

# Auburn Road Early Preliminary Engineering (EPE) Study Final Report



## Auburn Road – Old M-59

Proposed Reconstruction of Auburn Road  
from Culbertson Ave. to Dequindre Road  
Nov. 17, 2017

City of Rochester Hills



Auburn Road Reconstruction EPE Study  
Culbertson Ave. to Dequindre Road



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# Introduction and Executive Summary

## Brief Project Description and History

The City of Rochester Hills desires to improve a section of the Auburn Road corridor, between Culbertson Avenue and Dequindre Road. The improvement of this section of road had been previously studied by the City, but formal plans have never moved forward. The City hired LSL Planning to develop a Corridor Improvement Plan as a framework for enhancement of this portion of Auburn Road. The Plan intends to promote redevelopment, improve walkability, increase safety, and install traffic calming.

Following completion of the LSL Plan, the City hired OHM to complete an Early Preliminary Engineering (EPE) Study for the corridor. This Study builds off the aforementioned Auburn Road Corridor Improvement Plan. The Plan developed a roadway and streetscape improvement concept to improve the corridor. In general, this concept proposed the reconstruction of the roadway with a 3-lane road, with on-street parallel parking, improved access management, and several streetscape improvements.

The purpose of the current EPE Study was to further develop the proposed design concept, taking into consideration the impacts of several typical project technical aspects. The results of the EPE Study will allow the City to understand the impacts that these aspects will have on the design concept and further refine a project schedule and budget. Should the project proceed into the design phase, identifying these challenges will lessen the chance that unanticipated major obstacles will occur once formal design begins.

These general areas of investigation on the EPE include, but are not limited to:

1. Road Geometrics (plan and profile)
2. Utilities (public and private)
3. Parking
4. Environmental (wetlands, contamination)
5. Archeological and Historic
6. Pavement and Soils
7. Traffic
8. Right-way and Property
9. Cost
10. Constructability
11. Landscaping
12. Project Schedule
13. Coordination with MDOT (current owner of the road)

## **Executive Summary**

As OHM began our efforts under the EPE, we identified early that the top critical aspects of the project design to resolve during this phase included:

- Access Management – eliminating as much of the direct access as possible
- Traffic Calming – Creating the desired corridor requires controlling speeds
- Jurisdictional Ownership – remaining with MDOT ownership would impact the design

The goal of access management was the closure of as much of the direct access from the adjacent properties onto Auburn Road. This aspect affects the success of the on-street parking, the safety and walkability, and

the opportunities for the streetscape improvements. The unique opportunity here was to use the alleys to provide property access, and get support from the property owners. Concept plans were further developed and used for property owner engagement and generally received great support.

In addition to the concept developed during LSL Study, OHM also identified early in the process that another possible option existed. OHM presented the City with a second concept that was thought to provide some additional benefits for traffic calming, safety, and aesthetics. This option contained three single lane, urban-compact roundabouts, spaced throughout the half-mile section between Culbertson Avenue and Dequindre Road. Based on the initial favorable feedback, both options were considered in all of the areas of impact listed above, and presented to the property owners.

The study considered the possibility of constructing the project under the current MDOT ownership of the corridor, as well as the possibility of the City considering taking over jurisdiction of the roadway, either in total, or in part. While it does appear possible that the project could proceed under MDOT ownership for several reasons we recommend that the City consider accepting the transfer of the roadway to be under City jurisdiction.

The following report contains project plans and cross sections to illustrate the proposed improvements, as well as cost estimates and a proposed schedule. We understood the City desires to possibly proceed with the project as soon as possible. We did not believe it was possible to construct the project in the 2018 construction season, but instead be prepared to construct the project in 2019. However, several early phases of work including utility relocations, alley improvements, and parking changes could proceed in 2018 to prepare for the majority of the work to occur smoothly in 2019. Possible outside funding sources could have an impact on this schedule.

Considering all aspects of the project costs as part of this study, the total project cost is estimated between \$6.3 million and \$7.1 million, depending upon which option is considered. We understand that the City's initial budget for the project is \$5M. We have identified aspects of the project scope that can be modified for cost reduction, and we have outlined a few possible sources of outside funding that could be considered to offset some of the project costs to make the project fit closer to the City's initial budget.

# Section 1: Existing Condition

## Existing Condition

The Auburn Road corridor within the project limits is a constant 2 lanes of pavement with the exception of the two ends of the project. Both Culbertson Avenue and Dequindre Road are both three-lane sections containing a directional left turn lane. The road is a shouldered type road, containing very little curb and gutter. Drainage is inconsistent with some swales, but no significant road-side ditches. The corridor has an urban look with many businesses and sidewalks present immediately adjacent to or even inside of the right-of-way (ROW) line. The speed limit is 40 mph and the road within the limits of the project and is currently owned by MDOT.

Parking for many businesses encroaches into the current MDOT ROW. Ingress and egress for these parking areas sometimes stretches across the entire frontage of the property with very uncontrolled access, or provides an access driveway to the back area parking. Typically, both the parking within MDOT ROW and the unlimited ingress/egress opportunities are not desired. Being such an old corridor and the lack of any feasible, low cost options to change, the situation has been allowed to remain in place.

There are two alleys that are used, in part, by some of the businesses. Portions of the north side alley is privately owned and is maintained by some of the businesses that use it. Some sections of the alley are paved and others have a gravel surface.



North side alley east of Culbertson (from Google Earth)

The south side alley is platted as public alley and owned by the City of Rochester Hills, but has not been improved or maintained by the City over the years. The majority of the alley is a two-track gravel road, with one section paved behind development between Gerald and Melvin. The City has stated they provide no maintenance on this alley.





**South side alley east of Harrison (from Google Earth)**

There is a large County Drain that crosses the project near the east end of the project at Hessel Road. The 72” Ireland Drain, from the north, comes down Eastern Avenue where it turns easterly and is located in the north side ROW to Hessel Road where it turns south as a 78” pipe.

There are no bridges within the project limits.

There are two traffic signals within close proximity to the project, at the ends of the project limits. They are at Culbertson Avenue and Dequindre Road. The signal at Culbertson was recently upgraded by MDOT in 2017. The signal at Dequindre is owned by the Road Commission for Oakland County (RCOC) and is scheduled to be replaced in 2019.

### **Average Daily Traffic**

The Average Daily Traffic (ADT) data for this section of roadway is 11,475 vehicles and represents typical two-way traffic on a typical day.

### **Existing Cross Section**

The existing mainline road way is HMA. Soil borings and pavement cores reveal a pavement thickness ranging from 4 inches to 5 inches on sand and gravel base. There were a few locations where the pavement was less than 4 inches and a couple that were 6 inches. Granular subgrade soils are located throughout, which is to be expected on the east side of Rochester Hills. The cores in the alley south of Auburn Road showed variable thicknesses with one core being 3 inches and another having 6 inches of HMA. Ground water was encountered in a few of the soil boring locations at about 7 – 8 feet deep, which also was expected.

See Section 7 for more information on existing pavement and soil conditions.

### **Railroad Crossings**

There are no at-grade or grade separated railroad crossings within the project limits.

### **Commercial Driveways**

There is a significant amount of commercial driveways/access points within the project limits. Excessive parking within the ROW and unlimited access to the frontage areas are not desired. Limiting access points to private properties is always preferred and is considered safer for the users of the road.

### **Residential Driveways**

There are no residential driveways that have access off of Auburn Road. Residential areas are located on the adjacent opposite sides of the north and south alleyways.

## Right of Way (ROW)

Plat maps show a 100' total ROW width in the corridor, centered 50' on each side of the section line. The Plat maps and City ROW maps and have been attached in Section 9 for reference material.

## Utilities

Overhead and underground utilities were requested for the corridor through the Miss Dig Design Ticket system. Requests were made for both for Auburn Road and the north and south alleys.

Many of the private utilities are located in the alleys both north and south of Auburn Road. This would include DTE (power), AT&T (phone) and Comcast (cable). Only the Consumers gas main (north side) is located within the Auburn Road ROW. It is anticipated the road footprint will significantly change in the corridor. A significant amount of excavation will be required in the corridor to place the new storm sewer system.

The City's water main is located on the south side of Auburn Road and there are sanitary sewers in each alley. Service leads from the south side main cross the existing road to the north side businesses. Sanitary service is fed off the rear alleys.

Please refer to Section 5 for more information on the utilities in the Corridor and copies of information received from utility companies.

## Traffic Signs

Replacing all existing traffic signs is planned as part of this project.

There are no large sign supports or overhead trusses in the corridor.

The future speed limit is critical to the success of this project. The project aims to lower the speed limit from 40 mph to 25 mph. How this is done is dependent on who will own the road when complete. If MDOT continues to own the road, the speed limit could only be reduced via a speed study by the State Police. See Section 14 on the MDOT coordination for more discussion on this topic.

If ownership is transferred to the City of Rochester Hills, all regulatory signs should have Traffic Control Orders (TCO) issued for legal enforcement. If ownership is not transferred to the City, the regulatory signs would stay under the jurisdiction of MDOT.

## Intelligent Transportation Systems (ITS)

There are no MDOT SEMTOC facilities operating currently within the Auburn Road corridor.

## Local Concerns

During the EPE Process, businesses were contacted for discussion of the proposed improvements and to get feedback from the property or business owners. The following business either attended the public meeting or were contacted separately by the City:

- 1505 E. AUBURN ROAD, GARY KORLESKI – BUILDING OWNER
- 1524 E. AUBURN ROAD, OLD TOWNE CORNERS – DAVID DUDA, OWNER
- 1524 E. AUBURN ROAD, OLD TOWNE FLORIST – CYNTHIA, BUSINESS OWNER/TENANT & *REPRESENTING OTHER TENANTS AT MEETING.*
- 1536 E. AUBURN ROAD, BRAIN FREEZE
- 1550 E. AUBURN ROAD, SONAAR DRIVING SCHOOL – ANDREW INASU, PROPERTY AND BUSINESS OWNER
- 1603 E. AUBURN ROAD, METRO PCS (INFORMATION LEFT WITH EMPLOYEES)

- 1619 E. AUBURN, AUBURN ANIMAL HOSPITAL – SUE, BUILDING/BUSINESS OWNER
- 1629 E. AUBURN – BOZANA TAESKI, BUILDING/BUSINESS OWNER
- 1650 E. AUBURN ROAD, BRANDON ELECTRIC – DAVID DUDA, BUILDING/BUSINESS OWNER
- 1663 E. AUBURN, A&S HEATING & COOLING/AMERICAN GRILL – DWAYNE ZYSEK, BUILDING/BUSINESS OWNER
- 1673 E. AUBURN, AQUARIUM SHINE – DWAYNE ZYSEK
- 1681 E. AUBURN, HONEST HOME CARE – NELISH PATEL, BUSINESS OWNER/BUILDING OWNER
- 1711 E. AUBURN, JOHNNY BLACK’S PUBLIC HOUSE – MATT MOORE, BUILDING/BUSINESS OWNER
- 1725 E. AUBURN, LINENS & BEYOND – (CHAD?), BUILDING/BUSINESS OWNER
- 1756 E. AUBURN, INCOME TAX SERVICE BUSINESS (STEVE OWNS) & TRAILER REPAIR, SHAWN LLEWELLYN OWNS
- 1799 E. AUBURN ROAD, SUNOCO (LEFT INFORMATION WITH EMPLOYEES)
- 1820 E. AUBURN, LITTLE CAESARS PIZZA
- 1825 E. AUBURN, CORNERSTONE/BIBLE TRUTH APOSTOLOC CHURCH
- 1826 E. AUBURN, STATE FARM INSURANCE– KEN MAZZOLA, BUSINESS OWNER
- 1892 E. AUBURN, GETHSEMANE CHURCH – EILEEN
- 1979 & 1995 E. AUBURN, MCNEIL HOLDINGS – DAVE COIN, OWNER
- 1990 E. AUBURN AND 1970 E. AUBURN, NORTH SHACK – CATHY, BUSINESS OWNER
- 2960 EASTERN AVE, HOME OWNER – RICHARD CABALUM

See Section 16 for more information on discussions with the business owners concerning this project.



## Section 2: Location Map

# CITY OF ROCHESTER HILLS



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REVISIONS:


DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIC DATUM	VERT DATUM
07/11/2017					OKLAND				

CITY OF ROCHESTER HILLS  
 AUBURN RD  
 LOCATION MAP

DRAWING PATH: P:\0166\_0200\019017010\_Auburn\_Road\_EPE\_Study\Drawings\CHM\Misc\LOCATION MAP.dwg Nov 01, 2017 - 16:42pm

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### Section 3: Photographs

The following are photographs of various roadside features along the Auburn Road corridor between Culbertson Ave. and Dequindre Road within the project limits.





Looking west-northwest at the southeast corner of the intersection of Culbertson and Auburn

This intersection was improved in 2017 with the addition of a right-turn lane as well as signal improvements.



Looking northwest at the southeast corner of the intersection of Culbertson and Auburn

Radii reconfigured with the reconstruction



Looking west-northwest at the southeast corner of the intersection of Emmons and Auburn

The first intersection into the Brooklands Corridor from the west





Looking east at the northeast corner of the intersection of Emmons and Auburn

A large variety of businesses line Auburn Road



Looking east at the northwest corner of the intersection of Longview and Auburn

Side street approaches onto Auburn Road will have to be taken into consideration



Looking east at the southwest corner of the intersection of Eastern and Auburn

Parking bays and walkable area will highlight the proposed corridor



Looking west-northwest at the southwest corner of the intersection of Eastern and Auburn

Large amounts of coordination must be made with businesses to accommodate parking



Looking west-northwest between Gerald and Melvin on the south side of Auburn

Alleyways will need to provide significant access for some businesses



Looking west at the southeast corner of the intersection of Melvin and Auburn

With this development, a heavy focus will need to be placed on intersections





Looking east at the southeast corner of the intersection of Melvin and Auburn

This development will bring a significant change to a daily drive for some commuters



Looking west on the south leg of the intersection of Hessel and Auburn

The goal is to optimize the compatibility of the Auburn Road improvements with individual sites



Looking northeast at the southwest corner of the intersection of Dequindre and Auburn

A substantial amount of traffic uses this thoroughfare



Looking east at the southwest corner of the intersection of Dequindre and Auburn

Significant coordination will have to be made with Dequindre during the improvements



Looking north at the southwest corner of the intersection of Dequindre and Auburn

This development will help further the pedestrian network in the area



Looking southeast at the northwest corner of the intersection of Dequindre and Auburn

Walkability throughout the project will have to be taken into account





Looking west at the northwest corner of the intersection of Hessel and Auburn

The first intersection into the Brooklands Corridor from the east



Looking northeast to the west of the intersection of Hessel and Auburn

Another instance of incorporating Auburn Road improvements with individual sites



Looking west between Melvin and Hessel on Auburn

Business owners will stand to benefit from this development from the roadway improvements alone



Looking south to the east of the intersection of Melvin and Auburn

Storm water solutions must be provided throughout the project



Looking east at the northeast corner of the intersection of Eastern and Auburn

With driveway access off Auburn cut off for many parcels, driveways will have to be relocated



Looking west at the northwest corner of the intersection of Eastern and Auburn

Businesses that feature parking in the front will need to be accommodated with equivalent parking





Looking east on the north leg of the intersection of Harrison and Auburn

Another example of a business that will need equivalent parking



Looking east at the northwest corner of the intersection of Longview and Auburn

Some buildings throughout the corridor may need to maintain access off both Auburn Road and alleys in the back



Looking west at the northwest corner of the intersection of Longview and Auburn

Significant offsets off Auburn Road allow for development



Looking west at the northeast corner of the intersection of Emmons and Auburn

In the distance off right is a vacant City owned gravel lot with the potential for lot parking



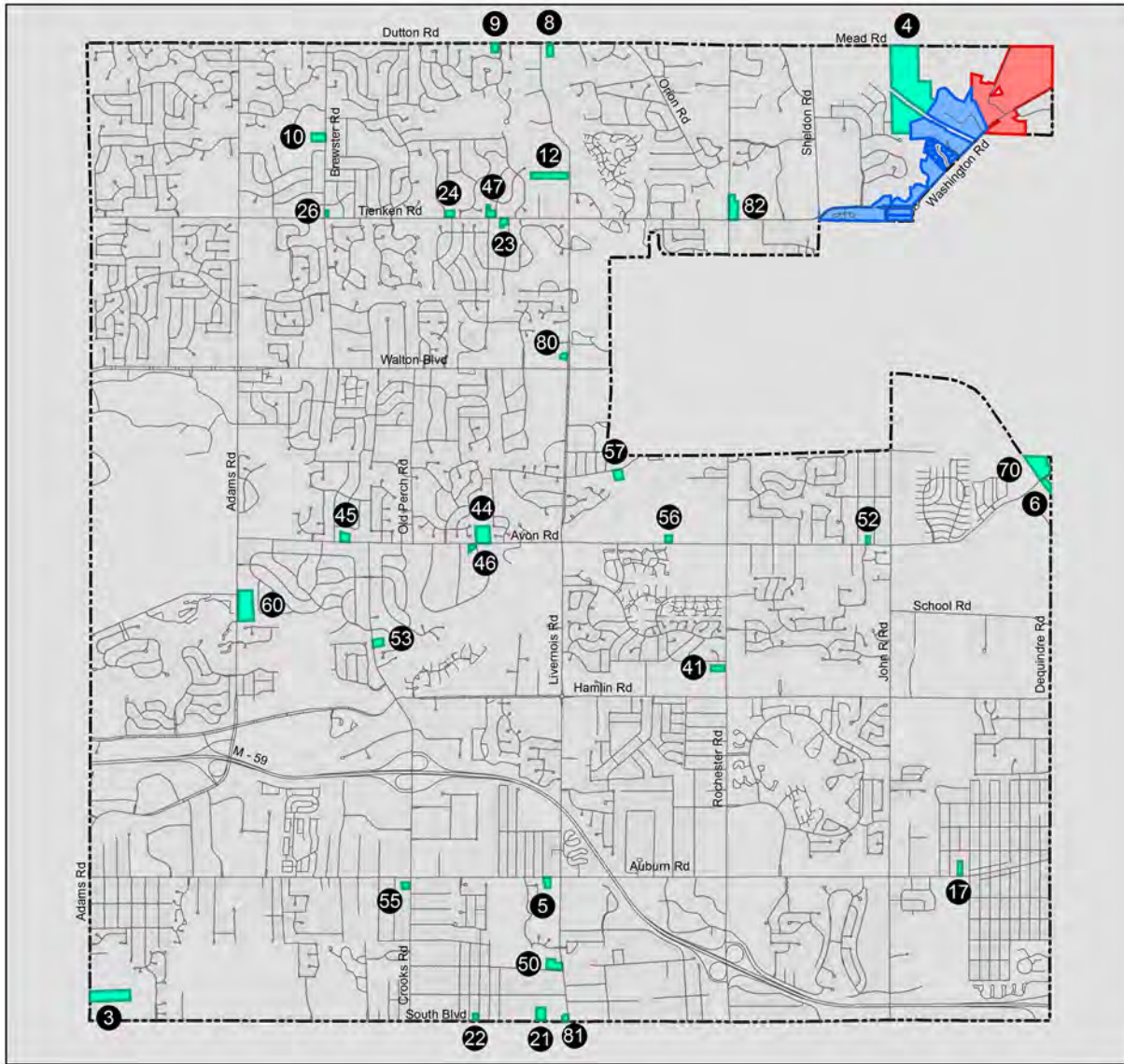
Looking southeast on the north leg of Emmons and Auburn

The importance of parking can be seen throughout the corridor



# Section 4: Archeological, Historical, Wetland, & Contamination Evaluations

No State historical properties were found within the project limits. One property, 1425 E. Auburn, is noted as being in the Noncontiguous historic district for the City and is located at the westerly limits outside of the project. See map below for noted historical sites in the Rochester Hills area.



No wetlands were noted within the project limits. See map below for noted wetlands in the Auburn Road vicinity

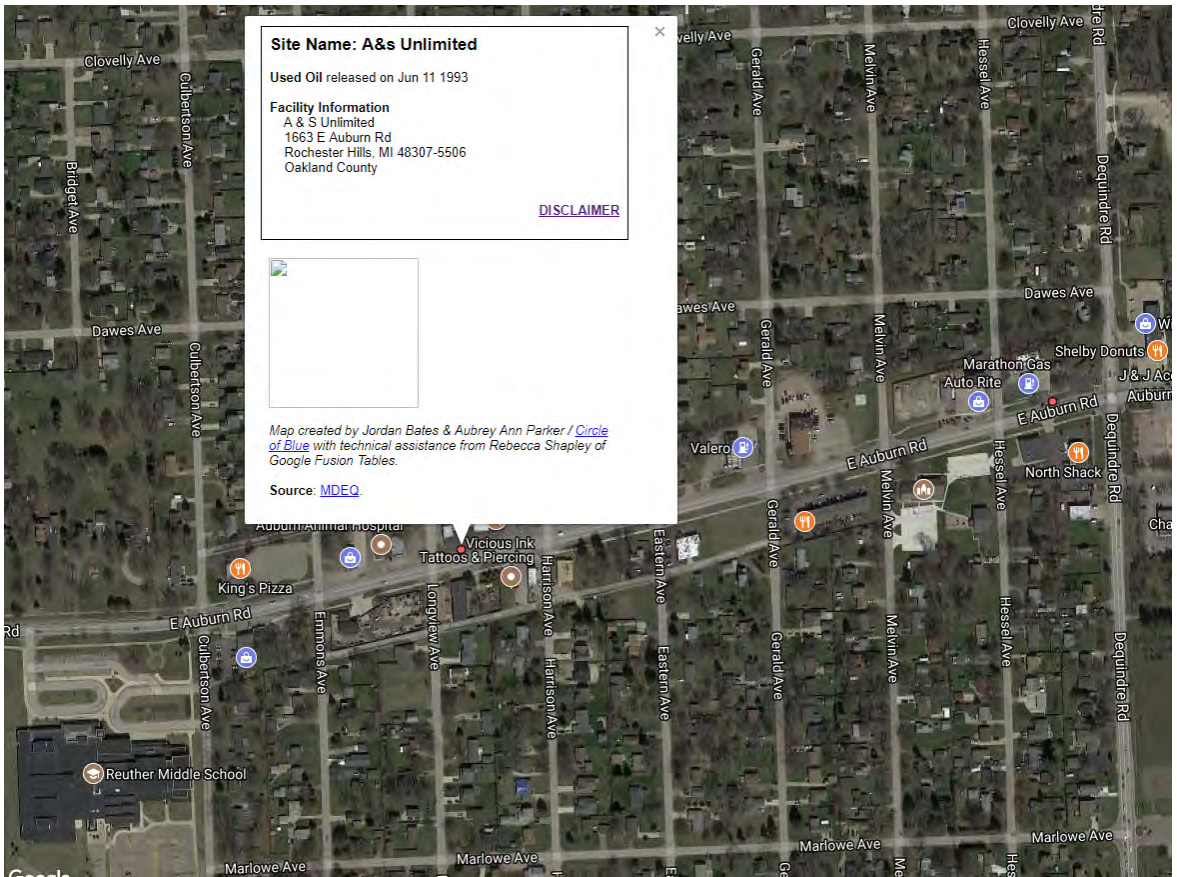


Map courtesy of MDEQ

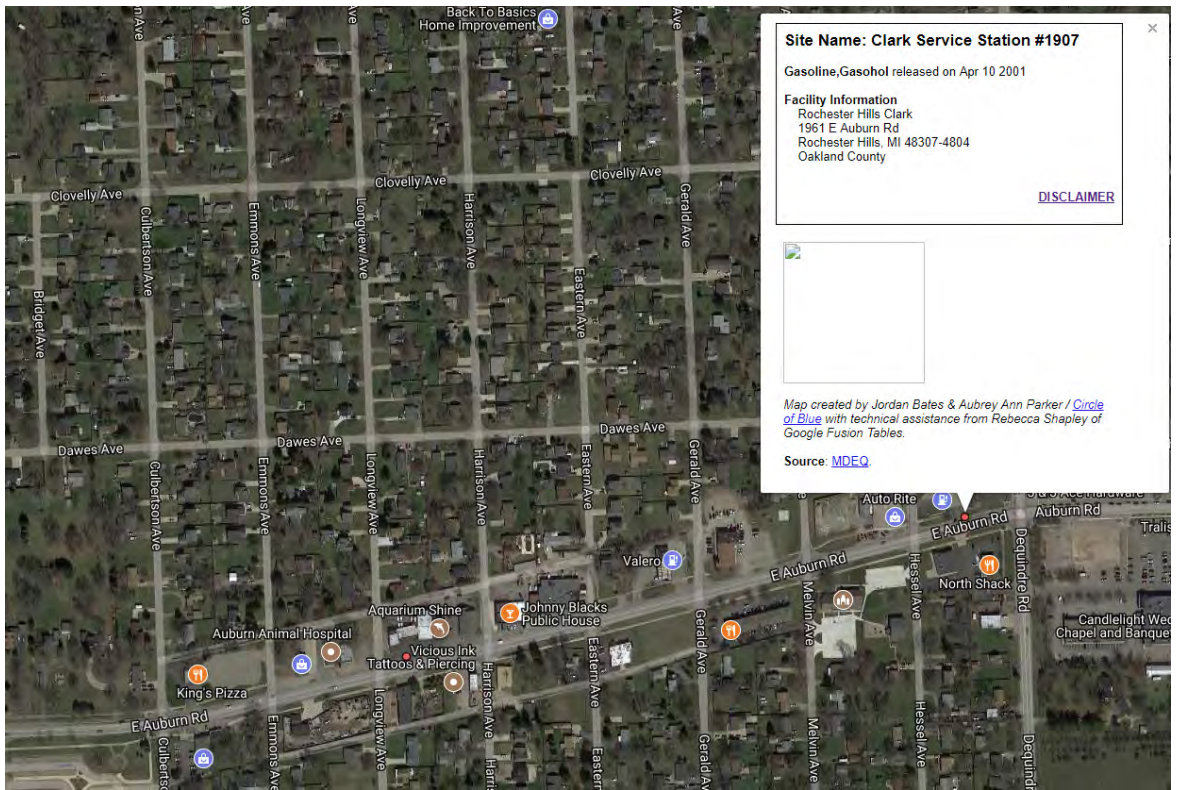
According to Michigan's Active Leaking Underground Storage Tanks (LUST) from MDEQ, two known properties along the proposed corridor have had oil tank leaks in the past resulting in potential contamination of the soils on those sites. The first property is A & S Unlimited, located at 1663 E Auburn Rd. On June 11, 1993 there was a reported underground oil tank leak. The second property is Clark Service Station #1907 (Marathon), located at 1961 E Auburn Rd. On April 10, 2001 there was a reported underground gasoline leak.

See maps on next page that shows the locations and information from the MDEQ website for the two properties.





Map courtesy of MDEQ



Map courtesy of MDEQ

In addition, the DEQ's Environmental Mapper was utilized to determine all storage tank facilities along the corridor, regardless of whether or not they have had recorded leaks. As shown in the detailed summaries below, these facility and tank details summarize when and what actions have been taken with the tanks, the substance stored in them, the material of the piping and tank, as well as reported leaks of the tanks. Understanding of these underground tanks and their history helps to better predict potential contamination in the soils. As a result of these findings, handling and disposing of contaminated soils have been included in the project cost summary to address these potential areas of contamination (refer to Section 11 for more details).

**Facility and Tank Details**

**Facility Information:**  
 Facility ID 00037529  
 A & S Unlimited  
 1663 E Auburn Rd, Rochester Hills, MI 48307  
 Phone#: (313) 852-5515

**Owner Information:**  
 A & S Unlimited  
 1663 E Auburn Rd, Rochester Hills, MI 48307  
 Phone#: (313) 852-5515

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	1000	11/23/1987 12:00:00 AM	Used Oil			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
2	Removed from Ground	4000	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
3	Removed from Ground	4000	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
4	Removed from Ground	2500	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
5	Removed from Ground	2500	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
6	Removed from Ground	6000	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No

**Release Information**

(NOTE: Release information is updated regularly. For more information on releases, contact: [DEQ - Leaking Underground Storage Tank Program](#))

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0764-93	A&S Unlimited	06/11/1993	Used Oil	Open			

**Facility and Tank Details**

**Facility Information:**  
 Facility ID 00037529  
 A & S Unlimited  
 1663 E Auburn Rd, Rochester Hills, MI 48307  
 Phone#: (313) 852-5515

**Owner Information:**  
 A & S Unlimited  
 1663 E Auburn Rd, Rochester Hills, MI 48307  
 Phone#: (313) 852-5515

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	1000	11/23/1987 12:00:00 AM	Used Oil			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
2	Removed from Ground	4000	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
3	Removed from Ground	4000	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
4	Removed from Ground	2500	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
5	Removed from Ground	2500	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No
6	Removed from Ground	6000	11/23/1987 12:00:00 AM	Gasoline			Unknown	Suction: No Valve At Tank	Asphalt Coated or Bare Steel,Unknown	No

**Release Information**

(NOTE: Release information is updated regularly. For more information on releases, contact: [DEQ - Leaking Underground Storage Tank Program](#))

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0764-93	A&S Unlimited	06/11/1993	Used Oil	Open			

**Facility and Tank Details**

**Facility Information:**  
 Facility ID 00019494  
 Auburn Hill LLC  
 1788 Auburn Rd, Rochester Hills, MI 48063  
 Phone#: (248) 475-8015

**Owner Information:**  
 S Stars Alliance LLC  
 1897 Sunset Dr, Bloomfield Hills, MI 48302  
 Phone#: (248) 425-8015

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Currently In Use	15000	5/7/1980 12:00:00 AM	Gasoline	Inventory Control, Automatic Tank Gauging	Line Tightness Testing	Fiberglass Reinforced Plastic	Pressure	Cathodically Protected Steel	No
2	Currently In Use	15000	5/7/1980 12:00:00 AM	Gasoline	Inventory Control, Automatic Tank Gauging	Line Tightness Testing	Fiberglass Reinforced Plastic	Pressure	Cathodically Protected Steel	No
3	Currently In Use	20000	1/1/1998 12:00:00 AM	On Road/Off Road Diesel	Inventory Control, Automatic Tank Gauging	Automatic Line Leak Detectors	Fiberglass Reinforced Plastic, Double Walled	Pressure	Fiberglass Reinforced Plastic	No
02-03-04	Removed from Ground	4000	5/7/1980 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No
02-04-04	Removed from Ground	4000	5/7/1980 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No
02-05-04	Removed from Ground	4000	5/7/1980 12:00:00 AM	Diesel			Galvanized Steel		Asphalt Coated or Bare Steel	No
02-06-04	Removed from Ground	4000	5/7/1980 12:00:00 AM	Diesel			Galvanized Steel		Asphalt Coated or Bare Steel	No
02-07-04	Removed from Ground	4000	5/7/1980 12:00:00 AM	Kerosene			Galvanized Steel		Asphalt Coated or Bare Steel	No

**Release Information**

(NOTE: Release information is updated regularly. For more information on releases, contact: [DEQ - Leaking Underground Storage Tank Program](#))

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-1326-98	Rochester Mini Mart	12/28/1988	Unknown	Closed	03/11/2002	Tier 1 Evaluation	NONE



**Facility and Tank Details**

**Facility Information:**  
 Facility ID 00012306  
 Brazeal Acquisitions, LLC  
 1961 E Auburn Rd, Rochester Hills, MI 48307  
 Phone# (248) 425-7225

**Owner Information:**  
 Simon Rochester Hills 1961 E Auburn LLC  
 21501 Ecorse Rd, Taylor, MI 48180  
 Phone# (313) 663-3500

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	10000	5/2/1972 12:00:00 AM	Gasoline	Automatic Tank Gauging	Automatic Line Leak Detectors, Line Tightness Testing	Double Walled, Fiberglass reinforced plastic	Pressure	Asphalt Coated or Bare Steel, Lined Interior	No
2	Removed from Ground	10000	5/2/1972 12:00:00 AM	Gasoline						No
3	Currently In Use	12000	8/1/2001 12:00:00 AM	Gasoline	Automatic Tank Gauging	Automatic Line Leak Detectors, Line Tightness Testing	Piping Material = SW Fiberglass, Fiberglass Reinforced Plastic, Double Walled	Pressure	Fiberglass Reinforced Plastic, Lined Interior, Double Walled	No
4	Currently In Use	12000	8/1/2001 12:00:00 AM	Gasoline	Automatic Tank Gauging	Automatic Line Leak Detectors, Line Tightness Testing	Piping material = SW Fglass, Fiberglass Reinforced Plastic, Double Walled	Pressure	Fiberglass Reinforced Plastic, Double Walled	No

**Release Information**

(NOTE: Release information is updated regularly. For more information on releases, contact: [DEQ - Leaking Underground Storage Tank Program](#))

Leak ID	LUIST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0218-01	Clark Service Station #1907	04/10/2001	Gasoline, Gasohol	Open			
C-0097-17	Brazeal Acquisitions, LLC	02/13/2017	Gasoline, Gasoline	Open			

## Section 5: Utility Evaluation

### Utilities

Overhead and underground utilities were requested for the corridor through the Miss Dig Design Ticket system. Requests were made for both for Auburn Road and the north and south alleys. The following utilities returned information.

1. Comcast
2. Oakland County Water Resources Commission
3. AT&T
4. Consumers Distribution
5. Detroit Edison – Electric
6. ITC

Of these, the following utility companies have facilities in the corridor

1. Comcast
2. Oakland County Water Resources Commission
3. AT&T
4. Consumers Distribution
5. Detroit Edison – Electric

It is anticipated the road footprint will significantly change in the corridor. With these improvements come a significant amount of excavation in the corridor, mainly to place the new storm sewer system. Excavation and underground sewer placement causes concern that there could be conflicts with existing utilities, both anticipated and unanticipated. These conflicts can delay the project and increase project costs.

The City's water main is located on the south side of Auburn Road and there are sanitary sewers in each alley. Water service leads from the south side main cross the existing road to the north side businesses.

An evaluation was made to see how much the road could be lowered to eliminate the existing condition where the road is currently higher than some business door sills. This is not an optimal condition, and one that a designer would look to rectify by lowering the proposed road elevation. While some lowering could occur, removing cover over the top of the existing water main can lead to the freezing of the main during winter months. The water main was built in the early 1980's still with much service life remaining, so this utility was decided to be left in place and not lowered (replaced). As such, the proposed road elevation will be balanced between trying to lower the road to be lower than the door sills and high enough not to become too shallow and freeze. Fire hydrant locations and frequency will have to be investigated to determine if more hydrants are needed and if the current locations may not be in the optimal locations.

Many of the private utilities are located in the alleys both north and south of Auburn Road. Only the Consumers gas main is located within the Auburn Road ROW and is located on the north side of the road. This is a 6" steel, medium pressure gas main. This utility could be impacted by the roadwork. The road design will attempt to avoid conflicts. Coordination with Consumers Energy will be required to obtain the proper information in a timely manner.

The utilities located in the alleys also could be in conflict with the proposed work depending on the work required. The location of the utility poles affect the width of the alley. From the business meetings it was understood that many of the businesses prefer two way alley traffic to be maintained. Standards require the



alley to be 20' wide. The right-of-way in the south side alley is 20'. It would be desired to have any utility poles located adjacent to the property lines with the residential properties on both the north and south alleys. This would leave about 18' of useable width for the alley. Poles not located right adjacent to the property lines would reduce the useable width of the alley. This issue will be required to discuss further. One-way alleys could be signed, but are not preferred by the business owners. Reduced width two-way alleys may be an option but would be substandard.

Improved drainage may also be required in the alleys. City sanitary sewers on both sides of the road are located in the alleys making the addition of new storm sewer more susceptible to conflict. Tipping the cross section of the alley pavement in one direction may be a way to place the alley storm on the outside edge of the alley, but easements may be required to maintain the sewer in the future if located at the edge of the city property.

The known utilities are shown on the Base Maps in Section 15. Vertical information on buried utilities have not been provided, but will need to be known once detailed design starts.

## Section 6: Traffic Analysis and Crash Report

This analysis is intended to provide a summary of the findings of the crash analysis performed for Auburn Road, from Culbertson Avenue to Dequindre Road, in Rochester Hills, Michigan. This segment of Auburn Road is approximately one half (½) mile in length, and is generally a two-lane roadway with a left turn lane approaching the signalized intersections at Culbertson Avenue and at Dequindre Road.

The primary focus of this analysis was to identify high crash locations and potentially correctable crash patterns. Particular attention was given to head-on and angle crashes, which tend to result in more serious injuries and greater property damage.

Crash data for the analysis was obtained from the Traffic Improvement Association's (TIA) Crash Analysis Tool (TCAT) software, which provides crash summary data as well as detailed traffic crash reports (UD-10s). The crash data encompassed a period of five full years spanning January 1, 2012 through December 31, 2016.

The crash analysis included two primary components: an intersection crash analysis and a segment crash analysis. The segment analysis encompassed approximately 2300 feet on Auburn Road, beginning 200 feet east of Culbertson and ending 200 feet west of Dequindre Road. The intersection crash analysis included all crashes that occurred within a 200' radius of the signalized intersections of Auburn Road at Culbertson Avenue, and Auburn Road at Dequindre Road.

### INTERSECTION CRASH ANALYSES

A crash analysis was performed for each of the two signalized intersections on Auburn Road: Auburn Road at Culbertson Avenue, and Auburn Road at Dequindre Road. A summary of the intersection crash data is shown in Table 1.

**TABLE 1: Summary of Segment Crash Data (2012-2016)**

Auburn Road, Culbertson Avenue to Dequindre Road <sup>1</sup>											
Intersection	Crash Type							Injuries			
	Side Swipe	Head-On & Head-On Left-Turn	Angle	Rear End	Single Vehicle	Other	TOTAL	Fatal	A-Level (Incapacitating)	B-Level (Non-Incapacitating)	C-Level (Possible)
	Auburn Road & Culbertson Avenue	0	0	3	5	3	2	13	0	0	0
Auburn Road & Dequindre Road	4	5	16	27	0	8	60	0	0	3	12
<b>TOTAL</b>	<b>4</b>	<b>5</b>	<b>19</b>	<b>33</b>	<b>3</b>	<b>10</b>	<b>73</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>14</b>
<b>% TOTAL</b>	<b>5%</b>	<b>7%</b>	<b>26%</b>	<b>45%</b>	<b>4%</b>	<b>14%</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>	<b>4%</b>	<b>19%</b>

<sup>1</sup> Several crashes occurred on M-59 (divided highway) but were mistakenly located as on Auburn Road by TCAT software. These crashes have been manually reviewed and removed from the crash totals.

The following provides an intersection-by-intersection summary of the crash data:

1. Auburn Road & Culbertson Avenue:

There were 13 total crashes during the study period within a 200 foot radius of the intersection. The prominent crash type was rear-end, with five rear-end crashes over a span of five years. There were no crashes at this location that resulted in fatality, Type A (incapacitating), or Type B (non-incapacitating) injury within this time frame. However, there was one crash involving a pedestrian, and one crash involving a bicyclist. Particular attention was given to pedestrian and bicycle crashes at this location, due to the presence of Reuther Middle School on the southwest quadrant.

One of the single vehicle crashes involved an 11 year old pedestrian crossing the north side of Culbertson Avenue at the crosswalk at 7:20 a.m., and was struck by a vehicle turning left from eastbound Auburn Road onto Culbertson. This crash was classified as a C-injury.

The bicycle crash was classified as Other/Unknown crash type, and involved a 15 year old bicyclist crossing the west side of Auburn Road at the crosswalk at 2:11 p.m. The bicycle was struck by a vehicle traveling westbound. This crash was also classified as a C-injury.

2. Auburn Road & Dequindre Road:

There were 60 total crashes during a five-year lookback within a 200 foot radius of the intersection. There were 27 rear-end crashes, and 16 angle crashes during the study period. These crash types are often associated with signalized intersections. There were no crashes involving a pedestrian or bicyclist at this location. There were no fatalities or Type A (incapacitating) injury crashes observed, 3 Type B (non-incapacitating) injury crashes, and 9 Type C (possible) injury crashes.

All of the head-on crashes involved a left-turning vehicle at the signalized intersection, with two crashes occurring between northbound/southbound vehicles, and the other two in the eastbound/westbound directions.

The rear-end crashes were well distributed amongst all four approaches, with eight crashes occurring in the northbound and southbound directions each, six in the westbound direction, and five eastbound. Nearly all of these occurred on the approach to the signal, which is not unexpected, as vehicles typically slow to a stop as the signal cycles.

In total, there were 15 crashes which involved a vehicle turning left at the intersection, with no discernible pattern as to direction of travel, time of day, or weather conditions. There are currently left turn lanes and 3-level left turn heads provided for all approaches, as well as supplemental low-level left turn signal heads.

Consideration should be given to improving signal conspicuity at this location, which may help reduce signal-related crashes. This intersection may be a candidate for traffic signal modernization. Potential measures could include modernizing the existing signal to a box-span configuration, and adding signal backplates with retroreflective borders, and using four-level flashing yellow arrows if permissive left turns are provided. Reviewing and updating clearance interval signal timings is recommended as part of a signal modernization project.

## **SEGMENT CRASH ANALYSIS**

There were a total of 53 crashes over a five-year span that occurred within the study area, and that were not in the immediate vicinity of a signalized intersection. Crash rates on road segments are typically expressed as number of crashes per 100 million vehicle miles traveled. The average annualized daily traffic on Auburn Road is approximately 12,000 vehicles, which equates to a crash rate of 484 crashes per 100 million vehicle miles

(MVM) traveled. The rate of fatal (Type K) and serious (Type A) injury crashes for this segment is 27 crashes per 100 MVM.

According to the Southeast Michigan Traffic Safety Plan, dated December 2015, published by the Southeast Michigan Council of Governments (SEMCOG), the SEMCOG regional average of combined fatal and Type A injury crashes is 5.81 per 100 MVM, while the Oakland County rate is 4.45 crashes per 100 MVM. This segment significantly exceeds this threshold.

A summary of the segment crashes is shown below in Table 2.

**TABLE 2: Summary of Segment Crash Data (2012-2016)**

Auburn Road, Culbertson Avenue to Dequindre Road <sup>1</sup>											
Intersection	Crash Type							Injuries			
	Side Swipe	Head-On & Head-On Left-Turn	Angle	Rear End	Single Vehicle	Other	TOTAL	Fatal	A-Level (Incapacitating)	B-Level (Non-Incapacitating)	C-Level (Possible)
<b>TOTAL</b>	<b>3</b>	<b>3</b>	<b>10</b>	<b>28</b>	<b>5</b>	<b>4</b>	<b>53</b>	<b>1</b>	<b>2</b>	<b>7</b>	<b>9</b>
<b>% TOTAL</b>	<b>6%</b>	<b>6%</b>	<b>19%</b>	<b>53%</b>	<b>9%</b>	<b>8%</b>	<b>100%</b>	<b>2%</b>	<b>4%</b>	<b>8%</b>	<b>17%</b>

<sup>1</sup> Several crashes occurred on M-59 (divided highway) but were mistakenly located as on Auburn Road by TCAT software. These crashes have been manually reviewed and removed from the crash totals.

There was one crash that resulted in a fatality, and two crashes that resulted in Type A (incapacitating) injuries. Of the 53 crashes, three crashes involved a bicyclist and two involved a pedestrian.

The fatal crash occurred on March 29, 2014, when a 79 year old pedestrian in the roadway was struck by a vehicle traveling westbound on Auburn Road, between Longview Avenue and Emmons Avenue. The pedestrian was propelled forward and was subsequently struck by another vehicle. The crash occurred at approximately 8:30 p.m. on an unlighted section of roadway, on dry pavement surface.

Of the two Type A (incapacitating) injury crashes, one involved an eastbound motorcyclist on Auburn Road who sustained injury after “laying the bike down” to avoid an angle collision with another vehicle. This crash was classified as a single vehicle collision, but the other vehicle was traveling southbound on Hessel Road, crossing Auburn Road and failed to yield.

The other Type A (incapacitating) injury crash occurred on Auburn Road at Total Trailer, just west of Harrison Avenue. An eastbound dump truck turned left into the driveway, striking a concrete mixer truck traveling westbound. The concrete truck then went off the roadway, into the business parking lot, and struck a parked vehicle, which then caused the parked vehicle to pivot and strike and injure a pedestrian in the parking lot.

Several of the bicycle crashes resulted in Type B (non-incapacitating) or Type C (possible) injuries. Additionally, two of the bicycle crashes occurred in the vicinity of the alleys that run parallel to Auburn Road. In both crashes, a bicyclist using the alleyway failed to yield to vehicular traffic on a cross-street. One crash occurred on Eastern Avenue at the alley south of Auburn Road, the other occurred on Gerald Avenue and the alley north of Auburn Road.

## RECOMMENDATIONS

### Safety

Overall, this project is expected to improve safety along the Auburn Road corridor. Several elements of the proposed plan have resulted in demonstrated safety benefits on projects throughout the nation. For example, adding street lighting has been shown to reduce the number of crashes occurring at night and times of dawn/dusk.

The traffic calming measures proposed as part of this project are expected to reduce vehicular speeds along the corridor, potentially resulting in a decrease to the posted speed limit from 40 mph to 25 mph. If the traffic calming measures are successful in reducing vehicle speeds, the lower speeds are expected to result in fewer traffic crashes. Additionally, the severity of crash injuries typically decreases significantly when speeds are reduced.

This project also proposes to add on-street parking along Auburn Road. On-street parking can be considered another method of traffic calming, which helps to reduce vehicle speeds and thereby reducing crash frequency and severity. However, on-street parking also creates additional potential conflicts, which may increase crash frequency. It is difficult to measure the net impact that this will have on corridor safety. Installing roundabouts can be an effective measure used for traffic calming, as it requires vehicles to slow down to enter and traverse the intersection. When single lane roundabouts are used, the overall number of crashes are typically reduced by 30-50%, with a majority of the crashes resulting in property damage only. Proposed improvements that result in fewer injury crashes are considered a significant improvement to overall safety.

Another proposed project element is the installation of raised medians with marked crosswalks. These provide enhanced conspicuity to pedestrian crossings, shorten the distance and time that pedestrians are in conflict with vehicles in the roadway, and provide a place of refuge. The medians also help with traffic calming. Raised median islands typically result in a significant reduction in crashes involving pedestrians.

Overall, there were 126 crashes, including 1 fatality, and 35 injury crashes. Based on available police report data, the injury crashes consist of 2 Type A (incapacitating) injury crashes, 9 Type B (non-incapacitating) injury crashes, and 23 Type C (possible) injury crashes.

The road segment and intersections generally experienced typical crash frequency and patterns. However, the presence of a pedestrian fatality, and multiple injury crashes, including several pedestrian and bicycle crashes, offers evidence for the presence of non-motorized traffic. As part of the proposed Auburn Road project, opportunities to improve safety for non-motorized users should be considered.

Based on multiple bicycle crashes involving the alley ways, it appears that a follow-up review of this area and non-motorized users may be beneficial. A field review for potential sight distance obstructions was not performed as part of this study; it is unknown if such obstructions are present, and may have been a contributing factor to these crashes. If there are a significant number of bicyclists using the alley, adding signage to alert bicyclists of cross-traffic may help reduce the frequency of collisions. The Auburn Road is currently planned to have the area between the back of curb and ROW paved. This area is shown at 13' wide. This would allow for an area for bicyclists to more freely utilize the Auburn paved frontage for bike travel instead of the alleys. Alternately, pavement markings could be added to the road (sharrows) that indicate the roadway is to be shared between vehicles and bicyclists. This would encourage bicyclists to use the roadway instead of the alley.

At the intersection of Auburn Road and Dequindre Road, consideration should be given to improving signal conspicuity. A separate project that includes modernization of this signal has already been planned, and is

tentatively scheduled to occur in 2019. It is anticipated that the project to modernize the signal will include a box-span configuration, with additional signal improvements that have not yet been designed.

It is expected that the proposed improvements to this segment of road, will result in significant safety benefits for non-motorized users. Pedestrian crossing distances will be reduced, and it is anticipated that posted speed limits will decrease from 40 mph to 25 mph. Reduced vehicle speeds typically result in fewer severe injury and fatal-injury collisions.

#### Capacity

Future traffic projections for Auburn Road in this area would be expected to grow if redevelopment occurs with larger volume destinations created. However growth would not be expected to exceed the capabilities of a three lane road. Three lanes road reach their capacity at about 17,000 to 18,000 vpd.

In addition to the three lane option, the urban compact roundabout also has capacity restrictions. An urban compact roundabout will reach a maximum capacity at about 15,000 vpd. With current volumes of just under 12,000 vpd, traffic will need to increase about 30% above existing levels before this corridor would start to see level of service drop below acceptable levels.



## Section 7: Pavement Recommendations and Soil Conditions

### Existing Soil Conditions

Based upon the soil boring information provided by Testing Engineers & Consultants, Inc. (TEC), the existing soils along Auburn Road consist of granular, well-draining subgrade soils with a ground water table approximately 7– 8 ft below grade. A majority of these granular soils are a combination of coarse sand, fine sand, and trace gravel. Refer to the picture below for soil boring locations, in addition to the attached field logs for more information regarding these soil borings.



Proposed Soil Boring Locations (pavement cores green, soil borings red)

### Pavement Recommendations

The recommended material for the road is an asphalt (HMA) pavement with a two-foot wide concrete curb and gutter. Relatively low traffic (12,000 vpd two-way) and not a significant amount of major truck traffic makes HMA pavement a cost effective choice. Concrete pavement was not considered due to increased cost to construct, but is an alternative that can be considered.

OHM is recommending an All Weather HMA pavement section for the corridor. This section is based on axel loading per Act 300, P.S. 1949, as amended. An All Weather road requires that no soils be in place that are frost susceptible down to the frost line (42 inches). The All Weather road section requires 9 inches on HMA over an 8 inch aggregate base course. A Class B road was not considered to avoid enforcing load restrictions during the spring and fall freeze/thaw cycles, in addition to having businesses located on the corridor that require truck access year round. In addition, a Class B road is more susceptible to damage and typically have a shorter life span, whereas an All Weather road has a stronger pavement section that can better accommodate potential future growth along the corridor.

Because of how well these granular subgrade soils drain vertically, in addition to the water table being below 42 inches, underdrain will not be needed for this pavement section.

The alley and parking pavement section is recommended to be 6 inches of HMA over 8 inches of aggregate base. Along this corridor, five segments of alleys are being proposed for improvements. Three blocks on the north side, two on the south side. See Base maps in Section 15 for these locations.

In addition to mainline and alley-way improvements, numerous side streets will need to be improved as well. These improvements are required to add parking along the east and west side of the street to provide additional parking. The side street pavement section is recommended to be 6 inches of HMA over 8 inches of aggregate base.

*1993 AASHTO PAVEMENT DESIGN/ FLEXIBLE STRUCTURAL DESIGN MODULE*

*Auburn Road – Culbertson to Dequindre*

*City of Rochester Hills*

*Simple ESAL Calculation*

---

Performance Period (years).....	20
Two – Way Daily Traffic (ADT).....	11,795
% Heavy Trucks (of ADT) FHWA Class 5 or Greater.....	3.0
Number of Lanes in Design Direction.....	1
% of All Trucks in Design Lane (%).....	100
% Trucks In Design Direction (%).....	50
Average Initial Truck Factor (ESALs/truck).....	0.544
Annual Truck Factor Growth Rate (%).....	0
Annual Truck Volume Growth Rate (%).....	1.0
Growth:.....	Simple
Total Calculated Cumulative ESALs.....	773,563

*Design Structural Number Calculation*

---

18-kip ESALs Over Initial Performance Period.....	773,563
Initial Serviceability.....	4.2
Terminal Serviceability.....	2.5
Reliability Level (%).....	90
Overall Standard Deviation.....	0.45
Roadbed Soil Resilient Modulus (PSI).....	5,000
Stage Construction.....	1
Calculated Design Structural Number.....	4.10

*Specified Layer Design*

---

Layer	Material Description	Structural Coefficient	Drainage Coefficient	Thickness (in)	Calculated SN
1.	HMA 5E3	.42	1.0	2.5	1.05
2.	HMA 4E3	.42	1.0	3.0	1.26
3.	HMA 3E3	.42	1.0	3.5	1.47
4.	Aggregate Base	.14	1.1	8.0	1.23
	<i>Total</i>				<i>5.01</i>



# Testing Engineers & Consultants, Inc.

1343 Rochester Road • PO Box 249 • Troy, Michigan 48099-0249

(248) 588-6200 or (313) T-E-S-T-I-N-G

Fax (248) 588-6232

soil borings

soil evaluation

foundation investigation

instrumentation

BORING NO. B-1 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.

Ground Surface (Elev.) \_\_\_\_\_

Datum 550, Solids

CLIENT City R.H.Hills Location: R.H.Hills

Started 11/5/17 Completed 11/5/17

Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
	0-1	LS	ASPHALT					
	1-1	LS	Moist fine sand/some gravel					
	1-3	LS	Loose moist br sand/trace gravel					
	3-10	LS	Loose moist fine sand					
	10-30		EOR 10, 12, GW					

DRAFT

- "N" • Standard Penetration Resistance
- S.S. • 2" O.D. Split Spoon Sample
- L.S. • Sectional Liner Sample
- S.T. • Shelby Tube Sample
- B.S. • Bottle Sample
- H.S. • Hausel Sample

- W • 11-0% of dry weight
- $\gamma_n$  • Natural Density-lbs. cu. ft.
- $q_u$  • Unconfined Compression lbs. sq. ft.
- W.L. • Water Level
- "H-N" • Hausel Penetration Resistance

Boring No. B-1



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BORING NO. B-2+14 JOB NO. 58386 PROJECT Auburn Rd. Improvmts

Ground Surface (Elev.) \_\_\_\_\_

Datum 550, Solids

CLIENT City R. Hills Location: R. Hills

Started 11/4/17 Completed 11/4/17

Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
#2	0	LS	0'-5"	Asphalt				
	5	LS	5'-11"	Moist br sand, crushed conc.				
	11	LS	11'-3"	M. Com moist br sand, trace gravel				
	15	LS	3'-5"	Loose moist br coarse sand trace gravel				
				E.O.B. 5' No GW.				
#14	15	LS	0'-3"	Asphalt				
	20	LS	3'-3"	Comp moist br sand, some gravel crushed conc.				
	25	LS	3'-5"	Loose moist br clayey sand trace gravel				
				E.O.B. 5' No GW				

DRAFT

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hand Sample
- W - 110% of dry weight
- $\gamma_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Hand Penetration Resistance

Boring No. B-2+14





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BORING NO. B-3 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.

Ground Surface (Elev.) \_\_\_\_\_

Datum 550, Solids

CLIENT City R.H.H.S Location: R.H.Hills

Started 11/4/17 Completed 11/4/17

Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
			0'-1.25	Asphalt				
			1.25'-1.3	Moist br sand, some gravel				
			1.3'-3	M. Comp moist br sand, fine gravel				
			3'-8	Loose moist br. fine sand				
			8'-10	M Comp moist br med. sand trace gravel				
				E.O.B. 10' NO GW.				

**DRAFT**

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hoop Sample

- W - 11-0% of dry weight
- $\gamma_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Hausel Penetration Resistance

Boring No. B-3



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soil borings

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foundation investigation

instrumentation

BORING NO. B-4 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.  
 Ground Surface (Elev.) \_\_\_\_\_  
 Datum 550, Solids  
 CLIENT City R. Hills Location: R. Hills  
 Started 11/5/17 Completed 11/5/17  
 Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE	"N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\delta n$	$q_u$
	0			0-5'	ASPHALT				
	5	S	23	5'-3'	M. Comp. silty fine sand trace gravel				
	5	S	23	3'-5.5'	loose moist fine sand trace gravel				
	10	S	10	5.5'-8'	M. Comp. silty fine sand clayey seams				
	10	S	14	8'-10'	M. Comp. silty fine sand trace gravel E.O.R. 10' 11a GW				
	15								
	20								
	25								
	30								

**DRAFT**

"N" - Standard Penetration Resistance  
 S.S. - 2" O.D. Split Spoon Sample  
 L.S. - Sectional Liner Sample  
 S.T. - Shelby Tube Sample  
 B.S. - Bottle Sample  
 H.S. - Housel Sample

W - 110% of dry weight  
 $\delta n$  - Natural Density lbs. cu. ft.  
 $q_u$  - Unconfined Compression lbs. sq. ft.  
 W.L. - Water Level  
 'H-M' - Housel Penetration Resistance

Boring No. B-4



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foundation investigation

instrumentation

BORING NO. B-9+5 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.  
 Ground Surface (Elev.) \_\_\_\_\_  
 Datum 550, Solids  
 CLIENT City R.Hills Location: R.Hills  
 Started 11/6/17 Completed 11/6/17  
 Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE	"N"	STRATA CHANGE	SOIL CLASSIFICATION	W.L.	W	$\gamma_n$	$q_u$
# 9	0	LS	16	0-6"	Asphalt				
	6	LS	10	6"-12"	Moist br sand, some crushed conc.				
	1.2-4'	LS	9		M. Comp, moist br sand, some trace gravel				
	4-5'	LS	9		M. Comp, moist gray fine sand				
					E.O.B. 5' No GW.				
# 5	15	LS	15	0-4.5"	Asphalt				
	15.5	LS	15	4.5"-1.1'	Moist br sand, some gravel				
	19	LS	12	1.1'-2'	Loose moist br sand, trace gravel				
	20	LS	12	2'-5'	Very loose moist br sand, trace gravel				
					E.O.B. 5' NOGW.				

DRAFT

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Housel Sample
- W - 110% of dry weight
- $\gamma_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Housel Penetration Resistance

Boring No. B-9+5





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soil evaluation

foundation investigation

instrumentation

BORING NO. B-6+15 JOB NO. 58386 PROJECT Auburn Rd. Improvmts  
 Ground Surface (Elev.) \_\_\_\_\_  
 Datum 550, Solids  
 CLIENT City R.Hills Location: R.Hills  
 Started 11/6/17 Completed 11/6/17  
 Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE	"N"	STRATA CHANGE	SOIL CLASSIFICATION	W.L.	W	$\gamma_n$	$q_u$
#6	0-7.25			Asphalt					
	7.25-15			Concrete					
	15-20	LS		Moist br. sand, some gravel					
	20-2	LS		M. Comp, moist br. sand, trace gravel					
	3-5			Loose moist br. med. sand, trace gravel					
					E.O.B. 5' No GW.				
#15	0-8.5			Asphalt					
	8.5-15.5			Concrete					
	15.5-22	LS		Moist br. sand, some gravel					
	22-4	LS		Loose moist br. sand, trace gravel					
	4-5			Loose moist br. fine sand, clayey seam					
					E.O.B. 5' No GW.				

**DRAFT**

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hand Sample
- W - 100% of dry weight
- $\gamma_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Hand Penetration Resistance

Boring No. B-6+15





# Testing Engineers & Consultants, Inc.

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

soil borings

soil evaluation

foundation investigation

instrumentation

BORING NO. B-1147 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.  
 Ground Surface (Elev.) \_\_\_\_\_  
 Datum 550.5010  
 CLIENT City R.Hills Location: R.Hills  
 Started 11/6/17 Completed 11/6/17  
 Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W <sub>L</sub>	W	δ <sub>n</sub>	q <sub>u</sub>
#11	0	589	0-25	Asphalt				
	2.5	589	2.5-5	M. Comp moist br. sand, trace gravel				
#17	3	233	3-5	Loose moist br. med sand, trace gravel				
	5			E.O.B. 5 / No GW.				
#17	15	18	0-6"	Asphalt				
	16	14	6"-13"	Moist br. sand, crushed conc.				
	17	9	13"-3'	M. Comp moist br. sand, trace gravel				
	20	232	3'-5'	Loose moist br. sand, trace gravel				
	20			E.O.B. 5 / No GW.				

**DRAFT**

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hoop Sample
- W - 110% of dry weight
- δ<sub>n</sub> - Natural Density-lbs. cu. ft.
- q<sub>u</sub> - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Housel Penetration Resistance

Boring No. B-1147



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Fax (248) 588-6232

soil borings

soil evaluation

foundation investigation

instrumentation

BORING NO. B-8 JOB NO. 58380 PROJECT Auburn Rd. Improvmts.

Ground Surface (Elev.) \_\_\_\_\_

Datum 550, Solids

CLIENT City R.Hills Location: R.Hills

Started 11/5/17 Completed 11/5/17

Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
	0		0-2.75	Asphalt				
	3.15	LS	3.15	M. Comp. moist br. sand, trace gravel				
	4.1	LS	4.1	M. Comp. moist br. sand with trace gravel				
	4.7	LS	4.7	M. Comp. moist med. sand, trace gravel				
	9.10	LS	9.10	M. Comp. moist br. fine sand				
				EOB: 10' No GW				
	15							
	20							
	25							
	30							

DRAFT

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hoop Sample
- W - H<sub>2</sub>O% of dry weight
- $\gamma_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Housel Penetration Resistance



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soil borings

soil evaluation

foundation investigation

instrumentation

BORING NO. B-13+10 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.

Ground Surface (Elev.) \_\_\_\_\_

Datum 550, Solids

CLIENT City R. Hills Location: R. Hills

Started 11/6/17 Completed 11/6/17

Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
13	0-5	LS	0-1.3	Asphalt				
			1.3-3	Moist br. sand, some gravel				
			3-5	M. Comp. moist br. sand, trace gravel				
				Loose moist br. sand, trace gravel				
				E.O.B. 5' No GW.				
10	15-25	LS	15-17	Asphalt				
			17-18	Moist br. sand, crushed conc.				
			18-19	M. Comp. moist br. sand, trace gravel				
			19-20	Loose wet br. sand				
			20-22	Hard st. grey clay, some silt				
			22-25	M. Comp. wet br. fine sand				
				E.O.B. 10', GW. 5'-6"-7'-3" Compl.				

DRAFT

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hoop Sample

- W - H<sub>2</sub>O% of dry weight
- $\gamma_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Housel Penetration Resistance

Boring No. B-13+10





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soil borings

soil evaluation

foundation investigation

instrumentation

BORING NO. B-12 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.

Ground Surface (Elev.) \_\_\_\_\_

Datum 550.50 solids

CLIENT City R.Hills Location: R.Hills

Started 11/5/17 Completed 11/5/17

Driller Ian Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
	0		0-2.5	Asphalt				
	2.5		2.5-3	M. Sandstone, some gravel				
	3		3-3.5	M. Sandstone, some gravel				
	5		3.5-6	M. Sandstone, some gravel				
	6		6-10	M. Sandstone, fine sand				
	10			EO.B. 10' NOGW				
	15							
	20							
	25							
	30							

**DRAFT**

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hoop Sample
- W - 11-0% of dry weight
- $\gamma_n$  - Natural Density- lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Hoop Penetration Resistance





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soil borings

soil evaluation

foundation investigation

instrumentation

BORING NO. B-16 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.

Ground Surface (Elev.) \_\_\_\_\_

Datum 550.50 solids

CLIENT City R.Hills Location: R.Hills

Started 11/5/17 Completed 11/5/17

Driller Ion Mickle

ELEV.	DEPTH IN FEET	SAMPLE TYPE "N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
	0		0-3'	Asphalt				
	3	LS	3-2'	M. Comp. moist. silty ls. sand, trace gravel				
	5	LS	2-3'	M. Comp. moist. silty ls. sand, trace gravel				
		LS	3-5'	Loose moist. silty fine sand				
		LS	5-8'	Loose moist. gray. ls. sand, trace gravel				
	10	LS	8-10'	Very loose wet gray sand				
				E.O.B. 10', GW-8'-7-8' sand				

DRAFT

- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - House Sample
- W - H<sub>2</sub>O% of dry weight
- $\gamma_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Hausel Penetration Resistance

Boring No. B-16



# Testing Engineers & Consultants, Inc.

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

soil borings

soil evaluation

foundation investigation

instrumentation

BORING NO. B-17 JOB NO. 58386 PROJECT Auburn Rd. Improvmts.

Ground Surface (Elev.) \_\_\_\_\_

Datum 550.50 Solids

CLIENT City R.Hills Location: R.Hills

Started 11/5/17 Completed 11/5/17

Driller Ion Mickle

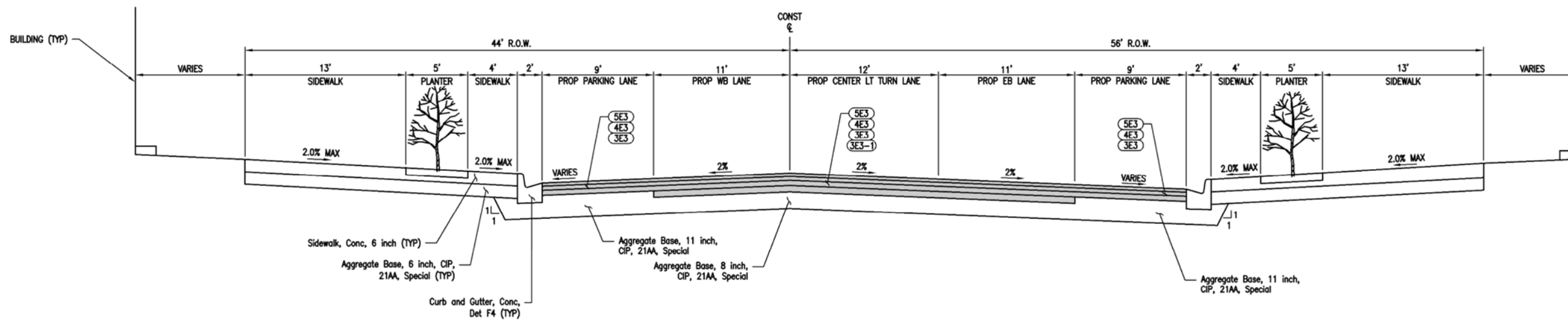
ELEV.	DEPTH IN FEET	SAMPLE TYPE	"N"	STRATA CHANGE	SOIL CLASSIFICATION	W. L.	W	$\gamma_n$	$q_u$
				0-4" ASPHALT					
		LS	3/2	4" 1' Concrete					
				1-17' Wettable sand, silty, fine, med. sand					
	5	LS	3/4	17-26' Very loose wet fine sand, fine gravel					
				28-55' Loose fine to med sand, clayey, silty					
		LS	4/1	55-8' M. Comp. med. to br. fine sand					
	10	LS	5/1	8-10' M. Comp. fine to med sand					
				E.O.B. 10' GW - 18' wet (10' to 7'-4" gravel)					
	15								
	20								
	25								
	30								

DRAFT

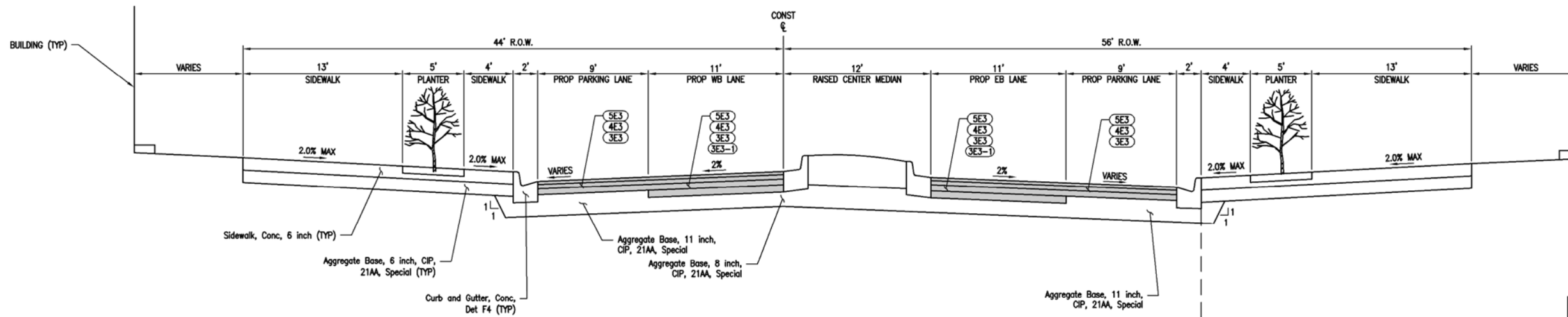
- "N" - Standard Penetration Resistance
- S.S. - 2" O.D. Split Spoon Sample
- L.S. - Sectional Liner Sample
- S.T. - Shelby Tube Sample
- B.S. - Bottle Sample
- H.S. - Hoop Sample
- W - H<sub>2</sub>O% of dry weight
- $\delta_n$  - Natural Density-lbs. cu. ft.
- $q_u$  - Unconfined Compression lbs. sq. ft.
- W.L. - Water Level
- "H-N" - Hoop Penetration Resistance

Boring No. B-17

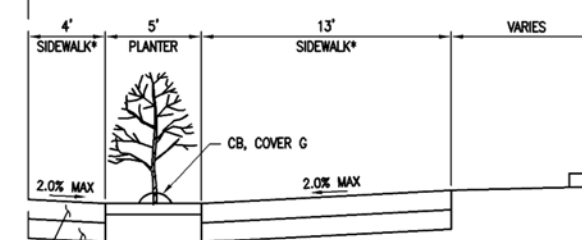
# Section 8: Proposed Typical Cross Sections



PROPOSED AUBURN RD TYPICAL #1  
(CENTER LEFT TURN LANE SECTION)



PROPOSED AUBURN RD TYPICAL #2  
(RAISED CENTER MEDIAN SECTION)



\*WIDTHS CAN VARY BASED ON DRAINAGE NEEDS  
BEHIND-THE-CURB DRAINAGE  
 TO APPLY: WHERE FINISH FLOOR ELEVATIONS ARE LOWER THAN THE PROP TOP OF CURB ELEVATION

PERMANENT HMA APPLICATION CHART					
SYMBOL	PAY ITEM	RATE (LB/SYD)	DEPTH (IN)	PERFORMANCE GRADE	REMARKS
5E3	HMA, 5E3	165 LB	1.5	64-22	TOP COURSE, AWI = 260 MINIMUM
4E3	HMA, 4E3	220 LB	2	64-22	LEVELING COURSE
3E3	HMA, 3E3	275 LB	2.5	58-22	BASE COURSE
3E3-1	HMA, 3E3	330 LB	3	58-22	BASE COURSE
-	-	0.05 - 0.15 GAL/SYD	-	TYPE SS-1h	BOND COAT - TO BE APPLIED BETWEEN EACH LIFT OF NEW PERMANENT HMA & EACH LIFT OF NEW TEMPORARY HMA (TYP)

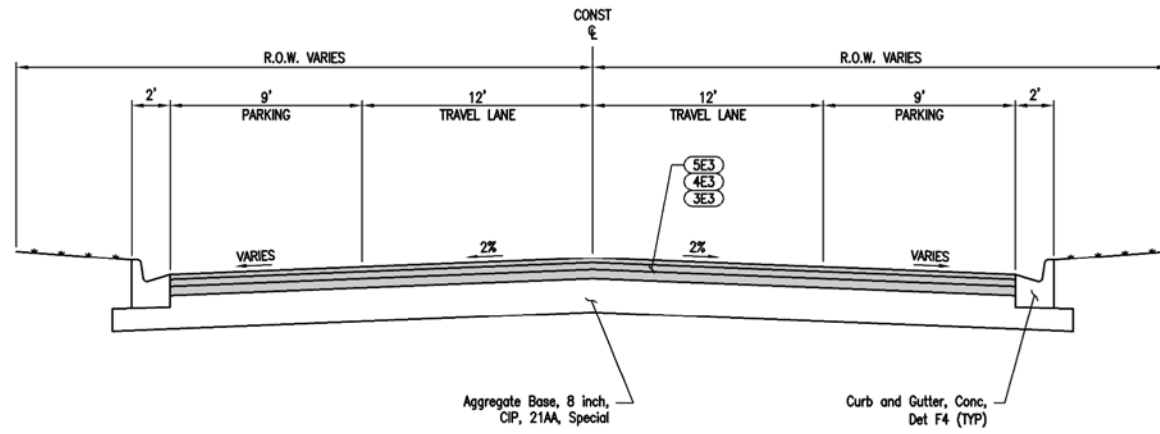
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DATE: 01/18/2018; PROJ NUMBER: 0190-01010; ENG: RLB; PROJ LEAD: RLB; COUNTY: OAKLAND; CITY: ROCHESTER HILLS; SCALE: 1"=10'; VERT DATUM: NAVD 1988; REVISIONS:

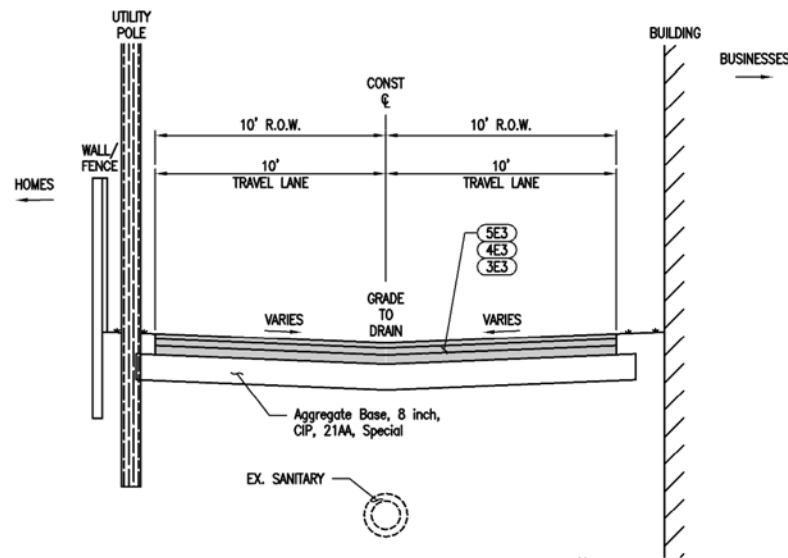
CITY OF ROCHESTER HILLS  
 AUBURN ROAD CORRIDOR IMPROVEMENTS  
 TYPICAL CROSS SECTIONS

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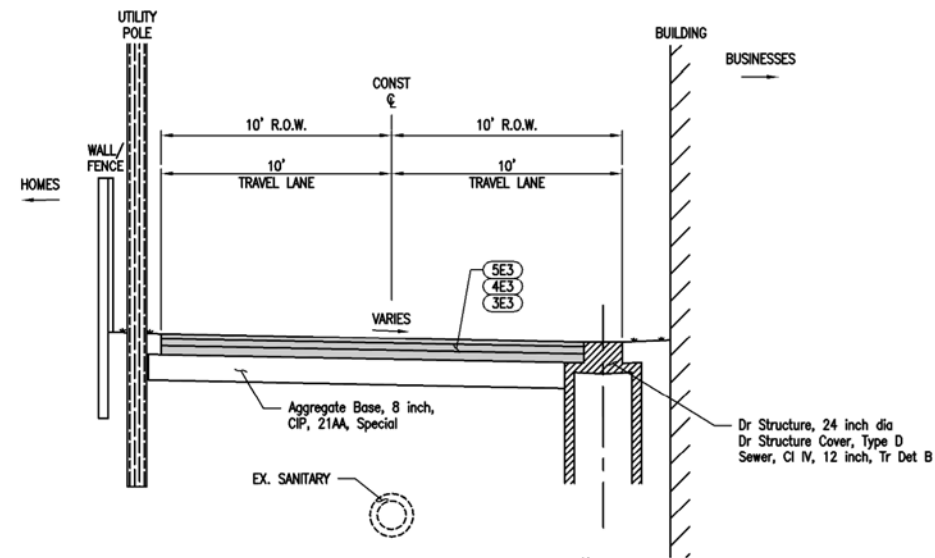




PROPOSED SIDE STREET TYPICAL



PROPOSED ALLEY TYPICAL #1  
 (EAST FACING NORTH ALLEY)



PROPOSED ALLEY TYPICAL #2  
 (EAST FACING NORTH ALLEY)

DRAWING PATH: P:\0166\_0200\0190170010\_Auburn\_Road\_EPE\_Study\Drawings\CivilTypical\17001CTYP.dwg Nov 15, 2017 - 2:52pm

DATE	PROJ NUMBER	ENG	PROJ LEAD	CAD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
01/19/17-02/10	019A-17-0210	ML	RL	RP	OAKLAND	CITY OF ROCHESTER HILLS	H. V.	IND 13	NAVD 1988

CITY OF ROCHESTER HILLS  
 AUBURN ROAD CORRIDOR IMPROVEMENTS  
 TYPICAL CROSS SECTIONS

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## Section 9: Right-of-Way Impacts

### Existing Right of Way (ROW)

The majority of the right-of-way (ROW) in the corridor is 100' wide, centered, with 50' on each side of the section line. Three properties on the north side between Hessel and Dequindre, have an additional 10', for a total of 60'. Refer to the plat maps, City GIS ROW maps, and tax maps attached in this Section for more details.

### Temporary Grading Permits

Temporary permissions for grading will be required for numerous parcels. These are needed for the following reasons:

1. For parcels without sidewalk, the new sidewalk that is built with the project should be built at an elevation that works best for the final product, which in some cases, will not match the existing ground elevations at the ROW. This will require grading beyond the ROW to correct this issue.
2. For removal of old driveways and to remove the look once access has been removed that there may still be a driveway out to Auburn Road.
3. Worked performed on private properties to add or correct impacts made by closing the driveway.
4. North side alley work (see below).

### Permanent Easements (Non-alleys)

1. The other locations requiring permanent ROW at this point in this project are permanent sidewalk easements associated with the roundabout concept. At these roundabout locations, the four corners formed at the intersections of Auburn with the side streets of Culbertson, Harrison and Melvin are affected. Sidewalk will need to be placed outside of the existing ROW at these locations to have continuous sidewalk access.

### Side Street Closures

During the prior LSL Study the City considered the closure of some of the adjacent local side streets that access Auburn Rd. As part of the general goal for improving access management, reducing the number of side street intersections was suggested in the Study. Given the short length of the blocks and number of street intersections in the corridor, this could provide benefit. It would allow for less space dedicated to left-turn lanes and, therefore, more opportunity for streetscape amenities. In addition, the area of ROW where the street is removed, could be used for other purposes such as parking or public plazas.

However, with the consideration of the roundabout option and the use of the alleys for property access, almost all of the driveways to Auburn road have been eliminated. In addition, the roundabouts would be utilized to achieve left turning movements out of the side streets, while and blocking side street through traffic at the non-roundabout intersections has accomplished many of the outcomes desired with the proposed closures.

If there was still a desire to close the side streets to create a common place for pedestrians to gather (such as a paved plaza), it was agreed upon that the common place should be centrally located along the corridor. This resulted in streets between (and including) Longview Ave to Gerald Ave to be further investigated as feasible options to close. In analyzing each side street closure, access to immediately adjacent properties was closely looked at. With access being cut-off directly from Auburn Rd, side street or rear alley access must be maintained. As a result, the following streets were eliminated as potential options to close:

- Longview Ave (north of Auburn) – Side street access must be maintained off of Longview Ave for American Grill and Patio
- Harrison Ave (north and south of Auburn) – In reference to the roundabout option, this street has a proposed roundabout intersection with Auburn Rd that requires side street access.

- Eastern Ave (north of Auburn) – Side street access must be maintained off of Eastern Ave for Total Trailer
- Gerald Ave (north of Auburn) – Side street access must be maintained off of Gerald Ave for Sunoco gas station.

The remaining side streets have potential to be closed, while still providing indirect access to adjacent properties through use adjacent side streets and alleys:

- Longview Ave (south of Auburn)
- Eastern Ave (south of Auburn)
- Gerald Ave (south of Auburn)

Since all potential side street closure locations are along the south side of Auburn Rd, Emmons Ave north of Auburn Rd, was also considered to provide balance to common places along the corridor (one each side of Auburn Rd). Emmons is a potential candidate because the City owns the northwest property of that intersection. In addition, the northeast property is vacant. All additional properties along Auburn Rd between Emmons Ave and Longview Ave will need to utilize Longview Ave to access their rear alleys for access to their property.

Overall, with the Roundabout option, we feel the side street closures are not required for improved access management. If the City desires to close some for the purposes of creating the public plazas or parking areas, then the location noted above are the potential locations. Detailed cost estimates were not completed, and would largely depend upon the scope of the plaza, but removal of the existing roadway and minimal restoration would likely be in the \$25k to \$50k range.

### **North Side Private Alleys and Roads**

With the Auburn Road improvements, several adjacent alleys and roadways are proposed for improvement, mainly to provide access and additional parking for the parking that is lost along the frontages. Some of these alleys and roads are not clearly dedicated for public ownership (see attached exhibit). The ownership of these as private, is defined by “Supervisor’s Plat of Brooklands Park”, “Supervisor’s Plat of Brooklands Park No. 1” & “Supervisor’s Plat of Brooklands Park No. 2”. Due to this issue there are several options available:

Option #1: Prepare a Joint Access Agreement/Easement over the affected private roads and alleys. The adjacent property owners should sign off on these easements and the Homeowner’s Associations for each Plat should be approached to get their buy-in.

Potential Issues:

- Issues unknown at this time

Option #2: In the case of “Supervisor’s Plat of Brooklands Park”, where lot lines extend to the centers of roads and alleys, dedicate the portions of roads and alleys to be improved as public.

Potential Issue:

- This would require a replat, with a circuit judge signing off.

Option #3: In the case of “Supervisor’s Plat of Brooklands Park No. 1”, where the roads and alleys are dedicated as private, dedicate the portions of roads and alleys to be improved as public.

Potential Issue:

- This would require a replat, with a circuit judge signing off.

From a Professional Surveyor’s perspective: Option #1 seems to be the most viable route to explore at this point.

It is also recommended that an Attorney practiced in Real Estate Law be consulted moving forward.



# AUBURN RD ALLEY OWNERSHIP



**OHM**  
ARCHITECTS ENGINEERS PLANNERS  
34000 Plymouth Road  
Livonia, MI 48150  
P (734) 522-6711 | F (734) 522-6427  
OHM-ADVISORS.COM



CULBERTSON AVE

EMMONS AVE

LONGVIEW AVE

HARRISON AVE

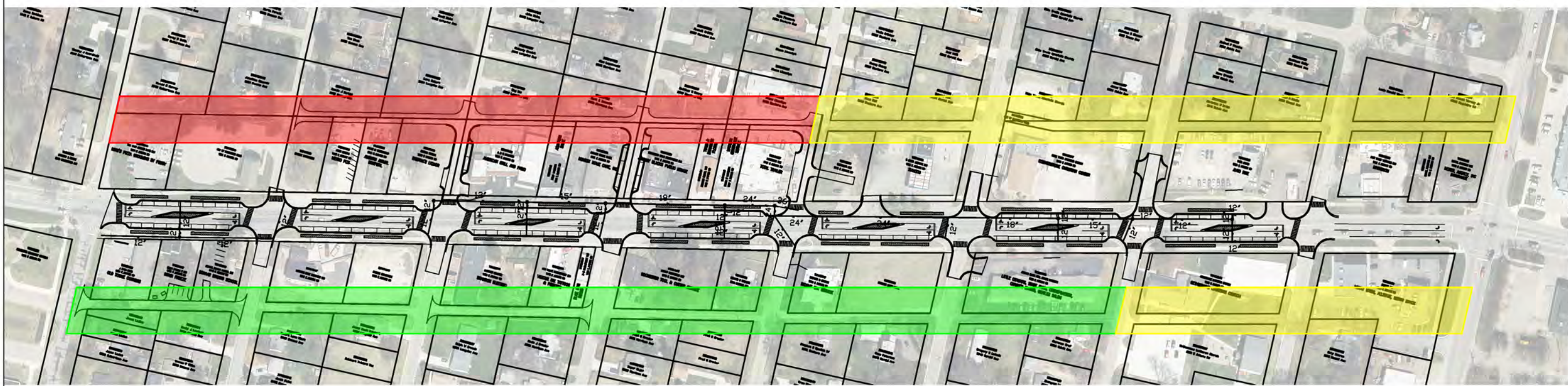
EASTERN AVE

GERALD AVE

MELVIN AVE

HESSEL AVE

DEQUINDRE RD



PRIVATE ALLEY



PUBLIC ALLEY



PUBLIC ALLEY (NO EXISTING ALLEY PRESENT)

DRAWING PATH: P:\0166\_0220\0190\0100 Auburn\_Road\_EPE\_Study\Drawings\Civil\Auburn\_Road\_EPE\_Study\0190\0100 Auburn\_Road\_EPE\_Study.dwg Nov 05, 2017 7:10:20am

SHEET	DATE	PROJ NUMBER	ENG	PROJ LEAD	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
1	01/17/2018	0190-0100	ML	RO	JP	OWA	CITY OF ROCHESTER HILLS	N	V	NAVD 1988

CITY OF ROCHESTER HILLS  
AUBURN ROAD CORRIDOR IMPROVEMENTS  
AUBURN RD - ALLEY OWNERSHIP

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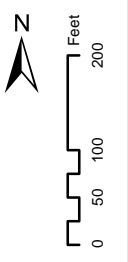


Additional copies can be obtained from:  
 Oakland County One Stop Shop  
 2100 Pontiac Lake Rd. Bldg. 41 West  
 Waterford, Michigan 48328  
 www.advantageoakland.com  
 (248) 858-0721

The information contained herewith has been compiled from recorded deeds, plats, tax maps, surveys and other public records. It is not a legally recorded map or survey and is not intended to be used as one. Users should consult the information sources mentioned above when questions arise.

**Legend**

- Sec Corner
- Swamp or Marsh
- Lake
- Lot or Unit
- Sec Line
- Tax Parcel Line
- Common Area
- Subdivision Line



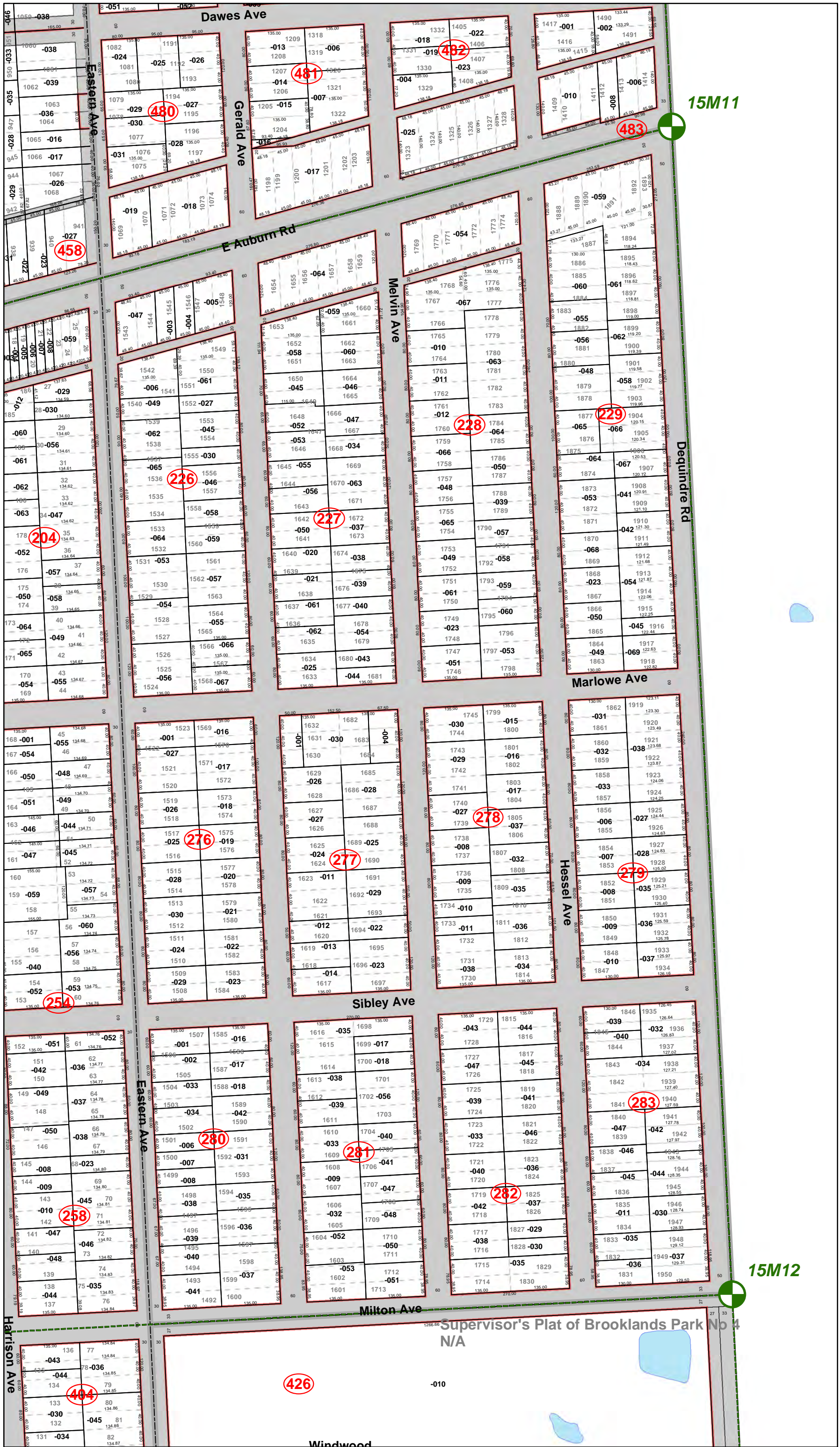
**Geographic Township of:**  
**AVON**

Map Created On: 4/6/2017  
 TWP-SEC  
**15 - 36**  
 SHEET #  
**4199**

L. Brooks Patterson  
 Oakland County Executive



Continued on page 4199

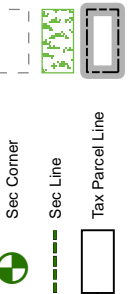


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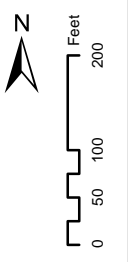
L. Brooks Patterson  
 Oakland County Executive

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Lot or Unit  
 Common Area  
 Subdivision Line



Legend



Geographic Township of:

**AVON**

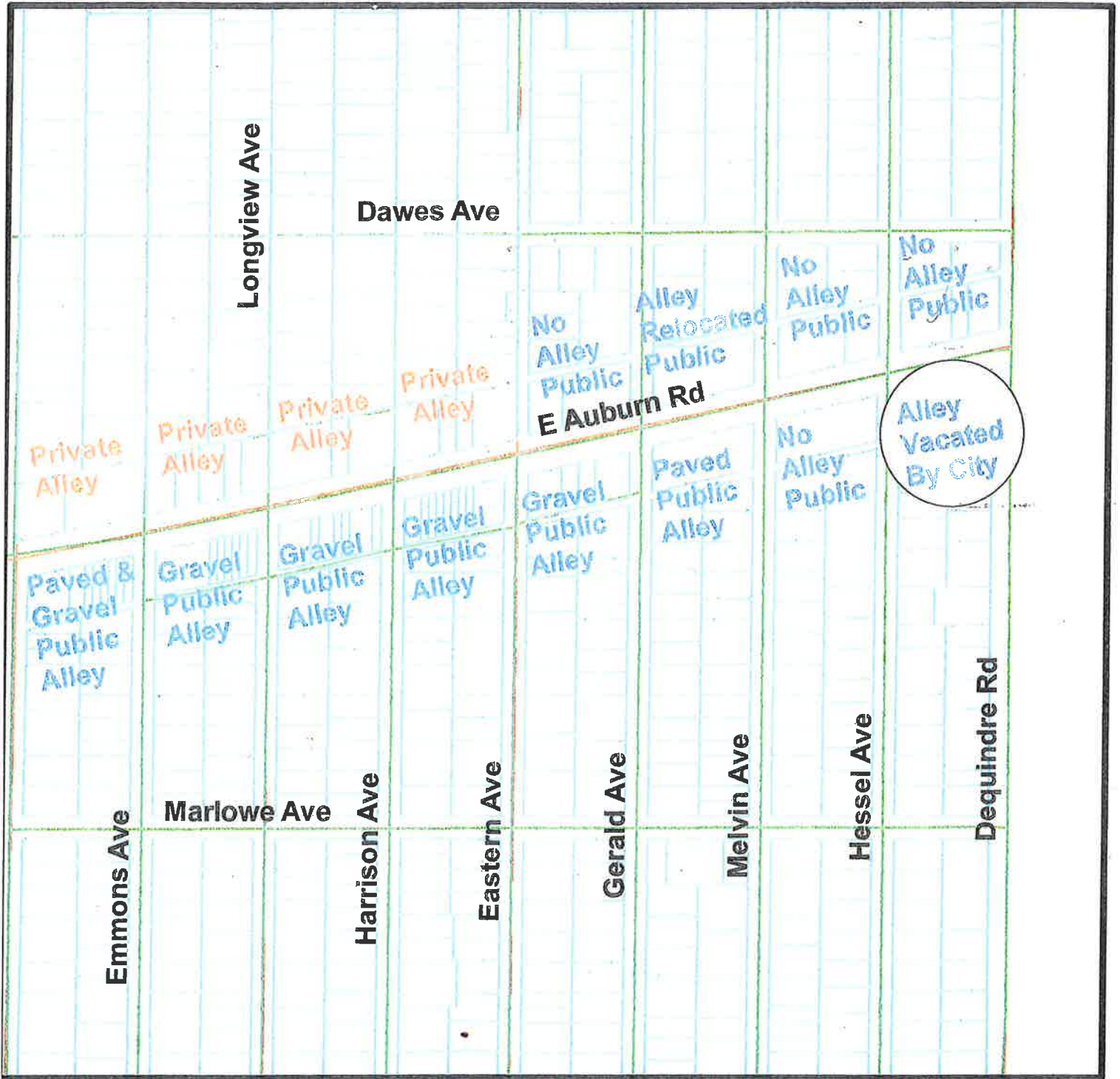
TWP-SEC  
**15 - 36**  
 SHEET #  
**4200**

Continued on page 0

Map Created On: 4/6/2017



# Brooklands Alley's



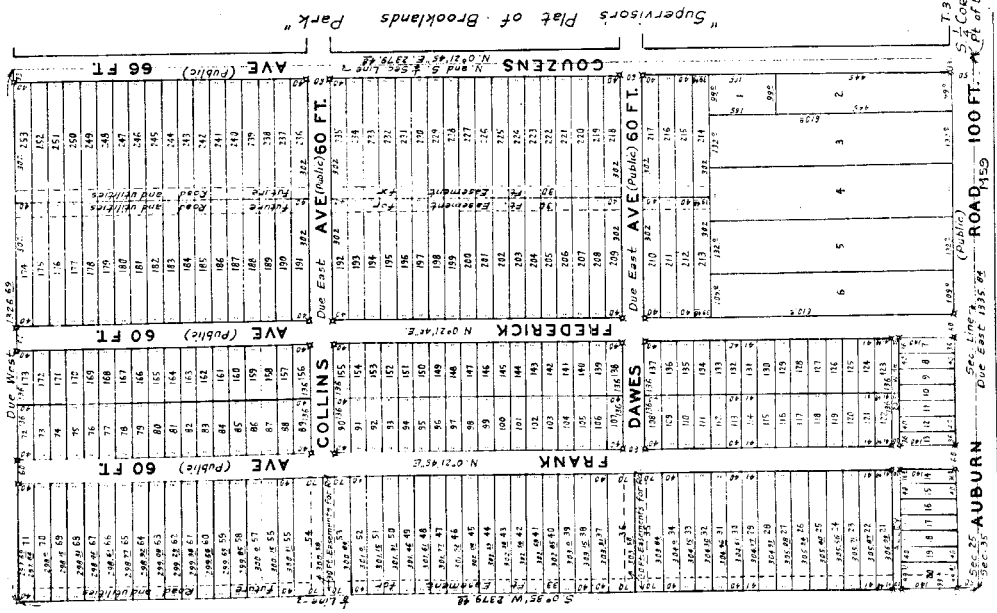
Private Alleys  
Public Alleys



**"SUPERVISOR'S PLAT OF  
BROOKLANDS PARK NO. 5"**  
A SUBDIVISION OF PART OF THE E 1/2 OF S.W. 1/4 OF SEC. 25, T. 3 N. R. 11 E.  
AVON TWP., OAKLAND CO., MICHIGAN

SCALE 1 INCH = 200 FT.

Note:—  
All dimensions shown on this Plat  
are in feet and decimals thereof.



**DEDICATION**

KNOW ALL MEN BY THESE PRESENTS, That I, Oliver P. Gibbs, Supervisor of the Township of Avon, Oakland County, State of Michigan, by virtue of authority in me vested by Section 51, Act 112, of 1923, having been duly authorized by the Township Board, have caused the land described in the annexed plat to be surveyed, laid out and platted, to be known as "Supervisor's Plat of Brooklands Park No. 5" a subdivision of part of the E 1/2 of S.W. 1/4 of Sec. 25, T. 3 N. R. 11 E., Avon Twp., Oakland Co., Michigan, and the streets as indicated have been dedicated to Avon Twp. for use of the Public.

Witness my hand and seal this 10th day of May, 1946.

**ACKNOWLEDGEMENT**  
Shirley Gray (Shirley Gray)  
Helen Allen (Helen Allen)

**STATE OF MICHIGAN  
COUNTY OF OAKLAND**  
On this day of May, A.D. 1946 before me, a Notary Public in and for said County, personally came the above named Oliver P. Gibbs, Supervisor of the Township of Avon, known to me to be the person who executed the above dedication, and acknowledged the same to be his free act and deed as such Supervisor.

Oliver P. Gibbs (Oliver P. Gibbs)  
Supervisor of the Township of Avon.

**CERTIFICATE OF MUNICIPAL APPROVAL**

This plat was approved by the Township Board of the Township of Avon at a meeting held May 28<sup>th</sup>, A.D. 1946.

Frances O. Covert (Frances O. Covert)  
Clerk of the Township of Avon.

**SURVEYORS CERTIFICATE**

I hereby certify that the plat hereon delineated is a correct one and that permanent metal monuments consisting of bars not less than one-half (1/2) inch in diameter and forty-eight (48) inches in length, have been placed at points indicated at least four (4) inches in diameter and forty-eight (48) inches in depth have been placed at points marked thus "X" as thereon shown, at angles in the boundaries of the land platted, at all intersections of streets and at the intersections of streets with the boundaries of the plat as shown on said Plat.

Wilbur S. McAlpine (Wilbur S. McAlpine)  
Registered Land Surveyor No. 1815

**DESCRIPTION**

The land embraced in the annexed plat of Supervisor's Plat of Brooklands Park No. 5, a subdivision of part of the E 1/2 of S.W. 1/4 of Sec. 25, T. 3 N. R. 11 E., Avon Twp., Oakland Co., Michigan, is described as beginning at the S. 1/4 Cor. of said Sec. 25, thence N. 0° 21' 45" E. on N and S 1/4 Sec. line 237.98 ft., thence due West 1335.68 ft. to a line, thence S. 0° 55' W. on a line 2375.84 ft. to south line of said Sec. 25, thence due East on Sec. line 1335.64 ft. to the point of beginning.

APPROVED  
Charles M. Gray  
Notary Public  
Oakland County, Michigan

Approved by the Board of County Auditors of Oakland County, Michigan, this 27th day of June, 1946.  
J. C. Austin, Chairman

RECEIVED  
L. C. Moore, Chairman  
J. H. Morley  
J. C. Austin

**Examined and Approved**

Mayno Joseph (Mayno Joseph)  
Auditor General's Dept.

RECEIVED  
L. C. Moore, Chairman  
J. H. Morley  
J. C. Austin

FILED IN AUDITOR GENERAL'S DEPT.  
Mayno Joseph, Auditor General

RECEIVED  
L. C. Moore, Chairman  
J. H. Morley  
J. C. Austin





## Section 10: Project Schedule

The following Project Schedule defines the entire project from EPE Study through construction. Dates provided for design and construction activities are tentative and subject to change. The City expressed a desire to start construction work in 2018. Considering the necessary steps, it is not likely the project could be started soon enough to be completed in 2018. However, 2018 work could consist of utility relocation, alley improvements, and private property work in advance of the 2019 road work on Auburn Road. A schedule for this scenario is included. Immediate items required to proceed include:

1. Road ownership transfer
2. Design proceeding
3. Identification of funding

The schedule attached provides a guide to how to get through the design process, bid the work in the late summer of 2018, which would allow some work in the alleys and side streets to proceed in the Fall of 2018. Work on Auburn Road itself would commence in the Spring of 2019.

Critical items that can affect this proposed Project Schedule include:

1. Delay in survey due to winter weather
2. Delay in obtaining temporary or permanent easements required to build the project
3. Delay in relocating utilities in conflict with the project

The project could slip into being built into entirely in 2019, with no pre-work in 2018. The project start date would slip to late April, 2019, and would result on the delay of completion of the project by two months with an anticipated completion date of mid-November, 2019.

Auburn Road EPE Study, Design and Construction Draft Project Schedule  
City Bid Project  
11-03-17

ID	Task Name	Duration	Start	Finish	Predecessors	2018											
						Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1	<b>TENTATIVE AUBURN ROAD PROJECT SCHEDULE</b>	<b>607 days</b>	<b>Tue 5/9/17</b>	<b>Fri 9/20/19</b>													
2	<b>Auburn Road EPE</b>	<b>148 days</b>	<b>Tue 5/9/17</b>	<b>Mon 12/4/17</b>													
3	OHM Commenced work on Auburn Road EPE	1 day	Tue 5/9/17	Tue 5/9/17													
4	Utility Requests from Private Utilities	1 day	Wed 5/10/17	Wed 5/10/17	3												
5	Investigate Historic Sites	10 days	Thu 5/11/17	Wed 5/24/17	4												
6	Developed Base Plan on Aerial	15 days	Thu 5/25/17	Wed 6/14/17	5												
7	Perform Limited Topographic Survey of Door Sills and Road	5 days	Thu 6/15/17	Wed 6/21/17	6												
8	Developed Geometric Options to Increase Parki	10 days	Thu 6/22/17	Wed 7/5/17	7												
9	Investigated Viable MOT Options	2 days	Thu 7/6/17	Fri 7/7/17	8												
10	Wetland Investigation	2 days	Mon 7/10/17	Tue 7/11/17	9												
11	Performed Site Visit and took Corridor Pictures for EPE Study Report	2 days	Wed 7/12/17	Thu 7/13/17	10												
12	Investigate Soil Types	2 days	Fri 7/14/17	Mon 7/17/17	11												
13	Developed Proposed Typical Sections	3 days	Tue 7/18/17	Thu 7/20/17	12												
14	Obtained Traffic Crash History	2 days	Fri 7/21/17	Mon 7/24/17	13												
15	Progress Meeting #1 with City/OHM	1 day	Thu 7/27/17	Thu 7/27/17													
16	Followup Work from Progress Meeting #1	10 days	Fri 7/28/17	Thu 8/10/17	15												
17	Progress Meeting #2 with City/OHM	1 day	Fri 8/11/17	Fri 8/11/17	16												
18	Followup Work from Progress Meeting #2	9 days	Mon 8/14/17	Thu 8/24/17	17												
19	Progress Meeting #3 with City/OHM	1 day	Fri 8/25/17	Fri 8/25/17	18												
20	Followup Work from Progress Meeting #3	9 days	Mon 8/28/17	Thu 9/7/17	19												
21	City's Consultant to Obtain Soil Borings	20 days	Wed 9/20/17	Tue 10/17/17													
22	Progress Meeting #4 with City/OHM	1 day	Fri 9/22/17	Fri 9/22/17													
23	City Meeting with Auburn Road Business Owne	4 days	Mon 9/25/17	Thu 9/28/17													
24	Progress Meeting #5 with City/OHM	1 day	Fri 9/29/17	Fri 9/29/17	23												
25	Meeting with City/MDOT to Discuss Project and City Road Turnback	1 day	Fri 10/6/17	Fri 10/6/17													
26	Progress Meeting #6 with City/OHM	1 day	Fri 10/13/17	Fri 10/13/17													
27	OHM Revise Final Preferred Concept and Submit Draft Final EPE Study to City	26 days	Mon 10/2/17	Mon 11/6/17	24												
28	Progress Meeting #7	1 day	Thu 11/9/17	Thu 11/9/17													
29	RH City Council Meeting	1 day	Mon 12/4/17	Mon 12/4/17													
30	<b>Preliminary Engineering Design (PE)</b>	<b>212 days</b>	<b>Mon 1/1/18</b>	<b>Mon 10/29/18</b>													
31	City Evaluation Process for Road Turnback	15 days	Mon 1/1/18	Fri 1/19/18													
32	Road Turnback Process	90 days	Mon 1/22/18	Fri 5/25/18	31												
33	Begin Detailed Design	1 day	Mon 2/5/18	Mon 2/5/18													
34	TAP Grant Application Submittal	1 day	Wed 3/7/18	Wed 3/7/18													
35	TAP Grant Notice of Award	0 days	Fri 6/29/18	Fri 6/29/18	34FS+80 days												
36	Base Plan Level Plan Design after Survey	10 days	Mon 3/19/18	Fri 3/30/18													

Auburn Road EPE Study, Design and Construction Draft Project Schedule  
 City Bid Project  
 11-03-17

ID	Task Name	Duration	Start	Finish	Predecessors	2018																
						Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			
37	Meeting with Business Owners	1 day	Mon 4/9/18	Mon 4/9/18	36FS+5 days																	
38	Meeting with City to Review Base Plans	1 day	Mon 4/9/18	Mon 4/9/18	36FS+5 days																	
39	Preliminary Plan Development	35 days	Tue 4/10/18	Tue 5/29/18	38																	
40	Preliminary Plan Meeting with City	1 day	Wed 6/6/18	Wed 6/6/18	39FS+5 days																	
41	Meeting with Business Owners	1 day	Wed 6/13/18	Wed 6/13/18	40FS+4 days																	
42	City Council Update	1 day	Mon 6/18/18	Mon 6/18/18																		
43	Finalize ROW Documents (Temp or Perm.)	10 days	Wed 5/9/18	Tue 5/22/18	40FS-20 days																	
44	City Acquires ROW (Temp or Perm.)	60 days	Wed 5/23/18	Thu 8/16/18	43																	
45	Submit Project Permits (RCOC, MDOT)	1 day	Wed 5/9/18	Wed 5/9/18	40FS-20 days																	
46	Permit Approval	30 days	Thu 5/10/18	Thu 6/21/18	45																	
47	Utility Relocation Process	120 days	Thu 5/10/18	Mon 10/29/18	45																	
48	Final Draft Plans Complete	40 days	Thu 6/7/18	Thu 8/2/18	40																	
49	City Final Review ( As Necessary?)	5 days	Fri 8/3/18	Thu 8/9/18	48																	
50	Final Revisions (As Necessary?)	5 days	Fri 8/10/18	Thu 8/16/18	49																	
51	Submittal to City for Advertisement	1 day	Fri 8/17/18	Fri 8/17/18	50																	
52	<b>Construction Engineering</b>	<b>284 days</b>	<b>Tue 8/14/18</b>	<b>Fri 9/20/19</b>																		
53	Tentitive Project Letting Date (CITY)	0 days	Tue 8/14/18	Tue 8/14/18																		
54	Project Construction Award	1 day	Mon 8/20/18	Mon 8/20/18																		
55	Construction - Parking and ROW Remediation Work (roadwork to follow in 2019)	45 days	Mon 9/10/18	Fri 11/9/18																		
56	Auburn Road Construction	100 days	Mon 5/6/19	Fri 9/20/19																		