Bruce County Paramedic Services

# Comprehensive Deployment and Base Review of Paramedic Services

Final Report

ORH/BCPS/1
June 9, 2020

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# EXECUTIVE SUMMARY

## Current Service Profile

i. ORH collected data from the ADRS system in order to understand the demand placed on BCPS, the usage of resources deployed, and the response performance achieved within Bruce County.

ii. Analysis of 2016 to 2019 data showed that BCPS responded to an average of 17.5 calls per day excluding standby moves. Priority 4 (P4) calls accounted for 55% of all calls.

iii. There were on average 16.7 incidents per day in the off-peak period, and 20.0 incidents per day at peak (mid-June to mid-September). The difference between off-peak and peak demand was greatest in South Bruce Peninsula (3.2 incidents per day off-peak and 4.4 incidents per day peak).

iv. BCPS met or exceeded almost all CTAS reporting targets at County-wide level, although CTAS1 8-minute performance was 42% against a target of 45%.

v. All of BCPS' six stations were crewed 24/7, with one additional 09:00 to 21:00 shift which alternated between Walkerton and Wiarton. Ambulance utilization was higher at weekends than weekdays, remaining relatively high between 13:00 and 21:00.

vi. ORH benchmarked BCPS against its database of Ontario ambulance service data. Generally, BCPS benchmarked well and was not a particular outlier in any measure, although some measures reflected the relatively rural nature of Bruce County (such as time to scene and time to hospital).

## Demand Projections

vii. In order to understand the vehicle requirements in 2029, ORH estimated demand in two-year intervals between 2019 and 2029. The underlying hypothesis of the projection method is that demand is strongly related to the population age profile, which often varies by area.

viii. The age and gender of historical patients was combined with historical population data to produce demand rates per 1,000 by year, age and gender group, and municipality. This was forecast to 2029 and combined with population projections to produce 2029 demand forecasts by LTM.

ix. Historical analysis focused on two horizons; 2011 to 2019 and 2016 to 2019. Projections were created using both methods, and the mid-point of the two projections, a 5.3% increase per year (or 67% over 10 years), was used as the core scenario. The historical analysis and future demand projections focused on P3 and P4 calls only as P1 and P2 demand had been falling historically; P1 and P2 demand was kept constant for the future projection.

# Figure I: Deployment Summary

**Weekly Vehicle Hours**

| Station | Base Position | Maintaining Performance | |
|---|---|---|---|
| | | Peak | Off-Peak |
| Chesley | 168 | 168 | 168 |
| Kincardine | 168 | 252 | 252 |
| Port Elgin | 168 | 252 | 252 |
| Port Elgin (Sauble Beach) | - | 84 | 84 |
| Tobermory | 168 | 168 | 168 |
| Walkerton | 210 | 168 | 168 |
| Walkerton (Holyrood) | - | 84 | 84 |
| Wiarton | 210 | 168 | 168 |
| Wiarton (Ferndale) | - | 84 | - |
| Total | 1,092 | 1,428 | 1,344 |

**Peak Vehicles**

| Station | Base Position | Maintaining Performance | | Current Spare Vehicles |
|---|---|---|---|---|
| | | Peak | Off-Peak | |
| Chesley | 1 | 1 | 1 | 1 |
| Kincardine | 1 | 2 | 2 | 1 |
| Port Elgin | 1 | 2 | 2 | 1 |
| Port Elgin (Sauble Beach) | - | 1 | 1 | |
| Tobermory | 1 | 1 | 1 | |
| Walkerton | 2[1] | 1 | 1 | 1[2] |
| Walkerton (Holyrood) | - | 1 | 1 | |
| Wiarton | 2[1] | 1 | 1 | 1[2] |
| Wiarton (Ferndale) | - | 1 | | |
| Total | 7 | 11 | 10 | 5 |

[1] Second vehicle alternates between Walkerton and Wiarton, so only counted once in total

[2] Spare vehicle also used currently for alternating Walkerton/Wiarton shift

### *Model Validation and Base Position*

x. A key reason for undertaking detailed analysis of the current service profile (described in Section 2) was so that this information could be used to populate ORH's simulation model, AmbSim. AmbSim is a discrete event simulation model that replicates the key characteristics of an emergency ambulance service and can be used to predict future behaviour under a variety of different scenarios.

xi. The model was validated by comparing a 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. It was concluded that the model replicated current behaviour accurately and therefore could be used with confidence when examining options for change.

xii. The model was configured to reflect a 2020 Base Position by uplifting demand to annualized projected 2020 levels, before being used to test future scenarios. Measured from the time the unit is notified, P4 8-minute response performance was 45.2% in the 2020 Base Position.

### *Station Location Optimization*

xiii. ORH's location optimization model OGRE was used to assess the configuration of existing station locations and identify how this could be improved currently and in the future. The model uses a genetic algorithm which evaluates large numbers of potential configurations, resulting in an optimal solution.

xiv. The modelling initially focused on 'blank canvas optimization' (assuming no sites are fixed) aiming to minimize the mean response time to P4 non-transfer incidents. The modelling results showed that the optimal six locations were in close proximity to existing station locations. The following additional or relocated sites were identified:

- Port Elgin station relocating north to MacKenzie Road (for capacity reasons).

- Response posts at Holyrood, Sauble Beach and Ferndale.

### *Future Demand Modelling*

xv. A 2029 'Do Nothing' position was modelled to quantify the impact of projected demand increases with no other operational changes. P4 8-minute response performance is projected to degrade from 45.2% in 2020 to 41.6% in 2029, with significant lengthening of 90th percentile response times for some LTMs.

xvi. To maintain 2020 performance levels BCPS-wide (but accepting worsening performance for most LTMs), an additional 84 vehicle hours are required per week. To maintain performance in each LTM, an additional 336 vehicle hours are required per week at peak, and an additional 252 off-peak, representing 31% and 23% increases in resourcing respectively (see Figure I). At peak, an additional four vehicles would be required.

## Figure 11: Phasing

| 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**) |
| 2021 | 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* |

xvii. Maintaining performance in each LTM led to a 4.9 percentage point improvement in BCPS-wide P4 8-minute response performance.

xviii. The additional 336 peak and 252 off-peak vehicle hours were phased to make the most efficient staggering of resource and estate changes over the next ten years (see Figure II). BCPS should monitor performance achieved over the next ten years, and may wish to make alterations to this phasing plan should demand increases or performance diverge significantly from the projected levels.

xix. Sensitivity modelling was also undertaken to test the following parameters included in the core modelling scenarios:

- Assuming the upper and lower bound demand projections.

- Modelling 2028 demand (assuming no growth for 2020).

- Increased 'treat and release'.

- Improving performance above 2020 levels in 2029 using alternative shift lengths.

- Inclusion of future developments.

- Alternative Huron-Kinloss and Neyaashiinigmiing 27 (Cape Croker) options.

# Contents

# 1 INTRODUCTION

### Report Overview

1.1 Operational Research in Health Limited (ORH) has carried out a Comprehensive Deployment and Base Review of Bruce County Paramedic Services (BCPS) for the County of Bruce (Bruce County or the County) in order to develop a plan for the delivery of Paramedic Services. The key objectives for the review included:

- Projecting ambulance call volumes, taking into consideration opportunities for alternative response options.

- Recommending response time performance plans.

- Recommending the resources required to achieve response time performance plans, including frontline and support services.

- Recommending a station facility model.

- Identifying broader considerations for overall service efficiencies.

1.2 This is the Final Report for the review and encompasses a ten-year time period from 2019 to 2029.

1.3 A quantitative description of BCPS operations embracing demand, performance, resources and resource use is provided in Section 2. Using historical demand and population data, a demand projection was made to 2029 (Section 3).

1.4 A simulation model of Paramedic Services operations was built and validated, and used to create a Base Position (Section 4). The model was then used to assess options for changing the station configuration (Section 5) and for maintaining response performance in 2029 (Section 6).

1.5 The final phasing of recommendations is provided in Section 7.

1.6 A glossary of terms is provided in Appendix **A**.

### Background

#### *Bruce County Paramedic Services*

1.7 The County of Bruce assumed the responsibility of delivering Paramedic Services as of November 5, 2000. BCPS provides emergency and non-emergency out-of-hospital primary paramedic level care to approximately 68,000 permanent residents and several thousand seasonal residents over a 3,900 square kilometer area in Ontario. Bruce County is located in south-western Ontario on the shores of Lake Huron and Georgian Bay and is bordered by the County of Grey, the County of Huron, and the County of Wellington.

1.8   In 2018 BCPS responded to approximately 7,000 patient contact calls for service, dispatched by the London Ambulance Communications Centre, operated by the Ministry of Health and Long-Term Care (MOHLTC).

1.9   The current fleet consists of 15 vehicles inclusive of ambulances and response units. BCPS provides seven (7) transport ambulances at peak, and six (6) transport ambulances off peak.

1.10  BCPS employs seven management and one administrative staff, and 96 full-time and part-time paramedics. The operations include not only emergency responses but a complement of administrative activities inclusive of the recurring medical education of all paramedic staff.

1.11  BCPS operates from within six response stations, all of which are currently staffed 24/7.

### *ORH*

1.12  ORH helps emergency services around the world to optimize resource use and respond in the most effective and efficient way.

1.13  We have set the benchmark for emergency service planning, with a proven approach combining rigorous scientific analysis with experienced, insightful consultancy. Our expert team uses sophisticated modeling techniques to identify opportunities for improvement and uncover hidden capacity. Simulating future scenarios ensures that solutions are objective, evidence-based and quantified.

1.14  ORH has been continuously active in undertaking paramedic services reviews across the world over more than 30 years. The process of applying our modelling and analysis techniques to varied jurisdictions has given ORH unrivalled international Paramedic Services consultancy experience. It has also ensured that our approach is flexible and can encompass the wide range of factors encountered in working with clients and their stakeholders.

1.15  ORH's approach to strategic planning is centred on consultancy, extensive data analysis and using a suite of modelling packages developed in-house:

- **Analysis** of demand, performance and resource use to allow the model of the service area to be populated and validated, and to inform an appraisal of potential options for change.

- Identifying and **modelling** options that aim to improve the effectiveness, efficiency and equity of service provision.

- Delivering sustainable solutions in a timely manner through a tried and tested **consultancy** process with suitably qualified personnel.

# 2    CURRENT SERVICE PROFILE

ORH collected data from the ADRS system in order to understand the demand placed on BCPS' services, the usage of resources deployed, and the response performance achieved within Bruce County.

Analysis of 2016 to 2019 data showed that BCPS responded to an average of 17.5 calls per day excluding standby moves. Priority 4 (P4) calls accounted for 55% of all calls.

There were on average 16.7 incidents per day in the off-peak period, and 20.0 incidents per day in the peak (mid-June to mid-September). The difference between off-peak and peak demand was greatest in South Bruce Peninsula (3.2 incidents per day off-peak and 4.4 incidents per day peak).

BCPS met or exceeded almost all CTAS reporting targets at County-wide level, although CTAS1 8-minute performance was 42% against a target of 45%.

All of BCPS' six stations were crewed 24/7, with one additional 09:00 to 21:00 shift which alternated between Walkerton and Wiarton. Ambulance utilization was higher at weekends than weekdays, remaining relatively high between 13:00 and 21:00.

ORH benchmarked BCPS against its database of Ontario ambulance service data. Generally, BCPS benchmarked well and was not a particular outlier in any measure, though some measures reflected the relatively rural nature of Bruce County (such as time to scene and time to hospital).

### Introduction

2.1    ORH collected data from the ADRS system in order to understand the demand placed on BCPS' services, the usage of resources deployed, and the response performance achieved within Bruce County.

2.2    A four-year sample of data, from January 1, 2016 to December 31, 2019, was collected in order to examine and analyze trends in demand and performance.

### Demand

2.3    During the sample period BCPS responded to an average of 17.5 calls per day excluding standby moves (see top table in Figure **2-1**).

## Figure 2-1: Demand Summary

### BCPS Responded Demand

| Category | Lower Tier Municipality | | | | | | | | | Service-wide |
|----------|------|------|------|------|------|------|------|------|------|------|
|          | A-E  | B    | H-K  | K    | NBP  | SS   | SB   | SBP  | OOA  |      |
| P4       | 0.7  | 1.1  | 0.5  | 1.7  | 0.7  | 2.2  | 0.2  | 2.0  | 0.6  | 9.8  |
| P3       | 0.5  | 0.9  | 0.3  | 1.4  | 0.5  | 1.4  | 0.1  | 1.4  | 0.3  | 6.8  |
| P2       | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  |      | 0.0  | 0.0  | 0.1  |
| P1       | 0.0  | 0.4  | 0.0  | 0.0  | 0.0  | 0.0  |      | 0.1  | 0.3  | 0.9  |
| **Total** | **1.2** | **2.4** | **0.8** | **3.1** | **1.2** | **3.7** | **0.3** | **3.5** | **1.3** | **17.5** |

### Non-BCPS Responded Demand

| Category | Lower Tier Municipality | | | | | | | | | Service-wide |
|----------|------|------|------|------|------|------|------|------|------|------|
|          | A-E  | B    | H-K  | K    | NBP  | SS   | SB   | SBP  | OOA  |      |
| P4       | 0.1  | 0.2  | 0.4  |      |      |      | 0.2  | 0.0  |      | 1.0  |
| P3       | 0.0  | 0.2  | 0.2  |      |      |      | 0.1  | 0.0  |      | 0.5  |
| P2       |      | 0.0  |      |      |      |      |      |      |      | 0.0  |
| P1       |      | 0.5  |      |      |      |      |      |      |      | 0.5  |
| **Total** | **0.2** | **1.0** | **0.6** |  |  |  | **0.2** | **0.0** |  | **2.0** |

### LTM Key

| | |
|---|---|
| A-E | Arran-Elderslie |
| B | Brockton |
| H-K | Huron-Kinloss |
| K | Kincardine |
| NBP | Northern Bruce Peninsula |
| SS | Saugeen Shores |
| SB | South Bruce |
| SBP | South Bruce Peninsula |
| OOA | Out of Area |

2.4 Priority 4 (P4) calls, which are the highest priority, accounted for 9.8 per day, or 55% of all calls. The largest proportion of P1 to P4 demand is in Saugeen Shores at 3.7 per day (21.0%), followed by South Bruce Peninsula at 3.5 (19.9%). The lowest demand level is in South Bruce at 0.3 calls per day (1.9%). In addition to incidents within the County, BCPS responds to 1.3 calls per day outside Bruce County.

2.5 A further 2.0 calls per day occurred within Bruce County but received a response from another service (see bottom table in Figure **2-1**). The majority of these (1.0 per day) occurred in Brockton due to the placement of Grey County's Hanover station, with a further 0.6 per day in Huron-Kinloss, 0.2 in South Bruce and 0.1 in Arran-Elderslie (see more detail in Appendix **B1**).

2.6 P3 and P4 demand increased from 15.3 incidents per day in 2016 to 17.5 in 2019, a total increase of 14.4% and an average annual increase of 4.7% (see Appendix **B2a**). There is a notable peak in demand during the months of July and August of each year, particularly for P4 calls. P3 and P4 demand peaked for 2019 in August at 20.6 incidents per day.

2.7 The difference between peak (mid-June to mid-September) and off-peak demand was greatest in South Bruce Peninsula, with average daily demand of 1.2 incidents higher than off-peak (see Appendix **B2b**). There were also increases in Northern Bruce Peninsula and Saugeen Shores, of 1.1 and 0.7 incidents per day respectively.

2.8 Across the week hourly demand peaked between 10:00 and 11:00 with a gradual decrease until 19:00, when the decrease became more prominent (see Appendix **B3**). Weekend demand is higher than weekday demand from 16:00 until 05:00.

2.9 Most of the analysis focuses on Priority as this is known at point of dispatch, as opposed to the Canadian Triage and Acuity Scale (CTAS) code which is recorded on scene or at hospital and is not necessarily recorded for all calls. Comparing Priority and CTAS shows that the majority of calls are coded as CTAS3, and of these 66% are P4 and 33% are P3 (see Appendix **B4**). The number of incidents per day with an unknown CTAS is 2.1.

2.10 The majority of patients from Bruce County were taken to hospitals operated by either Grey Bruce Health Services (GBHS) or South Bruce Grey Health Centre (SBGHC). The majority of these facilities are located within Bruce County, except for GBHS Owen Sound in Grey County (see Appendix **B5a**). GBHS Southampton was the most frequent destination for patients at 3.2 per day, followed by SBGHC Kincardine at 2.7 per day. Victoria Hospital in London receives 0.2 patients per day, comprising P3 and P4 transfers.

2.11 Patients were generally transported to their nearest hospital location (see Appendix **B5b**).

## Figure 2-2: Performance Summary

| Category | Target Minute | Target Performance | LTM | | | | | | | | | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A-E | B | H-K | K | NBP | SS | SB | SBP | OOA | |
| P3 | 8 | | 43% | 73% | 2% | 63% | 20% | 36% | 4% | 53% | 58% | 48% |
| | 10 | | 47% | 80% | 9% | 74% | 23% | 48% | 10% | 56% | 62% | 56% |
| | 15 | | 56% | 89% | 35% | 83% | 31% | 84% | 58% | 66% | 74% | 72% |
| | 30 | | 93% | 98% | 94% | 96% | 72% | 95% | 97% | 95% | 98% | 94% |
| P4 | 8 | | 41% | 76% | 6% | 62% | 26% | 57% | 13% | 34% | 24% | 46% |
| | 10 | | 46% | 83% | 15% | 68% | 31% | 75% | 46% | 40% | 35% | 56% |
| | 15 | | 62% | 94% | 50% | 84% | 39% | 92% | 84% | 60% | 66% | 74% |
| | 30 | | 99% | 100% | 99% | 100% | 93% | 99% | 100% | 98% | 98% | 99% |
| CTAS1 | 8 | 45% | 26% | 68% | | 65% | 50% | 48% | 13% | 35% | 20% | 42% |
| CTAS2 | 10 | 50% | 40% | 81% | 13% | 62% | 33% | 75% | 43% | 36% | 32% | 52% |
| CTAS3 | 15 | 70% | 56% | 92% | 46% | 80% | 37% | 90% | 78% | 55% | 62% | 71% |
| CTAS4 | 30 | 85% | 98% | 99% | 96% | 99% | 84% | 98% | 97% | 96% | 97% | 97% |
| CTAS5 | 30 | 90% | 100% | 100% | 95% | 99% | 69% | 96% | 100% | 95% | 100% | 96% |

**LTM Key**

| | |
|---|---|
| A-E | Arran-Elderslie |
| B | Brockton |
| H-K | Huron-Kinloss |
| K | Kincardine |
| NBP | Northern Bruce Peninsula |
| SS | Saugeen Shores |
| SB | South Bruce |
| SBP | South Bruce Peninsula |
| OOA | Out of Area |

### Response Performance

2.12   Mandated reporting of response performance to the MOHLTC calculates performance from the time the first vehicle is notified until arrival on scene. ORH replicates this calculation but also presents performance measured from the time the call is answered, to include the processes undertaken in the London Central Ambulance Communications Centre (CACC). Targets are set by CTAS code but not by Priority code.

2.13   When measured from the time the call was answered, P4 8-minute response performance (the percentage of calls receiving a response within 8 minutes) varied from 1% in Huron-Kinloss to 52% in Brockton (see Appendix **B6a**); Bruce County overall P4 8-minute performance was 35%.

2.14   When measured from the time the first vehicle was notified, P4 8-minute response performance varied from 6% in Huron-Kinloss to 76% in Brockton (see Appendix **B6b**); Bruce County overall P4 8-minute performance was 46%.

2.15   Across the sample period, BCPS met or exceeded almost all CTAS targets at County-wide level (see Figure **2-2**). CTAS1 8-minute performance was 42% compared with a target of 45%. While the targets were generally met County-wide, there was significant variation by LTM.

2.16   Options for improving performance and reducing the disparity between LTMs are explored in the modelling described in Section 6.

2.17   Mean response time is generally lowest in areas in close proximity to stations (see Appendix **B7**). There are demand hotspots in areas of longer response times including in Huron-Kinloss and in Sauble Beach; the optimization modelling described in Section 5 aims to propose alternative scenarios to address such gaps in coverage.

### Call Components

2.18   ORH calculates each component of the call cycle separately and analyzes these to understand how they may vary by day (see definitions and outcomes in Appendix **B8**).

2.19   Total occupied time (from time notified to posting clear) for P4 calls was lowest at 50m42s in the morning period, and highest at night at 53m32s. Within individual components, the largest variation between these two periods was present in time to scene and time at scene.

2.20   Time at scene is the largest contributor to occupied time across all periods, varying from 17m14s in the afternoon to 18m09s in the night period.

2.21   Mobilization time was longest between 00:00 and 08:00 and there was little difference in mobilization time by day of the week (see Figure **2-3**). There was also a peak at 18:00, which can be potentially attributed to shift changeover.

## Figure 2-3: P1 to P4 Mobilization Time by Day and Hour
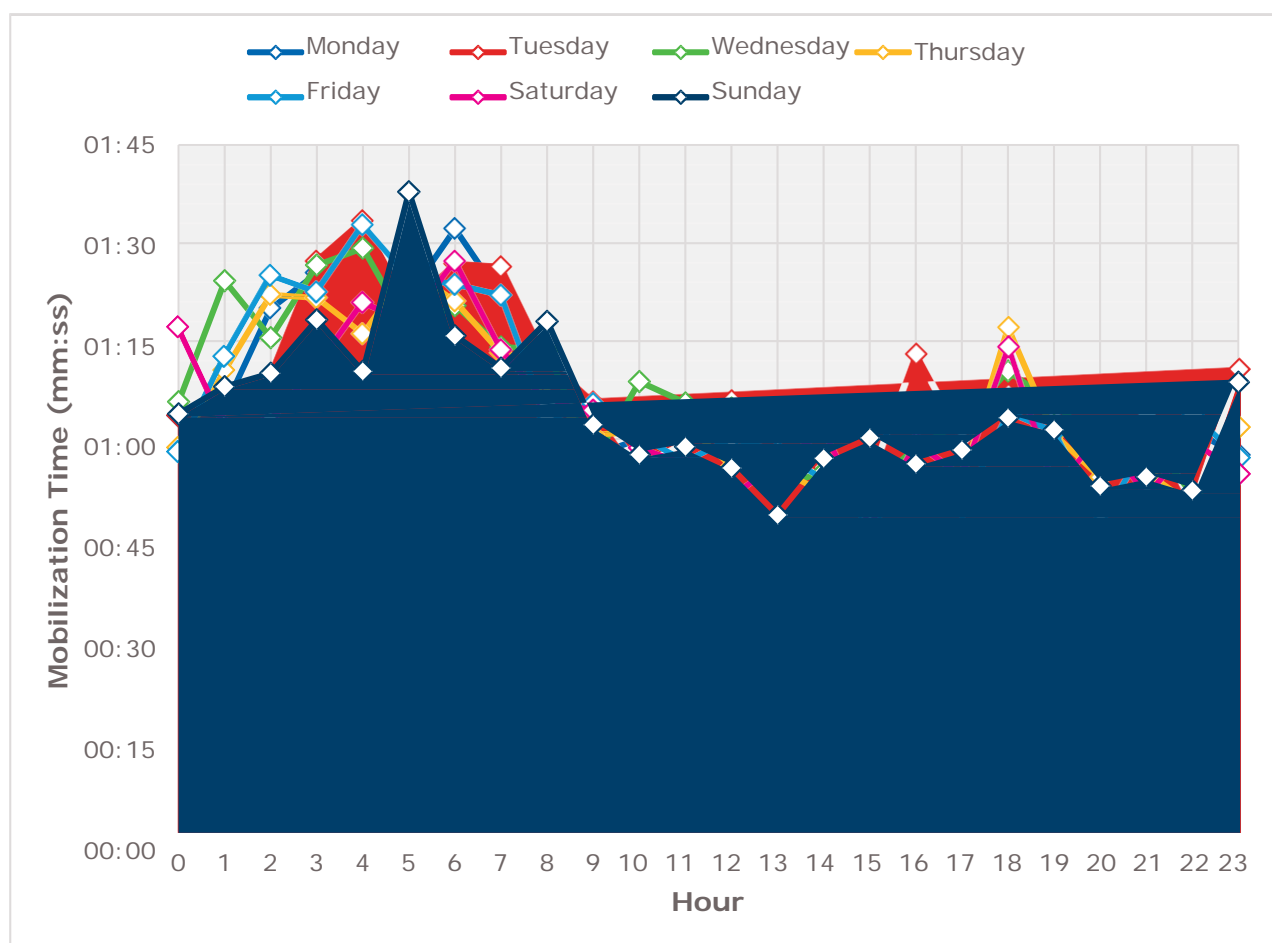


## Figure 2-4: P3 and P4 Mobilization Time by Station

| Station | P3 | | P4 | | Overall (P1 to P4) |
|---|---|---|---|---|---|
| | Transfer | Non-Transfer | Transfer | Non-Transfer | |
| Chesley | 01:10 | 01:00 | 00:59 | 01:01 | 00:59 |
| Kincardine | 01:11 | 01:06 | 01:02 | 01:00 | 01:01 |
| Port Elgin | 01:18 | 01:18 | 01:11 | 01:10 | 01:11 |
| Tobermory | 00:40 | 01:23 | 00:30 | 01:08 | 01:10 |
| Walkerton | 01:25 | 01:01 | 01:13 | 00:56 | 01:03 |
| Wiarton | 00:56 | 00:54 | 00:48 | 00:53 | 00:52 |
| **Overall** | **01:10** | **01:06** | **01:02** | **01:01** | **01:02** |

2.22　There was slight variation in mobilization time by station; Port Elgin and Tobermory had the longest mobilization times of approximately 1m10s (see Figure **2-4**). Wiarton station had the shortest mobilization time (0m52s) during the sample period.

2.23　Following consultation with BCPS it was identified that there may be radio reception and reporting issues with mobilization times at Port Elgin and Tobermory, as opposed to genuinely longer mobilization times; this will not affect the reporting of response performance as it is a time stamp communication issue.

2.24　Average time at hospital for facilities within Bruce County was below 15m00s, with the exception of SBGHC Walkerton at 15m47s (see Appendix **B9a**). Time at hospital was shortest in Kincardine at 11m11s. Time at hospital was longer for those facilities outside the County, notably for Victoria Hospital in London at 39m03s.

2.25　Separating this into the time from ambulance arrival at hospital to handover of the patient (arrival to handover), and handover of the patient until the ambulance posting clear (handover to clear), further showed the difference between in-County and out-of-County hospitals (see Appendices **B9b** and **B9c**). Victoria Hospital had the longest arrival to handover but a below average handover to clear time. The quickest handover to clear time was observed at another out-of-County hospital in Owen Sound.

### Resources

2.26　BCPS currently employs 52 full-time (FT) frontline staff, and approximately 47 part-time (PT) staff. These frontline staff are supported by four FT and four PT superintendents, as well as a Commander, Admin Coordinator, Deputy Chief and Director/Chief.

2.27　BCPS currently deploys at least one double-staffed 24/7 ambulance to each of its six stations, plus a 24/7 superintendent based at Walkerton. Weekly planned resources changed over the sample period (see Figure **2-5**):

- There is a shift that has alternated between Walkerton and Wiarton from 09:00-21:00 Monday to Sunday from July 2017 onwards; prior to this date it ran from 08:00-17:00 Monday to Friday from both stations.

- A 13:00-22:00 Monday to Friday shift ran at Port Elgin prior to September 2019.

- A 20:00-08:00 Monday to Friday shift was introduced at Chesley in September 2019.

## Figure 2-5: Weekly Planned Resourcing

| Station | Average over 4 years | Current Deployments as of Sept 2019 |
|---|---|---|
| Chesley | 113.1 | 168 |
| Kincardine | 168 | 168 |
| Port Elgin | 209.1 | 168 |
| Tobermory | 168 | 168 |
| Walkerton | 211.1 | 210 |
| Wiarton | 211.1 | 210 |
| **Overall** | **1,080.5** | **1,092** |

*09:00 to 21:00 shift alternates between Walkerton and Wiarton from July 2017*

## Figure 2-6: Ambulance Utilization by Hour
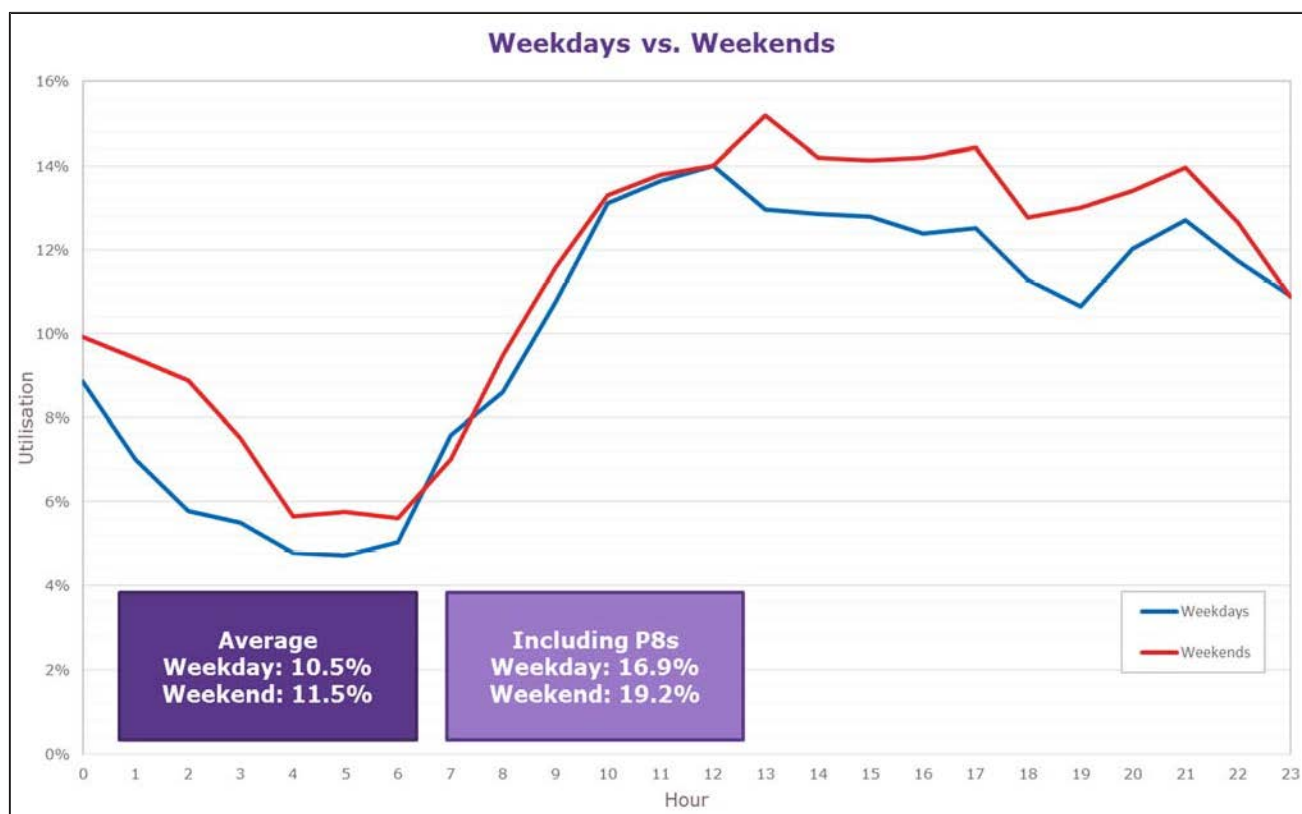
2.28 The most recent deployment saw 1,092 ambulance hours per week deployed on average. By hour of the day, the ambulance deployment broadly followed the pattern of demand (see Appendix **B10**).

2.29 The difference between deployed ambulances and average demand was greater between 00:00-06:00 than during any other period of the day. It should, however, be noted that in a relatively rural service it is difficult to completely match the profile of resourcing to demand, given the need to cover geographical areas during periods of low call volume.

### Resource Use

2.30 In evaluating the current use of resources, it is of interest to measure how well frontline resources 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 notified to posting clear). This therefore excludes time spent on rest breaks, returning to base and other duties such as completing paperwork.

2.31 Excluding standby moves (P8s), average ambulance utilization was 10.5% on weekdays and 11.5% on weekends (see Figure **2-6**). Utilization was highest across the week from 12:00 to 21:00 on weekends, and weekend utilization continued to be higher than on weekdays throughout the night period.

2.32 Average ambulance utilization was 16.9% on weekdays and 19.2% on weekends when standby moves were included.

2.33 Utilization by station varied from 3.1% at Tobermory to 13.7% at Kincardine and Port Elgin when only P1 to P4 calls were included. Including standby moves increased utilization, in particular at Chesley (9.3% to 23.4%) and Walkerton (9.5% to 20.2%).

2.34 This was reinforced by analyzing the most frequent standby moves which showed that Chesley to Wiarton, Chesley to Walkerton, Walkerton to Port Elgin, Walkerton to Kincardine and Walkerton to Kinloss were some of the most frequent moves (see Appendix **B11**).

### Benchmarking

2.35 ORH has compiled an anonymized database of key operational parameters across recent Ontario paramedic service clients. The results of benchmarking can help to identify potential efficiencies for BCPS to target over the next ten years.

## Figure 2-7: Benchmarking Summary

| Benchmark | BCPS value | Rank | Minimum | Maximum |
|---|---|---|---|---|
| P4 Control Assign Time | 01:05 | 7 of 10 | 00:41 | 01:45 |
| P4 Mobilization Time | 01:01 | 9 of 10 | 00:20 | 01:11 |
| P4 Time to Scene | 09:12 | 8 of 8 | 06:06 | 09:12 |
| Time at Scene | 15:59 | 1 of 10 | 15:59 | 27:17 |
| Time to Hospital | 18:06 | 8 of 10 | 11:20 | 24:25 |
| Time at Hospital | 15:34 | 1 of 10 | 15:34 | 55:03 |
| P4 Conveyance Rate | 88% | 8 of 10 | 79% | 89% |
| P4 Multiple Attendance Ratio | 1.06 | 2 of 10 | 1.04 | 1.24 |
| Occupied Time | 55:35 | 1 of 10 | 55:35 | 77:32 |

**Note:**

All benchmarks are ranked from minimum to maximum value, so the maximum value will gain the highest (10) rank. Times are given in mm:ss format.
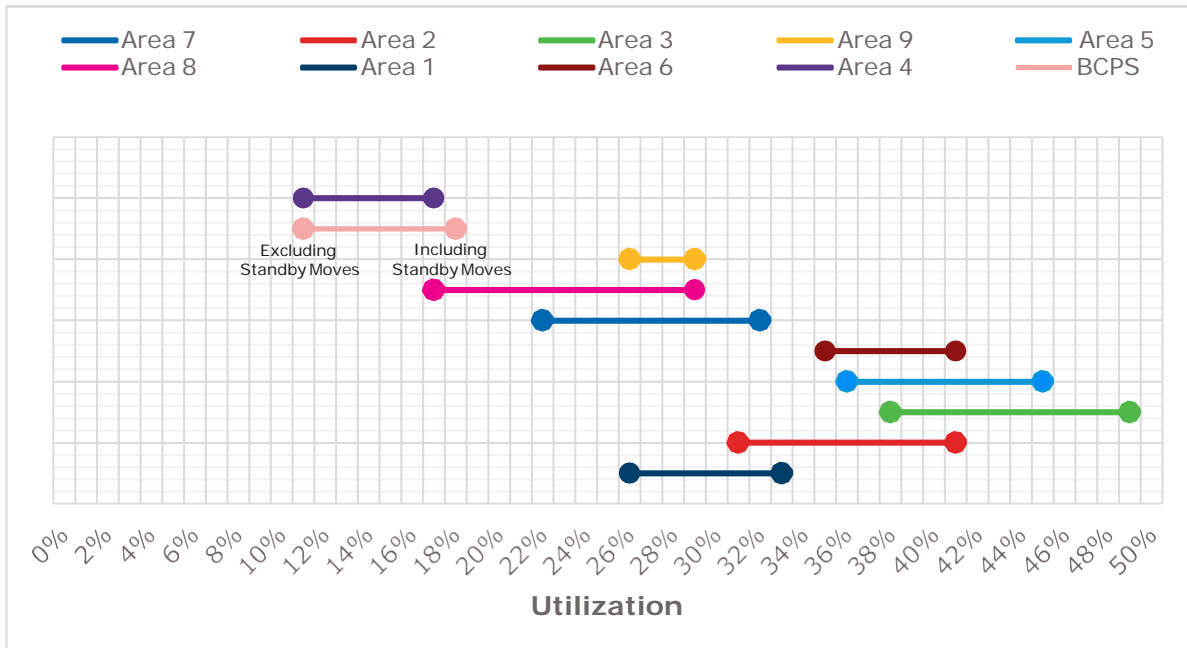
2.36    The benchmarking results can be summarized as follows (see Figure **2-7**):

- Activation time in Bruce County was similar to the benchmarked average once outliers were excluded (see Appendix **C1**).

- Mobilization time for P4 calls was the second-longest benchmarked, though there may be differences in data recording between services (Appendix **C2**).

- Ambulance time to scene for P4s was the longest benchmarked, due to the rural geography of the County (Appendix **C3**).

- Time at scene for ambulances was the shortest benchmarked (Appendix **C4**).

- Time to hospital was around the upper quartile of benchmarked services, again reflecting the rurality of the County (Appendix **C5**).

- Time at hospital was benchmarked at 15m34s, approximately 40 minutes shorter than the longest benchmarked value which was for a more urban service with offload delay issues (Appendix **C6**).

- Conveyance rate for P4 calls showed little variation between services, although BCPS had one of the higher values (Appendix **C7**).

- The multiple attendance rate for P4s in BCPS was relatively low as the County only operates double-crewed ambulances and has no solo responders (Appendix **C8**).

- Average ambulance occupied time in BCPS was the shortest of any benchmarked service due to a number of the call components being low in comparison to other services (Appendix **C9**).

2.37    BCPS senior management were consulted with the results of the benchmarking; few controllable factors showed BCPS as an outlier either at the upper or lower end, and therefore it was decided that no efficiency parameters were to be tested within the modelling.

# 3    DEMAND PROJECTIONS

In order to understand the vehicle requirements in 2029, ORH estimated demand in two-year intervals between 2019 and 2029. The underlying hypothesis of the projection method is that demand is strongly related to the population age profile, which often varies by area.

The age and gender of historical patients was combined with historical population data to produce demand rates per 1,000 by year, age and gender group, and municipality. This was forecasted to 2029 and combined with population projections to produce 2029 demand forecasts by LTM.

Historical analysis focused on two horizons; 2011 to 2019 and 2016 to 2019. Projections were created using both methods, and the mid-point of the two projections, a 5.3% increase per year, was used as the core scenario. The historical analysis and future demand projections focused on P3 and P4 calls only as P1 and P2 demand had been falling historically; P1 and P2 demand was kept constant for the future projection.

The Bruce County Planning and Development department provided ORH with information on planned and approved housing developments. These were used to devise two demand increase scenarios for sensitivity modelling, representing 6.1% and 10.4% increases in demand compared to the core projection.

### Methodology Overview

3.1    ORH estimated demand in yearly intervals from 2019 to 2029 in order to inform the demand levels for the ten-year plan.

3.2    The approach used in this review is based on the methodology presented in the La Trobe report '*Factors in Ambulance Demand: Options for Funding and Forecasting*' (Livingstone 2007).

3.3    Several forecasting models were investigated as part of the La Trobe study. Their 'Method 4', which uses age and gender distribution trends to forecast future growth, was considered by the authors to produce the best results. The underlying hypothesis is that demand is strongly related to the population age profile. There is an underlying trend for increased demand in all age groups due to unquantifiable factors such as the overall level of health provision, public expectation, etc, which, it is assumed, will continue into the foreseeable future.

## Figure 3-1:  Population-based Projection Method
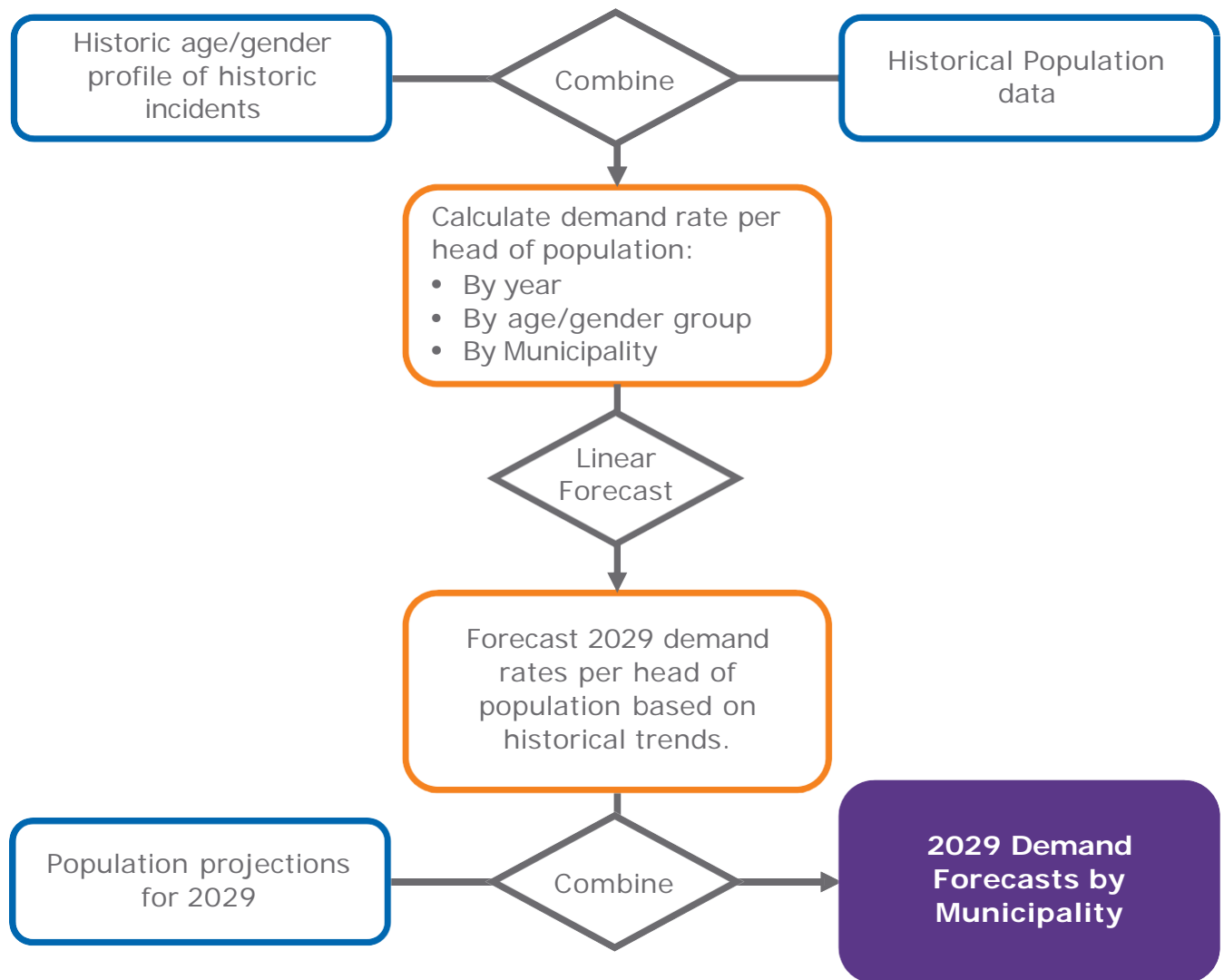
3.4 As well as a slight overall population increase, the population across the County is expected to age by 2029. This in itself is expected to lead to an increase in demand, an effect which is well known from observations of Paramedic Services demand around the world.

3.5 An overview of the approach taken is provided in Figure **3-1**. This method relies on the availability of accurate historical and future population and demand data.

### Population and Demand Profiles

3.6 To calculate demand projections according to the method described in Figure **3-1**, historical population estimates and future population projections are required by age, LTM and year through to 2029.

3.7 No single data source provided the required detail and therefore an amalgamation process was required, which involved:

- Combining Statistics Canada historical estimates and Ministry of Finance future projections to produce yearly **County-wide population**.

- Linearly projecting the Statistics Canada LTM historical estimates to produce yearly **LTM population** for future years.

- Using the Census raw county data to establish the age profile by LTM for 2016 and adjusting the Ministry of Finance County-wide age profiles to give yearly **LTM age profiles**.

3.8 Using this methodology showed a typical ageing profile from 2019 to 2029 in the majority of LTMs; the 75+ age group was projected to increase by 58.1% across Bruce County (see Appendix **D1**). A notable exception was Saugeen Shores where, although the 75+ age group was also expected to increase, there were increases of 14.9% and 21.2% in the 0 to 14 and 15 to 29 age groups respectively; this can be potentially be attributed to works being undertaken in the area at the Bruce Power nuclear power plant.

3.9 Analyzing the historical age and gender demand data showed that P1 and P2 calls were reducing in volume from 2011 through to 2019; following consultation with BCPS it was decided to focus on P3 and P4 calls within the demand projection.

3.10 Analysis focused on two horizons; 2011 to 2019 and 2016 to 2019. Between 2011 and 2019, P3 and P4 calls increased by 5.1% per year on average across Bruce County, varying from 4.5% in Kincardine and Northern Bruce Peninsula to 6.9% in Brockton (see Appendix **D2**).

# Figure 3-2: Demand Projection Comparison

*Average Annual Demand Increase by Projection Option*

|  | Average Annual Demand Increase | | |
|---|---|---|---|
|  | Lower Bound | Upper Bound | Core Projection |
| Arran-Elderslie | 3.5% | 8.5% | **6.0%** |
| Brockton | 4.9% | 8.0% | **6.4%** |
| Huron-Kinloss | 4.8% | 8.3% | **6.6%** |
| Kincardine | 4.8% | 2.9% | **3.8%** |
| Northern Bruce Peninsula | 2.9% | 4.7% | **3.8%** |
| Saugeen Shores | 4.0% | 7.9% | **5.9%** |
| South Bruce | 4.5% | 9.3% | **6.9%** |
| South Bruce Peninsula | 3.1% | 5.6% | **4.4%** |
| Bruce County | 4.0% | 6.5% | **5.3%** |

*Core Projection: Incidents per Day*

| Area | Incidents per Day | | |
|---|---|---|---|
|  | 2020 | 2029 | Difference |
| Arran-Elderslie | 1.4 | 2.4 | 0.9 |
| Brockton | 2.6 | 4.3 | 1.8 |
| Huron-Kinloss | 0.9 | 1.6 | 0.7 |
| Kincardine | 3.0 | 4.2 | 1.2 |
| Northern Bruce Peninsula | 1.4 | 1.9 | 0.5 |
| Saugeen Shores | 4.3 | 7.2 | 2.9 |
| South Bruce | 0.4 | 0.7 | 0.3 |
| South Bruce Peninsula | 3.8 | 5.6 | 1.8 |
| Bruce County | 17.7 | 27.8 | 10.1 |

3.11 Between 2016 and 2019 the average annual demand increase Bruce County-wide was similar at 4.7%, but there was greater variation by LTM from -3.9% in Kincardine to 10.5% in South Bruce. The 2016 to 2019 sample was adjusted to match the ADRS sample to account for unrecorded age/gender information where possible.

3.12 Annual demand rates per 1,000 population by age group and year were compared to understand the underlying trend for requests for ambulance assistance.

3.13 The demand rate per 1,000 was relatively similar in 2011 and 2016 with an increase in 2019; using this as a basis for projection created a relatively small increase in the demand rate across all age groups (see Appendix **D3a**).

3.14 A larger increase in demand rate per 1,000 was projected when using only the ADRS-adjusted 2016 to 2019 data (see Appendix **D3b**).   This was particularly notable in the 75+ age group where the demand rate was projected to increase from 309 per 1,000 in 2019 to 545 per 1,000 in 2029.

## Demand Projection Results

### *Projection Methods*

3.15 Using the 2011 to 2019 data produced an average annual demand increase of 4.0% across Bruce County, varying from 2.9% in Northern Bruce Peninsula to 4.9% in Brockton (see Appendix **D4a**). This formed the 'lower bound projection'.

3.16 The 'upper bound projection' used the 2016 to 2019 data, resulting in a projected average annual increase of 6.5% Bruce County-wide through to 2029 (see Appendix **D4b**). The highest year-on-year percentage increase was projected in South Bruce at 9.3%, whereas the lowest increase was projected in Kincardine at 2.9%.

### *Core Projection*

3.17 Following consultation with BCPS senior management, it was decided to use the midpoint of the lower and upper bound methods to form the core demand projection.

3.18 This projection scenario resulted in a 5.3% average annual increase Bruce County-wide, with varying increases by LTM from 3.8% in Kincardine and Northern Bruce Peninsula to 6.9% in South Bruce (see Figure **3-2**).

3.19 BCPS agreed that the demand increases should be applied to P3 and P4 calls only, due to the historical trend of diminishing P1 and P2 calls. P1 and P2 demand was kept constant.

3.20    When the demand increases were applied, the LTM with the largest increases in responded incidents per day was Saugeen Shores with an increase of 2.9 per day. Despite having the largest percentage increase, South Bruce had the smallest projected increase in incidents per day at 0.3 due to low call volumes.

3.21    In 2029 the demand projection produced 29.8 responded incidents per day, increasing from 19.0 in 2020 (including out-of-area demand)

3.22    The core projection was taken forward for use in the modelling phases of the study, with the lower and upper bound projections treated as sensitivity modelling (checking that future recommendations are robust and future-proof) options.

### Incorporating Future Housing Developments

3.23    The age and gender demand projection method outlined takes account of demographic change at LTM level but applies growth evenly within each LTM.

3.24    It is possible to redistribute growth within an LTM using housing development information; as with any future assumption or projection this introduces some uncertainty as to the likelihood of developments being built as planned. Based on ORH's experience it was decided to introduce development information into a sensitivity modelling option to test the robustness of potential solutions, rather than include developments in core scenarios.

3.25    The Planning and Development department of the County of Bruce provided ORH with information on potential future housing developments. The files provided included the following information for each development:

- Settlement

- Status (draft approved, pre-consultation, evaluation)

- Total units (high range and low range)

- Likelihood of build (fully or partially built by 2030, after 2030)

3.26    A total of 39 developments were included, though not all had associated geospatial information due to their status (see Appendix **D5a**). Spatial data was required to accurately model the location of potential demand.

3.27    There were housing developments clustered in and around the stations of Port Elgin, Walkerton, Chesley, Wiarton and Tobermory, and also in Sauble Beach and Lion's Head (see Appendix **D5b**). Some of the development information included spatial data for each unit whereas others included one per development, meaning that the number of units will display differently in the appendix.

## Figure 3-3: Development Scenarios and Demand Levels

| LTM | Total Units | | Total Persons | | 2029 Annual Demand | |
|---|---|---|---|---|---|---|
| | Approved & Built by 2030 | All Units (Approved or otherwise) | Approved & Built by 2030 | All Units (Approved or otherwise) | Approved & Built by 2030 | All Units (Approved or otherwise) |
| Arran-Elderslie | 0 | 179 | 0 | 430 | 0 | 44 |
| Brockton | 330 | 414 | 792 | 994 | 95 | 119 |
| Huron-Kinloss | 86 | 269 | 206 | 646 | 12 | 38 |
| Kincardine | 181 | 628 | 434 | 1,507 | 42 | 146 |
| North Bruce Peninsula | 0 | 188 | 0 | 451 | 0 | 0 |
| Saugeen Shores | 1,716 | 2,313 | 4,118 | 5,551 | 513 | 692 |
| South Bruce | 20 | 162 | 48 | 389 | 2 | 14 |
| South Bruce Peninsula | 7 | 210 | 17 | 504 | 3 | 75 |
| Bruce County | 2,340 | 4,363 | 5,616 | 10,471 | 666 | 1,127 |

| % of figures without developments | | | 7.1% | 13.3% | 6.1% | 10.4% |
|---|---|---|---|---|---|---|

3.28    Two scenarios were devised; only approved developments expected to be built by 2030, and all developments regardless of status and build year (see Figure **3-3**). A population per household factor of 2.4 was used (in line with information provided by the County), and 2029 core projection demand rates were applied by LTM.

3.29    It was assumed that developments create demand in addition to the core projection, as it is difficult to predict the migratory patterns of future development population. Based on this assumption, the two development scenarios created 1.8 and 3.1 additional responded incidents per day respectively, representing 6.1% and 10.4% increases in demand compared to the core projection.

# 4   MODEL VALIDATION AND BASE POSITION

A key reason for undertaking detailed analysis of the current service profile (described in Section 2) was so that this information could be used to populate ORH's simulation model, AmbSim. AmbSim is a discrete event simulation model that replicates the key characteristics of an emergency ambulance service and can be used to predict future behaviour under a variety of different scenarios.

The model was validated by comparing a 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. It was concluded that the model replicated current behaviour accurately and therefore could be used with confidence when examining options for change.

The model was configured to reflect a 2020 Base Position by uplifting demand to annualized projected 2020 levels, before being used to test future scenarios. Measured from the time the unit is notified, P4 8-minute response performance was 45.2% in the 2020 Base Position.

Peak (mid-June to mid-September) and off-peak models were created to assess different resourcing options by season.

## Model Validation

### *AmbSim*

4.1   ORH has developed a sophisticated simulation model, AmbSim (see Appendix **E1**), for modelling the operations of ambulance services. AmbSim is a discrete event simulation model that replicates the key characteristics of an emergency ambulance service and can be used to predict future behaviour under a variety of different scenarios.

4.2   AmbSim takes account of the actual geographical and temporal distributions of demand and resources and incorporates travel times between locations. It reports operational performance in terms of response times, vehicle workload and utilization, and patient flows.

4.3   A virtual replica of BCPS operations was created within AmbSim.  Once validated, and thereby shown to accurately reflect the historical sample service profile analyzed, a Base Position was created reflecting the current 2020 position.

*Model Validation*

4.4    ORH's simulation model was populated using parameters derived from the analysis of the current service as presented in Section 2. Analysis of BCPS activity data provided information on demand, call locations, job cycle times and hospital transports. Service data was also used to provide ambulance numbers and deployed hours, deployment locations, and dispatch times for inputting to the model.

4.5    In addition to this data, ORH developed a detailed travel time model of the BCPS area using commercially available data calibrated against information on journey times from activity data and Automatic Vehicle Location (AVL) data. To achieve this, the area was 'noded' with key points in relation to the road network and incident distribution (including some locations outside the region). Stations and hospitals were also included as noded points.

4.6    Travel times between nodes are a key model input and were assigned initially based on road classifications that differentiate achievable speeds in 'average' traffic conditions. A careful calibration process was undertaken that gives ambulance travel times for different periods of the day, reflecting lights and sirens conditions as well as normal speeds.

4.7    The model was then validated by comparing a 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.

4.8    The modelled P4 non-transfer response time distribution, measured from the time of call, showed a close match to actual analyzed values (see Appendix **E2a**).

4.9    Modelled ambulance utilization in AmbSim also closely followed the temporal profile analyzed from the ADRS data (see Appendix **E2b**). Average ambulance utilization across the week was 11.0%.

4.10   The comparison of outputs showed that the model was an accurate replica of BCPS operations and therefore was appropriate to use for different modelling scenarios.


## Base Position

4.11   The model was initially set up to reflect BCPS operations during the 2016 to 2019 sample period to ensure a robust sample for model validation; however, it was then possible to switch to a more up-to-date Base Position for 2020.

4.12   In line with the demand projections, demand was uplifted in the model to 19.0 responded incidents per day, and the shift pattern was updated to reflect the latest 2019 position (for example, with an alternating shift between Walkerton and Wiarton).  No other model parameters were changed.

# Figure 4-1: 2020 Base Position

*Measured from Time of Call*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 33.2% | 39.5% | 50.1% | 14:03 | 22:13 |
| Brockton | 59.5% | 73.8% | 89.3% | 09:25 | 15:20 |
| Huron-Kinloss | 1.3% | 7.0% | 30.0% | 17:15 | 23:20 |
| Kincardine | 46.7% | 60.3% | 77.4% | 10:58 | 20:10 |
| Northern Bruce Peninsula | 19.6% | 25.4% | 33.9% | 20:09 | 31:13 |
| Saugeen Shores | 40.5% | 56.4% | 85.4% | 10:42 | 17:39 |
| South Bruce | 2.7% | 13.3% | 73.2% | 13:35 | 19:06 |
| South Bruce Peninsula | 26.7% | 33.2% | 51.0% | 15:14 | 25:05 |
| Out of Area | 13.6% | 21.4% | 47.0% | 16:44 | 25:00 |
| **Bruce County** | **34.0%** | **44.9%** | **65.5%** | **13:15** | **23:39** |

*Measured from Time Unit Notified*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

4.13    There are general reductions in response performance owing to the increase in demand; P4 8-minute response performance is at 34.0% County-wide when measured from time of call (see Appendix **E3a** and Figure **4-1**) and 45.2% when measured from time notified (see Appendix **E3b**).

4.14    Average vehicle utilization increases slightly from 11.0% to 11.8%.

### *Peak and Off-Peak Modelling*

4.15    Analysis showed that demand in the peak period (mid-June to mid-September) was 3.4 incidents per day higher than the rest of the year across Bruce County, and the difference was largest in South Bruce Peninsula and Northern Bruce Peninsula (see Section 2).

4.16    To reflect these localized seasonal differences, peak and off-peak versions of the Base Position were created in order to assess whether resourcing profiles should be flexible across the year in certain locations to better match the profile of demand. The models were updated with daily demand for the peak and off-peak by LTM along with a change in the distribution of incidents by node to reflect peak demand hotspots, particularly on the lakeshore.

4.17    County-wide P4 8-minute response performance in the peak 2020 Base Position model is 41.4% and the equivalent figure is 46.7% in the off-peak model.

# 5    STATION LOCATION OPTIMIZATION

ORH's location optimization model OGRE was used to assess the configuration of existing station locations and identify how this could be improved currently and in the future. The model uses a genetic algorithm which evaluates large numbers of potential configurations, resulting in an optimal solution.

The modelling initially focused on 'blank canvas optimization' (assuming no sites are fixed) and the criteria was to minimize the mean response time to P4 non-transfer incidents.

Three demand scenarios were modelled: BCPS-responded demand, all demand in Bruce County, and BCPS-responded demand plus forecasted housing development demand.

The modelling results showed that the optimal six locations were in close proximity to existing station locations. When additional sites were modelled, locations were frequently identified in certain areas; a summary of the initial findings is as follows:

- Port Elgin station relocating to MacKenzie Road: 13.5 percentage point improvement in 8-minute P4 response performance in Saugeen Shores.

- Response post at Holyrood: 11.4 percentage point improvement in 10-minute P4 response performance in Huron-Kinloss.

- Response post at Sauble Beach: 14.0 percentage point improvement in 8-minute P4 response performance in South Bruce Peninsula.

- Response post at peak in Ferndale: 3.0 percentage point improvement in 8-minute P4 response performance in Northern Bruce Peninsula.

### Introduction

5.1    ORH's location optimization model OGRE (Optimizing by Genetic Resource Evolution) can be used to assess the configuration of existing station locations and identify how this could be improved currently and in the future. The model uses a genetic algorithm which evaluates large numbers of potential configurations, resulting in an optimal solution.

5.2    The location optimization criteria used in all cases was to minimize the mean response time to P4 non-transfer incidents. 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 fully evaluated with simulation modelling (see below).

# Figure 5-1: Optimal 6 Station Locations



**Station Locations**

◇ Current Station

◆ 6 Stations

**Demand**

⬤ 500

⬤ 250

• 50

Tobermory

Wiarton

Port Elgin

GREY

Chesley

Kincardine

Walkerton

0      40

kilometres

WELLINGTON

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ORH
PLAN. PREPARE. PERFORM.
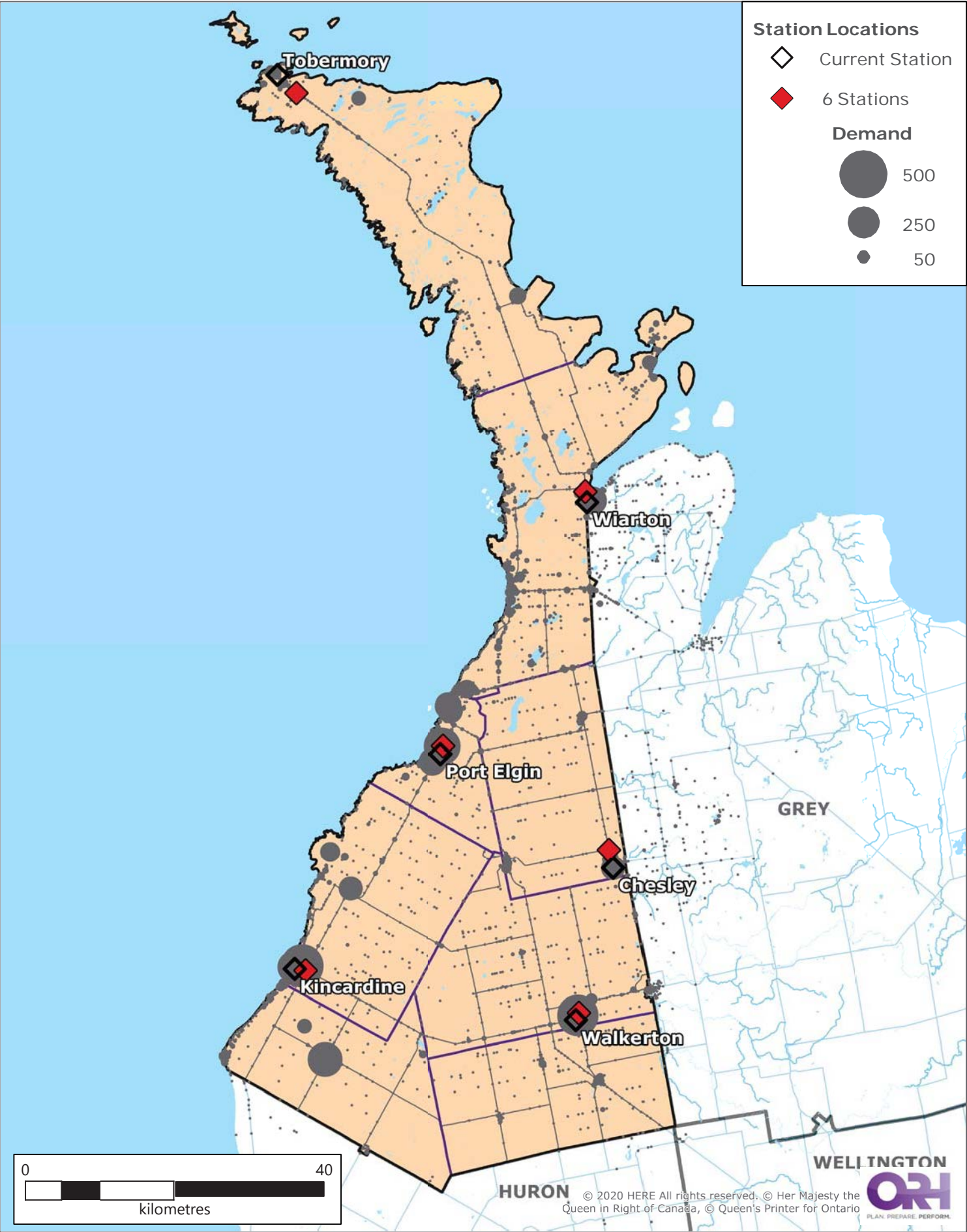
### Blank Canvas Optimization

***BCPS-responded Demand***

5.3 In the first instance, the optimization model was used to find six optimal sites, taking account of the potential coverage provided to BCPS-responded demand. This therefore excludes any demand which was met by other services within Bruce County. Mapping the location optimization results showed that the current station configuration was well aligned to the optimal deployment of six stations (see Figure **5-1**). There were slight changes in location suggested, but generally the optimal sites were in the same settlement areas.

5.4 Having confirmed that the current stations are relatively optimally located, the optimization model was then used to determine where additional optimal sites might be located.

5.5 The optimization results for adding sites were found to be in a nested format (for example, the optimal eight stations include the optimal seven locations). The results identified the following potential additional sites (see Appendix **F1**):

- 7 stations: Sauble Beach (South Bruce Peninsula)

- 8 stations: Ferndale (Northern Bruce Peninsula)

- 9 stations: Southampton (Saugeen Shores)

- 10 stations: Ripley (Huron-Kinloss)

***Bruce Demand***

5.6 The same optimization process was undertaken for all P4 non-transfer demand occurring within Bruce County regardless of which service responded to the call (see Appendix **F2**). The main difference between the demand scenarios is seen in Lucknow.

5.7 From this position, additional sites were identified as follows:

- 7 stations: Holyrood (Huron-Kinloss)

- 8 stations: Sauble Beach (South Bruce Peninsula)

- 9 stations: Ferndale (Northern Bruce Peninsula)

- 10 stations: Southampton (Saugeen Shores)

***Housing Development Demand***

5.8 The BCPS-responded demand position was modified to include expected demand from housing development sites. The optimization model was then re-run using the updated demand profile (see Appendix **F3**).

5.9   The results were broadly similar to the BCPS-responded demand position excluding developments; there were no major changes in the location or ordering of optimal sites. This means that the optimal configuration is robust given the expected impact of housing developments.

### Recommended Station Configuration

#### *Port Elgin*

5.10   The location optimization results demonstrated that the existing Port Elgin station was in close proximity to the optimal site. However, this station is at-capacity and in poor condition which poses issues for the future.

5.11   Using AmbSim to test moving the station to its optimal location produced an 11.8 percentage point improvement in P4 8-minute response performance in Saugeen Shores compared with the Base Position (see Appendix **F4a**), and an 18s reduction in average (mean) response times.

5.12   BCPS had previously identified a potentially suitable site on MacKenzie Road, close to the optimal site; this site was also tested within the model and produced a 13.5 percentage point gain in P4 8-minute performance in Saugeen Shores compared to the Base Position (see Appendix **F4b**). Using this site provided very little improvement in the average response time (which was the target for the optimization modelling).

5.13   Given the feasibility of moving the Port Elgin site to MacKenzie Road, plus the similar performance gains achieved in comparison to the optimal scenario, the MacKenzie Road site is recommended as the future location in Port Elgin.

#### *Huron-Kinloss*

5.14   There is no existing site within Huron-Kinloss LTM and analyzed P4 performance in this area was low. The optimization model suggested sites at Ripley or Holyrood (depending on demand scenario), and there is also significant demand in Lucknow that is currently being met by Huron County Paramedic Services.

5.15   In order to accurately test these options, the additional demand in Huron-Kinloss was added to the Base Position model; this comprised of demand in the area responded to by a Service other than BCPS. If a BCPS site was opened in Huron-Kinloss, this station would be the closest response post for most of the demand in the area and therefore BCPS responses would increase.

5.16   Using AmbSim, the three sites (Ripley, Holyrood and Lucknow) were tested as response posts, with Ripley deploying from Kincardine, and Holyrood and Lucknow deploying from Walkerton. For illustrative purposes, an additional 07:00 to 19:00 vehicle was deployed to each location, however, this is not necessarily the shift timing that is recommended for the future (see Section 6).

## Figure 5-2: Huron-Kinloss Modelling Options

*Base Position 2020 - Huron Kinloss LTM Performance*

| Base Position 2020 | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Base Position 2020 | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |

*Huron Kinloss Options - Huron Kinloss LTM Performance*

| Response Post | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Ripley | 10.5% | 16.3% | 50.7% | 16:09 | 26:47 |
| Holyrood | 5.6% | 25.8% | 54.4% | 15:50 | 26:48 |
| Lucknow | 16.6% | 23.8% | 55.0% | 15:20 | 26:43 |

*Difference to 2020 Base Position - Huron Kinloss LTM Performance*

| Response Post | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Ripley | 4.7% | 2.0% | 2.9% | 00:50 | 06:12 |
| Holyrood | -0.2% | 11.4% | 6.6% | 00:31 | 06:13 |
| Lucknow | 10.8% | 9.4% | 7.3% | 00:01 | 06:08 |

5.17   The three options produced different changes in performance depending on the measure, owing to their proximity to demand (see Appendix **F5**). For example, Holyrood produced no improvement in 8-minute performance but the largest improvement in 10-minute performance. The results are further summarized in Figure **5-2**.

5.18   The average and 90th percentile measures in Huron-Kinloss showed degradation from the Base Position, due to the inclusion of additional demand in the area which is not included in the Base Position.

5.19   In consultation with BCPS senior management it was agreed that Holyrood would provide the most sensible option for coverage in Huron-Kinloss going forward; Holyrood gives improved performance when compared to Ripley, and a site in Lucknow would likely have increased workload over-the-border in Huron County.

### Sauble Beach

5.20   Optimization modelling consistently identified an additional site in the Sauble Beach area. This was tested in AmbSim, operating as a response post deployed from Port Elgin.

5.21   Comparing this configuration to the 2020 Base Position showed large performance improvements in South Bruce Peninsula, with P4 8-minute response performance improving from 33.5% to 47.5% (see Appendix **F6**).

5.22   Additional shifts were also tested at Port Elgin and Wiarton to provide a comparison for the Sauble Beach response post; the addition of a shift at the new post provided greater coverage and improvements in performance compared to the additional shifts modelled at either Port Elgin or Wiarton.

### Ferndale

5.23   Optimization modelling also consistently identified an additional site in Ferndale. This was tested in AmbSim, operating as a response post deployed from Wiarton at peak.  Comparing this to the 2020 Base Position improved P4 8-minute response performance in Northern Bruce Peninsula from 25.4% to 28.4% (see Appendix **F7**), and reduced the mean and 90th percentile response times in this LTM by approximately one minute.

5.24   Adding this vehicle at Ferndale yielded marginally better performance than the same vehicle deployed at Tobermory. Due to the relatively low utilization of the current Tobermory vehicle, a Ferndale post would only be required during the peak months and in the later stages of the 10-year planning horizon (see Section 6).

# 6    FUTURE DEMAND MODELLING

A 2029 'Do Nothing' position was modelled to quantify the impact of demand increases (average 5.3% per annum or 67% over 10 years) with no other operational changes. P4 8-minute response performance is projected to degrade from 45.2% in 2020 to 41.6% in 2029.

BCPS senior management requested two core scenarios with the aim of maintaining 2020 performance; one scenario with performance maintained across BCPS and the second with performance maintained in each LTM.

To maintain performance BCPS-wide, an additional 84 vehicle hours are required per week. To maintain performance in each LTM, an additional 336 vehicle hours are required per week during the peak, and an additional 252 off-peak, representing 31% and 23% increases in resourcing respectively. At peak, an additional four vehicles would be required.

Maintaining performance in each LTM leads to a 4.9 percentage point improvement in BCPS-wide P4 8-minute response performance.

Sensitivity modelling was also undertaken to test parameters included in the core modelling scenarios, including:

- Assuming the upper and lower bound demand projections.

- Modelling 2028 demand (assuming no growth for 2020).

- Increased 'treat and release'.

- Improving performance above 2020 levels in 2029 using alternative shift lengths.

- Inclusion of future developments.

- Alternative Huron-Kinloss and Neyaashiinigmiing 27 (Cape Croker) options.

### Do Nothing Scenario

6.1    In order to provide meaningful context for future resource recommendations, it was important to create a 'Do Nothing' position for each future year through to 2029. This involved using the core demand projection of 5.3% average growth per year, or 67% over ten years, with no other operational changes.

# Figure 6-1: 2029 'Do Nothing'

## 2020 Final Location Configuration

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 18.4% |
| Arran-Elderslie | 34.8% | 40.0% | 53.7% | 12:54 | 21:43 | |
| Brockton | 65.8% | 73.0% | 85.6% | 08:33 | 17:58 | |
| Huron-Kinloss | 5.6% | 13.8% | 47.0% | 16:01 | 22:40 | |
| Kincardine | 58.6% | 64.5% | 81.0% | 09:42 | 19:22 | |
| Northern Bruce Peninsula | 23.8% | 28.8% | 36.4% | 18:56 | 30:38 | |
| Saugeen Shores | 50.8% | 65.3% | 83.8% | 09:53 | 20:35 | |
| South Bruce | 10.3% | 35.9% | 72.7% | 13:32 | 22:39 | |
| South Bruce Peninsula | 32.6% | 38.1% | 56.9% | 13:23 | 23:47 | |
| Out of Area | 21.2% | 31.1% | 58.1% | 14:19 | 23:58 | |
| **Bruce County** | **41.6%** | **50.6%** | **68.7%** | **11:55** | **23:14** | |

## Difference from 2020 Base Position

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 6.7% |
| Arran-Elderslie | -5.3% | -4.7% | -7.9% | 01:15 | 01:56 | |
| Brockton | -9.6% | -9.5% | -8.1% | 01:51 | 05:00 | |
| Huron-Kinloss | -0.2% | -0.6% | -0.8% | 00:42 | 02:05 | |
| Kincardine | -3.2% | -2.9% | -2.9% | 00:47 | 01:27 | |
| Northern Bruce Peninsula | -1.6% | -1.5% | -1.6% | 01:06 | 02:03 | |
| Saugeen Shores | -4.7% | -7.0% | -6.6% | 01:19 | 05:48 | |
| South Bruce | -1.1% | -7.3% | -9.4% | 02:01 | 05:56 | |
| South Bruce Peninsula | -0.9% | -0.8% | -1.9% | 00:33 | 00:56 | |
| Out of Area | -0.7% | -1.2% | -4.1% | 01:00 | 02:15 | |
| **Bruce County** | **-3.6%** | **-3.8%** | **-4.3%** | **01:02** | **02:07** | |

6.2     County-wide P4 8-minute response performance degrades from 45.2% in the 2020 Base Position to 41.6% in 2029, with the 90th percentile increasing by 2m07s, from 21m07s to 23m14s (see Appendix **G1a** and Figure **6-1**). Several LTMs see an increase of 5 minutes or more to the 90th percentile. Average ambulance utilization increases from 11.8% to 18.4%.

6.3     Modelling each intervening year showed similar reductions in performance year-on-year, although the 90th percentile increases became larger (see Appendix **G1b**); for example, a 9s increase from 2020 to 2021 but an 18s increase from 2028 to 2029.

6.4     Modelled P4 average (mean) response time was mapped showing the level of performance that could be expected in different geographical areas (see Appendix **G1c**). Mean average response time was lowest nearest to station locations, although response time was poorer nearer to Tobermory due to vehicles having to cover a relatively sparse distribution of incidents in Northern Bruce Peninsula.

## Maintaining Performance in 2029

6.5     To offset the projected demand increases and the negative impacts on response performance, BCPS will need to deploy additional resources by 2029. Most of the modelling focused on the target year of 2029 to ensure that the optimal final position was known before phasing from the current scenario.

### *Maintaining Performance BCPS-wide*

6.6     An initial scenario was devised with the target of maintaining 2020 P4 8-minute response performance in 2029 at County-wide level only, therefore not applying any performance 'floor' targets by LTM.

6.7     The 2029 'Do Nothing' scenario was used as a base, and shifts were then modified or added iteratively to find the most resource-efficient way to restore County-wide BCPS performance.

6.8     In order to maintain performance, the Walkerton/Wiarton alternating shift was based permanently at Walkerton, and a response post was introduced at Sauble Beach, with a single shift operating from 10:00 to 22:00 seven days a week during the off-peak months, and from 14:00 to 02:00 during the peak months (mid-June to mid-September). Port Elgin was also relocated to MacKenzie Road.

6.9     BCPS-wide P4 8-minute response performance improved from the 2020 Base Position, increasing from 45.2% to 48.1% (see Appendix **G2**). The largest improvement in performance was in Saugeen Shores LTM, due to the introduction of the Sauble Beach shift which would reduce the need for Port Elgin vehicles to travel to this area.  Utilization in this scenario was 16.7%.

## Figure 6-2: Maintain Performance by LTM

*Maintaining Performance by LTM in 2029*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 14.8% |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | |

*Difference from 2020 Base Position*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 3.0% |
| Arran-Elderslie | 7.4% | 8.2% | 12.8% | -01:25 | -01:17 | |
| Brockton | 1.4% | 1.8% | 1.5% | -00:24 | -00:39 | |
| Huron-Kinloss | 1.4% | 16.9% | 12.8% | -00:30 | 04:56 | |
| Kincardine | 0.4% | 0.8% | 1.1% | -00:17 | -00:47 | |
| Northern Bruce Peninsula | 0.7% | 1.3% | 2.4% | -00:35 | -00:24 | |
| Saugeen Shores | 13.2% | 5.6% | 0.1% | -00:12 | -00:03 | |
| South Bruce | 1.3% | 2.6% | 3.7% | -00:38 | -00:39 | |
| South Bruce Peninsula | 9.7% | 14.4% | 9.9% | -01:44 | -01:17 | |
| Out of Area | 0.5% | 0.9% | 2.6% | -00:38 | -00:48 | |
| **Bruce County** | **4.9%** | **5.9%** | **4.0%** | **-00:38** | **-00:45** | |

6.10    In total 84 additional vehicle hours were required per week, representing an 8% increase on the base deployment.

### *Maintaining Performance by LTM*

6.11    A second scenario applied the constraint that performance in each LTM must, at minimum, be maintained at 2020 Base Position levels. It was agreed with  BCPS senior management that 12-hour shifts should continue to be used in the future, although a position making use of shorter shifts to improve performance was tested as part of the sensitivity modelling.

6.12    P4 8-minute response performance was maintained in each LTM (see Appendix **G3a** and Figure **6-2**). The largest improvement in this measure was in Saugeen Shores, which increased by 13.2 percentage points compared to the 2020 Base Position.

6.13    In order to maintain performance by LTM, the following changes were made to shifts:

- Introducing a Sauble Beach response post: 10:00 to 22:00 off-peak and 14:00 to 02:00 at peak (mid-June to mid-September).

- Moving the Walkerton/Wiarton split shift to a Holyrood response post operating from 07:00 to 19:00.

- Relocating Port Elgin to MacKenzie Road.

- Adding shifts at Kincardine (09:30 to 21:30) and Port Elgin (10:00 to 22:00).

- Introducing a Ferndale response post: 09:00 to 21:00, peak only.

6.14    This represents an additional resource requirement of 336 vehicle hours per week at peak and 252 hours off-peak, equating to 31% and 23% increases in resourcing respectively. Vehicle utilization was higher than in the Base Position, at 14.8% compared to 11.8%. Vehicle utilization was lowest at Tobermory at 5.9%, however it was not possible to maintain Northern Bruce Peninsula performance without the Ferndale shift.

6.15    By comparing the off-peak (Appendix **G3b-i**) and peak (Appendix **G3b-ii**) maps to the 2029 'Do Nothing' maps (Appendix **G1c**) some key improvements can be observed, including reduced response times around Sauble Beach and Holyrood.

### *Station Capacity Issues*

6.16    Within the 'Maintaining Performance by LTM' scenario there was a requirement for four additional vehicles at peak, whereas the majority of stations have no additional vehicle capacity (see Figure **6-3**).

## Figure 6-3: Deployment Summary

### Weekly Vehicle Hours

| Station | Base Position | Maintaining Performance | |
|---|---|---|---|
| | | Peak | Off-Peak |
| Chesley | 168 | 168 | 168 |
| Kincardine | 168 | 252 | 252 |
| Port Elgin | 168 | 252 | 252 |
| Port Elgin (Sauble Beach) | - | 84 | 84 |
| Tobermory | 168 | 168 | 168 |
| Walkerton | 210 | 168 | 168 |
| Walkerton (Holyrood) | - | 84 | 84 |
| Wiarton | 210 | 168 | 168 |
| Wiarton (Ferndale) | - | 84 | - |
| Total | 1,092 | 1,428 | 1,344 |

### Peak Vehicles

| Station | Base Position | Maintaining Performance | | Current Spare Vehicles |
|---|---|---|---|---|
| | | Peak | Off-Peak | |
| Chesley | 1 | 1 | 1 | 1 |
| Kincardine | 1 | 2 | 2 | 1 |
| Port Elgin | 1 | 2 | 2 | 1 |
| Port Elgin (Sauble Beach) | - | 1 | 1 | |
| Tobermory | 1 | 1 | 1 | |
| Walkerton | 2[1] | 1 | 1 | 1[2] |
| Walkerton (Holyrood) | - | 1 | 1 | |
| Wiarton | 2[1] | 1 | 1 | 1[2] |
| Wiarton (Ferndale) | - | 1 | | |
| Total | 7 | 11 | 10 | 5 |

[1] Second vehicle alternates between Walkerton and Wiarton, so only counted once in total

[2] Spare vehicle also used currently for alternating Walkerton/Wiarton shift

6.17    While the vehicles at Sauble Beach, Holyrood and Ferndale will start and end their shifts at existing stations, space will be required for crews to take breaks at each of the post locations and BCPS will need to investigate what options are available. For example, there may be opportunities to co-locate with the fire department in Sauble Beach or with the hospital in Lion's Head.

6.18    Assuming the Port Elgin MacKenzie Road station is built with at least four vehicle bays, then this should be able to accommodate the current 24/7 ambulance plus ambulances for the additional shifts at Port Elgin and Sauble Beach and the existing spare vehicle. This could be achieved through several double-length bays rather than four individual bays.

6.19    Kincardine currently has two bays, one of which is used for the existing 24/7 ambulance and the other for a spare ambulance. The additional shift could therefore be run from this station, but the spare ambulance would need to be relocated, potentially to Walkerton.

6.20    Tobermory has one bay which is used for its existing 24/7 ambulance. There is a possibility that an additional vehicle, to be deployed to Ferndale, could be based outside the station during the summer months, but BCPS will need to investigate the feasibility of this. Alternatively, this vehicle could deploy from Wiarton utilising the existing spare vehicle for the summer months, and this is what has been assumed in the modelling.

6.21    Walkerton would need to be able to accommodate the existing 24/7 ambulance and the Holyrood vehicle. Currently only two bays at Walkerton are used for frontline resources, but there is additional space used by support vehicles that could be reconfigured. In addition to the two vehicles listed above, Walkerton would need to be able to accommodate its existing spare vehicle and potentially the spare vehicle from Kincardine.

### Sensitivity Modelling

6.22    The modelling described up to this point has included a number of assumptions that had to be made and agreed in order to devise recommended scenarios, but it is important to stress-test these scenarios against changes to variables to ensure that any recommendations are robust (see Figure **6-4** for a summary of a selection of the results discussed below).

#### *Demand Projection Variation*

6.23    The core demand projection (average 5.3% per annum) was formed by using the midpoint of two demand projection methods (see Section 3). The 'Maintaining Performance by LTM' scenario was re-run in 2029 with these two alternative demand projection methods to quantify the impact of demand on performance outcomes.

# Figure 6-4: Sensitivity Modelling Results Summary

*Performance Results*

| Scenario | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | |
| **Maintain Performance by LTM** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | **14.8%** |
| Lower Demand Increase (4.0%) | 51.1% | 61.5% | 77.9% | 10:04 | 20:00 | 13.1% |
| Upper Demand Increase (6.5%) | 48.8% | 59.1% | 75.8% | 10:31 | 20:47 | 16.7% |
| 2028 Demand | 50.4% | 60.8% | 77.4% | 10:11 | 20:13 | 14.1% |
| Improve Performance by LTM | 54.5% | 65.5% | 81.3% | 09:23 | 18:46 | 12.4% |

*Difference from 'Maintain Performance by LTM'*

| Scenario | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | |
| Lower Demand Increase (4.0%) | 1.1% | 1.1% | 0.9% | -00:13 | -00:21 | -1.7% |
| Upper Demand Increase (6.5%) | -1.3% | -1.3% | -1.2% | 00:15 | 00:26 | 1.9% |
| 2028 Demand | 0.3% | 0.4% | 0.4% | -00:05 | -00:09 | -0.7% |
| Improve Performance by LTM | 4.5% | 5.0% | 4.3% | -00:53 | -01:36 | -2.4% |

6.24 Using the lower demand projection (average 4.0% per annum) resulted in performance improvements for all LTMs, with Bruce County P4 8-minute response performance at 51.1% compared to 50.0% when using the core demand projection (see Appendix **G4a-i**).

6.25 When using the higher demand projection (average 6.5% per annum), response performance degraded in all LTMs for all measures (see Appendix **G4a-ii**). There was a 1.3 percentage point reduction in Bruce County P4 8-minute response performance, from 50.0% to 48.8%.

6.26 During the early stages of the review the COVID-19 pandemic led to reductions in emergency ambulance demand for ORH's clients, meaning that demand projections potentially need to be 'reset' as demand in 2020 could be similar to that in 2019.

6.27 In order to try and quantify the resetting of the demand projection, the 2028 demand level was modelled in the 2029 'Maintaining Performance by LTM' scenario. Response performance was slightly higher as demand was approximately 5.3% lower; the P4 8-minute response performance improvement varied from 0.1% to 0.6% by LTM (see Appendix **G4a-iii**). Vehicle utilization was slightly lower at 14.1%.

### *Increased 'Treat and Release'*

6.28 The potential changes to the Ontario Ambulance Act include the introduction of 'treat and release', which removes the mandated requirement for transport to hospital unless the patient declines transport. This will provide paramedic staff with more flexibility on scene with the patient, potentially avoiding conveyance to hospital if it is not the most appropriate clinical outcome for the patient.

6.29 A number of assumptions had to be made in order to model the potential impact of 'treat and release'. Based on discussions with BCPS, two scenarios were agreed:

- 100% of CTAS5 and 50% of CTAS4 demand no longer requiring transport to hospital.

- 75% of CTAS5, 50% of CTAS4 and 25% of CTAS3 demand no longer requiring transport to hospital.

6.30 ORH benchmarked the amount of time spent on scene when not transporting versus transporting in UK ambulance services, where protocols similar to 'treat and release' are already operating. These services spend on average approximately 66% longer on scene when not transporting compared to transporting. This factor was therefore applied to the BCPS analyzed time on scene values.

## Figure 6-5: TWGM and Potential Targets

| Lower Tier Municipality | TWGM (2016 Census) | | Analyzed Mean Response Time (P4) | | Analyzed 10-Minute Response Performance (P4) | |
|---|---|---|---|---|---|---|
| | Value | Rank | Value | Rank | Value | Rank |
| Brockton | 1457.1 | 1 | 06:53 | 1 | 83.30% | 1 |
| Saugeen Shores | 1227.3 | 2 | 08:17 | 2 | 74.90% | 2 |
| Kincardine | 1213.5 | 3 | 08:52 | 3 | 67.90% | 3 |
| Arran-Elderslie | 728.4 | 4 | 11:55 | 5 | 45.60% | 4 |
| South Bruce | 566.4 | 5 | 11:47 | 4 | 45.50% | 5 |
| South Bruce Peninsula | 119.2 | 6 | 12:45 | 6 | 39.90% | 6 |
| Huron-Kinloss | 74.4 | 7 | 15:17 | 7 | 14.70% | 8 |
| Northern Bruce Peninsula | 18.1 | 8 | 17:37 | 8 | 30.60% | 7 |

**Potential targets:**

- 8-minute
- 10-minute
- 15-minute

| | Value | Rank | Value | Rank |
|---|---|---|---|---|
| Correlation with TWGM Value/Rank: | 0.94 | 0.98 | 0.95 | 0.98 |

6.31    The performance changes associated with both options were marginal, with a one-second reduction in the P4 mean average for 100% CTAS5 and 50% CTAS 4 (see Appendix **G4b-i**), and a two-second increase for 75% CTAS5, 50% CTAS4 and 25% CTAS3 (see Appendix **G4b-ii**).

6.32    In ORH's experience, 'treat and release' tends to provide larger availability and performance gains in services which have significant drive times to hospital and/or offload delays. In these cases, the benefit from reduced time spent travelling to and at hospital can outweigh the increased time on scene.

6.33    As discussed in the benchmarking section (see Section 2), although time to hospital is relatively long in BCPS, time at hospital is the shortest benchmarked by ORH within Ontario. It can therefore be surmised that the additional time spent on scene is broadly similar to time saved in not conveying the patient.

6.34    In some cases, performance falls may occur as vehicles will now become clear more often at scene than at hospital, and hospital locations in Bruce County tend to be well aligned with demand hotspots. While 'treat and release' may not improve response performance in Bruce County, it may provide better outcomes for the patient and the healthcare system as a whole.

### *Improving Performance in 2029*

6.35    The core modelling focused on maintaining performance by LTM, although BCPS also wanted to understand potential options for improving performance in each LTM.

6.36    ORH used The Weighted Geometric Mean (TWGM) measure which helps classify areas and their population in terms of, not only population density, but also the relative degree of clustering of population (see Figure **6-5**). Often, the greater the TWGM value, the more urban and/or clustered the population of an area is and, therefore, the easier it is to achieve higher response performance.

6.37    The TWGM measures, and subsequent rankings, showed strong correlation to analyzed average (mean) P4 response performance and 10-minute P4 response performance. ORH sought to use this to group LTMs and then set appropriate mean response time standards for each group (see Figure **6-5**).

6.38    Shifts (of varying shift lengths) and new locations (if necessary) were added into the model until these performance measures were met. The resultant County-wide P4 mean response time is 09m23s, a 01m31s improvement from the 2020 Base Position (see Appendix **G4c-i**). Vehicle utilization returns to a similar level to the Base Position.

6.39    In order to meet the targets, the following changes were required:

- Walkerton/Wiarton alternating shift moved permanently to Wiarton operating from 09:00 to 17:00.

- Response post at Ferndale operating from 09:00 to 19:00.

- Response post at Tiverton operating from 09:00 to 19:00.

- Response post at Holyrood operating from 07:00 to 17:00 and 17:00 to 01:00.

- Response post at Sauble Beach operating from 06:00 to 18:00 off-peak, and 06:00 to 18:00 and 18:00 to 02:00 at peak.

- Response post at Mildmay operating from 09:00 to 17:00.

- Additional shifts at Chesley (08:30 to 16:30), Port Elgin (10:00 to 22:00) and Tobermory (09:00 to 19:00, peak only).

6.40 This requirement totalled an additional 644 hours per week at peak and 518 hours per week off-peak, representing increases over the Base Position of 59% and 48% respectively.

6.41 Mean response performance improved particularly around the new response posts of Tiverton and Mildmay (see Appendices **G4c-ii** and **G4c-iii**).

6.42 Clearly, this scenario represents such a significant increase in resources and responses posts that is likely unrealistic in financial terms and would cause significant capacity issues. However, it is useful in demonstrating the level of resources that would be required to improve equity of performance across all LTMs.

### *Future Developments*

6.43 The core modelling scenarios included demographic changes through the inclusion of population and demand projections but did not include specific housing developments.

6.44 The Bruce County Planning Department provided ORH with expected developments by location, size and likelihood (see Section 3). Using the projected demand rates per 1,000 population for 2029, it was possible to quantify the potential additional demand and include this within AmbSim.

6.45 The 'all units' position was used, equivalent to a 10.4% increase in responded demand above the core projection. Most of this demand increase is expected in Saugeen Shores.

6.46 Including this additional demand in the 'Maintaining Performance by LTM' scenario produced some degradation in response performance, particularly in Saugeen Shores LTM where the additional demand led to increases in vehicle utilization and in turn a reduction in vehicle availability. In order to mitigate this, an additional 24/7 ambulance would be required at Port Elgin by 2029, over and above the resources already recommended. With this additional resource, performance is improved for the majority of measures in Saugeen Shores and is improved across all other measures in all other LTMs (see Appendix **G4d**).

### *Alternative Huron-Kinloss Options*

6.47　It was agreed that a response post in Holyrood should form part of the core recommendations, and alternatives were previously tested against the 2020 Base Position.

6.48　Alternative post locations at Ripley and Lucknow were also tested against the 2029 core 'Maintaining Performance by LTM' scenario to ensure that Holyrood was still the preferred option, and to provide BCPS with evidence of the likely performance change should one of the other locations become a more favourable option.

6.49　Similar comments can be made to those in Section 5. Lucknow gives better Huron-Kinloss performance at the 8-minute target than Holyrood (see Appendix **G4e-i**), but has similar 10- and 15-minute impacts and would likely have increased workload over-the-border in Huron County (which could not be modelled).

6.50　Ripley gives reduced Huron-Kinloss performance when compared to Ripley (see Appendix **G4e-ii**), particularly at the 10-minute target, but results in slightly better Kincardine performance.

### *Neyaashiinigmiing 27 (Cape Croker)*

6.51　Neyaashiinigmiing 27 is a reserve in South Bruce Peninsula that is administered by the Chippewas of Nawash Unceded First Nation. Demand in this region accounted for approximately 8% of all BCPS-responded demand in South Bruce Peninsula in 2019, and 1.5% of all BCPS-responded demand in 2019. In 2029, there were approximately 0.43 incidents per day in this region.

6.52　A scenario was tested in which a 24/7 ambulance, potentially to be run by the First Nation, was deployed in central Neyaashiinigmiing 27. It was assumed that such an ambulance would only respond to calls in the Neyaashiinigmiing 27 area and existing BCPS vehicles would only respond to calls outside this area. This additional shift is meant to be illustrative and in reality may not need to be deployed 24/7 as it would be fairly lowly utilised.

6.53　For P4 incidents responded to by BCPS vehicles, the South Bruce Peninsula 8-minute response performance improved by 4.4 percentage points, with reductions of 01m14s and 01m48s in average and 90th percentile response times (see Appendix **G4f**).

6.54　P4 8-minute performance for incidents in Neyaashiinigmiing 27 would be 93.2%, with an average response time of 04m29s and a 90th percentile response time of 06m30s.

# Figure 7-1: Phasing Response Performance Summary



**10-minute Performance by LTM**

Legend: Arran-Elderslie, Brockton, Huron-Kinloss, Kincardine, Northern Bruce Peninsula, Saugeen Shores, South Bruce, South Bruce Peninsula, Bruce County

**Average Response Time by LTM**

Legend: Arran-Elderslie, Brockton, Huron-Kinloss, Kincardine, Northern Bruce Peninsula, Saugeen Shores, South Bruce, South Bruce Peninsula, Bruce County
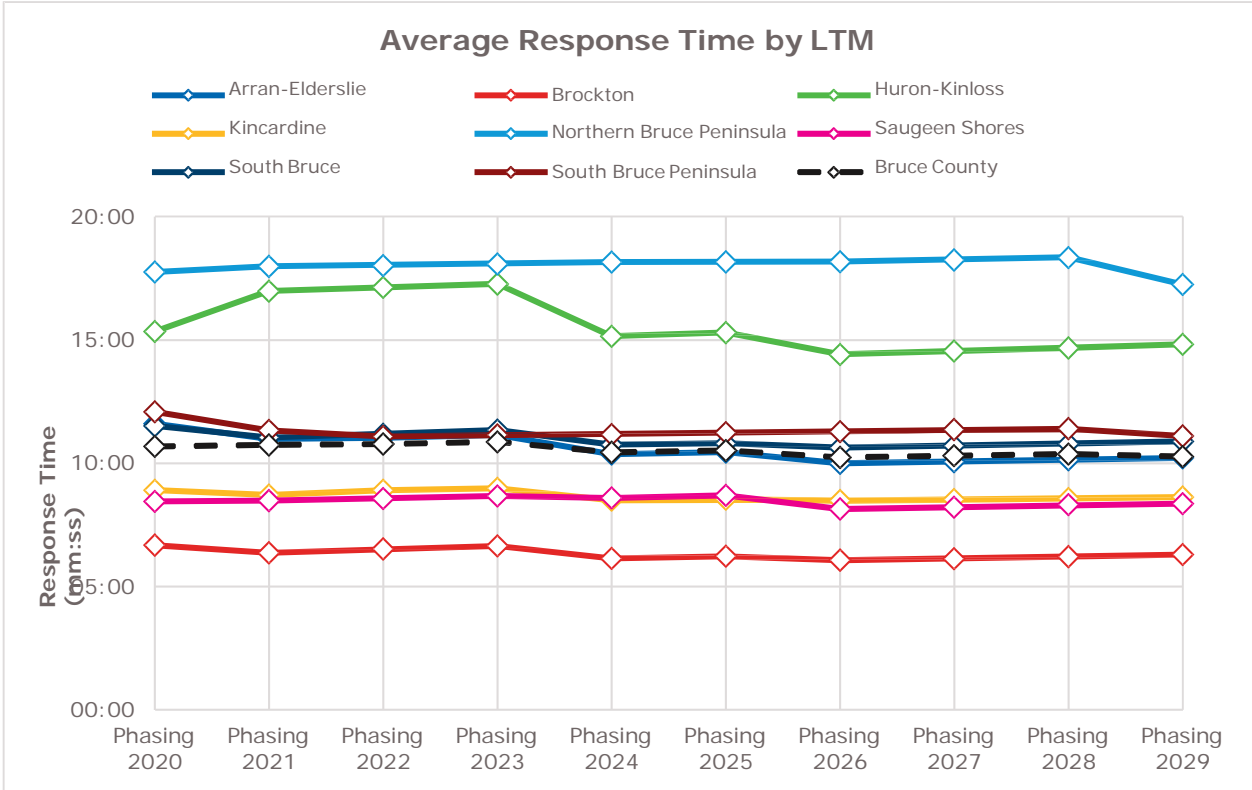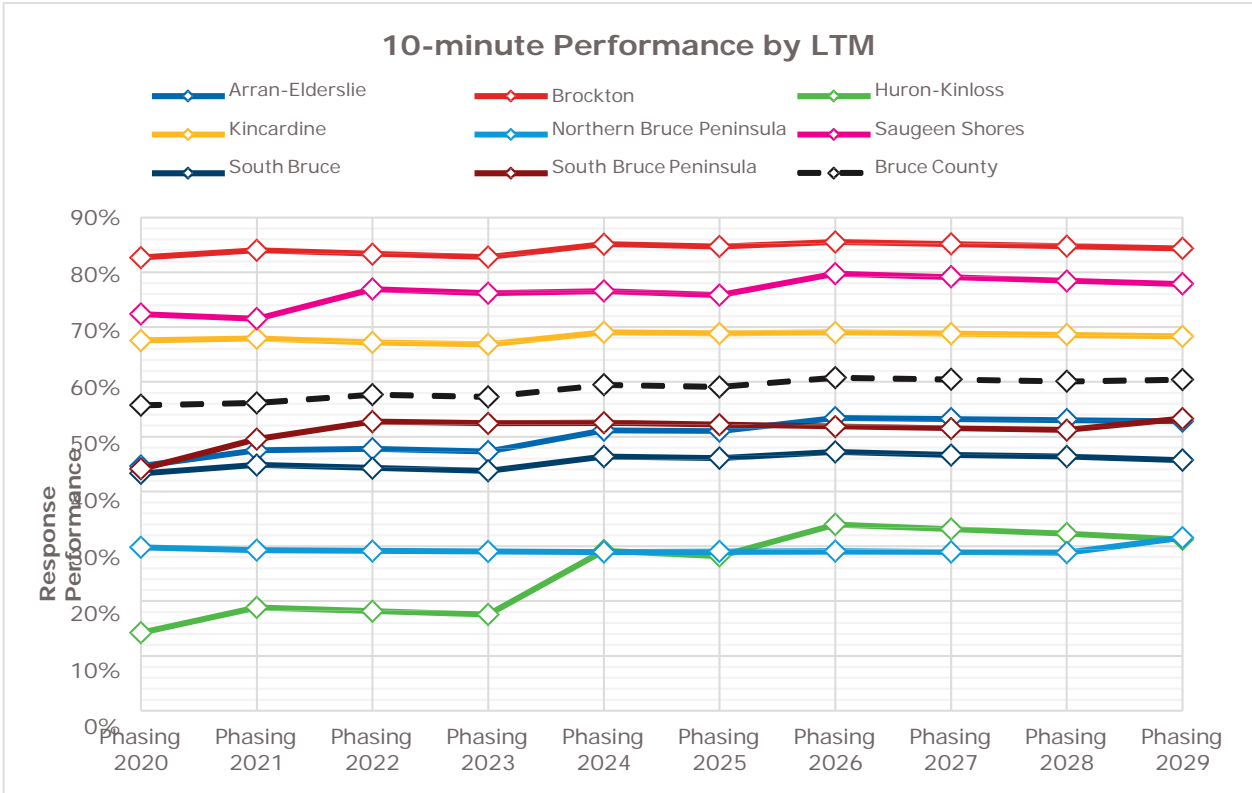
# 7    PHASING

7.1    The results of the core 'Maintaining Performance by LTM' scenario for 2029 in Section 6 have been phased to make the most efficient staggering of resource and estate changes over the next ten years.

7.2    The following phasing schedule is suggested to ensure that performance is maintained at Base Position levels in each year as far as possible:

- 2020: Add a 12-hour Sauble Beach shift (14:00 to 02:00) in the peak months.

- 2021: Add a 12-hour Sauble Beach shift (10:00 to 22:00) in the off-peak months and move the Walkerton/Wiarton alternating shift to Holyrood year-round (07:00 to 19:00).

- 2022: Move Port Elgin station to the Mackenzie Road site.

- 2023: No change.

- 2024: Add a 12-hour Kincardine shift (09:30 to 21:30) year-round.

- 2024: No change.

- 2026: Add a 12-hour Port Elgin shift (10:00 to 22:00) year-round.

- 2027: No change.

- 2028: No change.

- 2029: Add a 12-hour Ferndale shift (09:00 to 21:00) in the peak months.

7.3    BCPS should monitor performance achieved over the next ten years, and may wish to make alterations to this phasing plan should demand increases or performance diverge significantly from the projected levels. For example, if Northern Bruce Peninsula performance does not fall below 2020 Base Position levels by 2029, then the additional Ferndale shift may not be required.

7.4    The resulting year-on-year P4 10-minute response performance and average response times are given in Figure **7-1**.

# Appendices

| | |
|---|---|
| A | Glossary |
| B | Current Service Profile |
| C | Benchmarking |
| D | Demand Projections |
| E | Model Validation and Base Performance |
| F | Station Configuration |
| G | Future Demand Modelling |

**Bruce County Paramedic Services**

**Comprehensive Deployment and Base Review of Paramedic Services**

Appendices

ORH/BCPS/1

ORH

PLAN. PREPARE. **PERFORM.**

# A  Glossary

## Glossary

| Term | Definition |
|---|---|
| Activation Time | Time from T1 Call Received to T2 Unit Notified |
| AVL | Automatic Vehicle Location |
| BCPS | Bruce County Paramedic Services |
| CACC | Central Ambulance Communications Centre |
| CTAS | Canadian Triage and Acuity Scale |
| | 1    (Resuscitation): Conditions that are threats to life or limb (or imminent risk of deterioration) requiring immediate aggressive interventions |
| | 2    (Emergent): Conditions that are a potential threat to life, limb or function requiring rapid medical intervention or delegated acts |
| | 3    (Urgent): Conditions that could potentially progress to a serious problem requiring emergency intervention |
| | 4    (Less Urgent): Conditions that are related to patient age, distress, or potential for deterioration or complications which would benefit from intervention or reassurance |
| | 5    (Non Urgent): Conditions that may be acute but non-urgent as well as conditions which may be part of a chronic problem with or without evidence of deterioration |
| FT | Full Time |
| Incident | A P1 to P4 call resulting in at least one unit response |
| LTM | Lower Tier Municipality |
| Mobilization | A unit being mobilized to an incident (may be more than one unit mobilization for an incident and may not reach scene) |
| Mobilization Time | Time from T2 Unit Notified to T3 Unit Mobile |
| MOHLTC | Ministry of Health Long-Term Care |
| Occupied Time | Time from T2 Unit Notified to Unit Clear |
| Optimization | Using a sophisticated, geographically based genetic algorithm to evaluate multiple configurations of locations and identify best options. |
| ORH | Operational Research in Health Ltd |
| Priority 1 to 4 | P1    (Deferrable): A routine call that may be delayed without detriment to the patient (eg, a non-scheduled transfer; a minor injury) |
| | P2    (Scheduled): A call which must be done at a specific time, for example because of special treatment or diagnostic facility requirement (eg, inter-hospital transfers or a scheduled meet with an air ambulance) |
| | P3    (Prompt): A call that should be performed without delay (eg, serious injury or illness) |
| | P4    (Urgent): A call that must be performed immediately where the patients 'life or limb' may be at risk (eg, Vital Signs Absent patient or unconscious head injury) |

# Glossary

| Term | Definition |
|------|-----------|
| PT | Part Time |
| Response | A unit arriving at the scene of an incident (there may be more than one unit response at an incident) |
| Response Time | 1    Time from T2 Unit Notified of the first notified unit to T4 Arrive Scene of the first arrived unit. BCPS uses this measurement of response |
| | 2    Time from T0 Call Answer to T4 Arrive Scene of the first arrived unit. ORH also monitors this measurement of response time for modelling |
| Simulation | Using a discrete event simulation model, which replicates the key characteristics of an emergency service, to predict future behaviour under a variety of difference scenarios. |
| Standby (Priority 8) | Moving a crew from one station to another station to maintain coverage |
| Time Events | T0    Time Call Answered |
| | T1    Time Available for Dispatch |
| | T2    First Unit Notified |
| | T3    First Unit Mobilized |
| | T4    First Unit Arrived at Scene |
| Utilization | The combined occupied time of all units divided by the combined total deployed unit hours (shift start to shift end) |

# B    Current Service Profile

# P3 and P4 Non Transfer Incidents by Responding Service
## Jan 2016 to Dec 2019

**B1**

## Station Location
- ◆ BCPS Station
- ◆ Other Station

## Incident Response
- ● BCPS Only
- ● Other Service Only
- ● BCPS and
  Other Service

### Demand
- ● 500
- ● 250
- ● 50

Tobermory

Wiarton

Owen Sound

Chatsworth

Port Elgin

GREY

Chesley

Kincardine

Walkerton

WELLINGTON

HURON

0    40
kilometres

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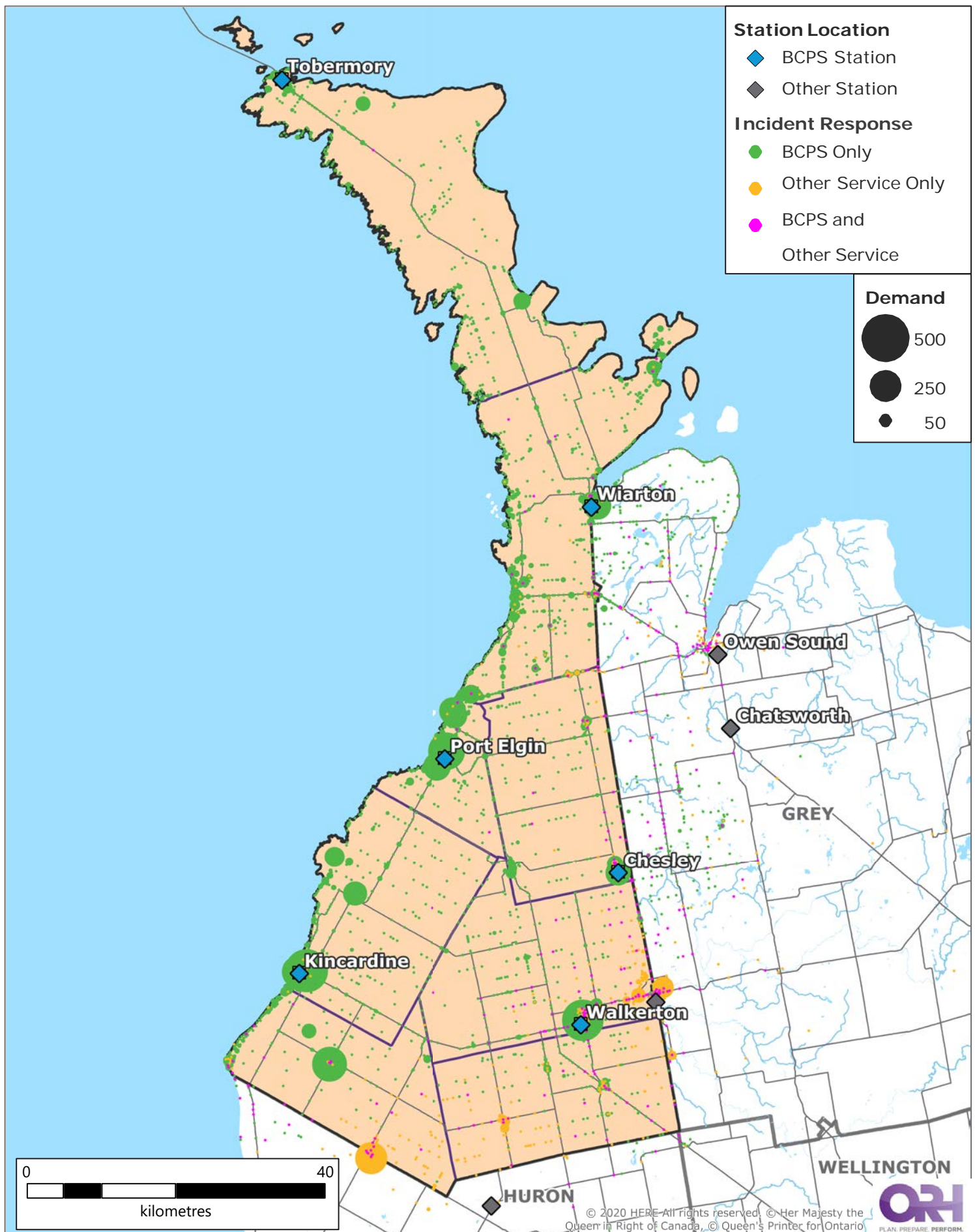
**Demand by Month**

Sample Period: 01/01/2016 to 31/12/2019

**Average Daily Responded Demand (P3 and P4)**

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Overall |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------|
| 2016 | 12.9 | 12.7 | 13.1 | 13.3 | 15.8 | 16.4 | 20.3 | 19.3 | 15.8 | 15.6 | 14.1 | 14.5 | 15.3 |
| 2017 | 15.9 | 14.7 | 15.1 | 15.5 | 16.1 | 16.4 | 19.5 | 19.8 | 17.7 | 16.1 | 14.6 | 16.1 | 16.5 |
| 2018 | 15.4 | 17.0 | 16.4 | 16.4 | 15.9 | 17.5 | 18.6 | 19.2 | 16.9 | 15.9 | 16.8 | 15.9 | 16.8 |
| 2019 | 16.3 | 16.6 | 16.5 | 15.3 | 17.1 | 18.1 | 19.5 | 20.6 | 17.1 | 16.5 | 18.0 | 18.4 | 17.5 |



**B2a**
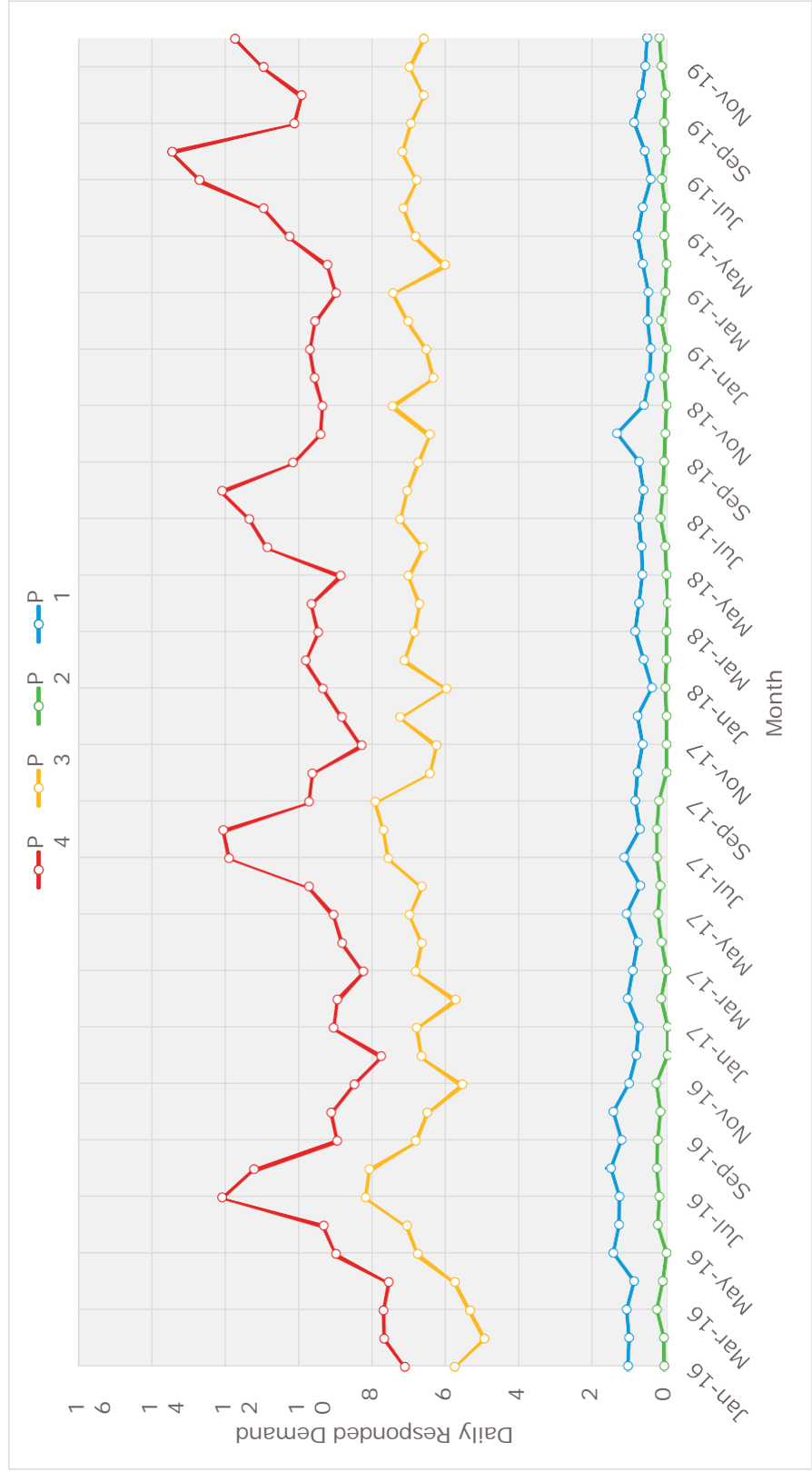
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## Demand by Month: Seasonality

Sample Period: 01/01/2016 to 31/12/2019

| Lower Tier Municipality | Off Peak | Peak | Difference |
|---|---|---|---|
| Arran-Elderslie | 1.2 | 1.2 | 0.0 |
| Brockton | 2.5 | 2.4 | -0.1 |
| Huron-Kinloss | 0.8 | 0.9 | 0.1 |
| Kincardine | 3.0 | 3.1 | 0.0 |
| Northern Bruce Peninsula | 0.9 | 2.0 | 1.1 |
| Saugeen Shores | 3.5 | 4.2 | 0.7 |
| South Bruce | 0.3 | 0.4 | 0.1 |
| South Bruce Peninsula | 3.2 | 4.4 | 1.2 |
| Out Of Area | 1.2 | 1.5 | 0.3 |
| **Service-Wide** | **16.7** | **20.0** | **3.4** |
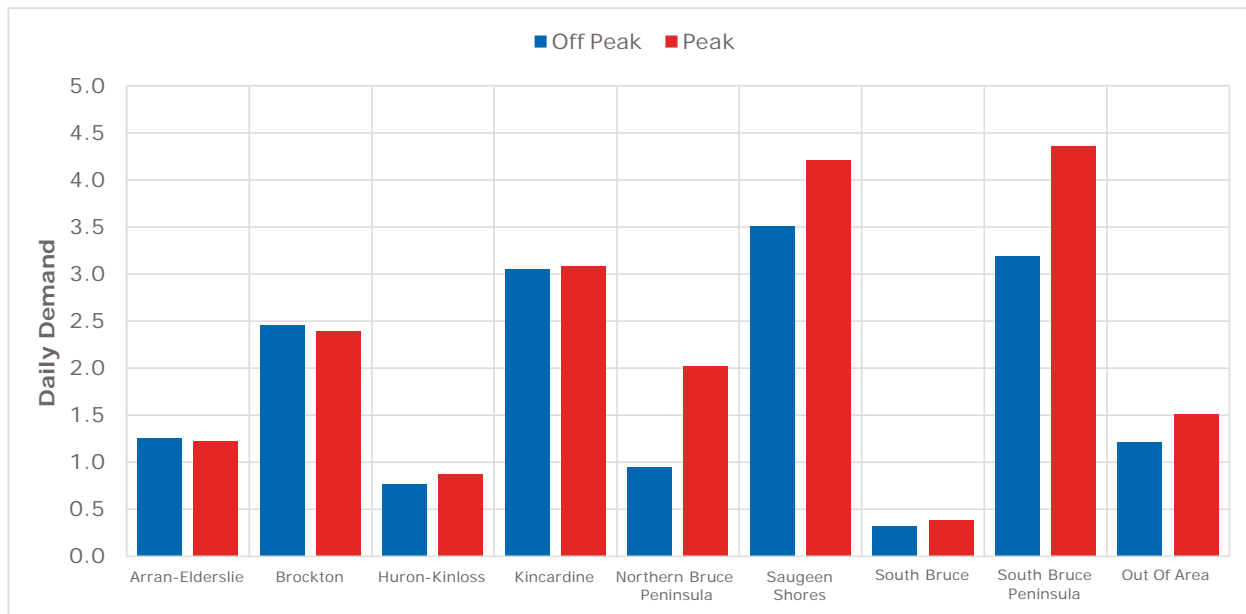


*Note: Peak Sample - 15th June to 14th September*

*Off Peak Sample - 15th September to 14th June*

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**Demand by Day and Hour - Weekday vs Weekend**

Sample Period: 01/01/2016 to 31/12/2019
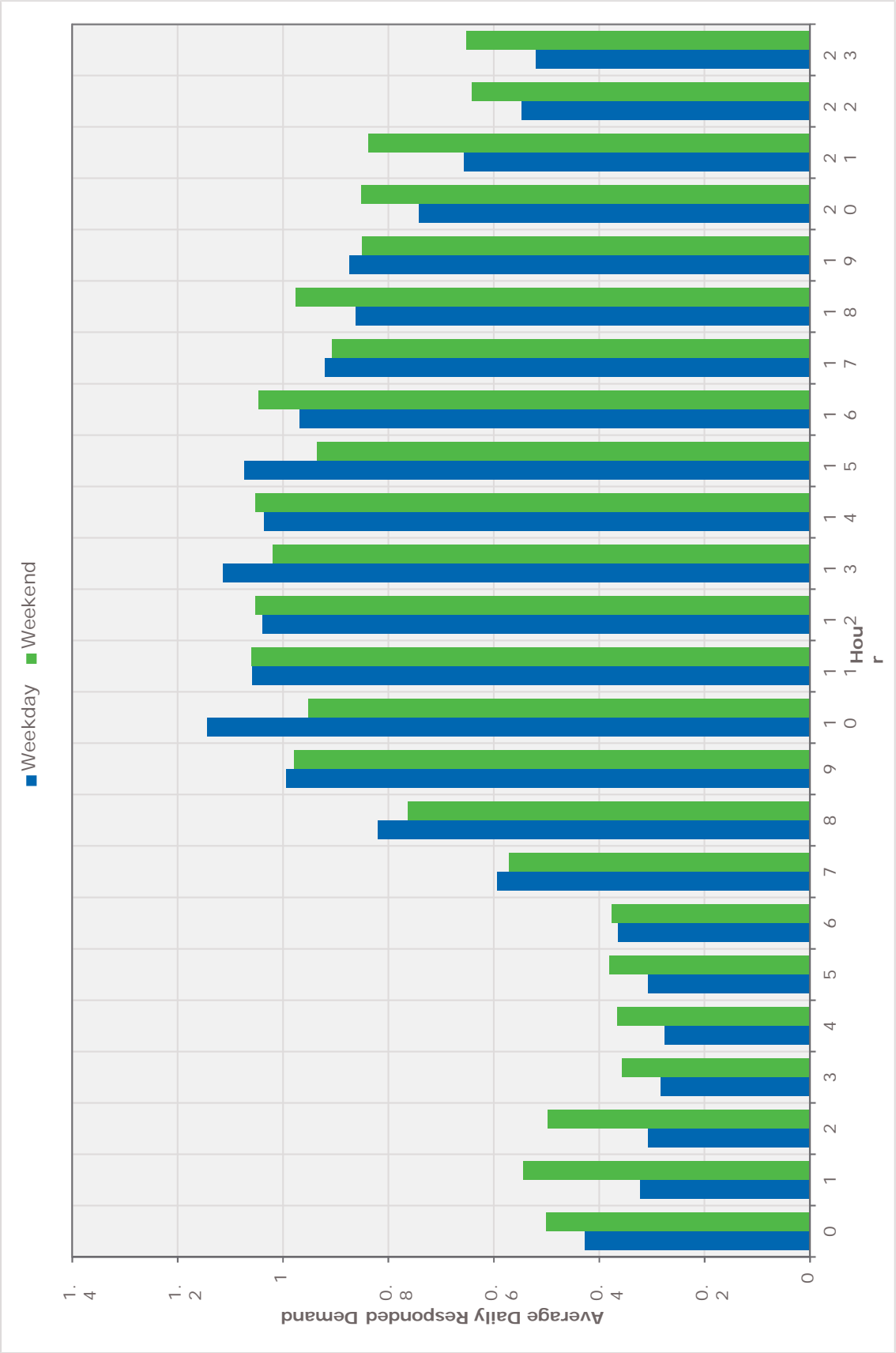
Bruce County Paramedic Services

## Demand Proportions by CTAS Code

Sample Period: 01/01/2016 to 31/12/2019

*Average Daily Demand*

| CTAS | Priority Code | | | | Total |
|------|------|------|------|------|------|
| | P1 | P2 | P3 | P4 | |
| 0 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
| 1 | 0.00 | 0.00 | 0.01 | 0.17 | 0.17 |
| 2 | 0.00 | 0.00 | 0.21 | 2.28 | 2.49 |
| 3 | 0.01 | 0.00 | 2.18 | 4.41 | 6.60 |
| 4 | 0.00 | 0.00 | 0.87 | 0.77 | 1.65 |
| 5 | 0.00 | 0.00 | 0.18 | 0.08 | 0.26 |
| TR | 0.79 | 0.11 | 2.40 | 0.87 | 4.17 |
| Unknown | 0.04 | 0.01 | 0.93 | 1.17 | 2.15 |
| **Total** | **0.85** | **0.13** | **6.77** | **9.76** | **17.51** |

| CTAS | Priority Code | | | | Total |
|------|------|------|------|------|------|
| | P1 | P2 | P3 | P4 | |
| 0 | 0.0% | 0.0% | 0.0% | 100.0% | 100.0% |
| 1 | 0.0% | 0.0% | 3.6% | 96.4% | 100.0% |
| 2 | 0.0% | 0.1% | 8.6% | 91.4% | 100.0% |
| 3 | 0.2% | 0.0% | 32.9% | 66.8% | 100.0% |
| 4 | 0.3% | 0.0% | 52.9% | 46.8% | 100.0% |
| 5 | 1.0% | 0.5% | 66.4% | 32.0% | 100.0% |
| TR | 19.0% | 2.7% | 57.4% | 20.9% | 100.0% |
| Unknown | 1.8% | 0.4% | 43.2% | 54.6% | 100.0% |
| **Total** | **4.9%** | **0.7%** | **38.6%** | **55.8%** | **100.0%** |

*Note: TR are Transfer incidents between facilities*

Bruce County Paramedic Services

**Hospital Profile**

Sample Period: 01/01/2016 to 31/12/2019

| Destination Hospital | P1 | | P2 | | P3 | | P4 | | Overall |
|---|---|---|---|---|---|---|---|---|---|
| | Transfers | Non Transfers | Transfers | Non Transfers | Transfers | Non Transfers | Transfers | Non Transfers | |
| Grey Bruce Health Services - Southampton | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.9 | 0.0 | 2.1 | 3.2 |
| South Bruce Grey Health Center - Kincardine | 0.3 | | 0.0 | 0.0 | 0.1 | 0.7 | 0.0 | 1.6 | 2.7 |
| Grey Bruce Health Services - Owen Sound | 0.0 | 0.0 | 0.0 | | 1.4 | 0.1 | 0.6 | 0.3 | 2.4 |
| Grey Bruce Health Services - Wiarton | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.6 | 0.0 | 1.4 | 2.2 |
| South Bruce Grey Health Center - Walkerton | 0.0 | | 0.0 | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 | 2.0 |
| Grey Bruce Health Services - Lion's Head | 0.0 | | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.5 | 0.8 |
| South Bruce Grey Health Center - Chesley | 0.1 | | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.4 | 0.7 |
| Hanover and District Hospital | 0.0 | | 0.0 | | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 |
| Victoria Hospital - London | 0.0 | | 0.0 | | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 |
| Other | 0.1 | 0.0 | 0.0 | | 0.2 | 0.0 | 0.2 | 0.1 | 0.7 |
| **Total** | **0.8** | **0.0** | **0.1** | **0.0** | **2.6** | **3.2** | **0.9** | **7.6** | **15.2** |

**Patient Destinations**

B5b

Legend:
- Bruce County
- Highways

**Hospitals**
- Chesley
- Hanover and District
- Kincardine
- Lion's Head
- Owen Sound
- Southampton
- Victoria London
- Walkerton
- Wiarton

**Demand**
- 300
- 150
- 30

Map labels:
- GBHS – Lion's Head
- GBHS – Wiarton
- GBHS – Owen Sound
- GBHS – Southampton
- Chesley
- Kincardine
- Walkerton
- Hanover and District Hospital
- Durham
- GREY
- WELLINGTON
- HURON
- Wingham & District Hospital

0    40
kilometres

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Bruce County Paramedic Services

**BCPS Response Performance (Measured from Time Call Answered)**

Sample Period: 01/01/2016 to 31/12/2019

| Category | Target Minute | Target Performance | LTM | | | | | | | | | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Arran-Eldersl... | Brockton | Huron-Kinlo ss | Kincardine | Northern Bruce Peninsul... | Saugeen Shore s... | Sou th Bru ... | South Bruce Peninsul... | Out of Area | |
| CTAS1 | 8 | 45% | 22% | 58% | | 61% | 38% | 38% | | 25% | 20% | 34% |
| CTAS 2 | 10 | 50% | 35% | 72% | 8% | 54% | 28% | 59% | 13% | 31% | 21% | 43% |
| | 15 | 70% | 47% | 86% | 29% | 74% | 31% | 82% | 65% | 46% | 46% | 62% |
| CTAS 3 | 30 | 85% | 96% | 98% | 95% | 97% | 76% | 97% | 97% | 92% | 92% | 95% |
| | 30 | 90% | 96% | 96% | 93% | 98% | 56% | 95% | 100% | 89% | 100% | 93% |
| CTAS 4 | 8 | | 33% | 60% | 1% | 47% | 20% | 42% | 3% | 28% | 15% | 35% |
| | 10 | | 40% | 74% | 7% | 61% | 26% | 58% | 15% | 34% | 23% | 46% |
| CTAS 5 | 15 | | 52% | 90% | 31% | 78% | 34% | 88% | 76% | 52% | 50% | 67% |
| | 30 | | 98% | 99% | 98% | 99% | 87% | 98% | 99% | 96% | 96% | 97% |
| | 8 | | 32% | 36% | 0% | 21% | 11% | 16% | 1% | 37% | 30% | 24% |
| P3 | 10 | | 38% | 55% | 1% | 47% | 17% | 30% | 5% | 45% | 33% | 38% |
| | 15 | | 48% | 72% | 22% | 72% | 24% | 64% | 39% | 54% | 43% | 58% |
| | 30 | | 85% | 86% | 89% | 91% | 49% | 92% | 94% | 88% | 72% | 86% |

Bruce County Paramedic Services

**BCPS Response Performance (Measured from Time Unit Notified)**

Sample Period: 01/01/2016 to 31/12/2019

| Category | Target Minute | Target Performance | Arran-Elderslie | Brockton | Huron-Kinloss | Kincardine | Northern Bruce Peninsula | Saugeen Shores | South Bru... | South Bruce Peninsula | Out of Area | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | LTM | | | | |
| CTAS1 | 8 | 45% | 26% | 68% | | 65% | 50% | 48% | 13% | 35% | 20% | 42% |
| CTAS 2 | 10 | 50% | 40% | 81% | 13% | 62% | 33% | 75% | 43% | 36% | 32% | 52% |
| | 15 | 70% | 56% | 92% | 46% | 80% | 37% | 90% | 78% | 55% | 62% | 71% |
| CTAS 3 | 30 | 85% | 98% | 99% | 96% | 99% | 84% | 98% | 97% | 96% | 97% | 97% |
| | 30 | 90% | 100% | 100% | 95% | 99% | 69% | 96% | 100% | 95% | 100% | 96% |
| CTAS 4 | 8 | | 41% | 76% | 6% | 62% | 26% | 57% | 13% | 34% | 24% | 46% |
| | 10 | | 46% | 83% | 15% | 68% | 31% | 75% | 46% | 40% | 35% | 56% |
| CTAS 5 | 15 | | 62% | 94% | 50% | 84% | 39% | 92% | 84% | 60% | 66% | 74% |
| | 30 | | 99% | 100% | 99% | 100% | 93% | 99% | 100% | 98% | 98% | 99% |
| P3 | 8 | | 43% | 73% | 2% | 63% | 20% | 36% | 4% | 53% | 58% | 48% |
| | 10 | | 47% | 80% | 9% | 74% | 23% | 48% | 10% | 56% | 62% | 56% |
| | 15 | | 56% | 89% | 35% | 83% | 31% | 84% | 58% | 66% | 74% | 72% |
| | 30 | | 93% | 98% | 94% | 96% | 72% | 95% | 97% | 95% | 98% | 94% |

# P4 Non-Transfer Mean Response Time

**B7**

Legend:

— Highways

**Locations**
- ◆ BCPS Station
- ◆ Other Station
- ▭ Bruce County LTM Boundaries

**Mean Response Time**
- 16+ mins
- 14-16 mins
- 12-14 mins
- 10-12 mins
- 8-10 mins
- 6-8 mins
- 0-6 mins

Map labels: Tobermory, Wiarton, Owen Sound, Chatsworth, Port Elgin, GREY, Kincardine, Chesley, Hanover, Walkerton, HURON, Wingham

0 — 25 kilometres
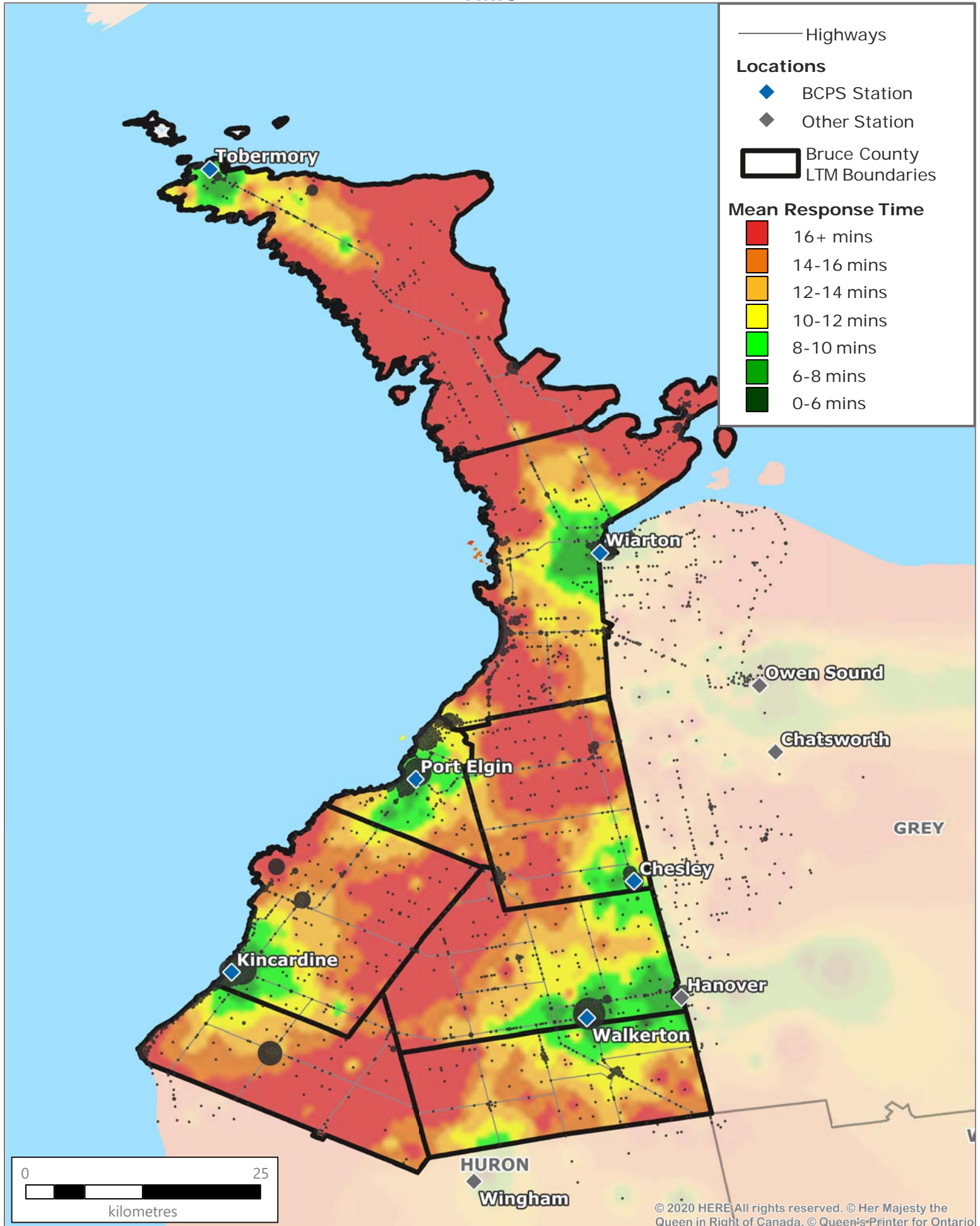
Bruce County Paramedic Services
## Call Components Diagram

### Call flow stages

- **Call Answered (CA)** [T0 TimeZero]
- **Vehicle Assigned (VA)** [T2 Notified]
- **Vehicle Mobile (VM)** [T3 Enroute]
- **Arrived at Scene** [T4 Arrived Scene]
- **Left Scene** [T5 Depart Scene]
- **Arrived at Hospital** [T6 Arrive Destination]
- **Clear** [T7 Clear Destination or T13 Unit Cancelled]

### Time components

- Response Time* (RT)
- Activation Time (CA-VA)
- Mobilization Time (VA-VM)
- Time to Scene (TTS)
- Time to Scene (TTS)
- Time at Scene (TAS)
- Time to Hospital (TTH)
- Time at Hospital (TAH)
- Occupied Time (OCC)
- Service Time (SER)

### Definitions

T0 [TimeZero] / Call Answered: Time when calltaker (CACC) answers call
T1 [Call Received] / Available for Dispatch: Time when the call becomes available for dispatch (call becomes visible in CAD queue as pending)
T2 [Notified] / Vehicle Assigned: Time when CACC notifies base/crew about an incident
T3 [Enroute] / Vehicle Mobile: Time when crew notifes CACC they are en route to an incident
T4 [Arrived Scene] / Arrived at Scene: Time when crew notifies CACC they have arrived at the scene of an incident
T5 [Depart Scene] / Left Scene: Time when crew notifies CACC they have left the scene of an incident
T6 [Arrive Destination] / Arrived at Hospital: Time when crew notifies CACC they have arrived at destination (eg, hospital)
T7 [Clear Destination] / Clear: Time when crew notifies CACC they are available for a new call
T13 [Unit Cancelled] / Clear: Time unit was cancelled/stood down from the call

\* BCPS Response Time is calculated from time first vehicle is allocated to the incident
  ORH Response Time is usually calculated from time call answered

Bruce County Paramedic Services

## P4 Call Components by Period of Day

Sample Period: 01/01/2016 to 31/12/2019
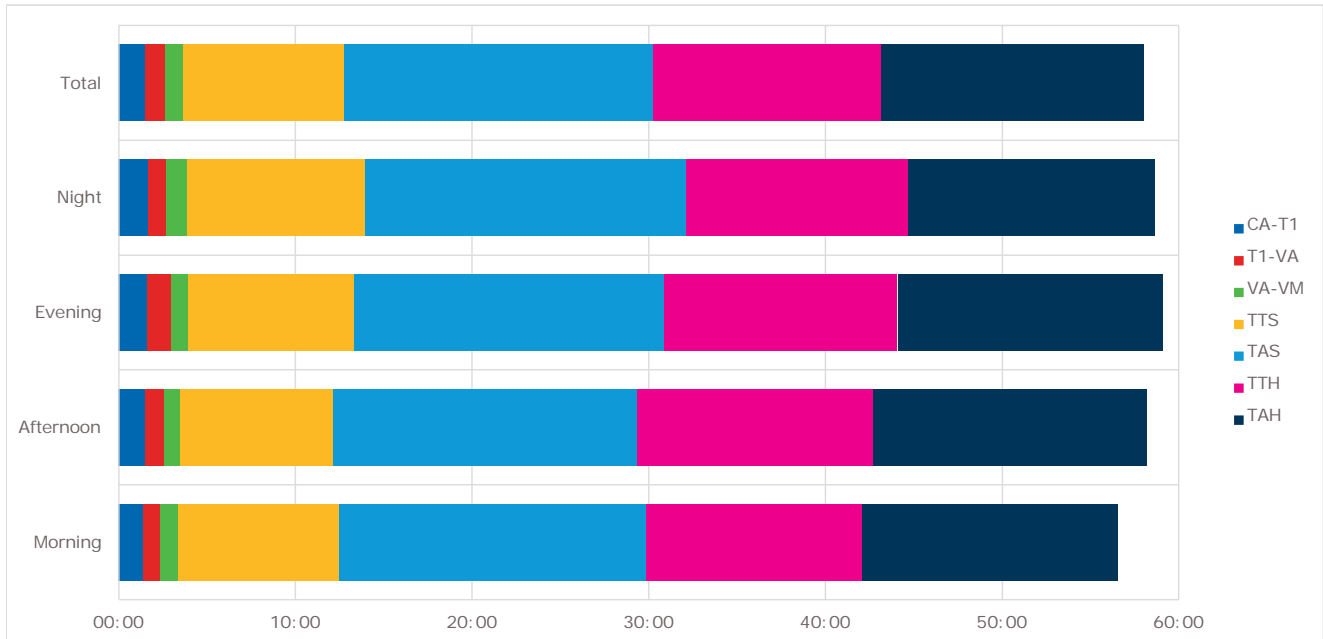


| | Component | Morning | Afternoon | Evening | Night | Total |
|---|---|---|---|---|---|---|
| | | 06:00 - 12:00 | 12:00 - 18:00 | 18:00 - 00:00 | 00:00 - 06:00 | |
| CA-T1 | Call Answered to T1_CallReceived | 01:23 | 01:29 | 01:36 | 01:40 | 01:31 |
| T1-VA | T1_CallReceived to Vehicle Assign | 00:59 | 01:07 | 01:23 | 01:00 | 01:08 |
| CC-VA | T0_TimeZero to Vehicle Assign | 02:13 | 02:21 | 02:35 | 02:10 | 02:21 |
| VA-VM | Vehicle Assign to Vehicle Mobile | 01:03 | 00:54 | 00:57 | 01:14 | 01:00 |
| TTS | Time to Scene | 09:04 | 08:37 | 09:24 | 10:04 | 09:08 |
| TAS | Time at Scene | 17:20 | 17:14 | 17:34 | 18:09 | 17:28 |
| TTH | Time to Hospital | 12:15 | 13:22 | 13:11 | 12:34 | 12:54 |
| TAH | Time at Hospital | 14:29 | 15:28 | 15:00 | 13:57 | 14:52 |
| OCC | Occupied Time | 50:42 | 52:13 | 53:25 | 53:32 | 52:17 |

Bruce County Paramedic Services

## Time at Hospital by Hospital

Sample Period: 01/01/2016 to 31/12/2019

**Legend:** In Bruce County | Outside Bruce County | Mixed | Average

**Time at Hospital**

Y-axis: 40:00, 35:00, 30:00, 25:00, 20:00, 15:00, 10:00, 05:00, 00:00

Patient Journeys per Week

| Hospital | Value |
|----------|-------|
| Victoria Hospital - London | 1.2 |
| Grey Bruce Health Services - Owen Sound | 17.9 |
| Other | 13.6 |
| South Bruce Grey Health Center - Walkerton | 15.9 |
| Hanover and District Hospital | 6.3 |
| South Bruce Grey Health Center - Chesley Hospital | 5.8 |
| Grey Bruce Health Services - Lion's Head | 5.7 |
| Grey Bruce Health Services - Wiarton | 15.8 |
| Grey Bruce Health Services - Kincardine | 22.9 |
| South Bruce Health Center - Southampton | 19.6 |

Bruce County Paramedic Services

**Time at Hospital by Hospital: Arrival to Patient Handover**

Sample Period: 01/01/2016 to 31/12/2019



Legend:
- In Bruce County
- Outside Bruce County
- Mixed
- Average

X-axis (Hospital): Victoria Hospital - London; Grey Bruce Health Services - Owen Sound; Other; South Bruce Grey Health Center - Walkerton; Hanover and District Health Hospital; South Grey Health Center - Chesley; Grey Bruce Health Services - Lion's Head; Grey Bruce Health Services - Wiarton; Grey Bruce Health Services - Southampton; South Bruce Grey Health Center - Kincardine

Y-axis (Time at Hospital): 00:00, 05:00, 10:00, 15:00, 20:00, 25:00, 30:00, 35:00, 40:00

Bruce County Paramedic Services

# Time at Hospital by Hospital: Patient Handover to Time Clear

Sample Period: 01/01/2016 to 31/12/2019



Legend:
- In Bruce County
- Outside Bruce County
- Mixed
- Average
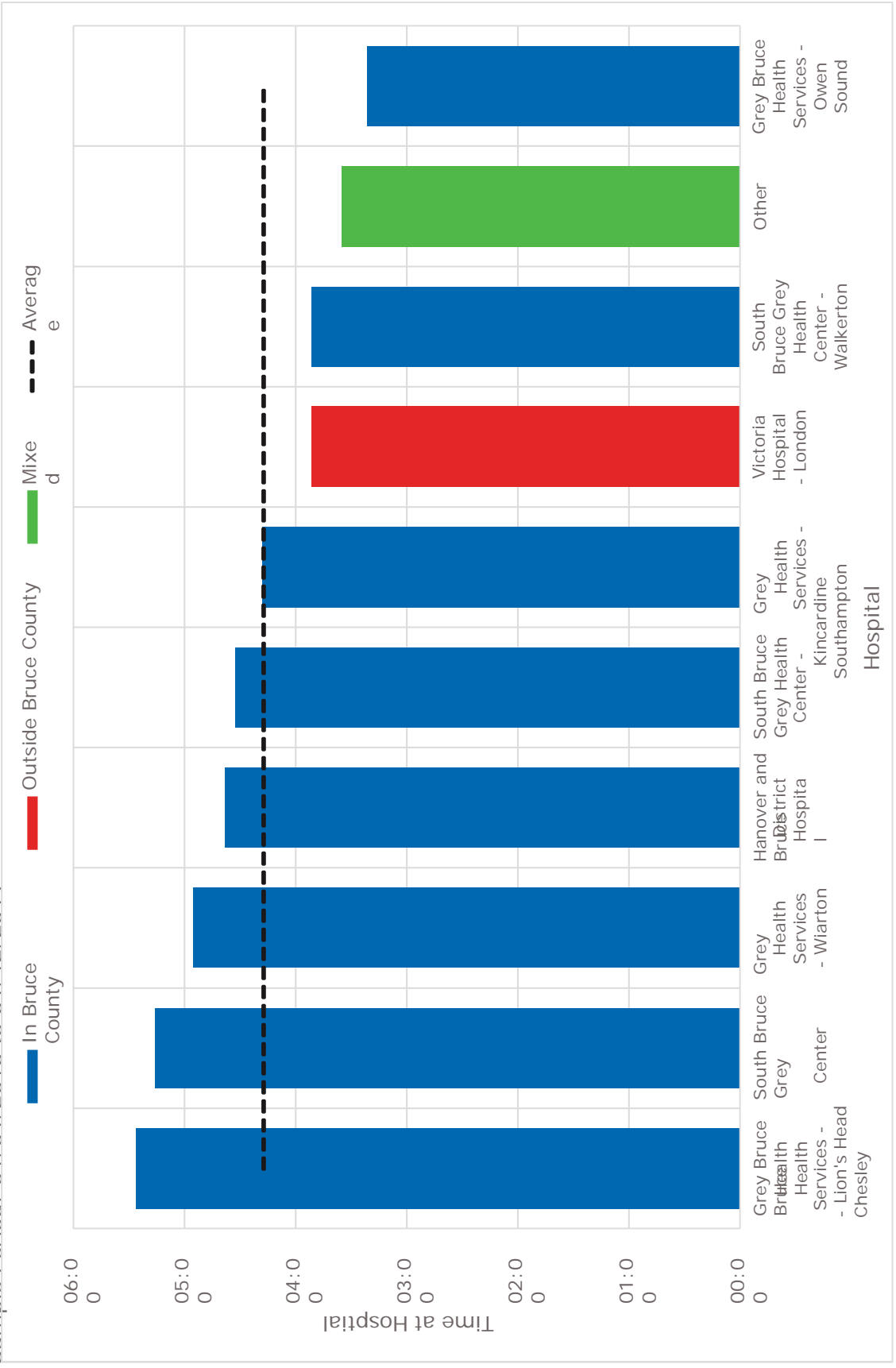
Bruce County Paramedic Services

**Demand-Resource Matching**

Sample Period: 01/01/2016 to 31/12/2019

# Standby Moves

**BCPS Station**

- Chesley
- Kincardine
- Port Elgin
- Tobermory
- Walkerton
- Wiarton

● Other Location

☐ LTM Boundaries

— Highways

Only routes with more than 1 standby move per week are included here.

Locations within 500m of a station have been snapped to the nearest stations

Tobermory

Wiarton

Port Elgin

Chesley

GREY

Kincardine

Walkerton

WELLINGTON

0 ▬▬▬ 40
kilometres

HURON
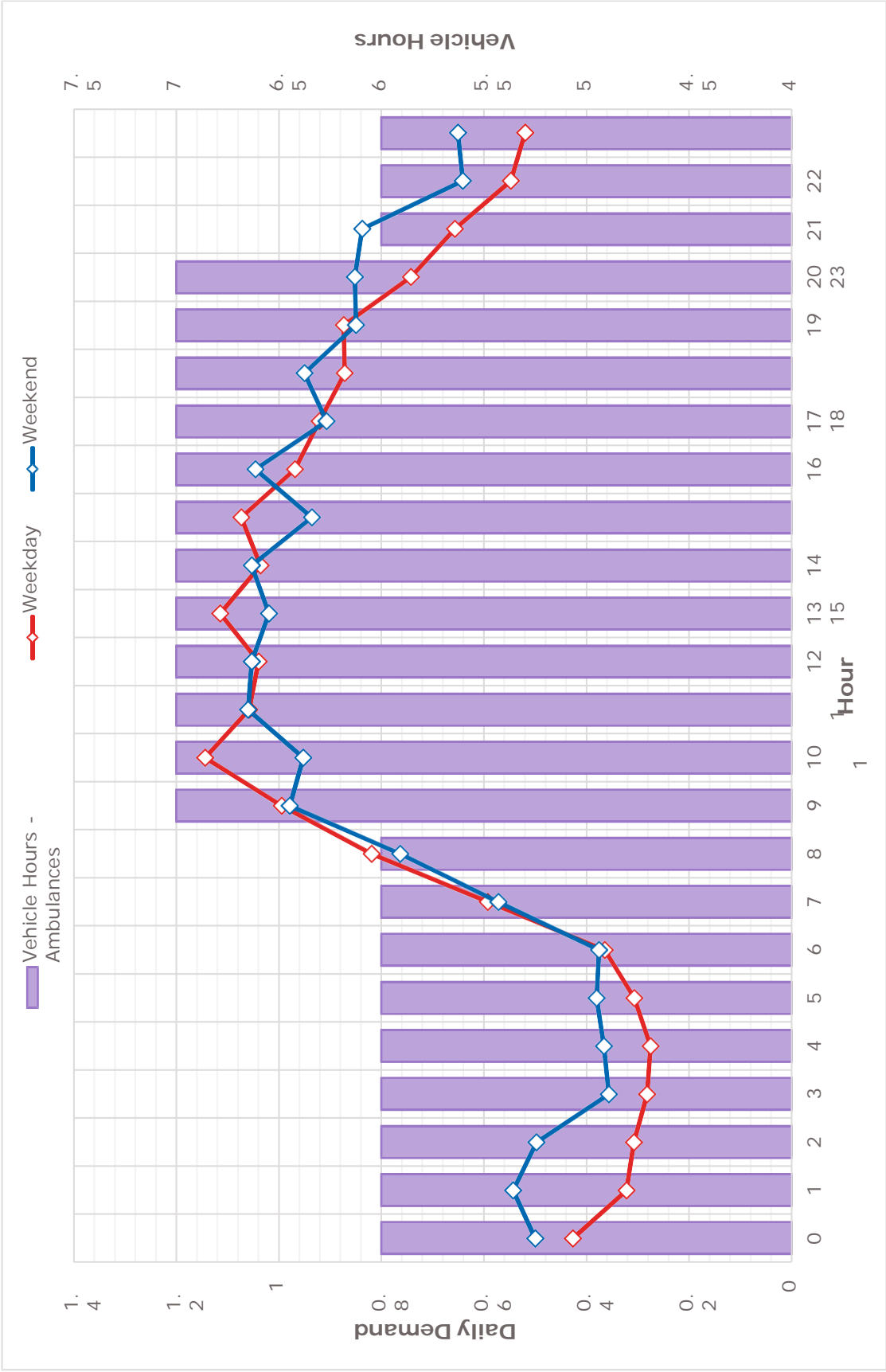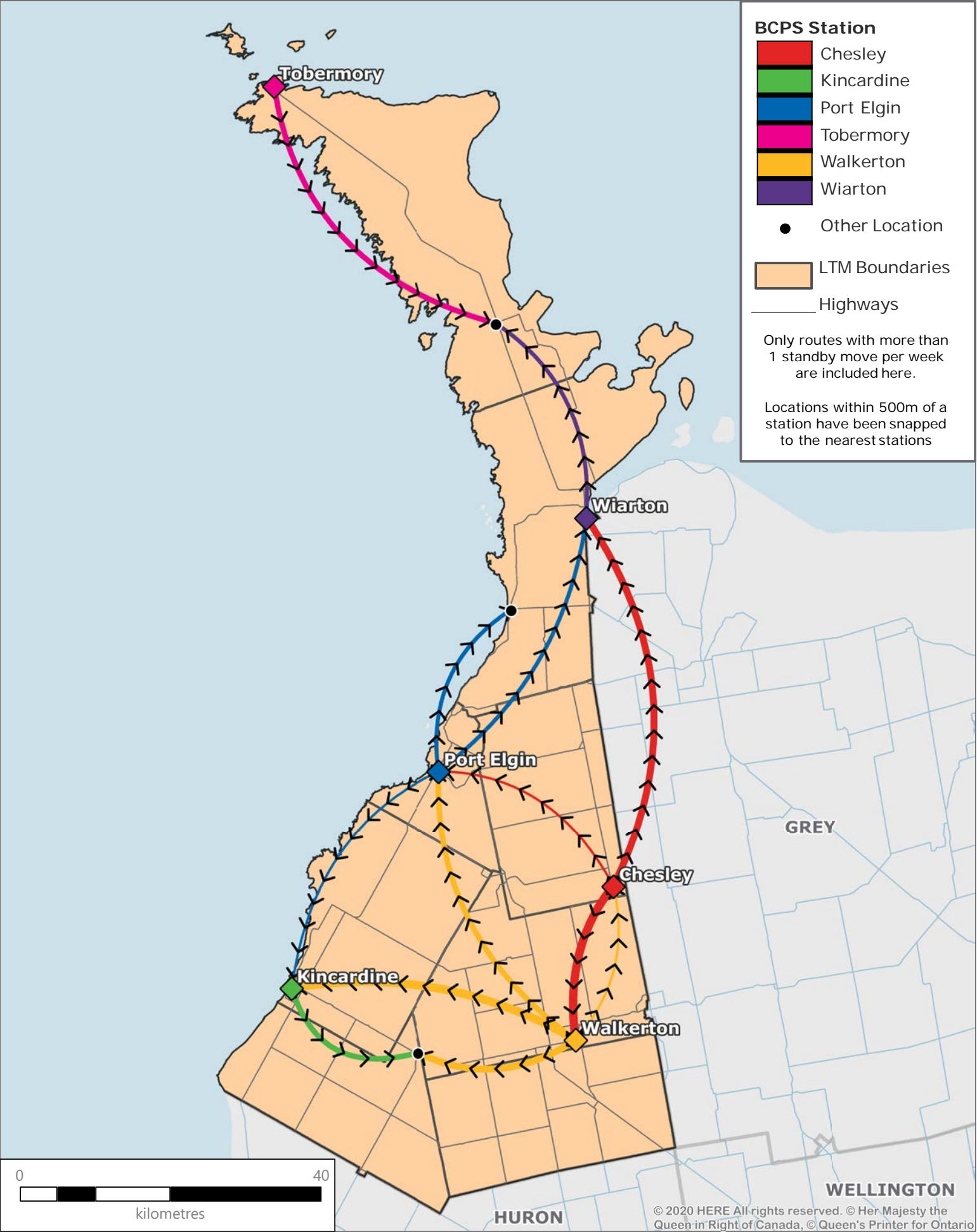
# C    Benchmarking

**C1      P4 Control Activation Time**

**C2      P4 Mobilization Time**

**C3      P4 Ambulance Time to Scene**

**C4      Ambulance Time at Scene**

**C5   Ambulance   Time   to   Hospital**

**C6   Ambulance   Time   at   Hospital**

**C7      P4 Conveyance Rate**

**C8      P4 Multiple Attendance Rate**

**C9      Ambulance Occupied Time**

Bruce County Paramedic Services

**Benchmarking: P4 Control Activation**

Sample Period: 01/01/2016 to 31/12/2019
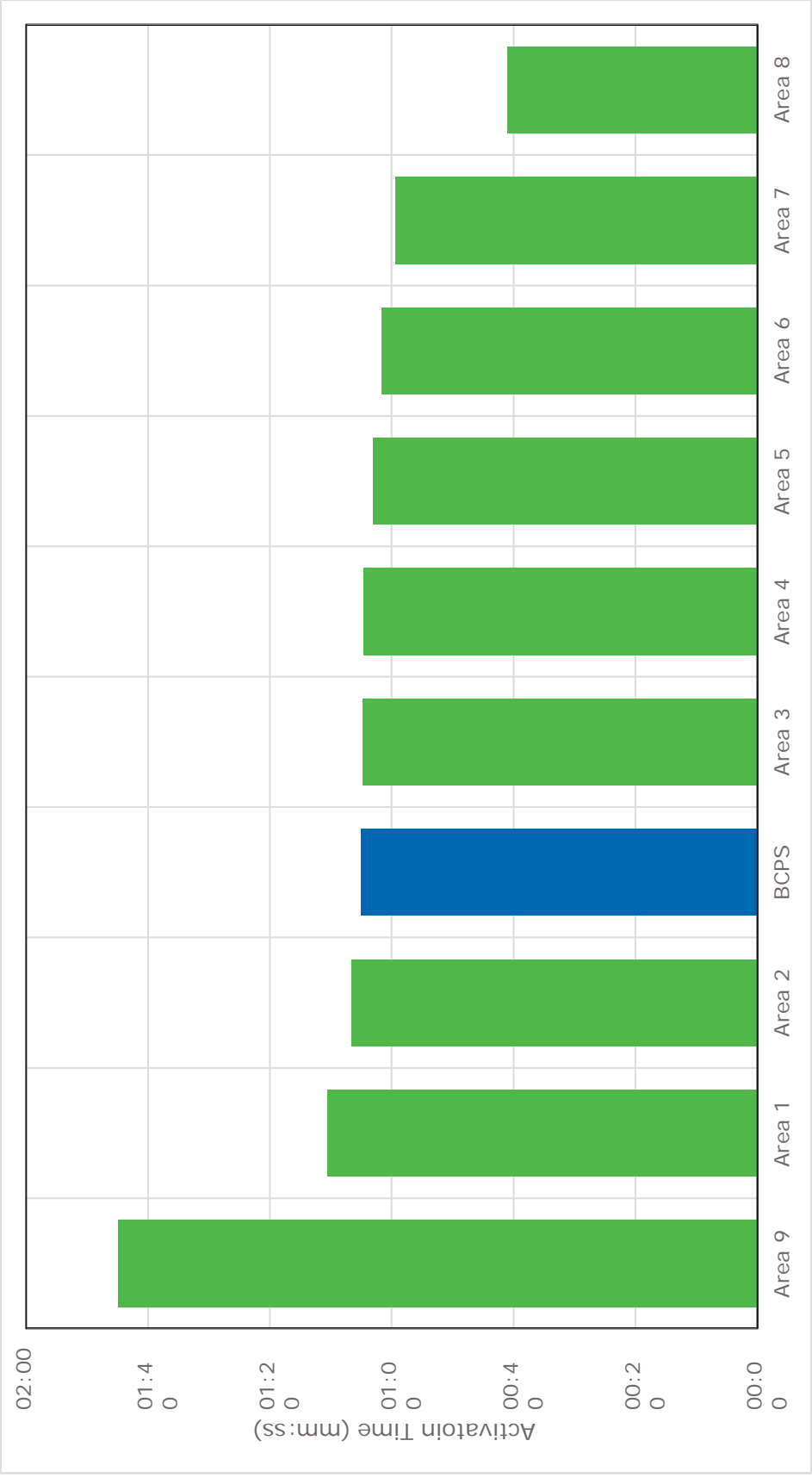


Activation time is defined as the time between T1_CallReceived and the time that the first resource is assigned to the incident.
Activation times shown are for the first resource that arrives on scene to the incident.

Bruce County Paramedic Services

**Benchmarking: P4 Mobilization Time**

Sample Period: 01/01/2016 to 31/12/2019
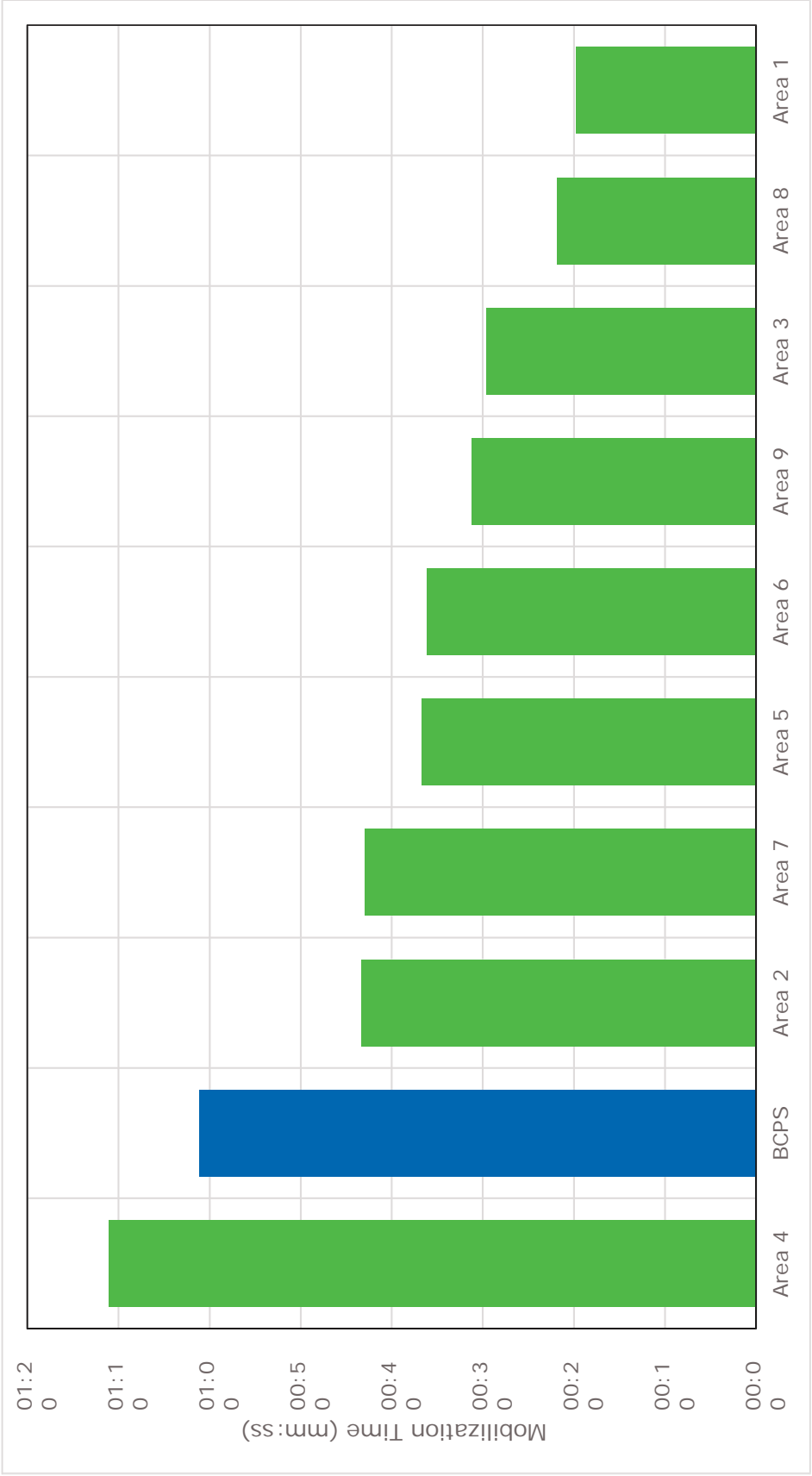


Vehicle Mobilization time is defined as the time between the resource being assigned to the incident and the resource reporting that it is en-route to the incident. Vehicle Mobilization times shown are for the first resource that arrives on scene to the incident.

Bruce County Paramedic Services

**Benchmarking: P4 Time to Scene**

Sample Period: 01/01/2016 to 31/12/2019



The Time to Scene is the average time taken from the resource reporting as en-route to the incident to the resource arriving on scene. This measure is for all responding resources to the incident.

**C3**

Bruce County Paramedic Services

**Benchmarking: Time at Scene**

Sample Period: 01/01/2016 to 31/12/2019
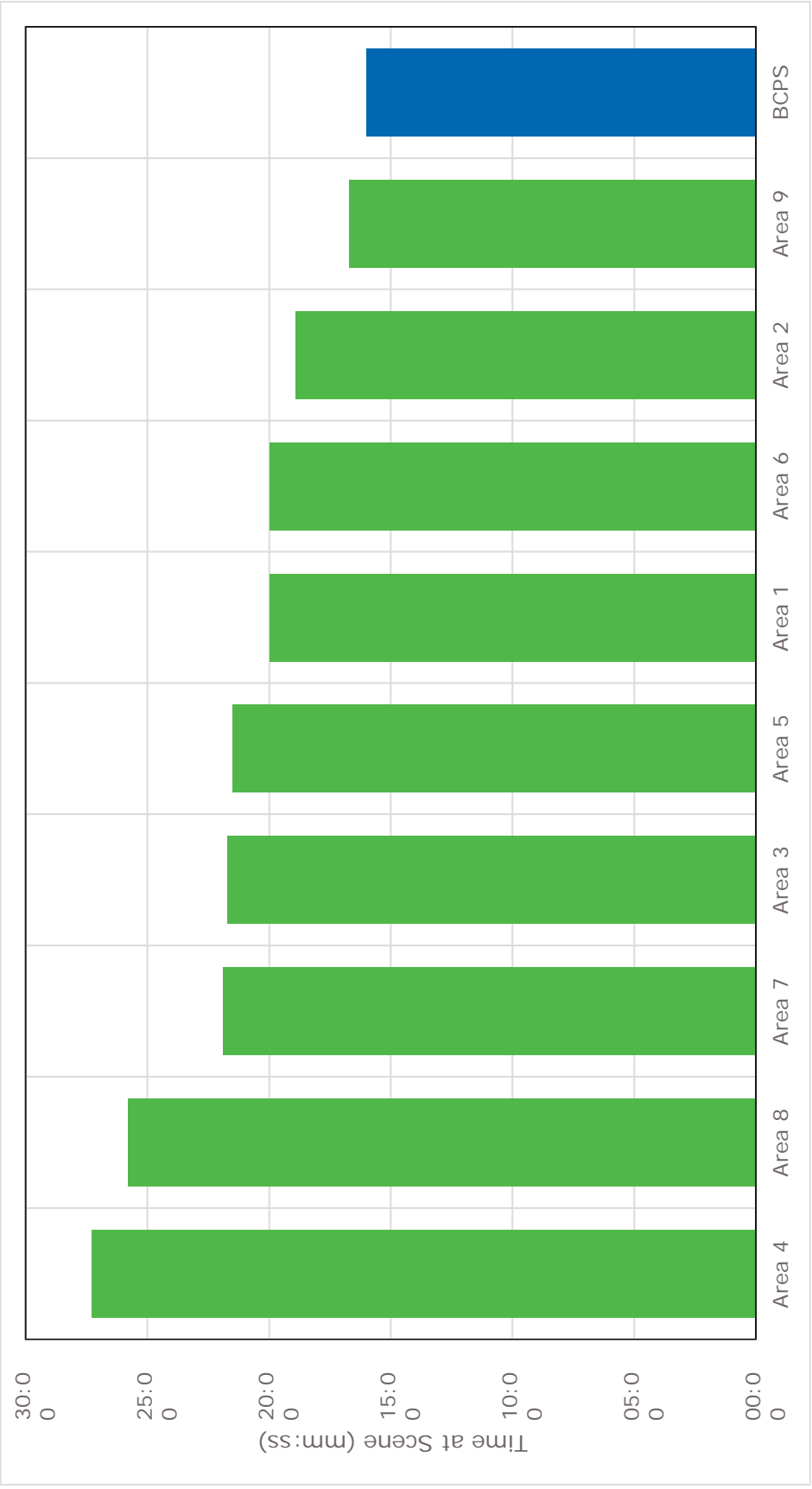


Time at Scene is the average time taken from when the resource arrives on scene to the time the resource leaves the scene. This measure is for all responding resources to the incident.

Bruce County Paramedic Services

**Benchmarking: Time to Hospital**

Sample Period: 01/01/2016 to 31/12/2019
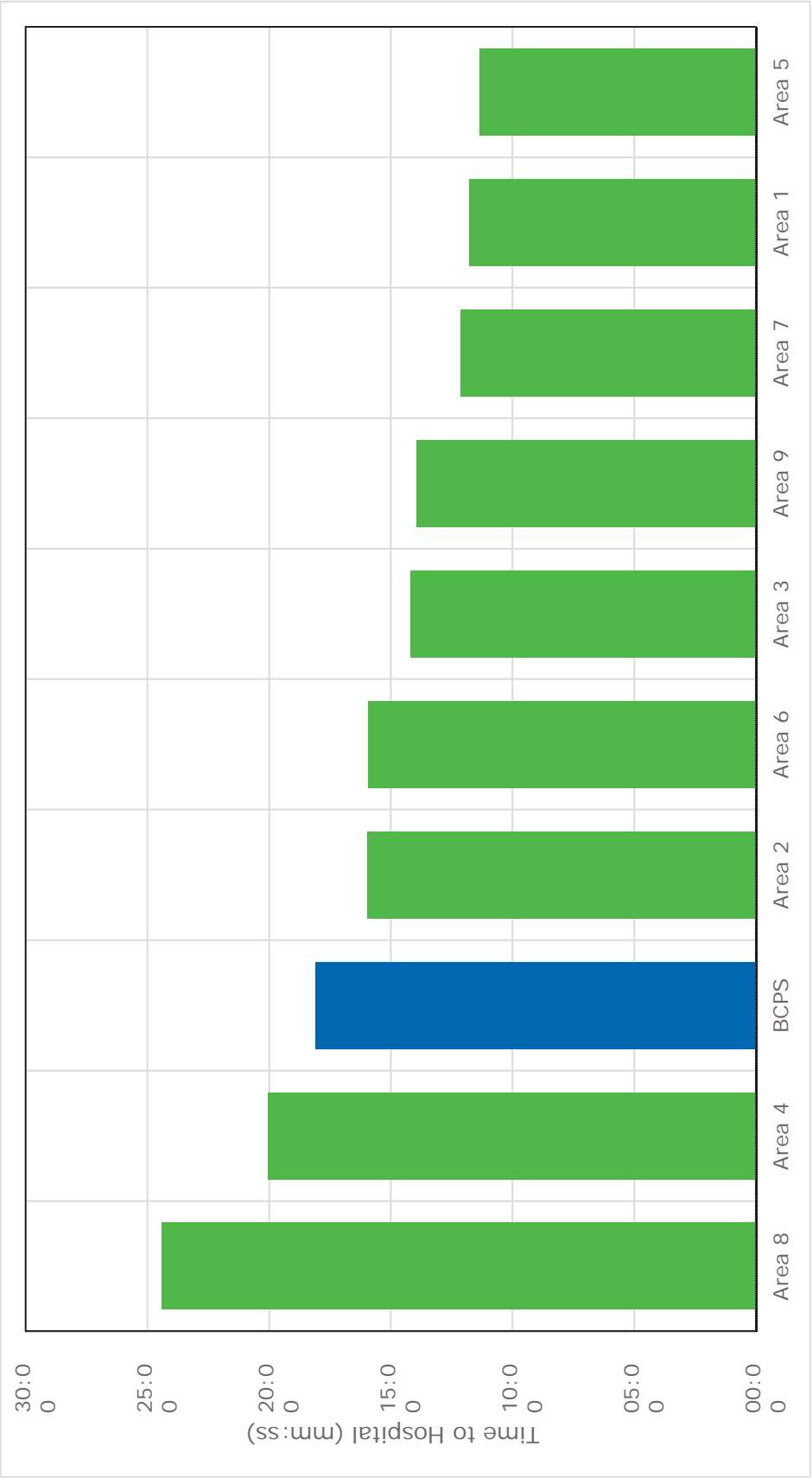


The Time to Hospital is the average time taken from when the resource leaves scene to when the resource arrives at Hospital.

Bruce County Paramedic Services

**Benchmarking: Time at Hospital**

Sample Period: 01/01/2016 to 31/12/2019
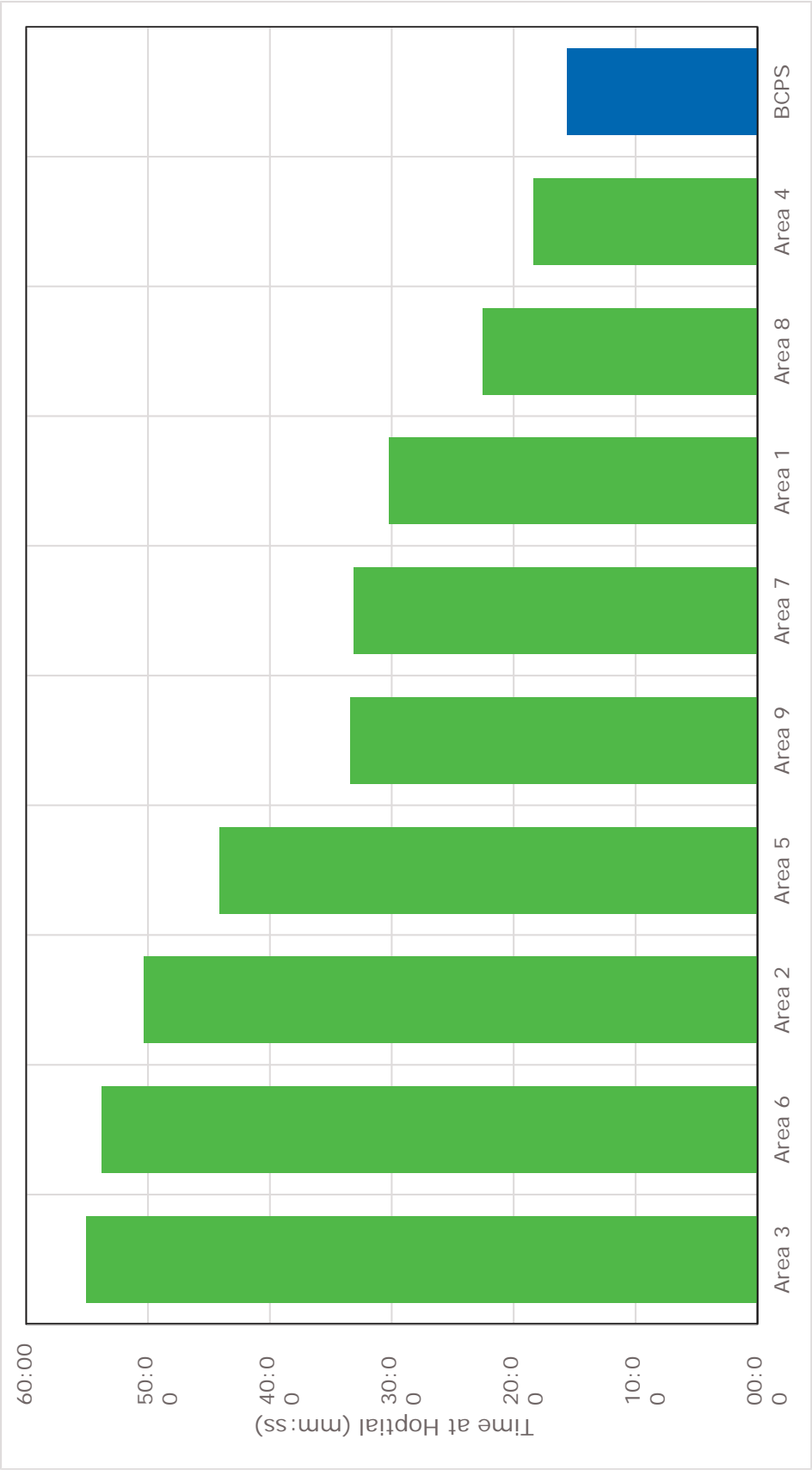


The Time at Hospital is the average time taken from when the resource arrives at hospital to when the resource is clear for the next assignment.

Bruce County Paramedic Services

**Benchmarking: P4 Conveyance Rate**

Sample Period: 01/01/2016 to 31/12/2019



The conveyance rate is the proportion of incidents (where at least one vehicle arrives on scene) that results in a patient transport to hospital.

Bruce County Paramedic Services

**Benchmarking: P4 Multiple Attendance Rate**

Sample Period: 01/01/2016 to 31/12/2019



The Multiple Attendance Ratio is the average number of resources that arrive on scene to each incident.

Bruce County Paramedic Services

**Benchmarking: Occupied Time**

Sample Period: 01/01/2016 to 31/12/2019
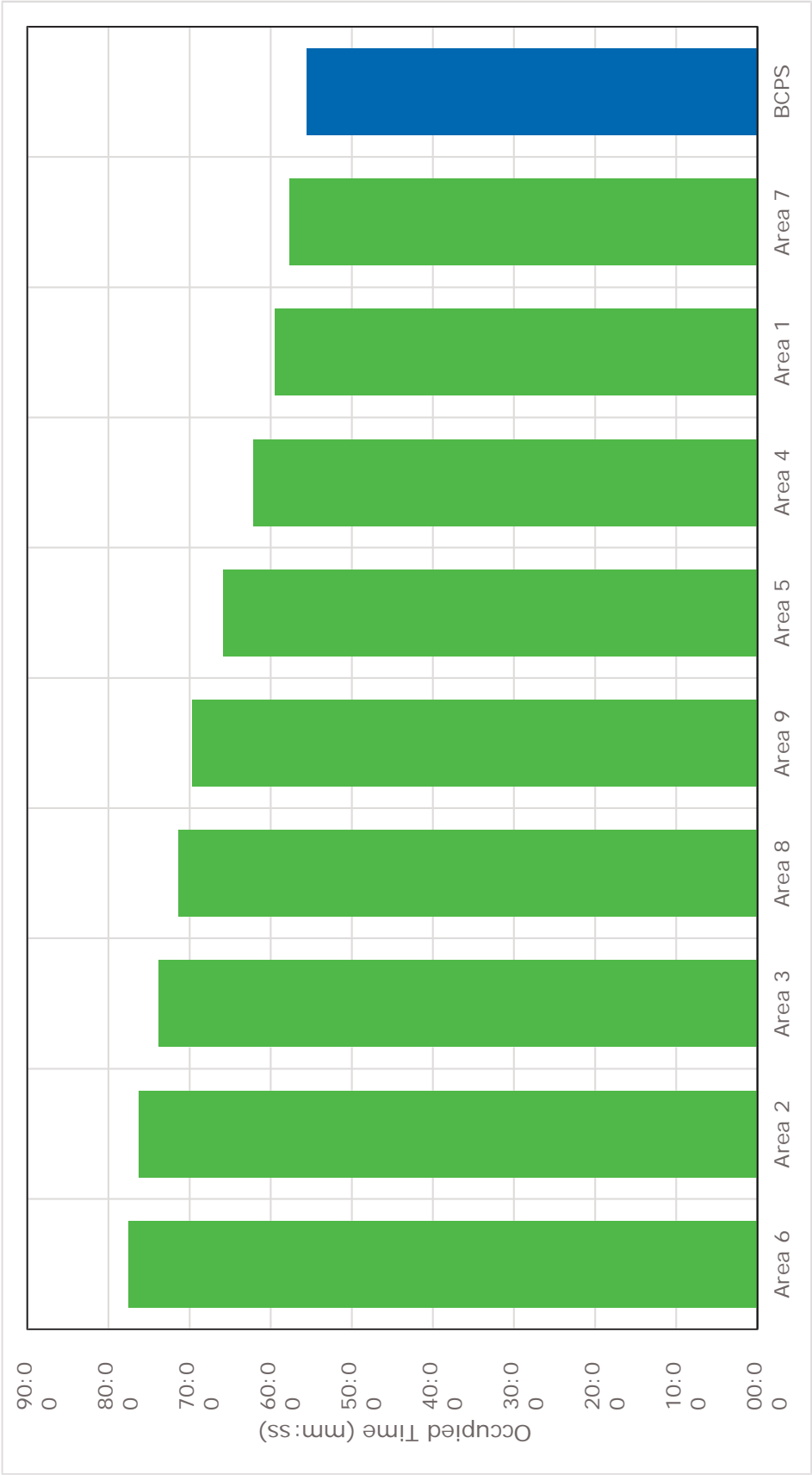


Occupied Time (mm:ss)

The Occupied Time is an average measure of the time from when the vehicle goes mobile to when the vehicle goes clear.

# D    Demand Projections

## Population Summary

### Estimated 2019 Population

| Area | Age Group | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|------|
| | 0 to 14 years | 15 to 29 years | 30 to 44 years | 45 to 59 years | 60 to 74 years | 75+ |
| Arran-Elderslie | 1,454 | 1,086 | 1,276 | 1,324 | 1,402 | 631 |
| Brockton | 1,749 | 1,522 | 1,643 | 2,092 | 2,084 | 982 |
| Huron-Kinloss | 1,454 | 1,167 | 1,175 | 1,423 | 1,780 | 757 |
| Kincardine | 2,065 | 1,781 | 2,132 | 2,352 | 2,750 | 1,205 |
| Northern Bruce Peninsula | 349 | 357 | 417 | 823 | 1,494 | 641 |
| Saugeen Shores | 2,263 | 2,094 | 2,558 | 2,850 | 3,748 | 1,612 |
| South Bruce | 1,102 | 1,062 | 985 | 1,239 | 1,105 | 438 |
| South Bruce Peninsula | 1,541 | 1,403 | 1,541 | 2,072 | 2,806 | 1,284 |
| Bruce County | 11,978 | 10,472 | 11,726 | 14,175 | 17,169 | 7,550 |

### Estimated 2029 Population

| Area | Age Group | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|------|
| | 0 to 14 years | 15 to 29 years | 30 to 44 years | 45 to 59 years | 60 to 74 years | 75+ |
| Arran-Elderslie | 1,502 | 1,175 | 1,262 | 1,176 | 1,376 | 1,018 |
| Brockton | 1,758 | 1,606 | 1,578 | 1,848 | 2,003 | 1,493 |
| Huron-Kinloss | 1,580 | 1,329 | 1,212 | 1,328 | 1,858 | 1,242 |
| Kincardine | 2,178 | 1,976 | 2,157 | 2,152 | 2,788 | 1,920 |
| Northern Bruce Peninsula | 366 | 409 | 408 | 768 | 1,566 | 906 |
| Saugeen Shores | 2,600 | 2,539 | 2,819 | 2,838 | 4,169 | 2,729 |
| South Bruce | 1,133 | 1,139 | 967 | 1,119 | 1,077 | 752 |
| South Bruce Peninsula | 1,589 | 1,530 | 1,509 | 1,863 | 2,811 | 1,881 |
| Bruce County | 12,706 | 11,704 | 11,914 | 13,092 | 17,648 | 11,940 |

### % Population Change from 2019 to 2029

| Area | Age Group | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|------|
| | 0 to 14 years | 15 to 29 years | 30 to 44 years | 45 to 59 years | 60 to 74 years | 75+ |
| Arran-Elderslie | 3.3% | 8.2% | -1.1% | -11.2% | -1.8% | 61.4% |
| Brockton | 0.5% | 5.5% | -4.0% | -11.7% | -3.9% | 52.0% |
| Huron-Kinloss | 8.6% | 13.9% | 3.1% | -6.6% | 4.4% | 64.0% |
| Kincardine | 5.5% | 11.0% | 1.2% | -8.5% | 1.4% | 59.3% |
| Northern Bruce Peninsula | 5.0% | 14.7% | -1.9% | -6.7% | 4.8% | 41.3% |
| Saugeen Shores | 14.9% | 21.2% | 10.2% | -0.4% | 11.2% | 69.3% |
| South Bruce | 2.8% | 7.3% | -1.8% | -9.7% | -2.5% | 71.7% |
| South Bruce Peninsula | 3.1% | 9.1% | -2.1% | -10.1% | 0.2% | 46.5% |
| Bruce County | 6.1% | 11.8% | 1.6% | -7.6% | 2.8% | 58.1% |

## Historical Demand Summary

*Average Annual Change in P3 and P4 Demand*

| Area | Average Annual Change (P3 and P4) | |
|---|---|---|
| | 2011 to 2019 | 2016 to 2019 |
| Arran-Elderslie | 5.2% | 8.9% |
| Brockton | 6.9% | 7.1% |
| Huron-Kinloss | 4.9% | 5.5% |
| Kincardine | 4.5% | -3.9% |
| Northern Bruce Peninsula | 4.5% | 3.2% |
| Saugeen Shores | 5.4% | 8.7% |
| South Bruce | 4.6% | 10.5% |
| South Bruce Peninsula | 4.7% | 5.6% |
| Bruce County | 5.1% | 4.7% |

**D3a**



2011 to 2019 Sample: Annual Incidents per 1,000 Population by Age Group

■ 2011　■ 2016　■ 2019　■ 2029

Age Group

Incidents per 1,000 per Year

75+

60 to 74 years

45 to 59 years

30 to 44 years

15 to 29 years

0 to 14 years

600　500　400　300　200　100　0

**D3b**
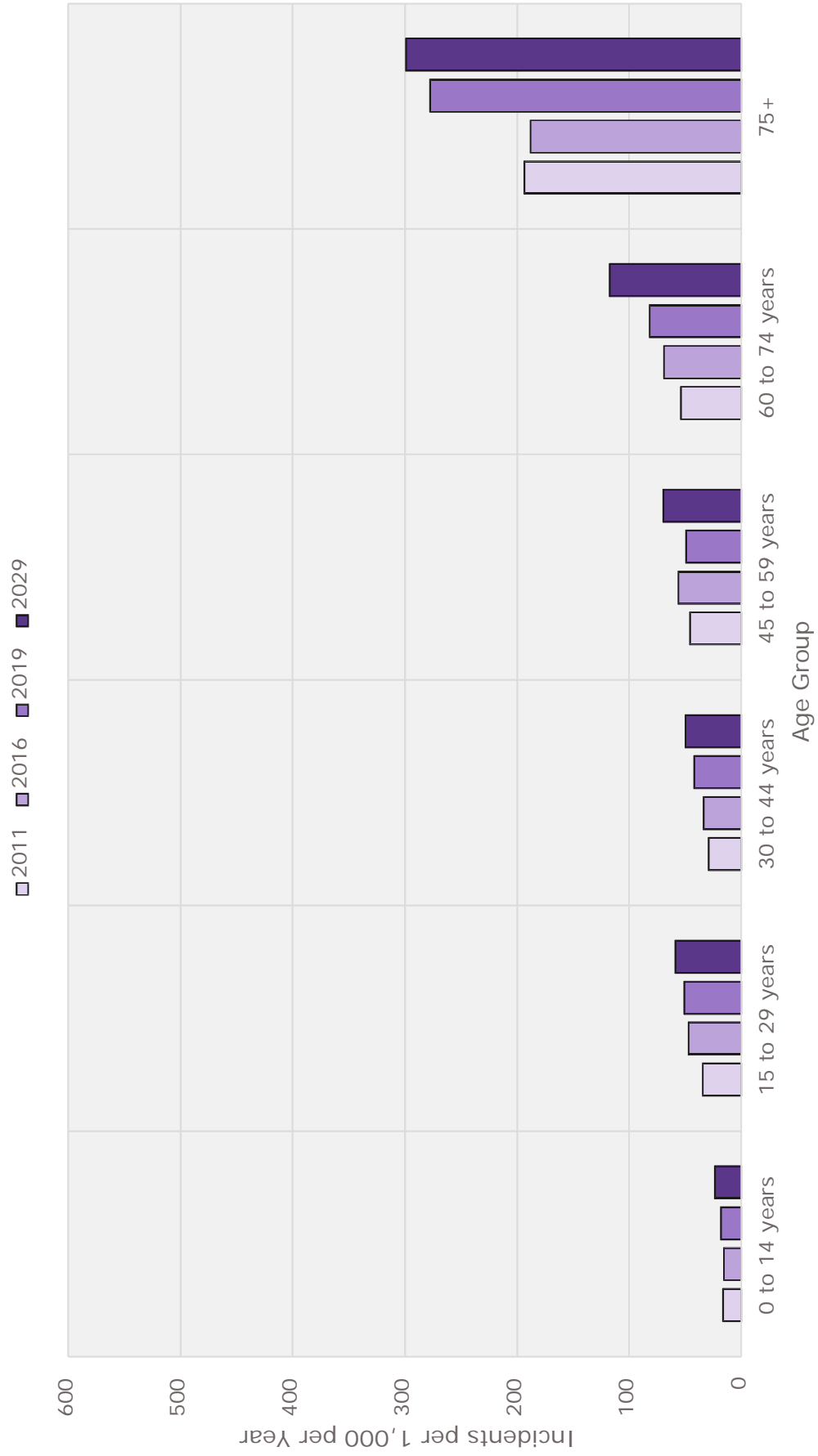


2016 to 2019 Sample: Annual Incidents per 1,000 Population by Age Group

■2016 ■2019 ■2029

Age Group

Incidents per 1,000 per Year

600 500 400 300 200 100 0

75+

60 to 74 years

45 to 59 years

30 to 44 years

15 to 29 years

0 to 14 years
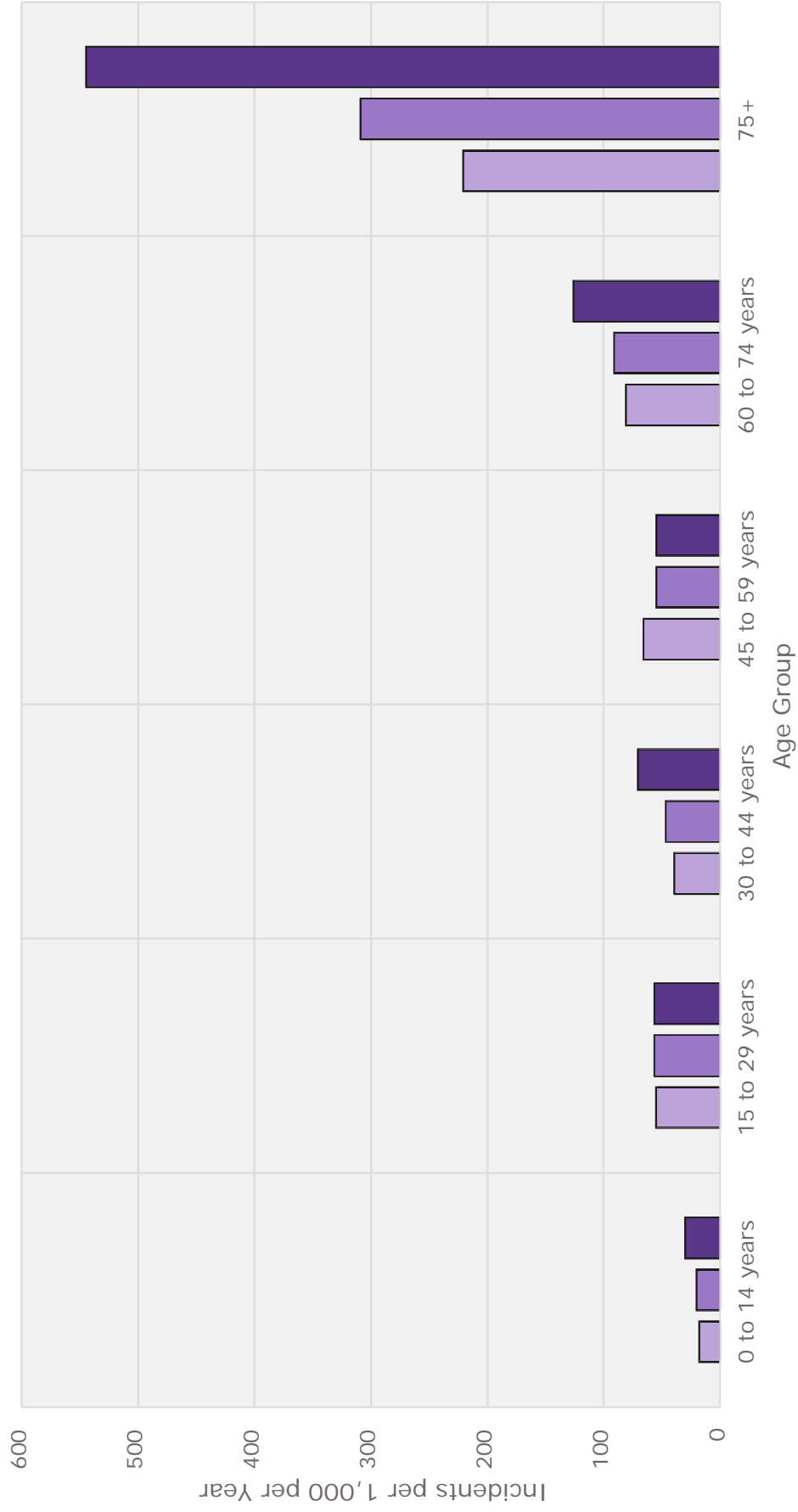
# Projected Annual Demand Change: Lower Bound

**Annual Change**

| Area | Annual Change | | | | | | | | | | Average |
|------|------|------|------|------|------|------|------|------|------|------|---------|
| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Arran-Elderslie | 4.8% | 2.7% | 2.9% | 3.0% | 3.9% | 3.8% | 3.5% | 3.2% | 3.5% | 3.8% | 3.5% |
| Brockton | 7.4% | 3.4% | 3.9% | 3.5% | 3.5% | 5.8% | 5.6% | 5.3% | 5.3% | 5.1% | 4.9% |
| Huron- | 8.3% | 3.8% | 4.3% | 3.8% | 4.0% | 4.1% | 4.1% | 5.2% | 5.3% | 5.2% | 4.8% |
| Kinloss | 8.6% | 4.3% | 4.6% | 4.3% | 4.4% | 4.5% | 4.4% | 4.1% | 4.2% | 4.1% | 4.8% |
| Kincardine | 4.3% | 2.4% | 2.7% | 2.5% | 2.8% | 3.1% | 3.0% | 2.8% | 2.8% | 2.7% | 2.9% |
| Northern Bruce | 2.9% | 3.9% | 4.2% | 3.9% | 4.3% | 4.3% | 4.2% | 4.0% | 4.2% | 4.0% | 4.0% |
| Peninsula Saugeen | 6.9% | 3.4% | 3.6% | 4.6% | 4.7% | 4.7% | 4.5% | 4.3% | 4.3% | 4.2% | 4.5% |
| Shores | 2.4% | 3.2% | 3.3% | 3.2% | 3.4% | 3.4% | 3.2% | 3.0% | 3.0% | 2.8% | 3.1% |
| Bruce County | 5.0% | 3.5% | 3.8% | 3.6% | 3.9% | 4.2% | 4.1% | 3.9% | 4.0% | 3.9% | 4.0% |

South Bruce Peninsula

**D4b**

# Projected Annual Demand Change: Upper Bound

**Annual Change**

| Area | Annual Change | | | | | | | | | | Average |
|------|------|------|------|------|------|------|------|------|------|------|---------|
| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Arran-Elderslie | 9.7% | 10.0% | 9.9% | 9.2% | 8.8% | 8.5% | 7.9% | 7.3% | 7.1% | 6.7% | 8.5% |
| Brockton | 5.7% | 8.2% | 8.8% | 8.5% | 8.6% | 8.5% | 8.3% | 7.7% | 7.8% | 7.6% | 8.0% |
| Huron- | 4.9% | 8.8% | 9.5% | 8.9% | 8.8% | 9.0% | 8.8% | 8.2% | 8.4% | 8.1% | 8.3% |
| Kinloss | 0.8% | 2.5% | 3.1% | 3.0% | 3.4% | 3.5% | 3.4% | 3.1% | 3.2% | 3.1% | 2.9% |
| Kincardine | 3.8% | 3.3% | 5.1% | 4.9% | 5.1% | 5.2% | 5.2% | 5.0% | 4.9% | 4.8% | 4.7% |
| Northern Bruce | 6.5% | 8.3% | 8.6% | 8.5% | 8.4% | 8.2% | 8.0% | 7.5% | 7.5% | 7.2% | 7.9% |
| Peninsula Saugeen | 13.3% | 9.7% | 10.4% | 9.7% | 9.3% | 9.0% | 8.6% | 8.0% | 7.9% | 7.5% | 9.3% |
| Shores | 4.8% | 6.1% | 6.2% | 6.0% | 6.0% | 5.9% | 5.6% | 5.3% | 5.2% | 4.9% | 5.6% |
| South County Bruce | 5.1% | 6.6% | 7.2% | 6.9% | 7.0% | 7.0% | 6.7% | 6.3% | 6.4% | 6.1% | 6.5% |

South Bruce Peninsula

**Development Information**

| LTM | Settlement | Name | Status | Total Units | | Likelihood | |
|---|---|---|---|---|---|---|---|
| | | | | High Range | Low Range | Likely to be fully or partially built out by 2030 | Likely to be built out after 2030 |
| Arran-Elderslie | Chesley | Finmore | Draft Approved | 120 | 60 | Unknown | Y |
| Arran-Elderslie | Tara | Healy (now Barry's Construction) | Draft Approved | 59 | 55 | Y | Y |
| Brockton | rural | Westerhaut | Draft Approved | 6 | 6 | Unknown | Unknown |
| Brockton | Walkerton | Barry's Hilltop | Draft Approved, seeking Redline Revisions | 114 | 114 | Y | |
| Brockton | Walkerton | Clancy Westwood 2 | Draft Approved | 216 | 216 | Y | |
| Brockton | Walkerton | Shah | Preconsultation | 78 | 78 | Y | |
| Huron-Kinloss | Lakeshore Residential Area | Bogdanovich Crimson Oak | Draft Approved | 77 | 77 | Y | |
| Huron-Kinloss | Lakeshore Residential Area | Kempton | Draft Approved | 9 | 9 | Y | |
| Huron-Kinloss | Lucknow | n/a | Preconsultation | 73 | 73 | Y | |
| Huron-Kinloss | Ripley | Brown | Draft Approved | 110 | 110 | Unknown | Unknown |
| Kincardine | Lakeshore Residential Area | West Ridge on the Lake | Draft Approved | 447 | 373 | Y | Y |
| Kincardine | Town of Kincardine | David Brown | Draft Approved | 181 | 181 | Y | |
| North Bruce Peninsula | Lion's Head | Harvey Warder | Draft Approved | 63 | 63 | Unknown | Unknown |
| North Bruce Peninsula | Lots 22 to 24 Con 3 WBR Eastnor Twp | Lakewood | Draft Approved | 62 | 62 | Y | Y |
| North Bruce Peninsula | Tobermory | Brent Robins/Pine Ridge Estates Craig | Evaluation | 49 | 49 | N | Unknown |
| North Bruce Peninsula | Tobermory | Adams/Kevin Doyle/Woodlands | Draft Approved | 14 | 14 | N | Unknown |
| Saugeen Shores | Lots 47 to 50 Lake Range Saugeen | Woodlands | Draft Approved, partially registered | 55 | 35 | Unknown | Unknown |
| Saugeen Shores | Port Elgin | Lake Ridge Estates | Draft Approved | 192 | 192 | Y | Y |
| Saugeen Shores | Port Elgin | Market Street | Evaluation | 210 | 210 | Unknown | |
| Saugeen Shores | Port Elgin | Northport | Draft Approved, partially registered | 190 | 128 | Y | |
| Saugeen Shores | Port Elgin | Redhawk/Westlinks | Draft Approved, partially registered | 199 | 199 | Y | |
| Saugeen Shores | Port Elgin | Summerside | Draft Approved, partially registered | 1,078 | 817 | Y | |
| Saugeen Shores | Southampton | Castle Village | Draft Approved | 81 | 81 | Y | Y |
| Saugeen Shores | Southampton | Georgian Huron Developments | Draft Approved | 73 | 73 | Y | |
| Saugeen Shores | Southampton | Hampton Woods | Draft Approval | 155 | 155 | Y | |
| Saugeen Shores | Southampton | Junevall | Draft Approved | 41 | 41 | Unknown | Unknown |
| Saugeen Shores | Southampton | Kruckberg | Draft Approved | 18 | 18 | Unknown | |
| Saugeen Shores | Southampton | Leslie | Draft Approved | 15 | 15 | Y | |
| Saugeen Shores | Southampton | McMillan Murray | Draft Approved, partially registered | | | Y | |
| South Bruce | Mildmay | Dent | Evaluation | 142 | 142 | Y | |
| South Bruce | Mildmay | Knox Weiss | Draft Approved, partially registered | 20 | 20 | Y | |
| South Bruce Peninsula | Lot 5 Con 6 WBR Albemarle | Pfleugl (now McKean) | Draft Approved | 7 | 7 | Y | |
| South Bruce Peninsula | Oliphant | Bryan & Beverly Patterson 851758 | Draft Approved | 10 | 10 | Unknown | Unknown |
| South Bruce Peninsula | Sauble Beach | Ont Ltd/Alan Aston/Valdor George | Draft Approved | 30 | 30 | Unknown | Unknown |
| South Bruce Peninsula | Sauble Beach | Wands/Vince Artuso Kendan | Draft Approved | 30 | 30 | Unknown | Unknown |
| South Bruce Peninsula | Sauble Beach | Holdings/Gremik East Rallis | Evaluation STALE | 36 | 36 | N | N |
| South Bruce Peninsula | Sauble Falls | Barry Kruisselbrink/Vista View | Draft Approved | 6 | 6 | Unknown | Unknown |
| South Bruce Peninsula | Wiarton | Barrys Construction & Insultation | Draft Approved | 45 | 45 | Y | Y |
| South Bruce Peninsula | Wiarton | | Draft Approved | 46 | 46 | Unknown | Unknown |

# Projected Demand: All Developments

**D5b**

**Annual Demand**

250

125

25

Tobermory

Wiarton

Port Elgin

Port Elgin

Chesley

GREY

Kincardine

Walkerton

HURON

0        30
kilometres

# E Model Validation and Base Position

# AmbSim
## ORH Ambulance Simulation Model
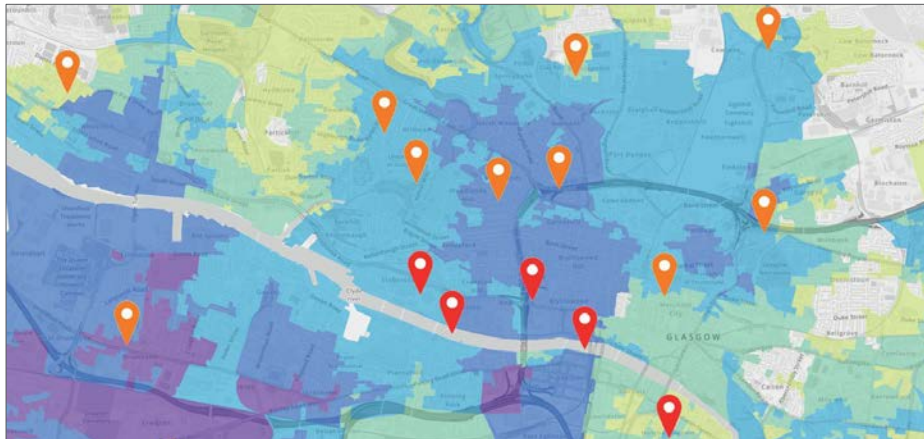
# Simulating potential changes and understanding their impacts

## KEY FACTS

· Used in numerous studies worldwide

· Built on historical analysis

· Validated against known operations

· Risk-free environment for testing

· Evidence base for change

## ABOUT AMBSIM

AmbSim is a simulation model that replicates the key characteristics of an ambulance service to predict future behaviour and performance under a variety of different scenarios. AmbSim is used by ORH consultants for ambulance service reviews, and in-house by services worldwide.

## AMBSIM'S APPROACH

Demand is generated in AmbSim in accordance with historical data. Vehicles within the model respond to this demand according to their proximity and the desired dispatch protocols; dispatch rules can be based on any combination of categorization systems, resource types and staff skills.

ORH analyzes Automatic Vehicle Location data to understand variation in road speeds by time, location, road classification and vehicle type. These are fed into the model to ensure that travel times accurately replicate reality.

Resources within AmbSim can reflect both actual and planned rosters. This allows the user to identify required changes in resource levels/balance in specific detail.

Time components of the job cycle are based on historical analysis and differ by location, day, hour, category, and vehicle type. Along with demand and resourcing, the user can vary these parameters to assess different scenarios.

## APPLICATION

AmbSim can be used to devise optimal operational models and resourcing by location, time, vehicle type and staff skill. Different demand levels and combinations of operational parameters can be incorporated to provide an evidence base for informed decision making. Inputs and parameters are flexible and can be updated to reflect changes that are within the control of the service and those that are external, such as hospital configuration.

**Emergency Service Planning**
Data Sheet

www.orhltd.com
t.+44 (0)118 959 6623

ORH
PLAN. PREPARE. PERFORM.
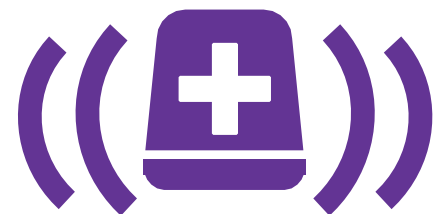
Bruce County Paramedic Services

**AmbSim Validation: P4 Response Time Distribution**

Measured From Time of Call

Cumulative Performance

Response Time (Minutes)

— Analysed Position    — Validated Position

E2a
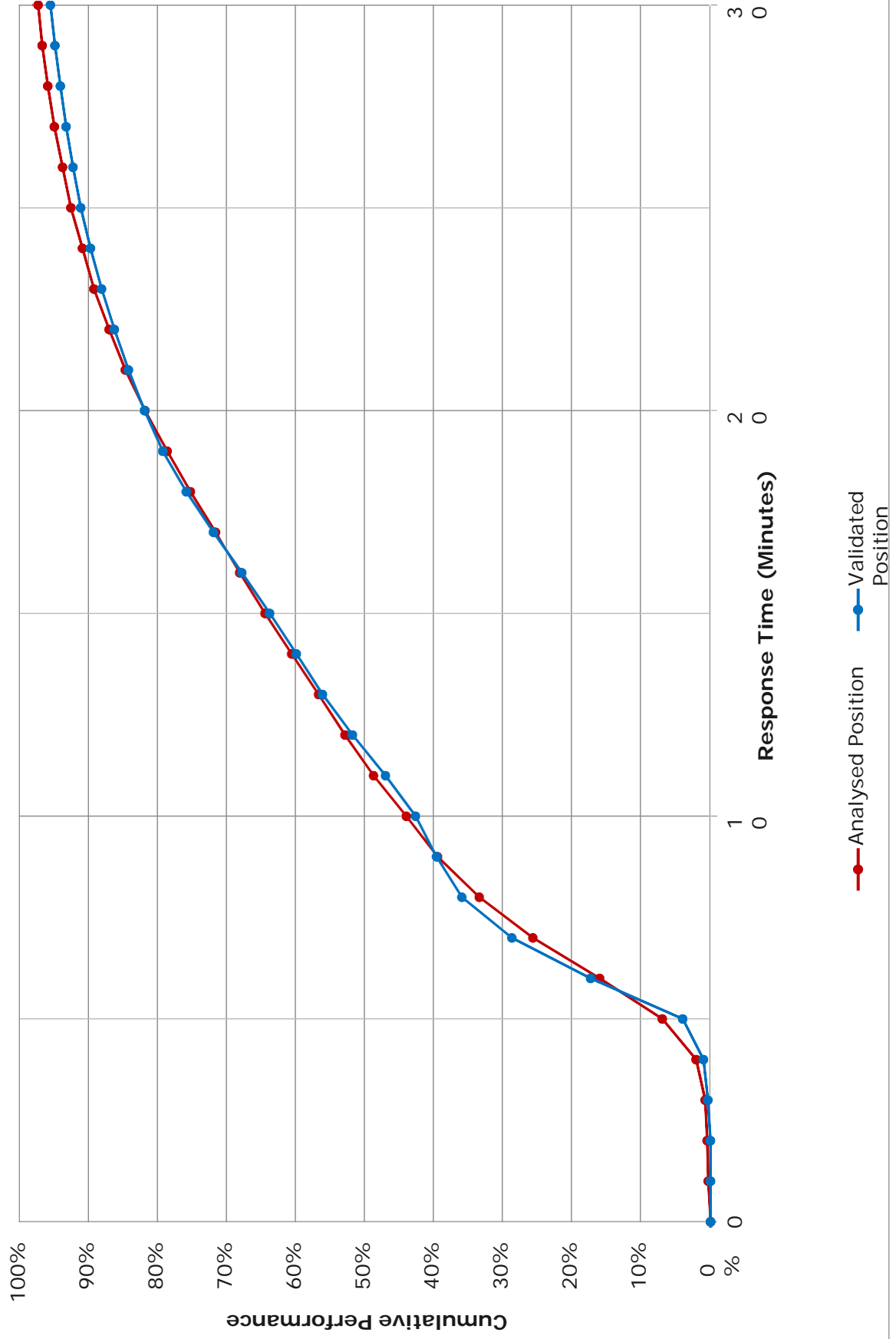
Bruce County Paramedic Services

**AmbSim Validation: Utilisation by Hour of Day**

Measured From Time of Call

Analysed Position - Ambulance

Validated Position - Ambulance

E2b
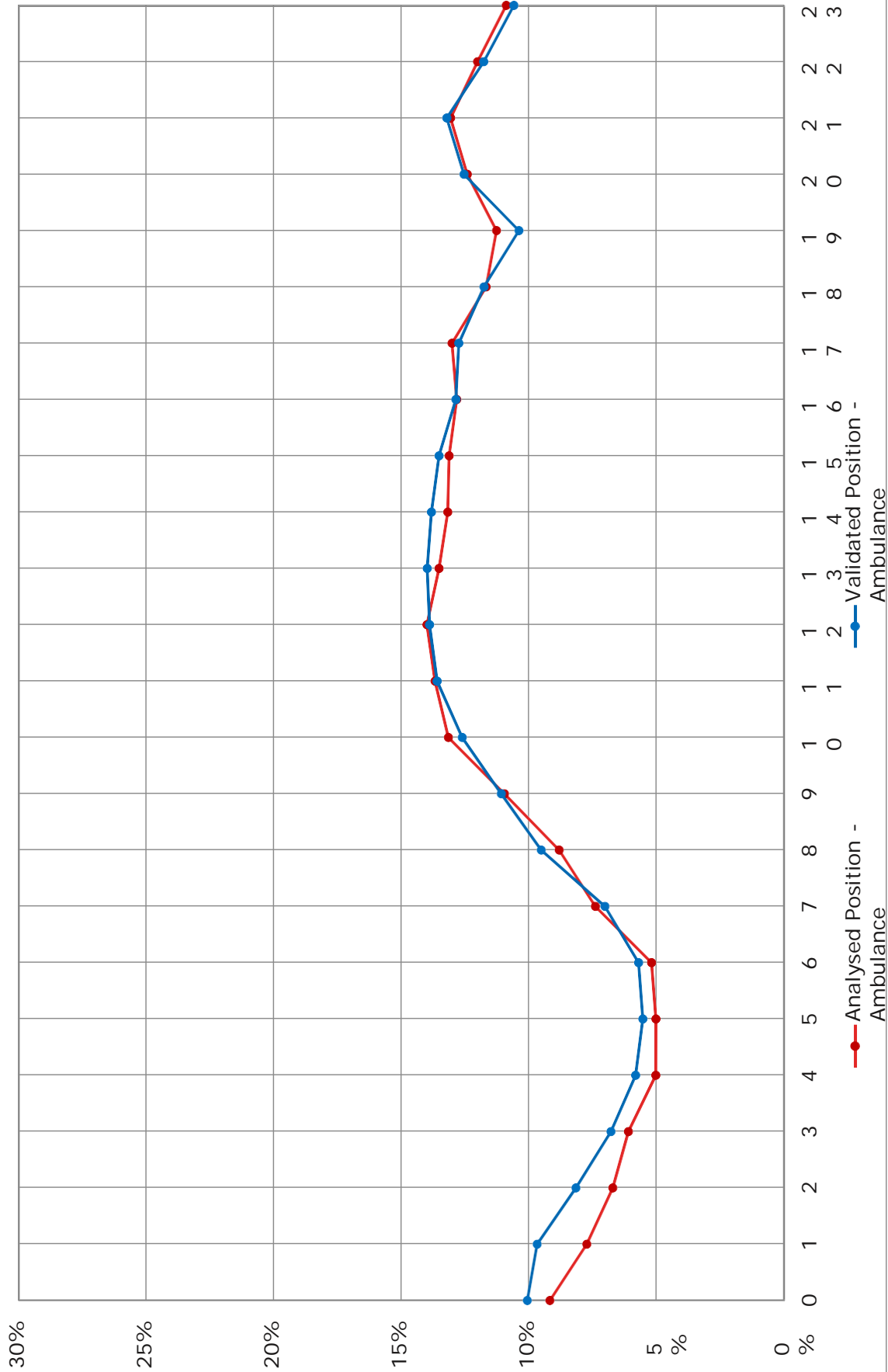
Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Of Call

*Base Position 2020*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 33.2% | 39.5% | 50.1% | 14:03 | 22:13 |
| Brockton | 59.5% | 73.8% | 89.3% | 09:25 | 15:20 |
| Huron-Kinloss | 1.3% | 7.0% | 30.0% | 17:15 | 23:20 |
| Kincardine | 46.7% | 60.3% | 77.4% | 10:58 | 20:10 |
| Northern Bruce Peninsula | 19.6% | 25.4% | 33.9% | 20:09 | 31:13 |
| Saugeen Shores | 40.5% | 56.4% | 85.4% | 10:42 | 17:39 |
| South Bruce | 2.7% | 13.3% | 73.2% | 13:35 | 19:06 |
| South Bruce Peninsula | 26.7% | 33.2% | 51.0% | 15:14 | 25:05 |
| Out of Area | 13.6% | 21.4% | 47.0% | 16:44 | 25:00 |
| **Bruce County** | **34.0%** | **44.9%** | **65.5%** | **13:15** | **23:39** |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

*Base Position 2020*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

Bruce County Paramedic Services

**Model Results: P4 Response Performance From Time Unit Notified**

Peak Performance 2020

*Base Position 2020*

| LTM | P4 Performance | | | | |
| --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

*Peak Performance 2020*

| LTM | P4 Performance | | | | |
| --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 38.6% | 43.7% | 61.5% | 11:52 | 19:54 |
| Brockton | 74.8% | 82.6% | 92.9% | 06:56 | 13:17 |
| Huron-Kinloss | 5.4% | 16.3% | 51.1% | 15:10 | 20:29 |
| Kincardine | 59.0% | 64.7% | 83.1% | 09:13 | 18:01 |
| Northern Bruce Peninsula | 27.5% | 32.6% | 42.8% | 18:14 | 31:09 |
| Saugeen Shores | 53.4% | 70.9% | 89.2% | 08:52 | 15:57 |
| South Bruce | 12.5% | 44.5% | 80.5% | 11:44 | 17:08 |
| South Bruce Peninsula | 27.5% | 32.7% | 53.8% | 13:44 | 23:03 |
| Out of Area | 22.8% | 33.3% | 61.0% | 12:53 | 21:58 |
| **Bruce County** | **41.4%** | **51.1%** | **70.1%** | **11:40** | **22:16** |

*Difference*

| LTM | P4 Performance | | | | |
| --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | -1.5% | -0.9% | -0.2% | 00:13 | 00:07 |
| Brockton | -0.6% | 0.1% | -0.7% | 00:14 | 00:19 |
| Huron-Kinloss | -0.4% | 1.9% | 3.3% | -00:09 | -00:06 |
| Kincardine | -2.8% | -2.8% | -0.9% | 00:18 | 00:06 |
| Northern Bruce Peninsula | 2.1% | 2.3% | 4.8% | 00:24 | 02:34 |
| Saugeen Shores | -2.2% | -1.4% | -1.2% | 00:19 | 01:10 |
| South Bruce | 1.2% | 1.4% | -1.6% | 00:13 | 00:25 |
| South Bruce Peninsula | -6.0% | -6.2% | -5.0% | 00:54 | 00:12 |
| Out of Area | 0.8% | 1.0% | -1.1% | -00:27 | 00:15 |
| **Bruce County** | **-3.8%** | **-3.4%** | **-2.9%** | **00:46** | **01:09** |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Off Peak Performance 2020

### Base Position 2020

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

### Off Peak Performance 2020

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.6% | 44.9% | 61.4% | 11:35 | 19:43 |
| Brockton | 75.7% | 82.5% | 93.9% | 06:38 | 12:53 |
| Huron-Kinloss | 6.1% | 13.5% | 46.2% | 15:24 | 20:37 |
| Kincardine | 62.9% | 68.4% | 84.1% | 08:50 | 17:54 |
| Northern Bruce Peninsula | 22.9% | 27.6% | 33.1% | 18:04 | 27:53 |
| Saugeen Shores | 56.5% | 72.9% | 90.7% | 08:27 | 14:37 |
| South Bruce | 10.5% | 42.2% | 82.0% | 11:35 | 16:44 |
| South Bruce Peninsula | 36.2% | 41.8% | 61.4% | 12:26 | 22:44 |
| Out of Area | 21.5% | 31.6% | 62.1% | 13:41 | 21:44 |
| **Bruce County** | **46.7%** | **55.8%** | **74.0%** | **10:38** | **20:48** |

### Difference

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 0.4% | 0.2% | -0.3% | -00:04 | -00:03 |
| Brockton | 0.2% | -0.1% | 0.2% | -00:04 | -00:05 |
| Huron-Kinloss | 0.3% | -0.9% | -1.5% | 00:05 | 00:02 |
| Kincardine | 1.0% | 0.9% | 0.2% | -00:05 | -00:01 |
| Northern Bruce Peninsula | -2.5% | -2.7% | -4.9% | 00:14 | -00:42 |
| Saugeen Shores | 1.0% | 0.6% | 0.3% | -00:07 | -00:10 |
| South Bruce | -0.8% | -1.0% | -0.1% | 00:04 | -00:00 |
| South Bruce Peninsula | 2.7% | 2.9% | 2.6% | -00:25 | -00:06 |
| Out of Area | -0.5% | -0.8% | -0.1% | 00:21 | 00:01 |
| **Bruce County** | **1.5%** | **1.3%** | **1.0%** | **-00:16** | **-00:19** |

# F    Station Configuration

# Station Optimization: 7 to 10 Stations
## BCPS Responded Demand

**F1**

**Station Locations**
◆ Current Station

**Optimal Locations**
◆ 7 Stations
◆ 8 Stations
◆ 9 Stations
◆ 10 Stations

**Demand**
● 500
● 250
• 50

Tobermory

Wiarton

Port Elgin

Chesley

GREY

Kincardine

Walkerton

WELLINGTON

0      40
kilometres

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ORH
PLAN. PREPARE. PERFORM.
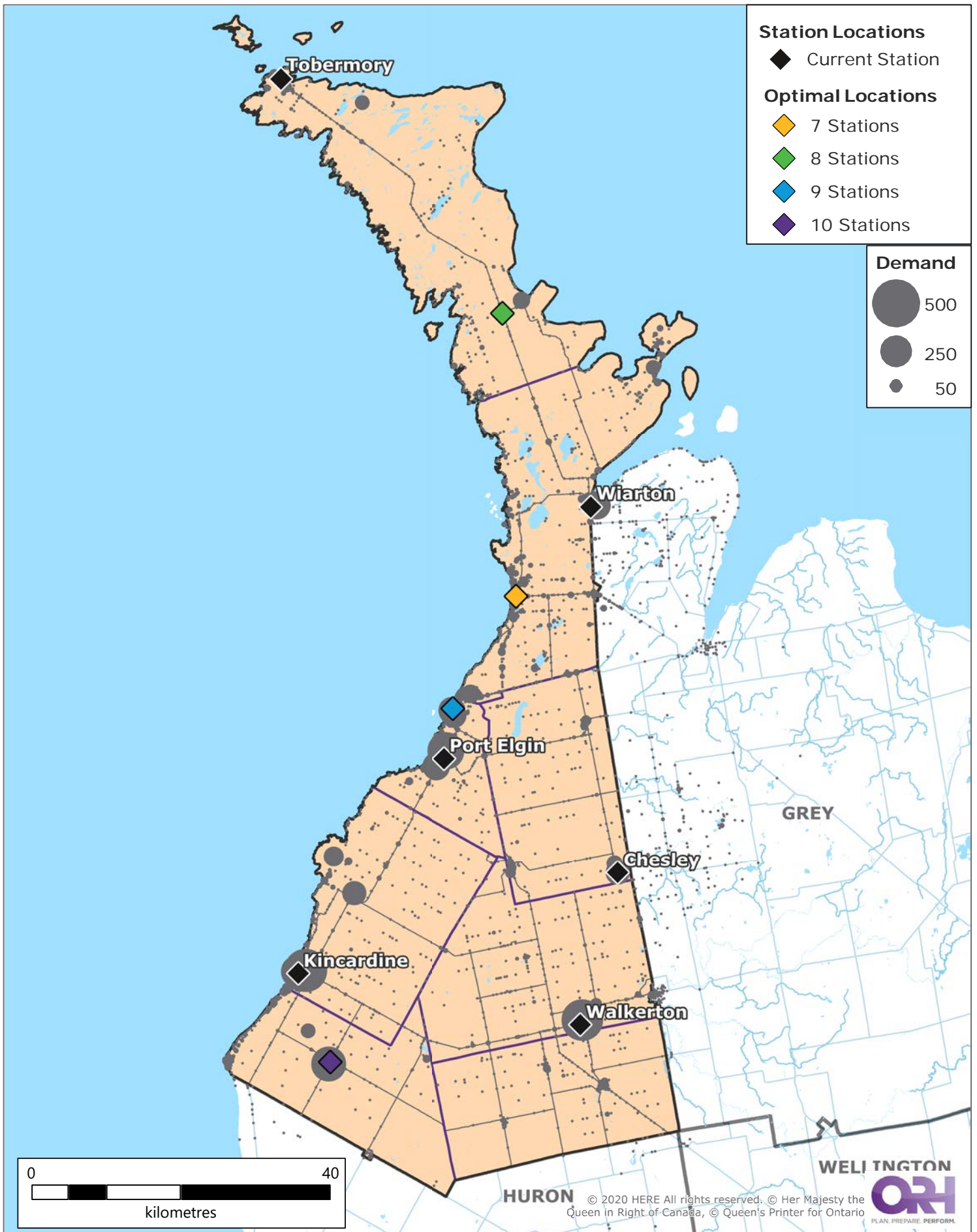
# Station Optimization: 7 to 10 Stations
All Demand in Bruce County

**Station Locations**
◆ Current Station

**Optimal Locations**
◆ 7 Stations
◆ 8 Stations
◆ 9 Stations
◆ 10 Stations

**Demand**
● 500
● 250
● 50

Tobermory

Wiarton

Port Elgin

GREY

Chesley

Kincardine

Walkerton

WELLINGTON

HURON

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ORH
PLAN. PREPARE. PERFORM.

0 ——————— 40
kilometres
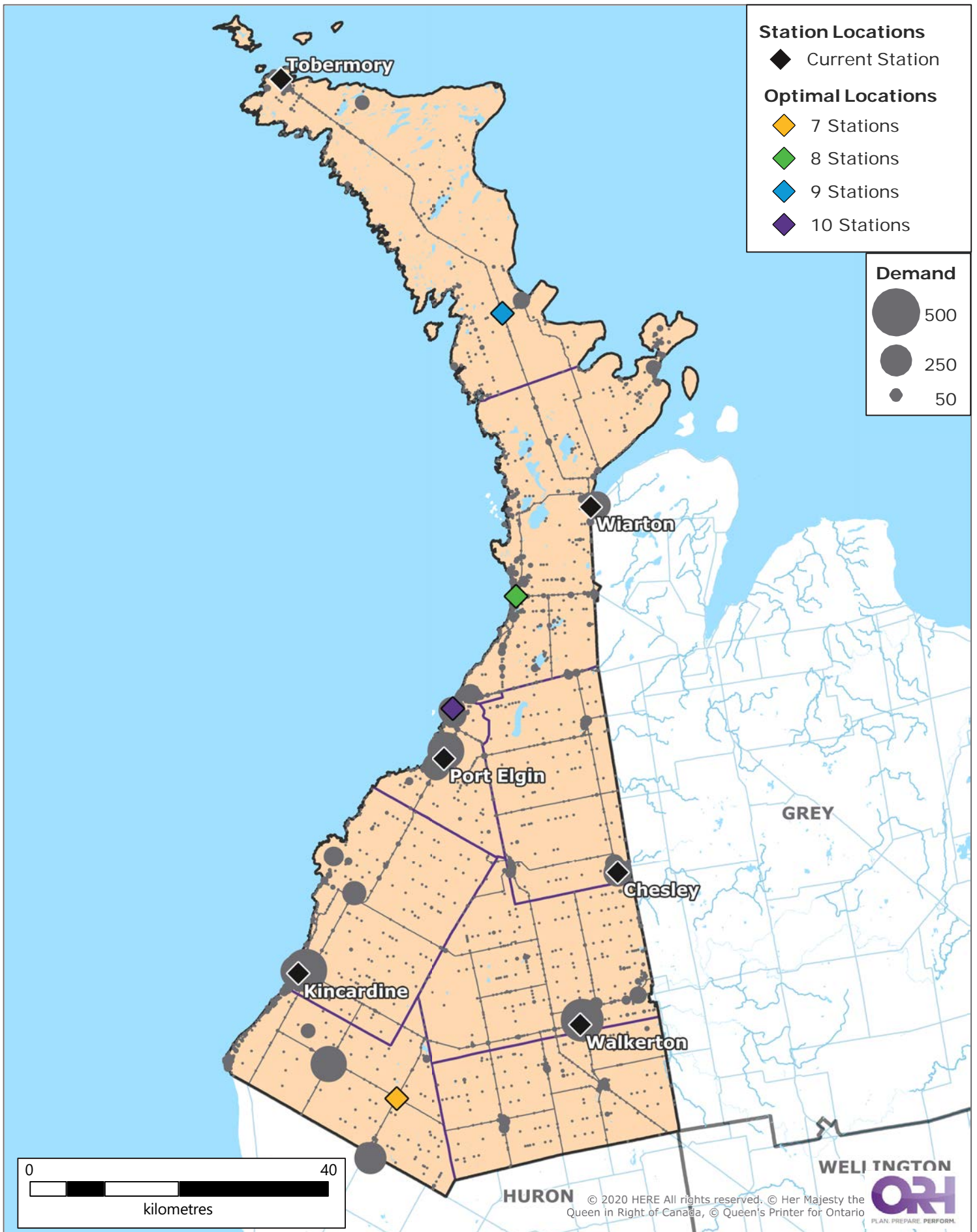
# Blank Canvas Station Optimization
## BCPS Responded Demand with Housing Developments

**F3**
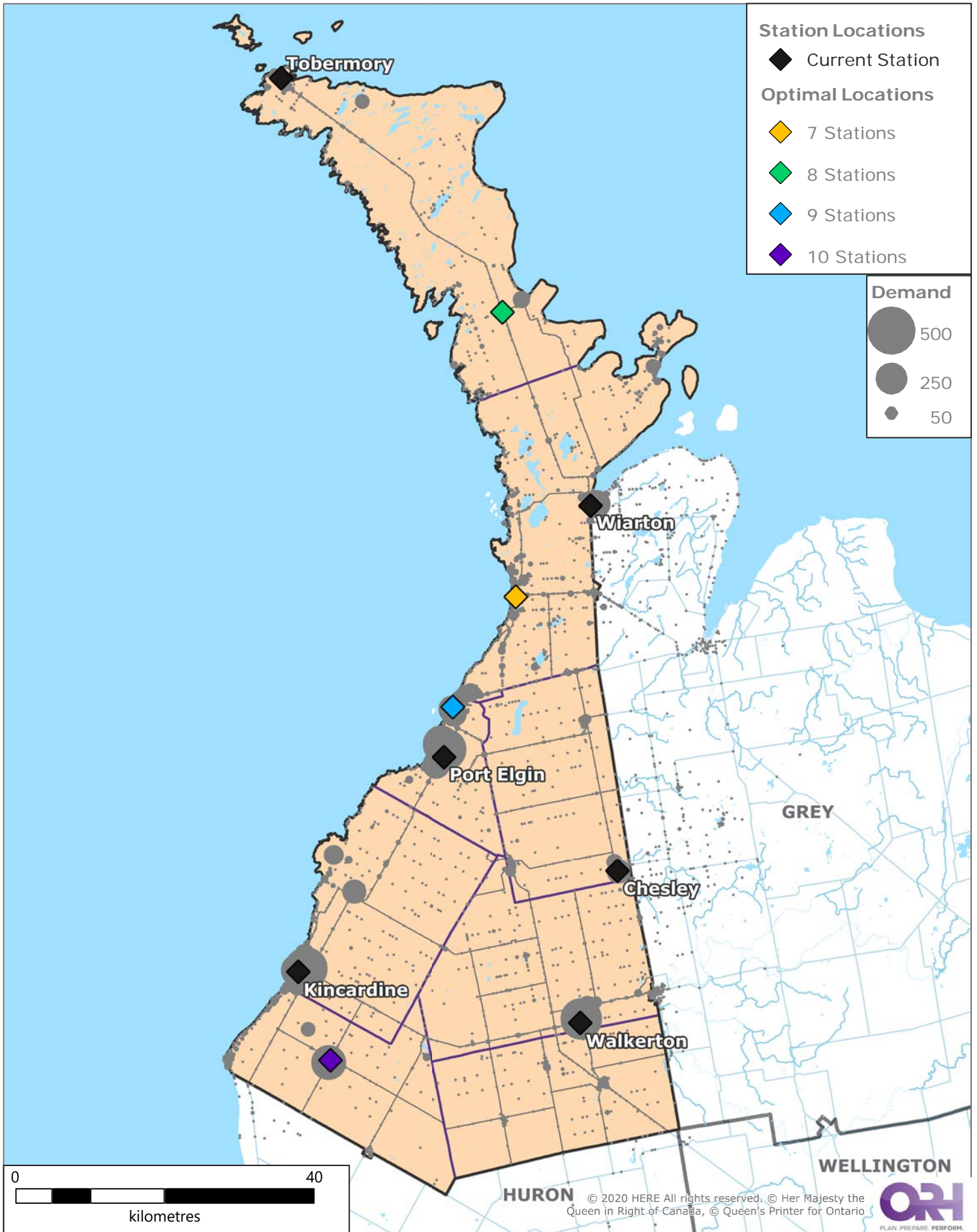
Tobermory

**Station Locations**
◆ Current Station
**Optimal Locations**
◆ 7 Stations
◆ 8 Stations
◆ 9 Stations
◆ 10 Stations

**Demand**
500
250
50

Wiarton

Port Elgin

GREY

Chesley

Kincardine

Walkerton

WELLINGTON

0    40
kilometres

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Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Move Port Elgin to Optimal Location

### Base Position 2020

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

### Move Port Elgin to Optimal Location

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.0% | 44.4% | 59.8% | 11:44 | 19:50 |
| Brockton | 75.3% | 82.4% | 93.6% | 06:43 | 12:58 |
| Huron-Kinloss | 5.8% | 14.3% | 47.7% | 15:20 | 20:34 |
| Kincardine | 61.8% | 67.3% | 83.5% | 08:58 | 18:06 |
| Northern Bruce Peninsula | 25.2% | 30.1% | 37.9% | 17:50 | 28:32 |
| Saugeen Shores | 67.3% | 78.3% | 90.5% | 08:15 | 14:41 |
| South Bruce | 10.9% | 42.6% | 81.9% | 11:37 | 16:46 |
| South Bruce Peninsula | 33.6% | 41.8% | 60.5% | 12:34 | 22:31 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:17 | 21:43 |
| **Bruce County** | **47.8%** | **56.3%** | **73.2%** | **10:47** | **21:01** |

### Difference

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | -0.2% | -0.3% | -1.9% | 00:05 | 00:03 |
| Brockton | -0.1% | -0.1% | -0.1% | 00:01 | 00:01 |
| Huron-Kinloss | 0.1% | 0.0% | -0.1% | 00:01 | -00:01 |
| Kincardine | 0.0% | -0.1% | -0.5% | 00:03 | 00:11 |
| Northern Bruce Peninsula | -0.2% | -0.2% | -0.1% | -00:00 | -00:02 |
| Saugeen Shores | 11.8% | 6.0% | 0.1% | -00:18 | -00:06 |
| South Bruce | -0.4% | -0.5% | -0.2% | 00:06 | 00:02 |
| South Bruce Peninsula | 0.1% | 2.9% | 1.7% | -00:17 | -00:19 |
| Out of Area | 0.1% | 0.0% | 0.0% | -00:03 | -00:00 |
| **Bruce County** | **2.7%** | **1.8%** | **0.2%** | **-00:07** | **-00:06** |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Move Port Elgin to MacKenzie Road

### *Base Position 2020*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

### *Move Port Elgin to MacKenzie Road*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.3% | 44.7% | 61.1% | 11:38 | 19:48 |
| Brockton | 75.3% | 82.4% | 93.6% | 06:44 | 12:59 |
| Huron-Kinloss | 5.8% | 14.1% | 47.7% | 15:21 | 20:37 |
| Kincardine | 61.8% | 67.3% | 83.0% | 09:02 | 18:18 |
| Northern Bruce Peninsula | 25.6% | 30.4% | 38.1% | 17:45 | 28:30 |
| Saugeen Shores | 69.1% | 78.5% | 90.2% | 08:32 | 14:51 |
| South Bruce | 11.2% | 42.8% | 81.5% | 11:39 | 16:49 |
| South Bruce Peninsula | 34.1% | 42.6% | 61.3% | 12:24 | 22:20 |
| Out of Area | 22.0% | 32.3% | 62.1% | 13:15 | 21:41 |
| **Bruce County** | **48.4%** | **56.5%** | **73.3%** | **10:49** | **21:00** |

### *Difference*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 0.2% | 0.1% | -0.5% | -00:01 | 00:01 |
| Brockton | -0.1% | -0.1% | -0.1% | 00:02 | 00:02 |
| Huron-Kinloss | 0.0% | -0.2% | -0.1% | 00:02 | 00:02 |
| Kincardine | -0.1% | -0.2% | -0.9% | 00:07 | 00:24 |
| Northern Bruce Peninsula | 0.1% | 0.1% | 0.1% | -00:05 | -00:05 |
| Saugeen Shores | 13.5% | 6.2% | -0.1% | -00:01 | 00:04 |
| South Bruce | -0.1% | -0.3% | -0.5% | 00:08 | 00:05 |
| South Bruce Peninsula | 0.6% | 3.7% | 2.5% | -00:26 | -00:31 |
| Out of Area | 0.0% | 0.0% | 0.0% | -00:05 | -00:02 |
| **Bruce County** | **3.2%** | **2.1%** | **0.3%** | **-00:05** | **-00:07** |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

New Response Post at Lucknow 07:00 - 19:00

### *Base Position 2020*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

### *New Response Post at Lucknow 07:00 - 19:00*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 45.0% | 49.2% | 69.7% | 10:42 | 18:48 |
| Brockton | 78.6% | 85.5% | 95.6% | 06:03 | 11:52 |
| Huron-Kinloss | 16.6% | 23.8% | 55.0% | 15:20 | 26:43 |
| Kincardine | 63.1% | 68.8% | 85.5% | 08:33 | 16:55 |
| Northern Bruce Peninsula | 25.5% | 30.3% | 38.0% | 17:49 | 28:31 |
| Saugeen Shores | 55.5% | 72.0% | 89.8% | 08:39 | 15:14 |
| South Bruce | 12.1% | 46.5% | 85.0% | 10:49 | 16:12 |
| South Bruce Peninsula | 33.6% | 39.0% | 59.0% | 12:47 | 22:46 |
| Out of Area | 22.4% | 33.1% | 64.5% | 12:49 | 21:18 |
| **Bruce County** | **45.9%** | **55.1%** | **73.8%** | **10:49** | **21:26** |

### *Difference*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 4.9% | 4.6% | 8.1% | -00:56 | -00:58 |
| Brockton | 3.1% | 3.0% | 2.0% | -00:39 | -01:06 |
| Huron-Kinloss | 10.8% | 9.4% | 7.3% | 00:01 | 06:08 |
| Kincardine | 1.3% | 1.3% | 1.6% | -00:22 | -01:00 |
| Northern Bruce Peninsula | 0.1% | 0.0% | 0.0% | -00:01 | -00:04 |
| Saugeen Shores | -0.1% | -0.3% | -0.6% | 00:06 | 00:27 |
| South Bruce | 0.8% | 3.4% | 2.9% | -00:42 | -00:32 |
| South Bruce Peninsula | 0.2% | 0.2% | 0.2% | -00:03 | -00:05 |
| Out of Area | 0.4% | 0.7% | 2.3% | -00:30 | -00:25 |
| **Bruce County** | **0.7%** | **0.6%** | **0.8%** | **-00:05** | **00:20** |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

New Response Post at Holyrood 07:00 - 19:00

*Base Position 2020*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

*New Response Post at Holyrood 07:00 - 19:00*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 45.4% | 49.6% | 70.2% | 10:38 | 18:43 |
| Brockton | 79.1% | 86.1% | 96.0% | 05:57 | 11:38 |
| Huron-Kinloss | 5.6% | 25.8% | 54.4% | 15:50 | 26:48 |
| Kincardine | 62.9% | 68.6% | 85.4% | 08:34 | 16:56 |
| Northern Bruce Peninsula | 25.5% | 30.3% | 38.0% | 17:48 | 28:33 |
| Saugeen Shores | 55.8% | 72.4% | 90.4% | 08:32 | 14:47 |
| South Bruce | 12.3% | 47.6% | 87.0% | 10:36 | 15:48 |
| South Bruce Peninsula | 33.6% | 38.9% | 58.8% | 12:50 | 22:50 |
| Out of Area | 22.3% | 32.9% | 64.0% | 12:55 | 21:17 |
| **Bruce County** | **45.0%** | **55.4%** | **73.9%** | **10:50** | **21:24** |

*Difference*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 5.3% | 5.0% | 8.5% | -01:01 | -01:04 |
| Brockton | 3.7% | 3.6% | 2.4% | -00:45 | -01:19 |
| Huron-Kinloss | -0.2% | 11.4% | 6.6% | 00:31 | 06:13 |
| Kincardine | 1.1% | 1.1% | 1.5% | -00:21 | -00:59 |
| Northern Bruce Peninsula | 0.0% | 0.0% | 0.0% | -00:02 | -00:02 |
| Saugeen Shores | 0.2% | 0.2% | 0.0% | -00:01 | 00:01 |
| South Bruce | 1.0% | 4.5% | 4.9% | -00:55 | -00:56 |
| South Bruce Peninsula | 0.1% | 0.1% | 0.0% | -00:01 | -00:00 |
| Out of Area | 0.3% | 0.5% | 1.9% | -00:25 | -00:26 |
| **Bruce County** | **-0.1%** | **1.0%** | **0.9%** | **-00:04** | **00:17** |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

New Response Post at Ripley 07:00 - 19:00

*Base Position 2020*

| LTM | P4 Performance | | | | |
| --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

*New Response Post at Ripley 07:00 - 19:00*

| LTM | P4 Performance | | | | |
| --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 44.8% | 48.9% | 70.2% | 10:42 | 18:45 |
| Brockton | 78.4% | 85.4% | 95.6% | 06:03 | 11:52 |
| Huron-Kinloss | 10.5% | 16.3% | 50.7% | 16:09 | 26:47 |
| Kincardine | 64.3% | 70.2% | 86.6% | 08:20 | 16:24 |
| Northern Bruce Peninsula | 25.5% | 30.4% | 38.1% | 17:48 | 28:32 |
| Saugeen Shores | 56.3% | 73.0% | 90.9% | 08:26 | 14:30 |
| South Bruce | 12.0% | 46.6% | 84.9% | 10:48 | 16:12 |
| South Bruce Peninsula | 33.6% | 39.0% | 58.9% | 12:50 | 22:51 |
| Out of Area | 22.2% | 33.1% | 64.7% | 12:55 | 21:17 |
| **Bruce County** | **45.6%** | **54.8%** | **73.8%** | **10:50** | **21:18** |

*Difference*

| LTM | P4 Performance | | | | |
| --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 4.7% | 4.3% | 8.6% | -00:57 | -01:01 |
| Brockton | 3.0% | 2.9% | 2.0% | -00:39 | -01:05 |
| Huron-Kinloss | 4.7% | 2.0% | 2.9% | 00:50 | 06:12 |
| Kincardine | 2.4% | 2.7% | 2.7% | -00:35 | -01:30 |
| Northern Bruce Peninsula | 0.1% | 0.1% | 0.1% | -00:02 | -00:03 |
| Saugeen Shores | 0.7% | 0.7% | 0.5% | -00:07 | -00:17 |
| South Bruce | 0.7% | 3.4% | 2.9% | -00:43 | -00:32 |
| South Bruce Peninsula | 0.1% | 0.1% | 0.1% | -00:01 | -00:00 |
| Out of Area | 0.3% | 0.7% | 2.6% | -00:25 | -00:26 |
| **Bruce County** | **0.5%** | **0.3%** | **0.7%** | **-00:04** | **00:12** |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Comparing Options in Huron Kinloss

*Base Position 2020 - Huron Kinloss LTM Performance*

| Base Position 2020 | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Base Position 2020 | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |

*Huron Kinloss Options - Huron Kinloss LTM Performance*

| Response Post | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Ripley | 10.5% | 16.3% | 50.7% | 16:09 | 26:47 |
| Holyrood | 5.6% | 25.8% | 54.4% | 15:50 | 26:48 |
| Lucknow | 16.6% | 23.8% | 55.0% | 15:20 | 26:43 |

*Difference to 2020 Base Position - Huron Kinloss LTM Performance*

| Response Post | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Ripley | 4.7% | 2.0% | 2.9% | 00:50 | 06:12 |
| Holyrood | -0.2% | 11.4% | 6.6% | 00:31 | 06:13 |
| Lucknow | 10.8% | 9.4% | 7.3% | 00:01 | 06:08 |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

New Response Post at Sauble Beach 07:00 - 19:00

*Base Position 2020*

| LTM | P4 Performance | | | | |
|-----|----------|-----------|-----------|---------|-------------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

*New Response Post at Sauble Beach 07:00 - 19:00*

| LTM | P4 Performance | | | | |
|-----|----------|-----------|-----------|---------|-------------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 40.8% | 45.4% | 65.8% | 11:20 | 19:24 |
| Brockton | 76.4% | 83.3% | 94.1% | 06:31 | 12:41 |
| Huron-Kinloss | 5.8% | 14.4% | 47.7% | 15:16 | 20:29 |
| Kincardine | 62.1% | 67.8% | 84.2% | 08:50 | 17:46 |
| Northern Bruce Peninsula | 26.7% | 31.7% | 39.8% | 16:50 | 27:24 |
| Saugeen Shores | 56.2% | 73.1% | 91.9% | 08:11 | 14:07 |
| South Bruce | 11.4% | 43.7% | 82.4% | 11:24 | 16:39 |
| South Bruce Peninsula | 47.5% | 54.9% | 70.8% | 10:33 | 21:00 |
| Out of Area | 23.4% | 34.2% | 64.7% | 12:40 | 21:01 |
| **Bruce County** | **48.7%** | **58.5%** | **76.3%** | **10:10** | **20:07** |

*Difference*

| LTM | P4 Performance | | | | |
|-----|----------|-----------|-----------|---------|-------------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Arran-Elderslie | 0.7% | 0.7% | 4.2% | -00:18 | -00:22 |
| Brockton | 0.9% | 0.8% | 0.5% | -00:11 | -00:16 |
| Huron-Kinloss | 0.1% | 0.0% | -0.1% | -00:03 | -00:06 |
| Kincardine | 0.3% | 0.3% | 0.3% | -00:05 | -00:09 |
| Northern Bruce Peninsula | 1.3% | 1.4% | 1.8% | -01:00 | -01:11 |
| Saugeen Shores | 0.6% | 0.9% | 1.5% | -00:22 | -00:40 |
| South Bruce | 0.0% | 0.6% | 0.4% | -00:07 | -00:05 |
| South Bruce Peninsula | 14.0% | 16.0% | 12.0% | -02:17 | -01:51 |
| Out of Area | 1.4% | 1.8% | 2.6% | -00:40 | -00:42 |
| **Bruce County** | **3.5%** | **4.0%** | **3.3%** | **-00:44** | **-01:00** |

Bruce County Paramedic Services

**Model Results: P4 Response Performance From Time Unit Notified**

New Response Post at Ferndale 07:00 - 19:00

*Base Position 2020*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | **8-minute** | **10-minute** | **15-minute** | **Average** | **90th Percentile** |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** |

*New Response Post at Ferndale 07:00 - 19:00*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | **8-minute** | **10-minute** | **15-minute** | **Average** | **90th Percentile** |
| Arran-Elderslie | 40.1% | 44.6% | 61.6% | 11:39 | 19:46 |
| Brockton | 75.5% | 82.6% | 93.7% | 06:42 | 12:57 |
| Huron-Kinloss | 5.9% | 14.2% | 47.4% | 15:20 | 20:34 |
| Kincardine | 62.0% | 67.6% | 83.9% | 08:55 | 17:55 |
| Northern Bruce Peninsula | 28.4% | 33.8% | 43.4% | 16:39 | 27:43 |
| Saugeen Shores | 55.3% | 72.2% | 90.2% | 08:36 | 14:59 |
| South Bruce | 11.0% | 42.9% | 81.9% | 11:35 | 16:45 |
| South Bruce Peninsula | 34.2% | 39.8% | 60.3% | 12:34 | 22:28 |
| Out of Area | 21.9% | 32.1% | 62.3% | 13:26 | 21:41 |
| **Bruce County** | **45.7%** | **55.1%** | **73.9%** | **10:43** | **20:46** |

*Difference*

| LTM | P4 Performance | | | | |
|---|---|---|---|---|---|
| | **8-minute** | **10-minute** | **15-minute** | **Average** | **90th Percentile** |
| Arran-Elderslie | -0.1% | -0.1% | 0.0% | 00:00 | -00:01 |
| Brockton | 0.1% | 0.1% | 0.1% | -00:00 | -00:00 |
| Huron-Kinloss | 0.1% | -0.2% | -0.4% | 00:01 | -00:01 |
| Kincardine | 0.2% | 0.1% | 0.0% | -00:00 | 00:01 |
| Northern Bruce Peninsula | 3.0% | 3.5% | 5.4% | -01:10 | -00:52 |
| Saugeen Shores | -0.3% | -0.1% | -0.2% | 00:02 | 00:12 |
| South Bruce | -0.4% | -0.2% | -0.2% | 00:04 | 00:02 |
| South Bruce Peninsula | 0.7% | 0.9% | 1.5% | -00:17 | -00:23 |
| Out of Area | -0.1% | -0.2% | 0.1% | 00:06 | -00:02 |
| **Bruce County** | **0.6%** | **0.7%** | **0.9%** | **-00:11** | **-00:21** |

# G  Scenario Modelling

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

2029 Do Nothing Scenario

### *Base Position 2020*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 11.8% |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 | |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 | |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 | |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 | |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 | |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 | |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 | |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 | |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 | |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** | |

### *2029 Do Nothing Scenario*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 18.4% |
| Arran-Elderslie | 34.8% | 40.0% | 53.7% | 12:54 | 21:43 | |
| Brockton | 65.8% | 73.0% | 85.6% | 08:33 | 17:58 | |
| Huron-Kinloss | 5.6% | 13.8% | 47.0% | 16:01 | 22:40 | |
| Kincardine | 58.6% | 64.5% | 81.0% | 09:42 | 19:22 | |
| Northern Bruce Peninsula | 23.8% | 28.8% | 36.4% | 18:56 | 30:38 | |
| Saugeen Shores | 50.8% | 65.3% | 83.8% | 09:53 | 20:35 | |
| South Bruce | 10.3% | 35.9% | 72.7% | 13:32 | 22:39 | |
| South Bruce Peninsula | 32.6% | 38.1% | 56.9% | 13:23 | 23:47 | |
| Out of Area | 21.2% | 31.1% | 58.1% | 14:19 | 23:58 | |
| **Bruce County** | **41.6%** | **50.6%** | **68.7%** | **11:55** | **23:14** | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 6.7% |
| Arran-Elderslie | -5.3% | -4.7% | -7.9% | 01:15 | 01:56 | |
| Brockton | -9.6% | -9.5% | -8.1% | 01:51 | 05:00 | |
| Huron-Kinloss | -0.2% | -0.6% | -0.8% | 00:42 | 02:05 | |
| Kincardine | -3.2% | -2.9% | -2.9% | 00:47 | 01:27 | |
| Northern Bruce Peninsula | -1.6% | -1.5% | -1.6% | 01:06 | 02:03 | |
| Saugeen Shores | -4.7% | -7.0% | -6.6% | 01:19 | 05:48 | |
| South Bruce | -1.1% | -7.3% | -9.4% | 02:01 | 05:56 | |
| South Bruce Peninsula | -0.9% | -0.8% | -1.9% | 00:33 | 00:56 | |
| Out of Area | -0.7% | -1.2% | -4.1% | 01:00 | 02:15 | |
| **Bruce County** | **-3.6%** | **-3.8%** | **-4.3%** | **01:02** | **02:07** | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Do Nothing Performance Trajectory to 2029

### *Base Position 2020 - Bruce County Performance*

| Base Position 2020 | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| Base Position 2020 | 45.2% | 54.5% | 73.0% | 10:54 | 21:07 |

### *Performance Trajectory by Year - Bruce County Performance*

| Year | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| 2021 | 44.9% | 54.2% | 72.7% | 10:58 | 21:16 |
| 2022 | 44.5% | 53.8% | 72.3% | 11:04 | 21:27 |
| 2023 | 44.2% | 53.5% | 71.9% | 11:09 | 21:37 |
| 2024 | 43.8% | 53.1% | 71.5% | 11:15 | 21:49 |
| 2025 | 43.4% | 52.7% | 71.0% | 11:22 | 22:05 |
| 2026 | 43.0% | 52.2% | 70.5% | 11:29 | 22:20 |
| 2027 | 42.5% | 51.7% | 69.9% | 11:38 | 22:39 |
| 2028 | 42.1% | 51.2% | 69.4% | 11:46 | 22:55 |
| 2029 | 41.6% | 50.6% | 68.7% | 11:55 | 23:14 |

### *Difference to 2020 Base Position - Bruce County Performance*

| Response Post | P4 Performance | | | | |
|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile |
| 2021 | -0.3% | -0.3% | -0.3% | 00:04 | 00:09 |
| 2022 | -0.7% | -0.6% | -0.7% | 00:10 | 00:21 |
| 2023 | -1.0% | -1.0% | -1.1% | 00:15 | 00:30 |
| 2024 | -1.4% | -1.4% | -1.5% | 00:21 | 00:42 |
| 2025 | -1.7% | -1.8% | -2.0% | 00:28 | 00:58 |
| 2026 | -2.1% | -2.2% | -2.5% | 00:35 | 01:13 |
| 2027 | -2.6% | -2.8% | -3.1% | 00:44 | 01:32 |
| 2028 | -3.1% | -3.3% | -3.7% | 00:52 | 01:49 |
| 2029 | -3.6% | -3.8% | -4.3% | 01:02 | 02:07 |

# Mean Response Time - 2029 Do Nothing

**G1c**
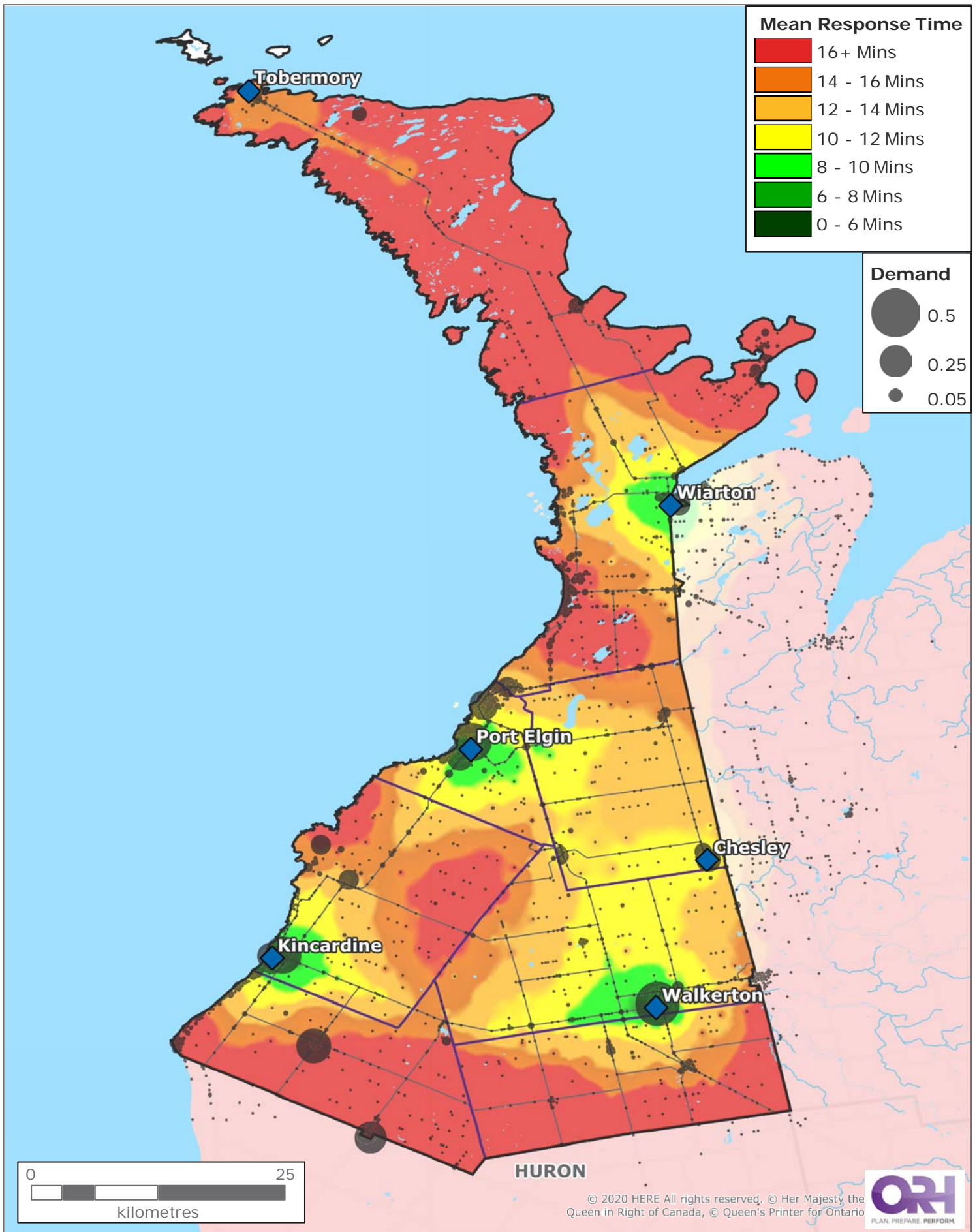
**Mean Response Time**

- 16+ Mins
- 14 - 16 Mins
- 12 - 14 Mins
- 10 - 12 Mins
- 8 - 10 Mins
- 6 - 8 Mins
- 0 - 6 Mins

**Demand**

- 0.5
- 0.25
- 0.05

Tobermory

Wiarton

Port Elgin

Chesley

Kincardine

Walkerton

HURON

0     25

kilometres

ORH
PLAN. PREPARE. PERFORM.

Bruce County Paramedic Services

**Model Results: P4 Response Performance From Time Unit Notified**

Maintain Performance BCPS-wide

*Base Position 2020*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **11.8%** |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 | |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 | |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 | |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 | |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 | |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 | |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 | |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 | |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 | |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** | |

*Maintain Performance BCPS-wide*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **16.7%** |
| Arran-Elderslie | 40.2% | 45.6% | 62.5% | 11:38 | 20:13 | |
| Brockton | 71.9% | 79.5% | 91.6% | 07:17 | 14:10 | |
| Huron-Kinloss | 6.1% | 14.3% | 47.8% | 15:40 | 21:59 | |
| Kincardine | 59.1% | 64.9% | 81.1% | 09:30 | 19:15 | |
| Northern Bruce Peninsula | 23.4% | 28.4% | 35.5% | 18:36 | 29:56 | |
| Saugeen Shores | 64.1% | 72.7% | 86.3% | 09:12 | 17:40 | |
| South Bruce | 11.6% | 40.8% | 79.0% | 12:07 | 17:43 | |
| South Bruce Peninsula | 41.3% | 50.8% | 66.6% | 11:31 | 22:02 | |
| Out of Area | 22.1% | 32.5% | 62.0% | 13:18 | 21:34 | |
| **Bruce County** | **48.1%** | **56.6%** | **73.1%** | **10:57** | **21:24** | |

*Difference*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **4.9%** |
| Arran-Elderslie | 0.0% | 1.0% | 0.9% | -00:00 | 00:26 | |
| Brockton | -3.5% | -3.1% | -2.1% | 00:34 | 01:12 | |
| Huron-Kinloss | 0.3% | -0.1% | 0.0% | 00:21 | 01:24 | |
| Kincardine | -2.7% | -2.6% | -2.9% | 00:35 | 01:21 | |
| Northern Bruce Peninsula | -2.0% | -1.9% | -2.5% | 00:46 | 01:21 | |
| Saugeen Shores | 8.5% | 0.4% | -4.1% | 00:39 | 02:54 | |
| South Bruce | 0.2% | -2.4% | -3.1% | 00:36 | 00:59 | |
| South Bruce Peninsula | 7.8% | 11.9% | 7.8% | -01:19 | -00:49 | |
| Out of Area | 0.1% | 0.2% | -0.2% | -00:02 | -00:09 | |
| **Bruce County** | **2.9%** | **2.2%** | **0.0%** | **00:03** | **00:17** | |

Bruce County Paramedic Services

**Model Results: P4 Response Performance From Time Unit Notified**

Maintaining Performance by LTM

### *Base Position 2020*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **11.8%** |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 | |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 | |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 | |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 | |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 | |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 | |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 | |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 | |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 | |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** | |

### *Maintaining Performance by LTM*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.8%** |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **3.0%** |
| Arran-Elderslie | 7.4% | 8.2% | 12.8% | -01:25 | -01:17 | |
| Brockton | 1.4% | 1.8% | 1.5% | -00:24 | -00:39 | |
| Huron-Kinloss | 1.4% | 16.9% | 12.8% | -00:30 | 04:56 | |
| Kincardine | 0.4% | 0.8% | 1.1% | -00:17 | -00:47 | |
| Northern Bruce Peninsula | 0.7% | 1.3% | 2.4% | -00:35 | -00:24 | |
| Saugeen Shores | 13.2% | 5.6% | 0.1% | -00:12 | -00:03 | |
| South Bruce | 1.3% | 2.6% | 3.7% | -00:38 | -00:39 | |
| South Bruce Peninsula | 9.7% | 14.4% | 9.9% | -01:44 | -01:17 | |
| Out of Area | 0.5% | 0.9% | 2.6% | -00:38 | -00:48 | |
| **Bruce County** | **4.9%** | **5.9%** | **4.0%** | **-00:38** | **-00:45** | |

# Mean Response Time - Maintain Performance

Off Peak Months (15th September to 14th June)

**G3b-i**

## Mean Response Time

- 16+ mins
- 14-16 mins
- 12-14 mins
- 10-12 mins
- 8-10 mins
- 6-8 mins
- 0-6 mins

## Demand

- 0.5
- 0.25
- 0.05

Tobermory

Wiarton

Sauble Beach

Port Elgin

Chesley

Kincardine

Walkerton

Holyrood

**HURON**

0    25
kilometres

ORH
PLAN. PREPARE. PERFORM.
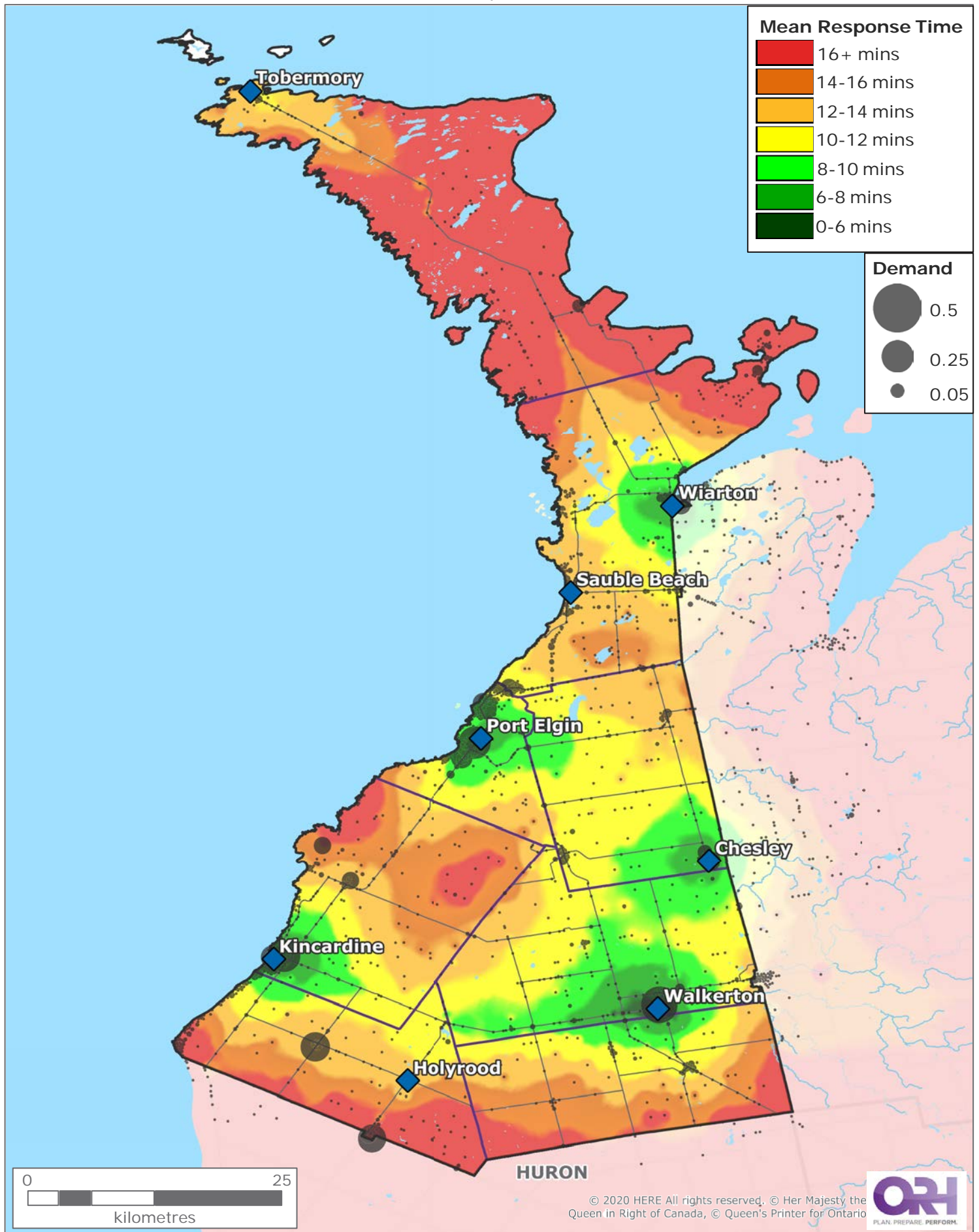
# Mean Response Time - Maintain Performance
Peak Months (15th June to 14th September)

**G3b-ii**

**Meant Response Time**

- 16+ mins
- 14-16 mins
- 12-14 mins
- 10-12 mins
- 8-10 mins
- 6-8 mins
- 0-6 mins

**Demand**
- 0.5
- 0.25
- 0.05

Tobermory

Ferndale

Wiarton

Sauble Beach

Port Elgin

Chesley

Kincardine

Walkerton

Holyrood

HURON

0         25

kilometres

ORH
PLAN. PREPARE. PERFORM.

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Maintaining Performance by LTM - Lower Demand Rate

### *Maintaining Performance by LTM*

| LTM | P4 Performance | | | | | | Utilization |
|-----|----------|-----------|-----------|---------|-------------------|---|-------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | | 14.8% |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | | |

### *Maintaining Performance by LTM - Lower Demand Rate*

| LTM | P4 Performance | | | | | | Utilization |
|-----|----------|-----------|-----------|---------|-------------------|---|-------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | | 13.1% |
| Arran-Elderslie | 48.2% | 53.3% | 75.9% | 10:03 | 18:08 | | |
| Brockton | 77.9% | 85.3% | 95.6% | 06:06 | 11:57 | | |
| Huron-Kinloss | 7.4% | 33.3% | 62.5% | 14:29 | 25:04 | | |
| Kincardine | 62.6% | 68.7% | 85.3% | 08:33 | 16:58 | | |
| Northern Bruce Peninsula | 26.5% | 31.9% | 40.9% | 17:04 | 28:01 | | |
| Saugeen Shores | 70.3% | 79.6% | 91.8% | 08:08 | 14:03 | | |
| South Bruce | 12.5% | 46.9% | 86.8% | 10:40 | 15:51 | | |
| South Bruce Peninsula | 43.8% | 54.0% | 69.4% | 10:57 | 21:20 | | |
| Out of Area | 22.6% | 33.5% | 65.4% | 12:34 | 20:48 | | |
| **Bruce County** | **51.1%** | **61.5%** | **77.9%** | **10:04** | **20:00** | | |

### *Difference*

| LTM | P4 Performance | | | | | | Utilization |
|-----|----------|-----------|-----------|---------|-------------------|---|-------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | | -1.7% |
| Arran-Elderslie | 0.7% | 0.4% | 1.5% | -00:10 | -00:22 | | |
| Brockton | 1.2% | 0.9% | 0.5% | -00:12 | -00:21 | | |
| Huron-Kinloss | 0.2% | 2.1% | 1.9% | -00:20 | -00:27 | | |
| Kincardine | 0.4% | 0.3% | 0.2% | -00:05 | -00:09 | | |
| Northern Bruce Peninsula | 0.3% | 0.3% | 0.5% | -00:11 | -00:10 | | |
| Saugeen Shores | 1.5% | 1.8% | 1.2% | -00:14 | -00:41 | | |
| South Bruce | -0.1% | 1.2% | 1.0% | -00:13 | -00:14 | | |
| South Bruce Peninsula | 0.6% | 0.7% | 0.7% | -00:09 | -00:13 | | |
| Out of Area | 0.1% | 0.2% | 0.6% | -00:07 | -00:07 | | |
| **Bruce County** | **1.1%** | **1.1%** | **0.9%** | **-00:13** | **-00:21** | | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Maintaining Performance by LTM - Higher Demand Rate

### Maintaining Performance by LTM

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.8%** |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | |

### Maintaining Performance by LTM - Higher Demand Rate

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **16.7%** |
| Arran-Elderslie | 46.7% | 52.3% | 72.5% | 10:26 | 18:56 | |
| Brockton | 75.2% | 83.0% | 94.3% | 06:35 | 12:45 | |
| Huron-Kinloss | 6.9% | 28.8% | 58.5% | 15:12 | 25:56 | |
| Kincardine | 61.6% | 67.9% | 84.6% | 08:45 | 17:23 | |
| Northern Bruce Peninsula | 25.7% | 31.2% | 40.1% | 17:29 | 28:27 | |
| Saugeen Shores | 66.9% | 75.7% | 89.0% | 08:39 | 15:50 | |
| South Bruce | 12.7% | 44.4% | 84.2% | 11:10 | 16:23 | |
| South Bruce Peninsula | 42.8% | 52.6% | 68.1% | 11:15 | 21:46 | |
| Out of Area | 22.4% | 33.2% | 64.2% | 12:48 | 21:03 | |
| **Bruce County** | **48.8%** | **59.1%** | **75.8%** | **10:31** | **20:47** | |

### Difference

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **1.9%** |
| Arran-Elderslie | -0.9% | -0.6% | -2.0% | 00:13 | 00:27 | |
| Brockton | -1.6% | -1.4% | -0.8% | 00:18 | 00:27 | |
| Huron-Kinloss | -0.3% | -2.4% | -2.1% | 00:23 | 00:26 | |
| Kincardine | -0.6% | -0.4% | -0.4% | 00:07 | 00:16 | |
| Northern Bruce Peninsula | -0.4% | -0.4% | -0.4% | 00:14 | 00:16 | |
| Saugeen Shores | -1.8% | -2.2% | -1.6% | 00:18 | 01:05 | |
| South Bruce | 0.1% | -1.3% | -1.6% | 00:17 | 00:18 | |
| South Bruce Peninsula | -0.5% | -0.7% | -0.6% | 00:09 | 00:13 | |
| Out of Area | -0.1% | -0.1% | -0.5% | 00:06 | 00:08 | |
| **Bruce County** | **-1.3%** | **-1.3%** | **-1.2%** | **00:15** | **00:26** | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Maintaining Performance by LTM - 2028 Demand Rate

### *Maintaining Performance by LTM*

| LTM | P4 Performance | | | | | Utilization |
|-----|------------|-----------|-----------|---------|-------------------|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 14.8% |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | |

### *Maintaining Performance by LTM - 2028 Demand Rate*

| LTM | P4 Performance | | | | | Utilization |
|-----|------------|-----------|-----------|---------|-------------------|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 14.1% |
| Arran-Elderslie | 48.0% | 53.1% | 75.2% | 10:08 | 18:17 | |
| Brockton | 77.3% | 84.8% | 95.3% | 06:13 | 12:10 | |
| Huron-Kinloss | 7.3% | 32.2% | 61.4% | 14:41 | 25:20 | |
| Kincardine | 62.6% | 68.7% | 85.2% | 08:34 | 17:00 | |
| Northern Bruce Peninsula | 26.3% | 31.7% | 40.6% | 17:12 | 28:10 | |
| Saugeen Shores | 69.4% | 78.6% | 91.0% | 08:16 | 14:28 | |
| South Bruce | 12.6% | 46.3% | 86.2% | 10:47 | 15:58 | |
| South Bruce Peninsula | 43.5% | 53.5% | 69.0% | 11:02 | 21:28 | |
| Out of Area | 22.6% | 33.4% | 65.1% | 12:38 | 20:52 | |
| **Bruce County** | **50.4%** | **60.8%** | **77.4%** | **10:11** | **20:13** | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
|-----|------------|-----------|-----------|---------|-------------------|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | -0.7% |
| Arran-Elderslie | 0.4% | 0.3% | 0.7% | -00:06 | -00:13 | |
| Brockton | 0.5% | 0.4% | 0.2% | -00:05 | -00:09 | |
| Huron-Kinloss | 0.1% | 0.9% | 0.8% | -00:08 | -00:10 | |
| Kincardine | 0.4% | 0.3% | 0.2% | -00:04 | -00:07 | |
| Northern Bruce Peninsula | 0.1% | 0.1% | 0.2% | -00:03 | -00:01 | |
| Saugeen Shores | 0.6% | 0.7% | 0.5% | -00:06 | -00:17 | |
| South Bruce | 0.0% | 0.6% | 0.4% | -00:06 | -00:07 | |
| South Bruce Peninsula | 0.2% | 0.3% | 0.3% | -00:04 | -00:06 | |
| Out of Area | 0.1% | 0.1% | 0.4% | -00:04 | -00:03 | |
| **Bruce County** | **0.3%** | **0.4%** | **0.4%** | **-00:05** | **-00:09** | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Increase Treat and Release - 100% CTAS5 50% CTAS4

### *Base Position 2020*

| LTM | P4 Performance | | | | | Utilization |
|-----|----------------|----------------|----------------|---------|--------------------|-------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **11.8%** |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 | |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 | |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 | |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 | |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 | |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 | |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 | |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 | |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 | |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** | |

### *Increase Treat and Release - 100% CTAS5 50% CTAS4*

| LTM | P4 Performance | | | | | Utilization |
|-----|----------------|----------------|----------------|---------|--------------------|-------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **11.6%** |
| Arran-Elderslie | 40.0% | 44.5% | 61.8% | 11:38 | 19:42 | |
| Brockton | 75.5% | 82.6% | 93.7% | 06:41 | 12:57 | |
| Huron-Kinloss | 5.7% | 14.3% | 47.7% | 15:21 | 20:35 | |
| Kincardine | 61.9% | 67.5% | 83.9% | 08:54 | 17:56 | |
| Northern Bruce Peninsula | 25.3% | 30.2% | 38.0% | 17:50 | 28:31 | |
| Saugeen Shores | 55.8% | 72.5% | 90.5% | 08:31 | 14:42 | |
| South Bruce | 11.1% | 43.3% | 81.9% | 11:33 | 16:46 | |
| South Bruce Peninsula | 33.5% | 38.9% | 59.0% | 12:49 | 22:48 | |
| Out of Area | 21.9% | 32.4% | 62.3% | 13:18 | 21:43 | |
| **Bruce County** | **45.2%** | **54.6%** | **73.1%** | **10:53** | **21:05** | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
|-----|----------------|----------------|----------------|---------|--------------------|-------------|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **-0.1%** |
| Arran-Elderslie | -0.1% | -0.1% | 0.1% | -00:01 | -00:05 | |
| Brockton | 0.1% | 0.0% | 0.0% | -00:01 | -00:01 | |
| Huron-Kinloss | 0.0% | 0.0% | -0.1% | 00:02 | 00:00 | |
| Kincardine | 0.1% | 0.0% | 0.0% | -00:01 | 00:01 | |
| Northern Bruce Peninsula | -0.2% | -0.1% | -0.1% | -00:00 | -00:04 | |
| Saugeen Shores | 0.2% | 0.3% | 0.2% | -00:02 | -00:05 | |
| South Bruce | -0.2% | 0.2% | -0.1% | 00:02 | 00:02 | |
| South Bruce Peninsula | 0.0% | 0.0% | 0.2% | -00:02 | -00:03 | |
| Out of Area | 0.0% | 0.0% | 0.1% | -00:02 | -00:00 | |
| **Bruce County** | **0.0%** | **0.1%** | **0.1%** | **-00:01** | **-00:02** | |

Bruce County Paramedic Services

**Model Results: P4 Response Performance From Time Unit Notified**

Increase Treat and Release - 75% CTAS5 50% CTAS4 25% CTAS3

*Base Position 2020*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **11.8%** |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 | |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 | |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 | |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 | |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 | |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 | |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 | |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 | |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 | |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** | |

*Increase Treat and Release - 75% CTAS5 50% CTAS4 25% CTAS3*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **11.5%** |
| Arran-Elderslie | 39.9% | 44.4% | 61.7% | 11:40 | 19:47 | |
| Brockton | 75.3% | 82.4% | 93.6% | 06:43 | 12:59 | |
| Huron-Kinloss | 5.7% | 14.3% | 47.5% | 15:22 | 20:45 | |
| Kincardine | 61.5% | 67.2% | 83.8% | 08:57 | 17:59 | |
| Northern Bruce Peninsula | 25.1% | 30.0% | 37.8% | 17:52 | 28:34 | |
| Saugeen Shores | 55.5% | 72.3% | 90.3% | 08:33 | 14:50 | |
| South Bruce | 11.5% | 43.1% | 81.7% | 11:36 | 16:47 | |
| South Bruce Peninsula | 33.2% | 38.7% | 58.5% | 12:54 | 22:55 | |
| Out of Area | 21.9% | 32.3% | 61.9% | 13:22 | 21:47 | |
| **Bruce County** | **45.0%** | **54.3%** | **72.9%** | **10:56** | **21:12** | |

*Difference*

| LTM | P4 Performance | | | | | Utilization |
| --- | --- | --- | --- | --- | --- | --- |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **-0.2%** |
| Arran-Elderslie | -0.3% | -0.2% | 0.1% | 00:02 | -00:00 | |
| Brockton | -0.1% | -0.1% | 0.0% | 00:01 | 00:02 | |
| Huron-Kinloss | -0.1% | -0.1% | -0.3% | 00:03 | 00:10 | |
| Kincardine | -0.3% | -0.3% | -0.2% | 00:02 | 00:04 | |
| Northern Bruce Peninsula | -0.3% | -0.3% | -0.2% | 00:02 | -00:01 | |
| Saugeen Shores | 0.0% | 0.0% | -0.1% | 00:00 | 00:04 | |
| South Bruce | 0.1% | 0.0% | -0.3% | 00:05 | 00:03 | |
| South Bruce Peninsula | -0.3% | -0.2% | -0.3% | 00:03 | 00:05 | |
| Out of Area | 0.0% | 0.0% | -0.2% | 00:02 | 00:04 | |
| **Bruce County** | **-0.2%** | **-0.1%** | **-0.2%** | **00:02** | **00:05** | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Improving Performance

### *Base Position 2020*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **11.8%** |
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 | |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 | |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 | |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 | |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 | |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 | |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 | |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 | |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 | |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** | |

### *Improving Performance*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **12.4%** |
| Arran-Elderslie | 51.2% | 56.5% | 81.1% | 09:27 | 17:10 | |
| Brockton | 80.5% | 88.1% | 97.0% | 05:40 | 10:49 | |
| Huron-Kinloss | 7.3% | 32.1% | 60.3% | 14:43 | 25:16 | |
| Kincardine | 70.7% | 78.8% | 92.1% | 07:19 | 13:46 | |
| Northern Bruce Peninsula | 39.4% | 46.2% | 60.2% | 13:23 | 26:14 | |
| Saugeen Shores | 69.2% | 78.3% | 91.6% | 08:01 | 14:15 | |
| South Bruce | 28.9% | 55.7% | 89.5% | 09:20 | 15:10 | |
| South Bruce Peninsula | 50.5% | 61.2% | 74.4% | 09:58 | 20:30 | |
| Out of Area | 23.4% | 34.9% | 67.7% | 12:07 | 20:22 | |
| **Bruce County** | **54.5%** | **65.5%** | **81.3%** | **09:23** | **18:46** | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **0.6%** |
| Arran-Elderslie | 11.1% | 11.9% | 19.5% | -02:11 | -02:37 | |
| Brockton | 5.1% | 5.5% | 3.4% | -01:02 | -02:08 | |
| Huron-Kinloss | 1.5% | 17.8% | 12.5% | -00:36 | 04:41 | |
| Kincardine | 8.8% | 11.3% | 8.2% | -01:36 | -04:08 | |
| Northern Bruce Peninsula | 14.0% | 15.9% | 22.2% | -04:27 | -02:20 | |
| Saugeen Shores | 13.6% | 6.0% | 1.3% | -00:32 | -00:31 | |
| South Bruce | 17.6% | 12.6% | 7.5% | -02:11 | -01:34 | |
| South Bruce Peninsula | 17.1% | 22.3% | 15.6% | -02:53 | -02:20 | |
| Out of Area | 1.4% | 2.5% | 5.6% | -01:13 | -01:21 | |
| **Bruce County** | **9.4%** | **11.0%** | **8.3%** | **-01:31** | **-02:21** | |

# Mean Response Time - Improve Performance
## Off Peak Months (15th September to 14th June)

**G4c-ii**
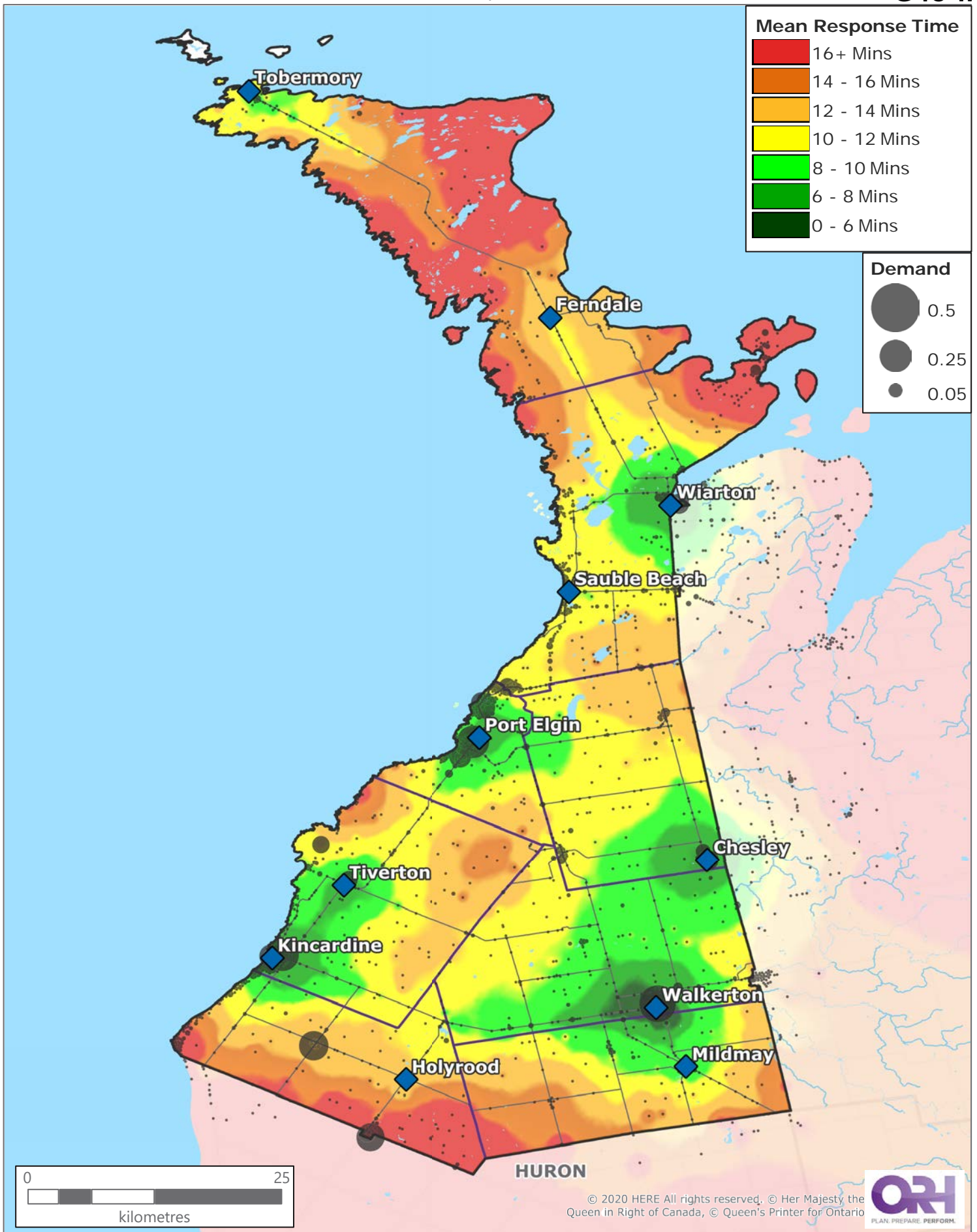
**Mean Response Time**
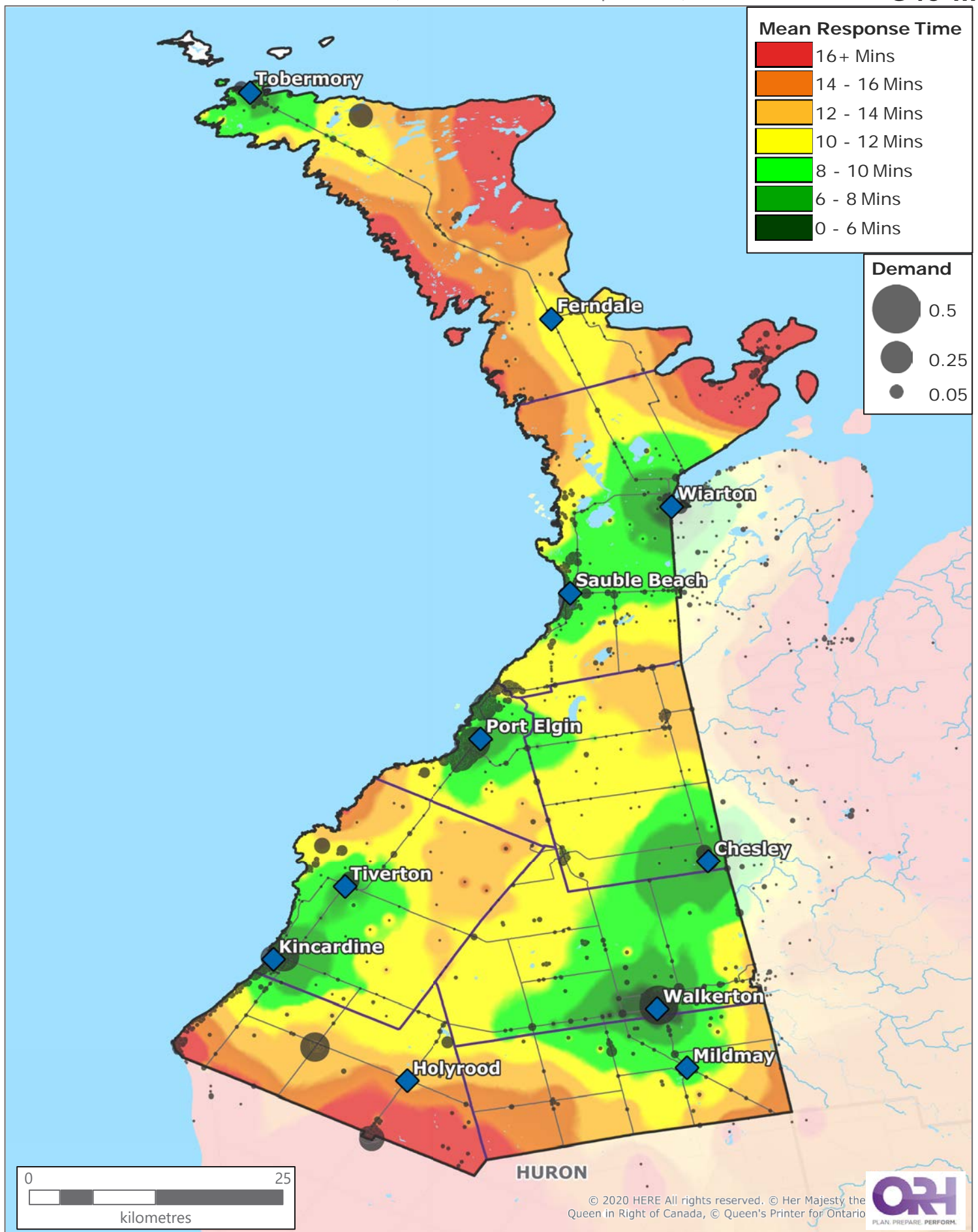
- 16+ Mins
- 14 - 16 Mins
- 12 - 14 Mins
- 10 - 12 Mins
- 8 - 10 Mins
- 6 - 8 Mins
- 0 - 6 Mins

**Demand**

- 0.5
- 0.25
- 0.05

Tobermory

Ferndale

Wiarton

Sauble Beach

Port Elgin

Chesley

Tiverton

Kincardine

Walkerton

Holyrood

Mildmay

HURON

0         25

kilometres

ORH
PLAN. PREPARE. PERFORM.

# Mean Response Time - Improve Performance
## Peak Months (15th June to 14th September)

**Mean Response Time**

- 16+ Mins
- 14 - 16 Mins
- 12 - 14 Mins
- 10 - 12 Mins
- 8 - 10 Mins
- 6 - 8 Mins
- 0 - 6 Mins

**Demand**

- 0.5
- 0.25
- 0.05

Tobermory

Ferndale

Wiarton

Sauble Beach

Port Elgin

Chesley

Tiverton

Kincardine

Walkerton

Holyrood

Mildmay

HURON

0      25
kilometres

ORH
PLAN. PREPARE. PERFORM.

Bruce County Paramedic Services

**Model Results: P4 Response Performance From Time Unit Notified**

Future Developments

*Base Position 2020*

| LTM | P4 Performance | | | | | Utilization |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 11.8% |
|---|---|---|---|---|---|---|
| Arran-Elderslie | 40.2% | 44.6% | 61.6% | 11:39 | 19:47 | |
| Brockton | 75.4% | 82.5% | 93.6% | 06:42 | 12:57 | |
| Huron-Kinloss | 5.8% | 14.3% | 47.8% | 15:19 | 20:35 | |
| Kincardine | 61.8% | 67.5% | 83.9% | 08:55 | 17:54 | |
| Northern Bruce Peninsula | 25.4% | 30.3% | 38.0% | 17:50 | 28:35 | |
| Saugeen Shores | 55.6% | 72.3% | 90.4% | 08:33 | 14:47 | |
| South Bruce | 11.3% | 43.1% | 82.1% | 11:31 | 16:44 | |
| South Bruce Peninsula | 33.5% | 38.9% | 58.8% | 12:51 | 22:51 | |
| Out of Area | 22.0% | 32.4% | 62.1% | 13:20 | 21:43 | |
| **Bruce County** | **45.2%** | **54.5%** | **73.0%** | **10:54** | **21:07** | |

*Future Developments*

| LTM | P4 Performance | | | | | Utilization |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 14.0% |
|---|---|---|---|---|---|---|
| Arran-Elderslie | 51.7% | 57.0% | 82.5% | 09:19 | 16:30 | |
| Brockton | 80.3% | 87.2% | 96.7% | 05:47 | 11:15 | |
| Huron-Kinloss | 8.4% | 40.0% | 69.9% | 13:10 | 21:33 | |
| Kincardine | 66.3% | 72.2% | 87.4% | 08:08 | 16:10 | |
| Northern Bruce Peninsula | 26.1% | 31.6% | 40.4% | 17:17 | 28:16 | |
| Saugeen Shores | 72.3% | 81.7% | 93.2% | 07:47 | 12:59 | |
| South Bruce | 13.0% | 48.2% | 88.6% | 10:16 | 15:24 | |
| South Bruce Peninsula | 43.7% | 53.8% | 69.1% | 11:01 | 21:29 | |
| Out of Area | 22.7% | 33.8% | 66.4% | 12:21 | 20:33 | |
| **Bruce County** | **54.0%** | **65.0%** | **81.0%** | **09:32** | **18:57** | |

*Difference*

| LTM | P4 Performance | | | | | Utilization |
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | 2.3% |
|---|---|---|---|---|---|---|
| Arran-Elderslie | 11.5% | 12.4% | 20.8% | -02:19 | -03:17 | |
| Brockton | 4.8% | 4.7% | 3.1% | -00:55 | -01:43 | |
| Huron-Kinloss | 2.6% | 25.6% | 22.1% | -02:09 | 00:58 | |
| Kincardine | 4.4% | 4.8% | 3.5% | -00:46 | -01:45 | |
| Northern Bruce Peninsula | 0.7% | 1.3% | 2.4% | -00:33 | -00:19 | |
| Saugeen Shores | 16.7% | 9.4% | 2.8% | -00:46 | -01:48 | |
| South Bruce | 1.6% | 5.1% | 6.5% | -01:15 | -01:20 | |
| South Bruce Peninsula | 10.2% | 14.9% | 10.3% | -01:50 | -01:21 | |
| Out of Area | 0.7% | 1.4% | 4.3% | -00:59 | -01:10 | |
| **Bruce County** | **8.8%** | **10.5%** | **8.0%** | **-01:22** | **-02:10** | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Alternative Huron-Kinloss Options - Lucknow

### *Maintaining Performance by LTM*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.8%** |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | |

### *Alternative Huron-Kinloss Options - Lucknow*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.8%** |
| Arran-Elderslie | 47.2% | 52.4% | 74.0% | 10:17 | 18:35 | |
| Brockton | 76.1% | 83.6% | 94.6% | 06:24 | 12:33 | |
| Huron-Kinloss | 21.2% | 29.1% | 61.3% | 14:11 | 25:16 | |
| Kincardine | 62.4% | 68.5% | 85.1% | 08:37 | 17:07 | |
| Northern Bruce Peninsula | 26.1% | 31.6% | 40.4% | 17:16 | 28:14 | |
| Saugeen Shores | 68.3% | 77.3% | 90.1% | 08:27 | 15:00 | |
| South Bruce | 12.4% | 45.0% | 83.6% | 11:08 | 16:27 | |
| South Bruce Peninsula | 43.2% | 53.2% | 68.7% | 11:06 | 21:34 | |
| Out of Area | 22.8% | 33.7% | 65.5% | 12:35 | 20:55 | |
| **Bruce County** | **51.2%** | **60.0%** | **76.9%** | **10:14** | **20:23** | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **0.0%** |
| Arran-Elderslie | -0.3% | -0.4% | -0.5% | 00:04 | 00:06 | |
| Brockton | -0.7% | -0.7% | -0.5% | 00:07 | 00:14 | |
| Huron-Kinloss | 14.0% | -2.2% | 0.7% | -00:38 | -00:14 | |
| Kincardine | 0.2% | 0.2% | 0.1% | -00:01 | -00:01 | |
| Northern Bruce Peninsula | -0.1% | 0.0% | 0.0% | 00:01 | 00:03 | |
| Saugeen Shores | -0.4% | -0.5% | -0.4% | 00:05 | 00:16 | |
| South Bruce | -0.2% | -0.7% | -2.1% | 00:15 | 00:22 | |
| South Bruce Peninsula | 0.0% | 0.0% | 0.0% | 00:00 | 00:01 | |
| Out of Area | 0.3% | 0.4% | 0.7% | -00:07 | -00:00 | |
| **Bruce County** | **1.2%** | **-0.4%** | **-0.1%** | **-00:02** | **00:02** | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Alternative Huron-Kinloss Options - Ripley

### *Maintaining Performance by LTM*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.8%** |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | |

### *Alternative Huron-Kinloss Options - Ripley*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.8%** |
| Arran-Elderslie | 46.1% | 51.2% | 73.4% | 10:25 | 18:39 | |
| Brockton | 75.9% | 83.4% | 94.6% | 06:27 | 12:36 | |
| Huron-Kinloss | 13.2% | 19.2% | 55.4% | 15:15 | 25:40 | |
| Kincardine | 64.6% | 71.0% | 87.2% | 08:14 | 16:11 | |
| Northern Bruce Peninsula | 26.1% | 31.6% | 40.5% | 17:16 | 28:13 | |
| Saugeen Shores | 69.2% | 78.3% | 90.8% | 08:16 | 14:34 | |
| South Bruce | 12.2% | 44.7% | 83.1% | 11:12 | 16:31 | |
| South Bruce Peninsula | 43.2% | 53.2% | 68.7% | 11:06 | 21:32 | |
| Out of Area | 22.5% | 33.6% | 65.5% | 12:42 | 20:56 | |
| **Bruce County** | **50.7%** | **59.4%** | **76.6%** | **10:17** | **20:19** | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **0.0%** |
| Arran-Elderslie | -1.4% | -1.7% | -1.1% | 00:12 | 00:10 | |
| Brockton | -0.9% | -0.9% | -0.6% | 00:09 | 00:17 | |
| Huron-Kinloss | 5.9% | -12.1% | -5.1% | 00:26 | 00:09 | |
| Kincardine | 2.4% | 2.7% | 2.1% | -00:24 | -00:56 | |
| Northern Bruce Peninsula | 0.0% | 0.1% | 0.0% | 00:01 | 00:02 | |
| Saugeen Shores | 0.4% | 0.4% | 0.3% | -00:06 | -00:10 | |
| South Bruce | -0.4% | -1.1% | -2.6% | 00:19 | 00:26 | |
| South Bruce Peninsula | 0.0% | 0.0% | 0.0% | -00:00 | -00:01 | |
| Out of Area | 0.0% | 0.3% | 0.7% | 00:00 | 00:01 | |
| **Bruce County** | **0.7%** | **-1.0%** | **-0.4%** | **00:01** | **-00:02** | |

Bruce County Paramedic Services

## Model Results: P4 Response Performance From Time Unit Notified

Neyaashiinigmiing 27 Additional Ambulance - All P4 Incidents

### *Maintaining Performance by LTM*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.8%** |
| Arran-Elderslie | 47.6% | 52.8% | 74.5% | 10:13 | 18:30 | |
| Brockton | 76.8% | 84.3% | 95.1% | 06:18 | 12:18 | |
| Huron-Kinloss | 7.2% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.2% | 68.3% | 85.0% | 08:38 | 17:07 | |
| Northern Bruce Peninsula | 26.2% | 31.5% | 40.4% | 17:15 | 28:11 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.7% | 10:53 | 16:05 | |
| South Bruce Peninsula | 43.2% | 53.3% | 68.7% | 11:06 | 21:33 | |
| Out of Area | 22.5% | 33.3% | 64.8% | 12:42 | 20:55 | |
| **Bruce County** | **50.0%** | **60.4%** | **77.0%** | **10:16** | **20:22** | |

### *Neyaashiinigmiing 27 Additional Ambulance - All P4 Incidents*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **14.5%** |
| Arran-Elderslie | 47.7% | 52.9% | 74.7% | 10:12 | 18:26 | |
| Brockton | 76.9% | 84.4% | 95.1% | 06:17 | 12:17 | |
| Huron-Kinloss | 7.3% | 31.3% | 60.6% | 14:49 | 25:31 | |
| Kincardine | 62.1% | 68.2% | 85.0% | 08:38 | 17:08 | |
| Northern Bruce Peninsula | 26.3% | 31.7% | 40.6% | 17:10 | 28:04 | |
| Saugeen Shores | 68.8% | 77.9% | 90.5% | 08:21 | 14:44 | |
| South Bruce | 12.6% | 45.7% | 85.5% | 10:55 | 16:07 | |
| South Bruce Peninsula | 47.7% | 58.7% | 76.3% | 09:52 | 19:46 | |
| Out of Area | 22.6% | 33.4% | 65.1% | 12:35 | 20:53 | |
| **Bruce County** | **50.9%** | **61.5%** | **78.3%** | **10:02** | **19:55** | |
| Neyaashiinigmiing 27 | 93.2% | 94.6% | 95.2% | 04:29 | 06:30 | |

### *Difference*

| LTM | P4 Performance | | | | | Utilization |
|---|---|---|---|---|---|---|
| | 8-minute | 10-minute | 15-minute | Average | 90th Percentile | **-0.3%** |
| Arran-Elderslie | 0.1% | 0.1% | 0.2% | -00:01 | -00:04 | |
| Brockton | 0.1% | 0.1% | 0.0% | -00:01 | -00:02 | |
| Huron-Kinloss | 0.1% | 0.1% | 0.0% | -00:00 | 00:01 | |
| Kincardine | -0.1% | -0.1% | 0.0% | 00:01 | 00:01 | |
| Northern Bruce Peninsula | 0.1% | 0.1% | 0.1% | -00:05 | -00:07 | |
| Saugeen Shores | 0.0% | 0.0% | 0.0% | -00:00 | 00:00 | |
| South Bruce | 0.0% | 0.0% | -0.3% | 00:02 | 00:03 | |
| South Bruce Peninsula | 4.4% | 5.4% | 7.6% | -01:14 | -01:48 | |
| Out of Area | 0.1% | 0.1% | 0.3% | -00:07 | -00:02 | |
| **Bruce County** | **0.9%** | **1.1%** | **1.3%** | **-00:14** | **-00:27** | |

**Emergency
Service
Planning**
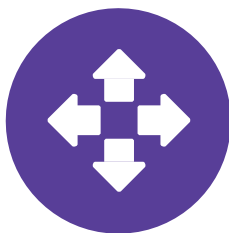
**Optimizing
Locations**

**Software
Solutions**

PLAN. PREPARE. PERFORM.