Lake Erie West
REGIONAL COUNCIL

2026 Transportation Improvement Program
Application for:

Ohio Statewide Urban Congestion Mitigation/ Air Quality (CMAQ) Projects

Submitted to the Ohio Statewide Urban CMAQ Committee (OSUCC) through Lake Erie West Regional Council

APPLICATIONS DUE
August 7, 2026

Projects can be submitted electronically to Lisa Householder at *householder@LakeErieWest.org*

Issued by:
Lake Erie West Regional Council
300 Dr Martin Luther King Jr. Drive
P. O. Box 9508
Toledo Ohio 43697-9508

May 18, 2026

Application also available at www.LakeErieWest.org

Introduction

The forms and information in this package are for the submittal of Congestion Mitigation and Air Quality (CMAQ) projects for Fiscal Years 2031-2032 in the Lake Erie West Regional Council (formerly known as the Toledo Metropolitan Area Council of Governments, or TMACOG) Transportation Improvement Program (TIP).

Lake Erie West will be selecting $10,000,000 worth of projects in this solicitation. For the purposes of the TIP funding programs, the Lake Erie West transportation region is limited to Lucas and Wood counties. Additionally, only those projects that are on federal aid eligible roads can be considered.

Application Forms and Instructions

This Application Form is to be filled out by the applicant. Supplemental information attached to the form should be as condensed as possible. For example, if a feasibility report has been prepared for the proposal, the applicant should excerpt and summarize rather than simply attaching the entire report.

Tips on the Application Process

Scrutinize the cost vs. benefit when applying for federal funds. The program requirements can be demanding, and what is originally thought of as a small, inexpensive project can spiral quickly into a complicated and expensive project. For example: a project once thought to have a total cost of $85,000 with no right-of-way acquisition became a $120,000 construction cost with an additional $220,000 required for right-of-way acquisition.

Federally funded projects are subjected to many requirements, including the National Environmental Policy Act, the Uniform Relocation Assistance and Acquisition Policies Act, and other ODOT regulations and standards. Most locally planned and funded projects are not subject to these requirements and may often be developed more quickly and at less expense than those that are federally funded. When developing a project schedule, keep in mind that the project will be subject to all of the ODOT Project Development Processes.

Before hiring a consultant, review the experience of the firm with federally funded projects. How many have they successfully advanced through the system? When, where, and what type of project(s)?

The Ohio Statewide Urban CMAQ Committee (OSUCC) is charged with developing protocols for managing the CMAQ Program and consists of representatives from the eight largest Metropolitan Planning Organizations (MPO) in the State of Ohio. The Project Evaluation Criteria is the method under which the OSUCC reviews and ranks the individual applications. An Overall Project Cover Sheet, Milestones Activities, and a detailed explanation of the Scoring Criteria for the Ohio CMAQ Program are shown on the following pages, including Criteria, Measures and Scoring Description, and Frequently Asked Questions and Answers. Examples of Project Type Descriptions are listed within the OSUCC Program, Policies, and Procedures.

The application should also include the following:

- ✓ Complete and detailed description of the proposed project and its relation to the intermodal transportation system and any other phases of the project. Location maps, elevations, photographs included, as necessary, to fully illustrate the project.

- ✓ Complete and detailed breakdown of the proposed construction/implementation costs inflated to year of expenditure - **certified by a professional engineer** – including funding sources.

- ✓ Complete and detailed description of the project's characteristics and benefits and how it is included or justified in a local plan or program. Description of how the project will be coordinated with a neighboring jurisdiction if project ends at or crosses a corporation line.

- ✓ The anticipated month and year, when the project will be ready for construction. Include the present status of property ownership and plan preparation.

- ✓ A certified copy of a resolution from the applicant's governing body authorizing the submission and local prioritization of the application(s) for CMAQ funds and committing to share in the project cost.

- ✓ A copy of the Synchro or HCM report to demonstrate both the Build and No-Build conditions. The report should include the average daily traffic (ADT), the peak and off-peak average vehicle delay for both Build and No-Build conditions. These criteria should be based on the project. If it is an intersection project, then the delay times and ADT need to be for the intersection. The Build speed should also be included for roundabout applications.

Lake Erie West
REGIONAL COUNCIL

Congestion Mitigation and Air Quality Program

Application for Ohio FY2026 – FY2029 CMAQ Funding

General Information		
Date: July 17, 2026		
Entity Name: The Office of the Lucas County Engineer		
Project Name: Garden Road and Holloway Road Roundabout		
Contact Information		
Contact Name: Jordan Kreglow, P.E., P.S.		
Title: Design Engineer		
Street Address: 1049 S. McCord Road		
City: Holland	State: Ohio	Zip: 43528
Phone: 419-213-2860	Email: jkreglow@co.lucas.oh.us	

MILESTONE ACTIVITY	EXPECTED DATE (month/year)
• Project Programmed with ODOT.	1/2027
• Begin Planning Phase: The date that the planning scope of work is developed.	3/2028
• Project Initiation Package: The date that the Project Initiation Package is approved by the District.	8/2027
• Consultant Authorized to Begin Design.	n/a
• Purpose and Need Submittal: The date that the Draft Purpose and Need is submitted.	n/a
• Begin Environmental Clearance: The date when the scoping for an environmental consultant or scoping for an environmental study is initiated.	4/2028
• Feasibility Study Submittal: The date when the Feasibility Study is received for review by the District from a consultant or local public agency.	n/a
• Preferred Alternative Approval: The date when a single Preferred Alternative is approved the preferred alternative may be established at scope development. If so, provide the scoping date. Otherwise, enter the appropriate approval date associated with the Feasibility Study or Alternative Evaluation Report.	n/a
• Preliminary Right-of-Way Plan Submittal: The date when Preliminary RW plans are received for review by the District from a consultant or local public agency.	3/2029
• Right-of-Way Authorization: The date when authorization is given to a local public agency to begin acquisition activities.	6/2029
• Stage 2 Design Plan Submittal	2/2029
• Environmental Document Approval: The date when the responsible agency (FHWA or ODOT) approves the document or the District confirms the project is exempt from documentation.	4/2029
• Stage 3 Design Plan Submittal	12/2029
• Right-of-Way Acquisition Complete: Date on which the local public agency certifies the completion of RW acquisition activities. (Utilities/encroachments not included.)	8/2030
• Final Plans and Bid Package Submittal to ODOT	9/2030
• Award Contract: The date the local public agency approves a contract with a successful bidder.	12/2030
• Begin Construction	6/2031
• Project Completion	11/2031
• For programs, purchases, studies, and other projects that do not have a construction phase, please provide a schedule for project development (including environmental approval) and funding. Provide an estimate of the date(s) that federal funds would need to be available. Give a summary of the schedule to be followed before the project is ready for funding and while it is being implemented. See also instructions for Item #48 above. Describe other relevant aspects of the project schedule. For example, is the funding schedule contingent upon other actions? Will the project need funding from other sources to proceed?	

PROJECT EVALUATION CRITERA

Criteria	Measure	Points
1. Project Type (Maximum Points =10)	Regional rideshare/vanpool programs	**10**
	Congestion Reduction, Traffic Flow Improvements & ITS	**10**
	Transit Vehicle Replacement	**8**
	Freight/Intermodal including diesel engine retrofits	**7**
	Public Education and Outreach	**6**
	Transit Service Upgrades	**5**
	Pedestrian/Bicycle	**4**
	Alternative Fuels and Vehicles- Non transit	**4**
	Employer-based Programs	**4**
	Travel Demand Management	**3**
	Modal Subsidies and Vouchers	**3**
	Transit Facility Upgrades	**2**
	Other TCM's and Misc	**2**

Project Type – CMAQ funds can be used on a variety of project types designed to address congestion mitigation and/or emissions reductions. A project will be awarded up to 10 points based on the type of project. (Refer to the Example of Project Types Descriptions.) Some projects may involve multiple project types. The score will be based on the primary project type. See below for example descriptions.

Narrative for Project Type, supporting documentation, and points.

The project will consist of construction of a single lane modern roundabout at the intersection of Garden Road and Holloway Road. The project includes the construction of a center landscape island, truck apron, pavement splitter islands, paved shoulders, pavement reconstruction, sidewalks, lighting, storm-sewer, signage, thermoplastic pavement markings, and other related work. The proposed roundabout will provide an increase in capacity and safety at the intersection.

Total points: (to be completed by MPO)

Criteria	Measure	Points
2. Cost Effectiveness (CE) (Maximum Points =20) * Sliding scale	High emissions reduced per dollar cost; Low dollar cost per kilogram reduced. Medium Low	*20

Cost Effectiveness is a measure of the project's ability to reduce emissions (HC, NO_x, and $PM_{2.5}$) per dollar invested ($ per kg). The OSUCC will apply standard methodologies to estimate the emissions reduction and award up to 20 points on a sliding scale relative to the applications received. The following formula will be used to estimate the cost effectiveness: CE $/kg= (CMAQ$ Request/Useful Life)/Annual Emissions Reduction

To be completed by MPO

Calculation and brief narrative for Cost Effectiveness, supporting documentation, and points.

Total points: (to be completed by MPO)

Criteria	Measure	Points
3. Other Benefits (Maximum Points =10)	*Score up to 2 points for each additional project benefit* Improved safety Fixed Route Transit Bicycle/Pedestrian Improved freight movement Benefits environmental justice population	 0 - 2 0 - 2 0 - 2 0 - 2 0 - 2

Other Benefits - Many projects have ancillary or additional benefits beyond the primary goals of the CMAQ program. This criterion allows for a range of points based on several categories including safety, fixed route transit service, bike/pedestrian, improved freight movement and benefits to environmental justice populations. Up to 2 points may be awarded for projects that demonstrate high positive impacts from any or all of the categories up to a maximum of 10 points

Narrative for Other Benefits, supporting documentation, and points.

Converting the intersection into a single lane roundabout will yield a CRF of 72.

Total points: (to be completed by MPO)		
Criteria	**Measure**	**Points**
4. Existing Modal Quality of Service (QOS) (Maximum Points =15)	Very Low Low Medium High	15 10 4 0

The Quality of Service (QOS) documents the existing modal service quality in the project area. A project may be awarded up to 15 points depending upon the current QOS. No points will be awarded to projects to improve modes currently operating at a high level. The applicant must provide documentation and data showing how the quality of service was determined.

a. For roadways the traditional level of service (LOS) will be the measure (F=very low, E=Low, D=medium).
b. For transit projects, the applicant is to provide information to assess the "quality of service." This should be appropriate to the need the transit project is fulfilling. For a transit vehicle replacement project, the % of fleet over useful life should be provided. For a project that would provide more frequent service, the load factor (peak or off peak as appropriate) of the impacted route should be used. For geographic or service hour expansion a more qualitative rational must be provide to assess the existing QOS.
c. Similarly, for bike or pedestrian projects, information is to be provided to demonstrate the poor quality of service being provided for users of those modes.

Please note: for transit, bike and pedestrian projects, lack of service or absence of a facility alone does not equate to poor level of service. Information must be provided that demonstrates there is demand for the service or facility that is not being met. The calculation of demand should relate to demand used in the cost effectiveness calculations.

What is the current and projected QOS? Please provide supporting documentation.

For Motor Vehicle Traffic:

2026 No Build Peak Hour: LOS B

Opening Day (2031) No Build Peak Hour: LOS B

Opening Day (2031) Build Peak Hour: LOS A

Design Year (2051) No Build Peak Hour: LOS B

Design Year (2051) Build Peak Hour: LOS B

See attached HCS reports.

Total points: (to be completed by MPO)

Criteria	Measure	Points
5. Positive Impact on QOS (Maximum Points =)	High impact Medium impact Low impact No impact	15 10 3 0

The **Positive Project Impact on Quality of Service** (QOS) assesses the impact the proposal will have on the existing situation, ranging from 0 to 15 points. Some examples of Positive Impacts for QOS for Roads, Transit, and Bicycle and Pedestrian, are shown below.

ROAD QOS IMPACTS

HIGH	MEDIUM	LOW
The project will improve the LOS from F to C	The project will improve the LOS from F to D or from E to C	The project will improve the LOS from F, E or D by one level or substantially reduce delay if resulting LOS remains F.

TRANSIT QOS IMPACTS[1]

HIGH	MEDIUM	LOW
Significantly increases service and reliability. Interconnect or fare coordination project, bus turnouts at major intersections, intermodal facility accommodating major transfers, reduces travel time. Fleet expansion will be considered high impact.	Increases service and reliability in a minor capacity, interconnect or fare coordination project, general bus turnouts, intermodal facility accommodating major transfers. Vehicle replacement will be considered a medium impact.	Increases passenger comfort or convenience, bike racks.

BICYCLE and PEDESTRIAN QOS IMPACTS[2]

HIGH	MEDIUM	LOW
Facility that will primarily serve commuters and/or school sites, sidewalks where none exist. Completes final pieces of a significant regional route.	Mixed use bicycle/pedestrian facility (recreation & commuter), usable sidewalk segments including upgrades and new installations and signage.	Public educational, promotional, and safety programs that promote and facilitate increased use of non-motorized modes of transportation.

FREIGHT QOS IMPACTS[3]

HIGH	MEDIUM	LOW
Facility or equipment that will improve the movement or processing of freight by 50% above existing conditions or other qualitative assessment	Facility or equipment that will improve the movement or processing of freight by 25% above existing conditions or other qualitative assessment	Facility or equipment that will improve the movement or processing of freight by 15% above existing conditions or other qualitative assessment

What is the Positive Impact on QOS? Please provide supporting documentation.

Total points: (to be completed by MPO)

[1] Council of Fresno County Governments, January 2006 CMAQ Call for Projects
[2] Council of Fresno County Governments, January 2006 CMAQ Call for Projects
[3] Council of Fresno County Governments, January 2006 CMAQ Call for Projects

Criteria	Measure	Points
6. Status of Project (Maximum Points =10)	Construction plans complete	10
	Non construction activity ready for authorization	8
	ROW clear and complete	8
	Environmental document complete	6
	Environmental document underway	2

The Status of Project points reflect the existing status of the project. The closer a project is to the construction/implementation phase, the more points it will receive. Those that are early in the project development process with environmental studies underway will receive 2 points. Projects with completed environmental status earn 6 points; those with right-of-way cleared and complete will be awarded 8 points. Non construction projects that do not require right-of-way and are ready for authorization such as a bus purchase also earn 8 points. Projects with construction plans complete earn 10 points.

Narrative for Status of Project, supporting documentation, and points.

This project is in the conceptual/study phase. At this time the LCEO is seeking funding.

Detailed plans and surveys have not been started.

Turning movement counts were conducted, along with the HCS Reports for the intersection.

Total points: (to be completed by MPO)

Criteria	Measure	Points	Measure	Points
7. Non-Federal Match of Requested CMAQ Funds of the phase(s) cost (Maximum Points =10)	Above 40%	5	Greater than $2.0 M	5
	>35 to 40%	4	$1.0 M to $2.0 M	4
	>30 to 35%	3	>$500,000 to $1.0 M	3
	>25 to 30%	2	$150,000 to $500,000	2
	>20 to 25%	1	$50,000 to $150,000	1
	Up to 20%	0	$0 to $50,000	0

Non-CMAQ Funding – The criteria rewards applicants that leverage additional funding above the required rate for local participation. The standard match rate for federal CMAQ funds is 20 percent (although there are exceptions). The applicant can gain up to a maximum of 10 points through leveraging non CMAQ resources towards the CMAQ eligible project cost for the phase(s) requesting CMAQ funding. Up to 5 points awarded based on percent of funding non-CMAQ funding and up to 5 points for amount of non-CMAQ funding. The non-CMAQ funding can be local, private, state or other federal provided it is not federal funding controlled by the submitting MPO.

Phase Description	State Fiscal Year	CMAQ $ Request	CMAQ % Share	Other Federal $ Secured	Other Federal $ Source	Local $ Match	Local $ Match Source	Phase $ Totals
Preliminary Engineering		$ 0	0%			50,000		$ 50,000
Detailed Design		$ 0	0%			170,000		$ 170,000
Right of Way		$ 0	0%			70,000		$ 70,000
Construction		$ 1,404,057	69%			351,014		$ 1,755,071
FUNDING TOTALS		$ 1,404,057	69%	$ 0		$ 641,014		$ 2,045,071

Narrative for Non-Federal Match, supporting documentation, and points.

Total points: (to be completed by MPO)

Criteria	Measure	Points
8. Regional Priority (Maximum Points =10) (determined by each MPO)	First Priority Project Second Priority Project Third Priority Project Fourth Priority Project All Other	10 7 4 2 0

Regional Priority – MPO's will be responsible for collecting, reviewing for completeness and ranking CMAQ applications from the eligible recipients in their regions. Top ranking projects from each region will receive 10 points, second highest receives 7 points, third highest receives 4 points, fourth highest receives 2 points. All others receive 0 points. Each MPO will develop their own approach to determining their regional priority. In cases where a project is in more than one MPO an average point score will be used.

Narrative for Regional Priority, supporting documentation, and points.

Total points: (to be completed by MPO)

Criteria	Measure	Points
9. History of Project Delivery By Project Sponsor:	One project slipped past programmed year Two of more project slipped past programmed year One or more projects cancelled	-5 -10 -10

History of Project Delivery – It is critical that projects that compete for and receive Ohio CMAQ dollars be delivered on time and within budget in order to fully realize the user benefits for Ohio citizens. Therefore, an applicant who has accepted CMAQ dollars and allows the project to slip beyond the programmed year of obligation will be penalized 5 points on all subsequent applications in the next round that CMAQ projects are applied for. Applicants that allow two or more projects to slip will be penalized 10 points on subsequent applications in the next CMAQ round. Project cancellations will also be cause for a 10 point reduction in the next CMAQ round. Exceptions may be granted by the OSUCC for circumstances beyond the control of the applicant.

MAXIMUM POINTS 100	**Applicant total points for this project to be assessed by the MPO.**	

Frequently Asked Questions and Answers

1. **What is the purpose of the Ohio Statewide Urban Congestion Mitigation Air Quality Program?**
   In November 2012, the Director of the Ohio Department of Transportation (ODOT) announced the creation of an Ohio Statewide Urban Congestion Mitigation and Air Quality (CMAQ) Program. The intent of the program is to more quickly advance eligible projects that improve air quality, reduce congestion, and eliminate delay/improve safety, in addition to utilizing statewide CMAQ funding in the year funds are allocated.

2. **What is the CMAQ Program?**
   The CMAQ program was established by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, and continues under the current federal transportation bill Infrastructure Investment and Jobs Act (IIJA); with an emphasis area on addressing PM2.5. The CMAQ Program provides a flexible funding source for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, or particulate matter (non-attainment areas), and for areas that were out of compliance but have now met (maintenance areas) the NAAQS. Generally, projects eligible under the CMAQ program prior to enactment of MAP-21 remain eligible. All CMAQ projects must demonstrate three primary elements of eligibility: 1.) transportation identity as described within the programmatic parameters in the CMAQ Final Program Guidance Section VII – Project Eligibility Provisions – D. Eligible Projects and Programs; 2.) emissions reduction; and 3.) location in or benefiting a non-attainment or maintenance area.

3. **What is the Ohio Statewide Urban Congestion Mitigation Air Quality Committee (OSUCC)?**
   In January 2013, the Ohio Association of Regional Councils (OARC) Executive Directors established OSUCC, charging them with the task of developing protocols for managing the Congestion Mitigation Air Quality (CMAQ) Program. The CMAQ Program provides approximately $60 plus million annually; although this amount may vary for each application round, to Ohio's eight largest Metropolitan Planning Organizations (MPOs) with populations larger than 200,000.

4. **What MPOs sit on OSUCC?**
   The OSUCC consists of representatives from the following agencies:
   - Akron Metropolitan Area Transportation Study (AMATS)
   - Eastgate Regional Council of Governments (Eastgate)
   - Miami Valley Regional Planning Commission (MVRPC)
   - Mid-Ohio Regional Planning Commission (MORPC)
   - Northeast Ohio Areawide Coordinating Agency (NOACA)
   - Ohio-Kentucky-Indiana Regional Council of Governments (OKI)
   - Stark County Area Transportation Study (SCATS)
   - Lake Erie West Regional Council (formerly TMACOG)

5. **What types of projects are eligible?**
   Non-capacity adding projects that can demonstrate an emissions reduction are generally eligible. For a complete listing of eligible projects, please visit the following link to review FHWA's Final CMAQ Program Guidance: https://www.fhwa.dot.gov/bipartisan-infrastructure-law/cmaq.cfm specifically Eligibility Requirements and Eligible Activities.

6. **What types of project are not eligible?**
   Projects which add new capacity for single-occupancy vehicles are not eligible. Maintenance projects are not eligible.

7. **Can any entity submit a project for CMAQ funding consideration?**
   Applicants are limited to qualified government entities that are members of one of the large MPOs located within the metropolitan planning area. Projects located within the boundaries of a non-member jurisdiction are not eligible for Federal CMAQ funds unless the member jurisdiction applying for funds would be the owner or maintainer of the facility being constructed.

8. **Does an applicant submit projects directly to OSUCC since there are eight MPOs and when is the solicitation process?**
   The solicitation process for projects will consist of two parts.
   - First, each of the eight large MPOs will solicit projects from their area. Each MPO shall conduct this part in whatever manner that best meets their local circumstances.
   - Second, each MPO will then provide the OSUCC the application form for each project from their area, including the MPO ranking, and the project scoring table.

   Following this solicitation the OSUCC will review the scoring provided by the MPO's. OSUCC may adjust project scores to ensure the scoring criterion was applied uniformly across all of the projects. This will lead to a listing of projects ranked by score.

9. **What is the schedule of activities for each CMAQ funding round?**
   - May of each year: Identify total amount by year of CMAQ funding to be available for new projects.
   - May – August: Each MPO solicits projects or otherwise identifies projects to be submitted to the OSUCC.
   - Early September: Projects submitted to OSUCC.
   - Early September – November: OSUCC review of projects and project scoring.
   - November: OSUCC identifies the recommended program of projects for funding.
   - December: Executive Directors approve projects for funding. All projects will follow the individual MPO public involvement policies in accordance with the standard STIP/TIP public involvement processes.

10. **Where can an applicant obtain a CMAQ application form?**
    Each MPO solicits projects from their respective area. Applicants should contact the respective MPO for their area.

Conceptual Construction Cost Estimate

PID # TBD

PROJECT: Garden Road and Holloway Road Roundabout

COMPLETION DATE: 2031 Construction **7/29/2026**

REF. NO.	ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
		ROADWAY				
1	201	CLEARING AND GRUBBING	1	L.S.	$ 5,000.00	$ 5,000.00
2	202	WEARING COURSE REMOVED	380	Sq. Yd.	$ 25.00	$ 9,500.00
3	202	PIPE REMOVED, 24" AND UNDER	1000	Foot	$ 25.00	$ 25,000.00
4	202	MAILBOX REMOVED	4	Each	$ 125.00	$ 500.00
5	202	CATCH BASIN REMOVED	9	Each	$ 400.00	$ 3,600.00
6	202	MONUMENT ASSEMBLY REMOVED	1	Each	$ 300.00	$ 300.00
7	203	EXCAVATION	2500	Cu. Yd.	$ 20.00	$ 50,000.00
8	203	EMBANKMENT, AS PER PLAN	600	Cu. Yd.	$ 20.00	$ 12,000.00
9	204	SUBGRADE COMPACTION, AS PER PLAN	6000	Sq. Yd.	$ 1.50	$ 9,000.00
10	204	EXCAVATION OF SUBGRADE, AS PER PLAN	150	Cu. Yd.	$ 25.00	$ 3,750.00
11	204	GRANULAR MATERIAL, TYPE D	150	Cu. Yd.	$ 65.00	$ 9,750.00
12	204	GEOTEXTILE FABRIC	500	Sq. Yd.	$ 2.00	$ 1,000.00
13	204	SCARIFICATION, AS PER PLAN	3000	Sq. Yd.	$ 8.00	$ 24,000.00
14	604	MONUMENT ASSEMBLY, AS PER PLAN (TYPE 2B)	1	Each	$ 500.00	$ 500.00
15	608	8" CONCRETE WALK	4100	Sq. Ft.	$ 12.00	$ 49,200.00
16	608	CURB RAMP, AS PER PLAN	1300	Sq. Ft.	$ 15.00	$ 19,500.00
17	653	TOPSOIL FURNISHED AND PLACED, AS PER PLAN	400	Cu. Yd.	$ 65.00	$ 26,000.00
18	Special	DECORATIVE PLAIN CONCRETE, 6" THICK (SPLITTER ISLAND)	4400	Sq. Ft.	$ 10.00	$ 44,000.00
19	Special	MAILBOX SUPPORT, TYPE 1 OR TYPE 2	4	Each	$ 350.00	$ 1,400.00
		ROADWAY TOTAL:				**$ 294,000.00**
		EROSION CONTROL				
20	601	TIED CONCRETE BLOCK MAT, TYPE 1	50	Sq. Yd.	$ 125.00	$ 6,250.00
21	659	SEEDING AND MULCHING, AS PER PLAN	2500	Sq. Yd.	$ 2.00	$ 5,000.00

REF. NO.	ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
22	659	REPAIR SEEDING AND MULCHING, AS PER PLAN	125	Sq. Yd.	$ 1.00	$ 125.00
23	659	COMMERCIAL FERTILIZER	0.25	Ton	$ 600.00	$ 150.00
24	659	WATER	15	MGal.	$ 10.00	$ 150.00
25	832	STORM WATER POLLUTION PREVENTION PLAN	1	L.S.	$ 2,500.00	$ 2,500.00
26	832	EROSION CONTROL	10000	Each	$ 1.00	$ 10,000.00
27	832	STORM WATER POLLUTION PREVENTION INSPECTIONS	1	L.S.	$ 5,000.00	$ 5,000.00
		EROSION CONTROL TOTAL:				**$ 29,175.00**
		DRAINAGE				
28	605	6" SHALLOW PIPE UNDERDRAINS WITH FABRIC WRAP, 707.31	1400	Foot	$ 10.00	$ 14,000.00
29	605	6" UNCLASSIFIED PIPE UNDERDRAINS WITH FABRIC WRAP, 707.31	320	Foot	$ 10.00	$ 3,200.00
30	611	6" CONDUIT, TYPE B	50	Foot	$ 30.00	$ 1,500.00
31	611	6" CONDUIT, TYPE C	130	Foot	$ 30.00	$ 3,900.00
32	611	6" CONDUIT, TYPE E	25	Foot	$ 25.00	$ 625.00
33	611	6" CONDUIT, TYPE F	150	Foot	$ 25.00	$ 3,750.00
34	611	6" CONDUIT, TYPE F, 707.33 OR 707.45	200	Foot	$ 35.00	$ 7,000.00
35	611	12" CONDUIT, TYPE B, AS PER PLAN	250	Foot	$ 100.00	$ 25,000.00
36	611	12" CONDUIT, TYPE C, AS PER PLAN	400	Foot	$ 80.00	$ 32,000.00
37	611	15" CONDUIT, TYPE B, AS PER PLAN	100	Foot	$ 140.00	$ 14,000.00
38	611	15" CONDUIT, TYPE C, AS PER PLAN	200	Foot	$ 120.00	$ 24,000.00
39	611	18" CONDUIT, TYPE B, AS PER PLAN	100	Foot	$ 140.00	$ 14,000.00
40	611	18" CONDUIT, TYPE C, AS PER PLAN	125	Foot	$ 130.00	$ 16,250.00
41	611	CATCH BASIN, NO. 2-2B	4	Each	$ 2,200.00	$ 8,800.00
42	611	CATCH BASIN, NO. 2-3	4	Each	$ 3,200.00	$ 12,800.00
43	611	MANHOLE, NO. 3	4	Each	$ 4,500.00	$ 18,000.00
44	611	INSPECTION WELL	6	Each	$ 450.00	$ 2,700.00
		DRAINAGE TOTAL:				**$ 201,525.00**

REF. NO.	ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
		PAVEMENT				
45	301	ASPHALT CONCRETE BASE, (449), PG 64-22	800	Cu. Yd.	$ 145.00	$ 116,000.00
46	304	AGGREGATE BASE	1400	Cu. Yd.	$ 50.00	$ 70,000.00
47	407	TACK COAT	1600	Gal.	$ 2.00	$ 3,200.00
48	441	ASPHALT CONCRETE SURFACE COURSE, 12.5 MM, TYPE A, (449)	550	Cu. Yd.	$ 240.00	$ 132,000.00
49	441	ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A, (449)	750	Cu. Yd.	$ 200.00	$ 150,000.00
50	609	COMBINATION CURB AND GUTTER, TYPE B-1, AS PER PLAN	1400	Foot	$ 25.00	$ 35,000.00
51	609	COMBINATION CURB AND GUTTER, TYPE 2, AS PER PLAN	150	Foot	$ 28.00	$ 4,200.00
52	609	COMBINATION CURB AND GUTTER, TYPE 3, AS PER PLAN	240	Foot	$ 30.00	$ 7,200.00
53	609	CURB, TYPE 6	1320	Foot	$ 20.00	$ 26,400.00
54	860	THINLAY ASPHALT CONCRETE, TYPE MED (DRIVEWAYS)	10	Cu. Yd.	$ 300.00	$ 3,000.00
55	Special	DECORATIVE REINFORCED CONCRETE PAVEMENT, 8" THICK, (TRUCK APRON), AS PER PLAN	345	Sq. Yd.	$ 90.00	$ 31,050.00
		PAVEMENT TOTAL:				**$ 578,050.00**
		WATER WORK				
56	638	8" DUCTILE IRON WATERLINE, (STANDARD PRESSURE 350) (POLYETHYLENE WRAP) OR PVC C-900 DR 18 WATERLINE	50	FOOT	$ 165.00	$ 8,250.00
57	638	8" ~ 22.5 DEGREE BEND	4	EACH	$ 750.00	$ 3,000.00
58	638	8" ~ 45 DEGREE BEND	4	EACH	$ 750.00	$ 3,000.00
59	638	FIRE HYDRANT AND GATE VALVE REMOVED AND RESET, AS PER PLAN	4	EACH	$ 4,000.00	$ 16,000.00
60	611	(WATER) MANHOLE RECONSTRUCTED TO GRADE	7	EACH	$ 2,000.00	$ 14,000.00
61	SPEC	CONCRETE ENCASEMENT	100	FOOT	$ 110.00	$ 11,000.00
		WATER WORK / SANITARY SEWER TOTAL:				**$ 55,250.00**
		LIGHTING				
62	625	CONDUIT, 2", 725.05, AS PER PLAN	900	Foot	$ 10.00	$ 9,000.00
63	625	CONDUIT, 4", 725.05, AS PER PLAN	60	Foot	$ 15.00	$ 900.00
64	625	TRENCH	960	Foot	$ 10.00	$ 9,600.00
65	625	PULLBOX, TYPE B	16	Each	$ 900.00	$ 14,400.00
66	Special	STREET LIGHTING COORDINATION	1	L.S.	$ 5,000.00	$ 5,000.00

REF. NO.	ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
		LIGHTING TOTAL:				**$ 38,900.00**
		TRAFFIC CONTROL				
67	621	RPM	1	L.S.	$ 13,000.00	$ 13,000.00
68	630	REMOVAL, STORAGE, OR REERECTION OF SIGNS AND SUPPORTS	1	L.S.	$ 1,000.00	$ 1,000.00
69	630	VARIOUS SIGNING ITEMS	1	L.S.	$ 15,000.00	$ 15,000.00
70	632	REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN	1	L.S.	$ 4,000.00	$ 4,000.00
71	644	VARIOUS PAVEMENT MARKINGS	1	L.S.	$ 20,000.00	$ 20,000.00
		TRAFFIC CONTROL TOTAL:				**$ 53,000.00**
		LANDSCAPING				
72	Special	CENTER ISLAND PLANTINGS	1	L.S.	$ 10,000.00	$ 10,000.00
		LANDSCAPING TOTAL:				**$ 10,000.00**
		MAINTENANCE OF TRAFFIC				
73	416	PORTABLE CHANGEABLE MESSAGE SIGN, AS PER PLAN	8	SNMT	$ 750.00	$ 6,000.00
74	616	WATER	10	M.Gal.	$ 10.00	$ 100.00
75	616	CALCIUM CHLORIDE	2	Ton	$ 400.00	$ 800.00
		MAINTENANCE OF TRAFFIC TOTAL:				**$ 6,900.00**
		MISCELLANEOUS				
76	614	MAINTAINING TRAFFIC	1	L.S.	$ 30,000.00	$ 30,000.00
77	623	CONSTRUCTION LAYOUT STAKES AND SURVEYING	1	L.S.	$ 20,000.00	$ 20,000.00

REF. NO.	ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
78	624	MOBILIZATION	1	L.S.	$ 25,000.00	$ 25,000.00
		MISCELLANEOUS TOTAL:				**$ 75,000.00**
		CONCEPTUAL CONSTRUCTION TOTAL ($2026):				**$ 1,341,800.00**
		CONCEPTUAL CONSTRUCTION TOTAL ($2031)*:				**$ 1,595,519.03**
		* - see ODOT Business Plan Inflation Calculator				
		10% CONTINGENCY:				**$ 159,551.90**
		CONCEPTUAL CONSTRUCTION GRAND TOTAL ($2031):				**$ 1,755,071**
	The useful life of this project is 20 years with only routine maintenance needed to attain or exceed this life.					

Prepared by: Lucas County Engineer's Office

Jordan Kreglow

Jordan Kreglow, P.E (93076) P.S.
Design Engineer

7/29/2026
Date

R.

Michael Melnyk, E.I.
Traffic Operations Supervisor

7/29/26
Date

STATE OF OHIO
7/29/26
JORDAN KREGLOW
E-93076
REGISTERED
PROFESSIONAL ENGINEER

CY 2026-2030 Business Plan Inflation Calculator:

Not sure if you have the latest calculator? Click here.

Last Modified: 1/30/2026

Today's Date:
July 29, 2026

Please Enter Values in the Yellow Areas Only:

Estimation Start Date:
Less than or Equal to Today's Date
(mm/dd/yyyy)

7/29/2026
Start Date:

Enter Construction Mid-Point Date:
(cannot exceed 07/29/2051)
(mm/dd/yyyy)

8/1/2031
Construction Mid-Point Date:

Present-Day Estimated Cost:

$1,341,800.00
Estimated Dollar Amount:

Estimate Start Date to Construction Mid-Point Date: **61** **Months**

Inflation - Start to Mid-Point of Construction:

	(compounded growth rate)	**Inflated Dollar Amount:**
Business Plan	**18.9%**	**$1,595,519.03**

Estimator's Name: Michael Melnyk, E.I.

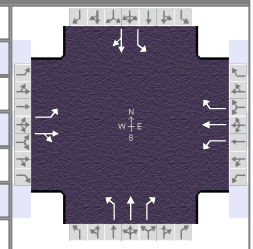
County - Route - Section: Garden Road and Holloway Road Roundabout

PID:

Estimator's Notes:

HCS Signalized Intersection Results Summary

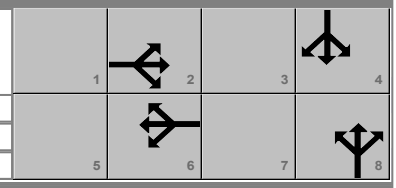
General Information				Intersection Information	
Agency	LCEO			Duration, h	0.250
Analyst	Michael Melnyk	Analysis Date	Jul 20, 2026	Area Type	Other
Jurisdiction	LCEO	Time Period	Peak Hour	PHF	0.92
Urban Street	Holloway Road	Analysis Year	2026	Analysis Period	1> 7:00
Intersection	Garden and Holloway	File Name	2026 Peak Hour.xus		
Project Description	CMAQ Application				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	37	185	49	79	182	137	66	251	108	121	249	31

Signal Information			
Cycle, s	35.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.9	11.5	0.0	0.0	0.0	0.0	
Yellow	5.0	5.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		5.0		5.0		6.0
Phase Duration, s		16.9		16.9		18.5		18.5
Change Period, ($Y+R_c$), s		7.0		7.0		7.0		7.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.1		3.1
Queue Clearance Time (g_s), s		6.1		8.6		8.8		9.9
Green Extension Time (g_e), s		1.4		1.4		1.7		1.7
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.00		0.00

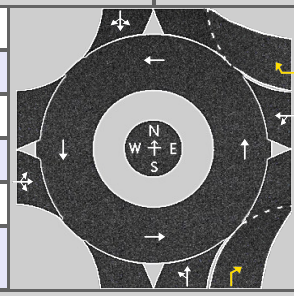
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	40	254		86	198	149	72	273	117	132	304	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1204	1831		1143	1900	1610	1092	1900	1610	1124	1863	
Queue Service Time (g_s), s	1.0	4.1		2.4	3.0	2.6	2.0	4.0	1.9	3.7	4.6	
Cycle Queue Clearance Time (g_c), s	4.0	4.1		6.6	3.0	2.6	6.8	4.0	1.9	7.9	4.6	
Green Ratio (*g/C*)	0.28	0.28		0.28	0.28	0.28	0.32	0.32	0.32	0.32	0.32	
Capacity (*c*), veh/h	436	509		388	529	448	409	616	522	436	604	
Volume-to-Capacity Ratio (*X*)	0.092	0.499		0.222	0.374	0.332	0.175	0.443	0.225	0.302	0.504	
Back of Queue (*Q*), ft/ln (95 th percentile)	8	48		20	36	27	15	42	16	29	51	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	1.9		0.8	1.4	1.1	0.6	1.7	0.7	1.2	2.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.22		0.08	0.17	0.12	0.06	0.15	0.06	0.09	0.00	
Uniform Delay (d_1), s/veh	11.9	10.7		13.4	10.2	10.1	12.4	9.4	8.7	12.6	9.6	
Incremental Delay (d_2), s/veh	0.0	0.3		0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	11.9	10.9		13.5	10.4	10.3	12.5	9.6	8.8	12.7	9.9	
Level of Service (LOS)	B	B		B	B	B	B	A	A	B	A	
Approach Delay, s/veh / LOS	11.1	B		11.0	B		9.8	A		10.7	B	
Intersection Delay, s/veh / LOS	10.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.08	B	1.89	B	2.07	B	1.88	B
Bicycle LOS Score / LOS	0.97	A	1.20	A	1.25	A	1.21	A

HCS Roundabouts Report

General Information

Analyst	Michael Melnyk
Agency or Co.	LCEO
Date Performed	7/17/2026
Analysis Year	2026
Time Analyzed	2026 Peak Hour
Project Description	Garden and Holloway



Site Information

Intersection	Garden and Holloway
E/W Street Name	Garden Road
N/S Street Name	Holloway Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	LCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LT				LT				LTR	
Volume (V), veh/h	0	37	185	49	0	79	182	137	0	66	251	108	0	121	249	31
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	41	207	55	0	88	204	153	0	74	281	121	0	135	279	35
Right-Turn Bypass	None				Yielding				Yielding				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763	4.9763		4.9763	4.9763		4.9763	
Follow-Up Headway, s		2.6087			2.6087	2.6087		2.6087	2.6087		2.6087	

Flow Computations, Capacity and v/c Ratios

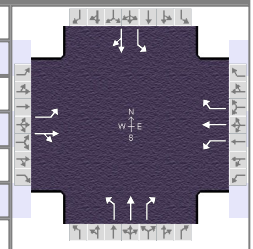
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		303			292	153		355	121		449	
Entry Volume, veh/h		294			283	149		345	117		436	
Circulating Flow (v_c), pc/h	502			396			383			366		
Exiting Flow (v_{ex}), pc/h	342			313			322			422		
Capacity (c_{pce}), pc/h		827			921	994		934	974		950	
Capacity (c), veh/h		803			895	965		907	945		922	
v/c Ratio (x)		0.37			0.32	0.15		0.38	0.12		0.47	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.9			7.5	5.2		8.3	5.0		9.7	
Lane LOS		A			A	A		A	A		A	
95% Queue Length, Q_{95} (veh)		1.7			1.4	0.5		1.8	0.4		2.6	
95% Queue Length, Q_{95} (ft)		43.5			35.8	12.8		46.1	10.2		66.6	
Approach Delay, s/veh | LOS	8.9	A		6.7	A		7.4	A		9.7	A	
Intersection Delay, s/veh | LOS	8.1						A					

HCS Signalized Intersection Results Summary

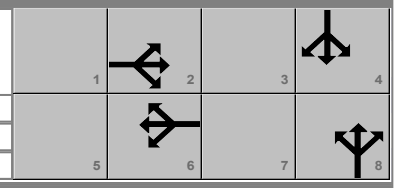
General Information				Intersection Information	
Agency	LCEO			Duration, h	0.250
Analyst	Michael Melnyk	Analysis Date	Jul 20, 2026	Area Type	Other
Jurisdiction	LCEO	Time Period	Off Peak	PHF	0.92
Urban Street	Holloway Road	Analysis Year	2026	Analysis Period	1> 7:00
Intersection	Garden and Holloway	File Name	2026 Off Peak.xus		
Project Description	CMAQ Application				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	31	123	22	99	124	87	38	232	80	56	197	42

Signal Information			
Cycle, s	30.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.0	8.0	0.0	0.0	0.0	0.0	
Yellow	5.0	5.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		5.0		5.0		6.0
Phase Duration, s		15.0		15.0		15.0		15.0
Change Period, ($Y+R_c$), s		7.0		7.0		7.0		7.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.1		3.1
Queue Clearance Time (g_s), s		4.3		6.3		6.6		6.8
Green Extension Time (g_e), s		1.0		1.0		1.2		1.2
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.00		0.00

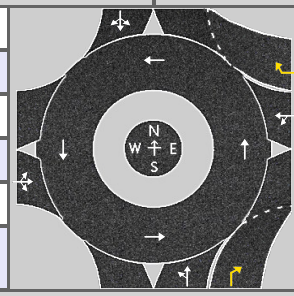
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	34	158		108	135	95	41	252	87	61	260	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1275	1849		1248	1900	1610	1137	1900	1610	1145	1842	
Queue Service Time (g_s), s	0.6	2.0		2.3	1.7	1.4	1.0	3.4	1.3	1.4	3.6	
Cycle Queue Clearance Time (g_c), s	2.3	2.0		4.3	1.7	1.4	4.6	3.4	1.3	4.8	3.6	
Green Ratio (*g/C*)	0.27	0.27		0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	
Capacity (*c*), veh/h	510	494		489	507	430	406	506	429	417	490	
Volume-to-Capacity Ratio (*X*)	0.066	0.319		0.220	0.266	0.220	0.102	0.498	0.203	0.146	0.530	
Back of Queue (*Q*), ft/ln (95 th percentile)	5	20		17	17	12	7	33	10	10	37	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	0.8		0.7	0.7	0.5	0.3	1.3	0.4	0.4	1.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.02	0.10		0.07	0.08	0.06	0.03	0.12	0.04	0.03	0.00	
Uniform Delay (d_1), s/veh	9.6	8.8		10.5	8.7	8.6	11.3	9.3	8.5	11.3	9.4	
Incremental Delay (d_2), s/veh	0.0	0.1		0.1	0.1	0.1	0.0	0.3	0.1	0.1	0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	9.6	8.9		10.6	8.8	8.7	11.4	9.6	8.6	11.4	9.7	
Level of Service (LOS)	A	A		B	A	A	B	A	A	B	A	
Approach Delay, s/veh / LOS	9.1	A		9.3	A		9.6	A		10.0	B	
Intersection Delay, s/veh / LOS	9.5						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.07	B	1.88	B	2.07	B	1.88	B
Bicycle LOS Score / LOS	0.80	A	1.04	A	1.12	A	1.02	A

HCS Roundabouts Report

General Information

Analyst	Michael Melnyk
Agency or Co.	LCEO
Date Performed	7/17/2026
Analysis Year	2026
Time Analyzed	2026 Off Peak
Project Description	Garden and Holloway



Site Information

Intersection	Garden and Holloway
E/W Street Name	Garden Road
N/S Street Name	Holloway Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	LCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LT				LT				LTR	
Volume (V), veh/h	0	31	123	22	0	99	124	87	0	38	232	80	0	56	197	42
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	35	138	25	0	111	139	97	0	43	260	90	0	63	221	47
Right-Turn Bypass	None				Yielding				Yielding				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763	4.9763		4.9763	4.9763		4.9763	
Follow-Up Headway, s		2.6087			2.6087	2.6087		2.6087	2.6087		2.6087	

Flow Computations, Capacity and v/c Ratios

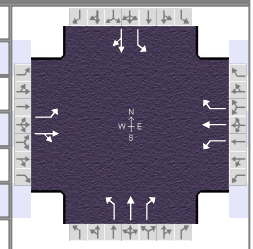
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		198			250	97		303	90		331	
Entry Volume, veh/h		192			243	94		294	87		321	
Circulating Flow (v_c), pc/h	395			338			236			293		
Exiting Flow (v_{ex}), pc/h	201			229			295			357		
Capacity (c_{pce}), pc/h		922			978	1021		1085	1124		1023	
Capacity (c), veh/h		896			949	992		1053	1091		994	
v/c Ratio (x)		0.21			0.26	0.09		0.28	0.08		0.32	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.2			6.4	4.5		6.1	4.0		7.0	
Lane LOS		A			A	A		A	A		A	
95% Queue Length, Q_{95} (veh)		0.8			1.0	0.3		1.1	0.3		1.4	
95% Queue Length, Q_{95} (ft)		20.5			25.6	7.7		28.2	7.7		35.8	
Approach Delay, s/veh | LOS	6.2	A		5.8	A		5.6	A		7.0	A	
Intersection Delay, s/veh | LOS	6.1						A					

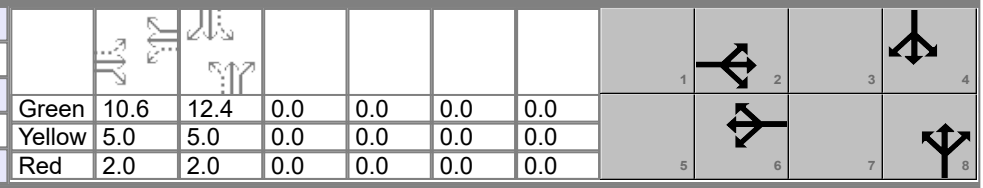
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	LCEO			Duration, h	0.250
Analyst	Michael Melnyk	Analysis Date	Jul 20, 2026	Area Type	Other
Jurisdiction	LCEO	Time Period	Peak Hour	PHF	0.92
Urban Street	Holloway Road	Analysis Year	2031	Analysis Period	1> 7:00
Intersection	Garden and Holloway	File Name	2031 Peak Hour.xus		
Project Description	CMAQ Application				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	39	194	51	83	191	144	69	264	114	127	262	33

Signal Information			
Cycle, s	37.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.6	12.4	0.0	0.0	0.0	0.0						
Yellow	5.0	5.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		5.0		5.0		6.0
Phase Duration, s		17.6		17.6		19.4		19.4
Change Period, ($Y+R_c$), s		7.0		7.0		7.0		7.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.1		3.1
Queue Clearance Time (g_s), s		6.5		9.2		9.5		10.7
Green Extension Time (g_e), s		1.5		1.5		1.8		1.8
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.00		0.00

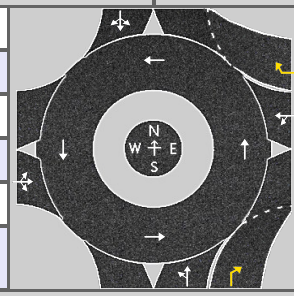
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	42	266		90	208	157	75	287	124	138	321	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1193	1831		1131	1900	1610	1076	1900	1610	1110	1862	
Queue Service Time (g_s), s	1.1	4.5		2.7	3.2	2.8	2.2	4.4	2.0	4.1	5.1	
Cycle Queue Clearance Time (g_c), s	4.4	4.5		7.2	3.2	2.8	7.5	4.4	2.0	8.7	5.1	
Green Ratio (*g/C*)	0.29	0.29		0.29	0.29	0.29	0.34	0.34	0.34	0.34	0.34	
Capacity (*c*), veh/h	429	522		379	541	459	401	636	539	430	624	
Volume-to-Capacity Ratio (*X*)	0.099	0.510		0.238	0.384	0.341	0.187	0.451	0.230	0.321	0.514	
Back of Queue (*Q*), ft/ln (95 th percentile)	9	54		23	40	30	17	47	19	33	58	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.4	2.2		0.9	1.6	1.2	0.7	1.9	0.7	1.3	2.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.05	0.25		0.09	0.19	0.14	0.07	0.17	0.07	0.10	0.00	
Uniform Delay (d_1), s/veh	12.3	11.0		14.0	10.6	10.4	12.9	9.6	8.8	13.1	9.8	
Incremental Delay (d_2), s/veh	0.0	0.3		0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	12.4	11.3		14.1	10.7	10.6	13.0	9.8	8.9	13.2	10.1	
Level of Service (LOS)	B	B		B	B	B	B	A	A	B	B	
Approach Delay, s/veh / LOS	11.4	B		11.4	B		10.1	B		11.0	B	
Intersection Delay, s/veh / LOS	10.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.08	B	1.89	B	2.07	B	1.88	B
Bicycle LOS Score / LOS	1.00	A	1.24	A	1.29	A	1.24	A

HCS Roundabouts Report

General Information

Analyst	Michael Melnyk
Agency or Co.	LCEO
Date Performed	7/17/2026
Analysis Year	2031
Time Analyzed	2031 Peak Hour
Project Description	Garden and Holloway



Site Information

Intersection	Garden and Holloway
E/W Street Name	Garden Road
N/S Street Name	Holloway Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	LCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LT				LT				LTR	
Volume (V), veh/h	0	39	194	51	0	83	191	144	0	69	264	114	0	127	262	33
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	44	217	57	0	93	214	161	0	77	296	128	0	142	293	37
Right-Turn Bypass	None				Yielding				Yielding				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763	4.9763		4.9763	4.9763		4.9763	
Follow-Up Headway, s		2.6087			2.6087	2.6087		2.6087	2.6087		2.6087	

Flow Computations, Capacity and v/c Ratios

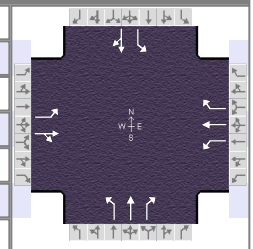
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		318			307	161		373	128		472	
Entry Volume, veh/h		309			298	156		362	124		458	
Circulating Flow (v_c), pc/h	528			417			403			384		
Exiting Flow (v_{ex}), pc/h	359			328			340			443		
Capacity (c_{pce}), pc/h		805			902	976		915	957		933	
Capacity (c), veh/h		782			876	947		888	929		906	
v/c Ratio (x)		0.39			0.34	0.17		0.41	0.13		0.51	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.6			7.9	5.4		8.9	5.1		10.5	
Lane LOS		A			A	A		A	A		B	
95% Queue Length, Q_{95} (veh)		1.9			1.5	0.6		2.0	0.5		2.9	
95% Queue Length, Q_{95} (ft)		48.6			38.4	15.4		51.2	12.8		74.2	
Approach Delay, s/veh | LOS	9.6	A		7.0	A		7.9	A		10.5	B	
Intersection Delay, s/veh | LOS	8.7						A					

HCS Signalized Intersection Results Summary

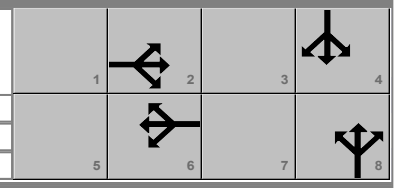
General Information				Intersection Information	
Agency	LCEO			Duration, h	0.250
Analyst	Michael Melnyk	Analysis Date	Jul 20, 2026	Area Type	Other
Jurisdiction	LCEO	Time Period	Off Peak	PHF	0.92
Urban Street	Holloway Road	Analysis Year	2031	Analysis Period	1> 7:00
Intersection	Garden and Holloway	File Name	2031 Off Peak.xus		
Project Description	CMAQ Application				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	33	129	23	104	130	91	40	244	84	59	207	44

Signal Information			
Cycle, s	30.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.0	8.4	0.0	0.0	0.0	0.0	
Yellow	5.0	5.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		5.0		5.0		6.0
Phase Duration, s		15.0		15.0		15.4		15.4
Change Period, ($Y+R_c$), s		7.0		7.0		7.0		7.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.1		3.1
Queue Clearance Time (g_s), s		4.5		6.6		6.9		7.2
Green Extension Time (g_e), s		1.0		1.0		1.3		1.3
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.00		0.00

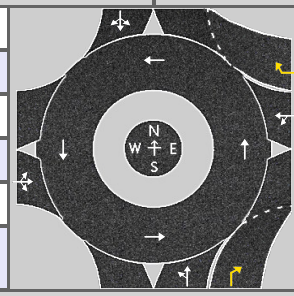
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	36	165		113	141	99	43	265	91	64	273	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1267	1850		1240	1900	1610	1124	1900	1610	1132	1842	
Queue Service Time (g_s), s	0.7	2.2		2.5	1.8	1.5	1.0	3.6	1.3	1.5	3.8	
Cycle Queue Clearance Time (g_c), s	2.5	2.2		4.6	1.8	1.5	4.9	3.6	1.3	5.2	3.8	
Green Ratio (*g/C*)	0.26	0.26		0.26	0.26	0.26	0.28	0.28	0.28	0.28	0.28	
Capacity (*c*), veh/h	496	487		474	500	424	404	526	446	415	510	
Volume-to-Capacity Ratio (*X*)	0.072	0.340		0.238	0.283	0.234	0.108	0.504	0.205	0.155	0.535	
Back of Queue (*Q*), ft/ln (95 th percentile)	5	23		19	19	13	7	34	11	11	39	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	0.9		0.7	0.8	0.5	0.3	1.4	0.4	0.4	1.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.03	0.11		0.07	0.09	0.06	0.03	0.12	0.04	0.03	0.00	
Uniform Delay (d_1), s/veh	9.9	9.1		10.9	8.9	8.8	11.5	9.2	8.4	11.4	9.3	
Incremental Delay (d_2), s/veh	0.0	0.2		0.1	0.1	0.1	0.0	0.3	0.1	0.1	0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	9.9	9.2		11.0	9.0	8.9	11.5	9.5	8.5	11.5	9.7	
Level of Service (LOS)	A	A		B	A	A	B	A	A	B	A	
Approach Delay, s/veh / LOS	9.3	A		9.6	A		9.5	A		10.0	B	
Intersection Delay, s/veh / LOS	9.7						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.07	B	1.88	B	2.07	B	1.88	B
Bicycle LOS Score / LOS	0.82	A	1.07	A	1.15	A	1.04	A

HCS Roundabouts Report

General Information

Analyst	Michael Melnyk
Agency or Co.	LCEO
Date Performed	7/17/2026
Analysis Year	2031
Time Analyzed	2031 Off Peak
Project Description	Garden and Holloway



Site Information

Intersection	Garden and Holloway
E/W Street Name	Garden Road
N/S Street Name	Holloway Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	LCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LT				LT				LTR	
Volume (V), veh/h	0	33	129	23	0	104	130	91	0	40	244	84	0	59	207	44
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	37	144	26	0	116	146	102	0	45	273	94	0	66	232	49
Right-Turn Bypass	None				Yielding				Yielding				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763	4.9763		4.9763	4.9763		4.9763	
Follow-Up Headway, s		2.6087			2.6087	2.6087		2.6087	2.6087		2.6087	

Flow Computations, Capacity and v/c Ratios

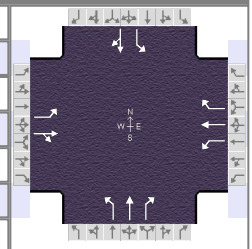
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		207			262	102		318	94		347	
Entry Volume, veh/h		201			254	99		309	91		337	
Circulating Flow (v_c), pc/h	414			355			247			307		
Exiting Flow (v_{ex}), pc/h	210			240			310			374		
Capacity (c_{pce}), pc/h		905			961	1006		1073	1114		1009	
Capacity (c), veh/h		878			933	977		1041	1081		980	
v/c Ratio (x)		0.23			0.27	0.10		0.30	0.08		0.34	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.5			6.7	4.6		6.4	4.1		7.3	
Lane LOS		A			A	A		A	A		A	
95% Queue Length, Q_{95} (veh)		0.9			1.1	0.3		1.2	0.3		1.5	
95% Queue Length, Q_{95} (ft)		23.0			28.2	7.7		30.7	7.7		38.4	
Approach Delay, s/veh | LOS	6.5	A		6.1	A		5.9	A		7.3	A	
Intersection Delay, s/veh | LOS	6.4						A					

HCS Signalized Intersection Results Summary

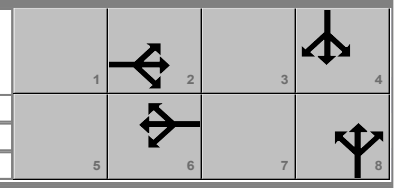
General Information				Intersection Information	
Agency	LCEO			Duration, h	0.250
Analyst	Michael Melnyk	Analysis Date	Jul 20, 2026	Area Type	Other
Jurisdiction	LCEO	Time Period	Peak Hour	PHF	0.92
Urban Street	Holloway Road	Analysis Year	2051	Analysis Period	1> 7:00
Intersection	Garden and Holloway	File Name	2051 Peak Hour.xus		
Project Description	CMAQ Application				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	47	237	63	101	233	176	85	322	139	155	319	40

Signal Information			
Cycle, s	46.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	14.9	17.7	0.0	0.0	0.0	0.0	
Yellow	5.0	5.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		5.0		5.0		6.0
Phase Duration, s		21.9		21.9		24.7		24.7
Change Period, ($Y+R_c$), s		7.0		7.0		7.0		7.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		8.9		13.2		13.5		15.5
Green Extension Time (g_e), s		1.9		1.9		2.3		2.2
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.02		0.04

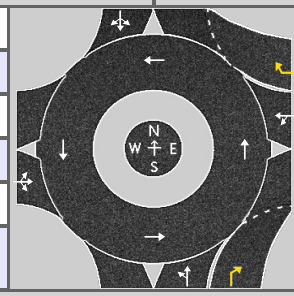
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	51	326		110	253	191	92	350	151	168	390	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1144	1831		1070	1900	1610	1009	1900	1610	1047	1863	
Queue Service Time (g_s), s	1.7	6.9		4.4	4.9	4.3	3.7	6.5	3.0	6.8	7.6	
Cycle Queue Clearance Time (g_c), s	6.5	6.9		11.2	4.9	4.3	11.5	6.5	3.0	13.5	7.6	
Green Ratio (*g/C*)	0.32	0.32		0.32	0.32	0.32	0.38	0.38	0.38	0.38	0.38	
Capacity (*c*), veh/h	400	583		339	605	513	369	724	613	402	709	
Volume-to-Capacity Ratio (*X*)	0.128	0.560		0.324	0.419	0.373	0.250	0.484	0.246	0.419	0.550	
Back of Queue (*Q*), ft/ln (95 th percentile)	16	96		40	70	52	30	83	32	58	101	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	3.8		1.6	2.8	2.1	1.2	3.3	1.3	2.3	4.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.08	0.45		0.15	0.33	0.24	0.12	0.30	0.12	0.18	0.00	
Uniform Delay (d_1), s/veh	15.0	13.2		17.8	12.5	12.3	15.9	10.9	9.8	16.2	11.3	
Incremental Delay (d_2), s/veh	0.1	0.3		0.2	0.2	0.2	0.1	0.2	0.1	0.3	0.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	15.1	13.5		18.0	12.6	12.4	16.0	11.1	9.9	16.4	11.5	
Level of Service (LOS)	B	B		B	B	B	B	B	A	B	B	
Approach Delay, s/veh / LOS	13.7	B		13.6	B		11.6	B		13.0	B	
Intersection Delay, s/veh / LOS	12.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.08	B	1.89	B	2.08	B	1.89	B
Bicycle LOS Score / LOS	1.11	A	1.40	A	1.47	A	1.41	A

HCS Roundabouts Report

General Information

Analyst	Michael Melnyk
Agency or Co.	LCEO
Date Performed	7/17/2026
Analysis Year	2051
Time Analyzed	2051 Peak Hour
Project Description	Garden and Holloway



Site Information

Intersection	Garden and Holloway
E/W Street Name	Garden Road
N/S Street Name	Holloway Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	LCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LT				LT				LTR	
Volume (V), veh/h	0	47	237	63	0	101	233	176	0	85	322	139	0	155	319	40
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	53	265	71	0	113	261	197	0	95	360	156	0	174	357	45
Right-Turn Bypass	None				Yielding				Yielding				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763	4.9763		4.9763	4.9763		4.9763	
Follow-Up Headway, s		2.6087			2.6087	2.6087		2.6087	2.6087		2.6087	

Flow Computations, Capacity and v/c Ratios

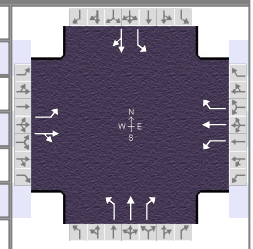
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		389			374	197		455	156		576	
Entry Volume, veh/h		378			363	191		442	151		559	
Circulating Flow (v_c), pc/h	644			508			492			469		
Exiting Flow (v_{ex}), pc/h	439			401			413			541		
Capacity (c_{pce}), pc/h		715			822	906		835	882		855	
Capacity (c), veh/h		695			798	879		811	856		830	
v/c Ratio (x)		0.54			0.46	0.22		0.54	0.18		0.67	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		13.9			10.5	6.3		12.3	6.0		16.2	
Lane LOS		B			B	A		B	A		C	
95% Queue Length, Q_{95} (veh)		3.3			2.4	0.8		3.3	0.6		5.3	
95% Queue Length, Q_{95} (ft)		84.5			61.4	20.5		84.5	15.4		135.7	
Approach Delay, s/veh | LOS	13.9	B		9.1	A		10.7	B		16.2	C	
Intersection Delay, s/veh | LOS	12.3						B					

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	LCEO			Duration, h	0.250
Analyst	Michael Melnyk	Analysis Date	Jul 20, 2026	Area Type	Other
Jurisdiction	LCEO	Time Period	Off Peak	PHF	0.92
Urban Street	Holloway Road	Analysis Year	2051	Analysis Period	1> 7:00
Intersection	Garden and Holloway	File Name	2051 Off Peak.xus		
Project Description	CMAQ Application				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	158	28	127	159	112	49	298	103	72	253	54

Signal Information			
Cycle, s	34.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	10.0	11.0	0.0	0.0	0.0	0.0						
Yellow	5.0	5.0	0.0	0.0	0.0	0.0		5	6	7	8	
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		5.0		5.0		6.0
Phase Duration, s		17.0		17.0		18.0		18.0
Change Period, ($Y+R_c$), s		7.0		7.0		7.0		7.0
Max Allow Headway (*MAH*), s		3.1		3.1		3.1		3.1
Queue Clearance Time (g_s), s		5.6		8.8		9.0		9.4
Green Extension Time (g_e), s		1.3		1.3		1.7		1.7
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.00		0.00

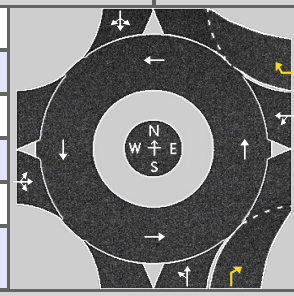
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	43	202		138	173	122	53	324	112	78	334	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1231	1850		1199	1900	1610	1063	1900	1610	1073	1842	
Queue Service Time (g_s), s	1.0	3.1		3.6	2.5	2.0	1.6	4.9	1.8	2.3	5.3	
Cycle Queue Clearance Time (g_c), s	3.6	3.1		6.8	2.5	2.0	7.0	4.9	1.8	7.4	5.3	
Green Ratio (*g/C*)	0.29	0.29		0.29	0.29	0.29	0.31	0.31	0.31	0.31	0.31	
Capacity (*c*), veh/h	468	528		442	542	460	372	593	503	385	575	
Volume-to-Capacity Ratio (*X*)	0.093	0.383		0.312	0.319	0.265	0.143	0.546	0.223	0.203	0.580	
Back of Queue (*Q*), ft/ln (95 th percentile)	8	35		30	29	20	11	52	16	18	59	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	1.4		1.2	1.2	0.8	0.5	2.1	0.6	0.7	2.4	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.16		0.12	0.14	0.09	0.05	0.19	0.06	0.05	0.00	
Uniform Delay (d_1), s/veh	11.2	10.0		12.7	9.8	9.6	13.1	9.9	8.8	13.0	10.1	
Incremental Delay (d_2), s/veh	0.0	0.2		0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	11.2	10.1		12.9	9.9	9.7	13.1	10.2	8.9	13.1	10.4	
Level of Service (LOS)	B	B		B	A	A	B	B	A	B	B	
Approach Delay, s/veh / LOS	10.3	B		10.8	B		10.2	B		10.9	B	
Intersection Delay, s/veh / LOS	10.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.08	B	1.89	B	2.07	B	1.88	B
Bicycle LOS Score / LOS	0.89	A	1.20	A	1.29	A	1.17	A

HCS Roundabouts Report

General Information

Analyst	Michael Melnyk
Agency or Co.	LCEO
Date Performed	7/17/2026
Analysis Year	2051
Time Analyzed	2051 Off Peak
Project Description	Garden and Holloway



Site Information

Intersection	Garden and Holloway
E/W Street Name	Garden Road
N/S Street Name	Holloway Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.92
Jurisdiction	LCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LT				LT				LTR	
Volume (V), veh/h	0	40	158	28	0	127	159	112	0	49	298	103	0	72	253	54
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	45	177	31	0	142	178	125	0	55	334	115	0	81	283	60
Right-Turn Bypass	None				Yielding				Yielding				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763	4.9763		4.9763	4.9763		4.9763	
Follow-Up Headway, s		2.6087			2.6087	2.6087		2.6087	2.6087		2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		253			320	125		389	115		424	
Entry Volume, veh/h		246			311	121		378	112		412	
Circulating Flow (v_c), pc/h	506			434			303			375		
Exiting Flow (v_{ex}), pc/h	258			293			379			456		
Capacity (c_{pce}), pc/h		824			886	938		1013	1061		941	
Capacity (c), veh/h		800			861	910		984	1030		914	
v/c Ratio (x)		0.31			0.36	0.13		0.38	0.11		0.45	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.0			8.3	5.2		7.8	4.5		9.4	
Lane LOS		A			A	A		A	A		A	
95% Queue Length, Q_{95} (veh)		1.3			1.7	0.5		1.8	0.4		2.4	
95% Queue Length, Q_{95} (ft)		33.3			43.5	12.8		46.1	10.2		61.4	
Approach Delay, s/veh | LOS	8.0	A		7.5	A		7.1	A		9.4	A	
Intersection Delay, s/veh | LOS	7.9						A					