordinance 2007-01Table 5 Minimum Required Detention Basin Flood Control Volume(Standard Release Rate of 0.13 cfs/acre)Treatment Forebay:None Proposed -Site is not industrial or commercial no anticipated
major sources of contamination from this site.

Area North West - District No. 1

24,945 sf

Total Area:

0.573 Acres

	Area	Runoff Coefficient		
Roof	6,600.0	0.95		6270.0
Existing/Proposed Asphalt	5,250.0	0.95		4987.5
driveways	2,400.0	0.95		2280.0
Sidewalk/Concrete	870.0	0.95		826.5
Lawn and other surfaces	9,825.0	0.15		1473.8
	Weighted Ru	inoff Coefficient		0.63
Range of Volume per Table 5	CN		VR	
CN	0.6		5,500	
CN	0.65		6,150	
Min. Volume Per	Acre based or	coeff.	5,890	c.f.
Volume Required	for .57 acres		3,373	c.f.
Volume Provided			3,966	c.f.

Basins 1 and 2 (Bio Retention)

Area South of Total Area:	of District No. 1 36,030	- District Nc D sf	. 2	0.827 Ac	res	
	,					
			Rui	noff		
		Area	Co	efficient		
Roof		12,300	.0	0.95		11685.0
Proposed Asp	bhalt	6,060	.0	0.95		5757.0
driveways		4,800	.0	0.95		4560.0
Sidewalk/Cor	ncrete	1,382	.0	0.95		1312.9
Lawn and oth	er surfaces	11,488	.0	0.15		1723.2
		Weighted	Runof	f Coefficient		0.69
Range of Volu	ume per Table 5	CN			VR	
-	CN	0.65			6,150	
	CN	0.7			6,810	
	Min. Volume Per	Acre based	on coe	eff.	6,678 (c.f.
	Volume Required	l for .83 acre	s		5,524 (c.f.
	Volume Provided	I			5,605 (c.f.
Roof BLD 1 a	and BLD 2 - Indiv	idual Stone	Draiı	n West		
Total Area:	6,38	5 sf		0.147 Ac	res	
			Rui	noff		
		Area	Co	efficient		
Roof		6,385	.0	0.95		6065.8
Existing/Prop	osed Asphalt	0	.0	0.95		0.0
driveways		0	.0	0.95		0.0
Sidewalk/Cor	ncrete	0	.0	0.95		0.0
Lawn and oth	er surfaces	0	.0	0.15		0.0
		Weighted	Runof	f Coefficient		0.95
Range of Volu	ume per Table 5	CN			VR	
	CN	0.95			10,800	
	CN	0.95			10,800	
	Min. Volume Per	Acre based	on coe	eff.	10,800 (c.f.
	Volume Required	l for 0.15 acr	es		1,583 (c.f.

Volume Provided

714 c.f.

Stone Drain

Stone	Drain	Calcu	lations
-------	-------	-------	---------

Stone Trench Volume	50% stone Voids
Stone Trench 4' x 1.5' deep Length of Stone Trench	3 cf/ft 238 ft
Volume Provided	714.0

(Additional Runoff to be directed to basins 3A and 3B in sock Drain)

East Side of Site Dis	trict No. 3				
Total Area:	436,656 sf		10.024 Acre	S	
		Rui	noff		
	Area	Coe	efficient		
Roof	74,5	536.0	0.95		70809.2
Proposed Asphalt	23,7	760.0	0.95		22572.0
driveways	14,2	280.0	0.95		13566.0
Sidewalk/Concrete	5,0	04.0	0.95		4753.8
Lawn and other surfa	ces 319,0	076.0	0.15		47861.4
	Weight	ed Runof	f Coefficient		0.37
Range of Volume per	Table 5 CN		,	VR	
CN	0.3	5		2,420	
CN	0.4	Ļ		2,930	
Min. Vo	lume Per Acre bas	ed on coe	eff.	2,624 (c.f.
Volume	Required for 10.0	3 acres	:	26,304 0	c.f.
Volume	Provided (4A/4B)		:	20,555 0	c.f.

(Additional Runoff to be directed to basins 3A and 3B in sock Drain)

South Side of Site District	No. 4			
Total Area: 126,	540 sf	2.905	Acres	
		Runoff		
	Area	Coefficient		
Roof	18,874.0	0.95		17930.3
Proposed Asphalt	5,910.0	0.95		5614.5
driveways	3,360.0	0.95		3192.0
Sidewalk/Concrete	1,498.0	0.95		1423.1
Lawn and other surfaces	96,898.0	0.15		14534.7
	Weighted Ru	unoff Coefficie	ent	0.34
Range of Volume per Table	5 CN		VR	
CN	0.3		1,990	
CN	0.35		2,420	
Min. Volume F	Per Acre based or	n coeff.	2,334	c.f.
Volume Requi	red for 10.03 acr	es	6,780	c.f.
Volume Provid	ded (4A/4B)		25,450	c.f.

Additional Runoff from Stone Drains behind buildings 1/2 to be collected Additional Runoff from District No. 3 to be collected



March 1, 2023

Mr. Bob Verschaeve, PE Mr. Andy Purvis, PE Gosling Czubak Eng, Sciences, Inc. Traverse City, MI 49686-8607

RE: Stormwater Revisions - Acme Village Flats – Mount Hope Road PUD Phase I

Dear Bob,

Please see the attached plans and calculations outlining the changes that we discussed for the Phase I Acme Flats Project on Mount Hope Road. The design has been changed to provide volume for the back to back 100 year storm event due to the well-drained soils that have been identified on this portion of the property.

General Comments

Combined District and created system with linked infiltration basins. Utilized an infiltration rate of 4 inches/hour for all of the basins which was the lowest infiltration rate that we established in the three borings that we completed and did infiltration testing on.

In all of the basins, we did not use the allowable release rate of 0.13 cubic feet per second which would decrease the size of the basins even further.

We have included two bio-retention basins in the design, to improve storm water treatment and provide the project with some low impact design features.

Below is a quick narrative on the three drainage districts that we have established for the project.

District Number 1

We combined two districts and modified the design to include a large network of infiltration basins that will provide a substantial footprint for volume and infiltration.

Stone drains with sock have been added to collect roof runoff and will outlet to basins.

We did not account for infiltration in the area of the stone drains and the volume provided is based on stone voids of 40%. The stone drains provide 572 c.f. of storage each.

Equalizing culverts have been utilized to connect the system between east and west side of the district and the basins on the west side of the site have emergency overflow spillways directed towards the

wetlands. The wetlands are a low area on this site and will not cause any downstream flooding as it is not anticipated that any off-site discharge will ever occur due to the granular soils on this site.

District No. 2

Drainage district number two includes runoff from the hill to the east of side of the site.

Storage is provided in infiltration basin number 2. The basin provides an estimated volume of 33,830 cubic feet of storage. My calculations for the back-to-back 100 year storm indicate that we need to provide a total volume of 52,012 cubic feet of storage. The additional volume will be provided in the bio-retention basin and infiltration basin located in district number 3.

District No. 3

Storm water volume in district number 3 is provided in a bio-retention basin that will overflow into a large infiltration basin on the southwest corner of the project site.

These basins will also provide additional volume that was generated from excess runoff that could possibly be generated in district number 2. The additional volume that was calculated that would contribute to district number 3 is estimated to be 18,182 cubic feet. This additional volume will overflow from district number 2 through a 4' diameter outlet control structure to bio-retention basin number 3. Bio-retention basin number 3 also has a 4' diameter outlet control structure that will overflow to infiltration basin number 3b.

The total volume required including the excess runoff from district number 2 is 28,472 cubic feet. The volume provided in the stone drain and basins number 3 and 3b is 4,010 cubic feet plus 27,150 cubic feet for a combined volume of 31,732 cubic feet.

Thanks for your earlier comments. If you need any additional information of further clarification on any of this information, please call me to let me know at your earliest opportunity.

Sincerely,

Grand Traverse Engineering and Construction

Ryan A. Cox, PE Civil Engineer

INFILTRATION BASIN DESIGN

Modified Rational Method, 100-year Developed Back to Back storms with Infiltration Project: Mount Hope Road Project

Project #: 2022-19

100-year Developed Condition

Sub I	District	"C"	Area		Weighted	Weighted]	
Sub-I	JISTIICT	Factor	(s.f.)	(acres)	Area (CxA)	"C"		
Pavement		0.95	18,280	0.420	0.399			
Building(s) r	oof	0.95	31,850	0.731	0.695			
Concrete		0.95	2,255	0.052	0.049			
Other imper	vious	0.95	0	0.000	0.000			
Open		0.20	52.155	1.197	0.239			
Total			104,540	2.400	1.382	0.58	1	
		Infiltra	tion Parameters]		
Measured Ir	filtration Rate	e of Soil	=	8.00	in/hr			
Calculated I	nfiltration Rat	e (0.50 safetv	factor) =	4.00	in/hr			
Area of Bas	in Provided (r	measured at 1	(2 Depth) =	7990.00	s.f.			
	100-voar st	orm IDE table	with "CA" and Inf	iltration ann	ied]		
Duration		Weighted		Infiltration	100 vr Storm	Second 100	Total Required	٦
(min)	(in/hr)	Area (aerec)	Peak Runoff (cfs)	Roto (ofc)	(o f)	Second 100	Storage (o.f.)	
(1111.)	(11/11)	Alea (acres)	8 60		(0.1.)	yr. Storm	Storage (c.i.)	
15	5.48	1.302	7.57	0.74	4,112			
20	J.40	1.302	6.45	0.74	6,150			
30	3.76	1.302	5 20	0.74	8 021			
40	3.06	1 382	4 23	0.74	8 373			
45	2.85	1 382	3.94	0.74	8,636			
50	2.00	1.382	3.69	0.74	8 850			
60	2.39	1.382	3.30	0.74	9,227	4,772	13,998	7
75	2.02	1.382	2.79	0.74	9,233	6,150	15,382	
90	1.78	1.382	2.46	0.74	9,288	6.857	16.145	
105	1.61	1.382	2.22	0.74	9.356	8.021	17.377	
120	1.48	1.382	2.05	0.74	9,399	8,373	17,772	■ PE
180	1.08	1.382	1.49	0.74	8,129	8,636	16,765	
240	0.86	1.382	1.19	0.74	6,460	8,850	15,310	1
300	0.72	1.382	0.99	0.74	4,593	9,227	13,820	1
360	0.64	1.382	0.88	0.74	3,124	9,233	12,356	1
420	0.56	1.382	0.77	0.74	858	9,288	10,147	1
480	0.51	1.382	0.70	0.74	-1,009	9,356	8,347	1
540	0.46	1.382	0.64	0.74	-3,374	9,399	6,025	1
600	0.43	1.382	0.59	0.74	-5,241	8,129	2,888	
720	0.37	1.382	0.51	0.74	-9,871	6,460	-3,411	1
1080	0.27	1.382	0.37	0.74	-23,762	4,593	-19,169	
1440	0.21	1.382	0.29	0.74	-38,655	-253	-38,908	

Required Volume

Volume Required = peak storage volume =	17,772	c.f.
Volume Provided in Basin Network #1	17130	c.f.
Volume Provided in Stone Trenches for Roof	1,716	c.f.
Total Volume Provided in system	<mark>18,846</mark>	<mark>c.f.</mark>

Drain Time - Infiltration Basin #1

72 > 12D/l

I = 0.52 in/hr D = Basin Depth

46.1538462

INFILTRATION BASIN DESIGN

Modified Rational Method, 100-year Developed Back to Back storms with Infiltration Project: Mount Hope Road Project

Project #: 2022-19

100-year Developed Condition

Sub I	District	"C"	Area		Weighted	Weighted		
Sub-L	JISTICE	Factor	(s.f.)	(acres)	Area (CxA)	"C"		
Pavement		0.95	37,740	0.866	0.823			
Building(s) r	oof	0.95	67,990	1.561	1.483			
Concrete		0.95	5,004	0.115	0.109			
Other imper	vious	0.95	0	0.000	0.000			
Open		0.20	288,135	6.615	1.323			
Total			398,869	9.157	3.738	0.41	-	
		Infiltra	tion Parameters]		
Measured In	filtration Rate	e of Soil	=	8.00	in/hr			
Calculated I	nfiltration Rat	e (0.50 safety	factor) =	4.00	in/hr			
Area of Basi	n Provided (r	neasured at 1	/2 Depth) =	17180.00	s.f.			
	100-vear st	orm IDF table	with "CA" and Inf	iltration appl	ied	1		
Duration	Intensity	Weighted		Infiltration	100 vr. Storm	Second 100	Total Required	٦
(min.)	(in/hr)	Area (acres)	Peak Runoff (cfs)	Rate (cfs)	(c.f.)	vr. Storm	Storage (c.f.)	
10	6.29	3.738	23.51	1.59	13.153	yn otoini	Clorage (c.r.)	
15	5.48	3.738	20.48	1.59	17.004			
20	4.67	3.738	17.46	1.59	19,038			
30	3.76	3.738	14.05	1.59	22,435			
40	3.06	3.738	11.44	1.59	23,634			
45	2.85	3.738	10.65	1.59	24,468			
50	2.67	3.738	9.98	1.59	25,169			
60	2.39	3.738	8.93	1.59	26,434	13,153	39,587	
75	2.02	3.738	7.55	1.59	26,819	17,004	43,823	
90	1.78	3.738	6.65	1.59	27,339	19,038	46,377	
105	1.61	3.738	6.02	1.59	27,892	22,435	50,327	
120	1.48	3.738	5.53	1.59	28,378	23,634	52,012	PEA
180	1.08	3.738	4.04	1.59	26,419	24,468	50,888	
240	0.86	3.738	3.21	1.59	23,384	25,169	48,552	
300	0.72	3.738	2.69	1.59	19,810	26,434	46,245	
360	0.64	3.738	2.39	1.59	17,313	26,819	44,133	
420	0.56	3.738	2.09	1.59	12,663	27,339	40,002	
480	0.51	3.738	1.91	1.59	9,089	27,892	36,982	7
540	0.46	3.738	1.72	1.59	4,170	28,378	32,548	1
600	0.43	3.738	1.61	1.59	597	26,419	27,016	7
720	0.37	3.738	1.38	1.59	-8,973	23,384	14,411	1
1080	0.27	3.738	1.01	1.59	-37,681	19,810	-17,871	1
1440	0.21	3.738	0.79	1.59	-69,102	-253	-69,355	

Required Volume

Volume Required = peak storage volume =	52,012	c.f.
Volume Provided in Basin Network #2	33,830	c.f.
Additional Volume Provided in District No. 3	18,182	c.f.

Drain Time - Infiltration Basin #2

72 > 12D/l

I = 0.52 in/hr D = Basin Depth

46.1538462

INFILTRATION BASIN DESIGN

Modified Rational Method, 100-year Developed Back to Back storms with Infiltration Project: Mount Hope Road Project

Project #: 2022-19

100-year Developed Condition

Sub F	Victriat	"C"	Area Weighted		Weighted	Weighted]
Sub-L	JSUICI	Factor	(s.f.)	(acres)	Area (CxA)	"C"	
Pavement		0.95	9,270	0.213	0.202		
Building(s) re	oof	0.95	25,256	0.580	0.551		
Concrete		0.95	1,498	0.034	0.033		
Other imperv	vious	0.95	0	0.000	0.000		
Open		0.20	97,239	2.232	0.446		
Total			133,263	3.059	1.232	0.40	•
		Infiltra	tion Parameters				
Measured In	filtration Rate	e of Soil	=	8.00	in/hr		
Calculated In	nfiltration Rate	e (0.50 safety	factor) =	4.00	in/hr		
Area of Basi	n Provided (n	neasured at 1	/2 Depth) =	13702.00	s.f.		
	100-vear sto	orm IDF table	with "CA" and Inf	iltration appl	ied		
Duration	Intensity	Weighted		Infiltration	100 vr. Storm	Second 100	Total Required
(min.)	(in/hr)	Area (acres)	Peak Runoff (cfs)	Rate (cfs)	(c.f.)	vr. Storm	Storage (c.f.)
10	6.29	1.232	7.75	1.27	3.889	j.: 0.0	eterage (em)
15	5.48	1.232	6.75	1.27	4,935		
20	4.67	1.232	5.75	1.27	5,382		
30	3.76	1.232	4.63	1.27	6,055		
40	3.06	1.232	3.77	1.27	6,004		
45	2.85	1.232	3.51	1.27	6,056		
50	2.67	1.232	3.29	1.27	6,063		
60	2.39	1.232	2.94	1.27	6,034	3,889	9,922
75	2.02	1.232	2.49	1.27	5,491	4,935	10,426
90	1.78	1.232	2.19	1.27	4,992	5,382	10,374
105	1.61	1.232	1.98	1.27	4,504	6,055	10,560
120	1.48	1.232	1.82	1.27	3,995	6,004	9,998
180	1.08	1.232	1.33	1.27	669	6,056	6,725
240	0.86	1.232	1.06	1.27	-3,011	6,063	3,052
300	0.72	1.232	0.89	1.27	-6,869	6,034	-835
360	0.64	1.232	0.79	1.27	-10,371	5,491	-4,881
420	0.56	1.232	0.69	1.27	-14,584	4,992	-9,592
480	0.51	1.232	0.63	1.27	-18,441	4,504	-13,937
540	0.46	1.232	0.57	1.27	-22,743	3,995	-18,748
600	0.43	1.232	0.53	1.27	-26,600	669	-25,931
720	0.37	1.232	0.46	1.27	-35,114	-3,011	-38,125
1080	0.27	1.232	0.33	1.27	-60,655	-6,869	-67,524
1440	0.21	1.232	0.26	1.27	-87,090	-253	-87,343

Required Volume

Volume Required = peak storage volume =	10,560	c.f.
Additional Volume Provided for Dist. No. 2	18182	c.f.
Total Volume Required	28,742	c.f.
Volume Provided in Stone Trenches for Roof	572	c.f.
Total Volume Provided in system	31,732	c.f.

Drain Time - Infiltration Basin #3

72 > 12D/l

I = 0.52 in/hr D = Basin Depth

46.1538462

Basin will drain in less than 72 hours

PEAK



March 7, 2023

Mr. Bob Verschaeve, PE Mr. Andy Purvis, PE Gosling Czubak Eng, Sciences, Inc. Traverse City, MI 49686-8607

RE: Stormwater Revisions - Acme Village Flats – Mount Hope Road PUD Phase I- Revisions No. 2

Dear Bob,

Please see the attached plans and calculations outlining the changes that we discussed for the Phase I Acme Flats Project on Mount Hope Road. The soils observed on this site are generally well drained sandy soils. The proposed infiltration basins have been designed to store the runoff volume generated from the 25 year, 24 hour developed condition less the runoff from the 2 year, 24 hour existing condition. Emergency overflow weirs are provided to direct any additional runoff towards the natural drainage course. The basins are large with a good area for surface infiltration. Infiltration calculations are included on the drainage calculations included with this submittal but were not used to size the basins.

Although it would not be expected with such large basins and the high level of infiltration that was observed on this site during the infiltration testing, any overflows from the storm water system would not cause any down stream flooding or damage to any adjacent properties.

District Number 1

District number 1 includes a network of infiltration basins that will provide a substantial footprint for volume and infiltration.

Stone drains with sock have been added to collect roof runoff and will outlet to basins.

The stone drains provide 572 c.f. of storage each.

Equalizing culverts have been utilized to connect the system between east and west side of the district and the basins on the west side of the site have emergency overflow spillways directed towards the natural drainage course on this site. The wetlands are a low area on this site and will not cause any downstream flooding as it is not anticipated that any off-site discharge will ever occur due to the granular soils on this site.

District No. 2

Drainage district number two includes runoff from the hill to the east of side of the site.

Storage is provided in infiltration basin number 2. The basin provides an estimated volume of 34,300 cubic feet of storage. My calculations indicate that we need to provide a total volume of 49,550 cubic feet of storage. The additional volume will be provided in the bio-retention basin and infiltration basin located in district number 3.

District No. 3

Storm water volume in district number 3 is provided in a bio-retention basin that will overflow into a large infiltration basin on the southwest corner of the project site.

These basins will also provide additional volume that was generated from excess runoff that could possibly be generated in district number 2. The additional volume that was calculated that would contribute to district number 3 is estimated to be 15,250 cubic feet. This additional volume will overflow from district number 2 through a 4' diameter outlet control structure to bio-retention basin number 3. Bio-retention basin number 3 also has a 4' diameter outlet control structure that will overflow to infiltration basin number 3b.

The total volume required including the excess runoff from district number 2 is 31,570 cubic feet. The volume provided in the stone drain and basins number 3 and 3b is 572 cubic feet plus 31,160 cubic feet for a combined volume of 31,732 cubic feet.

Thanks for your earlier comments. If you need any additional information of further clarification on any of this information, please call me to let me know at your earliest opportunity.

Sincerely,

Grand Traverse Engineering and Construction

Jon G.

Ryan A. Cox, PE *Civil Engineer*

DETENTION BASIN DESIGN

Modified Rational Method, 25-year Developed vs. 2-year Undeveloped
 Project:
 Acme Village Flats on Mount Hope Rd.

 Project #:
 2022-19

25-

		"C"	Are	•a	Weighted	Weighter
Sub-District		Factor	(s.f.)	(acres)	Area (CxA)	"C"
Pavement		0.95	18,280	0.420	0.399	
Building(s) r	oof	0.95	31,850	0.731	0.695	
Concrete		0.95	2.255	0.052	0.049	
Other imper	vious	0.95	0	0.000	0.000	
Open		0.20	52,155	1,197	0.239	
Total		0.20	104,540	2.400	1.382	0.58
		Infiltration	Parameters			1
Measured/A	ssumed Infiltr	ation Rate of	Soil -	0.00	in/hr	
Celevieted I			feeter)	0.00	111/111 im/har	
Calculated II		e (0.50 salety	(a D) =	0.00	in/nr	
Area of Basi	n Provided (m	easured at 1/	2 Depth) =	0.00	s.f.	
25	5-year storm	IDF table wit	h "CA" and Infi	iltration appli	ied]
Duration (min.)	Intensity (in/hr)	Weighted Area (acres)	Peak Runoff (cfs)	Infiltration Rate (cfs)	Required Storage (c.f.)	
10	4.82	1.382	6.66	0.00	3,997	
15	4.20	1.382	5.80	0.00	5,224	
20	3.58	1.382	4.95	0.00	5,937	
30	2.88	1.382	3.98	0.00	7,164	
40	2.34	1.382	3.23	0.00	7,761	
45	2.18	1.382	3.01	0.00	8,134	
50	2.05	1.382	2.83	0.00	8,499	
60	1.83	1.382	2.53	0.00	9,104	
75	1.55	1.382	2.14	0.00	9,639	
90	1.36	1.382	1.88	0.00	10,149	
105	1.23	1.382	1.70	0.00	10,709	
120	1.13	1.382	1.56	0.00	11,243	
180	0.83	1.382	1.15	0.00	12,388	
240	0.66	1.382	0.91	0.00	13,134	
300	0.56	1.382	0.77	0.00	13,930	
360	0.49	1.382	0.68	0.00	14,626	
420	0.43	1.382	0.59	0.00	14,975	
480	0.39	1.382	0.54	0.00	15,522	
540	0.35	1.382	0.48	0.00	15,671	
600	0.33	1.382	0.46	0.00	16,417	
720	0.28	1.382	0.39	0.00	16,716	
1080	0.20	1.382	0.28	0.00	17,910]

0.22 0.00 19,343 < PEAK Max. Storage Volume Required 19,343 c.f.

2-year Undeveloped Condition

0.16

1.382

1440

Sub-District	6	Are	Area		Weighted
Sub-District	Ŭ	(s.f.)	(acres)	Area (CxA)	"C"
Open	0.15	104,540	2.400	0.360	
Existing Impervious	0.95	0	0.000	0.000	
Total		104,540	2.400	0.360	0.15
Duration = 1	5 min.	(matches durat	tion at peak v	olume of 25-y	r dev.)
Intensity = 2.24	ity = 2.24 in/hr		or above dura	ation)	
Volume = 72	6 c.f.	(Q = CIA)			

Required Volume

Vol. Required = 25-yr developed minus the 2-yr undeveloped =	<mark>18,617</mark> c.f.
Volume Provided in Basin Network #1	17720 c.f.
Volume Provided in Stone Trenches for Roof	1,716 c.f.
Total Volume Provided in system	19,436 c.f.

Calculated Infiltration Rate = 8 in/hr

Volume of water infiltrated in 24 hours based on 4 in/hr

Bottom of Basins (Conservative) 6600 S.F.

Volume of water infiltrated in 24 hrs. = 52800 c.f.

l = 0.52 in/hr

Drain Time - Infiltration Basin Network #1

72 > 12D/l

D = Basin Depth 46.15384615 hrs

DETENTION BASIN DESIGN

Modified Rational Method, 25-year Developed vs. 2-year Undeveloped Project: Acme Village Flats on Mount Hope Rd. Project #: 2022-19

25-

ear Developed Condition							
Out F	N-4-1-4	"C"	Are	ea	Weighted	Weighted	
Sub-L	District	Factor	(s.f.)	(acres)	Area (CxA)	"C"	
Pavement		0.95	37,740	0.866	0.823		
Building(s) r	oof	0.95	67.990	1.561	1.483		
Concrete		0.95	5.004	0.115	0.109		
Other imper	vious	0.95	0	0.000	0.000		
Open		0.20	288 135	6.615	1 323		
Total		0.20	200,100	0.015	2 729	0.41	
Total			390,009	9.157	3.730	0.41	
		Infiltratior	Parameters				
Measured/A	ssumed Infiltr	ation Rate of	Soil =	0.00	in/hr		
Calculated In	nfiltration Rate	e (0.50 safety	factor) =	0.00	in/hr		
Area of Basi	n Provided (m	neasured at 1	2 Depth) =	0.00	s.f.		
	-		======	0.00		1	
25	o-year storm	IDF table wit	h "CA" and Inf	iltration appl	ied		
Duration (min.)	Intensity (in/hr)	Weighted Area	Peak Runoff (cfs)	Infiltration Rate	Required		
Duration (mm.)	Intensity (III/III)	(acres)	r eak Runon (cra)	(cfs)	Storage (c.f.)		
10	4.82	3.738	18.02	0.00	10,810		
15	4.20	3.738	15.70	0.00	14,129		
20	3.58	3.738	13.38	0.00	16,058		
30	2.88	3.738	10.77	0.00	19,377		
40	2.34	3.738	8.75	0.00	20,992		
45	2.18	3.738	8.15	0.00	22,001		
50	2.05	3.738	7.66	0.00	22,988		
60	1.83	3.738	6.84	0.00	24,625		
75	1.55	3.738	5.79	0.00	26,072		
90	1.36	3.738	5.08	0.00	27,451		
105	1.23	3.738	4.60	0.00	28,965		
120	1.13	3.738	4.22	0.00	30,412		
180	0.83	3.738	3.10	0.00	33,507		
240	0.66	3.738	2.47	0.00	35,525		
300	0.56	3.738	2.09	0.00	37,678		
360	0.49	3.738	1.83	0.00	39,562		
420	0.43	3.738	1.61	0.00	40,504		
480	0.39	3.738	1.46	0.00	41,984		
540	0.35	3.738	1.31	0.00	42,388		
600	0.33	3.738	1.23	0.00	44,407		
720	0.28	3.738	1.05	0.00	45,214		
1080	0.20	3.738	0.75	0.00	48,444		
1440	0.16	3.738	0.61	0.00	52,319	PEAK	

Max. Storage Volume Required 52,319 c.f.

2-year Undeveloped Condition

Sub-District		C	Are	Area		Weighted
		U	(s.f.)	(acres)	Area (CxA)	"C"
Open		0.15	398,869	9.157	1.374	
Existing Impervic	ous	0.95	0	0.000	0.000	
Total			398,869	9.157	1.374	0.15
Duration = 15 min.		(matches dura	tion at peak v	olume of 25-y	r dev.)	
Intensity = 2.24 in/hr		(2-year storm f	or above dura	ation)		
Volume = 2769 c.f.		(Q = CIA)				

Required Volume

Vol. Required = 25-yr developed minus the 2-yr undeveloped =	49,550	c.f.	
Volume Provided in Basin Network #2	34,300	c.f.	
Additional Volume Provided in District No. 3	15,250	c.f.	

Calculated Infiltration Rate = 8 in/hr

Volume of water infiltrated in 24 hours based on 4 in/hr

Bottom of Basins (Conservative) 14,700 S.F.

Volume of water infiltrated in 24 hrs. = 1176000 c.f.

Drain Time - Infiltration Basin #2

72 > 12D/l l = 0.52 in/hr D = Basin Depth

46.15384615 hrs

DETENTION BASIN DESIGN

Modified Rational Method, 25-year Developed vs. 2-year Undeveloped Project: Acme Village Flats on Mount Hope Rd. Project #: 2022-19

25-year Developed Condition

Out District		"C"	Are	a	Weighted	Weigh
Sub-L	JISTRICT	Factor	(s.f.)	(acres)	Area (CxA)	"C"
Pavement		0.95	9.270	0.213	0.202	
Building(s) r	oof	0.95	25,256	0.580	0.551	
Concrete		0.05	1 498	0.034	0.033	
Otherimpen	vious	0.95	1,430	0.004	0.000	
Onen	/1005	0.95	0	0.000	0.000	
Open		0.20	97,239	2.232	0.446	
Iotal			133,263	3.059	1.232	0.40
		Infiltration	Parameters			
Measured/As	ssumed Infiltra	ation Rate of S	Soil =	0.00	in/hr	
Calculated Ir	filtration Rate	(0.50 safety	factor) =	0.00	in/hr	
Area of Basi	n Provided (m	easured at 1/	2 Depth) =	0.00	s.f.	
						1
2	b-year storm	IDF table wit	h "CA" and Infi	Itration appli	ed	
Duration (min.)	Intensity (in/hr)	Weighted Area	Peak Runoff (cfs)	Infiltration Rate	Required	
		(acres)		(cfs)	Storage (c.f.)	
10	4.82	1.232	5.94	0.00	3,563	
15	4.20	1.232	5.17	0.00	4,657	
20	3.58	1.232	4.41	0.00	5,293	
30	2.88	1.232	3.55	0.00	6,387	
40	2.34	1.232	2.88	0.00	6,920	
45	2.18	1.232	2.69	0.00	7,252	
50	2.05	1.232	2.53	0.00	7,577	
60	1.83	1.232	2.25	0.00	8,117	
75	1.55	1.232	1.91	0.00	8,594	
90	1.36	1.232	1.68	0.00	9,049	
105	1.23	1.232	1.52	0.00	9,548	
120	1.13	1.232	1.39	0.00	10,024	
180	0.83	1.232	1.02	0.00	11,045	
240	0.66	1.232	0.81	0.00	11,710	
300	0.56	1.232	0.69	0.00	12,420	
360	0.49	1.232	0.60	0.00	13,041	
420	0.43	1.232	0.53	0.00	13,351	1
480	0.39	1.232	0.48	0.00	13,839	1
540	0.35	1.232	0.43	0.00	13,972	1
600	0.33	1.232	0.41	0.00	14,637	1
720	0.28	1.232	0.34	0.00	14,904	1
1080	0.20	1.232	0.25	0.00	15,968	1
1440	0.16	1.232	0.20	0.00	17,246	◄ PEAK
		Max	Storago Volum	no Poquirod	17 246	

2-year Undeveloped Condition

Sub-District		c	Are	a	Weighted	Weighted
		C	(s.f.)	(acres)	Area (CxA)	"C"
Open		0.15	133,263	3.059	0.459	
Existing Impe	rvious	0.95	0	0.000	0.000	
Total			133,263	3.059	0.459	0.15
Duration =	tion = 15 min.		(matches durat	ion at peak v	olume of 25-yı	r dev.)
Intensity =	2.24	in/hr	(2-year storm for	(2-year storm for above duration)		
Volume =	925	c.f.	(Q = CIA)			

Required Volume

Vol. Required = 25-yr developed minus the 2-yr undeveloped =	<mark>16,320</mark> c.f.
Additional Volume for Distirict No. 2	15,250 c.f.
Total Volume Required Volume Provided in Stone Trenches for Roof Total Volume Provided in system	31,570 c.f. 572 c.f. 31732 c.f.
Calculated Infiltration Rate = 8 in/hr	
Volume of water infiltrated in 24 hours based on 4 in/hr	
Bottom of Basins (Conservative) 14,000 S.F.	
Volume of water infiltrated in 24 hrs. = 1120000 c.f.	

Drain Time - Infiltration Basin Network #3

72 > 12D/l

46.1538462 hrs

l = 0.52 in/hr D = Basin Depth

Percolation Test Data Form

Location: ± 1 Test Hole Number: Adj to SB# 1 Test By: TAC Date of Test: 10/19/2022 Depth to Bottom of Hole: $\underline{13}^{\prime\prime}$ Diameter of Hole: $\underline{4}^{\prime\prime}$

Depth (inches)	Soil Texture	
0-84	TOPSOIL (SANDY)	
8''-581	FINE/MEDIUM SAM	(BROWN)
	,	

Time	Time Interval (hr)	Measurement (inches)	Drop in Water Level (inches)	Percolation Rate (in/hr)	Remarks
9:00		A	D DO	()	
9:10			3.50		
9120			3.25		
9:30			2.75		
9:40			2.50		RE-FILL
9:50			2.50		
10:00			2.50		
10:10			2.50		
					5

1/60 = 0.0/67

Average Infiltration Rate: _____ in/hr

STEADY RATE = ZISO ININ X GOMIN = 15/hr +1-

5/17/2007

Percolation Test Data Form

#2-

Location: $\frac{\#2}{Ady}$. Test Hole Number: \underline{Ady} . to SB-2Test By: \underline{RAC} Date of Test: $\underline{10/19/2022}$ Depth to Bottom of Hole: $\underline{13}^{1/}$ Diameter of Hole: $\underline{4}^{1/}$

Depth (inches)	Soil Texture]
0-31	TOPSOIL] 1
34-500	MEDISAND (BI	20mm)
		4
		4
		4
		4

Time	Time Interval (hr)	Measurement (inches)	Drop in Water Level (inches)	Percolation Rate (in/hr)	Remarks	
91.05 cm		A	300			
9:15 am			3.25			
9:25 am			2.75			
9:35 am			2.5		RE-FI	u
9: 45 am			2.5			
9:55 am			2,25			
10:05 gm			2.0			
10:15 am			210		RE-FI	el
10:25 gm			2,0			
10.35 900			2.0			
1						

Average Infiltration Rate: _____ in/hr

STEADY PATE - 2.0 IN × 60 min = 12 10/hr +1-