



County: _____
Local Public Agency: City of Highland Park
Section Number: 15-00126-00-PV
Route: Green Bay Road (FAU 2744)

Project Number: _____ Project Length: 7,300 feet (1.38 miles)

Street/Road Name: Green Bay Road

Termini: Central Avenue (FAU 1256) on the north to Clavey Road (FAU 1265) on the south limit

For Township or Road District bridge projects: The County Engineer certifies that the project design speed exceeds the minimum design speed recommended for this classification of roadway as provided in the BLRS Manual in order to prevent a deficient NBIS rating for approach roadway alignment appraisal. All elements have been designed to the chosen design speed unless noted otherwise in Section 2(e) and/or the attached BLR 22120.

County Engineer _____ Date _____

Categorical Exclusion and Design Approval Recommended

K. K. K. Local Agency Date 2/6/18

Categorical Exclusion Statement

This project will not have any significant impacts on the environment, or involve any unusual circumstances, therefore, it is a Categorical Exclusion I.

Categorical Exclusion and Design Approval

Anthony J. Quigley Regional Engineer Date 2/22/18

1. LOCATION AND EXISTING CONDITIONS

a. **Location** (attach location map to supplement narrative description)

Green Bay Road (FAU 2744) is an arterial road that runs in a general north-south direction through the City of Highland Park from Lake Cook Road in the Village of Northbrook on the south, through a part of the City of Highwood, to the city limits with the Village of Lake Forest on the north. The proposed project is located from the FAU Route of Central Avenue (FAU 1256) on the north to the FAU Route of Clavey Road (FAU 1265) on the south, with the reconstruction limits being defined as between Central Avenue on the north to Edgewood Road on the south consisting of approximately 7,300 feet or 1.38 miles. (see attached Location Map)

b. **Description of Existing Facility** - Give narrative description, including such items as width of travel, parking and turn lanes, sidewalks, alignment, traffic control devices, utilities, jurisdiction, maintenance responsibility, drainage, terrain and current land use (including major public facilities and local landmarks). Attach existing typical sections showing roadway widths, bridge widths, ROW widths, sidewalk widths, guardrail, curb and gutter and surface types.

The existing roadway is within a mainly residential area with commercial businesses and offices located at the north end of the project. There are 112 properties along the project improvement construction limits, defined as, between Central Avenue and Edgewood Road, with Lincoln Elementary School (North Shore School District #112), Lincoln Park (Park District of Highland Park) and two (2) places of worship (Immaculate Conception Church and Church of the Redeemer). There are 555 trees within the parkway with approximately half of these trees being of 15 inches (15") in diameter or larger and the other half being smaller than that in size. The posted speed limit for the most part is 30 mph, however, further to the south the speed limit increases to 35 mph. A five foot (5') wide public sidewalk exists along both sides of the roadway. Mailboxes on posts, or the like, within the parkway are non-existent as mail is either delivered to the door or picked up at the Post Office, i.e. in a Post Office Box. The existing right-of-way varies in width from 80 ft. at the north end near the commercial area to a minimum of 66 ft. which encompasses most of the remaining project length. The roadway is under the jurisdiction of the City of Highland Park (Local Agency) and consequently maintained by the City. This maintenance consisting mostly of snow and ice control also includes their sanitary and storm sewer systems as well as their water distribution system, which are not eligible for Federal funding participation. The roadway itself is a 30 ft. edge to edge portland cement concrete pavement consisting of a two lane, two way cross section for most of the project length; however, it does widen out at the north end near the commercial area where it becomes a two way, four lane road with dedicated turn lanes. Parking is prohibited along the roadway for the entire length of the project limits, including the commercial area at the north end. The roadway geometry is pretty much that of a straight alignment with slight deflections or curves if you will, as one approaches either of the two (2) intersections with Bob-O-Link Road and Deerfield Road. Within the project limits there are a total of 16 intersections, which includes five (5) signalized intersections with the remaining ones regulated and controlled by other methods, such as stop signs. Storm water run-off is collected by inlets that are located in the existing curb line and piped through various small diameter storm sewers that are separate from the sanitary sewer system. The City also has sanitary sewer and water main distribution infrastructure facilities within the right-of-way, some of which are under the roadway pavement. There currently are no dedicated or signed bicycle facilities of any type within or along the right-of-way. A separate dedicated path will be part of this improvement project.

c. **Traffic Data**

Current ADT: 12,300 % trucks: 6

Will 80,000 trucks be legally permitted on this route? Yes No

Design Year: 2017 ADT: 12,300 DHV: _____ % trucks: 8

d. **Structures** - Identify location within the proposed improvement of all structures on attached location map. Attach a copy of the Structure Master Report for all structures within the project limits. Attach a copy of the Bridge Condition Report or the Bridge Deck Resurfacing approval letter for structures to be replaced, rehabilitated, or

resurfaced.

e. **Railroads** - Identify location of all railroad crossings on attached location map and complete the following:

Railroad Name	No. and Type of Tracks (Main or Switching)	Type of Warning Devices*	No. of Trains Per Day	Railroad Width of Crossing at Rt. Angles
N/A	N/A	N/A	0	0

*Include a sketch showing location of railroad protective devices from the edge of roadway and to the nearest track.

f. **Contiguous Sections** - Describe the existing typical sections at each end of the proposed improvement including number of travel lanes, turning lanes and parking lanes, lane widths and roadway width (f-f of curbs or e-e of shoulders), and sidewalk width.

Central Avenue at the north limit is a four (4) leg, signalized, multi-lane, east-west arterial roadway with turn lanes. Central Avenue serves many commercial establishments and business offices within the area with wide sidewalks running along their frontages. Edgewood Road functions as a two (2) lane, two-way collector street creating a skewed "T" channelized (with turn lanes) intersection with Green Bay Road. The Edgewood Road right-of-way currently has a public sidewalk along the north side of the right-of-way and a turf parkway along the south side, having no public sidewalk along that side.

2. Proposed Improvement

a. Discuss the purpose and need of the project:

The existing rigid concrete pavement has passed its expected useful design life, showing its age and requiring more repairs and maintenance time dedicated to its upkeep. The surface's ride quality has declined and is diminishing with the passage of every year that goes by. This now is of a greater concern with the increased use by cyclist's and a proposed dedicated (marked) bike lane that the City has planned as part of their Bike-Walk 2030 Street Policy Plan. The geometry at some intersections requires improvements be made, more specifically addressing the need of improved turning movement geometry to be made to the curb radii in order to accommodate larger trucks without jumping the curb. It will become necessary to place turning movement restrictions on larger trucks at some locations in that there will not be sufficient right-of-way available in order to widen the pavement as there is no planned right-of-way taking in this proposed improvement.. This roadway improvement will be coordinated with the City's planned sewer and water main utility improvements along this portion of Green Bay Road. The City realizes the cost implications associated with their utilities and will be responsible for the entire financial obligation associated with the construction costs of their sanitary sewer and water main improvements as these costs are not eligible for Federal Funding under this project, however; the City would benefit with the economy of scale while undertaking these proposed utility improvements as part of this roadway project improvement.

b. What design guidelines will be used for the proposed improvement? (Check One)

- Rural (BLRS Manual Chapter 32)
- Urban (BLRS Manual Chapter 32)
- Suburban (BLRS Manual Chapter 32)
- 3R Guidelines (BLRS Manual Chapter 33)
- Bicycle Guidelines (BLRS Manual Chapter 42)
- Pedestrian Guidelines
- Other:

Functional Classification: Arterial Collector Local Road Other

Terrain: Level Rolling

Regulatory or Posted Speed Limit: 35 Design Speed: 35

- c. Describe type of work to be accomplished by the improvement. Discussion should include width of proposed travel, parking, bicycle and turning lanes, sidewalks, shared-use paths, guardrail, traffic control devices, drainage items (including storm sewer outfalls), alignment changes, railroad work, utility adjustments, intersection improvements, side slopes and clear zones. Specify the emax for horizontal curves. Attach typical sections, plan and profile sheets, and intersection design studies when applicable.

The existing roadway alignment, profile and width are to be maintained as they currently exist as initial criteria in the proposed design of the reconstructed roadway, as these elements are adequate as they currently exist today and function satisfactorily in handling today's traffic volumes. It has been further recognized by City and IDOT representatives that expanding the roadway to that of a four lane roadway would not be much of a benefit and would terminate the project due to the impact to the surroundings. A dedicated (marked) bike lane (Sta. 0+50 to Sta. 72+00) will be incorporated in the design in order to more safely accommodate the growing number of bicyclists in the area. Pedestrian foot traffic is accommodated by means of the existing sidewalk system which will have improved ADA compliant crossings at the intersections where they currently do not exist. As previously touched upon and noted during the planning concept of a four lane roadway or two lane roadway as the proposed reconstructed improvement of this route was the concern of the (negative) impact to the substantial number of the parkway trees that would need to be removed as well as the additional right-of-way that would be required for widening the roadway. The impact to any of these parkway trees was a major concern, particularly considering the fact that the City is designated a "Tree City". There are five (5) existing signalized intersections that operate at a Level of Service (LOS) of C or better, however; there are some minor delays at Bob-O-Link affecting both the north and south bound traffic on Green Bay Road in the evening rush hour as well as some morning delays along the east and west bound directions on Bob-O-Link, neither of which is of any major design concern. There will be no Intersection Design Study (IDS) on these intersections as agreed to at the August 27, 2015 and September 15, 2015 IDOT/FHWA Coordination meetings. These signalized intersections will however, have improved geometry and up-graded traffic signals. The intersection at the north termini of the project at Central Avenue does not require any such improvements to be made within the scope of this project. Traffic control devices including weight restrictions and turning movements on trucks will be posted and signed as required as well as pavement markings that meet the current MUTCD Manual will be installed. Drainage along the right-of-way will be improved with a new storm sewer system in this project. The City plans on incorporating within the scope of the project, sanitary sewer and water main distribution infrastructure improvements which are not eligible for Federal funding within this project.

- d. Discuss items affecting improvement such as hazardous mailbox supports, parking and truck restrictions, mail delivery from traffic lanes, justification (including warrants) for multi-way stop signs, traffic signals and other traffic control and railroad protective devices, stage construction, nearby airports, and additional lighting:

The parkway area behind the curb is relatively clear with the usual parkway trees (mentioned earlier), utility poles, utility boxes and traffic control devices. Mail is delivered to the door or to Post Office boxes and as such there are no mailbox supports behind the curb. There is no on-street parking as that condition is prohibited. The traffic signals which exist along this route do not have any documented warrant data due to their age. They were installed approximately 40 plus years ago when this was a State route so their existence is based on their inherent warrant. Article 39-4.03 of the BLR & S Manual states "If it is obvious that an existing traffic signal meets one or more of the traffic signal warrants, no special documentation will be required to allow the existing signals to remain or be modernized". Each of the signalized intersections meets these criteria. The traffic signals at five (5) of the signalized intersections will be upgraded and modernized but no new (additional) traffic signal locations are necessary or being proposed under this improvement.

- e. Identify each aspect to be constructed at less than the design guidelines and provide a clear description of required design variances and appropriate justification. (BLRS Manual Section 27-7). If a design variance is required, include a copy of the approved BLR 22120 form as an attachment.

No variances are being sought or requested.

- f. Current estimated cost of proposed improvement? \$ 11,000,000

- g. Analyze the need for accommodating pedestrians, bicyclists and the handicapped. When applicable, describe the facilities to be provided for pedestrians and bicyclists. Discuss the ADA accessibility and maximum longitudinal grade of these facilities. (BLRS Manual Chapter 41)

The proposed improvement will incorporate a bike lane along Green Bay Road as called for in the City's adopted Bike-Walk 2030 Comprehensive Street Plan. The sidewalk pedestrian crossings at the intersection crosswalks will be made more visible, pedestrian friendly and safer with pavement marking, advance warning signs and pedestrian crossing signs, as well as being made handicapped accessible meeting ADA standards and requirements including flatter slopes with 2% maximum grades and detectable warnings. City-wide bicycling improvements have already been made in 2017.

Sidewalks/Shared-Use Paths:

Maximum 2% crosslope: Yes No Not Applicable

ADA ramps with detectable warnings at street intersections: Yes No Not Applicable

If no, provide justification.

- h. Discuss any proposed improvements being considered in adjacent segments including the anticipated construction startup date of these improvements.

Clavey Road (FAU 1265), an east-west route, approximately one half mile, to the south of this project will be improved prior to this project from the intersection at Green Bay Road to the west under a separate improvement project designed by another Engineering Consultant.

3. Crash Analysis (BLRS Manual Section 22-2.11(b)(9))

- a. Summarize crash data for the past five years, including a spot map or a location map showing crash locations when possible. Detail the types of crashes and include collision diagrams, if possible, especially at cluster sites. Give the source of this data.

Crash data, furnished by the City of Highland Park Police Department for each the years 2012, 2013, 2014, 2015 and 2016 was reviewed and analyzed paying particular attention to existing roadway characteristics and potential deficiencies that might be able to be addressed within the design of this improvement. Roadway conditions, drivers age, time of year and particular day were considered in the review process to see if that might have played a part in the incident. Some reports were not roadway related, as they occurred off of the roadway on private property in parking lots and such, which were eliminated for consideration. One incident which occurred on the roadway consisted of a fire hose coming off of a fire truck striking a vehicle. Accident types for most of the categories charted remained pretty much the same and consistent through the period analyzed, with the exception of the rear end collisions, which increased over the years, particularly the last couple of years. The most prevalent collisions were of course, the rear end type crashes during the five (5) year period of reported accidents. This is not surprising and could be expected to be the case. Interestingly enough though, was the fact that some of these rear end type incidents were not at the expected locations of a controlled intersection such as at traffic signals, where sudden stops, etc., are more likely to occur thereby increasing the potential of not being able to stop in order to avoid hitting another vehicle. Many incidents were attributable to

the fact that the drivers were following too closely to the vehicle in front of them or that they simply were not engaged fully in their driving by not paying attention. This seems to be borne out in the number of rear end accidents reported, with an increase in these types of accidents over time, particularly noting the substantial increase within the last few years. This increase is in direct parallel with the nationwide occurrence of all accidents due to distracted driving of various kinds, such as cell phone use, texting, gaming, geo-map reading, etc. The remaining incidents were for the most part improper lane use, failure to yield on turn movements, i. e. left turns not yielding to on-coming vehicles or vehicle operator age related. There were no reported lane cross-over "Head-on" collisions and fortunately, no fatalities reported during this five (5) year period. While too voluminous in nature to include all of the individual accident reports within this document they are available, for further review, upon request.

- b. Analyze available crash data including results of field check. Discussion should include high crash locations, critical wet weather sites, and other crash patterns. If the data is inconclusive, make a statement to that effect.

For the most part the roadway is safe showing little to no design deficiencies, however; conditions would be improved with new signing and pavement markings. The cluster or high number of crash locations cannot really be corrected for within the design as they are centered toward the more heavily traveled and congested segment of the roadway near the commercial area at the north end of the project and tend to be caused by poor driving characteristics comprised of motorist errors, mainly inattentiveness to their driving, poor judgement or following too close to the vehicle ahead of them thereby not providing a safe stopping distance between the two vehicles. The roadway design and/or conditions as well as the weather had little or nothing to do with the cause of the various incidents, which were for the most part, relatively minor in nature. Only a few of accidents were reported to have occurred due to wet, slippery pavement conditions caused by rain, snow and/or ice.

- c. Describe how the proposed project will address any crash issues.

Crashes unfortunately will probably remain much the same in type and nature; however, it is anticipated that with the new pavement which will be smoother providing a better ride quality and be made safer for bicyclist's with the addition of a separate marked bike lane and associated traffic signing devices and pavement markings. With roughly a total average of nine (9) crashes, mostly rear end type, per year which fortunately seem to be relatively minor in nature, the best solution to reducing these various incidents would be greater attention be paid by the motorists to their driving. There will be more visible marked, signed and delineated safer crosswalks provided as part of this improvement. Hopefully, in that only one (1) non-serious vehicle vs. pedestrian, who I might add, was north of and not within the designated crosswalk area and one (1) vehicle vs. bicyclist incident, might be eliminated.

4. Right-of-Way

- a. Describe the right-of-way taking, including the total acreage required for each of the following categories: ROW, permanent easements, temporary easements and temporary land use permits. Include the width of taking, number of property owners, acreage of right-of-way and/or easements, character of land; i.e., farm, residential, commercial or publicly owned properties, anticipated impacts to properties that remain, and location of any improvements with respect to required right-of-way. Discuss any impacts on setbacks required by zoning.

No easements or new right-of-way are being proposed to be taken as part of these proposed improvements..

- b. Are any residents, businesses or farms to be displaced?

Yes No

If yes, describe the number and type of displacements anticipated and mitigation that will be taken to provide relief for this impact on an attached sheet.

5. Prime Farmland (BLRS Manual Section 20-10)

- a. If the project requires more than 3 acres/mile (0.75 hectares/kilometers), 10 acres (4 hectares) for a non-linear improvement, or the project ROW is not contiguous to the existing ROW, contact the Illinois Department of Agriculture and attach results of the coordination and summarize the results below.

N/A

- b. The project requires consultation with the Natural Resource Conservation Service., Form AD-1006 has been completed and submitted to the local office of NRCS. The completed AD-1006 form is attached.
- The impact of this project on farmland conversion has been evaluated in accordance with the requirements of the US Natural Resources (NRCS). The project will cover 3 acres or less of farmland per mile (0.75 hectares or less of farmland per kilometer) and the conversion will not result in more than minor impacts. Accordingly, the project conforms to the general form AD-1006 prepared by NRCS. Therefore, further coordination with NRCS on this project will not be necessary.

6. Floodplain Encroachment (BLRS Manual Section 20-7)

Does the proposed work cross or encroach upon a 100-year floodplain, including a regulatory floodway?

Yes No

If yes, summarize the location hydraulics study, regulatory floodway restrictions, the effect of any encroachment (including a comparison between existing and proposed conditions) and the effect of over-the-road flow on the proposed transportation facility. Attach any available floodplain maps.

7. Phase I & II NPDES Storm Water Permit Requirements (BLRS Manual Section 7-4.01)

Will the project involve soil disturbance of 1 acre (0.4 hectares) or more?

Yes No

If yes, the project must comply with the Phase II NPDES Storm Water Permit Requirements.

8. "404" Permit (BLRS Manual Section 7-4.02)

Does this project involve waters regulated by Section 404?

Yes No

If yes, what type of 404 permit is required? Nationwide Individual Regional None

Attach a copy of any 404 permit authorization and/or coordination letters with the Corps of Engineers.

If an individual Section 404 permit is required, please notify the Illinois Department of Transportation district office before submitting the application.

9. Special Waste (BLRS Manual Section 20-12)

a. Following the special waste assessment screening criteria shown on Figure 20-12A of the BLRS Manual, is Preliminary Environmental Site Assessment (PESA) required?

Yes No

b. Is work being done on property in the name of the state or are contract plans being prepared by the state?

Yes No

c. If a PESA is required for either state or local ROW, did the PESA results determine that the project has Recognized Environmental Conditions (REC's) for special waste?

Yes No

If the PESA results determine that the project contains REC's, describe how the special waste is proposed to be handled (including if a Preliminary Site Investigation (PSI) is required).

10. Environmental Survey (BLRS Manual Section 20-2)

Whenever a project involves land acquisition (including easements), any in-stream work (including drainage structure run-around), is located within or adjacent to historic properties listed in (or eligible for) the National Register of Historic Places, a bridge on the historic list, is near wetlands, or known locations of threatened or endangered species, the Environmental Survey Request Form should be submitted early in the project development phase.

- a. Wild and Scenic Rivers - If this project crosses or affects a river on the National Wild and Scenic Rivers System or a river listed in the Nationwide Inventory of Rivers with potential for inclusion on the system, include coordination between the National Park Service and the Bureau of Design and Environment (BDE).
 Involvement No Involvement

- b. Wetlands - Does the proposed work impact the use of regulatory wetlands?
 Yes No

If yes, indicate how the wetlands will be migrated. Banking Accumulation On-site Other

- c. Archaeological and Historical Preservation Include results of coordination. Does the project impact an archaeological or historic preservation site?
 Yes No

If yes, describe any required documents.

- d. Threatened or Endangered Species – Does the project impact any endangered species or plants?
 Involvement No Involvement

Include copy of biological resources memorandum or signoff by BDE and/or IDNR.

- e. Stream Modification and Wildlife Impacts - Include copies of any correspondence between BDE and IDNR or U.S. Fish and Wildlife Service. Attach copies of any additional coordination between local agency and IDNR or U.S. Fish and Wildlife Service whenever required as a result of biological review by BDE. Address any proposed mitigation measures.
 Involvement No Involvement

11. **Section 4(f) Lands (BLRS Manual Section 20-3)**

- a. Does this project require any right-of-way, including temporary construction easements, from a publicly owned park, recreational area, wildlife and waterfowl, or any historic site in or eligible for the National Register of Historic Places?
 Yes No
- b. If yes, what type of of the Section 4(f) involvement has been completed?
 Section 4(f) deminimis Standard Section 4(f) Temporary Occupancy None

12. **Air Quality (BLRS Manual Section 20-11) Check One:**

- a. This project is in an attainment area.
 Projects within a portion of a nonattainment area for which the Chicago Metropolitan Agency for Planning (CMAP) is the MPO.

This project is included in the _____ (transportation plan) and in the Transportation Improvement Program (TIP), endorsed by the _____, the region's Metropolitan Planning Organization. The _____ (transportation plan) was found to conform by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) on _____.

The TIP was found to conform by FHWA on _____ and by FTA on _____.

- Projects within a nonattainment area served by a Metropolitan Planning Organization other than CMAP.

This project is included in the Long-Range Transportation Plan and in the _____ Transportation

Improvement Program (TIP) endorsed by _____, the Metropolitan Planning Organization (MPO) for the region in which the project is located.

On _____ the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) determined that the Long-Range Transportation Plan conforms with the transportation-related provisions of the Clean Air Act Amendments of 1990. The FHWA and the FTA determined on _____ that the TIP conforms with the Clean Air Act Amendments. These findings were in accordance with 40 CFR Part 93, "Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and projects Funded or Approved Under Title 23 USC or the Federal Transit Act."

The project's design concept and scope are consistent with the project information used for the TIP conformity analysis. Therefore, this project conforms to the existing State Implementation Plan and the transportation-related requirements of the 1990 Clean Air Act Amendments.

b. Mobile Source Air Toxics (See BDE PM 52-06)

This project will not result in any meaningful changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions relative to the no-build alternative. As such, FHWA has determined that this project will generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special Mobile Source Air Toxic concerns. Consequently, this effort is exempt from analysis for MSATs.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next 20 years. Even after accounting for a 64 percent increase in VMT, FHWA predicts MSATs will decline in the range of 57 to 87 percent, from 2000 to 2020, based on regulations now in effect, even with a projected 64 percent increase in VMT. This will both reduce the background level of MSATs as well as the possibility of even minor MSAT emissions from this project.

c. Construction-related Particulate Matter

Demolition and construction activities can result in short-term increases in fugitive dust and equipment-related particulate emissions in and around the project area. (Equipment-related particulate emissions are usually insignificant when equipment is well maintained.) The potential air quality impacts will be short-term, occurring only when demolition and construction work is in progress and local conditions are appropriate.

The potential for fugitive dust emissions typically is associated with building demolition, ground clearing, site preparation, grading, stockpiling of materials, on-site movement of equipment, and transportation of materials. The potential is greatest during dry periods, periods of intense construction activity, and during high wind conditions.

The Department's *Standard Specifications for Road and Bridge Construction* include provisions on dust control. Under these provisions, dust and airborne dirt generated by construction activities will be controlled through dust control procedures or a specific dust control plan, when warranted. The contractor and the Department will meet to review the nature and extent of dust-generating activities and will cooperatively develop specific types of control techniques appropriate to the specific situation. Techniques that may warrant consideration include measures such as minimizing track-out of soil onto nearby publicly-traveled roads, reducing speed on unpaved roads, covering haul vehicles, and applying chemical dust suppressants or water to exposed surfaces, particularly those on which construction vehicles travel. With the application of appropriate measures to limit dust emissions during construction, this project will not cause any significant, short-term particulate matter air quality impacts.

d. Project-level Hot Spot Analysis. Check One:

- This project is in an attainment area and does not require a hot spot analysis.
- This project does not meet the definition of a project of air quality concern as defined in 40 CFR 93.123(b)(1).
Due to _____

it has been determined that the project will not cause or contribute to any new localized PM2.5 or PM10 violations or increase the frequency or severity of any PM2.5 or PM10 violations. USEPA has determined that such projects meet the Clean Air Act's requirements without any further Hot-Spot analysis.

This project is in a non-attainment or maintenance area and is a project of air quality concern. Therefore, a qualitative hot spot analysis is required. See Attachment _____.

e. COSIM

Are through lanes or auxiliary turn lanes being added with this project?

Yes No

If yes, has a COSIM pre-screen analysis been completed?

Yes No

If yes, pre-screen analysis is attached as Attachment _____

If no, explain why an analysis has not been performed. _____

If yes, did the COSIM pre-screen analysis pass or fail? Pass Fail

If the COSIM pre-screen analysis failed, a full COSIM analysis would be required.

13. Noise (BLRS Manual Section 20-6)

The referenced project meets the criteria for a Type III project established in 23 CFR Part 772. Therefore, the proposed project requires no traffic noise analysis or abatement evaluation. Type III projects do not involve added capacity, construction of new through lanes, changes in the horizontal or vertical alignment of the roadway, or exposure of noise sensitive land uses to a new or existing highway noise source.

Based on the traffic noise analysis and noise abatement evaluation conducted, highway traffic noise abatement measures are likely to be implemented based on preliminary design. The noise barriers determined to meet the feasible and reasonable criteria are identified on the attachment. If it subsequently develops during final design that constraints not foreseen in the preliminary design or public input substantially change, the abatement measures may need to be modified or removed from the project plans. A final decision of the installation of the abatement measure(s) will be made upon completion of the project's final design and the public involvement process.

If this project involves a new alignment, additional lanes, or involves a significant alignment change, attach a traffic noise analysis.

14. Work Zone Transportation Management Plans

Does the project intersect or follow a state route?

Yes No

Is the state or local route considered a significant route?

Yes No Not Applicable

If yes, describe how the Work Zone Transportation Management Plan is being implemented.

15. Complete Streets (BLRS Manual Chapter 10)

Does the project include the addition of a travel, turning, or bi-directional turn lane on a state highway?

Yes No

If yes, describe how the Complete Streets Law requiring accommodating bicyclists on a state route apply.

16. Maintenance of Traffic (BLRS Manual Section 22-2.11(b)(9))

Discuss how vehicle traffic and pedestrians will be accommodated during construction, including the impacts of any road and/or sidewalk closure. If the road will be closed, include information concerning location of alternate routes, their ability to handle the additional traffic (street width, number of traffic lanes, structural adequacy, etc.), and the amount of adverse travel. When a marked detour route will be provided, include coordination with appropriate agencies, a description of the adverse travel, and include a map showing the alternate routes or marked detour in the report.

Green Bay Road will be open to local traffic in order to serve the adjacent properties along the route of the proposed improvement. The thru-traffic that uses this route will be handled by providing a signed detour route along St. Johns Avenue a few blocks to the east, that runs parallel to Green Bay Road designated as an arterial/ collector route. Signs will be posted well advance of the construction commencement informing the motoring public of the impending road work enabling them to plan ahead should they wish to seek alternative routes or transportation methods. It is thought that some motorists will create their own detour routes, particularly those coming from the west by using Skokie Valley Road. The main designated and signed detour route will take the southbound thru-traffic east along Central Avenue to St. Johns Avenue then south to Roger Williams Avenue where it will then take them back to the west to Green Bay Road. The reverse detour route would be signed accordingly for the northbound thru-traffic. Signs along the busier roads such as Laurel Avenue and Roger Williams Avenue would be placed for the motoring public wishing to use Green Bay Road informing them of the detour well in advance such that they would be directed accordingly before coming to Green Bay Road. Signs would be erected at the various subdivision serving side street intersections informing motorists that the road is closed by using Type III barricades along with signs stating "Closed to Local Traffic Only" use. The busier roads intersecting Green Bay Road, such as Bob-O-Link Road, Lincoln Avenue and Deerfield Road will be signed directing motorists to the appropriate detour route. Eastbound Deerfield Road traffic at its split at Central Avenue would be directed to the north along Central Avenue then east to either northbound Green Bay Road (north of the project limits) or continuing to the east to the southbound Green Bay Road detour along St. Johns Avenue. The same routing would be the case for traffic along Laurel Avenue whether they are eastbound or westbound, as local traffic only signs would be erected at both the Deerfield Road and Laurel Avenue intersections. Advance information signs will be installed on Central Avenue before the roadway split at Central Avenue and Deerfield Road such that motorists entering the subdivision streets fed by McDaniel Avenue west of Green Bay Road are aware that Green Bay Road is open to local traffic only. All sidewalks will remain open during construction, unless it becomes necessary to close them, using Highway Standard 701801, using barricades and appropriate detour route signs directing the pedestrian traffic accordingly. Green Bay Road would always be open in one direction during construction and accessible to emergency vehicles, i.e. police, fire and public works, as well as the utility companies such as the gas or electric companies, etc. by using flaggers or other traffic control means and devices whenever it becomes necessary to direct traffic around any construction activities. All traffic control that would be required would comply with the current requirements and various appropriate Highway Standards of the Illinois Department of Transportation as well as the MUTCD. Two (2) directions of traffic would always be maintained where a four (4) lane section currently exists. However, in the section where only two (2) lanes of traffic exist, the northbound lane of traffic would be used for northbound traffic when construction is taking place in the southbound lane with a signed detour route for the southbound traffic. Once the new southbound roadway pavement is open to vehicles the opposite would be true, that is, the southbound traffic would use the new pavement and the northbound traffic would be detoured. Any temporary Hot Mix Asphalt (HMA) pavement patching within the construction zone could be provided, if necessary. The detour routes being considered at this time will be able to accommodate the additional traffic imposed upon them as they are wide enough with proven structural integrity. Measures for temporary closures, i.e. driveways, concrete walks through driveways, curbs and the like will be addressed during

the preparation of the final construction plan documents. The Work Zone Transportation Management Plan during construction is identified in the Maintenance of Traffic Plan.

17. Public Involvement (BLRS Manual Chapter 21)

- a. Summarize public informational meetings, formal public hearings, property owner signoffs, council or board meetings, media coverage, and personal contact with public. Include copies of newspaper advertisements, letter to property owners, public comments, and documents showing all public comments have been addressed.

City of Highland Park Council meetings, which are televised, discussing the project were held on August 3, 2015, August 24, 2015, October 26, 2015 and October 24, 2016, during which time no one, at the time, or any time subsequent to the meetings stepped forward expressing comments either in favor of the project or against it.

- b. Has any opposition been expressed toward the improvement?

Yes No

If yes, briefly discuss the type and extent of opposition.

- c.

If yes, discuss how the opposition has been addressed with the property owners?

18. Coordination: LA-IDOT-FHWA (BLRS Manual Section 22-1.02)

Has there been any coordination meetings for this project? Yes No

If yes, list the date(s) of the coordination meeting(s) below and attach coordination meeting minutes in the report.

19. Other Coordination

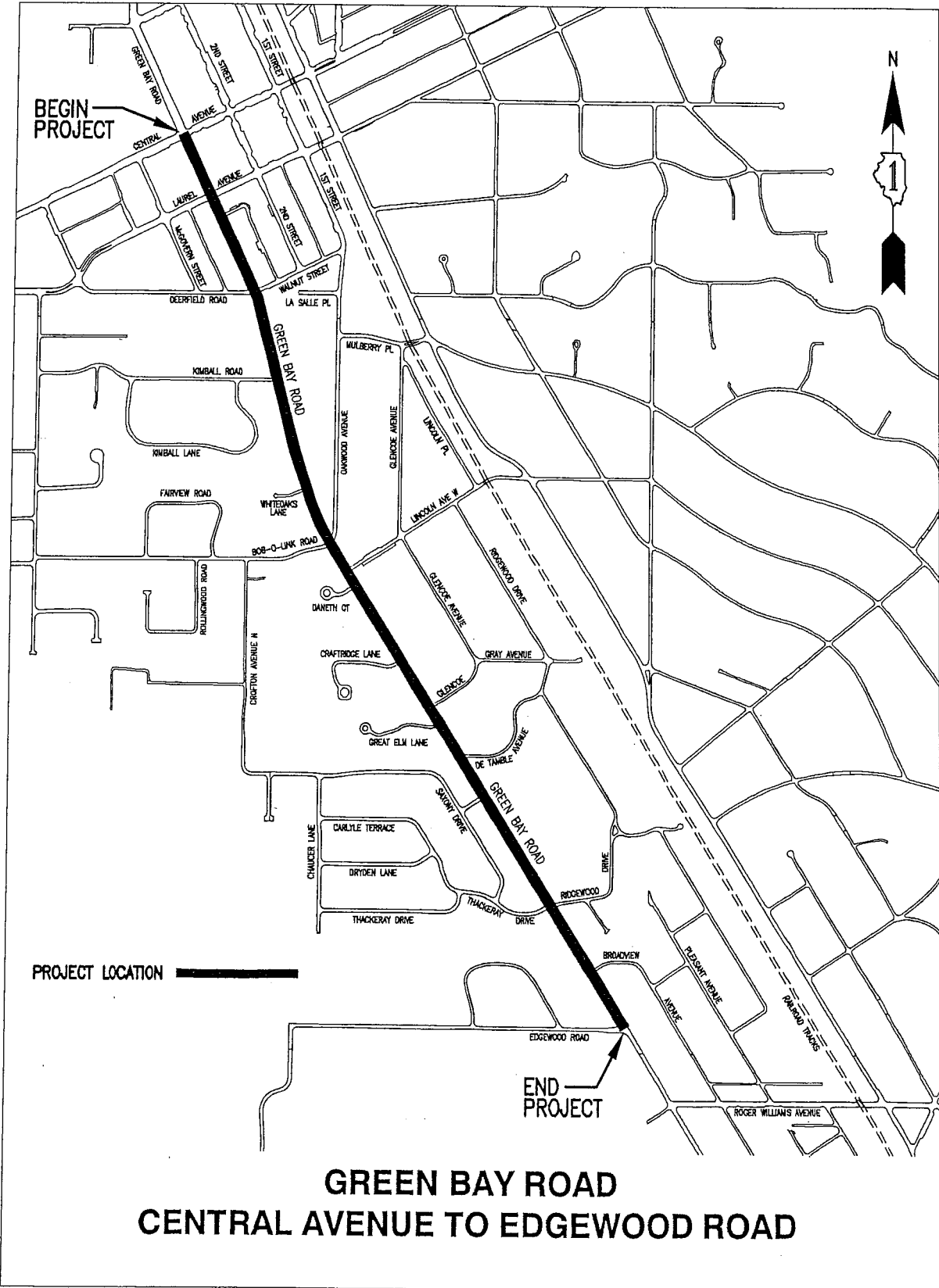
Attach results.

20. Summary of Commitments

Coordination meetings between FHWA, IDOT and the City of Highland Park on 8/27/15 and 9/15/15.

Summary of Attachments (when required):

1. Location Map and Functional Classification Map
2. Existing and Proposed Typical Sections
3. Structure Master Report
4. Bridge Condition Report Approval Cover Letter
5. Preliminary Bridge Design and Hydraulic Report Approval Cover Letter
6. Railroad Crossing Drawing
7. Plan and Profile Sheet (for Rural Projects with additional ROW, Urban Projects, bike trail/or sidewalk projects, and Bridge Projects)
8. Intersection Design Studies
9. Spot Map and/or Collision Diagram
10. Soil Conservation Service and Illinois Department of Agriculture Coordination
11. "404" Permit correspondence
12. Environmental Clearances and Correspondence
13. Property Owner Signoffs and/or Correspondence with Property Owners Regarding Public Comments
14. Public Information Meeting Newspaper Advertisement and a Copy of Property Owner Letter
15. Bimonthly Coordination Meeting Minutes
16. BLR 22120 Design Variance Form
17. Detour or Alternate Route Map
18. Other Coordination



BEGIN PROJECT



END PROJECT

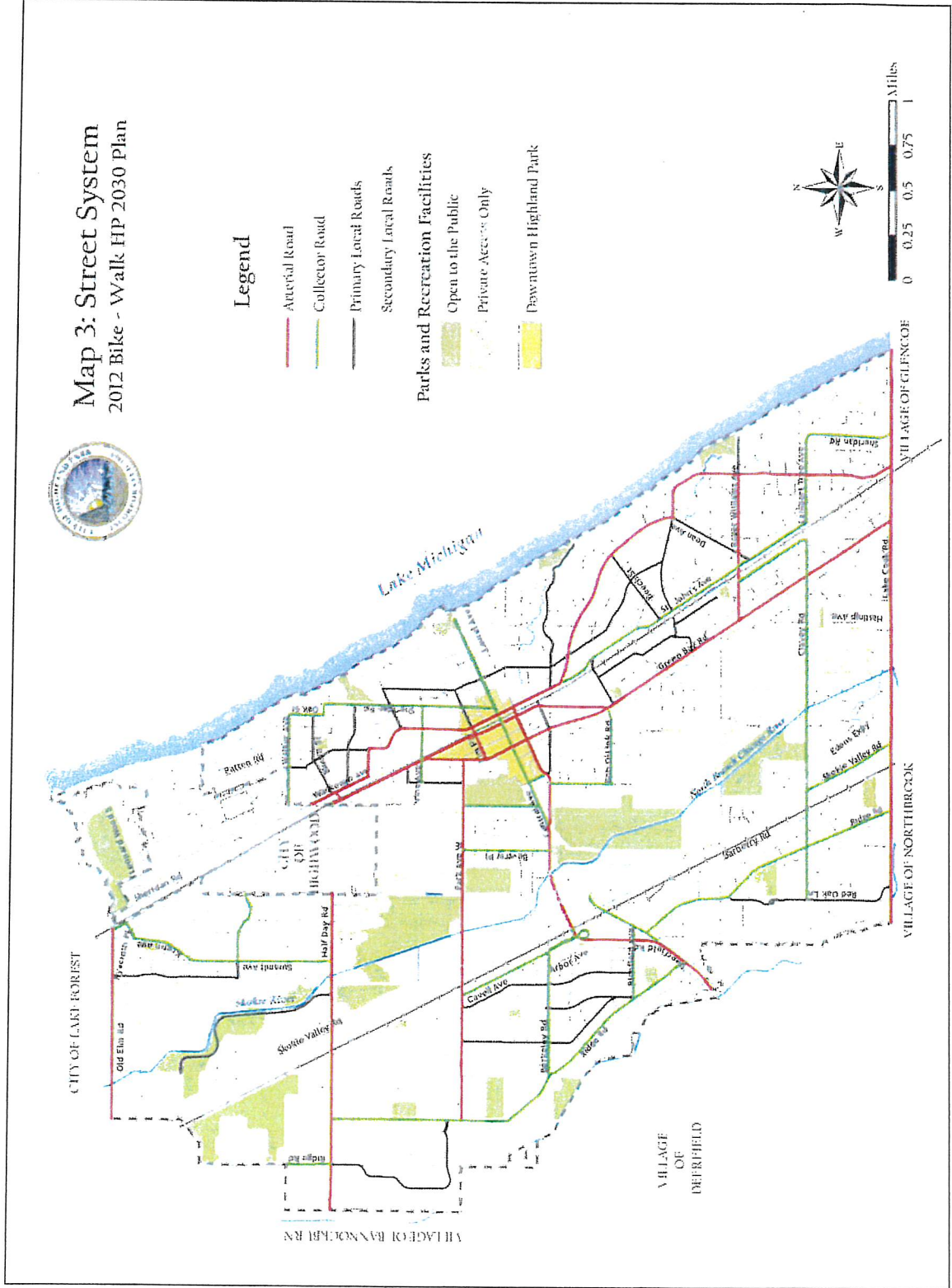
PROJECT LOCATION

GREEN BAY ROAD CENTRAL AVENUE TO EDGEWOOD ROAD

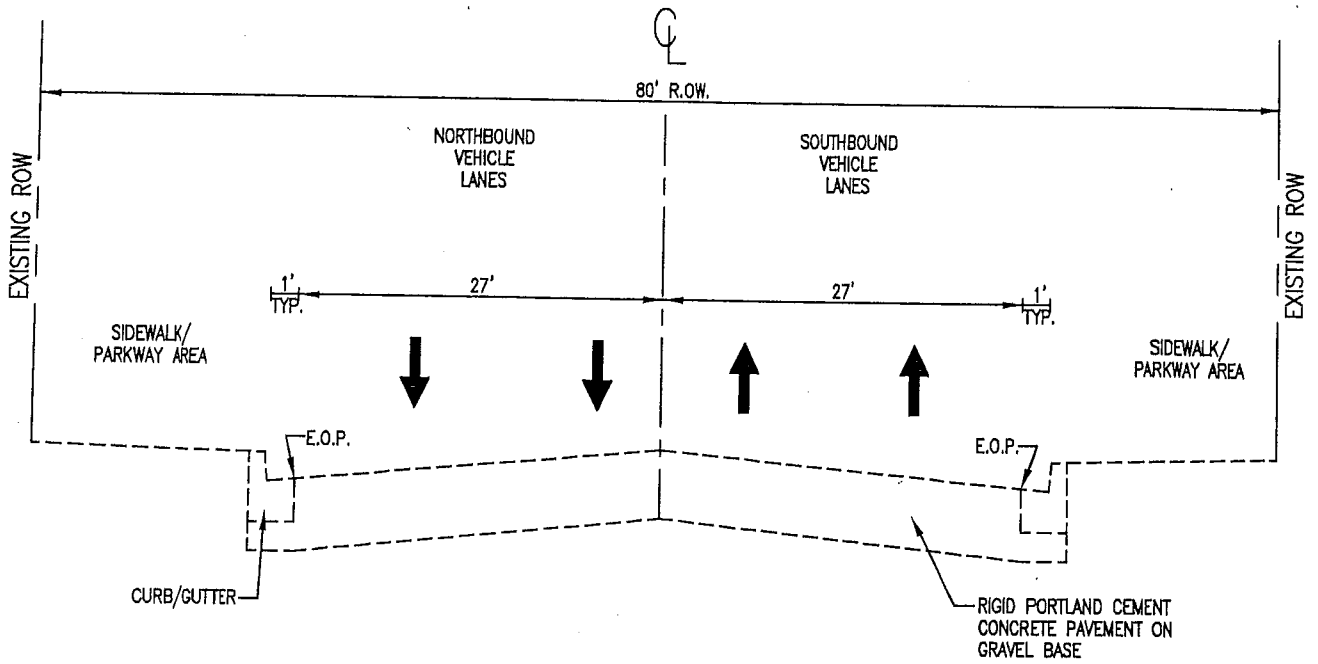
Bike – Walk HP 2030



Map 3: Street System
2012 Bike - Walk HP 2030 Plan

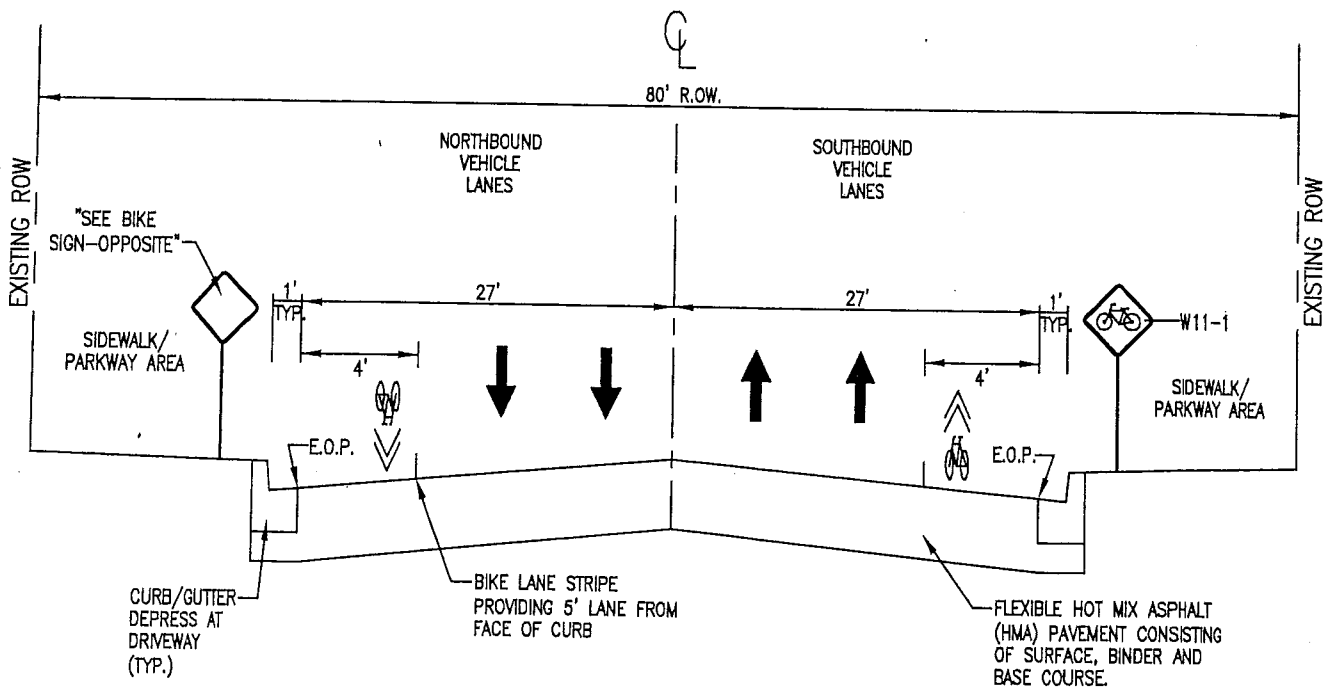






**EXISTING TYPICAL ROADWAY SECTION
GREEN BAY ROAD**

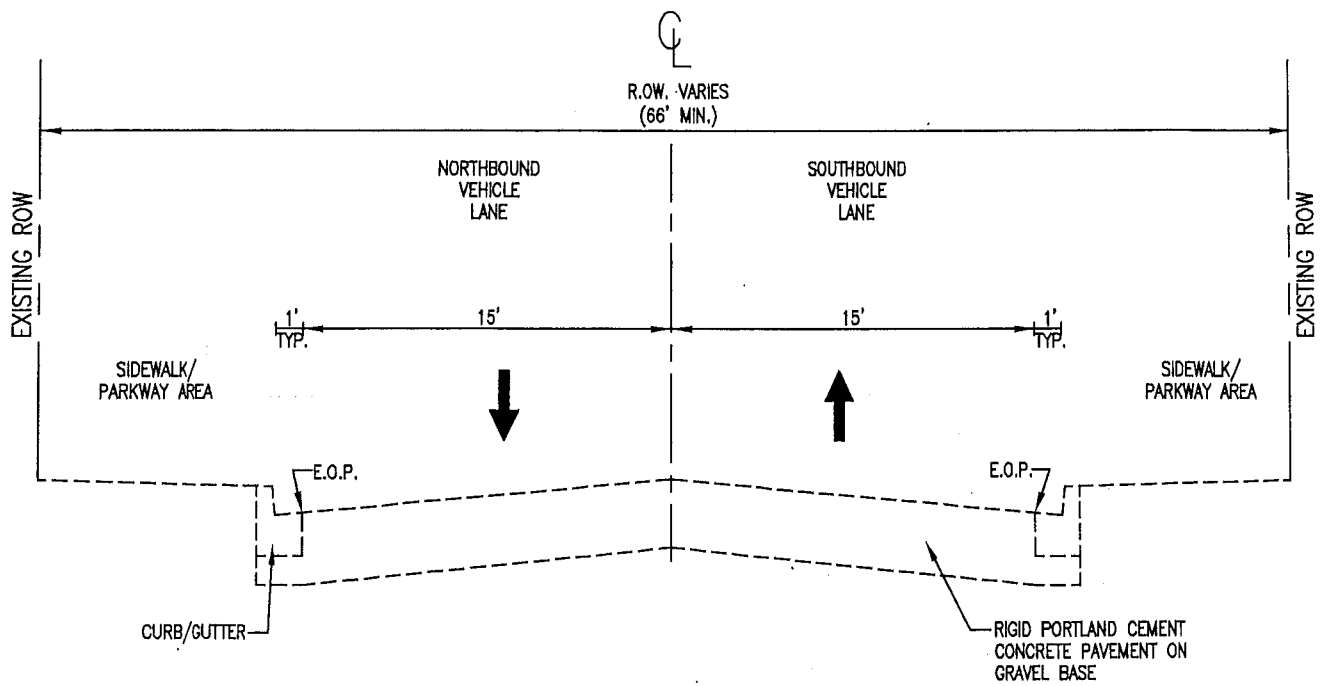
STA. 0+00 TO 8+00



**PROPOSED TYPICAL ROADWAY SECTION
GREEN BAY ROAD**

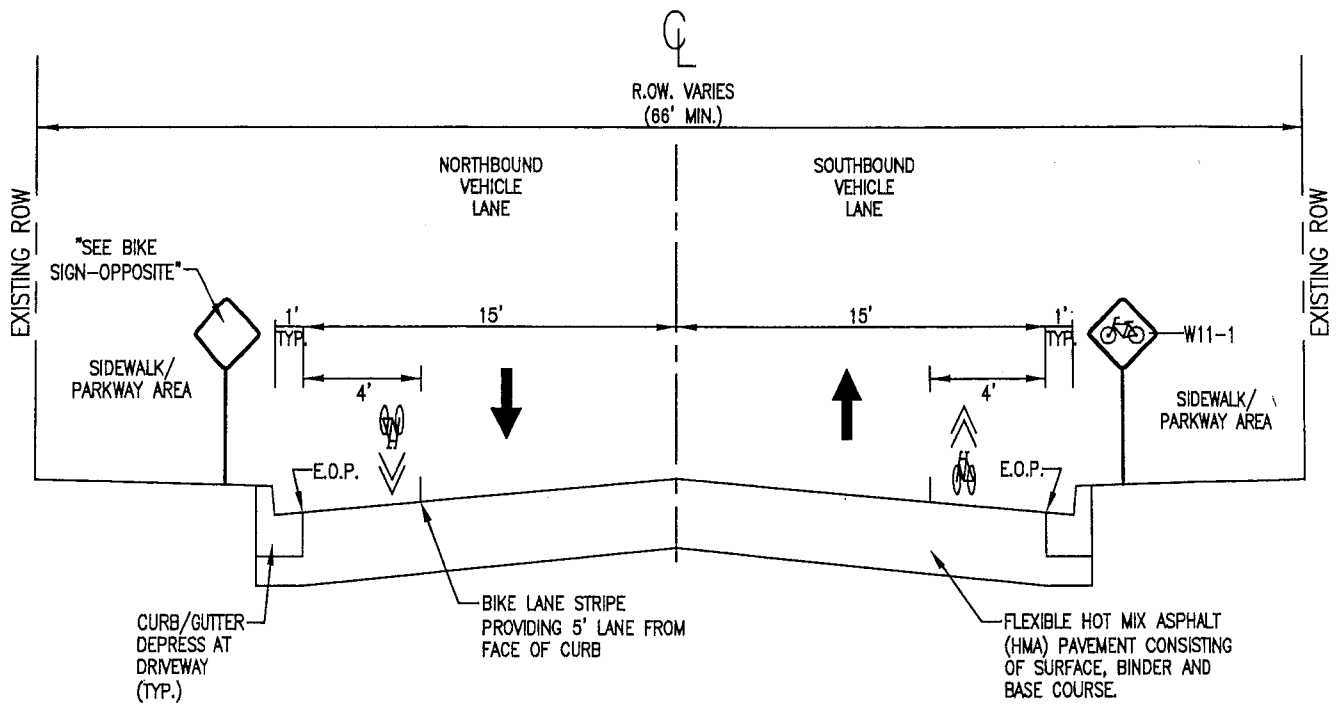
STA. 0+00 TO 8+00

- NOTE:**
- * APPROPRIATE PAVEMENT MARKINGS TO BE PROVIDED.
 - * D11-1, STA. 0+90 RT
 - * D11-1, STA. 0+90 LT
 - M4-12, STA. 0+90 LT



**EXISTING TYPICAL ROADWAY SECTION
GREEN BAY ROAD**

STA. 8+00 TO 72+81



**PROPOSED TYPICAL ROADWAY SECTION
GREEN BAY ROAD**

STA. 8+00 TO 72+81

- NOTE:**
- * APPROPRIATE PAVEMENT MARKINGS TO BE PROVIDED.
 - * D11-1, STA. 72+00 RT
 - M4-12, STA. 72+00 RT
 - * D11-1, STA. 72+00 LT

SUMMARY OF ACCIDENTS BY TYPE (2012-2016)

ACCIDENT TYPE	2012	2013	2014	2015	2016	TOTAL
1) REAR END COLLISION	1	2	3	14	26	46
2) LEFT TURN ROADWAY ONTO DRIVEWAY	1	-	1	2	-	4
3) LEFT TURN DRIVEWAY ONTO ROADWAY	1	1	-	-	-	2
4) VEHICLE vs PEDESTRIAN	1	-	-	-	-	1
5) SIDESWIPE PARKED VEHICLE	-	-	1	-	-	1
6) ERRANT VEHICLE LEAVING ROADWAY	-	-	-	3	-	3
7) VEHICLE MERGE	2	-	-	1	-	3
8) LEFT TURN ROADWAY TO ROADWAY	-	-	-	4	1	5
9) SLIDE SLIPPERY PAVEMENT	-	-	-	2	1	3
10) RUN RED LIGHT	-	-	-	2	2	4
11) VEHICLE VS BIKE	-	-	-	-	1	1
12) RIGHT TURN ON RED	-	-	-	-	1	1
TOTAL	6	3	5	28	32	74

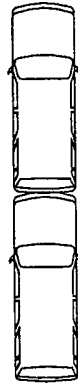
COLLISION DIAGRAMS

(BY TYPE)

CURB &
GUTTER
(TYP.)

GREEN BAY ROAD

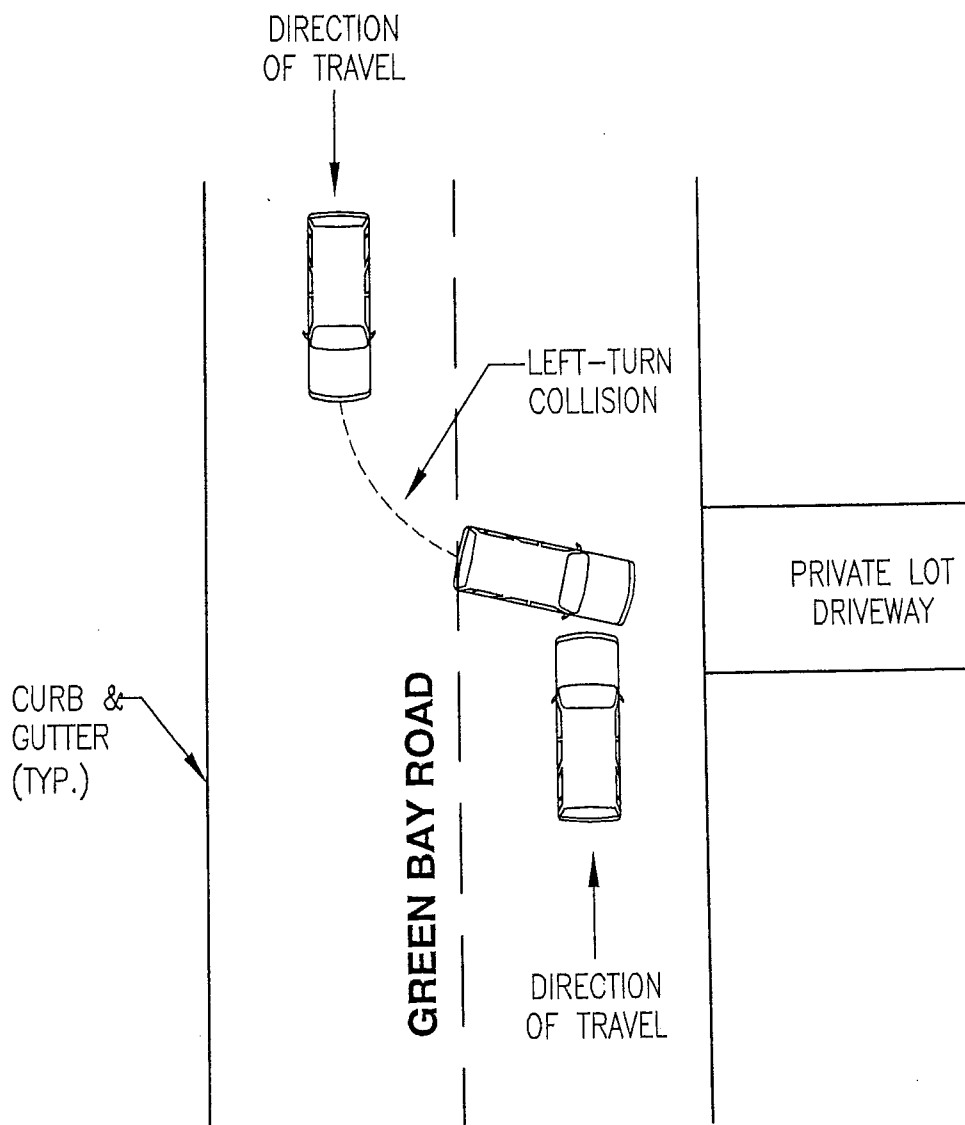
DIRECTION
OF TRAVEL



REAR-END
COLLISION

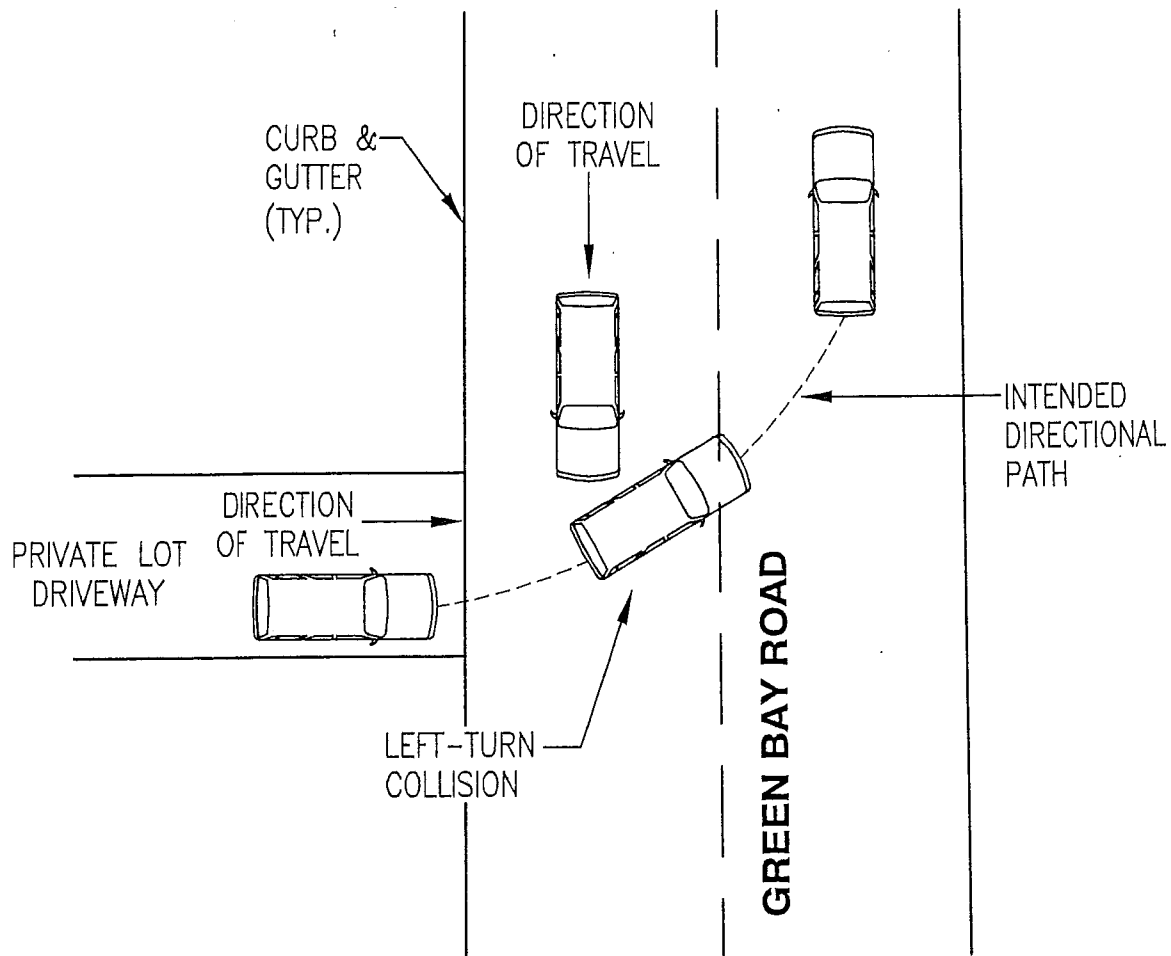
REAR-END COLLISION

TYPE 1



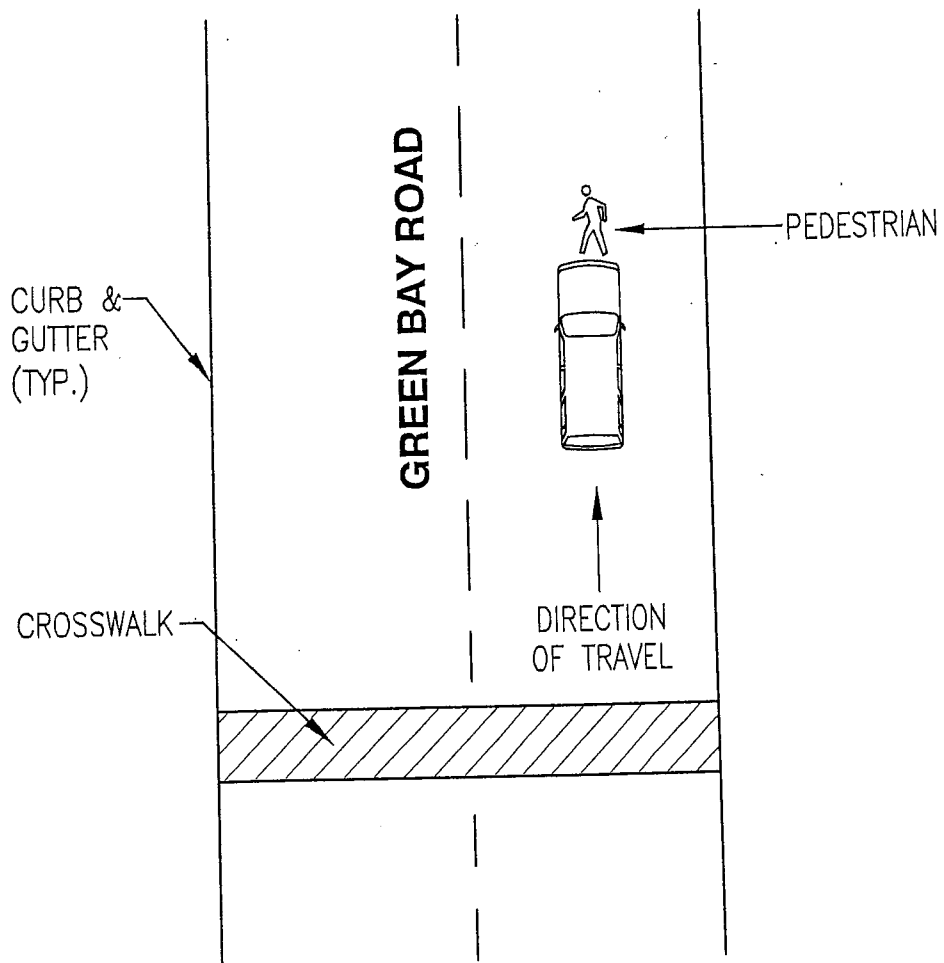
**LEFT-TURN COLLISION
ROADWAY TO DRIVEWAY**

TYPE 2



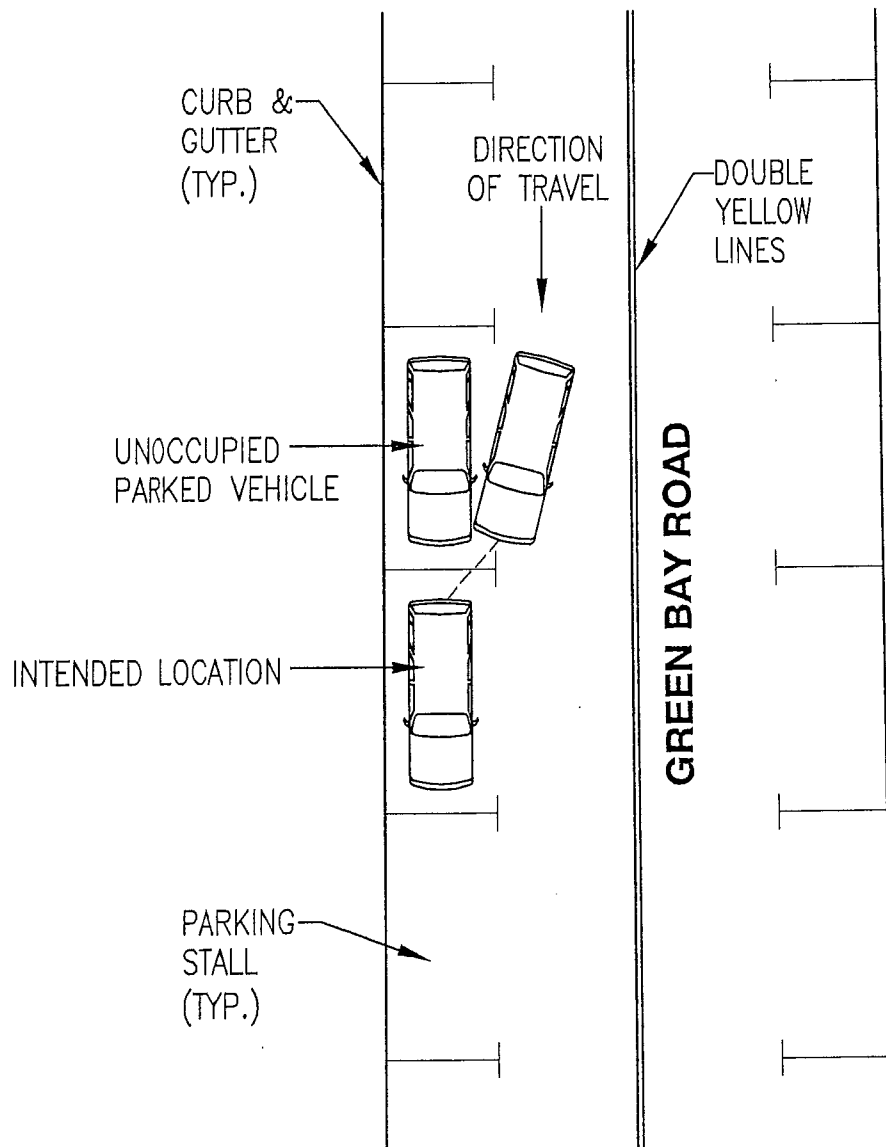
**LEFT-TURN COLLISION
DRIVEWAY TO ROADWAY**

TYPE 3



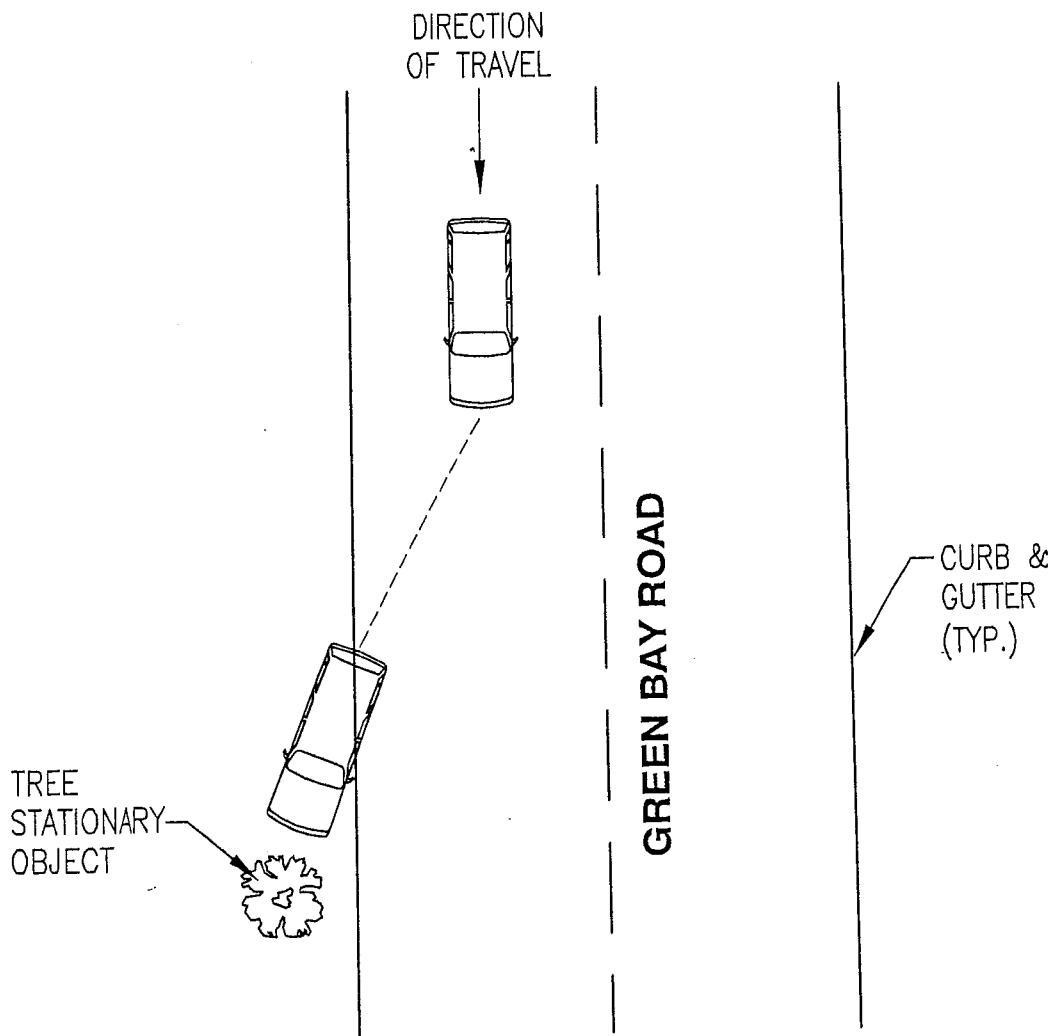
VEHICLE vs PEDESTRIAN

TYPE 4



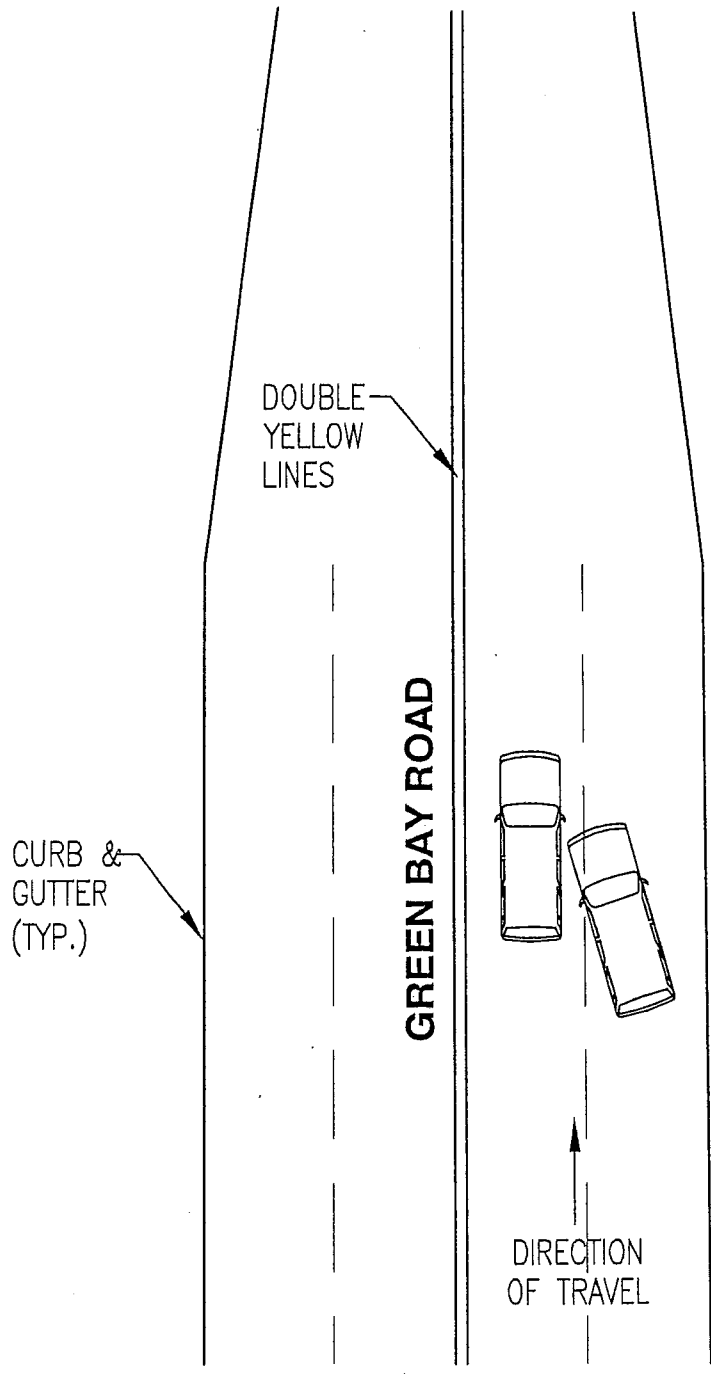
SIDSWIPE OF PARKED VEHICLE

TYPE 5



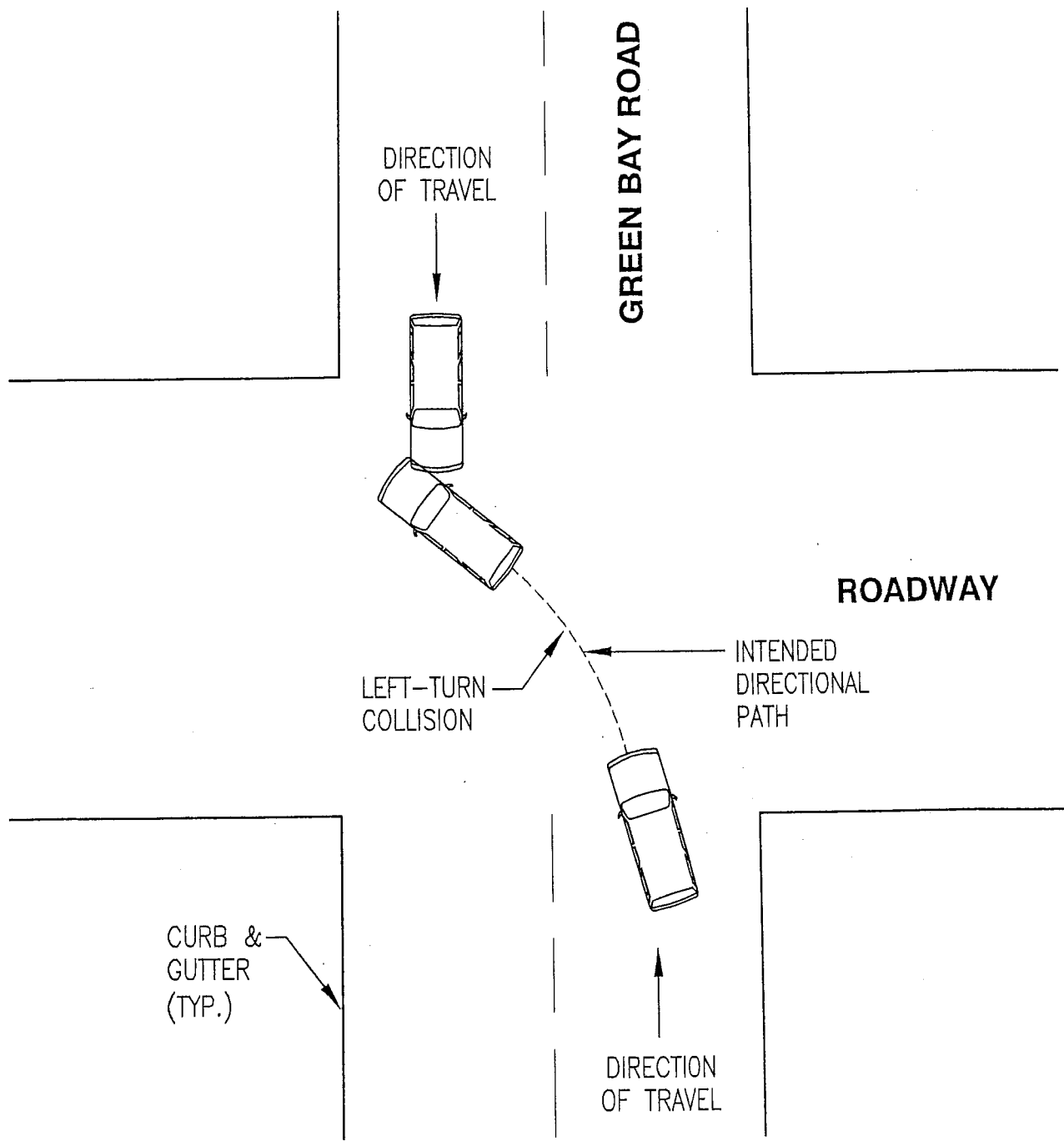
**ERRANT VEHICLE RAN OFF TRAVELED WAY
VEHICLE VS STATIONARY OBJECT**

TYPE 6



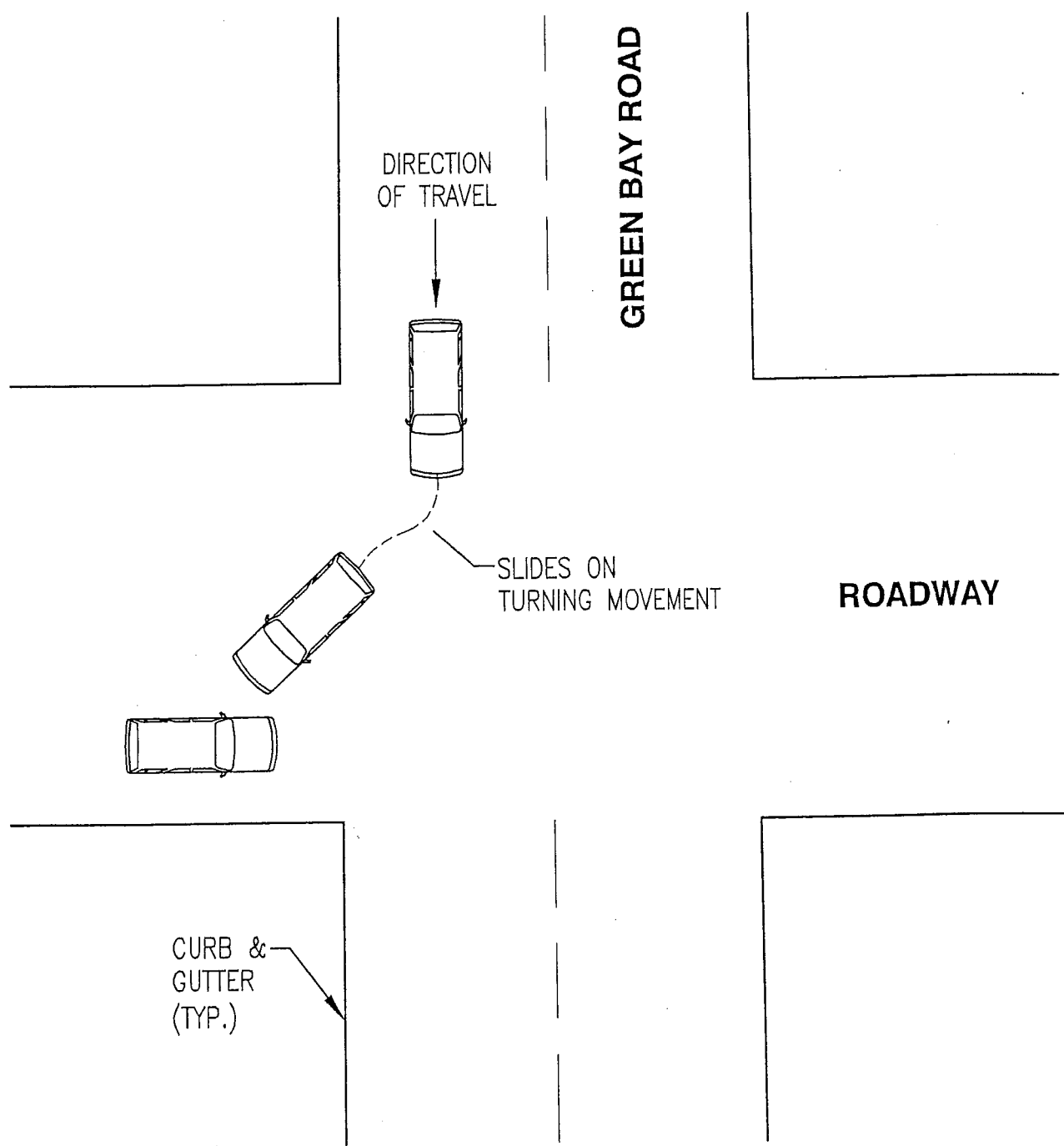
VEHICLE MERGE - LANE DROP

TYPE 7



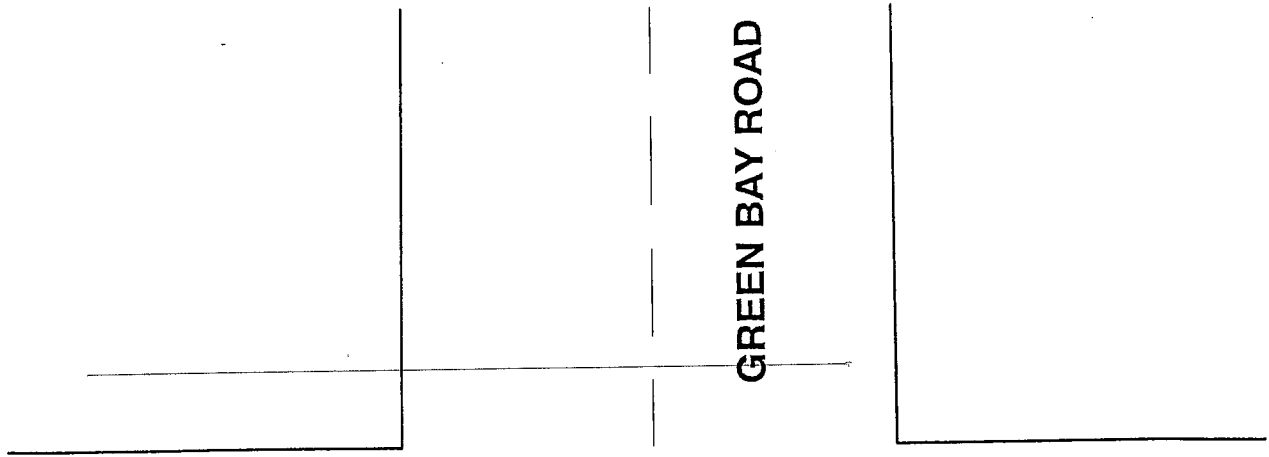
**LEFT TURN COLLISION
ROADWAY TO ROADWAY**

TYPE 8



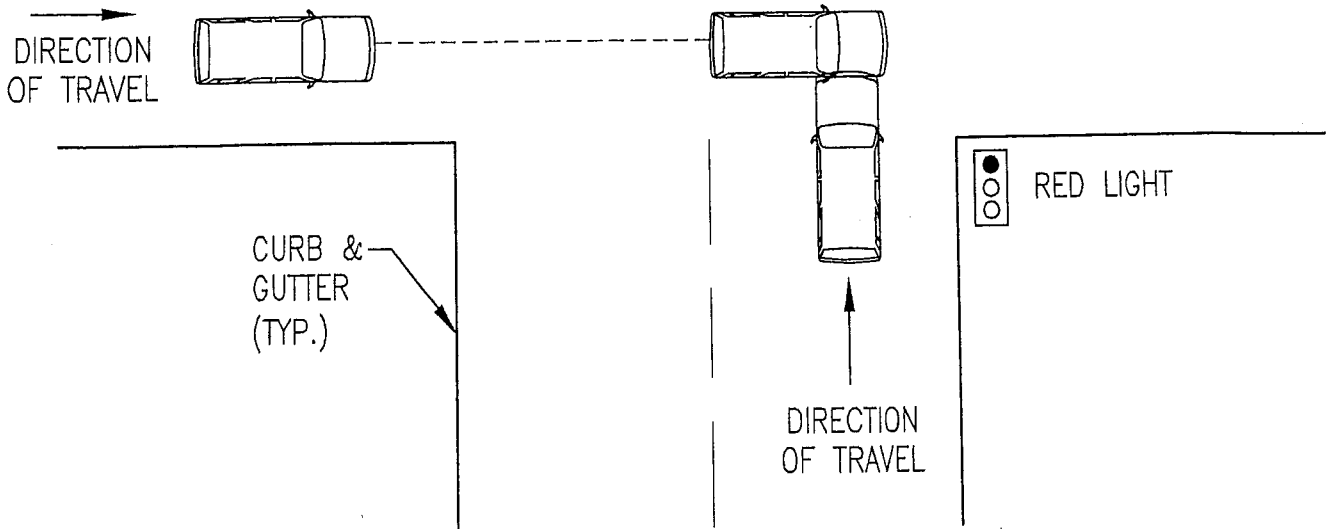
**SLIDE
SLIPPERY PAVEMENT**

TYPE 9



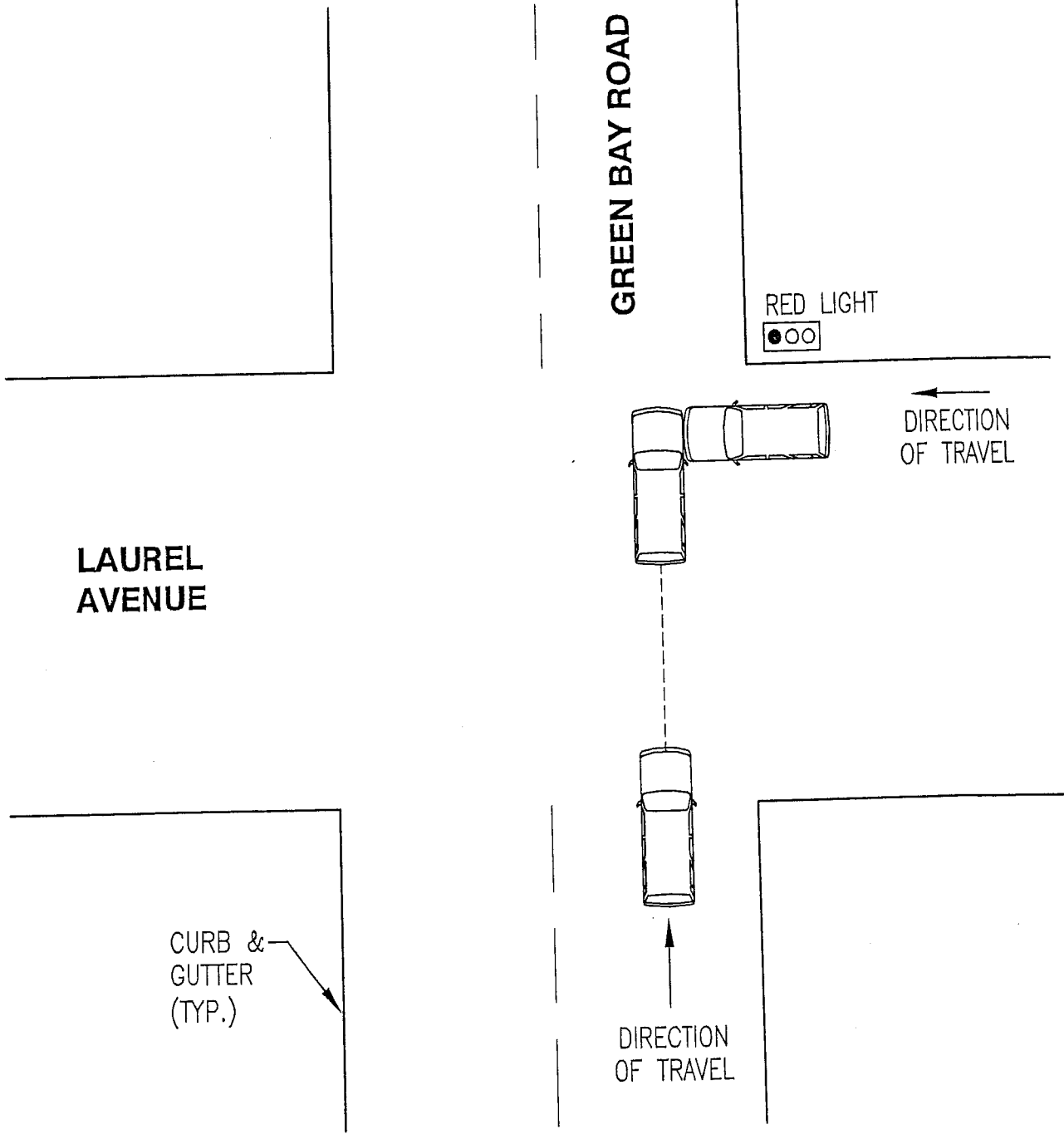
GREEN BAY ROAD

CENTRAL AVENUE



**DISREGARD TRAFFIC CONTROL DEVICE
RUN RED LIGHT**

TYPE 10 (CASE 1)



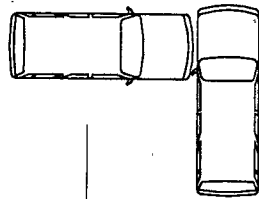
**DISREGARD TRAFFIC CONTROL DEVICE
RUN RED LIGHT**

TYPE 10 (CASE 2)

GREEN BAY ROAD

LAUREL AVENUE

DIRECTION OF TRAVEL →



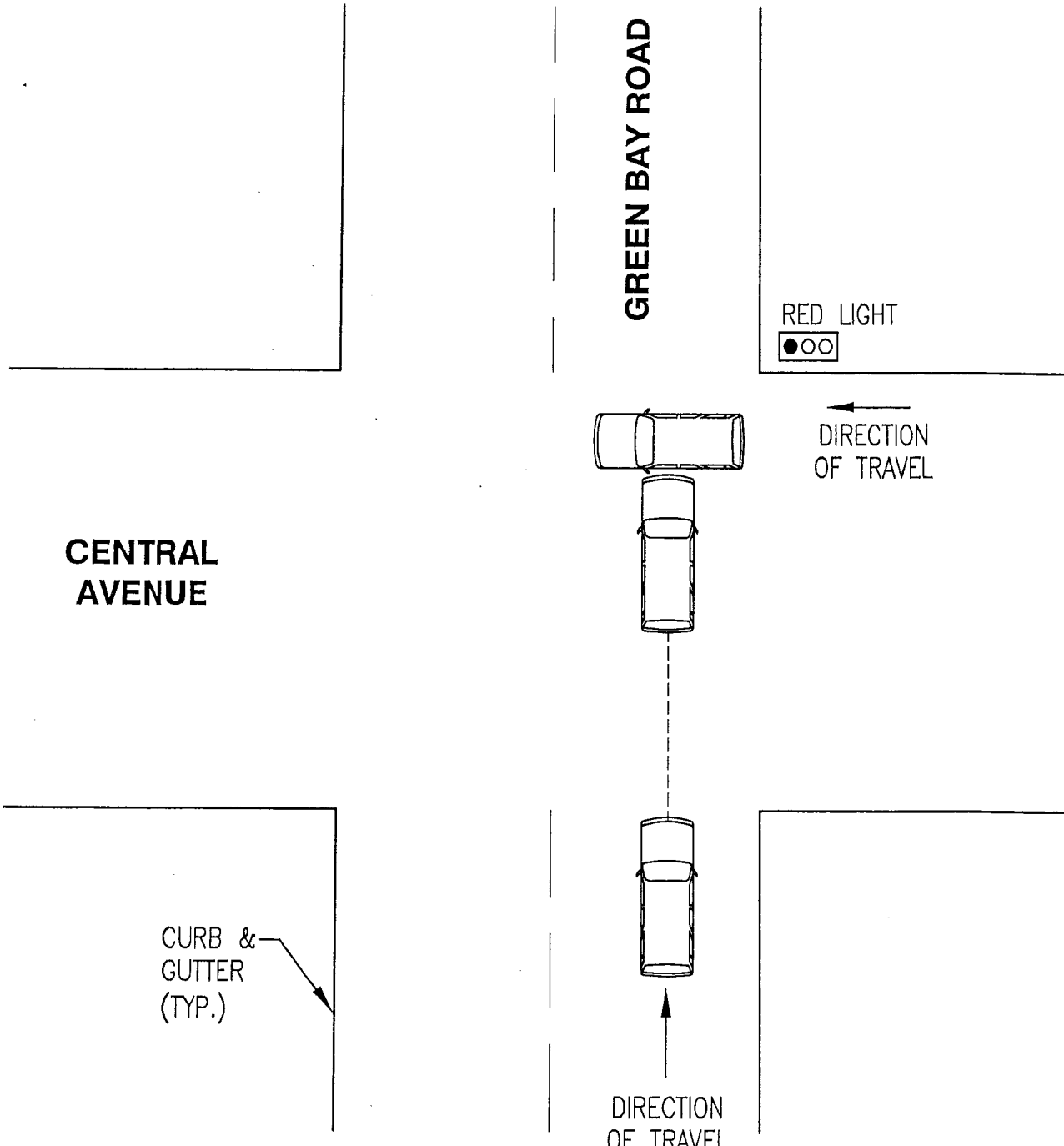
RED LIGHT ●○○

CURB & GUTTER (TYP.)

↑
DIRECTION OF TRAVEL

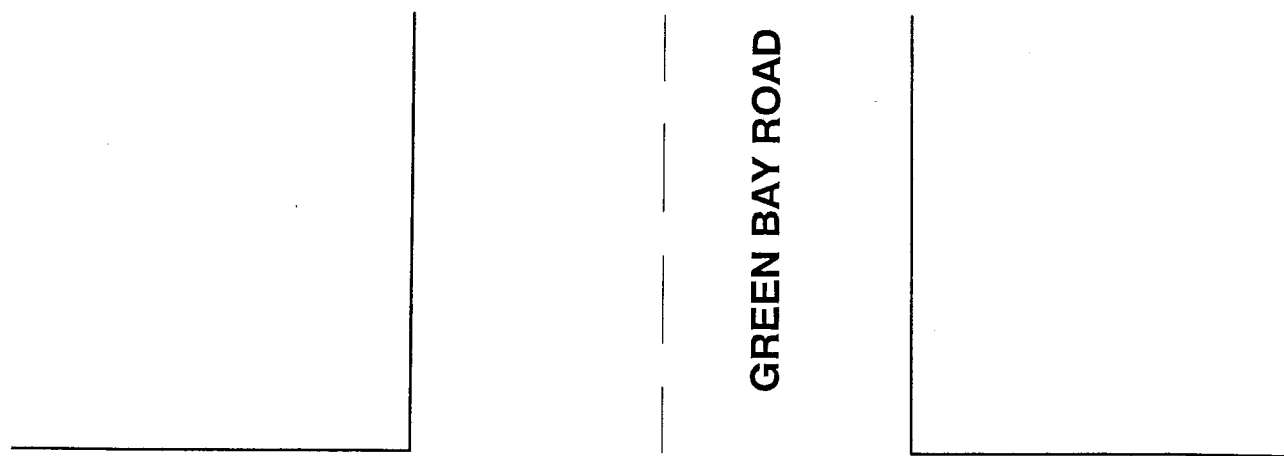
**DISREGARD TRAFFIC CONTROL DEVICE
RUN RED LIGHT**

TYPE 10 (CASE 3)



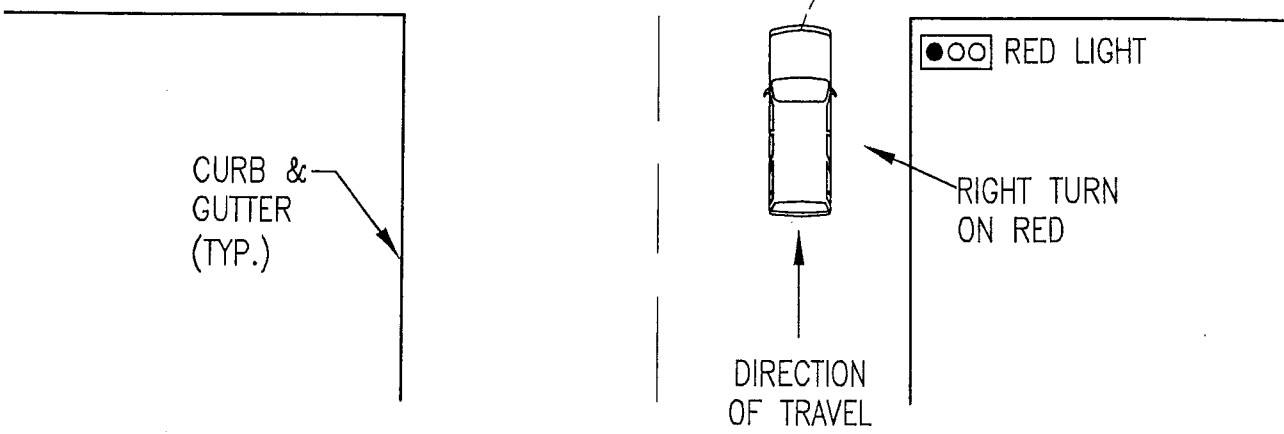
**DISREGARD TRAFFIC CONTROL DEVICE
RUN RED LIGHT**

TYPE 10 (CASE 4)



CENTRAL AVENUE

GREEN BAY ROAD



CURB &
GUTTER
(TYP.)

CAR HIT BIKER



●○○ RED LIGHT

RIGHT TURN
ON RED

DIRECTION
OF TRAVEL

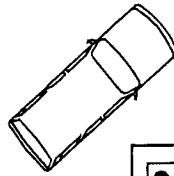
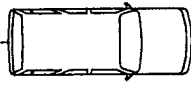
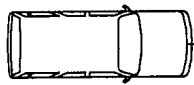
VEHICLE VS BICYCLIST

TYPE 11

GREEN BAY ROAD

ROADWAY

DIRECTION
OF TRAVEL



CURB &
GUTTER
(TYP.)

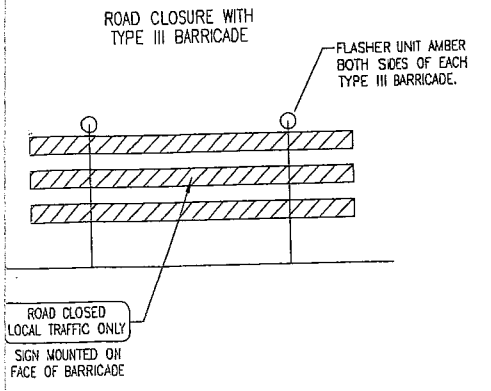
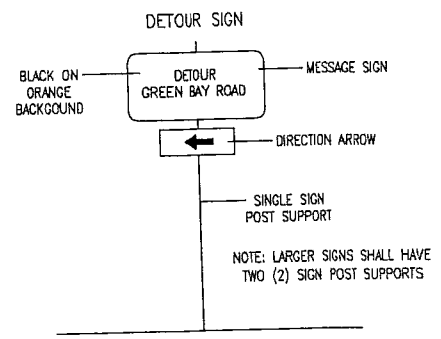
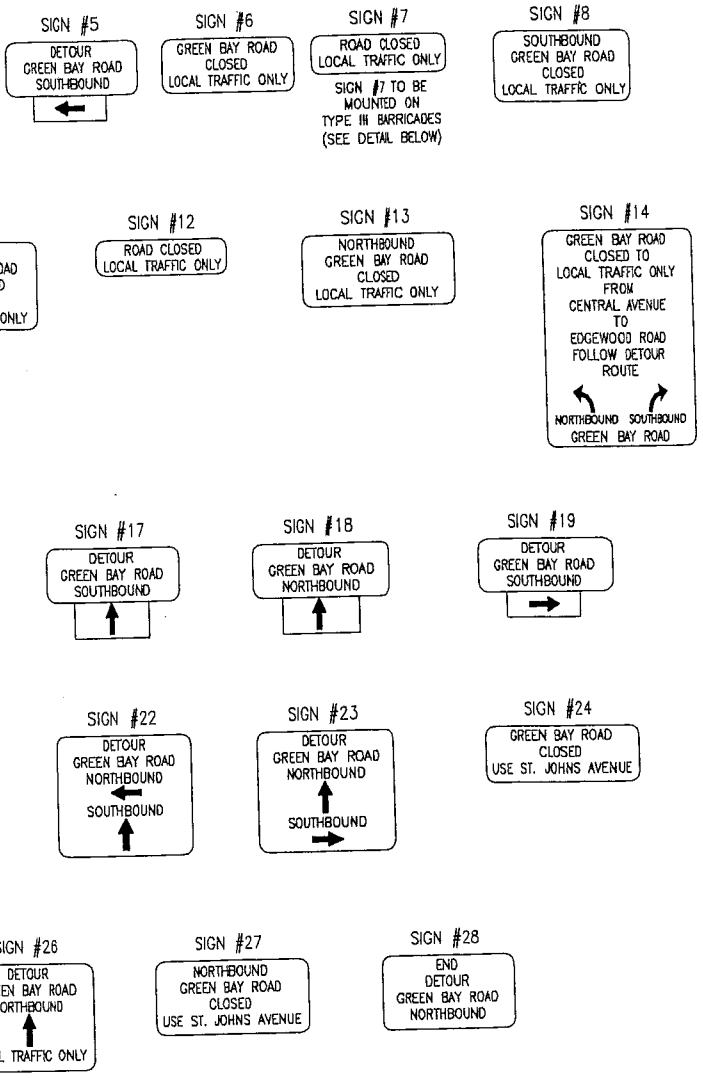
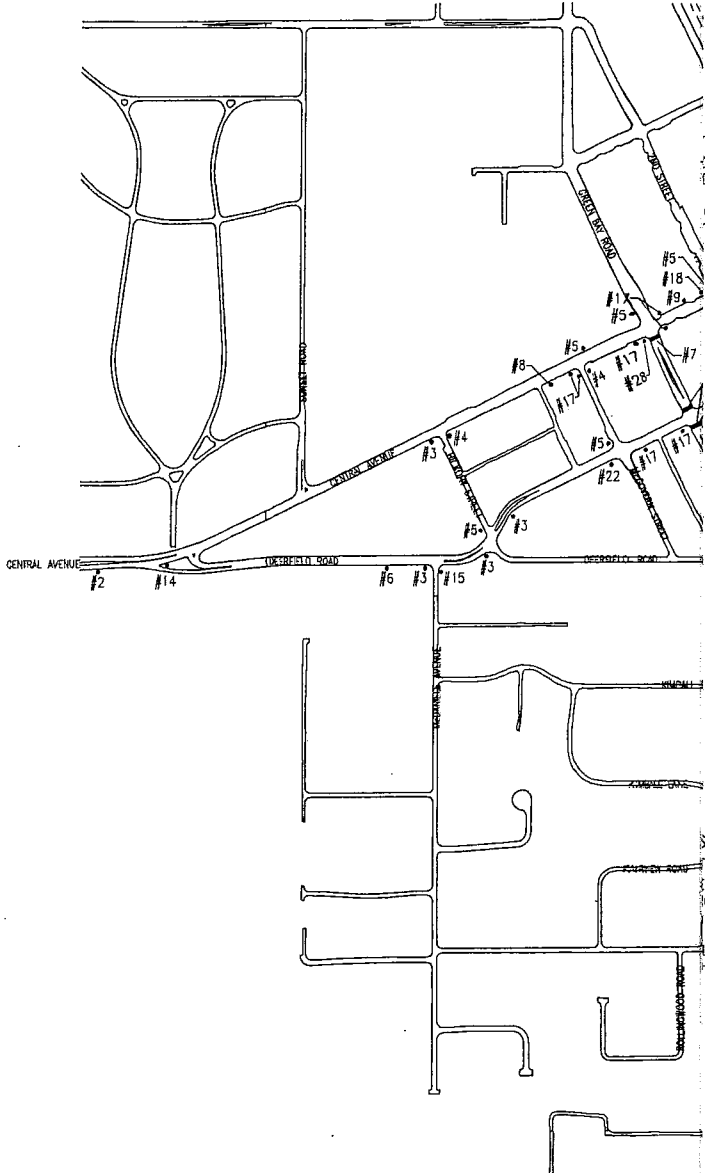
●○○ RED LIGHT

DIRECTION
OF TRAVEL

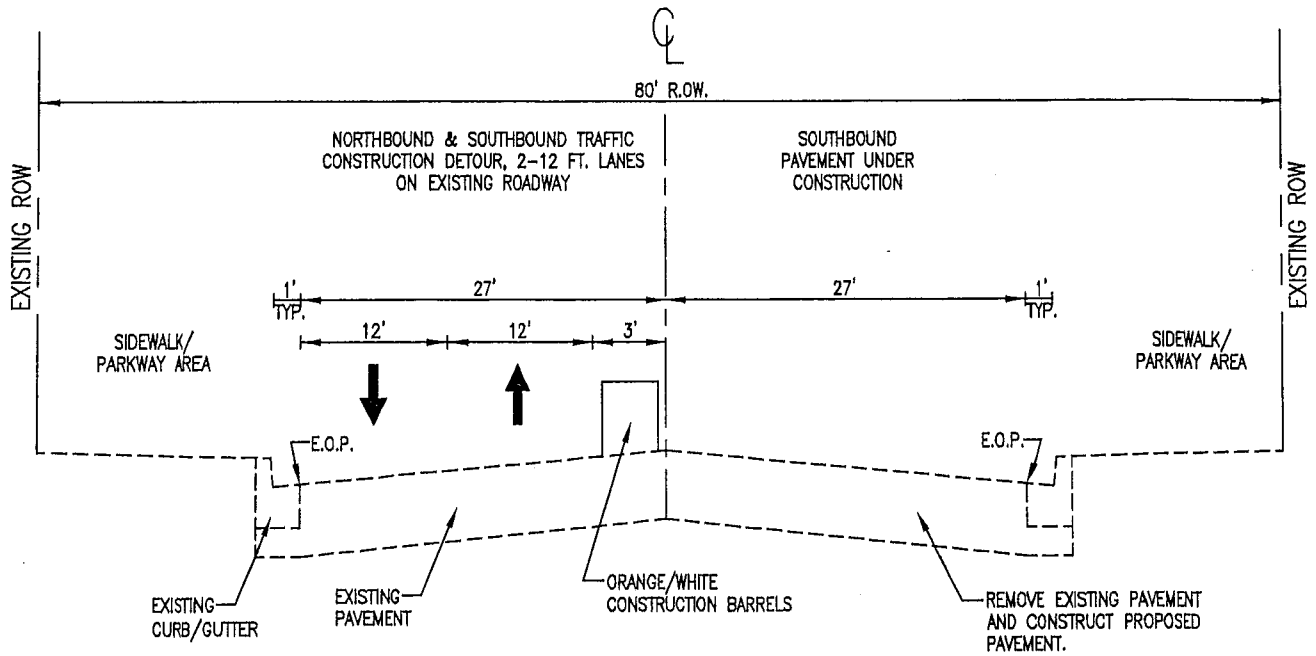
RIGHT TURN ON RED

TYPE 12

GREEN BAY ROAD



MAINTENANCE OF TRAFFIC - PHASE I

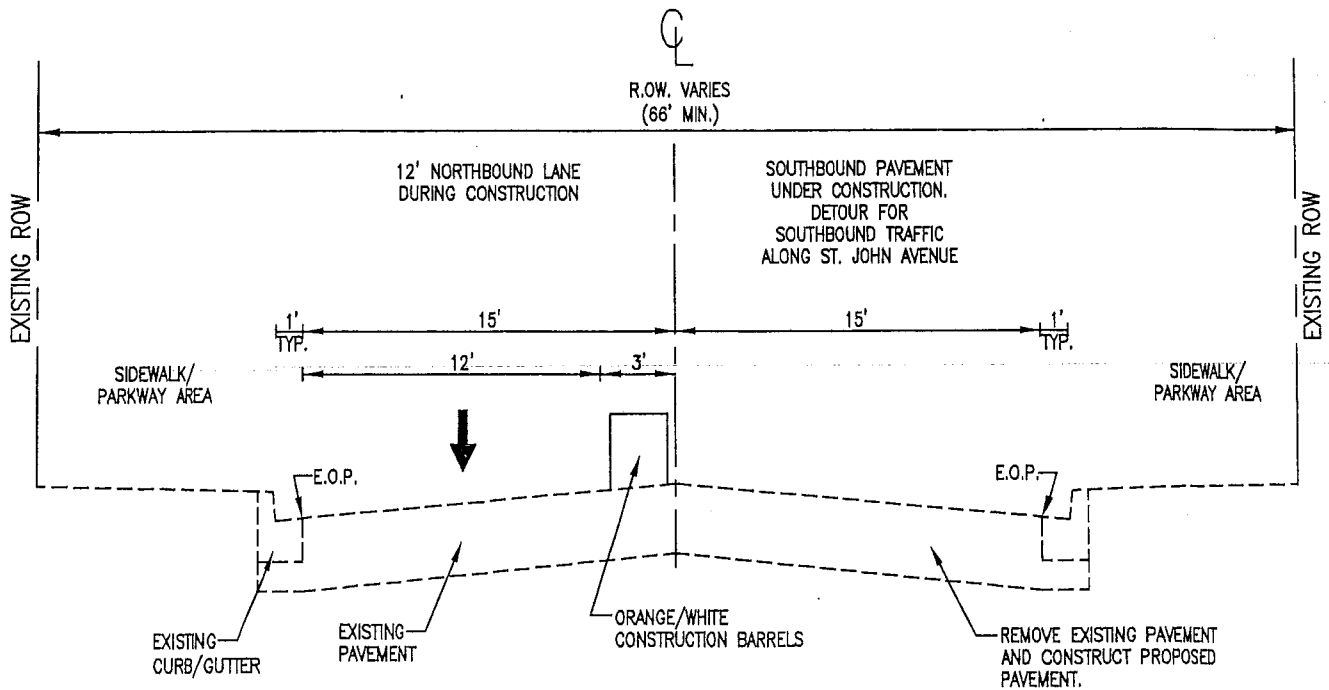


**TYPICAL SOUTHBOUND ROADWAY SECTION
UNDER CONSTRUCTION
GREEN BAY ROAD**

STA. 0+00 TO 5+00

USE HIGHWAY STANDARD 701501

MAINTENANCE OF TRAFFIC - PHASE I

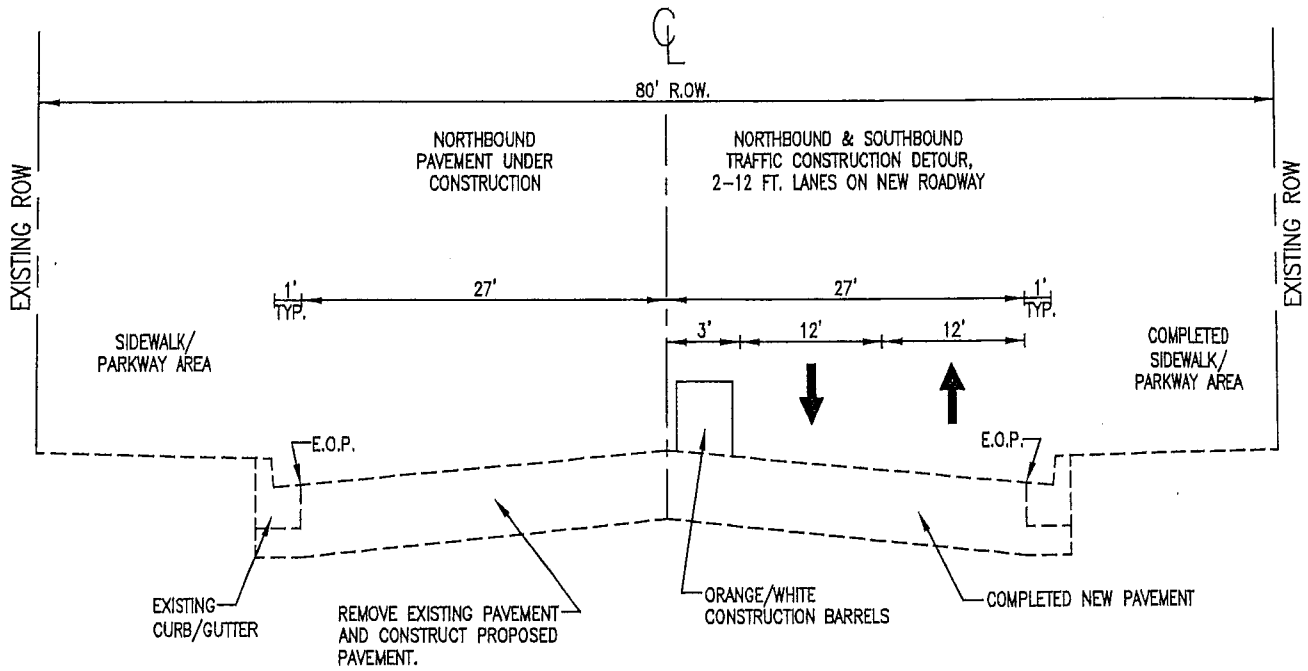


**TYPICAL SOUTHBOUND ROADWAY SECTION
UNDER CONSTRUCTION
GREEN BAY ROAD**

STA. 5+00 TO 72+81

USE HIGHWAY STANDARD 701501

MAINTENANCE OF TRAFFIC - PHASE 2



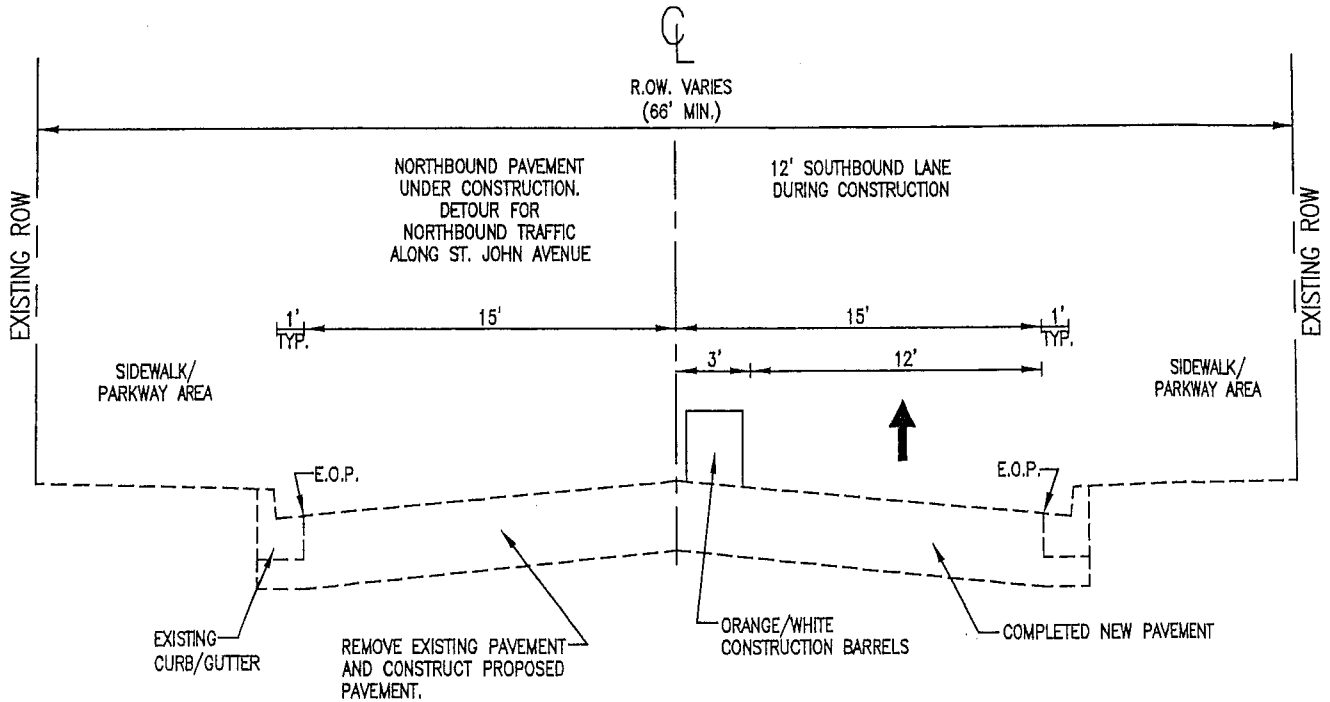
**TYPICAL NORTHBOUND ROADWAY SECTION
UNDER CONSTRUCTION
GREEN BAY ROAD**

NOTE:
FINAL PAVEMENT MARKINGS AT THE
TIME OF PHASE 2 COMPLETION

STA. 0+00 TO 5+00

USE HIGHWAY STANDARD 701501

MAINTENANCE OF TRAFFIC - PHASE 2



**TYPICAL NORTHBOUND ROADWAY SECTION
UNDER CONSTRUCTION
GREEN BAY ROAD**

NOTE:
FINAL PAVEMENT MARKINGS AT THE
TIME OF PHASE 2 COMPLETION

STA. 5+00 TO 72+81

USE HIGHWAY STANDARD 701501

Vehicle Turning Maneuvers Narrative

Central Avenue – WB40 vehicle accommodated

Laurel Avenue – WB40 vehicle accommodated

Deerfield Road – WB40 vehicle accommodated

Walnut Street – WB40 vehicle accommodated

Kimball Road – SU30 vehicle accommodated – small residential side street

Bob-O-Link Road – WB40 vehicle accommodated

Oakwood Avenue – WB40 vehicle accommodated except for no right turn from southbound Oakwood onto Green Bay Road which accommodates an SU30 vehicle.

Lincoln Avenue – SU30 vehicle accommodated – small residential side street

Daneth Court – SU30 vehicle accommodated – small residential side street

Croftidge Lane – SU30 vehicle accommodated – small residential side street

Glencoe Avenue – SU30 vehicle accommodated – small residential side street

Great Elm Lane – SU30 vehicle accommodated – small residential side street

DeTamble Avenue – SU30 vehicle accommodated – small residential side street

Saxony Road – SU30 vehicle accommodated – small residential side street

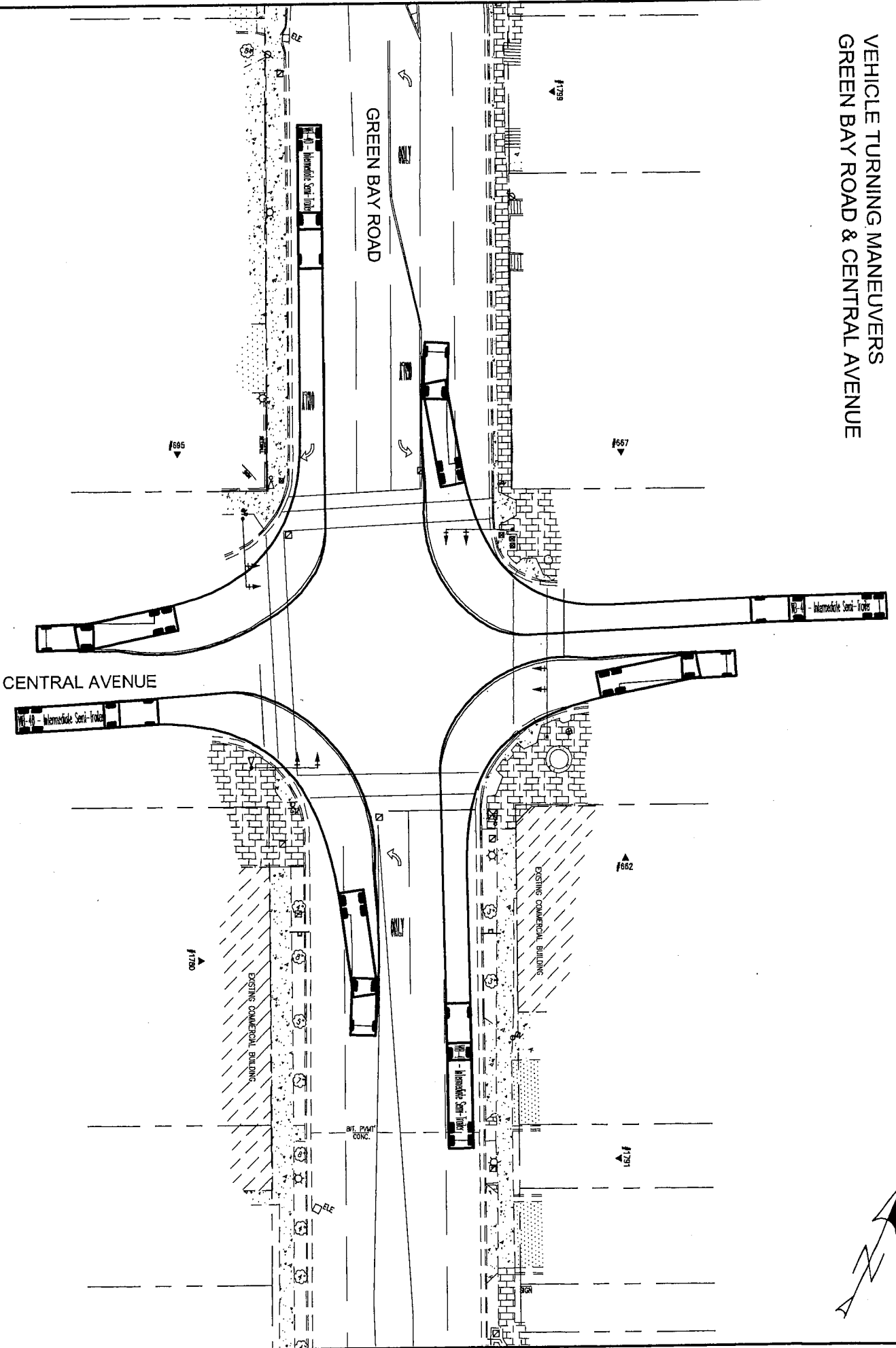
Ridgewood Drive – SU30 vehicle accommodated – small residential side street

Thackeray Drive – SU30 vehicle accommodated – small residential side street

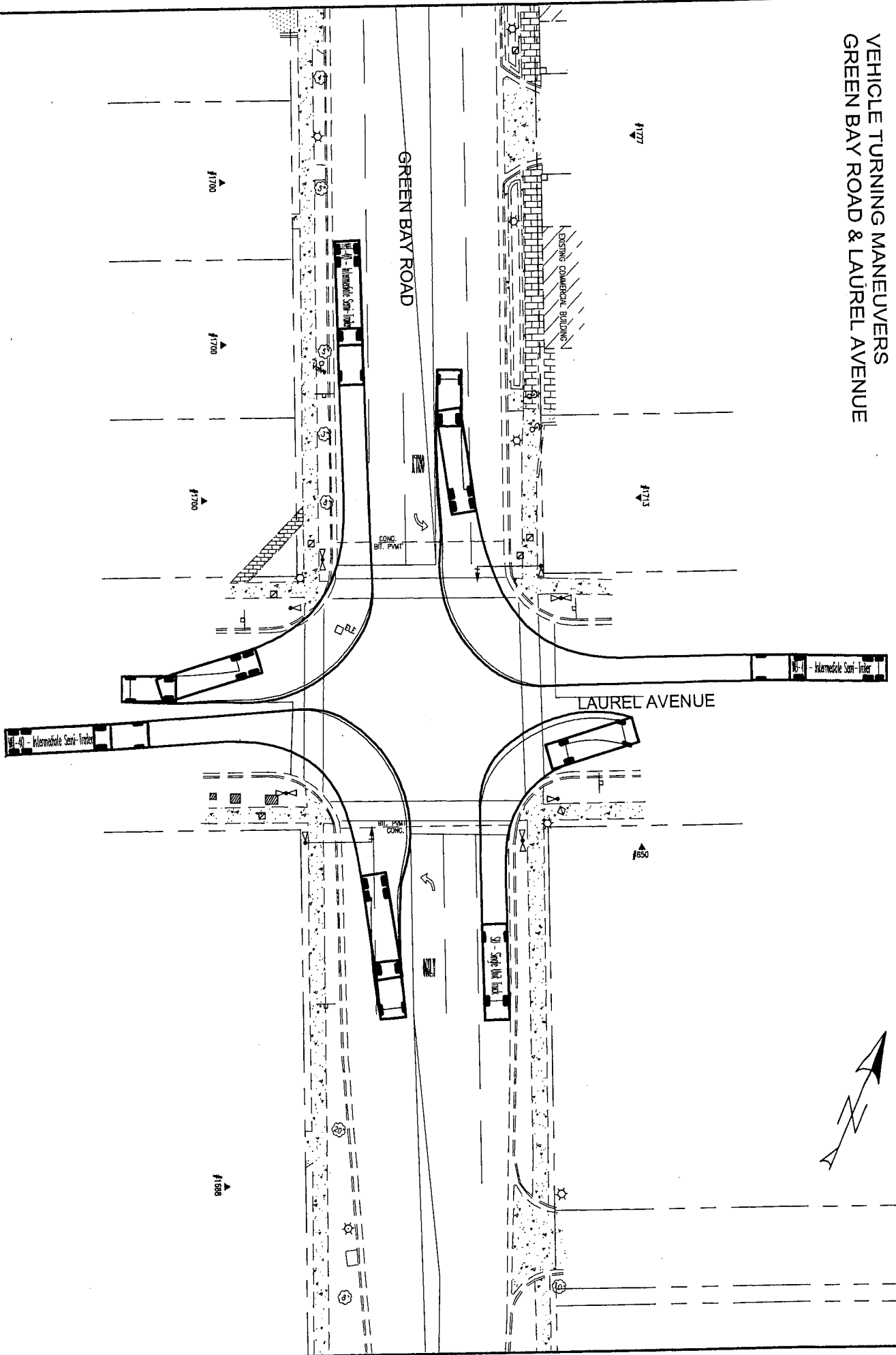
Broadview Avenue – SU30 vehicle accommodated – small residential side street

Edgewood Road – WB40 vehicle accommodated

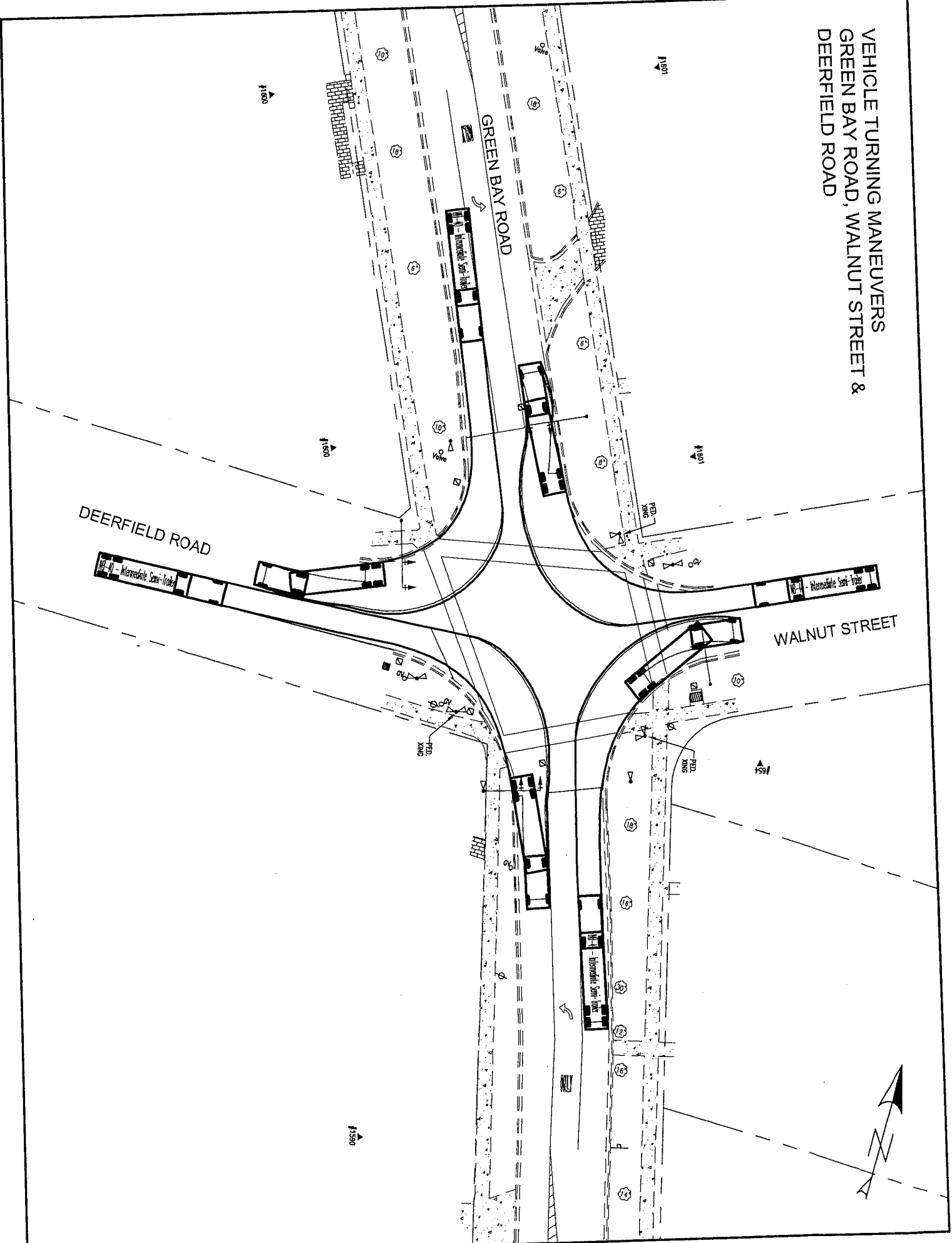
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & CENTRAL AVENUE



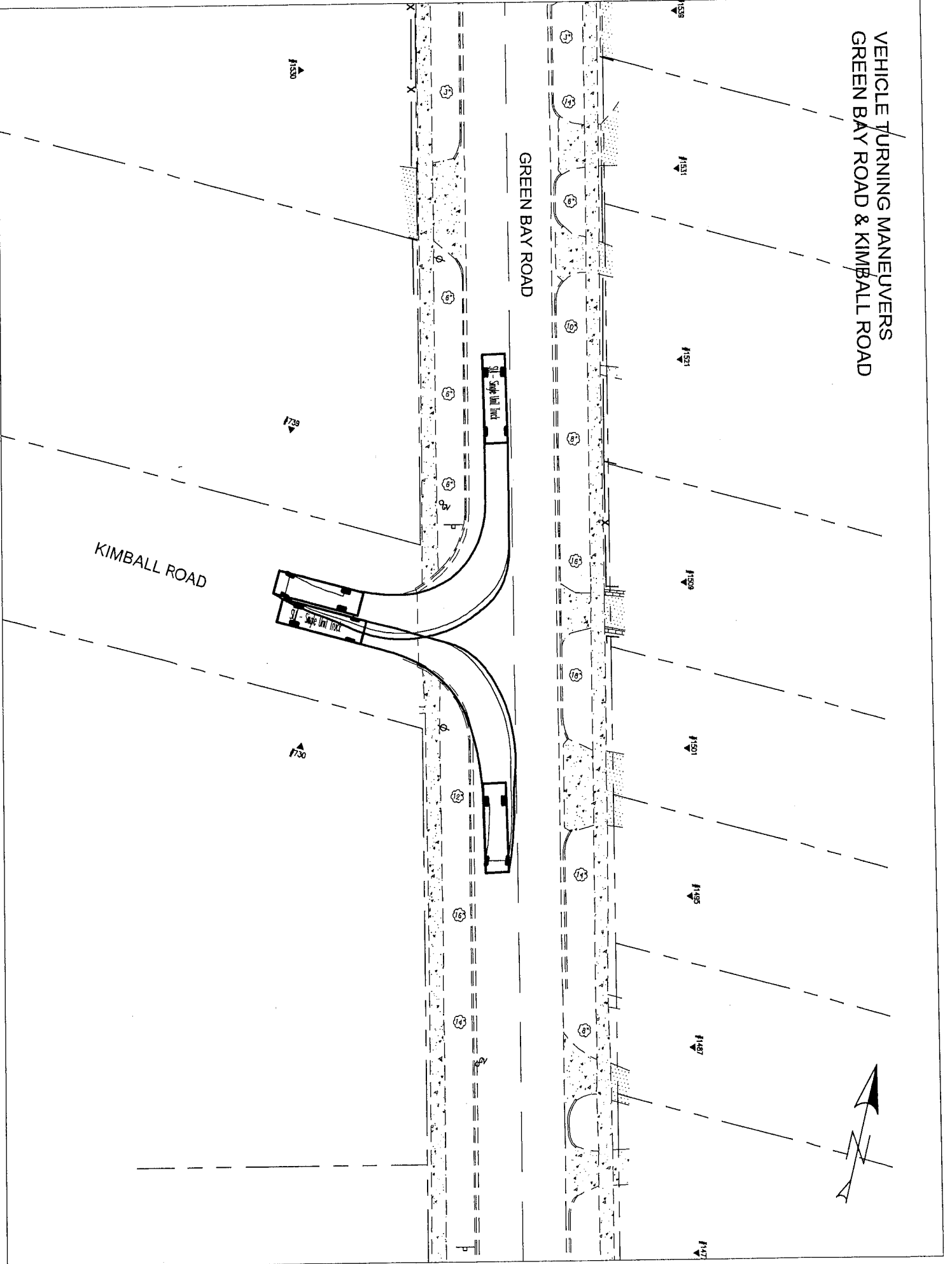
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & LAUREL AVENUE



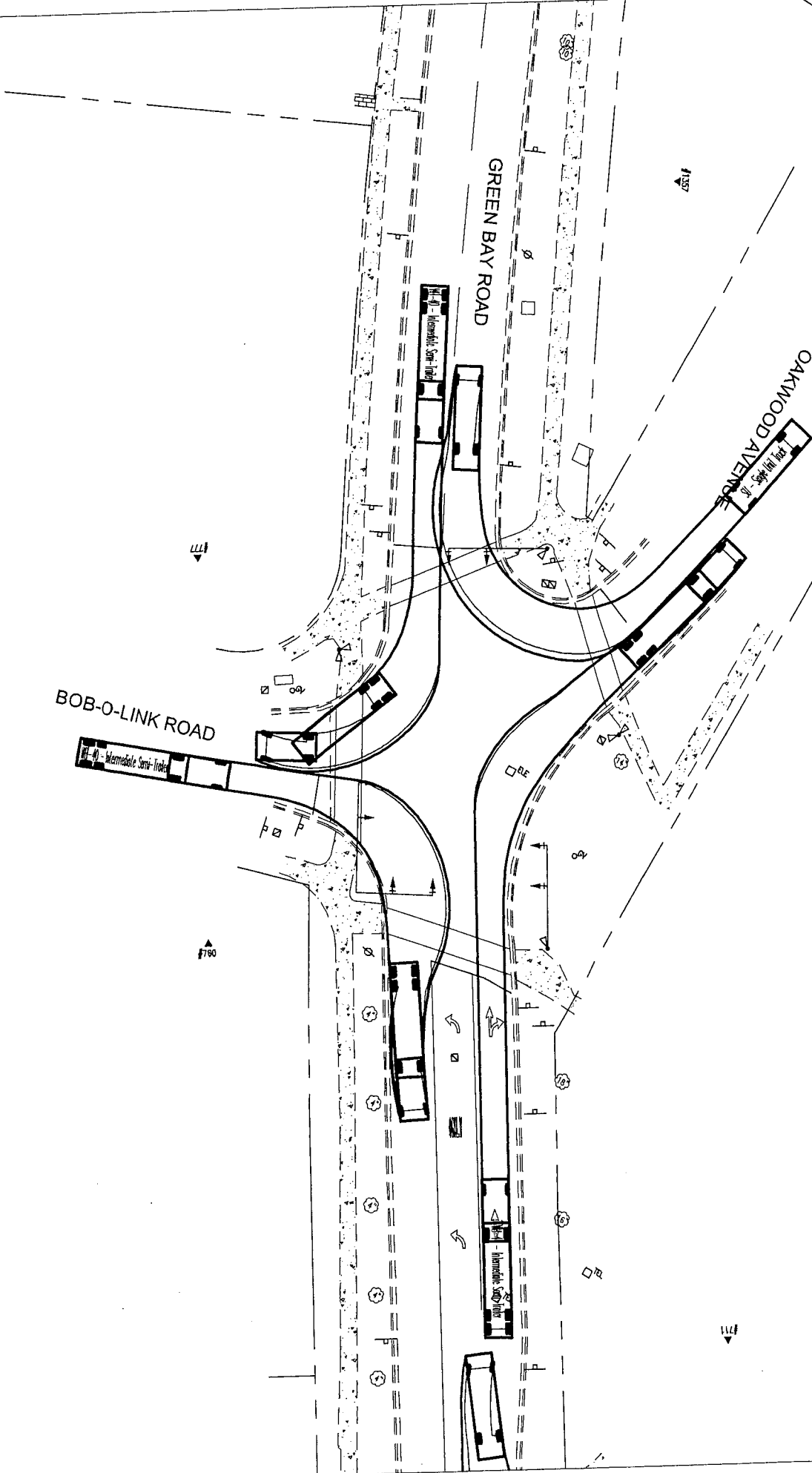
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD, WALNUT STREET &
DEERFIELD ROAD



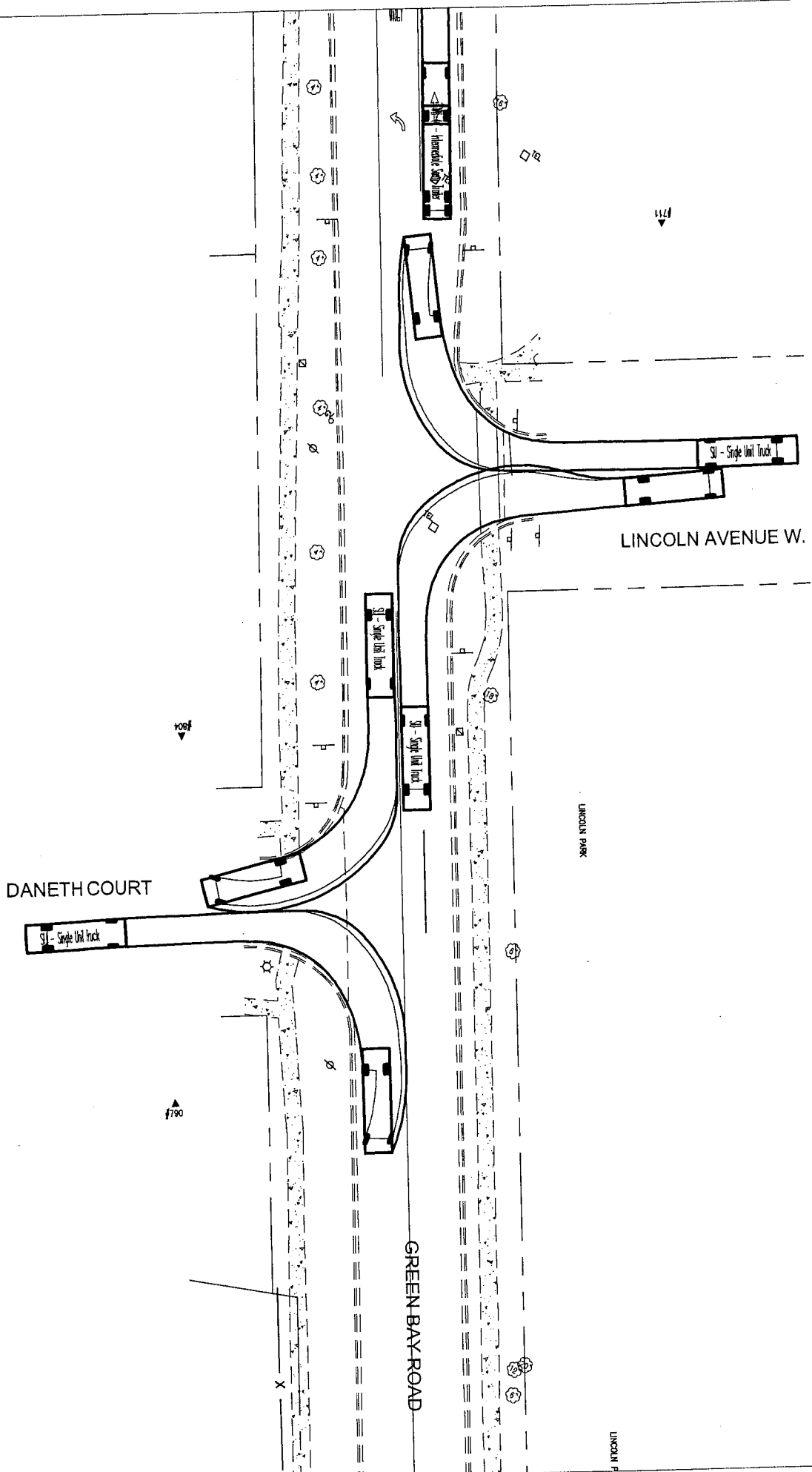
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & KIMBALL ROAD



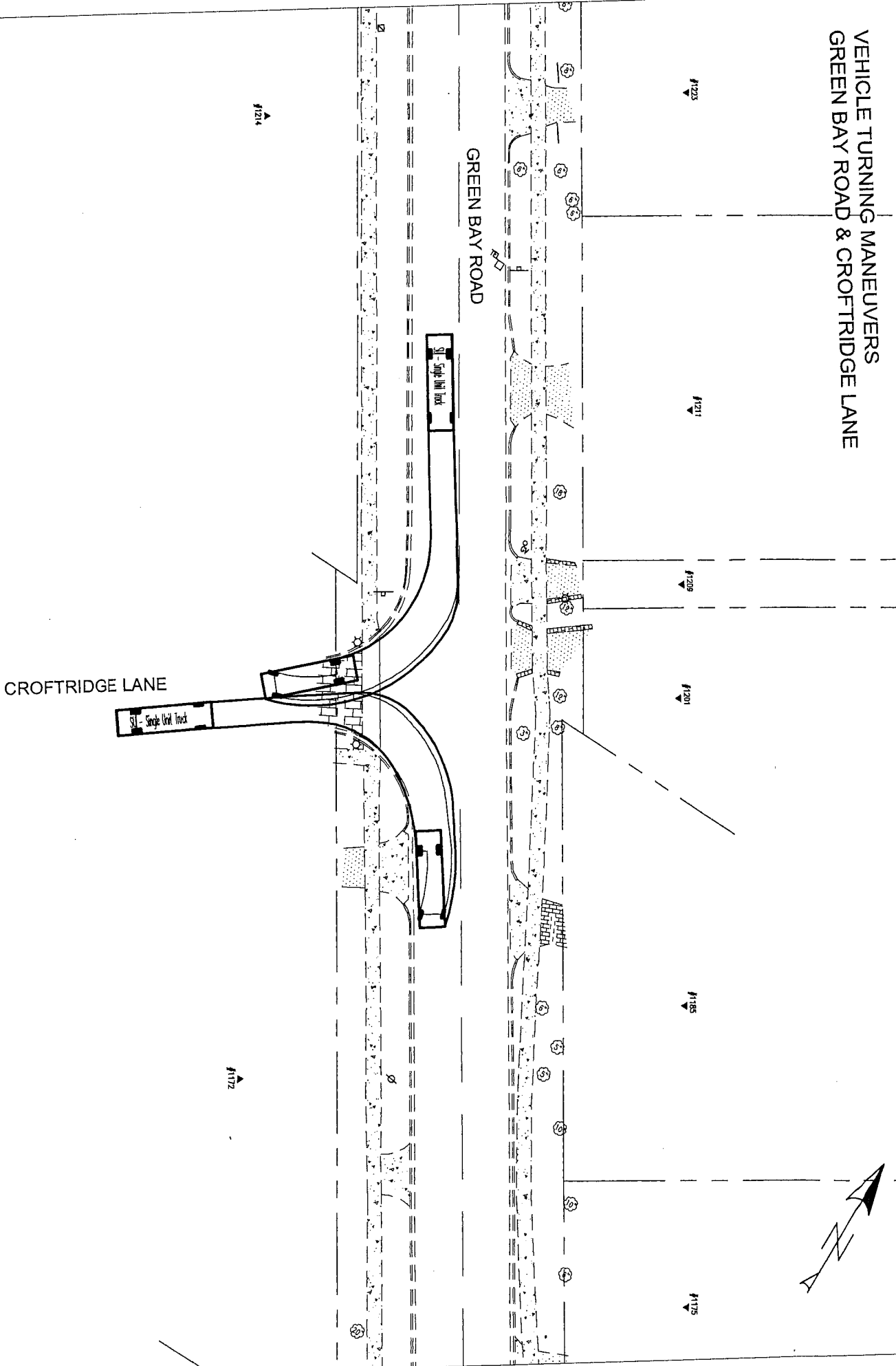
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD, BOB-O-LINK ROAD &
OAKWOOD AVENUE



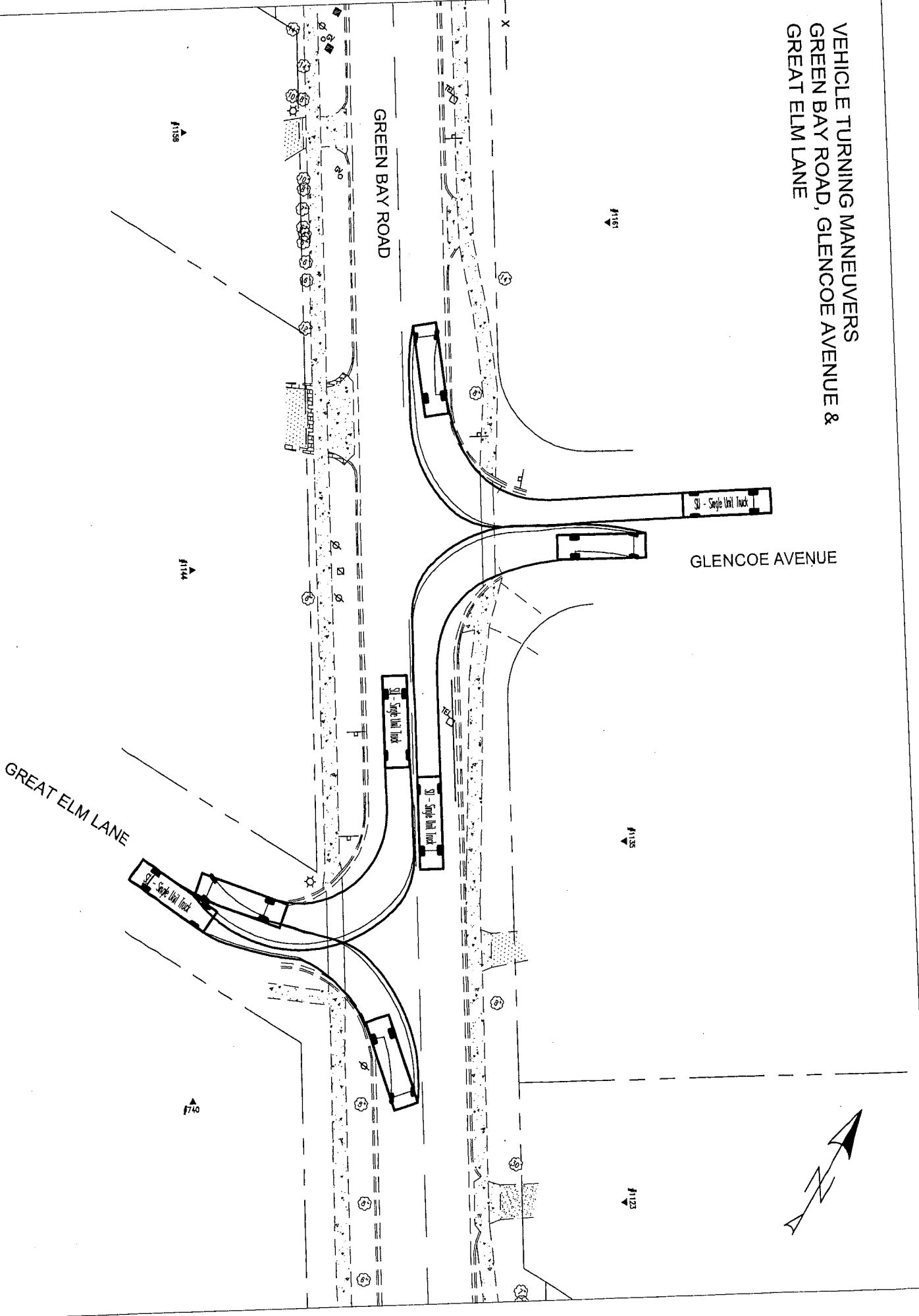
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD, LINCOLN AVENUE W. &
DANETH COURT



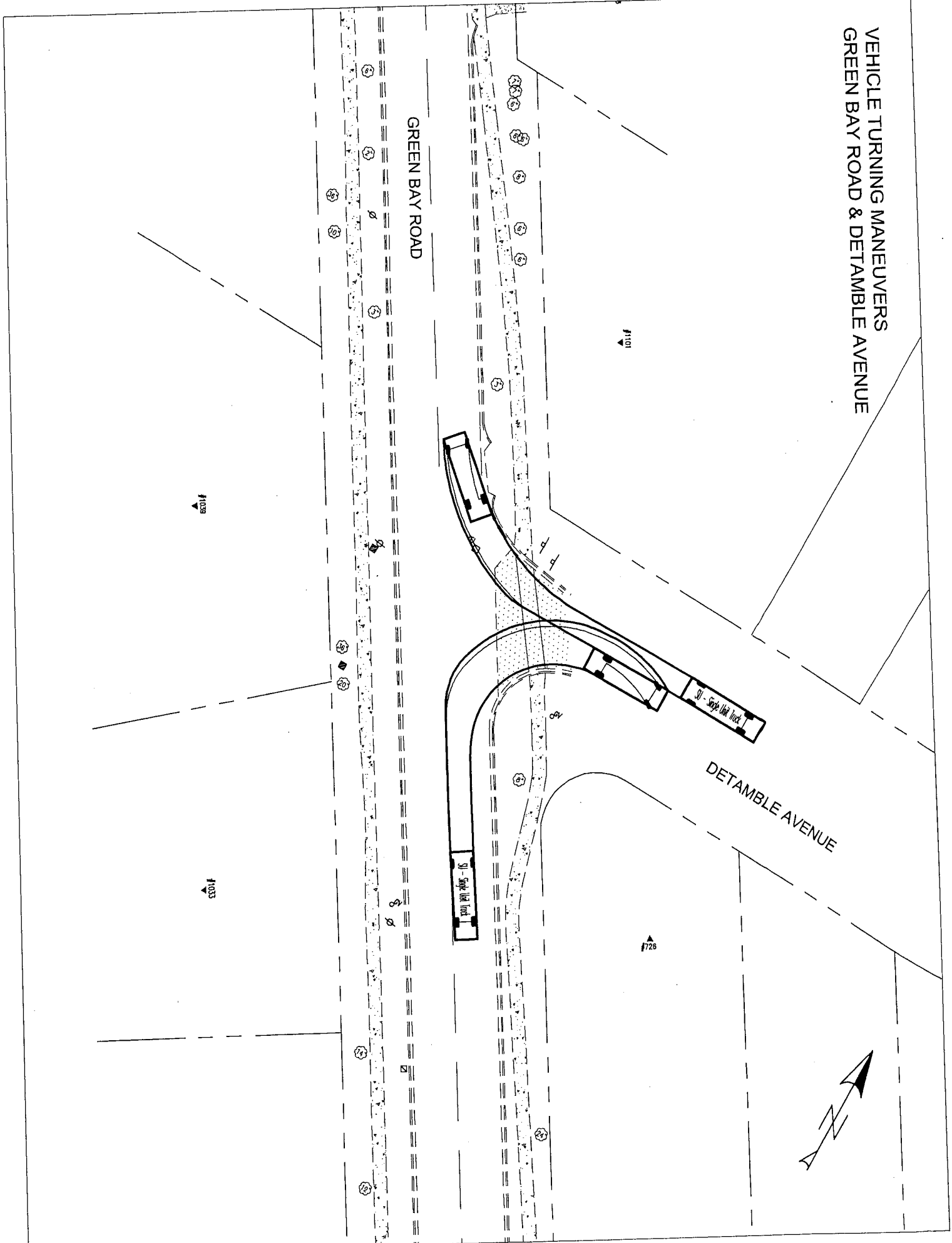
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & CROFTRIDGE LANE



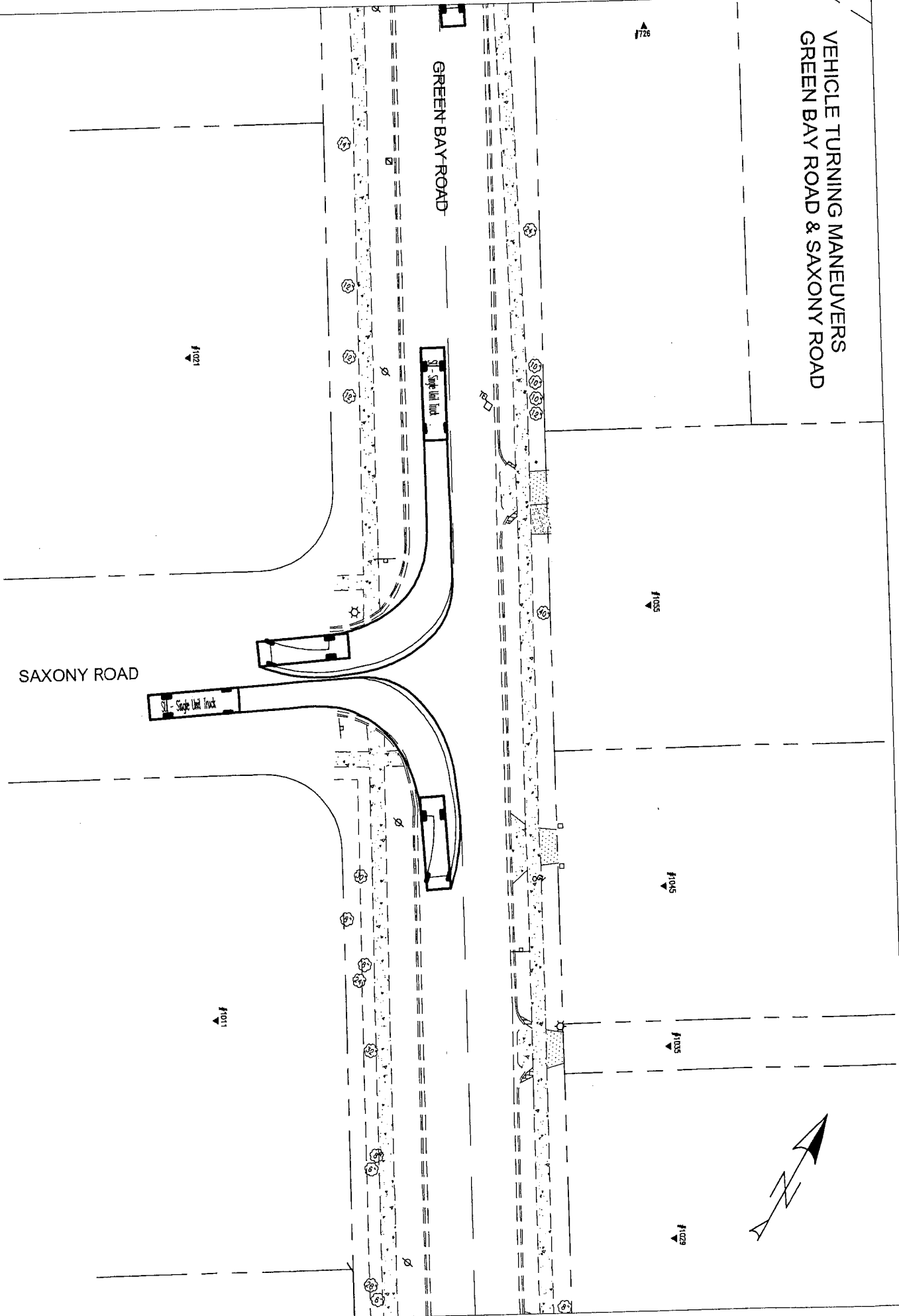
VEHICLE TURNING MANEUVERS
GREEN BAY ROAD, GLENCOE AVENUE &
GREAT ELM LANE



VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & DETAMBLE AVENUE



VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & SAXONY ROAD

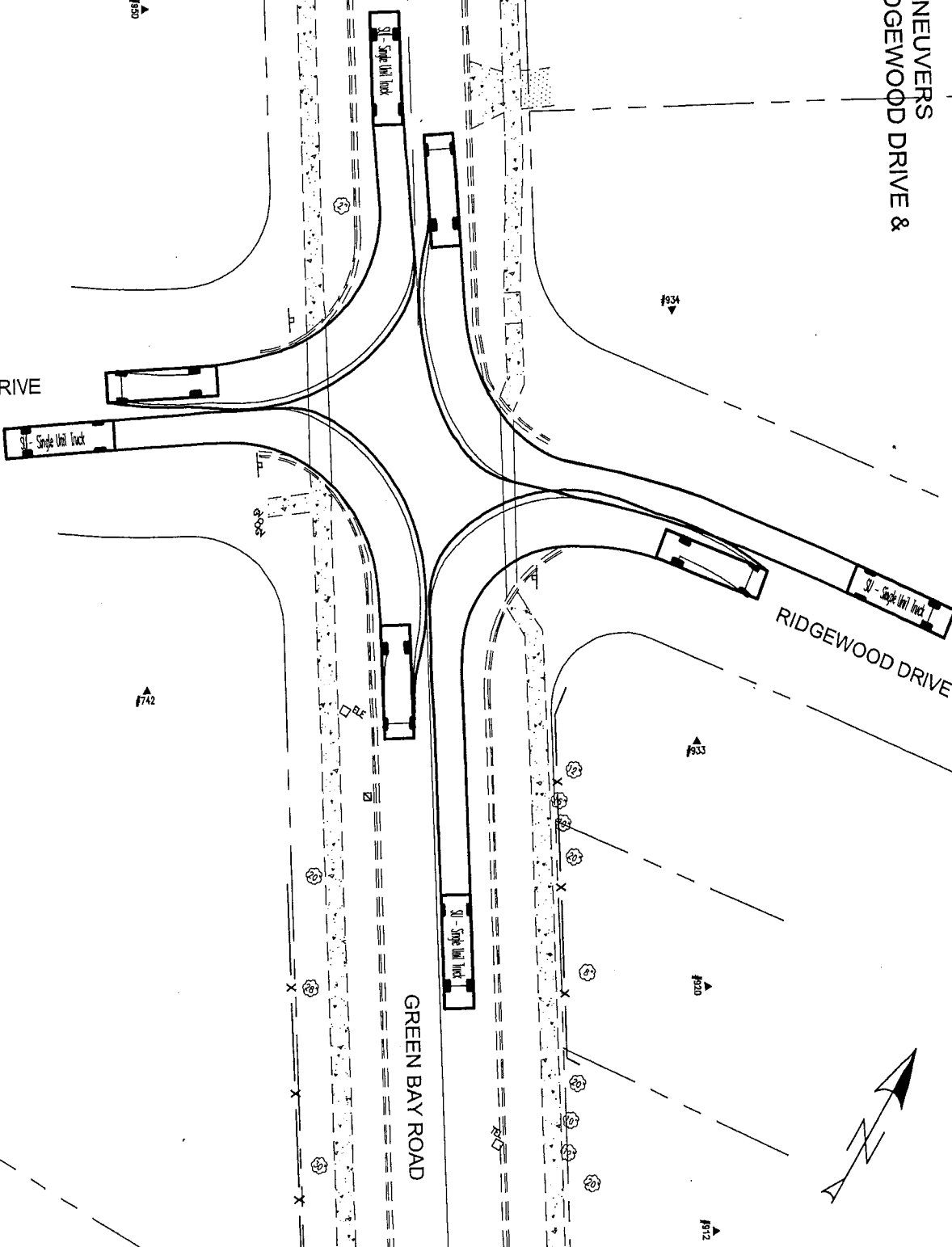


VEHICLE TURNING MANEUVERS
GREEN BAY ROAD, RIDGEWOOD DRIVE &
THACKERAY DRIVE

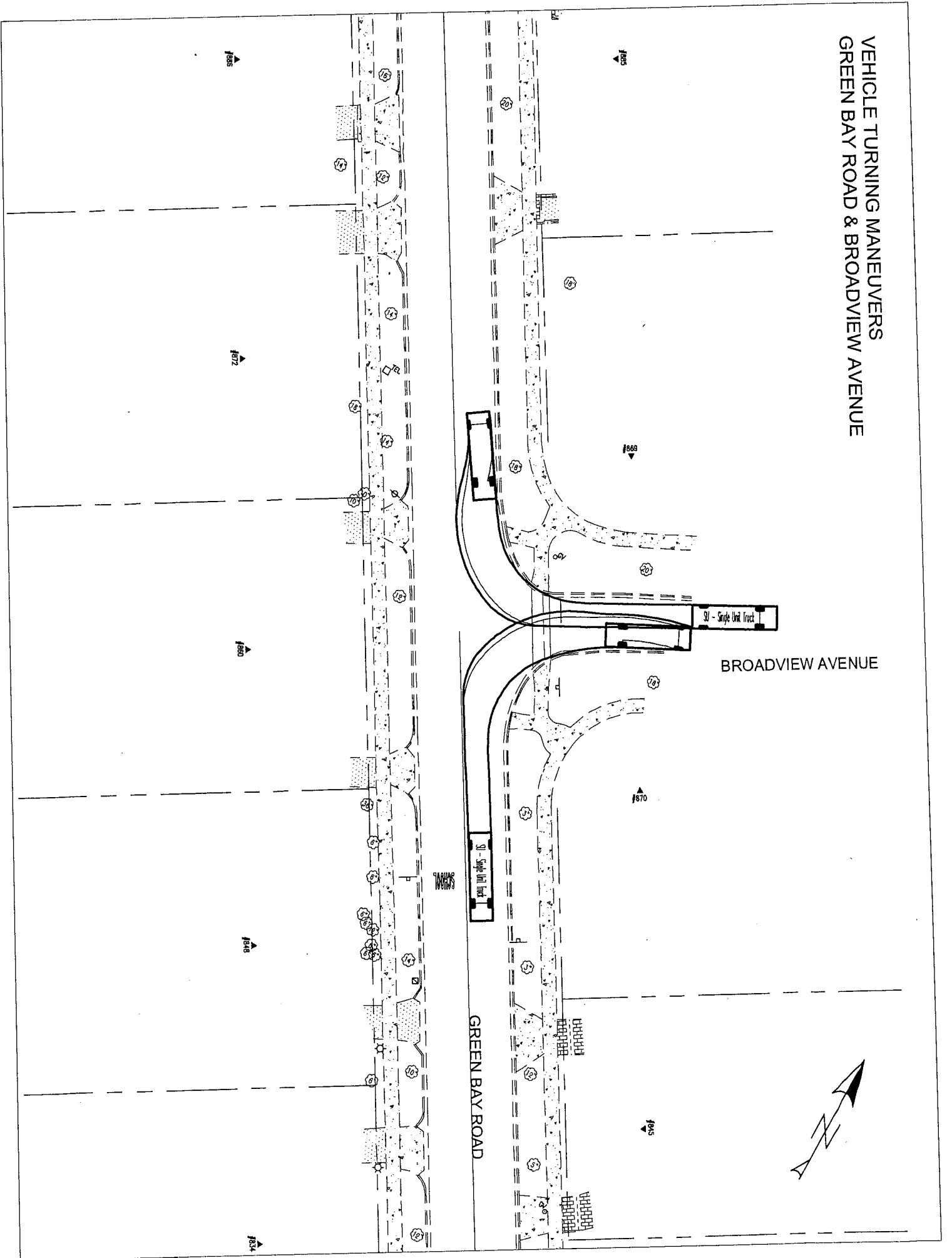
THACKERAY DRIVE

RIDGEWOOD DRIVE

GREEN BAY ROAD



VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & BROADVIEW AVENUE

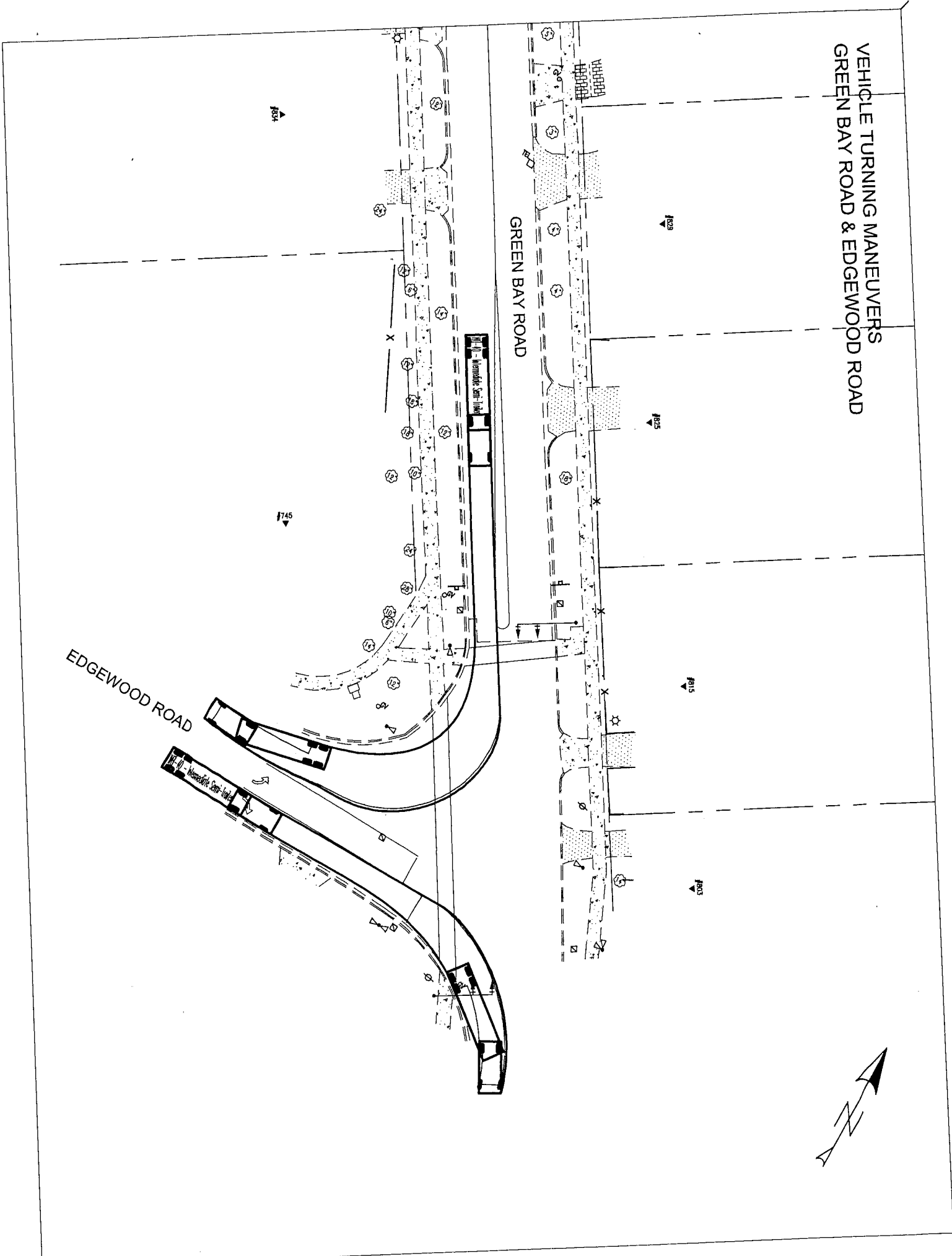


VEHICLE TURNING MANEUVERS
GREEN BAY ROAD & EDGEWOOD ROAD



GREEN BAY ROAD

EDGEWOOD ROAD





Chicago Metropolitan
Agency for Planning

233 South Wacker Drive
Suite 800
Chicago, Illinois 60606

312 454 0400
www.cmap.illinois.gov

November 7, 2016

Hon Nancy R. Rotering
Mayor
City of Highland Park
1707 St Johns Avenue
Highland Park, IL 60035

Subject: Clavey Road from US 41 NB Ramp and Green Bay Road
City of Highland Park

Dear Mayor Rotering:

In response to a request made on your behalf and dated October 24, 2016, we have developed year 2040 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current ADT	2040 ADT
Green Bay Road north of Clavey Road	12,300	17,000
Green Bay Road south of Clavey Road	8,100	10,500
Clavey Road west of Green Bay Road	7,400	9,500
Clavey Road east of Green Bay Road	1,400	1,600
US-41 NB On/Off-Ramp	7,300	8,000
Clavey Road west of US-41 NB Ramp	12,800	15,000
Clavey Road east of US-41 NB Ramp	8,600	11,000

Traffic projections are developed using existing ADT data provided in the request letter and the results from the October 2016 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2040 socioeconomic projections and assumes the implementation of the GO TO 2040 Comprehensive Regional Plan for the Northeastern Illinois area.

If you have any questions, please call me at (312) 386-8806.

Sincerely,

Jose Rodriguez, PTP, AICP
Senior Planner, Research & Analysis

cc: Hus (Robinson Engineering)
file:///S:/AdminGroups/ResearchAnalysis/Small AreaTrafficForecasts_CY16/Highland%20Park/la-41-16/la-41-16 docx

TRAFFIC COUNT DATA

Green Bay Road Existing Levels of Service*

Intersection	Weekday AM Peak		Weekday PM Peak	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Green Bay Road / Central Avenue				
Northbound	10-	A	13	B
Southbound	13	B	17	B
Eastbound	33	C	29	C
Westbound	33	C	35	C
<i>Intersection</i>	21	C	22	C
Green Bay Road / Laurel Avenue				
Northbound	16	B	12	B
Southbound	11	B	7	A
Eastbound	43	D	27	C
Westbound	41	D	34	C
<i>Intersection</i>	24	C	16	B
Green Bay Road / Deerfield Road				
Northbound	11	B	13	B
Southbound	10-	A	10-	A
Eastbound	23	C	28	C
Westbound	20	C	26	C
<i>Intersection</i>	14	B	15	B
Green Bay Road / Bob-O-Link Road / Oakwood Avenue				
Northbound	29	C	95	F
Southbound	29	C	37	D
Eastbound	61	E	57	E
Westbound	60	E	62	E
<i>Intersection</i>	34	C	74	E
Green Bay Road / Edgewood Road				
Northbound	10+	B	14	B
Southbound	20	B	15	B
Eastbound	33	C	28	C
Westbound	35	C	41	D
<i>Intersection</i>	19	B	15	B
Green Bay Road / Roger Williams Avenue				
Northbound	13	B	19	B
Southbound	8	A	7	A
Eastbound	22	C	26	C
Westbound	29	C	31	C
<i>Intersection</i>	14	B	17	B

* - Signalized intersections along Green Bay Road from Central Avenue to Roger Williams Avenue

AM PEAK HOUR HCS WORKSHEETS

HCS 2010 Signalized Intersection Input Data

General Information						Intersection Information					
Agency	Kimley-Horn			Duration, h	0.25						
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other						
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour	PHF	0.95					
Intersection	Green Bay Road / Central		Analysis Year	2016	Analysis Period	1> 8:00					
File Name	Ex_AM_Green Bay Rd & Central Av.xus										
Project Description	Green Bay Road Phase I Study										

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	195	265	50	15	115	30	95	265	15	25	280	225
Demand (v), veh/h												

Signal Information				Signal Timing (s)																				
Cycle, s	90.0	Reference Phase	2	Green	3.0	1.9	41.5	3.0	3.0	17.6	Yellow	3.0	0.0	4.5	3.0	0.0	4.5	Red	1.0	0.0	1.5	1.0	0.0	1.5
Offset, s	0	Reference Point	Begin	[Signal Diagram]																				
Uncoordinated	No	Simult. Gap E/W	On	[Signal Diagram]																				
Force Mode	Fixed	Simult. Gap N/S	On	[Signal Diagram]																				

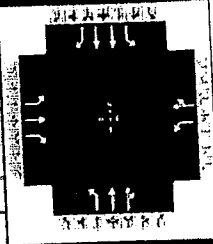
Traffic Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	195	265	50	15	115	30	95	265	15	25	280	225
Demand (v), veh/h	195	265	50	15	115	30	95	265	15	25	280	225
Initial Queue (Q _b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h	None			None			None			None		
Heavy Vehicles (P _{HV}), %	3	4	12	2	3		4	4		4	6	6
Ped / Bike / RTOR, /h	4	0	0	10	0	0	9	0	0	3	0	0
Buses (N _b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (AT)	3	3	3	3	3	3	3	4	3	3	4	3
Upstream Filtering (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (W), ft	10.0	10.0	10.0	10.0	10.0		10.0	11.0		10.0	10.0	11.0
Turn Bay Length, ft	100	0	100	50	0		50	0		50	0	50
Grade (P _g), %	0			0			0			0		
Speed Limit, mi/h	30	30	30	25	25	25	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
	Maximum Green (G _{max}) or Phase Split, s	10.0	35.0	10.0	35.0	10.0	35.0	10.0
Yellow Change Interval (Y), s	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5
Red Clearance Interval (R _c), s	1.0	1.5	1.0	1.5	1.0	1.5	1.0	1.5
Minimum Green (G _{min}), s	3	15	3	15	3	15	3	15
Start-Up Lost Time (I _t), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (e), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (PT), s	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (Walk), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (PC), s	0.0	16.0	0.0	21.0	0.0	21.0	0.0	18.0

Multimodal Information	EB			WB			NB			SB		
	0	No	25	0	No	25	0	No	25	0	No	25
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	AM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Central	Analysis Year	2016	Analysis Period	1 > 8:00
File Name	Ex_AM_Green Bay Rd & Central Av.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	195	265	50	15	115	30	95	265	15	25	280	225
Demand (v), veh/h												

Signal Information				Signal Timing (s)																	
Cycle, s	90.0	Reference Phase	2	Green	3.0	1.9	41.5	3.0	3.0	17.6	Yellow	3.0	0.0	4.5	Red	1.0	0.0	1.5	1.0	0.0	1.5
Offset, s	0	Reference Point	Begin																		
Uncoordinated	No	Simult. Gap E/W	On																		
Force Mode	Fixed	Simult. Gap N/S	On																		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	10.0	26.6	7.0	23.6	8.9	49.4	7.0	47.5
Change Period, (Y+R _c), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Allow Headway (MAH), s	4.1	6.1	4.2	6.1	4.1	0.0	4.1	0.0
Queue Clearance Time (q _s), s	8.0	13.8	2.6	8.8	4.7		2.7	
Green Extension Time (g _e), s	0.0	3.6	0.0	3.7	0.2	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	0.09	1.00	0.06	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	7	4	14	3	8	18	5	2	12	1	6	16
Assigned Movement	205	279	53	16	153		100	148	147	26	295	237
Adjusted Flow Rate (v), veh/h	1757	1923	1430	1774	1772		1740	1827	1790	1740	1796	1514
Adjusted Saturation Flow Rate (s), veh/h/ln	6.0	11.8	2.6	0.6	6.8		2.7	2.9	3.1	0.7	3.2	9.0
Queue Service Time (g _s), s	6.0	11.8	2.6	0.6	6.8		2.7	2.9	3.1	0.7	3.2	9.0
Cycle Queue Clearance Time (g _c), s	0.27	0.23	0.23	0.23	0.20		0.52	0.48	0.48	0.49	0.46	0.46
Green Ratio (g/C)	344	441	328	223	347		625	880	862	588	1656	698
Capacity (c), veh/h	0.597	0.632	0.160	0.071	0.439		0.160	0.168	0.170	0.045	0.178	0.339
Volume-to-Capacity Ratio (X)	344	684	508	282	571		866	880	862	866	1656	698
Available Capacity (c _a), veh/h	2.6	9.7	1.7	0.5	5.6		1.8	2.1	2.2	0.5	2.2	5.8
Back of Queue (Q), veh/ln (95th percentile)	0.68	0.00	0.46	0.25	0.00		0.93	0.00	0.00	0.25	0.00	3.04
Queue Storage Ratio (RQ) (95th percentile)	29.5	31.3	27.7	27.6	31.8		11.3	8.9	9.3	11.7	10.0	15.5
Uniform Delay (d ₁), s/veh	2.8	3.2	0.5	0.1	1.9		0.1	0.4	0.4	0.0	0.2	1.3
Incremental Delay (d ₂), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d ₃), s/veh	32.3	34.4	28.2	27.7	33.7		11.4	9.3	9.8	11.8	10.2	16.8
Control Delay (d), s/veh	C	C	C	C	C		B	A	A	B	B	B
Level of Service (LOS)	33.0	C	C	33.1	C		10.0	A	A	13.1	B	B
Approach Delay, s/veh / LOS	20.8			20.8			10.0			13.1		
Intersection Delay, s/veh / LOS	C											

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.8 / C	3.0 / C	2.3 / B	2.4 / B
Bicycle LOS Score / LOS	1.4 / A	0.8 / A	0.8 / A	0.9 / A

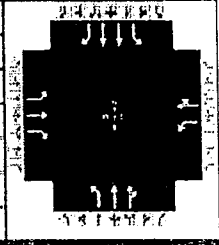
HCS 2010 Signalized Intersection Intermediate Values

General Information

Agency	Kimley-Horn		
Analyst	RKF	Analysis Date	Nov 23, 2016
Jurisdiction	City of Highland Park	Time Period	AM Peak Hour
Intersection	Green Bay Road / Central	Analysis Year	2016
File Name	Ex_AM_Green Bay Rd & Central Av.xus		
Project Description	Green Bay Road Phase I Study		

Intersection Information

Duration, h	0.25
Area Type	Other
PHF	0.95
Analysis Period	1> 8:00



Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	195	265	50	15	115	30	95	265	15	25	280	225

Signal Information

Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	Begin										
Uncoordinated	No	Simult. Gap E/W	On	Green	3.0	1.9	41.5	3.0	3.0	17.6			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	0.0	4.5	3.0	0.0	4.5			
				Red	1.0	0.0	1.5	1.0	0.0	1.5			

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.971	0.962	0.893	0.980	0.971	1.000	0.962	0.962	1.000	0.962	0.943	0.943
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.952	1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.961			0.980			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.991			0.997			0.998			0.994		
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})			0.995			0.985			0.991			0.997
Movement Saturation Flow Rate (s), veh/h	1757	1923		1774	1405		1740	3424		1740	3592	
Proportion of Vehicles Arriving on Green (P)	0.07	0.23	0.23	0.03	0.20	0.20	0.05	0.64	0.48	0.03	0.61	0.46
Incremental Delay Factor (k)	0.18	0.23	0.23	0.11	0.23		0.11	0.50	0.50	0.11	0.50	0.50

Signal Timing / Movement Groups

	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Green Ratio (g/C)	0.27	0.23	0.23	0.20	0.52	0.48	0.49	0.46
Permitted Saturation Flow Rate (s _p), veh/h/ln	1218	0	1096	0	1059	0	1059	0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln								
Permitted Effective Green Time (g _p), s	18.6	0.0	17.6	0.0	41.5	0.0	41.5	0.0
Permitted Service Time (g _u), s	10.8	0.0	6.9	0.0	38.3	0.0	38.3	0.0
Permitted Queue Service Time (g _{ps}), s	5.6		0.2		0.3		0.1	
Time to First Blockage (g _t), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g _s), s								
Protected Right Saturation Flow (s _R), veh/h/ln		0						0
Protected Right Effective Green Time (g _R), s		0.0						0.0

Multimodal

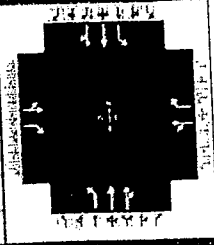
	EB		WB		NB		SB	
Pedestrian F_w / F_v	2.107	0.00	2.224	0.00	1.557	0.00	1.710	0.00
Pedestrian F_s / F_{delay}	0.000	0.132	0.000	0.135	0.000	0.100	0.000	0.103
Pedestrian M_{corner} / M_{low}								
Bicycle c_b / d_b	458.79	26.72	392.12	29.08	963.43	12.09	922.10	13.07
Bicycle F_w / F_v	-3.64	0.89	-3.64	0.28	-3.64	0.33	-3.64	0.46

--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

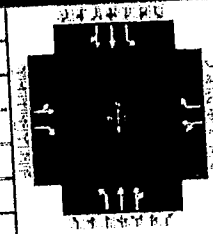
--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information					Intersection Information							
Agency	Kimley-Horn				Duration, h	0.25						
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other						
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour		PHF	0.95					
Intersection	Green Bay Road / Laurel A		Analysis Year	2016		Analysis Period	1 > 8:00					
File Name	Ex_AM_Green Bay Rd & Laurel Av.xus											
Project Description	Green Bay Road Phase I Study											
Demand Information												
	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	40	170	5	15	90	45	10	320	20	45	245	25
Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	No	Simult. Gap E/W	On		Green	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On		Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
					Red	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Traffic Information												
	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	40	170	5	15	90	45	10	320	20	45	245	25
Initial Queue (Q _b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h		None			None			None			None	
Heavy Vehicles (P _{HV}), %		3	3		6	6		2	4		6	8
Ped / Bike / RTOR, /h	6	0	0	4	0	0	2	0	0	1	0	0
Buses (N _b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (AT)	3	3	3	3	3	3	3	3	3	3	4	3
Upstream Filtering (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (W), ft		11.0	11.0		11.0	11.0		10.0	11.0		10.0	11.0
Turn Bay Length, ft		0	100		0	0		50	0		50	0
Grade (P _g), %		0			0			0			0	
Speed Limit, mi/h	25	25	25	25	25	25	30	30	30	30	30	30
Phase Information												
	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Maximum Green (G _{max}) or Phase Split, s		46.0		46.0	12.0	32.0	12.0	32.0				
Yellow Change Interval (Y), s		4.5		4.5	3.0	4.5	3.0	4.5				
Red Clearance Interval (R _c), s		1.5		1.5	0.0	1.5	0.0	1.5				
Minimum Green (G _{min}), s	3	10	3	10	3	15	3	15				
Start-Up Lost Time (l _t), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Extension of Effective Green (e), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Passage (PT), s	3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0				
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min				
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Walk (Walk), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0				
Pedestrian Clearance Time (PC), s	0.0	12.0	0.0	12.0	0.0	12.0	0.0	12.0				
Multimodal Information												
	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Kimley-Horn	Analysis Date	Nov 23, 2016	Duration, h	0.25
Analyst	RKF	Time Period	AM Peak Hour	Area Type	Other
Jurisdiction	City of Highland Park	Analysis Year	2016	PHF	0.95
Intersection	Green Bay Road / Laurel A			Analysis Period	1 > 8:00
File Name	Ex_AM_Green Bay Rd & Laurel Av.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	40	170	5	15	90	45	10	320	20	45	245	25
Demand (v), veh/h												

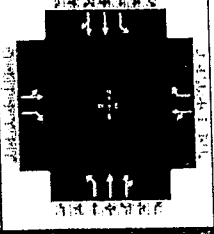
Signal Information																	
Cycle, s	90.0	Reference Phase	2														
Offset, s	0	Reference Point	Begin														
Uncoordinated	No	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2	1	6
Case Number		7.0		7.0		4.0	1.1	4.0
Phase Duration, s		22.3		22.3		6.0	6.0	6.0
Change Period, (Y+R _c), s		6.0		6.0		3.0	6.0	3.0
Max Allow Headway (MAH), s		0.0		0.0		0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0		0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0		0.0	0.0	0.0
Phase Call Probability		0.00		0.00		0.00	0.00	0.00
Max Out Probability		0.00		0.00		0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	7	4	14	3	8	18	5	2	12	1	6	16
Assigned Movement												
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Queue Service Time (g _s), s	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g _c), s	0.18	0.18		0.18	0.18		0.65	0.62	0.62	0.65	0.62	0.62
Green Ratio (g/C)	363	280		358	273		768	1131	1107	703	1089	1054
Capacity (c), veh/h	0.610	0.019		0.309	0.174		0.014	0.159	0.161	0.067	0.132	0.134
Volume-to-Capacity Ratio (X)	0	0		0	0		0	0	0	0	0	0
Available Capacity (c _a), veh/h	4.6	1.9		0.0	0.0		0.2	4.2	4.1	0.9	2.3	2.5
Back of Queue (Q), veh/ln (95th percentile)	0.00	0.05		0.00	0.00		0.06	0.00	0.00	0.27	0.00	0.00
Queue Storage Ratio (RQ) (95th percentile)	34.4	30.3		32.2	31.2		5.6	7.2	7.3	5.7	3.1	3.8
Uniform Delay (d ₁), s/veh	3.5	0.1		1.0	0.6		0.0	0.3	0.3	0.0	0.3	0.3
Incremental Delay (d ₂), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d ₃), s/veh	42.2	38.2		0.0	0.0		12.2	15.7	15.7	12.4	10.8	11.6
Control Delay (d), s/veh												
Level of Service (LOS)	43.2 D			41.0 D			15.6 B			11.3 B		
Approach Delay, s/veh / LOS	23.8			23.8			C			C		
Intersection Delay, s/veh / LOS	23.8			23.8			C			C		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.8 C	2.9 C	2.3 B	2.3 B
Bicycle LOS Score / LOS	0.9 A	0.7 A	0.8 A	0.8 A

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information											
Agency	Kimley-Horn			Duration, h	0.25										
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other									
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour		PHF	0.95								
Intersection	Green Bay Road / Laurel A		Analysis Year	2016		Analysis Period	1 > 8:00								
File Name	Ex_AM_Green Bay Rd & Laurel Av.xus														
Project Description	Green Bay Road Phase I Study														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				40	170	5	15	90	45	10	320	20	45	245	25
Signal Information															
Cycle, s	90.0	Reference Phase	2												
Offset, s	0	Reference Point	Begin	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturation Flow / Delay				EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R			
Lane Width Adjustment Factor (f_w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Heavy Vehicle Adjustment Factor (f_{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Approach Grade Adjustment Factor (f_g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Parking Activity Adjustment Factor (f_p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Bus Blockage Adjustment Factor (f_{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Area Type Adjustment Factor (f_a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Lane Utilization Adjustment Factor (f_{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Left-Turn Adjustment Factor (f_{LT})		0.000			0.000			0.000			0.000				
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.000			0.000				
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Movement Saturation Flow Rate (s), veh/h		0			0			0			0				
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Incremental Delay Factor (k)		0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00			
Signal Timing / Movement Groups				EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R				
Lost Time (t _L)					0.0		0.0	0.0	0.0	0.0	0.0				
Green Ratio (g/C)					0.18		0.18	0.65	0.62	0.65	0.62				
Permitted Saturation Flow Rate (s _p), veh/h/ln					0		0	0	0	0	0				
Shared Saturation Flow Rate (s _{sh}), veh/h/ln					0		0	0	0	0	0				
Permitted Effective Green Time (g _p), s					0.0		0.0	0.0	0.0	0.0	0.0				
Permitted Service Time (g _u), s					0.0		0.0	0.0	0.0	0.0	0.0				
Permitted Queue Service Time (g _{ps}), s					0.0		0.0	0.0	0.0	0.0	0.0				
Time to First Blockage (g _f), s					0.0		0.0	0.0	0.0	0.0	0.0				
Queue Service Time Before Blockage (g _{rs}), s					0.0		0.0	0.0	0.0	0.0	0.0				
Protected Right Saturation Flow (s _a), veh/h/ln					0		0								
Protected Right Effective Green Time (g _R), s					0.0		0.0	0.0	0.0	0.0	0.0				
Multimodal				EB			WB			NB			SB		
Pedestrian F_w / F_v				2.107	0.00	2.107	0.00	1.557	0.00	1.557	0.00				
Pedestrian F_s / F_{delay}				0.000	0.143	0.000	0.159	0.000	0.105	0.000	0.104				
Pedestrian M_{corner} / M_{cw}					0.00		0.00		0.00		0.00				
Bicycle c_b / d_b				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Bicycle F_w / F_v				-3.64	0.37	-3.64	0.26	-3.64	0.30	-3.64	0.27				

--- Messages ---

No errors or warnings exist.

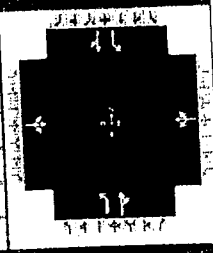
--- Comments ---

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HCS 2010™ Streets Version 6.65

Generated: 11/30/2016 11:10:38 AM

HCS 2010 Signalized Intersection Input Data

General Information						Intersection Information									
Agency	Kimley-Horn			Duration, h	0.25										
Analyst	RKF			Analysis Date	Nov 23, 2016										
Jurisdiction	City of Highland Park			Time Period	AM Peak Hour										
Intersection	Green Bay Road / Deerfield			Analysis Year	2016										
File Name	Ex_AM_Green Bay Rd & Deerfield Rd.xus			PHF	0.95										
Project Description	Green Bay Road Phase I Study			Analysis Period	1 > 8:00										
															
Demand Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	5	120	50	15	60	30	50	300	25	20	240	5			
Signal Information															
Cycle, s	56.2	Reference Phase	2												
Offset, s	0	Reference Point	Begin	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Traffic Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	5	120	50	15	60	30	50	300	25	20	240	5			
Initial Queue (Q ₀), veh/h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h	None			None			None			None			None		
Heavy Vehicles (P _{HV}), %	7			6			6			4			15		
Ped / Bike / RTOR, /h	1	0	0	6	0	0	2	0	0	3	0	0	3	0	0
Buses (N _b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (AT)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (W), ft	11.0			11.0			11.0			11.0			11.0		
Turn Bay Length, ft	0			0			115			0			0		
Grade (P _g), %	0			0			30			30			30		
Speed Limit, mi/h	25	25	25	25	25	25	30	30	30	30	30	30	30	30	30
Phase Information				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Maximum Green (G _{max}) or Phase Split, s					24.0		24.0	8.0	39.0	8.0	39.0				
Yellow Change Interval (Y), s					4.5		4.5	3.0	4.5	3.0	4.5				
Red Clearance Interval (R _c), s					1.5		1.5	1.0	1.5	1.0	1.5				
Minimum Green (G _{min}), s				3	8	3	8	3	15	3	15				
Start-Up Lost Time (l _t), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Extension of Effective Green (e), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Passage (PT), s				3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0				
Recall Mode				Off	Off	Off	Off	Off	Min	Off	Min				
Dual Entry				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Walk (Walk), s				0.0	10.0	0.0	10.0	0.0	10.0	0.0	10.0				
Pedestrian Clearance Time (PC), s				0.0	19.0	0.0	19.0	0.0	15.0	0.0	19.0				
Multimodal Information				EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No			0.50			No			0.50			No		

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information				
Agency	Kimley-Horn				Duration, h	0.25			
Analyst	RKF				Area Type	Other			
Jurisdiction	City of Highland Park	Analysis Date	Nov 23, 2016		PHF	0.95			
Intersection	Green Bay Road / Deerfield		Time Period	AM Peak Hour		Analysis Period	1 > 8:00		
File Name	Ex_AM_Green Bay Rd & Deerfield Rd.xus								
Project Description	Green Bay Road Phase I Study								

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	5	120	50	15	60	30	50	300	25	20	240	5
Demand (v), veh/h	5	120	50	15	60	30	50	300	25	20	240	5

Signal Information				Timing Diagram								
Cycle, s	56.2	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

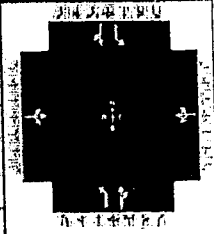
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
	Assigned Phase		4		8	5	2	1
Case Number		8.0		8.0	1.1	4.0	1.1	4.0
Phase Duration, s		16.8		16.8	7.0	32.4	7.0	32.4
Change Period, (Y+R _c), s		6.0		6.0	4.0	6.0	4.0	6.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.00		0.00	0.00	0.00	0.00	0.00
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement	7	4	14	3	8	18	5	2	12	1	6	16
Assigned Movement							0	0		0	0	
Adjusted Flow Rate (v), veh/h							0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln							0.0	0.0		0.0	0.0	
Queue Service Time (g _s), s							0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g _c), s							0.52	0.47		0.52	0.47	
Green Ratio (g/C)							0.19	0.19		0.19	0.19	
Capacity (c), veh/h							389	389		628	846	
Volume-to-Capacity Ratio (X)							0.473	0.284		0.084	0.404	
Available Capacity (c _a), veh/h							0	0		0	0	
Back of Queue (Q), veh/ln (95th percentile)							4.1	2.3		0.5	4.7	
Queue Storage Ratio (RQ) (95th percentile)							0.00	0.00		0.11	0.00	
Uniform Delay (d ₁), s/veh							20.6	19.6		6.8	9.8	
Incremental Delay (d ₂), s/veh							1.9	0.8		0.1	1.4	
Initial Queue Delay (d ₃), s/veh							0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							22.5	20.4		6.9	11.2	
Level of Service (LOS)							C	C		A	B	
Approach Delay, s/veh / LOS	22.5		C	20.4		C			10.6		B	
Intersection Delay, s/veh / LOS	13.8						B					

Multimodal Results	EB		WB		NB		SB	
	Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.1	B	2.1
Bicycle LOS Score / LOS	0.8	A	0.7	A	1.1	A	0.9	A

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	AM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Deerfield	Analysis Year	2016	Analysis Period	1> 8:00
File Name	Ex_AM_Green Bay Rd & Deerfield Rd.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	5	120	50	15	60	30	50	300	25	20	240	5

Signal Information													
Cycle, s	56.2	Reference Phase	2										
Offset, s	0	Reference Point	Begin										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0			
				Yellow	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0			

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.935	1.000	1.000	0.943	1.000	0.943	0.962	1.000	0.870	0.943	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0	0		0	0
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)		0.23			0.23			0.11	0.50		0.11	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)		6.0		6.0	4.0	6.0	4.0	6.0
Green Ratio (g/C)		0.19		0.19	0.52	0.47	0.52	0.47
Permitted Saturation Flow Rate (s _p), veh/h/ln		0		0	0	0	0	0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln		0		0	0	0	0	0
Permitted Effective Green Time (g _p), s		0.0		0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g _v), s		0.0		0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g _{ps}), s		0.0		0.0	0.0	0.0	0.0	0.0
Time to First Blockage (g _f), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g _{rs}), s		0.0		0.0	0.0	0.0	0.0	0.0
Protected Right Saturation Flow (s _R), veh/h/ln								
Protected Right Effective Green Time (g _R), s		0.0		0.0	0.0	0.0	0.0	0.0

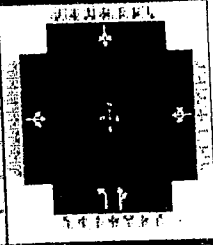
Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.557	0.00	1.389	0.00	1.389	0.00
Pedestrian F_s / F_{delay}	0.000	0.117	0.000	0.117	0.000	0.083	0.000	0.083
Pedestrian M_{corner} / M_{cov}								
Bicycle c_b / d_b	385.09	18.32	385.09	18.32	939.45	7.90	939.01	7.91
Bicycle F_w / F_v	-3.64	0.30	-3.64	0.18	-3.64	0.65	-3.64	0.46

--- Messages ---

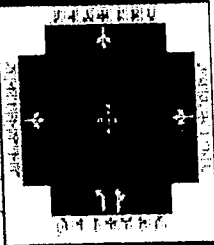
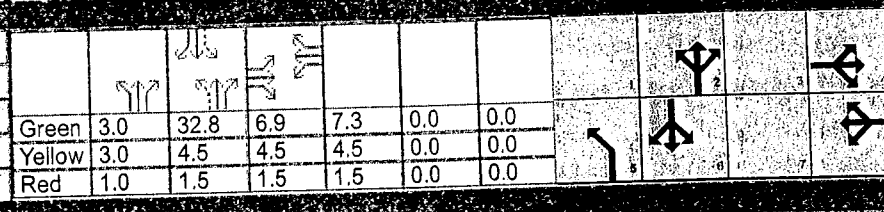
No errors or warnings exist.

--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information					Intersection Information											
Agency	Kimley-Horn				Duration, h	0.25										
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other										
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour		PHF	0.95									
Intersection	Green Bay Road / Bob-O-Link		Analysis Year	2016		Analysis Period	1 > 8:00									
File Name	Ex_AM_Green Bay Rd & Bob-O-Link.xus															
Project Description	Green Bay Road Phase I Study															
Demand Information				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h				15	30	25	80	5	1	15	340	125	5	285	15	
Signal Information																
Cycle, s	98.0	Reference Phase	2													
Offset, s	0	Reference Point	Begin	Green	3.0	32.8	6.9	7.3	0.0	0.0						
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.0	4.5	4.5	4.5	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.5	1.5	1.5	0.0	0.0						
Traffic Information				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h				15	30	25	80	5	1	15	340	125	5	285	15	
Initial Queue (Q _b), veh/h				0	0	0	0	0	0	0	0	0	0	0	0	
Base Saturation Flow Rate (s ₀), veh/h				1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Parking (N _m), man/h				None			None			None			None			
Heavy Vehicles (P _{HV}), %				6			8			27			4			
Ped / Bike / RTOR, /h				33	1	0	0	0	0	10	0	0	9	1	0	
Buses (N _b), buses/h				0	0	0	0	0	0	0	0	0	0	0	0	
Arrival Type (AT)				3	3	3	3	3	3	3	3	3	3	3	3	
Upstream Filtering (I)				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lane Width (W), ft				11.0			11.0			9.0			0			
Turn Bay Length, ft				0			0			0			0			
Grade (P _g), %				0			0			0			0			
Speed Limit, mi/h				25	25	25	25	25	25	30	30	30	30	30	30	
Phase Information				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Maximum Green (G _{max}) or Phase Split, s					24.0		24.0	11.0	39.0			39.0				
Yellow Change Interval (Y), s					4.5		4.5	3.0	4.5			4.5				
Red Clearance Interval (R _c), s					1.5		1.5	1.0	1.5			1.5				
Minimum Green (G _{min}), s				3	8	3	8	3	15	3	15					
Start-Up Lost Time (I _t), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Extension of Effective Green (e), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Passage (PT), s				3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0					
Recall Mode				Off	Off	Off	Off	Off	Min	Off	Min					
Dual Entry				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Walk (Walk), s				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Pedestrian Clearance Time (PC), s				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Multimodal Information				EB			WB			NB			SB			
85th % Speed / Rest in Walk / Corner Radius				0	No	25	0	No	25	0	No	25	0	No	25	
Walkway / Crosswalk Width / Length, ft				9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0	
Street Width / Island / Curb				0	0	No	0	0	No	0	0	No	0	0	No	
Width Outside / Bike Lane / Shoulder, ft				12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	
Pedestrian Signal / Occupied Parking				No	0.50	No	0.50	No	0.50	No	0.50	No	0.50			

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information															
Agency	Kimley-Horn				Duration, h	0.25														
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other														
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour		PHF	0.95													
Intersection	Green Bay Road / Bob-O-Link		Analysis Year	2016		Analysis Period	1 > 8:00													
File Name	Ex_AM_Green Bay Rd & Bob-O-Link.xus																			
Project Description	Green Bay Road Phase I Study																			
Demand Information					EB			WB			NB			SB						
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h					15	30	25	80	5	1	15	340	125	5	285	15				
Signal Information																				
Cycle, s	98.0	Reference Phase	2																	
Offset, s	0	Reference Point	Begin																	
Uncoordinated	Yes	Simult. Gap E/W	On																	
Force Mode	Fixed	Simult. Gap N/S	On																	
Green	3.0	32.8	6.9	7.3	0.0	0.0														
Yellow	3.0	4.5	4.5	4.5	0.0	0.0														
Red	1.0	1.5	1.5	1.5	0.0	0.0														
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT								
Assigned Phase					4		8		5		2		6							
Case Number					12.0		12.0		1.0		4.0		8.3							
Phase Duration, s					12.9		13.3		7.0		45.8		38.8							
Change Period, (Y+R _c), s					6.0		6.0		4.0		6.0		6.0							
Max Allow Headway (MAH), s					6.4		6.2		4.1		12.2		12.2							
Queue Clearance Time (g _s), s					6.7		7.2		2.7		24.9		15.9							
Green Extension Time (g _e), s					0.4		0.5		0.0		11.7		16.2							
Phase Call Probability					0.87		0.91		1.00		1.00		1.00							
Max Out Probability					0.00		0.00		0.00		0.97		0.85							
Movement Group Results					EB			WB			NB			SB						
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement					7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					74			91			16			489						
Adjusted Saturation Flow Rate (s), veh/h/ln					1500			1678			1425			1736						
Queue Service Time (g _s), s					4.7			5.2			0.7			22.9						
Cycle Queue Clearance Time (g _c), s					4.7			5.2			0.7			22.9						
Green Ratio (g/C)					0.07			0.07			0.39			0.41						
Capacity (c), veh/h					106			125			281			704						
Volume-to-Capacity Ratio (X)					0.695			0.722			0.056			0.695						
Available Capacity (c _a), veh/h					367			411			397			704						
Back of Queue (Q), veh/ln (95th percentile)					4.0			4.8			0.4			15.4						
Queue Storage Ratio (RQ) (95th percentile)					0.00			0.00			0.14			0.00						
Uniform Delay (d ₁), s/veh					44.5			44.4			20.0			24.1						
Incremental Delay (d ₂), s/veh					16.0			15.4			0.1			5.6						
Initial Queue Delay (d ₃), s/veh					0.0			0.0			0.0			0.0						
Control Delay (d), s/veh					60.6			59.7			20.1			29.7						
Level of Service (LOS)					E			E			C			C						
Approach Delay, s/veh / LOS					60.6		E		59.7		E		29.4		C		29.1		C	
Intersection Delay, s/veh / LOS					34.4						C									
Multimodal Results					EB			WB			NB			SB						
Pedestrian LOS Score / LOS					2.3			B			2.1			B						
Bicycle LOS Score / LOS					0.6			A			0.6			A						

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information											
Agency	Kimley-Horn			Duration, h	0.25		Area Type	Other							
Analyst	RKF	Analysis Date	Nov 23, 2016			PHF	0.95								
Jurisdiction	City of Highland Park			Time Period	AM Peak Hour			Analysis Period	1 > 8:00						
Intersection	Green Bay Road / Bob-O-Link			Analysis Year	2016										
File Name	Ex_AM_Green Bay Rd & Bob-O-Link.xus														
Project Description	Green Bay Road Phase I Study														
Demand Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	15	30	25	80	5	1	15	340	125	5	285	15			
Signal Information															
Cycle, s	98.0	Reference Phase	2												
Offset, s	0	Reference Point	Begin	Green	3.0	32.8	6.9	7.3	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.0	4.5	4.5	4.5	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.5	1.5	1.5	0.0	0.0					
Saturation Flow / Delay				EB			WB			NB			SB		
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.040	1.000		
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.943	1.000	1.000	0.926	1.000	0.787	0.962	1.000	1.000	1.000	1.000	1.000		
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Left-Turn Adjustment Factor (f_{LT})		0.837			0.954		0.952	0.000			0.984				
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.950			0.000				
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	1.000			1.000						0.994			0.966		
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})			0.778			1.000			0.988				0.966		
Movement Saturation Flow Rate (s), veh/h		643			98		1425	1269			1699				
Proportion of Vehicles Arriving on Green (P)	0.07	0.07	0.07	0.07	0.07	0.07	0.03	0.41	0.41	0.33	0.33	0.33			
Incremental Delay Factor (k)		0.23			0.23		0.11	0.50			0.50				
Signal Timing / Movement Groups				EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R				
Lost Time (t _L)		4.0			6.0		4.0	6.0			6.0				
Green Ratio (g/C)		0.07			0.07		0.39	0.41			0.33				
Permitted Saturation Flow Rate (s _p), veh/h/ln		0			0		851	0			916				
Shared Saturation Flow Rate (s _{sh}), veh/h/ln											0				
Permitted Effective Green Time (g _p), s		0.0			0.0		34.8	0.0			32.8				
Permitted Service Time (g _u), s		0.0			0.0		18.8	0.0			16.9				
Permitted Queue Service Time (g _{qs}), s							0.3				0.0				
Time to First Blockage (g _t), s		0.0			0.0		0.0	0.0			23.4				
Queue Service Time Before Blockage (g _{rs}), s											12.8				
Protected Right Saturation Flow (s _r), veh/h/ln															
Protected Right Effective Green Time (g _R), s															
Multimodal				EB			WB			NB			SB		
Pedestrian F_w / F_v	1.557	0.00		1.389	0.00		1.389	0.00		1.389	0.00		0.123		
Pedestrian F_s / F_{delay}	0.000	0.150		0.000	0.162		0.000	0.114		0.000	0.114		0.123		
Pedestrian M_{corner} / M_{low}													21.73		
Bicycle c_b / d_b	149.39	41.98			56.25		811.42	17.31		668.58			21.73		
Bicycle F_w / F_v	-3.64	0.12		-3.64	0.15		-3.64	0.83		-3.64	0.83		0.53		

--- Messages ---

No errors or warnings exist.

--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information						Intersection Information					
Agency	Kimley-Horn					Duration, h	0.25				
Analyst	RKF	Analysis Date	Nov 23, 2016			Area Type	Other				
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour		PHF	0.95				
Intersection	Green Bay Road / Edgewood		Analysis Year	2016		Analysis Period	1 > 7:15				
File Name	Ex_AM_Green Bay Rd & Edgewood Rd.xus										
Project Description	Green Bay Road Phase I Study										

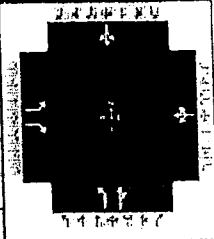
Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	105		160	1	1	1	185	265	1	1	335	105

Signal Information												
Cycle, s	74.2	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Traffic Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	105		160	1	1	1	185	265	1	1	335	105
Initial Queue (Q _b), veh/h	0		0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h	1900		1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h		None			None			None			None	
Heavy Vehicles (P _{HV}), %	11		3		2		5	5			4	
Ped / Bike / RTOR, /h				13	2	0	0	0	0	5	0	0
Buses (N _b), buses/h	0		0	0	0	0	0	0	0	0	0	0
Arrival Type (AT)	3		3	3	3	3	3	3	3	3	3	3
Upstream Filtering (I)	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (W), ft	10.0		10.0		12.0		10.0	10.0			12.0	
Turn Bay Length, ft	0		105		0		85	0			0	
Grade (P _g), %		0			0			0			0	
Speed Limit, mi/h	25		25	15	15	15	30	30	30	30	30	30

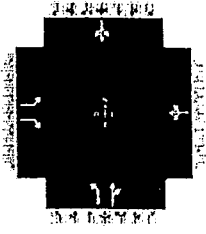
Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
	Maximum Green (G _{max}) or Phase Split, s		39.0		14.0	11.0	39.0	
Yellow Change Interval (Y), s		4.5		4.5	3.0	4.5		4.5
Red Clearance Interval (R _c), s		1.5		1.5	1.0	1.5		1.5
Minimum Green (G _{min}), s	3		3	10	3	15	3	15
Start-Up Lost Time (I _t), s	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (e), s	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Passage (PT), s	3.0		3.0	5.0	3.0	7.0	3.0	7.0
Recall Mode	Off		Off	Off	Off	Max	Off	Min
Dual Entry	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Walk (Walk), s	0.0		0.0	7.0	0.0	0.0	0.0	7.0
Pedestrian Clearance Time (PC), s	0.0		0.0	10.0	0.0	0.0	0.0	0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	



HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	Kimley-Horn			Duration, h	0.25	
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Edgewood		Analysis Year	2016	Analysis Period	1 > 7:15
File Name	Ex_AM_Green Bay Rd & Edgewood Rd.xus					
Project Description	Green Bay Road Phase I Study					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	105		160	1	1	1	185	265	1	1	335	105

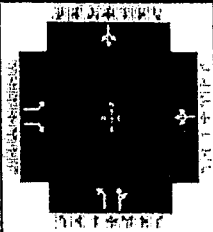
Signal Information																				
Cycle, s	74.2	Reference Phase	2																	
Offset, s	0	Reference Point	Begin																	
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		9.0		12.0	1.0	4.0		8.3
Phase Duration, s		16.7		9.3	10.6	48.3		37.7
Change Period, (Y+R _c), s		6.0		6.0	4.0	6.0		6.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0		0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0		0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0		0.0
Phase Call Probability		0.00		0.00	0.00	0.00		0.00
Max Out Probability		0.00		0.00	0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0		0		0		0	0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		0		0		0	0			0	
Queue Service Time (g _s), s	0.0		0.0		0.0		0.0	0.0			0.0	
Cycle Queue Clearance Time (g _c), s	0.0		0.0		0.0		0.0	0.0			0.0	
Green Ratio (g/C)	0.14		0.14		0.04		0.54	0.57			0.43	
Capacity (c), veh/h	235		226		74		447	1029			795	
Volume-to-Capacity Ratio (X)	0.469		0.746		0.043		0.436	0.272			0.584	
Available Capacity (c _a), veh/h	0		0		0		0	0			0	
Back of Queue (Q), veh/ln (95th percentile)	3.4		5.6		0.1		2.7	3.9			10.5	
Queue Storage Ratio (RQ) (95th percentile)	0.00		1.38		0.00		0.83	0.00			0.00	
Uniform Delay (d ₁), s/veh	29.2		30.5		34.0		11.4	8.1			16.6	
Incremental Delay (d ₂), s/veh	1.5		4.8		0.5		0.7	0.7			3.1	
Initial Queue Delay (d ₃), s/veh	0.0		0.0		0.0		0.0	0.0			0.0	
Control Delay (d), s/veh	30.6		35.3		34.5		12.0	8.8			19.7	
Level of Service (LOS)	C		D		C		B	A			B	
Approach Delay, s/veh / LOS	33.4		C	34.5		C	10.1	B		19.7		B
Intersection Delay, s/veh / LOS	19.2						B					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.3 / B	2.1 / B	1.4 / A	2.3 / B
Bicycle LOS Score / LOS	F	0.5 / A	1.3 / A	1.3 / A

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information		
Agency	Kimley-Horn			Duration, h	0.25	
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other	
Jurisdiction	City of Highland Park	Time Period	AM Peak Hour	PHF	0.95	
Intersection	Green Bay Road / Edgewood	Analysis Year	2016	Analysis Period	1 > 7:15	
File Name	Ex_AM_Green Bay Rd & Edgewood Rd.xus					
Project Description	Green Bay Road Phase I Study					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	105		160	1	1	1	185	265	1	1	335	105

Signal Information													
Cycle, s	74.2	Reference Phase	2										
Offset, s	0	Reference Point	Begin										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0			
				Yellow	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0			

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Approach Grade Adjustment Factor (f_g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Parking Activity Adjustment Factor (f_p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bus Blockage Adjustment Factor (f_{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Area Type Adjustment Factor (f_a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Utilization Adjustment Factor (f_{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0	0			0
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)	0.00		0.00		0.00			0.00	0.00			0.00

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)		0.0		0.0	0.0	0.0		0.0
Green Ratio (g/C)		0.14		0.04	0.54	0.57		0.43
Permitted Saturation Flow Rate (s _p), veh/h/ln		0		0	0	0		0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln		0		0	0	0		0
Permitted Effective Green Time (g _p), s		0.0		0.0	0.0	0.0		0.0
Permitted Service Time (g _v), s		0.0		0.0	0.0	0.0		0.0
Permitted Queue Service Time (g _{qs}), s		0.0		0.0	0.0	0.0		0.0
Time to First Blockage (g _t), s		0.0		0.0	0.0	0.0		0.0
Queue Service Time Before Blockage (g _{rs}), s		0.0		0.0	0.0	0.0		0.0
Protected Right Saturation Flow (s _R), veh/h/ln		0						
Protected Right Effective Green Time (g _R), s		0.0		0.0	0.0	0.0		0.0

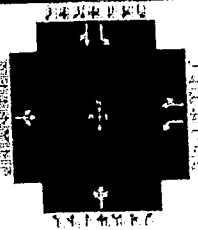
Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.389	0.00	0.681	0.00	1.557	0.00
Pedestrian F_s / F_{delay}	0.000	0.141	0.000	0.152	0.000	0.077	0.000	0.100
Pedestrian M_{corner} / M_{cw}		0.00		0.00		0.00		0.00
Bicycle c_b / d_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bicycle F_w / F_v	-3.64		-3.64	0.01	-3.64	0.78	-3.64	0.77

--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

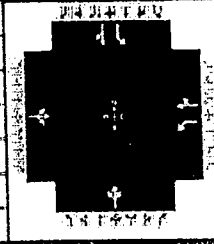
--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information					Intersection Information											
Agency	Kimley-Horn				Duration, h	0.25										
Analyst	RKF		Analysis Date	Nov 23, 2016		Area Type	Other									
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour		PHF	0.95									
Intersection	Green Bay Road / Roger W		Analysis Year	2016		Analysis Period	1 > 7:15									
File Name	Ex_AM_Green Bay Rd & Roger Williams Ave.xus															
Project Description	Green Bay Road Phase I Study															
Demand Information					EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h	1	1	1	135	1	105	1	340	70	90	415	1				
Signal Information																
Cycle, s	71.1	Reference Phase	2													
Offset, s	0	Reference Point	Begin		Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	Yes	Simult. Gap E/W	On		Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On		Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Traffic Information					EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h	1	1	1	135	1	105	1	340	70	90	415	1				
Initial Queue (Q _b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0				
Base Saturation Flow Rate (s ₀), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Parking (N _m), man/h	None			None			None			None						
Heavy Vehicles (P _{HV}), %	2			4			6			6						
Ped / Bike / RTOR, /h	0	0	0	3	0	0	2	0	0	2	0	0				
Buses (N _b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0				
Arrival Type (AT)	3	3	3	3	3	3	3	3	3	3	3	3				
Upstream Filtering (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Lane Width (W), ft	10.0			12.0			12.0			16.0						
Turn Bay Length, ft	0			60			0			95						
Grade (P _g), %	0			0			0			0						
Speed Limit, mi/h	25	25	25	25	25	25	30	30	30	30	30	30				
Phase Information					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Maximum Green (G _{max}) or Phase Split, s			19.0				19.0				11.0		44.0			
Yellow Change Interval (Y), s			4.5				4.5				3.0		4.5			
Red Clearance Interval (R _c), s			1.5				1.5				1.5		1.5			
Minimum Green (G _{min}), s	3	8	3	8	3	8	3	8	3	15	3	15				
Start-Up Lost Time (I _t), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Extension of Effective Green (e), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Passage (PT), s	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0				
Recall Mode	Off	Off	Off	Off	Off	Off	Off	Off	Off	Min	Off	Min				
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Walk (Walk), s	0.0	0.0	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0				
Pedestrian Clearance Time (PC), s	0.0	0.0	0.0	15.0	0.0	15.0	0.0	17.0	0.0	17.0	0.0	12.0				
Multimodal Information					EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25				
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0				
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No				
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0				
Pedestrian Signal / Occupied Parking	No	0.50	No	No	0.50	No	No	0.50	No	No	0.50	No				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	AM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Roger W	Analysis Year	2016	Analysis Period	1 > 7:15
File Name	Ex_AM_Green Bay Rd & Roger Williams Ave.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement				135	1	105	1	340	70	90	415	1
Demand (v), veh/h	1	1	1	135	1	105	1	340	70	90	415	1

Signal Information														
Cycle, s	71.1	Reference Phase	2											
Offset, s	0	Reference Point	Begin	Green	0.0	0.0	0.0	0.0	0.0	0.0				
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2	1	6
Case Number		8.0		6.0		8.3	1.0	4.0
Phase Duration, s		20.7		20.7		42.6	7.8	50.4
Change Period, (Y+Rc), s		6.0		6.0		6.0	4.0	6.0
Max Allow Headway (MAH), s		0.0		0.0		0.0	0.0	0.0
Queue Clearance Time (qs), s		0.0		0.0		0.0	0.0	0.0
Green Extension Time (ge), s		0.0		0.0		0.0	0.0	0.0
Phase Call Probability		0.00		0.00		0.00	0.00	0.00
Max Out Probability		0.00		0.00		0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		0		0	0		0			0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0	0		0			0	0	
Queue Service Time (gs), s		0.0		0.0	0.0		0.0			0.0	0.0	
Cycle Queue Clearance Time (gc), s		0.0		0.0	0.0		0.0			0.0	0.0	
Green Ratio (g/C)		0.21		0.21	0.21		0.51			0.60	0.62	
Capacity (c), veh/h		382		299	313		980			519	1084	
Volume-to-Capacity Ratio (X)		0.008		0.476	0.356		0.442			0.183	0.404	
Available Capacity (ca), veh/h		0		0	0		0			0	0	
Back of Queue (Q), veh/ln (95th percentile)		0.1		4.4	3.1		7.6			1.0	5.4	
Queue Storage Ratio (RQ) (95th percentile)		0.00		1.91	0.00		0.00			0.26	0.00	
Uniform Delay (d1), s/veh		22.4		29.1	24.2		11.0			7.5	6.7	
Incremental Delay (d2), s/veh		0.0		2.5	1.5		1.4			0.2	1.1	
Initial Queue Delay (d3), s/veh		0.0		0.0	0.0		0.0			0.0	0.0	
Control Delay (d), s/veh		22.4		31.6	25.6		12.5			7.6	7.8	
Level of Service (LOS)		C		C	C		B			A	A	
Approach Delay, s/veh / LOS	22.4	C		29.0	C		12.5	B		7.8	A	
Intersection Delay, s/veh / LOS	13.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.2	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.9	A	1.2	A	1.4	A

HCS 2010 Signalized Intersection Intermediate Values

General Information					Intersection Information				
Agency	Kimley-Horn				Duration, h	0.25			
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other			
Jurisdiction	City of Highland Park		Time Period	AM Peak Hour	PHF	0.95			
Intersection	Green Bay Road / Roger Williams Ave		Analysis Year	2016	Analysis Period	1 > 7:15			
File Name	Ex_AM_Green Bay Rd & Roger Williams Ave.xus								
Project Description	Green Bay Road Phase I Study								

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement				135	1	105	1	340	70	90	415	1
Demand (v), veh/h	1	1	1	135	1	105	1	340	70	90	415	1

Signal Information				Signal Phases										
Cycle, s	71.1	Reference Phase	2											
Offset, s	0	Reference Point	Begin	Green	0.0	0.0	0.0	0.0	0.0	0.0				
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0				

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Approach Grade Adjustment Factor (f_g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Parking Activity Adjustment Factor (f_p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bus Blockage Adjustment Factor (f_{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Area Type Adjustment Factor (f_a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Utilization Adjustment Factor (f_{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0			0	
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)		0.00			0.00			0.00			0.00	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)		0.0		0.0		0.0	0.0	0.0
Green Ratio (g/C)		0.21		0.21		0.51	0.60	0.62
Permitted Saturation Flow Rate (s_p), veh/h/ln		0		0		0	0	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln		0		0		0	0	0
Permitted Effective Green Time (g_e), s		0.0		0.0		0.0	0.0	0.0
Permitted Service Time (g_u), s		0.0		0.0		0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s		0.0		0.0		0.0	0.0	0.0
Time to First Blockage (g_f), s		0.0		0.0		0.0	0.0	0.0
Queue Service Time Before Blockage (g_s), s		0.0		0.0		0.0	0.0	0.0
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s		0.0		0.0		0.0	0.0	0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.00	1.557	0.00	1.557	0.00	1.389	0.00
Pedestrian F_s / F_{delay}	0.000	0.125	0.000	0.125	0.000	0.085	0.000	0.065
Pedestrian $M_{moorner} / M_{cow}$		0.00		0.00		0.00		0.00
Bicycle c_b / d_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bicycle F_w / F_v	-3.64	0.01	-3.64	0.42	-3.64	0.71	-3.64	0.88

--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

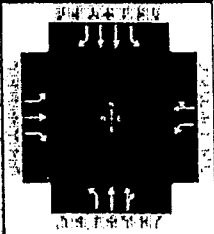
PM PEAK HOUR HCS WORKSHEETS

HCS 2010 Signalized Intersection Input Data

General Information					Intersection Information											
Agency	Kimley-Horn				Duration, h	0.25										
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other										
Jurisdiction	City of Highland Park		Time Period	PM Peak Hour	PHF	0.95										
Intersection	Green Bay Road / Central		Analysis Year	2016	Analysis Period	1 > 16:15										
File Name	Ex_PM_Green Bay Rd & Central Av.xus															
Project Description	Green Bay Road Phase I Study															
Demand Information					EB			WB			NB			SB		
Approach Movement	L	T	R		L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	175	235	90		30	225	55	150	480	35	30	290	235			
Signal Information																
Cycle, s	90.0	Reference Phase	2													
Offset, s	0	Reference Point	Begin													
Uncoordinated	No	Simult. Gap E/W	On		Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On		Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
					Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Traffic Information					EB			WB			NB			SB		
Approach Movement	L	T	R		L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	175	235	90		30	225	55	150	480	35	30	290	235			
Initial Queue (Q ₀), veh/h	0	0	0		0	0	0	0	0	0	0	0	0			
Base Saturation Flow Rate (s ₀), veh/h	1900	2000	1900		1900	1900	1900	1900	1900	1900	1900	2000	1900			
Parking (N _m), man/h		None			None			None			None					
Heavy Vehicles (P _{HV}), %	2	2	3		2	2		3	4		3	3	2			
Ped / Bike / RTOR, /h	5	1	0		10	3	0	7	0	0	4	0	0			
Buses (N _b), buses/h	0	0	0		0	0	0	0	0	0	0	0	0			
Arrival Type (AT)	3	3	3		3	3	3	3	4	3	3	4	3			
Upstream Filtering (I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Lane Width (W), ft	10.0	10.0	10.0		10.0	10.0		10.0	11.0		10.0	10.0	11.0			
Turn Bay Length, ft	100	0	100		50	0		50	0		50	0	50			
Grade (Pg), %		0			0			0			0					
Speed Limit, mi/h	30	30	30		25	25	25	30	30	30	30	30	30			
Phase Information					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Maximum Green (G _{max}) or Phase Split, s	10.0		35.0		10.0	35.0		10.0	35.0		10.0	35.0				
Yellow Change Interval (Y), s	3.0		4.5		3.0	4.5		3.0	4.5		3.0	4.5				
Red Clearance Interval (R _c), s	1.0		1.5		1.0	1.5		1.0	1.5		1.0	1.5				
Minimum Green (G _{min}), s	3		15		3	15		3	15		3	15				
Start-Up Lost Time (l _t), s	2.0		2.0		2.0	2.0		2.0	2.0		2.0	2.0				
Extension of Effective Green (e), s	2.0		2.0		2.0	2.0		2.0	2.0		2.0	2.0				
Passage (PT), s	3.0		5.0		3.0	5.0		3.0	5.0		3.0	5.0				
Recall Mode	Off		Off		Off	Off		Off	Min		Off	Min				
Dual Entry	Yes		Yes		Yes	Yes		Yes	Yes		Yes	Yes				
Walk (Walk), s	0.0		7.0		0.0	7.0		0.0	7.0		0.0	7.0				
Pedestrian Clearance Time (PC), s	0.0		16.0		0.0	21.0		0.0	21.0		0.0	18.0				
Multimodal Information					EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25		0	No	25	0	No	25	0	No	25			
Walkway / Crosswalk Width / Length, ft	9.0	12	0		9.0	12	0	9.0	12	0	9.0	12	0			
Street Width / Island / Curb	0	0	No		0	0	No	0	0	No	0	0	No			
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0		12	5.0	2.0	12	5.0	2.0	12	5.0	2.0			
Pedestrian Signal / Occupied Parking	No	0.50			No	0.50		No	0.50		No	0.50				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	Kimley-Horn			Duration, h	0.25	
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other	
Jurisdiction	City of Highland Park		Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Central		Analysis Year	2016	Analysis Period	1 > 16:15
File Name	Ex_PM_Green Bay Rd & Central Av.xus					
Project Description	Green Bay Road Phase I Study					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	175	235	90	30	225	55	150	480	35	30	290	235

Signal Information																						
Cycle, s	90.0	Reference Phase	2																			
Offset, s	0	Reference Point	Begin																			
Uncoordinated	No	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	Yellow	0.0	0.0	0.0	0.0	0.0	Red	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On																			

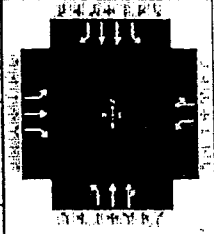
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	10.0	30.3	7.2	27.5	10.8	45.5	7.0	41.7
Change Period, (Y+R _c), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0	0	0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0		0	0	0	0	0	0
Queue Service Time (g _s), s	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g _c), s	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.31	0.27	0.27	0.27	0.24		0.49	0.44	0.44	0.43	0.40	0.40
Capacity (c), veh/h	294	530	415	304	427		586	802	781	424	1468	623
Volume-to-Capacity Ratio (X)	0.626	0.467	0.228	0.104	0.690		0.269	0.342	0.343	0.074	0.208	0.397
Available Capacity (c _a), veh/h	0	0	0	0	0		0	0	0	0	0	0
Back of Queue (Q), veh/ln (95th percentile)	5.9	8.0	2.9	0.9	10.4		3.1	5.0	5.2	0.7	2.9	7.0
Queue Storage Ratio (RQ) (95th percentile)	1.49	0.00	0.74	0.47	0.00		1.60	0.00	0.00	0.34	0.00	3.57
Uniform Delay (d ₁), s/veh	26.9	27.4	25.5	24.5	31.2		13.0	11.9	12.6	15.1	13.7	19.4
Incremental Delay (d ₂), s/veh	4.1	1.4	0.6	0.1	4.3		0.2	1.2	1.2	0.1	0.3	1.9
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	31.1	28.8	26.1	24.7	35.5		13.2	13.1	13.8	15.1	14.0	21.3
Level of Service (LOS)	C	C	C	C	D		B	B	B	B	B	C
Approach Delay, s/veh / LOS	29.1	C		34.5	C		13.4	B		17.2	B	
Intersection Delay, s/veh / LOS	21.5						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.8	C		3.0	C		2.3	B		2.4	B	
Bicycle LOS Score / LOS	1.4	A		1.0	A		1.1	A		1.0	A	

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Central	Analysis Year	2016	Analysis Period	1> 16:15
File Name	Ex_PM_Green Bay Rd & Central Av.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	175	235	90	30	225	55	150	480	35	30	290	235

Signal Information										Signal Diagram				
Cycle, s	90.0	Reference Phase	2											
Offset, s	0	Reference Point	Begin											
Uncoordinated	No	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0					0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0					0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0				

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Approach Grade Adjustment Factor (f_g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Parking Activity Adjustment Factor (f_p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bus Blockage Adjustment Factor (f_{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Area Type Adjustment Factor (f_a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Utilization Adjustment Factor (f_{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.000	0.000		0.000	0.000		0.000	0.000		0.000	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h	0	0		0	0		0	0		0	0	
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/G)	0.31	0.27	0.27	0.24	0.49	0.44	0.43	0.40
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	0	0	0	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln	0	0	0	0	0	0	0	0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blockage (g), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Protected Right Saturation Flow (s_R), veh/h/ln		0						0
Protected Right Effective Green Time (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	2.107	0.00	2.224	0.00	1.557	0.00	1.710	0.00
Pedestrian F_s / F_{delay}	0.000	0.127	0.000	0.131	0.000	0.106	0.000	0.112
Pedestrian M_{corner} / M_{cov}		0.00		0.00		0.00		0.00
Bicycle c_b / d_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bicycle F_w / F_v	-3.64	0.87	-3.64	0.54	-3.64	0.58	-3.64	0.48

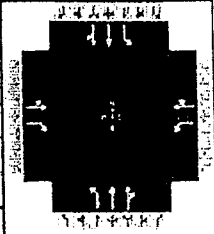
--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information				Intersection Information			
Agency	Kimley-Horn			Duration, h	0.25		
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other		
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95		
Intersection	Green Bay Road / Laurel A	Analysis Year	2016	Analysis Period	1 > 16:15		
File Name	Ex_PM_Green Bay Rd & Laurel Av.xus						
Project Description	Green Bay Road Phase I Study						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	100	10	45	170	85	30	550	35	60	310	30

Signal Information																		
Cycle, s	90.0	Reference Phase	2															
Offset, s	0	Reference Point	Begin															
Uncoordinated	No	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

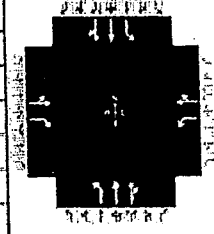
Traffic Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	100	10	45	170	85	30	550	35	60	310	30
Initial Queue (Q ₀), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h	None			None			None			None		
Heavy Vehicles (P _{HV}), %		2	2	7	2		2	4		3	3	
Ped / Bike / RTOR, /h	8	0	0	7	0	0	4	2	0	5	0	0
Buses (N _b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (A _T)	3	3	3	3	3	3	3	3	3	3	4	3
Upstream Filtering (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (W), ft		11.0	11.0	11.0	11.0		10.0	11.0		10.0	11.0	
Turn Bay Length, ft		0	100	50	0		50	0		50	0	
Grade (P _g), %		0			0			0			0	
Speed Limit, mi/h	25	25	25	25	25	25	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
	Maximum Green (G _{max}) or Phase Split, s		46.0		46.0	12.0	32.0	12.0
Yellow Change Interval (Y), s		4.5		4.5	3.0	4.5	3.0	4.5
Red Clearance Interval (R _c), s		1.5		1.5	0.0	1.5	0.0	1.5
Minimum Green (G _{min}), s	3	10	3	10	3	15	3	15
Start-Up Lost Time (l _t), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (e), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (P _T), s	3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (Walk), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (P _C), s	0.0	12.0	0.0	12.0	0.0	12.0	0.0	12.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Laurel A	Analysis Year	2016	Analysis Period	1 > 16:15
File Name	Ex_PM_Green Bay Rd & Laurel Av.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	100	10	45	170	85	30	550	35	60	310	30

Signal Information													
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	Begin										
Uncoordinated	No	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

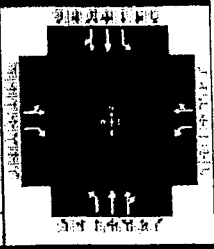
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		7.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		28.6		28.6	6.0	54.9	6.5	55.4
Change Period, (Y+Rc), s		6.0		6.0	3.0	6.0	3.0	6.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (gs), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (ge), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0
Queue Service Time (gs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (gc), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.25	0.25	0.25	0.25	0.25	0.25	0.58	0.54	0.54	0.58	0.55	0.55
Capacity (c), veh/h	497	390	197	437			651	995	970	514	1015	983
Volume-to-Capacity Ratio (X)	0.233	0.027	0.240	0.614			0.049	0.313	0.314	0.123	0.178	0.180
Available Capacity (ca), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Back of Queue (Q), veh/ln (95th percentile)	3.7	0.3	1.9	9.3			0.4	6.1	6.0	0.9	1.9	2.1
Queue Storage Ratio (RQ) (95th percentile)	0.00	0.08	1.00	0.00			0.23	0.00	0.00	0.47	0.00	0.00
Uniform Delay (d1), s/veh	27.0	25.5	38.2	29.9			8.2	11.2	11.3	8.4	5.7	6.5
Incremental Delay (d2), s/veh	0.5	0.1	1.3	3.0			0.0	0.8	0.8	0.1	0.4	0.4
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	27.5	25.6	39.6	32.9			8.3	12.1	12.1	8.6	6.1	6.9
Level of Service (LOS)		C	C	D	C		A	B	B	A	A	A
Approach Delay, s/veh / LOS	27.4	C		33.9	C		11.9	B		6.8	A	
Intersection Delay, s/veh / LOS	16.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.2	B	2.2	B
Bicycle LOS Score / LOS	0.7	A	1.0	A	1.0	A	0.8	A

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Laurel A	Analysis Year	2016	Analysis Period	1> 16:15
File Name	Ex_PM_Green Bay Rd & Laurel Av.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	100	10	45	170	85	30	550	35	60	310	30

Signal Information														
Cycle, s	90.0	Reference Phase	2											
Offset, s	0	Reference Point	Begin	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.980	0.980	0.935	0.980	1.000	0.980	0.962	1.000	0.971	0.971	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0	0		0	0
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)		0.23	0.23		0.23	0.23		0.11	0.50	0.50		0.11 0.50 0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)		6.0		6.0	3.0	6.0	3.0	6.0
Green Ratio (g/C)		0.25		0.25	0.58	0.54	0.58	0.55
Permitted Saturation Flow Rate (s _p), veh/h/ln		0		0	0	0	0	0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln		0		0	0	0	0	0
Permitted Effective Green Time (g _p), s		0.0		0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g _v), s		0.0		0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g _{ps}), s		0.0		0.0	0.0	0.0	0.0	0.0
Time to First Blockage (g _t), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g _{rs}), s		0.0		0.0	0.0	0.0	0.0	0.0
Protected Right Saturation Flow (s _R), veh/h/ln		0						
Protected Right Effective Green Time (g _R), s		0.0		0.0	0.0	0.0	0.0	0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	2.107	0.00	2.107	0.00	1.557	0.00	1.557	0.00
Pedestrian F_s / F_{delay}	0.000	0.130	0.000	0.130	0.000	0.090	0.000	0.089
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	501.19	25.27	501.19	25.27	1087.06	9.39	1098.80	9.14
Bicycle F_w / F_v	-3.64	0.21	-3.64	0.52	-3.64	0.53	-3.64	0.35

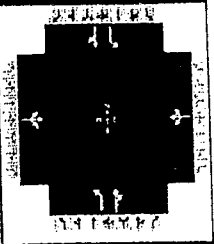
--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Deerfield	Analysis Year	2016	Analysis Period	1> 16:15
File Name	Ex_PM_Green Bay Rd & Deerfield Rd.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	5	85	75	20	70	30	80	585	20	20	340	5

Signal Information												
Cycle, s	67.3	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

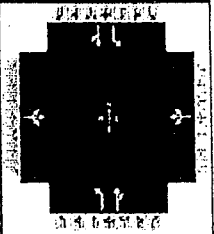
Traffic Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	5	85	75	20	70	30	80	585	20	20	340	5
Initial Queue (Q ₀), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h	None			None			None			None		
Heavy Vehicles (P _{HV}), %	2			6			4			10		
Ped / Bike / RTOR, /h	5	0	0	1	0	0	2	0	0	0	0	0
Buses (N _b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (AT)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (W), ft	11.0			11.0			10.0			10.0		
Turn Bay Length, ft	0			0			115			115		
Grade (P _g), %	0			0			0			0		
Speed Limit, mi/h	25	25	25	25	25	25	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
	Maximum Green (G _{max}) or Phase Split, s		24.0		24.0	8.0	39.0	24.0
Yellow Change Interval (Y), s		4.5		4.5	3.0	4.5	3.0	4.5
Red Clearance Interval (R _c), s		1.5		1.5	1.0	1.5	1.0	1.5
Minimum Green (G _{min}), s	3	8	3	8	3	15	3	15
Start-Up Lost Time (I _t), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (e), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (PT), s	3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (Walk), s	0.0	10.0	0.0	10.0	0.0	10.0	0.0	10.0
Pedestrian Clearance Time (PC), s	0.0	19.0	0.0	19.0	0.0	15.0	0.0	19.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft.	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	Kimley-Horn			Duration, h	0.25		
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other		
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95		
Intersection	Green Bay Road / Deerfield	Analysis Year	2016	Analysis Period	1> 16:15		
File Name	Ex_PM_Green Bay Rd & Deerfield Rd.xus						
Project Description	Green Bay Road Phase I Study						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	5	85	75	20	70	30	80	585	20	20	340	5

Signal Information																
Cycle, s	67.3	Reference Phase	2													
Offset, s	0	Reference Point	Begin													
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	1.1	4.0	1.1	4.0
Phase Duration, s		17.6		17.6	7.5	42.7	7.0	42.2
Change Period, (Y+R _c), s		6.0		6.0	4.0	6.0	4.0	6.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (q _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

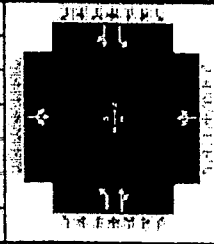
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0			0			0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0			0			0	0		0	0	
Queue Service Time (g _s), s	0.0			0.0			0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g _c), s	0.0			0.0			0.0	0.0		0.0	0.0	
Green Ratio (g/C)	0.17			0.17			0.59	0.54		0.58	0.54	
Capacity (c), veh/h	349			346			619	990		377	990	
Volume-to-Capacity Ratio (X)	0.498			0.365			0.136	0.644		0.056	0.367	
Available Capacity (c _a), veh/h	0			0			0	0		0	0	
Back of Queue (Q), veh/ln (95th percentile)	4.9			3.4			0.8	10.6		0.2	5.2	
Queue Storage Ratio (RQ) (95th percentile)	0.00			0.00			0.18	0.00		0.05	0.00	
Uniform Delay (d ₁), s/veh	25.6			24.9			6.4	10.7		8.4	9.0	
Incremental Delay (d ₂), s/veh	2.3			1.4			0.1	3.2		0.1	1.1	
Initial Queue Delay (d ₃), s/veh	0.0			0.0			0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	28.0			26.2			6.5	13.9		8.5	10.0	
Level of Service (LOS)	C			C			A	B		A	B	
Approach Delay, s/veh / LOS	28.0	C		26.2	C		13.1	B		9.9	A	
Intersection Delay, s/veh / LOS	15.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.8	A	0.7	A	1.7	A	1.1	A

HCS 2010 Signalized Intersection Intermediate Values

General Information

Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Deerfield	Analysis Year	2016	Analysis Period	1> 16:15
File Name	Ex_PM_Green Bay Rd & Deerfield Rd.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	5	85	75	20	70	30	80	585	20	20	340	5

Signal Information

Cycle, s	67.3	Reference Phase	2												
Offset, s	0	Reference Point	Begin												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Approach Grade Adjustment Factor (f_g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Parking Activity Adjustment Factor (f_p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bus Blockage Adjustment Factor (f_{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Area Type Adjustment Factor (f_a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Utilization Adjustment Factor (f_{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f_{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0	0		0	0
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)		0.00			0.00			0.00	0.00		0.00	0.00

Signal Timing / Movement Groups

	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)		0.0		0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)		0.17		0.17	0.59	0.54	0.58	0.54
Permitted Saturation Flow Rate (s _p), veh/h/ln		0		0	0	0	0	0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln		0		0	0	0	0	0
Permitted Effective Green Time (g _p), s		0.0		0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g _u), s		0.0		0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g _{ps}), s		0.0		0.0	0.0	0.0	0.0	0.0
Time to First Blockage (g _r), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g _{rs}), s		0.0		0.0	0.0	0.0	0.0	0.0
Protected Right Saturation Flow (s _{pr}), veh/h/ln								
Protected Right Effective Green Time (g _r), s		0.0		0.0	0.0	0.0	0.0	0.0

Multimodal

	EB			WB			NB			SB		
Pedestrian F_w / F_v	1.557	0.00		1.557	0.00		1.389	0.00		1.389	0.00	
Pedestrian F_s / F_{delay}	0.000	0.126		0.000	0.126		0.000	0.078		0.000	0.079	
Pedestrian $M_{corner} / M_{c/w}$		0.00			0.00			0.00			0.00	
Bicycle c_b / d_b	0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00	
Bicycle F_w / F_v	-3.64	0.29		-3.64	0.21		-3.64	1.19		-3.64	0.63	

--- Messages ---

No errors or warnings exist.

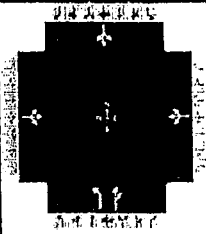
--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information						Intersection Information																	
Agency	Kimley-Horn					Duration, h	0.25																
Analyst	RKF	Analysis Date	Nov 23, 2016			Area Type	Other																
Jurisdiction	City of Highland Park		Time Period	PM Peak Hour		PHF	0.95																
Intersection	Green Bay Road / Bob-O-Link		Analysis Year	2016		Analysis Period	1 > 16:00																
File Name	Ex_PM_Green Bay Rd & Bob-O-Link.xus																						
Project Description	Green Bay Road Phase I Study																						
Demand Information						EB			WB			NB			SB								
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R						
Demand (v), veh/h						10	10	20	105	20	2	35	645	160	2	405	15						
Signal Information																							
Cycle, s	106.3	Reference Phase	2																				
Offset, s	0	Reference Point	Begin																				
Uncoordinated	Yes	Simult. Gap E/W	On			Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On			Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
						Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
Traffic Information						EB			WB			NB			SB								
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R						
Demand (v), veh/h						10	10	20	105	20	2	35	645	160	2	405	15						
Initial Queue (Q _b), veh/h						0	0	0	0	0	0	0	0	0	0	0	0	0					
Base Saturation Flow Rate (s ₀), veh/h						1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900					
Parking (N _m), man/h						None			None			None			None								
Heavy Vehicles (P _{HV}), %						3			2			5			4								
Ped / Bike / RTOR, /h						0	0	0	1	1	0	2	0	0	0	2	0						
Buses (N _b), buses/h						0	0	0	0	0	0	0	0	0	0	0	0						
Arrival Type (AT)						3	3	3	3	3	3	3	3	3	3	3	3						
Upstream Filtering (I)						1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Lane Width (W), ft						11.0			11.0			10.0			12.0								
Turn Bay Length, ft						0			0			90			0								
Grade (P _g), %						0			0			0			0								
Speed Limit, mi/h						25	25	25	25	25	25	30	30	30	30	30	30						
Phase Information						EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT										
Maximum Green (G _{max}) or Phase Split, s							24.0		24.0	11.0	39.0		39.0										
Yellow Change Interval (Y), s							4.5		4.5	3.0	4.5		4.5										
Red Clearance Interval (R _c), s							1.5		1.5	1.0	1.5		1.5										
Minimum Green (G _{min}), s						3	8	3	8	3	15	3	15										
Start-Up Lost Time (l _t), s						2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0										
Extension of Effective Green (e), s						2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0										
Passage (PT), s						3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0										
Recall Mode						Off	Off	Off	Off	Off	Min	Off	Min										
Dual Entry						Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes										
Walk (Walk), s						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Pedestrian Clearance Time (PC), s						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Multimodal Information						EB			WB			NB			SB								
85% Speed / Rest in Walk / Corner Radius						0	No	25	0	No	25	0	No	25	0	No	25						
Walkway / Crosswalk Width / Length, ft						9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0						
Street Width / Island / Curb						0	0	No	0	0	No	0	0	No	0	0	No						
Width Outside / Bike Lane / Shoulder, ft						12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0						
Pedestrian Signal / Occupied Parking						No	0.50	No	0.50	No	0.50	No	0.50	No	0.50								

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Bob-O-Link	Analysis Year	2016	Analysis Period	1 > 16:00
File Name	Ex_PM_Green Bay Rd & Bob-O-Link.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	10	20	105	20	2	35	645	160	2	405	15

Signal Information																	
Cycle, s	106.3	Reference Phase	2														
Offset, s	0	Reference Point	Begin														
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

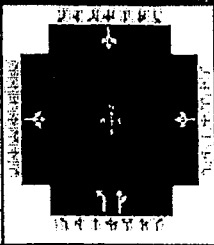
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		12.0		12.0	1.0	4.0		8.3
Phase Duration, s		11.7		16.3	7.3	52.3		45.0
Change Period, (Y+Rc), s		6.0		6.0	4.0	6.0		6.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0		0.0
Queue Clearance Time (qs), s		0.0		0.0	0.0	0.0		0.0
Green Extension Time (ge), s		0.0		0.0	0.0	0.0		0.0
Phase Call Probability		0.00		0.00	0.00	0.00		0.00
Max Out Probability		0.00		0.00	0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0			0			0	0		0		
Adjusted Saturation Flow Rate (s), veh/h/ln	0			0			0	0		0		
Queue Service Time (gs), s	0.0			0.0			0.0	0.0		0.0		
Cycle Queue Clearance Time (gc), s	0.0			0.0			0.0	0.0		0.0		
Green Ratio (g/C)	0.05			0.10			0.42	0.44		0.37		
Capacity (c), veh/h	90			172			124	761		595		
Volume-to-Capacity Ratio (X)	0.470			0.775			0.297	1.113		0.747		
Available Capacity (ca), veh/h	0			0			0	0		0		
Back of Queue (Q), veh/ln (95th percentile)	2.3			7.5			1.0	45.9		15.9		
Queue Storage Ratio (RQ) (95th percentile)	0.00			0.00			0.30	0.00		0.00		
Uniform Delay (d1), s/veh	48.8			46.9			26.3	30.0		28.1		
Incremental Delay (d2), s/veh	8.0			14.6			1.3	68.4		8.3		
Initial Queue Delay (d3), s/veh	0.0			0.0			0.0	0.0		0.0		
Control Delay (d), s/veh	56.8			61.5			27.7	98.3		36.5		
Level of Service (LOS)												
Approach Delay, s/veh / LOS	56.8	E		61.5	E		95.4	F		36.5	D	
Intersection Delay, s/veh / LOS	73.9						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.7	A	1.9	A	1.2	A

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Bob-O-Link	Analysis Year	2016	Analysis Period	1 > 16:00
File Name	Ex_PM_Green Bay Rd & Bob-O-Link.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	10	20	105	20	2	35	645	160	2	405	15

Signal Information													
Cycle, s	106.3	Reference Phase	2										
Offset, s	0	Reference Point	Begin										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0			
				Red	0.0	0.0	0.0	0.0	0.0	0.0			

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f _w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy Vehicle Adjustment Factor (f _{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Approach Grade Adjustment Factor (f _g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Parking Activity Adjustment Factor (f _p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bus Blockage Adjustment Factor (f _{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Area Type Adjustment Factor (f _a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Utilization Adjustment Factor (f _{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f _{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f _{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f _{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f _{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f _{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0	0		0	
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)		0.00			0.00			0.00	0.00		0.00	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)		0.0		0.0	0.0	0.0		0.0
Green Ratio (g/C)		0.05		0.10	0.42	0.44		0.37
Permitted Saturation Flow Rate (s _p), veh/h/ln		0		0	0	0		0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln		0		0	0	0		0
Permitted Effective Green Time (g _p), s		0.0		0.0	0.0	0.0		0.0
Permitted Service Time (g _s), s		0.0		0.0	0.0	0.0		0.0
Permitted Queue Service Time (g _{qs}), s		0.0		0.0	0.0	0.0		0.0
Time to First Blockage (g), s		0.0		0.0	0.0	0.0		0.0
Queue Service Time Before Blockage (g _s), s		0.0		0.0	0.0	0.0		0.0
Protected Right Saturation Flow (s _R), veh/h/ln								
Protected Right Effective Green Time (g _R), s		0.0		0.0	0.0	0.0		0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F _w / F _v	1.557	0.00	1.389	0.00	1.389	0.00	1.389	0.00
Pedestrian F _s / F _{delay}	0.000	0.151	0.000	0.164	0.000	0.113	0.000	0.123
Pedestrian M _{corner} / M _{cw}		0.00		0.00		0.00		0.00
Bicycle c _b / d _b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bicycle F _w / F _v	-3.64	0.07	-3.64	0.22	-3.64	1.46	-3.64	0.73

--- Messages ---

No errors or warnings exist.

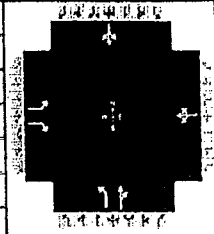
--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information				Intersection Information											
Agency	Kimley-Horn			Duration, h	0.25										
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other										
Jurisdiction	City of Highland Park		Time Period	PM Peak Hour	PHF	0.95									
Intersection	Green Bay Road / Edgewood		Analysis Year	2016	Analysis Period	1 > 16:15									
File Name	Ex_PM_Green Bay Rd & Edgewood Rd.xus														
Project Description	Green Bay Road Phase I Study														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				30		40	1	1	1	30	795	1	1	490	45
Signal Information															
Cycle, s	67.7	Reference Phase	2												
Offset, s	0	Reference Point	Begin												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Traffic Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				30		40	1	1	1	30	795	1	1	490	45
Initial Queue (Q _b), veh/h				0		0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h				1900		1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h					None			None			None			None	
Heavy Vehicles (P _{HV}), %				7		3		2		3	3			4	
Ped / Bike / RTOR, /h							1	0	0	0	0	0	1	2	0
Buses (N _b), buses/h				0		0	0	0	0	0	0	0	0	0	0
Arrival Type (AT)				3		3	3	3	3	3	3	3	3	3	3
Upstream Filtering (I)				1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (W), ft				10.0		10.0		12.0		10.0	10.0			12.0	
Turn Bay Length, ft				0		105		0		85	0			0	
Grade (P _g), %					0			0			0			0	
Speed Limit, mi/h				25		25	15	15	15	30	30	30	30	30	30
Phase Information				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Maximum Green (G _{max}) or Phase Split, s					39.0		14.0	11.0	39.0		39.0				
Yellow Change Interval (Y), s					4.5		4.5	3.0	4.5		4.5				
Red Clearance Interval (R _c), s					1.5		1.5	1.0	1.5		1.5				
Minimum Green (G _{min}), s				3		3	10	3	15	3	15				
Start-Up Lost Time (I _t), s				2.0		2.0	2.0	2.0	2.0	2.0	2.0				
Extension of Effective Green (e), s				2.0		2.0	2.0	2.0	2.0	2.0	2.0				
Passage (PT), s				3.0		3.0	5.0	3.0	7.0	3.0	7.0				
Recall Mode				Off		Off	Off	Off	Max	Off	Min				
Dual Entry				Yes		Yes	Yes	Yes	Yes	Yes	Yes				
Walk (Walk), s				0.0		0.0	7.0	0.0	0.0	0.0	7.0				
Pedestrian Clearance Time (PC), s				0.0		0.0	10.0	0.0	0.0	0.0	22.0				
Multimodal Information				EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius				0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft				9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb				0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft				12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking				No	0.50	No	0.50	No	0.50	No	0.50	No	0.50		

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Kimley-Horn			Duration, h	0.25
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95
Intersection	Green Bay Road / Edgewood	Analysis Year	2016	Analysis Period	1 > 16:15
File Name	Ex_PM_Green Bay Rd & Edgewood Rd.xus				
Project Description	Green Bay Road Phase I Study				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	30		40	1	1	1	30	795	1	1	490	45

Signal Information																
Cycle, s	67.7	Reference Phase	2													
Offset, s	0	Reference Point	Begin													
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

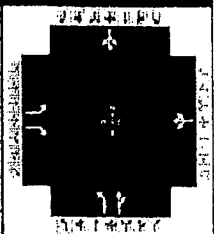
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		9.0		12.0	1.0	4.0		8.3
Phase Duration, s		13.5		6.8	7.0	47.4		40.4
Change Period, (Y+R _c), s		6.0		6.0	4.0	6.0		6.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0		0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0		0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0		0.0
Phase Call Probability		0.00		0.00	0.00	0.00		0.00
Max Out Probability		0.00		0.00	0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7		14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0		0	0	0	0	0	0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		0	0	0	0	0	0			0	
Queue Service Time (g _s), s	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Cycle Queue Clearance Time (g _c), s	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Green Ratio (g/C)	0.11		0.11	0.01	0.01	0.01	0.58	0.61			0.51	
Capacity (c), veh/h	187		173	20	20	20	420	1128			966	
Volume-to-Capacity Ratio (X)	0.168		0.243	0.159	0.159	0.159	0.075	0.743			0.584	
Available Capacity (c _a), veh/h	0		0	0	0	0	0	0			0	
Back of Queue (Q), veh/ln (95th percentile)	0.9		1.2	0.2	0.2	0.2	0.3	12.8			9.9	
Queue Storage Ratio (RQ) (95th percentile)	0.00		0.28	0.00	0.00	0.00	0.09	0.00			0.00	
Uniform Delay (d ₁), s/veh	27.3		27.5	33.1	33.1	33.1	8.3	9.3			11.9	
Incremental Delay (d ₂), s/veh	0.4		0.7	7.8	7.8	7.8	0.1	4.4			2.6	
Initial Queue Delay (d ₃), s/veh	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (d), s/veh	27.7		28.2	40.9	40.9	40.9	8.4	13.8			14.5	
Level of Service (LOS)	C		C	D	D	D	A	B			B	
Approach Delay, s/veh / LOS	28.0		C	40.9		D	13.6		B		14.5	
Intersection Delay, s/veh / LOS	14.7						B					

Multimodal Results	EB			WB			NB			SB		
	Pedestrian LOS Score / LOS	2.3		B	2.1		B	1.3		A	2.2	
Bicycle LOS Score / LOS			F	0.5		A	1.9		A	1.4		A

HCS 2010 Signalized Intersection Intermediate Values

General Information				Intersection Information			
Agency	Kimley-Horn			Duration, h	0.25		
Analyst	RKF	Analysis Date	Nov 23, 2016	Area Type	Other		
Jurisdiction	City of Highland Park	Time Period	PM Peak Hour	PHF	0.95		
Intersection	Green Bay Road / Edgewood		Analysis Year	2016	Analysis Period	1 > 16:15	
File Name	Ex_PM_Green Bay Rd & Edgewood Rd.xus						
Project Description	Green Bay Road Phase I Study						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	30		40	1	1	1	30	795	1	1	490	45

Signal Information																
Cycle, s	67.7	Reference Phase	2													
Offset, s	0	Reference Point	Begin													
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f _w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy Vehicle Adjustment Factor (f _{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Approach Grade Adjustment Factor (f _g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Parking Activity Adjustment Factor (f _p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bus Blockage Adjustment Factor (f _{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Area Type Adjustment Factor (f _a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Utilization Adjustment Factor (f _{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f _{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f _{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f _{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f _{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f _{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0			0	
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)	0.00		0.00		0.00			0.00			0.00	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)		0.0		0.0	0.0	0.0		0.0
Green Ratio (g/C)		0.11		0.01	0.58	0.61		0.51
Permitted Saturation Flow Rate (s _p), veh/h/ln		0		0	0	0		0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln		0		0	0	0		0
Permitted Effective Green Time (g _p), s		0.0		0.0	0.0	0.0		0.0
Permitted Service Time (g _u), s		0.0		0.0	0.0	0.0		0.0
Permitted Queue Service Time (g _{ps}), s		0.0		0.0	0.0	0.0		0.0
Time to First Blockage (g _f), s		0.0		0.0	0.0	0.0		0.0
Queue Service Time Before Blockage (g _{fs}), s		0.0		0.0	0.0	0.0		0.0
Protected Right Saturation Flow (s _r), veh/h/ln		0						
Protected Right Effective Green Time (g _r), s		0.0		0.0	0.0	0.0		0.0

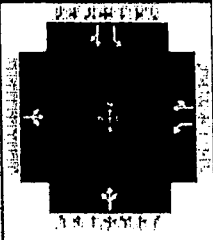
Multimodal	EB		WB		NB		SB	
Pedestrian F _w / F _v	1.557	0.00	1.389	0.00	0.681	0.00	1.557	0.00
Pedestrian F _s / F _{delay}	0.000	0.140	0.000	0.149	0.000	0.065	0.000	0.084
Pedestrian M _{corner} / M _{ov}		0.00		0.00		0.00		0.00
Bicycle c _b / d _b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bicycle F _w / F _v	-3.64		-3.64	0.01	-3.64	1.43	-3.64	0.93

--- Messages ---

No errors or warnings exist.

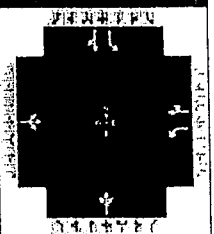
--- Comments ---

HCS 2010 Signalized Intersection Input Data

General Information				Intersection Information											
Agency	Kimley-Horn			Duration, h	0.25										
Analyst	RKF	Analysis Date	Nov 23, 2016			Area Type	Other								
Jurisdiction	City of Highland Park		Time Period	PM Peak Hour			PHF						0.95		
Intersection	Green Bay Road / Roger Williams Ave		Analysis Year	2016			Analysis Period						1 > 16:15		
File Name	Ex_PM_Green Bay Rd & Roger Williams Ave.xus														
Project Description	Green Bay Road Phase I Study														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				1	1	1	160	1	55	1	770	105	65	455	1
Signal Information															
Cycle, s	72.2	Reference Phase	2												
Offset, s	0	Reference Point	Begin												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Traffic Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				1	1	1	160	1	55	1	770	105	65	455	1
Initial Queue (Q _b), veh/h				0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s ₀), veh/h				1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N _m), man/h				None			None			None			None		
Heavy Vehicles (P _{HV}), %				2			4			3			5		
Ped / Bike / RTOR, /h				0			1			0			2		
Buses (N _b), buses/h				0			0			0			0		
Arrival Type (AT)				3			3			3			3		
Upstream Filtering (f)				1.00			1.00			1.00			1.00		
Lane Width (W), ft				10.0			12.0			16.0			9.0		
Turn Bay Length, ft				0			60			0			95		
Grade (P _g), %				0			0			0			0		
Speed Limit, mi/h				25			25			30			30		
Phase Information				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Maximum Green (G _{max}) or Phase Split, s					19.0		19.0		44.0		11.0	44.0			
Yellow Change Interval (Y), s					4.5		4.5		4.5		3.0	4.5			
Red Clearance Interval (R _c), s					1.5		1.5		1.5		1.0	1.5			
Minimum Green (G _{min}), s				3	8	3	8	3	15	3	15				
Start-Up Lost Time (l), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
Extension of Effective Green (e), s				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
Passage (PT), s				3.0	5.0	3.0	5.0	3.0	7.0	3.0	7.0				
Recall Mode				Off	Off	Off	Off	Off	Min	Off	Min				
Dual Entry				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Walk (Walk), s				0.0	0.0	0.0	7.0	0.0	7.0	0.0	7.0				
Pedestrian Clearance Time (PC), s				0.0	0.0	0.0	15.0	0.0	17.0	0.0	12.0				
Multimodal Information				EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius				0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft				9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb				0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft				12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking				No	0.50	No	0.50	No	0.50	No	0.50	No	0.50		

HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information					
Agency	Kimley-Horn			Duration, h	0.25						
Analyst	RKF	Analysis Date	Nov 23, 2016		Area Type	Other					
Jurisdiction	City of Highland Park		Time Period	PM Peak Hour		PHF	0.95				
Intersection	Green Bay Road / Roger W		Analysis Year	2016		Analysis Period	1> 16:15				
File Name	Ex_PM_Green Bay Rd & Roger Williams Ave.xus										
Project Description	Green Bay Road Phase I Study										



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	1	1	1	160	1	55	1	770	105	65	455	1

Signal Information				Signal Timing						Signal Phases					
Cycle, s	72.2	Reference Phase	2	Green	0.0	0.0	0.0	0.0	0.0	0.0	Phase 1	Phase 2	Phase 3	Phase 4	
Offset, s	0	Reference Point	Begin	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	Phase 5	Phase 6	Phase 7	Phase 8	
Uncoordinated	Yes	Simult. Gap E/W	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	Phase 9	Phase 10	Phase 11	Phase 12	
Force Mode	Fixed	Simult. Gap N/S	On												

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2	1	6
Case Number		8.0		6.0		8.3	1.0	4.0
Phase Duration, s		17.4		17.4		47.6	7.2	54.8
Change Period, (Y+R _c), s		6.0		6.0		6.0	4.0	6.0
Max Allow Headway (MAH), s		0.0		0.0		0.0	0.0	0.0
Queue Clearance Time (q _s), s		0.0		0.0		0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0		0.0	0.0	0.0
Phase Call Probability		0.00		0.00		0.00	0.00	0.00
Max Out Probability		0.00		0.00		0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB			
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16	
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0	0	0	0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0	
Queue Service Time (g _s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cycle Queue Clearance Time (g _c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Green Ratio (g/C)	0.16	0.16	0.16	0.16	0.16	0.16	0.58	0.65	0.68	0.65	0.68	0.68	
Capacity (c), veh/h	323	323	323	320	245	245	1132	267	1196	267	1196	1196	
Volume-to-Capacity Ratio (X)	0.010	0.010	0.010	0.526	0.241	0.241	0.815	0.256	0.401	0.256	0.401	0.401	
Available Capacity (c _a), veh/h	0	0	0	0	0	0	0	0	0	0	0	0	
Back of Queue (Q), veh/ln (95th percentile)	0.1	0.1	0.1	5.4	1.7	1.7	17.9	0.9	4.9	0.9	4.9	4.9	
Queue Storage Ratio (RQ) (95th percentile)	0.00	0.00	0.00	2.27	0.00	0.00	0.00	0.24	0.00	0.24	0.00	0.00	
Uniform Delay (d ₁), s/veh	25.6	25.6	25.6	29.2	26.6	26.6	12.7	12.5	5.2	12.5	5.2	5.2	
Incremental Delay (d ₂), s/veh	0.0	0.0	0.0	2.9	1.1	1.1	6.5	0.5	1.0	0.5	1.0	1.0	
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	25.7	25.7	25.7	32.0	27.7	27.7	19.2	13.0	6.2	13.0	6.2	6.2	
Level of Service (LOS)	C			C			B			B			
Approach Delay, s/veh / LOS	25.7	C		30.9	C		19.2	B			7.1	A	
Intersection Delay, s/veh / LOS	16.9						B						

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.3	B	2.2	B	2.0	B
Bicycle LOS Score / LOS	0.5	A	0.9	A	2.0	B	1.4	A

HCS 2010 Signalized Intersection Intermediate Values

General Information						Intersection Information					
Agency	Kimley-Horn			Duration, h	0.25						
Analyst	RKF	Analysis Date	Nov 23, 2016			Area Type	Other				
Jurisdiction	City of Highland Park			Time Period	PM Peak Hour			PHF	0.95		
Intersection	Green Bay Road / Roger Williams Ave			Analysis Year	2016			Analysis Period	1> 16:15		
File Name	Ex_PM_Green Bay Rd & Roger Williams Ave.xus										
Project Description	Green Bay Road Phase I Study										

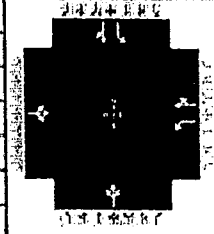
Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	1	1	1	160	1	55	1	770	105	65	455	1

Signal Information				Signal Phases										
Cycle, s	72.2	Reference Phase	2											
Offset, s	0	Reference Point	Begin	Green	0.0	0.0	0.0	0.0	0.0	0.0				
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0				

Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f _w)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Heavy Vehicle Adjustment Factor (f _{HV})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Approach Grade Adjustment Factor (f _g)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Parking Activity Adjustment Factor (f _p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bus Blockage Adjustment Factor (f _{bb})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Area Type Adjustment Factor (f _a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Utilization Adjustment Factor (f _{LU})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Work Zone Adjustment Factor (f _{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f _{LT})		0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f _{RT})		0.000			0.000			0.000			0.000	
Left-Turn Pedestrian Adjustment Factor (f _{LPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Right-Turn Ped-Bike Adjustment Factor (f _{RPB})	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Movement Saturation Flow Rate (s), veh/h		0			0			0			0	
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incremental Delay Factor (k)		0.00			0.00			0.00			0.00	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t _L)		0.0		0.0		0.0	0.0	0.0
Green Ratio (g/C)		0.16		0.16		0.58	0.65	0.68
Permitted Saturation Flow Rate (s _p), veh/h/ln		0		0		0	0	0
Shared Saturation Flow Rate (s _{sh}), veh/h/ln		0		0		0	0	0
Permitted Effective Green Time (g _p), s		0.0		0.0		0.0	0.0	0.0
Permitted Service Time (g _v), s		0.0		0.0		0.0	0.0	0.0
Permitted Queue Service Time (g _{ps}), s		0.0		0.0		0.0	0.0	0.0
Time to First Blockage (g _t), s		0.0		0.0		0.0	0.0	0.0
Queue Service Time Before Blockage (g _{ts}), s		0.0		0.0		0.0	0.0	0.0
Protected Right Saturation Flow (s _R), veh/h/ln								
Protected Right Effective Green Time (g _R), s		0.0		0.0		0.0	0.0	0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F _w / F _v	1.389	0.00	1.557	0.00	1.557	0.00	1.389	0.00
Pedestrian F _s / F _{delay}	0.000	0.130	0.000	0.130	0.000	0.075	0.000	0.054
Pedestrian M _{corner} / M _{cw}		0.00		0.00		0.00		0.00
Bicycle c _b / d _b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bicycle F _w / F _v	-3.64	0.01	-3.64	0.38	-3.64	1.52	-3.64	0.90



--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

Study Name Green Bay & Deerfield
 Start Date Tuesday, November 15, 2016 4:00 PM

		Eastbound				Westbound				Northbound				Southbound				Crosswalk													
Time Period	Mode	L	R	T	U	L	R	T	U	L	R	T	U	L	R	T	U	W	E												
AM Peak Period	Lights	0	5	114	45	164	112	0	13	57	25	95	153	0	49	250	22	361	285	0	17	227	6	250	320	870	W	0	3	3	
Specified Period	Mediums	0	1	5	7	13	6	0	1	3	2	6	9	0	3	9	1	13	23	0	3	15	0	18	12	50	E	0	2	2	
7:00 AM - 9:00 AM	Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	2	S	0	1	1	
One Hour Peak	Total	0	6	119	52	177	118	0	14	60	27	101	162	0	52	301	23	376	308	0	20	242	6	268	334	922	N	0	6	6	
8:00 AM - 9:00 AM	PHF																									0.88					
	Bicycles on/road	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
PM Peak Period	Lights	0	5	86	75	166	148	0	20	62	31	113	122	0	79	561	18	658	426	0	18	331	7	356	597	1293	W	0	0	0	
Specified Period	Mediums	0	0	1	1	2	10	0	0	7	0	7	5	0	3	25	2	30	11	0	2	10	0	12	25	51	E	0	2	2	
1:00 PM - 3:00 PM	Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	5	5	
One Hour Peak	Total	0	5	87	76	168	158	0	20	69	31	120	127	0	82	586	20	668	437	0	20	341	7	368	622	1344	N	0	1	1	
4:15 PM - 5:15 PM	PHF																									0.97					
	Bicycles on/road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8			

Study Name Green Bay & Bob-O-Link
 Start Date Tuesday, November 15, 2016 4:00 PM
 End Date Wednesday, November 16, 2016 9:00 AM
 Site Code

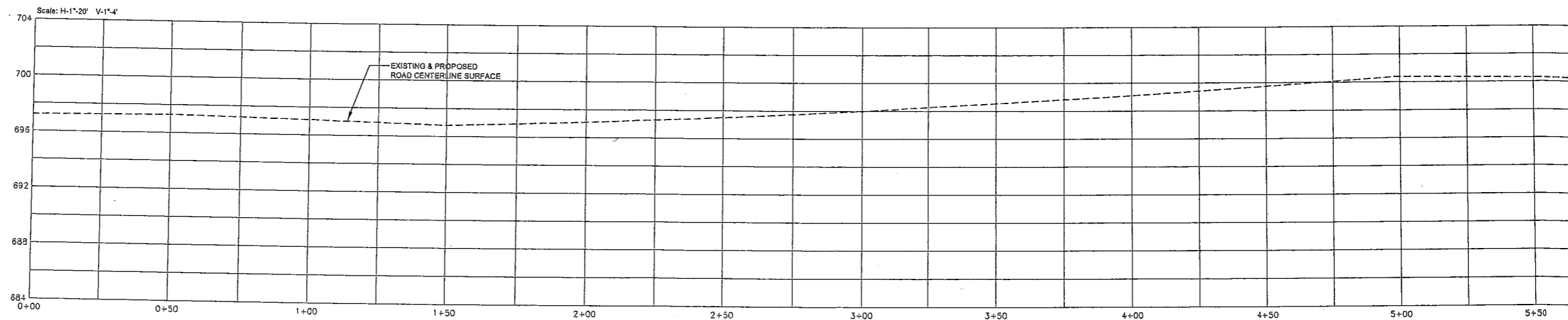
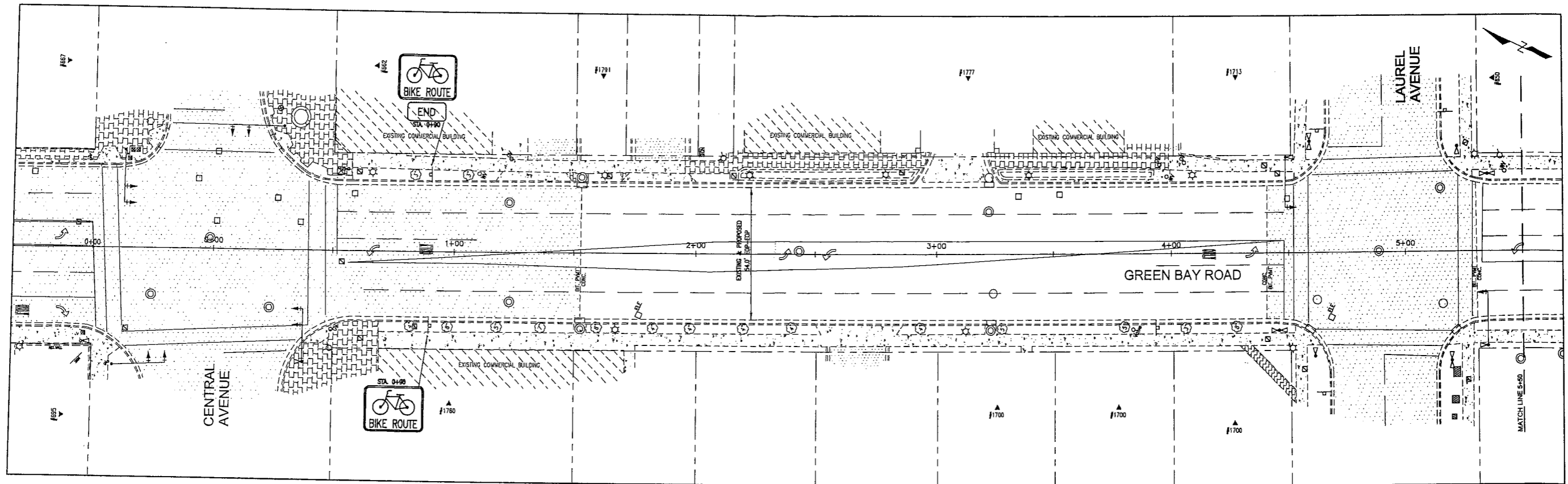
Report Summary

Time Period	Class	Eastbound				Westbound				Northbound				Southbound				Crosswalk													
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	W	E												
AM Peak Period	Lights	0	14	30	23	67	31	0	75	4	1	80	156	0	11	329	120	460	363	0	6	265	16	287	344	334	W	1	9	10	
Specified Period	%	0%	24%	50%	39%	94%	49%	0%	12%	1%	10%	26%	39%	0%	18%	55%	19%	63%	51%	0%	1%	41%	1%	70%	58%	81%	10%	10%	10%	10%	
7:00 AM - 9:00 AM	Mediums	0	1	1	2	4	4	0	2	0	0	2	6	0	4	10	4	18	23	0	1	19	0	20	11	44	E	0	10	10	
One Hour Peak	%	0%	2%	2%	3%	6%	6%	0%	3%	0%	0%	3%	9%	0%	4%	10%	3%	14%	18%	0%	2%	6%	0%	7%	4%	15%	2%	10%	10%	10%	
8:00 AM - 9:00 AM	Articulated Trucks	0	0	0	0	0	0	0	5	0	0	5	2	0	0	2	2	4	5	0	0	0	0	0	2	9	S	1	33	34	
	%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	1%	3%	1%	3%	3%	3%	
	Total	0	15	31	25	71	35	0	82	4	1	87	164	0	15	341	126	482	391	0	7	284	16	307	357	347	H	0	0	0	
	PHF																									0.84					
	%																										2	52	54	54	
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM Peak Period	Lights	0	11	9	19	39	67	0	104	19	1	124	165	0	34	609	154	797	514	0	2	391	14	407	621	1367	W	2	0	2	
Specified Period	%	0%	20%	17%	35%	77%	124%	0%	24%	4%	1%	31%	42%	0%	6%	14%	3%	16%	12%	0%	0%	3%	1%	4%	6%	16%	16%	0%	0%	0%	0%
4:00 PM - 6:00 PM	Mediums	0	0	0	1	1	0	0	1	0	1	2	5	0	0	38	5	43	17	0	0	15	0	15	38	61	E	0	2	2	2
One Hour Peak	%	0%	0%	0%	1%	1%	0%	0%	1%	0%	1%	2%	5%	0%	0%	38%	5%	43%	17%	0%	0%	15%	0%	15%	38%	61%	0%	2%	2%	2%	2%
1:00 PM - 5:00 PM	Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	0	11	9	20	40	64	0	105	20	2	127	170	0	34	647	159	840	531	0	2	406	14	422	660	1429	N	1	1	2	2
	PHF																									0.97					
	%																										3	3	6	6	
	Bicycles on Road	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	

Study Name Green Bay & Edgewood
Start Date Tuesday, November 15, 2016 4:00 PM
End Date Wednesday, November 16, 2016 9:00 AM
Site Code

Report Summary

Time Period	Class	Eastbound					Northbound					Southbound					Crosswalk				
		U	L	R	O	T	U	L	R	O	T	U	L	R	O	T	Total	W	S	N	
AM Peak Period	Lights	0	92	156	248	280	0	177	253	430	478	0	322	103	425	345	1103	W	0	5	5
Specified Period	%	0%	89%	97%	94%	96%	0%	99%	95%	95%	87%	0%	96%	96%	96%	93%	98%	0%	100%		
7:00 AM - 9:00 AM	Mediums	0	11	4	15	13	0	9	9	18	15	0	11	4	15	20	48	S	0	0	0
One Hour Peak	%	0%	11%	3%	6%	1%	0%	5%	3%	4%	3%	0%	3%	1%	3%	5%	4%	0%	0%		
7:15 AM - 8:15 AM	Articulated Trucks	0	0	1	1	0	0	0	5	5	2	0	1	0	1	5	7	N	2	13	15
	%	0%	0%	1%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%	0%	1%	1%	13%	87%		
	Total	0	103	161	264	293	0	186	267	453	495	0	334	107	441	370	1158	2	18	20	
	PHF	0	0.57	0.67	0.7	0.63	0	0.62	0.78	0.92	0.87	0	0.89	0.55	0.91	0.71	0.86				
	PHF%	0%	21%	5%	0%	1%	0%	5%	5%	5%	3%	0%	1%		1%	7%	5%				
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
PM Peak Period	Lights	0	27	39	66	70	0	30	773	803	511	0	472	40	512	800	1381	W	2	1	3
Specified Period	%	0%	93%	94%	94%	91%	0%	97%	97%	97%	97%	0%	97%	37%	96%	97%	97%	87%	93%		
4:00 PM - 6:00 PM	Mediums	0	2	1	3	6	0	1	22	23	18	0	17	5	22	24	48	S	0	0	0
One Hour Peak	%	0%	7%	3%	4%	3%	0%	3%	3%	3%	3%	0%	3%	11%	4%	3%	3%	0%	0%		
4:00 PM - 5:00 PM	Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	0	1	1
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%		
	Total	0	29	40	69	77	0	31	795	826	529	0	489	46	535	824	1430	2	2	4	
	PHF																0.94				
	PHF%	0%	7%	3%	4%	3%	0%	3%	3%	2%	3%	0%	4%		4%	3%	3%				
	Bicycles on Road	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1				



DOLAND
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1010 W. MONROE - 2ND FLOOR - LAKE FOREST, IL 60048
311 EAST COLLEGE STREET, SUITE 2
PALATKA, ILLINOIS 60130
(815) 399-3013 (815) 354-3127 FAX
www.dolandengineering.com

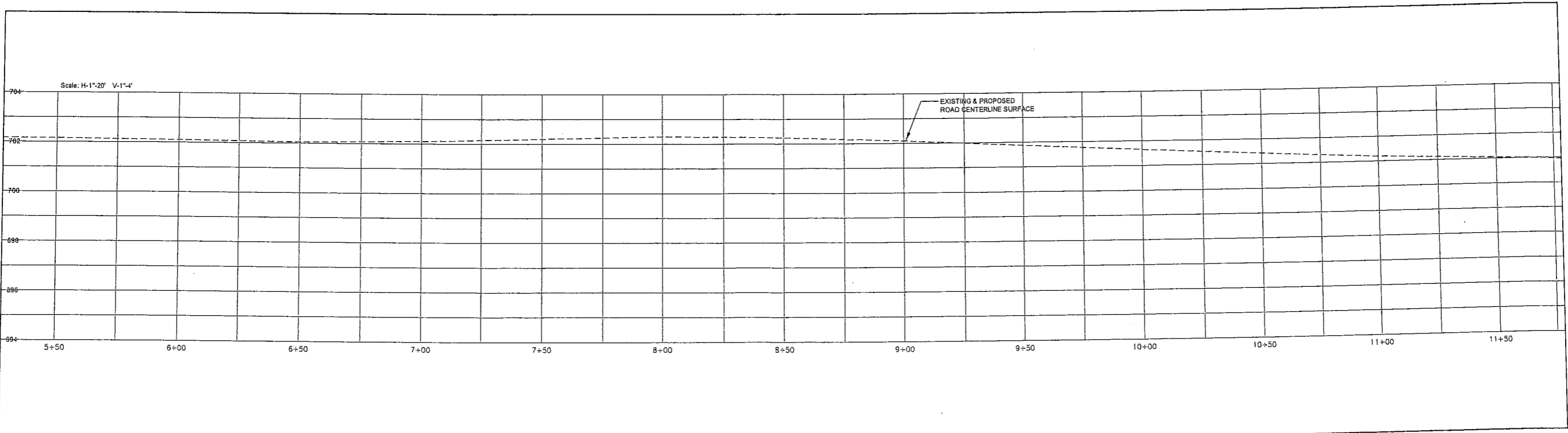
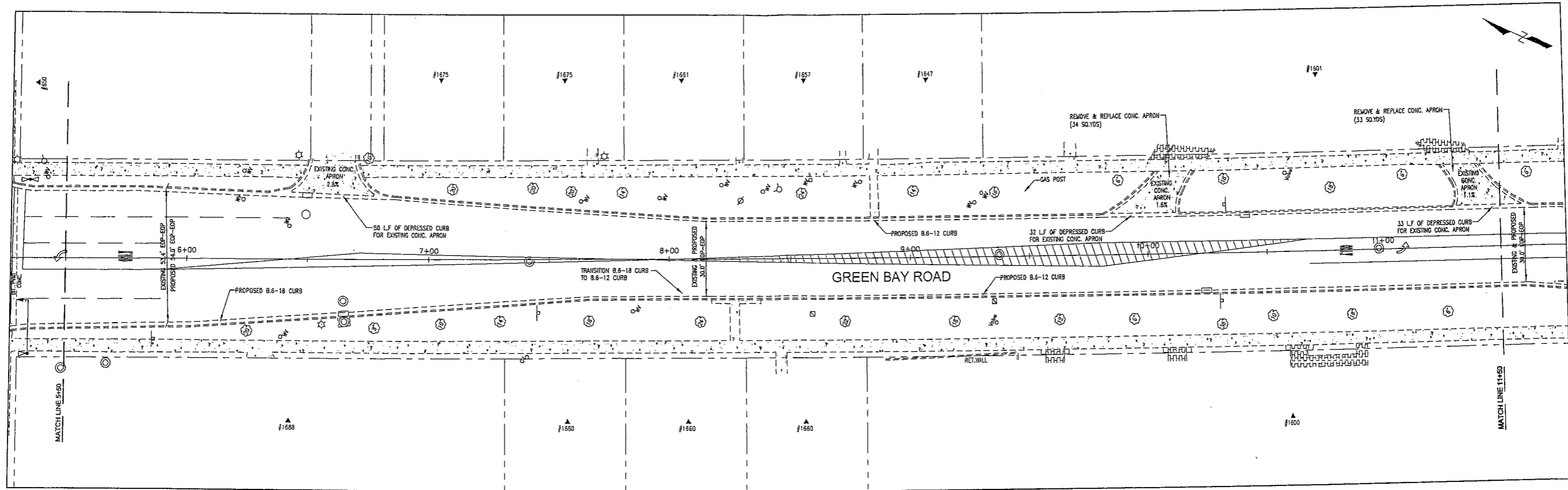
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PLOT DATE:	CHECKED:	REVISED:
	DATE:	REVISED:

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20' SHEET NO. 00 OF 00 SHEETS STA. 0+00 STA. 5+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
--		LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



DOLAND
ENGINEERING, LLC
4001 N. WISCONSIN ST. - 2ND FLOOR - LAKE BLUFF, IL 60064
331 EAST COLLEGE STREET, SUITE 2
EAST AURORA, ILLINOIS 60127
(815) 591-3333 (FAX) 815-512-7322
www.dolandengineering.com

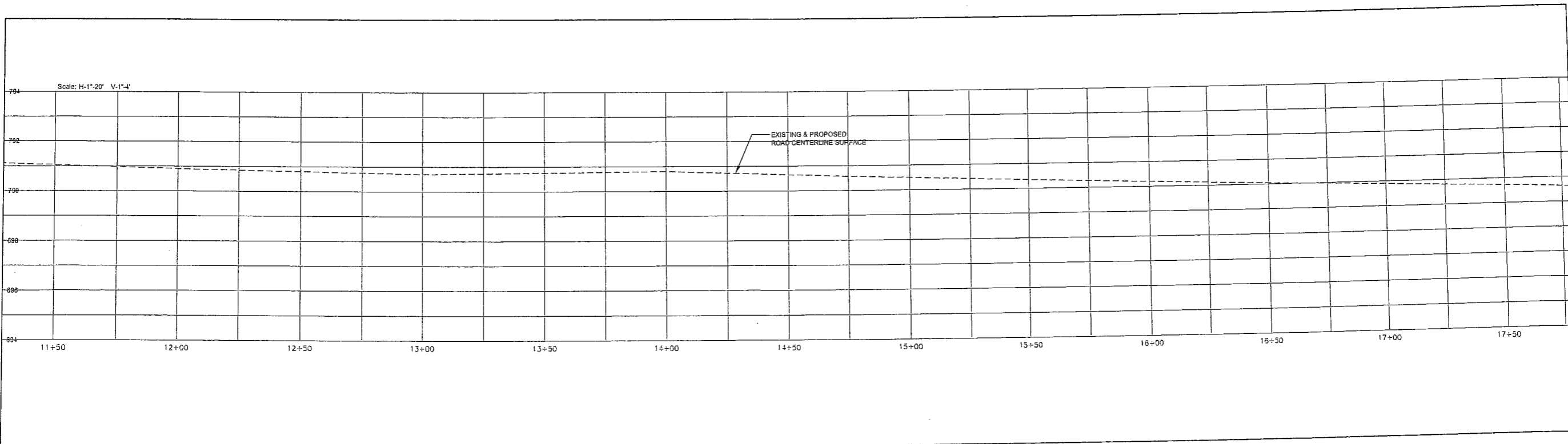
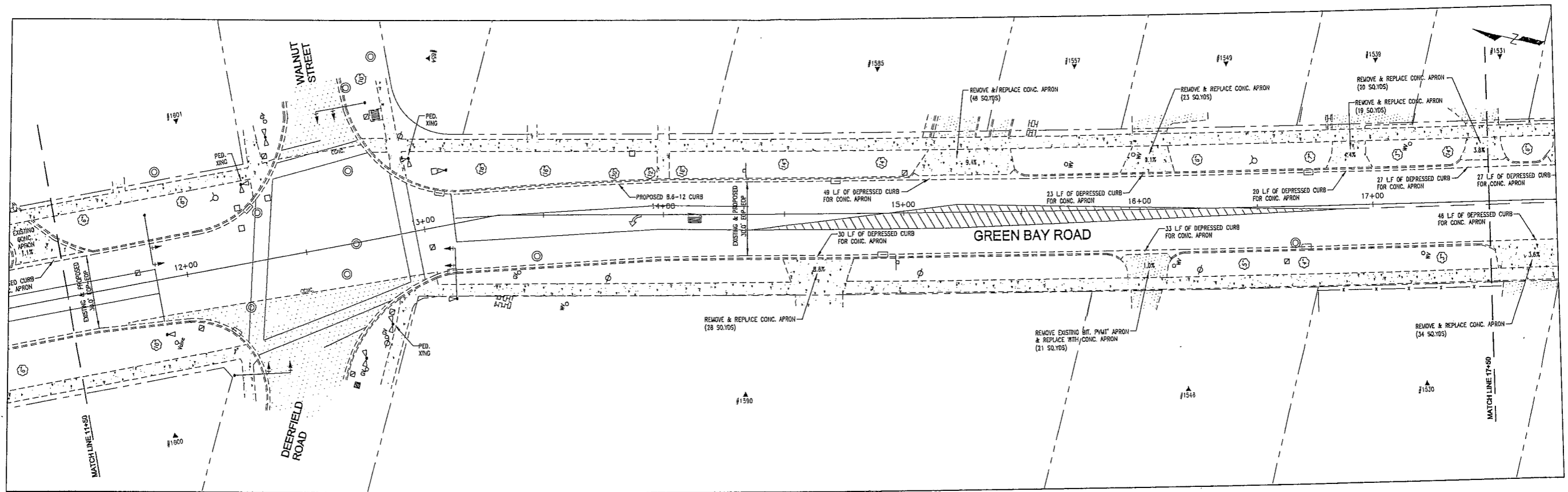
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PLOT SCALE:	DRAWN:	REVISED:
PLOT DATE:	CHECKED:	REVISED:
	DATE:	REVISED:

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'
SHEET NO. 00 OF 00 SHEETS
STA. 5+50 STA. 11+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
---		LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



DOLAND
ENGINEERING, LLC
1000 W. MONROE STREET, SUITE 200
PALM BEACH, FLORIDA 33411
TEL: 561-833-1111 FAX: 561-833-1112
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USER NAME:	DESIGNED:	REVISED:
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PLOT DATE:	CHECKED:	REVISED:
	DATE:	REVISED:

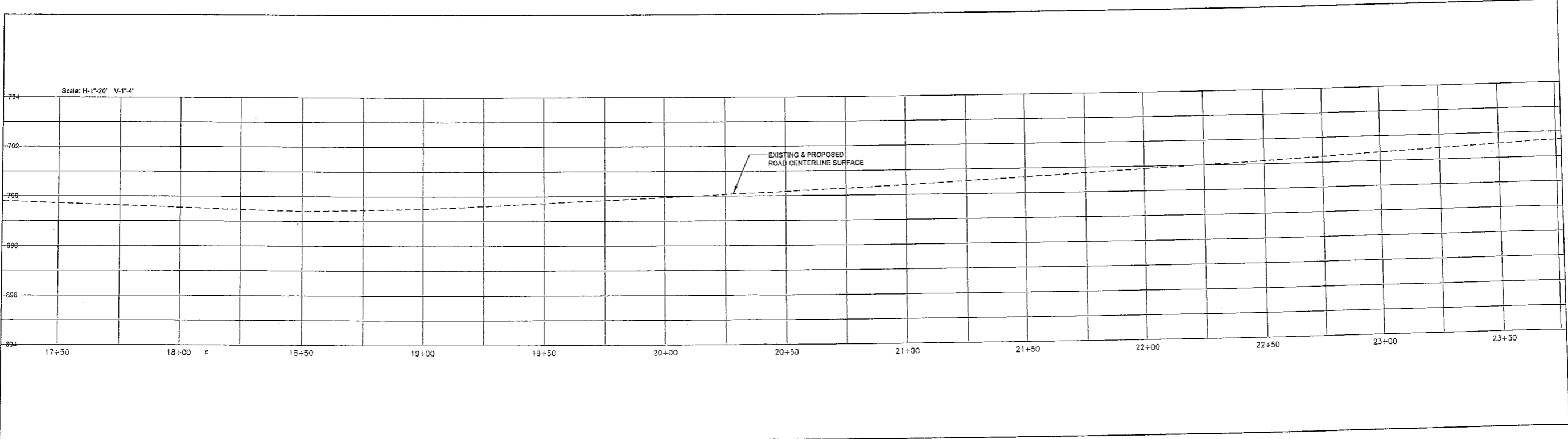
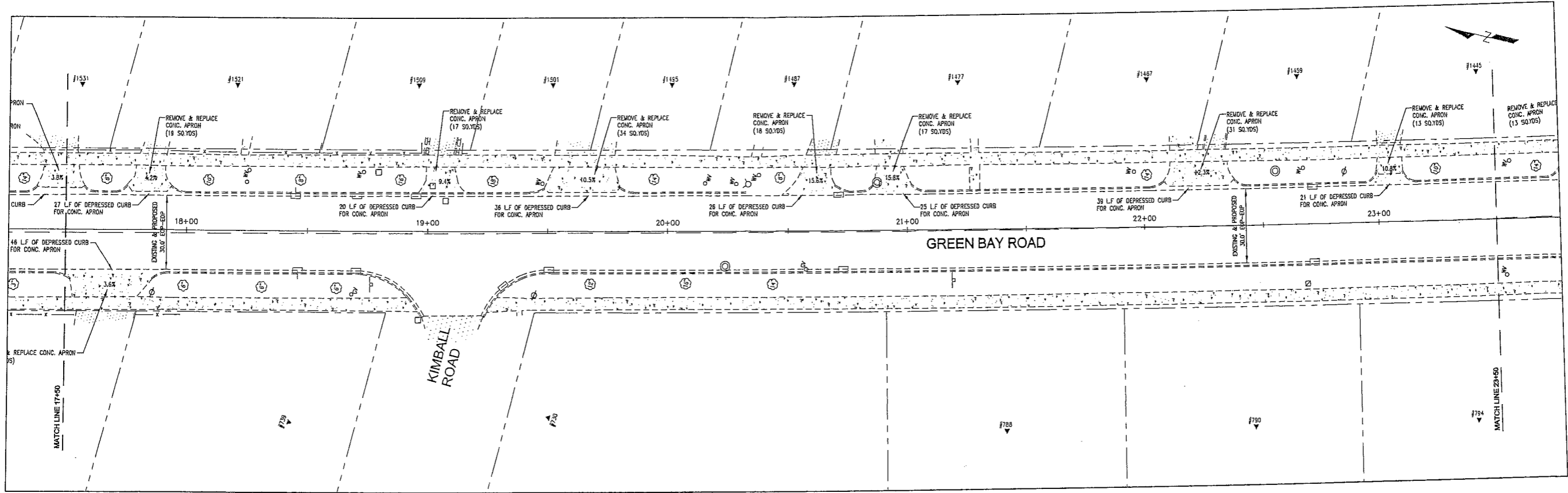
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

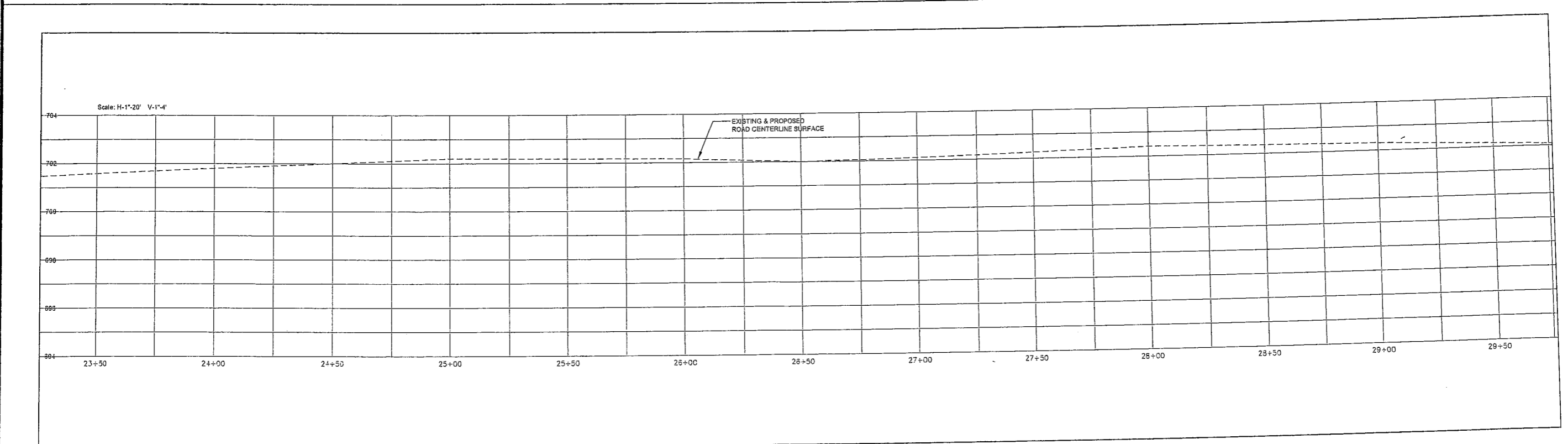
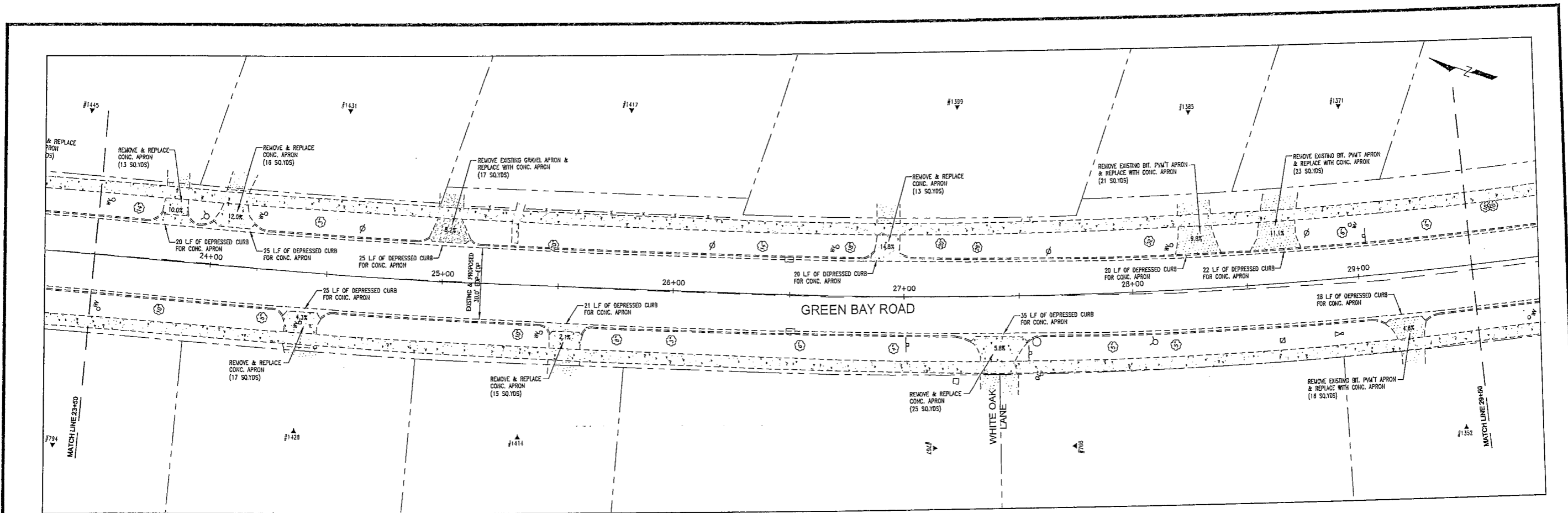
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SHEET NO. 00 OF 00 SHEETS STA. 11+50 STA. 17+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
--		LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



 DOLAND ENGINEERING, LLC 1001 N. DEARBORN - 4TH FLOOR - CHICAGO, IL 60610 312.321.1111 (TOLL FREE) 312.321.1111 FAX www.dolandengineering.com	USER NAME:	DESIGNED:	REVISED:	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	ROADWAY PLAN & PROFILE			F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
	PLOT SCALE:	DRAWN:	REVISED:					--	--	LAKE	00	00	
	PLOT DATE:	CHECKED:	REVISED:		SCALE: 1"=20' SHEET NO. 00 OF 00 SHEETS STA. 17+50 STA. 23+50			FED. ROAD DIST. NO.	CONTRACT NO.		ILLINOIS	FEDERAL AID PROJECT	
		DATE:	REVISED:										



DOLAND
 ENGINEERING, LLC
 1111 EAST OAK STREET, SUITE 2
 FALLS CHURCH, VIRGINIA 22044
 (703) 241-3333 (703) 241-3471 FAX
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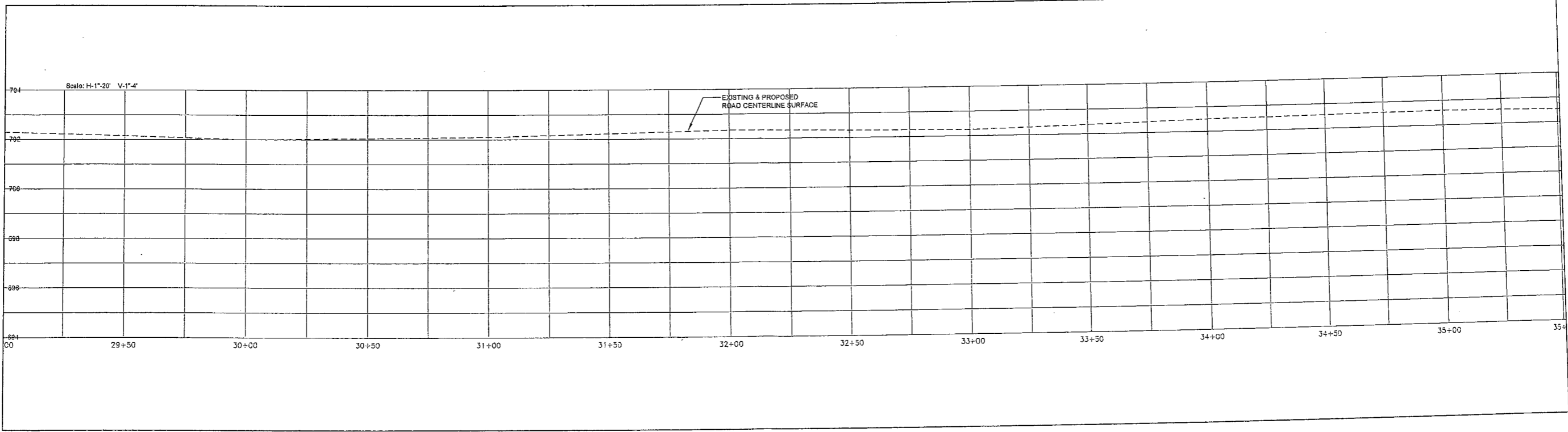
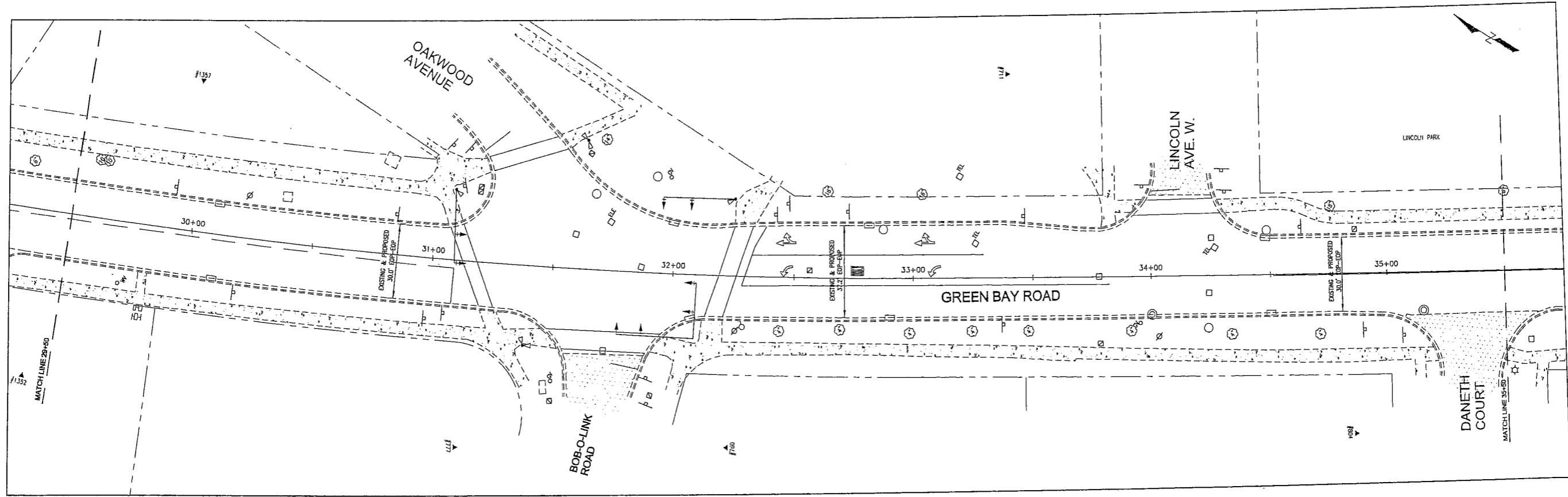
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PLOT DATE:	CHECKED:	REVISED:
	DATE:	REVISED:

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'
 SHEET NO. 00 OF 00 SHEETS
 STA. 23+50 STA. 29+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
---	---	LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



DOLAND
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MILWAUKEE, ILLINOIS 53212
(414) 331-8331 (414) 331-1427 FAX
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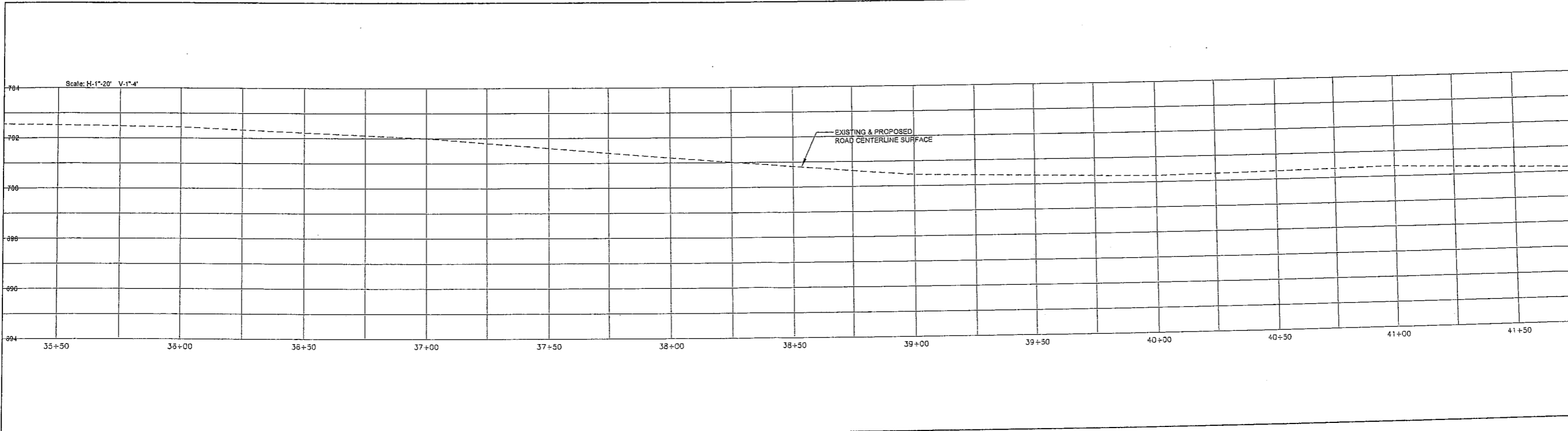
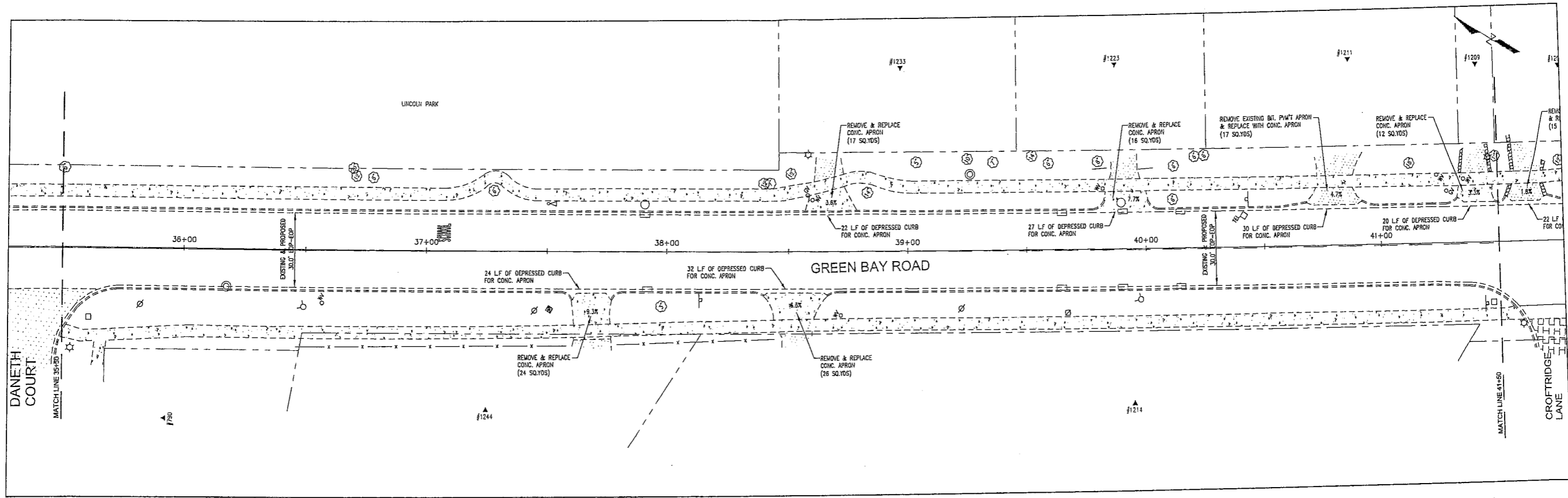
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PLOT SCALE:	CHECKED:	REVISED:
PLOT DATE:	DATE:	REVISED:

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'
SHEET NO. 00 OF 00 SHEETS
STA. 29+50 STA. 35+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
--	--	LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



DOLAND
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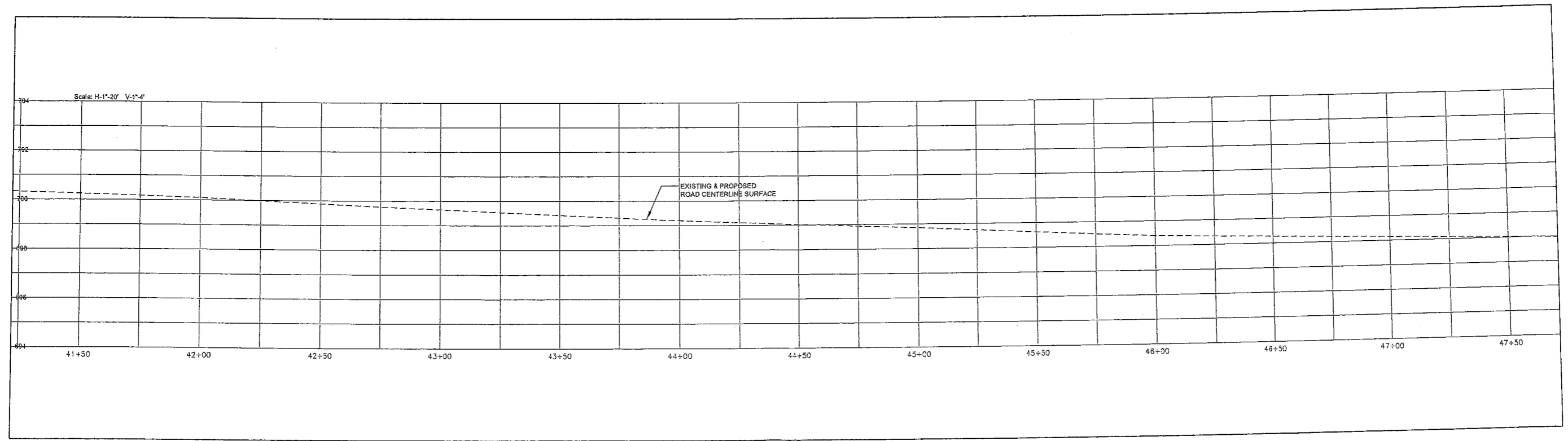
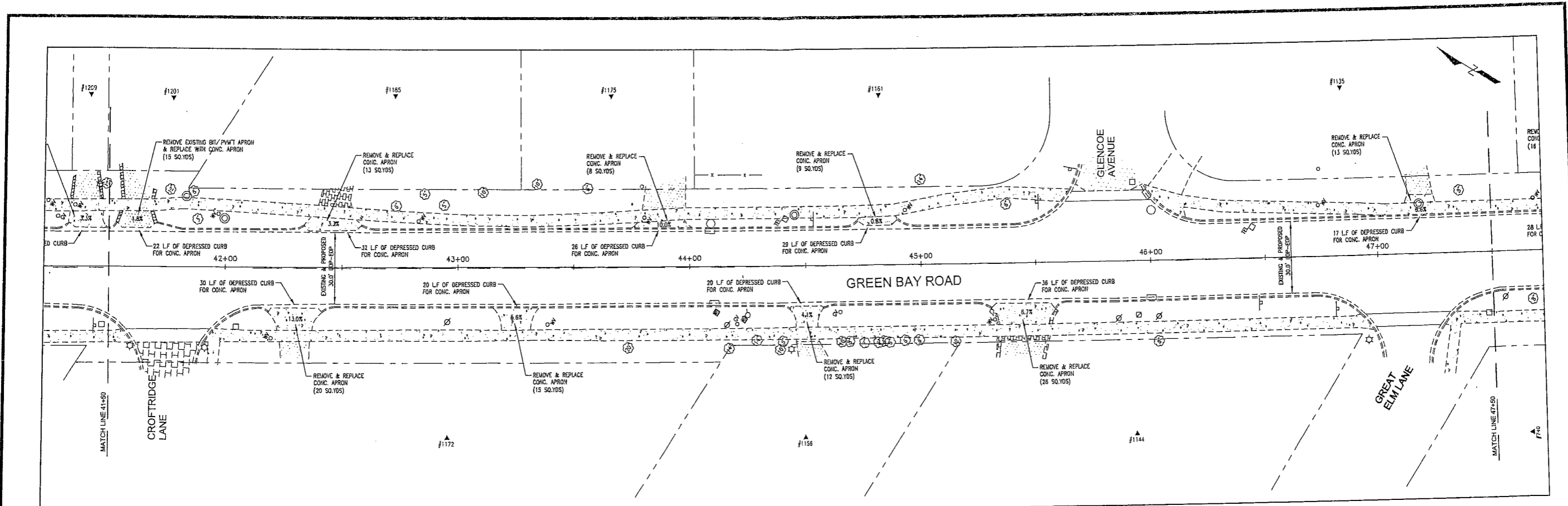
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DRAWN:	REVISED:	
PLOT SCALE:	CHECKED:	REVISED:
PLOT DATE:	DATE:	REVISED:

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'
SHEET NO. 00 OF 00 SHEETS
STA. 35+50 STA. 41+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
--	--	LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



DOLAND
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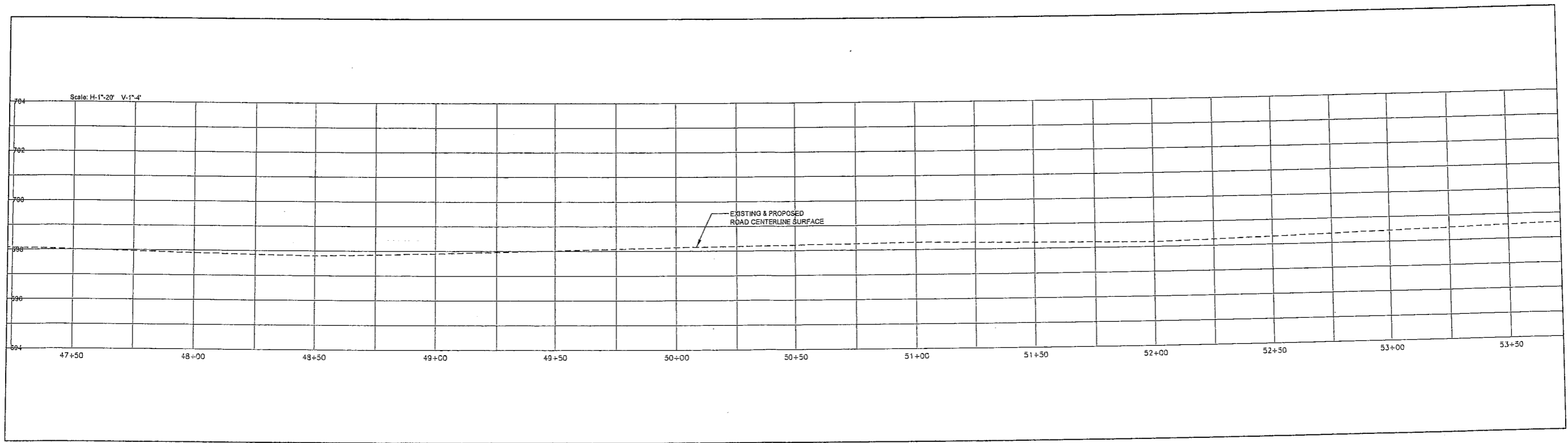
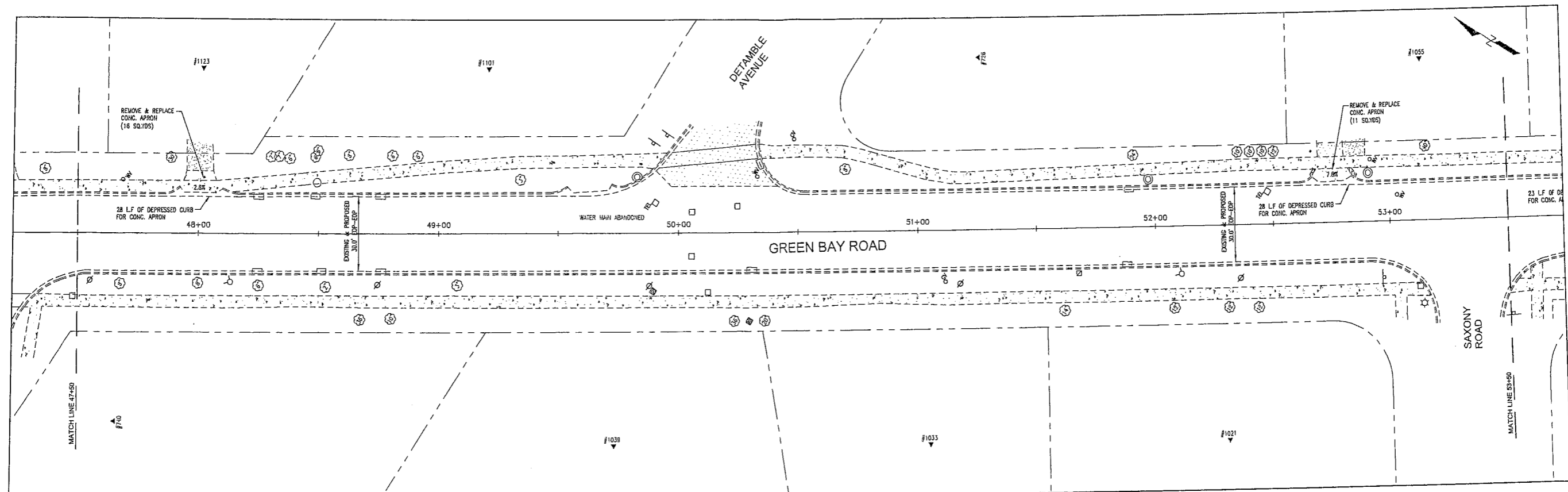
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DRAWN:	CHECKED:	REVISED:
PLOT SCALE:	DATE:	REVISED:
PLOT DATE:		

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=30'
 SHEET NO. 00 OF 00 SHEETS
 STA. 41+50 STA. 47+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		LAKE	00	00
FED. ROAD DIST. NO.	CONTRACT NO.			
ILLINOIS	FEDERAL AID PROJECT			



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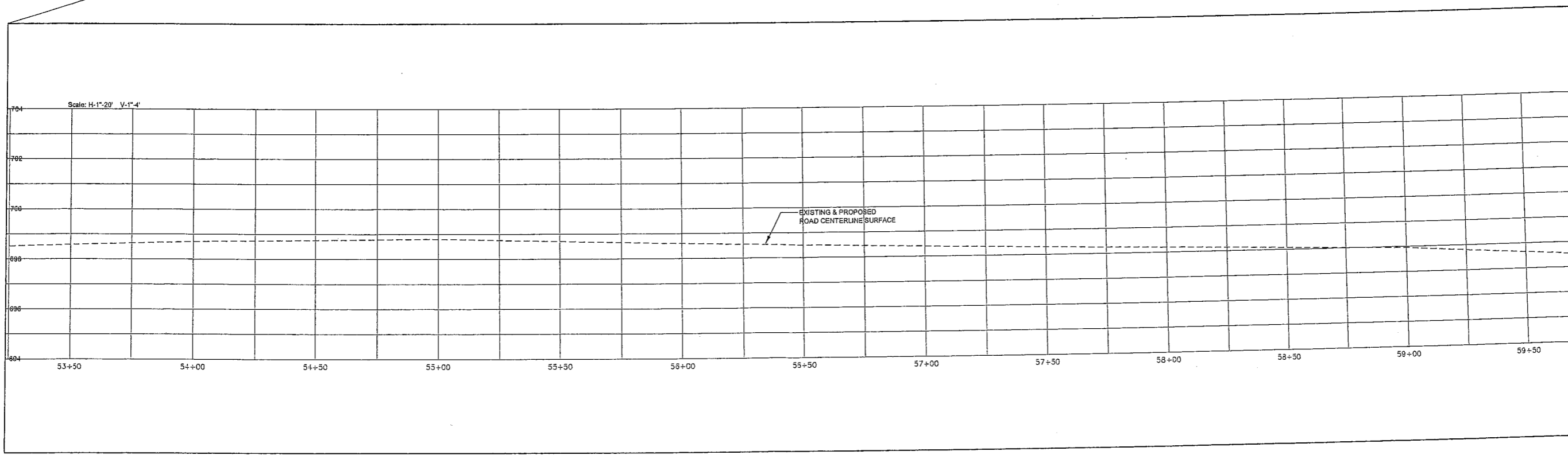
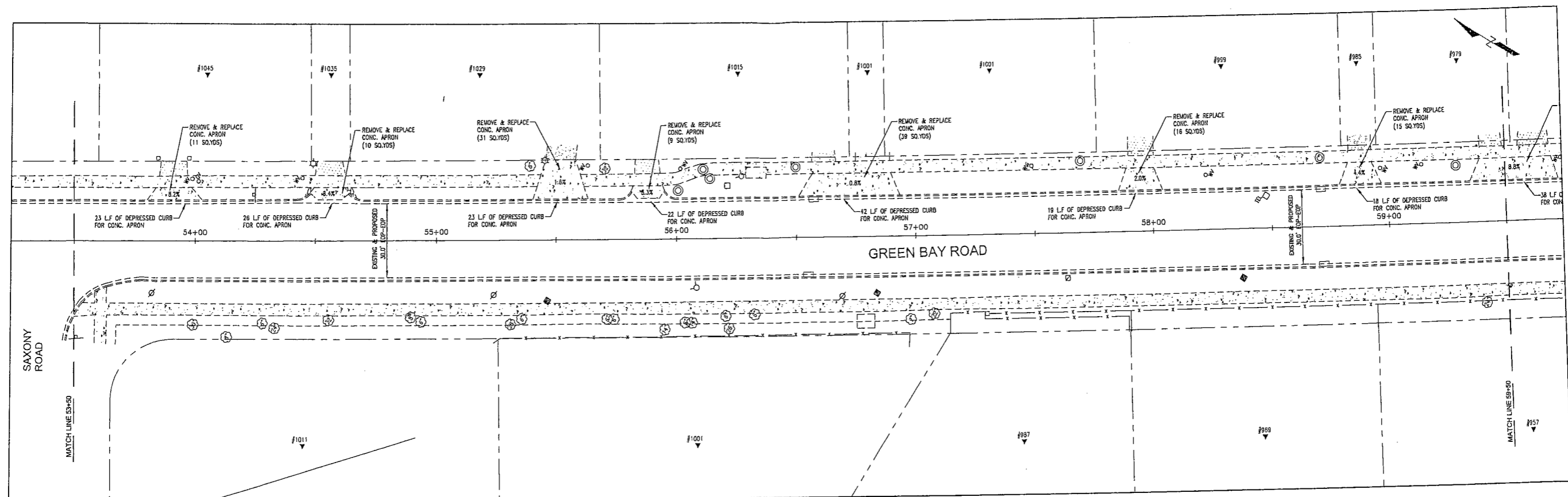
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	DRAWN:	REVISED:
PLOT SCALE:	CHECKED:	REVISED:
PLOT DATE:	DATE:	REVISED:

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20' SHEET NO. 00 OF 00 SHEETS STA. 47+50 STA. 53+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
--		LAKE	00	00
FED. ROAD DIST. NO.	CONTRACT NO.			
ILLINOIS	FEDERAL AID PROJECT			



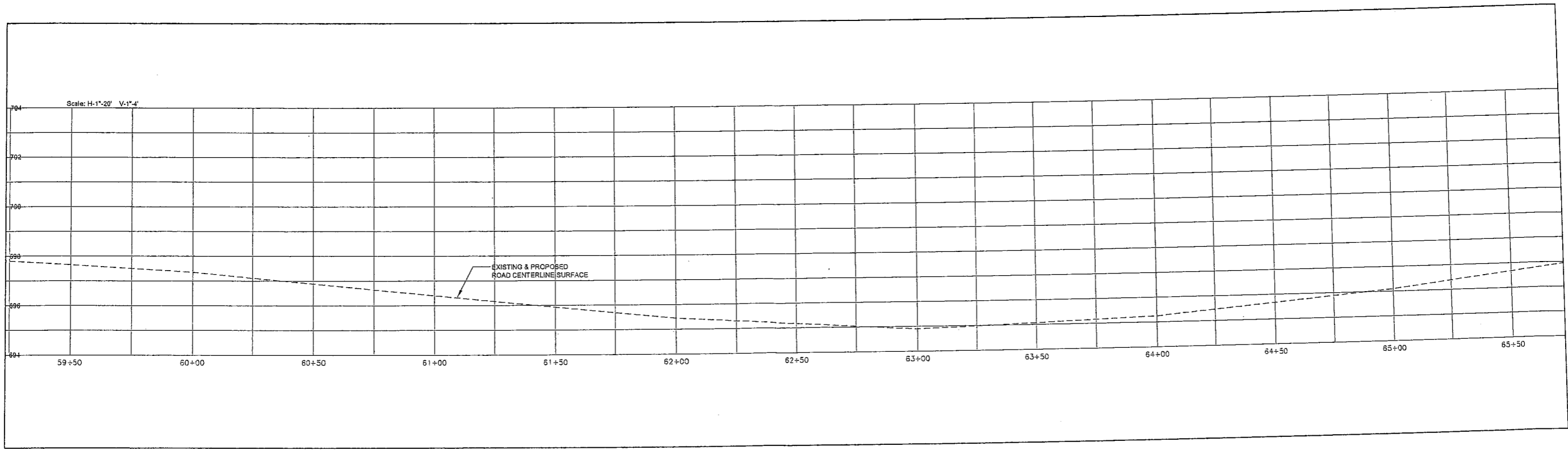
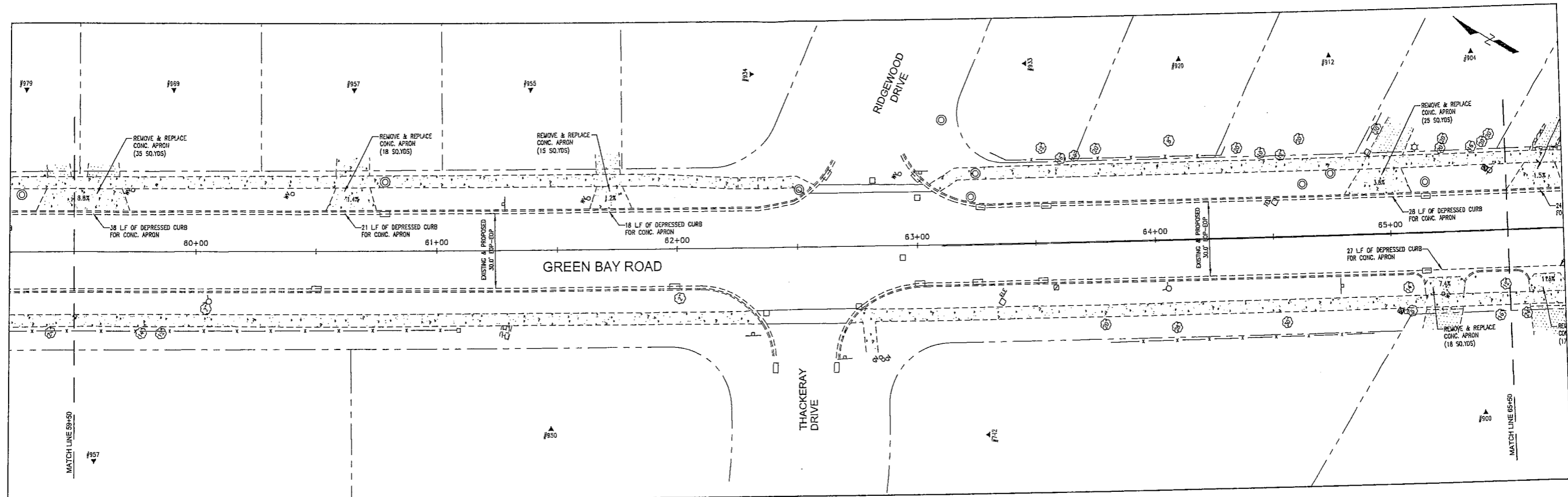
DOLAND
 B N O I M B E R L I N G , L L C
 311 WEST ALPINE STREET, SUITE 2
 PLAZA, ILVING, IL 60131
 (631) 331-3000 (631) 331-1177 FAX
 www.dolandengineering.com

USER NAME:	DESIGNED:	REVISED:
PLOT SCALE:	DRAWN:	REVISED:
PLOT DATE:	CHECKED:	REVISED:
	DATE:	REVISED:

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'	SHEET NO. 00 OF 00 SHEETS	STA. 53+50	STA. 59+50
F.A. RTE. SECTION COUNTY TOTAL SHEETS SHEET NO.			
--- LAKE 00 00			
FED. ROAD DIST. NO. CONTRACT NO.			
ILLINOIS FEDERAL AID PROJECT			



DOLAND
 ENGINEERING, LLC
 311 EAST CALLE STREET, SUITE C
 PALATKA, ILLINOIS 60137
 (815) 381-3344 (815) 381-1477 FAX
 www.dolandengineering.com

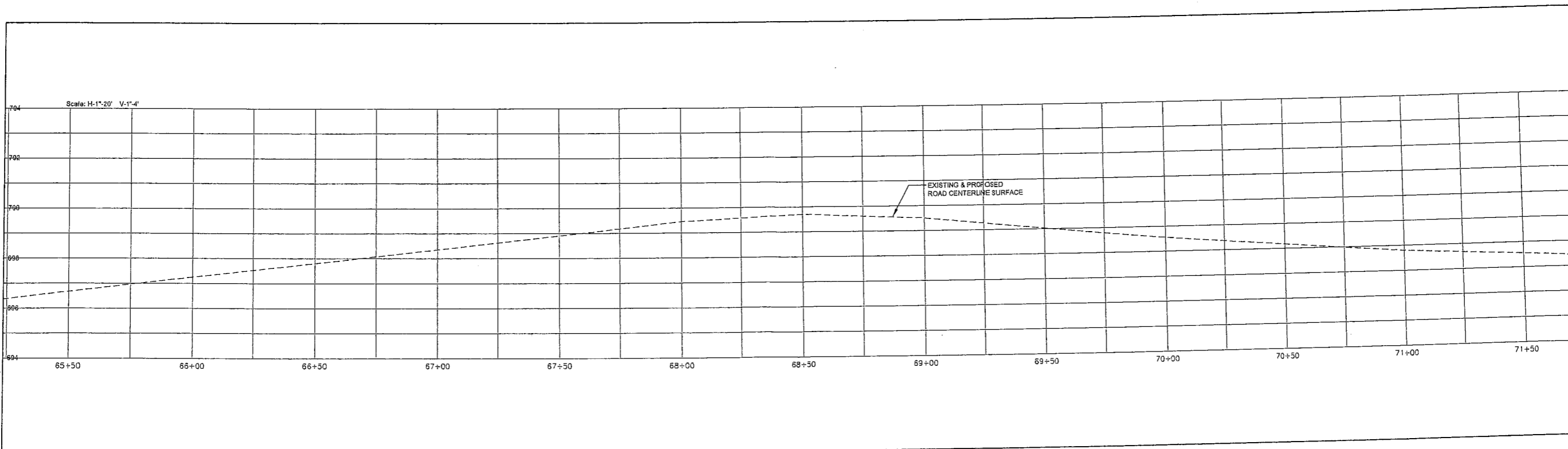
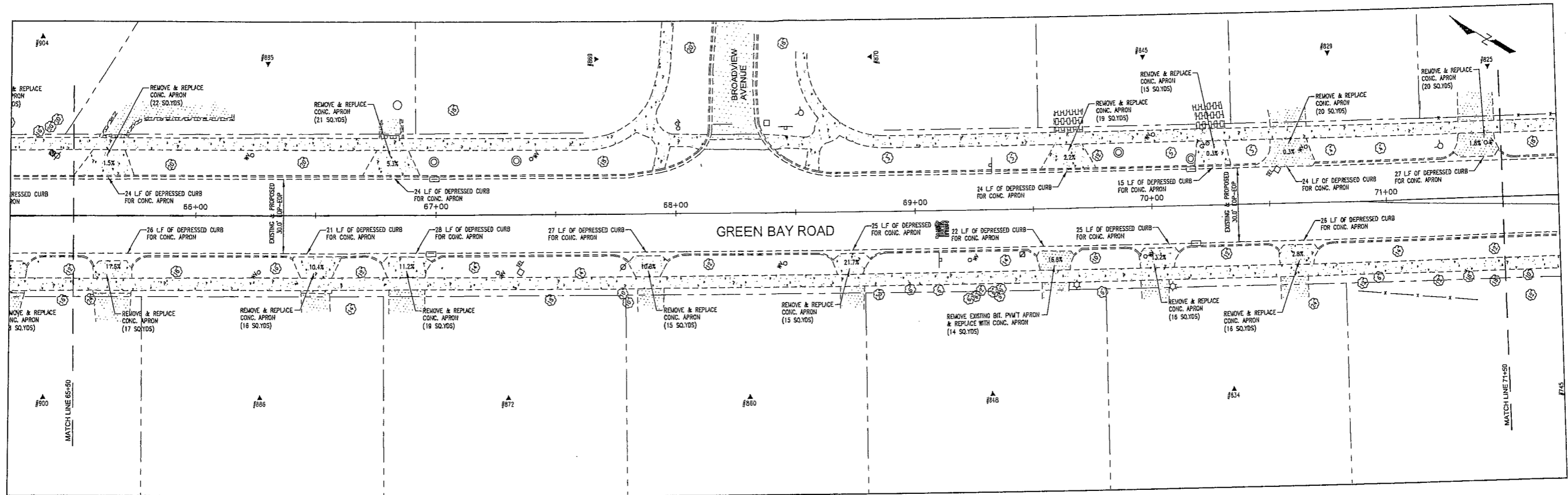
USER NAME:	DESIGNED:	REVISED:
PLOT SCALE:	DRAWN:	REVISED:
PLOT DATE:	CHECKED:	REVISED:
	DATE:	REVISED:

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'
 SHEET NO. 00 OF 00 SHEETS
 STA. 59+50 STA. 65+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
--		LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



DOLAND
 ENGINEERING, LLC
 311 WEST OGDEN STREET, SUITE 2
 AUSTIN, ILLINOIS 60607
 (630) 391-5000 (630) 391-1470 FAX
 www.dolandengineering.com

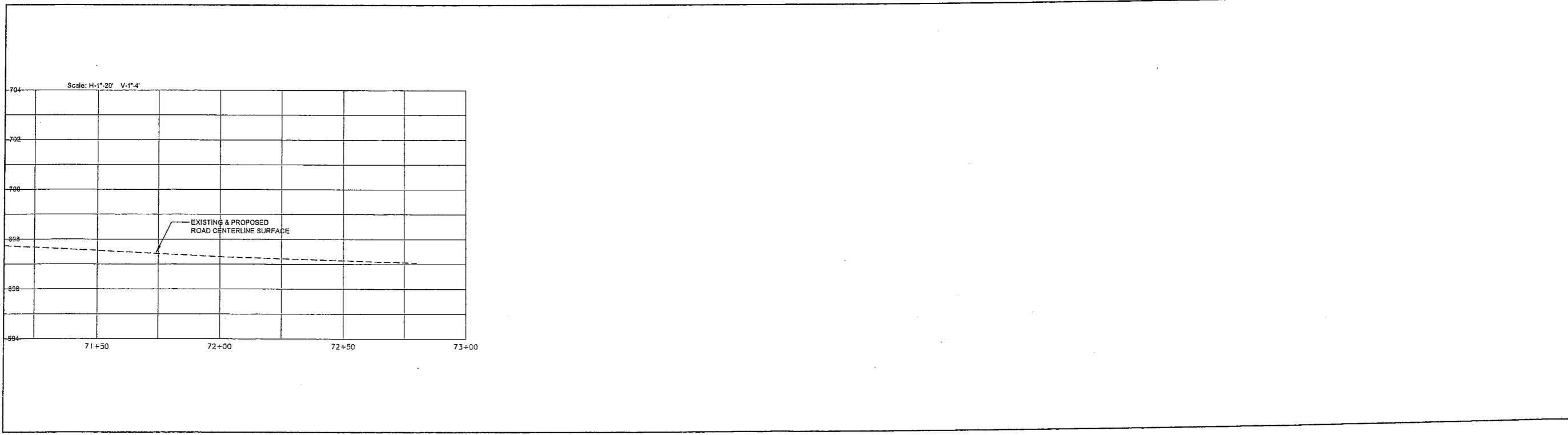
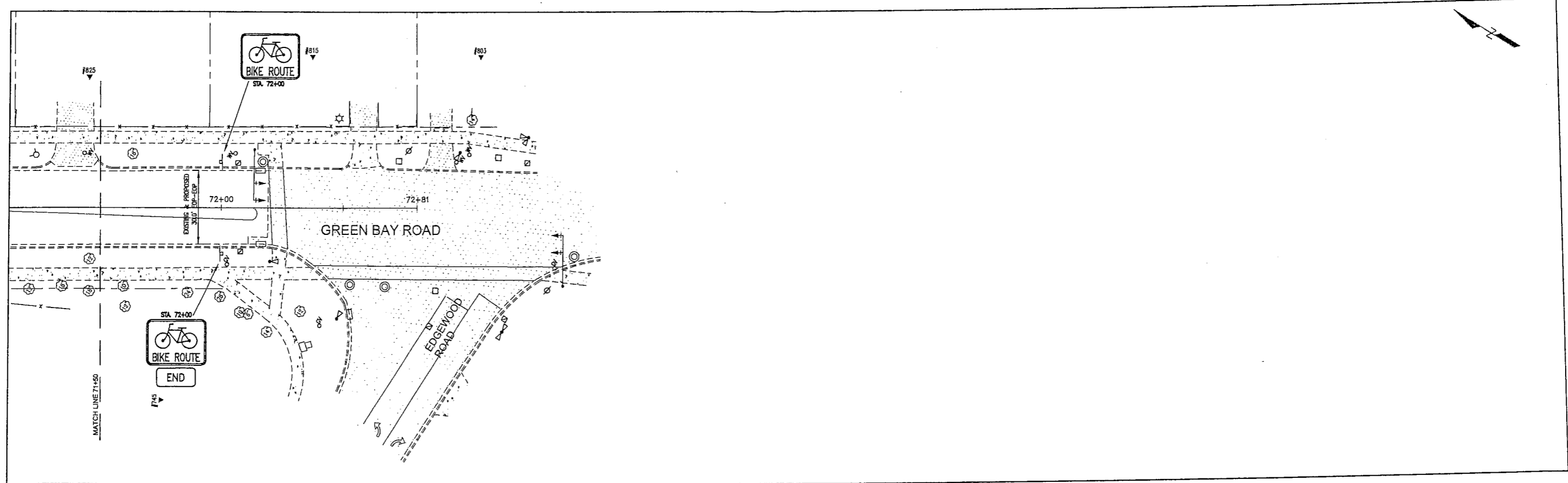
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PLOT SCALE:	DRAWN:	REVISED:
PLOT DATE:	CHECKED:	REVISED:
	DATE:	REVISED:

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'
 SHEET NO. 00 OF 00 SHEETS
 STA. 65+50 STA. 71+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
--		LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		



DOLAND
ENGINEERING, LLC
3111 SOUTH WASHINGTON STREET, SUITE 2
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USER NAME:	DESIGNED:	REVISED:
DRAWN:	CHECKED:	REVISED:
PLOT SCALE:	DATE:	REVISED:
PLOT DATE:		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN & PROFILE

SCALE: 1"=20'	SHEET NO. 00 OF 00 SHEETS	STA. 71+50	STA. 72+81
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F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
---		LAKE	00	00
FED. ROAD DIST. NO.		CONTRACT NO.		
ILLINOIS		FEDERAL AID PROJECT		