THE CITY OF
GREATER GEELONG

Planning Scheme Amendment C339ggee
Flood overlays and zones

CITY OF GREATER
GEELONG

REVIEW OF COMPLEX SUBMISSIONS – LARA, AVALON AND FYANSFORD

City of Greater Geelong

July 2022

BACKGROUND

1. The main purpose of Planning Scheme Amendment C339ggee is to implement the following three flood studies by updating planning scheme zone and overlay maps:

    1.1 Lower Barwon and Lower Moorabool Flood Investigation, December 2018

    1.2 Lara Flood Study, March 2020

    1.3 Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment December 2015 (LCHA) (remaining areas around Lake Connewarre).

2. The overlays will help ensure that any significant buildings and works constructed in areas identified as flood prone are built to a standard that considers future flooding.

3. On 28 July 2020 Council resolved to support the preparation and public exhibition of the amendment.

4. The Amendment was exhibited from 15 July 2021 to 16 August 2021 (with late submissions accepted to the end of August and beyond).

5. Notices were sent to 10,326 owners and occupiers of land affected by the proposed overlay and zone changes, government authorities, land managers and prescribed Ministers.

6. The C339ggee webpage contains detailed information including copies of the exhibited planning scheme overlay and zone maps and proposed changes to overlay schedules along with copies of the original flood studies and Frequently Asked Questions (FAQs).

CONSIDERATION OF SUBMISSIONS

7. As a result of public exhibition, a total of 561 submissions were received of which 535 objected.

8. The vast majority of submissions were from the Lara Flood Study area and mainly related to the Special Building Overlay. A further breakdown of submissions is provided below:

Key area of interest of submissions	Number of submissions
Lara Flood Study area	505
Lower Barwon/Moorabool Study area	40
LSIO2 (Sea level rise/coastal inundation)	3
Schedule changes to LSIO and FO	4
Government authority submissions	4
Location of area not specified	5
Total submissions	**561**

9. In September and October 2021, Council officers reviewed the 561 submissions and prepared a table summarising the submission against themes. A description of the themes and an officer's response to each theme was compiled into a report to Council.

10. The submissions were grouped under the following themes:

a) No history of flooding;

b) Need for improved drainage infrastructure;

c) Land not considered flood prone due to topography;

d) Recent development works / new housing estates;

e) Challenges to validity of flood modelling;

f) Impact on insurance;

g) Impact on property values; and

h) Complex or site specific submissions.

11. On 14 December 2021 Council considered the officer's report on submissions received to Amendment C399ggee and resolved as follows:

    1. *Request the Minister for Planning to appoint an Independent Panel under Part 5 of the Planning and Environment Act 1987 to consider all submissions to Amendment C339ggee except those relating to the Lara Flood Study;*
    2. *Defer a decision on the Lara Flood Study submissions to allow Council officers to investigate and prepare a further report on the site specific and more complex submissions and report back to Council in early 2022;*
    3. *Refer all submissions except the Lara Flood Study submissions to the Panel;*
    4. *Submit to the Panel its response to the submissions (except the Lara Flood Study submissions) generally as outlined in this report; and*
    5. *Note that Council officers will liaise with Planning Panels Victoria to delay appointment of a Panel and a Panel Hearing pending the outcome of Council's future consideration of the Lara Flood Study submissions.*

PROCESS TO REVIEW COMPLEX SUBMISSIONS

12. After the Council passed the above resolution Council officers decided to put the complete amendment on hold pending review of the Lara Flood Study submissions as per resolution no.4. This is to enable all the submissions to be referred to a single independent Panel.

13. Council officers further reviewed the submissions that had been categorised as complex submissions in the 14 December council report.

14. Around 50 submissions were selected for closer review from the Lara Flood Study area plus an additional 4 submissions from Fyansford which is within the Lower Barwon Lower Moorabool Flood Study area.

15. The submissions selected for further review were considered to be the more complex submission that raised issues beyond the other themes already addressed in the report to Council of 14 December 2021. The submissions to be reviewed were selected as they included information such as: site specific, factual or evidence based information or data, technical information (including from qualified flood and drainage engineers), local topographic information and knowledge, information on localised drainage systems and information on development and landform changes that have occurred on the ground since original flood studies were prepared and that may impact on the flood prone nature of the land.

16. The task of reviewing the submissions was divided up as follows:

a) **City's Engineering Department** – provided initial engineering advice and reviewed individual submissions in Lara affected by the Special Building Overlay (SBO) which is within the City's remit as the local drainage authority.

b) **City's Strategic Implementation Unit** – coordinated the review, authored this report and reviewed the Lara based submissions that requested rezoning.

c) **Corangamite Catchment Management Authority (CCMA)** – reviewed individual submissions in Lara, Anakie and Avalon for areas proposed for either a Land Subject to Inundation Overlay (LSIO) or Floodway Overlay (FO) which tends to be land affected by riverine flooding and is within the CCMA's remit as the flood plain management authority.

d) **Water Technology Consultants** – The City engaged Water Technology as the original authors of the Lara Flood Study and the Lower Barwon Moorabool, Flood Study to review the more complex submissions and in particular submissions that were lodged by developers and affected multiple properties and included specialist engineering reports.

   The focus of the Water Technology review was on areas in Lara that had been subdivided and developed since the original studies were undertaken plus to review information supplied regarding flooding and drainage in the Avalon and Fyansford areas.

   Water Technology recommended further modelling be undertaken in the Avalon area and the City commissioned them to undertake this additional work.

17. The review took longer than expected mainly due to human resourcing constraints, other priorities, and high workloads in the City and also within Water Technology where it's flood modelling specialists were required to assist with the northern NSW flood disaster that occurred in the first quarter of 2022. The further modelling undertaken around Avalon also extended the timeframe.

RESULTS OF THE REVIEW

18. The results of the review are summarised in **Appendix 1**. The submissions reviewed are grouped by the reviewing authority. Where individuals have not given permission to publish names the surname is replaced with "individual submitter". Submissions are public documents and full copies are available from the City but for privacy reasons, unless the submitter has provided consent, names and full addresses cannot be published in council minutes or on the City's web site.

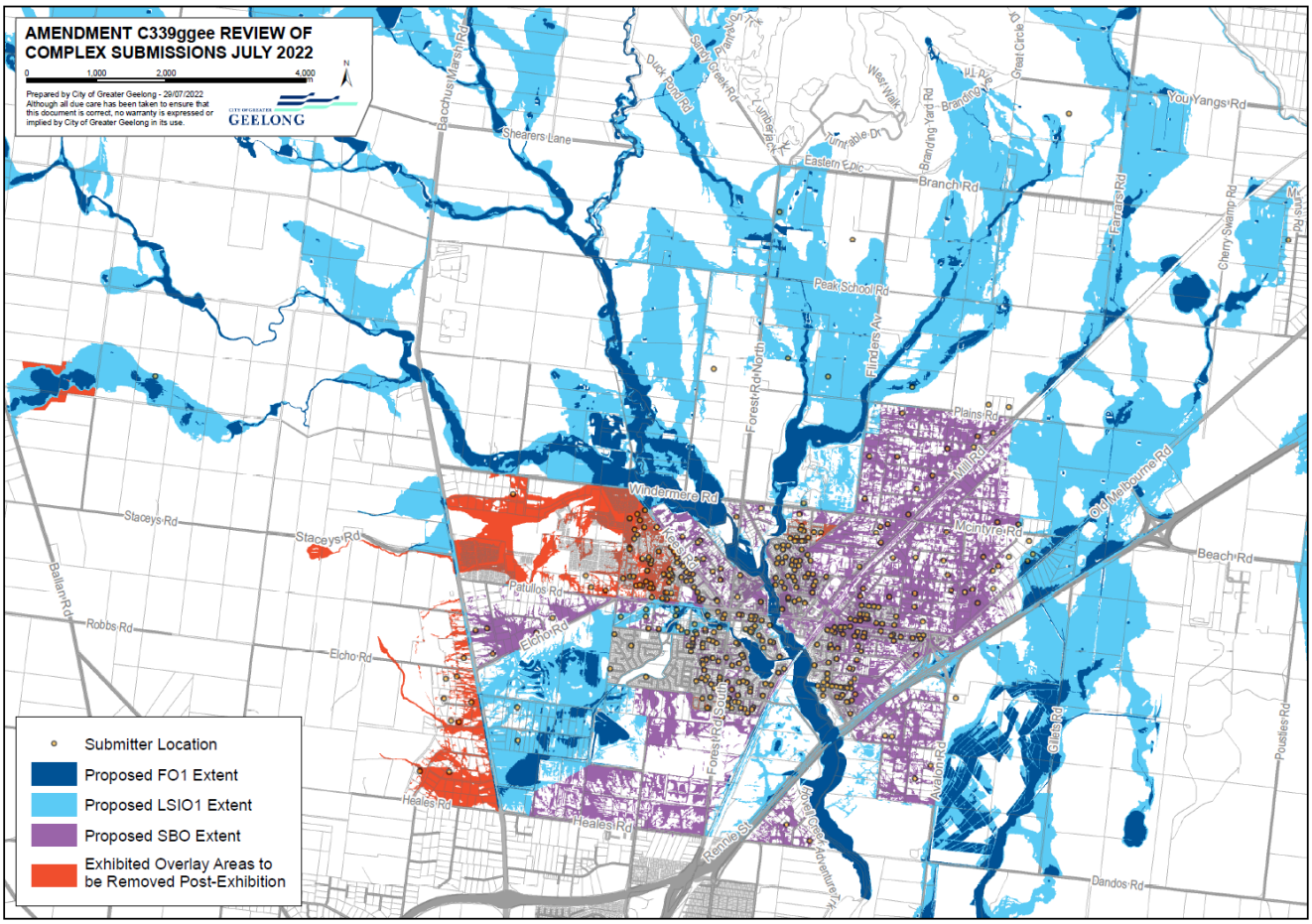
19. The main changes from the review derive from Water Technology's expert advice on the new residential estates that have developed since the flood studies were prepared and growth areas which are under development or soon to be developed. Based on this advice the City is recommending that a number of properties come out of the amendment and overlays are not proceeded with in the new estates in the Lara West and Northern Geelong growth areas.

20. In addition, Council engineers recommend trimming the overlay maps to remove the SBO from a small number of submitter's properties where the overlay only marginally affects the property.

21. In relation to the request for changes to zoning the responses are outlined in the table in Appendix 1. Of the four submissions reviewed only one is considered potentially appropriate being a change in zoning of 6 McHarrys Rd from Low Density Residential Zone 1 (which allows lots of a minimum size of 0.4ha) down to LDRZ2 which allows lots of 0.2ha. This is subject to further discussion regarding reticulated sewerage being provided by Barwon Water.

22. The maps in **Appendix 2** have been prepared showing areas in red that had overlays exhibited but which are now recommended to be removed from the amendment. An overview map of Lara showing exhibited overlays and areas to be removed is in **Figure 1** below and a larger image in Appendix 2.

Figure 1 – Overview map of Lara - with overlays exhibited (blue & purple) and to be removed (red)



23. A total of 2203 properties are proposed to be removed as detailed below:

Location	No. of properties to be removed
Lara	1327
Future Lara (under construction not yet titled)	708
Northern Geelong Growth Area	105
Fyansford	63
Total properties for removal	**2203**

24. A full copy of the memo of advice from Water Technology of 12 May 2022 is in **Appendix 3**.

25. The summary of the Water Technology advice by area from pages 39-40 of the memo is provided below:

26. **Fyansford -** The information on which the Lower Barwon and Lower Moorabool Flood Study was collected in January 2017. At this time the areas around Fyansford were under construction. Since this time these works have been completed which include filling to achieve flood protection. The works within both the Gen Fyansford and Heights estates protect new residential lots from inundation during the 1% AEP riverine flood event, as such it is recommended that these properties now be excluded from the planning scheme amendment, and the exhibited flood related overlays be clipped to the filled development areas. The subject properties include: Heights Estate; 32 Monier Way, and 31-33 Salisbury.

27. The property at 12-15 The Parade Fyansford is recommended to remain within the extent. The limit of the flood protection works within Fyansford do not extend to the property and as such given the low ground levels within the property and adjacent road the area is likely to be inundated during the 1% AEP flood event.

28. **Lara West Precinct (includes Coridale, Applegum, Austin and Manzeene Village estates) -** Due to previous planning permit conditions, additional information and significant changes to land form and drainage infrastructure, it is recommended that the properties identified in this area in relation to submissions 296, 510, 468, 297, 198, 230, 448, 449, 457, 474, 552 (listed below) are excluded from the planning scheme amendment. It may be prudent to maintain the above properties within the land liable to flooding until further flood modelling is completed as part of the Hovells Creek Stormwater Management Plan project.

29. **Lara Lakes and Lara Central Estate** - Due to previous planning permit conditions, additional information, and significant changes to land from and drainage infrastructure, it is recommended that the properties identified in this area in relation to submission 296 (listed below) are excluded from the planning scheme amendment. It may be prudent to maintain the above properties within the land liable to flooding until further flood modelling is completed as part of the Hovells Creek Stormwater Management Plan project.

30. **Avalon** - The response to submissions in the Avalon area relates to the following properties: 1425 Princes Freeway (1-43 Beach Road) and 1475 Princes Freeway (45 Beach Road) ; 15 Avalon Road and 255-275 Avalon Road. It is noted that the Lara Flood Study was undertaken at a regional scale and there are limitations within the model setup and methodology that may have impacts on individual property results and localised flood behaviour.

31. In light of the submission provided, a review of topography data, hydrology catchment delineation and the hydraulic model inflow boundaries was undertaken. Upon review of the information provided within the following submissions, it appears reasonable to reconsider the application of the overlays in their current form based upon the information provided. It appears the boundary inflow locations within the hydraulic model may be providing an over-representation of flooding within the site.

32. **Northern Growth Area -** The Northern Growth Area submission to exclude the site from the current Amendment would exclude a number of existing dwellings from being identified as within a flood prone area. It is recommended that the area be excluded at this time.

CONCLUSION AND RECOMMENDATIONS

33. Council officers recommend removal of 2203 properties from the amendment as outlined in this review. A total of 73 submissions will be resolved by the removal of the properties as proposed i.e., the submitters own or submitted on properties that were proposed to be subject to overlays but no longer will be as a result of these changes.

34. The summary table in **Appendix 1** and the Water Technology memo in **Appendix 3** provide a substantial amount of expert discussion, review, figures, maps, diagrams and planning and engineering based feedback on the submissions that were reviewed.

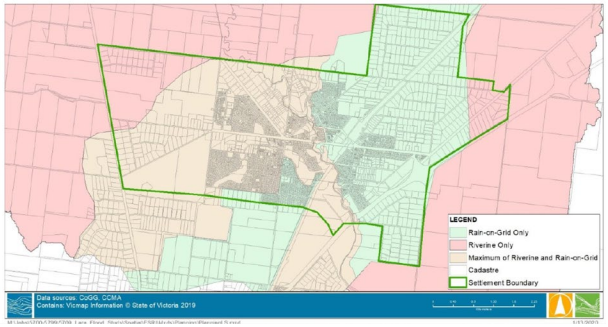
35. No further removal of overlays is recommended beyond that described in this report. The review has added rigour to the process and should give landowners and Council confidence that the flood modelling (post review) is fit for purpose and accurately maps the areas that could potentially be affected by flooding as required by State government policy.

36. The planning overlays being used in Lara and surrounds such as as the SBO, FO and LSIO are commonly used across the municipality and the State. Typically, they do not prevent development, but they do trigger a planning permit for new dwellings and other substantial buildings and works. In particular they ensure that floor levels are constructed above the predicted flood levels and provide an opportunity for specialist flood and drainage engineers at Council and the CCMA to review development applications before permits are issued.

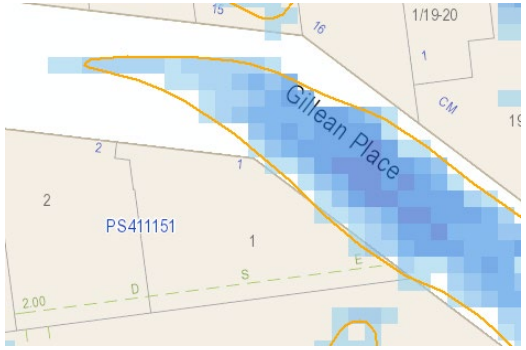
37. The Council minutes of 14 December 2021 and the FAQs which are both available on the C339ggee webpage provide discussion and answers to the broader questions, issues and themes raised in submissions and should be read in conjunction with this more detailed review of the complex submissions.

38. Council officers recommend this review be used as a basis for Council's submission to an independent Panel which is the next step in the planning scheme amendment process.

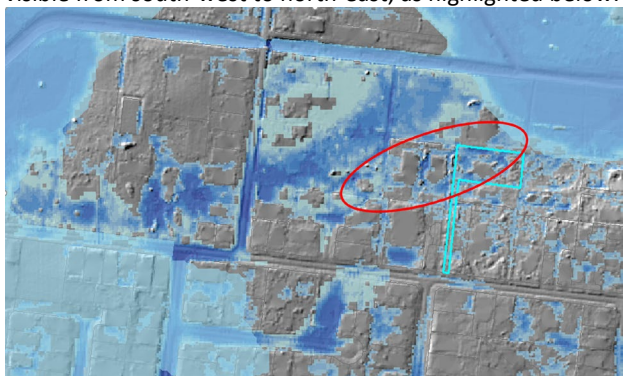
Appendix 1 – Review of Complex Submissions Summary and Response Table

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
126	Individual Submitter	Glenoe Drive	Lara	**CoGG Engineering**	Special Building Overlay (SBO)	Application of the Special Building Overlay to the Rural Living Zone areas against the Victorian Planning Provisions. The RLZ is classed as Rural Zone while the SBO is specifically only to be applied to Urban Zones. Planning Practice Note 12: "The SBO applies to stormwater flooding in urban areas only " Reference Table 1 in PPN 12. Lack of a lower limit in interpreting the Lara Flood study data for the LSIO and SBO have resulted in a significant overreach by Council in the application of these zones in Lara. The data in the Study covers stormwater flooding in steps of 0 to 0.1,0.1 to 0.2 and 0.2 to 0.3 metres. With the lower limit set to 0mm on the first step, large areas with extremely low levels of potential stormwater flooding have been caught with areas where the potential flood risk is higher. It would be more reasonable to set the lower limit to 30mm or so which would limit the application of the SBO and LSIO to areas where potential flooding is actually a potential issue rather than a blanket application to large areas of Lara with little flooding risk.	The City acknowledges the submitter's property is within the Rural Living Zone and that the Special Building Overlay (SBO) is not a perfect fit in this situation. Selection of the most appropriate planning control was the subject of significant discussion, with the decisions based around: • Whether flooding is predominantly riverine or stormwater (see below map) • Whether a particular property is inside the Lara township boundary as shown in Cl 21.13-4  (Lara Flood Study – R04 Assess and Treat Risk Report, fig 5-4, Water Technology, 2020b) An alternative overlay for the subject property is the Land Subject to Inundation Overlay (LSIO). Its purpose as expressed in Cl44.04 is: To identify flood prone land in a riverine or coastal area affected by the 1 in 100 (1 per cent Annual Exceedance Probability) year flood. In this case, flooding is relatively shallow overland flow and cannot be attributed to a waterway. Where a flood hazard is known, the City has a duty of care to advise residents and to ensure future development responds to and is compatible with the modelled hazard. Depths less than 0.03m (30mm) have been excluded from consideration in delineating the 1% AEP flood extent and the	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							proposed SBO. This is consistent with the approach taken with the Highton Flood Study (amendment C355). Modelling indicates flood depths across the submitter's property are between 0.05 – 0.12m. **No changes are recommended.**	
164	Free	Reliance Avenue	Lara	**CoGG Engineering**	SBO	Submits Amendment as it relates to four properties in Lara in should be withdrawn. Reasonable flood mitigation systems should be installed so properties are not subjected to inundation or flood overlay restrictions. Council should fund installation of flood basin on its land adjoining Elcho Drain connection to Hovels Creek, such that a 1 in 100 year event has such storage at that location to avoid flooding to homes near Elcho Drain, and upstream. Believes this land was for flood mitigation and a basin could prevent loss of homes and life in Lara. Council has allowed significant new development in Lara in the past years, adding to revenue base, also adding flood risk with additional hard surface runoff, homes, roads, larger storm water drains being added to an unchanged Hovels creek, which is known for its flooding history. Refers to bottle neck for floodwater at Hovels Creek under rail bridge, low gradient of storm-water path from Lara to Corio Bay, and planned growth of Lara upstream.	8-10 Reliance Avenue – No overlay 12 Yoorok Drive – Existing SBO1 6 Corvi Court - SBO 4 Fisher Street - SBO The submission relates to four properties as above, two of which are proposed to have the SBO applied through this amendment. One property was previously subject to Schedule 1 to the Special Building Overlay (SBO1) due to its siting withing the Grand Lakes Estate; no change is proposed to the SBO1. No overlay is proposed for the final property. The submitter requests further flood mitigation works are undertaken in Lara to minimise the need for planning controls. A network of flood mitigation measures currently exists within Lara, including floodways, retarding basins, gauges, pumps and flood gates. Further mitigation works are limited to what will feasibly reduce flooding and what is affordable. The Lara Flood Study 2020 identifies a number of mitigation projects, one of which is currently being further developed into detail design. As these are generally multi-year projects, planning controls can be removed from those properties that are protected when works are complete. The submission notes recent growth of Lara and questions the impact of land development of the flooding situation. State planning policy requires new lots be flood free up to and including the 1% AEP event and that land development not cause adverse impact to adjoining properties and the natural environment. This can be achieved through filling and the construction of retarding basins and/or floodways. The Elcho Basin is one example, where the City as owner/developer of the Geelong Ring Road Employment Precinct has constructed the asset to ensure flood conditions on downstream properties	No

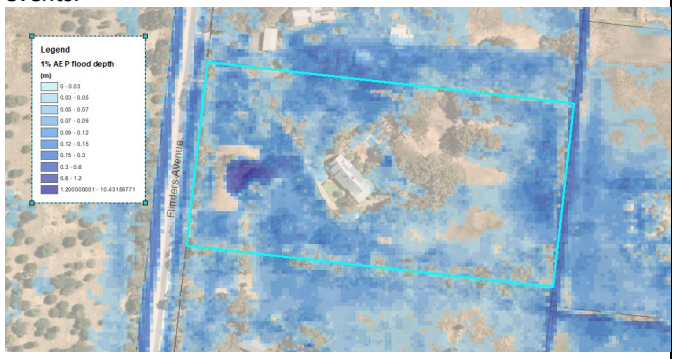
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							are not worsened as a result of ongoing development ion the precinct. **No changes are recommended.**	
213	Individual Submitter	Kiddle Drive	Lara	**CoGG Engineering**	SBO	Submitter states Lara has experienced a few major flooding events during his time here, particularly in low-lying areas where homes have been flooded. Not so in Kiddle Drive — what happens here are not flooded homes but water-logged paddocks. Submits that SBO applies to stormwater flooding in urban areas only. States Council are obviously concerned about this surface water but what actually are their plans and solutions?	As per Submission 126, the SBO is proposed to be applied to a rural residential property, this time in the Rural Living Zone. The purpose of SBO is to recognise that there is a risk of flooding as a result of overland flow beyond the capacity of the existing drainage system. In this instance, flooding cannot be attributed to a waterway therefore the SBO is the most appropriate overlay to reflect the known flood hazard. The SBO gives the City opportunity to assess buildings and/or works that may restrict or redirect flows. In low-risk areas such as this, typically the only requirement would be to raise finished floor levels. **No changes are recommended**.	No
225	Individual Submitter	Gillean Place	Lara	**CoGG Engineering**	SBO	Submits that the SBO only comes 70cm into property.	The proposed SBO represents a minor encroachment of approximately 0.7m (70cm) into the property. Modelled depths are between 0.03 – 0.04m (30 – 40mm). This is likely to be a result of how the model grid was delineated, and whilst is not 'wrong' does represent an unnecessary burden on the property.  **It is recommended that the SBO is clipped to the property line.**	Yes, See Map 1

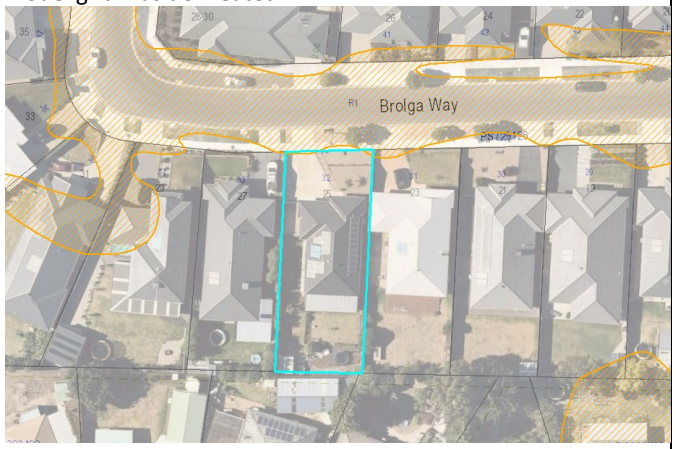
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
233	Houston	Forest Road North	Lara	**CoGG Engineering**	SBO	Submits that objection relates specifically to the fact that the source data and time of the study is using information on our property that was prior to the subdivision of the lot now known as 137 Forest Road North. The study is using the topography of the lot and assumed it to be flat and refers to it as being a part of 145 Forest Road North in Lara. Refers to house and shed construction and ground works to raise profile which has not been taken into account by thew amendment i.e. inappropriate data.	Submission 233 objects to the application of the SBO due to recent building works that have occurred on the property. As detailed in the Lara Flood Study – R01 Preliminary Report, photogrammetry covering the urban areas of Lara was captured in 2017. This data was processed to remove all buildings and structures to produce the 'bare-ground' Digital Terrain Model used in the flood model. Aerial photography indicates building works on the property commenced in late 2017. There is no evidence of widespread filling of the land that would prevent overland flows from entering the property from the north. Re-running the flood model to include the dwelling may result in a slight redistribution of overland flows within the property, however the works that have been completed are unlikely to make it flood-free. **No changes are recommended.**	No
262	Individual Submitter	Buckingham St	Lara	**CoGG Engineering**	SBO	Submission questions the accuracy of the flood mapping due to the presence of boundary fences.	Boundary fences are typically removed from raw LiDAR and photogrammetry in order to produce the 'bare-earth' Digital Terrain Model used in the flood model. Any build-up of earth around fence-lines will typically be captured. Obstructions, including buildings and structures are accounted for by increasing the surface roughness, which directs overland flows to areas of least resistance. Whilst this is not a perfect representation, it is standard practice within the industry and provides a good balance of detail to project cost.	No

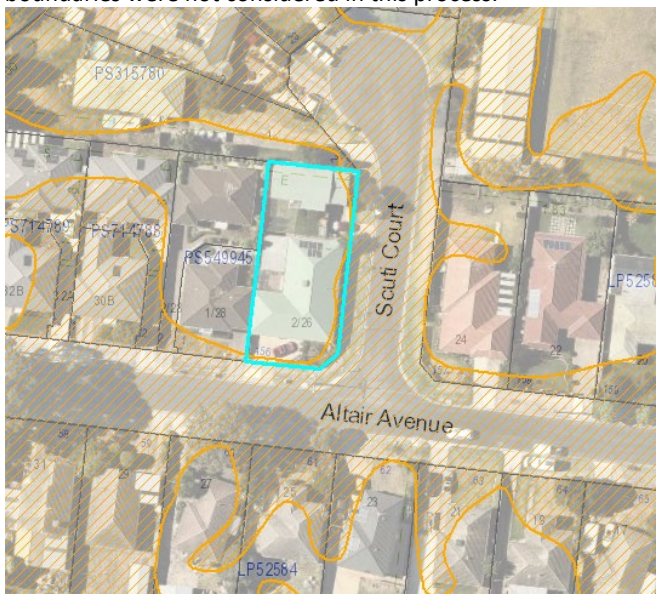
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							From the raw flood mapping a clear overland flow path is visible from south-west to north-east, as highlighted below:  There is some variation from the final flood study mapping to the proposed SBO extent. Shallow depths (below 0.03m) have been excluded, small unconnected 'puddles' have been removed and the gridded results have been smoothed. Whilst there may be some localised inaccuracies, the intent of the SBO is simply to provide a trigger for works in the floodplain to be further assessed so that the clear passage of floodwaters is maintained, and works do not represent a hazard to human health and safety. **No changes are recommended.**	
279	Bevan Little Lambs Playgroup Lara	Lakeside Bvd	Lara	**CoGG Engineering**	SBO	Wants decision to apply SBO to property reviewed and the SBO removed. Block of land has a 2.2m fall high ground rear of block. In 2005 approval was granted to build family home. Before work commenced on the house build, the block was cut at the same level as neighbours. With house design enclosing the rear yard, retainer walls, tanks, landscaping including extensive aggie drainage, drainage pits, dual redundancy storm water discharge system were all designed and installed with very calculated intentions (in short, 2	Submission 279 asserts that flood risks identified in the Lara Flood Study 2020 did not exist previously. The possibility of flooding has always existed, it simply had not been fully quantified. As with any environmental hazard, the City has a duty of care to advise residents of flood hazards where known, and to ensure future development responds to and is compatible with the modelled hazard. The flood study was completed by experts in the field, has been independently peer reviewed and is therefore considered fit for purpose as a regional flood study. Specific to the submitter's property, the flood hazard is not from raised water levels within the lake system, rather from the inability of underground drainage system to accept and	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						drainage systems that allow dedicated maximum storm water discharge from rear yard of property into street drainage system. In the rare event that the street drains were at maximum capacity, the water from our property flows across nature strip onto Lakeside BVD). Living room floor (covered by SBO) is 3.7m higher than Elcho drain path in Lake Lands retention system. SBO is totally unreasonable, major technical shortcomings that brings into question the flood model. Council should consider legal implications of accepting the findings, insinuating Council accepts an increase in flood risk to landowners in Lakeside Bvd. A flood risk that did not clearly exist a few years ago in a modern estate that was approved by the COGG.	convey runoff during heavy rainfall. Excess runoff then flows overland along low-lying drainage paths. It is clear that the owners have invested significantly in drainage infrastructure on their property. The National Construction Code and relevant Australian Standards require that site drainage systems cater for up to the 1 in 20 year (5% AEP) rainfall event, however this will be quickly overwhelmed in more intense rainfall. Rainwater tanks are typically installed to capture rainwater for reuse but have limited use in flood mitigation unless significant airspace is available. The City is keenly aware that the drainage system in Lara, as with many other parts of the municipality, has been constructed to differing standards over the course of many years. The study does not invalidate works previously completed in accordance with the standards of the day. The study is a necessary first step to identify 'hot spots' and assess the financial and social impact of flood damage. It is only with this information that the City can sustainably build a program of mitigation strategies including physical works, flood warning and information dissemination strategies, and planning and building controls. The Special Building Overlay is the least onerous of the flood related planning controls, as it typically reflects shallow, low hazard overland flows. It is acknowledged a planning permit adds additional time and cost, however, provides opportunity for owners and building designers to tailor a design to the land. Minor works may be exempt from a permit, as set out in cl 44.05-2. **No changes are recommended**	
288	Maczyszyn	Buckingham St	Lara	**CoGG Engineering**	SBO	Opposes SBO with reasons including: 30 years lived in Lara the only flood event was primarily caused by works conducted by the Council incorrectly conducting works on the Hovel Creek area. Property is opposite Grand Lakes Estate. During construction of estate the council	The City agrees with the submitter that the developer of Grand Lakes Estate invested significant effort to ensure new lots within that estate were flood free. This does not guarantee the situation will be improved for adjoining properties, only that it will not be made worse. As with Grand Lakes, recent development including Manzeene Village, Lara Central, Lara Views and estates within the Lara West urban growth area have invested significant time and money in studies and	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						insisted that the developer, Bisinella Developments, invest significant time, effort, and money into ensuring drainage was adequately addressed. Was signed off by Geelong council. Fall of property is away from street and rear has large culvert drain, in 9 years lived in current property no flood events. Annual rainfall for Lara is considerably less that the state average. COGG has approved, without foresight, an excessive number of developments without the adequate consider, planning or development of infrastructure. Impacts of overlay include increased insurance premiums, issues in gaining approval for improvements.	infrastructure to ensure land can be developed without adverse impact on existing residences and the natural environment. Whilst the comment on Lara's low average annual rainfall is noted, this has no bearing on whether land will flood. There will still be rainfall events that drainage systems are simply unable to manage, particularly so in older areas where subdivision does not fully consider topography. Similarly, the comments relating to the fall of the property and the presence of the drain to the rear are noted. Lot-scale drainage in rural-residential areas is required to have capacity for the 10% AEP event. Given overlays reflect the 1% AEP event, this drain will be quickly overwhelmed in higher rainfall events. The submitter has also raised concerns around future insurance coverage and costs. This is a common theme when flood models are published. Advice from the Insurance Council of Australia is "As of March 2015, more than 93% of home building and contents insurance policies contain flood cover as a standard inclusion" (https://www.floods.org.au/client_images/1787680.pdf). Flood insurance premiums are generally proportional to the flood risk at a property, therefore studies such as the Lara Flood Study 2020 allow insurers to better tailor their products to suit. Where a resident feels an insurer has overestimated their flood risk, the City is able to supply flood data (extent, depth, etc.) to assist in re-assessing the risk. **No changes are recommended.**	
289	Maguire	Flinders Ave	Lara	**CoGG Engineering**	SBO	Seeks review of proposal to include property in the SBO. Gives specific topographic examples/local knowledge as to why flooding is mitigated. Lived at property since 1995 and have some experience in how the property handles large stormwater events. Important mitigations in place that reduce flooding impacts on this property.	Submission 289 questions whether the Study has considered improvements to and surrounding the property, including a driveway elevated above natural surface, flood storage provided by a dam on site and catch drains to the east and north. The Digital Elevation Model has certainly captured the driveway, dam and drain to the east of the property, as evidenced by decreased (driveway) and increased (drain, dam) flood depths in these areas.	No

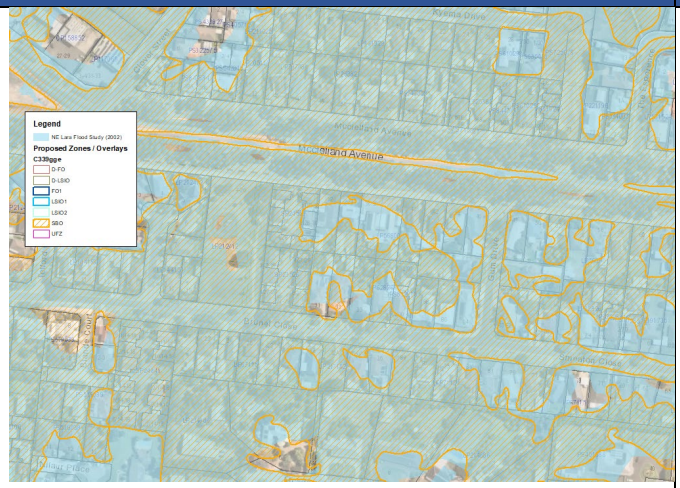
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						Generally, the property slopes gently toward Flinders Avenue and Plains Road. 1. The dam, rather than being an item of risk, plays an important flood mitigation role. Historically, the dam is empty (as now) or only partially full and is a catchment for significant flooding events that impact the Windermere Rd side. Also, drainage pipe leading from the dam to the nature strip in Flinders Avenue allows emptying of water from the dam if it over-fills. 2. Driveway, runs over 100m from Flinders Avenue to behind the house, is built up above surrounding land and acts as a barrier. 3. During large stormwater events, water on the Plains Rd side runs toward the front end of our neighbour's property, channel diverts excess waters to Flinders Avenue. 4. Channel system mitigates water entering property from the rear, not clear if it has informed the Lara Flood study.	The drain to the north is a private asset that has lesser capacity than the easement drain to the east, therefore will not provide significant flood protection for anything but frequent rainfall events.  The drain to the east was constructed circa 1990 and is estimated to have capacity for up to a 10% AEP event. It is noted the dam is generally kept empty; however, it will not have the capture capacity of a properly designed retarding basin. **No changes are recommended.**	
292	Individual Submitter	Brolga Way	Lara	**CoGG Engineering**	SBO	Amendment affects the front 30-40cm of our land, on which our house is set back 8m from the property line on a steep upwards incline. *Attached images highlighting submission*	The submitter's property sits within the Lara Central Estate, which was more broadly referred to in submission 269. The proposed Special Building Overlay represents a very minor encroachment along the frontage. As presented in the submission, a retaining wall has been constructed along the frontage which significantly elevates the majority if the lot above footpath level. Similar to submission 225, it can be surmised that the identified flooding is a result of how the	Yes - clip overlay to exclude property See Map 4

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							model grid was delineated.  **It is recommended that the SBO extent is clipped to the property line.**	
300	Matthews	Buckingham Street	Lara	**CoGG Engineering**	SBO	Same submission and property as number 288	See no.288	
331	Moore	Turnstyle Crt	Lara	**CoGG Engineering**	SBO	Submission 331 queries the mapped flood extents based on the existence of drainage infrastructure on and adjacent to the property.	The shape and extent of the 1% AEP flood extent over the land is reflective of flat terrain. Model results show floodwaters are shallow and low velocity, with increased depth in any small depression. Features such as the mounded areas referred to in the submission have been captured in the Digital Terrain Model and generally excluded from the proposed SBO. As previously noted, the raw flood mapping is simplified to produce the draft planning overlays, which may result in some areas that are not expected to flood being covered by the overlay. This is normal practice and was addressed by the panel for amendment C265 which applied the SBO to parts of Portarlington, Newcomb, and Corio. This simplification process also explains why roadside drains may not fully covered by the proposed SBO, as elevated driveways will split the water in the drain into disconnected pieces that may be smaller than the minimum 'puddle' size. The submitter acknowledges areas of the site are inundated during 'unusual rain events'. The areas highlighted in the	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							submission are within the proposed SBO, which suggests results of the flood model are generally accurate. **No changes are recommended.**	
334	Individual Submitter	Altair Ave	Lara	**CoGG Engineering**	SBO	SBO only covers a small amount of property. This amendment is provisionally supported on the basis that: 1. Residential properties are not publicly defined as being within a SBO if the SBO covers a minor percentage of the land or dwelling area. 2. Additional approvals are not required for minor interior and exterior changes (e.g. fencing, replacing roofing on existing pergola) for areas of a property impacted by the SBO overlay but outside the specific SBO overlay boundary. 3. Assistance is provided (e.g. advice, materials) to property owners to minimise any impact of storm water in advance of such occurrence.	It is noted the submitter generally supports the application of planning controls based on the Lara Flood Study 2020 but has some concerns relating to the need for approvals for minor works and support during flood events. As previously detailed, the proposed Special Building Overlay is based on the modelled 1% AEP flood extent with some minor modifications to remove shallow depths and isolated 'puddles' and to smooth the blocky raw model outputs. Property boundaries were not considered in this process.  Most of the subject property is flood free, with modelled flood depths in the proposed SBO between 0.03 – 0.06m (30 – 60mm). The need for a permit is triggered by buildings or works within the SBO, subject to exemptions listed in cl 44.05-2. For example, a replacement fence in the same location and	Yes, clip overlay to exclude property See Map 2

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							of the same materials is generally exempt from needing a permit. Flood response and recovery activities and responsibilities for such are set out within Municipal Flood Emergency Plans. VicSES and the City have roles in providing flood warnings, immediate assistance and evacuation if needed and recovery assistance in the event damage results in a dwelling being uninhabitable. **It is recommended the SBO be clipped to the property boundary.** In this instance the encroachment of the SBO is minor, modelled flooding is low hazard and is likely to have resulted minor anomalies in delineation of the model grid and Digital Terrain Model.	
385	Phelps	Watt St	Lara	**CoGG Engineering**	SBO	Land was recently subdivided, and extensive and expensive earth and flood mitigation works have been undertaken, which aren't reflected in the flood modelling	Submission 385 objects to the application of the SBO due to building works that have recently occurred on the property. As detailed in the Lara Flood Study – R01 Preliminary Report, photogrammetry covering the urban areas of Lara was captured in 2017. At this time, building works on the subject land had not commenced. The subject property has been identified as flood prone for some time, as shown in the below extract from the North East Lara Flood Study (WBM Oceanics, 2002):	No

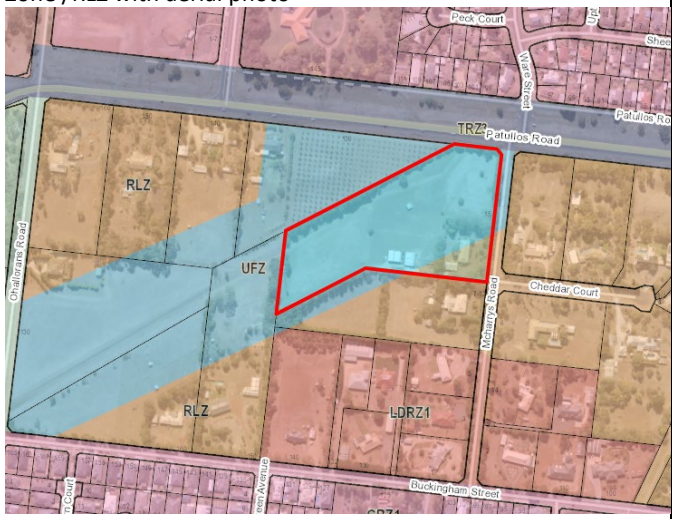
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							 Figure 5-2 Area of inundation above 100mm Land shown by that study to be subject to flooding during the 1% AEP event had previously been designated as flood prone for the purposes of Building Regulations (1994), which has resulted in the requirement for floor levels of the new dwelling to be elevated. It is important to note that providing freeboard to a dwelling does not change the flood prone status of the land. The 1% AEP flood extent in the vicinity of the submitter's property has slightly reduced from the 2002 to the 2020 study:	

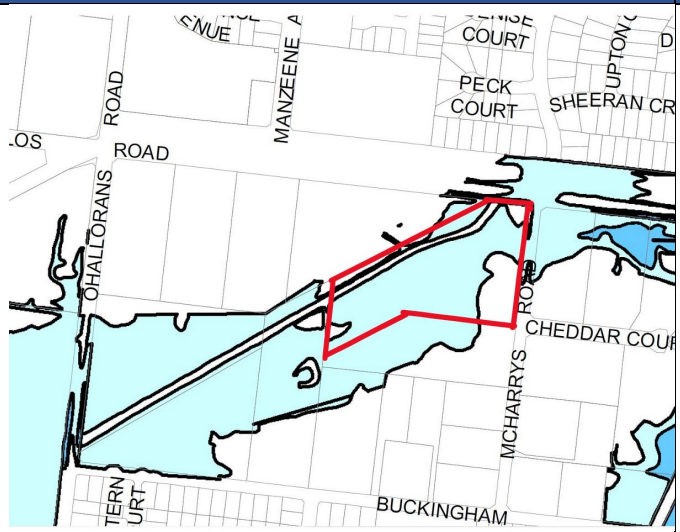
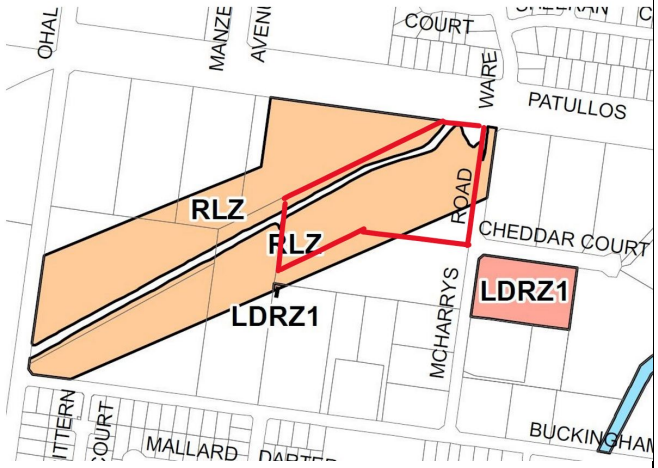
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							 The submitter also notes the City required a rainwater tank be installed on the new dwelling. This is correct; however, it is not intended to protect the dwelling from flooding. The City's piped drainage network is only designed to cater for relatively minor rainfall events (generally 20% AEP); rainwater tanks can be used as on-site detention to ensure stormwater discharge matches conditions that existed for a single dwelling on the property, to ensure development does not exacerbate flood conditions during frequent events and adversely impact surrounding properties. **No changes are recommended.**	
397	Individual Submitter			**CoGG Engineering**	SBO	No address given Submission 397 does not object to the application of overlay(s) to a specific property, however, suggests the modelling is inaccurate due to an absence of lived history, makes comment on maintenance issues, implications for insurance coverage and community consultation.	As previously indicated, the Lara Flood Study 2020 does not create flooding where it did not previously exist, it merely models the impacts across the entire catchment. State policy in planning and floodplain management obligates the City to act on the best available information by informing residents of the hazard and including the information in the planning scheme to inform decision making. The submitter's comments on their lived history of flooding are noted. It cannot be assumed that flooding has not previously occurred or will not occur at any given property, on the basis that there are no records of flooding to the extent identified by	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							the mapping of 1% AEP overland flows. The City has engaged with the community on a number of occasions over the course of the flood study, where long term residents have provided valuable intelligence and first-hand accounts of flooding that have been fed into validation of the study outputs. During intense rainfall events, blockages to rural drains will generally have little impact on the scale of flooding as they are only designed to cater for more frequent, less intense rainfall events. If the submitter is aware of issues with the City's road and drainage infrastructure that are not captured by proactive inspection, these can be reported for rectification. The issue of insurance coverage has been commented on to in response to submissions 288 and 300. Similarly, the value of a property is determined by the complex interplay of many different factors such as location, streetscape, and amenity. It is difficult to assign what effect if any, the identification of land as liable to flooding may have on the value of a property, nor is there any evidence that flood studies previously undertaken by the City have had any effect on values. **No changes are recommended.**	
405	Individual Submitter	Wongalea Drive	Lara	**CoGG Engineering**	SBO	Challenges flood modelling due to vacant farmland opposite property and general topography of Lara. Claims that only flooding could occur as a result of increased drainage load as a result of potential future development.	The Special Building Overlay represents the extent of flooding expected during an event that has a 1% chance of occurring in any given year. It is not related to a waterway overtopping its banks but represents overland flow paths where stormwater will flow when the capacity of the underground drainage system is reached during heavy rainfall. The submitter's lived history is noted, but this does not mean flooding has not or will not occur. The model used to derive the 1% AEP flood extent relies on many inputs, including a Digital Terrain Model (validated with ground survey), the existing drainage system and land uses. The model also considers the ability of rainfall to infiltrate into undeveloped land and garden areas. Modelling indicates flood depths across the property are in the range 0.03 – 0.21 m (20 – 210mm). Water depths in Wongalea Drive in front of the property up to 0.4m (400mm), which is	No

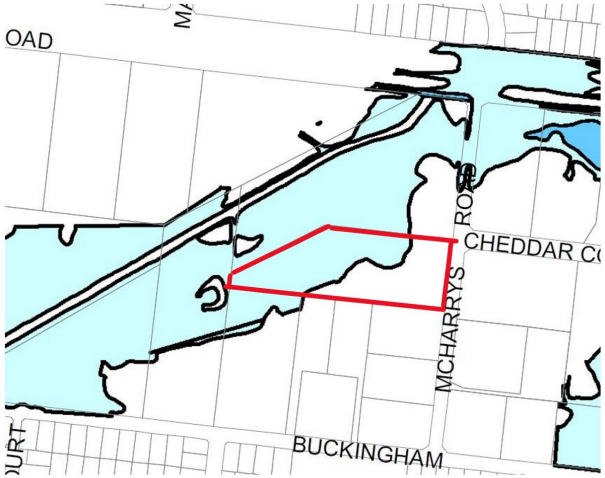
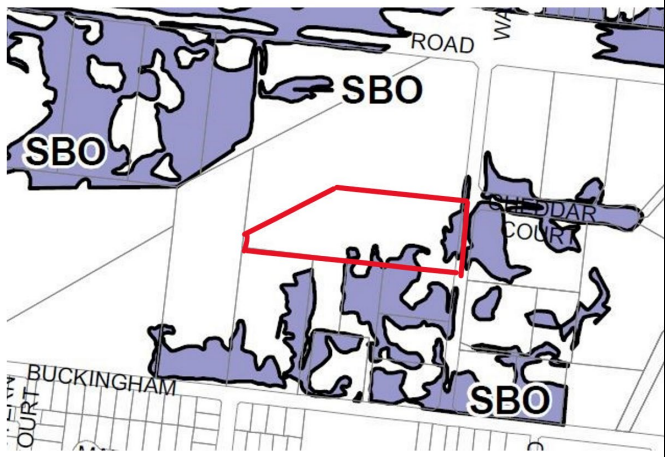
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							classified H2-Unsafe for small vehicles (Australian Disaster Resilience Guideline 7-3: Technical flood risk management guideline: Flood hazard, 2014). This does not mean the road is not trafficable, however it is not recommended certain vehicles attempt to drive in floodwaters. The submission makes reference to the impact of development on adjoining land. It is requirement of state planning policy that development consider the capacity of existing infrastructure and, where deficiencies exist, to undertake works so that there is no adverse impact on adjoining properties. Undertaking flood studies and including the results in the planning scheme allows the City to be more informed in its decision making. **No changes are recommended.**	
410	ROAD Securities	Grosvenor Drive	Wandana Heights	**CoGG Engineering**	SBO	The current floor slab is about 250mm above the existing gutter. Also cites other examples where modelling contradicts real world.	This submission requests amendment of the Special Building Overlay due to minor encroachment of their property. Less than 1m2 of the property is proposed to be encumbered. Modelling outputs show the depth of water in the affected corner is 0.03m (30mm). 	Yes - clip overlay to exclude property See Map 3

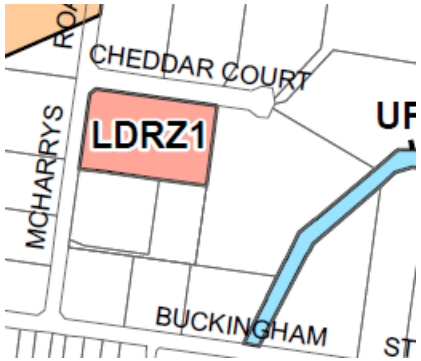
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							Given the minor encroachment and low risk, it is recommended the SBO is clipped to the property boundary.	
48	Blair	McHarrys Rd	Lara	**CoGG Planning**	Zoning change and LSIO1	Supports the change that is in the Amendment to reclassify part of land (15 McHarrys Rd) from flood overlay to RLZ, but with the change to include the rezoning of submitter's land to LDRZ as is proposed for 6 McHarrys Road Lara. Refers to Lara Structure Plan Page 16 stated "*The McHarrys Road area is considered appropriate for the Low Density Residential Zone. This area is adjacent to an existing Low-Density precinct and the new Grand Lakes Estate residential development*". Provides other reasons for the land to be rezoned to LDRZ in particular… "One of the main reasons for not rezoning our land to LDRZ in the past by the council was because of the flood overlay that existed on our property, but now that is being removed there should now be no reason not to change its classification."	This property is currently in both the Urban Floodway Zone and the Rural Living Zone – see Figure 1 below. A house is located on the RLZ part of the land in the south east corner. In the new zone and overlay mapping under C339 it proposed to put all the land in the RLZ and instead of the UFZ apply the LSIO to the flood prone area. The three figures below show existing zoning, proposed LSIO and the proposed RLZ zoning. The submitter wants the land to be included in the Low Density Residential Zone 1 (LDRZ1) presumably so it could be subdivided. The minimum subdivision area for a lot in the LDRZ1 is 0.4 hectares (ha). Whilst the land title is close to 3ha most of it is flood prone. There is only around 0.38ha of land in the south east corner of the property outside the LSIO (and hence not flood prone). It is poor planning practice to allow subdivision of flood prone land and the size of the flood free land in the south east corner is not big enough to warrant a zoning change of the entire site to LDRZ1 to facilitate subdivision. **On this basis the RLZ as exhibited is considered to be the most appropriate zone and no changes are recommended.**	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							Figure 1- Current zoning maps showing site in Urban Floodway Zone /RLZ with aerial photo  Figure 2 - Exhibited overlay maps showing LSIO in light blue (below)	

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							 Figure 3 - Exhibited zone map (below) 	
184	Individual Submitter	Bath Street	Lara	**CoGG Planning**		Objects to Amendment C339 which proposes to apply the Land Subject to Inundation Overlay (LSIO1) to the land. Submits the land is currently not affected	The land has been identified as being flood prone as part of the Lara Flood Study and as such it is appropriate that a planning scheme overlay be applied to recognise this fact. An overlay is a commonly used tool across Greater Geelong and	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						by any planning overlays and the proposed LSIO1 is a significant change to how the land will be managed now and in the future. Requests the land is deleted from Amendment C339. Submission states that the subject land is currently zoned General Residential Zone – Schedule 1. No planning overlays apply to the land. The land was not identified in the Lara Structure Plan as a site potentially impacted by flooding. Frustrated that Council that the LSIO is the preferred planning overlay to implement the Lara Flood Study. The planning assessment could have considered other options, including the provision of greater drainage infrastructure.	Victoria to trigger a planning permit for buildings and works in flood prone areas. Typically, this results in any new dwellings having floor levels raised above the flood level and allows consideration of access and other issues that flooding may cause. Where land is in the General Residential Zone the Special Building Overlays is normally used as is proposed in many other parts of urban Lara. However, the SBO is for flooding from local stormwater drainage systems. In this case the LSIO is proposed as the land is affected by potential inundation from a water course. **The choice of overlay (i.e. SBO versus LSIO) will be further reviewed with Council engineers however it is recommended that an overlay continue to be applied and no change to exhibited mapping is proposed at this stage.**	
298	Martin	McHarrys Road	Lara	**CoGG Planning**	Zoning change	Supports the change that is in the Amendment to reclassify part of land from Urban Floodway Zone to RLZ, but with the change to include the rezoning of submitter's land to LDRZ as is proposed for 6 McHarrys Road Lara.	This submission relates to 7-13 McHarrys Rd. The wording in the submission is the same as submitter 48 which is for the property to the north on McHarrys Rd. As with the property to the north the Amendment proposes to put all the land in the RLZ and instead of the UFZ apply the LSIO to the flood prone area. In addition, this property is affected by the proposed SBO mapping in the south eastern party of the site. The proposed overlays are shown in Figures 1 and 2 below. As with submitter 48 proposals to further subdivide this property that may result if it is placed in the LDRZ1 are unlikely to be supported as the flood free area is not adequate to provide flood free lots of sufficient size. **On this basis the RLZ as exhibited is considered to be the most appropriate zone and no changes are recommended.**	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							Figure 1 – Proposed LSIO (below)  Figure 2 – Proposed SBO (below) 	
301	Maxwell c/o Context	McHarrys Rd	Lara	**CoGG Planning**	Zoning change	The Amendment seeks to rezone the Subject Land at 6 McHarrys Rd from Rural Living Zone (RLZ) to Low Density	The land is proposed for rezoning from RLZ to LDRZ1. LDRZ1 applies in areas without reticulated sewerage and applies to properties surrounding this site and allows lots of	Yes (subject to more

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
	Planning Pty Ltd					Residential Zone 1 (LDRZ1) – which is fully supported subject to points regarding reticulated sewerage. Submitter advises they are in active conversation with Barwon Water regarding the connection of reticulated sewerage from Patullos Road to 6 McHarrys Road and would like Council to consider the possibility of rezoning the subject site to LDRZ2.	minimum 04ha. LDRZ2 allows lots down to 0.2 ha in size and requires reticulated sewerage. Council officers are willing to consider LDRZ2 zoning, but it requires further discussion with Barwon Water and Council engineers. This can occur as part of the next step in the amendment process being the Panel hearing. Below is the proposed zone map. 	detail to be provided)
91	Charlesworth	Farrars Road	Lara	**Corangamite Catchment Management Authority (CCMA)**	Land Subject to Inundation Overlay Schedule 1 (LSIO1)	Believes that the flood levels on the proposed mapping overestimates the area of property subject to flooding and request a modification of the proposed flood mapping. The property is 5 acres in size. A shed/garage was constructed at the rear in the mid-1970s. No water inundation has ever occurred affecting either the house or garage during this time. Amount of inundation on the property each year has significantly reduced since the drainage was improved along the front of the property and throughout Farrars Road in around 2015. Current inundation overlay appears to be more accurate than the proposed inundation overlay level, in terms of the	<u>CCMA comments:</u> Comments regarding flood history are noted however insufficient evidence is provided to justify the requested reduction in extent. It is noted that the submission details water was 10m from the house in 2012. Not familiar with the 2012 event in this location however this anecdotal extent seems to be very close to the house, particularly given 2012 was not a large enough event for calibration modelling. In any case, 2012 was not significant enough to compare to a 1% AEP event, which the overlays are based off. Based on this CMA is confident in the proposed 1% AEP based overlay. Comments regarding elevations of driveway appear to have been picked up in ground level information used in the study: depth over the driveway is less than the surrounding area. Driveway appears to hold up water, this can be seen on both the flood mapping depth results and aerial imagery where the area immediately north of the driveway is wetter/greener than south.	No

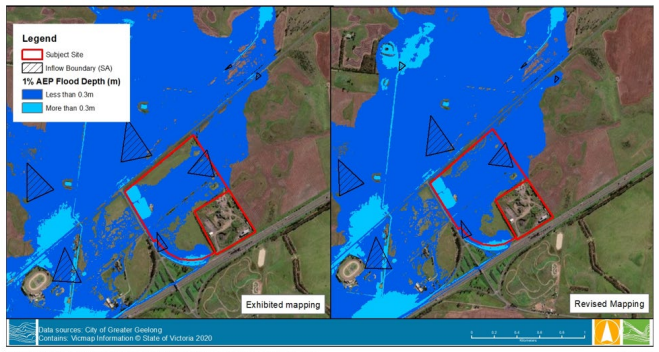
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						inundation experienced on our property during the last 50 years of submitter's experience. Proposed inundation overlay does not identify raised areas on property.	It is assumed that the dam walls have been included in LSIO due to filtering/filling of holes. Flood model results show the elevated dam walls are not subject to inundation. There is likely little practical effect in removing this from the LSIO as this is not a developable area. Flooding on this property, with the exception of deep water in the dam, is not a barrier to development based on current flood hazard management practices at CCMA. The overlay and associated permit trigger will ensure that future development has a degree of flood immunity and retains the storage and passage of floodwaters as required by current government policy. Not clear why dam was included in LSIO rather than FO. Submitters comments regarding neighbouring dams not being in LSIO appear to be due to their inclusion in FO. Recommend leaving as LSIO in this case due to small dam size (note this is also likely why it wasn't FO in the first place). **No change to mapping recommended.**	
92	Individual Submitter	Old Melbourne Road	Lara	**Corangamite Catchment Management Authority (CCMA)**	Floodway Overlay Schedule 1 (FO1) and LSIO1	Property has previously had an LSIO Overlay and due to this reason, as the property owner/submitter become aware of the two main reasons that potential flooding occurs not just on this property but the neighbouring properties as well: 1. Placement of underground services. 2. Council drains. Concerned at lack of drains maintenance and believes this would reduce flood extent.	<u>CCMA comments:</u> It is the understanding of the CMA that flooding north of the highway here is impacted by the number, spacing and capacity of culverts under the road. Flood depths in the front of the subject property are around 0.4 metres. Immediately south of the road, in the drain, flood levels drop by around 0.25 metres. This conveyance restriction appears to be the largest influence on flood depths in this area. Matters raised in the submission relate primarily to drainage and would potentially be impactful in small (frequent) storm events, however the proposed works (removal of earth and removal of vegetation in drains) are unlikely to have a significant impact in a 1% AEP event. This area is the ultimate drainage point for a significant catchment. **No change to mapping recommended.**	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
177	Individual Submitter	Ballan Rd	Anakie	**Corangamite Catchment Management Authority (CCMA)**	FO1, LSIO1	Includes a marked-up copy of exhibited FO LSIO map with elevations from GoogleEarth. Submits flooding & inundation in the Anakie area only occurs as the result of poor construction and maintenance of roads preventing the natural dispersion of water.	Topographic data used in the study is up to date and more accurate than that available from Google Earth. Flood modelling does not allow water to flow uphill. CMA notes this is at a boundary of the flood model (i.e. inflow location) which may skew results. This is not expected to influence the extent greatly but may have a small impact **Change recommended - Amendment mapping appears to have merged old maps with new. This should be rectified.**	Yes - amend maps to correct mistake See Map 9
228	Holt	Plains Road	Lara	**Corangamite Catchment Management Authority (CCMA)**	FO1, LSIO1	The water overlays in Amendment C339ggcc are on our property 375 Plains Road Lara, bounded by Plains Road, The Melbourne-Geelong Rail line, Peak School Road, and the Old Melbourne Road, excluding east of Cherry Swamp Road. Historically the water has been a problem to the landowners for the following reasons: 1. Flatness of the land, not all of it is a flood plain. 2.The interference of the water course by the railway, Mill Road and including all the recent drainage works. 3 At Old Melbourne Road, the failure of the water to continue to flow across the flood plain due to interference with water flow. Map is significantly better than the previous flood plain map. Map is incorrect with the flood plain being so extensive when the water flows through the property from north to south in formed water courses.	CCMA comments: Little to respond to, submission appears to acknowledge the flatness of the land and difficulty in conveying water. CCMA no comment on drainage matters not related to us. Worth noting the LSIO should have minimal impact on the farming use of the land. **No change to mapping recommended**	No
229	Hora	Blairs Road	Lara	**Corangamite Catchment Management**	FO1, LSIO1	Objects to flood overlay mapping for this property which indicates minor inundation along boundary, nature stirps and road	CCMA comments: 200 Blairs Road: Inconsequential flooding and little purpose of	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
				Authority (CCMA)		drains. Property hasn't flooded since living there in 1977. Entry to property never floods. Provides marked up overlay plan showing location.	the overlay here. Removing this property from the amendment and would have little practical effect. (Note: assuming ONLY the parcel Lot 1/TP4329). Note CCMA still has confidence in the mapping, however the very minor inundation of roadside drains has negligible impact on this property. **No change to mapping recommended**	
258	Individual Submitter	Flinders Avenue	Lara	**Corangamite Catchment Management Authority (CCMA)**	FO1, LSIO1	Objects to extension of area subject to inundation. Proposes inundation can be reduced by undertaking work the was not carried out on Peak School Road when the level was altered 30 years ago.	CCMA comments: Flood "assessment" undertaken assumes static water (i.e. constant water level) and is flawed. No comment re: Peak School Road design, however, agree with the rough estimate of a 100m north influence of the road on flood behaviour (~130m by my assessment). Note property has an inflow location on it in the model. The location of this property in the catchment (i.e. upper catchment) would be considered in any development assessment. Overlays are meant to show CURRENT situation, not future situations dependent on yet to be undertaken work. Works done on Peak School Road in future should be considered for modelling and subsequent amendment if necessary. **No change to mapping recommended**	No
263	Kitanoski	Bath Street	Lara	**Corangamite Catchment Management Authority (CCMA)**	LSIO1	Due to the new Planning Scheme property is now highlighted as land subject to Inundation but is outside of a 1km radius from any of the known areas of "Land Liable to Flooding" which has an AEP of 1% in the surrounding area of Lara. Refers to street drainage. Believes property has proven time and time again its resistance to flooding not only the household but the land itself. Storms of 1973 where 120mm fell throughout Lara in 12 hours and then again in 1988 where 120mm fell in 5 hours. Property stood strong 50 years ago	CCMA comments: A flow path clearly exists through this property/between it and No. 5 in large events. Some planning control is appropriate, LSIO has been applied for consistency. **No change to mapping recommended**	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						back when there were no City Planned Drainage Systems in place.		
299	Matthews	Whytcrosses Road	Anakie	**Corangamite Catchment Management Authority (CCMA)**	LSIO1	Strongly reject the claim that the land on Whytcrosses Rd Anakie is subject to inundation. Believes topographical maps used are in modelling are inadequate. Inadequate consultation and information have been provided to Anakie residents for the amendment.	CCMA comments Undefined flow here, sheet flow of less than 10cm in depth. Flow originates from a waterway breakout northwest of the subject property. Agree with submission in that this is somewhat normal/expected in a very large (1% AEP) event. Somewhat inconsequential however earthworks on this property have a potential to block flow of water in high events. **No change to mapping recommended**	No
308	McEvoy	Cheddar Crt	Lara	**Corangamite Catchment Management Authority (CCMA)**	FO1, LSIO1	Proposes drainage infrastructure on Elcho and Patulos roads to mitigate flooding. Claims that the application of LSIO and FO is confusing and hard to implement and suggests that SBO would be more applicable.	CCMA comments: Modelling in this area is high confidence. Area is not appropriate for SBO as flows are not urban/overland flows, but rather large catchment flows where storage and conveyance are important. Overlays are accurate and informed by best available information. **No change to mapping recommended. Confusion re: which overlay applies can be resolved via CCMA flood advice**	No
328	Mladenovic			**Corangamite Catchment Management Authority (CCMA)**	unknown	Since the creation of the flood catchment area next to land, submitter has never had water pass through the land so it should no longer be considered subject to inundation. Suggests Council create another flood catchment area by investing in nearby land between the Elcho Park Golf Course and O'Hallorans Road.	CCMA comments: Not much to respond to. CCMA is confident in the mapping and recommends its inclusion in the scheme. It is noted that the Retarding Basin immediately south was based on design and works are underway (Council to confirm?) - might be opportunity/reason to remodel the as constructed and run as a corrections amendment at that time. Expected to have minimal impact based on modelling seen for Elcho Drain Widening project. **No change recommended**	No
463	Individual Submitter	Plains Road	Lara	**Corangamite Catchment Management**	LSIO1, FO1	Long term residents of the area with extensive local knowledge unfortunately couldn't attend community info sessions.	CCMA comments: Submissions acknowledges "insufficient drainage".	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
				Authority (CCMA)		Submits works in neighbouring areas, outside of their control is reason for flooding on their property. Have requested for drain on Farrars Rd to be improved to ease flooding on their property. Requests a meeting to discuss.	Inundation of this property in a 1% AEP event appears to be a result of low capacity drains and culverts at the railway, not an access track downstream. Data they have would have been useful for the community consultation and it would have been great if they attended. **No change to mapping recommended**	
117	Dando	Beach Road	Lara	**Water Technology Consultants**	LSIO1, FO1	Objects to the Amendment on the grounds that the revised Flood Overlays and Land Subject to Inundation Overlays are based on 1% AEP estimated flood extents that are not reflective of observed flooding on our site at 1425-1427 Princes Freeway, Lara. Commissioned an expert review of the flood study underpinning the proposed Amendment. The review findings concluded that the depiction of flooding within and around our sites is subjective, not consistent with observed and known flood characteristics and not an accurate representation of the 1% AEP flood impacting our sites. Provides an expert review by WMA Water.	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> In response to submission 117, it is noted that the Lara Flood Study was undertaken at a regional scale and limitations within the model setup and methodology may have impacts on individual property results and localised flood behaviour. In light of the submission provided, a review of topography data, hydrology catchment delineation and the hydraulic model inflow boundaries was undertaken. Upon review of the information provided within the submission, it appears reasonable to consider an objection based upon the information provided. It appears the boundary inflow locations within the hydraulic model may be providing an over-representation of flooding within the site. The site is impacted from inundation and runoff from an upstream catchment of around 1.5 km2. An existing drain transverses the site in a north-east to south-westerly direction with the only outlet via a minor culvert under Beach Road. The Beach Road Princess Highway interchange appears to restrict flows, holding them back within the site. The drain does not appear to be well represented in the hydraulic model results; however, it is evident in the aerial imagery and LiDAR data for the site. The presence of water on Old Melbourne Road in the model results is due to the placement of the inflow boundary being located on the roadway. As a result, when flows are entering the hydraulic model, there is some water being placed onto the roadway. This appears as the overtopping of flows onto the roadway.	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							It is agreed that the flood waters in a 1% AEP event, flows upstream of the roadway do not overtop Old Melbourne Road. It is recommended sensitivity analysis be undertaken for the 1 % AEP 48-hour design storm. In order to respond to the concerns raised in the submission, additional modelling was undertaken for the site with changes to inflow boundary and grid resolution. The model was rerun for the critical storms impacted this area. The critical storm event varies across the property at 1-43 and 45 Beach Road, Lara with the 48hr and 2hr critical durations considered key to the maximum flood extent at this location. The results of the revised flood mapping are shown in Figure 31.  Figure 31 1% AEP Flood extent comparison and boundary locations The flood depth results indicate an increase in the flooding extent onsite associated with the changes to the model. The flooding extent has increased within the northern portion of the site adjacent to Old Melbourne Road. Flooding depths within this area of increased extent are between 1-3 cm. This is predominantly associated with the inflow now being located on the downstream side of the Old Melbourne Road culverts which is inputting more water into the model immediately upstream of the site. It is important to note that the inflow was not included in the model upstream of the Old Melbourne Road culverts as the	

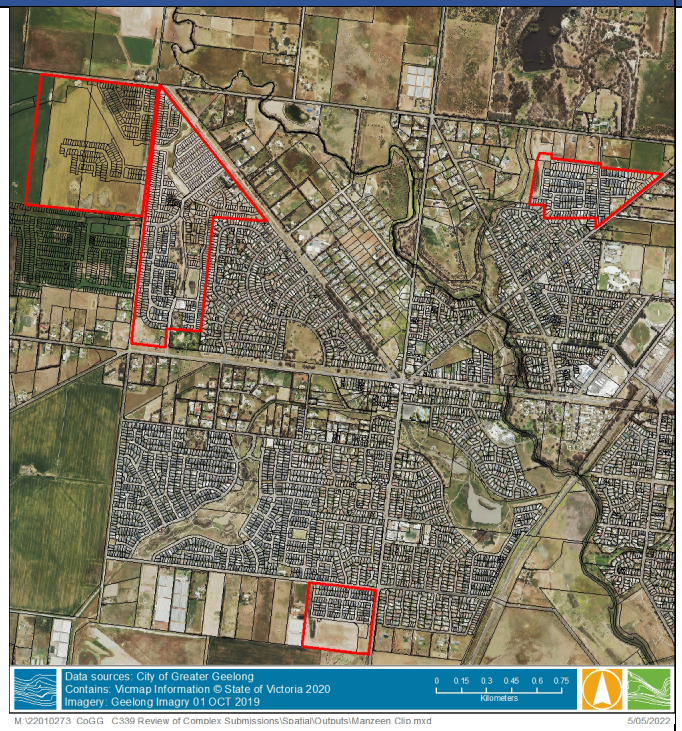
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							catchment area on which this inflow is based is largely on the eastern side of the road. Based on the results of the revised mapping indicating an increase in flooding extent with very shallow depths it is recommended that the **flood overlays at this location are applied as exhibited**.	
129	Dominion Property Group (Consultants) for Avalon City Pty Ltd	Avalon Road	Avalon	**Water Technology Consultants**	LSIO1, FO1	States that submission can be summarised as follows: • Amendment C339 as exhibited seeks to incorrectly increase the extent of the Land Subject to Inundation Overlay (LSIO) over the subject site; • We contend that the modelling undertaken for the site and the broader Avalon Catchment has not considered the site specific conditions of our client's land.	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> It is noted within the accompanying report (Rain Consulting) that the Lara Flood Study was undertaken at a regional scale and where possible, limitations within the model setup and methodology may have impacts on individual property results and localised flood behaviour. In light of the submission provided, a review of points raised within the submission and accompanying report was undertaken. This focused on the topography data, hydrology catchment delineation, culvert structures and the hydraulic model setup and limitations. Upon review of the information provided within the submission, it is acknowledged that the representation of the culverts conveying flow into the site may be not accurately represent the flow within the site. It is acknowledged there are discrepancies in the culvert data used in the model and that observed during the site visit. This is likely to impact on the flow behaviour into the site, particularly in minor, more frequent storms. As outlined in the Rain Consulting report, it is recommended sensitivity analysis be undertaken for the 1 % AEP 48-hour storm to: • Ensure the best available data (culvert sizes) are included in the hydraulic model. • Sub-grid sampling be employed within the model to reflect the narrow drain, ensuring that drainage capacity reflect what is on the ground. Until the sensitivity modelling has been completed, there is likely uncertainty around the impact of the 1% AEP flood extent and as a result the planning overlays exhibited.	No

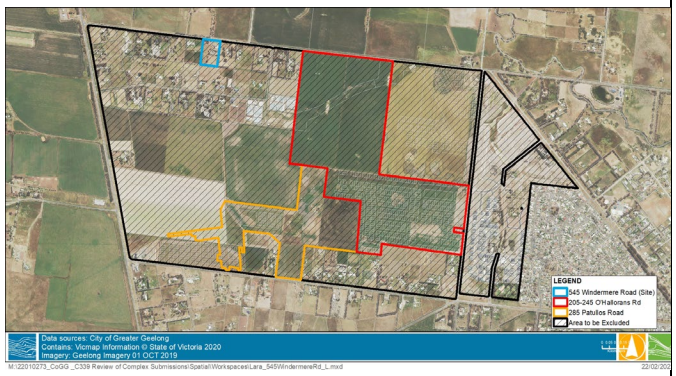
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							Updated flood mapping was completed based on the submission for 15 Avalon Road, Lara. The flooding extent within the property at the location of the northern culverts is very similar to that previously modelled. It is noted that the flood levels have changed slightly onsite, however this has not resulted in any meaningful difference in the extent of inundation. **Having regard to the above it is recommended that the flood overlays at this location are applied as exhibited**. The flooding extent at the location of the northern culverts has been shown to be consistent with previous modelling furthermore modelling results of the southern culvert whilst slightly request still shown an extent similar to that exhibited (LSIO) with remaining questions regarding the likely existence of a single or double string which is shown to reduce the flow across the highway at this location.	
286	MAB Corporation	Avalon Road	Avalon	**Water Technology Consultants**	LSIO1, FO1	Objects to the proposed amendment for the following reasons: 1. Inaccuracies in the flood studies which have informed the extent of the FO1 and LSIO1 proposed over the land. There has been inadequate time to complete an independent assessment of the flood studies, therefore we reserve the right to have this analysis undertaken. 2. Amendment is premature, with the land part of Avalon Corridor Strategy, which contemplates strategic guidance on potential land use and development change to 2050. The land is identified (in-part) for future use as "potential commercial / industrial related business". Consideration to flooding is more appropriately coordinated with the future Planning Scheme Amendments for the	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> A response to each of these points raised within Submission 286 is provided below. There are no claims or evidence presented as to the inaccuracies of the flood study informing the extent of the FO and LSIO. While it is understood the site covers an area identified for future growth and development under the Avalon Corridor Strategy, it is necessary to utilise and publish the best available information in relation to flooding. This includes both planning and emergency management. The incorporation of the proposed overlays on an existing Zone (in this case, SUZ1) is common practice across Victoria and ensures that any rezoning should also consider other planning controls. It is noted that the Lara Flood Study was undertaken at a regional scale and limitations within the model setup and methodology may have impacts on individual property results and localised flood behaviour. In light of another submission provided adjacent to the site, a review of topography data,	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						Corridor Strategy. Land should be excised from this Amendment. Alternatively, where an Overlay applies to land forming part of the Avalon Corridor Strategy, an expiry clause should be added to indicate the interim nature. 3. Existing planning controls (Special Use Zone Schedule 1 'Environmental wetlands, salt production and land-based aquaculture activities') include application requirements and decision guidelines associated with disposal of effluent and run-off water together with the drainage of the land.	hydrology catchment delineation and the hydraulic model inflow boundaries was undertaken. Sensitivity modelling in relation to the Princes Highway Culverts may change the flood behaviour leading to the site, however it is not likely to significantly impact the overall extent of flooding on this site. Any future development within this site will likely require a detailed stormwater management plan and flood impact assessment to consider the flood risk in relation to the Victorian Floodplain Management Guidelines.	
510	Individual Submitter	545 Windermere Rd	Lara (Lara West Growth Area)	**Water Technology Consultants**	LSIO1, FO1	Only a small amount of property intersects with overlays. Has submitted an assessment by WMA Water of their property which suggests the overlays should be removed.	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> The subject area is located within the Lara West Development Precinct. Development within this area is based on the surface water planning and development layout produced as part of the Lara West Precinct Structure Plan. Development within this area has only commenced within the past 2 years. Flood modelling for the Lara Flood Study was based on existing conditions at the time of model development in 2017/2019. It is considered that the flood mapping produced by the Lara Flood Study no longer represents the current flooding risk within this area, which is continuing to change as the precinct develops. **Having regards to this, it is recommended that this area be excluded from the planning scheme amendment** and that flood mapping is updated once the area has been fully developed and/or as part of modelling undertaken for the Northern Growth Area which will discharge through this site. It is noted that whilst the flooding associated with the exhibited overlay at 545 Windermere Lara is associated with regional flows it is likely that, once developed, measures will be taken to reduce the extent and depth of inundation at this location. The submission prepared for this property raised	No

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							concerns regarding incorporation of local drainage features, which are likely to help conveyance of flood waters at this location. The Lara Flood Study was based on a regional flood model. This model does not include all private and rural drainage features which often become overwhelmed during significant floods. In addition, detailed information on these assets is typically not available and the maintenance and condition of them is not known. For these reasons they are typically disregarded in flood mapping analyses at the regional scale. Whilst the property at 545 Windermere Road shown in Figure 18 is recommended to be removed for this amendment it is also recommended that the flood prone designation remain in place. Unlike the other two properties identified in this area, 545 Windermere Road is not part of the larger land holdings where works are ongoing to develop the Lara West area. Hence there is no immediate plan to resolve flooding risk here, with no current application to develop the site. This means there is residual flood risk across the site until such time as development within this area of Lara West proceeds and residual flood risks are addressed.	
296	Marshall, TGM Cardno (Consultants) for Bisinella	1.Lara Central Estate 2. Lara Views Estate 3. Lara Lakes Estate (Lara West Growth Area) 4. Applegum Estate (Manzeene Village area)	Lara	**Water Technology Consultants**	SBO, LSIO1, FO1	Submitter's client, L Bisinella Developments Pty. Ltd, notes that it recognises the importance of managing flood risks across the municipality. However, it is submitted that insufficient rigour has been applied in the preparation of the Amendment and that the proposed changes to the Planning Scheme are not soundly based. More detailed site specific analysis needs to be undertaken, including more up to date surveys and assessment of conditions. In its current form, the Amendment should be abandoned. The application of overlays such as the Special Building Overlay (**SBO**) to land has significant consequences for landowners.	Summary of response (see Water Technology Memo 12 May 2022 for full comments): The following response is in relation to submission 296, located at the following locations listed below and shown in Figure 19 & Figure 20. • 130-150 Forest Rd South (Lara Views Estate) • 385 Windemere Road (Lara Lakes Estate) • 43-55 & 60 Manzeene Avenue (Applegum Subdivision) • 21 Caddys Road, 131 Flinders Avenue & 135 Flinders Lane (Lara Central Estate) The main issue relating to each of the areas is the exclusion of more up-to-date information to reflect the development which	Yes - exclude from overlay See Maps 4, 5, 6

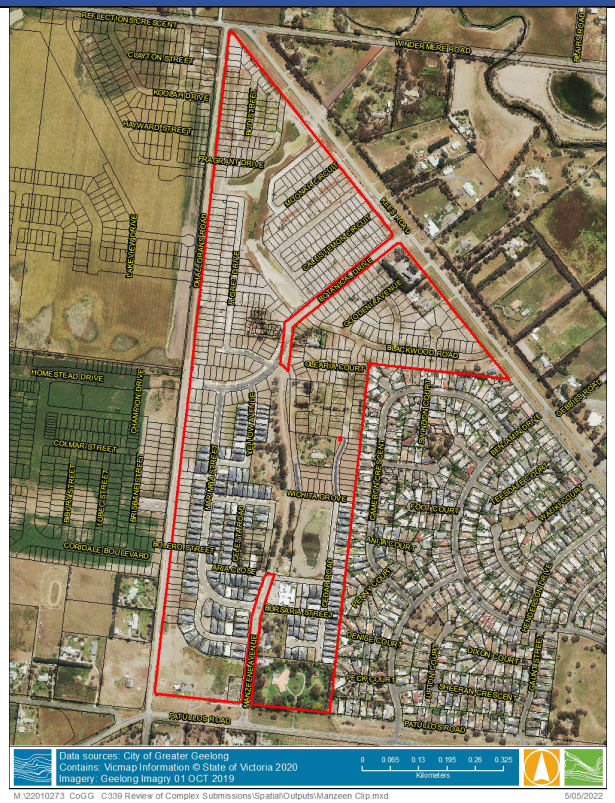
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						Submits that material supporting the Amendment appears to: (a) fail to acknowledge the existing conditions of developed which has been recently developed; (b) fail to recognise where development of land has been approved and will be undertaken; and (c) be based on out of date information obtained in 2018. Submitter provides details of the planning approval and specific flood mapping undertaken for Bisinella estates.	has occurred at each of the sites since the LiDAR/photogrammetry was captured in 2017. In response to the submission, **it is noted that two of the properties located within Lara West Precinct Structure Plan (385 Windemere Road and 43-55 & 60 Manzeene Avenue) are within the area recommended to be excluded from the planning scheme amendmen**t. Flood Risk assessment has formed a part of previous applications and permit requirements for these sites. Detailed hydraulic assessments and/or flood impact assessments have been undertaken to allow development. The Lara Flood Study did not have access to the additional information (additional drainage and design surfaces) at the time of the investigation. **In relation to the remaining properties within this submission (130-150 Forest Rd South and 21 Caddys Road, 131 Flinders Avenue & 135 Flinders Lane), it is recommended that these areas also be excluded from the planning scheme amendment**. The reasons identified above include: • permit conditions based on detailed assessments. • significant changes to the landform. • additional drainage infrastructure that has been constructed since the development of the flood study. It is recommended to maintain the current flood extent as indicative of the land liable to flooding. The areas to be omitted from the current amendment are shown in Figure 22 below.	

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
								
297	Mesh (Consultants) for Villawood	Coridale Estate	Lara (Lara West Growth Area)	**Water Technology Consultants**	LSIO1, FO1, SBO	Villawood Properties are developing the Coridale Estate pursuant to PP-496-2018 which permits a "Staged Multi Lot Subdivision and Removal of Native Vegetation". The Coridale Estate is located in the Lara West Precinct Structure Plan (PSP) at 205-245 O'Hallorans Road and 465 Windermere Road, Lara. The development allowed by the permit includes Condition 22 requiring flood mapping which has been undertaken and development complies and no lots in Stage 1 to 5 are subject to flooding.	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> The subject area is located within the Lara West Development Precinct. Development within this area is based on the surface water planning and development layout produced as part of the Lara West Precinct Structure Plan. Development within this area has only commenced within the past 2 years. Flood modelling for the Lara Flood Study was based on existing conditions at the time of model development in 2017/2019. This was based on topography and existing stormwater and rural drainage infrastructure information collected at the time (preceding development in this area). It is acknowledged that construction of Lara west has progressed with several locations now having established	Yes - exclude from overlay See Map 5

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						Application of the SBO to any of the properties identified in the estate would be inappropriate and not reflective of the current condition of the land which has previously been acknowledged by Council. Requests the SBO not be applied to any lots in Stage 1 to 5 of the Coridale Estate.	residential areas and a number of large wetland/retarding basins constructed or having been approved. It is considered that the flood mapping produced by the Lara Flood Study no longer represents the current flooding risk within this area, which is continuing to change as the precinct develops. Having regards to this, **it is recommended that this area be excluded from the planning scheme amendment** and that flood mapping is updated once the area has been fully developed and/or as part of modelling undertaken for the Northern Growth Area which will discharge through this site.  **Figure 1 Area to be removed from amendment**	
468	Spiire (Consultants) for Austin Land	Austin Estate and 295 Patullos Rd	Lara (Lara West Growth Area)	**Water Technology Consultants**	LSIO1, SBO	Acknowledges the extensive flood studies undertaken by the City of Greater Geelong and the continued work to implement these studies. As land is within Lara West PSP it is not identified as areas subject to flooding within the Planning Scheme. Flooding issues should be catered for through preparation and approval of PSPs. Contests the need to impose any flood-related planning overlays on the 285 or 295 Patullos Rd given the planning framework already in place. A combination of estate construction, earthworks and	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> As above… The subject area is located within the Lara West Development Precinct. Development within this area is based on the surface water planning and development layout produced as part of the Lara West Precinct Structure Plan. Development within this area has only commenced within the past 2 years. Flood modelling for the Lara Flood Study was based on existing conditions at the time of model development in 2017/2019. This was based on topography and existing stormwater and	Yes - exclude from overlay See Map 5

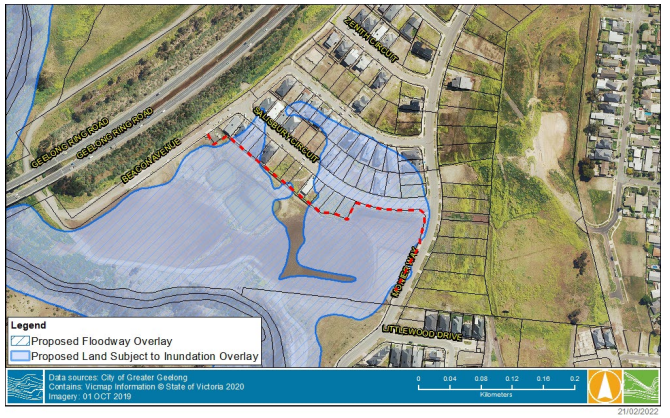
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						major infrastructure will limit the extents of a 1% AEP event and ensure safe conveyance without increasing the flood risk to adjacent properties. Submits that Amendment C339 should be revised to remove the LSIO1 and SBO from the Site and 295 Patullos.	rural drainage infrastructure information collected at the time (preceding development in this area). It is acknowledged that construction of Lara west has progressed with several locations now having established residential areas and a number of large wetland/retarding basins constructed or having been approved. It is considered that the flood mapping produced by the Lara Flood Study no longer represents the current flooding risk within this area, which is continuing to change as the precinct develops. Having regards to this, **it is recommended that this area be excluded from the planning scheme amendment** and that flood mapping is updated once the area has been fully developed and/or as part of modelling undertaken for the Northern Growth Area which will discharge through this site. Note: See image in response above – Austin land is outlined in yellow.	
475	Individual Submitter	West gateway	Lara (Lara West)	**Water Technology Consultants**	SBO	Wants excluded because property in Lara West PSP.	As per above submissions and responses this land is within the Lara West Growth Area and hence is to be excluded from the amendment.	Yes - exclude from overlay See Map 5
198	Individual Submitter	Floret Drive	Lara (Manzeene Village)	**Water Technology Consultants**	SBO	Essentially proposes that the Manzeene Village Flood Modelling be adopted.	Summary of response (see Water Technology Memo 12 May 2022 for full comments): The topographic information (Photogrammetry) on which the Lara Study is based was collected in 2017. At this time "Manzeene Village" estate had commenced earthworks but was still in the early stages of development. This means that raised ground levels for areas which had been or were planning to be filled as part of the development were not incorporated into the modelling. Further to this the stormwater network which has been designed for this estate which manages stormwater runoff had also not been completed or incorporated into the flood model.	Yes - exclude from overlay See Map 5

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							It is now understood that much of the development has been completed with the bulk of the drainage and stormwater network now in operation. Further to this the area has been filling in line with approved plans in order to protect the estate from overland flooding. Having regard to the above it is considered that the presented flood mapping does not accurately represent the existing development conditions and likely flood risk at this location. Updated draft flood mapping has been produced at this location as part of flood modelling investigations for the Northern Growth Area. This information, which incorporated developed conditions up to 2020 shows a significantly reduced flooding risk in comparison with the exhibited flood related zones and overlays. As part of the Hovells Creek Stormwater Management Plan and Growth Area Surface Water Planning the overland flooding and drainage conditions within this section of the catchment will be updated. With rapidly evolving development works to the west and the completion of outstanding earthworks within the development **it is recommended that, at this time, the Manzeene Village development area be omitted from the planning scheme amendment**. It is understood that development at this location was based on detailed flooding assessment on which mitigation measure were proposed and subsequently constructed which protects buildings from the potential impact of inundation during the 1% AEP design flood. In light of this, it is considered that omitting this area until such time as updated, appropriate flood mapping is available presents a manageable risk and would provide a better planning outcome (as shown in Figure 17).	

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
								
230	Hora		Lara (Manzeene Village)	**Water Technology Consultants**	SBO	Should be revised to reflect Manzeene Village as developed.	See above response for “Manzeene Village” as a whole.	Yes
330	Montgomery	Cedar Road	Lara (Manzeene Village)	**Water Technology Consultants**	SBO	Claims that modelling isn't applicable to Manzeene Village	See above response for “Manzeene Village” as a whole.	Yes
356	Individual Submitter	Cedar Road	Lara (Manzeene Village)	**Water Technology Consultants**	SBO	Would not have bought in Manzeene Village if they had known about the proposed overlay.	See above response for “Manzeene Village” as a whole.	Yes

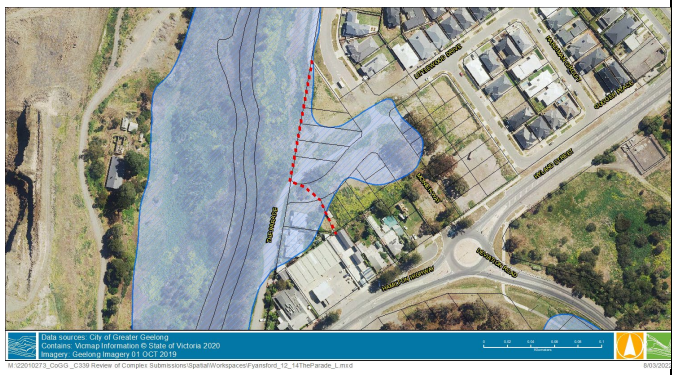
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
448	Sharma		Lara (Manzeene Village)	**Water Technology Consultants**	SBO	Opposes the amendment for Manzeene Village, as it is incorrect and obsolete.	See above response for "Manzeene Village" as a whole.	Yes
449	Sharma		Lara (Manzeene Village)	**Water Technology Consultants**	SBO	Opposes the amendment for Manzeene Village, as it is incorrect and obsolete.	See above response for "Manzeene Village" as a whole.	Yes
457	Individual Submitter		Lara (Manzeene Village)	**Water Technology Consultants**	SBO, LSIO	Property was built in Manzeene Village during late 2020 and as such LSIO1 shouldn't apply.	See above response for "Manzeene Village" as a whole.	Yes
474	Stojic	Cadence Avenue	Lara (Manzeene Village)	**Water Technology Consultants**	SBO	Wants excluded because property in Manzene Village.	See above response for "Manzeene Village" as a whole.	Yes
283	Lovely Banks Development Group		Lara & Lovely Banks (Northern Growth Area)	**Water Technology Consultants**	LSIO, FO	Supports Council in technical investigations and actions that comprehensively plan for the Lara region to improve stormwater management and to give effect to that in the Planning Scheme. Lovely Banks made submissions through Amendment C395, including expert evidence from Neil Craigie. Since that hearing, Lovely Banks has further advanced masterplanning and integrated stormwater management strategic thinking. In this context it submits: • Council consider options to leverage the development of Lovely Banks to improve existing and future flood conditions in Lara. • Council explore the Lovely Banks proposal to divert low flows from the Elcho Creek catchment to the Hovells	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> The Lovely Banks Development Group provided a submission supporting the submission and the technical investigation however to also exclude the proposed overlays within the Northern Growth Area (NGA). The submission also had several suggestions to investigate flow diversion and explore mitigation options to reduce flooding. The key issue raised by the Lovely Banks Group in relation to Amendment C339 is shown below: "*The LSIO changes in the Northern Growth Area not proceed through Amendment C339 and instead be adjusted when the Elcho Road East PSP is incorporated into the Planning Scheme.*" While it is understood that Lovely Banks are undertaking significant planning works in relation to the future development of their site, it should not be expected to preclude the exhibited overlays from being included within the current amendment. The Elcho Road PSP work is relatively high level and would not likely provide the 'best available' flood information for the current conditions. There are a number of existing properties within the NGA that have been identified as being at risk from flooding (Figure 25). Exclusion of the NGA and these properties could leave the City liable by not	Yes - exclude from overlay See Map 7

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						Creek catchment to reduce nuisance flooding in the southern Lara region. • Council work with Barwon Water to explore innovative and integrated water management solutions in the Elcho Creek catchments to improve flood management. • LSIO changes in the Northern Growth Area not proceed through Amendment C339 and instead be adjusted when the Elcho Road East PSP is incorporated into the Scheme. Lovely Banks would like to resolve submission by collaborative workshops with Council and others.	providing the most up to date and 'best available' flood information as part of the amendment. As timelines for the NGA works have not been finalised and considerable design work still to be completed it is recommended that proposed overlays are excluded for this area with Amendment C339. Future adjustments to flood overlays associated with PSP investigations could be implemented at a later date as separate amendments.	
78			Fyansford	**Water Technology Consultants**		Submitter 78 Cardno TGM lodged an objection related to land known as the Heights Estate at 355 Church Street, Herne Hill. They state: On 19 August 2014 Planning permit PP-107-2012/A was issued for the subdivision of land at 355 Church Street, Herne Hill in accordance with endorsed plans which includes the area of land now proposed for a Flood Overlay. Since then, the Heights Estate subdivision has now been completed. The planning permit for the subdivision of this land was supported by the Heights Development Flood Impact Assessment 2017 developed by BMT WBM. The Assessment determined that the subject land is not flood prone under development conditions… we are therefore surprised to now see that part of this land is now deemed to be flood prone as determined by this amendment.	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> The Lower Barwon and Lower Moorabool Flood Study was based on topographic information derived from aerial survey collected in January 2017. At this time "The Heights" estate had commenced some earthworks but filling of this area had not begun. This means that raised ground levels resulting from the development were not incorporated into the hydraulic modelling. The 1% AEP design flood level and corresponding flood extent on which the Land Subject to Inundation Overlay is based is around 8.3 m AHD in this area. It is understood that ground levels within the lowest sections of the estate have now been raised. Approved plans provided to council indicate that ground levels within Salisbury Circuit and the sections shown to be flooded under the exhibited overlay have been raised to at least 9.4 metres AHD within the land on the southern side of Salisbury Circuit.	Yes - exclude from overlay See Map 8

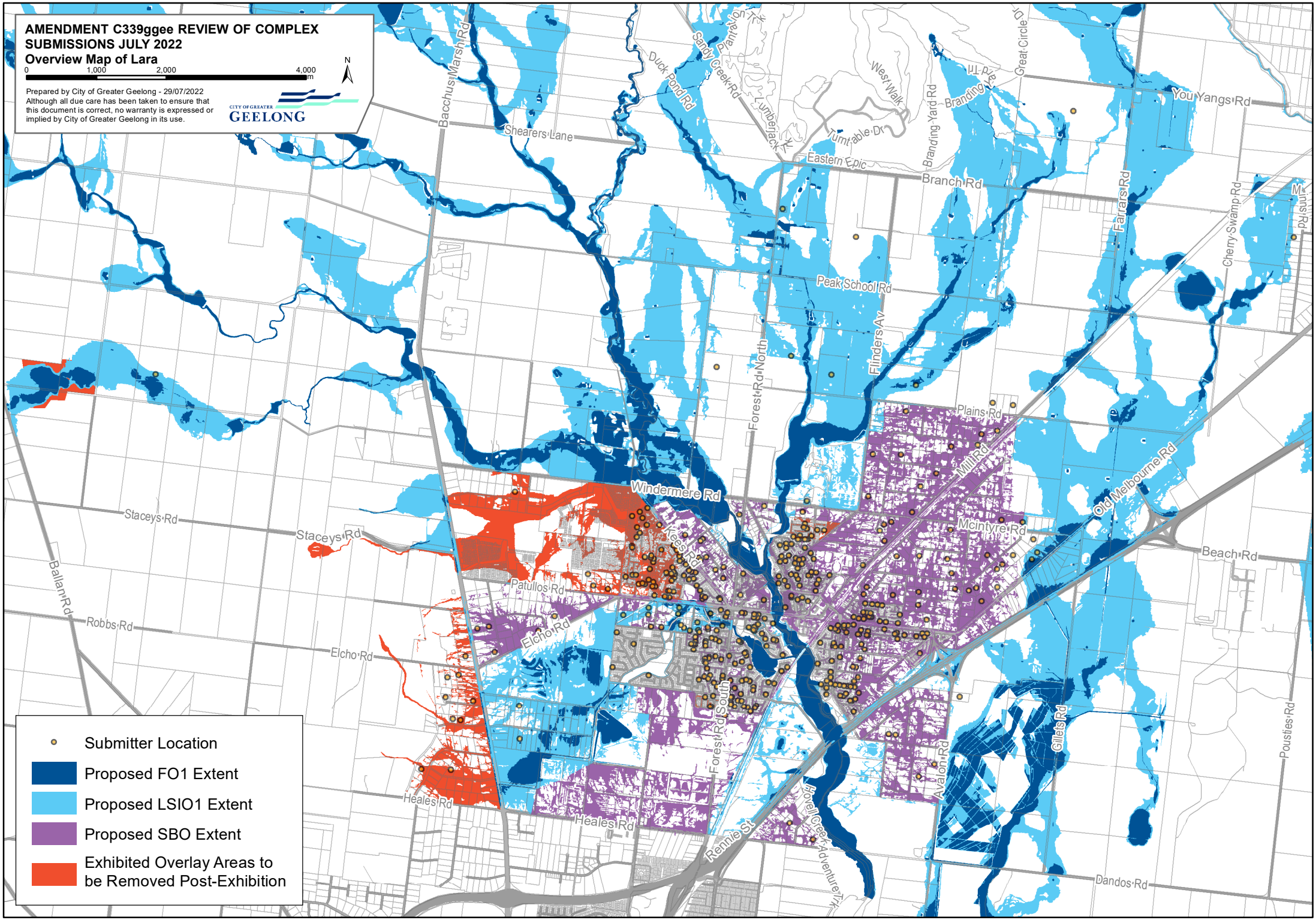
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							This means that site lots within the Heights Estate are now higher than the applicable design flood level and the associated residential lots would not be subject to inundation during the 1% AEP design flood. It is evident that the exhibited overlay does not align with the likely flooding extent at this location based on the fill that has been placed in that area. It is therefore recommended that the exhibited LSIO map be clipped to the extent of filling within the Heights development. The Figure 4 below shows the exhibited clipped flooding extent at the location (dashed red line).  **Figure 2 Recommended Flood Extent Limit**	
434		Salisbury Circuit	Fyansford	**Water Technology Consultants**		Raised questions and concerns about the extent of the overlays in the area which is a relatively new housing estate next to the Moorabool River.	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> See response above to submission 78.	Yes - exclude from overlay See Map 8
440		Monier Way	Fyansford	**Water Technology Consultants**		Raised questions and concerns about the extent of the overlays in the area which is	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u>	Yes - exclude

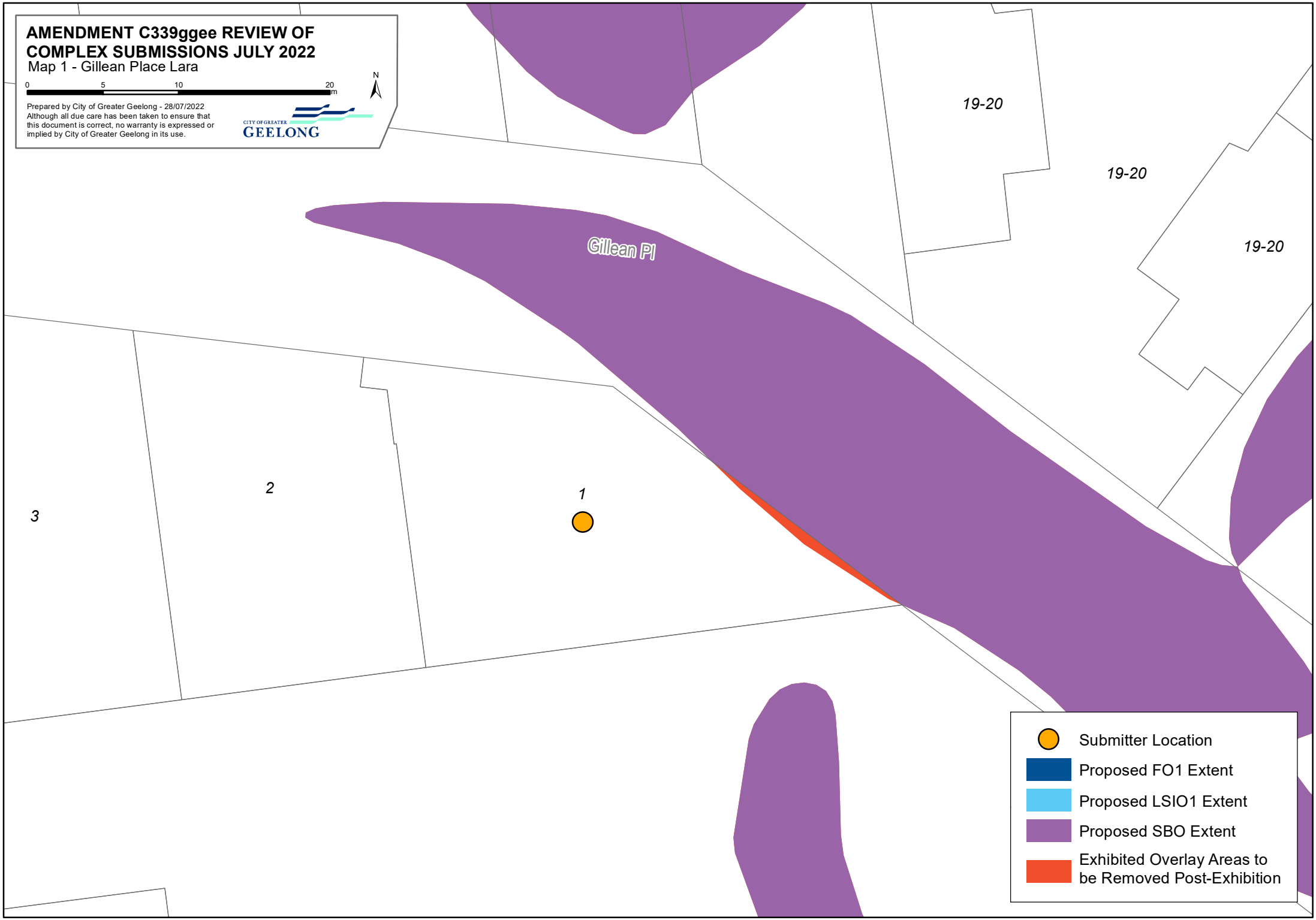
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
						a relatively new housing estate next to the Moorabool River.	The Lower Barwon and Lower Moorabool Flood Study was based on topographic information derived from aerial survey collected in January 2017. At this time "Gen Fyansford" estate had commenced earthworks but extensive filling of this area had not begun. This means that raised ground levels as part of the development were not incorporated into the modelling. The 1% AEP flood level and corresponding flood extent on which the Land Subject to Inundation Overlay is based is around 8.15 m AHD in this area. It is understood that ground levels within the lowest sections of the estate have now been raised. Approved plans provided to council indicate that ground levels within Monier Way and the sections shown to be flooded in the exhibited C339 overlay have been raised to 9.3 – 9.6 metres AHD along Monier Way. Figure 6 shows a side-by-side comparison of the existing and flood-study topography, highlighted where the lots have been filled. Figure 7 shows a comparison of the existing and exhibited LSIO layers. This means that Gen Fyansford land levels are now higher that the applicable flood level and the associated residential lots would not be subject to inundation in a 1% AEP design flood. It is therefore recommended that the exhibited LSIO map be clipped to the extent of filling within this area of development. The Figure 8 below shows the exhibited clipped flooding extent at the location (dashed red line).	from overlay See Map 8

Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							 **Figure 3 Recommended Floodway and Land Subject to Inundation Clip Line**	
269		The Parade	Fyansford	**Water Technology Consultants**		Raised questions and concerns about the extent of the overlays in the area which is a relatively new housing estate next to the Moorabool River.	<u>Summary of response (see Water Technology Memo 12 May 2022 for full comments):</u> The topographic information on which the Lower Barwon and Lower Moorabool Flood Study was based on aerial survey collected in January 2017. Ground levels on the subject property are understood to range between 7.1 – 7.6 metres AHD. The 1% AEP design flood levels and corresponding flood extent on which the Land Subject to Inundation Overlay is based, are around 8.15 m AHD in this area. The topographic data is shown in Figure 10. Figure 11 shows a comparison between current and exhibited flood overlays. At the time of the flood study the "Gen Fyansford" estate had commenced earthworks but filling of this area had not occurred. This means that raised ground levels as part of the development were not incorporated into the modelling or extent mapping. A detailed review of construction plans indicates that flood protection works within the estate do not extend to the subject property. The Gen Fyansford estate is filled above the applicable	Yes - exclude from overlay See Map 8

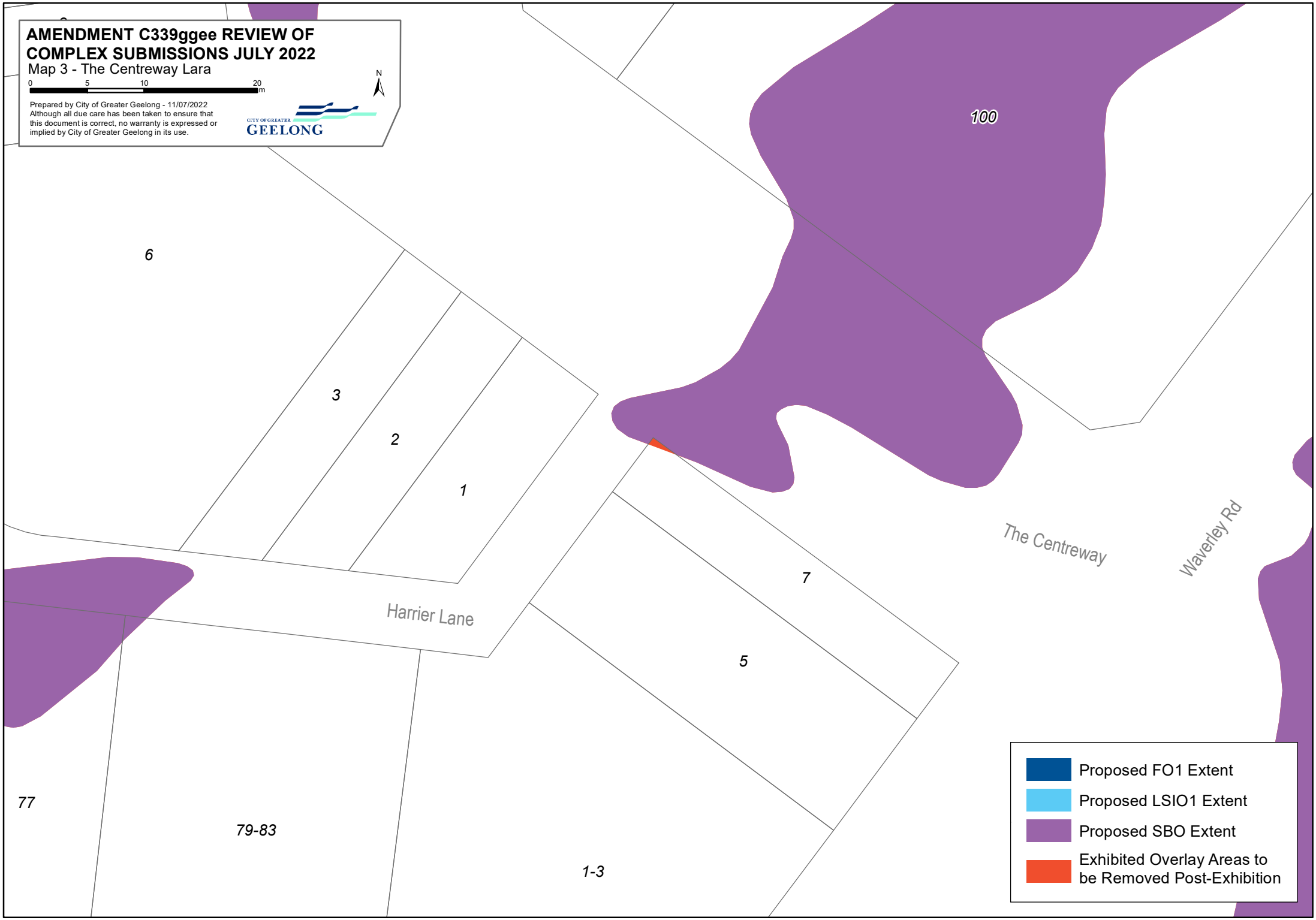
Sub No.	Surname	Property Address	Suburb (Growth Area)	Reviewed by:	Proposed Planning Control	Summary of Submission	Response	Change to maps?
							1% AEP flood level in order to provide flood protection to all residential lots. Whilst it is acknowledged that the existing flood modelling within this section of the floodplain does not account for filling of the Gen Fyansford estate, the impact of filling is likely to be localised and only provide flood immunity to the areas shown to be filled above the applicable flood level. Having regard to this it is recommended that the LSIO and FO extent in this location be clipped to match the filled area as shown in Figure 12.  Figure 4 Recommended Floodway and Land Subject to Inundation Clip Line	

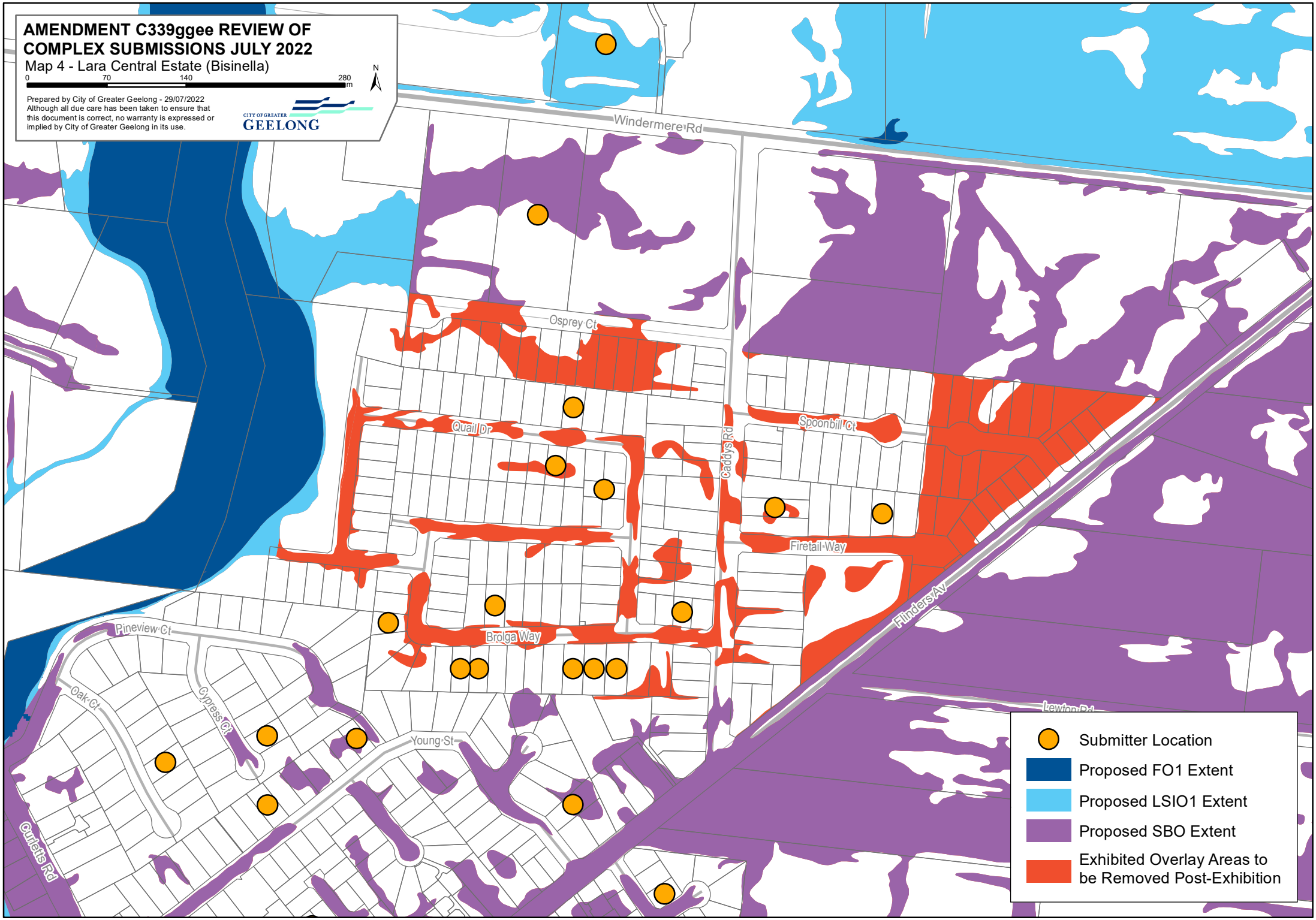
Appendix 2 – Maps of areas to be removed

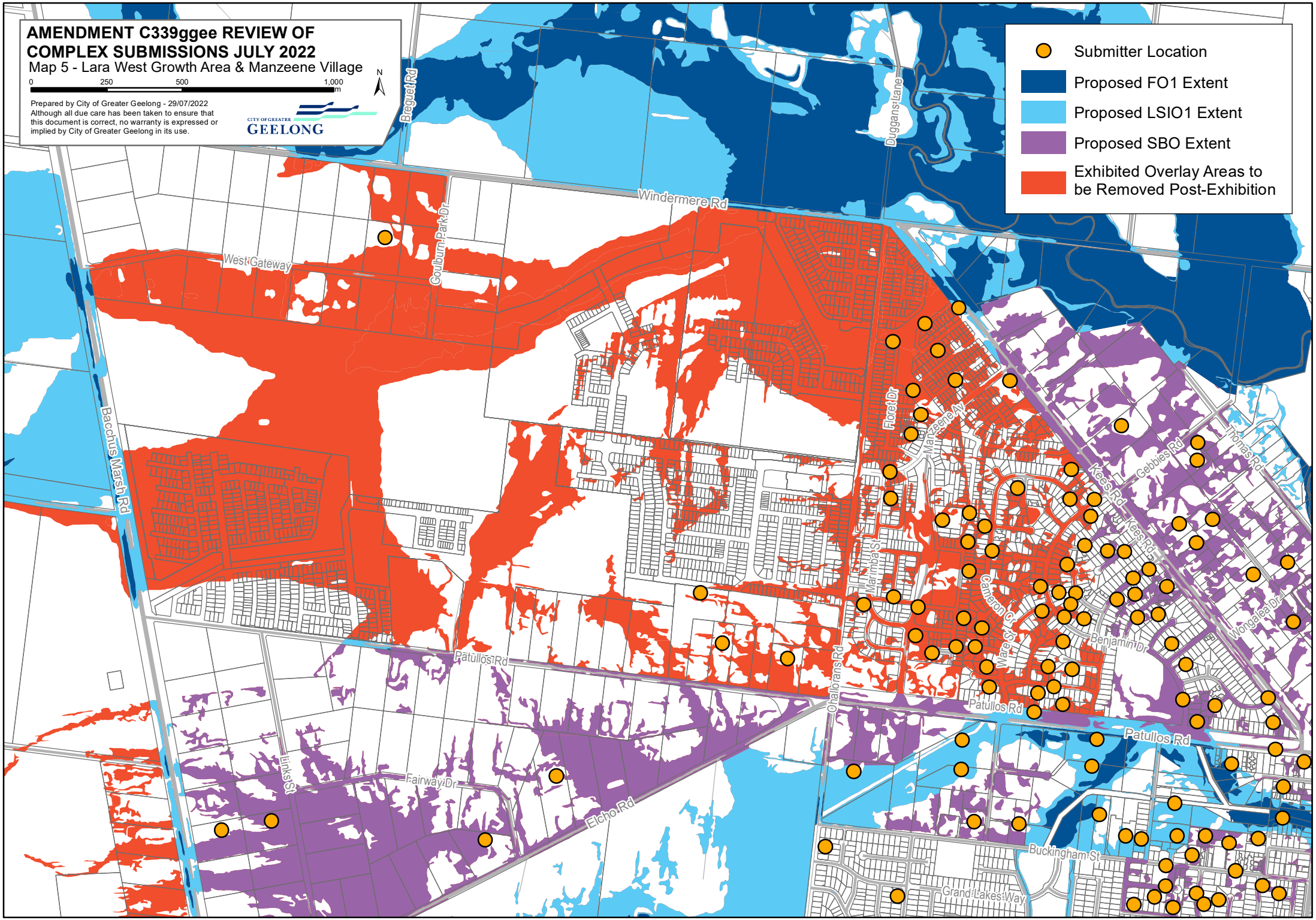

AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Overview Map of Lara
0 1,000 2,000 4,000 m
N
Prepared by City of Greater Geelong - 29/07/2022
Although all due care has been taken to ensure that this document is correct, no warranty is expressed or implied by City of Greater Geelong in its use.
CITY OF GREATER GEELONG
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition
Bacchus Marsh Rd
Duck Pond Rd
Sandy Creek Rd
Plantation Tr
Lumberjack Tr
West Walk
Turntable Dr
Great Circle Dr
Branding Yard Rd
Branding Yard
You Yangs Rd
Shearers Lane
Eastern Epic
Branch Rd
Farrars Rd
Cherry Swamp Rd
Peak School Rd
Flinders Av
Forest Rd North
Plains Rd
Mill Rd
Old Melbourne Rd
Windermere Rd
Staceys Rd
Staceys Rd
Kees Rd
Mcintyre Rd
Beach Rd
Ballan Rd
Patullos Rd
Robbs Rd
Elcho Rd
Elcho Rd
Forest Rd South
Avalon Rd
Giles Rd
Pousties Rd
Heales Rd
Heales Rd
Rennie St
Powell Creek Adventure Tr
Dandos Rd

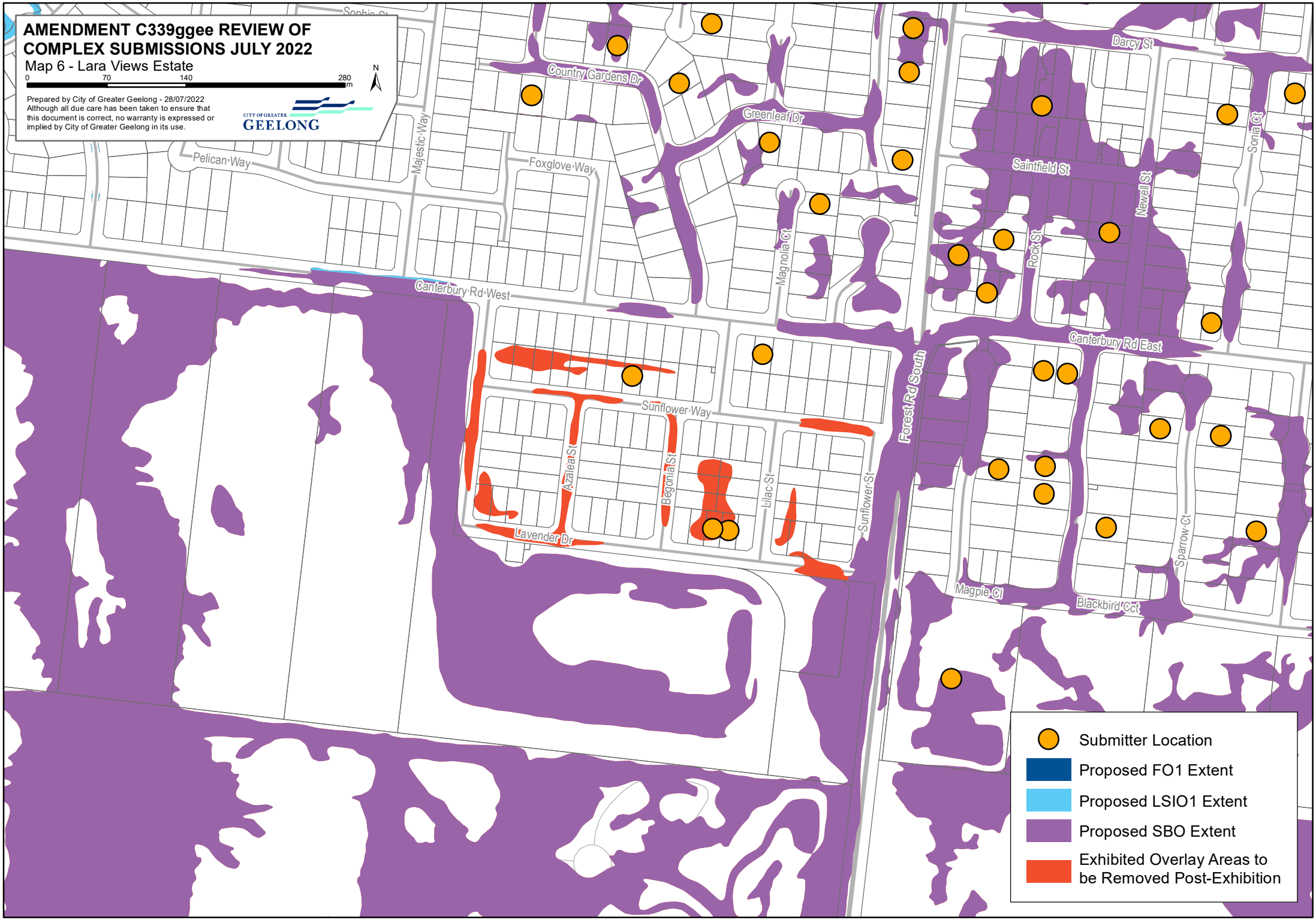

AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 1 - Gillean Place Lara
0
5
10
20
m
N
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CITY OF GREATER GEELONG
19-20
19-20
19-20
Gillean Pl
3
2
1
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition

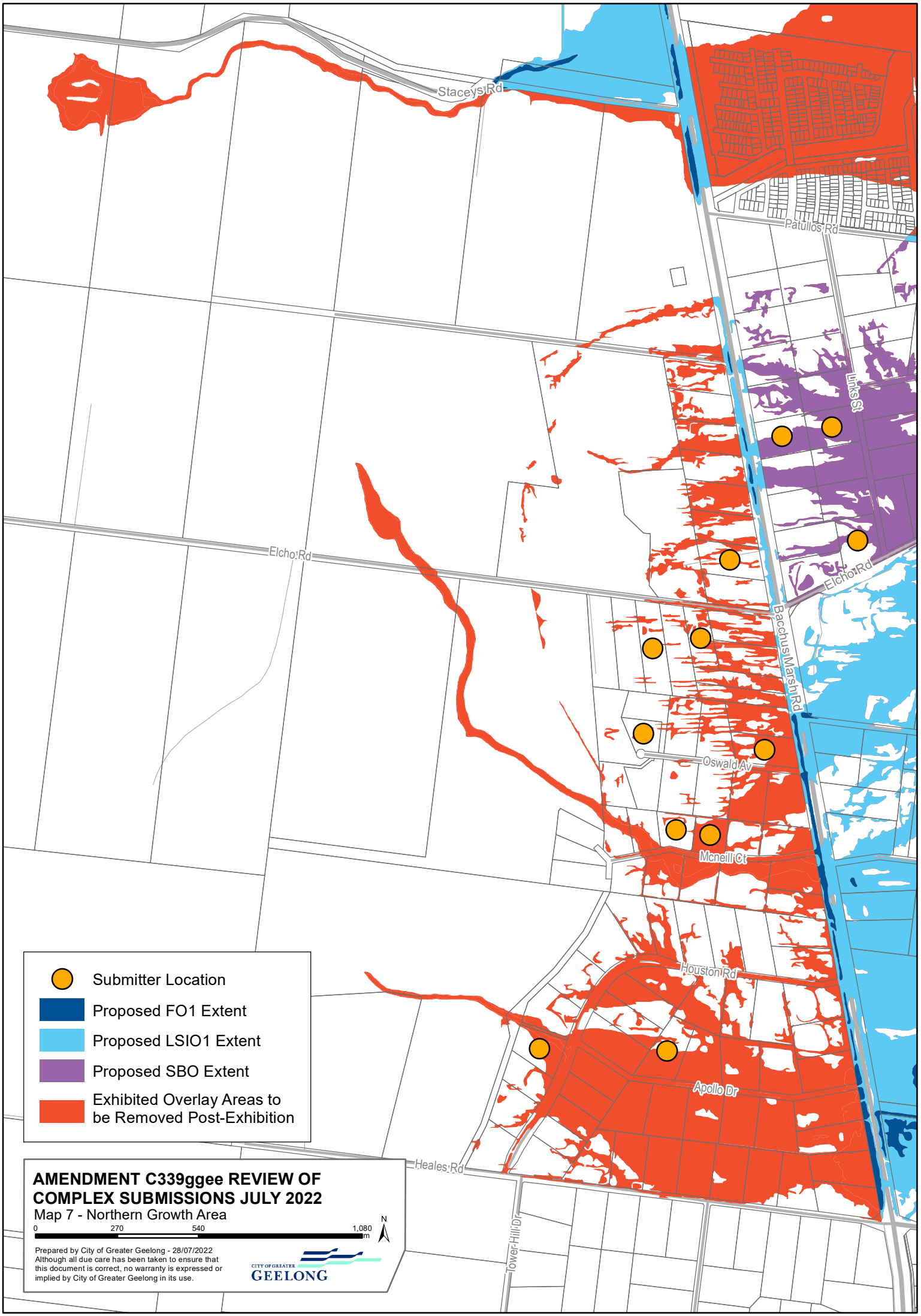

AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 2 - Altair Avenue Lara
0 5 10 20 m
N
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CITY OF GREATER GEELONG
1
30B
30A
28
28
26
Scuti Ct
24
Altair Av
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition

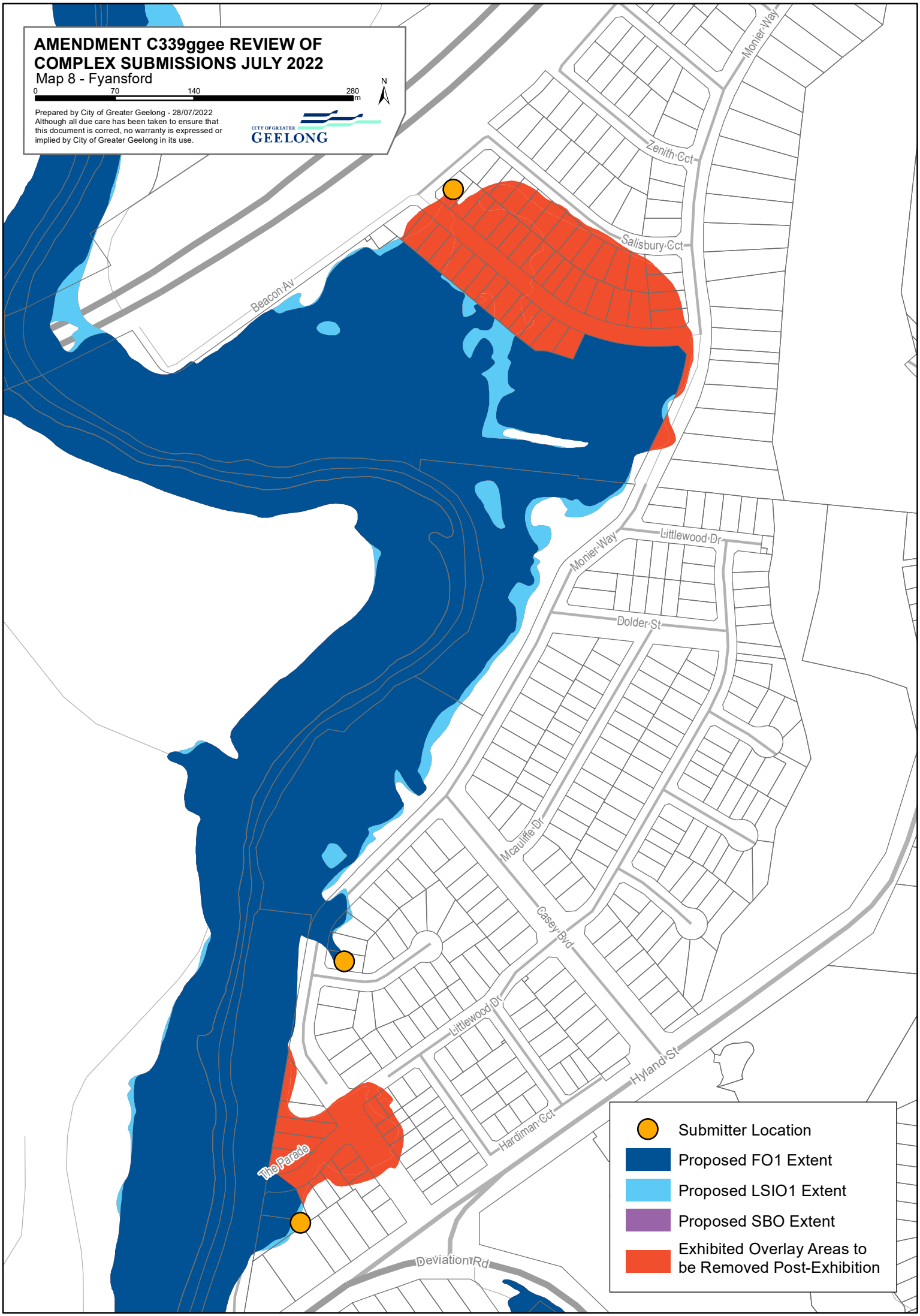

AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 3 - The Centreway Lara
0 5 10 20 m
N
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CITY OF GREATER GEELONG
100
6
3
2
1
7
5
Harrier Lane
The Centreway
Waverley Rd
77
79-83
1-3
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition

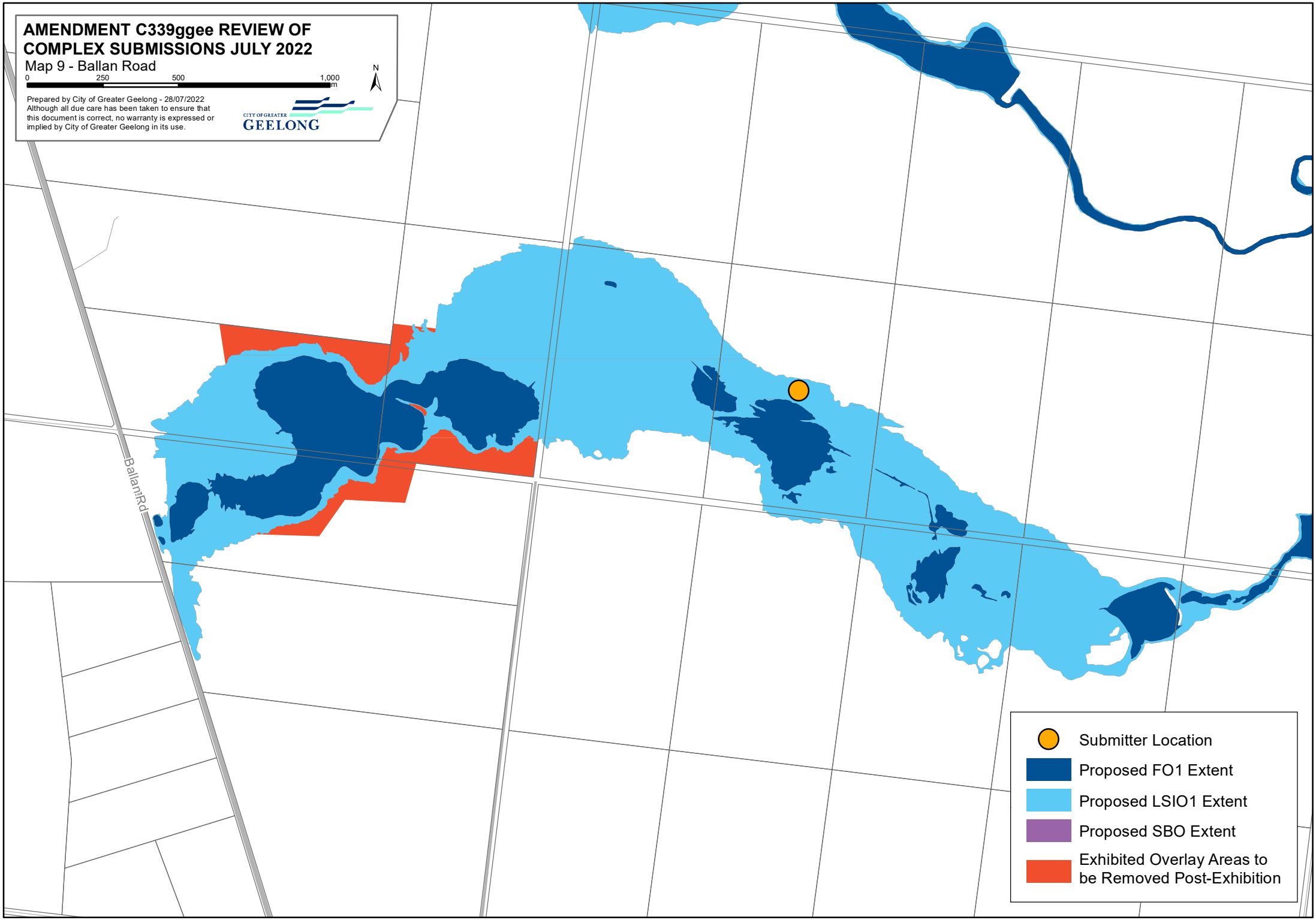

AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 4 - Lara Central Estate (Bisinella)
0 70 140 280 m
N
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CITY OF GREATER GEELONG
Windermere Rd
Osprey Ct
Quail Dr
Caddys Rd
Spoonbill Ct
Firetail Way
Flinders Av
Brolga Way
Pineview Ct
Oak Ct
Cypress Ct
Young St
Ourletts Rd
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition


AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 5 - Lara West Growth Area & Manzeene Village
0 250 500 1,000 m
N
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CITY OF GREATER GEELONG
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition
Windermere Rd
Breguet Rd
Duggans Lane
West Gateway
Coulburn Park Dr
Bacchus Marsh Rd
Florel Dr
Manzeene Av
Marimba St
Cameron Ct
Ware Ct
Chalcrans Rd
Kees Rd
Gebbies Rd
Thomas Rd
Benjamin Dr
Wongalee Dr
Patullos Rd
Links St
Fairway Dr
Elcho Rd
Buckingham St
Grand Lakes Way


AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 6 - Lara Views Estate
0 70 140 280 m
N
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CITY OF GREATER GEELONG
Country Gardens Dr
Greenleaf Dr
Darcy St
Pelican Way
Majestic Way
Foxglove Way
Magnolia Ct
Saintfield St
Newell St
Sonia Ct
Rock St
Canterbury Rd West
Canterbury Rd East
Forest Rd South
Sunflower Way
Azalea St
Begonia St
Lilac St
Sunflower St
Lavender Dr
Sparrow Ct
Magpie Cl
Blackbird Cct
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition


Staceys Rd
Patullos Rd
Links Ct
Elcho Rd
Elcho Rd
Bacchus Marsh Rd
Oswald Av
Mcneill Ct
Houston Rd
Apollo Dr
Heales Rd
Tower Hill Dr
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition
AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 7 - Northern Growth Area
0
270
540
1,080
m
N
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CITY OF GREATER GEELONG


AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 8 - Fyansford
0
70
140
280
m
N
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CITY OF GREATER GEELONG
Monier Way
Zenith Cct
Salisbury Cct
Beacon Av
Littlewood Dr
Monier Way
Dolder St
Mcauliffe Dr
Casey Blvd
Littlewood Dr
Hyland St
Hardiman Cct
The Parade
Deviation Rd
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition


AMENDMENT C339ggee REVIEW OF COMPLEX SUBMISSIONS JULY 2022
Map 9 - Ballan Road
0
250
500
1,000
m
N
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CITY OF GREATER GEELONG
Ballan Rd
Submitter Location
Proposed FO1 Extent
Proposed LSIO1 Extent
Proposed SBO Extent
Exhibited Overlay Areas to be Removed Post-Exhibition

Appendix 3 – Water Technology Memo of Advice

MEMORANDUM

To [redacted] – City of Greater Geelong
From Water Technology
Date 12 May 2022
Subject C339 Complex Submission Responses
Our ref 22010273_M01V02.docx

1 BACKGROUND

The City of Greater Geelong received over 500 written submissions to the Exhibited Planning Scheme Amendment C339. Water Technology was commissioned to provide a response to complex flood related issues within the submissions, drawing on our experience with flood studies in the area and general appreciation of flooding issues related to planning. Many of the submissions answered below in relation to flooding question the existing planning controls, including the Floodway Overlay. It is noted that many of the submissions question the extent of the planning control layers, often in relation to several historic flood events that were used as part of the model validation during the relevant flood studies. We also note that for some of the flood study areas, the historic floods (i.e., 1988 Lara/Hovells Creek and 1995 Geelong/Barwon River) were of smaller magnitude than the 1% AEP design storm. The 1% AEP storm is the design standard on which flood related planning controls are based in Victoria.

2 FLOOD STUDIES

2.1 Lara Flood Study

The study brief prepared by City of Greater Geelong (the City) demonstrated a strong understanding of the area and its floodplain and drainage infrastructure. The objectives of this study are described below.

- To produce detailed flood mapping for a range of flood modelling scenarios within the study area.
- To undertake definitive flood investigations for the floodplain reaches within the study area; to pool all the available data and, through rigorous analysis determine robust flood levels, velocities, depths and extents.
- To build on the previous flood studies undertaken in 2001/02 by the partnership of Corangamite CMA, City of Greater Geelong and a consultant (Floodplain Management Strategy, April 2002) using baseline data and current technology to update flood data, value add for extra flood events, update of land use changes, update flood intelligence for the City of Greater Geelong Flood Emergency Plan, update flood data in the City of Greater Geelong Planning Scheme with a focus on the technical flood information to inform planning and building controls.

2.2 Lower Barwon and Lower Moorabool Rivers Flood Risk Management Study

Corangamite CMA in partnership with the City of Greater Geelong and Golden Plains Shire Council engaged Water Technology to undertake the Lower Barwon and Lower Moorabool Rivers Flood Risk Management Study. The overall objective of this project was to review and revise existing flooding information and produce detailed flood mapping for a range of flood modelling scenarios within the study area. The project involved a definitive flood investigation for the floodplain reaches within the study area, including collation of available

relevant data, a comprehensive hydrological assessment, and determination of robust flood levels, velocities, depths and extents for a range of design floods. The project aimed to develop an improved understanding of flood behaviour to enable improved land use planning and emergency response.

3 PLANNING SCHEME AMENDMENT C339

This amendment (C339) implements the Lower Barwon and Lower Moorabool Flood Investigation (Dec 2018), Lara Flood Study (March 2020) and part of the Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment (Dec 2015). The amendment includes rezoning of land in Lara to implement the Lara Flood Study outcomes, revises the mapping extent of the Floodway Overlay (FO), Land Subject to Inundation Overlay (LSIO and LSIO2) and the Special Building Overlay (SBO) in the areas of the respective studies and amends the Schedules to the FO and LSIO.

On 14 December 2021, the City considered a report on the submissions to Amendment C339ggee and resolved to:

- Request the Minister for Planning to appoint an Independent Panel under Part 5 of the Planning and Environment Act 1987 to consider all submissions to Amendment C339ggee except those relating to the Lara Flood Study;
- Defer a decision on the Lara Flood Study submissions to allow Council officers to investigate and prepare a further report on the site specific and more complex submissions and report back to Council in early 2022;
- Refer all submissions except the Lara Flood Study submissions to the Panel;
- Submit to the Panel its response to the submissions (except the Lara Flood Study submissions) generally as outlined in this report; and
- Note that Council officers will liaise with Planning Panels Victoria to delay appointment of a Panel and a Panel Hearing pending the outcome of Council's future consideration of the Lara Flood Study submissions.

4 VICTORIAN FLOODPLAIN MANAGEMENT

In 2016, the Department of Environment, Land, Water and Planning (DELWP) released the Victorian Floodplain Management Strategy. This document aims to set the direction for floodplain management in Victoria.

> *The Victorian Floodplain Management Strategy sets out a systematic approach to evaluating Victoria's flood risks. It also provides a systematic approach to sharing information between the individuals, communities, government agencies and other organisations responsible for managing the various aspects of flood risk. Most importantly, it clarifies which agency is accountable for each aspect of floodplain management.*

Relevant to this memo are the following sections:

- **Policy 13a** The 1% Annual Exceedance Probability flood will remain the design flood event for the land use planning and building systems in Victoria.
- **Policy 13b** The strategic planning framework must give due consideration to flooding and its impacts on land use potential.
- **Policy 13c** LGAs with areas at risk of a 1% Annual Exceedance Probability flood must ensure that their Planning Scheme contains:
  - the objectives and strategies for managing the risk in the Municipal Strategic Statement

- the appropriate zone and overlays.

- **Accountability 13a** LGAs are accountable for ensuring that their Planning Schemes correctly identify the areas at risk of a 1% Annual Exceedance Probability flood, and contain the appropriate objectives and strategies to guide decisions in exercising land use controls in regard to flooding.
- **Action 13b** The CMAs and Melbourne Water will work with LGAs to ensure that Planning Schemes use the planning controls that align with their flood risks.

5 SUBMISSIONS

A number of the submissions relate to similar localities within the respective modelling areas, having regard to this the detailed information presented below will be grouped within these areas including:

- *Submissions 78, 434 and 440 which relate to the "The Heights" development (Fyansford precinct) within the Lower Barwon and Lower Moorabool Flood Study*
- *Submission 269 which relates to existing parts of Fyansford within the Lower Barwon and Lower Moorabool Flood Study*
- *Submissions 198,230,448,449,457,474 and 552 which relate to the Manzeene Development within the Lara Flood Study*
- *Submissions 510, 468 and 297 which relate to the Lara West Development Area within the Lara Flood Study*
- *Submissions 117, 129 and 286 which relate to Avalon and the Princess Highway area within the Lara Flood Study*
- *Submission 296 which relates to the Lara Lakes, Lara Central and Lara Views Estate within the Lara Flood Study*
- *Submission 283 which relates to the Northern Growth Area within the Lara Flood Study*

6 RESPONSE

A response to the above submissions has been provided below. A summary of each submission is provided. This includes an analysis of the exhibited flood-related planning overlay and Flood Study results along with a response to points raised or queried within the submission.

6.1 Submissions 78 and 434

The location of the submissions received is shown below in Figure 1 for the following:

- The Heights (estate)
- 31-33 Salisbury Circuit, Fyansford



Figure 1 Submission Location

The Lower Barwon and Lower Moorabool Flood Study was based on topographic information derived from aerial survey collected in January 2017.

At this time "The Heights" estate had commenced some earthworks but filling of this area had not begun. This means that raised ground levels resulting from the development were not incorporated into the hydraulic modelling.

The 1% AEP design flood level and corresponding flood extent on which the Land Subject to Inundation Overlay is based is around 8.3 m AHD in this area.

It is understood that ground levels within the lowest sections of the estate have now been raised. Approved plans provided to council indicate that ground levels within Salisbury Circuit and the sections shown to be flooded under the exhibited overlay have been raised to at least 9.4 metres AHD within the land on the southern side of Salisbury Circuit.

This means that site lots within the Heights Estate are now higher than the applicable design flood level and the associated residential lots would not be subject to inundation during the 1% AEP design flood.

It is understood that, at the time filling of the site was approved, a planning scheme amendment occurred which realigned the existing flood overlays. This overlay aligns with more recent filling extents as shown in

Figure 2 below, which compares the topography from the Lower Barwon and Lower Moorabool River Flood Study with more current survey levels. Figure 3 show the existing and exhibited LSIO layers side by side. This highlights that the exhibited layer is not reflective of the current topography as discussed above.

It is evident that the exhibited overlay does not align with the likely flooding extent at this location based on the fill that has been placed in that area.



Figure 2 Topography comparison



Figure 3 Existing and Exhibited Planning Layers

It is therefore recommended that the exhibited LSIO map be clipped to the extent of filling within the Heights development. The Figure 4 below shows the exhibited clipped flooding extent at the location (dashed red line).

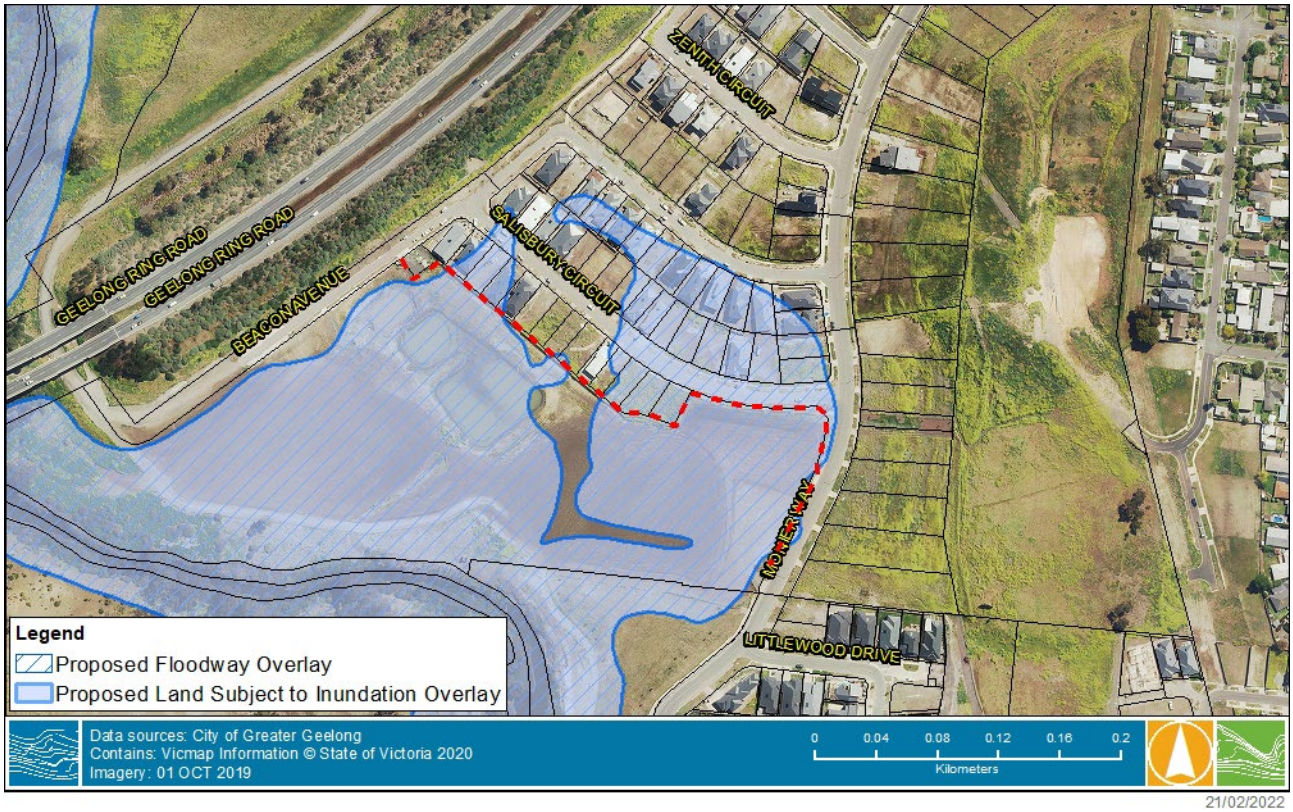


Figure 4 Recommended Flood Extent Limit

6.2 Submission 440

The location of the submission received is shown below in Figure 5:

- 32 Monier Way, Fyansford



Figure 5 Submission Site

The Lower Barwon and Lower Moorabool Flood Study was based on topographic information derived from aerial survey collected in January 2017.

At this time "Gen Fyansford" estate had commenced earthworks but extensive filling of this area had not begun. This means that raised ground levels as part of the development were not incorporated into the modelling.

The 1% AEP flood level and corresponding flood extent on which the Land Subject to Inundation Overlay is based is around 8.15 m AHD in this area.

It is understood that ground levels within the lowest sections of the estate have now been raised. Approved plans provided to council indicate that ground levels within Monier Way and the sections shown to be flooded in the exhibited C339 overlay have been raised to 9.3 – 9.6 metres AHD along Monier Way. Figure 6 shows a side-by-side comparison of the existing and flood-study topography, highlighted where the lots have been filled. Figure 7 shows a comparison of the existing and exhibited LSIO layers.

This means that Gen Fyansford land levels are now higher that the applicable flood level and the associated residential lots would not be subject to inundation in a 1% AEP design flood.

It is therefore recommended that the exhibited LSIO map be clipped to the extent of filling within this area of development. The Figure 8 below shows the exhibited clipped flooding extent at the location (dashed red line).

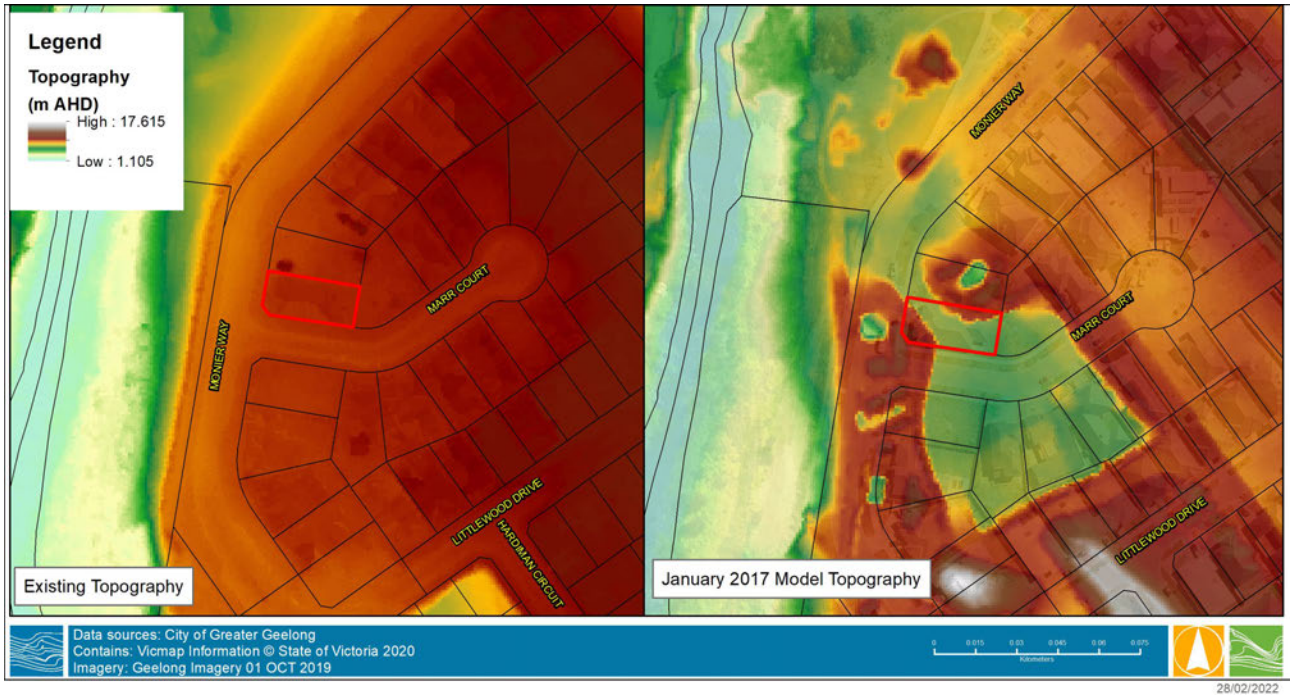


Figure 6 Topography Comparison



Figure 7 Planning Layer Comparison



Figure 8 Recommended Floodway and Land Subject to Inundation Clip Line

6.3 Submission 269

The location of the submission received is shown below in Figure 9:

- 12-14 The Parade, Fyansford



Figure 9 Submission Site

The topographic information on which the Lower Barwon and Lower Moorabool Flood Study was based on aerial survey collected in January 2017. Ground levels on the subject property are understood to range between 7.1 – 7.6 metres AHD. The 1% AEP design flood levels and corresponding flood extent on which the Land Subject to Inundation Overlay is based, are around 8.15 m AHD in this area. The topographic data is shown in Figure 10. Figure 11 shows a comparison between current and exhibited flood overlays.

At the time of the flood study the “Gen Fyansford” estate had commenced earthworks but filling of this area had not occurred. This means that raised ground levels as part of the development were not incorporated into the modelling or extent mapping. A detailed review of construction plans indicates that flood protection works within the estate do not extend to the subject property. The Gen Fyansford estate is filled above the applicable 1% AEP flood level in order to provide flood protection to all residential lots.

Whilst it is acknowledged that the existing flood modelling within this section of the floodplain does not account for filling of the Gen Fyansford estate, the impact of filling is likely to be localised and only provide flood immunity to the areas shown to be filled above the applicable flood level. Having regard to this it is recommended that the LSIO and FO extent in this location be clipped to match the filled area as shown in Figure 12.

A site inspection of the subject location was carried out to validate the extent of the development works. A photograph of the subject property entrance relative to filling of lots west of The Parade is shown in Figure 13.

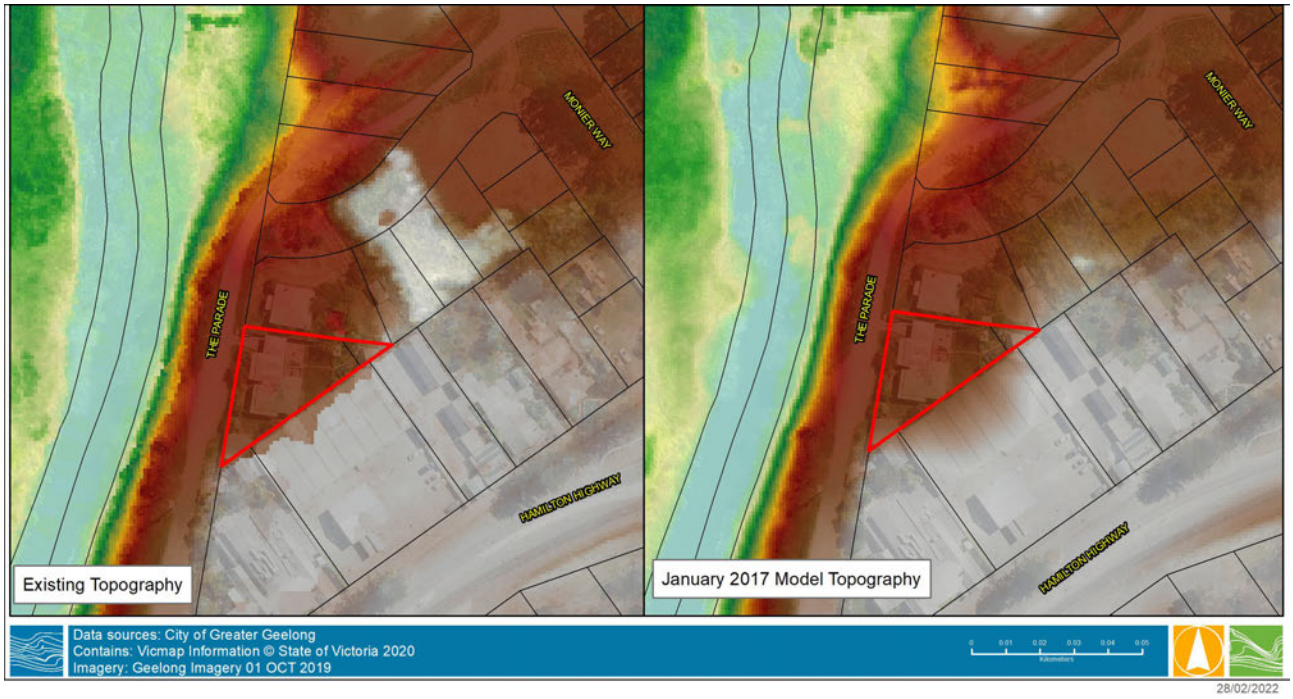


Figure 10 Topography Comparison



Figure 11 Planning Layer Comparison



Figure 12 Recommended Floodway and Land Subject to Inundation Clip Line



Figure 13 Subject Site (white fence) showing development filling to the west

6.4 Submissions 198,230,448,449,457,474,552

The locations of the submissions received are shown below in Figure 14 for the following:

- 6 Floret Drive, Lara
- 28 Moonah Circuit, Lara
- 22-26 Moonah Circuit, Lara
- 69 Callistemon Circuit, Lara
- 30-34 Moonah Circuit, Lara

The location of the submission received for the address below is shown in Figure 15.

- 29 Cadence Ave, Lara

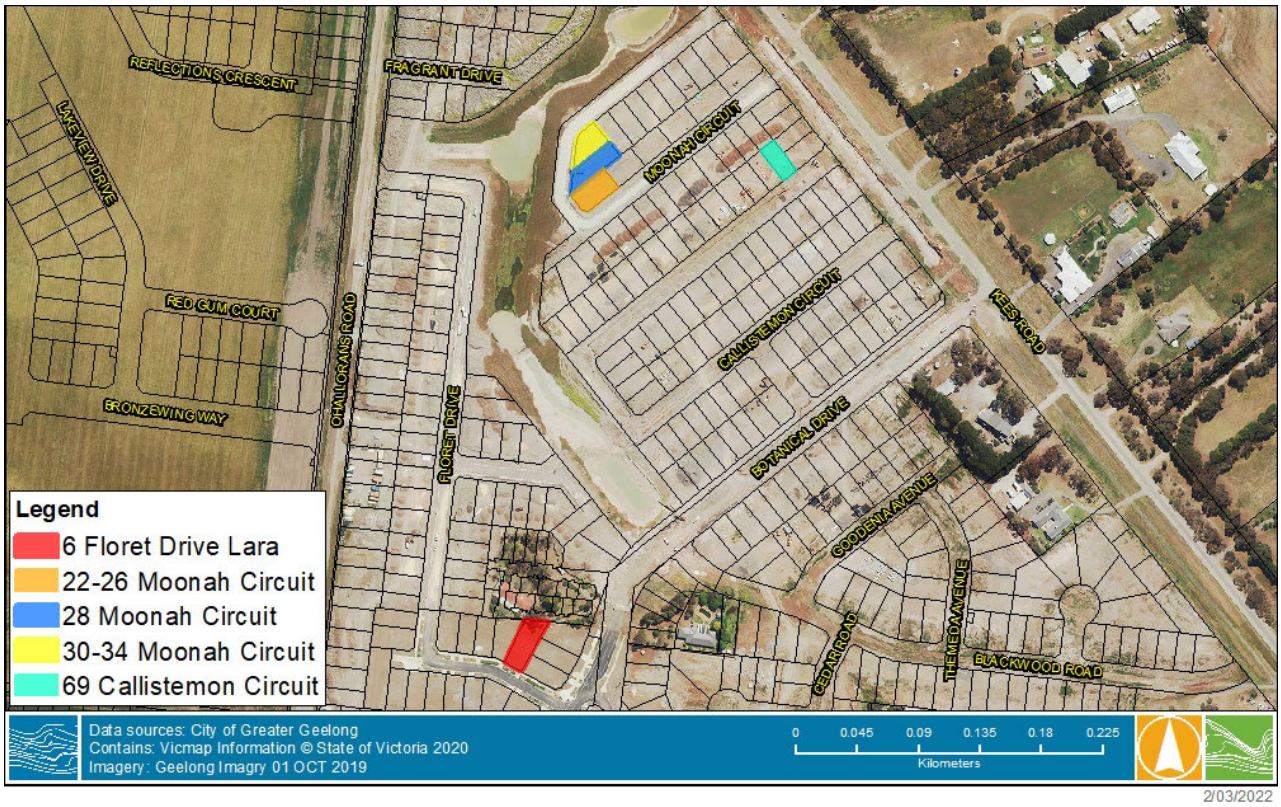


Figure 14 Submission Sites

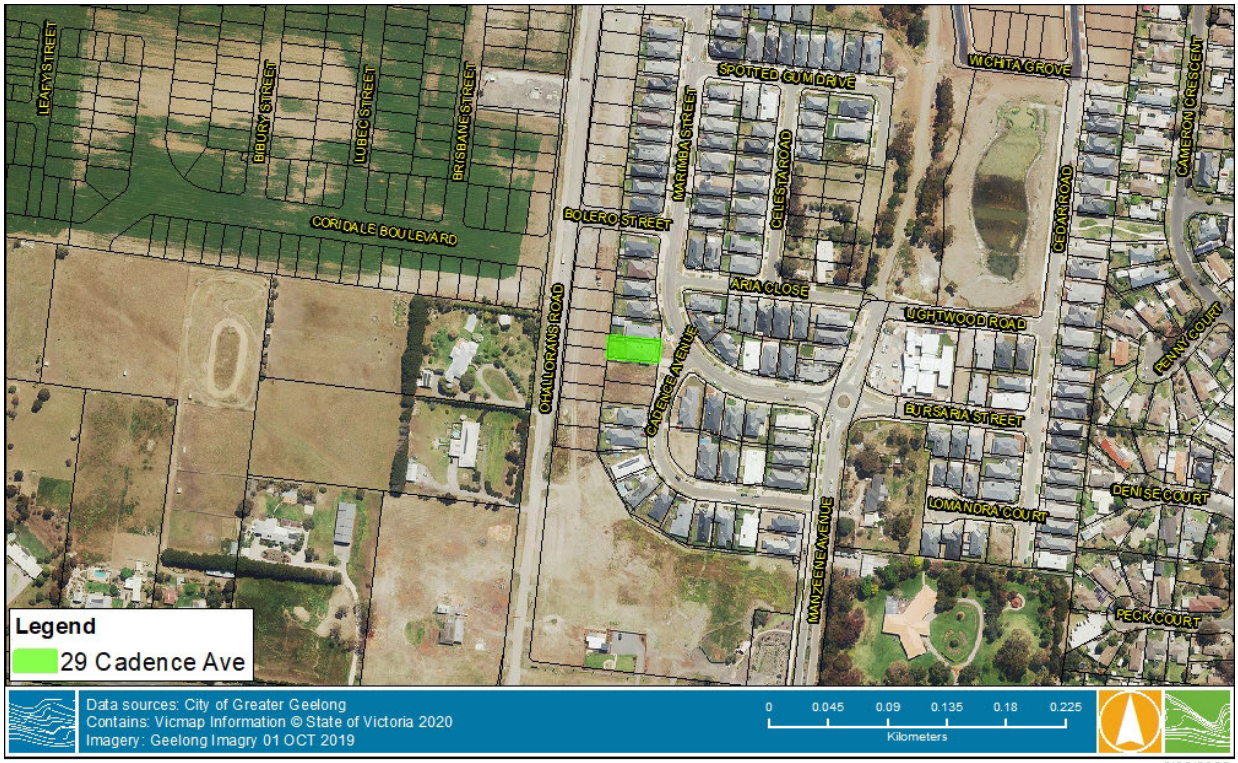


Figure 15 Submission Site

The topographic information (Photogrammetry) on which the Lara Study is based was collected in 2017.

At this time “Manzeene Village” estate had commenced earthworks but was still in the early stages of development. This means that raised ground levels for areas which had been or were planning to be filled as part of the development were not incorporated into the modelling.

Further to this the stormwater network which has been designed for this estate which manages stormwater runoff had also not been completed or incorporated into the flood model.

It is now understood that much of the development has been completed with the bulk of the drainage and stormwater network now in operation. Further to this the area has been filling in line with approved plans in order to protect the estate from overland flooding.

Having regard to the above it is considered that the presented flood mapping does not accurately represent the existing development conditions and likely flood risk at this location.

Updated draft flood mapping has been produced at this location as part of flood modelling investigations for the Northern Growth Area. This information, which incorporated developed conditions up to 2020 shows a significantly reduced flooding risk in comparison with the exhibited flood related zones and overlays.

A comparison of the exhibited SBO extent and the draft updated flood extent is shown in Figure 16 below.

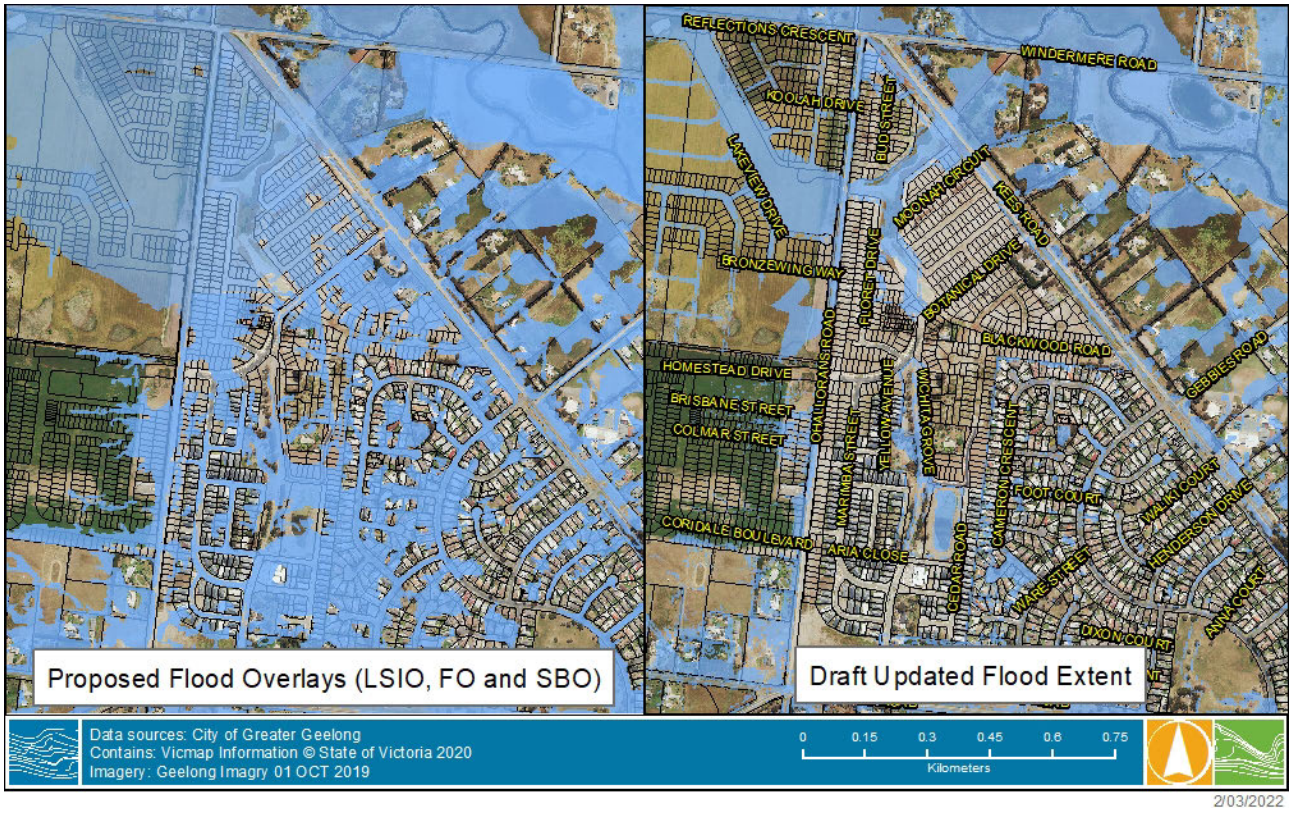


Figure 16 Comparison of flooding at Lara

As part of the Hovells Creek Stormwater Management Plan and Growth Area Surface Water Planning the overland flooding and drainage conditions within this section of the catchment will be updated. With rapidly evolving development works to the west and the completion of outstanding earthworks within the development it is recommended that, at this time, the Manzeene Village development area be omitted from the planning scheme amendment. It is understood that development at this location was based on detailed flooding assessment on which mitigation measure were proposed and subsequently constructed which protects buildings from the potential impact of inundation during the 1% AEP design flood. In light of this, it is considered that omitting this area until such time as updated, appropriate flood mapping is available presents a manageable risk and would provide a better planning outcome (as shown in Figure 17).

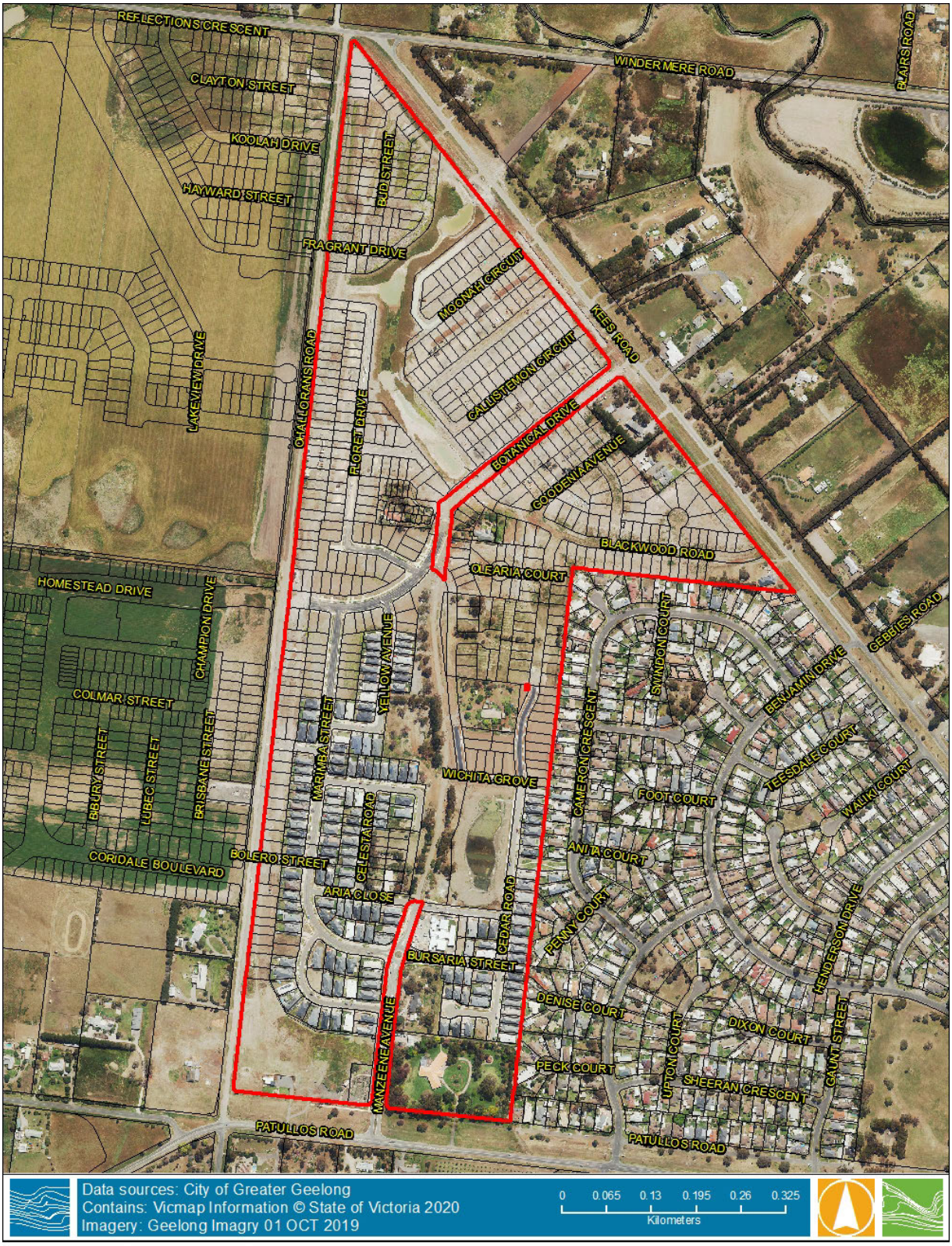


Figure 17 Area to be omitted (within red outline)

6.5 Submissions 510, 468, 297

The locations of the submissions received are shown below in Figure 17:

- 205-545 O'Hallorans Road, Lara
- 285 Patullos Road, Lara
- 545 Windermere Road, Lara

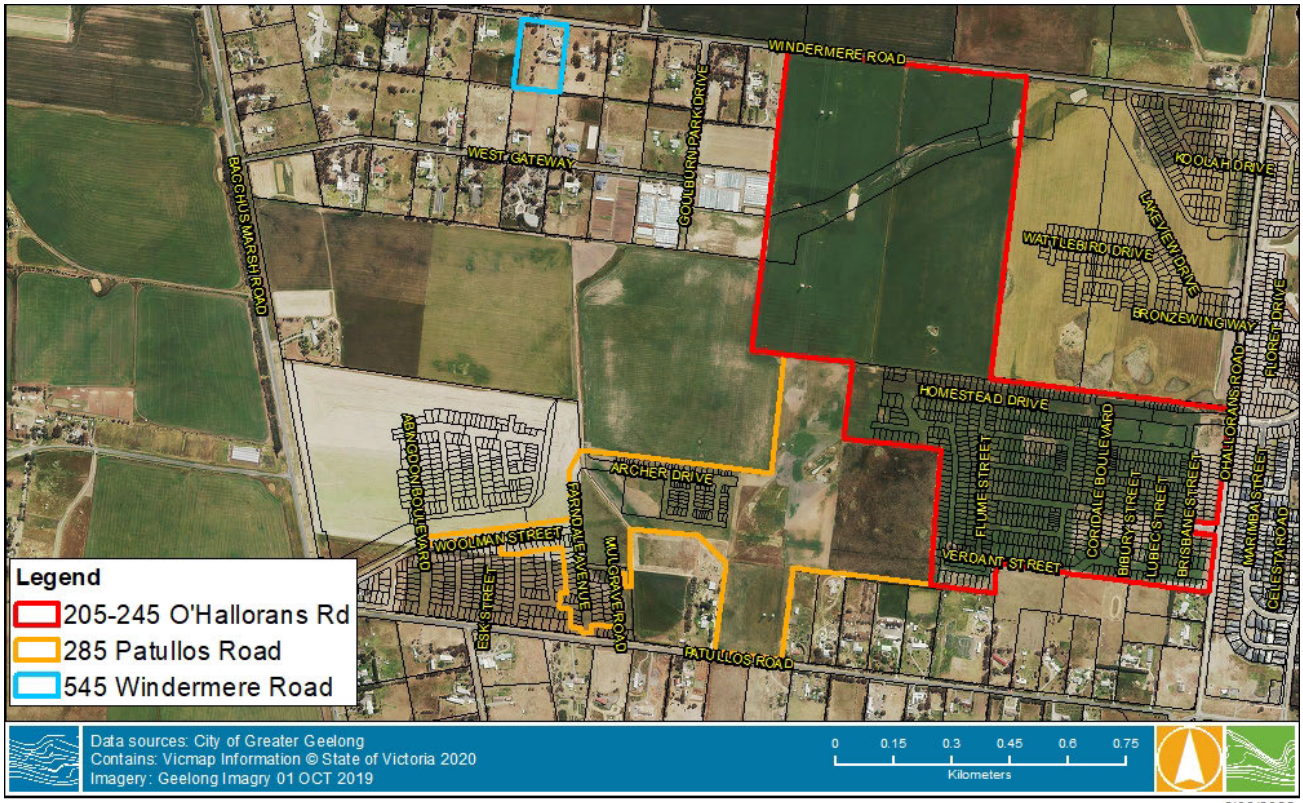


Figure 18 Submission Sites

The subject area is located within the Lara West Development Precinct. Development within this area is based on the surface water planning and development layout produced as part of the Lara West Precinct Structure Plan. Development within this area has only commenced within the past 2 years.

Flood modelling for the Lara Flood Study was based on existing conditions at the time of model development in 2017/2019. This was based on topography and existing stormwater and rural drainage infrastructure information collected at the time (preceding development in this area).

It is acknowledged that construction of Lara west has progressed with several locations now having established residential areas and a number of large wetland/retarding basins constructed or having been approved.

It is considered that the flood mapping produced by the Lara Flood Study no longer represents the current flooding risk within this area, which is continuing to change as the precinct develops. Having regards to this, it is recommended that this area be excluded from the planning scheme amendment and that flood mapping is updated once the area has been fully developed and/or as part of modelling undertaken for the Northern Growth Area which will discharge through this site.

It is noted that whilst the flooding associated with the exhibited overlay at 545 Windermere Lara is associated with regional flows it is likely that, once developed, measures will be taken to reduce the extent and depth of inundation at this location. The submission prepared for this property raised concerns regarding incorporation of local drainage features, which are likely to help conveyance of flood waters at this location. The Lara Flood Study was based on a regional flood model. This model does not include all private and rural drainage features which often become overwhelmed during significant floods. In addition, detailed information on these assets is typically not available and the maintenance and condition of them is not known. For these reasons they are typically disregarded in flood mapping analyses at the regional scale.

Whilst the property at 545 Windermere Road shown in Figure 18 is recommended to be removed for this amendment it is also recommended that the flood prone designation remain in place. Unlike the other two properties identified in this area, 545 Windermere Road is not part of the larger land holdings where works are ongoing to develop the Lara West area. Hence there is no immediate plan to resolve flooding risk here, with no current application to develop the site. This means there is residual flood risk across the site until such time as development within this area of Lara West proceeds and residual flood risks are addressed.

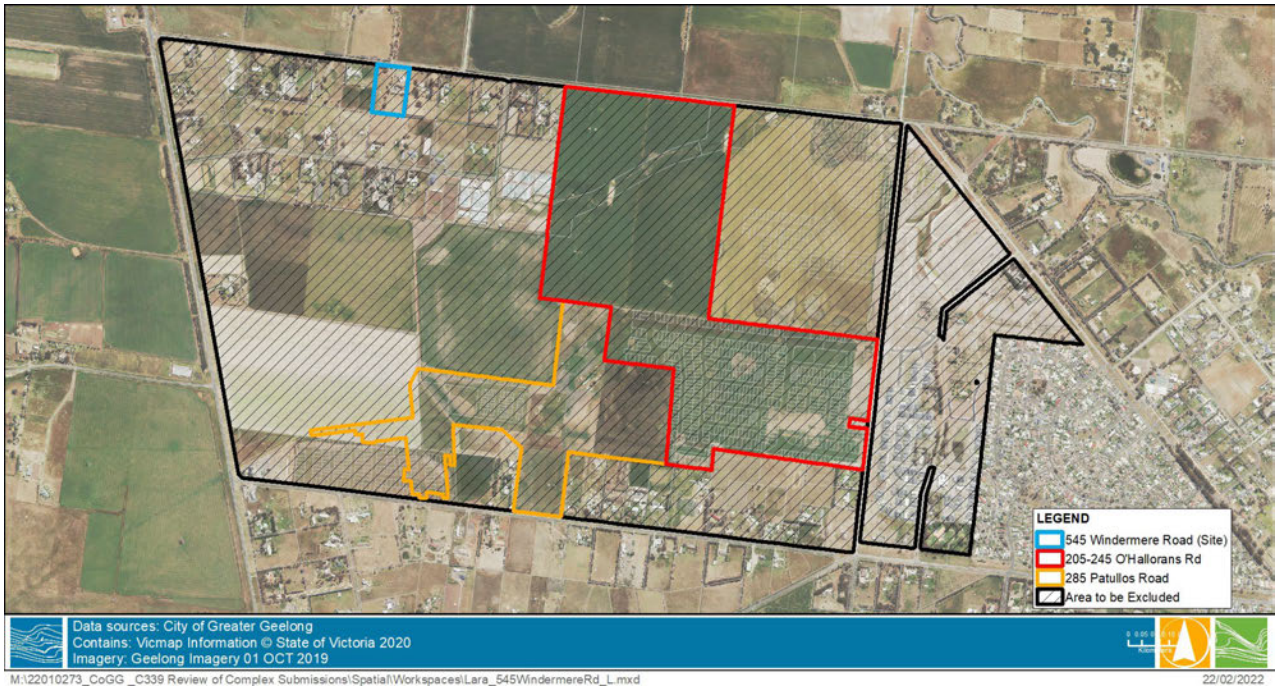


Figure 19 Area to be removed from amendment

6.6 Submission 296

The following response is in relation to submission 296, located at the following locations listed below and shown in Figure 19 & Figure 20.

- 130-150 Forest Rd South (Lara Views Estate)
- 385 Windemere Road (Lara Lakes Estate)
- 43-55 & 60 Manzeene Avenue (Applegum Subdivision)
- 21 Caddys Road, 131 Flinders Avenue & 135 Flinders Lane (Lara Central Estate)

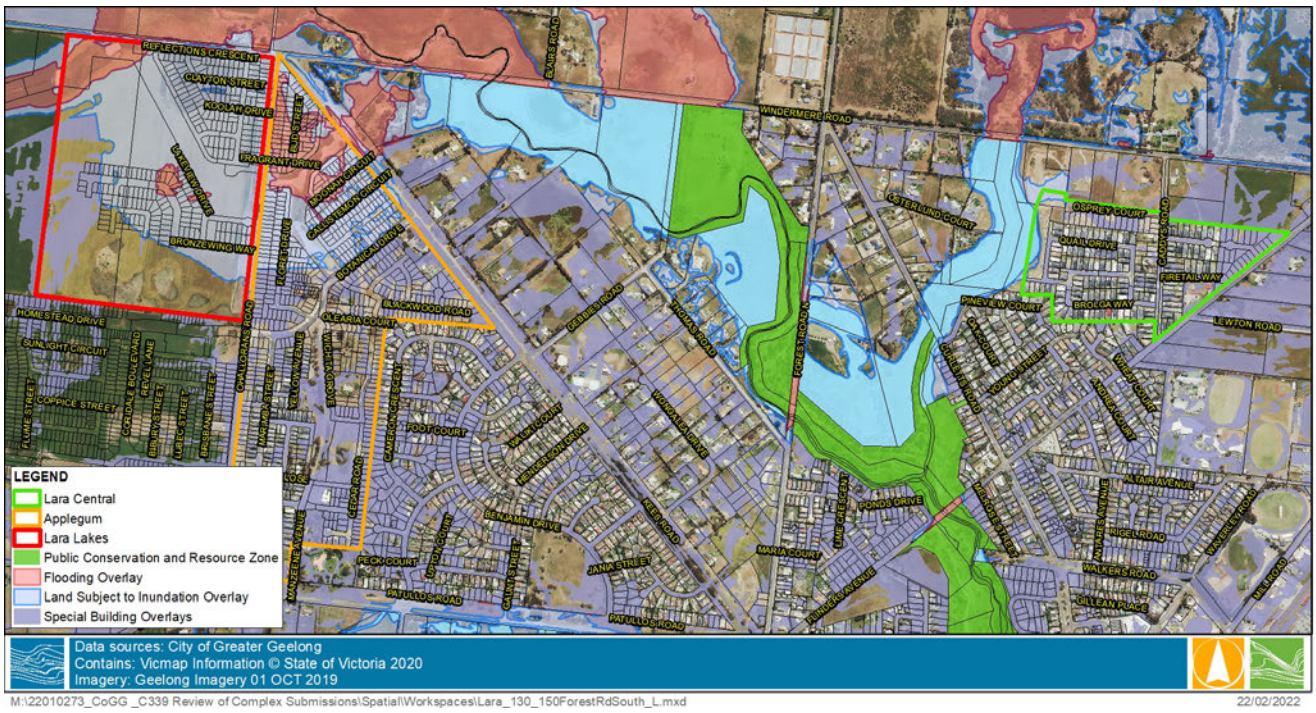


Figure 20 Lara Central, Lara Lakes and Applgeum developments and Exhibited Overlays

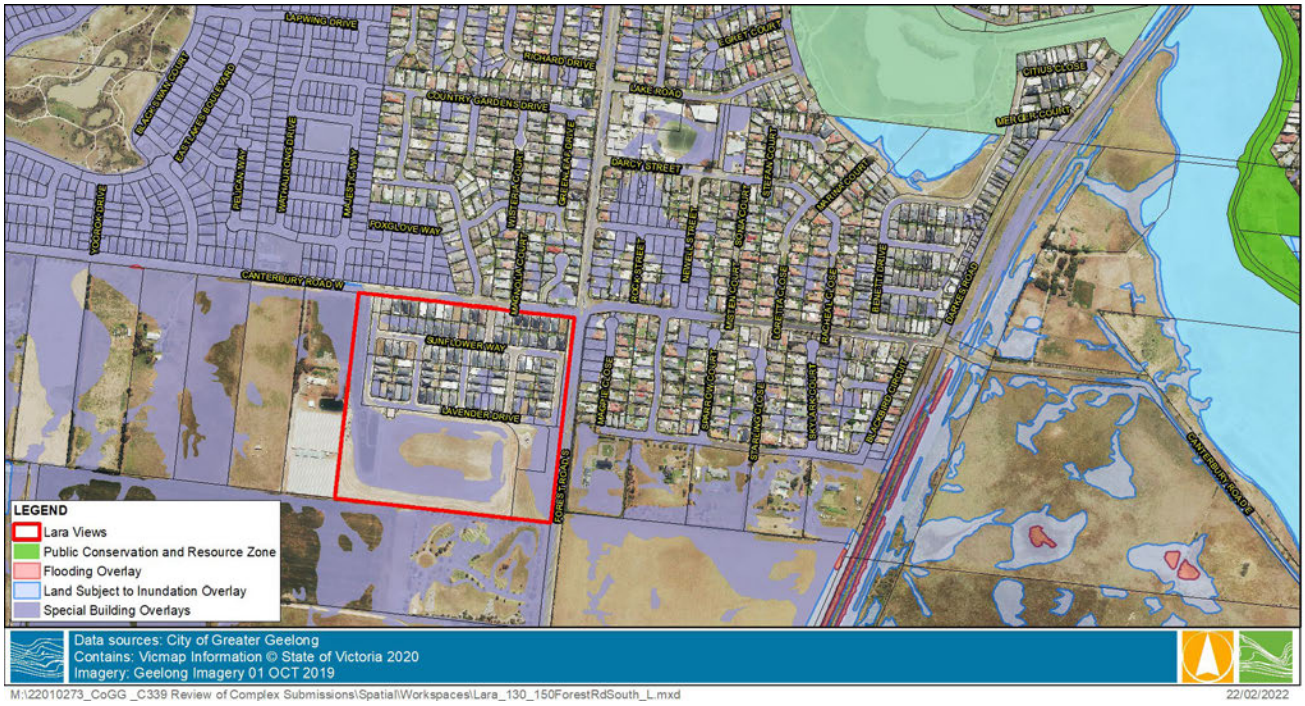


Figure 21 Lara Views Development and Exhibited Overlays

The submission has been prepared by TGM Cardno on behalf of L Bisinella Developments Pty Ltd and includes the properties listed below:

- 130-150 Forest Rd South (Lara Views Estate)
- 385 Windemere Road (Lara Lakes Estate)
- 43-55 & 60 Manzeene Avenue (Applegum Subdivision)
- 21 Caddys Road, 131 Flinders Avenue & 135 Flinders Lane (Lara Central Estate)

The main issue relating to each of the areas is the exclusion of more up-to-date information to reflect the development which has occurred at each of the sites since the LiDAR/photogrammetry was captured in 2017. A summary of the key points identified in the submission is provided below.

"insufficient rigour has been applied in the preparation of the Amendment and that the proposed changes to the Greater Geelong Planning Scheme (Scheme) are not soundly based. More detailed site specific analysis needs to be undertaken, including more up to date surveys and assessment of conditions. In its current form, the Amendment should be abandoned."

"the impact of the Amendment on affected land will be significant. It is important that all consequences arising from the implementation of the Amendment are properly considered. Based on the work undertaken to date, our client queries whether the practical consequences of the Amendment are fully appreciated."

In relation to Lara Views Estate, a planning permit was granted on the basis of detailed hydraulic assessments. The submission identifies the following points:

"The Lara Flood Study does not appear to consider the developed condition of this land and does not explain why the SBO is proposed in areas where the land has been developed with finished floor levels that will ensure inundation cannot occur."

"The SBO mapping is inconsistent with the Stormwater Management Plan that has been approved by Council and subsequently implemented in respect of the Lara Views Estate."

"In circumstances where potential flooding issues have already been managed, there is no basis to apply to the SBO as proposed."

In relation to Lara Lakes Estate, a planning permit was granted on the basis of detailed hydraulic assessments. The submission identifies the following points:

"The development is being undertaken in accordance with an approved Surface Water Management Strategy and Flood Impact Assessment. Consistent with that assessment, the residential lots in the development will not be susceptible to flooding."

"The Flood Study prepared by Water Technology fails to acknowledge the existing conditions of the site and does not account for the fact it is currently being developed to meet the desired outcomes of the SBO and FO."

"Further, the SBO and FO mapping is inconsistent with the detailed Flood Impact Assessment and Stormwater Management Plan that have been agreed by Council and are subsequently being implemented in respect of the Lara Lakes Estate."

In relation to the "Applegum Subdivision", a planning permit was granted on the basis of detailed hydraulic assessments. The submission identifies the following points:

"The land is currently being subdivided in accordance with planning permit PP-933-2020."

"The Summary Report does not refer to the fact that a permit has been obtained for the land and that the development deals with flood risk. Indeed, the SBO mapping exhibited with the Amendment (extracted below) is inconsistent with the Flood Impact Assessment and Stormwater Management Plan approved by Council."

In relation to Lara Central Estate, a planning permit was granted on the basis of detailed hydraulic assessments. The submission identifies the following points:

"The Council has issued several permits in respect of the parcels of land which allow for subdivision and have considered stormwater impacts."

"The subdivision is complete and drainage assets have been constructed. Notwithstanding this, the Summary Report has failed to refer to these permits or the existing conditions of the land. While a Flood Impact Assessment and Stormwater Management Plan have been approved by Council as part of the permit application process, the Amendment contains entirely different mapping."

"Our client submits that the purpose built drainage infrastructure constructed pursuant to the permit is sufficient and will ensure the objectives of the SBO are met. For this reason, there is no need for a portion of the land to be burdened by the SBO."

In response to the submission, it is noted that two of the properties located within Lara West Precinct Structure Plan (385 Windemere Road and 43-55 & 60 Manzeene Avenue) are within the area identified within Section 6.5 (Figure 18) and are recommended to be excluded from the planning scheme amendment. Flood Risk assessment has formed a part of previous applications and permit requirements for these sites. Detailed hydraulic assessments and/or flood impact assessments have been undertaken to allow development. The Lara Flood Study did not have access to the additional information (additional drainage and design surfaces) at the time of the investigation.

In relation to the remaining properties within this submission (130-150 Forest Rd South and 21 Caddys Road, 131 Flinders Avenue & 135 Flinders Lane), it is recommended that these areas also be excluded from the planning scheme amendment. The reasons identified above include:

- permit conditions based on detailed assessments
- significant changes to the landform
- additional drainage infrastructure that has been constructed since the development of the flood study.

It is recommended to maintain the current flood extent as indicative of the land liable to flooding.

The areas to be omitted from the current amendment are shown in Figure 22 below.

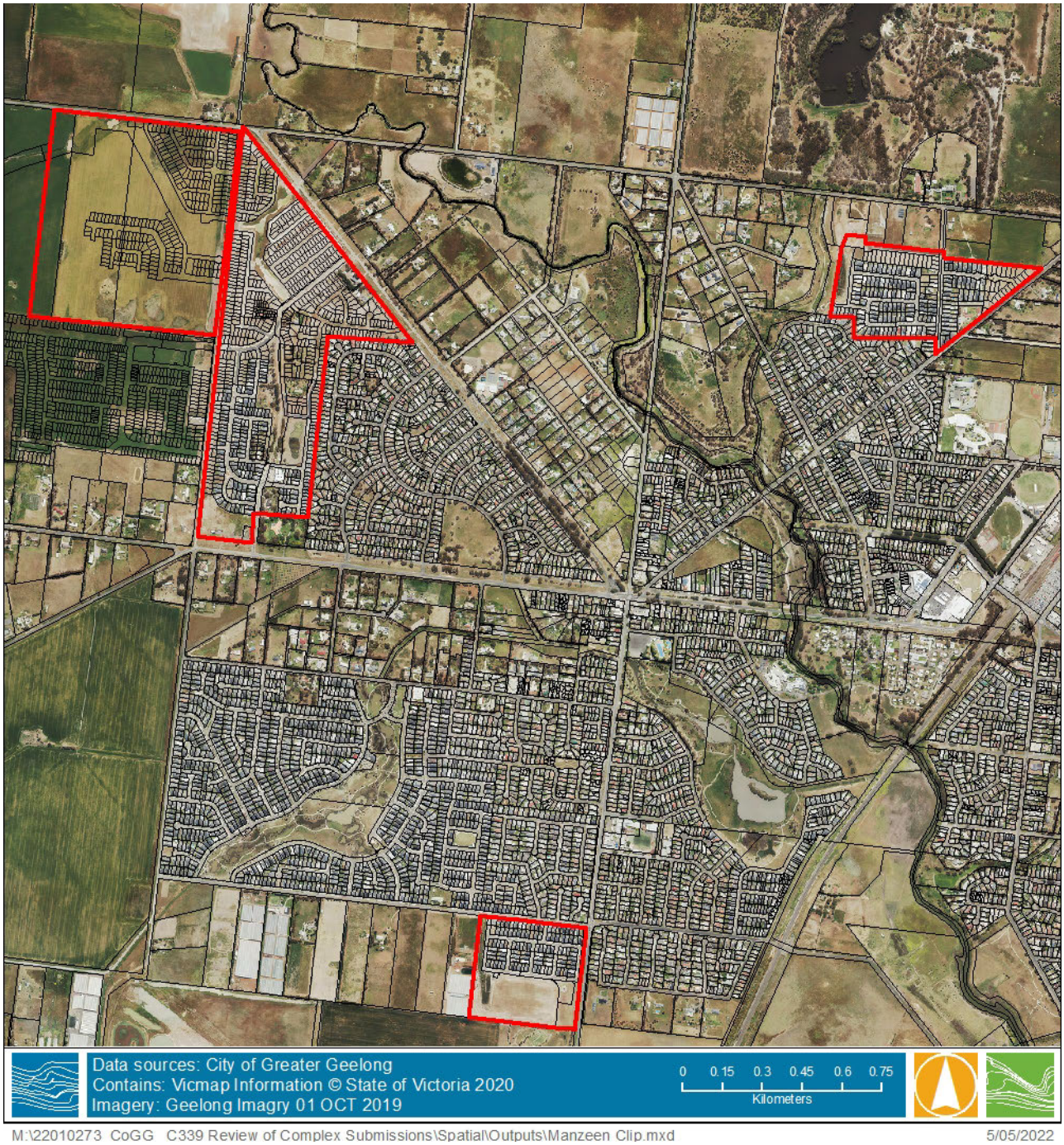


Figure 22 Area to be omitted

6.7 Submissions 117, 129, 286

These submissions relate to the Avalon area around the Princes Highway within the Austins Swamp catchment and the response has been based on the information obtained through the Lara Flood Study. The location of these submissions is shown in Figure 21 (submission 117) and Figure 22 (submission 129 & 286) and includes the following properties:

- 1425 Princes Freeway (1-43 Beach Road) and 1475 Princes Freeway (45 Beach Road) #117
- 15 Avalon Road #129
- 255-275 Avalon Road #286

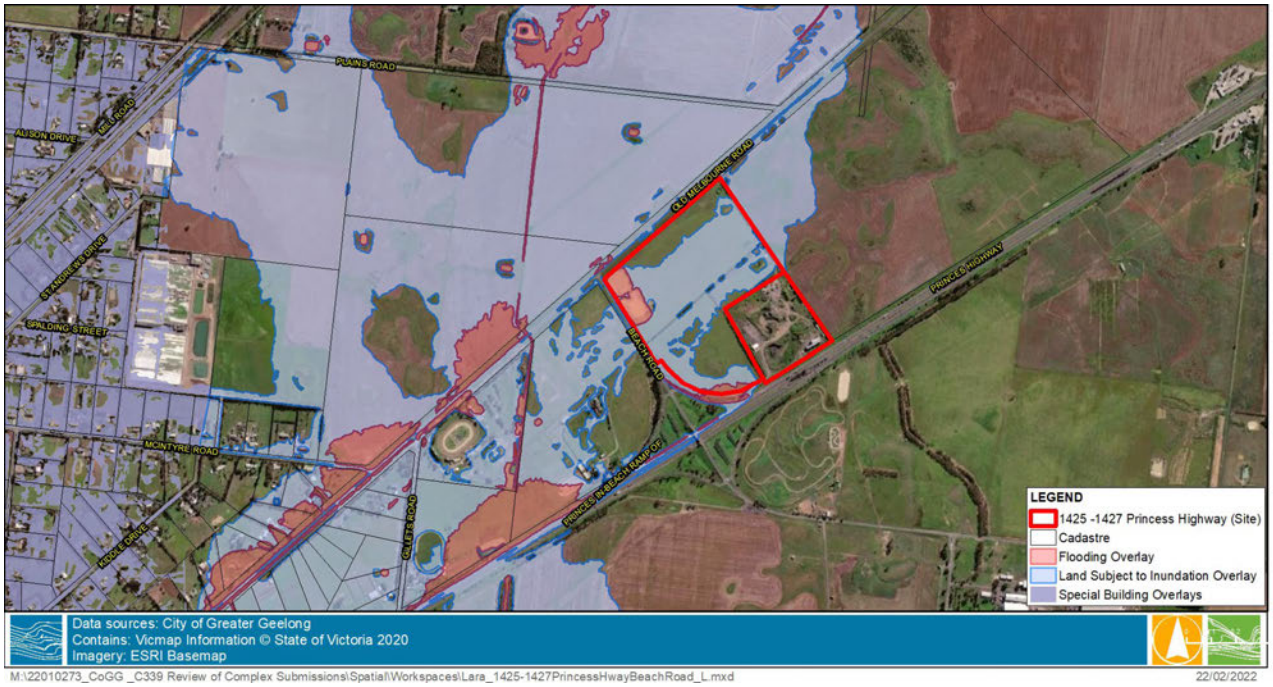


Figure 23 1-43 & 45 Beach Road, Avalon Subject Site and Exhibited Overlays

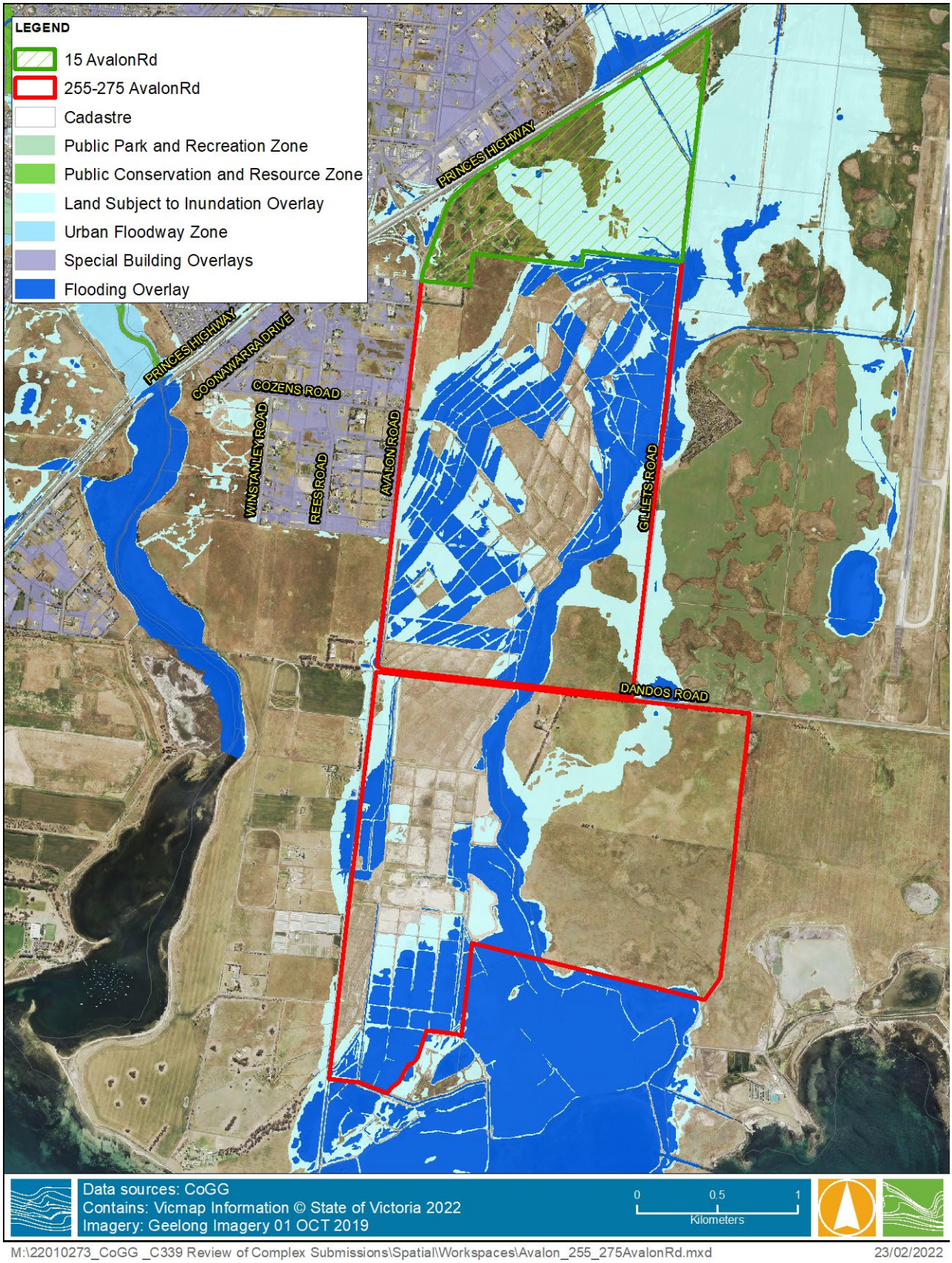


Figure 24 15 Avalon Road & 225-275 Avalon Road, Avalon and Exhibited Overlays

Submission 117 contains an independent review undertaken by WMAwater in relation to the hydraulic model. A summary of the submission is provided below.

"WMAwater conducted a review of the Amendment documents and Lara Flood Study reports in relation to the site characteristics (Review Report attached). It has been concluded that representation of the site in models underpinning the Amendment to the Flood and Land Subject to Inundation Overlays, does not reflect actual conditions."

A review report was provided with the submission and highlighted the following reasons for the objection.

- *"At no stage during those years have the property owners ever witnessed flooding within the site. Particularly, the previous owner did not observe flooding to the extent indicated in the Proposed Amendment during the significant rain events experienced in Lara in 1988, 2011 and 2017."*
- *"There was lack of historical data/evidence to undertake an accurate calibration in Austins Swamp Catchment."*
- *"The floodwater was modelled to overtop the northeast section of Old Melbourne Road."*
- *"..The adopted grid size (4 metre) did not allow a robust representation of smaller (relative) topographical and hydraulic features within the 2d-domain"*

In response to submission 117, it is noted that the Lara Flood Study was undertaken at a regional scale and limitations within the model setup and methodology may have impacts on individual property results and localised flood behaviour. In light of the submission provided, a review of topography data, hydrology catchment delineation and the hydraulic model inflow boundaries was undertaken.

Upon review of the information provided within the submission, it appears reasonable to consider an objection based upon the information provided. It appears the boundary inflow locations within the hydraulic model may be providing an over-representation of flooding within the site.

The site is impacted from inundation and runoff from an upstream catchment of around 1.5 km^2. An existing drain transverses the site in a north-east to south-westerly direction with the only outlet via a minor culvert under Beach Road. The Beach Road Princess Highway interchange appears to restrict flows, holding them back within the site. The drain does not appear to be well represented in the hydraulic model results, however it is evident in the aerial imagery and LiDAR data for the site.

The presence of water on Old Melbourne Road in the model results is due to the placement of the inflow boundary being located on the roadway. As a result, when flows are entering the hydraulic model, there is some water being placed onto the roadway. This appears as the overtopping of flows onto the roadway.

It is agreed that the flood waters in a 1% AEP event , flows upstream of the roadway do not overtop Old Melbourne Road.

It is recommended sensitivity analysis be undertaken for the 1 % AEP 48-hour design storm to test:

- Adjustment of the inflow boundary location included in the hydraulic model to be located downstream of the roadway.
- Sub-grid sampling be employed within the model to reflect the narrow drain ensuring that drainage capacity reflects what is on the ground.

Submission 129 contains an independent review undertaken by Rain Consulting in relation to the hydraulic model. A summary of the following reasons for the objection provided in the submission is provided below.

- *Amendment C339 as exhibited seeks to incorrectly increase the extent of the Land Subject to Inundation Overlay (LSIO) over the subject site;*

- *We contend that the modelling undertaken for the site and the broader Avalon Catchment has not considered the site specific conditions of our clients land."*

The submission provides the following reasons to the objection:

- All water flow from the north of the Princes Freeway and into the subject site is achieved via a number of engineered culverts and established drainage channels. The proposed amendment ignores the impact of this existing infrastructure on the potential extent of inundation or flooding within the site;
- As a consequence the proposed amendment impacts on a larger proportion of the site than it should;
- An independent inundation, flooding and drainage assessment completed by Rain Consulting, (on behalf of the landowner), outlines the various actions required to address these inaccuracies in order to increase the accuracy of the flood model;
- Once these actions are undertaken, it is anticipated that a more accurate and realistic model could be prepared on which to base the proposed amendment;
- The subject site along with several other properties surrounding Avalon Airport are formally identified by the draft Avalon Corridor Strategy (ACS) as being suitable for future commercial and industrial development.

It is noted within the accompanying report (Rain Consulting) that the Lara Flood Study was undertaken at a regional scale and where possible, limitations within the model setup and methodology may have impacts on individual property results and localised flood behaviour.

In light of the submission provided, a review of points raised within the submission and accompanying report was undertaken. This focused on the topography data, hydrology catchment delineation, culvert structures and the hydraulic model setup and limitations.

Upon review of the information provided within the submission, it is acknowledged that the representation of the culverts conveying flow into the site may be not accurately represent the flow within the site. It is acknowledged there are discrepancies in the culvert data used in the model and that observed during the site visit. This is likely to impact on the flow behaviour into the site, particularly in minor, more frequent storms.

Further to this:

- Culverts were sized for a 1 in 30 Year ARI based on the Princes Highway West Project – Hydrology and Hydraulic Study, Western Ring Road to Corio Overpass, Stage 2 Final Report, prepared for VicRoads (Lawson and Treloar).
- The 1% AEP flood overtops the Princes Highway to the north of the northern culverts with overland flow entering the site.
- Historic imagery from the 1973 flood event (while noted this is quite old), clearly shows the presence of the northern drain and shallow overland flow across the paddock (Figure 23 and Figure 24). This suggests the drains may be sized to convey the culvert capacity, but may not adequately convey the 1% AEP flood flow, resulting in widespread shallow flooding across the site.

As outlined in the Rain Consulting report, it is recommended sensitivity analysis be undertaken for the 1 % AEP 48-hour storm to:

- Ensure the best available data (culvert sizes) are included in the hydraulic model
- Sub-grid sampling be employed within the model to reflect the narrow drain, ensuring that drainage capacity reflect what is on the ground.

Until the sensitivity modelling has been completed, there is likely uncertainty around the impact of the 1% AEP flood extent and as a result the planning overlays exhibited.

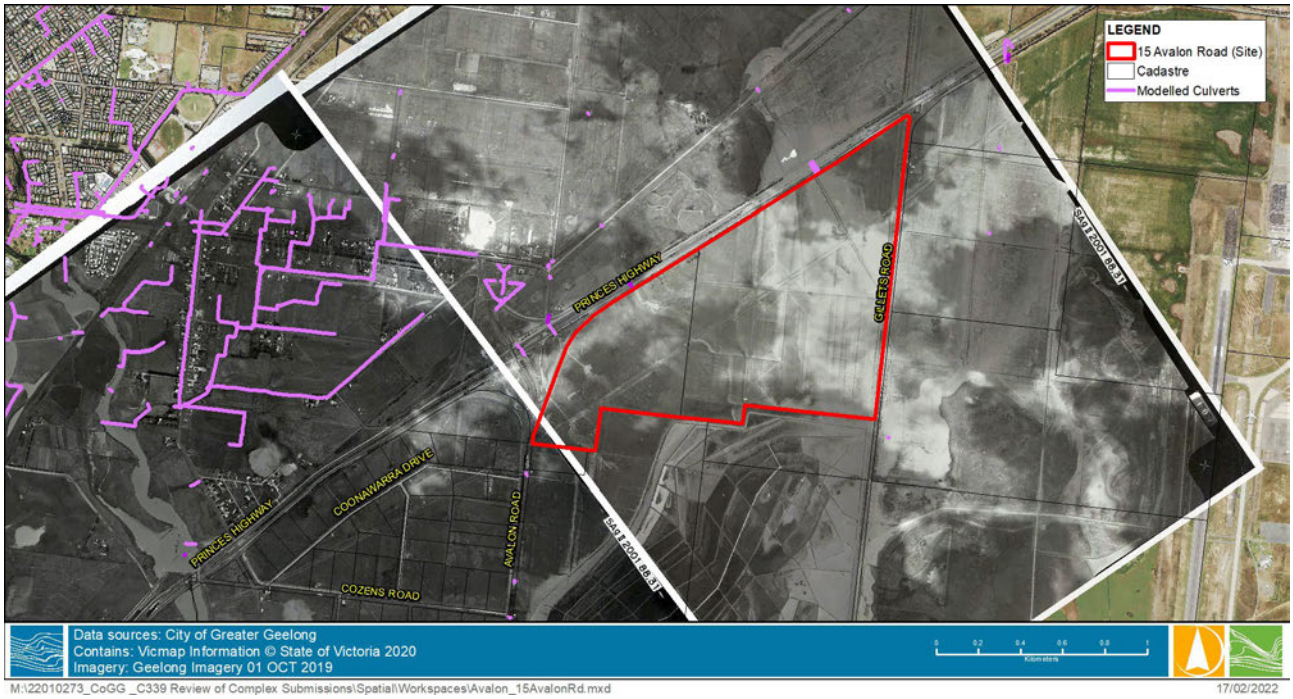


Figure 25 1973 Flood Imagery (post-event) at site

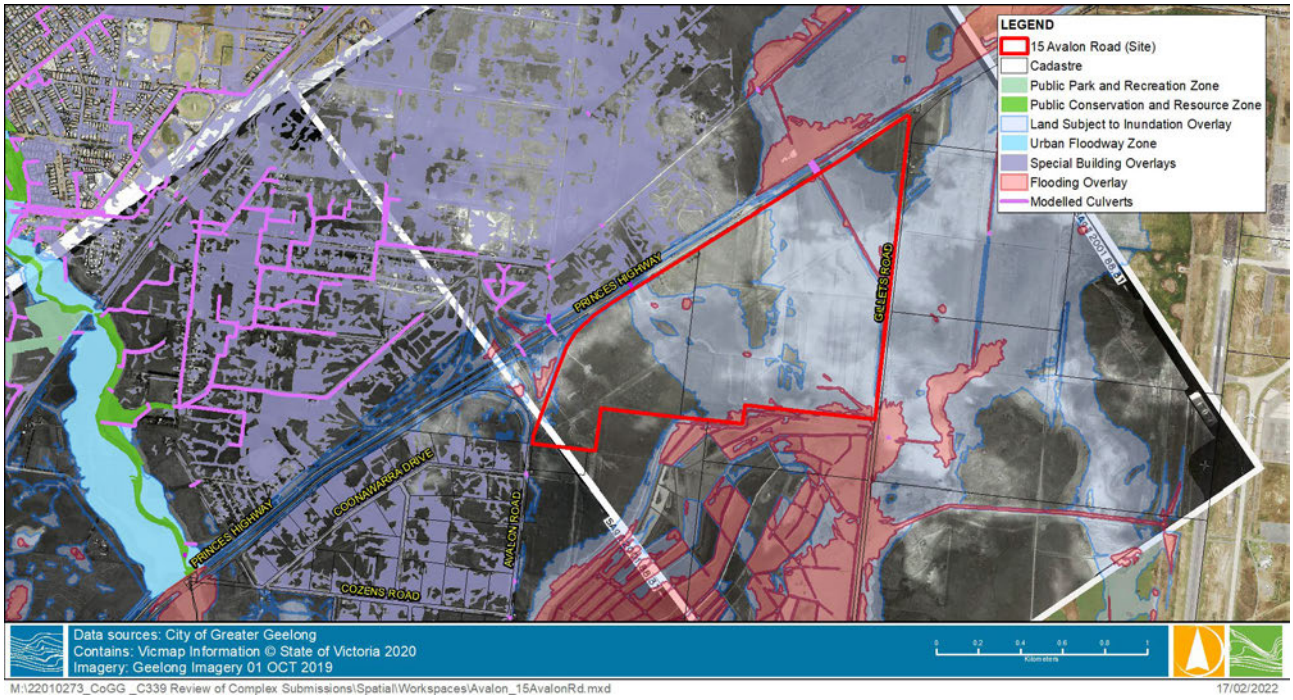


Figure 26 Proposed Overlays with 1973 Flood Imagery

Submission 286 identifies three reasons for the objection to the exhibited amendment. A summary of the following reasons for the objection provided in the submission is provided below.

1. *"..there are inaccuracies in the flood studies which have informed the extent of the FO1 and LSIO1 proposed over the Land."*

2. The site is *"..part of the study area associated with the Avalon Corridor Strategy, which contemplates strategic guidance on potential land use and development change to 2050….Consideration to flooding is more appropriately coordinated with the future Planning Scheme Amendments to facilitate development of land in accordance with the Framework Plan forming part of the Avalon Corridor Strategy.."*

3. There are existing planning controls (Special Use Zone 1) that *"..are to be considered for a planning application contemplating building and works on the Land… The proposed FO1 and LSIO1 are considered to be a laying of duplicate controls which fail to offer any further planning considerations beyond which must be considered under the existing planning controls over the Land.."*

A response to each of these points raised within Submission 286 is provided below.

There are no claims or evidence presented as to the inaccuracies of the flood study informing the extent of the FO and LSIO. While it is understood the site covers an area identified for future growth and development under the Avalon Corridor Strategy, it is necessary to utilise and publish the best available information in relation to flooding. This includes both planning and emergency management. The incorporation of the proposed overlays on an existing Zone (in this case, SUZ1) is common practice across Victoria and ensures that any rezoning should also consider other planning controls.

It is noted that the Lara Flood Study was undertaken at a regional scale and limitations within the model setup and methodology may have impacts on individual property results and localised flood behaviour. In light of another submission provided adjacent to the site, a review of topography data, hydrology catchment delineation and the hydraulic model inflow boundaries was undertaken.

Sensitivity modelling in relation to the Princes Highway Culverts may change the flood behaviour leading to the site, however it is not likely to significantly impact the overall extent of flooding on this site. Any future development within this site will likely require a detailed stormwater management plan and flood impact assessment to consider the flood risk in relation to the Victorian Floodplain Management Guidelines.

6.7.1 Updated Flood Mapping

6.7.1.1 15 Avalon Road, Lara

Updated flood mapping was completed based on the submission for 15 Avalon Road, Lara.

It was noted in the submission that culverts under the Princess Highway adjacent to the property may have been input into the model using an unreliable data source. The applicant provided onsite observations of culvert sizes at two specific locations. A comparison of the culverts sizes adopted in the Lara flood study and those observed onsite are shown in Table below.

Culvert Location	Original Model	Updated Model
North-eastern Culverts – East	4 x 1.2m x 1.8m	2 x 0.45m x 1.2m
North-eastern Culverts – Central	2 x 0.45m x 1.5m	2 x 0.9m x 2.1m
North–eastern Culverts - Western	2 x 1.2m x 2.1m	4 x 0.9m x 2.1m
Southern Culverts - Main	2 x 1.8m x 2.4m	1 x 0.45m x 0.9m*

In order to assess the likely change to flooding depth and extent across the subject property in consideration of the observed culvert sizes the model was rerun. An assessment of the critical durations at the location of interest was undertaken. This confirmed that the 48hr and 18hr storm durations were critical for the 1% AEP at this location.

Additional queries were raised in the submission regarding the resolution of the model in relation to its ability to pick up the capacity of the farm drainage onsite. The Lara Flood Study model used a model grid of 4 metres, which means that it is possible that the coarse catchment modelling has not effectively picked up the finer detail of the farm drainage in this location.

In the updated modelling and in order to respond to this the model was rerun with Sub Grid Sampling (SGS) at 1m resolution. This ensured that the available flow area within the drains was more adequately represented.

The maximum flood depth results of the updated model have been compared to the previous results from the Lara Flood Study. The assessment indicated a minor change in flooding extent at the location of the northern crossing. Under both scenarios the Princes Highway is overtopped in the 1% AEP flood event. Whilst the capacity of the culverts has changed this has resulted in an increase in flood levels upstream of the highway leading to an increase in water overtopping the road as shown in Figure 6-28. Flood Levels upstream and downstream of the highway adjacent to the norther culverts are shown in the Table below:

Table 1 1% AEP Flood Levels Upstream and Downstream of Princess Hwy Culverts (15 Avalon Rd, Lara)

	Lara Flood Study 1%, 48hr AEP Flood Level (m AHD)	Updated Modelling 1%, 48hr AEP Flood Level (m AHD)
Upstream – Northern Culverts	9.45	9.48
Downstream – Northern Culverts	8.88	8.86

A difference plot of the depth variation between these two scenarios is shown in Figure 6-29.

The results indicate a more notable reduction in the extent of inundation associated with reduced flow through the southern culvert. Whilst the modelling did adjust the geometry of the southern culverts at this location there is questions in relation to whether there are 2 strings of culverts at this location. Whilst it is noted that as part of the onsite inspection only one opening of the culvert is visible, and it is also acknowledged that these culverts were not physically surveyed available information does indicate the possible presence of two culverts side by side.

The evidence that these may exists includes plans provided by VicRoads and google earth imagery which shown alignment of access pits along the assumed alignment of 2 potential culvert strings. As shown below.

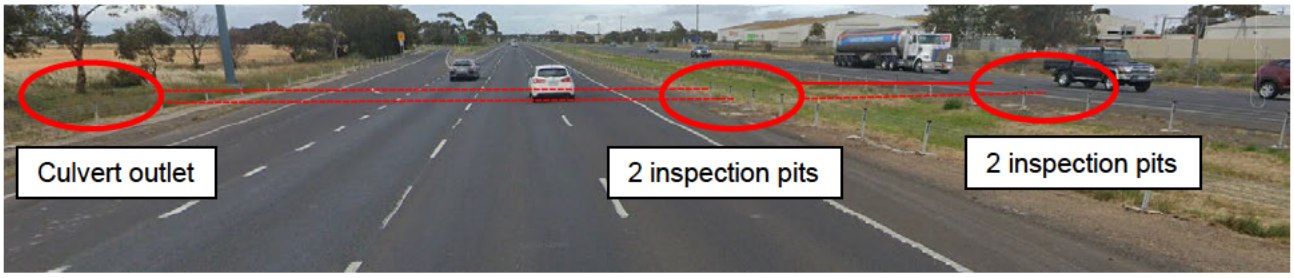


Figure 27 Location of Princess Hwy Culverts (Southern Culverts – 15 Avalon Rd, Lara)



Figure 28 Princess Highway at culvert location showing side by side inspection pits

The flooding extent within the property at the location of the northern culverts is very similar to that previously modelled. It is noted that the flood levels have changed slightly onsite, however this has not resulted in any meaningful difference in the extent of inundation.

Having regard to the above it is recommended that the **flood overlays at this location are applied as exhibited**. The flooding extent at the location of the northern culverts has been shown to be consistent with previous modelling furthermore modelling results of the southern culvert whilst slightly request still shown an extent similar to that exhibited (LSIO) with remaining questions regarding the likely existence of a single or double string which is shown to reduce the flow across the highway at this location.

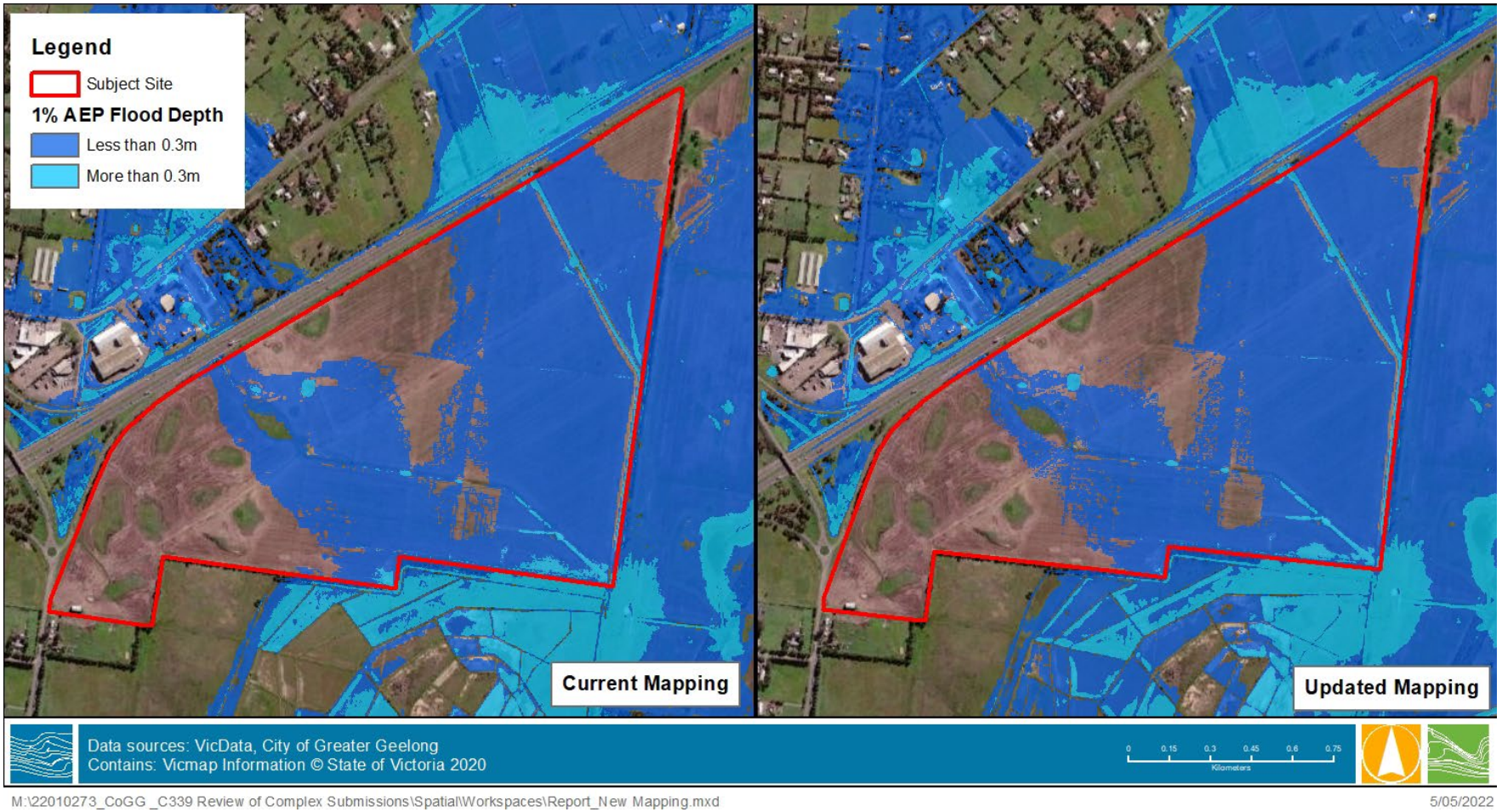


Figure 29 1% AEP Flood extent comparison

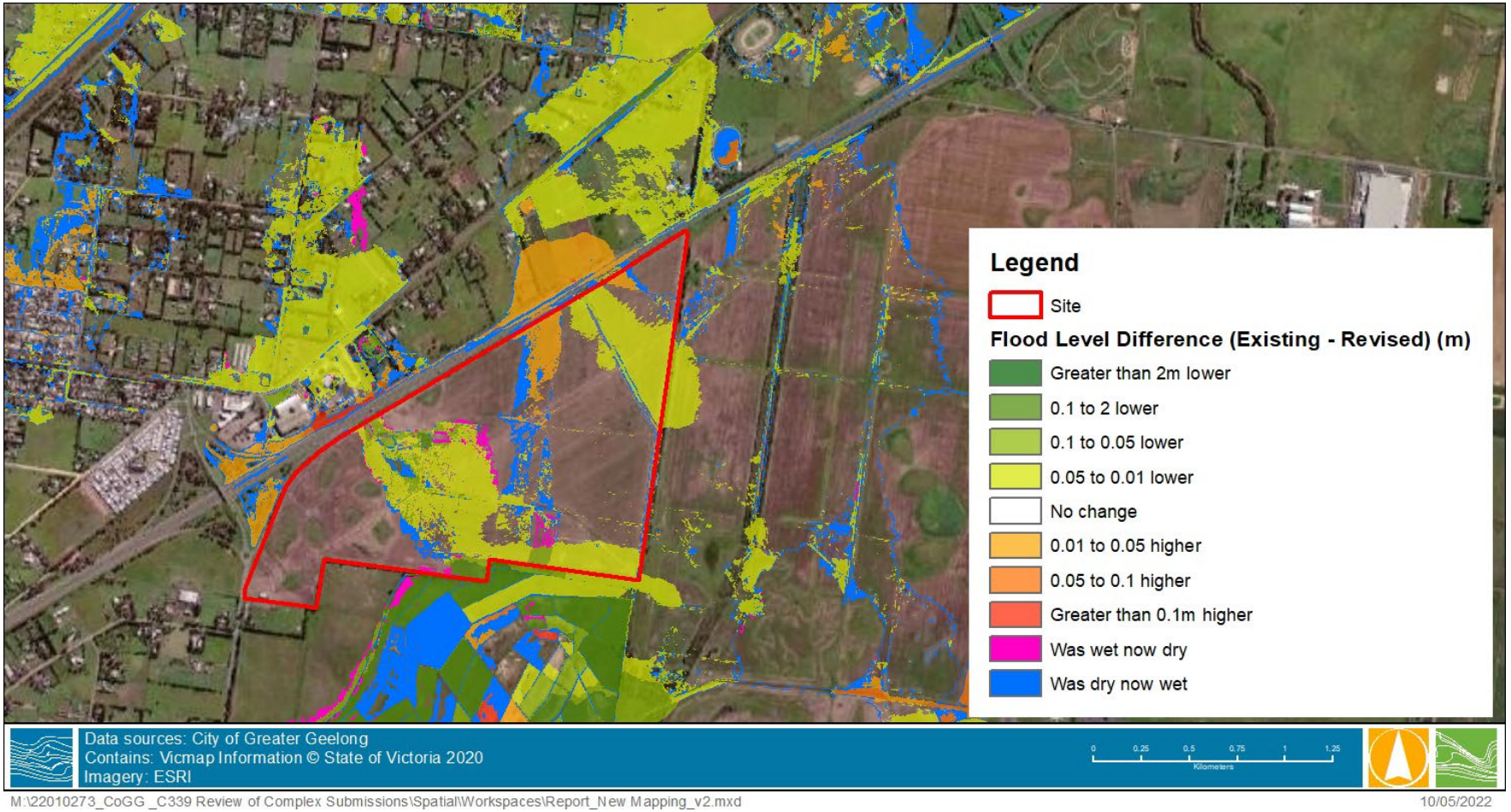


Figure 30 Flood Level Difference (1% AEP 48hr) Existing vs Revised

6.7.2 1-43 & 45 Beach Road, Avalon

In accordance with feedback provided in the submission received for the property at 1-43 and 45 Beach Road, concerns were raised in relation to how inflows had been included at this location with an inflow shown on the Old Melbourne Road adjacent to the property. This inflow was previously placed over the road subsequently showing water over the road at this location, giving the impression of overtopping. Further to the above the submission raised questions in relation to the recognition of onsite drainage.

In order to respond to the concerns raised in the submission, additional modelling was undertaken for the site which included the following changes:

- Relocation of existing inflow boundary (SA) from on top of the Old Melbourne Road to immediately downstream of the highway. This movement of this inflow boundary is in line with the catchment delineation assessment undertaken as part of the Lara Flood Study RORB modelling which covers this location. The comparative locations of these inflows are shown in Figure 31.
- Model in TUFLOW HPC with Sub Grid Sampling at 1 meter grid resolution which allows for greater representation of narrower channels and capacity within the rural drainage network and storages onsite.

The model was rerun for the critical storms impacted this area. The critical storm event varies across the property at 1-43 and 45 Beach Road, Lara with the 48hr and 2hr critical durations considered key to the maximum flood extent at this location.

The results of the revised flood mapping are shown in Figure 31. The flood depth results indicate an increase in the flooding extent onsite associated with the changes to the model. The flooding extent has increased within the northern portion of the site adjacent to Old Melbourne Road. Flooding depths within this area of increased extent are between 1-3 cm. This is predominantly associated with the inflow now being located on the downstream side of the Old Melbourne Road culverts which is inputting more water into the model immediately upstream of the site.

It is important to note that the inflow was not included in the model upstream of the Old Melbourne Road culverts as the catchment area on which this inflow is based is largely on the eastern side of the road.

Based on the results of the revised mapping indicating an increase in flooding extent with very shallow depths it is recommended that the **flood overlays at this location are applied as exhibited**.

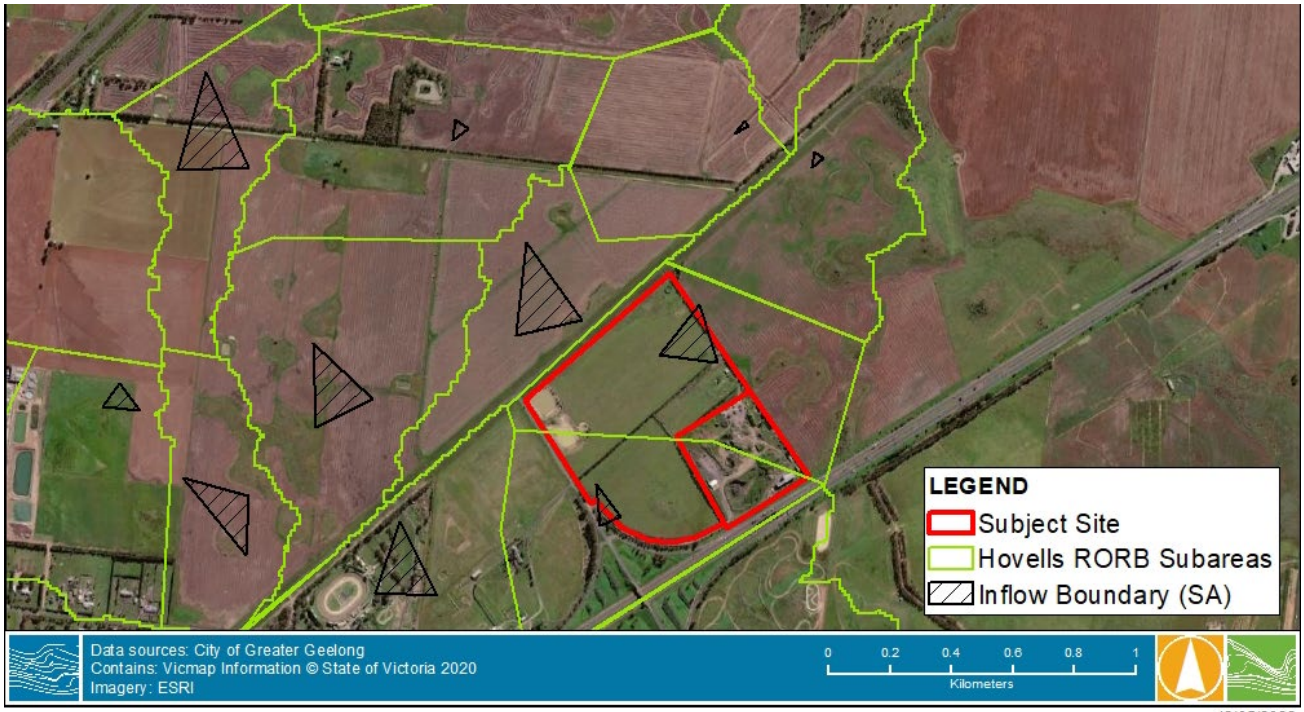
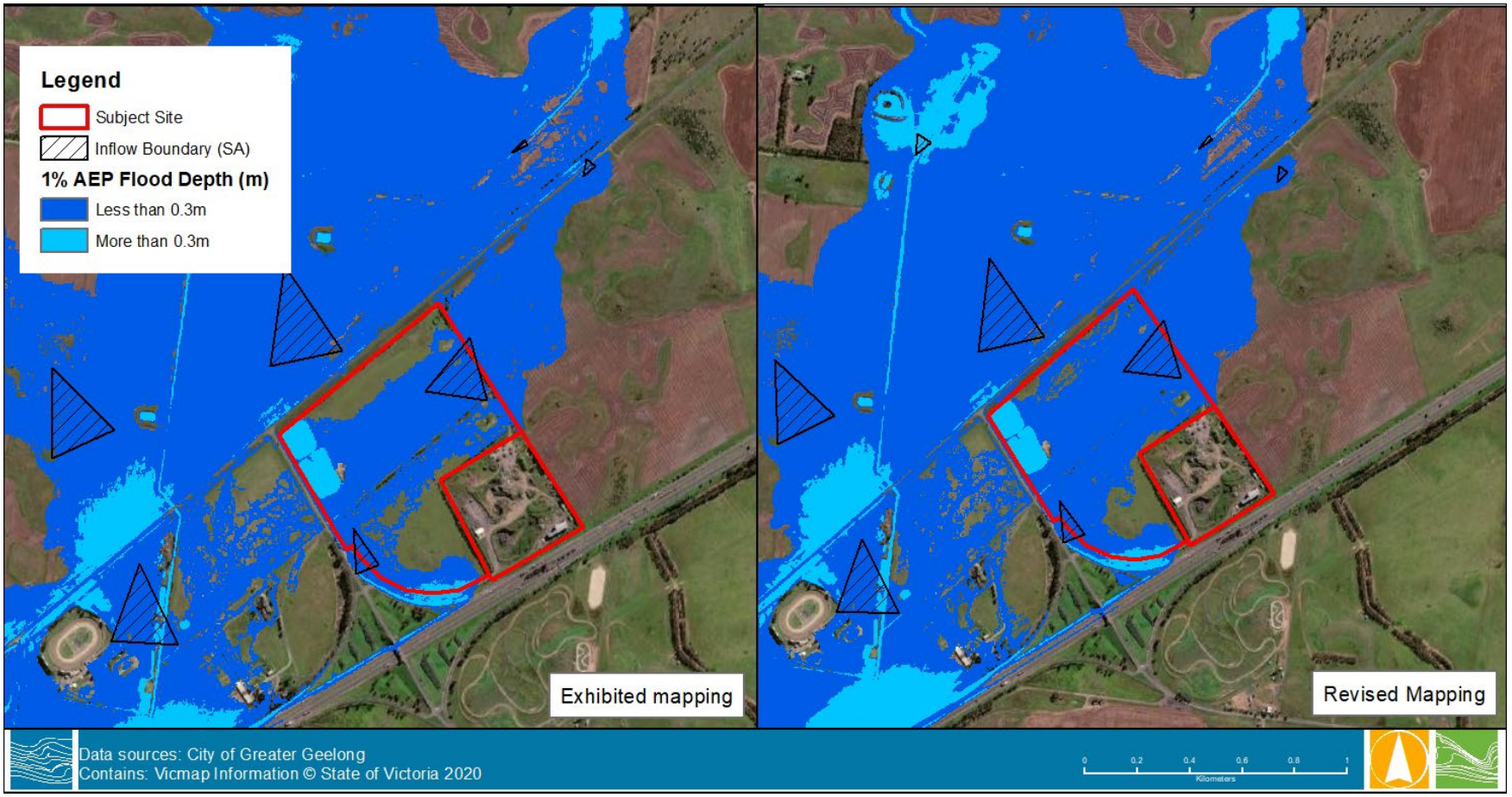


Figure 31 Sub Catchment and Inflow Locations



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Figure 32 1% AEP Flood extent comparison and boundary locations

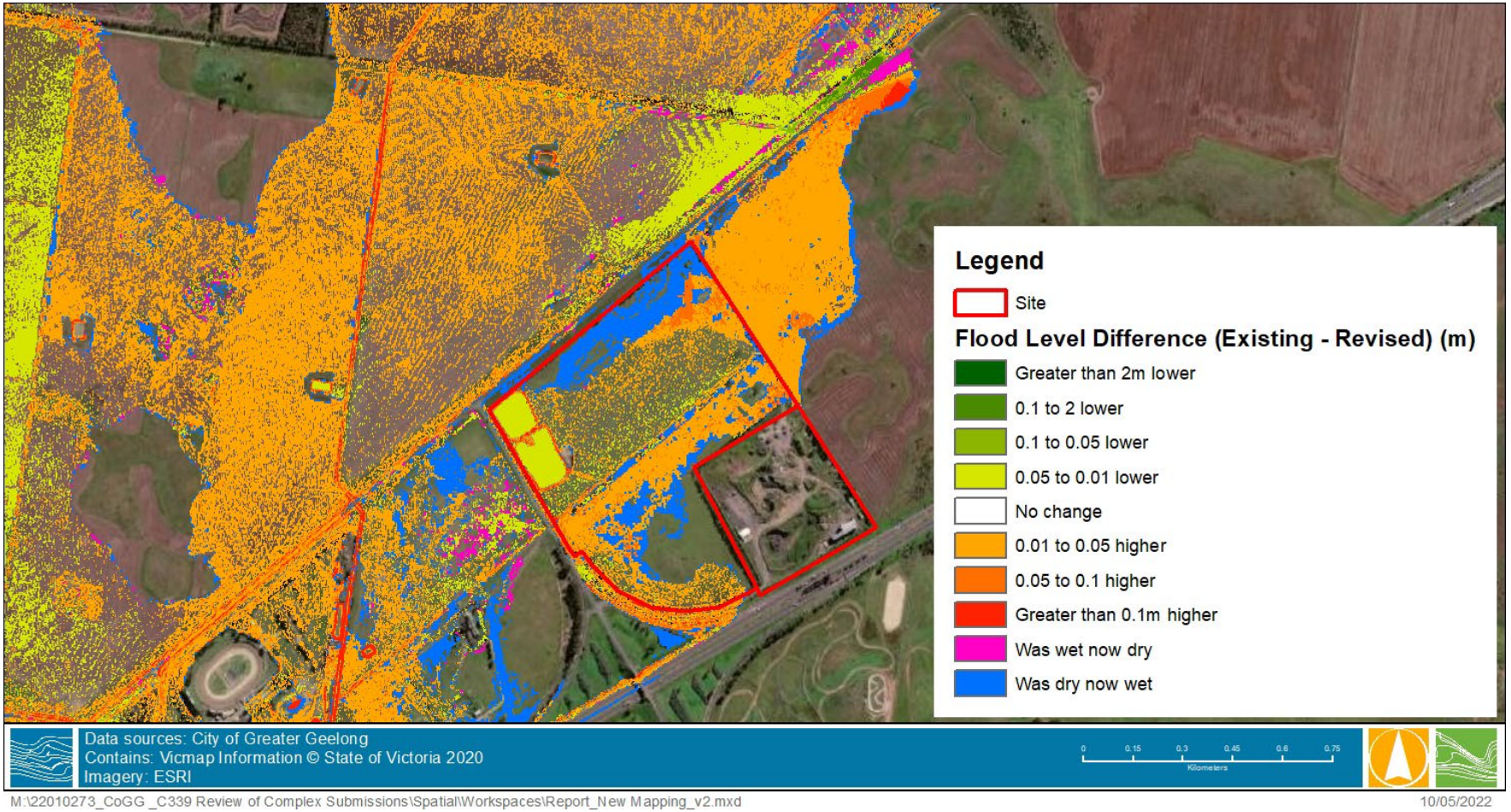


Figure 33 Flood Level Difference (1% AEP Combined 2hr and 48hr) Existing vs Revised

6.8 Submission 283

The Lovely Banks Development Group provided a submission supporting the submission and the technical investigation however to also exclude the proposed overlays within the Northern Growth Area (NGA). The submission also had several suggestions to investigate flow diversion and explore mitigation options to reduce flooding. The key issue raised by the Lovely Banks Group in relation to Amendment C339 is shown below:

"The LSIO changes in the Northern Growth Area not proceed through Amendment C339 and instead be adjusted when the Elcho Road East PSP is incorporated into the Planning Scheme."

While it is understood that Lovely Banks are undertaking significant planning works in relation to the future development of their site, it should not be expected to preclude the exhibited overlays from being included within the current amendment. The Elcho Road PSP work is relatively high level and would not likely provide the 'best available' flood information for the current conditions. There are a number of existing properties within the NGA that have been identified as being at risk from flooding (Figure 25). Exclusion of the NGA and these properties could leave the City liable by not providing the most up to date and 'best available' flood information as part of the amendment.

As timelines for the NGA works have not been finalised and considerable design work still to be completed it is recommended that proposed overlays are excluded for this area with Amendment C339. Future adjustments to flood overlays associated with PSP investigations could be implemented at a later date as separate amendments.

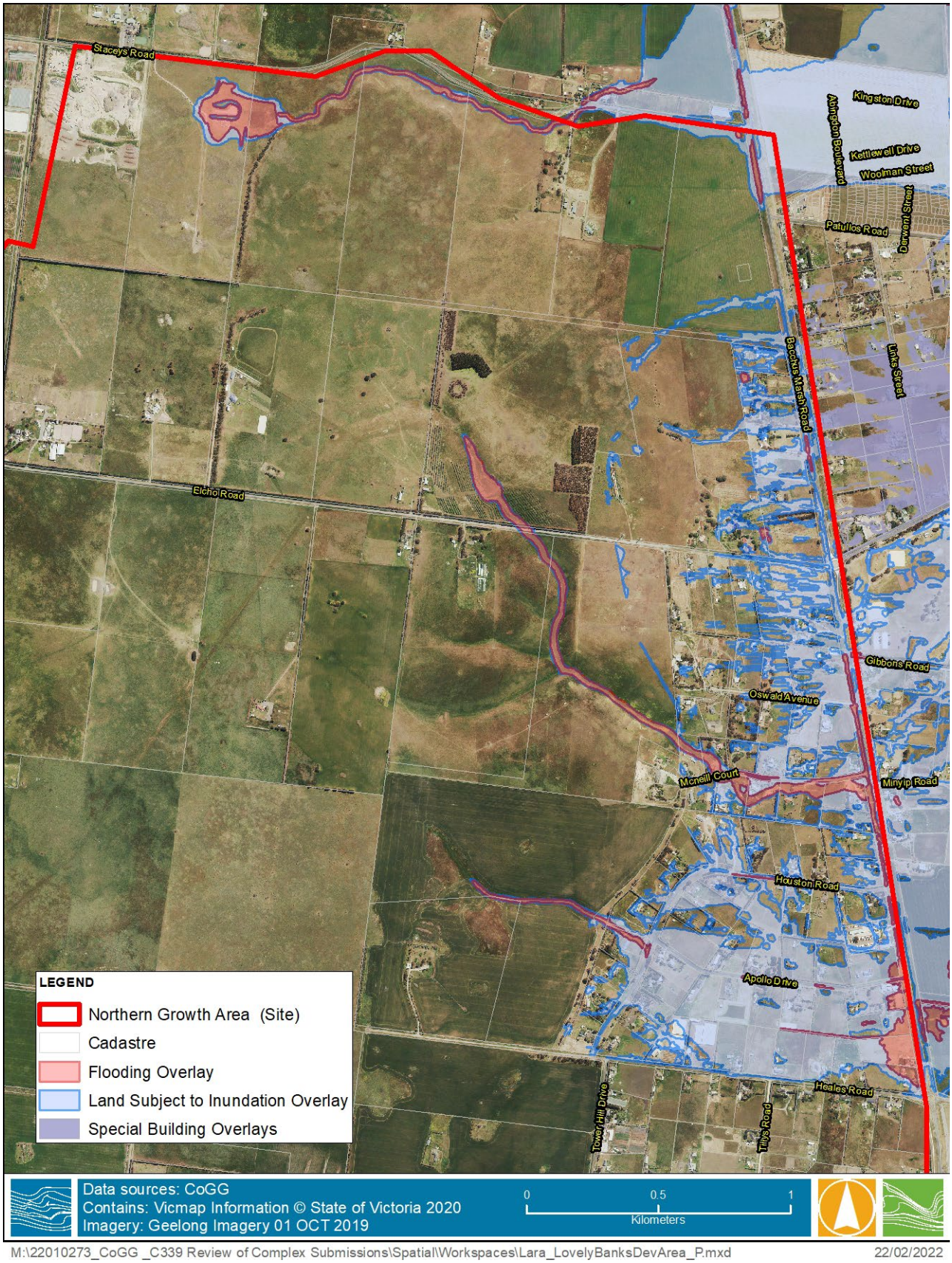


Figure 34 Properties within NGA with Exhibited Overlays

7 SUMMARY

7.1 Fyansford

The information on which the Lower Barwon and Lower Moorabool Flood Study was collected in January 2017. At this time the areas around Fyansford were under construction. Since this time these works have been completed which include filling to achieve flood protection. The works within both the Gen Fyansford and Heights estates protect new residential lots from inundation during the 1% AEP riverine flood event, as such it is recommended that these properties now be excluded from the planning scheme amendment, and the exhibited flood related overlays be clipped to the filled development areas. The subject properties include:

- Heights Estate
- 32 Monier Way, Fyansford
- 31-33 Salisbury

The property at 12-15 The Parade Fyansford is recommended to remain within the extent. The limit of the flood protection works within Fyansford do not extend to the property and as such given the low ground levels within the property and adjacent road the area is likely to be inundated during the 1% AEP flood event.

7.2 Lara West Precinct

Due to previous planning permit conditions, additional information and significant changes to land form and drainage infrastructure, it is recommended that the properties identified in this area in relation to submission 296, 510, 468, 297, 198, 230, 448, 449, 457, 474, 552 (listed below) are excluded from the planning scheme amendment.

- 6 Floret Drive, Lara
- 28 Moonah Circuit, Lara
- 22-26 Moonah Circuit, Lara
- 69 Callistemon Circuit, Lara
- 29 Cademce Ave, Lara
- 30-34 Moonah Circuit, Lara
- 205-545 O'Hallorans Road, Lara
- 285 Patullos Road, Lara
- 545 Windermere Road, Lara
- 385 Windemere Road (Lara Lakes Estate)
- 43-55 & 60 Manzeene Avenue (Applegum Subdivision)

It may be prudent to maintain the above properties within the land liable to flooding until further flood modelling is completed as part of the Hovells Creek Stormwater Management Plan project.

7.3 Lara Lakes and Lara Central Estate

Due to previous planning permit conditions, additional information and significant changes to land from and drainage infrastructure, it is recommended that the properties identified in this area in relation to submission 296 (listed below) are excluded from the planning scheme amendment.

- 130-150 Forest Rd South (Lara Views Estate)
- 21 Caddys Road, 131 Flinders Avenue & 135 Flinders Lane (Lara Central Estate)

It may be prudent to maintain the above properties within the land liable to flooding until further flood modelling is completed as part of the Hovells Creek Stormwater Management Plan project.

7.4 Avalon

The response to submissions in the Avalon area relates to the following properties:

- 1425 Princes Freeway (1-43 Beach Road) and 1475 Princes Freeway (45 Beach Road)
- 15 Avalon Road
- 255-275 Avalon Road

It is noted that the Lara Flood Study was undertaken at a regional scale and there are limitations within the model setup and methodology that may have impacts on individual property results and localised flood behaviour. In light of the submission provided, a review of topography data, hydrology catchment delineation and the hydraulic model inflow boundaries was undertaken.

Upon review of the information provided within the following submissions, it appears reasonable to reconsider the application of the overlays in their current form based upon the information provided. It appears the boundary inflow locations within the hydraulic model may be providing an over-representation of flooding within the site.

It is recommended sensitivity analysis be undertaken for the 1 % AEP 48-hour storm to:

- Refine the inflow boundary location for the site within submission 117
- Ensure the best available data (culvert sizes) are included in the hydraulic model
- Sub-grid sampling be employed within the model to reflect the narrow drain ensuring that drainage capacity reflects what is on the ground.

7.5 Northern Growth Area

The Northern Growth Area submission to exclude the site from the current Amendment would exclude a number of existing dwellings from being identified as within a flood prone area. It is recommended that the area be excluded at this time.



Figure 35 Proposed changes to exhibited overlays – Parade, Fyansford



Figure 36 Proposed changes to exhibited overlays – The Heights, Fyansford

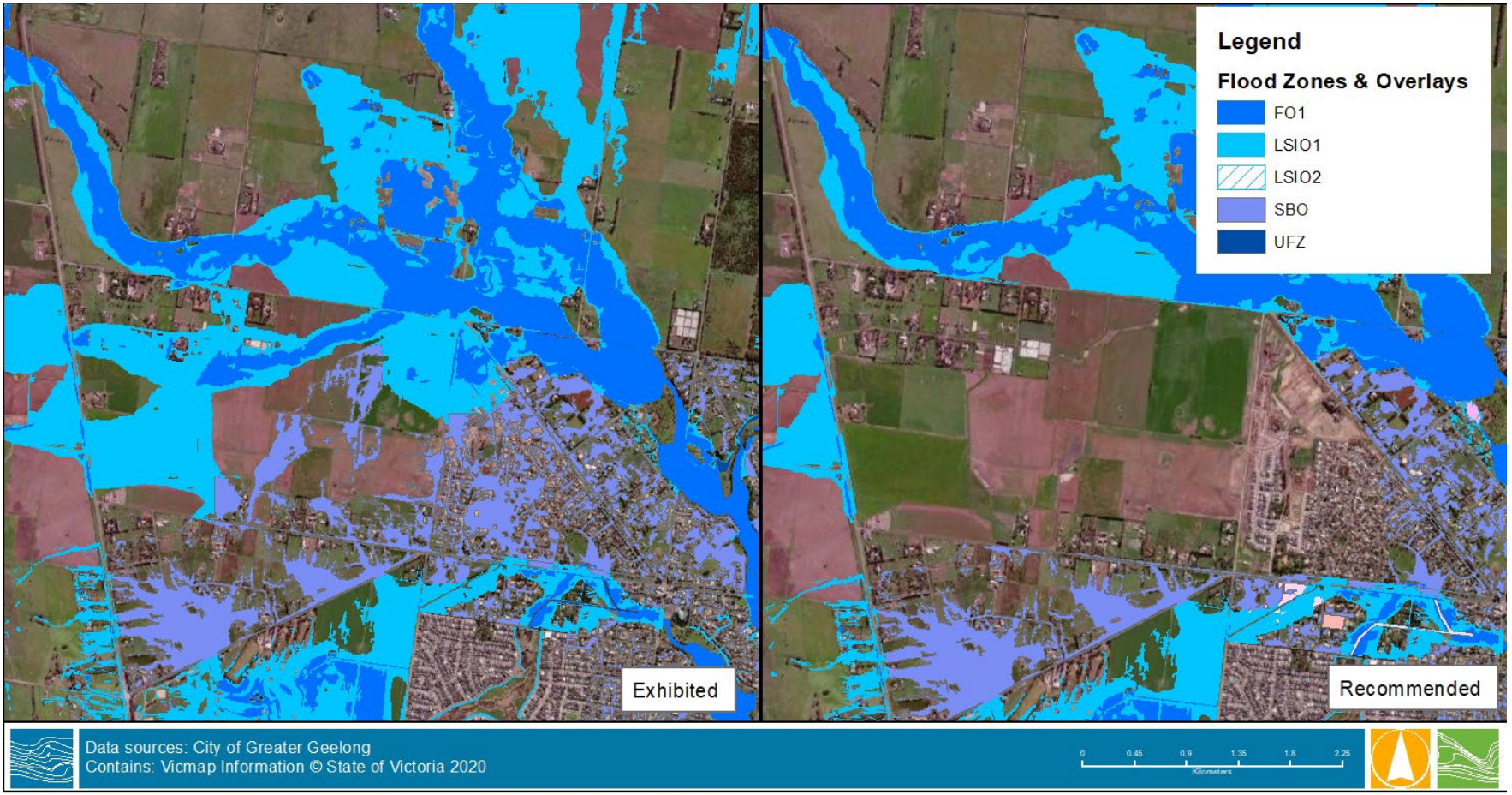


Figure 37 Proposed changes to exhibited overlays – Lara West



Figure 38 Proposed changes to exhibited overlays – Lara View



Figure 39 Proposed changes to exhibited overlays – Lara Central Estate

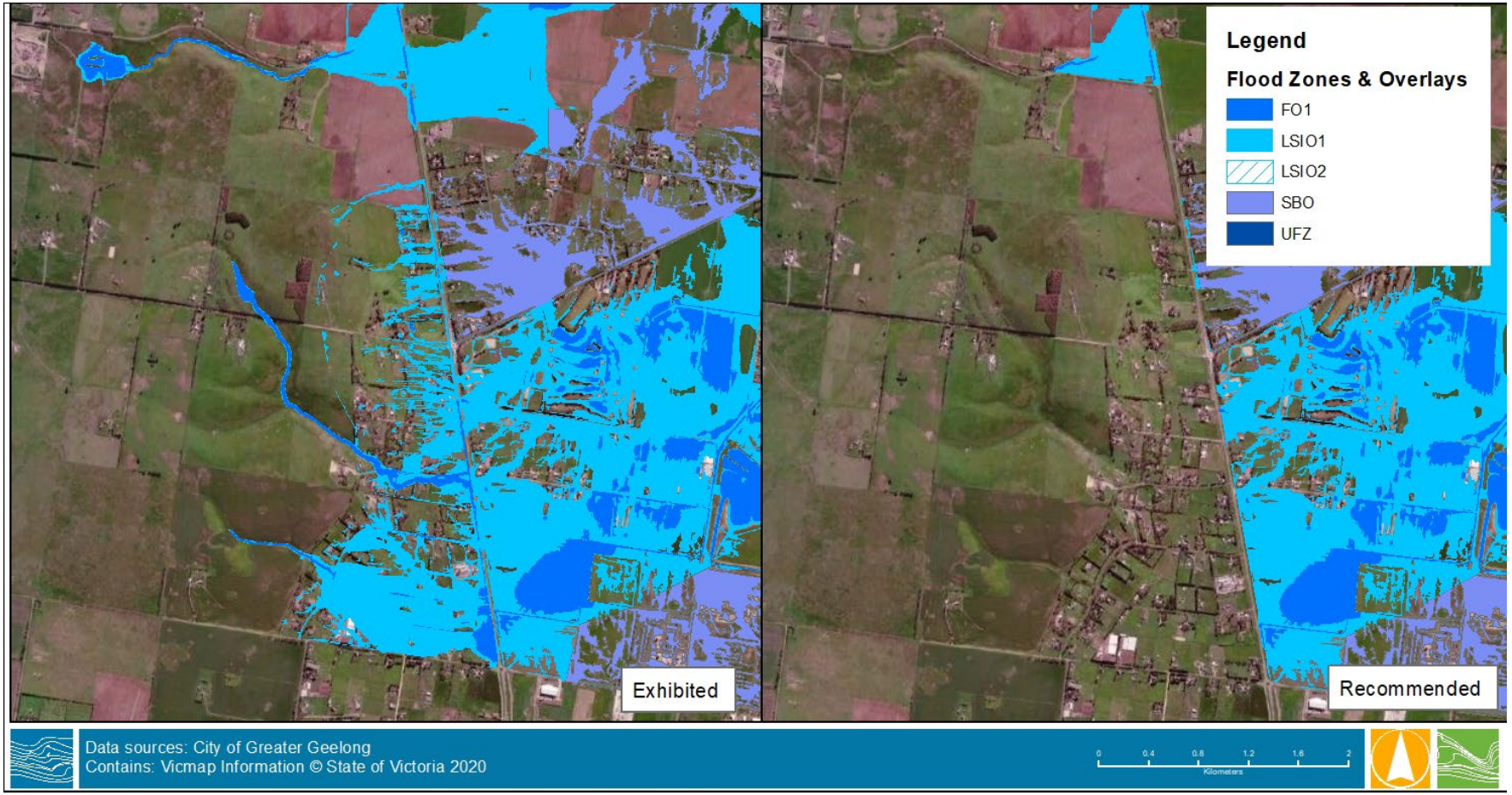


Figure 40 Proposed changes to exhibited overlays – Northern Growth Area