



Phillips Lytle LLP

Via E-Mail and FedEx

May 4, 2020

John C. Whitney, P.E.
Town Supervisor
Town of Grand Island
2255 Baseline Road
Grand Island, New York 14072

Re: TC Buffalo Development Associates, LLC
Application for Planned Development District Designation
2780 Long Road, Grand Island, NY 14072
Tax Section 23, Block 1, Lot 50
Tax Section 23, Block 1, Lot 26.1

Dear Supervisor Whitney and Members of the Town of Grand Island Town Board:

As you know, we represent TC Buffalo Development Associates, LLC ("**TC Buffalo**") with respect to the proposed development of approximately 145.4 acres of land located at 2780 Long Road ("**Site**"), in the Town of Grand Island ("**Town**"), New York, for use as an e-commerce storage and distribution facility for consumer products ("**Facility**"), by a single confidential prospective entity ("**Project**"). The Site is currently owned by Grand Island Commerce Center Joint Venture ("**Owner**"), which has authorized TC Buffalo to file all applications necessary for the development, construction and operation of the Project at the Site.

On February 21, 2020, TC Buffalo submitted an Application to the Town Board to designate the Site as a PDD (the "**Application**"). As part of the Application, TC Buffalo also submitted an Analysis of Environmental Impacts Pursuant to New York State Environmental Quality Review Act or SEQR (the "**EA**"). The Town Board declared its intent to act as lead agency for the purposes of a coordinated review, as required by SEQR, on February 25, 2020. Lead Agency packages were distributed to potentially interested and involved agencies by February 28, 2020.

ATTORNEYS AT LAW

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Under SEQR, prior to undertaking, funding or approving a project, the Town Board must, as lead agency, consider the potential environmental impacts of a proposed project. As such, TC Buffalo submitted the EA with the Application, and then on April 9, 2020, submitted a supplemental submission in response to traffic comments to aid in the Town Board's review of the Project and its determination, as lead agency, pursuant to SEQR (the "**Traffic Supplement**"). *See Exhibit A*. The Traffic Supplement includes an evaluation of traffic impacts on the bridges, upcoming bridge maintenance, an evaluation of additional intersections, responses to comments received to date, a summary of outreach with the Erie County Department of Public Works ("**ECPDW**") and the New York State Department of Transportation, and responses to comments raised by the ECDPW.

On behalf of TC Buffalo, we are providing this second supplemental submission to respond to comments received on the Project and to aid in the Town Board's review of the Project pursuant to SEQR (the "**Supplemental EA**"). The Supplemental EA includes detailed responses to comments from the Town Board, the Town Planning Board, the Town Long Range Planning Advisory Board, the Town Conservation Advisory Board, and the community's feedback received since submission of the Application.

In addition, and in response to comments received, we are providing herein a Traffic Supplement, USACE JD (defined below), OPRHP Letter of No Effect (defined below), Signal Warrants (defined below), West Parcel Lot Potential Development Plan (defined below), a Cut/Fill Map (defined below), a 1990 Inventory and 2019 Inventory (defined below), and a Soil Survey (defined below). Accordingly, please find attached the supplemental information listed below:

Exhibit A: Traffic Supplement

Exhibit B: Memorandum to the Town Board with Responses to Comments



Exhibit C: USACE Jurisdictional Determination
Exhibit D: OPRHP Letter of No Effect
Exhibit E: Signal Warrants
Exhibit F: West Parcel Lot Potential Development Plan
Exhibit G: Cut/Fill Map
Exhibit H: 1990 and 2019 Inventory
Exhibit I: Soil Survey

I. UPDATES

1. Lead Agency

As noted above, by letter dated February 25, 2020, the Town Board declared its intent to act as Lead Agency for purposes of a coordinated review pursuant to SEQR. Shortly thereafter lead agency packets, including the Application and the EA, were circulated to the list of interested and involved agencies. More than 30 days had passed since circulation of the lead agency packets and no agency had objected to the Town Board acting as Lead Agency.

2. Public and Town Outreach

TC Buffalo has undertaken public outreach to help inform the Town and community of Project plans and goals as well as to receive input and feedback on various aspects of the Project. TC Buffalo presented the Project at a Town Board workshop (March 2), a meeting with a representative from Town advisory boards (March 3), a Planning Board meeting (March 9), a Long Range Planning Committee meeting (March 11), and an Economic Advisory Board meeting (March 12). A compilation of all comments received and itemized responses to each comment are attached hereto as ***Exhibits B***.

In addition, the Town Board, has retained consultants to thoroughly review the Application. TC Buffalo will respond to all questions and comments raised by the Town's consultants and will revise reports/submittals as necessary. Furthermore, the Town Board and Planning Board will conduct a public hearing in the near future to receive additional public input. TC Buffalo will continue to provide additional



information and respond to any additional material issues raised at the public hearing as well as any further comments from the Town Board, the Town advisory boards, the Town's consultants and the general public on the materials provided herein. TC Buffalo will continue to participate in additional Town Board meetings as the Project moves through the zoning application process with the Town.

3. Agency Outreach

Additionally, TC Buffalo has reached out, and continues to engage in, communications with the New York State Department of Environmental Conservation ("NYSDEC") and the U.S. Army Corps of Engineers ("USACE"). The limits of NYSDEC-regulated wetlands were confirmed through issuance of a NYSDEC Wetland Delineation Verification on January 23, 2020. On March 23, 2020, the U.S. Army Corps of Engineers ("USACE") issued its Jurisdictional Determination ("USACE JD") regarding the on-Site wetlands. *See Exhibit C.* A joint USACE (Section 404)/NYSDEC (WQC) Permit application was submitted to both agencies on April 24, 2020.

TC Buffalo has engaged with the U.S. Fish and Wildlife Service ("USFWS") and the NYSDEC Natural Heritage Program ("NHP") regarding the evaluation of the potential presence of threatened and endangered species or rare or state-listed animals, plants or significant natural communities on the Site.

TC Buffalo has also engaged in outreach with the New York State Office of Parks, Recreation and Historic Preservation ("OPRHP") regarding the Project. By letter dated March 17, 2020 OPRHP determined that a Phase 1B would not be required. By letter dated April 16, 2020, OPRHP issued a Finding of No Effect that no historic properties including archaeological and/or historic resources will be affected by the Project ("**OPRHP Letter of No Effect**"). *See Exhibit D.*

SRF Associates, TC Buffalo's traffic consultant, has engaged in outreach with the ECDPW, the New York State Department of Transportation ("NYSDOT") and the New York State Thruway Authority ("NYSTA") regarding potential traffic impacts related to the Project. On March 27, 2020 SRF Associates and TC Buffalo participated in a



teleconference meeting with the ECDPW. Overall the ECDPW indicated that they do not have any issues with the proposed mitigation. They issued comments and requested additional information prior to completing their review. Responses to those comments are included in the Traffic Supplement. *See Exhibit A.* SRF has obtained background information, traffic counts, hourly data, and maintenance information for the Long Road bridge, Bedell Road bridge, and the North and South Grand Island bridges from NYSTA. The information obtained from the NYSTA was used to prepare the Traffic Supplement. Additionally, on April 9, 2020, TC Buffalo and SRF Associates participated in a teleconference call with the NYSTA.

Finally, TC Buffalo continues to engage with the Grand Island Fire Department, National Grid and National Fuel regarding services at the Site.

4. Traffic Supplement

TC Buffalo has received several traffic-related comments from the Town Board, the Planning Board, various advisory boards, the ECDPW and members of the general public. A compilation of all comments received and itemized responses to each comment are attached hereto as *Exhibits B.* In response to these traffic-related questions and comments, TC Buffalo prepared a Traffic Supplement for the Project, annexed hereto as *Exhibit A.* As shown in the Traffic Supplement, the Project will only increase traffic on the North and South Grand Island Bridges by approximately 2.1% to 3.3% during the peak summer months (i.e., July and August) and overall anticipated traffic volumes at full buildout remain below historical highs for the Grand Island Bridges. In addition, the Project's shift times are designed to differ from peak travel time on the bridges. As such, the Project will not have any significant adverse impacts on traffic with the currently proposed mitigation. A review of the current operating conditions and projected traffic volumes indicates that no improvements are warranted or recommended on the Grand Island Bridges or the Long Road and Bedell Road bridges. More detail regarding the Traffic Supplement is provided in *Exhibit B.*

During the April 9, 2020 teleconference with NYSTA, the NYSTA requested signal warrants for the I-190 northbound off-ramp and the I-190 southbound off-ramp. On



April 20, 2020 SRF Associates submitted the signal warrants for the requested off-ramps to the NYSTA (the “**Signal Warrants**”). *See Exhibit E.* Based on the Signal Warrants, SRF continues to recommend installation of a signal only at the Long Road intersection.

Regarding traffic impacts from construction activities, the Site work for the Project is nearly balanced and there is limited need to import soil material with the exception of approximately 100,000 cubic yards of imported granular fill to be placed over the building and asphaltic areas, as recommended by the project geotechnical engineer, due to the high clay content within the existing soils. A Cut/Fill map has been prepared that shows where the cut to fill material will be generated from on Site (the “**Cut/Fill Map**”). *See Exhibit G.* The number of daily truck and car trips during construction is not expected to exceed normal operations of the Facility. As such, any impacts from trucks and construction employee traffic is factored into the Traffic Impact Study and the Traffic Supplement.

5. *West Parcel*

TC Buffalo has received comments that it should purchase the West Parcel as a buffer between development at the Site and the residential area west of the West Parcel and to allow the West Parcel to remain a wildlife corridor to Buckhorn State Park. As shown below, based on the West Parcel’s characteristics, purchase of the West Parcel is not necessary to achieve these goals.

TC Buffalo has prepared a map showing the portions of the West Parcel that contain NYSDEC-regulated wetlands, along with their corresponding 100-foot buffer, to determine what portion of the West Parcel is actually developable (the “**West Parcel Lot Potential Development Plan**”). *See Exhibit F.* As shown in *Exhibit F*, excluding the regulated wetlands and their corresponding 100-foot buffer, the remaining potential development area cross-hatched in red is approximately 17.8 acres. Applying the underlying zoning of the R1A District, and accounting for stormwater management and roadways, realistically only 5 residential lots could be developed on all of the approximately 62 acres of the West Parcel. Those developable acres are located in the northeast corner of the West Parcel. As such, a large percentage (over 70%) of the West



Parcel is undevelopable. Because those regulated wetlands are currently protected and will remain so, they will continue to serve as an important aesthetic, hydrologic, and habitat resource. As such, based on the West Parcel's characteristics, significant development limitations currently exist on the West Parcel and, even with development, the buffer between the Facility and the residential area to the west, and the wildlife corridor across the West Parcel to Buckhorn State Park will remain. As such, TC Buffalo is not planning to purchase this area, and a request for a subdivision of the West Parcel is explained in more detail below.

6. Subdivision Request

TC Buffalo will submit an application to subdivide the West Parcel from the Site to facilitate the Project. Collectively the Site and the West Parcel make up a single tax lot 23.00.1-50.¹ This is a unique subdivision request because TC Buffalo is not seeking to subdivide the West Parcel into new lots for development. Rather, TC Buffalo does not have plans to purchase or develop the West Parcel, which is zoned R-1A Low Density Single Family Residential, and is merely looking to separate the Site from the West Parcel as necessary to acquire and develop the Site.

As described above, the West Parcel contains several NYSDEC regulated wetlands that render a large percentage of the West Parcel undevelopable. *See Exhibit F.* The West Parcel has unimproved frontage on Sunset Drive; however, to the extent frontage is required, TC Buffalo is proposing to provide access from Long Road. TC Buffalo is proposing a public right-of-way over the first +/- 660 feet of the new roadway entering the Site from Long Road. TC Buffalo is willing to dedicate this right-of-way to the Town. Additionally, the West Parcel is not located in a sewer district. However, at this time, TC Buffalo does not have any plans to purchase the West Parcel and the West Parcel is not part of the Application. As such, any future development in the West Parcel would require connection to a sewer district.

¹ The Site also includes tax lot 23.00.1-26.1. However, this tax lot will not be impacted by the instant Subdivision Application.



7. Wetland Delineation & Habitat Inventory

The Site has been surveyed several times in the last year or so and the results are consistent with investigations completed when development of the Site was first approved by the Town over thirty years ago. In October 1990 Acres International Corporation (“**Acres**”) conducted field investigations as part of its wetland delineation report. As part of its investigations, Acres prepared a complete list of vegetation (the “**1990 Inventory**”). *See Exhibit H.* More recently, in July and August 2019 Wilson Environmental Technologies, Inc. (“**WET**”) conducted field investigations as part of its wetland delineation report. As part of its investigations, WET prepared a complete list of vegetation (the “**2019 Inventory**”). *See Exhibit H.* WET also conducted a soil survey of the Site (the “**Soil Survey**”). *See Exhibit I.* WET’s investigation shows that there have been limited changes to the Site since the Acres investigations.

The Site has been fully delineated and WET prepared a Wetland Delineation Report dated August 27, 2019 for the Site (*see* Exhibit 12.C annexed to Application). On March 23, 2020, The USACE issued the USACE JD on March 23, 2020, which is consistent with the Wetland Delineation Report. *See Exhibit C.* The USACE JD confirms that the Site contains seven (7) federally regulated wetlands/waters (Wetlands J, L, N, P, Q, R and T), totaling approximately 4.55 acres of the site. In addition, there are two federally-regulated streams onsite identified on the Town of Grand Island Zoning Maps as a “Feeder Creek” and “Collector Creek.” The Feeder Creek totals approximately 3,400 linear feet and generally bisects the site north to south. The Feeder Creek continues offsite, ultimately discharging to the Niagara River. The Collector Creek totals approximately 475 linear feet and runs west to east across the southeastern corner of the site. The Collector Creek continues offsite to the east toward a tributary of Big Burnt Ship Creek.

Of these USACE regulated wetlands, the Project will impact approximately 0.79 acres for construction of parking areas, access roads, part of the Facility, and stormwater basin. TC Buffalo anticipates purchasing 1.58 wetland mitigation credits from the Ducks Unlimited – Niagara River In-Lieu Fee Program, as required compensation by the USACE. The feeder creek is proposed to be relocated to the western portion of the



Site and has been designed with a similar length and longitudinal slope as the current feature to maintain similar stream flow. Based on a hydraulic and hydrologic analysis, the relocation will not adversely impact flood conditions. Rather, as designed, additional flood storage will be provided along the stream corridor through the creation of adjacent floodplain wetlands and oversized stormwater basins that will provide additional flood storage under certain conditions.

The limits of NYSDEC-regulated wetlands were confirmed through issuance of a NYSDEC Wetland Delineation Verification on January 23, 2020. The site contains six (6) state-regulated wetlands (Wetlands M, R, S, T, U and V) totaling approximately 1.03 acres of the site, all located along the western portion of the Site. Each of the NYSDEC-regulated wetlands contains a 100-foot adjacent area. The Feeder Creek and Collector Creek are not considered “protected waters” under the NYSDEC Protection of Waters Program. None of the on-Site NYSDEC jurisdictional wetlands, or any of their corresponding 100-foot buffer, will be disturbed by the Project.

8. Economic Impact

TC Buffalo expects to apply for a PILOT with the Erie County Industrial Development Agency. Without a PILOT, the Project is not economically viable. However, even with a PILOT in place, the Town will receive a dramatic increase in the amount of property tax/PILOT payments as compared with the current tax payments the Town receives for the undeveloped Site, in addition to significant increases in special district charges. At the end of the PILOT period, the Town will receive a significant increase in unabated property taxes. In addition to the proposed PILOT/tax payments to the Town, the Project will provide major economic benefits to the Town through: (1) creation of at least 1,000 new full time jobs and at least 300 construction jobs (for Grand Island and other residents in the region); (2) utilization of local companies, local labor and source local materials as much as possible; (3) patronizing of local convenience stores, gas stations, hotels, local eateries, etc. by Project employees as well as regular business visitors; and (4) high visibility from I-190 of national/ global name recognition that will have a positive ripple effect on the local economy. Further detail regarding economic impacts and benefits to the Town will be provided as available.



9. Updated Waiver/Modifications Request

In a PDD, the underlying zoning regulations in an M1 district are applicable to the Project. See Code §§ 407-120(B); 407-16. As necessary to address the unique nature of the Project and to further the objectives for requiring a PDD, TC Buffalo requested certain waivers or modifications from the underlying M-1 requirements for the Project. Based on Project feedback, TC Buffalo is proposing the construction of a Sound Wall at the northwest corner of the Site to minimize the acoustical impact from on-Site truck activity to the neighboring residences. As such, TC Buffalo is requesting the following additional waivers or modifications from the underlying M-1 requirements:

Building Category	Code Requirement	Proposed Waiver/Modification
Minimum Lot Frontage	150 feet (§ 407-16, Schedule I)	120 feet
Minimum Lot Width	150 feet (§ 407-16, Schedule I)	120 feet
Maximum Building Height (in stories)	4 stories (§ 407-16, Schedule I)	5 stories
Maximum Building height	45 feet (§ 407-16, Schedule I)	87.31 feet
Off-street Parking Requirements	4,043 spaces, plus one space per employee (§ 407-133, Schedule III)	1,855 spaces for cars 16 spaces for motorcycles²
Lighting Requirements	Not higher than 20 feet (§ 407-109(C))	40 feet high (pole 37 feet on a concrete base of 3 feet) 25 feet high (building mounted)
Watercourses	No plan shall be approved that would alter the course of a natural watercourse (§ 407-110(M))	Permit crossing of Collector Creek and relocation of Feeder Creek

² Code § 407-136 establishes certain dimension requirements for parking spaces. The motorcycle spaces proposed are smaller than the spaces outlined in Code § 407-36, but nevertheless serve to provide parking on the Site.



Side Yard Setback	50 foot minimum setback when adjacent to Residential Zoned Lots (§ 407-16, Schedule I)	Permit sound wall to be placed 16 feet from West Parcel boundary line
Front Yard Setback	65 foot minimum front yard setback or 80 foot minimum setback from Long Road centerline right-of-way (§ 407-16, Schedule I)	Permit sound wall to be placed 42 feet from the pavement edge of Long Road or 19.5 feet from the southern Long Road right-of-way line

- Setbacks - Code § 407-16, Schedule I establishes a side yard setback requirement of 50 feet when adjacent to a residential zoned lot and a front yard setback of 65 feet from the front yard or 80 feet from the centerline right-of-way. TC Buffalo is proposing to construct a sound wall at the northwest corner of the Site, along the norther Site driveway, carried to a height of approximately 16 feet above grade. The sound wall will minimize the acoustical impact from on-Site truck activity to the neighboring residences. Accordingly, TC Buffalo respectfully requests waiver of these setback requirements to accommodate the sound wall on the Site.

II. COMMENTS RECEIVED

As noted above, TC Buffalo has received preliminary comments from the Town Board, the Planning Board, the Long Range Planning Committee, the Conservation Advisory Board and members of the community. A compilation of all comments received and detailed, itemized responses to each comment are annexed hereto as *Exhibit B*.

III. CONCLUSION

TC Buffalo has undertaken public, town and agency outreach to provide detailed information on Project plans and to solicit feedback on potential issues and concerns, and will continue to do so through an upcoming public hearing on the Project and through coordination with the Traffic Safety Advisory Board. In addition, the Town Board has retained consultants to thoroughly review the Project documentation. TC Buffalo will respond to all questions and comments raised by the Town's consultants and will revise reports/submittals as necessary. And finally, TC Buffalo has provided substantial documentation in the EA and in this Supplemental EA, as well as detailed



responses to all substantive comments received. TC Buffalo will continue to provide additional information and respond to any additional material issues raised at the public hearing as well as any additional comments from the Town Board, the Town advisory boards, the Town's consultants and the general public on the materials provided herein. TC Buffalo is committed to working with the Town to address the concerns of the Town and the residents of Grand Island, and to provide information required for the Town to complete a fulsome review of the Project.

Overall, a number of temporary and/or minor environmental impacts have been identified in connection with the Project. However, it is very respectfully submitted that a thorough analysis of these potential impacts reveals that where necessary, such impacts have been mitigated to the greatest extent possible by the design of the Project and that none of these impacts will be significant.

Please do not hesitate to contact us if there are any questions regarding the Application and this Supplemental EA.

Very truly yours,

Phillips Lytle LLP

By /s/ *Kimberly R. Nason*

Kimberly R. Nason

KRN

cc: Charles W. Malcomb, Esq., Town Attorney (via e-mail)
 Robert H. Westfall, P.E., Town Engineer (via e-mail and FedEx)
 Ronald Milks, Town Code Enforcement Officer (via e-mail and FedEx)



Robert Hassett, Town Building Safety Inspector (via e-mail and FedEx)
Rhonda Tollner, Town Zoning Clerk (via e-mail and FedEx)
James Murray-Coleman, Trammel Crow Company (via e-mail)
Michael Finan, P.E., LEED-AP, Langan Engineering (via e-mail)

Via FedEx

Patricia Frentzel, Town Clerk
David M. Bruno, Chairman, Town Planning Board
Richard Crawford, Jr., Town Highway Superintendent
Charles Grunzeig, Chair, Town Traffic Safety Advisory Board
John Butler, Chair, Town Board of Architectural Review
Jeffrey Green, Chair, Town Conservation Advisory Board
Mark Sadkowski, Chief, Grand Island Fire Company
Erie County Department of Public Works, Division of Highways
Jennifer Delaney, P.E., Erie County Health Department
John Cappellino, Erie County Industrial Development Agency
Erie County Sheriff's Department
Mariely Ortiz, Erie County Department of Environment and Planning
Erie County Executive's Office
David Denk, Regional Permit Administrator, NYSDEC Region 9
Ramsey E. Kahi, P.E., NYSDOT, Region 5 – SEQR/Planning
Matthew Latko, P.E., New York State Thruway Authority, Buffalo Division
Andrew Hvisdak, NYSDOS, Division of Building Standards & Codes
New York State Department of Health
Josalyn Ferguson, OPRHP
New York Power Authority
Niagara Reservation State Park
Amanda Mays, Regional Director, Empire State Development Corporation
US Army Corps of Engineers, Buffalo District

EXHIBIT A



Phillips Lytle LLP

Via E-Mail

April 9, 2020

John C. Whitney, P.E.
Town Supervisor
Town of Grand Island
2255 Baseline Road
Grand Island, New York 14072

Re: TC Buffalo Development Associates, LLC
Application for Planned Development District Designation
2780 Long Road, Grand Island, NY 14072
Tax Section 23, Block 1, Lot 50
Tax Section 23, Block 1, Lot 26.1

Dear Supervisor Whitney and Members of the Town of Grand Island Town Board:

As you know, we represent TC Buffalo Development Associates, LLC ("**TC Buffalo**") with respect to the proposed development of approximately 145.4 acres of land located at 2780 Long Road ("**Site**"), in the Town of Grand Island ("**Town**"), New York, for use as an e-commerce storage and distribution facility for consumer products ("**Facility**"), by a single confidential prospective entity ("**Project**"). The Site is currently owned by Grand Island Commerce Center Joint Venture ("**Owner**"), which has authorized TC Buffalo to file all applications necessary for the development, construction and operation of the Project at the Site.

On February 21, 2020, TC Buffalo submitted an Application to the Town Board to designate the Site as a PDD (the "**Application**"). As part of the Application, TC Buffalo also submitted an Analysis of Environmental Impacts Pursuant to New York State Environmental Quality Review Act ("**SEQR**"). The Town Board declared its intent to act as lead agency for the purposes of a coordinated review, as required by SEQR, on February 25, 2020. Lead Agency packages were distributed to potentially interested and involved agencies by February 28, 2020. Under SEQR, prior to undertaking, funding or approving a project, the Town Board must, as lead agency, consider the potential environmental impacts of a proposed project. On behalf of TC Buffalo, in

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The Grand Island Town Board
Page 2

April 8, 2020

response to feedback received by the Town Board, the Planning Board, various advisory boards, members of the general public, and the Erie County Department of Public Works (“ECDPW”) we provide this supplemental submission to aid in the Town Board’s review of the Project and its determination, as lead agency, pursuant to SEQR. This supplemental submission includes a supplemental traffic evaluation and responses to traffic comments from the ECDPW.

Please do not hesitate to contact us if there are any questions regarding the Application and this supplemental submission.

Very truly yours,

Phillips Lytle LLP

By

s/ Kimberly R. Nason

KRN

cc: Charles Grunzeig, Traffic Safety Advisory Board Chair
Robert H. Westfall, P.E., Town Engineer
Ronald Milks, Code Enforcement Officer
Robert Hassett, Building Safety Inspector
Rhonda Tollner, Zoning Clerk
James Murray-Coleman, Trammel Crow Company
Michael Finan, P.E., LEED-AP, Langan Engineering

April 6, 2020

James Murray-Coleman
TC Buffalo Development Associates, LLC
300 Conshohocken State Road, Suite 250
West Conshohocken, PA 19428

RE: Grand Island Distribution Facility Project, Town of Grand Island, Erie County, NY NYS
Supplemental Evaluation and Analysis Regarding the Traffic Impact Study dated February 2020

Dear Mr. Murray-Coleman,

Our office prepared a Traffic Impact Study (TIS) dated February 2020 that identified and evaluated the potential traffic impacts associated with the proposed e-commerce storage and distribution facility Project (the "Project") in the Town of Grand Island (the "Town"). This letter is submitted as a supplement to the TIS to address questions and comments raised by members of the Town Board, Planning Board, and various advisory boards, as well as the Erie County Department of Public Works ("ECDPW") and members of the general public.

I. Evaluation of Thruway Bridges

Long Rd and Bedell Road Bridges over I-190

The bridge that carries Long Road (CR 310) over I-190 was built in 1954 and is owned and maintained by the New York State Thruway Authority (NYSTA). There are no posted safety restrictions for this bridge. This bridge was last inspected by the NYSTA on August 30, 2018. The inspection report, attached, indicates no flags were issued (flags are issued in bridge inspection reports when structural or safety deficiencies are identified).

The segment of Long Road that crosses the bridge currently carries approximately 1,750 vehicles per day (vpd). The proposed distribution facility is expected to add approximately 1,230 passenger vpd and approximately 240 trucks vpd traveling on Long Road over I-190 for a total of 1,470 vpd. Review of the current operating conditions and projected traffic volumes indicates that no improvements are warranted or recommended on this bridge.

The bridge that carries Bedell Road over I-190 was built in 1954 and is also owned and maintained by the NYSTA. There are no posted safety restrictions for this bridge. This bridge was last inspected by the NYSTA on May 17, 2018. The inspection report, attached, indicates no flags were issued.

The segment of Bedell Road that crosses the bridge currently carries approximately 918 vpd. The proposed distribution facility is expected to add approximately 1,550 passenger vpd traveling on Bedell Road over I-190; no trucks are expected to use Bedell Road. Review of the current operating conditions and projected traffic volumes indicates that no improvements are warranted or recommended on this bridge.

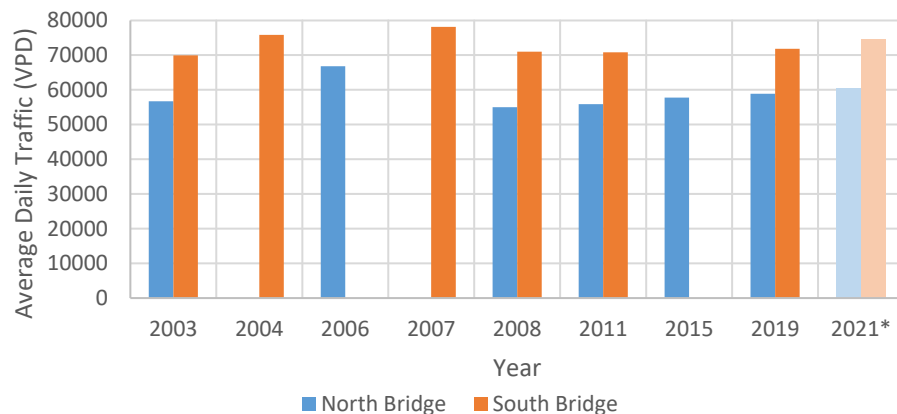
NYSTA North and South Grand Island Bridges carrying I-190

The North Grand Island bridge (NGIB) is a twin truss arch bridge. The first span was opened in 1935 and the second addition to the truss arch bridge came in 1965. This bridge is owned and maintained by the NYSTA and extends I-190 across the Niagara River from Niagara Falls to Grand Island.

The South Grand Island Bridge (SGIB) is also a twin truss arch bridge with the first span opened in 1935 and the second opened in 1962. This bridge, which is also operated by the NYSTA, extends I-190 across the Niagara River from Tonawanda to Grand Island.

Table VI below summarizes the historical traffic volumes on the NGIB and the SGIB and estimates future traffic volumes on the NGIB and SGIB with the Proposed Distribution Facility. Data shown in Table VI was obtained from the Greater Buffalo Niagara Regional Transportation Council (GBNRTC) and the NYSTA (Note: for some years, data is only available for one of the bridges).

Table VI: Historical Bridge Traffic Volume Data
Average Daily Traffic in Vehicles Per Day (VPD)



* Estimated Future Traffic Volumes w/Distribution Facility (also includes the now defunct Cannon Design and Fantasy Island)

Note: Traffic volumes decreased significantly in 2008 as a result of the recession

As shown in Table VI, the traffic volumes using these bridges were considerably higher between 2004 and 2007 than they are currently. Even with the addition of the Project, the estimated 2021 traffic volumes will not exceed the 2004 through 2007 traffic volumes on these bridges. The NGIB currently carries an average of 58,860 vpd. The Project is expected to add approximately 1,388 passenger vehicles per day and approximately 48 trucks per day on the NGIB. As such, the Project is expected to increase traffic on the NGIB by only approximately 2.4 percent and will remain below historic peak levels achieved in 2006.

The SGIB currently carries an average of 71,830 vpd. The proposed distribution facility is expected to add approximately 2,301 passenger vehicles per day and approximately 436 trucks per day on the SGIB. As such, the Project is expected to increase traffic on the SGIB by only approximately 3.8 percent and will remain below historic peak levels achieved in 2004 and 2007.

Additionally, it is worth noting that the Grand Island Bridges require motorists to pay a toll in the northbound/southbound direction upon entering the Island only. In March of 2018 cashless tolling was implemented and the existing toll plazas were subsequently removed. This change has resulted in less congestion at these locations and improved safety. The NYSTA states the following on their website when discussing the

benefits of cashless tolling on the Grand Island Bridges: “Additionally, over the last ten years, approximately 80 percent of all accidents within a tenth of a mile of the Grand Island Toll Barriers were caused by "Following Too Close" or an "Unsafe Speed." With the implementation of cashless tolling, the Thruway Authority expects accidents within these areas to be reduced.” Thus, review of the current operating conditions and projected traffic volumes indicates that no improvements are warranted or recommended on these bridges.

This analysis is consistent with more recent traffic data obtained from NYSTA. Monthly traffic volumes on both the NGIB and the SGIB were obtained from the NYSTA. Tables VII and VIII below, show the variation in traffic using the bridges between January and December 2019 (the most recent data available). The tables also show in green the traffic that will be added to the bridges as a result of the Project.

Table VII: 2019 North Bridge Data

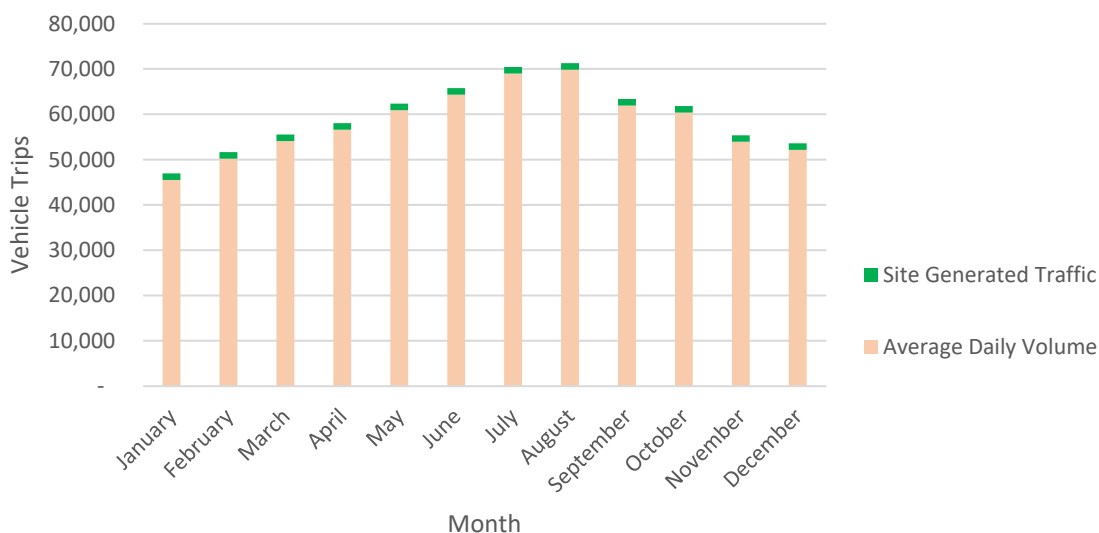
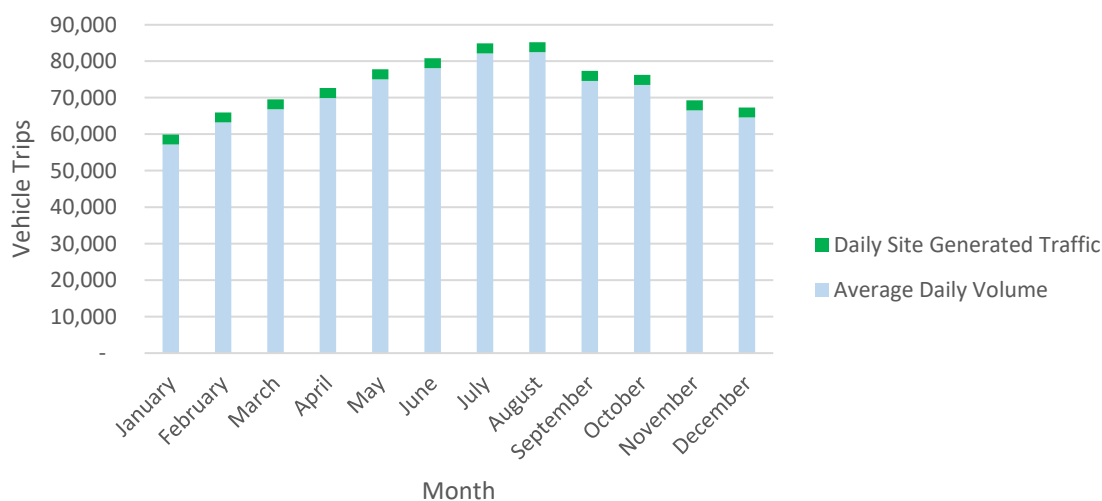


Table VIII: 2019 South Bridge Data



As shown in Tables VII and VIII, during the peak summer season (i.e. July and August), the Project will only increase traffic on the bridges by approximately 2.1%-3.3% during the peak months of July and August.

In addition, the NYSTA provided bi-directional hourly data for both bridges during 2019. Tables IX-XII below show a comparison of the average hourly variation in traffic on a weekday using the bridges during the months of July and November.

Table IX: NGIB Average Weekday Hourly Traffic -
North Bound
Comparison of July & November 2019 vs 2022

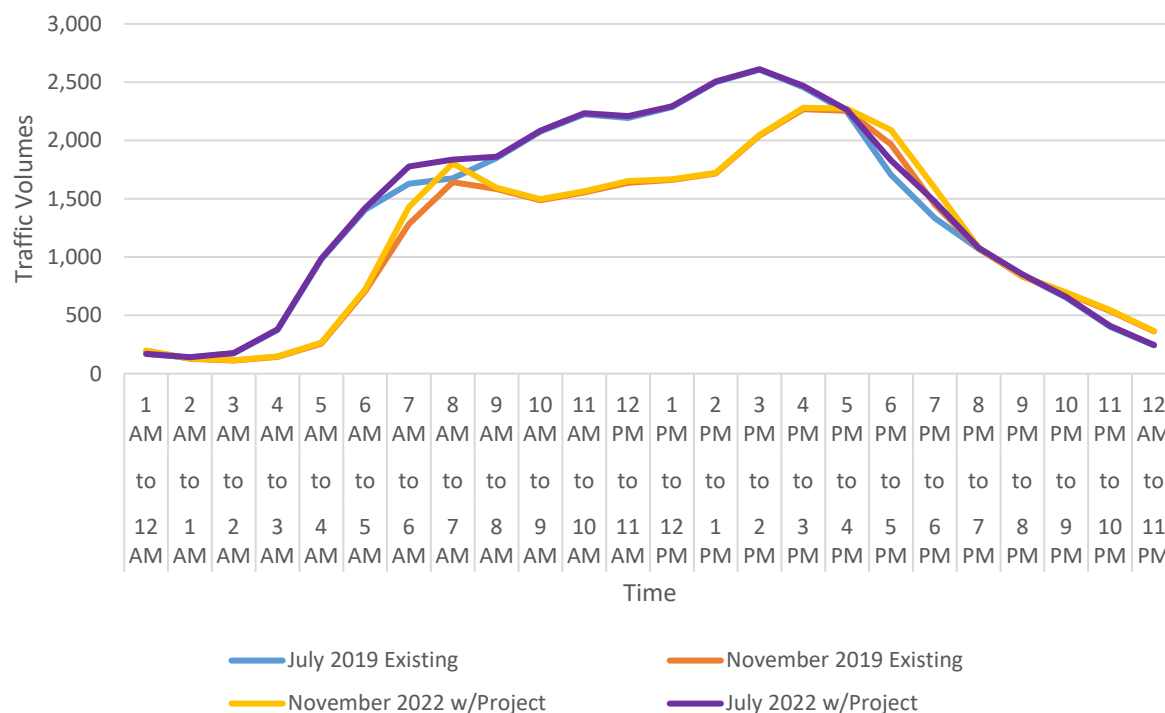


Table X: NGIB Average Weekday Hourly Traffic -
Southbound
Comparison of July & November 2019 vs 2022

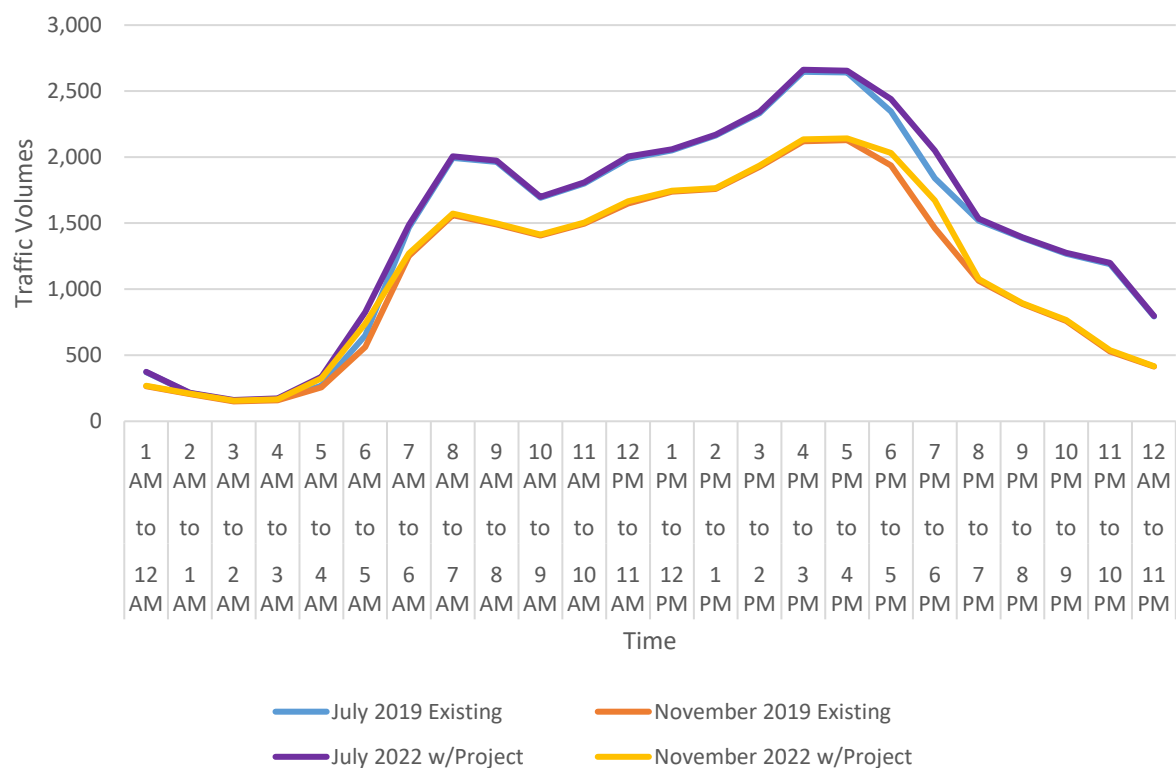
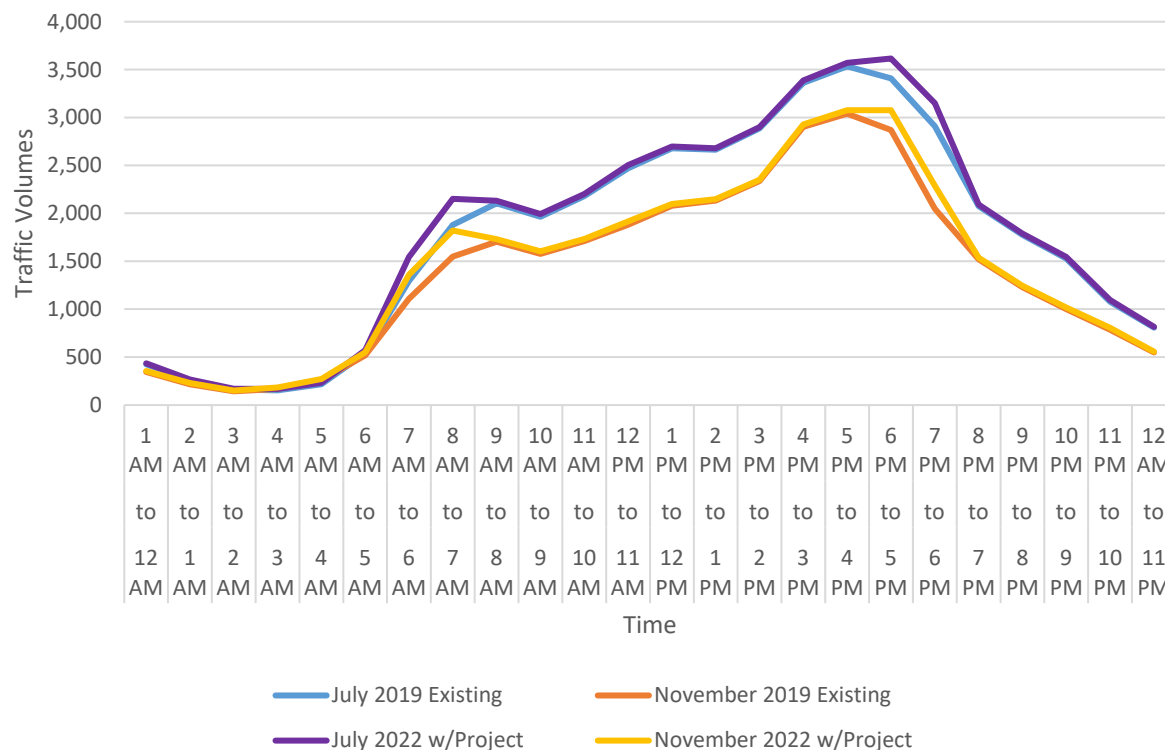
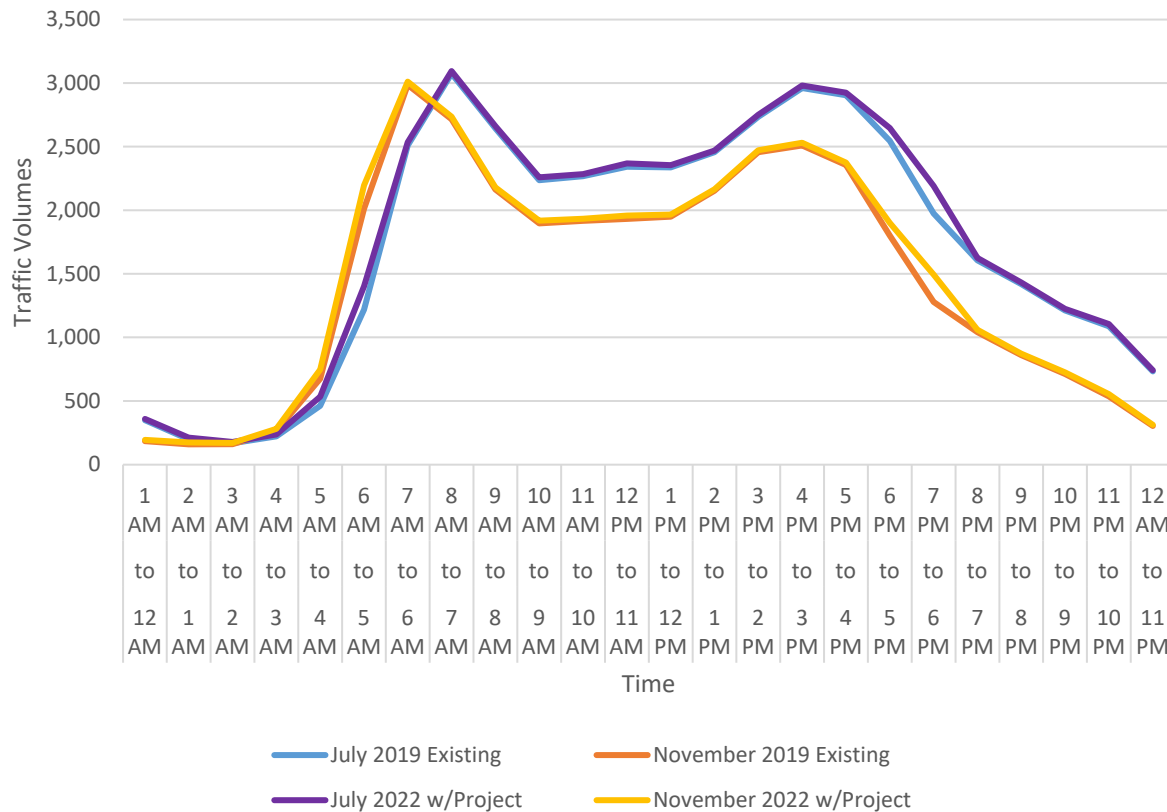


Table XI: SGBI Average Weekday Hourly Traffic -
Northbound Comparison of July & November
2019 vs 2022



SGBI July & November of 2019 Average Weekday Hourly Traffic - South Bound



As shown in Tables IX - XII above, the peak hour weekday traffic in July and November is between 7:00-10:00 AM and 4:00-6:00 PM. The Project will have peak facility hours between 6:30-7:30 AM and 5:30-6:30 PM for employees entering and exiting the site. Additionally, the overnight shifts will end between 4:30-5:00AM. As such, the Project's shift times are designed to miss peak travel hours on the bridges.

II. NYSTA North and South Grand Island Bridge Construction

Information provided by the NYSTA indicates that the bridge decks for both bridges were replaced relatively recently:

- NB SGIB – deck was replaced 2008 contract with a completion date of 2/2011
- SB SGIB – wearing surface placed in 2012 contract with a completion date of 11/2013
- NB NGIB – wearing surface placed in 2016 contract with a completion date of 12/2017
- SB NGIB – deck was replaced in 2013 contract with a completion date of 12/2015.

The bridge decks have an approximate 20-year life cycle.

The NYSTA has posted the following maintenance schedule for the Grand Island Bridges:

- **South Grand Island Bridges: Maintenance Cleaning for Steel Preservation - 2021**
 - Location: S. GRAND IS. SB (OLD) Bridge
 - Estimated Letting Year: 2021

- **South Grand Island Bridges: Maintenance Cleaning for Steel Preservation - 2021**
 - Location: S. GRAND IS. NB (NEW) Bridge
 - Estimated Letting Year: 2021
- **North and South Grand Island Bridges: Retrofit / Repair Roller Bearings, Pins and Hangers and North Grand Island Bridges - Steel Repairs**
 - Location: NORTH GRAND ISLAND NB (OLD) Bridge
 - Estimated Letting Year: 2021
- **North and South Grand Island Bridges: Retrofit / Repair Roller Bearings, Pins and Hangers and North Grand Island Bridges - Steel Repairs**
 - Location: NORTH GRAND ISLAND SB (NEW) Bridge
 - Estimated Letting Year: 2021
- **North and South Grand Island Bridges: Retrofit / Repair Roller Bearings, Pins and Hangers and North Grand Island Bridges - Steel Repairs**
 - Location: S. GRAND IS. SB (OLD) Bridge
 - Estimated Letting Year: 2021
- **North and South Grand Island Bridges: Retrofit / Repair Roller Bearings, Pins and Hangers and North Grand Island Bridges - Steel Repairs**
 - Location: S. GRAND IS. NB (NEW) Bridge
 - Estimated Letting Year: 2021

According to NYSTA, these steel repairs will require lane closures however, they will only be permitted to take place under nighttime operations. Notably, the Project is not expected to reach full buildout until spring of 2022 and therefore the Project may not overlap with the NFTA's proposed bridge construction.

III. Evaluation of Additional Study Area Intersections

Concerns have been raised regarding the intersections of Whitehaven Road with Baseline Road and the two I-190 ramps. Turning movement count data was collected at the Whitehaven Road/Baseline Road intersection on Wednesday March 11th between 6-9 AM and 4-7 PM. This data has been incorporated into the Traffic Impact Study (TIS) and all figures have been updated. Updated Figures 1-8 are attached to this letter. All turning movement count data were collected on typical weekdays while local schools were in session prior to any COVID-19 related restrictions. The traffic volumes were reviewed to confirm the accuracy and relative balance of the collective traffic counts and adjustments to traffic volumes were made where necessary. Distribution of site generated traffic (see Figures 6B and 7) indicates that Project is estimated to add 21(35) vehicles during the AM(PM) peak hours to the Whitehaven Road/I-190 ramp intersections. These increases are considered minimal. Therefore, these intersections are not included in the updated analysis (this is consistent with national and local guidelines regarding study area for traffic impact studies).

The level of service table has been updated to include the Whitehaven Road/Baseline Road intersection, see updated Table V below. It is noted that a discrepancy was identified in the analyses for Full Development Conditions at the Grand Island Blvd intersections with Baseline Road and Whitehaven Road. There was a mistake in the trip distribution calculations which resulted in a mistake in the full development traffic volume calculations at these intersections. Table V also provides the updated results for these intersections. The results indicate that Baseline Road/Whitehaven Road intersection operates at LOS "A" for all movements during the peak hours. No changes in levels of service are anticipated as a result of the proposed distribution facility and no mitigation is warranted or recommended.

TABLE V: UPDATED CAPACITY ANALYSIS RESULTS

INTERSECTION	2019 EXISTING CONDITIONS		2021 BACKGROUND CONDITIONS		FULL BUILD CONDITIONS		FULL BUILD CONDITIONS W/ MITIGATION	
	AM	PM	AM	PM	AM	PM	AM	PM
1. Long Road / Islechem Driveway / Proposed North Driveway (U)								
EB left - Long Road	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0
WB left - Long Road	-	-	-	-	A 8.4	A 8.0	A 8.4	A 8.0
NB - Proposed North Driveway	-	-	-	-	A 8.7	B 10.6	A 8.7	B 10.6
SB - Islechem Driveway	A 0.0	A 8.7	A 0.0	A 8.7	A 0.0	E 39.0	A 0.0	E 39.0
2. Long Road / I-190 Ramp (U)								
EB - Long Road	-	-	-	-	-	-	A 5.1	B 11.8
WB - Long Road	A 7.6	A 7.3	A 7.6	A 7.3	A 7.7	A 8.7	B 13.6	B 11.3
NB - I-190 Ramp	B 12.3	A 9.6	B 12.4	A 9.7	E 40.8	F 67.0	B 15.1	B 15.9
Overall LOS	-	-	-	-	-	-	B 13.2	B 12.7
3. Long Road / Grand Island Boulevard (U)								
EB left/thru - Long Road	A 8.8	B 10.1	A 8.8	B 10.2	A 9.7	C 24.0	A 9.7	C 24.0
EB right - Long Road	A 8.1	A 9.0	A 8.1	A 9.0	A 9.1	B 10.3	A 9.1	B 10.3
WB - Long Road	A 9.8	A 8.9	A 9.8	A 9.0	B 11.6	B 10.9	B 11.6	B 10.9
NB - Grand Island Boulevard	A 9.7	B 11.3	A 9.7	B 11.4	B 14.5	C 23.8	B 14.5	C 23.8
SB - Grand Island Boulevard	A 8.2	A 8.1	A 8.2	A 8.1	A 8.8	A 9.5	A 8.8	A 9.5
4. Grand Island Boulevard / I-190 NB Ramp Off (U)								
EB left - I-190 Ramp	B 10.0	B 11.6	B 10.0	B 11.6	C 17.3	C 20.0	B 12.6	B 14.9
EB right - I-190 Ramp	-	-	-	-	-	-	B 10.8	B 10.8
5. Grand Island Boulevard / Bedell Road (S)								
EB - Bedell Road	A 5.1	A 7.7	A 5.1	A 7.7	A 5.7	A 8.6	A 5.7	A 8.6
WB - Bedell Road	A 8.6	A 8.0	A 8.7	A 8.0	B 10.9	B 10.7	B 10.9	B 10.7
NB - Grand Island Boulevard	A 6.4	A 5.8	A 6.4	A 5.6	A 7.3	A 7.0	A 7.3	A 7.0
SB - Grand Island Boulevard	A 5.6	A 6.5	A 5.6	A 6.6	A 3.7	A 8.0	A 3.7	A 8.0
Overall LOS	A 6.9	A 6.8	A 6.9	A 6.6	A 6.4	A 6.2	A 6.4	A 6.2
6. Grand Island Boulevard / Baseline Road (S)								
EB left - Grand Island Boulevard	A 0.0	B 11.3	A 0.0	B 11.3	B 12.3	B 11.2	B 12.0	B 11.2
EB thru/right - Grand Island Boulevard	B 10.1	B 11.1	A 10.0	B 11.1	B 10.3	B 15.7	B 10.3	B 15.7
WB left - Grand Island Boulevard	B 12.0	B 10.9	B 12.0	B 10.9	B 12.0	B 11.4	B 12.0	B 11.4
WB thru/right - Grand Island Boulevard	B 11.8	B 15.5	B 11.9	B 15.6	B 12.4	B 15.4	B 12.4	B 15.4
NB left - Baseline Road	A 8.8	B 13.7	A 9.1	B 13.8	A 9.6	B 14.6	A 9.6	B 14.6
NB thru/right - Baseline Road	A 7.5	B 11.1	A 7.7	B 11.2	A 8.0	B 11.6	A 8.0	B 11.6
SB left - Baseline Road	A 8.9	B 14.5	A 9.1	B 14.6	A 9.4	B 15.2	A 9.4	B 15.2
SB thru/right - Baseline Road	A 8.0	B 10.7	A 8.1	B 10.9	A 8.3	B 11.3	A 8.3	B 11.3
Overall LOS	A 9.3	B 13.2	A 9.5	B 13.2	A 9.0	B 14.5	A 9.0	B 14.5
7. Grand Island Boulevard / Whitehaven Road (S)								
EB left - Whitehaven Road	B 10.4	B 17.3	B 10.4	B 17.1	B 10.4	B 17.7	B 10.4	B 18.1
EB thru - Whitehaven Road	B 11.1	B 18.7	B 11.1	B 18.4	B 11.0	B 19.4	B 11.0	B 18.7
EB right - Whitehaven Road	A 4.5	A 6.0	A 4.5	A 6.0	A 4.4	A 5.9	A 4.4	A 5.5
WB left - Whitehaven Road	B 11.4	B 19.4	B 11.4	B 19.1	B 11.4	C 20.2	B 11.4	B 19.3
WB thru/right - Whitehaven Road	A 9.8	A 9.3	A 9.8	A 9.1	B 10.0	A 9.6	A 10.0	A 9.1
NB left - Grand Island Boulevard	B 10.5	A 8.1	B 10.5	A 8.1	B 11.4	A 8.4	B 11.4	A 8.6
NB thru/right - Grand Island Boulevard	A 9.9	B 12.6	A 9.9	B 12.8	B 10.8	B 13.2	B 10.8	B 12.8
SB left - Grand Island Boulevard	A 9.7	A 9.9	A 9.7	A 8.2	B 10.4	B 12.0	B 10.4	B 11.7
SB thru/right - Grand Island Boulevard	B 11.3	A 8.9	B 11.3	A 9.0	B 12.2	B 10.1	B 12.2	A 10.0
Overall LOS	B 10.5	B 11.8	B 10.5	B 11.8	B 10.6	B 12.3	B 10.6	B 11.9
8. Bedell Road / Proposed Site Driveway (U)								
EB left - Bedell Road	N/A		N/A		A 0.0	A 0.0	A 0.0	A 0.0
SB - Proposed South Driveway					A 9.5	B 12.7	B 10.1	B 12.7
9. Grand Island Boulevard / Staley Road (ROUNDABOUT)								
EB left - Staley Road	B 10.9	B 11.7	B 11.2	B 11.9	B 11.8	B 12.6	N/A	
EB thru - Staley Road	A 5.3	A 6.1	A 5.6	A 6.3	A 6.2	A 7.0		
EB right - Staley Road	A 5.8	A 6.9	A 6.1	A 7.1	A 6.7	A 7.8		
WB left - Staley Road	B 12.3	B 11.2	B 12.6	B 11.3	B 12.6	B 12.2		
WB thru - Staley Road	A 6.7	A 5.6	A 7.0	A 5.7	A 7.0	A 6.6		
WB right - Staley Road	A 7.3	A 6.4	A 7.6	A 6.5	A 7.6	A 7.4		
NB left - Grand Island Boulevard	B 12.5	A 9.6	B 13.3	A 9.7	B 14.4	B 10.6		
NB thru - Grand Island Boulevard	A 7.3	A 4.1	A 8.1	A 4.2	A 9.3	A 5.1		
NB right - Grand Island Boulevard	A 7.4	A 4.6	A 8.3	A 4.7	A 9.4	A 5.6		
SB left - Grand Island Boulevard	A 7.2	A 7.5	A 7.2	A 7.5	A 7.2	A 7.6		
SB thru - Grand Island Boulevard	A 1.6	A 1.9	A 1.6	A 1.9	A 1.6	A 2.0		
SB right - Grand Island Boulevard	A 2.4	A 2.7	A 2.4	A 2.7	A 2.4	A 2.8		
Overall LOS	A 7.0	A 4.8	A 7.3	A 4.9	A 7.7	A 6.3		
10. Baseline Road / Whitehaven Road (S)								
EB left - Whitehaven Road	A 7.5	A 7.9	A 6.7	A 8.2	A 6.6	A 8.7	A 6.8	A 8.5
EB thru/right - Whitehaven Road	A 6.1	A 5.4	A 5.6	A 5.4	A 5.6	A 5.7	A 6.0	A 5.7
WB left - Whitehaven Road	A 7.0	A 6.8	A 6.6	A 6.9	A 6.6	A 7.2	A 6.7	A 7.1
WB thru/right - Whitehaven Road	A 7.6	A 5.9	A 6.1	A 6.0	A 6.0	A 6.3	A 6.7	A 6.3
NB left - Baseline Road	A 9.1	A 7.9	A 6.2	A 8.1	A 6.3	A 9.1	A 7.5	A 9.0
NB thru/right - Baseline Road	A 5.6	A 6.2	A 4.5	A 6.3	A 4.6	A 6.3	A 5.1	A 6.2
SB left - Baseline Road	A 7.0	A 7.3	A 6.0	A 7.4	A 6.1	A 7.4	A 6.2	A 7.4
SB thru/right - Baseline Road	A 3.0	A 5.1	A 2.2	A 5.1	A 2.3	A 5.5	A 2.6	A 5.5
Overall LOS	A 6.5	A 6.0	A 4.9	A 6.1	A 4.9	A 6.4	A 4.8	A 6.3

NOTES:

1. A(2.8) = Level of Service (Delay in seconds per vehicle)
2. (S) = Signalized; (U) = Unsignalized
3. N/A = Approach does not exist and/or was not analyzed during this condition
4. F(*) = Delay greater than 200 seconds per vehicle

IV. Additional Comments/Questions Addressed

Seasonality of Traffic Volumes

Based upon a review of the monthly traffic using the NGIB and SGIB, the months of July and August typically have traffic volumes that are approximately 13%-16% higher than the average month while January is typically 26%-29% lower than the average month. Data for this project was collected in early November 2019. The month of October was 2%-3% higher than the average month and November was 8%-9% lower than the average month. Daily traffic volumes can fluctuate between 5%-10% on average. Therefore, the count data provided in the TIS falls within the typical fluctuations of daily traffic volumes for the average month. Highways are designed for typical average daily conditions and not peak demand times. Therefore, no adjustments are required and the improvements recommended for the Project are appropriate. It is also noted that the seasonal fluctuations in traffic volumes typically occur during hours outside of the commuter peak times since traffic during these time periods tend to be higher than the rest of the day. Tourists typically avoid traveling along commuter routes during peak commuter traffic time periods.

I-190 Ramp/Merge Lanes

Meetings with NYSTA are pending, additional information will be provided when it is available.

Grand Island Blvd/Staley Rd Roundabout

This intersection was included and analyzed in the TIS. See also updated Table V above.

Truck Traffic

See attached hourly distribution that was included in the Appendix of the TIS. Truck traffic is deliberately low during commuter peak times and higher at other times of the day/night. Trucks will not be permitted to use Bedell Road. Employees may use either Bedell Road or Long Road to access the on-site parking facilities. Table XIII below shows the hourly distribution of truck traffic entering and exiting the site.

Table XIII: Hourly Distribution of Truck Traffic



Shift Times

A facility such as the one proposed is expected to operate with the shift times shown in Table XIV below. These shift times result in the facility peak hours of 6:30-7:30 AM and 5:30-6:30 PM for employees entering and exiting the site. Additionally, the Project does not generate exiting traffic during the morning commuter peak hours that would add to the commuter traffic leaving Grand Island southbound and traveling towards Buffalo given that the overnight shifts end at 4:30 and 5:00 AM. As shown in Tables IX-XII above, weekday traffic peak hours occurred between 7:00-10:00 AM and 4:00-6:00 PM during both July and November 2019. As such, the Project's shift times mitigate potential impacts to traffic.

Table XIV: Shift Times

	Shift Start Time	Shift End Time
Day Shift – Group 1	7:00 AM	5:30 PM
Day Shift – Group 2	7:30 AM	6:00 PM
Night Shift – Group 1	6:00 PM	4:30 AM
Night Shift – Group 2	6:30 PM	5:00 AM

Consideration of Background Traffic Volumes

Widely accepted methodology for preparing traffic impact studies requires that any projects in the study area that are currently approved or under construction must be considered in the traffic analysis. Projects that are contemplated but not yet approved are not included in a traffic analysis. Therefore, traffic volumes associated with the Heron Pointe residential development on Grand Island Boulevard were added to the existing traffic volumes. To account for normal increases in background traffic growth, including any unforeseen developments in the project study area, a conservative growth rate of 0.5 % per year was applied to the existing traffic volumes, based upon historical traffic growth derived from NYSDOT traffic volume data for the area, for the two-year build-out period.

V. Outreach with Erie County Department of Public Works & New York State Department of Transportation

On March 27, 2020 our office participated in a teleconference meeting with the Erie County Department of Public Works (ECDPW). Overall the ECDPW indicated that they do not have any issues with the proposed mitigation. They will review the information provided in this letter and requested some additional information prior to completing their review.

Our office has been in contact with NYSDOT as they complete their review of the TIS and provide comments.

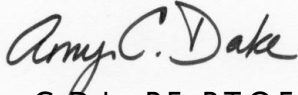
April 6, 2020

VI. Conclusion

A thorough analysis of existing conditions show that the Project can be accommodated by the existing bridge network without any mitigation. That, in addition to the comprehensive traffic analysis contained in the TIS, indicates that the Project can be accommodated by the existing roadway network with the recommended improvements identified in the TIS. As such, the Project will not have any significant adverse impacts on traffic.

Please let me know if there are any questions or if any additional information is required.

Very truly yours,
SRF Associates



Amy C. Dake, P.E., P.T.O.E.
Senior Managing Traffic Engineer

V:\Projects\2019\39064 Project Olive Grand Island\Thruway Bridge Info\Supplemental Evaluation Letter 04-06-20.docx

ATTACHMENT

April 6, 2020

Letter to

James Murray-Coleman
TC Buffalo Development Associates, LLC

Proposed Grand Island Distribution Facility Supplemental Evaluation

Town of Grand Island
Erie County, New York



3495 Winton Place
Building E, Suite 110
Rochester, NY 14623

New York State Department of Transportation General Bridge Inspection Report

Inspection Date: August 30, 2018

Structure Information

BIN: 5045780

Feature Carried: LONG RD

Feature Crossed: 190IX

Orientation: 3 - EAST

Region: 05 - BUFFALO

County: ERIE

Political Unit: Town of GRAND ISLAND

Approximate Year Built: 1954

Primary Owner: 2L - NYS Thruway Authority

Primary Maintenance Responsibility: 2L - NYS Thruway Authority

General Type Main Span: 4 - Steel (Continuous), 02 - Stringer/Multi-Beam or Girder

This Bridge is not a Ramp

Number of Spans: 4

Postings

Posted Load Matches Inventory: Yes

Posted Load in field: Not Posted

Posted Vertical Clearances Match Inventory: Yes

Inventory On: Not Posted

Inventory Under: Not Posted

Number of Flags Issued

Red PIA: 0

Red: 0

Yellow: 0

Safety PIA: 0

New York State Inspection Overview

General Recommendation: 6

Federal NBI Ratings

NBI Deck Condition: 8

NBI Superstructure Condition: 6

NBI Substructure Condition: 6

NBI Channel Condition: N

NBI Culvert Condition: N

Action Items

Non-Structural Condition Observations noted: YES

Vulnerability Reviews Recommended: NO

Diving Inspection Requested: NO

Further Investigation Requested: NO

Inspector & Reviewer Signature Information

Inspection Signature: Michael Bower, P.E. 084068-1

Review Signature: Mike Sullivan, P.E. 72693

Processed by : Johnbull Bello

Date: September 18, 2018

Date: October 24, 2018

Date: November 06, 2018

Report Printed: January 31, 2019 1:41:57 PM

Special Emphasis Inspection

Special Emphasis Detail	"Other" Special Emphasis Detail Description	Hands-On Insp Performed	Hands-On Inspection Note
AASHTO Category D, E, and E' welded details	Spans 1 - 4, Girders 1 - 6; Welds at the ends of partial length top flange cover plates.	No	2018 - Waived, refer to fatigue evaluation sketch.

Additional Information

Overloads Observed

No overload vehicles observed during this inspection.

Notes to Next Inspector

1. BIN plate is located on the begin abutment stem in Bay 5.
2. Parked in median behind guide rail off I-190 SB.
3. Utilized extension ladder to access piers.
4. No WZTC is required at this location.

Improvements Observed

2018 – I-190 NB & SB lanes have been milled and inlaid since the previous inspection.

Pedestrian Fence Height

8'

Snow Fence

None

Bin Plate Condition

OK

Scour Critical Rating

N - Bridge not over waterway.

Field Notes

Staff Present During Inspection

Name	Title	Organization
Michael Bower	TL	NYSTA
Neil Ferguson	ATL	NYSTA

General Equipment Required for Inspection*

Access Type
13 - Walking
15 - Extension Ladder

* For span specific equipment requirements refer to the Active Inventory's "Access Needs" tab in BDIS.

Detailed Time & Weather Conditions

Field Date	Arrival	Departure	Temp (F)	Weather Conditions
08/30/2018	11:15 AM	01:40 PM	70	Mostly Cloudy

Inspection Times (hours)

Time required for travel, inspection and report preparation	10
Lane closure usage	None
Railroad flagging time	No

Element Quantities

Element Assessment Summary Table

Element	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
12 - Reinforced Concrete Deck	9958	ft ²	9958				0
107 - Steel Open Girder/Beam	1205	ft	601	601	3		0
205 - Reinforced Concrete Column	12	each		12			0
215 - Reinforced Concrete Abutment	100	ft	80	20			0
220 - Reinforced Concrete Pile Cap/Footing	309	ft		106			203
227 - Reinforced Concrete Pile	122	each					122
234 - Reinforced Concrete Pier Cap	141	ft		130	11		0
310 - Elastomeric Bearing	30	each	30				0
321 - Reinforced Concrete Approach Slab	1744	ft ²	1309	435			0
330 - Metal Bridge Railing	407	ft	407				0
510 - Wearing Surfaces	9576	ft ²	9576				0
515 - Steel Protective Coating	10253	ft ²	7964	1842	447		0
800 - Erosion or Scour	456	ft	350	106			0
830 - Secondary Members	4	each	4				0
850 - Backwall	100	ft	80	20			0
851 - Abutment Pedestal	12	each	12				0
852 - Pier Pedestal	18	each	17	1			0
853 - Wingwall	54	ft	54				0

Element Assessment by Span

Element**	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
<i>Span Number : 1</i>							
BA215 - Reinforced Concrete Abutment	50	ft	40	10			0
BA220 - Reinforced Concrete Pile Cap/Footing	53	ft		53			0
BA227 - Reinforced Concrete Pile	19	each					19
BA310 - Elastomeric Bearing	6	each	6				0
515 - Steel Protective Coating	24	ft ²	20	2	2		0
BA321 - Reinforced Concrete Approach Slab	847	ft ²	636	211			0
BA800 - Erosion or Scour	53	ft		53			0
BA850 - Backwall	50	ft	40	10			0
BA851 - Abutment Pedestal	6	each	6				0
BW220 - Reinforced Concrete Pile Cap/Footing	28	ft					28
BW227 - Reinforced Concrete Pile	6	each					6

BIN: 5045780 Bridge Inspection Report
Inspection Date: August 30, 2018

Element**	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
BW800 - Erosion or Scour	28	ft	28				0
BW853 - Wingwall	27	ft	27				0
PR205 - Reinforced Concrete Column	4	each		4			0
PR220 - Reinforced Concrete Pile Cap/Footing	49	ft					49
PR227 - Reinforced Concrete Pile	24	each					24
PR234 - Reinforced Concrete Pier Cap	47	ft		46	1		0
PR310 - Elastomeric Bearing	6	each	6				0
515 - Steel Protective Coating	24	ft ²	20	2	2		0
PR800 - Erosion or Scour	98	ft	98				0
PR852 - Pier Pedestal	6	each	6				0
12 - Reinforced Concrete Deck	1922	ft ²	1922				0
510 - Wearing Surfaces	1858	ft ²	1858				0
107 - Steel Open Girder/Beam	228	ft	114	113	1		0
515 - Steel Protective Coating	1653	ft ²	1489	82	82		0
330 - Metal Bridge Railing	78	ft	78				0
515 - Steel Protective Coating	272	ft ²		272			0
830 - Secondary Members	1	each	1				0
Span Number : 2							
PR205 - Reinforced Concrete Column	4	each		4			0
PR220 - Reinforced Concrete Pile Cap/Footing	49	ft					49
PR227 - Reinforced Concrete Pile	24	each					24
PR234 - Reinforced Concrete Pier Cap	47	ft		37	10		0
PR310 - Elastomeric Bearing	6	each	6				0
515 - Steel Protective Coating	24	ft ²	20	2	2		0
PR800 - Erosion or Scour	98	ft	98				0
PR852 - Pier Pedestal	6	each	5	1			0
12 - Reinforced Concrete Deck	3210	ft ²	3210				0
510 - Wearing Surfaces	3079	ft ²	3079				0
107 - Steel Open Girder/Beam	393	ft	196	197			0
515 - Steel Protective Coating	2854	ft ²	2570	142	142		0
330 - Metal Bridge Railing	131	ft	131				0
515 - Steel Protective Coating	442	ft ²		442			0
830 - Secondary Members	1	each	1				0
Span Number : 3							
PR205 - Reinforced Concrete Column	4	each		4			0
PR220 - Reinforced Concrete Pile Cap/Footing	49	ft					49
PR227 - Reinforced Concrete Pile	24	each					24

BIN: 5045780 Bridge Inspection Report
Inspection Date: August 30, 2018

Element**	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
PR234 - Reinforced Concrete Pier Cap	47	ft		47			0
PR310 - Elastomeric Bearing	6	each	6				0
515 - Steel Protective Coating	24	ft ²	20	2	2		0
PR800 - Erosion or Scour	98	ft	98				0
PR852 - Pier Pedestal	6	each	6				0
12 - Reinforced Concrete Deck	2903	ft ²	2903				0
510 - Wearing Surfaces	2785	ft ²	2785				0
107 - Steel Open Girder/Beam	356	ft	178	178			0
515 - Steel Protective Coating	2578	ft ²	2322	128	128		0
330 - Metal Bridge Railing	119	ft	119				0
515 - Steel Protective Coating	409	ft ²		409			0
830 - Secondary Members	1	each	1				0
Span Number : 4							
EA215 - Reinforced Concrete Abutment	50	ft	40	10			0
EA220 - Reinforced Concrete Pile Cap/Footing	53	ft		53			0
EA227 - Reinforced Concrete Pile	19	each					19
EA310 - Elastomeric Bearing	6	each	6				0
515 - Steel Protective Coating	24	ft ²	14	5	5		0
EA321 - Reinforced Concrete Approach Slab	897	ft ²	673	224			0
EA800 - Erosion or Scour	53	ft		53			0
EA850 - Backwall	50	ft	40	10			0
EA851 - Abutment Pedestal	6	each	6				0
EW220 - Reinforced Concrete Pile Cap/Footing	28	ft					28
EW227 - Reinforced Concrete Pile	6	each					6
EW800 - Erosion or Scour	28	ft	28				0
EW853 - Wingwall	27	ft	27				0
12 - Reinforced Concrete Deck	1923	ft ²	1923				0
510 - Wearing Surfaces	1854	ft ²	1854				0
107 - Steel Open Girder/Beam	228	ft	113	113	2		0
515 - Steel Protective Coating	1653	ft ²	1489	82	82		0
330 - Metal Bridge Railing	79	ft	79				0
515 - Steel Protective Coating	272	ft ²		272			0
830 - Secondary Members	1	each	1				0

** Elements with a prefix designate the locations of BA-Begin Abutment, BW-Begin Wingwall, EA-End Abutment, EW-End Wingwall, CO-Culvert Outlet, and PR-Pier. No prefix generally indicates the element is part of the superstructure.

Inspection Notes

General Comments

1. Bridge is located at MP 919.32
2. Special Emphasis details exist, refer to special emphasis section of report. As per 2017 NYSDOT Bridge Inspection Manual and AASHTO Fatigue Categories, riveted splice connections do not meet criteria for special emphasis details (not welded). There is no apparent history of impacts, overload permits or profile sagging. Riveted splice connections are removed as special emphasis details this inspection. Removal was discussed with QC and Metals Department.

Element Condition Notes

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: 107 - Steel Open Girder/Beam	228	114	113	1	0	0
Span 2: 107 - Steel Open Girder/Beam	393	196	197	0	0	0
Span 3: 107 - Steel Open Girder/Beam	356	178	178	0	0	0
Span 4: 107 - Steel Open Girder/Beam	228	113	113	2	0	0

Common

Referenced Photo(s): 1, 2

Referenced Sketch(es): None

2018 – The steel girders in all spans are generally in good to fair condition with areas of previous pitting on the bottom flange and bottom of web but typically overall section loss is negligible. Previous pitting affects approximately 50% of the total girder length in all four spans, CS2.

The beam ends at the begin and end abutments exhibit previous pitting and minor to moderate bearing area section loss. Caliper readings were taken at the worst apparent locations.

Span 1 at Begin

G6: 3/8" average thickness (0.490" original) approximately 20-25% bearing area section loss, 1 LF CS3.

G1 thru G5 beam ends have approximately 10-15% bearing area section loss, CS2.

Span 4 at End

G1 & G6: 3/8" average thickness (0.490" original) approximately 20-25% bearing area section loss, 2 LF CS3.

G2 thru G5 beam ends have approximately 10-15% bearing area section loss, CS2.

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	1653	1489	82	82	0	0
Span 2: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	2854	2570	142	142	0	0
Span 3: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	2578	2322	128	128	0	0
Span 4: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	1653	1489	82	82	0	0

Common

Referenced Photo(s): 1, 2, 7

Referenced Sketch(es): None

2018 – Paint on the girders in all four spans is generally in good condition with only isolated locations of fading and minor rusting at the edges of the bottom flange.

Spans 1 thru 4

CS1 = 90%

CS2 = 5%

CS3 = 5%

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: PR205 - Reinforced Concrete Column	4	0	4	0	0	0
Span 2: PR205 - Reinforced Concrete Column	4	0	4	0	0	0
Span 3: PR205 - Reinforced Concrete Column	4	0	4	0	0	0

Condition State 2 Note

Referenced Photo(s): 3, 5

Referenced Sketch(es): None

2018 – The reinforced concrete columns at Piers 1, 2 & 3 exhibit areas of previous repairs, cracking, hollow sounding concrete, and isolated surface spalling. Hollow sounding concrete is located at:

Pier 1

Column 1: Begin 2 SF, End 8 SF
Column 2: Begin 2 SF, End 5 SF
Column 3: End 8 SF, 1 SF surface spall
Column 4: Left 10 SF

Pier 2

Column 1: Begin 20 SF
Column 2: Begin 10 SF, End 5 SF
Column 3: Begin 5 SF, End 2 SF
Column 4: Left 10 SF

Pier 3

Column 1: Begin 5 SF
Column 2: Begin 8 SF, End 2 SF
Column 3: Begin 15 SF, (2) 1 SF surface spalls
Column 4: Begin 5 SF

All pier columns are assessed CS2.

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: BA220 - Reinforced Concrete Pile Cap/Footing	53	0	53	0	0	0
Span 4: EA220 - Reinforced Concrete Pile Cap/Footing	53	0	53	0	0	0

Condition State 2 Note

Referenced Photo(s): 6

Referenced Sketch(es): None

2018 – The top of the begin and end abutment footings are exposed for the full length of the abutment stem up to 6" vertically. The front edge and top face of the footings exhibit surface spalling on the majority of exposed surfaces, CS2.

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: PR234 - Reinforced Concrete Pier Cap	47	0	46	1	0	0
Span 2: PR234 - Reinforced Concrete Pier Cap	47	0	37	10	0	0
Span 3: PR234 - Reinforced Concrete Pier Cap	47	0	47	0	0	0

Common

Referenced Photo(s): 3, 4, 5

Referenced Sketch(es): None

2018 – The reinforced concrete pier caps at Piers 1, 2 & 3 exhibit mapcracking, delaminations, hollow sounding concrete and spalling.

Pier 1

Isolated hollow sounding on top of cap in all bays.
Left Nose: Mapcracking, honeycombing and isolated hollow sounding
Column Bay 1: 75% of underside is hollow sounding. Begin face beneath G2, 1 SF surface spall.
Column Bay 3: Begin face cracked and delaminated at top, left and right sides of G5. End face right of G5, 1' wide x 2' high x 1.5" deep spall, 4' wide x 3' high hollow sounding left of spall.

1 LF is CS3, remainder is CS2.

Pier 2 (Photo 3)

Approximately 25% to 100% on the top of cap is hollow sounding in all bays.

Column Bay 1: Begin face, up to 7' wide x 1' to 4' high x up to 3" deep spall with exposed, corroded (50% section loss +/-), and debonded hoop rebar. 10 SF hollow sounding concrete right of spall (Photo 4). End face, mapcracking, 15 SF hollow sounding.

Column Bay 2: Begin face cracked and delaminated at bottom, isolated hollow sounding.

Column Bay 3: Begin face left of G5 at top, cracked and delaminated, beneath G5, 3' long x 1' high x 2.5" deep spall, right of G5 1 SF surface spall. End face beneath G5, 2 SF surface spall, 20 SF hollow sounding surrounding spall.

10 LF is CS3, remainder is CS2.

Pier 3

Column Bay 1: 50% of underside is hollow sounding.

Column Bay 2: Underside at begin, 1' wide between columns cracked and delaminated.

Column Bay 3: Begin face right of G5 at top, 2' long cracked and delaminated. End face, 3.5' long x 3' high hollow sounding, (2) 1 SF surface spalls (Photo 5).

47 LF is CS2.

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: BA310 - Elastomeric Bearing-515 - Steel Protective Coating	24	20	2	2	0	0
Span 1: PR310 - Elastomeric Bearing-515 - Steel Protective Coating	24	20	2	2	0	0
Span 2: PR310 - Elastomeric Bearing-515 - Steel Protective Coating	24	20	2	2	0	0
Span 3: PR310 - Elastomeric Bearing-515 - Steel Protective Coating	24	20	2	2	0	0
Span 4: EA310 - Elastomeric Bearing-515 - Steel Protective Coating	24	14	5	5	0	0

Common

Referenced Photo(s): 1, 2

Referenced Sketch(es): None

2018 – Paint on the bearings is generally in good condition with only isolated locations of rust staining and corrosion on the edges of the sole and masonry plates.

Begin abutment, Piers 1, 2 & 3

CS1 = 80%

CS2 = 10%

CS3 = 10%

End abutment

CS1 = 60%

CS2 = 20%

CS3 = 20%

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: BA321 - Reinforced Concrete Approach Slab	847	636	211	0	0	0
Span 4: EA321 - Reinforced Concrete Approach Slab	897	673	224	0	0	0

Condition State 2 Note

Referenced Photo(s): 8

Referenced Sketch(es): None

2018 – The begin and end approach slabs exhibit minor cracking and wear/rounding at the approach asphalt interface. Approximately 25% of the begin and end approach slabs is CS2.

Non-Structural Condition Observations

Category: APPROACH - Settlement Quantity: 100 Unit: sqft

Referenced Element(s): NONE

Referenced Photo(s): 8

Referenced Sketch(es): NONE

2018 – The begin and end asphalt approach pavement exhibits minor settlement of up to 1" at the sleeper slab interface. Approximately 50 SF of asphalt at begin and end is affected.

Category: APPROACH - Other -Joint Quantity: 50 Unit: ft

Referenced Element(s): NONE

Referenced Photo(s): 8

Referenced Sketch(es): NONE

2018 – The pourable joint seal between the approach slab and sleeper slab at begin and end exhibits debonding over approximately 50% of the joint length. Approximately 25 LF of the joint is affected at begin and end.

Category: APPROACH - Railing Quantity: 40 Unit: ft

Referenced Element(s): NONE

Referenced Photo(s): 11,12

Referenced Sketch(es): NONE

2018 – The begin left approach guide rail is leaning away from the shoulder and is laterally displaced approximately 12" to 16" for 30 LF. All (3) cables of the cable anchorage system are disconnected.

The end right approach guide rail has (3) disconnected clip angles on the top rail affecting approximately 10 LF.

Category: FENCING - Pedestrian Quantity: 407 Unit: ft

Referenced Element(s): NONE

Referenced Photo(s): 13

Referenced Sketch(es): NONE

2018 – The pedestrian fencing bottom horizontal rails exhibit moderate to severe corrosion at the connections to the fence posts. Approximately 75% of all bottom rails at the post connections are completely corroded through and disconnected. The bottom rails remain attached to the fencing with wire ties. Remaining bottom rails at the post connections exhibit at least 75% section loss. Approximately 407 LF of bottom horizontal rail is affected.

The fence posts are in good to fair condition with no significant section loss. The bottom 3' +/- of the fence posts exhibit surface corrosion on the inside faces, immediately behind the bridge rail posts.

Recommend removing and replacing bottom horizontal rails and connections and spot painting/spray galvanizing corroded areas on fence posts.

Category: OTHER -Electric Box Quantity: 1 Unit: ea

Referenced Element(s): NONE

Referenced Photo(s): 14

Referenced Sketch(es): NONE

2018 – The electrical box in the ground to the right of Pier 1 has a displaced cover. The cover is displaced approximately 6" and there is water in the bottom of the box.

Category: ATTACHMENTS - Fascia Mounted Signs Quantity: 1 Unit: ea

Referenced Element(s): NONE

Referenced Photo(s): 9,10

Referenced Sketch(es): NONE

2018 – The sign attached to Span 2 G1 near 1/4 span exhibits minor impact damage and numerous missing backing strip splice plate bolts.

The main sign panel has 4 vertical splices with 5 total rows of backing strip splice plates. For purpose of orientation, splices are numbered from begin to end and backing strip rows are numbered from top to bottom.

1st Splice

Row 1: 2 of 4 bolts missing
Row 2: 8 of 12 bolts missing
Row 3: 6 of 12 bolts missing
Row 4: 5 of 12 bolts missing
Row 5: Not visible from bridge deck

2nd Splice

Row 1: 3 of 4 bolts missing
Row 2: 7 of 12 bolts missing
Row 3: 5 of 12 bolts missing
Row 4: 8 of 12 bolts missing
Row 5: Not visible from bridge deck

3rd Splice

Row 1: 2 of 4 bolts missing
Row 2: 9 of 12 bolts missing
Row 3: 9 of 12 bolts missing
Row 4: Backing strip plate is missing, approximate 1/2" offset in sign panels
Row 5: Not visible from bridge deck

4th Splice

Row 1: 2 of 4 bolts missing
Row 2: 7 of 12 bolts missing
Row 3: 6 of 12 bolts missing
Row 4: Backing strip plate is missing, approximate 1/4" offset in sign panels
Row 5: Not visible from bridge deck

All other bolts on the sign panel and framing appear to be in place.

The end bottom corner of the sign panel has minor impact damage and is bent approximately 3" to 6" toward the bridge.

Inspection Photographs

Photo Number: 1 Photo Filename: 919.32-2018-01.JPG

Attachment Description:
G6 at Begin, right side



Photo Number: 2 Photo Filename: 919.32-2018-02.JPG

Attachment Description:
G1 at End, left side, G6 is similar



Photo Number: 3

Photo Filename: 919.32-2018-03.JPG

Attachment Description:
Pier 2 begin face



Photo Number: 4

Photo Filename: 919.32-2018-04.JPG

Attachment Description:
Pier 2 begin face beneath
G2



Photo Number: 5

Photo Filename: 919.32-2018-05.JPG

Attachment Description:
Pier 3 end face beneath G5



Photo Number: 6

Photo Filename: 919.32-2018-06.JPG

Attachment Description:
Begin abutment footing
looking right, end is similar



Photo Number: 7

Photo Filename: 919.32-2018-07.JPG

Attachment Description:
Span 3 girder paint looking
toward begin left, typical



Photo Number: 8

Photo Filename: 919.32-2018-08.JPG

Attachment Description:
End approach slab, sleeper
slab and approach
pavement looking right,
begin is similar



Photo Number: 9

Photo Filename: 919.32-2018-09.JPG

Attachment Description:
Span 2 sign attached to G1
near 1/4 span



Photo Number: 10

Photo Filename: 919.32-2018-10.JPG

Attachment Description:
Span 2 sign, back side
showing missing backing
strip splice plates



Photo Number: 11

Photo Filename: 919.32-2018-11.JPG

Attachment Description:
Begin left approach guide
rail looking toward bridge



Photo Number: 12

Photo Filename: 919.32-2018-12.JPG

Attachment Description:
End right approach guide
rail looking away from
bridge



Photo Number: 13

Photo Filename: 919.32-2018-13.JPG

Attachment Description:
Typical corroded bottom rail
at post connection, Span 3
begin right (Chalk label is
incorrect)



Photo Number: 14

Photo Filename: 919.32-2018-14.JPG

Attachment Description:
Electrical box right of Pier 1
looking right



Inspection Sketches

Sketch Number: 1

Sketch Filename: 919.32_PhotoMap.jpg

BIN: 5045780

MP: 919.32

TEAM LEADER: Michael Bower

Feature Carried: LONG RD

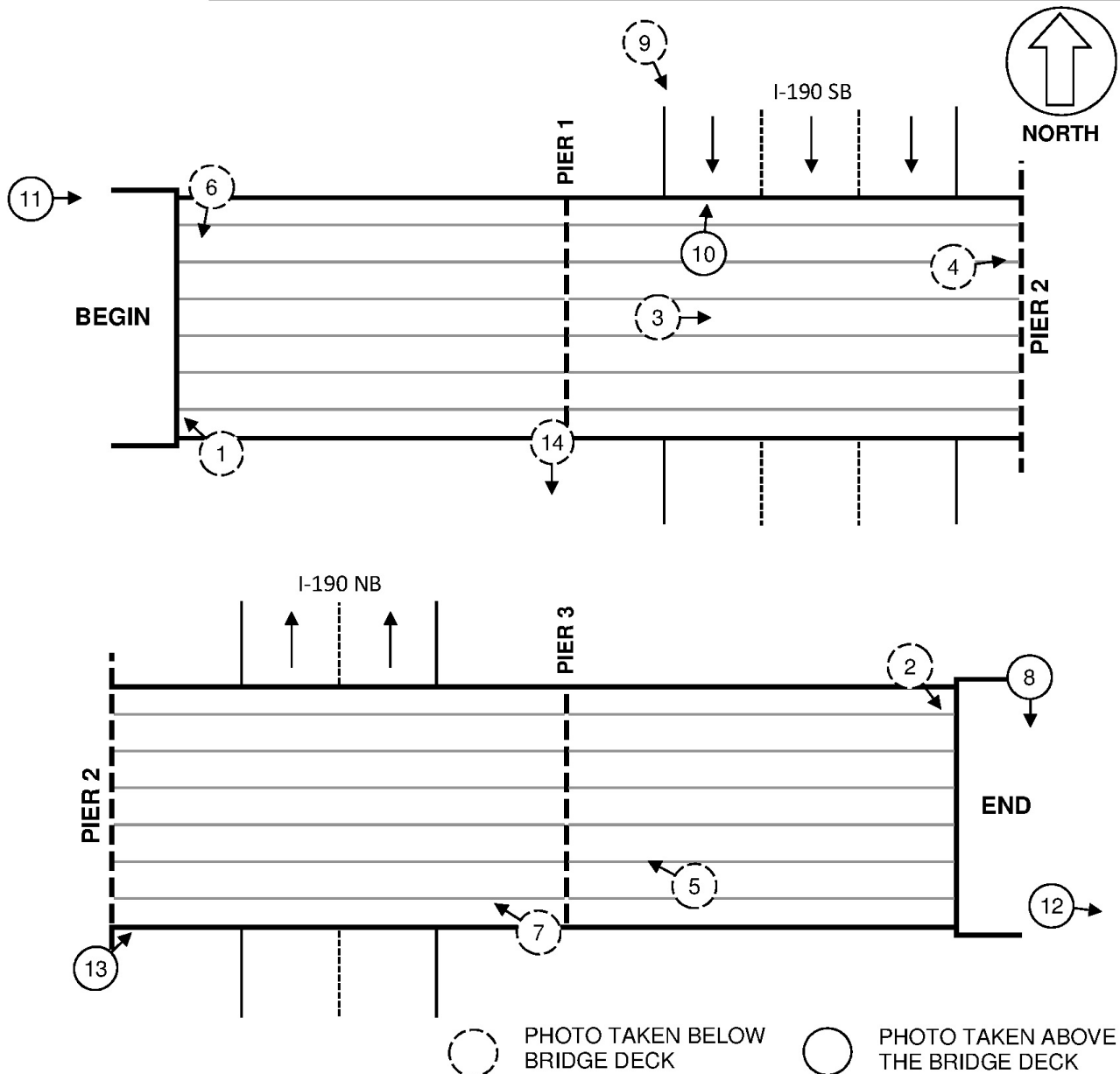
Feature Crossed: 190IX



NYS THRUWAY AUTHORITY BRIDGE INSPECTION REPORT

SHEET 1 OF 1

DATE: 08/30/2018



Sketch Description: 919.32_PhotoMap.jpg

Sketch Number: 2

Sketch Filename: 919.32_Vertical Clearance.jpg



**MINIMUM BRIDGE UNDERCLEARANCE
MAINLINE BRIDGES
BUFFALO DIVISION
NEW YORK STATE THRUWAY AUTHORITY**

MP: 919.32

SHEET 1 OF 1

BIN: 5045780

DATE: 08/30/2018

Bridge Orientation: North

Feature Crossed: I-190

TWY Traffic Direction:

Date	A	B	C	D	E	F	G	H	A'	B'	C'	D'	E'	F'	G'	H'
10/01/2008	15.54	15.00	14.54	14.60	14.81				15.45	14.39	14.56	14.89		15.16		
09/20/2010	15.58	15.00	14.62	14.58	14.81				15.41	14.39	14.54	14.87		15.18		
09/19/2012	15.58	15.00	14.56	14.58	14.83				15.38	14.39	14.56	14.90		15.18		
09/10/2014	15.56	15.00	14.56	14.58	14.81				15.38	14.35	15.58	14.90		15.17		
08/18/2016	15.64	15.16	14.61	14.65	14.84				15.37	14.43	14.61	14.94		15.20		
08/30/2018	15.40	15.00	--	14.66	14.85	14.96			14.69	14.51	--	15.02		15.33		

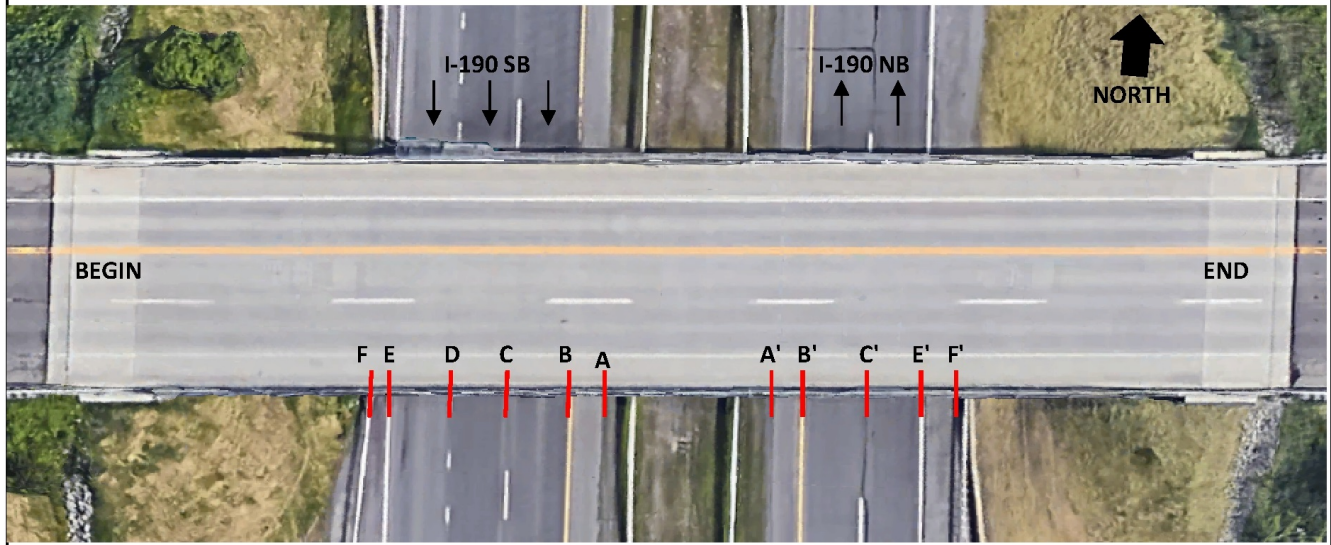
REMARKS:

Measurements taken along Right Fascia Girder.

A and A' readings taken at edge of pavement. Readings prior to 2018 were taken at median guide rail.

2018 - Minor changes in readings due to I-190 NB & SB being milled and inlaid since the previous inspection. High traffic volumes prevented taking readings at C and C'.

SKETCH:



Sketch Description: 919.32_Vertical Clearance.jpg

Sketch Number: 3

Sketch Filename: 919.32_Fatigue Evaluation Results for Waiver.jpg

FATIGUE EVALUATION

Milepost: 919.32
Feature Carried: Long Road
Feature Crossed: 190IX

BIN: 5045780
Date: 8/20/2014

Summary Table

Span	Members	Cover Plate	Side of Flange	Location	Minimum Expected Fatigue Life
1	G1 & G6	Top Flange	Bottom	8.06' from Pier 1	121 years
2	G1 & G6	Top Flange	Bottom	7.06' from Pier 1	222 years
2	G1 & G6	Top Flange	Bottom	9.06' from Pier 2	111 years
3	G1 & G6	Top Flange	Bottom	10.06' from Pier 2	176 years
3	G1 & G6	Top Flange	Bottom	6.06' from Pier 3	Infinite
4	G1 & G6	Top Flange	Bottom	6.06' from Pier 3	138 years
1	G2 - G5	Top Flange	Bottom	8.5' from Pier 1	90 years
2	G2 - G5	Top Flange	Bottom	8.5' from Pier 1	Infinite
2	G2 - G5	Top Flange	Bottom	11' from Pier 2	168 years
3	G2 - G5	Top Flange	Bottom	11' from Pier 2	145 years
3	G2 - G5	Top Flange	Bottom	7' from Pier 3	Infinite
4	G2 - G5	Top Flange	Bottom	7' from Pier 3	113 years

Controlling Minimum Expected Fatigue Life: 90 years

Check for any automatic exemptions in accordance with Appendix C of the NYS Bridge Inspection Manual (Supersedes TA 12-002).

Is minimum expected fatigue life greater than 10 years? Yes*

* Automatic exemptions from the 100% hands-on requirement granted.

Is minimum expected fatigue life greater than 50 years? Yes**

** Reanalysis is not necessary unless traffic increases by more than 6 percent annually. If the traffic growth is greater, then reanalyze every 12 years.

COMPLETED BY

Michael Gaskill
MICHAEL GASKILL
PE # 092560
LOAD RATING ENGINEER

REVIEWED BY

Garret Hoffmann
GARRET HOFFMANN
PE # 070686
QUALITY CONTROL ENGINEER

Sketch Description: 919.32_Fatigue Evaluation Results for Waiver.jpg

Sketch Number: 4

Sketch Filename: 919.32_LR Verification Form.jpg

NEW YORK STATE THRUWAY AUTHORITY

BRIDGE INSPECTION FIELD VERIFICATION OF LOAD RATING DATA

Date: 08/30/18

MP/BIN: 919.32

Feature Carried / Crossed: LONG RD / 190IX

Dead Load:

WS Thickness & Material Shown on Plans -

Changes Noted in Field: **None**

Railing Type Shown on Plans -

Changes Noted in Field: **None**

Other DL Contributions (e.g. utilities) on Plans -

Changes Noted in Field: **None**

Section Loss:

Existing Documentation (sketches, etc.) ? - **Yes**

Location of Documentation (previous report, blue folder, etc.)? -

New Section Loss noted? - **None**

Brief Description (attach sketches if helpful) -

Refer to Element 107 - Steel Open Girder/Beam condition note

Additional Notes:

Attachments: yes **no** (please circle)

Team Leader: Michael Bower Date: August 30, 2018

Sketch Description: 919.32_LR Verification Form.jpg

BIN: 5045780
Carried: LONG ROAD
Crossed: 190I

919.32-2018-AbutmentBegin.JPG



919.32-2018-AbutmentEnd.JPG



919.32-2018-ApproachBegin.JPG



919.32-2018-ApproachEnd.JPG



919.32-2018-ElevationLeft.JPG



919.32-2018-ElevationRight.JPG



919.32-2018-FeatureCrossedLeft.JPG



919.32-2018-FeatureCrossedRight.JPG



919.32-2018-Framing.JPG



919.32-2018-Pier3_Typ.JPG



New York State Department of Transportation General Bridge Inspection Report

Inspection Date: May 17, 2018

Structure Information

BIN: 5516270

Feature Carried: BEDELL RD

Feature Crossed: 190IX

Orientation: 3 - EAST

Region: 05 - BUFFALO

County: ERIE

Political Unit: Town of GRAND ISLAND

Approximate Year Built: 1954

Primary Owner: 2L - NYS Thruway Authority

Primary Maintenance Responsibility: 2L - NYS Thruway Authority

General Type Main Span: 4 - Steel (Continuous), 02 - Stringer/Multi-Beam or Girder

This Bridge is not a Ramp

Number of Spans: 4

Postings

Posted Load Matches Inventory: Yes

Posted Load in field: Not Posted

Posted Vertical Clearances Match Inventory: Yes

Inventory On: Not Posted

Inventory Under: Not Posted

Number of Flags Issued

Red PIA: 0

Red: 0

Yellow: 0

Safety PIA: 0

New York State Inspection Overview

General Recommendation: 5

Federal NBI Ratings

NBI Deck Condition: 5

NBI Superstructure Condition: 6

NBI Substructure Condition: 7

NBI Channel Condition: N

NBI Culvert Condition: N

Action Items

Non-Structural Condition Observations noted: YES

Vulnerability Reviews Recommended: NO

Diving Inspection Requested: NO

Further Investigation Requested: NO

Inspector & Reviewer Signature Information

Inspection Signature: Michael Bower, P.E. 084068-1

Date: June 15, 2018

Review Signature: Mike Sullivan, P.E. 72693

Date: July 06, 2018

Processed by : Johnbull Bello

Date: July 11, 2018

Report Printed: January 31, 2019 8:21:22 AM

Special Emphasis Inspection

Special Emphasis Detail	"Other" Special Emphasis Detail Description	Hands-On Insp Performed	Hands-On Inspection Note
AASHTO Category D, E, and E' welded details	Partial length cover plates on tension flanges (top and bottom) of G2 & G3 in all 4 span	Yes	2018 - No defects detected

Additional Information

Overloads Observed

No overload vehicles observed during this inspection.

Notes to Next Inspector

1. BIN plate is located on the right side of the begin abutment.
2. Parked off of shoulder behind Pier 3 during NB lane closures and off of shoulder behind Pier 1 during SB lane closures.
3. Utilized scissors lift truck to access special emphasis details, piers, and bridge mounted sign.
4. Niagara Section Maintenance provided left and right lane closures on I-190 NB and SB.

Improvements Observed

None

Pedestrian Fence Height

8'

Snow Fence

None

Bin Plate Condition

OK

Scour Critical Rating

N - Bridge not over waterway.

Field Notes

Staff Present During Inspection

Name	Title	Organization
Michael Bower	TL	NYSTA
Neil Ferguson	ATL	NYSTA
Niagara Maintenance	Various	NYSTA

General Equipment Required for Inspection*

Access Type
13 - Walking
15 - Extension Ladder
19 - Up to 30 Foot Lift
29 - Lane Closure With Shadow Vehicle

* For span specific equipment requirements refer to the Active Inventory's "Access Needs" tab in BDIS.

Detailed Time & Weather Conditions

Field Date	Arrival	Departure	Temp (F)	Weather Conditions
05/17/2018	08:30 AM	02:00 PM	70	Sunny

Inspection Times (hours)

Time required for travel, inspection and report preparation	15
Lane closure usage	4
Railroad flagging time	No

Element Quantities

Element Assessment Summary Table

Element	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
12 - Reinforced Concrete Deck	7114	ft ²		7108	6		0
107 - Steel Open Girder/Beam	848	ft		848			0
205 - Reinforced Concrete Column	9	each	8	1			0
215 - Reinforced Concrete Abutment	74	ft	25	49			0
220 - Reinforced Concrete Pile Cap/Footing	259	ft					259
225 - Steel Pile	82	each					82
234 - Reinforced Concrete Pier Cap	102	ft	84	18			0
302 - Compression Joint Seal	74	ft	74				0
311 - Movable Bearing	16	each		8	8		0
313 - Fixed Bearing	4	each	4				0
330 - Metal Bridge Railing	432	ft	432				0
510 - Wearing Surfaces	5604	ft ²	5604				0
515 - Steel Protective Coating	9434	ft ²	3290	5410	534	200	0
800 - Erosion or Scour	366	ft	366				0
811 - Curb	432	ft	432				0
830 - Secondary Members	4	each	4				0
831 - Steel Beam End	8	each		8			0
850 - Backwall	74	ft	37	37			0
851 - Abutment Pedestal	8	each	2	6			0
852 - Pier Pedestal	12	each	12				0
853 - Wingwall	62	ft	62				0

Element Assessment by Span

Element**	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
<i>Span Number : 1</i>							
BA215 - Reinforced Concrete Abutment	37	ft		37			0
BA220 - Reinforced Concrete Pile Cap/Footing	42	ft					42
BA225 - Steel Pile	12	each					12
BA302 - Compression Joint Seal	37	ft	37				0
BA311 - Movable Bearing	4	each			4		0
515 - Steel Protective Coating	16	ft ²		15	1		0
BA800 - Erosion or Scour	38	ft	38				0
BA831 - Steel Beam End	4	each		4			0

BIN: 5516270 Bridge Inspection Report
Inspection Date: May 17, 2018

Element**	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
BA850 - Backwall	37	ft		37			0
BA851 - Abutment Pedestal	4	each		4			0
BW220 - Reinforced Concrete Pile Cap/Footing	32	ft					32
BW225 - Steel Pile	7	each					7
BW800 - Erosion or Scour	32	ft	32				0
BW853 - Wingwall	31	ft	31				0
PR205 - Reinforced Concrete Column	3	each	2	1			0
PR220 - Reinforced Concrete Pile Cap/Footing	37	ft					37
PR225 - Steel Pile	14	each					14
PR234 - Reinforced Concrete Pier Cap	34	ft	25	9			0
PR311 - Movable Bearing	4	each		4			0
515 - Steel Protective Coating	16	ft ²	8	8			0
PR800 - Erosion or Scour	74	ft	74				0
PR852 - Pier Pedestal	4	each	4				0
12 - Reinforced Concrete Deck	1428	ft ²		1428			0
510 - Wearing Surfaces	1125	ft ²	1125				0
107 - Steel Open Girder/Beam	166	ft		166			0
515 - Steel Protective Coating	1296	ft ²	64	1168	64		0
330 - Metal Bridge Railing	87	ft	87				0
515 - Steel Protective Coating	549	ft ²	549				0
811 - Curb	87	ft	87				0
830 - Secondary Members	1	each	1				0
Span Number : 2							
PR205 - Reinforced Concrete Column	3	each	3				0
PR220 - Reinforced Concrete Pile Cap/Footing	37	ft					37
PR225 - Steel Pile	16	each					16
PR234 - Reinforced Concrete Pier Cap	34	ft	34				0
PR313 - Fixed Bearing	4	each	4				0
515 - Steel Protective Coating	16	ft ²	8	8			0
PR800 - Erosion or Scour	74	ft	74				0
PR852 - Pier Pedestal	4	each	4				0
12 - Reinforced Concrete Deck	2129	ft ²		2126	3		0
510 - Wearing Surfaces	1677	ft ²	1677				0
107 - Steel Open Girder/Beam	258	ft		258			0
515 - Steel Protective Coating	2014	ft ²	202	1510	202	100	0
330 - Metal Bridge Railing	129	ft	129				0

BIN: 5516270 Bridge Inspection Report
Inspection Date: May 17, 2018

Element**	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
515 - Steel Protective Coating	818	ft ²	818				0
811 - Curb	129	ft	129				0
830 - Secondary Members	1	each	1				0
Span Number : 3							
PR205 - Reinforced Concrete Column	3	each	3				0
PR220 - Reinforced Concrete Pile Cap/Footing	37	ft					37
PR225 - Steel Pile	14	each					14
PR234 - Reinforced Concrete Pier Cap	34	ft	25	9			0
PR311 - Movable Bearing	4	each		4			0
515 - Steel Protective Coating	16	ft ²	8	8			0
PR800 - Erosion or Scour	74	ft	74				0
PR852 - Pier Pedestal	4	each	4				0
12 - Reinforced Concrete Deck	2129	ft ²		2126	3		0
510 - Wearing Surfaces	1677	ft ²	1677				0
107 - Steel Open Girder/Beam	258	ft		258			0
515 - Steel Protective Coating	2014	ft ²	202	1510	202	100	0
330 - Metal Bridge Railing	129	ft	129				0
515 - Steel Protective Coating	818	ft ²	818				0
811 - Curb	129	ft	129				0
830 - Secondary Members	1	each	1				0
Span Number : 4							
EA215 - Reinforced Concrete Abutment	37	ft	25	12			0
EA220 - Reinforced Concrete Pile Cap/Footing	42	ft					42
EA225 - Steel Pile	12	each					12
EA302 - Compression Joint Seal	37	ft	37				0
EA311 - Movable Bearing	4	each			4		0
515 - Steel Protective Coating	16	ft ²		15	1		0
EA800 - Erosion or Scour	42	ft	42				0
EA831 - Steel Beam End	4	each		4			0
EA850 - Backwall	37	ft	37				0
EA851 - Abutment Pedestal	4	each	2	2			0
EW220 - Reinforced Concrete Pile Cap/Footing	32	ft					32
EW225 - Steel Pile	7	each					7
EW800 - Erosion or Scour	32	ft	32				0
EW853 - Wingwall	31	ft	31				0
12 - Reinforced Concrete Deck	1428	ft ²		1428			0
510 - Wearing Surfaces	1125	ft ²	1125				0

Element**	Total Quantity	Unit	CS-1	CS-2	CS-3	CS-4	CS-5
107 - Steel Open Girder/Beam	166	ft		166			0
515 - Steel Protective Coating	1296	ft ²	64	1168	64		0
330 - Metal Bridge Railing	87	ft	87				0
515 - Steel Protective Coating	549	ft ²	549				0
811 - Curb	87	ft	87				0
830 - Secondary Members	1	each	1				0

** Elements with a prefix designate the locations of BA-Begin Abutment, BW-Begin Wingwall, EA-End Abutment, EW-End Wingwall, CO-Culvert Outlet, and PR-Pier. No prefix generally indicates the element is part of the superstructure.

Inspection Notes

General Comments

1. Bridge is located at MP 918.39
2. Special Emphasis details for staggered diaphragms and riveted girder splices are removed this inspection. These details do not meet Special Emphasis details as outlined in NYSDOT BIM Appendix C.
3. Welds at ends of partial length cover plates remain as Special Emphasis Details, refer to Special Emphasis section of report.

Element Condition Notes

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: 12 - Reinforced Concrete Deck	1428	0	1428	0	0	0
Span 2: 12 - Reinforced Concrete Deck	2129	0	2126	3	0	0
Span 3: 12 - Reinforced Concrete Deck	2129	0	2126	3	0	0
Span 4: 12 - Reinforced Concrete Deck	1428	0	1428	0	0	0

Common

Referenced Photo(s): 1, 2, 3

Referenced Sketch(es): None

2018 – The reinforced concrete deck exhibits mapcracking with light to moderate efflorescence, honeycombing, dampness, and isolated locations of delaminations and surface spalling.

Worst location of mapcracking with efflorescence is Span 4, Bay 1, near end (Photo 1). Leakage and dampness is typically worst surrounding previously patched areas of deck.

Isolated locations deterioration meeting CS3 conditions are:

Span 2, Bay 1 near midspan – 1 SF spall with exposed rebar (Photo 2)

Span 2, Bay 2 near midspan – (2) 1 SF spalled/honeycombed areas with exposed rebar

Span 3, Bay 1 near midspan – 1 SF spall with exposed rebar

Span 3, Right fascia near midspan – 2' long x 5" high x 4" deep corner spall (Photo 3)

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: 107 - Steel Open Girder/Beam	166	0	166	0	0	0
Span 2: 107 - Steel Open Girder/Beam	258	0	258	0	0	0
Span 3: 107 - Steel Open Girder/Beam	258	0	258	0	0	0
Span 4: 107 - Steel Open Girder/Beam	166	0	166	0	0	0

Condition State 2 Note

Referenced Photo(s): 4, 5

Referenced Sketch(es): None

2018 – Under contract TAN 14-48B various steel repairs were made to the fascia girders, G1 & G4 in all spans and end diaphragms at the piers in the fascia bays were replaced. Refer to contract plans for repair details.

In all spans, the top and bottom flanges exhibit isolated areas of corrosion and flange section loss of approximately 5% (Photos 4 & 5).

G2 and G3 unrepaired webs at begin and end exhibit minor pitting on the lower portions of the web and estimated 5-10% bearing area section loss.

Element 107 is assessed CS2 in all spans.

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	1296	64	1168	64	0	0
Span 2: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	2014	202	1510	202	100	0
Span 3: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	2014	202	1510	202	100	0
Span 4: 107 - Steel Open Girder/Beam-515 - Steel Protective Coating	1296	64	1168	64	0	0

Common

Referenced Photo(s): 4, 5

Referenced Sketch(es): None

2018 – The paint system on the girders in all spans is generally slightly faded and chalky with isolated areas of rusting and paint failure typically along the edges of the top and bottom flanges. There are also locations where spot painting was performed around steel repairs, this paint is in good condition. Approximate percentage of paint condition states is as follows.

Spans 1 & 4: CS1 5%, CS2 90%, CS3 5%

Spans 2 & 3: CS1 10%, CS2 75%, CS3 10%, CS4 5%

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: PR205 - Reinforced Concrete Column	3	2	1	0	0	0

Condition State 2 Note

Referenced Photo(s): 8

Referenced Sketch(es): None

2018 – Column 1 left side at top has a 2' wide x 3' high area of hollow sounding concrete.

	TQ	CS-1	CS-2	CS-3	CS-4	CS-5
Span 1: PR234 - Reinforced Concrete Pier Cap	34	25	9	0	0	0
Span 3: PR234 - Reinforced Concrete Pier Cap	34	25	9	0	0	0

Condition State 2 Note

Referenced Photo(s): 8, 9, 10

Referenced Sketch(es): None

2018 – Under contract TAN 14-48B, concrete repairs were completed at various locations on the pier caps.

Sounding of the piers located hollow sounding areas at:

Pier 1

Left nose, 2' wide x 1' high (affects 1 LF of pier cap)

Bottom of cap, right of C2, 4' long x 1' wide

Bottom of cap, left of C3, 4' long x 1' to 3' wide extending up to 1' onto the end face

CS2 = 1' + 4' + 4' = 9 LF

Pier 3

Begin face, Bay 1 at top, 4' long x 1' high

Begin face, Bay 2 at top, 3' long x 1' high and 1' long x 2' high

Begin face, Bay 4 at mid-height, 1 SF

CS2 = 4' + 3' + 1' + 1' = 9 LF

Span 1: BA311 - Movable Bearing
 Span 4: EA311 - Movable Bearing

TQ	CS-1	CS-2	CS-3	CS-4	CS-5
4	0	0	4	0	0
4	0	0	4	0	0

Condition State 3 Note

Referenced Photo(s): 6, 7

Referenced Sketch(es): None

2018 – The begin and end abutment bearings are extended at 70 F. At the worst locations, the steel shoes have extended to the edge and beyond the limits of the masonry plate.

Begin – G2 & G3 bearing shoes extend ¾" beyond edge of masonry plate.
 End – G1 & G2 bearing shoes are flush with the edge of the masonry plate.

The begin and end abutment bearings also exhibit pack rust between the masonry plate and bronze plate typically ¼" +/- thick and up to ½" thick on G2 at End. There is minor pack rust between the bronze plate and steel shoes up to ¼" thick. Movement appears to be restricted.

The anchor bolts exhibit previous section loss of up to 50%.

Span 1: BA311 - Movable Bearing-515 - Steel Protective Coating
 Span 4: EA311 - Movable Bearing-515 - Steel Protective Coating

TQ	CS-1	CS-2	CS-3	CS-4	CS-5
16	0	15	1	0	0
16	0	15	1	0	0

Common

Referenced Photo(s): 6, 7

Referenced Sketch(es): None

2018 – Approximately 5% of the paint on the begin and end abutment bearings is blistered with rust, CS3. Remaining paint is in fair condition.

Span 1: BA851 - Abutment Pedestal

TQ	CS-1	CS-2	CS-3	CS-4	CS-5
4	0	4	0	0	0

Condition State 2 Note

Referenced Photo(s): 6

Referenced Sketch(es): None

2018 – The begin abutment pedestals exhibit minor cracking and surface spalling/rounding along the top edges.

Span 4: EA851 - Abutment Pedestal

TQ	CS-1	CS-2	CS-3	CS-4	CS-5
4	2	2	0	0	0

Condition State 2 Note

Referenced Photo(s): 7

Referenced Sketch(es): None

2018 – End abutment Pedestal 1 exhibits minor cracking and surface spalling on the front face. Pedestal 2 has (2) 1 SF surface spalls on the front and right faces.

Non-Structural Condition Observations

Category: FENCING - Pedestrian Quantity: 518 Unit: ft

Referenced Element(s): NONE

Referenced Photo(s): 11,12

Referenced Sketch(es): NONE

2018 – The original four-rail discontinuous bridge rail remains in place behind the new, independently supported two-rail bridge rail. The original railing supports the pedestrian fencing by:

- The base plate of the fence post is welded to the base plate of the original bridge rail post.
- Near mid-height of the fence post, a U-bolt is attached to a plate that is welded to the original bridge rail post.

The original bridge rail posts are corroded and thinned at the base. The worst location is Span 3 right side near 3/4 span (behind the fascia mounted sign) where three consecutive posts have rust holes at the base.

Additionally, the paint system on the original bridge rail is failing, resulting in rust staining down the sides of the left and right fascias.

This condition affects the full length of pedestrian fencing on both sides (259' x 2 = 518 LF)

Category: ATTACHMENTS - Fascia Mounted Signs Quantity: 3 Unit: ea

Referenced Element(s): NONE

Referenced Photo(s): 13,14,15,16

Referenced Sketch(es): 2

2018 – The fascia mounted sign attached to Span 3, G4, near 3/4 span exhibits minor impact damage, corroded framing, and numerous missing bolts.

There are (3) sign panels with the following configuration

Bottom, single panel "LAST EXIT ON ISLAND"
Center, 3 panels with 2 vertical splices "LONG RD 3/4 MILE"
Top, single panel "EXIT 20"

The bottom sign panel has minor impact damage along the bottom edge on the right (end) half of the panel (Photo 13).

The vertical "z-bars" connecting the top sign panel are slightly distorted and the top sign panel is shifted towards end.

Over 50% of the backing strip splice bolts on the center sign panel are missing (Photo 14). The lower 1/4 of the sign panel can be moved by hand. There are isolated locations of missing "z-bar" to sign panel and "z-bar" to WT framing bolts missing. For locations of missing bolts refer to Sign Panel Deterioration Sketch.

The sign panel framing consists of L3 x 3 x 3/8" angles and bolted gusset / connection plates. The L and WT angles within a 3" +/- length adjacent to the gusset plates or fascia are pitted and exhibit up to 33% section loss (Photo 15). Worst location is the WT connection to the concrete fascia at end (Photo 16). The gusset plates are similarly corroded.

Inspection Photographs

Photo Number: 1

Photo Filename: 918.39-2018-01.JPG

Attachment Description:
Span 4 deck, Bay 1 looking
toward end



Photo Number: 2

Photo Filename: 918.39-2018-02.JPG

Attachment Description:
Span 2 deck, Bay 1 near
midspan



Photo Number: 3

Photo Filename: 918.39-2018-03.JPG

Attachment Description:
Span 3 deck, Right fascia
near midspan looking
toward begin



Photo Number: 4

Photo Filename: 918.39-2018-04.JPG

Attachment Description:
Span 3, G1 right side
looking toward end



Photo Number: 5

Photo Filename: 918.39-2018-05.JPG

Attachment Description:
Span 2, G2 & G3 left side
near 1/3 span



Photo Number: 6

Photo Filename: 918.39-2018-06.JPG

Attachment Description:
Begin abutment, G3
bearing, left side



Photo Number: 7

Photo Filename: 918.39-2018-07.JPG

Attachment Description:
End abutment, G2 bearing
and pedestal, right side



Photo Number: 8

Photo Filename: 918.39-2018-08.JPG

Attachment Description:
Pier 1, Column 1 and left
side of pier cap



Photo Number: 9

Photo Filename: 918.39-2018-09.JPG

Attachment Description:
Pier 1, underside of pier
cap, column bay 2



Photo Number: 10

Photo Filename: 918.39-2018-10.JPG

Attachment Description:
Pier 3, begin face of pier
cap



Photo Number: 11

Photo Filename: 918.39-2018-11.JPG

Attachment Description:
Bridge rail configuration
looking from end right



Photo Number: 12

Photo Filename: 918.39-2018-12.JPG

Attachment Description:
Original bridge rail, Span 3
right side near 3/4 span,
rust hole at base of post



Photo Number: 13

Photo Filename: 918.39-2018-13.JPG

Attachment Description:
Span 3, fascia mounted
sign near 3/4 span, front
face



Photo Number: 14

Photo Filename: 918.39-2018-14.JPG

Attachment Description:
Span 3, fascia mounted
sign near 3/4 span, back
face



Photo Number: 15

Photo Filename: 918.39-2018-15.JPG

Attachment Description:
Span 3, fascia mounted
sign near 3/4 span, framing
looking from left side (begin)



Photo Number: 16

Photo Filename: 918.39-2018-16.JPG

Attachment Description:
Span 3, fascia mounted
sign near 3/4 span, framing
looking from right side (end)



Inspection Sketches

Sketch Number: 1

Sketch Filename: 918.39_PhotoLocationMap.jpg

BD 186 (4/95)

BIN: 5516270

MP: 918.39

TEAM LEADER: Michael Bower

Feature Carried: BEDELL RD

Feature Crossed: 190IX

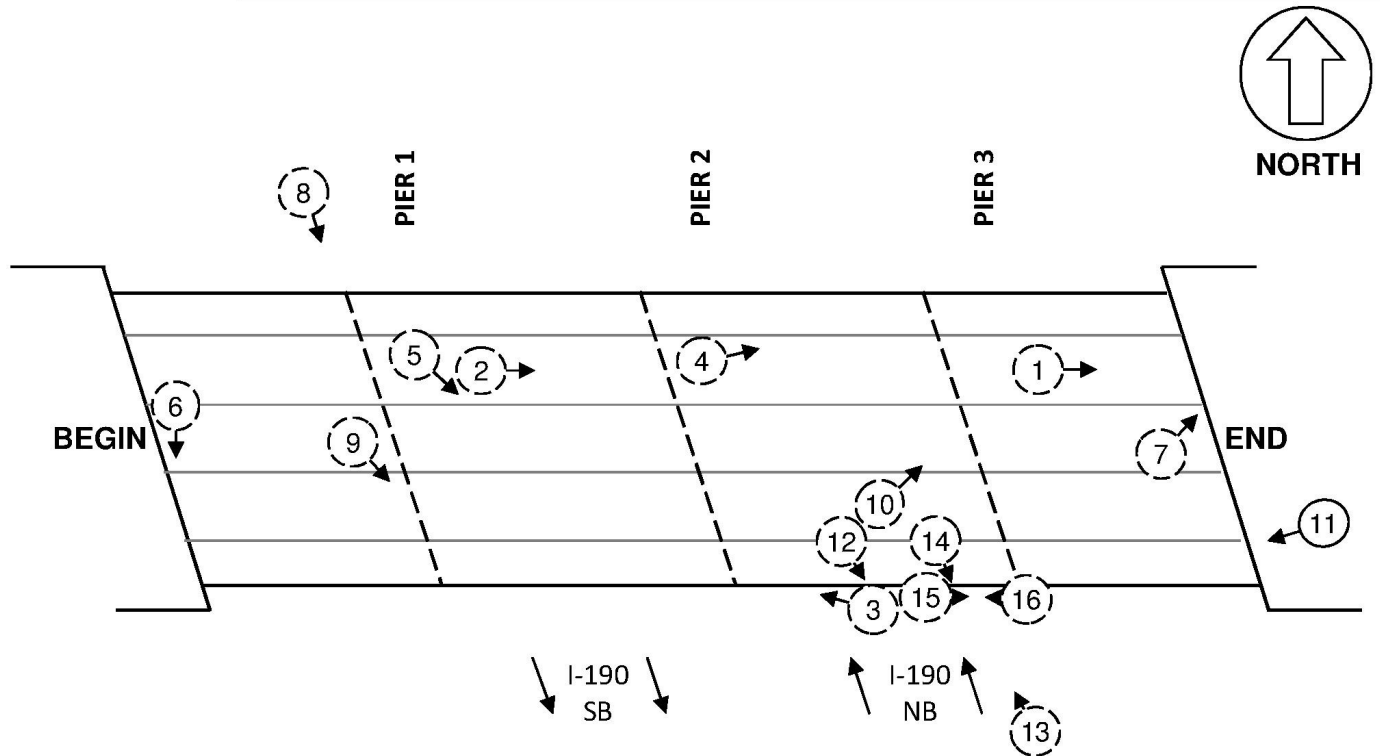


NYS THRUWAY AUTHORITY BRIDGE INSPECTION REPORT

SHEET 1 **OF** 1

ATL: Neil Ferguson

DATE: 05/17/2018



○ PHOTO TAKEN BELOW
BRIDGE DECK

○ PHOTO TAKEN ABOVE
THE BRIDGE DECK

Sketch Description: 918.39_PhotoLocationMap.jpg

Sketch Number: 2

Sketch Filename: 918.39_Fascia Mounted Sign Deterioration.jpg

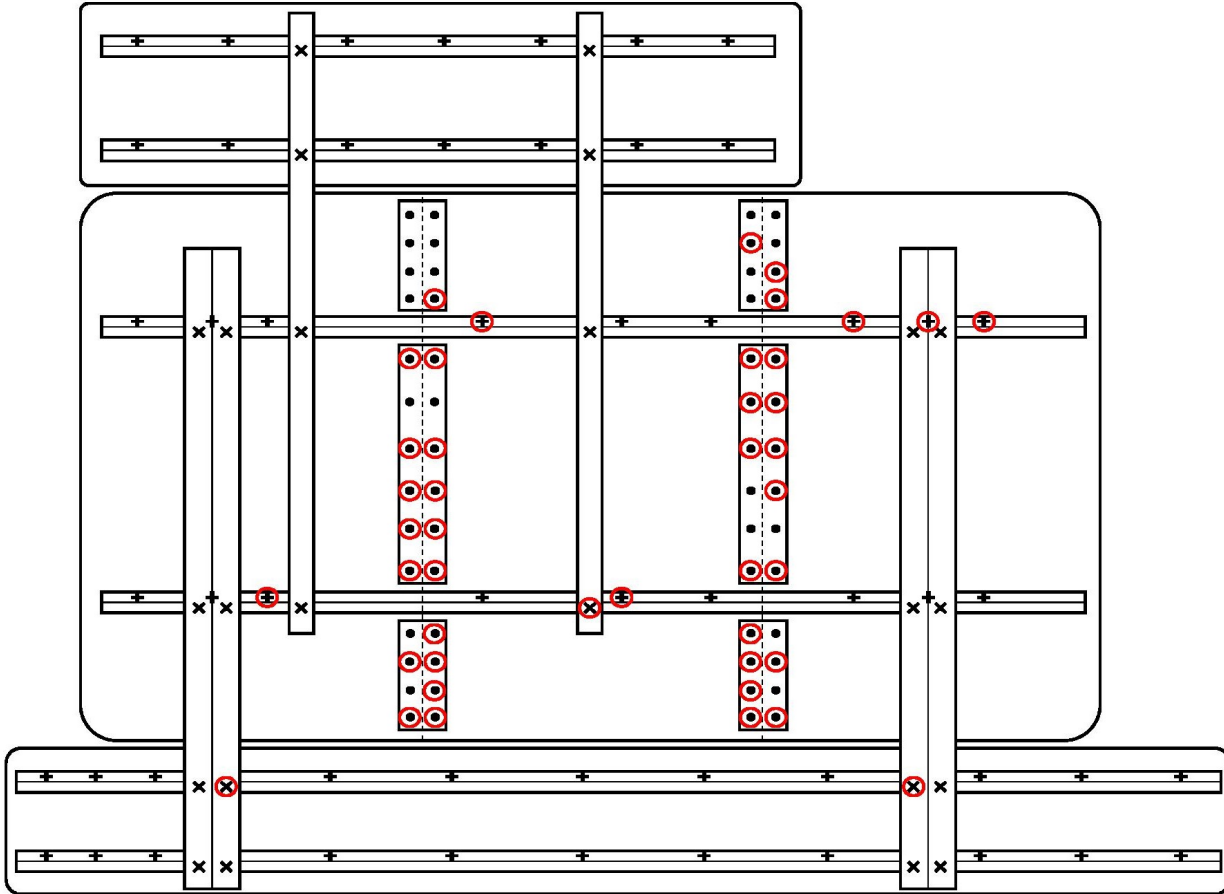
MP: 918.39
BIN: 5516270

FEATURE CARRIED: BEDELL RD
FEATURE CROSSED: 190IX

SHEET 1 OF 1
DATE: 05/17/2018

FASCIA MOUNTED SIGN DETERIORATION SKETCH

(AS VIEWED LOOKING AT BACK OF SIGN)



LEGEND

● = BACKING STRIP SPLICE BOLT	✕ = "Z-BAR" TO FRAMING BOLT
+ = "Z-BAR" TO PANEL BOLT	○ = MISSING BOLT

Sketch Description: 918.39_Fascia Mounted Sign Deterioration.jpg

Sketch Number: 3

Sketch Filename: 918.39_Vertical Clearance.jpg



**MINIMUM BRIDGE UNDERCLEARANCE
MAINLINE BRIDGES
BUFFALO DIVISION
NEW YORK STATE THRUWAY AUTHORITY**

MP: 918.39 SHEET 1 OF 1

BIN: 5516270 DATE: 05/17/2018

Bridge Orientation: East

Feature Crossed: 190IX

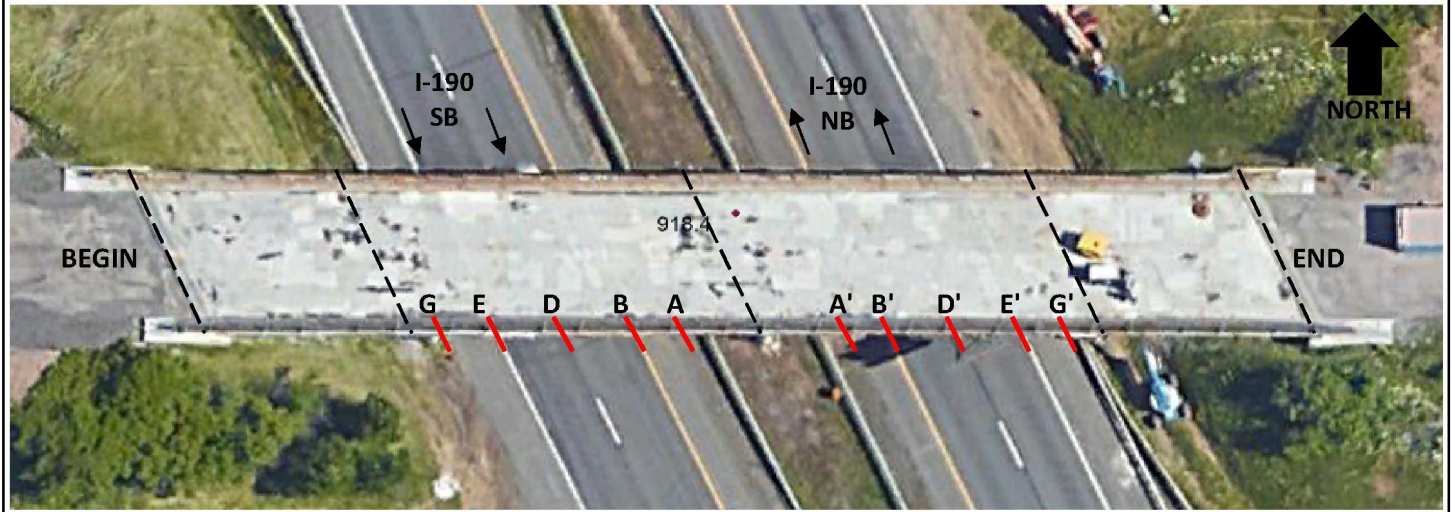
TWY Traffic Direction:

Date	A	B	C	D	E	F	G	H	A'	B'	C'	D'	E'	F'	G'	H'
10/04/2010	14.60	14.33		14.06	14.28				15.06	14.76		14.52	14.55			
11/03/2012	14.64	14.34		14.09	14.36		14.54		15.04	14.75		14.50	14.55		14.74	
05/05/2014	14.80	14.34		14.07	14.36		14.52		15.17	14.75		14.50	14.57		14.80	
04/28/2016	14.79	14.35		14.10	14.37		14.61		15.17	14.76		14.51	14.56		14.89	
09/12/2016	14.76	14.60		14.33	14.56		14.67		14.99	14.77		14.58	14.60		14.62	
05/17/2018	14.78	14.55		14.33	14.56		14.61		15.03	14.77		14.58	14.61		14.63	

REMARKS:

- Readings taken on 9/12/2016 are after resurfacing of I-190 NB & SB.
- 2018 - No significant changes to readings.

SKETCH:



Sketch Description: 918.39_Vertical Clearance.jpg

Sketch Number: 4

Sketch Filename: 918.39_LR Verification Form.jpg

NEW YORK STATE THRUWAY AUTHORITY

BRIDGE INSPECTION FIELD VERIFICATION OF LOAD RATING DATA

Date: 05/17/18

MP/BIN: 918.39

Feature Carried / Crossed: BEDELL RD / 190IX

Dead Load:

WS Thickness & Material Shown on Plans -

Changes Noted in Field: None

Railing Type Shown on Plans -

Changes Noted in Field: None

Other DL Contributions (e.g. utilities) on Plans -

Changes Noted in Field: None

Section Loss:

Existing Documentation (sketches, etc.) ? - Steel repairs completed on Girders 1 & 4 at both the begin and end abutment locations (Span 1 begin and Span 4 end).

Location of Documentation (previous report, blue folder, etc.)? - Plans TAN 14 - 48B located in BIN folder.

New Section Loss noted? - Yes

Brief Description (attach sketches if helpful) -

Estimated 5% top and bottom flange section loss on all girders

Additional Notes: None

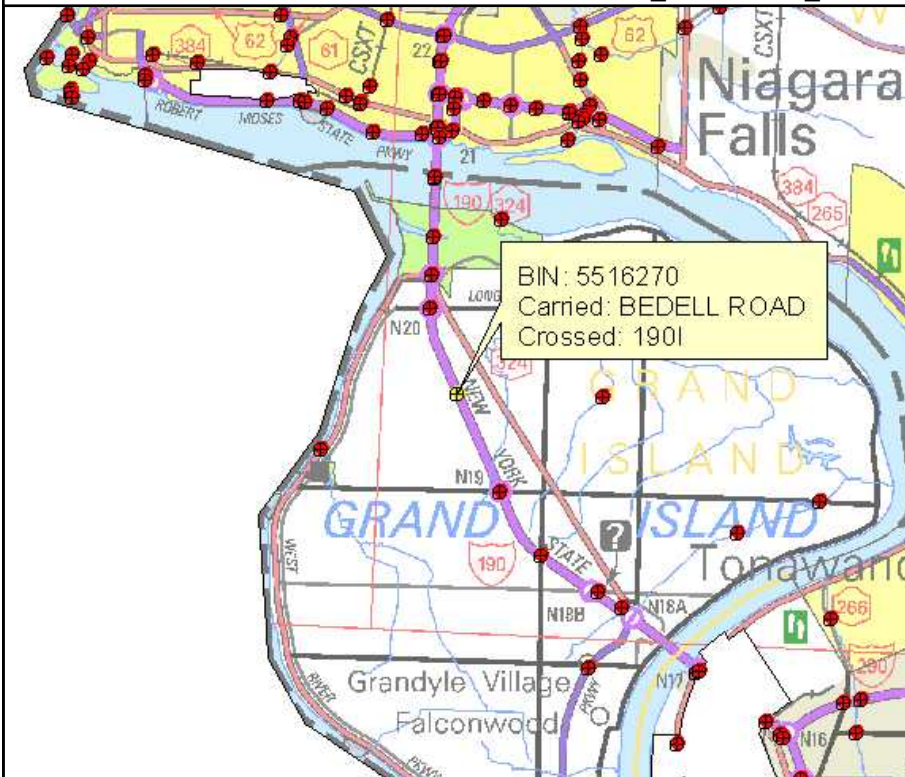
Attachments: yes ☒ no (please circle)

Team Leader: Michael Bower Date: May 17, 2018

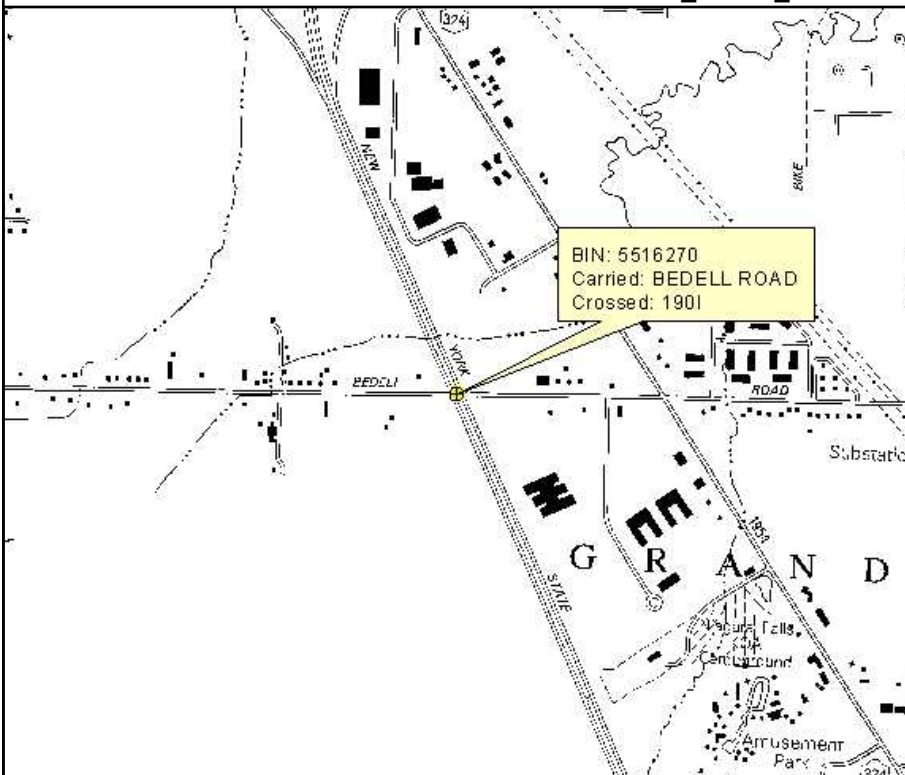
Sketch Description: 918.39_LR Verification Form.jpg

Standard Photographs

5516270_LOCATION_MAP.JPG



5516270_QUAD_MAP.JPG



918.39_16-Approach_Begin.JPG



918.39_16-Approach_End.JPG



918.39_16-Elevation_Left.JPG



918.39_16-Elevation_Right.JPG



918.39_16-End Left Wingwall.JPG



918.39_16-Feature Crossed Left.JPG



918.39_16-Feature Crossed Right.JPG



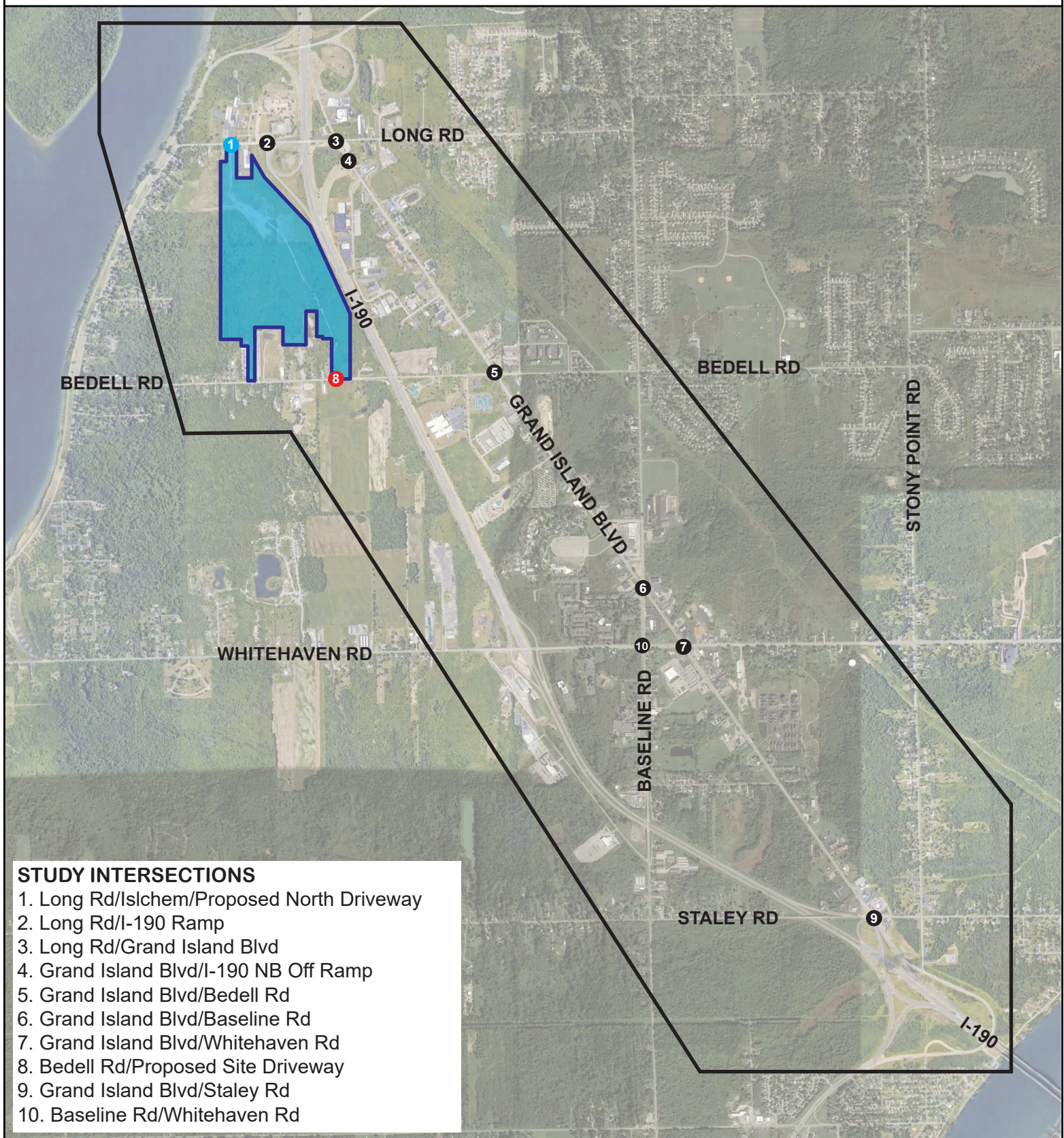
918.39_16-Pier 2 (Typ. Pier 1 and Pier 3).JPG



918.39_16-Span 2 Framing (Typ. Span 1 and Span 3).JPG



FIGURE 1 - SITE LOCATION & STUDY AREA



Legend

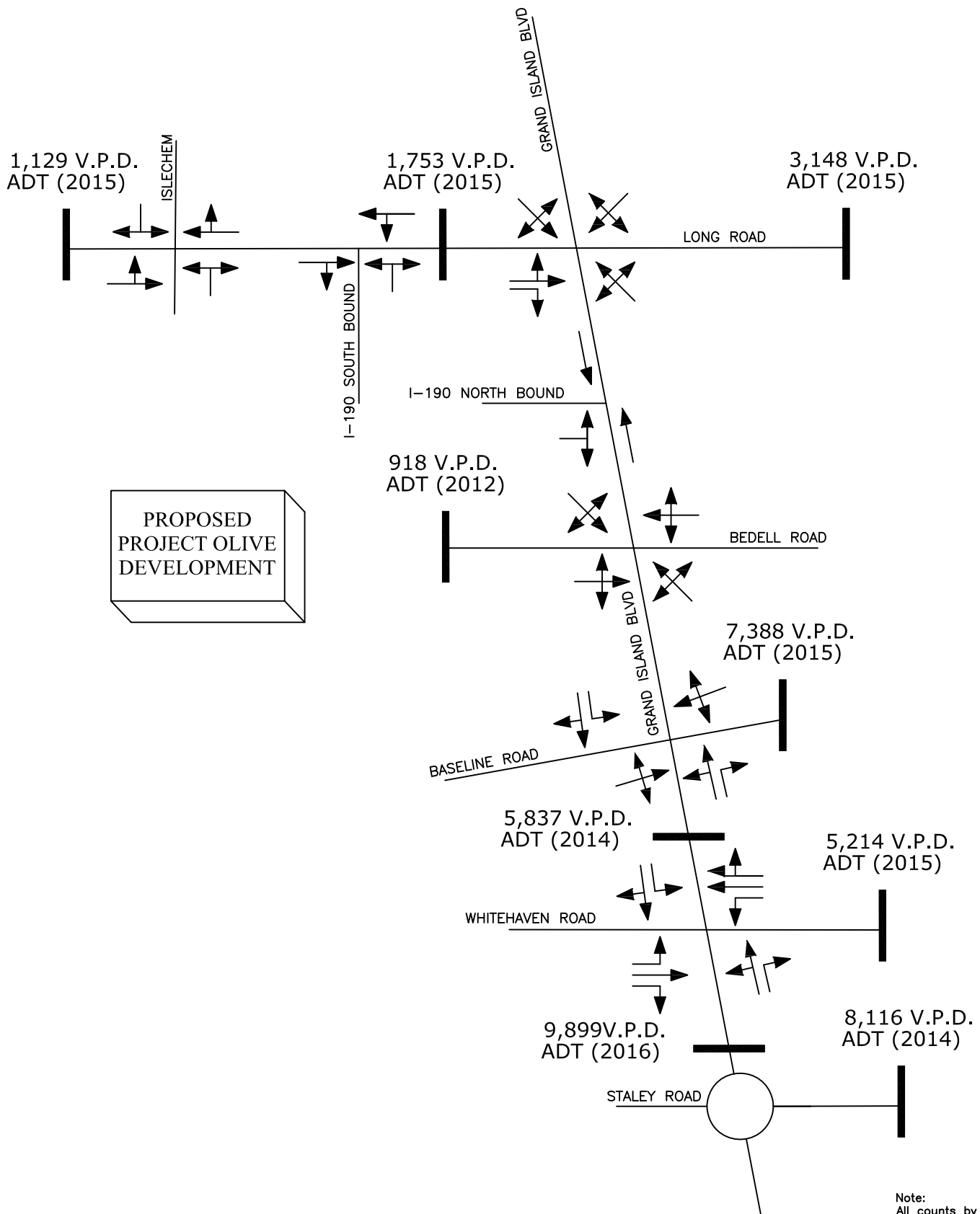
- Study Intersection
- Study/Proposed Intersection
- Proposed Intersection
- Site Location
- Study Area

PROPOSED PROJECT OLIVE

TOWN OF GRAND ISLAND, NY

0 150 300 600
Feet





Note:
All counts by NYSDOT
V.P.D = Vehicles Per Day

PROJECT NO: 39064

KEY

N

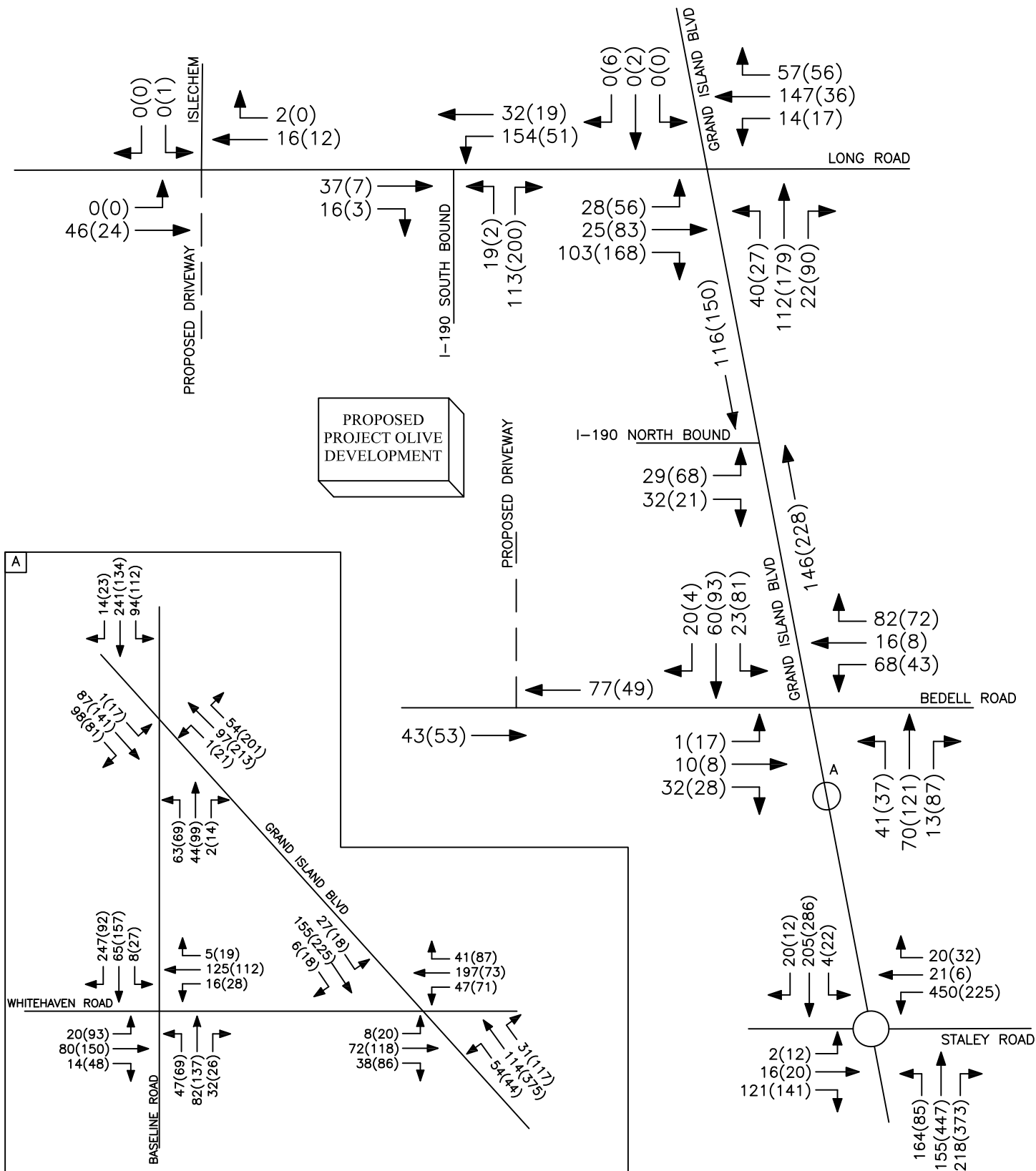
NOT TO SCALE

FIGURE 2

LANE GEOMETRY &
AVERAGE DAILY TRAFFIC

PROJECT OLIVE DEVELOPMENT,
TOWN OF GRAND ISLAND, NY

SRF
ASSOCIATES
Transportation Planning / Engineering / Design
www.srf.net / (585) 272-4660



PROJECT NO: 39064

AM PEAK HOUR: 6:30AM-7:30AM
PM PEAK HOUR: 5:30PM-6:30PM

KEY

N

NOT TO SCALE

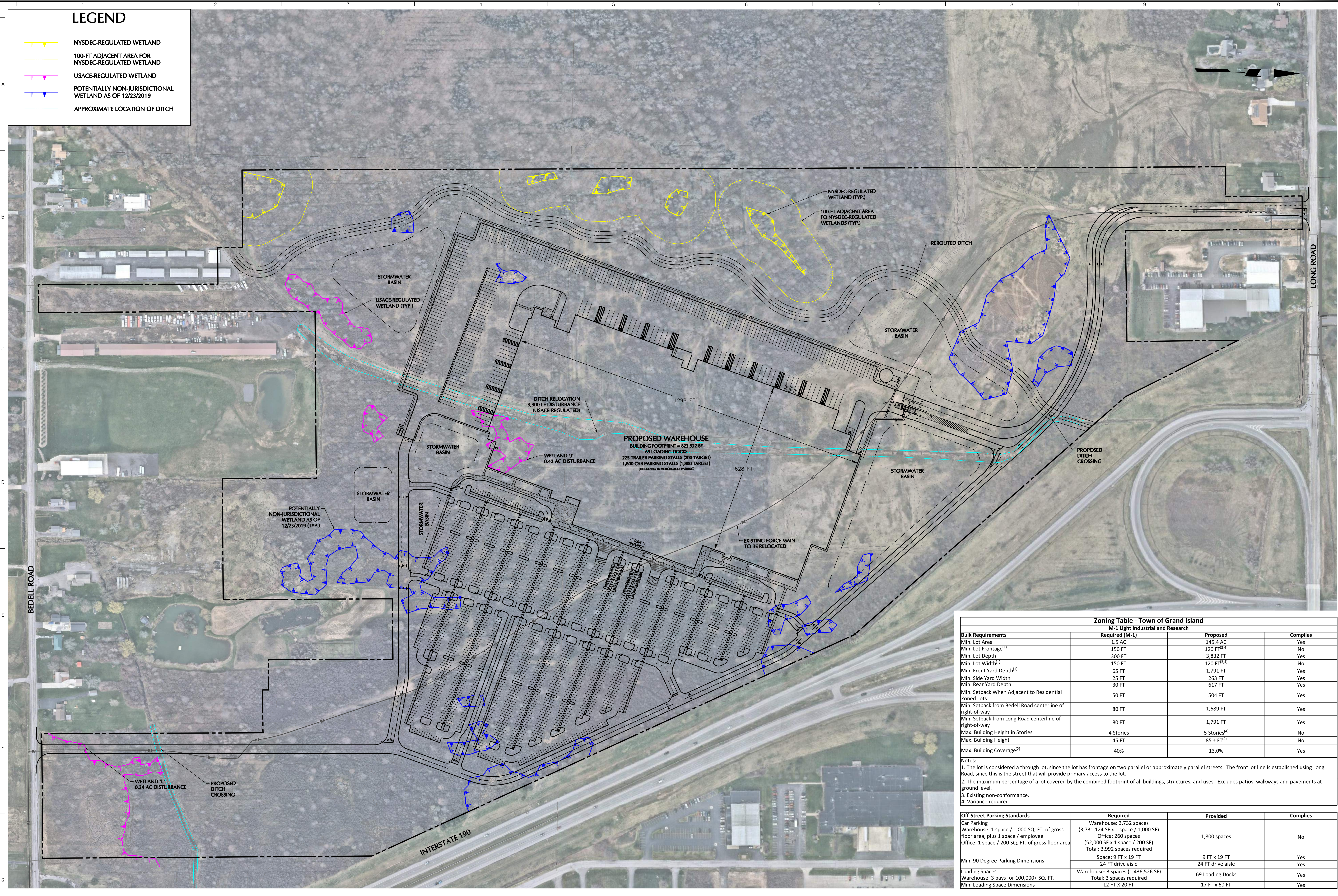
00(00) = AM(PM)

FIGURE 4

PEAK HOUR VOLUMES 2020 BACKGROUND CONDITIONS

PROJECT OLIVE DEVELOPMENT,
TOWN OF GRAND ISLAND, NY

SRF
ASSOCIATES
Transportation Planning / Engineering / Design
www.srf.net / (585) 272-4660



Zoning Table - Town of Grand Island			
M-1 Light Industrial and Research			
Bulk Requirements	Required (M-1)	Proposed	Complies
Min. Lot Area	145 ± AC	145 ± AC	Yes
Min. Lot Frontage ⁽¹⁾	150 FT	120 FT ^(3,4)	No
Min. Lot Depth	300 FT	3,832 FT	Yes
Min. Lot Width ⁽¹⁾	150 FT	120 FT ^(3,4)	No
Min. Front Yard Depth ⁽¹⁾	65 FT	1,791 FT	Yes
Min. Side Yard Width	25 FT	263 FT	Yes
Min. Rear Yard Depth	30 FT	617 FT	Yes
Min. Setback When Adjacent to Residential Zoned Lots	50 FT	504 FT	Yes
Min. Setback from Bedell Road centerline of right-of-way	80 FT	1,689 FT	Yes
Min. Setback from Long Road centerline of right-of-way	80 FT	1,791 FT	Yes
Max. Building Height in Stories	4 Stories	5 Stories ⁽⁴⁾	No
Max. Building Height	45 FT	85 ± FT ⁽⁴⁾	No
Max. Building Coverage ⁽²⁾	40%	13.0%	Yes
Notes: 1. The lot is considered a through lot, since the lot has frontage on two parallel or approximately parallel streets. The front lot line is established using Long Road, since this is the street that will provide primary access to the lot. 2. The maximum percentage of a lot covered by the combined footprint of all buildings, structures, and uses. Excludes patios, walkways and pavements at ground level. 3. Existing non-conformance. 4. Variance required.			
Off-Street Parking Standards	Required	Provided	Complies
Car Parking	Warehouse: 3,732 spaces (3,731,124 SF x 1 space / 1,000 SF) Office: 260 spaces (52,000 SF x 1 space / 200 SF) Total: 3,992 spaces required	1,800 spaces	No
Min. 90 Degree Parking Dimensions	Space: 9 FT x 19 FT 24 FT drive aisle	9 FT x 19 FT 24 FT drive aisle	Yes Yes
Loading Spaces	Warehouse: 3 spaces (1,436,526 SF) Total: 3 spaces required	69 Loading Docks	Yes
Warehouse: 3 bays for 100,000+ SQ. FT.			
Min. Loading Space Dimensions	12 FT X 20 FT	17 FT X 60 FT	Yes

120 0 60 120

SCALE: 1 INCH = 120 FEET

WARNING:
IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 148 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		

DRAFT 12/5/2019

SIGNATURE _____ DATE SIGNED _____

PROFESSIONAL XXXXXXXXXX
STATE LIC. No. XXXXX

LANGAN
Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
300 Kimball Drive
Parsippany, NJ 07054

T: 973.560.4900 F: 973.560.4901 www.langan.com
NJ CERTIFICATE OF AUTHORIZATION No. 24GAZ7996400

Project

PROJECT OLIVE

SECTION No. 23.00, BLOCK No. 1, LOT Nos. 50 & 26.1

ERIE COUNTY TOWN OF GRAND ISLAND NEW YORK

Drawing Title

CONCEPT PLAN 1

Project No.

100785901

Date

12/5/2019

Drawn By

TLK

Checked By

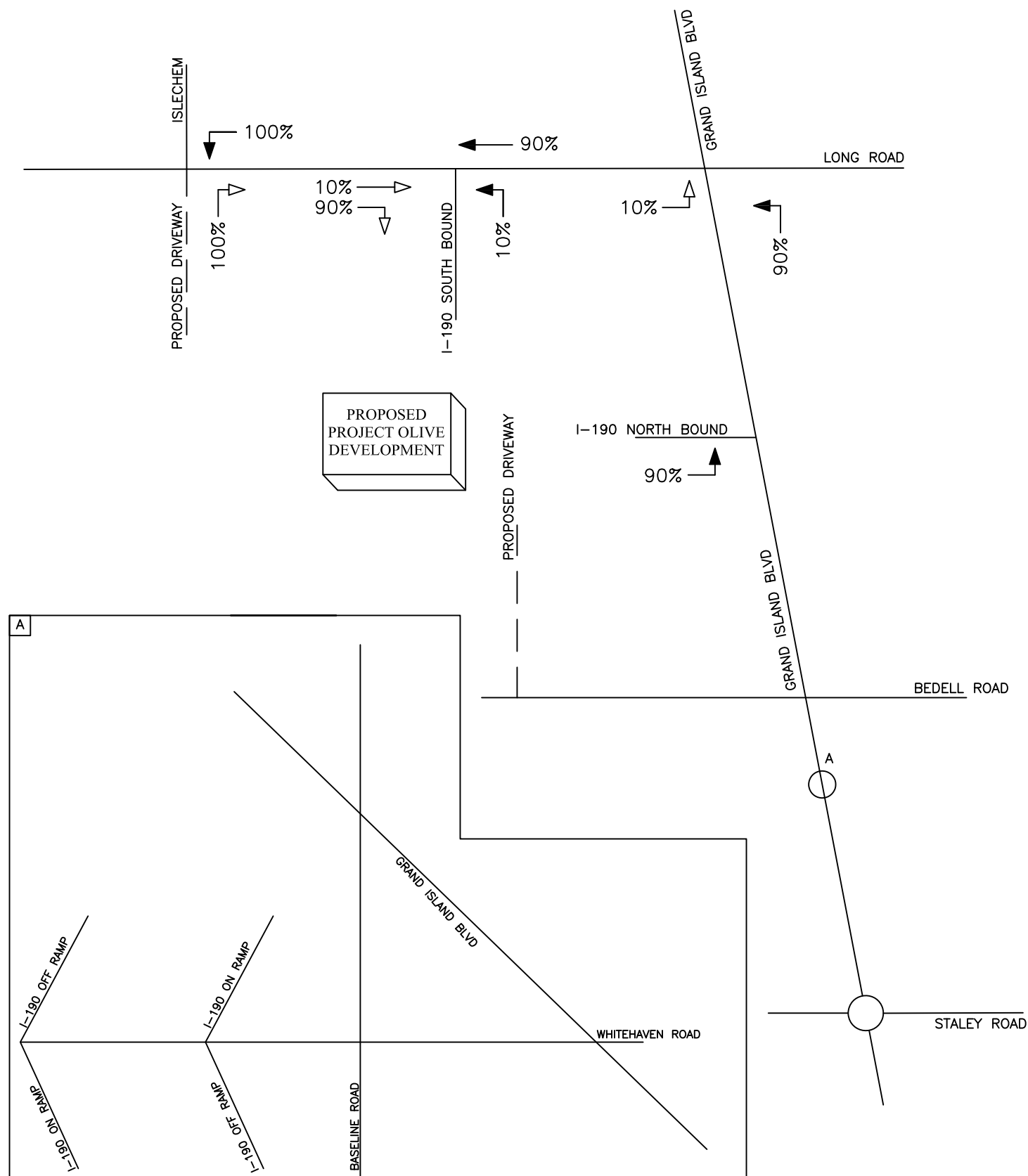
RB

Drawing No.

CP-01

CS101

Sheet 1 of ###



PROJECT NO: 39064

AM PEAK HOUR: 6:30AM-7:30AM
PM PEAK HOUR: 5:30PM-6:30PM

KEY

NOT TO SCALE

00(00) = AM(PM)

N

→ = ENTERING TRIPS

→ = EXITING TRIPS

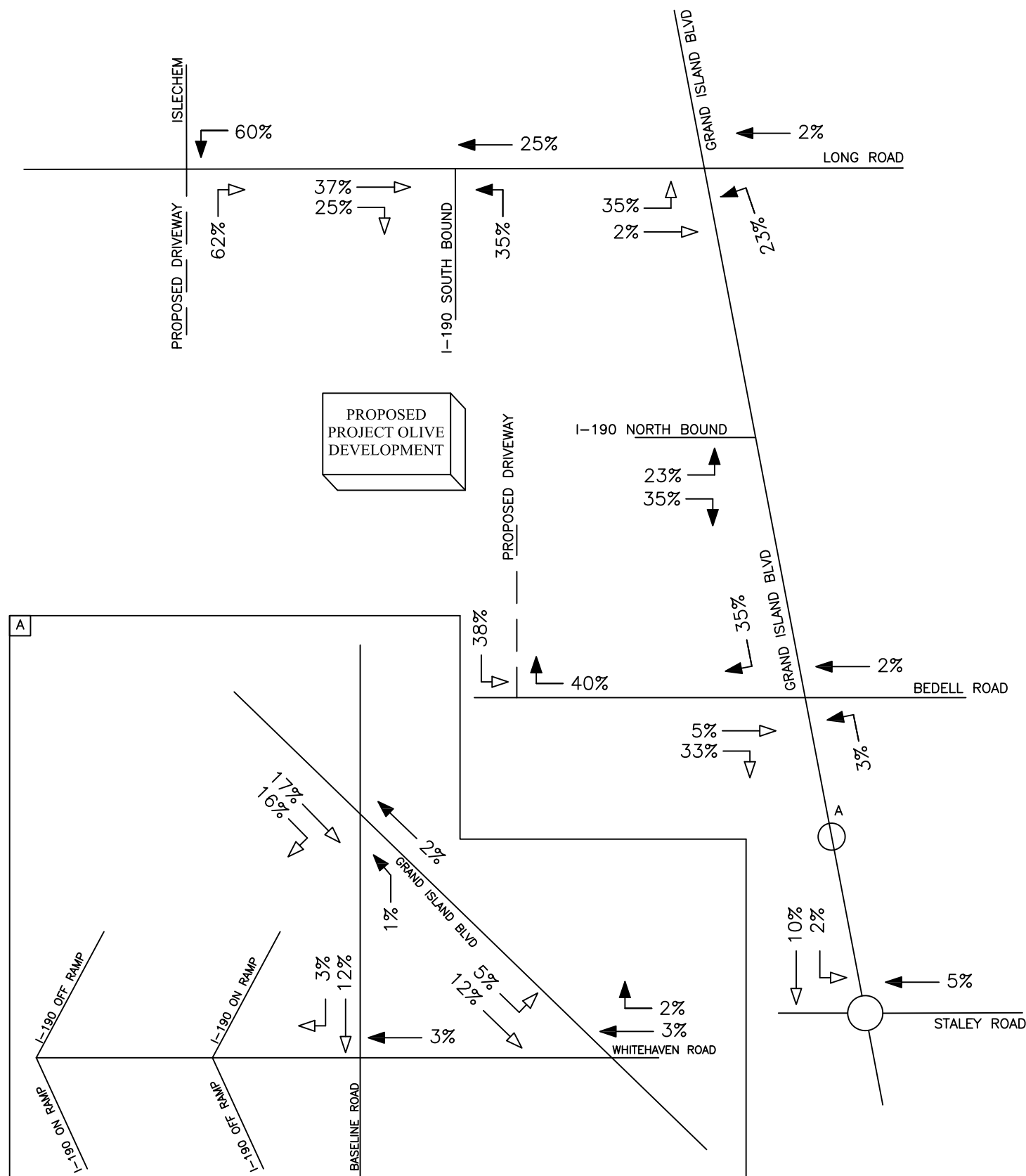
FIGURE 6A

TRIP DISTRIBUTION
TRUCKS

PROJECT OLIVE DEVELOPMENT,
TOWN OF GRAND ISLAND, NY

SRF
ASSOCIATES

Transportation Planning / Engineering / Design
www.srf.net / (585) 272-4660



PROJECT NO: 39064

AM PEAK HOUR: 6:30AM-7:30AM
PM PEAK HOUR: 5:30PM-6:30PM

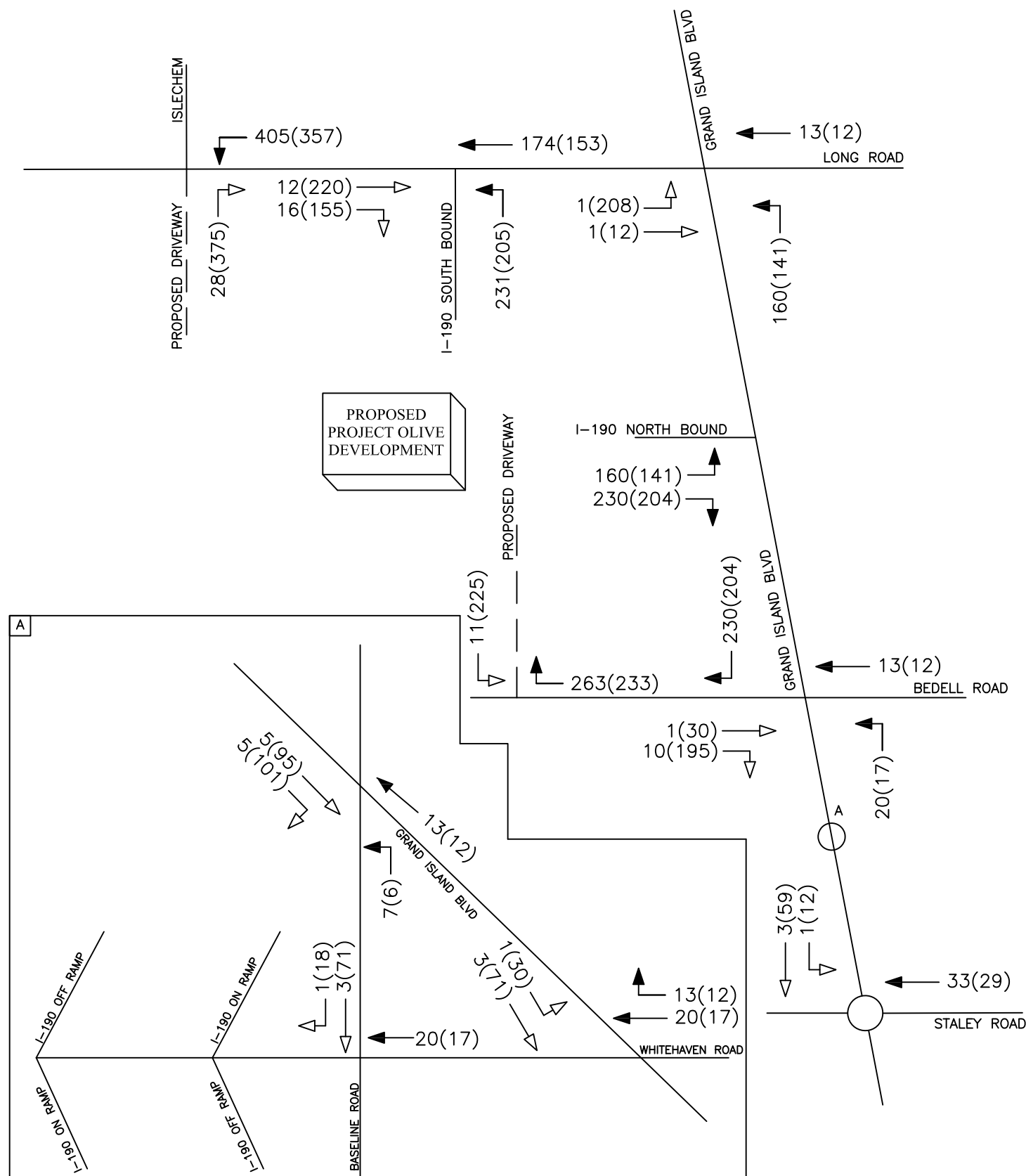
FIGURE 6B

TRIP DISTRIBUTION
CARS

PROJECT OLIVE DEVELOPMENT,
TOWN OF GRAND ISLAND, NY




Transportation Planning / Engineering / Design
www.srf.net / (585) 272-4660



PROJECT NO: 39064

AM PEAK HOUR: 6:30AM-7:30AM
PM PEAK HOUR: 5:30PM-6:30PM

KEY

 **NOT TO SCALE**

00(00) = AM(PM)

→ = ENTERING TRIPS

↔ = EXITING TRIPS

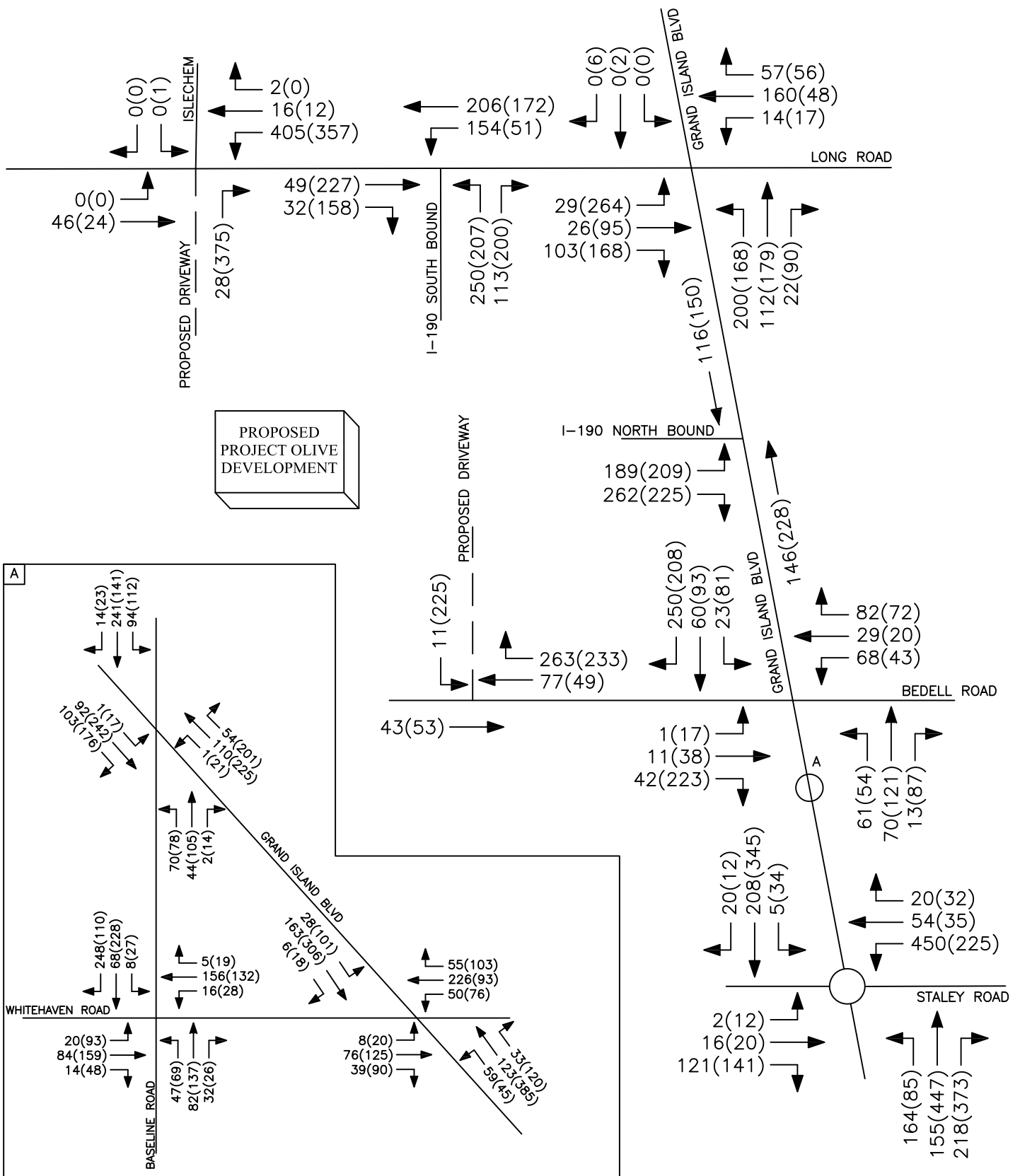
FIGURE 7

TOTAL SITE GENERATED TRIPS

PROJECT OLIVE DEVELOPMENT,
TOWN OF GRAND ISLAND, NY

 **SRF**
ASSOCIATES

Transportation Planning / Engineering / Design
www.srf.net / (585) 272-4660



AR Sortable 640K FC

TRAFFIC DATA FOR ENTITLEMENT USE

Headcount	
Headcount - Day Shift	Total
Headcount - Night Shift	993

Shift Structure	
Day Shift - Inbound Employees	Start
Day Shift - Outbound Employees	End
Night Shift - Inbound Employees	7:00:00 AM 5:30:00 PM
Night Shift - Outbound Employees	7:30:00 AM 6:00:00 PM
	6:00:00 PM 4:30:00 AM
	6:30:00 PM 5:00:00 AM

Adjustment below accounts for mass transit and carpool users.	
Adjust as needed for jurisdiction	
Net Cars Factor	91%

Traffic Schedule

Cars	Trucks	Total Vehicles
Average Weekday		Cars + Trucks Average Weekday

Time	In	Out	Total
00:00	3	7	10
01:00	1	4	5
02:00	5	14	19
03:00	8	14	22
04:00	18	190	208
05:00	39	503	542
06:00	29	17	46
06:15	77	18	95
06:30	134	10	144
06:45	180	7	187
07:00	178	10	188
07:15	231	5	236
07:30	34	7	41
07:45	8	6	14
08:00	27	19	46
09:00	17	10	27
10:00	21	18	39
11:00	40	43	83
12:00	11	18	29
13:00	14	15	29
14:00	12	26	38
15:00	31	40	71
16:00	48	34	82
17:00	28	35	63
17:15	53	16	69
17:30	117	136	253
17:45	151	78	229
18:00	189	261	450
18:15	183	176	359
18:30	24	117	141
18:45	5	43	48
19:00	19	37	56
20:00	8	8	16
21:00	16	16	32
22:00	18	23	41
23:00	3	6	9
	1,986	1,986	3,967

Time	In	Out	Total
00:00	9	9	18
01:00	15	15	30
02:00	6	6	12
03:00	12	12	24
04:00	6	6	12
05:00	9	9	18
06:00	2	2	4
06:15	2	2	4
06:30	2	2	4
06:45	2	2	4
07:00	3	3	6
07:15	3	3	6
07:30	3	3	6
07:45	3	3	6
08:00	12	12	24
09:00	21	21	42
10:00	12	12	24
11:00	13	13	26
12:00	13	13	26
13:00	8	8	16
14:00	8	8	16
15:00	8	8	16
16:00	9	9	18
17:00	2	2	4
17:15	2	2	4
17:30	2	2	4
17:45	2	2	4
18:00	2	2	4
18:15	2	2	4
18:30	2	2	4
18:45	2	2	4
19:00	7	7	14
20:00	11	11	22
21:00	8	8	16
22:00	11	11	22
23:00	8	8	16
	242	242	484

	In	Out	Total
00:00	12	15	27
01:00	16	19	35
02:00	11	19	29
03:00	19	25	44
04:00	22	179	201
05:00	44	467	511
06:00	28	17	46
06:15	72	18	90
06:30	124	11	135
06:45	166	8	174
07:00	165	12	177
07:15	213	8	221
07:30	34	9	43
07:45	10	8	19
08:00	37	29	66
09:00	36	30	67
10:00	31	28	59
11:00	49	52	102
12:00	23	29	52
13:00	21	22	42
14:00	19	32	51
15:00	36	44	81
16:00	53	40	93
17:00	27	34	61
17:15	50	17	67
17:30	108	126	234
17:45	139	73	212
18:00	174	240	414
18:15	169	162	331
18:30	24	108	132
18:45	7	41	48
19:00	24	41	65
20:00	18	18	37
21:00	23	23	45
22:00	27	32	59
23:00	11	13	24
	2,044	2,050	4,094

Morning Peak Hour of Generator			
	Enter	Exit	Total
06:30-07:30	668	39	707
Trucks	10	10	20

Evening Peak Hour of Generator			
	Enter	Exit	Total
17:30-18:30	590	600	1,191
Trucks	8	8	16

**PROPOSED PROJECT OLIVE DEVELOPMENT
TOWN OF GRAND ISLAND, NY
AM PEAK**

FIG 3

FIG 4

FIG 6

FIG 6

FIG 7

FIG 8

LOCATION NUMBER	INTERSECTION DESCRIPTION	2019 Existing Volume	Num of yrs		2021 Background Volume	Proposed Development - Trucks				Proposed Development - Cars				Total Site Trips	FULL Build Volumes
			2	0.50%		Enter Dist. %	Exit Dist. %	Trips IN 10	Trips OUT 10	Enter Dist. %	Exit Dist. %	Trips IN 658	Trips OUT 29		
1	Long Road Islechem Driveway														
	SR ST SL														
	WR WT WL	2 16	2 16		2 16	100%		10		60%		395		405	2 16 405
	NR NT NL						100%		10		62%		18	28	28
	ER ET EL	46	46		46										46
2	Long Road I-190 SB Ramp														
	SR ST SL														
	WR WT WL	32 152	32 154		32 154	90%		9		25%		165		174	206 154
	NR NT NL	112 19	113 19		113 19	10%		1		35%		230		231	113 250
	ER ET EL	16 37	16 37		16 37		90% 10%		9 1		25% 37%		7 11	16 12	32 49
3	Long Road Grand Island Boulevard														
	SR ST SL														
	WR WT WL	56 146 14	57 147 14		57 147 14					2%		13		13	57 160 14
	NR NT NL	22 111 40	22 112 40		22 112 40	90%		9		23%		151		160	22 112 200
	ER ET EL	102 25 28	103 25 28		103 25 28		10%		1		2% 35%		1 10	1 1	103 26 29
4	Grand Island Boulevard I-190 NB Off-Ramp														
	SR ST SL	115	116		116										116
	WR WT WL														
	NR NT NL	145	146		146										146
	ER ET EL	32 29	32 29		32 29	90%		9		35% 23%		230 151		230 160	262 189

FIG 3

FIG 6

FIG 6

FIG 7

FIG 8

Num of yrs																
2																
LOCATION NUMBER	INTERSECTION DESCRIPTION	2019 Existing Volume	Bkgd Volume 0.50%	Heron Pointe	2021 Background Volume	Proposed Development - Trucks				Proposed Development - Cars				Total Site Trips	FULL Build Volumes	
						Enter Dist. %	Exit Dist. %	Trips IN 10	Trips OUT 10	Enter Dist. %	Exit Dist. %	Trips IN 658	Trips OUT 29			
5	Grand Island Boulevard Bedell Road															
	SR	20	20		20					35%		230		230	250	
	ST	59	60		60								60			
	SL	23	23		23								23			
	WR	81	82		82					2%		13		13	82	
	WT	16	16		16								29			
	WL	67	68		68								68			
	NR	13	13		13										13	
	NT	69	70		70								70			
	NL	41	41		41				3%		20		20	61		
ER	32	32		32						33%			10	10	42	
ET	10	10		10						5%		1	1	11		
EL	1	1		1										1		
6	Grand Island Boulevard Baseline Road															
	SR	14	14			14										14
	ST	236	238			241									241	
	SL	93	94	94										94		
	WR	53	54		54					2%		13		13	54	
	WT	96	97		97									110		
	WL	1	1		1									1		
	NR	2	2	4	2										2	
	NT	40	40		44									44		
	NL	57	58		63				1%		7		7	70		
ER	97	98	5	98						16%		5	5	5	103	
ET	86	87		87						17%		5	5	92		
EL	1	1		1										1		
7	Grand Island Boulevard Whitehaven Road															
	SR	6	6			6										6
	ST	155	157			160					12%		3	3	163	
	SL	27	27	27						5%		1	1	28		
	WR	41	41	1	42					2%		13		13	55	
	WT	197	199		206					3%		20		20	226	
	WL	47	47		50									50		
	NR	31	31	2	33										33	
	NT	114	115		123									123		
	NL	54	55		59									59		
ER	38	38	1	39										39		
ET	72	73		76									76			
EL	8	8		8									8			
8	Grand Island Boulevard Staley Road															
	SR	20	20			20										20
	ST	188	190			205					10%		3	3	208	
	SL	4	4	4					2%		1	1	5			
	WR	20	20		20					5%		33		33	20	
	WT	21	21		21									54		
	WU	446	450		450									450		
	NR	216	218		218										218	
	NT	146	147		155									155		
	NL	162	164		164									164		
NU	6	6		6										6		
ER	120	121		121											121	
ET	16	16		16										16		
EL	2	2		2										2		

FIG 3

FIG 6

FIG 6

FIG 7

FIG 8

[illegible]

**PROPOSED PROJECT OLIVE DEVELOPMENT
TOWN OF GRAND ISLAND, NY
PM PEAK**

FIG 3

FIG 4

FIG 6

FIG 6

FIG 7

FIG 8

LOCATION NUMBER	INTERSECTION DESCRIPTION	Num of yrs		Heron Pointe	2021 Background Volume	Proposed Development - Trucks				Proposed Development - Cars				Total Site Trips	FULL Build Volumes
		2019 Existing Volume	2 Bkgd Volume 0.50%			Enter Dist. %	Exit Dist. %	Trips IN 8	Trips OUT 8	Enter Dist. %	Exit Dist. %	Trips IN 582	Trips OUT 592		
1	Long Road Islechem Driveway														
	SR ST SL	1	1		1										1
	WR WT WL	12	12		12	100%		8		60%		349		357	12 357
	NR NT NL						100%		8		62%		367	375	375
	ER ET EL	24	24		24										24
2	Long Road I-190 Ramp														
	SR ST SL														
	WR WT WL	19 50	19 51		19 51	90%		7		25%		146		153	172 51
	NR NT NL	198 2	200 2		200 2	10%		1		35%		204		205	200 207
	ER ET EL	3 7	3 7		3 7		90% 10%		7 1		25% 37%		148 219	155 220	158 227
3	Long Road Grand Island Boulevard														
	SR ST SL	6 2	6 2		6 2										6 2
	WR WT WL	55 36 17	56 36 17		56 36 17					2%		12		12	56 48 17
	NR NT NL	89 177 27	90 179 27		90 179 27	90%		7		23%		134		141	90 179 168
	ER ET EL	166 82 55	168 83 56		168 83 56		10%		1		2% 35%		12 207	12 208	168 95 264
4	Grand Island Boulevard I-190 NB Off-Ramp														
	SR ST SL	149	150		150										150
	WR WT WL														
	NR NT NL	226	228		228										228
	ER ET EL	21 67	21 68		21 68	90%		7		35% 23%		204 134		204 141	225 209

FIG 3

FIG 4

FIG 6

FIG 6

FIG 7 FIG 8

Num of yrs															
2															
LOCATION NUMBER	INTERSECTION DESCRIPTION	2019 Existing Volume	Bkgd Volume 0.50%	Heron Pointe	2021 Background Volume	Proposed Development - Trucks				Proposed Development - Cars				Total Site Trips	FULL Build Volumes
						Enter Dist. %	Exit Dist. %	Trips IN 8	Trips OUT 8	Enter Dist. %	Exit Dist. %	Trips IN 582	Trips OUT 592		
5	Grand Island Boulevard Bedell Road														
	SR	4	4		4				35%		204		204	208	
	ST	92	93		93								93	81	
	SL	80	81		81										
	WR	71	72		72								72		
	WT	8	8		8				2%		12		12	20	
	WL	43	43		43								43		
	NR	86	87		87								87		
NT	120	121		121									121		
NL	37	37		37				3%		17		17	54		
ER	28	28		28					33%		195	195	223		
ET	8	8		8					5%		30	30	38		
EL	17	17		17									17		
6	Grand Island Boulevard Baseline Road														
	SR	23	23		23									23	
	ST	133	134	7	141									141	
	SL	111	112		112								112		
	WR	199	201		201								201		
	WT	211	213		213				2%		12		12	225	
	WL	21	21		21									21	
	NR	14	14	6 3	14									14	
NT	98	99	105									105			
NL	68	69	72					1%		6	6	78			
ER	80	81		81					16%		95	95	176		
ET	140	141		141				17%		101		101	242		
EL	17	17		17									17		
7	Grand Island Boulevard Whitehaven Road														
	SR	18	18		18									18	
	ST	225	227	8	235					12%		71	71	306	
	SL	68	69		71			5%		30		30	101		
	WR	87	88	3	91									91	
	WT	73	74	2	76				2%		12		12	103	
	WL	71	72	4	76				3%		17		17	93	
	NR	117	118	2	120									120	
NT	375	379	6	385									385		
NL	44	44	1	45									45		
ER	86	87	3	90									90		
ET	118	119	6	125									125		
EL	20	20		20									20		
8	Grand Island Boulevard Staley Road														
	SR	12	12		12									12	
	ST	273	276	10	286					10%		59	59	345	
	SL	22	22		22			2%		12		12	34		
	SU														
	WR	32	32		32				5%		29		29	32	
	WT	6	6		6									35	
	WL	223	225		225									225	
WU															
NR	369	373	9	373									373		
NT	434	438		447									447		
NL	84	85		85									85		
NU	6	6		6									6		
ER	140	141		141									141		
ET	20	20		20									20		
EU	12	12		12									12		

FIG 3

FIG 6

FIG 6

FIG 7 FIG 8

2




[illegible]

A4 - UPDATED

**Level of Service Calculations:
Existing Conditions**

HCM 6th TWSC
1: Long Rd & Islechem DWY

39064 Project Olive Grand Island
2019 Existing Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	46	16	2	0	0
Future Vol, veh/h	0	46	16	2	0	0
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	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	55	19	2	0	0




Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	21	0	-	0	75
Stage 1	-	-	-	-	20
Stage 2	-	-	-	-	55
Critical Hdwy	4.1	-	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	2.2	-	-	-	3.5
Pot Cap-1 Maneuver	1608	-	-	-	933
Stage 1	-	-	-	-	1008
Stage 2	-	-	-	-	973
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1608	-	-	-	933
Mov Cap-2 Maneuver	-	-	-	-	933
Stage 1	-	-	-	-	1008
Stage 2	-	-	-	-	973

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1608	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	5.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	37	16	152	32	19	0
Future Vol, veh/h	37	16	152	32	19	0
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	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	43	18	175	37	22	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	61	0	439
Stage 1	-	-	-	-	52
Stage 2	-	-	-	-	387
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1555	-	579
Stage 1	-	-	-	-	976
Stage 2	-	-	-	-	691
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1555	-	512
Mov Cap-2 Maneuver	-	-	-	-	512
Stage 1	-	-	-	-	976
Stage 2	-	-	-	-	612

Approach	EB	WB	NB
HCM Control Delay, s	0	6.3	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	512	-	-	1555	-
HCM Lane V/C Ratio	0.043	-	-	0.112	-
HCM Control Delay (s)	12.3	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.4	-

HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - AM Peak Hour

Intersection												
Intersection Delay, s/veh	9.3											
Intersection LOS	A											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕			↕			↕	
Traffic Vol, veh/h	28	25	102	14	146	56	40	111	22	0	0	0
Future Vol, veh/h	28	25	102	14	146	56	40	111	22	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	1	0	1	0	0	1	0	0	0	0
Mvmt Flow	33	29	119	16	170	65	47	129	26	0	0	0
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			2			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			2			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			2		
HCM Control Delay	8.3			9.8			9.7			0		
HCM LOS	A			A			A			-		
Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1							
Vol Left, %	23%	53%	0%	6%	0%							
Vol Thru, %	64%	47%	0%	68%	100%							
Vol Right, %	13%	0%	100%	26%	0%							
Sign Control	Stop	Stop	Stop	Stop	Stop							
Traffic Vol by Lane	173	53	102	216	0							
LT Vol	40	28	0	14	0							
Through Vol	111	25	0	146	0							
RT Vol	22	0	102	56	0							
Lane Flow Rate	201	62	119	251	0							
Geometry Grp	2	7	7	5	2							
Degree of Util (X)	0.27	0.094	0.149	0.319	0							
Departure Headway (Hd)	4.837	5.494	4.522	4.57	5.16							
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes							
Cap	740	651	791	786	0							
Service Time	2.88	3.236	2.264	2.608	3.224							
HCM Lane V/C Ratio	0.272	0.095	0.15	0.319	0							
HCM Control Delay	9.7	8.8	8.1	9.8	8.2							
HCM Lane LOS	A	A	A	A	N							
HCM 95th-tile Q	1.1	0.3	0.5	1.4	0							

HCM 6th TWSC
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2019 Existing Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↕			↕	↕	
Traffic Vol, veh/h	29	32	0	145	115	0
Future Vol, veh/h	29	32	0	145	115	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	34	37	0	169	134	0
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	303	134	-	0	-	0
Stage 1	134	-	-	-	-	-
Stage 2	169	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	693	920	0	-	-	0
Stage 1	897	-	0	-	-	0
Stage 2	866	-	0	-	-	0
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	693	920	-	-	-	-
Mov Cap-2 Maneuver	693	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	10	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT			
Capacity (veh/h)	-	796	-			
HCM Lane V/C Ratio	-	0.089	-			
HCM Control Delay (s)	-	10	-			
HCM Lane LOS	-	B	-			
HCM 95th %tile Q(veh)	-	0.3	-			

Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2019 Existing Conditions - AM Peak Hour

	EBL	EBT	WBL	WBT	SEL	SET	NWL	NWT
Lane Configurations								
Traffic Volume (vph)	1	10	67	16	23	59	41	69
Future Volume (vph)	1	10	67	16	23	59	41	69
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		3		3		1		1
Permitted Phases	3		3		1		1	
Detector Phase	3	3	3	3	1	1	1	1
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	35.0	35.0	35.0	35.0	40.0	40.0	40.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Yellow Time (s)	3.2	3.2	3.2	3.2	4.3	4.3	4.3	4.3
All-Red Time (s)	1.6	1.6	1.6	1.6	1.2	1.2	1.2	1.2
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		4.8		4.8		5.5		5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)		6.8		6.8		14.1		14.1
Actuated g/C Ratio		0.24		0.24		0.50		0.50
v/c Ratio		0.11		0.42		0.13		0.16
Control Delay		5.1		8.6		5.6		6.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		5.1		8.6		5.6		6.4
LOS		A		A		A		A
Approach Delay		5.1		8.6		5.6		6.4
Approach LOS		A		A		A		A

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 28.3
Natural Cycle: 45
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 6.9
Intersection Capacity Utilization 35.3%
Analysis Period (min) 15

Splits and Phases: 5: Grand Island Blvd & Bedell Road



Timings
6: Baseline Road & Grand Island Blvd

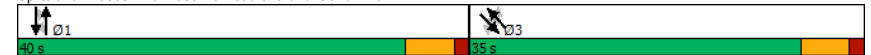
39064 Project Olive Grand Island
2019 Existing Conditions - AM Peak Hour

	NBL	NBT	SBL	SBT	SET	NWL	NWT
Lane Configurations							
Traffic Volume (vph)	57	40	93	236	86	1	96
Future Volume (vph)	57	40	93	236	86	1	96
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA
Protected Phases		1		1	3		3
Permitted Phases	1		1			3	
Detector Phase	1	1	1	1	3	3	3
Switch Phase							
Minimum Initial (s)	25.0	25.0	25.0	25.0	15.0	15.0	15.0
Minimum Split (s)	37.7	37.7	37.7	37.7	37.7	37.7	37.7
Total Split (s)	40.0	40.0	40.0	40.0	35.0	35.0	35.0
Total Split (%)	53.3%	53.3%	53.3%	53.3%	46.7%	46.7%	46.7%
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3	4.3	4.3
All-Red Time (s)	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	25.0	25.0	25.0	25.0	15.8	15.8	15.8
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.30	0.30	0.30
v/c Ratio	0.12	0.03	0.15	0.16	0.35	0.00	0.29
Control Delay	8.8	7.5	8.9	8.0	10.1	12.0	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	7.5	8.9	8.0	10.1	12.0	11.8
LOS	A	A	A	A	B	B	B
Approach Delay		8.3		8.2	10.1		11.8
Approach LOS		A		A	B		B

Intersection Summary

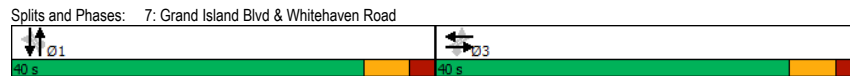
Cycle Length: 75
Actuated Cycle Length: 52.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.35
Intersection Signal Delay: 9.3
Intersection Capacity Utilization 68.4%
Analysis Period (min) 15

Splits and Phases: 6: Baseline Road & Grand Island Blvd



















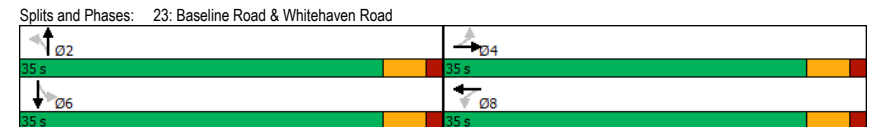
Timings 39064 Project Olive Grand Island
7: Grand Island Blvd & Whitehaven Road
2019 Existing Conditions - AM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	8	72	38	47	197	54	114	27	155
Future Volume (vph)	8	72	38	47	197	54	114	27	155
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		3			3		1		1
Permitted Phases	3		3	3		1		1	
Detector Phase	3	3	3	3	3	1	1	1	1
Switch Phase									
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	10.0	10.0	10.0	10.0
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5	36.8	36.8	36.8	36.8
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.8	6.8	6.8	6.8
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.7	10.7	10.7	10.7	10.7	12.5	12.5	12.5	12.5
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.34	0.34	0.34	0.34
v/c Ratio	0.03	0.17	0.10	0.16	0.29	0.17	0.29	0.08	0.33
Control Delay	10.4	11.1	4.5	11.4	9.8	10.5	9.9	9.7	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	11.1	4.5	11.4	9.8	10.5	9.9	9.7	11.3
LOS	B	B	A	B	A	B	A	A	B
Approach Delay		8.9			10.1		10.0		11.1
Approach LOS		A			B		B		B
Intersection Summary									
Cycle Length: 80									
Actuated Cycle Length: 36.9									
Natural Cycle: 75									
Control Type: Actuated-Uncoordinated									
Maximum v/c Ratio: 0.33									
Intersection Signal Delay: 10.1									
Intersection Capacity Utilization 42.9%									
Analysis Period (min) 15									
Intersection LOS: B									
ICU Level of Service A									












Timings 39064 Project Olive Grand Island
23: Baseline Road & Whitehaven Road
2019 Existing Conditions - AM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	20	79	16	225	47	81	8	64
Future Volume (vph)	20	79	16	225	47	81	8	64
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	None	None	None
Act Effct Green (s)	7.8	7.8	7.8	7.8	7.4	7.4	7.4	7.4
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.29	0.29	0.29	0.29
v/c Ratio	0.09	0.12	0.06	0.29	0.22	0.15	0.03	0.37
Control Delay	7.5	6.1	7.0	7.6	9.1	5.6	7.0	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	6.1	7.0	7.6	9.1	5.6	7.0	3.0
LOS	A	A	A	A	A	A	A	A
Approach Delay		6.3		7.5		6.6		3.1
Approach LOS		A		A		A		A
Intersection Summary								
Cycle Length: 70								
Actuated Cycle Length: 25.3								
Natural Cycle: 50								
Control Type: Actuated-Uncoordinated								
Maximum v/c Ratio: 0.37								
Intersection Signal Delay: 5.5								
Intersection Capacity Utilization 41.1%								
Analysis Period (min) 15								
Intersection LOS: A								
ICU Level of Service A								






Lanes, Volumes, Timings
1: Long Rd & Islechem DWY

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	24	12	0	1	0
Future Volume (vph)	0	24	12	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit						
Fit Protected					0.950	
Satd. Flow (prot)	0	1863	1863	0	1770	0
Fit Permitted					0.950	
Satd. Flow (perm)	0	1863	1863	0	1770	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		305	680		378	
Travel Time (s)		6.9	15.5		8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	26	13	0	1	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	13	0	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	13.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
1: Long Rd & Islechem DWY

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	24	12	0	1	0
Future Vol, veh/h	0	24	12	0	1	0
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	0	26	13	0	1	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	13	0	-	0	39
Stage 1	-	-	-	-	13
Stage 2	-	-	-	-	26
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1606	-	-	-	973
Stage 1	-	-	-	-	1010
Stage 2	-	-	-	-	997
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1606	-	-	-	973
Mov Cap-2 Maneuver	-	-	-	-	973
Stage 1	-	-	-	-	1010
Stage 2	-	-	-	-	997

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1606	-	-	-	973
HCM Lane V/C Ratio	-	-	-	-	0.001
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lanes, Volumes, Timings
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↖	
Traffic Volume (vph)	7	3	50	19	2	0
Future Volume (vph)	7	3	50	19	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.961					
Flt Protected				0.965	0.950	
Satd. Flow (prot)	1826	0	0	1834	1805	0
Flt Permitted				0.965	0.950	
Satd. Flow (perm)	1826	0	0	1834	1805	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	680			268	304	
Travel Time (s)	15.5			6.1	6.9	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	4	70	27	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	0	97	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 20.4%	ICU Level of Service A					
Analysis Period (min)	15					

HCM 6th TWSC
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↖	
Traffic Vol, veh/h	7	3	50	19	2	0
Future Vol, veh/h	7	3	50	19	2	0
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	10	4	70	27	3	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	14	0	179
Stage 1	-	-	-	-	12
Stage 2	-	-	-	-	167
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1617	-	815
Stage 1	-	-	-	-	1016
Stage 2	-	-	-	-	867
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1617	-	779
Mov Cap-2 Maneuver	-	-	-	-	779
Stage 1	-	-	-	-	1016
Stage 2	-	-	-	-	829

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	779	-	-	1617	-
HCM Lane V/C Ratio	0.004	-	-	0.044	-
HCM Control Delay (s)	9.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Lanes, Volumes, Timings
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↗	→	↘	↖	←	↙	↘	↖	↗	↘	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗	↘		↗			↗			↗	
Traffic Volume (vph)	55	82	166	17	36	55	27	177	89	0	2	6
Future Volume (vph)	55	82	166	17	36	55	27	177	89	0	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.931				0.959			0.895	
Flt Protected		0.980		0.992				0.995				
Satd. Flow (prot)	0	1862	1615	0	1755	0	0	1802	0	0	1674	0
Flt Permitted		0.980		0.992				0.995				
Satd. Flow (perm)	0	1862	1615	0	1755	0	0	1802	0	0	1674	0
Link Speed (mph)		30		30				30			30	
Link Distance (ft)		1099		662				615			522	
Travel Time (s)		25.0		15.0				14.0			11.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	2%
Adj. Flow (vph)	60	89	180	18	39	60	29	192	97	0	2	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	180	0	117	0	0	318	0	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0		0				0			0	
Link Offset(ft)		0		0				0			0	
Crosswalk Width(ft)		16		16				16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 43.6% ICU Level of Service A

Analysis Period (min) 15

HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection

Intersection Delay, s/veh 10.1

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗	↘		↗			↗			↗	
Traffic Vol, veh/h	55	82	166	17	36	55	27	177	89	0	2	6
Future Vol, veh/h	55	82	166	17	36	55	27	177	89	0	2	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	0	2
Mvmt Flow	60	89	180	18	39	60	29	192	97	0	2	7
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	9.5	8.9	11.3	8.1
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	9%	40%	0%	16%	0%
Vol Thru, %	60%	60%	0%	33%	25%
Vol Right, %	30%	0%	100%	51%	75%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	293	137	166	108	8
LT Vol	27	55	0	17	0
Through Vol	177	82	0	36	2
RT Vol	89	0	166	55	6
Lane Flow Rate	318	149	180	117	9
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.421	0.233	0.236	0.16	0.012
Departure Headway (Hd)	4.762	5.622	4.714	4.917	4.906
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	752	634	756	722	720
Service Time	2.817	3.39	2.48	2.997	2.999
HCM Lane V/C Ratio	0.423	0.235	0.238	0.162	0.013
HCM Control Delay	11.3	10.1	9	8.9	8.1
HCM Lane LOS	B	B	A	A	A
HCM 95th-tile Q	2.1	0.9	0.9	0.6	0

Lanes, Volumes, Timings
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↖	↗	↖	↗	↘	↙
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↗	↗	
Traffic Volume (vph)	67	21	0	226	149	0
Future Volume (vph)	67	21	0	226	149	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					
Flt Protected	0.963					
Satd. Flow (prot)	1750	0	0	1900	1881	0
Flt Permitted	0.963					
Satd. Flow (perm)	1750	0	0	1900	1881	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	283			4618	261	
Travel Time (s)	6.4			105.0	5.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	5%	0%	0%	1%	0%
Adj. Flow (vph)	74	23	0	251	166	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	97	0	0	251	166	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.6%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↗	↗	
Traffic Vol, veh/h	67	21	0	226	149	0
Future Vol, veh/h	67	21	0	226	149	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	1	0
Mvmt Flow	74	23	0	251	166	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	417	166	- 0 - 0
Stage 1	166	-	- - -
Stage 2	251	-	- - -
Critical Hdwy	6.4	6.25	- - - -
Critical Hdwy Stg 1	5.4	-	- - - -
Critical Hdwy Stg 2	5.4	-	- - - -
Follow-up Hdwy	3.5	3.345	- - - -
Pot Cap-1 Maneuver	596	871	0 - - 0
Stage 1	868	-	0 - - 0
Stage 2	795	-	0 - - 0
Platoon blocked, %			- - -
Mov Cap-1 Maneuver	596	871	- - - -
Mov Cap-2 Maneuver	596	-	- - - -
Stage 1	868	-	- - - -
Stage 2	795	-	- - - -

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT
Capacity (veh/h)	- 645	-
HCM Lane V/C Ratio	- 0.152	-
HCM Control Delay (s)	- 11.6	-
HCM Lane LOS	- B	-
HCM 95th %tile Q(veh)	- 0.5	-

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	17	8	28	43	8	71	80	92	4	37	120	86
Future Volume (vph)	17	8	28	43	8	71	80	92	4	37	120	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.929			0.922			0.997			0.952	
Flt Protected		0.984			0.983			0.978			0.992	
Satd. Flow (prot)	0	1667	0	0	1722	0	0	1853	0	0	1777	0
Flt Permitted		0.845			0.861			0.767			0.933	
Satd. Flow (perm)	0	1431	0	0	1508	0	0	1453	0	0	1671	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			76			2			48	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		564			771			4618			5011	
Travel Time (s)		12.8			17.5			105.0			113.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	18	9	30	46	9	76	86	99	4	40	129	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	131	0	0	189	0	0	261	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		40.0	40.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%		53.3%	53.3%		53.3%	53.3%	
Maximum Green (s)	30.2	30.2		30.2	30.2		34.5	34.5		34.5	34.5	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.2	1.2		1.2	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		6.6			6.6			16.5			16.5	
Actuated g/C Ratio		0.22			0.22			0.55			0.55	
v/c Ratio		0.17			0.34			0.24			0.28	
Control Delay		7.7			8.0			6.5			5.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.7			8.0			6.5			5.6	
LOS		A			A			A			A	
Approach Delay		7.7			8.0			6.5			5.6	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 30.2

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 6.6

Intersection LOS: A

Intersection Capacity Utilization 40.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Grand Island Blvd & Bedell Road
























Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour












												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	68	98	14	111	133	23	17	140	80	21	211	199
Future Volume (vph)	68	98	14	111	133	23	17	140	80	21	211	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	125		0	165		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.978			0.946			0.927	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3541	0	1805	3419	0	1805	1786	0	1805	1761	0
Flt Permitted	0.646			0.676			0.373			0.611		
Satd. Flow (perm)	1227	3541	0	1284	3419	0	709	1786	0	1161	1761	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		15			25			45			74	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	1180			420			5011			1413		
Travel Time (s)	26.8			9.5			113.9			32.1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	22%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	73	105	15	119	143	25	18	151	86	23	227	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	120	0	119	168	0	18	237	0	23	441	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	

Lanes, Volumes, Timings

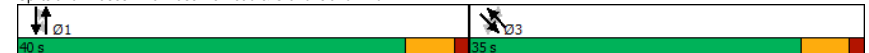
6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	37.7	37.7		37.7	37.7		37.7	37.7		37.7	37.7	
Total Split (s)	40.0	40.0		40.0	40.0		35.0	35.0		35.0	35.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	34.3	34.3		34.3	34.3		29.3	29.3		29.3	29.3	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	25.2	25.2		25.2	25.2		23.4	23.4		23.4	23.4	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.39	0.39		0.39	0.39	
v/c Ratio	0.14	0.08		0.22	0.12		0.07	0.33		0.05	0.60	
Control Delay	13.7	11.1		14.5	10.7		11.3	11.1		10.9	15.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.7	11.1		14.5	10.7		11.3	11.1		10.9	15.5	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.1			12.3			11.1			15.3	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:		Other										
Cycle Length: 75												
Actuated Cycle Length: 60.1												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.60												
Intersection Signal Delay: 13.2				Intersection LOS: B								
Intersection Capacity Utilization 79.2%				ICU Level of Service D								
Analysis Period (min) 15												

Splits and Phases: 6: Baseline Road & Grand Island Blvd



Lanes, Volumes, Timings
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

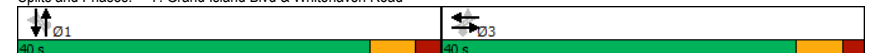
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	20	118	86	71	73	87	44	375	117	68	225	18
Future Volume (vph)	20	118	86	71	73	87	44	375	117	68	225	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	225		210	155		0	110		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.918			0.964			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1787	3255	0	1805	1832	0	1805	1879	0
Flt Permitted	0.641			0.674			0.595			0.386		
Satd. Flow (perm)	1218	1900	1615	1268	3255	0	1130	1832	0	733	1879	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			95		96			24			6	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	790			1017			5939			1413		
Travel Time (s)	18.0			23.1			135.0			32.1		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	130	95	78	80	96	48	412	129	75	247	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	130	95	78	176	0	48	541	0	75	267	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	

Lanes, Volumes, Timings
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour










Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	3		3	3			1			1		
Detector Phase	3	3	3	3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5		36.8	36.8		36.8	36.8	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	33.5	33.5	33.5	33.5	33.5		33.2	33.2		33.2	33.2	
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.8	6.8		6.8	6.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	22.0	22.0	22.0	22.0	22.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	11.7	11.7	11.7	11.7	11.7		23.9	23.9		23.9	23.9	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24		0.48	0.48		0.48	0.48	
v/c Ratio	0.08	0.29	0.21	0.26	0.21		0.09	0.60		0.21	0.29	
Control Delay	17.3	18.7	6.0	19.4	9.3		8.1	12.6		9.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.3	18.7	6.0	19.4	9.3		8.1	12.6		9.9	8.9	
LOS	B	B	A	B	A		A	B		A	A	
Approach Delay		13.7			12.4			12.2			9.1	
Approach LOS		B			B			B			A	
Intersection Summary												
Area Type:		Other										
Cycle Length: 80												
Actuated Cycle Length: 49.5												
Natural Cycle: 75												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.60												
Intersection Signal Delay: 11.8					Intersection LOS: B							
Intersection Capacity Utilization 68.6%					ICU Level of Service C							
Analysis Period (min) 15												

Splits and Phases: 7: Grand Island Blvd & Whitehaven Road











Lanes, Volumes, Timings
8: Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	7	0	0	69	0	198
Future Volume (vph)	7	0	0	69	0	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			1099	401	
Travel Time (s)	6.1			25.0	9.1	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Adj. Flow (vph)	10	0	0	97	0	279
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	97	0	279
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	22.3%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
22: I-190 NB

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

						
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	2	198	0	53	0	0
Future Volume (vph)	2	198	0	53	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.866					
Flt Protected						
Satd. Flow (prot)	1613	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1613	0	0	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	267			304	401	
Travel Time (s)	6.1			6.9	9.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	215	0	58	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	0	0	58	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.7%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour














	←	→	↖	↗	←	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖		↖	↖		↖	↖		↖	↖		
Traffic Volume (vph)	92	149	48	28	111	19	68	136	26	27	155	91	
Future Volume (vph)	92	149	48	28	111	19	68	136	26	27	155	91	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	200		0	225		0	95		0	175		0	
Storage Lanes	1		0	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	
Frt		0.963			0.978			0.976			0.945		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1805	3476	0	1805	3531	0	1805	3523	0	1805	3411	0	
Flt Permitted	0.702			0.702			0.755			0.755			
Satd. Flow (perm)	1334	3476	0	1334	3531	0	1434	3523	0	1434	3411	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		52			20			28			98		
Link Speed (mph)	30				30			30			30		
Link Distance (ft)	534				790			532			1180		
Travel Time (s)	12.1				18.0			12.1			26.8		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	99	160	52	30	119	20	73	146	28	29	167	98	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	99	212	0	30	139	0	73	174	0	29	265	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)	12				12			12			12		
Link Offset(ft)	0				0			0			0		
Crosswalk Width(ft)	16				16			16			16		
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Number of Detectors	1	2		1	2		1	2		1	2		
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru		
Leading Detector (ft)	20	100		20	100		20	100		20	100		
Trailing Detector (ft)	0	0		0	0		0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		0	0		0	0		
Detector 1 Size(ft)	20	6		20	6		20	6		20	6		
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(ft)		94			94			94			94		
Detector 2 Size(ft)		6			6			6			6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		

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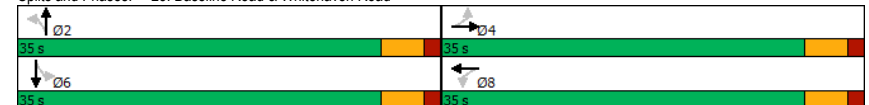
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Lanes, Volumes, Timings
23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2			6			
Detector Phase	4	4		8	8		2	2		6	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5		
Total Split (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0		
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0		
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Recall Mode	None	None		None	None		None	None		None	None		
Act Effct Green (s)	8.2	8.2		8.2	8.2		7.9	7.9		7.8	7.8		
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.35	0.35		0.34	0.34		
v/c Ratio	0.20	0.16		0.06	0.11		0.15	0.14		0.06	0.21		
Control Delay	7.9	5.4		6.8	5.9		7.9	6.2		7.3	5.1		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	7.9	5.4		6.8	5.9		7.9	6.2		7.3	5.1		
LOS	A	A		A	A		A	A		A	A		
Approach Delay		6.2			6.1			6.7			5.3		
Approach LOS		A			A			A			A		
Intersection Summary													
Area Type:	Other												
Cycle Length: 70													
Actuated Cycle Length: 22.7													
Natural Cycle: 45													
Control Type: Actuated-Uncoordinated													
Maximum v/c Ratio: 0.21													
Intersection Signal Delay: 6.0				Intersection LOS: A									
Intersection Capacity Utilization 37.9%				ICU Level of Service A									
Analysis Period (min) 15													

Splits and Phases: 23: Baseline Road & Whitehaven Road



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A5 - UPDATED

**Level of Service Calculations:
Background Conditions**

Lanes, Volumes, Timings
1: Long Rd & Islechem DWY

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	46	16	2	0	0
Future Volume (vph)	0	46	16	2	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987				
Flt Protected						
Satd. Flow (prot)	0	1900	1875	0	1900	0
Flt Permitted						
Satd. Flow (perm)	0	1900	1875	0	1900	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		305	701		314	
Travel Time (s)		6.9	15.9		7.1	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	55	19	2	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	55	21	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 6.7%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
1: Long Rd & Islechem DWY

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	0	46	16	2	0	0
Future Vol, veh/h	0	46	16	2	0	0
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	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	55	19	2	0	0

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	21	0	-	0	75	20
Stage 1	-	-	-	-	20	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1608	-	-	-	933	1064
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	973	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1608	-	-	-	933	1064
Mov Cap-2 Maneuver	-	-	-	-	933	-
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	973	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1608	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	-	0	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

Lanes, Volumes, Timings
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Volume (vph)	37	16	154	32	19	0
Future Volume (vph)	37	16	154	32	19	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.960					
Flt Protected				0.960	0.950	
Satd. Flow (prot)	1824	0	0	1821	1805	0
Flt Permitted				0.960	0.950	
Satd. Flow (perm)	1824	0	0	1821	1805	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	701			243	329	
Travel Time (s)	15.9			5.5	7.5	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	43	18	177	37	22	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	214	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 26.9%	ICU Level of Service A					
Analysis Period (min)	15					

HCM 6th TWSC
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	5.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Vol, veh/h	37	16	154	32	19	0
Future Vol, veh/h	37	16	154	32	19	0
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	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	43	18	177	37	22	0


















Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	61
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1555
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1555
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.3	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	509	-	-	1555	-
HCM Lane V/C Ratio	0.043	-	-	0.114	-
HCM Control Delay (s)	12.4	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.4	-

Lanes, Volumes, Timings
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	25	103	14	147	57	40	112	22	0	0	0
Future Volume (vph)	28	25	103	14	147	57	40	112	22	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.965			0.983				
Flt Protected		0.974			0.997			0.989				
Satd. Flow (prot)	0	1851	1599	0	1816	0	0	1835	0	0	1900	0
Flt Permitted		0.974			0.997			0.989				
Satd. Flow (perm)	0	1851	1599	0	1816	0	0	1835	0	0	1900	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1103			662			435			522	
Travel Time (s)		25.1			15.0			9.9			11.9	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	1%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	33	29	120	16	171	66	47	130	26	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	120	0	253	0	0	203	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 34.8% ICU Level of Service A

Analysis Period (min) 15






HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

Intersection

Intersection Delay, s/veh 9.3

Intersection LOS A


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	25	103	14	147	57	40	112	22	0	0	0
Future Vol, veh/h	28	25	103	14	147	57	40	112	22	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	1	0	1	0	0	1	0	0	0	0
Mvmt Flow	33	29	120	16	171	66	47	130	26	0	0	0
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	8.3	9.8	9.7	0
HCM LOS	A	A	A	-

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	23%	53%	0%	6%	0%
Vol Thru, %	64%	47%	0%	67%	100%
Vol Right, %	13%	0%	100%	26%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	174	53	103	218	0
LT Vol	40	28	0	14	0
Through Vol	112	25	0	147	0
RT Vol	22	0	103	57	0
Lane Flow Rate	202	62	120	253	0
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.272	0.094	0.151	0.322	0
Departure Headway (Hd)	4.844	5.499	4.527	4.572	5.169
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	738	650	789	783	0
Service Time	2.889	3.243	2.271	2.613	3.236
HCM Lane V/C Ratio	0.274	0.095	0.152	0.323	0
HCM Control Delay	9.7	8.8	8.1	9.8	8.2
HCM Lane LOS	A	A	A	A	N
HCM 95th-tile Q	1.1	0.3	0.5	1.4	0

Lanes, Volumes, Timings
4: I-190 NB & Grand Island Blvd

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

						
Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	0	146	116	0	29	32
Future Volume (vph)	0	146	116	0	29	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.930	
Flt Protected					0.977	
Satd. Flow (prot)	0	1881	1881	0	1726	0
Flt Permitted					0.977	
Satd. Flow (perm)	0	1881	1881	0	1726	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		5059	435		319	
Travel Time (s)		115.0	9.9		7.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	170	135	0	34	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	170	135	0	71	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 17.9%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
4: I-190 NB & Grand Island Blvd

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	1.9					
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	146	116	0	29	32
Future Vol, veh/h	0	146	116	0	29	32
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	86	86	86	86	86	86
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	0	170	135	0	34	37

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	-	0	-	0	305 135
Stage 1	-	-	-	-	135 -
Stage 2	-	-	-	-	170 -
Critical Hdwy	-	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	0	-	-	0	691 919
Stage 1	0	-	-	0	896 -
Stage 2	0	-	-	0	865 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	691 919
Mov Cap-2 Maneuver	-	-	-	-	691 -
Stage 1	-	-	-	-	896 -
Stage 2	-	-	-	-	865 -

Approach	NB	SB	NE
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NBT	SBT
Capacity (veh/h)	794	-	-
HCM Lane V/C Ratio	0.089	-	-
HCM Control Delay (s)	10	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.3	-	-

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

	↶	→	↷	↶	←	↶	↷	↶	↷	↶	↷	↶
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	10	32	68	16	82	23	60	20	41	70	13
Future Volume (vph)	1	10	32	68	16	82	23	60	20	41	70	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.900			0.934			0.974			0.986	
Flt Protected		0.999			0.980			0.989			0.984	
Satd. Flow (prot)	0	1580	0	0	1714	0	0	1809	0	0	1821	0
Flt Permitted		0.988			0.845			0.922			0.882	
Satd. Flow (perm)	0	1563	0	0	1478	0	0	1687	0	0	1632	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			78			21			11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3145			771			5059			5011	
Travel Time (s)		71.5			17.5			115.0			113.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	100%	0%	8%	0%	0%	3%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	1	11	34	72	17	86	24	63	21	43	74	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	46	0	0	175	0	0	108	0	0	131	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

	↶	→	↷	↶	←	↶	↷	↶	↷	↶	↷	↶
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Initial (s)	6.0	6.0		6.0	6.0					10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5					22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0					40.0	40.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%					53.3%	53.3%	
Maximum Green (s)	30.2	30.2		30.2	30.2					34.5	34.5	
Yellow Time (s)	3.2	3.2		3.2	3.2					4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6					1.2	1.2	
Lost Time Adjust (s)		0.0			0.0					0.0	0.0	
Total Lost Time (s)		4.8			4.8					5.5	5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0					4.0	4.0	
Recall Mode	None	None		None	None					Min	Min	
Act Effect Green (s)		6.9			6.9					14.1	14.1	
Actuated g/C Ratio		0.24			0.24					0.50	0.50	
v/c Ratio		0.11			0.42					0.13	0.16	
Control Delay		5.1			8.7					5.6	6.4	
Queue Delay		0.0			0.0					0.0	0.0	
Total Delay		5.1			8.7					5.6	6.4	
LOS		A			A					A	A	
Approach Delay		5.1			8.7					5.6	6.4	
Approach LOS		A			A					A	A	
Intersection Summary												
Area Type:		Other										
Cycle Length:		75										
Actuated Cycle Length:		28.3										
Natural Cycle:		45										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.42										
Intersection Signal Delay:		6.9								Intersection LOS: A		
Intersection Capacity Utilization		35.5%								ICU Level of Service A		
Analysis Period (min)		15										

Splits and Phases: 5: Grand Island Blvd & Bedell Road























Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2021 Background Conditions - AM Peak Hour












												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	63	44	2	94	241	14	0	87	98	1	97	54
Future Volume (vph)	63	44	2	94	241	14	0	87	98	1	97	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	125		0	165		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.992			0.921			0.947	
Flt Protected	0.950			0.950						0.950		
Satd. Flow (prot)	1752	3488	0	1805	3548	0	1900	1718	0	1805	1753	0
Flt Permitted	0.580			0.723						0.630		
Satd. Flow (perm)	1070	3488	0	1374	3548	0	1900	1718	0	1197	1753	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		2			10			89			43	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	642			804			5011			1413		
Travel Time (s)	14.6			18.3			113.9			32.1		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	0%	0%	1%	0%	0%	4%	0%	0%	3%	2%
Adj. Flow (vph)	69	48	2	103	265	15	0	96	108	1	107	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	50	0	103	280	0	0	204	0	1	166	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	

Lanes, Volumes, Timings

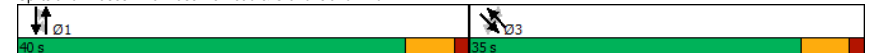
6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2021 Background Conditions - AM Peak Hour

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	37.7	37.7		37.7	37.7		37.7	37.7		37.7	37.7	
Total Split (s)	40.0	40.0		40.0	40.0		35.0	35.0		35.0	35.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	34.3	34.3		34.3	34.3		29.3	29.3		29.3	29.3	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	25.0	25.0		25.0	25.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.31	0.31		0.31	0.31	
v/c Ratio	0.14	0.03		0.16	0.16		0.35	0.00		0.00	0.29	
Control Delay	9.1	7.7		9.1	8.1		10.0	12.0		12.0	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.1	7.7		9.1	8.1		10.0	12.0		12.0	11.9	
LOS	A	A		A	A		B	B		B	B	
Approach Delay		8.5			8.4			10.0			11.9	
Approach LOS		A			A			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 75												
Actuated Cycle Length: 52.4												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.35												
Intersection Signal Delay: 9.5						Intersection LOS: A						
Intersection Capacity Utilization 68.4%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 6: Baseline Road & Grand Island Blvd



Lanes, Volumes, Timings

7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - AM Peak Hour

	←	→	↖	↗	←	→	↖	↗	←	→	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	8	72	38	47	197	41	54	114	31	27	155	6
Future Volume (vph)	8	72	38	47	197	41	54	114	31	27	155	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	225		210	155		0	110		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.974			0.968			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1538	1736	3487	0	1805	1831	0	1805	1802	0
Flt Permitted	0.568			0.698			0.630			0.642		
Satd. Flow (perm)	1079	1881	1538	1275	3487	0	1197	1831	0	1220	1802	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)			52		38			21			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		787			1017			5939			1413	
Travel Time (s)		17.9			23.1			135.0			32.1	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	0%	1%	5%	4%	1%	0%	0%	0%	2%	0%	5%	0%
Adj. Flow (vph)	10	91	48	59	249	52	68	144	39	34	196	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	91	48	59	301	0	68	183	0	34	204	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12				12			12			12	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)	16				16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	

03/18/2020

SRF Associates

Synchro 10 Report













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Lanes, Volumes, Timings

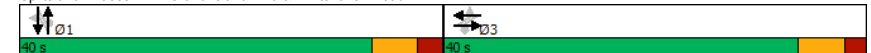
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	3		3	3			1			1		
Detector Phase	3	3	3	3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5		36.8	36.8		36.8	36.8	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	33.5	33.5	33.5	33.5	33.5		33.2	33.2		33.2	33.2	
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.8	6.8		6.8	6.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	22.0	22.0	22.0	22.0	22.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	10.7	10.7	10.7	10.7	10.7		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29		0.34	0.34		0.34	0.34	
v/c Ratio	0.03	0.17	0.10	0.16	0.29		0.17	0.29		0.08	0.33	
Control Delay	10.4	11.1	4.5	11.4	9.8		10.5	9.9		9.7	11.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.4	11.1	4.5	11.4	9.8		10.5	9.9		9.7	11.3	
LOS	B	B	A	B	A		B	A		A	B	
Approach Delay		8.9			10.1			10.0			11.1	
Approach LOS		A			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 80												
Actuated Cycle Length: 36.9												
Natural Cycle: 75												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.33												
Intersection Signal Delay: 10.1						Intersection LOS: B						
Intersection Capacity Utilization 42.9%						ICU Level of Service A						
Analysis Period (min) 15												

Splits and Phases: 7: Grand Island Blvd & Whitehaven Road



03/18/2020










SRF Associates

Synchro 10 Report

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Lanes, Volumes, Timings
8: Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	37	0	0	186	0	113
Future Volume (vph)	37	0	0	186	0	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	243			1103	424	
Travel Time (s)	5.5			25.1	9.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	43	0	0	214	0	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	0	214	0	130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
9: Bedell Road & Proposed South DWY

39064 Project Olive Grand Island
2021 Background Conditions - AM Peak Hour









Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			
Traffic Volume (vph)	0	43	77	0	0	0
Future Volume (vph)	0	43	77	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	0	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		179	3145		393	
Travel Time (s)		4.1	71.5		8.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	47	84	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	47	84	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	7.4%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

22: I-190 NB

39064 Project Olive Grand Island

2021 Background Conditions - AM Peak Hour

						
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	19	113	0	170	0	0
Future Volume (vph)	19	113	0	170	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.885					
Flt Protected						
Satd. Flow (prot)	1649	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1649	0	0	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	179			329	424	
Travel Time (s)	4.1			7.5	9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	123	0	185	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	0	0	185	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	12.3%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - AM Peak Hour

	↖	→	↗	↙	←	↖	↗	↑	↖	↗	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SWR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗		↖	↖↗	
Traffic Volume (vph)	20	80	14	16	125	5	47	82	32	8	65	247
Future Volume (vph)	20	80	14	16	125	5	47	82	32	8	65	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	95		0	175		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.978			0.995			0.958			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3461	0	1770	3522	0	1770	3391	0	1770	3118	0
Flt Permitted							0.727			0.727		
Satd. Flow (perm)	1863	3461	0	1863	3522	0	1354	3391	0	1354	3118	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		15			5			35			268	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		546			787			372			538	
Travel Time (s)		12.4			17.9			8.5			12.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	87	15	17	136	5	51	89	35	9	71	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	102	0	17	141	0	51	124	0	9	339	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effct Green (s)	7.0	7.0		7.1	7.1		9.1	9.1		9.1	9.1	
Actuated g/C Ratio	0.37	0.37		0.38	0.38		0.48	0.48		0.48	0.48	
v/c Ratio	0.03	0.08		0.02	0.11		0.08	0.08		0.01	0.21	
Control Delay	6.7	5.6		6.6	6.1		6.2	4.5		6.0	2.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.7	5.6		6.6	6.1		6.2	4.5		6.0	2.2	
LOS	A	A		A	A		A	A		A	A	
Approach Delay		5.8			6.2			5.0			2.3	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 18.9

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.21

Intersection Signal Delay: 4.2

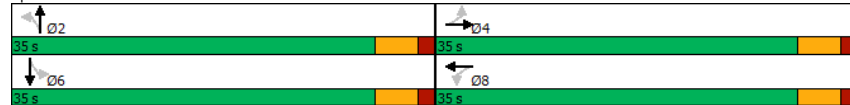
Intersection LOS: A

Intersection Capacity Utilization 39.0%

ICU Level of Service A










Analysis Period (min) 15

Splits and Phases: 23: Baseline Road & Whitehaven Road







Lanes, Volumes, Timings
1: Long Rd & Islechem DWY

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	24	12	0	1	0
Future Volume (vph)	0	24	12	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr						
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1863	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1863	0	1770	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		305	695		378	
Travel Time (s)		6.9	15.8		8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	26	13	0	1	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	13	0	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	13.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
1: Long Rd & Islechem DWY

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	24	12	0	1	0
Future Vol, veh/h	0	24	12	0	1	0
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	0	26	13	0	1	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	13	0	-	0	39
Stage 1	-	-	-	-	13
Stage 2	-	-	-	-	26
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1606	-	-	-	973
Stage 1	-	-	-	-	1010
Stage 2	-	-	-	-	997
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1606	-	-	-	973
Mov Cap-2 Maneuver	-	-	-	-	973
Stage 1	-	-	-	-	1010
Stage 2	-	-	-	-	997

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1606	-	-	-	973
HCM Lane V/C Ratio	-	-	-	-	0.001
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lanes, Volumes, Timings
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Volume (vph)	7	3	51	19	2	0
Future Volume (vph)	7	3	51	19	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.961					
Flt Protected				0.965	0.950	
Satd. Flow (prot)	1826	0	0	1834	1805	0
Flt Permitted				0.965	0.950	
Satd. Flow (perm)	1826	0	0	1834	1805	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	695			248	327	
Travel Time (s)	15.8			5.6	7.4	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	4	72	27	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	0	99	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 20.5%	ICU Level of Service A					
Analysis Period (min)	15					

HCM 6th TWSC
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Vol, veh/h	7	3	51	19	2	0
Future Vol, veh/h	7	3	51	19	2	0
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	10	4	72	27	3	0


















Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	14	0	183
Stage 1	-	-	-	-	12
Stage 2	-	-	-	-	171
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1617	-	811
Stage 1	-	-	-	-	1016
Stage 2	-	-	-	-	864
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1617	-	775
Mov Cap-2 Maneuver	-	-	-	-	775
Stage 1	-	-	-	-	1016
Stage 2	-	-	-	-	825

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	775	-	-	1617	-
HCM Lane V/C Ratio	0.004	-	-	0.044	-
HCM Control Delay (s)	9.7	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Lanes, Volumes, Timings
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	83	168	17	36	56	27	179	90	0	2	6
Future Volume (vph)	56	83	168	17	36	56	27	179	90	0	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.930			0.959			0.895	
Flt Protected		0.980			0.992			0.996				
Satd. Flow (prot)	0	1862	1615	0	1753	0	0	1804	0	0	1674	0
Flt Permitted		0.980			0.992			0.996				
Satd. Flow (perm)	0	1862	1615	0	1753	0	0	1804	0	0	1674	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1104			662			429			522	
Travel Time (s)		25.1			15.0			9.8			11.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	2%
Adj. Flow (vph)	61	90	183	18	39	61	29	195	98	0	2	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	151	183	0	118	0	0	322	0	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control	Stop			Stop			Stop			Stop		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 43.9% ICU Level of Service A

Analysis Period (min) 15






HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

Intersection

Intersection Delay, s/veh 10.2

Intersection LOS B










Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	83	168	17	36	56	27	179	90	0	2	6
Future Vol, veh/h	56	83	168	17	36	56	27	179	90	0	2	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	0	2
Mvmt Flow	61	90	183	18	39	61	29	195	98	0	2	7
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	9.5	9	11.4	8.1
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	9%	40%	0%	16%	0%
Vol Thru, %	60%	60%	0%	33%	25%
Vol Right, %	30%	0%	100%	51%	75%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	296	139	168	109	8
LT Vol	27	56	0	17	0
Through Vol	179	83	0	36	2
RT Vol	90	0	168	56	6
Lane Flow Rate	322	151	183	118	9
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.427	0.236	0.24	0.162	0.012
Departure Headway (Hd)	4.773	5.634	4.725	4.93	4.925
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	750	633	754	720	717
Service Time	2.83	3.404	2.495	3.012	3.021
HCM Lane V/C Ratio	0.429	0.239	0.243	0.164	0.013
HCM Control Delay	11.4	10.2	9	9	8.1
HCM Lane LOS	B	B	A	A	A
HCM 95th-tile Q	2.1	0.9	0.9	0.6	0




Lanes, Volumes, Timings
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	68	21	0	228	150	0
Future Volume (vph)	68	21	0	228	150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.969					
Flt Protected	0.963					
Satd. Flow (prot)	1753	0	0	1900	1881	0
Flt Permitted	0.963					
Satd. Flow (perm)	1753	0	0	1900	1881	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	283			5065	429	
Travel Time (s)	6.4			115.1	9.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	5%	0%	0%	1%	0%
Adj. Flow (vph)	76	23	0	253	167	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	0	0	253	167	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.7%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	68	21	0	228	150	0
Future Vol, veh/h	68	21	0	228	150	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	1	0
Mvmt Flow	76	23	0	253	167	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	420	167	- 0 - 0
Stage 1	167	-	- - -
Stage 2	253	-	- - -
Critical Hdwy	6.4	6.25	- - -
Critical Hdwy Stg 1	5.4	-	- - -
Critical Hdwy Stg 2	5.4	-	- - -
Follow-up Hdwy	3.5	3.345	- - -
Pot Cap-1 Maneuver	594	869	0 - - 0
Stage 1	867	-	0 - - 0
Stage 2	794	-	0 - - 0
Platoon blocked, %			- -
Mov Cap-1 Maneuver	594	869	- - -
Mov Cap-2 Maneuver	594	-	- - -
Stage 1	867	-	- - -
Stage 2	794	-	- - -

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT
Capacity (veh/h)	- 642	-
HCM Lane V/C Ratio	- 0.154	-
HCM Control Delay (s)	- 11.6	-
HCM Lane LOS	- B	-
HCM 95th %tile Q(veh)	- 0.5	-

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	17	8	28	43	8	72	81	93	4	37	121	87
Future Volume (vph)	17	8	28	43	8	72	81	93	4	37	121	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.929			0.921			0.997			0.952	
Flt Protected		0.984			0.983			0.978			0.992	
Satd. Flow (prot)	0	1667	0	0	1720	0	0	1853	0	0	1777	0
Flt Permitted		0.845			0.861			0.765			0.933	
Satd. Flow (perm)	0	1431	0	0	1507	0	0	1449	0	0	1671	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			77			2			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3127			771			5065			5011	
Travel Time (s)		71.1			17.5			115.1			113.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	18	9	30	46	9	77	87	100	4	40	130	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	132	0	0	191	0	0	264	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		40.0	40.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%		53.3%	53.3%		53.3%	53.3%	
Maximum Green (s)	30.2	30.2		30.2	30.2		34.5	34.5		34.5	34.5	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.2	1.2		1.2	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		6.6			6.6			16.5			16.5	
Actuated g/C Ratio		0.22			0.22			0.55			0.55	
v/c Ratio		0.17			0.34			0.24			0.28	
Control Delay		7.7			8.0			6.6			5.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.7			8.0			6.6			5.6	
LOS		A			A			A			A	
Approach Delay		7.7			8.0			6.6			5.6	
Approach LOS		A			A			A			A	
Intersection Summary												
Area Type:		Other										
Cycle Length:		75										
Actuated Cycle Length:		30.2										
Natural Cycle:		45										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.34										
Intersection Signal Delay:		6.6						Intersection LOS: A				
Intersection Capacity Utilization		41.2%						ICU Level of Service A				
Analysis Period (min)		15										

Splits and Phases: 5: Grand Island Blvd & Bedell Road
























Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2021 Background Conditions - PM Peak Hour












												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	72	105	14	112	134	23	17	141	81	21	213	201
Future Volume (vph)	72	105	14	112	134	23	17	141	81	21	213	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	125		0	165		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.978			0.945			0.927	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3545	0	1805	3419	0	1805	1784	0	1805	1761	0
Flt Permitted	0.645			0.671			0.370			0.610		
Satd. Flow (perm)	1226	3545	0	1275	3419	0	703	1784	0	1159	1761	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		15			25			45			74	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		642			804			5011			1413	
Travel Time (s)		14.6			18.3			113.9			32.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	22%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	77	113	15	120	144	25	18	152	87	23	229	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	128	0	120	169	0	18	239	0	23	445	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	

Lanes, Volumes, Timings

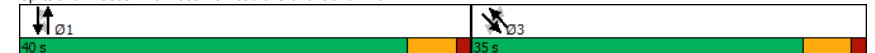
6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2021 Background Conditions - PM Peak Hour

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	37.7	37.7		37.7	37.7		37.7	37.7		37.7	37.7	
Total Split (s)	40.0	40.0		40.0	40.0		35.0	35.0		35.0	35.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	34.3	34.3		34.3	34.3		29.3	29.3		29.3	29.3	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.2	25.2		25.2	25.2		23.6	23.6		23.6	23.6	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.39	0.39		0.39	0.39	
v/c Ratio	0.15	0.09		0.23	0.12		0.07	0.33		0.05	0.61	
Control Delay	13.8	11.2		14.6	10.8		11.3	11.1		10.9	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.8	11.2		14.6	10.8		11.3	11.1		10.9	15.6	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.2			12.4			11.1			15.3	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 75												
Actuated Cycle Length: 60.3												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.61												
Intersection Signal Delay: 13.2						Intersection LOS: B						
Intersection Capacity Utilization 79.4%						ICU Level of Service D						
Analysis Period (min) 15												

Splits and Phases: 6: Baseline Road & Grand Island Blvd



Lanes, Volumes, Timings

7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	20	118	86	71	73	87	44	375	117	18	225	18
Future Volume (vph)	20	118	86	71	73	87	44	375	117	18	225	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	225		210	155		0	110		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.918			0.964			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1787	3255	0	1805	1832	0	1805	1879	0
Flt Permitted	0.641			0.674			0.595			0.386		
Satd. Flow (perm)	1218	1900	1615	1268	3255	0	1130	1832	0	733	1879	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			95		96			24			6	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	791			1017			5939			1413		
Travel Time (s)	18.0			23.1			135.0			32.1		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	130	95	78	80	96	48	412	129	20	247	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	130	95	78	176	0	48	541	0	20	267	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	

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Synchro 10 Report

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Lanes, Volumes, Timings

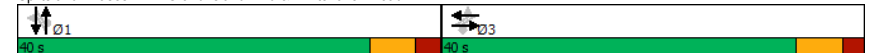
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	3		3	3			1			1		
Detector Phase	3	3	3	3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5		36.8	36.8		36.8	36.8	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	33.5	33.5	33.5	33.5	33.5		33.2	33.2		33.2	33.2	
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.8	6.8		6.8	6.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	22.0	22.0	22.0	22.0	22.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	11.6	11.6	11.6	11.6	11.6		23.5	23.5		23.5	23.5	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24		0.48	0.48		0.48	0.48	
v/c Ratio	0.08	0.29	0.21	0.26	0.21		0.09	0.61		0.06	0.30	
Control Delay	17.1	18.4	6.0	19.1	9.1		8.1	12.8		8.2	9.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.1	18.4	6.0	19.1	9.1		8.1	12.8		8.2	9.0	
LOS	B	B	A	B	A		A	B		A	A	
Approach Delay		13.5			12.2			12.4			8.9	
Approach LOS		B			B			B			A	
Intersection Summary												
Area Type:		Other										
Cycle Length: 80												
Actuated Cycle Length: 49.1												
Natural Cycle: 75												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.61												
Intersection Signal Delay: 11.8					Intersection LOS: B							
Intersection Capacity Utilization 64.3%					ICU Level of Service C							
Analysis Period (min) 15												

Splits and Phases: 7: Grand Island Blvd & Whitehaven Road



03/18/2020










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Synchro 10 Report

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Lanes, Volumes, Timings
8: Long Rd

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

						
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	7	0	0	70	0	200
Future Volume (vph)	7	0	0	70	0	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction	0.865					
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	248			1104	422	
Travel Time (s)	5.6			25.1	9.6	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Adj. Flow (vph)	10	0	0	99	0	282
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	99	0	282
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	22.4%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
9: Bedell Road & Proposed South DWY

39064 Project Olive Grand Island
2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			
Traffic Volume (vph)	0	53	49	0	0	0
Future Volume (vph)	0	53	49	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	0	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		159	3127		387	
Travel Time (s)		3.6	71.1		8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	58	53	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	58	53	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	6.7%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

22: I-190 NB

39064 Project Olive Grand Island

2021 Background Conditions - PM Peak Hour

	↑	↖	↗	↓	↙	↘
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↖			↗		
Traffic Volume (vph)	2	200	0	54	0	0
Future Volume (vph)	2	200	0	54	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.866					
Flt Protected						
Satd. Flow (prot)	1613	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1613	0	0	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	180			327	422	
Travel Time (s)	4.1			7.4	9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	217	0	59	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	219	0	0	59	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 15.8%	ICU Level of Service A					
Analysis Period (min)	15					

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - PM Peak Hour

	↖	→	↗	↙	←	↖	↗	↙	↓	↘		
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SWR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗		↖	↖↗	
Traffic Volume (vph)	93	150	48	28	112	19	69	137	26	27	157	92
Future Volume (vph)	93	150	48	28	112	19	69	137	26	27	157	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	95		0	175		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.964			0.978			0.976			0.945	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3412	0	1770	3461	0	1770	3454	0	1770	3345	0
Flt Permitted	0.690			0.690			0.727			0.727		
Satd. Flow (perm)	1285	3412	0	1285	3461	0	1354	3454	0	1354	3345	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			21			28			100	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		395			791			440			532	
Travel Time (s)		9.0			18.0			10.0			12.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	163	52	30	122	21	75	149	28	29	171	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	215	0	30	143	0	75	177	0	29	271	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effct Green (s)	8.3	8.3		8.3	8.3		8.0	8.0		8.0	8.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.35	0.35		0.35	0.35	
v/c Ratio	0.22	0.17		0.06	0.11		0.16	0.14		0.06	0.22	
Control Delay	8.2	5.4		6.9	6.0		8.1	6.3		7.4	5.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.2	5.4		6.9	6.0		8.1	6.3		7.4	5.1	
LOS	A	A		A	A		A	A		A	A	
Approach Delay		6.3			6.1			6.8			5.3	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 22.9

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.22

Intersection Signal Delay: 6.1

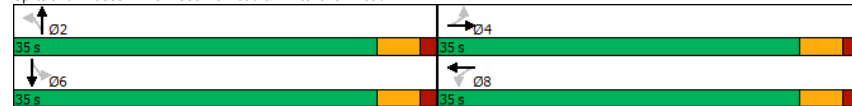
Intersection LOS: A

Intersection Capacity Utilization 38.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 23: Baseline Road & Whitehaven Road



A6 - UPDATED

**Level of Service Calculations:
Full Development Conditions**

Lanes, Volumes, Timings

1: Proposed North DWY/Islechem DWY & Long Rd

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	46	0	405	16	2	0	0	28	0	0	0
Future Volume (vph)	0	46	0	405	16	2	0	0	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.999			0.865				
Flt Protected					0.954							
Satd. Flow (prot)	0	1900	0	0	1777	0	0	1611	0	0	1863	0
Flt Permitted					0.954							
Satd. Flow (perm)	0	1900	0	0	1777	0	0	1611	0	0	1863	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			700			382			314	
Travel Time (s)		6.9			15.9			8.7			7.1	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.92	0.92	0.84	0.92	0.84
Heavy Vehicles (%)	0%	0%	2%	2%	0%	0%	2%	2%	2%	0%	2%	0%
Adj. Flow (vph)	0	55	0	482	19	2	0	0	30	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	503	0	0	30	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 40.1%

ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC

1: Proposed North DWY/Islechem DWY & Long Rd

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour

Intersection												
Int Delay, s/veh	7.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	46	0	405	16	2	0	0	28	0	0	0
Future Vol, veh/h	0	46	0	405	16	2	0	0	28	0	0	0
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	92	92	84	92	84
Heavy Vehicles, %	0	0	2	2	0	0	2	2	2	0	2	0
Mvmt Flow	0	55	0	482	19	2	0	0	30	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	21	0	0	55	0	0	1039	1040	55	1054	1039	20
Stage 1	-	-	-	-	-	-	55	55	-	984	984	-
Stage 2	-	-	-	-	-	-	984	985	-	70	55	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1608	-	-	1550	-	-	209	230	1012	206	231	1064
Stage 1	-	-	-	-	-	-	957	849	-	302	327	-
Stage 2	-	-	-	-	-	-	299	326	-	945	849	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1608	-	-	1550	-	-	158	158	1012	151	158	1064
Mov Cap-2 Maneuver	-	-	-	-	-	-	158	158	-	151	158	-
Stage 1	-	-	-	-	-	-	957	849	-	302	224	-
Stage 2	-	-	-	-	-	-	205	223	-	917	849	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8	8.7	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1012	1608	-	-	1550	-	-	-
HCM Lane V/C Ratio	0.03	-	-	-	0.311	-	-	-
HCM Control Delay (s)	8.7	0	-	-	8.4	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	1.3	-	-	-

Lanes, Volumes, Timings
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Volume (vph)	49	25	154	206	250	0
Future Volume (vph)	49	25	154	206	250	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.954					
Flt Protected				0.979	0.950	
Satd. Flow (prot)	1813	0	0	1850	1805	0
Flt Permitted				0.979	0.950	
Satd. Flow (perm)	1813	0	0	1850	1805	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	700			240	278	
Travel Time (s)	15.9			5.5	6.3	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	56	29	177	237	287	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	0	0	414	287	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 46.5%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	16.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Vol, veh/h	49	25	154	206	250	0
Future Vol, veh/h	49	25	154	206	250	0
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	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	56	29	177	237	287	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	85
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1524
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1524
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.3	40.8
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	372	-	-	1524	-
HCM Lane V/C Ratio	0.772	-	-	0.116	-
HCM Control Delay (s)	40.8	-	-	7.7	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	6.4	-	-	0.4	-

Lanes, Volumes, Timings
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔			↔			↔	
Traffic Volume (vph)	29	26	103	14	160	57	200	112	22	0	0	0
Future Volume (vph)	29	26	103	14	160	57	200	112	22	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.967			0.991				
Flt Protected		0.974			0.997			0.971				
Satd. Flow (prot)	0	1851	1599	0	1819	0	0	1822	0	0	1900	0
Flt Permitted		0.974			0.997			0.971				
Satd. Flow (perm)	0	1851	1599	0	1819	0	0	1822	0	0	1900	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1107			662			443			522	
Travel Time (s)		25.2			15.0			10.1			11.9	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	1%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	34	30	120	16	186	66	233	130	26	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	64	120	0	268	0	0	389	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 44.3% ICU Level of Service A

Analysis Period (min) 15

HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

Intersection

Intersection Delay, s/veh 12.4

Intersection LOS B










Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔			↔			↔	
Traffic Vol, veh/h	29	26	103	14	160	57	200	112	22	0	0	0
Future Vol, veh/h	29	26	103	14	160	57	200	112	22	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	1	0	1	0	0	1	0	0	0	0
Mvmt Flow	34	30	120	16	186	66	233	130	26	0	0	0
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	9.3	11.6	14.5	0
HCM LOS	A	B	B	-

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	60%	53%	0%	6%	0%
Vol Thru, %	34%	47%	0%	69%	100%
Vol Right, %	7%	0%	100%	25%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	334	55	103	231	0
LT Vol	200	29	0	14	0
Through Vol	112	26	0	160	0
RT Vol	22	0	103	57	0
Lane Flow Rate	388	64	120	269	0
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.559	0.11	0.174	0.39	0
Departure Headway (Hd)	5.178	6.21	5.232	5.226	5.745
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	703	578	685	688	0
Service Time	3.178	3.945	2.967	3.257	3.788
HCM Lane V/C Ratio	0.552	0.111	0.175	0.391	0
HCM Control Delay	14.5	9.7	9.1	11.6	8.8
HCM Lane LOS	B	A	A	B	N
HCM 95th-tile Q	3.5	0.4	0.6	1.9	0

Lanes, Volumes, Timings
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	189	262	0	146	116	0
Future Volume (vph)	189	262	0	146	116	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922					
Flt Protected	0.979					
Satd. Flow (prot)	1715	0	0	1881	1881	0
Flt Permitted	0.979					
Satd. Flow (perm)	1715	0	0	1881	1881	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	536			5051	443	
Travel Time (s)	12.2			114.8	10.1	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	220	305	0	170	135	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	525	0	0	170	135	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

Intersection						
Int Delay, s/veh	10.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↗	↗	
Traffic Vol, veh/h	189	262	0	146	116	0
Future Vol, veh/h	189	262	0	146	116	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	220	305	0	170	135	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	305	135	- 0 - 0
Stage 1	135	-	- - - -
Stage 2	170	-	- - - -
Critical Hdwy	6.4	6.2	- - - -
Critical Hdwy Stg 1	5.4	-	- - - -
Critical Hdwy Stg 2	5.4	-	- - - -
Follow-up Hdwy	3.5	3.3	- - - -
Pot Cap-1 Maneuver	691	919	0 - - 0
Stage 1	896	-	0 - - 0
Stage 2	865	-	0 - - 0
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	691	919	- - - -
Mov Cap-2 Maneuver	691	-	- - - -
Stage 1	896	-	- - - -
Stage 2	865	-	- - - -

Approach	EB	NB	SB
HCM Control Delay, s	17.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT
Capacity (veh/h)	- 807	-
HCM Lane V/C Ratio	- 0.65	-
HCM Control Delay (s)	- 17.3	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 4.9	-

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	11	42	68	29	82	23	60	250	61	70	13
Future Volume (vph)	1	11	42	68	29	82	23	60	250	61	70	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.896				0.939			0.899			0.988	
Flt Protected	0.999				0.981			0.997			0.979	
Satd. Flow (prot)	0	1576	0	0	1727	0	0	1697	0	0	1814	0
Flt Permitted	0.992				0.850			0.973			0.754	
Satd. Flow (perm)	0	1565	0	0	1496	0	0	1656	0	0	1397	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			67			263			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3134			771			5051			5011	
Travel Time (s)		71.2			17.5			114.8			113.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	100%	0%	8%	0%	0%	3%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	1	12	44	72	31	86	24	63	263	64	74	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	189	0	0	350	0	0	152	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		40.0	40.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%		53.3%	53.3%		53.3%	53.3%	
Maximum Green (s)	30.2	30.2		30.2	30.2		34.5	34.5		34.5	34.5	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.2	1.2		1.2	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		7.7			7.7			14.2			14.2	
Actuated g/C Ratio		0.24			0.24			0.44			0.44	
v/c Ratio		0.14			0.47			0.40			0.25	
Control Delay		5.7			10.9			3.7			7.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		5.7			10.9			3.7			7.3	
LOS		A			B			A			A	
Approach Delay		5.7			10.9			3.7			7.3	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 32.5

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 6.4

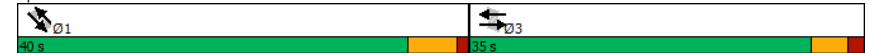
Intersection LOS: A

Intersection Capacity Utilization 52.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Grand Island Blvd & Bedell Road























Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour













												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	70	44	2	94	241	14	1	92	103	1	110	54
Future Volume (vph)	70	44	2	94	241	14	1	92	103	1	110	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	125		0	165		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.992			0.921			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3488	0	1805	3548	0	1805	1717	0	1805	1760	0
Flt Permitted	0.580			0.723			0.644			0.624		
Satd. Flow (perm)	1070	3488	0	1374	3548	0	1224	1717	0	1186	1760	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		2			10			88			38	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	642			804			5011			1413		
Travel Time (s)	14.6			18.3			113.9			32.1		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	0%	0%	1%	0%	0%	4%	0%	0%	3%	2%
Adj. Flow (vph)	77	48	2	103	265	15	1	101	113	1	121	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	50	0	103	280	0	1	214	0	1	180	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	

Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	37.7	37.7		37.7	37.7		37.7	37.7		37.7	37.7	
Total Split (s)	40.0	40.0		40.0	40.0		35.0	35.0		35.0	35.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	34.3	34.3		34.3	34.3		29.3	29.3		29.3	29.3	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	25.0	25.0		25.0	25.0		16.3	16.3		16.3	16.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.31	0.31		0.31	0.31	
v/c Ratio	0.15	0.03		0.16	0.17		0.00	0.36		0.00	0.32	
Control Delay	9.6	8.0		9.4	8.3		12.0	10.3		12.0	12.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.6	8.0		9.4	8.3		12.0	10.3		12.0	12.4	
LOS	A	A		A	A		B	B		B	B	
Approach Delay		8.9			8.6			10.3			12.4	
Approach LOS		A			A			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 52.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 9.8

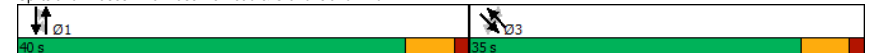
Intersection LOS: A

Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Baseline Road & Grand Island Blvd



Lanes, Volumes, Timings

7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour














	←	→	↖	↗	←	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	
Traffic Volume (vph)	8	76	39	50	226	55	59	123	33	28	163	6	
Future Volume (vph)	8	76	39	50	226	55	59	123	33	28	163	6	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	225		0	225		210	155		0	110		0	
Storage Lanes	1		1	1		1	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.850		0.971			0.968			0.994		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1805	1881	1538	1736	3477	0	1805	1831	0	1805	1802	0	
Flt Permitted	0.539			0.695			0.624			0.633			
Satd. Flow (perm)	1024	1881	1538	1270	3477	0	1186	1831	0	1203	1802	0	
Right Turn on Red			Yes		Yes		Yes		Yes		Yes		
Satd. Flow (RTOR)			52		46			21			3		
Link Speed (mph)	30				30			30			30		
Link Distance (ft)	791				1017			5939			1413		
Travel Time (s)	18.0				23.1			135.0			32.1		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	
Heavy Vehicles (%)	0%	1%	5%	4%	1%	0%	0%	0%	2%	0%	5%	0%	
Adj. Flow (vph)	10	96	49	63	286	70	75	156	42	35	206	8	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	10	96	49	63	356	0	75	198	0	35	214	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)	12				12			12			12		
Link Offset(ft)	0				0			0			0		
Crosswalk Width(ft)	16				16			16			16		
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Number of Detectors	1	2	1	1	2		1	2		1	2		
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru		
Leading Detector (ft)	20	100	20	20	100		20	100		20	100		
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6		
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(ft)		94			94			94			94		
Detector 2 Size(ft)		6			6			6			6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA		
Protected Phases		3			3			1			1		

Lanes, Volumes, Timings

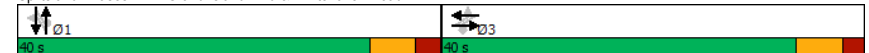
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	3		3	3			1			1			
Detector Phase	3	3	3	3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		10.0	10.0		10.0	10.0		
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5		36.8	36.8		36.8	36.8		
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0		
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		
Maximum Green (s)	33.5	33.5	33.5	33.5	33.5		33.2	33.2		33.2	33.2		
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3		
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.5	2.5		2.5	2.5		
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.8	6.8		6.8	6.8		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		
Recall Mode	None	None	None	None	None		Min	Min		Min	Min		
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	22.0	22.0	22.0	22.0	22.0		23.0	23.0		23.0	23.0		
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0		
Act Effect Green (s)	12.1	12.1	12.1	12.1	12.1		13.0	13.0		13.0	13.0		
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.33	0.33		0.33	0.33		
v/c Ratio	0.03	0.16	0.10	0.16	0.32		0.19	0.32		0.09	0.35		
Control Delay	10.4	11.0	4.4	11.4	10.0		11.4	10.8		10.4	12.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	10.4	11.0	4.4	11.4	10.0		11.4	10.8		10.4	12.2		
LOS	B	B	A	B	A		B	B		B	B		
Approach Delay		8.9			10.2			10.9			11.9		
Approach LOS		A			B			B			B		
Intersection Summary													
Area Type:		Other											
Cycle Length: 80													
Actuated Cycle Length: 38.9													
Natural Cycle: 75													
Control Type: Actuated-Uncoordinated													
Maximum v/c Ratio: 0.35													
Intersection Signal Delay: 10.6					Intersection LOS: B								
Intersection Capacity Utilization 43.5%					ICU Level of Service A								
Analysis Period (min) 15													

Splits and Phases: 7: Grand Island Blvd & Whitehaven Road



Lanes, Volumes, Timings
9: Bedell Road & Proposed South DWY

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			
Traffic Volume (vph)	0	43	77	263	11	0
Future Volume (vph)	0	43	77	263	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896				
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1669	0	0	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1669	0	0	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		506	3134		384	
Travel Time (s)		11.5	71.2		8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	47	84	286	12	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	47	370	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization Err%	ICU Level of Service H					
Analysis Period (min)	15					

Lanes, Volumes, Timings
11: I-190 NB

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↖			↑		
Traffic Volume (vph)	250	113	0	179	0	0
Future Volume (vph)	250	113	0	179	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958					
Flt Protected						
Satd. Flow (prot)	1785	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1785	0	0	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	159			278	366	
Travel Time (s)	3.6			6.3	8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	123	0	195	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	395	0	0	195	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.4%	ICU Level of Service A					
Analysis Period (min)	15					

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖		↖	↖		↖	↖	
Traffic Volume (vph)	20	84	14	16	156	5	47	82	32	8	68	248
Future Volume (vph)	20	84	14	16	156	5	47	82	32	8	68	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	95		0	175		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.979			0.996			0.958			0.882	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3525	0	1770	3391	0	1770	3122	0
Flt Permitted							0.727			0.727		
Satd. Flow (perm)	1863	3465	0	1863	3525	0	1354	3391	0	1354	3122	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			5			35			270	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			791			395			527	
Travel Time (s)		10.7			18.0			9.0			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	91	15	17	170	5	51	89	35	9	74	270
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	106	0	17	175	0	51	124	0	9	344	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

03/18/2020

SRF Associates

Synchro 10 Report

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Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions - AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effct Green (s)	7.3	7.3		7.4	7.4		9.2	9.2		9.2	9.2	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.49	0.49		0.49	0.49	
v/c Ratio	0.03	0.08		0.02	0.13		0.08	0.07		0.01	0.21	
Control Delay	6.6	5.6		6.6	6.0		6.3	4.6		6.1	2.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	5.6		6.6	6.0		6.3	4.6		6.1	2.3	
LOS	A	A		A	A		A	A		A	A	
Approach Delay		5.8			6.1			5.1			2.4	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 18.9

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.21

Intersection Signal Delay: 4.3

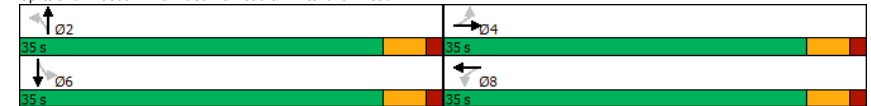
Intersection LOS: A

Intersection Capacity Utilization 39.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 23: Baseline Road & Whitehaven Road



03/18/2020

SRF Associates

Synchro 10 Report

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Lanes, Volumes, Timings
24: Long Rd

39064 Project Olive Grand Island
Full Build Conditions - AM Peak Hour

	→	↗	↖	←	↘	↙
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑		↑
Traffic Volume (vph)	49	0	0	360	0	113
Future Volume (vph)	49	0	0	360	0	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	240			1107	366	
Travel Time (s)	5.5			25.2	8.3	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	56	0	0	414	0	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	0	414	0	130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 22.3%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Propsoed North DWY/Islechem DWY & Long Rd

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

	↗	→	↘	↖	←	↙	↘	↗	↖	↙	↘	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	24	0	357	12	0	0	0	375	1	0	0
Future Volume (vph)	0	24	0	357	12	0	0	0	375	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.865				
Flt Protected					0.954						0.950	
Satd. Flow (prot)	0	1863	0	0	1777	0	0	1611	0	0	1770	0
Flt Permitted					0.954						0.950	
Satd. Flow (perm)	0	1863	0	0	1777	0	0	1611	0	0	1770	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			700			497			378	
Travel Time (s)		6.9			15.9			11.3			8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	26	0	388	13	0	0	0	408	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	26	0	0	401	0	0	408	0	0	1	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 57.0%	ICU Level of Service B											
Analysis Period (min) 15												

HCM 6th TWSC

1: Propsoed North DWY/Islechem DWY & Long Rd

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	24	0	357	12	0	0	0	375	1	0	0
Future Vol, veh/h	0	24	0	357	12	0	0	0	375	1	0	0
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	26	0	388	13	0	0	0	408	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	13	0	0	26	0	0	815	815	26	1019	815	13
Stage 1	-	-	-	-	-	-	26	26	-	789	789	-
Stage 2	-	-	-	-	-	-	789	789	-	230	26	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1606	-	-	1588	-	-	296	312	1050	215	312	1067
Stage 1	-	-	-	-	-	-	992	874	-	384	402	-
Stage 2	-	-	-	-	-	-	384	402	-	773	874	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1606	-	-	1588	-	-	240	235	1050	107	235	1067
Mov Cap-2 Maneuver	-	-	-	-	-	-	240	235	-	107	235	-
Stage 1	-	-	-	-	-	-	992	874	-	384	303	-
Stage 2	-	-	-	-	-	-	290	303	-	473	874	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	7.7	10.6	39
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1050	1606	-	-	1588	-	-	107
HCM Lane V/C Ratio	0.388	-	-	-	0.244	-	-	0.01
HCM Control Delay (s)	10.6	0	-	-	8	0	-	39
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	1.9	0	-	-	1	-	-	0

Lanes, Volumes, Timings
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Volume (vph)	227	158	51	172	207	0
Future Volume (vph)	227	158	51	172	207	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.945					
Flt Protected				0.989	0.950	
Satd. Flow (prot)	1796	0	0	1879	1805	0
Flt Permitted				0.989	0.950	
Satd. Flow (perm)	1796	0	0	1879	1805	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	700			270	291	
Travel Time (s)	15.9			6.1	6.6	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	320	223	72	242	292	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	543	0	0	314	292	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	54.9%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM 6th TWSC
2: I-190 NB & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	17.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Vol, veh/h	227	158	51	172	207	0
Future Vol, veh/h	227	158	51	172	207	0
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	320	223	72	242	292	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	543
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1036
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1036
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	67
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	320	-	-	1036	-
HCM Lane V/C Ratio	0.911	-	-	0.069	-
HCM Control Delay (s)	67	-	-	8.7	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8.8	-	-	0.2	-

Lanes, Volumes, Timings
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↗	→	↘	↖	←	↙	↘	↖	↗	↘	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕			↕			↕	
Traffic Volume (vph)	264	95	168	17	48	56	168	179	90	0	2	6
Future Volume (vph)	264	95	168	17	48	56	168	179	90	0	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.937			0.972			0.895		
Flt Protected		0.965		0.993			0.981					
Satd. Flow (prot)	0	1834	1615	0	1768	0	0	1804	0	0	1674	0
Flt Permitted		0.965		0.993			0.981					
Satd. Flow (perm)	0	1834	1615	0	1768	0	0	1804	0	0	1674	0
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		1077		662			436			522		
Travel Time (s)		24.5		15.0			9.9			11.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	2%
Adj. Flow (vph)	287	103	183	18	52	61	183	195	98	0	2	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	183	0	131	0	0	476	0	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0		0			0			0		
Link Offset(ft)		0		0			0			0		
Crosswalk Width(ft)		16		16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop		Stop		Stop		Stop		Stop		Stop

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 63.8%

ICU Level of Service B

Analysis Period (min) 15

HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection

Intersection Delay, s/veh 20.2

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕			↕			↕	
Traffic Vol, veh/h	264	95	168	17	48	56	168	179	90	0	2	6
Future Vol, veh/h	264	95	168	17	48	56	168	179	90	0	2	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	0	2
Mvmt Flow	287	103	183	18	52	61	183	195	98	0	2	7
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	19.6	10.9	23.8	9.5
HCM LOS	C	B	C	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	38%	74%	0%	14%	0%
Vol Thru, %	41%	26%	0%	40%	25%
Vol Right, %	21%	0%	100%	46%	75%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	437	359	168	121	8
LT Vol	168	264	0	17	0
Through Vol	179	95	0	48	2
RT Vol	90	0	168	56	6
Lane Flow Rate	475	390	183	132	9
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.749	0.712	0.278	0.223	0.015
Departure Headway (Hd)	5.676	6.565	5.481	6.109	6.292
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	637	550	654	585	564
Service Time	3.725	4.317	3.232	4.178	4.384
HCM Lane V/C Ratio	0.746	0.709	0.28	0.226	0.016
HCM Control Delay	23.8	24	10.3	10.9	9.5
HCM Lane LOS	C	C	B	B	A
HCM 95th-tile Q	6.7	5.7	1.1	0.8	0

Lanes, Volumes, Timings
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	RT	RT		LT	LT	
Traffic Volume (vph)	209	225	0	228	150	0
Future Volume (vph)	209	225	0	228	150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.930					
Flt Protected	0.976					
Satd. Flow (prot)	1681	0	0	1900	1881	0
Flt Permitted	0.976					
Satd. Flow (perm)	1681	0	0	1900	1881	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	447			5058	436	
Travel Time (s)	10.2			115.0	9.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	5%	0%	0%	1%	0%
Adj. Flow (vph)	232	250	0	253	167	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	482	0	0	253	167	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 44.0%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	10.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	RT	RT		LT	LT	
Traffic Vol, veh/h	209	225	0	228	150	0
Future Vol, veh/h	209	225	0	228	150	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	1	0
Mvmt Flow	232	250	0	253	167	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	420	167	- 0 - 0
Stage 1	167	-	- - - -
Stage 2	253	-	- - - -
Critical Hdwy	6.4	6.25	- - - -
Critical Hdwy Stg 1	5.4	-	- - - -
Critical Hdwy Stg 2	5.4	-	- - - -
Follow-up Hdwy	3.5	3.345	- - - -
Pot Cap-1 Maneuver	594	869	0 - - 0
Stage 1	867	-	0 - - 0
Stage 2	794	-	0 - - 0
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	594	869	- - - -
Mov Cap-2 Maneuver	594	-	- - - -
Stage 1	867	-	- - - -
Stage 2	794	-	- - - -

Approach	EB	NB	SB
HCM Control Delay, s	20	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT
Capacity (veh/h)	- 711	-
HCM Lane V/C Ratio	- 0.678	-
HCM Control Delay (s)	- 20	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 5.3	-

Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↩	→	↪	↩	←	↩	↪	↩	↪	↩	↪	↩
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	17	38	223	43	20	72	81	93	208	54	121	87
Future Volume (vph)	17	38	223	43	20	72	81	93	208	54	121	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.892			0.928			0.926			0.955	
Flt Protected		0.997			0.984			0.990			0.990	
Satd. Flow (prot)	0	1588	0	0	1735	0	0	1742	0	0	1780	0
Flt Permitted		0.970			0.796			0.867			0.854	
Satd. Flow (perm)	0	1545	0	0	1404	0	0	1525	0	0	1535	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		240			77			106			44	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3096			771			5058			5011	
Travel Time (s)		70.4			17.5			115.0			113.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	18	41	240	46	22	77	87	100	224	58	130	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	299	0	0	145	0	0	411	0	0	282	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												

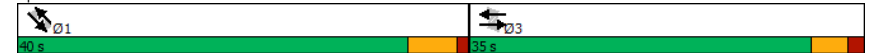
Lanes, Volumes, Timings
5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↩	→	↪	↩	←	↩	↪	↩	↪	↩	↪	↩
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		40.0	40.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%		53.3%	53.3%		53.3%	53.3%	
Maximum Green (s)	30.2	30.2		30.2	30.2		34.5	34.5		34.5	34.5	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.2	1.2		1.2	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		8.0			8.0			16.2			16.2	
Actuated g/C Ratio		0.23			0.23			0.46			0.46	
v/c Ratio		0.56			0.38			0.54			0.39	
Control Delay		8.6			10.7			8.0			7.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.6			10.7			8.0			7.0	
LOS		A			B			A			A	
Approach Delay		8.6			10.7			8.0			7.0	
Approach LOS		A			B			A			A	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 35.1	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 8.2	Intersection LOS: A
Intersection Capacity Utilization 61.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Grand Island Blvd & Bedell Road























Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour












												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	78	105	14	112	141	23	17	242	176	21	225	201
Future Volume (vph)	78	105	14	112	141	23	17	242	176	21	225	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	125		0	165		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.93	1.00	1.00	1.00	1.00
Frt		0.982			0.979			0.937			0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3545	0	1805	3428	0	1805	1770	0	1805	1765	0
Flt Permitted	0.640			0.671			0.366			0.376		
Satd. Flow (perm)	1216	3545	0	1275	3428	0	695	1770	0	714	1765	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		15			25			57			70	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		642			804			5011			1413	
Travel Time (s)		14.6			18.3			113.9			32.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	22%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	84	113	15	120	152	25	18	260	189	23	242	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	128	0	120	177	0	18	449	0	23	458	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	

Lanes, Volumes, Timings

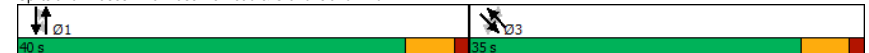
6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	37.7	37.7		37.7	37.7		37.7	37.7		37.7	37.7	
Total Split (s)	40.0	40.0		40.0	40.0		35.0	35.0		35.0	35.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	34.3	34.3		34.3	34.3		29.3	29.3		29.3	29.3	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	25.2	25.2		25.2	25.2		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.41	0.41		0.41	0.41	
v/c Ratio	0.17	0.09		0.23	0.13		0.06	0.59		0.08	0.60	
Control Delay	14.6	11.6		15.2	11.3		11.2	15.7		11.4	15.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.6	11.6		15.2	11.3		11.2	15.7		11.4	15.4	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.8			12.9			15.5			15.2	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:		Other										
Cycle Length: 75												
Actuated Cycle Length: 62.2												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.60												
Intersection Signal Delay: 14.5				Intersection LOS: B								
Intersection Capacity Utilization 80.0%				ICU Level of Service D								
Analysis Period (min) 15												

Splits and Phases: 6: Baseline Road & Grand Island Blvd



Lanes, Volumes, Timings

7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	20	125	90	76	93	103	45	385	120	101	306	18
Future Volume (vph)	20	125	90	76	93	103	45	385	120	101	306	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	225		210	155		0	110		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.921			0.964			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1787	3263	0	1805	1832	0	1805	1885	0
Flt Permitted	0.617			0.669			0.548			0.371		
Satd. Flow (perm)	1172	1900	1615	1259	3263	0	1041	1832	0	705	1885	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			99		113			24			5	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	792			1017			5939			1413		
Travel Time (s)	18.0			23.1			135.0			32.1		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	137	99	84	102	113	49	423	132	111	336	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	137	99	84	215	0	49	555	0	111	356	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	

03/18/2020

SRF Associates

Synchro 10 Report













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Lanes, Volumes, Timings

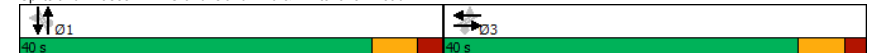
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	3		3	3			1			1		
Detector Phase	3	3	3	3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5		36.8	36.8		36.8	36.8	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	33.5	33.5	33.5	33.5	33.5		33.2	33.2		33.2	33.2	
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.8	6.8		6.8	6.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	22.0	22.0	22.0	22.0	22.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	12.3	12.3	12.3	12.3	12.3		24.7	24.7		24.7	24.7	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24		0.48	0.48		0.48	0.48	
v/c Ratio	0.08	0.30	0.21	0.28	0.25		0.10	0.62		0.33	0.39	
Control Delay	17.7	19.4	5.9	20.2	9.6		8.4	13.2		12.0	10.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.7	19.4	5.9	20.2	9.6		8.4	13.2		12.0	10.1	
LOS	B	B	A	C	A		A	B		B	B	
Approach Delay		14.1			12.6			12.8			10.5	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 80												
Actuated Cycle Length: 51.1												
Natural Cycle: 75												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 12.3						Intersection LOS: B						
Intersection Capacity Utilization 69.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Grand Island Blvd & Whitehaven Road



03/18/2020

SRF Associates

Synchro 10 Report

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Lanes, Volumes, Timings
8: Bedell Road & Proposed South DWY

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	↖	→	←	↖	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	53	49	233	225	0
Future Volume (vph)	0	53	49	233	225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.889				
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1656	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1656	0	1770	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		268	3096		641	
Travel Time (s)		6.1	70.4		14.6	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	62	58	274	265	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	62	332	0	265	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 36.1%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
8: Bedell Road & Proposed South DWY

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	0	53	49	233	225	0
Future Vol, veh/h	0	53	49	233	225	0
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	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	62	58	274	265	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	332	0	-	0	257 195
Stage 1	-	-	-	-	195 -
Stage 2	-	-	-	-	62 -
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	1227	-	-	-	732 846
Stage 1	-	-	-	-	838 -
Stage 2	-	-	-	-	961 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1227	-	-	-	732 846
Mov Cap-2 Maneuver	-	-	-	-	732 -
Stage 1	-	-	-	-	838 -
Stage 2	-	-	-	-	961 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1227	-	-	-	732
HCM Lane V/C Ratio	-	-	-	-	0.362
HCM Control Delay (s)	0	-	-	-	12.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.7









Lanes, Volumes, Timings
11: Long Rd

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑		↑
Traffic Volume (vph)	227	0	0	223	0	200
Future Volume (vph)	227	0	0	223	0	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	270			1077	408	
Travel Time (s)	6.1			24.5	9.3	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Adj. Flow (vph)	320	0	0	314	0	282
Shared Lane Traffic (%)						
Lane Group Flow (vph)	320	0	0	314	0	282
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.0%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings
23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island
2019 Existing Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	159	48	28	132	19	69	137	26	27	228	110
Future Volume (vph)	93	159	48	28	132	19	69	137	26	27	228	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	95		0	175		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt	0.965			0.981			0.976			0.951		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3415	0	1770	3472	0	1770	3454	0	1770	3366	0
Flt Permitted	0.667			0.667			0.533			0.640		
Satd. Flow (perm)	1242	3415	0	1242	3472	0	993	3454	0	1192	3366	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	52			21			28			120		
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	619			792			604			522		
Travel Time (s)	14.1			18.0			13.7			11.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	173	52	30	143	21	75	149	28	29	248	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	225	0	30	164	0	75	177	0	29	368	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)	94			94			94			94		
Detector 2 Size(ft)	6			6			6			6		
Detector 2 Type	CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				8				2			
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)	8.2	8.2		8.2	8.2		8.3	8.3		8.3	8.3	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.35	0.35		0.35	0.35	
v/c Ratio	0.24	0.19		0.07	0.14		0.22	0.15		0.07	0.30	
Control Delay	8.7	5.7		7.2	6.3		9.1	6.3		7.4	5.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.7	5.7		7.2	6.3		9.1	6.3		7.4	5.5	
LOS	A	A		A	A		A	A		A	A	
Approach Delay		6.6			6.4			7.1			5.7	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 23.8

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 6.4

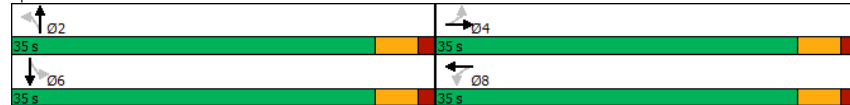
Intersection LOS: A

Intersection Capacity Utilization 40.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 23: Baseline Road & Whitehaven Road



Lanes, Volumes, Timings

24: I-190 NB

39064 Project Olive Grand Island

2019 Existing Conditions - PM Peak Hour

	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↖			↗		
Traffic Volume (vph)	207	200	0	209	0	0
Future Volume (vph)	207	200	0	209	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934					
Flt Protected						
Satd. Flow (prot)	1740	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1740	0	0	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	192			291	408	
Travel Time (s)	4.4			6.6	9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	225	217	0	227	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	442	0	0	227	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 26.5%

ICU Level of Service A

Analysis Period (min) 15

A7 - UPDATED

**Level of Service Calculations:
Full Development Conditions
With Project Modifications
and Improvements**

Lanes, Volumes, Timings

1: Proposed North DWY/Islechem DWY & Long Rd

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	46	0	405	16	2	0	0	28	0	0	0
Future Volume (vph)	0	46	0	405	16	2	0	0	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.999			0.865				
Flt Protected					0.954							
Satd. Flow (prot)	0	1900	0	0	1777	0	0	1611	0	0	1863	0
Flt Permitted					0.954							
Satd. Flow (perm)	0	1900	0	0	1777	0	0	1611	0	0	1863	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			695			382			314	
Travel Time (s)		6.9			15.8			8.7			7.1	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.92	0.92	0.84	0.92	0.84
Heavy Vehicles (%)	0%	0%	2%	2%	0%	0%	2%	2%	2%	0%	2%	0%
Adj. Flow (vph)	0	55	0	482	19	2	0	0	30	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	503	0	0	30	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 40.1%

ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC

1: Proposed North DWY/Islechem DWY & Long Rd

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

Intersection												
Int Delay, s/veh	7.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	46	0	405	16	2	0	0	28	0	0	0
Future Vol, veh/h	0	46	0	405	16	2	0	0	28	0	0	0
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	92	92	84	92	84
Heavy Vehicles, %	0	0	2	2	0	0	2	2	2	0	2	0
Mvmt Flow	0	55	0	482	19	2	0	0	30	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	21	0	0	55	0	0	1039	1040	55	1054	1039	20
Stage 1	-	-	-	-	-	-	55	55	-	984	984	-
Stage 2	-	-	-	-	-	-	984	985	-	70	55	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1608	-	-	1550	-	-	209	230	1012	206	231	1064
Stage 1	-	-	-	-	-	-	957	849	-	302	327	-
Stage 2	-	-	-	-	-	-	299	326	-	945	849	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1608	-	-	1550	-	-	158	158	1012	151	158	1064
Mov Cap-2 Maneuver	-	-	-	-	-	-	158	158	-	151	158	-
Stage 1	-	-	-	-	-	-	957	849	-	302	224	-
Stage 2	-	-	-	-	-	-	205	223	-	917	849	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8	8.7	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1012	1608	-	-	1550	-	-	-
HCM Lane V/C Ratio	0.03	-	-	-	0.311	-	-	-
HCM Control Delay (s)	8.7	0	-	-	8.4	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	1.3	-	-	-

Lanes, Volumes, Timings
2: I-190 SB & Long Rd

39064 Project Olive Grand Island
Full Build Conditions with Improvements - AM Peak Hour

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↖	
Traffic Volume (vph)	49	32	154	206	250	0
Future Volume (vph)	49	32	154	206	250	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.946					
Flt Protected				0.979	0.950	
Satd. Flow (prot)	1797	0	0	1850	1805	0
Flt Permitted				0.819	0.950	
Satd. Flow (perm)	1797	0	0	1547	1805	0
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)	37					
Link Speed (mph)	30			30	30	
Link Distance (ft)	695			259	291	
Travel Time (s)	15.8			5.9	6.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	56	37	177	237	287	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	0	0	414	287	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						

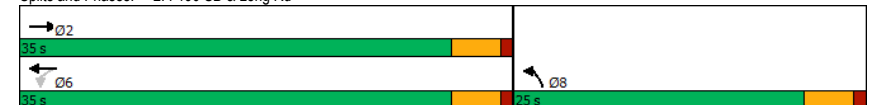
Lanes, Volumes, Timings
2: I-190 SB & Long Rd

39064 Project Olive Grand Island
Full Build Conditions with Improvements - AM Peak Hour

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Minimum Initial (s)	5.0		5.0	5.0	5.0	
Minimum Split (s)	22.5		22.5	22.5	22.5	
Total Split (s)	35.0		35.0	35.0	25.0	
Total Split (%)	58.3%		58.3%	58.3%	41.7%	
Maximum Green (s)	30.5		30.5	30.5	20.5	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5		4.5	4.5		
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		None	None	Min	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	15.6			15.6	11.6	
Actuated g/C Ratio	0.42			0.42	0.31	
v/c Ratio	0.12			0.63	0.51	
Control Delay	5.1			13.6	15.1	
Queue Delay	0.0			0.0	0.0	
Total Delay	5.1			13.6	15.1	
LOS	A			B	B	
Approach Delay	5.1			13.6	15.1	
Approach LOS	A			B	B	

Intersection Summary	
Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	36.9
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	13.2
Intersection Capacity Utilization:	47.4%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	A

Splits and Phases: 2: I-190 SB & Long Rd



Lanes, Volumes, Timings
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
Full Build Conditions with Improvements - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕			↕			↕	
Traffic Volume (vph)	29	26	103	14	160	57	200	112	22	0	0	0
Future Volume (vph)	29	26	103	14	160	57	200	112	22	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.967			0.991				
Flt Protected		0.974			0.997			0.971				
Satd. Flow (prot)	0	1851	1599	0	1819	0	0	1822	0	0	1900	0
Flt Permitted		0.974			0.997			0.971				
Satd. Flow (perm)	0	1851	1599	0	1819	0	0	1822	0	0	1900	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1093			662			443			522	
Travel Time (s)		24.8			15.0			10.1			11.9	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	1%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	34	30	120	16	186	66	233	130	26	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	64	120	0	268	0	0	389	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 44.3% ICU Level of Service A

Analysis Period (min) 15

HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
Full Build Conditions with Improvements - AM Peak Hour

Intersection

Intersection Delay, s/veh 12.4

Intersection LOS B











Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕			↕			↕	
Traffic Vol, veh/h	29	26	103	14	160	57	200	112	22	0	0	0
Future Vol, veh/h	29	26	103	14	160	57	200	112	22	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	1	0	1	0	0	1	0	0	0	0
Mvmt Flow	34	30	120	16	186	66	233	130	26	0	0	0
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	9.3	11.6	14.5	0
HCM LOS	A	B	B	-

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	60%	53%	0%	6%	0%
Vol Thru, %	34%	47%	0%	69%	100%
Vol Right, %	7%	0%	100%	25%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	334	55	103	231	0
LT Vol	200	29	0	14	0
Through Vol	112	26	0	160	0
RT Vol	22	0	103	57	0
Lane Flow Rate	388	64	120	269	0
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.559	0.11	0.174	0.39	0
Departure Headway (Hd)	5.178	6.21	5.232	5.226	5.745
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	703	578	685	688	0
Service Time	3.178	3.945	2.967	3.257	3.788
HCM Lane V/C Ratio	0.552	0.111	0.175	0.391	0
HCM Control Delay	14.5	9.7	9.1	11.6	8.8
HCM Lane LOS	B	A	A	B	N
HCM 95th-tile Q	3.5	0.4	0.6	1.9	0

Lanes, Volumes, Timings
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
Full Build Conditions with Improvements - AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	189	262	0	146	116	0
Future Volume (vph)	189	262	0	146	116	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.850					
Flt Protected	0.950					
Satd. Flow (prot)	1805	1615	0	1881	1881	0
Flt Permitted	0.950					
Satd. Flow (perm)	1805	1615	0	1881	1881	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	536			5051	443	
Travel Time (s)	12.2			114.8	10.1	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	220	305	0	170	135	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	220	305	0	170	135	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
Full Build Conditions with Improvements - AM Peak Hour

Intersection						
Int Delay, s/veh	7.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗		↖	↗	
Traffic Vol, veh/h	189	262	0	146	116	0
Future Vol, veh/h	189	262	0	146	116	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	220	305	0	170	135	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	305	135	- 0 - 0
Stage 1	135	-	- - - -
Stage 2	170	-	- - - -
Critical Hdwy	6.4	6.2	- - - -
Critical Hdwy Stg 1	5.4	-	- - - -
Critical Hdwy Stg 2	5.4	-	- - - -
Follow-up Hdwy	3.5	3.3	- - - -
Pot Cap-1 Maneuver	691	919	0 - - 0
Stage 1	896	-	0 - - 0
Stage 2	865	-	0 - - 0
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	691	919	- - - -
Mov Cap-2 Maneuver	691	-	- - - -
Stage 1	896	-	- - - -
Stage 2	865	-	- - - -

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	691	919	-
HCM Lane V/C Ratio	-	0.318	0.332	-
HCM Control Delay (s)	-	12.6	10.8	-
HCM Lane LOS	-	B	B	-
HCM 95th %tile Q(veh)	-	1.4	1.5	-

Lanes, Volumes, Timings

5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	↶	→	↷	↶	←	↶	↷	↶	↷	↶	↷	↶
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	11	42	68	29	82	23	60	250	61	70	13
Future Volume (vph)	1	11	42	68	29	82	23	60	250	61	70	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.896				0.939			0.899			0.988	
Flt Protected	0.999				0.981			0.997			0.979	
Satd. Flow (prot)	0	1576	0	0	1727	0	0	1697	0	0	1814	0
Flt Permitted	0.992				0.850			0.973			0.754	
Satd. Flow (perm)	0	1565	0	0	1496	0	0	1656	0	0	1397	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			67			263			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3134			771			5051			5011	
Travel Time (s)		71.2			17.5			114.8			113.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	100%	0%	8%	0%	0%	3%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	1	12	44	72	31	86	24	63	263	64	74	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	189	0	0	350	0	0	152	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												

Lanes, Volumes, Timings

5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	↶	→	↷	↶	←	↶	↷	↶	↷	↶	↷	↶
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		40.0	40.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%		53.3%	53.3%		53.3%	53.3%	
Maximum Green (s)	30.2	30.2		30.2	30.2		34.5	34.5		34.5	34.5	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.2	1.2		1.2	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		7.7			7.7			14.2			14.2	
Actuated g/C Ratio		0.24			0.24			0.44			0.44	
v/c Ratio		0.14			0.47			0.40			0.25	
Control Delay		5.7			10.9			3.7			7.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		5.7			10.9			3.7			7.3	
LOS		A			B			A			A	
Approach Delay		5.7			10.9			3.7			7.3	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 32.5

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 6.4

Intersection LOS: A

Intersection Capacity Utilization 52.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Grand Island Blvd & Bedell Road



Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	↩	↩		↩	↩		↩	↩		↩	↩	
Traffic Volume (vph)	70	44	2	94	241	14	1	92	103	1	110	54
Future Volume (vph)	70	44	2	94	241	14	1	92	103	1	110	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	125		0	165		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.992			0.921			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3488	0	1805	3548	0	1805	1717	0	1805	1760	0
Flt Permitted	0.580			0.723			0.644			0.624		
Satd. Flow (perm)	1070	3488	0	1374	3548	0	1224	1717	0	1186	1760	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		2			10			88			38	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	642			804			5011			1413		
Travel Time (s)	14.6			18.3			113.9			32.1		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	0%	0%	1%	0%	0%	4%	0%	0%	3%	2%
Adj. Flow (vph)	77	48	2	103	265	15	1	101	113	1	121	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	50	0	103	280	0	1	214	0	1	180	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	

Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	37.7	37.7		37.7	37.7		37.7	37.7		37.7	37.7	
Total Split (s)	40.0	40.0		40.0	40.0		35.0	35.0		35.0	35.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	34.3	34.3		34.3	34.3		29.3	29.3		29.3	29.3	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	25.0	25.0		25.0	25.0		16.3	16.3		16.3	16.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.31	0.31		0.31	0.31	
v/c Ratio	0.15	0.03		0.16	0.17		0.00	0.36		0.00	0.32	
Control Delay	9.6	8.0		9.4	8.3		12.0	10.3		12.0	12.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.6	8.0		9.4	8.3		12.0	10.3		12.0	12.4	
LOS	A	A		A	A		B	B		B	B	
Approach Delay		8.9			8.6			10.3			12.4	
Approach LOS		A			A			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 52.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 9.8

Intersection LOS: A

Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Baseline Road & Grand Island Blvd



Lanes, Volumes, Timings

7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour














	←	→	↙	↘	←	↙	↘	→	↙	↘	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↙	↘	↙	↙	↘	↘	↙	↘	↙	↙	↘	↘	
Traffic Volume (vph)	8	76	39	50	226	55	59	123	33	28	163	6	
Future Volume (vph)	8	76	39	50	226	55	59	123	33	28	163	6	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	225		0	225		210	155		0	110		0	
Storage Lanes	1		1	1		1	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.850		0.971			0.968			0.994		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1805	1881	1538	1736	3477	0	1805	1831	0	1805	1802	0	
Flt Permitted	0.539			0.695			0.624			0.633			
Satd. Flow (perm)	1024	1881	1538	1270	3477	0	1186	1831	0	1203	1802	0	
Right Turn on Red			Yes		Yes		Yes		Yes		Yes		
Satd. Flow (RTOR)			52		46			21			3		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		792			1017			5939			1413		
Travel Time (s)		18.0			23.1			135.0			32.1		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	
Heavy Vehicles (%)	0%	1%	5%	4%	1%	0%	0%	0%	2%	0%	5%	0%	
Adj. Flow (vph)	10	96	49	63	286	70	75	156	42	35	206	8	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	10	96	49	63	356	0	75	198	0	35	214	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)	12				12			12			12		
Link Offset(ft)	0				0			0			0		
Crosswalk Width(ft)	16				16			16			16		
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Number of Detectors	1	2	1	1	2		1	2		1	2		
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru		
Leading Detector (ft)	20	100	20	20	100		20	100		20	100		
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6		
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(ft)		94			94			94			94		
Detector 2 Size(ft)		6			6			6			6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA		
Protected Phases		3			3			1			1		

Lanes, Volumes, Timings

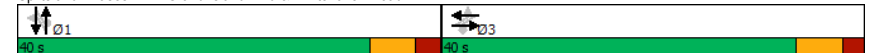
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	3		3	3			1			1			
Detector Phase	3	3	3	3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		10.0	10.0		10.0	10.0		
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5		36.8	36.8		36.8	36.8		
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0		
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		
Maximum Green (s)	33.5	33.5	33.5	33.5	33.5		33.2	33.2		33.2	33.2		
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3		
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.5	2.5		2.5	2.5		
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.8	6.8		6.8	6.8		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		
Recall Mode	None	None	None	None	None		Min	Min		Min	Min		
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	22.0	22.0	22.0	22.0	22.0		23.0	23.0		23.0	23.0		
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0		
Act Effect Green (s)	12.1	12.1	12.1	12.1	12.1		13.0	13.0		13.0	13.0		
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.33	0.33		0.33	0.33		
v/c Ratio	0.03	0.16	0.10	0.16	0.32		0.19	0.32		0.09	0.35		
Control Delay	10.4	11.0	4.4	11.4	10.0		11.4	10.8		10.4	12.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	10.4	11.0	4.4	11.4	10.0		11.4	10.8		10.4	12.2		
LOS	B	B	A	B	A		B	B		B	B		
Approach Delay		8.9			10.2			10.9			11.9		
Approach LOS		A			B			B			B		
Intersection Summary													
Area Type:	Other												
Cycle Length:	80												
Actuated Cycle Length:	38.9												
Natural Cycle:	75												
Control Type:	Actuated-Uncoordinated												
Maximum v/c Ratio:	0.35												
Intersection Signal Delay:	10.6					Intersection LOS: B							
Intersection Capacity Utilization	43.5%					ICU Level of Service A							
Analysis Period (min)	15												

Splits and Phases: 7: Grand Island Blvd & Whitehaven Road

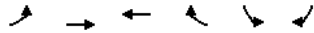


Lanes, Volumes, Timings

9: Bedell Road & Propsed South DWY

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	43	77	263	11	0
Future Volume (vph)	0	43	77	263	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896				
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1669	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1669	0	1770	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		506	3134		384	
Travel Time (s)		11.5	71.2		8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	47	84	286	12	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	47	370	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 30.2%

ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC

9: Bedell Road & Propsed South DWY

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	0	43	77	263	11	0
Future Vol, veh/h	0	43	77	263	11	0
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	0	47	84	286	12	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	370	0	274
Stage 1	-	-	227
Stage 2	-	-	47
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1189	-	716
Stage 1	-	-	811
Stage 2	-	-	975
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1189	-	716
Mov Cap-2 Maneuver	-	-	716
Stage 1	-	-	811
Stage 2	-	-	975

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1189	-	-	-	716
HCM Lane V/C Ratio	-	-	-	-	0.017
HCM Control Delay (s)	0	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings

11: I-190 SB

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	↑	↖	↗	↓	↙	↘
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↖			↗		
Traffic Volume (vph)	250	113	0	186	0	0
Future Volume (vph)	250	113	0	186	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958					
Flt Protected						
Satd. Flow (prot)	1785	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1785	0	0	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	134			291	395	
Travel Time (s)	3.0			6.6	9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	123	0	202	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	395	0	0	202	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.4%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SWR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗		↖	↖↗	
Traffic Volume (vph)	20	84	14	16	156	5	47	82	32	8	68	248
Future Volume (vph)	20	84	14	16	156	5	47	82	32	8	68	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	95		0	175		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.978			0.995			0.958			0.882	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3531	0	1805	3524	0	1805	3434	0	1805	3184	0
Flt Permitted	0.800			0.800			0.580			0.670		
Satd. Flow (perm)	1520	3531	0	1520	3524	0	1102	3434	0	1273	3184	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			6			36			282	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		555			792			508			534	
Travel Time (s)		12.6			18.0			11.5			12.1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	23	95	16	18	177	6	53	93	36	9	77	282
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	111	0	18	183	0	53	129	0	9	359	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

23: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)	6.8	6.8		6.9	6.9		7.0	7.0		7.0	7.0	
Actuated g/C Ratio	0.31	0.31		0.32	0.32		0.32	0.32		0.32	0.32	
v/c Ratio	0.05	0.10		0.04	0.16		0.15	0.12		0.02	0.30	
Control Delay	6.8	6.0		6.7	6.7		7.5	5.1		6.2	2.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.8	6.0		6.7	6.7		7.5	5.1		6.2	2.6	
LOS	A	A		A	A		A	A		A	A	
Approach Delay		6.1			6.7			5.8			2.7	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 21.8

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 4.8

Intersection LOS: A

Intersection Capacity Utilization 39.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 23: Baseline Road & Whitehaven Road

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Lanes, Volumes, Timings

24: Long Rd

39064 Project Olive Grand Island

Full Build Conditions with Improvements - AM Peak Hour

	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑		↑
Traffic Volume (vph)	49	0	0	360	0	113
Future Volume (vph)	49	0	0	360	0	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Fit Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Fit Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	259			1093	395	
Travel Time (s)	5.9			24.8	9.0	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	56	0	0	414	0	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	0	414	0	130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 22.3%

ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

39064 Project Olive Grand Island

1: Propsoed North DWY/Islechem DWY & Long Rd 2021 Full Build Conditions with Improvements - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Traffic Volume (vph)	0	24	0	357	12	0	0	0	375	1	0	0
Future Volume (vph)	0	24	0	357	12	0	0	0	375	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.865				
Flt Protected					0.954						0.950	
Satd. Flow (prot)	0	1863	0	0	1777	0	0	1611	0	0	1770	0
Flt Permitted					0.954						0.950	
Satd. Flow (perm)	0	1863	0	0	1777	0	0	1611	0	0	1770	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		305			692			497			378	
Travel Time (s)		6.9			15.7			11.3			8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	26	0	388	13	0	0	0	408	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	26	0	0	401	0	0	408	0	0	1	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 57.0%	ICU Level of Service B											
Analysis Period (min) 15												

HCM 6th TWSC

39064 Project Olive Grand Island

1: Propsoed North DWY/Islechem DWY & Long Rd 2021 Full Build Conditions with Improvements - PM Peak Hour

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Traffic Vol, veh/h	0	24	0	357	12	0	0	0	375	1	0	0
Future Vol, veh/h	0	24	0	357	12	0	0	0	375	1	0	0
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	26	0	388	13	0	0	0	408	1	0	0
Major/Minor												
Major1	Major2		Minor1		Minor2							
Conflicting Flow All	13	0	0	26	0	0	815	815	26	1019	815	13
Stage 1	-	-	-	-	-	-	26	26	-	789	789	-
Stage 2	-	-	-	-	-	-	789	789	-	230	26	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1606	-	-	1588	-	-	296	312	1050	215	312	1067
Stage 1	-	-	-	-	-	-	992	874	-	384	402	-
Stage 2	-	-	-	-	-	-	384	402	-	773	874	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1606	-	-	1588	-	-	240	235	1050	107	235	1067
Mov Cap-2 Maneuver	-	-	-	-	-	-	240	235	-	107	235	-
Stage 1	-	-	-	-	-	-	992	874	-	384	303	-
Stage 2	-	-	-	-	-	-	290	303	-	473	874	-
Approach												
EB	WB		NB		SB							
HCM Control Delay, s	0		7.7		10.6		39					
HCM LOS					B					E		
Minor Lane/Major Mvmt												
NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	1050	1606	-	-	1588	-	-	107				
HCM Lane V/C Ratio	0.388	-	-	-	0.244	-	-	0.01				
HCM Control Delay (s)	10.6	0	-	-	8	0	-	39				
HCM Lane LOS	B	A	-	-	A	A	-	E				
HCM 95th %tile Q(veh)	1.9	0	-	-	1	-	-	0				

Lanes, Volumes, Timings
2: I-190 SB & Long Rd

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Volume (vph)	227	158	51	172	207	0
Future Volume (vph)	227	158	51	172	207	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.945					
Flt Protected				0.989	0.950	
Satd. Flow (prot)	1796	0	0	1879	1805	0
Flt Permitted				0.763	0.950	
Satd. Flow (perm)	1796	0	0	1450	1805	0
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)	85					
Link Speed (mph)	30			30	30	
Link Distance (ft)	692			268	277	
Travel Time (s)	15.7			6.1	6.3	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	320	223	72	242	292	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	543	0	0	314	292	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						

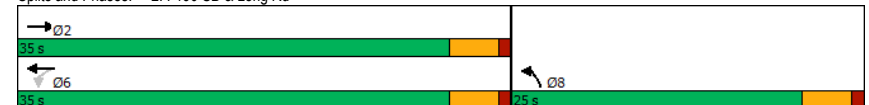
Lanes, Volumes, Timings
2: I-190 SB & Long Rd

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Minimum Initial (s)	5.0		5.0	5.0	5.0	
Minimum Split (s)	22.5		22.5	22.5	22.5	
Total Split (s)	35.0		35.0	35.0	25.0	
Total Split (%)	58.3%		58.3%	58.3%	41.7%	
Maximum Green (s)	30.5		30.5	30.5	20.5	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5			4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		None	None	Min	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	16.5			16.5	12.0	
Actuated g/C Ratio	0.43			0.43	0.31	
v/c Ratio	0.66			0.50	0.52	
Control Delay	11.8			11.3	15.9	
Queue Delay	0.0			0.0	0.0	
Total Delay	11.8			11.3	15.9	
LOS	B			B	B	
Approach Delay	11.8			11.3	15.9	
Approach LOS	B			B	B	

Intersection Summary	
Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	38.4
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	12.7
Intersection Capacity Utilization:	56.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	B

Splits and Phases: 2: I-190 SB & Long Rd



Lanes, Volumes, Timings
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔			↔			↔	
Traffic Volume (vph)	264	95	168	17	48	56	168	179	90	0	2	6
Future Volume (vph)	264	95	168	17	48	56	168	179	90	0	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.937			0.972			0.895	
Flt Protected		0.965			0.993			0.981				
Satd. Flow (prot)	0	1834	1615	0	1768	0	0	1804	0	0	1674	0
Flt Permitted		0.965			0.993			0.981				
Satd. Flow (perm)	0	1834	1615	0	1768	0	0	1804	0	0	1674	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1087			662			436			522	
Travel Time (s)		24.7			15.0			9.9			11.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	2%
Adj. Flow (vph)	287	103	183	18	52	61	183	195	98	0	2	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	183	0	131	0	0	476	0	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 63.8%

ICU Level of Service B

Analysis Period (min) 15

HCM 6th AWSC
3: Grand Island Blvd & Long Rd

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

Intersection

Intersection Delay, s/veh 20.2

Intersection LOS C











Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔			↔			↔	
Traffic Vol, veh/h	264	95	168	17	48	56	168	179	90	0	2	6
Future Vol, veh/h	264	95	168	17	48	56	168	179	90	0	2	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	0	2
Mvmt Flow	287	103	183	18	52	61	183	195	98	0	2	7
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	19.6	10.9	23.8	9.5
HCM LOS	C	B	C	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	38%	74%	0%	14%	0%
Vol Thru, %	41%	26%	0%	40%	25%
Vol Right, %	21%	0%	100%	46%	75%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	437	359	168	121	8
LT Vol	168	264	0	17	0
Through Vol	179	95	0	48	2
RT Vol	90	0	168	56	6
Lane Flow Rate	475	390	183	132	9
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.749	0.712	0.278	0.223	0.015
Departure Headway (Hd)	5.676	6.565	5.481	6.109	6.292
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	637	550	654	585	564
Service Time	3.725	4.317	3.232	4.178	4.384
HCM Lane V/C Ratio	0.746	0.709	0.28	0.226	0.016
HCM Control Delay	23.8	24	10.3	10.9	9.5
HCM Lane LOS	C	C	B	B	A
HCM 95th-tile Q	6.7	5.7	1.1	0.8	0





Lanes, Volumes, Timings
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	209	225	0	228	150	0
Future Volume (vph)	209	225	0	228	150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.850					
Flt Protected	0.950					
Satd. Flow (prot)	1805	1538	0	1900	1881	0
Flt Permitted	0.950					
Satd. Flow (perm)	1805	1538	0	1900	1881	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	447			5058	436	
Travel Time (s)	10.2			115.0	9.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	5%	0%	0%	1%	0%
Adj. Flow (vph)	232	250	0	253	167	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	232	250	0	253	167	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 30.2%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
4: Grand Island Blvd & I-190 NB

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

Intersection						
Int Delay, s/veh	6.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	209	225	0	228	150	0
Future Vol, veh/h	209	225	0	228	150	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	1	0
Mvmt Flow	232	250	0	253	167	0

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	420	167	- 0 - 0
Stage 1	167	-	- - - -
Stage 2	253	-	- - - -
Critical Hdwy	6.4	6.25	- - - -
Critical Hdwy Stg 1	5.4	-	- - - -
Critical Hdwy Stg 2	5.4	-	- - - -
Follow-up Hdwy	3.5	3.345	- - - -
Pot Cap-1 Maneuver	594	869	0 - - 0
Stage 1	867	-	0 - - 0
Stage 2	794	-	0 - - 0
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	594	869	- - - -
Mov Cap-2 Maneuver	594	-	- - - -
Stage 1	867	-	- - - -
Stage 2	794	-	- - - -

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	594	869	-
HCM Lane V/C Ratio	-	0.391	0.288	-
HCM Control Delay (s)	-	14.9	10.8	-
HCM Lane LOS	-	B	B	-
HCM 95th %tile Q(veh)	-	1.9	1.2	-

Lanes, Volumes, Timings

5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island

2021 Full Build Conditions with Improvements - PM Peak Hour

	↩	→	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	17	38	223	43	20	72	81	93	208	54	121	87
Future Volume (vph)	17	38	223	43	20	72	81	93	208	54	121	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.892			0.928			0.926			0.955	
Flt Protected		0.997			0.984			0.990			0.990	
Satd. Flow (prot)	0	1588	0	0	1735	0	0	1742	0	0	1780	0
Flt Permitted		0.970			0.796			0.867			0.854	
Satd. Flow (perm)	0	1545	0	0	1404	0	0	1525	0	0	1535	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		240			77			106			44	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3096			771			5058			5011	
Travel Time (s)		70.4			17.5			115.0			113.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	18	41	240	46	22	77	87	100	224	58	130	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	299	0	0	145	0	0	411	0	0	282	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												

03/19/2020

SRF Associates

Synchro 10 Report

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Lanes, Volumes, Timings

5: Grand Island Blvd & Bedell Road

39064 Project Olive Grand Island

2021 Full Build Conditions with Improvements - PM Peak Hour

	↩	→	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		40.0	40.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%		53.3%	53.3%		53.3%	53.3%	
Maximum Green (s)	30.2	30.2		30.2	30.2		34.5	34.5		34.5	34.5	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.2	1.2		1.2	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			5.5			5.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		8.0			8.0			16.2			16.2	
Actuated g/C Ratio		0.23			0.23			0.46			0.46	
v/c Ratio		0.56			0.38			0.54			0.39	
Control Delay		8.6			10.7			8.0			7.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.6			10.7			8.0			7.0	
LOS		A			B			A			A	
Approach Delay		8.6			10.7			8.0			7.0	
Approach LOS		A			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 35.1

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 8.2

Intersection LOS: A

Intersection Capacity Utilization 61.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Grand Island Blvd & Bedell Road



03/19/2020

SRF Associates

Synchro 10 Report





















Page 10

Lanes, Volumes, Timings

6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2021 Full Build Conditions with Improvements - PM Peak Hour













												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	78	105	14	112	141	23	17	242	176	21	225	201
Future Volume (vph)	78	105	14	112	141	23	17	242	176	21	225	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		0	125		0	165		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.937	1.00	1.00	0.929	1.00
Frt		0.982			0.979			0.937				0.929
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3545	0	1805	3428	0	1805	1770	0	1805	1765	0
Flt Permitted	0.640			0.671			0.366			0.376		
Satd. Flow (perm)	1216	3545	0	1275	3428	0	695	1770	0	714	1765	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		15			25			57			70	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	642			804			5011			1413		
Travel Time (s)	14.6			18.3			113.9			32.1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	22%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	84	113	15	120	152	25	18	260	189	23	242	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	128	0	120	177	0	18	449	0	23	458	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	

Lanes, Volumes, Timings

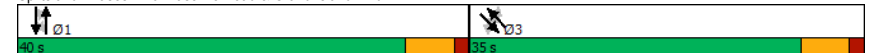
6: Baseline Road & Grand Island Blvd

39064 Project Olive Grand Island

2021 Full Build Conditions with Improvements - PM Peak Hour

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	37.7	37.7		37.7	37.7		37.7	37.7		37.7	37.7	
Total Split (s)	40.0	40.0		40.0	40.0		35.0	35.0		35.0	35.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	34.3	34.3		34.3	34.3		29.3	29.3		29.3	29.3	
Yellow Time (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	25.2	25.2		25.2	25.2		25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.41	0.41		0.41	0.41	
v/c Ratio	0.17	0.09		0.23	0.13		0.06	0.59		0.08	0.60	
Control Delay	14.6	11.6		15.2	11.3		11.2	15.7		11.4	15.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.6	11.6		15.2	11.3		11.2	15.7		11.4	15.4	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		12.8			12.9			15.5			15.2	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:		Other										
Cycle Length: 75												
Actuated Cycle Length: 62.2												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.60												
Intersection Signal Delay: 14.5				Intersection LOS: B								
Intersection Capacity Utilization 80.0%				ICU Level of Service D								
Analysis Period (min) 15												

Splits and Phases: 6: Baseline Road & Grand Island Blvd



Lanes, Volumes, Timings

7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2021 Full Build Conditions with Improvements - PM Peak Hour













	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	20	125	90	76	93	103	45	385	120	101	306	18
Future Volume (vph)	20	125	90	76	93	103	45	385	120	101	306	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	225		210	155		0	110		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.921			0.964			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1787	3263	0	1805	1832	0	1805	1885	0
Flt Permitted	0.617			0.669			0.548			0.378		
Satd. Flow (perm)	1172	1900	1615	1259	3263	0	1041	1832	0	718	1885	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			99		113			22			4	
Link Speed (mph)	30				30			30			30	
Link Distance (ft)	785				1017			5939			1413	
Travel Time (s)	17.8				23.1			135.0			32.1	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	137	99	84	102	113	49	423	132	111	336	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	137	99	84	215	0	49	555	0	111	356	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	12				12			12			12	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)	16				16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	

Lanes, Volumes, Timings

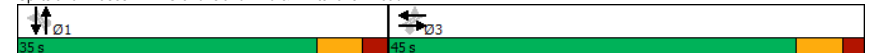
7: Grand Island Blvd & Whitehaven Road

39064 Project Olive Grand Island

2021 Full Build Conditions with Improvements - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	3		3	3			1			1		
Detector Phase	3	3	3	3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.5	35.5	35.5	35.5	35.5		36.8	36.8		36.8	36.8	
Total Split (s)	45.0	45.0	45.0	45.0	45.0		35.0	35.0		35.0	35.0	
Total Split (%)	56.3%	56.3%	56.3%	56.3%	56.3%		43.8%	43.8%		43.8%	43.8%	
Maximum Green (s)	38.5	38.5	38.5	38.5	38.5		28.2	28.2		28.2	28.2	
Yellow Time (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		6.8	6.8		6.8	6.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	22.0	22.0	22.0	22.0	22.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	12.0	12.0	12.0	12.0	12.0		26.1	26.1		26.1	26.1	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23		0.50	0.50		0.50	0.50	
v/c Ratio	0.08	0.31	0.22	0.29	0.25		0.09	0.59		0.31	0.37	
Control Delay	16.1	18.7	5.5	19.3	9.1		8.6	12.8		11.7	10.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.1	18.7	5.5	19.3	9.1		8.6	12.8		11.7	10.0	
LOS	B	B	A	B	A		A	B		B	A	
Approach Delay		13.4			12.0			12.5			10.4	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 80												
Actuated Cycle Length: 51.8												
Natural Cycle: 75												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.59												
Intersection Signal Delay: 11.9						Intersection LOS: B						
Intersection Capacity Utilization 69.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Grand Island Blvd & Whitehaven Road



Lanes, Volumes, Timings
8: Bedell Road & Proposed South DWY

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

	↖	→	←	↖	↘	↘
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↖		↘	
Traffic Volume (vph)	0	53	49	233	225	0
Future Volume (vph)	0	53	49	233	225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.889				
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1656	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1656	0	1770	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		268	3096		641	
Travel Time (s)		6.1	70.4		14.6	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	62	58	274	265	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	62	332	0	265	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 36.1%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
8: Bedell Road & Proposed South DWY

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↖		↘	
Traffic Vol, veh/h	0	53	49	233	225	0
Future Vol, veh/h	0	53	49	233	225	0
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	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	62	58	274	265	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	332	0	0 257 195
Stage 1	-	-	- 195 -
Stage 2	-	-	- 62 -
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	1227	-	- 732 846
Stage 1	-	-	- 838 -
Stage 2	-	-	- 961 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1227	-	- 732 846
Mov Cap-2 Maneuver	-	-	- 732 -
Stage 1	-	-	- 838 -
Stage 2	-	-	- 961 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1227	-	-	-	732
HCM Lane V/C Ratio	-	-	-	-	0.362
HCM Control Delay (s)	0	-	-	-	12.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1.7

Lanes, Volumes, Timings
11: I-190 NB/I-190 SB

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

	↑	↖	↗	↓	↙	↘
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↖			↗		
Traffic Volume (vph)	207	200	0	209	0	0
Future Volume (vph)	207	200	0	209	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.934					
Flt Protected						
Satd. Flow (prot)	1740	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1740	0	0	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	203			277	380	
Travel Time (s)	4.6			6.3	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	225	217	0	227	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	442	0	0	227	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 26.5%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings
24: Long Rd

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

	→	↖	↗	←	↙	↘
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↖			↗		↖
Traffic Volume (vph)	227	0	0	223	0	200
Future Volume (vph)	227	0	0	223	0	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	268			1087	380	
Travel Time (s)	6.1			24.7	8.6	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Adj. Flow (vph)	320	0	0	314	0	282
Shared Lane Traffic (%)						
Lane Group Flow (vph)	320	0	0	314	0	282
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.0%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings

25: Baseline Road & Whitehaven Road













39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

	←	→	↖	↗	←	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖		↖	↖		↖	↖		↖	↖		
Traffic Volume (vph)	93	159	48	28	132	19	69	137	26	27	228	110	
Future Volume (vph)	93	159	48	28	132	19	69	137	26	27	228	110	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	200		0	225		0	95		0	175		0	
Storage Lanes	1		0	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	
Frt		0.965			0.981			0.975			0.951		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1805	3484	0	1805	3541	0	1805	3520	0	1805	3433	0	
Flt Permitted	0.678			0.678			0.535			0.641			
Satd. Flow (perm)	1288	3484	0	1288	3541	0	1016	3520	0	1218	3433	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		52			20			29			118		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		626			785			441			533		
Travel Time (s)		14.2			17.8			10.0			12.1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.90	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	100	171	52	30	142	20	74	147	29	29	245	118	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	100	223	0	30	162	0	74	176	0	29	363	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)		12			12			12			12		
Link Offset(ft)		0			0			0			0		
Crosswalk Width(ft)		16			16			16			16		
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Number of Detectors	1	2		1	2		1	2		1	2		
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru		
Leading Detector (ft)	20	100		20	100		20	100		20	100		
Trailing Detector (ft)	0	0		0	0		0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		0	0		0	0		
Detector 1 Size(ft)	20	6		20	6		20	6		20	6		
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(ft)		94			94			94			94		
Detector 2 Size(ft)		6			6			6			6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		

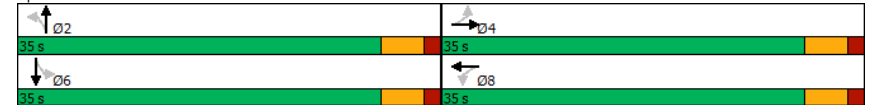
Lanes, Volumes, Timings

25: Baseline Road & Whitehaven Road

39064 Project Olive Grand Island
2021 Full Build Conditions with Improvements - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effct Green (s)	8.1	8.1		8.1	8.1		8.1	8.1		8.1	8.1	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.34	0.34		0.34	0.34	
v/c Ratio	0.23	0.18		0.07	0.13		0.21	0.14		0.07	0.29	
Control Delay	8.5	5.7		7.1	6.3		9.0	6.2		7.4	5.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.5	5.7		7.1	6.3		9.0	6.2		7.4	5.5	
LOS	A	A		A	A		A	A		A	A	
Approach Delay		6.6			6.4			7.0			5.6	
Approach LOS		A			A			A			A	
Intersection Summary												
Area Type:	Other											
Cycle Length: 70												
Actuated Cycle Length: 23.6												
Natural Cycle: 50												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.29												
Intersection Signal Delay: 6.3				Intersection LOS: A								
Intersection Capacity Utilization 40.8%				ICU Level of Service A								
Analysis Period (min) 15												

Splits and Phases: 25: Baseline Road & Whitehaven Road



April 9, 2020

James Murray-Coleman
TC Buffalo Development Associates, LLC
300 Conshohocken State Road, Suite 250
West Conshohocken, PA 19428

RE: Grand Island Distribution Facility Project, Town of Grand Island, Erie County, NY NYS
Response to Erie County Comments/Questions

Dear Mr. Murray-Coleman,

Our office prepared a Traffic Impact Study ("TIS") dated February 2020 that identified and evaluated the potential traffic impacts associated with the proposed e-commerce storage and distribution facility Project (the "Project") in the town of Grand Island (the "Town"). The Erie County Department of Public Works (ECDPW) received and reviewed a copy of the TIS. On March 27, 2020, we participated in a teleconference meeting with the ECDPW to discuss the Project and the TIS and the ECDPW provided comments regarding same. We write to provide responses to the ECDPW's comments and questions.

Comment: Why don't the peak hour trips match the number of employees? Applicant indicates that there can be as many as 900 employees per shift but only ~600 vehicles enter the site during the AM peak hour. Please clarify.

Response: Not all employees enter and exit the facility during the peak AM and PM hours. The average number of employees working at the facility, approximately 900-1,000 at any given time, includes all employees. There will be employees that work the designated shifts shown in Table XIV below as well other types of employees such as management, administration, janitorial staff, etc. Employees that are not working the designated shifts will enter and exit the site during off-peak hours (i.e., times other than those shown in Table XIV). Moreover, it is typical for employees of these types of facilities to have work schedule flexibility such that employees can start and end their workdays at times that best suit their personal circumstances. As a result, employees arrive to/depart from work throughout a typical day. The highest amount of employee commuting occurs around the shift times shown in Table XIV.

The attached trip generation information reflects the amount of employees estimated to run the operation and the arrival and departure patterns experienced at other similar facilities.

Table XIV: Shift Times

	Shift Start Time	Shift End Time
Day Shift – Group 1	7:00 AM	5:30 PM
Day Shift – Group 2	7:30 AM	6:00 PM
Night Shift – Group 1	6:00 PM	4:30 AM
Night Shift – Group 2	6:30 PM	5:00 AM

The applicant also expects a number of employees will use the nearby bus service for their commute or will carpool with another employee. On average, approximately 19% of employees at similar facilities take mass transit or carpool. The traffic study has conservatively assumed that only 9% of employees will use mass transit or carpool.

Comment: ECDPW noted a few errors in the TIS that need to be corrected: 1) Table I has errors related to jurisdiction for the study area roadways, 2) Figures 6A and 6B have arrows pointing in the wrong direction.

Response: See revised Table I below and revised Figures attached to the Supplemental Analysis dated April 6, 2020.

TABLE I
EXISTING HIGHWAY SYSTEM

ROADWAY	ROUTE ¹	FUNC. CLASS ²	JURIS. ³	SPEED LIMIT ⁴	# OF TRAVEL LANES ⁵	TRAVEL PATTERN/DIRECTION	EST. AADT ⁶	AADT SOURCE ⁷
Baseline Road (From Grand Island Blvd to Bedell Rd)	CR 2f49	Minor Arterial	NYSDOT/ Village of Grand Island ECDPW	45	2	One-way Two-way/ North-South	7,423	NYSDOT (2015)
Bedell Road (From West River Pkwy to Grand Island Blvd)	N/A	Minor Arterial Local Road	ECDPW/ Town of Grand Island	45	2	One-way Two-way/ East-West	923	NYSDOT (2012)
Long Road (From Grand Island Blvd to Baseline Rd)	CR 310	Major Collector	NYSDOT/ Village of Grand Island ECDPW	40	2	One-way Two-way/ East-West	3,162	NYSDOT (2015)
Long Road (From I-190 SB to Grand Island Blvd)	CR 310	Major Collector	NYSDOT/ Village of Grand Island NYSDOT/ ECDPW	40	2	One-way Two-way/ East-West	1,761	NYSDOT (2015)
Long Road (From West River Pkwy to I-190 SB)	CR 310	Major Collector	NYSDOT/ Village of Grand Island ECDPW	40	2	One-way Two-way/ East-West	1,129	NYSDOT (2015)
Grand Island Boulevard (From Whitehaven Rd to I-190 NB)	NY 324	Minor Arterial	ECDPW/ NYSDOT	45	2	One-way Two-way/ North-South	9,899	NYSDOT (2016)
Grand Island Boulevard (From Long Rd to Whitehaven Rd)	NY 324	Minor Arterial	ECDPW/ NYSDOT	45	2	One-way Two-way/ North-South	5,870	NYSDOT (2014)

ROADWAY	ROUTE ¹	FUNC. CLASS ²	JURIS. ³	SPEED LIMIT ⁴	# OF TRAVEL LANES ⁵	TRAVEL PATTERN/DIRECTION	EST. AADT ⁶	AADT SOURCE ⁷
Staley Road (From Grand Island Blvd to Stoney Point Rd)	N/A	Major Collector	ECDPW/ Town of Grand Island	45	2	One-way Two-way/ East-West	8,188	NYSDOT (2014)
Whitehaven Road (From Grand Island Blvd to Stony Point Road)	CR 75	Major Collector	NYSDOT/ Village of Grand Island ECDPW	45	2	One-way Two-way/ East-West	5,237	NYSDOT (2015)

Notes:

1. Route Name/Number: "NYS" = New York State.
2. State Functional Classification of Roadway: All are Urban.
3. Jurisdiction: "NYSDOT" = New York State Department of Transportation, "ECDPW" = Erie County Department of Public Works
4. Posted or Statewide Limit in Miles per Hour (MPH).
5. Excludes turning/auxiliary lanes developed at intersections.
6. Estimated AADT in Vehicles per Day (vpd).
7. Source (Year).

Comment: ECDPW is concerned with the location of existing bus stops with respect to pedestrians walking to the site and asked whether NFTA been contacted to discuss providing an on-site bus stop. Because there are no pedestrian facilities on Long Road and the bridge is too narrow to add sidewalks, ECDPW would prefer that an on-site bus stop is provided.

Response: NFTA currently provides one bus route, Route #40, that provides service between Buffalo and Niagara Falls with stops on Grand Island. This bus route travels the entire length of Grand Island Blvd between Long Road and Staley Road with multiple stops along Grand Island Blvd including stops at the intersection of Grand Island Blvd/Bedell Road, Grand Island Blvd just south of Long Road, and one located at the I-190 southbound ramp at Long Road as shown in Figure 9. The site plan is designed to provide an on-site location for a bus stop and the applicant is currently investigating the feasibility of NFTA providing service on-site.



Comment: ECDPW questioned the trip distribution patterns used in the report. ECDPW predicts that more people will turn left from the I-190 NB off-ramp onto Grand Island Blvd to access the site via Long Road vs turning right and using Bedell Road. ECDPW's concern is that this may result in the need for signalization at the I-190 NB off-ramp/Grand Island Blvd intersection.

Response: The distribution of site trips was based on a combination of population centers, existing traffic patterns, and google map directions to and from the site. Many factors can change the distribution patterns for employees traveling to/from the site. ECDPW feels that more employees will use the I-190 rather than using Grand Island Blvd, while some Town comments indicate that more employees will use Grand Island Blvd. The capacity analysis using the distribution in the TIS results in certain intersection mitigation that will not change significantly if the distribution is slightly different.

The TIS recommends constructing a right turn lane on the ramp for traffic exiting the I-190 northbound. This mitigation provides LOS "B" conditions during both peak hours at full development. This intersection is owned and maintained by the NYSDOT. NYSDOT comments regarding mitigation at this intersection will be evaluated once they are received.

Comment: ECDPW also predicts that more traffic will exit the site at Long Rd and use I-190 SB rather than using Grand Island Blvd to travel south on the Island. This would further support the need for signalization of the I-190 SB off-ramp/Long Road intersection.

Response: As noted above, the distribution of site trips was based on a combination of population centers, existing traffic patterns, and google map directions to and from the site. Many factors can change the distribution patterns for employees traveling to/from the site. More employees may use the I-190 rather than using Grand Island Blvd as suggested by ECDPW, or more employees may use Grand Island Blvd as has been suggested by some Town comments. The capacity analysis using the distribution in the TIS results in certain intersection mitigation that will not change significantly if the distribution is moderately different.

Additional traffic using the I-190 further reinforces the need for a traffic signal at the Long Rd/I-190 ramp intersection. Signalizing this intersection will make it easier to get on the I-190 and travel south towards Buffalo thereby encouraging more employees to use the I-190.

Comment: ECDPW would like to see a left turn lane warrant at this location.

Response: Volume warrants for left-turn treatments along Long Road at the proposed driveway intersection were investigated using the Transportation Board's NCHRP Report 279, Intersection Channelization Design Guide, 1985. Provisions for left-turn lane facilities should be established where traffic volumes are high enough and safety considerations are enough to warrant the additional lane. This investigation analyzes warrants during the weekday AM and PM peak hours for the Long Road/proposed site driveway intersection under full development conditions.

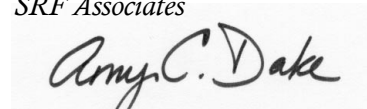
The combination of projected westbound traffic volumes (shown in Figure 8 of the TIS for full development conditions) turning left from Long Road indicate warrants for left-turn treatment are not met during the weekday AM and PM peak hours as a result of the traffic turning into the site driveway. This is a result of the very low through volumes on Long Road.

April 9, 2020

Please let me know if there are any questions or if any additional information is required.

Very truly yours,

SRF Associates

A handwritten signature in black ink that reads "Amy C. Dake". The signature is written in a cursive, flowing style.

Amy C. Dake, P.E., P.T.O.E.
Senior Managing Traffic Engineer

V:\Projects\2019\39064 Project Olive Grand Island\Agency Review\Erie County\Project Olive - Response to Erie County Comments -04-09-20.docx

ATTACHMENT

April 9, 2020

Letter to

James Murray-Coleman

TC Buffalo Development Associates, LLC

Proposed Grand Island Distribution Facility Supplemental Evaluation

Town of Grand Island

Erie County, New York



3495 Winton Place
Building E, Suite 110
Rochester, NY 14623

AR Sortable 640K FC

TRAFFIC DATA FOR ENTITLEMENT USE

Headcount	
Headcount - Day Shift	Total
Headcount - Night Shift	993

Shift Structure	
Day Shift - Inbound Employees	Start
Day Shift - Outbound Employees	End
Night Shift - Inbound Employees	7:00:00 AM 5:30:00 PM
Night Shift - Outbound Employees	7:30:00 AM 6:00:00 PM
	6:00:00 PM 4:30:00 AM
	6:30:00 PM 5:00:00 AM

Adjustment below accounts for mass transit and carpool users.	
Adjust as needed for jurisdiction	
Net Cars Factor	91%

Traffic Schedule

Cars	Trucks	Total Vehicles
Average Weekday		Cars + Trucks Average Weekday

Time	In	Out	Total
00:00	3	7	10
01:00	1	4	5
02:00	5	14	19
03:00	8	14	22
04:00	18	190	208
05:00	39	503	542
06:00	29	17	46
06:15	77	18	95
06:30	134	10	144
06:45	180	7	187
07:00	178	10	188
07:15	231	5	236
07:30	34	7	41
07:45	8	6	14
08:00	27	19	46
09:00	17	10	27
10:00	21	18	39
11:00	40	43	83
12:00	11	18	29
13:00	14	15	29
14:00	12	26	38
15:00	31	40	71
16:00	48	34	82
17:00	28	35	63
17:15	53	16	69
17:30	117	136	253
17:45	151	78	229
18:00	189	261	450
18:15	183	176	359
18:30	24	117	141
18:45	5	43	48
19:00	19	37	56
20:00	8	8	16
21:00	16	16	32
22:00	18	23	41
23:00	3	6	9
	1,986	1,986	3,967

Time	In	Out	Total
00:00	9	9	18
01:00	15	15	30
02:00	6	6	12
03:00	12	12	24
04:00	6	6	12
05:00	9	9	18
06:00	2	2	4
06:15	2	2	4
06:30	2	2	4
06:45	2	2	4
07:00	3	3	6
07:15	3	3	6
07:30	3	3	6
07:45	3	3	6
08:00	12	12	24
09:00	21	21	42
10:00	12	12	24
11:00	13	13	26
12:00	13	13	26
13:00	8	8	16
14:00	8	8	16
15:00	8	8	16
16:00	9	9	18
17:00	2	2	4
17:15	2	2	4
17:30	2	2	4
17:45	2	2	4
18:00	2	2	4
18:15	2	2	4
18:30	2	2	4
18:45	2	2	4
19:00	7	7	14
20:00	11	11	22
21:00	8	8	16
22:00	11	11	22
23:00	8	8	16
	242	242	484

	In	Out	Total
00:00	12	15	27
01:00	16	19	35
02:00	11	19	29
03:00	19	25	44
04:00	22	179	201
05:00	44	467	511
06:00	28	17	46
06:15	72	18	90
06:30	124	11	135
06:45	166	8	174
07:00	165	12	177
07:15	213	8	221
07:30	34	9	43
07:45	10	8	19
08:00	37	29	66
09:00	36	30	67
10:00	31	28	59
11:00	49	52	102
12:00	23	29	52
13:00	21	22	42
14:00	19	32	51
15:00	36	44	81
16:00	53	40	93
17:00	27	34	61
17:15	50	17	67
17:30	108	126	234
17:45	139	73	212
18:00	174	240	414
18:15	169	162	331
18:30	24	108	132
18:45	7	41	48
19:00	24	41	65
20:00	18	18	37
21:00	23	23	45
22:00	27	32	59
23:00	11	13	24
	2,044	2,050	4,094

Morning Peak Hour of Generator			
	Enter	Exit	Total
06:30-07:30	668	39	707
Trucks	10	10	20

Evening Peak Hour of Generator			
	Enter	Exit	Total
17:30-18:30	590	600	1,191
Trucks	8	8	16

Guideline for determining left-turn Lane at a two-way stop-controlled intersection TWO LANE ROADWAY

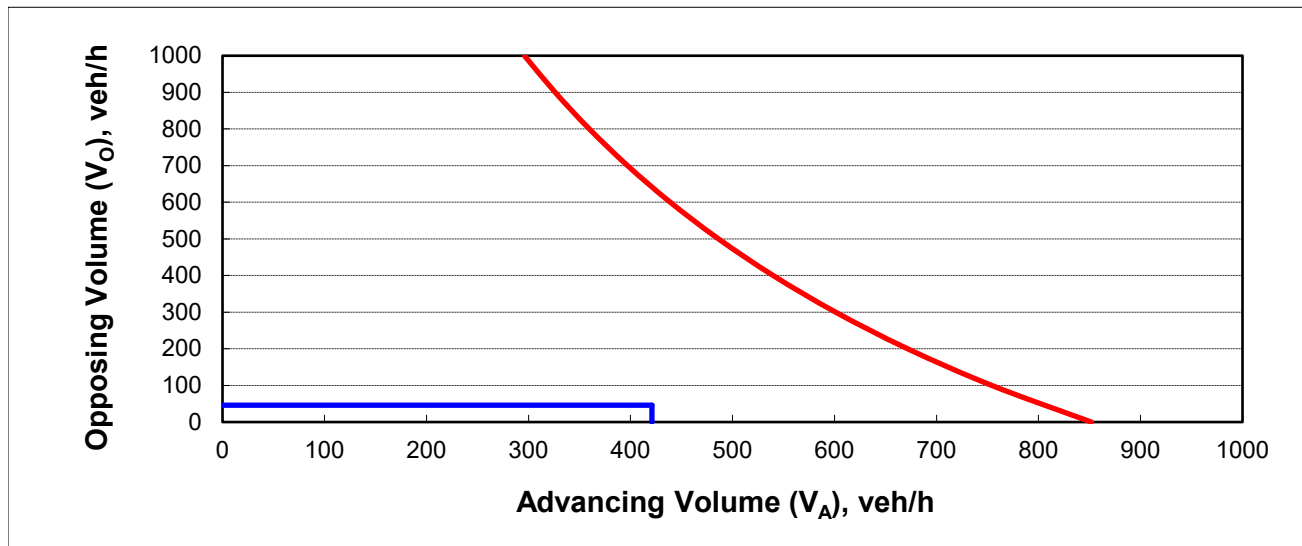
INPUT

Variable	Value
Major Approach	Long Road and Proposed Site Driveway
Approach	WB - AM Peak Full Build
Design Speed Limit - MPH	45
Percent of left-turns in advancing volume (V_A), %:	96%
Advancing volume (V_A), veh/h:	421
Opposing volume (V_O), veh/h:	46

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

PLOT - LINE 1		PLOT - LINE 2	
0	46	421	0
421	46	421	46



OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	805
Guidance for determining the need for a major-road left-turn bay:	
WB - AM Peak Full Build Left-turn treatment NOT warranted at Long Road and Proposed Site Driveway	

Guideline for determining left-turn Lane at a two-way stop-controlled intersection TWO LANE ROADWAY

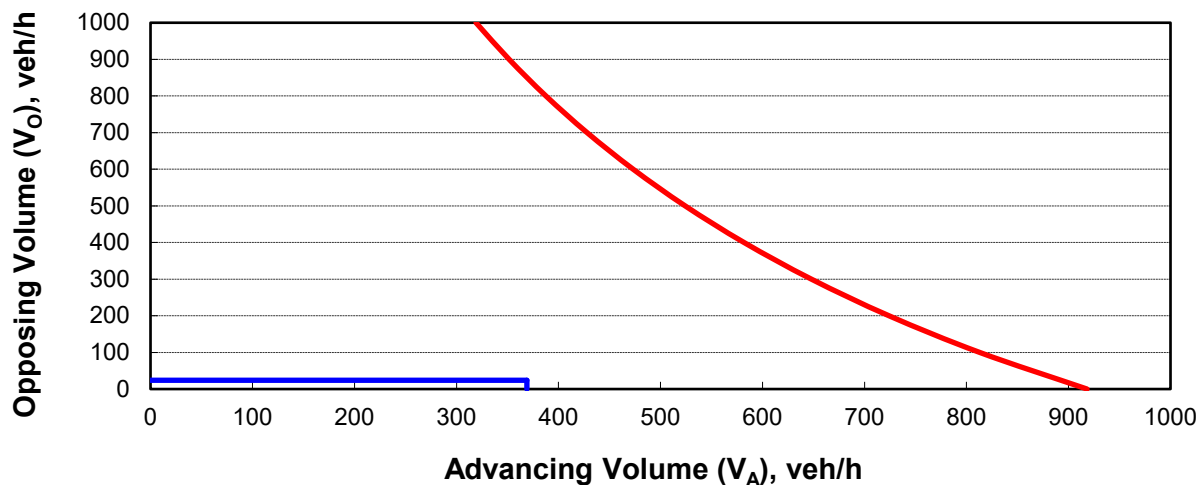
INPUT

Variable	Value
Major Approach	Long Road and Proposed Site Driveway
Approach	WB - PM Peak Full Build
Design Speed Limit - MPH	45
Percent of left-turns in advancing volume (V_A), %:	97%
Advancing volume (V_A), veh/h:	369
Opposing volume (V_O), veh/h:	24

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

PLOT - LINE 1		PLOT - LINE 2	
0	24	369	0
369	24	369	24



OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	891
Guidance for determining the need for a major-road left-turn bay:	
WB - PM Peak Full Build Left-turn treatment NOT warranted at Long Road and Proposed Site Driveway	

EXHIBIT B



Phillips Lytle LLP

Memorandum

To: Town of Grand Island Town Board

From: TC Buffalo Development Associates, LLC

Date: May 4, 2020

Re: TC Buffalo Proposed E-Commerce Warehouse and Distribution Facility

TC Buffalo Development Associates, LLC (“TC Buffalo”) provides the attached responses to the comments received from the Town Board, the Town’s Advisory Boards, including the Town Planning Board, Town Long Range Planning Advisory Board, Conservation Advisory Board, and comments received from the County Department of Public Works and community feedback since TC Buffalo submitted its Planned Development District and Site Plan Application and Analysis of Environmental Impacts Pursuant to SEQR dated February 21, 2020 (we have included each of the comments along with each response, in italics, for context). Accordingly, TC Buffalo provides comments to the following:

- **March 2, 2020 Town Board Meeting Comments**
- **March 9, 2020 Town Planning Board Meeting Comments**
- **March 11, 2020 Long Range Planning Advisory Board Meeting Comments**
- **April 3, 2020 Comments from Conservation Advisory Board**

MARCH 2, 2020 TOWN BOARD MEETING

TOWN BOARD COMMENTS FROM WORK SESSION

1. Comment that road (transportation) issues are different because we are on an island. As such, have we looked at impacts from maintenance on bridges, sometimes one lane or a whole bridge is shut down and that can last from 12 hours to a few months, and impacts for first responders to access the Site.

*Response: Regarding bridge maintenance, a Traffic Supplement was submitted to the Town on April 9, 2020 that includes an evaluation of traffic impacts on the bridges, upcoming bridge maintenance, an evaluation of additional intersections, addresses comments received to date, discusses outreach with the Erie County Department of Public Works and the New York State Department of Transportation, and responses to comments raised by the ECDPW (the "Traffic Supplement"). **See Exhibit A, Traffic Supplement.***

The bridge that carries Long Road (CR 310) over I-190 was built in 1954 and is owned and maintained by the New York State Thruway Authority (NYSTA). There are no posted safety restrictions for this bridge. This bridge was last inspected by the NYSTA on August 30, 2018 and no flags were issued (flags are issued in bridge inspection reports when structural or safety deficiencies are identified). The segment of Long Road that crosses the bridge currently carries approximately 1,750 vehicles per day (vpd). The proposed distribution facility is expected to add approximately 1,230 passenger vpd and approximately 240 trucks vpd traveling on Long Road over I-190 for a total of 1,470 vpd. Review of the current operating conditions and projected traffic volumes indicates that no improvements are warranted or recommended on this bridge.

The bridge that carries Bedell Road over I-190 was built in 1954 and is also owned and maintained by the NYSTA. There are no posted safety restrictions for this bridge. This bridge was last inspected by the NYSTA on May 17, 2018 and no flags were issued. The segment of Bedell Road that crosses the bridge currently carries approximately 918 vpd. The proposed distribution facility is expected to add approximately 1,550 passenger vpd traveling on Bedell Road over I-190; no trucks are expected to use Bedell Road. Review of the current operating conditions and projected traffic volumes indicates that no improvements are warranted or recommended on this bridge.

The North Grand Island bridge (NGIB) is a twin truss arch bridge. The first span was opened in 1935 and the second addition to the truss arch bridge came in 1965. This bridge is owned and maintained by the NYSTA. The South Grand Island Bridge (SGIB) is also a twin truss arch bridge with the first span opened in 1935 and the second opened in 1962. This bridge, which is also operated by the NYSTA.

Traffic volumes using these bridges were considerably higher between 2004 and 2007 than they are currently. Even with the addition of the Project, the estimated 2021 traffic volumes will not exceed the 2004 through 2007 traffic volumes on these bridges. The NGIB currently carries an average of 58,860 vpd. The Project is expected to add approximately 1,388 passenger vehicles per

day and approximately 48 trucks per day on the NGIB. As such, the Project is expected to increase traffic on the NGIB by only approximately 2.4 percent and will remain below historic peak levels achieved in 2006. The SGIB currently carries an average of 71,830 vpd. The proposed distribution facility is expected to add approximately 2,301 passenger vehicles per day and approximately 436 trucks per day on the SGIB. As such, the Project is expected to increase traffic on the SGIB by only approximately 3.8 percent and will remain below historic peak levels achieved in 2004 and 2007. Additionally, cashless tolling was implemented in March 2018 and the existing toll plazas were subsequently removed. This change has resulted in less congestion at these locations and improved safety. Thus, review of the current operating conditions and projected traffic volumes indicates that no improvements are warranted or recommended on these bridges.

SRF Associates, TC Buffalo's traffic consultant, has engaged in outreach with the NYSTA to obtain background information, traffic counts, hourly data, and maintenance information for the Long Road bridge, Bedell Road bridge, and the North and South Grand Island bridges. The information obtained from the NYSTA was used to prepare the Traffic Supplement. Additionally, on April 9, 2020, TC Buffalo and SRF Associates participated in a conference call with NYSTA. Based on this outreach, and NYSTA's posted maintenance schedule through 2021 for the Grand Island bridges. According to NYSTA, these steel repairs will require lane closures, however, they will only be permitted to take place during nighttime operations and the bridges will not be shut down. Notably, the Project is not expected to reach full buildout until spring of 2022, and therefore the Project may not overlap with the NYSTA's current proposed bridge maintenance.

Regarding impacts to first responders accessing the Site, primary first responders will come from Grand Island. The Site will be serviced by the Grand Island Fire Company ("GIFC"), who will provide fire protection and emergency medical services (EMS) for the Site. GIFC acknowledges the Facility would be the largest structure in the Town and are trained on scaling up an incident as required with the assistance of mutual aid from the City of Tonawanda, Town of Tonawanda (six fire companies) and beyond if necessary. While back up responders may come from off-island, as shown in the Traffic Supplement, the Project will only increase traffic on the bridges by approximately 2.1% to 3.3% during the peak summer months (i.e., July and August) and overall traffic volumes are below historical highs for the Grand Island Bridges. In addition, the Project's shift times are designed to differ from peak travel time on the bridges. As such, the Project will not have any significant adverse impacts on traffic, including first responders' ability to access or leave Grand Island.

2. Have we looked at differences between peak hour in the summer and the fall.

Response: Yes. **See Exhibit A, Traffic Supplement.** Based upon a review of the monthly traffic that is using the Grand Island bridges, the months of July and August typically have traffic volumes that are approximately 13%-16% higher than the average monthly traffic, while January is typically 26%-29% lower than the average month. Data for the Project was collected in early November 2019. The month of October was 2%-3% higher than the average month and November was 8%-9% lower than the

average month. Daily traffic volumes can fluctuate between 5%-10% on average. Therefore, the count data provided in the Traffic Impact Study ("TIS"), annexed to the February 21, 2020 Application as Exhibit 12.G, falls within the typical fluctuations of daily traffic volumes for the average month. Notably, the traffic volumes on these bridges were considerably higher between 2004 and 2007 than they are currently. Even with the addition of the Project, the estimated 2021 traffic volumes will not exceed the 2004 through 2007 traffic volumes on these bridges. Plus with the implementation of cashless tolling, there is even less congestion and improved safety.

Moreover, highways are designed for typical average daily conditions and not peak demand times. For example, highways and intersections surrounding a large retail center such as a regional mall are not designed for the Christmas season, rather they are designed to accommodate typical daily operating conditions. Therefore, no adjustments are required and the improvements recommended for the Project in the TIS are appropriate. It is also noted that the seasonal fluctuations in traffic volumes typically occur during hours outside of the commuter peak times. As traffic during these time periods tend to be higher than the rest of the day, tourists typically avoid traveling along commuter routes during peak commuter traffic time periods.

3. Have we incorporated current development, such as Southpointe.

*Response: **See Exhibit A, Traffic Supplement.** Widely accepted methodology for preparing traffic impact studies requires that any projects in the study area that are currently approved or under construction must be considered in the traffic analysis. Projects that are contemplated but not yet approved are not included in a traffic analysis. Therefore, traffic volumes associated with the Heron Pointe residential development on Grand Island Boulevard were added to the existing traffic volumes. Traffic volumes associated with the Southpointe project were not included because that project has not yet been approved. However, to account for normal increases in background traffic growth, including any unforeseen or potential developments in the project study area, the traffic analysis applies a conservative growth rate of 0.5 % per year to the existing traffic volumes, based upon historical traffic growth derived from NYSDOT traffic volume data for the area, for the two-year build-out period.*

4. Have we consulted with the Thruway.

*Response: SRF Associates, TC Buffalo's traffic consultant, has engaged in outreach with the NYSTA to obtain background information, traffic counts, hourly data, and maintenance information for the Long Road bridge, Bedell Road bridge, and the North and South Grand Island bridges. The information obtained from the NYSTA was used to prepare the Traffic Supplement. Additionally, on April 9, 2020, TC Buffalo and SRF Associates participated in a conference call with NYSTA. NYSTA recommended that TC Buffalo provide traffic signal warrants for the study area, including the traffic signal at the Long Road intersection that TC Buffalo is proposing to add. On April 20, 2020 SRF Associates submitted its signal warrant analyses to NYSTA. **See Exhibit E, Signal Warrants.** NYSTA intends to consult with the New York State Department of*

Transportation and pending that consultation will, to the extent necessary, submit a written response.

5. If people exit 190 at Whitehaven, did we study the intersections of Whitehaven Road/Baseline Road, and Whitehaven Road/I-190 ramps?

Response: See Exhibit A, Traffic Supplement. Turning movement count data was collected at the Whitehaven Road/Baseline Road intersection on Wednesday March 11, 2020 between 6-9 AM and 4-7 PM. This data has been incorporated into the Traffic Supplement and all figures and the level of service table have been updated to include this intersection. The results indicate that the Whitehaven Road/Baseline Road intersection operates at LOS "A" for all movements during the peak hours. No changes in levels of service are anticipated as a result of the Project and no mitigation is warranted or recommended.

Distribution of site generated traffic (see Figures 6B and 7 annexed to the Traffic Supplement) indicates that Project is estimated to add 21(35) vehicles during the AM(PM) peak hours to the Whitehaven Road/I-190 ramp intersections. These increases are considered minimal. Therefore, these intersections are not included in the updated analysis, which is consistent with national and local guidelines regarding study area for traffic impact studies.

6. How tall is the proposed building in comparison with other buildings on Grand Island.

Response: It is TC Buffalo's understanding that the Facility will be the tallest building on Grand Island. However, the Facility will be significantly shorter than many of the telecommunications towers on the island.

7. Have we engaged in outreach with the Grand Island Fire Department and, if so, do they have any equipment needs.

Response: TC Buffalo has had extensive engagement with the Grand Island Fire Department. Thus far, in response to this engagement, TC Buffalo will be providing an additional water tank on Site for fire suppression to address water pressure issues. TC Buffalo will also be providing additional standpipe hose valves in amounts and locations to be determined by the Grand Island Fire Department.

8. Will the water tanks be taller than the height of the building, and how will they be mounted.

Response: The height of the water tanks will not be taller than the height of the building. They will be used for the fire suppression system and will be ground mounted tanks with pumps.

9. The water line on Long Road is a 12" supply line and the water line on Bedell Road is an 8" supply line. What will applicant use?

Response: TC Buffalo proposes a 10" supply line that will run from Long Road to Bedell Road to connect to those two supply lines. TC Buffalo will also, in consultation with the Grand Island Fire Department, supply hydrants around the building for fire fighter use.

10. What is the height of the building.

Response: As defined by the Town Code, the building height is approximately 87.31 feet, as "measured from the mean level of the ground surrounding the building to the highest point of the roof, but not including chimneys, spires, towers, tanks and similar projections." See Town Code § 407-10. Inclusive of the "similar projections" on the roof, such as the stair towers, the highest point of the building will measure approximately 98.2 feet from the mean level of the ground surrounding the building.

11. What is the total acreage of federal wetlands impacted, where will the feeder creek be relocated and has the site been fully delineated.

*Response: The Site has been fully delineated and a Wetland Delineation Report dated August 27, 2019 was prepared for the Site, and included as Exhibit 12.C in the February 21, 2020 Application. On March 23, 2020, the U.S. Army Corps of Engineers ("USACE") issued its Jurisdictional Determination ("JD") regarding the on-Site wetlands. The JD is consistent with the Wetland Delineation Report. **See Exhibit C, USACE Jurisdiction Determination.***

The Project will impact approximately 0.79 acres of USACE-regulated wetlands for construction of parking areas, access roads, part of the Facility, and the stormwater basin. TC Buffalo anticipates purchasing 1.58 wetland mitigation credits from the Ducks Unlimited – Niagara River In-Lieu Fee Program, as required compensation by the USACE. None of the on-Site New York State Department of Environmental Conservation ("NYSDEC") jurisdictional wetlands, or any of their corresponding 100-foot buffer, will be disturbed by the Project.

The feeder creek is proposed to be relocated to the western portion of the Site and has been designed with a similar length and longitudinal slope as the current feature to maintain similar stream flow. Based on a hydraulic and hydrologic analysis, the relocation will not adversely impact flood conditions. Rather, as designed, additional flood storage will be provided along the stream corridor through the creation of adjacent floodplain wetlands and oversized stormwater basins that will provide additional flood storage under certain conditions.

12. Regarding the Photo simulations we provided, are there any additional pictures/locations that were not included in our submittal?

Response: TC Buffalo submitted pictures for all locations/ viewpoints that were analyzed in the Visual Assessment. Notably, as shown in the Visual Assessment, the Facility will not be seen from residential neighborhoods (in addition to State and local parks, parkways and scenic byways) in the vicinity of the Site. This is due to the Facility location on the Site, the size of the overall Site, setbacks from surrounding lot lines, the distance from surrounding development, and screening provided by existing wooded areas.

13. Have we considered purchasing the adjacent 62 acres.

*Response: At this time, TC Buffalo does not have any plans to purchase the West Parcel and the West Parcel is not part of the instant Application. As it does not own the West Parcel, TC Buffalo cannot guarantee that the West Parcel will not be developed by the current owner or a future prospective purchaser. However, that being said, the West Parcel contains several NYSDEC regulated wetlands that, along with their corresponding 100-foot buffer, render a large percentage (over 70%) of the West Parcel undevelopable. **See Exhibit F, West Parcel Lot Proposed Development Plan.** Because those regulated wetlands are currently protected and will remain so, they will continue to serve as an important aesthetic, hydrologic, and habitat resource. As shown in **Exhibit F**, excluding the regulated wetlands and their corresponding 100-foot buffer, the remaining potential development area cross-hatched in red is approximately 17.8 acres. Applying the underlying zoning of the R1A, accounting for stormwater management and roadways, realistically only 5 residential lots could be developed on all of the approximately 62 acres of the West Parcel. Those developable acres are located in the northeast corner of the West Parcel. As such, based on the West Parcel's characteristics, significant development limitations currently exist on that property and even with development, the buffer between the Facility and the gold coast will remain.*

14. Will the project require a new or upgrade to an existing energy substation.

Response: Section D.2.k.iii of the Full Environmental Assessment Form states that the Project will require a new or upgrade to an existing substation. TC Buffalo is having ongoing discussions with National Grid to determine whether an upgrade is required.

15. How many jobs is the project expected to create and will local construction firms be utilized.

Response: The Project will create at least 1,000 new jobs during operations, and at least 300 construction jobs. TC Buffalo will make best efforts to utilize local companies, local labor, and source local materials, as much as possible.

16. When will the owner/confidential tenant be named?

Response: TC Buffalo will be the owner and developer of the Site. Once the Site is developed, TC Buffalo will lease the Site to a single prospective tenant to occupy and operate the Site. The prospective tenant will be named prior to the time it takes possession of the Site.

PUBLIC COMMENTS FROM TOWN BOARD MEETING

17. One commenter said this is the most important project to ever come to Grand Island and requested that this matter be tabled for 6 months for the Town to read the filing and really think through the consequences.

Response: TC Buffalo is committed to working with the Town to address the concerns of the Town and the residents of Grand Island, and to provide information required for the Town to complete a fulsome review of the Project. Additionally, the Town has engaged the following consultants to conduct a thorough, independent review of various aspects of the Project: GHD to review sewer and noise, Wendel to review water, CHA to review traffic, and Advance Design Group to review stormwater. TC Buffalo will respond to all questions and comments raised by these consultants and will revise reports/submittals as necessary.

18. A commenter agreed that the Town should take the appropriate time to consider the Project, but thinks this Project would be good for Grand Island.

Response: The Site is consistent with the character of the surrounding uses and was targeted for development in the Comprehensive Plan. The Project is consistent with the economic development goals outlined in the Comprehensive Plan and will create at least 1,000 new jobs. Despite the scale of the Facility, the Facility is generally not visible from surrounding areas and most of the visual impacts will be along the NYS Thruway where visual sensitivity is the lowest. The Project will not fragment significant habitats and there are no known critical areas, critical vegetation, threatened or endangered species or critical features on the Site. The Project will have minimal water and energy demands and will implement energy conservation measures. The Project will not replace or eliminate existing facilities, structures or areas of historic and cultural importance to the community. The vast majority of on-Site activities will take place within the Facility, in a secured environment that is not open to the public. The operations does not entail the type of activities that require an air registration permit or involve hazardous wastes. TC Buffalo is committed to working with the Town to address the concerns of the Town and the residents of Grand Island to create a Project that benefits both the developer and Grand Island.

19. This project may bring 1,000 jobs, but those will not be filled by the people of Grand Island.

Response: There will not be restrictions on who can apply to work at the Facility and residents of Grand Island can apply. It is expected that the 1,000 jobs will be filled by residents of Erie and Niagara County, including residents of Grand Island.

20. Grand Island has always been residential and should stay that way.

Response: Although the Project is large in scale, it will not disrupt the Town's distinctive lifestyle offerings. For one, the Project has been designed to reduce the visual

impacts of the Facility. The Facility is well-situated on a large industrially zoned Site, and incorporates screening and other landscape features that not only obscure the building, but enhance the appearance of the Site. In addition, the Facility is generally not visible from surrounding areas and most of the visual impact will be along the I-190 where visual sensitivity is lowest. At the same time, the Project's location, immediately adjacent to I-190, means that potential impacts from truck and vehicle traffic associated with the Project will likely be minimized and concentrated mostly in the area of the Site. This enables the Project to provide for economic development on the Island without disturbing the Town's current small town/residential feel.

Notably, the Site has been targeted for development in the Comprehensive Plan and the Project is consistent with other commercial development located on Long and Bedell Roads, as well as all along I-190. A healthy commercial component is critical to the Town's tax base. By concentrating these businesses along I-190, the Town can encourage commercial development in a way that provides the least intrusion to the Town's residents.

21. West River used to be the gold coast and the 62 acres should act as a buffer between the gold coast and the project Site.

*Response: At this time, TC Buffalo does not have any plans to purchase the West Parcel and the West Parcel is not part of the instant Application. As it does not own the West Parcel, TC Buffalo cannot guarantee that the West Parcel will not be developed by the current owner or a future prospective purchaser. However, that being said, the West Parcel contains several NYSDEC regulated wetlands that, along with their corresponding 100-foot buffer, render a large percentage (over 70%) of the West Parcel undevelopable. **See Exhibit F, West Parcel Lot Proposed Development Plan.** Because those regulated wetlands are currently protected and will remain so, they will continue to serve as an important aesthetic, hydrologic, and habitat resource. As shown in **Exhibit F**, excluding the regulated wetlands and their corresponding 100-foot buffer, the remaining potential development area cross-hatched in red is approximately 17.8 acres. Applying the underlying zoning of the R1A, accounting for stormwater management and roadways, realistically only 5 residential lots could be developed on all of the approximately 62 acres of the West Parcel. Those developable acres are located in the northeast corner of the West Parcel. As such, based on the West Parcel's characteristics, significant development limitations currently exist on that property and even with development, the buffer between the Facility and the residences to the west of the West Parcel will remain.*

22. Commenter asked about impacts to emergency response vehicles accessing Grand Island with increased traffic from the project.

Response: The Site will be serviced by the GIFC, who will provide fire protection and EMS for the Site. GIFC acknowledges the Facility would be the largest structure in the Town and are trained on scaling up an incident as required with the assistance of mutual aid from the City of Tonawanda, Town of Tonawanda (six fire companies) and beyond if necessary. Additionally, as shown in the Traffic Supplement, the Project will only

increase traffic on the bridges by approximately 2.1% to 3.3% during the peak summer months (i.e., July and August). **See Exhibit A, Traffic Supplement.** In addition, the Project's shift times are designed to differ from peak travel on the bridges. As such, the Project will not have any significant adverse impacts on traffic, including first responders ability to access or leave Grand Island.

23. Commenter asked if this would be the tallest building in Grand Island.

Response: It is TC Buffalo's understanding that the Facility will be the tallest building on Grand Island. However, the Facility will be significantly shorter than many of the telecommunications towers on the island.

24. Commenter asked once the trucks come over the bridges, how will we know what routes they will take.

Response: Trucks will only be allowed to access the Site from Long Road. As such, the trucks will choose the routes that provide the most direct and fastest route to Long Road. As shown in the Traffic Impact Study (annexed to the February 21, 2020 Application at Exhibit 12.G), existing traffic patterns were reviewed in detail to determine likely travel routes. It is expected that all truck traffic will travel directly to and from the NYS Thruway via Long Road, Grand Island Boulevard, and I-190.

25. Will the fire equipment reach the building.

Response: The Facility will have a fire apparatus access road around the entire building¹ and will have aerial access on one side, which can accommodate the fire equipment. In addition, each of the Facility's stairwells will be under positive pressure and will have fire access windows for fire fighter access.

26. The applicant should pay for a bridge to serve its employees.

Response: See Exhibit A, Traffic Supplement. As shown in the Traffic Supplement, review of the current operating conditions and projected traffic volumes from the Project indicates that no improvements are warranted or recommended on the Grand Island Bridges and the Long Road and Bedell Road bridges. Thus, construction of a new bridge is not warranted.

27. Commenter asked how the Grand Island bridges can handle the increased traffic from the Project.

Response: See Exhibit A, Traffic Supplement. As shown in the Traffic Supplement, review of the current operating conditions and projected traffic volumes from the Project indicates that no improvements are warranted or recommended on any of the bridges used to access Grand Island. Notably, the Project is expected to increase traffic on the

¹ The current plans only show fire apparatus access road on three sides. Revised plans will include access on all sides.

North Grand Island Bridge by only approximately 2.4 percent and will remain below historic peak levels achieved in 2006; and the South Grand Island Bridge by only approximately 3.8 percent and will remain below historic peak levels achieved in 2004 and 2007. Additionally, cashless tolling on the Grand Island Bridges has resulted in less congestion at these locations and improved safety.

28. Commenter said there is no mass transit on Grand Island, so everyone will need to use their own vehicles, which will add traffic.

Response: See Traffic Impact Study ("TIS"), annexed to the February 21, 2020 Application as Exhibit 12.G, and Exhibit A, Traffic Supplement. The TIS identifies and evaluates the potential traffic impacts resulting from full build-out of the proposed Facility. The Traffic Supplement identifies and evaluates the potential traffic impacts specifically relating the existing bridge network. A thorough analysis of existing conditions show that the Project can be accommodated by the existing bridge network without any mitigation. That, in addition to the comprehensive traffic analysis contained in the TIS, indicates that the Project can be accommodated by the existing roadway network with the recommended improvements identified in the TIS. As such, the Project will not have any significant adverse impacts on traffic.

Additionally, NFTA currently provides one bus route, Route #40, that provides service between Buffalo and Niagara Falls with stops on Grand Island. This bus route travels the entire length of Grand Island Blvd between Long Road and Staley Road with multiple stops along Grand Island Blvd including stops at the intersection of Grand Island Blvd/Bedell Road, Grand Island Blvd just south of Long Road, and one located at the I-190 southbound ramp at Long Road. TC Buffalo is proposing an on-Site location for a bus stop and the is currently investigating the feasibility of NFTA providing service on-Site, which could reduce the number of passenger vehicle trips to the Site.

MARCH 9, 2020 TOWN PLANNING BOARD MEETING

1. Have we had conversations with USACE regarding relocation of Feeder Creek?
Is it manmade?

Response: TC Buffalo participated in a meeting with USACE and NYSDEC on February 13, 2020, which included discussion of the Feeder Creek relocation. Based on that discussion, the Feeder Creek is proposed to be relocated to the western portion of the Site and has been designed with a similar length and longitudinal slope as the current feature to maintain similar stream flow. Based on a hydraulic and hydrologic analysis, the relocation will not adversely impact flood conditions.

Based on a review of historic aerial photographs, and conversations with the Town, the Feeder Creek appears to be a natural feature that has been extensively altered by site clearing and prior construction.

2. Are we consulting with USFWS, SHPO, NHP?

*Response: TC Buffalo will complete a formal U.S. Fish and Wildlife Service ("USFWS"). consultation through submission of the U.S. Army Corps of Engineers ("USACE") Section 404 Permit Application. Consideration of those species identified by USFWS through the IPaC Official Species List has been completed and will be submitted to USACE. TC Buffalo has completed its consultation with SHPO through receipt of a Findings of No Effect dated April 16, 2020 that no historic properties, including archaeological and/or historical resources, will be affected by the Project. **See Exhibit D, OPRHP Letter of No Effect.** In addition, Langan Engineers conducted field surveys in June, September and October 2019 to evaluate each of the species and communities identified by the New York State Department of Environmental Conservation ("NYSDEC") Natural Heritage Program ("NHP") and USFWS. The NHP determined that there are no documented occurrences of rare or state-listed animals, plants or significant natural communities on the Site but identified the presence of blacknose shiner (*Notropis heterolepis*), the short-eared owl (*Asio flammeus*) and the silver maple-ash swamp within the vicinity of the Site. The USFWS Official Species List identifies northern long-eared bat as a species that should be considered in an effects analysis for the Project. Consideration of those species identified by the NHP and the USFWS has been completed and will be submitted with the joint USACE (Section 404)/NYSDEC (WQC) Permit applications. However, Langan determined that based on the wetland delineation report and its site surveys that it does not appear that the Site is used as habitat by and of those species identified by NHP or USFWS. Moreover, the Project will not fragment significant habitats, and there are no known critical areas, critical vegetation known for creating important breeding sites, or critical features on the Site.*

3. The Planning Board understands the 62-acres not part of this submission. However, looking at Page 13 of the LOI, how can we guarantee no development. Are there any assurances that nothing will be developed on the 62-acres?

*Response: At this time, TC Buffalo does not have any plans to purchase the West Parcel and the West Parcel is not part of the instant Application. As it does not own the West Parcel, TC Buffalo cannot guarantee that the West Parcel will be developed by the current owner or a future prospective purchaser. However, that being said, the West Parcel contains several NYSDEC regulated wetlands that, along with their corresponding 100-foot buffer, render a large percentage (over 70%) of the West Parcel undevelopable. **See Exhibit F, West Parcel Lot Proposed Development Plan.** Because those regulated wetlands are currently protected and will remain so, they “will continue to serve as an important aesthetic, hydrologic, and habitat resource” as described on page 13 of the LOI, even if the West Parcel is developed. As shown in **Exhibit F**, excluding the regulated wetlands and their corresponding 100-foot buffer, the remaining potential development area cross-hatched in red is approximately 17.8 acres. Applying the underlying zoning of the R1A, accounting for stormwater management and roadways, realistically only 5 residential lots could be developed on all of the approximately 62 acres of the West Parcel. As such, based on the West Parcel’s characteristics, significant development limitations currently exist on that property.*

4. Information regarding traffic on and off the Bridges, including information on peak/off-peak times, plus summer peak.

*Response: **See Exhibit A, Traffic Supplement.** As shown in the Traffic Supplement, review of the current operating conditions and projected traffic volumes from the Project indicates that no improvements are warranted or recommended on any of the bridges used to access Grand Island. Notably, the Project is expected to increase traffic on the North Grand Island Bridge by only approximately 2.4 percent and will remain below historic peak levels achieved in 2006; and the South Grand Island Bridge by only approximately 3.8 percent and will remain below historic peak levels achieved in 2004 and 2007. Additionally, cashless tolling on the Grand Island Bridges has resulted in less congestion at these locations and improved safety.*

Based upon a review of the monthly traffic using the Grand Island bridges, the months of July and August typically have traffic volumes that are approximately 13%-16% higher than the average monthly traffic while January is typically 26%-29% lower than the average month. Data for this Project was collected in early November 2019. The month of October was 2%-3% higher than the average month and November was 8%-9% lower than the average month. Daily traffic volumes can fluctuate between 5%-10% on average. Therefore, the count data provided in the Traffic Impact Study (“TIS”), annexed to the February 21, 2020 Application as Exhibit 12.G, falls within the typical fluctuations of daily traffic volumes for the average month. Notably, the traffic volumes on these bridges were considerably higher between 2004 and 2007 than they are currently. Even with the addition of the Project, the estimated 2021 traffic volumes will not exceed the 2004 through 2007 traffic volumes on these bridges. Plus with the implementation of cashless tolling, there is even less congestion and improved safety.

Moreover, highways are designed for typical average daily conditions and not peak demand times. For example, highways and intersections surrounding a large retail center such as a regional mall are not designed for the Christmas season, rather they are designed to accommodate typical daily operating conditions. Therefore, no adjustments are required and the improvements recommended for the Project in the TIS are appropriate. It is also noted that the seasonal fluctuations in traffic volumes typically occur during hours outside of the commuter peak times since traffic during these time periods tend to be higher than the rest of the day. Tourists typically avoid traveling along commuter routes during peak commuter traffic time periods.

5. Requested we study the intersections of Whitehaven/I-190, Whitehaven/Baseline, and the Staley Road roundabout.

Response: See Exhibit A, Traffic Supplement. Turning movement count data was collected at the Whitehaven Road/Baseline Road intersection on Wednesday March 11, 2020 between 6-9 AM and 4-7 PM. This data has been incorporated into the Traffic Supplement and all figures and the level of service table have been updated to include this intersection. The results indicate that the Whitehaven Road/Baseline Road intersection operates at LOS "A" for all movements during the peak hours. No changes in levels of service are anticipated as a result of the Project and no mitigation is warranted or recommended.

Distribution of site generated traffic (see Figures 6B and 7 annexed to the Traffic Supplement) indicates that Project is estimated to add 21(35) vehicles during the AM(PM) peak hours to the Whitehaven Road/I-190 ramp intersections. These increases are considered minimal. Therefore, these intersections are not included in the updated analysis, which is consistent with national and local guidelines regarding study area for traffic impact studies.

The Staley Road roundabout intersection was included and analyzed in the TIS. See updated Table V of *See Exhibit A, Traffic Supplement.*

6. Peak hour of 10 trucks/hour seems to be too low.

Response: See Exhibit A, Traffic Supplement. Table XIII of the Traffic Supplement provides an hourly distribution of truck traffic entering and exiting the Site. During the peak AM and PM hours, it is expected that there will be approximately 10 trucks per hour. During off peak times (e.g., between 10-4), there are more truck trips per hour. Truck traffic is deliberately low during commuter peak times and higher at other times of the day/night. This distribution mitigates the number of truck trips when traffic flows are the heaviest.

7. Information on shorter merge lanes on the North and South GI Bridges, the merge lanes cause the backups.

Response: SRF Associates, TC Buffalo's traffic consultant, has engaged in outreach with the NYSTA to obtain background information, traffic counts, hourly data, and maintenance information for the Long Road bridge, Bedell Road bridge, and the North and South Grand Island bridges. Additionally, on April 9, 2020, TC Buffalo and SRF Associates participated in a conference call with NYSTA.

NYSTA owns and maintains the bridges and any decision to expand ramps or merge lanes is solely within their purview. Nonetheless, based on existing conditions and the amount of traffic and project traffic volumes, no bridge improvements are warranted or recommended at this time. NYSTA intends to consult with the New York State Department of Transportation and pending that consultation will, to the extent necessary, submit a written response.

8. Traffic impacts associated with construction - in order to import the required amount of fill, it will require approximately 40,000 truck trips, in addition to construction employees.

*Response: **See Exhibit G, Cut/Fill Map.** The Cut/Fill Map shows where the Site cut to fill material will be generated from on the Site. The Site work for the Project is nearly balanced and there is limited need to import soil material with the exception of approximately 100,000 cubic yards of imported granular fill to be placed over the building and asphaltic areas, as recommended by the project geotechnical engineer, due to the high clay content within the existing soils. As such, the number of truck trips required to bring fill to the Site is limited. Notably, the number of daily truck and car trips during construction is not expected to exceed normal operations of the Facility. As such, any impacts from trucks and construction employee traffic is factored into the TIS and the Traffic Supplement.*

9. Thruway will shut down Bridges from time to time. Have we looked at this.

Response: SRF Associates, TC Buffalo's traffic consultant, has engaged in outreach with the NYSTA to obtain background information, traffic counts, hourly data, and maintenance information for the Long Road bridge, Bedell Road bridge, and the North and South Grand Island bridges. The information obtained from the NYSTA was used to prepare the Traffic Supplement. Additionally, on April 9, 2020, TC Buffalo and SRF Associates participated in a conference call with NYSTA.

Based on this outreach, and NYSTA's posted maintenance schedule through 2021 for the Grand Island bridges. According to NYSTA, these steel repairs will require lane closures, however, they will only be permitted to take place during nighttime operations and the bridges will not be shut down. Notably, the Project is not expected to reach full buildout until spring of 2022, and therefore the Project may not overlap with the NYSTA's current proposed bridge maintenance. Moreover, the Project will only increase traffic on the bridges by approximately 2.1% to 3.3% during the peak summer months (i.e., July and August); and the Project's shift times are designed to miss peak travel on the bridges. As such, the Project will not have any significant adverse impacts on traffic, including potential bridge construction.

10. Will personal vehicles use both exits?

Response: Trucks will not be permitted to access the Site from Bedell Road. However, personal vehicles/employees may use either Bedell Road or Long Road to access the on-Site parking facilities. As shown in the Traffic Impact Study, annexed to the February 21, 2020 Application as Exhibit 12.G, it is expected that approximately 40% of all cars (personal vehicles) will enter/exit the Site via Bedell Road and approximately 60% of all cars will enter/exit the Site via Long Road.

11. In an emergency, will trucks be able to use the Bedell exit?

Response: Trucks will never be permitted to use the Bedell Road entrance/exit. There are two guard houses at the north and south end of the truck court. During normal operations trucks will enter and exit the truck court via the northern guard house. In the event of an emergency, trucks may exit the truck court via the southern guard house, enter the vehicle parking area, and then continue to exit the Site via Long Road. This provides an emergency route for the trucks, however trucks will continue to enter and exit the Site via Long Road.

12. What are the proposed shifts and how are those shifts guaranteed.

Response: The proposed shift times for normal operations are as follows:

	Shift Start Time	Shift End Time
Day Shift Group 1	7:00 AM	5:30 PM
Day Shift Group 2	7:30 AM	6:00 PM
Night Shift Group 1	6:00 PM	4:30 AM
Night Shift Group 2	6:30 PM	5:00 AM

The proposed shift times are typical for these types of facilities and uses. The shift times correspond to peak traffic hours generated by the employees exiting and exiting the Site. As such, the tenant will utilize the proposed shift times to mitigate potential impacts to traffic. Moreover, the TIS and the Traffic Supplement are based on the proposed shift times. Therefore, any impacts associated with the Project are based on the proposed shift times.

13. The Town has a tremendous amount of other developments that should be factored in to the traffic study, such as Southpointe.

Response: See Exhibit A, Traffic Supplement. Widely accepted methodology for preparing traffic impact studies requires that any projects in the study area that are currently approved or under construction must be considered in the traffic analysis. Projects that are contemplated but not yet approved, such as Southpointe, are not included in a traffic analysis. Therefore, traffic volumes associated with the Heron Pointe residential development on Grand Island Boulevard were added to the existing traffic volumes. Traffic volumes associated with the Southpointe project were not included because that project has not yet been approved. However, to account for normal increases

in background traffic growth, including any unforeseen or potential developments in the Project study area, a conservative growth rate of 0.5 % per year was applied to the existing traffic volumes, based upon historical traffic growth derived from NYSDOT traffic volume data for the area, for the two-year build-out period.

14. What is the frontage for the 62-acre parcel and is this parcel land locked?

Response: The frontage for the West Parcel will be created by the project subdivision. The Applicant is proposing a public right-of-way over the first +/-660 feet of the new roadway entering the development from Long Road. Additionally, the West Parcel has unimproved frontage on Sunset Drive; however, the TC Buffalo does not intend to improve that roadway and prefers to provide the access from Long Road.

15. Why are we raising the building so high.

Response: As discussed at the Planning Board meeting, the building is being raised to accommodate the proposed stormwater management systems. The elevation of the discharge points for the storm water piping governs since the site is flat and positive drainage needs to be provided.

16. Based on reports, it looks like we can get ~90k cubic yards of fill from on-site, but will need ~450k cubic yard of fill

*Response: **See Exhibit G, Cut/Fill Map.** The Site work for the project is near balanced and there is limited need to import soil material with the exception of approximately 100,000 cubic yard of imported granular fill to be placed over the building and asphaltic areas as recommended by the project geotechnical engineer due to the high clay content within the existing soils.*

17. Why are we not using oil/ water separators before discharging and the Town may require same.

Response: The Project stormwater management system has been designed in accordance with the NYSDEC "NYS Stormwater Management Design Manual," which does not require oil/water separators. The Project stormwater will be conveyed to bioretention areas that will treat the stormwater runoff through an engineered media. Once the stormwater is filtered through the media, it will be discharged to wet extended detention ponds that meters the outflow to the discharge points that flow off Site.

18. Is the water tank/tower taller than the building

Response: The water tank is a ground mounted tank that is lower than the proposed building height.

19. Foundation/Geotech report did not seem complete.

Response: This is correct. A final geotechnical evaluation is underway and is expected to be finalized in the beginning of May. Notably, the final geotechnical evaluation and corresponding report are needed solely for the design and load of the proposed building and will not impact the analysis of environmental impacts in accordance with SEQRA. The Project will not have any significant adverse impacts to the physical resources of the land.

20. There could be constant noise/vibration during construction to obtain fill, what approach are we using to minimize this.

Response: There will be temporary noise generated from the construction activity that will be in compliance with the Town noise ordinance. Project construction does not involve multiple phases and is expected to be completed in approximately 18 to 24 months. Activity will be intermittent with planned winter shutdowns to mitigate construction impacts to the nearby residential neighbors. The Town prohibits operation of heavy equipment outside the hours of 0700-1900 Monday to Saturday and construction of the Project will comply with these requirements. To minimize noise during construction, where possible, the contractors will limit the number of equipment operating near a sound receptor at any given time; avoid exposing any one receptor to high sound levels for an extended period of time; place stationary equipment, such as generators, compressors, and office trailers, away from noise-sensitive receptors; and avoid having construction parking or laydown areas near noise-sensitive receptors. In addition, TC Buffalo has proposed a sound barrier along the northern driveway of the Site carried to a height of 16 feet above grade.

21. One of the log borings (LB-8) in the Geotech report identified petroleum, how are we dealing with that.

Response: While drilling for soil boring LB-8, a petroleum odor was noted by the Langan field scientist. The petroleum odor was from a bottle of PB Blaster (a lubricant) that was used to clean the equipment. This is noted in the boring log as well. See Geotechnical Report annexed to the February 21 Application as Exhibit 12.A. No further action is required.

22. Consistencies – the soil report didn't consider same number of vehicles as traffic report or other reports.

Response: The soil report will be modified once we have all comments to the submission from the Town and the retained consultants.

23. For height of the building, code says mean height and we're saying average height

Response: Mean height and average height are the same. The plans will be revised to change average height to mean height to avoid any confusion.

24. Water model based on flow test from 2008, is that too old?

Response: An updated hydrant flow testing will be scheduled in the near future. TC Buffalo does not expect the results to be significantly different than what was provided in 2008. Additionally, based on consultation with the Town and the Grand Island Fire Company, TC Buffalo will provide two large water tanks with fire pumps for the building's fire suppression system to address any water pressure/flow issues on-Site.

25. What is the amount of open space and what does that include?

Response: Even at full buildout, the Project will leave a significant portion of land as undeveloped or open space. The proposed impervious coverage is ±55.4 acres. The remaining ±90.0 acres will be open space, which will enhance the aesthetic value of the Project, screen the Facility from the neighboring properties, and make it an enticing place to work. The open spaces, as defined by the Code, are comprised of landscaped areas, wetlands and regulated adjacent areas, stormwater management areas, and undisturbed areas. Notably, as shown on the Landscape Plans, annexed to the February 21, 2020 Application as Exhibit 1, the Project will include approximately 1,400 new trees, in addition to thousands of shrubs, perennials and ornamental grasses.

26. Are we meeting intent of open space for PDD?

Response: The intent of the open space requirement for PDD is to encourage mindful development that complies with the PDD's design standards. Even at full buildout, the Project will leave more than 60% of the Site as undeveloped or open space. This layout enhances the goals of the PDD by, among other things, encouraging the preservation of scenic and natural features; creating adequate and safe internal circulation for vehicles and pedestrians; providing carefully designed landscaping to reduce the visual impacts of the Site while enhancing the Site's aesthetics; and creating a balance [with?]the overall density of development on the Site.

The open space will continue to provide wildlife habitat for area species. The open space will enhance the aesthetic value of the Project by screening the Facility from the neighboring properties, and make it an enticing place for employees and other Site visitors to enjoy.

27. Sound wall - will we have an independent meeting with the neighbor closest the the Site off Long Road?

Response: TC Buffalo intends to schedule a meeting with the Site's neighbor to discuss the proposed Sound Wall and address any other issues/concerns raised by that neighbor.

28. What will the sound wall look like and how will it impact shading to the neighboring property.

Response: The proposed sound wall will be comprised of wood material in a lattice-like pattern. A sample section of the sound wall was shown to the planning board at its March 9, 2020 meeting. The Applicant is evaluating the best location of the Sound Wall to minimize impacts to the neighboring property as much as practicable. Shading caused by the Sound Wall will be similar to shading caused by screening trees that would mature to greater than 16 feet over time.

29. Why are we exiting out to Bedell instead of the paper street.

Response: As discussed at the Planning Board meeting on March 9, 2020, there is a large USACE regulated wetland east of the proposed roadway from Bedell Road. Shifting the driveway would result in a significant increase to the wetland and environmental impacts.

30. Will we provide screening at Bedell.

Response: As shown on the Landscape Plans, annexed to the February 21, 2020 Application as Exhibit 1, stormwater ponds and landscaping will screen the Facility from Bedell Road and the properties located along Bedell Road. Notably, the Project provides significant rear yard setbacks (30 feet required, 588.2 feet provided) and side yard setbacks (25 feet required, 259.3 feet provided), as well as setbacks from Bedell Road (80 feet required, 1,656.6 feet provided), that far exceed the required Town Code minimums.

31. Code requires max of 20' on the lights and we're showing 25-40'.

Response: As discussed at the Planning Board meeting on March 9, 2020, TC Buffalo is seeking a waiver/modification from the Code's lighting requirements to include building and pole mounted lighting that exceed the Code's height requirement. The use of taller light poles significantly reduces the overall number of lights needed to safely light the Site. Utilizing shorter lights would reduce energy efficiency and would be unsightly.

32. We are asking for less parking than required? The concern is, what if the use/tenant changes.

Response: As discussed at the Planning Board meeting on March 9, 2020, the Project includes ample parking for the current use/prospective tenant. It is expected that no more than 1,800 people will occupy the Facility at any one time and the Project includes 1,855 parking spaces and 16 motorcycle spaces. Including parking to meet the Code's parking requirements would require significant additional Site development and disturbance. Should the use of the Facility or the tenant change, there are other areas of the Site that could be altered to accommodate an increase in parking. For example, part of all of the truck court area could be easily converted to parking spaces. Additionally, a portion of the first floor of the Facility could also be easily converted to parking spaces. Lastly, it is reasonable that the current use/prospective tenant would occupy the Facility for at least twenty years. As technology evolves and the use of autonomous vehicles,

ride-sharing, and mass transit increases, the need for additional parking at the Site, even for a changed use/tenant, is not likely.

33. Potential for a bike/walking path through site.

Response: In consultation with the Town, TC Buffalo is considering the development of a bike/walking path through the Site to accommodate the Town's goal of having a complete path that encircles the entire island.

34. Does the FD have the equipment to meet roof and sprinkler systems.

Response: The Facility will be protected with control mode sprinklers designed to provide superior protection and achieve suppression like results. The Facility will be provided with two independent water sources, each with its own fire pump. Two separate fire loops will be provided to supply the sprinkler systems and standpipe system, each loop will be redundantly fed with separate connections to each source of water. In addition, TC Buffalo will provide a fire apparatus access road around the whole Facility and the Facility have aerial access on one side, which can accommodate the fire equipment. Each of the Facility's stairwells will be under positive pressure and will have fire access windows for fire fighter access. TC Buffalo will also provide an additional water tank on Site for fire suppression to address water pressure issues, as well as additional standpipe hose valves in amounts and locations to be determined by the Grand Island Fire Department.

35. Will we be applying for abatements/PILOT programs. Are tax breaks contemplated?

Response: TC Buffalo expects to apply for a PILOT with the Erie County Industrial Development Agency. Without a PILOT, the Project is not economically viable. However, even with a PILOT in place, the Town will receive a dramatic increase in the amount of property tax/PILOT payments as compared with the current tax payments the Town receives for the undeveloped Site. At the end of the PILOT period, the Town will receive a significant increase in unabated property taxes. In addition to the proposed PILOT/tax payments to the Town, the Project will provide major economic benefits to the Town through: (1) creation of at least 1,000 new full time jobs and at least 300 construction jobs (for Grand Island and other residents in the region); (2) patronizing of local convenience stores, gas stations, hotels, local eateries, etc. by Project employees as well as regular business visitors; and (3) high visibility from I-190 of national/global name recognition that will have a positive ripple effect on the local economy. Further detail regarding economic impacts and benefits to the Town will be provided as available.

MARCH 11, 2020 LONG RANGE PLANNING BOARD MEETING

1. The Long Range Planning Board has a trail plan and has been working towards a goal of connecting trail networks to provide a connected loop around the whole island. The Site was targeted as a place to connect existing trails south of the Site to existing trails north of the Site. Is applicant open to allowing a trail to run though the Site?

Response: In consultation with the Town, TC Buffalo is considering the development of a bike/walking path along the northern edge of the Site to accommodate the Town's goal of having a complete path that encircles the entire island.

2. What is the maximum number of employees in the facility at peak time.

Response: During normal operations there will be between 1,000 and 1,800 employees, broken out into two shifts. It is expected that no more than 1,800 people will occupy the Facility at any one time.

3. What are the options with reducing the building by one level/story.

Response: The Facility as designed is a critical component of the Project's operations and efficiencies, economic development goals and long-term viability. Reducing the building by one level/story would not only dramatically alter the operations of the Facility, but that loss in space would need to be made up with a larger footprint. Increasing the footprint would require significant additional development of the Site, increase the amount of site disturbance and impervious surfaces, and increase the environmental impacts to the Site. Notably, based on the Site layout and the presence of federal and state regulated wetlands, increasing the building footprint is not likely feasible. As such, reducing the building by one level/story would likely render the Project unviable.

4. Is applicant considering purchasing the 62 acres to guarantee it remains open space?

*Response: At this time, TC Buffalo does not have any plans to purchase the West Parcel and the West Parcel is not part of the instant Application. As it does not own the West Parcel, TC Buffalo cannot guarantee that the West Parcel will not be developed by the current owner or a future prospective purchaser. However, that being said, the West Parcel contains several NYSDEC regulated wetlands that, along with their corresponding 100-foot buffer, render a large percentage (over 70%) of the West Parcel undevelopable. **See Exhibit F, West Parcel Lot Proposed Development Plan.** Because those regulated wetlands and the surrounding 100 foot buffer are currently protected from development by State law and will remain so, they will continue to serve as an important aesthetic, hydrologic, and habitat resource, even if the West Parcel is developed. As shown in **Exhibit F**, excluding the regulated wetlands and their corresponding 100-foot buffer, the remaining potential development area cross-hatched in red is approximately 17.8 acres. Applying the underlying zoning of the R1A, accounting*

for stormwater management and roadways, realistically no more than a handful (approximately 5) of residential lots could be developed on the West Parcel. In addition, the West Parcel is not in a sewer district and there are limitations regarding access. As such, based on the West Parcel's characteristics, significant development limitations help ensure that it will not be developed in the future although some limited development is possible.

5. Right now the impacts to the residential properties west of the site are low because the 62 acres acts as a buffer. However, if residential development occurs in the 62 acres, won't there be issues developing that site because of sound, light, etc. associated with the Project?

*Response: As discussed in Comment 4 above, a large portion of the West Parcel is undevelopable. As shown in **Exhibit F**, the only developable portion of the West Parcel is adjacent to the northwest portion of the Site. As shown on the Landscape Plans, annexed to the February 21, 2020 Application as Exhibit 1, a large stormwater pond and landscaping will screen the Facility from any proposed development on the West Parcel. Additionally, the Project provides significant side yard setbacks that far exceed the require Town Code minimums.*

6. Do we have a tree inventory of the existing trees on Site and do we know about how many trees are proposed to be planted?

*Response: In July and August 2019, Wilson Environmental Technologies, Inc. ("WET") conducted field investigations as part of its wetland delineation report. As part of its investigations, WET prepared a complete list of vegetation. **See Exhibit H, 1990 and 2019 Inventory.** The majority of the Site and particularly the area of proposed development consists of a combination of successional scrub-shrub/sapling stage vegetation and herbaceous cover that is of little aesthetic or ecological significance, as well as open areas of bare soil or other disturbance. Shrubs commonly found in this vegetation community and on this parcel include gray stem dogwood (*Cornus racemosa*, FAC), English hawthorn (*Crataegus monogyna*, FACU), honeysuckle (*Lonicera tartarica*, FACU), glossy buckthorn (*Frangula alnus*, FAC) and common buckthorn (*Rhamnus cathartica*, FACU). Herbaceous species found in this community would include teasel (*Dipsacus sylvestris*, FACU), Canada goldenrod (*Solidago canadensis*, FACU), white avens (*Geum canadense*, FACU), common cinquefoil (*Potentilla simplex*, FACU), Virginia creeper (*Parthenocissus quinquefolia*, FACU), flat-stem bluegrass (*Poa compressa*, FACU), flat top goldenrod (*Euthamia graminifolia*, FACU), speedwell (*Veronica arvensis*, UPL), field mustard (*Brassica rapa*, UPL), common strawberry (*Fragaria virginiana*, FACU), king devil (*Hieracium pratense*, UPL), sweet vernal grass (*Anthoxanthum odoratum*, FACU) and others.*

*Scattered trees are present across the southern portion of the site but mature stands of trees are generally limited to areas of the site that are not intended for development. A woodlot community is located west of tributary and continues west, off site. Trees and saplings in upland areas of the site are dominated by shagbark hickory (*Carya ovata*, FACU), English*

hawthorn (Crataegus monogyna, FACU), red maple (Acer rubrum, FAC), wild pear (Pyrus communis, UPL), red oak (Quercus rubra; FACU) and American basswood (Tilia americana, FACU) in the tree stratum; with gray dogwood (Cornus racemosa, FAC), Allegheny blackberry (Rubus allegheniensis, FACU) and common red raspberry (Rubus ideaus, FACU) dominant in the shrub stratum. Dominant species found in the herbaceous stratum include white avens (Geum canadense, FACU), common strawberry (Fragaria virginiana, FACU), ground ivy (Glechoma hederacea, FACU), red fescue (Festuca rubra, FACU), and Canada goldenrod (Solidago canadensis, FACU).

As shown on the Landscape Plans, annexed to the February 21, 2020 Application as Exhibit 1, the Project will include approximately 1,400 new trees, not counting shrubs.

7. What material will each floor be constructed out of?

Response: The Facility will be constructed of concrete and steel materials meeting the requirements for Type IA construction. The exterior walls will be constructed of a combination of concrete tilt-up or precast panels and insulated metal panel façade. The lower concrete wall panels will extend from the ground floor to approximately the third elevated level and the insulated metal panels will be utilized for the remainder of the height. Each intermediate floor slab will be constructed of a composite deck consisting of a 6-inch normal weight concrete slab over a metal deck that is supported by steel columns, solid wide-flange steel girders, and open web bar joist intermediate framing members. The roof will be supported by solid steel columns, open web bar joists and joist girders.

8. Will the Facility have signage and, if so, how will they be lit.

Response: The Project will include a sign on the Facility naming the prospective tenant that will be internally lit and visible from I-190. Additionally, as shown on the Signage and Striping Plans, annexed to the February 21, 2020 Application as Exhibit 1, the Project will include a number of other signs, including, but not limited to, stop signs, speed limit signs, and directional/instructional signs.

9. How will refuse areas be maintained.

Response: The Site will not have any external refuse areas or dumpsters. All refuse will be handled internally. The Facility will utilize trash compactors and boilers inside the Facility and will not use incinerators.

10. Will TC Buffalo be the owner of the building? Will it be owner-occupied?

Response: As currently contemplated, TC Buffalo will be the owner and developer of the Site. Once the Site is developed, TC Buffalo anticipates engaging in a long term lease of the Site to a single prospective tenant to occupy and operate the Site. It is not likely that the Facility will be owner-occupied.

11. What kind of trucks will come to the Site. Are we doing anything to mitigate the sound impacts of idling trucks on site?

Response: The Facility is mostly serviced by tractor trailers. Most of these trucks are diesel trucks with a lower decibel, less intrusive backup noises to mitigate the sounds on-Site. Additionally, this Facility will have full time yard jockeys that move the trailers around the truck court. This eliminates trucks idling, which is the largest source of truck noise. Trucks will enter the Site, drop their trailer in one of the 219 trailer parking spaces, pick up a new trailer and immediately exit the Site.

12. Where will the construction entrance be located?

Response: All construction vehicles, both trucks and personal vehicles for construction employees, will access the Site from Long Road.

13. How much traffic do we expect to go to/from Canada?

Response: TC Buffalo anticipates approximately 10% of truck traffic will come from/go to Canada.

14. Why didn't we choose a site that is close to a rail line?

Response: Not only are sites with rail access limited, but the Project is not ideally suited for shipping/receiving materials via rail. Shipping by rail is best when you have a lot of goods coming from one or a few sources. However, this Project expects to receive a lot of goods coming from a lot of sources and trucks are the best and most efficient way to handle these goods.

APRIL 3, 2020 CONSERVATION ADVISORY BOARD COMMENTS

This email is in regards to Project Olive. The data provided in the submittal is very dated, and with that, the Conservation Advisory Board believes it would be appropriate to request that the following be performed in regard to the Environmental Evaluation of the project site:

1. **Species Inventory** - This includes plants and animals. Special attention should be given to birds (migratory and nesting such as the Short-eared Owl) and amphibians and reptiles (e.g. spotted turtle, map turtle, western chorus frog, and blue spotted salamander). It is important that an amphibian survey is conducted in the spring. An inventory should be done in late May and early June for nesting birds and mid-May for migrating birds. All vegetation on the area being developed needs to be accounted for.

Response: In October 1990 Acres International Corporation ("Acres") conducted field investigations as part of its wetland delineation report. As part of its investigations, Acres prepared a complete list of vegetation. See Exhibit H, 1990 and 2019 Inventory. Pursuant to Acres wetland delineation report, approximately 33 acres in the northern part of the site has been severely disturbed. Vegetation in this area is mostly herbaceous with some shrubby clumps. The clay substrate supports a few areas dominated by cattails and purple loosestrife. Much of the remainder of the site has been used in the past for agricultural activities as evidenced by remnant ditches and plow lines. Certain areas of the site, especially in the southern and southeastern portions, appear to have disturbed soils. Aside from the clay borrow area, the majority of the site vegetation is old field in the shrubland and to a lesser extent the sapling stage of secondary succession. An extensive network of north-south trending plow furrows and, ditches indicates that most of the site has been cultivated in the past. Small areas in the southern section of the site have been disturbed by commercial and residential activities along Bedell Road. Dirt piles, rubble and lack of topsoil are common occurrences in these areas.

*More recently, in July and August 2019 Wilson Environmental Technologies, Inc. ("WET") conducted field investigations as part of its wetland delineation report. As part of its investigations, WET prepared a complete list of vegetation. See Exhibit H, 1990 and 2019 Vegetation Inventory. WET's investigation shows that there have been limited changes to the Site since the Acres investigations. Pursuant to WET's delineation report, the majority of the Site and particularly the area of proposed development consists of a combination of successional scrub-shrub/sapling stage vegetation and herbaceous cover that is of little aesthetic or ecological significance, as well as open areas of bare soil or other disturbance. Shrubs commonly found in this vegetation community and on this parcel include gray stem dogwood (*Cornus racemosa*, FAC), English hawthorn (*Crataegus monogyna*, FACU), honeysuckle (*Lonicera tartarica*, FACU), glossy buckthorn (*Frangula alnus*, FAC) and common buckthorn (*Rhamnus cathartica*, FACU). Herbaceous species found in this community would include teasel (*Dipsacus sylvestris*, FACU), Canada goldenrod (*Solidago canadensis*, FACU), white avens (*Geum canadense*, FACU), common cinquefoil (*Potentilla simplex*, FACU), Virginia creeper*

(*Parthenocissus quinquefolia*, FACU), flat-stem bluegrass (*Poa compressa*, FACU), flat top goldenrod (*Euthamia graminifolia*, FACU), speedwell (*Veronica arvensis*, UPL), field mustard (*Brassica rapa*, UPL), common strawberry (*Fragaria virginiana*, FACU), king devil (*Hieracium pratense*, UPL), sweet vernal grass (*Anthoxanthum odoratum*, FACU) and others.

Scattered trees are present across the southern portion of the site but mature stands of trees are generally limited to areas of the site that are not intended for development. A woodlot community is located west of tributary and continues west, off site. Trees and saplings in upland areas of the site are dominated by shagbark hickory (*Carya ovata*, FACU), English hawthorn (*Crataegus monogyna*, FACU), red maple (*Acer rubrum*, FAC), wild pear (*Pyrus communis*, UPL), red oak (*Quercus rubra*, FACU) and American basswood (*Tilia americana*, FACU) in the tree stratum; with gray dogwood (*Cornus racemosa*, FAC), Allegheny blackberry (*Rubus allegheniensis*, FACU) and common red raspberry (*Rubus ideaus*, FACU) dominant in the shrub stratum. Dominant species found in the herbaceous stratum include white avens (*Geum canadense*, FACU), common strawberry (*Fragaria virginiana*, FACU), ground ivy (*Glechoma hederacea*, FACU), red fescue (*Festuca rubra*, FACU), and Canada goldenrod (*Solidago canadensis*, FACU).

In addition, Langan Engineers conducted field surveys in June, September and October 2019 to evaluate each of the species and communities identified by the New York State Department of Environmental Conservation ("NYSDEC") Natural Heritage Program ("NHP") and the U.S. Fish and Wildlife Service ("USFWS"). The NHP determined that there are no documented occurrences of rare or state-listed animals, plants or significant natural communities on the project site but identified the presence of blacknose shiner (*Notropis heterolepis*), the short-eared owl (*Asio flammeus*) and the silver maple-ash swamp within the vicinity of the site. An Official Species List was generated for the site in November 2019 using the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool, a copy of which is annexed hereto. The Official Species List identifies northern long-eared bat as a species that should be considered in an effects analysis for the project.

2. **Habitat Inventory** - An inventory on all the habitats present on the lot being developed is needed. Special attention should be given to rare communities like the Oak-Hickory Forest.

Response: See Response to Comment 1 above, **Exhibit H, 1990 and 2019 Inventory**. The Site has been surveyed several times in the last year or so and the results are consistent with investigations completed when development of the Site was first approved by the Town over thirty years ago. The majority of the Site and particularly the area of proposed development consists of a combination of successional scrub-shrub/sapling stage vegetation, herbaceous cover and open areas of bare soil or other disturbance that is of little aesthetic or ecological significance. Scattered trees are present across the southern portion of the Site but mature stands of trees are generally limited to areas of the Site to the west that will not be intended for development under the scope of this project, and likely will have little development due to the extensive wetlands in that area. Moreover, while the

Environmental Assessment Form mapper identified the Silver Maple-Ash Swamp as a potential significant natural community on the Site, the NHP determination shows that the Silver Maple-Ash Swamp is not found on-Site but rather within Buckhorn State Park, approximately 0.35 miles north of the Site. Neither the Environmental Assessment Form mapper nor the NHP identified any other significant natural communities on or in the vicinity of the Site.

3. A detailed tree inventory is needed on the trees in the area being developed. Rare trees include Big Shellbark Hickory, Shumard Oak and Pin Oak.

*Response: See Responses to Comment 1 and 2 above, **Exhibit H, 1990 and 2019 Inventory**. The Site has been surveyed several times in the last 30+ years and the results are consistent with investigations completed when development of the Site was first approved by the Town over thirty years ago. Neither the 1990 nor the 2019 Vegetation Inventories identified the presence of the above-referenced species. This is further supported by the response from the NHP, confirming that there are no known occurrences of rare or state threatened or endangered species of plants/trees onsite.*

4. A soil study should be done and should include wetlands delineation to confirm the wetland area with current maps.

*Response: A wetland delineation report was completed for the Site by WET in August 2019, which includes a soil study of the Site. **See Exhibit I, Soil Survey**. On March 23, 2020, the U.S. Army Corps of Engineers ("USACE") issued its Jurisdictional Determination ("JD") regarding the on-Site wetlands. **See Exhibit C, USACE Jurisdiction Determination**. The JD is consistent with the Wetland Delineation Report.*

The USACE Jurisdiction Determination confirms that the Site contains seven (7) federally regulated wetlands/waters (Wetlands J, L, N, P, Q, R and T), totaling approximately 4.55 acres of the site. In addition, there are two federally-regulated streams onsite identified on the Town of Grand Island Zoning Maps as a "Feeder Creek" and "Collector Creek". The Feeder Creek totals approximately 3,400 linear feet and generally bisects the site north to south. The Feeder Creek continues offsite, ultimately discharging to the Niagara River. The Collector Creek totals approximately 475 linear feet and runs west to east across the southeastern corner of the site. The Collector Creek continues offsite to the east toward a tributary of Big Burnt Ship Creek.

Of these USACE regulated wetlands, the Project will impact approximately 0.79 acres for construction of parking areas, access roads, part of the Facility, and stormwater basin. TC Buffalo anticipates purchasing 1.58 wetland mitigation credits from the Ducks Unlimited – Niagara River In-Lieu Fee Program, as required compensation by the USACE. The feeder creek is proposed to be relocated to the western portion of the Site and has been designed with a similar length and longitudinal slope as the current feature to maintain similar stream flow. Based on a hydraulic and hydrologic analysis, the relocation will not adversely impact flood conditions. Rather, as designed, additional flood storage will be provided along the stream corridor through the creation of adjacent

floodplain wetlands and oversized stormwater basins that will provide additional flood storage under certain conditions.

The limits of NYSDEC-regulated wetlands were confirmed through issuance of a NYSDEC Wetland Delineation Verification on January 23, 2020. The site contains six (6) state-regulated wetlands (Wetlands M, R, S, T, U and V) totaling approximately 1.03 acres of the site, all located along the western portion of the Site. Each of the NYSDEC-regulated wetlands contains a 100-foot adjacent area. The Feeder Creek and Collector Creek are not considered "protected waters" under the NYSDEC Protection of Waters Program.

None of the on-Site NYSDEC jurisdictional wetlands, or any of their corresponding 100-foot buffer, will be disturbed by the Project.

5. Report on measurable buffers around streams and wetlands.

Response: As noted above, the NYSDEC-regulated wetlands contain a 100-foot adjacent buffer area as required by NYSDEC regulations. None of the on-Site NYSDEC jurisdictional wetlands, or any of their corresponding 100-foot buffer, will be disturbed by the Project.

The Project will impact to approximately 0.79 acres of USACE regulated wetlands for construction of parking areas, access roads, part of the Facility, and stormwater basin. USACE wetlands/waters do not require a regulated buffer. However, TC Buffalo anticipates purchasing 1.58 wetland mitigation credits from the Ducks Unlimited – Niagara River In-Lieu Fee Program, as required compensation by the USACE.

6. What are environmental impacts when the stream is re-routed?

Response: Approximately 3,450 linear feet of the Feeder Creek flows south to north, generally bisecting the site. The Feeder Creek continues offsite to the north along the I-190 entrance ramp and then west along Long Road and ultimately to the Niagara River. According to WET's Wetland Delineation Report (see Exhibit 12.C annexed to the February 21, 2020 Application), the stream was altered in the 1950's/1960's as part of a Town drainage improvement project. The Project will relocate approximately 3,130 linear feet of the Feeder Creek to the west of the proposed development. The creek will be reconstructed adjacent to undisturbed forested uplands and wetlands and will generally be offset from the proposed development by at least 50 feet.

In March 2020, data was collected at eleven (11) locations, approximately 300 feet apart, along the Feeder Creek to document the physical and ecological characteristics of the creek to be relocated. The Feeder Creek is a relatively flat stream with a gentle slope ranging from approximately 1% to 3%. At the time of observation, water flow was very slow and water depths ranged from approximately 2 to 16+ inches with an average water depth of approximately 9-inches. The width of the stream channel (OHWM) is fairly consistent along its length as the stream is very linear with no tortuosity. The width ranges from

approximately 10 feet to 17 feet with an average width of approximately 14 feet. The substrate of the creek is generally comprised of clay and silt.

The majority of the creek contains vegetation throughout the channel. Vegetation growing within the channel is comprised of herbaceous vegetation that includes dense stands of narrowleaf cattail (*Typha angustifolia*) and scattered American bur-reed (*Sparganium americanum*), purple loosestrife (*Lythrum salicaria*), woolgrass (*Scirpus cyperinus*), swamp aster (*Symphiotrichum puniceum*) and submerged aquatic vegetation.

Vegetation growing along the banks and within the riparian corridor of the Feeder Creek often includes a dense successional stand of shrubs and saplings with some areas of open field along the northern portion. Dominant saplings and shrubs include gray dogwood (*Cornus racemosa*), silky dogwood (*Cornus amomum*), redbud dogwood (*Cornus sericea*), gray alder (*Alnus incana*), hawthorn (*Crataegus* spp.), buckthorn (*Rhamnus cathartica*), American elm (*Ulmus americana*) and black willow (*Salix nigra*). Herbaceous vegetation is comprised of soft rush (*Juncus effusus*), St. John's wort (*Hypericum perforatum*), Queen Anne's lace (*Daucus carota*), mugwort (*Artemisia vulgaris*), common teasel (*Dipsacus fullonum*), *Rubus* spp., goldenrod (*Solidago* spp.), moss (*Bryophyta*) and upland grasses (*Poaceae* spp.).

The riparian corridor along the stream is disturbed in two (2) areas - the open field in the northern portion of the Site and a developed area associated with an adjacent lot in the southern portion. In the northern portion there are several ATV trails, man-made crossings and disturbed vegetation (currently open field). In the southern portion, an approximate 55-foot section of the stream (off-Site) is piped via three (3) corrugated plastic culverts. On top of the pipes, there is a very large gravel stockpile.

Based on the collected data, the Feeder Creek appears to be an intermittent stream with defined bed and banks that includes flowing water seasonally and after meaningful rain events. Based on the density of vegetation throughout the stream coupled with the seasonally inconsistent water levels, it is unlikely to provide adequate habitat to sustain aquatic life.

According to NYSDEC and NWI Wetland Maps, the stream appears to convey a portion of flow from a ±200-acre wetland complex located between Whitehaven Road and Bedell Road to the south of the Site, to a reach of the Niagara River northwest of the Site. Based on a preliminary evaluation of the Feeder Creek, the stream is at bank full stage and in certain areas exceeds capacity during a 1% annual chance storm event. The primary function/value of the stream appears to be flood storage and conveyance. Based on Site topography adjacent to a large portion of the stream, the Site does not afford significant opportunity for flood storage to alleviate flooding in upstream and downstream areas.

The relocated creek will be constructed along the western side of the proposed development, up to approximately 600 feet west of the original creek location. Similar to the existing creek, the proposed channel measures approximately 15 to 20 feet in width and will be composed of natural soil substrate. The relocated creek has been designed with a slightly meandering alignment and will include vegetated banks on both sides. A seed mix will be

applied to the banks and supplemented by planted native trees and shrubs. In order to increase the available capacity for flood storage onsite, and in turn provide potential alleviation of off-Site flooding, approximately 2.33 acres of floodplain wetlands are proposed adjacent to the southern end of the stream. In addition, an outlet to an oversized stormwater pond in the northwestern portion of the site has been created to provide additional flood storage while maintaining normal downstream flow.

7. It would be good to have baseline data on air quality (pollution) in the area of development.

Response: Ambient Air Quality Standards in Region 9, where the project site is located, indicate air quality is in attainment for both Federal and State standards. The Project does not entail the types of activities or operations that require TC Buffalo to acquire air registrations or permits or that are associated with a significant potential for air emissions. Any impacts to air quality from construction activities will be minor and temporary in nature. Mitigation measures such as erosion control, sediment control, pollution-prevention, and stormwater management measures will be implemented during construction, in addition to the regular maintenance of construction equipment and proper maintenance of a stabilized construction access roadway to reduce idling and stacking of construction vehicles. Moreover, the Site work for the Project is near balanced and there is limited need to import soil material to the Site, thereby significantly reducing the number of construction truck trips.

Regular operation of the Project will have minimal impacts on air quality. The primary energy source for heating the warehouse is natural gas and back-up generators, which are subject to NYSDEC regulations. Based on the Project operations, vehicles associated with the Project will not idle excessively and will comply with NYSDEC regulations regarding heavy duty vehicle idling. The Facility will have full time yard jockeys that move the trailers around the truck court. Trucks will enter the Site, drop their trailer in one of the 219 trailer parking spaces, pick up a new trailer and immediately exit the Site, thereby eliminating the sound and air impacts associated with idling trucks.

Additionally, the traffic generated by this Project is not of quantity and type to significantly affect associated vehicular pollutants, such as lead (Pb) and carbon monoxide (CO). Lead emissions from motor vehicles have been in decline since the introduction of non-leaded fuel and, with the further removal of lead additives from gasoline, should continue to decline. High carbon monoxide (CO) levels are generally associated with very high volume, slow-moving or idling motor vehicles. The problem worsens in areas with little atmospheric dispersion. Though traffic volumes will increase as a result of the Project, CO levels should not increase substantially due to the windy conditions associated with this area, which provide excellent atmospheric dispersion.

8. The CAB would like to see the area/lot that is not being developed to be set as a "protected natural area." This would act as a buffer between the West River homeowners and the development and serve as a corridor to Buckhorn State Park.

Response: At this time, TC Buffalo does not have any plans to purchase the West Parcel and the West Parcel is not part of the instant Application. As it does not own the West Parcel, TC Buffalo cannot guarantee that the West Parcel will be developed by the current owner or a future prospective purchaser.

*However, that being said, the West Parcel contains several NYSDEC regulated wetlands that, along with their corresponding 100-foot buffer, render a large percentage (over 70%) of the West Parcel undevelopable. **See Exhibit F, West Parcel Lot Proposed Development Plan.** Because those regulated wetlands and the surrounding 100 foot buffer are currently protected from development by State law and will remain so, they will continue to serve as an important aesthetic, hydrologic, and habitat resource, even if the West Parcel is developed. As shown in **Exhibit F**, excluding the regulated wetlands and their corresponding 100-foot buffer, the remaining potential development area cross-hatched in red is approximately 17.8 acres. Applying the underlying zoning of the R1A, accounting for stormwater management and roadways, realistically no more than a handful (approximately 5) of residential lots could be developed on the West Parcel. In addition, the West Parcel is not in a sewer district and there are limitations regarding access. As such, based on the West Parcel's characteristics, significant development limitations help ensure that it will not be developed in the future although some limited development is possible.*

9. We also would like to see native vegetation retained.

Response: Notably, not all of the vegetation that currently exists on the Site is native. That being said, any vegetation not disturbed by the Project will be preserved in its current state. And, to the extent practicable, TC Buffalo will utilize native species in its plantings throughout the Site.

10. In addition we would like to see what could be added to the infrastructure to reduce the environmental impact.

Response: The Facility as designed is a critical component of the Project's operations and efficiencies, economic development goals and long-term viability. The Project design is the result of an examination of feasible design alternatives that could avoid and minimize potential impacts to existing wetlands and waters to the extent practicable. The size and design of the multi-story facility is utilized to obtain a minimum building footprint necessary to achieve the storage capacity and operational needs of the prospective tenant. The Project design represents the least environmental impact practicable while achieving a layout that meets the requirements and design standards of the proposed facility and the Town Code.

In addition, the design team has worked hard to forgo the installation of a new electrical substation to support the project and has determined that it can diversify the loads of the building to utilize the available electrical service in the immediate area. This has resulted in reducing the developed footprint by more than 2 acres.

Overall, while a number of temporary and/or minor environmental impacts have been identified in connection with the Project, where necessary, such impacts have been mitigated to the greatest extent possible by the Project design and/or off-Site mitigation.

EXHIBIT C



DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

March 23, 2020

Regulatory Branch

SUBJECT: Department of the Army Application No. LRB-2007-01763.

Michael Huntress
Acquest Companies
5554 Main Street
Williamsville, New York 14221

Dear Mr. Huntress:

I am writing to you in regard to your request for a Department of the Army (DA) Jurisdictional Determination on a parcel of property approximately 144 acres in size located between Long and Bedell Roads, west of and adjacent to the New York State Thruway I-190 in the Town of Grand Island, County of Erie, and State of New York.

Section 404 of the Clean Water Act (CWA) establishes Corps of Engineers jurisdiction over the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands, as defined in 33 CFR Part 328.3.

I am hereby verifying the Federal wetland boundary as shown on the attached wetland delineation map (Sheet 2 of 2). This verification was confirmed on March 23, 2020 and will remain valid for a period of five (5) years from the date of this correspondence unless new information warrants revision of the delineation before the expiration. At the end of this period, a new wetland delineation will be required if a project has not been completed on this property and additional impacts are proposed for WOUS. Further, this delineation/determination has been conducted to identify the limits of the Corps CWA jurisdiction for the particular site identified in this request. This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are United States Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resource Conservation Service prior to starting work.

Based upon my review of the submitted delineation and on-site observations, I have determined that Tributary 1 (3433 linear feet), Tributary 2 (480 linear feet) and wetland areas J (0.415 acres), L (2.755 acres), N (0.152 acres), P (0.621 acres), Q (0.118 acres), R (0.058 acres), and T (0.433 acres) on the subject parcel are part of a surface water tributary system to a navigable water of the United States as noted on the attached Jurisdictional Determination (JD) form. Therefore, the wetlands are regulated under Section 404 of the CWA. DA authorization is required if you propose a discharge of dredged or fill material in these areas.

In addition, I have determined that there is no clear surface water connection or ecological continuum between wetland areas A (2.619 acres), B (0.228 acres), C (0.123 acres), D (0.220 acres), E (0.107 acres), F (0.257 acres), G (0.736 acres), H (0.231 acres), I (0.073 acres), K (1.699 acres), M (0.209 acres), O (0.09 acres), S (0.148 acres) and U (0.126 acres) on the parcel and a surface tributary system to a navigable water of the United States. Therefore, these waters are considered isolated, non-navigable,

Regulatory Branch

SUBJECT: Department of the Army Application No. LRB-2007-01763.

intrastate waters and not regulated under Section 404 of the CWA. Accordingly, you do not need DA authorization to commence work in these areas.

I encourage you to contact the appropriate state and local governmental officials to ensure that the proposed work complies with their requirements.

Finally, this letter contains an approved JD for the subject parcel. If you object to this JD, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal the above JD, you must submit a completed RFA form within 60 days of the date on this letter to the Great Lakes/Ohio River Division Office at the following address:

Jacob Siegrist
Regulatory Appeals Review Officer
US Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10-714
Cincinnati, Ohio 45202-3222
Phone: 513-684-2699 Fax: 513-684-2460

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete; that it meets the criteria for appeal under 33 C.F.R. part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by May 21, 2020.

It is not necessary to submit an RFA to the Division office if you do not object to the determination in this letter.

Questions pertaining to this matter should be directed to me by calling 716-879-4346, by writing to the following address: U.S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, New York 14207, or by e-mail preferred at this time: martin.h.crosson@usace.army.mil

Sincerely,

Martin Crosson 3/23/2020

Martin Crosson
Biologist

Enclosure

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Acquest Companies		File Number: 2007-01763	Date: 23MAR2020
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		A
	PROFFERED PERMIT (Standard Permit or Letter of permission)		B
	PERMIT DENIAL		C
X	APPROVED JURISDICTIONAL DETERMINATION		D
	PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/CECW/Pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

● **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

● **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

● **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

● **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

● **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

● **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Martin Crosson
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
716-879-4346
martin.h.crosson@usace.army.mil

If you only have questions regarding the appeal process you may also contact:

Jacob Siegrist
Regulatory Appeals Review Officer
US Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10-714
Cincinnati, Ohio 45202-3222
Phone: 513-684-2699 Fax: 513-684-2460

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.

Date:

Telephone number:

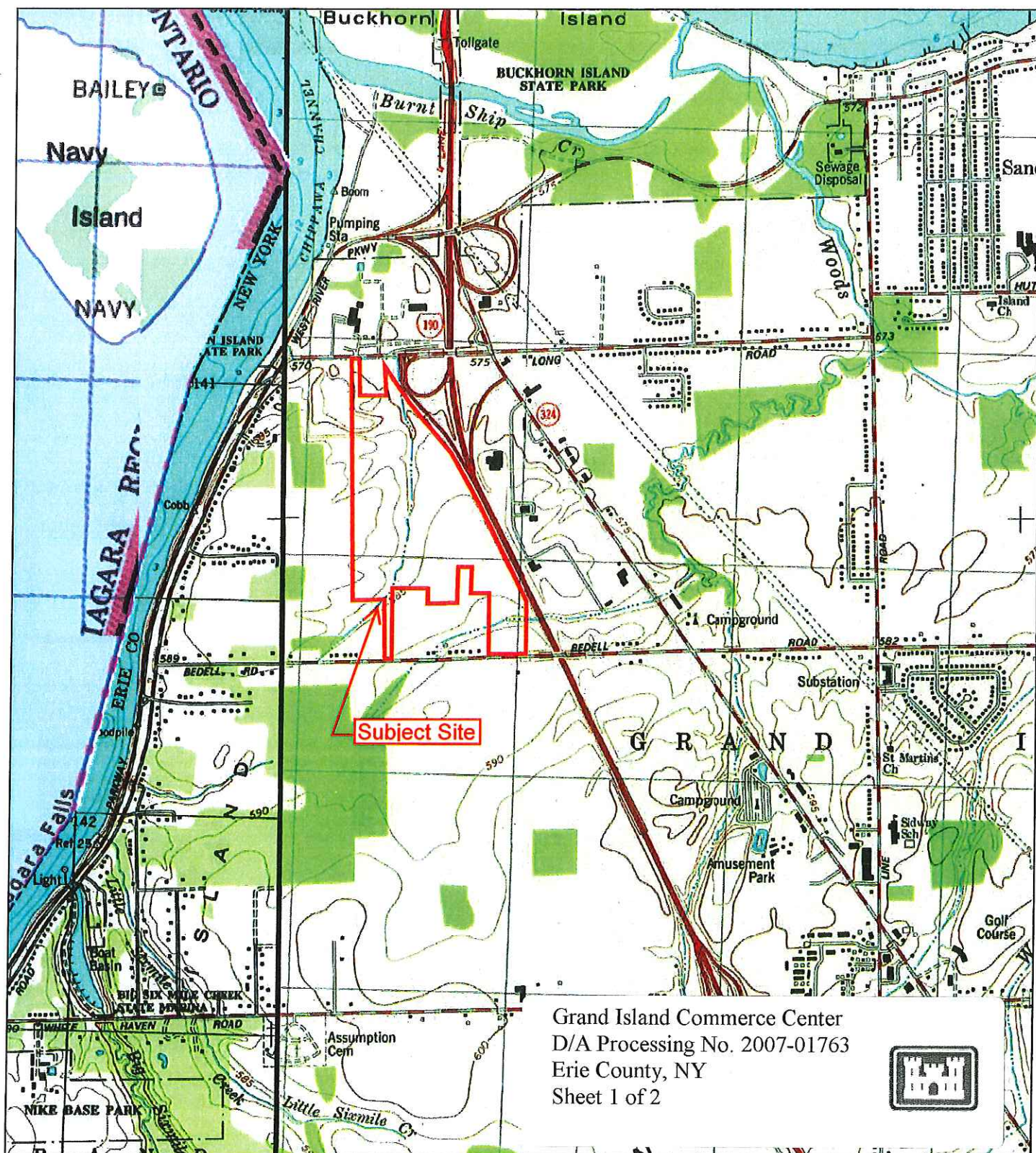


Figure 1: USGS Quadrangle Map

Tonawanda West Quadrangle

Scale 1:24,000



Prepared for:

Aquest Development LLC

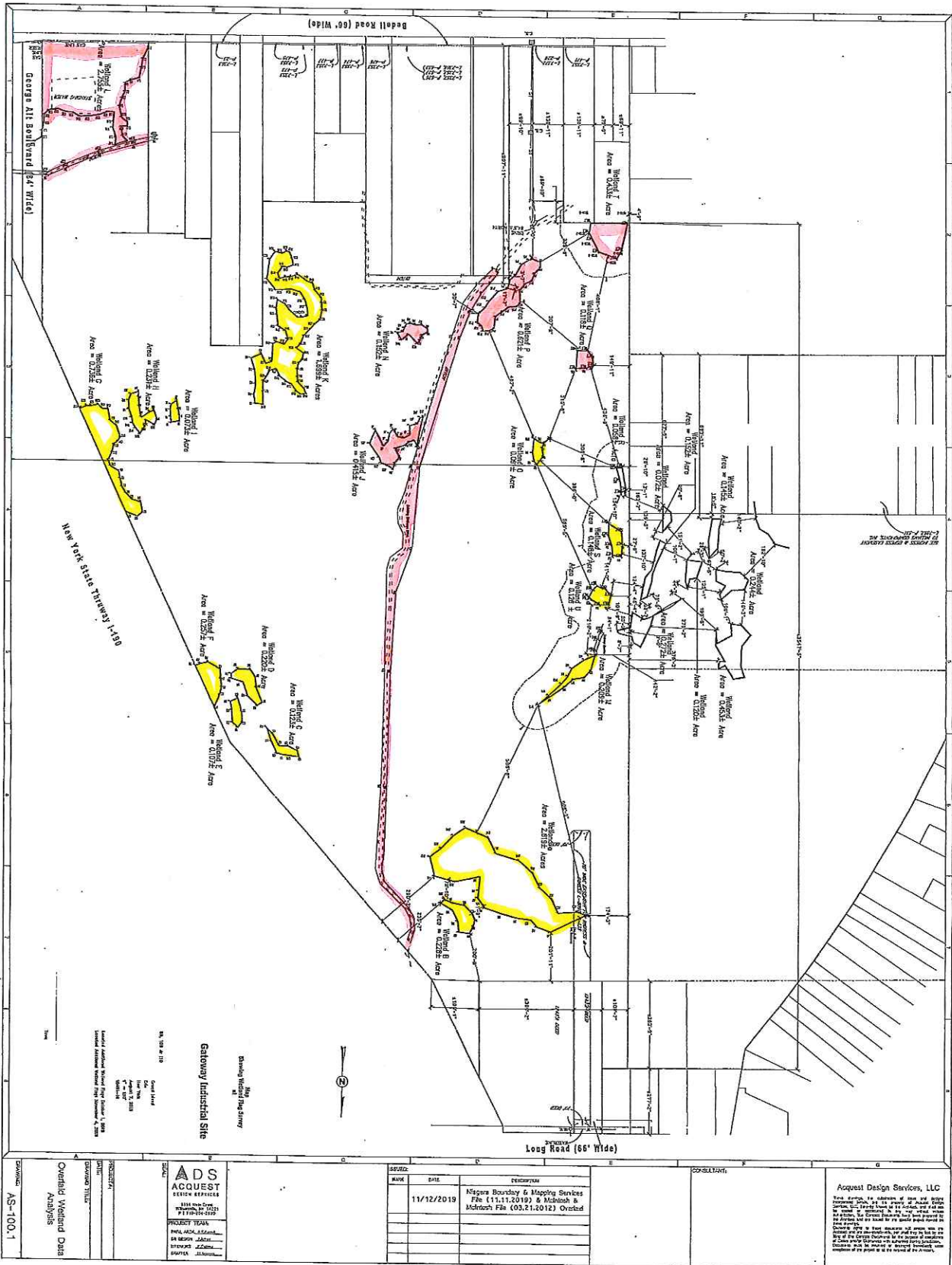
Town of Grand Island

Erie County, New York



Jurisdictional Waters of the U.S.
Include: Wetlands J, L, N, P, Q, R,
T, Tributary 1 and Tributary 2

Non-Jurisdictional/Isolated Waters
Include: Wetlands A, B, C, D, E, F,
G, H, I, K, M, O, S and U



- Jurisdictional**
- J-0.415
 - L-2.755
 - N-0.152
 - P-0.621
 - Q-0.118
 - R-0.058
 - T-0.433
 - Trib 1 ~ 3433 LF
 - Trib 2 ~ 480 LF
- Isolated**
- A-2.619
 - B-0.228
 - C-0.123
 - D-0.220
 - E-0.107
 - F-0.257
 - G-0.736
 - H-0.231
 - I-0.073
 - K-1.699
 - M-0.209
 - O-0.09
 - S-0.148
 - U-0.126

EXHIBIT D



**Parks, Recreation,
and Historic Preservation**

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

March 17, 2020

Martin Crosson
USACE, Buffalo District
1776 Niagara Street
Buffalo, NY 14207

Re: USACE
Project Olive
Bedell Road, Town of Grand Island, Erie County, NY
20PR01600

Dear Martin Crosson:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). The Archaeology Unit is in receipt of the report prepared by Archaeological & Historic Resource Services (AHRS) entitled "Phase IA Archaeological Survey Project Olive 2780 Long Road, Town of Grand Island, Erie County, NY" (Audin, Audin & Novak, March 2020; 20SR00144). We are reviewing this project in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO's Archaeology Unit and relate only to Archaeological Historic/Cultural resources.

Based upon our review of this project, the SHPO has determined that a Phase IA/B Archaeological Survey was previously conducted by Dean & Barbour Associates over the current project's Area of Potential Effects (APE) (Dean September 1992; Legacy Report #283; 92PR01322)). It is therefore the SHPO's opinion that a Phase IB archaeological investigation is not warranted, and our office has no archaeological concerns for this project.

Please continue to consult with Ms. Jennifer Walkowski in the Survey & Evaluation Unit regarding her request for additional information. Ms. Walkowski can be reached at Jennifer.walkowski@parks.ny.gov.

If you have any questions, I can be reached at 518-268-2218 or via e-mail at Josalyn.Ferguson@parks.ny.gov.

Sincerely,

Josalyn Ferguson, Ph.D.
Scientist Archaeology

via e-mail only

c.c. Charles Vandrei, David Witt, DEC
c.c. Robert March, Langan Engineering
c.c. Steven Metivier, USACE

c.c. Maria & Michael Audin, AHRS
c.c. Robert Westfall, Town of Grand Island

Division for Historic Preservation

P.O. Box 189, Waterford, New York 12188-0189 • (518) 237-8643 • parks.ny.gov



Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

April 16, 2020

Martin Crosson
USACE, Buffalo District
1776 Niagara Street
Buffalo, NY 14207

Re: USACE
Project Olive
Bedell Road, Town of Grand Island, Erie County, NY
20PR01600

Dear Martin Crosson:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

Based upon this review, it is the opinion of the New York SHPO that no historic properties, including archaeological and/or historic resources, will be affected by this undertaking.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

A handwritten signature in black ink, reading "R. Daniel Mackay".

R. Daniel Mackay

Deputy State Historic Preservation Officer
Division for Historic Preservation

EXHIBIT E

RE: Project Olive Proposed E-Commerce Distribution Facility - Grand Island NY -N18.83+/-

Amy Dake <adake@srfa.net>

Mon 4/20/2020 12:59 PM

To: Lindsey E. Haubenreich <LHaubenreich@phillipslytle.com>; 'Helser, Scott (Wayne)' <Wayne.Helser@thruway.ny.gov>;

Cc: Kimberly R. Nason <knason@phillipslytle.com>; Mike Finan <mfinan@langan.com>; Ernesto, Andy @ TCC Northeast <AErnesto@trammellcrow.com>; Murray-Coleman, James @ Pittsburgh <J.MurrayColeman@trammellcrow.com>;

 2 attachments (159 KB)

Signal Warrant Analyses GI Blvd-I-190 NB 04-13-20.pdf; Signal Warrant Analyses Long-I190 SB 04-13-20.pdf;

External Email: Use Caution.

Hi Scott,

Attached are the signal warrant analyses. The analyses indicate that Warrant 1 Conditions A and B are not met at either location. Warrant 2 (4-hour warrant) is met for 3 hours of the day at the Long Rd intersection and 7 hours or the day at the Grand Island Blvd intersection under full development conditions.

Given the results of the capacity analyses at both locations, we continue to recommend installation of a signal at the Long Rd intersection.

Please let me know if you have any questions or need anything else.

Amy C. Dake, P.E., PTOE
Senior Managing Traffic Engineer

SRF ASSOCIATES, D.P.C.
Transportation Planning / Engineering / Design

[3495 Winton Place](#)
[Building E, Suite 110](#)
[Rochester, NY 14623](#)
(585) 272-4660
(585) 314-5078 - mobile
[\[www.srfa.net\]](http://www.srfa.net)www.srfa.net

Integrating Transportation with People & Places

**Traffic Signal Warrant Analysis Grand Island Blvd and I-190 NB Off-Ramp
Town of Grand Island, Erie County**

Hour		Existing Fluctuation in Artery Volumes			2022 Background Volumes	Full Development Artery Volume on GI Blvd at I-190 NB Off-Ramp	Existing I-190 NB Off-Ramp per 2014 NYSDOT Count	2022 Background Volumes	2022 Site Trips	Total Hourly Ramp Exit Volumes on I-190 NB Off-Ramp*	2021 Warrant Analysis		
		per 2014 NYSDOT count on GI Blvd	per 2014 NYSDOT count on GI Blvd	per 2014 NYSDOT count on GI Blvd							Warrant 1 Condition A	Warrant 1 Condition B	Warrant 2 (4- hour)
		EB (SB)	WB (NB)	Two-Way							420/140	630/70	80 vph min
12:00 AM	to 1:00 AM	18	10	28	28	28	7	7	10	17	N	N	N
1:00 AM	to 2:00 AM	9	5	14	14	14	4	4	14	18	N	N	N
2:00 AM	to 3:00 AM	6	4	10	10	10	2	2	8	10	N	N	N
3:00 AM	to 4:00 AM	7	7	14	14	14	2	2	15	17	N	N	N
4:00 AM	to 5:00 AM	7	5	12	12	12	3	3	16	19	N	N	N
5:00 AM	to 6:00 AM	50	37	87	88	88	8	8	31	39	N	N	N
6:00 AM	to 7:00 AM	120	114	234	236	236	32	32	251	283	N	N	Y
7:00 AM	to 8:00 AM	199	187	386	390	390	59	60	272	332	N	N	Y
8:00 AM	to 9:00 AM	253	177	430	434	434	82	83	26	109	N	N	Y
9:00 AM	to 10:00 AM	193	154	347	350	350	46	46	29	75	N	N	N
10:00 AM	to 11:00 AM	189	175	364	368	368	41	41	23	64	N	N	N
11:00 AM	to 12:00 PM	221	204	425	429	429	38	38	35	73	N	N	N
12:00 PM	to 1:00 PM	311	281	592	598	598	36	36	18	54	N	N	N
1:00 PM	to 2:00 PM	262	210	472	477	477	40	40	15	55	N	N	N
2:00 PM	to 3:00 PM	226	201	427	431	431	56	57	14	71	N	N	N
3:00 PM	to 4:00 PM	236	237	473	478	478	70	71	25	96	N	N	Y
4:00 PM	to 5:00 PM	252	303	555	561	561	96	97	36	133	N	N	Y
5:00 PM	to 6:00 PM	241	259	500	505	505	78	79	210	289	Y	N	Y
6:00 PM	to 7:00 PM	189	151	340	343	343	52	53	240	293	N	N	Y
7:00 PM	to 8:00 PM	152	119	271	274	274	37	37	17	54	N	N	N
8:00 PM	to 9:00 PM	127	98	225	227	227	32	32	15	47	N	N	N
9:00 PM	to 10:00 PM	85	62	147	148	148	27	27	16	43	N	N	N
10:00 PM	to 11:00 PM	61	44	105	106	106	14	14	20	34	N	N	N
11:00 PM	to 12:00 AM	29	16	45	45	45	10	10	9	19	N	N	N
		1283	577	1860		1879	872						

* Assumes no credit for potential right turn on red volumes

1 0 7



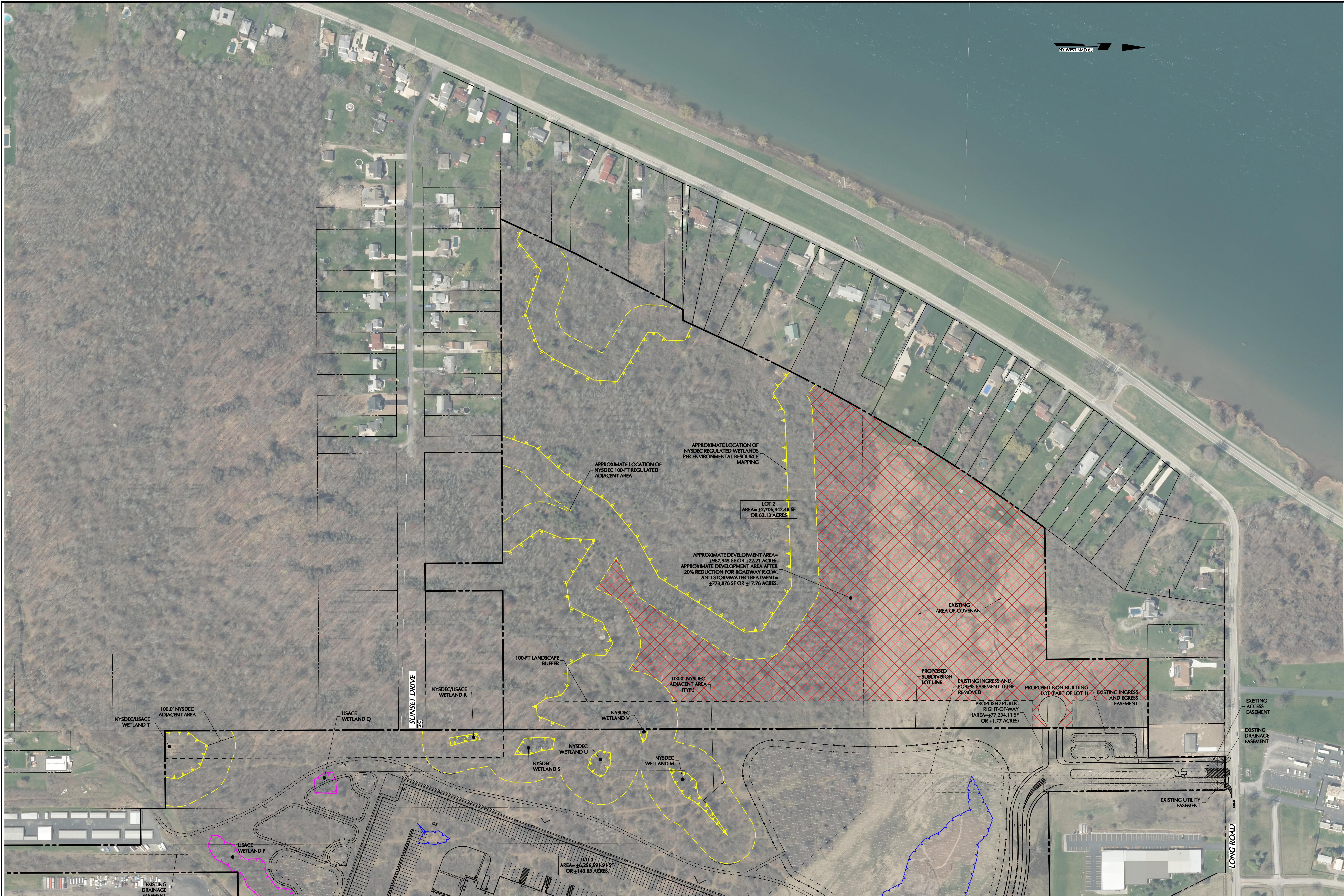
Traffic Signal Warrant Analysis Long Road and I-190 SB Off-Ramp Town of Grand Island, Erie County

Hour			Existing Fluctuation in Artery Volumes			2022 Background Volumes	2022 Site Trips	Full Development Artery Volume on Long Road at I-190 SB Off-Ramp	Existing I-190 SB Off-Ramp per 2016 NYSDOT Count (Northbound Left Only)*	2022 Background Volumes	2022 Site Trips	Total Hourly Northbound Left Turn Volumes on I-190 SB Off-Ramp	2021 Warrant Analysis		
			per 2015 NYSDOT count on Long Road	per 2015 NYSDOT count on Long Road	per 2015 NYSDOT count on Long Road								Warrant 1 Condition A	Warrant 1 Condition B	Warrant 2 (4-hour)
			EB	WB	Two-Way								420/140	630/70	80 vph min
12:00 AM	to	1:00 AM	4	6	10	10	22	32	3	3	3	6	N	N	N
1:00 AM	to	2:00 AM	3	8	11	11	31	42	1	1	3	4	N	N	N
2:00 AM	to	3:00 AM	6	5	11	11	21	32	1	1	6	7	N	N	N
3:00 AM	to	4:00 AM	5	7	12	12	33	45	1	1	6	7	N	N	N
4:00 AM	to	5:00 AM	13	6	19	19	134	153	1	1	67	68	N	N	N
5:00 AM	to	6:00 AM	23	9	32	32	339	371	4	4	177	181	N	N	Y
6:00 AM	to	7:00 AM	93	21	114	115	152	267	11	11	19	30	N	N	N
7:00 AM	to	8:00 AM	172	30	202	204	142	346	17	17	5	22	N	N	N
8:00 AM	to	9:00 AM	128	27	155	157	41	198	20	20	8	28	N	N	N
9:00 AM	to	10:00 AM	70	21	91	92	50	142	14	14	6	20	N	N	N
10:00 AM	to	11:00 AM	57	26	83	84	39	123	13	13	8	21	N	N	N
11:00 AM	to	12:00 PM	64	40	104	105	61	166	15	15	16	31	N	N	N
12:00 PM	to	1:00 PM	82	45	127	128	39	167	18	18	8	26	N	N	N
1:00 PM	to	2:00 PM	58	32	90	91	28	119	17	17	6	23	N	N	N
2:00 PM	to	3:00 PM	57	32	89	90	34	124	21	21	10	31	N	N	N
3:00 PM	to	4:00 PM	80	61	141	142	48	190	25	25	15	40	N	N	N
4:00 PM	to	5:00 PM	91	44	135	136	50	186	24	24	13	37	N	N	N
5:00 PM	to	6:00 PM	94	38	132	133	267	400	24	24	94	118	N	N	Y
6:00 PM	to	7:00 PM	58	26	84	85	486	571	18	18	210	228	N	N	Y
7:00 PM	to	8:00 PM	48	39	87	88	41	129	16	16	14	30	N	N	N
8:00 PM	to	9:00 PM	22	12	34	34	28	62	16	16	4	20	N	N	N
9:00 PM	to	10:00 PM	23	10	33	33	29	62	13	13	6	19	N	N	N
10:00 PM	to	11:00 PM	18	16	34	34	40	74	9	9	9	18	N	N	N
11:00 PM	to	12:00 AM	14	16	30	30	20	50	5	5	3	8	N	N	N
			1283	577	1860			5636	307						

* Assume 10% of existing volumes turn left based upon peak hour TMCs

0 0 3

EXHIBIT F



WARNING:
IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY
PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED
PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		

SIGNATURE _____ DATE SIGNED _____
MICHAEL FINAN
PROFESSIONAL ENGINEER NY Lic. No. 081473-1

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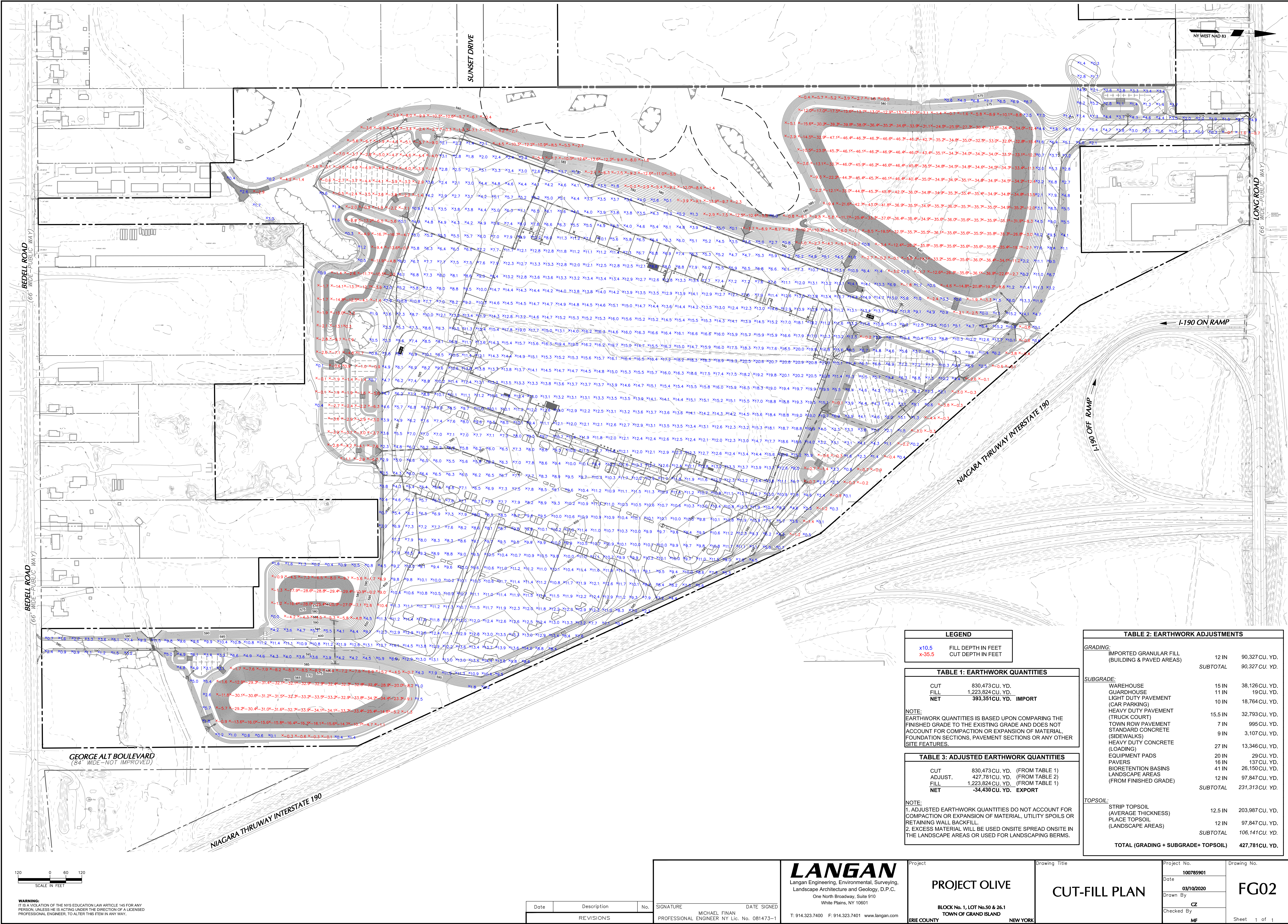
Project
PROJECT OLIVE
BLOCK No. 1, LOT No.50 & 26.1
TOWN OF GRAND ISLAND
ERIE COUNTY NEW YORK

Drawing Title
**LOT 2
DEVELOPMENT
AREA**

Project No.
100785901
Date
03/10/2020
Drawn By
CZ
Checked By
MF

Drawing No.
FG01
Sheet 1 of 1

EXHIBIT G



WARNING:
IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		

SIGNATURE	DATE	SIGNED
MICHAEL FINAN		
PROFESSIONAL ENGINEER NY Lic. No. 081473-1		

LANGAN
Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
One North Broadway, Suite 910
White Plains, NY 10601

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Project	Drawing Title
PROJECT OLIVE	CUT-FILL PLAN
BLOCK No. 1, LOT No.50 & 26.1	
TOWN OF GRAND ISLAND	
ERIE COUNTY	NEW YORK

Project No.	Drawing No.
100785901	FG02
Date	
03/10/2020	
Drawn By	
CZ	
Checked By	
MF	

Project No.	Drawing No.
100785901	FG02
Date	
03/10/2020	
Drawn By	
CZ	
Checked By	
MF	

LEGEND	
x10.5	FILL DEPTH IN FEET
x35.5	CUT DEPTH IN FEET

TABLE 1: EARTHWORK QUANTITIES	
CUT	830,473 CU. YD.
FILL	1,223,824 CU. YD.
NET	393,351 CU. YD. IMPORT

NOTE:
EARTHWORK QUANTITIES IS BASED UPON COMPARING THE FINISHED GRADE TO THE EXISTING GRADE AND DOES NOT ACCOUNT FOR COMPACTION OR EXPANSION OF MATERIAL, STANDARD SECTIONS, PAVEMENT SECTIONS OR ANY OTHER SITE FEATURES.

TABLE 3: ADJUSTED EARTHWORK QUANTITIES	
CUT	830,473 CU. YD. (FROM TABLE 1)
ADJUST.	427,781 CU. YD. (FROM TABLE 2)
FILL	1,223,824 CU. YD. (FROM TABLE 1)
NET	-34,430 CU. YD. EXPORT

NOTE:
1. ADJUSTED EARTHWORK QUANTITIES DO NOT ACCOUNT FOR COMPACTION OR EXPANSION OF MATERIAL, UTILITY SPOILS OR RETAINING WALL BACKFILL.
2. EXCESS MATERIAL WILL BE USED ONSITE SPREAD ONSITE IN THE LANDSCAPE AREAS OR USED FOR LANDSCAPING BERMS.

TABLE 2: EARTHWORK ADJUSTMENTS		
GRADING:		
IMPORTED GRANULAR FILL (BUILDING & PAVED AREAS)	12 IN	90,327 CU. YD.
SUBTOTAL		90,327 CU. YD.
SUBGRADE:		
WAREHOUSE	15 IN	38,126 CU. YD.
GUARDHOUSE	11 IN	19 CU. YD.
LIGHT DUTY PAVEMENT (CAR PARKING)	10 IN	18,764 CU. YD.
HEAVY DUTY PAVEMENT (TRUCK COURT)	15.5 IN	32,793 CU. YD.
TOWN ROW PAVEMENT	7 IN	995 CU. YD.
STANDARD CONCRETE (SIDEWALKS)	9 IN	3,107 CU. YD.
HEAVY DUTY CONCRETE (LOADING)	27 IN	13,346 CU. YD.
EQUIPMENT PADS	20 IN	29 CU. YD.
PAVERS	16 IN	137 CU. YD.
BIORETENTION BASINS	41 IN	26,150 CU. YD.
LANDSCAPE AREAS (FROM FINISHED GRADE)	12 IN	97,847 CU. YD.
SUBTOTAL		231,313 CU. YD.
TOPSOIL:		
STRIP TOPSOIL (AVERAGE THICKNESS)	12.5 IN	203,987 CU. YD.
PLACE TOPSOIL (LANDSCAPE AREAS)	12 IN	97,847 CU. YD.
SUBTOTAL		106,141 CU. YD.
TOTAL (GRADING + SUBGRADE+ TOPSOIL)		427,781 CU. YD.

EXHIBIT H

TABLE 1
Vegetation Identified
During Wetland Delineation

<u>Scientific Name</u>	<u>Common Name</u>	<u>Federal Status</u>
Herbaceous		
<i>Alisma subcordatum</i>	American water plantain	OBL
<i>Anthoxanthum odoratum</i>	Large sweet vernal grass	FACU
<i>Bidens frondosa</i>	Devil's pitchfork	FACW
<i>Carex crinita</i>	Fringed sedge	OBL
<i>Carex intumescens</i>	Greater baldder sedge	OBL
<i>Carex laxiflora</i>	Broad looseflower sedge	UPL
<i>Carex scoparia</i>	Pointed broom sedge	FACW
<i>Carex tribuloides</i>	Blunt broom sedge	FACW
<i>Carex vulpinoidea</i>	Common fox sedge	OBL
<i>Centaurea stoebe</i>	Spotted knapweed	UPL
<i>Cirsium altissimum</i>	Tall thistle	UPL
<i>Cirsium vulgare</i>	Bull thistle	FACU
<i>Dactylis glomerata</i>	Orchard grass	FACU
<i>Daucus carota</i>	Queen anne's lace	UPL
<i>Dipsacus fullonum</i>	Fuller's teasel	FACU
<i>Erigeron annuus</i>	Eastern daisy fleabane	FACU
<i>Eupatorium perfoliatum</i>	Common boneset	FACW
<i>Euthamia graminifolia</i>	Flat top goldentop	FAC
<i>Festuca rubra</i>	Red fescue	FACU
<i>Fragaria virginiana</i>	Virginia strawberry	FACU
<i>Geum canadense</i>	White avens	FAC
<i>Glechoma hederacea</i>	Groundivy	FACU
<i>Glyceria melicaria</i>	Melic mannagrass	OBL
<i>Impatiens capensis</i>	Spotted touch me not	FACW
<i>Juncus effusus</i>	Lamp rush	OBL
<i>Juncus tenuis</i>	Lesser poverty rush	FAC
<i>Lotus corniculatus</i>	Garden bird's foot trefoil	FACU
<i>Lythrum salicaria</i>	Purple loosestrife	OBL
<i>Onoclea sensibilis</i>	Sensitive fern	OBL
<i>Parthenocissus quinquefolia</i>	Virginia creeper	FACU
<i>Penstemon digitalis</i>	Foxglove beardtongue	FAC
<i>Persicaria virginiana</i>	Jumpseed	FAC
<i>Phleum pratense</i>	Common timothy	FACU
<i>Phragmites australis</i>	Common reed	FACW
<i>Poa compressa</i>	Flat stem bluegrass	FACU
<i>Potentilla simplex</i>	Oldfield cinquefoil	FACU
<i>Prunella vulgaris</i>	Common selfheal	FAC
<i>Pycnanthemum virginianum</i>	Virginia mountain mint	FACW
<i>Rumex crispus</i>	Curly dock	FAC
<i>Scirpus cyperinus</i>	Cottongrass bulrush	OBL

Herbaceous (Cont.)

<i>Solidago altissima</i>	Tall goldenrod	FACU
<i>Solidago canadensis</i>	Canadian goldenrod	FACU
<i>Solidago gigantea</i>	Late goldenrod	FACW
<i>Solidago rugosa</i>	Wrinkle leaf goldenrod	FAC
<i>Symphyotrichum lanceolatum</i>	White panicked american aster	FACW
<i>Toxicodendron radicans</i>	Eastern poison ivy	FAC
<i>Trifolium repens</i>	White clover	FACU
<i>Typha angustifolia</i>	Narrowleaf cattail	OBL
<i>Verbena hastata</i>	Simpler's joy	FACW

Shrub

<i>Cornus amomum</i>	Silky dogwood	FACW
<i>Cornus racemosa</i>	Gray dogwood	FAC
<i>Frangula alnus</i>	Glossy false buckthorn	FAC
<i>Lonicera tatarica</i>	Twinsisters	FACU
<i>Rhamnus cathartica</i>	European buckthorn	FAC
<i>Rosa multiflora</i>	Rambler rose	FACU
<i>Rubus allegheniensis</i>	Allegheny blackberry	FACU
<i>Rubus flagellaris</i>	Whiplash dewberry	FACU
<i>Salix discolor</i>	Pussy willow	FACW
<i>Spiraea alba</i>	White meadowsweet	FACW
<i>Viburnum recognitum</i>	Southern arrow wood	FAC

Tree

<i>Acer rubrum</i>	Red maple	FAC
<i>Acer saccharum</i>	Sugar maple	FACU
<i>Crataegus monogyna</i>	English hawthorn	FACU
<i>Fraxinus pennsylvanica</i>	Green ash	FACW
<i>Malus coronaria</i>	Sweet crabapple	UPL
<i>Populus deltoides</i>	Eastern cottonwood	FAC
<i>Pyrus communis</i>	Common pear	UPL
<i>Quercus palustris</i>	Pin oak	FACW
<i>Salix nigra</i>	Black willow	OBL
<i>Ulmus americana</i>	American elm	FACW

Vine

<i>Vitis aestivalis</i>	Summer grape	FACU
-------------------------	--------------	------

TABLE 1
COMMON AND SCIENTIFIC NAMES AND INDICATOR STATUS OF
PLANTS IDENTIFIED AT THE GRAND ISLAND COMMERCE CENTER SITE, 1990

COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS
Trees		
American elm	<u>Ulmus americana</u>	FACW
Apple	<u>Malus sp.</u>	U
Shagbark hickory	<u>Carya ovata</u>	FACU
Black cherry	<u>Prunus serotina</u>	FACU
Pin oak	<u>Quercus palustris</u>	FACW
Red oak	<u>Quercus rubra</u>	FACU
Swamp white oak	<u>Quercus bicolor</u>	FACW
Green ash	<u>Fraxinus pennsylvanica</u>	FACW
Quaking aspen	<u>Populus tremuloides</u>	FACU
Red maple	<u>Acer rubrum</u>	FAC
White oak	<u>Quercus alba</u>	FACU
Shrubs and Vines		
Alder buckthorn	<u>Rhamnus frangula</u>	FAC
Grey dogwood	<u>Cornus foemina</u>	FAC
Hawthorn	<u>Crataegus sp.</u>	NA
Meadowsweet	<u>Spiraea alba</u>	FACW
Nannyberry	<u>Viburnum lentago</u>	FAC
Red raspberry	<u>Rubus idaeus</u>	FAC
Red-osier dogwood	<u>Cornus stolonifera</u>	FACW
Silky dogwood	<u>Cornus amomum</u>	FACW
Tartarian honeysuckle	<u>Lonicera tatarica</u>	FACU
Herbs		
American bugleweed	<u>Lycopus americanus</u>	OBL
Bebb' sedge	<u>Carex bebbii</u>	OBL
Bittersweet nightshade	<u>Solanum dulcamara</u>	FAC-
Blue vervain	<u>Verbena hastata</u>	FACW+
Canada bluegrass	<u>Poa compressa</u>	FACU
Canada goldenrod	<u>Solidago canadensis</u>	FACU
Common dandelion	<u>Taraxacum officinale</u>	FACU
Common mullein	<u>Verbascum thapsis</u>	U
Common St. Johnswort	<u>Hypericum perforatum</u>	U
Daisy	<u>Chrysanthemum leucanthemum</u>	U
Devil's beggarsticks	<u>Bidens frondosa</u>	FACW
Fox sedge	<u>Carex vulpinoidea</u>	OBL
Garlic mustard	<u>Alliaria officinalis</u>	NR; FAC, FACW
Heal-all	<u>Prunella vulgaris</u>	FACU
Kentucky bluegrass	<u>Pod pratensis</u>	FACU
King devil	<u>Hieracium pratense</u>	U
Lance-leaved goldenrod	<u>Solidago graminifolia</u>	FAC
New England aster	<u>Aster novae-angliae</u>	FACW
Purple loosestrife	<u>Lythrum salicaria</u>	FACW+
Purpleleaf willowherb	<u>Epilobium coloratum</u>	OBL
Panic grass	<u>Panicum lanuginosum</u>	FAC
Quackgrass	<u>Agropyron repens</u>	FACU
Queen Anne's lace	<u>Daucus carota</u>	U

TABLE 1 (Cont'd)
COMMON AND SCIENTIFIC NAMES AND INDICATOR STATUS OF
PLANTS IDENTIFIED AT THE GRAND ISLAND COMMERCE CENTER, 1990

COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS
Herbs (Cont'd)		
Redtop	<u>Agrostis gigantea</u>	FACW
Rough avens	<u>Geum virginianum</u>	FAC
Rough-fruited cinquefoil	<u>Potentilla recta</u>	U
Rough-stem goldenrod	<u>Solidago rugosa</u>	FAC
Soft rush	<u>Juncus effusus</u>	FACW
Tall buttercup	<u>Ranunculus acris</u>	FAC
Teasel	<u>Dipsacus sylvestris</u>	NA
Timothy	<u>Phleum pratense</u>	FACU
Water plantain	<u>Alisma plantago-aquatica</u>	OBL
White avens	<u>Geum canadense</u>	FACU
White heath aster	<u>Aster ericoides</u>	FACU
Wild strawberry	<u>Fragaria virginiana</u>	FACU
Woolgrass	<u>Scirpus cyperinus</u>	FACW
Yarrow	<u>Achillea millefolium</u>	FACU
Yellow foxtail	<u>Setaria glauca</u>	FAC

EXHIBIT I

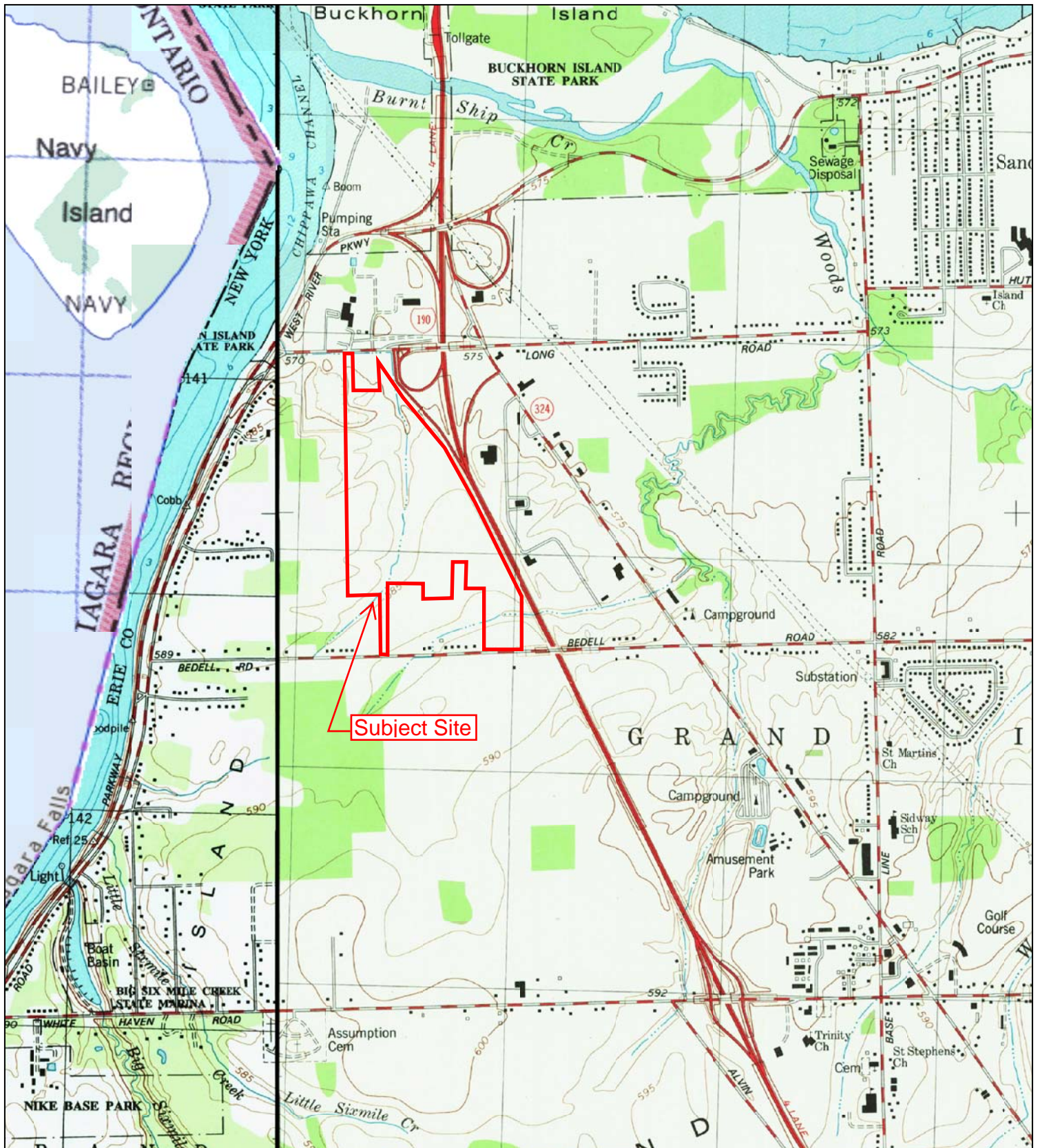
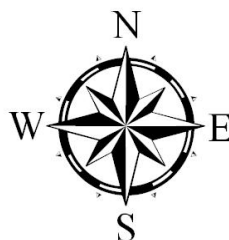


Figure 1: USGS Quadrangle Map

Tonawanda West Quadrangle

Scale 1:24,000

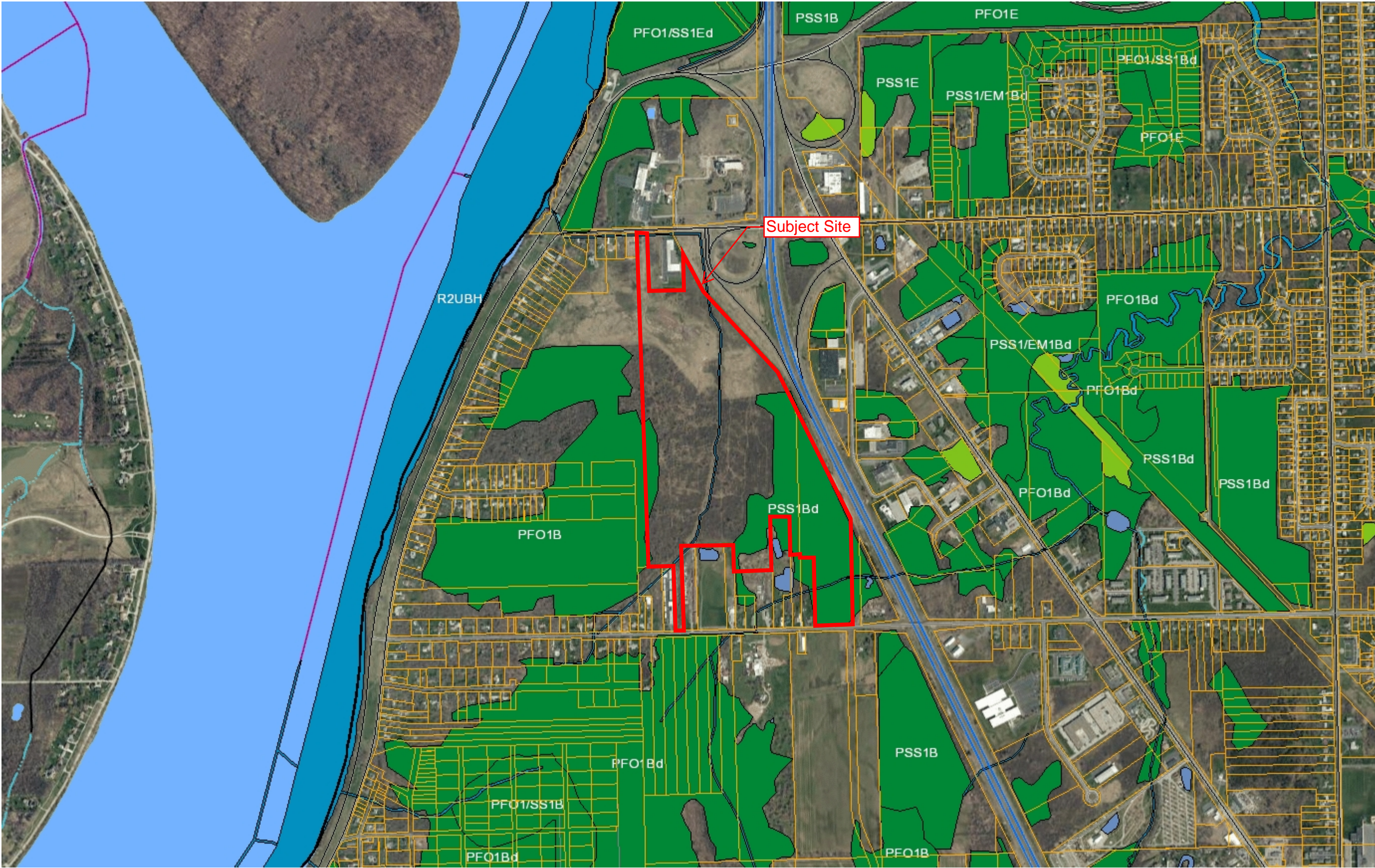


Prepared for:
Aquest Development LLC

Town of Grand Island
Erie County, New York



Figure 2: National Wetlands Inventory Map



- Legend**
- Parcels
 - Streets and Highways
 - Interstate
 - Primary State Road
 - Secondary State Road
 - County Road
 - Local Road
 - National Wetland Inventory
 - Estuarine and Marine Deepwater
 - Estuarine and Marine Wetland
 - Freshwater Emergent Wetland
 - Freshwater Forested/Shrub Wetland
 - Freshwater Pond
 - Lake
 - Other
 - Riverine
 - Flowline - Large Scale
 - Perennial
 - Intermittent
 - Ephemeral
 - Artificial Path
 - Canal Ditch
 - Coastline
 - Connector
 - Pipeline
 - Underground Conduit



0.6 0 0.28 0.6 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
THIS MAP IS NOT TO BE USED FOR NAVIGATION

ERIE COUNTY
DEPARTMENT OF ENVIRONMENT & PLANNING
OFFICE OF GIS

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

1: 18,056

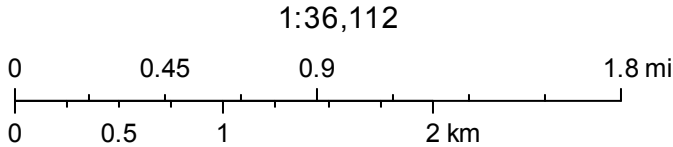
Environmental Resource Mapper



Figure 3: NYSDEC Freshwater Wetlands Map

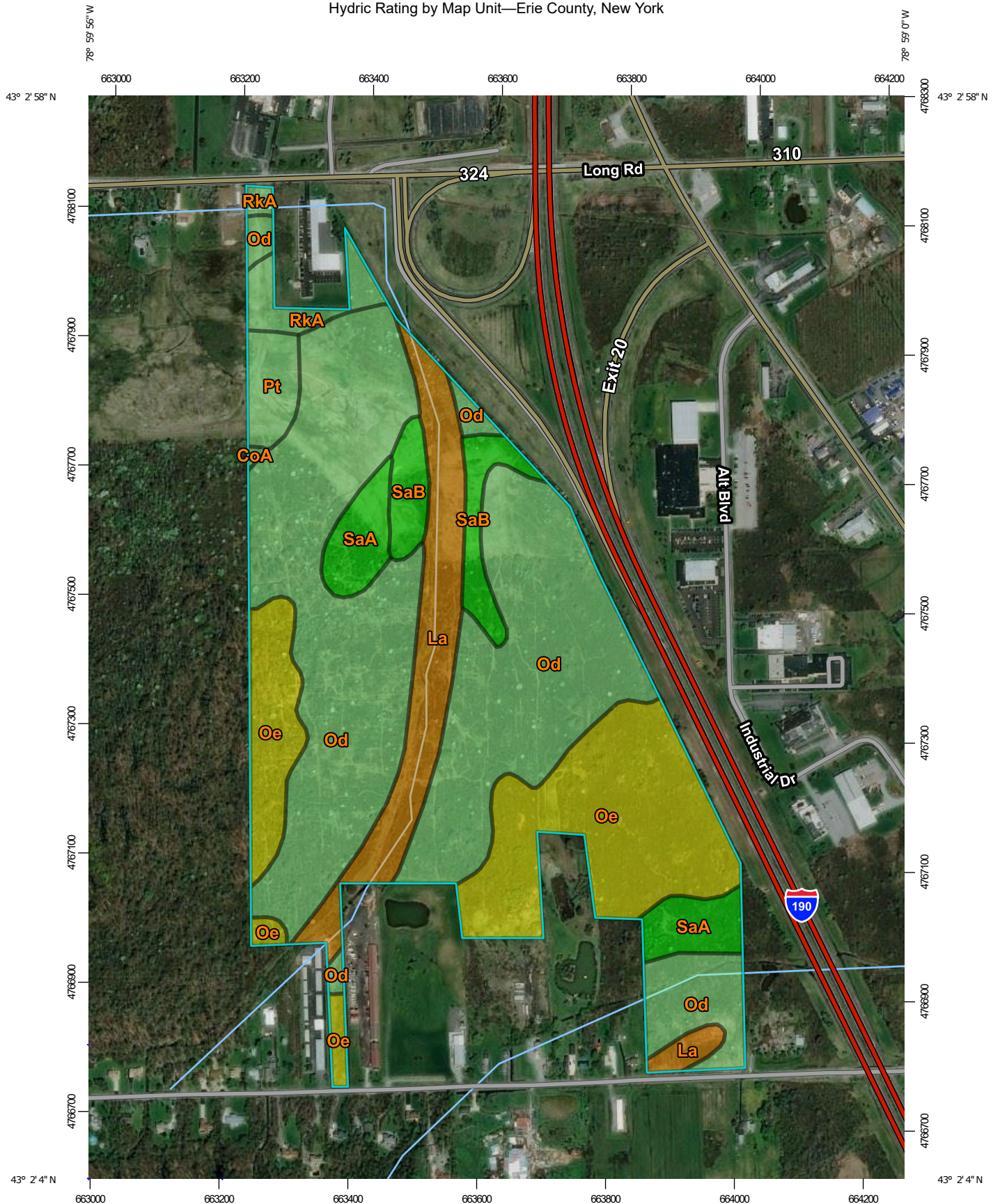
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Class: 2

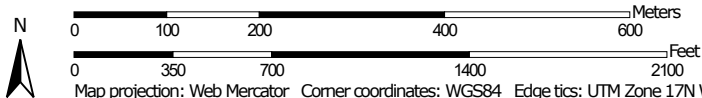


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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Hydric Rating by Map Unit—Erie County, New York



Map Scale: 1:8,160 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

8/13/2019
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Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CoA	Churchville silt loam, 0 to 3 percent slopes	5	0.1	0.1%
La	Lakemont silt loam, 0 to 3 percent slopes	95	14.9	10.7%
Od	Odessa silt loam, 0 to 3 percent slopes	5	74.3	53.1%
Oe	Odessa-Lakemont complex, 0 to 3 percent slopes	37	30.8	22.0%
Pt	Pits, borrow	5	3.3	2.3%
RkA	Rhinebeck gravelly loam, 0 to 3 percent slopes	5	3.4	2.4%
SaA	Schoharie silt loam, 0 to 3 percent slopes	0	6.9	5.0%
SaB	Schoharie silt loam, 3 to 8 percent slopes	0	6.2	4.4%
Totals for Area of Interest			139.9	100.0%