Application for a Major Modification to Solid Waste Facility Permit – TNOD Response Document

Camden County Energy Recovery Center
Camden Green Initiative Project

AECOM Project number: 60654787

July 2023

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Camden County Energy Recovery Associates
600 Morgan Blvd.
Camden, NJ 08104
Tel: 856.966.7174

July 14, 2023

Mr. Anthony Fontana, Chief
Bureau of Solid Waste Permitting
Division of Solid & Hazardous Waste Permitting
New Jersey Department of Environmental Protection
401 E. State Street, 2nd Floor, West Wing
P.O. Box 420, Mail Code 401-02C
Trenton, NJ 08625-0414

Re: Technical Notice of Deficiency
Application for a Solid Waste Facility Permit – Major Modification
Camden County Energy Recovery Associates, L.P.
Camden County Energy Recovery Center (CCERC)
Camden City, Camden County
Facility ID No.: 133512
Permit No.: RRF220001

Dear Mr. Fontana :

Camden County Energy Recovery Associates, L.P. ("CCERA") hereby submits this response document to the Technical Notice of Deficiency dated April 11, 2023, concerning its application ("the Application") for a major modification of the Solid Waste Permit (Permit No. RRF190001) for the Camden County Energy Recovery Center ("the CCERC, the Facility"). CCERA is seeking approval to upgrade the air quality control systems ("AQCS") at the Facility and to install and operate a Liquid Direct Injection ("LDI") system to receive and process Type 72 waste. Proposed modifications of the AQCS include conversion of the existing spray dryer scrubber on each Municipal Waste Combustor ("MWC") to a circulating dry scrubber ("CDS") system, replacement of the electrostatic precipitator ("ESP") on each MWC with a fabric filter baghouse, and improvement of the selective noncatalytic reduction system on each MWC. The proposed LDI system will allow for the processing of nonhazardous liquid wastes in each of the three (3) MWCs.

The enclosed response document includes responses to the 12 technical comments from the Department and responses to the three (3) public comments concerning the application to which you requested our response. Also included are attachments which are referenced in the responses to the comments. They include health risk assessment and traffic analysis reports for the project, Material Characterization and LDI Safety and Handling Addendum Forms, a completed Page 2 of the Solid Waste Facility Permit Application Form, and a revised Baghouse Bag Disposal Policy.

Thank you for your consideration of this matter. If you any have any questions concerning this response document, the Application, or the proposed Project, please contact Mr. Gary Pierce of Covanta Environmental at (518) 207-7149.

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Camden County Energy Recovery Associates
600 Morgan Blvd.
Camden, NJ 08104
Tel: 856.966.7174

Sincerely,

Todd Frace
Facility Manager

cc: T. Byrne - NJDEP
K. Beccia - NJDEP
J. Bernardino – Covanta
M. Van Brunt - Covanta
T Gregan - Covanta
P. Earls - Covanta
J. Walsh – Covanta
B. Stormwind - AECOM
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DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF SUSTAINABLE WASTE MANAGEMENT
BUREAU OF SOLID WASTE PERMITTING
401 East State Street
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PHILIP D. MURPHY
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SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

April 11, 2023

Todd Frace, Facility Manager
Camden County Energy Recovery Associates, L.P.
600 Morgan Boulevard
Camden, NJ 08104

Re: Technical Notice of Deficiency
Application for a Solid Waste Facility Permit – Major Modification
Camden County Energy Recovery Associates, L.P.
Camden County Energy Recovery Center (CCERC)
Camden City, Camden County
Facility ID No.: 133512
Permit No.: RRF220001

Dear Mr. Frace:

The Bureau of Solid Waste Permitting (Bureau) is in receipt of a Solid Waste Facility (SWF) Permit – Major Modification application dated September 20, 2022 for the above referenced facility. The Bureau is also in receipt of a revised application received on November 4, 2022 and replacement drawings received on November 22, 2022.

The application proposes to upgrade the air quality control systems (AQCS) at the CCERC, to add Type 72 (Bulk Liquid and Semi-Liquid) Waste as an approved waste type to be accepted and processed at the facility, and to install and operate a Type 72 waste delivery system and a Liquid Direct Injection (LDI) system in order to receive and process the Type 72 waste. Proposed modifications to the AQCS include conversion of the existing spray dryer scrubber on each Municipal Waste Combustor (MWC) to a circulating dry scrubber (CDS), replacement of the electrostatic precipitator on each MWC with a fabric filter baghouse, and improvement of the selective noncatalytic reduction system on each MWC.

The Bureau has completed a review of the application pursuant to N.J.A.C. 7:26-2.4(g)11 to determine if the submittal is technically complete. Upon review, the Bureau has determined that the application is TECHNICALLY INCOMPLETE.

For this office to determine the application complete, the following deficiencies must be addressed:

1. Section 3.2.1.1 SNCR Controls Upgrade (page 3-3) – Provide an estimation of the reduction in annual mass emissions of NOx that will result from the upgrade to a continuous modulation of urea injection. Also include a discussion of whether this upgrade will change the amount of urea that will be used by the facility and discuss any environmental and health impacts of this change.

2. Section 3.2.1.2 – Scrubbing System Modification (page 3-4) – Provide additional detail regarding the impacts of changing the existing spray dryer scrubber system to a circulating dry scrubber, including a calculation of the anticipated reduction in reagent use, a calculation of the reduction in ash disposal volumes, and a calculation of the anticipated reduction in acid gases, mercury, and organic substances. Please include a discussion of the changes in environmental and health impacts with each of these calculations.

3. Section 3.2.1.3 Baghouse (page 3-4) – Provide a calculation of the estimated reduction in air emissions from the installation of the fabric filter baghouse. Emissions data from the recently installed baghouse unit in the Essex County Resource Recovery Facility may be used as a reference. Include a discussion of the change in environmental and health impacts with this calculation.

4. Section 3.2.1.4 Fly Ash Recirculation System (page 3-6) – Provide additional discussion of the environmental and health impacts that would result from the additional moisture content which will improve the reaction efficiency of the hydrated lime in the fly ash and the reduction in the flue gas temperature within the reactor.

5. Section 3.2.2.1 General Description of LDI System (page 3-9) – Please clarify that incoming loads of Type 72 liquid waste will be recorded in both tons and gallons. Also include that the mandatory fingerprint analysis will be officially recorded by facility personnel and that these records will be kept at the facility for inspection.

6. Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – Please add landfill leachate and materials containing PFAS to the list of unacceptable materials to be used for Liquid Direct Injection.

7. Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – This Section states, "Additional testing, if deemed necessary, may include analysis for flash point, total metals, volatile organic compounds ("VOCs"), total halogens, and any additional information the waste approver deems necessary to complete their review." Provide additional information about how the waste approver would determine if this additional information would be necessary to complete their review.

8. Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – Provide a calculation of the quantity of process wastewater that will be processed at the facility that would otherwise be discharged to the Camden County Municipal Utilities Authority (CCMUA) Sewage Treatment Plant by utilizing the LDI system to process internally generated wastewater. Discuss the environmental and health impacts of the anticipated reduction of wastewater discharged to the CCMUA Sewage Treatment Plant.

9. Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – Discuss the environmental and health impacts of utilizing the LDI waste streams in the SNCR system as a carrier liquid for injecting urea into the boilers for the control of NOx emissions.

10. Section 3.2.2.4 Traffic (page 3-13) – Provide more detailed analysis regarding the impact of the increased truck traffic on the traffic volumes evaluated in the Final Environmental and Health Impact Statement for the CCERC. Include a computation of the average daily and peak daily delivery vehicle count from data from the most recent three (3) years of operational data and a projection of the increased truck numbers onto this data.

11. Appendix A – Solid Waste Facility Permit Application Form – Page 2 – In the revised application received by the Bureau on November 4, 2022, Sections 4 (Application Type), 5 (Facility Type), and 6 (Waste Types) have not been filled out. Please complete and submit these Sections of the SWF Permit Application Form.

12. Appendix D – CAM-SOP-751 Baghouse Bag Disposal Procedure – Please add the following provisions to the SOP to ensure that spent baghouse filters aren't inadvertently taken off-site:

    a. Covanta Camden shall prohibit the use of any third-party contractors for the disposal of used baghouse filters. Instead, only employees of Covanta Camden will be responsible for taking the used filter bags that have been double bagged and sealed to the tipping floor for processing in the MWC units at the facility.

    b. In addition to the regular scaling out of all refuse hauler trucks, ash hauler trucks, and metal hauler trucks, all other hauler trucks leaving the site for any reason shall be required to stop at the scale house for authorization to leave prior to leaving the site in order to prevent any unauthorized removal of waste from the site.

13. Public Comments – Please provide a response to each of the three (3) enclosed comments that the Bureau has received regarding the application.

A response to this notice of deficiency that adequately addresses each noted item is required to be submitted to the Bureau within sixty (60) days from the date of this letter pursuant to N.J.A.C. 7:26-2.4(g)11(i)(2). Failure to submit a complete and timely response may result in the Bureau rejecting the application as technically incomplete pursuant to N.J.A.C. 7:26-2.4(g)11. Please provide to the Bureau one (1) original hard copy, three (3) hard copies, and one (1) electronic copy of your response. The electronic copy of the response may be emailed to Kimberly.Beccia@dep.nj.gov.

If you have any questions concerning this matter, please contact Kimberly Beccia of my staff at (609) 984-2104 or by email at Kimberly.Beccia@dep.nj.gov.

Sincerely,

/s/

Anthony Fontana, Chief
Bureau of Solid Waste Permitting

c: Tom Farrell, Chief, Bureau of Solid Waste Compliance and Enforcement
John Stavash, Supervisor, Bureau of Solid Waste Compliance and Enforcement
Kandyce Perry, Director, Office of Environmental Justice
Ken Ratzman, Manager, Air Quality Regulation and Planning
Paschal Nwako, Health Officer, Camden County Department of Health & Human Services
Gary Pierce, Environmental Manager, Camden County Energy Recovery Associates, L.P.
Brian Stormwind, Associate Vice President, Manager, Air Quality Services – East, AECOM

Enclosure

Doc: Technical NOD – SW

Comment No. 1 - Section 3.2.1.1 SNCR Controls Upgrade (page 3-3) – Provide an estimation of the reduction in annual mass emissions of NOx that will result from the upgrade to a continuous modulation of urea injection. Also include a discussion of whether this upgrade will change the amount of urea that will be used by the facility and discuss any environmental and health impacts of this change.

The current permitted allowable annual mass emission rate of oxides of nitrogen ("NOx") from the Camden County Energy Recovery Center ("the CCERC") is 459 tons per year ("tpy"). Average annual emissions of NOx for the 3-year period 2020-2022 were 430 tons. In the air permit application for the Camden Green Initiative Project ("the CGI Project"), Camden County Energy Recovery Associates, L.P. ("CCERA") proposed that upon completion of enhancements to the Selective Noncatalytic Reduction ("SNCR") systems, annual NOx emissions from the CCERC would not exceed a total of 400 tons. Based on each of the three (3) boilers operating 8,256 hours per year to combust a total facility maximum of 451,140 tons of MSW (the permitted waste throughput limit) and achieving an annual average stack NOx concentration of 100 ppmdv7, it is estimated that total annual NOx emissions would be approximately 400 tons. Co-firing an average of four (4) gallons per minute of liquid waste in each unit for 8,256 hours per year would reduce the annual MSW throughput rate from 451,140 tpy to 426,352 tpy (451,140 tpy processed - 24,788 tpy of liquids = 426,352 tpy) because the total weight of liquid waste processed, most of which is water, would count toward the annual waste throughput limit of 451,140 tons. Assuming NOx emissions are unaffected by co-firing that amount of LDI (based on operation of LDI systems at other Covanta facilities), annual NOx emissions from combusting 426,352 tons of MSW at the CCERC are estimated to be approximately 380 tons at an annual average stack NOx concentration of 100 ppmdv7. In summary, it is estimated that the reduction in annual mass emissions of NOx would range from approximately 30-50 tpy, depending upon the amount of liquid waste processed.

It is difficult to provide an exact difference in urea usage resulting from proposed continuous modulation of urea injection based on the outlet NOx continuous emission monitors. An estimate places the annual reduction in urea consumption at approximately 10 percent of current levels. This reduction in urea usage would result in a small reduction in the number of reagent deliveries and have minimal health and environmental impacts.

The estimated reduction in NOx emissions resulting from the SNCR system upgrades as discussed above are more significant from the standpoint of environmental and health impacts. The air quality control region in which the CCERC is located is designated as nonattainment with respect to the 2015 8-hour National Ambient Air Quality Standard ("NAAQS") for ozone. NAAQS are set to provide public health protection, including protecting the health of sensitive populations such as people with asthma, children and the elderly. NOx can react with other compounds in the atmosphere to form ozone and is designated as a precursor to ozone formation. Although New Jersey reports it is getting close to meeting the ozone NAAQS, and NOx emissions from the CCERC are a very small percentage of total NOx emissions in the region (approximately 2.2 percent), the expected reduction in NOx emissions from the CCERC will provide some benefit in terms of improving air quality. In addition to being a precursor to ozone formation, at high enough ambient concentrations, nitrogen dioxide ("NO_2") itself can cause health problems, especially for sensitive individuals such as children, the elderly, and people with asthma. New Jersey has long been in attainment with the NAAQS for NO_2. Nonetheless the expected

reduction in NOx emissions from the CCERC will contribute to reducing ambient NOx levels in the local air shed.

Comment No. 2 - Section 3.2.1.2 – Scrubbing System Modification (page 3-4) – Provide additional detail regarding the impacts of changing the existing spray dryer scrubber system to a circulating dry scrubber, including a calculation of the anticipated reduction in reagent use, a calculation of the reduction in ash disposal volumes, and a calculation of the anticipated reduction in acid gases, mercury, and organic substances. Please include a discussion of the changes in environmental and health impacts with each of these calculations.

As stated in the solid waste permit application for the Camden Green Initiative Project, changing from the existing spray dryer scrubbing systems to using circulating dry scrubber technology will improve contact and increase residence time between acid gases, mercury, and organic substances and the hydrated lime and activated carbon reagents in the flue gas. The advantages attributable to fly ash recirculation are improved emission control efficiencies, optimized reagent usage, and reduced ash disposal volumes.

It is difficult to quantify the reduction in reagent usage and ash disposal volumes from current levels. The injection rate of hydrated lime to each MWC is controlled based on feedback from the stack sulfur dioxide ("SO_2") CEMS analyzer. Although less lime would likely be needed to meet the existing acid gas permit limits (most notably SO_2 and hydrogen chloride ("HCl"), Camden County Energy Recovery Associates, L.P. ("CCERA") has proposed a 17% reduction and a 31% reduction in the maximum SO_2 and HCL stack gas concentration permit limits, respectively. In addition, the installation of new air quality control equipment will allow for a small increase in the annual rate of MSW combustion within the permitted waste throughput limit. More restrictive emission limits and a minor increase in the annual quantity of waste combusted may result in a net zero change in lime consumption compared to present levels. The same principles apply with respect to ash disposal volumes. Meeting more restrictive acid gas standards and slightly greater waste processing rates mean the formation of more calcium salts from the reaction of lime with SO_2 and HCL which may offset the improvements provided by the advanced circulating dry scrubber technology. The normal per MWC lime consumption rate is estimated to be approximately 485 pounds per hour with a maximum rate of approximately 1,540 pounds per hour. The normal per MWC ash generation rate is estimated to be approximately 2,050 pounds per hour with a maximum rate of approximately 3,400 pounds per hour. Testing to verify these expected lime consumption and ash generation rates will be conducted upon the startup of each retrofitted unit.

Use of the circulating dry scrubber technology will also allow for additional contact of the injected activated carbon with mercury and dioxins/furans in the flue gas from the MWCs from the filter cake on the fabric filter bags. As such, it is expected that less activated carbon will be needed to achieve the optimum emissions reduction performance of the new control equipment. As with the acid gases, CCERA has also proposed stricter stack gas concentration permit emission limits for these contaminants (approximately 11% for mercury and 63% for dioxins/furans).

Upon completion of the retrofit of the first MWC, CCERA will obtain an approval from NJDEP to perform environmental improvement pilot testing for mercury emissions to optimize the activated carbon injection rate in pounds per hour and determine the associated screw feeder setting. Testing will be conducted at different carbon injection rates in accordance with a test program protocol to be submitted to the NJDEP for review. Upon completion of the pilot testing program and establishment of the appropriate injection rate on the first MWC, CCERA will continue to operate that unit and will

operate the subsequent two (2) MWCs at that established injection rate upon completion of their upgrades.

Based on emission reductions achieved at Covanta's Essex County Resource Recovery Facility located in Newark, NJ, when it was upgraded from electrostatic precipitators to fabric filter baghouses and average emissions from the CCERC, the anticipated percent reductions in the annual mass emission rates (tons per year) of acid gases, mercury, and organic substances (dioxins/furans) emissions upon completion of the facility retrofits are as follows:

- SO_2 – 60%
- HCl – 50%
- Mercury – 80%
- Dioxins/Furans – 70%

The proposed retrofits to the air quality control equipment on the MWCs at the CCERC are anticipated to significantly reduce the environmental and health impacts attributable to the facility. Preliminary air quality modeling of the proposed criteria pollutant emissions from the CCERC was performed in accordance NJDEP's Technical Manual 1002 and USEPA Guideline on Air Quality Models. The results indicated that predicted impacts of emissions from the CCERC are well below the USEPA's regulatory Significant Impact Levels ("SIL") except for modelled 1-hour NO_2 concentrations. Consequently, Covanta is performing a cumulative, multisource analysis, which in addition to the impacts from the CCERC, will include nearby background sources of NOx emissions and an ambient background concentration for comparison to the National Ambient Air Quality Standard ("NAAQS"). Covanta fully expects that the results of the required multisource analysis will show that the CCERC does not significantly contribute to a predicted violation of the 1-hour NO_2 NAAQS.

To evaluate the potential health effects of the CCERC upon completion of the proposed air quality control system retrofits, CCERA contracted with AECOM to conduct a multi-pathway human health risk assessment of the CCERC. A copy of the health risk assessment report is included in this document as **Attachment 1**. The proposed maximum short-term hourly emission rates and the proposed annual emission rates of air toxics were modeled using USEPA's preferred dispersion model, AERMOD, to obtain air concentrations and deposition rates for the area surrounding the facility. The IRAP-h View™ Industrial Risk Assessment Program (IRAP) was used to implement USEPA's Human health Risk Assessment Protocol (HHRAP) which integrates the AERMOD output, pollutant-specific emissions, site-specific physical and hydrological parameters, exposure parameters, and compound-specific toxicity values to estimate the cumulative human health risk at specific exposure locations near the facility. The approach was conservative in that maximum allowable short-term proposed permit emission rates were used (as opposed to actual or expected emission rates) and it assumed all three (3) MWCs operated continuously (8,760 hours per year) when each is limited by permit to 8,256 hours per year of operation.

The IRAP software used AERMOD output along with the site-specific physical and hydrological parameters and pollutant-specific emissions rates to calculate exposure point concentrations in the air, soil, surface water and fish, home-grown vegetables, farm-raised animals, cow's milk, eggs, and mother's milk (child only). The IRAP software then used the exposure point concentrations and toxicity values to calculate the pollutant-specific Excess Lifetime Cancer Risk which is expressed as a probability

(e.g., 10^{-5} or one chance in 100,000), and non-carcinogenic risk, expressed as a hazard index ("HI"). The total cumulative risk was then calculated as the sum of the pollutant-specific values.

USEPA guidelines for hazardous waste boilers indicate that total incremental cancer risk should not exceed 1 x 10^{-5} (one chance in 100,000). USEPA selected this level partly to account for exposure to background contamination levels from offsite combustion sources. USEPA guidelines indicate that the non-cancer HI for an individual constituent, or mixture of constituents where appropriate, should be less than 1.0. The USEPA cancer and non-cancer guidelines are also consistent with that of NJDEP as provided in Section 2.3.1 of *Technical Manual 1003 Guidance on Preparing a Risk Assessment for Air Contaminant Emissions.* The health risk assessment presented results relative to these cancer and non-cancer thresholds. The calculated overall long-term risk results for all exposure scenarios evaluated are less than the acceptable cancer risk and non-cancer (HI) risk thresholds. The maximum acute risk results for each of the exposure scenario locations, applicable to both adults and children, are less than the acceptable HI risk threshold of 1.0.

Comment No. 3 - Section 3.2.1.3 Baghouse (page 3-4) – Provide a calculation of the estimated reduction in air emissions from the installation of the fabric filter baghouse. Emissions data from the recently installed baghouse unit in the Essex County Resource Recovery Facility may be used as a reference. Include a discussion of the change in environmental and health impacts with this calculation.

Based on emission reductions achieved at Covanta's Essex County Resource Recovery Facility located in Newark, NJ when it was upgraded from electrostatic precipitators to fabric filter baghouses, and present emission levels from the Camden County Energy Recovery Center ("the CCERC"), the anticipated percent reductions in annual mass emission rates (tons per year) resulting from the proposed upgrades of the air quality control systems on the MWCs at the CCERC are as follows:

Substance	Anticipated Percent Reduction
Lead	95
PM-10	45
Sulfur Dioxide	60
Filterable Particulate	55
Cadmium	90
Dioxins/Furans	70
Hydrogen Chloride	50
Mercury	80
Sulfuric Acid	45
Oxides of Nitrogen	5

The discussion below describes the results of preliminary air quality modelling of facility criteria pollutant emissions and a human health risk assessment which addresses the potential health effects of noncriteria pollutants including metals, dioxins/furans, and polycyclic aromatic compounds.

As discussed in Section 5 of the Title V air permit modification application for the Camden Green Initiative ("CGI") Project submitted to the NJDEP in July 2022, preliminary air quality modeling of the proposed criteria pollutant emissions from the CCERC was performed in accordance NJDEP's Technical Manual 1002 and USEPA Guideline on Air Quality Models. The results indicated that predicted impacts from the CCERC are well below the USEPA's regulatory Significant Impact Levels ("SIL"), except for modelled 1-hour nitrogen dioxide ("NO_2") concentrations. The preliminary maximum 1-hour NO_2 impact of the facility was 10.86 micrograms per cubic meter ($\mu g/m^3$) versus the USEPA SIL of 7.5 $\mu g/m^3$, both small percentages of the National Ambient Air Quality Standard ("NAAQS") for 1-hour NO_2 which is 188 $\mu g/m^3$. Nonetheless, predicting an impact above the SIL triggers the need to perform a cumulative, multisource analysis, which in addition to the impacts from the CCERC, must include nearby background sources of NOx emissions and an ambient background concentration for comparison to the NAAQS. NJDEP's ambient air monitoring data recorded at the Spruce Street monitoring site in the City of Camden indicates 1-hour NO_2 levels of approximately 90 $\mu g/m^3$. Emissions inventory information for nearby sources, including some in the Philadelphia area, has been acquired for conducting the upcoming analysis. Covanta fully expects that the results of the required multisource analysis will show that the

CCERA facility does not cause or significantly contribute to a modelled exceedance of the 1-hour NO_2 NAAQS.

To evaluate the potential health effects of the CCERC upon completion of the proposed upgrade of the air quality control systems, Camden County Energy Recovery Associates, L.P. ("CCERA") contracted with an independent 3rd party consultant (AECOM) to conduct a multi-pathway human health risk assessment of the CCERC. A copy of the health risk assessment report is included in this document as **Attachment 1**. The proposed maximum short-term hourly emission rates and the proposed annual emission rates of air toxics were modeled using USEPA's preferred dispersion model, AERMOD, to obtain air concentrations and deposition rates for the area surrounding the facility. The IRAP-h View™ Industrial Risk Assessment Program ("IRAP") was used to implement U.S. Environmental Protection Agency's ("USEPA") Human Health Risk Assessment Protocol ("HHRAP") which integrates the AERMOD output, pollutant-specific emissions, site-specific physical and hydrological parameters, exposure parameters, and compound-specific toxicity values to estimate the cumulative human health risk at specific exposure locations near the facility. The approach was conservative in that maximum allowable emission rates were used (as opposed to actual emission rates) and that it assumed all three (3) MWCs operated continuously (8,760 hours per year) when each is limited by permit to 8,256 hours per year of operation.

In accordance with USEPA's HHRAP, the following multi-pathway scenarios were evaluated for both adult and child exposures:

1. Resident/Fisher - An adult/child who eats local produce from a backyard garden and fish caught from local water bodies. This scenario was located where AERMOD output indicated the highest CCERC stack air concentrations and deposition fluxes regardless of whether actual residences are currently present.
2. Farmer Type 1/ Fisher: A farmer (adult/child) who eats mainly produce and livestock (excluding consumption of beef and dairy milk) and fish caught from local water bodies. This scenario was also conservatively located where AERMOD output indicated the highest facility impacts even though those locations are not zoned for agricultural use.
3. Farmer Type 2/ Fisher: A farmer (adult/child) who eats produce and livestock from the farm (including beef and dairy milk) and fish caught from local water bodies. This scenario was evaluated at actual farms located nearest to the facility and confirmed through readily available online information, to have beef and/or dairy cows. The nearest of these are the farm at Saul High School in Philadelphia, PA (~11 miles away), and Wellacrest Farms in Mullica Hill, NJ (~12 miles from the CCERC).

The IRAP software used AERMOD outputs along with the site-specific physical and hydrological parameters and pollutant-specific emissions rates to calculate exposure point concentrations in the air, soil, surface water and fish, home-grown vegetables, farm-raised animals, cow's milk, eggs, and mother's milk (child only). The IRAP software then used the exposure point concentrations and toxicity values to calculate the pollutant-specific Excess Lifetime Cancer Risk which is expressed as a probability (e.g., 10^{-5} or one chance in 100,000), and non-carcinogenic risk, expressed as a hazard index (HI). The total cumulative risk was then calculated as the sum of the pollutant-specific values.

USEPA guidelines for hazardous waste boilers indicate that total incremental cancer risk should not exceed 1×10^{-5} (one chance in 100,000). USEPA selected this level partly to account for exposure to background contamination levels from offsite combustion sources. USEPA guidelines indicate that the

non-cancer HI for an individual constituent, or mixture of constituents where appropriate, should be less than 1.0. The USEPA cancer and non-cancer guidelines are also consistent with that of NJDEP as provided in Section 2.3.1 of *Technical Manual 1003 Guidance on Preparing a Risk Assessment for Air Contaminant Emissions.* The health risk assessment presented results relative to these cancer and non-cancer thresholds. The calculated overall long-term risk results for all exposure scenarios evaluated are less than the acceptable cancer risk and non-cancer (HI) risk thresholds. The maximum acute risk results for each of the exposure scenario locations, applicable to both adults and children, are also less than the acceptable HI risk threshold of 1.0.

Comment No. 4 - Section 3.2.1.4 Fly Ash Recirculation System (page 3-6) – Provide additional discussion of the environmental and health impacts that would result from the additional moisture content which will improve the reaction efficiency of the hydrated lime in the fly ash and the reduction in the flue gas temperature within the reactor.

As described in the solid waste permit application, a portion of the fly ash collected in each fabric filter will be recirculated back into two (2) double-shaft mixers. A controlled volume of wastewater will be added to the mixers to condition the recirculated fly ash which contains unreacted lime. The additional moisture from the wastewater addition reduces the temperature in the reactor which follows the mixers and improves the reaction efficiency of the lime with acidic gas components in the flue gas stream which form calcium salts. This circulating dry scrubber technology has proven very effective in controlling acid gas emissions at Covanta's facilities in Ontario, Canada and Dublin, Ireland, as well as at other waste-to-energy facilities in Europe.

Consistent with the proposed change from spray dry scrubbing technology to the more effective circulating dry scrubbing technology, Camden County Energy Recovery Associates, L.P. ("CCERA") has proposed to reduce the permitted 24-hour average emission concentration limit (ppmdv7) and the hourly (pounds per hour) and annual mass emission rates (tons per year) of sulfur dioxide ("SO_2"). CCERA has also proposed to reduce the permitted emission concentration and the annual mass emission rate of hydrogen chloride ("HCl"), and the hourly and annual mass emission rates of hydrogen fluoride ("HF"). As described in the response to Comment No. 3, the anticipated overall percent reductions in annual acid gas mass emission rates (tons per year) resulting from the proposed upgrades of the air quality control systems are 60% for SO_2, 50% for HCl, 45% for sulfuric acid mist, and 90% for HF.

Preliminary air quality modeling results of proposed criteria pollutant emissions from the Camden County Energy Recovery Center ("CCERC") indicates that modeled SO_2 impacts will be below the USEPA Significant Impact Levels for the 1-hour, 3- hour, 24-hour, and annual averaging periods. The results of a health risk assessment conducted by AECOM of proposed non-criteria pollutant emissions limits for the CCERC, including those for HCl and HF, indicated that long-term and acute cancer and non-cancer risks are below acceptable thresholds.

Comment No. 5 - Section 3.2.2.1 General Description of LDI System (page 3-9) – Please clarify that incoming loads of Type 72 liquid waste will be recorded in both tons and gallons. Also include that the mandatory fingerprint analysis will be officially recorded by facility personnel and that these records will be kept at the facility for inspection.

Tanker trucks carrying Type 72 liquid waste entering the Camden County Energy Recovery Center will proceed to the scale house where they will be weighed, and the weights recorded. Once weighed and the accompanying paperwork verified, the tanker trucks will proceed to the unloading area within the Waste Receiving Building where a mandatory fingerprint analysis will be conducted by Facility staff. Upon satisfactory completion of the fingerprint analysis, the waste will be unloaded into the designated storage tank. The total volumetric flow in gallons of each delivery unloaded will be monitored and recorded. The results of each fingerprint analysis will be recorded and maintained for inspection upon request along with the records of the weights and volumes of each waste delivery. The flow to each boiler will be totalized in the distributed control system from an in-line flow measurement to each boiler injection point and the records maintained.

Comment No. 6 - Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – Please add landfill leachate and materials containing PFAS to the list of unacceptable materials to be used for Liquid Direct Injection.

During the December 2022 Environmental Justice Public Hearing on the proposed Camden Green Initiative Project and in a response to a request for information from the NJDEP's Air Permitting Bureau, Covanta committed to not accepting landfill leachate for disposal at the Camden County Energy Recovery Center. As an additional precautionary matter, the Facility will also not accept aqueous film-forming foams ("AFFFs") or other liquids known to contain Per- and Polyfluoroalkyl Substances ("PFAS") given its recognized contribution to environmental impacts. Regarding the question of PFAS in general, USEPA released interim guidance on the disposal of PFAS which included an evaluation of existing disposal technologies. Although the science around the management of PFAS remains very much in the developmental stages, USEPA recognized that thermal treatment is among the available technologies for the destruction of PFAS. Waste to Energy facilities are part of the mix of thermal treatment options and may be among the most cost effective thermal treatment options given the potential for the presence of PFAS compounds in municipal solid waste.

Unacceptable liquid wastes for processing with the Liquid Direct System ("LDI") system will also include the following:

- Pesticides/Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA") Material
- Department of Transportation ("DOT") Placarded Loads
- Oily Waters
- Sewage Sludge
- Material Not Approved Under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), and
- Isocyanates

In addition to the unacceptable liquid wastes identified above, Camden County Energy Recovery Associates, L.P. ("CCERA") will not accept liquid wastes containing more than de minimis amounts of the halogens fluorine, iodine, or bromine for processing in the proposed LDI system. The target range for chlorine and sulfur content of liquid wastes to be processed is less than 2%, the target range for the solids content of the wastes is 10% or less, and the water content should be 90% or greater. CCERA has proposed to install advanced air quality control equipment which will effectively minimize air emissions of acid gases, particulate matter including metals, and organic substances.

Comment No. 7 - Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – This Section states, "Additional testing, if deemed necessary, may include analysis for flash point, total metals, volatile organic compounds ("VOCs"), total halogens, and any additional information the waste approver deems necessary to complete their review." Provide additional information about how the waste approver would determine if this additional information would be necessary to complete their review.

Covanta assigns an experienced account executive from the Covanta Environmental Services division ("CES") to each proposed waste stream who coordinates with the prospective customer for the completion of a Material Characterization Form ("MCF"). A copy of the MCF is contained in **Attachment 2**. Completion of Section 2 of the MCF requires the generator to provide information on the nature of the waste, its physical form, and the type of container it would be shipped in. The generator must provide a detailed description of the waste generating process, including the materials used to generate the waste and the identification of potential contaminants which may be contained in the waste as required in Section 2.8 of the MCF. Section 3 requires information concerning the regulatory classification of the waste stream. Information on the composition of the waste is required in Section 4. Section 4 includes required concentrations of constituents including halogens (bromine, chlorine, fluorine, and iodine), sixteen metals, and other substances and compounds as listed in Section 4.1. Section 4.2 requires information on the components that make up the waste and its packaging. The Covanta approval personnel review the completed MCF as certified by the generator and assess the need for pre-approval testing.

The generator of a proposed LDI waste stream must also complete and certify the attached LDI Safety and Handling Addendum Form (see **Attachment 2**). This form requires additional information on the composition of the waste as well as physical data. Information on health hazards and the personal protective equipment which should be used when handling and processing the waste as well as during cleanup of any spills, must also be provided.

In the event that a generator fails to provide the required information requested by the MCF and the LDI Safety and Handling Addendum Forms, the account executive will require additional testing to be performed by the generator in order to supplement any missing information needed to complete the review. Additional testing may also be required if, after reviewing the details of the process by which the waste is generated, the account executive determines additional testing is needed to verify the information provided on the forms or deems additional information is necessary to complete the review. Additional testing, if deemed necessary by the CES account executive, may include analyses for total metals, volatile organic substances, total halogens, and analyses for other properties or waste components considering the source of the waste.

All potential LDI waste streams will require some level of analytical testing from a New Jersey Certified Laboratory prior to being approved. All waste streams will be subject to mandatory analyses and in some cases, additional testing will be required based on the waste stream components and the process that generated the waste. A proposed waste stream cannot be approved without, at a minimum, testing for pH, total dissolved solids, and total suspended solids. To qualify as an LDI stream for processing at the Facility, the material must have a pH in the range of 4-10, a flashpoint of greater than 160^{o} F, and a minimum water content of 90%. Liquid wastes containing more than de minimis amounts (1%) of the halogens fluorine, iodine, or bromine will not be accepted for processing in the proposed LDI system. The acceptable chlorine and sulfur content of the waste is below 2% and the acceptable solids content

of the waste is below 10%. In addition to the above, the experience of the account executive and operations staff are used to determine the acceptability of a proposed waste from environmental, health and safety, and operational perspectives. This approach has led to successful implementation of LDI at other Covanta facilities, including the former Warren County, New Jersey waste-to-energy facility.

Comment No. 8 - Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – Provide a calculation of the quantity of process wastewater that will be processed at the facility that would otherwise be discharged to the Camden County Municipal Utilities Authority (CCMUA) Sewage Treatment Plant by utilizing the LDI system to process internally generated wastewater. Discuss the environmental and health impacts of the anticipated reduction of wastewater discharged to the CCMUA Sewage Treatment Plant.

Camden County Energy Recovery Associates, L.P. ("CCERA") has yet to identify specific sources of Type 72 waste to be received and processed at the Camden County Energy Recovery Center ("the CCERC") and will not seek to identify specific generators of potential liquid waste streams until the proposed LDI system is approved by the New Jersey Department of Environmental Protection. Potential sources include the generators of liquid wastes previously approved for processing at Covanta's Warren County Facility in the 2016-2019 timeframe and generators of similar waste streams in the general Camden County area. The LDI wastes processed at the Warren County Facility were primarily rinse and/or wash waters used to clean out vessels and other equipment used in the manufacture of products such as shampoo, conditioner, latex products, and pharmaceutical products, to name a few examples. Most of the streams processed at the Warren Facility consisted of 95-97% water.

In the event there is capacity in the LDI system to process wastewater in addition to the volumes supplied by generators of approved waste streams, CCERA intends to use that excess capacity to process cooling tower blowdown generated at the CCERC. As described in the Solid Waste permit application for the Camden Green Initiative Project ("the CGI Project"), the LDI system will be designed to process approximately 26,000 gallons per day ("gpd") of Type 72 waste at a nominal flow rate of six (6) gallons per minute per boiler. The CCERA discharges an estimated average of approximately 150,000 gpd of cooling tower blowdown from the CCERC to the nearby Camden County Municipal Utilities Authority ("the CCMUA") Sewerage Treatment Plant ("STP"). To the extent there is remaining processing capacity in the LDI system, a portion of the present discharge may be internally processed at the CCERC rather than discharged to the CCMUA's facility.

A reduction in the volume of wastewater discharged from the CCERC to the CCMUA STP afforded by alternatively processing that wastewater in the LDI system at the facility offers several environmental benefits. Processing internally generated cooling tower blowdown and other non-hazardous liquid streams from outside the CCERC that would otherwise be treated by the CCMUA will reduce influent load to the STP, which in turn may reduce STP operating costs, extend the life of processing equipment, and reduce the potential for bypasses.

The LDI tons processed may displace a portion of the municipal solid waste that would otherwise be combusted at the CCERC because the LDI tons will count toward the existing permitted annual waste throughput limit. Such displacement would be accomplished with no increase in air emissions, odor, or truck traffic. The LDI system will provide an additional revenue stream to help fund the proposed advanced air quality control equipment and, more importantly, contribute to the Community Benefits Agreement associated with the CGI Project. The water in the liquid waste streams will be evaporated and many of the components contained in the liquid waste streams will be destroyed in the waste combustors. Remaining components will be effectively controlled by the advanced air quality control systems.

Comment No. 9 - Section 3.2.2.2 Liquid Waste Approval Process (page 3-12) – Discuss the environmental and health impacts of utilizing the LDI waste streams in the SNCR system as a carrier liquid for injecting urea into the boilers for the control of NOx emissions.

The Camden Green Initiative Project includes equipping the existing Selective Non-Catalytic Reduction ("SNCR") system at the Camden County Energy Recovery Center (the CCERC") used to reduce the emissions of oxides of nitrogen ("NOx") with advanced controls which will provide fully automatic urea injection rates, including feedback control from the stack NO_X analyzer for each unit. The existing SNCR system on each of the three (3) municipal waste combustors has two injection levels for urea blended with carrier water. Only the upper-level nozzles are currently being used for the operation of the SNCR systems. Injection of Liquid Direct Injection ("LDI") waste streams through the lower level of nozzles will facilitate NOx reduction while injection of LDI as carrier liquid for urea in the upper level will maintain existing emission control with the benefit of elimination of the need to use potable water. The combination of lower and upper injection locations will provide a more stable and effective NO_X reduction system.

The estimated reduction in NOx emissions (30-50 tons per year) resulting from the SNCR system upgrades as discussed above is significant from the standpoint of environmental and health impacts. The air quality control region in which the CCERC is located is designated as nonattainment with respect to the 2015 8-hour National Ambient Air Quality Standard ("NAAQS") for ozone. NAAQS are set to provide public health protection, including protecting the health of sensitive populations such as people with asthma, children and the elderly. NOx can react with other compounds in the atmosphere to form ozone and is designated as a precursor to ozone formation. Although New Jersey reports it is getting close to meeting the ozone NAAQS and NOx emissions from the CCERC are a very small percentage of total NOx emissions in the region (approximately 2.2 percent in 2021), the expected reduction in NOx emissions from the CCERC will provide some benefit in terms of improving air quality. In addition to being a precursor to ozone formation, at high enough ambient concentrations, nitrogen dioxide ("NO_2") itself can cause health problems, especially for sensitive individuals such as children, the elderly, and people with asthma. New Jersey has long been in attainment with the NAAQS for NO_2. Nonetheless the expected reduction in NOx emissions from the CCERC will contribute to reducing ambient NOx levels in the local air shed.

Comment No. 10 - Section 3.2.2.4 Traffic (page 3-13) – Provide more detailed analysis regarding the impact of the increased truck traffic on the traffic volumes evaluated in the Final Environmental and Health Impact Statement for the CCERC. Include a computation of the average daily and peak daily delivery vehicle count from data from the most recent three (3) years of operational data and a projection of the increased truck numbers onto this data.

The average daily and peak daily vehicle counts during 2020, 2021, and 2022 are presented in the table below.

Vehicles	2020	2021	2022
Maximum Daily Vehicles Inbound Material	242	226	218
Average Daily Vehicles Inbound Material	151	155	152
Average Daily Vehicles Outbound Material	30	30	30

The maximum daily inbound material vehicle trips are experienced on the weekday following a holiday weekend or the day following a weather event which prevents normal waste collection. The Average Daily Vehicles Outbound Material refer to vehicles carrying ash and recovered metal from the Facility.

The Final Environmental Health and Impact Statement for the Camden County Energy Recovery Center ("the CCERC") dated April 1986 included an analysis of the impact of traffic volumes associated with facility through the intersection of the Interstate I-676 ramp, Morgan Boulevard, and the facility driveway. The analysis was based on approximately 290-310 vehicle trips to the facility each weekday under full operation and 20 private vehicles per day, for a total of 310-330 vehicles passing through the intersection. It was projected that the additional traffic would not have an adverse on the existing "C" level-of-service.

Camden County Energy Recovery Associated, L.P. ("CCERA") commissioned AECOM to perform a traffic study to evaluate the projected increase in truck traffic associated with the proposed project to upgrade the air quality control systems and process liquid wastes on current traffic conditions. The traffic study examined the expected increase in truck traffic on Holtec Boulevard and a capacity analysis for the adjacent intersections of Holtec Boulevard and Broadway, Holtec Boulevard and the I-676 Southbound Ramp/CCERC Driveway, and Morgan Street and I-676 Northbound Ramp/Master Street. The analysis was based on the project resulting in an increase in the annual amount of waste processed to 451,140 tons, the permit limit. Annual MSW processed was increased from 398,000 tons to 425,000 tons and the receipt and processing of approximately 26,000 tons of liquid wastes per year was added to the total to reach the permit limit. These assumptions on increased waste processing, including additional outbound ash vehicle trips, equates to approximately an additional 2,950 vehicle trips per year, or approximately one (1) additional vehicle trip per hour during which waste is received at the CCERC (approximately an additional 10 trips per day). This number was added to an estimated average of 180-195 daily vehicle trips to arrive at a total number of 190-205 vehicle trips per day.

A copy of the AECOM traffic analysis is attached to this response document as **Attachment 3.** The report summarizes the traffic analysis methodology, inputs, and findings. The findings of the analysis indicate that the Camden Green Initiative Project will have an insignificant impact on traffic in the vicinity of the CCERC.

Comment No. 11 - Appendix A – Solid Waste Facility Permit Application Form – Page 2 – In the revised application received by the Bureau on November 4, 2022, Sections 4 (Application Type), 5 (Facility Type), and 6 (Waste Types) have not been filled out. Please complete and submit these Sections of the SWF Permit Application Form.

A completed copy of Page 2 of the Solid Waste Facility Permit Application Form is contained in **Attachment 4** to this response document.

Comment No. 12 - 751 Baghouse Bag Disposal Procedure – Please add the following provisions to the SOP to ensure that spent baghouse filters aren't inadvertently taken off-site:

a. **Covanta Camden shall prohibit the use of any third-party contractors for the disposal of used baghouse filters. Instead, only employees of Covanta Camden will be responsible for taking the used filter bags that have been double bagged and sealed to the tipping floor for processing in the MWC units at the facility.**

b. **In addition to the regular scaling out of all refuse hauler trucks, ash hauler trucks, and metal hauler trucks, all other hauler trucks leaving the site for any reason shall be required to stop at the scale house for authorization to leave prior to leaving the site to prevent any unauthorized removal of waste from the site.**

The requested additions to the CAM-SOP-751 Baghouse Bag Disposal Procedure have been included as Provisions Nos. 5.5.3 and 5.5.4 of the procedure included as **Attachment 5** of this response document.

Comment No. 13 - Public Comments – Please provide a response to each of the three (3) enclosed comments that the Bureau has received regarding the application.

The three (3) public comments and a response to each follow as Enclosures 1, 2, and 3.

February 6, 2023

Dear NJ DEP:

We offer the following comments on these three permit applications: Solid Waste Facility PI No. 133512: SWF Permit Modification No. RRF220001, Title V Operating Permit Program Interest (PI) No. 51614: Title V Operating Permit Renewal Activity No. BOP180001, and Title V Operating Permit Modification Activity No. BOP220001.

We ask that DEP deny these permits as a violation of Title VI of the Civil Rights Act of 1964, as well as flying in the face of NJ's new Environmental Justice Law and associated regulations, and Administrative Order 2021-25.

We first draw your attention to the thoughtful letter submitted to you by Camden for Clean Air on December 29, 2022, providing numerous legitimate concerns about the hearing process. This letter can be found at https://camdenforcleanair.org/pdf/DEPhearingletter.pdf. It's a disgrace that NJ DEP claims to care about environmental justice, but could not even send so much as an acknowledgement (no less a real response) to the environmental justice group that wrote you that letter. We share and echo all of the concerns raised in that letter, and ask that DEP extend the comment period until a proper process can be conducted.

We noticed that the application date on the Title V Operating Permit renewal is from mid-2018. This is a five-year permit, and it's already 4.5 years late. DEP is flouting the intent of the Clean Air Act by allowing such excessive delay. We ask that this permit renewable apply only for the remaining portion of the five-year period since the last Title V permit expired, and that DEP require a new Title V Operating Permit application be filed for the period that presumably would start in mid-2023. By allowing such massive delay in seeking permits, and allowing Covanta not to have to resubmit on a normal five-year schedule, Covanta is avoiding being subject to the new Environmental Justice law which we understand is taking effect at the start of this year. The Title V permit modification application should be held for approval until such time as a new Title V Operating Permit (not a retroactive rubber-stamping of the 2018 application) is approved.

Furthermore, we know from Covanta's own officials that they deliberately linked the air pollution upgrades with their approval to for "liquid direct injection" of Type 72 liquid industrial wastes. They combined these in the same permit application because they have since admitted what they previously lied to the public about – that they have no intention of installing the missing baghouse unless they get the approval to burn lucrative liquid industrial wastes. It is not DEP's job to ensure that Covanta can make their plant more profitable. DEP should not be in the position of having to approve the burning of a more dangerous waste stream in order to gain the advantages of increased pollution controls. These need to be delinked in permitting.

We call on DEP to reject Covanta's permits to burn liquid industrial wastes that contain halogens or metals. Covanta claims that they would not burn landfill leachate or PFAS, but we do not see this spelled out in their permit application. In Oregon, where Covanta Marion burns liquid industrial wastes,

the state has a "Cleaner Air Oregon" program that requires air testing under a worse case scenario. The state chose to make them test with the landfill leachate they burn because it's the worst of the liquid waste they could burn. Oregon's Department of Environmental Quality has stated in a January 2023 email:

> "Compared to other types of liquid waste, leachate was selected to represent a potential worst-case LDI emissions scenario for two main reasons:
>
> 1. Leachate contains metals and halides which could contribute to increased TAC emissions.
> 2. Leachate is an ongoing and recurring waste stream burned at the facility.
>
> ...That said, leachate may help represent a worst-case operating condition for some TACs for the following reasons:
>
> - Leachate contains heavy metals. Increased metals concentrations in combusted waste could contribute to higher emissions of those metal TACs to the air.
> - Leachate contains copper which can act as a catalyst for the formation of dioxins and furans.
> - Leachate contains salts, including chloride salts. The increased chloride content could impact formation and emissions of chloride-containing TACs (such as dioxins and furans)."

We know that one of the liquid wastes Covanta would like to burn is from the pharmaceutical industry. Many pharmaceuticals contain halogens. Fluorine, chlorine, and bromine are routinely part of drug formulas and can be noted on most pharmaceutical packaging. These would lead to formation of acid gases and dioxins/furans.

No waste with appreciable amounts of toxic metals or halogens should be added to the waste types Covanta can incinerate.

Continuous emissions monitors should be used for measuring emissions and enforcing compliance with permit limits. The technology to continuously monitor mercury, other toxic metals, particulate matter, acid gases, dioxins/furans, and other regulated air pollutants from trash incinerators has existed for over 15 years since EPA tested and verified much of this equipment. It's time to start requiring them in air permits so that DEP can ensure that spikes in emissions, especially during startup, shutdown, and malfunction times, are not missed for lack of looking.

Only three pollutants are monitored on a continuous basis (NOx, SO_2, and CO) at most trash incinerators, with some rare exceptions such as the six in Pennsylvania also monitoring hydrochloric acid on a continuous basis. Other pollutants, if monitored at all, are typically tested once per year, and sometimes less frequently. If we regulated motorists the way we do most pollutants from smokestacks, it would be akin to enforcing a speed limit by allowing drivers to drive all year with no speedometer. Once a year, a speed trap would be set on the highway with signs warning "slow down... speed trap ahead," and the driver's brother would be running the speed trap (companies choose who they pay to conduct the test). Some incinerator operators have also been known to manipulate emission testing to present lower emissions levels to regulators.[1]

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[1] In Connecticut, Covanta was fined $20,000 in 1993 in a civil action filed by the state Attorney General in response to an employee adjusting a continuous emissions monitoring device to alter a reading in order to pass a continuous emissions monitoring audit. In Tulsa, Oklahoma in 2013, Covanta was the target of a criminal investigation by the U.S. Attorney's Office "related to alleged improprieties in the recording and reporting of emissions data" in which Covanta entered into a non-

Increased downtime at aging incinerators results in higher emissions from startup and shutdown occurrences. Dioxin emissions are a stark example. One study out of Europe found that using continuous sampling for dioxins at incinerators found the actual emissions to be 32-52 times higher than we think they are in the U.S. when requiring incinerators to test each unit just once every one to four years under ideal operating conditions.[2,3] A more recent study found that our failure to use continuous sampling technology is underestimating dioxin emissions by 460 to 1,290 times.[4] Considering that continuous sampling technology has been tested and verified by EPA since 2006[5] and that dioxin is the most toxic substance known to EPA – 140,000 times more toxic than mercury[6] – there is no excuse for not requiring continuous dioxin sampling at waste incinerators.

We recently looked at the stack test data vs. continuous monitoring data for hydrochloric acid at the Covanta Delaware Valley incinerator in Chester, Pennsylvania and noted that the CEMS data showed emissions to be twice as high as stack tests indicate. This is just another reason why stack tests should not be sufficient to enforce permit limits. Please require modern monitoring technology.

Sincerely,

Mike Ewall, Esq.
Executive Director
Energy Justice Network
215-436-9511
mike@energyjustice.net
http://www.energyjustice.net

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prosecution agreement to follow applicable laws and regulations and pay a $200,000 "community service payment" to the state environmental agency. For the Connecticut incident, see page 37 for this 1993 incident reported in this 93-page compilation of Covanta's U.S. violations through September 2006: www.energyjustice.net/files/incineration/covanta/violations2006.pdf. For Tulsa, see Covanta Holding Corporation's 2019 10-K Securities and Exchange Commission filing, p. 105. (see "Tulsa Matter" describing the consequences of this 2013 incident) d18rn0p25nwr6d.cloudfront.net/CIK-0000225648/992dfb7f-398d-4b17-8e33-75e956f6f235.pdf

[2] Annual stack testing is required to be done under optimal operating conditions, and are thus designed not to catch the excessive emissions that occur during startup, shutdown, and malfunction conditions. Also, for dioxins and furans, annual dioxin testing is often allowed to be conducted on just one boiler unit each year, on a rotating basis. This means many units are being tested for dioxins – the most toxic chemicals known to science – just once every two to four years (all but three trash incinerators have two to four units).

[3] De Fré R, Wevers M. "Underestimation in dioxin emission inventories," Organohalogen Compounds, 36: 17–20. www.ejnet.org/toxics/cems/1998_DeFre_OrgComp98_Underest_Dioxin_Em_Inv_Amesa.pdf

[4] Arkenbout, A, Olie K, Esbensen, KH. "Emission regimes of POPs of a Dutch incinerator: regulated, measured and hidden issues." docs.wixstatic.com/ugd/8b2c54_884225001557480 5aeb13a18479226fc.pdf

[5] Environmental Protection Agency, Environmental Technology Verification Program. archive.epa.gov/nrmrl/archive-etv/web/html/vt-ams.html

[6] Environmental Protection Agency, Risk-Screening Environmental Indicators (RSEI) Model. www.epa.gov/rsei

Enclosure No. 1 Response

The renewal application for the Camden Title V Operating Permit was submitted to NJDEP on June 4, 2018, and deemed administratively complete on June 21, 2018. The permit expired on December 21, 2019. In accordance with N.J.A.C. 7:27 Subchapter 22, the renewal application was deemed administratively complete more than 12 months prior to the expiration date, and as such, Covanta may continue to operate the Camden County Energy Recovery Center ("CCERC") until the Department takes final action on the renewal application. No action has been taken on the renewal application. Since submittal of the renewal application, Covanta has filed an application for the Camden Green Initiative ("CGI") Project which, if approved, would result in many revisions of the existing Title V permit including more stringent emission limits reflecting the proposed upgrade of the air quality control systems, new warmup, startup, and shutdown emission limits, Liquid Direct Injection ("LDI") processing provisions, and other associated changes. If the CGI Project permit modification application is approved by the NJDEP, Covanta believes that the NJDEP will incorporate those changes into the renewed Title V permit.

The commentator asserted that Covanta intentionally linked the proposed upgrade of the air quality control systems with the processing of liquid wastes because it has no intention of installing the fabric filter baghouses ("FFs") unless approval of liquid waste processing is granted by the NJDEP, and that Covanta has not been truthful with the public about the linkage. To clarify, Covanta intends to replace the existing electrostatic precipitators ("ESPs") at the CCERC facility with FFs, regardless of the status of liquid waste processing. What Covanta officials stated during the Environmental Justice Hearing was that without the ability to process liquid waste, the design and scope of the project would likely need to be reevaluated. Replacing the existing ESPs with FFs remains the most important element of the CGI Project.

To help support the proposed upgrade of the air quality control systems, Covanta decided to include liquid waste processing as part of the CGI Project. Processing liquid waste at its Waste-to-Energy facilities is an operation with which Covanta has significant experience and which has a negligible environmental impact on air emissions as documented by the test data included in the air permit application from other Covanta facilities at which liquids are processed. Including this capability at the CCERC allows Covanta to not only propose replacing the existing ESPs, but also includes the replacement of the existing spray dryer scrubbing technology with more advanced and extremely effective circulating dry scrubbing ("CDS") technology. The inclusion of CDS technology provides an environmentally superior means of acid gas control compared to the existing spray dryer scrubbing technology but is a non-essential part of the proposed air quality control upgrade project. Maintaining the existing spray dryer scrubbers would still allow for compliance with the proposed emission limits.

The commentator urged NJDEP to not allow Covanta to process landfill leachate and Per- and Polyfluoroalkyl Substances ("PFAS") with the proposed LDI liquid waste processing system. During the December 2022 Environmental Justice Public Hearing on the proposed CGI Project, and in a response to a request for information from the NJDEP's Air Permitting Bureau, Covanta committed to not accepting landfill leachate for disposal at the CCERC. As an additional precautionary measure, the Facility will also not accept aqueous film-forming foams ("AFFFs") given its recognized environmental impact. Regarding the question of PFAS in general, USEPA released interim guidance on the disposal of PFAS which included an evaluation of existing disposal technologies. Although the science surrounding the management of PFAS remains very much in the developmental stages, USEPA recognized that thermal

treatment is among the available technologies for the destruction of PFAS. Waste-to-Energy facilities are part of the mix of thermal treatment options and may be among the most cost-effective thermal treatment options given the potential for the presence of PFAS compounds in municipal solid waste.

Unacceptable liquid wastes for processing with the LDI system will also include the following:

- Pesticides/Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Material
- Department of Transportation (DOT) Placarded Loads
- Oily Waters
- Sewage Sludge
- Material Not Approved Under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), and
- Isocyanates

The commentator also urged the NJDEP not to allow Covanta to process liquid wastes which contain appreciable amounts of halogens and metals. Covanta will not accept liquid wastes containing more than de minimis amounts (1%) of the halogens fluorine, iodine, and bromine for processing in the proposed LDI system. The target range for the chlorine and sulfur content of liquid wastes to be processed is less than 2%, the target range for the solids content of the wastes is 10% or less, and the water content should be 90% or greater. Wastes with appreciable amounts of metals will not be accepted. Covanta has proposed to install advanced air quality control equipment which will effectively minimize air emissions of acid gases and particulate matter, including metals.

The commentator urged the Department to require continuous emission monitoring for additional pollutants for measuring emissions and enforcing permit limits. The facility presently monitors the emissions of carbon monoxide, sulfur dioxide, and oxides of nitrogen. It was suggested that the emissions of hydrogen chloride, mercury, other toxic metals, particulate matter, and dioxins/furans should also be monitored continuously. Except for hydrogen chloride, the USEPA has not promulgated performance specifications for continuously monitoring the emissions of these other substances suggested by the commentator and the accuracy of the monitoring devices for them is questionable.

In addition to continuously monitoring for the emissions of carbon monoxide, sulfur dioxide, and oxides of nitrogen, each MWC is continuously monitored for operational parameters related to emissions control and proper performance of the air quality control systems. The stack opacity continuous monitor indicates effective control of particulate emissions. Also, each fabric filter module will be equipped with a broken bag detector to allow for emission trending and advance warning of potential filter bag failures. This level of monitoring will provide a reliable indicator of the onset of worn filter media and help to locate damaged bags thereby shortening downtime for bag replacement. This also helps to ensure compliance with our opacity, particulate matter, and metals emission limitations. In that sulfur dioxide is the least reactive of the acid gases with lime reagent, readings from the inlet and outlet sulfur dioxide continuous emission monitors are indicative of the effective control of other acid gases, including hydrogen chloride. Several parameters related to documenting good combustion efficiency are also continuously monitored to ensure compliance with state and federal requirements. In addition to monitoring carbon monoxide emission concentrations from each MWC, regulations also require that an MWC may not operate at a steam production rate greater than 110% of the rate recorded during the most recent compliant dioxin/furan test. Additionally, the inlet temperature to each fabric filter must not exceed 30^{o} F above the temperature at which it was operated during the most

recent compliant dioxin/furan test to reduce the potential for the formation of dioxins and furans above levels achieved during compliant tests. These operating limits, in addition to other standard process controls, allow operators to effectively manage the operation of air quality control equipment and ensure the minimization of emissions.

Beccia, Kimberly [DEP]

From: Magi Liebe <maliebe@haddontwp.com>
Sent: Thursday, March 9, 2023 10:56 AM
To: Beccia, Kimberly [DEP]
Cc: Environmental Commission
Subject: [EXTERNAL] Permit No. RRF220001

Re: Application for a Solid Waste Facility Permit
Camden County Energy Recovery Associates, L.P.
Camden County Energy Recovery Center (CCERC)
Facility ID no.: 133512
Permit No.: RRF220001

Dear Ms. Kimberly Beccia,

The Haddon Township Environmental Commission recognizes Covanta's business need to incorporate an additional liquid waste stream into operations. However, HTEC also recognizes ongoing/burgeoning developments in comparatively benign waste treatment technologies and diversion techniques, such as food waste reduction, digestion, and composting. It is of particular urgency that these technologies be explored prior to any further expansion of current waste-to-energy processes. Finally, and perhaps most importantly, HTEC recognizes the plight of front-line communities in reducing known particulate emissions from large-scale point sources. We therefore encourage NJDEP to suspend further consideration of Covanta's permit request, until good faith efforts are first made to implement the proposed Air Quality Control Systems (AQCS) upgrade.

Sincerely,

Marjorie Liebe

Marjorie Liebe, Chairperson
Township of Haddon Environmental Commissioners
EnviroComm@HaddonTwp.com

Enclosure No. 2 Response

Covanta supports efforts to employ eco-friendly technologies which are higher up the waste management hierarchy and would reduce the amount of food waste and recyclables contained in the municipal solid waste processed at the Camden County Energy Recovery Center ("CCERC"). This is demonstrated through our ferrous and non-ferrous metals recycling efforts that help keep these materials out of landfills. We are promoting recycling and composting through collaborations with various entities including Rutgers University and the New Jersey Composting Council and we continue to explore additional opportunities to conduct similar studies.

Camden County Energy Recovery Associates, L.P. ("CCERA") is permitted to process up to 451,140 tons of solid waste per year at the CCERC and is not proposing to increase that annual waste throughput limit. Since acquiring the facility in 2013, Covanta has been making improvements to equipment operations and maintenance standards and practices which have translated into processing approximately 400,000 tons in 2022. The proposed Camden Green Initiative ("CGI") Project will further maximize the benefits provided by the CCERA's facility through ensuring the capability of the Municipal Waste Combustors ("MWCs") to process MSW, including the weight of liquid waste processed (90-95% of which will be water), to achieve the 451,140-ton annual limit. This goal will be accomplished through a process that works to maximize potential benefits by recycling ferrous and non-ferrous metals (approximately 15,000 tons in 2022), providing renewable electric power for the electric grid (approximately 35 MWe), and lowering greenhouse gas emissions through landfill methane avoidance (a reduction of approximately 1 ton of CO_2 equivalents per ton of waste processed at the CCERC).

In addition to these benefits, Covanta will be equipping the MWCs at the CCERC with advanced, state of the art air quality control systems to significantly reduce air emissions from current levels. Covanta has installed these control systems at its facilities in Ontario, Canada, and Dublin, Ireland, and installations are pending on other new facilities in Europe. This new technology, which includes circulating dry scrubbing systems followed by fabric filter baghouses ("FFs"), is proven to be highly effective in controlling air emissions and the CCERC and a recently permitted expansion MWC at a facility operated by Covanta in Pasco County, Florida, will be the first facilities in the United States at which it will be used. CCERA has proposed to reduce the filterable particulate concentration limit for each MWC by greater than 50% and has proposed a new $PM_{2.5}$ limit for each MWC. The proposed design of the FFs for the CCERC is essentially the same as the design of the FFs installed at Covanta's Essex County Resource Recovery Facility ("the ECRRF") when the air quality control systems were upgraded from electrostatic precipitators to FFs. The concentration of filterable particulate emissions was reduced by approximately 64% at the ECRRF. The emission control performance at these two (2) New Jersey facilities is expected to be comparatively effective upon the completion of the retrofit of the CCERC. No liquid waste will be processed in an MWC at the CCERC until the upgrade of its air quality control system has been completed.

Beccia, Kimberly [DEP]

From: Fontana, Anthony [DEP]
Sent: Tuesday, January 3, 2023 7:18 AM
To: Byrne, Tom [DEP]; Bendorf, Martin [DEP]; Beccia, Kimberly [DEP]
Subject: FW: Covanta-Camden Incinerator Permit Applications PI#51614, BOP220001

Anthony Fontana, Bureau Chief
Bureau of Solid Waste Permitting
Division of Solid & Hazardous Waste
New Jersey Department of Environmental Protection

From: Joseph Bouvier <JBouvier@mattioni.com>
Sent: Monday, January 2, 2023 3:27 PM
To: DEPcomments@camdenforcleanair.org
Cc: Chleboski, Ted [DEP] <Ted.Chleboski@dep.nj.gov>; Korolev, Vladimir [DEP] <Vladimir.Korolev@dep.nj.gov>
Subject: [EXTERNAL] Covanta-Camden Incinerator Permit Applications PI#51614, BOP220001

Please accept these comments with regard to the Covanta permit applications under review by the New Jersey DEP for additions/modifications to its Camden incinerator.

I am a volunteer member of the Merchantville Green Team and a volunteer member of the Camden for Clean Air organization.

I request that the DEP deny Covanta's permits to expand operations at its Camden incinerator to include the burning of liquid industrial waste and Covanta's request to renew the operation permit for the Camden incinerator.

Climate change due to greenhouse gases is here, posing an existential threat to our planet. Climate-change deniers aren't seen as credible any longer, because the effects of climate change are now obvious and easily seen. Severe weather events have inundated our country in the last decade, and are believed to have been caused by or accelerated by climate change. Ask yourselves, prior to about ten years ago, how many tornadoes did we ever experience in the State of New Jersey? They were an extremely rare occurrence. Now, however, each summer and fall, we see several tornadoes ravishing our beloved State. It may be too late to improve this situation, but dramatic action must be taken right away to at least prevent things from getting worse. As a society, we must immediately shift away from greenhouse gas producers.

Levels of greenhouse gases produced by incinerators are far worse than levels produced by all other manners of disposing of municipal waste, such as landfilling. So, from a greenhouse gas perspective, incinerators are disfavored. And incinerators are an incredibly inefficient method of producing electricity (they release more than twice as much CO2 to make the same amount of electricity as a coal power plant).

But the problems are compounded when you consider the toxins produced by incinerators that are released directly into the air that we breathe. Carbon dioxide is not the only culprit. Dangerous nitrous oxides, sulphur dioxides, lead, and mercury are also released into the air. These substances cause severe and chronic health problems such as heart

attacks and asthma. This is, further, an environmental justice issue. Virtually every incinerator in the Northeast United States is located in a marginalized community, causing poor people and people of color to disproportionately bear the burden and heavy physical toll, and exorbitant healthcare costs, resulting from poor air quality.

Recent published studies by the New Jersey Department of Health, which are viewable online, show that Camden and virtually every single one of its surrounding towns (including Gloucester City, Collingswood, Oaklyn, Pennsauken, Merchantville, Mt. Ephraim, and Brooklawn) have a statistically significantly worse air quality when compared to other municipalities in the State. And most of these towns have higher rates of the types of cancer caused by breathing carcinogen-polluted air than the statewide average. Camden, in particular, has a statistically significantly higher rate than the statewide average. I reference these findings of "statistically significantly" worse rates because such a characterization compels the conclusion that the air in and around Camden is believed to be causing these health hazards.

I have also seen reports that the Covanta incinerator in Camden produces over half of the industrial air pollution in all of Camden County. Is it improper to conclude that Covanta pollution may be the primary reason (or at least one of the primary reasons) that Camden residents have so many health problems? More scientific study might be needed to determine this to be definitively true, but the likelihood is that Covanta's incinerator hurts and kills people.

So, what can we do about this? I say let's try and help the people of Camden and surrounding towns by reducing the levels of air pollution by switching from incineration to landfills (the county can also work toward greater participation in recycling, reuse, and composting). Such a decision would help not only people's health, but will also assist in preventing the global problem of climate change from getting worse. It is the right thing to do.

I attended the Covanta "public hearing" presentation on December 8, 2022, and must say I was disappointed by Covanta's failure to try to engage with the most-affected community on this issue, the people who live directly in the bowels of the Covanta smokestack in Camden. Few Camden residents were informed of the hearing. It should have been held in person, in the Covanta neighborhood. Instead, it was an on-line remote hearing. Residents within one mile (or perhaps two miles) should have been mailed direct notice of the hearing, in English and Spanish. A Spanish interpreter should further have been present at the hearing to answer questions, since such a high percentage of Camden residents speak Spanish. I saw that during the remote hearing, one resident asked a question in Spanish in the "chat" room, but the reply given was that Covanta was unable to provide a response to a question in Spanish.

I was struck by a couple of other things during the Dec. 8 public hearing, as well. Covanta employs extremely few Camden residents at its incinerator facility (I believe it was only 6 or 7 out of approximately 145 employees). Such representation is not indicative of being a good "neighborhood partner" (as Covanta likes to claim).

Also, Covanta is requesting a permit to install baghouses inside the incinerator, a type of filter that would help reduce pollutants from being released into the air. My question is, why has it taken so long for Covanta to move to install the baghouses? This should have been done a LONG time ago, as baghouses are apparently the standard nationwide for incinerators. And why in the world would Covanta say, as it did in the public hearing, that it only intends to install the baghouses provided that its permit for collection and disposal of liquid industrial waste is granted? Again, this type of representation is not the position a "good neighborhood partner" would take. In fact, the opposite is true. Covanta appears to be taking advantage of the Camden community and purposely neglecting to take basic steps that would help reduce pollution and health risks.

I lastly request that when DEP considers the Covanta permit applications, that it apply the spirit and rule of the soon-to-be-enacted Environmental Justice Law. Based on the long environmental disjustice heaped onto the citizens of Camden by this company, Covanta should have the burden of proving that the grant of its permits will not adversely affect marginalized communities.

Thank you for your consideration of my comments.

Joseph F. Bouvier, Esquire
(he/him/his)

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Enclosure No. 3 Response

Covanta strongly believes in the science behind climate change and agrees that it is essential that society shifts toward a carbon neutral future. Covanta strongly disagrees with the commentator's statement that levels of greenhouse gases ("GHGs") produced by the combustion of unrecycled municipal solid waste ("MSW") are far worse than the levels produced by landfilling the waste. In fact, the opposite is true.

The United States Environmental Protection Agency ("the USEPA") life cycle emission analysis demonstrates that waste-to-energy ("WTE") facilities reduce the amount of GHG expressed as CO_2 equivalents (or "CO_2e") in the atmosphere by approximately 1 ton for every ton of MSW combusted. WTE GHG reductions are quantified using a life cycle assessment ("LCA") approach that includes GHG reductions from avoided methane emissions from landfills, WTE electrical generation that offsets or displaces fossil-fuel based electrical generation, and the recovery of metals for recycling that offset refining and mining of new metals. The GHG reductions associated with these three (3) factors more than offset WTE fossil-based CO_2e from combustion of plastics and other fossil-fuel based components of MSW. Using national averages as inputs, the results of a life cycle analysis show an approximate 1-ton reduction in GHG emissions for every ton of MSW combusted rather than landfilled as estimated by the USEPA.

USEPA scientists, in a prominent peer reviewed paper, concluded WTE facilities reduce GHG emissions relative to even those landfills equipped with energy recovery systems. In addition to the USEPA, many other governmental and nongovernmental organizations have formally recognized WTE for its role in reducing world-wide GHG emissions including the:

- Intergovernmental Panel on Climate Change ("IPCC"), which called WTE a "key GHG mitigation technology",
- World Economic Forum ("WEF"), which identified WTE as one of eight renewable energy sources expected to make a significant contribution to a future low carbon energy system,
- European Union,
- U.S. Conference of Mayors,
- Clean Development Mechanism of the Kyoto protocol,
- Voluntary carbon markets, and
- Third Way and the Center for American Progress.

Unlike coal power plants that only generate electricity, the primary purpose of WTE facilities is to manage post-recycled and unrecycled MSW safely and efficiently. WTE facilities accomplish that goal while at the same time generating electricity and recovering recyclable metals. WTE facilities emit less fossil-based GHG emissions, not more, than coal plants of the same electrical output. The advantages of WTE over the alternative of landfilling post-recycled and unrecycled MSW from a climate change perspective are discussed above.

Numerous references to poor air quality in the Camden area and associated health effects are made in the commentator's document which lead to their likely conclusion that, while not proven, the Camden County Energy Recovery Center ("the CCERC") facility "hurts and kills people". This implied conclusion is contradicted by the results of 1) the preliminary modeling results of proposed criteria pollutant emission rates from the CCERC, 2) air quality monitoring data in the City of Camden recorded and published by

the NJDEP, and 3) the results of a human health assessment conducted to evaluate the risks posed by noncriteria pollutant emissions from the CCERC.

As discussed in Section 5 of the Title V air permit modification application for the Camden Green Initiative ("CGI") Project submitted to the NJDEP in July 2022, preliminary air quality modeling of the proposed criteria pollutant emissions from the CCERC was performed in accordance NJDEP's Technical Manual 1002 and USEPA Guidance on Air Quality Models. The results indicated that predicted impacts from the CCERC are well below the USEPA's regulatory Significant Impact Levels ("SIL"), except for modelled 1-hour nitrogen dioxide ("NO_2") concentrations. The preliminary maximum 1-hour NO_2 concentration modeled for the facility was 10.86 micrograms per cubic meter ($\mu g/m^3$) versus the USEPA SIL of 7.5 $\mu g/m^3$, both small percentages of the National Ambient Air Quality Standard ("NAAQS") for 1-hour NO_2 which is 188 $\mu g/m^3$. Nonetheless, modeled concentrations above the SIL triggers the need to perform a cumulative, multisource analysis, which in addition to the impacts from the CCERC, must include nearby background sources of NOx emissions and an ambient background concentration for comparison to the NAAQS. NJDEP's ambient air monitoring data recorded at the Spruce Street monitoring site in the City of Camden indicates 1-hour NO_2 levels of approximately 90 $\mu g/m^3$. Emissions inventory information for nearby sources, including some in the Philadelphia area, has been acquired for conducting the upcoming analysis. Covanta fully expects that the results of the required multisource analysis will show that the CCERC does not cause or significantly contribute to a modelled exceedance of the 1-hour NO_2 NAAQS.

While it is true that criteria pollutants at high enough concentrations can cause adverse health effects, ambient air quality monitoring data recorded in 2021 by the New Jersey Department of Environmental Protection in the City of Camden indicates concentration levels in attainment with USEPA's National Ambient Air Quality Standards, except for the 8-hour NAAQS for ozone on a single occasion and the NAAQS for $PM_{2.5}$ on two (2) occasions for the entire year. In 2021, the most recent year for which the NJDEP has published its annual *NJ Air Quality Report*, data from the Spruce Street monitoring station in the City of Camden indicated no exceedances of the NAAQS for sulfur dioxide, carbon monoxide, nitrogen dioxide, and lead during the year. The daily 8-hour ozone standard was exceeded at Spruce Street on one (1) occasion (August 13, 2021) when a recorded value of 0.071 ppm exceeded the recently lowered 8-hour ozone NAAQS of 0.070 ppm. Ground level ozone is created when nitrogen oxides ("NOx") and volatile organic compounds ("VOCs") react in the presence of sunlight. The CCERC is a minor source of total VOC emissions and accounts for a very small percentage of annual NOx emissions (approximately 2.2%) in the Camden County airshed. Other larger sources of NOx emissions include diesel and gasoline vehicles, aircraft, commercial fuel combustion and other mobile sources. As part of the CGI Project, Covanta has proposed enhancement of the NOx control systems to further reduce its NOx emission rates. In addition to ozone formation in the local Camden area, ozone can be transported hundreds of miles from upwind sources. Like ozone, particulate matter can also be transported from upwind out of state areas. Particulate matter levels measured in New Jersey are usually good to moderate, but the 24-hour maximum $PM_{2.5}$ standard was exceeded at the Spruce Street monitoring site on two (2) days in 2021 (July 20-21, 2021). These exceedances were attributed to wildfires in the western United States and Canada which affected ambient particulate matter levels in New Jersey and the entire Northeast. The proposed CGI Project will result in a greater than 50% decrease in the allowable concentration levels of filterable particulate matter at the CCERC. Covanta's Essex County Resource Recovery Facility in Newark, NJ, has observed a decrease in filterable particulate matter

emissions when that facility upgraded from electrostatic precipitators ("ESPs") to fabric filter baghouses ("FF").

To evaluate the potential health effects of the CCERC facility upon completion of the proposed upgrade of the air quality control systems, Camden County Energy Recovery Associates, L.P. ("CCERA") contracted with an independent 3rd party consultant (AECOM) to conduct a multi-pathway human health risk assessment of the CCERC. A copy of the health risk assessment report is included in this document as **Attachment 1**. The proposed maximum short-term hourly emission rates and the proposed annual emission rates of air toxics were modeled using USEPA's preferred dispersion model, AERMOD, to obtain air concentrations and deposition rates for the area surrounding the facility. The IRAP-h View™ Industrial Risk Assessment Program (IRAP) was used to implement the USEPA'S human Health Risk Assessment Protocol (HHRAP) which integrates the AERMOD output, pollutant-specific emissions, site-specific physical and hydrological parameters, exposure parameters, and compound-specific toxicity values to estimate the cumulative human health risk at specific exposure locations near the facility. The approach was conservative in that maximum allowable short-term proposed permit emission rates were used (as opposed to actual emission rates) and in that it assumed all three (3) MWCs operated continuously (8,760 hours per year) when each is limited by permit to 8,256 hours per year of operation.

In accordance with USEPA's HHRAP, the following multi-pathway scenarios were evaluated for both adult and child exposures:

1. Resident/Fisher - An adult/child who eats local produce from a backyard garden and fish caught from local water bodies. This scenario was located where AERMOD output indicated the highest CCERC stack air concentrations and deposition fluxes regardless of whether actual residences are currently present.
2. Farmer Type 1/ Fisher: A farmer (adult/child) who eats mainly produce and livestock (excluding consumption of beef and dairy milk) and fish caught from local water bodies. This scenario was also conservatively located where AERMOD output indicated the highest facility impacts even though those locations are not zoned for agricultural use.
3. Farmer Type 2/ Fisher: A farmer (adult/child) who eats produce and livestock from the farm (including beef and dairy milk) and fish caught from local water bodies. This scenario was evaluated at actual farms located nearest to the facility and confirmed through readily available online information, to have beef and/or dairy cows. The nearest of these are the farm at Saul High School in Philadelphia, PA (~11 miles away), and Wellacrest Farms in Mullica Hill, NJ (~12 miles away from the CCERC).

The IRAP software used AERMOD outputs along with the site-specific physical and hydrological parameters and pollutant-specific emissions rates to calculate exposure point concentrations in the air, soil, surface water and fish, home-grown vegetables, farm-raised animals, cow's milk, eggs, and mother's milk (child only). The IRAP software then used the exposure point concentrations and toxicity values to calculate the pollutant-specific Excess Lifetime Cancer Risk which is expressed as a probability (e.g., 10^{-5} or one chance in 100,000), and non-carcinogenic risk, expressed as a hazard index ("HI"). The total cumulative risk was then calculated as the sum of the pollutant-specific values.

USEPA guidelines for hazardous waste boilers indicate that total incremental cancer risk should not exceed 1×10^{-5} (one chance in 100,000). USEPA selected this level partly to account for exposure to background contamination levels from offsite combustion sources. USEPA guidelines indicate that the

non-cancer HI for an individual constituent, or mixture of constituents where appropriate, should be less than 1.0. The USEPA cancer and non-cancer guidelines are also consistent with that of NJDEP as provided in Section 2.3.1 of *Technical Manual 1003 Guidance on Preparing a Risk Assessment for Air Contaminant Emissions.* The health risk assessment presented results relative to these cancer and non-cancer thresholds. The calculated overall long-term risk results for all exposure scenarios evaluated are less than the acceptable cancer risk and non-cancer (HI) risk thresholds. The maximum acute risk results for each of the exposure scenario locations, applicable to both adults and children, are also less than the acceptable HI risk threshold of 1.0.

The commentator expressed dissatisfaction with the way the Environmental Justice public hearing was conducted, how residents were notified, and the lack of a Spanish interpreter to translate comments and responses during the hearing. As Ms. Patricia Earls of Covanta stated during the public hearing held on December 8, 2022, Covanta has been working in close coordination with the NJDEP's Office of Permitting and Project Navigation (OPPN) and has been following their guidance on best practices for complying with the public information session requirements of Administrative Order 2021-25 (AO-2021-25). Covanta was advised by NJDEP to identify the meeting as a public hearing and to hold the hearing virtually to increase potential participation. We acknowledge that some people may not have internet access, and still more people were apparently unaware of the hearing. We strongly recommend that all interested community members with internet sign up for the NJDEP's Office of Environmental Justice ("EJ") newsletter. This is a free service that announces all scheduled upcoming EJ public hearings. To the notice aspect, we followed all NJDEP guidance and published in multiple newspapers, sent invitations to elected officials in and around Camden, and reached out to community members from across Camden with whom we have a relationship. However, we recognize that outreach efforts under NJ's Environmental Justice program continue to evolve and will require additional adjustments to ensure full participation by all members of the community.

We also understand that since our hearing, the NJDEP's guidance has been updated to encourage hybrid presentations. Accordingly, we will follow this guidance and hold future meetings in a hybrid (in person and online) format. We will have Spanish translation services available in case they are needed. Numerous attempts were made to advertise our public hearing in a Spanish newspaper in the area, but we were unable to locate one that could post our notice. The NJDEP has been sent a recording of our public hearing. Our response to comments package will be submitted to NJDEP and posted on the NJDEP's Environmental Justice website. Any Spanish speaking residents wishing to submit comments are encouraged to do so at any time through the normal channels listed on our website and someone from our team will promptly respond. This document has also been translated into Spanish and will be made available to the public.

Finally, we want to stress that Covanta is committed to community partnership and speaking directly to EJ issues. We have had an EJ policy in place since 2011 and were the only industrial company in the State that we are aware of that testified in support of the foundational New Jersey Environmental Justice Law. We are invested in the community for the long run, have worked hard to develop relationships with community leadership, and welcome future discussions, plant tours, and creative ideas to help highlight the amazing potential for this great city.

The commentator stated a belief that few employees (6 or 7 of 147 employees) of CCERC were residents of Camden which demonstrated that Covanta was not a "good neighborhood partner". As Mr. Todd Frace, Facility Manager of the CCERC, stated in response to a comment during the Environmental Justice hearing, the CCERC has 47 full-time employees, six (6) of which were born and raised in Camden. Additionally, two (2) corporate employees based at the facility were also born and raised in Camden. This total of eight (8) employees equates to approximately 13% of the staff and Covanta is invested in increasing that percentage to a range of 20-25%. Covanta has been striving to be a good neighbor, and continuously looks for ways to improve our relationship with the community. We hope that our meetings with community leaders and citizen groups, our Community Benefits Agreement, and our multi-year long effort to study emission control upgrades shows this commitment.

The commentator questioned why it has taken so long for Covanta to equip the CCERC with fabric filter baghouses. Mr. Jack Bernardino, the CGI Project Manager, replied to a similar comment expressed during the Environmental Justice public hearing. He pointed out that Covanta had taken over the facility in 2013 from Foster Wheeler and that discussions about baghouses really started around 2017/2018. At that time there were discussions of equipping the CCERC with baghouses along with the microgrid project. After the microgrid discussions waned, Covanta pursued other opportunities to finance installation of the baghouses. Other factors contributing to schedule extensions in the implementation of the project included the onset of the COVID-19 pandemic and the associated economic disruptions, as well as the more recent purchase of Covanta by EQT, which required a review of the CGI Project for corporate governance purposes.

To help support the implementation of the entire scope of the CGI Project, Covanta included liquid waste processing as an integral component. Processing liquid waste at its WTE facilities is an operation with which Covanta has significant experience and which has a negligible environmental impact on air emissions as documented by the test data included in the CCERA air permit application from other Covanta facilities at which liquids are processed. Including this operation also provides for the replacement of the existing spray dryer scrubbing technology with more advanced and highly effective circulating dry scrubbing ("CDS") technology.

Lastly, the commentator asserted that Covanta stated at the Environmental Justice hearing that it only intends to install the baghouses if its permit for collection and disposal of liquid waste is granted. What Covanta did state during the hearing was that without the ability to process liquid waste, the design and scope of the project would require re-evaluation. Replacement of the existing ESPs with fabric filter baghouses is the most important element of the project and is key to achieving the environmental enhancement goals of the CGI Project. The inclusion of CDS scrubbing technology is an environmentally preferable but non-essential part of the proposed air quality control upgrade project.

Covanta asserts that implementation of the proposed CGI Project will not adversely affect marginalized communities and looks forward to providing the proposed reductions in air emissions from the CCERC once permits for the CGI Project have been granted by the NJDEP.

Attachment 1

Health Risk Assessment Study

AECOM
250 Apollo Drive
Chelmsford, MA 01824
aecom.com

Project name:
Covanta Camden RRF

Project ref: 60654787

To:
Gary Pierce
Covanta Energy LLC
GPierce@covantaenergy.com

CC:

From:
Brian Stormwind & Amanda MacNutt

Date:
July 14, 2023

Memo

A multi-pathway human health risk assessment (HHRA) was conducted for the Camden County Energy Recovery Center (CCERC) to support the facility's Air Quality Control System Upgrade project (the "Project"). Emissions of air toxics from the municipal solid waste combustor (MWC) stack were modeled with the USEPA-preferred dispersion model, AERMOD, to obtain normalized annual air concentrations and deposition rates for the area surrounding the facility. The IRAP-h View™ Industrial Risk Assessment Program[1] (IRAP) was then used to implement U.S. Environmental Protection Agency's (USEPA) Human Health Risk Assessment Protocol (HHRAP)[2] which integrates the AERMOD output, pollutant-specific emissions, site-specific physical and hydrological parameters, exposure parameters, and compound-specific toxicity values to estimate the cumulative human health risk at specific exposure locations near the facility.

MWC Emissions Data

The USEPA HHRAP guidance allows for the use of actual emissions when estimating cancer and non-cancer health risks. However, the analysis conservatively used the proposed maximum potential to emit permitted emission rates for the Project; see **Table 1** (Table 3-3 from the Modeling Protocol). Note the HHRA was conducted with the maximum pound per hour (lb/hr) emission rates for each of the three (3) municipal solid waste (MSW) units and assumed all three units continuously operate throughout the year. This incorporates some added conservatism in the analysis since the MSW units are effectively limited by permit to 8256 hours per year operation.

Mercury emissions were speciated into elemental mercury and mercuric chloride based on stack test data from the Olmsted County Waste-to-Energy facility, following methodology used for the health risk assessment conducted for the Covanta Hennepin Energy Resource Company facility[3]. Use of speciated mercury stack test data is preferred where available and the Olmsted stack test data produces more conservative results (higher mercury deposition rates) compared to the default mercury speciation data provided in the HHRAP.

Hexavalent chromium emissions were assumed to be 10% of total chromium emissions. Use of 10% is a common conservative assumption for estimation of hexavalent chromium emissions from total chromium emissions for waste-to-energy facilities. The California Air Resources Board (CARB) did a review of emissions data and determined that Covanta should use an assumption of 5% for the risk assessment conducted for Covanta's Stanislaus County Resource Recovery Facility located in Crows Landing, CA. The 5% value was incorporated into Title V permit for the Stanislaus County facility. The results of coincident total chromium/hexavalent chromium stack testing at Covanta's

[1] Lakes Environmental 2009. Industrial Risk Assessment Program – Human Health (IRAP-h) View™ Human Health Risk Assessment Program. http://www.weblakes.com/products/iraph/
[2] USEPA 2005. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Final. EPA520-R-05-006. Office of Waste-Hazardous Waste – Treatment & Disposal. September. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P10067PR.TXT
[3] AECOM 2012. Human Health Risk Assessment for the Covanta Hennepin Energy Resource Company. May.

Long Beach Resource Recovery Facility located in Long Beach, CA, showed that approximately 2% of total chromium was hexavalent chromium, confirming the use of 5% as being conservative. Nonetheless, further conservatism was added to the CCERC analysis by assuming 10% of total chromium was hexavalent chromium.

Permitted emissions of polynuclear aromatic hydrocarbons (PAHs) are for the total emissions of PAHs. The facility does not have permit limits for the individual PAH congeners. Emissions for the congeners were estimated based on data from three stack test runs conducted at the CCERC between March 26, 2021 and March 29, 2021[4]. For each of the three runs, the percentage of the total was computed for each congener. To be conservative, the congener percentages for Run 3 were used as the basis for emissions in the HHRA because that run had the highest total percentage of congeners that are the most toxic[5]. Emissions for each congener modeled in the HHRA were calculated based on the total permitted PAH limit multiplied by the percentages from Run 3.

Similar to PAHs, permitted emissions for "PCDD/PCDF" are for the total amount of PCDD/PCDF with no specific limits for the individual congeners. Therefore, emissions for the congeners were also estimated based on available stack test data. While speciated PCDD/PCDF congener data is available for the CCERC from stack tests, the current facility uses an ESP for particulate control. Dioxins/furans adhere to the surface of particles and therefore, emissions of dioxins/furans are closely associated with particulate emissions which will be better controlled by fabric filter baghouses following the Project. Therefore, the current available congener data at Camden are not representative of the future operations of the facility following implementation of the Project. However, dioxins/furans congener data were available from Covanta's Essex County Resource Recovery Facility (ECRRF) which operates MWCs that are similar to the units at the CCERC and the ECRRF is equipped with similar baghouses that will be installed at the CCERC. Emissions for the PCDD/PCDF congeners were estimated based on data from three stack test runs conducted at the ECRRF between March 15, 2021 and March 16, 2021[6]. Similar to the approach used for PAH congeners, for each of the three runs, the percentage of the total was found for each congener. The percentages found for Run 1 were used in the analysis as the basis for estimated emissions in the HHRA because that run had the highest total percentage of congeners that are the most toxic[7]. Emissions for each congener modeled in the HHRA were calculated based on the total permitted PCDD/PCDF limit multiplied by the percentages from Run 1.

Table 2 provides the speciated PAH and Dioxin/Furan emissions.

HHRA Methodology

AERMOD Modeling

The AERMOD model (version 22112) was used to develop annual and hourly air concentrations and deposition rates based on a normalized (1 g/sec) MWC emission rate, and pollutant-specific emissions were input and applied to the modeling results within the IRAP program. AERMOD was run in accordance with the Dispersion Modeling Protocol submitted to the New Jersey Department of Environmental Protection (NJDEP) in September 2022[8] to obtain annual and 1-hour average air concentrations for input to IRAP. To develop annual deposition rates, additional inputs not discussed in the air quality modeling protocol were also required for input to AERMOD. The additional data specifically required for the deposition modeling are:

- Particle Size Distribution – Stack test data from the MWC at Covanta's Hempstead facility in New York[9] were used to represent the particle size distribution of the exhaust from the CCERC stack. The Hempstead facility units are controlled with baghouses and the particle size data were the most recent, representative data available. These data are required by AERMOD to estimate wet and dry particulate deposition.

[4] Provided by Gary Pierce (Covanta) via email to Brian Stormwind (AECOM) on December 07, 2022.
[5] Based on Toxic Equivalency Factors (TEF) for different congeners, provided in: USEPA 1993. Provisional guidance for quantitative risk assessment of polycyclic aromatic hydrocarbons. EPA/600/R-93/089. https://ordspub.epa.gov/ords/eims/eimscomm.getfile?p_download_id=466885
[6] Provided by Gary Pierce (Covanta) via email to Brian Stormwind (AECOM) on December 07, 2022.
[7] Based on Toxic Equivalency Factors (TEF) for different congeners, provided in: USEPA 2010. Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds. EPA/100/R 10/005.. https://www.epa.gov/sites/default/files/2013-09/documents/tefs-for-dioxin-epa-00-r-10-005-final.pdf
[8] AECOM 2022. Air Quality Modeling Protocol. Air Quality Control System Upgrade Project. Prepared for Camden County Energy Recovery Center. September. https://epa-prgs.ornl.gov/radionuclides/2005_HHRAP.pdf
[9] Radian Corporation 1989. Compliance Test Report for American Ref-Fuel Company of Hempstead. Hempstead Resource Recovery Facility. Westbury, New York. December.

- Chemical-Specific Parameters for Vapor Deposition – physical parameters including diffusivity in air (D_a), diffusivity in water (D_w), cuticular resistance (rcl) to uptake by lipids for leaves, and Henry's Law constant (H) are required for AERMOD to estimate vapor deposition. The IRAP software is designed to accept normalized vapor deposition output for divalent mercury, plus only one more "generic" compound that would represent all non-mercury vapor-state compounds. AERMOD sensitivity testing indicated that, of the emitted pollutants, associated physical parameters for benzo (a) pyrene resulted in the highest vapor deposition rates. As such, those physical parameters were used to represent all non-mercury vapor-state compounds. This is conservative because this methodology overestimates the vapor deposition for all emitted pollutants with the exception of divalent mercury and benzo (a) pyrene.

Exposure Scenarios

In accordance with USEPA's HHRAP[2], the following multi-pathway scenarios were evaluated for both adult and child exposure:

1. Resident/ Fisher – An adult/child who eats local produce from a backyard garden and fish caught from local water bodies. This scenario was located where AERMOD output indicated the highest CCERC stack air concentrations and deposition fluxes regardless of whether actual residences are currently present.

2. Farmer Type 1/ Fisher – A farmer (adult/child) who eats primarily produce and livestock from the farm *(excluding consumption of beef and dairy milk)* as well as fish caught from local water bodies. This scenario was also conservatively located where AERMOD output indicated the highest facility impacts even though those locations are not zoned for agricultural use[10].

   Note that the 2017 Census of Agriculture indicated there were no dairy cows in Camden County[11]. Furthermore, communication with the Rutgers Cooperative Extension indicated that while a few cattle are kept on farms in eastern Camden County, there were not likely any cattle within 10 miles of Camden City[12]. Since the HHRA risk results (presented below) indicated that the dairy and beef pathways contribute the largest portion of risk/hazard to the farmer scenario, inclusion of these pathways at the locations of the highest modeled AERMOD impact would unrealistically elevate the calculated risk/hazard for the farmer because no beef/dairy cows are currently present or reasonably expected to be kept at those locations in the future. The beef/dairy pathways were, however, evaluated for a farmer scenario located at the nearest beef/dairy farms as described below.

3. Farmer Type 2/ Fisher – A farmer (adult/child) who eats primarily produce and livestock from the farm *(including consumption of beef and dairy milk)* as well as fish caught from local water bodies. This scenario was evaluated at actual farms located nearest to the facility and confirmed, through readily available online information, to have beef and/or dairy cows. The nearest of these are the farm at Saul High School in Philadelphia, PA (~11 miles away), and Wellacrest Farms in Mullica Hill, NJ (~12 miles away).

Ingestion rates for the direct and indirect pathways associated with each of the exposure scenarios were based on default values provided in USEPA's HHRAP guidance[2], with the exception of the fish ingestion pathway. Site-specific fish ingestion rates used in the HHRA were based on a 2011-2012 creel angler survey of the Passaic River which flows through Newark, NJ.[13] The purpose of the study was to collect data about anglers' behaviors and fish consumption habits to calculate exposure factors for a human health risk assessment of the Study Area. Findings of the study are applicable to the current HHRA because fish consumption behaviors of residents in the Newark area are expected to be similar to those in the Camden area. The two locales are both urban areas in relatively close proximity to one another (approximately 75 miles apart), and the Passaic River is an urban, industrialized river similar to the Delaware River that is located adjacent to the CCERC. The study found the mean and 90th percentile consumption rates for the population of consuming anglers to be 5.0 and 8.8 grams per day (g/day), respectively. The study included a sensitivity analysis that estimated a maximum 95th percentile consumption rate of 27.75 g/day.

[10] Camden zoning map, https://www.ci.camden.nj.us/wp-content/uploads/2020/08/zoning_map.pdf
[11] United State Department of Agriculture (USDA) 2019. 2017 Census of Agriculture, New Jersey State and County Data. Volume 1, Geographic Area Series. Part 30. AC-17-A-30. April. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/New_Jersey/njv1.pdf
[12] Email from Mike Haberland (Rutgers Cooperative Extension) to Amanda MacNutt (AECOM) on December 02, 2022.
[13] Betsy Ruffle, Suzanne Baird, Gemma Kirkwood & F. Jay Breidt 2019. "Estimation of fish consumption rates based on a creel angler survey of an urban river in New Jersey, USA", Human and Ecological Risk Assessment: An International Journal, DOI: 10.1080/10807039.2018.1546549.

To be conservative, the HHRA used the value of 27.75 g/day for an adult fisher, even though the study indicates actual consumption rates are likely much lower. The child fisher consumption rate of 4.11 g/day was based on scaling the adult rate by the ratio of child-to-adult fish consumption rates in USEPA's HHRAP[14]. The HHRA assumed that locally caught fish were from either the Delaware River, Cooper River, or Newton Creek. These water bodies were selected because they are located closest to the facility and would therefore be subject to the highest impacts due to emissions from the MWC.

The drinking water pathway was not evaluated since water in the Camden local area is treated at one of five New Jersey American Water treatment plants prior to consumption. **Figure 1** provides the locations of the exposure scenarios. **Figure 2** depicts the proximity of the selected water bodies to the CCERC stack.

Toxicity Values

Toxicity values are used to define the relationship between the dose of a compound and the likelihood and magnitude of a health effect. Toxicity values used in the HHRA were selected with preference given to published values contained in the New Jersey Department of Environmental Protection (NJDEP) risk screening worksheet[15] unless more recent data were available in USEPA's Integrated Risk Information System (IRIS)[16]. For oral routes, which are not included in the NJDEP worksheet, the hierarchy of reference sources provided in USEPA's HHRAP were used. **Table 3** provides the toxicity values used in the HHRA. **Table 4** provides the acute benchmarks used in the HHRA.

Human Health Risk Assessment Thresholds and Results

The IRAP software used AERMOD output along with the site-specific physical and hydrological parameters and pollutant-specific emissions rates to calculate exposure point concentrations in the air, soil, surface water and fish, home-grown vegetables, farm-raised animals, cow's milk, eggs, and mother's milk (child only). The IRAP software then used the exposure point concentrations and toxicity values to calculate the pollutant-specific Excess Lifetime Cancer Risk which is expressed as a probability (e.g., 10^{-5} or one chance in 100,000), and non-carcinogenic risk, expressed as a hazard index (HI). The total cumulative risk was then calculated as the sum of the pollutant-specific values.

USEPA guidelines for hazardous waste boilers indicate that total incremental cancer risk should not exceed 1×10^{-5} (one chance in 100,000)[17]. USEPA selected this level in part to account for exposure to background levels of contamination from offsite combustion sources. USEPA guidelines indicate that the non-cancer HI for an individual constituent, or mixture of constituents where appropriate, should be less than 1.0[18]. The USEPA cancer and non-cancer guidelines are also consistent with that of NJDEP as provided in Section 2.3.1 of *Technical Manual 1003 Guidance on Preparing a Risk Assessment for Air Contaminant Emissions*[19]. The risk findings presented below assess calculated risk results relative to these cancer and non-cancer thresholds.

Table 5 presents the overall long-term risk results. While multiple locations and water bodies were evaluated for each exposure scenario, the table presents only the highest risk results. The overall risk results for all exposure scenarios evaluated are less than the acceptable cancer risk and non-cancer (HI) risk thresholds.

Table 6 presents the maximum acute risk results for each of the exposure scenario locations. Note that these results are applicable to both adult and child. All acute risk results are less than the acceptable HI risk threshold of 1.

[14] HHRAP (Table 6-1) mean fish consumption rate of 0.8 servings/week (child) divided by 5.4 servings/week (adult) = 0.148 scalar applied to adult consumption rate.
[15] https://www.state.nj.us/dep/aqpp/downloads/risk/Risk2020.xlsx
[16] USEPA 2020. Integrated Risk Information System (IRIS). Office of Research and Development, Washington, D.C. Available at: http://www.epa.gov/iris.
[17] USEPA 1991. Burning of Hazardous Waste in Boilers and Industrial Furnaces. 40 CFR Parts 260, 261, 264, 265, 266, 270, and 271. EPA/OSW-FR-91-012; SWH-FRL-3865-61. February. https://www.epa.gov/sites/default/files/2016-03/documents/52fr16982.pdf
[18] USEPA 1998. Human Health Risk Assessment Protocol for Hazardous Waste combustion Facilities. Office of Solid Waste and Emergency Response. EPA-530-D-98-001A. July. https://www.epa.gov/sites/default/files/2015-09/documents/rags_a.pdf
[19] https://www.state.nj.us/dep/aqpp/downloads/techman/1003.pdf

Figure 1: Evaluated Exposure Scenario Locations

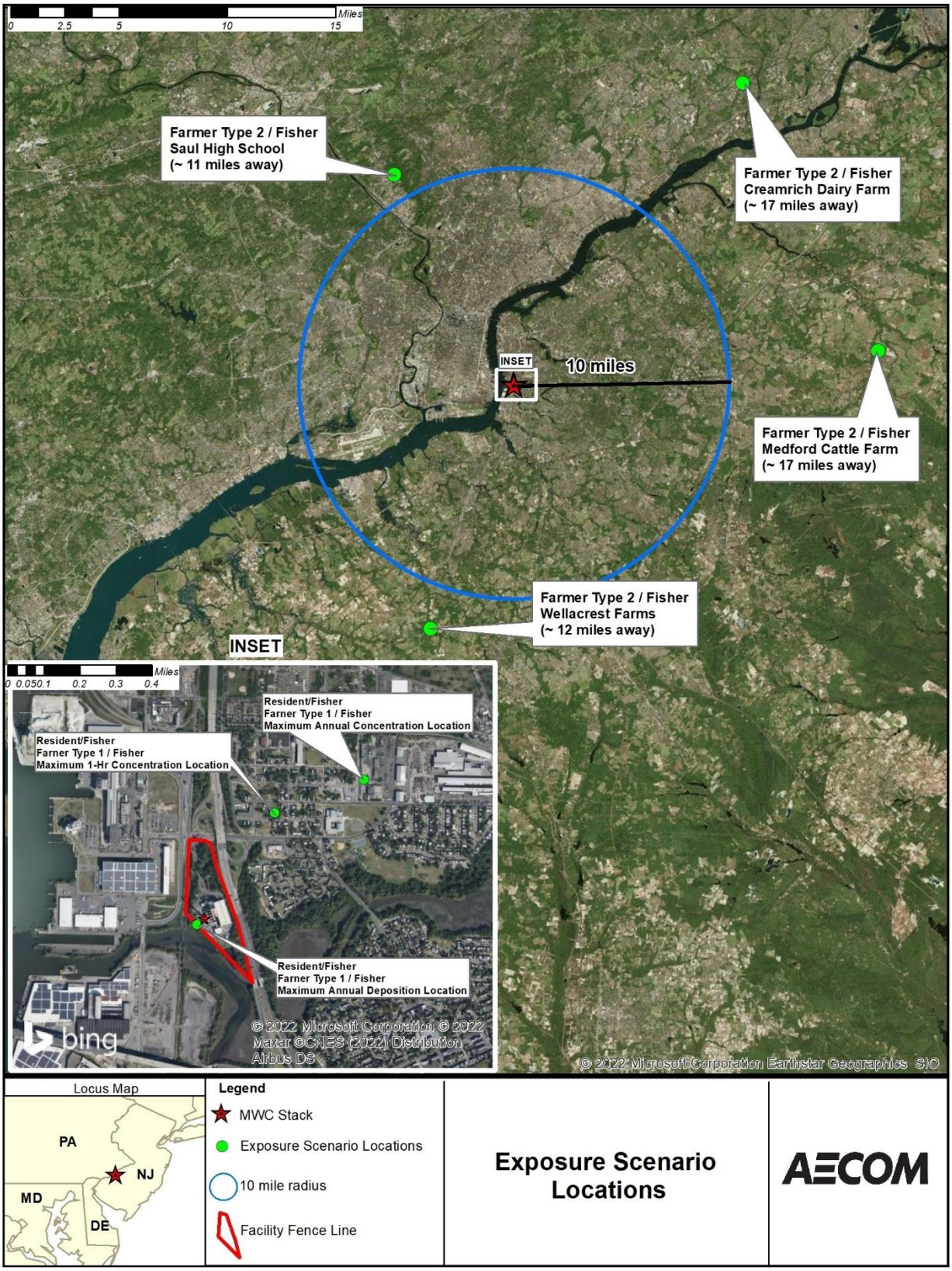

Figure 2: Proximity of Evaluated Water Bodies to CCERC

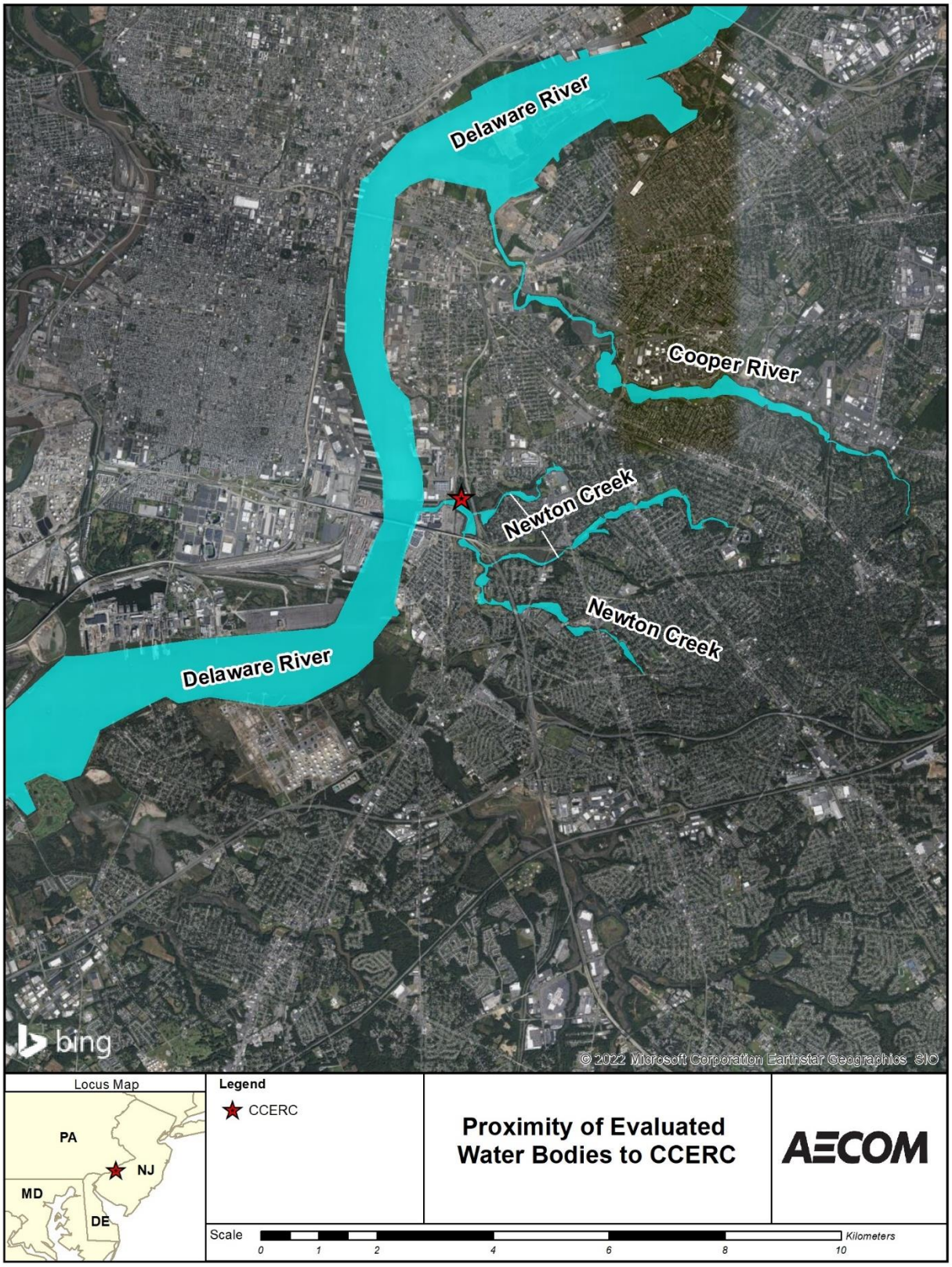

Table 1: Proposed Project Potential HAP Emissions and NJDEP Reporting Thresholds

Pollutant	Maximum Potential Emission Rate One MSW Unit (lb/hr)	Maximum Potential Emission Rate Three MSW Units (lb/yr) [1]	NJDEP Reporting Threshold (lb/yr) [2]	Above Reporting Threshold Yes/No
Lead	0.0170	421.5	2	Yes
Arsenic	0.000525	13.00	0.01	Yes
Cadmium	0.0017	42.15	0.01	Yes
PCDD/PCDF	0.00000221	0.055	0.0000012[3]	Yes
Hydrochloric acid	5.16	127,803	900	Yes
Mercury	0.0043	107	2	Yes
Hydrogen fluoride	0.035	867	600	Yes
H_2SO_4	2.60	64,397	NA	No
Ammonia	1.62	40,124	NA	No
Beryllium	0.0000131	0.32	0.02	Yes
Chromium	0.0215	533	1,000	No
Hexavalent chromium[4]	0.00215	107	0.004	Yes
Nickel	0.01800	446	0.6	Yes
2,3,7,8-TCDD	0.00000011	0.003	0.0000012	Yes
PAH	0.01450	359	2[5]	Yes

Notes:

[1] Based on three units operating 8256 hours/year for comparison with the NJDEP reporting thresholds. While each unit is limited to 8256 hours/year operation by permit condition, the emissions used in the HRA were conservatively based on unlimited annual operation for all three units (i.e., 8760 hours/year for each unit).

[2] https://www.nj.gov/dep/aqm/currentrules/Sub%2017.pdf; NA = no reporting threshold available.

[3] Threshold for 2,3,7,8-TCDD.

[4] Hexavalent chromium emissions conservatively estimated at 10%.

[5] Threshold for POM.

Table 2: Speciated PAH and Dioxin/Furan Emissions

Compound	Emissions (g/sec)	% of Total[(1)]
Total PAH (Permit Limit)	**5.48E-03**	
Naphthalene	3.22E-03	59%
2-Methylnaphthalene	4.74E-04	9%
Acenaphthene	1.33E-05	0.2%
Acenaphthylene	4.36E-05	1%
Fluorene	6.63E-05	1%
Phenanthrene	4.26E-04	8%
Anthracene	6.16E-05	1%
Fluoranthene	3.03E-04	6%
Pyrene	7.10E-04	13%
Benz(a)anthracene	3.98E-06	0.1%
Chrysene	9.95E-06	0.2%
Benzo[b]fluoranthene	1.23E-05	0.2%
Benzo[k]fluoranthene	3.50E-06	0.1%
Benzo(e)pyrene[(2)]	4.31E-05	1%
Benzo(a)pyrene	7.58E-06	0.14%
Perylene[(2)]	4.31E-06	0.1%
Indeno(1,2,3-cd)pyrene	9.95E-06	0.2%
Dibenz[a,h]anthracene	1.04E-06	0.02%
Benzo(g,h,i)perylene	6.63E-05	1%
Total PCDD/PCDF (Permit Limit)	**8.35E-07**	
1,2,3,6,7,8-HxCDD	2.15E-07	26%
1,2,3,7,8,9-HxCDD	1.90E-07	23%
1,2,3,4,6,78-HpCDD	1.31E-07	16%
OCDD	2.07E-08	2%
1,2,3,4,7,8-HxCDF	1.22E-07	15%
1,2,3,7,8,9-HxCDF	1.00E-07	12%
1,2,3,4,6,7,8-HpCDF	5.63E-08	7%
2,3,7,8-TCDD[(3)]	4.16E-08	--
1,2,3,7,8-PentaCDD[(4)]	4.16E-08	--

Notes:

(1) Percentages based on stack test data provided by Gary Pierce (Covanta) to Brian Stormwind (AECOM) on December 7, 2022.
(2) Not included in the HHRA due to lack of toxicity data for the compound
(3) Not detected in stack test data. Emissions set equal to the permit limit.
(4) Not detected in stack test data. Emissions conservatively set equal to the 2,3,7,8-TCDD permit limit.

Table 3: Toxicity Values

Air Toxic Pollutant	Cas No.	Inhalation				Oral			
		Cancer		Chronic Non-Cancer		Cancer		Chronic Non-Cancer	
		Unit Risk Factor $(\mu g/m^3)^{-1}$	Ref.	Reference Conc. (mg/m^3)	Ref.	Cancer Slope Factor $(mg/kg\text{-}d)^{-1}$	Ref.	Reference Dose (mg/kg-d)	Ref.
Ammonia	7664-41-7	NA	NA	5.00E-01	IRIS	NA	NA	3.40E+01	HEAST
Hydrogen Fluoride	7664-39-3	NA	NA	1.40E-02	NJDEP	NA	NA	5.71E-04	CalEPA
Sulfuric Acid	7664-93-9	NA	NA	1.00E-03	NJDEP	NA	NA	NA	NA
PentaCDD, 1,2,3,7,8-	40321-76-4	3.80E+01	CalEPA	4.00E-08	CalEPA(1)	1.30E+05	CalEPA	7.00E-10	IRIS(1)
Arsenic	7440-38-2	4.30E-03	NJDEP	1.50E-05	NJDEP	1.50E+00	IRIS	3.00E-04	IRIS
Beryllium	7440-41-7	2.40E-03	NJDEP	2.00E-05	NJDEP	NA	NA	2.00E-03	IRIS
Cadmium	7440-43-9	1.80E-03	IRIS	2.00E-05	NJDEP	NA	NA	1.00E-03	IRIS
Chromium	7440-47-3	NA	NA	5.30E+00	IRIS (R)	NA	NA	1.50E+00	IRIS
Hexavalent Chromium	18540-29-9	1.20E-02	NJDEP	1.00E-04	NJDEP	5.00E-01	CalEPA	3.00E-03	IRIS
Lead	7439-92-1	1.20E-05	NJDEP	1.50E-03	HHRAP	8.50E-03	CalEPA	4.29E-04	IRIS
Mercury	7439-97-6	NA	NA	3.00E-04	NJDEP	NA	NA	1.60E-04	CalEPA
Mercuric Chloride	7487-94-7	NA	NA	1.10E-03	IRIS (R)	NA	NA	3.00E-04	IRIS
Methyl Mercury	22967-92-6	NA	NA	3.50E-04	IRIS (R)	NA	NA	1.00E-04	IRIS
Nickel	7440-02-0	2.40E-04	NJDEP	1.40E-05	CalEPA	NA	NA	2.00E-02	IRIS
2,3,7,8-TCDD	1746-01-6	3.80E+01	NJDEP	4.00E-08	NJDEP	1.30E+05	CalEPA	7.00E-10	IRIS
1,2,3,7,8-PentaCDD	40321-76-4	3.80E+01	CalEPA	4.00E-08	CalEPA(1)	1.30E+05	CalEPA(1)	7.00E-09	IRIS(1)
1,2,3,6,7,8-HxCDD	57653-85-7	3.80E+00	NJDEP(1)	4.00E-07	NJDEP(1)	1.30E+04	CalEPA(1)	7.00E-09	IRIS(1)
1,2,3,7,8,9-HxCDD	19408-74-3	3.80E+00	NJDEP(1)	4.00E-07	NJDEP(1)	1.30E+04	CalEPA(1)	7.00E-08	IRIS(1)
1,2,3,4,6,7,8-HpCDD	37871-00-4	3.80E-01	NJDEP(1)	4.00E-06	NJDEP(1)	1.30E+03	CalEPA(1)	2.33E-06	IRIS(1)
OCDD	3268-87-9	1.14E-02	NJDEP(1)	1.33E-04	NJDEP(1)	3.90E+01	CalEPA(1)	7.00E-09	IRIS(1)
1,2,3,4,7,8-HxCDF	70648-26-9	3.80E+00	NJDEP(1)	4.00E-07	NJDEP(1)	1.30E+04	CalEPA(1)	7.00E-09	IRIS(1)
Naphthalene	91-20-3	3.40E-05	NJDEP	3.00E-03	NJDEP	1.20E-01	CalEPA	2.00E-02	IRIS
2-Methylnaphthalene	91-57-6	NA	NA	NA	NA	NA	NA	4.00E-03	IRIS
Acenaphthene	83-32-9	NA	NA	2.1E-01	IRIS (R)	NA	NA	6.00E-02	IRIS
Fluorene	86-73-7	NA	NA	1.4E-01	IRIS (R)	NA	NA	4.00E-02	IRIS
Phenanthrene(2)	85-01-8	NA	NA	1.05E+00	IRIS (R)	NA	NA	3.00E-01	IRIS
Anthracene	120-12-7	NA	NA	1.05E+00	IRIS (R)	NA	NA	3.00E-01	IRIS

Notes:

(1) Value based on USEPA Toxicity Equivalence Factors (TEFs). https://www.epa.gov/sites/default/files/2013-09/documents/tefs-for-dioxin-epa-00-r-10-005-final.pdf

(2) No toxicity values available. Anthracene values used as surrogate.

(3) No toxicity values available. Pyrene values used as surrogate.

References:

NJDEP – New Jersey Department of Environmental Protection Risk Spreadsheet. https://www.state.nj.us/dep/aqpp/downloads/risk/Risk2020.xlsx

IRIS – USEPA Integrated Risk Information System (IRIS). https://www.epa.gov/iris

IRIS (R) – USEPA IRIS using route-to-route extrapolation, where: RfC (mg/m^3) = [RfD (mg/kg-day) x 70 kg] / 20 m3/day.

CalEPA – California EPA Office of Environmental Health Hazard Assessment, Chronic Reference Exposure Levels Database. https://oehha.ca.gov/chemicals

HEAST – Health Effects Summary Tables (Archive). https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=2877

Table 3: Toxicity Values Cont.

Air Toxic Pollutant	Cas No.	Inhalation				Oral			
		Cancer		Chronic Non-Cancer		Cancer		Chronic Non-Cancer	
		Unit Risk Factor ($\mu g/m^3)^{-1}$	Ref.	Reference Conc. (mg/m^3)	Ref.	Cancer Slope Factor $(mg/kg\text{-}d)^{-1}$	Ref.	Reference Dose (mg/kg-d)	Ref.
Fluoranthene	206-44-0	NA	NA	1.40E-01	IRIS (R)	NA	NA	4.00E-02	IRIS
Pyrene	129-00-0	NA	NA	1.05E-01	IRIS (R)	NA	NA	1.05E-01	IRIS (R)
Benz(a)anthracene	56-55-3	NA	NA	NA	NA	7.00E-01	PPRTV	NA	NA
Chrysene	218-01-9	6.00E-06	NJDEP(1)	NA	NA	1.20E-01	CalEPA	NA	NA
Benzo[b]fluoranthene	205-99-2	6.00E-05	NJDEP(1)	NA	NA	1.20E+00	CalEPA	NA	NA
Benzo[k]fluoranthene	207-08-9	6.00E-06	NJDEP(1)	NA	NA	1.20E-01	CalEPA	NA	NA
Benzo(a)pyrene	50-32-8	6.00E-04	NJDEP	2.00E-06	NJDEP	2.90E+00	CalEPA	3.00E-04	IRIS
Indeno(1,2,3-cd)pyrene	193-39-5	6.00E-05	NJDEP(1)	NA	NA	1.20E+00	CalEPA	NA	NA
Dibenz[a,h]anthracene	53-70-3	6.00E-04	IRIS(1)	NA	NA	4.10E+00	CalEPA	NA	NA
Benzo(g,h,i)perylene(3)	191-24-2	NA	NA	0.105	IRIS (R)	NA	NA	3.00E-02	IRIS

Notes:

(1) Value based on USEPA Toxicity Equivalence Factors (TEFs).
https://www.epa.gov/sites/default/files/2013-09/documents/tefs-for-dioxin-epa-00-r-10-005-final.pdf

(2) No toxicity values available. Anthracene values used as surrogate.

(3) No toxicity values available. Pyrene values used as surrogate.

References:

NJDEP – New Jersey Department of Environmental Protection Risk Spreadsheet. https://www.state.nj.us/dep/aqpp/downloads/risk/Risk2020.xlsx
IRIS – USEPA Integrated Risk Information System (IRIS). https://www.epa.gov/iris

IRIS (R) – USEPA IRIS using route-to-route extrapolation, where: RfC (mg/m^3) = [RfD (mg/kg-day) x 70 kg] / 20 m3/day.

CalEPA – California EPA Office of Environmental Health Hazard Assessment, Chronic Reference Exposure Levels Database. https://oehha.ca.gov/chemicals

PPRTV – Provisional Peer-Reviewed Toxicity Values https://www.epa.gov/pprtv

HEAST – Health Effects Summary Tables (Archive). https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=2877

Table 4: Acute Benchmarks

Air Toxic Pollutant	Cas No.	Acute Benchmark $(\mu g/m^3)^{-1}$	Ref.
Ammonia	7664-41-7	3.20E+00	NJDEP
Hydrogen Fluoride	7664-39-3	2.40E-01	NJDEP
Sulfuric Acid	7664-93-9	1.20E-01	NJDEP
Arsenic	7440-38-2	2.00E-04	NJDEP
Beryllium	7440-41-7	5.00E-03	HHRAP
Cadmium	7440-43-9	3.00E-02	HHRAP
Chromium	7440-47-3	1.50E+00	HHRAP
Hexavalent Chromium	18540-29-9	NA	NA
Lead	7439-92-1	1.50E-01	HHRAP
Mercury	7439-97-6	6.00E-04	NJDEP
Mercuric Chloride	7487-94-7	1.25E-01	HHRAP
Methyl Mercury	22967-92-6	3.00E-02	HHRAP
Nickel	7440-02-0	2.00E-04	NJDEP
2,3,7,8-TCDD	1746-01-6	1.50E-03	HHRAP
1,2,3,7,8-PentaCDD	40321-76-4	2.50E-03	HHRAP
1,2,3,6,7,8-HxCDD	57653-85-7	1.50E-02	HHRAP
1,2,3,7,8,9-HxCDD	19408-74-3	1.50E-02	HHRAP
1,2,3,4,6,7,8-HpCDD	37871-00-4	6.00E-01	HHRAP
OCDD	3268-87-9	7.50E-02	HHRAP
1,2,3,4,7,8-HxCDF	70648-26-9	7.50E-03	HHRAP
1,2,3,7,8,9-HxCDF	72918-21-9	1.50E-02	HHRAP
1,2,3,4,6,7,8-HpCDF	67562-39-4	1.50E-01	HHRAP
Naphthalene	91-20-3	7.50E+01	HHRAP
2-Methylnaphthalene	91-57-6	NA	NA
Acenaphthene	83-32-9	1.30E+00	HHRAP
Acenaphthylene	208-96-8	1.00E+01	PAC-1
Fluorene	86-73-7	1.16E+01	HHRAP
Phenanthrene[(1)]	85-01-8	6.00E+00	HHRAP
Anthracene	120-12-7	6.00E+00	HHRAP

Notes:

[(1)] No toxicity values available. Anthracene values used as surrogate.
[(2)] No toxicity values available. Pyrene values used as surrogate.

References:

NJDEP – New Jersey Department of Environmental Protection Risk Spreadsheet. https://www.state.nj.us/dep/aqpp/downloads/risk/Risk2020.xlsx
HHRAP –USEPA 2005. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Final. EPA520-R-05-006. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P10067PR.TXT
PAC-1 – United States Department of Energy (USDOE) 2016. Protective Action Criteria (PAC) with AEGLs, ERPGs, and TEELs: Rev. 29 for Chemicals of Concern. https://www.energy.gov/ehss/protective-action-criteria-pac-aegls-erpgs-teels

Table 4: Acute Benchmarks Cont.

Air Toxic Pollutant	Cas No.	Acute Benchmark $(\mu g/m^3)^{-1}$	Ref.
Anthracene	120-12-7	6.00E+00	HHRAP
Fluoranthene	206-44-0	1.50E-02	HHRAP
Pyrene	129-00-0	1.50E+01	HHRAP
Benz(a)anthracene	56-55-3	3.00E-01	HHRAP
Chrysene	218-01-9	6.00E-01	HHRAP
Benzo[b]fluoranthene	205-99-2	6.00E-01	HHRAP
Benzo[k]fluoranthene	207-08-9	6.00E-01	HHRAP
Benzo(a)pyrene	50-32-8	6.00E-01	HHRAP
Indeno(1,2,3-cd)pyrene	193-39-5	5.00E-01	HHRAP
Dibenz(a,h)anthracene	53-70-3	3.00E+01	HHRAP
Benzo(g,h,i)perylene(3)	191-24-2	3.00E+01	PAC-1

Notes:

(1) No toxicity values available. Anthracene values used as surrogate.
(2) No toxicity values available. Pyrene values used as surrogate.

References:

NJDEP – New Jersey Department of Environmental Protection Risk Spreadsheet. https://www.state.nj.us/dep/agpp/downloads/risk/Risk2020.xlsx
HHRAP –USEPA 2005. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Final. EPA520-R-05-006. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P10067PR.TXT
PAC-1 – United States Department of Energy (USDOE) 2016. Protective Action Criteria (PAC) with AEGLs, ERPGs, and TEELs: Rev. 29 for Chemicals of Concern. https://www.energy.gov/ehss/protective-action-criteria-pac-aegls-erpgs-teels

Table 5: Long-Term Human Health Risk Assessment Results

Exposure Scenario	Adult / Child	Cancer Risk	Chronic Hazard Index
Resident Fisher	Adult	8.9E-07	0.48
Resident Fisher	Child	4.1E-07	0.40
Farmer Type 1 / Fisher	Adult	2.5E-06	0.48
Farmer Type 1 / Fisher	Child	5.1E-07	0.42
Farmer Type 2 / Fisher	Adult	2.2E-06	0.45
Farmer Type 2 / Fisher	Child	3.2E-07	0.36
Risk Thresholds		**1.0E-05**	**1.00**

Table 6: Acute Human Health Risk Assessment Results

Exposure Scenario	Adult / Child	Hazard Index
Resident Fisher	Adult & Child	0.022
Farmer Type 1 / Fisher	Adult & Child	0.022
Farmer Type 2 / Fisher	Adult & Child	0.002
	Risk Threshold	**1.00**

Attachment 2a

Material Characterization Form

COVANTA MATERIAL CHARACTERIZATION FORM (MCF)

Powering Today. Protecting Tomorrow.

SECTION 1 – GENERAL CUSTOMER INFORMATION *(If multiple locations, include a list of the locations as an attachment)*

GENERATOR INFORMATION

Company Name: _____
Address: _____
_____
Phone #: _____

TECHNICAL CONTACT INFORMATION

Contact Name: _____
Title: _____
Phone #: - _____
E-mail @: _____

SERVICE COMPANY INFORMATION

Company Name: _____
Address: _____
_____
Phone #: - _____

BILLING INFORMATION

Address: _____
_____
Billing Phone #: _____
Billing E-mail @: _____

SERVICE COMPANY AUTHORIZATION

On Behalf of (enter Generator Co. Name), I hereby authorize (enter Service Co. Name) to complete the Covanta Material Characterization Form (MCF) and all other necessary forms for the disposal of the non-hazardous waste described on them. Furthermore, I understand that the completion of this authorization provides this Service Company with authorization to characterize and profile the waste.

Generator Representative Name: _____
Generator Representative Title: _____ _____ _____
Signature Date

SECTION 2 – GENERAL WASTE STREAM INFORMATION

2.1 NAME OF WASTE: _____

2.2 GENERAL WASTE CLASSIFICATION *(Please select an applicable choice from the menu. You may write a category in if yours is not available)*

Other (use this option to write in your answer) _____

SECTION 3 – SHIPPING INFORMATION

3.1 CONTAINER TYPE: (check all that apply)
☐ Steel Drums ☐ Poly Drums ☐ Fiber Drums ☐ Boxes ☐ Pails
☐ Gaylord (yd3) Boxes ☐ Super Sacks ☐ Totes ☐ Other: Describe _____

3.2 QTY. PER DELIVERY: 8 tons SELECT A UNIT **3.3 FREQUENCY:** Weekly **3.4 DELIVERY VEHICLE:** Van Trailer

SECTION 4 – PROCESS DESCRIPTION

4.1 Provide a detailed description of the waste generating process. Also, describe the materials used to generate the waste, as well as, any other chemical or physical constituents that may be present as a result of commingling or contamination. ***Make a definitive statement as to whether or not any of the constituents, which are noted in section 7.1, are present.*** Provide a process flow diagram if possible. Attach additional pages if necessary.

_____
_____
_____
_____
_____
_____
_____
_____

4.2 Will the properties of the waste be consistent from delivery to delivery? ☐ No ☑ Yes
If no, how can the properties of the waste vary between loads?

_____
_____
_____
_____

4.3 Will analytical testing results be provided for this waste stream? ☑ No ☐ Yes

Name of Waste: _____

SECTION 5 – REGULATORY WASTE CLASSIFICATION

5.1 Is the waste an EPA Listed Hazardous Waste per 40 CFR 261? ☑ No ☐ Yes - **If YES, STOP. Waste is unacceptable**

5.2 Is the waste an EPA Characteristic Hazardous Waste per 40 CFR 261? ☑ No ☐ Yes - **If YES, STOP. Waste is unacceptable**

5.3 Does the waste meet the exemption criteria from any of the following? *(Check all that apply. A separate addendum may be required)*

☑ Aqueous Solution (<24% Alcohol and >50% Water) ☐ Non-Terne Plated Used Oil Filters ☐ RCRA Empty ☐ Other: _____

5.4 Is the waste a "Hazardous Waste" as defined by the State of Origin? ☑ No ☐ Yes - If YES, specify state ID: _____

5.5 Does the waste meet the definition of any of the following in the State of Origin? *(Check all that apply)*:

☑ None ☐ Special Waste ☐ Residual Waste ☐ Regulated Waste. State waste code: _____ ☐ Other: _____

5.6 The regulatory classification determinations for *section* 5.1 – *section* 5.5 were based on *(Check all that apply):*

☐ Analytical Data: _____ ☑ Information Provided in reference materials

☑ Generator Knowledge: _____ ☐ Information developed thorough prior testing

☑ Knowledge of the applicable regulations ☑ Information describing the waste generating process

☑ Information describing the materials used in the waste generating process ☐ Other: _____

5.7 **Additional Waste Information:** *(Check all that apply)*

☐ Non-Hazardous Waste from a CERCLA Site ☐ DEA Controlled Substance ☐ DOT Regulated

☐ Household Hazardous Waste (HHW) ☐ FIFRA Listed Material ☐ Radioactive

SECTION 6 – WASTE CHARACTERISTICS

6.1 **PHYSICAL FORM:** ☑ Solid (non-powder) ☐ Waxy Solid ☐ Powder ☑ Liquid ☐ Cream/Paste

(Check all that apply) ☑ Consumer Packaged ☐ Active Ingredient ☐ Tablets ☐ Bulk ☐ Other: _____

6.2 **PHYSICAL CHARACTERISTICS** *(Please specify the following characteristics to the best of your knowledge):*

Odor: None Flash Point: N/A °F pH: N/A BTU Value: 5600 ☐ Estimated or ☐ Measured

6.3 **PPE RECOMMENDATIONS FOR SAFE HANDLING & SPILL CLEAN-UP** *(Information provided in this section should be based on the PPE required of the generator's employees when managing, unloading, processing and in the case of a spill of the profiled waste)*

Eye Protection: Safety Glasses Special Precautions/Equipment: Specify

Hand Protection: Leather Gloves Respiratory Protection: None Other PPE: Describe

SECTION 7 – WASTE COMPOSITION

7.1 **CONSTITUENTS** - Identify the *TOTAL* concentration of the constituents present in the waste as weight percent or ppm, including all the contributions of all compounds. Report *TOTAL* concentration results, *do not report TCLP results in this section*. If TCLP testing was performed, attach as back-up information. If a constituent is not present, please identify it by noting "N/A" (not applicable) in the space provided.

Bromine	ppm	Arsenic	NA ppm	Lead	NA ppm	Zinc	NA ppm
Chlorine	wt.%	Barium	NA ppm	Manganese	NA ppm	Aluminum Oxide	<1 wt.%
Fluorine	0 ppm	Beryllium	ppm	Mercury	ppm	Silicates	<1 wt.%
Iodine	ppm	Cadmium	ppm	Nickel	ppm	Silicone	<1 wt.%
Nitrogen	wt.%	Chromium	ppm	Selenium	ppm	Titanium Dioxide	<1 wt.%
Sulfur	wt.%	Cobalt	ppm	Silver	ppm	Water	0 wt.%
Antimony	ppm	Copper	ppm	Vanadium	ppm	Alcohol	0 wt.%

7.2 **COMPOSITION** (Please complete the table below. Attach additional pages if needed. All substances regulated by 29CFR 1910.1000 Subpart Z and 2 9 CFR1910.1200 must be listed. The total wt.% range must add up to ≤100):

Component	CAS # (if known)	Chemical Formula (if known)	Range (wt.%)

SECTION 8 – NON-HAZARDOUS CERTIFICATION

I certify, as an Authorized Representative of the Generator, that this document. Including all completed forms and all pertinent addenda, accurately represent and describe the waste stream outlined. The information submitted Is true, accurate and complete, and no available information has been omitted or falsified. I further certify that the material is non-hazardous based upon Federal, State and Local Regulations.

Authorized Representative

Name: _____

Title: _____

Company: _____ _____ _____

Signature Date

SAVE CLEAR PRINT

Attachment 2b

LDI Safety & Handling Form

COVANTA
Powering Today. Protecting Tomorrow.

LIQUID DIRECT INJECTION (LDI) SAFETY & HANDLING ADDENDUM FORM

SECTION 1 – GENERAL INFORMATION

Generator Company: _____ Service Company: _____

Technical Contact: _____ Title: _____

Phone #: _____ E-mail @: _____

Waste Name: (as described in Section 2.1 of the attached Material Characterization Form [MCF]) _____

Waste Description: _____

_____

Primary COV Facility Destination: Other (write in facility nam Back-up COV Facility Destination(s): Other (write in facility na

SECTION 2 – WASTE COMPOSITION

COMPONENTS	CAS # (IF KNOWN)	CONCENTRATION

SECTION 3 – WASTE PHYSICAL DATA

Physical State: _____ Color/Appearance: _____ Percent (%) Solids: _____

Odor: ☐ Stong ☐ Moderate ☐ Mild ☐ Other: _____

Temperature @ arrival: _____ °F Freezing Point: _____ °F Boiling Point: _____ °F pH: _____

Incompatibility (materials or conditions to avoid): _____

SECTION 4 – HEALTH HAZARD INFORMATION

What type of irritation could reasonably be expected while unloading/processing this waste?

☐ Skin ☐ Eye ☐ Nose ☐ Throat ☐ None: _____

What type of irritation could reasonably be expected while cleaning up a spill of this waste?

☐ Skin ☐ Eye ☐ Nose ☐ Throat ☐ None: _____

What types of long-term effects are expected?

Carcinogenic Effects: _____ Reproductive Effects: _____

Additional Sign / Symptoms of overexposure: _____

Emergency / First Aid Procedures: _____

SECTION 5 –SAFE HANDLING & SPILL CLEAN-UP PERSONAL PROTECTIVE EQUIPMENT (PPE)

∗∗Information provided in this section should be based on the PPE required of the generator's employees managing the waste stream. What ***type*** of PPE, ***specifically***, should be worn when unloading/processing and in the case of a spill.

Eye Protection (Handling): SELECT AN OPTION Eye Protection (Spill): SELECT AN OPTION

Gloves (Handling): SELECT AN OPTION Gloves (Spill): SELECT AN OPTION

Respiratory (Handling): SELECT AN OPTION Respiratory (Spill): SELECT AN OPTION

Other PPE (Handling): _____ Other PPE (Spill): _____

Special Precautions / Equipment: _____

SECTION 6 - CERTIFICATION

I hereby certify that the above information is true and accurate to the best of my knowledge.

AUTHORIZED REPRESENTATIVE

Name: _____

Title: _____ _____ _____

Signature Date

SAVE CLEAR PRINT

Attachment 3

Traffic Study

AECOM

Camden County Energy Recovery Center

Air Quality Control Systems Upgrade Project - Traffic Assessment Study

Camden County Energy Recovery Associates, L.P.
Camden, NJ

December 2022

Delivering a better world

Prepared for:

Camden County Energy Recovery Associates, L.P.
Camden, NJ

Prepared by:

AECOM
1700 Market Street
Philadelphia, PA 19103
aecom.com

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1. Introduction

AECOM was tasked with performing a traffic study for the Camden County Energy Recovery Center (CCERC), in the City of Camden, Camden County, NJ, to evaluate the projected increase in truck traffic associated with the Air Quality Control System Upgrade Project (Project). The traffic study involved examining the expected increase in truck traffic associated with the proposed Project on Holtec Boulevard and a capacity analysis for the adjacent intersections of Holtec Boulevard and Broadway, Holtec Boulevard and I-676 SB Off-Ramp/Covanta Driveway, and Morgan Street and I-676 NB Off-Ramp/ Master Street. **Figure 1** below shows the location of the CCERC and immediate surrounding area, and **Figure 2** shows the intersections under study.

An Environmental Impact Study (EIS) was completed for original permitting of the CCERC in 1983 and excerpts from the report are included in **Appendix A**. As indicated by Covanta, site access and truck traffic routes will continue to be as described in the EIS, and the trucks traveling to and from the CCERC will primarily use I-676, Morgan Street, and Broadway.

The purpose of this analysis is to evaluate the potential impact to the identified intersections following implementation of the Project. This report summarizes the traffic analysis methodology, inputs and findings. **As discussed in Section 6, the findings of the study indicate that the Project would have no significant impact on the traffic in the vicinity of the CCERC.**

Figure 1. Location of CCERC

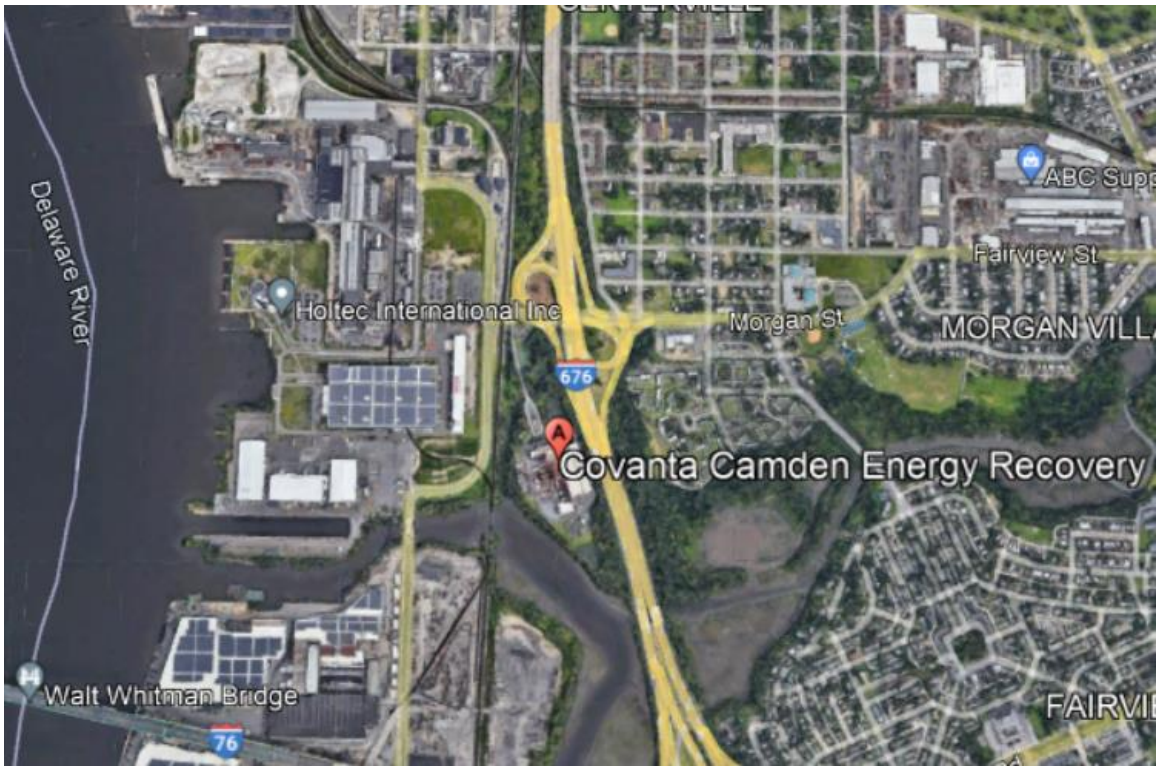


Figure 2. Study Area Intersections

2. Roadway Characteristics

Overall Roadway Characteristics

Broadway and Holtec Boulevard / Morgan Street are two important roadways that connect to the CCERC. An active railroad line runs parallel to Broadway between the intersections of Holtec Boulevard, and Broadway and Holtec Boulevard, and the CCERC Driveway/ I-676 SB off-ramp in the study area.

Holtec Boulevard / Morgan Street in the study area is an east-west corridor with generally two lanes in each direction from Fairview Street to Broadway. Holtec Boulevard / Morgan Street consists of multiple signalized and unsignalized intersections.

At the intersection of Morgan Street and Master Street, the eastbound Morgan Street has left/thru-thru lanes and the westbound Morgan Street has thru-thru/right lanes. The northbound I-676 Off-Ramp has left-left/thru lanes and the southbound Master Street approach has a shared left-right lane. Similarly, at the intersection of the Holtec Boulevard with CCERC Driveway/ I-676 SB off-ramp, the eastbound approach consists of thru-thru/right lanes and the westbound approach consists of two thru lanes and a left turn

lane. The northbound CCERC Driveway consists of a shared left-right lane and the southbound I-676 off-ramp consists of one 250 feet left turn lane and a thru-right lane.

Broadway is a north-south corridor generally with two lanes in each direction. At the intersection of Broadway with Holtec Boulevard, the eastbound approach consists of one 175 feet left turn lane, a thru lane and a shared thru-right lane, and the westbound approach consists of thru-thru/right lanes. The northbound approach consists of one 320 feet left-turn lane, a through lane, and a 330 feet right-turn lane. The southbound approach consists of one 360 feet left turn lane and a shared left-through lane.

Holtec Boulevard / Morgan Street has a posted speed limit of 30 miles per hour (mph), and Broadway has a posted speed limit of 25 mph. All other approaches were assumed to be 25 mph.

3. Existing Traffic Conditions

Data Collection

Turning Movement Counts (TMC) were collected at the intersections listed below. TMCs were collected on Thursday, September 22, 2022 by Tri-State Traffic Data, Inc. between 7:00 AM to 10:00 AM and 2:00 PM to 6:00 PM. Data was collected in 15-minute intervals in order to understand traffic pattern fluctuations.

- Morgan Street and Master Street
- Holtec Boulevard and CCERC Driveway/ I-676 SB Off-Ramp
- Holtec Boulevard and Broadway

The TMCs included vehicular volumes (light and heavy vehicles), pedestrians, and bicycles data. From the traffic counts a rail crossing was observed during the AM peak hour and none during the PM peak hour. The complete count data is provided in **Appendix B**.

Additionally, signal plans and timing sheets for the intersections, requested from the New Jersey Department of Transportation (NJDOT), were used to finalize the Synchro model traffic analysis. The signal plans and timings sheets are provided in **Appendix C**.

LOS Threshold for Signalized and Unsignalized Intersections

The Level of Service (LOS) analysis was performed using Synchro[1], a traffic analysis and signal optimization software which utilizes Highway Capacity Manual's (HCM)[2] standards for signalized intersections, unsignalized intersections and roundabouts. The LOS is defined by a letter grade assigned to an intersection based on the delay in seconds and the type of intersection traffic control. The delay is calculated by considering factors such as volume, speed, geometry, grade, heavy vehicle percentages, and traffic control. LOS ranges from A through F, with A primarily representing minimum delay or free flow conditions and F representing congestion or extreme delay. Control delay quantifies the

[1] SYNCHRO | Bentley Systems | Infrastructure Engineering Software Company
[2] http://hcmvolume4.org/Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis | Publications (trb.org)

increase in travel time that a vehicle experiences due to the traffic control as well as provides a surrogate measure for driver discomfort and fuel consumption.

Table 1 illustrates the LOS criteria for signalized and unsignalized intersections.

Table 1. LOS Thresholds for Signalized/ Unsignalized Intersections

Level of Service	Control Delay (sec/veh) - signalized	Control Delay (sec/veh) - Unsignalized	Description
A	≤ 10	≤ 10	This describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at the boundary intersection is minimal. The travel speed exceeds 80% of the base free-flow speed.
B	> 10 and ≤ 20	> 10 and ≤ 15	This describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only strictly restricted, and control delay at the boundary intersections is not significant. The travel speed is between 67% and 80% of the base free flow speed.
C	> 20 and ≤ 35	> 15 and ≤ 25	This describes stable operation. The ability to maneuver and change lanes at midsegment locations may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed.
D	> 35 and ≤ 55	> 25 and ≤ 35	This indicates a less stable condition in which small increases in flow may cause substantial increase in delay and decrease in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersection. The travel speed is between 40% and 50% of the base free-flow speed.
E	> 55 and ≤ 80	> 35 and ≤ 50	This is characterized by unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume and inappropriate signal timing at the boundary intersections. The travel speed is between 30% and 40% of the base free-flow speed.
F	> 80	> 50	This is characterized by flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30% of less of the base free-flow speed.

Source: Transportation Research Board, *Highway Capacity Manual 6th Edition* (Washington, D.C., 2010).

Existing Condition Analysis

The traffic analysis was completed using the Synchro traffic model (Version 11.0). The vehicular TMC established the existing year 2022 condition morning (AM) and evening (PM) peak hours for the study area. A system peak was calculated by looking at the counts at the three intersections holistically and the AM peak hour was determined to be the 7:30 AM to 8:30 AM, and the PM peak hour was determined to be 4:00 PM to 5:00 PM From the TMC it was also found that the railroad during the peak hours, between the intersections of Holtec Boulevard & Broadway and Holtec Boulevard & Covanta Driveway/ I-676 SB off-ramp was in use only once between 7:30 AM and 7:34 AM, which overlaps with the AM peak hour for this study. To account for the impacts of the train crossing, the green time for the conflicting phases were reduced by 8 seconds per signal cycle. The calculation is as follows:

$$time\ lost\ to\ train\ per\ hour = 4\ minutes = 240\ seconds$$

$$1\ signal\ cycle = 120\ seconds$$

$$cycles\ per\ hour = \frac{3600\ seconds}{120\ seconds} = 30$$

$$time\ lost\ to\ train\ per\ cycle = \frac{240\ seconds}{30\ cycles} = 8\ seconds\ per\ cycle$$

Note that this lost time (reduction in green time) is only applied to movements that conflict with the train movement. Phases that are allowed to move concurrently with the train movement (such as the NBT and SBT on Broadway and the SBL/ NBR at the intersection of I-676 SB Off-Ramp and Driveway) are not impacted.

- The peak hour traffic volumes can be seen in **Figure** 33 and
-

Figure 44 below.

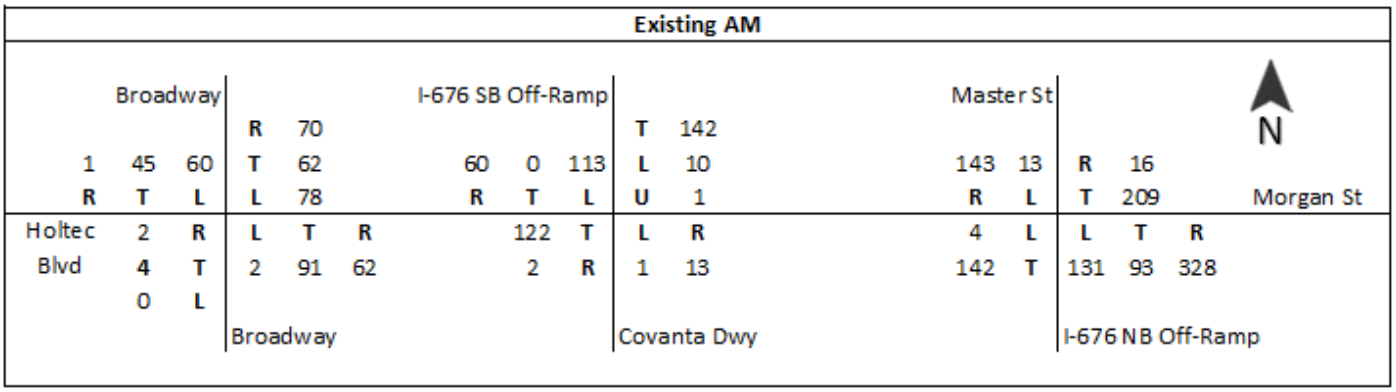
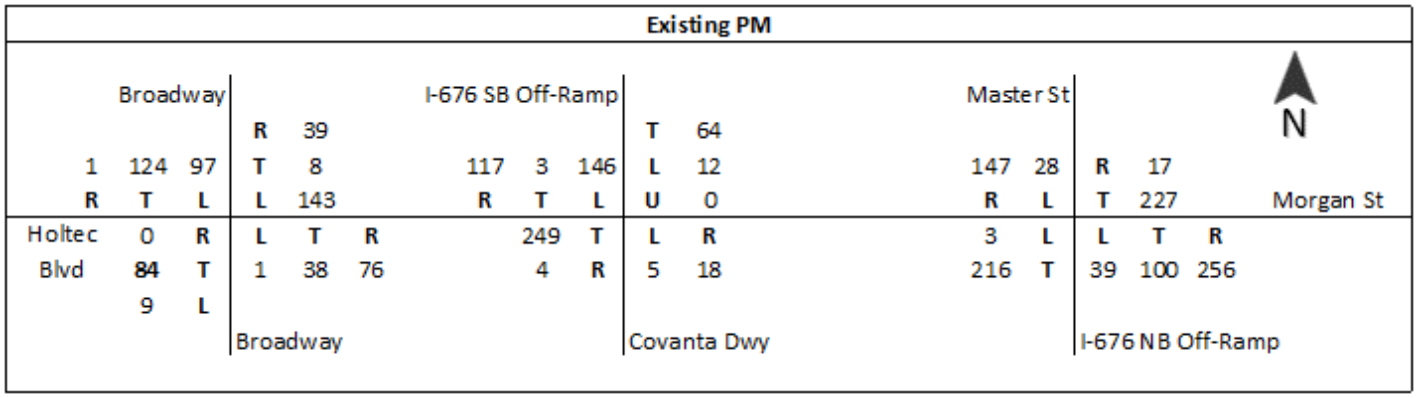


Figure 3. AM Peak Hour Existing Year 2022

Figure 4. PM Peak Hour Existing Year 2022



Traffic count data was used in conjunction with the existing geometry and intersection traffic control to create the Synchro traffic model. HCM 2000 was used for the capacity analysis. The capacity analysis results are summarized in **Table 2** below and the detailed reports are presented in **Appendix D**.

From the results in **Table 2**, in the existing conditions all intersections operate at an acceptable LOS of B during both AM and PM peak hours. The northbound and southbound approaches at both Holtec Boulevard & Broadway and the eastbound and westbound approaches at Holtec Boulevard & Covanta/ I-676 SB off-ramp, operate at LOS A in both peak hours indicating free flow operations. Similarly, the eastbound and westbound approaches at the intersections of Holtec Boulevard & Broadway, and the northbound and southbound approaches at Holtec Boulevard & Covanta/ I-676 SB off-ramp operate at LOS C or better in both peak hours, indicating no operational issues at the intersection. All the approaches and the intersection level of service at Morgan Street and Master Street/ I-676 NB off-ramp operate at LOS B or better, again indicating no operational issues at the intersection.

Table 2. Existing Condition Capacity Analysis

Intersection	Approach	Movement	Peak Hour Delay in seconds (LOS)	
			A.M.	P.M.
Holtec Boulevard and Broadway	Eastbound	Left	22.7 (C)	-
		Through/ Right	25.0 (C)	24.1 (C)
		Approach	**24.2 (C)**	**24.1 (C)**
	Westbound	Left	23.7 (C)	18.9 (B)
		Through/ Right	26.2 (C)	14.4 (B)
		Approach	**25.2 (C)**	**17.8 (B)**
	Northbound	Left	8.3 (A)	8.2 (A)
		Through	9.1 (A)	8.5 (A)
		Right	8.7 (A)	8.7 (A)
		Approach	**9.0 (A)**	**8.7 (A)**
	Southbound	Left	9.4 (A)	9.9 (A)
		Through/ Right	8.7 (A)	9.5 (A)
		Approach	**9.1 (A)**	**9.7 (A)**
	Total Intersection		**16.6 (B)**	**14.6 (B)**
Holtec Boulevard and Covanta Driveway/ I-676 SB off-ramp	Eastbound	Through/ Right	5.4 (A)	11.2 (B)
	Westbound	Left	7.2 (A)	7.2 (A)
		Through	7.4 (A)	7.1 (A)
		Approach	**7.4 (A)**	**7.1 (A)**
	Northbound	Left	20.8 (C)	15.4 (B)
		Right	20.8 (C)	15.4 (B)
		Approach	**20.8 (C)**	**15.4 (B)**
	Southbound	Left	28.7 (C)	27.6 (C)
		Through/ Right	25.2 (C)	23.5 (C)
		Approach	**27.5 (C)**	**25.7 (C)**
	Total Intersection		**14.5 (B)**	**17.3 (B)**
Morgan St and Master St/ I-676 NB off-ramp	Eastbound	Left/ Through	16.4 (B)	13.4 (B)
	Westbound	Through/ Right	18.4 (B)	18.5 (B)
	Northbound	Left	8.8 (A)	7.7 (A)
		Through/ Right	10.7 (B)	10.1 (B)
		Approach	**10.3 (B)**	**9.9 (A)**
	Southbound	Left	8.0 (A)	8.0 (A)
		Right	8.2 (A)	8.1 (A)
		Approach	**8.2 (A)**	**8.1 (A)**
	Total Intersection		**12.4 (B)**	**12.3 (B)**

4. Project Traffic Volume Increase

The Project would generate additional truck trips to and from the site. The traffic impact analysis was based on the following information provided by Covanta.

The current vehicle trips associated with the operation of the CCERC ("the Facility") ranges from 180 to 195 vehicles per day which is associated with a current actual Municipal Solid Waste (MSW) throughput of approximately 398,000 tons per year. The Project will result in an MSW throughput rate of approximately 425,000 tons per year and a Liquid Direct Injection (LDI) throughput of approximately 26,000 tons per year (facility MSW limit of 451,140 tpy – 425,000 tpy). Therefore, the Project will result in an increase of 27,140 tons per year of MSW and 26,000 tons per year of LDI.

MSW loads average 20 tons per vehicle (transfer trailer loads) and LDI loads average 20 tons per vehicle (5,000 gallon loads). Waste will continue to be received at the CCERC on weekdays from 7:00 A.M to 5:00 P.M and from 7:00 A.M to 12:00 PM on Saturday. The 27,140 additional tons of MSW at 20 tons per load is equivalent to 1,350 additional MSW deliveries per year, and 26,000 tons of LDI at 20 tons per load is equivalent to 1,300 LDI deliveries per year, for a total 2,650 additional waste deliveries per year. Additional ash generation would be approximately 20% by weight of the additional MSW, or 5,400 tons per year. At 20 tons per truck, ash disposal would generate an additional 270 trips per year. This equates to a total number of additional vehicle trips per year of 2,920 (1350 + 1300 + 270) and the total number of receiving and disposal hours would equal 55 hours per week ([5 days x 10 hours] + 5 hours), and the total hours per year would equal 2,750 hours (55 x 50 weeks per year).

Therefore, the Project is expected to result in approximately 2,920 additional trucks trips per year over 2,750 receiving hours per year which equates to approximately one (1) additional vehicular trip per hour, to and from the Facility, respectively.

Figure 5**5 and Figure** 6**6** below show the total, existing ("Base Volume" in blue) plus Project ("Trip Gen Volume" in red), traffic volumes in black for AM and PM, respectively.

Figure 5. Existing Year 2022 AM Traffic Volumes with Project Traffic Increase

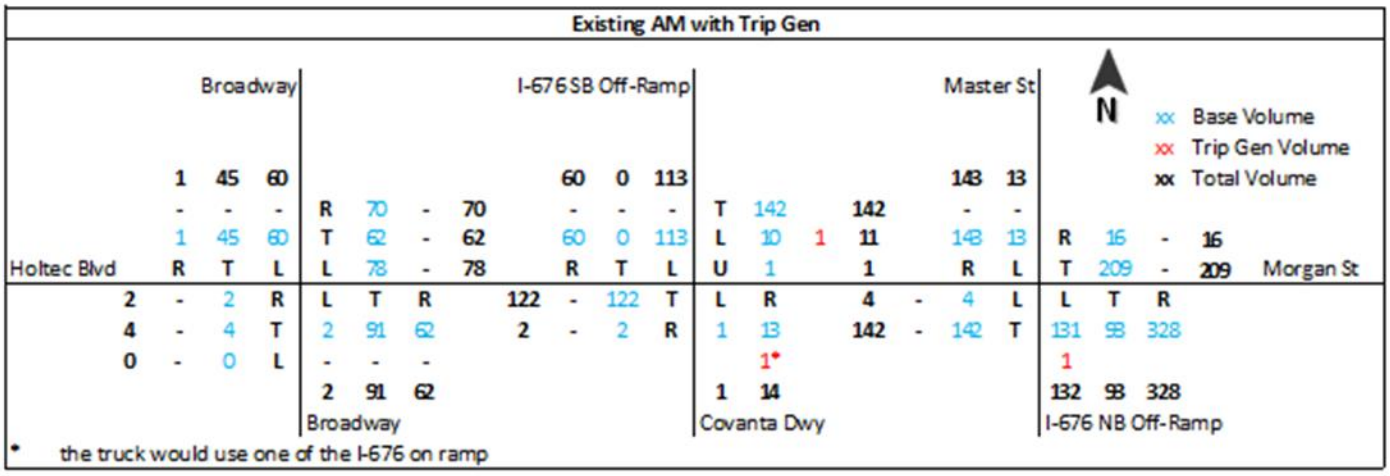
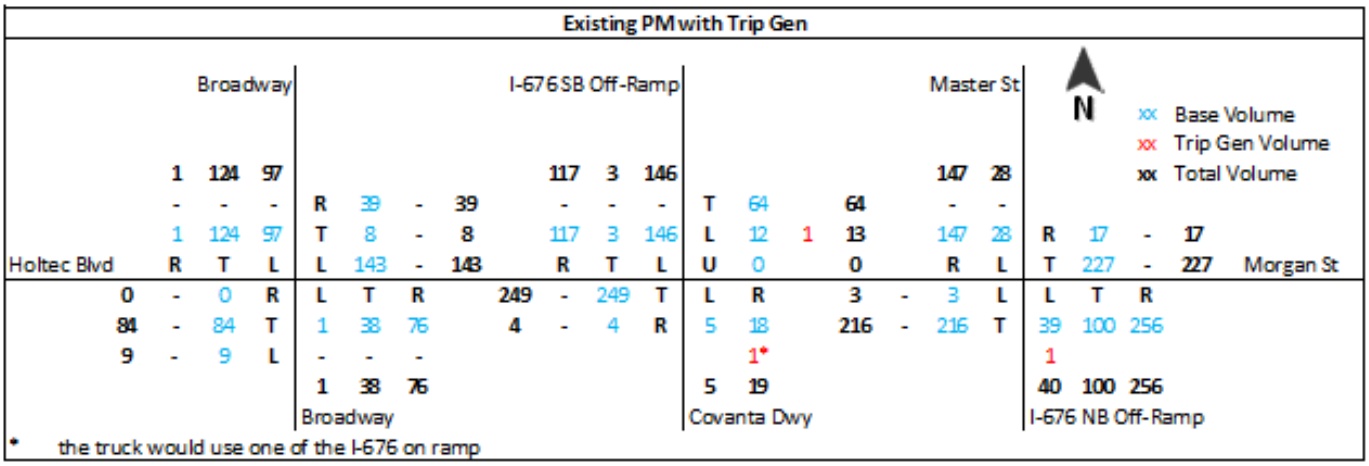


Figure 6. Existing Year 2022 PM Traffic Volumes with Project Traffic Increase



5. Traffic Analysis Results with Project Increase

The traffic capacity analysis was completed to determine the impact of the additional trips generated by the Project. For this analysis the volumes shown in **Figure 5** and **Figure 6** were used in the Synchro model.

Table 3 below summarizes the capacity analysis results and the detailed traffic capacity analysis reports are presented in **Appendix E**. From the table below, it can be seen that the overall intersection LOS for all the intersections with the Project is B, with no change from the existing conditions, which implies that the intersections currently operate acceptably and would continue to do so following the Project with no improvements or mitigation required. Therefore, the Project would have an negligible impact on traffic operations at all three (3) intersections under study.

Table 3. Existing Year 2022 with Project Increase Volume

Intersection	Approach	Movement	Existing Peak Hour Delay in seconds (LOS)		w/Project Peak Hour Delay in seconds (LOS)	
			A.M.	P.M.	A.M.	P.M.
Holtec Boulevard and Broadway	Eastbound	Left	22.7 (C)	-	22.7 (C)	-
		Through/ Right	25.0 (C)	24.1 (C)	25.0 (C)	24.1 (C)
		Approach	**24.2 (C)**	**24.1 (C)**	**24.2 (C)**	**24.1 (C)**
	Westbound	Left	23.7 (C)	18.9 (B)	23.7 (C)	18.9 (B)
		Through/ Right	26.2 (C)	14.4 (B)	26.2 (C)	14.6 (B)
		Approach	**25.2 (C)**	**17.8 (B)**	**25.2 (C)**	**17.8 (B)**
	Northbound	Left	8.3 (A)	8.2 (A)	8.3 (A)	8.2 (A)
		Through	9.1 (A)	8.5 (A)	9.1 (A)	8.5 (A)
		Right	8.7 (A)	8.7 (A)	8.7 (A)	8.7 (A)
		Approach	**9.0 (A)**	**8.7 (A)**	**9.0 (A)**	**8.7 (A)**
	Southbound	Left	9.4 (A)	9.9 (A)	9.4 (A)	9.9 (A)
		Through/ Right	8.7 (A)	9.5 (A)	8.7 (A)	9.5 (A)
		Approach	**9.1 (A)**	**9.7 (A)**	**9.1 (A)**	**9.7 (A)**
	Total Intersection		**16.6 (B)**	**14.6 (B)**	**16.6 (B)**	**14.6 (B)**
Holtec Boulevard and Covanta Driveway/ I-676 SB off-ramp	Eastbound	Through/ Right	5.4 (A)	11.2 (B)	5.4 (A)	11.2 (B)
	Westbound	Left	7.2 (A)	7.2 (A)	7.2 (A)	7.2 (A)
		Through	7.4 (A)	7.1 (A)	7.4 (A)	7.2 (A)
		Approach	**7.4 (A)**	**7.1 (A)**	**7.4 (A)**	**7.2 (A)**
	Northbound	Left	20.8 (C)	15.4 (B)	20.8 (C)	15.4 (B)
		Right	20.8 (C)	15.4 (B)	20.9 (C)	15.4 (B)
		Approach	**20.8 (C)**	**15.4 (B)**	**20.9 (C)**	**15.4 (B)**
	Southbound	Left	28.7 (C)	27.6 (C)	28.7 (C)	27.6 (C)
		Through/ Right	25.2 (C)	23.5 (C)	25.2 (C)	23.5 (C)
		Approach	**27.5 (C)**	**25.7 (C)**	**27.5 (C)**	**25.7 (C)**
	Total Intersection		**14.5 (B)**	**17.3 (B)**	**14.5 (B)**	**17.2 (B)**
Morgan Street and Master Street / I-676 NB off-ramp	Eastbound	Left/ Through	16.4 (B)	13.4 (B)	16.4 (B)	13.4 (B)
	Westbound	Through/ Right	18.4 (B)	18.5 (B)	18.4 (B)	18.5 (B)
	Northbound	Left	8.8 (A)	7.7 (A)	8.9 (A)	7.7 (A)
		Through/ Right	10.7 (B)	10.1 (B)	10.7 (B)	10.1 (B)
		Approach	**10.3 (B)**	**9.9 (A)**	**10.3 (B)**	**9.9 (A)**
	Southbound	Left	8.0 (A)	8.0 (A)	8.0 (A)	8.0 (A)
		Right	8.2 (A)	8.1 (A)	8.2 (A)	8.1 (A)
		Approach	**8.2 (A)**	**8.1 (A)**	**8.2 (A)**	**8.1 (A)**
	Total Intersection		**12.4 (B)**	**12.3 (B)**	**12.4 (B)**	**12.3 (B)**

6. Summary

The findings of the study indicate that the truck traffic increase associated with the proposed Project will have a negligible impact on the traffic in the vicinity of the CCERC as the adjacent intersections analyzed have sufficient capacity to accommodate the minor traffic increase.

APPENDICES

APPENDIX A
Environmental Impact Study Excerpts

8.3.3 Historical and Archeological Impacts

The State and National Registers of Historic Places has singled out for recognition four sites which are within the general vicinity of the proposed facility. Two of these sites, the Morgan Village Archeological site and a Prehistoric/Historic occupation site in Gloucester City are sub-surface and should not come in contact with any adverse impact of the facility's construction or operation. The two remaining sites, the Fairview Historical District and Newton Avenue Garage may be subject to minor adverse impacts due to the potential for particulate fallout and the acidification of rainfall (depending on weather conditions) due to stack emissions. These types of impacts generally are endemic to major metropolitan areas, and result in accelerated aging, corrosion, and defacement of structures. There have been no historic or archaelogical resources identified on the site. Impacts to the historic and archeologic resources of the area are not projected to be significant in terms of air pollutants, since implementation of state-of-the-art air pollution control equipment for acid gases and particulates is required in New Jersey, and should effectively mitigate the potential adverse impact. It is not expected that the increased traffic flow to and around the project site will have any discernible adverse impact on the areas' historic or archeologic resources.

8.4 Socioeconomic Impacts

8.4.1 Traffic and Transportation

<u>Anticipated Transportation Routes To and From the Proposed Facility</u>

The projected major garbage truck routes from the service area municipalities to the proposed South Camden Resource Recovery

Figure 8.2

site can be seen on Figure 8.2. The primary routes to the site would be Route 30 north to I-295 south to I-76, I-676 north; Route 168 north to I-295 south to I-76, I-676 north; and Route 42 north to I-76, I-676. Trucks traveling to the site from Camden City would take I-676 south to the site. From Woodlynne, trucks will be directed to use Route 168 to Route 130, to I-676 North to Morgan Boulevard. These vehicle routing schemes are intended to eliminate the use of local roadways to reach the site, however some trucks from Camden and Gloucester City may use Broadway to reach Morgan Boulevard. All other refuse vehicles will reach the site via the Morgan Boulevard exit off of I-676. The proposed project site is located directly adjacent to this exit, therefore travel from the exit to the site entrance would be a maximum of 800 feet on Morgan Boulevard. Refuse trucks will return to their respective collection areas via the same route which they used to arrive at the facility.

Traffic Volumes

Approximately 290-310 vehicle trips to the facility will occur each week day under full operations. The maximum rate of vehicle trips is projected to be on the order of 53-54 per peak hour. Based on the projected operation and maintenance staff, 12 to 15 employee cars are expected to enter and leave the site during the 7:00 A.M. to 3:00 P.M. shift. Visitors to the facility during this shift are expected to account for 2 or 3 cars per day, or a single bus. Thus, without accounting for special maintenance, ash handling or delivery vehicles, the total number of private vehicles per day per shift is expected to total no more than approximately 20.

Thus, during each weekday, an additional maximum of about 330 vehicles will pass through the intersection of the I-676 ramp, Morgan Boulevard, and the facility driveway. This intersection now handles an average of 10,867 vehicles per day at a

level-of-service of "C". The addition of 300+ vehicle round trips will result in an increase of daily traffic of about 5.6 percent. This additional traffic is not projected to have an adverse effect on the existing level-of-service. An explanation of level-of-service (LOS) rating is given in Section 3.4.1.

On-site Traffic

To minimize the impact of traffic onsite due to waste hauling vehicles, the following provisions will be employed. Garbage trucks will be scale weighed into the plant and weighed upon their exit, after unloading. Trucks will be queued in an orderly manner for entry weighing. If necessary, the entrance road from Morgan Boulevard to the main gate adjacent to the scale house can accomodate a queue of 17 packer trucks or 10 transfer trailers without causing a backup of traffic onto Morgan Boulevard. Queuing also will be utilized if necessary for entry into the tipping area, dumping into the pit, exiting the tipping floor, and exit weighing. A total of 30 queuing locations are provided on site to minimize traffic congestion. Each truck will be assigned a parking location on the tipping floor before proceeding to that area. Truck drivers will be instructed to dump into the pit and not on the tipping floor to prevent congestion and traffic accidents. A speed limit of 10 miles per hour will be enforced onsite and 5 miles per hour in the tipping area. A total of twenty unloading locations will be provided inside the tipping floor, 17 packer truck locations and 3 transfer trailer locations.

Trucks will enter the site from Morgan Boulevard via the main access road. The site road system will provide for a counter clockwise circular traffic pattern around the plant site as shown on Figure 4.1. The access road from Morgan Blvd. to the plant site will be a two lane 24'0" wide road with a 4'0" gravel shoulder on each side. Onsite roads, which are 2 lanes, will be

24'0" wide roads with a 4'0" wide gravel shoulder on each side. Because of the traffic patterns there will be areas where the two lane road splits into two single lane 12'0" wide roads with 4'0" wide gravel shoulders on both sides of the single lane roads. The traffic plan will utilize a one way only traffic flow. This one way road system will provide for a smoothly controlled flow of refuse vehicles, transfer vehicles, plant vehicles, private vehicles, employee and service vehicles to and from the facility. Appropriate directional and traffic control signage and signalization will be utilized and is detailed in the Engineering Report. Visitors will enter the site from Morgan Boulevard and park in a visitors' parking lot at the front of the administration building.

8.4.2. Sewage & Wastewater

Wastewater sources from the proposed facility include neutralization regeneration waste water from the anion/cation units (from the boiler feedwater preparation system), backwash from carbon filters, cooling tower blowdown, boiler blowdown, waste condensate, intermittent flow from the garbage pit sump, utility station clean-up water, dirty storm water and sanitary waste water.

Sanitary waste will be collected and directed to the Camden City sewer system. The estimated average sanitary wastewater flow is 1500 gpd., with a peak instantaneous flow of 3000 gpd. The local sanitary wastewater collection system in Morgan Boulevard can accomodate these flows without adverse impact on other users, and the upgraded CCMUA regional wastewater treatment facility will accept the additional flow without overloading plant capacity. The estimated composition of the sanitary wastewater flow is based upon a typical medium-high strength sanitary waste.

received a SHPO opinion of eligibility in 1983. Refer to Appendix C for correspondence from the NJDEP on the subject of Historic/Archeologic resources near the project site.

3.4 Socioeconomic Conditions

3.4.1 Traffic

a. Description of Site Access

The proposed Camden County Resource Recovery project site is located on Morgan Boulevard, adjacent to Interstate 676 in South Camden City. The proposed site is largely served by the same thoroughfares that are used by other facilities in the industrial district. These primary roadways include Interstate 676, Interstate 76, Broadway Avenue, and Morgan Boulevard.

Direct vehicular access to the site would be by I-676 via the Morgan Boulevard interchange which is located less than 400 feet from the proposed entrance to the site. Interstate 676 intersects with I-76 approximately one mile south of the Morgan Boulevard interchange. Both I-676 and I-76 are part of the interstate system initiated in 1956. Each highway ranges from six to eight lanes in width and is considered a major industrial and commercial collector.

Broadway Avenue is a two lane commercial and industrial collector, 30 to 40 feet in width, oriented in a north-south direction to the west of the site. Broadway is currently used as a major connector to both downtown Camden and Gloucester City.

Morgan Boulevard is a two lane local, commercial and industrial roadway, 40 feet in width, oriented in an east-west direction connecting Broadway with Interstate 676, and providing access to

the South Jersey Port properties, Morgan Village and Fairview neighborhoods.

Access to the site from other parts of Camden County is available via U. S. Route 130 and Route 42 which connect with Interstate 76 approximately 1.1 miles and 2.5 miles, respectively southeast of the project site.

Immediate access to the site is only fair under existing conditions due to access limitations to the east and south. To the east of the site is I-676 and to the south is Newton Creek. Access from the west would require either a grade crossing or an overpass due to the existing railroad line and drainage ditch (See Figures 2.1 and 2.2). The Pennsylvania Reading Seashore Line (Conrail) provides freight service to nearby industries. This 2-track right-of-way is available to provide rail access for both the construction phase and operational phase of the proposed resource recovery facility. The best access to the site is provided by Morgan Boulevard with its direct connections to I-676.

b. Traffic Volume

In order to gauge any traffic impacts that might occur from the proposed resource recovery facility, two 24-hour traffic counts were performed at the interchange of I-676 and Morgan Boulevard, near the proposed site access/egress point. This intersection was chosen due to its location and the probability of being the most utilized route for most or all traffic bound to and from the facility.

Due to the complex nature of the interchange, (See Figure 3.12, two separate counts were performed on each side of the I-676 overpass. Through traffic on I-676 was not counted in this study

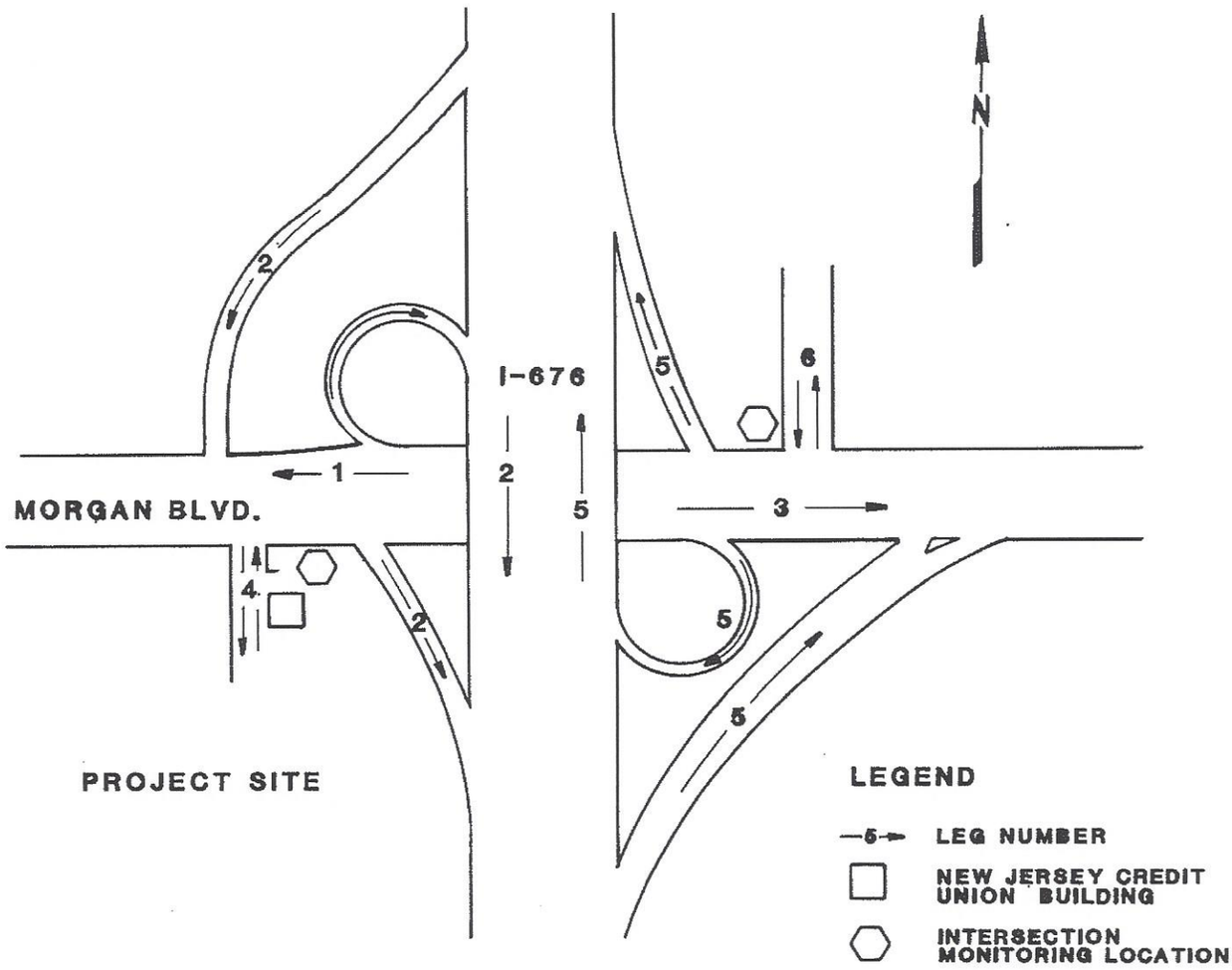


FIGURE 3.12

N.T.S.

since data was available from the New Jersey State Department of Transportation. Data from NJDOT revealed that an annual average daily traffic (AADT) range of 13,000 to 23,000 southbound vehicles in 1983 and 14,800 to 19,400 southbound vehicles and 17,300 to 20,800 northbound vehicles in 1982 occurred between Atlantic Avenue and the ramp to the Walt Whitman Bridge on I-676. No northbound data was supplied for 1983.

The Interstate 676/Morgan Boulevard interchange provides on and off ramps to both northbound and southbound I-676. On-ramps are provided on each side of Morgan Boulevard so that all movements onto I-676 are via right turns. Both off ramps are intended to intersect Morgan Boulevard at traffic signal controlled locations which permit traffic to turn in either direction onto Morgan Boulevard. However, the traffic signal at the intersection of Morgan Boulevard and the southbound I-676 off ramp does not yet exist. The signal is to be installed by Conrail with an automatic train pre-emption system, but the completion date is not yet determined. The interchange is a "clover leaf-diamond" type with traffic entering I-676 served by the "clover-leaf" ramps and exiting traffic served by the "diamond" ramps (refer to Figure 3.12).

The project site is located on the west side of the I-676 interchange. Complete twenty-four hour intersection counts for this location can be found in Appendix D. The total number of vehicles counted between 6:00 a.m. December 16, 1985 and 6:00 a.m. December 17, 1985 was 11,032 vehicles. Of this total, 9,331 trucks. Of these totals, 3,848 vehicles turned from Morgan Boulevard onto I-676, 1,481 from the westbound lanes of Morgan Blvd and 2,367 from the eastbound lanes. Totals from the second traffic count, December 17 to December 18, are slightly but not significantly lower. The total number of vehicles was 10,701 with 9,006 cars and 1,695 trucks. These 24-hour totals represent

TABLE 3.15

TRAFFIC TOTALS

	East Side of I-676			West Side of I-676		
	Total Vehicles	Total Cars	Total Trucks	Total Vehicles	Total Cars	Total Trucks
12/16/85	5797	4789	1008	11,032	9331	1701
12/17/85						
12/17/85	8051	6701	1350	10,701	9006	1695
12/18/85						

a decrease of traffic from a 1977 annual average daily traffic count (AADT) provided by N.J.D.O.T. of 14,676 vehicles.

A traffic survey was also performed on the east side of the I-676 overpass. Figure 3.12 shows both the east and west side of the overpass which were considered separately in this study. Table 3.15 gives totals for each intersection for cars, trucks, and all vehicles for each 24-hour period. Hourly totals and totals for each vehicle turning option can also be found in Appendix D.

Levels-of-service (LOS) are an indication of the degree of delay experienced by drivers. Ratings range from A to F, with E being considered the threshold of driver acceptability and A being a condition of minimum or no delay. Levels-of-service are defined as follows:

> Level of Service A indicates that all approaches are open,i.e. no signal phase is fully used by traffic: turning movements are easily made and no vehicle waits longer than one red traffic light.
> Level of Service B represents stable operations with an occasional approach phase used fully and a substantial number of phases approaching full use.
>
> Level of Service C still reflects stable operations, but with fully loaded phases occurring more frequently. Occasionally, drivers may have to wait through more than one red signal and back-ups may develop behind turning vehicles.
>
> Level of Service D is a condition of increasing restriction. Delays to approaching traffic may be substantial during short periods within the peak travel period, but enough cycles with lower demand occur to permit periodic clearance

of developing queues (lines), thus preventing excessive back-ups.

Level of Service E represents traffic activity at capacity level and the most vehicles that any particular intersection or approach can accommodate. During capacity conditions, long queues may develop and delays may extend for several cycles.

Level of Service F represents jammed traffic conditions. Back-ups from downstream, or on the cross street, may restrict or prevent the movement of vehicles from certain approaches; hence, the volume of traffic that can be accommodated is unpredictable.

The northbound Interstate 676 off ramp to Morgan Boulevard is the only signalized intersection included in the traffic count study. Peak traffic volumes at this intersection occurred between the hours of 7:00 a.m. to 9:30 a.m. and 1:00 p.m. to 3:00 p.m., with the peak morning hour 7:30 a.m. to 8:30 a.m. and the peak afternoon hour 4:00 p.m. to 5:00 p.m. The level of service at this intersection was determined to be C during peak volume hours and A at all other times. All other entrance and exit ramps in the I-676 and Morgan Boulevard interchange are found to perform at a level-of-service of C or better during any peak hour.

Accident Statistics

The New Jersey Department of Transportation was contacted for statistics regarding traffic accidents at four major accident locations in the area of the proposed facility. These locations are:

1) Interstate Route 676 between mileposts 0.00 and 3.62.

2) Interstate Highway Route 76 between mileposts 0.00 and 2.04.

3) Broadway Avenue (County Route 551) between Morgan Boulevard and Jackson Street.

4) Morgan Boulevard between Broadway Avenue and its intersection with Fairview Avenue.

The New Jersey DOT provided a computer print-out of accidents occurring in these areas for the dates 1/01/82 to 12/31/82 and 1/01/83 to 12/31/83. The following assumptions were made prior to reviewing the accident data:

1) Solid waste receiving hours for the proposed resource recovery facility will be 7:00 a.m. to 6:00 p.m., Monday through Saturday.

2) Truck traffic in the area will span the full twelve (12) hours of receiving time at the proposed resource recovery facility.

A summary of applicable data is presented in Tables 3.16 and 3.17.

Four hundred ninety-six (496) accidents occurred in the four areas between 1/01/82 and 12/31/83, of which eighty-six (17.3%) involved at least one truck. Of the four hundred ninety-six accidents, 355 occurred between the hours of 6:00 a.m. and 6:00 p.m. Twenty-two percent (22%) of these accidents involved trucks. Eighty percent (80%) of the accidents involving trucks occurred between the hours of 6:00 a.m. and 6:00 p.m. on the days of Monday through Saturday. A comparison of Columns 5 and 7 on

TABLE 3.16
TRAFFIC ACCIDENT STATISTICS FOR 1982 & 1983

Location	Total No. Accidents	Total No. Involving Trucks	Total No. 6AM-6PM Monday-Friday	Tot.No.6AM-6PM Monday-Friday Involving Trucks	Total No. 6AM-6PM Monday-Saturday	Tot.No.6AM-6PM Monday-Saturday Involving Trucks	Total No. 6AM-6PM	Total No. 6AM-6PM Involving Trucks
				1982				
1	52	5	30	4	31	4	33	4
2	167	27	91	20	100	20	112	23
3	19	6	12	6	15	6	15	6
4	7	2	5	2	6	2	6	2
				1983				
1	67	4	31	4	36	4	41	4
2	164	36	86	26	100	28	111	28
3	12	4	10	4	10	4	10	4
4	8	2	6	1	7	1	7	2
Totals	496	86	271	67	305	69	335	73

TABLE 3.17

INJURY OCCURRENCE DUE TO TRAFFIC ACCIDENTS

Location	Total No. Injured	Total No.Injured 6AM-6PM Monday-Saturday	Total No.Injured 6AM-6PM Monday-Saturday Involving Trucks
		1982	
1	42	18	4
2	119	55	9
3	8	6	1
4	5	5	1
		1983	
1	45	22	1
2	134	65	16
3	14	12	7
4	12	12	1
		TOTALS	
	379	195	40

Table 3.16 shows that the addition of Saturday to the data resulted in the addition of only two more accidents involving trucks.

Table 3.17 presents data concerning the number of injuries incurred as a result of traffic accidents at each of the four locations. The total number of people injured over the two year period was three hundred seventy-nine (379), one hundred seventy-four (174) during 1982 and two hundred five (205) during 1983. One hundred ninety-five (195) or fifty-one percent of the two year total were injured in accidents occurring between 6:00 a.m. and 6:00 p.m., Monday through Saturday. Two hundred fifty three (253) or sixty-seven percent of all accidents resulting in injuries occurred in location two, Interstate Route 76.

3.4.2 Sewerage

The Camden County Municipal Utilities Authority (CCMUA) owns and operates the main sewage treatment facility (Jackson Street WTF) in the City of Camden. This facility is currently being upgraded from primary to secondary treatment and is scheduled to be completed in December 1986. The secondary treatment system consists of primary clarification, an enriched oxygen activated sludge system, secondary clarification and chlorination. Present flow to the facility is approximately 17 million gallons per day with the sole contributor being the City of Camden. The upgraded facility will have a design capacity of 38 million gallons per day and is intended to eventually treat all the sewage collected in Camden County's Cooper River, Big Timber Creek and Newton Creek watersheds.

The discharge from the District One Wastewater Treatment Facility will continue as a surface water discharge to the Delaware River adjacent to the Jackson Street plant, near River mile 97.9,

APPENDIX B
Turning Movement Counts (TMC)

TRI-STATE TRAFFIC DATA

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Camden County, NJ
Holtec Blvd & Broadway
Thursday, September 22, 2022
Location: 39.912638, -75.118081

Count Name: Holtec Blvd & Broadway
Site Code:
Start Date: 09/22/2022
Page No: 1

Turning Movement Data

Start Time	Holtec Blvd Eastbound							Holtec Blvd Westbound							Broadway Northbound							Boradway Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	0	1	1	0	0	0	2	22	32	21	0	0	0	75	1	9	9	0	1	0	20	9	6	0	0	0	0	15	112
7:15 AM	0	2	0	0	0	3	2	22	16	30	0	0	0	68	0	21	8	2	0	0	31	16	11	0	0	0	3	27	128
7:30 AM	0	2	0	0	0	1	2	26	14	16	0	0	0	56	0	19	14	2	0	0	35	10	11	0	0	0	0	21	114
7:45 AM	0	1	0	0	0	0	1	20	25	21	1	0	0	67	1	31	13	1	0	0	46	11	9	1	0	0	0	21	135
Hourly Total	0	6	1	0	0	4	7	90	87	88	1	0	0	266	2	80	44	5	1	0	132	46	37	1	0	0	3	84	489
8:00 AM	1	0	0	0	0	0	1	15	11	18	0	0	0	44	1	22	16	0	0	0	39	20	11	0	0	0	0	31	115
8:15 AM	1	1	0	0	0	0	2	17	12	14	0	0	0	43	0	19	16	0	0	0	35	19	14	0	0	0	0	33	113
8:30 AM	1	2	0	0	0	0	3	17	17	9	0	0	1	43	0	20	18	0	0	0	38	12	10	0	0	0	0	22	106
8:45 AM	0	2	0	0	0	1	2	16	13	14	1	0	0	44	0	8	12	0	0	0	20	16	8	0	0	0	0	24	90
Hourly Total	3	5	0	0	0	1	8	65	53	55	1	0	1	174	1	69	62	0	0	0	132	67	43	0	0	0	0	110	424
9:00 AM	0	0	1	0	0	0	1	15	9	11	0	0	0	35	0	7	23	0	0	0	30	10	8	0	0	0	0	18	84
9:15 AM	1	1	0	0	0	0	2	14	8	16	0	0	0	38	0	12	18	0	0	0	30	15	5	0	0	0	0	20	90
9:30 AM	1	2	0	0	0	2	3	11	7	17	0	0	0	35	0	8	17	1	0	0	26	22	13	1	0	0	0	36	100
9:45 AM	0	0	0	0	0	1	0	16	0	14	0	0	0	30	0	9	11	0	0	0	20	7	12	0	0	0	1	19	69
Hourly Total	2	3	1	0	0	3	6	56	24	58	0	0	0	138	0	36	69	1	0	0	106	54	38	1	0	0	1	93	343
10:00 AM	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
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	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
2:00 PM	1	3	0	0	0	0	4	15	0	18	0	0	0	33	0	9	16	0	0	0	25	13	16	0	0	0	0	29	91
2:15 PM	1	2	2	0	0	0	5	14	7	11	0	0	0	32	0	9	21	0	0	0	30	18	14	0	0	0	0	32	99
2:30 PM	0	5	0	0	0	1	5	22	6	5	1	0	0	34	2	13	19	0	0	0	34	30	10	0	0	0	0	40	113
2:45 PM	1	6	0	0	0	0	7	12	6	8	0	0	0	26	0	5	16	2	0	0	23	14	16	1	0	0	0	31	87
Hourly Total	3	16	2	0	0	1	21	63	19	42	1	0	0	125	2	36	72	2	0	0	112	75	56	1	0	0	0	132	390
3:00 PM	0	4	3	0	0	0	7	16	6	15	0	0	0	37	1	9	18	0	0	0	28	24	19	1	0	0	0	44	116
3:15 PM	1	3	0	0	0	2	4	20	5	11	0	0	0	36	0	15	18	0	0	0	33	22	22	1	0	0	0	45	118
3:30 PM	0	50	4	5	0	3	59	20	1	11	0	0	0	32	1	7	21	0	0	0	29	32	41	4	0	0	3	77	197
3:45 PM	0	19	2	1	0	0	22	19	2	11	0	0	0	32	0	7	24	0	0	0	31	20	16	0	1	0	1	37	122
Hourly Total	1	76	9	6	0	5	92	75	14	48	0	0	0	137	2	38	81	0	0	0	121	98	98	6	1	0	4	203	553
4:00 PM	0	38	1	1	0	0	40	22	4	12	0	0	0	38	1	9	19	1	0	2	30	20	23	0	0	0	0	43	151
4:15 PM	0	20	3	1	0	0	24	28	1	10	0	0	0	39	0	5	24	0	0	0	29	24	24	0	0	0	0	48	140
4:30 PM	0	13	1	1	0	1	15	44	0	8	0	0	0	52	0	13	19	1	0	0	33	23	32	0	0	0	0	55	155
4:45 PM	0	13	1	0	0	0	14	49	3	9	0	0	1	61	0	11	11	1	0	0	23	30	45	1	0	0	0	76	174
Hourly Total	0	84	6	3	0	1	93	143	8	39	0	0	1	190	1	38	73	3	0	2	115	97	124	1	0	0	0	222	620
5:00 PM	1	18	4	0	0	0	23	39	2	8	0	0	0	49	0	8	24	0	0	0	32	37	50	0	0	0	1	87	191
5:15 PM	0	14	2	0	0	1	16	39	2	9	0	0	0	50	1	11	18	0	0	0	30	27	31	0	0	0	0	58	154
5:30 PM	0	10	1	0	0	2	11	21	0	7	0	0	0	28	0	8	13	0	0	0	21	18	10	0	0	0	0	28	88
5:45 PM	1	10	1	0	0	1	12	22	2	11	0	0	0	35	0	9	11	1	0	0	21	25	15	0	0	0	0	40	108
Hourly Total	2	52	8	0	0	4	62	121	6	35	0	0	0	162	1	36	66	1	0	0	104	107	106	0	0	0	1	213	541
Grand Total	11	242	27	9	0	19	289	613	211	365	3	0	2	1192	9	333	467	12	1	2	822	544	502	10	1	0	9	1057	3360
Approach %	3.8	83.7	9.3	3.1	0.0	-	-	51.4	17.7	30.6	0.3	0.0	-	-	1.1	40.5	56.8	1.5	0.1	-	-	51.5	47.5	0.9	0.1	0.0	-	-	-
Total %	0.3	7.2	0.8	0.3	0.0	-	8.6	18.2	6.3	10.9	0.1	0.0	-	35.5	0.3	9.9	13.9	0.4	0.0	-	24.5	16.2	14.9	0.3	0.0	0.0	-	31.5	-
Lights	11	232	25	9	0	-	277	469	202	277	1	0	-	949	9	281	244	8	0	-	542	447	454	9	1	0	-	911	2679
% Lights	100.0	95.9	92.6	100.0	-	-	95.8	76.5	95.7	75.9	33.3	-	-	79.6	100.0	84.4	52.2	66.7	0.0	-	65.9	82.2	90.4	90.0	100.0	-	-	86.2	79.7
Buses	0	0	0	0	0	-	0	2	0	11	0	0	-	13	0	30	2	0	0	-	32	15	30	0	0	0	-	45	90
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.3	0.0	3.0	0.0	-	-	1.1	0.0	9.0	0.4	0.0	0.0	-	3.9	2.8	6.0	0.0	0.0	-	-	4.3	2.7
Trucks	0	10	2	0	0	-	12	142	9	77	2	0	-	230	0	22	221	4	1	-	248	82	18	1	0	0	-	101	591
% Trucks	0.0	4.1	7.4	0.0	-	-	4.2	23.2	4.3	21.1	66.7	-	-	19.3	0.0	6.6	47.3	33.3	100.0	-	30.2	15.1	3.6	10.0	0.0	-	-	9.6	17.6
Bicycles on Crosswalk	-	-	-	-	-	6	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	31.6	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	11.1	-	-
Pedestrians	-	-	-	-	-	13	-	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	-	68.4	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	88.9	-	-

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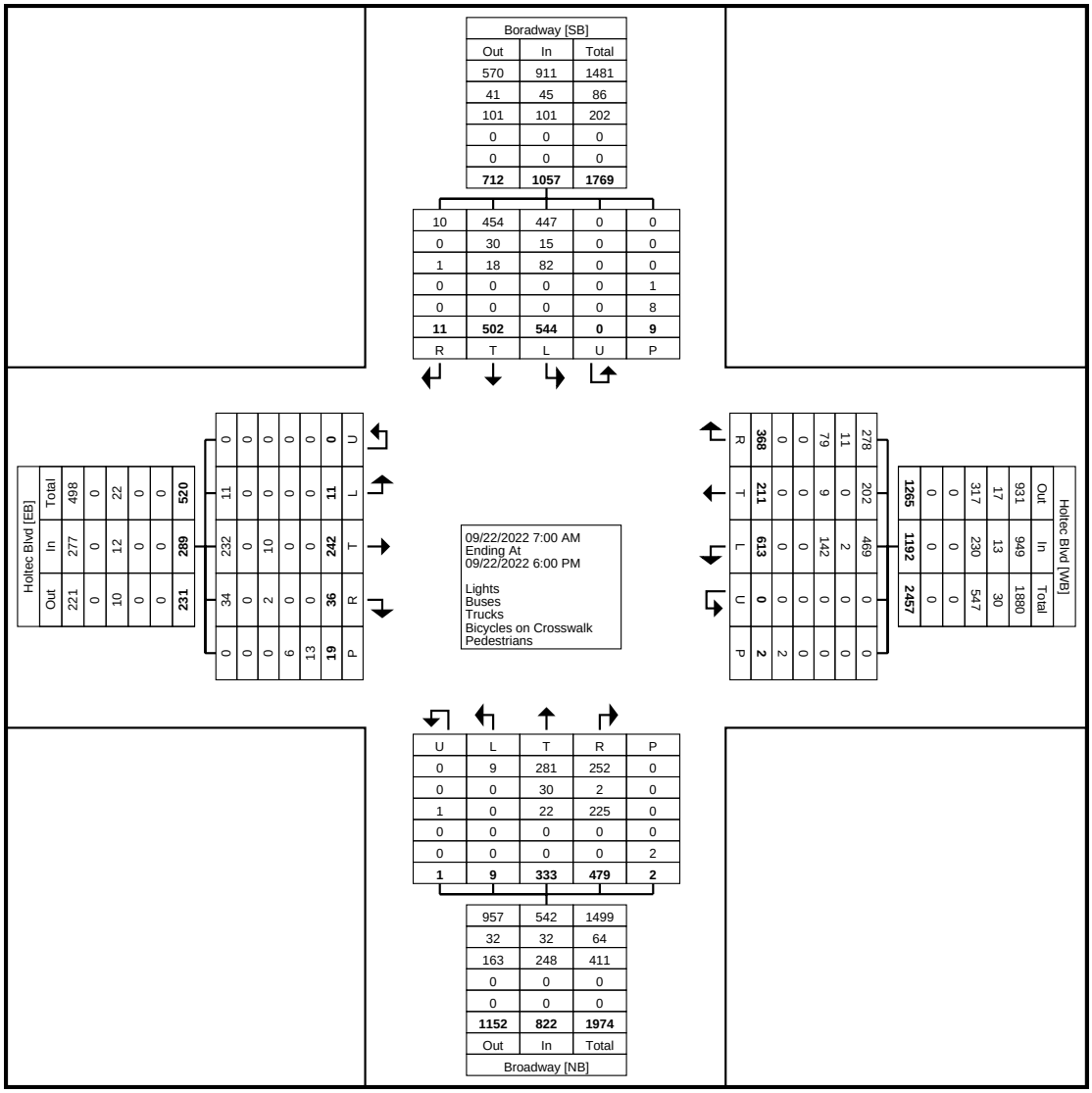
Camden County, NJ
Holtec Blvd & Broadway
Thursday, September 22, 2022
Location: 39.912638, -75.118081

Count Name: Holtec Blvd & Broadway
Site Code:
Start Date: 09/22/2022
Page No: 2



Turning Movement Data Plot

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Camden County, NJ
Holtec Blvd & Broadway
Thursday, September 22, 2022
Location: 39.912638, -75.118081

Count Name: Holtec Blvd & Broadway
Site Code:
Start Date: 09/22/2022

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Holtec Blvd Eastbound							Holtec Blvd Westbound							Broadway Northbound							Boradway Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:15 AM	0	2	0	0	0	3	2	22	16	30	0	0	0	68	0	21	8	2	0	0	31	16	11	0	0	0	3	27	128
7:30 AM	0	2	0	0	0	1	2	26	14	16	0	0	0	56	0	19	14	2	0	0	35	10	11	0	0	0	0	21	114
7:45 AM	0	1	0	0	0	0	1	20	25	21	1	0	0	67	1	31	13	1	0	0	46	11	9	1	0	0	0	21	135
8:00 AM	1	0	0	0	0	0	1	15	11	18	0	0	0	44	1	22	16	0	0	0	39	20	11	0	0	0	0	31	115
Total	1	5	0	0	0	4	6	83	66	85	1	0	0	235	2	93	51	5	0	0	151	57	42	1	0	0	3	100	492
Approach %	16.7	83.3	0.0	0.0	0.0	-	-	35.3	28.1	36.2	0.4	0.0	-	-	1.3	61.6	33.8	3.3	0.0	-	-	57.0	42.0	1.0	0.0	0.0	-	-	-
Total %	0.2	1.0	0.0	0.0	0.0	-	1.2	16.9	13.4	17.3	0.2	0.0	-	47.8	0.4	18.9	10.4	1.0	0.0	-	30.7	11.6	8.5	0.2	0.0	0.0	-	20.3	-
PHF	0.250	0.625	0.000	0.000	0.000	-	0.750	0.798	0.660	0.708	0.250	0.000	-	0.864	0.500	0.750	0.797	0.625	0.000	-	0.821	0.713	0.955	0.250	0.000	0.000	-	0.806	0.911
Lights	1	3	0	0	0	-	4	49	66	64	1	0	-	180	2	84	36	3	0	-	125	47	33	1	0	0	-	81	390
% Lights	100.0	60.0	-	-	-	-	66.7	59.0	100.0	75.3	100.0	-	-	76.6	100.0	90.3	70.6	60.0	-	-	82.8	82.5	78.6	100.0	-	-	-	81.0	79.3
Buses	0	0	0	0	0	-	0	0	0	3	0	0	-	3	0	4	1	0	0	-	5	2	5	0	0	0	-	7	15
% Buses	0.0	0.0	-	-	-	-	0.0	0.0	0.0	3.5	0.0	-	-	1.3	0.0	4.3	2.0	0.0	-	-	3.3	3.5	11.9	0.0	-	-	-	7.0	3.0
Trucks	0	2	0	0	0	-	2	34	0	18	0	0	-	52	0	5	14	2	0	-	21	8	4	0	0	0	-	12	87
% Trucks	0.0	40.0	-	-	-	-	33.3	41.0	0.0	21.2	0.0	-	-	22.1	0.0	5.4	27.5	40.0	-	-	13.9	14.0	9.5	0.0	-	-	-	12.0	17.7
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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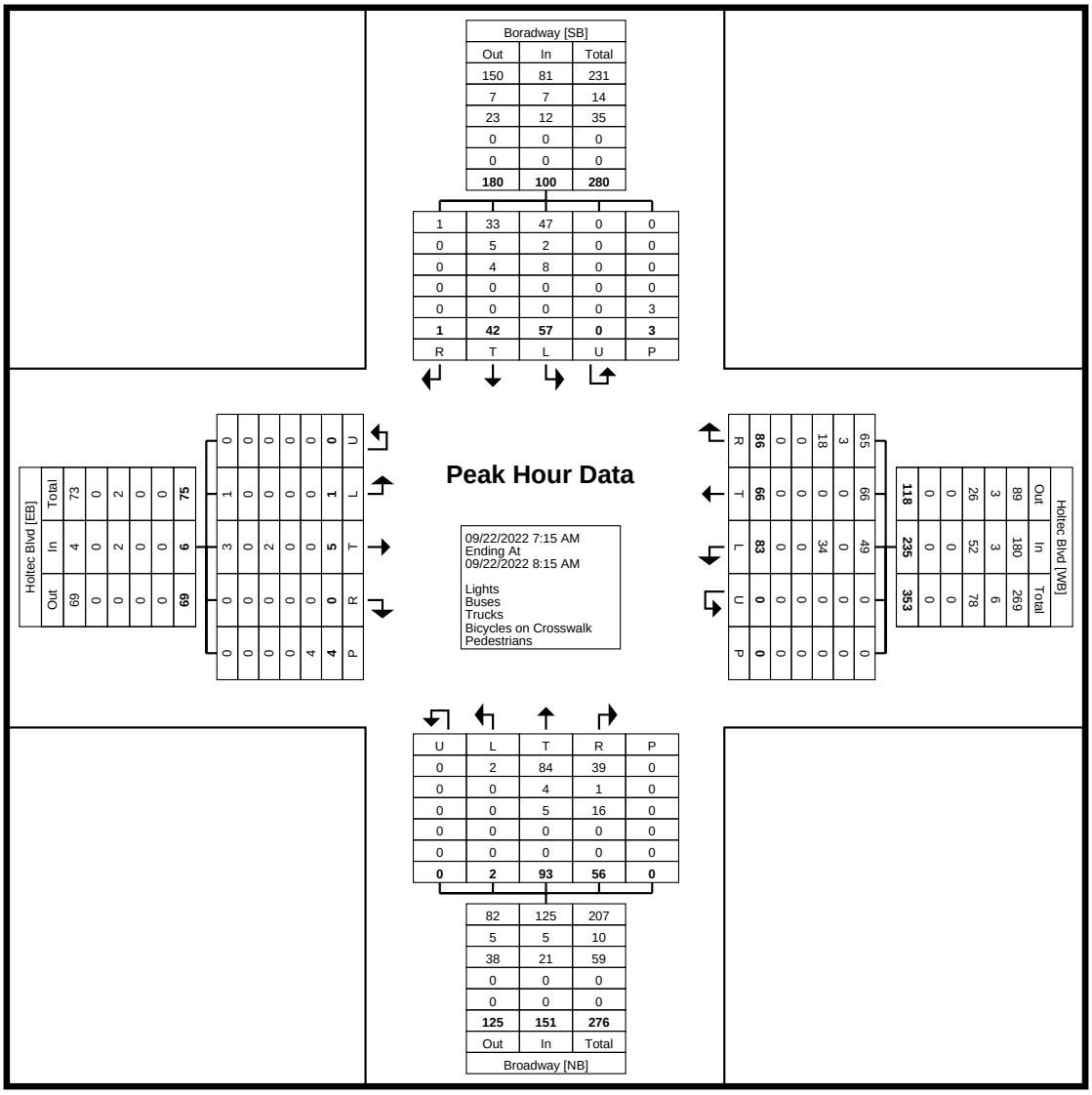
Camden County, NJ
Holtec Blvd & Broadway
Thursday, September 22, 2022
Location: 39.912638, -75.118081

Count Name: Holtec Blvd & Broadway
Site Code:
Start Date: 09/22/2022



Turning Movement Peak Hour Data Plot (7:15 AM)

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Camden County, NJ
Holtec Blvd & Broadway
Thursday, September 22, 2022
Location: 39.912638, -75.118081

Count Name: Holtec Blvd & Broadway
Site Code:
Start Date: 09/22/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Holtec Blvd Eastbound							Holtec Blvd Westbound							Broadway Northbound							Boradway Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:30 PM	0	13	1	1	0	1	15	44	0	8	0	0	0	52	0	13	19	1	0	0	33	23	32	0	0	0	0	55	155
4:45 PM	0	13	1	0	0	0	14	49	3	9	0	0	1	61	0	11	11	1	0	0	23	30	45	1	0	0	0	76	174
5:00 PM	1	18	4	0	0	0	23	39	2	8	0	0	0	49	0	8	24	0	0	0	32	37	50	0	0	0	1	87	191
5:15 PM	0	14	2	0	0	1	16	39	2	9	0	0	0	50	1	11	18	0	0	0	30	27	31	0	0	0	0	58	154
Total	1	58	8	1	0	2	68	171	7	34	0	0	1	212	1	43	72	2	0	0	118	117	158	1	0	0	1	276	674
Approach %	1.5	85.3	11.8	1.5	0.0	-	-	80.7	3.3	16.0	0.0	0.0	-	-	0.8	36.4	61.0	1.7	0.0	-	-	42.4	57.2	0.4	0.0	0.0	-	-	-
Total %	0.1	8.6	1.2	0.1	0.0	-	10.1	25.4	1.0	5.0	0.0	0.0	-	31.5	0.1	6.4	10.7	0.3	0.0	-	17.5	17.4	23.4	0.1	0.0	0.0	-	40.9	-
PHF	0.250	0.806	0.500	0.250	0.000	-	0.739	0.872	0.583	0.944	0.000	0.000	-	0.869	0.250	0.827	0.750	0.500	0.000	-	0.894	0.791	0.790	0.250	0.000	0.000	-	0.793	0.882
Lights	1	58	8	1	0	-	68	162	4	28	0	0	-	194	1	36	58	2	0	-	97	109	155	1	0	0	-	265	624
% Lights	100.0	100.0	100.0	100.0	-	-	100.0	94.7	57.1	82.4	-	-	-	91.5	100.0	83.7	80.6	100.0	-	-	82.2	93.2	98.1	100.0	-	-	-	96.0	92.6
Buses	0	0	0	0	0	-	0	0	0	2	0	0	-	2	0	6	0	0	0	-	6	2	2	0	0	0	-	4	12
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	5.9	-	-	-	0.9	0.0	14.0	0.0	0.0	-	-	5.1	1.7	1.3	0.0	-	-	-	1.4	1.8
Trucks	0	0	0	0	0	-	0	9	3	4	0	0	-	16	0	1	14	0	0	-	15	6	1	0	0	0	-	7	38
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	5.3	42.9	11.8	-	-	-	7.5	0.0	2.3	19.4	0.0	-	-	12.7	5.1	0.6	0.0	-	-	-	2.5	5.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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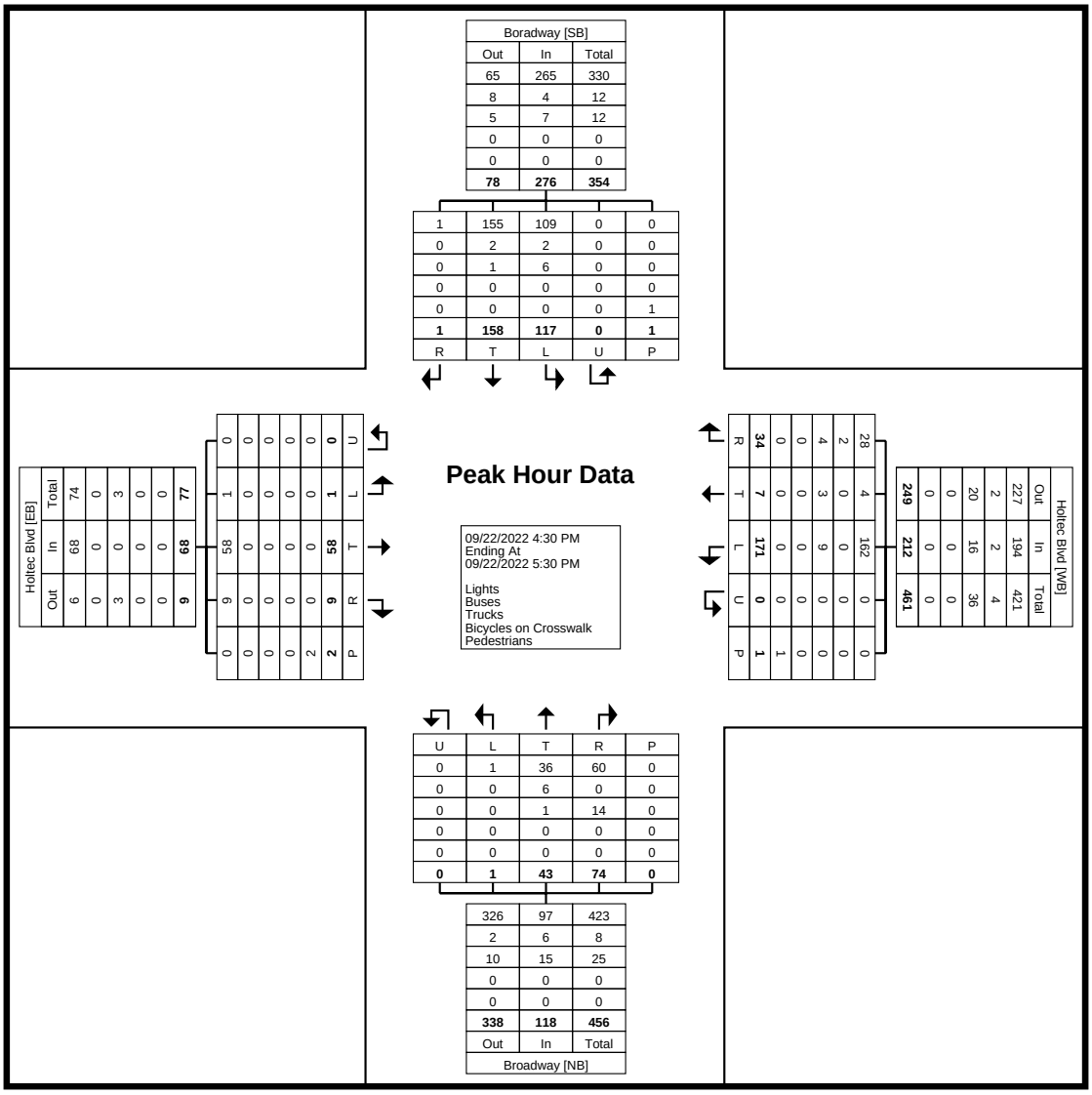
Holtec Blvd & Broadway
Thursday, September 22, 2022
Location: 39.912638, -75.118081

Count Name: Holtec Blvd & Broadway
Site Code:
Start Date: 09/22/2022



Turning Movement Peak Hour Data Plot (4:30 PM)

TRI-STATE TRAFFIC DATA

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Camden County, NJ
Holtec Blvd & I676 SB Off Ramp/Cavanta Center
Thursday, September 22, 2022
Location: 39.91263, -75.117426

Count Name: Holtec Blvd & I-676 SB Off Ramp/Cavanta Center Acess Rd
Site Code:
Start Date: 09/22/2022
Page No: 1

Turning Movement Data

Start Time	Holtec Blvd Eastbound						Holtec Blvd Westbound					Cavanta Center Access Rd Northbound						I-676 Ramp Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:00 AM	16	1	0	0	0	17	5	52	0	0	57	0	0	0	0	0	0	17	0	26	0	1	43	117
7:15 AM	28	0	0	0	0	28	1	36	0	0	37	2	1	2	0	0	5	17	0	25	0	4	42	112
7:30 AM	28	1	0	0	0	29	3	35	0	0	38	0	1	2	0	0	3	18	0	20	0	2	38	108
7:45 AM	24	0	0	0	0	24	0	47	1	0	48	0	0	3	0	0	3	28	0	17	0	1	45	120
Hourly Total	96	2	0	0	0	98	9	170	1	0	180	2	2	7	0	0	11	80	0	88	0	8	168	457
8:00 AM	36	0	0	0	0	36	2	28	0	0	30	1	1	0	0	0	2	36	0	11	2	0	49	117
8:15 AM	34	1	0	0	0	35	5	32	0	0	37	0	0	6	0	0	6	31	0	10	0	1	41	119
8:30 AM	30	1	0	0	0	31	3	29	0	0	32	1	2	2	0	0	5	37	2	12	1	1	52	120
8:45 AM	30	0	0	0	0	30	6	24	0	0	30	1	2	1	0	0	4	31	2	14	1	0	48	112
Hourly Total	130	2	0	0	0	132	16	113	0	0	129	3	5	9	0	0	17	135	4	47	4	2	190	468
9:00 AM	32	1	0	0	0	33	2	19	0	0	21	0	3	2	0	0	5	21	1	15	0	2	37	96
9:15 AM	31	2	0	0	0	33	8	27	0	0	35	0	4	0	0	0	4	22	2	12	0	1	36	108
9:30 AM	41	1	0	0	0	42	5	23	0	0	28	2	1	5	0	0	8	18	2	9	0	2	29	107
9:45 AM	18	0	0	0	0	18	8	19	0	0	27	0	6	3	0	1	9	16	2	8	0	2	26	80
Hourly Total	122	4	0	0	0	126	23	88	0	0	111	2	14	10	0	1	26	77	7	44	0	7	128	391
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	32	1	0	0	0	33	9	24	0	0	33	0	2	6	0	0	8	15	0	6	0	0	21	95
2:15 PM	42	0	0	0	0	42	6	21	0	0	27	1	7	1	0	1	9	25	4	10	1	0	40	118
2:30 PM	52	0	0	0	0	52	5	23	0	0	28	1	3	1	0	0	5	31	2	8	0	0	41	126
2:45 PM	37	0	0	0	0	37	3	15	0	0	18	1	1	9	0	0	11	20	0	10	1	2	31	97
Hourly Total	163	1	0	0	0	164	23	83	0	0	106	3	13	17	0	1	33	91	6	34	2	2	133	436
3:00 PM	44	1	0	0	1	45	3	19	0	0	22	0	7	5	0	0	12	48	2	18	1	4	69	148
3:15 PM	43	1	0	0	0	44	3	22	0	0	25	0	3	2	0	0	5	31	1	12	2	0	46	120
3:30 PM	102	1	0	0	0	103	2	14	0	0	16	0	3	2	0	0	5	40	1	16	0	2	57	181
3:45 PM	64	0	0	0	0	64	3	18	0	0	21	1	3	1	0	0	5	35	0	14	0	1	49	139
Hourly Total	253	3	0	0	1	256	11	73	0	0	84	1	16	10	0	0	27	154	4	60	3	7	221	588
4:00 PM	77	0	0	0	0	77	4	19	0	0	23	1	1	4	0	1	6	29	0	14	1	0	44	150
4:15 PM	64	3	0	0	0	67	3	14	0	0	17	1	0	0	0	3	1	33	0	19	4	2	56	141
4:30 PM	53	1	0	0	0	54	2	11	0	0	13	2	1	4	0	2	7	42	3	41	0	1	86	160
4:45 PM	55	0	0	0	0	55	3	20	0	0	23	1	3	5	0	1	9	42	0	43	0	3	85	172
Hourly Total	249	4	0	0	0	253	12	64	0	0	76	5	5	13	0	7	23	146	3	117	5	6	271	623
5:00 PM	78	2	0	0	0	80	2	14	0	0	16	1	0	1	0	0	2	21	0	27	4	2	52	150
5:15 PM	59	0	0	0	0	59	5	19	0	0	24	0	1	5	0	0	6	27	0	30	0	1	57	146
5:30 PM	41	0	0	0	1	41	6	11	0	0	17	0	1	0	0	0	1	22	2	17	0	2	41	100
5:45 PM	49	0	0	0	0	49	1	20	0	0	21	0	1	3	0	0	4	32	0	13	1	2	46	120
Hourly Total	227	2	0	0	1	229	14	64	0	0	78	1	3	9	0	0	13	102	2	87	5	7	196	516
Grand Total	1240	18	0	0	2	1258	108	655	1	0	764	17	58	75	0	9	150	785	26	477	19	39	1307	3479
Approach %	98.6	1.4	0.0	0.0	-	-	14.1	85.7	0.1	-	-	11.3	38.7	50.0	0.0	-	-	60.1	2.0	36.5	1.5	-	-	-
Total %	35.6	0.5	0.0	0.0	-	36.2	3.1	18.8	0.0	-	22.0	0.5	1.7	2.2	0.0	-	4.3	22.6	0.7	13.7	0.5	-	37.6	-
Lights	919	6	0	0	-	925	32	489	1	-	522	6	15	22	0	-	43	734	15	412	17	-	1178	2668
% Lights	74.1	33.3	-	-	-	73.5	29.6	74.7	100.0	-	68.3	35.3	25.9	29.3	-	-	28.7	93.5	57.7	86.4	89.5	-	90.1	76.7
Buses	16	0	0	0	-	16	0	11	0	-	11	0	0	0	0	-	0	27	0	2	0	-	29	56
% Buses	1.3	0.0	-	-	-	1.3	0.0	1.7	0.0	-	1.4	0.0	0.0	0.0	-	-	0.0	3.4	0.0	0.4	0.0	-	2.2	1.6
Trucks	305	12	0	0	-	317	76	155	0	-	231	11	43	53	0	-	107	24	11	63	2	-	100	755
% Trucks	24.6	66.7	-	-	-	25.2	70.4	23.7	0.0	-	30.2	64.7	74.1	70.7	-	-	71.3	3.1	42.3	13.2	10.5	-	7.7	21.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	11.1	-	-	-	-	-	10.3	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	0	-	-	-	-	-	8	-	-	-	-	-	35	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	88.9	-	-	-	-	-	89.7	-	-

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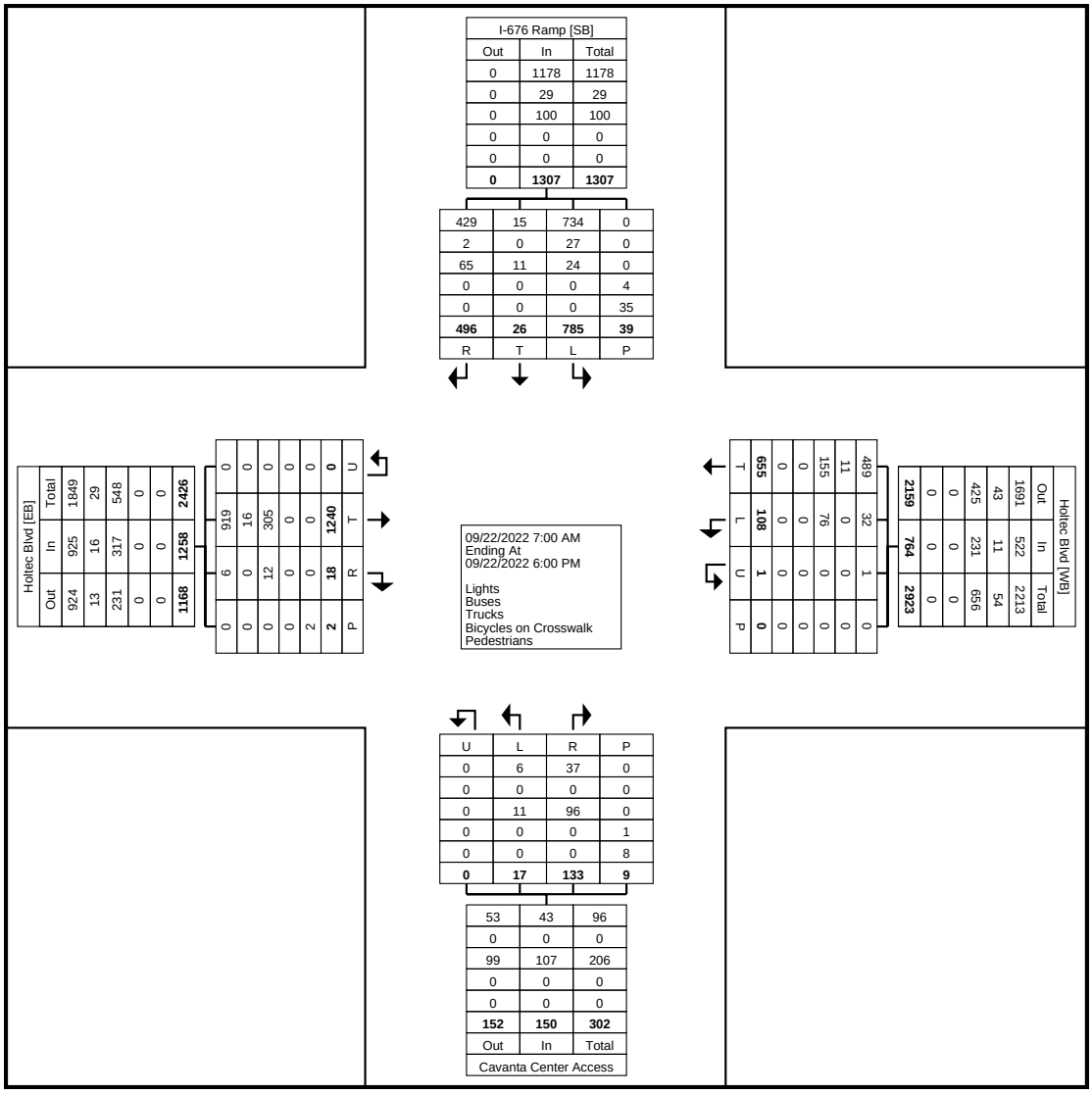
Camden County, NJ
Holtec Blvd & I676 SB Off Ramp/Cavanta Center
Thursday, September 22, 2022
Location: 39.91263, -75.117426

Count Name: Holtec Blvd & I-676 SB Off Ramp/Cavanta Center Acess Rd
Site Code:
Start Date: 09/22/2022



Turning Movement Data Plot

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Holtec Blvd & I676 SB Off Ramp/Cavanta Center
Thursday, September 22, 2022
Location: 39.91263, -75.117426

Count Name: Holtec Blvd & I-676 SB Off Ramp/Cavanta Center Acess Rd
Site Code:
Start Date: 09/22/2022

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Holtec Blvd Eastbound						Holtec Blvd Westbound					Cavanta Center Access Rd Northbound						I-676 Ramp Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:45 AM	24	0	0	0	0	24	0	47	1	0	48	0	0	3	0	0	3	28	0	17	0	1	45	120
8:00 AM	36	0	0	0	0	36	2	28	0	0	30	1	1	0	0	0	2	36	0	11	2	0	49	117
8:15 AM	34	1	0	0	0	35	5	32	0	0	37	0	0	6	0	0	6	31	0	10	0	1	41	119
8:30 AM	30	1	0	0	0	31	3	29	0	0	32	1	2	2	0	0	5	37	2	12	1	1	52	120
Total	124	2	0	0	0	126	10	136	1	0	147	2	3	11	0	0	16	132	2	50	3	3	187	476
Approach %	98.4	1.6	0.0	0.0	-	-	6.8	92.5	0.7	-	-	12.5	18.8	68.8	0.0	-	-	70.6	1.1	26.7	1.6	-	-	-
Total %	26.1	0.4	0.0	0.0	-	26.5	2.1	28.6	0.2	-	30.9	0.4	0.6	2.3	0.0	-	3.4	27.7	0.4	10.5	0.6	-	39.3	-
PHF	0.861	0.500	0.000	0.000	-	0.875	0.500	0.723	0.250	-	0.766	0.500	0.375	0.458	0.000	-	0.667	0.892	0.250	0.735	0.375	-	0.899	0.992
Lights	80	0	0	0	-	80	1	97	1	-	99	0	0	2	0	-	2	119	0	41	2	-	162	343
% Lights	64.5	0.0	-	-	-	63.5	10.0	71.3	100.0	-	67.3	0.0	0.0	18.2	-	-	12.5	90.2	0.0	82.0	66.7	-	86.6	72.1
Buses	4	0	0	0	-	4	0	1	0	-	1	0	0	0	0	-	0	8	0	0	0	-	8	13
% Buses	3.2	0.0	-	-	-	3.2	0.0	0.7	0.0	-	0.7	0.0	0.0	0.0	-	-	0.0	6.1	0.0	0.0	0.0	-	4.3	2.7
Trucks	40	2	0	0	-	42	9	38	0	-	47	2	3	9	0	-	14	5	2	9	1	-	17	120
% Trucks	32.3	100.0	-	-	-	33.3	90.0	27.9	0.0	-	32.0	100.0	100.0	81.8	-	-	87.5	3.8	100.0	18.0	33.3	-	9.1	25.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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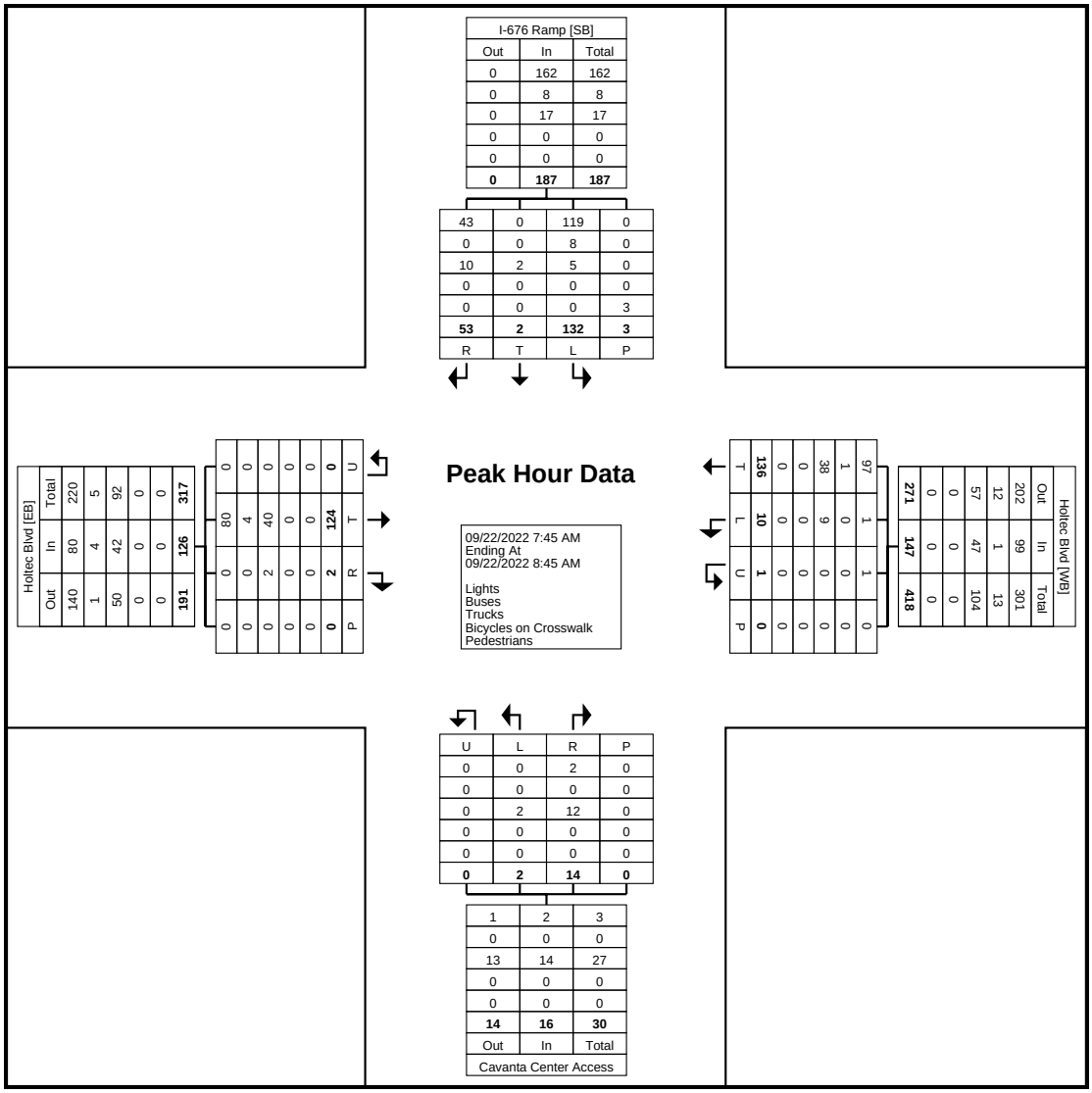
Thursday, September 22, 2022
Location: 39.91263, -75.117426

Count Name: Holtec Blvd & I-676 SB Off Ramp/Cavanta Center Acess Rd
Site Code:
Start Date: 09/22/2022



Turning Movement Peak Hour Data Plot (7:45 AM)

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Thursday, September 22, 2022
Location: 39.91263, -75.117426

Count Name: Holtec Blvd & I-676 SB Off Ramp/Cavanta Center Acess Rd
Site Code:
Start Date: 09/22/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Holtec Blvd Eastbound						Holtec Blvd Westbound					Cavanta Center Access Rd Northbound						I-676 Ramp Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:30 PM	53	1	0	0	0	54	2	11	0	0	13	2	1	4	0	2	7	42	3	41	0	1	86	160
4:45 PM	55	0	0	0	0	55	3	20	0	0	23	1	3	5	0	1	9	42	0	43	0	3	85	172
5:00 PM	78	2	0	0	0	80	2	14	0	0	16	1	0	1	0	0	2	21	0	27	4	2	52	150
5:15 PM	59	0	0	0	0	59	5	19	0	0	24	0	1	5	0	0	6	27	0	30	0	1	57	146
Total	245	3	0	0	0	248	12	64	0	0	76	4	5	15	0	3	24	132	3	141	4	7	280	628
Approach %	98.8	1.2	0.0	0.0	-	-	15.8	84.2	0.0	-	-	16.7	20.8	62.5	0.0	-	-	47.1	1.1	50.4	1.4	-	-	-
Total %	39.0	0.5	0.0	0.0	-	39.5	1.9	10.2	0.0	-	12.1	0.6	0.8	2.4	0.0	-	3.8	21.0	0.5	22.5	0.6	-	44.6	-
PHF	0.785	0.375	0.000	0.000	-	0.775	0.600	0.800	0.000	-	0.792	0.500	0.417	0.750	0.000	-	0.667	0.786	0.250	0.820	0.250	-	0.814	0.913
Lights	223	3	0	0	-	226	10	54	0	-	64	2	1	10	0	-	13	126	2	135	4	-	267	570
% Lights	91.0	100.0	-	-	-	91.1	83.3	84.4	-	-	84.2	50.0	20.0	66.7	-	-	54.2	95.5	66.7	95.7	100.0	-	95.4	90.8
Buses	2	0	0	0	-	2	0	2	0	-	2	0	0	0	0	-	0	4	0	1	0	-	5	9
% Buses	0.8	0.0	-	-	-	0.8	0.0	3.1	-	-	2.6	0.0	0.0	0.0	-	-	0.0	3.0	0.0	0.7	0.0	-	1.8	1.4
Trucks	20	0	0	0	-	20	2	8	0	-	10	2	4	5	0	-	11	2	1	5	0	-	8	49
% Trucks	8.2	0.0	-	-	-	8.1	16.7	12.5	-	-	13.2	50.0	80.0	33.3	-	-	45.8	1.5	33.3	3.5	0.0	-	2.9	7.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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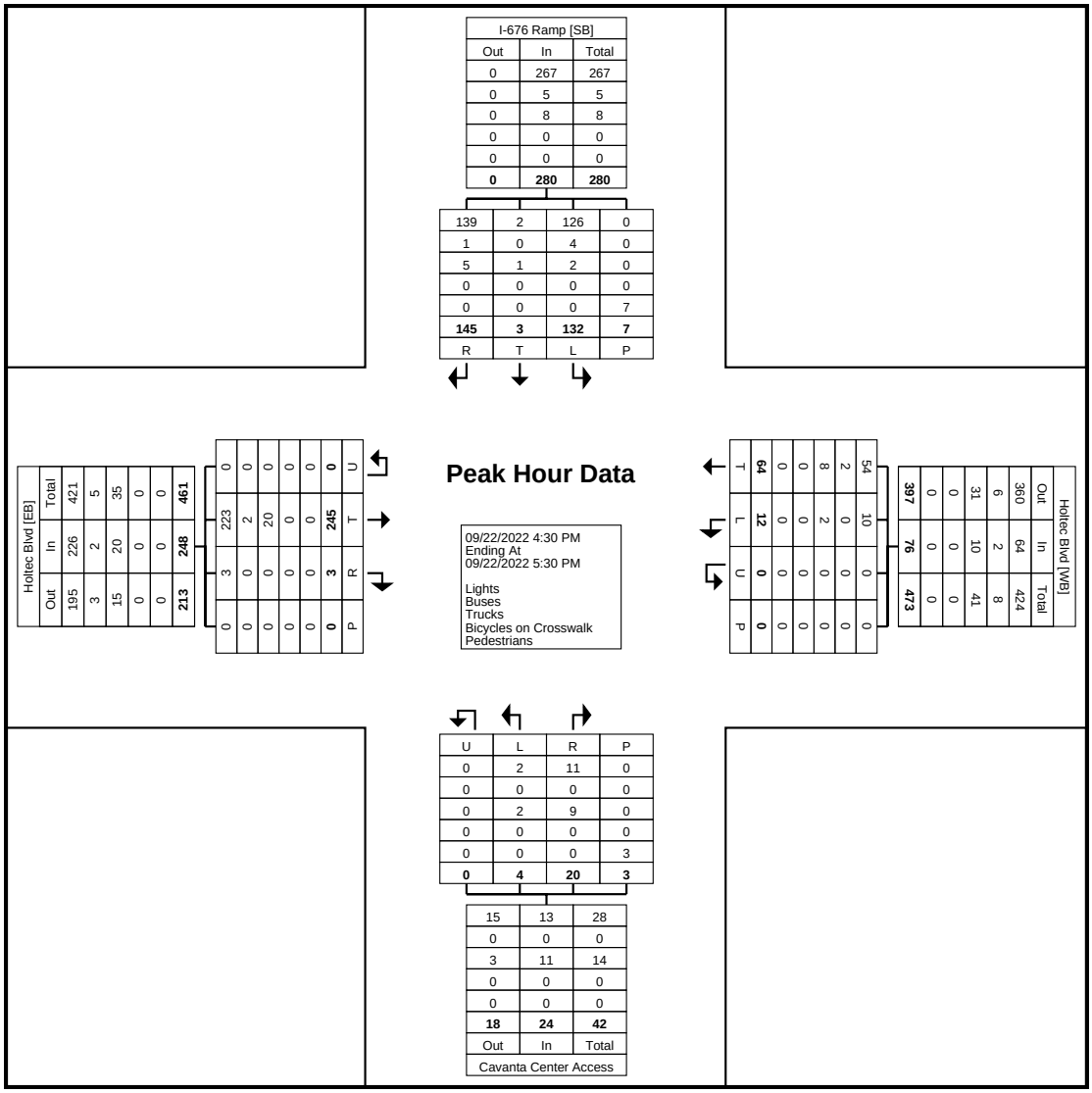
Thursday, September 22, 2022
Location: 39.91263, -75.117426

Count Name: Holtec Blvd & I-676 SB Off Ramp/Cavanta Center Acess Rd
Site Code:
Start Date: 09/22/2022



Turning Movement Peak Hour Data Plot (4:30 PM)

TRI-STATE TRAFFIC DATA

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Camden County, NJ
Morgan Rd & I676 SB Off Ramp/Master Rd
Thursday, September 22, 2022
Location: 39.912604, -75.114601

Count Name: Morgan Rd & I-676 SB Off Ramp/Master Rd
Site Code:
Start Date: 09/22/2022

Turning Movement Data

Start Time	Morgan Rd Eastbound						Morgan Rd Westbound						I-676 Ramp Northbound						Master Rd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	1	20	0	0	0	21	0	32	1	0	0	33	53	26	59	0	0	138	2	0	18	0	1	20	212
7:15 AM	0	16	0	0	0	16	0	79	4	0	1	83	27	27	66	0	1	120	2	0	44	0	4	46	265
7:30 AM	1	25	0	0	0	26	0	49	7	0	0	56	30	26	95	0	0	151	3	0	53	0	1	56	289
7:45 AM	1	37	0	0	0	38	0	60	3	0	0	63	40	21	93	0	0	154	5	0	35	0	0	40	295
Hourly Total	3	98	0	0	0	101	0	220	15	0	1	235	150	100	313	0	1	563	12	0	150	0	6	162	1061
8:00 AM	1	43	0	0	0	44	0	55	3	0	0	58	25	24	67	0	0	116	1	0	30	0	0	31	249
8:15 AM	1	37	0	0	0	38	0	45	3	0	0	48	36	22	73	0	0	131	4	0	25	0	0	29	246
8:30 AM	0	49	0	0	0	49	0	47	6	0	0	53	27	14	62	0	0	103	2	0	37	0	0	39	244
8:45 AM	0	33	0	0	0	33	0	56	2	0	0	58	29	14	51	0	2	94	4	0	38	0	0	42	227
Hourly Total	2	162	0	0	0	164	0	203	14	0	0	217	117	74	253	0	2	444	11	0	130	0	0	141	966
9:00 AM	1	25	0	1	0	27	0	36	1	0	0	37	21	22	54	0	0	97	5	0	24	0	1	29	190
9:15 AM	1	27	0	0	0	28	0	44	6	0	0	50	25	17	61	0	1	103	1	0	22	0	1	23	204
9:30 AM	0	30	0	0	0	30	0	35	2	0	0	37	25	21	42	0	0	88	2	0	27	0	1	29	184
9:45 AM	0	21	0	0	0	21	0	44	2	0	1	46	23	22	41	0	0	86	5	0	19	0	5	24	177
Hourly Total	2	103	0	1	0	106	0	159	11	0	1	170	94	82	198	0	1	374	13	0	92	0	8	105	755
10:00 AM	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
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	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
2:00 PM	2	28	0	0	0	30	0	37	4	0	0	41	22	18	62	0	0	102	4	0	34	0	0	38	211
2:15 PM	1	33	0	0	0	34	0	38	1	0	0	39	20	20	65	0	0	105	0	0	31	0	0	31	209
2:30 PM	0	47	0	0	0	47	0	56	2	0	0	58	16	23	72	0	0	111	1	0	29	0	3	30	246
2:45 PM	2	34	0	0	0	36	0	47	3	0	0	50	13	30	75	0	0	118	2	0	36	0	0	38	242
Hourly Total	5	142	0	0	0	147	0	178	10	0	0	188	71	91	274	0	0	436	7	0	130	0	3	137	908
3:00 PM	0	47	0	0	0	47	0	66	4	0	1	70	13	21	48	0	0	82	6	0	51	0	2	57	256
3:15 PM	3	51	0	0	0	54	0	86	4	0	0	90	17	16	78	0	0	111	5	0	48	0	0	53	308
3:30 PM	1	56	0	0	0	57	0	57	2	0	0	59	14	23	51	0	0	88	3	0	57	0	2	60	264
3:45 PM	0	47	0	1	0	48	0	54	4	0	0	58	11	20	67	0	0	98	5	0	40	0	2	45	249
Hourly Total	4	201	0	1	0	206	0	263	14	0	1	277	55	80	244	0	0	379	19	0	196	0	6	215	1077
4:00 PM	1	51	0	0	0	52	0	56	4	0	0	60	9	28	57	0	0	94	9	0	43	0	1	52	258
4:15 PM	0	51	0	0	0	51	0	50	8	0	0	58	10	32	67	0	3	109	7	0	40	0	0	47	265
4:30 PM	1	58	0	0	0	59	0	54	1	0	0	55	7	14	57	0	1	78	4	0	31	0	0	35	227
4:45 PM	1	56	0	0	0	57	0	67	4	0	0	71	13	26	75	0	2	114	8	0	33	0	0	41	283
Hourly Total	3	216	0	0	0	219	0	227	17	0	0	244	39	100	256	0	6	395	28	0	147	0	1	175	1033
5:00 PM	0	41	0	0	0	41	0	44	6	0	0	50	9	23	45	0	0	77	3	0	36	0	4	39	207
5:15 PM	0	43	0	0	0	43	0	45	3	0	0	48	10	21	63	0	0	94	3	0	42	0	0	45	230
5:30 PM	0	34	0	0	1	34	0	44	6	0	0	50	11	24	54	0	2	89	4	0	35	0	2	39	212
5:45 PM	1	46	0	0	0	47	0	39	1	0	0	40	16	17	73	0	0	106	5	0	32	0	0	37	230
Hourly Total	1	164	0	0	1	165	0	172	16	0	0	188	46	85	235	0	2	366	15	0	145	0	6	160	879
Grand Total	20	1086	0	2	1	1108	0	1422	97	0	3	1519	572	612	1773	0	12	2957	105	0	990	0	30	1095	6679
Approach %	1.8	98.0	0.0	0.2	-	-	0.0	93.6	6.4	0.0	-	-	19.3	20.7	60.0	0.0	-	-	9.6	0.0	90.4	0.0	-	-	-
Total %	0.3	16.3	0.0	0.0	-	16.6	0.0	21.3	1.5	0.0	-	22.7	8.6	9.2	26.5	0.0	-	44.3	1.6	0.0	14.8	0.0	-	16.4	-
Lights	19	974	0	2	-	995	0	1293	93	0	-	1386	365	578	1665	0	-	2608	92	0	959	0	-	1051	6040
% Lights	95.0	89.7	-	100.0	-	89.8	-	90.9	95.9	-	-	91.2	63.8	94.4	93.9	-	-	88.2	87.6	-	96.9	-	-	96.0	90.4
Buses	1	37	0	0	-	38	0	35	2	0	-	37	2	8	22	0	-	32	12	0	7	0	-	19	126
% Buses	5.0	3.4	-	0.0	-	3.4	-	2.5	2.1	-	-	2.4	0.3	1.3	1.2	-	-	1.1	11.4	-	0.7	-	-	1.7	1.9
Trucks	0	75	0	0	-	75	0	94	2	0	-	96	205	26	86	0	-	317	1	0	24	0	-	25	513
% Trucks	0.0	6.9	-	0.0	-	6.8	-	6.6	2.1	-	-	6.3	35.8	4.2	4.9	-	-	10.7	1.0	-	2.4	-	-	2.3	7.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	16.7	-	-	-	-	-	10.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	10	-	-	-	-	-	27	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	83.3	-	-	-	-	-	90.0	-	-

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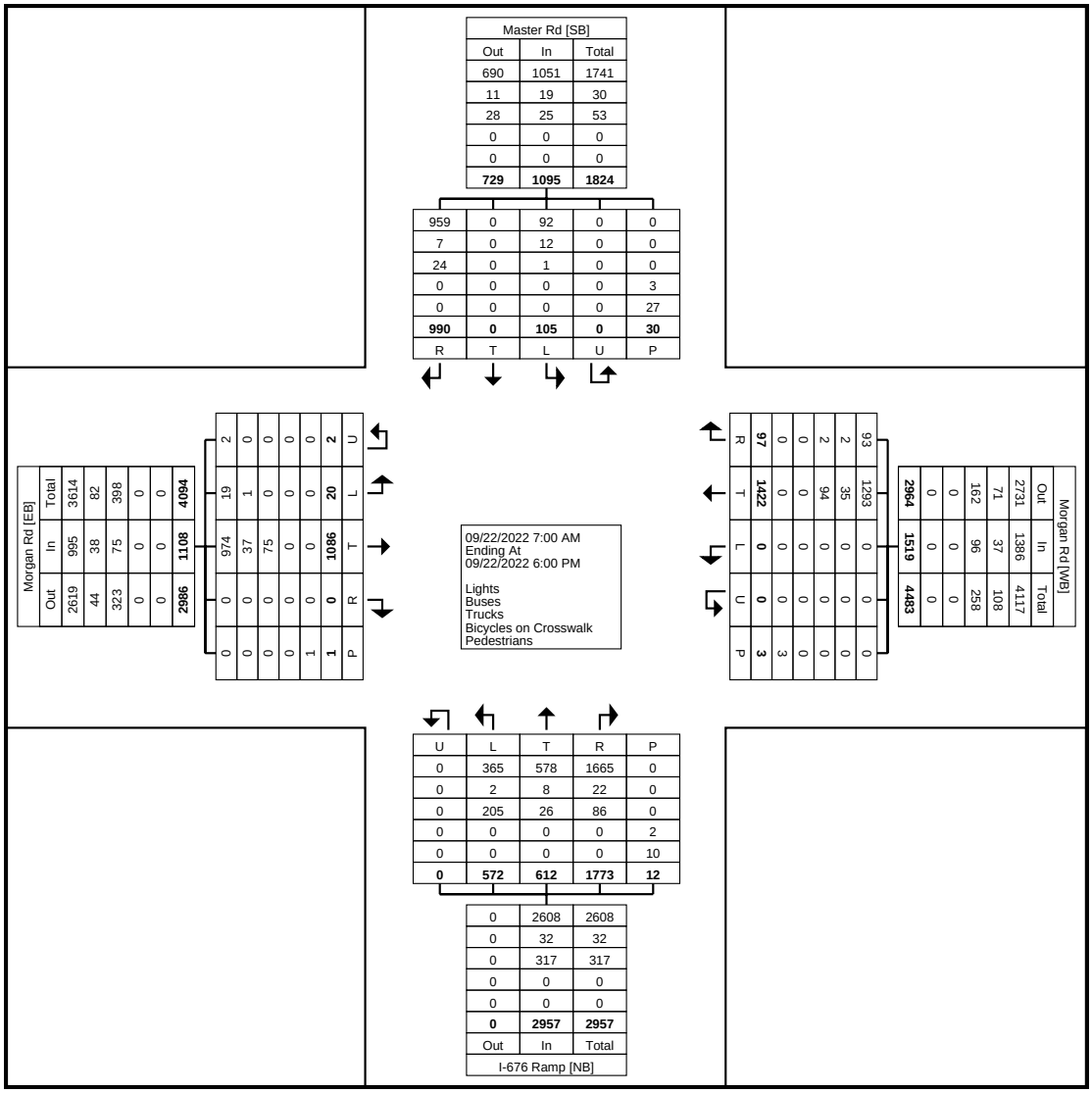

Turning Movement Data Plot

Camden County, NJ
Morgan Rd & I676 SB Off Ramp/Master Rd
Thursday, September 22, 2022
Location: 39.912604, -75.114601

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Turning Movement Peak Hour Data (7:15 AM)

Start Time	Morgan Rd Eastbound						Morgan Rd Westbound						I-676 Ramp Northbound						Master Rd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:15 AM	0	16	0	0	0	16	0	79	4	0	1	83	27	27	66	0	1	120	2	0	44	0	4	46	265
7:30 AM	1	25	0	0	0	26	0	49	7	0	0	56	30	26	95	0	0	151	3	0	53	0	1	56	289
7:45 AM	1	37	0	0	0	38	0	60	3	0	0	63	40	21	93	0	0	154	5	0	35	0	0	40	295
8:00 AM	1	43	0	0	0	44	0	55	3	0	0	58	25	24	67	0	0	116	1	0	30	0	0	31	249
Total	3	121	0	0	0	124	0	243	17	0	1	260	122	98	321	0	1	541	11	0	162	0	5	173	1098
Approach %	2.4	97.6	0.0	0.0	-	-	0.0	93.5	6.5	0.0	-	-	22.6	18.1	59.3	0.0	-	-	6.4	0.0	93.6	0.0	-	-	-
Total %	0.3	11.0	0.0	0.0	-	11.3	0.0	22.1	1.5	0.0	-	23.7	11.1	8.9	29.2	0.0	-	49.3	1.0	0.0	14.8	0.0	-	15.8	-
PHF	0.750	0.703	0.000	0.000	-	0.705	0.000	0.769	0.607	0.000	-	0.783	0.763	0.907	0.845	0.000	-	0.878	0.550	0.000	0.764	0.000	-	0.772	0.931
Lights	3	107	0	0	-	110	0	216	16	0	-	232	85	92	306	0	-	483	9	0	157	0	-	166	991
% Lights	100.0	88.4	-	-	-	88.7	-	88.9	94.1	-	-	89.2	69.7	93.9	95.3	-	-	89.3	81.8	-	96.9	-	-	96.0	90.3
Buses	0	7	0	0	-	7	0	8	0	0	-	8	0	4	7	0	-	11	2	0	2	0	-	4	30
% Buses	0.0	5.8	-	-	-	5.6	-	3.3	0.0	-	-	3.1	0.0	4.1	2.2	-	-	2.0	18.2	-	1.2	-	-	2.3	2.7
Trucks	0	7	0	0	-	7	0	19	1	0	-	20	37	2	8	0	-	47	0	0	3	0	-	3	77
% Trucks	0.0	5.8	-	-	-	5.6	-	7.8	5.9	-	-	7.7	30.3	2.0	2.5	-	-	8.7	0.0	-	1.9	-	-	1.7	7.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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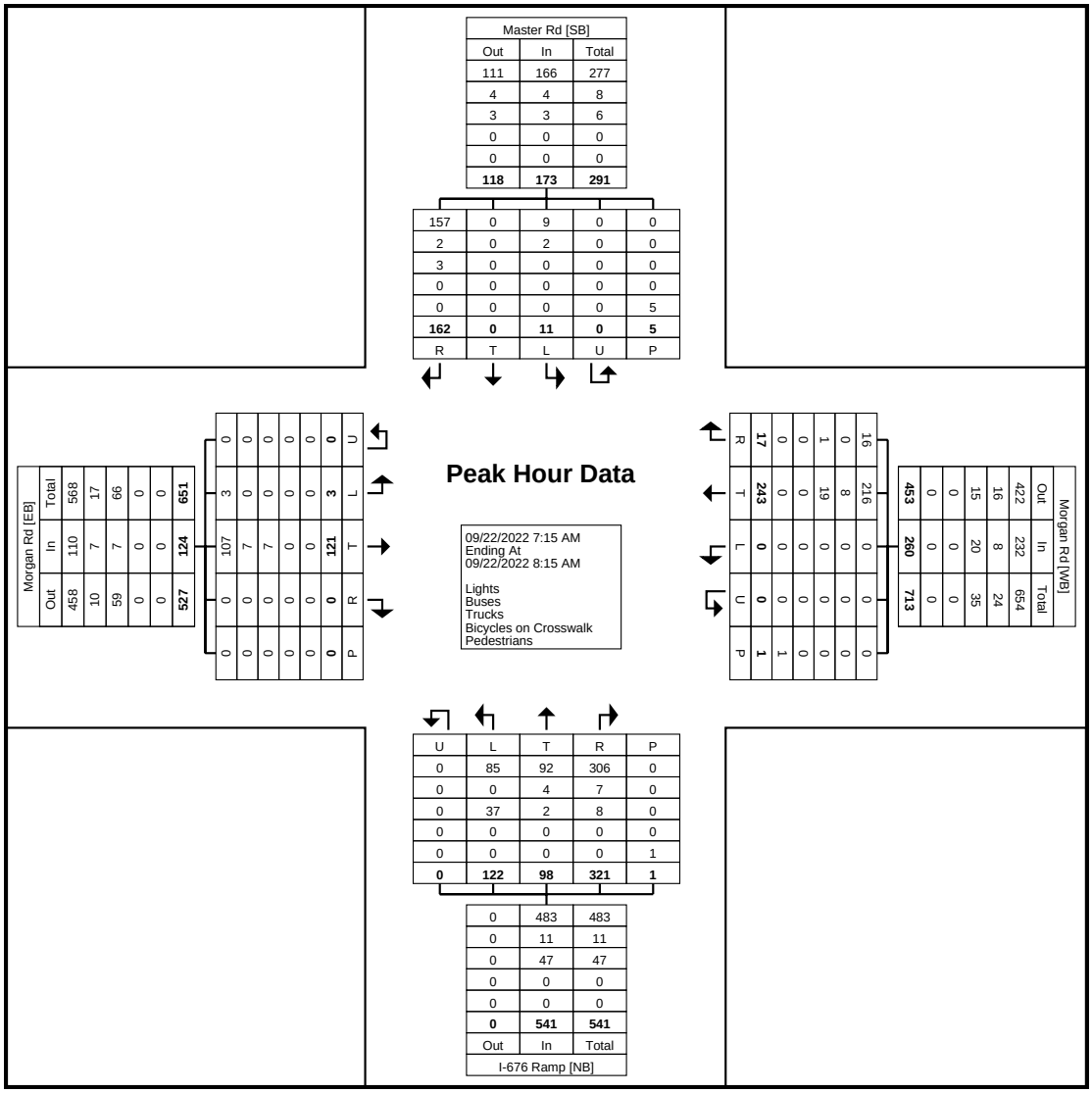
Camden County, NJ
Morgan Rd & I676 SB Off Ramp/Master Rd
Thursday, September 22, 2022
Location: 39.912604, -75.114601

Count Name: Morgan Rd & I-676 SB Off Ramp/Master Rd
Site Code:
Start Date: 09/22/2022
Page No: 4



Turning Movement Peak Hour Data Plot (7:15 AM)

Camden County, NJ
Morgan Rd & I676 SB Off Ramp/Master Rd
Thursday, September 22, 2022
Location: 39.912604, -75.114601

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Turning Movement Peak Hour Data (3:15 PM)

Start Time	Morgan Rd Eastbound						Morgan Rd Westbound						I-676 Ramp Northbound						Master Rd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:15 PM	3	51	0	0	0	54	0	86	4	0	0	90	17	16	78	0	0	111	5	0	48	0	0	53	308
3:30 PM	1	56	0	0	0	57	0	57	2	0	0	59	14	23	51	0	0	88	3	0	57	0	2	60	264
3:45 PM	0	47	0	1	0	48	0	54	4	0	0	58	11	20	67	0	0	98	5	0	40	0	2	45	249
4:00 PM	1	51	0	0	0	52	0	56	4	0	0	60	9	28	57	0	0	94	9	0	43	0	1	52	258
Total	5	205	0	1	0	211	0	253	14	0	0	267	51	87	253	0	0	391	22	0	188	0	5	210	1079
Approach %	2.4	97.2	0.0	0.5	-	-	0.0	94.8	5.2	0.0	-	-	13.0	22.3	64.7	0.0	-	-	10.5	0.0	89.5	0.0	-	-	-
Total %	0.5	19.0	0.0	0.1	-	19.6	0.0	23.4	1.3	0.0	-	24.7	4.7	8.1	23.4	0.0	-	36.2	2.0	0.0	17.4	0.0	-	19.5	-
PHF	0.417	0.915	0.000	0.250	-	0.925	0.000	0.735	0.875	0.000	-	0.742	0.750	0.777	0.811	0.000	-	0.881	0.611	0.000	0.825	0.000	-	0.875	0.876
Lights	5	186	0	1	-	192	0	233	13	0	-	246	26	82	240	0	-	348	17	0	186	0	-	203	989
% Lights	100.0	90.7	-	100.0	-	91.0	-	92.1	92.9	-	-	92.1	51.0	94.3	94.9	-	-	89.0	77.3	-	98.9	-	-	96.7	91.7
Buses	0	8	0	0	-	8	0	8	1	0	-	9	0	1	2	0	-	3	5	0	0	0	-	5	25
% Buses	0.0	3.9	-	0.0	-	3.8	-	3.2	7.1	-	-	3.4	0.0	1.1	0.8	-	-	0.8	22.7	-	0.0	-	-	2.4	2.3
Trucks	0	11	0	0	-	11	0	12	0	0	-	12	25	4	11	0	-	40	0	0	2	0	-	2	65
% Trucks	0.0	5.4	-	0.0	-	5.2	-	4.7	0.0	-	-	4.5	49.0	4.6	4.3	-	-	10.2	0.0	-	1.1	-	-	1.0	6.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.0	-	-

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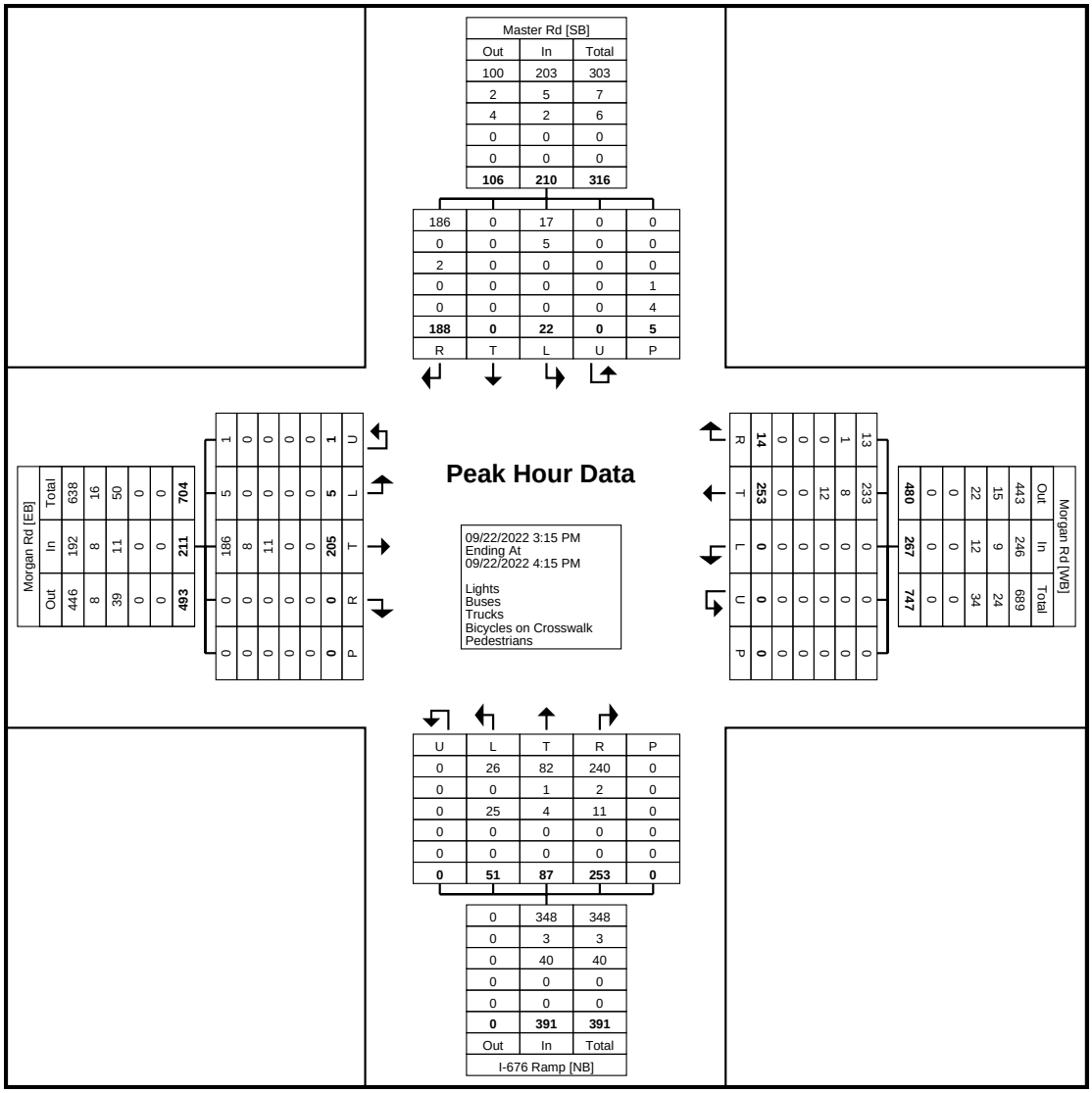


Turning Movement Peak Hour Data Plot (3:15 PM)

System Peak Hour Turning
Movement Counts

Holtec Blvd & Broadway - TMC

Thu Sep 22, 2022
Forced Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991739, Location: 39.912638, -75.118081

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg	Holtec Blvd							Holtec Blvd						
Direction	Eastbound							Westbound						
Time	L	T	R	U	RR	**App**	Ped*	L	T	R	U	RR	**App**	Ped*
2022-09-22 7:30AM	0	2	0	0	0	**2**	1	26	14	16	0	0	**56**	0
7:45AM	0	1	0	0	0	**1**	0	20	25	21	0	1	**67**	0
8:00AM	1	0	0	0	0	**1**	0	15	11	18	0	0	**44**	0
8:15AM	1	1	0	0	0	**2**	0	17	12	14	0	0	**43**	0
Total	2	4	0	0	0	**6**	1	78	62	69	0	1	**210**	0
% Approach	33.3%	66.7%	0%	0%	0%	**-**	-	37.1%	29.5%	32.9%	0%	0.5%	**-**	-
% Total	0.4%	0.8%	0%	0%	0%	**1.3%**	-	16.4%	13.0%	14.5%	0%	0.2%	**44.0%**	-
PHF	0.500	0.500	-	-	-	**0.750**	-	0.750	0.620	0.821	-	0.250	**0.784**	-
Lights	2	1	0	0	0	**3**	-	41	62	52	0	1	**156**	-
% Lights	100%	25.0%	0%	0%	0%	**50.0%**	-	52.6%	100%	75.4%	0%	100%	**74.3%**	-
Articulated Trucks and Single-Unit Trucks	0	3	0	0	0	**3**	-	37	0	16	0	0	**53**	-
% Articulated Trucks and Single-Unit Trucks	0%	75.0%	0%	0%	0%	**50.0%**	-	47.4%	0%	23.2%	0%	0%	**25.2%**	-
Buses	0	0	0	0	0	**0**	-	0	0	1	0	0	**1**	-
% Buses	0%	0%	0%	0%	0%	**0%**	-	0%	0%	1.4%	0%	0%	**0.5%**	-
Pedestrians	-	-	-	-	-	-	1	-	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Holtec Blvd & Broadway - TMC

Thu Sep 22, 2022
Forced Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991739, Location: 39.912638, -75.118081

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg	Broadway							Boradway							
Direction	Northbound							Southbound							
Time	L	T	R	U	RR	**App**	Ped*	L	T	R	U	RR	**App**	Ped*	**Int**
2022-09-22 7:30AM	0	19	14	0	2	**35**	0	10	11	0	0	0	**21**	0	**114**
7:45AM	1	31	13	0	1	**46**	0	11	9	1	0	0	**21**	0	**135**
8:00AM	1	22	16	0	0	**39**	0	20	11	0	0	0	**31**	0	**115**
8:15AM	0	19	16	0	0	**35**	0	19	14	0	0	0	**33**	0	**113**
Total	2	91	59	0	3	**155**	0	60	45	1	0	0	**106**	0	**477**
% Approach	1.3%	58.7%	38.1%	0%	1.9%	**-**	-	56.6%	42.5%	0.9%	0%	0%	**-**	-	**-**
% Total	0.4%	19.1%	12.4%	0%	0.6%	**32.5%**	-	12.6%	9.4%	0.2%	0%	0%	**22.2%**	-	**-**
PHF	0.500	0.734	0.922	-	0.375	**0.842**	-	0.750	0.804	0.250	-	-	**0.803**	-	0.883
Lights	2	80	37	0	1	**120**	-	46	36	1	0	0	**83**	-	362
% Lights	100%	87.9%	62.7%	0%	33.3%	**77.4%**	-	76.7%	80.0%	100%	0%	0%	**78.3%**	-	75.9%
Articulated Trucks and Single-Unit Trucks	0	6	21	0	2	**29**	-	10	5	0	0	0	**15**	-	100
% Articulated Trucks and Single-Unit Trucks	0%	6.6%	35.6%	0%	66.7%	**18.7%**	-	16.7%	11.1%	0%	0%	0%	**14.2%**	-	21.0%
Buses	0	5	1	0	0	**6**	-	4	4	0	0	0	**8**	-	15
% Buses	0%	5.5%	1.7%	0%	0%	**3.9%**	-	6.7%	8.9%	0%	0%	0%	**7.5%**	-	3.1%
Pedestrians	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Holtec Blvd & I-676 SB Off Ramp/Cavanta Cent... - TMC

Thu Sep 22, 2022
Forced Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991738, Location: 39.91263, -75.117426

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg	Holtec Blvd						Holtec Blvd					Cavanta Center Access Rd						I-676 Ramp						
Direction	Eastbound						Westbound					Northbound						Southbound						
Time	T	R	U	RR	**App**	Ped*	L	T	U	**App**	Ped*	L	R	U	RR	**App**	Ped*	L	T	R	RR	**App**	Ped*	**Int**
2022-09-22 7:30AM	28	1	0	0	**29**	0	3	35	0	**38**	0	0	1	0	2	**3**	0	18	0	20	0	**38**	2	**108**
7:45AM	24	0	0	0	**24**	0	0	47	1	**48**	0	0	0	0	3	**3**	0	28	0	17	0	**45**	1	**120**
8:00AM	36	0	0	0	**36**	0	2	28	0	**30**	0	1	1	0	0	**2**	0	36	0	11	2	**49**	0	**117**
8:15AM	34	1	0	0	**35**	0	5	32	0	**37**	0	0	0	0	6	**6**	0	31	0	10	0	**41**	1	**119**
Total	122	2	0	0	**124**	0	10	142	1	**153**	0	1	2	0	11	**14**	0	113	0	58	2	**173**	4	**464**
% Approach	98.4%	1.6%	0%	0%	**-**	-	6.5%	92.8%	0.7%	**-**	-	7.1%	14.3%	0%	78.6%	**-**	-	65.3%	0%	33.5%	1.2%	**-**	-	-
% Total	26.3%	0.4%	0%	0%	**26.7%**	-	2.2%	30.6%	0.2%	**33.0%**	-	0.2%	0.4%	0%	2.4%	**3.0%**	-	24.4%	0%	12.5%	0.4%	**37.3%**	-	-
PHF	0.847	0.500	-	-	**0.861**	-	0.500	0.755	0.250	**0.797**	-	0.250	0.500	-	0.458	**0.583**	-	0.785	-	0.725	0.250	**0.883**	-	0.967
Lights	84	0	0	0	**84**	-	0	100	1	**101**	-	0	0	0	2	**2**	-	101	0	47	1	**149**	-	336
% Lights	68.9%	0%	0%	0%	**67.7%**	-	0%	70.4%	100%	**66.0%**	-	0%	0%	0%	18.2%	**14.3%**	-	89.4%	0%	81.0%	50.0%	**86.1%**	-	72.4%
Articulated Trucks and Single-Unit Trucks	33	2	0	0	**35**	-	10	41	0	**51**	-	1	2	0	9	**12**	-	4	0	11	1	**16**	-	114
% Articulated Trucks and Single-Unit Trucks	27.0%	100%	0%	0%	**28.2%**	-	100%	28.9%	0%	**33.3%**	-	100%	100%	0%	81.8%	**85.7%**	-	3.5%	0%	19.0%	50.0%	**9.2%**	-	24.6%
Buses	5	0	0	0	**5**	-	0	1	0	**1**	-	0	0	0	0	**0**	-	8	0	0	0	**8**	-	14
% Buses	4.1%	0%	0%	0%	**4.0%**	-	0%	0.7%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	7.1%	0%	0%	0%	**4.6%**	-	3.0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Morgan Rd & I-676 SB Off Ramp/Master Rd - TMC

Thu Sep 22, 2022
Forced Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991737, Location: 39.912604, -75.114601

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg / Direction	Morgan Rd Eastbound						Morgan Rd Westbound						I-676 Ramp Northbound						Master Rd Southbound						
Time	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	**Int**
2022-09-22 7:30AM	1	25	0	0	**26**	0	0	49	7	0	**56**	0	30	26	95	0	**151**	0	3	0	53	0	**56**	1	**289**
7:45AM	1	37	0	0	**38**	0	0	60	3	0	**63**	0	40	21	93	0	**154**	0	5	0	35	0	**40**	0	**295**
8:00AM	1	43	0	0	**44**	0	0	55	3	0	**58**	0	25	24	67	0	**116**	0	1	0	30	0	**31**	0	**249**
8:15AM	1	37	0	0	**38**	0	0	45	3	0	**48**	0	36	22	73	0	**131**	0	4	0	25	0	**29**	0	**246**
Total	4	142	0	0	**146**	0	0	209	16	0	**225**	0	131	93	328	0	**552**	0	13	0	143	0	**156**	1	**1079**
% Approach	2.7%	97.3%	0%	0%	**-**	-	0%	92.9%	7.1%	0%	**-**	-	23.7%	16.8%	59.4%	0%	**-**	-	8.3%	0%	91.7%	0%	**-**	-	-
% Total	0.4%	13.2%	0%	0%	**13.5%**	-	0%	19.4%	1.5%	0%	**20.9%**	-	12.1%	8.6%	30.4%	0%	**51.2%**	-	1.2%	0%	13.3%	0%	**14.5%**	-	-
PHF	1.000	0.826	-	-	**0.830**	-	-	0.871	0.571	-	**0.893**	-	0.819	0.894	0.863	-	**0.896**	-	0.650	-	0.675	-	**0.696**	-	0.914
Lights	4	124	0	0	**128**	-	0	187	15	0	**202**	-	81	89	316	0	**486**	-	9	0	139	0	**148**	-	964
% Lights	100%	87.3%	0%	0%	**87.7%**	-	0%	89.5%	93.8%	0%	**89.8%**	-	61.8%	95.7%	96.3%	0%	**88.0%**	-	69.2%	0%	97.2%	0%	**94.9%**	-	89.3%
Articulated Trucks and Single-Unit Trucks	0	7	0	0	**7**	-	0	16	1	0	**17**	-	50	2	6	0	**58**	-	0	0	2	0	**2**	-	84
% Articulated Trucks and Single-Unit Trucks	0%	4.9%	0%	0%	**4.8%**	-	0%	7.7%	6.3%	0%	**7.6%**	-	38.2%	2.2%	1.8%	0%	**10.5%**	-	0%	0%	1.4%	0%	**1.3%**	-	7.8%
Buses	0	11	0	0	**11**	-	0	6	0	0	**6**	-	0	2	6	0	**8**	-	4	0	2	0	**6**	-	31
% Buses	0%	7.7%	0%	0%	**7.5%**	-	0%	2.9%	0%	0%	**2.7%**	-	0%	2.2%	1.8%	0%	**1.4%**	-	30.8%	0%	1.4%	0%	**3.8%**	-	2.9%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Holtec Blvd & Broadway - TMC

Thu Sep 22, 2022
Forced Peak (4 PM - 5 PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991739, Location: 39.912638, -75.118081

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg	Holtec Blvd							Holtec Blvd						
Direction	Eastbound							Westbound						
Time	L	T	R	U	RR	**App**	Ped*	L	T	R	U	RR	**App**	Ped*
2022-09-22 4:00PM	0	38	1	0	1	**40**	0	22	4	12	0	0	**38**	0
4:15PM	0	20	3	0	1	**24**	0	28	1	10	0	0	**39**	0
4:30PM	0	13	1	0	1	**15**	1	44	0	8	0	0	**52**	0
4:45PM	0	13	1	0	0	**14**	0	49	3	9	0	0	**61**	1
Total	0	84	6	0	3	**93**	1	143	8	39	0	0	**190**	1
% Approach	0%	90.3%	6.5%	0%	3.2%	**-**	-	75.3%	4.2%	20.5%	0%	0%	**-**	-
% Total	0%	13.5%	1.0%	0%	0.5%	**15.0%**	-	23.1%	1.3%	6.3%	0%	0%	**30.6%**	-
PHF	-	0.553	0.500	-	0.750	**0.581**	-	0.730	0.500	0.813	-	-	**0.779**	-
Lights	0	83	6	0	3	**92**	-	133	8	33	0	0	**174**	-
% Lights	0%	98.8%	100%	0%	100%	**98.9%**	-	93.0%	100%	84.6%	0%	0%	**91.6%**	-
Articulated Trucks and Single-Unit Trucks	0	1	0	0	0	**1**	-	9	0	5	0	0	**14**	-
% Articulated Trucks and Single-Unit Trucks	0%	1.2%	0%	0%	0%	**1.1%**	-	6.3%	0%	12.8%	0%	0%	**7.4%**	-
Buses	0	0	0	0	0	**0**	-	1	0	1	0	0	**2**	-
% Buses	0%	0%	0%	0%	0%	**0%**	-	0.7%	0%	2.6%	0%	0%	**1.1%**	-
Pedestrians	-	-	-	-	-	-	1	-	-	-	-	-	-	1
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Holtec Blvd & Broadway - TMC

Thu Sep 22, 2022
Forced Peak (4 PM - 5 PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991739, Location: 39.912638, -75.118081

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg	Broadway							Boradway							
Direction	Northbound							Southbound							
Time	L	T	R	U	RR	**App**	Ped*	L	T	R	U	RR	**App**	Ped*	**Int**
2022-09-22 4:00PM	1	9	19	0	1	**30**	2	20	23	0	0	0	**43**	0	**151**
4:15PM	0	5	24	0	0	**29**	0	24	24	0	0	0	**48**	0	**140**
4:30PM	0	13	19	0	1	**33**	0	23	32	0	0	0	**55**	0	**155**
4:45PM	0	11	11	0	1	**23**	0	30	45	1	0	0	**76**	0	**174**
Total	1	38	73	0	3	**115**	2	97	124	1	0	0	**222**	0	**620**
% Approach	0.9%	33.0%	63.5%	0%	2.6%	**-**	-	43.7%	55.9%	0.5%	0%	0%	**-**	-	**-**
% Total	0.2%	6.1%	11.8%	0%	0.5%	**18.5%**	-	15.6%	20.0%	0.2%	0%	0%	**35.8%**	-	**-**
PHF	0.250	0.731	0.760	-	0.750	**0.871**	-	0.808	0.689	0.250	-	-	**0.730**	-	0.891
Lights	1	33	49	0	3	**86**	-	85	119	1	0	0	**205**	-	557
% Lights	100%	86.8%	67.1%	0%	100%	**74.8%**	-	87.6%	96.0%	100%	0%	0%	**92.3%**	-	89.8%
Articulated Trucks and Single-Unit Trucks	0	0	24	0	0	**24**	-	10	1	0	0	0	**11**	-	50
% Articulated Trucks and Single-Unit Trucks	0%	0%	32.9%	0%	0%	**20.9%**	-	10.3%	0.8%	0%	0%	0%	**5.0%**	-	8.1%
Buses	0	5	0	0	0	**5**	-	2	4	0	0	0	**6**	-	13
% Buses	0%	13.2%	0%	0%	0%	**4.3%**	-	2.1%	3.2%	0%	0%	0%	**2.7%**	-	2.1%
Pedestrians	-	-	-	-	-	-	2	-	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Holtec Blvd & I-676 SB Off Ramp/Cavanta Cent... - TMC

Thu Sep 22, 2022
Forced Peak (4 PM - 5 PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991738, Location: 39.91263, -75.117426

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg	Holtec Blvd						Holtec Blvd					Cavanta Center Access Rd						I-676 Ramp						
Direction	Eastbound						Westbound					Northbound						Southbound						
Time	T	R	U	RR	**App**	Ped*	L	T	U	**App**	Ped*	L	R	U	RR	**App**	Ped*	L	T	R	RR	**App**	Ped*	**Int**
2022-09-22 4:00PM	77	0	0	0	**77**	0	4	19	0	**23**	0	1	1	0	4	**6**	1	29	0	14	1	**44**	0	**150**
4:15PM	64	3	0	0	**67**	0	3	14	0	**17**	0	1	0	0	0	**1**	3	33	0	19	4	**56**	2	**141**
4:30PM	53	1	0	0	**54**	0	2	11	0	**13**	0	2	1	0	4	**7**	2	42	3	41	0	**86**	1	**160**
4:45PM	55	0	0	0	**55**	0	3	20	0	**23**	0	1	3	0	5	**9**	1	42	0	43	0	**85**	3	**172**
Total	249	4	0	0	**253**	0	12	64	0	**76**	0	5	5	0	13	**23**	7	146	3	117	5	**271**	6	**623**
% Approach	98.4%	1.6%	0%	0%	**-**	-	15.8%	84.2%	0%	**-**	-	21.7%	21.7%	0%	56.5%	**-**	-	53.9%	1.1%	43.2%	1.8%	**-**	-	**-**
% Total	40.0%	0.6%	0%	0%	**40.6%**	-	1.9%	10.3%	0%	**12.2%**	-	0.8%	0.8%	0%	2.1%	**3.7%**	-	23.4%	0.5%	18.8%	0.8%	**43.5%**	-	**-**
PHF	0.808	0.333	-	-	**0.821**	-	0.750	0.800	-	**0.826**	-	0.625	0.417	-	0.650	**0.639**	-	0.869	0.250	0.680	0.313	**0.788**	-	0.906
Lights	214	2	0	0	**216**	-	6	54	0	**60**	-	3	0	0	6	**9**	-	141	2	113	5	**261**	-	546
% Lights	85.9%	50.0%	0%	0%	**85.4%**	-	50.0%	84.4%	0%	**78.9%**	-	60.0%	0%	0%	46.2%	**39.1%**	-	96.6%	66.7%	96.6%	100%	**96.3%**	-	87.6%
Articulated Trucks and Single-Unit Trucks	33	2	0	0	**35**	-	6	8	0	**14**	-	2	5	0	7	**14**	-	0	1	3	0	**4**	-	67
% Articulated Trucks and Single-Unit Trucks	13.3%	50.0%	0%	0%	**13.8%**	-	50.0%	12.5%	0%	**18.4%**	-	40.0%	100%	0%	53.8%	**60.9%**	-	0%	33.3%	2.6%	0%	**1.5%**	-	10.8%
Buses	2	0	0	0	**2**	-	0	2	0	**2**	-	0	0	0	0	**0**	-	5	0	1	0	**6**	-	10
% Buses	0.8%	0%	0%	0%	**0.8%**	-	0%	3.1%	0%	**2.6%**	-	0%	0%	0%	0%	**0%**	-	3.4%	0%	0.9%	0%	**2.2%**	-	1.6%
Pedestrians	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	6	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	85.7%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.3%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Morgan Rd & I-676 SB Off Ramp/Master Rd - TMC

Thu Sep 22, 2022
Forced Peak (4 PM - 5 PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 991737, Location: 39.912604, -75.114601

Provided by: Tri-State Traffic Data, Inc.
184 Baker Road,
Coatesville, PA, 19320, US

Leg	Morgan Rd						Morgan Rd						I-676 Ramp						Master Rd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2022-09-22 4:00PM	1	51	0	0	**52**	0	0	56	4	0	**60**	0	9	28	57	0	**94**	0	9	0	43	0	**52**	1	**258**
4:15PM	0	51	0	0	**51**	0	0	50	8	0	**58**	0	10	32	67	0	**109**	3	7	0	40	0	**47**	0	**265**
4:30PM	1	58	0	0	**59**	0	0	54	1	0	**55**	0	7	14	57	0	**78**	1	4	0	31	0	**35**	0	**227**
4:45PM	1	56	0	0	**57**	0	0	67	4	0	**71**	0	13	26	75	0	**114**	2	8	0	33	0	**41**	0	**283**
Total	3	216	0	0	**219**	0	0	227	17	0	**244**	0	39	100	256	0	**395**	6	28	0	147	0	**175**	1	**1033**
% Approach	1.4%	98.6%	0%	0%	**-**	-	0%	93.0%	7.0%	0%	**-**	-	9.9%	25.3%	64.8%	0%	**-**	-	16.0%	0%	84.0%	0%	**-**	-	-
% Total	0.3%	20.9%	0%	0%	**21.2%**	-	0%	22.0%	1.6%	0%	**23.6%**	-	3.8%	9.7%	24.8%	0%	**38.2%**	-	2.7%	0%	14.2%	0%	**16.9%**	-	-
PHF	0.750	0.931	-	-	**0.928**	-	-	0.847	0.531	-	**0.859**	-	0.750	0.781	0.853	-	**0.866**	-	0.778	-	0.855	-	**0.841**	-	0.913
Lights	3	203	0	0	**206**	-	0	213	17	0	**230**	-	30	97	242	0	**369**	-	26	0	141	0	**167**	-	972
% Lights	100%	94.0%	0%	0%	**94.1%**	-	0%	93.8%	100%	0%	**94.3%**	-	76.9%	97.0%	94.5%	0%	**93.4%**	-	92.9%	0%	95.9%	0%	**95.4%**	-	94.1%
Articulated Trucks and Single-Unit Trucks	0	7	0	0	**7**	-	0	9	0	0	**9**	-	9	2	13	0	**24**	-	1	0	5	0	**6**	-	46
% Articulated Trucks and Single-Unit Trucks	0%	3.2%	0%	0%	**3.2%**	-	0%	4.0%	0%	0%	**3.7%**	-	23.1%	2.0%	5.1%	0%	**6.1%**	-	3.6%	0%	3.4%	0%	**3.4%**	-	4.5%
Buses	0	6	0	0	**6**	-	0	5	0	0	**5**	-	0	1	1	0	**2**	-	1	0	1	0	**2**	-	15
% Buses	0%	2.8%	0%	0%	**2.7%**	-	0%	2.2%	0%	0%	**2.0%**	-	0%	1.0%	0.4%	0%	**0.5%**	-	3.6%	0%	0.7%	0%	**1.1%**	-	1.5%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- 66.7%		-	-	-	-	-	0%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- 33.3%		-	-	-	-	- 100%		-

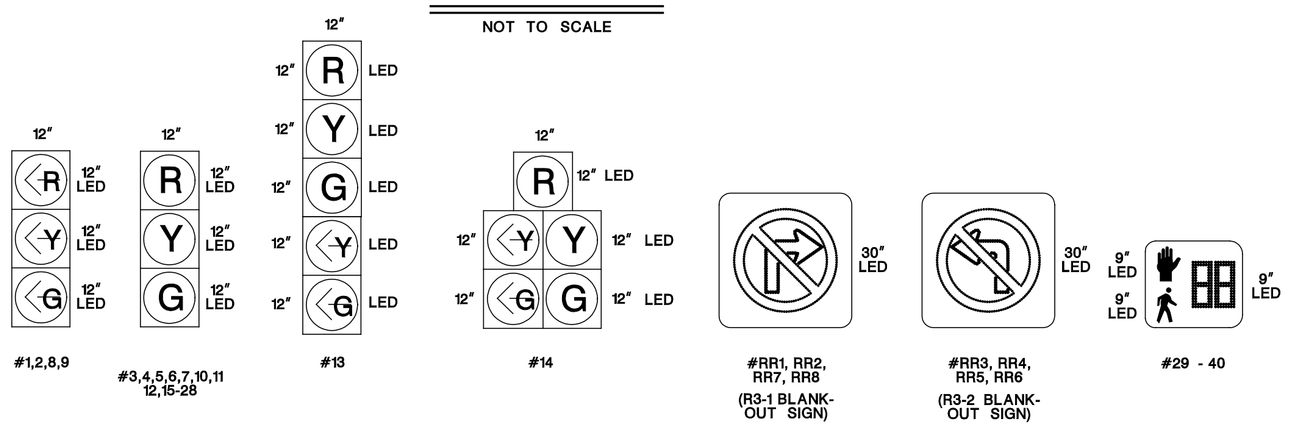
*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

APPENDIX C
Signal Timings and Signal Plans

STATE	FEDERAL PROJECT NO.
N.J.	*

SIGNAL LEGEND

NOT TO SCALE



NOTE:

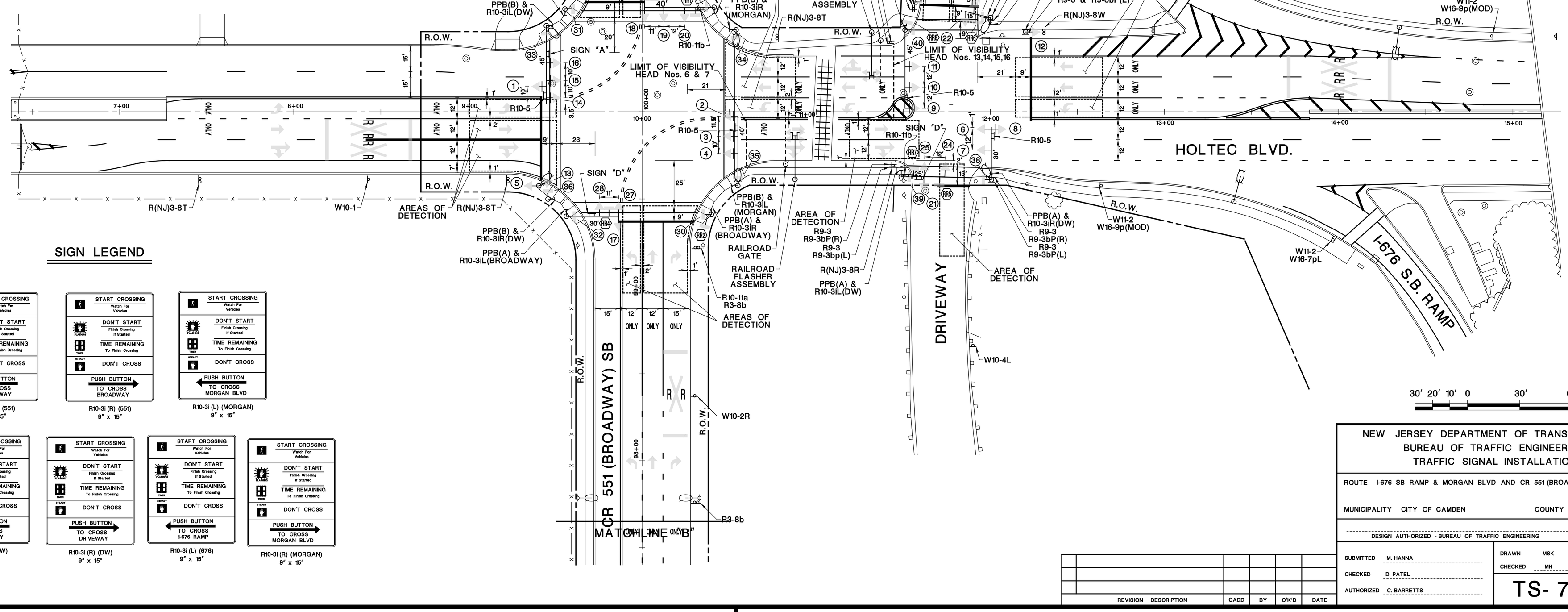
1. SIGNAL HEADS #6, 7, 13, 14, 15 & 16 ARE OPTICALLY PROGRAMMED WITH LIMITS OF VISIBILITY AS SHOWN ON THE PLAN.
2. SIGNAL HEADS #5, 12 & 13 ARE MOUNTED AT A HEIGHT OF 12' ABOVE PAVEMENT LEVEL.
3. SIGNAL HEADS #1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 14, 15 & 16 ARE EQUIPPED WITH BACKPLATES.

SIGN LEGEND

NOT TO SCALE

SIGN "A"
96" x 18"
(REVERSE DOUBLE-SIDED)

SIGN "D"
48" x 18"
(DOUBLE-SIDED)



SIGN LEGEND

R10-3i (L) (551) 9" x 15"
R10-3i (R) (551) 9" x 15"
R10-3i (L) (MORGAN) 9" x 15"
R10-3i (L) (DW) 9" x 15"
R10-3i (R) (DW) 9" x 15"
R10-3i (L) (676) 9" x 15"
R10-3i (R) (MORGAN) 9" x 15"

NEW JERSEY DEPARTMENT OF TRANSPORTATION
BUREAU OF TRAFFIC ENGINEERING
TRAFFIC SIGNAL INSTALLATION

ROUTE I-676 SB RAMP & MORGAN BLVD AND CR 551 (BROADWAY)

MUNICIPALITY CITY OF CAMDEN COUNTY CAMDEN

DESIGN AUTHORIZED - BUREAU OF TRAFFIC ENGINEERING DATE

REVISION DESCRIPTION	CADD	BY	C'K'D	DATE

SUBMITTED M. HANNA
CHECKED D. PATEL
AUTHORIZED C. BARRETTS

DRAWN MSK
CHECKED MH

SCALE: 1" = 30'

TS- 7178

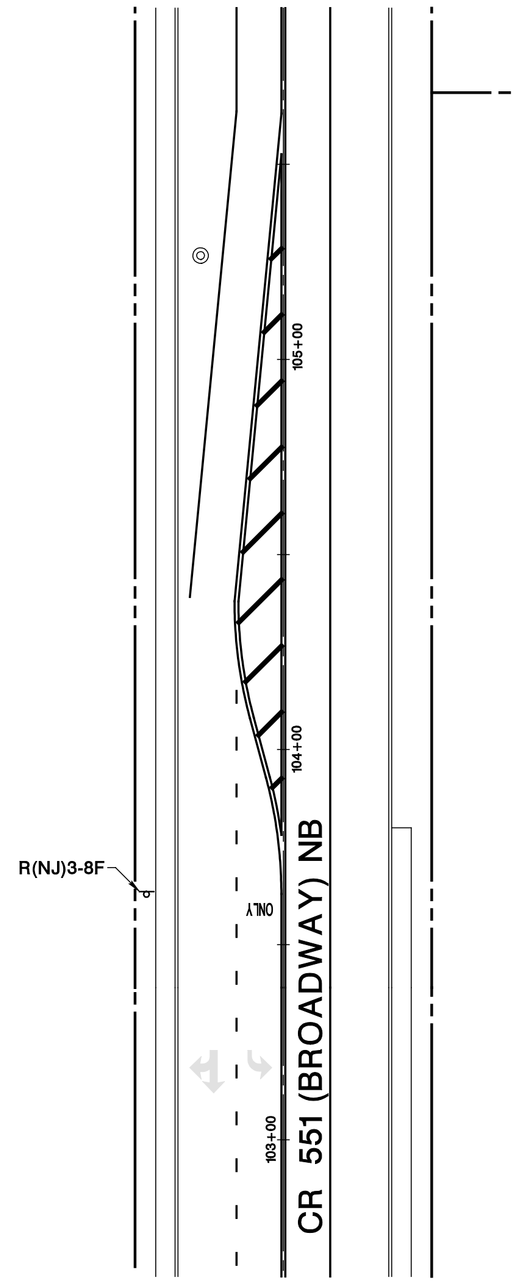
REFERENCE

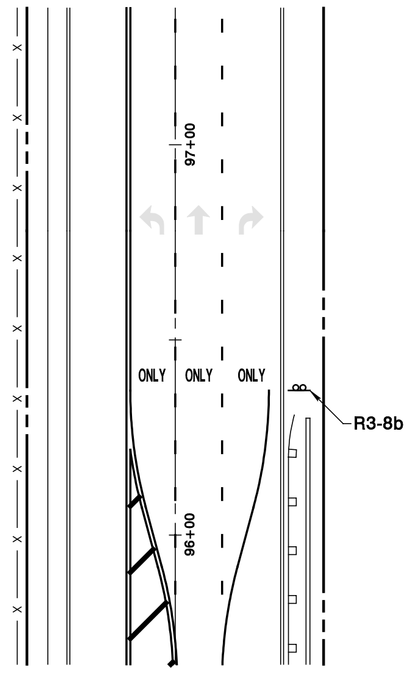
ID = TPOBARB file = _Traffic Signals by Route\Route 67667600116 Rt 676 Morgan Blvd – CR 551 MP 1.1667600116_0416105_ts7178_17_msk.dgn pen table = \\njdotprjfs\v8system\njdotwa\projects\NJDOTEng\plot\TBLs\Non-Roadway\stloc.tbl

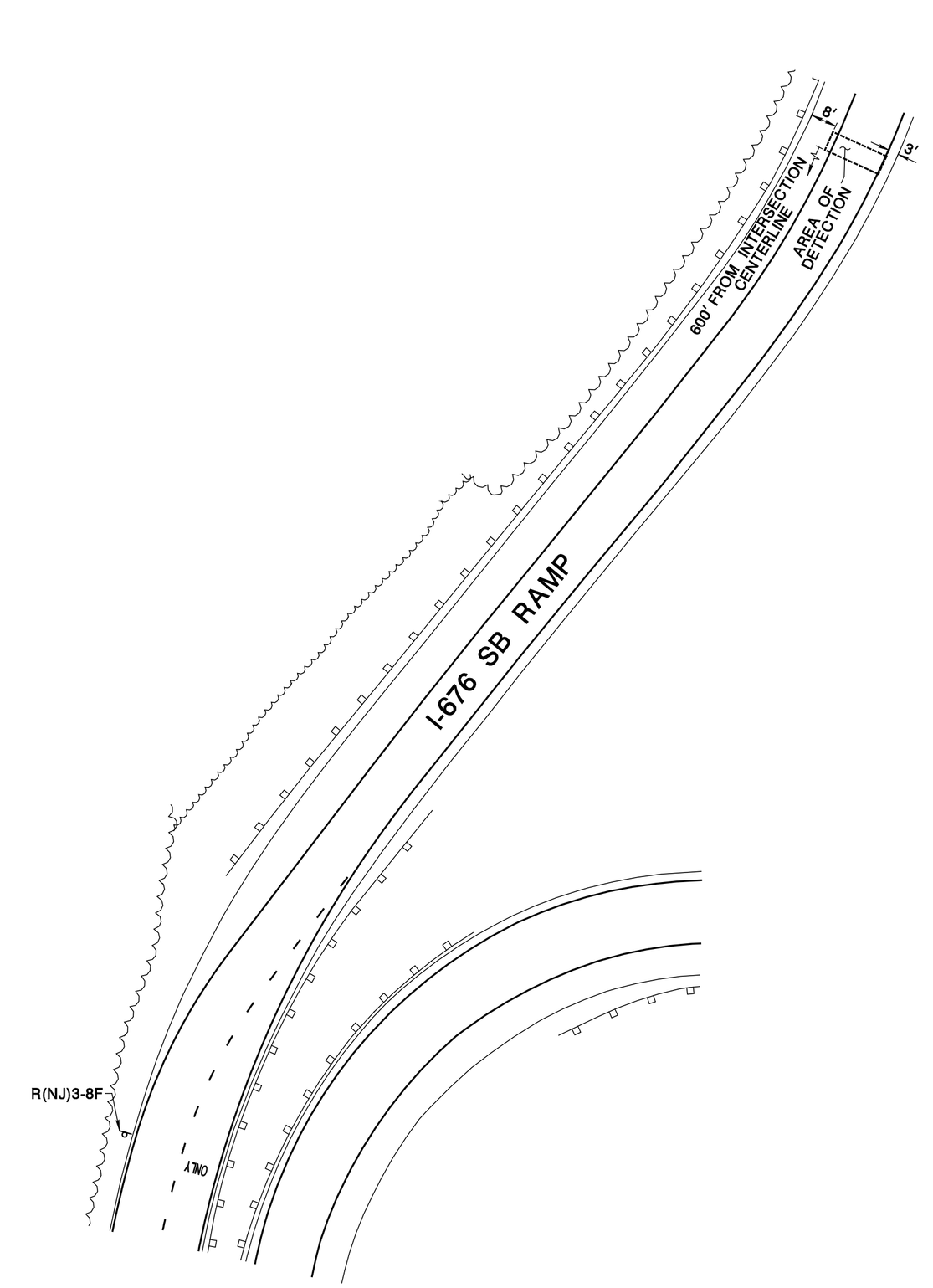
file=_Traffic Signals by Route\Route 67667600116 Rt 676 Morgan Blvd – CR 551 MP 1.1667600116_0416105_ts7178_17_msk.dgn

STATE	FEDERAL PROJECT NO.
N.J.	*

REFERENCE







30' 20' 10' 0 30' 60'

NEW JERSEY DEPARTMENT OF TRANSPORTATION
BUREAU OF TRAFFIC ENGINEERING
TRAFFIC SIGNAL INSTALLATION

ROUTE I-676 SB RAMP & MORGAN BLVD AND CR 551 (BROADWAY)

MUNICIPALITY CITY OF CAMDEN COUNTY CAMDEN

DESIGN AUTHORIZED - BUREAU OF TRAFFIC SIGNAL & SAFETY ENGINEERING DATE

REVISION DESCRIPTION	CADD	BY	C'K'D	DATE

SUBMITTED M. HANNA
CHECKED D. PATEL
AUTHORIZED C. BARRETTS

DRAWN MSK
CHECKED MH

SCALE: 1" = 30'

TS- 7178

file=_Traffic Signals by Route\Route 67667600116 Rt 676 Morgan Blvd - CR 551 MP 1.16667600116_0418105_ts7178_17_msk.dgn

86-121 Second Variable Cycle with Max 3 Extension

Normal Operation

		Signal Indications																			
Phase	**Highway & Street Name**	**1,2**	**3-5**	**6,7**	**8,9**	**10-12**	**13, 14**	**15,16**	**17-20**	**21, 22**	**23-25**	**26-28**	**29-32**	**33-36**	**37-40**	**RR1, RR2**	**RR3, RR4**	**RR5, RR6**	**RR7, RR8**	**RR Signals**	**RR Gates**	**Time (Sec)**
A	CR 551 (Broadway) ROW	<R-	R	G	<R-	R	R	R	G	R	R	G	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	7-25
	Change (Outer)	<R-	R	G	<R-	R	R	R	Y	R	R	Y	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	G	<R-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	Y[(1)]	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R[(1)]	<R-	R	G/<G-[(1)]	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
B	I-676 Ramp / Dvwy ROW	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	7-15
	Change (Outer)	<R-	R	R	<R-	R	G/<G-	G	R	Y	Y	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	R	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	R	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
C	Morgan Blvd. ROW	<R-	G	G	<R-	G	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	7-14
	Change (Outer)	<R-	Y	G	<R-	Y	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	G	<R-	R	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	Y	<R-	R	Y/<Y-[(2)]	Y[(3)]	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R[(2)]	R[(3)]	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
D	Morgan Blvd. Lag Lefts	<G-	R	R	<G-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5-7
	Change (Outer)	<Y-	R	R	<Y-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	G[(4)]	<R-	R	Y/<Y-[(6)(7)]	Y[(8) (9)]	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	G[(5)]	<R-	R	R[(6)(8)]	R[(8) (9)]	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
Emergency Flash		**<R-**	**Y**	**Y**	**<R-**	**Y**	**Y**	**Y**	**R**	**R**	**R**	**R**	**DARK**	**DARK**	**DARK**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**UP**	**-**

131-141 Second Variable Cycle with Max 3 Extension

With Pedestrian Actuation

		Signal Indications																			
Phase	**Highway & Street Name**	**1,2**	**3-5**	**6,7**	**8,9**	**10-12**	**13, 14**	**15,16**	**17-20**	**21, 22**	**23-25**	**26-28**	**29-32**	**33-36**	**37-40**	**RR1, RR2**	**RR3, RR4**	**RR5, RR6**	**RR7, RR8**	**RR Signals**	**RR Gates**	**Time (Sec)**
A	CR 551 (Broadway) ROW	<R-	R	G	<R-	R	R	R	G	R	R	G	DW	W	W	OFF	OFF	OFF	OFF	OFF	UP	7
	Pedestrian Clearance	<R-	R	G	<R-	R	R	R	G	R	R	G	DW	FDW	FDW	OFF	OFF	OFF	OFF	OFF	UP	25
	Change (Outer)	<R-	R	G	<R-	R	R	R	Y	R	R	Y	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	G	<R-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	Y(1)	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R(1)	<R-	R	G/<G-(1)	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
B	I-676 Ramp / Dvwy ROW	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	7-15
	Change (Outer)	<R-	R	R	<R-	R	G/<G-	G	R	Y	Y	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	R	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	R	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
C	Morgan Blvd. ROW	<R-	G	G	<R-	G	G	G	R	R	R	R	W	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	7
	Pedestrian Clearance	<R-	G	G	<R-	G	G	G	R	R	R	R	FDW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	20
	Change (Outer)	<R-	Y	G	<R-	Y	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	G	<R-	R	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	Y	<R-	R	Y/<Y-(2)	Y(3)	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R(2)	R(3)	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
D	Morgan Blvd. Lag Lefts	<G-	R	R	<G-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5-7
	Change (Outer)	<Y-	R	R	<Y-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2
	Inside Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	5
	Change (Inner)	<R-	R	G(4)	<R-	R	Y/<Y-(6)(7)	Y(8) (9)	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	3
	Clearance	<R-	R	G(5)	<R-	R	R(6)(8)	R(8) (9)	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	2

Notes:

1. The memory circuits shall be OFF.
2. The vehicle extension interval shall be set at 4-seconds.
3. The manual control shall be disconnected.
4. Pedestrian push button PPB(A) shall call Phase “C” and PPB(B) shall call Phase “A”.
5. Signal is to rest in Phase “C” (Green, DW). Unactuated phases shall be skipped.
6. A queue detector pre-emption shall be provided on the I-676 southbound ramp. The queue detection shall employ a 10-second delay before accepting actuation.
7. Upon actuation of the queue detector pre-emption, all minimum green, yellow change, red clearance and pedestrian clearance times shall be guaranteed followed by green time to Phase “B” for the duration of the actuation plus 30-seconds.
8. The minimum queue detector pre-emption re-service time shall be set at 4-minutes.
9. Upon completion of the queue detector pre-emption, R.O.W. shall be given to Morgan Boulevard and Normal Operation shall resume.
10. Railroad pre-emption supersedes the queue pre-emption for the I-676 SB ramp.
11. Phase “B” shall have a Dynamic Max / Max 3 option installed with the following parameters:
    a. The number of successive Max terminations (Max-Outs) shall be set at 2.
    b. The increment adjustment time or Max 3 Adjust shall be set to 10-seconds.
    c. The Dynamic maximum green limit time or Max 3 Limit shall be set to 45-seconds.
    d. The number of successive gap terminations (Gap-Outs) shall be set at 2.
12. During transition into railroad pre-emption control, the minimum green time shall be set at 2-seconds, and the pedestrian clearance interval shall be omitted.
13. (1) Traffic signal heads shall display G if Phase “B” is skipped.
14. (2) Traffic signal heads shall display G/<G- if Phases “D” & “A” are skipped.
15. (3) Traffic signal heads shall display G if Phases “D” & “A” are skipped.
16. (4) Traffic signal heads shall display Y if Phase “A” is skipped.
17. (5) Traffic signal heads shall display R if Phase “A” is skipped.
18. (6) Traffic signal heads shall display G/<G- if Phase “A” is skipped.
19. (7) Traffic signal heads shall display G/<G- if Phases “A” & “B” are skipped.
20. (8) Traffic signal heads shall display G if Phases “A” & “B” are skipped.
21. (9) Traffic signal heads shall display G if Phase “A” is skipped.

Variable Cycle
Railroad Pre-emption

		Signal Indications																			
	Phase	**1,2**	**3-5**	**6,7**	**8,9**	**10-12**	**13, 14**	**15,16**	**17-20**	**21,22**	**23-25**	**26-28**	**29-32**	**33-36**	**37-40**	**RR1, RR2**	**RR3, RR4**	**RR5, RR6**	**RR7, RR8**	**RR Signals**	**RR Gates**	**Time (Sec)**
Φ A to Pre-emption	CR 551 (Broadway) ROW	<R-	R	G	<R-	R	R	R	G	R	R	G	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-
	RR Pre-Pulse Extension	<R-	R	G	<R-	R	R	R	G	R	R	G	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	RR Pre-Pulse Change (Outer)	<R-	R	G	<R-	R	R	R	Y	R	R	Y	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	RR Pre-Pulse Clearance	<R-	R	G	<R-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Track Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	11
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	UP	3
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	7
	Track Clearance Change	<R-	R	Y	<R-	R	Y/<Y-	Y	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	3
	Track Clearance All-Red	<R-	R	R	<R-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	2
	Hold	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Horizontal	-
	Return - Gate Ascending	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Ascending	12
	Change	<R-	R	R	<R-	R	R	R	Y	G	G	Y	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R	R	R	G	G	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Return to Normal (Phase B)	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-
Φ B to Pre-emption	I-676 Ramp / Dvwy ROW	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-
	RR Pre-Pulse Extension	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	RR Pre-Pulse Change (Outer)	<R-	R	R	<R-	R	G/<G-	G	R	Y	Y	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	RR Pre-Pulse Clearance	<R-	R	R	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Track Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	11
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	UP	3
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	7
	Track Clearance Change	<R-	R	Y	<R-	R	Y/<Y-	Y	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	3
	Track Clearance All-Red	<R-	R	R	<R-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	2
	Hold	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Horizontal	-
	Return - Gate Ascending	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Ascending	12
	Change	<R-	R	R	<R-	R	R	R	Y	G	G	Y	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R	R	R	G	G	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Return to Normal (Phase B)	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-

		Signal Indications																			
	Phase	**1,2**	**3-5**	**6,7**	**8,9**	**10-12**	**13, 14**	**15,16**	**17-20**	**21,22**	**23-25**	**26-28**	**29-32**	**33-36**	**37-40**	**RR1, RR2**	**RR3, RR4**	**RR5, RR6**	**RR7, RR8**	**RR Signals**	**RR Gates**	**Time (Sec)**
Φ C to Pre-emption	Morgan Blvd. ROW	<R-	G	G	<R-	G	G	G	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-
	RR Pre-Pulse Extension	<R-	G	G	<R-	G	G	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	RR Pre-Pulse Change (Outer)	<R-	Y	G	<R-	Y	G	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	RR Pre-Pulse Clearance	<R-	R	G	<R-	R	G	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Track Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	11
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	UP	3
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	7
	Track Clearance Change	<R-	R	Y	<R-	R	Y/<Y-	Y	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	3
	Track Clearance All-Red	<R-	R	R	<R-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	2
	Hold	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Horizontal	-
	Return - Gate Ascending	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Ascending	12
	Change	<R-	R	R	<R-	R	R	R	Y	G	G	Y	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R	R	R	G	G	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Return to Normal (Phase B)	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-
Φ D to Pre-emption	Morgan Blvd. Lag Lefts	<G-	R	R	<G-	R	R	R	R	R	R	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-
	RR Pre-Pulse Extension	<G-	R	R	<G-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	RR Pre-Pulse Change (Outer)	<Y-	R	R	<Y-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	RR Pre-Pulse Clearance	<R-	R	R	<R-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Track Clearance	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	11
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	UP	3
	Track Clearance (Adjusted)	<R-	R	G	<R-	R	G/<G-	G	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	7
	Track Clearance Change	<R-	R	Y	<R-	R	Y/<Y-	Y	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	3
	Track Clearance All-Red	<R-	R	R	<R-	R	R	R	R	R	R	R	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Descending	2
	Hold	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Horizontal	-
	Return - Gate Ascending	<R-	R	R	<R-	R	R	R	G	G	G	G	DW	DW	DW	NRT	NLT	NLT	NRT	Active	Ascending	12
	Change	<R-	R	R	<R-	R	R	R	Y	G	G	Y	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	3
	Clearance	<R-	R	R	<R-	R	R	R	R	G	G	R	DW	DW	DW	NRT	NLT	NLT	NRT	OFF	UP	2
	Return to Normal (Phase B)	<R-	R	R	<R-	R	G/<G-	G	R	G	G	R	DW	DW	DW	OFF	OFF	OFF	OFF	OFF	UP	-

Railroad Pre-emption Input Parameters and Times

Railroad Pre-emption Input Parameters	Pre-emption Time (sec.)
Minimum Green	2
Minimum Walk	0
Minimum Pedestrian Clearance	0
Track Green	21
Track Yellow	3
Track Red Clearance	2
Minimum Hold Time	15
Delay Time	2
Hold Delay Time	3

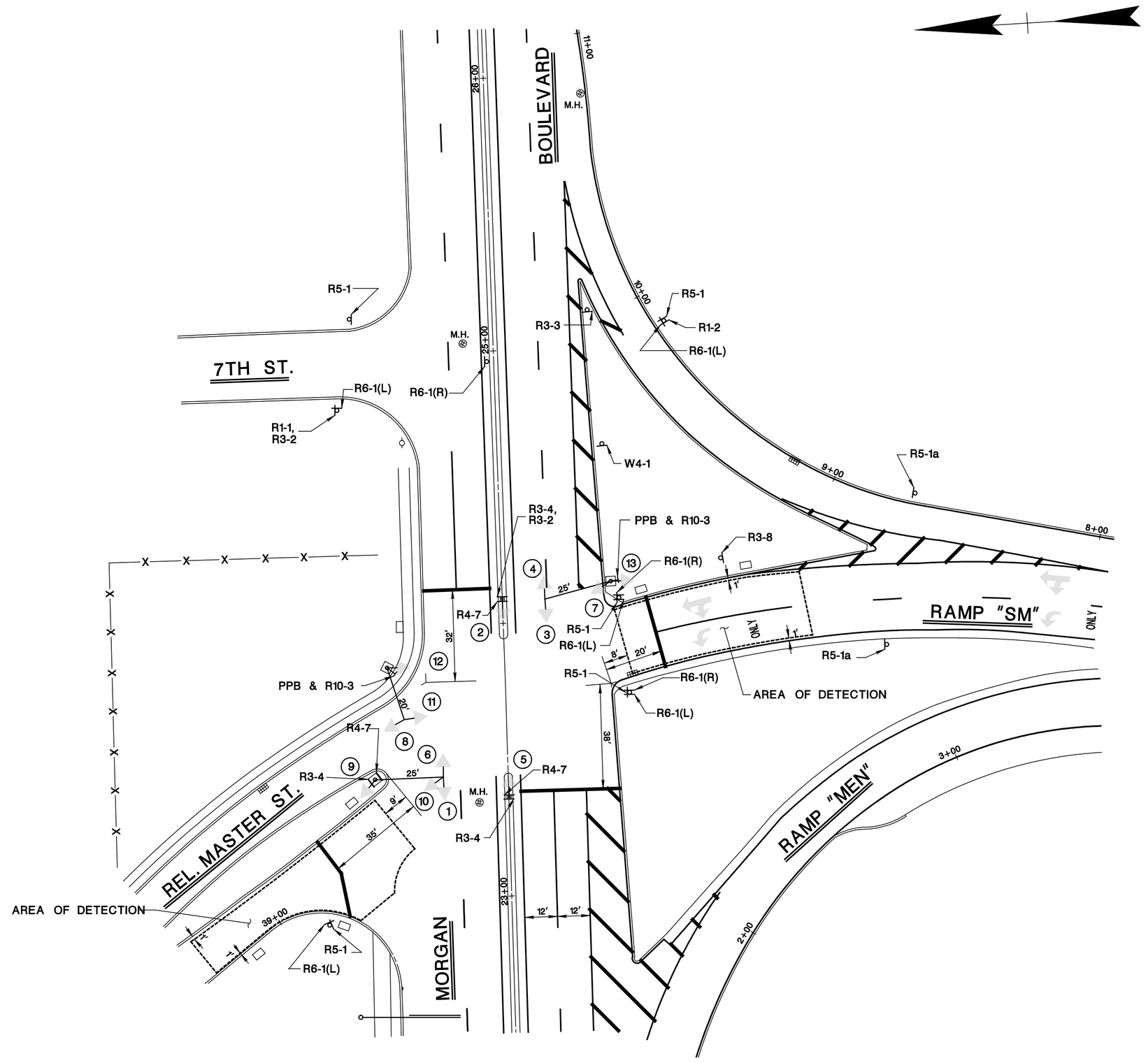
STATE	FEDERAL PROJECT NO.
N.J.	*

SIGN LEGEND

R1-1	STOP	30" x 30"
R1-2	YIELD	36" x 36" x 36"
R3-2	NO LEFT TURN (SYMBOL)	24" x 24"
R3-3	NO TURNS	24" x 24"
R3-4	NO U TURN (SYMBOL)	24" x 24"
R3-8	DOUBLE TURN (SYMBOL)	30" x 30"
R4-7	KEEP RIGHT (SYMBOL)	24" x 30"
R5-1	DO NOT ENTER	30" x 30"
R5-1a	WRONG WAY	36" x 24"
R6-1(L)	ONE WAY (LEFT)	36" x 12"
R6-1(R)	ONE WAY (RIGHT)	36" x 12"
R10-3	PUSH BUTTON FOR GREEN LIGHT	9" x 12"
W4-1	MERGE	36" x 36"

SIGNAL LEGEND

8"
R 8"
Y 8"
G 8"
1-13



ORIGINAL SIGNED BY
William E. Anderson
Manager, Bureau of Traffic Engineering and Safety Programs
April 27, 1995

30' 20' 10' 0 30' 60'

	AS BUILT - SUPERSEDES TS 2910		DJM	TJS	3/9/95
	REVISION DESCRIPTION	CADD	BY	C'K'D	DATE

TS-
TS-

NEW JERSEY DEPARTMENT OF TRANSPORTATION
BUREAU OF TRAFFIC ENGINEERING
TRAFFIC SIGNAL INSTALLATION

ROUTE I-676/MORGAN BLVD. & RELOCATED MASTER STREET/RAMP "SM"

MUNICIPALITY CITY OF CAMDEN COUNTY CAMDEN

DESIGN AUTHORIZED - BUREAU OF TRAFFIC ENGINEERING DATE

SUBMITTED DJM
CHECKED TJS
AUTHORIZED

DRAWN NRA
CHECKED DJM

SCALE: 1" = 30'

TS-4603

Form /71

New Jersey Department of Transportation

TRAFFIC ENGINEERING – ELECTRICAL PROJECT

Number 596

Job No.	0418103
Memo to	Mr. R. Uth - #4
Attention	

Route No.	I-676 Morgan Boulevard and Relocated
Location	Master Street and Ramp SM Camden City, Camden County
Date	May 1, 1980

Kindly engage your State forces to employ signal timing and operations as shown below:

70 Second Background Cycle

		Signal Faces			
	Phase	1-6	7-10	11-13	Time
A.	Morgan Boulevard ROW	G	R	R	38-22
A.	Morgan Boulevard Change	Y	R	R	3*
A.	Morgan Boulevard Clear	R	R	R	2
B.	Ramp SM ROW	R	R	G	***10-22
B.	Ramp SM Change	R	R	Y	3
B.	Ramp SM Clearance	R	R	R	2
C.	Relocated Master Street ROW	R	G	R	7-11**
C.	Relocated Master Street Change	R	Y	R	3
C.	Relocated Master Street Clear	R	R	R	2

Reference:

Vehicle interval for Phases B and C: 2 seconds

Memory circuit for Phases B and C be disconnected.

Manual control be disconnected.

Controller shall be capable of skipping phases not actuated.

*Offset is 0 seconds measured from the beginning of yellow to Morgan Boulevard at this intersection.

**An actuation of the pedestrian push button on the northeast corner shall provide 11 seconds of green to Phase C without recall.

***An actuation of the pedestrian push button on the southeast corner shall provide 11 seconds of green to Phase B.

JMP:JS:vls

APPENDIX D
Existing Year 2022 Capacity Results

AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	4	0	78	62	70	2	91	62	60	45	1
Future Volume (vph)	2	4	0	78	62	70	2	91	62	60	45	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.92		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2063		1228	2945		1805	1696	1162	1467	1584	
Flt Permitted	0.65	1.00		0.75	1.00		0.72	1.00	1.00	0.69	1.00	
Satd. Flow (perm)	1226	2063		975	2945		1368	1696	1162	1062	1584	
Peak-hour factor, PHF	0.75	0.75	0.75	0.78	0.78	0.78	0.84	0.84	0.84	0.80	0.80	0.80
Adj. Flow (vph)	3	5	0	100	79	90	2	108	74	75	56	1
RTOR Reduction (vph)	0	0	0	0	76	0	0	0	19	0	0	0
Lane Group Flow (vph)	3	5	0	100	93	0	2	108	56	75	57	0
Heavy Vehicles (%)	0%	75%	0%	47%	0%	24%	0%	12%	39%	23%	20%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	17.5	17.5		17.5	17.5		82.5	82.5	82.5	82.5	82.5	
Effective Green, g (s)	17.5	17.5		17.5	17.5		82.5	82.5	82.5	82.5	82.5	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.75	0.75	0.75	0.75	0.75	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	195	328		155	468		1026	1272	871	796	1188	
v/s Ratio Prot		0.00			0.03			0.06			0.04	
v/s Ratio Perm	0.00			c0.10			0.00		0.05	c0.07		
v/c Ratio	0.02	0.02		0.65	0.20		0.00	0.08	0.06	0.09	0.05	
Uniform Delay, d1	39.0	39.0		43.3	40.2		3.4	3.7	3.6	3.7	3.6	
Progression Factor	1.00	1.00		0.39	0.04		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		8.9	0.2		0.0	0.1	0.1	0.2	0.1	
Delay (s)	39.0	39.0		25.6	2.0		3.4	3.8	3.8	3.9	3.6	
Level of Service	D	D		C	A		A	A	A	A	A	
Approach Delay (s)		39.0			10.7			3.8			3.8	
Approach LOS		D			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	0	122	2	1	10	142	0	1	0	13	113	0	60
Future Volume (vph)	0	122	2	1	10	142	0	1	0	13	113	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		5.0		5.0	5.0	5.0	
Lane Util. Factor		0.95			1.00	0.95		1.00		1.00	1.00	1.00	
Frt		1.00			1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected		1.00			0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)		2730			936	2777		902		873	1626	1346	
Flt Permitted		1.00			0.66	1.00		0.71		1.00	0.95	1.00	
Satd. Flow (perm)		2730			651	2777		677		873	1626	1346	
Peak-hour factor, PHF	0.86	0.86	0.86	0.80	0.80	0.80	0.80	0.58	0.58	0.58	0.88	0.88	0.88
Adj. Flow (vph)	0	142	2	1	12	178	0	2	0	22	128	0	68
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	6	0	17	0
Lane Group Flow (vph)	0	142	0	0	14	178	0	2	0	17	128	51	0
Heavy Vehicles (%)	0%	31%	100%	0%	100%	30%	0%	100%	0%	85%	11%	0%	20%
Turn Type		NA		Perm	Perm	NA		Perm		Perm	Perm	NA	
Protected Phases		4				8						6	
Permitted Phases				8	8			2		2	6		
Actuated Green, G (s)		17.5			17.5	17.5		82.5		82.5	82.5	82.5	
Effective Green, g (s)		17.5			17.5	17.5		82.5		82.5	82.5	82.5	
Actuated g/C Ratio		0.16			0.16	0.16		0.75		0.75	0.75	0.75	
Clearance Time (s)		5.0			5.0	5.0		5.0		5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		434			103	441		507		654	1219	1009	
v/s Ratio Prot		0.05				c0.06						0.04	
v/s Ratio Perm					0.02			0.00		0.02	c0.08		
v/c Ratio		0.33			0.14	0.40		0.00		0.03	0.11	0.05	
Uniform Delay, d1		41.0			39.8	41.6		3.4		3.5	3.7	3.6	
Progression Factor		1.22			1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.4			0.6	0.6		0.0		0.1	0.2	0.1	
Delay (s)		50.4			40.4	42.2		3.5		3.6	3.9	3.7	
Level of Service		D			D	D		A		A	A	A	
Approach Delay (s)		50.4				42.0			3.6			3.8	
Approach LOS		D				D			A			A	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	142	0	0	209	16	131	93	328	13	0	143
Future Volume (vph)	4	142	0	0	209	16	131	93	328	13	0	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor		0.95			0.95		0.95	0.95		1.00		1.00
Frt		1.00			0.99		1.00	0.89		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3201			3228		1243	1521		1378		1568
Flt Permitted		0.95			1.00		0.95	1.00		0.31		1.00
Satd. Flow (perm)		3037			3228		1243	1521		450		1568
Peak-hour factor, PHF	0.83	0.83	0.83	0.89	0.89	0.89	0.90	0.90	0.90	0.70	0.70	0.70
Adj. Flow (vph)	5	171	0	0	235	18	146	103	364	19	0	204
RTOR Reduction (vph)	0	0	0	0	9	0	0	185	0	0	0	119
Lane Group Flow (vph)	0	176	0	0	244	0	131	297	0	19	0	85
Heavy Vehicles (%)	0%	13%	0%	0%	11%	6%	38%	4%	4%	31%	0%	3%
Turn Type	Perm	NA			NA		Perm	NA		Perm		Prot
Protected Phases		4			8			2				6
Permitted Phases	4						2			6		6
Actuated Green, G (s)		25.0			25.0		25.0	25.0		25.0		25.0
Effective Green, g (s)		25.0			25.0		25.0	25.0		25.0		25.0
Actuated g/C Ratio		0.42			0.42		0.42	0.42		0.42		0.42
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Grp Cap (vph)		1265			1345		517	633		187		653
v/s Ratio Prot					c0.08							0.05
v/s Ratio Perm		0.06					0.11	0.20		0.04		
v/c Ratio		0.14			0.18		0.25	0.47		0.10		0.13
Uniform Delay, d1		10.8			11.0		11.4	12.7		10.7		10.8
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.2			0.3		1.2	2.5		1.1		0.4
Delay (s)		11.1			11.3		12.6	15.2		11.7		11.2
Level of Service		B			B		B	B		B		B
Approach Delay (s)		11.1			11.3			14.6			11.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	84	9	143	8	39	1	38	76	97	124	1
Future Volume (vph)	0	84	9	143	8	39	1	38	76	97	124	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt		0.99		1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3524		1687	2808		1805	1681	1214	1612	1826	
Flt Permitted		1.00		0.65	1.00		0.65	1.00	1.00	0.73	1.00	
Satd. Flow (perm)		3524		1154	2808		1233	1681	1214	1236	1826	
Peak-hour factor, PHF	0.58	0.58	0.58	0.78	0.78	0.78	0.87	0.87	0.87	0.73	0.73	0.73
Adj. Flow (vph)	0	145	16	183	10	50	1	44	87	133	170	1
RTOR Reduction (vph)	0	12	0	0	39	0	0	0	27	0	0	0
Lane Group Flow (vph)	0	149	0	183	21	0	1	44	60	133	171	0
Heavy Vehicles (%)	0%	1%	0%	7%	0%	15%	0%	13%	33%	12%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		23.8		23.8	23.8		76.2	76.2	76.2	76.2	76.2	
Effective Green, g (s)		23.8		23.8	23.8		76.2	76.2	76.2	76.2	76.2	
Actuated g/C Ratio		0.22		0.22	0.22		0.69	0.69	0.69	0.69	0.69	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		762		249	607		854	1164	840	856	1264	
v/s Ratio Prot		0.04			0.01			0.03			0.09	
v/s Ratio Perm				c0.16			0.00		0.05	c0.11		
v/c Ratio		0.20		0.73	0.03		0.00	0.04	0.07	0.16	0.14	
Uniform Delay, d1		35.3		40.2	34.0		5.2	5.3	5.5	5.8	5.7	
Progression Factor		1.00		0.81	0.67		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		10.7	0.0		0.0	0.1	0.2	0.4	0.2	
Delay (s)		35.4		43.4	22.8		5.2	5.4	5.6	6.2	6.0	
Level of Service		D		D	C		A	A	A	A	A	
Approach Delay (s)		35.4			38.3			5.5			6.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	249	4	12	64	0	5	0	18	146	3	117
Future Volume (vph)	0	249	4	12	64	0	5	0	18	146	3	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)		3143		1203	3112		1289		967	1752	1563	
Flt Permitted		1.00		0.48	1.00		0.66		1.00	0.95	1.00	
Satd. Flow (perm)		3143		607	3112		896		967	1752	1563	
Peak-hour factor, PHF	0.82	0.82	0.82	0.83	0.83	0.83	0.64	0.64	0.64	0.79	0.79	0.79
Adj. Flow (vph)	0	304	5	14	77	0	8	0	28	185	4	148
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	9	0	45	0
Lane Group Flow (vph)	0	307	0	14	77	0	8	0	19	185	107	0
Heavy Vehicles (%)	0%	14%	50%	50%	16%	0%	40%	0%	67%	3%	33%	3%
Turn Type		NA		Perm	NA		Perm		Perm	Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8			2		2	6		
Actuated Green, G (s)		23.8		23.8	23.8		76.2		76.2	76.2	76.2	
Effective Green, g (s)		23.8		23.8	23.8		76.2		76.2	76.2	76.2	
Actuated g/C Ratio		0.22		0.22	0.22		0.69		0.69	0.69	0.69	
Clearance Time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		680		131	673		620		669	1213	1082	
v/s Ratio Prot		c0.10			0.02						0.07	
v/s Ratio Perm				0.02			0.01		0.02	c0.11		
v/c Ratio		0.45		0.11	0.11		0.01		0.03	0.15	0.10	
Uniform Delay, d1		37.4		34.6	34.6		5.2		5.3	5.8	5.6	
Progression Factor		0.88		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.5		0.4	0.1		0.0		0.1	0.3	0.2	
Delay (s)		33.4		34.9	34.7		5.3		5.4	6.1	5.8	
Level of Service		C		C	C		A		A	A	A	
Approach Delay (s)		33.4			34.7			5.4			5.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

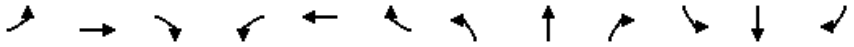
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	216	0	0	227	17	39	100	256	28	0	147
Future Volume (vph)	3	216	0	0	227	17	39	100	256	28	0	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor		0.95			0.95		0.95	0.95		1.00		1.00
Frt		1.00			0.99		1.00	0.89		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3406			3383		1394	1540		1687		1553
Flt Permitted		0.95			1.00		0.95	1.00		0.38		1.00
Satd. Flow (perm)		3244			3383		1394	1540		681		1553
Peak-hour factor, PHF	0.93	0.93	0.93	0.86	0.86	0.86	0.87	0.87	0.87	0.84	0.84	0.84
Adj. Flow (vph)	3	232	0	0	264	20	45	115	294	33	0	175
RTOR Reduction (vph)	0	0	0	0	9	0	0	147	0	0	0	102
Lane Group Flow (vph)	0	235	0	0	275	0	40	267	0	33	0	73
Heavy Vehicles (%)	0%	6%	0%	0%	6%	0%	23%	3%	5%	7%	0%	4%
Turn Type	Perm	NA			NA		Perm	NA		Perm		Prot
Protected Phases		4			8			2				6
Permitted Phases	4						2			6		6
Actuated Green, G (s)		25.0			25.0		25.0	25.0		25.0		25.0
Effective Green, g (s)		25.0			25.0		25.0	25.0		25.0		25.0
Actuated g/C Ratio		0.42			0.42		0.42	0.42		0.42		0.42
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Grp Cap (vph)		1351			1409		580	641		283		647
v/s Ratio Prot					c0.08							0.05
v/s Ratio Perm		0.07					0.03	0.17		0.05		
v/c Ratio		0.17			0.19		0.07	0.42		0.12		0.11
Uniform Delay, d1		11.0			11.1		10.5	12.4		10.7		10.7
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.3			0.3		0.2	2.0		0.8		0.4
Delay (s)		11.3			11.4		10.7	14.3		11.6		11.1
Level of Service		B			B		B	B		B		B
Approach Delay (s)		11.3			11.4			14.0			11.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX E
Existing Year 2022 with Trip Generation Volume Capacity Results

AM Peak

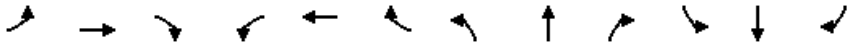


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	4	0	78	62	70	2	91	62	60	45	1
Future Volume (vph)	2	4	0	78	62	70	2	91	62	60	45	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.92		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2063		1228	2945		1805	1696	1162	1467	1584	
Flt Permitted	0.65	1.00		0.75	1.00		0.72	1.00	1.00	0.69	1.00	
Satd. Flow (perm)	1226	2063		975	2945		1368	1696	1162	1062	1584	
Peak-hour factor, PHF	0.75	0.75	0.75	0.78	0.78	0.78	0.84	0.84	0.84	0.80	0.80	0.80
Adj. Flow (vph)	3	5	0	100	79	90	2	108	74	75	56	1
RTOR Reduction (vph)	0	0	0	0	69	0	0	0	36	0	0	0
Lane Group Flow (vph)	3	5	0	100	100	0	2	108	38	75	57	0
Heavy Vehicles (%)	0%	75%	0%	47%	0%	24%	0%	12%	39%	23%	20%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	13.7	10.9		24.0	16.2		36.0	36.0	36.0	36.0	36.0	
Effective Green, g (s)	13.7	10.9		24.0	16.2		36.0	36.0	36.0	36.0	36.0	
Actuated g/C Ratio	0.20	0.16		0.34	0.23		0.51	0.51	0.51	0.51	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	263	321		363	681		703	872	597	546	814	
v/s Ratio Prot	0.00	0.00		c0.03	0.03			0.06			0.04	
v/s Ratio Perm	0.00			c0.06			0.00		0.03	c0.07		
v/c Ratio	0.01	0.02		0.28	0.15		0.00	0.12	0.06	0.14	0.07	
Uniform Delay, d1	22.7	25.0		16.8	21.4		8.3	8.8	8.5	8.9	8.6	
Progression Factor	1.00	1.00		1.38	1.22		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.4	0.1		0.0	0.3	0.2	0.5	0.2	
Delay (s)	22.7	25.0		23.7	26.2		8.3	9.1	8.7	9.4	8.7	
Level of Service	C	C		C	C		A	A	A	A	A	
Approach Delay (s)		24.2			25.3			9.0			9.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	0	122	3	1	11	142	0	2	0	14	113	0	60
Future Volume (vph)	0	122	3	1	11	142	0	2	0	14	113	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		5.0		5.0	5.0	5.0	
Lane Util. Factor		0.95			1.00	0.95		1.00		1.00	1.00	1.00	
Frt		1.00			1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected		1.00			0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)		2718			934	2777		902		868	1626	1346	
Flt Permitted		1.00			0.66	1.00		0.71		1.00	0.95	1.00	
Satd. Flow (perm)		2718			649	2777		677		868	1626	1346	
Peak-hour factor, PHF	0.86	0.86	0.86	0.80	0.80	0.80	0.80	0.58	0.58	0.58	0.88	0.88	0.88
Adj. Flow (vph)	0	142	3	1	14	178	0	3	0	24	128	0	68
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	6	0	17	0
Lane Group Flow (vph)	0	142	0	0	15	178	0	3	0	18	128	51	0
Heavy Vehicles (%)	0%	31%	100%	0%	100%	30%	0%	100%	0%	86%	11%	0%	20%
Turn Type		NA		Perm	Perm	NA		Perm		Perm	Perm	NA	
Protected Phases		4				8						6	
Permitted Phases				8	8			2		2	6		
Actuated Green, G (s)		17.5			17.5	17.5		82.5		82.5	82.5	82.5	
Effective Green, g (s)		17.5			17.5	17.5		82.5		82.5	82.5	82.5	
Actuated g/C Ratio		0.16			0.16	0.16		0.75		0.75	0.75	0.75	
Clearance Time (s)		5.0			5.0	5.0		5.0		5.0	5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		432			103	441		507		651	1219	1009	
v/s Ratio Prot		0.05				c0.06						0.04	
v/s Ratio Perm					0.02			0.00		0.02	c0.08		
v/c Ratio		0.33			0.15	0.40		0.01		0.03	0.11	0.05	
Uniform Delay, d1		41.0			39.8	41.6		3.5		3.5	3.7	3.6	
Progression Factor		1.22			1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.4			0.7	0.6		0.0		0.1	0.2	0.1	
Delay (s)		50.5			40.5	42.2		3.5		3.6	3.9	3.7	
Level of Service		D			D	D		A		A	A	A	
Approach Delay (s)		50.5				42.0			3.6			3.8	
Approach LOS		D				D			A			A	

Intersection Summary			
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

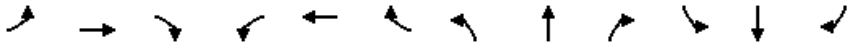


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	142	0	0	209	16	132	93	328	13	0	143
Future Volume (vph)	4	142	0	0	209	16	132	93	328	13	0	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor		0.95			0.95		0.95	0.95		1.00		1.00
Frt		1.00			0.99		1.00	0.89		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3201			3228		1234	1521		1378		1568
Flt Permitted		0.95			1.00		0.95	1.00		0.31		1.00
Satd. Flow (perm)		3037			3228		1234	1521		450		1568
Peak-hour factor, PHF	0.83	0.83	0.83	0.89	0.89	0.89	0.90	0.90	0.90	0.70	0.70	0.70
Adj. Flow (vph)	5	171	0	0	235	18	147	103	364	19	0	204
RTOR Reduction (vph)	0	0	0	0	9	0	0	185	0	0	0	119
Lane Group Flow (vph)	0	176	0	0	244	0	132	297	0	19	0	85
Heavy Vehicles (%)	0%	13%	0%	0%	11%	6%	39%	4%	4%	31%	0%	3%
Turn Type	Perm	NA			NA		Perm	NA		Perm		Prot
Protected Phases		4			8			2				6
Permitted Phases	4						2			6		6
Actuated Green, G (s)		25.0			25.0		25.0	25.0		25.0		25.0
Effective Green, g (s)		25.0			25.0		25.0	25.0		25.0		25.0
Actuated g/C Ratio		0.42			0.42		0.42	0.42		0.42		0.42
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Grp Cap (vph)		1265			1345		514	633		187		653
v/s Ratio Prot					c0.08							0.05
v/s Ratio Perm		0.06					0.11	0.20		0.04		
v/c Ratio		0.14			0.18		0.26	0.47		0.10		0.13
Uniform Delay, d1		10.8			11.0		11.4	12.7		10.7		10.8
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.2			0.3		1.2	2.5		1.1		0.4
Delay (s)		11.1			11.3		12.6	15.2		11.7		11.2
Level of Service		B			B		B	B		B		B
Approach Delay (s)		11.1			11.3			14.6			11.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

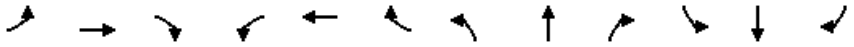
c Critical Lane Group

PM Peak



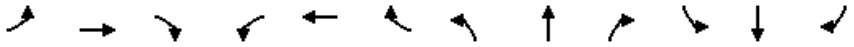
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	84	9	143	8	39	1	38	76	97	124	1
Future Volume (vph)	0	84	9	143	8	39	1	38	76	97	124	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt		0.99		1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3524		1687	2808		1805	1681	1214	1612	1826	
Flt Permitted		1.00		0.65	1.00		0.65	1.00	1.00	0.73	1.00	
Satd. Flow (perm)		3524		1154	2808		1233	1681	1214	1236	1826	
Peak-hour factor, PHF	0.58	0.58	0.58	0.78	0.78	0.78	0.87	0.87	0.87	0.73	0.73	0.73
Adj. Flow (vph)	0	145	16	183	10	50	1	44	87	133	170	1
RTOR Reduction (vph)	0	13	0	0	33	0	0	0	42	0	0	0
Lane Group Flow (vph)	0	148	0	183	27	0	1	44	45	133	171	0
Heavy Vehicles (%)	0%	1%	0%	7%	0%	15%	0%	13%	33%	12%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		13.4		23.9	23.9		36.1	36.1	36.1	36.1	36.1	
Effective Green, g (s)		13.4		23.9	23.9		36.1	36.1	36.1	36.1	36.1	
Actuated g/C Ratio		0.19		0.34	0.34		0.52	0.52	0.52	0.52	0.52	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		674		435	958		635	866	626	637	941	
v/s Ratio Prot		0.04		c0.03	0.01			0.03			0.09	
v/s Ratio Perm				c0.11			0.00		0.04	c0.11		
v/c Ratio		0.22		0.42	0.03		0.00	0.05	0.07	0.21	0.18	
Uniform Delay, d1		23.9		18.0	15.3		8.2	8.4	8.5	9.2	9.1	
Progression Factor		1.00		1.02	0.95		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.2		0.7	0.0		0.0	0.1	0.2	0.7	0.4	
Delay (s)		24.1		19.0	14.6		8.2	8.5	8.7	9.9	9.5	
Level of Service		C		B	B		A	A	A	A	A	
Approach Delay (s)		24.1			17.9			8.7			9.7	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	249	5	13	64	0	6	0	19	146	3	117
Future Volume (vph)	0	249	5	13	64	0	6	0	19	146	3	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frt		1.00		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)		3133		1172	3112		1203		961	1752	1563	
Flt Permitted		1.00		0.48	1.00		0.66		1.00	0.95	1.00	
Satd. Flow (perm)		3133		590	3112		837		961	1752	1563	
Peak-hour factor, PHF	0.82	0.82	0.82	0.83	0.83	0.83	0.64	0.64	0.64	0.79	0.79	0.79
Adj. Flow (vph)	0	304	6	16	77	0	9	0	30	185	4	148
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	9	0	45	0
Lane Group Flow (vph)	0	308	0	16	77	0	9	0	21	185	107	0
Heavy Vehicles (%)	0%	14%	60%	54%	16%	0%	50%	0%	68%	3%	33%	3%
Turn Type		NA		Perm	NA		Perm		Perm	Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8			2		2	6		
Actuated Green, G (s)		23.8		23.8	23.8		76.2		76.2	76.2	76.2	
Effective Green, g (s)		23.8		23.8	23.8		76.2		76.2	76.2	76.2	
Actuated g/C Ratio		0.22		0.22	0.22		0.69		0.69	0.69	0.69	
Clearance Time (s)		5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		677		127	673		579		665	1213	1082	
v/s Ratio Prot		c0.10			0.02						0.07	
v/s Ratio Perm				0.03			0.01		0.02	c0.11		
v/c Ratio		0.45		0.13	0.11		0.02		0.03	0.15	0.10	
Uniform Delay, d1		37.5		34.7	34.6		5.2		5.3	5.8	5.6	
Progression Factor		0.88		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.5		0.4	0.1		0.0		0.1	0.3	0.2	
Delay (s)		33.4		35.2	34.7		5.3		5.4	6.1	5.8	
Level of Service		C		D	C		A		A	A	A	
Approach Delay (s)		33.4			34.8			5.4			5.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	216	0	0	227	17	40	100	256	28	0	147
Future Volume (vph)	3	216	0	0	227	17	40	100	256	28	0	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor		0.95			0.95		0.95	0.95		1.00		1.00
Frt		1.00			0.99		1.00	0.89		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3406			3383		1372	1540		1687		1553
Flt Permitted		0.95			1.00		0.95	1.00		0.38		1.00
Satd. Flow (perm)		3244			3383		1372	1540		681		1553
Peak-hour factor, PHF	0.93	0.93	0.93	0.86	0.86	0.86	0.87	0.87	0.87	0.84	0.84	0.84
Adj. Flow (vph)	3	232	0	0	264	20	46	115	294	33	0	175
RTOR Reduction (vph)	0	0	0	0	9	0	0	147	0	0	0	102
Lane Group Flow (vph)	0	235	0	0	275	0	41	267	0	33	0	73
Heavy Vehicles (%)	0%	6%	0%	0%	6%	0%	25%	3%	5%	7%	0%	4%
Turn Type	Perm	NA			NA		Perm	NA		Perm		Prot
Protected Phases		4			8			2				6
Permitted Phases	4						2			6		6
Actuated Green, G (s)		25.0			25.0		25.0	25.0		25.0		25.0
Effective Green, g (s)		25.0			25.0		25.0	25.0		25.0		25.0
Actuated g/C Ratio		0.42			0.42		0.42	0.42		0.42		0.42
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0		5.0
Lane Grp Cap (vph)		1351			1409		571	641		283		647
v/s Ratio Prot					c0.08							0.05
v/s Ratio Perm		0.07					0.03	0.17		0.05		
v/c Ratio		0.17			0.19		0.07	0.42		0.12		0.11
Uniform Delay, d1		11.0			11.1		10.5	12.4		10.7		10.7
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.3			0.3		0.2	2.0		0.8		0.4
Delay (s)		11.3			11.4		10.8	14.3		11.6		11.1
Level of Service		B			B		B	B		B		B
Approach Delay (s)		11.3			11.4			14.0			11.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Attachment 4

Solid Waste Form Page 2

3. **Professional Engineer:**

Name: **Michael E. VanBrunt** N.J. License P.E. #: **24GE0448200**

Name of Firm: **Covanta Energy, LLC**

Address: **445 South Street**

City: **Morristown** State: **NJ** Zip Code: **07960**

Telephone: **(862)-345-5279**

4. **Application Type:** (Circle applicable letter)

A. Initial Solid Waste Facility (SWF) Permit
B. Existing SWF Annual Update
C. SWF Permit Modification (check here ____ if expansion)
D. SWF Permit Renewal
E. SWF Transfer of Ownership
F. Closure/Post-Closure Plan
G. Disruption Approval
H. Other – describe here _____

5. **Facility Type:** (Circle all that apply)

A. Sanitary Landfill
B. Incinerator/Resource Recovery Facility
C. Transfer Station
D. Transfer Station/Materials Recovery Facility
E. Intermodal Container Facility
F. Compost
G. Other – describe here_____

6. **Waste Types:** (Circle all types of waste requested for facility acceptance)

10. Municipal Waste
12. Dry Sewage Sludge
13. Bulky Waste
13C. Construction and Demolition Waste
23. Vegetative Waste
25. Animal and Food Processing Waste
27. Dry Industrial Waste
27A. Asbestos Containing Waste
27I. Incinerator Ash/Ash Containing Waste
72. Bulk Liquid and Semi-Liquid
73. Septic Tank Clean-Out Wastes
74. Liquid Sewage Sludge

Treated Regulated Medical Waste Untreated Regulated Medical Waste

Attachment 5

SOP – Baghouse Bag Disposal

COVANTA

Powering Today. Protecting Tomorrow.

Standard Operating Procedure (SOP)

CAM-SOP-751 Baghouse Bag Disposal

Revision: 1.0 July 13, 2023

Revision and Signoff Sheet

Applicability / Authorship

Level	Business Unit	Position	Prepared by	Contributors
Facility	Camden	Facility Manager	Todd Frace	

Change Record

Date	Author	Revision	Change Reference	Page #

Reviewers

Name	Version approved	Position	Date

Annual Review

Name	Version approved	Position	Date

TABLE OF CONTENTS

1 Introduction

1.1 Background

1.1.1 Prior to commencing this procedure, review all the steps that will be performed. If there are steps that cannot be done for any reason, bring them to the Shift Supervisor or Operations Manager attention prior to beginning the evolution.

1.2 Purpose

1.2.1 The purpose of this procedure is to provide procedural steps on handling used baghouse bags as an internally generated waste within the facility. Proper adherence to this procedure will ensure proper bag disposal.

2 Preparations & Communications

2.1 Preparations

2.1.1 Baghouse cell locked out and cooled down in accordance with applicable safety procedures.

2.2 Communications

2.2.1 Verify all affected employees are aware of baghouse bag changeout. This would include Facility Manager, Operations Manager, Facility Safety Manager, Facility Environmental Specialist and Tipping Floor Supervisor.

3 Safety, Health, & Environmental

3.1 Safety Warnings & Precautions

3.1.1 Do not handle until all safety precautions have been read and understood.

3.1.2 Wear protective gloves/protective clothing/eye protection/face protection/ respiratory protection.

3.1.3 Contaminated work clothing shall not be allowed out of the workplace.

3.2 Environmental Considerations

3.2.1 Bags must be doubled bagged and sealed prior to leaving the baghouse enclosure.

3.2.2 At no time shall compressed air be used to blow fly ash off the baghouse top.

3.3 Relevant Safety Procedures

3.3.1 Safety Procedure No. 03 - Hazard Communications
3.3.2 Safety Procedure No. 11 - Respiratory Protection
3.3.3 Safety Procedure No. 13 - Heavy Metals
3.3.4 Safety Procedure No. 15 - Lock-Out Tag-Out
3.3.5 Safety Procedure No. 16 - Confined Space Entry
3.3.6 Safety Procedure No. 43 - Personal Protective Equipment

3.4 Relevant JSA ('s)

3.4.1 "N/A"

3.5 Required Permits

3.5.1 "N/A".

4 References

4.1 Drawings

4.1.1 Baghouse G&A Drawing.

4.2 Manuals

4.2.1 Covanta Camden Air Quality Control System OEM Manual.

4.3 Other

4.3.1 Covanta Technical Standard; Section 7.2.E.1 - Filter Bag Management.
4.3.2 EPA Response to Commissioner Burack Dated 10/10/2014.

5 Procedure

5.1 Isolate Baghouse / Cell

5.1.1 Prior to isolating cell or shutting down baghouse. The baghouse cell shall be ran through a minimum of three manual pulse cycles to remove as much ash and lime as possible.
5.1.2 Isolate the cell (by closing the outlet damper) early enough before the job to enable several pulse cycles before baghouse / cell is open.
5.1.2.1 Manually run several pulse cycles to clean bags in the off-line mode.

5.2 Lock-Out Baghouse Cell

5.2.1 Isolate and lock out the inlet & outlet dampers and pulse air per SP #15.

5.2.2 Verify the baghouse hopper is empty and lock out air lock and block bottom of the hopper per SP #15.

5.3 Remove Bags

5.3.1 Make sure that tools, old clamps and other metal items do not fall into the hopper as damage to airlocks and other dust handling equipment can occur. The hopper should be emptied to allow easier retrieval if any items fall into the hopper. If possible, block off the bottom of the empty hopper to allow easier retrieval of dropped items.

5.3.2 Ensure baghouse hopper door is closed while removing bags.

5.3.3 Remove top cover and set aside.

5.3.4 Vacuum top of tube sheet to remove any loose ash.

5.3.5 Remove compartment air manifolds /pulse pipes.

5.3.6 Remove nuts and hold-down washers securing bags to be replaced.

5.3.7 Remove cages and stack inside baghouse enclosure.

5.3.8 Remove bags by pressing snap ring and removing bag. While pulling bag out of the tube sheet, bag shall be rolled up and placed in a plastic bag.

NOTE: If baghouse cage cannot be removed or bag is full of ash and can't be removed go to section 5.4 "Alternate Bag Removal Method" after all other bags removed.

5.3.9 Double bag baghouse bags in "Contractor Size" trash bag. Tape bag close and stack inside of baghouse enclosure for disposal.

5.3.10 Vacuum off tube sheet of all ash.

5.4 Alternate Bag Removal Process.

5.4.1 Bag / Cage Removal - If unable to remove the cage from the bag, take the following steps.

5.4.1.1 Layout a piece of plastic sheeting in the baghouse enclosure. Sheeting shall be long enough to sit the bag & cage on.

5.4.1.2 Remove bag and cage together and lay on the plastic sheeting.

5.4.1.3 Cut the bag lengthwise with a utility knife and remove the cage.

5.4.1.4 Roll up baghouse bag and double bag in trash bag. Tape bag close and stack inside of baghouse enclosure for disposal.

5.4.2 Bag Removal - If unable to pull bag out.

5.4.2.1 Verify bottom of hopper is blocked and hopper door is closed.

5.4.2.2 Using a utility knife cut the bag around the inside circumference. This will allow the bag to fall into the hopper.

5.4.2.3 Open the baghouse cell hopper door.

5.4.2.4 Roll baghouse bag up and place in trash bag. Double bag the baghouse bag has it is removed from the hopper access door. Tape bag and stow bag in the baghouse enclosure.

5.5 Bag Disposal

5.5.1 Bags shall be disposed of within one shift after completion of bag removal form a cell.

5.5.2 Bags shall be double bagged to ensure containment, removed from the baghouse enclosure and directly transferred to the waste feed area and inserted into the combustor via one of the three approved methods.

5.5.3 Covanta Camden will not use ant third-party contractors for the disposal of used baghouse filters. Only employees of Covanta Camden will be responsible for taking the used filter bags that have been double-bagged and sealed to the tipping floor for processing in the boilers at the facility.

5.5.4 In addition to the regular scaling out of all refuse hauler trucks, ash hauler trucks, and metal hauler trucks, all other hauler trucks leaving the site for any reason shall be required to stop at the scale house for authorization to leave prior to leaving the site in order to prevent any unauthorized removal of waste from the site.

5.5.5 Hand Carried via Boiler Building

5.5.5.1 Verify bags are doubled bagged.

5.5.5.2 Hand carry bags from the baghouse enclosure, through the scrubber penthouse into the boiler building. Go down one flight of steps to the fifth floor to the charging deck entrance.

5.5.5.3 Obtain permission from the crane operator to enter charging deck. Enter charging deck and discard bags in the feed hopper of a operating combustor.

5.5.6 Transported via Small Dumpster from Baghouse Enclosure to Tipping Floor

5.5.6.1 Using the hoist system raise dumpster from the baghouse ground level to the upper level of the baghouse enclosure.

5.5.6.2 Ensure all bags are doubled bag and fill dumpster with bags.

5.5.6.3 Lower dumpster to ground floor.

5.5.6.4 Transport dumpster via mobile equipment to the tipping and dump bags into tipping floor pit.

5.5.6.5 Have crane operator feed bags into feed chute of operating boilers. Feeding of bags shall be staggered in accordance with combustor management practices.

5.5.7 Transported via Dumpster / Loader

5.5.7.1 Verify all bags are doubled bagged.

5.5.7.2 Sealed bags will be carried from the top of the baghouse enclosure to the ground floor and placed in dumpster or loader bucket.

NOTE: Bags shall not be dropped from the boiler building enclosure. All bags will be carried down and placed in dumpster / enclosure.

5.5.7.3 Transport dumpster via mobile equipment to the tipping and dump bags into tipping floor pit.

5.5.7.4 Have crane operator feed bags into feed chute of operating boilers. Feeding of bags shall be staggered in accordance with combustor management practices.