

NOVEMBER 15, 2023

LAMBTON EMERGENCY MEDICAL SERVICES

MASTER PLAN 2024 - 2028



LAMBTON EMERGENCY MEDICAL SERVICES

LOOKING TOWARDS THE FUTURE

Lambton Emergency Medical Services (EMS) is the designated ambulance service operator for the County of Lambton. Employing over 160 full and part-time employees, our staff provide timely and high-quality prehospital care to visitors to the county and its nearly 130,000 residents¹.

In 2022, Lambton EMS paramedics responded to over 21,000 emergency calls² from its nine stations across the county. Lambton EMS recently established its Community Paramedic program with 8 full-time staff providing integrated, non-emergent supports to patients with chronic illnesses or who are awaiting long-term care. This program is working upstream with health sector partners in primary care, the Sarnia-Lambton Ontario Health Team (SLOHT), and Bluewater Health hospitals to help prevent emergencies before they happen amongst at-risk populations.

¹ Statistics Canada 2021 Census Data

² Lambton EMS Ambulance Call Report Data - Accessed from iMedic Database (unpublished)



Also in 2022, due to increasing demand for service, Lambton EMS added the first increase of service hours in 14 years. An aging demographic and a rise in social challenges such as homelessness, mental health and addictions, have placed pressure on the service's ability to respond when called. Ensuring the service continues to be well positioned to respond to the needs of the community will require an evaluation of past performance, modelling of future performance, and a willingness to modernize our model of service to improve effectiveness and optimize our use of resources.

This Master Plan examines trends amongst the people we serve, measures our system's performance, evaluates the stations and fleet, considers the well-being of our staff, and makes recommendations to address the growing demands for service for the years ahead.

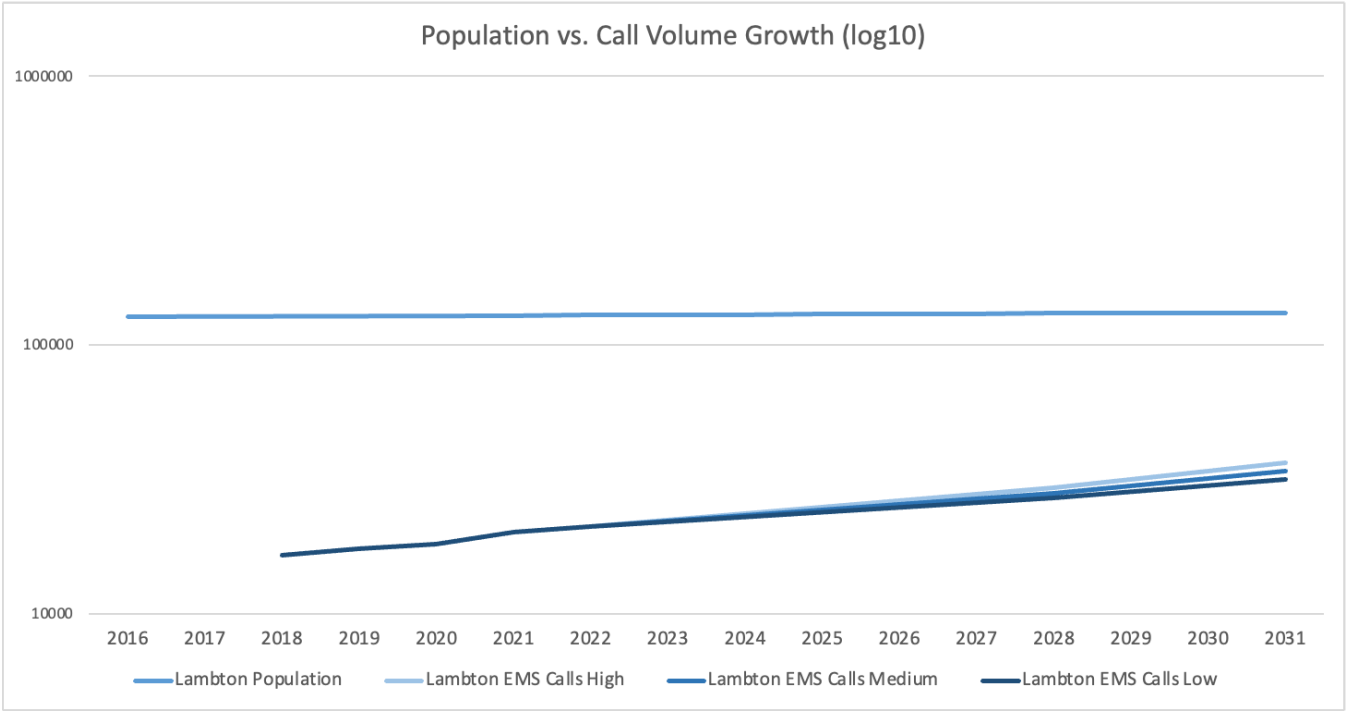
Lambton EMS last completed a Master Plan for the period of 2015 to 2019³. With these factors in mind, the need is great to develop an updated Master Plan looking forward towards the next five years.

³ <https://www.lambtononline.ca/en/county-government/resources/Documents/Emergency-Medical-Services-Strategic-Plan-2015-2019.pdf>

THE PEOPLE WE SERVE

LAMBTON COUNTY DEMOGRAPHICS

Over the past 5 years, the County of Lambton has an average annual population growth rate of 0.24% while 911 calls for ambulance service have increased at a rate of 5.9% ^{4,5}. Understanding the demographic trends behind this disparity is important for being able to accurately predict how demand for ambulance service will unfold in the years ahead.



Many municipal services typically see demand correlated directly with changes in population. Collection of solid waste, use of recreation facilities, transit ridership are examples of these types of services. While demand for Emergency Medical Services is also driven by population increases, variations in the factors affecting the Social Determinants of Health (SDOH), as well as an aging demographic play an even more significant role.

⁴ Statistics Canada 2021 Census Data

⁵ Lambton EMS Ambulance Call Report Data - Accessed from iMedic Database (unpublished)

The Social Determinants of Health include⁶:

- Income and social protection
- Education
- Unemployment and job insecurity
- Working life conditions
- Food insecurity
- Housing, basic amenities and the environment
- Early childhood development
- Social inclusion and non-discrimination
- Structural conflict
- Access to affordable health services of decent quality

These factors have significant impact in influencing one’s health outcomes and can be more important than the health care one receives or the choices one makes around their lifestyle. Working upstream to address SDOH impacts can result in significantly improved health outcomes. As a department within Lambton County’s Public Health Services Division, Lambton EMS is well placed to work collaboratively with our Public Health and broader health sector partners for the best health outcomes for our residents.

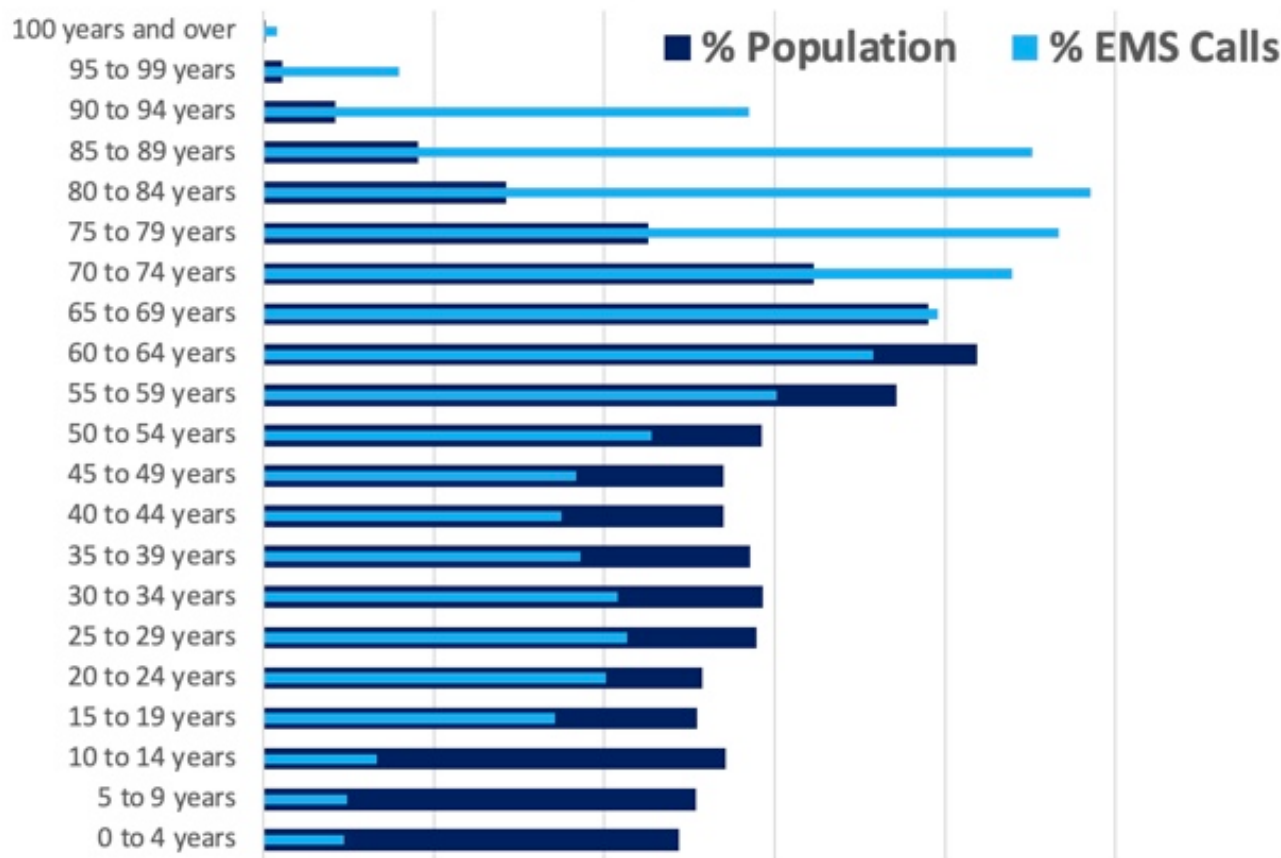
A comparison of Lambton County residents to the Ontario benchmark shows generally similar characteristics for income and employment, with Lambton having a lower unemployment rate, and lower median household income. There are fewer high school and university graduates in Lambton, but more residents holding college diplomas⁷.

	Lambton County	Ontario
Median Income	\$42,400	\$41,200
Median Household Income	\$83,000	\$91,000
Unemployment Rate	11.2%	12.2%
High School Diploma	16.8%	16.7%
College Diploma	28.4%	20.3%
Bachelor's Degree	11.2%	19.6%
Graduate Degree	3.1%	7.7%
At Least High School Diploma	59.5%	64.3%
No High School Diploma	40.5%	35.7%

⁶ https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1

⁷ Statistics Canada 2021 Census Data

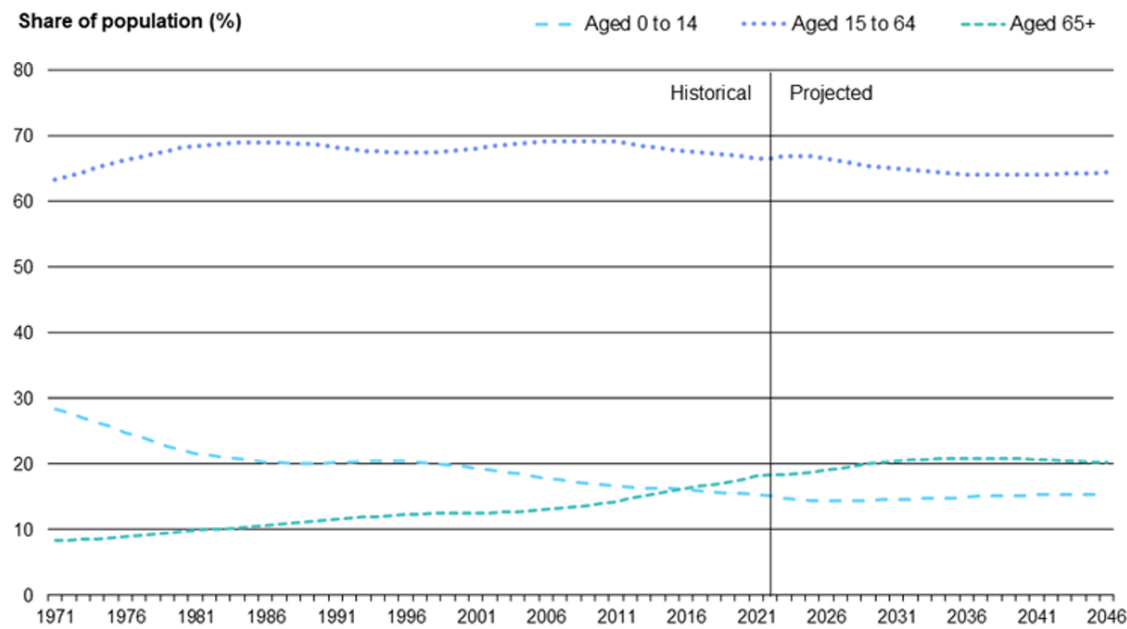
Health care services have seen demand outpace population growth as the population ages. In Lambton County, 53% of 911 calls are for those aged 65 or older⁸, yet this cohort only represents 25% of the current population. The proportion of those in this age group will continue to grow in, placing increasing demands on the healthcare system⁹.



2021 Lambton County population pyramid compared to EMS calls by age cohort

⁸ Lambton EMS Ambulance Call Report Data - Accessed from iMedic Database (unpublished)

⁹ Statistics Canada 2021 Census Data



Proportion of population aged 0-14, 15-64 and 65+ in Ontario, 1971 to 2046¹⁰

In addition to an aging population, Lambton County has identified over 250 people experiencing homelessness on its By-Name List (BNL) through the Homeless Individuals and Families Information System (HIFIS)¹¹. As this is only a registry of those willing to provide their names and have had encounters and sought services of agencies in the County, the number of people experiencing homelessness is quite likely undercounted. Of those who have been identified, 45% have been experiencing chronic homelessness and 14% are youth.

While those identified in the By-Name List account for 0.2% of Lambton’s population, Lambton Emergency Medical Services responded to at least 580 calls to 911 for patients with no fixed address in 2022, representing 3% of the service’s annual total call volume. For comparison, in 2021, our service responded to 281 patients who claimed no fixed address, meaning that the number of EMS encounters with people experiencing homelessness had doubled in just one year. Of these clients, 11% were experiencing an acute mental health event, while 12% were experiencing a suspected opioid overdose. The remaining medical concerns included traumas, assaults, heat & cold exposures, infections, chest pain and shortness of breath. Mental health calls to EMS numbered 789 across Lambton County last year and suspected opioid overdoses accounted for an additional 238 calls.

¹⁰ <https://www.ontario.ca/page/ontario-population-projections>

¹¹ County of Lambton Homelessness Data, September 26, 2023

Marginalized populations and people experiencing homelessness face markedly poorer health outcomes due to numerous systemic barriers to care. The inability to access primary care, mental health or addictions supports, lack of fluency with the health system or access to health advocates, financial hardships, racial and social inequities, and mistrust of system partners due to adverse past interactions leave members of these communities disconnected from the health care they need.

Understanding population and call demand growth within the communities of Lambton County helps ensure resources are appropriately placed where they're most needed now and in the future. The table below illustrates this growth and the relative proportion that each community represents in county's population and EMS demand for service.

Lambton County Population							
	2016	2021	Avg Annual Growth (%)	Avg Annual EMS Call Growth (%)	Lambton Pop'n (%)	Lambton EMS Calls (%)	Avg Age
Sarnia	71617	72047	0.12	6.21	56.5	61.6	44.8
St. Clair	14082	14659	0.82	9.02	11.1	6.7	43.5
Lambton Shores	10632	11876	2.34	7.65	8.4	5.4	49.9
Plympton-Wyoming	7794	8308	1.32	4.75	6.2	3.4	43
Petrolia	5743	6013	0.94	3.35	4.5	4.6	43.3
Warwick	3693	3641	-0.28	3.64	2.9	1.6	41.1
Enniskillen	2797	2825	0.2	3.35	2.2	1.4	44.5
Brooke-Alvinston	2412	2359	-0.44	6.98	1.9	1.1	41.1
Dawn-Euphemia	1966	1968	0.02	5.13	1.6	0.3	42.3
Point Edward	2038	1930	-1.06	2.70	1.6	1.9	50
Kettle and Stony Point FN	1011	1233	4.4	2.11	0.8	2.8	42.4
Aamjiwnaang FN	639	648	0.28	2.89	0.5	1.2	38.9
Oil Springs	648	647	-0.04	2.78	0.5	0.2	41.6
Walpole Island FN	1589			16.67	1.3	0.1	
Lambton County	126990	128514	0.24	5.90	100.0%	92.3	44.7

THE PEOPLE WHO SERVE

THE LAMBTON EMS TEAM

Lambton's paramedics, supervisors and administrative support are the core of the Lambton EMS team. Highly trained and dedicated to those they serve, our team works closely together, around the clock, to provide outstanding patient care to the community. Understanding their work environment and the pressures they face is important to ensuring both they, and the community they serve, remain safe.

In recent years, paramedic services across the province have been experiencing challenges in fully staffing ambulance shifts. While all full-time positions remain filled locally, short-term staffing vacancies, such as temporary absences due to illness, have been difficult to fill. As well, this has led to difficulty in providing vacation time for full-time staff members, when requested. Several factors have contributed to this including scheduling rules in the Collective Agreement, variability in the desirability of the shift requiring backfill (e.g., busyness, distance from home, time of day, day of week, etc.), or availability of part-time staff, many of whom have jobs at other ambulance services. Management and union leaders have been working together in to address language in the Collective Agreement regarding part time scheduling and staff availability in attempts to identify challenges and improve ambulance staffing.

Last year, an operational review was conducted by Performance Concepts Inc. who hosted a staff town hall to gauge the perceptions and concerns of Lambton EMS employees¹². This engagement provided some insight into the level of morale and, perhaps by extension, some rationale for the current challenges in keeping the ambulances fully staffed.

When asked to describe a typical shift at Lambton EMS, staff members provided a range of responses from, "it's ok", to "busy", to "exhausting". Paramedics expressed their concern about the call volume at several stations, specifically Sarnia, Brights Grove and Corunna, while others expressed concern about the high number of stand-by taskings while working at Watford, Thedford and Brigden. These ambulances and their crews are

¹² <https://lambton.civicweb.net/FileStorage/A3B1791DA5724DD3AE037DABB45E88E3-Lambton%20EMS%20Overview%20of%20Operations%20Review%20Staff%20Pr.pdf>

moving more than 50% of the time, in addition to station duties and training completed on shift, lending for a high workload.

These are important findings and strategies to address these workload inequities are recommended throughout this report.

PARAMEDIC WELLNESS

The work done by paramedics places significant physical and emotional demands on our staff. Shift work, unstable scene conditions, challenging lifting and awkward body positioning, infection risk, threats of violence, and exposure to traumatic events and suffering can take their toll. Paramedics experience some of the highest rates of injuries amongst workers in the province. While 5% to 10% of the general population experiences Post Traumatic Stress Disorder, the rate of PTSD is two to four times that amongst paramedics, who are estimated to have a rate of close to 20% ¹³.

Working through the unknowns of the COVID-19 pandemic added markedly more stress to an already stressful job. Fatigue, fear for self and family, rapidly changing rules and regulations led to drops in morale and job satisfaction. While staff are recovering, the impacts from the pandemic are certain to be felt for some time.

Lambton EMS has invested in new equipment to reduce the rate of physical injuries, including powered hydraulic stretchers and other lifting devices. These investments have helped to markedly reduce lost time due to back, knee and shoulder injuries. The service has also helped to establish a Peer Support Team and provided training to help address the mental health and wellbeing of staff. A psychiatrist who specializes in mental health injuries of first responders is also retained by the service to support our members.

It is essential that staff wellness of all of our team remain a priority through continued investments in equipment and training to make the workplace safer, supports to prevent injury and to help staff through their recoveries when injuries do occur, and the promotion of wellbeing to improve resilience to the stressors of the job. It is recommended that work continue to identify new opportunities to support staff

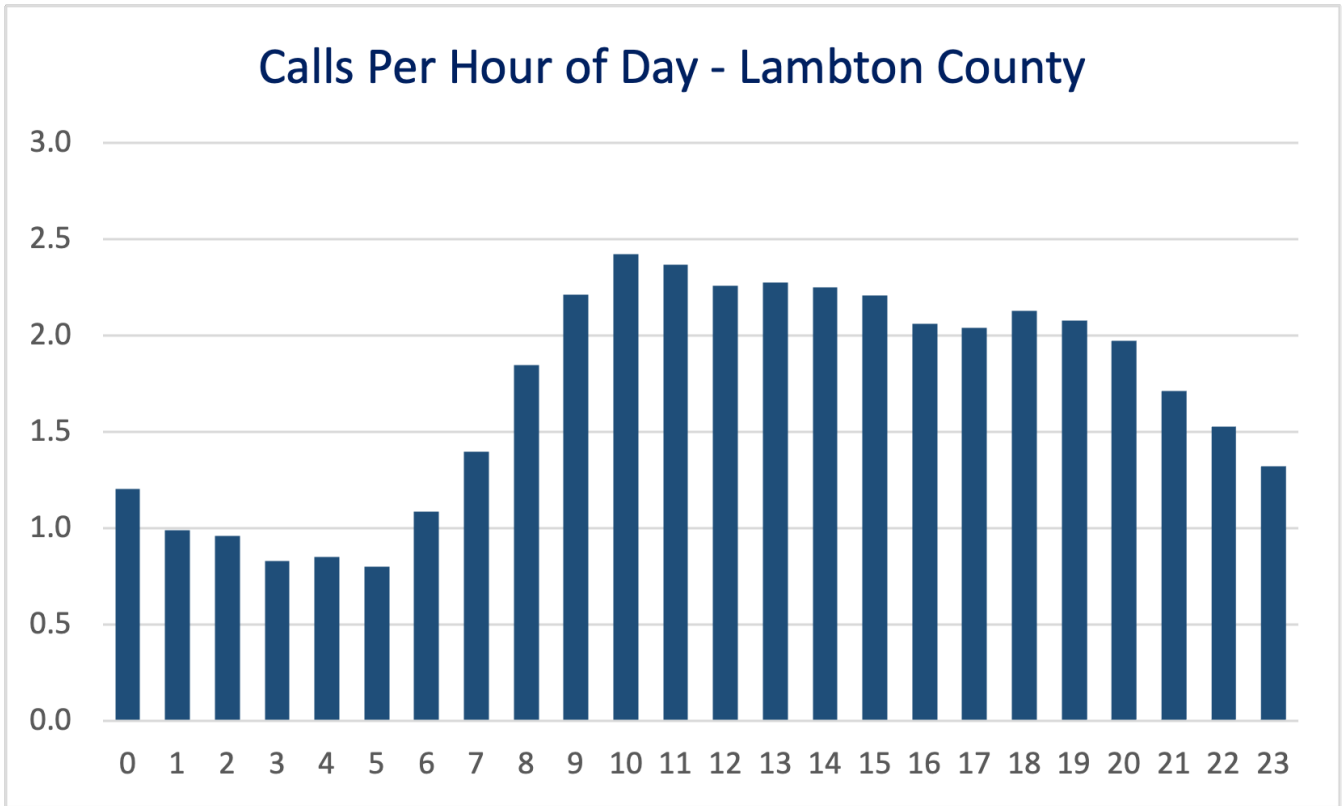
¹³ https://cradpdf.drdc-rddc.gc.ca/PDFS/unc289/p805905_A1b.pdf

wellbeing, measure and monitor impacts of workplace stress, and collaborate with staff and union representation to prevent physical and occupational stress injuries. Ongoing monitoring of utilization and improved balancing of workload between stations will be important to these efforts.

RECOMMENDATION #1 – MAINTAIN PRIORITY ON STAFF WELLBEING. IDENTIFY OPPORTUNITIES TO SUPPORT STAFF. MONITOR AND REPORT TO COUNCIL AND STAFF.

THE WORK WE DO

Emergency services routinely respond to the unpredictable, however there is actually a great deal of predictability in the work we do. Peak hours of demand have very little variance year over year. Call volumes tend to grow at a relatively steady rate. Some stations have seasonal patterns in call volume, such as Grand Bend, which sees almost twice as many calls in the summer months than in the winter.



While it is generally straightforward to predict how many 911 calls we might receive in a given period of time, it is much more difficult to predict *when* those calls will actually occur. A multi-vehicle collision could happen at any time requiring the response of several ambulances, as an example. For this reason, ambulance services need to build in significant safety capacity in case the calls received all happen at once.

Lambton EMS realizes this safety capacity by staffing 11 ambulances during the day and 10 at night, at stations across the county. The ambulances serving the Sarnia area have lower availability than those in the more rural areas of the county due to the higher call volumes in the city. Emergency Medical Services functions as a system and the lower utilization of some crews provides buffer for instances where there may be a surge in calls. If the crew's workload is too low, there is however a risk that the crew will not be able to have repeated exposure to different call types leading to an attrition of skills. Low utilization of an ambulance is also rather inefficient. To fully staff an ambulance around the clock costs over \$1 Million per year. It's imperative that staffing is done in a manner that evaluates the different sources of variability, reflects the potential level of demand at any given time, controls for the sources of predictable variability and mitigates the impacts of unpredictable variability.

Emergency Medical Services were established to provide rapid response to serious health emergencies, however, not all patients who call 911 require immediate emergency care. Approximately, 25% of all patients seen by Lambton EMS paramedics are triaged on the Canadian Triage Acuity Scale (CTAS) at level 4 or 5, the lowest acuity categories of the 5-point scale¹⁴. These patients are often transported and seen in the Emergency Department receiving little to no additional treatment. Due to challenges in finding a family doctor or difficulties in navigating the health system, often, people turn to the emergency health system to address primary care needs, as they have few other places to turn.

EMS has a role to play in helping people get the care they need while reducing the draw on limited emergency health care resources. Development of criteria to determine patient risk, potentially using Artificial Intelligence / machine learning, could help to identify at the time of the call to 911 whether the patient could be suitable to defer for a time when system demand is lower rather than sending an ambulance to their location,

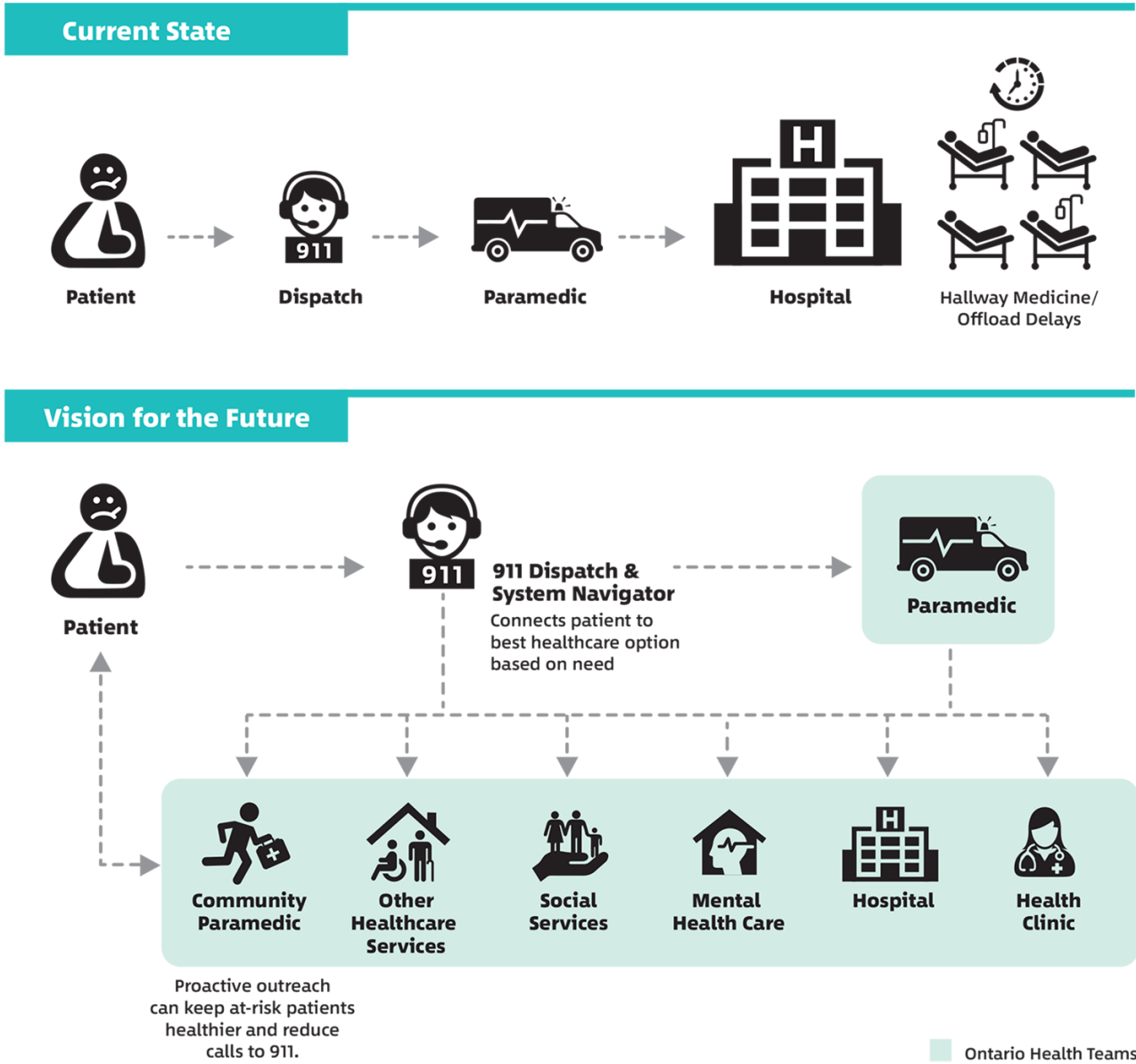
¹⁴ Lambton EMS Ambulance Call Report Data - Accessed from the iMedic Database (unpublished)

right away. Likewise, it would be very helpful to be able to refer some lower acuity health concerns directly to timely appointments with primary care.

Leveraging the Community Paramedics to attend a scene and conduct an assessment could free up ambulance crews for higher acuity calls and increase system capacity. These proposals are currently being advocated by the Ontario Association of Paramedic Chiefs (OAPC), but will require system change at the Ministry of Health in order to explore these opportunities in practice. Lambton EMS has a unique opportunity to trial a project like this as the Wallaceburg Central Ambulance Communications Centre (CACC) is a small dispatch centre operated by the Sunnybrook Base Hospital. Sunnybrook operates the CACC with the intent to conduct research into prehospital care systems so a partnership between Lambton EMS and Sunnybrook could be quite feasible. This is worth exploring and should be a priority for the service to advance in the coming years.

The OAPC has promoted its 'Vision for the Future'¹⁵ in its submission to the Province regarding the modernization of Emergency Health Services. The submission envisions a system where 911 dispatchers, system navigators and paramedics work to connect patients with the care they need in the time they need it. The care required is not always care that is delivered in an Emergency Department. Often these supports can be through social services, mental health, primary care or other services. Key to success of this vision is further integration of Emergency Medical Services into the broader health system. Through this work, the EMS system can begin to take steps to remove some of the impacts of unpredictable variability.

¹⁵ EHS Modernization: A Submission by the Ontario Association of Paramedic Chiefs, March 2020



OAPC Vision for the Future - Reproduced with permission

HOW WE'RE DOING

LAMBTON EMS PERFORMANCE ANALYSIS

Number of 24 hr Crew	10.5	Average Annual Call Growth	5.9%
Number of 911 Calls / Year	21232	Total Number of Calls / Year	35461
Unit Hour Utilization	19%	Percent of time on Code 8	18%
Average C-4 Response Time	7.03 mins	90 th Percentile Response Time	13.0 mins
Fleet Size	25	Number of Garage Bays	15

Response time is the primary Key Performance Indicator (KPI) in Emergency Medical Services. On this indicator, Lambton EMS continues to perform within or better than its response time targets in all categories, however, response times are slowly increasing as service demand increases¹⁶.

Response Level		2018	2019	2020	2021	2022
	Target Goal (%)	Actual	Actual	Actual	Actual	Actual
Sudden Cardiac Arrest	45% in 6 mins	60%	61%	59%	54%	54%
CTAS 1	60% in 8 mins	77%	77%	78%	78%	75%
CTAS 2	70% in 10 mins	84%	84%	83%	81%	79%
CTAS 3	65% in 10 mins	80%	80%	77%	76%	75%
CTAS 4	70% in 12 mins	87%	88%	86%	83%	83%
CTAS 5	80% in 15 mins	93%	93%	93%	92%	91%

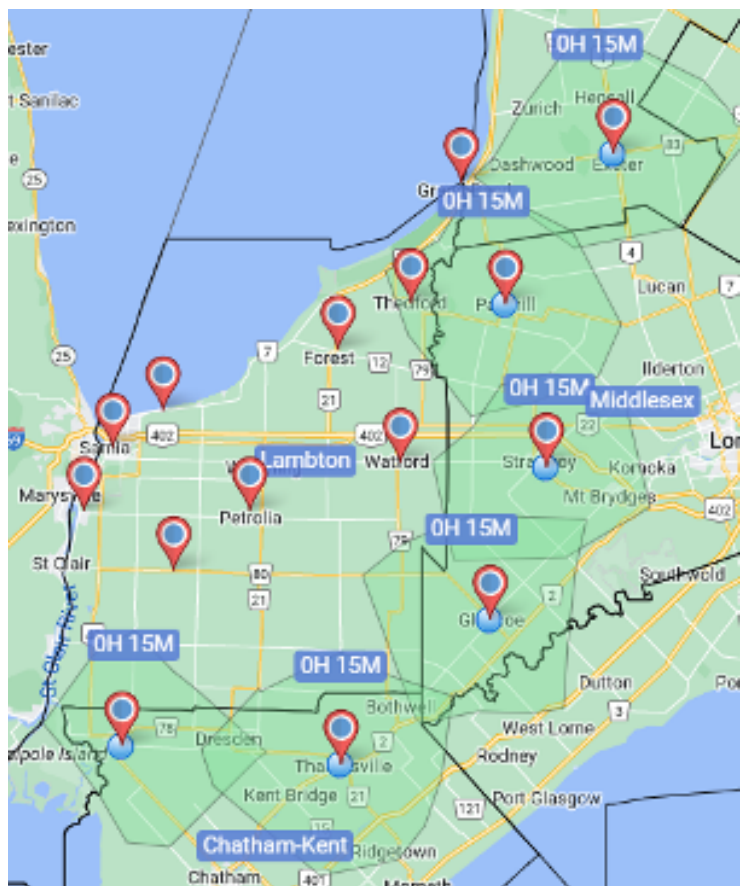
The Ministry of Health requires that all ambulance services set, and report on, their response time targets annually based on community need. Response times are set to correspond to a patient's level of urgency, with sudden cardiac arrest having the highest priority and other call types decreasing in urgency on a 5-point scale. This scale is called

¹⁶ <https://lambton.civicweb.net/FileStorage/B51225E5823846869A493EFBF8A2ABAC-2022%20Ambulance%20Response%20Times2.pdf>

the Canadian Triage Acuity Scale (CTAS)¹⁷ and helps to triage resources based on a patient's level of need. This allows the most urgent cases to receive the fastest response while low urgency cases may receive a slower response, based on the availability of resources. Response times may also be measured in 90th percentile, which is the response time at which 90 percent of calls are serviced. This can be viewed as a more accurate measure as it contains less variance than an average.

The EMS system is designed to operate in a borderless fashion where the closest, most appropriate ambulance and crew are sent to a call for service, regardless of which municipality the calls and the crews may be in.

Lambton EMS operates out of 9 stations positioned across the County to provide balanced coverage and to minimize response times to emergencies. Lambton County resources may, at times, be called to respond to emergencies in neighbouring counties when Lambton resources are closest, and neighbouring county resources may, likewise, respond into Lambton County.



¹⁷ <https://www.lhsc.on.ca/media/2904/download>

When an ambulance from one station is called into service, ambulances from other stations may relocate to balance out the coverage to help reduce response times in what is called 'standby' or 'Code 8' movement. These movements are coordinated by the Wallaceburg Central Ambulance Communications Centre (CACC) in accordance with a deployment plan set by Lambton EMS. While ambulances and crews maintain stations within the various municipalities across the County, they are positioned to provide both local and county-wide response.

Code 8 assignments are important to ensuring balanced emergency coverage and are examined in detail later in this report.

Response times are a function of the urgency of the call, the distance between the call and the closest available ambulance, and the availability of an ambulance to respond. Ensuring that there are sufficient numbers of staffed ambulances in service, and that stations are in the optimal locations, helps to keep response times within acceptable standards.

The Master Plan work sought to identify current service performance both county-wide and at a station-by-station level as well as to provide forecasting to call volume growth in each station's service area. These projections can help to predict when service level changes or additions may be required to meet demand.

UNIT HOUR UTILIZATION

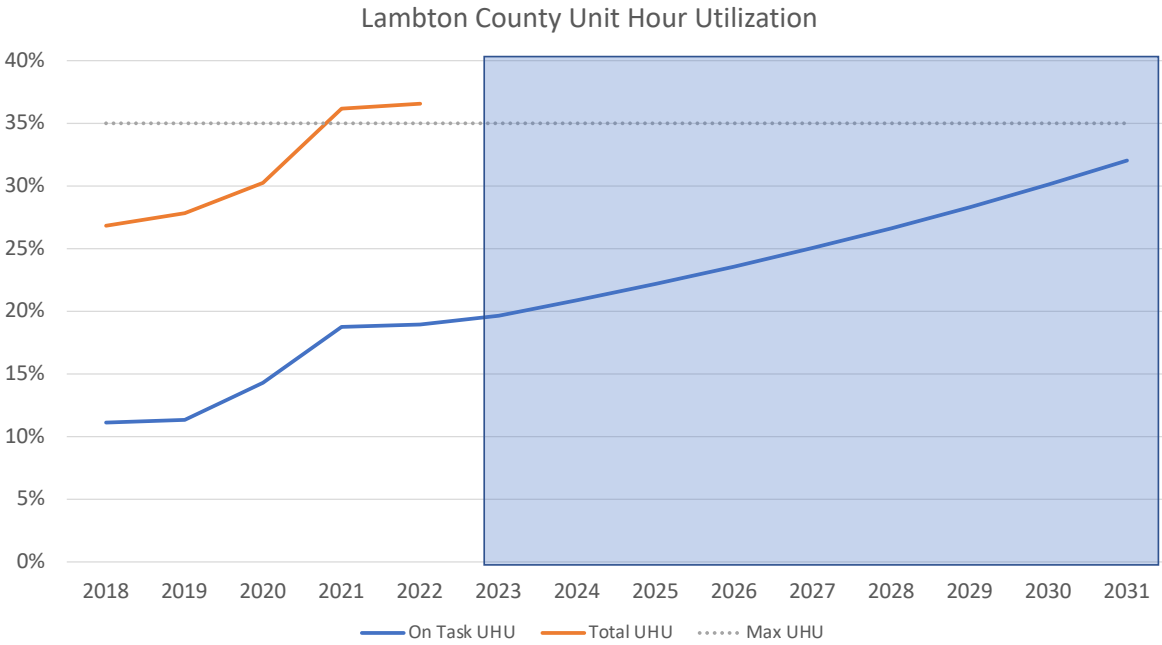
While response time is the KPI used to measure EMS efficacy, Unit Unit-Hour-Utilization (UHU) is the Key Performance Indicator (KPI) most commonly used by emergency medical services to determine the level of system busyness and capacity to respond to 911 calls. It is derived by taking the total amount of time spent servicing calls and dividing by the total amount of time available for service.

While there is no universally accepted optimal UHU, services generally aim for UHU values between 30% and 40%¹⁸. When the UHU is too low, the cost per call serviced is high. When utilization is above 35%, call response times begin to decrease due to reduced ambulance availability. At this level, there is also a higher risk to crews for fatigue and

¹⁸ <https://fitchassoc.com/new-ems-imperative-demonstrating-value/>

burnout. As such, a time-on-task UHU of 35% is recommended to be the upper limit for any individual Lambton EMS station.

Paramedics have raised concerns that too much time spent moving between stations on Code 8 coverage also contributes to crew fatigue. The UHU graphs in this report identify both time-on-task on an ambulance call (blue line) and total utilization accounting for 911 calls plus Code 8 standby assignments (orange line).



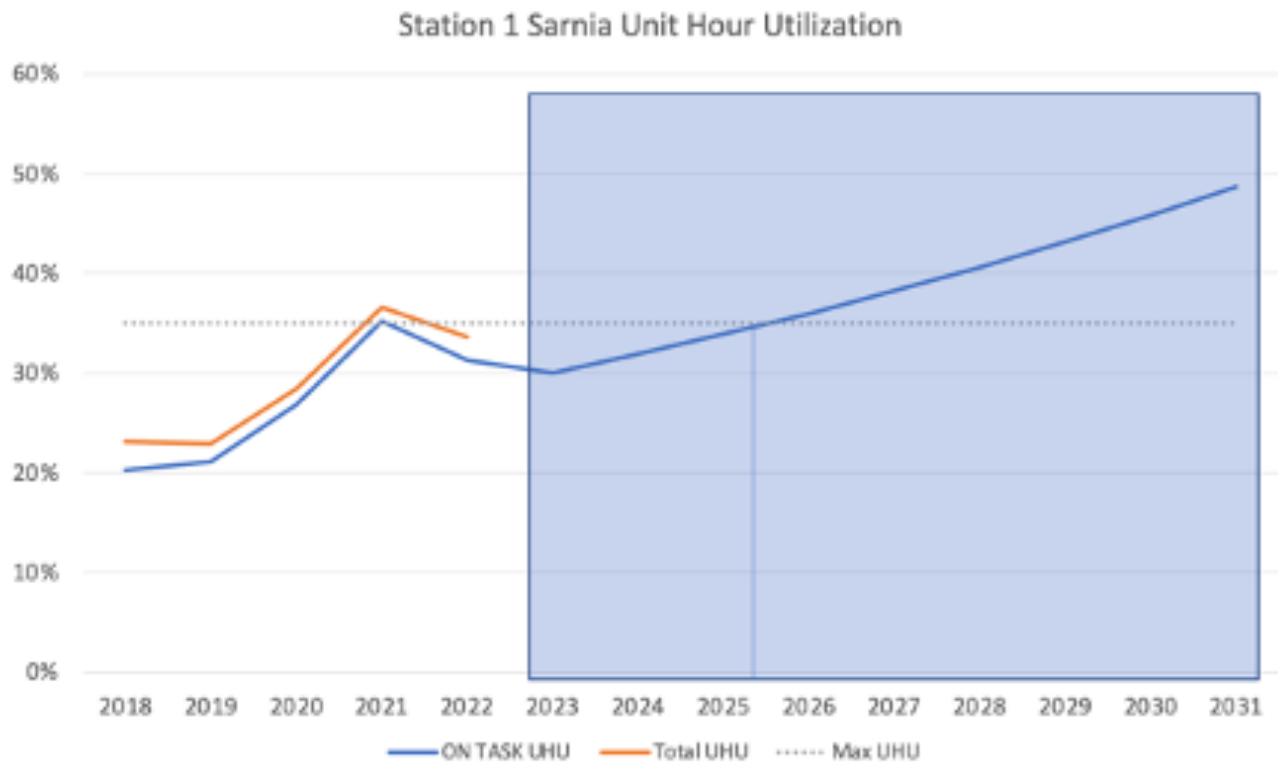
Forecasting of ‘On Task’ UHU was done by calculating the average annual change in call volume over five years at each station, then determining the total time-on-task and dividing it by the total number of annual service hours at that station. This forecast is represented within the blue shaded box. Data for this assessment was obtained from the Lambton EMS Ambulance Call Report (ACR) Database.

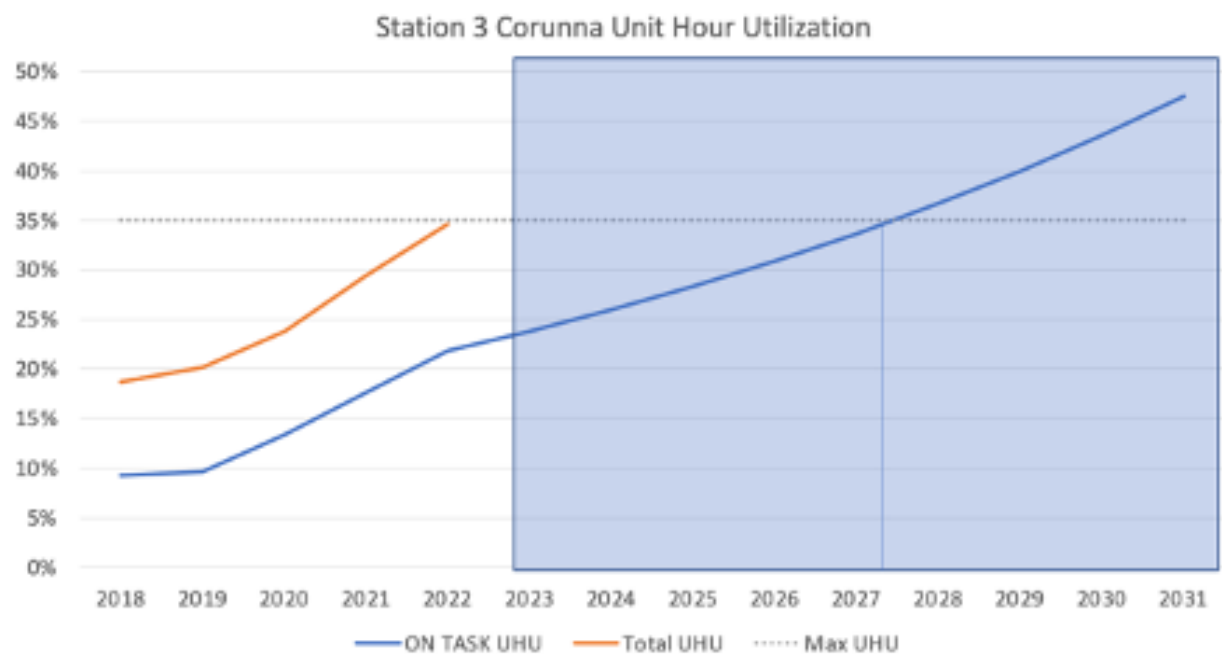
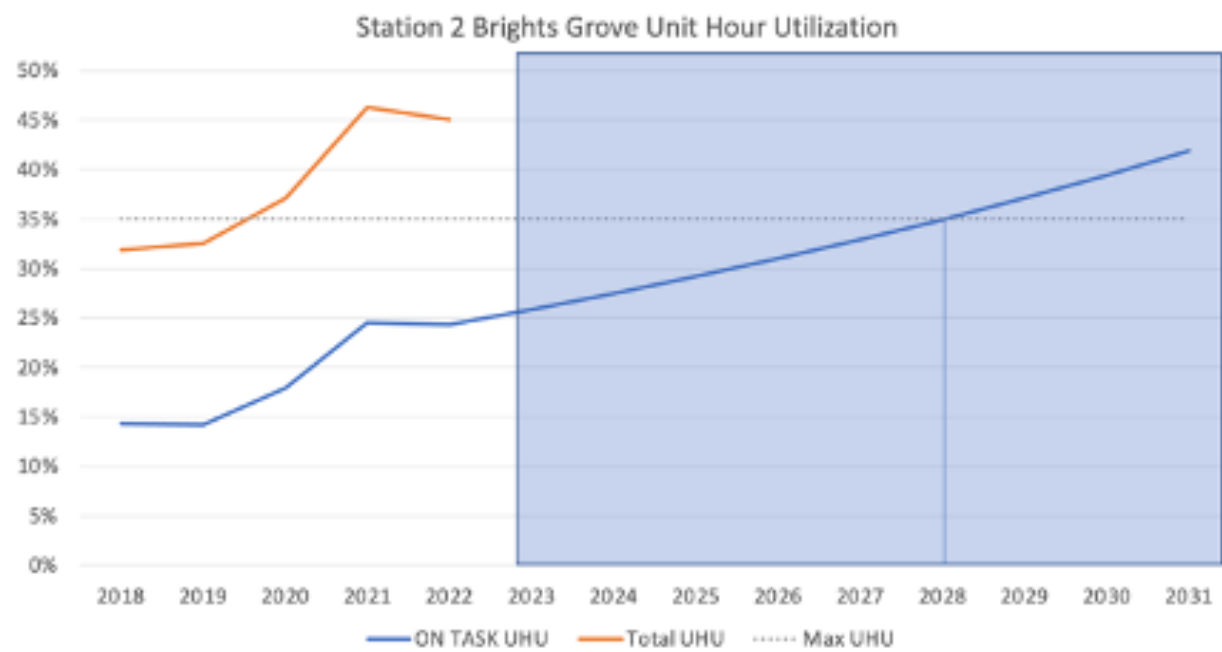
Forecasting of ‘Total UHU’ (time-on-task plus Code 8 standbys) was not performed, as this number is a function of the service’s deployment plan which can be changed administratively. These changes are recommended further in this report.

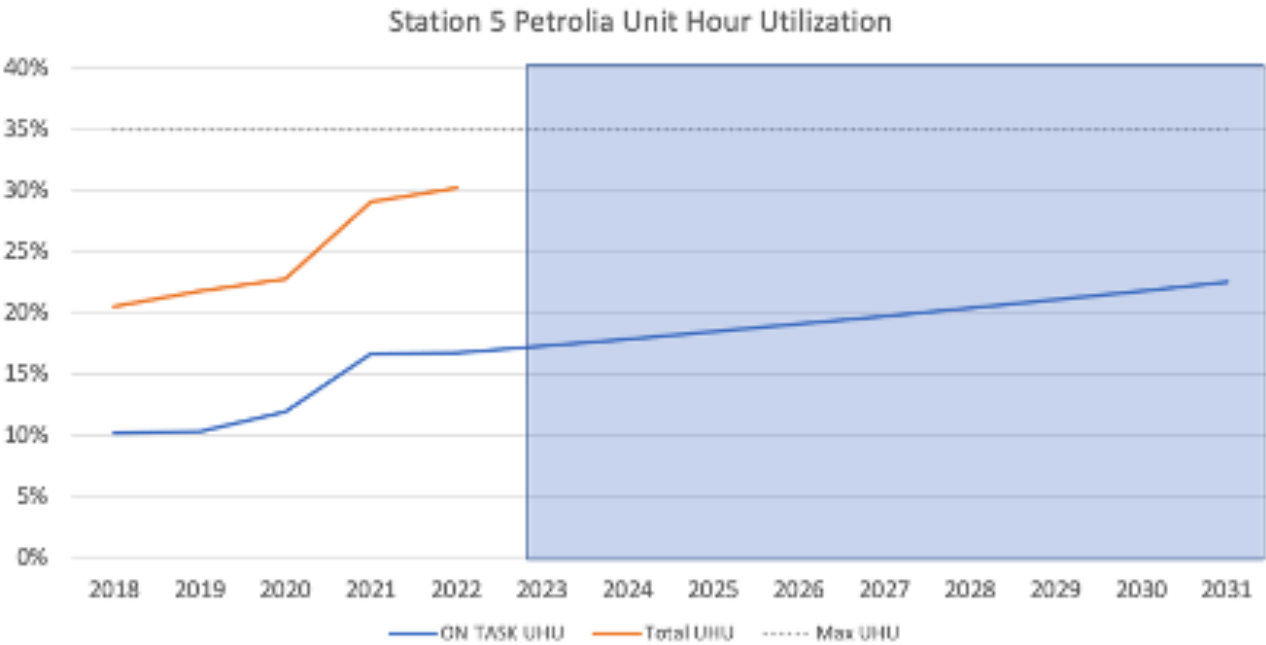
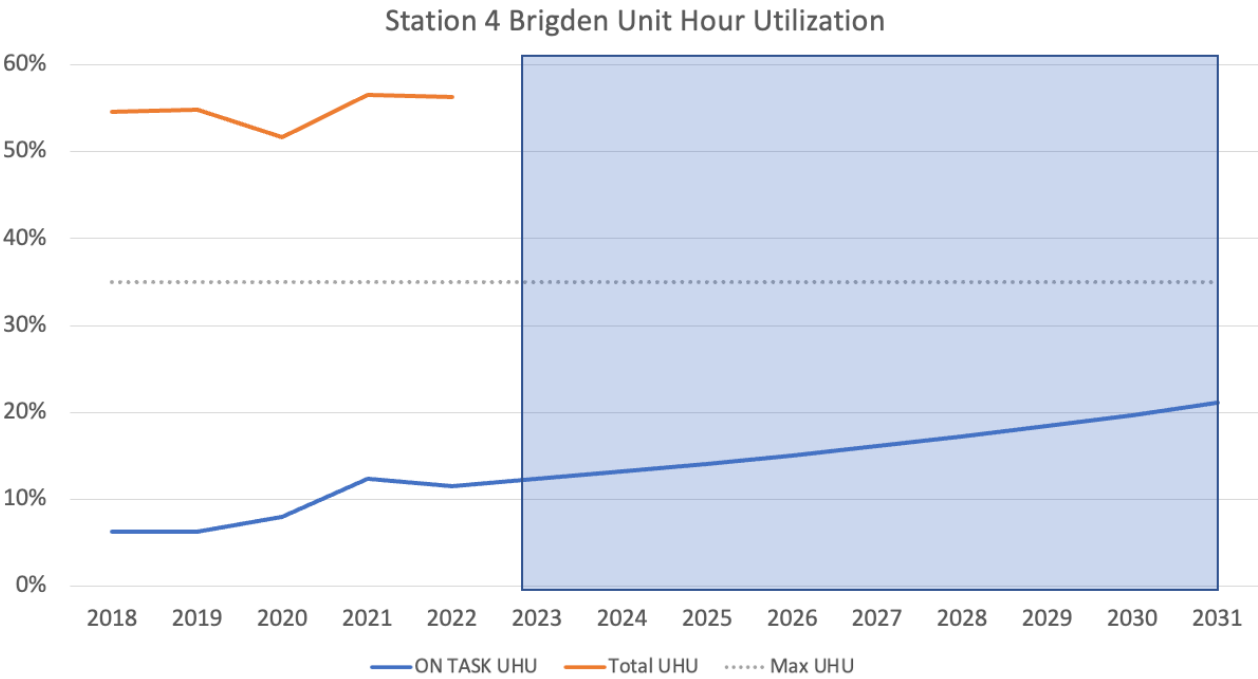
The ‘flattening’ of the curve in the UHU forecast for Lambton County between 2021 and 2022 demonstrates the point in time when the additional 12 hours per day of service was added to Sarnia in June of 2022. This plateau is evident to varying degrees in the projections of the various stations with more pronounced effect at stations closer to Sarnia. This shows that the additional resources were helpful in slowing the rate of increase of calls and standbys, though the effect is somewhat short-lived.

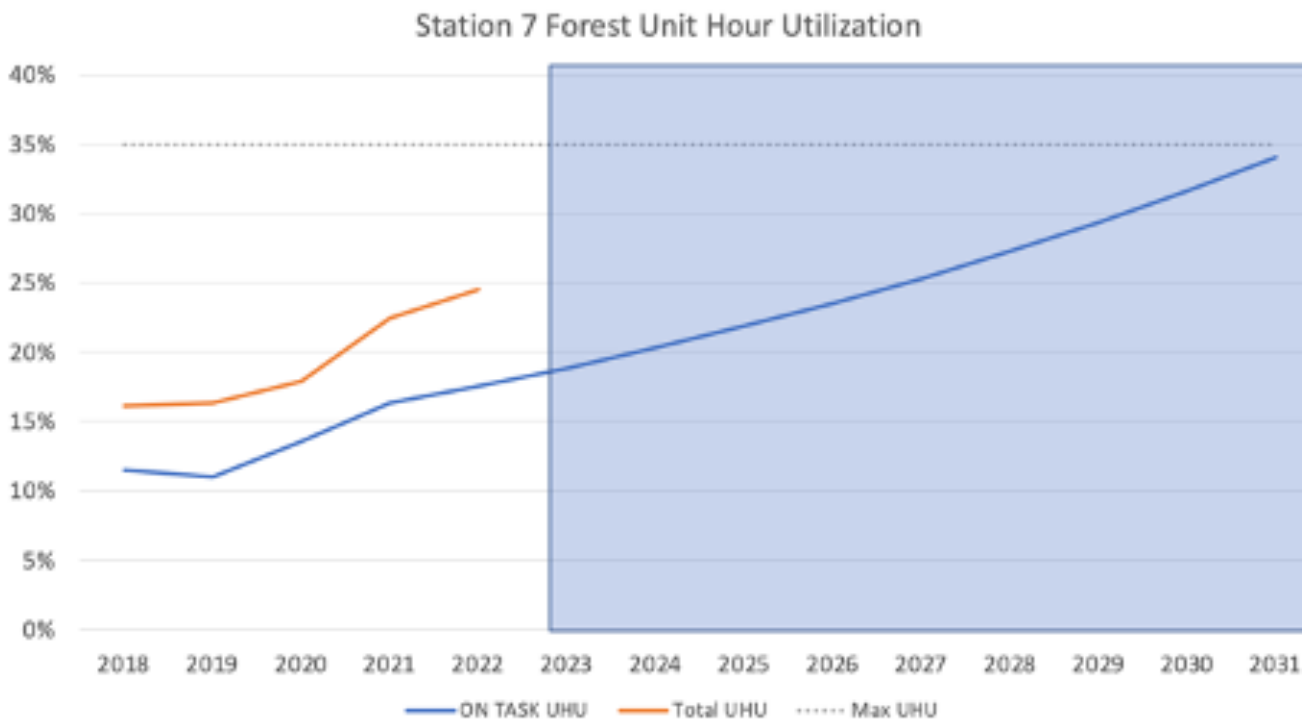
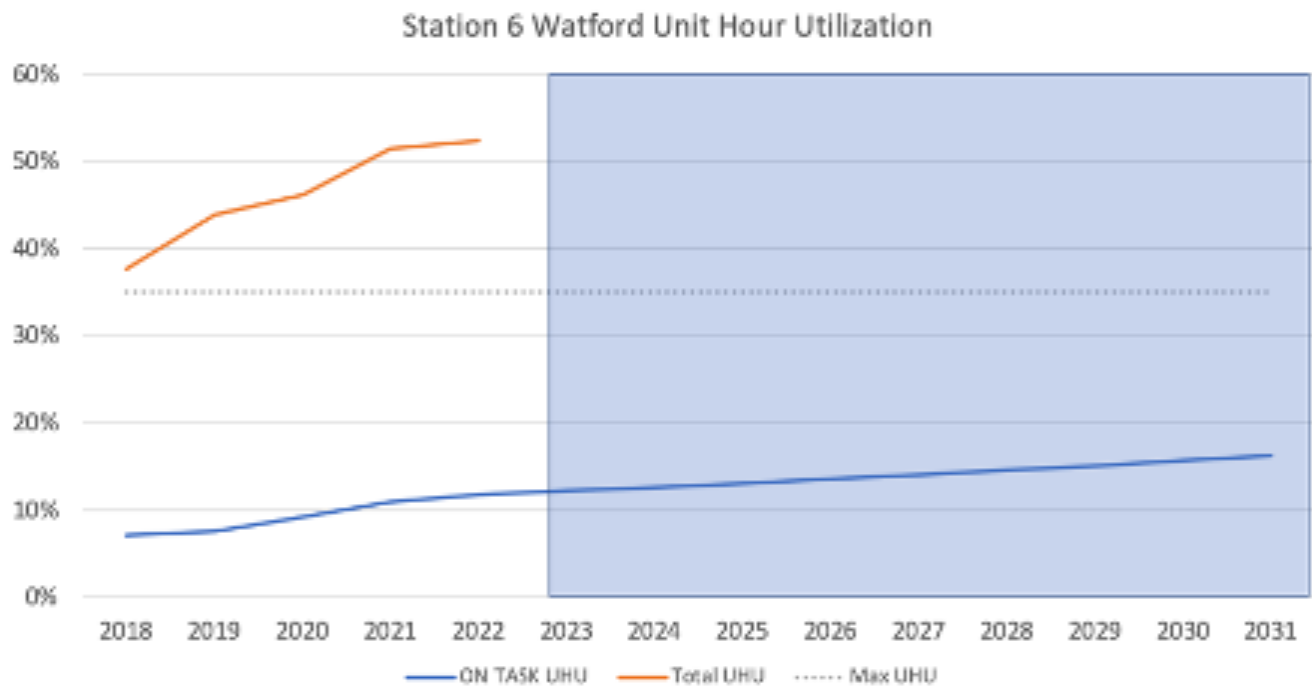
This forecasting was completed to determine when the service could anticipate needing to add additional resources in order to maintain appropriate response times and crew workload.

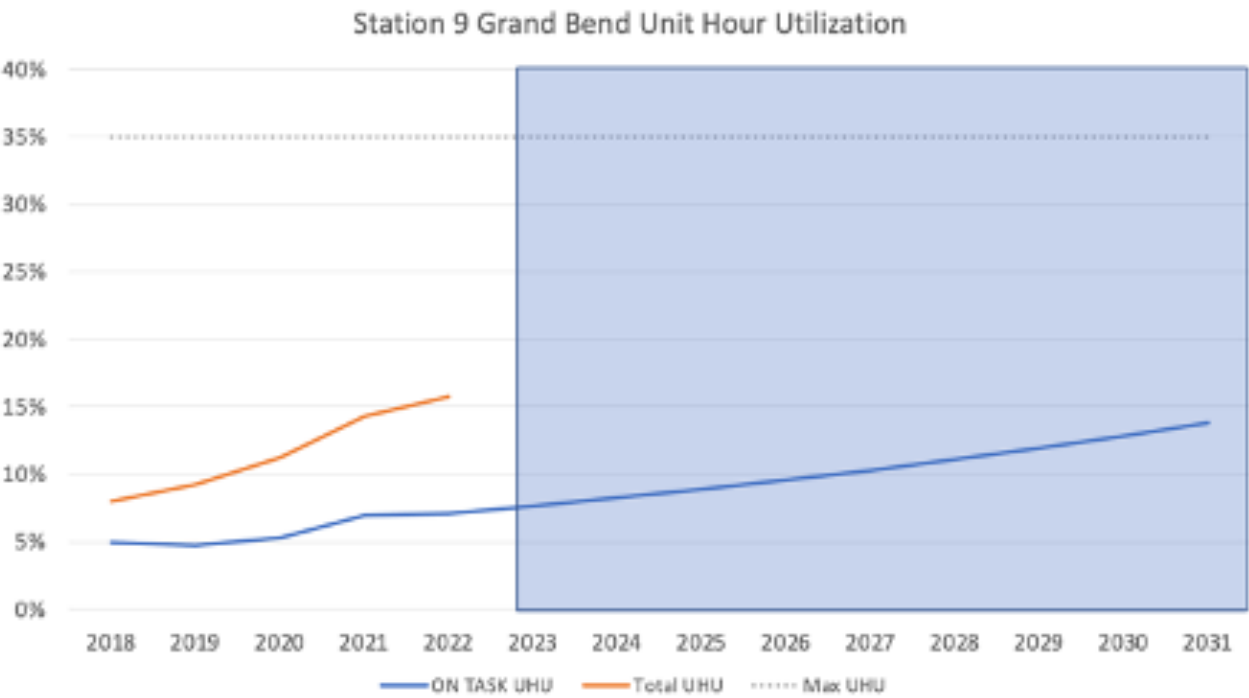
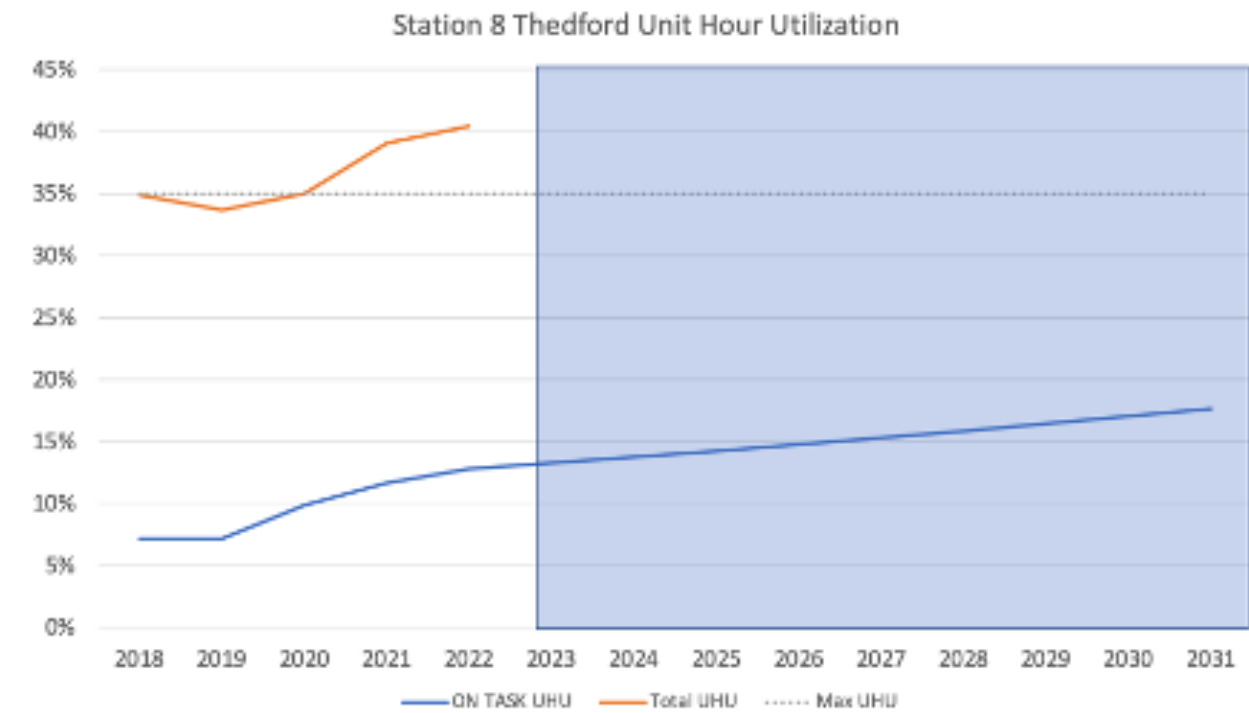
UNIT HOUR UTILIZATION BY STATION





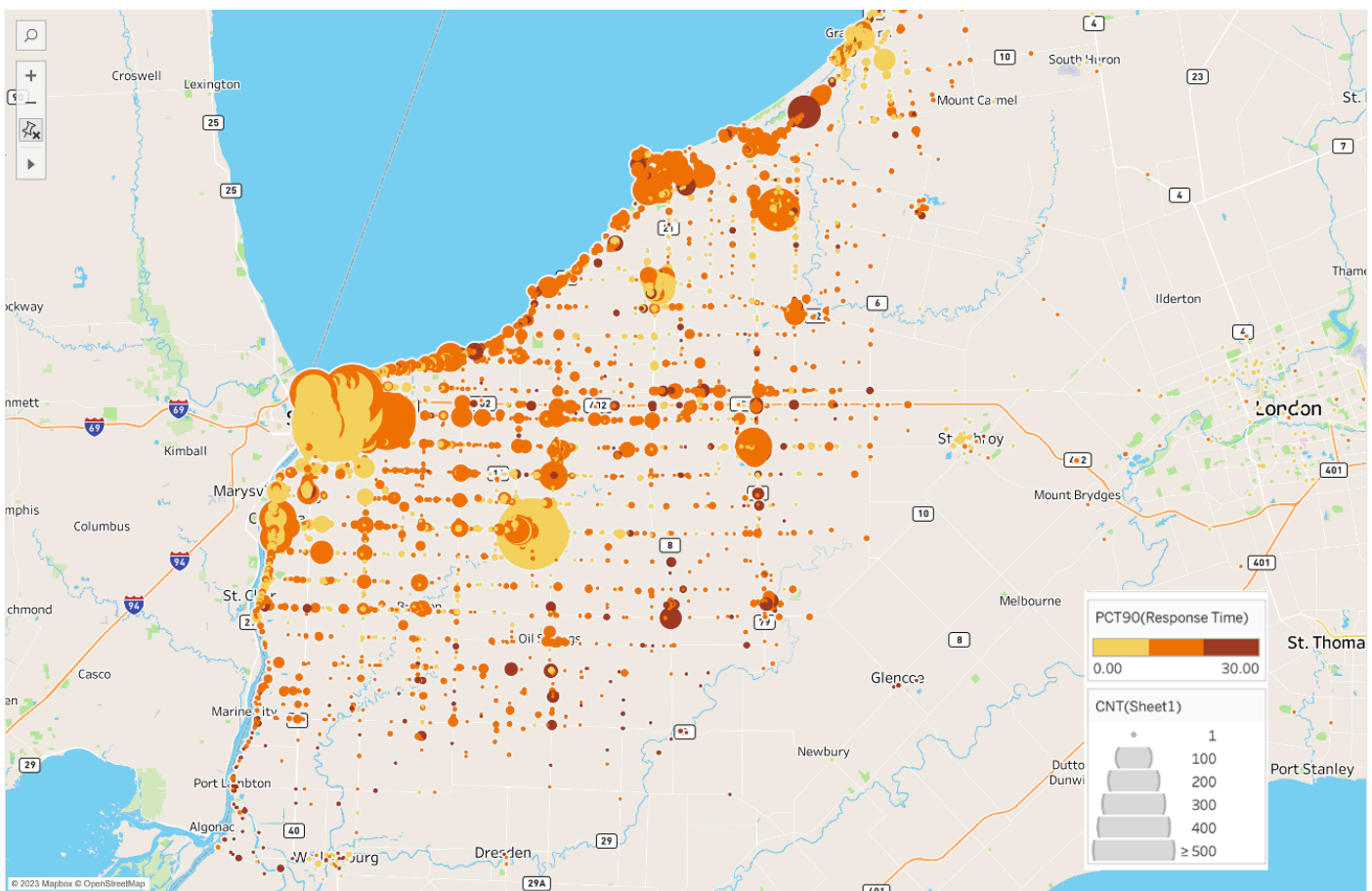






HEATMAPPING

Heatmapping of 90th percentile response times was also conducted for each station using the ACR database and Tableau software. The heat map provides an 'at a glance' view of the response time performance and geographic clustering of calls for each station. A larger circle represents a larger concentration of 911 calls. As the circles become darker, this is an indication of longer 90th percentile response times. The three colour gradients from light to dark represent 0-10 minutes, 10-20 minutes, and 20-30 minutes, respectively.



Prior to the Province's adoption of the Response Time Performance Plan, ambulance services were provided 90th percentile response time targets for both urban and rural environments. For urban responses, the Ministry of Health 90th percentile standard was 8 minutes and 59 seconds and for rural response, the 90th percentile standard was 14 minutes and 59 seconds. These measures still provide a good indication of the agility of

an Emergency Medical Service to respond to emergencies in a timely manner and can be used as a benchmark when evaluating station-by-station performance.

STATION LOCATIONS AND RESPONSE TIMES

An essential part of ensuring optimal 911 response coverage is to evaluate the placement of resources. Response times to life-threatening emergencies should be minimized and, ideally, kept below 15 minutes. Measuring average response times does not provide a good indicator of the consistency of response and, therefore, measuring the 90th percentile provides a better representation of performance. The 90th percentile indicator reports the time to which 90 percent of life-threatening 911 calls are responded. Using average response times could hide large variances in performance. As an example, if one call response was 1 minute and another call response 29 minutes, the average response time would be 15 minutes. The first call response would be very fast while the second would be very prolonged.



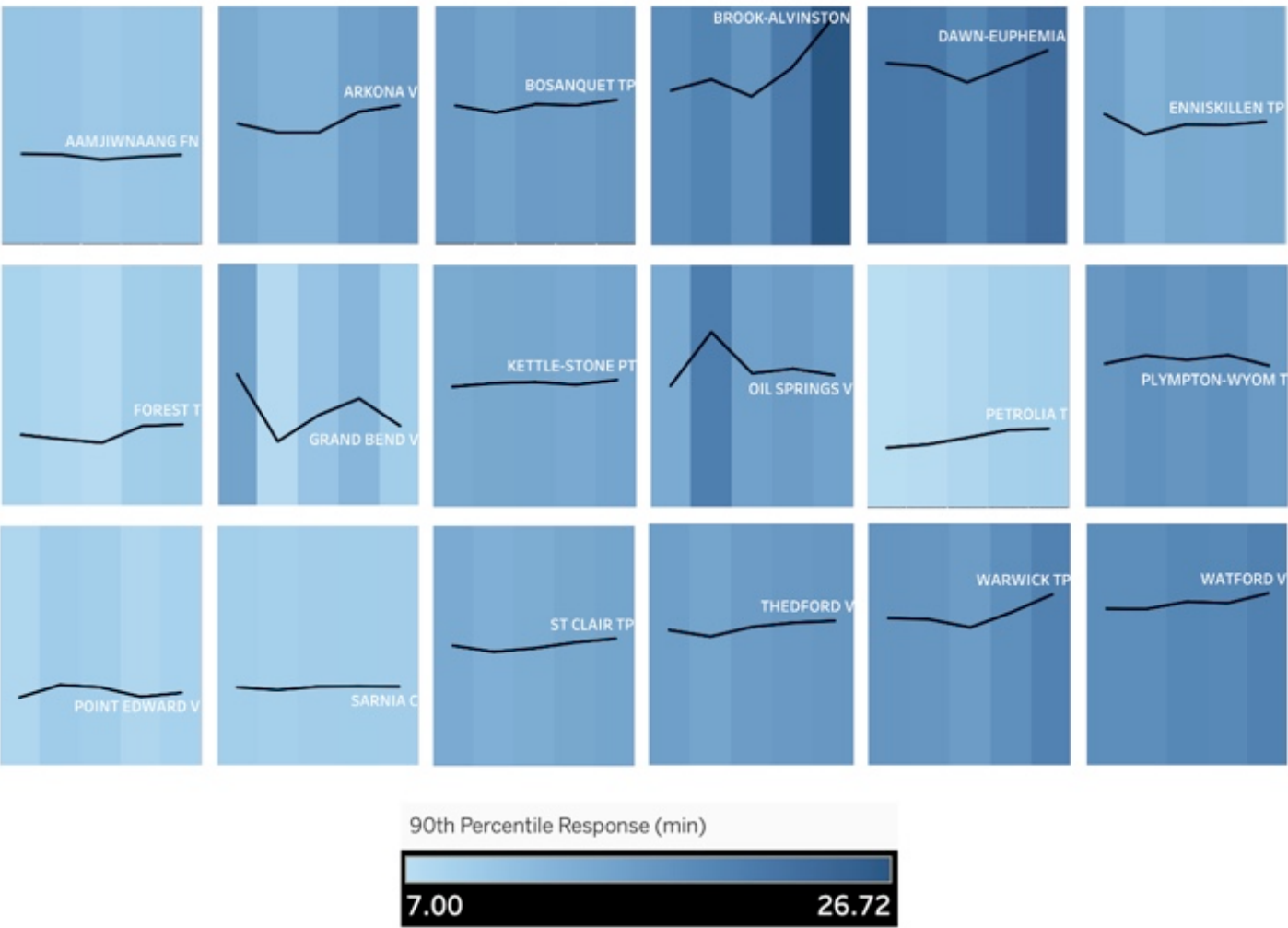
Current Lambton EMS Stations

The data reviewed for the Master Plan examined the 90th percentile response times for each station, in addition to those for the entire county, as a whole. This was completed using heat maps illustrating both the response time and frequency of calls for any given area in the county.

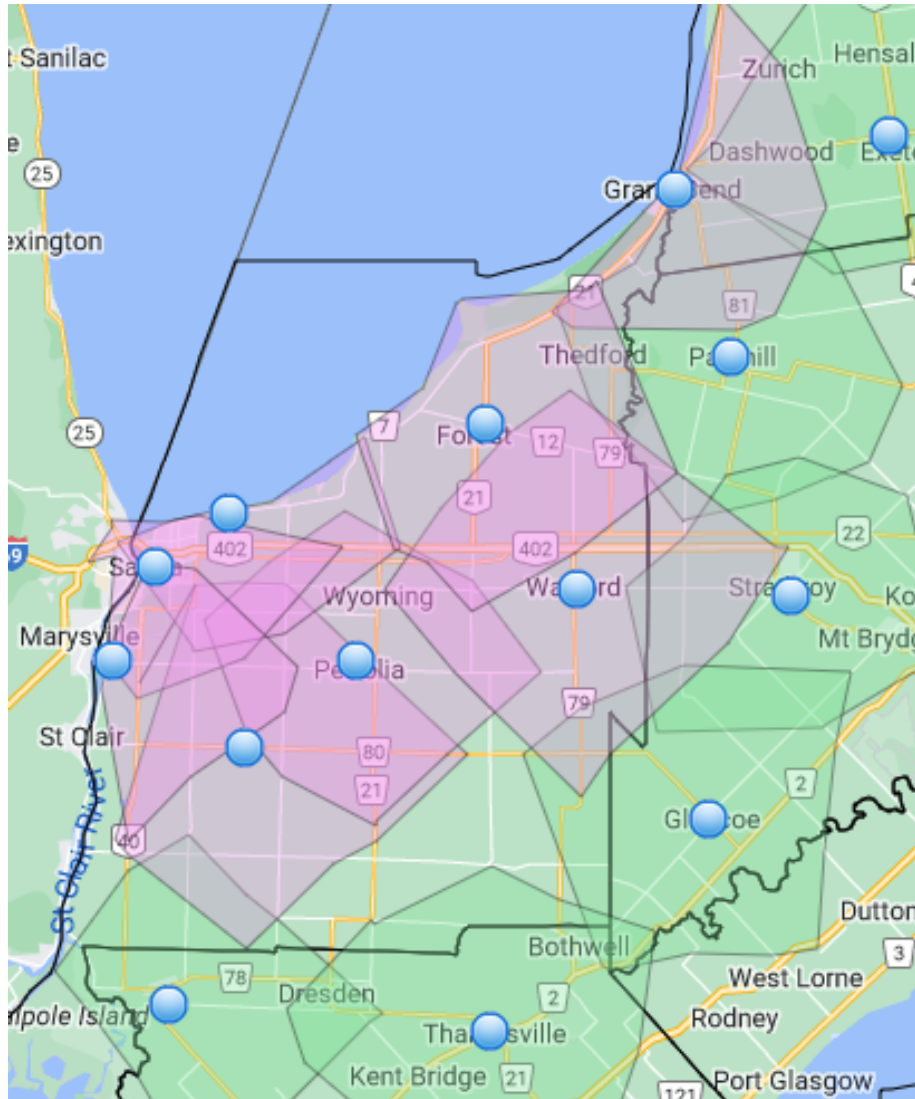
Two factors are key to determining emergency response coverage for a community. First, resource positioning ideally should reflect the opportunity to provide the fastest response times to the greatest number of calls within the resources available. Second, the number of resources provided should reflect the demand for service and the response time expectations set out for the service.

Ambulance services are required to distribute resources across the geographic areas they serve and, together with neighbouring services, provide seamless and borderless response capacity across the province. Higher density areas generate higher demands for service and, as such, resources are often drawn into higher population areas at the expense of response times to lower density areas. By moving resources to service the areas with more frequent calls, the overall response times are kept relatively low, though the less frequent calls in lower density areas may experience prolonged responses, as a result. These prolonged responses are not often detected in the typical response time analyses and reporting. A summary of station-by-station performance can be found in Appendix A.

Response Time Trend by Municipality 2018 - 2022

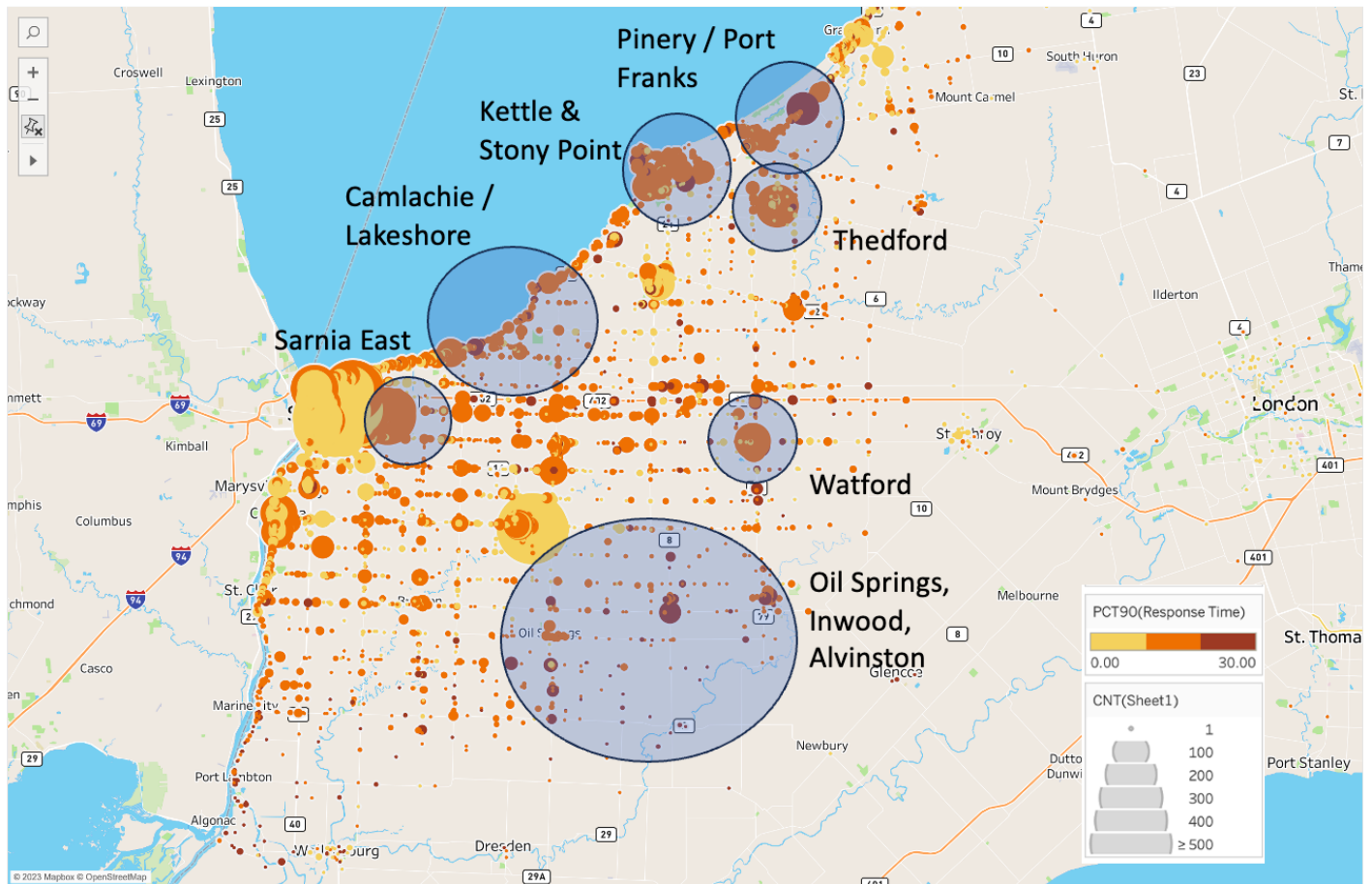


A more granular examination of response times by lower-tier municipality provides a more accurate picture of how well emergency coverage is balanced across the county. Over the past 5 years, there has been a marked increase in response times to Brooke-Alvinston and Dawn-Euphemia resulting from a high rate of Code 8 assignments for the Watford and Brigid stations. Response times in Sarnia, Point Edward, Forest and Petrolia are amongst the lowest in the county. As is demonstrated in this figure, response times in almost all municipalities are slowly increasing, most likely as a result of steadily increasing call volumes and a limited increase in resources to handle those calls.



This map shows Lambton EMS's reach within the 15-minute rural 90th percentile standard. This map also shows the 15-minute response time polygons into Lambton County for neighbouring services in Middlesex, Chatham-Kent and Huron. Of note is the fairly large area in the south of the county which is not possible to reach within 15 minutes of any station. While population density and call volumes are much smaller in this area, long response times to the region are exacerbated when the Bridgen ambulance crew is not at that station.

HOW WE CAN IMPROVE



The heatmap of the volume of calls and their relative response times further illustrates areas for improvement. In this map, larger dots indicate a higher density of calls, and the increasing darkness of the dots indicates longer 90th percentile response times. The highlighted areas with darker, larger dots are areas of concern to be addressed through this master plan's recommendations.

SARNIA EAST

The Sarnia area represents over 65% of call volume for Lambton EMS. The 90th percentile response times for most of the city and Point Edward are very good, measuring around 8 minutes. The heatmap east of Sarnia and out to Highway 402 shows increasing response times yet high density as calls get further away from the George Street Station.

The Brights Grove station is the most frequent ambulance to be sent on Code 8 to cover Sarnia and is not often in the station to provide coverage to the lakeshore region, though response times are still able to be maintained within acceptable parameters. Brights Grove is also located directly adjacent to the Sarnia Fire and Rescue Services Telford Station, which provides first response to life threatening medical emergencies under the Tiered Response Agreement (TRA). Having the two stations responding from the same place at the same time negates most benefits from the TRA as the response times would be nearly identical. This provides an opportunity to relocate the Brights Grove station further south to the east end of Sarnia, which can help improve response coverage for the area. Relocating to the area of Highways 40 and 402 provides quick access in all directions, improves coverage of Highway 402, and can reach Brights Grove with a 90th percentile time of 9 minutes. This move will also significantly reduce the need to send this unit on Code 8 standbys as most of Sarnia could be serviced within 9 minutes from this location.

Establishing a new station in this location also provides the opportunity to establish a headquarters where operations, administration, logistics and training can be joined together. At this time, EMS administration and operations are in separate locations creating a disconnect between staff and management. Major supply storage is kept offsite in rented storage lockers due to a lack of space in EMS facilities, training is conducted in whatever spaces that can be booked across the county and garage space is not sufficient to shelter the fleet. Bringing these functions under one roof will help to improve labour/management relations, ensure adequate supplies are available for crews, and establish a facility for continuous staff training.

**RECOMMENDATION #2– RELOCATE BRIGHTS GROVE STATION TO A
NEW HEADQUARTERS TO BE BUILT IN THE AREA OF HIGHWAYS 40
AND 402.**

CAMLACHIE / LAKESHORE

With Brights Grove relocated to the east side of Sarnia, establishing a station in the Camlachie area will help to address the growing population and call volume along the lakeshore of Plympton-Wyoming, which currently does not have a station within the municipality. This move will also help to provide redundant coverage to Brights Grove. If standby coverage is required in Petrolia or Sarnia East, then this station would be well positioned to do so.

RECOMMENDATION # 3 - ESTABLISH NEW STATION IN CAMLACHIE

GRAND BEND / PINERY / PORT FRANKS

The Grand Bend station has the lowest utilization of Lambton EMS's resources. Unit hour utilization sits around 7% with slow growth of call volume. It is not frequently used to provide Code 8 coverage for other areas because it is distant from standby posts in Forest, Petrolia and Sarnia. It is also situated directly on the border of Middlesex County, Huron County and Lake Huron, providing limited coverage within the area of Lambton County.

Ideally, station locations provide opportunities to respond in all directions, Grand Bend's Lambton County coverage only extends to the southwest. When it does respond outside of the Village of Grand Bend, to cover the Pinery, Port Franks and Thedford, response times are prolonged with 90th percentile response times well beyond 20 minutes. This is especially pronounced with calls to the Pinery Provincial Park where the response time to the gates of the park is around 10 minutes but then requires an additional 15 minutes to arrive on scene inside the park.

Relocation of the Grand Bend station closer to the Pinery gates would allow for 10-minute, 90th percentile response times to Grand Bend, Port Franks, and Thedford, in addition to reducing response times into the park by over 10 minutes. This would

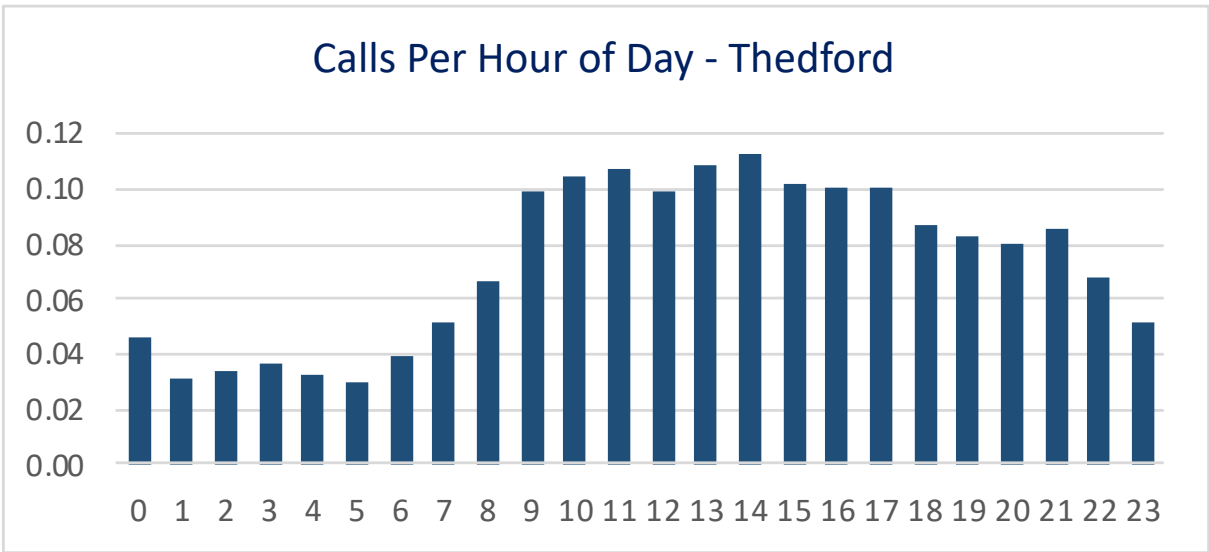
increase utilization and provide the opportunity to relocate resource hours from the Thedford station.

Given the seasonal nature of calls in the Village of Grand Bend, additional capacity can be provided through a seasonal upstaff directly in the Village. This is suggested to be staffed from 10:00 am to 10:00 pm, Friday to Sunday through July and August, covering the hours of greatest demand.

RECOMMENDATION # 4 - RELOCATE GRAND BEND STATION CLOSER TO PINERY PROVINCIAL PARK

THEDFORD / FOREST

Thedford station has a lower unit hour utilization than the average, around 12%, indicating it is an under-utilized resource. As such, it is often sent on Code 8 assignments to Forest. While 15% of Thedford’s calls are in Thedford, more than 25% of their calls are in Forest or Kettle Point. Thedford also has very low nighttime utilization, averaging just over one call every 2 days, between the hours of 9:00 pm and 9:00 am. With Grand Bend relocated towards the Pinery, Thedford can be effectively be provided with adequate response coverage from the new station.



The resources allocated to Thedford can be safely relocated to Forest to provide additional daytime coverage, reducing the need for standby coverage in the area and improving response to the region. Nighttime hours can be reallocated where needed with three recommended options for consideration:

- Placement in Sarnia as an additional daytime ambulance for peak demand
- Converting a daytime ambulance in Sarnia to 24-hour service
- New placement in Inwood area as a daytime ambulance to provide improved coverage to the southeast

The decision on which of these options would be preferred would need to be evaluated in 2026 by examining the impact of service enhancements in 2024 and 2025 on response times, unit hour utilization and Code 8 assignments.

RECOMMENDATION # 5 - RELOCATE THEDFORD DAYTIME COVERAGE TO FOREST, RELOCATE NIGHTTIME COVERAGE WHERE MOST REQUIRED

KETTLE AND STONY POINT

These communities have a higher proportional call volume than their proportion of Lambton County's population. 90th percentile response times are between 10 to 20 minutes and are serviced primarily out of Forest station. When that station is on another call and no standby has been assigned, the response will come from Thedford, Grand Bend, Petrolia or Brights Grove, making for even longer response times. Having additional daytime capacity in Forest will reduce the frequency that responses to Kettle and Stony Point come from these more distant stations.

Past discussions have occurred with leadership in Kettle and Stony Point to explore the opportunity for an Indigenous-led ambulance resource. It is recommended that Lambton EMS re-engage in these discussions to determine if this is viable and if there are any opportunities for collaboration and support. This would provide additional capacity in the area and help to reduce response times. Similar discussions could also be explored with Walpole Island.

RECOMMENDATION # 6 - EXPLORE OPPORTUNITIES TO COLLABORATE AND SUPPORT ESTABLISHMENT OF FIRST NATIONS AMBULANCE SERVICES AT KETTLE AND STONY POINT AND WALPOLE ISLAND

WATFORD / WARWICK

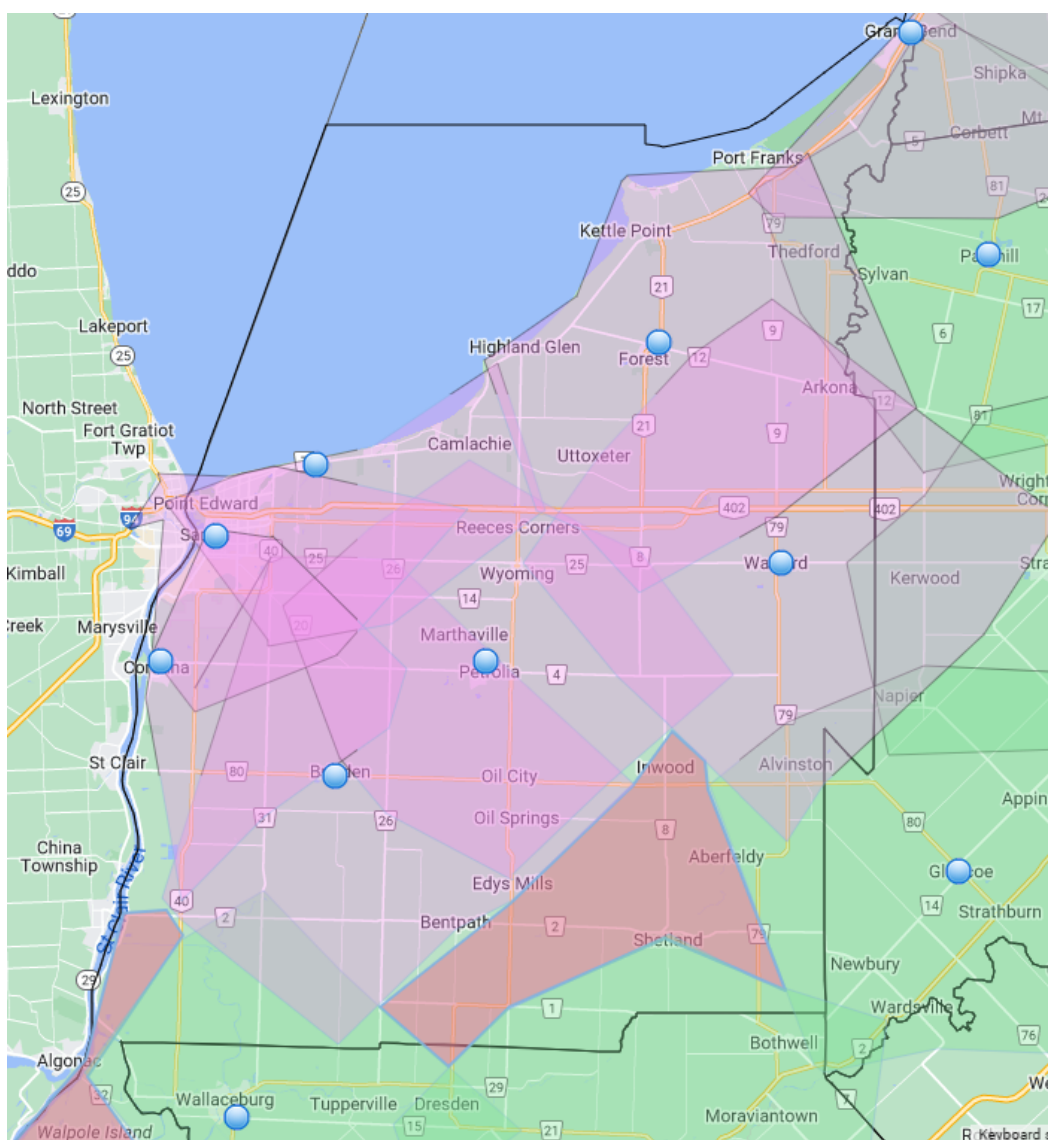
The 90th percentile response times in Warwick have been increasing over the past five years, ranging from 10 to 20 minutes. This appears to be driven by the high number of Code 8 assignments from the station in Watford. Given there is already an ambulance posted in this area, though it is assigned elsewhere more than 50% of the time, the recommended strategy to address response issues in the region is to ensure there are adequate resources elsewhere in the county to reduce the need for the Watford ambulance to be assigned on Code 8 standbys. Updates to the deployment plan and implementation of the suggested enhancements are anticipated to improve that unit's availability and will reduce response times as a result.

OIL SPRINGS / INWOOD / ALVINSTON

These communities in the southwest of the county are primarily served by Watford and Bridgen. Supplemental coverage may also be sent from Strathroy, Glencoe, Thamesville and Wallaceburg. Similar to Warwick, these communities are experiencing prolonged response times, in part, due to frequent Code 8 assignments for the Watford and Bridgen

crews. However, there is also a sizable area (noted in red) where no Lambton or neighbouring service's ambulances can reach within 15 minutes. While call volumes and population density in this area is quite low, this is an area for consideration for future placement of resources. Deployment plan updates and implementation of enhancements should also provide some improvement to response times in the interim.

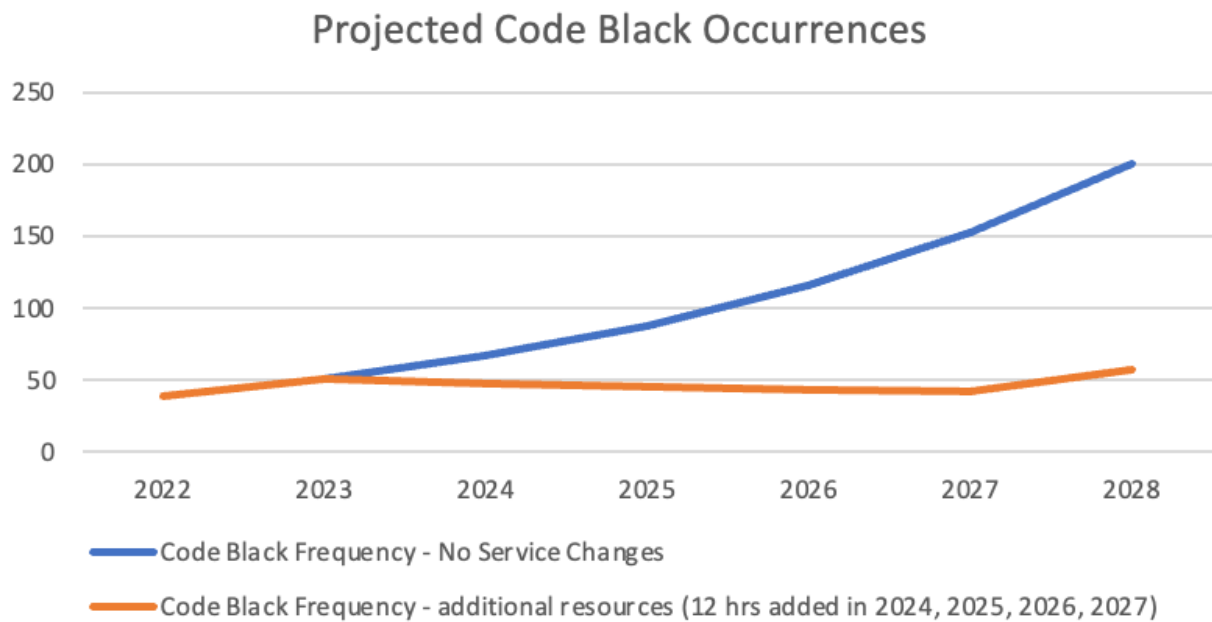
Lambton County 15 minute response coverage overlay

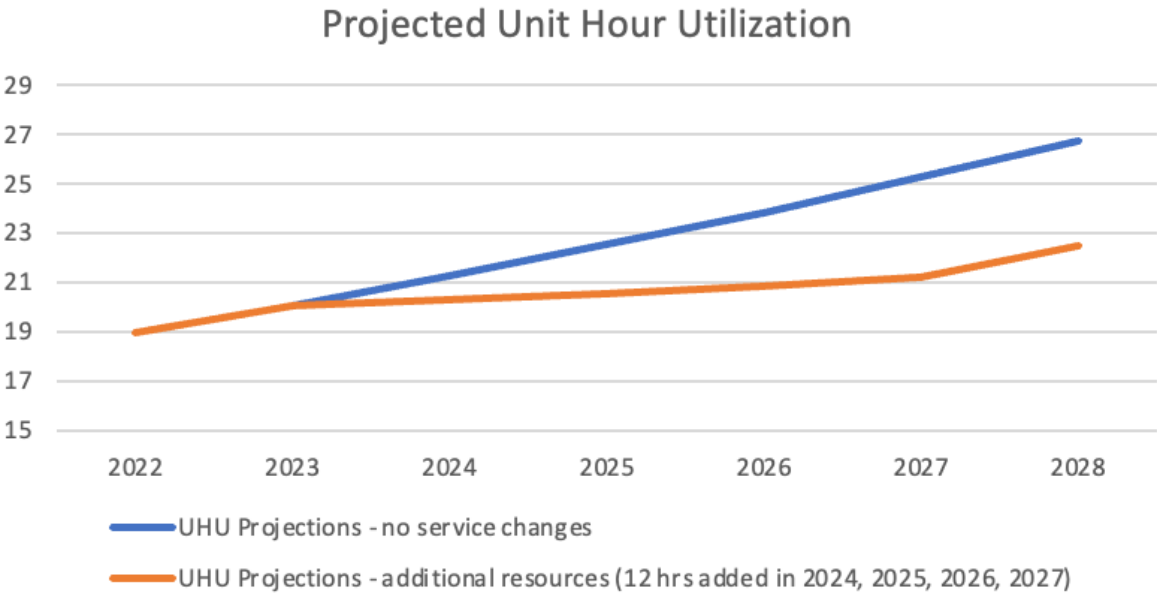


CODE BLACK

There are occasions when all ambulances in Lambton are assigned on calls and there are no available ambulances left in the county. These circumstances are referred to as Code Black. In 2022, there were 36 instances when this occurred. Compared to other Ontario ambulance services in our region, this is rather uncommon but is still a circumstance to avoid. Factors such as call volume, demand surges, hospital offload delays and the number of staffed ambulances all have impact into whether an ambulance is available when 911 is called.

Projections based on population growth and call volume increases over the next 5 years indicate that without the addition of any new resources, there will be 200 Code Black occurrences by 2028. Code Blacks are also a late indicator of diminished overall system capacity. Prior to a Code Black occurring, there will have been significant Code 8 assignments to crews as fewer and fewer ambulances are available. Lower priority calls will have been deferred upwards of 30 minutes in order to prioritize response to life threatening emergencies.





Likewise, without additional resources, county-wide Unit Hour Utilization is projected to increase by 42% over the next 5 years.

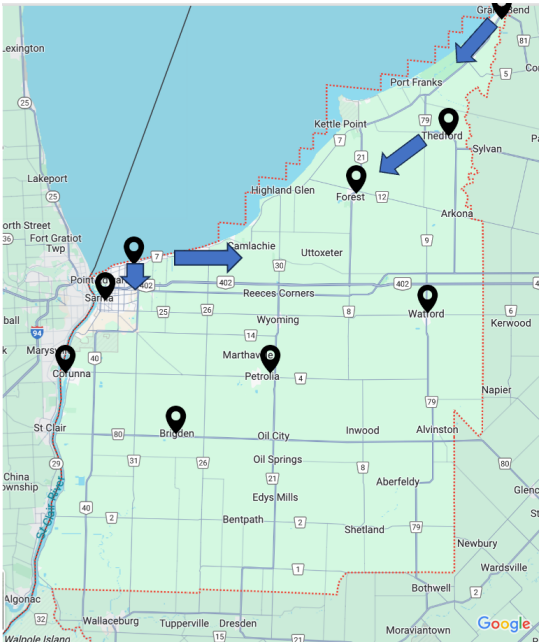
In order to maintain Code Black frequency at current levels and to slow the increase in Unit Hour Utilization, it is recommended that 12 hours of service be added in each of the next four years. These represent the timeframe in which 4 stations will approach the recommended maximum 35% Unit Hour Utilization threshold, as shown in the earlier section of this report ‘Unit Hour Utilization by Station’.

This will require an enhancement of 3 additional 12-hour daytime ambulances along with the reallocation of 12 hours of service from the Thedford station. These strategic enhancements will service peak demand, avoid the need for underutilized additional nighttime service, and improve the utilization of current resources.

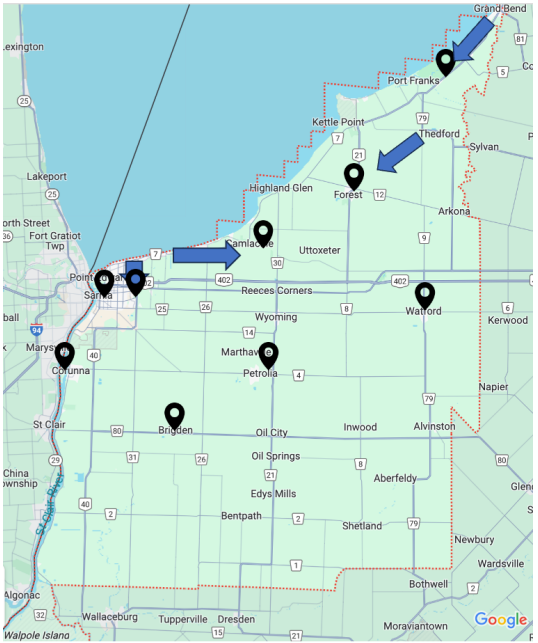
Three options are presented below on timing and placement of the additional resources. Considering 64% of calls for service occur in Sarnia, yet only 37% of ambulance resources are currently stationed there, in each proposed option, a minimum of 3 of the 4 new ambulances are recommended be placed in the city. This will bring the number of peak daytime ambulances in Sarnia to 7 from the current 4 and will help to reduce the draw of ambulances from other parts of the county into the city to provide Code 8 standby coverage.

RECOMMENDATION # 7 - INCREASE AMBULANCE SERVICE BY 36 HOURS (3 ADDITIONAL 12-HOUR AMBULANCES FOR PEAK HOURS)

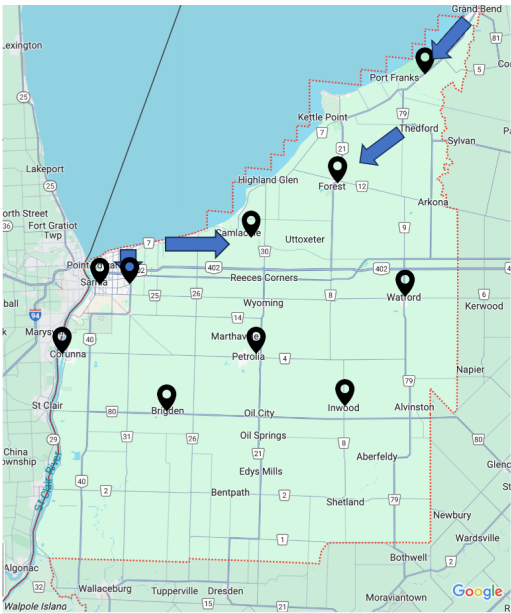
PROPOSED STATION RELOCATIONS



Current



Future - Options 1 & 2



Future - Option 3

Current Staffed Shifts (252 hours of service / day)

	Sarnia	Brights	Corunna	Brigden	Petrolia	Watford	Forest	Thedford	Grand Bend	Total
24 hr	2	1	1	1	1	1	1	1	1	10
12 hr	1									1

Proposed Staffed Shifts**Option 1** - Thedford night hours into 4th Sarnia day ambulance

(288 hours of service / day)

	Sarnia	Sarnia East	Corunna	Brigden	Petrolia	Watford	Forest	Camlachie	Grand Bend	Total
24 hr	1	1	1	1	1	1	1	1	1	9
12 hr	2	3					1			6

Option 2 - Thedford night hours to convert Sarnia 12-hr ambulance into 24-hr ambulance

(288 hours of service / day)

	Sarnia	Sarnia East	Corunna	Brigden	Petrolia	Watford	Forest	Camlachie	Grand Bend	Total
24 hr	1	2	1	1	1	1	1	1	1	10
12 hr	2	1					1			4

Option 3 - Thedford night hours into Inwood day ambulance

(288 hours of service / day)

	Sarnia	Sarnia East	Corunna	Brigden	Petrolia	Watford	Forest	Camlachie	Grand Bend	Inwood	Total
24 hr	1	1	1	1	1	1	1	1	1		9
12 hr	2	2					1			1	6

Proposed timeline of service enhancements and station relocations

2024	2025	2026	2027	2028
Construction of Headquarters in Sarnia East	Begin construction of Camlachie Station	Begin construction of Pinery Station	Relocate Grand Bend station to Pinery	End state
Add 12 hours of additional service in Sarnia area (to start in Corunna until Headquarters is completed). (0800 hrs – 2000 hrs)	Move 0800-2000 from Corunna to Headquarters	Add additional 12 hours of service to Sarnia East	Relocate Thedford crew to Forest – to become 12 hr day crew (0900 hrs to 2100 hrs)	Evaluate impact of changes (response times, unit hour utilization, Code 8 assignments)
	Close Brights Grove and relocate to Headquarters until completion of Camlachie	Relocate 24 hr ambulance to Camlachie station from Headquarters	Reallocate hours from Thedford nights where needed (either Sarnia day, Sarnia night, Inwood day)	
	Add 12 hours of additional service to Sarnia Downtown (0900 hrs - 2100 hrs)	Relocate 24 hr ambulance to Headquarters from Sarnia Downtown.		

FURTHER STRATEGIES FOR ADDRESSING WORKLOAD INEQUITIES

As noted in the section Unit Hour Utilization by Station, busyness is quite variable between Lambton EMS's stations. Crews working in Sarnia have an average utilization over 24 hours of 35%, indicating very busy day shifts and steady night shifts. Comparatively, utilization in Grand Bend is under 8%, with few additional taskings for standby coverage in other areas. During the staff town hall, paramedics identified that the additional workload of moving between stations on standby coverage should be considered when evaluating the overall workload of staff. As such, both time-on-task (Code 1-4 calls) and standbys (Code 8 calls) are presented for each station within in this report.

Emergency coverage for the County of Lambton is maintained by positioning ambulances in areas where the probability of a 911 call is likely to occur and with the intent of minimizing the distance that needs to be travelled. When an ambulance in the fleet is tasked to a call, the remaining ambulances may be repositioned in order to reduce response times using available resources. These movements are called 'standbys' or 'Code 8's'. Code 8 movements account for approximately one third of all fleet activity at Lambton EMS.

In order to address the relative inequity of call distribution and to improve the efficiency of resource utilization, several strategies can be employed.

- 1) Reduce unnecessary Code 8 assignments while more equitably distributing Code 8 assignments between stations. – RECOMMENDED
- 2) Work with Wallaceburg Central Ambulance Communications Centre (CACC) to monitor crew workload and assign lower priority calls and standbys to those crews with greater availability. – RECOMMENDED
- 3) Rotate crews between assignments. Several EMS agencies such as Niagara Region and London-Middlesex create pairs of stations where crews work shifts between two stations where one is busy and the other is quieter. – NOT RECOMMENDED
- 4) Centrally deploy crews from one location and provide assignments to stations across the county, in rotation, when crews report for duty. – NOT RECOMMENDED
- 5) Reallocate and augment current resources across the county to obtain a more balanced utilization profile and reduced workload variance between stations. - RECOMMENDED

In the short term, Options 1&2 are feasible and updates to the service's deployment plan and will have immediate impact. A deeper look at Code 8's is provided in the next section.

In the longer term, Option 5 – the reallocation and augmentation of resources, as proposed above, will be key to ensure an efficient delivery of service while avoiding placing an unbalanced and excessive burden on some crews while having a light workload for others.

Rotation of crew between station pairs (Option 3) becomes challenging as the stations in Lambton County are spread out over a large geography. The busiest stations for calls are Corunna, Sarnia and Brights Grove. The stations with the lowest call volumes are Grand Bend, Thedford and Watford. If these stations were paired with each other, staff would have significant commutes to one of the stations in the pair and the move would likely not be supported by employees.

Central deployment (Option 4) is also challenging due to geography. The most reasonable location to establish a facility capable of housing such an operation would be in or around Sarnia, where most activity occurs. However, the drive from Sarnia to the various stations would range from 15 minutes to upwards of an hour. This would result in no coverage at the remote post locations for up to 2 hours each shift change, making central deployment in this manner somewhat less feasible.

**RECOMMENDATION # 8 - REDUCE UNNECESSARY CODE 8
ASSIGNMENTS WHILE MORE EQUITABLY DISTRIBUTING CODE 8
ASSIGNMENTS BETWEEN STATIONS.**

**RECOMMENDATION # 9 - WORK WITH WALLACEBURG CENTRAL
AMBULANCE COMMUNICATIONS CENTRE (CACC) TO MONITOR
CREW WORKLOAD AND ASSIGN LOWER PRIORITY CALLS AND
STANDBYS TO THOSE CREWS WITH GREATER AVAILABILITY.**

**RECOMMENDATION # 10 - REALLOCATE AND AUGMENT CURRENT
RESOURCES ACROSS THE COUNTY TO OBTAIN A MORE BALANCED
UTILIZATION PROFILE AND REDUCED WORKLOAD VARIANCE
BETWEEN STATIONS**

A DEEPER LOOK AT CODE 8'S

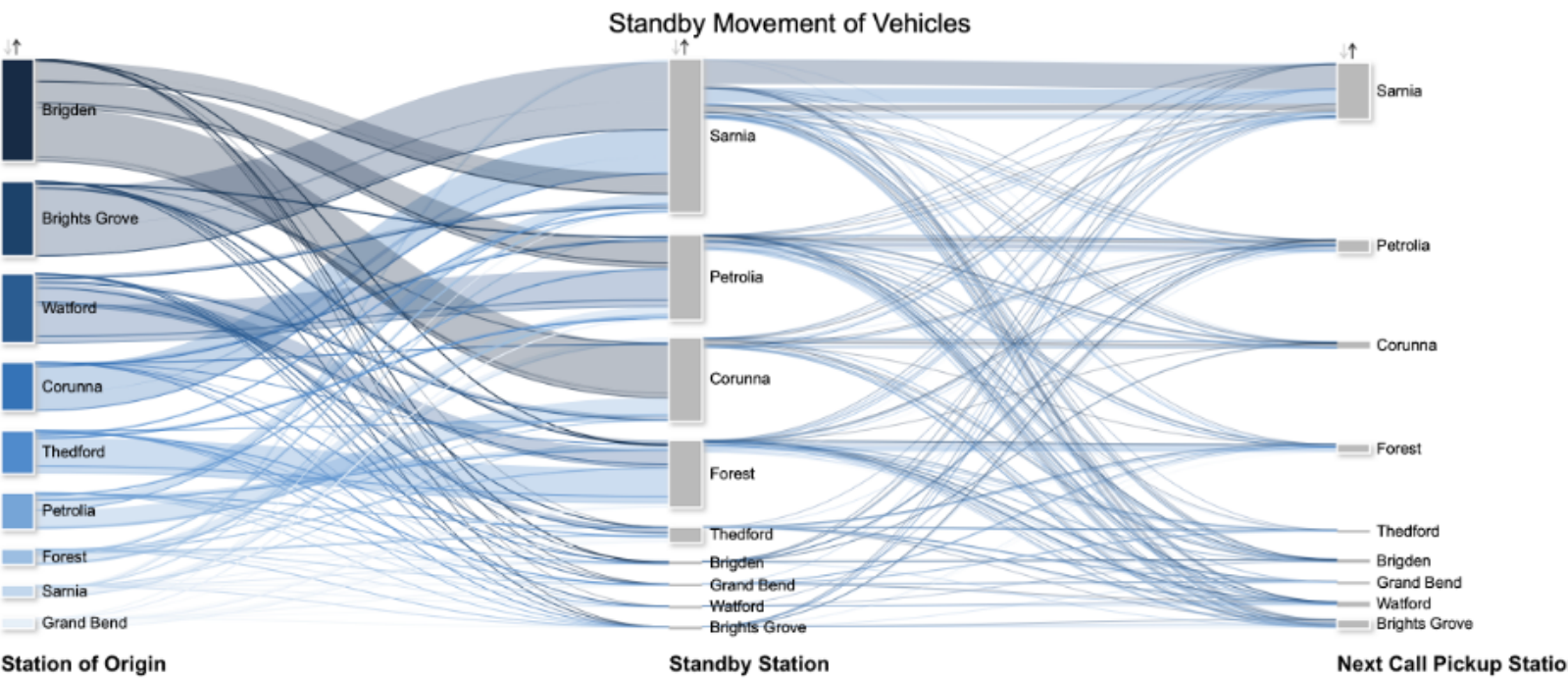
Code 8s are most frequently assigned to provide coverage to Sarnia, Petrolia and Forest, as these three locations account for higher population densities and call volumes. These locations are also staging points for providing balanced coverage to the county's geography when available resources are limited.

An analysis of Code 8 movements was conducted as part of the EMS Master Plan to look for opportunities to improve ambulance availability and reduce response times with existing resources, while concurrently reducing crew workload and vehicle mileage.

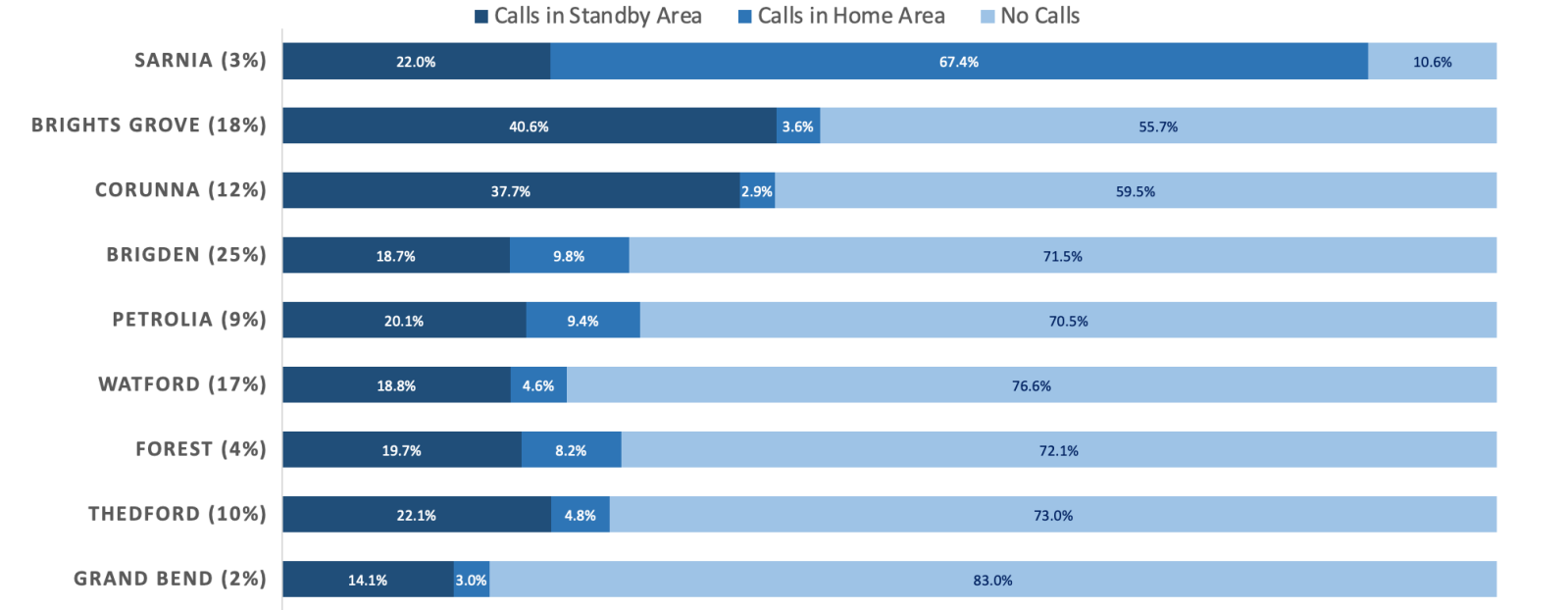
Over the 5-year period from 2017 to 2022, there were 63,698 Code 8 assignments that could be analyzed, after cleaning the data. Of those, 23,870 involved ambulances from across the county being sent to Sarnia to provide additional coverage. This represented over one third of all Code 8's and illustrates the magnet effect that 911 demand in Sarnia has on the remainder of the county's ambulance resources.

Code 8 assignments were examined to determine the number of times each station sent an ambulance to another station to provide coverage, along with the distance travelled and the time spent on standby. Further analysis was conducted to determine whether an ambulance was subsequently tasked on a 911 call while assigned to a standby and if that call occurred in the area of the standby or in the area from which the ambulance originated. This analysis illustrated the relative efficacy of each standby movement to help determine opportunities for changes in practice.

The Sankey diagram below identifies the flow of ambulances from their home stations to the stations they were assigned on a Code 8 standby. From there, the diagram shows whether the ambulance on standby was assigned on an emergency call and, if so, what station's area the call was in.

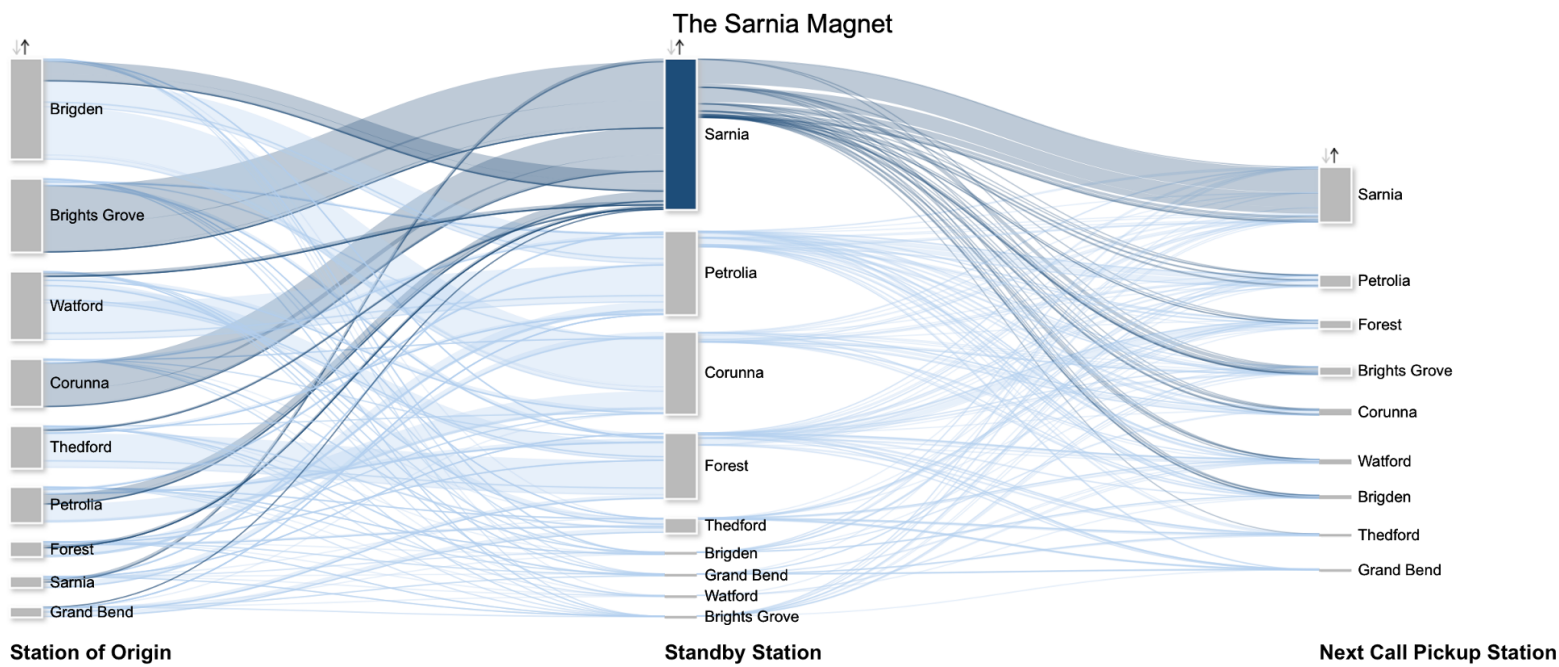


FREQUENCY AND LOCATION OF CALLS WHILE ON STANDBY
(BY STATION OF ORIGIN, N=63,698)



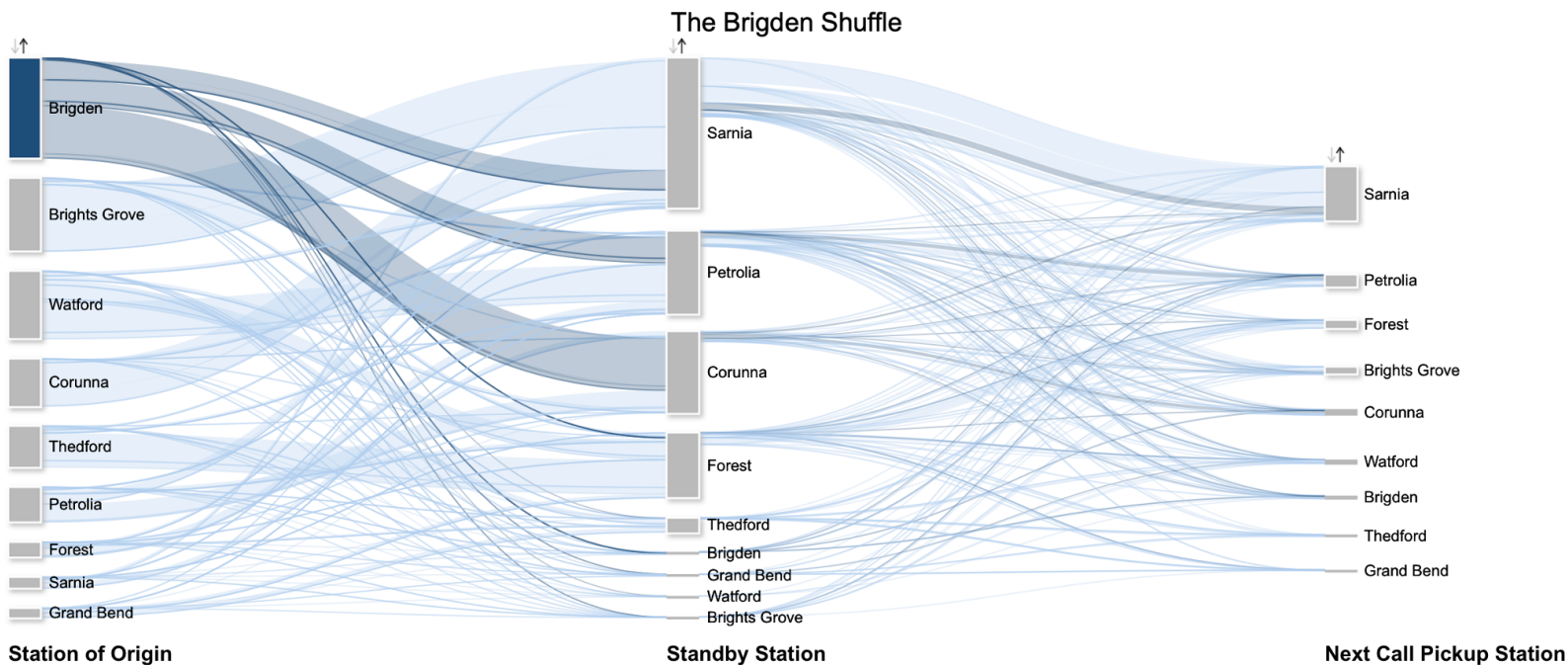
This figure displays the ratio of calls that occur in the area in which a station is sent on standby compared to the calls that occur back in the station of origin's area while on standby elsewhere. This can be used as a measure of effectiveness of the standby movement. The higher the ratio of calls in the standby area versus calls to the home area represents a higher efficacy of the standby movement.

In the graph, it is evident that Sarnia has a very high ratio of home area calls to standby area calls demonstrating low efficacy of any standbys originating from Sarnia. Conversely, standbys performed by Brights Grove and Corunna have a very high efficacy as the ratio of calls in the areas they are sent to versus calls in their home area is over ten-to-one. This is mostly attributable to the fact that these stations most often provided coverage in Sarnia, where the highest volume of calls occur.



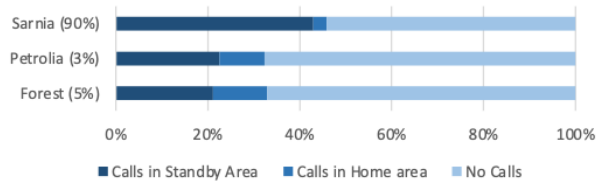
Several trends arose through the deeper analysis:

- Brigden, Brights Grove, and Watford had the highest number of Code 8 assignments, accounting for 60% of all standby movements in the fleet.
- The high rate of Code 8 assignments for Brigden and Watford are likely accountable for the high 90th percentile response times for the Dawn-Euphemia and Brooke-Alvinston regions.
- While Brigden most frequently covered Corunna's area when that station was assigned to another call, this movement left the area to the south and east of Brigden uncovered and with lengthy response times should a call occur in that area.
- Brigden is the most frequently assigned unit on Code 8's however there is relatively low yield for these standbys. The crew is often retuned to Brigden base without being reassigned on a 911 call. Crews refer to this as 'The Brigden Shuffle'.

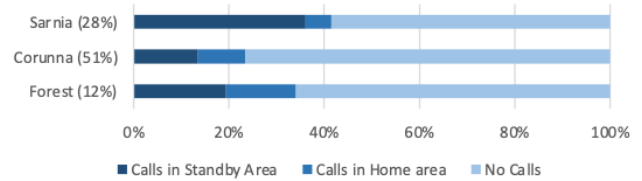


- While Brights Grove is usually the first unit assigned to provide standby coverage for Sarnia, it would be more effective to send Corunna first as this would maintain a better balance of resources in the west.

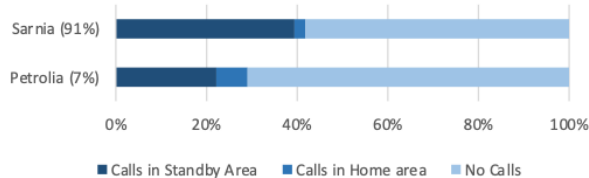
Brights Grove Standby Locations and Utilization (n=11,591)



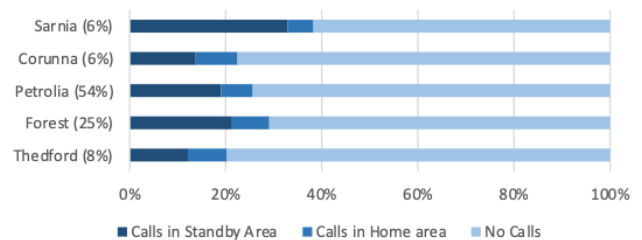
Petrolia Standby Locations and Utilization (n=5,575)



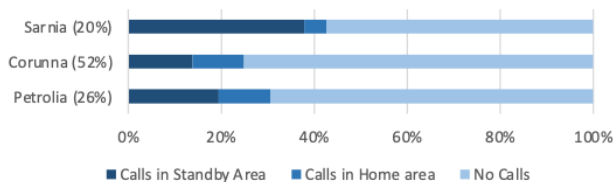
Corunna Standby Locations and Utilization (n=7,527)



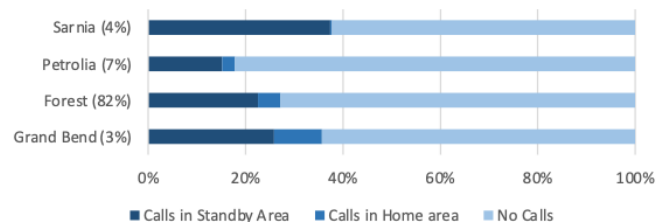
Watford Standby Locations and Utilization (n=10,773)



Brigden Standby Locations and Utilization (n=15,929)



Thedford Standby Locations and Utilization (n=6,557)



By examining the ratio of Calls in Standby Area to Calls in Home Area, it is possible to identify specific station and standby movements that provide the higher and lower yields. As can be seen above, most Code 8s sent to Sarnia have very high yields as the call volume in Sarnia is markedly higher than the call volume in the areas of the stations being sent to the city.

Looking closer at Brigden, Petrolia and Watford standbys in Corunna, the ratio is almost even, indicating that the movement is essentially a 'coin-flip' as to whether the next call

for a vehicle sent to Corunna on Code 8 will be in Corunna or in the area from which the ambulance was originally sent. Most of the other Code 8 movements appear to demonstrate that the assignment moved the ambulance closer to the next call, thereby indicating their efficacy through reduced response times.

Given that Corunna's response area can be provided with 15-minute response time coverage, in most circumstances, from Sarnia and Brigden, but Brigden's response area largely cannot be effectively covered from any other station within the same timeframe, it is recommended that Corunna no longer be included in the deployment strategy as a Code 8 location. This recommendation has the potential to reduce fleetwide standbys by ~20% and fleet movement by over 100,000 kilometers per year. In effect, this strategy is anticipated to improve response times in the south and southeast regions of the county by keeping ambulances in their response areas (and more specifically, Brigden) more often, and save approximately \$30,000 to \$50,000 annually in fuel.

Further, as one third of the Code 8 movement of the Lambton EMS fleet is associated with providing coverage to the Sarnia area, recommendations to increase the number of staffed ambulances identified earlier in this report will also help to reduce the need to draw in resources from other parts of the county in response to call demand.

It is recommended that staff update the Lambton EMS Deployment Plan, working with staff from the Wallaceburg Central Ambulance Communications Centre, to make necessary adjustments to optimize resource utilization and assignments reflecting the data presented in this report. The Deployment Plan should be reviewed on an ongoing basis to evaluate the effects of these changes and provide opportunities for adjustments as the needs arise. Monitoring should include station-by-station measurement of Code 8s and their associated impact on lower-tier municipal response times and crew workload. This evaluation should be reported annually to council and included alongside the Response Time Performance Plan.

RECOMMENDATION # 11 - UPDATE AND MONITOR THE EMS DEPLOYMENT PLAN TO OPTIMIZE RESOURCE UTILIZATION AND RESPONSE TIMES

OUR STATIONS AND OUR FLEET

Lambton EMS operates 11 ambulances out of 9 stations. The fleet consists of 26 vehicles with 15 ambulances, 4 Emergency Response Units (ERU) (Ford F150 pickup trucks), 1 Emergency Support Unit (ESU), 1 Administration vehicle and 5 Community Paramedicine small SUVs. An additional ambulance is currently on order and awaiting delivery as a result of the addition of a new shift in 2022. There are a total of 15 vehicle garage bays to shelter and maintain the fleet. The ERUs, the ESUs and the Community Paramedic vehicles are currently without sheltered parking. Climate controlled sheltered parking is important due to temperature sensitive medications and medical equipment being carried and stored on board the fleet vehicles.

Current Garage Bays

Sarnia	Brights	Corunna	Brigden	Petrolia	Watford	Forest	Thedford	Grand Bend	Total
4	1	2	1	2	1	2	1	1	15

The recommendations for relocation of EMS stations identified earlier in this report provide an opportunity to ensure sufficient garage capacity for the fleet's vehicles. Should the recommendations be adopted, the fleet size will need to grow to 33 vehicles. It is recommended that the proposed new headquarters be built to provide for the bulk of garage space needs for storage and minor maintenance of fleet vehicles. The proposed new Camlachie and Grand Bend stations should be built with 3 or 4 bays each in order to ensure space for future needs.

Proposed Garage Bays

Sarnia	Sarnia East	Corunna	Brigden	Petrolia	Watford	Forest	Camlachie	Grand Bend	Total
4	18	2	1	2	1	2	3	3	36

RECOMMENDATION # 12 - ENSURE SUFFICIENT GARAGE SPACE TO MAINTAIN CLIMATE CONTROL FOR RESPONSE VEHICLES

FLEET VEHICLES

Ambulances, ERUs and the ESU are required to undergo a high level of preventative maintenance, as prescribed by the Ministry of Health and the Ministry of Transportation. Due to their 24-hour utilization and high mileage, Lambton EMS ambulances and ERUs are replaced every six years and are frequently required to be out of service for both routine maintenance and periodic repairs.

Supply chain interruptions arising through the pandemic have placed additional pressures on the fleet. The typical order-to-delivery time of 12 months for new ambulances has been delayed by the manufacturers to over 2 years. Some ambulances are now approaching 500,000 kilometers in mileage. This has resulted in higher repair and maintenance costs and prolonged repair times for older vehicles in the fleet. To mitigate the impact of these delays, it is recommended that the service begin to order the required ambulances 2 years in advance of their scheduled replacement.

In order to ensure there is a sufficient number of operable vehicles at any given time to cover the scheduled ambulance shifts, Lambton EMS maintains an ambulance fleet size that is 50% larger than the number of scheduled cars at peak. With 11 ambulances at current peak staffing, the current appropriate fleet size is 16 vehicles.

Should the recommendations of this Master Plan be implemented, three ambulances will need to be added for every two additional shifts of staffing. The recommendations in the Master Plan are to add 4 new shifts over the next 5 years and would therefore require expanding the fleet by 6 new ambulances to support these staffing enhancements. The suggested number of ambulances required for the 15 peak-period shifts will be 22.

ELECTRIC VEHICLES?

The Lambton EMS fleet travels hundreds of thousands of kilometres and consumes approximately \$400,000 in fuel each year. It is therefore worthwhile to explore the conversion to electric vehicles, where possible. Technology is rapidly evolving and electric powered ambulances will be introduced to the market shortly. Due to the 24-hour

operating cycle for ambulances and the need for the EVs to have an opportunity to gain sufficient charge, it may be several years before electric ambulances present as a viable alternative to the gas-powered fleet. However, the supervisor and community paramedic vehicles have sufficient overnight downtime which could be used for recharging that Lambton EMS should consider electrifying these fleets.



Ford F150 Lightning Special Service Vehicle¹⁹

As an example, the current F150 chassis used by the service costs \$65,000, before up-fitting for emergency response. The equivalent F150 Lightning electric vehicle has a cost of \$79,000 before up-fitting. The supervisor vehicles are driven approximately 40,000 km annually and consume 13.2 litres per 100 kilometres driven for an annual fuel cost of \$8500 (at \$1.60/L). The service life of the supervisor vehicles is 6 years providing for a lifetime fuel savings opportunity of \$51,000. Subtracting the purchase price cost difference of \$14,000 provides for a savings of \$37,000 over the lifetime of the vehicle or \$6,200 per year. If all 4 supervisor vehicles were replaced with their equivalent EV, the

¹⁹ <https://images.carexpert.com.au/resize/3000/-/app/uploads/2022/07/2023-Ford-F-150-Lightning-Pro-SSV-2.jpg>

total savings would be approximately \$25,000 annually. Similar efficiencies could also be realized with the community paramedic fleet.

RECOMMENDATION #13 - INVESTIGATE FEASIBILITY OF CONVERTING NON-AMBULANCE VEHICLES TO ELECTRIC VEHICLES

STATIONS

Lambton EMS's stations are all in a reasonably good state of repair and range in age from 7 years (Forest) to 32 years (Sarnia – George St and Corunna). Capital repairs and replacements have been completed as the need has arisen including LED garage lighting, garage doors, and repaving. Stations are also currently being upgraded with backup generators. Other wear-and-tear elements such as paint, flooring, fixtures and furniture will be replaced on a proactive or as-needed basis.

An inventory of each station's building components was completed and reviewed to identify any major capital repairs or replacements anticipated during the 5-year period of this master plan. These can be found in Appendix B. Several stations will require substantial HVAC replacements, repaving and concrete resurfacing within the next five years. The EMS operating and capital budgets will need to be updated to reflect these costs.

FLEET MAINTENANCE & LOGISTICS

Lambton EMS vehicles are serviced at a local automotive dealership, with some minor repairs and maintenance completed in-house by an Operations Supervisor who has extensive experience and familiarity with the fleet. The maintenance of fleet and facilities is coordinated by the Logistics Supervisor, who also is responsible for ordering and maintenance of supplies and equipment for the service. Most fleet and station maintenance are outsourced to local providers. Supplies are distributed to the stations by Operations Supervisors and by injured paramedics working on modified duties during their recovery.

The current model creates vulnerabilities as there is little depth to the logistics portfolio. Should either of the two supervisors who perform these logistics duties experience an extended absence, there would be a substantial impact on the ability to deliver ambulance services to the community.

Supply chain interruptions have had a disruptive impact on the delivery of paramedic services. Shortages of consumable supplies, automotive parts and medications, recently, have not been uncommon and creative solutions have had to be found in order to ensure these needed supplies are available for crews and patients alike.

Given the mission-critical importance of logistics in supporting the front-line work of emergency response, it is recommended that a separate review of logistics operations be conducted with the goal of identifying best practices, staffing needs, supply management strategies, software / inventory management systems, and an exploration of opportunities for in-house maintenance of fleet vehicles, in collaboration with other County departments.

RECOMMENDATION # 14 - CONDUCT REVIEW OF LOGISTICS OPERATIONS TO ENSURE BEST PRACTICES ARE IDENTIFIED AND ADOPTED



OUR IDENTITY



Modernizing the services provided by Lambton Emergency Medical Services could benefit through a modernization of the branding and identity of the service. The implementation of the recommendations from the 2024 – 2029 Master Plan provide an opportunity for renewal and re-engagement with the community and the workforce.

While the title 'Emergency Medical Services' reflects the emergency work done, with the incorporation of Community Paramedicine into the service offerings of Lambton EMS, the title no longer captures the full scope of upstream healthcare work also being done, beyond emergency response. Other services in the province have adopted the title 'Paramedic Services' to better reflect the breadth of service provided to the community.

The current markings on Lambton EMS ambulances originate from an early Ministry of Health provincial standard, first introduced over 30 years ago. Since the province downloaded responsibility for the delivery of EMS to municipalities almost 25 years ago, most ambulance services in the province have developed their own unique branding to reflect their municipal corporate standard and to improve visibility for improved safety. Likewise, the current Lambton EMS uniform crest was introduced when the service was assumed by Lambton County.



(Lambton County, Oxford County, Middlesex-London, Perth County ambulances, clockwise from top)

It is recommended that Lambton EMS explore the opportunity to rebrand its name, vehicles and uniform crest to better reflect the work performed by the service and to create a better connection with the corporate identity of the County of Lambton. Such a move appears to be supported by the workforce, with 85% of staff survey results indicating a desire for a branding change of crests and vehicles.

The vehicle livery can be updated as vehicles are added and replaced and would not require repainting the existing fleet. The cost to implement would be marginal and contained within the cost of the vehicle. Uniform rebranding would need to be done through a reissue of uniform shirts and is recommended to be done at one time. As uniforms are issued and replaced on a regular basis, it is not anticipated that this would involve significant new cost.

Additionally, most ambulance services in Ontario have adopted the Paramedic Chiefs of Canada (PCC) standards for rank and insignia²⁰. Lambton EMS does currently employ the national insignia displayed on the uniform epaulettes but has not incorporated the rank titles associated with them. As these titles are widely used by with other ambulance and emergency services, adoption of this nomenclature helps to align with industry peers, better identify responsibilities within the organization for stakeholders, and provide role clarity at emergency scenes.

						
Current	Manager	Deputy Manager	Supervisors			
Proposed	Chief	Deputy Chief	Commander	Deputy Commander (future use)	Superintendent (future use)	Acting Superintendent (future use)

²⁰ K. Newall - EMS Chiefs of Canada. Rank & Insignia Project Team Report - A report for the Executive of the EMS Chiefs of Canada (EMS Chiefs of Canada, 2008)

Should Lambton EMS proceed with rebranding, this would be an ideal opportunity to align its nomenclature with the PCC standard. This can be done while maintaining the corporate position names currently in use, while adding the rank as an adjunct to the position name. The move will not impact wage rates for staff but will provide for future opportunities to further stratify the reporting relationships, should that become necessary.

RECOMMENDATION # 15 - REFRESH LAMBTON EMS BRAND (NAME, UNIFORM CRESTS AND VEHICLE MARKINGS)

RECOMMENDATION # 16 - ADOPT PARAMEDIC CHIEFS OF CANADA RANKING NOMENCLATURE



MOVING FORWARD

With these changes, it is highly likely that response times can be improved, resource utilization can become more balanced, ambulances will be able to spend more time in their dedicated service areas, and crew workload will be more equitable. Relocation of ambulances currently in service can help to defer the point in time when UHUs exceed will 35%.

Change management principles will be important, especially for residents and representatives of Brights Grove, Thedford and Grand Bend as the relocations could be perceived as a loss of service to these communities. Emergency Medical Services are provided from a region-wide perspective and operates as a system. These relocations have been chosen to maintain appropriate response times to these communities while providing improved response times to a greater proportion of the county.

Additionally, the paramedic crews who work at lower volume stations may find their workload increasing, however, the workload will be more equitably distributed between stations, as a result. As well, the service realignment will most likely result in a reduction of Code 8 standby assignments, leading to decreased busyness even for those stations with lower call volumes.

Ultimately, these recommendations are ones that can be implemented fully by the County of Lambton. Further work will need to occur to make more significant gains with respect to how 911 calls are processed in order to provide more suitable resources and response to lower acuity health concerns. The ability to schedule a paramedic visit for a low acuity concern or refer those calls to alternate health care providers such as primary care, walk-in clinics or Telehealth will be essential to establishing sustainability of the prehospital care system. Enhanced integration of paramedic services into the health care system can help alleviate many of the pressures currently faced by the system.

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION # 1 – Maintain priority on staff wellbeing. Identify opportunities to support staff. Monitor and report to council and staff.

RECOMMENDATION # 2– Relocate Brights Grove station to a new headquarters to be built in the area of Highways 40 and 402.

RECOMMENDATION # 3 - Establish new station in Camlachie.

RECOMMENDATION # 4 - Relocate Grand Bend station closer to Pinery provincial park.

RECOMMENDATION # 5 - Relocate Thedford daytime coverage to Forest, relocate nighttime coverage where most required.

RECOMMENDATION # 6 - Explore opportunities to collaborate and support establishment of first nations ambulance services at kettle and stony point and Walpole island

RECOMMENDATION # 7 - Increase ambulance service by 36 hours (3 additional 12-hour ambulances for peak hours).

RECOMMENDATION # 8 - Reduce unnecessary Code 8 assignments while more equitably distributing Code 8 assignments between stations.

RECOMMENDATION # 9 - Work with Wallaceburg Central Ambulance Communications Centre (CACC) to monitor crew workload and assign lower priority calls and standbys to those crews with greater availability.

RECOMMENDATION # 10 - Reallocate and augment current resources across the county to obtain a more balanced utilization profile and reduced workload variance between stations.

RECOMMENDATION # 11 - Update and monitor the EMS deployment plan to optimize resource utilization and response times.

RECOMMENDATION # 12 - Ensure sufficient garage space to maintain climate control for response vehicles.

RECOMMENDATION # 13 - Investigate feasibility of converting non-ambulance vehicles to electric vehicles.

RECOMMENDATION # 14 - Conduct a review of logistics operations to ensure best practices are identified and adopted.

RECOMMENDATION # 15 - Refresh Lambton EMS brand (name, uniform crests and vehicle markings).

RECOMMENDATION # 16 - Adopt Paramedic Chiefs of Canada ranking nomenclature.

APPENDIX A - STATION PROFILES

STATION 1 - SARNIA

Number of 24 hr Crew	2.5	Number of Garage Bays	4
Number of 911 Calls / Year	8687	Total Number of Calls / Year	9146
Unit Hour Utilization	31%	Percent of time on Code 8	2%
Average C-4 Response Time	5.33 mins	90 th Percentile Response Time	8.0 mins
Average Annual Call Growth	4.3%	Station Condition	B

STATION 2 - SARNIA EAST, BRIGHTS GROVE

Number of 24 hr Crew	1	Number of Garage Bays	1
Number of 911 Calls / Year	2492	Total Number of Calls / Year	4907
Unit Hour Utilization	24%	Percent of time on Code 8	21%
Average C-4 Response Time	7.51 mins	90 th Percentile Response Time	12.00 mins
Average Annual Call Growth	4.1%	Station Condition	B

STATION 3 - CORUNNA

Number of 24 hr Crew	1	Number of Garage Bays	2
Number of 911 Calls / Year	2322	Total Number of Calls / Year	4061
Unit Hour Utilization	21.8%	Percent of time on Code 8	13%
Average C-4 Response Time	6.64 mins	90 th Percentile Response Time	13.0 mins
Average Annual Call Growth	16.4%	Station Condition	B

STATION 4 - BRIGDEN

Number of 24 hr Crew	1	Number of Garage Bays	1
Number of 911 Calls / Year	1100	Total Number of Calls / Year	4397
Unit Hour Utilization	11.6%	Percent of time on Code 8	45%
Average C-4 Response Time	8.67 mins	90 th Percentile Response Time	16.0 mins
Average Annual Call Growth	4.7%	Station Condition	B

STATION 5 - PETROLIA

Number of 24 hr Crew	1	Number of Garage Bays	2
Number of 911 Calls / Year	1695	Total Number of Calls / Year	3044
Unit Hour Utilization	16.7%	Percent of time on Code 8	13%
Average C-4 Response Time	7.82 mins	90 th Percentile Response Time	15.0 mins
Average Annual Call Growth	3.5%	Station Condition	B

STATION 6 - WATFORD

Number of 24 hr Crew	1	Number of Garage Bays	1
Number of 911 Calls / Year	1121	Total Number of Calls / Year	3615
Unit Hour Utilization	11.7%	Percent of time on Code 8	40%
Average C-4 Response Time	9.48 mins	90 th Percentile Response Time	18.0 mins
Average Annual Call Growth	7.0%	Station Condition	B

STATION 7 - FOREST

Number of 24 hr Crew	1	Number of Garage Bays	2
Number of 911 Calls / Year	1449	Total Number of Calls / Year	2042
Unit Hour Utilization	17.5%	Percent of time on Code 8	7%
Average C-4 Response Time	9.7 mins	90 th Percentile Response Time	16.0 mins
Average Annual Call Growth	3.2%	Station Condition	A

STATION 8 - THEDFORD

Number of 24 hr Crew	1	Number of Garage Bays	1
Number of 911 Calls / Year	1146	Total Number of Calls / Year	2539
Unit Hour Utilization	12.8%	Percent of time on Code 8	27%
Average C-4 Response Time	10.49 mins	90 th Percentile Response Time	18.0 mins
Average Annual Call Growth	10.2%	Station Condition	D

STATION 9 - GRAND BEND

Number of 24 hr Crew	1	Number of Garage Bays	2
Number of 911 Calls / Year	1199	Total Number of Calls / Year	1639
Unit Hour Utilization	7.9%	Percent of time on Code 8	7%
Average C-4 Response Time	8.15 mins	90 th Percentile Response Time	15.0 mins
Average Annual Call Growth	13.7%	Station Condition	B

APPENDIX B - MAJOR CAPITAL NEEDS BY STATION AND REMAINING USEFUL LIFE (YEARS)

STATION 1 (SARNIA - GEORGE ST.)

Heating/cooling units below windows	0
Baseboard Heaters	0
Exhaust System (gas monitor)	3
Exterior Windows (16"x16" - 4 glass blocks)	5
Domestic Hot Water Heater	5
Flooring - Concrete coating	6

STATION 2 (BRIGHTS GROVE)

Furnace	1
Radiant heat	1
Heat Recovery Unit	1
Exhaust Fan	1
Split System Air Conditioning	1
Asphalt	3
Fencing - Wood	4
Plumbing & Fixtures	5
Flooring - Concrete coating	6

STATION 3 (CORUNNA)

Furnace	1
Radiant heat	1
Heat Recovery Unit	1
Exhaust Fan	1
Split System Air Conditioning	1
Asphalt	3
Fencing - Wood	4
Plumbing & Fixtures	5
Flooring - Concrete coating	6

STATION 4 (BRIGDEN)

Radiant heat	3
Exhaust Fan	3
Exhaust System (gas monitor)	3
Plumbing & Fixtures	5
Flooring - Concrete coating	6
Domestic Hot Water Heater	6
Furnace	6
Split System Air Conditioning	6
Interior Lighting	6
Asphalt	6
Fencing - Chain Link	6

STATION 5 (PETROLIA)

Asphalt Roadway	1
Asphalt Parking Lot	1
Radiant heat	3
Exhaust Fan	3
Exhaust System (gas monitor)	3
Interior Lighting	5
Outdoor Lighting - Circular soffit mounted	5
Fencing - Chain Link	5
Flooring - Concrete coating	6
Ceilings - Rectangular ceiling tile	6

STATION 6 (WATFORD)

Outdoor Illuminated Signage	3
Radiant heat	4
Exhaust Fan	4
Exhaust System (gas monitor)	4
Flooring - Concrete coating	6

STATION 7 (FOREST) – NONE REQUIRED**STATION 8 (THEDFORD) – LEASED, NONE REQUIRED**

STATION 9 (GRAND BEND)

Radiant heat	3
Exhaust Fan	3
Exhaust System (gas monitor)	3
Asphalt Parking	4
Site Furniture	4
Plumbing & Fixtures	5
Flooring - Concrete coating	6
Ceilings - Acoustical tile	6
Domestic Hot Water Heater	6
Split System Air Conditioning	6
Interior Lighting	6
Outdoor Lighting - Other	6
Fencing - Chain Link	6