



Agenda
Village of Glen Ellyn
Capital Improvements Commission Meeting
Tuesday, May 11, 2021
7:00 PM
Electronic Conference Call

On March 16, 2020, Governor Pritzker issued Executive Order. No. 5 in response to COVID19, which temporary suspended certain requirements of the Open Meetings Act ILCS 120 allowing Village Capital Improvements Commission members to participate electronically in meetings. Please complete the Capital Improvements Commission public comment form, which can be found at www.glenellyn.org/publiccomment. All public comments submitted prior to the Public Comment portion of the agenda will be read into the official record, and any comments received during the meeting will be read into the record during the appropriate portion of the agenda. If you wish to attend the meeting, you may contact the Village at (630) 5475507

or

rdaubert@glenellyn.org and the meeting information will be provided to you. As a courtesy, the Village requests that these requests be submitted before 4:30pm on the day prior to the meeting.

A. Call to Order

B. Public Comment (Non Agenda Items)

C. Approval of Minutes

- 1) Motion to approve the March 9, 2021 Capital Improvements Commission Meeting Minutes.

D. Current Business

- 1) May 2021 CIC Meeting on CBD SUI - Review of Curb Extensions and Exclusive Turn Lane Removals
- 2) Park Boulevard and Sheehan Avenue Intersection Improvements

E. Trustee's Report

F. Other Business

G. Public Works Report

H. Project Report

- 1) Engineering Project Report Dated 5/7/2021

I. Adjournment



Meeting Minutes
Village of Glen Ellyn
Capital Improvements Commission
Regular Meeting
March 9, 2021
7:00 PM
Electronic Conference Call

Board or Commission: Capital Improvements

Date: March 9, 2021

Meeting: Regular

Called to Order: 7:00 p.m.

Quorum: Yes

Adjourned: 8:47 p.m.

Member Attendance:

Steve Szymanski	Chairman	Present
Joel Baldin	Commissioner	Present
Adam B. Biggam	Commissioner	Present
Joshua J. Cattero	Commissioner	Present
Arthur F. Foerster	Commissioner	Present
Michael M. Lindquist	Commissioner	Absent
Steve Neurauder	Commissioner	Present
Rocco J. Zuccherro	Commissioner	Present
Steve Thompson	Trustee Liaison	Present
Richard Daubert	Staff Liaison/Professional Engineer	Present

Also Present:

Julius Hansen	Public Works Director
Elisa Pollina	Recording Secretary
Tom Topor	Senior Civil Engineer
Phil Hutchinson	Civiltech Engineering
Kristin Kalitowski	Civiltech Engineering
Mike Folkening	Civiltech Engineering
Dan Anderson	Historical Society

A. CALL TO ORDER

The March 9, 2021 Meeting of the Capital Improvements Commission was called to order by Chairman Szymanski at 7:01 PM via Electronic Conference Call.

B. PUBLIC COMMENT – None

C. APPROVAL OF MINUTES FROM FEBRUARY 9, 2021 CAPITAL IMPROVEMENTS COMMISSION MEETING

MOTION TO APPROVE MINUTES FROM FEBRUARY 9, 2021 CAPITAL IMPROVEMENTS COMMISSION MEETING

MOTION BY: Commissioner Neurauter

SECOND BY: Commissioner Foerster

RESULT: UNANIMOUS APPROVAL

D. CURRENT BUSINESS

March 2021 CIC Meeting on CBD Streetscape Design Elements:

Engineer Daubert reports tonight we want to recap the design elements of the CBD streetscape that the Village Board will ultimately review and approve via Ordinance. Engineer Topor and Phil Hutchinson from Civiltech Engineering will lead the presentation with a follow up discussion on next steps.

Hutchinson reports the following objectives will be covered at tonight's meeting:

Approved Streetscape Elements
Draft 3D Model
Schedule Update
Draft Cost Estimate & Budget
Pennsylvania Avenue Improvements
Next Steps & Draft Ordinance

Hutchinson reports on the approved streetscape elements. The proposed decorative pavement will be Fire Clay Brick pavers 4"x12" Herringbone Field: Blend of 32 Antique, 33 Dark Antique, 34 Mulberry, 36 Sunset Red and 63 Charcoal, 4"x8" Soldier Course Border: 63 Charcoal. Expanded pavers - narrow band with a 16" wide running bond course of 4'x12' brick. Hutchinson shows map rendering (see attached).

Decorative Crosswalks – The Village Board has decided to move forward with the decorative pavers. The decorative brick colors will be in the same north shore blend colors with 4"x 8" herringbone and a charcoal band around the edge. The crosswalk in front of the movie theater will also be raised.

Hutchinson shows a map of the crosswalks including the 3 Prairie Path crosswalks that will also be upgrade to pavers as part of the project (see attached presentation).

Planter Curbs – There will be 2 sizes - 5'x15' and 5'x7'. There will be a combination of granite and precast concrete. If we get favorable pricing, we could offer more granite planters. Hutchinson shows a map of where the granite and precast concrete planters will be located (see attached presentation).

Historic Plaques – The Village Board decided on the 16'x16' granite plaques centered in the decorative pavement field and positioned at a 45 degree angle. The color will match the planter curb material (Mesabi Black, Diamond 10 finish).

Planter Seat Walls – Planter Seat walls will be included in high profile locations. The design will have a clay brick face and will provide additional seating.

Tree Plan – We will plant approximately 230 new trees and utilize soil cells everywhere we can. We will offer a diverse mix of trees. We will also install an irrigation system. This tree plan will be a much improved plan from what is currently there now.

We will also have new bike racks, trash/recycling receptacles and big belly compactors.

Hutchinson shows the CIC a video of the CBD Streetscape rendering. He adds we hope to upload this video rendering to the project website once we get final approval from the Village Board. This will help people visualize what the CBD will look like. The CIC thanks Hutchinson for the all his work.

Engineer Topor reports on the construction timeline. Last month we introduced the idea of pushing the project back to 2022. The proposed schedule is as follows: 2022 - South of the downtown will be done first. 2023 – Main & Pennsylvania, 2024 – Western side of downtown, 2025-2027 – Train station (see attached schedule). We are still reviewing the Phase 1 Schedule. We are looking to bid the project out in late fall of 2021. There will be 8 weeks of utility work on Main Street and 13 weeks of streetscape work on Main Street; then we will focus on Duane Street. Once a schedule is nailed down, our plan is to come back to the CIC to go over the details of the schedule.

Engineer Daubert adds, one thing we noticed with our review of the schedule is that the complete closure of Main Street should be considered during both the utility work and during the streetscape work. If we do that, we can compress the construction schedule. We plan on coming back to the CIC with more details on this.

Commissioner Zucchero asks if the sidewalks on Main Street will remain open during the utility work. Engineer Topor replies yes, the goal is to be open when the utility work is being done where possible, but we are still reviewing this.

Trustee Thompson asks why the schedule timeline on Duane Street is longer than Main Street. Kalitowski replies, on Duane Street we are not proposing a full closure, so it will take longer.

Cost Estimates & Budget – Engineer Topor reports, we put together a cost estimate back in December for the overall project costs. Back then we had a 20% contingency built in on all construction items. We have since asked Civiltech to update the cost estimates. They are as follows:

ALL PHASES SUMMARY		
CONSTRUCTION SUBTOTAL		\$20,381,000
CONTINGENCY	VAR	\$2,808,000
CONSTRUCTION ENGINEERING	11%	\$2,551,000
ALL PHASES TOTAL		\$25,740,000

2022 PHASE 1 SUMMARY		
CONSTRUCTION SUBTOTAL		\$4,965,000
CONTINGENCY	10%	\$496,000
CONSTRUCTION ENGINEERING	11%	\$601,000
PHASE 1 TOTAL		\$6,062,000

2023 PHASE 2 SUMMARY		
CONSTRUCTION SUBTOTAL		\$8,714,000
CONTINGENCY	13%	\$1,133,000
CONSTRUCTION ENGINEERING	11%	\$1,083,000
PHASE 2 TOTAL		\$10,930,000

2024 PHASE 3 SUMMARY		
CONSTRUCTION SUBTOTAL		\$3,168,000
CONTINGENCY	16%	\$507,000
CONSTRUCTION ENGINEERING	11%	\$404,000
PHASE 3 TOTAL		\$4,080,000

2025-2027 PHASE 4 SUMMARY		
CONSTRUCTION SUBTOTAL		\$3,534,000
CONTINGENCY	19%	\$672,000
CONSTRUCTION ENGINEERING	11%	\$463,000
PHASE 4 TOTAL		\$4,669,000

Chairman Szymanski asks based on what you are seeing with bids, have you seen any delta on changes of bids. Engineer Topor replies, the Pennsylvania Avenue Improvements bid opening is on Friday and this will give us an indication. Earlier in the year prices are always a bit better. Kalitowski adds, we saw some bids last week and bids are coming in lower. But it is hard to pin point what is driving the bids lower. But we are feeling like bids are coming in lower.

Engineer Daubert adds, once the design is finalized for Phase 1, we will complete a formal engineer's estimate that will omit the contingency. Based on our thoroughness in design, our projects typically include many pay items for potential work which is not necessarily always used on projects. He notes that our projects regularly close out in under the award amount.

Commissioner Zuccherro asks do you need anything from the CIC with respect to the closure of Main Street. Engineer Daubert replies yes, when we come back to discuss the schedule we would ask the CIC then to weigh in on the closure.

Trustee Thompson adds we could potentially have 3 new trustees and a new appointee after the election as well as a new philosophy going forward. This could be a challenge. Commissioner Zuccherro asks, is that the purpose of the ordinance. Engineer Daubert adds, the ordinance commemorates all the design decisions made to date. So it will help the new trustees understand what was done to arrive at the design of the project.

Trustee Thompson adds Finance Director Coyle has been meeting with the Trustees to explain the financial piece of the project. This is also an infrastructure need.

Chairman Szymanski adds we should also do presentations with the businesses to help move the project along. Engineer Daubert replies, yes we will meet with the businesses to discuss the project in detail.

Pennsylvania Avenue Improvements – Engineer Topor reports we are gearing up for improvements on Pennsylvania and the goal is to replace 3 storm sewers and widen sidewalks on the south side of the street to accommodate an outdoor dining patio for A Toda Madre. We are scheduled to open bids on Friday March 12th. We have about 13 contractors that picked up bids. We are hoping to get the work done in about 45 days. The cost of this is included in the Phase 2 cost estimate for the project.

Next Steps – Topor reports that our next steps would be:

1. Commemorate project decisions in a Village approved ordinance
2. Present to the Village Board on March 22nd at the Village Board meeting
3. Follow-up meeting in April if needed

Chairman Szymanski asks Topor if he can give the write up to the CIC so we know what will be presented to the board. Engineer Topor replies yes.

Topor adds he would also like to include Historic Plaque criteria in the ordinance. Dan Anderson from the Historic Society reports on the Historic Plaque criteria. The criteria being used to identify these sites are as follows: building on the site, history of site, noteworthy site due to an event that took place and finally how much information we have on a given site. This is a complicated routine. The research is largely being done by volunteers. We hope to have a list of sites by April and we hope to have all noteworthy sites wrapped up by the end of the year. Topor adds, Phase 1 is the most important to have the historic locations finalized by spring 2022. Chairman Szymanski thanks Dan Anderson for all his work.

Topor states he will update the ordinance and have a final ordinance for the March 22 Village Board Meeting.

- E. TRUSTEE’S REPORT** – Trustee Thompson reports last night the Board approved the easement between the Civic Center and Fire & Wine for the Ped-way. Work is moving along on the parking garage with a completion date of May 1st. The Board is debating a height variance for the Apex project. There are pros and cons for putting mechanical equipment on the roof and it does add more height to the building. Commissioner Zuccherro asks if there are any discussions to bring the tent back. Trustee Thompson replies there will not be a tent on south Main Street due to Apex construction. The compromise would be expanded sidewalk dining.

- F. OTHER BUSINESS** – None

- G. PUBLIC WORKS REPORT** – None.

- H. PROJECT REPORT** – (See attached report) Engineer Daubert reports there will be a preconstruction meeting on Thursday March 11th for Village Green Storm Sewer project.

We are preparing the street resurfacing and street reconstruction projects to go out to bid.

There is another FHWA meeting next Tuesday on the train station. We are making a lot of progress on the historic issue.

We applied to participate in CMAP's pavement management program and will be getting a PCI survey and five-year pavement management plan at no cost to the Village.

Chairman Szymanski asks when the train station will come before the CIC. Engineer Daubert replies, in May we will get everyone up to speed. The Phase II design won't start until next year at the soonest.

Engineer Daubert reports Bob Minix will be officially retiring at the end of this year and we will be looking to hire a new Civil Engineer with at least 5 years of experience. We will be advertising this position. If you know of anyone interested, please let them know about it.

- I. ADJOURNMENT** – Commissioner Zucchero motions and Commissioner Baldin seconds to adjourn the meeting. The meeting was adjourned at 8:47 p.m.

The next meeting is scheduled for April 13, 2021

Submitted by Elisa Pollina, Recording Secretary

Reviewed by Richard Daubert, Professional Engineer

Draft



**Glen Ellyn Capital
Improvements Commission**
535 Duane Street
Glen Ellyn, IL 60137

Meeting 5/11/2021 7:00 PM
Department: Public Works
Department Head: Dave Buckley
Category: Discussion Item
Prepared By: Rich Daubert

**AGENDA ITEM (ID # 2021-
1123)**

DOC ID: 2021-1123

May 2021 CIC Meeting on CBD SUI - Review of Curb Extensions and Exclusive Turn Lane Removals

Statement of the Issue:

Please see the attached memorandum and its associated attachments pertaining to this agenda item.

Analysis:

Budget Impact:

Action Requested:

Attachments:

1. May 2021 CIC Memo on CBD SUI Geometrics
2. 1. Police Chief Memo on CBD SUI 4-30-2021
3. 2. Forest and Pennsylvania Memo - Removal of Northbound Right Turn Lane 4-30-2019
4. 3. Main and Duane Memo - Removal of Southbound Right Turn Lane 12-15-2020
5. 4. Main and Crescent Memo - Removal of Southbound Right Turn Lane 4-30-2019
6. 5. Main and Crescent Memo - Removal of Eastbound Right Turn Lane 12-15-2020
7. 6. Main-Duane and Main-Crescent Exhibits



MEMORANDUM

TO: Capital Improvements Commission

FROM: Rich Daubert, Professional Engineer

DATE: May 7, 2021

RE: CBD Streetscape and Utility Improvements
Review of Curb Extensions and Exclusive Turn Lane Removals

INTRODUCTION

The purpose of this agenda item is to have the Capital Improvements Commission revisit two geometric design elements for the Central Business District Streetscape and Utility Improvements (CBD SUI) Project: curb extensions and exclusive turn lanes.

This request was made by members of the Village Board during their March 22nd consideration and approval of the design ordinance for the project. As part of the deliberation, members of the Board were looking for the Police Chief's input on these items. At said meeting, the Police Chief expressed some concerns with curb extensions, parking losses, and removal of the exclusive turn lanes. As the deliberation started to become somewhat of a spirited debate in the middle of the meeting, Public Works Engineering Staff ultimately suggested it revisit these items collaboratively with the Police Chief and return to the Capital Improvements Commission for direction on the items. The Professional Engineer and Police reviewed these matters in the field with the Police Chief providing formal input on the items in the attachment entitled "1. Police Chief Memo on CBD SUI 4-30-2021".

Staff is ultimately seeking direction from the CIC on these items which will be subsequently presented to the Village Board for final direction.

BACKGROUND

As previously emphasized by staff, the CBD SUI Project offers the Village the opportunity to review making geometric changes to the roadway and sidewalk network in the Central Business District. More specifically, one of the objectives of the project was to review opportunities to make the downtown more pedestrian friendly, incorporating wider sidewalks albeit at the cost of parking, as well as to institute shorter crosswalks where feasible.

SUBJECT

As it relates to this memo, Public Works Engineering Staff directed Civiltech Engineering to complete traffic counts via the use of traffic cameras followed by traffic analysis at the intersections of:

- Forest/Pennsylvania
- Main/Crescent
- Main/Duane

Staff emphasizes that per the attached technical memos, the traffic counts and analysis were completed prior to the onset of the COVID-19 Pandemic. In addition, the traffic counts were verified to be generally consistent with past counts completed in the CBD.

More specifically, staff directed Civiltech to review the traffic impacts of removing exclusive turn lanes at these three intersections. The removal of the turn lanes offered opportunities to install curb extensions and accommodate additional on-street parking. As further detailed later in this memorandum, more explicit benefits of curb extensions are that they improve the lines of visibility between pedestrians and motorists, shorten the distance and time that pedestrians share the roadway with vehicles, prevent vehicles from parking inappropriately close to crosswalks, and calm traffic by reducing the footprint of the roadway.

Expanding on the aforementioned traffic analysis, staff's desire was to objectively communicate how the changes would potentially impact traffic operations at these intersections so that Staff, the Capital Improvements Commission, and Village Board could ultimately weigh the pros and cons of instituting these changes. Based on discussions with the Police Chief, his primary concerns are associated with the intersection of Main and Crescent. However, each intersection will individually be revisited below as to comprehensively approach the topic at hand. Following the narratives on each intersection, there are other general considerations to be reviewed.

Intersection of Forest/Pennsylvania

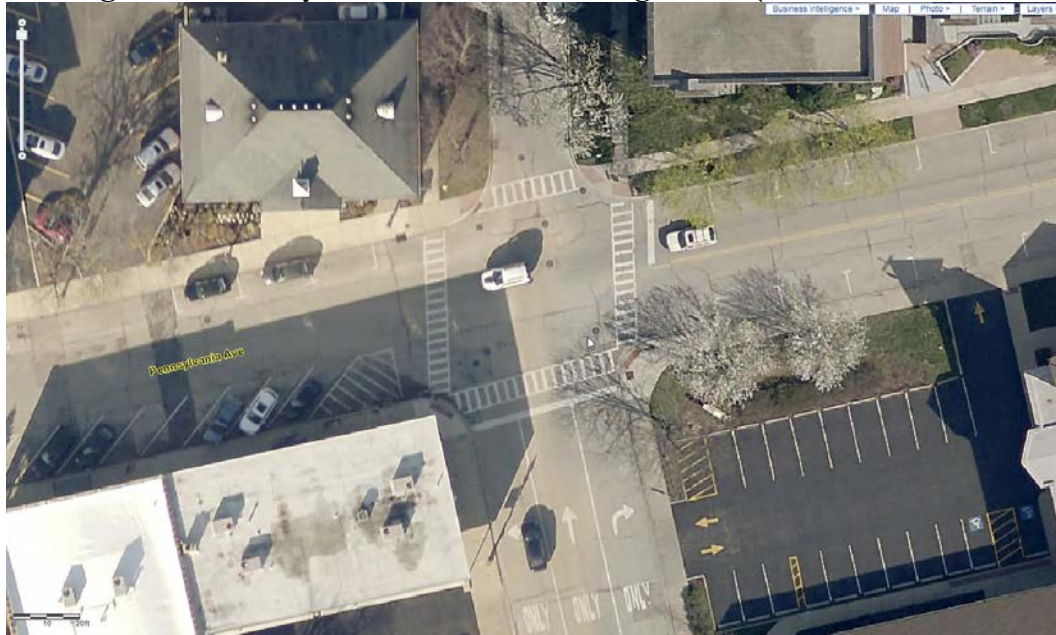
Proposed Changes: The proposed changes to this intersection include:

- A curb extension at the southwest corner of the intersection
- Consolidation of the three northbound vehicular travel lanes located at the south leg of the intersection into two vehicular travel lanes.

Per the existing conditions exhibit below, there are three existing northbound vehicular travel lanes at the south leg of the intersection. This includes:

- An exclusive left turn lane
- An exclusive thru lane
- An exclusive right turn lane

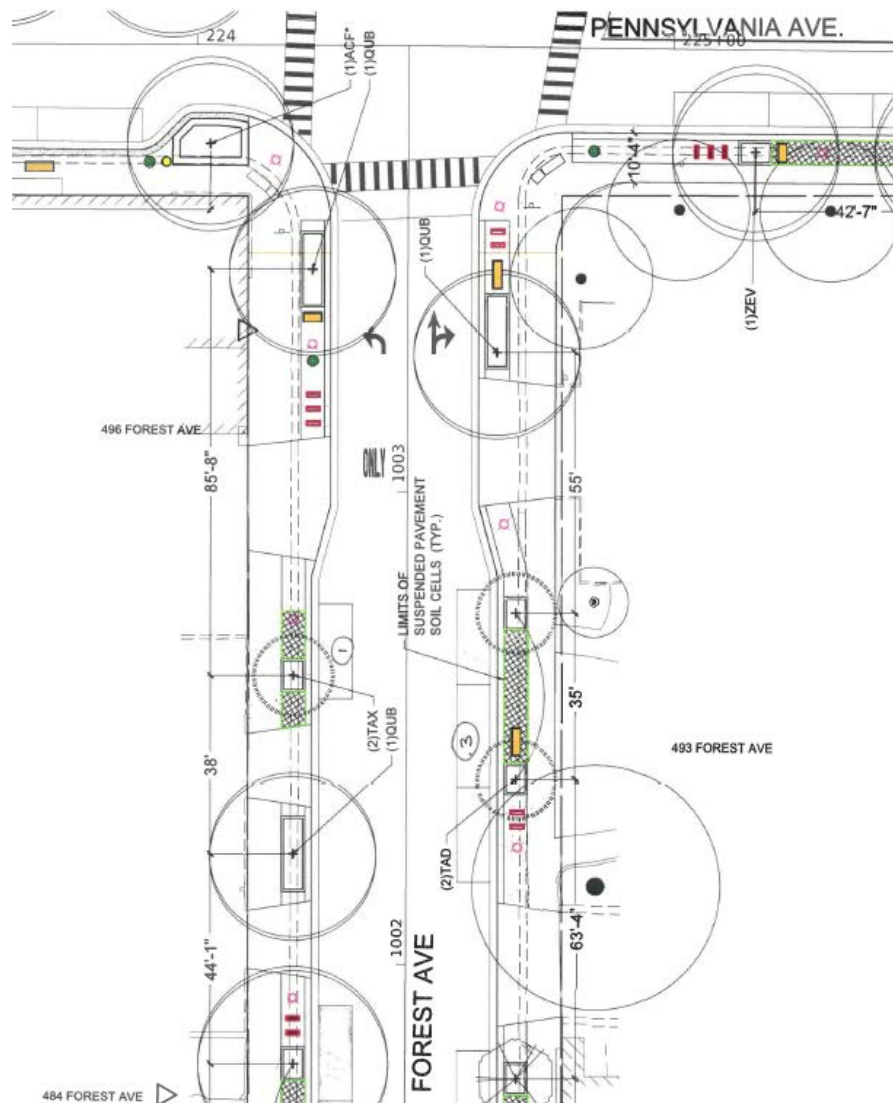
Existing Forest/Pennsylvania Intersection Configuration (2016 Aerial With North Up)



The proposition is to combine the exclusive thru and exclusive right turn lanes into a single shared thru/right turn lane. In other words, the proposed condition will include:

- An exclusive left turn lane
- A shared thru and right turn lane

Proposed Forest/Pennsylvania Intersection Configuration With North Generally Up



Forest/Pennsylvania Intersection Change Pros, Cons, Analysis, and Recommendations

Pros: The pros for these changes are that they allow for the roadway to be narrowed and sidewalk to be widened at the south leg of the intersection. This shortens the crosswalk by approximately fifteen feet (15') (a 4.3 second reduction in pedestrian time in the roadway) and provides room for a larger tree and streetscape elements (benches and bike racks). Likewise benefits occur at the west and north legs of the intersection where the crosswalks are respectively shortened by seventeen feet (17') (a 4.9 second reduction in pedestrian time in the roadway) as well as five feet (5') (a 1.4 second reduction in pedestrian time in the roadway). As previously noted, more explicit benefits of curb extensions are that they improve the lines of visibility between pedestrians and motorists, shorten the distance and time that pedestrians share the roadway with vehicles, prevent vehicles from parking inappropriately close to crosswalks, and calm traffic by reducing the footprint of the roadway.

Cons: The potential con of these changes is the removal of an exclusive right turn lane at the south leg of the intersection which could potentially impact the intersection performance. However, this was assessed and is further discussed below. In addition, reversing these changes would come at a significant cost and inconvenience to the public.

Traffic Analysis: As further detailed in attachment "2. Forest and Pennsylvania Memo – Removal of Northbound Right Turn Lane 4-30-2019", computerized traffic analysis (synchro analysis) was completed to determine the intersection level of service, delay, and 95th percentile queues. The analysis demonstrates that the intersection level of service is not degraded by these changes. Instead, there are slight improvements in terms of delay and queuing at the intersection.

Recommendation: While not formally commemorated in the attached memorandum from the Police Chief, the Public Works Professional Engineer did discuss these changes with the Police Chief not having any strong opposition to this change. Based on the evaluation of the pros, cons, analysis, and Police Chief Input, Public Works Engineering Staff recommends the proposed changes to the Forest/Pennsylvania intersection including the consolidation of the three existing vehicular travel lanes at the south leg of the intersection into an exclusive left turn and shared thru/right turn lane including curb extensions.

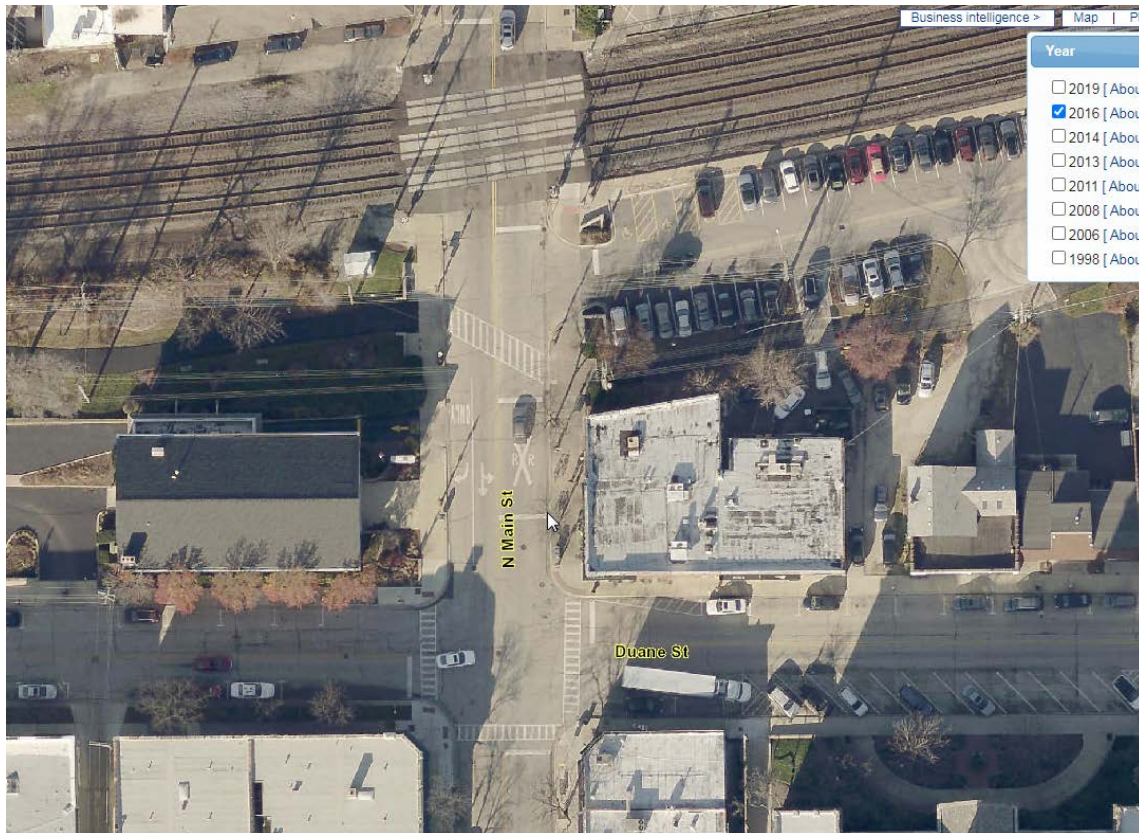
Main/Duane Intersection

Proposed Changes: The proposed changes to this intersection include:

- A curb extension across the west leg of the intersection (at the southwest corner)
- While not a curb extension, sidewalk widening is also proposed on Duane Street east of the intersection which in turn will shorten the crosswalk at the east leg of the intersection
- Consolidation of the two southbound vehicular travel lanes at the north leg of the intersection into a shared thru/left/right turn lane

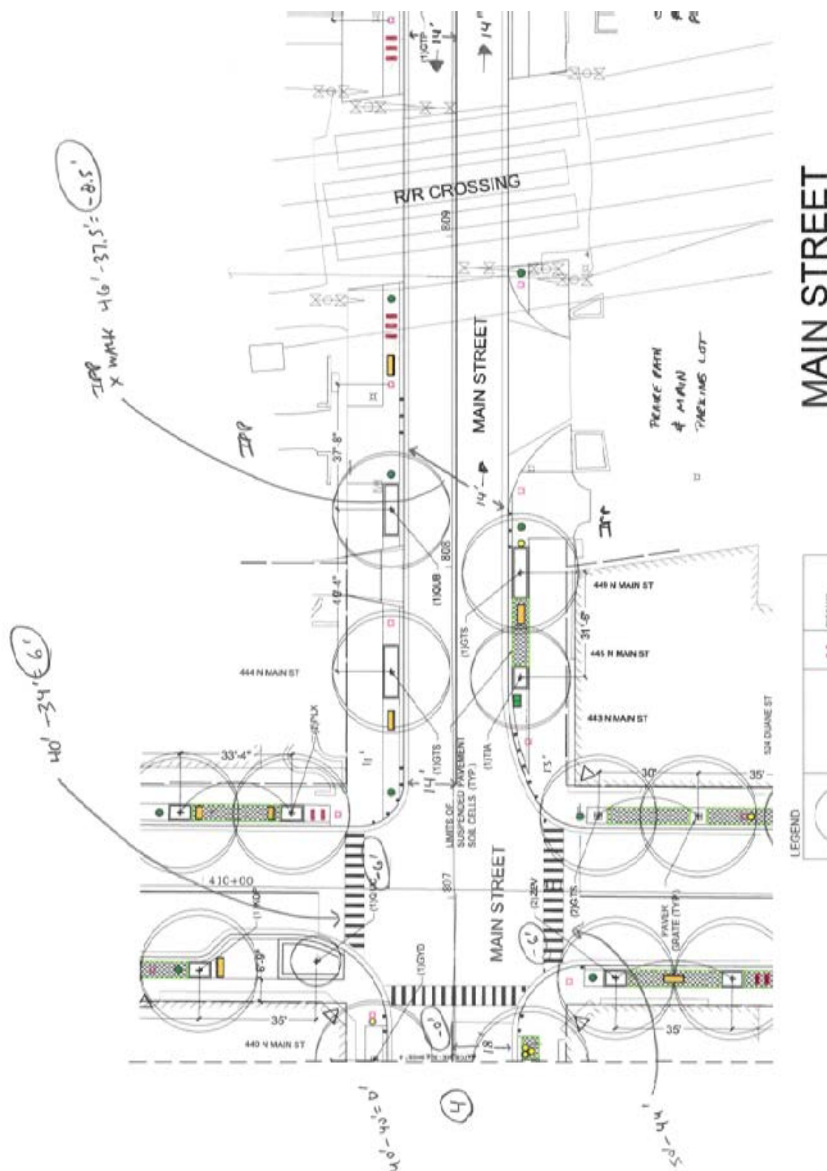
Per the existing conditions below, there are two existing southbound vehicular travel lanes at the north leg of the intersection: an exclusive right turn lane and a shared thru/left turn lane. The proposition is to combine these two lanes into a shared thru/left/right turn lane.

Existing Main/Duane Intersection Configuration (2016 Aerial with North Up)

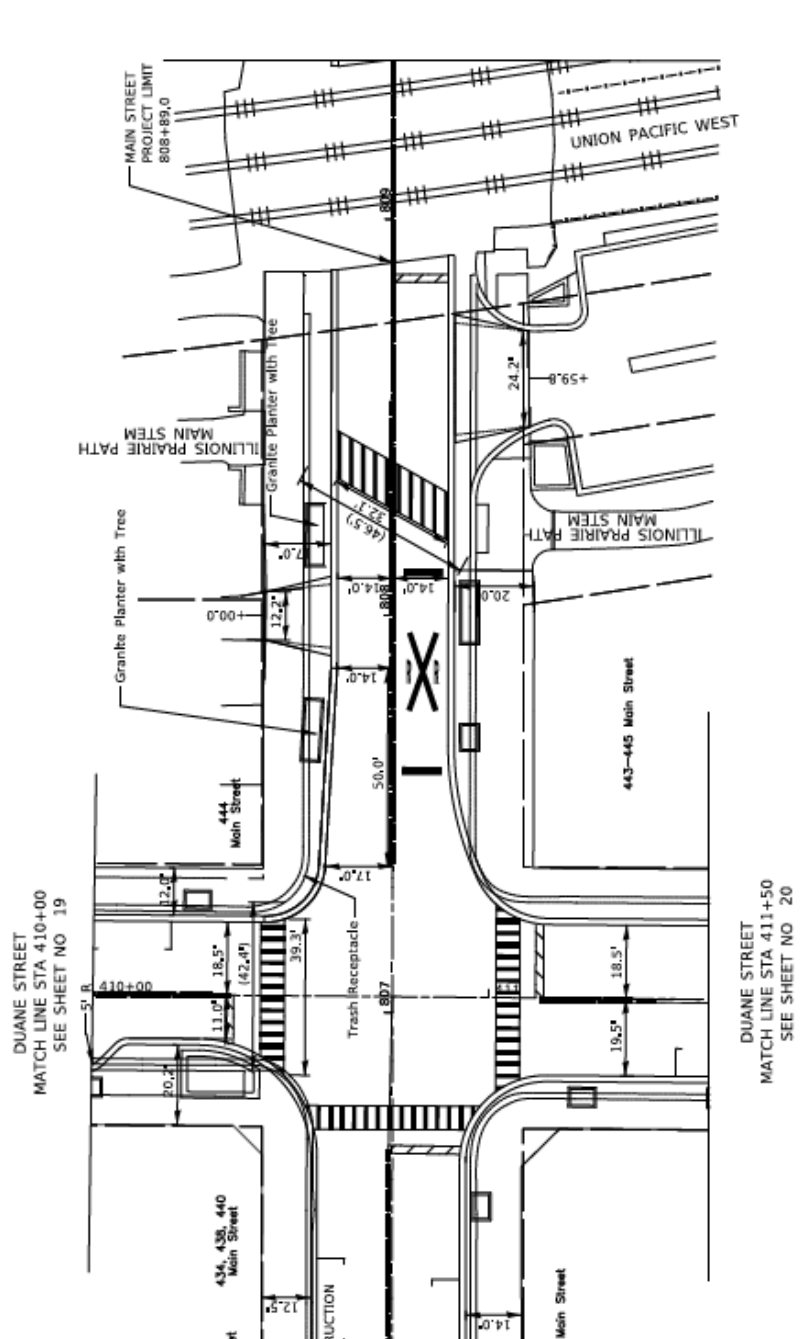


Two alternatives were considered for the aforementioned lane consolidation. The “Originally Proposed” alternative depicted hereinafter involved a consistent 14’ wide vehicular lane whereas the “Revised Proposed” alternative included a taper at the corner to provide an “escape” to satisfy Police Department concerns with potential traffic queuing of southbound vehicular traffic back across the UP-West Line.

Originally Proposed Main/Duane Intersection Configuration With North Up



Revised Proposed Main/Duane Intersection Configuration With North Up



Main/Duane Intersection Change Pros, Cons, Analysis, and Recommendations

Pros: The pros for these changes are that they allow for the roadway to be narrowed and sidewalk area to be widened at the north leg of the intersection. This shortens the crosswalk for the Illinois Prairie Path by approximately 8' (a 2.3 second reduction in pedestrian time in the roadway) and offers more room for streetscape elements (trees, benches, and bike racks). The geometric changes to Duane Street at the west and east legs of the intersection shorten the crosswalks by 6' each (a 1.7 reduction in pedestrian time in the roadway). As previously noted, more explicit benefits of the curb extension at the southwest corner of the intersection is that it improves the lines of visibility between pedestrians and motorists, shortens the distance and time that pedestrians share the roadway with vehicles, prevents vehicles from parking inappropriately close to the crosswalk, and calms traffic by reducing the footprint of the roadway.

Cons: The potential con of these changes is the removal of an exclusive southbound right turn lane at the north leg of the intersection which could potentially impact the intersection performance. However, this was assessed and is further discussed below.

Analysis: As further detailed in attachment "3. Main and Duane Memo – Removal of Southbound Right Turn Lane 12-15-2020", traffic counts were completed and video footage of the peak hours reviewed to determine the extent of conflicts between pedestrians and southbound right turning vehicles at the west leg of the intersection. The review yielded that there were no times during peak hours at which southbound right turning vehicles had to wait to turn right due to pedestrians in the crosswalk. Minimal impacts would be expected with the changes based on the aforementioned.

Recommendation: Based on the evaluation of the pros, cons, and analysis, Public Works Engineering Staff recommends the proposed change. While not formally commemorated in the attached memorandum from the Police Chief, collaboration among the Police Chief and Professional Engineer yielded support of the changes in the context of the "Revised Proposed" alternative being instituted. Hence, the "Revised Proposed" alternative is recommended.

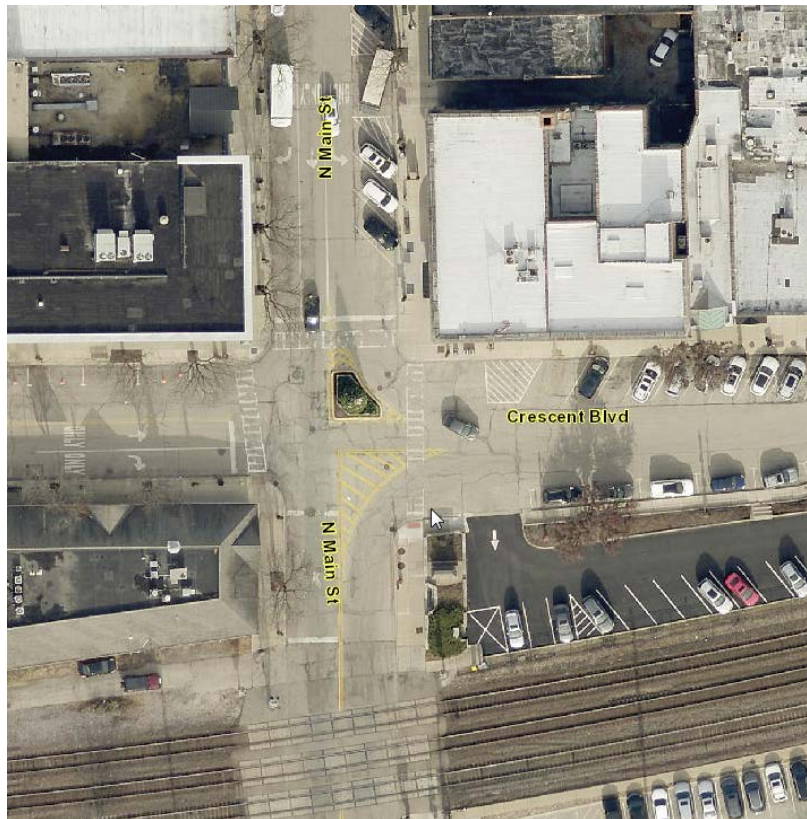
Main/Crescent Intersection

Proposed Changes: The proposed changes to this intersection include:

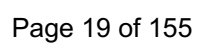
- At the north leg of the intersection, consolidation of the southbound vehicular exclusive right turn lane and exclusive thru lane into a shared thru/right turn lane
- At the west leg of the intersection, consolidation of the eastbound vehicular exclusive right turn lane and exclusive thru lane into a shared thru/right turn lane
- Curb extensions at the northeast, northwest, and southwest corners of the intersection
- While not a curb extension, sidewalk widening is also proposed on Crescent east of the intersection which in turn will shorten the crosswalk at the east leg of the intersection

Per the existing conditions exhibit below, there are three existing southbound vehicular travel lanes at the north leg of the intersection: an exclusive right turn lane, an exclusive thru lane, and a left turn lane. At the west leg of the intersection, there is an exclusive right turn lane and an exclusive thru lane.

Existing Main/Crescent Intersection Configuration (2019 Aerial with North Up)



Proposed Main/Crescent Intersection Configuration With North Up



Main/Crescent Intersection Change Pros, Cons, Analysis, and Recommendations

Pros: As previously discussed with the CIC, Public Works Engineering Staff was looking for areas to accommodate additional on-street parking. In this regard, the removal of these turn lanes will offer at least 5 additional parking spaces, two (2) on the west side of Main Street, north of Crescent and three (3) on the south side of Crescent, west of Main Street. Details are being confirmed on the placement of fire hydrants which may allow for a 6th parking space to be accommodated at the north leg of the intersection. An added benefit to the addition of the parking on the south side of Crescent west of Main is that it allows for a curb extension to be installed at the southwest corner of the intersection. In tangent with the curb extension at the northwest corner of the intersection, this allows the crosswalk at the west leg of the intersection to be shortened by thirteen feet (13') (a 3.7 second reduction in pedestrian time in the roadway). The curb extension at the northeast corner of the intersection will shorten the crosswalk at the north leg of the intersection by approximately 5' (a 1.4 second reduction in pedestrian time in the roadway). The geometric changes will also shorten the crosswalk at the east leg of the intersection by 13' (a 3.7 second reduction in pedestrian time in the roadway). With over 200 pedestrians and 1,100 vehicles entering and interacting in the intersection in the morning and afternoon peak hours, consolidation of traffic lanes and shortening of the crosswalks will make the intersection more accommodating to pedestrians. As previously noted, more explicit benefits of the curb extensions are that they improve the lines of visibility between pedestrians and motorists, shortens the distance and time that pedestrians share the roadway with vehicles, prevents vehicles from parking inappropriately close to the crosswalk, and calms traffic by reducing the footprint of the roadway.

Cons: The con of these changes is that the removal of the exclusive right turn lanes does have some impacts to vehicles using the intersection which are further outlined in the narrative below. Elaborating on this and getting into the details outlined in the Police Chief's memo, the exclusive turn lanes do under certain scenarios, provide opportunities for vehicles to avoid getting stuck in queues and in particular continue to travel eastbound on Crescent Boulevard. Another con is that the changes at the southwest corner of the intersection will not easily be undone; alternatively, the removal of the southbound right turn lane at the north leg of the intersection; i.e. its conversion into parking could more easily be undone simply by restriping the roadway.

Southbound Right Turn Lane Removal Analysis: As further detailed in attachment "4. Main and Crescent Memo – Removal of Southbound Right Turn Lane 4-30-2019", traffic counts were completed with both synchro analysis and video footage reviewed to assess the performance of the intersection under the existing and proposed geometry. The review yielded that the intersection is performing well and that the removal of the southbound right turn lane will not materially affect the intersection level of service during non-gate down (conflicting train traffic) times. When the railroad gates are down, review of the video footage was utilized to understand how the removal of the southbound right turn lane would impact traffic operations of the intersection. In summary, the high volume of southbound Main Street Traffic quickly renders use of the southbound right turn lane useless under gate down times. Of other consideration, once the gates go up and traffic starts to clear the intersection, the right turn lane does offer some storage for vehicles to wait for pedestrians crossing the west leg of the intersection and not block thru southbound traffic. However, right turning volumes are so low (During the morning peak hour

~2% of the total traffic approaching from the north leg of the intersection with the percentage in the afternoon peak hour being 4.8%) that minimal impact in the form of queuing is expected.

Eastbound Right Turn Lane Removal Analysis: As further detailed in attachment “5. Main and Crescent Memo – Removal of Eastbound Right Turn lane 12-15-2020”, traffic counts were completed with both synchro analysis and video footage reviewed to assess the performance of the intersection under the existing and proposed geometry. The review yielded that the intersection is performing well and that the removal of the eastbound right turn lane will not materially affect the intersection level of service during non-gate down (conflicting train traffic) times. When the railroad gates are down, review of the video footage was utilized to understand how the removal of the eastbound right turn lane would impact traffic operations of the intersection. In summary, during the morning and afternoon peak hours, the more limited gate down times allowed during commuter rail traffic would not result in queuing of vehicles back through the intersection of Main/Crescent as to block eastbound thru traffic across the intersection. However, during extended gate down times due to freight traffic (which predominantly occurs during non-vehicle rush hours when traffic volumes are lower), observations of a selected mid-morning, early afternoon, and mid-afternoon freight train events did causing queuing back into the intersection. However, the number of vehicles queuing during these times was low with five vehicles queuing mid-morning, seven in the early afternoon, and five in the mid-afternoon. Of the 17 vehicles that queued, only 5 vehicles ultimately drove east through the intersection; i.e. only 5 vehicles would have been impacted with the removal of the turn lane under these conditions.

In terms of train traffic, prior to the COVID-19 pandemic, the UP-West line experienced approximately 50 freight trains daily with approximately 60 passenger trains. In recent discussions with UP, the number of freight trains was down due to the pandemic but freight demand is starting to rise again. Overall, UP staff noted that added freight demand is not necessarily going to add to the number of trains they run. Rather, the railroad is optimizing the length of trains to move current and projected traffic while working to minimize overall gate down time. This is consistent with this writer’s observations of trains in the CBD. Having said this, in terms of the aforementioned analysis and Police Chief’s input on this matter, it is certainly plausible that some additional vehicles could be impacted by the removal of the eastbound right turn lane at Crescent and Main.

Recommendation: As summarized in the Police Chief’s Memo, there are some hesitations with making any changes to this particular intersection in terms of eliminating the right turn lanes and instituting the curb extensions. While Public Works Engineering Staff understands and appreciates some of the concerns, we respectfully feel otherwise on the holistic improvements offered by the changes. In this regard, we feel that it is important for the CIC to have a spirited discussion and deliberation on the information at hand with staff from Public Works and Police present to provide their input on the pros and cons and to facilitate a decision by the CIC.

As part of the CIC’s consideration, in addition to feedback from the Police Chief, the Fire Chief has provided feedback on this topic stating: “The only concern with that stretch of Main Street is the ability to get around traffic backed up at the railroad crossing. Since the existing right turn lane is fairly short, I don’t think it really helps that much in this regard, but it does give motorists a little space to pull to the right when we come through. Usually, we end up using the left lane to pass

traffic and go around the east side of the hose trough going south. That lane tends to be clearer as traffic turning left is not restricted. That path is important going east also when the gates are closed, so anything that can be done to segregate the two southbound lanes to prevent traffic heading across the tracks from blocking the left lane would be good. If emergency vehicles were heading west, it's very unlikely they would use the turn lane. So eliminating the right turn lane doesn't seem to be a problem.”

Staff also solicited input from nearby businesses on removal of the right turn lanes. Feedback in support of the changes noted: “I like the idea of more parking. The turn lane isn’t always used that often and any traffic has a long distance without blocking other businesses like what happens when the train blocks traffic to the north on Main. If anything it will make things safer without a car being able to pass the turning car going to the east.” with another adjacent business likewise supporting the added parking and curb extensions. Past discussions with one retail business on the east side of Main Street did express concern with the removal of the southbound right turn lane. Said business owner noted concern with the loss of the right turn lane for loading of trucks. Staff does have a solution for this whereby the parking spaces can be signed for loading use outside of peak hours.

Additional Narrative On Curb Extensions

As summarized in this memorandum, the benefits of curb extensions are that they improve the lines of visibility between pedestrians and motorists, shortens the distance and time that pedestrians share the roadway with vehicles, prevents vehicles from parking inappropriately close to the crosswalk, and calms traffic by reducing the footprint of the roadway.

Having said this, there are important considerations in implementing curb extensions which are accounted for in Civiltech’s design of the CBD SUI project:

- Curb extensions should only be used in areas where there is on-street parking and where transit and bicyclists would be traveling outside of the curb edge for the length of the street.
- As curb extensions offer room for streetscape elements, care needs to be taken to ensure that street furniture and landscaping do not obstruct motorists’ view of pedestrians and vehicular traffic.
- The turning needs of larger vehicles must not be compromised by turning extensions.
- Curb extensions add a layer of consideration in terms of roadway drainage. Grading and incorporation of drainage structures must be closely looked at by the engineer of record
- They can complicate maintenance of the roadways (street sweeping and snow removal)

Development Traffic

A valid and recurring question relating to this item is whether or not the vehicular traffic generated by Apex 400, Avere on Duane, and Glenwood Station Developments have been taking into consideration. The short answer is yes. To put it into context for the CIC, the traffic impact studies were reviewed with the Avere on Duane Street Development (48 residential units across from the Glen Ellyn Public Library) having a net reduction in traffic compared to the previous land uses. In terms of Apex 400 (107 residential units and ~9,000 square feet of ground floor commercial) and the Glenwood Station (86

residential units and ~1,500 square feet of retail) Developments, it is anticipated that the 2025 base design year traffic at the intersection of Main/Crescent will increase by approximately 2.3% in the morning and 3.6% in the evening peak hours. In terms of the ratio of Development Traffic to the Total Intersection Traffic, Apex 400 and Glenwood Station generated trips are only 2.2% of the total traffic in the morning and 3.5% in the evening. Looking specifically at the eastbound Crescent Boulevard approach to Main Street, the Glenwood Station Development is anticipated to generate 6 cars in the am peak hour (4.2% of the traffic for this specific approach) and 5 cars in the pm peak hour (3.6% of the traffic for this specific approach).

Traffic and Safety Considerations

This writer wants to emphasize that these specific improvements/changes to the 3 subject intersections in this memorandum are not necessarily make or break improvements that will in one way or another impart undue burden to the motoring public nor result in drastic increases in safety for pedestrians. Having said this, safety is not just about reactively addressing accidents or having to prove that there are correctable accidents warranting changes. The Federal Highway Administration simply defines safety as the absence of risk or danger. FHWA also notes that safety problems may exist even in locations that do not have a demonstrated history of crashes. While the proposed improvements have merit to reducing risk for pedestrians in the Glen Ellyn CBD, it is likewise important to consider if the improvements create any greater risk for motorists and/or pedestrians. The objective analysis shows that minimal motorists will be impacted by these changes with no objective data supporting subjective concerns of delay and driver frustration. No evidence has also been presented that these changes will result in traffic avoiding the Glen Ellyn Central Business District and adversely impacting the economic viability of the Downtown. Instead, there are documented case studies proving otherwise that complete streets and promoting pedestrian conveniences have economic benefits.

Village's Complete Streets Resolution and FY 2020-2022 Strategic Plan

One of the goals of the Village, as commemorated in Village Resolution 19-03, is to institute complete streets as to accommodate the surface transportation needs of all users including: motorists, pedestrians, bicyclists, public transportation riders and drivers, emergency vehicles and promote a more livable community for all people of all ages and abilities, including children, youth, families, older adults, including those with disabilities. The Village's FY 2020-2022 Strategic Plan Summary also includes specific outcomes, indicators, and targets to provide a transit oriented downtown with ADA improvements and optimization of Parking. Making these types of improvements to the 3 subject intersections supports these initiatives.

Economic Benefits

Per the safe routes to school national partnership, a significant benefit of creating complete streets are the economic impacts. More specifically:

- Studies have shown that bicyclists and pedestrians shop more often and spend more money in their communities than those who drive
- Investments in bicycle and pedestrian infrastructure create more jobs per million dollars spent than highway projects. Bicycle and pedestrian projects produce 9.6-11.4 jobs per million dollars spent compared to only 7.8 jobs created by road projects only.

- Neighborhoods that invest in bicycle and pedestrian infrastructure have higher property values and increased sales tax revenue.
- Fuel and transportation savings allow residents to spend more in their local economies.

Diversity, Equity, and Inclusion

As it relates to Diversity, Equity, and Inclusion, many cities are becoming more sensitive to the fact that underserved populations are more reliant on pedestrian/public transit infrastructure with startling higher fatality rates. The National Complete Streets Coalition states that the pedestrian fatality rate for Latinos is over 60 percent higher than the rate for whites and the rate for African Americans is almost 75 percent higher than for whites. Latino children are 40 percent more likely than white children to be killed while walking, and the African American pedestrian fatality rate for children is more than twice that of their white peers. In response, local metros such as the City of Milwaukee and City of Chicago are more aggressively instituting complete streets into public projects with specific goals of supporting greater equity and inclusion for historically underserved populations. While the Village of Glen Ellyn has relatively complete pedestrian infrastructure throughout the Village, there are many opportunities within the CBD improve the pedestrian infrastructure as to address insufficient sidewalk widths, excessive cross slope, general deterioration, and improve overall accessibility. In summary, improving the pedestrian infrastructure is a way in which the Village can further support Diversity, Equity, and Inclusion.

ACTION REQUESTED

Public Works Engineering Staff respectfully requests the Capital Improvements Commission revisit the proposed changes at the intersections of Forest/Pennsylvania, Main/Duane, and Main/Crescent as to consider the concerns of the Glen Ellyn Police Chief regarding the proposed changes. We respectfully request a spirited dialogue as to consider the outlined pros and cons of the changes. We also invite any further input on potentially overlooked concerns. Our ultimate goal is to whether at this meeting or the June meeting, solicit recommendations in the form of motions from the Capital Improvements Commission on the proposed changes.

LIST OF ATTACHMENTS

1. Police Chief Memo on CBD SUI 4-30-2021
2. Forest and Pennsylvania Memo – Removal of Northbound Right Turn Lane 4-30-2019
3. Main and Duane Memo – Removal of Southbound Right Turn Lane 12-15-2020
4. Main and Crescent Memo – Removal of Southbound Right Turn Lane 4-30-2019
5. Main and Crescent Memo – Removal of Eastbound Right Turn Lane 4-30-2019
6. Main-Duane and Main-Crescent Exhibits

MEMORANDUM

To: Mark Franz, Village Manager
Rich Daubert, Village Engineer

From: Philip J. Norton, Chief of Police

Date: April 30, 2021

Re: CBD Streetscape Plan



Background

Recently I was asked by Village Board Trustees to give my opinion about certain aspects of the Central Business District street scape plan.

Specifically, my focus will be the intersection of Main Street and Crescent Boulevard, and to a lesser extent, Main Street and Duane Street and proposed “bump-outs”

I have met on-site with Rich Daubert, Village Engineer, to discuss this project. I believe I understand the issues and the intention of the “bump outs” to be primarily of safety, concerning the following:

- Shortening the time pedestrians are in the street.
- Reduce conflicting movements (basically, lanes of traffic).
- Make pedestrians more visible to the motoring public.

I looked at all vehicle vs. pedestrian accidents since 2009 at or near the intersection of Crescent Boulevard and Main Street. There are a total of 7 such accidents. Arguably, none of the accidents would have been prevented with the proposed “bump-outs”.

History

I have had the opportunity to closely observe the traffic pattern of vehicles and pedestrians in the Central Business District for over three and a half decades. I have paid closer attention recently due to construction projects and multiple parking changes.

The Central Business District is bifurcated by three sets of railroad tracks. The combinations of tracks handle passenger and freight traffic. Well over 100 trains per day travel through the CBD. In the absence of trains, vehicular traffic moves well in the Central Business District. It is not uncommon for multiple trains to travel through our CBD at nearly the same time, creating longer blockages at the grade crossings.

Between Glen Ellyn and Lombard a stretch of over a mile of railroad tracks is used frequently to park or “stage” trains as they await clearance to move to the intermodal station. It is also not uncommon for trains to stop or slow while they attempt to come to rest or leave this stretch of tracks, which also causes longer than usual delays at our crossings.

Observation of vehicular traffic during blocked crossings reveals cars changing intended course in an attempt “to keep moving” or drive closer to their intended destination within the limitations of the blocked crossings. They also attempt to direct themselves to our vehicular underpass at Taylor Avenue, which was recently improved (widened by removing a sidewalk) and made more attractive for motorists.

Issues

Bump-outs as designed in the streetscape plans would clearly limit the ability for vehicular traffic to maneuver when trains are blocking the crossings. The more limiting the lanes become, the less traffic that can move. This will lead to much greater driver frustration and higher degrees of “gridlock” as traffic backs up with nowhere to go. As I have mentioned, it is similar to squeezing a water hose; no matter what the pressure of the hose, by squeezing it you are negatively impacting the flow of water.

Driver frustration exists today as evidenced by on-going discussions of a vehicular underpass or overpass. While it can be argued that such a project is not necessary and current driver frustrations may be acceptable, any increase to such frustrations likely will result in adverse outcomes. While I am not an economic development expert, it seems logical that we would want to avoid creating an environment where traffic seeks to circumvent our business district.

Additionally, in today’s world, there exists very well organized trucking, commerce and delivery systems, such as Fed Ex and UPS. These companies make regular, multiple trips a day to our CBD, in support of our local businesses. Eliminating lane space will impact their ability to make these deliveries and /or create additional blockages that will exacerbate the gridlock/frustration issue.

The Volunteer Fire Company also resides in the Central Business District. Any additional traffic back-up will, of course, impede their ability to get where they need to go in a timely manner.

Recommendation

It is my recommendation, for the reasons enumerated above, that the bumps-outs be eliminated from the streetscape plans.

I would be happy to discuss this further.



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Transportation

Civil

Construction

Environmental

Water Resources

Structural

Appraisal

Technical Memorandum

Date: April 30, 2019
To: Rich Daubert, P.E.
Village Engineer
Village of Glen Ellyn
From: James R. Woods, P.E., PTOE
Anmol Shrivastava, P.E.
Civiltech Engineering, Inc.
Re: Forest Avenue and Pennsylvania Avenue
Northbound Right Turn Lane Reduction Traffic Study

At the Village's request, Civiltech has performed a brief study to analyze the feasibility of removing the exclusive northbound right turn lane at the intersection of Forest Avenue/Pennsylvania Avenue. The proposed lane configuration on the south leg of Forest Avenue is a left turn lane and a shared through/right lane. This lane consolidation would allow for the provision of pedestrian bumpouts making the pedestrian crossing narrower.

In order to evaluate traffic operation under existing and future scenarios, intersection capacity analyses were completed using Synchro, which is a macroscopic software model that estimates the Level of Service (LOS) and average delay per vehicle.

The ability of an intersection to accommodate traffic flow is expressed in terms of Level-of-Service (LOS), which is assigned a letter grade from A to F based on the average control delay experienced by vehicles passing through the intersection. Control delay is that portion of the total delay attributed to the stop sign control operation, and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Level-of-Service A is the highest grade (best traffic flow and least delay), Level-of-Service E represents saturated or at-capacity conditions, and Level-of-Service F is the lowest grade (oversaturated conditions, extensive delays).

I. Existing and Proposed Intersection Configurations

Forest Avenue and Pennsylvania Avenue is a stop-controlled intersection. The north leg of Forest Avenue is a single-lane one-way street (northbound) with on-street parallel parking on the east side. The east leg is a single lane two-way street with on-street parallel parking on the south side and north side. The south leg is a single lane two-way street with on-street parallel parking on the west side and diagonal parking on the east side. There is currently an exclusive left turn lane (with 75 feet of storage), a through lane, and a right turn lane (with 75 feet of storage) on the south leg of the intersection. The west leg is a single lane one-way street (westbound) with on-street diagonal parking on the south side and parallel parking on the north side.

The proposed revised lane configuration involves consolidating the northbound right turn lane and through lane into a shared right-through lane. In place of the right turn lane, sidewalk widening and pedestrian bumpouts are proposed on the east and west sides of the street.

II. Existing Traffic Conditions

In order to quantify current traffic conditions in the vicinity of the site, peak hour traffic volumes at the intersection of Forest Avenue and Pennsylvania Avenue was used. The traffic counts were conducted in 2012 by KLOA as part of the Central Business District Study. Based on a comparison of these counts with other nearby recent counts conducted by Civiltech, we anticipate that volumes at Forest/Pennsylvania have not changed significantly since 2012. The traffic counts show that the weekday morning peak hour of traffic occurs from 7:00 to 8:00 a.m. and the weekday evening peak hour of traffic occurs from 4:00 to 5:00 p.m. **Exhibit 1** illustrates existing peak hour traffic volumes. It should be noted that the northbound left turn volume is relatively high, consisting of 70% of the total traffic volume on the south leg.

III. Synchro Analysis

Synchro analysis for the morning and evening peak hours were conducted under the following conditions:

1. Existing Geometry
2. Proposed Geometry

The two conditions are discussed below.

Existing Geometry

The Synchro analysis indicates that the intersection of Forest Avenue and Pennsylvania Avenue is operating well with minimal delay and queuing during the weekday morning and evening peak hours. The results of the analysis are summarized in **Table 1** below:

Table 1: Capacity Analysis Results –Existing Geometry

Intersection	Weekday AM Peak			Weekday PM Peak		
	LOS	Delay (sec)	95 th Percentile Queue (veh)	LOS	Delay (sec)	95 th Percentile Queue (veh)
Forest Avenue and Pennsylvania Ave						
Overall	B	11.3	-	C	15.7	-
Eastbound Approach	-	-	-	-	-	-
Westbound Approach	B	11.8	2.0	C	17.1	4.2
Northbound Approach	B	10.9	1.6	B	14.5	3.3
Southbound Approach	-	-	-	-	-	-

The Levels of Service are well within an acceptable range for all movements. The detailed existing conditions results are contained in **Appendix A**.

Proposed Geometry

A Synchro analysis conducted with the proposed lane configuration indicates that the proposed intersection of Forest Avenue and Pennsylvania Avenue will continue to operate well with minimal delay and queuing during the weekday morning and evening peak hours. The results from the Synchro analysis are highlighted in **Table 2** below:

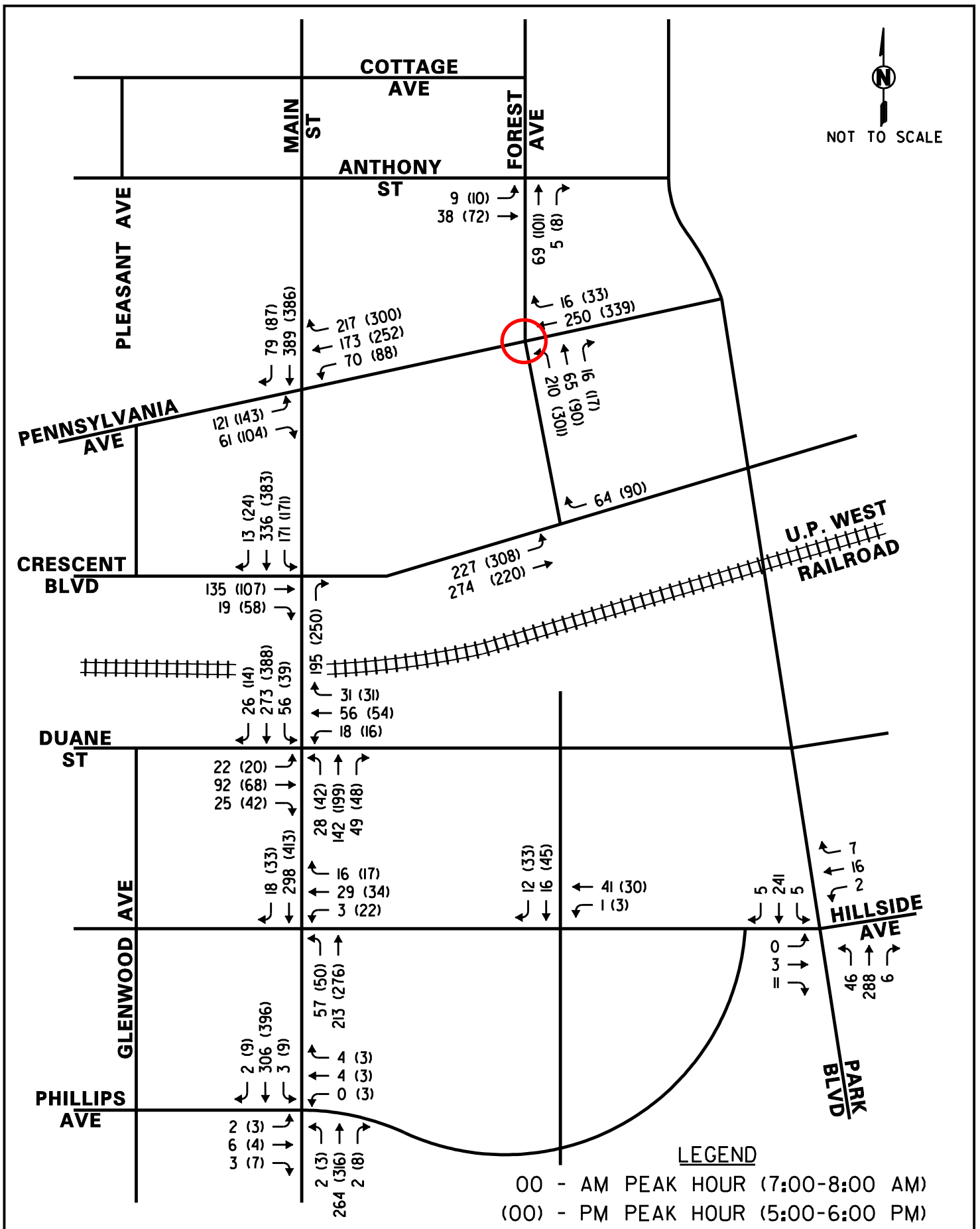
Table 2: Capacity Analysis Results –Proposed Geometry

Intersection	Weekday AM Peak			Weekday PM Peak		
	LOS	Delay (sec)	95 th Percentile Queue (veh)	LOS	Delay (sec)	95 th Percentile Queue (veh)
Forest Avenue and Pennsylvania Ave						
Overall	B	10.6	-	B	13.9	-
Eastbound Approach	-	-	-	-	-	-
Westbound Approach	B	10.4	1.7	B	14.0	3.3
Northbound Approach	B	10.7	1.6	B	13.9	3.1
Southbound Approach	-	-	-	-	-	-

Because the northbound right turn volume is so low, delays and Levels of Service are projected to be very similar and may even slightly improve if the exclusive right turn lane is removed. Additionally, the 95th percentile queue for the northbound lane is projected to be two vehicles during the a.m. and three vehicles for the p.m. peak hours, which is well within an acceptable range for a stop-controlled intersection. The detailed proposed conditions results are contained in **Appendix B**.

IV. Recommendations and Conclusions

Based on the results of the capacity analyses as well as our field observations, Civiltech recommends reconfiguring the south leg of Forest Avenue at Pennsylvania Avenue to consolidate the three existing lanes to a left turn lane and a shared through/right lane. The delays and queue lengths would remain similar during the morning and evening peak hours while the operation of the intersection would improve. This is because drivers on the east approach would have a more intuitive condition regarding their right-of-way because they would only be navigating two lanes of stopped traffic on the south approach rather than three. Additionally, removal of the right turn lane would allow for wider sidewalks and pedestrian bump-outs at the intersection. This will improve safety, particularly for pedestrians crossing the south leg, as the distance they would be exposed to motorized traffic would be significantly reduced.



PROJECT: CENTRAL BUSINESS DISTRICT TRAFFIC STUDY GLEN ELLYN, ILLINOIS	TITLE: EXISTING PEAK HOUR TRAFFIC VOLUMES	PROJECT NO: 10-125  FIGURE NO: 4
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Appendix A

Intersection

Intersection Delay, s/veh	11.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	250	16	210	65	16	0	0	0
Future Vol, veh/h	0	0	0	0	250	16	210	65	16	0	0	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	263	17	221	68	17	0	0	0
Number of Lanes	0	0	0	0	1	0	1	1	1	0	0	0

Approach	WB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	NB	
Conflicting Lanes Left	3	0
Conflicting Approach Right		WB
Conflicting Lanes Right	0	1
HCM Control Delay	11.8	10.9
HCM LOS	B	B

Lane	NBLn1	NBLn2	NBLn3	WBLn1
Vol Left, %	100%	0%	0%	0%
Vol Thru, %	0%	100%	0%	94%
Vol Right, %	0%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	210	65	16	266
LT Vol	210	0	0	0
Through Vol	0	65	0	250
RT Vol	0	0	16	16
Lane Flow Rate	221	68	17	280
Geometry Grp	7	7	7	7
Degree of Util (X)	0.356	0.101	0.022	0.413
Departure Headway (Hd)	5.804	5.301	4.596	5.306
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	619	674	775	678
Service Time	3.554	3.05	2.345	3.046
HCM Lane V/C Ratio	0.357	0.101	0.022	0.413
HCM Control Delay	11.8	8.7	7.4	11.8
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	1.6	0.3	0.1	2

Intersection	
Intersection Delay, s/veh	15.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	339	33	301	90	17	0	0	0
Future Vol, veh/h	0	0	0	0	339	33	301	90	17	0	0	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	357	35	317	95	18	0	0	0
Number of Lanes	0	0	0	0	1	0	1	1	1	0	0	0

Approach	WB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	NB	
Conflicting Lanes Left	3	0
Conflicting Approach Right		WB
Conflicting Lanes Right	0	1
HCM Control Delay	17.1	14.5
HCM LOS	C	B

Lane	NBLn1	NBLn2	NBLn3	WBLn1
Vol Left, %	100%	0%	0%	0%
Vol Thru, %	0%	100%	0%	91%
Vol Right, %	0%	0%	100%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	301	90	17	372
LT Vol	301	0	0	0
Through Vol	0	90	0	339
RT Vol	0	0	17	33
Lane Flow Rate	317	95	18	392
Geometry Grp	7	7	7	7
Degree of Util (X)	0.55	0.151	0.025	0.613
Departure Headway (Hd)	6.251	5.746	5.038	5.633
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	580	628	715	634
Service Time	3.951	3.446	2.738	3.433
HCM Lane V/C Ratio	0.547	0.151	0.025	0.618
HCM Control Delay	16.3	9.5	7.9	17.1
HCM Lane LOS	C	A	A	C
HCM 95th-tile Q	3.3	0.5	0.1	4.2

Appendix B

Intersection												
Intersection Delay, s/veh	10.6											
Intersection LOS	B											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	250	16	210	65	16	0	0	0
Future Vol, veh/h	0	0	0	0	250	16	210	65	16	0	0	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	263	17	221	68	17	0	0	0
Number of Lanes	0	0	0	0	1	0	1	1	0	0	0	0

Approach	WB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	NB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		WB
Conflicting Lanes Right	0	1
HCM Control Delay	10.4	10.7
HCM LOS	B	B

Lane	NBLn1	NBLn2	WBLn1
Vol Left, %	100%	0%	0%
Vol Thru, %	0%	80%	94%
Vol Right, %	0%	20%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	210	81	266
LT Vol	210	0	0
Through Vol	0	65	250
RT Vol	0	16	16
Lane Flow Rate	221	85	280
Geometry Grp	7	7	2
Degree of Util (X)	0.351	0.12	0.366
Departure Headway (Hd)	5.713	5.071	4.705
Convergence, Y/N	Yes	Yes	Yes
Cap	628	704	764
Service Time	3.461	2.818	2.73
HCM Lane V/C Ratio	0.352	0.121	0.366
HCM Control Delay	11.5	8.5	10.4
HCM Lane LOS	B	A	B
HCM 95th-tile Q	1.6	0.4	1.7

Intersection												
Intersection Delay, s/veh	13.9											
Intersection LOS	B											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	339	33	301	90	17	0	0	0
Future Vol, veh/h	0	0	0	0	339	33	301	90	17	0	0	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	357	35	317	95	18	0	0	0
Number of Lanes	0	0	0	0	1	0	1	1	0	0	0	0

Approach	WB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	NB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		WB
Conflicting Lanes Right	0	1
HCM Control Delay	14	13.9
HCM LOS	B	B

Lane	NBLn1	NBLn2	WBLn1
Vol Left, %	100%	0%	0%
Vol Thru, %	0%	84%	91%
Vol Right, %	0%	16%	9%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	301	107	372
LT Vol	301	0	0
Through Vol	0	90	339
RT Vol	0	17	33
Lane Flow Rate	317	113	392
Geometry Grp	7	7	2
Degree of Util (X)	0.53	0.169	0.545
Departure Headway (Hd)	6.021	5.404	5.013
Convergence, Y/N	Yes	Yes	Yes
Cap	592	657	717
Service Time	3.816	3.199	3.063
HCM Lane V/C Ratio	0.535	0.172	0.547
HCM Control Delay	15.5	9.3	14
HCM Lane LOS	C	A	B
HCM 95th-tile Q	3.1	0.6	3.3



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Transportation Design

Traffic Engineering

Civil Engineering

Construction Engineering

Environmental Studies

Water Resources

Structural Design

Right of Way

Urban Design

Transportation Planning

Program Management

Technical Memorandum

Date: December 15, 2020
To: Tom J. Topor, P.E.
Senior Civil Engineer
Village of Glen Ellyn
From: Anmol Shrivastava, P.E., PTOE
Steve Pautsch, P.E., PTOE
Civiltech Engineering, Inc.
Re: Main Street and Duane Street
Southbound Right Turn Lane Reduction Traffic Study

At the Village's request, Civiltech has performed a brief study to analyze the feasibility of removing the exclusive southbound right turn lane at the intersection of Main Street/Duane Street and converting it to a shared left/through/right lane.

I. Existing and Proposed Intersection Configurations

Main Street and Duane is a three-way stop-controlled intersection with a free-flow southbound movement. The north leg of Main Street is a two-way street with one lane in each direction and no on-street parking. There is currently a shared left/through and exclusive right turn lane on the north leg of the intersection. The east leg is a single lane two-way street with on-street parallel parking on the north side and diagonal parking on the south side. The south leg is a single lane two-way street with on-street parallel parking on the west and east side. The west leg is a single lane two-way street with on-street parallel parking on the north and south side.

The proposed revised lane configuration involves consolidating the southbound right turn and left/through lane into a shared left/through/right lane. The diagonal parking on the south side of east leg at Duane Street is proposed to be converted to parallel parking.

II. Existing Traffic Conditions

In order to quantify current traffic conditions in the vicinity of the site, 24-hour traffic counts were conducted using Miovision Video Collection Units (VCUs) at the intersection of Main Street and Duane Street. The traffic counts were conducted on Tuesday, March 19, 2019. The traffic counts show that the weekday morning peak hour of traffic occurs from 7:15 to 8:15 a.m. and the weekday evening peak hour of traffic occurs from 4:30 to 5:30 p.m. **Exhibit 1** illustrates the existing peak hour



traffic volumes while detailed traffic count data is contained in **Appendix A**.

III. Queuing

Should the southbound right turn lane on Main Street be removed, the primary issue to consider is the potential for pedestrians crossing the west leg of Duane Street to cause queueing on the north leg, since there would only be a single lane for all southbound movements. Therefore, videos recorded during the morning and evening peak hours from the 2019 traffic counts were observed to verify the interaction between southbound vehicles turning right and pedestrians. Based on this review, the right southbound right turns did not have to stop at any time to wait for pedestrians. This could be attributed to the low number of right turning vehicles combined with the relatively light volume of pedestrian traffic. There are 20 and 25 vehicles turning right from the north leg during the morning and evening peak hours respectively - about one vehicle turning right every two minutes. Additionally, there are 23 and 46 pedestrians crossing the west leg during the A.M. and P.M. peak hours, also a relatively low volume. Upon review of the videos, there were no occurrences where a vehicle turning right had to stop to wait for a pedestrian because the times when pedestrians and right-turning vehicles were within the intersection never coincided. Even if there were a time when a pedestrian was in the intersection, the delay would be low because the west leg crossing distance is short. This would only minimally impact southbound traffic.

IV. Recommendations and Conclusions

Based on a review of intersection video in conjunction with traffic volume data, Civiltech does not have any objection to reconfiguring the north leg of Main Street at Duane Street to consolidate the separate right turn and left/through lanes into a single shared left/through/right lane. On only occasion would motorists making southbound right turns from Main Street have to stop for pedestrians crossing Duane Street but if they do, then they would likely only be delayed for a few seconds, which would not lead to significant queuing on the north leg of Main.

APPENDIX A

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (1-hour intervals)

Start Time	Main Street									Duane Street									Intersection Total
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
12:00 AM	2	9	5	16	1	6	3	10	26	2	2	1	5	0	1	1	2	7	33
1:00 AM	0	5	1	6	1	4	3	8	14	0	0	1	1	0	1	0	1	2	16
2:00 AM	0	4	2	6	0	5	1	6	12	0	0	0	0	1	1	0	2	2	14
3:00 AM	0	12	3	15	1	4	0	5	20	1	1	1	3	0	2	0	2	5	25
4:00 AM	0	10	3	13	1	10	1	12	25	1	0	3	4	1	3	0	4	8	33
5:00 AM	4	24	14	42	8	16	5	29	71	4	9	3	16	3	12	3	18	34	105
6:00 AM	8	79	28	115	13	71	10	94	209	18	20	7	45	8	13	7	28	73	282
7:00 AM	17	217	48	282	55	152	27	234	516	29	45	23	97	17	67	19	103	200	716
8:00 AM	17	263	55	335	35	127	32	194	529	30	50	11	91	48	77	15	140	231	760
9:00 AM	12	209	48	269	30	87	25	142	411	18	49	10	77	35	43	19	97	174	585
10:00 AM	16	203	55	274	33	138	25	196	470	28	25	13	66	29	51	23	103	169	639
11:00 AM	22	263	51	336	39	157	35	231	567	28	41	20	89	28	59	14	101	190	757
12:00 PM	22	236	44	302	39	169	41	249	551	24	32	14	70	40	53	23	116	186	737
1:00 PM	14	200	45	259	42	143	30	215	474	22	49	17	88	28	53	18	99	187	661
2:00 PM	24	220	36	280	43	153	25	221	501	35	51	9	95	29	60	21	110	205	706
3:00 PM	23	249	58	330	30	158	35	223	553	16	61	14	91	41	95	16	152	243	796
4:00 PM	16	267	56	339	39	137	28	204	543	18	70	11	99	34	62	16	112	211	754
5:00 PM	20	307	49	376	46	156	28	230	606	30	58	24	112	32	86	17	135	247	853
6:00 PM	27	231	50	308	39	164	26	229	537	21	42	23	86	39	59	15	113	199	736
7:00 PM	13	171	37	221	33	119	24	176	397	11	26	12	49	29	60	14	103	152	549
8:00 PM	10	131	24	165	13	96	18	127	292	8	23	7	38	13	22	8	43	81	373
9:00 PM	3	90	18	111	18	74	11	103	214	4	27	7	38	10	15	7	32	70	284
10:00 PM	2	60	8	70	6	43	6	55	125	9	4	3	16	7	9	4	20	36	161
11:00 PM	1	16	2	19	2	11	6	19	38	2	4	1	7	1	3	0	4	11	49
TOTAL	273	3476	740	4489	567	2200	445	3212	7701	359	689	235	1283	473	907	260	1640	2923	10624

24-Hour Vehicle Traffic Count

North Leg 7,300
South Leg 7,400
East Leg 3,500
West Leg 3,000

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
12:00 AM	1	5	2	8	1	2	2	5	13	0	0	0	0	0	0	1	1	1	14	33
12:15 AM	1	1	1	3	0	2	1	3	6	1	1	0	2	0	0	0	0	2	8	23
12:30 AM	0	3	1	4	0	0	0	0	4	1	0	1	2	0	0	0	0	2	6	20
12:45 AM	0	0	1	1	0	2	0	2	3	0	1	0	1	0	1	0	1	2	5	17
1:00 AM	0	3	0	3	0	1	0	1	4	0	0	0	0	0	0	0	0	0	4	16
1:15 AM	0	1	1	2	0	1	1	2	4	0	0	0	0	0	1	0	1	1	5	16
1:30 AM	0	1	0	1	1	1	0	2	3	0	0	0	0	0	0	0	0	0	3	15
1:45 AM	0	0	0	0	0	1	2	3	3	0	0	1	1	0	0	0	0	1	4	17
2:00 AM	0	2	0	2	0	2	0	2	4	0	0	0	0	0	0	0	0	0	4	14
2:15 AM	0	0	1	1	0	2	0	2	3	0	0	0	0	0	1	0	1	1	4	16
2:30 AM	0	2	0	2	0	1	1	2	4	0	0	0	0	1	0	0	1	1	5	19
2:45 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	18
3:00 AM	0	2	1	3	0	1	0	1	4	1	0	0	1	0	1	0	1	2	6	25
3:15 AM	0	4	1	5	0	0	0	0	5	0	1	0	1	0	1	0	1	2	7	28
3:30 AM	0	1	0	1	1	1	0	2	3	0	0	1	1	0	0	0	0	1	4	27
3:45 AM	0	5	1	6	0	2	0	2	8	0	0	0	0	0	0	0	0	0	8	33
4:00 AM	0	2	1	3	0	3	0	3	6	0	0	1	1	1	1	0	2	3	9	33
4:15 AM	0	1	0	1	1	2	0	3	4	0	0	1	1	0	1	0	1	2	6	37
4:30 AM	0	4	1	5	0	2	1	3	8	0	0	1	1	0	1	0	1	2	10	44
4:45 AM	0	3	1	4	0	3	0	3	7	1	0	0	1	0	0	0	0	1	8	66
5:00 AM	1	6	1	8	0	3	0	3	11	0	0	0	0	0	2	0	2	2	13	105
5:15 AM	0	3	1	4	1	1	1	3	7	1	2	1	4	1	1	0	2	6	13	151
5:30 AM	1	8	2	11	3	4	3	10	21	1	3	1	5	0	5	1	6	11	32	184
5:45 AM	2	7	10	19	4	8	1	13	32	2	4	1	7	2	4	2	8	15	47	217
6:00 AM	1	15	2	18	4	13	0	17	35	6	10	3	19	3	1	1	5	24	59	282
6:15 AM	3	8	4	15	2	12	3	17	32	1	4	2	7	0	4	3	7	14	46	338
6:30 AM	1	24	9	34	3	11	5	19	53	4	2	0	6	2	3	1	6	12	65	497
6:45 AM	3	32	13	48	4	35	2	41	89	7	4	2	13	3	5	2	10	23	112	649
7:00 AM	3	31	9	43	7	31	5	43	86	9	2	2	13	2	10	4	16	29	115	716
7:15 AM	5	52	12	69	24	55	3	82	151	7	7	6	20	2	26	6	34	54	205	800
7:30 AM	2	63	15	80	15	40	9	64	144	10	25	9	44	3	20	6	29	73	217	757

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
7:45 AM	7	71	12	90	9	26	10	45	135	3	11	6	20	10	11	3	24	44	179	738
8:00 AM	7	53	14	74	8	31	11	50	124	12	14	5	31	18	19	7	44	75	199	760
8:15 AM	1	62	15	78	8	28	8	44	122	5	9	0	14	8	17	1	26	40	162	714
8:30 AM	3	79	13	95	12	29	2	43	138	4	14	4	22	9	24	5	38	60	198	693
8:45 AM	6	69	13	88	7	39	11	57	145	9	13	2	24	13	17	2	32	56	201	647
9:00 AM	3	62	21	86	9	19	4	32	118	4	9	3	16	8	8	3	19	35	153	585
9:15 AM	0	46	9	55	6	19	8	33	88	3	13	3	19	13	12	9	34	53	141	585
9:30 AM	4	57	11	72	9	24	3	36	108	6	14	2	22	9	11	2	22	44	152	588
9:45 AM	5	44	7	56	6	25	10	41	97	5	13	2	20	5	12	5	22	42	139	594
10:00 AM	4	57	16	77	7	28	5	40	117	7	7	4	18	3	10	5	18	36	153	639
10:15 AM	3	50	12	65	10	30	4	44	109	7	4	3	14	8	7	6	21	35	144	680
10:30 AM	3	46	11	60	5	35	10	50	110	8	5	4	17	9	17	5	31	48	158	717
10:45 AM	6	50	16	72	11	45	6	62	134	6	9	2	17	9	17	7	33	50	184	758
11:00 AM	5	68	11	84	11	32	6	49	133	9	16	5	30	7	17	7	31	61	194	757
11:15 AM	5	58	15	78	12	35	9	56	134	7	11	4	22	9	14	2	25	47	181	711
11:30 AM	7	72	14	93	4	52	7	63	156	6	7	6	19	7	14	3	24	43	199	720
11:45 AM	5	65	11	81	12	38	13	63	144	6	7	5	18	5	14	2	21	39	183	725
12:00 PM	4	50	9	63	8	30	9	47	110	5	7	4	16	10	6	6	22	38	148	737
12:15 PM	6	51	10	67	12	41	12	65	132	8	7	6	21	10	21	6	37	58	190	757
12:30 PM	6	66	12	84	8	52	9	69	153	7	8	3	18	13	13	7	33	51	204	727
12:45 PM	6	69	13	88	11	46	11	68	156	4	10	1	15	7	13	4	24	39	195	702
1:00 PM	0	47	14	61	12	42	5	59	120	6	18	4	28	5	9	6	20	48	168	661
1:15 PM	1	47	12	60	11	36	8	55	115	2	10	3	15	10	15	5	30	45	160	664
1:30 PM	8	53	14	75	13	31	6	50	125	10	9	5	24	7	17	6	30	54	179	668
1:45 PM	5	53	5	63	6	34	11	51	114	4	12	5	21	6	12	1	19	40	154	677
2:00 PM	6	58	9	73	10	40	4	54	127	9	8	2	19	6	15	4	25	44	171	706
2:15 PM	3	44	6	53	13	38	11	62	115	9	8	3	20	11	13	5	29	49	164	791
2:30 PM	5	60	8	73	13	41	4	58	131	7	14	2	23	5	19	10	34	57	188	832
2:45 PM	10	58	13	81	7	34	6	47	128	10	21	2	33	7	13	2	22	55	183	826
3:00 PM	6	83	24	113	8	49	10	67	180	3	20	5	28	13	31	4	48	76	256	796
3:15 PM	8	52	10	70	11	41	11	63	133	6	13	3	22	14	28	8	50	72	205	712

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
3:30 PM	5	67	9	81	5	38	8	51	132	4	13	4	21	10	16	3	29	50	182	688
3:45 PM	4	47	15	66	6	30	6	42	108	3	15	2	20	4	20	1	25	45	153	706
4:00 PM	5	60	15	80	4	29	8	41	121	3	15	5	23	10	12	6	28	51	172	754
4:15 PM	0	66	8	74	10	42	6	58	132	6	19	0	25	6	16	2	24	49	181	821
4:30 PM	4	69	19	92	10	32	10	52	144	4	18	4	26	12	14	4	30	56	200	858
4:45 PM	7	72	14	93	15	34	4	53	146	5	18	2	25	6	20	4	30	55	201	840
5:00 PM	6	99	15	120	5	43	5	53	173	10	17	6	33	4	24	5	33	66	239	853
5:15 PM	6	81	21	108	12	35	12	59	167	4	11	5	20	4	22	5	31	51	218	806
5:30 PM	6	57	5	68	11	43	5	59	127	7	8	6	21	8	23	3	34	55	182	807
5:45 PM	2	70	8	80	18	35	6	59	139	9	22	7	38	16	17	4	37	75	214	755
6:00 PM	6	66	8	80	12	42	7	61	141	5	7	6	18	9	18	6	33	51	192	736
6:15 PM	11	65	17	93	9	47	9	65	158	8	13	6	27	13	18	3	34	61	219	691
6:30 PM	5	46	12	63	8	30	5	43	106	2	5	4	11	4	8	1	13	24	130	605
6:45 PM	5	54	13	72	10	45	5	60	132	6	17	7	30	13	15	5	33	63	195	624
7:00 PM	2	46	8	56	10	31	4	45	101	4	9	2	15	9	20	2	31	46	147	549
7:15 PM	0	37	9	46	9	25	8	42	88	4	9	3	16	9	14	6	29	45	133	488
7:30 PM	5	50	11	66	6	33	6	45	111	3	4	6	13	7	13	5	25	38	149	442
7:45 PM	6	38	9	53	8	30	6	44	97	0	4	1	5	4	13	1	18	23	120	399
8:00 PM	3	30	5	38	5	27	5	37	75	0	2	0	2	4	3	2	9	11	86	373
8:15 PM	1	32	2	35	5	20	3	28	63	3	7	4	14	3	5	2	10	24	87	396
8:30 PM	3	37	10	50	3	24	4	31	81	3	11	1	15	3	4	3	10	25	106	385
8:45 PM	3	32	7	42	0	25	6	31	73	2	3	2	7	3	10	1	14	21	94	331
9:00 PM	1	38	11	50	4	24	5	33	83	1	11	0	12	6	7	1	14	26	109	284
9:15 PM	1	23	2	26	4	19	2	25	51	1	10	4	15	4	5	1	10	25	76	233
9:30 PM	0	16	1	17	5	18	2	25	42	0	2	2	4	0	1	5	6	10	52	193
9:45 PM	1	13	4	18	5	13	2	20	38	2	4	1	7	0	2	0	2	9	47	186
10:00 PM	2	28	4	34	4	11	1	16	50	1	1	1	3	2	2	1	5	8	58	161
10:15 PM	0	12	0	12	1	10	1	12	24	3	0	2	5	1	5	1	7	12	36	118
10:30 PM	0	13	4	17	1	12	3	16	33	4	2	0	6	3	2	1	6	12	45	106
10:45 PM	0	7	0	7	0	10	1	11	18	1	1	0	2	1	0	1	2	4	22	66
11:00 PM	0	5	2	7	1	1	2	4	11	1	1	0	2	0	2	0	2	4	15	49

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
11:15 PM	0	7	0	7	1	7	3	11	18	1	2	1	4	1	1	0	2	6	24	
11:30 PM	0	2	0	2	0	2	0	2	4	0	1	0	1	0	0	0	0	1	5	
11:45 PM	1	2	0	3	0	1	1	2	5	0	0	0	0	0	0	0	0	0	5	
TOTAL	273	3476	740	4489	567	2200	445	3212	7701	359	689	235	1283	473	907	260	1640	2923	10624	

Morning Peak Hour

	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	Intersection Total
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
7:15 AM	21	239	53	313	56	152	33	241	554	32	57	26	115	33	76	22	131	246	800
Percent Trucks	4.8%	0.8%	5.7%	1.9%	3.6%	3.9%	3.0%	3.7%	2.7%	0.0%	0.0%	7.7%	1.7%	0.0%	0.0%	0.0%	0.0%	0.8%	2.1%

Intersection Peak Hour Factor =

0.92

Evening Peak Hour

	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	Intersection Total
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
4:30 PM	23	321	69	413	42	144	31	217	630	23	64	17	104	26	80	18	124	228	858
Percent Trucks	0.0%	1.2%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.8%	0.4%	0.6%

Intersection Peak Hour Factor =

0.90

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:45 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
3:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
4:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	4
4:15 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	3
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	3
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
5:30 AM	1	1	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	9
5:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	1	1	2	10
6:00 AM	1	2	0	3	0	0	0	0	3	0	1	0	1	0	0	0	0	1	4	10
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	12
6:30 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	1	0	1	1	3	15
6:45 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	16
7:00 AM	0	0	1	1	1	1	1	3	4	2	0	0	2	0	0	0	0	2	6	17
7:15 AM	0	0	2	2	0	2	0	2	4	0	0	0	0	0	0	0	0	0	4	17
7:30 AM	0	1	1	2	1	0	0	1	3	0	0	1	1	0	0	0	0	1	4	26
7:45 AM	0	0	0	0	1	2	0	3	3	0	0	0	0	0	0	0	0	0	3	32

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
8:00 AM	1	1	0	2	0	2	1	3	5	0	0	1	1	0	0	0	0	1	6	29
8:15 AM	0	6	0	6	0	3	1	4	10	3	0	0	3	0	0	0	0	3	13	30
8:30 AM	0	6	0	6	2	1	0	3	9	0	0	0	0	1	0	0	1	1	10	19
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
9:00 AM	0	1	4	5	1	1	0	2	7	0	0	0	0	0	0	0	0	0	7	14
9:15 AM	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	0	0	1	2	12
9:30 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	13
9:45 AM	1	2	0	3	0	0	0	0	3	0	1	0	1	0	0	0	0	1	4	19
10:00 AM	1	0	0	1	1	2	0	3	4	0	0	0	0	1	0	0	1	1	5	23
10:15 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	1	1	1	3	27
10:30 AM	0	4	0	4	0	1	0	1	5	0	1	0	1	0	1	0	1	2	7	29
10:45 AM	1	1	1	3	0	2	1	3	6	1	0	0	1	1	0	0	1	2	8	30
11:00 AM	0	4	2	6	0	1	0	1	7	0	0	0	0	0	2	0	2	2	9	25
11:15 AM	0	3	0	3	1	0	0	1	4	0	0	0	0	1	0	0	1	1	5	22
11:30 AM	0	5	0	5	1	1	0	2	7	0	0	0	0	0	1	0	1	1	8	22
11:45 AM	0	2	0	2	0	0	0	0	2	0	1	0	1	0	0	0	0	1	3	17
12:00 PM	0	5	0	5	0	0	0	0	5	0	0	0	0	1	0	0	1	1	6	18
12:15 PM	0	1	0	1	0	1	1	2	3	0	0	1	1	0	1	0	1	2	5	17
12:30 PM	0	2	0	2	0	0	1	1	3	0	0	0	0	0	0	0	0	0	3	14
12:45 PM	0	1	1	2	1	0	0	1	3	1	0	0	1	0	0	0	0	1	4	13
1:00 PM	0	2	0	2	0	1	0	1	3	1	1	0	2	0	0	0	0	2	5	12
1:15 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	2	15
1:30 PM	2	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	19
1:45 PM	0	1	0	1	0	1	0	1	2	0	1	0	1	0	0	0	0	1	3	20
2:00 PM	0	6	0	6	0	1	0	1	7	0	0	0	0	0	1	0	1	1	8	18
2:15 PM	0	2	0	2	0	1	0	1	3	0	1	0	1	0	1	1	2	3	6	15
2:30 PM	0	1	0	1	0	1	0	1	2	0	0	0	0	0	0	1	1	1	3	13
2:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	16
3:00 PM	0	2	0	2	0	1	2	3	5	0	0	0	0	0	0	0	0	0	5	17
3:15 PM	0	1	1	2	2	0	0	2	4	0	0	0	0	0	0	0	0	0	4	19
3:30 PM	0	1	0	1	1	1	1	3	4	0	0	0	0	0	2	0	2	2	6	16
3:45 PM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	2	14

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
4:00 PM	0	1	0	1	0	3	1	4	5	0	1	0	1	1	0	0	1	2	7	13
4:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	6
4:30 PM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	5
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:00 PM	1	1	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 PM	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 PM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Duane Street									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
TOTAL	10	80	14	104	17	39	11	67	171	9	8	4	21	7	13	3	23	44	215	

Morning Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
7:15 AM	1	2	3	6	2	6	1	9	15	0	0	2	2	0	0	0	0	2	17

Evening Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
4:30 PM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	1	0	1	1	5



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Transportation

Civil

Construction

Environmental

Water Resources

Structural

Appraisal

Technical Memorandum

Date: April 30, 2019
To: Rich Daubert
Village Engineer
Village of Glen Ellyn
From: James R. Woods, P.E., PTOE
Anmol Shrivastava, P.E.
Civiltech Engineering, Inc.
Re: Main Street and Crescent Boulevard
Southbound Right Turn Lane Reduction Traffic Study

At the Village's request, Civiltech has performed a brief study to analyze the feasibility of removing the exclusive southbound right turn lane at the intersection of Main Street/Crescent Avenue. The proposed lane configuration on the north leg of Main Street is a shared through/right lane and a left turn lane. This lane consolidation would allow for the provision of two additional on-street parking spaces on the west side of Main Street and would allow the sidewalk widening proposed as part of the streetscape project to extend south to Crescent Boulevard.

In order to evaluate traffic operation under existing and future scenarios, intersection capacity analyses were completed using Synchro, which is a macroscopic software model that estimates the Level of Service (LOS) and average delay per vehicle.

The ability of an intersection to accommodate traffic flow is expressed in terms of Level-of-Service (LOS), which is assigned a letter grade from A to F based on the average control delay experienced by vehicles passing through the intersection. Control delay is that portion of the total delay attributed to the stop sign control operation, and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Level-of-Service A is the highest grade (best traffic flow and least delay), Level-of-Service E represents saturated or at-capacity conditions, and Level-of-Service F is the lowest grade (oversaturated conditions, extensive delays).

I. Existing and Proposed Intersection Configurations

Main Street and Crescent Boulevard is a stop-controlled intersection. The north leg of Main Street is a two-lane one-way street (southbound) with on-street parallel parking on the west side and on-street diagonal parking on the east side. There are currently exclusive left, through, and right turn lanes (with 100 feet of storage) on the north leg of the intersection. The east leg is a single lane one-way street (eastbound) with on-street parallel parking on the south side and diagonal parking on the north side. The south leg is a single lane two-way street with no on-street parking. The west leg is a single lane two-way street. There are exclusive right and through lanes on the west leg of the intersection.

The proposed revised lane configuration involves consolidating the southbound right turn and through lanes into a shared right-through lane. In place of the right turn lane, two additional parallel parking spaces may be provided and the sidewalk widening, which is anticipated as part of the upcoming streetscape project, can be extended south to Crescent Boulevard.

II. Existing Traffic Conditions

In order to quantify current traffic conditions in the vicinity of the site, 24-hour traffic counts were conducted using Miovision Video Collection Units (VCUs) at the intersection of Main Street and Crescent Boulevard. The traffic counts were conducted on Tuesday, March 19. The traffic counts show that the weekday morning peak hour of traffic occurs from 7:15 to 8:15 a.m. and the weekday evening peak hour of traffic occurs from 4:30 to 5:30 p.m. **Exhibit 1** illustrates the existing peak hour traffic volumes while detailed traffic count data is contained in **Appendix A**. It should be noted that the southbound right turn volume is low, only consisting of 5.5% of the total traffic volume on the north leg.

III. Synchro Analysis

Synchro analysis for the morning and evening peak hours were conducted under the following conditions:

1. Existing Geometry
2. Proposed Geometry

The two conditions are discussed below.

Existing Geometry

The Synchro analysis indicates that the intersection of Main Street and Crescent Boulevard is operating well with minimal delay and queuing during the weekday morning and evening peak hours. The results of the analysis are summarized in **Table 1** below:

Table 1: Capacity Analysis Results –Existing Geometry

Intersection	Weekday AM Peak			Weekday PM Peak		
	LOS	Delay (sec)	95 th Percentile Queue (veh)	LOS	Delay (sec)	95 th Percentile Queue (veh)
Main Street and Crescent Boulevard						
Overall	B	11.1	-	B	12.1	-
Eastbound Approach	B	10.5	0.8	B	10.1	0.6
Westbound Approach	-	-	-	-	-	-
Northbound Approach	B	10.2	1.1	B	10.8	1.3
Southbound Approach	B	11.6	2.4	B	13.2	3.5

The Levels of Service are well within an acceptable range for all movements. The detailed existing conditions results are contained in **Appendix B**.

Proposed Geometry

A Synchro analysis conducted with the proposed lane configuration indicates that the intersection of Main Street and Crescent Boulevard will continue to operate well under the proposed configuration with minimal delay and queuing during the weekday morning and evening peak hours. The results from the Synchro analysis are highlighted in **Table 2** below:

Table 2: Capacity Analysis Results –Proposed Geometry

Intersection	Weekday AM Peak			Weekday PM Peak		
	LOS	Delay (sec)	95 th Percentile Queue (veh)	LOS	Delay (sec)	95 th Percentile Queue (veh)
Main Street and Crescent Boulevard						
Overall	B	11.0	-	B	12.2	-
Eastbound Approach	B	10.2	0.8	A	9.7	0.4
Westbound Approach	-	-	-	-	-	-
Northbound Approach	A	9.6	1.0	B	10.1	1.2
Southbound Approach	B	11.7	2.6	B	13.7	3.8

The Levels of Service are projected to be virtually unaffected by the removal of the right turn lane and would continue to remain well within an acceptable range for all movements. Additionally, the 95th percentile queue for the southbound lane is around three vehicles for both the a.m. and p.m. peak hours, which is well within an acceptable range for a stop-controlled intersection. The detailed proposed conditions results are contained in **Appendix C**.

IV. Trains During Peak Hours

When the railroad gates are down, extensive queuing occurs on north leg of Main. Because the Synchro analyses do not account for blockages caused by the railroad crossing, Civiltech conducted field

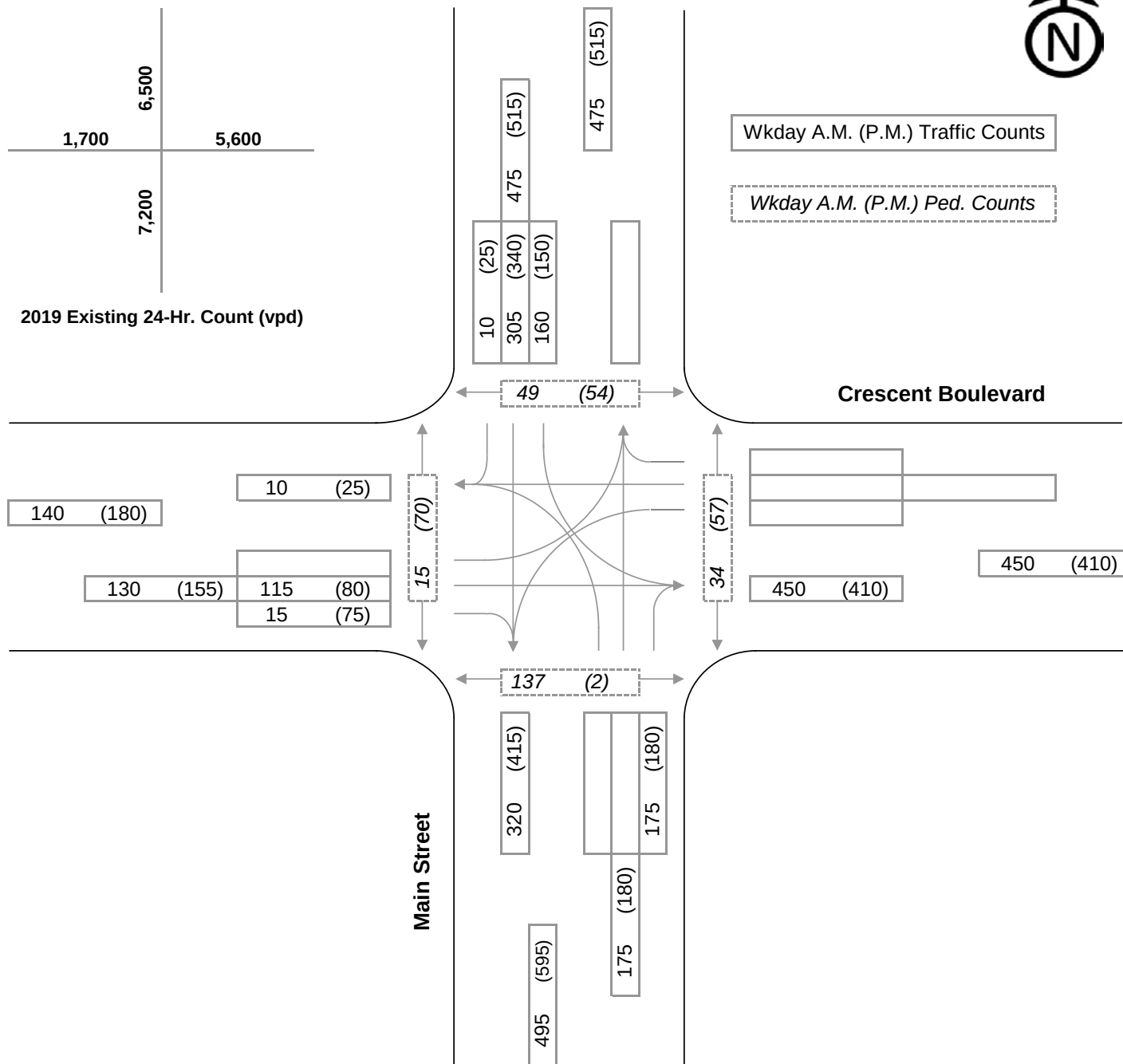
observations to determine how the right turn lane operates during these periods. Because this lane is only 100 feet long, once four southbound through vehicles stop in the through lane, motorists desiring to turn right are blocked from entering the right turn lane. Because the ratio of right-turning to through vehicles is so low, there are few instances where a car turning right is able to enter the right turn lane before being blocked by the queue in the through lane. Therefore, when the gates are down, the number of right-turning cars that would be negatively affected by the removal of the exclusive right turn lane is very low.

Once the gates go up and traffic starts to move, the right turn lane provides space for drivers turning west to wait without blocking through traffic while commuters cross the west leg crosswalk. If the right turn lane is removed, there could be more frequent occurrences where through traffic is stopped behind right-turning vehicles waiting for pedestrians. However, because the southbound right turn volume is so low, we believe that this condition is manageable.

V. Recommendations and Conclusions

Based on the results of the capacity analyses as well as our field observations, Civiltech recommends reconfiguring the north leg of Main Street at Crescent Boulevard to consolidate the separate right turn and through lanes into a single shared through/right lane. The delay and queue lengths would only increase minimally during the morning and evening peak hours but two additional parallel parking spaces could be provided on the west side of the street. Additionally, removal of the right turn lane would allow the proposed one-foot sidewalk widening that is anticipated as part of the streetscape to extend south to Crescent Boulevard. Finally, reducing the north approach from three to two lanes will likely improve safety, particularly for pedestrians crossing the north leg, as they would only have to traverse two lines of cars instead of three.

A bump-out does not appear to be feasible extending into Main Street from the northwest corner due to turning vehicle requirements. Therefore, the distance between the west edge of pavement and lane line, will be approximately 18 feet. The proposed design provides for a de-facto right turn storage pocket that will provide sufficient space for cars turning right to shift to the west and out of the way of through traffic while waiting for pedestrians to clear the west crosswalk. Maintaining the right turn storage area will be particularly advantageous during the evening rush hour by continuing to allow train-related north leg queues to clear while high volumes of commuters cross the west leg of Crescent Boulevard.



Vehicle Traffic Peak Hours:

7:15 A.M. to 8:15 A.M.

4:30 P.M. to 5:30 P.M.

Count Date(s):

Tuesday, 3/19/2019

Village of Glen Ellyn

CBD Streetscape and Utility Improvements

2019 Existing Peak Hour Traffic

Main Street and Crescent Boulevard



Prepared: 3/29/2019

File: PHD Main and Crescent.xlsx

Appendix A

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (1-hour intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
12:00 AM	0	13	4	17	8	0	0	8	25	0	1	0	1	1	0	0	1	2	27
1:00 AM	0	5	2	7	3	0	1	4	11	0	0	0	0	1	0	0	1	1	12
2:00 AM	0	6	2	8	4	0	0	4	12	0	0	0	0	0	1	0	1	1	13
3:00 AM	0	12	5	17	2	2	1	5	22	0	0	0	0	2	4	0	6	6	28
4:00 AM	1	12	3	16	10	0	0	10	26	1	0	0	1	1	1	0	2	3	29
5:00 AM	0	40	40	80	20	0	0	20	100	2	0	0	2	4	20	1	25	27	127
6:00 AM	5	114	98	217	82	0	0	82	299	0	0	0	0	5	40	0	45	45	344
7:00 AM	9	277	163	449	163	0	0	163	612	0	0	0	0	13	106	0	119	119	731
8:00 AM	9	315	133	457	153	0	0	153	610	0	0	0	0	23	91	0	114	114	724
9:00 AM	8	256	109	373	116	0	0	116	489	0	0	0	0	19	54	0	73	73	562
10:00 AM	16	259	105	380	182	0	0	182	562	0	0	0	0	22	51	0	73	73	635
11:00 AM	30	323	132	485	186	0	0	186	671	0	0	0	0	20	43	0	63	63	734
12:00 PM	26	290	152	468	211	0	0	211	679	0	0	0	0	29	52	0	81	81	760
1:00 PM	42	232	153	427	174	0	0	174	601	0	0	0	0	34	41	0	75	75	676
2:00 PM	39	257	141	437	207	0	0	207	644	0	0	0	0	28	55	0	83	83	727
3:00 PM	38	299	164	501	187	0	1	188	689	0	0	0	0	39	46	0	85	85	774
4:00 PM	34	290	153	477	164	0	0	164	641	0	0	0	0	51	67	0	118	118	759
5:00 PM	25	310	144	479	185	0	0	185	664	0	0	0	0	67	83	0	150	150	814
6:00 PM	21	263	135	419	174	0	0	174	593	0	0	0	0	49	59	0	108	108	701
7:00 PM	22	196	85	303	137	0	0	137	440	0	0	0	0	23	57	0	80	80	520
8:00 PM	11	149	61	221	112	0	0	112	333	0	0	0	0	12	22	0	34	34	367
9:00 PM	9	103	38	150	83	0	0	83	233	0	0	0	0	9	16	0	25	25	258
10:00 PM	7	67	18	92	59	0	0	59	151	0	0	0	0	1	7	0	8	8	159
11:00 PM	0	19	7	26	12	0	0	12	38	0	0	0	0	1	2	0	3	3	41
TOTAL	352	4107	2047	6506	2634	2	3	2639	9145	3	1	0	4	454	918	1	1373	1377	10522

24-Hour Vehicle Traffic Count

North Leg 6,500
South Leg 7,200
East Leg 5,600
West Leg 1,700

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
12:00 AM	0	5	2	7	3	0	0	3	10	0	0	0	0	1	0	0	1	1	11	27
12:15 AM	0	3	1	4	2	0	0	2	6	0	0	0	0	0	0	0	0	0	6	22
12:30 AM	0	4	1	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	19
12:45 AM	0	1	0	1	2	0	0	2	3	0	1	0	1	0	0	0	0	1	4	15
1:00 AM	0	2	2	4	1	0	0	1	5	0	0	0	0	1	0	0	1	1	6	12
1:15 AM	0	2	0	2	0	0	1	1	3	0	0	0	0	0	0	0	0	0	3	12
1:30 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	11
1:45 AM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	12
2:00 AM	0	2	1	3	2	0	0	2	5	0	0	0	0	0	1	0	1	1	6	13
2:15 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	15
2:30 AM	0	2	0	2	1	0	0	1	3	0	0	0	0	0	0	0	0	0	3	20
2:45 AM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	20
3:00 AM	0	2	1	3	1	1	0	2	5	0	0	0	0	2	1	0	3	3	8	28
3:15 AM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	3	0	3	3	7	26
3:30 AM	0	1	1	2	1	0	0	1	3	0	0	0	0	0	0	0	0	0	3	25
3:45 AM	0	5	3	8	0	1	1	2	10	0	0	0	0	0	0	0	0	0	10	29
4:00 AM	0	3	0	3	2	0	0	2	5	1	0	0	1	0	0	0	0	1	6	29
4:15 AM	0	2	2	4	2	0	0	2	6	0	0	0	0	0	0	0	0	0	6	46
4:30 AM	1	3	0	4	2	0	0	2	6	0	0	0	0	1	0	0	1	1	7	63
4:45 AM	0	4	1	5	4	0	0	4	9	0	0	0	0	0	1	0	1	1	10	84
5:00 AM	0	7	7	14	3	0	0	3	17	2	0	0	2	1	3	0	4	6	23	127
5:15 AM	0	5	12	17	2	0	0	2	19	0	0	0	0	1	3	0	4	4	23	163
5:30 AM	0	10	9	19	4	0	0	4	23	0	0	0	0	1	3	1	5	5	28	199
5:45 AM	0	18	12	30	11	0	0	11	41	0	0	0	0	1	11	0	12	12	53	247
6:00 AM	0	20	16	36	17	0	0	17	53	0	0	0	0	0	6	0	6	6	59	344
6:15 AM	0	13	22	35	15	0	0	15	50	0	0	0	0	2	7	0	9	9	59	434
6:30 AM	1	34	16	51	16	0	0	16	67	0	0	0	0	0	9	0	9	9	76	581
6:45 AM	4	47	44	95	34	0	0	34	129	0	0	0	0	3	18	0	21	21	150	707
7:00 AM	2	42	48	92	29	0	0	29	121	0	0	0	0	4	24	0	28	28	149	731
7:15 AM	4	72	36	112	62	0	0	62	174	0	0	0	0	0	32	0	32	32	206	775
7:30 AM	1	75	48	124	41	0	0	41	165	0	0	0	0	5	32	0	37	37	202	744

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
7:45 AM	2	88	31	121	31	0	0	31	152	0	0	0	0	4	18	0	22	22	174	716
8:00 AM	1	69	44	114	42	0	0	42	156	0	0	0	0	5	32	0	37	37	193	724
8:15 AM	2	73	30	105	32	0	0	32	137	0	0	0	0	8	30	0	38	38	175	687
8:30 AM	2	85	35	122	30	0	0	30	152	0	0	0	0	9	13	0	22	22	174	639
8:45 AM	4	88	24	116	49	0	0	49	165	0	0	0	0	1	16	0	17	17	182	604
9:00 AM	2	84	27	113	25	0	0	25	138	0	0	0	0	5	13	0	18	18	156	562
9:15 AM	1	48	29	78	30	0	0	30	108	0	0	0	0	4	15	0	19	19	127	569
9:30 AM	1	69	25	95	30	0	0	30	125	0	0	0	0	6	8	0	14	14	139	595
9:45 AM	4	55	28	87	31	0	0	31	118	0	0	0	0	4	18	0	22	22	140	599
10:00 AM	4	77	23	104	42	0	0	42	146	0	0	0	0	5	12	0	17	17	163	635
10:15 AM	2	57	25	84	41	0	0	41	125	0	0	0	0	10	18	0	28	28	153	639
10:30 AM	4	59	24	87	45	0	0	45	132	0	0	0	0	1	10	0	11	11	143	661
10:45 AM	6	66	33	105	54	0	0	54	159	0	0	0	0	6	11	0	17	17	176	725
11:00 AM	2	80	33	115	41	0	0	41	156	0	0	0	0	6	5	0	11	11	167	734
11:15 AM	6	77	38	121	42	0	0	42	163	0	0	0	0	4	8	0	12	12	175	720
11:30 AM	10	85	36	131	59	0	0	59	190	0	0	0	0	4	13	0	17	17	207	726
11:45 AM	12	81	25	118	44	0	0	44	162	0	0	0	0	6	17	0	23	23	185	718
12:00 PM	13	55	27	95	42	0	0	42	137	0	0	0	0	8	8	0	16	16	153	760
12:15 PM	8	72	30	110	50	0	0	50	160	0	0	0	0	8	13	0	21	21	181	782
12:30 PM	3	78	34	115	64	0	0	64	179	0	0	0	0	4	16	0	20	20	199	769
12:45 PM	2	85	61	148	55	0	0	55	203	0	0	0	0	9	15	0	24	24	227	752
1:00 PM	8	54	44	106	50	0	0	50	156	0	0	0	0	10	9	0	19	19	175	676
1:15 PM	12	56	41	109	43	0	0	43	152	0	0	0	0	7	9	0	16	16	168	686
1:30 PM	13	65	33	111	45	0	0	45	156	0	0	0	0	10	16	0	26	26	182	674
1:45 PM	9	57	35	101	36	0	0	36	137	0	0	0	0	7	7	0	14	14	151	679
2:00 PM	12	65	35	112	51	0	0	51	163	0	0	0	0	8	14	0	22	22	185	727
2:15 PM	5	56	34	95	52	0	0	52	147	0	0	0	0	0	9	0	9	9	156	764
2:30 PM	11	64	31	106	59	0	0	59	165	0	0	0	0	9	13	0	22	22	187	804
2:45 PM	11	72	41	124	45	0	0	45	169	0	0	0	0	11	19	0	30	30	199	800
3:00 PM	10	103	36	149	54	0	1	55	204	0	0	0	0	7	11	0	18	18	222	774
3:15 PM	10	54	51	115	56	0	0	56	171	0	0	0	0	15	10	0	25	25	196	738

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
3:30 PM	11	77	37	125	44	0	0	44	169	0	0	0	0	6	8	0	14	14	183	710
3:45 PM	7	65	40	112	33	0	0	33	145	0	0	0	0	11	17	0	28	28	173	725
4:00 PM	18	66	32	116	36	0	0	36	152	0	0	0	0	16	18	0	34	34	186	759
4:15 PM	3	64	38	105	41	0	0	41	146	0	0	0	0	8	14	0	22	22	168	813
4:30 PM	9	79	35	123	42	0	0	42	165	0	0	0	0	15	18	0	33	33	198	853
4:45 PM	4	81	48	133	45	0	0	45	178	0	0	0	0	12	17	0	29	29	207	842
5:00 PM	8	99	33	140	53	0	0	53	193	0	0	0	0	25	22	0	47	47	240	814
5:15 PM	5	82	33	120	40	0	0	40	160	0	0	0	0	24	24	0	48	48	208	751
5:30 PM	9	63	45	117	42	0	0	42	159	0	0	0	0	9	19	0	28	28	187	747
5:45 PM	3	66	33	102	50	0	0	50	152	0	0	0	0	9	18	0	27	27	179	701
6:00 PM	6	76	32	114	39	0	0	39	153	0	0	0	0	10	14	0	24	24	177	701
6:15 PM	3	72	40	115	56	0	0	56	171	0	0	0	0	18	15	0	33	33	204	662
6:30 PM	1	55	33	89	31	0	0	31	120	0	0	0	0	9	12	0	21	21	141	583
6:45 PM	11	60	30	101	48	0	0	48	149	0	0	0	0	12	18	0	30	30	179	590
7:00 PM	7	48	24	79	35	0	0	35	114	0	0	0	0	4	20	0	24	24	138	520
7:15 PM	8	45	29	82	30	0	0	30	112	0	0	0	0	3	10	0	13	13	125	470
7:30 PM	5	55	21	81	42	0	0	42	123	0	0	0	0	10	15	0	25	25	148	426
7:45 PM	2	48	11	61	30	0	0	30	91	0	0	0	0	6	12	0	18	18	109	387
8:00 PM	1	35	15	51	28	0	0	28	79	0	0	0	0	3	6	0	9	9	88	367
8:15 PM	3	32	14	49	25	0	0	25	74	0	0	0	0	3	4	0	7	7	81	385
8:30 PM	2	46	22	70	29	0	0	29	99	0	0	0	0	3	7	0	10	10	109	360
8:45 PM	5	36	10	51	30	0	0	30	81	0	0	0	0	3	5	0	8	8	89	307
9:00 PM	2	48	20	70	26	0	0	26	96	0	0	0	0	4	6	0	10	10	106	258
9:15 PM	2	21	8	31	19	0	0	19	50	0	0	0	0	3	3	0	6	6	56	206
9:30 PM	5	16	6	27	23	0	0	23	50	0	0	0	0	2	4	0	6	6	56	185
9:45 PM	0	18	4	22	15	0	0	15	37	0	0	0	0	0	3	0	3	3	40	168
10:00 PM	2	33	4	39	13	0	0	13	52	0	0	0	0	0	2	0	2	2	54	159
10:15 PM	1	12	5	18	16	0	0	16	34	0	0	0	0	0	1	0	1	1	35	117
10:30 PM	2	15	3	20	16	0	0	16	36	0	0	0	0	1	2	0	3	3	39	99
10:45 PM	2	7	6	15	14	0	0	14	29	0	0	0	0	0	2	0	2	2	31	67
11:00 PM	0	7	3	10	2	0	0	2	12	0	0	0	0	0	0	0	0	0	12	41

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
11:15 PM	0	8	1	9	7	0	0	7	16	0	0	0	0	0	1	0	1	1	17	
11:30 PM	0	2	1	3	2	0	0	2	5	0	0	0	0	1	1	0	2	2	7	
11:45 PM	0	2	2	4	1	0	0	1	5	0	0	0	0	0	0	0	0	0	5	
TOTAL	352	4107	2047	6506	2634	2	3	2639	9145	3	1	0	4	454	918	1	1373	1377	10522	

Morning Peak Hour

	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	Intersection Total
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
7:15 AM	8	304	159	471	176	0	0	176	647	0	0	0	0	14	114	0	128	128	775
Percent Trucks	0.0%	1.6%	3.1%	2.1%	3.4%	#DIV/0!	#DIV/0!	3.4%	2.5%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.0%	#DIV/0!	0.0%	0.0%	2.1%

Intersection Peak Hour Factor =

0.94

Evening Peak Hour

	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	Intersection Total
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
4:30 PM	26	341	149	516	180	0	0	180	696	0	0	0	0	76	81	0	157	157	853
Percent Trucks	0.0%	0.9%	0.7%	0.8%	0.0%	#DIV/0!	#DIV/0!	0.0%	0.6%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.0%	#DIV/0!	0.0%	0.0%	0.5%

Intersection Peak Hour Factor =

0.89

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45 AM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	3
2:00 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:30 AM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
4:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	2
4:15 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
5:00 AM	0	0	1	1	0	0	0	0	1	2	0	0	2	0	0	0	0	2	3	9
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
5:30 AM	0	1	1	2	0	0	0	0	2	0	0	0	0	1	0	1	2	2	4	12
5:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	2	10
6:00 AM	0	4	1	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	9
6:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6
6:30 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	10
6:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	11
7:00 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	14
7:15 AM	0	2	0	2	3	0	0	3	5	0	0	0	0	0	0	0	0	0	5	16
7:30 AM	0	1	2	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	24
7:45 AM	0	1	1	2	2	0	0	2	4	0	0	0	0	0	0	0	0	0	4	27

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
8:00 AM	0	1	2	3	1	0	0	1	4	0	0	0	0	0	0	0	0	0	4	24
8:15 AM	0	6	0	6	7	0	0	7	13	0	0	0	0	0	0	0	0	0	13	25
8:30 AM	0	4	1	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	14
8:45 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	12
9:00 AM	0	4	0	4	0	0	0	0	4	0	0	0	0	1	0	0	1	1	5	13
9:15 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	12
9:30 AM	0	0	3	3	1	0	0	1	4	0	0	0	0	0	0	0	0	0	4	14
9:45 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	16
10:00 AM	0	0	1	1	2	0	0	2	3	0	0	0	0	1	0	0	1	1	4	23
10:15 AM	0	1	1	2	1	0	0	1	3	0	0	0	0	0	1	0	1	1	4	25
10:30 AM	0	4	1	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	27
10:45 AM	0	1	4	5	3	0	0	3	8	0	0	0	0	1	0	0	1	1	9	27
11:00 AM	0	4	0	4	1	0	0	1	5	0	0	0	0	1	0	0	1	1	6	25
11:15 AM	0	2	4	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	23
11:30 AM	1	5	0	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	22
11:45 AM	0	3	1	4	2	0	0	2	6	0	0	0	0	0	1	0	1	1	7	18
12:00 PM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	20
12:15 PM	0	2	0	2	1	0	0	1	3	0	0	0	0	0	2	0	2	2	5	22
12:30 PM	0	0	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	21
12:45 PM	1	2	2	5	3	0	0	3	8	0	0	0	0	1	0	0	1	1	9	21
1:00 PM	0	2	3	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	14
1:15 PM	0	1	1	2	1	0	0	1	3	0	0	0	0	1	0	0	1	1	4	16
1:30 PM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	20
1:45 PM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	21
2:00 PM	1	6	1	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	8	20
2:15 PM	0	3	1	4	3	0	0	3	7	0	0	0	0	0	1	0	1	1	8	16
2:30 PM	1	0	0	1	2	0	0	2	3	0	0	0	0	0	0	0	0	0	3	11
2:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	9
3:00 PM	0	2	1	3	1	0	0	1	4	0	0	0	0	0	0	0	0	0	4	8
3:15 PM	0	2	1	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	6
3:30 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
4:00 PM	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	0	0	2	7
4:15 PM	0	0	1	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	6
4:30 PM	0	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	4
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6:15 PM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	1	0	1	1	3	6
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
7:00 PM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:15 PM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 PM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
TOTAL	4	90	45	139	47	1	0	48	187	3	0	0	3	7	7	1	15	18	205	

Morning Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
7:15 AM	0	5	5	10	6	0	0	6	16	0	0	0	0	0	0	0	0	0	16

Evening Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
4:30 PM	0	3	1	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4

Appendix B

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑						↑	↑	↑	↑
Traffic Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Future Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	0	0	0	0	0	0	0	3	3	2	0
Mvmt Flow	0	122	16	0	0	0	0	0	186	170	324	11
Number of Lanes	0	1	1	0	0	0	0	0	1	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.5	10.2	11.6
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	115	15	160	305	10
LT Vol	0	0	0	160	0	0
Through Vol	0	115	0	0	305	0
RT Vol	175	0	15	0	0	10
Lane Flow Rate	186	122	16	170	324	11
Geometry Grp	8	8	8	7	7	7
Degree of Util (X)	0.279	0.216	0.025	0.267	0.462	0.013
Departure Headway (Hd)	5.389	6.354	5.649	5.641	5.121	4.382
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	670	568	637	631	698	808
Service Time	3.089	4.063	3.358	3.419	2.898	2.159
HCM Lane V/C Ratio	0.278	0.215	0.025	0.269	0.464	0.014
HCM Control Delay	10.2	10.8	8.5	10.5	12.3	7.2
HCM Lane LOS	B	B	A	B	B	A
HCM 95th-tile Q	1.1	0.8	0.1	1.1	2.4	0

Intersection

Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑						↑	↑	↑	↑
Traffic Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Future Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	0
Mvmt Flow	0	90	84	0	0	0	0	0	202	169	382	28
Number of Lanes	0	1	1	0	0	0	0	0	1	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.1	10.8	13.2
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	80	75	150	340	25
LT Vol	0	0	0	150	0	0
Through Vol	0	80	0	0	340	0
RT Vol	180	0	75	0	0	25
Lane Flow Rate	202	90	84	169	382	28
Geometry Grp	8	8	8	7	7	7
Degree of Util (X)	0.313	0.164	0.138	0.272	0.564	0.036
Departure Headway (Hd)	5.576	6.585	5.879	5.816	5.312	4.589
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	645	546	610	622	684	785
Service Time	3.307	4.319	3.612	3.516	3.012	2.289
HCM Lane V/C Ratio	0.313	0.165	0.138	0.272	0.558	0.036
HCM Control Delay	10.8	10.6	9.6	10.7	14.7	7.5
HCM Lane LOS	B	B	A	B	B	A
HCM 95th-tile Q	1.3	0.6	0.5	1.1	3.5	0.1

Appendix C

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑						↑	↑	↑	
Traffic Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Future Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	0	0	0	0	0	0	0	3	3	2	0
Mvmt Flow	0	122	16	0	0	0	0	0	186	170	324	11
Number of Lanes	0	1	1	0	0	0	0	0	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.2	9.6	11.7
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	97%
Vol Right, %	100%	0%	100%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	115	15	160	315
LT Vol	0	0	0	160	0
Through Vol	0	115	0	0	305
RT Vol	175	0	15	0	10
Lane Flow Rate	186	122	16	170	335
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.253	0.207	0.024	0.266	0.473
Departure Headway (Hd)	4.901	6.088	5.38	5.627	5.084
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	728	586	660	637	707
Service Time	2.961	3.86	3.152	3.379	2.836
HCM Lane V/C Ratio	0.255	0.208	0.024	0.267	0.474
HCM Control Delay	9.6	10.5	8.3	10.4	12.4
HCM Lane LOS	A	B	A	B	B
HCM 95th-tile Q	1	0.8	0.1	1.1	2.6

Intersection

Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗						↗	↘	↘	
Traffic Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Future Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	0
Mvmt Flow	0	90	84	0	0	0	0	0	202	169	382	28
Number of Lanes	0	1	1	0	0	0	0	0	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.7	10.1	13.7
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	93%
Vol Right, %	100%	0%	100%	0%	7%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	80	75	150	365
LT Vol	0	0	0	150	0
Through Vol	0	80	0	0	340
RT Vol	180	0	75	0	25
Lane Flow Rate	202	90	84	169	410
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.281	0.157	0.13	0.267	0.586
Departure Headway (Hd)	5	6.276	5.567	5.693	5.142
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	712	567	638	627	697
Service Time	3.079	4.067	3.358	3.463	2.911
HCM Lane V/C Ratio	0.284	0.159	0.132	0.27	0.588
HCM Control Delay	10.1	10.2	9.2	10.5	15
HCM Lane LOS	B	B	A	B	B
HCM 95th-tile Q	1.2	0.6	0.4	1.1	3.8



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Transportation Design

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Right of Way

Urban Design

Transportation Planning

Program Management

Technical Memorandum

Date: December 15, 2020
To: Tom J. Topor, P.E.
Senior Civil Engineer
Village of Glen Ellyn
From: Anmol Shrivastava, P.E., PTOE
Steve Pautsch, P.E., PTOE
Civiltech Engineering, Inc.
Re: Main Street and Crescent Boulevard
Eastbound Right Turn Lane Removal

At the Village's request, Civiltech has performed a brief study to analyze the feasibility of removing the exclusive eastbound right turn lane at the intersection of Main Street/Crescent Avenue and reconfiguring the east approach to a single shared through/right lane. This lane consolidation would allow for a sidewalk bump out and additional on-street parking spaces.

In order to evaluate traffic operation under existing and future scenarios, intersection capacity analyses were completed using Synchro, which is a macroscopic software model that estimates the Level of Service (LOS) and average delay per vehicle. Intersection video from 2019 was also reviewed to predict the impact that train operations would have on the intersection, should the right turn lane be removed.

I. Existing and Proposed Intersection Configurations

Main Street and Crescent Boulevard is a stop-controlled intersection. The north leg of Main Street is a two-lane one-way southbound street with on-street parallel parking on the west side and on-street diagonal parking on the east side. There are currently exclusive left, through, and right turn lanes with 100 feet of storage on the north leg of the intersection. The east leg is a one-way street (eastbound) with on-street parallel parking on the south side and diagonal parking on the north side. The south leg is a single lane two-way street with no on-street parking. The west leg is a single lane two-way street with parallel parking on both sides. There is an exclusive right turn lane with 100 feet of storage on the west leg of the intersection.

The proposed lane configuration involves consolidating the eastbound right turn and through lanes into a single shared right-through lane. In place of the right turn lane, three additional parallel parking spaces could be provided along with the sidewalk bump-out.



II. Existing Traffic Conditions

In order to quantify current traffic conditions in the vicinity of the site, 24-hour traffic counts were conducted using Miovision Video Collection Units (VCUs) at the intersection of Main Street and Crescent Boulevard. The traffic counts were conducted on Tuesday, March 19, 2019. The traffic counts show that the weekday morning peak hour of traffic occurs from 7:15 to 8:15 a.m. and the weekday evening peak hour of traffic occurs from 4:30 to 5:30 p.m. **Exhibit 1** illustrates the existing peak hour traffic volumes while detailed traffic count data is contained in **Appendix A**. It should be noted that the eastbound right turn volume is 33.1% of the total traffic volume on the west leg.

III. Synchro Analysis

The ability of an intersection to accommodate traffic flow is expressed in terms of Level of Service (LOS), which is assigned a letter grade from A to F based on the average control delay experienced by vehicles passing through the intersection. Control delay is that portion of the total delay attributed to the stop sign control operation, and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Level of Service A is the highest grade (best traffic flow and least delay), Level of Service E represents saturated or at-capacity conditions, and Level of Service F is the lowest grade (oversaturated conditions, extensive delays).

Synchro analyses for the morning and evening peak hours were conducted to compare these traffic metrics for the existing geometry and proposed geometry. The two conditions are discussed below.

Existing Geometry

The Synchro analysis indicates that the intersection of Main Street and Crescent Boulevard is operating well with minimal delay and queuing during the weekday morning and evening peak hours. The results of the analysis are summarized in **Table 1** below:

Table 1: Capacity Analysis Results –Existing Geometry

Intersection	Weekday A.M. Peak			Weekday P.M. Peak		
	LOS	Delay (sec)	95 th Percentile Queue (veh)	LOS	Delay (sec)	95 th Percentile Queue (veh)
Main Street and Crescent Boulevard						
<i>Overall</i>	B	11.1	-	B	12.1	-
<i>Eastbound Approach</i>	B	10.5	0.8	B	10.1	0.6
<i>Westbound Approach</i>	-	-	-	-	-	-
<i>Northbound Approach</i>	B	10.2	1.1	B	10.8	1.3
<i>Southbound Approach</i>	B	11.6	2.4	B	13.2	3.5

The Levels of Service are well within an acceptable range for all movements. The detailed existing conditions results are contained in **Appendix B**.

Proposed Geometry

A Synchro analysis conducted with the proposed lane configuration indicates that the intersection of Main Street and Crescent Boulevard will continue to operate well under the proposed configuration with minimal delay and queuing during the weekday morning and evening peak hours. Synchro analysis results are highlighted in **Table 2** below:

Table 2: Capacity Analysis Results –Proposed Geometry

Intersection	Weekday A.M. Peak			Weekday P.M. Peak		
	LOS	Delay (sec)	95 th Percentile Queue (veh)	LOS	Delay (sec)	95 th Percentile Queue (veh)
Main Street and Crescent Boulevard						
<i>Overall</i>	B	10.8	-	B	11.9	-
<i>Eastbound Approach</i>	B	10.5	0.9	B	11.0	1.2
<i>Westbound Approach</i>	-	-	-	-	-	-
<i>Northbound Approach</i>	A	9.1	1.0	A	9.6	1.1
<i>Southbound Approach</i>	B	11.5	2.4	B	12.9	3.4

The Levels of Service are projected to be virtually unaffected by the removal of the right turn lane and would continue to remain well within an acceptable range for all movements. Additionally, the 95th percentile queue for the eastbound lane is around one vehicle for both the A.M. and P.M. peak hours, which is well within an acceptable range for a stop-controlled intersection. The detailed proposed conditions results are contained in **Appendix C**.

IV. Train Induced Blockages

While the Synchro analysis shows that the intersection would work well under typical conditions, it does not account for blockages caused by the railroad crossing. When the gates are down, traffic turning right from eastbound Crescent onto southbound Main queues up at the gates, and wraps the corner into the right turn lane. Should more than eight right-turning cars queue up, the queue spills out into the eastbound through lane, potentially blocking that movement. Eliminating the right turn lane cuts the amount of storage for queueing by about half to four cars, so an analysis was completed to determine the impact that this modification would have on eastbound traffic during times when the gates are down.

Civiltech reviewed video collected during the A.M. and P.M. peak hours to observe the eastbound to southbound right turn queues during the peak vehicle and Metra train traffic periods. When the gates are down during the morning peak, a maximum queue of four vehicles was noted. Therefore, the queues would not block eastbound traffic. During the evening peak hour, there is one instance where the queue was five vehicles when the gates were down, which would have led to a blockage if the right turn lane were not present. Given that the P.M. peak right turn volume is 75 cars in an hour (a little more than one per minute), this observation makes sense since the maximum gate down time was timed to be about three minutes. Also, it should be noted that the P.M. peak hour eastbound through volume is relatively light, at about 80 vehicles, so potential blockages would impact a minimal number of through vehicles.

Finally, the videos were reviewed to assess impacts during off-peak freight train crossings. While the most total train traffic occurs during the morning and evening rush hours, longer freight trains cause gates to be down longer than Metra trains. Thus, videos of three freight train crossings were reviewed, one during mid-morning, one during early afternoon, and one during mid-afternoon.

- Mid-morning – five vehicle right turn queue, one eastbound through vehicle after fourth car arrived
- Early afternoon – seven vehicle right turn queue, four eastbound through vehicles after fourth car arrived
- Mid-afternoon – five vehicle right turn queue, no eastbound through vehicles after fourth car arrived

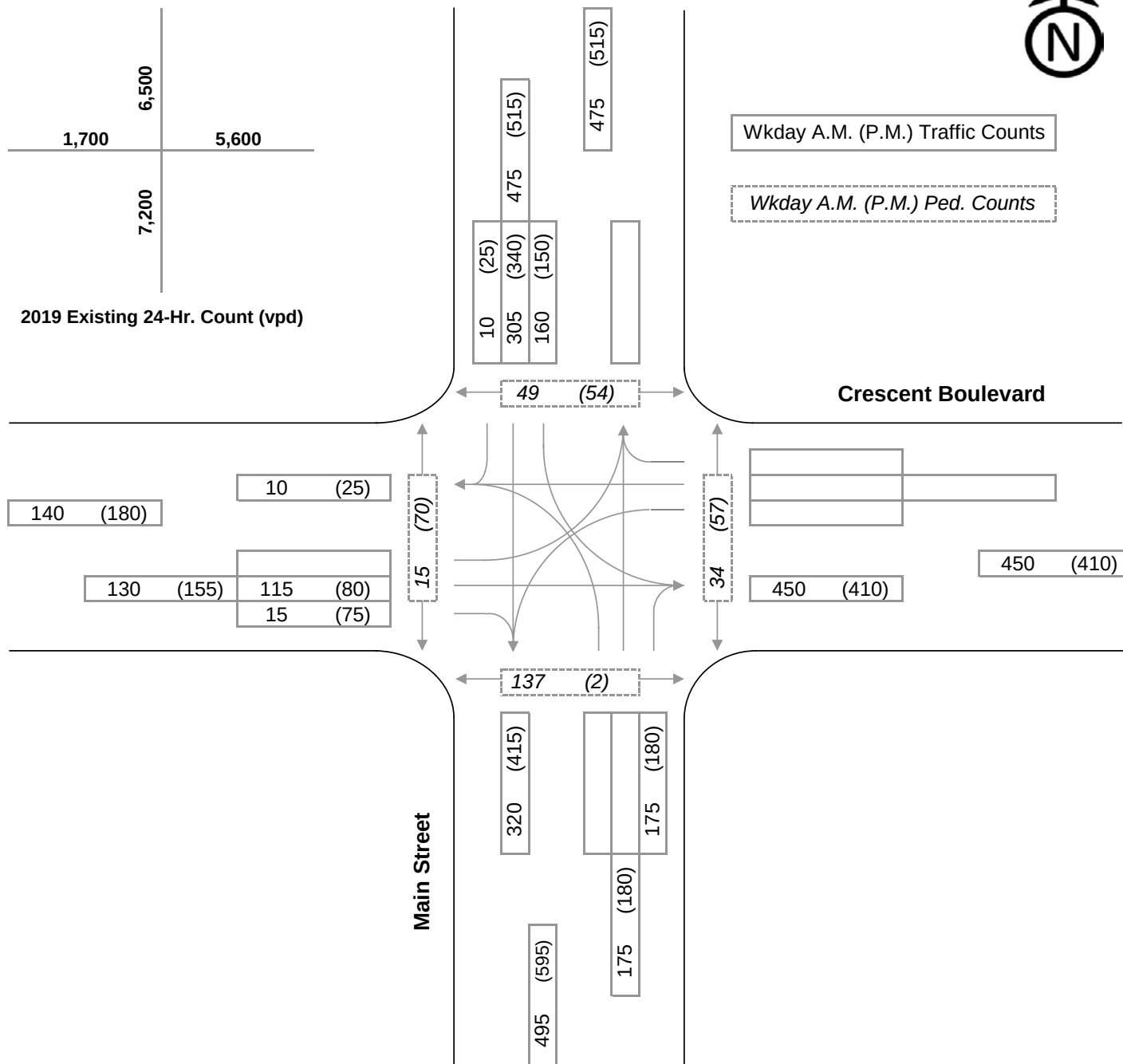
This evaluation shows that freight trains do cause slightly longer queues during off-peak periods. However, relatively few eastbound through vehicles would be impacted by consolidating the lanes on the west leg.

V. Recommendations and Conclusions

Based on the results of the capacity analyses and video observations, Civiltech recommends reconfiguring the west leg of Crescent Boulevard at Main Street to consolidate the separate right turn and through lanes into a single shared



through/right lane. The capacity analysis delay and queue lengths would only increase minimally during the morning and evening peak hours. There would be a few instances per day where trains (primarily mid-day freight trains) would cause right turns onto southbound Main Street to queue back and interfere with eastbound through Crescent Boulevard traffic. However, eastbound through volumes are low so relatively few drivers would be affected per train. Removing the right turn lane provides the benefit of adding two on-street parking spaces while additional sidewalk space could be provided along the south side of Crescent. Finally, pedestrian safety would be improved as the crossing distance across the west leg would be decreased and pedestrians would only have to contend with crossing two lanes of traffic instead of three. It is our opinion that the benefits provided by the providing the additional parking spaces, wider sidewalk and shorter crosswalk (which would be used by hundreds of people each day) outweigh the potential delays caused to a handful of motorists each day.



Vehicle Traffic Peak Hours:

7:15 A.M. to 8:15 A.M.

4:30 P.M. to 5:30 P.M.

Count Date(s):

Tuesday, 3/19/2019

Village of Glen Ellyn

CBD Streetscape and Utility Improvements

2019 Existing Peak Hour Traffic

Main Street and Crescent Boulevard



EXHIBIT 1

Prepared: 3/29/2019

File: PHD Main and Crescent.xlsx

APPENDIX A

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (1-hour intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
12:00 AM	0	13	4	17	8	0	0	8	25	0	1	0	1	1	0	0	1	2	27
1:00 AM	0	5	2	7	3	0	1	4	11	0	0	0	0	1	0	0	1	1	12
2:00 AM	0	6	2	8	4	0	0	4	12	0	0	0	0	0	1	0	1	1	13
3:00 AM	0	12	5	17	2	2	1	5	22	0	0	0	0	2	4	0	6	6	28
4:00 AM	1	12	3	16	10	0	0	10	26	1	0	0	1	1	1	0	2	3	29
5:00 AM	0	40	40	80	20	0	0	20	100	2	0	0	2	4	20	1	25	27	127
6:00 AM	5	114	98	217	82	0	0	82	299	0	0	0	0	5	40	0	45	45	344
7:00 AM	9	277	163	449	163	0	0	163	612	0	0	0	0	13	106	0	119	119	731
8:00 AM	9	315	133	457	153	0	0	153	610	0	0	0	0	23	91	0	114	114	724
9:00 AM	8	256	109	373	116	0	0	116	489	0	0	0	0	19	54	0	73	73	562
10:00 AM	16	259	105	380	182	0	0	182	562	0	0	0	0	22	51	0	73	73	635
11:00 AM	30	323	132	485	186	0	0	186	671	0	0	0	0	20	43	0	63	63	734
12:00 PM	26	290	152	468	211	0	0	211	679	0	0	0	0	29	52	0	81	81	760
1:00 PM	42	232	153	427	174	0	0	174	601	0	0	0	0	34	41	0	75	75	676
2:00 PM	39	257	141	437	207	0	0	207	644	0	0	0	0	28	55	0	83	83	727
3:00 PM	38	299	164	501	187	0	1	188	689	0	0	0	0	39	46	0	85	85	774
4:00 PM	34	290	153	477	164	0	0	164	641	0	0	0	0	51	67	0	118	118	759
5:00 PM	25	310	144	479	185	0	0	185	664	0	0	0	0	67	83	0	150	150	814
6:00 PM	21	263	135	419	174	0	0	174	593	0	0	0	0	49	59	0	108	108	701
7:00 PM	22	196	85	303	137	0	0	137	440	0	0	0	0	23	57	0	80	80	520
8:00 PM	11	149	61	221	112	0	0	112	333	0	0	0	0	12	22	0	34	34	367
9:00 PM	9	103	38	150	83	0	0	83	233	0	0	0	0	9	16	0	25	25	258
10:00 PM	7	67	18	92	59	0	0	59	151	0	0	0	0	1	7	0	8	8	159
11:00 PM	0	19	7	26	12	0	0	12	38	0	0	0	0	1	2	0	3	3	41
TOTAL	352	4107	2047	6506	2634	2	3	2639	9145	3	1	0	4	454	918	1	1373	1377	10522

24-Hour Vehicle Traffic Count

North Leg 6,500
South Leg 7,200
East Leg 5,600
West Leg 1,700

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
12:00 AM	0	5	2	7	3	0	0	3	10	0	0	0	0	1	0	0	1	1	11	27
12:15 AM	0	3	1	4	2	0	0	2	6	0	0	0	0	0	0	0	0	0	6	22
12:30 AM	0	4	1	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	19
12:45 AM	0	1	0	1	2	0	0	2	3	0	1	0	1	0	0	0	0	1	4	15
1:00 AM	0	2	2	4	1	0	0	1	5	0	0	0	0	1	0	0	1	1	6	12
1:15 AM	0	2	0	2	0	0	1	1	3	0	0	0	0	0	0	0	0	0	3	12
1:30 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	11
1:45 AM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	12
2:00 AM	0	2	1	3	2	0	0	2	5	0	0	0	0	0	1	0	1	1	6	13
2:15 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	15
2:30 AM	0	2	0	2	1	0	0	1	3	0	0	0	0	0	0	0	0	0	3	20
2:45 AM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	20
3:00 AM	0	2	1	3	1	1	0	2	5	0	0	0	0	2	1	0	3	3	8	28
3:15 AM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	3	0	3	3	7	26
3:30 AM	0	1	1	2	1	0	0	1	3	0	0	0	0	0	0	0	0	0	3	25
3:45 AM	0	5	3	8	0	1	1	2	10	0	0	0	0	0	0	0	0	0	10	29
4:00 AM	0	3	0	3	2	0	0	2	5	1	0	0	1	0	0	0	0	1	6	29
4:15 AM	0	2	2	4	2	0	0	2	6	0	0	0	0	0	0	0	0	0	6	46
4:30 AM	1	3	0	4	2	0	0	2	6	0	0	0	0	1	0	0	1	1	7	63
4:45 AM	0	4	1	5	4	0	0	4	9	0	0	0	0	0	1	0	1	1	10	84
5:00 AM	0	7	7	14	3	0	0	3	17	2	0	0	2	1	3	0	4	6	23	127
5:15 AM	0	5	12	17	2	0	0	2	19	0	0	0	0	1	3	0	4	4	23	163
5:30 AM	0	10	9	19	4	0	0	4	23	0	0	0	0	1	3	1	5	5	28	199
5:45 AM	0	18	12	30	11	0	0	11	41	0	0	0	0	1	11	0	12	12	53	247
6:00 AM	0	20	16	36	17	0	0	17	53	0	0	0	0	0	6	0	6	6	59	344
6:15 AM	0	13	22	35	15	0	0	15	50	0	0	0	0	2	7	0	9	9	59	434
6:30 AM	1	34	16	51	16	0	0	16	67	0	0	0	0	0	9	0	9	9	76	581
6:45 AM	4	47	44	95	34	0	0	34	129	0	0	0	0	3	18	0	21	21	150	707
7:00 AM	2	42	48	92	29	0	0	29	121	0	0	0	0	4	24	0	28	28	149	731
7:15 AM	4	72	36	112	62	0	0	62	174	0	0	0	0	0	32	0	32	32	206	775
7:30 AM	1	75	48	124	41	0	0	41	165	0	0	0	0	5	32	0	37	37	202	744

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
7:45 AM	2	88	31	121	31	0	0	31	152	0	0	0	0	4	18	0	22	22	174	716
8:00 AM	1	69	44	114	42	0	0	42	156	0	0	0	0	5	32	0	37	37	193	724
8:15 AM	2	73	30	105	32	0	0	32	137	0	0	0	0	8	30	0	38	38	175	687
8:30 AM	2	85	35	122	30	0	0	30	152	0	0	0	0	9	13	0	22	22	174	639
8:45 AM	4	88	24	116	49	0	0	49	165	0	0	0	0	1	16	0	17	17	182	604
9:00 AM	2	84	27	113	25	0	0	25	138	0	0	0	0	5	13	0	18	18	156	562
9:15 AM	1	48	29	78	30	0	0	30	108	0	0	0	0	4	15	0	19	19	127	569
9:30 AM	1	69	25	95	30	0	0	30	125	0	0	0	0	6	8	0	14	14	139	595
9:45 AM	4	55	28	87	31	0	0	31	118	0	0	0	0	4	18	0	22	22	140	599
10:00 AM	4	77	23	104	42	0	0	42	146	0	0	0	0	5	12	0	17	17	163	635
10:15 AM	2	57	25	84	41	0	0	41	125	0	0	0	0	10	18	0	28	28	153	639
10:30 AM	4	59	24	87	45	0	0	45	132	0	0	0	0	1	10	0	11	11	143	661
10:45 AM	6	66	33	105	54	0	0	54	159	0	0	0	0	6	11	0	17	17	176	725
11:00 AM	2	80	33	115	41	0	0	41	156	0	0	0	0	6	5	0	11	11	167	734
11:15 AM	6	77	38	121	42	0	0	42	163	0	0	0	0	4	8	0	12	12	175	720
11:30 AM	10	85	36	131	59	0	0	59	190	0	0	0	0	4	13	0	17	17	207	726
11:45 AM	12	81	25	118	44	0	0	44	162	0	0	0	0	6	17	0	23	23	185	718
12:00 PM	13	55	27	95	42	0	0	42	137	0	0	0	0	8	8	0	16	16	153	760
12:15 PM	8	72	30	110	50	0	0	50	160	0	0	0	0	8	13	0	21	21	181	782
12:30 PM	3	78	34	115	64	0	0	64	179	0	0	0	0	4	16	0	20	20	199	769
12:45 PM	2	85	61	148	55	0	0	55	203	0	0	0	0	9	15	0	24	24	227	752
1:00 PM	8	54	44	106	50	0	0	50	156	0	0	0	0	10	9	0	19	19	175	676
1:15 PM	12	56	41	109	43	0	0	43	152	0	0	0	0	7	9	0	16	16	168	686
1:30 PM	13	65	33	111	45	0	0	45	156	0	0	0	0	10	16	0	26	26	182	674
1:45 PM	9	57	35	101	36	0	0	36	137	0	0	0	0	7	7	0	14	14	151	679
2:00 PM	12	65	35	112	51	0	0	51	163	0	0	0	0	8	14	0	22	22	185	727
2:15 PM	5	56	34	95	52	0	0	52	147	0	0	0	0	0	9	0	9	9	156	764
2:30 PM	11	64	31	106	59	0	0	59	165	0	0	0	0	9	13	0	22	22	187	804
2:45 PM	11	72	41	124	45	0	0	45	169	0	0	0	0	11	19	0	30	30	199	800
3:00 PM	10	103	36	149	54	0	1	55	204	0	0	0	0	7	11	0	18	18	222	774
3:15 PM	10	54	51	115	56	0	0	56	171	0	0	0	0	15	10	0	25	25	196	738

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
3:30 PM	11	77	37	125	44	0	0	44	169	0	0	0	0	6	8	0	14	14	183	710
3:45 PM	7	65	40	112	33	0	0	33	145	0	0	0	0	11	17	0	28	28	173	725
4:00 PM	18	66	32	116	36	0	0	36	152	0	0	0	0	16	18	0	34	34	186	759
4:15 PM	3	64	38	105	41	0	0	41	146	0	0	0	0	8	14	0	22	22	168	813
4:30 PM	9	79	35	123	42	0	0	42	165	0	0	0	0	15	18	0	33	33	198	853
4:45 PM	4	81	48	133	45	0	0	45	178	0	0	0	0	12	17	0	29	29	207	842
5:00 PM	8	99	33	140	53	0	0	53	193	0	0	0	0	25	22	0	47	47	240	814
5:15 PM	5	82	33	120	40	0	0	40	160	0	0	0	0	24	24	0	48	48	208	751
5:30 PM	9	63	45	117	42	0	0	42	159	0	0	0	0	9	19	0	28	28	187	747
5:45 PM	3	66	33	102	50	0	0	50	152	0	0	0	0	9	18	0	27	27	179	701
6:00 PM	6	76	32	114	39	0	0	39	153	0	0	0	0	10	14	0	24	24	177	701
6:15 PM	3	72	40	115	56	0	0	56	171	0	0	0	0	18	15	0	33	33	204	662
6:30 PM	1	55	33	89	31	0	0	31	120	0	0	0	0	9	12	0	21	21	141	583
6:45 PM	11	60	30	101	48	0	0	48	149	0	0	0	0	12	18	0	30	30	179	590
7:00 PM	7	48	24	79	35	0	0	35	114	0	0	0	0	4	20	0	24	24	138	520
7:15 PM	8	45	29	82	30	0	0	30	112	0	0	0	0	3	10	0	13	13	125	470
7:30 PM	5	55	21	81	42	0	0	42	123	0	0	0	0	10	15	0	25	25	148	426
7:45 PM	2	48	11	61	30	0	0	30	91	0	0	0	0	6	12	0	18	18	109	387
8:00 PM	1	35	15	51	28	0	0	28	79	0	0	0	0	3	6	0	9	9	88	367
8:15 PM	3	32	14	49	25	0	0	25	74	0	0	0	0	3	4	0	7	7	81	385
8:30 PM	2	46	22	70	29	0	0	29	99	0	0	0	0	3	7	0	10	10	109	360
8:45 PM	5	36	10	51	30	0	0	30	81	0	0	0	0	3	5	0	8	8	89	307
9:00 PM	2	48	20	70	26	0	0	26	96	0	0	0	0	4	6	0	10	10	106	258
9:15 PM	2	21	8	31	19	0	0	19	50	0	0	0	0	3	3	0	6	6	56	206
9:30 PM	5	16	6	27	23	0	0	23	50	0	0	0	0	2	4	0	6	6	56	185
9:45 PM	0	18	4	22	15	0	0	15	37	0	0	0	0	0	3	0	3	3	40	168
10:00 PM	2	33	4	39	13	0	0	13	52	0	0	0	0	0	2	0	2	2	54	159
10:15 PM	1	12	5	18	16	0	0	16	34	0	0	0	0	0	1	0	1	1	35	117
10:30 PM	2	15	3	20	16	0	0	16	36	0	0	0	0	1	2	0	3	3	39	99
10:45 PM	2	7	6	15	14	0	0	14	29	0	0	0	0	0	2	0	2	2	31	67
11:00 PM	0	7	3	10	2	0	0	2	12	0	0	0	0	0	0	0	0	0	12	41

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Vehicles (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
11:15 PM	0	8	1	9	7	0	0	7	16	0	0	0	0	0	1	0	1	1	17	
11:30 PM	0	2	1	3	2	0	0	2	5	0	0	0	0	1	1	0	2	2	7	
11:45 PM	0	2	2	4	1	0	0	1	5	0	0	0	0	0	0	0	0	0	5	
TOTAL	352	4107	2047	6506	2634	2	3	2639	9145	3	1	0	4	454	918	1	1373	1377	10522	

Morning Peak Hour

	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	Intersection Total
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
7:15 AM	8	304	159	471	176	0	0	176	647	0	0	0	0	14	114	0	128	128	775
Percent Trucks	0.0%	1.6%	3.1%	2.1%	3.4%	#DIV/0!	#DIV/0!	3.4%	2.5%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.0%	#DIV/0!	0.0%	0.0%	2.1%

Intersection Peak Hour Factor =

0.94

Evening Peak Hour

	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches	Intersection Total
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total		
4:30 PM	26	341	149	516	180	0	0	180	696	0	0	0	0	76	81	0	157	157	853
Percent Trucks	0.0%	0.9%	0.7%	0.8%	0.0%	#DIV/0!	#DIV/0!	0.0%	0.6%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	0.0%	#DIV/0!	0.0%	0.0%	0.5%

Intersection Peak Hour Factor =

0.89

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45 AM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	3
2:00 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:30 AM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 AM	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
4:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	2
4:15 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
5:00 AM	0	0	1	1	0	0	0	0	1	2	0	0	2	0	0	0	0	2	3	9
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
5:30 AM	0	1	1	2	0	0	0	0	2	0	0	0	0	1	0	1	2	2	4	12
5:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	2	10
6:00 AM	0	4	1	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	9
6:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6
6:30 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	10
6:45 AM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	11
7:00 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	14
7:15 AM	0	2	0	2	3	0	0	3	5	0	0	0	0	0	0	0	0	0	5	16
7:30 AM	0	1	2	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	24
7:45 AM	0	1	1	2	2	0	0	2	4	0	0	0	0	0	0	0	0	0	4	27

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
8:00 AM	0	1	2	3	1	0	0	1	4	0	0	0	0	0	0	0	0	0	4	24
8:15 AM	0	6	0	6	7	0	0	7	13	0	0	0	0	0	0	0	0	0	13	25
8:30 AM	0	4	1	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	14
8:45 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	12
9:00 AM	0	4	0	4	0	0	0	0	4	0	0	0	0	1	0	0	1	1	5	13
9:15 AM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	12
9:30 AM	0	0	3	3	1	0	0	1	4	0	0	0	0	0	0	0	0	0	4	14
9:45 AM	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	16
10:00 AM	0	0	1	1	2	0	0	2	3	0	0	0	0	1	0	0	1	1	4	23
10:15 AM	0	1	1	2	1	0	0	1	3	0	0	0	0	0	1	0	1	1	4	25
10:30 AM	0	4	1	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	27
10:45 AM	0	1	4	5	3	0	0	3	8	0	0	0	0	1	0	0	1	1	9	27
11:00 AM	0	4	0	4	1	0	0	1	5	0	0	0	0	1	0	0	1	1	6	25
11:15 AM	0	2	4	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	23
11:30 AM	1	5	0	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	22
11:45 AM	0	3	1	4	2	0	0	2	6	0	0	0	0	0	1	0	1	1	7	18
12:00 PM	0	4	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	20
12:15 PM	0	2	0	2	1	0	0	1	3	0	0	0	0	0	2	0	2	2	5	22
12:30 PM	0	0	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	21
12:45 PM	1	2	2	5	3	0	0	3	8	0	0	0	0	1	0	0	1	1	9	21
1:00 PM	0	2	3	5	1	0	0	1	6	0	0	0	0	0	0	0	0	0	6	14
1:15 PM	0	1	1	2	1	0	0	1	3	0	0	0	0	1	0	0	1	1	4	16
1:30 PM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	20
1:45 PM	0	1	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	21
2:00 PM	1	6	1	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	8	20
2:15 PM	0	3	1	4	3	0	0	3	7	0	0	0	0	0	1	0	1	1	8	16
2:30 PM	1	0	0	1	2	0	0	2	3	0	0	0	0	0	0	0	0	0	3	11
2:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	9
3:00 PM	0	2	1	3	1	0	0	1	4	0	0	0	0	0	0	0	0	0	4	8
3:15 PM	0	2	1	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	6
3:30 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
4:00 PM	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	0	0	2	7
4:15 PM	0	0	1	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	6
4:30 PM	0	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	4
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6:15 PM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	1	0	1	1	3	6
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
7:00 PM	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:15 PM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10:45 PM	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 PM	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	
11:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Project CBD Streetscape and Utility Improvements
Count Date 3/19/2019

Total Trucks (15-minute intervals)

Start Time	Main Street									Crescent Boulevard									Intersection Total	Hour Sums
	North Approach				South Approach				Both Approaches	East Approach				West Approach				Both Approaches		
	Right	Thru	Left	Total	Right	Thru	Left	Total		Right	Thru	Left	Total	Right	Thru	Left	Total			
TOTAL	4	90	45	139	47	1	0	48	187	3	0	0	3	7	7	1	15	18	205	

Morning Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
7:15 AM	0	5	5	10	6	0	0	6	16	0	0	0	0	0	0	0	0	0	16

Evening Peak Hour

	North Approach				South Approach				Both	East Approach				West Approach				Both	Intersection
	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Right	Thru	Left	Total	Right	Thru	Left	Total	Approaches	Total
4:30 PM	0	3	1	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4

APPENDIX B

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑						↑	↑	↑	↑
Traffic Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Future Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	0	0	0	0	0	0	0	3	3	2	0
Mvmt Flow	0	122	16	0	0	0	0	0	186	170	324	11
Number of Lanes	0	1	1	0	0	0	0	0	1	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.5	10.2	11.6
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	115	15	160	305	10
LT Vol	0	0	0	160	0	0
Through Vol	0	115	0	0	305	0
RT Vol	175	0	15	0	0	10
Lane Flow Rate	186	122	16	170	324	11
Geometry Grp	8	8	8	7	7	7
Degree of Util (X)	0.279	0.216	0.025	0.267	0.462	0.013
Departure Headway (Hd)	5.389	6.354	5.649	5.641	5.121	4.382
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	670	568	637	631	698	808
Service Time	3.089	4.063	3.358	3.419	2.898	2.159
HCM Lane V/C Ratio	0.278	0.215	0.025	0.269	0.464	0.014
HCM Control Delay	10.2	10.8	8.5	10.5	12.3	7.2
HCM Lane LOS	B	B	A	B	B	A
HCM 95th-tile Q	1.1	0.8	0.1	1.1	2.4	0

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑						↑	↑	↑	↑
Traffic Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Future Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	0
Mvmt Flow	0	90	84	0	0	0	0	0	202	169	382	28
Number of Lanes	0	1	1	0	0	0	0	0	1	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.1	10.8	13.2
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	80	75	150	340	25
LT Vol	0	0	0	150	0	0
Through Vol	0	80	0	0	340	0
RT Vol	180	0	75	0	0	25
Lane Flow Rate	202	90	84	169	382	28
Geometry Grp	8	8	8	7	7	7
Degree of Util (X)	0.313	0.164	0.138	0.272	0.564	0.036
Departure Headway (Hd)	5.576	6.585	5.879	5.816	5.312	4.589
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	645	546	610	622	684	785
Service Time	3.307	4.319	3.612	3.516	3.012	2.289
HCM Lane V/C Ratio	0.313	0.165	0.138	0.272	0.558	0.036
HCM Control Delay	10.8	10.6	9.6	10.7	14.7	7.5
HCM Lane LOS	B	B	A	B	B	A
HCM 95th-tile Q	1.3	0.6	0.5	1.1	3.5	0.1

APPENDIX C

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Future Vol, veh/h	0	115	15	0	0	0	0	0	175	160	305	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	0	0	0	0	0	0	0	3	3	2	0
Mvmt Flow	0	122	16	0	0	0	0	0	186	170	324	11
Number of Lanes	0	1	0	0	0	0	0	0	1	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.5	9.1	11.5
HCM LOS	B	A	B

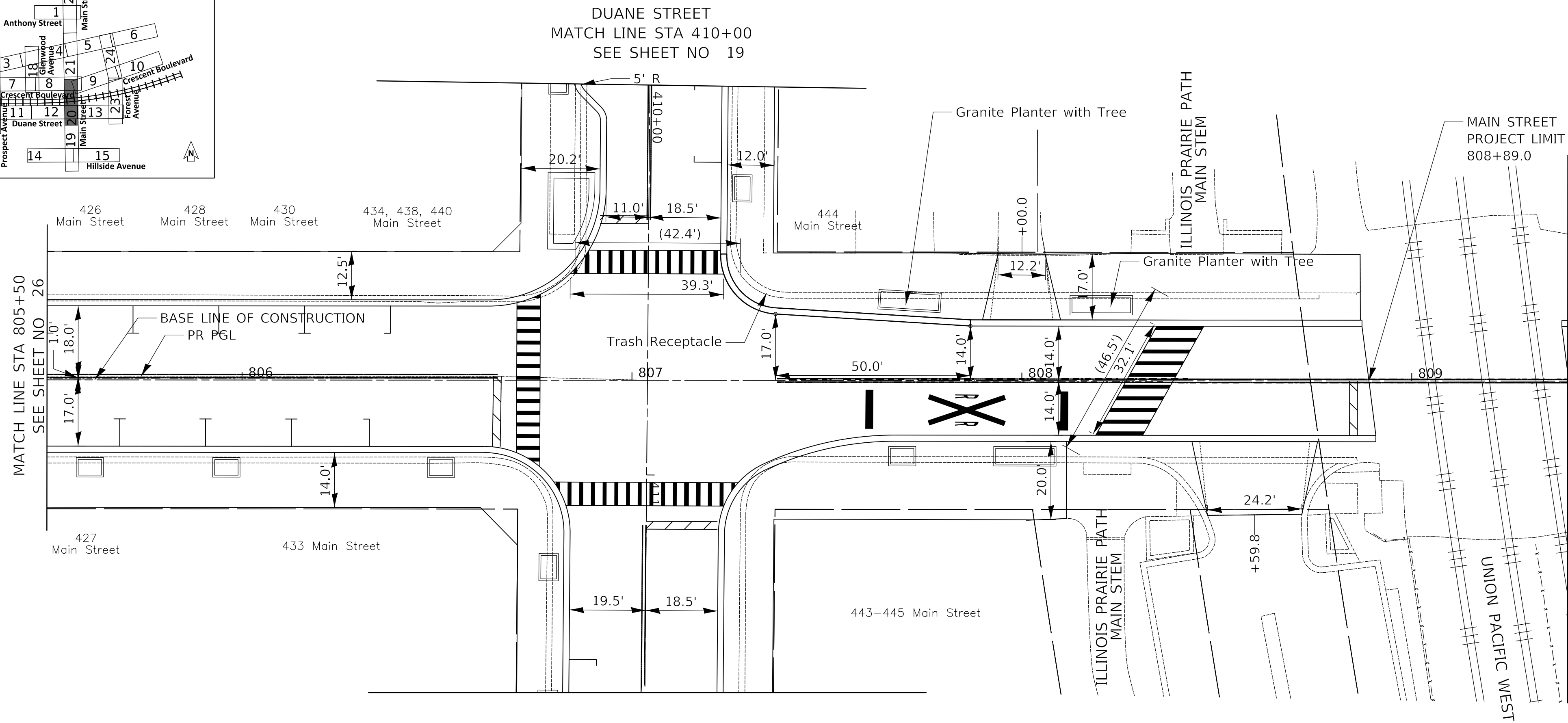
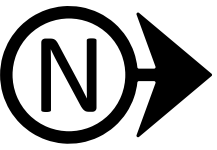
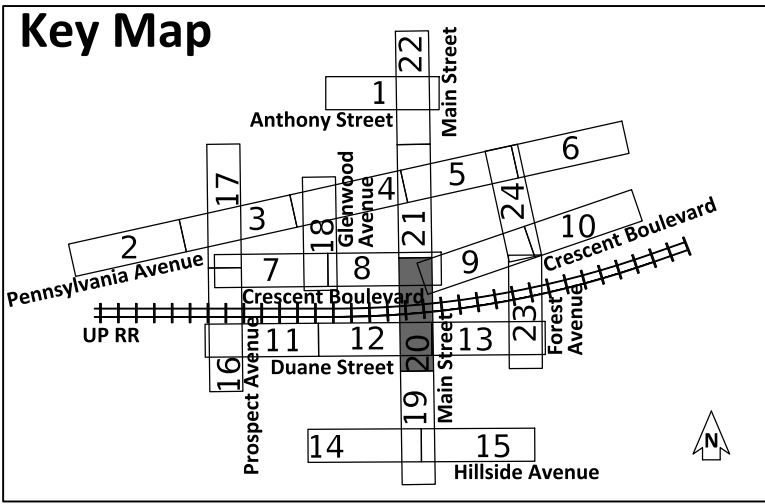
Lane	NBLn1	EBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	100%	0%	0%
Vol Thru, %	0%	88%	0%	100%	0%
Vol Right, %	100%	12%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	130	160	305	10
LT Vol	0	0	160	0	0
Through Vol	0	115	0	305	0
RT Vol	175	15	0	0	10
Lane Flow Rate	186	138	170	324	11
Geometry Grp	7	7	7	7	7
Degree of Util (X)	0.247	0.229	0.266	0.46	0.013
Departure Headway (Hd)	4.776	5.958	5.628	5.108	4.369
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	747	599	637	701	814
Service Time	2.546	3.732	3.383	2.863	2.124
HCM Lane V/C Ratio	0.249	0.23	0.267	0.462	0.014
HCM Control Delay	9.1	10.5	10.4	12.2	7.2
HCM Lane LOS	A	B	B	B	A
HCM 95th-tile Q	1	0.9	1.1	2.4	0

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

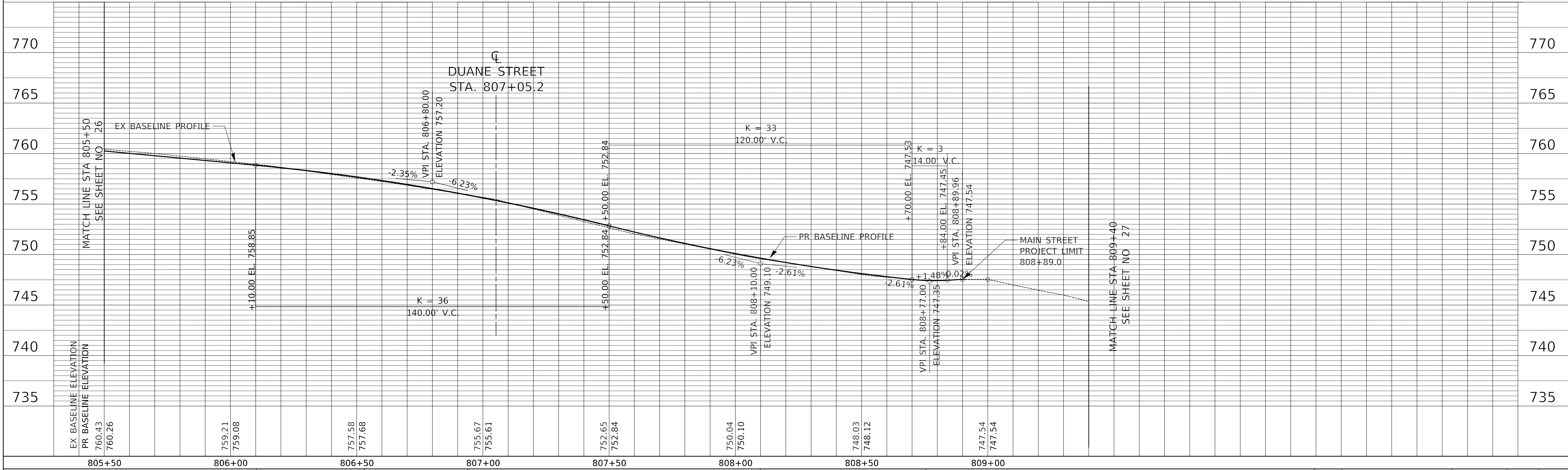
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Future Vol, veh/h	0	80	75	0	0	0	0	0	180	150	340	25
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	0
Mvmt Flow	0	90	84	0	0	0	0	0	202	169	382	28
Number of Lanes	0	1	0	0	0	0	0	0	1	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	11	9.6	12.9
HCM LOS	B	A	B

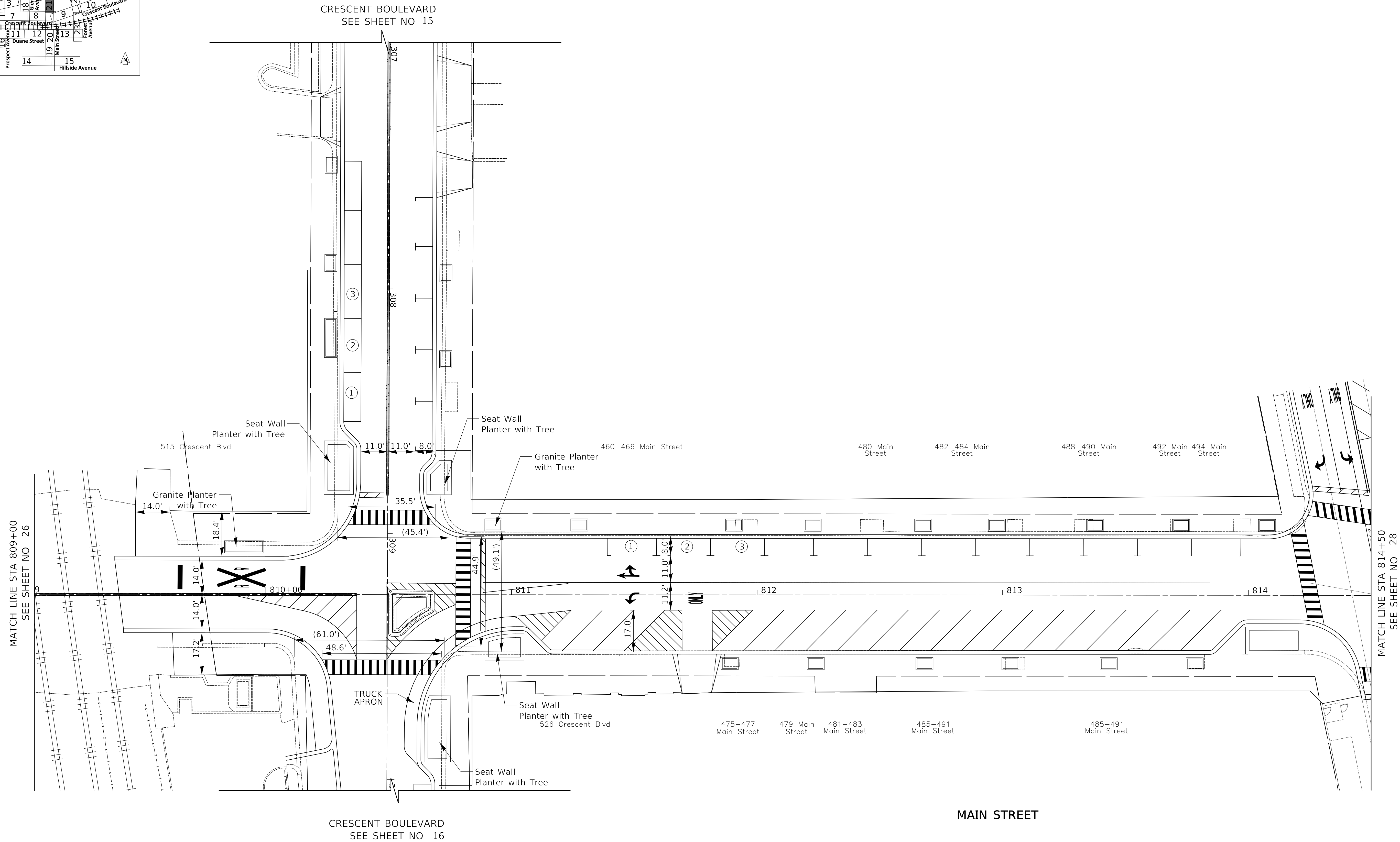
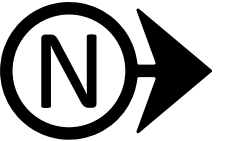
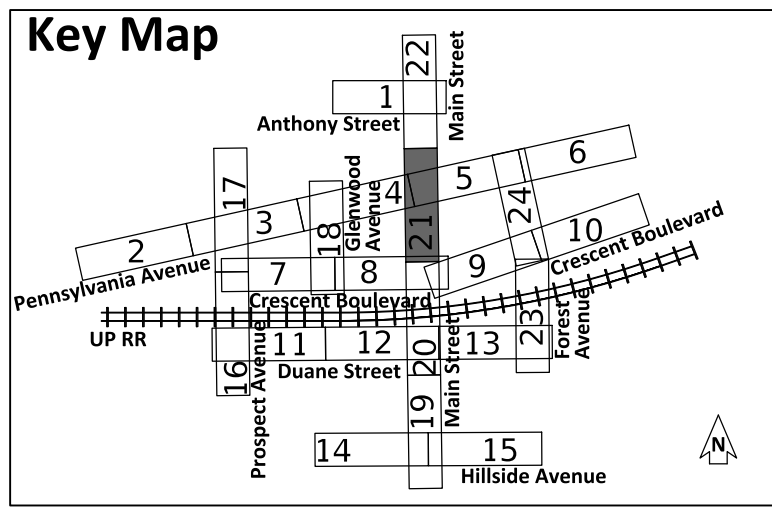
Lane	NBLn1	EBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	100%	0%	0%
Vol Thru, %	0%	52%	0%	100%	0%
Vol Right, %	100%	48%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	155	150	340	25
LT Vol	0	0	150	0	0
Through Vol	0	80	0	340	0
RT Vol	180	75	0	0	25
Lane Flow Rate	202	174	169	382	28
Geometry Grp	7	7	7	7	7
Degree of Util (X)	0.276	0.284	0.268	0.553	0.035
Departure Headway (Hd)	4.921	5.876	5.716	5.213	4.49
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	720	606	624	688	789
Service Time	2.715	3.671	3.49	2.986	2.263
HCM Lane V/C Ratio	0.281	0.287	0.271	0.555	0.035
HCM Control Delay	9.6	11	10.6	14.3	7.4
HCM Lane LOS	A	B	B	B	A
HCM 95th-tile Q	1.1	1.2	1.1	3.4	0.1



MAIN STREET



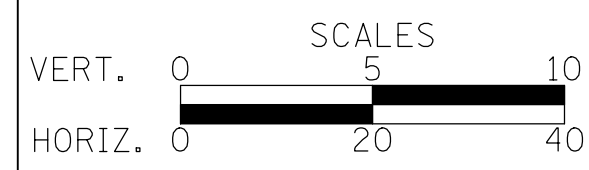
	Two Pierce Place, Suite 1400 Itasca, Illinois 60143 Tel: 630.773.3900 Fax: 630.773.3975 www.civiltechinc.com	DESIGNED - TGB	REVISED -
		DRAWN - JRR	REVISED -
		CHECKED - KRK	REVISED -
		DATE -	REVISED -
VILLAGE OF GLEN ELLYN			
VERT. 0 5 10 HORIZ. 0 20 40		PLAN AND PROFILE MAIN STREET	
SHEET NO. 20 OF 24 SHEETS		STA. 805+50 TO STA. 809+00	
F.A.U. RTE.		SECTION	COUNTY
		DUPAGE	ILLINOIS
		TOTAL SHEETS	SHEET NO.
		109	27
FED. ROAD DIST. NO. 1			



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CHECKED -	KRK	REVISED -	
DATE -		REVISED -	

VILLAGE OF GLEN ELLYN



**PLAN AND PROFILE
MAIN STREET**

SHEET NO. 21 OF 24 SHEETS STA. 809+00 TO STA. 814+00

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		DUPAGE	109	27
FED. ROAD DIST. NO. 1 ILLINOIS FED. AID PROJECT				



**Glen Ellyn Capital
Improvements Commission**
535 Duane Street
Glen Ellyn, IL 60137

Meeting 5/11/2021 7:00 PM
Department: Public Works
Department Head: Dave Buckley
Category: Discussion Item
Prepared By: Rich Daubert

**AGENDA ITEM (ID # 2021-
1125)**

DOC ID: 2021-1125

Park Boulevard and Sheehan Avenue Intersection Improvements

Statement of the Issue:

As outlined in the attached "Park-Sheehan Analysis Memo-Final 11-30-2020" pedestrians are at times experiencing challenges in walking across the south leg of the Park Boulevard and Sheehan Avenue intersection.

Commissioner Neurauter has worked closely with staff to outline the challenges pedestrians are facing at this intersection, particularly with westbound left turning vehicles failing to yield to pedestrians at times. As a product, staff retained Civiltech Engineering to complete traffic counts, video surveillance, and computerized traffic analysis of the intersection.

Based on analysis of the intersection, implementation of a leading pedestrian interval to prioritize pedestrian right-of-way over vehicular traffic has been recommended.

Staff worked with Civiltech to complete the study and identify several supplemental improvements including replacement of the traffic signal controller, replacement of the pedestrian signal heads with countdown pedestrian signal heads, and replacement of the pedestrian push buttons.

Analysis:

Please see the attached Park-Sheehan Analysis Memo-Final 11-30-2020.

Budget Impact:

Sufficient funds have been allocated in the 2021 to implement these improvements.

Action Requested:

Commissioner Neurauter and Staff would like to briefly report with the CIC on this matter.

Attachments:

1. Park-Sheehan Analysis Memo-Final 11-30-2020



Civiltech Engineering, Inc.
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Transportation

Civil

Construction

Environmental

Water Resources

Structural

Appraisal

Technical Memorandum

Date: November 30, 2020
To: Mr. Rich Daubert, P.E.
Professional Engineer
Village of Glen Ellyn
From: Steven A. Pautsch, P.E., PTOE
Brian R. DeSalle, P.E., PTOE
Civiltech Engineering, Inc.
Re: Intersection Safety and Operations Study
Park Boulevard at Sheehan Avenue/Winchell Way

The Village of Glen Ellyn (Village) has requested that Civiltech Engineering, Inc. (Civiltech) investigate potential pedestrian safety improvements at the signalized intersection of Park Boulevard and Sheehan Avenue/Winchell Way. A study performed by a local resident reported that young families have moved into the residential areas near the intersection in recent years, resulting in an increase in pedestrian traffic at the intersection. The intersection is located between Park View Elementary School and Glen Crest Middle School. As a result, schoolchildren cross at the intersection both with and without adults present during school arrival and dismissal periods. A crossing guard is present at the intersection during Park View Elementary arrival and dismissal periods.

The resident study cited previously also reported several incidents between pedestrians and vehicles at the intersection, especially between pedestrians crossing the south approach of the intersection and westbound vehicles turning left from Sheehan Avenue to go south on Park Boulevard. The study also mentioned that drivers reported difficulty seeing pedestrians within the south crosswalk due to sun glare during the afternoon and evening hours. Motorists face an additional challenge due to the significant offset between the east and west legs of the intersection, making it difficult to see eastbound vehicles on Winchell Way when stopped on the Sheehan Avenue approach.

The purpose of the current study is to investigate the existing conditions at the intersection, review relevant crash data, and provide potential recommendations to reduce the potential for conflicts between motorists and pedestrians at the intersection.

I. EXISTING CONDITIONS

Exhibit 1 shows the location of the subject intersection. Park Boulevard, Sheehan Avenue, and Winchell Way are all under the jurisdiction of the Village of Glen Ellyn. The intersection of Park Boulevard and Sheehan Avenue/Winchell Way is a signalized intersection, with protected-permitted left turn phasing provided for Park Boulevard approaches. Pedestrian push-buttons and signals are present for all crosswalks at the intersection, although it is noted that the existing pedestrian signals do not have countdown timers. **Exhibit 2** is a 2016 aerial photograph of the intersection. Park Boulevard is a major collector street consisting of two lanes in each direction separated by a double yellow centerline striping. At its intersection with Sheehan Avenue/Winchell Way, Park Boulevard has exclusive left turn lanes in both directions. The posted speed limit is 35 mph, however, the northern limit of a 20 mph school speed zone for Park View Elementary School exists just south of the intersection. Sheehan Avenue is a one-lane minor collector street, and Winchell Way is a local street that serves as access for the Village Links and Reserve 22 Restaurant. Both roadways have a single approach lane for all movements at Park Boulevard.

Park View Elementary School is located on the southwest quadrant of the intersection and serves 462 students (2019) in kindergarten through fifth grade. Park View's school days begin at 8:50 a.m. and end at 3:35 p.m. Glen Crest Middle School is located three blocks to the east of the intersection along Sheehan Avenue and serves 684 students (2019) in sixth through eighth grade. Typical school days begin at 7:50 a.m. and end at 2:35 p.m. at Glen Crest. Also of note is that two access points to the College of DuPage are located within one mile to the south along Park Boulevard at 22nd Street and College Road. Arrival and dismissal periods for class changeover times at College of DuPage also have an effect on traffic intensity at the intersection.

A. Traffic Counts

For this study, a 24-hour video traffic count was conducted at the intersection on Tuesday, February 11, 2020. The peak hour traffic count data is summarized on **Exhibit 3**. The peak vehicle traffic hours at the intersection were found to be 7:00 a.m. to 8:00 a.m. and 5:00 p.m. to 6:00 p.m. While these time periods were found to be the peak vehicle traffic hours, they do not correspond to the highest pedestrian volumes, which are the focus of this study. Therefore, the peak vehicle traffic hours have not been used for the analyses contained in this study. Instead, the peak pedestrian hours, which are from 7:45 a.m. to 8:45 a.m. and 2:45 p.m. to 3:45 p.m., are the focus of the analyses in this study. The hourly traffic volumes which occur during the peak pedestrian traffic hours are provided on **Exhibit 4**.

The traffic count revealed that there are distinct 20-minute pedestrian peak periods during both the morning school arrival and afternoon school dismissal periods. These periods occur between 8:25 to 8:45 A.M. and 3:30 to 3:50 P.M. During these periods, the number of westbound to southbound left turns also increase significantly as a result of pick-up and drop-off operations at Glen Crest Middle School. The increase in westbound to southbound left turns corresponds to peak pedestrian volumes across the south leg of the intersection, potentially resulting in the vehicle-pedestrian conflicts mentioned in the resident study discussed previously.

B. Field Observations

In order to observe queuing and driver/pedestrian behavior, additional cameras were placed at the intersections of Lowden Avenue/Park Boulevard, Park View Elementary North Entrance/Park Boulevard, and Sheehan Avenue/Ellyn Avenue. These camera locations are shown on **Exhibit 2** for reference. The key findings from the field observations are as follows:

- Westbound Sheehan Avenue queues were found to extend back to Ellyn Avenue for a short period as a result of Glen Crest morning arrival period traffic. These queues did not recur during the afternoon dismissal period.
- Westbound drivers appear to accelerate on Sheehan Avenue when a green light is visible at Park Boulevard.
- Southbound Park Boulevard queues extend to Lowden Avenue briefly at times during the A.M. school arrival periods, but are not significant during P.M. dismissal periods.
- Northbound Park Boulevard queues were not observed to be significant during the A.M. and P.M. school arrival and dismissal periods.
- Crossing guard was present from 8:20 a.m. to 8:45 a.m. and 3:20 p.m. to 3:45 p.m. at the south crosswalk of Park/Sheehan. It was noted that the crossing guard in several cases stood a few feet north of the crosswalk to be more visible to westbound left turning motorists, especially during the afternoon period.
- There were no “near-miss” incidents observed between westbound left turning vehicles and pedestrians in the south crosswalk during the time periods recorded for field observations.

II. CRASH ANALYSIS

Intersection crash data spanning the period from 2014 through December 2018 was collected from the Village of Glen Ellyn. The crashes occurring at the intersection during this period are summarized in **Table 1**. A collision diagram was prepared and is presented in **Exhibit 5**.

Table 1
Intersection Crash Summary, January 2014 to December 2018
Park Boulevard at Sheehan Avenue/Winchell Way

Year	Crash Type							Total
	Right Angle	Left Turn	Rear End	Sideswipe	Fixed Object	Ped/Bike	Other	
2014	0	0	0	1	0	0	0	1
2015	0	0	1	0	0	0	0	1
2016	0	0	1	1	0	0	0	2
2017	0	0	1	0	0	1	0	2
2018	0	0	1	0	0	0	0	1
Total	0	0	4	2	0	1	0	7

As can be seen in this table, the number of crashes at the intersection is low, with only 1-2 per year. However, of the seven reported collisions, three involved injuries with one of them classified as severe. The majority of crashes were either rear end collisions or sideswipe collisions. Nearly all of the crashes occurred on Park Boulevard, with only one rear end crash occurring on the Sheehan Way approach. The single pedestrian crash is notable for being the one severe crash that occurred during the analysis period. Examination of the police report revealed that the pedestrian entered the south crosswalk before receiving the walk signal and was struck by a southbound driver entering the intersection on a yellow signal.

III. DISCUSSION OF INTERSECTION MODIFICATION ALTERNATIVES

A. Near-Term Intersection Alternatives

In order to reduce the potential for conflicts between pedestrians and motorists at the Park Boulevard/Sheehan Avenue/Winchell Way intersection, two near-term intersection modification alternatives involving traffic signal modifications were examined and are briefly presented below. Additional information about each of these alternatives is presented in **Table 3**.

The first near-term alternative involves implementation of a leading pedestrian interval (LPI) for the crosswalks crossing Park Boulevard. The goal of the LPI is to give pedestrians a head start across the crosswalk by providing extra crossing time before the corresponding vehicle phases are given the green signal indication. This also improves pedestrian visibility by giving drivers additional time to see the pedestrians in the crosswalk.

The second near-term alternative involves implementation of an exclusive pedestrian phase (EPP). The EPP provides a separate phase in which pedestrians can cross one or more crosswalks at the intersection while all vehicle movements are shown a red signal indication. The goal of the EPP is to provide additional pedestrian security by allowing pedestrians time to cross while greatly diminishing the risk of conflicts with motorists. It should be noted that pedestrians would no longer be permitted to move concurrently with vehicle movements if an EPP is implemented.

An additional option considered was a hybrid of the two alternatives, with an EPP during the A.M. and P.M. peak periods and either a LPI or traditional pedestrian phasing during off-peak periods. The primary concern regarding a variable pedestrian phase scheme such as this would be potential confusion of pedestrians and motorists who travel through the intersection at different times of day while different pedestrian phasings are active. To conform to motorist and pedestrian expectations, most agencies in the region choose to maintain consistent phasing throughout the day.

B. Operational Analysis of Near-Term Alternatives

Since the proposed near-term alternatives will affect the capacity of the intersection, the impact to the traffic operations at the intersection were evaluated using the *Highway Capacity Manual* (HCM) methodology as implemented in the Synchro capacity analysis software for existing conditions and each of the proposed near-term alternatives. It was noted previously that the pedestrian peak periods are approximately 20 minutes in length, which is shorter than the one hour analysis periods used in the HCM methodology. In order to evaluate the impact of these short-term bursts of activity, the intersection was analyzed by using the vehicle and pedestrian volumes during the 20-minute period and multiplying by three to get hourly volumes reflecting the same traffic intensity as that which occurs during the 20-minute period. The factored traffic volumes used in the Synchro analyses are provided as **Exhibit A-1** in **Appendix A**.

Conventional pedestrian signal timing consists of a walk phase (indicated by a walking person symbol on pedestrian signal heads) and a pedestrian clearance phase (indicated by a flashing upright hand symbol on pedestrian signal heads). Walk times are typically five to seven seconds, but can be greater depending on location-specific factors. Pedestrian clearance times are calculated as the amount of time it would take for a pedestrian to cross from one curb to the opposite curb assuming an industry-standard walking speed of 3.5 feet/second.

For the leading pedestrian interval (LPI) alternative, it was assumed that nine seconds of additional walk time would be provided for pedestrians crossing the north and south intersection approaches prior to the east-west vehicle green phase. During the vehicle green phase, five more seconds of walk time and 18 seconds of pedestrian clearance time would be provided for a total of 14 seconds of walk time and 18 seconds of clearance time. Nine seconds was chosen for the LPI length as it is the amount of time it would take a pedestrian to cross to the center of the south intersection approach assuming the industry-accepted pedestrian crossing speed of 3.5 feet/second.

For the exclusive pedestrian phase (EPP) alternative, it was assumed that a 30-second pedestrian phase would be provided (12 seconds walk, 18 seconds pedestrian clearance) for all pedestrians crossing at the intersection, regardless of approach (In Synchro, 16 seconds of pedestrian clearance time were modeled as the program does not allow yellow times less than 2.0 seconds). In terms of signal timing changes, the EPP results in a 20-second increase in the signal cycle length, from 70 seconds to 90 seconds. The results of the operational analyses are summarized in **Table 2**. Analysis reports from Synchro are provided for reference in **Appendix A**.

Table 2
Operational Analysis Summary of Near-Term Intersection Modification Alternatives
Park Boulevard at Sheehan Avenue/Winchell Way during the Pedestrian Peak Hours

Roadway	Direction/ Movement		Level of Service and Delay (sec/veh)					
			Existing Conditions		Leading Pedestrian Interval		Exclusive Pedestrian Phase	
			A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
Winchell Way	Eastbound	L/T/R	B (11.9)	B (12.4)	B (16.3)	B (15.3)	C (26.3)	C (32.1)
	Approach Total		B (11.9)	B (12.4)	B (16.3)	B (15.3)	C (26.3)	C (32.1)
Sheehan Avenue	Westbound	L/T/R	C (23.6)	B (17.7)	C (34.7)	C (21.7)	D (45.8)	D (48.7)
	Approach Total		C (23.6)	B (17.7)	C (34.7)	C (21.7)	D (45.8)	D (48.7)
Park Boulevard	Northbound	Left	B (10.0)	A (8.8)	A (7.4)	A (7.5)	B (17.6)	B (16.9)
		Th/Rt	B (15.9)	B (13.6)	C (21.4)	C (20.1)	C (23.0)	C (24.5)
	Approach Total		B (15.9)	B (13.5)	C (21.3)	B (19.9)	C (22.9)	C (24.4)
	Southbound	Left	B (10.0)	A (8.8)	A (7.6)	A (7.6)	B (17.3)	B (17.3)
		Th/Rt	B (17.2)	B (11.3)	C (24.3)	B (16.2)	C (25.0)	B (19.6)
	Approach Total		B (17.0)	B (11.2)	C (23.8)	B (15.9)	C (24.8)	B (19.5)
Overall Intersection Total			B (17.6)	B (13.2)	C (24.6)	B (18.7)	C (27.5)	C (25.4)

The results of the operational analysis show that both of the near-term alternatives result in increased delays for motorists, however, the impact of the leading pedestrian interval is less significant than that of the exclusive pedestrian phase. For example, the LPI increases delays for westbound motorists at the intersection by about four seconds per vehicle during the P.M. peak pedestrian period. Under the EPP alternative, the delay more than doubles during the P.M. peak period, increasing by 31 seconds per vehicle and degrading operations by two Levels of Service (LOSs). If the amount of pedestrian walk time is reduced from 12 seconds to 7 seconds (an 85-second cycle length) for the EPP alternative, the result is a minor decrease in delay at the intersection for all vehicles of about two seconds on average. While neither alternative increases delays so much that the

alternative would be considered infeasible to implement, the LPI is the better alternative with respect to increased motorist delays. In addition to vehicle delays, the alternatives were evaluated from the perspective of vehicle queuing. **Table 3** provides a Synchro queuing summary for existing conditions as well as both the LPI and EPP alternatives.

Table 3
Queuing Summary of Near-Term Intersection Modification Alternatives
Park Boulevard at Sheehan Avenue/Winchell Way during the Pedestrian Peak Hours

Roadway	Direction/ Movement		Synchro 95 th Percentile Queue Length (feet) ¹					
			Existing Conditions		Leading Pedestrian Interval		Exclusive Pedestrian Phase	
			A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
Winchell Way	Eastbound	L/T/R	15 feet	25 feet	20 feet	25 feet	25 feet	40 feet
Sheehan Avenue	Westbound	L/T/R	155 feet	80 feet	215 feet	100 feet	345 feet	195 feet
Park Boulevard	Northbound	Left	10 feet	15 feet	5 feet	10 feet	10 feet	20 feet
		Th/Rt	175 feet	275 feet	180 feet	300 feet	230 feet	315 feet
	Southbound	Left	20 feet	20 feet	15 feet	15 feet	30 feet	25 feet
		Th/Rt	285 feet	135 feet	300 feet	140 feet	390 feet	170 feet

¹Queue Lengths shown are rounded up to the nearest 5-foot increment.

As shown in the table, both of the proposed alternatives result in increased vehicle queues on nearly all approaches, although the increases are much more significant for the EPP alternative, especially on the Sheehan Avenue approach, where the 95th percentile queue length more than doubles over existing conditions during the A.M. peak pedestrian hour, and triples in length during the P.M. peak. For reference, these increases would mean westbound Sheehan queues extending east to Milton Avenue and possibly to the western bus access drive to Glen Crest Elementary based on field-observed existing queue during the A.M. peak pedestrian hour. Therefore, the LPI alternative also performs better from a vehicle queuing perspective than the EPP alternative.

C. Non-Operational Factors

While LOS, queuing, and motorist delay are important components of any traffic analysis, it is important to consider other factors like cost, property impacts, implementation needs, and driver and pedestrian behavior to determine which alternative is the best solution for a specific situation. **Table 4** reviews additional factors such as required work to implement each alternative, relative implementation cost of each alternative, and advantages and disadvantages of each of the potential near-term solutions.

D. Longer-Term Potential Intersection Improvements

In addition to the near-term intersection improvements presented previously, a consideration of longer-term intersection improvements is summarized below. Should the opportunity arise, these improvements would have the potential to make the intersection more pedestrian-friendly and correct or reduce the offset between the Sheehan Avenue and Winchell Way approaches. These potential longer-term improvements are summarized in **Table 5**. All of the potential improvements in the table would require significantly more investment and require additional study.

Table 4
Near-Term Intersection Modification Alternatives
Park Boulevard at Sheehan Avenue/Winchell Way

Alternative	Description	Work Involved	Relative Cost	Advantages	Disadvantages
No Action Alternative	Maintain Existing Conditions	None	None	Lowest Cost	Does not address safety concerns
Leading Pedestrian Signal Intervals (LPIs)	Provide Walk signal indication prior to the Sheehan Avenue/Winchell Way movements receiving the green signal	- Replace Existing Signal Controller and Cabinet - Install Pedestrian Countdown Signals - Controller Programming and Signal Re-Timing	Low	- Allows pedestrians to enter crosswalk early, improving pedestrian visibility to turning vehicles, improving motorist compliance - No increase in pedestrian wait times unless cycle length is increased	- Does not provide as much pedestrian protection as all-red pedestrian phase - Increases delay for some motorists - Increases vehicle queues slightly on most approaches - Difficult to implement with existing signal equipment – controller replacement strongly recommended
Exclusive Pedestrian Crossing Phase (EPP)	Provide exclusive signal phase for pedestrian movements only.	- Replace Existing Signal Controller and Cabinet - Install Pedestrian Countdown Signals - Controller Programming and Signal Re-Timing	Low (Same as LPI)	- Reduces potential for conflicts between turning vehicles and pedestrians - Can be omitted if no pedestrian call is placed (button is pushed)	- Increased delay for all motorists at the intersection - Significant increase in westbound queues (to Milton in or further in A.M.) and increases on most other approaches - Pedestrians cannot cross with traffic on a green signal, increasing their delay - Some pedestrians may continue to cross with the green traffic phase even though a Don't Walk signal would be displayed during this time. - Cannot be implemented with existing signal controller – requires controller replacement - May encourage increased vehicle speeds and/or aggressive driving to “beat” the pedestrian phase

Table 5
Long-Term Intersection Modification Alternatives
Park Boulevard at Sheehan Avenue/Winchell Way

Alternative	Description	Work Involved	Relative Cost	Advantages	Disadvantages
Westbound Left Turn Lane Installation	Restriping of the Sheehan Avenue approach to provide an exclusive westbound left turn lane. Implementation of a westbound protected-permitted left turn signal phase	- Traffic Signal Modernization - Sidewalk Reconstruction and ADA Ramps - Considerable widening of westbound approach - Utility relocations and tree removals	Medium-High	- Protected left turn phase may reduce number of conflicts with pedestrians - If Flashing Yellow Arrow operation implemented, could show red arrow when pedestrian phase is called	- Widening of Sheehan approach would have impacts to utilities and existing trees, - Narrowed parkways/decreased green space on Sheehan - Left turn drivers may try to speed through on yellow arrow
Realignment of Sheehan Avenue and Winchell Way Approaches	Realign Sheehan Avenue and Winchell Way approaches to remove the offset that exists between them today	- Significant Right-of-Way Acquisition, utility relocations, tree removals - Possible Roadway Widening for Turn Lanes - Traffic Signal Modernization - Sidewalk Reconstruction and ADA Ramps - Utility Relocations	Medium-High	- May shorten south crosswalk length - Improves visibility of pedestrians crossing the intersection by bringing south crosswalk closer to intersection - Reduces the risk of left turn versus through vehicle crashes	- Right-of-way acquisition required and likely would require property acquisitions - Impacts to existing utilities and trees, reduced parkway areas at some locations
Park Boulevard Road Diet	Reduce Park Boulevard from two through lanes to one in each direction with a center median/left turn lane with possible installation of dedicated bicycle lanes	- Restriping with potential Bike Lane Implementation - Traffic Signal Retiming - Potential for curb extensions and pedestrian refuge islands - Coordination with DuPage County for segment of Park Boulevard south of Buena Vista Drive.	Medium to High (more than one intersection)	- Reduces crosswalk lengths and number of lanes crossed across Park Boulevard, improving pedestrian mobility and safety - Accommodates more non-motorized travel if bike lanes are implemented - May reduce vehicle speeds due to reduced cross-section - Fits better with residential character of area - Improves vehicular safety throughout the corridor by reducing potential for rear-end and sideswipe collisions.	- Requires an extensive public involvement effort and a commitment to change entire Park Boulevard corridor - Potential for increased delays at busy intersections - Would decrease gaps in traffic on Park, increasing delays for vehicles turning left onto Park from side streets or driveways.

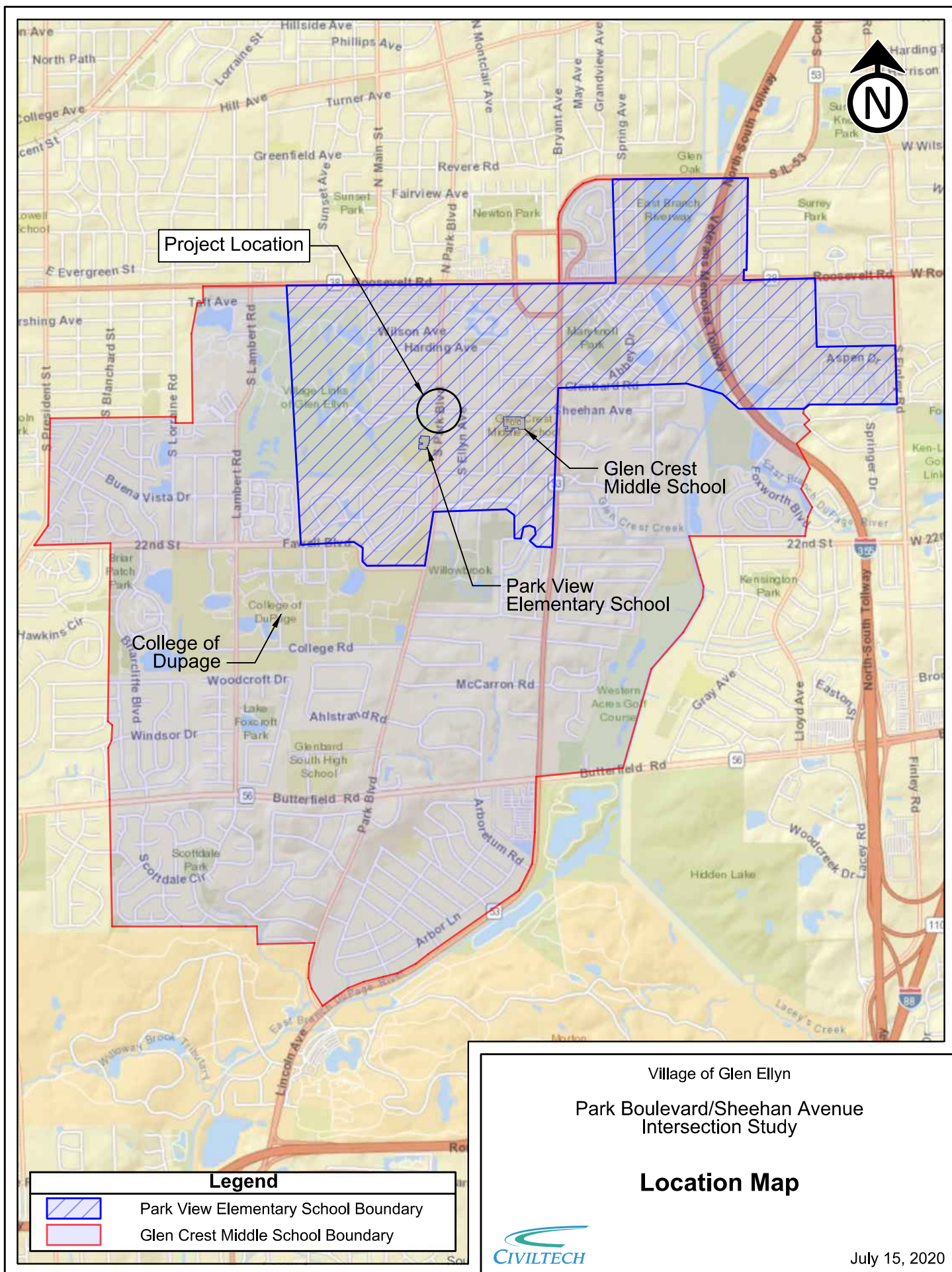
IV. CONCLUSIONS AND RECOMMENDATIONS

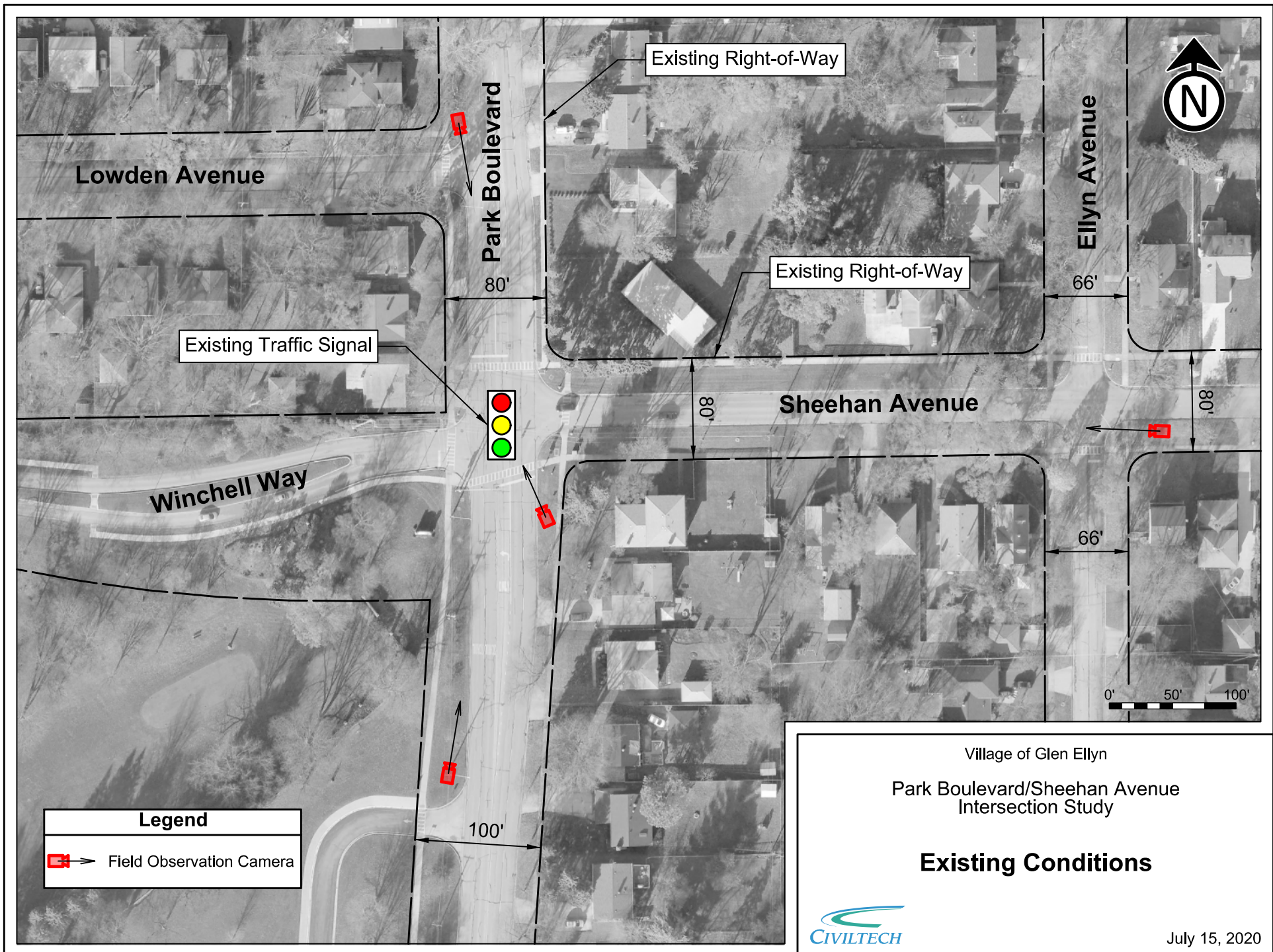
This report has presented the results of a study of the traffic operations at the intersection of Park Boulevard with Sheehan Avenue and Winchell Way in the Village of Glen Ellyn. The study was performed in response to Village and resident concerns about pedestrian safety at the intersection, specifically conflicts between pedestrians in the south crosswalk and westbound left turning vehicles from Sheehan Avenue during arrival and dismissal periods at two nearby schools.

The findings of the intersection operations and safety study can be summarized as follows:

- The number of crashes that have occurred at or near the intersection is relatively low, with 7 crashes from 2014 through 2018. This averages to one to two collisions per year. However, residents have reported several “near-miss” incidents between westbound left turning drivers and pedestrians crossing the south crosswalk. Possible causes for these incidents include failure of drivers to yield to pedestrians, afternoon sun glare blinding drivers, and excessive speed of westbound turning vehicles due to the displacement of south leg crosswalk from the east approach.
- Potential near-term treatments include implementing a leading pedestrian walk interval (LPI) for pedestrians crossing the north and south approaches or provision of an exclusive pedestrian crossing signal phase (EPP). Either treatment would likely require replacement of the existing traffic signal controller at the intersection. While analyses indicate that there is sufficient capacity to implement either alternative, the LPI would result in less vehicle delays and smaller increases in queues over the EPP alternative, especially on the Sheehan Avenue approach. While the exclusive pedestrian phase would provide more security for pedestrians, pedestrian compliance is a significant concern about the EPP as pedestrians may not wait for the exclusive phase to cross the street if they have a green signal and traffic is light on Sheehan. Also of concern is the impacts of delay on motorist behavior, possibly resulting in drivers becoming impatient and increasing their speeds to make up for lost time. It is therefore recommended that the LPI be implemented as an initial pedestrian improvement at the intersection.
- Potential longer-term treatments include installing a westbound left turn lane, realigning the Sheehan Avenue and Winchell Way approaches to remove the intersection offset, and implementing a road diet on Park Boulevard. These treatments are significantly more expensive, and would require additional detailed study prior to implementation. However, they also could provide several additional safety benefits. Of these alternatives, a road diet would likely offer the most return on investment in terms of improving safety (19% to 47% decrease in crashes per FHWA) and livability not only at the intersection, but along the Park Boulevard corridor.

EXHIBITS







Wkday A.M. (P.M.) Traffic Counts

Wkday A.M. (P.M.) Ped. Counts

2020 Existing 24-Hr. Count (vpd)

Winchell Way

Sheehan Avenue

Park Boulevard

30 (55)

15 (35)

15 (20)

5 (5)
5 (5)
5 (10)

4 (1)

1

35 (50)
5 (10)
190 (155)

230 (215)

145 (125)

375 (340)

6 (1)

710 (830)
5 (10)
425 (460)
105 (85)

1,245 (1,385)

5 (15)
515 (665)
35 (35)

1,020 (1,230)

465 (515)

Vehicle Traffic Peak Hours:

7:00 A.M. to 8:00 A.M.

5:00 P.M. to 6:00 P.M.

Count Date(s):

Tuesday, 2/11/2020

Village of Glen Ellyn

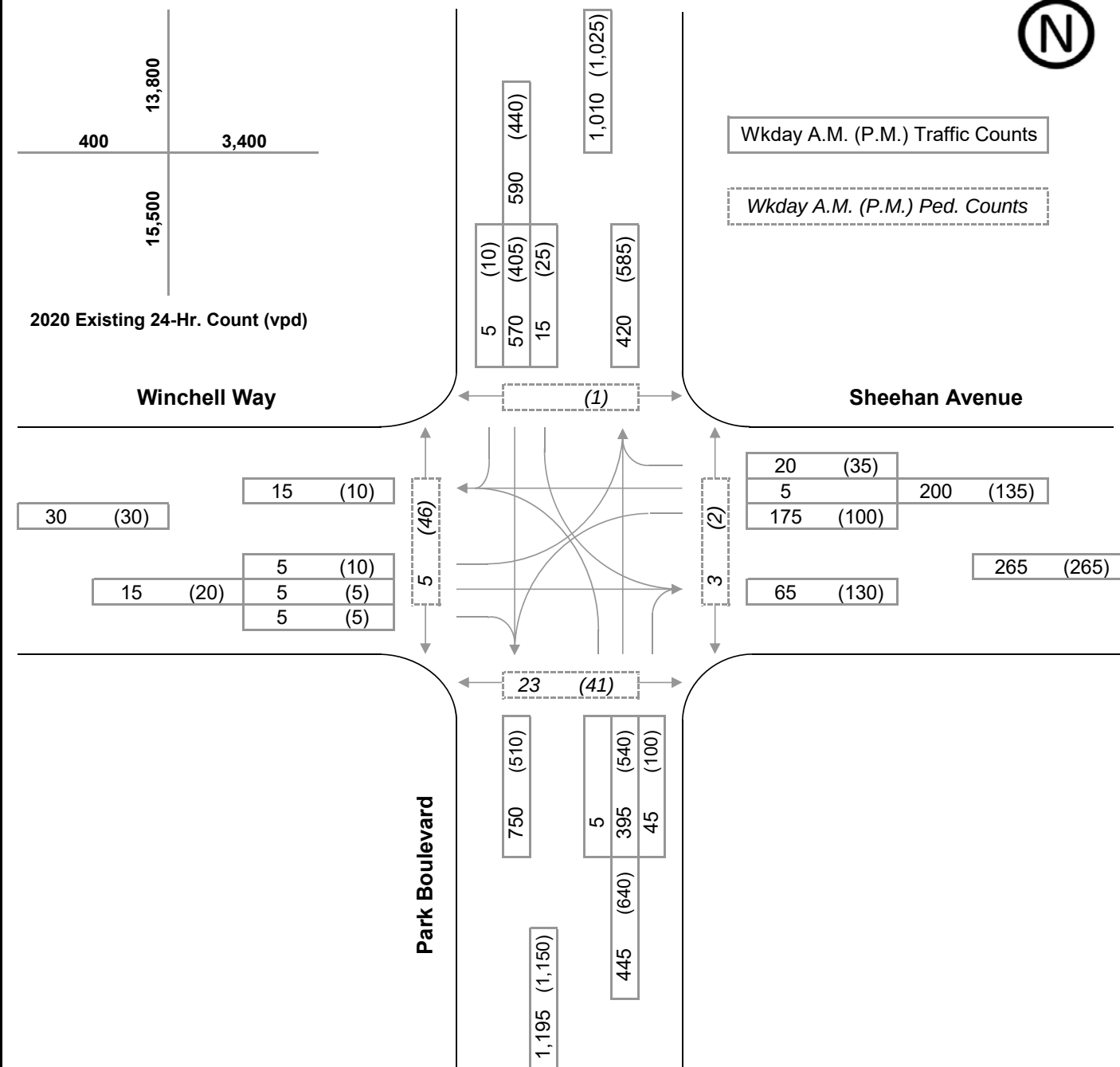
Park Boulevard/Sheehan Avenue Study

2020 Existing A.M. (P.M.) Peak Hour Traffic

Park Boulevard and Sheehan Avenue



Prepared: 2/17/2020



Pedestrian Peak Hours:

7:45 A.M. to 8:45 A.M.
2:45 P.M. to 3:45 P.M.

Count Date(s):

Tuesday, 2/11/2020

Village of Glen Ellyn

Park Boulevard/Sheehan Avenue Study

2020 Existing Pedestrian Peak Hour Traffic

Park Boulevard and Sheehan Avenue





Park Boulevard

Winchell Way

Sheehan Avenue

03/23/15, 9A, SI, PDO

08/2/14, 7P, CD, PDO

10/06/16, 8A, RW, PDO

10/17/17, 7P, CD, A

02/06/18, 8A, CI, B

01/18/17, 6P, CW, C

09/21/16, 9P, CW, B

Legend

- Backing Up Motor Vehicle <-->
- Path of Motor Vehicle -->
- Uninvolved Motor Vehicle - - ->
- Pedestrian Involvement --> ⊗
- Collision with Animal --> ⊕
- Collision with Bicycle --> △
- Rear-End Collision --> |>
- Sideswipe Collision --> |>|>
- Right Angle Collision --> |>|>|>
- Left Turn Collision --> |>|>|>|>
- Head-On Collision --> |>|>|>|>|>
- Out of Control --> ~~~~~
- Overtaken Vehicle --> |>|>|>|>|>|>
- Parked Vehicle ⊠
- Fixed Object □
- Other/Non-Specified ×

Date:

Month/Day/Year

Time:

Hour, A=A.M., P=P.M.

Weather: C=Clear, R=Rain,

F=Fog, S=Snow

Pavement:

D=Dry,

W=Wet,

I=Icy

Injury: ○

K=Fatal,

A=Incapacitated,

B=Non-Incapacitating,

C=Not Evident,

PDO=Property

Damage Only

Completed By: AS

Collision Type	K	A	B	C	PDO	Total
Right Angle	0	0	0	0	0	0
Left Turn	0	0	0	0	0	0
Rear End	0	1	0	0	12	4
Sideswipe	0	0	0	0	2	2
Ped/Bike	0	1	0	0	0	1
Off Rd. Fixed Obj.	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total	0	1	2	1	3	7

Details

Dry 2

Wet 3

Icy 2

Day 4

Night 3

Village of Glen Ellyn

Park Boulevard and Sheehan Avenue
Intersection Crash Study

Collision Diagram (2014-2018)

Park Boulevard and Sheehan Avenue



Not to Scale

Exhibit 5

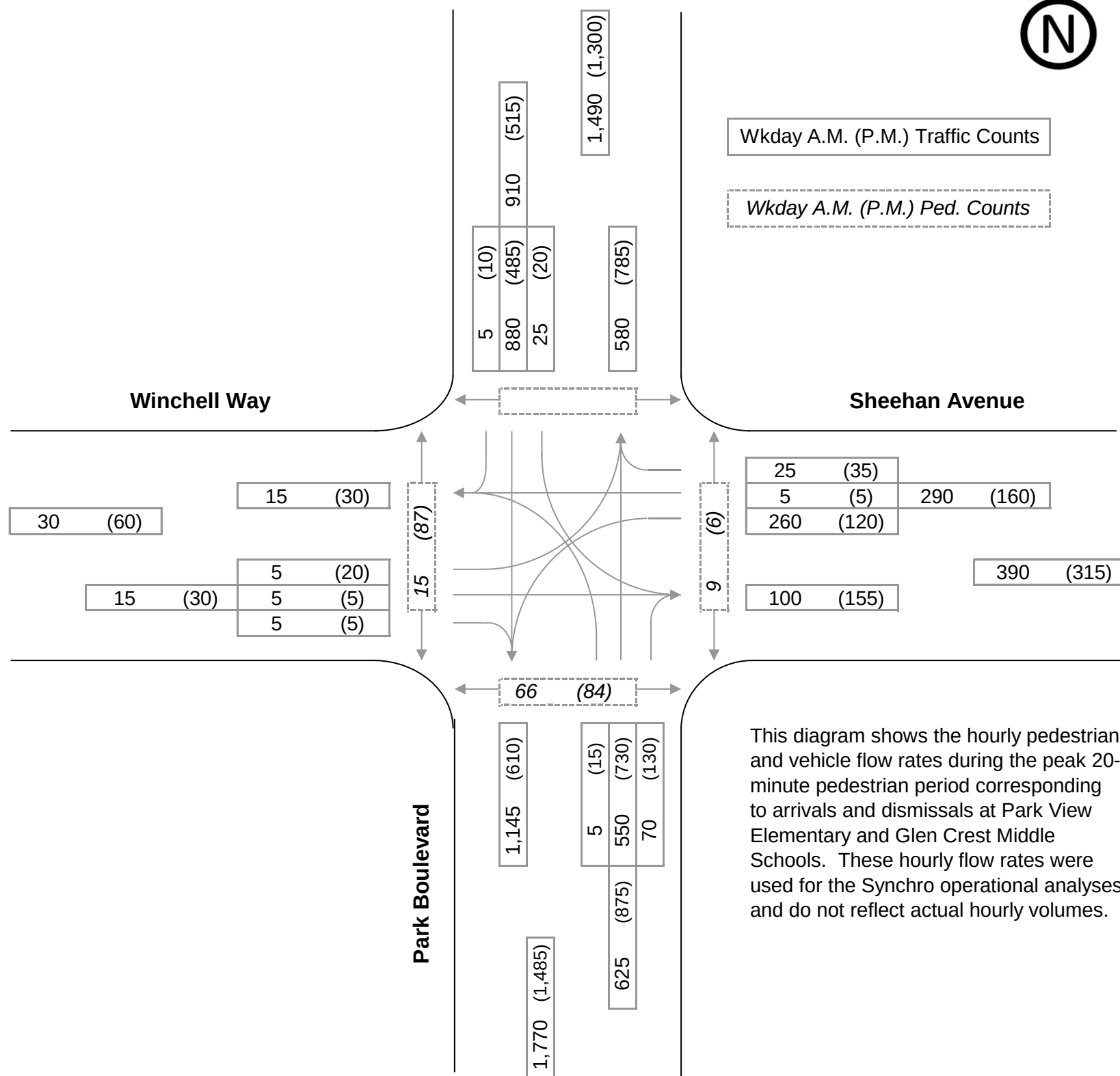
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APPENDIX A
Synchro Traffic Analysis Reports



Wkday A.M. (P.M.) Traffic Counts

Wkday A.M. (P.M.) Ped. Counts



This diagram shows the hourly pedestrian and vehicle flow rates during the peak 20-minute pedestrian period corresponding to arrivals and dismissals at Park View Elementary and Glen Crest Middle Schools. These hourly flow rates were used for the Synchro operational analyses and do not reflect actual hourly volumes.

Pedestrian Peak 20 minutes:

8:25 A.M. to 8:45 A.M.
3:30 P.M. to 3:50 P.M.

Count Date(s):

Tuesday, 2/11/2020

Village of Glen Ellyn

Park Boulevard/Sheehan Avenue Study

**2020 A.M. and P.M. Peak
20-Minute Pedestrian Periods**

Pedestrian and Vehicle Hourly Flow Rates
Park Boulevard and Sheehan Avenue



Prepared: 3/3/2020

**Existing Pedestrian A.M. and P.M. Peak Hour
Synchro Analysis Reports**

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Arrival

Lanes and Geometrics

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			140			120		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.98			0.96		0.99	1.00		0.99	1.00	
Frt		0.955			0.988			0.983			0.999	
Flt Protected		0.984			0.957		0.950			0.950		
Satd. Flow (prot)	0	1314	0	0	1768	0	1805	3405	0	1703	3570	0
Flt Permitted		0.891			0.737		0.250			0.386		
Satd. Flow (perm)	0	1190	0	0	1308	0	472	3405	0	687	3570	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		872			990			637			440	
Travel Time (s)		19.8			22.5			12.4			8.6	

Intersection Summary

Area Type: Other

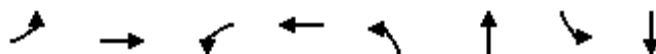
Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Arrival

Volume

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Future Volume (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Confl. Peds. (#/hr)			66	66			15		9	9		15
Confl. Bikes (#/hr)												
Peak Hour 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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	100%	1%	0%	8%	0%	4%	2%	6%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	290	0	5	620	0	25	885	0
Intersection Summary												

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue Existing Conditions, School Arrival

Timings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↗	↕	↗	↕
Traffic Volume (vph)	5	5	260	5	5	550	25	880
Future Volume (vph)	5	5	260	5	5	550	25	880
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	37.0	37.0	29.0	29.0	6.0	23.5	6.0	23.5
Total Split (s)	37.0	37.0	37.0	37.0	6.0	27.0	6.0	27.0
Total Split (%)	52.9%	52.9%	52.9%	52.9%	8.6%	38.6%	8.6%	38.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	3.0	6.5	3.0	6.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effect Green (s)		18.2		18.2	26.4	21.8	26.9	22.9
Actuated g/C Ratio		0.33		0.33	0.48	0.40	0.49	0.42
v/c Ratio		0.04		0.67	0.02	0.46	0.06	0.59
Control Delay		11.9		23.6	10.0	15.9	10.0	17.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		11.9		23.6	10.0	15.9	10.0	17.2
LOS		B		C	A	B	B	B
Approach Delay		11.9		23.6		15.9		17.0
Approach LOS		B		C		B		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 54.9

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 17.6

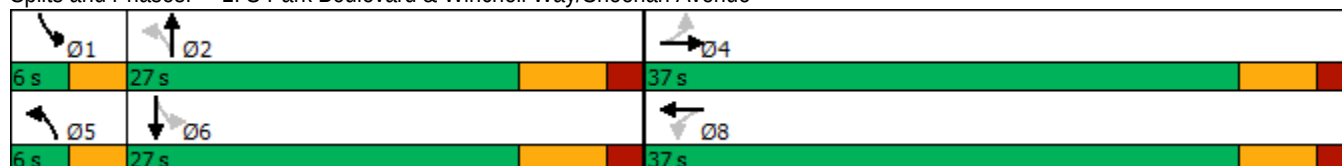
Intersection LOS: B

Intersection Capacity Utilization 58.6%

ICU Level of Service B

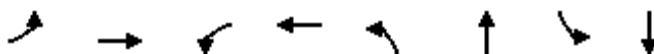
Analysis Period (min) 15

Splits and Phases: 1: S Park Boulevard & Winchell Way/Sheehan Avenue



Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Arrival

Phasings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	37.0	37.0	29.0	29.0	6.0	23.5	6.0	23.5
Total Split (s)	37.0	37.0	37.0	37.0	6.0	27.0	6.0	27.0
Total Split (%)	52.9%	52.9%	52.9%	52.9%	8.6%	38.6%	8.6%	38.6%
Maximum Green (s)	31.0	31.0	31.0	31.0	3.0	20.5	3.0	20.5
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	5.0	5.0	4.0	4.0	3.0	5.0	3.0	5.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	2.0	2.0	2.0	2.0	0.0	20.0	0.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	Max	None	Max
Walk Time (s)	16.0	16.0	8.0	8.0		7.0		7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0		10.0		10.0
Pedestrian Calls (#/hr)	20	20	0	0		5		5
90th %ile Green (s)	31.0	31.0	31.0	31.0	3.0	20.5	3.0	20.5
90th %ile Term Code	Ped	Ped	Hold	Hold	Max	MaxR	Max	MaxR
70th %ile Green (s)	21.8	21.8	21.8	21.8	0.0	20.5	3.0	26.5
70th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Max	Hold
50th %ile Green (s)	16.6	16.6	16.6	16.6	0.0	20.5	0.0	20.5
50th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR
30th %ile Green (s)	13.9	13.9	13.9	13.9	0.0	20.5	0.0	20.5
30th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR
10th %ile Green (s)	10.8	10.8	10.8	10.8	0.0	23.8	0.0	23.8
10th %ile Term Code	Hold	Hold	Gap	Gap	Skip	Dwell	Skip	Dwell

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 54.9

Control Type: Actuated-Uncoordinated

90th %ile Actuated Cycle: 70

70th %ile Actuated Cycle: 60.8

50th %ile Actuated Cycle: 49.6

30th %ile Actuated Cycle: 46.9

10th %ile Actuated Cycle: 47.1

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Arrival

Queues



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	290	5	620	25	885
v/c Ratio	0.04	0.67	0.02	0.46	0.06	0.59
Control Delay	11.9	23.6	10.0	15.9	10.0	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	23.6	10.0	15.9	10.0	17.2
Queue Length 50th (ft)	3	70	1	64	3	99
Queue Length 95th (ft)	13	153	7	172	19	#284
Internal Link Dist (ft)	792	910		557		360
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	689	757	301	1352	394	1488
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.38	0.02	0.46	0.06	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Dismissal

Lanes and Geometrics

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			140			120		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.96		0.91	1.00		1.00	1.00	
Frt		0.977			0.970			0.977			0.997	
Flt Protected		0.968			0.964		0.950			0.950		
Satd. Flow (prot)	0	1777	0	0	1769	0	1805	3510	0	1805	3550	0
Flt Permitted		0.756			0.760		0.471			0.292		
Satd. Flow (perm)	0	1388	0	0	1337	0	819	3510	0	553	3550	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		872			990			637			440	
Travel Time (s)		19.8			22.5			12.4			8.6	

Intersection Summary

Area Type: Other

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Dismissal

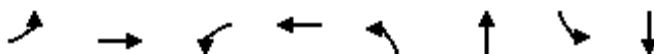
Volume

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Future Volume (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Confl. Peds. (#/hr)			84	84			87		6	6		87
Confl. Bikes (#/hr)												
Peak Hour 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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	160	0	15	860	0	20	495	0
Intersection Summary												

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue

Existing Conditions, School Dismissal

Timings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↗	↕	↗	↕
Traffic Volume (vph)	20	5	120	5	15	730	20	485
Future Volume (vph)	20	5	120	5	15	730	20	485
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	37.0	37.0	29.0	29.0	6.0	23.5	6.0	23.5
Total Split (s)	37.0	37.0	37.0	37.0	6.0	27.0	6.0	27.0
Total Split (%)	52.9%	52.9%	52.9%	52.9%	8.6%	38.6%	8.6%	38.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	3.0	6.5	3.0	6.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effect Green (s)		14.0		14.0	29.8	27.3	29.8	27.3
Actuated g/C Ratio		0.28		0.28	0.59	0.54	0.59	0.54
v/c Ratio		0.08		0.43	0.03	0.45	0.05	0.26
Control Delay		12.4		17.7	8.8	13.6	8.8	11.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		12.4		17.7	8.8	13.6	8.8	11.3
LOS		B		B	A	B	A	B
Approach Delay		12.4		17.7		13.5		11.2
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 50.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 13.2

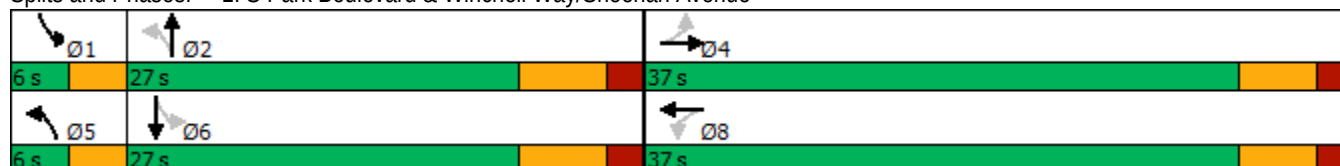
Intersection LOS: B

Intersection Capacity Utilization 59.5%

ICU Level of Service B

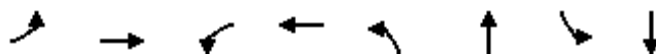
Analysis Period (min) 15

Splits and Phases: 1: S Park Boulevard & Winchell Way/Sheehan Avenue



Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Dismissal

Phasings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	37.0	37.0	29.0	29.0	6.0	23.5	6.0	23.5
Total Split (s)	37.0	37.0	37.0	37.0	6.0	27.0	6.0	27.0
Total Split (%)	52.9%	52.9%	52.9%	52.9%	8.6%	38.6%	8.6%	38.6%
Maximum Green (s)	31.0	31.0	31.0	31.0	3.0	20.5	3.0	20.5
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	5.0	5.0	4.0	4.0	3.0	5.0	3.0	5.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	2.0	2.0	2.0	2.0	0.0	20.0	0.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	Max	None	Max
Walk Time (s)	16.0	16.0	8.0	8.0		7.0		7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0		10.0		10.0
Pedestrian Calls (#/hr)	25	25	0	0		5		25
90th %ile Green (s)	31.0	31.0	31.0	31.0	3.0	20.5	3.0	20.5
90th %ile Term Code	Ped	Ped	Hold	Hold	Max	MaxR	Max	MaxR
70th %ile Green (s)	14.0	14.0	14.0	14.0	0.0	20.5	0.0	20.5
70th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR
50th %ile Green (s)	11.2	11.2	11.2	11.2	0.0	20.5	0.0	20.5
50th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR
30th %ile Green (s)	10.1	10.1	10.1	10.1	0.0	25.4	0.0	25.4
30th %ile Term Code	Hold	Hold	Gap	Gap	Skip	Dwell	Skip	Dwell
10th %ile Green (s)	0.0	0.0	0.0	0.0	0.0	35.5	0.0	35.5
10th %ile Term Code	Skip	Skip	Skip	Skip	Skip	Dwell	Skip	Dwell

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 50.2

Control Type: Actuated-Uncoordinated

90th %ile Actuated Cycle: 70

70th %ile Actuated Cycle: 47

50th %ile Actuated Cycle: 44.2

30th %ile Actuated Cycle: 48

10th %ile Actuated Cycle: 42

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Existing Conditions, School Dismissal

Queues



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	30	160	15	860	20	495
v/c Ratio	0.08	0.43	0.03	0.45	0.05	0.26
Control Delay	12.4	17.7	8.8	13.6	8.8	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	17.7	8.8	13.6	8.8	11.3
Queue Length 50th (ft)	6	34	2	73	2	37
Queue Length 95th (ft)	21	80	13	#275	16	134
Internal Link Dist (ft)	792	910		557		360
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	884	852	547	1910	405	1932
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.19	0.03	0.45	0.05	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

**Proposed Pedestrian A.M. and P.M. Peak Hour
Leading Pedestrian Interval (LPI) Alternative
Synchro Analysis Reports**

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Arrival

Lanes and Geometrics

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			140			120		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.98			0.95		0.99	1.00		0.99	1.00	
Frt		0.955			0.988			0.983			0.999	
Flt Protected		0.984			0.957		0.950			0.950		
Satd. Flow (prot)	0	1307	0	0	1768	0	1805	3405	0	1703	3570	0
Flt Permitted		0.889			0.737		0.321			0.405		
Satd. Flow (perm)	0	1181	0	0	1290	0	605	3405	0	720	3570	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		872			990			637			440	
Travel Time (s)		19.8			22.5			12.4			8.6	

Intersection Summary

Area Type: Other

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Arrival

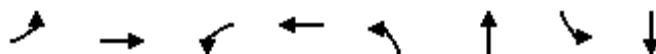
Volume

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Future Volume (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Confl. Peds. (#/hr)			66	66			15		9	9		15
Confl. Bikes (#/hr)												
Peak Hour 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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	100%	1%	0%	8%	0%	4%	2%	6%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	290	0	5	620	0	25	885	0
Intersection Summary												

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue

Proposed Conditions - LPI, School Arrival

Timings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↗	↕	↗	↕
Traffic Volume (vph)	5	5	260	5	5	550	25	880
Future Volume (vph)	5	5	260	5	5	550	25	880
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	29.0	29.0	29.0	29.0	6.0	32.5	6.0	32.5
Total Split (s)	29.0	29.0	29.0	29.0	6.0	35.0	6.0	35.0
Total Split (%)	41.4%	41.4%	41.4%	41.4%	8.6%	50.0%	8.6%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	11.0	0.0	11.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	3.0	15.5	3.0	15.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effect Green (s)		18.6		18.6	34.1	20.4	34.6	21.5
Actuated g/C Ratio		0.30		0.30	0.54	0.32	0.55	0.34
v/c Ratio		0.04		0.76	0.01	0.56	0.06	0.72
Control Delay		16.3		34.7	7.4	21.4	7.6	24.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		16.3		34.7	7.4	21.4	7.6	24.3
LOS		B		C	A	C	A	C
Approach Delay		16.3		34.7		21.3		23.8
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 62.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 24.6

Intersection LOS: C

Intersection Capacity Utilization 65.3%

ICU Level of Service C

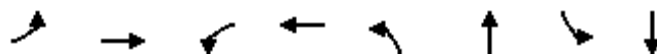
Analysis Period (min) 15

Splits and Phases: 1: S Park Boulevard & Winchell Way/Sheehan Avenue

Ø1	Ø2	Ø4
6 s	35 s	29 s
Ø5	Ø6	Ø8
6 s	35 s	29 s

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Arrival

Phasings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	29.0	29.0	29.0	29.0	6.0	32.5	6.0	32.5
Total Split (s)	29.0	29.0	29.0	29.0	6.0	35.0	6.0	35.0
Total Split (%)	41.4%	41.4%	41.4%	41.4%	8.6%	50.0%	8.6%	50.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	3.0	19.5	3.0	19.5
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	11.0	0.0	11.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	5.0	5.0	4.0	4.0	3.0	5.0	3.0	5.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	2.0	2.0	2.0	2.0	0.0	20.0	0.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	Max	None	Max
Walk Time (s)	5.0	5.0	5.0	5.0		7.0		7.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0		10.0		10.0
Pedestrian Calls (#/hr)	20	20	0	0		5		5
90th %ile Green (s)	23.0	23.0	23.0	23.0	3.0	19.5	3.0	19.5
90th %ile Term Code	Ped	Ped	Max	Max	Max	MaxR	Max	MaxR
70th %ile Green (s)	23.0	23.0	23.0	23.0	0.0	19.5	3.0	25.5
70th %ile Term Code	Hold	Hold	Max	Max	Skip	MaxR	Max	Hold
50th %ile Green (s)	19.5	19.5	19.5	19.5	0.0	19.5	0.0	19.5
50th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR
30th %ile Green (s)	16.1	16.1	16.1	16.1	0.0	19.5	0.0	19.5
30th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR
10th %ile Green (s)	12.2	12.2	12.2	12.2	0.0	22.8	0.0	22.8
10th %ile Term Code	Hold	Hold	Gap	Gap	Skip	Dwell	Skip	Dwell

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 62.8

Control Type: Actuated-Uncoordinated

90th %ile Actuated Cycle: 70

70th %ile Actuated Cycle: 70

50th %ile Actuated Cycle: 60.5

30th %ile Actuated Cycle: 57.1

10th %ile Actuated Cycle: 56.5

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Arrival

Queues



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	290	5	620	25	885
v/c Ratio	0.04	0.76	0.01	0.56	0.06	0.72
Control Delay	16.3	34.7	7.4	21.4	7.6	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	34.7	7.4	21.4	7.6	24.3
Queue Length 50th (ft)	4	91	1	97	4	150
Queue Length 95th (ft)	16	#211	5	176	14	#296
Internal Link Dist (ft)	792	910		557		360
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	436	476	386	1106	444	1221
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.61	0.01	0.56	0.06	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Dismissal

Lanes and Geometrics

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			140			120		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.94		0.91	1.00		1.00	1.00	
Frt		0.977			0.970			0.977			0.997	
Flt Protected		0.968			0.964		0.950			0.950		
Satd. Flow (prot)	0	1771	0	0	1769	0	1805	3510	0	1805	3550	0
Flt Permitted		0.760			0.760		0.471			0.329		
Satd. Flow (perm)	0	1390	0	0	1318	0	814	3510	0	623	3550	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		872			990			637			440	
Travel Time (s)		19.8			22.5			12.4			8.6	

Intersection Summary

Area Type: Other

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Dismissal

Volume

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Future Volume (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Confl. Peds. (#/hr)			84	84			87		6	6		87
Confl. Bikes (#/hr)												
Peak Hour 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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	160	0	15	860	0	20	495	0
Intersection Summary												

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Dismissal

Timings

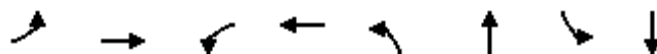
								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	20	5	120	5	15	730	20	485
Future Volume (vph)	20	5	120	5	15	730	20	485
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	31.0	31.0	31.0	31.0	6.0	32.5	6.0	32.5
Total Split (s)	31.0	31.0	31.0	31.0	6.0	33.0	6.0	33.0
Total Split (%)	44.3%	44.3%	44.3%	44.3%	8.6%	47.1%	8.6%	47.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	11.0	0.0	11.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	3.0	15.5	3.0	15.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)		14.9		14.9	35.6	26.0	35.6	26.0
Actuated g/C Ratio		0.26		0.26	0.63	0.46	0.63	0.46
v/c Ratio		0.08		0.46	0.03	0.53	0.04	0.30
Control Delay		15.3		21.7	7.5	20.1	7.6	16.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		15.3		21.7	7.5	20.1	7.6	16.2
LOS		B		C	A	C	A	B
Approach Delay		15.3		21.7		19.9		15.9
Approach LOS		B		C		B		B
Intersection Summary								
Cycle Length: 70								
Actuated Cycle Length: 56.8								
Natural Cycle: 70								
Control Type: Actuated-Uncoordinated								
Maximum v/c Ratio: 0.53								
Intersection Signal Delay: 18.7					Intersection LOS: B			
Intersection Capacity Utilization 60.7%					ICU Level of Service B			
Analysis Period (min) 15								

Splits and Phases: 1: S Park Boulevard & Winchell Way/Sheehan Avenue



Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Dismissal

Phasings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0
Minimum Split (s)	31.0	31.0	31.0	31.0	6.0	32.5	6.0	32.5
Total Split (s)	31.0	31.0	31.0	31.0	6.0	33.0	6.0	33.0
Total Split (%)	44.3%	44.3%	44.3%	44.3%	8.6%	47.1%	8.6%	47.1%
Maximum Green (s)	25.0	25.0	25.0	25.0	3.0	17.5	3.0	17.5
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.5	3.0	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	11.0	0.0	11.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	5.0	5.0	4.0	4.0	3.0	5.0	3.0	5.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	2.0	2.0	2.0	2.0	0.0	20.0	0.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	Max	None	Max
Walk Time (s)	5.0	5.0	5.0	5.0		7.0		7.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0		10.0		10.0
Pedestrian Calls (#/hr)	25	25	0	0		5		25
90th %ile Green (s)	23.0	23.0	23.0	23.0	3.0	17.5	3.0	17.5
90th %ile Term Code	Ped	Ped	Hold	Hold	Max	MaxR	Max	MaxR
70th %ile Green (s)	23.0	23.0	23.0	23.0	0.0	17.5	0.0	17.5
70th %ile Term Code	Ped	Ped	Hold	Hold	Skip	MaxR	Skip	MaxR
50th %ile Green (s)	12.2	12.2	12.2	12.2	0.0	17.5	0.0	17.5
50th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR
30th %ile Green (s)	10.8	10.8	10.8	10.8	0.0	22.4	0.0	22.4
30th %ile Term Code	Hold	Hold	Gap	Gap	Skip	Dwell	Skip	Dwell
10th %ile Green (s)	0.0	0.0	0.0	0.0	0.0	32.5	0.0	32.5
10th %ile Term Code	Skip	Skip	Skip	Skip	Skip	Dwell	Skip	Dwell

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 56.8

Control Type: Actuated-Uncoordinated

90th %ile Actuated Cycle: 68

70th %ile Actuated Cycle: 62

50th %ile Actuated Cycle: 51.2

30th %ile Actuated Cycle: 54.7

10th %ile Actuated Cycle: 48

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - LPI, School Dismissal

Queues



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	30	160	15	860	20	495
v/c Ratio	0.08	0.46	0.03	0.53	0.04	0.30
Control Delay	15.3	21.7	7.5	20.1	7.6	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	21.7	7.5	20.1	7.6	16.2
Queue Length 50th (ft)	7	42	2	115	2	58
Queue Length 95th (ft)	25	96	10	#298	13	137
Internal Link Dist (ft)	792	910		557		360
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	621	589	562	1608	453	1626
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.27	0.03	0.53	0.04	0.30

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

**Proposed Pedestrian A.M. and P.M. Peak Hour
Exclusive Pedestrian Phase (EPP) Alternative
Synchro Analysis Reports**

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Arrival

Lanes and Geometrics

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			140			120		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.97			0.92		0.99	1.00		0.99	1.00	
Frt		0.955			0.988			0.983			0.999	
Flt Protected		0.984			0.957		0.950			0.950		
Satd. Flow (prot)	0	1293	0	0	1768	0	1805	3405	0	1703	3570	0
Flt Permitted		0.893			0.737		0.196			0.339		
Satd. Flow (perm)	0	1173	0	0	1250	0	371	3405	0	604	3570	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		872			990			637			440	
Travel Time (s)		19.8			22.5			12.4			8.6	

Intersection Summary

Area Type: Other

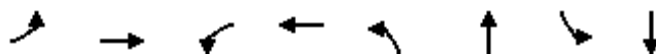
Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Arrival

Volume

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Future Volume (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Confl. Peds. (#/hr)			66	66			15		9	9		15
Confl. Bikes (#/hr)												
Peak Hour 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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	100%	1%	0%	8%	0%	4%	2%	6%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	5	5	5	260	5	25	5	550	70	25	880	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	290	0	5	620	0	25	885	0
Intersection Summary												

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue Proposed Conditions - EPP, School Arrival

Timings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	Ø10
Lane Configurations		↕		↕	↙	↕	↙	↕	
Traffic Volume (vph)	5	5	260	5	5	550	25	880	
Future Volume (vph)	5	5	260	5	5	550	25	880	
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA	
Protected Phases		4		8	5	2	1	6	10
Permitted Phases	4		8		2		6		
Detector Phase	4	4	8	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0	28.0
Minimum Split (s)	14.0	14.0	14.0	14.0	6.0	21.0	6.0	21.0	30.0
Total Split (s)	25.0	25.0	25.0	25.0	6.0	29.0	6.0	29.0	30.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	6.7%	32.2%	6.7%	32.2%	33%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	0.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	3.0	6.0	3.0	6.0	
Lead/Lag					Lead	Lag	Lead	Lag	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	None	Max	None
Act Effect Green (s)		20.2		20.2	28.6	24.5	29.0	25.4	
Actuated g/C Ratio		0.30		0.30	0.42	0.36	0.42	0.37	
v/c Ratio		0.04		0.79	0.02	0.51	0.08	0.67	
Control Delay		26.3		45.8	17.6	23.0	17.3	25.0	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		26.3		45.8	17.6	23.0	17.3	25.0	
LOS		C		D	B	C	B	C	
Approach Delay		26.3		45.8		22.9		24.8	
Approach LOS		C		D		C		C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 68.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 27.5

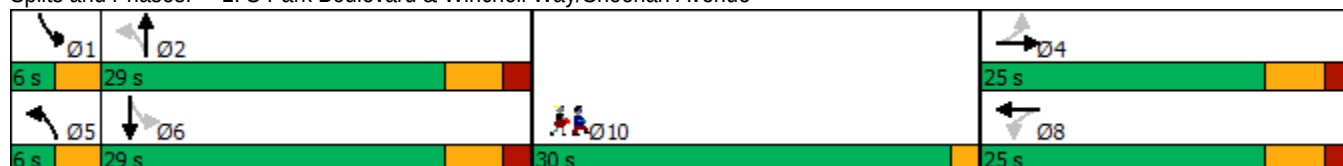
Intersection LOS: C

Intersection Capacity Utilization 57.3%

ICU Level of Service B

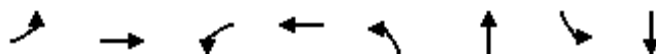
Analysis Period (min) 15

Splits and Phases: 1: S Park Boulevard & Winchell Way/Sheehan Avenue



Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Arrival

Phasings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	Ø10
Protected Phases		4		8	5	2	1	6	10
Permitted Phases	4		8		2		6		
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0	28.0
Minimum Split (s)	14.0	14.0	14.0	14.0	6.0	21.0	6.0	21.0	30.0
Total Split (s)	25.0	25.0	25.0	25.0	6.0	29.0	6.0	29.0	30.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	6.7%	32.2%	6.7%	32.2%	33%
Maximum Green (s)	19.0	19.0	19.0	19.0	3.0	23.0	3.0	23.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	0.0
Lead/Lag					Lead	Lag	Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)	5.0	5.0	5.0	5.0	3.0	5.0	3.0	5.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	2.0	2.0	2.0	2.0	0.0	20.0	0.0	20.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	Max	None	Max	None
Walk Time (s)									12.0
Flash Dont Walk (s)									16.0
Pedestrian Calls (#/hr)									30
90th %ile Green (s)	19.0	19.0	19.0	19.0	3.0	23.0	3.0	23.0	28.0
90th %ile Term Code	Hold	Hold	Max	Max	Max	MaxR	Max	MaxR	Max
70th %ile Green (s)	19.0	19.0	19.0	19.0	0.0	23.0	3.0	29.0	28.0
70th %ile Term Code	Hold	Hold	Max	Max	Skip	MaxR	Max	Hold	Max
50th %ile Green (s)	19.0	19.0	19.0	19.0	0.0	23.0	0.0	23.0	0.0
50th %ile Term Code	Hold	Hold	Max	Max	Skip	MaxR	Skip	MaxR	Skip
30th %ile Green (s)	19.0	19.0	19.0	19.0	0.0	23.0	0.0	23.0	0.0
30th %ile Term Code	Hold	Hold	Max	Max	Skip	MaxR	Skip	MaxR	Skip
10th %ile Green (s)	19.0	19.0	19.0	19.0	0.0	23.0	0.0	23.0	0.0
10th %ile Term Code	Hold	Hold	Max	Max	Skip	MaxR	Skip	MaxR	Skip

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 68.4

Control Type: Actuated-Uncoordinated

90th %ile Actuated Cycle: 90

70th %ile Actuated Cycle: 90

50th %ile Actuated Cycle: 54

30th %ile Actuated Cycle: 54

10th %ile Actuated Cycle: 54

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Arrival

Queues



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	290	5	620	25	885
v/c Ratio	0.04	0.79	0.02	0.51	0.08	0.67
Control Delay	26.3	45.8	17.6	23.0	17.3	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	45.8	17.6	23.0	17.3	25.0
Queue Length 50th (ft)	3	76	1	69	4	107
Queue Length 95th (ft)	24	#344	9	229	26	#390
Internal Link Dist (ft)	792	910		557		360
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	346	369	222	1218	307	1324
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.79	0.02	0.51	0.08	0.67

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Dismissal

Lanes and Geometrics

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			140			120		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.97			0.89		0.94	1.00		1.00	1.00	
Frt		0.977			0.970			0.977			0.997	
Flt Protected		0.968			0.964		0.950			0.950		
Satd. Flow (prot)	0	1749	0	0	1769	0	1805	3511	0	1805	3553	0
Flt Permitted		0.800			0.760		0.451			0.223		
Satd. Flow (perm)	0	1445	0	0	1243	0	805	3511	0	423	3553	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		872			990			637			440	
Travel Time (s)		19.8			22.5			12.4			8.6	

Intersection Summary

Area Type: Other

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Dismissal

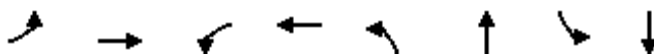
Volume

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Future Volume (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Confl. Peds. (#/hr)			84	84			87		6	6		87
Confl. Bikes (#/hr)												
Peak Hour 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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	20	5	5	120	5	35	15	730	130	20	485	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	160	0	15	860	0	20	495	0
Intersection Summary												

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue

Proposed Conditions - EPP, School Dismissal

Timings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	Ø10
Lane Configurations		↔		↔	↔	↔	↔	↔	
Traffic Volume (vph)	20	5	120	5	15	730	20	485	
Future Volume (vph)	20	5	120	5	15	730	20	485	
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA	
Protected Phases		4		8	5	2	1	6	10
Permitted Phases	4		8		2		6		
Detector Phase	4	4	8	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0	28.0
Minimum Split (s)	14.0	14.0	14.0	14.0	6.0	21.0	6.0	21.0	30.0
Total Split (s)	21.0	21.0	21.0	21.0	6.0	33.0	6.0	33.0	30.0
Total Split (%)	23.3%	23.3%	23.3%	23.3%	6.7%	36.7%	6.7%	36.7%	33%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	0.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	3.0	6.0	3.0	6.0	
Lead/Lag					Lead	Lag	Lead	Lag	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	None	Max	None
Act Effect Green (s)		14.3		14.3	34.8	30.6	35.3	31.6	
Actuated g/C Ratio		0.19		0.19	0.46	0.41	0.47	0.42	
v/c Ratio		0.11		0.68	0.04	0.60	0.08	0.33	
Control Delay		32.1		48.7	16.9	24.5	17.3	19.6	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		32.1		48.7	16.9	24.5	17.3	19.6	
LOS		C		D	B	C	B	B	
Approach Delay		32.1		48.7		24.4		19.5	
Approach LOS		C		D		C		B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 74.9

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 25.4

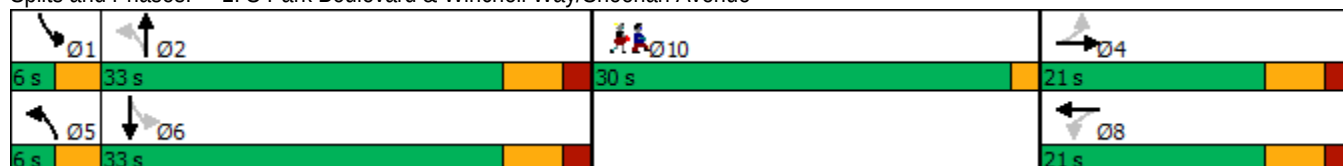
Intersection LOS: C

Intersection Capacity Utilization 45.4%

ICU Level of Service A

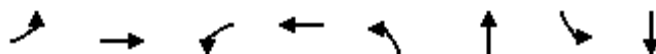
Analysis Period (min) 15

Splits and Phases: 1: S Park Boulevard & Winchell Way/Sheehan Avenue



Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Dismissal

Phasings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	Ø10
Protected Phases		4		8	5	2	1	6	10
Permitted Phases	4		8		2		6		
Minimum Initial (s)	8.0	8.0	8.0	8.0	3.0	15.0	3.0	15.0	28.0
Minimum Split (s)	14.0	14.0	14.0	14.0	6.0	21.0	6.0	21.0	30.0
Total Split (s)	21.0	21.0	21.0	21.0	6.0	33.0	6.0	33.0	30.0
Total Split (%)	23.3%	23.3%	23.3%	23.3%	6.7%	36.7%	6.7%	36.7%	33%
Maximum Green (s)	15.0	15.0	15.0	15.0	3.0	27.0	3.0	27.0	28.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	0.0
Lead/Lag					Lead	Lag	Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)	5.0	5.0	5.0	5.0	3.0	5.0	3.0	5.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	2.0	2.0	2.0	2.0	0.0	20.0	0.0	20.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	Max	None	Max	None
Walk Time (s)									12.0
Flash Dont Walk (s)									16.0
Pedestrian Calls (#/hr)									40
90th %ile Green (s)	15.0	15.0	15.0	15.0	3.0	27.0	3.0	27.0	28.0
90th %ile Term Code	Hold	Hold	Max	Max	Max	MaxR	Max	MaxR	Max
70th %ile Green (s)	15.0	15.0	15.0	15.0	0.0	27.0	3.0	33.0	28.0
70th %ile Term Code	Hold	Hold	Max	Max	Skip	MaxR	Max	Hold	Max
50th %ile Green (s)	15.0	15.0	15.0	15.0	0.0	27.0	0.0	27.0	28.0
50th %ile Term Code	Hold	Hold	Max	Max	Skip	MaxR	Skip	MaxR	Max
30th %ile Green (s)	13.2	13.2	13.2	13.2	0.0	27.0	0.0	27.0	0.0
30th %ile Term Code	Hold	Hold	Gap	Gap	Skip	MaxR	Skip	MaxR	Skip
10th %ile Green (s)	11.1	11.1	11.1	11.1	0.0	35.2	0.0	35.2	0.0
10th %ile Term Code	Hold	Hold	Gap	Gap	Skip	Dwell	Skip	Dwell	Skip

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 74.9

Control Type: Actuated-Uncoordinated

90th %ile Actuated Cycle: 90

70th %ile Actuated Cycle: 90

50th %ile Actuated Cycle: 84

30th %ile Actuated Cycle: 52.2

10th %ile Actuated Cycle: 58.3

Park Boulevard/Sheehan Avenue Study 1: S Park Boulevard & Winchell Way/Sheehan Avenue
Proposed Conditions - EPP, School Dismissal

Queues



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	30	160	15	860	20	495
v/c Ratio	0.11	0.68	0.04	0.60	0.08	0.33
Control Delay	32.1	48.7	16.9	24.5	17.3	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	48.7	16.9	24.5	17.3	19.6
Queue Length 50th (ft)	13	80	5	212	7	107
Queue Length 95th (ft)	40	#191	17	312	21	166
Internal Link Dist (ft)	792	910		557		360
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	305	262	415	1434	257	1498
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.61	0.04	0.60	0.08	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



**Glen Ellyn Capital
Improvements Commission**
535 Duane Street
Glen Ellyn, IL 60137

Meeting 5/11/2021 7:00 PM
Department: Public Works
Department Head: Dave Buckley
Category: Report
Prepared By: Rich Daubert

**AGENDA ITEM (ID # 2021-
1124)**

DOC ID: 2021-1124

Engineering Project Report Dated 5/7/2021

Statement of the Issue:

The Public Works Engineering Division Project Report Dated May 7, 2021 is attached hereto for review by the Capital Improvements Commission.

Analysis:

Budget Impact:

Action Requested:

Attachments:

1. Engineering Project Report 5-7-21

May 7, 2021



ENGINEERING DIVISION PROJECT ACTIVITY REPORT

CONSTRUCTION PROJECTS

PENNSYLVANIA AVE. IMPROVEMENT PROJECT – Contractor: John Neri Construction (Project No. 15006 & 16005; Value of Construction Contract = \$252,502)

The project includes both underground utility improvements (storm sewer, sanitary sewer service line, water service line, and street lighting conduit and wiring upgrades) and sidewalk widening from 7' to 16.5' on the south side of Pennsylvania, just east of Main Street and will allow for A Toda Madre restaurant outdoor dining expansion. The Village Board approved the construction contract on April 12th and work started on May 3rd. Initially, the contractor will focus on underground utility work and installation of the 42" storm sewer, followed by foundation work completed by A Toda Madre. Finally new sidewalk and paving work will be completed. The project is currently projected to be completed by June 25th.



Pennsylvania Ave, looking east from Main St

VILLAGE GREEN STORM SEWER PROJECT– Contractor: Mauro Sewer Construction (Project No. 16007; Value of Construction Contract = \$169,715)

This project involves the replacement of approximately 1,200 linear feet of 12-inch storm sewer from Village Green Park to Lambert Lake. Construction has been substantially completed including installation of top soil, seed, and erosion control blanket.



Turf restoration behind Village Green Park baseball fields

CONSTRUCTION PROJECTS IN CLOSE-OUT

CUMNOR AVENUE UTILITY IMPROVEMENTS – Contractor: John Neri Construction

(Project No. 19009; Value of Construction Contract = \$363,365)

This project involved the construction of approximately 470 feet of water main, including 11 service connections, and 475 feet of sanitary sewer, including 11 service connections, on Cumnor Avenue between Fairway and Acorn. The project is now fully complete, including parkway restoration and all punch list items. Final documentation and closeout of the project is anticipated to occur in the coming weeks.

ROADWAY REHABILITATION PROJECT 20002– Contractor: Schroeder Asphalt Services

(Project No. 19007; Value of Construction Contract = \$1,298,381)

This project involved more limited utility (repairs) and roadway improvements (resurfacing) along approximately 2 miles of roadways generally located in southeast Glen Ellyn. All punch list items have been completed with the Engineer working on closeout invoicing and documentation for the project.

SCOTT-CLIFTON-CUMNOR IMPROVEMENTS – Contractor: Chicagoland Paving

(Project No. 19007; Value of Construction Contract = \$622,405)

Final punch list work has been completed with preparation of the final balancing change order for the project underway.

NORTH PARK BLVD. / MAIN STREET IMPROVEMENTS – Contractor: R.W. Dunteman

(Project No. 13001; Value of Construction Contract = \$2,945,000)

Staff and the Resident Engineer have addressed all of IDOT's requests with project closeout in the court of IDOT District 1 Materials.

TAYLOR AVENUE PEDESTRIAN TUNNEL – Contractor: "D" Construction

(Project No. 15009; Value of Construction Contract = \$2,745,521)

All authorizations have been submitted to IDOT; once the authorizations have been signed off on by IDOT and posted, the final pay estimate will be generated by the Engineer. The final pay estimate will be transmitted to the Contractor with 21 days provided to dispute the quantities. Otherwise IDOT will proceed with final invoicing for the project.

HILL AVENUE BRIDGE REPLACEMENT – Contractor: Dunnet Bay Construction

(Project No. 16008; Value of IDOT Contract = \$1,550,000; Glen Ellyn Share = \$160,000)

The project record drawings have been received from the Consultant and placed in the Village's drawing database. Final invoicing by IDOT for the balance of the Construction Contract Costs is still forthcoming.

CRESCENT BOULEVARD RECONSTRUCTION – Contractor: Martam Construction

(Project No. 13002; Value of IDOT Contract = \$3,153,000; Local Share = \$1,480,000)

IDOT has issued the material certification approval letter for the project. With all other documentation complete, the Contractor was given written notice by IDOT on Nov. 5th that they have 21 days to contest the Village's final quantities; otherwise IDOT will proceed with final invoicing for the project.

ENGINEERING PROJECTS

UTILITY AND ROADWAY REHABILITATION PROJECT 20001– Engineer: *Engineering Resource Associates*

(Project No. 20001)

This project, currently in the design phase, involves more extensive utility and roadway improvements along approximately 1.6 miles of streets in the central-west area of the Village. The first phase of the project involving Phillips, Vine, Ridgewood, Evergreen, and Center was released for competitive bidding on April 12th with 7 bid proposals received and publicly opened on April 27th. A summary of the bids received, including the engineer's estimate, is as follows.

Bidder	Bid*
Copenhaver Construction, Gilberts, IL	\$3,052,890
A Lamp Concrete Contractors, Schaumburg, IL	\$3,354,322
Engineer's Estimate (Glen Ellyn)	\$3,374,147
John Neri Construction, Addison, IL	\$3,379,149
Swallow Construction, West Chicago	\$3,480,110
Performance Construction & Engineering, Yorkville, IL	\$3,529,900
R.W. Dunteman Company, Addison, IL	\$3,573,423
Bolder Contractors, Cary, IL	\$3,770,503

Staff completed a thorough review of the bid proposals and will be providing a recommendation of award of the construction contract to Copenhaver Construction at the May 10th Village Board Meeting.

In concert with the letting of the project, a request for proposals for construction engineering services for full time oversight of the project was issued to eleven engineering firms with six proposals received. A summary of the proposals received is as follows:

Summary of Construction Engineering Proposals			
Consultant	Total Hours	Not-to-Exceed Price	Evaluation Score
Edwin Hancock Engineering	1,847	\$183,528	83
V3 Companies	1,168	\$144,642	80
Chastain & Associates	1,621	\$211,326	77
Engineering Resource Associates	1,089	\$148,954	72
Thomas Engineering Group	2,321	\$224,894	68
Civiltech Engineering	2,172	\$284,347	66

While Edwin Hancock Engineering's proposal was not the lowest in terms of cost, it was the most favorable proposal in terms of qualifications, completeness of project approach, hours, and fee. Staff will accordingly be providing a recommendation to enter into an agreement with the firm for construction engineering services for the project at the May 10th Village Board Meeting.

2021 STREET IMPROVEMENTS PROJECT – Engineer: Chastain & Associates

(Project No. 21002)

This project involves more limited utility (repairs) and roadway improvements (resurfacing) along approximately 3 miles of roadways generally located in northeast Glen Ellyn to be improved in 2021. The project was released for competitive bidding on April 14th with 7 bid proposals received and publicly opened on April 28th. A summary of the bids received, including the engineer's estimate, is as follows.

Bidder	Total Bid*
RW Dunteman Company of Addison, IL	\$1,624,278
Engineer's Estimate (Chastain & Associates)	\$1,651,210
Geneva Construction Company of Aurora, IL	\$1,655,078
Brothers Asphalt Paving, Inc. of Addison, IL	\$1,742,090
A Lamp Concrete Contractors, Inc. of Schaumburg, IL	\$1,769,834
Schroeder Asphalt Services, Inc. of Huntley, IL	\$1,914,336
K-Five Construction Corporation of Westmont, IL	\$1,928,718
Orange Crush, LLC of Hillside, IL	\$2,099,916

Staff completed a thorough review of bids received and will be providing a recommendation of award of the construction contract to RW Dunteman at the May 10th Village Board Meeting.

In concert with the letting of the project, a request for proposals for construction engineering services for full time oversight of the project was issued to eleven engineering firms with six proposals received. A summary of the proposals received is as follows:

Summary of Construction Engineering Proposals			
Consultant	Total Personnel Hours	Total Not-to-Exceed Price*	Evaluation Score
Chastain & Associates, LLC	935	\$118,932	80
Engineering Resource Associates	772	\$106,817	77
V3 Companies	650	\$108,314	77
Hancock Engineering	1,295	\$134,496	75
Thomas Engineering Group	1,044	\$148,769	74
Civiltech Engineering, Inc.	1,097	\$180,561	72

While Chastain & Associates proposal was not the lowest in terms of cost, it was the most favorable proposal in terms of qualifications, completeness of project approach, hours, and fee. Staff will accordingly be providing a recommendation to enter into an agreement with the firm for construction engineering services for the project at the May 10th Village Board Meeting.

HILL AVENUE UTILITY IMPROVEMENTS – Engineer: Walter E. Deuchler Associates

(Project No. 00511)

Union Pacific Railroad Company has approved the plans for the water main and sanitary sewer main crossing of the UP-West Line. A pipeline crossing agreement between the Village and Railroad is under review by staff for forthcoming presentation to the Village Board for consideration of approval. The Engineer is currently working on drawing revisions for the water main extension on Hill Avenue.

GLEN ELLYN/IL AMERICAN WATER INTERCONNECT– Engineer: Donohue

This project involves the design of an emergency use interconnection between the Village and Illinois American Water Company (ILAWC) distributions systems, near Glenbard South High School. The interconnection would significantly reduce the water outage areas for the respective utilities in the event of water main breaks. The Engineer is currently preparing 90% plans, specifications, and estimates which are anticipated to be ready for Village and ILAWC review in mid-May. A draft agreement between the Village and ILAWC has been prepared and is under staff review.

CENTRAL BUSINESS DISTRICT PROJECTS

TRAIN STATION / PEDESTRIAN TUNNEL – Engineer: CDM Smith/KMI Architects

(Project No. 16016)

Work continues on the Section 106/4f tasks. IDOT and FHWA have reviewed the revised project purpose and need document with no further comments. JLK (Architects) is making revisions to the latest historic documentation package on properties within the project area of potential effect. CDM Smith is currently working on the alternatives analysis for the project including no build, relocation to the east, relocation to the west, rehabilitation, rehabilitation with an addition, and new construction.

CBD UTILITY STUDY – Engineer: RJN Group/Michels Corp.

(Project No. 15006)

The results of the remaining sewer services televising and building inspections were included in a supplemental report submitted in July 2020. Staff is working with RJN to address identified deficiencies and infrastructure requiring upgrades in the scope of the CBD Streetscape and Utility Improvements Project.

CBD UTILITY AND STREETScape IMPROVEMENTS – Engineer: Civiltech Engineering, Inc.

(Project No. 15006)

The design team will discuss geometric changes to the downtown intersections at the next CIC meeting, scheduled for May 10th. Work continued on detail construction staging of Phase 1 of the project with exhibits and construction staging renderings to be ready for CIC and Village Board review in June.

Design work continues on the streetscape and utility portions of Phase 1 of project slated for commencement of construction in early 2022.

PROCUREMENT OF GOODS AND SERVICES

Public Works seeks the best vendor prices for various annual municipal and utility maintenance and operations activities. This effort includes local bidding of projects or joint purchasing initiatives, including the Municipal Partnering Initiative (MPI), a consortium of DuPage County communities.

Project	Estimated Glen Ellyn Cost	Status
2021 Sidewalk and Concrete Street Repairs	\$325,475 (2021)	This annual program includes repairs to deteriorated or damaged sidewalk and concrete roadway infrastructure throughout the Village. This year's program also includes an Alternate Bid for two new segments of requested sidewalk installations. Staff worked to design the two segments of new sidewalk for inclusion in the bid documents. Bid documents and candidate repair locations were compiled for a bid advertisement on April 16, 2021. Bids were opened on April 29, 2021 and award to Schroeder & Schroeder, Inc. is targeted for the May 10, 2021 Village Board meeting. If awarded at that time, a first batch of repairs is anticipated to be completed late-June and July with a second batch being completed at the end of the construction season.
2021 Parking Lot Resurfacing and Asphalt Roadway Patching	\$210,700 (2021)	Project scope includes roadway patching throughout the Village and resurfacing of the Park & Montclair parking lot. The contract was advertised on January 29, 2021 with bids opened on February 10, 2021. The contract was awarded to the low bidder, J.A. Johnson Paving Company at the February 22, 2021 Village Board meeting. The contractor is aiming to complete the parking lot work the week of May 24 with roadway patching work occurring either shortly before or after.
2021 Pavement Markings	\$30,000 (2021)	This contract is annually intended to be awarded to the 2021 low bidder of either the DuPage County contract or Suburban Purchasing Cooperative. These contracts are typically awarded or extended annually in March or April. Staff will soon work to recommend a Village contract to the Board. Construction is targeted to be completed mid to late Summer.
2021 Crack Sealing	\$25,000 (2021)	This year's program is anticipated to be procured once staff has compiled candidate locations using upcoming Pavement Condition Index (PCI) Study data. The 2021 PCI Study is discussed below.
2021 Asphalt Surface Rejuvenation	\$40,000 (2021)	Candidate locations include streets that have been resurfaced one to three years prior. Staff has finalized target locations and quantities and has received pricing from single source vendor Corrective Asphalt Materials. Staff will recommend single source purchase award at a Village Board Meeting in advance of work being completed late Summer.
2021 Pavement Condition Index (PCI) Study	\$50,000 (2021)	The Village has obtained pavement condition data for all Village streets every four years since 2004. Unfortunately, COVID-19 caused staff to recommend deferral of a 2020 Study due to financial concerns at the time. However, on a positive note, Staff applied for participation in CMAP's

Project	Estimated Glen Ellyn Cost	Status
		Pavement Management Program and recently learned that CMAP was able to secure additional State Planning and Research Grants and has included Glen Ellyn in its next round of assisting communities with completing PCI Studies and developing Pavement Maintenance Programs. The Village will in turn receive an updated Pavement Condition Index Survey of all the Village's streets as well as a 5-year pavement management program; <u>both at no cost to the Village.</u> Staff met with CMAP's consultants, AECOM and Applied Research Associates, Inc. (ARA) on March 18th to officially kick off this effort. ARA completed all data collection in April, with resulting reports and recommendations will anticipated to be provided to the Village in June and July.

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