Emergency Service Planning

Bruce County Paramedic Services

Updating the Deployment Review

Final Report

August 27, 2024
ORH/BCPS/2

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Accreditations

Other than data provided by Bruce County Paramedic Services, this report also contains data from the following sources:

Statistics Canada

EXECUTIVE SUMMARY

0.1 In 2020, Operational Research in Health Limited (ORH) carried out a Comprehensive Deployment and Base Review to develop a plan for the delivery of Bruce County Paramedic Services (BCPS). BCPS have made progress in implementing the recommended changes from that review, but needed to understand whether the review's longer-term recommendations were still valid. As a result, BCPS commissioned ORH to update the deployment review using up-to-date data and assumptions through to 2029.

0.2 ORH collected a four-year sample of workload and resourcing data (January 2020 to December 2023) and combined this with information from the previous review to examine and analyze trends in demand and performance. For comparison purposes, analysis is largely reported against three sample periods: 2022 to 2023 (Sample 1), 2020 to 2021 (Sample 2), and 2016 to 2019 (Sample 3).

0.3 BCPS responded to an average of 23.1 P1 to P4 incidents per day during the most recent two-year sample (Sample 1). There is a clear seasonal increase in demand from mid-June to mid-September. A lower and upper demand projection was made in the original review, and the midpoint of these two projections, a 5.3% increase per year, was used as the core scenario. Based on the now up-to-date data sample, analyzed figures tended to be skewed more to the upper projection figures and increased by more than 10% for 2021 and 2022 when compared to the previous year but decreased by 4% for 2023.

0.4 Between 2020 and 2023, Canadian Triage and Acuity Scale (CTAS) performance improved slightly in all categories, except for CTAS5 (the lowest acuity) which reduced slightly.

0.5 The overall occupied time (from vehicle mobile to vehicle clear) for P4 non-transfer incidents was around 52 incidents in Sample 1, compared with 91 minutes for P4 transfer incidents. This difference is largely driven by longer travel times to hospital for transfer incidents. Average time at hospital increased by several minutes for P4 incidents between Sample 3 and Sample 2, and by a further minute for Sample 1.

0.6 As of 2024, BCPS plan to deploy 1,260 ambulance hours per week. This has increased from 1,176 in 2022 and 1,092 in 2020. The 2024 deployment levels are similar to those recommended for 2024 in the original review, however a second day shift for Port Elgin has been brought forward in place of a second Kincardine day shift.

0.7 Average ambulance utilization for Sample 1 was around 13%, with a high of 19% at 11:00 and a low of 7% at 04:00. When including time spent on P8 standby moves, average utilization for Sample 1 increases to 22%.

0.8 ORH uses sophisticated predictive modelling tools that have been developed in-house to assist with the development of master plans for paramedic services. ORH updated its simulation model, AmbSim, to reflect the 2022 to 2023 sample for BCPS. A 2024 Base Position was then created to provide a basis for comparison with future scenarios.

0.9 To understand resource requirements for the next five years, a demand projection was required. Demand projections were created using a population-based projection method with the underlying hypothesis that demand is strongly related to the population age profile.

0.10 The predicted increasing and ageing in population, coupled with increasing demand rates based on data from 2016 to 2023, suggests that the number of P3 and P4 incidents per day will continue to increase by 2029. A 'lower projection' (28 P3 and P4 incidents per day in 2029) and 'upper projection' (34 per day in 2029) were created. The mid-point between these two projections was taken as a core projection for future modelling.

0.11 To highlight the impact on future performance if no investment is made to BCPS frontline operations, the demand projections were applied to the Base Position in AmbSim. No other operational changes or deployment enhancements were made (a 'Do Nothing' scenario). Clearly there will be frontline resource investments required by 2029 to offset the demand increases and, at a minimum, maintain current response performance levels.

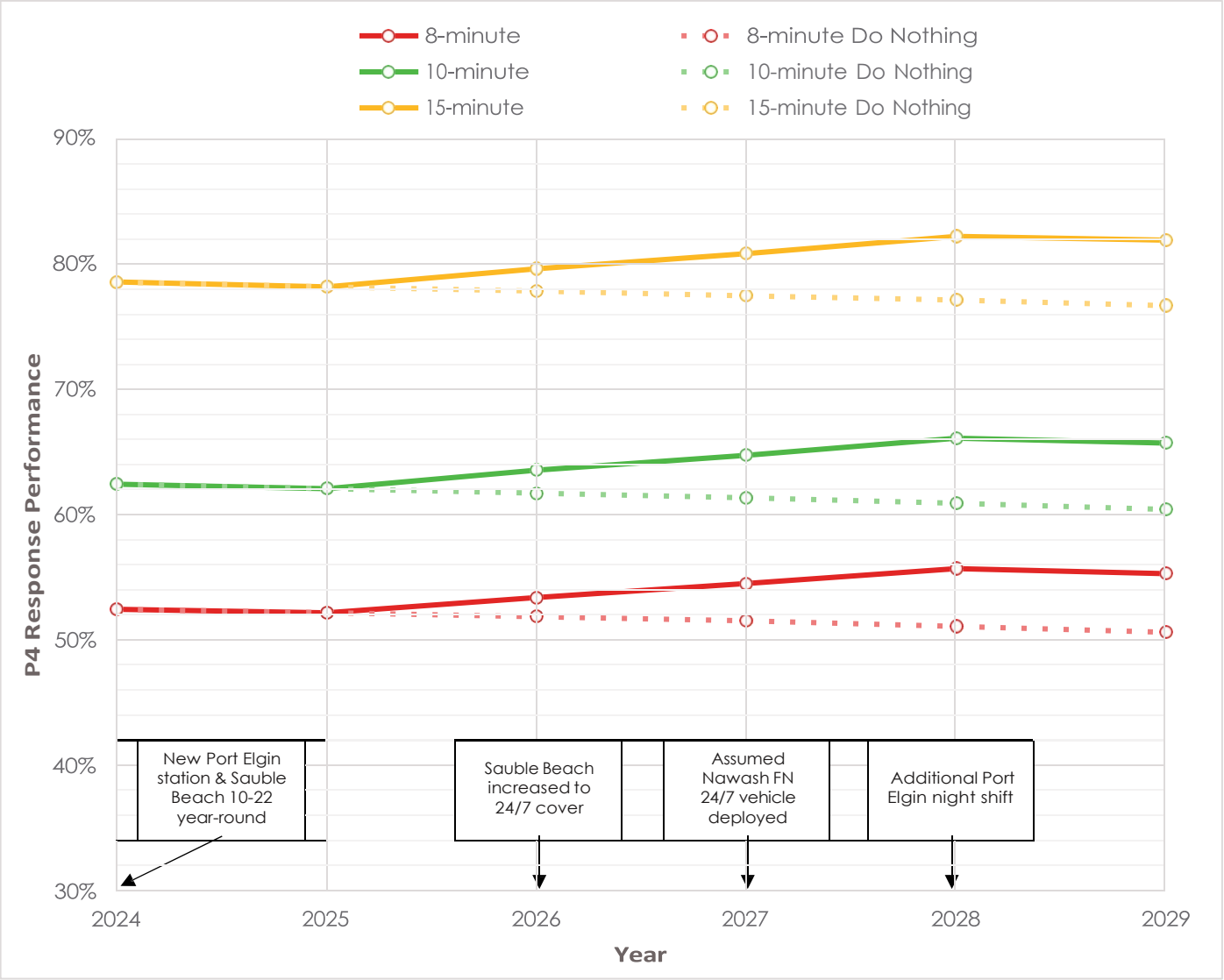
0.12 Before honing in on a core set of recommendations, a range of scenarios were tested in AmbSim and results were fed back to BCPS senior management for review. Based on the options explored, deployment recommendations for the next five years have been set out according to the trajectory outlined in Figure **I**.

0.13 The process for determining an appropriate trajectory aimed to stagger ambulance increases so that the financial impacts are as evenly spread across the five years as possible, while balancing this with the need to improve performance in an equitable fashion across the LTMs.

0.14 Under the recommended trajectory (based on the core projection scenario), P4 response performance would:

- Increase from 53% in 2024 to 55% in 2029 at the 8-minute target (instead of falling to 48% in the Do Nothing scenario with no deployment enhancements)
- Increase from 63% in 2024 to 65% in 2029 at the 10-minute target (instead of falling to 61% in the Do Nothing scenario with no deployment enhancements)
- Increase from 79% in 2024 to 82% in 2029 at the 15-minute target (instead of falling to 77% in the Do Nothing scenario with no deployment enhancements)

Figure I: Recommended Trajectory and Performance Results



Contents

1 Introduction

1.1 In 2020, Operational Research in Health Limited (ORH) carried out a Comprehensive Deployment and Base Review to develop a plan for the delivery of Bruce County Paramedic Services (BCPS). This involved projecting call volumes, assessing the optimal configuration of base locations, and determining the level of resource deployment required through to 2029 to maintain or improve performance.

1.2 In the original review, a core demand projection was made equivalent to a 5.3% increase per annum between 2019 and 2029. In order to offset this demand, and maintain and improve equity of performance across the County, a series of deployment recommendations were made for 2020 to 2029 (see Figure **1-1**).

1.3 BCPS have made progress in implementing the recommended changes from the review. However, since the conclusion of the review:

- Call growth has been higher than anticipated, particularly in Saugeen Shores, likely due to the ongoing impacts of the COVID-19 pandemic
- There have been increased offload delays in Owen Sound, and other changes to hospital capabilities are now anticipated
- The new Port Elgin and Sauble Beach stations have opened, and there are developments in the County that may impact the potential location of stations in the south of the County

1.4 As a result, BCPS commissioned ORH to refresh the deployment review using up-to-date data and assumptions, to understand whether the longer-term recommendations of the original review were still valid.

1.5 This is the Final Report for the review.

Figure 1-1: Previous Review Recommendations

Year	Peak	Off-Peak
2020	Add 12-hour **Sauble Beach** shift (**14:00 to 02:00**)	*No change*
2021	*No change*	Add 12-hour **Sauble Beach** shift (**10:00 to 22:00**)
	Move Wiarton/Walkerton split shift to **Holyrood** (**07:00 to 19:00**)	
2022	**Move Port Elgin** station to Mackenzie Road site.	
2023	*No change*	
2024	Add 12-hour **Kincardine** shift (**09:30 to 21:30**).	
2025	*No change*	
2026	Add 12-hour **Port Elgin** shift (**10:00 to 22:00**).	
2027	*No change*	
2028	*No change*	
2029	Add 12-hour **Ferndale** shift (**09:00 to 21:00**).	*No change*

2 Current Service Profile

ORH collected a four-year sample of workload and resourcing data (January 2020 to December 2023) and combined this with information from the previous review to examine and analyze trends in demand and performance. For comparison purposes, analysis is largely reported against three sample periods: 2022 to 2023 (Sample 1), 2020 to 2021 (Sample 2), and 2016 to 2019 (Sample 3).

BCPS responded to an average of 23.1 P1 to P4 incidents per day during the most recent two-year sample (Sample 1). There is a clear seasonal increase in demand from mid-June to mid-September. A lower and upper demand projection was made in the original review, and the midpoint of these two projections, a 5.3% increase per year, was used as the core scenario. Based on the now up-to-date data sample, analyzed figures tended to be skewed more to the upper projection figures and increased by more than 10% for 2021 and 2022 when compared to the previous year but decreased by 4% for 2023.

Between 2020 and 2023, Canadian Triage and Acuity Scale (CTAS) performance improved slightly in all categories, except for CTAS5 (the lowest acuity) which reduced slightly.

The overall occupied time (from vehicle mobile to vehicle clear) for P4 non-transfer incidents was around 52 incidents in Sample 1, compared with 91 minutes for P4 transfer incidents. This difference is largely driven by longer travel times to hospital for transfer incidents. Average time at hospital increased by several minutes for P4 incidents between Sample 3 and Sample 2, and by a further minute for Sample 1.

As of 2024, BCPS plan to deploy 1,260 ambulance hours per week. This has increased from 1,176 in 2022 and 1,092 in 2020. The 2024 deployment levels are similar to those recommended for 2024 in the original review, however a second day shift for Port Elgin has been brought forward in place of a second Kincardine day shift.

Average ambulance utilization for Sample 1 was around 13%, with a high of 19% at 11:00 and a low of 7% at 04:00. When including time spent on P8 standby moves, average utilization for Sample 1 increases to 22%.

Data Collection

2.1 ORH collected a four-year sample of workload and resourcing data (January 2020 to December 2023) and combined this with information from the previous review to examine and analyze trends in demand and performance. This included:

- Ambulance Dispatch Reporting System (ADRS) call and workload data
- Resource data (planned deployments)
- Geographical data (station and hospital locations)
- Operational policies and procedures (deployment protocols, meal break policies)

2.2 For comparison purposes in this report, the analysis is largely reported against three sample periods:

- January 2022 to December 2023 (Sample 1)
- January 2020 to December 2021 (Sample 2)
- January 2016 to December 2019 (Sample 3)

Demand Analysis

2.3 Unless otherwise specified, demand is defined in this report as BCPS-responded incidents, that is, where at least one BCPS vehicle arrives on scene. If two vehicles mobilize to or attend the scene of the same incident, this unique incident is only counted once. This includes out-of-area incidents. Demand is grouped into the four main priority categories (Priority 4 through Priority 1) or the five main Canadian Triage Acuity Scale (CTAS) categories (1 through 5).

2.4 BCPS responded to an average of 23.1 Priority 1 (P1) to Priority 4 (P4) incidents per day during the most recent two-year sample (Sample 1). This has increased across the full sample period from 17.5 incidents per day in Sample 3, and 20.4 incidents per day in Sample 2 (see Figure **2-1**).

2.5 There has been a consistent increase in demand year-on-year, except for early 2020 which is attributed to the COVID-19 pandemic lockdown restrictions (see Appendix **A1a**). P1 and P2 demand levels have remained at a fairly low stable level for each month in the full sample period.

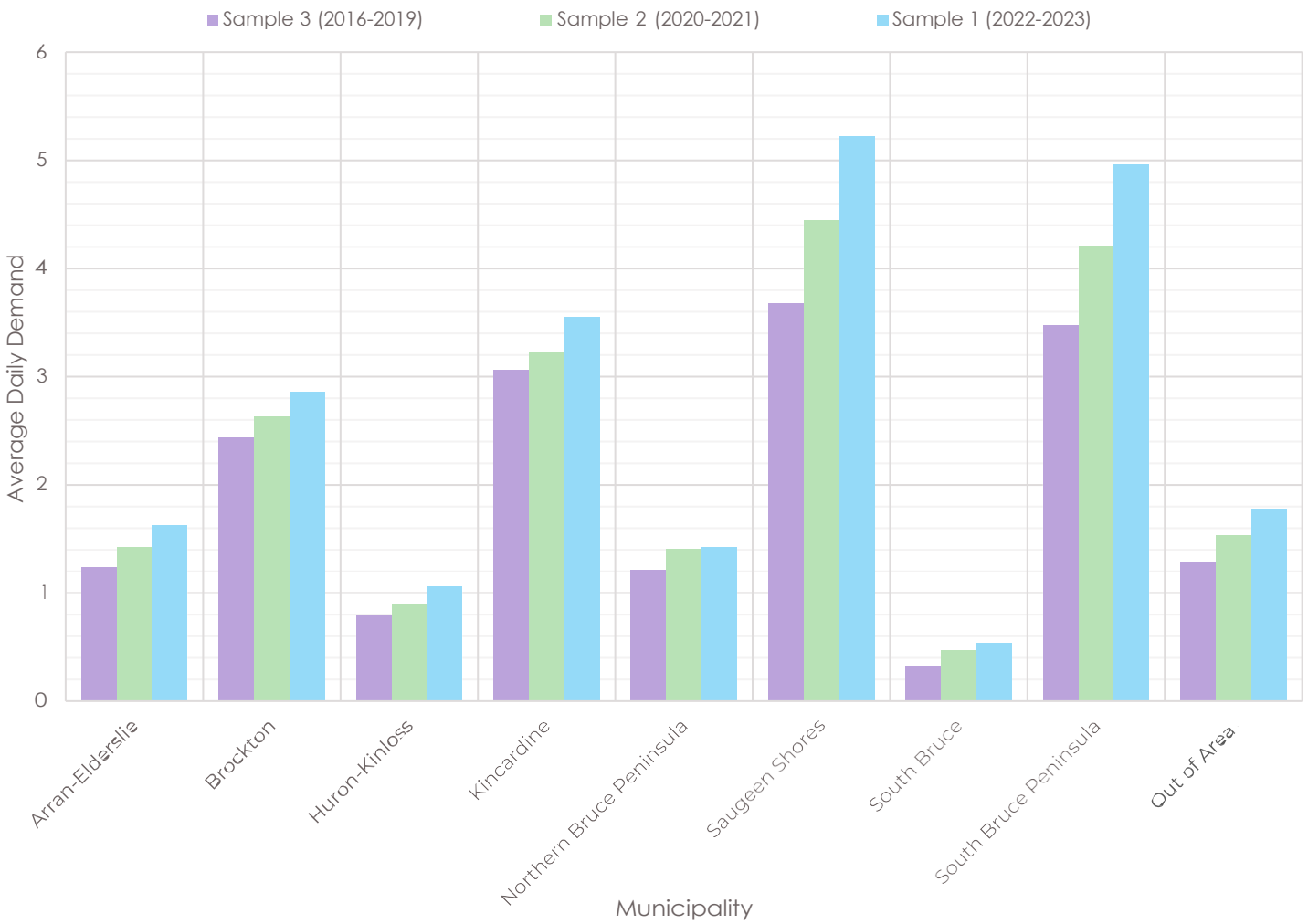
2.6 Demand has increased between the samples in every Lower Tier Municipality (LTM) in Bruce County (see Figure **2-2**). Saugeen Shores and South Bruce Peninsula account for the highest proportion of demand at around 5 incidents per day in Sample 1, and South Bruce the lowest at around 0.5 incidents per day. BCPS responded to 2 incidents per day outside of Bruce County in Sample 1.

2.7 Although the focus of the demand analysis is on BCPS-responded incidents, ORH also collected information on other service responses to demand within Bruce County (see Appendix **A1b**). Other services responded to around 1.5 incidents per day within Bruce County in Sample 1. Relative to each LTM, this happens most frequently for South Bruce and Huron-Kinloss. These areas border Huron County and neither have a permanent base station, although Huron-Kinloss is serviced in part from Kincardine and South Bruce from Walkerton.

Figure 2-1: Average Daily Demand by Priority

Priority	Sample 3 (2016-19)	Sample 2 (2020-21)	Sample 1 (2022-23)
P1	0.9	1.0	0.8
P2	0.1	0.1	0.2
P3	6.8	7.8	8.9
P4	9.8	11.5	13.3
Total	17.5	20.4	23.1

Figure 2-2: Average Daily Demand by Municipality



2.8 There is a clear seasonal increase in demand from mid-June to mid-September (peak period). During these months, demand is around 20% higher than in the off-peak period (see Appendix **A1c**). For example, BCPS responded to an average of 26.7 incidents per day in the peak period of Sample 1, compared to 21.9 in the off-peak period.

2.9 A lower and upper demand projection was made for P3 and P4 Bruce County demand in the original review for 2020 onwards. The midpoint of these two projections, a 5.3% increase per year, was used as the core scenario. Based on the now up-to-date data sample, analyzed figures tended to be skewed more to the upper projection figures (see Figure **2-3**). Analyzed incidents increased by more than 10% for 2021 and 2022 when compared to the previous year but decreased by 4% for 2023.

2.10 Conveyance rates (the percentage of incidents resulting in a transport to hospital) for P4 incidents increased slightly between Sample 3 and Sample 1, from 88.3% to 90.7%. For P3 incidents, conveyance rates reduced slightly between Sample 3 and Sample 1, from 85.7% to 84.7% (see Appendix **A1d**).

2.11 Southampton Hospital received the largest number of BCPS-transported patients, with an average of around 130 per month across the total sample period (see Appendix **A1e**), although the average from mid-2022 onwards increased to 150 per month. There are four other hospitals that received between 50 and 100 BCPS-transported patients per month: Kincardine, Wiarton, Owen Sound (in Grey County) and Walkerton.

Performance and Call Component Analysis

2.12 Mandated reporting of response performance to the Ministry of Health (MoH) calculates County-wide performance from the time the first vehicle is notified until the first vehicle arrival on scene. ORH replicates this calculation, but also monitors performance measured from the time the call is answered, including the processes undertaken in the Central Ambulance Communications Centre (CACC); therefore representing the full patient experience. Targets are set by CTAS code but not by priority code.

2.13 Between 2020 and 2023, CTAS performance improved slightly in all categories (see Figure **2-4**), except for CTAS5 (the lowest acuity) which reduced slightly.

2.14 When looking at P4 8-minute and P3 10-minute performance by month, there was a slightly worsening trend from 2016 to 2020, followed by a slight improvement in the more recent years (see Appendix **A2a**). Resource enhancements in 2022 have helped to offset demand increases.

2.15 ORH calculates each 'call component' of the incident cycle separately and analyzes these to understand how they may vary (see Figure **2-5** for P4 averages).

Figure 2-3: Comparison to Original Review Projections

Average Daily P3 + P4 Demand (excluding Out of Area)

Year	Lower Projection Scenario	Upper Projection Scenario	Core Projection Scenario	Actual Demand	Actual % Change from Previous Year
2020	15.6	17.4	16.5	17.1	-
2021	16.2	18.6	17.4	19.2	12.3%
2022	16.8	19.9	18.4	21.2	10.4%
2023	17.4	21.3	19.4	20.4	-3.8%

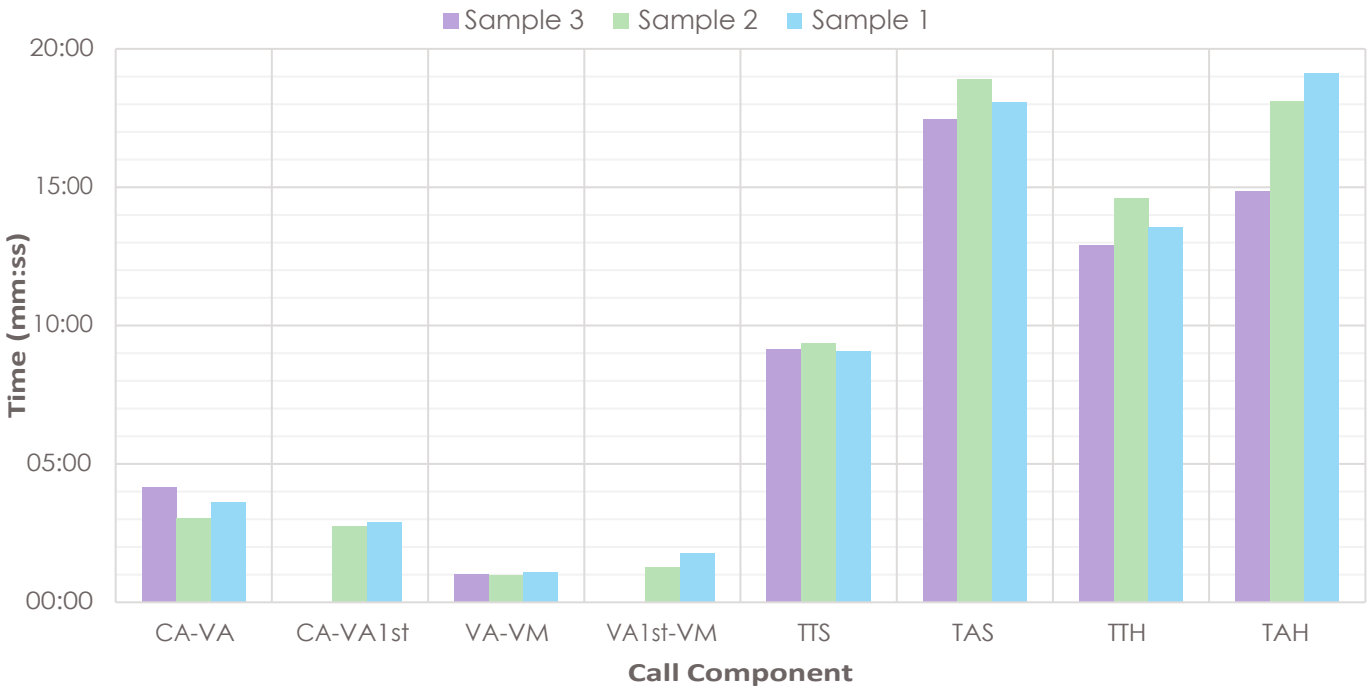
Figure 2-4: BCPS Reported CTAS Performance by Year

% Calls in Target

CTAS and Target Time	Current Target %	2020	2021	2022	2023
CTAS1 in 8 mins	45%	42.3%	50.0%	50.0%	49.0%
CTAS2 in 10 mins	50%	49.2%	56.0%	53.0%	53.0%
CTAS3 in 15 mins	70%	69.6%	70.0%	70.0%	71.0%
CTAS4 in 20 mins	85%	82.1%	83.0%	85.0%	86.0%
CTAS5 in 25 mins	90%	91.1%	91.0%	90.0%	90.5%

Reported figures from Interdev/iMedic dashboard

Figure 2-5: P4 Average Call Components



Time stamps used are for first BCPS vehicle on scene, except where first assigned vehicle is also considered.

CA-VA: Call Answer to Vehicle Assigned

CA-VA1st: Call Answer to First Vehicle Assigned

VA-VM: Vehicle Assigned to Vehicle Mobile

VA1st-VM: First Vehicle Assigned to Vehicle Mobile

TTS: Time to Scene

TAS: Time at Scene

TTH: Time to Hospital

TAH: Time at Hospital

2.16 Average time to scene, time at scene and time to hospital increased from Sample 3 to Sample 2, and then decreased again slightly for Sample 1. The increase in Sample 2 for time at scene is assumed to be driven by the additional restrictions and protection measures imposed during the COVID-19 pandemic. Average time at hospital increased by several minutes between Sample 3 and Sample 2, and by a further minute for Sample 1.

2.17 P3 averages are given in Appendix **A2b**. The trends observed are similar to P4 incidents, although time to hospital fell by several minutes in Sample 1 when compared to Samples 2 and 3. This is because the number of inter-facility transfers has reduced between the samples (which tend to have longer travel time to hospital). The underlying time between call answer and vehicle assignment is much longer than for P4 incidents, as P3 incidents can be held when vehicle availability falls.

2.18 The overall occupied time (from vehicle mobile to vehicle clear) for P4 non-transfer incidents was around 52 incidents in Sample 1, compared with 91 minutes for P4 transfer incidents (see Appendix **A2c**). As with P3 incidents, this difference is largely driven by longer travel times to hospital for transfer incidents.

2.19 The total time at hospital can be broken down into two further components: arrival to handover time and handover to clear time (see Appendix **A2d-i**). The breakdown was not available by month for Sample 3, but across Samples 2 and 1 the arrival to handover time has been slowly reducing (after a spike in mid-2020), and handover to clear time has been slowly increasing.

2.20 Some hospitals have a much longer average time at hospital than others (see Appendix **A2d-ii**). The longest within Bruce County is Southampton Hospital, which also receives the most patient transports. However, the out-of-area hospitals tend to have longer times at hospital than Bruce County.

Resourcing Analysis

2.21 As of 2024, BCPS plan to deploy 1,260 ambulance hours per week. This has increased from 1,176 in 2022 and 1,092 in 2020 (see Figure **2-6**).

2.22 The 2024 deployment levels are similar to those recommended for 2024 in the original review, however a second day shift for Port Elgin has been brought forward in place of a second Kincardine day shift. This was to reflect the fact that demand in Saugeen Shores LTM (+42% between Samples 3 and 1) has increased at a higher rate than in Kincardine LTM (+16% between Samples 3 and 1). Even with the additional Sauble Beach vehicle, both Port Elgin vehicles are frequently utilized.

2.23 A second Walkerton day shift is intended to roam to Holyrood and utilize the emergency management trailer as a base wherever possible rather than being permanently stationed there.

Figure 2-6: Ambulance Deployment Summary

Weekly Ambulance Hours

Station	Scenario			
	2020 Base (from Original Review)	2022 Deployment Plan	2024 Deployment Plan	2024 Recommended (from Original Review)
Chesley	168	168	168	168
Kincardine	168	168	168	252
Port Elgin	168	168	252	168
Tobermory	168	168	168	168
Walkerton	210	252	252	168
Wiarton	210	168	168	168
Sauble Beach	0	84	84	84
Holyrood	0	0	0	84
Overall	1,092	1,176	1,260	1,260

Notes:

84 weekly hours = 12/7 vehicle

Sauble Beach utilized as post in 2022 Deployment Plan, but as full station in 2024 Deployment Plan and 2024 Recommended

Second Walkerton day shift in 2022/2024 Deployment Plan intended to roam to Holyrood whenever possible

Port Elgin moved to new location in 2024

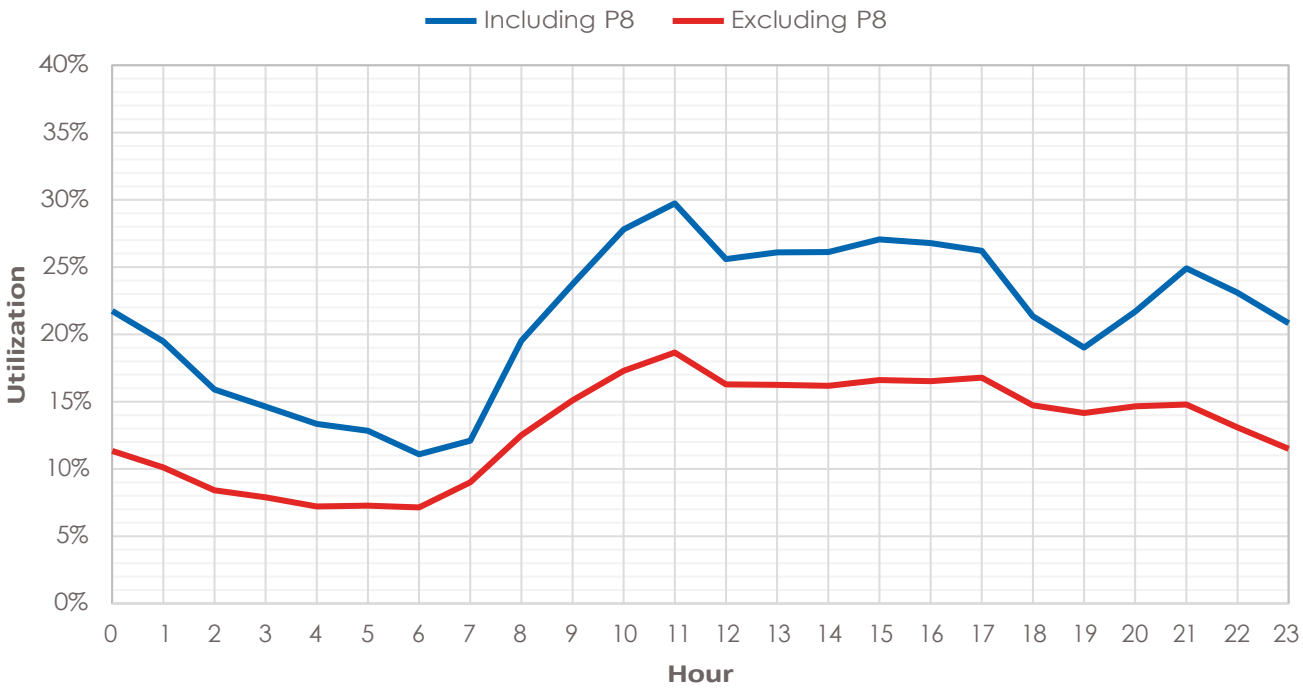
2.24 There is a peak of 9 ambulances deployed in the day across Bruce County in 2024, and 6 ambulances at night (see Appendix **A3a**). There was a peak of 8 ambulances in the day in 2022.

2.25 There is a reasonably good match between the hourly profile of demand and the hourly profile of resources (see demand resource matching in Appendix **A3b**). There are, however, limitations as to how well BCPS can match demand levels given that only 12-hour shifts are deployed, and a certain level of coverage must always be maintained, even in rural areas. Demand is highest at around 09:00 to 10:00, whereas resources in the peak period of the year are highest at 12:00.

2.26 In evaluating the current use of resources, it is of interest to measure how well ambulances are utilized. Utilization here is defined as the proportion of a vehicle's planned shift time that is spent responding and dealing with patient care (measured from time of mobilization to posting clear). This therefore excludes time spent on rest breaks, returning to base, and other duties such as completing paperwork.

2.27 Average ambulance utilization for Sample 1 was around 13%, with a high of 19% at 11:00 and a low of 7% at 04:00 (see Figure **2-7**). Utilization then drops at 12:00 when the highest resource level is reached. When including time spent on P8 standby moves, average utilization for Sample 1 increases to 22%.

Figure 2-7: Ambulance Utilization by Hour



3 The Model Base Position

ORH uses sophisticated predictive modelling tools that have been developed in-house to assist with the development of master plans for paramedic services.

ORH updated its simulation model, AmbSim, to reflect the 2022 to 2023 sample for BCPS discussed in Section 2. A 2024 Base Position was then created to provide a basis for comparison with future scenarios.

Modelling Capabilities

Simulation

3.1 ORH has developed a sophisticated simulation model, AmbSim, for modelling the operations of emergency medical services. AmbSim is a discrete event simulation model that replicates the key characteristics of an emergency medical service and can be used to predict future behaviour under a variety of different scenarios when run by ORH's experienced modelling consultants.

3.2 AmbSim can be described as 'off-the-shelf', as it has been developed by ORH and is used both by ORH and our clients. It does, however, require customization to reflect the geography, demand and operations of the service in which it is to be used.

3.3 Once customized, AmbSim can provide evidence-based answers to a wide range of 'what if' questions. The model can assess the impact of changes to several factors, such as station locations and resource deployments, dispatch protocols and resource use, or demand increases or decreases. AmbSim reports operational performance in terms of response times, resource workload and utilization. It can simulate multiple vehicle types and incident types with specified response rules.

Location Optimization

3.4 ORH can also utilize 'Auto Add' functionality within the Demand Coverage Model (DCM), a powerful model that evaluates response time coverage and optimizes the locations of emergency service resources. Auto Add uses a substitution algorithm to assess millions of options in minutes, quickly identifying optimum solutions. The optimization criteria are carefully agreed with the client to ensure that solutions meet an individual client's needs.

3.5 DCM is a flexible model, ideally suited to identifying the scope for operational efficiencies, improving service delivery, and optimizing the use of resources. Only travel time to incidents is accounted for in the optimization process; the exact impact of changing resource deployments within a changed station configuration is therefore fully evaluated in AmbSim to check that optimal locations deliver service improvements.

Model Setup and Base Position

3.6 A virtual replica of BCPS operations was created within AmbSim by taking the 2020 Base Position scenario from the previous review, and 'refreshing' various inputs to align with the analyzed parameters for the 2022 to 2023 sample discussed in Section 2.

3.7 As part of the previous review, AmbSim was validated by comparing a wide range of outputs from the model, such as response performance, vehicle workload (utilization) and hospital workload, to the corresponding analyzed figures for these factors based on actual data from 2016 to 2019. The comparison of outputs showed that the model replicated historical operations accurately.

3.8 The refreshed inputs therefore include, in particular, increased demand volumes, increased time at hospital, and changes to the deployments.

3.9 The model was then further updated to create a 2024 Base Position to provide a basis for comparison with future scenarios:

- In line with projections, a further slight uplift was applied to demand
- The vehicle shift pattern was updated to reflect planned 2024 deployments
- The Port Elgin station was moved to the new headquarters site at MacKenzie Rd
- Sauble Beach was assumed to operate 10:00 to 22:00 all year round (instead of 12:00 to 00:00 peak and 10:00 to 22:00 off-peak)

3.10 The P4 response performance results for the 2024 Base Position are given in Figure **3-1**. There is a considerable beneficial impact for Saugeen Shores when moving to the new Port Elgin station.

Figure 3-1: 2024 Base Position Performance Results

Base Position with 2024 Deployment Plan

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th %ile (mm:ss)
Arran-Elderslie	48.8%	53.3%	75.2%	10:07	18:31
Brockton	80.3%	87.2%	96.8%	05:45	11:10
Huron-Kinloss	12.1%	26.6%	56.1%	14:27	21:20
Kincardine	59.1%	65.3%	82.8%	09:10	17:49
Northern Bruce Peninsula	25.0%	29.0%	34.5%	17:41	27:27
Saugeen Shores	59.7%	79.3%	95.2%	07:27	11:53
South Bruce	10.3%	39.3%	85.8%	10:49	16:00
South Bruce Peninsula	41.1%	49.7%	71.8%	10:49	20:42
Bruce County	**48.4%**	**59.6%**	**78.6%**	**10:01**	**19:48**

Base Position including Port Elgin (New) and Sauble Beach 10-22 Year Round

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th %ile (mm:ss)
Arran-Elderslie	49.2%	53.7%	75.4%	10:03	18:32
Brockton	80.1%	87.0%	96.7%	05:47	11:13
Huron-Kinloss	11.9%	26.2%	56.1%	14:32	21:26
Kincardine	58.8%	64.8%	81.7%	09:20	18:15
Northern Bruce Peninsula	25.5%	29.3%	34.5%	17:28	27:08
Saugeen Shores	75.5%	86.4%	95.0%	07:37	11:30
South Bruce	10.4%	39.0%	85.4%	10:53	16:05
South Bruce Peninsula	42.4%	56.3%	73.6%	10:24	20:24
Bruce County	**52.6%**	**62.5%**	**78.6%**	**09:59**	**19:48**

4 The Do Nothing Scenario

To understand resource requirements for the next five years, a demand projection was required. Demand projections were created using a population-based projection method with the underlying hypothesis that demand is strongly related to the population age profile.

Population in 2016 was around 70,000 across Bruce County, increasing to 79,000 by 2023 (a 13% increase over 7 years), and to 86,000 by 2029 (a further 10% increase over 6 years). The population is projected to continue to age during this period. For example, the percentage of the population aged 75 and over was 9% in 2016 compared to 13% in 2029.

The predicted increasing and ageing in population, coupled with increasing demand rates based on data from 2016 to 2023, suggests that the number of P3 and P4 incidents per day will increase from 21 in 2023 to 28 in 2029 ('lower projection'). An alternative projection was created, focusing on the trends observed in demand for the 2019 to 2022 period, which suggests that the number of P3 and P4 incidents per day could increase to 34 in 2029 ('upper projection').

The mid-point between these two projections was taken as a core projection for future modelling. To highlight the impact on future performance if no investment is made to BCPS frontline operations, the demand projections were applied to the Base Position in AmbSim. No other operational changes or deployment enhancements were made (a 'Do Nothing' scenario). In this scenario, P4 10-minute response performance would fall from 63% in 2024 to 61% in 2029.

Demand Projections

Methodology Overview

4.1 To understand resource requirements for the next five years, a demand projection was required.

4.2 Demand projections were created using a population-based projection method (see Appendix **B1**). This method is based on the hypothesis that demand is strongly related to the population age profile and that there is an underlying trend for increased demand at all age groups due to unquantifiable factors such as the overall level of health provision and public expectation which, it is assumed, will continue into the foreseeable future.

4.3 Historical population is compared with historical demand to calculate demand rates per head of population for different age and area combinations. These are then investigated to understand how they have changed over time and combined with future population projections to calculate expected future demand levels. This method captures three factors that impact demand:

- Changes to the population size
- Changes to the age profile of the population
- Changes to the base demand rates per head of population

Historical and Projected Population

4.4 Population figures by year, age, and municipality for each year from 2016 to 2029 were required to feed into the demand projection calculation. ORH was provided with several datasets regarding the historical and projected population of Bruce County (see Appendix **B2**); no single dataset contained every element required.

4.5 In agreement with BCPS senior leadership, the Stats Canada historical data was used for 2016 to 2023, and Ministry of Finance (MoF) projection data was used for 2024 to 2029. Given that the MoF data was only given for Bruce County as a whole, the Bruce Good Growth data was used to generate assumptions for breaking down the data by municipality.

4.6 Population in 2016 was around 70,000 across Bruce County, increasing to 79,000 by 2023 (a 13% increase over 7 years), and to 86,000 by 2029 (a further 10% increase over 6 years). The population is projected to continue to age between 2023 and 2033 (see Figure **4-1**). For example, the percentage of the population aged 75 and over was 9% in 2016 compared to 13% in 2029.

Historical Demand and Projected Demand Rates

4.7 Historical demand figures by year, age, and municipality for each year from 2016 to 2023 were also required to feed into the demand projection calculation (see Figure **4-2**). In 2023, the percentage of the demand aged 75 and over was 38%.

4.8 There is a clear correlation between age and demand, with the older age groups generating the most incidents. As a result, when comparing historical population and historical demand, demand rates per 1,000 population are substantially higher for the '75+' age group than for other age groups (see Appendix **B3**). Demand rates in each age group have generally followed an upward trend and are therefore predicted to increase again between 2024 and 2029.

Demand Projections

4.9 The predicted increasing and ageing in population, coupled with increasing demand rates, suggests that the number of P3 and P4 incidents per day, excluding out-of-area demand, will increase from 21 in 2023 to 28 in 2029 ('lower projection'). This represents a 5.4% increase per annum.

Figure 4-1: Historical and Projected Population by Age Group

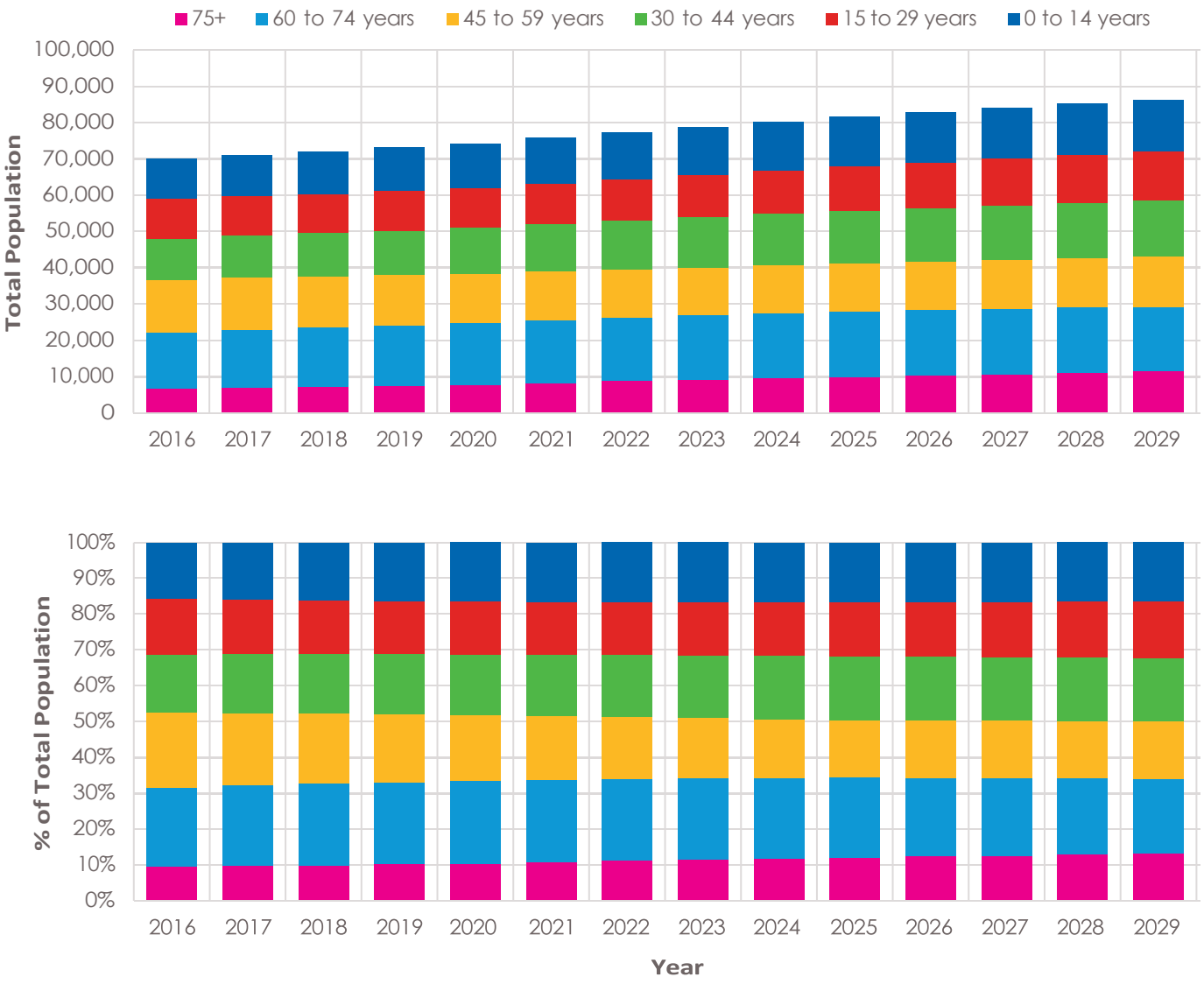
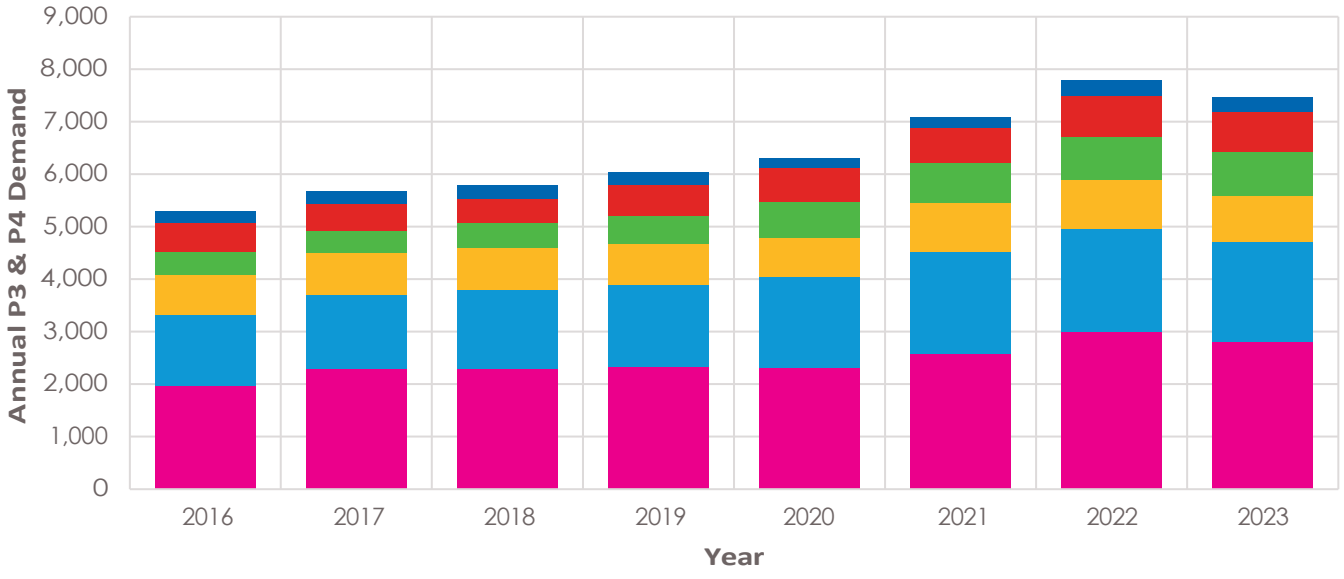


Figure 4-2: Historical Demand by Age Group



4.10 As discussed, this projection was based in part on the trends observed in demand for the historical 2016 to 2023 sample period (see Figure **4-3**). However, the rate of increase in demand was higher in the 2019 to 2022 period (by 4.7 from 16.6 to 21.3 P3 and P4 incidents per day) than for the 2016 to 2019 period (by 2.2 from 14.4 to 16.6 P3 and P4 incidents per day).

4.11 An alternative projection was therefore created, focusing on the trends observed in demand for the 2019 to 2022 period. This new projection suggests that the number of P3 and P4 incidents per day could increase to 34 in 2029 ('upper projection'). This represents an 8.7% increase per annum.

4.12 The mid-point between these two projections was taken as a core projection for future modelling, equivalent to a 7% increase per annum. Detailed projection results by LTM, and for all three projection scenarios (upper, lower, and core), are provided in Appendix **B4**.

Do Nothing Performance in 2029

4.13 To provide meaningful context for future resource recommendations, it was important to model a 'Do Nothing' scenario through to 2029. This helps to highlight the impact on performance if no investment is made to BCPS frontline operations. The demand projections were therefore applied to the Base Position in AmbSim, and no other operational changes or deployment enhancements were made.

4.14 In this 'Do Nothing' scenario, based on the core projection scenario (see Figure **4-4**), P4 response performance:

- Would fall from 53% in 2024 to 51% in 2029 at the 8-minute target
- Would fall from 63% in 2024 to 61% in 2029 at the 10-minute target
- Would fall from 79% in 2024 to 77% in 2029 at the 15-minute target

4.15 Clearly there will be frontline resource investments required by 2029 to offset the demand increases and, at a minimum, maintain current response performance levels.

4.16 Detailed P4 response performance results by LTM, and for all three projection scenarios (upper, lower, and core), are provided in Appendix **B5**.

Figure 4-3: Projection Results

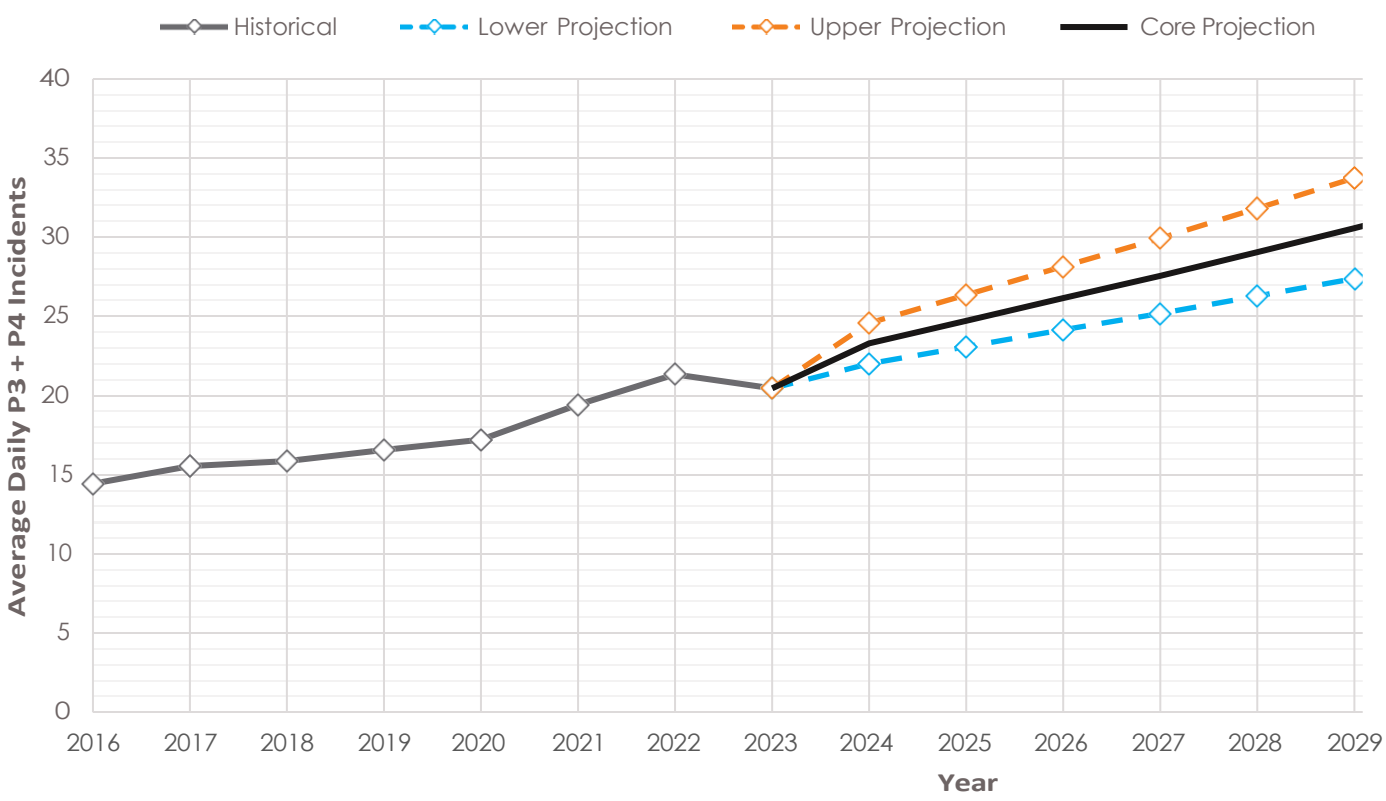
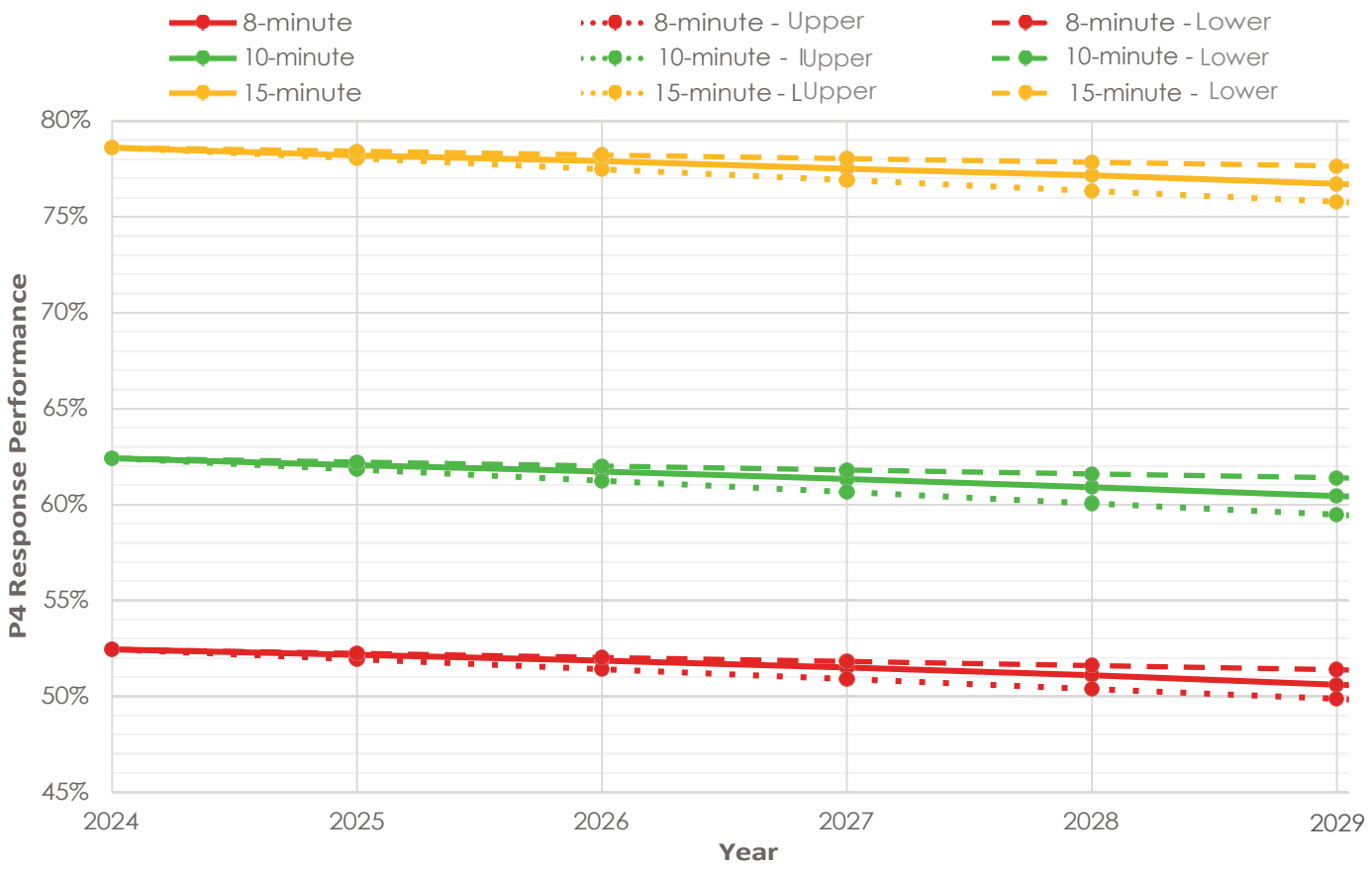


Figure 4-4: Do Nothing Scenario P4 Performance Results



5 Deployment Scenarios

Before honing in on a core set of recommendations, a range of scenarios were tested in AmbSim and results fed back to BCPS senior management for review.

Scenarios were tested to understand:

- The performance benefits of deploying either an additional day shift to Kincardine or an additional night shift to Sauble Beach in 2026.
- The potential impact of Chippewas of Nawash Unceded First Nations (Nawash FN) deploying their own ring-fenced ambulance on response performance in South Bruce Peninsula.

Deployment Options for 2026

5.1 Beyond the deployment changes that BCPS have already made between 2020 and 2024, the next change was proposed for 2026. It was therefore of interest to understand whether it would be more beneficial to prioritize deploying an additional day shift to Kincardine or to extend Sauble Beach station coverage to 24 hours.

5.2 Each option was tested independently in AmbSim to understand the potential performance impacts (see Appendix **C**).

5.3 If Sauble Beach station coverage is extended to 24 hours (by adding a night shift) then P4 response performance in South Bruce Peninsula would improve by around 7 to 8 percentage points against the 8-, 10- and 15-minute performance targets. Average response times in this LTM would reduce by 1m18s, from 10m34s to 9m15s, and the 90th percentile response times would reduce by 1m49s, from 20m31s to 18m41s. There are also marginal performance improvements in neighbouring Saugeen Shores LTM.

5.4 If an additional day shift is deployed at Kincardine Station, then P4 response performance in Kincardine would improve by around 4 percentage points against the 8-, 10- and 15-minute performance targets. Average response times in this LTM would reduce by 42s, from 9m35s to 9m15s, and the 90th percentile response times would reduce by 1m16s, from 18m41s to 17m25s. There are further performance improvements in neighbouring Saugeen Shores LTM.

5.5 As Kincardine LTM has better baseline performance than South Bruce Peninsula LTM prior to deploying any additional resources, it is recommended that the additional Sauble Beach deployment be prioritized above the Kincardine deployment.

First Nations Deployment

5.6 There is a possibility that the Chippewas of Nawash Unceded First Nations (Nawash FN) may deploy their own ambulances in the future. AmbSim was therefore used to understand the potential impacts on performance impacts.

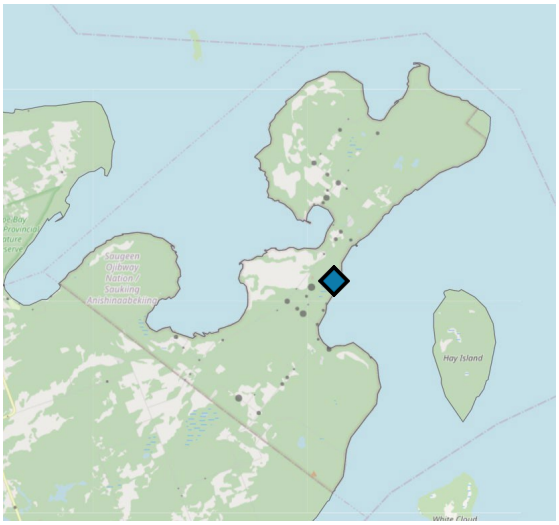
5.7 For the purposes of modelling, several assumptions were made (see Figure **5-1**):

- A single 24/7 vehicle could be deployed from the Nawash Fire station at Halfway Point
- The FN ambulance would act in a similar way to existing BCPS ambulances (that is, have the same mobilization times, time at scene, travel speeds, etc)
- It would only respond to demand within the Neyaashiinigmiing (Cape Croker) boundary; of the total five P3 and P4 incidents per day in South Bruce Peninsula, 0.4 or 7% occur within the Nawash FN area.
- It would only respond if it was closer than a BCPS ambulance, so BCPS ambulances may still respond into these areas when appropriate

5.8 There would be significant performance improvements for South Bruce Peninsula if this change occurred immediately in 2024 (see Figure **5-2**). P4 8-, 10-, and 15-minute response performance would each increase by approximately 8 percentage points.. Average and 90th percentile response times in this LTM would reduce by around 01m20s and 02m15s respectively.

Figure 5-1: First Nations Assumptions

Nawash Modelled Site



P3 & P4 Demand

Area	Average Daily
Neyaashiinigmiing	0.38
Total South Bruce Peninsula	5.05

Figure 5-2: First Nations Performance Results

24/7 Ambulance at Nawash FN

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th %ile (mm:ss)
South Bruce Peninsula	49.8%	64.4%	82.2%	09:03	18:10
Bruce County	54.2%	64.2%	80.3%	09:42	19:14

Difference to 2024 Base Position including Port Elgin (New) and Sauble Beach 10-22 Year Round

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th %ile (mm:ss)
South Bruce Peninsula	7.4%	8.1%	8.6%	-01:21	-02:14
Bruce County	1.6%	1.7%	1.6%	-00:17	-00:34

6 Recommended Trajectory

6.1 Based on the options explored in Section 5, deployment recommendations for the next five years have been set out according to the trajectory outlined in Figure **6-1**.

6.2 The process for determining an appropriate trajectory aimed to stagger ambulance increases so that the financial impacts are as evenly spread across the five years as possible while balancing this with the need to improve performance in an equitable fashion across the LTMs.

6.3 The recommend trajectory includes:

- Increasing Sauble Beach to 24/7 coverage (2026)
- Deploying an additional Port Elgin night shift (2028)

6.4 It is also assumed that Nawash FN may deploy a vehicle to respond directly within their boundary (2027).

6.5 Under the recommended trajectory (based on the core projection scenario), P4 response performance:

- Would increase from 52% in 2024 to 55% in 2029 at the 8-minute target
- Would increase from 62% in 2024 to 66% in 2029 at the 10-minute target
- Would increase from 79% in 2024 to 82% in 2029 at the 15-minute target

6.6 Detailed P4 response performance results by LTM and year are provided in Appendices **D1** (8-minute performance) and **D2** (average response time).

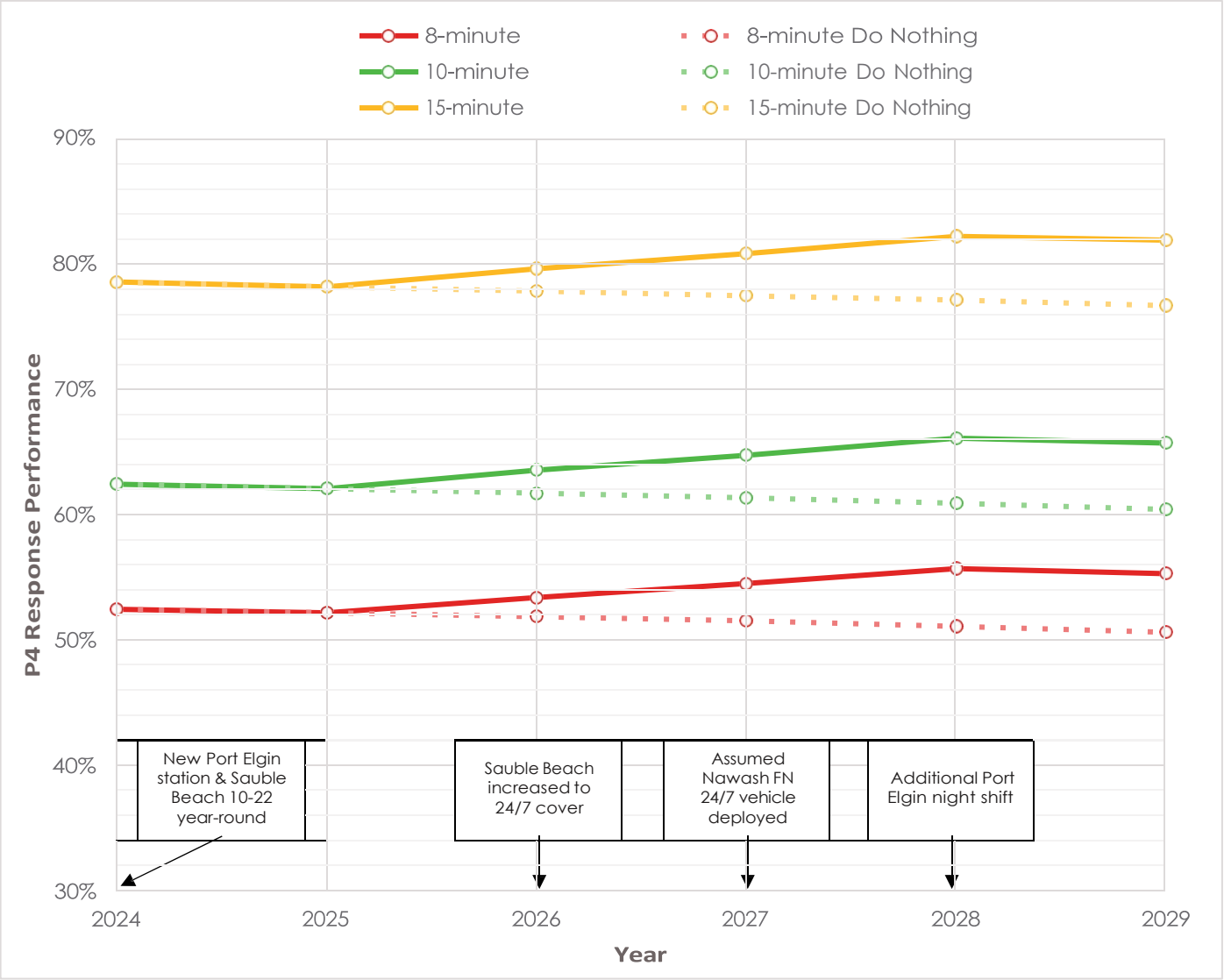
6.7 By 2029, average response times for Bruce County will have improved by around 40 seconds.

6.8 If the Nawash FN vehicle does not come to fruition, then P4 response performance in South Bruce Peninsula in 2029 will be lower than the recommended trajectory position (see Appendix **D3**). However, this still represents an improvement compared to the Base Position.

6.9 While not recommended for the 2024 to 2029 period, beyond 2029, BCPS should consider deploying an additional Kincardine day shift.

6.10 There is also a possibility that a new Deep Geologic Repository project could be hosted in South Bruce LTM which is anticipated to drive further population growth in several communities in both South Bruce and Huron-Kinloss LTMs. However, it is not anticipated to come to fruition in the next five years.

Figure 6-1: Recommended Trajectory and Performance Results



Appendices

Bruce County Paramedic Services

Updating the Deployment Review

Final Report

August 27, 2024
ORH/BCPS/2

PLAN. PREPARE. **PERFORM.**

A Current Service Profile

A1 Demand Analysis

- A1a Average Daily Demand by Month
- A1b Average Daily Demand by Municipality – Other Service Demand
- A1c Peak vs Off-Peak Comparison
- A1d Conveyance Rate by Priority
- A1e Monthly Demand by Receiving Hospital

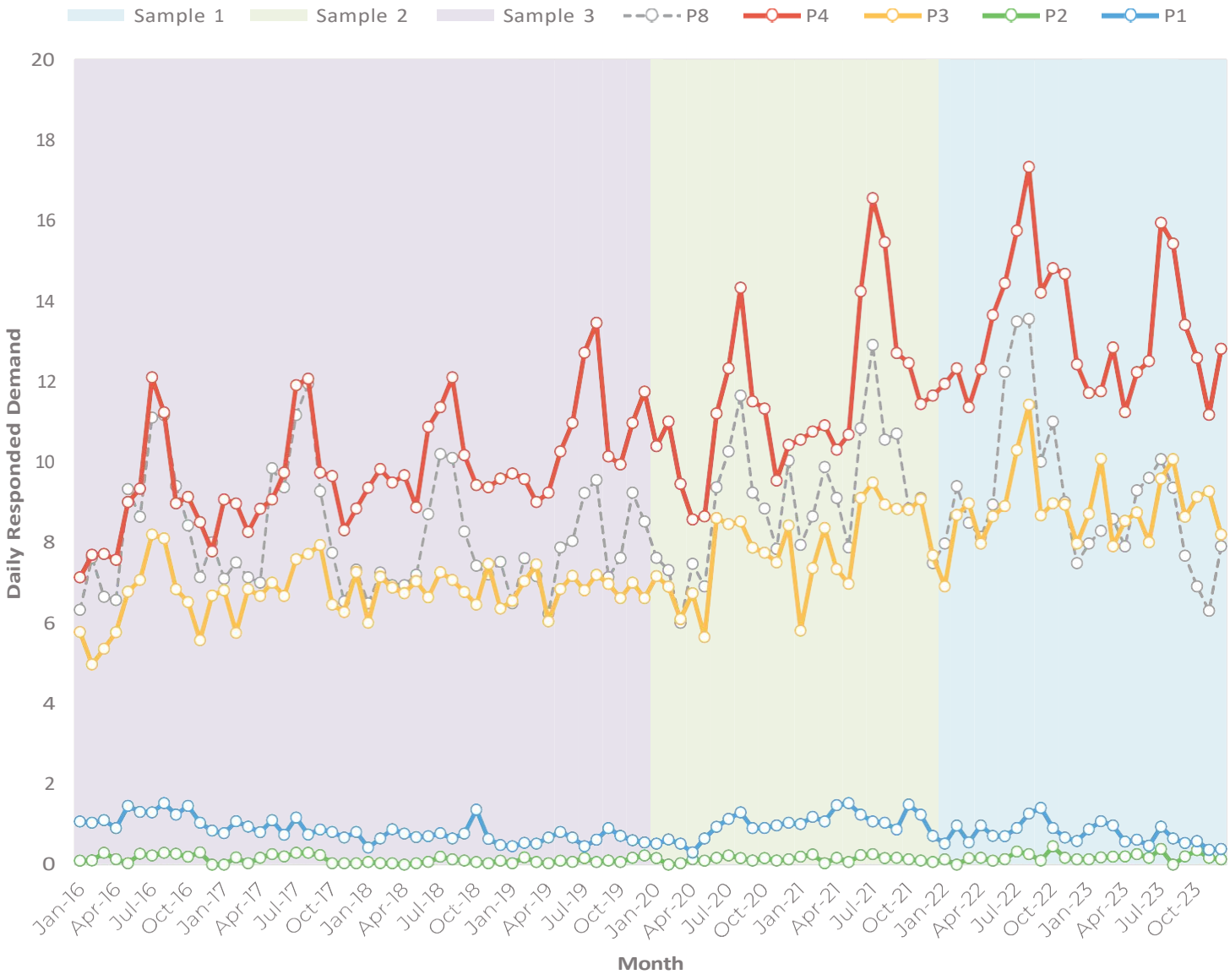
A2 Performance and Call Components Analysis

- A2a Performance by Month
- A2b P3 Average Call Components
- A2c P4 Transfer vs Non-Transfer Call Components
- A2d Average Time at Hospital
  - A2d-i Components by Month
  - A2d-ii By Hospital

A3 Resourcing Analysis

- A3a 2022 vs 2024 Deployments by Day and Hour (Peak)
- A3b Demand-Resource Matching (Peak)

Average Daily Demand by Month



Average Daily Demand by Municipality – Other Service Demand

Incidents involving BCPS Vehicles

Sample	Arran-Elderslie	Brockton	Huron-Kinloss	Kincardine	Northern Bruce Peninsula	Saugeen Shores	South Bruce	South Bruce Peninsula	Out of Area	Total
Sample 3 (2016-2019)	1.24	2.43	0.79	3.06	1.21	3.68	0.33	3.48	1.29	17.51
Sample 2 (2020-2021)	1.42	2.63	0.90	3.23	1.41	4.44	0.47	4.21	1.53	20.24
Sample 1 (2022-2023)	1.62	2.86	1.06	3.55	1.42	5.22	0.54	4.96	1.77	23.00

Incidents involving Other Service Vehicles Only

Sample	Arran-Elderslie	Brockton	Huron-Kinloss	Kincardine	Northern Bruce Peninsula	Saugeen Shores	South Bruce	South Bruce Peninsula	Out of Area	Total
Sample 3 (2016-2019)	0.15	0.98	0.57	0.00	0.01	0.00	0.23	0.04	0.00	1.98
Sample 2 (2020-2021)	0.18	0.55	0.38	0.01	0.00	0.01	0.27	0.03	0.00	1.43
Sample 1 (2022-2023)	0.19	0.48	0.49	0.01	0.00	0.01	0.21	0.07	0.00	1.47

% Other Service Vehicles Only

Sample	Arran-Elderslie	Brockton	Huron-Kinloss	Kincardine	Northern Bruce Peninsula	Saugeen Shores	South Bruce	South Bruce Peninsula	Out of Area	Total
Sample 3 (2016-2019)	10.8%	28.6%	42.0%	0.1%	0.6%	0.0%	41.3%	1.2%	0.1%	10.2%
Sample 2 (2020-2021)	11.0%	17.3%	29.8%	0.3%	0.1%	0.2%	36.4%	0.7%	0.0%	10.7%
Sample 1 (2022-2023)	10.7%	14.4%	31.9%	0.2%	0.0%	0.3%	28.5%	1.3%	0.0%	9.7%

Peak vs Off-Peak Comparison

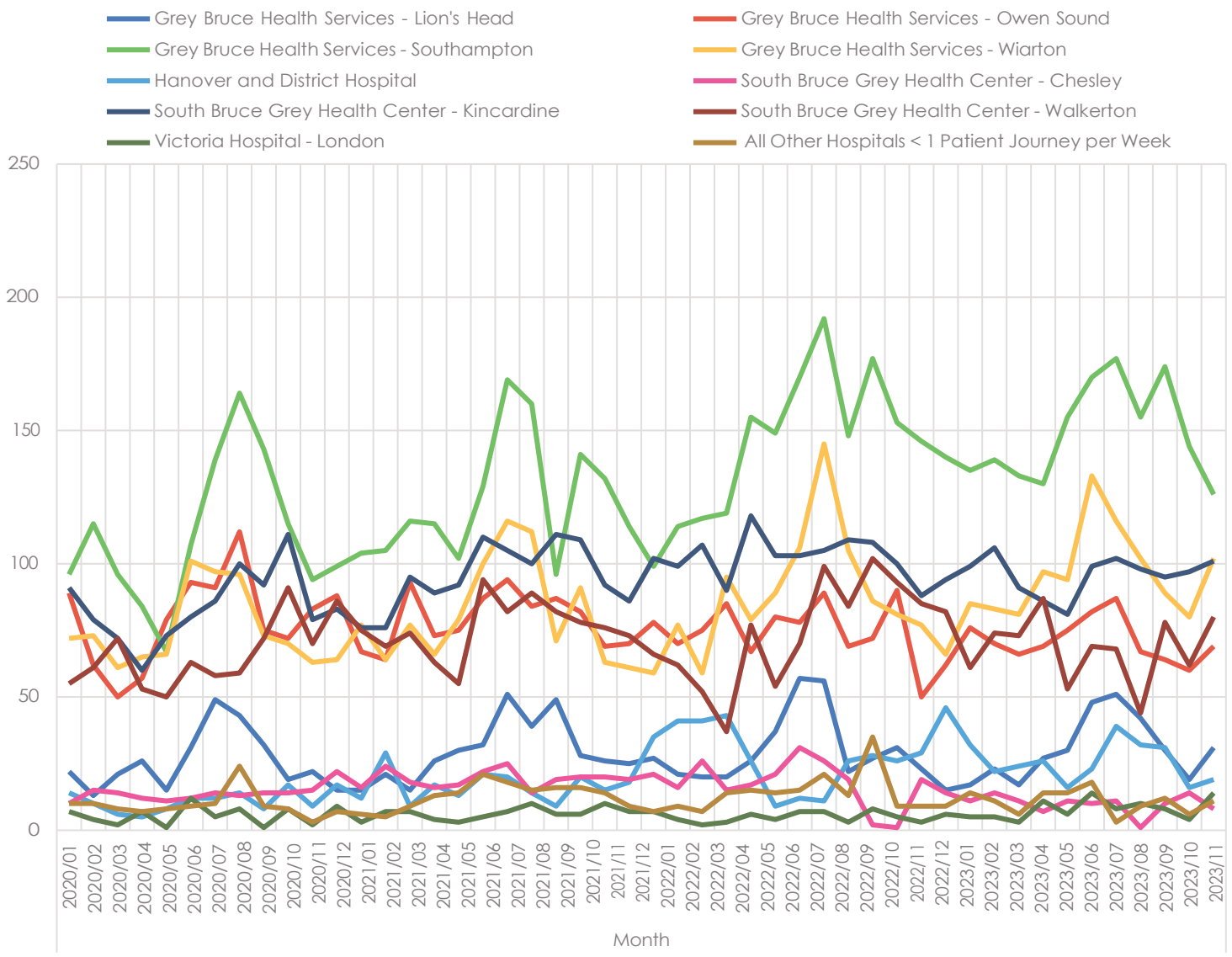
Period	Sample 3 (2016-2019)	Sample 2 (2020-2021)	Sample 1 (2022-2023)
Peak	20.0	24.1	26.7
Off-Peak	16.7	19.2	21.9
Overall	17.5	20.4	23.1

Increase Off-Peak to Peak	20%	25%	22%

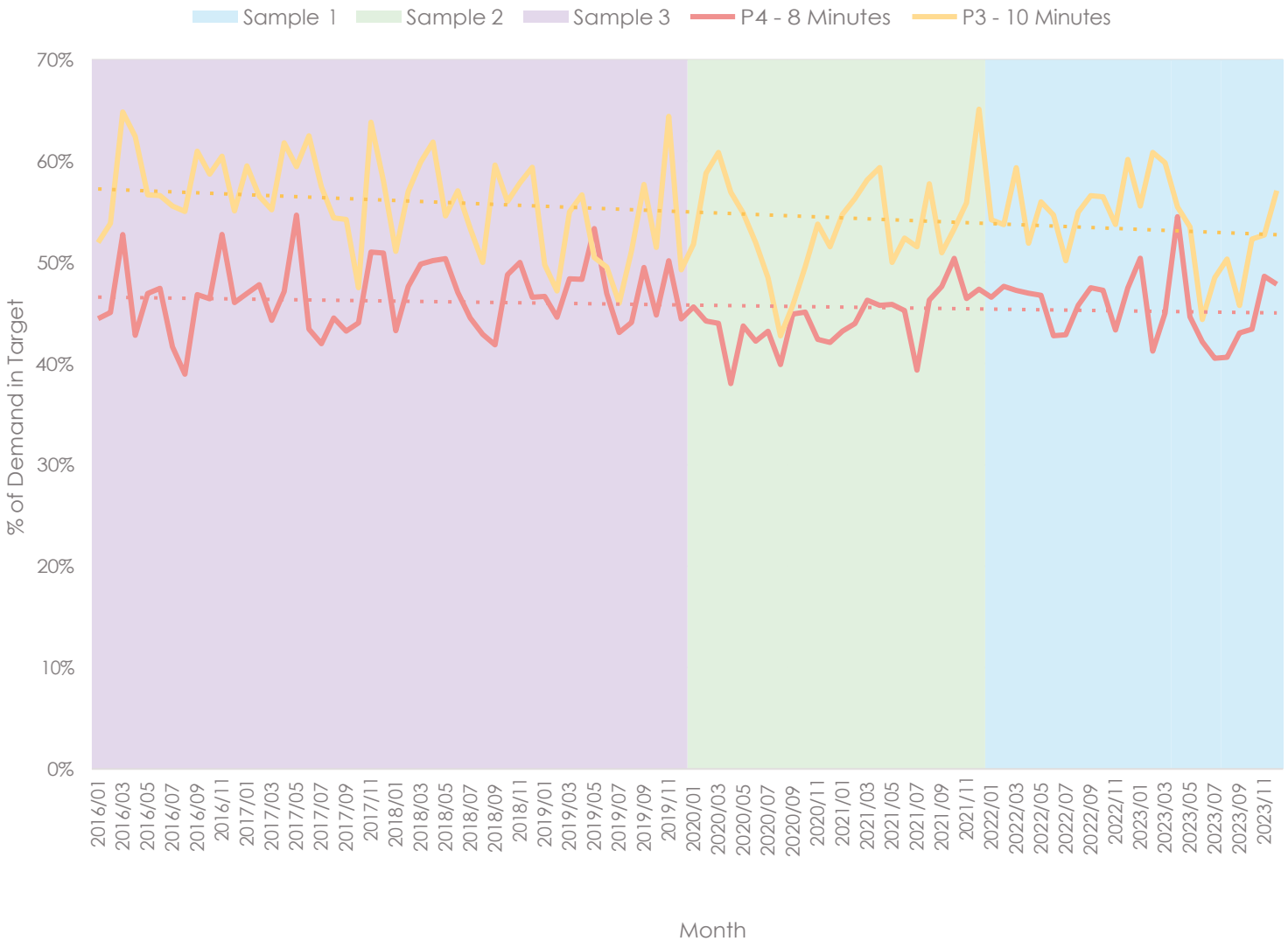
Conveyance Rate by Priority

Priority	Sample 3 (2016-2019)			Sample 2 (2020-2021)			Sample 1 (2022-2023)		
	Incidents	To Hospital	Conveyance	Incidents	To Hospital	Conveyance	Incidents	To Hospital	Conveyance
P3	6.75	5.78	85.7%	7.35	6.40	87.1%	8.47	7.17	84.7%
P4	9.69	8.56	88.3%	10.74	9.59	89.3%	12.31	11.16	90.7%

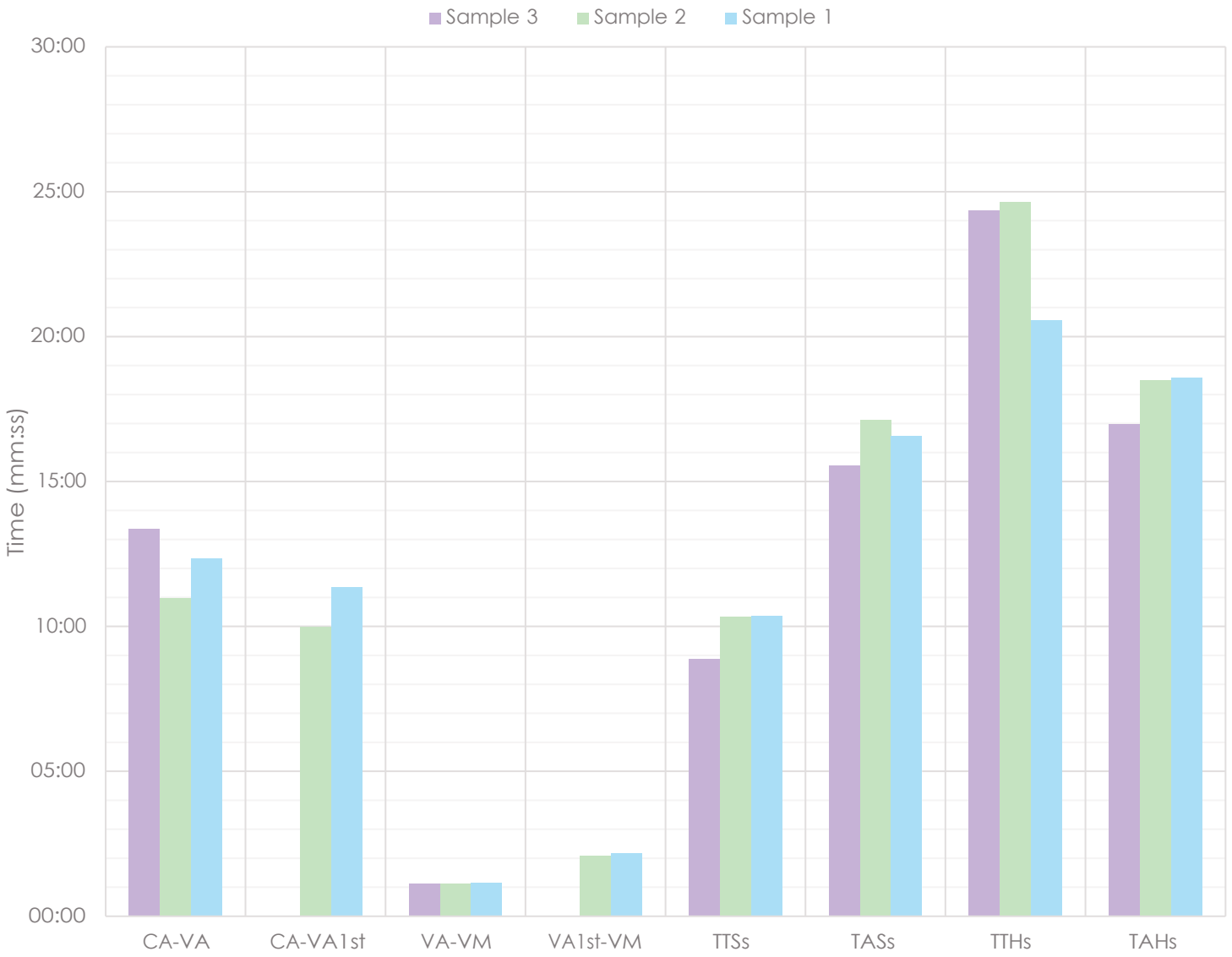
Monthly Demand by Receiving Hospital



Performance by Month



P3 Average Call Components



Time stamps used are for first BCPS vehicle on scene, except where first assigned vehicle is also considered.

CA-VA: Call Answer to Vehicle Assigned

CA-VA1st: Call Answer to First Vehicle Assigned

VA-VM: Vehicle Assigned to Vehicle Mobile

VA1st-VM: First Vehicle Assigned to Vehicle Mobile

TTS: Time to Scene

TAS: Time at Scene

TTH: Time to Hospital

TAH: Time at Hospital

P4 Transfer vs Non-Transfer Call Components

Component	Sample 3 (2016-19)		Sample 2 (2020-21)		Sample 1 (2022-23)	
	Transfer	Non-Transfer	Transfer	Non-Transfer	Transfer	Non-Transfer
CA-VA	06:54	02:10	08:29	02:21	09:36	03:05
VA-VM	01:02	01:00	01:04	00:59	01:05	01:05
TTS	05:53	09:30	06:32	09:44	06:18	09:19
TAS	17:06	17:30	17:10	19:07	17:07	18:09
TTH	33:32	10:48	41:10	11:07	40:54	11:03
TAH	25:30	13:37	26:35	16:56	28:24	18:12
OCC	87:13	48:22	91:06	51:59	91:15	51:39
Incident Split	9%	91%	11%	89%	8%	92%

Time stamps used are for first BCPS vehicle on scene, except where first assigned vehicle is also considered.

CA-VA: Call Answer to Vehicle Assigned

CA-VA1st: Call Answer to First Vehicle Assigned

VA-VM: Vehicle Assigned to Vehicle Mobile

VA1st-VM: First Vehicle Assigned to Vehicle Mobile

TTS: Time to Scene

TAS: Time at Scene

TTH: Time to Hospital

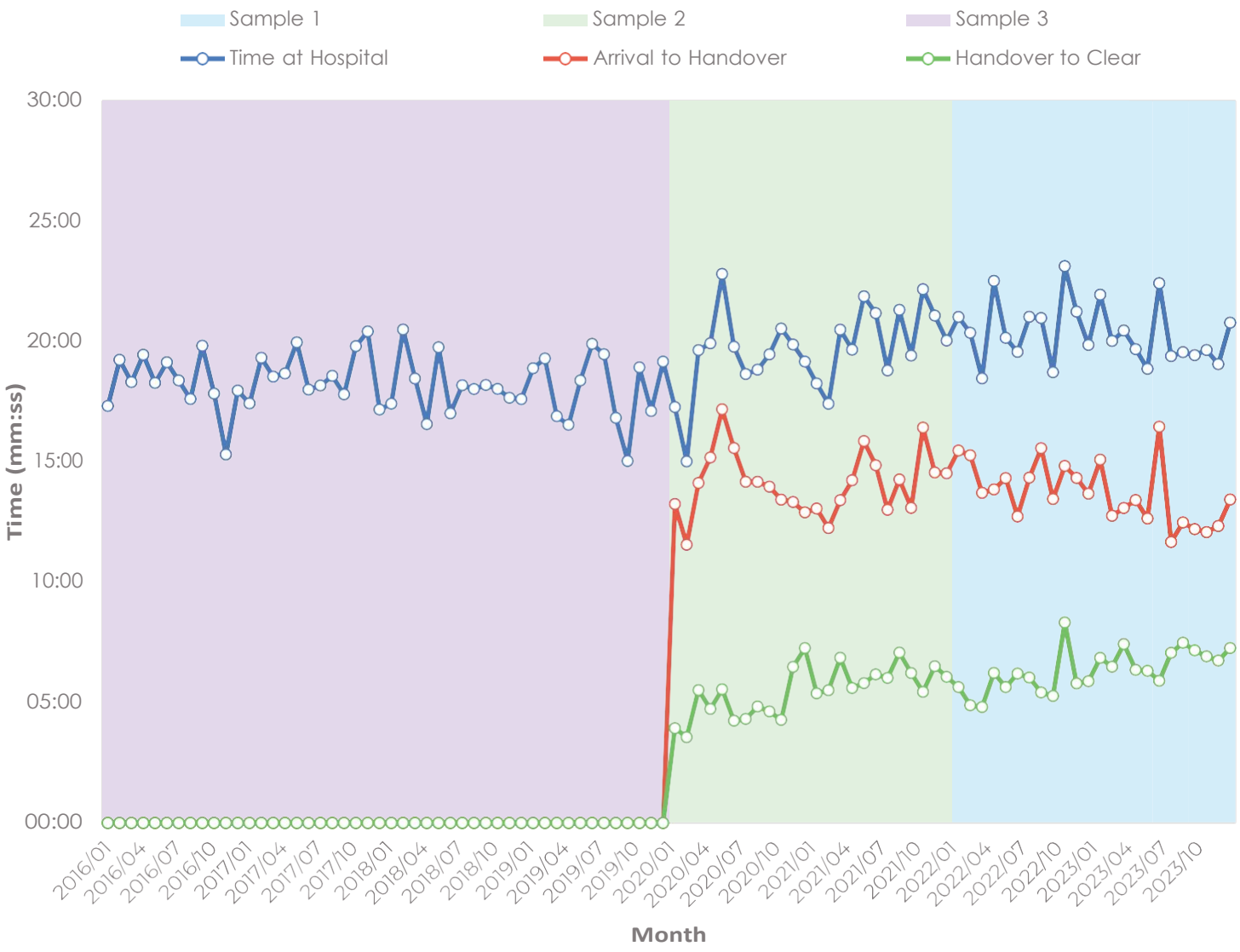
TAH: Time at Hospital

Average Time at Hospital – Components by Hospital

Hospital	Sample 3 (2016-2019)			Sample 2 (2020-2021)			Sample 1 (2022-2023)		
	Time at Hospital	Arrival to Handover	Handover to Clear	Time at Hospital	Arrival to Handover	Handover to Clear	Time at Hospital	Arrival to Handover	Handover to Clear
Grey Bruce Health Services - Southampton	13:17	08:50	04:18	16:28	11:08	05:15	18:32	12:57	05:34
South Bruce Grey Health Center - Kincardine	11:13	06:34	04:33	13:28	06:54	06:27	13:56	06:59	06:54
Grey Bruce Health Services - Owen Sound	22:52	19:31	03:21	25:08	20:00	05:07	27:14	20:09	07:02
Grey Bruce Health Services - Wiarton	13:36	08:26	04:55	15:21	09:14	06:02	16:38	10:06	06:30
South Bruce Grey Health Center - Walkerton	15:45	11:49	03:51	17:44	12:56	04:52	17:39	11:25	06:12
Other	24:17	20:18	03:35	19:05	14:53	03:23	22:18	16:44	04:26
Grey Bruce Health Services - Lion's Head	14:01	08:27	05:26	16:58	10:13	06:39	17:19	09:40	07:37
South Bruce Grey Health Center - Chesley	14:49	09:20	05:16	16:22	09:45	06:39	15:50	09:09	06:32
Hanover and District Hospital	14:45	10:06	04:38	17:52	10:55	06:56	16:42	09:52	06:53
Victoria Hospital - London	38:21	34:44	03:51	38:55	35:48	03:25	41:41	35:42	05:00
Total	**18:18**	**13:48**	**04:22**	**19:44**	**14:11**	**05:29**	**20:47**	**14:16**	**06:16**

Ordered by patient journeys (highest to lowest)

Average Time at Hospital – Components by Month



Handover time not captured by month in original sample analysis

2022 vs 2024 Deployments by Day and Hour (Peak)

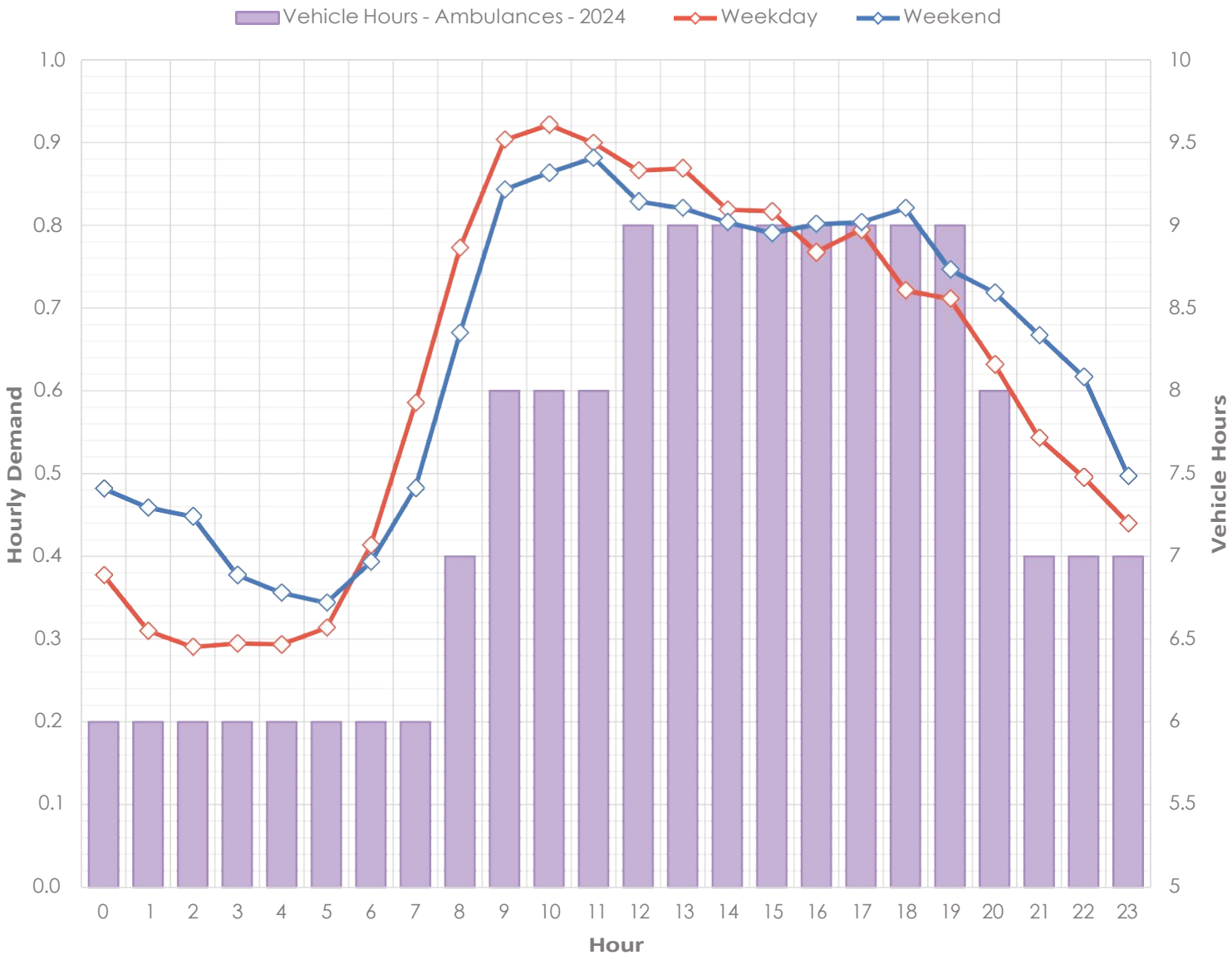
Vehicle Hours - Ambulances - 2024

Weekday	Hour																							Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Monday	6	6	6	6	6	6	6	6	7	8	8	8	9	9	9	9	9	9	9	9	8	7	7	7	180
Tuesday	6	6	6	6	6	6	6	6	7	8	8	8	9	9	9	9	9	9	9	9	8	7	7	7	180
Wednesday	6	6	6	6	6	6	6	6	7	8	8	8	9	9	9	9	9	9	9	9	8	7	7	7	180
Thursday	6	6	6	6	6	6	6	6	7	8	8	8	9	9	9	9	9	9	9	9	8	7	7	7	180
Friday	6	6	6	6	6	6	6	6	7	8	8	8	9	9	9	9	9	9	9	9	8	7	7	7	180
Saturday	6	6	6	6	6	6	6	6	7	8	8	8	9	9	9	9	9	9	9	9	8	7	7	7	180
Sunday	6	6	6	6	6	6	6	6	7	8	8	8	9	9	9	9	9	9	9	9	8	7	7	7	180
Total	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**49**	**56**	**56**	**56**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**56**	**49**	**49**	**49**	**1260**

Vehicle Hours - Ambulances - 2022

Weekday	Hour																							Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Monday	6	6	6	6	6	6	6	6	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	168
Tuesday	6	6	6	6	6	6	6	6	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	168
Wednesday	6	6	6	6	6	6	6	6	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	168
Thursday	6	6	6	6	6	6	6	6	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	168
Friday	6	6	6	6	6	6	6	6	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	168
Saturday	6	6	6	6	6	6	6	6	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	168
Sunday	6	6	6	6	6	6	6	6	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	168
Total	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**49**	**49**	**49**	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**49**	**49**	**49**	**1176**

Demand Resource Matching (Peak)



B The Do Nothing Scenario

B1 Projection Methodology

B2 Population Data Sources

B3 Demand Rates

B4 Demand Projection Results

B4a Upper Projection

B4b Lower Projection

B4c Core Projection

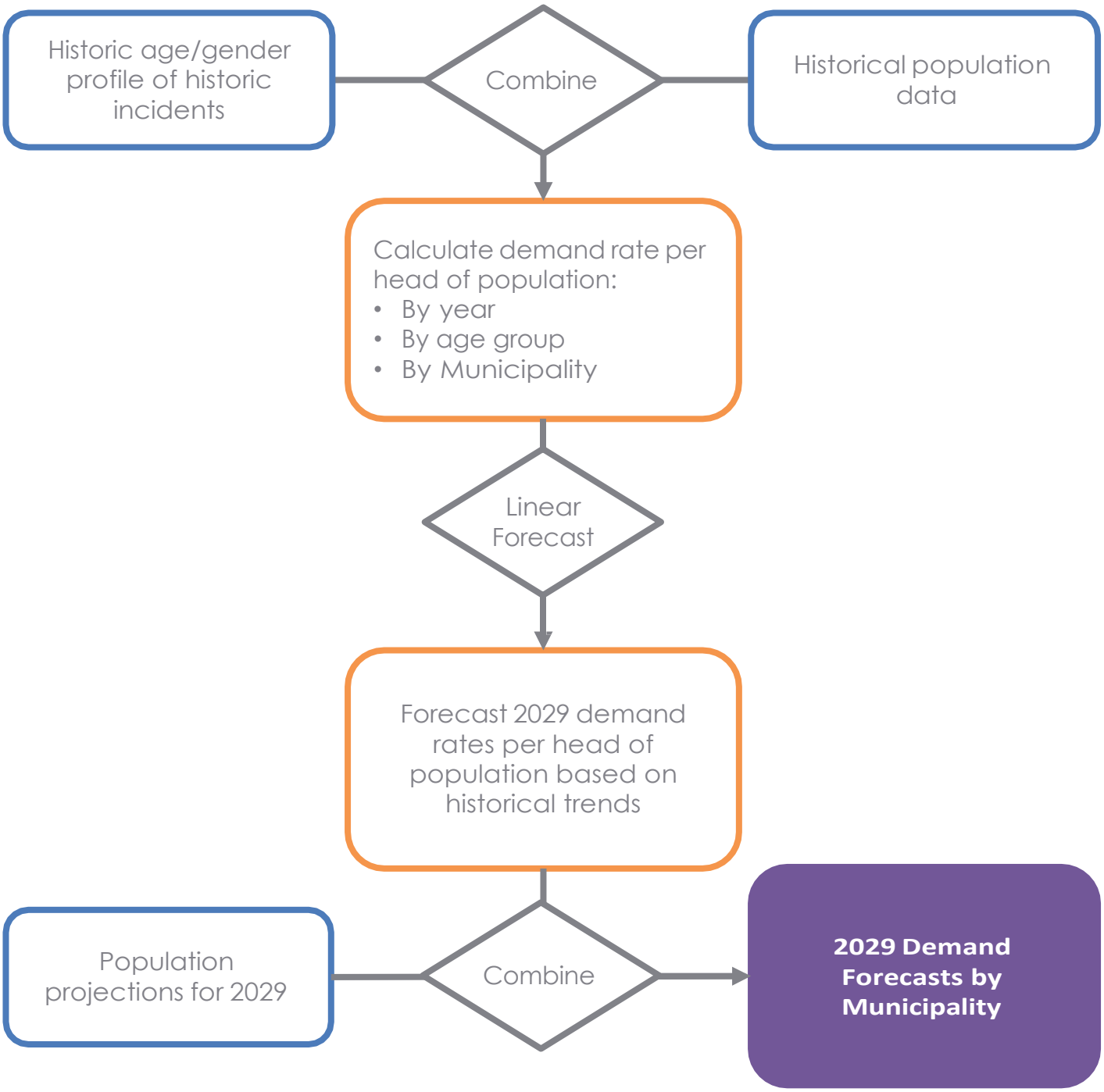
B5 2029 Do Nothing P4 Response Performance Results

B5a Upper Projection

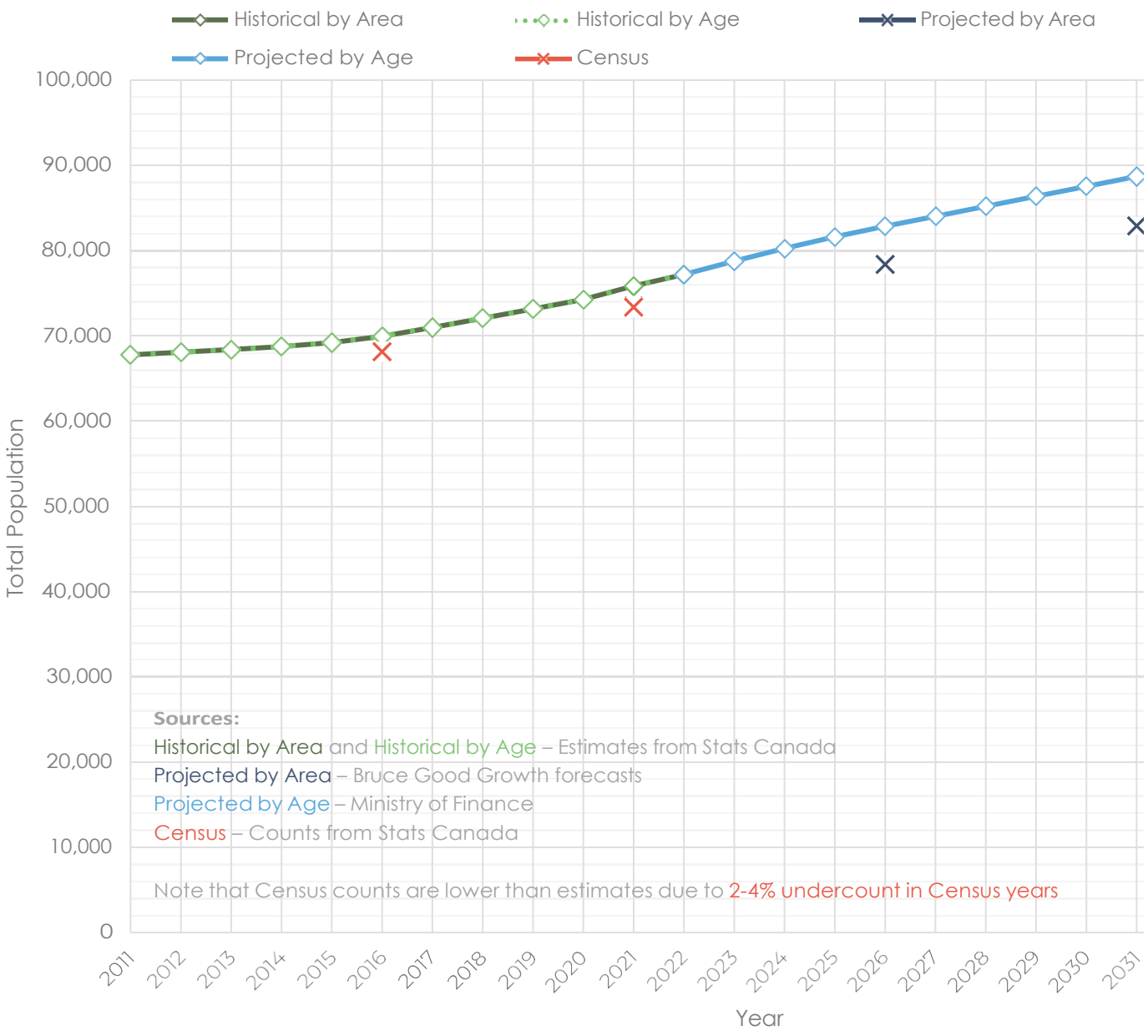
B5b Lower Projection

B5c Core Projection

Projection Methodology

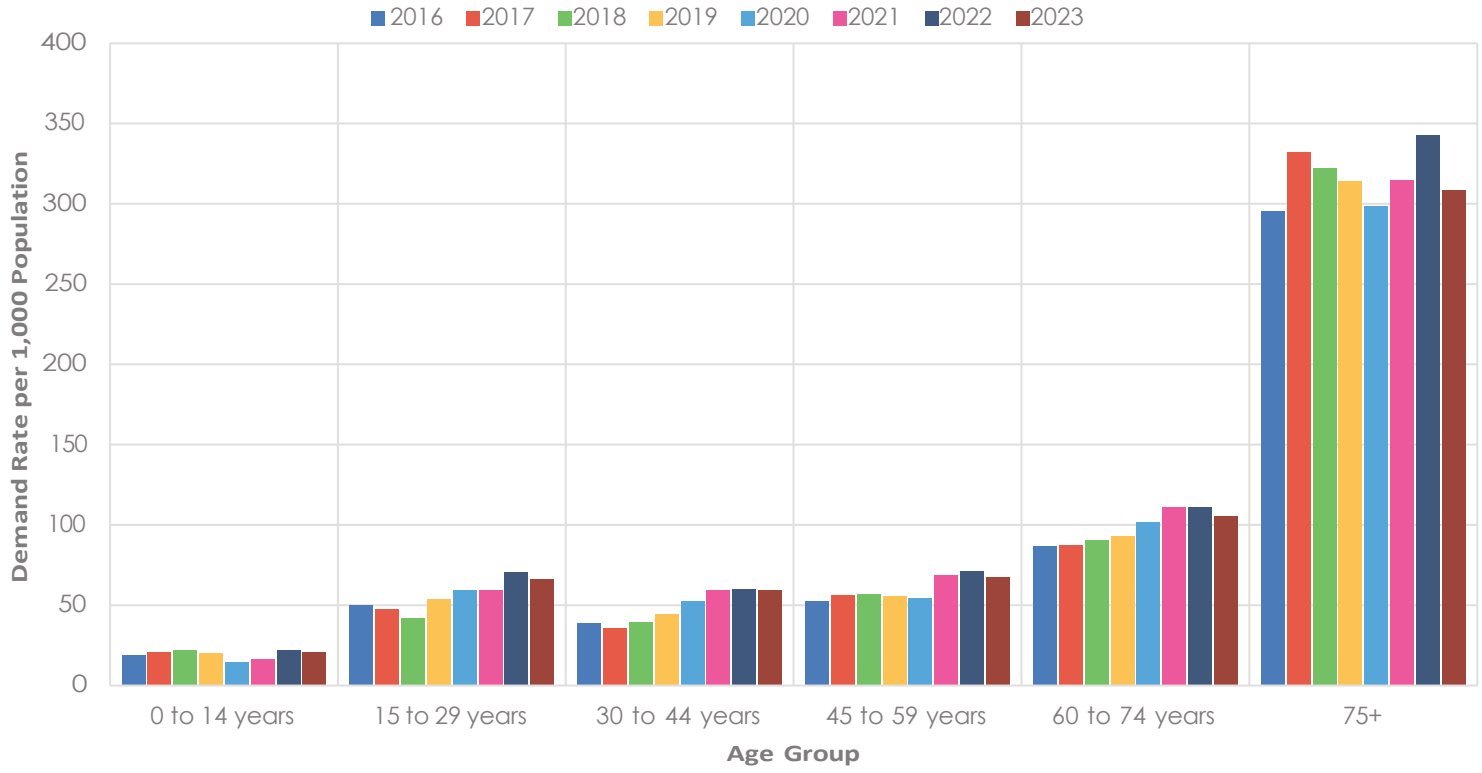


Population Data Sources

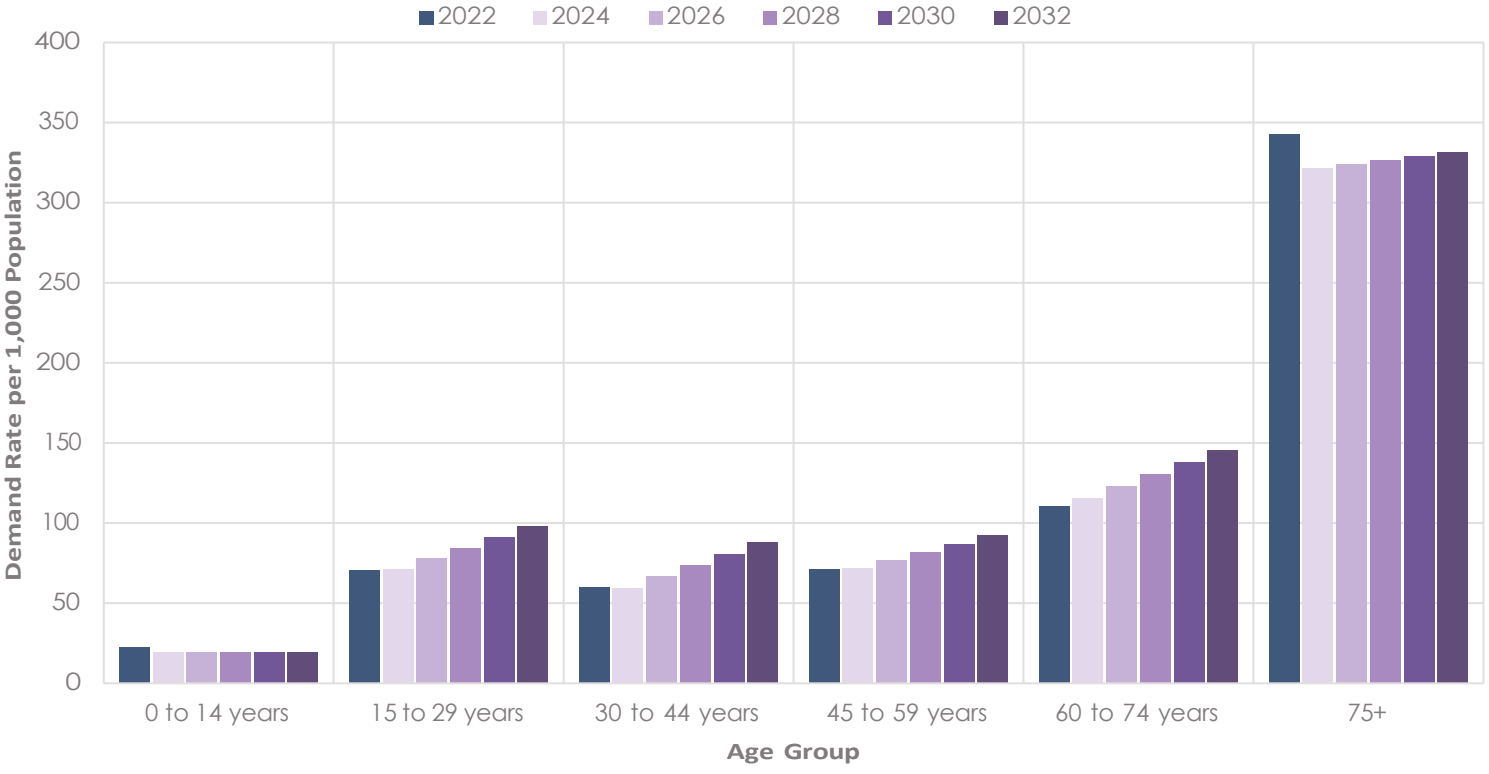


Demand Rates

Historical Demand Rates Per 1,000 Population



Projected Demand Rates Per 1,000 Population



Demand Projection Results – Upper Projection

Average Daily Demand (P3 + P4)

Municipality	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Arran-Elderslie	1.1	1.2	1.3	1.3	1.3	1.5	1.7	1.5	1.9	2.0	2.2	2.3	2.5	2.6
Brockton	1.7	2.0	2.0	2.1	2.1	2.4	2.8	2.5	3.1	3.3	3.6	3.8	4.0	4.3
Huron-Kinloss	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.0	1.3	1.4	1.5	1.6	1.7	1.8
Kincardine	3.2	3.1	3.0	2.9	3.0	3.5	3.7	3.4	4.3	4.6	4.9	5.2	5.6	5.9
Northern Bruce Peninsula	1.1	1.2	1.1	1.3	1.3	1.5	1.5	1.3	2.0	2.1	2.3	2.4	2.5	2.6
Saugeen Shores	3.2	3.5	3.8	4.0	4.1	4.7	5.2	5.1	6.5	7.1	7.7	8.2	8.8	9.4
South Bruce	0.3	0.3	0.4	0.3	0.5	0.4	0.6	0.5	0.6	0.7	0.8	0.8	0.9	1.0
South Bruce Peninsula	3.0	3.4	3.4	3.6	4.0	4.4	4.8	5.1	4.9	5.1	5.3	5.6	5.9	6.2
Overall	14.4	15.5	15.9	16.6	17.2	19.4	21.3	20.5	24.6	26.4	28.2	29.9	31.8	33.7

Percentage Increase	From 2016								From 2023					
	-	108%	110%	115%	119%	135%	148%	142%	120%	129%	138%	146%	156%	165%
	Equivalent to 5.1% per annum								Equivalent to 8.7% per annum					

Demand Projection Results – Lower Projection

Average Daily Demand (P3 + P4)

Municipality	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Arran-Elderslie	1.1	1.2	1.3	1.3	1.3	1.5	1.7	1.5	1.6	1.7	1.7	1.8	1.8	1.9
Brockton	1.7	2.0	2.0	2.1	2.1	2.4	2.8	2.5	2.8	3.0	3.1	3.3	3.4	3.6
Huron-Kinloss	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.0	1.1	1.2	1.2	1.3	1.3	1.4
Kincardine	3.2	3.1	3.0	2.9	3.0	3.5	3.7	3.4	3.8	4.0	4.1	4.2	4.4	4.5
Northern Bruce Peninsula	1.1	1.2	1.1	1.3	1.3	1.5	1.5	1.3	1.7	1.8	1.9	2.0	2.1	2.2
Saugeen Shores	3.2	3.5	3.8	4.0	4.1	4.7	5.2	5.1	5.7	6.1	6.4	6.8	7.1	7.5
South Bruce	0.3	0.3	0.4	0.3	0.5	0.4	0.6	0.5	0.6	0.6	0.6	0.7	0.7	0.8
South Bruce Peninsula	3.0	3.4	3.4	3.6	4.0	4.4	4.8	5.1	5.2	5.3	5.4	5.7	6.0	6.2
Overall	14.4	15.5	15.9	16.6	17.2	19.4	21.3	20.5	22.5	23.6	24.7	25.8	26.9	28.0

Percentage Increase	From 2016								From 2023					
	-	108%	110%	115%	119%	135%	148%	142%	110%	115%	121%	126%	131%	137%
	Equivalent to 5.1% per annum								Equivalent to 5.4% per annum					

Demand Projection Results – Core Projection

Average Daily Demand (P3 + P4)

Municipality	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Arran-Elderslie	1.1	1.2	1.3	1.3	1.3	1.5	1.7	1.5	1.8	1.9	2.0	2.0	2.1	2.3
Brockton	1.7	2.0	2.0	2.1	2.1	2.4	2.8	2.5	3.0	3.2	3.4	3.5	3.7	3.9
Huron-Kinloss	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.0	1.2	1.3	1.4	1.4	1.5	1.6
Kincardine	3.2	3.1	3.0	2.9	3.0	3.5	3.7	3.4	4.1	4.3	4.5	4.7	5.0	5.2
Northern Bruce Peninsula	1.1	1.2	1.1	1.3	1.3	1.5	1.5	1.3	1.8	2.0	2.1	2.2	2.3	2.4
Saugeen Shores	3.2	3.5	3.8	4.0	4.1	4.7	5.2	5.1	6.1	6.6	7.1	7.5	8.0	8.5
South Bruce	0.3	0.3	0.4	0.3	0.5	0.4	0.6	0.5	0.6	0.7	0.7	0.8	0.8	0.9
South Bruce Peninsula	3.0	3.4	3.4	3.6	4.0	4.4	4.8	5.1	5.0	5.2	5.3	5.6	5.9	6.2
Overall	14.4	15.5	15.9	16.6	17.2	19.4	21.3	20.5	23.6	25.0	26.4	27.8	29.4	30.9

Percentage Increase	From 2016								From 2023					
	-	108%	110%	115%	119%	135%	148%	142%	115%	122%	129%	136%	143%	151%
	Equivalent to 5.1% per annum								Equivalent to 7.1% per annum					

2029 Do Nothing P4 Response Performance (Upper Projection)

2024 Base Position including Port Elgin (New) and Sauble Beach 10-22 Year Round

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	49.2%	53.7%	75.4%	10:03	18:32
Brockton	80.1%	87.0%	96.7%	05:47	11:13
Huron-Kinloss	11.9%	26.2%	56.1%	14:32	21:26
Kincardine	58.8%	64.8%	81.7%	09:20	18:15
Northern Bruce Peninsula	25.5%	29.3%	34.5%	17:28	27:08
Saugeen Shores	75.5%	86.4%	95.0%	07:37	11:30
South Bruce	10.4%	39.0%	85.4%	10:53	16:05
South Bruce Peninsula	42.4%	56.3%	73.6%	10:24	20:24
Bruce County	**52.6%**	**62.5%**	**78.6%**	**09:59**	**19:48**

2029 Do Nothing Trajectory (Upper Projection)

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	45.4%	50.5%	68.2%	10:50	19:41
Brockton	76.2%	83.5%	94.9%	06:24	12:34
Huron-Kinloss	11.0%	22.9%	53.0%	15:24	24:05
Kincardine	54.2%	60.6%	77.8%	10:13	19:55
Northern Bruce Peninsula	24.8%	29.1%	35.0%	17:48	27:47
Saugeen Shores	70.6%	80.4%	91.7%	08:22	14:00
South Bruce	10.1%	36.5%	82.3%	11:28	16:38
South Bruce Peninsula	40.7%	53.8%	71.3%	10:54	20:56
Bruce County	**50.0%**	**59.6%**	**75.8%**	**10:35**	**20:46**

Difference

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	-3.8%	-3.2%	-7.1%	00:47	01:10
Brockton	-4.0%	-3.5%	-1.8%	00:37	01:21
Huron-Kinloss	-0.9%	-3.2%	-3.1%	00:52	02:38
Kincardine	-4.5%	-4.2%	-3.9%	00:53	01:40
Northern Bruce Peninsula	-0.7%	-0.2%	0.5%	00:21	00:39
Saugeen Shores	-4.9%	-6.1%	-3.3%	00:46	02:30
South Bruce	-0.2%	-2.5%	-3.1%	00:35	00:33
South Bruce Peninsula	-1.7%	-2.4%	-2.3%	00:30	00:32
Bruce County	**-2.6%**	**-2.9%**	**-2.8%**	**00:36**	**00:58**

2029 Do Nothing P4 Response Performance (Lower Projection)

2024 Base Position including Port Elgin (New) and Sauble Beach 10-22 Year Round

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	49.2%	53.7%	75.4%	10:03	18:32
Brockton	80.1%	87.0%	96.7%	05:47	11:13
Huron-Kinloss	11.9%	26.2%	56.1%	14:32	21:26
Kincardine	58.8%	64.8%	81.7%	09:20	18:15
Northern Bruce Peninsula	25.5%	29.3%	34.5%	17:28	27:08
Saugeen Shores	75.5%	86.4%	95.0%	07:37	11:30
South Bruce	10.4%	39.0%	85.4%	10:53	16:05
South Bruce Peninsula	42.4%	56.3%	73.6%	10:24	20:24
Bruce County	**52.6%**	**62.5%**	**78.6%**	**09:59**	**19:48**

2029 Do Nothing Trajectory (Lower Projection)

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	47.9%	52.7%	73.0%	10:18	18:56
Brockton	78.8%	85.8%	96.0%	06:00	11:45
Huron-Kinloss	11.8%	25.2%	55.0%	14:48	22:24
Kincardine	57.2%	63.3%	80.5%	09:39	18:51
Northern Bruce Peninsula	25.1%	29.2%	34.7%	17:37	27:26
Saugeen Shores	73.6%	84.1%	93.8%	07:54	12:22
South Bruce	10.0%	38.6%	84.5%	11:06	16:16
South Bruce Peninsula	41.2%	54.8%	72.2%	10:42	20:43
Bruce County	**51.5%**	**61.5%**	**77.6%**	**10:13**	**20:11**

Difference

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	-1.3%	-1.0%	-2.4%	00:15	00:25
Brockton	-1.3%	-1.2%	-0.7%	00:13	00:32
Huron-Kinloss	-0.2%	-0.9%	-1.1%	00:17	00:58
Kincardine	-1.6%	-1.5%	-1.2%	00:18	00:36
Northern Bruce Peninsula	-0.4%	-0.1%	0.2%	00:09	00:18
Saugeen Shores	-1.9%	-2.3%	-1.2%	00:17	00:52
South Bruce	-0.4%	-0.4%	-0.9%	00:13	00:11
South Bruce Peninsula	-1.2%	-1.5%	-1.4%	00:18	00:19
Bruce County	**-1.1%**	**-1.0%**	**-1.0%**	**00:14**	**00:23**

2029 Do Nothing P4 Response Performance (Core Projection)

2024 Base Position including Port Elgin (New) and Sauble Beach 10-22 Year Round

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	49.2%	53.7%	75.4%	10:03	18:32
Brockton	80.1%	87.0%	96.7%	05:47	11:13
Huron-Kinloss	11.9%	26.2%	56.1%	14:32	21:26
Kincardine	58.8%	64.8%	81.7%	09:20	18:15
Northern Bruce Peninsula	25.5%	29.3%	34.5%	17:28	27:08
Saugeen Shores	75.5%	86.4%	95.0%	07:37	11:30
South Bruce	10.4%	39.0%	85.4%	10:53	16:05
South Bruce Peninsula	42.4%	56.3%	73.6%	10:24	20:24
Bruce County	**52.6%**	**62.5%**	**78.6%**	**09:59**	**19:48**

2029 Do Nothing Trajectory (Core Projection)

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	46.6%	51.7%	70.7%	10:34	19:21
Brockton	77.5%	84.7%	95.5%	06:13	12:11
Huron-Kinloss	11.4%	24.3%	54.3%	15:04	23:13
Kincardine	55.5%	61.7%	79.0%	09:57	19:22
Northern Bruce Peninsula	24.8%	29.0%	34.8%	17:45	27:39
Saugeen Shores	72.1%	82.3%	92.8%	08:07	13:12
South Bruce	10.1%	37.7%	83.4%	11:18	16:26
South Bruce Peninsula	40.9%	54.2%	71.7%	10:49	20:51
Bruce County	**50.7%**	**60.5%**	**76.7%**	**10:24**	**20:29**

Difference

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	-2.6%	-2.1%	-4.7%	00:31	00:49
Brockton	-2.6%	-2.3%	-1.2%	00:26	00:58
Huron-Kinloss	-0.5%	-1.9%	-1.9%	00:32	01:47
Kincardine	-3.3%	-3.1%	-2.7%	00:37	01:07
Northern Bruce Peninsula	-0.7%	-0.3%	0.3%	00:17	00:31
Saugeen Shores	-3.4%	-4.1%	-2.2%	00:30	01:42
South Bruce	-0.2%	-1.3%	-2.0%	00:25	00:21
South Bruce Peninsula	-1.5%	-2.1%	-1.9%	00:25	00:27
Bruce County	**-1.8%**	**-2.0%**	**-1.9%**	**00:25**	**00:41**

C 2026 Options Performance Results

2026 Options Performance Results

2026 using Port Elgin (New)

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average	90th Percentile
Kincardine	57.5%	63.6%	80.7%	09:35	18:41
Saugeen Shores	74.3%	84.8%	94.1%	07:47	11:59
South Bruce Peninsula	41.4%	55.0%	73.0%	10:34	20:31
Bruce County	51.9%	61.7%	77.9%	10:09	20:05

2026 using Port Elgin (New) + Sauble Beach Night

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average	90th Percentile
Kincardine	58.0%	64.1%	81.0%	09:30	18:35
Saugeen Shores	74.7%	85.4%	94.4%	07:37	11:51
South Bruce Peninsula	47.9%	62.9%	80.7%	09:15	18:41
Bruce County	53.5%	63.6%	79.7%	09:46	19:27

Difference to 2026 using Port Elgin (New)

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average	90th Percentile
Kincardine	0.5%	0.5%	0.3%	-00:05	-00:06
Saugeen Shores	0.4%	0.5%	0.3%	-00:10	-00:09
South Bruce Peninsula	6.5%	7.8%	7.8%	-01:18	-01:49
Bruce County	1.6%	1.9%	1.8%	-00:24	-00:38

2026 using Port Elgin (New) + Kincardine Day

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average	90th Percentile
Kincardine	61.9%	68.0%	84.3%	08:53	17:25
Saugeen Shores	76.5%	87.2%	95.3%	07:31	11:14
South Bruce Peninsula	42.1%	55.9%	73.0%	10:31	20:32
Bruce County	53.5%	63.4%	79.3%	09:53	19:39

Difference to 2026 using Port Elgin (New)

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average	90th Percentile
Kincardine	4.4%	4.4%	3.6%	-00:42	-01:16
Saugeen Shores	2.2%	2.4%	1.2%	-00:16	-00:45
South Bruce Peninsula	0.7%	0.9%	0.1%	-00:03	00:01
Bruce County	1.7%	1.7%	1.4%	-00:16	-00:26

D Recommended Trajectory

D1 P4 8-minute Response Performance by LTM and Year

D2 P4 Average Response Time by LTM and Year

D3 2029 P4 Response Performance with no FN Vehicle

2029 Recommended Trajectory
P4 8-minute Response Performance by LTM and Year

P4 8-minute Response Performance

LTM	2024	2025	2026	2027	2028	2029
Arran-Elderslie	49%	49%	48%	48%	51%	51%
Brockton	80%	80%	79%	79%	80%	80%
Huron-Kinloss	12%	12%	12%	12%	12%	12%
Kincardine	59%	58%	58%	57%	59%	58%
Northern Bruce Peninsula	25%	26%	26%	26%	26%	26%
Saugeen Shores	76%	75%	75%	74%	76%	76%
South Bruce	10%	10%	10%	10%	11%	11%
South Bruce Peninsula	42%	42%	48%	55%	55%	55%
Bruce County	53%	52%	54%	55%	56%	55%

Difference from Base Position including Port Elgin (New) and Sauble Beach 10-22 Year Round

LTM	2024	2025	2026	2027	2028	2029
Arran-Elderslie	0%	0%	-1%	-1%	2%	2%
Brockton	0%	0%	-1%	-1%	0%	0%
Huron-Kinloss	0%	0%	0%	0%	0%	0%
Kincardine	0%	-1%	-1%	-1%	0%	-1%
Northern Bruce Peninsula	0%	0%	1%	1%	1%	1%
Saugeen Shores	0%	-1%	-1%	-1%	1%	0%
South Bruce	0%	0%	0%	0%	0%	0%
South Bruce Peninsula	0%	0%	5%	13%	13%	12%
Bruce County	0%	0%	1%	2%	3%	3%

2029 Recommended Trajectory
P4 Average Response Time by LTM and Year

P4 Average Response Time (mm:ss)

LTM	2024	2025	2026	2027	2028	2029
Arran-Elderslie	10:03	10:07	10:08	10:14	09:32	09:35
Brockton	05:47	05:52	05:53	05:58	05:47	05:50
Huron-Kinloss	14:32	14:37	14:39	14:47	14:43	14:45
Kincardine	09:20	09:28	09:30	09:34	09:19	09:24
Northern Bruce Peninsula	17:28	17:26	17:06	17:07	17:06	17:13
Saugeen Shores	07:37	07:43	07:37	07:40	07:14	07:20
South Bruce	10:53	10:59	10:58	11:07	10:54	10:59
South Bruce Peninsula	10:24	10:29	09:15	07:59	07:58	08:02
Bruce County	09:59	10:04	09:46	09:34	09:19	09:23

Difference from Base Position including Port Elgin (New) and Sauble Beach 10-22 Year Round

LTM	2024	2025	2026	2027	2028	2029
Arran-Elderslie	00:00	00:05	00:05	00:11	-00:31	-00:27
Brockton	00:00	00:05	00:06	00:11	-00:00	00:03
Huron-Kinloss	00:00	00:05	00:07	00:15	00:12	00:13
Kincardine	00:00	00:07	00:09	00:14	-00:02	00:04
Northern Bruce Peninsula	00:00	-00:02	-00:22	-00:20	-00:21	-00:15
Saugeen Shores	00:00	00:07	00:00	00:04	-00:22	-00:16
South Bruce	00:00	00:06	00:05	00:14	00:01	00:06
South Bruce Peninsula	00:00	00:05	-01:08	-02:25	-02:26	-02:22
Bruce County	00:00	00:05	-00:13	-00:25	-00:40	-00:36

2029 P4 Response Performance with no FN Vehicle

2029 Recommended Trajectory

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	51.0%	56.0%	80.2%	09:35	17:24
Brockton	79.7%	86.7%	96.6%	05:50	11:23
Huron-Kinloss	11.6%	24.9%	54.8%	14:45	22:14
Kincardine	58.1%	64.3%	81.5%	09:24	18:27
Northern Bruce Peninsula	26.2%	30.1%	34.9%	17:13	26:44
Saugeen Shores	75.5%	86.8%	95.5%	07:20	11:19
South Bruce	10.5%	38.1%	84.8%	10:59	16:10
South Bruce Peninsula	54.6%	69.8%	88.9%	08:02	15:29
Bruce County	**55.4%**	**65.8%**	**82.0%**	**09:23**	**18:37**

2029 Recommended Trajectory with no FN Vehicle

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	50.9%	55.9%	80.2%	09:35	17:21
Brockton	79.6%	86.7%	96.5%	05:50	11:24
Huron-Kinloss	11.6%	24.9%	54.9%	14:45	22:19
Kincardine	58.1%	64.3%	81.4%	09:25	18:27
Northern Bruce Peninsula	26.0%	29.9%	34.9%	17:17	26:52
Saugeen Shores	75.7%	86.8%	95.5%	07:21	11:20
South Bruce	10.6%	38.3%	85.1%	10:58	16:08
South Bruce Peninsula	47.1%	61.8%	80.4%	09:23	18:52
Bruce County	**53.9%**	**64.2%**	**80.5%**	**09:39**	**19:10**

Difference

LTM	P4 Performance				
	8-minute	10-minute	15-minute	Average (mm:ss)	90th % ile (mm:ss)
Arran-Elderslie	-0.1%	-0.1%	-0.1%	-00:00	-00:03
Brockton	0.0%	0.0%	0.0%	00:01	00:01
Huron-Kinloss	0.0%	0.0%	0.1%	00:01	00:05
Kincardine	0.0%	0.0%	-0.1%	00:00	-00:01
Northern Bruce Peninsula	-0.2%	-0.2%	0.0%	00:04	00:08
Saugeen Shores	0.2%	0.0%	0.0%	00:00	00:01
South Bruce	0.1%	0.3%	0.2%	-00:01	-00:02
South Bruce Peninsula	-7.5%	-8.0%	-8.5%	01:21	03:23
Bruce County	**-1.5%**	**-1.6%**	**-1.5%**	**00:16**	**00:33**

Emergency Service Planning

Optimising Locations

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Alternatively write to us at:
ORH, 3 Queens Road, Reading, Berkshire RG1 4AR, UK

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