Planning and Environment Act 1987

Panel Report

Greater Geelong Planning Scheme Amendment C335

Highton, Belmont and Wandana Heights Special Building Overlay

1 August 2016

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Planning and Environment Act 1987

Panel Report pursuant to Section 25 of the Act

Greater Geelong Planning Scheme Amendment C335

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Trevor McCullough, Chair

Contents

List of Abbreviations

AEP	Annual Exceedance Probability
CoGG	City of Greater Geelong
DELWP	Department of Environment, Land, Water and Planning
DEM	Digital Elevation Model
DTM	Digital Terrain Model
GIS	Graphical Information System
LiDAR	Light Detection and Ranging
LPPF	Local Planning Policy Framework
MSS	Municipal Strategic Statement
SBO	Special Building Overlay
SPPF	State Planning Policy Framework
VPP	Victoria Planning Provisions

Overview

Amendment Summary	
The Amendment	Greater Geelong Planning Scheme Amendment C335
Common Name	Highton, Belmont and Wandana Heights Special Building Overlay
Subject Site	The Amendment applies the Special Building Overlay (SBO) in parts of the Kardinia Creek catchment generally located in Highton, Belmont and Wandana Heights
Planning Authority	Greater Geelong City Council
Exhibition	Between 27 August and 28 September 2015
Submissions	A total of 62 submissions were received as listed in Appendix A

Panel Process	
The Panel	Trevor McCullough
Directions Hearing	Geelong, 7 June 2016
Panel Hearing	Geelong, 14 July 2016
Site Inspections	Unaccompanied, 7 June and 14 July 2016
Appearances	The following submitters presented at the Hearing: • Greater Geelong City Council represented by Mr Barry Gough and Mr Richard Wojnarowski and calling expert evidence from Mr Joel Leister of BMT WBM Pty Ltd on flood modelling • Mr Donald Moore and Mr Lawrie Miller • Mr Robin Cawsey • Ms Jayne Sanders • Ms Lorraine McBride • Mr Ellis Blainey • Mr Josh Bosker
Date of this Report	1 August 2016

Executive Summary

(i) Summary

Amendment C335 to the Greater Geelong Planning Scheme applies the Special Building Overlay (SBO) in parts of the Kardinia Creek catchment generally located in Highton, Belmont and Wandana Heights.

Council submitted that the Amendment is required to ensure the nature and extent of flood risk is disclosed to potential purchasers of affected properties on any Planning Certificate issued by Council and through a Section 32 Statement at the time of purchase.

Council submitted that, throughout the catchment, many of the natural flow paths have been rendered ineffective due to the presence of urban development along and within the overland flow paths. Consequently, floodwaters have been noted to build up behind road formations and within road reserves. The existing drainage network is generally undersized and therefore contributes to localised stormwater flooding.

Submissions opposing the Amendment raised the following key issues:

- The accuracy of the flood modelling was challenged.
- The flood impact on individual properties was challenged.
- Historical observations by some landowners that properties had never flooded.
- The topography of the land means that flood waters cannot remain on the property.
- Recently completed drainage works have altered stormwater flow paths.
- Impact of the overlay on property values and insurance costs.

The Panel considered all written and verbal submissions and evidence presented, and has concluded that the SBO is an appropriate planning tool to apply and that the flood mapping methodology is sound and 'fit for purpose'.

In relation to the issues raised by submitters and individual properties, the Panel considered all submissions and evidence, and inspected many of the submitter's properties, and has concluded:

- In light of the further modelling undertaken following the exhibition of the Amendment, the properties as shown in Appendix C should be removed from the SBO.
- Historical or anecdotal accounts of properties never flooding should not be taken as necessarily meaning that properties will not be flooded in the future.
- The Panel accepts the Council adopted modelling of overland flow paths as a reasonable basis for the SBO.
- The approach taken by Council to removing properties that meet Council's criteria from the SBO is appropriate. Application of the SBO to all other properties that do not meet these criteria is supported.
- No evidence was provided to support claims of impacts on property values or insurance premiums. In any case these are not matters that should impact the decision to apply the overlay.

In summary the Panel finds that the proposed Amendment is sound planning, has a net community benefit and should be supported.

(ii) Recommendation

The Panel recommends that Amendment C335 to the Greater Geelong Planning Scheme be adopted as exhibited subject to the removal of the areas as shown in Appendix C of this report.

1 The proposal

1.1 The Amendment

The Amendment applies the Special Building Overlay (SBO) to land at Highton, Wandana Heights and Belmont that has been identified in the adopted Highton Drainage/Flood Study prepared by BMT WBM Consultants on behalf of Council as being:

- subject to natural overland flows in the event of a storm exceeding the design capacity of the underground drainage system
- liable to inundation from an open watercourse during a severe storm of 1 in 100 year intensity
- subject to poor surface drainage.

The area proposed to be affected by the Amendment is shown in Appendix B to this report.

The catchment is located predominantly within the Geelong suburb of Highton, approximately four kilometres south west of Geelong's CBD and on the south side of the Barwon River. The catchment drains approximately 1,050 hectares of mainly urbanised land via overland flow paths and a series of retarding basins into the Barwon River.

1.2 Background

Council advised that, over the past 10 to 15 years, it has undertaken and adopted a number of flood studies of discrete catchments located within the City. Five previous studies were introduced to the Planning Scheme and this Amendment seeks to extend the coverage of the Special Building Overlay (SBO) to reflect the findings of the most recent Council studies.

Council submitted that application of the SBO ensures that the nature and extent of flood risk is disclosed to potential purchasers of affected properties on any Planning Certificate issued by Council and through the a statement issued under section 32 of the *Sale of Land Act* 1962 (Vic), at the time of purchase.

Council submitted that, throughout the catchment, many of the natural flow paths have been rendered ineffective due to the presence of urban development along and within the overland flow paths. Consequently, floodwaters have been noted to build-up behind road formations and within road reserves.

The existing drainage network is generally undersized and therefore contributes to localised stormwater flooding. Like many drainage systems in areas of a similar age, Highton's drainage network has been designed to outdated standards and has a limited capacity for the catchment it is draining. The Kardinia Creek catchment is drained by a series of underground pipes and overland flow paths. Eleven retarding basins have also been constructed within the catchment to help alleviate local flooding issues.

The recent adoption of the *Highton Drainage and Flood Study* by Council resulted in the land to which it applies being identified as 'flood prone' land. The provisions of the Building Act specify minimum floor level requirements identical to those of the SBO, however Council submitted that the absence of an SBO over the land deprives the community of a transparent mechanism to identify land affected by flooding / inundation. The Amendment introduces such a mechanism in the form of SBO mapping, which forms part of the planning scheme, and which is required to be disclosed on a Planning Certificate and in a Section 32 Statement.

1.3 Issues dealt with in this report

The Panel considered all written submissions, as well as submissions presented to it during the Hearing. In addressing the issues raised in those submissions, the Panel has been assisted by the information provided to it as well as its observations from inspections of specific sites.

Opposing submissions raised the following key issues:

- The accuracy of the flood modelling was challenged.
- The flood impact on individual properties was challenged.
- Historical observations by some landowners that properties had never flooded.
- The topography of the land means that flood waters cannot remain on the property.
- Recently completed drainage works have altered stormwater flow paths.
- Impact of the overlay on property values and insurance costs.
- Unnecessary cost and delays caused by the need to apply for a permit.

This report deals with the issues under the following headings:

- Planning context
- Flood mapping methodology
- Issues raised in submissions.

2 Planning context

2.1 Introduction

Council provided a response to the Strategic Assessment Guidelines as part of the Explanatory Report and its submission at the Hearing.

The Panel has reviewed the policy context of the Amendment and made a brief appraisal of the relevant controls and other relevant planning strategies.

2.2 State Planning Policy Framework (SPPF)

The Panel considers the following State policy to be the most relevant to the Amendment, as summarised in Council's submission:

> *Clause 11 Settlement, which seeks to anticipate and respond to the needs of existing and future communities through provision of zoned and serviced land for housing, employment, recreation and open space, commercial and community facilities and infrastructure.*
>
> *Planning for urban growth and development in Belmont, Highton and Wandana Heights has over time considered opportunities for the consolidation, redevelopment and intensification of existing urban areas and the limits of land capability and natural hazards and environmental quality. This has included the recent re-zoning of land in the immediate vicinity of the Highton Shopping Centre as Residential Growth Zone, Schedule 2. The application of the SBO is consistent with the long term implementation of planning controls in these localities.*
>
> *Clause 13 Environmental Risks, which seeks to identify and manage the potential for the environment, and environmental changes, to impact upon the economic, environmental or social well-being of society.*
>
> *Management of drainage and flooding has been taken into account by identifying land affected by flooding, including floodway areas, as verified by the relevant floodplain management authority, in planning scheme maps. This amendment applies an SBO to relevant land in order to better indicate necessary adjustments brought about by new urban development and changes to land use.*

2.3 Local Planning Policy Framework (LPPF)

Council submitted that the Amendment implements the Municipal Strategic Statement (MSS) with particular reference to Clause 21.05 Natural Environment. In particular, the Amendment is consistent with the second of the identified objectives of Clause 21.05-7 Flooding, being:

- *To minimise the potential for damage and risks to public safety and property from flooding.*

In addition, Council submitted that the Amendment implements each of the three related strategies:

- *Ensure that land use and development is compatible with flood prone land.*

- *Discourage land use and development in floodplains where flood function may be impaired.*
- *Recognise flood hazards associated with waterways and ensure the free passage of water whilst protecting development from flooding impacts.*

2.4 Other planning strategies, policies or reports used in formulating the Amendment

The mapping of the SBO relies heavily on the work contained in the *Highton Drainage/Flood Study Final Report BMT WBM May 2014*.

The methodology contained in that report is discussed in more detail in Chapter 3.

2.5 Planning scheme provisions

(i) Zones

The land in the catchment is primarily in the General Residential Zone, with some areas affected by the SBO in the Residential Growth Zone. There are no changes to zones proposed as part of this Amendment.

(ii) Overlays

The Amendment applies the Special Building Overlay (SBO). The purpose of the SBO is:

> *To implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.*
>
> *To identify land in urban areas liable to inundation by overland flows from the urban drainage system as determined by, or in consultation with, the floodplain management authority.*
>
> *To ensure that development maintains the free passage and temporary storage of floodwaters, minimises flood damage, is compatible with the flood hazard and local drainage conditions and will not cause any significant rise in flood level or flow velocity.*
>
> *To protect water quality in accordance with the provisions of relevant State Environment Protection Policies, particularly in accordance with Clauses 33 and 35 of the State Environment Protection Policy (Waters of Victoria).*

The overlay sets out permit exemptions for certain types of buildings and works. A schedule to the overlay can specify further exemptions. No schedule is proposed under this Amendment.

2.6 Ministerial Directions and Practice Notes

(i) Ministerial Directions

Council submitted that the Amendment is consistent with:

- Ministerial Direction 11 (Strategic Assessment of Amendments)
- The Ministerial Direction on the Form and Content of Planning Schemes under Section 7(5) of the Act.

(ii) Planning Practice Notes

Council submitted that the Amendment uses the most appropriate VPP tool and is consistent with Planning Practice Note 12 *Applying the Flood Provisions in Planning Schemes* (June 2015).

In particular, the Practice Note identifies the Special Building Overlay as the appropriate tool to apply in circumstances where relatively shallow overland flows occur in urban areas during rainfall events of an intensity which exceeds the capacity of the established drainage infrastructure.

2.7 Conclusion

The Panel is satisfied that the Amendment has been prepared in accordance with the relevant Ministerial Directions and Planning Practice Note. The Panel agrees that the SBO is the appropriate planning tool to implement the proposed controls.

The Panel is satisfied that the implementation of the SBO is consistent with state and local sections of the planning scheme. Subject to assessing the methodology adopted for the flood mapping and the site specific issues identified in the following chapters, the Panel concludes that the Amendment should be supported.

3 Flood mapping methodology

3.1 The issue

Is the flood mapping methodology that has been used as a basis for the SBO sound and 'fit for purpose'?

3.2 Overview of the flood mapping methodology

The SBO is based on flood mapping carried out by BMT WBM and reported in the *Highton Drainage/Flood Study Final Report May 2014*. The report has been adopted by Council. The Executive Summary of the report provides a useful overview of the study methodology:

> *The study was carried out under the following core elements.*
>
> 1. *Preliminary Tasks – These were project initiation, including an inception meeting and initial site inspection, along with a data collation and review exercise. The data collation and review phase included an analysis of previous drainage investigations, council policy, aerial photography of the area, topography, GIS datasets, digital plans and design information.*
> 2. *Digital Terrain Model – Photogrammetry and LiDAR data of the study area was provided by the City of Greater Geelong (CoGG) and used to assist in the hydrological model development. Additional continuous elevation strings representing features of hydraulic importance (such as retarding basin crests) were sourced for use in the modelling.*
> 3. *Hydrological and Hydraulic Modelling, and Mapping of the Existing Conditions – The hydrologic and hydraulic modelling was undertaken using the traditional approach of applying flow boundaries from the hydrological model (RORB) to the two-dimensional (2D) hydraulic model (TUFLOW). The existing flood characteristics were identified through hydrologic and hydraulic modelling of the 20%, 10%, 5% and 1% Annual Exceedance Probability (AEP) flood events. The flood results were mapped using GIS. An assessment of flood damage was undertaken using the stage-damage curve approach.*
> 4. *Mitigation Option Assessment and Mapping – A wide range of potential structural and non-structural flood mitigation measures were screened, from which a shortlist of three (3) alternative flood mitigation schemes were selected to be tested using the hydraulic model. Flood damage, scheme cost and benefit-cost ratios were determined for each of the schemes tested. A 'no structural works' option was also considered.*
> 5. *Selection and Detailed Mapping of the Preferred Mitigation Scheme – The mitigation schemes were assessed according to their ability to reduce flood damage. The schemes were ranked according to a range of economic and non-economic factors. A preferred strategy was then selected in consultation with CoGG. The preferred scheme was mapped using GIS, with hardcopy plans of flood extent and flood levels produced.*

3.3 Evidence and submissions

Council relied on the evidence of Mr Joel Lister of BMT WBM who effectively provided a review of the flood study and commentary, in response to the Panel's request, on the reliability and suitability of the modelling methodology.

Mr Lister provided evidence on whether best practice modelling and mapping was undertaken given the extent of the studies and the intended uses. He provided the following summary of the factors that affect the accuracy of the mapping:

> *The hydrological modelling approach:*
> - *the software and model schematisation;*
> - *the interpolation and extrapolation of rainfall data;*
> - *rainfall losses;*
> - *assumptions relating to fraction imperviousness within the catchment*
> - *routing - parameters and reach types.*
>
> *The hydraulic modelling approach:*
> - *the software and model schematisation;*
> - *model resolution;*
> - *hydraulic losses.*
>
> *The digital terrain model.*

He added:

> *Hydrological modelling is used to quantify the volume and flow rate of runoff from a catchment for a given rainfall event, e.g. the 1% AEP event. The hydrologic model includes the whole catchment upstream of and including the area of interest.*
>
> *The hydraulic model is used to determine the extent, depth and velocity of flooding for the runoff generated by the hydrologic model. The hydraulic model covers the extent of the area of interest, which may or may not be the entire catchment.*
>
> *The digital terrain model is a digital representation of the ground levels.*

In his evidence, Mr Lister provided commentary on the appropriateness and accuracy of each of the elements of the mapping. The detail of the hydrological and hydraulic modelling is not repeated in this report, but his evidence on the terrain modelling is shown below because some submitters did challenge that aspect of the work:

> *The digital terrain model (DTM) is a digital representation of ground levels. The DTM can also be referred to as a digital elevation model (DEM). The DTM is the basis on which the hydraulic model is built and is used to further refine the output from the hydraulic model to produce the flood maps. Therefore it is important that the DTM is reliable for the intended purpose of the study and within budgetary constraints. The DTM used in the Highton Study (for both the hydrologic analysis and the hydraulic analysis) was derived from aerial photogrammetry and LiDAR (Light Detection and Ranging) with some ground survey used ensure accurate representation of the spillways of the retarding basins. The specified vertical point accuracy of the photogrammetry was ±*

> *100 mm within one standard deviation. Ground truthing, i.e. comparing DTM levels with ground survey, was undertaken on the Highton catchments. Based on the ground survey, 100% of the points were within ± 100 mm of the LiDAR surface, whilst 94% of the points were within ± 100 mm of the photogrammetry surface.*
>
> *At the time of the Study, this was an industry standard level of accuracy, and still is, and to achieve a greater level of accuracy would have resulted in substantial increases in study costs.*
>
> *In shallow overland flooding the tolerances discussed above can result in localised discrepancies in the flood mapping, particularly along the flood fringe, or at shallow flood depths. At the lot scale this may mean that localised ground features are not recognised in the flood mapping and so the extent is not exactly as it should be for a given flood level, ie, if the detail were to be incorporated into the DTM then the flood extent may cover more or less of the property. This may also mean that some properties are identified within the 'raw' or unclipped flood extent when they should not be and vice versa. However, analysis to this level of detail is not possible with the budgetary and time constraints available to Council and it is considered that the adopted practices and tolerances are acceptable. In circumstances where there is only minor incursion of the flood extent onto a property, the consequences to a land owner will generally not be significant if there is consideration of redevelopment. If a proposed building redevelopment does not fall within the SBO then there are no constraints on the development with regards to flooding except for the requirement of the Building Regulations (if the property is designated under the Building Regulations).*

In summary Mr Lister concluded:

> *The review has found that the modelling and mapping was undertaken using best practice at the time the Study was undertaken and that the flood mapping is fit for purpose.*

Several submitters, including Ms Sanders and Mr Blainey, questioned how the model took into account physical features such as retaining walls, buildings and driveways. Mr Lister explained that detailed features were not modelled but that a broad coefficient of roughness was included in the model appropriate to an urban area. Ms Sanders and Mr Blainey submitted that more detailed site inspections should be undertaken to take into account on ground physical features. Mr Lister gave evidence that it is not practical to do such detailed mapping on a site by site basis, and that in any case site features can change. He gave evidence that the modelling, despite some possible localised inaccuracies, was appropriate for the broad mapping of flood affected properties and the application of the SBO.

Other submitters raised the need for further site inspections to verify the topography. Council responded that each of the submitter's properties was reviewed, but site inspections were not carried out at all properties.

A number of submitters raised concerns about the accuracy of the topographical mapping. In particular, Mr Blainey submitted that Mr Lister's evidence that "*Calibration was not*

possible in the Highton catchment because of lack of data" and "*this may mean that some properties were identified … when they should not be or vice versa*" generate some doubt about the veracity of the flood mapping.

The hydrological and hydraulic modelling methodology was not challenged in any submission and no contrary evidence was provided to the Panel.

Council acknowledged the inherent inaccuracies associated with mapping flood behaviour over such a broad area, but submitted that it is better to err on the side of caution and implement the overlay rather than run the risk of significant flood damage to properties through poor planning.

3.4 Discussion

The Panel accepts the evidence of Mr Lister that the flood mapping methodology is sound and fit for purpose. The methodology is similar to that used for other flood controls in Greater Geelong and in other municipalities that have introduced flood controls. The Panel accepts that the flood modelling and topographical mapping has been done utilising best practice methods and that the resulting mapping is appropriate for the purpose of introducing an SBO.

Council and Mr Lister both acknowledged that there is some degree of inherent inaccuracy in the modelling when undertaken on such a broad scale.

The Panel acknowledges that the SBO is in some ways a very blunt instrument and that means it may not always accurately identify the extent of flooding that may ultimately be experienced. The Panel also acknowledges, however, that it would be impractical to apply higher levels of analysis and more detailed site mapping to such an exercise. The cost and time involved in achieving a more perfect model would mean that an overlay would never be applied. The Panel therefore accepts the broad modelling approach adopted by Council.

The Panel agrees with Council's position that it is better to apply the overlay based on the best available modelling than to not apply any control because it may not present a perfect picture. The Panel notes, in any case, that the overlay does not prevent any development or works from being undertaken but rather simply introduces a permit trigger, providing the opportunity for Council to apply appropriate conditions to protect buildings and works from flood impacts. The Panel agrees that this is sound planning.

3.5 Conclusion

The Panel concludes that the flood modelling that has been used as the basis for the SBO is appropriate and fit for purpose. The Panel makes further comment about the application of that modelling in Chapter 4.

4 Issues raised in submissions

In this Chapter the Panel reviews issues raised in submissions, both in a general sense and in relation to issues raised on individual properties. The majority of submissions related to how the flood modelling has been applied to individual properties.

4.1 General issues

4.1.1 Review of submitters' properties

(i) Evidence and submissions

In response to the 62 submissions, Council officers and BMT WBM reviewed the modelling on each property and provided a written response to each. The responses provided more detailed flood maps that showed the 'clipped' flood depths (greater than 0.03 metres), the 'raw' modelled depths and a commentary on the predicted source of flooding for each property.

Post exhibition reviews of properties by Council determined that the SBO should be removed from seven properties at 1 to 6 Parkland Court and 2 The Mews. Council submitted that these properties could be removed as a result of recent drainage works in that area that is now expected to limit inundation of that area.

As part of that review, BMT WBM also provided a supplementary modelling report on 11 and 12 Summerhill Terrace and 14 Henderson Drive. These two areas were selected as Council determined that the road profiles could be more accurately modelled to reflect recent changes and that this may impact flood modelling. The review determined that four Summerhill Terrace properties should be removed from the SBO, but that 14 Henderson Drive should be retained in the SBO.

Appendix C shows all eleven properties proposed by Council to be removed from the SBO.

Mr Lister provided the following evidence in relation to the further review:

> *I have reviewed the 1% AEP mapping at each property where a submitter requested that their property be excluded from the SBO, and believe that the mapping is representative of likely flooding at those properties. Further, BMT WBM prepared a series of flood depth maps that displayed the 'raw' flood extents in addition to the trimmed flood extent proposed for the SBO.*
>
> *These maps also showed flow direction and provided a brief commentary on the source of the floodwaters to provide greater clarity to each submitter regarding the flood behaviour on their respective properties. Additionally, BMT WBM undertook some more detailed modelling (at a local scale) in response to submissions related to three properties within the catchment. This local scale modelling resulted in the removal of four properties from the SBO. I understand that Council has removed seven other properties from the SBO as a result of structural mitigation works, undertaken by Council after the Study was completed, and one property due to the miniscule encroachment of the clipped flood extent (in the order of millimetres). However, I recommend that all remaining properties are not removed from the SBO.*

In response to questions from the Panel about why the supplementary modelling had only been applied to two discrete areas and not to other areas raised in submissions, Council responded that the areas chosen were the only areas where recent works had been undertaken that were likely to alter flood paths, and no other areas justified the more detailed modelling. Council maintained that they were comfortable that the initial modelling was suitable for the remaining catchment area.

(ii) Discussion

The Panel accepts the revised modelling and reviews that have been done by Council that removes the eleven sites from the SBO. The Panel also accepts that the more detailed modelling of 14 Henderson Drive demonstrates that the land will be inundated to the extent shown and should remain in the SBO provided that it is not excluded under other criteria as discussed in section 4.2 of this report.

(iii) Conclusion

The Panel concludes that the properties as shown in Appendix C should be removed from the SBO.

4.1.2 Historical records and anecdotal information

(i) Evidence and submissions

A large number of submitters stated in their submission that they had never experienced flooding on their land, and in some cases provided supporting anecdotal submissions from neighbours, relatives or others familiar within the area that particular lots have never flooded in living memory.

Many submitters recounted particular heavy rain storm events where their land was not flooded.

Ms McBride's submission was typical of a number of submissions:

> *I have lived at my property for 20 years and have observed at times heavy rain falling for sustained periods of time, then dissipating by absorption into the sandy soil. … In my observation at no time has rain water ever stood still or pooled anywhere on my property, certainly not on the surfaces suggested by the study. It is a physical impossibility. … During the severe storm at the beginning of 2016, at no time did I see evidence of excessive run-off on grassed/natural surfaces on my property.*

Mr Moore provided his own accounts of storms in December 1978 and January 2016. He submitted that both storms were 1% AEP storms and on neither occasion did his property flood. He maintains that any overflow from stormwater pipes would be accommodated within the road profile. Mr Moore provided supporting statements from Mr Lawrence Miller (former Municipal Engineer at the Shire of South Barwon) and long time resident Mrs Woolford. Mr Miller referred to records of the 1978 event and gave an account of the drainage and mitigation works carried out by Council after that event. Council produced copies of reports prepared by the Shire of South Barwon in 1979 and 1981 which also provided an account of the December 1978 event, the drainage works that was completed in response and an account of a further storm in 1981. There was some disagreement

between Council officers and Mr Miller about what the reports were saying in relation to the extent of the 1978 event, and whether it was a 1% AEP event. In any case, Mr Miller submitted that the land around Mr Moore's property did not flood in that storm and that it should be excluded from the SBO.

Mr Cawsey provided similar submissions in relation to his property, stating that family members with long-standing knowledge of his property had never observed flooding.

Mr Lister gave the following evidence in relation to historical and anecdotal records:

> *A number of submitters indicated that their property had not been flooded in the time that they had lived there, and some of these stated that there had been some significant rainfall events during that time, including statements that there have been 1% AEP rainfall events (including most recently in January 2016). Anecdotal information such as this must to be treated with caution. For example, shallow flooding may not necessarily be considered to be flooding by the property owner.*
>
> *This information also needs to be considered in the context of the rarity of events being modelled (there may not have been such an event during the time the resident has lived in the area) and that the modelling is accounting for the ultimate development of the catchment as allowed under current zonings. With regards to reports of 1% AEP year rainfall events, these can be very localised and of a duration that is not critical for the particular catchment, i.e. is too short or too long to result in the 1% AEP flooding at the particular residence. The rainfall intensities and durations of storms producing overland flows or flash flooding within urban areas also vary with location and can only be rated with respect to AEP by having a pluviograph at the relevant location. I am not aware of any pluviographs located within the Highton catchment.*

Council submitted that, while the anecdotal reports provided by submitters are not doubted, the type of storm likely to cause flooding may never have been experienced. Council submitted that intense storms of short duration are most likely to cause flooding in the upper areas of the catchment, and it is possible that there have not been such storms in living memory. Council submitted that submitters' accounts of flooding (or lack of) from previous storms should not be regarded as evidence that flooding would not occur in future. Council reiterated that the SBO would assist in preventing damage to buildings and works in future storms.

(ii) Discussion

The Panel believes that historical records and anecdotal evidence of previous flood levels are a valid and important input into mapping of flood levels. The difficulty is that it is not always clear what flood frequency previous flood events correspond to. Claimed 1% AEP events may be lesser or greater frequency in different parts of a catchment. Historical and anecdotal records are often used to supplement modelling for river flooding, but the Panel agrees with Council's position that they are less relevant to the sort of flood modelling being undertaken in this Amendment. That is not so say that they should be discounted, rather that it is unclear what frequency of storm any historical records may relate to in the upper reaches of a catchment.

(iii) Conclusion

The Panel concludes that historical or anecdotal accounts of properties never flooding should not be taken as necessarily meaning that properties will not be flooded in the future.

4.1.3 Overland flow paths

(i) Evidence and submissions

Some submitters claimed that rain events could not possibly flood their properties in the manner shown in the modelling. A common submission was that blocks were steeply sloping and so water cannot remain on the land for any length of time. Other submitters pointed to buildings and works that had been recently completed that had changed the behaviour of overland flows on their land.

Ms Sanders provided photographs of her property showing how the site was now substantially built over. She claimed it was no longer possible for the property to be flooded in the way shown in the modelling. She submitted that, in any case, it is unlikely that she would want to do any further buildings or works on the land as it is now fully developed. She submitted that, given this, the SBO is an unnecessary burden on the property.

Mr Cawsey submitted that his property in Thornhill Drive could not be flooded as all drainage points are outside the boundaries of his property and the area slopes away from all sides of his property, except from the south. He submitted that the area shown as inundated is a particularly dry area of his garden with no evidence of inundation.

In response to submissions on this issue, Mr Lister gave evidence that the mapping needed to be understood in terms of the overland flood paths created when the drainage system overflows and when the road reserve is relied upon to carry the bulk of flood waters. His evidence was that this can lead to flow paths that might not be immediately intuitive or consistent with what had previously been experienced by local landowners. He reiterated that he had confidence in the accuracy of the modelling and the predicted flood paths.

Council acknowledged that flow paths can be altered by buildings, fences and retaining walls, but submitted that the modelling should ignore these influences as these structures could be changed over time, and it is important to ensure that the design of any new structures takes into account overland flood paths.

Mr Blainey submitted that the modelled overland flows were not possible on his property in James Cook Drive because of the existence of walls and buildings that would clearly alter the flow path. He further raised doubts about whether overland flood paths were likely to be generated from flows along the pipe easement at the rear of his property as predicted by the modelling. He questioned why his property would be affected when others that appear to be equally at risk are not.

Council submitted that the property was near the edge of the modelled area and it was possible that there may be properties that may be affected by flooding that have not been identified. They submitted that it did not diminish the likelihood of flooding on Mr Blainey's property. Council acknowledged that it would be relatively easy to mitigate flooding of lots in the vicinity of Mr Blainey's property in James Cook Drive by the formation of a diversion channel in the pipe easement. Council officers were unable to commit Council to undertaking this work, however, and submitted that the SBO should still be applied.

(ii) Discussion

The Panel accepts Council's position that the mapping of flood paths should ignore the impact of structures such as buildings and fences as it is precisely these type of structures that the SBO is seeking to protect by triggering a permit requirement. The Panel agrees that the design of any new structures should take into account overland flood paths.

The Panel notes that the source of flooding is not always intuitive in this type of flood modelling. It may result from drain overflow or by overtopping of kerbs rather than by flowing down a hill from a higher point. The Panel has reviewed the Council response to each of the submissions and accepts the explanations about the source of likely flooding.

In relation to Mr Blainey's property and other properties in James Cook Drive, the Panel notes that the flow paths have likely been altered by buildings on the site, but accepts Council's position that the site may still be inundated and agrees that the lots should be included in the overlay. The Panel however agrees with Mr Blainey that mitigation works in the pipe reserve to the rear of Mr Blainey's property would present an easy and relatively inexpensive way of removing the flood risk. The Panel believes that Council should commit to undertaking these works as soon as practicable and if the works can be undertaken before this Amendment is gazetted, the SBO should be altered accordingly.

(iii) Conclusion

The Panel accepts the Council adopted modelling of overland flow paths as a reasonable basis for the SBO.

4.2 Exclusion of properties with minimal flood impact

(i) The issue

To what extent should properties that are affected only to a small degree or by shallow flows be excluded from the SBO?

(ii) Evidence and submissions

Mr Lister noted:

> *Due to the presence of extensive shallow overland flow in the catchment, Council determined that flood depths less than 0.03 metres (3 centimetres) would not be considered as part of the 1% AEP flood extent (and by extension the proposed Highton SBO) as the flood risk related to these shallow depths is considered to be minimal. Small 'patches' of residual flooding left after the clipping of shallow depths were also removed when the area was less than 100 square metres.*

In response to questions put by the Panel, Mr Lister gave evidence that the approach to removing areas of very shallow inundation is appropriate and consistent with practice in other flood mapping projects undertaken by Council, including the Bridge Street Main Drain and Western Gully Main Drain Flood Study and South East Ocean Grove Study.

Council clarified which properties had been 'clipped' from the overlay. The area clipped is defined as:

- areas where it has been determined that flood depths are less than 0.03 metres, and
- lots where the area of flooding is part of a 'patch' that is less than 100 square metres in total.

The second dot point is an important qualification and it means that some lots may only be affected to a very small extent but the overall area of the 'patch' impacting on the lot is greater than 100 square metres, meaning that the lot is retained in the overlay, despite the small area of direct flooding on the lot.

A number of submitters, including Mr Moore, Mr Bosker and Mr Malone (14 Henderson Drive), submitted that the extent of projected flooding on their properties is very minor, and therefore should be removed from the SBO. Council advised the Panel that in all three of these cases the areas of the 'patches' of remaining flood affected area (greater than 0.03 metres in depth) is greater than 100 square metres and therefore the properties should be retained in the SBO. Council stressed that it was better to err on the conservative side in determining whether properties should be in or out of the SBO.

(iii) Discussion

Council has acknowledged that low risk areas need not be included in the overlay by removing land where flood depths are less than 0.03 metres, or residual flooding affecting less than 100 square metres in total area. The Panel agrees with this approach.

The Panel notes that the approach to excluding properties from flood overlays varies from Council to Council. In Port Phillip for example, Council determined that it would review all properties where the extent of inundation was less than 15 square metres. In the same municipality Melbourne Water argued that a more risk adverse approach should be taken and no exclusions should apply. Other Councils have accepted that where the land levels have been altered, by fill for example, that it will accept exclusion from an overlay.

This inconsistent approach is not helpful. The Panel believes that the following guiding principles should apply to excluding land from a flood overlay:

- any exclusions should be applied consistently in accordance with stated criteria.
- land that is at very low risk of flooding should not be included in the controls where the Council determines that such controls would apply an unnecessary or trivial control.
- it is appropriate to err on the conservative side in a 'line ball' decisions on whether to apply the overlay.

The Panel accepts that Greater Geelong City Council's approach in this case meets these principles and is reasonable. It is noted that a large number of properties have been excluded by removing properties with flood depths of less than 0.03 metres or where flooding affects less than 100 square metres. The Panel accepts that this removes any trivial or unreasonable application of the overlay. The Panel believes that Council has applied a clear set of criteria to those properties to be removed and that the approach is fair and even handed. The Panel was not convinced by other arguments for exemption.

(iv) Conclusions

The Panel concludes that:

- The approach taken by Council to removing properties from the SBO is appropriate.
- Application of the SBO to all other properties that do not meet these criteria is supported.

4.3 Property values and insurance premiums

(i) The issue

A number of submitters raised concerns about how the SBO would affect property values and insurance premiums.

(ii) Submissions

Most submitters understood that the application of the SBO would not prevent future development of land but that the overlay may generate the need to apply for a planning permit for subdivision, buildings and works. Several submitters raised concerns about the possible impact of the overlay on the value of their property when and if they come to sell it. Submitters at the hearing, when questioned by the Panel on what impact the overlay would have on them personally, mentioned property values and some also mentioned likely increase in insurance premiums.

Mr Blainey submitted that he had his house on the market recently and he believed that a number of prospective purchasers had been turned away when they were informed of Council's intention to apply the SBO.

Council submitted that no evidence had been provided of impacts on property values or increased insurance premiums, and argued that the clearer definition of the area affected by flooding will help prospective purchasers more accurately assess the flood risk on any lot.

(iii) Discussion

Several Planning Panels have considered the issue of property values previously.

The Planning Panel in relation to Amendment C18 to the Stonnington Planning Scheme concluded that:

> *Panels have consistently found that there is no justification for setting aside of any SBO amendment on the basis of requests for compensation, loss of property value, and possible increase in insurance premiums.*

The Panel in relation to Amendment C50 to the Moreland Planning Scheme stated that:

> *The value of any property is determined by the complex interplay of many different factors such as overall economic conditions, public economic policies, location, streetscape and amenity, and it is difficult to assign what effect, if any, the identification of land as liable to overland flows may have on the value of a property. This view consistent with the conclusions of the Panels for Amendment C3 to the Yarra Planning Scheme and Amendment C18 to the Stonnington Planning Scheme. These Panels generally found no correlation between the application of the SBO and property values.*

Melbourne Water also reported that the Stonnington City Council commissioned Charter Keck Kramer to review the effects on property prices of the application of the SBO. Charter Keck Kramer examined property prices in the City of Port Phillip and found no correlation.

There is, in any case, a long held view in case law that property devaluation is not a valid planning consideration. Planning Panels and Responsible Authorities have long relied upon several cases as a basis for finding that clause 10.04 Integrated decision making and 'net community benefit' is the core consideration for Amendments.

This Panel is satisfied that property value conclusions by previous Panels should be similarly applied to this Amendment. No evidence was provided to the contrary in submissions to this Amendment.

In relation to insurance premiums, the impact has been consistently dismissed as a relevant issue by previous Planning Panels. There was a significant discussion on this topic in Amendment Bayside C1. Both the Council and Melbourne Water put the following to this Panel:

> *This is not a relevant consideration in the determination of whether a development overlay should apply. Insurance contracts have always imposed an obligation of disclosure on policy holders. The application of an SBO does not cause or change the likelihood of flooding, but recognizes the existing condition of land. Insurance companies would continue to calculate their premiums on the basis of what is known, and the properties identified in the overlay would still be subject to flooding in a 1 in 100 year rain event. The Insurance Council of Australia has advised Melbourne Water that most insurance policies that provide coverage for storm damage, include cover for damages resulting from overland flows. However this would need to be confirmed by the household's individual insurer.*

The Banyule C1 Panel agreed with these points and added:

> *The Panel agrees that [the impact on insurance] is not a matter which should affect the imposition of the overlay. Such a position, if accepted, may also affect the imposition of other overlays such as the Wildfire Management Overlay. The inclusion of the overlay in the scheme represents an important piece of information for property owners and potential purchasers and developers.*

This Panel is satisfied that insurance premium conclusions by previous Panels should be similarly applied to this Amendment. No evidence was provided to the contrary in submissions to this Amendment.

(iv) Conclusions

The Panel concludes that:

- No evidence was provided to the Panel to support claims of impacts on property values or insurance premiums
- In any case these are not matters that should impact the decision to apply the overlay.

4.4 Recommendations

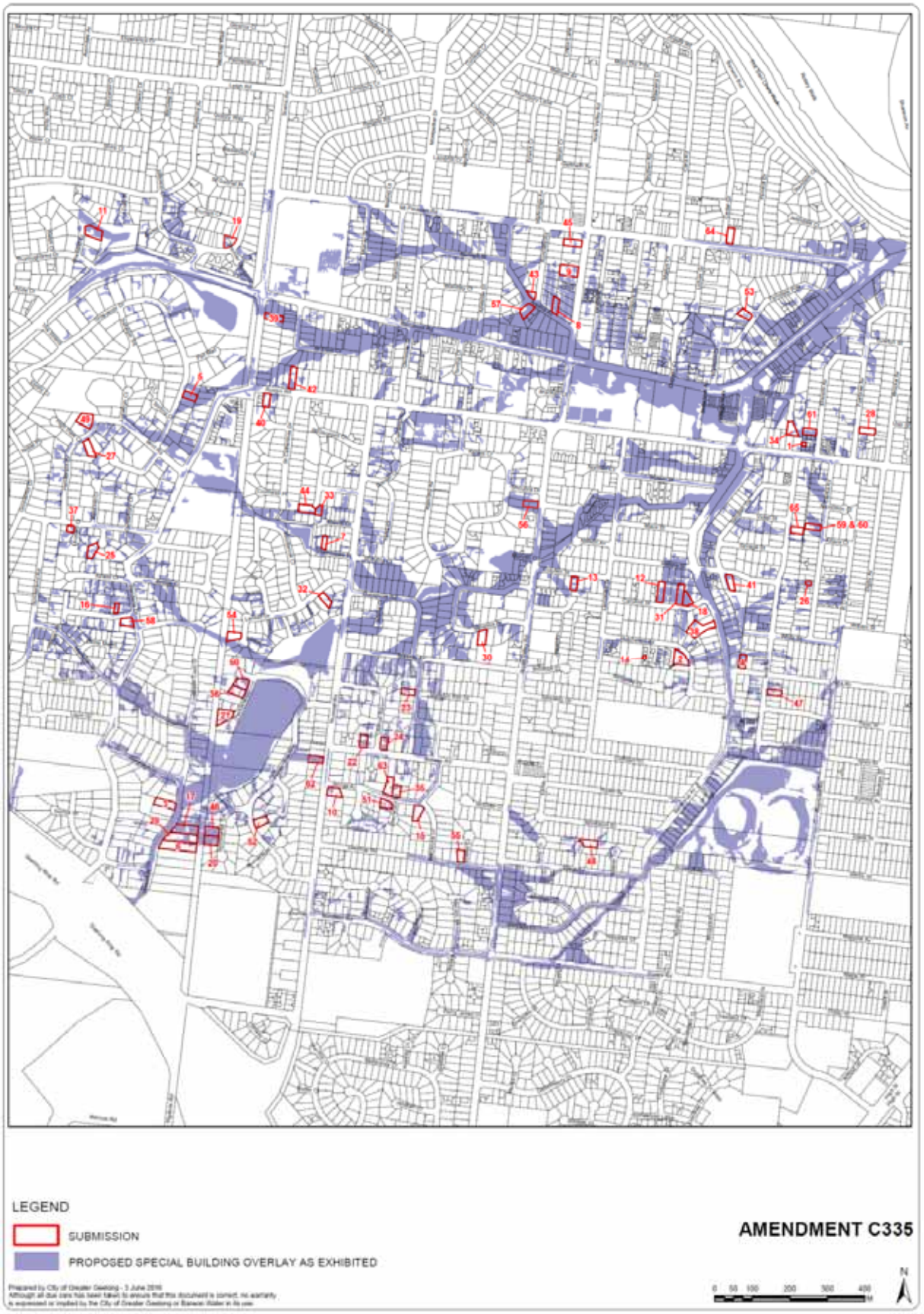
The Panel recommends that Amendment C335 to the Greater Geelong Planning Scheme be adopted as exhibited subject to the removal of the areas as shown in Appendix C of this report.

Appendix A List of submitters

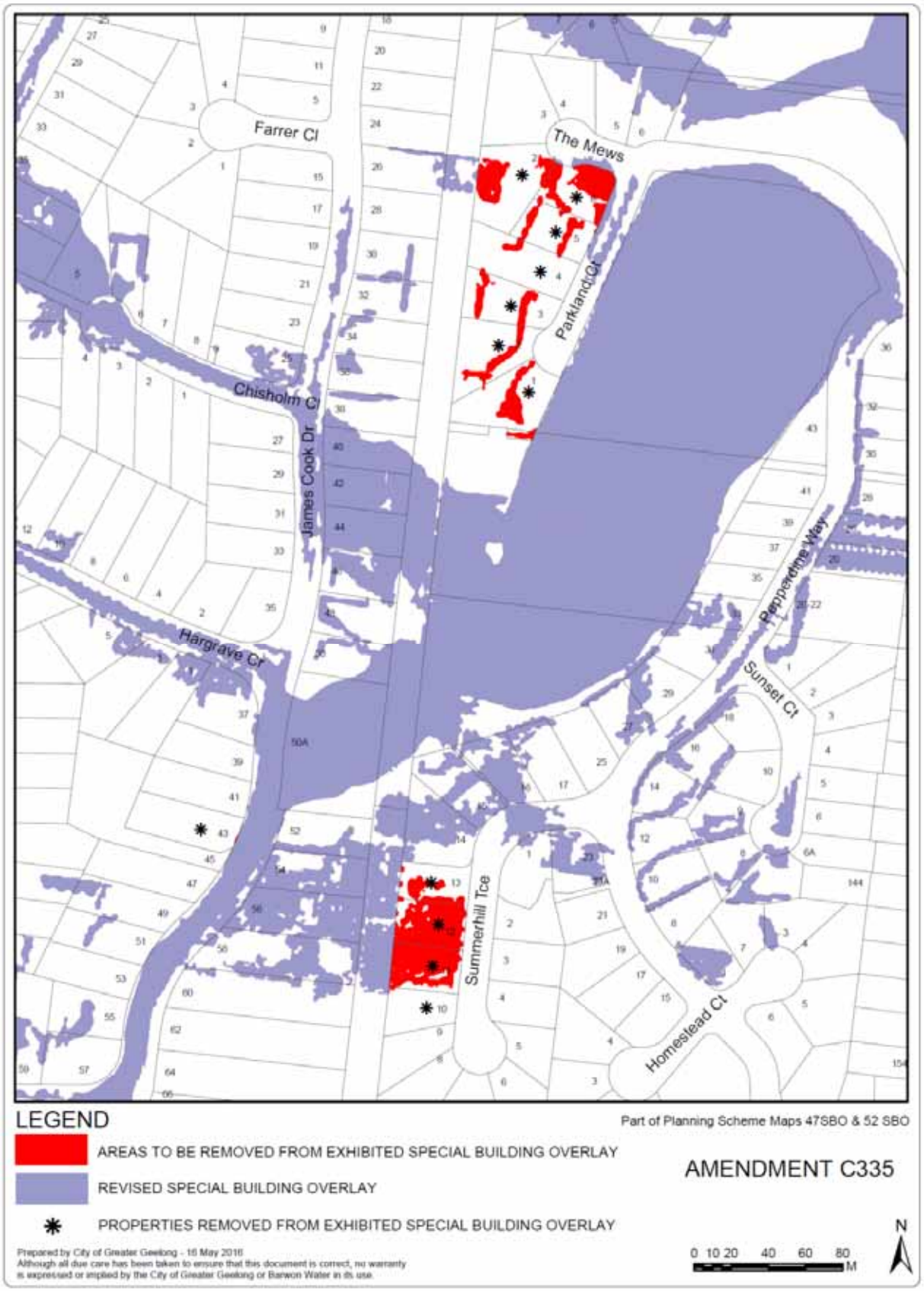
No.	Submitter
1	Georgina Alford
2	Christine Alsop
3	Manuel Alves
4	Susan and Anthony Baulch
5	Andrew Beechey
6	Ellis Blainey
7	Josh Bosker
8	Richard Briggs
9	Nicholas Carr
10	Robin Cawsey
11	David Collier
12	Daryl Cox
13	Violet Dandy
14	Catherine De Leur
15	Philip Dias
16	Robert Gilmour
17	Derek Griffin
18	Peter and Sally Hill
19	Warren and Edith Hobbs
20	Greg Hogan
21	Maureen Jacobson
22	Felicity Johnson
23	Robert Kovacic
23	Graham Lewis
24	David Lindsay
25	Neil Lofts
26	Peter Malone
27	Sophodes and Olga Mantzaridis
28	Loraine McBride
29	Ross McBride
30	Robert and Sally McDonald

No.	Submitter
31	Peter McGregor
32	Grace McKenzie
33	Nick Milanovic
34	Donald Moore
35	Peter Nice
36	Dianne Osborn
37	Andrew and Joanna Owen
38	David Peart
39	Karen Pitfield
40	Isobel Pretlove
41	Douglas Rennie
42	Geoff Rivett and Colin and Dorothy Robertson
43	Colin Robertson
44	Timothy and Carol Sanders
45	Jared Scott
46	Amy and Luke Sier
47	Bernard Smith
48	Lane Smith
49	Santina Spanninga
50	Laurence Michael and Hazel Anne Staynes
51	Karen Sunderland
52	Sandra Thompson
53	Mary Tresidder
54	Peter van Elden
55	Vicki Vandenbroucke
56	Caroline and Jozef Vass
57	Jeffrey Woodhouse
58	Ken Wilson
59	Mick & Beverley Wray
60	Paula Wray
61	Lloyd Yates
62	Zili Zhang

Appendix B Proposed Special Building Overlay map


LEGEND
SUBMISSION
PROPOSED SPECIAL BUILDING OVERLAY AS EXHIBITED
AMENDMENT C335
N

Appendix C Council proposed changes to the Special Building Overlay


Farrer Cl
The Mews
Parkland Ct
Chisholm Ct
James Cook Dr
Hargrave Cr
Peppermint Way
Sunset Ct
Summerhill Tce
Homestead Ct
LEGEND
Part of Planning Scheme Maps 47SBO & 52 SBO
AREAS TO BE REMOVED FROM EXHIBITED SPECIAL BUILDING OVERLAY
REVISED SPECIAL BUILDING OVERLAY
PROPERTIES REMOVED FROM EXHIBITED SPECIAL BUILDING OVERLAY
AMENDMENT C335
Prepared by City of Greater Geelong - 16 May 2016
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