RUTGERS
Center for Advanced Infrastructure
and Transportation

Road Safety Audit:
Englewood, NJ

Audit Date: July 29, 2010

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Report submitted by the Transportation Safety Resource Center (TSRC) at Rutgers' Center for Advanced Infrastructure and Transportation (CAIT) in December 2010

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Introduction/Background

In the summer of 2010, Englewood, New Jersey, Police Chief Arthur O'Keefe requested a Road Safety Audit (RSA) of County Route 501—Grand Avenue / Engle Street (MP 42.86-45.05)—in the City of Englewood. The Englewood Police Department (EPD) identified this corridor as an area of concern due to crash history, observations, and experiences along this corridor. The Rutgers Transportation Safety Resource Center (TSRC) offered to host an RSA in partnership with EPD.

A RSA is a safety performance evaluation done by an independent, multidisciplinary team on existing or future roads and intersections. The team identifies and foresees any potential road safety issues that could be hazardous to not only motorized traffic, but all road users including pedestrians and bicyclists. RSAs, particularly on a municipal level, are a fairly new concept in New Jersey.

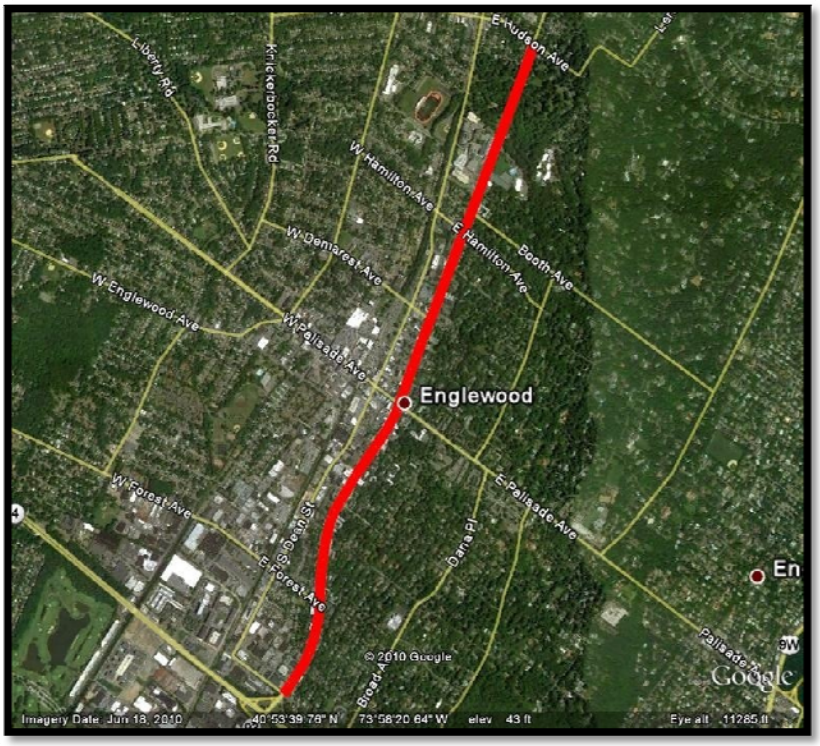

Figure 1 – Google Map of Study Area

In Figure 1, the study area is outlined in red. Grand Avenue / Engle Street, also known as County Route 501, runs about 2 miles through the center of Englewood City. The study area starts at the intersection of Grand Avenue / Van Nostrand Avenue and ends at the intersection of Engle Street / East Hudson Avenue.

Grand Avenue / Engle Street is classified as an Urban Principal Arterial with two lanes of through traffic through Englewood with intermittent turning lanes at intersections. Parking is also intermittent throughout this length. A total of 27 intersections, nine of which are signalized, exist along this corridor. A posted speed limit of 35 miles per hour (mph) exists along most of the route with a short section that is 30 mph through the Englewood Central Business District (CBD).

The land use along Grand Avenue / Engle Street is mostly residential. Medical offices and senior housing complexes are common along this part of the corridor. The CBD is located in and around the area of Palisades Avenue. The following is a sample of the most common businesses and services:

- Restaurants
- Salons/Spas
- Medical Offices
- Legal Services
- Auto Dealers
- Library
- Hospital

Road Safety Audit Process

The City of Englewood RSA followed a process that began with data collection, a crucial task that served as the backbone for recommendations for improvement. Data was collected using Plan4Safety, a crash data analysis tool, and consisted of crash types, locations, years, road conditions, and contributing circumstances.

From the data, the top "hot spots" were determined. Each intersection was ranked, and all intersections with more than 15 crashes over the last three years were considered. There were 10 intersections identified by total crashes, outlined in Table 1.

Rank	Cross Street	MP	Crashes	Common Crash Type(s)
1	Van Nostrand Avenue / Bancker Street	42.86 -42.91	62	Right angle and same direction (SD) side swipe
2	Englewood Avenue	43.74	41	Rear end and SD side swipe
3	Palisades Avenue (CR 505)	43.86	36	Rear end, SD side swipe, pedestrian
4	Hamilton Avenue	44.43	33	Right angle, SD side swipe
5	East Linden Avenue	43.40	31	Right angle, SD side swipe
6	East Forest Avenue (CR 64)	43.18	23	Rear end and SD side swipe
7	Demarest Avenue	44.14	22	SD side swipe
8	Glenwood Road / Brownes Terrace	44.57	21	SD side swipe
9	Honeck Avenue	43.00	20	SD side swipe
10	Garrett Place	43.54	17	SD side swipe and parked vehicle

Table 1 – Vehicular Crash Data 2007–2009

Bicycle crashes were investigated; only five bicycle-related crashes were identified since 2003. They are outlined in Table 2.

Cross Street	Date	Contributing Circumstance	Injury Class
Van Nostrand Avenue	5/24/2007	Wrong way	None
Englewood Ave	5/14/2008	n/a	Complaint of pain
Spring Lane	12/12/2008	Wrong way	Complaint of pain
East Hamilton Avenue	6/22/2007	n/a	Incapacitated
Brownes Terrace	6/16/2004	Wrong way	Complaint of pain

Table 2 – Bicyclical Crash Data 2003–2009

Pedestrian crash data was obtained and sorted by number of pedestrian-related crashes at each intersection. The top four intersections were identified and are outlined in Table 3.

Cross Street	Pedestrian Crashes	Pedestrians Involved	Pedestrians Injured
Palisades Avenue (CR 505)	4 (8)	4 (8)	4 (7)
Bergen Street	2 (4)	2 (4)	1 (3)
Garrett Place	2 (3)	4 (6)	2 (4)
East Hudson Street	1 (1)	1 (5)	1 (5)

Table 3 – Pedestrian Crash Data 2007–2009 (2003–2009)

All of the pedestrian-related crashes were analyzed to try to identify trends within the crashes, including an analysis of the pedestrians' pre-crash action, which are summarized in Table 4 bellow.

Pedestrian Pre-Crash Action	Crashes 07–09	Crashes 03–09
Crossing at marked crosswalk (at intersection)	5	12
Crossing / jaywalking	3	8
Crossing at unmarked crosswalk (at intersection)	1	2
Pedestrian off road	1	1
Approaching / leaving school bus	1	1
Other, null, unknown	9	18

Table 4 – Pedestrian Pre-Crash Data

After a full analysis, the following intersections were reviewed in the field by an independent audit team on July 29, 2010:

1. Grand Avenue and Van Nostrand Avenue
2. Grand Avenue and Bancker Avenue
3. Grand Avenue and Honeck Avenue
4. Grand Avenue and East Forest Avenue (CR 64)
5. Grand Avenue and East Linden Avenue
6. Grand Avenue and Garrett Place
7. Grand Avenue and Englewood Avenue
8. Grand Avenue / Engle Street and Palisade Avenue
9. Engle Street and Bergen Street
10. Engle Street and Demarest Avenue
11. Engle Street and Hamilton Avenue
12. Engle Street and Glenwood Road / Brownes Terrace
13. Engle Street and East Hudson Street

During the field visit to these intersections, it was decided to add the intersection of Chestnut Street and Engle Street to the list due to observations on site. After a field visit to these crash locations, the RSA team met to discuss the safety issues identified and possible mitigation measures. These suggested improvements were focused on being cost-effective and applicable to the existing intersections. There were no suggestions involving geometric adjustments.

This report will provide a crash history summary for each intersection as well as recommendations to mitigate further crash occurrences. The goal of the RSA was to find cost-effective solutions to the safety issues identified.

RSA Team

The RSA team consisted of 16 members, including police officers, engineers, and planners, from different agencies across the state.

Audit Team Members

Name	Organization	Phone	Email
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Ranjit Walia	Rutgers VTC	732-932-6812 ext. 711	rwalia@rci.rutgers.edu
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Frank Voley	Englewood Engineer	201-569-7590	n/a
Tom Greeley	Englewood Police	201-871-6411	tgreeley@englewoodpd.org
Carlos Calderin	Englewood Police	201-871-6411	n/a
Chief Arthur O'Keefe	Englewood Police	201-871-6409	aokeefe@englewoodpd.org

Information Sources

Several sources of information were used in the RSA process. For example, crash data from 2007–2009 was examined for trends and patterns. Specific resources used in the analysis include:

- NJDOT Crash Database (2007–2009)
- Plan4Safety Crash Data Analysis Tool
- NJDOT Traffic Volume Counts (2009)
- NJDOT Straight Line Diagrams
- NJ Transit Bus Routes
- Google Earth

At the start of the RSA, each team member was provided a binder with drawings for each intersection as well as crash data, traffic counts, and a map of NJ Transit bus routes.

Safety Improvements Overview

The following is an overview of suggested general safety improvements that may make roads safer for motorists and pedestrians. It is important to understand how these improvements work before deciding which ones to implement.

Pavement Markings

On-street pavement markings are meant to give guidance to drivers and pedestrians and to provide traffic control. Absence of pavement markings may confuse drivers as to what the correct path of travel is or pedestrians as to where to safely cross a road. It is important that pavement markings be not only highly visible in both the daytime and nighttime, but also consistent with other traffic control devices present. The following are some examples of typical pavement markings; proper use and types of pavement markings are more fully outlined in the Manual on Uniform Traffic Control Devices (MUTCD).

- Stop bars
- Inside / outside shoulders / edge lines
- High visibility crosswalks
- Centerlines
- Lane delineation
- "STOP" at stop signs

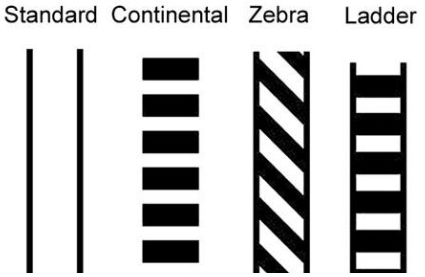


Figure 2 – High Visibility Crosswalk Patterns

Signs

Signs, like pavements markings, provide guidance to motorists and pedestrians, but they also give warning to potentially hazardous conditions and provide useful information about services. Signs use specific color and shape to relay their intended message. As when using pavement markings, consistency with other traffic control devices is key in the use of signs, as outlined in the MUTCD. There are three classifications of signs, described as follows:

A. Regulatory signs give notice of traffic laws or regulations. They typically have a white background.
B. Warning signs give notice of a situation that might not be readily apparent. They typically have a yellow or fluorescent yellow background.
C. Guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. They typically have either a green, blue, or brown background depending on use.

Traffic Calming

The goal of traffic calming is to reduce vehicle speed by altering the traveling environment to create safer and more livable communities. There are many techniques that can be implemented to accomplish these goals, each with their own unique advantages, disadvantages, costs, and side effects. Traffic calming is not a magic bullet, and by slowing traffic down on one street, traffic may be diverted to a parallel route that does not have such countermeasures. As such, it is important that a comprehensive area study be undertaken to determine which countermeasures are most applicable and where. As Grand Avenue / Engle Street is a major artery, and it is understood that traffic is meant to utilize this roadway, any traffic calming measures along this route must be undertaken with measures along parallel routes or else drivers will divert their route to these streets, possibly including Broad Avenue / Dana Place, Jones Road, Van Brunt Street, and Tenafly Road. Some traffic calming techniques that may be applicable to this RSA are given below:

Information-Oriented Countermeasures

- Posted speed limit
- "Your Speed" signs
- Educational / enforcement campaigns

Horizontal Narrowing Countermeasures

- Bulb-outs / curb extensions
- Painted shoulders / narrower travel lanes

Vertical Deflection Countermeasures

- Raised intersections
- Raised crosswalks
- Thermoplastic optical illusion speed hump

Environmental Condition Countermeasures

- Surface type (cobblestone)
- Shared spaces

Figure 3 – Sidewalk bulb-outs on Ferry Street in Newark, NJ

Corridor Wide Investigation

The following is a summary of the corridor wide safety issues that were identified by the RSA team. Recommendations are also listed.

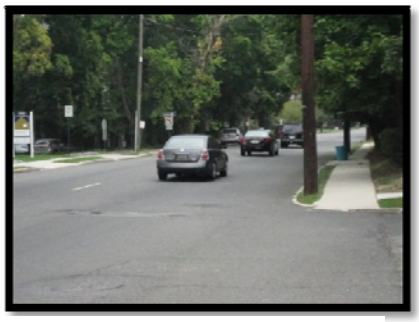


Figure 4 – Right lane is wide enough to accommodate a shoulder, bicycle lane, or extra parking (if needed).

Observations

1. Some traffic control devices, such as signs, pavement markings, and traffic signals were observed to be in disrepair or do not meet current standards.
2. Pedestrian accommodations are basic, if existent. Pedestrian signal indications are typically antiquated and/or broken. Crosswalks are typically unmarked, without signage and ADA-compliant curb ramps.
3. Travel lanes are of excessive width south of Tracy Place. In certain sections without parking, the corridor maintains two 20-foot lanes. Wide travel lanes may lead to speeding and illegal passing, which can lead to side wipe crashes.
4. The corridor serves as a major route for emergency vehicles traveling from Fort Lee, Palisades Park, Leonia, etc. to Englewood Hospital, which makes minimizing congestion critical.
5. There is an abundance of signage along the route, many unnecessary. Studies have shown that the large number of signs, called "sign clutter," limits the drivers' ability to process any of them.

Figure 5 – Shoulder striping used on Grand Ave. in Leonia

Recommendations

1. Traffic signal equipment should be updated and/or replaced if broken.
2. Ensure proper retroreflectivity of existing traffic signs and replace as needed.
3. Reduce sign clutter by removing all unnecessary signs.
4. Ensure proper visibility and retroreflectivity of pavement markings, including crosswalks. Replace as needed.
5. Due to the nature of the roadway and the amount of pedestrian activity, replace older pedestrian signals with countdown pedestrian signal indications with push buttons as needed. Refresh and install high visibility crosswalks where needed. Install ADA-compliant curb ramps as required.
6. Narrowing lanes by installing shoulder striping all along the corridor has been shown to reduce vehicle speeds while also providing better defined space for bicycles.
7. Study bicycle usage of the corridor to consider adding a bicycle lane or "Share the Road" signs.
8. Coordinate with Englewood Hospital to study Emergency Vehicle Preemption (EVP)[1].

Figure 6 – Bicyclist in conflict with turning vehicle

[1] A good reference to use in the study of EVP is "Traffic Signal Preemption for Emergency Vehicles" by the FHWA. http://www.itsdocs.fhwa.dot.gov/jpodocs/repts_te/14097_files/14097.pdf

Specific Intersection Investigation

The following is a detailed account of crash data and types, observations, and recommendations by the RSA team for each intersection considered. The crash types are ranked by frequency.

Van Nostrand Avenue / Grand Avenue (CR501)

Van Nostrand Avenue / Grand Avenue Overview Map

Dirt path or cowpath indicates pedestrian traffic going under Rt. 4 bridge

Crash Data **23**	1. **SD side swipe** 2. **Right angle** 3. **Rear end**
Observed Conditions	• Lack of pedestrian facilities near Rt.4 ramps • Cars speed off of Rt. 4 off-ramp • Heavy westbound traffic to Rt. 4 on-ramp conflicts with eastbound traffic turning onto Grand Avenue southbound

Existing pedestrian signal head

Recommendations	Cost	Timeline	Safety Benefit
Install crosswalks and ADA-compliant curb ramps at Rt.4 on/off-ramp crossings	Low	Short	High
Install ramp advisory speed sign and/or signal ahead sign on Rt. 4 off-ramp leading to intersection	Low	Short	Medium
Reconfigure lanes and/or traffic signal phasing to eliminate westbound-eastbound conflicts	Medium–High	Medium	High
Upgrade to countdown pedestrian signal heads with ADA pushbuttons	Medium–High	Medium	High
Install sidewalk on Rt. 4 off-ramp and under Rt.4 overpass	Medium–High	Medium	High

Bancker Street / Grand Avenue (CR501)

Bancker Street / Grand Avenue Overview Map

Faded yellow centerline

Crash Data **39**	1. **SD side swipe** 2. **Rear end** 3. **Right angle**
Observed Conditions	• Crosswalk partially faded • Yellow centerline faded

Partially faded crosswalk

Recommendations	Cost	Timeline	Safety Benefit
Repaint crosswalk with ladder style pattern	Low	Short	Medium
Repaint yellow centerline	Low	Short	Medium

Honeck Avenue / Grand Avenue (CR501)

Honeck Avenue / Grand Avenue Overview Map

Wide curb radius makes street crossing wider, exposing pedestrians to traffic.

Crash Data **20**	1. **SD side swipe** 2. **Rear end** 3. **Right angle**
Observed Conditions	• Inadequate sight distance for vehicles on Honeck Avenue • Missing crosswalk on Honeck Avenue • Missing street name sign may cause confusion • No sidewalk along corners onto Honeck Avenue

Vehicles stopped at the stop bar are unable to see oncoming traffic.

Recommendations	Cost	Timeline	Safety Benefit
Install crosswalk and ADA-compliant curb ramps on Honeck	Low	Short	High
Move stop bar closer to intersection and remove sight line obstructions(if possible)	Low	Short	High
Install visible street name sign	Low	Short	Medium
Install ADA-compliant curb ramps	Low	Short	High
Extend curb to shorten crosswalk and install sidewalk	High	Long	High

Forest Avenue / Grand Avenue (CR501)

Forest Avenue / Grand Avenue Overview Map

Traffic signal in disrepair

Crash Data **23**	1. **SD side swipe** 2. **SD rear end** 3. **Right angle** 4. **Parked car**
Observed Conditions	• Faded crosswalk on Grand Avenue • Pedestrians crossing Grand Avenue on the north side to reach bus stop • "No Right Turn" and "One Way" signs covered by brush

Pedestrians crossing here are in conflict with turning vehicles.

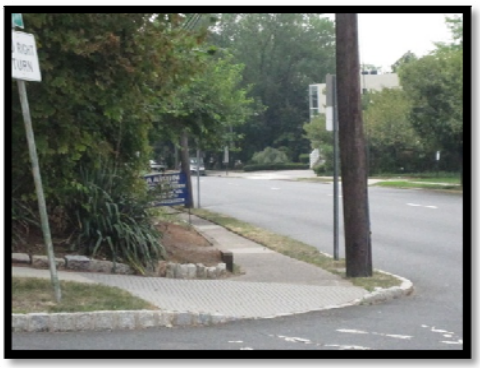
Recommendations	Cost	Timeline	Safety Benefit
Repaint crosswalk on Grand Avenue	Low	Short	High
Install "No Pedestrian Crossing" sign on north side	Low	Short	High
Clear "No Right Turn" and "One Way" signs of brush	Low	Short	Low
Upgrade to countdown pedestrian signal heads with pushbuttons	Medium–High	Medium	High
Coordinate with NJ Transit to move bus stop to south side (if possible)	Medium	Medium	High
Restrict parking in northwest corner to allow semi-trailer trucks to turn	Low	Short	Medium

East Linden Avenue / Grand Avenue (CR501)

East Linden Avenue / Grand Avenue Overview Map

Pedestrian walking briskly across Grand Avenue

Crash Data **31**	1. **SD side swipe** 2. **Right angle** 3. **Parked car** 4. **Rear end**
Observed Conditions	• Faded crosswalks on East Linden Avenue • Missing stop bar on westbound approach • Poor sight distance on westbound approach • Sidewalk ramps south of intersection with no crosswalk



Poor sight distance here is exacerbated by bus stop usage.

Recommendations	Cost	Timeline	Safety Benefit
Repaint crosswalks on East Linden Avenue	Low	Short	High
Install stop bar on westbound approach	Low	Short	High
Maintain sight distance triangle for westbound approach	Low	Medium	High
Install crosswalk with ADA-compliant curb ramps south of intersection	Low	Short	High
Install pedestrian warning signs at crosswalk	Low	Short	High
Coordinate with NJ Transit to move bus stop to north side (if possible)	Medium	Medium	High

Garrett Place / Grand Avenue (CR501)

Garrett Place / Grand Avenue Overview Map

Absence of crosswalk and stop line

Crash Data **17**	1. **SD side swipe** 2. **Parked car** 3. **Right angle** 4. **Rear end**
Observed Conditions	• Crosswalk and stop bar missing • Yellow centerline missing

Vehicle exiting Garrett Place is in the middle of the road, preventing other vehicle from entering.

Recommendations	Cost	Timeline	Safety Benefit
Install crosswalk and stop bar on Garrett Place	Low	Short	High
Install yellow centerline to ensure vehicles keep right on Garrett Place	Low	Short	High
Raise stop sign to a minimum height of 5 feet	Low	Short	Medium

Englewood Avenue / Grand Avenue (CR501)

Englewood Avenue / Grand Avenue Overview Map

Absence of crosswalk

Crash Data **41**	1. **SD side swipe** 2. **Rear end** 3. **Parked car** 4. **Right angle**
Observed Conditions	• Faded stop bar and crosswalk on Grand Avenue • Missing crosswalk on Englewood Avenue

Faded pavement markings

Recommendations	Cost	Timeline	Safety Benefit
Install crosswalk ,stop bar, and ADA-compliant curb ramps on Garrett Place	Low	Short	High
Enforce “No Parking” areas along Grand Avenue to prevent parked car crashes	Low	Short	High
Install lane use signs and refresh pavement markings to further enhance lane use designations	Low	Short	Medium

Palisades Avenue / Grand Avenue (CR501)

Palisades Avenue / Grand Avenue Overview Map

Excessive use of signs can decrease their effectiveness.

Crash Data **36**	1. **SD side swipe** 2. **Rear end** 3. **Pedestrian** 4. **Parked car**
Observed Conditions	• Excessive traffic signs • Traffic and pedestrian signal equipment outdated and/or in disrepair • Dean Street signal causes queue backup onto Grand Avenue • Faded pavement markings

Outdated equipment and signs

Recommendations	Cost	Timeline	Safety Benefit
Install "Don't Block the Box" and advanced lane use signs along the westbound approach	Low	Short	High
Repaint stop bar, lane lines, and arrows on Grand and Palisade avenues as needed	Low	Short	High
Eliminate and/or update signs as needed	Low	Short	Low
Retime and coordinate traffic signal with Dean Street signal to prevent queue backup	Medium	Medium	High
Upgrade traffic signal equipment	Medium–High	Medium	High
Upgrade to countdown pedestrian signal heads with pushbuttons	Medium–High	Medium	High
Implement reverse angle parking on Palisades Avenue	Medium	Long	High

Bergen Street / Engle Street (CR501)

Bergen Street / Engle Street Overview Map

Bicyclist traveling in the opposite direction of traffic

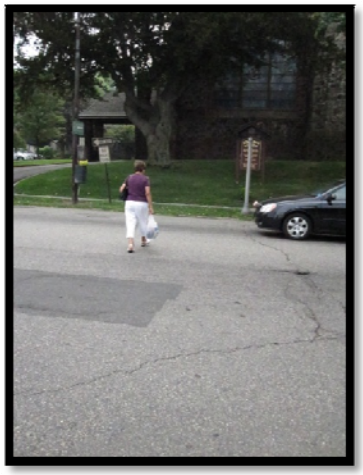
Crash Data **14**	1. **SD side swipe** 2. **Rear end** 3. **Right angle** 4. **Pedestrian**
Observed Conditions	• Vehicles do not stop for pedestrians trying to cross • Delivery trucks park in southwest corner partially blocking unmarked crosswalk • Marked crosswalk creates conflict with turning vehicles

High visibility striping, shown on the left, could increase the visibility of the crosswalk on Engle Street.

Recommendations	Cost	Timeline	Safety Benefit
Increase visibility of crosswalk on Engle Street by installing high visibility striping	Low	Short	High
Enforce no parking areas within 25 feet of crosswalks	Low	Short	High
Install crosswalk on south side of intersection	Low	Short	High
Replace stop sign on eastbound approach of Bergen Street	Low	Short	High

Demarest Avenue / Engle Street (CR501)

Demarest Avenue / Engle Street Overview Map



Pedestrian crossing at unmarked crosswalk

Crash Data **22**	1. **SD side swipe** 2. **Rear end**
Observed Conditions	• Faded/missing crosswalks • Missing stop bar • Traffic and pedestrian signal equipment outdated and/or in disrepair

Pedestrian signal in disrepair

Recommendations	Cost	Timeline	Safety Benefit
Repaint crosswalk on Demarest Avenue	Low	Short	High
Replace stop sign on eastbound approach of Bergen Street	Low	Short	High
Install crosswalk on south side of intersection	Low	Short	High
Install stop bar and crosswalk with ADA-compliant ramps on Engle Street	Medium	Medium	High
Upgrade to countdown pedestrian signal heads with pushbuttons	Medium–High	Medium	High

Chestnut Street / Engle Street (CR501)

Chestnut Street / Engle Street Overview Map

Vehicles try to go through, across Engle Street.

Crash Data **14**	1. **SD side swipe** 2. **Parked car** 3. **Right angle**
Observed Conditions	• Faded crosswalk • Poor sight distance on eastbound approach of Chestnut Street

Poor sight distance for vehicles on eastbound approach of Chestnut Street

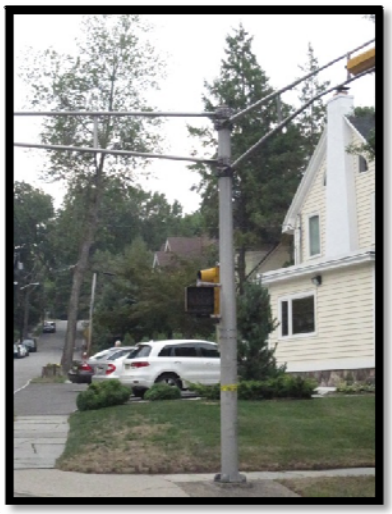
Recommendations	Cost	Timeline	Safety Benefit
Repaint crosswalk on Chestnut Street	Low	Short	High
Extend curb on southwest corner to prevent through traffic	Medium–High	Medium	High

Hamilton Avenue / Engle Street (CR501)

Hamilton Avenue / Engle Street Overview Map

Overhead traffic signal blocked by tree branches

Crash Data **33**	1. **Right angle** 2. **SD side swipe** 3. **Parked car** 4. **Rear end**
Observed Conditions	• Faded crosswalk • Missing stop bars • Signal equipment in disrepair



Pedestrian signal in disrepair

Recommendations	Cost	Timeline	Safety Benefit
Repaint crosswalk on Hamilton Avenue	Low	Short	High
Install stop bars on Engle Street and eastbound Hamilton Avenue	Low	Short	High
Trim tree in southeast corner blocking traffic signal	Low	Short	High
Install crosswalk and ADA-compliant curb ramps across Grand Avenue	Low	Short	High
Lower overhead traffic signals to increase visibility	Low	Short	High
Upgrade to countdown pedestrian signal heads with pushbuttons	Medium–High	Medium	High

Glenwood Road / Brownes Terrace / Engle Street (CR501)

Glenwood Road / Brownes Terrace / Engle Street Overview Map

Missing Crosswalk

Crash Data **21**	1. **SD side swipe** 2. **Rear end** 3. **Right angle**
Observed Conditions	• Crosswalk missing • No ADA ramps • Stop bar and centerline missing on westbound approach

Crosswalk leads into traffic pole with no ramp.

Recommendations	Cost	Timeline	Safety Benefit
Install crosswalk and ADA-compliant curb ramps as needed	Low	Short	High
Install stop bar and yellow centerline on westbound approach	Low	Short	High
Install ramp for crosswalk on Engle Street	Medium	Medium	High
Upgrade to countdown pedestrian signal heads with pushbuttons	Medium–High	Medium	High

East Hudson Street / Engle Street (CR501)

East Hudson Avenue / Engle Street Overview Map

"One Way" sign blocked by pole

Crash Data **10**	1. **Right angle** 2. **SD side swipe** 3. **Rear end**
Observed Conditions	• Crosswalks missing • Missing stop bars • Arrows in signal heads create conflict in movements

Traffic signals with arrows create conflict and are not standard.

Recommendations	Cost	Timeline	Safety Benefit
Install crosswalk and ADA-compliant curb ramps as needed	Low	Short	High
Install stop bars all around	Low	Short	High
Add left and right turn lanes on southbound approach by pulling back parking	Low	Medium	High
Upgrade to countdown pedestrian signal heads with pushbuttons	Medium–High	Medium	High
Upgrade traffic signal equipment	Medium–High	Medium	High

Conclusion

The recommendations suggested in this report should improve the safety of the entire corridor as well as the specific intersections. Many of the recommendations can be implemented through routine maintenance, while others will take more time and investment. However, engineering strategies alone will not eliminate the safety issues identified.

A combined effort of public education and police enforcement is necessary to make this corridor a safer place for all its users. Education about traffic safety in public school, such as drivers' education courses in high school, and handing pamphlets to pedestrians are just a sample of the different educational campaigns that can benefit road users.

Enforcement, especially in the areas of parking and pedestrian right-of-way, can go a long way in reducing crashes and alerting drivers of the seriousness of maintaining safety along this corridor. Officers may also hand out pamphlets during routine traffic stops to educate motorists of changes in traffic laws.

Potential Funding Sources

In this economy, budget constraints may hamper the implementation of some of these recommendations. Finding alternative funding sources is critical to ensuring the investment in the safety of the corridor's users.

Local Funding Sources:

Roadway Owner's Maintenance and Operation Budget:

Existing funds from local and county sources, as appropriate, which are allocated for investment in maintenance and operational activity, can be used to implement above suggestions. Many of the above countermeasures may be eligible for the appropriate use of these existing funds. The manager of these funds who understands the full budget picture should be consulted.

State Funding Sources:

Contact:

NJDOT Local Aid District 2 Office
153 Halsey Street - 5th floor
200 Stierli Court
Newark, NJ 07102
Phone: 973-877-1500
Fax: 973-877-1556

Municipal Aid/Urban Aid Program (NJDOT Local Aid):

http://www.state.nj.us/transportation/business/localaid/municaid.shtm

This program has been a significant resource for municipalities in funding local transportation projects. All municipalities are eligible. The department continues to encourage municipalities to consider using the Municipal Aid Program to fund projects that support walking and biking in

their communities. NJDOT has set a goal to award up to 10 percent of the Municipal Aid Program funds to projects such as pedestrian safety improvements, bikeways, and streetscapes. [2].

Local Aid Infrastructure Fund (Discretionary Aid):
http://www.state.nj.us/transportation/business/localaid/descrfunding.shtm

Subject to funding appropriation, a discretionary fund is established to address emergencies and regional needs throughout the state. Any county or municipality may apply at any time. These projects are approved at the discretion of the commissioner. Payment of project costs is the same as the Municipal Aid Program. Under this program a county or municipality may also apply for funding for local pedestrian safety and bikeway projects[3].

Safe Streets to Transit:
http://www.state.nj.us/transportation/business/localaid/safe.shtm

The intent of this program is to encourage counties and municipalities to construct safe and accessible pedestrian linkages to transit facilities in order to promote increased usage of transit by all segments of the population.

Federal Funding Sources via NJDOT Office of Local Aid:

Contact:
NJDOT Local Aid District 2 Office
153 Halsey Street - 5th floor
200 Stierli Court
Newark, NJ 07102
Phone: 973-877-1500
Fax: 973-877-1556

Safe Routes to Schools (SRTS):
http://www.state.nj.us/transportation/business/localaid/srts.shtm

The federal-aid SRTS program provides federal-aid highway funds to State Departments of Transportation over five fiscal years (FY2005–FY2009). The program targets schools for grades K–8 only. The main objectives of the program are:

- to enable and encourage children, including those with disabilities, to walk and bicycle to school;
- to make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age; and

[2] Local Aid Letter Dated June 18, 2010, available publicly:
http://www.state.nj.us/transportation/business/localaid/documents/2011Letter.pdf
[3] NJDOT TTF State Aid Handbook available publicly:
http://www.state.nj.us/transportation/business/localaid/documents/StateAidHandbook-May272010.pdf

- to facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.

Funds are available for a variety of both infrastructure and non-infrastructure projects that benefit elementary and middle school children in grades K–8 in both public and private schools. The infrastructure portion can fund design, construction, and planning of the proposed improvements, while the non-infrastructure portion would fund activities that encourage walking and bicycling to school.

Applicants to this program must submit separate applications for infrastructure and non-infrastructure projects.

Selection of SRTS projects involves the participation of civic, education, and environmental groups, the transportation community, and other government organizations such as the state's Metropolitan Planning Organizations.

Federal Funding Sources via North Jersey Transportation Planning Authority (NJTPA):

Contact:
North Jersey Transportation Planning Authority
One Newark Center, 17th Floor
Newark, NJ 07102
Phone: 973-639-8400
Fax: 973-639-1953

Local Lead and Local Scoping:
http://www.njtpa.org/Project/Devel/local_lead_scoping/default.aspx

The Local Scoping program provides federal funds to NJTPA subregions to advance proposed projects through preliminary engineering and federal environmental reviews. The Local Lead program provides funding to advance projects through final design, right-of-way, and construction. For FY2010, approximately $71 million in funding will be allocated for graduates of the Local Scoping Program as well as fund other local program initiatives.

Local Safety Program:
http://www.njtpa.org/Project/Devel/local_safety/default.aspx

The federally funded Local Safety Program (LSP) is a component of wider safety planning at the NJTPA, supporting construction of quick-fix, high-impact safety improvements on county and local roadway facilities in the NJTPA region. Projects supported by this program have included new and upgraded traffic signals, signage, pedestrian indications, crosswalks, curb ramps, pavement markings, and other improvements to increase the safety of drivers, bicyclists, and pedestrians.

The Local Safety Program:

- typically addresses NJTPA and/or NJDOT derived high priority crash locations on county or local roadways,
- supports quick-fix projects, backed with detailed crash data, with minimal or no environmental or cultural resource impacts (eligible for programmatic categorical exclusion from FHWA), and
- funds the construction phase of work only— planning, design, and right-of-way acquisition are the responsibility of the sponsor.

Local CAMQ Mobility Initiatives:
http://www.njtpa.org/Project/Mobility/CMAQ/CMAQMobility.aspx

The federal Congestion Mitigation and Air Quality (CMAQ) program provides funds to reduce roadway congestion and reduce single occupancy auto usage in order to lessen the level of pollutants and greenhouse gases generated through the use of fossil fuels. The NJTPA has established the Local CMAQ Mobility Initiatives program to help meet these goals, including ridesharing, transit usage, travel demand management, and traffic mitigation projects. Proposals must implement strategies and policies in the Regional Transportation Plan, Plan 2035.

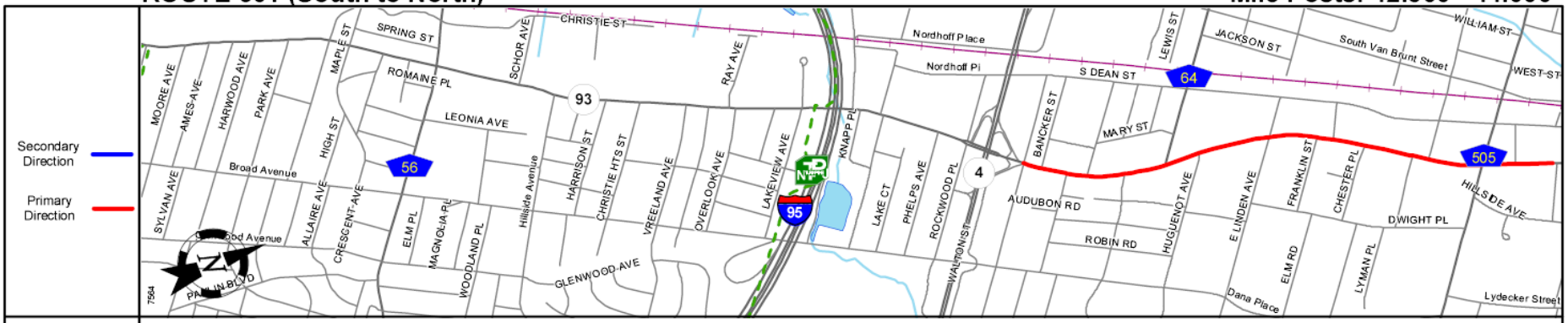
Appendix A

Straight Line Diagrams

Englewood RSA - Grand Ave / Engle St

ROUTE 501 (South to North)

Mile Posts: 42.860 - 44.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	

Interstate Route 287 | US Route 22 | NJ Route 33 | County Road 689 | Interchange Number 2 | Grade Separated Interchange | Traffic Signal | Traffic Monitoring Sites WIM AVC VOL | Road Underpass | Road Overpass

Secondary Direction

Primary Direction

Englewood City, Bergen Co

(42.86) VAN NOSTRAND AVENUE | (42.91) BANCKER ST | (42.96) MADISON AVE | (43.00) HONECK AVE | MEADOWBROOK RD (43.08) | 64 FOREST AVE (43.16) | HUGUENOT AVE (43.25) | E. LINDEN (43.40) AVENUE | GARRETT PL (43.54) | (43.50) FRANKLIN ST | (43.60) CHESTER PL | ENGLEWOOD AVE (43.74) | (43.70) TRACY PL | 505 PALISADES (43.86) AVENUE | (43.93) BERGEN ST

Units in miles

Englewood City, Bergen Co

41.0 | 42.0 | 43.0 | 44.0

Street Name	Grand Avenue Scenic and Historic Highway	Engle Street
Jurisdiction	County	
Functional Class	Urban Principal Arterial	
Federal Aid - NHS Sy	STP	
Speed Limit	35	30
Number of Lanes	2	
Med. Type	None	
Med. Width	0	
Pavement	40	50 40
Shoulder	0	

MP 42.86 = End Coinc With NJ 93 MP 3.50

SRI = 00000501__

Date last inventoried: October 2006

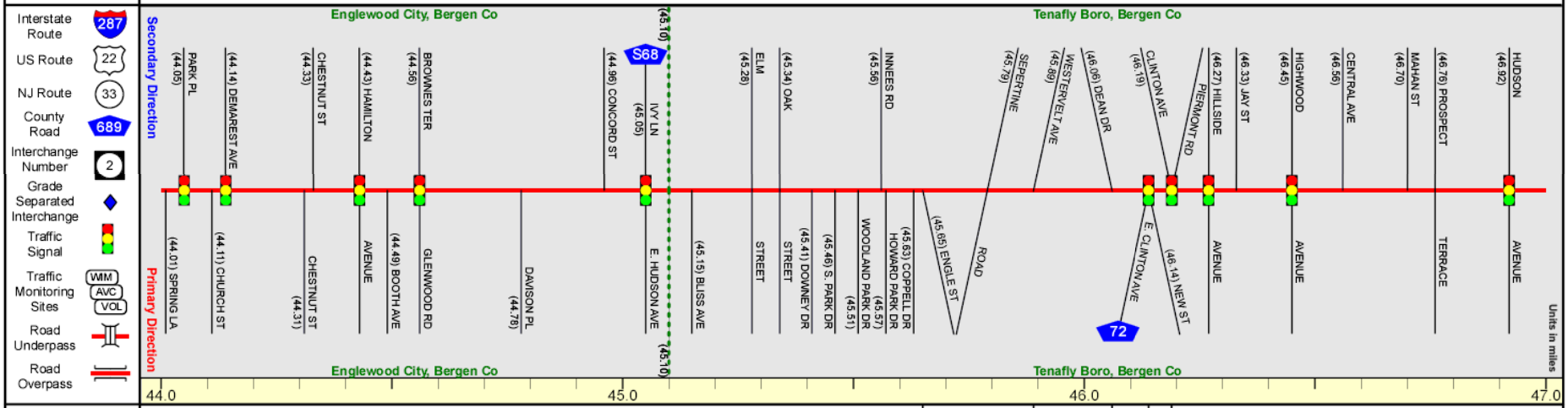
Page Created: May, 2010

Englewood RSA - Grand Ave / Engle St

ROUTE 501 (South to North)

Mile Posts: 44.000 - 47.000

Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	Engle Street / Westervelt Avenue / Huyler Avenue / Dean Drive / East Clinton / County Road
Jurisdiction	County
Functional Class	Urban Principal Arterial
Federal Aid - NHS Sy	STP
Speed Limit	30 / 35 / 25 / 30 / 35
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	40 / 36 / 32 / 40 / 32 / 60 / 42 / 32
Shoulder	0

SRI = 00000501__

Date last inventoried: October 2006

Page Created: May, 2010

Appendix B

Intersection Drawings

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

_____

_____

Speed Limit : _____

Signal head placement :

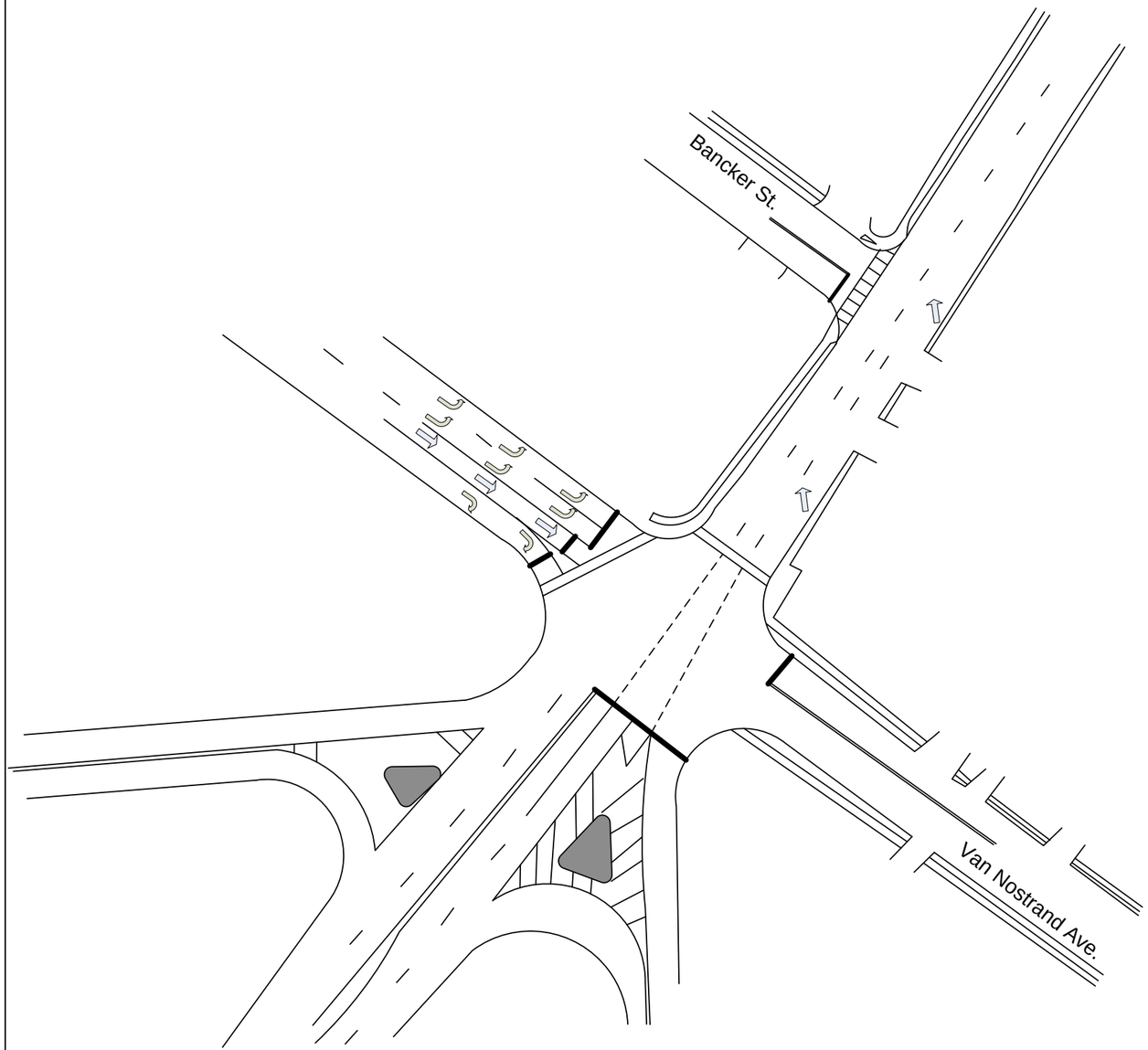
Good Bad Fair

LIGHTING

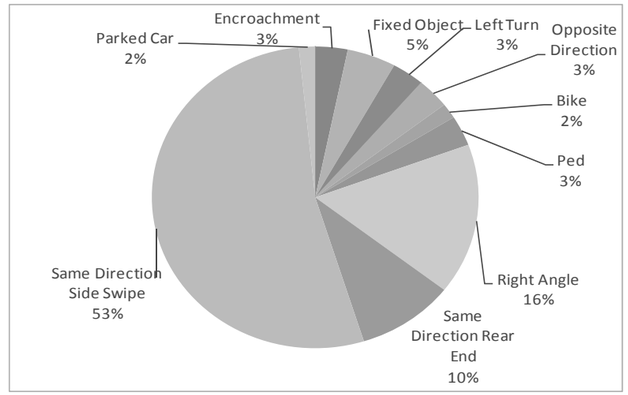
Sufficient lighting :

Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



CRASH TYPES



NOTES

Van Nostrand Avenue & Bancker Street

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

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Speed Limit : _____

Signal head placement :

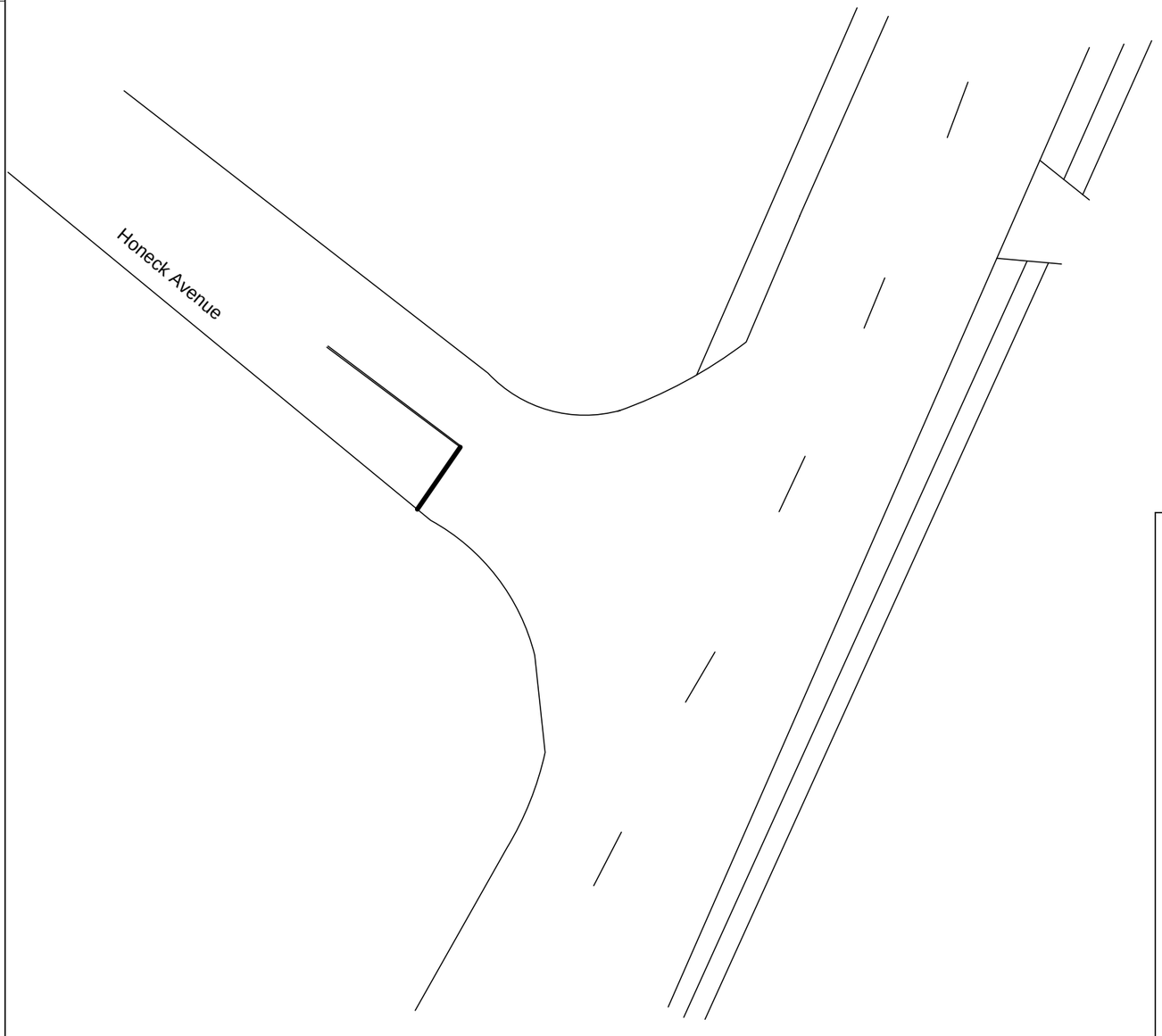
Good Bad Fair

LIGHTING

Sufficient lighting :

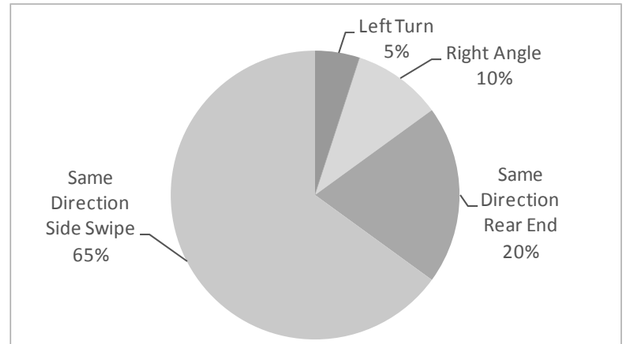
Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



Honeck Avenue

CRASH TYPES



NOTES

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

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Speed Limit : _____

Signal head placement :

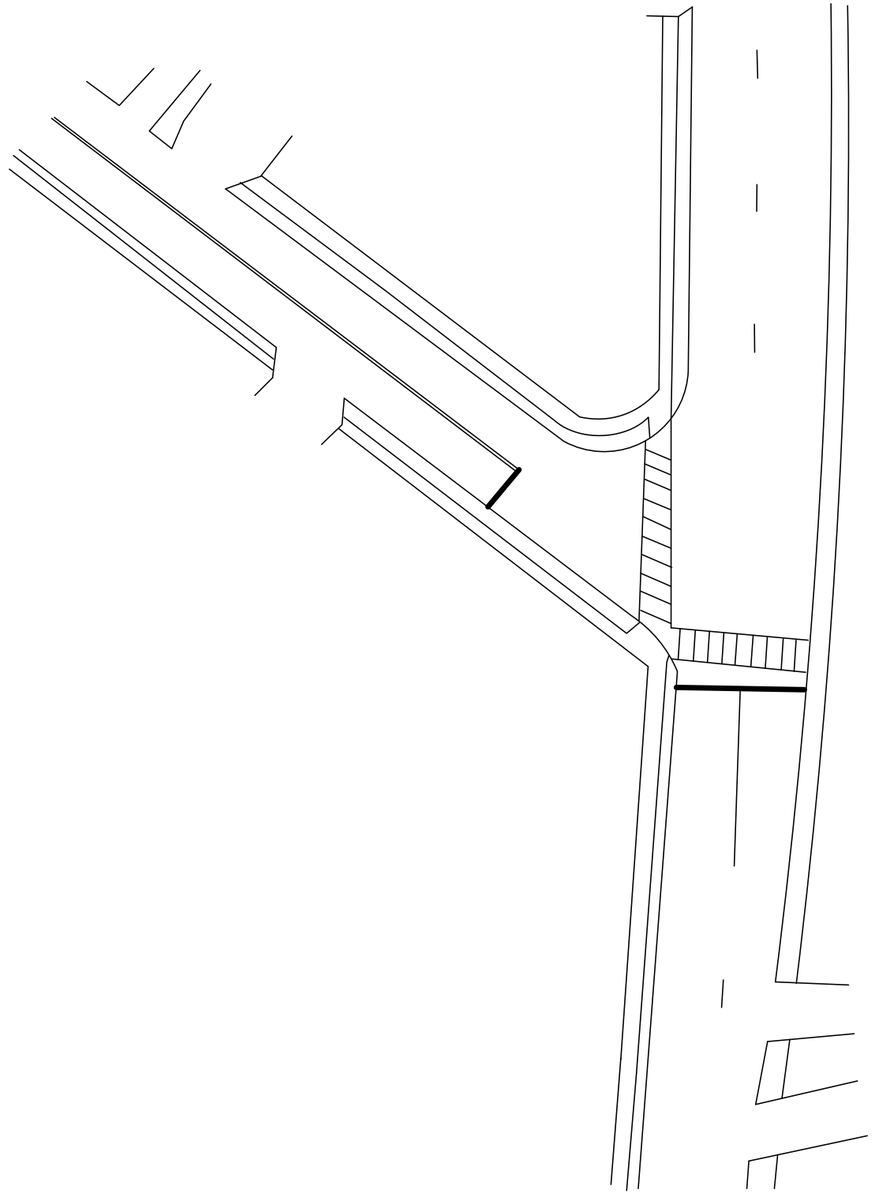
Good Bad Fair

LIGHTING

Sufficient lighting :

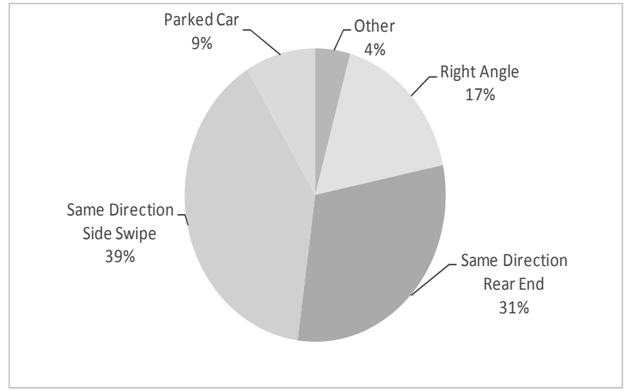
Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



East Forest Avenue

CRASH TYPES



NOTES

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

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Speed Limit : _____

Signal head placement :

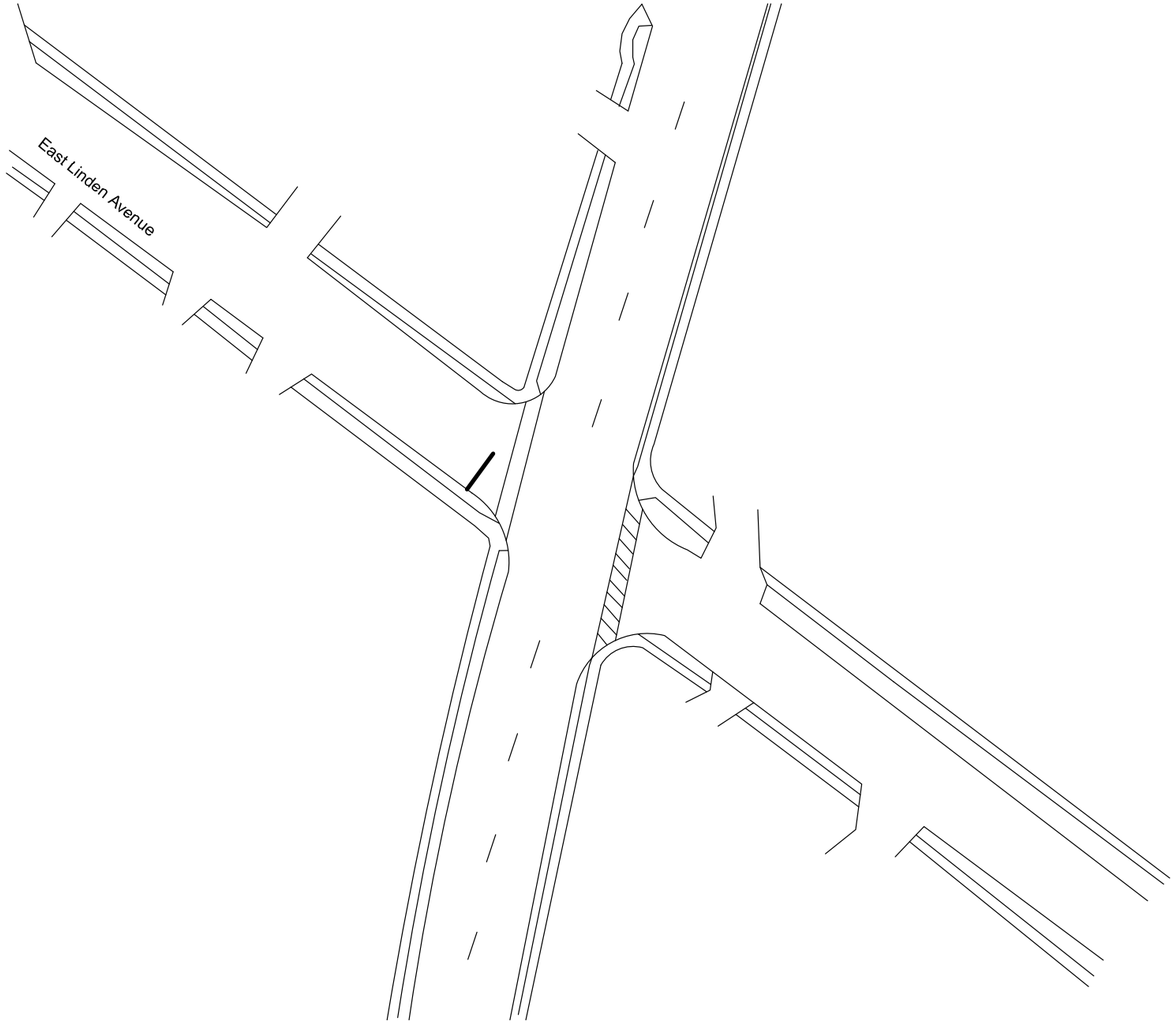
Good Bad Fair

LIGHTING

Sufficient lighting :

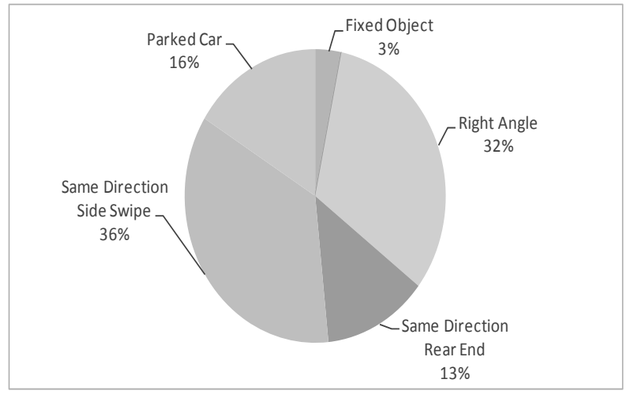
Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



East Linden Avenue

CRASH TYPES



NOTES

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

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Speed Limit : _____

Signal head placement :

Good Bad Fair

LIGHTING

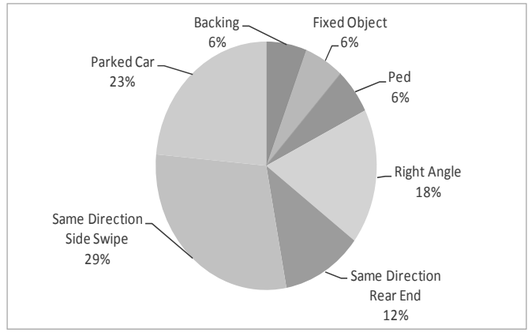
Sufficient lighting :

Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation

Garrett Place

CRASH TYPES



PEDESTRIAN CRASHES

Date			Pedestrian Injury	Ped Contributing Circumstances	Pedestrian Pre-Crash Action
Saturday 4:15 PM, 2009	50' North	-	Complaint of Pain	None	Crossing / Jaywalking
Wednesday 8:01 PM, 2007	At	Dark Rain	Incapacitated	None	Going Straight Ahead
Wednesday 12:57 PM, 2004	At	Rain	Moderate Injury	-	-
			Moderate Injury	-	-

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CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

____

____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

____

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Speed Limit : _______________

Signal head placement :

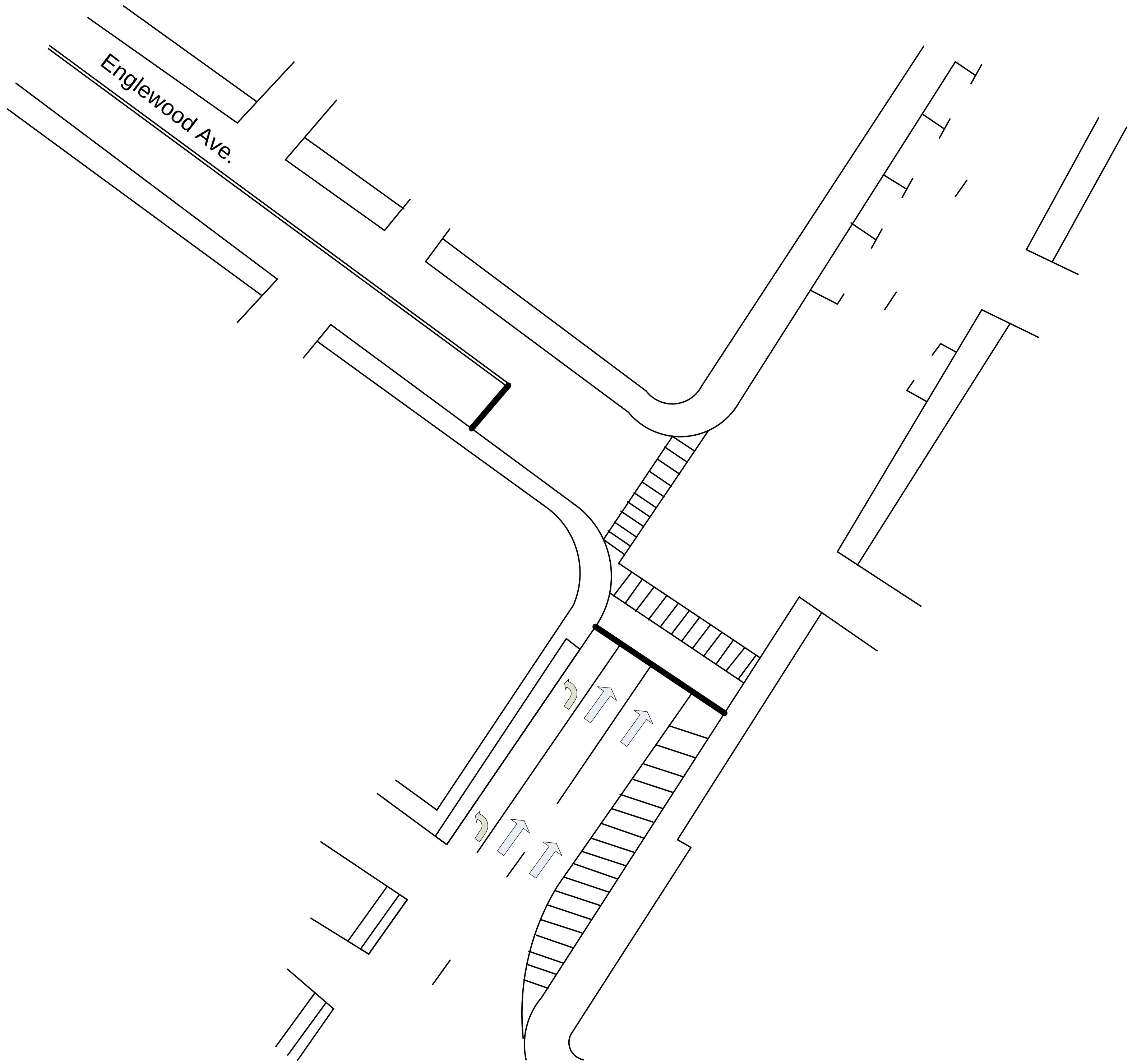
Good Bad Fair

LIGHTING

Sufficient lighting :

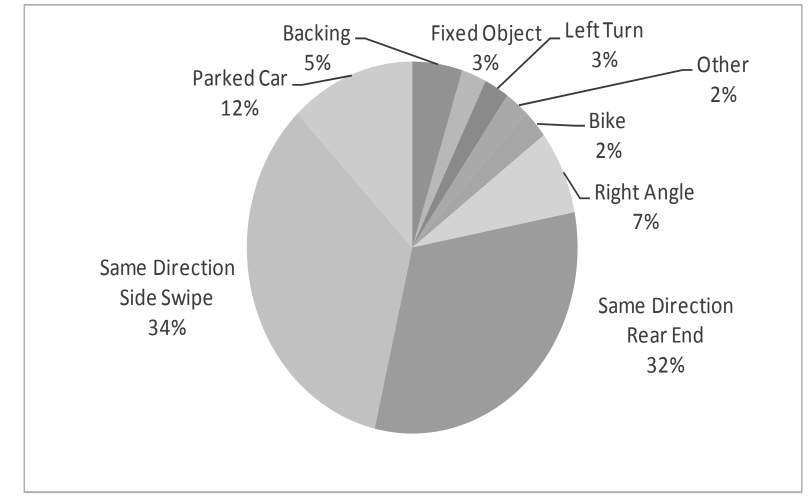
Yes No

RUTGERS Center for Advanced Infrastructure and Transportation



Englewood Avenue

CRASH TYPES



NOTES

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/ Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

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Speed Limit : _____

Signal head placement :

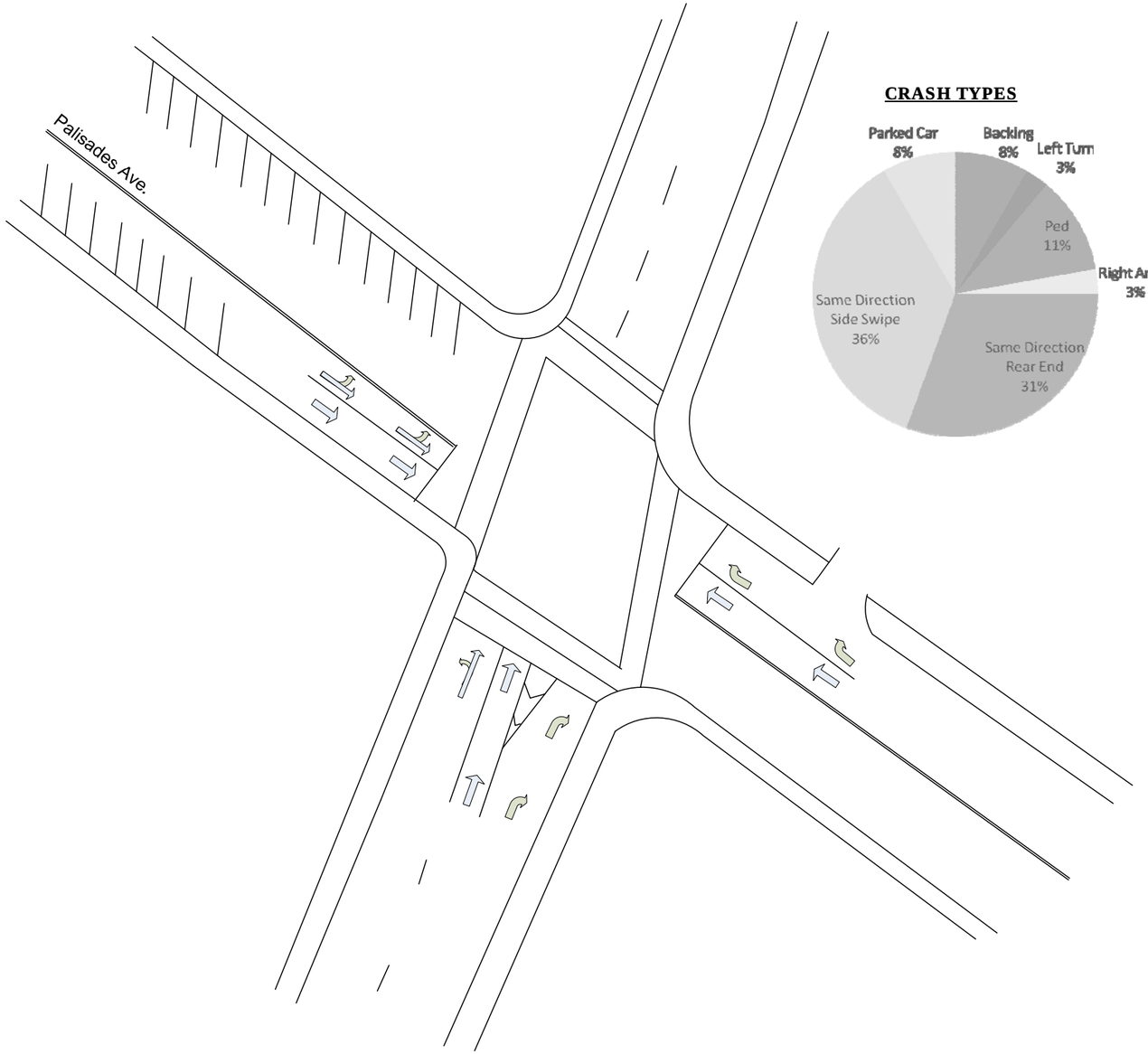
Good Bad Fair

LIGHTING

Sufficient lighting :

Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



CRASH TYPES

PEDESTRIAN CRASHES

Date			Pedestrian Injury	Ped Contributing Circumstances	Pedestrian Pre-Crash Action
Tuesday 4:10 PM, 2009	20' South	-	Complaint of Pain	Crossing Where Prohibited	Crossing at unmarked Crosswalk (At Intersection)
Thursday 4:25 PM, 2009	25' South	-	Moderate Injury	Crossing Where Prohibited	Crossing / Jaywalking
Monday 1:50 AM, 2008	5' South	Dark	Incapacitated	Dark Clothing/Low Visibility to Driver	Crossing at marked Crosswalk (At Intersection)
Friday 7:06 PM, 2008	20' North	-	Complaint of Pain	-	Crossing / Jaywalking
Friday 4:52 PM, 2006	At	-	Complaint of Pain	None	Crossing at marked Crosswalk (At Intersection)
Tuesday 11:30 AM, 2005	300' South	-	Complaint of Pain	-	Crossing / Jaywalking
Wednesday 1:43 PM, 2005	At	-	Unknown (Pedestrian Left Scene of Accident)		
Thursday 9:12 AM, 2003	50' South	Rain	Complaint of Pain	-	Crossing / Jaywalking

NOTES

Palisades Avenue (CR 505)

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

_____

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Speed Limit : _____

Signal head placement :

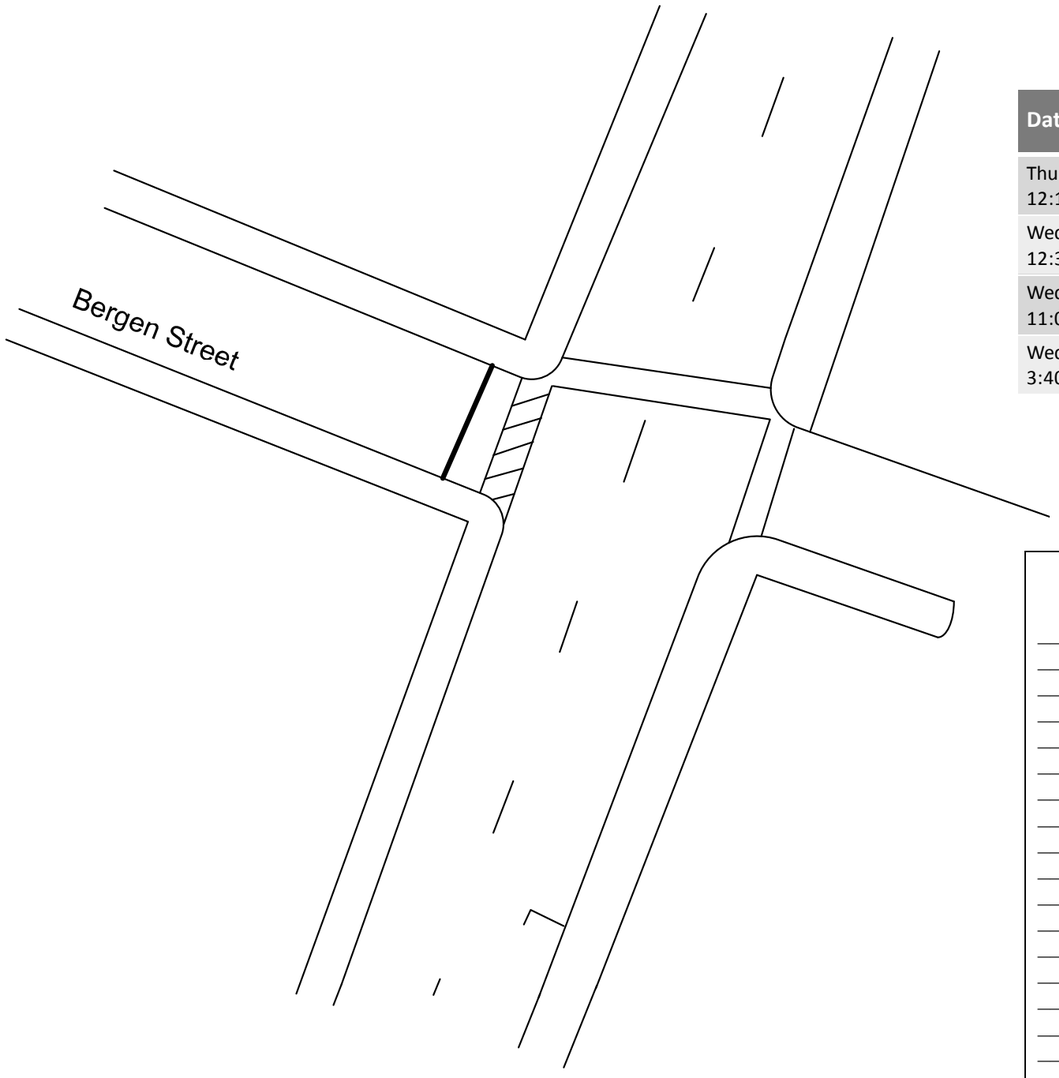
Good Bad Fair

LIGHTING

Sufficient lighting :

Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



Bergen Street

PEDESTRIAN CRASHES

Date			Pedestrian Injury	Ped Contributing Circumstances	Pedestrian Pre-Crash Action
Thursday 12:15 PM, 2009	At	-	Complaint of Pain	-	Crossing at marked Crosswalk (At Intersection)
Wednesday 12:35 PM, 2008	At	-	-	None	Crossing at marked Crosswalk (At Intersection)
Wednesday 11:00 AM, 2006	At	-	Moderate Injury	-	Crossing / Jaywalking
Wednesday 3:40 PM, 2003	15' South	-	Complaint of Pain	-	Other Pedestrian Action

NOTES

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

_____

_____

Speed Limit : _____

Signal head placement :

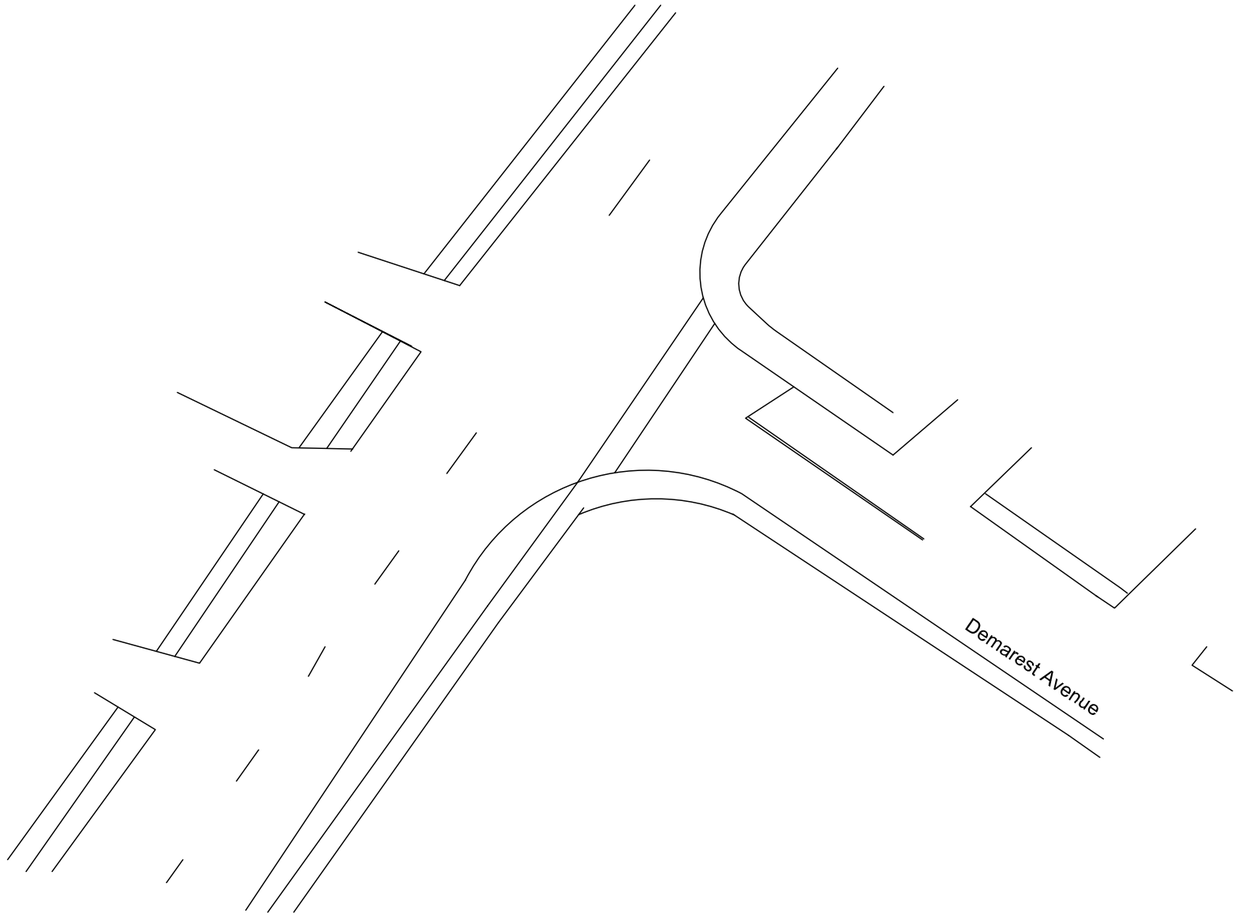
Good Bad Fair

LIGHTING

Sufficient lighting :

Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



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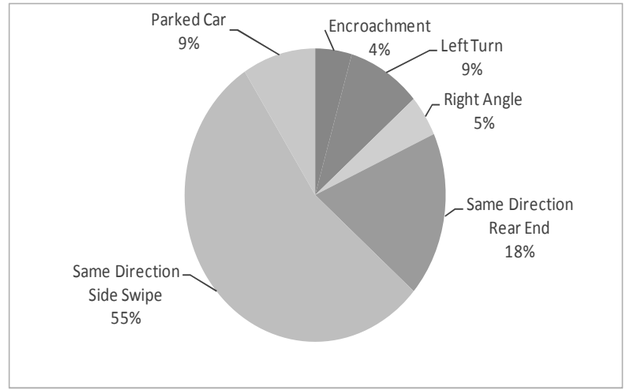

NOTES

Demarest Avenue

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

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_____

Speed Limit : _____

Signal head placement :

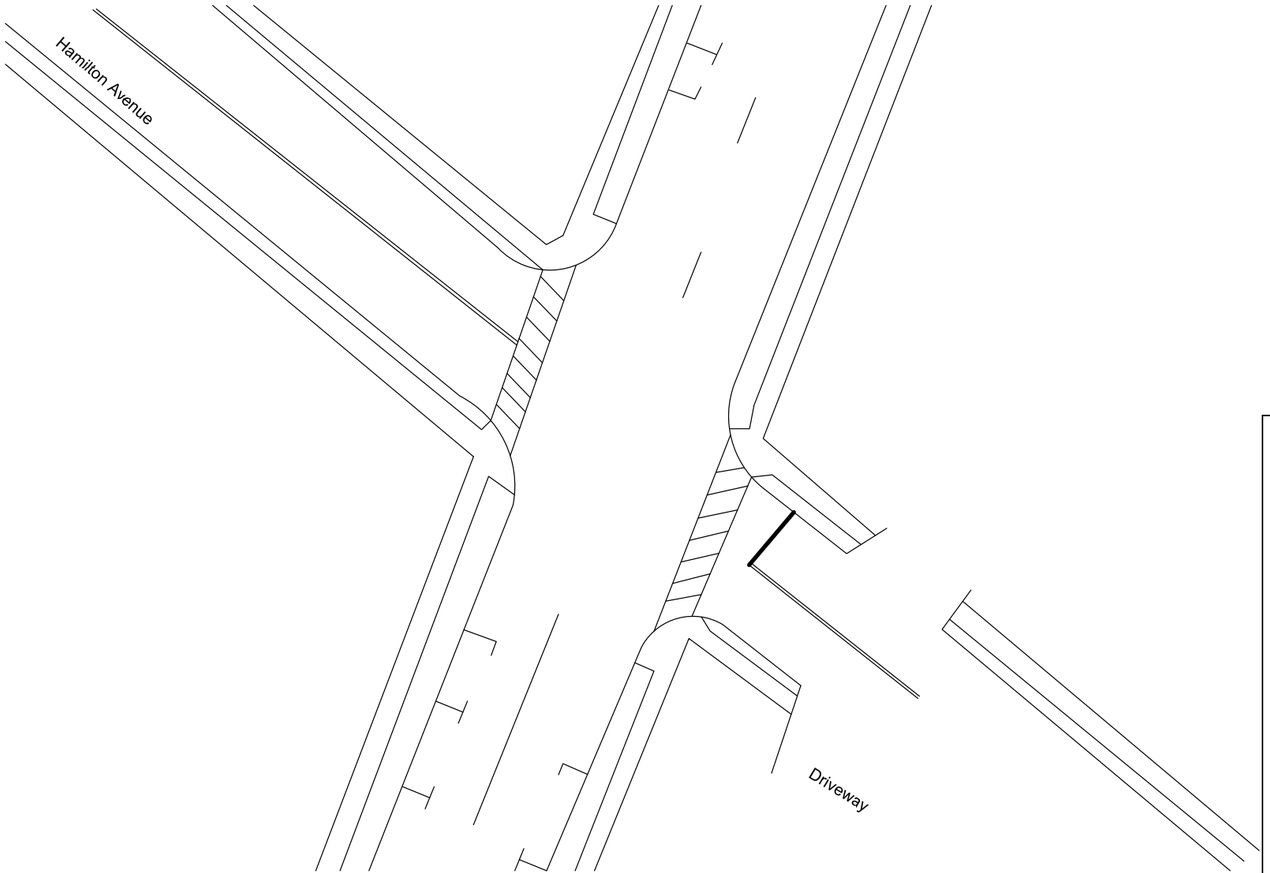
Good Bad Fair

LIGHTING

Sufficient lighting :

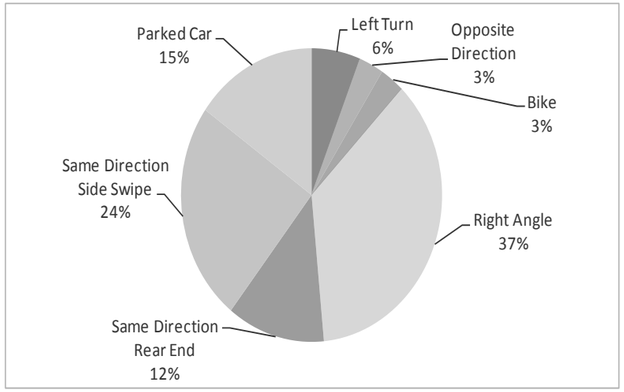
Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



Hamilton Avenue

CRASH TYPES



NOTES

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

_____

_____

Speed Limit : _____

Signal head placement :

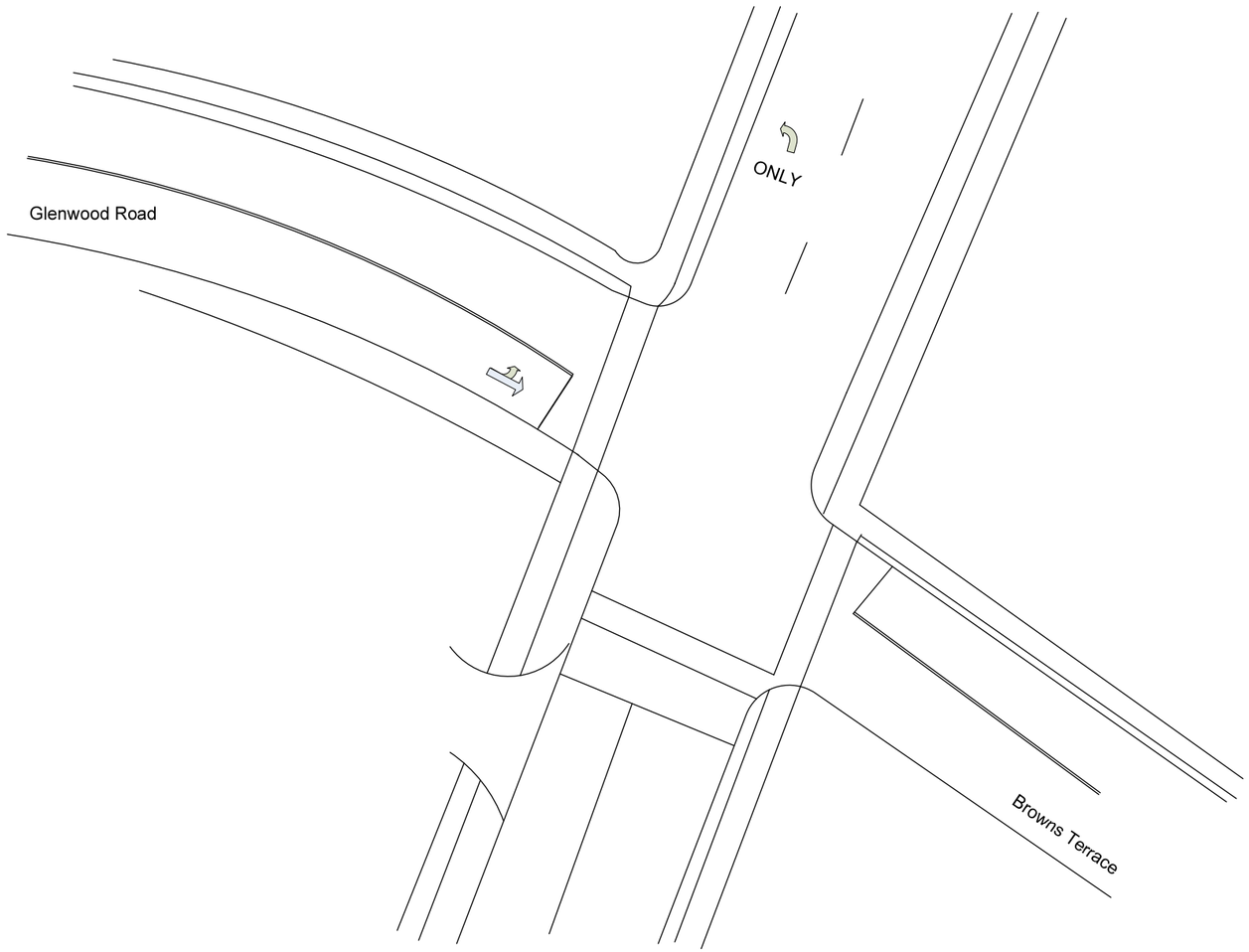
Good Bad Fair

LIGHTING

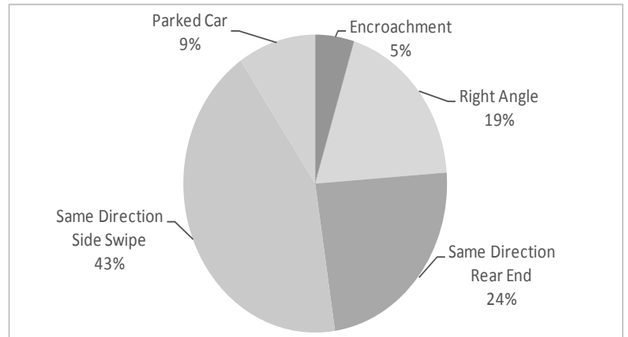
Sufficient lighting :

Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



CRASH TYPES



NOTES

Glenwood Road / Browns Terrace

CHECK LIST

BUS STOPS

Signed :

Yes No

Sheltered :

Yes No

LAND USE

Residential , Commercial,

Industrial , School/library

PEDESTRIANS

Countdown, Hand/Man, Walk/Don't walk, RYG

Push Button:

Yes No

Marked Crosswalk:

Yes No

SIGNAL

Phasing :

_____

_____

Good Sight Distance :

Yes No

Properly Signed :

Yes No

Pavement & Marking defects :

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Speed Limit : _____

Signal head placement :

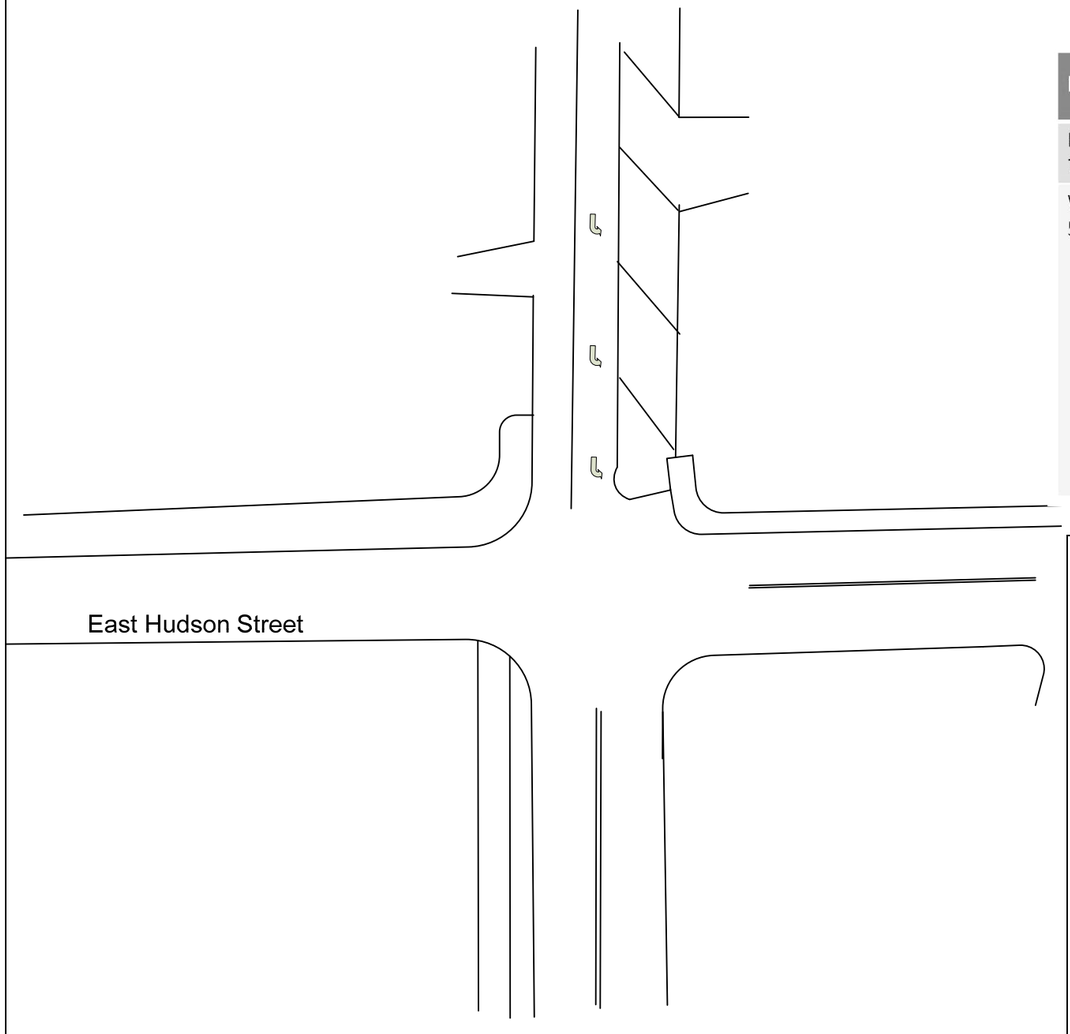
Good Bad Fair

LIGHTING

Sufficient lighting :

Yes No

RUTGERS
Center for Advanced Infrastructure and Transportation



East Hudson Street

PEDESTRIAN CRASHES

Date			Pedestrian Injury	Ped Contributing Circumstances	Pedestrian Pre-Crash Action
Friday 7:25 AM, 2009	At	-	Complaint of Pain	-	Crossing at marked Crosswalk (At Intersection
Wednesday 5:43 PM, 2005	At	-	Complaint of Pain	-	Crossing at marked Crosswalk (At Intersection)
			Complaint of Pain	-	Crossing at marked Crosswalk (At Intersection)
			Complaint of Pain	-	Crossing at marked Crosswalk (At Intersection)
			Complaint of Pain	-	Crossing at marked Crosswalk (At Intersection)
			Complaint of Pain	-	Crossing at marked Crosswalk (At Intersection)

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Appendix C

Traffic Counts

NEW JERSEY DEPARTMENT OF TRANSPORTATION
DIVISION OF TRAFFIC ENGINEERING AND SAFETY
Bureau of Transportation Data Development

Station ID : 2-5-414

SRI : 00000501__
Street Name : RT 501, Grand Avenue
County : Bergen
Milepost : 43.3
Location: Bet Huguenot Ave and Linden Ave
Municipality : Englewood City
Date : 12/2/2008
Direction: North
By : Berger
Latitude : 40.886606
Longitude : -73.977353

Date	12/2/2008		12/3/2008		12/4/2008		12/5/2008		12/6/2008		12/7/2008		12/8/2008		HOUR	Weekday Average	
Day	tuesday		wednesday		thursday		friday		saturday		sunday		monday				
direction	n		n		n		n		n		n		n			n	
0AM - 1AM	-	-	105	-	147	-	133	-							**0AM - 1AM**	**128**	-
1 - 2	-	-	**60**	-	**71**	-	**64**	-							1 - 2	**65**	-
2 - 3	-	-	40	-	46	-	61	-							2 - 3	**49**	-
3 - 4	-	-	**34**	-	**45**	-	**37**	-							3 - 4	**39**	-
4 - 5	-	-	61	-	66	-	70	-							4 - 5	**66**	-
5 - 6	-	-	**227**	-	**188**	-	**211**	-							5 - 6	**209**	-
6 - 7	-	-	616	-	664	-	647	-							6 - 7	**642**	-
7 - 8	-	-	**1244**	-	**1219**	-	**1198**	-							7 - 8	**1220**	-
8 - 9	-	-	1414	-	1353	-	1500	-							8 - 9	**1422**	-
9 - 10	-	-	**1322**	-	**1318**	-	**1342**	-							9 - 10	**1327**	-
10 - 11	-	-	1199	-	1303	-	1258	-							10 - 11	**1253**	-
11 - 12	-	-	**1114**	-	**1234**	-	**1157**	-							11 - 12	**1168**	-
12 N - 1PM	-	-	1223	-	1253	-									**12 N - 1PM**	**1238**	-
1 - 2	-	-	**1245**	-	**1246**	-									1 - 2	**1246**	-
2 - 3	-	-	1265	-	1337	-									2 - 3	**1301**	-
3 - 4	-	-	**1365**	-	**1292**	-									3 - 4	**1328**	-
4 - 5	-	-	1294	-	1215	-									4 - 5	**1254**	-
5 - 6	1138	-	**1232**	-	**1267**	-									5 - 6	**1250**	-
6 - 7	**833**	-	1176	-	1112	-									6 - 7	**1142**	-
7 - 8	594	-	**921**	-	**905**	-									7 - 8	**886**	-
8 - 9	**510**	-	664	-	675	-									8 - 9	**644**	-
9 - 10	382	-	**473**	-	**529**	-									9 - 10	**504**	-
10 - 11	**224**	-	382	-	396	-									10 - 11	**387**	-
11 - 12			**195**	-	**239**	-									11 - 12	**219**	-
															24 hours	18987	-
															Pattern Factor	0.97	
															Axle Cor. Fact	0.966	

	Est. AADT	17791	-
	2 - way AADT	-	
	k - factor	-	
	D - factor	-	

New Jersey Department of Transportation

Daily Volume from 02/17/2009 through 02/19/2009

Site Names:	2-5-415, , CO 501-44.8	Seasonal Factor Type:	2 Urban Other Roadways
County:	BERGEN	Daily Factor Type:	2 Urban Other Roadways
Funct. Class:	Urban Principal Arterial - Other	Axle Factor Type:	14
Location:	Bet Davidson Pl and Concord St	Growth Factor Type:	2 Urban Other Roadways

	02/15/2009			02/16/2009			02/17/2009			02/18/2009			02/19/2009			02/20/2009	
	Road	S	N	Road	S	N	Road	S	N	Road	S	N	Road	S	N	Road	S
00:00										67		67	53		53		
01:00										31		31	46		46		
02:00										20		20	22		22		
03:00										9		9	14		14		
04:00										29		29	23		23		
05:00										63		63	44		44		
06:00										156		156	168		168		
07:00										410		410	420		420		
08:00										558		558	518		518		
09:00										526		526	551		551		
10:00										601		601	543		543		
11:00										587		587	597		597		
12:00										657		657	610		610		
13:00							695		695	626		626					
14:00							707		707	663		663					
15:00							831		831	746		746					
16:00							882		882	809		809					
17:00							906		906	784		784					
18:00							824		824	751		751					
19:00							734		734	628		628					
20:00							541		541	441		441					
21:00							339		339	302		302					
22:00							258		258	228		228					
23:00							171		171	155		155					
Volume							6,888		6,888	9,847		9,847	3,609		3,609		
AM Peak Vol										601		601	597		597		
AM Peak Fct										0.93		0.93	0.80		0.80		
AM Peak Hr										10.00		10.00	11.00		11.00		
PM Peak Vol										816		816					
PM Peak Fct										0.91		0.91					
PM Peak Hr										15.45		15.45					
Seasonal Fct							1.044		1.044	1.044		1.044	1.044		1.044		
Daily Fct							0.951		0.951	0.944		0.944	0.885		0.885		
Axle Fct							0.486		0.486	0.486		0.486	0.486		0.486		
Pulse Fct							2.000		2.000	2.000		2.000	2.000		2.000		

Created 05/04/2009 2:14:57 PM **ROAD AADT** **9,661** **NEG AADT** **0** **POS AADT** **9,661**

Station Number :2-5-415 SRI: 00000501__

MP: 44.8 Municipality: Englewood City County: Bergen

Functional Class: 14 Group Number: 1/2

latitude: 40.90661 longitude: -73.966198

Date: 12/2/2008

Direction: N

hour	mtcycle	auto	2axle 4-tire	bus	axle 6-tire truc	axle single truc	axle single uni	axle single trai	xle single trail	xle single trail	axle multi trail	axle multi trail	axle multi traili	Other	Total
0	0	49	5	1	3	0	0	0	0	0	0	0	0	0	58
1	0	33	1	2	2	0	0	0	1	0	0	0	0	0	39
2	0	17	1	3	1	0	0	0	0	0	0	0	0	0	22
3	0	12	1	0	2	0	0	0	1	0	0	0	0	0	16
4	1	16	9	0	1	0	0	0	0	0	0	0	0	0	27
5	0	50	5	1	4	1	0	2	1	0	0	0	0	0	64
6	1	149	30	10	10	0	1	2	2	0	0	0	0	0	205
7	0	348	57	16	17	1	9	14	3	1	0	3	5	0	474
8	1	425	81	16	10	4	6	17	0	4	0	1	4	0	569
9	2	385	76	15	18	2	3	15	3	0	0	2	2	0	523
10	0	441	75	10	27	2	2	19	2	0	0	1	1	0	580
11	1	495	78	12	20	3	5	18	3	2	1	1	3	0	642
12	4	490	67	15	14	2	4	25	2	2	0	2	4	0	631
13	3	489	82	14	20	6	5	15	2	0	1	0	1	0	638
14	0	608	96	9	16	4	3	25	1	1	1	1	0	0	765
15	0	664	90	16	14	2	9	19	0	2	0	4	2	0	822
16	7	724	85	13	11	3	10	25	3	2	0	3	0	0	886
17	6	741	80	15	5	3	11	20	0	1	0	2	2	0	886
18	4	688	73	15	10	9	5	10	1	2	0	1	0	0	818
19	1	490	53	18	7	4	3	16	4	2	1	4	2	0	605
20	0	410	34	12	3	2	3	8	1	2	0	0	0	0	475
21	0	240	31	8	2	2	1	5	1	1	0	0	0	0	291
22	0	212	20	8	0	0	3	5	0	0	0	0	0	0	248
23	0	136	11	7	1	0	0	0	0	0	0	0	0	0	155
Total	31	8312	1141	236	218	50	83	260	31	22	4	25	26	0	10439

Station Number :2-5-415 SRI: 00000501__

MP: 44.8 Municipality: Englewood City County: Bergen

Functional Class: 14 Group Number: 1/2

latitude: 40.90661 longitude: -73.966198

Date: 12/2/2008

Direction: N

Id	Dir	hr	cl1	cl2	cl3	cl4	cl5	cl6	cl7	cl8	cl9	cl10	cl11	cl12	cl13	cl14	clTotal
0	N	17	2	593	61	9	6	2	7	30	1	11	0	0	8	0	730
1	N	18	3	603	59	16	7	0	7	21	1	7	0	4	3	0	731
2	N	19	0	488	44	21	5	1	9	22	1	5	0	0	1	0	597
3	N	20	2	361	45	13	1	0	4	6	0	5	0	2	2	0	441
4	N	21	2	277	28	8	1	0	1	10	0	3	0	0	0	0	330
5	N	22	0	178	13	11	1	0	1	2	0	0	0	2	0	0	208
6	N	23	0	123	7	6	0	0	1	0	0	1	0	0	0	0	138
7	N	0	0	49	5	1	3	0	0	0	0	0	0	0	0	0	58
8	N	1	0	33	1	2	2	0	0	0	1	0	0	0	0	0	39
9	N	2	0	17	1	3	1	0	0	0	0	0	0	0	0	0	22
10	N	3	0	12	1	0	2	0	0	0	1	0	0	0	0	0	16
11	N	4	1	16	9	0	1	0	0	0	0	0	0	0	0	0	27
12	N	5	0	50	5	1	4	1	0	2	1	0	0	0	0	0	64
13	N	6	1	149	30	10	10	0	1	2	2	0	0	0	0	0	205
14	N	7	0	348	57	16	17	1	9	14	3	1	0	3	5	0	474
15	N	8	1	425	81	16	10	4	6	17	0	4	0	1	4	0	569
16	N	9	2	385	76	15	18	2	3	15	3	0	0	2	2	0	523
17	N	10	0	441	75	10	27	2	2	19	2	0	0	1	1	0	580
18	N	11	1	495	78	12	20	3	5	18	3	2	1	1	3	0	642
19	N	12	4	490	67	15	14	2	4	25	2	2	0	2	4	0	631
20	N	13	3	489	82	14	20	6	5	15	2	0	1	0	1	0	638
21	N	14	0	608	96	9	16	4	3	25	1	1	1	1	0	0	765
22	N	15	0	664	90	16	14	2	9	19	0	2	0	4	2	0	822
23	N	16	7	724	85	13	11	3	10	25	3	2	0	3	0	0	886
24	N	17	6	741	80	15	5	3	11	20	0	1	0	2	2	0	886
25	N	18	4	688	73	15	10	9	5	10	1	2	0	1	0	0	818
26	N	19	1	490	53	18	7	4	3	16	4	2	1	4	2	0	605
27	N	20	0	410	34	12	3	2	3	8	1	2	0	0	0	0	475
28	N	21	0	240	31	8	2	2	1	5	1	1	0	0	0	0	291
29	N	22	0	212	20	8	0	0	3	5	0	0	0	0	0	0	248
30	N	23	0	136	11	7	1	0	0	0	0	0	0	0	0	0	155
31	N	0	0	67	7	2	1	0	1	2	0	0	0	0	0	0	80
32	N	1	0	32	2	1	3	0	0	0	0	0	0	0	0	0	38
33	N	2	0	15	2	1	1	0	0	0	0	0	0	0	0	0	19
34	N	3	0	14	2	0	1	0	0	0	0	0	0	0	0	0	17
35	N	4	0	16	8	0	1	0	0	1	0	0	0	0	0	0	26
36	N	5	0	37	9	2	2	1	0	1	0	0	0	0	0	0	52
37	N	6	1	170	22	6	7	3	1	8	1	1	0	0	0	0	220
38	N	7	1	351	71	24	20	3	4	14	5	5	0	2	3	0	503
39	N	8	1	422	78	17	20	8	10	24	5	3	0	2	2	0	592
40	N	9	0	416	76	13	18	10	7	18	3	6	0	3	1	0	571
41	N	10	2	393	68	14	23	5	8	20	4	5	0	2	0	0	544
42	N	11	0	461	75	11	14	5	8	23	1	3	0	2	6	0	609
43	N	12	1	464	63	10	20	2	5	16	2	4	1	1	0	0	589
44	N	12	0	486	72	10	17	7	11	20	2	3	0	3	0	0	631
45	N	13	2	593	94	10	11	8	11	32	1	5	0	3	4	0	774
46	N	14	3	556	93	11	13	3	10	27	1	4	1	3	4	0	729
47	N	15	5	638	87	11	5	6	16	34	0	4	0	3	3	0	812
48	N	16	0	657	73	7	8	1	7	20	3	4	1	1	5	0	787
49	N	17	0	592	61	20	6	1	9	27	2	4	0	4	1	0	727

Station Number: 2-5-415 SRI: 00000501__

MP: 44.8 Municipality: Englewood City County: Bergen

Functional Class: 14 Group Number: 1/2

latitude: 40.90661 longitude: -73.966198

Date: 12/2/2008

Pattern Factor: 0.97 AADT: 20252

K factor: 0.09 D factor: 0.5

Direction: N S

hour	mtcycle	auto	2axle 4-tire	bus	axle 6-tire truc	axle single tru	axle single uni	axle single tra	xle single trail	xle single trail	xle multi trail	xle multi trail	xle multi trail	Other	Total
0	0	98	10	2	6	0	0	0	0	0	0	0	0	0	116
1	0	66	2	4	4	0	0	0	2	0	0	0	0	0	78
2	0	34	2	6	2	0	0	0	0	0	0	0	0	0	44
3	0	24	2	0	4	0	0	0	2	0	0	0	0	0	32
4	2	32	18	0	2	0	0	0	0	0	0	0	0	0	54
5	0	100	10	2	8	2	0	4	2	0	0	0	0	0	128
6	2	298	60	20	20	0	2	4	4	0	0	0	0	0	410
7	0	696	114	32	34	2	18	28	6	2	0	6	10	0	948
8	2	850	162	32	20	8	12	34	0	8	0	2	8	0	1138
9	4	770	152	30	36	4	6	30	6	0	0	4	4	0	1046
10	0	882	150	20	54	4	4	38	4	0	0	2	2	0	1160
11	2	990	156	24	40	6	10	36	6	4	2	2	6	0	1284
12	8	980	134	30	28	4	8	50	4	4	0	4	8	0	1262
13	6	978	164	28	40	12	10	30	4	0	2	0	2	0	1276
14	0	1216	192	18	32	8	6	50	2	2	2	2	0	0	1530
15	0	1328	180	32	28	4	18	38	0	4	0	8	4	0	1644
16	14	1448	170	26	22	6	20	50	6	4	0	6	0	0	1772
17	12	1482	160	30	10	6	22	40	0	2	0	4	4	0	1772
18	8	1376	146	30	20	18	10	20	2	4	0	2	0	0	1636
19	2	980	106	36	14	8	6	32	8	4	2	8	4	0	1210
20	0	820	68	24	6	4	6	16	2	4	0	0	0	0	950
21	0	480	62	16	4	4	2	10	2	2	0	0	0	0	582
22	0	424	40	16	0	0	6	10	0	0	0	0	0	0	496
23	0	272	22	14	2	0	0	0	0	0	0	0	0	0	310
Total	62	16624	2282	472	436	100	166	520	62	44	8	50	52	0	20878
% Percent	0	79	10	2	2	0	0	2	0	0	0	0	0	0	0

Station Number :2-5-415 SRI: 00000501__

MP: 44.8 Municipality: Englewood City County: Bergen

Functional Class: 14 Group Number: 1/2

latitude: 40.90661 longitude: -73.966198

Date: 12/2/2008

Direction: S

hour	mtcycle	auto	2axle 4-tire	bus	axle 6-tire truc	axle single truc	axle single uni	axle single trai	xle single trail	xle single trail	xle multi trailer	xle multi trailer	xle multi traile	Other	Total
0	0	49	5	1	3	0	0	0	0	0	0	0	0	0	58
1	0	33	1	2	2	0	0	0	1	0	0	0	0	0	39
2	0	17	1	3	1	0	0	0	0	0	0	0	0	0	22
3	0	12	1	0	2	0	0	0	1	0	0	0	0	0	16
4	1	16	9	0	1	0	0	0	0	0	0	0	0	0	27
5	0	50	5	1	4	1	0	2	1	0	0	0	0	0	64
6	1	149	30	10	10	0	1	2	2	0	0	0	0	0	205
7	0	348	57	16	17	1	9	14	3	1	0	3	5	0	474
8	1	425	81	16	10	4	6	17	0	4	0	1	4	0	569
9	2	385	76	15	18	2	3	15	3	0	0	2	2	0	523
10	0	441	75	10	27	2	2	19	2	0	0	1	1	0	580
11	1	495	78	12	20	3	5	18	3	2	1	1	3	0	642
12	4	490	67	15	14	2	4	25	2	2	0	2	4	0	631
13	3	489	82	14	20	6	5	15	2	0	1	0	1	0	638
14	0	608	96	9	16	4	3	25	1	1	1	1	0	0	765
15	0	664	90	16	14	2	9	19	0	2	0	4	2	0	822
16	7	724	85	13	11	3	10	25	3	2	0	3	0	0	886
17	6	741	80	15	5	3	11	20	0	1	0	2	2	0	886
18	4	688	73	15	10	9	5	10	1	2	0	1	0	0	818
19	1	490	53	18	7	4	3	16	4	2	1	4	2	0	605
20	0	410	34	12	3	2	3	8	1	2	0	0	0	0	475
21	0	240	31	8	2	2	1	5	1	1	0	0	0	0	291
22	0	212	20	8	0	0	3	5	0	0	0	0	0	0	248
23	0	136	11	7	1	0	0	0	0	0	0	0	0	0	155
Total	31	8312	1141	236	218	50	83	260	31	22	4	25	26	0	10439

Station Number :2-5-415 SRI: 00000501__

MP: 44.8 Municipality: Englewood City County: Bergen

Functional Class: 14 Group Number: 1/2

latitude: 40.90661 longitude: -73.966198

Date: 12/2/2008

Direction: S

Id	Dir	hr	cl1	cl2	cl3	cl4	cl5	cl6	cl7	cl8	cl9	cl10	cl11	cl12	cl13	cl14	clTotal
0	S	17	2	593	61	9	6	2	7	30	1	11	0	0	8	0	730
1	S	18	3	603	59	16	7	0	7	21	1	7	0	4	3	0	731
2	S	19	0	488	44	21	5	1	9	22	1	5	0	0	1	0	597
3	S	20	2	361	45	13	1	0	4	6	0	5	0	2	2	0	441
4	S	21	2	277	28	8	1	0	1	10	0	3	0	0	0	0	330
5	S	22	0	178	13	11	1	0	1	2	0	0	0	2	0	0	208
6	S	23	0	123	7	6	0	0	1	0	0	1	0	0	0	0	138
7	S	0	0	49	5	1	3	0	0	0	0	0	0	0	0	0	58
8	S	1	0	33	1	2	2	0	0	0	1	0	0	0	0	0	39
9	S	2	0	17	1	3	1	0	0	0	0	0	0	0	0	0	22
10	S	3	0	12	1	0	2	0	0	0	1	0	0	0	0	0	16
11	S	4	1	16	9	0	1	0	0	0	0	0	0	0	0	0	27
12	S	5	0	50	5	1	4	1	0	2	1	0	0	0	0	0	64
13	S	6	1	149	30	10	10	0	1	2	2	0	0	0	0	0	205
14	S	7	0	348	57	16	17	1	9	14	3	1	0	3	5	0	474
15	S	8	1	425	81	16	10	4	6	17	0	4	0	1	4	0	569
16	S	9	2	385	76	15	18	2	3	15	3	0	0	2	2	0	523
17	S	10	0	441	75	10	27	2	2	19	2	0	0	1	1	0	580
18	S	11	1	495	78	12	20	3	5	18	3	2	1	1	3	0	642
19	S	12	4	490	67	15	14	2	4	25	2	2	0	2	4	0	631
20	S	13	3	489	82	14	20	6	5	15	2	0	1	0	1	0	638
21	S	14	0	608	96	9	16	4	3	25	1	1	1	1	0	0	765
22	S	15	0	664	90	16	14	2	9	19	0	2	0	4	2	0	822
23	S	16	7	724	85	13	11	3	10	25	3	2	0	3	0	0	886
24	S	17	6	741	80	15	5	3	11	20	0	1	0	2	2	0	886
25	S	18	4	688	73	15	10	9	5	10	1	2	0	1	0	0	818
26	S	19	1	490	53	18	7	4	3	16	4	2	1	4	2	0	605
27	S	20	0	410	34	12	3	2	3	8	1	2	0	0	0	0	475
28	S	21	0	240	31	8	2	2	1	5	1	1	0	0	0	0	291
29	S	22	0	212	20	8	0	0	3	5	0	0	0	0	0	0	248
30	S	23	0	136	11	7	1	0	0	0	0	0	0	0	0	0	155
31	S	0	0	67	7	2	1	0	1	2	0	0	0	0	0	0	80
32	S	1	0	32	2	1	3	0	0	0	0	0	0	0	0	0	38
33	S	2	0	15	2	1	1	0	0	0	0	0	0	0	0	0	19
34	S	3	0	14	2	0	1	0	0	0	0	0	0	0	0	0	17
35	S	4	0	16	8	0	1	0	0	1	0	0	0	0	0	0	26
36	S	5	0	37	9	2	2	1	0	1	0	0	0	0	0	0	52
37	S	6	1	170	22	6	7	3	1	8	1	1	0	0	0	0	220
38	S	7	1	351	71	24	20	3	4	14	5	5	0	2	3	0	503
39	S	8	1	422	78	17	20	8	10	24	5	3	0	2	2	0	592
40	S	9	0	416	76	13	18	10	7	18	3	6	0	3	1	0	571
41	S	10	2	393	68	14	23	5	8	20	4	5	0	2	0	0	544
42	S	11	0	461	75	11	14	5	8	23	1	3	0	2	6	0	609
43	S	12	1	464	63	10	20	2	5	16	2	4	1	1	0	0	589
44	S	12	0	486	72	10	17	7	11	20	2	3	0	3	0	0	631
45	S	13	2	593	94	10	11	8	11	32	1	5	0	3	4	0	774
46	S	14	3	556	93	11	13	3	10	27	1	4	1	3	4	0	729

47	S	15	5	638	87	11	5	6	16	34	0	4	0	3	3	0	812
48	S	16	0	657	73	7	8	1	7	20	3	4	1	1	5	0	787
49	S	17	0	592	61	20	6	1	9	27	2	4	0	4	1	0	727