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Legend

Mitigation strategy

Pump station

Pipe (existing)

Pipe (new)

Study area boundary



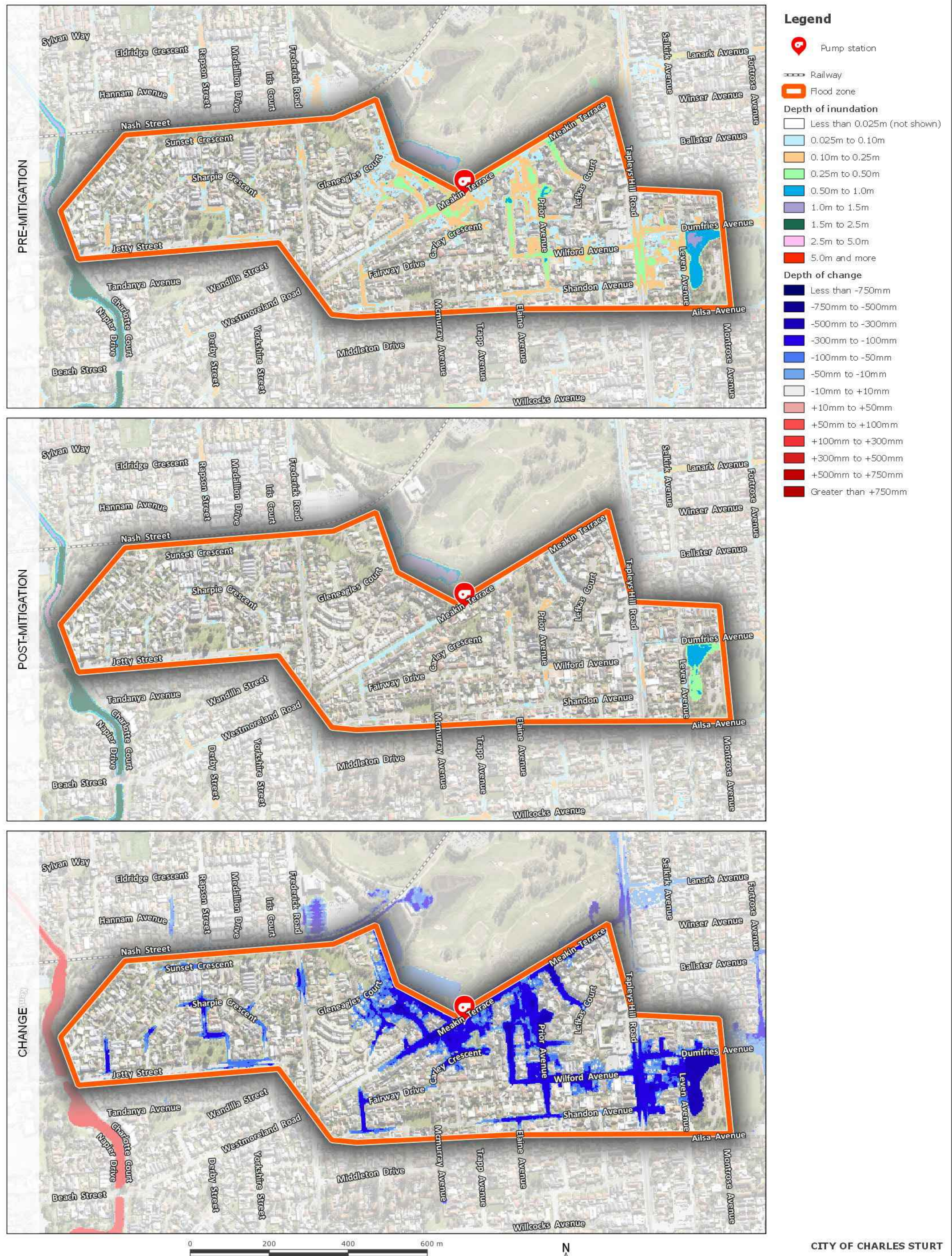
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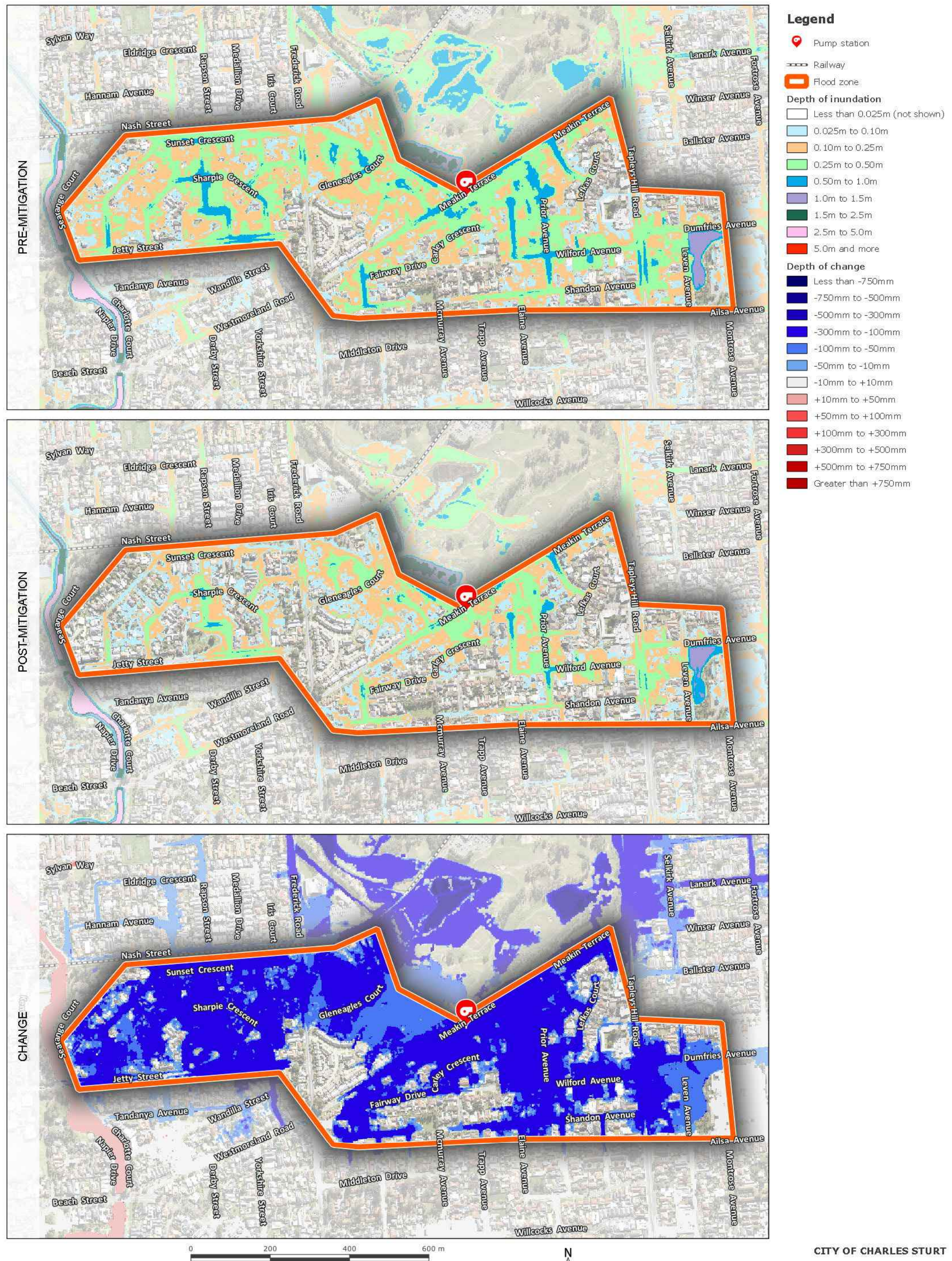
Data Acknowledgement:
Aerial imagery from City of Charles Sturt, 2019
Roads and railways from Data SA, 2019



WEST LAKES STORMWATER MANAGEMENT PLAN
OVERVIEW OF STRUCTURAL MITIGATION STRATEGIES

Figure 6.1







6.1.2 Crittenden Road to Grange Lakes pipe upgrades

The area in the vicinity of the Findon Road and Crittenden Road intersection has a documented history of flooding. The potential for flooding was also identified by the flood mapping undertaken during the development of this SMP.

Two separate drainage systems service this area. The upstream end of the Trimmer Parage system drains Findon Road in a northerly direction. This system diverts runoff into the existing underground storage within Don Klaebe Reserve before heading west along Trimmer Parade. Upgrades of this system are not proposed. The second drainage network commences within Crittenden Road and conveys runoff from the eastern portion of the catchment in a southerly direction along Findon Road, before heading in a westerly direction to a direct outlet to Grange Lakes at the western end of Brogan Court.

A number of options were considered to mitigate the flooding issues at this location. Options that were considered included localised pipe upgrades and additional detention within the contributing catchment. However, the results of the modelling indicated that the primary issue contributing to the flooding is the limited capacity of the downstream trunk drainage system. Only minimal flood mitigation benefits could be realised with the implementation of local drainage upgrades.

The modelling indicates that the upgrade of the entire downstream drainage network to the Grange Lakes outlet (a total distance of approximately 5.5 km) is required to provide a measurable reduction in flooding in the vicinity of Crittenden Road and Findon Road. The preliminary modelling indicates that the existing capacity of the trunk drainage network would need to be tripled. Increased inlet capacity, through the provision of additional inlet pits is also required within the areas of existing flooding. Opportunity exists to incorporate raingardens along the length of the pipe upgrade, to improve water quality and promote urban greening.

An alternative drainage alignment was also explored, with flows diverted south along Findon Road with an outlet to the River Torrens. While this would potentially reduce the pipe upgrade distance to approximately 3 km, review of the elevation profile along the alignment shows that terrain increases from an elevation of 7.2 mAHD at the low point near Crittenden Road to 10 mAHD at the river.

The maximum invert of the upstream end of the pipe would be 5.6 mAHD. Assuming 0.2% grade to the Torrens, the invert of the outfall would be below 0 mAHD. By comparison, the invert of the River in this area is in the order of 2 mAHD. On this basis, the diversion of flows to the Torrens is not considered to be practicable.

The layout of the recommended upgrades is shown in Figure 6.5. The impact of the proposed upgrades on the 20% AEP and 1% AEP flood extents is shown in Figure 6.6 and Figure 6.7, respectively.

In the 20% AEP event, reductions in flood depths of up to 200 mm are observed within both Findon Road and Crittenden Road. Upgrading this system also alleviates some of the pressure from the Findon Road network to the north and the Lillian Street/Amanda Avenue network to the east; reductions of up to 150 mm are observed within these areas. Additionally, the increased capacity allows flood depths to be reduced within Briese Court (known area of flooding) by approximately 70 mm (although flood depths above kerb height are still observed within the low spot in the street).

Significant benefits are also achieved further downstream along the proposed route of the pipe upgrade, especially within the vicinity of McAllan Avenue, Seaton (approximately 1.1 km west of the intersection of Findon Road and Crittenden Road). The flood modelling for the pre- and post-mitigation scenarios shows that there are at least 14 residential properties in this area that will no longer be subject to the entry of floodwaters in the 20% AEP event. A change map for this section of the catchment is provided in Figure 6.8.

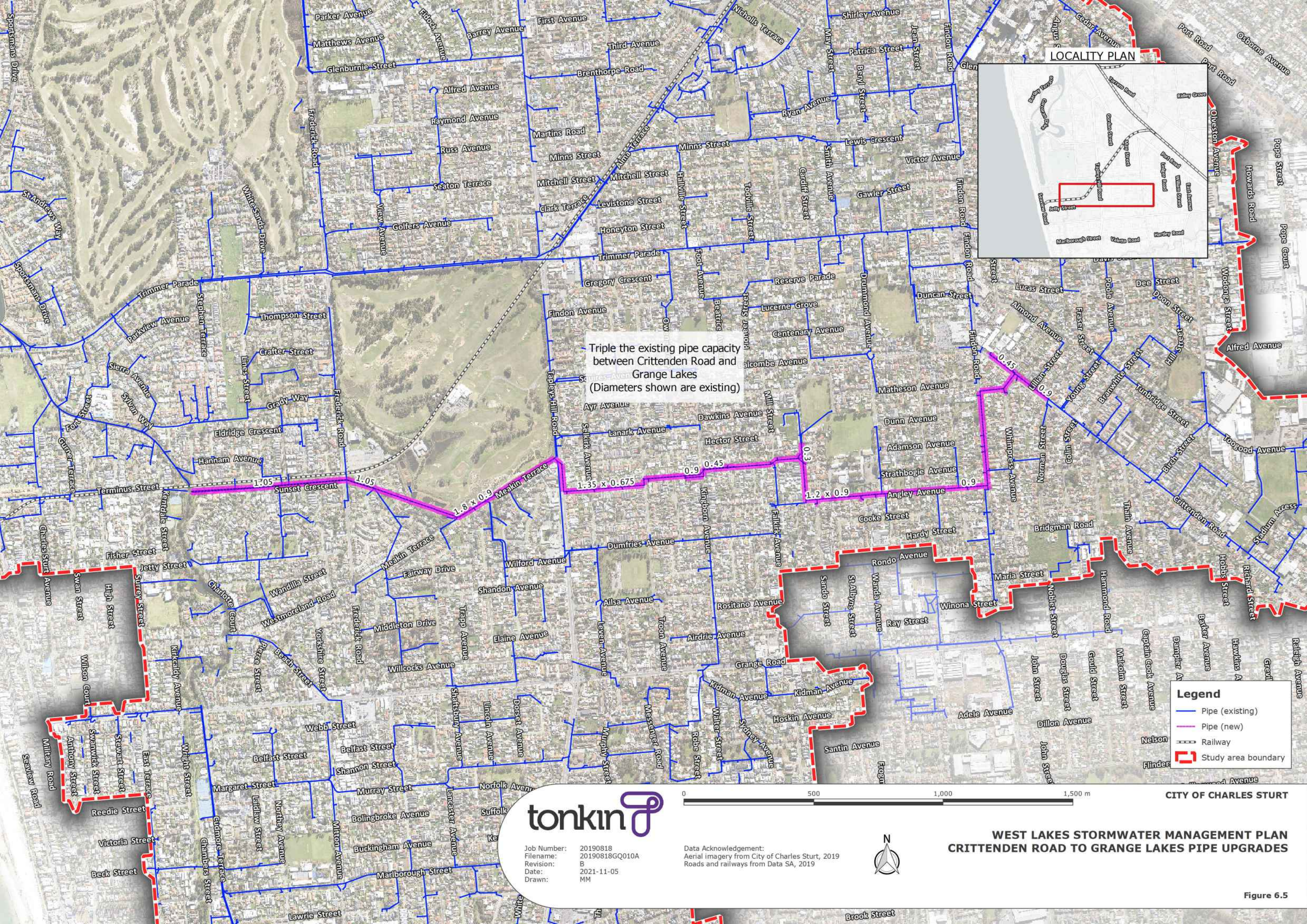
Additionally, Council has previously identified flooding issues within Gluyas Avenue, Grange. Previous investigations (Tonkin, 2017) identified that works were required to lower the hydraulic grade line (HGL)



in the trunk drainage system to improve flooding within this area. The proposed Crittenden Road to Grange Lakes pipe upgrades achieve this, and will result in reductions in flood depths within Gluyas Avenue for the 20% AEP event.

It is recognised that there are a number of challenges associated with such extensive pipe upgrades through heavily developed areas, not least of which is capital costs and the presence of existing services. Consideration should be given to constructing the upgrades within the reserve adjacent Sunset Crescent, and within open land along the edge golf course. Alternative alignments for the upstream sections of pipe may also be considered. During the subsequent design phases, consideration should be given to alternative pipe configurations, including a reduced number of pipes with a larger diameter.

The flooding improvements realised by construction of the Gleneagles Reserve underground tank (Section 6.1.1) and Matheson Reserve underground tank (Section 6.1.4) are not dependent on these pipe upgrades being completed.



Triple the existing pipe capacity between Crittenden Road and Grange Lakes (Diameters shown are existing)

LOCALITY PLAN

Legend

- Pipe (existing)
- Pipe (new)
- Railway
- Study area boundary



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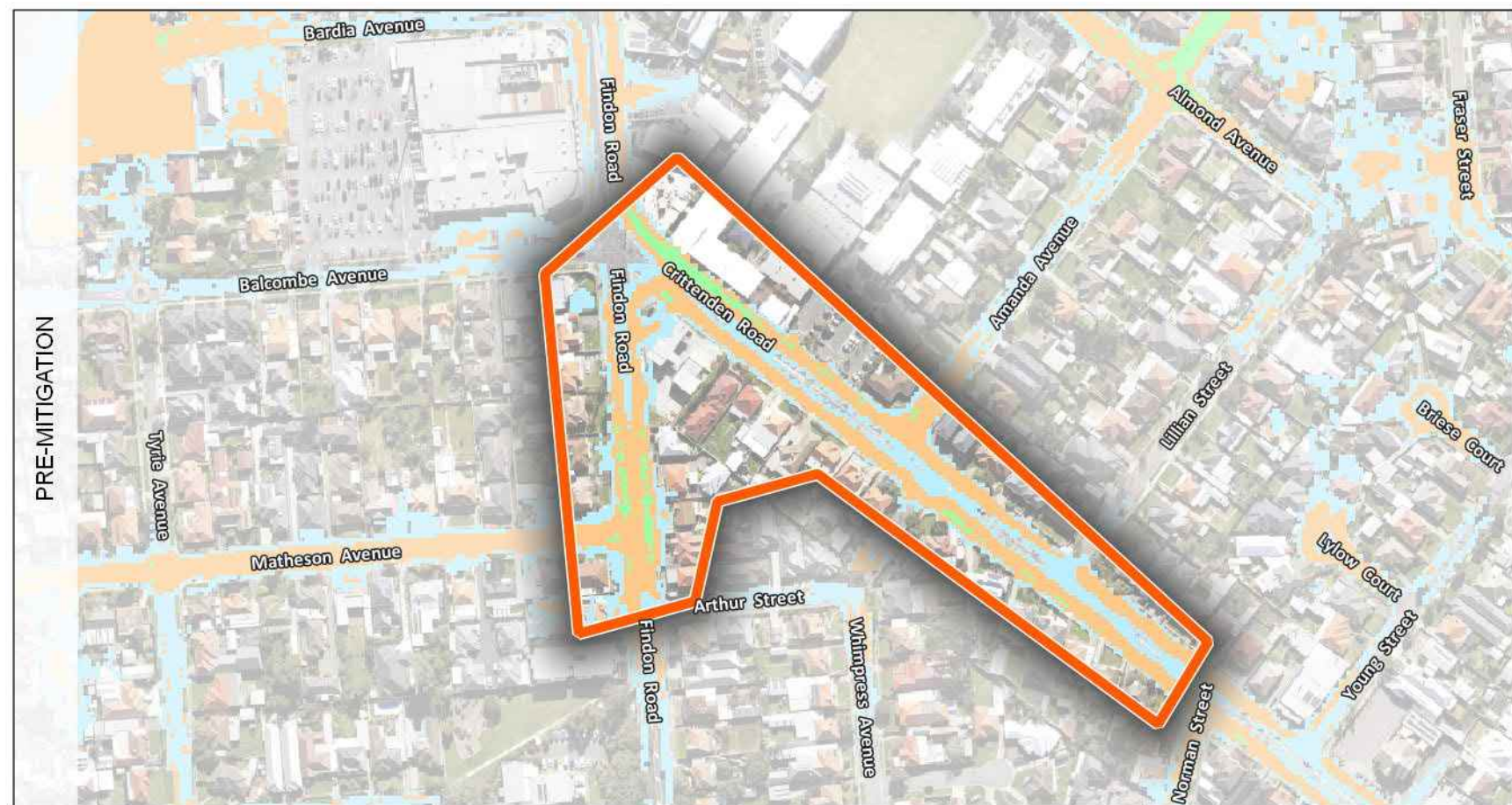
Data Acknowledgement:
Aerial imagery from City of Charles Sturt, 2019
Roads and railways from Data SA, 2019



WEST LAKES STORMWATER MANAGEMENT PLAN
CRITTENDEN ROAD TO GRANGE LAKES PIPE UPGRADES

CITY OF CHARLES STURT

Figure 6.5



Legend

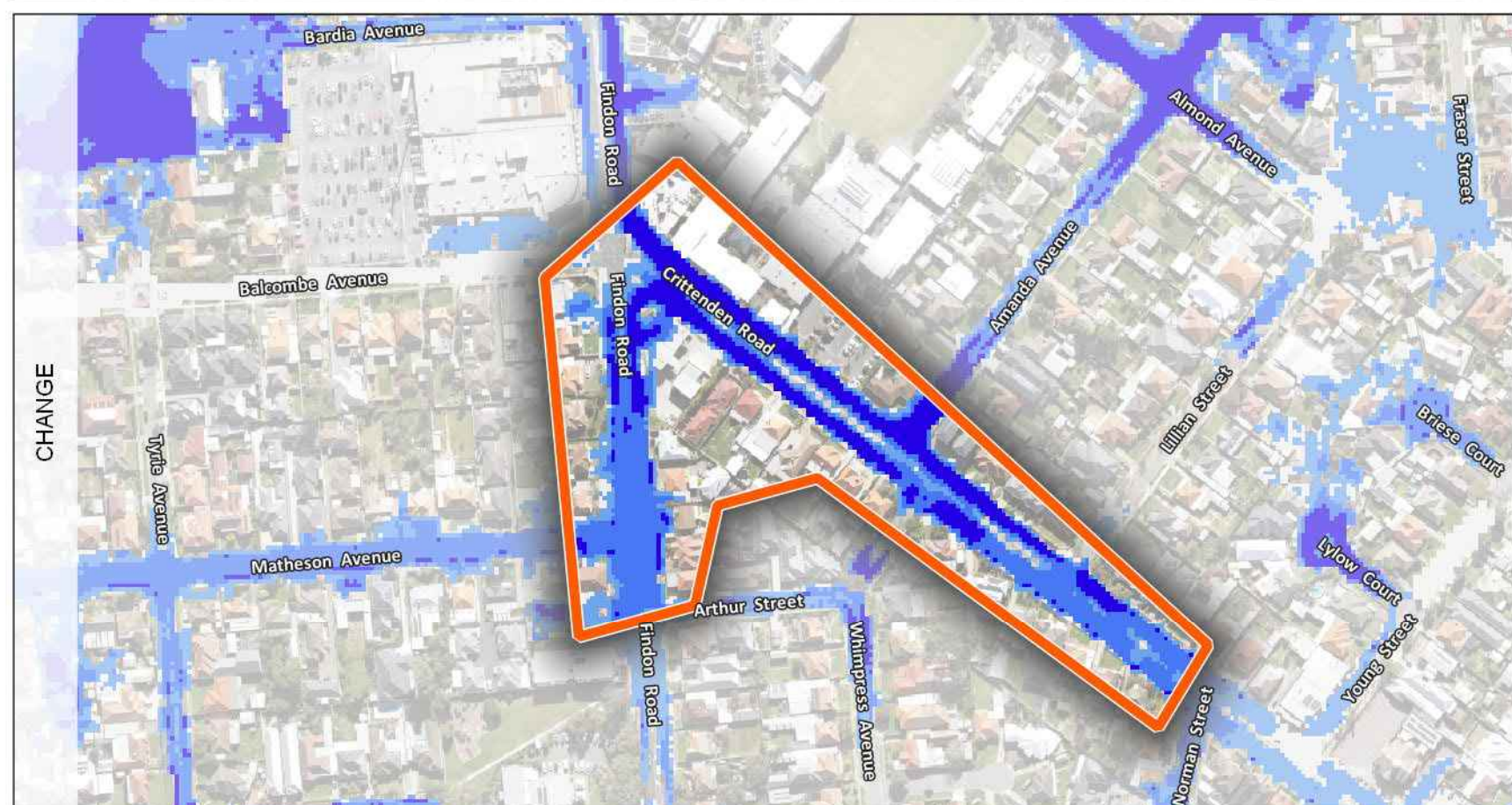
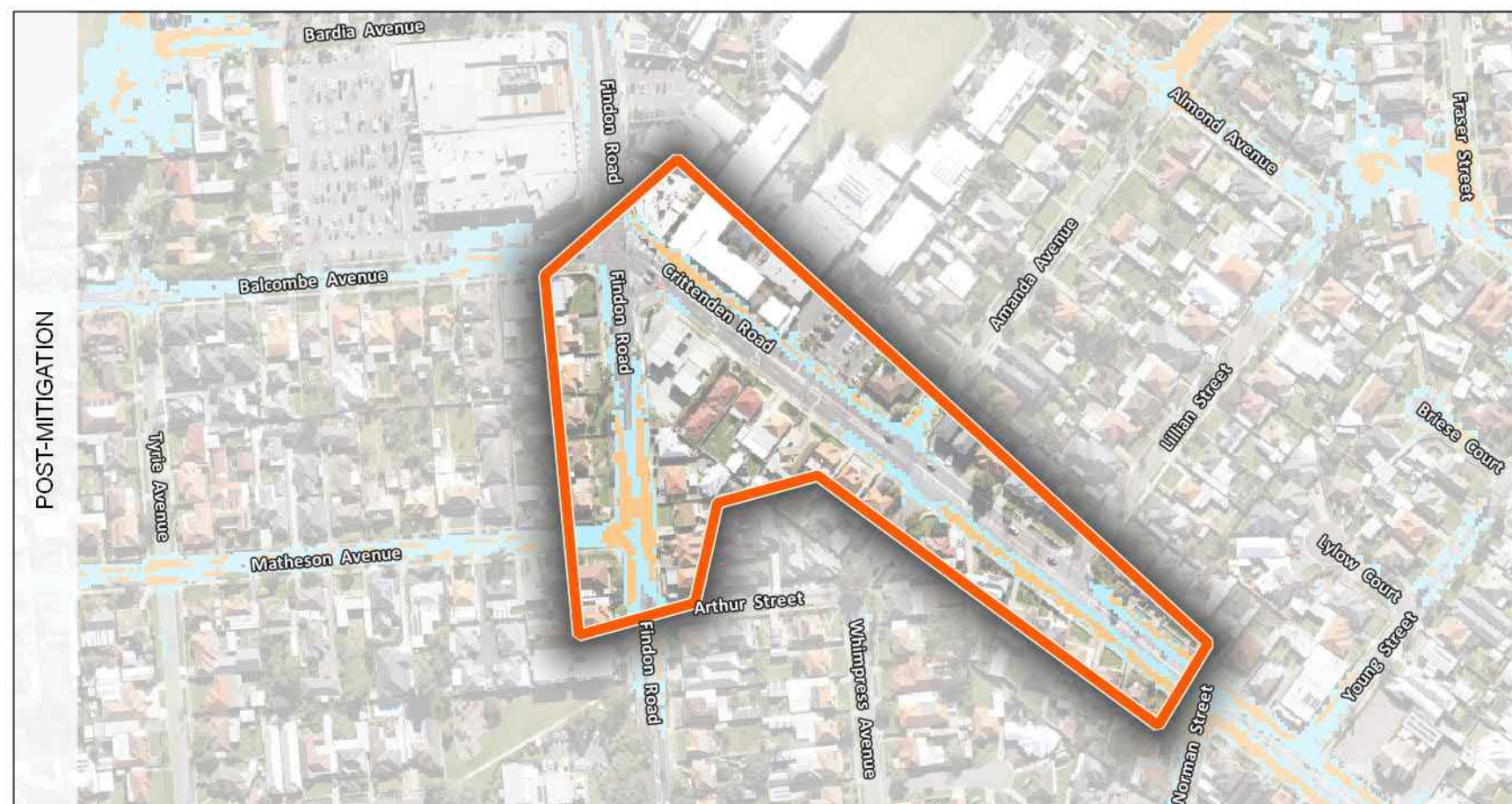
Flood zone

Depth of inundation

- Less than 0.025m (not shown)
- 0.025m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more

Depth of change

- Less than -750mm
- 750mm to -500mm
- 500mm to -300mm
- 300mm to -100mm
- 100mm to -50mm
- 50mm to -10mm
- 10mm to +10mm
- +10mm to +50mm
- +50mm to +100mm
- +100mm to +300mm
- +300mm to +500mm
- +500mm to +750mm
- Greater than +750mm



0 100 200 300 m



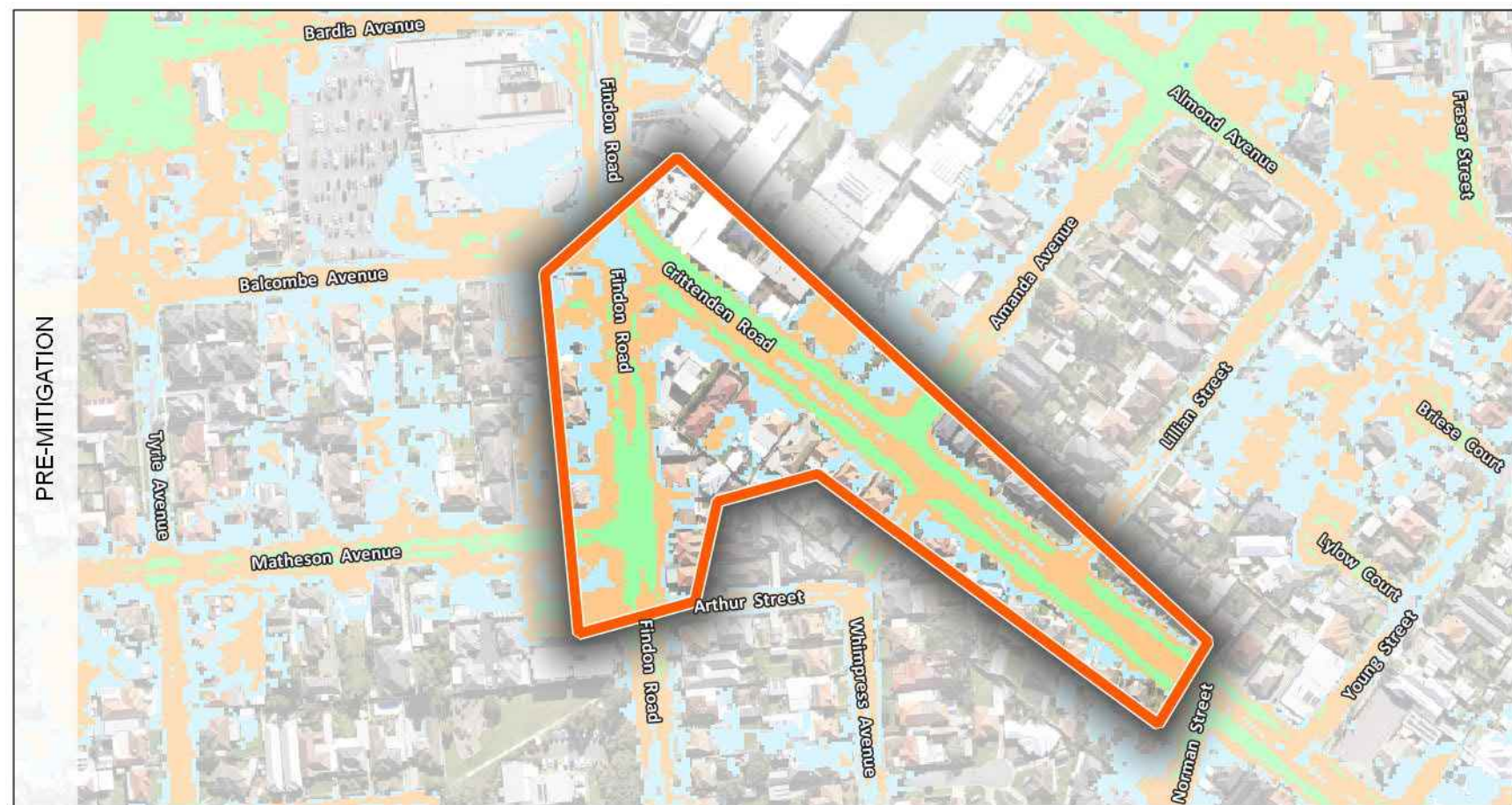
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Data Acknowledgement:
Aerial imagery from City of Charles Sturt, 2019
Roads and railways from Data SA, 2019

**WEST LAKES STORMWATER MANAGEMENT PLAN
CRITTENDEN ROAD TO GRANGE LAKES PIPE UPGRADES
20% AEP CHANGE MAP**



Legend

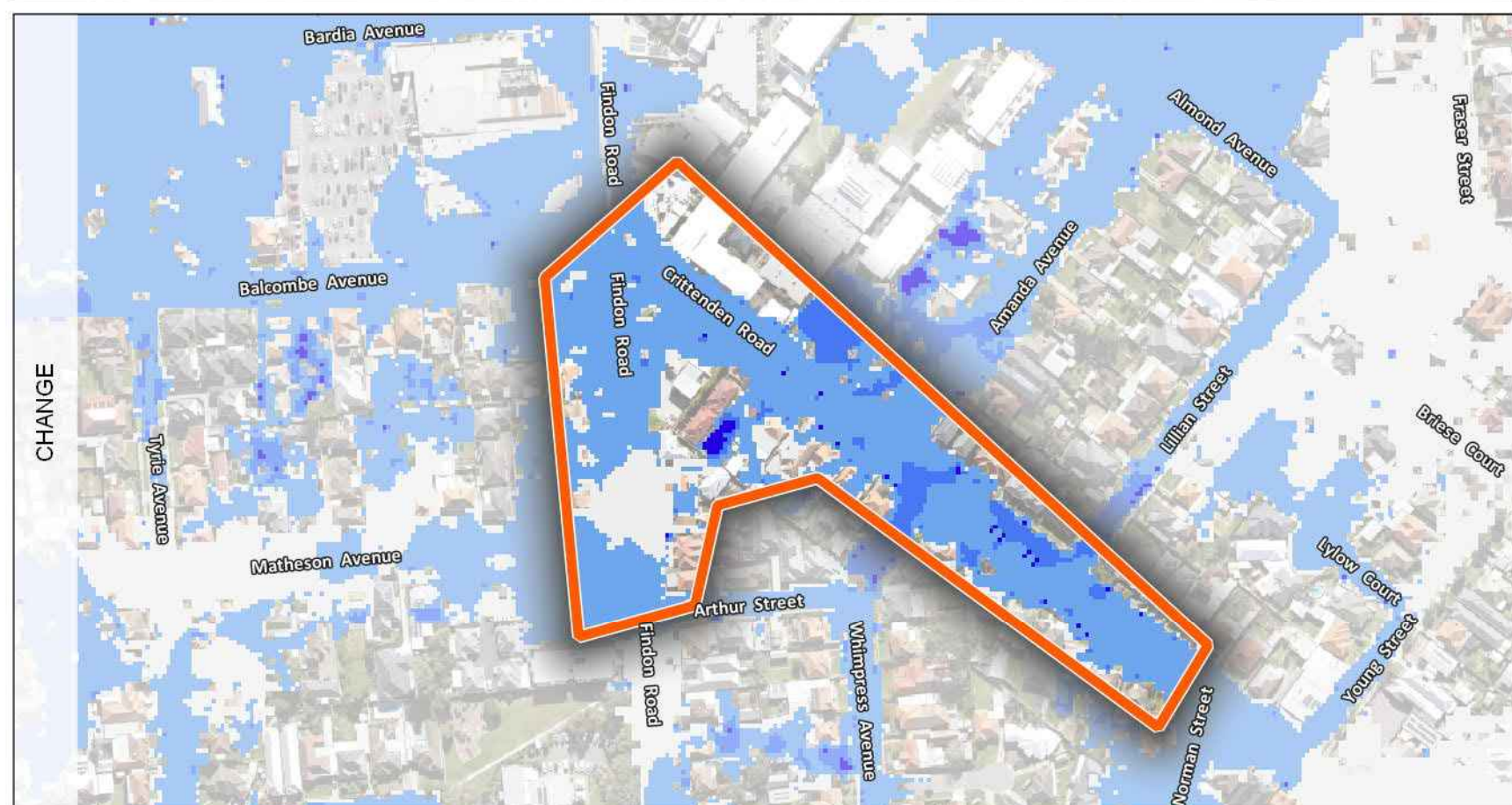
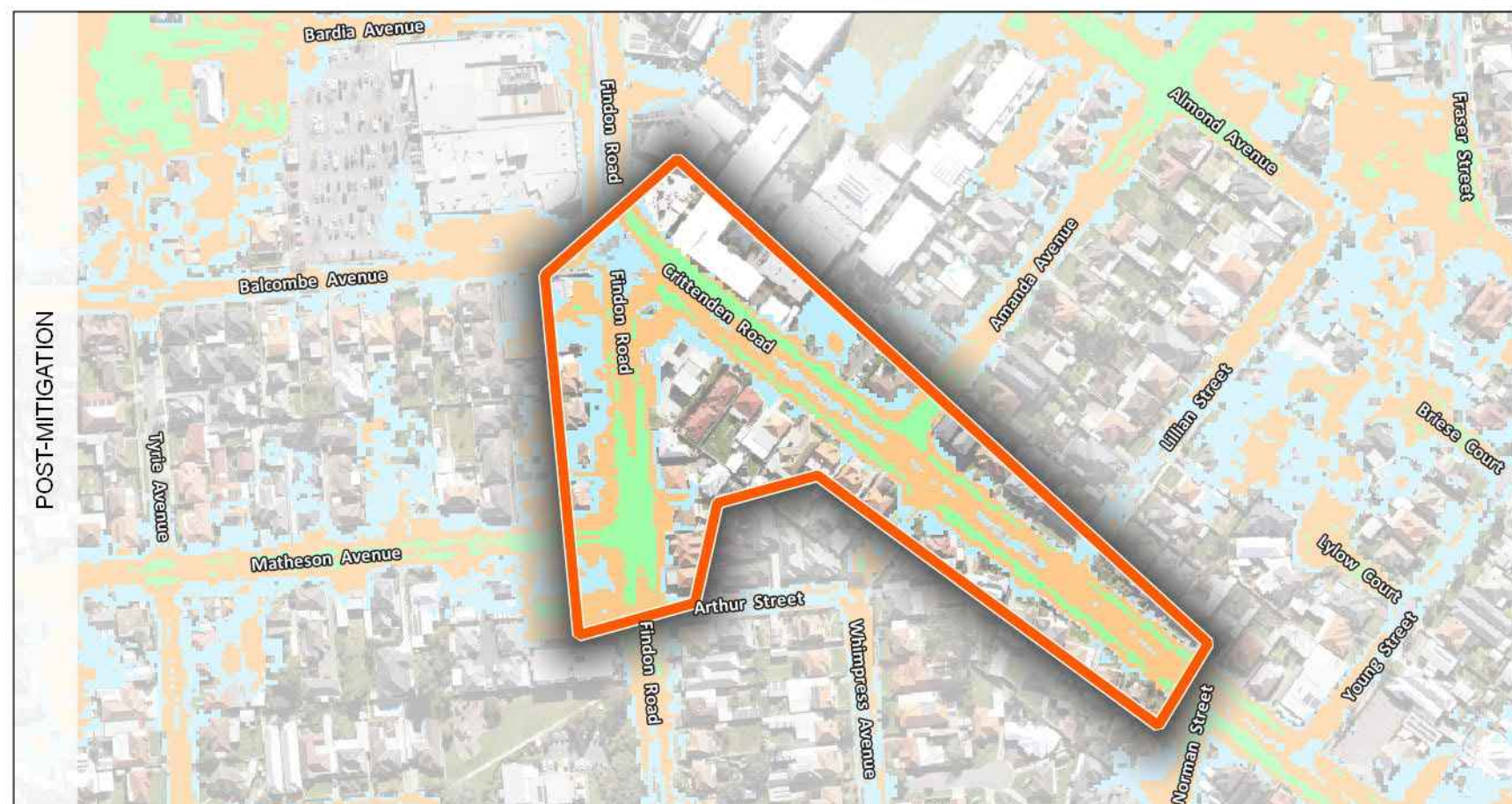
Flood zone

Depth of inundation

Less than 0.025m (not shown)
 0.025m to 0.10m
 0.10m to 0.25m
 0.25m to 0.50m
 0.50m to 1.0m
 1.0m to 1.5m
 1.5m to 2.5m
 2.5m to 5.0m
 5.0m and more

Depth of change

Less than -750mm
 -750mm to -500mm
 -500mm to -300mm
 -300mm to -100mm
 -100mm to -50mm
 -50mm to -10mm
 -10mm to +10mm
 +10mm to +50mm
 +50mm to +100mm
 +100mm to +300mm
 +300mm to +500mm
 +500mm to +750mm
 Greater than +750mm



0 100 200 300 m



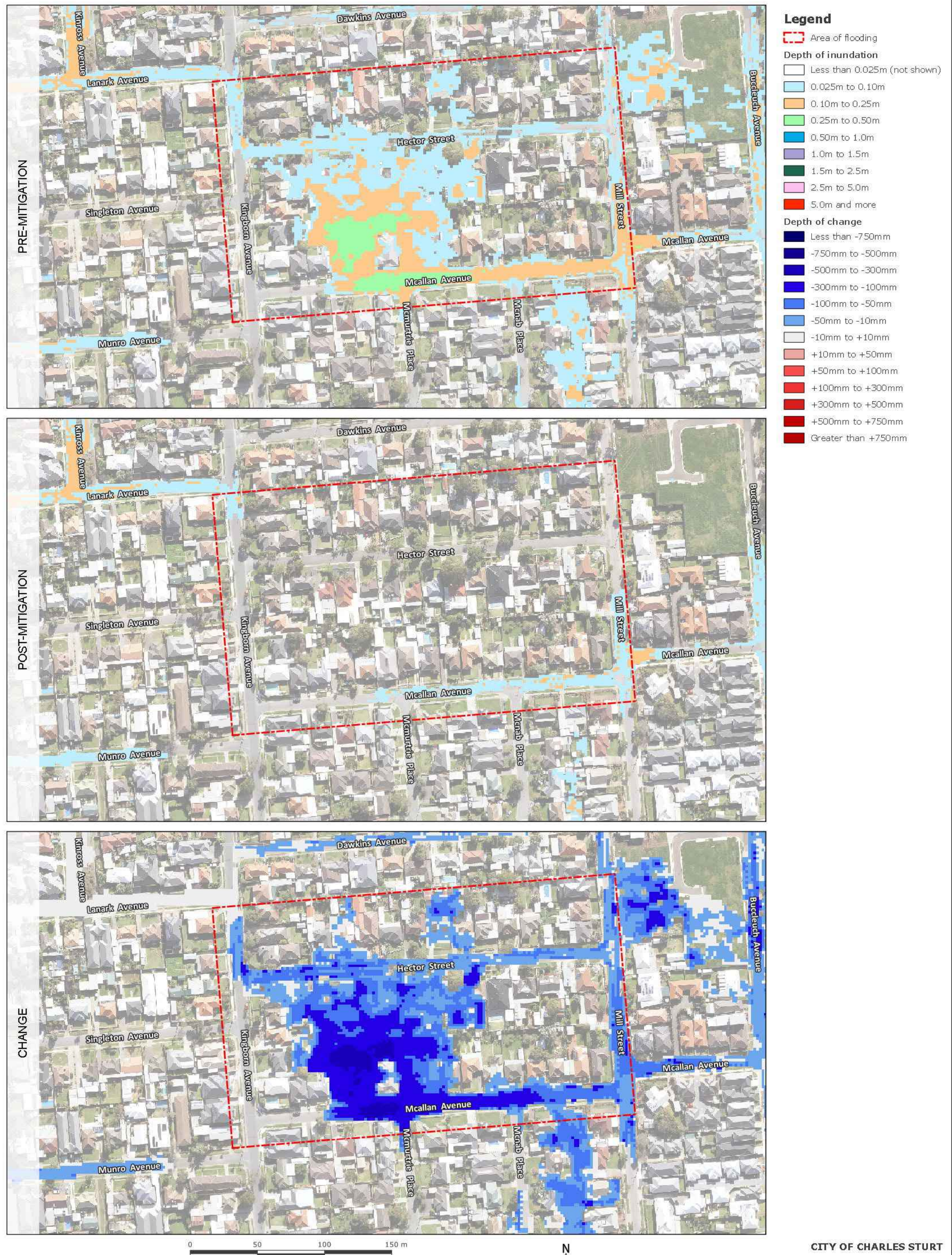
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Data Acknowledgement:
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 Roads and railways from Data SA, 2019

WEST LAKES STORMWATER MANAGEMENT PLAN CRITTENDEN ROAD TO GRANGE LAKES PIPE UPGRADES 1% AEP CHANGE MAP





6.1.3 Beatrice Avenue and Trimmer Parade pipe upgrades

Flooding within the area surrounding Beatrice Avenue is a known issue, which has been confirmed by the flood mapping undertaken as part of the development of this SMP. The area is currently served by a local drainage network (pipe sizes up to DN525), which connects to the Trimmer Parade trunk drain. In order to alleviate the flooding within this area, improving the capacity of this existing drainage network is proposed.

During the development of the SMP, a number of options looking at localised upgrades were assessed, however it was determined that the effectiveness of these upgrades was limited by the downstream capacity of the Trimmer Parade trunk drain. Pipe upgrades within Trimmer Parade are required to provide a suitable level of flood protection to private property within the Beatrice Avenue area.

The required pipe upgrades are shown in Figure 6.9. The works include the following:

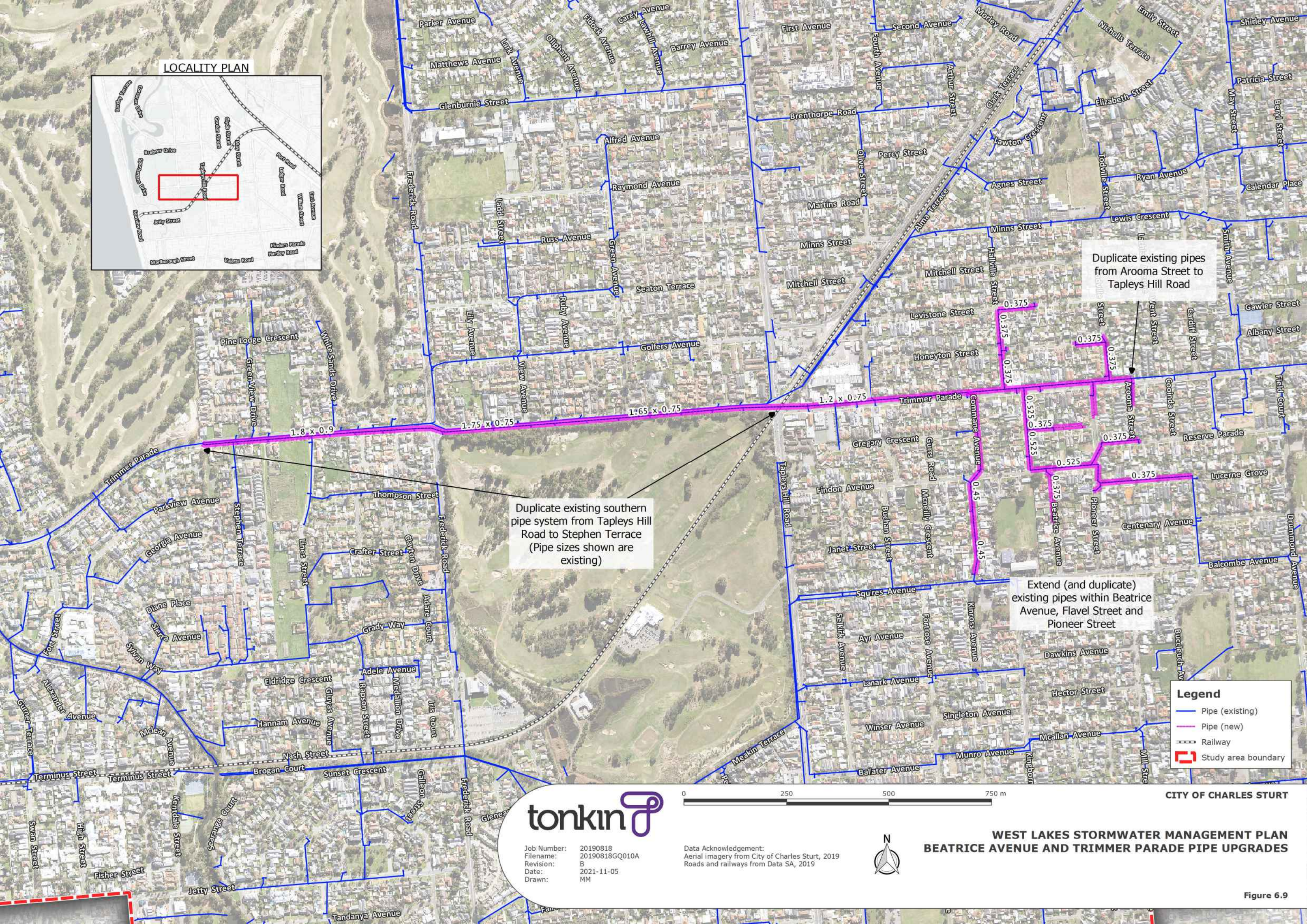
- Duplication of the lateral drains within and surrounding Beatrice Avenue.
- Extension of the drains within Beatrice Avenue, Flavel Street and Pioneer Street.
- Duplication of the Trimmer Parade trunk drain between Arooma Street and Tapleys Hill Road.
- Duplication of the southern Trimmer Parade trunk drain between Tapleys Hill Road and Stephen Terrace.

No upgrades of the Trimmer Parade trunk drain are proposed beyond Stephen Terrace as the modelling shows that the system has sufficient capacity from this point onwards (4x DN1500). The total length of pipe upgrade required is approximately 4.2 kilometres. In addition to the duplication of pipes, an increased inlet capacity will also be required in some locations, which can be achieved through the installation of additional inlet pits. Opportunities to incorporate water sensitive urban design elements should also be considered as part of the detailed design of the works.

As with the Crittenden Road pipe upgrades, it is recommended that a staged approach to construction be undertaken, with sections of the network constructed incrementally, beginning at the downstream end. Alternative pipe configurations, such as removal of the existing pipe network and replacement with pipes of a larger diameter, are also feasible; these details will be confirmed during detailed design.

The post-mitigation flood extents for the 20% AEP and 1% AEP events are shown in Figure 6.10 and Figure 6.11, respectively. The results for the 20% AEP event show that there is some residual flooding through private property within Beatrice Avenue and Pioneer Street. However, property flooding within the remaining streets is almost entirely alleviated, in addition to significant (100-200 mm) reductions in flood depth within the road corridors.

An assessment of the flooding benefits provided by an underground tank/detention basin within the Seaton Park Primary School was also undertaken (as an alternative to the pipe upgrade strategy). This would involve diversion of pipe flows from Beatrice Avenue into the school oval (identified as a nearby area of open space). It was found that this option provided some reduction in surrounding flood depths, but not to the extent of the pipe upgrades (generally less than 80 mm). It has therefore not considered further as part of this SMP, but could be considered as a standalone option to provide some reduction in flooding depending on the proposed construction timeframes for the recommended pipe upgrades.



Legend

- Pipe (existing)
- Pipe (new)
- Railway
- Study area boundary



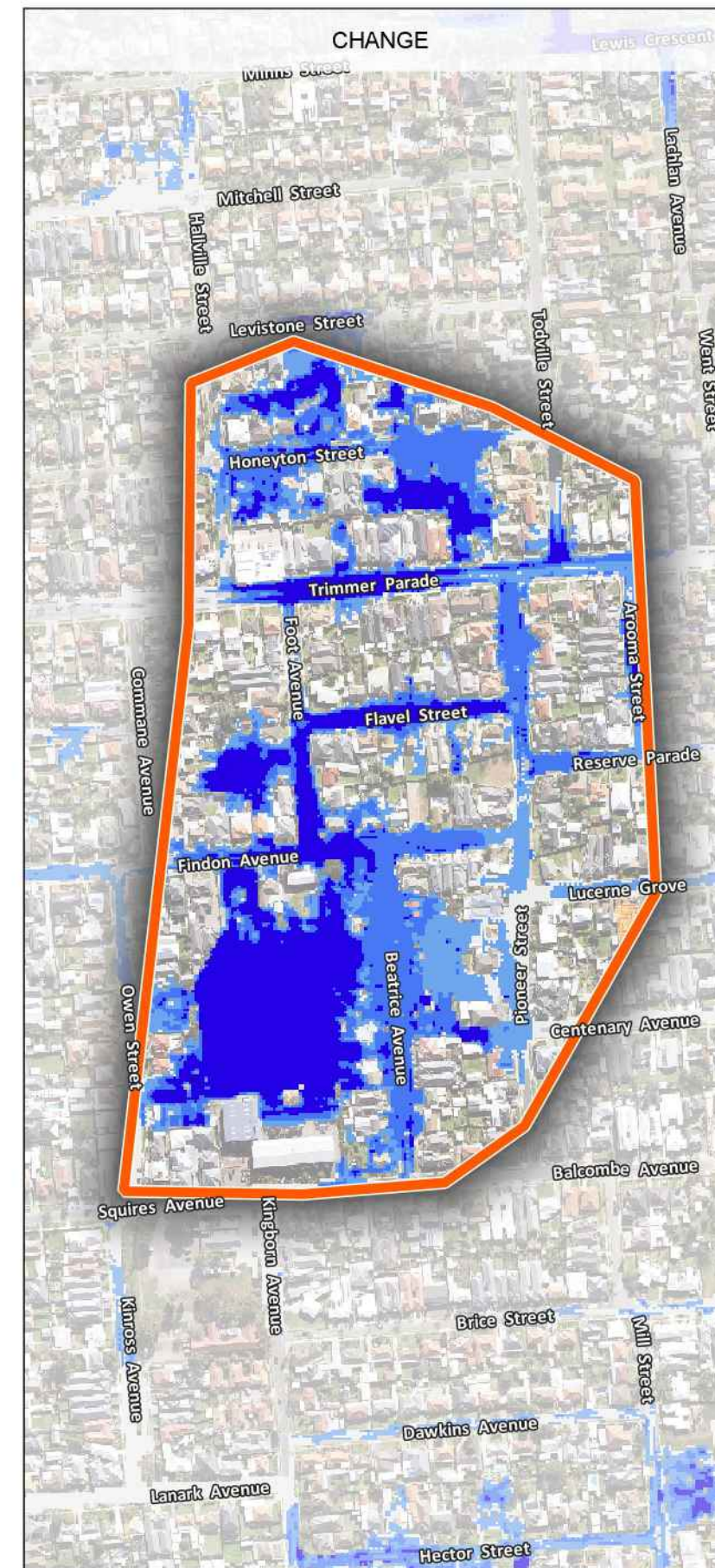
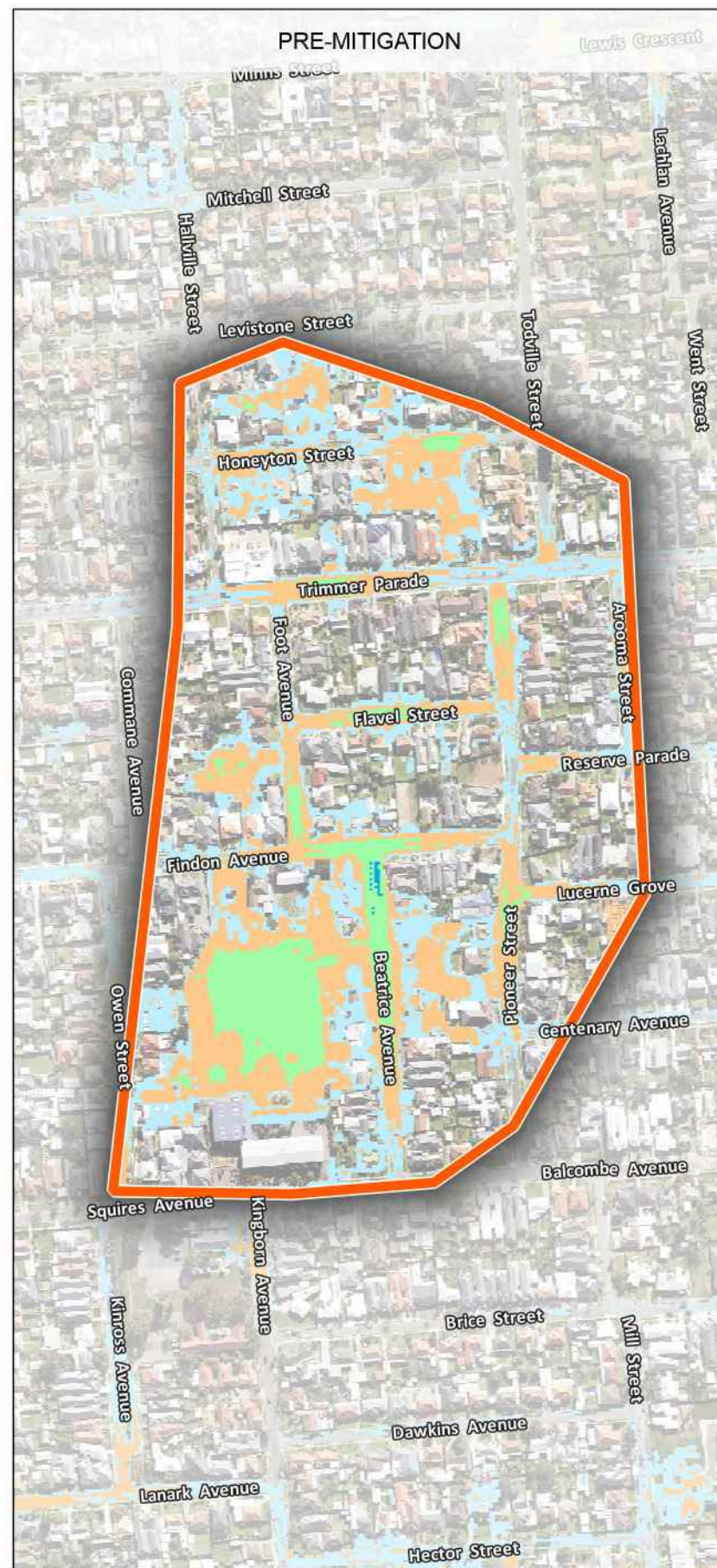
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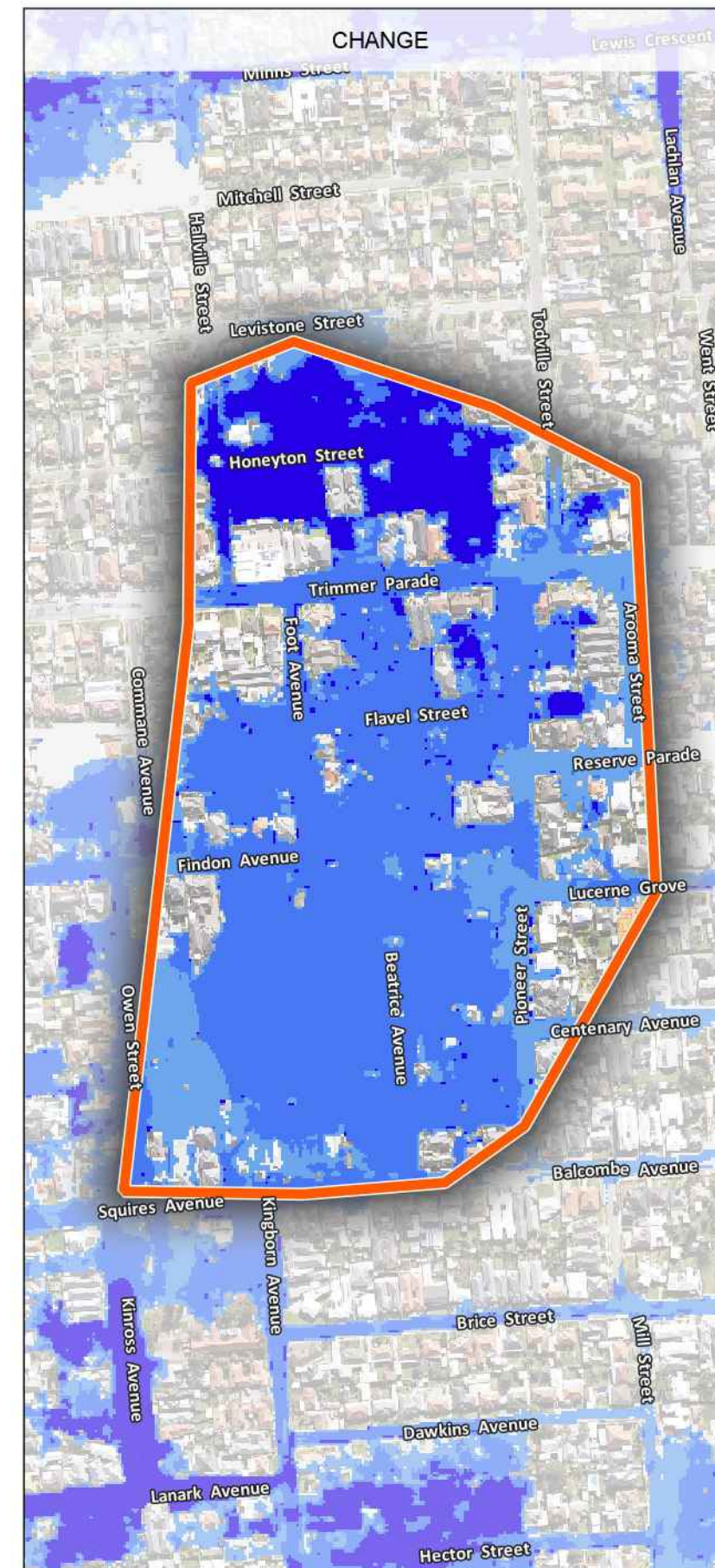
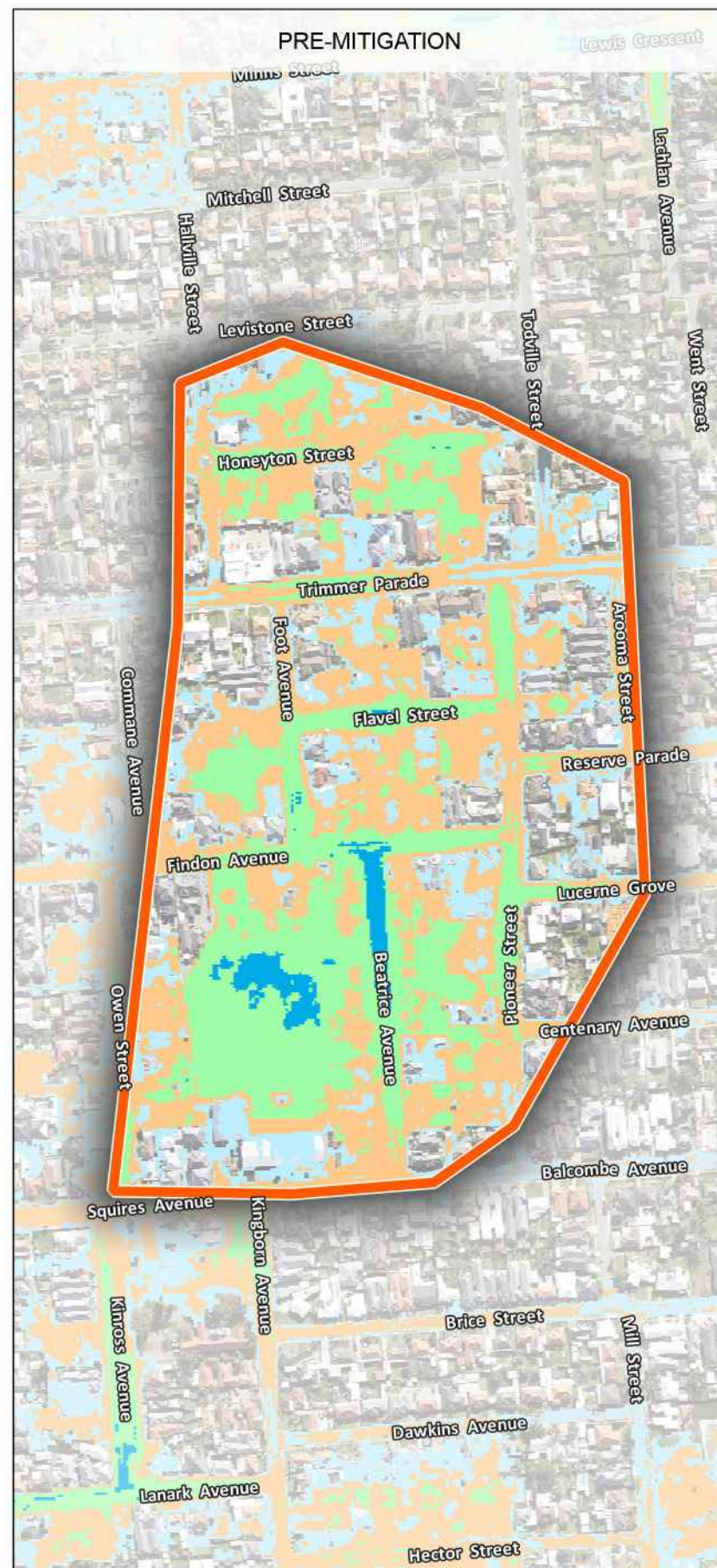


**WEST LAKES STORMWATER MANAGEMENT PLAN
 BEATRICE AVENUE AND TRIMMER PARADE PIPE UPGRADES**

Data Acknowledgement:
 Aerial imagery from City of Charles Sturt, 2019
 Roads and railways from Data SA, 2019

Figure 6.9







6.1.4 Matheson Reserve underground tank

There is significant ponding of runoff within Drummond Avenue and Dominion Avenue, in addition to some flooding of private property, during the 20% AEP event. Tonkin has previously undertaken an assessment of potential flood mitigation strategies within this area (Tonkin, 2016). It was found that upgrades to the existing pit and pipe drainage system would not reduce the incidence of flooding at the low spot. Given the adjacent area of open space within Matheson Reserve, an assessment of the flood mitigation benefits that could be provided by an underground tank within the reserve has been undertaken.

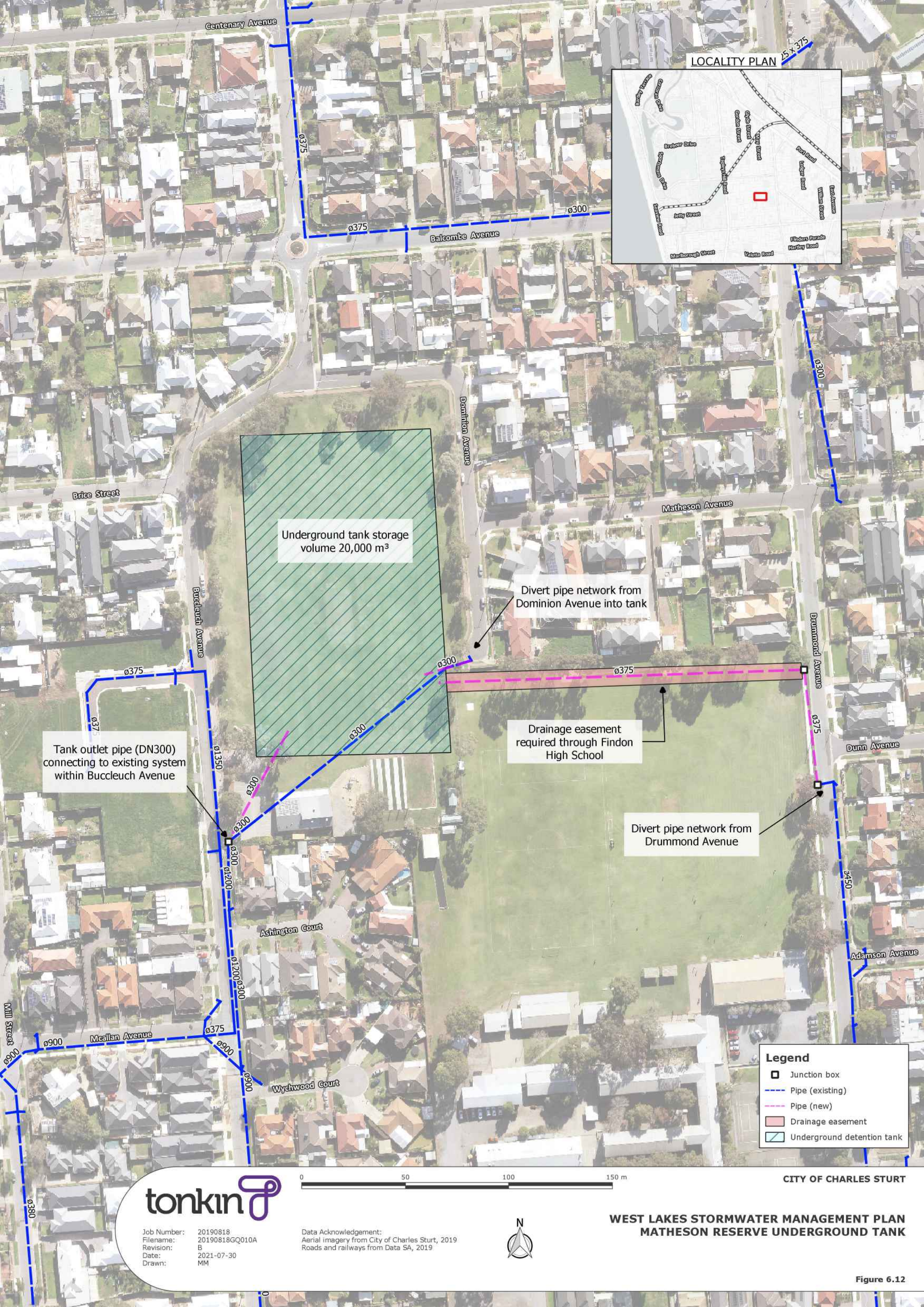
The flood modelling incorporated a detention tank with a storage volume of 20,000 m³. This volume is based on an assumed surface area of 10,000 m² and depth of 2 m. As with the Gleneagles Reserve underground tank, this storage could be constructed progressively to cater for the increased flows that will result from infill development within the upstream catchment.

The tank will receive inflows via diversion of the underground drainage network that begins at the southern end of Dominion Avenue and passes through the reserve (DN300), as well as the system that begins near the intersection of Drummond Avenue and Dunn Avenue (DN450). Diversion of the second system would require acquisition of a drainage easement through the Findon High School sports field. The outlet from the storage will connect into the existing drainage system in Buccleuch Avenue. The configuration of this proposed strategy is provided in Figure 6.12.

During the detailed design process, opportunities to incorporate infiltration (subject to site geotechnical conditions) and/or storage and reuse to provide water for irrigation of the reserve may be considered to increase the benefits associated with construction of the storage.

Difference maps for the 20% AEP and 1% AEP events are provided in Figure 6.13 and Figure 6.14, respectively. Results for the 20% AEP event show that there is no longer any flooding of private property within the vicinity of the proposed works. Additionally, within both Dominion Avenue and Drummond Avenue, significant reductions (greater than 300 mm within both roads) in the depth of ponding are observed. Some residual flooding at the low point within Drummond Road (adjacent to Dunn Avenue) remains.

A minor improvement (between 50-70 mm) in road and property flooding is achieved during the 1% AEP event.



LOCALITY PLAN 15 x 375

Underground tank storage
volume 20,000 m³

Divert pipe network from
Dominion Avenue into tank

Drainage easement
required through Findon
High School

Divert pipe network from
Drummond Avenue

Tank outlet pipe (DN300)
connecting to existing system
within Buccleuch Avenue

- Legend**
- Junction box
 - Pipe (existing)
 - Pipe (new)
 - Drainage easement
 - ▨ Underground detention tank



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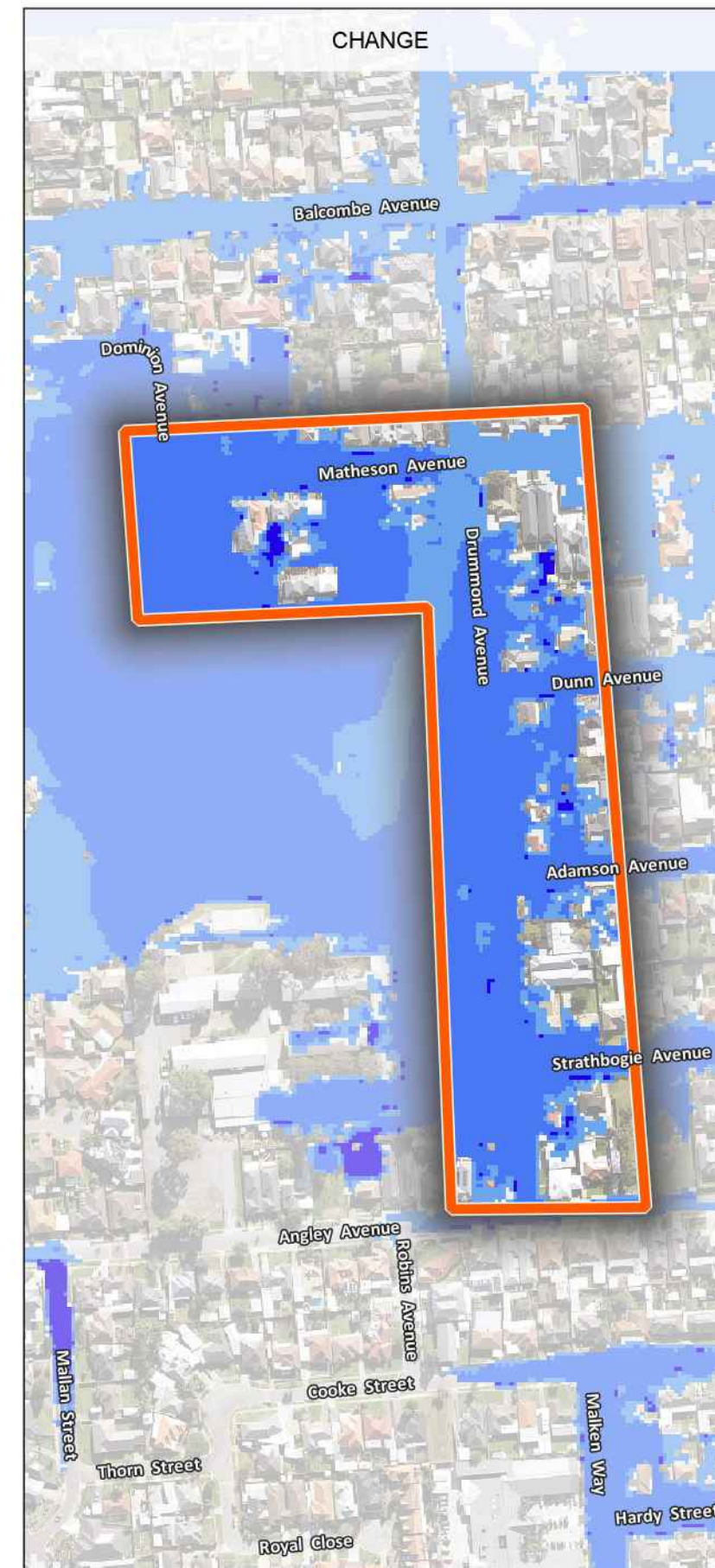
Data Acknowledgement:
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**WEST LAKES STORMWATER MANAGEMENT PLAN
MATHESON RESERVE UNDERGROUND TANK**

Figure 6.12





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Data Acknowledgement:
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**WEST LAKES STORMWATER MANAGEMENT PLAN
 MATHESON RESERVE UNDERGROUND TANK
 1% AEP CHANGE MAP**

Figure 6.14



6.1.5 Frank Mitchell Reserve underground tank

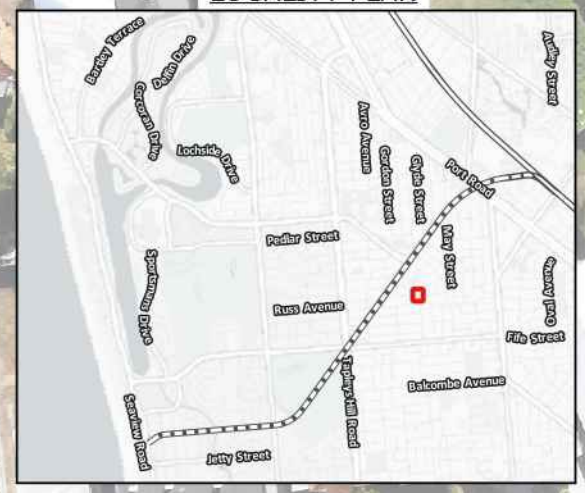
Modelling undertaken to assess options to reduce flooding in the vicinity of Todville Street identified the option of an underground detention storage within Frank Mitchell Reserve. The park was identified as a suitable location for the construction of an underground storage given its close proximity to the area of flooding. The modelling utilised a storage volume in the order of 36,000 m³, with a nominal footprint of 12,000 m² and depth of 3 m. Diversion of flows into the reserve will be via the DN1350 pipe at the intersection of Todville Street and Ryan Avenue. The outlet from this tank will then connect back into this existing system further downstream. The layout of this proposed upgrade is shown in Figure 6.15, while the changes in flooding for the 20% AEP and 1% AEP events are shown in Figure 6.16 and Figure 6.17, respectively.

Results for the 20% AEP event show that the construction of the tank results in reductions in flood depth of approximately 300 mm at the low point within Todville Street (adjacent to Ryan Avenue) as well as some improvements within Ryan Avenue and Minns Street. The 1% AEP event flood map shows that the tank also provides additional downstream benefits, with flooding improvements observed towards Alma Terrace and the railway line.

As with the other proposed tank storages, opportunities for water harvesting and reuse as well as infiltration should be considered during the design development.



LOCALITY PLAN



tonkin

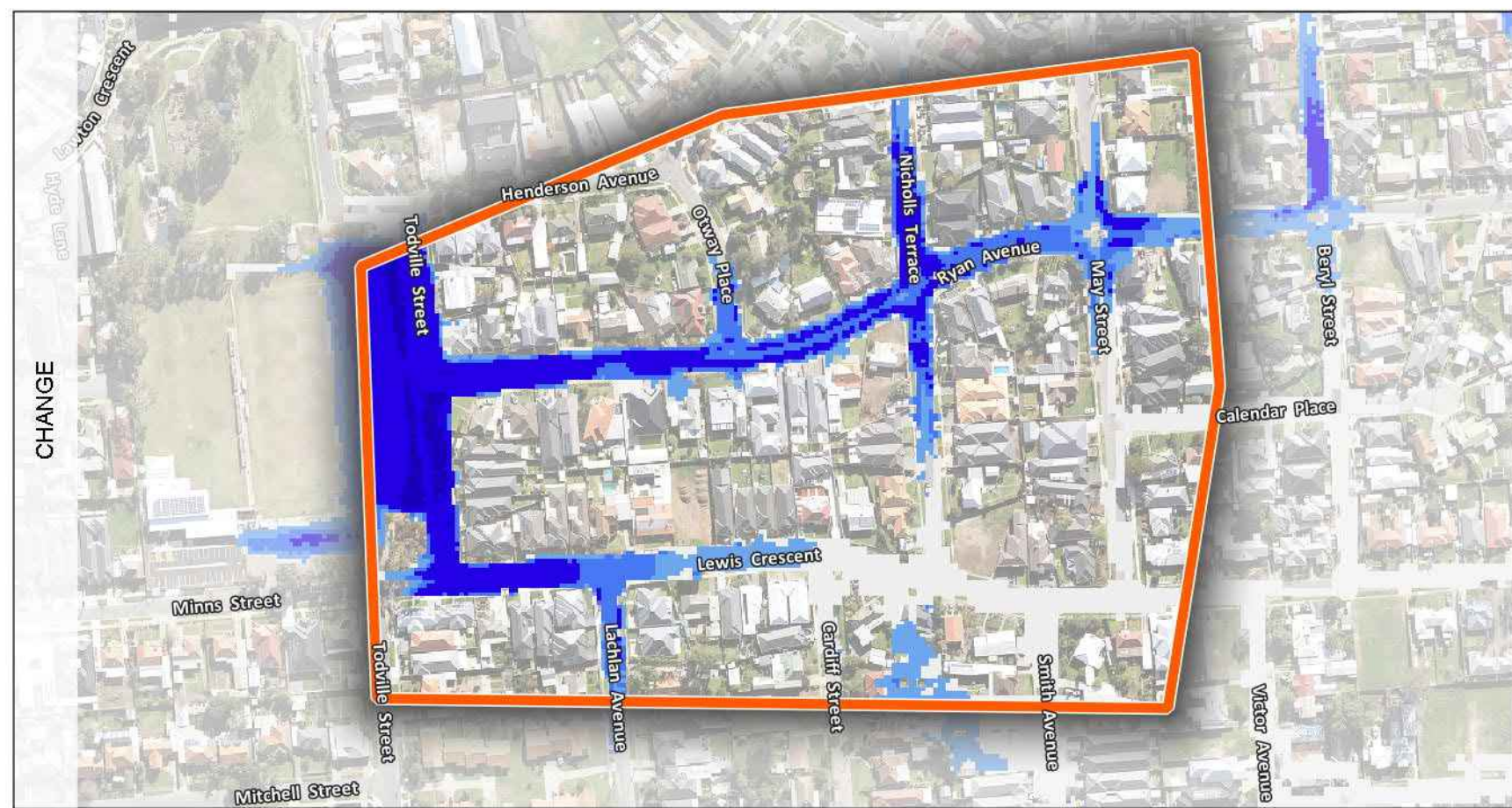
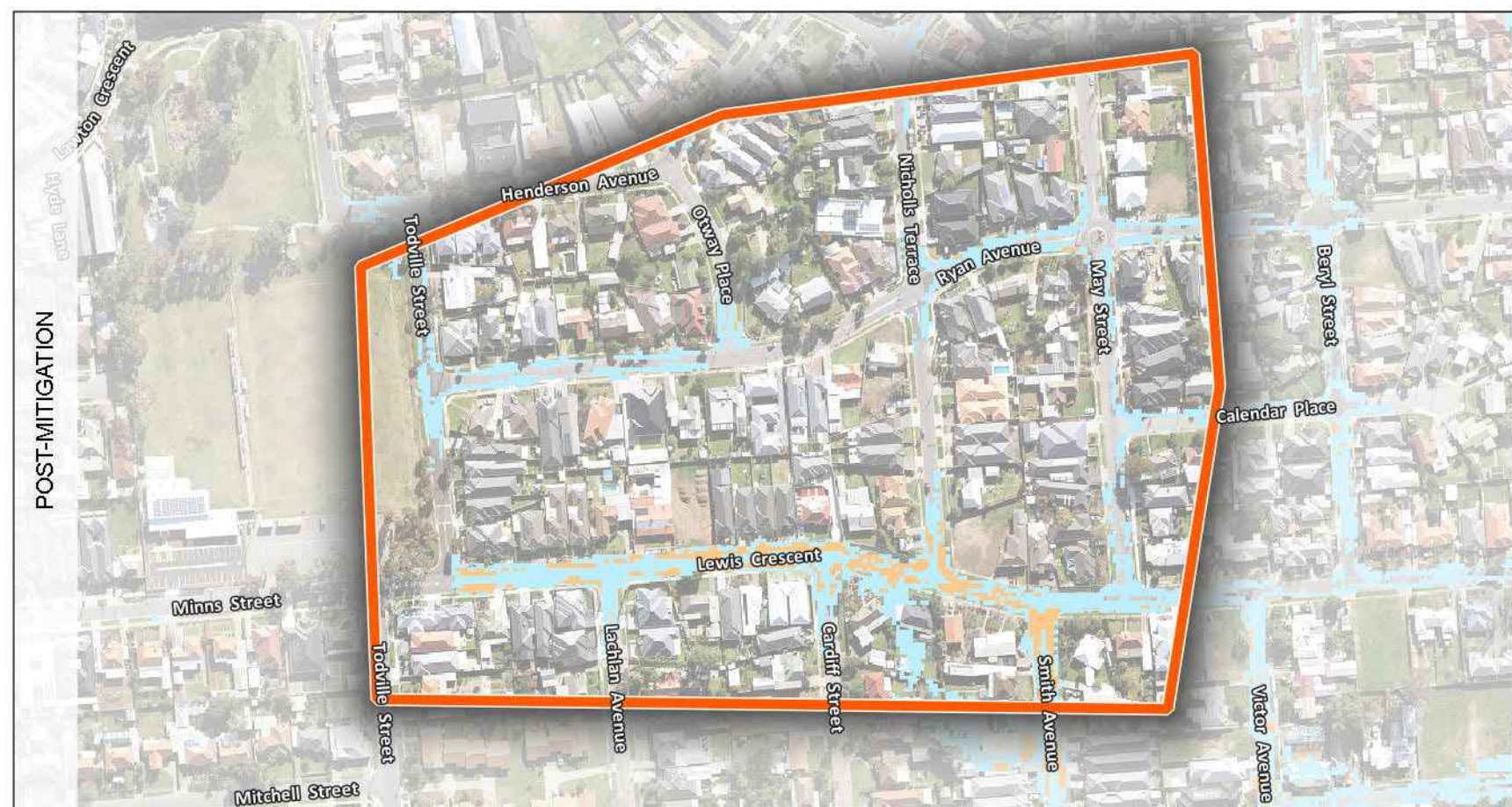
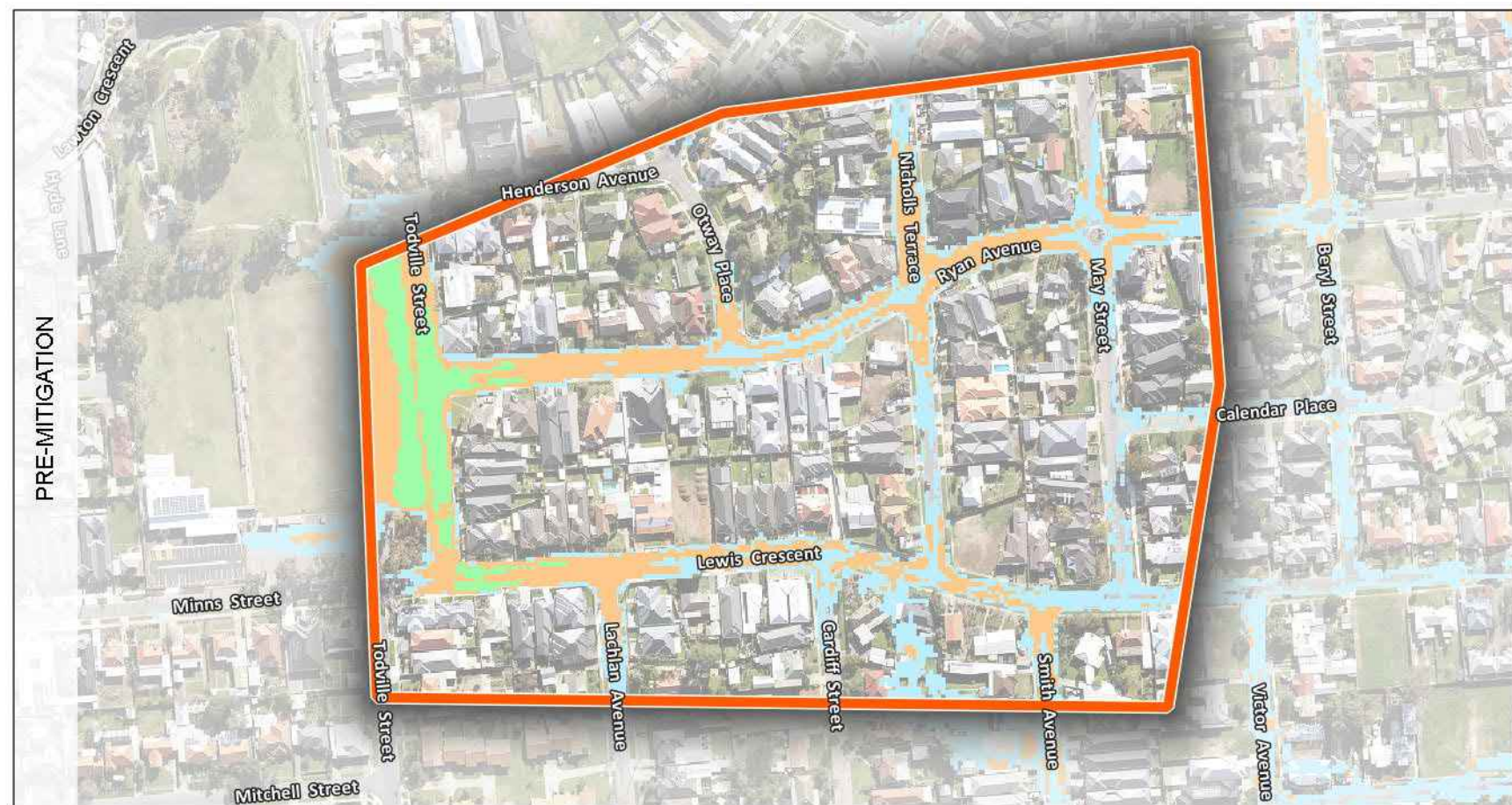
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Data Acknowledgement:
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Roads and railways from Data SA, 2019



**WEST LAKES STORMWATER MANAGEMENT PLAN
FRANK MITCHELL RESERVE UNDERGROUND TANK**

Figure 6.14



Legend

 Flood zone

Depth of inundation

- Less than 0.025m (not shown)
- 0.025m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more

Depth of change

- Less than -750mm
- 750mm to -500mm
- 500mm to -300mm
- 300mm to -100mm
- 100mm to -50mm
- 50mm to -10mm
- 10mm to +10mm
- +10mm to +50mm
- +50mm to +100mm
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- +300mm to +500mm
- +500mm to +750mm
- Greater than +750mm

0 100 200 300 m



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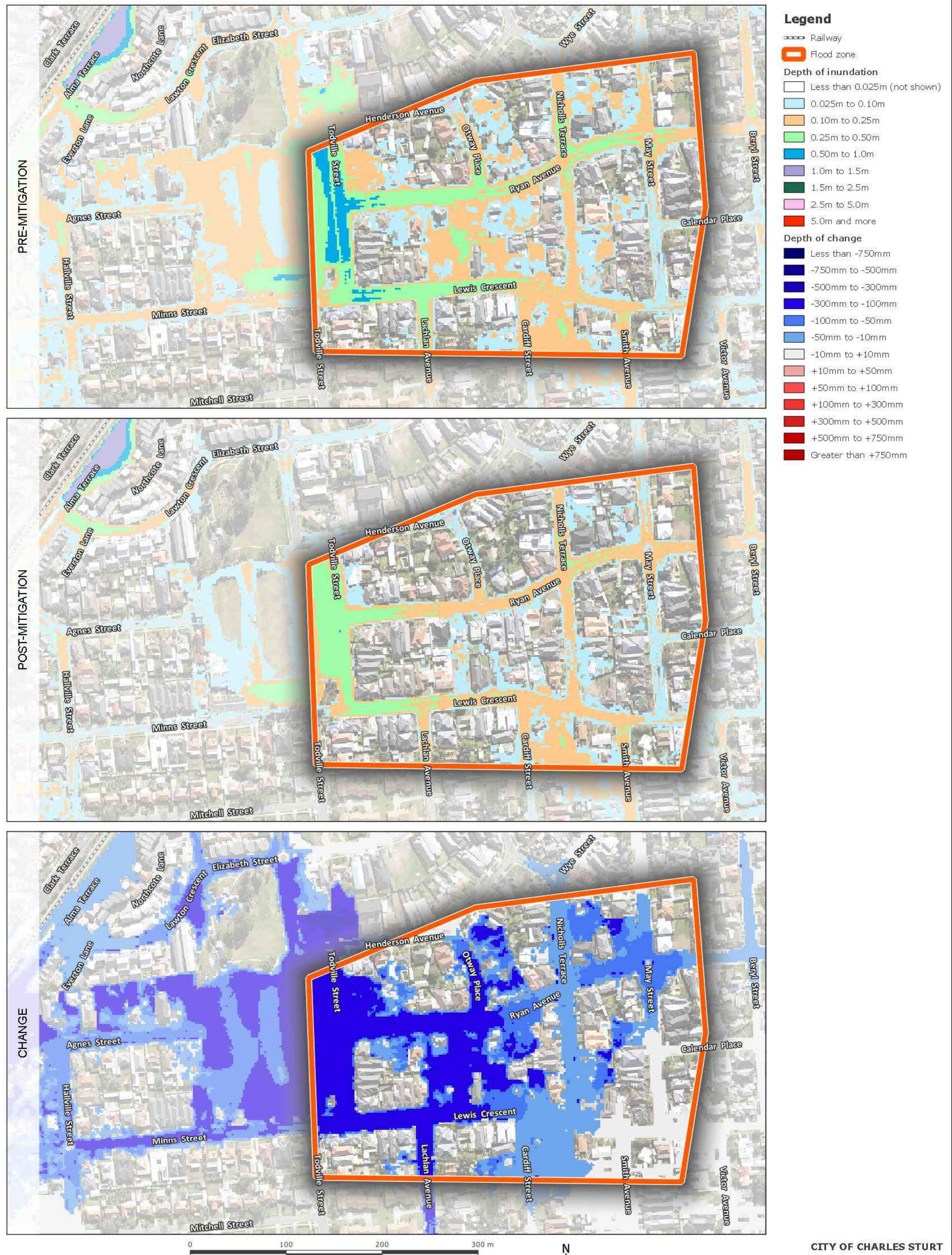


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 Aerial imagery from City of Charles Sturt, 2019
 Roads and railways from Data SA, 2019

**WEST LAKES STORMWATER MANAGEMENT PLAN
 FRANK MITCHELL RESERVE UNDERGROUND TANK
 20% AEP CHANGE MAP**

Figure 6.16





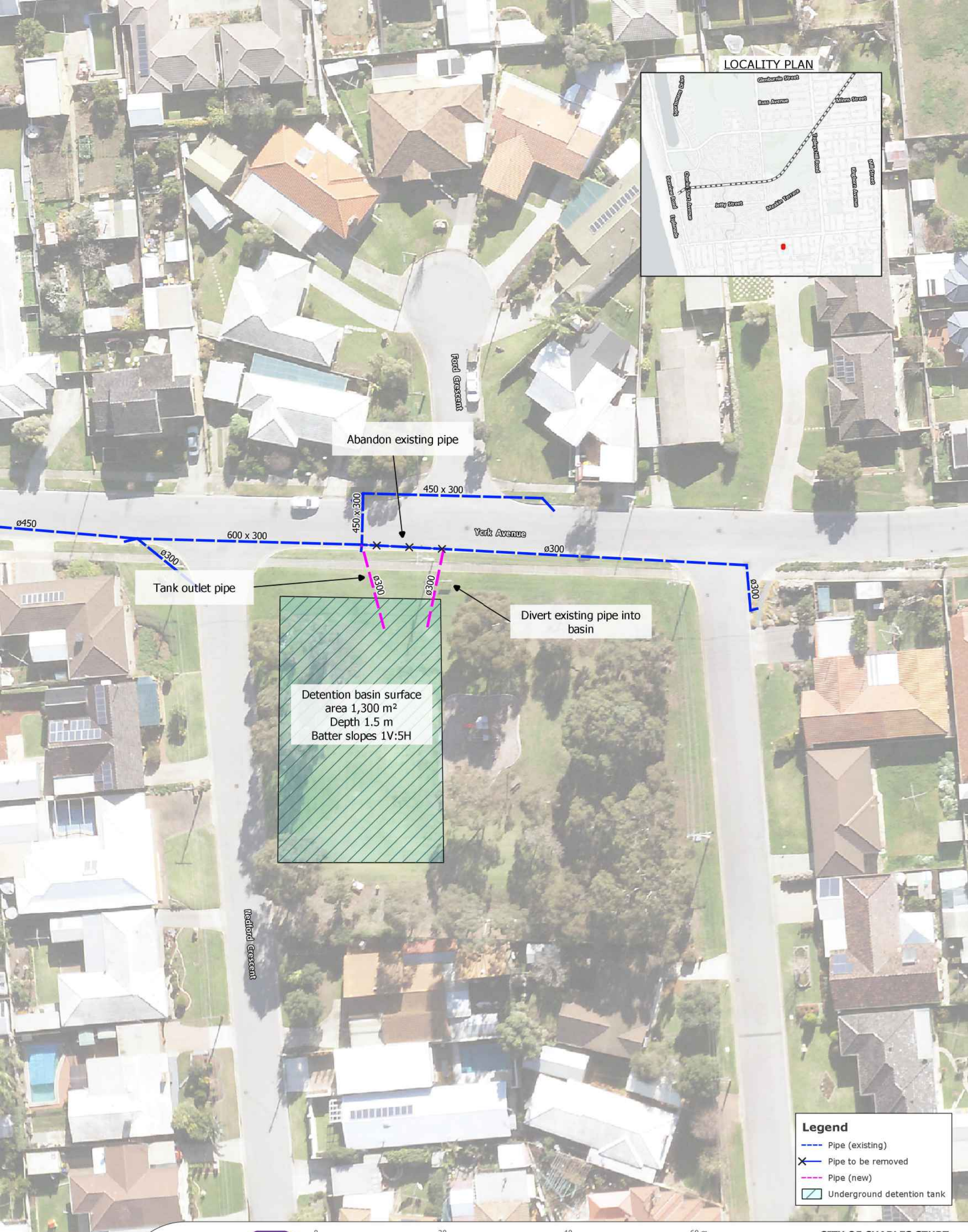
6.1.6 Nedford Reserve detention basin

Ponding of runoff within York Avenue adjacent to Ford Crescent is estimated to exceed 300 mm in the 20% AEP event. In order to alleviate this flooding, it is proposed that a detention storage be constructed within the adjacent reserve (Nedford Reserve). Unlike a number of the reserves identified within this report for flood storage, Nedford Reserve is not used as an active sports field. As such, it is considered that there is an opportunity to construct an open detention basin (rather than an underground tank).

The modelling indicates that a basin with a surface area of approximately 1,300 m² is required. This would occupy slightly less than half the area of the reserve. Flows will be directed into the basin via diversion of the existing DN300 within York Avenue, and will be discharged via a DN300 connecting into the same network. This configuration is shown in Figure 6.18.

Opportunities for landscaping with a variety of native species should be considered during the design process. This will contribute to greening of the study area in addition to improved biodiversity. Opportunities for the treatment of low flows via infiltration or other means should also be considered.

Results of the modelling for the 20% AEP event (Figure 6.19) show that the basin provides a significant reduction in flood depths (reduction of 150 mm – 200 mm) within York Avenue and Nedford Crescent. However, some residual flooding within York Avenue remains. The basin does not provide any flood improvement benefits for the 1% AEP event (refer Figure 6.20).



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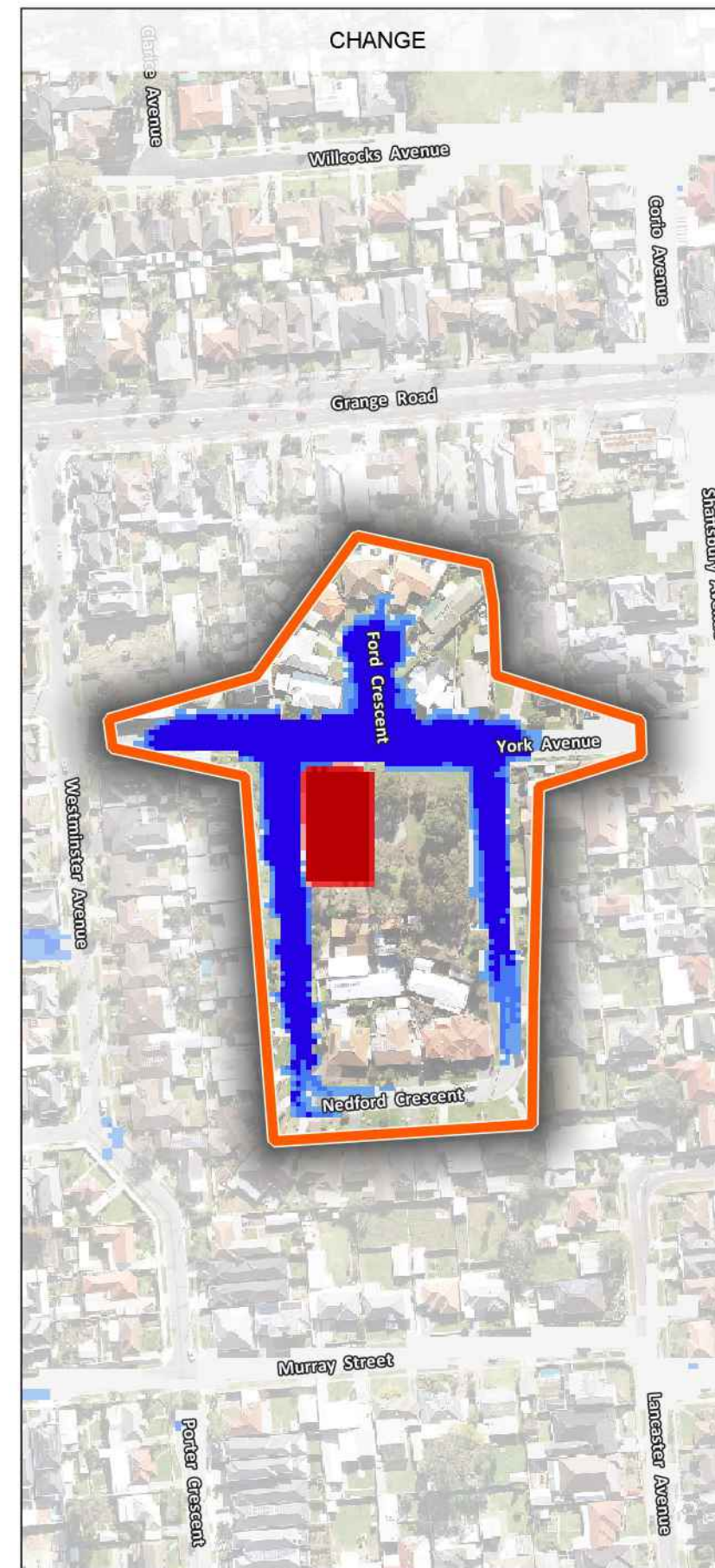
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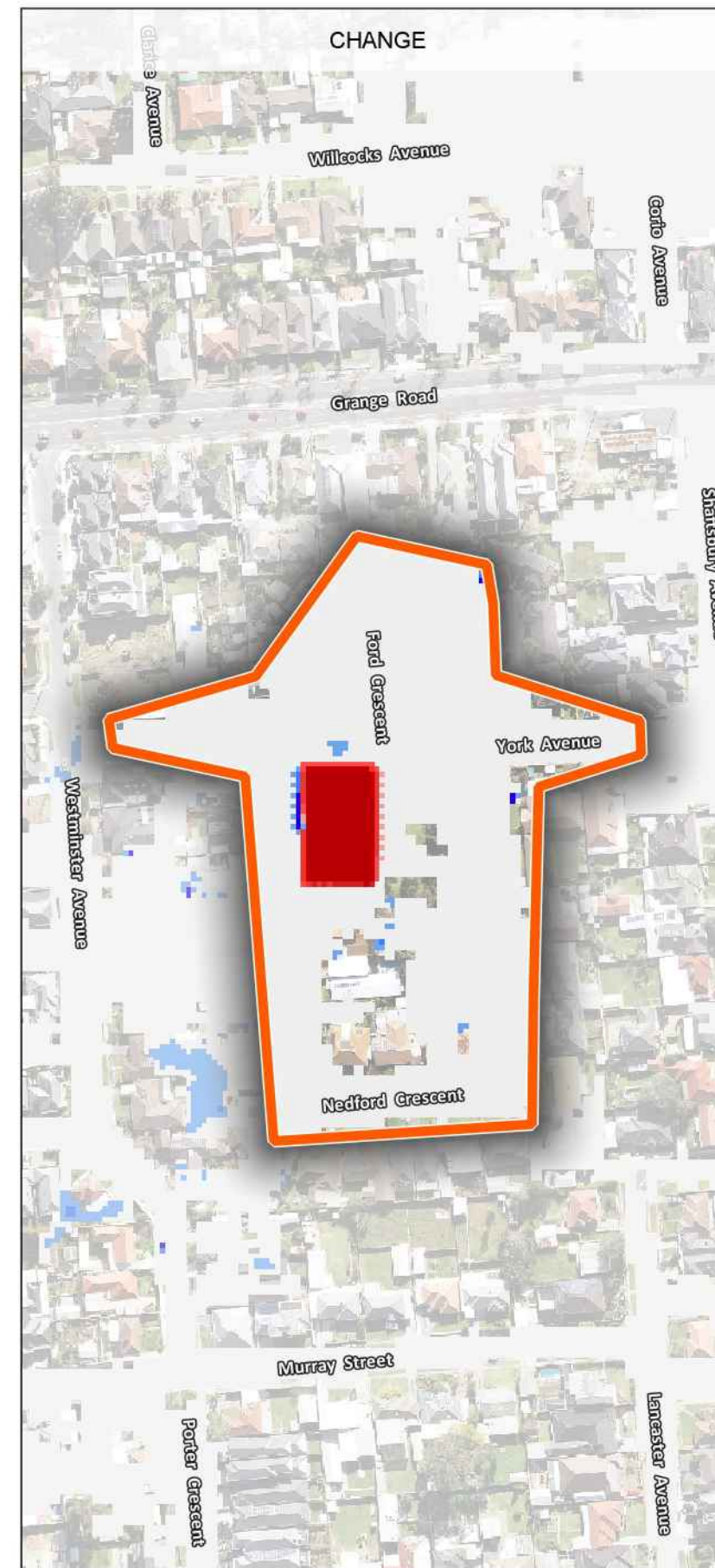
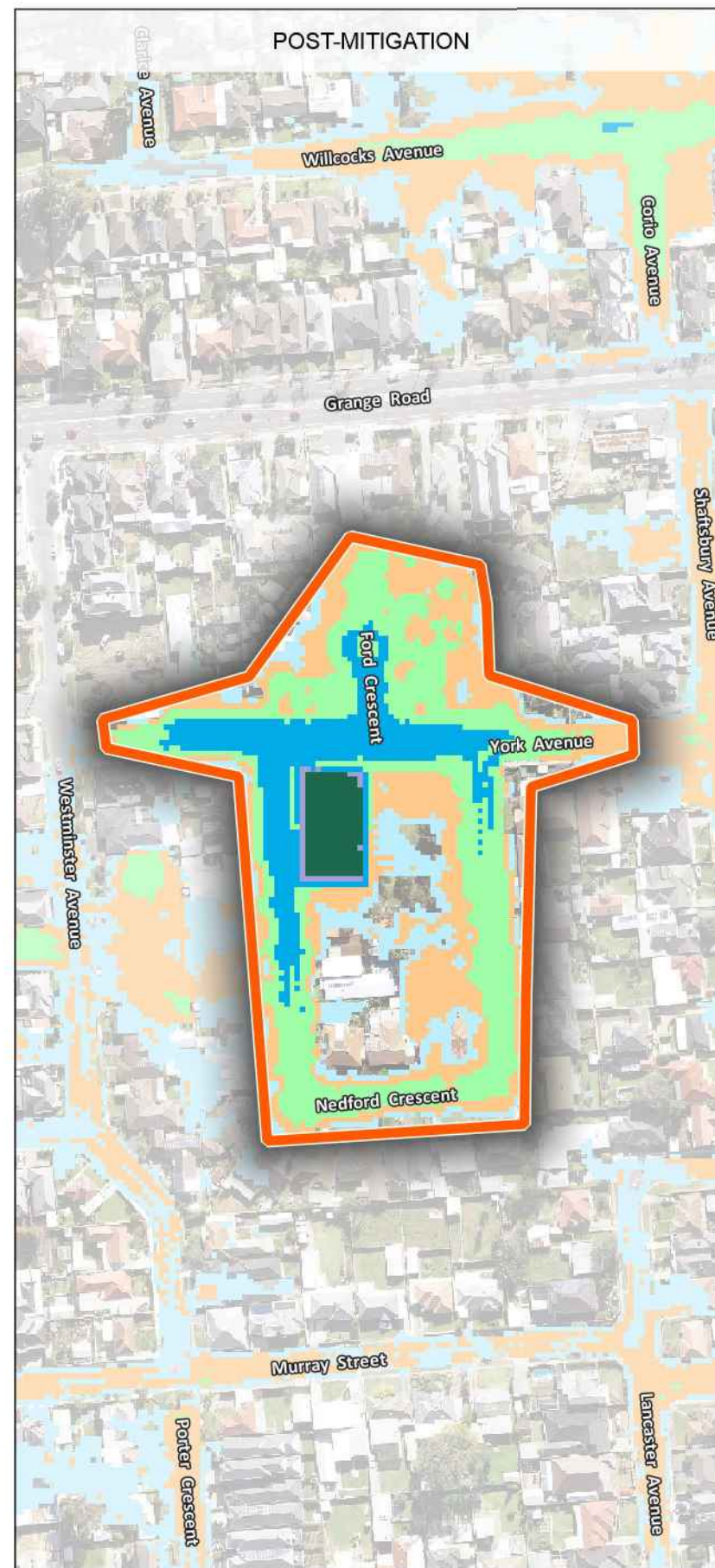
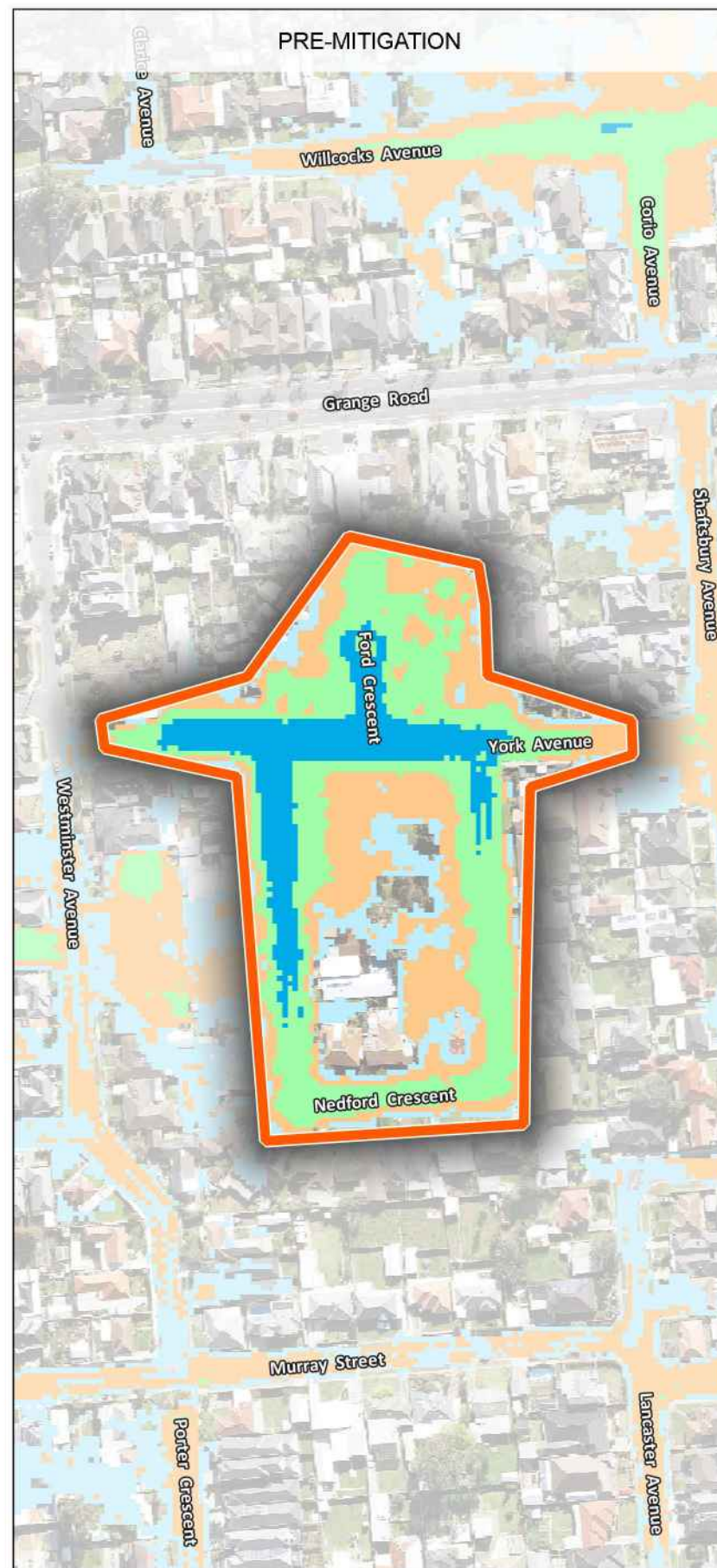


**WEST LAKES STORMWATER MANAGEMENT PLAN
NEDFORD RESERVE DETENTION BASIN**

CITY OF CHARLES STURT

Figure 6.18







6.1.7 Golfers Avenue pipe and pump upgrades

The flood modelling for the 20% AEP event shows significant ponding within the roads surrounding Golfers Avenue and Frederick Road. This area is currently served by an underground drainage network which connects to the Trimmer Parade trunk drain at Frederick Road. A pump station at the intersection of Golfers Avenue and Frederick Road is used to convey runoff from the low point to the Trimmer Parade drain.

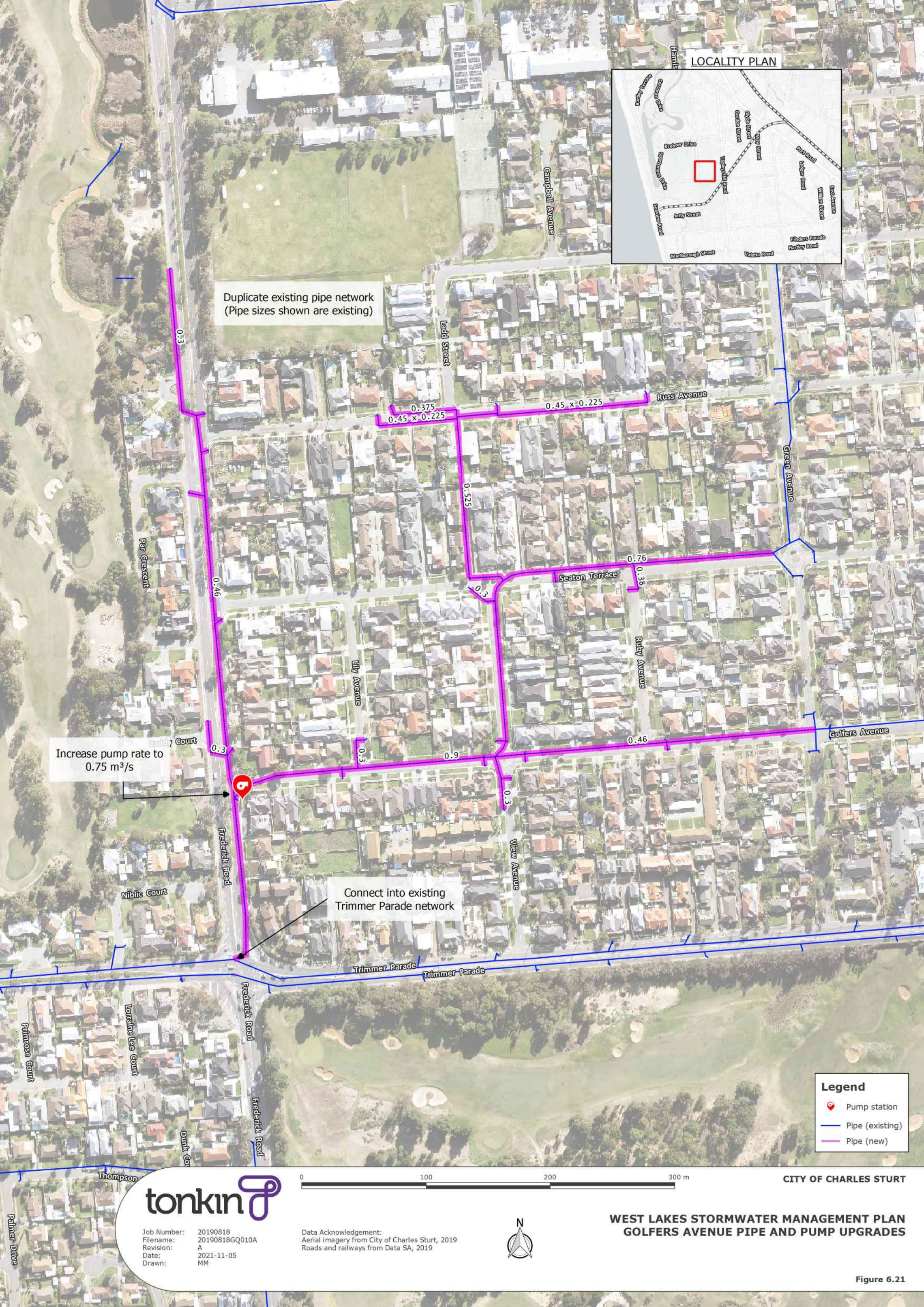
In order to alleviate the ponding within the road during this event, upgrades to the pipe network and pump capacity are proposed. Given the large capacity of the Trimmer Parade drain downstream (west) of Frederick Road, it was determined that only localised pipe upgrades are required.

The modelling indicates that the capacity of the existing pipe network needs to be duplicated (either with the addition of a parallel drainage run, or replacement of the existing system with pipes of a larger diameter). Additionally, the pump rate from the Golfers Avenue pump station needs to increase from 0.25 m³/s to 0.75 m³/s. A concept layout for this mitigation scenario is shown in Figure 6.21. The 20% AEP and 1% AEP change maps are shown in Figure 6.22 and Figure 6.23, respectively.

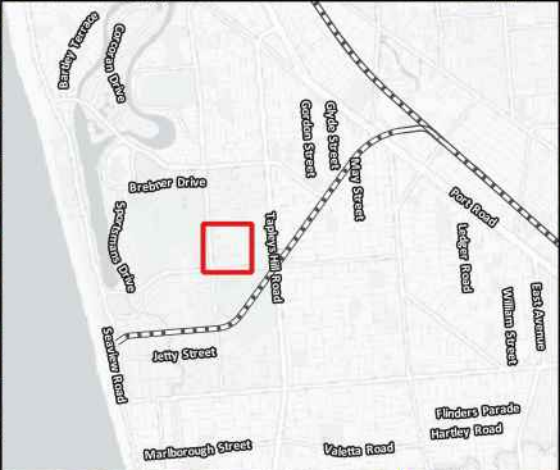
The results of the 20% AEP modelling show that while there is some residual ponding of runoff within the road, significant reductions can be achieved, most notably at the following locations:

- Frederick Road and Russ Avenue intersection (reduction of up to 250 mm)
- Lily Avenue (reduction of up to 200 mm)
- View Avenue (reduction of up to 130 mm).

Some minor reductions in flood depths (up to 50 mm) are also observed throughout this region for the 1% AEP event. Flooding of private property within this area is still a widespread issue for this event.



LOCALITY PLAN



Duplicate existing pipe network
(Pipe sizes shown are existing)

Increase pump rate to
0.75 m³/s

Connect into existing
Trimmer Parade network

Legend

- Pump station
- Pipe (existing)
- Pipe (new)



Job Number: 20190818
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Data Acknowledgement:
Aerial imagery from City of Charles Sturt, 2019
Roads and railways from Data SA, 2019



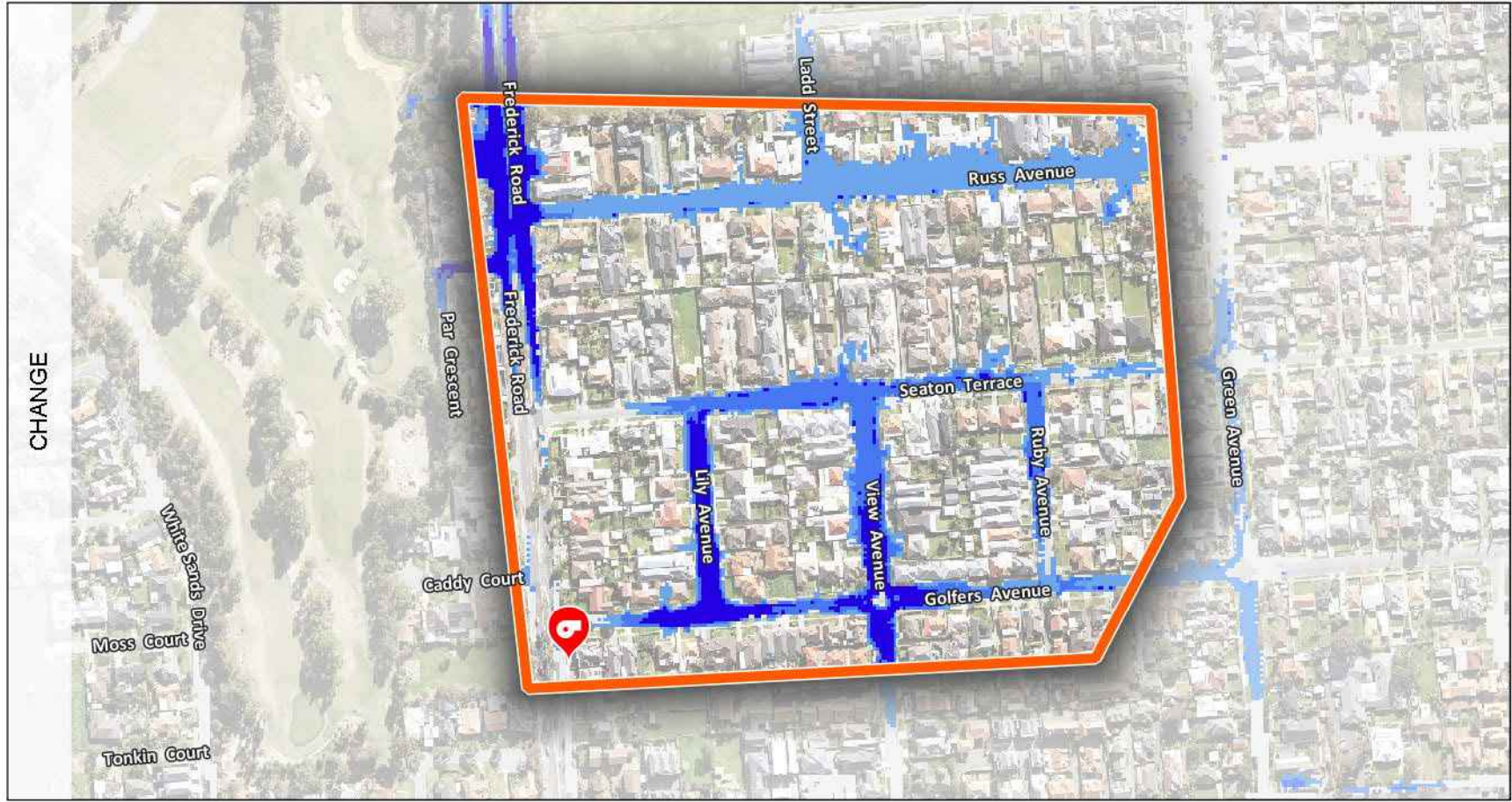
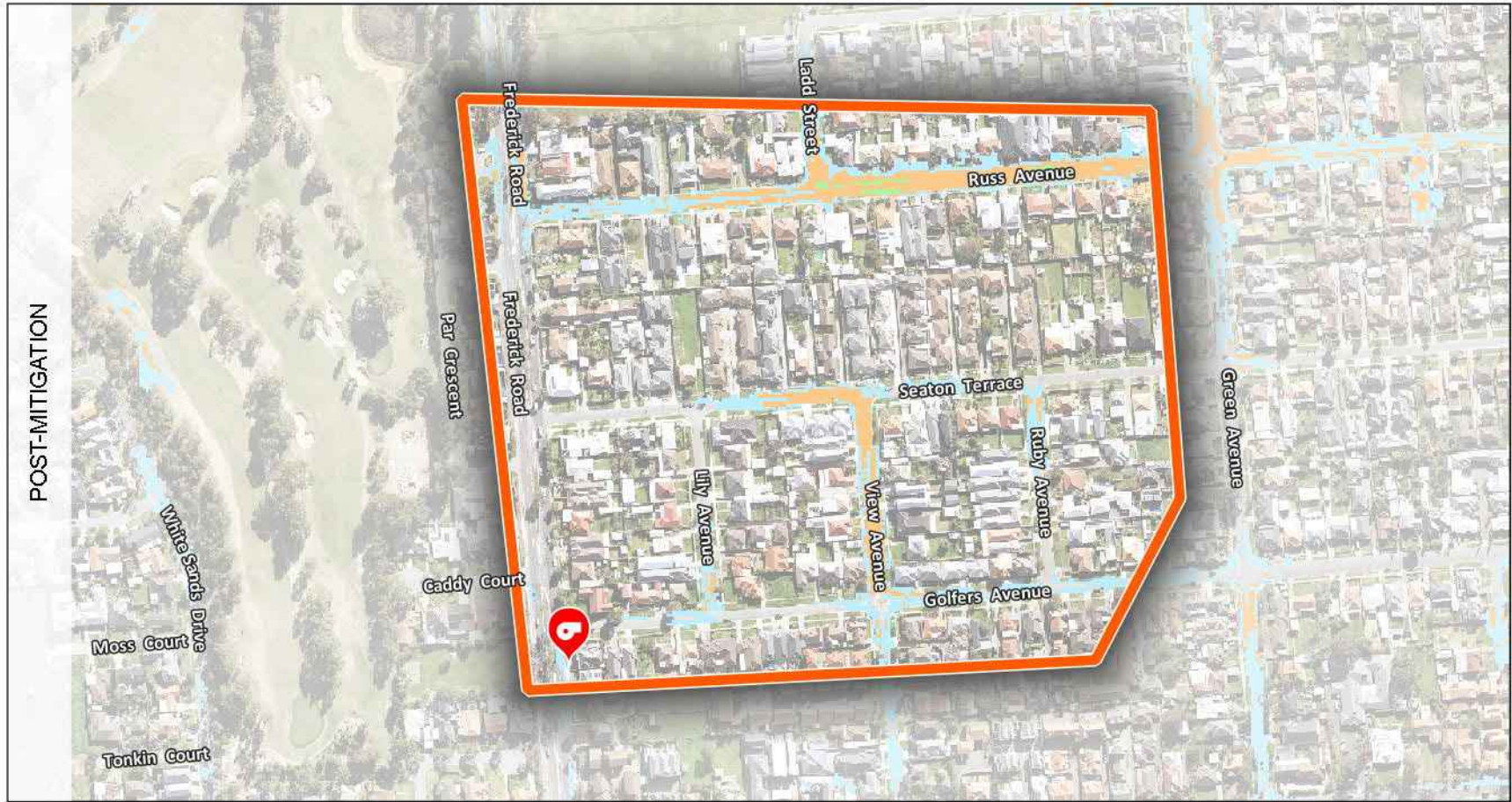
**WEST LAKES STORMWATER MANAGEMENT PLAN
GOLFERS AVENUE PIPE AND PUMP UPGRADES**

Figure 6.21



Legend

- Pump station
- Flood zone
- Depth of inundation**
 - Less than 0.025m (not shown)
 - 0.025m to 0.10m
 - 0.10m to 0.25m
 - 0.25m to 0.50m
 - 0.50m to 1.0m
 - 1.0m to 1.5m
 - 1.5m to 2.5m
 - 2.5m to 5.0m
 - 5.0m and more
- Depth of change**
 - Less than -750mm
 - 750mm to -500mm
 - 500mm to -300mm
 - 300mm to -100mm
 - 100mm to -50mm
 - 50mm to -10mm
 - 10mm to +10mm
 - +10mm to +50mm
 - +50mm to +100mm
 - +100mm to +300mm
 - +300mm to +500mm
 - +500mm to +750mm
 - Greater than +750mm



0 100 200 300 m



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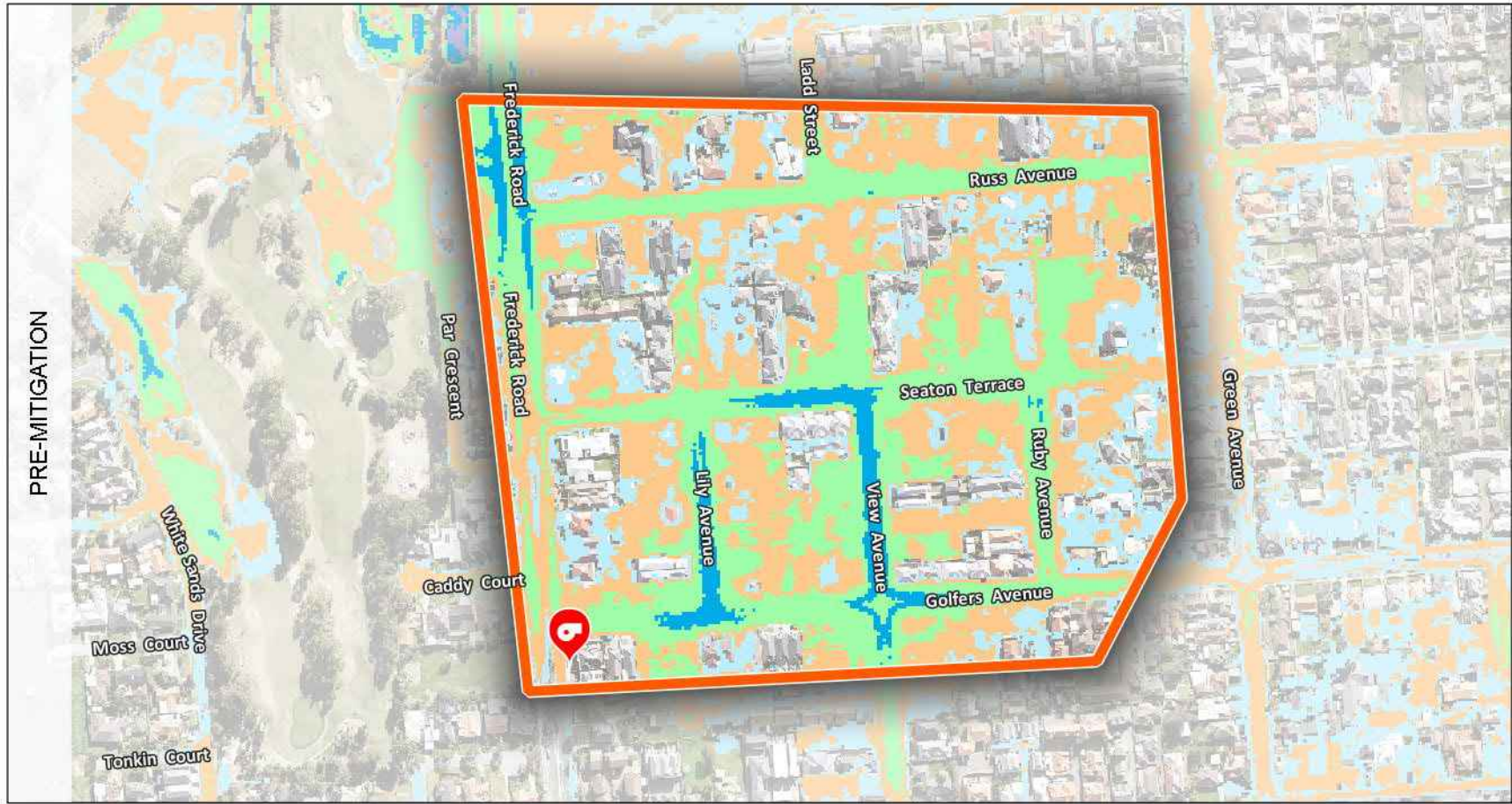


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 Aerial imagery from City of Charles Sturt, 2019
 Roads and railways from Data SA, 2019

WEST LAKES STORMWATER MANAGEMENT PLAN GOLFERS AVENUE PIPE AND PUMP UPGRADES 20% AEP CHANGE MAP

Figure 6.22



Legend

Pump station

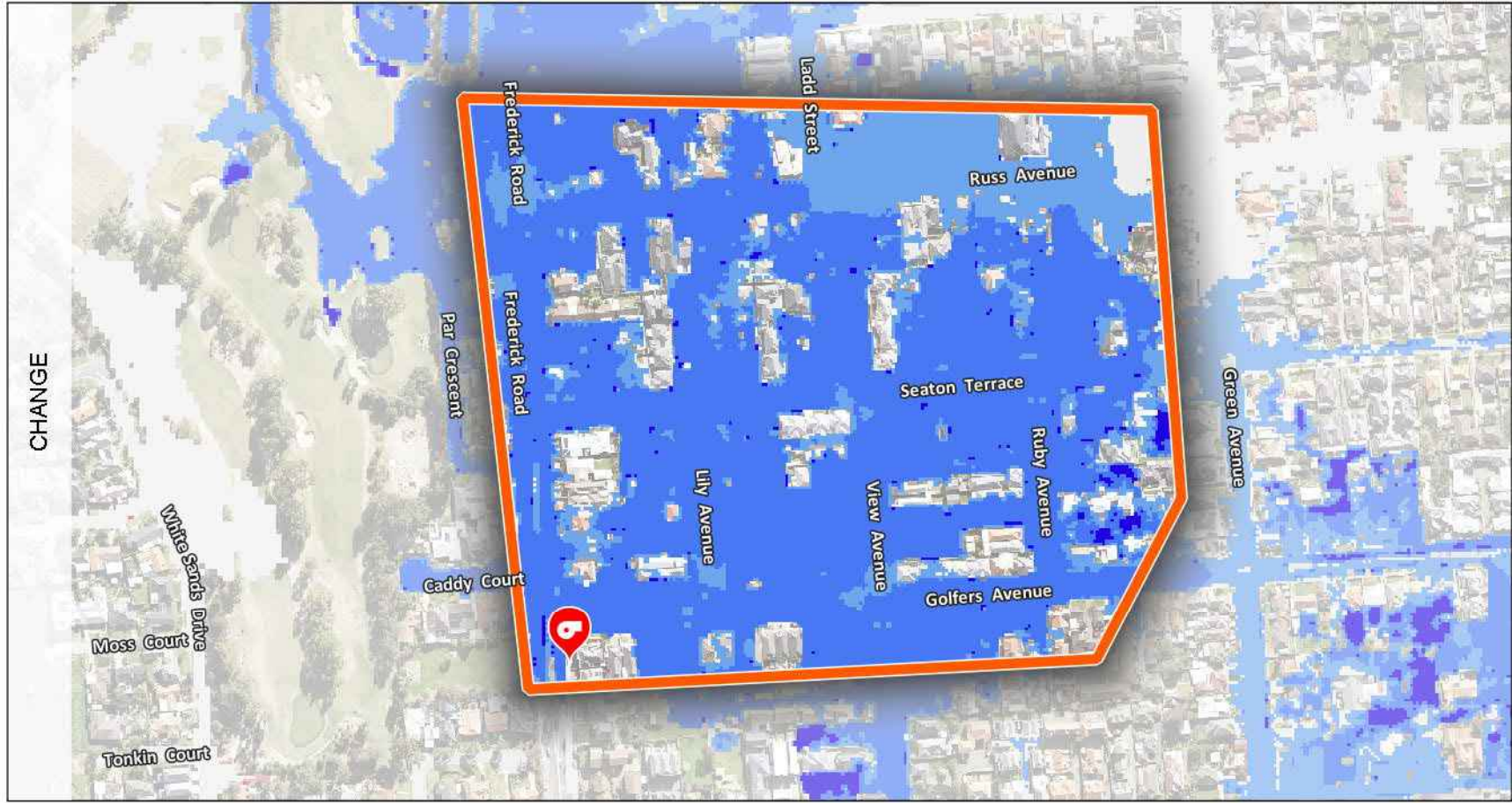
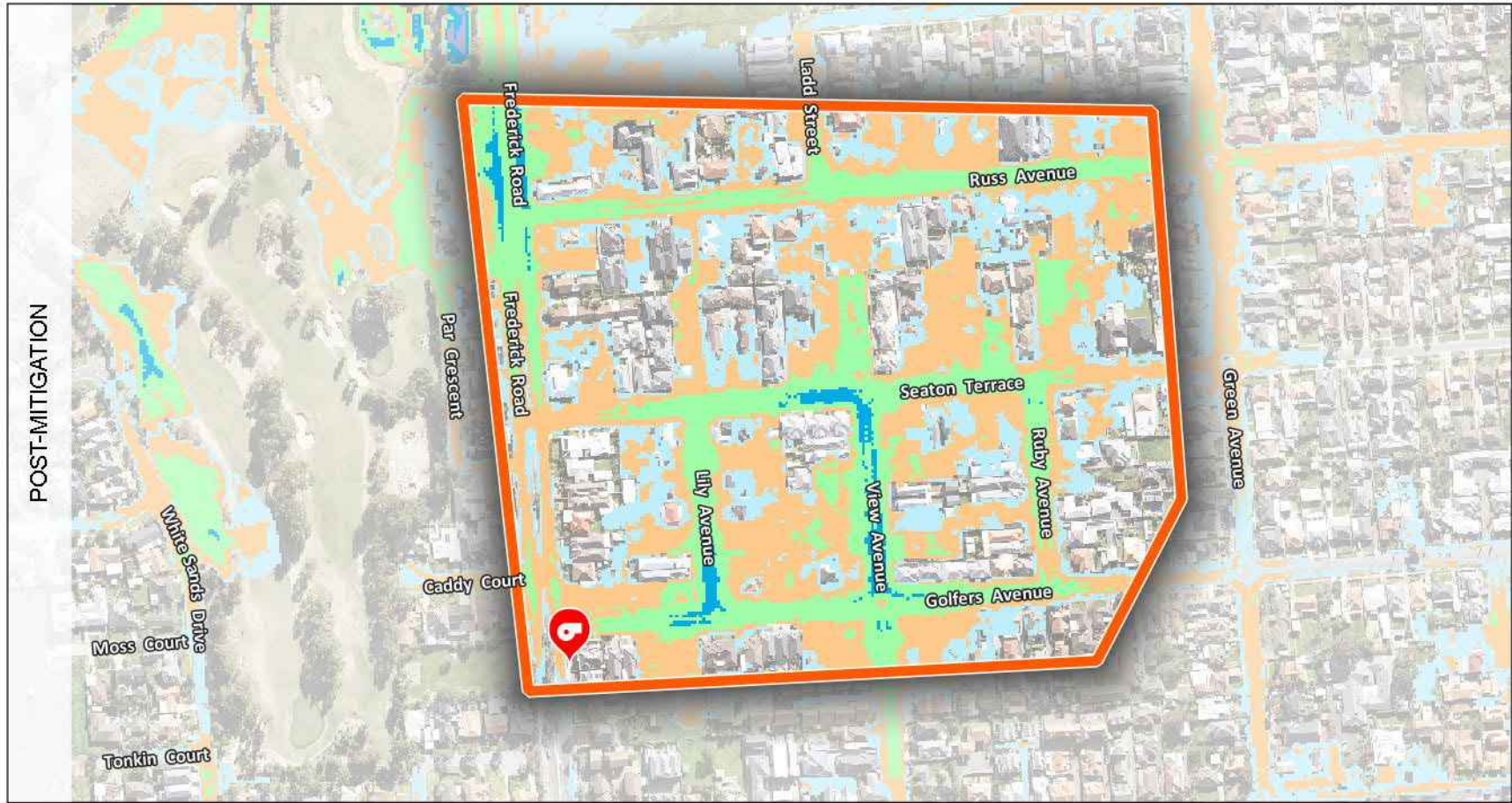
Flood zone

Depth of inundation

- Less than 0.025m (not shown)
- 0.025m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more

Depth of change

- Less than -750mm
- 750mm to -500mm
- 500mm to -300mm
- 300mm to -100mm
- 100mm to -50mm
- 50mm to -10mm
- 10mm to +10mm
- +10mm to +50mm
- +50mm to +100mm
- +100mm to +300mm
- +300mm to +500mm
- +500mm to +750mm
- Greater than +750mm



0 100 200 300 m



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 Roads and railways from Data SA, 2019

WEST LAKES STORMWATER MANAGEMENT PLAN GOLFERS AVENUE PIPE AND PUMP UPGRADES 1% AEP CHANGE MAP

Figure 6.23



6.1.8 Sansom Road pipe upgrades

Modelling has been undertaken to assess the reductions in flooding that can be achieved by upgrading the existing underground drainage network within the area surrounding Sansom Road. Flooding within Sansom Road during the 20% AEP event is estimated to reach a depth of 150 mm, while flooding in George Street exceeds 300 mm. The existing pipe network servicing the area outfalls to West Lakes approximately 1.4 km away. The proposed upgrades include duplication of this system all the way to the outlet, as shown in Figure 6.24. The changes in flood depth associated with this strategy are shown in Figure 6.26 (20% AEP) and Figure 6.27 (1% AEP).

Though there is some residual flooding within the roadway for the 20% AEP event, the reduction in flood depth is approximately 130 mm in Sansom Road and 240 mm in George Street, and the flooding of private properties within the area is alleviated completely. Additionally, benefits are provided in the 1% AEP event, with flooding reduced by up to 200 mm to the east of Sansom Road.

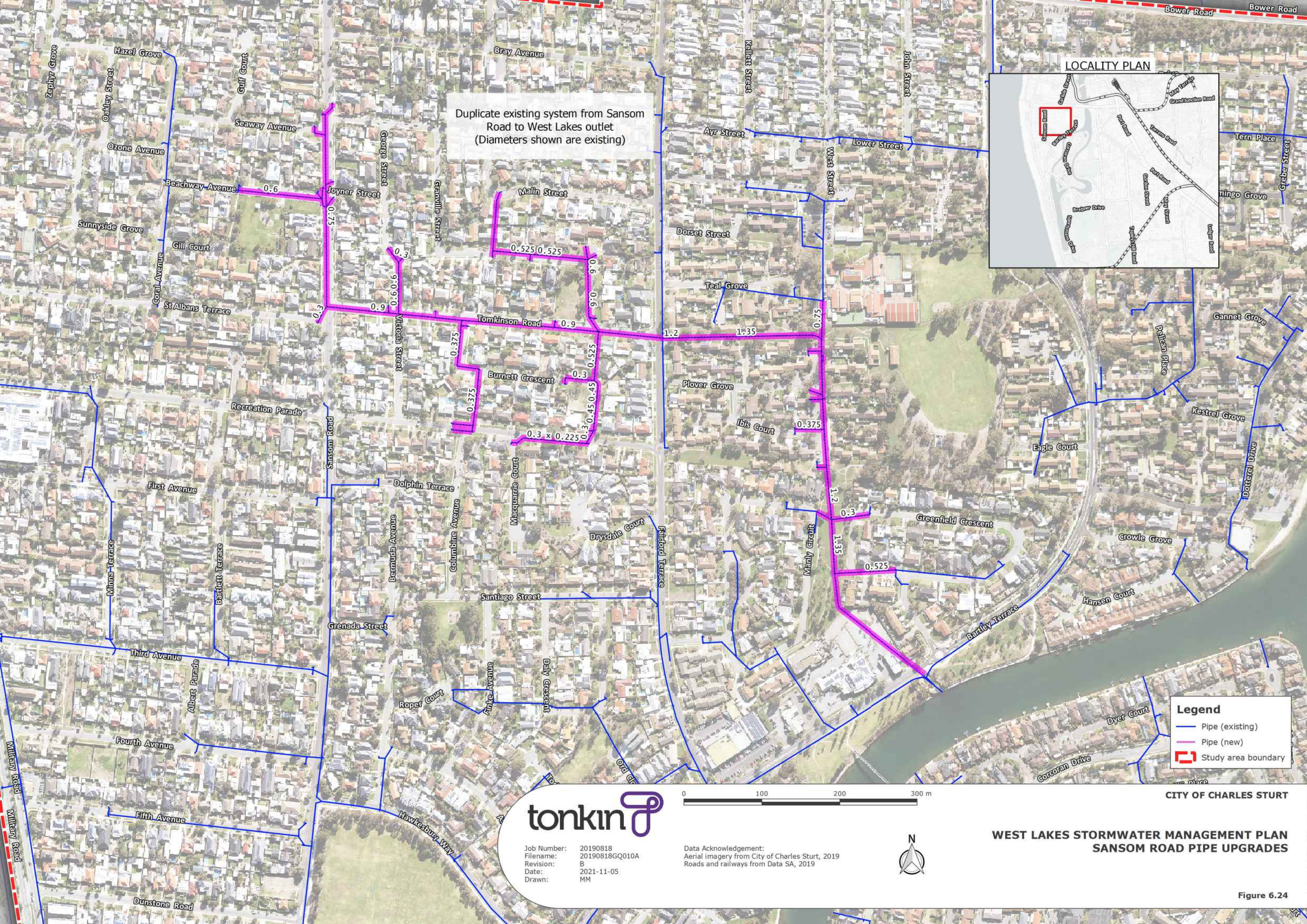
Opportunities to incorporate WSUD into the proposed works, including daylighting the stormwater network in the green space in Manly Circuit could be considered to provide additional benefits associated with water quality improvement and urban greening.

6.1.9 Recreation Parade detention basin

Review of the flood mapping for the 20% AEP event shows that there is some inundation of private properties near the intersection of Recreation Parade and Victoria Parade (low point). There are historical reports of flooding at this location as well.

As the flooding issue is quite localised, rather than upgrading the adjacent pipe network all the way to the outlet (an approximate distance of 1.8 km), it is proposed that the flooding be mitigated via detention. The modelling indicates that a detention storage with a volume of approximately 1,700 m³ is required. This may be provided in a number of forms including an open basin or within the road reserve. The location of proposed upgrade is shown in Figure 6.25.

Results of the flood modelling for this mitigation measure for the 20% AEP and 1% AEP events are included within the change maps for the Sansom Road pipe upgrades (Figure 6.26 and Figure 6.27). The results confirm that construction of the basin will prevent inundation of private property in the 20% AEP event. There is also a reduction in flood depths within Victoria Parade of 200 mm for this event.



Duplicate existing system from Sansom Road to West Lakes outlet
(Diameters shown are existing)



Legend

- Pipe (existing)
- Pipe (new)
- Study area boundary



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**WEST LAKES STORMWATER MANAGEMENT PLAN
SANSOM ROAD PIPE UPGRADES**

Figure 6.24



LOCALITY PLAN



Detention storage to be provided within vicinity of flooded area. Storage may be in the form of an open basin or within the road reserve.

Outlet from storage to be connected to existing underground drainage network

Legend

--- Pipe (existing)



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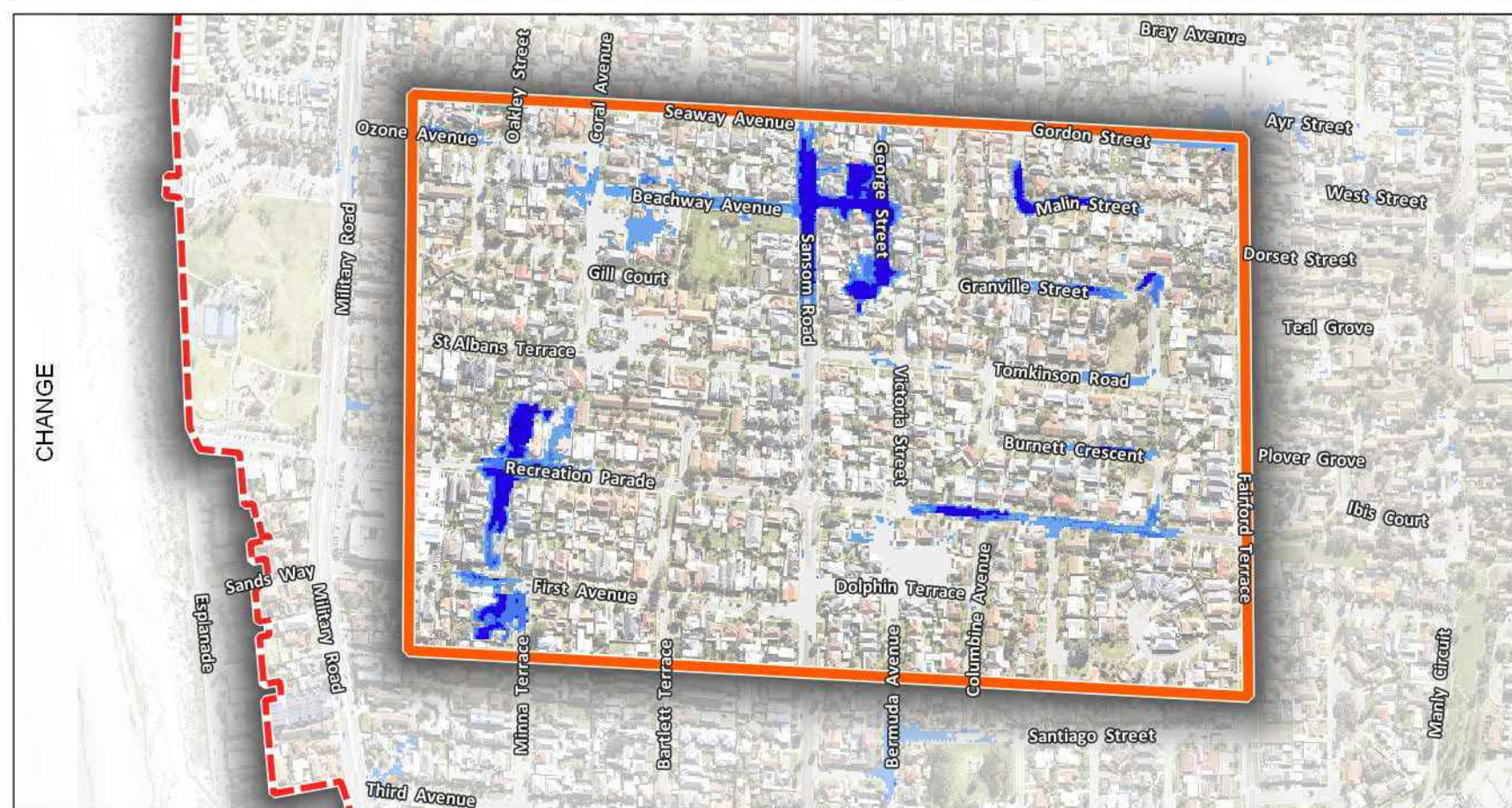
Data Acknowledgement:
Aerial imagery from City of Charles Sturt, 2019
Roads and railways from Data SA, 2019



WEST LAKES STORMWATER MANAGEMENT PLAN
RECREATION PARADE DETENTION BASIN

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Figure 6.25



0 200 400 600 m



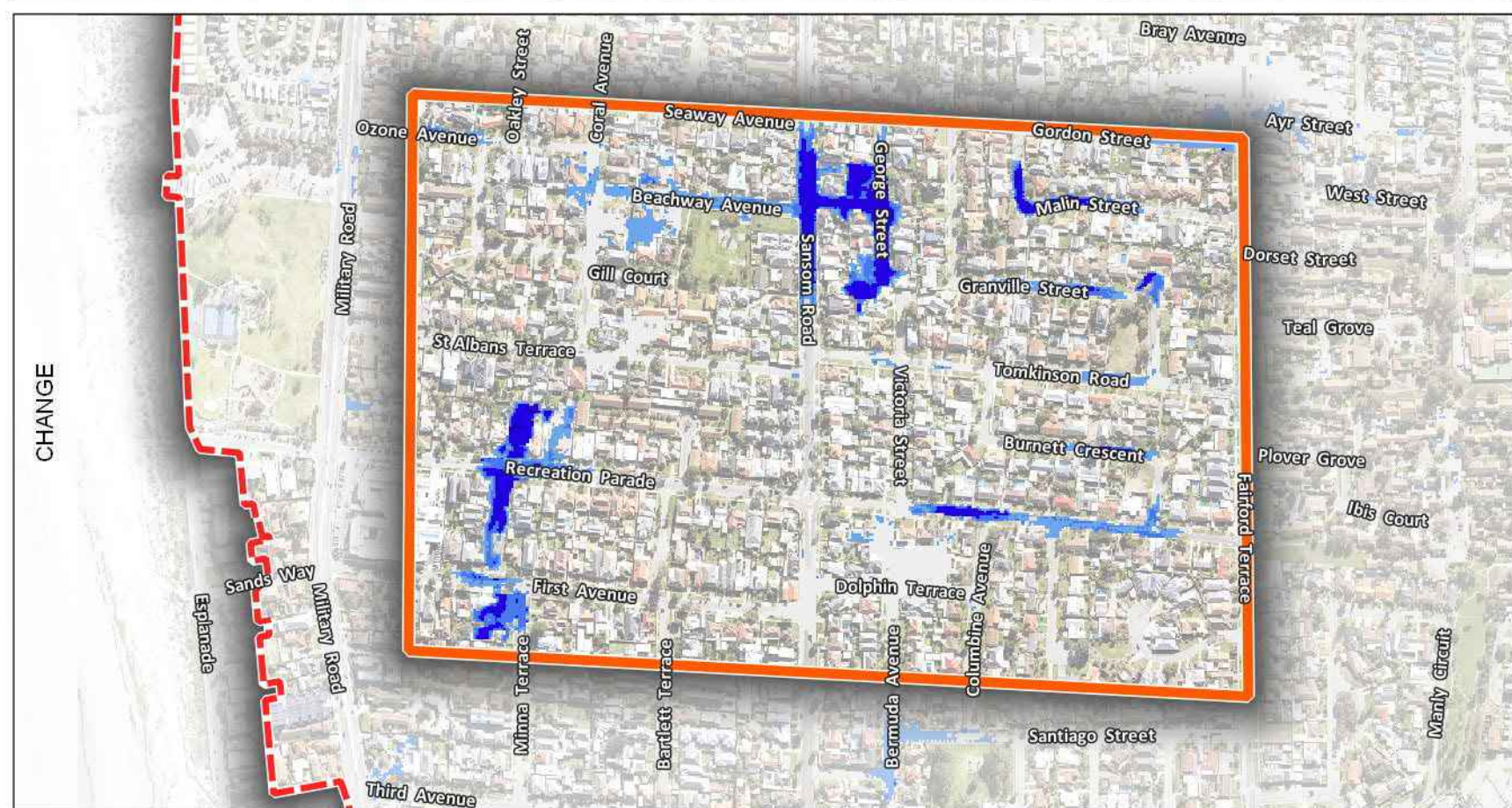
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 Aerial imagery from City of Charles Sturt, 2019
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WEST LAKES STORMWATER MANAGEMENT PLAN SANSOM ROAD PIPE UPGRADES AND RECREATION PARADE DETENTION BASIN 20% AEP CHANGE MAP



0 200 400 600 m



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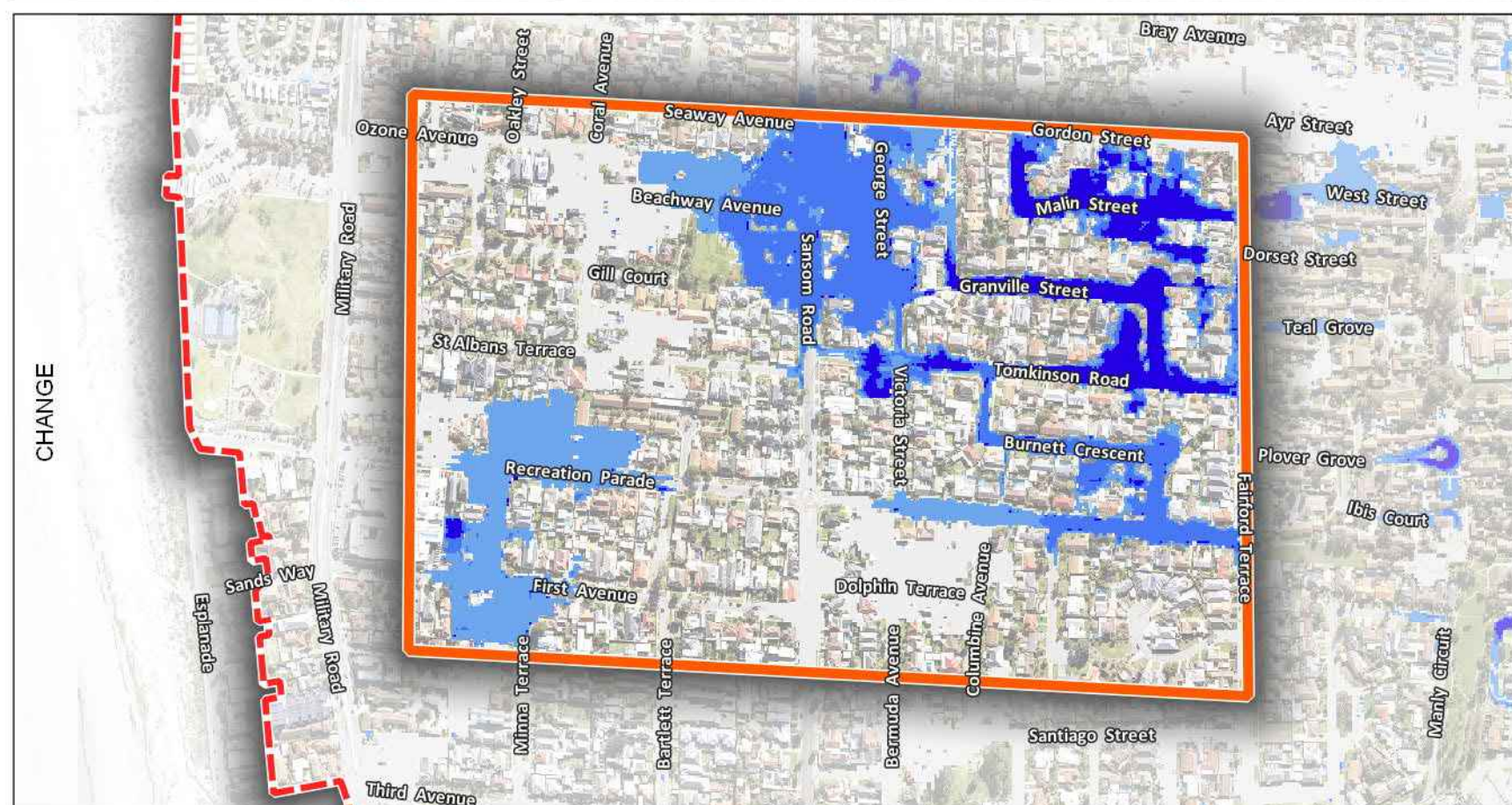
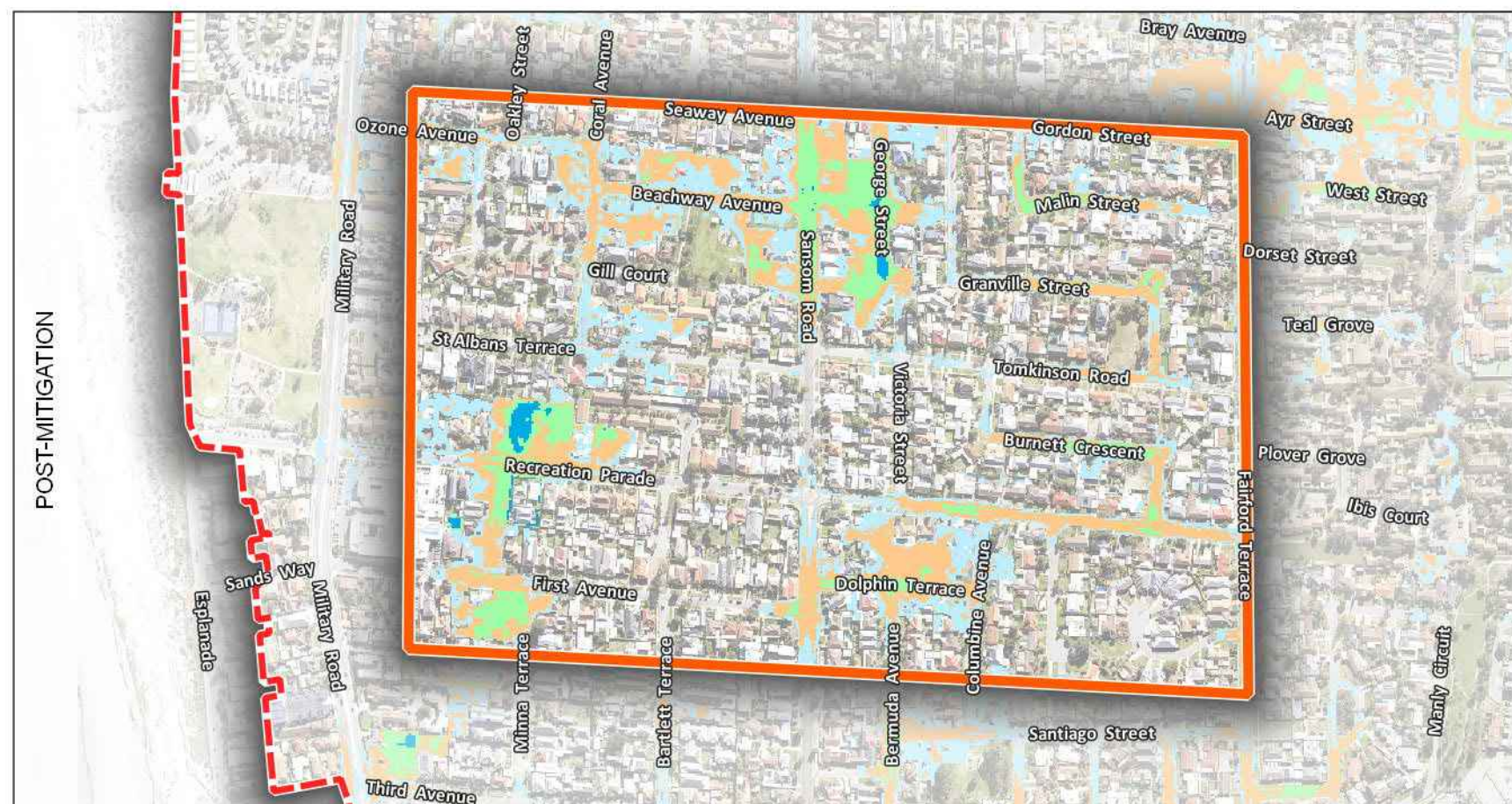
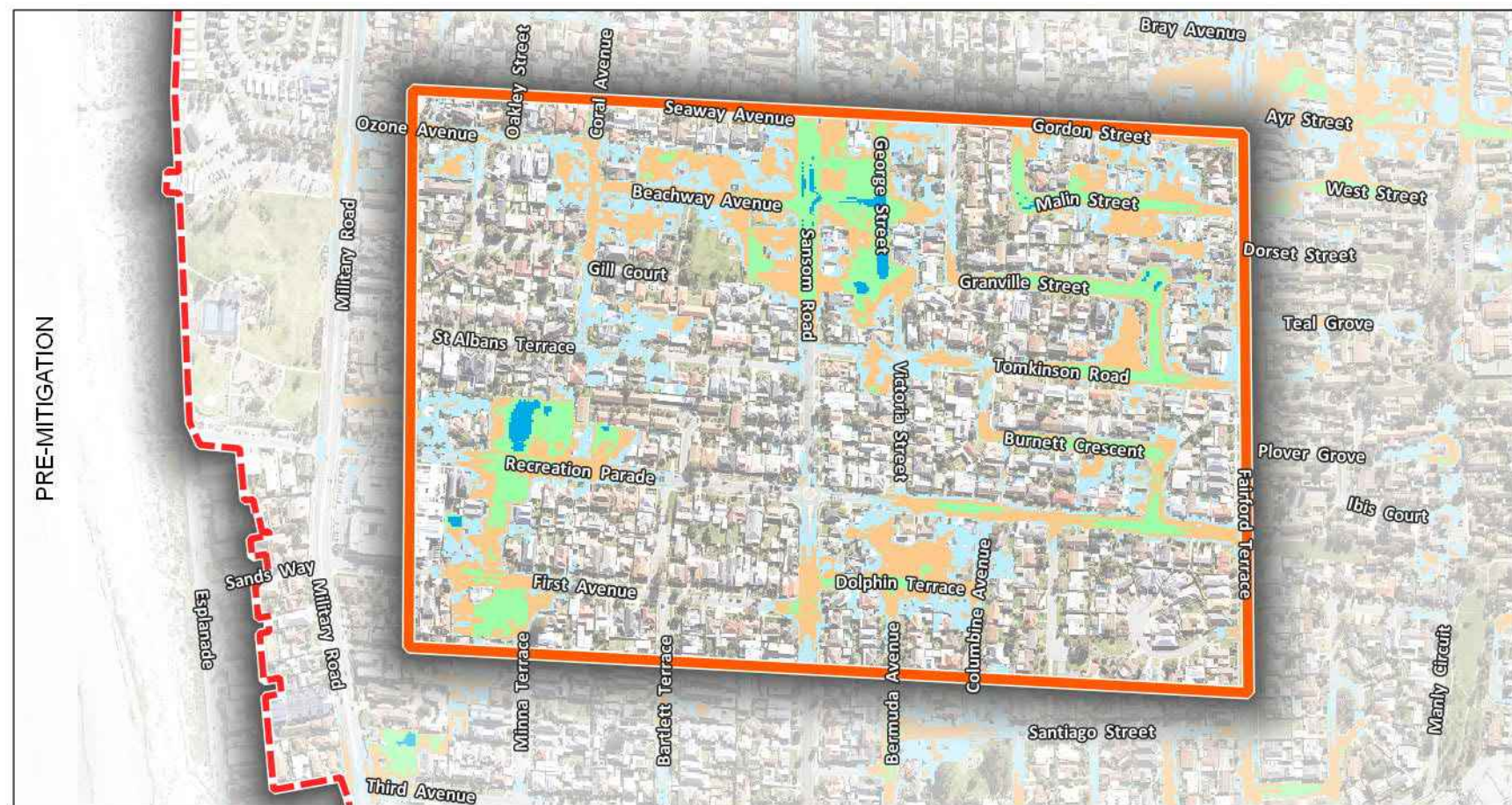


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Data Acknowledgement:
 Aerial imagery from City of Charles Sturt, 2019
 Roads and railways from Data SA, 2019

**WEST LAKES STORMWATER MANAGEMENT PLAN
 SANSOM ROAD PIPE UPGRADES AND
 RECREATION PARADE DETENTION BASIN
 20% AEP CHANGE MAP**

Figure 6.26



Legend

- Flood zone
- Study area boundary
- Depth of inundation**
 - Less than 0.025m (not shown)
 - 0.025m to 0.10m
 - 0.10m to 0.25m
 - 0.25m to 0.50m
 - 0.50m to 1.0m
 - 1.0m to 1.5m
 - 1.5m to 2.5m
 - 2.5m to 5.0m
 - 5.0m and more
- Depth of change**
 - Less than -750mm
 - 750mm to -500mm
 - 500mm to -300mm
 - 300mm to -100mm
 - 100mm to -50mm
 - 50mm to -10mm
 - 10mm to +10mm
 - +10mm to +50mm
 - +50mm to +100mm
 - +100mm to +300mm
 - +300mm to +500mm
 - +500mm to +750mm
 - Greater than +750mm

0 200 400 600 m



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6.1.10 Market Corner pipe upgrades

A number of options were investigated to address flooding issues within the vicinity of Market Corner and Rivett Avenue. The investigations included consideration of pipe upgrades and detention storages. Based on the results of the modelling, pipe upgrades are recommended.

Drainage from this area is currently provided by two separate lateral drainage networks, both of which ultimately connect to the trunk drain within Cheadle Street. Given that this trunk drain has larger capacity than the lateral drains, upgrade of the trunk drain is not proposed. Instead, the upgrades are localised to the areas surrounding Market Corner and Rivett Avenue, as shown in Figure 6.28. The upgrade includes duplication of these existing systems. Removal and replacement of the existing pipes with single pipes of a larger diameter would also be feasible. The results of the modelling for the pipe duplication scenario for the 20% AEP is shown in Figure 6.29. The upgrades result in a moderate reduction in flooding. Most of the ponding within Rivett Avenue is alleviated, however there is still an area of deep ponding (over 300 mm) within Market Corner.

6.1.11 Holland Street pipe upgrades

A number of strategies to reduce the flooding within Holland Street have been investigated, including pipe upgrades and diversion of runoff to a basin within Toogood Reserve. Each of these strategies resulted in a minor reduction in flooding only (approximately 15 mm in the 20% AEP event).

It is not recommended that the Holland Street mitigation options be considered further at this point.

6.1.12 Main Street pipe upgrades

A pipe upgrade scenario to address the flooding of private property within Main Street has been assessed. The proposed upgrades included duplication of the local drainage network within Main Street, Willsmore Street and William Street. Results of the modelling for the 20% AEP event show that upgrade of the existing drainage network will result in additional flood inundation within William Street due to the additional volume of runoff being transferred to this location and exceeding the capacity of the pipes. On this basis, the pipe duplication would need to extend further to connect into the upgraded Meakin Terrace system. It is not considered that the magnitude of flooding warrants such a significant pipe upgrade.

Consideration was also given to construction of a detention basin within the long, narrow reserve to the west of William Street. This scenario was modelled, and while the results demonstrated a slight reduction of ponding within the road at William Street and Golding Street, the change in flood depths within private properties in Main Street was negligible. The detention basin option is therefore also not recommended.

6.2 Bower Road culvert upgrade

The Western Adelaide Region Climate Change Adaptation Plan (Tonkin, 2015) recommended an upgrade to the Bower Road causeway to mitigate the impacts of sea level rise and flooding from the Port River into West Lakes. Further investigation is recommended once a mean sea level increase of 300 mm has been recorded. Based on current projections this will likely be around 2050.

Consideration of pumping to assist manage water quality in the lake was also recommended as a long-term strategy (post 2050). The pumps could also be used to draw down the Lake prior to a forecast heavy rainfall event.

These works, which will be the responsibility of DIT as the operator of the lake, are recommended as a high priority action in addition to the stormwater upgrade works identified in the preceding section.



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WEST LAKES STORMWATER MANAGEMENT PLAN MARKET CORNER PIPE UPGRADES

Figure 6.28